

SAAB V4

SERVICE MANUAL



M 1967-1979

SERVICE MANUAL



SAAB 95, 96 AND
MONTE CARLO
MODEL 1967-1979

Ordering Number 305631

SAAB-SCANIA AKTIEBOLAG
Saab Car Division

NYKÖPING SWEDEN
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SERVICE MANUAL

SAFARI

SAFARI 4600
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SAFARI 4600

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FOREWORD

This Service Manual has been compiled for the use of service shops as an aid to service and repair work which, we hope, will enable all concerned to do a thorough and successful job. The recommendations and directions contained in this Manual are based on experience gained up to date. As fresh experience becomes available, the relevant information will be passed on to Saab general agents and authorized service shops in the form of "Service Informations" (SI). Service Informations should be filed in a special binder.

Like the Spare Parts Catalogue, the Service Manual is arranged in sections according to the same system as used in the Repair Catalogue issued by the Swedish Automobile Servicing and Retailing Employers' Association.

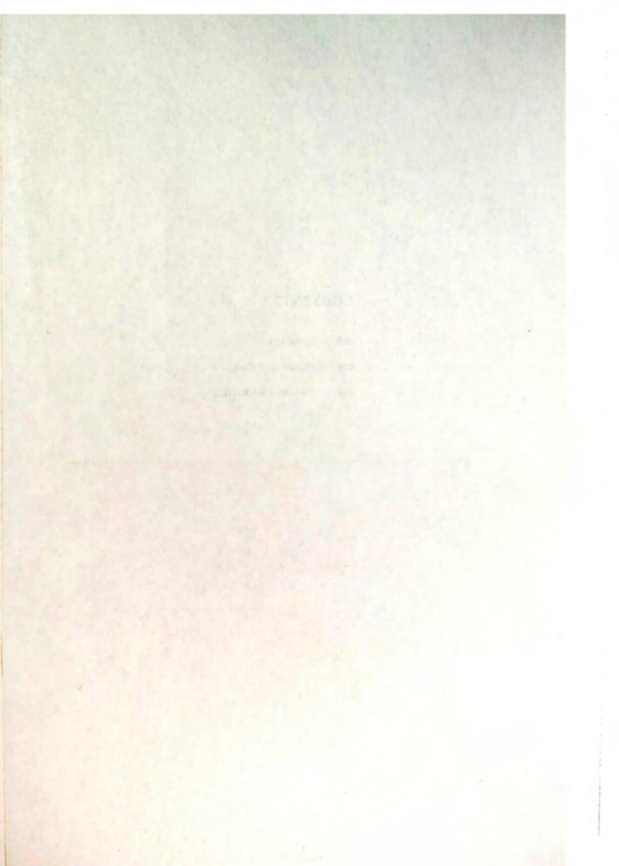
Each section begins with a brief design description followed by detailed descriptions of the service work relevant to that section.

Technical data such as dimensions, tolerances, tightening torques, etc. are listed in group 0.

SAAB-SCANIA AKTIEBOLAG
Saab Car Division
NYKÖPING
SWEDEN

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EXTERIOR, SAAB 96 GL

GENERAL

CHASSIS AND ENGINE NUMBERS

The illustrations below show the locations of the chassis and engine numbers. To ensure correct identification in the case of a particular car or engine, these numbers, together with the mileage, must always be quoted in warranty claims, etc. If a exchange engine is fitted in a car, the number of the original engine must, without fail, be stamped in the appropriate place. This is of the utmost importance if customs difficulties are to be avoided in the event that the car is subsequently used in a country other than that of registration.

CHASSIS NUMBERS, AS FROM MODEL 1972

As from model 1972, the chassis number consists of eleven digits. Explanation of the digits is shown in the following example:

| | | | | |
|---|-------|-------|-------|---------|
| | 96 | 72 | 2 | 000 001 |
| Car type | _____ | _____ | _____ | _____ |
| Year of model | _____ | _____ | _____ | _____ |
| Place of manufacture | _____ | _____ | _____ | _____ |
| 2 = Trollhättan | | | | |
| 3 = Arlöv | | | | |
| 6 = Nystad (Finland) | | | | |
| Serial number. Each model year begins with 000 001. | | | | |

Cars made in Trollhättan

Saab 95

| | |
|------------|---------------------------|
| Model 1967 | 42001 — 50197 |
| Model 1968 | 52001 — 62059 |
| Model 1969 | 65001 — 74968 |
| Model 1970 | 80001 — 88371 |
| Model 1971 | 95095001 — 95102180 |
| Model 1972 | 95722000001 — 95722008323 |
| Model 1973 | 95732000001 — 95732007767 |
| Model 1974 | 95742000001 — 95742006620 |
| Model 1975 | 95752000001 — 95752002048 |

Saab 96

| | |
|-------------|---------------------------|
| Model 1967 | 420001 — 458526 |
| Model 1968 | 470001 — 507018 |
| Model 1969 | 520001 — 552859 |
| Model 1970 | 560001 — 592844 |
| Model 1971 | 96600001 — 96627413 |
| Model 1972 | 96722000001 — 96722021567 |
| Model 1973 | 96732000001 — 96732023028 |
| Model 1974 | 96742000001 — 96742017275 |
| Model 1975 | 96752000001 — 96752015165 |
| Model 1975B | 96752060001 — 96752064517 |
| Model 1976 | 96762000001 — 96762011756 |
| Model 1977 | 96772000001 — 96772000439 |

Cars made in Arlöv

Saab 95

| | |
|-------------|---------------------------|
| Model 1975 | 95753000001 — 95753003018 |
| Model 1975B | 95753060001 — 95753061838 |
| Model 1976 | 95763000001 — 95763003838 |
| Model 1977 | 95773000001 — 95773001668 |
| Model 1977B | 95773002001 — 95773003140 |
| Model 1978 | 95783000001 — 95783001474 |

Saab 96

| | |
|-------------|---------------------------|
| Model 1975B | 96753060001 — 96753060550 |
| Model 1976 | 96763000001 — 96763001222 |
| Model 1977 | 96773000001 — 96773004539 |
| Model 1977B | 96773006001 — 96773009922 |
| Model 1978 | 96783000001 — 96783004536 |

Cars made in Nystad (Finland)

Saab 95

| | |
|------------|---------------------------|
| Model 1970 | 50600001 — 50600838 |
| Model 1971 | 51600001 — 51601165 |
| Model 1972 | 95726000001 — 95726000119 |
| Model 1973 | 95736000001 — 95736000185 |
| Model 1974 | 95746000001 — 95746000165 |
| Model 1975 | 95756000001 — 95756000281 |
| Model 1976 | 95766000001 — 95766000080 |

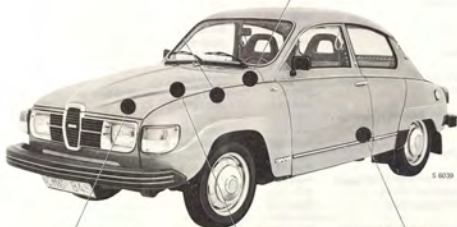
Saab 96

| | |
|-------------|---------------------------|
| Model 1970 | 60600001 — 60601540 |
| Model 1971 | 61600001 — 61602639 |
| Model 1972 | 96726000001 — 96726006009 |
| Model 1973 | 96736000001 — 96736008344 |
| Model 1974 | 96746000001 — 96746005605 |
| Model 1975 | 96756000001 — 96756007419 |
| Model 1976 | 96766000001 — 96766007634 |
| Model 1977 | 96776000001 — 96776003753 |
| Model 1977B | 96776006001 — 96776009247 |
| Model 1978 | 96786000001 — 96786006137 |
| Model 1979 | 96796000001 — |

CAR MANUFACTURED BY
SAAB-SCANIA
 Trollhättan - Sweden
 CAR COLOUR **WT5**

0072001323
SAAB 900

Color code and chassis
 number signs



Engine number



Gearbox number



Chassis number imprinted in car body

GENERAL DATA

Model 1967-1968

| | Saab 95 | Saab 96 | Monte Carlo |
|--|-------------------------------------|--------------------------------------|--------------------------------------|
| Overall length, incl. bumpers | 14 ft. 0 in. (4270 mm) | 13 ft. 8 in. (4170 mm) | 13 ft. 8 in. (4170 mm) |
| Overall width | 5 ft. 2 in. (1580 mm) | 5 ft. 2 in. (1580 mm) | 5 ft. 2 in. (1580 mm) |
| Overall height (unladen) | 4 ft. 10 in. (1470 mm) | 4 ft. 10 in. (1470 mm) | 4 ft. 10 in. (1470 mm) |
| Ground clearance (2 people front) | 5.1 in. (130 mm) | 5.1 in. (130 mm) | 5.1 in. (130 mm) |
| Track, front and rear | 4 ft. 0 in. (1220 mm) | 4 ft. 0 in. (1220 mm) | 4 ft. 0 in. (1220 mm) |
| Wheelbase | 8 ft. 2 in. (2498 mm) | 8 ft. 2 in. (2498 mm) | 8 ft. 2 in. (2498 mm) |
| Turning radius | 17 ft. 5 in. (5.3 m) | 17 ft. 5 in. (5.3 m) | 17 ft. 5 in. (5.3 m) |
| Empty weight, incl. fuel, coolant, tools and spare wheel | 2080 lb. (945 kg) | 1940 lb. (880 kg) | 2000 lb. (910 kg) |
| Total weight, incl. permissible passengers and luggage | 3370 lb. (1530 kg) | 2880 lb. (1300 kg) | 2880 lb. (1300 kg) |
| Weight distribution: | | | |
| Empty | Front 57 % | Front 62 % | Front 61 % |
| Fully laden, incl. passengers and luggage | Front 44 % | Front 52 % | Front 51 % |
| Number of seats (incl. driver) | 7 | 5 | 2 + 2 |
| Available load luggage space | 39 cu. ft. (1.1 m ³) | 13 cu. ft. (0.37 m ³) | 13 cu. ft. (0.37 m ³) |
| Loading area with driver + 4 passengers | 39.4 x 37.4 in. (1000 x 950 mm) | 39.4 x 37.4 in. (1000 x 950 mm) | 39.4 x 37.4 in. (1000 x 950 mm) |
| Loading area with driver + 1 passenger | 63 x 37.4 in. (1600 x 950 mm) | — | — |
| Trunk height | 31.4 in. (800 mm) | 18.1 in. (460 mm) | 18.1 in. (460 mm) |

Model 1969

| | Saab 95 | Saab 96 |
|---|-------------------------------------|--------------------------------------|
| Overall length, incl. bumpers | 14 ft. 1 in. (4300 mm) | 13 ft. 9 in. (4200 mm) |
| Overall width | 5 ft. 2 in. (1580 mm) | 5 ft. 2 in. (1580 mm) |
| Overall height (unladen) | 4 ft. 10 in. (1470 mm) | 4 ft. 10 in. (1470 mm) |
| Ground clearance (2 people front) | 5.1 in. (130 mm) | 5.1 in. (130 mm) |
| Track, front and rear | 4 ft. 0 in. (1220 mm) | 4 ft. 0 in. (1220 mm) |
| Wheelbase | 8 ft. 2 in. (2498 mm) | 8 ft. 2 in. (2498 mm) |
| Turning radius | 17 ft. 9 in. (5.4 m) | 17 ft. 9 in. (5.4 m) |
| Empty weight, incl. fuel, coolant, tools and spare wheel | 2160 lb. (980 kg) | 2000 lb. (910 kg) |
| Total weight, incl. permissible passengers and luggage | 3370 lb. (1530 kg) | 2880 lb. (1300 kg) |
| Weight distribution: | | |
| Empty | Front 57 % | Front 62 % |
| Fully laden, incl. passengers and luggage | Front 44 % | Front 52 % |
| Number of seats (incl. driver) | 7 | 5 |
| Available load luggage space | 39 cu. ft. (1.1 m ³) | 13 cu. ft. (0.37 m ³) |
| Loading area with driver + 4 passengers | 39.4 x 37.4 in. (1000 x 950 mm) | 39.4 x 37.4 in. (1000 x 950 mm) |
| Loading area with driver + 1 passenger | 63 x 37.4 in. (1600 x 950 mm) | |
| Trunk height | 31.4 in. (800 mm) | 18.1 in. (460 mm) |

Model 1970

| | Saab 95 | Saab 96 |
|---|-------------------------------------|--------------------------------------|
| Overall length, incl. bumpers | 14 ft. 1 in. (4300 mm) | 13 ft. 9 in. (4200 mm) |
| Overall width | 5 ft. 2 in. (1580 mm) | 5 ft. 2 in. (1580 mm) |
| Overall height (unladen) | 4 ft. 10.5 in. (1490 mm) | 4 ft. 10 in. (1470 mm) |
| Ground clearance (2 people front) | 5.1 in. (130 mm) | 5.1 in. (130 mm) |
| Track, front and rear | 4 ft. 0 in. (1220 mm) | 4 ft. 0 in. (1220 mm) |
| Wheelbase | 8 ft. 2 in. (2498 mm) | 8 ft. 2 in. (2498 mm) |
| Turning radius | 17 ft. 6 in. (5.4 m) | 17 ft. 6 in. (5.4 m) |
| Empty weight, incl. fuel, coolant, tools and spare wheel | 2150 lb. (975 kg) | 2000 lb. (905 kg) |
| Total weight, incl. permissible passengers and luggage | 3395 lb. (1540 kg) | 2990 lb. (1350 kg) |
| Weight distribution: | | |
| Curb weight incl. driver | Front 58 % | Front 62 % |
| Total weight | Front 45 % | Front 51 % |
| Max. roof load | 220 lb. (100 kg) | 220 lb. (100 kg) |
| Max. trailer weight | 2000 lb. (910 kg) | 2000 lb. (910 kg) |
| Number of seats (incl. driver) | 7 | 5 |
| Available load luggage space | 39 cu. ft. (1.1 m ³) | 13 cu. ft. (0.37 m ³) |
| Loading area with driver + 4 passengers | 39.4 x 37.4 in. (1000 x 950 mm) | 39.4 x 37.4 in. (1000 x 950 mm) |
| Loading area with driver + 1 passenger | 63 x 37.4 in. (1600 x 950 mm) | 60.5 x 37.4 in. (1540 x 950 mm) |
| Trunk height | 31.4 in. (800 mm) | 18.1 in. (460 mm) |

Model 1971

| | Saab 95 | Saab 96 |
|--|-------------------------------------|--------------------------------------|
| Overall length, incl. bumpers | 14 ft. 1 in. (4300 mm) | 13 ft. 9 in. (4200 mm) |
| Overall width | 5 ft. 2 in. (1580 mm) | 5 ft. 2 in. (1580 mm) |
| Overall height (unladen) | 4 ft. 10.5 in. (1490 mm) | 4 ft. 10 in. (1470 mm) |
| Ground clearance (2 people front) | 5.1 in. (130 mm) | 5.1 in. (130 mm) |
| Track, front and rear | 4 ft. 0 in. (1220 mm) | 4 ft. 0 in. (1220 mm) |
| Wheelbase | 8 ft. 2 in. (2498 mm) | 8 ft. 2 in. (2498 mm) |
| Turning radius | 17 ft. 6 in. (5.4 m) | 17 ft. 6 in. (5.4 m) |
| Empty weight, incl. fuel, coolant, tools and spare wheel | 2200 lb. (1000 kg) | 2020 lb. (920 kg) |
| Total weight, incl. permissible passengers and luggage | 3395 lb. (1540 kg) | 2990 lb. (1350 kg) |
| Weight distribution: | | |
| Curb weight incl. driver | Front 58 % | Front 62 % |
| Total weight | Front 46 % | Front 52 % |
| Max. roof load | 220 lb. (100 kg) | 220 lb. (100 kg) |
| Max. trailer weight | 2000 lb. (910 kg) | 2000 lb. (910 kg) |
| Number of seats (incl. driver) | 7 | 5 |
| Available load luggage space | 39 cu. ft. (1.1 m ³) | 13 cu. ft. (0.37 m ³) |
| Loading area with driver + 4 passengers | 39.4 x 37.4 in. (1000 x 950 mm) | 39.4 x 37.4 in. (1000 x 950 mm) |
| Loading area with driver + 1 passenger | 63 x 37.4 in. (1600 x 950 mm) | 60.5 x 37.4 in. (1540 x 950 mm) |
| Trunk height | 31.4 in. (800 mm) | 18.1 in. (460 mm) |

Model 1972

| | Saab 95 | Saab 96 |
|--|-------------------------------------|--------------------------------------|
| Overall length, incl. bumpers | 14 ft. 1 in. (4300 mm) | 13 ft. 9 in. (4200 mm) |
| Overall width | 5 ft. 2 in. (1590 mm) | 5 ft. 2 in. (1590 mm) |
| Overall height (unladen) | 4 ft. 10.5 in. (1490 mm) | 4 ft. 10 in. (1470 mm) |
| Ground clearance (2 people front) | 5.1 in. (130 mm) | 5.1 in. (130 mm) |
| Track, front and rear | 4 ft. 0 in. (1220 mm) | 4 ft. 0 in. (1220 mm) |
| Wheelbase | 8 ft. 2 in. (2498 mm) | 8 ft. 2 in. (2498 mm) |
| Turning radius | 17 ft. 6 in. (5.4 m) | 17 ft. 6 in. (5.4 m) |
| Empty weight, incl. fuel, coolant, tools and spare wheel | 2180 lb. (990 kg) | 2020 lb. (920 kg) |
| Total weight, incl. permissible passengers and luggage | 3395 lb. (1540 kg) | 2980 lb. (1350 kg) |
| Weight distribution: | | |
| Curb weight incl. driver | Front 58-59 % | Front 62-63 % |
| Total weight | Front 46-47 % | Front 52-53 % |
| Max. roof load | 220 lb. (100 kg) | 220 lb. (100 kg) |
| Max. trailer weight | 2000 lb. (910 kg) | 2000 lb. (910 kg) |
| USA weights: | | |
| Curb weight: | | |
| Without air conditioning | 2180 lb. (990 kg) | 2030 lb. (920 kg) |
| With air conditioning | 2250 lb. (1020 kg) | 2100 lb. (950 kg) |
| Gross vehicle weight rating | 3300 lb. (1495 kg) | 2950 lb. (1335 kg) |
| Gross axle weight rating: | | |
| Front axle | 1590 lb. (720 kg) | 1590 lb. (720 kg) |
| Rear axle | 1770 lb. (800 kg) | 1540 lb. (700 kg) |
| Vehicle capacity weight: | | |
| Without air conditioning | 1050 lb. (475 kg) | 850 lb. (385 kg) |
| With air conditioning | 1050 lb. (475 kg) | 850 lb. (385 kg) |
| Weight distribution by curb weight | Front 58-59 % | Front 62-63 % |
| Weight distribution by gross vehicle weight rating | Front 46-47 % | Front 52-53 % |
| Number of seats (incl. driver) | 7 | 5 |
| Available load luggage space | 39 cu. ft. (1.1 m ³) | 13 cu. ft. (0.37 m ³) |
| Loading area with driver + 4 passengers | 39.4 x 37.4 in. (1000 x 950 mm) | 39.4 x 37.4 in. (1000 x 950 mm) |
| Loading area with driver + 1 passenger | 63 x 37.4 in. (1600 x 950 mm) | 60.5 x 37.4 in. (1540 x 950 mm) |
| Trunk height | 31.4 in. (800 mm) | 18.1 in. (460 mm) |

Model 1973-1974

| | Saab 95 | Saab 96 |
|--|--|--|
| Overall length, incl. bumpers | 14 ft. 1 in. (4300 mm) | 13 ft. 9 in. (4200 mm) |
| | USA cars: 14 ft. 3 in. (4350 mm) | USA cars: 14 ft. 1 in. (4250 mm) |
| Overall width | 5 ft. 2 in. (1590 mm) | 5 ft. 2 in. (1590 mm) |
| Overall height (unladen) | 4 ft. 10.5 in. (1490 mm) | 4 ft. 10 in. (1470 mm) |
| Ground clearance (2 people front) | 5.1 in. (130 mm) | 5.1 in. (130 mm) |
| Track, front and rear | 4 ft. 0 in. (1220 mm) | 4 ft. 0 in. (1220 mm) |
| Wheelbase | 8 ft. 2 in. (2498 mm) | 8 ft. 2 in. (2498 mm) |
| Turning radius | 17 ft. 6 in. (5.4 m) | 17 ft. 6 in. (5.4 m) |
| Empty weight, incl. fuel, coolant, tools and spare wheel | 2135 lb. (970 kg) | 2000 lb. (910 kg) |
| Total weight, incl. permissible passengers and luggage | 3395 lb. (1540 kg) | 2980 lb. (1350 kg) |
| Weight distribution: | | |
| Curb weight incl. driver | Front 58-59 % | Front 62-63 % |
| Total weight | Front 46-47 % | Front 52-53 % |
| Max. roof load | 220 lb. (100 kg) | 220 lb. (100 kg) |
| Max. trailer weight | 2000 lb. (910 kg) | 2000 lb. (910 kg) |
| USA weights: | | |
| Curb weight: | | |
| Without air conditioning | 2180 lb. (990 kg) | 2030 lb. (920 kg) |
| With air conditioning | 2250 lb. (1020 kg) | 2100 lb. (950 kg) |
| Gross vehicle weight rating | 3300 lb. (1495 kg) | 2950 lb. (1335 kg) |
| Gross axle weight rating: | | |
| Front axle | 1590 lb. (720 kg) | 1590 lb. (720 kg) |
| Rear axle | 1770 lb. (800 kg) | 1540 lb. (700 kg) |
| Vehicle capacity weight: | | |
| Without air conditioning | 1050 lb. (475 kg) | 850 lb. (385 kg) |
| With air conditioning | 1050 lb. (475 kg) | 850 lb. (385 kg) |
| Weight distribution by curb weight | Front 58-59 % | Front 62-63 % |
| Weight distribution by gross vehicle weight rating | Front 46-47 % | Front 52-53 % |
| Number of seats (incl. driver) | 7 | 5 |
| Available load luggage space | 39 cu. ft. (1.1 m ³) | 13 cu. ft. (0.37 m ³) |
| Loading area with driver + 4 passengers | 39.4 x 37.4 in. (1000 x 950 mm) | 39.4 x 37.4 in. (1000 x 950 mm) |
| Loading area with driver + 1 passenger | 63 x 37.4 in. (1600 x 950 mm) | 60.5 x 37.4 in. (1540 x 950 mm) |
| Trunk height | 31.4 in. (800 mm) | 18.1 in. (460 mm) |

Model 1975

| | Saab 95 | Saab 96 |
|---|-------------------------------------|--------------------------------------|
| Overall length, incl. bumpers | 14 ft. 1 in. (4300 mm) | 13 ft. 9 in. (4200 mm) |
| Overall width | 5 ft. 2 in. (1590 mm) | 5 ft. 2 in. (1590 mm) |
| Overall height (unladen) | 4 ft. 10.5 in. (1490 mm) | 4 ft. 10 in. (1470 mm) |
| Ground clearance (2 people front) | 5.1 in. (130 mm) | 5.1 in. (130 mm) |
| Track, front | 4 ft. 0.3 in. (1228 mm) | 4 ft. 0.3 in. (1228 mm) |
| Track, rear | 4 ft. (1220 mm) | 4 ft. (1220 mm) |
| Wheelbase | 8 ft. 2 in. (2498 mm) | 8 ft. 2 in. (2498 mm) |
| Turning radius | 17 ft. 6 in. (5.6 m) | 17 ft. 6 in. (5.6 m) |
| Empty weight, incl. fuel, coolant, tools and spare wheel | 2135 lb. (980 kg) | 2000 lb. (910 kg) |
| Total weight, incl. permissible passengers and luggage | 3395 lb. (1540 kg) | 2980 lb. (1350 kg) |
| Weight distribution: | | |
| Total weight | Front 46 % | Front 52 % |
| Max. roof load | 220 lb. (100 kg) | 220 lb. (100 kg) |
| Max. trailer weight | 2000 lb. (910 kg) | 2000 lb. (910 kg) |
| Number of seats (incl. driver) | 7 | 5 |
| Available load luggage space | 39 cu. ft. (1.1 m ³) | 13 cu. ft. (0.37 m ³) |
| Loading area with driver + 4 passengers | 39.4 x 37.4 in. (1000 x 950 mm) | 39.4 x 37.4 in. (1000 x 950 mm) |
| Loading area with driver + 1 passenger | 63 x 37.4 in. (1600 x 950 mm) | 60.5 x 37.4 in. (1540 x 950 mm) |
| Trunk height | 31.4 in. (800 mm) | 18.1 in. (460 mm) |

As from model 1976

| | Saab 95 | Saab 96 |
|---|--------------------------------------|--------------------------------------|
| Overall length, incl. bumpers | 14 ft. 5.6 in. (4410 mm) | 14 ft. 1.3 in. (4300 mm) |
| Overall width | 5 ft. 2 in. (1590 mm) | 5 ft. 2 in. (1590 mm) |
| Overall height (unladen) | 4 ft. 10.5 in. (1490 mm) | 4 ft. 10 in. (1470 mm) |
| Ground clearance (2 people front) | 6 in. (150 mm) | 6 in. (150 mm) |
| Track, front | 4 ft. 0.3 in. (1228 mm) | 4 ft. 0.8 in. (1232 mm) |
| Track, rear | 4 ft. (1220 mm) | 4 ft. (1220 mm) |
| Wheelbase | 8 ft. 2 in. (2498 mm) | 8 ft. 2 in. (2498 mm) |
| Turning radius | 17 ft. 6 in. (5.5 m) | 17 ft. 6 in. (5.6 m) |
| Empty weight, incl. fuel, coolant, tools and spare wheel | 2150 lb. (980 kg) | 2050 lb. (930 kg) |
| Total weight, incl. permissible passengers and luggage | 3395 lb. (1540 kg) | 2980 lb. (1350 kg) |
| Weight distribution: | | |
| Total weight | Front 46 % | Front 52 % |
| Max. roof load | 220 lb. (100 kg) | 220 lb. (100 kg) |
| Max. trailer weight | 2200 lb. (1000 kg) | 2200 lb. (1000 kg) |
| Number of seats (incl. driver) | 5 | 5 |
| Available load luggage space | 26 cu. ft. (731 dm ³) | 19 cu. ft. (544 dm ³) |
| Loading area with driver + 4 passengers | 41.1 x 36.6 in. (1045 x 930 mm) | 38.4 x 37 in. (975 x 940 mm) |
| Loading area with driver + 1 passenger | 66 x 36.6 in. (1680 x 930 mm) | 63 x 37 in. (1600 x 940 mm) |
| Trunk height | 35.4 in. (900 mm) | 15.9 in. (405 mm) |

Ground height (meters)

Ground height (meters)

Ground height (meters)

Ground height (meters)

Ground height (meters)

Ground height (meters)

Ground height (meters)

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Ground height (meters)

Ground height (meters)

Ground height (meters)

SPECIFICATIONS

Engine

GENERAL DATA

| | | USA cars, as from model 1971 | As from model 1977 B |
|---|---|---|---|
| Engine type | 4-stroke, 4 cylinders, V4 | 4-stroke, 4 cylinders, V4 | |
| Max. power, DIN | 48 kW (65 bhp) at 4 700 rev/min | 47 kW (65 bhp) at 4 700 rev/min | 50 kW (68 bhp) at 4 700 rev/min |
| Max. torque | 115 Nm (85 ft.lb., 11.7 kpm) at 2 500 rev/min | 115 Nm (85 ft.lb., 11.7 kpm) at 2 500 rev/min | 115 Nm (85 ft.lb., 11.7 kpm) at 3 000 rev/min |
| Compression ratio, nominal | 9.0:1 | 8.0:1 | |
| Number of cylinders | 4 | 4 | |
| Cylinder bore | 3.54 in. (90 mm) | 3.54 in. (90 mm) | |
| Stroke | 2.32 in. (58.86 mm) | 2.63 in. (66.8 mm) | |
| Cylinder volume | 9.14 cu. in. (1 498 cc) | 104 cu. in. (1 698 cc) | |
| Firing order | 1-3-4-2 | 1-3-4-2 | |
| Placement of cylinders (from front of car): | | | |
| Right hand side | 1-2 | 1-2 | |
| Left hand side | 3-4 | 3-4 | |
| Idling speed: | | 900 rev/min | |
| Up to and incl. model 1975 | 800-900 rev/min | | |
| As from model 1976 | 850-900 rev/min | | |
| Weight, incl. electric equipment and carburetor | 265 lb. (120 kg) | 265 lb. (120 kg) | |

CYLINDER BLOCK

| | |
|--|---|
| Type | 60° Vee formation, cylinder block and crankcase casted in one piece |
| Material | Cast iron of a special alloy |
| Number of main bearings | 3 |
| Cylinder block bores for camshaft bushings: | |
| Front | 44.65-44.68 mm |
| Center | 44.27-44.30 mm |
| Rear | 43.89-43.92 mm |
| Cylinder block bores for balance shaft bushings: | |
| Front | 54.420-54.445 mm |
| Rear | 57.620-57.645 mm |
| Cylinder bore: | |
| Standard | 90.030-90.040 mm |
| Oversize 0.02 in. (0.5 mm) | 90.530-90.540 mm |
| Oversize 0.04 in. (1.0 mm) | 91.030-91.040 mm |
| Diameter main bearing bore | 60.62-60.64 mm |
| Thrust bearing width | 22.61-22.66 mm |

PISTONS

| | |
|---|--|
| | As from engine No. 59835 (USA cars as from No. 53921) |
| Material | Aluminium |
| Number of piston rings, on each piston | 2 compression and 1 oil control ring (tripartite) |
| Permissible difference in weight (piston and connecting rod) in one and the same engine | 0.46 oz. (13 g) |

| | | |
|--|--|----------------|
| Piston ring groove width: | | |
| Upper | 2.030–2.055 mm | |
| Center | 3.030–3.050 mm | |
| Lower | 5.017–5.042 mm | 4.000–4.020 mm |
| Piston diameter: | | |
| (The piston is out-of-round and spherical) | | |
| Standard | 89.978–90.002 mm | |
| Oversize 0.5 | 90.478–90.502 mm | |
| Oversize 1.0 | 90.978–91.002 mm | |
| Piston clearance | 0.0011 in.—0.0024 in. (0.03–0.06 mm) | |
| Piston, removal | From the upper side of the cylinder block | |
| Position of the piston | The jag to be turned forward | |

PISTON RINGS

Upper compression ring (chrome plated)



Lower compression ring



S 1267

Segment
Center spring
Segment } Oil control ring

As from engine No. 59835
(USA cars as from No. 53921)

Upper compression ring

| | |
|---------------------------------|------------------------------|
| Thickness | 1.978–1.990 mm |
| Width | 0.15 in. max. (max. 3.76 mm) |
| Piston ring clearance in groove | 0.0394–0.077 mm |
| Gap in position | 0.250–0.500 mm |

Lower compression ring

| | |
|------------------------------|------------------------------|
| Thickness | 2.978–2.990 mm |
| Width | 0.15 in. max. (max. 3.76 mm) |
| Piston ring play (in groove) | 0.040–0.078 mm |
| Gap in position | 0.250–0.500 mm |

Oil control ring

| | | |
|------------------------------------|----------------|----------------|
| Thickness (total) | 4.839–4.991 mm | 3.824–3.974 mm |
| Width (segment) | 3.430–3.580 mm | |
| Piston ring play in groove (total) | 0.026–0.203 mm | 0.026–0.196 mm |
| Cap in position (segment) | 0.380–1.400 mm | |

CONNECTING RODS

| | |
|--|------------------|
| Bore diameter in the big end | 56.820–56.840 mm |
| Vertical inner diameter of fitted con-rod bearing inserts: | 54.008–54.042 mm |
| Undersize 0.25 | 53.760–53.800 mm |
| Undersize 0.50 | 53.506–53.546 mm |
| Undersize 0.75 | 53.252–53.292 mm |
| Undersize 1.00 | 52.998–53.038 mm |

| | |
|---|------------------|
| Diameter of crank pins: | 53.98–54.00 mm |
| Undersize 0.25 | 53.746–53.736 mm |
| Undersize 0.50 | 53.492–53.482 mm |
| Undersize 0.75 | 53.238–53.228 mm |
| Undersize 1.00 | 52.984–52.974 mm |
| Clearance between bearing insert and crank pin: | |
| Standard | 0.014–0.054 mm |
| Undersize | 0.014–0.064 mm |

CRANKSHAFT

| | |
|---|---------------------|
| Crank pin diameter | see connecting rods |
| Number of main bearings | 3 |
| Main bearing journal diameter: | 56.980–57.000 mm |
| Undersize 0.25 | 56.746–56.736 mm |
| Undersize 0.50 | 56.492–56.482 mm |
| Undersize 0.75 | 56.238–56.228 mm |
| Undersize 1.00 | 55.984–55.974 mm |
| Vertical inner diameter of fitted main bearing inserts: | 57.008–57.042 mm |
| Undersize 0.25 | 56.760–56.776 mm |
| Undersize 0.50 | 56.506–56.522 mm |
| Undersize 0.75 | 56.252–56.268 mm |
| Undersize 1.00 | 55.998–56.014 mm |
| Clearance between insert and crank pin: | |
| Standard | 0.012–0.048 mm |
| Undersize | 0.014–0.058 mm |
| Thrust journal length (center main bearing) | 26.44–26.39 mm |
| Crankshaft end play | 0.102–0.203 mm |
| Thrust (axial) bearing insert width | 26.29–26.24 mm |

BALANCE SHAFT

| | |
|------------------------------------|----------------|
| Number of bearings | 2 |
| Clearance in bushing: | |
| Front | 0.02–0.08 mm |
| Rear | 0.03–0.07 mm |
| Balance shaft end float | 0.05–0.15 mm |
| Inner diameter of bushings: | |
| Front | 50.85–50.88 mm |
| Rear | 54.03–54.05 mm |
| Bearing diameter of balance shaft: | |
| Front | 50.83–50.80 mm |
| Rear | 54.00–53.98 mm |
| Bachlash, new drive gear | 0.05–0.14 mm |
| Backlash, wearing limit | 0.40 mm |

CAMSHAFT

| | |
|----------------------------------|----------------------|
| Number of bearings | 3 |
| Insert diameter: | |
| Front | 41.516–41.542 mm |
| Center | 41.135–41.161 mm |
| Rear | 40.754–40.780 mm |
| Bearing clearance, all | 0.025–0.077 mm |
| Inner diameter of bushings: | |
| Front | 41.587–41.593 mm |
| Center | 41.186–41.212 mm |
| Rear | 40.805–40.831 mm |
| Camshaft end float | 0.025–0.076 mm |
| Spacer thickness: | |
| Red | 4.064–4.089 mm |
| Blue | 4.089–4.114 mm |
| Camshaft drive | Gear pinion |
| Number of teeth on pinion | 34 |
| Number of teeth on camshaft gear | 68 |
| Backlash, new drive gear | 0.05–0.20 mm |
| Backlash, wearing limit | 0.40 mm |
| Cam lift | 0.256 in. (6.490 mm) |
| Cam heel-to-toe dimension | 34.201–33.998 mm |

VALVE MECHANISM

| | |
|--|--------------------------------|
| Angle of seat (cylinder head) intake and exhaust | 45° |
| Seat width, intake and exhaust | 0.059–0.070 in. (1.5–1.7 mm) |
| Stem diameter: | |
| Intake: | |
| Standard | 8.043–8.025 mm |
| Oversize | 8.243–8.225 mm |
| | 8.443–8.425 mm |
| | 8.643–8.625 mm |
| | 8.843–8.825 mm |
| Exhaust: | |
| Standard | 8.017–7.999 mm |
| Oversize | 8.217–8.199 mm |
| | 8.417–8.399 mm |
| | 8.617–8.599 mm |
| | 8.817–8.799 mm |
| Stem bore in cylinder head intake and exhaust | 8.063–8.088 mm |
| Clearance between stem and guide: | |
| Intake | 0.020–0.063 mm |
| Exhaust | 0.046–0.089 mm |
| Disc diameter: | |
| Intake | 1.46 in. (37 mm) |
| Exhaust | 1.26 in. (32 mm) |
| Valve lift | 0.38 in. (9.7 mm) |
| Valve clearance, cold engine: | |
| Intake | 0.014–0.015 in. (0.30–0.35 mm) |
| Exhaust | 0.015–0.016 in. (0.35–0.40 mm) |

| | Model 1967 | As from model 1968 | Monte Carlo |
|---|--|--|--|
| Free length of springs | 1.78 in. (45.2 mm) | 1.91 in. (48.5 mm) | 1.85 in. (47.0 mm) |
| Fully compressed | 1.13 in. (28.6 mm) | 1.13 in. (28.6 mm) | 1.06 in. (27.0 mm) |
| Load for compression to 1.59 in. (40.26 mm) | 175–211 N (39–47 lbs., 17.8–21.5 kp) | 267–302 N (60–68 lbs., 27.2–30.8 kp) | 265–294 N (59–66 lbs., 27.0–30.0 kp) |
| Valve tappet diameter | 22.202–22.190 mm | | |
| Clearance between tappet and bore | 0.023–0.060 mm | | |

VALVE TIMING

| | |
|-------------------------------|----------------------------------|
| Intake (valve play 0.425 mm) | opens 21° BTDC shuts 82° ATDC |
| Exhaust (valve play 0.425 mm) | opens 63° BTDC shuts 40° ATDC |

LUBRICATION SYSTEM

| | |
|---|---|
| Type | Circulation system lubrication under pressure |
| Pressure lubricated points | Oil pump of rotor type Camshaft, crankshaft, balance shaft, connecting rods, rocker arms |
| Splash lubricated points | Piston pins and cylinder walls |
| Transmission gear, lubrication | Oil spraying |
| Oil filter, type | "Full-flow" type |
| Crankcase ventilation: | |
| Up to and incl. engine No. 16100 | Semi enclosed (From the oil filler cap via crankcase to the air filter) |
| Crankcase ventilation: | |
| As from engine No. 16101 | Totally enclosed (From air filter via crankcase and NOVO-valve to inlet manifold) |
| Oil type: | |
| Engine oil SAE 10 W 30 | |
| alt. SAE 10 W 40 | |
| Winter, constant temperature below -4°F (-20°C) SAE 5 W 20 | Service SE in the API-system or according to Fords spec. |
| Warning! This grade of oil must not be used at temperature above +32°F (0°C). | ESE-M2C-101C |
| Oil pan capacity incl. oil filter | 3.3 U.S. quarts (3.3 liters) |
| Oil pan capacity excl. oil filter | 3.0 U.S. quarts (3 liters) |
| Oil pump relief valve opens at | 47–55.5 lbs./sq.in., 3.3–3.9 bar (kp/cm ²) |
| Oil pressure control light operates at | 4.3–8.5 psi., 0.3–0.6 bar (kp/cm ²) |
| Draining plug, thread | M 14 x 1.5 |
| Oil pump: | |
| Clearance rotor to housing | 0.012 in. (0.3 mm) |
| Clearance rotor to sealing surface | 0.004 in. (0.1 mm) |

WRENCH TORQUES

| | |
|---|---|
| Spark plug | 29–39 Nm (3–4 kpm) |
| Main bearing cap bolts | 98 Nm (10 kpm) |
| Connecting rod nuts | 34 Nm (3.5 kpm) |
| Crankshaft gear bolt | 49 Nm (5.0 kpm) |
| Flywheel retaining bolts, crankshaft | 69 Nm (7.0 kpm) |
| Camshaft thrust plate, block | 20 Nm (2.0 kpm) |
| Bolt – camshaft gear | 49 Nm (5.0 kpm) |
| Cylinder head to block (to be tightened in 3 stages) | 54 Nm (5.5 kpm) 69 Nm (7.0 kpm) 93 Nm (9.5 kpm) |
| Inlet manifold up to and incl. engine No. 91279: | |
| To be tightened in 2 stages: | |
| Stage 1 bolts | 3.9–7.9 Nm (0.4–0.8 kpm) |
| Stage 2 bolts | 22–28 Nm (2.2–2.9 kpm) |
| Stage 1 nuts | 2.9–4.9 Nm (0.3–0.5 kpm) |
| Stage 2 nuts | 15–18 Nm (1.5–1.8 kpm) |
| As from engine No. 91280: | |
| Stage 1 bolts | 3.9–7.9 Nm (0.4–0.8 kpm) |
| Stage 2 bolts | 21–25 Nm (2.1–2.5 kpm) |
| Stage 1 nuts | 3.9–7.9 Nm (0.4–0.8 kpm) |
| Stage 2 nuts | 21–25 Nm (2.1–2.5 kpm) |
| Intermediate plate to block | 20 Nm (2.0 kpm) |
| Transmission cover | 20 Nm (2.0 kpm) |
| Water pump to transmission cover | 10 Nm (1.0 kpm) |
| Pulley to balance shaft | 49 Nm (5.0 kpm) |
| Oil pump to block | 15 Nm (1.5 kpm) |
| Oil pan to block | 4.9 Nm (0.5 kpm) |
| Thermostat housing to induction manifold | 20 Nm (2.0 kpm) |
| Valve cover to cylinder head | 4.9 Nm (0.5 kpm) |
| Rocker shaft bracket | 61 Nm (6.2 kpm) |
| Oil filter half a turn after contact between gasket and engine block. | |

FUEL SYSTEM

Carburetor

| | Model 1967–1968 | Model 1967–1968 | USA-cars |
|----------------------------|--|--|--|
| | Solex 28–32 PDSIT–7 | Solex 32 PDSIT–4 | Model 1967–1968 |
| Type | Automatic | Automatic | Automatic |
| Choke | 125 | 127.5 | 127.5 |
| Main jet | 25.5 | 25.5 | 25.5 |
| Choke tube | 110 | 95 | 100 |
| Emulsion jet | 50 | 50 | 42.5 |
| Idling jet, fuel | 1.5 | 1.5 | 1.5 |
| Idling jet, air (drilling) | 1.5 | 1.5 | 1.5 |
| Float valve | 7.3 gram | 7.3 gram | 7.3 gram |
| Float weight | 50 | 50 | 50 |
| Acceleration jet | 0.6 ± 0.12 cu. in. | 0.6 ± 0.12 cu. in. | 0.6 ± 0.12 cu. in. |
| Acceleration pump capacity | (10 ± 2 cm ³)/10 strokes | (10 ± 2 cm ³)/10 strokes | (10 ± 2 cm ³)/10 strokes |
| | 800–900 rev/min | 800–900 rev/min | 800–900 rev/min |
| Idling speed | | | |
| Fast idling: | | | |
| Stage I | 1 100–1 300 rev/min | 1 100–1 300 rev/min | 1 100–1 300 rev/min |
| Stage II | 1 700–1 900 rev/min | 1 700–1 900 rev/min | 1 700–1 900 rev/min |
| Stage III | 2 700–2 900 rev/min | 2 700–2 900 rev/min | 2 700–2 900 rev/min |
| Float level when idling | Nom. 0.59 ± 0.04 in. (15 ± 1 mm) from gasket level | Nom. 0.59 ± 0.04 in. (15 ± 1 mm) from gasket level | Nom. 0.59 ± 0.04 in. (15 ± 1 mm) from gasket level |

| | | | |
|--|--|--|--|
| | | <u>Model 1969</u> | <u>USA-cars, model 1969</u> |
| Type | | FoMoCo C8GH-9510-G | FoMoCo C8GH-9510-H |
| Choke | | Automatic | Automatic |
| Main jet | | 135 | 135 |
| Float valve | | 2.0 | 2.0 |
| Acceleration pump capacity | | 0.33-0.45 cu. in. (5.5-7.5 cm ³)/10 strokes | 0.33-0.45 cu. in. (5.5-7.5 cm ³)/10 strokes |
| Idling speed | | 800-900 rev/min | 900 rev/min |
| Fast idling, third step | | 1 800-2 000 rev/min | 1 900-2 100 rev/min |
| Float level, fully closed float valve | | 1.08 in. (27.5 mm) | 1.08 ± 0.01 in. (27.5 ± 0.25 mm) |
| Float level, fully open float valve | | 1.34 in. (34.0 mm) | 1.42 ± 0.01 in. (36 ± 0.25 mm) |
| | | | |
| | | <u>Model 1970</u> | <u>USA-cars, model 1970</u> |
| Type | | FoMoCo C8GH-9510-G | FoMoCo 70 TW-9510-AA |
| Choke | | Automatic | Automatic |
| Main jet | | 135 | 135 |
| Float valve | | 2.0 | 2.0 |
| Acceleration pump capacity | | 0.33-0.45 cu. in. (5.5-7.5 cm ³)/10 strokes | 0.33-0.45 cu. in. (5.5-7.5 cm ³)/10 strokes |
| Idling speed | | 800-900 rev/min | 900 rev/min |
| Fast idling speed with headlights lower beam on third step | | 1 800-2 000 rev/min | 1 900-2 100 rev/min |
| Float level, fully closed float valve | | 1.08 in. (27.5 mm) | 1.08 ± 0.01 in. (27.5 ± 0.25 mm) |
| Float level, fully open float valve | | 1.34 in. (34.0 mm) | 1.42 ± 0.01 in. (36 ± 0.25 mm) |
| | | | |
| | | <u>Model 1971-1975</u> | <u>USA-cars, model 1971-1975</u> |
| Type | | FoMoCo 71 TW-9510-JB-JC | FoMoCo 71 TW-9510-LA |
| | | FoMoCo 71 TW-9510-JD | (as from model 1972: |
| | | FoMoCo 72 TF-9510-KGA | FoMoCo 72 TF-9510-KEA |
| | | FoMoCo 73 TF-9510-KEA | FoMoCo 72 TF-9510-KFA) |
| Choke | | Automatic | Automatic |
| Main jet | | 130 | 140 |
| Float valve | | 2.0 | 2.0 |
| Acceleration pump capacity | | 0.27-0.4 cu. in. (4.5-6.5 cm ³)/10 strokes | 0.27-0.4 cu. in. (4.5-6.5 cm ³)/10 strokes |
| Idling speed | | 800-900 rev/min | 900 rev/min |
| Fast idling speed with headlights lower beam on third step | | 1 800-2 000 rev/min | 1 900-2 100 rev/min |
| Float level, fully closed float valve | | 1.08 in. (27.5 mm) | 1.08 ± 0.01 in. (27.5 ± 0.25 mm) |
| Float level, fully open float valve | | 1.34 in. (34.0 mm) | 1.42 ± 0.01 in. (36 ± 0.25 mm) |

| | | |
|---|-----------------------------------|---------------------------------------|
| Type | Model 1976 | Model 1977 |
| Choke | Ford 75 TF-9510-KHA | Ford 77 TF-9510-KDA |
| Main jet | Manual | Manual |
| Float valve | 122 (Sweden and Finland: 125) | 120 |
| Acceleration pump capacity | 2.0 | 2.0 |
| | 0.24-0.30 cu. in. | 0.135-0.256 cu. in. |
| | (4-5 cm ³)/10 strokes | (2.2-4.2 cm ³)/10 strokes |
| Float level | | |
| (Distance between the sealing edge of the carburetor housing and the bottom of the float with the valve closed. The ball in the valve should not be pressed in.) | 1.22 ± 0.04 in. (31 ± 1 mm) | 1.22 ± 0.04 in. (31 ± 1 mm) |
| Choke valve settings | | |
| (Maximum opening of valve when choke lever turned against stop.) | 0.15 in. (3.8 mm) | 0.15 in. (3.8 mm) |
| Idling speed | 850-900 rev/min | 850-900 rev/min |
| CO-setting (idling speed) | 0.5-1.0 % | 0.5-1.0 % |
| Fast idling setting | 1 500 rev/min | 1 500 rev/min |
| (Warm engine. The choke valve is held fully open while the choke lever is turned into the position where the choke valve starts to close. Blank off the overrun valve hose and disconnect the vacuum hose from the distributor to prevent these functions affecting the fast-idling speed.) | | |
| Retardation time of the overrun valve from 3 000 rev/min to idling speed | | 4-5 sec. |

| | | |
|----------------------------------|--|------------------------|
| | As from chassis | |
| | No. 96786003932 | |
| Carburetor | Solex 32/32 TDID | |
| Ford designation: | 79 TF 9510-LA | |
| | <u>Primary stage</u> | <u>Secondary stage</u> |
| Main jet | x 122.5 | x 130 |
| Air jet, main system | 130 | 135 |
| Transition jet | — | 60 |
| Air jet, transition system | — | 120 |
| Idling jet | 42.5 | |
| Acceleration jet | 45 | |
| Booster valve | 60 | |
| Fast idling speed | 3 500-3 700 rev/min | |
| Idling speed | 850-900 rev/min | |
| CO-content | 1 ± 0.5 % | |
| Throttle valve damper delay time | 4-6 seconds from 3 000 rev/min to idling speed | |
| Opening temperature, PVS-valve | approx. 104°C | |

The carburetor jets have been set by the factory to achieve optimum performance and must not be tampered with.

Fuel pump

| | |
|------------------|---|
| Type | Membrane pump driven by eccentric on the camshaft |
| Feeding pressure | 3.4–4.3 lb./sq. in. (0.24–0.30 bar kp/cm ²) at 4 000 crankshaft rev/min |

Fuel tank

| | | |
|----------|---|--|
| Capacity | <u>Up to and incl. model 1970</u> Saab 96 approx. 10.5 U.S. gal. (approx. 40 liters) Saab 95 approx. 11.5 U.S. gal. (approx. 43 liters) | <u>Model 1971–1975</u> Saab 96 approx. 10 U.S. gal. (approx. 38 liters) Saab 95 approx. 11 U.S. gal. (approx. 42 liters) |
| | <u>As from model 1976</u> Saab 95 L and 96 L approx. 10 U.S. gal. (approx. 38 liters) | |

Fuel transmitter:

| | |
|--|----------------|
| Type designation Saab 95 up to chassis No. 57.023 | Veglia 67–8011 |
| Type designation Saab 95 as from chassis No. 57.024, up to and incl. model 1975 | VDO 38/20 |
| Type designation Saab 96 up to chassis No. 475.599 | VDO 20.228 |
| Type designation Saab 96 as from chassis No. 475.600 and as from model 1976 also Saab 95 | VDO 38/228 |

Air pre-heating

The air cleaner snorkel has due to temperature condition two different positions "Summer" or "Winter" (Position "Winter" at permanent temperature below 50°F (+10°C)).

Position "Summer": The air cleaner snorkel in front of the pre-heater casing.

Position "Winter": The air cleaner snorkel behind the pre-heater casing.

Exhaust system

Exhaust pipe, internal diameter

1.34 in. (34 mm)

COOLING SYSTEM

Type

Capacity incl. heater:

Up to and incl. model 1968

Model 1969–1976

As from model 1977

As from model 1969 USA

Thermostat, opening range:

Engine No. —26418

Engine No. 26419–

Max. opening

Pressure cap opens at:

Up to model 1970 (USA-cars up to model 1969)

As from model 1971 (USA-cars as from model 1970)

Overpressure

7.9 US quarts (7.5 liters)

7.2 US quarts (6.8 liters)

6.1 US quarts (5.8 liters)

7.5 US quarts (7.1 liters)

189°F (87°C)

181°F (83°C)

0.28 in. (7 mm)

2.2–4.3 psi (0.25–0.30 bar, kp/cm²)

7.5–10.3 psi (0.55–0.75 bar, kp/cm²)

Anti-freeze coolant mixture

Maximum anti-freeze and rust protection is obtained at a dosage of 2.5–3 imp.qt. (3–3.5 l), as from model 1977 2–2.5 imp.qt. (2.5–3 l). Saab original anti-freeze should be used all year round and renewed at 2-year intervals. If other anti-freeze qualities are used, they should be changed every year.

Electrical system

BATTERY

Voltage
Capacity

12 V
44 Ah

As from model 1971
(LHD-cars)
12 V
60 Ah

ALTERNATOR

Type, up to and incl. chassis No
95773001663, 96773004488 and
96776001632

Type, as from chassis No.
95773001664, 96773004489 and
96776001633

Rated voltage

Rated speed

Max. permissible continuous load,
up to and incl. chassis No

95773001663, 96773004488 and
96776001632

Max. permissible continuous load,
as from chassis No. 95773001664,

96773004489 and 96776001633

Direction of rotation

Brush-spring pressure

Testing values, see group 3.

Bosch K1 14 V 35 A 20

Bosch K1 14 V 55 A 20
14 V
2 000 rev/min

35 A

55 A
Clockwise and counter-clockwise
2.9–3.9 N (10.5–14 oz., 300–400 p)

CHARGING REGULATOR

Type designation

Bosch AD 1 14 V, not radio suppressed

STARTER MOTOR

Type designation

Number of teeth on pinion

Number of teeth on ring gear

Output

Mechanic testing values:

Brush-spring pressure

Pinion backlash

Distance between pinion and ring gear

Contact reserve

Rotor axial clearance

Rotor brake friction torque

Pinion clearance torque

Electric testing values:

Uncharged

Charged

Locked starter motor

Lowest pull-in voltage for operating
solenoid switch

Model 1967–1968

Bosch EF 12 V 0.8 PS

0 001 208 029

9

138

0.6 kW (0.8 hp)

11.3–12.8 N (40.5–46 oz.,
1 150–1 300 p)

0.0138–0.0236 in. (0.35–0.6 mm)

0.0985–0.118 in. (2.5–3.0 mm)

0.0395 in. (1.0 mm)

0.00197–0.0118 in. (0.05–0.3 mm)

0.25–0.40 Nm (0.181–0.290 ft. lbs.,

2.5–4.0 kpcpm)

0.13–0.18 Nm (0.094–0.130 ft. lbs.,

1.3–1.8 kpcpm)

11.5 V and 30–50 A

6 500–7 700 rev/min

9 V and 170–200 A

1 150–1 450 rev/min

6 V 250–300 A

7.5 V

Model 1969–1974

Bosch GF 12 V 1.0 PS

0 001 311 024

9

138

0.7 kW (1.0 hp)

11.3–12.8 N (40.5–46 oz.,
1 150–1 300 p)

0.0138–0.0236 in. (0.35–0.6 mm)

0.0985–0.118 in. (2.5–3.0 mm)

0.0395 in. (1.0 mm)

0.00197–0.0118 in. (0.05–0.3 mm)

0.25–0.40 Nm (0.181–0.290 ft. lbs.,

2.5–4.0 kpcpm)

0.13–0.18 Nm (0.094–0.130 ft. lbs.,

1.3–1.8 kpcpm)

11.5 V and 35–55 A

6 500–8 500 rev/min

9 V and 205–235 A

1 000–1 300 rev/min

6 V 325–375 A

8 V

Type designation

Model 1975—
Bosch GF 12 V 1, 1 PS
0 001 311 009

Number of teeth on pinion

9

Number of teeth on ring gear

138

Output

0.8 kW (1.1 hp)

Mechanic testing values:

Brush-spring pressure

11.3–12.8 N (40.5–46 oz.,
1 150–1 300 p)

Pinion backlash

0.0138–0.0236 in. (0.35–0.6 mm)

Distance between pinion and ring gear

0.0985–0.118 in. (2.5–3.0 mm)

Contact reserve

0.0395 in. (1.0 mm)

Rotor axial clearance

0.00197–0.0118 in. (0.05–0.3 mm)

Rotor brake friction torque

0.25–0.40 Nm (0.181–0.290 ft. lbs.,
2.5–4.0 kp/cm)

Pinion clearance torque

0.13–0.18 Nm (0.094–0.130 ft. lbs.,
1.3–1.8 kp/cm)

Electrical testing values:

Uncharged

11.5 V and 35–55 A

Charged

6 500–8 500 rev/min

9 V and 205–235 A

1 000–1 300 rev/min

6 V 325–375 A

Locked starter motor

Lowest pull-in voltage for operation

solenoid switch

8 V

IGNITION COIL

Type designation

Bosch K 12

Performances at a primary voltage of 12 V:

4 000 sparks/minute (1 000 distributor
revolutions)

Spark length minimum

0.55 in. (14 mm)

16 000 sparks/minute (4 000 distributor
revolutions)

Spark length minimum

0.24 in. (6 mm)

Primary-winding resistance (between
connections 1 and 15)

3.1–3.6 ohm

IGNITION CABLES

Resistance in spark plug connection
up to engine No. ~ 242000

1 000 ohm \pm 10 %

Resistance in ignition cable and spark
plugs as from engine No. ~ 242000

10 000–23 000 ohm/m (yd)

SPARK PLUGS

| | Up to and incl. engine No. 59835 | As from engine No. 59836 | USA-cars (1.7 l) As from engine No. 24200 |
|-------------------|-------------------------------------|--|---|
| Motorcraft | AE 22 | AGR (resistor) AG 22 | AGR 32 (resistor) AG 32 |
| Bosch | W 225 T35 | W 175 T30 | W 145 T30 |
| Champion | UL 82 Y | N-9Y | N-11Y |
| NGK | B 7 HS | BP 6 ES | BP 6 ES |
| | 0.5 in. (12.7 mm) | 0.7 in. (19 mm) | 0.7 in. (19 mm) |
| Thread | M 14 x 1.25 | M 14 x 1.25 | M 14 x 1.25 |
| Electrode gap | 0.024-0.028 in. (0.6-0.7 mm) | 0.024-0.028 in. (0.6-0.7 mm) | 0.024-0.028 in. (0.6-0.7 mm) |
| | | model 1977: 0.036-0.040 in. (0.9-1.0 mm) | |
| Tightening torque | 22-29 ft.lb. (29-39 Nm) | 22-29 ft.lb. (29-39 Nm) | 22-29 ft.lb. (29-39 Nm) |

DISTRIBUTOR

| | |
|--|---|
| Capacitor, capacity | 0.18-0.22 μ F |
| Basic setting with stroboscope at max. 800 rev/min with disconnected vacuum hoses (1° on the balance shaft pulley corresponds to approx. 0.05 in. (1.2 mm) on the circumference of the pulley) | 6° BTDC (USA-version as from model 1971 3° BTDC) |
| Order of firing, cyl. 1 is the furthestmost R.H. one | 1-3-4-2 |
| Breaker gap | 0.016 in. (0.4 mm) |
| Dwell angle | 50 \pm 3° |
| Direction of rotation | Clockwise |
| Resistance in distributor arm | 3 000 ohm \pm 20 % (as from about engine No. 242000, the resistance in the rotor arm is 5 000 ohm \pm 20 %) |

NOTE! Ignition advance curves, see
group 3.

BULBS

Up to model 1968

| | Effect | Cap | Saab 95 | Qty. Saab 96 | Monte Carlo |
|--|---------|----------|---------|-----------------|-------------|
| Headlights, Sealed Beam | 50/40 W | — | 2 | 2 | 2 |
| Headlights, asymmetric | 45/40 W | P 45 t | 2 | 2 | 2 |
| Parking light and direction indicator light, front | 21/5 W | BAY 15 d | 2 | 2 | 2 |
| Stop light and direction indicator light, rear | 21 W | BA 15 S | 4 | 4 | 4 |
| Tail light | 5 W | BA 15 S | 2 | 2 | 2 |
| Number plate light | 5 W | S 8.5 | 2 | 2 | 2 |
| Back-up light | 21/5 W | BAY 15 d | — | — | 2 |
| Dome light | 5 W | S 8.5 | 2 | 1 | 1 |
| Fog- and spot light | 45 W | BA 20 S | — | — | 2 |
| Temperature- and fuel gauge, speedometer | 2 W | BA 7 S | — | — | 4 |
| Lighting, clock | 4 W | BA 9 S | — | — | 1 |
| Lighting, tachometer | 2 W | BA 9 S | — | — | 1 |
| Control lamps | 2 W | BA 7 S | 9 | 11 | 6 |
| Other instrument lamps | 2 W | BA 9 S | 2 | — | — |
| Trunk light | 4 W | BA 9 S | — | 1 | 1 |

Model 1969—1975

| | | | | | |
|---|---------|----------------|----|----|--|
| Headlights, Sealed Beam | 50/40 W | — | 2 | 2 | |
| Headlights, asymmetric, up to and incl. model 1972 | 45/40 W | P 45 t | 2 | 2 | |
| Headlights, asymmetric, as from model 1973 | 60/55 W | P 43 t/38 | 2 | 2 | |
| Parking light, front | 5 W | BA 15 S | 2 | 2 | |
| Direction indicator light, front | 21 W | BA 15 S | 2 | 2 | |
| Parking and direction indicator lights, front (USA) | 5/21 W | BAY 15 d | 2 | 2 | |
| Direction indicator light, rear | 21 W | BA 15 S | 2 | 2 | |
| Tail light | 5 W | BA 15 S | 2 | 2 | |
| Stop light | 21 W | BA 15 S | 2 | 2 | |
| Number plate light | 5 W | S 8.5 | 3 | 2 | |
| Control- and instrument lamps | 1.2 W | Glass | 11 | 11 | |
| Control lamp, hazard warning signal | 2 W | BA 75 | 1 | 1 | |
| Dome light | 5 W | S 8.5 | 2 | 1 | |
| Trunk light | 4 W | BA 9 S | — | 1 | |
| Back-up light | 21 W | BA 15 S | 2 | — | |
| Side position light (USA) | 4 W | BA 9 S | 2 | — | |
| | | Miniature bulb | | | |
| | | BA 9 S | — | 2 | |
| Lighting tachometer (USA) | 2 W | Miniature bulb | | | |

As from model 1976

| | Effect | Cap | Qty. | |
|---|---------|-----------|---------|---------|
| | | | Saab 95 | Saab 96 |
| Headlights, Sealed beam | 50/40 W | — | 2 | 2 |
| Headlights, asymmetric | 60/55 W | P 43 t/38 | 2 | 2 |
| Parking light, front | 5 W | BA 15 S | 2 | 2 |
| Direction indicator light, front | 21 W | BA 15 S | 2 | 2 |
| Direction indicator light, rear | 21 W | BA 15 S | 2 | 2 |
| Tail light | 5 W | BA 15 S | 2 | 2 |
| Stop light | 21 W | BA 15 S | 2 | 2 |
| Number plate light (Saab 95 L) | 5 W | BA 15 S | 2 | — |
| Number plate light (Saab 96 L) | 5 W | SV 8.5—8 | — | 2 |
| Control- and instrument lamps | 1.2 W | Glass | 7 | 7 |
| Control lamp, seat belt warning indicator lights | 3 W | Glass | 2 | 2 |
| Control lamp, hazard warning signal repeater, high beam, electrically heated rear window, choke and brake | 2 W | BA 7 S | 5 | 5 |
| Dome light | 5 W | SV 8.5—8 | 2 | 1 |
| Trunk light | 4 W | BA 9 S | 1 | 1 |
| Back-up lights | 21 W | BA 15 S | 2 | — |

FUSES

Number

Length x diameter

Glass tube fuse (for headlight wipers), as from model 1971

Up to and incl. model 1975

8 A:12

1 x 0.25" (25 x 6 mm)

3.0 A

As from model 1976

8 A:11, 16 A:1

1 x 0.25" (25 x 6 mm)

3.0 A

FLASHER UNIT

Type designation

Flashing frequency

Up to model 1968

Lucas FL5 12 V 42 W

Hella 91 PSt 2 x 32 Cp 12 V

60—120 impulses/min

As from model 1969

Tungsol 550—12

Hella 91/1 P3V 2 x 21 W—12 V

60—120 impulses/min

HORN

Type designation:

Up to and incl. model 1971

As from model 1972

Hella 831—12 V H and 831—12 V T

Hella 834 alt. R Cajavec' JAS 12/42

HEATER FAN MOTOR

Type designation

Output and speed at free blowing and a voltage of 13 V:

1/2-speed

1/1-speed

Elektrolux KS 3430/221 12 V

rev/min \pm 5 %

2 300

3 500

W \pm 5 %

56

109

WINDSHIELD WIPER MOTOR

Type designation

Up to and incl. model 1969

Lucas DL 3

As from model 1970

Lucas 15 W

Output rev/min and current consumption. Warm motor, loaded with 1 Nm (10 kpcm, 8.7 in.lb.) and tension 13.5 V:

1/2-speed

rev/min

44-48

A

appr. 1.5

1/1-speed

60-70

appr. 2.3

Blocked motor (e.g. frozen wiper blades)

appr. 14

rev/min

49 ± 4

A

appr. 1.6

67 ± 5

appr. 2.5

appr. 14

HEADLIGHT WIPER MOTOR

Type designation

SWF 4E 3876/1

Output rev/min (double strokes/min) and current consumption. Loaded with 0.25 Nm (2.5 kpcm, 2.2 in.lb.) and tension 13 V:

rev/min

46 ± 5

A

1.5-2

Blocked motor (e.g. frozen wiper blades)

5-6

WINDSHIELD WASHER/HEADLIGHT WASHER

Type designation

MEAB (SCHÜRER)

Two jets ø 0.7 mm:

Pressure

1 bar (kp/cm², 14 psi)

Capacity

260 cm³/min

Cars with headlight washers, as from chassis Nos. 95.101.000, 96.622.242 resp. 51601144, 61601459:

Four jets, ø 0.7 mm:

Pressure

1.2 bar (kp/cm², 17 psi)

Capacity

1 000 cm³/min

ELECTRICAL HEATING OF THE DRIVER'S SEAT

Thermostat cut-in temperature

+10°C ± 3.9°C

(+50°F ± 7°F)

Thermostat cut-off temperature

+27°C ± 2.8°C

(+80.5°F ± 5°F)

Heating elements, out-put:

Cold

about 65 W

Warm

about 50 W

ELECTRICAL HEATING OF THE REAR WINDOW

Out-put at 12 V

150 W

Transmission

GEAR BOX

Oil capacity

Type of oil

approx. 1.8 US quarts (approx. 1.7 liters)

EP-oil SAE 80 W (alternatively SAE 75)

according to API GL-4

Gear ratios, total:

1st gear

17.0:1

2nd gear

10.2:1

3rd gear

6.3:1

4th gear

4.1:1

Reverse

15.5:1

Differential gear ratio, pinion/ring gear

4.88:1

Number of teeth, pinion/ring gear

8:39

Road speed in mph at 1 000 rev/min

engine speed:

Tire dimension

5.60 x 15"

5.20 x 15"

155 SR 15

1st gear

4.2 mph

6.8 km/h

4.2 mph

6.7 km/h

4.2 mph

6.7 km/h

2nd gear

7.1 mph

11.4 km/h

7.0 mph

11.2 km/h

6.9 mph

11.2 km/h

3rd gear

11.5 mph

18.5 km/h

11.3 mph

18.2 km/h

11.2 mph

18.0 km/h

4th gear

17.7 mph

28.4 km/h

17.2 mph

27.8 km/h

17.1 mph

27.9 km/h

Reverse

4.7 mph

7.5 km/h

4.7 mph

7.4 km/h

4.5 mph

7.3 km/h

Pinion/ring gear adjustment: specified

dimension ± 0.002 in. (0.005 mm)

Ring gear backlash: specified dimension

± 0.002 in. (0.05 mm)

Matched gear sets:

3rd speed gear and pinion shaft 3rd gear

4th speed gear and pinion shaft 4th gear

Ring gear and pinion shaft

Synchromeshes

Tightening torques

| Bolt joints | Bolts | | Tightening torques | | |
|------------------------------------|--------|-------|--------------------|-----|--------|
| | Quant. | Size | Nm | kpm | ft.lb. |
| Transmission case end cover | 6 | 5/16" | 25 | 2.5 | 18 |
| Differential bearings | 4 | 3/8" | 39 | 4 | 29 |
| Ring gear bolts | 12 | 5/16" | 25 | 2.5 | 18 |
| Pinion shaft nut. First tightening | 1 | 7/8" | 118 | 12 | 87 |
| Then slacken and retighten | | | 59 | 6 | 44 |
| Nut, primary shaft | 1 | 3/4" | 49 | 5 | 36 |
| Nut, countershaft | 1 | 3/4" | 79 | 8 | 60 |

CLUTCH

| | |
|---|--|
| Make | Fichtel & Sachs |
| Type | Single dry plate |
| Clearance, release bearing—clutch measured at the slave cylinder | 0.16 in. (4 mm) |
| Clearance between release plate and flywheel | approx. 1 in. (26 mm) |
| Pressure plate springs: | |
| Length compressed | 0.94 in. (23.9 mm) |
| Tension when compressed | 600–660 N (134–147 lb., 61–67 kp) |
| Dimensions of clutch facing | 5–6.5 in. (127 x 190.5 mm) |
| New clutch disc: | |
| Thickness, unloaded | 0.33 ± 0.04 in. (8.4 ± 0.1 mm) |
| Thickness, loaded with 3 680 N (825 lbs., 375 kp) | 0.28 ± 0.01 in. (7.2 ± 0.3 mm) |
| Max throw clutch disc | The clutch disc should rotate freely when the pressure plate is raised 0.047 in. (1.2 mm) |
| Engagement pressure | 3 340–4 170 N (750–935 lbs., 340–425 kp) |

Clutch operation

Up to model 1968

| | Master cylinder | Slave cylinder |
|---|------------------|------------------------------|
| Make | Girling | Girling |
| Cylinder diameter | 5/8" | 3/4" |
| Max. permissible stroke | 1.38 in. (35 mm) | |
| Hose connection | 3/8" UNF–24 | 3/8" UNF–24 |
| Hose length between master and slave cylinder | | 14 in. (355.6 mm) |
| Distance from clutch pedal foot plate to the lower part of the dash panel (max. pedal stroke) | | approx. 6.3 in. (ca. 160 mm) |
| Clearance, release bearing—clutch measured at the slave cylinder | | 0.16 in. (4 mm) |

As from model 1969

| | Lockheed | Girling |
|---|---------------------|-----------------|
| Make | | 3/4" |
| Cylinder diameter | 5/8" | |
| Stroke | 1.22 in. (31 mm) | |
| Hose connection | 7/16"–20 UNF–28 | 7/16"–20 UNF–28 |
| Hose length between master and slave cylinder | 15.3 in. (388.6 mm) | |
| Distance from clutch—pedal foot plate to the lower part of the dash panel (max. pedal stroke) | 5.1 in. (130 mm) | |
| Clearance, release bearing—clutch measured at the slave cylinder | 0.16 in. (4 mm) | |

Brake system

GENERAL

| | |
|-------------------------------|---|
| Make | Lockheed |
| As from model 1971, LHD-cars: | |
| Master cylinder | ATE |
| Type, front | Disc brake |
| Type, rear | Drum brake |
| Footbrake: | |
| Up to and incl. model 1968 | Hydraulic, diagonal twocircuit type |
| As from model 1969 | Hydraulic, diagonal twocircuit type with vacuum servo ¹⁾ |

1) On RHD cars there are no vacuum servo.

| | | |
|---------------|---|------------------------------|
| Vacuum servo: | | As from model 1971, LHD-cars |
| Make | Model 1969–1970 | Lockheed |
| Type | 4258–193 | ATE |
| Brake fluid | Satisfying the requirements of spec. SAE J 1703 or SAE 70 R3. | |
| Handbrake | Mechanical | |

DIMENSIONS

| | |
|---|---|
| Brake disc: | |
| Diameter | 10 1/2" (266.7 mm) |
| Thickness | 0.375" (9.5 mm) |
| Grinding permitted to min. thickness | 0.355" (9.0 mm) |
| (Max. 0.010"/0.25 mm on each side) | |
| Max. total indicated axial throw | 0.008" (0.2 mm) |
| Brake drum: | |
| Diameter | 8" (203.2 mm) |
| Adjustment machining permitted to max. diameter | 8.06" (204.7 mm) |
| Max. total indicated radial throw | 0.006" (0.15 mm) |
| Brake shoes | 8" x 1 1/2" |
| Offcenter grinding of brake linings | Thickness of rear brake lining: 0.020–0.022 in. (0.50–0.56 mm) less than that of the drum |
| Master cylinder: | |
| Diameter, up to and incl. model 1968 | 3/4" |
| Diameter, as from model 1969 | 13/16" |
| Clearance between master cylinder piston and push-rod | 0.024–0.047" (0.6–1.2 mm) |
| Same clearance at tip of brake pedal | 0.12–0.24" (3–6 mm) |
| Distance from brake pedal footplate to the lower part of the dash panel (max. stroke approx.) | 6.3" (160 mm) |
| Wheel cylinder: | |
| Diameter, front | 2" |
| Diameter, rear: | |
| Saab 96 | 5/8" |
| Saab 95 up to model 1969 | 3/4" |
| Saab 95 as from model 1970 | 5/8" |
| Brake lines | 3/16" Bundy-tube |
| Brake hoses: | |
| Length, front | 8 1/2" |
| Length, rear, Saab 96 | 8 1/2" |
| Saab 95 | 6 1/2" |
| Tightening torques: | |
| Castle nut, front wheel hub | 177 Nm (18 kpm, 130 ft.lb.) |
| Castle nut, rear wheel hub | 88 Nm (9 kpm, 65 ft.lb.) |

Front assembly, steering

WHEEL ALIGNMENT

Front wheel alignment, no load:

"King-pin" inclination

Caster

Camber

Toe-in at wheel rim

Turning angles:

Outside wheels

Inside wheels

Diagonal tires

$7 \pm 1^\circ$

$2 \pm 1/2^\circ$

$3/4 \pm 1/4^\circ$

0.08 ± 0.04 in. (2 ± 1 mm)

20°

$22 \frac{1}{2} \pm 1 \frac{1}{2}^\circ$

Radial tires

$7 \pm 1^\circ$

$2 \pm 1/2^\circ$

$1/3 \pm 1/2^\circ$

0 ± 0.04 in. (0 ± 1 mm)

20°

$22 \frac{1}{2} \pm 1 \frac{1}{2}^\circ$

STEERING GEAR

Steering gear adjustment:

Pinion axial clearance

Radial clearance of rack

Steering ratio, steering wheel/road wheels average

Wheel travel between limit positions

Tie-rod ends:

Distance between wrench flat (end of thread) and lock nut

Up to and incl. model 1968

Max. 0.005 in. (0.12 mm)

Max. 0.012 in. (0.3 mm)

14:1

2 1/4 turns

Max. 1.5 in. (40 mm)

The following is valid for certain cars of model 1968. The distance between end of thread and lock nut must not exceed 1.0 in. (25 mm).

From model 1969

Max. 0.005 in. (0.12 mm)

Max. 0.01 in. (0.25 mm)

15.5:1

2.7 turns

Max. 1.0 in. (25 mm)

Permissible difference between left-hand and right-hand dimension

Max. 0.08 in. (2 mm)

Max. 0.08 in. (2 mm)

TIGHTENING TORQUE

Nut, tie-rod end

39–49 Nm (3.5–5 kpm, 25–36 ft.lb.)

REAR WHEEL ALIGNMENT

Camber

Toe-in (toe-out)

Both wheels together or measured rim-to-rim

Toe-in (toe-out) per wheel must not exceed

Max. difference in wheelbase, left and right (front wheels pointing straight ahead)

$0 \pm 1^\circ$

0 ± 1 mm

0 ± 0.28 in. (7 mm)

$0 \pm 3/4^\circ$

0.6 in. (15 mm)

Suspension, wheels

Suspension, wheels

| | Model 1967 | Model 1969-1970 | Model 1971 | Model 1971 certain export markets |
|---|-----------------------|-------------------------------|-----------------------|---|
| Front coil spring: | | | | |
| Max. spring expansion | 5.5 in. (140 mm) | 5.7 in. (145 mm) | 5.7 in. (145 mm) | 5.7 in. (145 mm) |
| Number of spring coils | 9.5 | 10.5 | 10.5 | 9.75 |
| Length of coil spring | 15.4 in. (391 mm) | 16.0 in. (405 mm) | 16.4 in. (416 mm) | 14.5 in. (368 mm) |
| Wire diameter | 0.46 in. (11.7 mm) | 0.47 in. (12 mm) | 0.47 in. (12 mm) | 0.51 in. (13 mm) |
| Color marking | Yellow | Green | Blue | White |
| | | Model 1972 | | |
| | Model 1972-1975 | certain export markets | As from model 1976 | |
| Max. spring expansion | 5.7 in (145 mm) | 5.7 in=(145 mm) | 5.7 in. (145 mm) | |
| Number of spring coils | 9.5 | 9 | 9.5 | |
| Length of coil spring | 15.0 in. (381 mm) | 14.1 in. (359 mm) | 14.7 in. (374 mm) | |
| Wire diameter | 0.49 in. (12.5 mm) | 0.51 in. (13.0 mm) | 0.49 in. (12.5 mm) | |
| Color marking | Yellow | Brown | Orange | |
| | | Saab 96 | | |
| | | Up to and incl. model 1975 | As from model 1976 | |
| Rear coil spring: | Saab 95 | | | |
| Max. spring expansion | 6.75 in. (170 mm) | 6.75 in. (170 mm) | 6.75 in. (170 mm) | |
| Number of spring coils | 7.5 | 9 | 7.5 | |
| Length of coil spring | 13.5 in. (342 mm) | 13.5 in. (342 mm) | 13.2 in. (336 mm) | |
| Wire diameter | 0.45 in. (11.4 mm) | 0.43 in. (11.0 mm) | 0.43 in. (11.0 mm) | |
| Color marking | White | Yellow | Orange | |
| Front shock absorbers | | | | |
| Type | Telescopic, hydraulic | | | |
| Length | 9 3/4 in. (250 mm) | | | |
| Extended | 15 3/8 in. (390 mm) | | | |
| Stroke, fitted | 3 1/3 in. (85 mm) | | | |
| Rear shock absorbers | Saab 95 | Saab 96 and Monte Carlo | | |
| Type | Arm, hydraulic | Telescopic, hydraulic | | |
| Length between centre hole and shoulder for washer | | 10" (255 mm) | | |
| Extended | | 16 7/16" (417 mm) | | |
| Stroke | 4 1/4 in. (106 mm) | 4 1/4 in. (106 mm) | | |

WHEELS

Type

Up to and incl. model 1975
"Wide base" disc wheels (as from
model 1969 with safety rim)
4 J x 15"

As from model 1976
"Wide base" disc wheels

Dimension

Permissible out-of-round of rim, see fig. (A) 0.06 in. (1.5 mm)
Permissible rim throw, see fig. (B) 0.06 in. (1.5 mm)

4.5 J x 15" (Saab 95: 4 J x 15")
0.05 in. (1.2 mm)
0.05 in. (1.2 mm)



MEASURE POINTS ON THE RIM

Wheel bolts:

Width across flats

Thread

3/4" in. (19.05 mm)
UNC 9/16"

Tightening torques:

Castle nut, front wheel hub

Castle nut, rear wheel hub

Wheel bolts

177 Nm (18 kpm/130 ft. lbs.)

88 Nm (9 kpm/65 ft. lbs.)

79-98 Nm (8-19 kpm/58-72 ft. lbs.)

TIRES

Size:

Saab 95

5.60 x 15" (diagonal)

155 SR 15 (radial)

Saab 96

5.20 x 15" (diagonal)

155 SR 15 (radial)

Tire pressure, front and rear

Light load 24 psi (1.7 bar, kp/cm²)

Fully loaded 27 psi (1.9 bar, kp/cm²)

At full load the tire pressure of the rear
tires on the Saab 95 should be 30 psi.
(2.1 bar, kp/cm²).

Tire pressure figures refer to cool tires.

Body

Body dimensions (approximate):

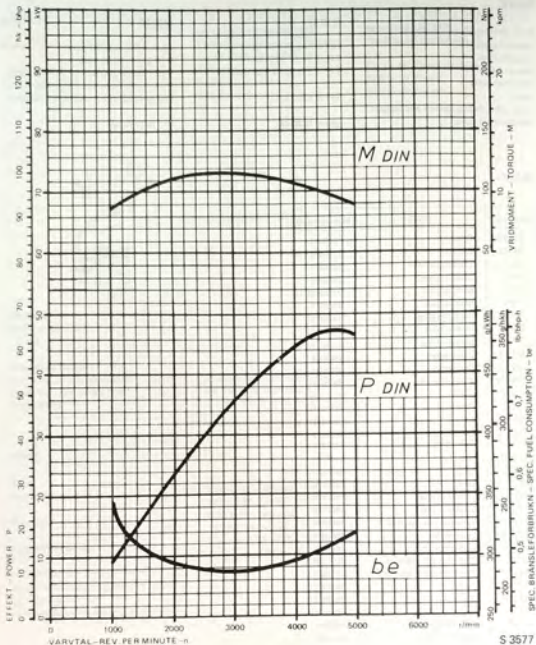
| | |
|--|----------------------------|
| Overall length | 13 ft. 7 in. (4 160 mm) |
| Overall width | 5 ft. 2 in. (1 585 mm) |
| Overall height | 4 ft. 1 1/2 in. (1 256 mm) |
| Weight of body: | |
| Total | 646 lb (293 kg) |
| Excl. hood, doors, fenders and luggage compartment cover | 496 lb (225 kg) |

Saab 96

| |
|--------------------------|
| 12 ft. 10 in. (3 930 mm) |
| 5 ft. 2 in. (1 585 mm) |
| 4 ft. 1 in. (1 240 mm) |
| 555 lb (252 kg) |
| 415 lb (188 kg) |

ENAMEL

| Color code | Color | Manufacture |
|------------|-------------------------|-------------|
| BK 1B | Black | Beckers |
| BK 1L | Black | Beckers |
| BK 2 | Dorado brown | Beckers |
| B 6L | Middle blue | Beckers |
| B 7H | Middle blue | Herberts |
| B 7L | Middle blue | Beckers |
| B 8 | Caroline blue | Herberts |
| B 9 | Coelin blue | Herberts |
| B 10 | Lagoon blue | Herberts |
| GN 5L | Olive green | Beckers |
| GN 6L | Sea-green | Beckers |
| GN 7H | Tyroler green | Herberts |
| GN 8 | Green | Herberts |
| GN 9 | Green | Herberts |
| GN 10 | Emerald green | Herberts |
| GN 11 | Opal green | Beckers |
| GN 12 | Jade green | Beckers |
| GY 4L | Ore-grey | Beckers |
| R 2B | Red | Beckers |
| R 2L | Red | Beckers |
| R3 | Sienna brown | Herberts |
| R 4 | Cinnabar red | Beckers |
| R 6 | Cardinal red metallic | Beckers |
| RB 1B | Silvermink | Beckers |
| RB 2 | Burgundy red | Beckers |
| SK 1 | Silver crystal metallic | Du Pont |
| SK 3 | Silver crystal metallic | Beckers |
| W 1L | White | Beckers |
| W 1B | White | Beckers |
| W 2 | Orchid white | Herberts |
| Y 5L | Light beige | Beckers |
| Y 6H | Savann beige | Herberts |
| Y 8 | Yellow | Beckers |
| Y 9 | Brilliant yellow | Herberts |
| Y 11 | Indian yellow | Beckers |
| Y 12 | Topaz yellow | Beckers |
| YR 6 | Antilop brown | Beckers |



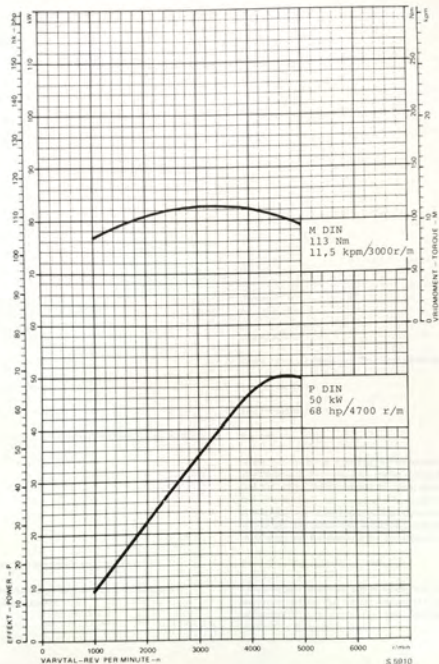
S 3577

ENGINE PERFORMANCE CURVES, UP TO AND INCL. MODEL 1977

P = output

M = torque

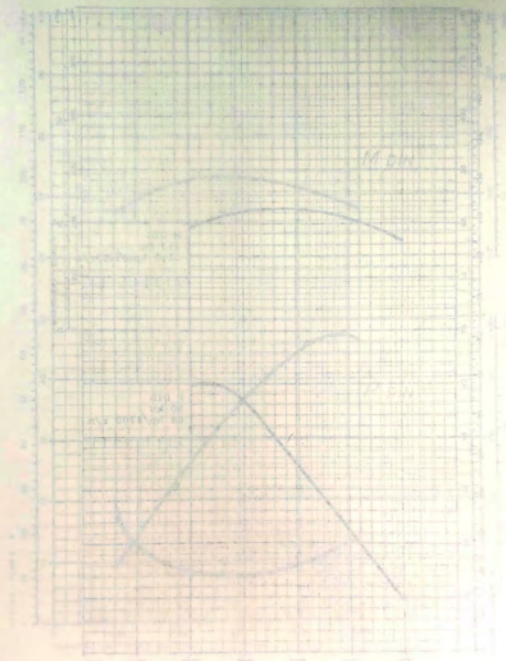
be = spec. fuel consumption



ENGINE PERFORMANCE CURVES, AS FROM MODEL 1977 B

P = output

M = torque



THIS GRAPH IS A REPRESENTATION OF THE DATA OBTAINED FROM THE TESTS CONDUCTED AT THE U.S. NAVY AIRCRAFT ENGINEERING CENTER, PATTERSON FIELD, CALIF. ON JANUARY 10, 1944. THE DATA WERE OBTAINED FROM THE TESTS OF THE ENGINEERED AIRCRAFT ENGINEERING CENTER, PATTERSON FIELD, CALIF. ON JANUARY 10, 1944. THE DATA WERE OBTAINED FROM THE TESTS OF THE ENGINEERED AIRCRAFT ENGINEERING CENTER, PATTERSON FIELD, CALIF. ON JANUARY 10, 1944.

TROUBLE SHOOTING

GENERAL

The localization of faults is often the most difficult part of the work, and no written instruction can replace knowledge about the car and its construction. The information contained in this section has been prepared with the object of facilitating systematic diagnosis, but does not claim to be exhaustive. Under each heading, the most likely sources of trouble are listed in order of probability, together with the appropriate corrective measures. Since a number of different auxiliary apparatuses may be used to facilitate trouble shooting, the instructions given for each individual problem should be followed.

ENGINE

Starting difficult, cold engine

Source of trouble

Faulty spark plugs. Gaps too wide.

The distributor is faulty.

The battery is poorly charged.

The capacitor is faulty.

The ignition coil is weak.

The interference suppressors on the spark plugs are faulty.

No fuel in the carburetor.

Clogged jets and passages in the carburetor.

No primary current to ignition coil and distributor.

No secondary current.

Remedy

Adjust or replace.

Check, adjust.

Check condition of battery. Recharge when necessary.

Test the capacitor.

Test the ignition coil.

Replace.

Check that the pump is feeding fuel by loosening hose at carburetor and running with starter motor. If no fuel is supplied, check pump filter, pipes, hoses and fuel filter for leaks and clogging. If fuel supply still fails after a new test, running with starter motor for about 12–15 sec., the pump itself is probably defective. Remove the pump for examination, and repair if necessary.

Blow jets and passages clean with air.

Check cable connections, and especially the starter switch, to confirm that current is supplied to ignition system when starter motor is on. The cable may be ruptured at the ignition switch.

Choke strangler flap fails to close.

Faulty carburetor gaskets.

Incorrect fast-idle adjustment.

Oil too viscous or dirty.

Poor compression caused by worn cylinders, pistons or piston rings. Piston rings stuck in ring grooves. Leaking valves.

The cylinder head gasket is leaking.

Remove air cleaner. Check that choke spindle runs easily. If spindle binds, clean its bearing surfaces with gasoline or trichloroethylene.

Replace gaskets.

Check adjustment. See section headed "Fast-idle adjustment" in group 2.

Change oil.

Measure compression pressure in all cylinders.

Replace gasket.

Starting difficult, warm engine

Source of trouble

The float level is incorrect. Damaged float or leaking needle valve.

No primary current to ignition coil and distributor.

No secondary current.

Dirt in jets or passages of the carburetor.

The carburetor is flooding.

Remedy

Check, adjust if necessary. Replace any faulty parts.

Check, correct as instructed above.

Blow jets and passages clean with air.

Check needle valve and float. Clean or replace.

Engine does not idle

Source of trouble

The float level is incorrect. Leaking needle valve.

Idling fuel jet clogged with dirt.

Improperly adjusted idling screw and/or air-regulating screw.

Faulty gasket between induction manifold and carburetor.

Leakage at vacuum connection.

Remedy

Check, adjust if necessary.

Clean.

Check, adjust

Replace gasket.

Check, repair.

Pinging

Source of trouble
Ignition wrongly timed

Wrong jets in carburetor. (Mixture too lean.)

Automatic ignition advance in distributor sticks at earliest timing.

Heavy deposits of carbon in compression chambers due to excessive city driving.

Octane number of fuel is too low.

Ignition by incandescence

Source of trouble
Spark plugs faulty.

Heavy deposits of carbon in compression chambers.

Engine idles too fast.

Excessive fuel consumption

It should be borne in mind that apparently excessive fuel consumption may result from extraneous causes such as a car top carrier, snow tires, predominately city driving, etc. A small tank installed in the engine compartment may be used to check fuel consumption. Connect up the small tank ahead of the fuel tank so that the same pump pressure is obtained. A test based merely on consumption between two fill-ups cannot be regarded as reliable.

Source of trouble
Fuel tank damaged.

Fuel line damaged.

Nipples or fittings leaking.

Ignition improperly adjusted.

Distributor faulty.

Ignition coil faulty.

Capacitor faulty.

Remedy
Adjust ignition timing. See group 3, Electrical System.

Change jets. See group 0.

Test distributor on test rig, if available. Clean and lubricate all parts. Replace any worn parts.

Decarbonize cylinder head.

Change fuel next time tank is refilled.

Remedy
Make certain that correct type of plug is fitted. See group 3, Electrical System.

Decarbonize cylinder head.

Adjust idling speed.

Remedy
Check, repair if necessary.

Check, replace if necessary.

Tighten or replace.

Check, adjust.

Test, adjust.

Test, replace if necessary.

Test, replace if necessary.

Carburetor improperly adjusted. Float level too high, wrong type of jets fitted, or air-regulating screw improperly adjusted.

Automatic choke improperly adjusted.

Air cleaner clogged

Brakes dragging.

Lack of power

Source of trouble

Engine not firing on all cylinders.

Carburetor adjusted improperly.

Icing in carburetor.

Unsatisfactory fuel.

Leaking valves in fuel pump.

Fuel pump filter clogged with dirt.

Air cleaner clogged.

Dirt in jets.

Poor compression caused by worn cylinders, pistons or piston rings.

Leaking valves.

Check carburetor settings and adjust if necessary. See group 2.

Check, adjust.

Blow air cleaner clean with air. Replace if necessary.

Check brake adjustment and free rolling of wheels. Note! Make sure that handbrake wire returns properly.

Remedy

Check spark plugs and connections at plug terminals and distributor cover. Check radio interference suppressors if fitted. Set air preheater device to winter position.

Check carburetor jet sizes, float level and richness adjustment.

Set air preheater device to winter position.

Empty and clean tank.

Replace.

Remove and clean.

Remove and clean.

Clean.

Measure compression pressure in all cylinders.

Decarbonize and grind valves.

Overheating

Source of trouble

Coolant level too low.

Fan belt slipping.

Pump impeller damaged.

Thermostat faulty.

Radiator clogged.

Hoses and passages clogged by dirt and sludge.

Water distribution pipe clogged.

Ignition improperly adjusted.

Air/fuel mixture too lean.

Remedy

Replenish coolant.

Adjust belt tension.

Replace.

Test, replace if necessary.

Clean.

Clean.

Remove, clean.

Check, adjust if necessary.

Clean, adjust carburetor.

Engine misses

Source of trouble

Unsatisfactory fuel. Water in fuel.

Fuel line partially clogged.

Fuel pump faulty.

Poor contact at ignition coil connection.

Open contacts at primary circuit connections.

Primary circuit open or shorted.

Ignition cables faulty.

Breaker contact points burnt.

Breaker contact points incorrectly gapped.

Remedy

Empty tank, then remove and clean.

Check, flush clean.

Check, repair if necessary.

Check, test and repair.

Check, correct.

Check, correct.

Clean connections. Replace cables if insulation is damaged.

Replace.

Check, adjust.

Excessive oil consumption

Remember that it is advisable to ascertain the conditions under which the car is driven before examining the engine or taking corrective measures when oil consumption is high. If possible, ask the driver about his driving habits and the type of driving for which the car is used. It's a good idea to let the driver take the car out for a spin and watch how he operates it. Abrupt acceleration, racing the engine and high speed driving lead to excessive oil consumption. Excessive oil consumption may be caused by keeping the oil level too high. It is not necessary to add oil until the level has dropped to (or just above) the lower mark on the dipstick. However, the level must never be permitted to drop beneath the lower mark.

Source of trouble

Leakage at oil pan gasket.

Gasket between fuel pump and cylinder block faulty.

Gasket in transmission cover damaged.

Crankshaft seal damaged.

Leakage at valve cover.

Oil filter seal faulty.

Worn cylinders, pistons or piston rings.

Piston rings stuck in grooves or broken.

Valve stem seals damaged.

Valve guides worn.

Low oil pressure

Source of trouble

Oil pressure gauge faulty.

Wiring to oil pressure gauge damaged.

Relief valve stuck in open position.

Relief valve spring broken or too weak.

Relief valve plunger worn.

Oil pump strainer clogged with dirt.

Worn rotor in pump.

Main and/or connecting rod bearings damaged or worn.

Overflow valve in oil filter faulty.

Remedy

Tighten the bolts. Replace gasket if faulty.

Replace gasket if faulty.

Replace gasket.

Replace seal.

Check that cover is correctly fitted. Replace gasket if necessary.

Check. Replace oil filter cartridge if necessary.

Measure compression pressure.

Replace piston rings.

Replace seals.

Reaming of valve guides. Installation of oversize valves.

Remedy

Test, replace if necessary.

Replace wiring.

Remove, replace.

Replace.

Replace.

Clean.

Replace.

Replace. Regrind crankshaft if damaged or worn.

Replace oil filter.

Engine jerks and spits on acceleration

Source of trouble

Spark plugs faulty.

Flash-over in ignition cables. Moisture in distributor cover.

Ignition coil faulty.

Acceleration pump inlet valve leaks.

Acceleration pump outlet valve leaks.

Acceleration jet clogged with dirt.

Water in fuel.

Fuel supply insufficient.

Remedy

Test, replace if necessary.

Check and wipe ignition cables and distributor cover. Replace if necessary.

Test, replace if necessary.

Blow clean with air.

Blow clean with air.

Clean jet.

Look for water in fuel pump filter (at lowest point) and in float chamber.

Check jets, float level, fuel pump pressure, etc. See group 2. Check that no air leakage occurs at gasket between induction manifold and cylinder block or at carburetor.

Fuel pump operates improperly or not at all

Source of trouble

Leakage at connections and pump housing cover.

Impurities in fuel.

Condensed water in fuel causes fuel system to freeze up in winter.

Pump diaphragm and valves leaks.

Remedy

Check fuel hose connection nipples and cover gaskets.

Check that pump filter and fuel lines between tank and carburetor are not clogged.

Check for icing in fuel pump filter and fuel lines. Drain tank and refill with fresh fuel if necessary.

Check pump diaphragm and valves, and replace if necessary. Check pump pressure with manometer. See group 2.

Carburetor floods or leaks fuel

Source of trouble

Dirt in needle valve.

Valve or seat worn.

Float level incorrect.

Fuel pump pressure to high.

Leakage at fuel pipe connections.

Float damaged.

Remedy

Clean valve and seat.

Replace.

Check float level.

Check pressure.

Replace faulty connections.

Replace.

Uneven idling

Source of trouble

Volume control screw adjusted improperly.

Dirt in idling jet.

Idling passage clogged.

Air leakage at carburetor or induction manifold gaskets.

Remedy

Adjust.

Remove, clean.

Remove carburetor and clean passage.

Tighten screws or replace gaskets. Adjust.

Faulty fuel gauge

Source of trouble

Fuel gauge registers too low or too high.

Fuel gauge works intermittently or not at all.

Remedy

Remove tank sender unit and adjust by carefully bending float arm.

Fit a new gauge or tank sender unit in order to localize the fault. Faulty part can either be replaced or sent to local Saab agent for repair.

Low coolant temperature

Source of trouble

Difficulty in maintaining sufficiently high coolant temperature in winter.

Remedy

Check thermostat opening temperature. (One method is to install a new thermostat for comparison.) It is recommended that air flow be screened at the front panel.

ELECTRICAL SYSTEM

Battery rundown

Source of trouble

Fan belt slipping.

Battery cells dry.

Battery faulty

Alternator or relay giving insufficient current.

Short circuit in starter switch.

Remedy

Adjust belt tension. See group 3, Electrical System.

Check fluid level in battery.

Check that specific gravity is same in all cells after charging.

Carry out charging test. Check cable connections.

Disassemble and inspect switch.

BRAKES

Brake warning light glows

The light glows because of too great pedal travel, but the braking effect is good.

The light glows because of too great pedal travel. The braking effect is poor or uneven.

Adjust the rear wheel brake shoes.

Investigate and repair leakage on brake lines, hoses or cylinders.

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| 101 | SPECIAL TOOLS |
| 110 | SERVICE INSPECTIONS |
| 120 | LUBRICATION |
| 141 | UNDERBODY AND RUSTPREVENTING TREATMENT |

GENERAL HINTS

GENERAL

A neat and tidy workshop is essential for the proper servicing of vehicles. Some parts of the car need to be treated with special care and effectively protected against dirt and contamination while work is in progress. For the mechanic who may be new to the job the following points may be of help:

1. Protect fenders and other paintwork with suitable coverings.
2. Lay protective coverings over the seats and upholstery to save them from spots of oil and dirt.
3. Clean the insides of fenders and the space round the rear axle thoroughly before starting to work on wheel hubs and axles. This makes the job easier and prevents grit and dirt from getting into bearings and other susceptible parts.
4. Before unscrewing spark plugs, clean the recess round the plug thoroughly.
5. Every job must have its proper place. It is bad practice, for example, to disassemble an engine or transmission on a bench which is also used for filing, etc. or where filing is done in the immediate neighbourhood.

THREAD SYSTEM AND WRENCH SIZES

The thread system mainly used in the Saab car is the UNC, i.e. **UNIFIED COARSE THREADS**, in which inches are the unit of measurement.

Wrench sizes for nuts and bolts are expressed in inches and the dimensions are the same as the designations of the tools. In a few cases, UNF, i.e. **UNIFIED FINE**, threads are used.

An important exception is the engine, which has the metric thread system.

Exceptions to the thread system will also be encountered in the case of components supplied by sub-suppliers, such as Bosch, where metric threads will be found.



INSTRUCTIONS FOR JACKING-UP THE CAR

The construction of the car, with its self-supporting body, offers no natural lifting points at which to apply a jack, as on cars with a conventional chassis. Two special fittings are provided one on each side, to take the jack included in the tools for the car. They are intended for use when changing wheels, etc. Under the front of the engine compartment floor, immediately behind the front muffler, a reinforcement provides a support for a shop jack. This is the best point at which to lift the front of the car in order to lubricate the ball joints. A similar jacking point is pro-

vided under the rear part of the car, where the floor is reinforced. This point is located on the center line of the car, immediately in front of the rear axle tunnel. Most shop jacks feature a lifting head shaped like a low fork, and it is therefore advisable to place a wooden block of suitable size on this in order to avoid damaging the floor. For certain jobs it is necessary to support the front or rear part of the car on trestles. Make sure that the weight of the car is borne up on the jacking points, or in the immediate vicinity of the wheel houses.



JACKING-UP THE FRONT END



JACKING UP THE REAR END



SUPPORTING THE FRONT END



SUPPORTING THE REAR END

SPECIAL TOOLS

GENERAL

The seven figure number quoted in the following list of special tools is the part number. The number which is also marked on the tools only includes the first six figures.

The special tools in the list are classified as follows:

Tools for engine, transmission and chassis work

- Class A0-1 = Tools used very frequently in service work (e.g. adjustment of timing)
- A0-2 = Tools used frequently in maintenance work (e.g. replacement of brake pads)
- A1 = Tools necessary for simple repairs (e.g. replacing the clutch or valves)
- A2 = Tools necessary for qualified repairs (e.g. reconditioning the gearbox)
- A3 = Tools which are mainly recommended for reasons of operational efficiency


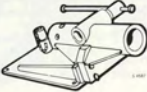
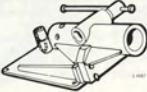



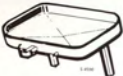
Tools for body work

- Class B1 = Tools necessary for simple body work (e.g. replacement of front fenders)
- B2 = Tools necessary for qualified body work (e.g. alignment work)
- B3 = Tools which are mainly recommended for reasons of operational efficiency

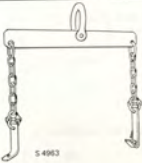


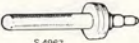
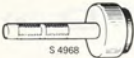
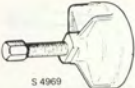

TOOL RACKS

It is most important that special tools be kept in a suitable place, where they will be readily accessible and easily found.

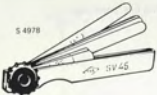




Special tools, engine

| Part No. | Description | Class | Illustration | Remarks |
|----------|------------------|-------|---|---|
| 7860794 | Floor stand | A 2 |  | Also Saab 99 |
| 7860877 | Bench stand | A 2 |  | Part of 7860877 Also Saab 99 |
| 7860885 | Vise stand | A 2 |  | |
| 7861479 | Engine stand | A 2 |  | Alternative to 7860794 Also Saab 99 Also Saab 99 |
| 8390478 | Shaft | A 2 |  | |
| 7860851 | Retainer, engine | A 2 |  | 54973 |
| 7860802 | Oil pan | A 2 |  | Also Saab 99 |






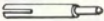

Special tools, engine

| Part No. | Description | Class | Illustration | Remarks |
|----------|--|-------|---|------------------------------|
| 7862022 | Lifting tool, power unit | |  | |
| 7862014 | Strap tool, oil filter cartridge | A 0-1 |  | Also Saab 99 2.0 l engine |
| 7862147 | Removing and centering tool, oil seal, balance shaft | A 2 |  | |
| 7862154 | Installing tool, oil seal, balance shaft and bushing, distributor | A 3 |  | |
| 7862170 | Installing tool, rear crankshaft seal | A 2 |  | |
| 7862188 | Removing tool, crankshaft gear | A 3 |  | |
| 7862287 | Installing tool, piston | A 3 |  | Also Saab 99 2.0 l engine |


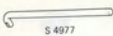




Special tools, engine

| Part No. | Description | Class | Illustration | Remarks |
|--------------------|---|-------|---|--|
| 7862394 | Feeler gauge, measuring valve clearance | A 3 |  | |
| 7862279 7861230 | Removing tool, valve spring Screw | A 3 |  | Spare part |
| 7862402 | Valve retainer | A 3 |  | |
| 8392193 | Valve seat cutter | A 2 |  | Concerning integral parts, see spare parts catalogue |
| 7862105 | Reamer, valve guide, over-size 0.2 | A 2 |  | |
| 7862113 | Reamer, valve guide, over-size 0.4 | A 2 | | |
| 7862121 | Reamer, valve guide, over-size 0.6 | A 2 | | |
| 7862139 | Reamer, valve guide, over-size 0.8 | A 2 | | |


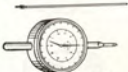


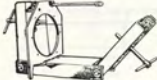
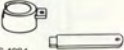

Special tools, engine

| Part No. | Description | Class | Illustration | Remarks |
|----------|--------------------------------------|-------|---|--------------|
| 7862196 | Installing tool, water pump shaft | A 3 |  S 4970 | |
| 7862204 | Installing tool, water pump impeller | A 3 |  S 4971 | |
| 7862436 | Dolly, water pump | A 3 |  S 4972 | |
| 7843303 | Pliers, hose clamps | A 1 |  S 4973 | Also Saab 99 |
| 8392045 | Adaptor, ignition timing | A 0-1 |  S 2363 | Also Saab 99 |
| 8392052 | Adaptor, dwell angle setting | A 0-1 |  S 2364 | Also Saab 99 |
| 7860620 | Key, bolts, inlet manifold | A 0-1 |  S 4079 | |

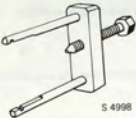







Special tools, engine

| Part No. | Description | Class | Illustration | Remarks |
|----------|---|-------|---|--------------|
| 7860984 | Level tube, float level | A 3 |  | |
| 7860919 | Key, fast idling setting | A 3 |  | |
| 7860513 | LOCTITE locking liquid | |  | Also Saab 99 |
| 8343808 | LOCTITE quickset | |  | Also Saab 99 |
| 7868052 | Atmosit sealing compound, inlet manifold | |  | |
| 7860505 | Plastigage, for measuring bearing clearance | |  | Also Saab 99 |






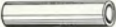

Special tools, transmission

| Part No. | Description | Class | Illustration | Remarks |
|----------|---|-------|---|---|
| 7840648 | Centering tool clutch—clutch disc | A 1 |  S4981 | |
| 7840622 | Dial indicator (incl. two spare points) | A 0-2 |  S 4982 | Also Saab 99 |
| 7838469 | Protective cover, inner universal joints | A 1 |  S 4983 | Also Saab 99 model 1969 |
| 7323736 | Protective cover, bearing, inner drive shaft | A 1 |  S 4984 | Also Saab 99 model 1969 |
| 7841000 | Assembling and disassembling fixture, transmission case | A 2 |  S 4988 | Concerning integral parts, see spare parts catalogue |
| 8790305 | Installing and removing tool, freewheel | A 2 |  S 4984 | Spare part |
| 8790313 | Sleeve | | | Spare part |
| 8790321 | Key | | | Spare part |
| 7841158 | Puller, pinion-shaft bearing | A 2 |  S 4996 | |






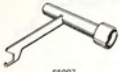


Special tools, transmission

| Part No. | Description | Klass | Illustration | Remarks |
|----------|--|-------|---|--------------------------------------|
| 7860521 | Puller, inner ring, pinion-shaft bearing | A 2 |  S 4998 | |
| 7840945 | Wrench, intermediate shaft end nut, gearbox | A 2 |  S 4997 | Up to and incl. gearbox No. F 108910 |
| 7861321 | Wrench, intermediate shaft end nut, gearbox | A 2 |  S 4997 | As from gearbox No. F 108911 |
| 7860588 | Arbor, intermediate shaft | A 2 |  S 4994 | Spare part |
| 7841117 | Point, short, for 7860588 | | | Spare part |
| 7841125 | Point, medium, for 7860588 | | | Spare part |
| 7841133 | Point, long, for 7860588 | | | Spare part |
| 7841257 | Supporting tool, intermediate shaft | A 2 |  S 5003 | |
| 7841042 | Driving-out arbor, primary shaft | A 2 |  S 4989 | |
| 7841091 | Installing tool, bearing | A 2 |  S 4993 | |
| 7841067 | Driving-on sleeve, pinion shaft and steering knuckle housing with bearing on outer drive shaft | A 2 |  S 4990 | Also Saab 99 |






Special tools, transmission

| Part No. | Description | Class | Illustration | Remarks |
|----------|--|-------|---|---------|
| 8390080 | Removing tool, pinion | A 2 |  S 4992 | |
| 8390098 | Support, pinion shaft | A 2 |  S 4998 | |
| 7841216 | Supporting tool | A 2 |  S 4997 | |
| 7841232 | Supporting tool, gear | A 2 |  S 5000 | |
| 7841224 | Aligning arbor, pinion shaft | A 2 |  S 4999 | |
| 7841075 | Driving-on sleeve, primary shaft | A 2 |  S 4991 | |
| 7861347 | Driving-on tool, intermediate-shaft gear | A 2 |  S 4992 | |

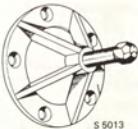

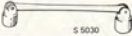

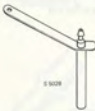

Special tools, transmission

| Part No. | Description | Class | Illustration | Remarks |
|----------|---|-------|---|---------|
| 7841141 | Aligning arbor, primary shaft | A 2 |  S 4995 | |
| 7841240 | Locating key, intermediate shaft | A 2 |  S 5001 | |
| 7842859 | Locating key, synchromesh hub | A 2 |  S 5002 | |
| 7840697 | Holders, poppet balls | A 2 |  S 4986 | |
| 7842370 | Testing device, shimming of end-cover | A 2 |  S 4985 | |
| 7842206 | Removing and installing tool, clutch shaft seal | A 2 |  S 5007 | |
| 7841463 | Measuring fixture, pinion adjustment | A 2 |  | |
| 7861305 | Ring half, measuring fixture | | | |
| 7841422 | Driving-out arbor | A 3 |  | |




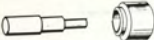
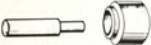


Special tools, transmission

| Part No. | Description | Class | Illustration | Remarks |
|----------|--|-------|---|--|
| 7842024 | Arbor, outer universal joint | A 1 |  | Also Saab 99 |
| 7841612 | Circclip pliers, outer universal joint | A 1 |  | Also Saab 99 |
| 8790473 | Key, filler plug, gearbox | A 0-1 |  | Also Saab 99 |
| 8790420 | Key drain plug, gearbox | A 0-1 |  S 5010 | As from gearbox No. F 118.182 Also Saab 99 |
| 7862444 | Oil dipstick, gearbox | A 0-1 |  S 5011 | |

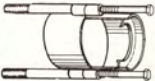


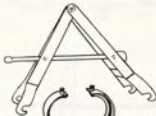





Special tools, chassis

| Part No. | Description | Class | Illustration | Remarks |
|----------|----------------------------------|-------|---|------------------------|
| 7840028 | Puller, wheel hub | A 0-2 |  <p>S 5013</p> | Spare part |
| 7841786 | Screw for 7840028 | | | |
| 7844640 | Key, brake adjustment | A 3 |  <p>S 5029</p> | |
| 7860976 | Key, brake adjustment | A 3 |  <p>S 5030</p> | Alternative to 7844640 |
| 7860430 | Clamp, brake piston | A 3 |  <p>S 5026</p> | |
| 7861099 | Bleeder key | A 0-2 |  <p>S 5028</p> | Also Saab 99 |
| 7841992 | Pliers, circlip, master cylinder | A 2 |  <p>S 5027</p> | |

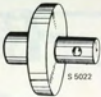




Special tools, chassis

| Part No. | Description | Class | Illustration | Remarks |
|----------|--|-------|---|---|
| 7840010 | Rule, toe-in measuring | A 2 |  | Also Saab 99 Not necessary if other suitable equipment is available. |
| 8995698 | Graduated scale | |  S 5012 | Spare part Also Saab 99 |
| 7840200 | Spanner, shaft-seal nut, front wheel hub | A 0-2 |  S 5015 | |
| 7841331 | Pressing tool, upper rubber bushing, control arm | A 3 |  | |
| 7841349 | Pressing tool, lower rubber bushing, control arm | A 3 |  S 5025 | |
| 7860448 | Extractor, tie rod end | A 0-2 |  S 5014 | Also Saab 99 |
| 7840713 | Wrench, steering-gear lock nut | A 2 | | |
| 7839624 | Wrench, steering-gear bearing housing | A 2 |  S 5020 | |

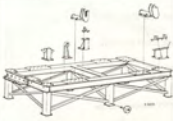

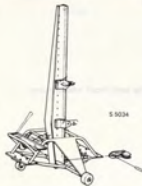

Special tools, chassis

| Part No. | Description | Class | Illustration | Remarks |
|----------|---|-------|---|--|
| 7840820 | Removing and inserting clamp, coil spring | A 1 |  | Superseded by 8995060 and two spring cups 7861248. Spare parts to 7840820. |
| 7842495 | Bolt and nut | |  | |
| | | | S 5052 | |
| 7840812 | Compressor, coil spring | A 1 |  | |
| | | | S 5051 | |
| 8995060 | Spring scissors | A 1 |  | |
| 7861248 | Spring cups (2) | A 1 | | |
| | | |  | S 5024 |
| 7840739 | Removing and installing tool, bushing rear axle | A 3 |  | S 5021 |
| 7840762 | Support and arbor, bushing, rear axle link | A 3 |  | |
| | | |  | S 5023 |
| 8995805 | Sleeve, wheel nut | A 0-1 |  | S 5031 |




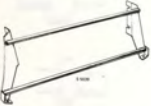

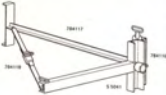
Special tools, chassis

| Part No. | Description | Class | Illustration | Remarks |
|----------|--|-------|---|---------|
| 7840754 | Installing arbor, front wheel ball bearing | A 3 |  S 5022 | |
| 7840309 | Shaft, driving tools | A 3 |  S 5016 | |
| 7840366 | Installing sleeve, dust cover, rear axle | A 3 |  S 5019 | |
| 7840325 | Installing tool, rear-axle ball bearing | A 3 |  S 5017 | |
| 7840333 | Installing tool, rear-axle ball bearing | A 3 |  S 5018 | |

Special tools, body




| Part No. | Description | Class | Illustration | Remarks |
|----------|---------------------------------------|-------|--|---|
| 8290140 | Aligning bench, body (earlier design) | B 2 |  | Also Saab 99 |
| 8290272 | Trestle cpl. | B 2 |  | Also Saab 99 Concerning integral parts, see the spare parts catalogue |
| 8290322 | Straightener | B 2 |  | |
| 8291908 | Aligning bench (later design) | B 2 |  | Pos. 1 |
| 8291874 | Wheels | B 2 | | Pos. 2 |
| 8292088 | Side support | B 2 | | Pos. 3 |
| 8291890 | Support, aligner | B 2 | | Pos. 4 |
| 8292153 | Extension part, puller arm | B 2 | | Pos. 5 |

Special tools, body





| Part No. | Description | Class | Illustration | Remarks |
|----------|--|-------|---|---|
| 7861206 | Pad, rear window | A 2 |  S 5035 | |
| 8291767 | Pad, front window | A 2 | | |
| 8291775 | Pad, side window | A 2 | | |
| 7884273 | Front fender fixture | B 1 |  S 5043 | |
| 7840770 | Aligning tool, body, diagonal measurements | B 2 |  S5036 | Concerning integral parts see spare parts catalogue |
| 7841455 | Aligning tool, front wheelhouses | B 1 |  S 1000 | |
| 7860463 | Aligning tool, power unit | B 1 |  S5040 | |
| 7884166 | Retainer, door | B 3 |  S 1041 | Stand, see special tools engine. |
| 7884174 | Retainer | B 3 | | |
| 7884182 | Stay | B 3 | | |

7884166 and 7884182, also Saab 99.

Special tools, body

| Part No. | Description | Class | Illustration | Remarks |
|----------|-----------------------------------|-------|---|--------------|
| 7860570 | Retaining tool, door window frame | B 3 |  S 5042 | |
| 8290579 | Tool for fitting of headlining | A 2 |  S 5037 | Also Saab 99 |
| 8290587 | Tool for fitting of headlining | A 2 |  S 5038 | Also Saab 99 |

Special tools, miscellaneous

| Part No. | Description | Class | Illustration | Remarks |
|----------|---|-------|---|--------------|
| 7840937 | Pliers, contact crimping of pre-insulated terminals | A 1 |  | Also Saab 99 |
| 7860695 | Pliers, contact crimping of uninsulated terminals | A 1 |  | Also Saab 99 |
| 7860703 | Pliers, contact crimping of round pegs | A 1 |  | Also Saab 99 |
| 8291395 | Sleeve wrench | A 3 |  | |

SERVICE INSPECTIONS

Every new car is accompanied by a service card that should be stamped at every service occasion.

Guarantee service at 12,000 miles (2,000 km) is made free of charge (except for oils etc. for which a charge is made).

Other maintenance according to the service program is made at 6,000 miles (10,000 km) and will be billed.

The maintenance program is included in the Guide.

The maintenance program is divided into the following.

EXHAUST EMISSION

The authorities' regulations governing the emission of carbon monoxide, hydrocarbons and nitric oxide in car exhaust fumes are becoming increasingly more stringent. Saab cars are designed and built to meet these requirements on the condition that the engines are correctly tuned.

The workshops hold a key position in being able to limit the emission of toxic gases from cars and therefore make a contribution to keeping pollution down.

Remember that a correctly tuned engine also ensures that the car runs smoothly and with low fuel consumption.

The relevant adjustments are described in the service program. We would like particularly to emphasize the importance of adjusting the ignition system and the fuel system in accordance with the specifications.

DELIVERY INSPECTION

1. Check the engine oil level and if necessary replenish oil.
2. Check the gearbox oil level and if necessary replenish oil.
3. Check level of coolant and its freezing point.
4. Check function of all locks, headlights, interior lights, stop lights, direction indicators, warning flashers, back-up lights, indicator, lights, brake warning light, windshield wipers/washer, headlight wipers/washer, heater fan and signal horn.
5. Check the headlight alignment.
6. Check the battery electrolyte level and charging condition.
7. Tighten cable terminals at battery, starter motor, voltage regulator and alternator.
8. Check, if necessary, adjust fan belt tension.
9. Check, if necessary, adjust the ignition setting.
10. Check the fluid level and if necessary replenish brake fluid in the master cylinders for brakes and clutch.
11. Check, if necessary, adjust the parking brake.
12. Check brake hoses and lines for leakage.
13. Tighten the wheel bolts.
14. Adjust the tire pressure, incl. the spare wheel.
15. Check, if necessary, adjust toe-in.
16. Check, if necessary, adjust the seat rails.
17. Check that tool kit, Guide and Service card are in place.
18. Test run car and check the general functions (clutch, gearbox, brakes, wheel balance, instruments, direction indicator return, etc).
Check that there is no rattle.
Check the steering wheel position.
19. Check and adjust idling, fast idling setting and CO-value.
20. Check the level of washer fluid.

GUARANTEE INSPECTION AT 1,200 MILES (2,000 KM)

1. Tighten cylinder head bolts to prescribed torque.
2. Check and if necessary adjust valve clearances.
3. Check and tighten inlet manifold and carburetor flange screws. Check that choke spindle moves freely.
4. Check and tighten exhaust manifold flange nuts.
5. Check exhaust system for leaks and tighten clamping and suspension screws.
6. Check and tighten screws on all engine mounts.
7. Change engine oil (owner pays for oil).
8. Change transmission oil and clean magnetic drain plug (owner pays for oil).
9. Check radiator coolant level and cooling system for leaks (pressure test).
10. Check fluid level in clutch master cylinder and top up if necessary. Check and if necessary adjust clutch bearing play.
11. Check operation of headlights, interior lights, stop lights, direction indicators, warning flasher, back-up lights, indicator lights, brake warning light, windshield wipers/washer, headlight wipers/washer, heater fan and signal horn.
12. Check and if necessary adjust headlight alignment.
13. Check battery electrolyte level and top up if necessary. Grease cable shoes.
14. Check and if necessary adjust alternator drive belt tension.
15. Check and if necessary adjust dwell angle of breaker points. Grease distributor breaker cam and lubricating felt. Check and if necessary adjust ignition timing.
16. Check fluid level in brake master cylinder. Top up if necessary.
17. Check and if necessary adjust rear wheel brake shoes.
18. Check and if necessary adjust the parking brake.
19. Check brake fluid lines and hoses for condition and leaks.
20. Check condition of rubber bellows on steering gear and inner and outer universal joints, and of rubber seals for ball joints and tie-rod ends.
21. Check and tighten screws securing rear axle to body.
22. Check and tighten screws securing control arms to body (front suspension).

23. Check and tighten rear engine mounting screw.
24. Check and if necessary adjust wheel alignment (camber, caster and toe-in). Check the tightness of the lock nuts on both tie-rods.
25. Test run car and check the general functions (clutch, gearbox, brakes, wheel balance, instruments, direction indicator return, etc).
Check that there is no rattle.
26. Check and if necessary adjust engine idling speed.

CONTROL PROGRAM

to be carried out by authorized workshop every 6,000 miles/10 000 km.

Engine

- Check and if necessary adjust valve clearance.
- Clean air cleaner insert.
- Check and if necessary adjust engine idling speed and the emission of carbon monoxide (CO) at idling.
- Clean fuel pump filter.
- Check fuel lines in engine compartment for leakage.
- Pressure test of the cooling system (check the condition of the hoses).
- Check the choke mechanism and fast idling.
- Check the vacuum hoses and connections.

Electrical system

- Check condition of V-belts and adjust belt tension if necessary.
- Inspect condition of headlights by eye.
- Check and if necessary adjust headlight alignment.
- Check spark plugs.
- Check condition of breaker points.
- Check and if necessary adjust dwell angle and ignition timing.
- Lubricate distributor breaker cam and lubricating felt.
- Check the condition of the ignition cables.

Transmission

- Check and if necessary adjust clutch release bearing play and the level in the clutch main cylinder.
- Check transmission oil level and top up if necessary.

Brake system

- Check level in master cylinder, top up with brake fluid if necessary.
- Remove wheels and check thickness of brake pads.
- Check the tightness of the wheel cylinders.
- Check and if necessary adjust handbrake and footbrake.
- Check brake lines and hoses for condition and leaks.

Front assembly

- Lubricate the steering gear.
- Lubricate ball joints and tie rod ends (not cars with permanently lubricated joints).
- Check toe-in.
- Check condition of rubber bellows on steering gear and inner and outer universal joints, and of rubber seals for ball joints and tie-rod ends.

Miscellaneous

- Test drive and function control.

SPECIAL MAINTENANCE PROGRAM

to be carried out every 6,000 miles/10,000 km or oftener.

The owner can carry out the work or order it in connection with service.

- Check the oil level in the engine.
- Check the freezing point of the cooling liquid.
- Check battery electrolyte level and top up if necessary.
- Tighten and grease cable clamps.
- Check fuel lines in the engine compartment for leakage.
- Check that the choke shaft moves easily. Lubricate the throttle control.
- Check the tightness and the condition of the exhaust system.
- Lubricate the door stops, the door hinges and the hood lock mechanism.
- Check the tire pattern depth.
- Check the air pressure in the spare tire.
- Check operation of parking, brake and tail lights, licence plate illumination, direction indicators, horn, back-up lights, hazard warning signal, interior lighting, control and indicator lights, windshield and headlight washers and wipers, brake warning light, instrument lighting, trunk lighting and ventilator fan.
- Check condition of washer jets and rubber wiper blades.

MAINTENANCE PROGRAM

In connection with 6,000 miles/10,000 km service. Carried out when needed by authorized workshop.

- U1. Change engine oil every 6,000 miles/10,000 km or twice a year.
- U2. Change oil filter every 6,000 miles/10,000 km.
- U3. Change oil in the gearbox. Clean the magnetic plug. Every 20,000 km/12,000 miles or at least once a year.
- U4. Change spark plugs every 12,000 miles/20,000 km.

U5. Change breaker points (after control).

U6a. Change fuel filter every 12,000 miles /20,000 km.

U6b. Change air cleaner insert every 18,000 miles/
30,000 km.

U7. Check and if necessary adjust wheel angles (camber, caster and toe-in) every 12,000 miles/20,000 km.

U8. Change brake fluid every 24,000 miles/40,000 km or every second year.

U9. At the first 6,000 miles/10,000 km program: Torquing the inlet manifold.

U10. Saab 95: Check and if necessary adjust liquid level in the rear shock absorbers every 12,000 miles/20,000 km.

U11. Every 12,000 miles/20,000 km as from model 1976: Check the crankcase ventilation hoses. Remove, wash and fit the guiding sleeve. Clean the strainer in the oil filling cap.

LUBRICATION

Engine

THE MOTOR OIL should be changed for the first time after 1,200 miles (2,000 km), after which it should be changed every 6,000 miles (10,000 km) or twice a year.



DRAIN PLUGS, OIL

1. Engine
2. Transmission

Use oil according to Service Class SE in the API system or to Ford specification ESE-M2C-101C. Viscosity SAE 10 W 30 or 10 W 40. In extremely cold weather, i.e. at constant temperatures below -4°F (-20°C), use oil of viscosity SAE 5 W 20. NOTE! This oil may not be used at temperatures above 32°F (0°C).

Oil quantity 5 imp. pints (3 liters), incl. oil filter 5.8 imp. pints (3.3 liters). The distance between the upper and lower marks on the dipstick corresponds to a volume of 2.5 imp. pints (1.5 liters).

THE OIL FILTER should be changed every 6,000 miles (10,000 km) in connection with oil change. The filter is removed with tool 78 62 014.

THE THROTTLE CONTROL BEARINGS, accessible from the engine compartment, should be oiled every 6,000 miles (10,000 km) with motor oil.

ELECTRICAL SYSTEM

The DISTRIBUTOR LUBRICATING FELT should be oiled every 6,000 miles (10,000 km) with motor oil.

The felt is placed in the upper part of the shaft under the distributor arm, which must be removed first.

THE DISTRIBUTOR BREAKER CAM is at the same time lubricated with Bosch Ft 1v4 grease.

NOTE

Avoid excessive lubrication of distributor parts, as grease on the breaker points causes burning of these and can disturb the ignition.

TRANSMISSION

THE TRANSMISSION OIL should be changed for the first time after 1,200 miles (2,000 km), and thereafter at intervals of 12,000 miles (20,000 km) or at least once every year. Use EP oil, SAE 80 W alt SAE 75, according to API GL-4 all the year round.

Gearbox and differential are filled and drained through the same openings.



FILLER AND LEVEL PLUGS, TRANSMISSION

1. Filler plug
2. Level plug

The oil level should be checked every 6,000 miles (10,000 km).

The level should not be lower than 0.2 in. (5 mm) below the hole for the level plug.

Use dipstick 78 62 444 after unscrewing the filler plug.



CHECKING THE GEARBOX OIL LEVEL

THE CLUTCH FLUID CONTAINER should be filled with brake fluid according to specification. The fluid level should be checked regularly and it should coincide with the level mark on the outside of the container.

BRAKE SYSTEM

THE BRAKE FLUID CONTAINER should be filled with brake fluid according to specification DOT3, DOT4 or SAE J 1703. The level should be checked regularly. At the same time check that the bleeding hole in the cover is not clogged. The brake fluid should be changed every 24,000 miles (40,000 km) or at least every second year.

CHASSIS

BALL JOINTS AND TIE ROD ENDS should, if not permanently lubricated, be greased every 6,000 miles (10,000 km) with Saab Special Chassis Grease. The front end of the car should be lifted so that the front wheels are free from the floor.

THE STEERING GEAR should be greased every 6,000 miles (10,000 km) with Saab Special Chassis Grease. While greasing, turn the steering wheel to full left lock so that the grease penetrates also to the righthand part of the steering gear. Check that rubber bellows are not abnormally swollen after lubrication and that they are free of defects likely to cause loss of grease.

REAR SHOCK ABSORBERS (Saab 95). The oil level should be checked every 12,000 miles (20,000 km). This should be level with the filling opening. Replenish if necessary with hydraulic oil suitable for shock absorbers.

BODY

THE DOOR HINGES AND THE ENGINE HOOD LOCK MECHANISM should be lubricated every 6,000 miles (10,000 km) with motor oil. The door hinges have special holes equipped with rubber plugs with a through hole. To lubricate, press the oil can against the rubber plug.

MISCELLANEOUS

THE SEAT RAILS should, if the seats are difficult to move, be lubricated with vaseline. Wipe off excessive grease so that clothes are not stained.

THE GEAR SHIFT ROD BEARING at the dash panel should be lubricated with motor oil if necessary. The felt bushing in the gear shift rod bearing should be oiled sparingly with paraffin base oil, if removed for other reason.

AT OVERHAUL front and rear wheel bearings and shaft joints should be repacked with Saab Special Chassis Grease.

UNDERBODY AND RUSTPREVENTING TREATMENT

TOUCHING-UP UNDERBODY COATING

To retain the advantages afforded by underbody coating, the underbody, too, should be regularly inspected and the underbody coating touched up as necessary. Apart from protecting against corrosion, the underbody coating improves sound insulation. This protection is particularly important with regard to the fenders, which are continuously exposed to wear from a constant barrage of flying stones and gravel. Before covering worn or bare parts with fresh underbody coating composition, clean the metal thoroughly with a scraper and a steel-wire brush and then wash with gasoline or suchlike. Before applying fresh composition, coat the metal with a reputable make of rust-inhibitive, and then apply about 0.06 in. (1.5 mm) thick coating of composition before the rust-inhibitive has dried. Excessive application will result in the composition running and it may even pull right away from the metal which it is intended to protect. Naturally, new metal panels, such as fenders, must always be treated in a similar manner after fitting. If underbody coating is applied prior to spraying, it is essential that all composition be washed off the surfaces which are to be enameled.

RUST-PREVENTING TREATMENT

The cars are treated with a rust preventive agent before leaving the factory. As from model 1974, spraying with rust-preventive oil has been greatly increased. The underside of the floor is sprayed after the underbody compound is applied. The rust preventing treatment which the car receives at the factory should be repeated within 12 months after delivery. The reason for this is that some settlement of the electrophoretic paint may occur in the welded body joints after the car has been driven for some time. Provided that this treatment is performed in accordance with the instructions issued by Saab-Scania, further spraying with rust-preventive oil will only be necessary every second or third year.

HOLES AND RUBBER PLUGS IN THE BODY

The parts of the body which must be sprayed with rust-preventive oil are listed under the heading Treatment program. On cars as from model 1974, no new holes need be made for this treatment. On older cars, some new holes must be drilled. The hole dimensions are 0.8 in. (20 mm) dia. and 0.4 in. (11 mm) dia. The holes are sealed with slitted rubber plugs (20 mm dia. 84 59 497 and 11 dia. 84 59 513).

PRELIMINARY WORK

1. Clean the car's underside, wheel housings, engine compartment, dash panel wall and sheet metal welds on the front floor.
2. Remove any gaps in the underbody sealing compound.
3. Remove all wheels and mask the brake discs and drums. Mask the surfaces of the rear axle studs against the suspension straps.
4. Withdraw the seat belts and fix them in the withdrawn position until the treatment is finished. (Applies only to Saab 96 cars in cases where reel belts are fitted).
5. Make 20 mm (0.8") and 11 mm (0.4") holes where indicated in the treatment program and pictures. (Applies only to models up to and incl. model 1973). After the treatment is finished, seal the new holes with slotted rubber plugs 84 59 497 (20 mm/0.8") and 84 59 513 (11 mm/0.4").

OIL, PRESSURE AND TEMPERATURE

About 3 1/2 pints (3 litres) of oil are used in the treatment. Information on pressure for spraying should be obtained from the oil manufacturer. Use heavy oil for the underbody and wheel housings and light oil for the members, cavities and welds. Heavy oil should be used for application with a brush or oil can. In order to assure sufficient penetration, the temperature of the car should not be less than 50°F (+10°C).

EQUIPMENT

Two high-pressure compressors for airless spraying with a 40:1 pressure increase for heavy oil and 48:1 for light oil. Two spray guns and nozzles which permit access to cavities, members, doors and through slitted rubber plugs. Oil can and brush for treatment of welds between wheel housings and fenders



EQUIPMENT FOR RUST-PREVENTIVE TREATMENT

1. Nozzle for spraying doors.
2. Nozzle for spraying members and cavities.
3. Nozzle with reduced pressure for treatment of welds between wheel housings and fenders. Can be substituted by brush or oil can.

TREATMENT PROGRAM

The treatment is divided up into four groups. The first group is done from underneath, the second group from the sides, and groups 3 and 4 from the horizontal reference line. The underbody and wheel housings are sprayed on the outside. Cavities and members are sprayed on the inside. The doors are treated through holes in the rear edge and sprayed on the bottom and approx. 100 mm (4.0") up the side.

NOTE

Points of treatment with slitted plugs can be treated through the plug if the right nozzle is used.

Group 1 (from below)

- 1.1 The cavity formed between the front floor and the bottom panel on the bearing bracket for the front suspension. Two holes 11 mm (0.4") in diameter accessible in the front floor panel.
- 1.2 The cavity formed by the front seat member against the center floor. Hole 11 mm (0.4") in diameter accessible in the center floor panel.
- 1.3 The cavity in the spring shaft by the rear axle attachment. Hole 11 mm (0.4") in diameter accessible in the center floor panel.
- 1.4 The cavity in the spring shaft to the side of the center bearing attachment. Two holes 11 mm (0.4") in diameter in the center floor plate.
- 1.5 Spray the underbody and the wheel housings with oil. Pay special attention to the points of attachment of the chassis components and the jack.
- 1.6 The joint between the lower dash panel, front floor and front wheel housing through the hole 20 mm (0.8") in diameter in the front floor.

Group 2 (from the sides)

- 2.1 Inside the scuff plates.
- 2.2 Cavities between the sill members and the outer side panels. The Saab 96 can be treated in either of the following two ways. Only alternative B can be used for the Saab 95.
 - A. Spraying through the drain plug in the underside of the front side panel. Aim the nozzle at the wheel housing and hold it about 10 mm (0.4") above and parallel with the lower edge of the side panel. Twist the nozzle a few degrees to the side, first in the direction along the side panel and then in the direction along the sill member, spray once in each direction. Spraying in any other direction entails the risk of getting spots on the reel belt, side board and adjoining trim. The trouble with this method is that it is difficult to cover the whole bottom surface of the side panel and that the oil tends to splash out into the space under the back seat.
 - B. Application from the inside with a brush. Fold the seat cushion forward and detach the strap between the cushion and the lower portion of the back cushion. Detach the wires from the sill members by removing the rubber plugs and unhooking the wires. Fold the seat cushion for-

ward even more and detach it from the hinge to the right. Remove the back cushion by undoing the screws which hold the hinge in place. Detach the side trim. Begin with the padded strip under the side window and continue with the top portion of the side board and then the front edge of the side board. Try not to damage the side board. If you pull too hard, the board around the clip attachments will tear. Then coat the bottom surface of the side panel and the adjoining free wheel surfaces up to a height of 100 mm (4.0") from the bottom. After the treatment is finished, replace the side trim and back and seat cushions.

Groups 3 and 4 (from horizontal reference line)

Engine compartment

- 3.1 The cavity between the front wheel housing panel and the spring support. Hole 40 mm (1 1/2") is provided in the front wheel housing panel, right and left.
- 3.2 The cavity formed by the front edge of the roof against the dash panel. Both outside corners should be treated. Two holes 11 mm (0.4") in diameter are accessible in the roof panel. The doors should be closed.
- 3.3 The cavities in the points of attachment of the front shock absorbers, right and left.

Trunk lid, Saab 96

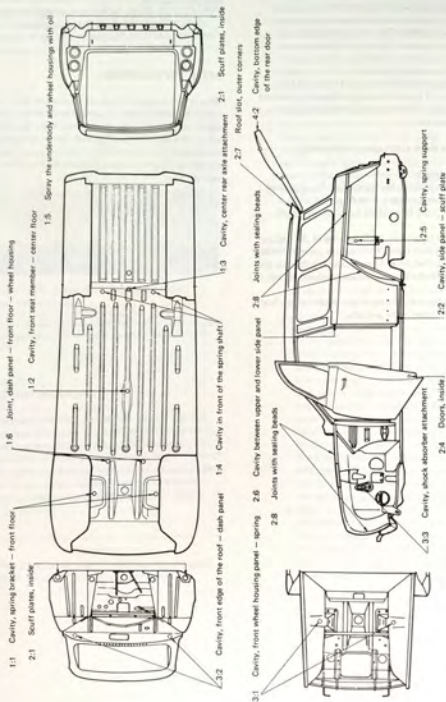
- 4.1 Treat the trunk lid through the holes provided.

Rear door, Saab 95

- 4.2 Treat the cavities on the bottom edge of the rear door through the run-off holes provided.

AFTER THE TREATMENT

Wipe off the excess oil from the application points on the doors, fender sides and painted surfaces. Use a rag dampened with mineral spirits. Clean the sheet surfaces around the joints and sealing beads. Don't use so much solvent that the oil in the joints is thinned out. Remove the masking from the brake discs and drums. Mount the wheels.



S 4195

POINTS OF RUST TREATMENT, SAAB 900

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GENERAL

The engine is a four-cylinder, water-cooled, overhead valve unit, with the cylinders arranged pairwise in a 60° Vee formation, and operates on the four-stroke cycle. The carburetor is a single downdraught carburetor with an automatic choke device. Up to and incl. model 1975, the single downdraught carburetor is equipped with automatic choke. Model 1976 (1975 B) and 1977 have a carburetor equipped with a manual choke. As from model 1977 B, the carburetor is of the two-stage type with an automatic choke device.

The cylinder heads have separate inlet ports and common exhaust ports for each bank of cylinders.

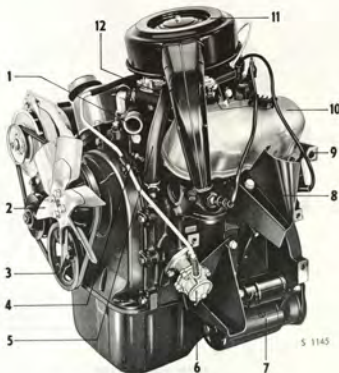
Engine balance is provided for by means of a balance shaft, located on the righthand side of the block. It is driven by the crankshaft run in three bearing bushes, whereas the balance shaft runs in two.

CYLINDER BLOCK

The cylinder block is of special cast iron and is cast in one piece. The cylinder bores, which are surrounded by cooling jackets, are machined directly into the cylinder block. Oil drillings for the lubrication system are provided in the cylinder block.

CYLINDER HEADS AND VALVES

The two fully identical cylinder heads are bolted to the cylinder block. The combustion chambers are partly machined and have 0.551 in. (14 mm) threads for spark plugs. The valves of special steel are suspension-mounted in the cylinder heads. The valves operate in guides machined directly in the cylinder head and there are thus no separate valve guides and valve seats.



ENGINE, LEFTHAND VIEW

- | | |
|--------------------------------|------------------------------|
| 1. Hose connection, upper | 7. Starter |
| 2. Fan | 8. Preheater plate |
| 3. Balance shaft pulley | 9. Bracket, engine side stay |
| 4. Temperature transmitter | 10. Valve cover |
| 5. Hose, crankcase ventilation | 11. Air filter |
| 6. Fuel pump | 12. Carburetor |

CRANKSHAFT

The cast-iron crankshaft has hardened and ground bearing journals. It runs in three main bearings, the middle one of which also serves as an axial guide bearing. Oilways for lubricating oil are drilled in the shaft. All main bearing inserts are interchangeable.

CAMSHAFT AND TAPPETS

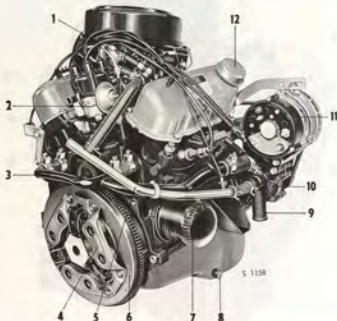
The camshaft is a cast unit with hardened and phosphated cams. It is driven by the crankshaft via a gear with a ratio of 2:1. The camshaft gear is made of fiber to ensure quiet running. Guidance in the axial direction is provided by a thrust plate located in the front end of the shaft. The axial clearance is determined by a spacer located behind the said thrust plate. The tappets are actuated di-

rectly by the camshaft. They are carried in the cylinder block and transmit the movement to the valves via push rods and rockers. The tappets are accessible upon removal of the cylinder heads.

CONNECTING RODS, PISTONS AND PISTON RINGS

The pistons are journaled on the piston pins, and the pins are secured to the connecting rods by means of shrinkage. Thanks to the tight fit of the connecting rods and piston pins, no special circlips are required for the piston pins. Both pistons and connecting rods complete and separate pistons and connecting rods are carried as spare parts.

The pistons are made of aluminium. They have grooves for two compression rings and one oil control ring. The upper compression ring is chromeplated and plain. The lower compression ring has oil-scraping properties. The oil control ring itself is tripartite.

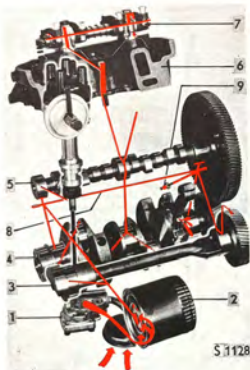


ENGINE RIGHTHAND VIEW

1. Automatic choke
2. Distributor
3. Water distribution pipe
4. Clutch
5. By-pass line
6. Flywheel
7. Oil filter
8. Oil drain plug
9. Hose connection, lower radiator hose
10. Water pump
11. Alternator
12. Oil filler cap

LUBRICATION SYSTEM

The engine lubrication system is of the forced feed type. The pressure is generated by a rotor-type pump driven by the camshaft. The pump is mounted in the oil pan under the crankshaft. The pump rotor forces the oil past a relief valve incorporated in the pump itself and on through the oil filter and oilways to the various lubrication points. The oil filter is of the full-flow type, which means that all oil force-fed to the lubrication points passes through the filter.



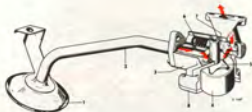
LUBRICATION SYSTEM

- | | |
|------------------|------------------------|
| 1. Oil pump | 6. Cylinder head |
| 2. Oil filter | 7. Rocker assembly |
| 3. Balance shaft | 8. Gallery line |
| 4. Crankshaft | 9. Oil pressure switch |
| 5. Camshaft | |

Oil pump, relief valve

The oil pump is of the bi-rotor type. Its shaft is connected to the distributor shaft which is driven by the camshaft via an angle drive. When the pump is working, oil is drawn into the spaces formed between the inner and outer rotors from the suction side to the discharge side. The pump suction line is fitted with a strainer.

The relief valve is incorporated in the pump body and consists of a spring-loaded plunger. The valve opens at a pressure of 45–55 psi (3.2–3.9 bar, kp/cm^2) and admits oil to the suction side of the pump.

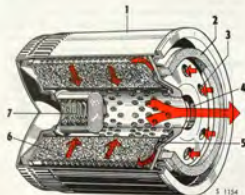


OIL PUMP, DISMANTLED

1. Housing with strainer
2. Suction line
3. Pump body
4. Bi-rotor
5. Rotor
6. Spring
7. Relief valve
8. Cover

Oil filter

The oil filter is made as a unit complete with cartridge. The filter is of the full-flow type and is screwed directly onto the cylinder block. The oil forced out to the various lubrication points in the engine passes first through the oil filter. The filter is fitted with an overflow valve which allows the oil to flow past the filter if flow resistance becomes excessive due to clogging of the filter.



OIL FILTER

1. Filter housing
2. Rubber seal
3. Oil inlet
4. Oil outlet
5. Check valve
6. Filter part
7. Overflow valve

IGNITION SYSTEM

The distributor is driven by the camshaft via a bevel gear. The rotor revolves in the clockwise direction. The firing order is 1-3-4-2. The ignition timing in relation to the engine speed is regulated by a centrifugal governor and in relation to the load by a vacuum governor.

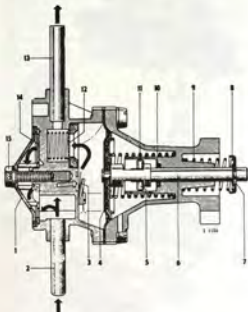
FUEL SYSTEM

The diaphragm-type fuel pump draws fuel up from the tank to the carburetor. The pump is located on the left-hand side of the engine and is driven by the camshaft by means of a push rod from a special cam on the shaft. The

pump is equipped with an idling device which ensures that pumping is no longer effective when a sufficiently high pressure has been attained. On its way to the carburetor, the fuel passes through a nylon filter housed in the fuel pump. The filter is accessible upon removal of the pump cover.

As from model 1970, a filter is also installed in the hose between the fuel pump and the carburetor.

The new type fuel pump is of the same basic design as the former type. However, the pump housing on the new pump cannot be dismantled for repair. If the diaphragm or valves are damaged, the housing must be replaced.



FUEL PUMP, EARLIER DESIGN, SECTIONED

1. Cover
2. Fuel inlet
3. Inlet valve
4. Diaphragm
5. Retaining pin
6. Diaphragm rod
7. Lock washer
8. Retaining washer
9. Return spring
10. Seal
11. Compression spring
12. Outlet valve
13. Fuel outlet
14. Filter
15. Screw for cover

Fuel tank, as from model 1971

As from model 1971, the fuel tank is designed so as to allow internal expansion of the fuel. The expansion space is opened by a valve which is actuated by the filler cap.

Fuel tank ventilation

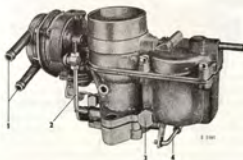
When fuel is poured in, the tank (1) will not be completely filled, and instead the level rises only slightly above the lower opening on the venting tube (3). The reason for this is that an air cushion is formed above this level and prevents further filling of the tank.

The formation of this air cushion is due to the fact that a spring-loaded valve (5) located in the filler pipe (2) blocks the upper opening on the venting tube (4) from the upper side of the tank.

When the tank cap (7) is screwed on, a lever is actuated which opens the valve, thus providing a communication from the upper part of the tank to the surrounding air via the ventilation hose (6) which runs out under the rear fender. The fuel, which increases in volume when the temperature rises, is now able to expand inside the tank instead of being pressed up through the filler pipe (2). As the fuel level becomes lower in course of driving, air is drawn into the tank via the ventilation hose (6).

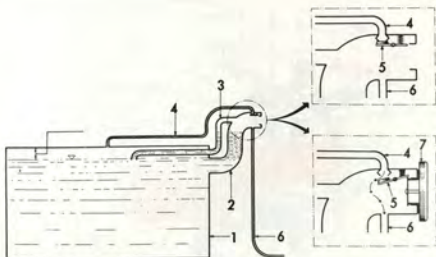
CARBURETOR SOLEX, UP TO AND INCL MODEL 1968

The carburetor is a Solex downdraught carburetor. Up to and incl. engine No. 16 100 (chassis No. -434.173 for the Saab 96 and Monte Carlo, and -46.137 for the Saab



CARBURETOR, UP TO AND INCL. ENGINE NO. 16 100, RIGHTHAND VIEW

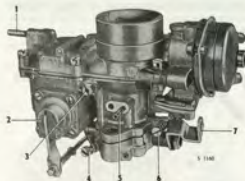
1. Water connections
2. Control link, fast idling
3. Plug for main jet
4. Control link, acceleration pump



FUEL TANK VENTILATION, ARRANGEMENT DIAGRAM

1. Fuel tank
2. Filler pipe
3. Venting tube
4. Venting tube
5. Spring-loaded valve
6. Ventilation hose
7. Tank cap

95) the designation is 28-32 PDSIT-7. As from engine No. 16 101 (chassis No. 434.174- for the Saab 96 and Monte Carlo, and No. 46.138- for the Saab 95), the designation is 32 PDSIT-4.



CARBURETOR, UP TO AND INCL. ENGINE NO. 16 100, LEFTHAND VIEW

1. Fuel inlet
2. Acceleration pump
3. Idling fuel jet
4. Air-regulating screw, idling mixture
5. Vacuum outlet
6. Adjusting screw, idling
7. Throttle control

The fuel supply is regulated by fixed jets mounted in the carburetor body. The body contains not only fuel drillings but also air drillings and a certain amount of air is mixed with the fuel at an early stage in the emulsion tube.

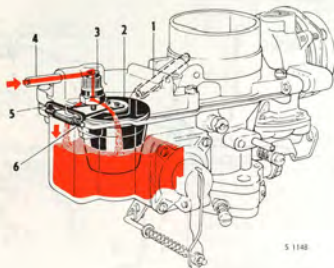
The carburetor features an automatic choke device with rapid idling, an acceleration pump and a pressure-controlled booster system known as an econostat. The various carburetor functions are dealt with in the following sections.

The illustrations show carburetor 28-32 PDSIT-7, but the functions described refer to carburetor 32 PDSIT-4 as well.

Float system

The fuel level in the float chamber is adjusted by means of the float. As the fuel flows into the chamber, the float is lifted up and presses the needle valve against the seat. As soon as the correct level is reached, the fuel supply is cut off. The procedure is repeated when the level falls.

The float is made of nylon and is fitted with a fixed lever. In order to keep the float level stable, the needle valve is fitted with a spring-loaded ball. The float chamber is internally ventilated, i.e. the ventilation emanates in the neck of the carburetor. Carburetor 32 PDSIT-4 is, however, equipped with a valve which opens when the throttle valve is closed, the float chamber then being ventilated outwards.



FLOAT SYSTEM

1. Ventilation duct
2. Float
3. Float valve
4. Fuel hose connection
5. Holder
6. Shaft

Choke device with fast idling

To facilitate cold-starting, the carburetor is equipped with a spring-loaded strangler valve in the upper part of the carburetor neck. When the valve is closed, the under-pressure below it increases and so does the fuel supply. The strangler valve is regulated automatically by means of a bimetal spring the function of which is directly dependent on the prevailing coolant temperature. The bimetal spring keeps the choke closed as long as the engine is cold, but as the temperature of the cooling water rises the strangler valve gradually opens and is wide open at a temperature of 140–149°F (60–65°C).

The starting automatics feature a vacuum-regulated diaphragm which, via a pull rod, opens the strangler valve slightly as soon as the engine has started, thus providing sufficient engine air and preventing suffocation. To ensure that this demand will be satisfied even when the vacuum falls in conjunction with acceleration, a device is provided which on such occasions forces the strangler valve to open.

The starting automatics include a ratchet device (ratchet wheel with three steps) which serves to increase the idling speed when starting from cold. The ratchet wheel is controlled by the bimetal spring and the amount of increase in idling speed is determined by the position adopted by the ratchet wheel.

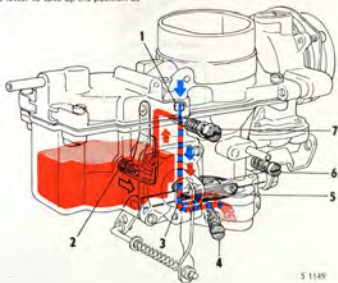
In order to engage the fast-idling device when starting from cold, the accelerator pedal must be pressed right down and then released before an attempt to start is made. This is necessary in order to release the ratchet wheel, thus enabling the latter to take up the position de-

cided by the bimetal spring. The throttle valve is then actuated by the adjustable control rod and the idling function of the throttle valve is now moved from the idling screw to the ratchet wheel.

Idling system

When the engine is idling, the throttle valve is almost fully closed (regulated by the idling screw) so that there will be a large vacuum (negative pressure) around and under it. The vacuum in the idling passage emanating under the throttle valve will then be so great as to cause fuel to be drawn up through the main jet and through a special duct up to the idling jet. The air jet is in the form of a drilling and cannot be altered. The obtained mixture of fuel and air is now drawn through the idling duct via the air-regulating screw into the engine.

The said air-regulating screw is used to vary the throughput area for the fuel, thus regulating the mixture of fuel and air. As a certain amount of air is always passing the throttle valve, the engine fuel-air mixture when idling will be richer if the screw is screwed out and thinner if it is screwed in.



S 1149

IDLING SYSTEM

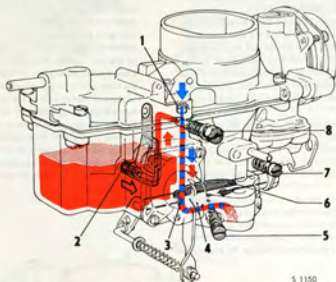
1. Idling air jet
2. Main jet
3. Idling duct
4. Air-regulating screw, idling mixture
5. Throttle valve
6. Adjusting screw, idling
7. Idling fuel jet

Low-speed system

To facilitate the transfer from the idling system to the main system, i.e. from idling to normal driving, the carburetor is fitted with a transitional system known as a low-speed system. This latter system communicates with the idling system and receives all its fuel-air mixture from the idling passage of the latter.

The fuel-air mixture of the low-speed system is supplied

to the engine through two holes drilled in the neck of the carburetor. These holes are located immediately above the closed position of the throttle valve. As the valve opening is slowly increased from idling, the mixture of fuel and air is drawn not only from the idling system but also through one or both of these holes, depending on the position of the throttle valve. The low-speed system cannot be adjusted or altered, as its function is set exactly by the manufacturer.



S 1150

LOW-SPEED SYSTEM

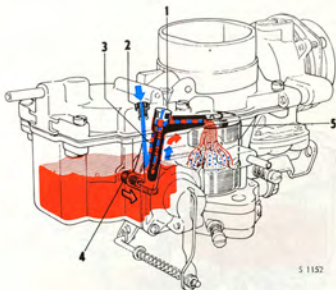
1. Idling air jet
2. Main jet
3. Idling duct
4. Transition hole
5. Air-regulating screw, idling mixture
6. Throttle valve
7. Adjusting screw, idling
8. Idling fuel jet

High-speed system

At higher speeds and heavier loads, fuel is supplied to the engine through the main system of the carburetor. The fuel passes the main jet before reaching the emulsion tube

pressed into the carburetor body.

As the fuel passes through the emulsion tube, an amount of air determined by the emulsion jet is mixed with it. The obtained mixture of fuel and air then flows into the neck of the carburetor through an atomizer.



S 1152

HIGH-SPEED SYSTEM

1. Cover plate
2. Emulsion jet
3. Emulsion tube
4. Main jet
5. Choke tube

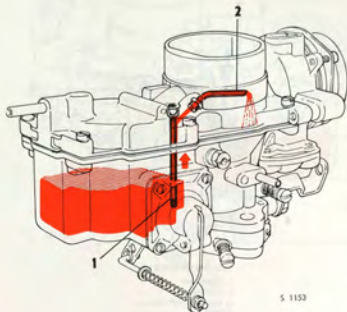
Econostat system

In order for the engine to receive enough fuel at higher full-load speeds, the carburetor is provided with a booster system known as an econostat. This works parallel with the main system and is fed directly from the float chamber.

The system consists of a calibrated riser which is press-

fitted in the float chamber cover. From the riser, a duct leads to the atomizer pipe which is also press-fitted in the cover. The opening of the atomizer pipe is placed in

the neck of the carburetor at a point where a slight vacuum prevails at low speed and low load. Only as the speed and load increase does the vacuum at this point become high enough to cause fuel to be drawn up through the riser.



S 1153

ECONOSTAT SYSTEM

- 1. Riser
- 2. Spray pipe

Acceleration system

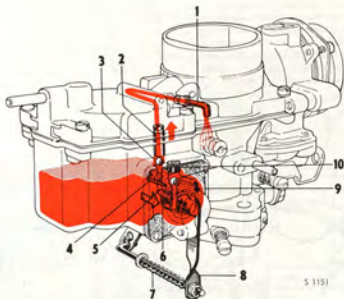
If the throttle valve is opened quickly, the air-fuel mixture tends to be lean. The reason for this is that the air moves more easily than the fuel and thus reaches the engine sooner.

To compensate for this, a certain amount of fuel is therefore injected into the engine with the aid of the acceleration pump. The latter, which is located on the right-hand side of the float chamber, is a diaphragm pump which works with a spring-loaded link from the throttle valve. The fuel to the acceleration system is sucked from the float chamber via an inlet valve inside the acceleration pump. Pump strokes cause the inlet valve to be closed

and the fuel is forced past the ball in the inlet duct and out into the throat of the carburetor via acceleration jet and injector tube.

When injection ceases and the diaphragm returns to the normal position, the ball closes the outlet duct and fuel fills the acceleration pump again through the open inlet valve.

The acceleration pump is connected with the float chamber via a small leakage hole in order to prevent acceleration fuel from flowing into the engine when it expands on account of the carburetor getting warm. This has made it necessary to increase the pump stroke.



5 1151

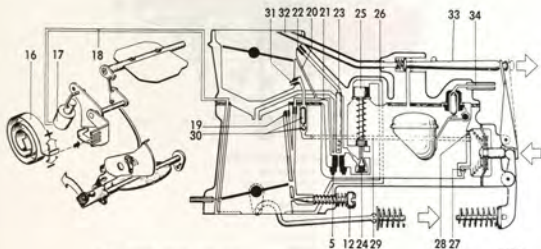
ACCELERATION SYSTEM

1. Injector tube
2. Acceleration jet
3. Ball
4. Leakage hole
5. Outlet duct
6. Spring
7. Control link
8. Lever
9. Diaphragm
10. Inlet valve

CARBURETOR FOMOCO, MODEL 1969-1970

As from model 1969 the car is equipped with a FoMoCo down-draught carburetor. The fuel feeding is regulated by fixed jets mounted in the carburetor body. Only the main jet is removable. In the body there are drilled fuel ducts, and also air ducts. In the emulsion tube is — at an early stage — a certain amount of air being mixed in with the fuel.

The carburetor has an automatic choke device with fast idle and accelerating pump. The carburetor differs from the Solex carburetor previously used, especially by it that only the main jet is removable and the fast idle device situated on the outside of the carburetor. The fast idle has four steps out of which the fourth step is engaged at the start only. As soon as the accelerator pedal is touched upon, the said step is disengaged independently of the cooling water temperature. Then fast idle works with three steps like the Solex carburetor previously used. Adjustment of fast idle, accelerating pump capacity, float chamber ventilation and float level is made by bending control rods and levers. These have, at the factory, been adjusted to prescribed measurements, and a readjustment at the garage is therefore — as a rule — not required.



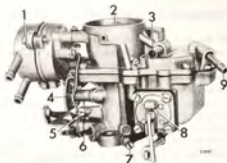
CARBURETOR, MODEL 1969-1970

- | | | |
|--------------------------------|----------------------------------|---|
| 1. Thermostatic spring housing | 13. Throttle valve | 25. Control piston |
| 2. Automatic choke housing | 14. Accelerating pump rod | 26. Vacuum passage |
| 3. Choke plate shaft | 15. Accelerating pump lever | 27. Inlet valve |
| 4. Choke plate | 16. Thermostatic spring | 28. Pressure-equalising hole |
| 5. Main jet | 17. Vacuum piston | 29. Pump discharge passage |
| 6. Float needle valve | 18. Vacuum passage | 30. Ball check valve (discharge) and weight |
| 7. Step cam | 19. Idle air jet | 31. Pump jet |
| 8. Float with shaft | 20. Idle air channel, mixing air | 32. Vent tube |
| 9. Diaphragm piston | 21. Idle fuel | 33. Vent push rod |
| 10. Vent actuating lever | 22. Air correction jet | 34. Fuel supply tube |
| 11. Idle adjusting screw | 23. Mixing tube | |
| 12. Idle mixture control screw | 24. Full load enrichment | |

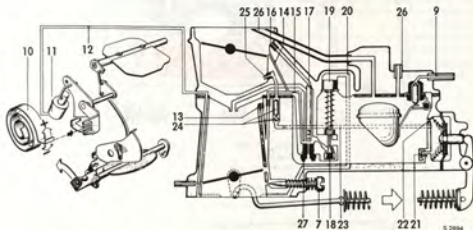
S 2142

CARBURETOR FOMOCO, MODEL 1971-1975

In order to satisfy the demands on cleaning of the exhaust gases, the engine is equipped with an emission carburetor. This carburetor differs from the version in earlier models in that it is made with narrower tolerances and each carburetor has been subjected to a flow test. The following descriptions are valid for FoMoCo carburetors model 1969-1975.



CARBURETOR, MODEL 1971-1975



CARBURETOR, MODEL 1971-1975

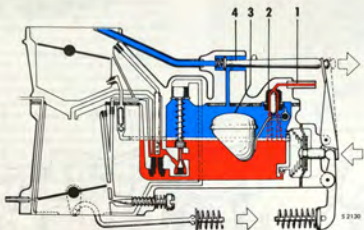
- | | | |
|--------------------------------------|--------------------------|---|
| 1. Automatic choke housing | 10. Thermostatic spring | 19. Control piston |
| 2. Choke plate | 11. Vacuum piston | 20. Vacuum passage |
| 3. Connection for float chamber vent | 12. Vacuum passage | 21. Ball check valve (inlet) |
| 4. Step cam | 13. Idle air jet | 22. Vent |
| 5. Idle adjusting screw | 14. Idle air channel | 23. Pump discharge passage |
| 6. Vacuum nipple | 15. Idle fuel channel | 24. Ball check valve (discharge) and weight |
| 7. Idle mixture control screw | 16. Air correction jet | 25. Pump jet |
| 8. Accelerating pump | 17. Mixing tube | 26. Vent tube, float chamber |
| 9. Fuel supply tube | 18. Full load enrichment | 27. Main jet |

Float system

The fuel level in the float chamber is governed by the float. When the fuel flows into the chamber, the float is lifted and presses the valve against the seat. Once the intended level is obtained, the fuel supply is cut off. When the level sinks, the course is repeated.

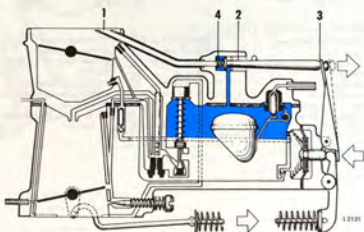
To ensure a stable float level, the needle valve is equipped with a spring-loaded ball.

The carburetor is equipped with a valve, which governs the ventilation of the float chamber. When the throttle valve is closed, the ventilation is directed outwards, when open inwards i.e. to the carburetor neck.



FLOAT SYSTEM

1. Fuel inlet
2. Float needle valve
3. Float
4. Vent push rod



FLOAT CHAMBER VENTILATION

1. Float chamber ventilation
2. Vent push rod
3. Lever
4. Spring

Starting automatics

To facilitate cold-starting, the carburetor is equipped with a choke plate in the upper part of the carburetor neck. When the plate is closed, the vacuum under it increases and so does the fuel supply.

The choke plate is regulated automatically by means of a thermostatic spring the function of which is directly dependent on the prevailing coolant temperature. The choke plate is closed as long as the engine is cold, but as the temperature of the cooling water rises the choke plate gradually opens and is wide open at a temperature of approx. 140°F (60°C).

The starting automatics feature a vacuum-regulated piston which, via a lever, open the choke plate slightly at soon as the engine has started, thus providing sufficient engine air and preventing "suffocation".

Furthermore, there is a mechanical device which forces the choke plate to open, then the vacuum falls due to remarkable acceleration.

The starting automatics include a step cam which serves to increase the idling speed when starting from cold. In order to engage the fast idle device when starting from cold, the accelerator pedal must be pressed right down and then released before an attempt to start is made. This is necessary in order to release the step cam thus enabling the latter to take up the position decided by the thermostatic spring.

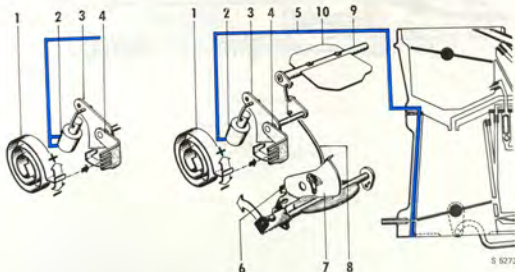
The position of the throttle valve is then not governed by the idling screw any longer but by the position the stop on the step cam.

Automatic choke (Modulating choke) as from carburetor 71 TW—JD

USA cars as from carburetor 70 TW—AA

The choke flap is regulated in the same manner as before by a bimetal spring which reacts to the coolant temperature.

When the engine is started, a vacuum-actuated piston is drawn downwards in a cylinder bore and, if the engine is cold, the choke flap opens somewhat. This is done by a lever and is necessary in order to supply the engine with enough air so that it will not "suffocate". The new design differs from the old one in that there are two slots along the bore of the cylinder. When the piston descends about 3 mm (0.12") the inner slot is exposed above the top of the piston, and when the latter descends a further 4 mm (0.16") the outer slot is also exposed. Atmospheric air can then flow through the slots to relieve the vacuum on the underside of the piston, so that the position of the choke flap is adjusted to the load on the engine. In the older type the choke flap opens by about 4.5–5 mm (0.18–0.20") with the piston all the way down. The new type has a longer cylinder bore, so that the choke flap is wide open when the piston is all the way down.



STARTING AUTOMATICS

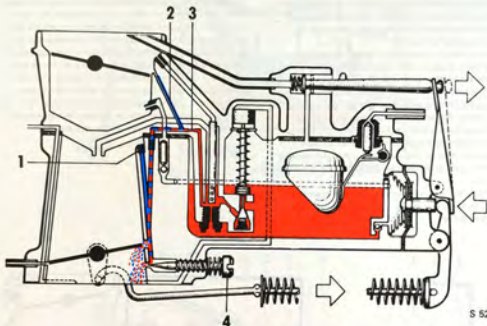
- | | |
|------------------------------|-----------------------|
| 1. Thermostatic spring | 6. Fast idle stop dog |
| 2. Vacuum piston | 7. Step cam |
| 3. Lever | 8. Link rod |
| 4. Thermostatic spring lever | 9. Choke plate shaft |
| 5. Vacuum passage | 10. Choke plate |

Idling system

When the engine is idling, the throttle valve is almost fully closed (regulated by the idling screw) so that there will be a large vacuum under the throttle valve.

The vacuum in the idle air channel emanating under the throttle valve, will then be so great as to cause fuel to be drawn up through the main jet and through a special idle fuel channel up to the idle fuel jet, consisting of an accurately calibrated constriction of the channel. The fuel is then partly mixed with the air admitted through a special air channel. The fuel-air mixture then passes another con-

striction, and receives more air from a pressure-equalising hole, which is placed further down in the neck of the carburetor. The purpose of this is to get the correct relationship between fuel and air, before the mixture — via the mixture control screw — is suctioned into the engine. In order to make the transition from idling system to main system more uniform, there is — in the carburetor neck, just above the idle mixture control screw — a slot, which becomes visible when the throttle valve is opened. This system receives its fuel from the idling system.



S 5274

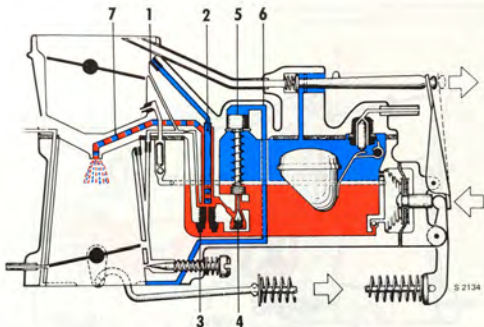
IDLING SYSTEM

1. Idle air jet
2. Idle air channel, mixing air
3. Idle fuel channel
4. Idle mixture control screw

Main system

At higher speeds and heavier loads, fuel is supplied to the engine through the main system of the carburetor. The fuel passes through the main jet before reaching the mixing tube pressed into the carburetor body. As the fuel passes by the mixing tube an amount of air determined by the mixing tube is mixed with it. The obtained mixture of fuel and air then flows into the neck of the carburetor through a spray pipe.

In order for the engine to receive enough fuel at higher full-load speeds, the carburetor is provided with a vacuum regulated full-load-enrichment system. The system consists of a piston, which via a channel communicates with the carburetor neck. The piston is actuated by the vacuum prevailing in the neck. When the engine speed is low and the throttle valve closed, the vacuum is large and the piston is lifted, and a spring-loaded valve — situated close by the main jet — kept shut. When the throttle valve is wide open, the vacuum diminishes and the piston is depressed by a spring, which opens the valve. The fuel then flows direct into the main system through the main jet.



MAIN SYSTEM

1. Air correction jet
2. Mixing tube
3. Main jet
4. Full load enrichment
5. Control piston, full load enrichment
6. Vacuum passage
7. Spray pipe

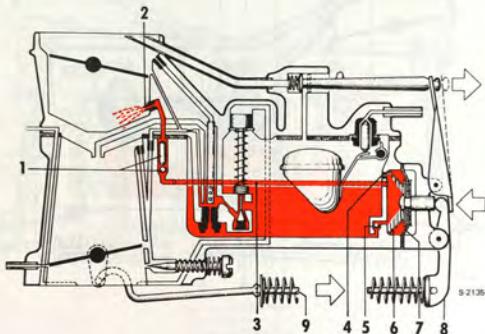
Acceleration system

If the throttle valve opens quickly, the air-fuel mixture tends to be lean. The reason for this is, among other things, that the air moves more easily than the fuel and thus reaches the engine sooner.

To compensate the "leanness", a certain amount of fuel is therefore injected into the engine with the aid of the accelerating pump. The latter is a diaphragm pump which works with a spring-loaded link from the throttle valve. The fuel to the acceleration system is sucked from the float chamber via an inlet valve inside the accelerating pump. Pump strokes cause the inlet valve to close and the fuel is forced past the ball in the outlet duct and out into the carburetor neck via the acceleration jet.

When injection ceases and the diaphragm returns to the normal position, the ball closes the outlet duct and fuel fills the accelerating pump again through the open inlet valve.

In the outlet duct of the acceleration system, there is — above the ball — a weight which serves as non-return valve. The fuel supply to the acceleration system is regulated by it that a certain pressure is required to lift the ball and the weight. In this way fuel injection is prevented, when the valve opens slowly.



ACCELERATION SYSTEM

1. Ball check valve (discharge) and weight
2. Acceleration jet
3. Fuel channel
4. Pressure-equalising hole
5. Ball check valve (inlet)
6. Spring
7. Diaphragm
8. Lever
9. Accelerating pump rod

General

The carburetor has been designed in regard to the stricter exhaust emission regulations and is a development of the FoMoCo carburetor.

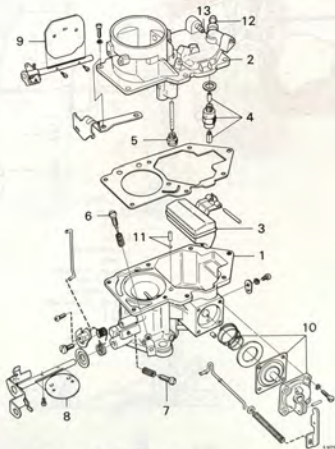
As opposed to the FoMoCo carburetor, the new carburetor is equipped with a manual choke, the lower passages in the idling system are of new design, and the spray pipe of the main system opens into a venturi-ring in the carburetor throat.

Sealed mixture adjusting screw, model 1977

On model 1977, a new type of adjusting screw has been introduced which is equipped with a seal which must be removed (and thereby destroyed) before any adjustment can be made.

The adjusting screw must be resealed after adjustment.

The seal comprises a plastic plug which is press-fitted above the adjusting screw. Plugs mounted at the factory are white while plugs for use by workshops are blue.



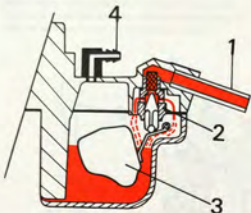
CARBURETOR, EXPLODED VIEW

- | | |
|-----------------------------------|--|
| 1. Float chamber | 8. Throttle flap |
| 2. Float chamber cover | 9. Choke flap |
| 3. Float | 10. Accelerating pump |
| 4. Float valve | 11. Ball and weight, acceleration fuel passage |
| 5. Main jet | 12. Fuel line connection |
| 6. Throttle screw, idling mixture | 13. Float chamber ventilation |
| 7. Idling screw | |

Float system

The fuel level in the float chamber is governed by the float, which acts on the needle valve at the fuel intake. As fuel flows into the float chamber, the float rises, whereupon the needle valve is pressed against its seating, shutting off the supply of fuel. When the level drops, the cycle is repeated.

Ventilation of the float chamber is by means of a nipple in the float chamber cover and a hose opening in the right wheel housing.



S 5276

FLOAT SYSTEM

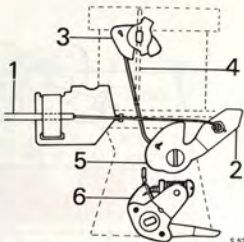
1. Fuel inlet
2. Float valve
3. Float
4. Ventilation

Choke

To facilitate starting when the engine is cold, the carburetor is fitted with a choke valve in the upper part of the carburetor throat. As the valve closes, the vacuum below it, and thus the fuel supply, increases.

The choke is controlled manually by means of the choke control. The choke control cable actuates a lever on the carburetor. The movement of the lever is transferred via a link to a driver on the choke valve pinion.

A fast idling cam which actuates the throttle valve is also attached to the lever. This is designed to increase the idling speed during cold-engine starts.



S 5277

CHOKE

1. Choke control
2. Lever
3. Driver, choke valve
4. Choke valve
5. Fast idling cam
6. Driver, throttle valve

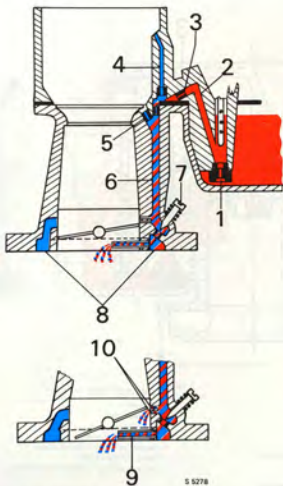
Idling system

A by-pass passage runs past the throttle valve and opens in an idling spray pipe in the throat of the carburetor below the throttle valve. The idling passage opens in the by-pass passage through the idle mixture control screw. When the engine is idling and the throttle valve is almost completely closed (adjusted by the throttle valve screw) there will be a high vacuum below the throttle valve and in the by-pass passage. Accordingly, fuel is drawn from the float chamber, through the main jet and idling fuel passage to the idling jet, comprising a carefully calibrated constriction in the passage. The fuel is then mixed with air introduced through a special air passage. The mixture

then passes through another constriction and additional air is introduced from a pressure equalizing hole, located lower down in the throat of the carburetor.

This is to ensure a correct fuel-air mixture before the mixture passes through the mixture control screw and the idling spray pipe and thence to the engine.

To improve the transition from the idling system to the main system, two holes connected to the idling passage are located above the idle mixture control screw in the throat of the carburetor. As the throttle valve opens slightly, the holes are opened and additional fuel is supplied.



IDLING SYSTEM

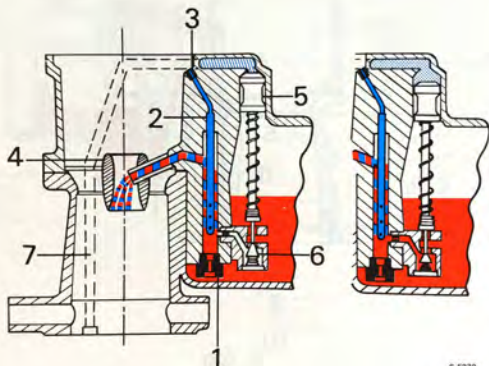
- | | |
|-----------------------------|------------------------------------|
| 1. Main jet | 6. Idling passage |
| 2. Idling fuel passage | 7. Idle mixture control screw |
| 3. Idling fuel jet | 8. By-pass passage |
| 4. Upper idling air passage | 9. Idling spray pipe |
| 5. Lower idling air passage | 10. Fuel outlet, transition system |

Main system

At higher speeds and heavier loads, fuel is supplied to the engine through the main system of the carburetor. The fuel flows through the main jet to the emulsion pipe which is press-fitted in the carburetor housing. A definite quantity of air is added to the fuel during its flow past the emulsion pipe and this quantity is governed by the emulsion pipe. The fuel-air mixture then flows through a spray pipe in the carburetor throat. The spray pipe opens in a ring-shaped inner venturi which provides the air flow with a considerable boost at the spray pipe opening, thereupon producing an effective atomization of the fuel-air mixture.

The carburetor is equipped with a vacuum-regulated

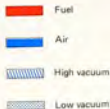
booster system to ensure that the engine receives a sufficient fuel quantity at full load. The system comprises a piston which is connected to the carburetor throat below the throttle valve by means of a passage. The piston is actuated by the vacuum below the throttle valve. When the engine speed is low and the throttle valve only slightly opened, the vacuum is high, the piston is forced up and a spring-loaded valve located at the main jet is kept closed. As the throttle valve approaches the open position, the vacuum drops and the piston is forced down by a spring, opening the valve. An additional supply of fuel then flows into the main system.



S 5279

THE MAIN SYSTEM

1. Main jet
2. Emulsion pipe
3. Emulsion jet
4. Spray pipe and venturi
5. Regulating piston, full-load boost
6. Valve, full-load boost
7. Vacuum passage, booster valve, full-load



Acceleration system

When the throttle valve is opened rapidly, there is a tendency for the fuel air mixture to become too lean due to the fact that the air flows more easily than the fuel and thus reaches the engine faster.

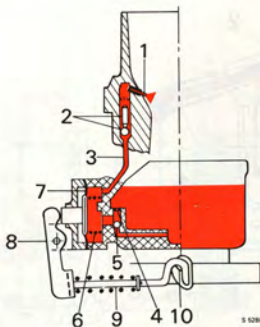
To compensate for this, a certain quantity of fuel is injected into the engine by means of the acceleration pump. The pump is a diaphragm pump and is actuated by a spring-loaded link from the throttle valve.

Fuel for the acceleration system is drawn from the float chamber through an inlet valve in the pump. Pump strokes cause the inlet valve to close and fuel is forced past the ball in the outlet duct, through the acceleration

jet into the throat of the carburetor.

When injection ceases and the diaphragm returns to its normal position the ball closes the outlet duct and fuel from the open inlet valve once again fills the acceleration pump.

A weight is located above the ball in the outlet duct of the acceleration system and this acts as a non-return valve. The supply of fuel to the acceleration system is regulated by means of the certain pressure required to lift the ball and the weight. This prevents fuel injection when the throttle is opened slowly.



ACCELERATION SYSTEM

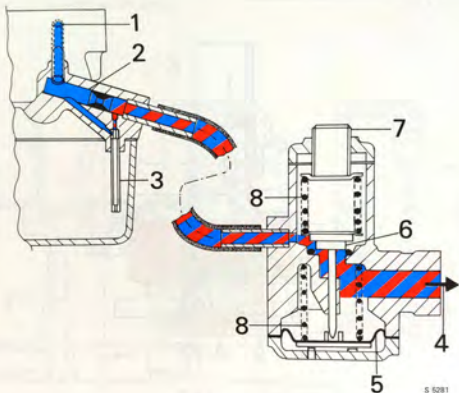
- | | |
|-----------------------------|--------------------------------|
| 1. Acceleration jet | 6. Spring |
| 2. Valve | 7. Acceleration pump diaphragm |
| 3. Acceleration fuel duct | 8. Lever |
| 4. Pressure equalizing hole | 9. Linkage |
| 5. Inlet valve | 10. Throttle valve |

Deceleration system, cars for the USA as from model 1970 and cars for Sweden model 1976 and 1977

The deceleration system comprises a system of passages inside the carburetor, and a deceleration valve outside the carburetor mounted in the flange between the carburetor and the inlet passage.

A spring-loaded diaphragm is located inside the bottom cover of the overrun valve; the vacuum in the inlet duct acts on the top of the diaphragm while atmospheric pressure from a hole in the bottom cover acts from below.

During engine deceleration (freewheel locked), the vacuum acting on top of the diaphragm is sufficiently high to exceed the force of the spring, thus drawing the diaphragm upwards. This actuates the valve spindle and the valve opens. Connection is thereby made between the inlet duct and the deceleration section of the carburetor. The additional fuel-air mixture required to ensure sufficient combustion during engine deceleration can thus flow through this passage.



S 5281

DECCELERATION SYSTEM

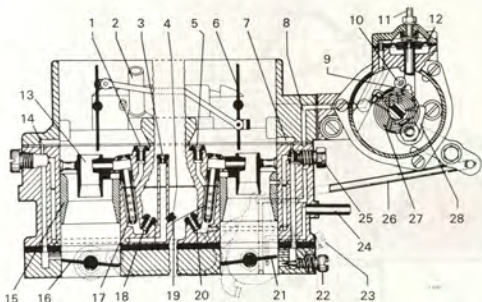
1. Air inlet
2. Deceleration air passage
3. Deceleration fuel passage
4. To the inlet pipe
5. Diaphragm
6. Valve
7. Adjusting screw
8. Spring

The carburetor comprises three main parts: The carburetor cover, the carburetor housing and the throttle section at the bottom. The carburetor is of the two-stage type, with primary and secondary stages. The primary stage includes the cold-start, idling and acceleration-enrichment functions. The two throttle valves are mounted in a separate throttle valve section underneath the carburetor housing. The throttle valve linkage is arranged in such a way that the secondary throttle valve will not open until the primary throttle valve is about 3/4 open. The two valves reach the full-throttle position simultaneously.

Float system

The level of fuel in the carburetor is regulated by the float.

When fuel enters the float chamber, the float will rise, pressing the needle valve into its seating. When the float reaches the predetermined level, the supply of fuel will be shut off. When the level drops, the valve opens and the cycle is repeated. Ventilation of the float chamber is by means of a valve in the carburetor housing. Operation of the valve is governed by the position of the throttle valve lever. When the throttle is open, the ventilation system will operate internally. When the engine is at idling speed or at a standstill, the ventilation will be external into the ambient air.



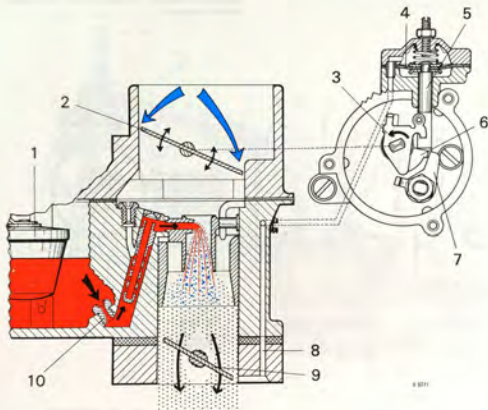
CARBURETOR

- | | | |
|--|------------------------------------|--------------------------------------|
| 1. Air jet, main system | 11. Adjusting screw | 21. Throttle valve |
| 2. Ventilation pipe, float chamber ventilation | 12. Diaphragm | 22. Mixture adjusting screw, idling |
| 3. Air jet, transition system | 13. Spray pipe | 23. Idling adjusting screw |
| 4. Fuel jet, transition system | 14. Air passage, transition system | 24. Vacuum passage |
| 5. Air jet, main system | 15. Throat ring | 25. Idling jet |
| 6. Choke valve | 16. Throttle valve | 26. Push rod, fast idling |
| 7. Air passage, idling system | 17. Emulsion pipe | 27. Bi-metal spring, automatic choke |
| 8. Vacuum passage | 18. Main jet | 28. Stop lever, fast idling |
| 9. Snap cam, fast idling | 19. Emulsion pipe | |
| 10. Driver | 20. Main jet | |

Starting system

The carburetor is fitted with an automatic choke to facilitate cold starting. The choke mechanism is actuated by depressing and releasing the accelerator before starting. The choke is controlled automatically by means of a bi-metallic spiral spring regulated by the temperature of the coolant. When the engine is cold, the choke valve will be partially or completely closed, depending on the ambient temperature, but will gradually open as the temperature

of the coolant rises. The automatic mechanism also includes a step cam, the function of which is to increase the idling speed during cold starting. The step cam is regulated by means of a bi-metallic spring. A vacuum-regulated diaphragm opens the choke soon after starting by means of a thrust rod, in order to ensure that the engine will receive a sufficient quantity of air when it is running. To ensure a sufficient supply of air also when the vacuum drops as a result of the throttle having been opened, a stop is provided on the linkage from the throttle, which forces the choke valve to open under these conditions.



STARTING SYSTEM

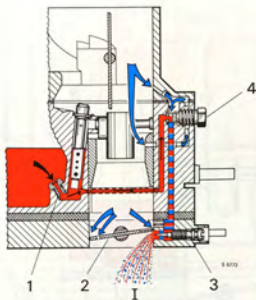
1. Float
2. Choke
3. Driver, choke valve
4. Diaphragm, vacuum control
5. Diaphragm rod

6. Step cam, fast idling
7. Stop lever, fast idling
8. Vacuum passage
9. Throttle valve
10. Main jet

Idling and transition system

Fuel is drawn through the main jet up to the idling jet owing to the high vacuum present beneath the throttle valve during idling. The idling jet mixes the fuel with air admitted through special calibrated holes in the throat of the carburetor. The fuel/air mixture is then sucked

from the idling jet past the idling mixture screw to the engine. To ensure smooth transition to the main system, several calibrated holes are situated above the idling mixture adjusting screw, and the fuel/air mixture from the idling system flows through these when the throttle is open.



IDLING AND TRANSITION SYSTEM

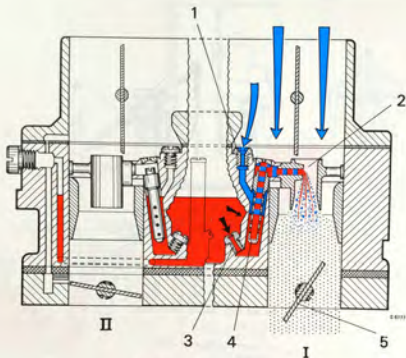
1. Main jet
 2. Throttle valve
 3. Mixture adjusting screw, idling
 4. Idling jet
- i = Primary stage

Main system

Under increasing engine speed and heavier loading, the engine is supplied with a greater quantity of fuel/air by means of the main system.

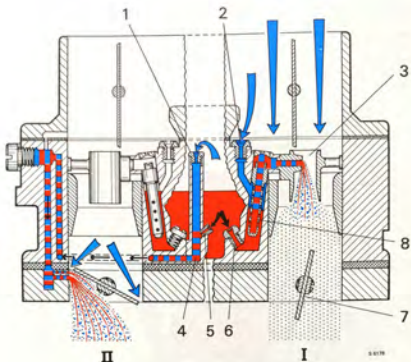
Initially, this is achieved by means of the primary stage only. The fuel flows from the float chamber through the main jet and emulsion pipe — where it is mixed with a given proportion of air — and thence to the spray pipe in

the carburetor throat. When the throttle valve in the primary stage approaches the full-throttle position, it actuates the throttle valve of the secondary stage by means of a lever, thereby bringing the secondary stage into operation. Calibrated holes are provided in the carburetor throat at the same level as the throttle valve, and the fuel/air mixture is sucked through these holes from special transition jets in order to achieve smooth transition to the main system of the secondary stage.



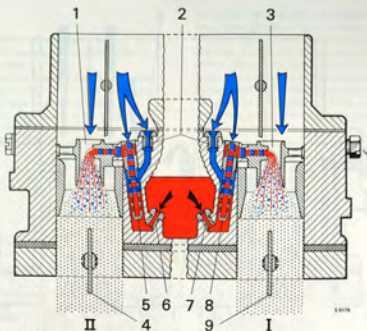
MAIN SYSTEM, PRIMARY STAGE

- 1. Air jet, main system
- 2. Spray pipe
- 3. Main jet
- 4. Emulsion pipe
- 5. Throttle valve
- I = Primary stage
- II = Secondary stage



MAIN SYSTEM, TRANSITION SYSTEM, SECONDARY STAGE

1. Air jet, transition system, secondary stage
 2. Air jet, main system
 3. Spray pipe
 4. Fuel/air passage, transition system
 5. Fuel jet, transition system, secondary stage
 6. Main jet
 7. Throttle valve
 8. Emulsion pipe
- I = Primary stage
II = Secondary stage



MAIN SYSTEM, FULL-LOAD

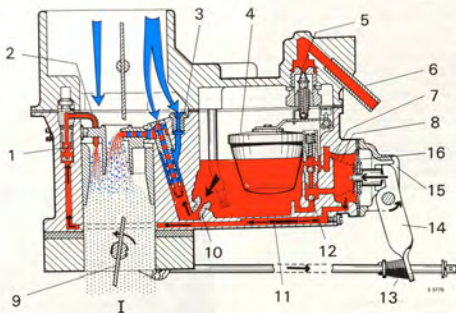
1. Spray pipe
2. Air jet
3. Spray pipe
4. Throttle valve
5. Emulsion pipe
6. Main jet
7. Main jet
8. Emulsion pipe
9. Throttle valve
- I = Primary stage
- II = Secondary stage

Acceleration system

When the throttle is opened quickly, the engine is supplied with additional fuel by means of the acceleration system. The system operates in the primary stage and comprises a diaphragm pump which is regulated by the throttle.

Fuel to the acceleration system flows from the float

chamber through an inlet valve in the acceleration pump. Pump strokes cause the inlet valve to close, and the fuel is forced through the outlet valve at a spray pipe into the throat of the carburetor. When the injection ceases, the outlet valve closes, the diaphragm returns to its normal position, and fuel from the open inlet valve once again fills the pump.



ACCELERATION SYSTEM

- | | |
|------------------------------------|---------------------|
| 1. Non-return valve | 9. Throttle valve |
| 2. Spray pipe, acceleration system | 10. Main jet |
| 3. Air jet, main system | 11. Calibration pin |
| 4. Float | 12. Valve |
| 5. Float valve | 13. Push rod |
| 6. Fuel pipe | 14. Lever |
| 7. Pressure reducing pipe | 15. Cover |
| 8. Diaphragm spring | 16. Pump diaphragm |
- I = Primary stage

Booster system

To provide additional power at high engine speeds and under heavy loads, there are two different systems which supply additional fuel to the engine.

One of the systems operates in the primary stage and is actuated by the vacuum in a recess in the throttle valve section. When there is a high vacuum in the suction pipe, a piston in the upper section of the carburetor is drawn upwards. When the vacuum drops below a certain limit owing to the wider throttle opening, a piston spring overcomes the vacuum and forces the piston rod against the needle valve, whereupon the valve opens. This permits additional fuel to flow from the float chamber to the main system of the primary stage.

The other booster system operates in the secondary stage and is actuated by the vacuum in the upper part of the carburetor throat. The system comes into operation when the air velocity — and thus the vacuum in this part of the throat — has become so high that fuel is drawn up from the float chamber through a calibrated ascending pipe.

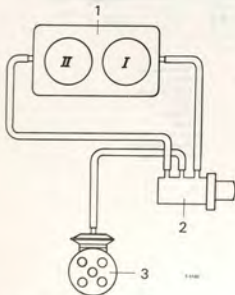
Vacuum valve (PVS-valve)

A thermo-regulated vacuum (positive vacuum supply) valve is located in the coolant pipe from the engine. The

function of this valve is to regulate the vacuum in the vacuum control unit of the distributor when the engine is hot and idling. This will increase the ignition timing, thereby reducing the temperature of the engine. When the temperature of the coolant is below about 215°F (104°C), the vacuum signal is regulated by the vacuum recess in the primary stage of the carburetor. In the event of the temperature of the coolant rising, the passage from the primary recess is closed, and the distributor will receive a vacuum signal from a recess in the secondary stage instead. This signal is stronger since the recess here is below the throttle valve, which implies an increase in the setting of the ignition timing.

Throttle valve damper (Dash-pot valve)

A mechanical damping device is provided to ensure satisfactory combustion during engine overrun. The damper retards the return of the throttle valve from high engine speed to idling speed.



VACUUM CONTROL, DISTRIBUTOR

1. Carburetor
2. Vacuum valve
3. Distributor



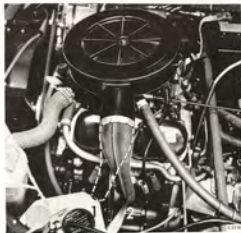
THROTTLE VALVE DAMPER

AIR CLEANER

The air cleaner is mounted on top of the engine and serves both to clean the induction air and as an induction silencer.

The air cleaner cartridge is made of a special grade of paper which may not be washed or moistened. The only service measures are blowing through with compressed air or replacement of the cartridge.

To preheat the induction air in cold weather, the inlet of the downward-pointing air cleaner snorkel can be placed behind a special preheater plate, screwed to the exhaust flange of the lefthand cylinder head. Winter position should be used at permanent temperature below 50°F (+10°C). In warmer weather, when preheating is no longer necessary, the upper part of the air cleaner is loosened and turned so that the snorkel inlet comes in front of the preheater plate.



AIR CLEANER AIR INTAKE, UP TO AND INCL. MODEL 1975 AND AS FROM MODEL 1977 B

1. Position "Summer"
2. Position "Winter"

During model 1972 an air cleaner made of plastic was introduced. When altering the preheater position loosen the clamp around the preheater snorkel and turn the snorkel to the desired position.

As from model 1970 for the USA and on model 1976 and 1977 for Sweden, the cars are equipped with a thermostatically controlled preheating valve. See section 232.



AIR CLEANER, MODELS 1976 AND 1977

COOLING SYSTEM

The cooling system is of positive-pressure type with a circulation pump. To ensure rapid heating up and a regular working temperature, the cooling system is equipped with a thermostat. This thermostat is placed in the front part of the induction pipe. It opens when the engine reaches normal working temperature.

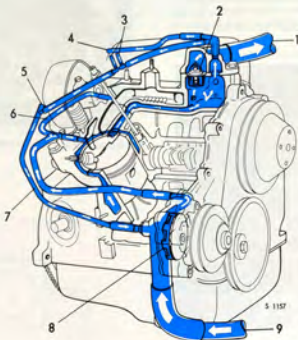
The water pump is located on the righthand side of the engine and is driven by the balance shaft belt pulley via the fan belt.

When the pump is working, the water is forced through

the water distribution pipe to the rear part of the cylinder block.

After having passed the engine, the water flows up by the side of the thermostat and through a by-pass line to the suction side of the pump. The cooling jacket of the automatic choke device and the heat exchanger are coupled parallel with the by-pass line.

The procedure described above occurs when the engine temperature is low and the thermostat is closed. When the thermostat is open, the water will also circulate through the radiator.



COOLING WATER CIRCULATION

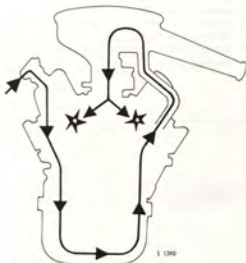
1. Upper radiator connection, outlet
2. Thermostat
3. Automatic choke connection
4. Heat exchanger connection, inlet
5. Heat exchanger connection, outlet
6. Water distribution pipe
7. By-pass line
8. Water pump
9. Lower radiator connection, inlet

CRANKCASE VENTILATION

Engines up to and incl. engine No. 16 100 are equipped with semi-enclosed crankcase ventilation. As from engine No. 16 101 the cars have a totally enclosed crankcase ventilation. Both systems are described below.

Semi-enclosed crankcase ventilation

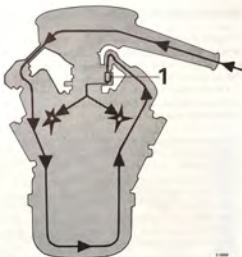
The air is admitted through the oil filler cap on the right-hand valve cover. It passes through the crankcase, and via a hose is led to the air filter and on to the carburetor without passing the air filter insert.



SEMI-ENCLOSED CRANKCASE VENTILATION

Totally enclosed crankcase ventilation

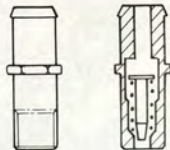
The air is admitted through the air filter, where it passes the filter insert, and via a flame guard and a hose is led into the righthand valve cover. Through the crankcase, the air is then led into the lefthand valve cover and on via a hose to an intermediate flange beneath the carburetor. In the intermediate flange there is a control valve regulating the flow of air through the crankcase.



TOTALLY ENCLOSED CRANKCASE VENTILATION

1. Control valve

When the engine is running, the flow through the valve is governed by the vacuum in the inlet manifold. In the event of the engine backfiring in the inlet manifold, the valve will close, thereby preventing ignition from taking place in the crankcase.



CONTROL VALVE

EXHAUST SYSTEM

To satisfy the regulations governing exhaust emission on certain markets, cars intended for these markets are equipped with special exhaust emission systems.

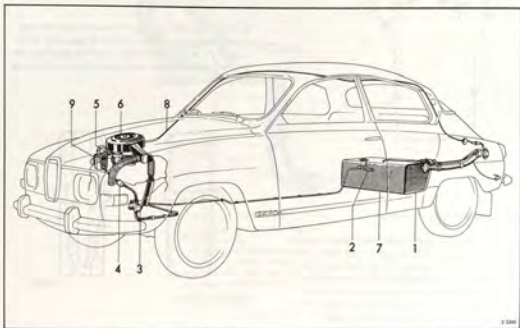
The exhaust emission systems include the following:

- Exactly calibrated carburetor (Sweden-version, as from model 1976)
- Deceleration system (USA-version, as from model 1970 and Sweden-version, as from model 1976)
- Distributor with double-acting vacuum control unit (USA-version, as from model 1971)
- Distributor with double-acting vacuum control unit, with only one side connected (Sweden-version, early cars of model 1976)
- Thermostatically controlled preheating of intake air (USA-version, as from model 1970 and Sweden-version, as from model 1976)

Combustion exhaust emission control system and evaporative loss control unit, USA-version

To comply with the exhaust emission control regulations in the USA, cars attended for this market have some certain equipment. As from model 1971, these cars are fitted with a charcoal filter, that absorbs the vapor from the tank. The charcoal canister is placed in the engine compartment and it is connected to the vent hose from the fuel tank and via a hose to the air cleaner. When the engine runs, fresh air is sucked through the charcoal filter and further to the carburetor. The filter will then be cleaned from petrol. The combustion exhaust emission control system consists of:

1. Deceleration valve (see deceleration system, Ford carburetor).
2. Carburetor with connections for deceleration valve and modulating choke.
3. Adaptional distributor advance curves. See group 3.
4. Delay valve, see group 3.
5. Air cleaner incorporating thermostatically controlled valve assembly. See section 232.



EVAPORATIVE LOSS CONTROL UNIT

- | | |
|---------------------|---|
| 1. Fuel tank | 6. Suction silencer with air cleaner |
| 2. Fuel transmitter | 7. Drain plug (accessible from beneath the car) |
| 3. Fuel pump | 8. Vapor hose |
| 4. Fuel filter | 9. Charcoal canister |
| 5. Carburetor | |

REMOVAL AND INSTALLATION

Removal of power unit

If the entire power unit is to be lifted out, see group 4. To lift out the engine only, proceed as follows:

1. Disconnect the battery earth cable from the battery.
2. Remove the hood by opening it wide and then removing the locking springs for the hood hinges. Disconnect the hose for the windshield washer. Now grip the hinge stay, bending it slightly inwards to release the pin on one side. An assistant will hold the hood on the other side and help to lift it off.
Remove the water container and the pump of the headlight washer.



REMOVAL OF ENGINE HOOD

3. Drain off the cooling water through the radiator draining tap. To ensure that draining will be as effective as possible, bleed the system through the bleed nipple on the heat exchanger. Save the coolant.

Up to and incl. model 1968:

4. Disconnect the headlight and direction indicator cables.
5. Back off the four screws for the front panel and detach the two radiator supports from the car body. Detach the clamping straps from the radiator and remove the hood lock and control wire.

Model 1969-1970:

4. Remove the headlight decor frames. Disconnect the headlight cables.
5. Back off the four screws for the front panel and detach the two radiator supports from the car body. Detach the clamping straps from the radiator and remove the control wire.

As from model 1971 (with headlight washer):

4. Remove the headlight decor frames. Disconnect the hoses for the headlight washers from the respective nozzles. Disconnect the headlight cables.

5. a. Back off the four screws for the front panel and detach the two radiator supports from the car body. Detach the clamping straps from the radiator and remove the control wire.
b. Bend the upper bracket of the expansion tank backwards, so that the headlight cleaner motor goes clear.
c. Detach the cables from the headlight wiper motor (note the connection positions of the cables).



REMOVAL OF FASTENING SCREWS, FRONT PLATE

6. Remove the front panel, taking great care to avoid damaging the paintwork.



REMOVAL OF FRONT PLATE

7. Disconnect the upper coolant hose from the engine and the lower coolant hose from the radiator.
8. Back off and remove the two lower radiator retaining screws and remove the radiator, and the expansion tank.
9. Disconnect all hoses and cables from the engine. Note the positions of the cable connections on the alternator.
10. Remove the air cleaner. Cover carburetor air inlet to prevent the entry of foreign matter into the engine.
11. Disconnect the throttle control and the engine side support, as well as the preheater casing.
12. Back off and remove the flange nuts for the exhaust pipes at the cylinder heads. Remove the lower clamps for the exhaust pipes at the engine cushions.
13. Remove the rubber cushions for the middle exhaust pipe from under the floor.
14. Remove the spacers at the cylinder heads and lower the muffler as far as possible.
15. Remove the two front engine cushions, working from above.
16. Remove the alternator and its bracket.
17. Disconnect the water-distribution pipe from the cylinder block and water pump.
18. Attach the lifting hook 78 62 022.
19. Lift the unit about 2 in. (50 mm) to provide a free forward passage for the engine oil pan.
20. Place a suitable wooden block under the gear box as a trestle.
21. Disconnect the starter motor.
22. Remove the protective plate in front of the flywheel.
23. Back off and remove the screws in the dividing surface between the engine and the clutch housing.
24. Pull the engine carefully from the gear box until the clutch shaft slides out of the clutch center.
25. Lift out the engine.



REMOVAL AND INSTALLATION OF ENGINE WITH LIFTING HOOK 78 62 022

INSTALLATION OF POWER UNIT

1. Lift the engine into the engine compartment for reassembling together with the gearbox. Use lifting hook 78 62 022.
2. Check with a centering arbor that the disc assembly is properly centered in the clutch.
3. Push the engine carefully towards the gearbox so that the clutch center engages the clutch shaft and taking care to avoid damaging the crankshaft bushing.
4. Refit the screws in the dividing surface between the engine and the clutch housing.
5. Refit the protective plate for the flywheel. Apply Loctite to lock the screws.
6. Reconnect the starter motor.
7. Reconnect the water-distribution pipe.
8. Refit the alternator and the fan belt.
9. Lift the unit slightly and remove the wooden block from under the gear box.
10. Lower the engine into position and tighten the front engine cushions.
11. Reconnect the exhaust pipes to the cylinder heads. Fit new gaskets.
12. Refit the clamps for the exhaust pipes and the suspension under the car.
13. Reconnect the throttle control.
14. Reconnect all hose and cable connections to the engine, starter motor and alternator.

CAUTION

Do not confuse the cables to the alternator, as this may result in ruining the latter.

15. Refit the air cleaner.
16. Refit the radiator and the expansion tank. Connect the lower coolant hose before tightening the lower retaining screws.
17. Connect the upper coolant hose.
18. Refit the front panel and the radiator clamping straps.
19. Refit the radiator stays and the hood lock.
20. Reconnect the headlight and direction indicator cables. Mount the water container and the pump of the headlight washer.
21. Refill the cooling system and bleed the system.
22. Check the engine oil level. Top up if necessary.
23. Reconnect the earth cable to the battery and refit the engine hood.
24. Check the headlight alignment. Adjust if necessary.
25. Teststart engine. Note the oil pressure and coolant temperature. Check the coolant level when the engine has been run up to the warm condition.
26. Take the car out for a test run.

ENGINE BODY

DISASSEMBLY OF ENGINE

1. Install the engine on a work stand.
2. Drain the engine oil.
3. Remove the distributor cap and ignition cables.
4. Remove the distributor vacuum line and the fuel inlet line by applying pressure with a screwdriver behind the washers at the flexible connections.
5. Remove the carburetor.
6. Remove the distributor clamping screw and clamp and then remove the distributor.
7. Remove the fuel pump, pump push rod and gasket.

NOTE

Mark the end of the pump push rod which rests against the camshaft as a guide for reassembly.

8. Take out the spark plugs.
9. Remove the oil pressure gauge.
10. Remove the valve covers. Release the rocker arm assembly by slackening the two bolts alternately and remove the rocker assembling and the oil return plates.



REMOVAL OF ROCKER ASSEMBLY

1. Rocker shaft with rocker arms
2. Oil return plate



REMOVAL OF FUEL PUMP

1. Pump push rod
2. Gasket
3. Fuel pump

11. Remove the push rods and keep them in the correct order.
12. Remove the thermostat housing cap, the thermostat and the gasket.



REMOVAL OF THERMOSTAT

1. Thermostat housing cover
2. Thermostat
3. Gasket

13. Remove the induction manifold retaining bolts and nuts. It may be necessary to tap the underside of the front and rear ends with a plastic or leather mallet in order to break the seals. Do not prize with a screwdriver between the manifold and the cylinder head. Remove the induction manifold.
14. Remove the bracket for the engine side stay.
15. Back off and remove the cylinder head bolts. Lift the heads off the cylinder block. Inspect the cylinder head gaskets for any signs of leakage.
16. Remove the tappets with the aid of a bent wire and keep them in the correct order.



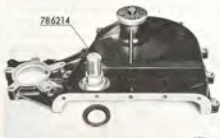
REMOVAL OF TAPPETS

17. Remove the oil pan retaining screws, the oil pan and the gaskets.
18. Remove the balance shaft pulley.
19. Back off and remove the transmission cover retaining bolts.
20. Tap the rear of the water pump with a plastic or leather mallet to loosen the transmission cover from the intermediate plate.
21. Disconnect the water pump from the transmission cover.



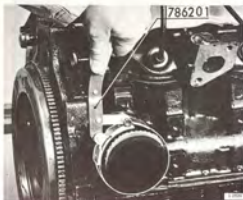
REMOVAL OF WATER PUMP

22. Take the oil seal for the balance shaft out of the transmission cover with tool 78 62 147.



REMOVAL OF TRANSMISSION COVER OIL SEAL
Tool 78 62 147

23. Remove the oil filter with tool 78 62 014.



REMOVAL OF OIL FILTER
Tool 78 62 014

24. Remove the oil pump and its drive shaft.



REMOVAL OF OIL PUMP

25. Remove the bolt and washer for the camshaft drive gear. Take out the camshaft gear by hand.
26. Pull off the balance shaft gear.
27. Remove the two intermediate plate retaining bolts and remove the plate and gasket.



ENGINE BLOCK, FRONT VIEW

1. Intermediate plate
2. Retaining bolts, intermediate plate

28. Back off and remove the camshaft thrust plate, remove the key and the spacer and pull the camshaft carefully out of the bearings to the front.

NOTE

As the bearings have different diameters, the camshaft can only be removed to the front, even if the rear cover plate has been taken off.

29. Remove any ridges or carbon deposits from the upper end of the cylinder bores.
30. Make sure that all connecting rods and caps are marked so that they can be reinstalled in their original positions. Remove the nuts and caps, and push the pistons with connecting rods out of the cylinder bores. Protect the crankshaft bearing necks from contact with the connecting rod cap screws.

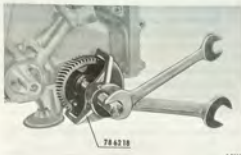
NOTE

In changing pistons, the connecting rod and connecting rod cap must be marked as indicated in the figure.



MARKING OF CONNECTING RODS

31. Remove the bearing inserts and caps from the connecting rods and mark them so that they can be reinstalled in their original positions. Install the caps loosely on the connecting rods from which they were removed.
32. Remove the crankshaft gear retaining bolt and remove the gear with tool 78 62 188.



REMOVAL OF CRANKSHAFT GEAR
Tool 78 62 188

33. Remove the flywheel.

NOTE

Before removing the flywheel, this item and the crankshaft flange must be marked up in relation to each other.

34. Using a plastic or leather mallet, drive the balance shaft rearwards until the sealing washer is out. Carefully remove the balance shaft from the rear of the block.

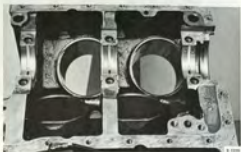


REMOVAL OF BALANCE SHAFT

35. Remove the bolts from the main bearing caps. Remove the main bearing caps together with the bearing inserts.
36. Lift the crankshaft carefully out of the block.
37. Slide the oil seal off the crankshaft.
38. Remove the main bearing inserts and caps from the block and keep them in the correct order.

REASSEMBLY OF ENGINE

1. Place all bearing inserts in position after having coated them lightly with engine oil.



INSTALLATION OF CRANKSHAFT

2. Place the crankshaft carefully in the bearing seats.



INSTALLATION OF MAIN BEARING

3. Install the main bearing caps with inserted and oiled bearing inserts. Apply a thin coat of sealing compound to the rear part of the contact surface of the rear bearing cap.

NOTE

The arrows on the center and front main bearing caps must point to the front.

4. Tighten the front and rear bearing caps to a torque of 98 Nm (72 ft.lb., 10.0 kpm). Finger-tighten the bolts for the center bearing cap.

NOTE

Do not confuse the screws for cylinder heads and main bearings. These have the same diameter, but the screws for the main bearings are approx. 0.4 in. (10 mm) longer than those for the cylinder heads.

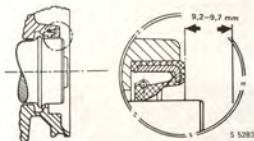
As from engine No. 74900, the cylinder head screws have been lengthened approx. 0.4 in. (10 mm) and consequently there is no danger of confusion.

5. Press the crankshaft forwards and pry the axial (center) bearing cap to the rear. Then, tighten the cap bolts to a torque of 98 Nm (72 ft.lb., 10 kpm) while holding the crankshaft forward. (This is necessary to make both halves of the bearing insert equally ready to bear axially.)



TORQUING THE CENTER MAIN BEARING CAP

6. Lubricate the inner diameter of the new crankshaft seal with engine oil and push the seal onto tool 78 62 170. Drive it into the main bearing to a distance of 0.36–0.38 in. (9.2–9.7 mm) from the rear plane of the engine block.



MOUNTING POSITION OF THE CRANKCASE SEAL



REAR CRANKSHAFT SEAL ASSEMBLY

Tool 78 62 170

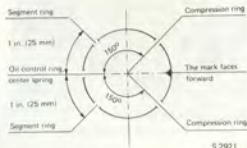
7. Fit new connecting rod bolts.

NOTE

Fit new connecting rod bolts every time the crankshaft has been disassembled.

8. Coat the pistons, rings and cylinder bores with engine oil. Place the piston rings in the following manner:

The oil control ring center spring gap 180° from the mark on the top of the piston; the oil segments with the gaps staggered 1 in. (25 mm) on either side of the center spring gap; the lower compression ring gap 150° from one side of the center spring gap and the upper compression ring gap 150° from the other side of the center spring gap. Installation of the piston rings as above is essential for optimum sealing and low oil consumption.



FITTING PISTON RING GAP

9. Install the piston together with connecting rod using tool 78 62 287 by carefully pressing the piston with the handle of a hammer. Make sure that the mark on the top of the piston faces forwards.



PISTON ASSEMBLY
Tool 78 62 287

13. Apply a thin coat of sealing compound to the new balance shaft sealing washer and drive it into the block until it bottoms out. Install the washer with the flat side out.

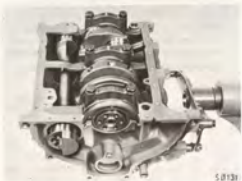


INSTALLATION OF BALANCE SHAFT COVER PLATE

14. Coat the two wedge-shaped seals with sealing compound and press them into the rear main bearing cap with a blunt screwdriver.



INSTALLATION OF SEALING KEYS, REAR MAIN BEARING CAP



INSTALLATION OF BALANCE SHAFT

NOTE

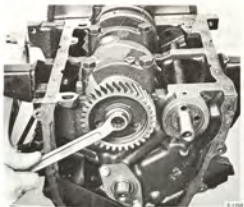
The domed side of the seal must be turned to face the main bearing cap.

15. Clean the crankshaft flange and the flywheel. Install the flywheel, using new bolts.



INSTALLATION OF FLYWHEEL

16. Locate the key in the crankshaft. Secure the gear on the shaft with a bolt and washer, tightening to a torque of 49 Nm (36 ft.lb., 5.0 kpm).
Avoid tapping the gear, as this may damage the axial bearings of the crankshaft.



INSTALLATION OF CRANKSHAFT GEAR

17. Coat the camshaft bearings with engine oil and install the camshaft carefully in the engine block.
18. Install the spacer with the countersunk side towards the camshaft. Insert the key.
19. Position the thrust plate over the front of the camshaft so that it covers the main oil galley hole.



AXIAL CAMSHAFT BEARING

NOTE

The spacer is a little thicker than the camshaft thrust plate. The difference in measurement corresponds to the axial play in the camshaft. To indicate the size group, the spacers have red or blue markings. When fitting new parts, choose a spacer giving the correct axial play. A red spacer gives a small clearance and a blue one a larger clearance. Axial play 0.00098–0.003 in. (0.025–0.076 mm).

20. Apply a thin coat of sealing compound to the mounting surface of the intermediate plate on the front of the block and to the block. Position the gasket on the block and install the plate loosely with the two retaining bolts. Temporarily install the two lower bolts as guide dowels and tighten the two retaining bolts. Also make sure that the lower edge of the plate is in line with the level of the pan. Then remove the guide bolts.



INSTALLATION OF INTERMEDIATE PLATE

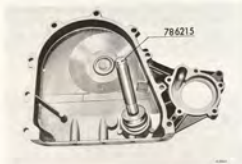
21. Turn the crankshaft until the mark on the crankshaft gear faces the camshaft.
22. Pass the camshaft gear onto the camshaft so that the mark coincides with the mark on the crankshaft gear. Secure the camshaft gear with a retaining bolt and washer.
23. Install the balance shaft gear so that the mark coincides with the mark on the crankshaft gear.



S 1142

INSTALLATION MARKS, TRANSMISSION GEAR

24. Install a new balance shaft pulley seal in the transmission cover, using tool 78 62 154.

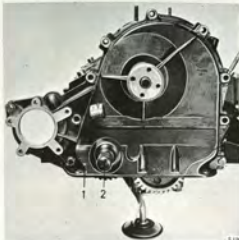


INSTALLATION OF TRANSMISSION COVER OIL SEAL

Tool 78 62 154

25. Apply a thin coat of sealing compound to the gasket mounting surfaces on the intermediate plate and transmission cover. Position the transmission cover gasket against the intermediate plate. Center the transmission cover with the special pilot tool

78 62 147 and secure it with the nine retaining bolts. To facilitate installation of the water pump, the latter should be secured to the transmission cover before this is installed on the engine.



S 1280

INSTALLATION OF TRANSMISSION COVER

1. Transmission cover
2. Centering arbor 78 62 147

26. Lubricate the inner diameter of the balance shaft pulley seal with engine oil. Align the pulley key way with the balance shaft key and install the pulley, the flat washer and the retaining bolt.
27. Insert the oil pump drive shaft in the block with the pointed end first.

NOTE

The stop plate on the shaft must be positioned 5.02 in. (127.5 mm) from the blunt end.



S 1280

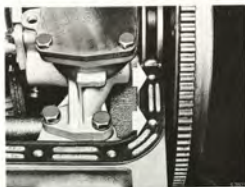
DRIVE SHAFT WITH HOLDER RING

28. Install the oil pump. Tighten the actual pump bolts first and then the suction line bolt.
29. Insert the rubber seal in the groove in the rear main bearing cap.
30. Apply a coat of sealing compound to the two corner joints where the transmission cover, the intermediate plate and the edges of the oil pan meet. Position the oil pan gasket on the block, and insert the two tabs on the cork gasket under the recesses in the rear bearing cap rubber seal.



INSTALLATION OF OIL PAN GASKET

31. Install and secure the oil pan. Position the two bolts with the rubber washers at the rear balance shaft bearing.



FITTING THE TWO BOLTS WITH RUBBER WASHERS

32. Lubricate the tappets and their bores with engine oil and install the tappets in the same sequence as they were originally fitted.
33. Install the cylinder head gaskets. The gaskets are marked "Front" and "Top".



INSTALLATION OF CYLINDER HEAD GASKET

34. Install the complete cylinder heads, insert the bolts and tighten them in the sequence indicated to the correct torque, tightening in three stages as per the following table:

| | Nm | kpm | ft.lb. |
|----|----|-----|--------|
| 1. | 54 | 5.5 | 40 |
| 2. | 69 | 7.0 | 50 |
| 3. | 93 | 9.5 | 68 |

IMPORTANT

To ensure effective sealing, the bolts must be tightened in three stages to the prescribed torque in the sequence indicated.

NOTE

The outer, rear bolt for the righthand cylinder head is specially adapted for the engine earth cable.



TORQUING OF CYLINDER HEAD BOLTS

35. Install the bracket for the engine side stay.
36. Dip the push rod ends in engine oil and install the push rods in their original positions in the tappets.
37. Lubricate the ends of the rocker arms with engine oil and install the oil return plate and rocker arm assembly. In so doing, align the push rods under the rocker arms. Secure the rocker arm assembly by alternately tightening the two screws.

NOTE

Check that the oil return plate is not in contact with the valve springs.



INSTALLATION OF ROCKER ASSEMBLY

1. Rocker shaft with rocker arms
2. Oil return plate

38. Apply sealing compound to the surfaces of the cylinder heads as shown in the illustration. Install the induction manifold gasket and make sure that the protruding part of the righthand cylinder head gasket enters the aperture in the induction manifold gasket. See fig. page 211-2.

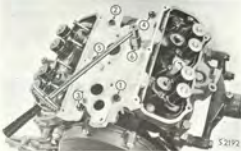


ASSEMBLED CYLINDER HEAD WITH MARKED SURFACES FOR APPLICATION OF SEALING COMPOUND

39. Fit the induction manifold. Tighten the screws and nuts with the tightening torque specified in group 0.

IMPORTANT

To ensure effective sealing, the bolts must be tightened in two stages to the prescribed torque in the sequence indicated.



TORQUING OF INDUCTION MANIFOLD

40. Install the thermostat, the gasket and the thermostat housing cover in the front part of the induction manifold, placing the thermostat holder at right angles to the longitudinal direction of the engine.
41. Adjust the valve play. See the section "Valve adjustment".
42. Install a new oil filter. Tighten it by hand until the oiled rubber seal makes contact with the cylinder block and then tighten it another half turn.
43. Install the fuel pump push rod, the gasket and the pump. Fit the push rod with the same end on the cam as originally.
44. Apply sealing compound to the threads of the oil pressure gauge and install the gauge in the block.



INSTALLATION OF OIL PRESSURE GAUGE

45. Install the clutch after having aligned the disc with tool 78 40 648.
46. Install the carburetor, together with its gasket.
47. Connect the fuel lines to the carburetor and to the fuel pump. Fit the hose clamps.
48. Refit the spark plugs.
49. Reinstall the fan belt pulley and fan.
50. Reinstall the alternator and its bracket. Tighten the fan belt.
51. Insert a new gasket in the valve cover. See fig. page 211-2. Press the clamp ends of the gasket into the notches in the cover.

NOTE

Before the valve covers of the cylinder heads are refitted, the lubrication of the rocker shaft must be checked with the engine running.

52. Reinstall the distributor. (See group 3, section 342.)
53. Reconnect the vacuum line to the distributor.
54. Install the distributor cap and attach the ignition cables.
55. Put in the oil dipstick.
56. Install the air filter.

FITTING OF PISTONS

For fitting of pistons in cylinder bores, a feeler gauge with a width of 1/2 in. is used. In measuring, the piston, without rings, should be placed in the bore in the way in which it will work subsequently, i.e. with its front marking pointing forwards in the engine. The feeler gauge should be connected to a spring balance and placed between piston and bore at right angles to the piston pin. When the pull amounts to 9.8 N (2.2 lb, 1 kp), the mean clearance agrees with the thickness of the feeler gauge. Tests should be carried out at several different depth positions.



MEASUREMENT OF PISTON CLEARANCE

Pistons obtained as spare parts are not classified, but their diameter lies within the upper part of the tolerance range, so that in most cases the cylinder bore will have to be honed in order to get the right piston clearance when a new piston is fitted.

If the clearance obtained is excessive, the cylinder bores must be drilled to the next oversize. See group 0.

FITTING OF PISTON RINGS

In a new or redrilled bore

Pass the piston rings one by one down into the bore. Use a piston turned upside down so that the ring takes up the proper position.

Measure the piston ring gap with a feeler gauge. The correct figures are given in group 0.

If the gap is too small, the ring must be trimmed with a special file.



MÄTNING AV KÖLVRINGSGAP

In a worn bore

When fitting piston rings in a worn cylinder bore, the ring gap must be measured in the lower reverse position, as the bore has the smallest diameter at this point.

CYLINDER HEADS

DISASSEMBLY

(Engine removed)

1. Remove the air filter.
2. Take off the distributor cap and disconnect the ignition cables.
3. Disconnect the vacuum line from the distributor.
4. Remove the distributor.
5. Remove the valve cover.
6. Detach the fuel line from the carburetor.
7. Remove the carburetor.
8. Back off and remove the induction manifold bolts and nuts. Separate the induction manifold from the gasket and remove it.
9. Remove the rocker arm assembly by alternate slackening of the two bolts and remove the oil return plates.
10. Remove the push rods and keep them in the correct sequence.
11. Remove the cylinder head.
12. Take away the cylinder head gasket.

REASSEMBLY

1. Remove all residual gasket material from the contact surfaces.
2. Place the cylinder head gasket over the two locating sleeves on the engine block. The lefthand and righthand cylinder head gaskets are different. They are marked "Front" and "Top" respectively.



INSTALLATION OF CYLINDER HEAD GASKET

3. Install the cylinder head on the locating sleeves. Tighten the bolts in three stages to the prescribed torque in the indicated sequence.

| | Nm | kpm | ft.lb. |
|----|----|-----|--------|
| 1. | 54 | 5.5 | 40 |
| 2. | 69 | 7.0 | 50 |
| 3. | 93 | 9.5 | 68 |

IMPORTANT

To ensure effective sealing, the bolts must be tightened in three stages to the prescribed torque in the sequence indicated.

NOTE

The outer, rear bolt for the righthand cylinder head is specially adapted for the engine earth cable.



TIGHTENING SEQUENCE, CYLINDER HEAD BOLTS

4. Apply sealing compound to the surfaces of the cylinder heads as indicated in the illustration on page 210-10. Install the induction manifold gasket and make sure that the protruding part of the righthand cylinder head gasket enters the aperture in the induction manifold gasket.



INSTALLATION OF INDUCTION MANIFOLD GASKET

5. Fit the induction manifold. Tighten the screws and nuts with the tightening torque specified in group 0.

IMPORTANT

To ensure effective sealing, the bolts must be tightened in two stages to the prescribed torque in the sequence indicated.



TIGHTENING SEQUENCE, INDUCTION MANIFOLD BOLTS

6. Dip the push rod ends in engine oil and install the push rods in their original positions in the tappets.
7. Lubricate the ends of the rocker arms with engine oil and install the oil return plate and rocker arm assembly. In so doing, align the push rods under the rocker arms and check that the oil return plate is not in contact with the valve springs. Secure the rocker arm assembly by alternately tightening the two screws.
8. Adjust the valve play. See the section "Valve adjustment".
9. Install the distributor in the engine block. (See group 3, section 342.)
10. Insert a new gasket in the valve cover. Press the clamp ends of the gasket into the notches in the cover.



INSERTION OF NEW GASKET IN VALVE COVER

NOTE

Before the valve covers of the cylinder heads are refitted, the lubrication of the rocker shaft must be checked with the engine running.

11. Reinstall the carburetor, together with its gasket.
12. Reconnect the fuel and vacuum lines.
13. Reinstall the distributor cap and connect the ignition cables.
14. Reinstall the alternator and its bracket. Tighten the fan belt.
15. Install the air filter.

NOTE

Retighten the cylinder head bolts and adjust the valves when the car has been driven for about 1,200 miles (2,000 km).

VALVE MECHANISM

ROCKER ARM ASSEMBLIES

Removal

1. Remove the air cleaner.
2. Disconnect the ignition cables from the spark plugs and valve cover.
3. Remove the bolts and lift off the valve cover.
4. Remove the rocker arm assembly by alternate slackening of the two bolts and take away the rocker arm assembly and oil return plate.



REMOVAL OF ROCKER ARM ASSEMBLY

1. Rocker shaft with rocker arms
2. Oil return plate

Installation

1. Pour a drop of engine oil into each rocker arm cup and onto each valve spindle.
2. Place the oil return plate on the cylinder head, put on the rocker shaft and align the adjusting screws over the push rods.
3. Check that the oil return plate is not in contact with the valve spring. Tighten the rocker shaft retaining screws alternately and evenly to the prescribed torque.
4. Adjust the valve play. See the section "Valve adjustment".
5. Insert a new gasket in the valve cover. See fig. page 211-2. Press the clamp ends of the gasket into the notches in the cover.

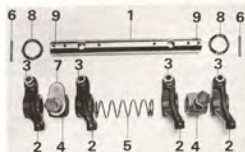
NOTE

Before the valve covers of the cylinder heads are refitted, the lubrication of the rocker shaft must be checked with the engine running.

6. Reconnect the ignition cables in the correct positions. Secure the ignition cable holder on the valve cover.
7. Install the air filter.

Disassembly

Drive the roll pins out of the shaft with a drift. Remove the spring washers, rocker arms, springs and rocker shaft brackets.



ROCKER ASSEMBLY, DISMANTLED

1. Rocker shaft
2. Rocker arms
3. Adjusting screws
4. Rocker shaft bracket
5. Spring
6. Clamping sleeve
7. Cover plate
8. Spring washer
9. Sealing washer

Reassembly

In reassembly, the oil holes in the rocker shaft for lubrication of the rocker arms must be turned downwards against the cylinder head. This position is marked by a grinding at the end of the rocker shaft.

First, drive a roll pin into the shaft and then install the various parts as indicated in the illustration. The rocker shaft bracket with the oil outlet must be positioned at the rear on the righthand side of the engine and at the front on the lefthand side of the engine.



ROCKER ASSEMBLY

VALVE STEM SEALS

Removal

(Engine installed in the car)

1. Remove the rocker arm assembly.
2. Unscrew the spark plugs.
2. Instead of a spark plug, screw in tool 78 62 402 and secure with same that valve of which the valve spring is to be removed. Before inserting the tool, the piston should however be put near the T.D.C. This for safety's sake, should for some reason the valve come loose and fall down on the piston.
4. By means of tool 78 62 279 depress the valve spring and remove the valve retainers.



REMOVAL OF VALVE SPRING

1. Tool 78 62 279
 2. Tool 78 62 402
-
5. Carefully relax the spring tension, and remove the valve spring and its washer.
 6. Remove the valve stem seal from the valve stem.

Installation

1. Install new valve stem seals on the valve stems.
2. Position the valve spring and valve spring washers and press with tool 78 62 279 down the spring.
3. Install the valve retainers and then relax the spring tension. Check that the retainer has adopted the correct position.
4. Remove tool 78 62 402.
5. Screw in the spark plugs.
6. Install the rocker arm assembly.
7. Adjust the valve play.
8. Install the valve covers.
9. Reconnect the ignition cables.
10. Install the air filter.

VALVE GRINDING

Removal of valves

Press down the valve spring washer with valve spring pliers. Remove the valve retainer, slowly relax the plier tension, remove the spring washer, the spring, the oil seal and the valve.



REMOVAL OF VALVES



CYLINDER HEAD, AND DISASSEMBLED VALVES

1. Retainer
2. Valve spring washer
3. Valve spring
4. Rubber sealing
5. Cylinder head
6. Inlet valve
7. Exhaust valve

Reaming of valve guides

After prolonged running, the valve guides become oval-worn on the rocker arm side. In reaming, therefore, the work must always be done from the valve seat side. The size of reamer to be chosen depends on the amount of wear on the guide and the valve oversizes available (see spare parts list). Reaming must always be commenced with the reamer having the smallest diameter as the work depth of the bigger diameters is too large. Use kerosene as cutting oil for this work.

Reaming of a valve guide necessitates installation of a new valve corresponding to the oversize of the reamer used. Thereafter, the valve seat must be carefully re-ground.



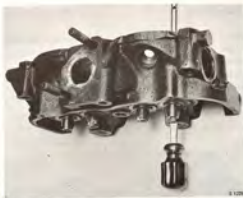
REAMING OF VALVE GUIDE

NOTE

Machining of the valve seat can give a good result only if the valve guide is in good condition. Therefore, always check the valve clearance in the guide before commencing any other work.

Milling the valve seat

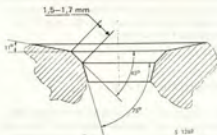
Clean all parts and remove carbon deposits and impurities from the valve and the passage in the cylinder head. The valve can either be ground in a machine or renewed, depending on its condition. Insert the pilot arbor in the valve guide from the valve seat side and screw in the clamping screw until the guide is locked in the valve guide. The valve seats in the cylinder head must first be milled clean with a 45° milling cutter.



APPLICATION OF PILOT ARBOR FOR VALVE MILLING CUTTER

As a rule, the width of the valve seat is excessive after this milling operation and it is then necessary to reduce the seat.

Reduction from inside is made with a 75° correction milling cutter and from outside with an 11° correction milling cutter. Reduction must always be performed so that the sealing surface of the cylinder head will meet the valve seat as close as possible to the center of the seat. This can easily be checked with marking dye. After adjustment, the width of the seat shall be 0.059–0.070 in. (1.5–1.7 mm) for both intake and exhaust valves.



VALVE SEAT ANGLES

NOTE

Correction milling must always be limited, as it is never permissible to remove more material than necessary. Milling set includes milling cutters of different sizes for intake and exhaust valve seats.

Valve honing

Apply a thin coat of grinding paste to the valve seat and insert the valve in the cylinder head. Make a few honing passes with the tool, carefully clean all grinding paste out of the seat and check the surface with marking dye. If necessary, repeat this procedure and also do further milling if this should prove to be required.



VALVE HONING

Installation of valves

Lubricate the valve stems and guides, and insert the valve with oil seal, valve spring and spring washer. Press the spring washer and spring down with the valve spring pliers and insert the two retainers.

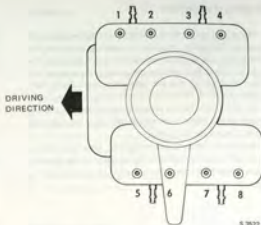
ADJUSTMENT OF VALVES

Set the mark on the pulley immediately opposite the dead center mark on the transmission cover. If the crankshaft is turned slightly back and forth in this position, the rocker arms at the first or fourth cylinder will move in opposite directions (will rock).

In this position, adjust the valves with a feeler gauge in accordance with the directions given below. Then turn the crankshaft one revolution and adjust the remaining valves.

If the rocker arms rock at cylinder 4, valves 1, 2, 4 and 6 must be adjusted.

If the rocker arms rock at cylinder 1, valves 3, 5, 7 and 8 must be adjusted.



VALVE NUMBERING



VALVE ADJUSTMENT

To ensure a smooth running and the lowest sound level of the engine it is essential that the valve play is accurately adjusted. The adjustment to be made with the engine cold.

Recommended valve play:

Intake valves 0.014 in. (0.35 mm)

Exhaust valves 0.016 in. (0.40 mm)

Checking and adjustment may, however, be made at once after removal of air cleaner and valve cover, even if the engine is still warm. The valve play has, in fact, already after 10 minutes reached a value corresponding to that of a cold engine.

CHECKING THE COMPRESSION PRESSURE

Before this check is performed, all spark plugs must be removed after the engine has been operated long enough for it to have reached the correct working temperature. Insert a new graph paper in the compression gauge and press the tool into the spark plug hole. Turn the engine round with the starter and with the accelerator pedal pressed right down, until the reading no longer increases. Bleed the instrument and feed the graph paper forward before measuring in the next cylinder. It is more important for the pressure to be equal in all cylinders than for a high compression figure to be obtained. If large differences in pressure are recorded, the compression pressure should be rechecked. If too low a pressure is due to cylinder wear or leaky valves, this can be decided by injecting a little engine oil into the suspected cylinder. As the oil practically completely seals around the pistons, the true cause of the leak can be established.



MEASURING COMPRESSION PRESSURE

VALVE COVER

Removal and installation

1. Remove the air cleaner. Detach the ignition cables from the plugs and valve cover. Remove the screws. Lift off the valve cover.
2. If a new gasket is to be installed, press the gasket tabs into the recesses in the cover. Put the valve cover on the cylinder head. Tighten the bolts evenly to the prescribed torque.

NOTE

The valve cover with the oil filler cap must always be installed on the righthand side of the engine.

TRANSMISSION

TRANSMISSION COVER

Removal

Engine removed (can also be done in the car)

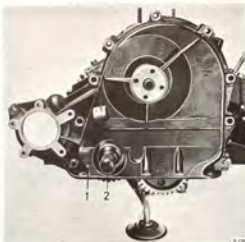
1. Install the engine on a work stand.
2. Remove the alternator and its bracket. (Removed in connection with lifting out the engine.)
3. Remove the fan and fan belt pulley.
4. To prevent oil sludge and impurities from entering the engine, the oil pan must always be removed downwards with the engine in the normal position.
5. Disconnect the water hoses from the water pump.
6. Remove the balance shaft pulley.
7. Remove the transmission cover.

NOTE

The oil pan cannot be removed with the engine installed in the car. Instead, back off and remove the seven front bolts in the oil pan. If this procedure is adopted, however, there is a great risk that the front part of the pan gasket will be damaged.

Installation

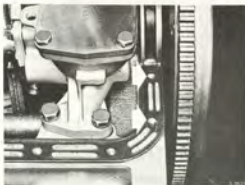
1. If this job is done in the car, it is nearly always necessary to renew the part of the pan gasket that rests against the transmission cover. The corresponding part of a new gasket must then be cut off with a sharp knife, carefully fitted, and glued to the rest of the gasket.
2. Apply a thin coat of sealing compound to the mounting surfaces of the transmission cover. Put the gasket in place. Put on the cover and center it with tool 78 62 147 until all the bolts have been tightened.



INSTALLATION OF TRANSMISSION COVER

1. Transmission cover
2. Centering arbor 78 62 147

3. Lightly oil the pulley shaft. Put on the pulley and tighten it with a bolt and washer.
4. Apply a coat of sealing compound to the two corner joints where the transmission cover, the intermediate plate and the edges of the oil pan meet. Position the oil pan gasket on the block and insert the two tabs on the cork gasket under the recesses in the rear bearing cap rubber seal.
5. Install and secure the oil pan. Position the two bolts with the rubber washers at the rear balance shaft bearing.



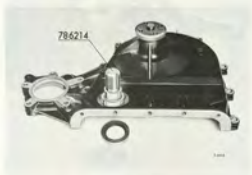
FITTING THE TWO BOLTS WITH RUBBER WASHERS

6. Install the fan and fan belt pulley.
7. Reconnect the water hoses to the water pump. To be installed after reassembly together with the gear box.
8. Install the alternator and tighten the fan belt. To be installed after reassembly together with the gear box.

REPLACEMENT OF BALANCE SHAFT SEAL

Transmission cover removed

Drive out the seal, using tool 78 62 147.

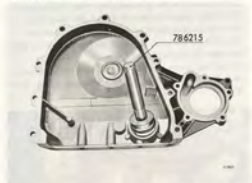


pump tool 78 62 196. Place a support under the short shaft end and press the flange onto the new shaft to the dimension shown in the figure. Do not refit the sealing washer.



REMOVAL OF FAN BEARING
Tool 78 62 436 and drift

Drive in the new seal in the transmission cover, using tool 78 62 154, until it bottoms out.



INSTALLATION OF OIL SEAL, TRANSMISSION COVER
Tool 78 62 154



INSTALLATION OF FAN BEARING
Tool 78 62 196

REPLACEMENT OF FAN BEARING

Transmission cover removed

To press out the fan bearing, use water pump tool 78 62 436 to hold up the transmission cover. Press the bearing together with the shaft out from the transmission cover with an arbor. The sealing washer on engines up to No. 40 399 will be pressed out downwards at the same time, and the flange will remain loose on the transmission cover. Commence reassembly by pressing the new shaft and bearing into the transmission cover. Next, place the cover on the length of piping again and press the new bearing in until it bottoms out, using water



INSTALLATION POSITION FOR FAN PULLEY FLANGE

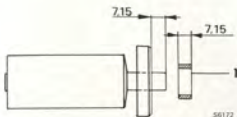
Transmission cover mounted in car

1. Remove the radiator and, if necessary, the front body panel.
2. Clean the transmission cover.
3. Rapidly heat the part of the transmission cover surrounding the bearing using a gas torch.

CAUTION

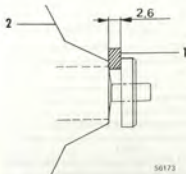
There is a considerable risk of fire when open flames are used in the engine compartment. Take all the necessary precautions to prevent fire.

4. Remove the bearing and driver.
5. Press the bearing out of the driver.



PRESSING THE FLANGE ONTO THE NEW BEARING

1. Spacer for flange
6. Press the flange onto the new bearing. Use a spacer as shown in illustration.
7. Coat the new bearing with Loctite.
8. Heat the transmission cover.
9. Press the bearing and flange into the transmission cover, and position the bearing against the stop.



PRESSING THE BEARING INTO THE TRANSMISSION COVER

1. Stop for positioning of fan bearing
2. Transmission cover

TRANSMISSION GEAR

NOTE

The transmission gears can be replaced separately.

The backlashes (side play) valid for the transmission gears are specified below:

| | Camshaft | Balance shaft gear |
|-------------------------------|-------------------------------------|-------------------------------------|
| New gears | 0.0020–0.0079 in. (0.05–0.20 mm) | 0.0020–0.0055 in. (0.05–0.14 mm) |
| Max. backlash (wearing limit) | 0.0157 in. (0.4 mm) | 0.0157 in. (0.4 mm) |

A side play of 0.0157 in. (0.40 mm) in the balance shaft gear is equivalent to 0.022 in. (0.56 mm) on the outside diameter of the balance shaft pulley.

Changing of the camshaft gear only can be carried out with the engine in the car after removal of the front panel and radiator.

See also removal of transmission cover, points 2, 3, 5–7 and for installation points 1 and 2.

When changing the crankshaft gear and balance shaft gear, the engine must be removed.

Removal

1. Secure the engine in a work stand.
2. To prevent oil sludge and impurities from dropping down into the engine, the oil pan must be removed downwards with the engine in the normal position.
3. Remove the balance shaft pulley.
4. Disconnect the hoses from the water pump.
5. Remove the transmission cover.
6. Back off the screws for the camshaft gear and crankshaft gear.
7. Turn the crankshaft round until the marks on the gears coincide.
8. Remove the screw and washer for the camshaft gear. Pull off the gear by hand.
9. Remove the balance shaft gear.
10. Pull the crankshaft gear off the crankshaft, using tool 78 62 188.

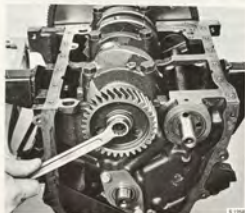


S 2419

REMOVAL OF CRANKSHAFT GEAR
Tool 78 62 188

Installation

1. Insert the key in the crankshaft. Tighten the gear on the shaft with a bolt and washer to a torque of 49 Nm (36 ft.lb., 5.0 kpm). Avoid tapping the gear, as this involves a risk of damage to the crankshaft axial bearing.



S 1254

INSTALLATION OF CRANKSHAFT GEAR

2. Turn the crankshaft until the mark on the crankshaft gear faces the camshaft.
3. Pass the camshaft gear onto the camshaft so that the mark coincides with the mark on the crankshaft gear and secure it with a bolt and washer.
4. Install the balance shaft gear so that the mark coincides with the mark on the crankshaft gear.



S 1142

INSTALLATION MARKS, TRANSMISSION GEAR

5. Apply sealing compound to the mounting surfaces of the transmission cover. Position the gasket. Put on the transmission cover and center it with tool 78 62 147 until all the bolts have been tightened.
6. Lightly oil the pulley shaft. Put on the pulley and tighten it with a bolt and washer.
7. Apply a coat of sealing compound to the corner joints where the transmission cover, the intermediate plate and the edges of the oil pan meet. Position the oil pan gasket on the block and insert the two tabs on the cork gasket under the recesses in the rear bearing cap rubber seal.
8. Install and secure the oil pan. Position the two bolts with the rubber washers at the rear balance shaft bearing.

CAMSHAFT

Removal

(Can also be done with the engine in the car)

1. Install the engine on a work stand.
2. Remove the air filter.
3. Disconnect the vacuum line from the distributor.
4. Remove the distributor, distributor cap and ignition cables.
5. Remove the valve covers.
6. Disconnect the fuel line.
7. Remove the carburetor.
8. Remove the fuel pump and the push rod.

NOTE

Mark the end of the pump push rod that rests against the camshaft for identification at reassembly.

9. Remove the induction manifold bolts and nuts. Separate the induction manifold from the gasket and remove it.

10. Remove the rocker arm assemblies by alternate slackening of the two bolts and remove the oil return plates.
11. Remove the push rods and keep them in the correct sequence.
12. Remove the cylinder heads.
13. Take away the cylinder head gaskets.
14. Remove the tappets with the aid of a bent wire and keep them in the correct order.



REMOVAL OF TAPPETS BY MEANS OF A BENT WIRE

15. To prevent oil sludge and impurities from entering the engine, the oil pan must be removed downwards with the engine in the normal position. (Engine removed.)

NOTE

The oil pan cannot be removed with the engine in the car. Instead, back off and remove the seven front bolts in the oil pan. If this procedure is adopted, however, there is a great risk that the front part of the pan gasket will be damaged.

16. Remove the balance shaft pulley.
17. Disconnect the water hoses from the water pump.
18. Remove the transmission cover.
19. Remove the bolt and washer for the camshaft gear. Remove the gear by hand.
20. Remove the camshaft thrust plate.
21. Pull the camshaft carefully out of the engine.

NOTE

As the bearings have different diameters, the camshaft can only be removed to the front, even if the rear cover plate is removed.

22. Drive the key out of the camshaft with a plastic mallet and remove the spacer.

Installation

1. Lubricate the camshaft bearings with engine oil and pass the camshaft carefully into the engine block.
2. Pass on the spacer with the countersunk side facing the camshaft. Insert the key.
3. Position the thrust plate over the front of the camshaft so that it covers the main oil gallery hole.



AXIAL CAMSHAFT BEARING

NOTE

The spacer is a little thicker than the camshaft thrust plate. The difference in measurement corresponds to the axial play in the camshaft. The spacer is available in two different thicknesses. To indicate the size group, the spacers have red or blue markings. When fitting new parts, choose a spacer giving the correct axial play. A red spacer gives a small clearance, and a blue one a larger clearance. Axial play 0.00098–0.0030 in. (0.025–0.076 mm).



MEASUREMENT OF THRUST PLATE

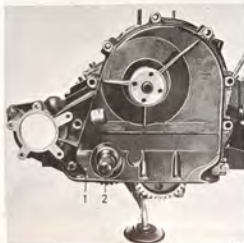
4. Turn the crankshaft until the mark on the crankshaft gear faces the camshaft.
5. Pass the camshaft gear onto the camshaft so that the mark coincides with the mark on the crankshaft gear. Secure the camshaft gear with a retaining bolt and washer.



S 1142

INSTALLATION MARKS, TRANSMISSION GEAR

6. If this job is done in the car, it is nearly always necessary to renew the part of the oil pan gasket that rests against the transmission cover. The corresponding part of a new gasket must then be cut off with a sharp knife, carefully fitted, and glued to the rest of the gasket.
7. Apply a thin coat of sealing compound to the mounting surfaces of the transmission cover. Position the gasket. Put on the cover and center it with tool 78 62 147 until all the bolts have been tightened.

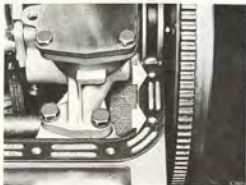


S 1288

INSTALLATION OF TRANSMISSION COVER

1. Transmission cover
2. Centering arbor 78 62 147

8. Connect the water hoses to the water pump.
9. Lightly oil the pulley shaft. Put on the pulley and tighten it with a bolt and washer.
10. Insert the rubber seal in the groove in the rear main bearing cap.
11. Apply a coat of sealing compound to the two corner joints where the transmission cover, the intermediate plate and the edges of the oil pan meet. Position the oil pan gasket on the block and insert the two tabs on the cork gasket under the recesses in the rear bearing cap rubber seal.
12. Install and secure the oil pan. Position the two bolts with the rubber washers at the rear balance shaft bearing.



FITTING THE TWO BOLTS WITH RUBBER WASHERS

13. Lubricate the tappets and their bores with engine oil and install the tappets in the same sequence as they were originally fitted.
14. Install the cylinder head gaskets. The gaskets are marked "Front" and "Top".



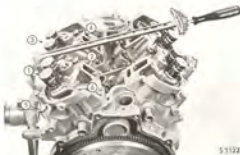
INSTALLATION OF CYLINDER HEAD GASKET

15. Install the complete cylinder heads, insert the bolts and tighten them in the sequence indicated in three stages to the correct torque as per the following table:

| | Nm | kpm | ft.lb. |
|----|----|-----|--------|
| 1. | 54 | 5.5 | 40 |
| 2. | 69 | 7.0 | 50 |
| 3. | 93 | 9.5 | 68 |

IMPORTANT

To ensure effective sealing, the bolts must be tightened in three stages to the prescribed torque in the sequence indicated.



51132

TIGHTENING SEQUENCE, CYLINDER HEAD BOLTS

NOTE

The outer, rear bolt for the righthand cylinder head is specially adapted for the engine earth cable.

16. Apply sealing compound to the surfaces of the cylinder heads as shown in the figure. Install the induction manifold gasket and make sure that the protruding part of the righthand cylinder head gasket enters the aperture in the induction manifold gasket.



51133

ASSEMBLED CYLINDER HEAD WITH MARKED SURFACES FOR APPLICATION OF SEALING COMPOUND

17. Install the induction manifold. Tighten the screws and nuts with the tightening torque specified in group D.

IMPORTANT

To ensure effective sealing, the bolts must be tightened in two stages to the prescribed torque in the sequence indicated.



52192

TIGHTENING SEQUENCE INDUCTION MANIFOLD BOLTS

18. Dip the push rod ends in engine oil and install the push rods in their original positions in the tappets.
 19. Lubricate the ends of the rocker arms with engine oil and install the oil return plates and rocker arm assemblies. In so doing, align the push rods under the rocker arms and check that the oil return plates are not in contact with the valve springs. Secure the rocker arm assemblies by alternately tightening the two screws.
 20. Adjust the valve play. See the section "Valve adjustment".
 21. Install the distributor in the engine block. See group 3, section 342.
 22. Install the fuel pump push rod, the gasket and the pump. Install the push rod with the same end against the cam as originally.
 23. Insert a new gasket in the valve cover. Press the clamp ends of the gasket into the notches in the cover.

NOTE

Before the valve covers of the cylinder heads are refitted, the lubrication of the rocker shaft must be checked with the engine running.



9 1241

INSTALLATION OF NEW GASKET IN VALVE COVER

24. Install the carburetor and gasket.
25. Reconnect the fuel and vacuum lines.
26. Install the distributor cap and attach the ignition cables.
27. Install the air filter.

NOTE

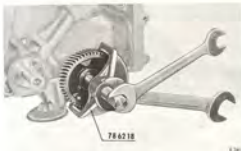
Retighten the cylinder head bolts and adjust the valves when the car has been driven for about 1,200 miles (2,000 km).

CRANK MECHANISM

CRANKSHAFT

Disassembly

1. Install the engine on a work stand.
2. Drain the engine oil, if this has not already been done.
3. To prevent oil sludge and impurities from entering the engine, the oil pan must be removed downwards with the engine in the normal position.
4. Remove the oil pump with its drive shaft.
5. Remove the balance shaft pulley.
6. Disconnect the water hoses from the water pump.
7. Remove the transmission cover.
8. Remove the crankshaft gear bolt. Pull the gear off with tool 78 62 188.

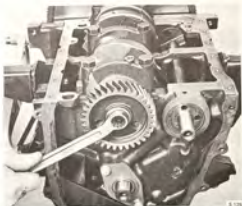


REMOVAL OF CRANKSHAFT GEAR
Tool 78 62 188

9. Screw off the clutch thrust plate and remove the disc.
10. Remove the flywheel.
11. Back off and remove all crankshaft bearing cap nuts. Remove the bearing caps together with the bearing inserts.
12. Remove the bolts from the main bearing caps. Remove the main bearing caps together with the bearing inserts.
13. Lift the crankshaft carefully out of the engine block. Slide the oil seal off the crankshaft.
14. Remove the bearing inserts and place them in the correct sequence for reinstallation.
15. Remove residual gasket fragments from all mounting surfaces.

Reassembly

1. Put on the crankshaft gear and secure it to the crankshaft with a bolt and washer.



INSTALLATION OF CRANKSHAFT GEAR

2. If a new crankshaft or new bearing inserts are installed, check that the correct fitting clearance is obtained. The measuring procedure is described in this section.
3. Coat all bearing inserts with engine oil after having placed them in their bearing positions.
4. Insert the crankshaft carefully into the engine block on the bearing inserts and make sure that the mark on the gear takes up the correct position in relation to the camshaft gear and the balance shaft gear.



INSTALLATION MARKS, TRANSMISSION GEAR

5. Put on the main bearing caps with inserted and oiled bearing inserts. Apply a thin coat of sealing compound to the rear part of the contact surface of the rear bearing cap.



REAR BEARING CAPS WITH MARKED SURFACES FOR APPLICATION OF SEALING COMPOUND

NOTE

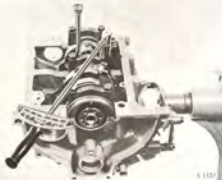
The arrows on the center and front main bearing caps must point to the front.

6. Tighten the front and rear bearing caps to a torque of 98 Nm (72 ft.lb., 10.0 kpm). Finger-tighten the bolts for the center bearing cap.

NOTE

Do not confuse the screw for cylinder heads and main bearings. These have the same diameter, but the screws for the main bearings are approx. 0.4 in. (10 mm) longer than those for the cylinder heads. As from engine No. 74900, the cylinder head screws have been lengthened approx. 0.4 in. (10 mm) and consequently there is no danger of confusion.

7. Press the crankshaft forwards and pry the axial (center) bearing cap to the rear. Then, tighten the cap bolts to a torque of 98 Nm (72 ft.lb., 10 kpm) while holding the crankshaft forward. (This is necessary to make both halves of the bearing inserts equally ready to bear axially.)



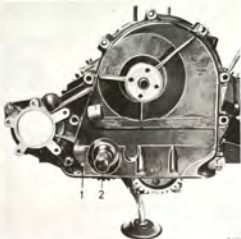
TORQUING THE CENTER MAIN BEARING CAP

8. Check that the crankshaft runs easily in the bearing seats.
9. Pull the connecting rods up against the crank webs on the shaft. Put on the bearing caps with inserted and oiled bearing inserts. Make sure that the marks coincide. Tighten the new bolts to the prescribed torque.

NOTE

Fit new connecting rod bolts every time the engine has been disassembled.

10. Apply a thin coat of sealing compound to the transmission cover gasket surface and to the intermediate plate. Position the gasket. Install the transmission cover and center it with tool 78 62 148 until all bolts have been tightened.



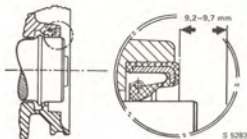
INSTALLATION OF TRANSMISSION COVER

1. Transmission cover
2. Centering arbor 78 62 147

11. Coat the inner diameter of the new crankshaft seal with engine oil and slide the seal onto tool 78 62 170. Insert the seal so that the distance between the seal and the rear of the engine block is between 0.36 and 0.38 in. (9.2 and 9.7 mm).



INSTALLATION OF REAR CRANKSHAFT SEAL
Tool 78 62 170



MOUNTING POSITION OF THE CRANKSHAFT SEAL

12. Coat the two wedge-shaped seals with sealing compound and press them into the rear main bearing cap with a blunt screwdriver.

NOTE

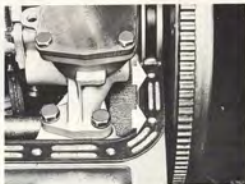
The domed side of the seal must be turned to face the main bearing cap.



INSTALLATION OF SEALING KEYS

13. Clean the crankshaft flange and the flywheel. Install the flywheel, using new bolts.
14. Install the clutch disc and pressure plate. Center the disc with tool 78 40 648.

15. Install the oil pump. Tighten the actual pump bolts first and then the suction line bolt.
16. Insert the rubber seal in the groove in the rear main bearing cap.
17. Apply a coat of sealing compound to the two corner joints where the transmission cover, the intermediate plate and the edges of the oil pan meet. Position the oil pan gasket on the block, and insert the two tabs on the cork gasket under the recesses in the rear bearing cap rubber seal.
18. Install and secure the oil pan. Position the two bolts with the rubber washers at the rear balance shaft bearing.



POSITIONING OF BOLTS WITH RUBBER WASHERS

19. Put on the pulley and secure it with the bolt.

Replacement of crankshaft seal

(Engine removed)

1. Remove the clutch.
2. Remove the flywheel.
3. Remove the rear crankshaft seal by means of a screwdriver.
4. Lubricate the inner diameter of the new crankshaft seal with engine oil and push the seal onto the tool 78 62 170. Drive the seal onto the main bearing until it has a distance of 0.36-0.38 in. (9.2-9.7 mm) from the rear plane of the cylinder block.
5. Clean the crankshaft flange and the flywheel. Install the flywheel, using new bolts.
6. Install the disc and the pressure plate. Center the disc with tool 78 40 648.

Replacement of disc-shaft bushing

1. Fill the bushing with grease.
2. Introduce centering tool 78 40 648 into bushing and tap gently with a plastic mallet in order to drive out the bushing. If necessary, gradually add more grease as the bushing is being driven out.



REMOVING THE DISC SHAFT BUSHING

Tool 78 40 648

3. Remove all grease from the crankshaft and from the tool. Take care so that no grease adheres to the friction surface of the flywheel.
4. Fit a new bushing, using centering tool 78 40 648.

Replacement of ring gear

(Flywheel removed)

1. Make center pops in the ring gear and drill two holes with a diameter of 0.28 or 0.32 in. (7 or 8 mm) as shown in the illustration. As a rule, the ring gear splits off during drilling, but otherwise it can easily be knocked off with the aid of a chisel.



SPLITTING OF RING GEAR BY DRILLING

NOTE

Make sure that the drill passes through the ring gear only and not into the flywheel.

2. Place the new ring gear on a plate with a thickness of 0.08–0.12 in. (2–3 mm) and heat it evenly with a welding flame from below. Test frequently by placing the ring gear on the flywheel with pliers until it drops down onto the flywheel lug.

NOTE

The ring gear is induction-hardened and loses its hardness if heated to temperatures above 554°F (290°C).

PISTON WITH CONNECTING ROD

Disassembly

1. Install the engine on a work stand.
2. Drain the engine oil, if this has not already been done.
3. Remove the air filter.
4. Disconnect the distributor vacuum line.
5. Remove the distributor, distributor cap and ignition cables.
6. Remove the valve covers.
7. Disconnect the fuel line.
8. Remove the carburetor.
9. Disconnect the induction manifold bolts and nuts. Separate the induction manifold from the gasket and remove it.
10. Remove the rocker arm assembly by alternate loosening of the two bolts and remove the oil return plate.
11. Remove the push rods and keep them in the correct sequence.
12. Remove the cylinder head.
13. Take away the cylinder head gasket.
14. Remove the tappets with the aid of a bent wire and keep them in the correct order.
15. Carefully remove any ridges or carbon deposits from the upper end of the cylinder bore.
16. To prevent oil sludge and impurities from entering the engine, the oil pan must be removed with the engine in the normal position. The engine must not be turned over until this has been done.
17. Remove the oil pump.
18. Remove the crankshaft bearing cap nuts. Take off the caps and bearing inserts and press the piston out with the handle of a hammer. Protect the crankshaft bearing necks from coming into contact with the connecting rod bearing cap screws.

NOTE

Note the marks on piston, connecting rod and bearing cap.



MARKING OF PISTONS AND CONNECTING RODS

19. The two upper piston rings can now be removed from the piston with piston-ring pliers. The center spring and segment in the tripartite oil control ring can be removed by hand.



PISTON WITH CONNECTING ROD

NOTE

As from about engine No. 274 900, the connecting rods have been provided with strengthened big-end bearing caps and longer screws. In this connection, the following modifications have been made:

- The crankshaft counter-weights have been modified to compensate for the increase in the weight of the connecting rods.
- The oil pump has been slightly modified to allow greater clearance between the connecting rod and the oil pump.

Old and new type connecting rods must not be mixed in the same engine. However, the new connecting rods may be fitted in old engines, provided that all connecting rods are changed. The slight resulting unbalance and play can be tolerated.

Reassembly

- If necessary, clean the piston ring grooves (using a piece of a worn piston ring). Lubricate pistons, rings and cylinder bores with engine oil. Place the piston rings in the following manner:
The oil control ring center spring gap 180° from the mark on the top of the piston; the oil segments with the gaps staggered 1 in. (25 mm) on either side of the center spring gap; the lower compression ring gap 150° from one side of the center spring gap and the upper compression ring gap 150° from the other side of the center spring gap. Installation of the piston rings as above is essential for optimum sealing and low oil consumption.



LOCATION OF PISTON RING GAP

- Fit new connecting rod bolts.

NOTE

Fit new connecting rod bolts every time the crankshaft has been disassembled.

- Lubricate the piston and cylinder with a thin coat of engine oil.
- Install the piston together with the connecting rod using tool 78 62 287 by carefully pressing the piston with the handle of a hammer. Make sure that the mark on the top of the piston faces forwards. Concerning piston- and piston-ring clearance, see section 210.



PISTON ASSEMBLY
Tool 78 62 287

5. If new bearings are installed check that the correct clearance is obtained. The measuring procedure is described in this section.
6. Install the bearing inserts dry in the connecting rods and then coat them with engine oil. Put on the bearing caps and tighten to the prescribed torque.
7. Slide the oil pump onto its drive shaft and install it with the gasket. Tighten the actual pump bolts first and then the suction line bolt.
8. Insert the rubber seal in the groove in the rear main bearing cap.



INSTALLATION OF OIL PAN GASKET

9. Apply a coat of sealing compound to the two corner joints where the transmission cover, the intermediate plate and the edges of the oil pan meet. Position the oil pan gasket on the block and insert the two tabs on the cork gasket under the recesses in the rear bearing cap rubber seal.

10. Install and secure the oil pan. Position the two bolts with the rubber washers at the rear balance shaft bearing.



FITTING THE TWO BOLTS WITH RUBBER WASHERS

11. Lubricate the tappets and their bores with engine oil and install the tappets in the same sequence as they were originally fitted.
12. Install the cylinder head gaskets. The gaskets are marked "Front" and "Top".



INSTALLATION OF CYLINDER HEAD GASKET

13. Install the complete cylinder heads, insert the bolts and tighten them in the sequence indicated in three stages to the correct torque according to the following table:

| | Nm | kpm | ft.lb. |
|----|----|-----|--------|
| 1. | 54 | 5.5 | 40 |
| 2. | 69 | 7.0 | 50 |
| 3. | 93 | 9.5 | 68 |

IMPORTANT

To ensure effective sealing, the bolts must be tightened in three stages to the prescribed torque in the sequence indicated.



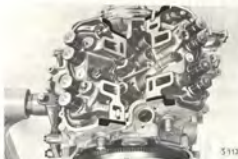
TORQUING THE CYLINDER HEAD

51132

NOTE

The outer, rear bolt for the righthand cylinder head is specially adapted for the engine earth cable.

14. Apply sealing compound to the surfaces of the cylinder heads as shown in the figure. Install the induction manifold gasket, and make sure that the protruding part of the righthand cylinder head gasket enters the aperture in the induction manifold gasket.



51133

ASSEMBLED CYLINDER HEAD WITH MARKED SURFACES FOR APPLICATION OF SEALING COMPOUND



INSTALLATION OF INDUCTION MANIFOLD GASKET

15. Install the induction manifold. Tighten the screws and nuts with the tightening torque specified in group 0.

IMPORTANT

To ensure effective sealing, the bolts must be tightened in two stages to the prescribed torque in the sequence indicated.



52192

TORQUING THE INDUCTION MANIFOLD

16. Dip the push rod ends in engine oil and install the push rods in their original positions in the tappets.
17. Lubricate the ends of the rocker arms with engine oil and install the oil return plate and the rocker arm assembly. In so doing, align the push rods under the rocker arms. Check that the oil return plates are not in contact with the valve springs. Secure the rocker arm assembly by alternately tightening the two screws.
18. Adjust the valve play. See the section "Valve adjustment".
19. Install the distributor and secure it with the clamp. Adjust the ignition setting.
20. Insert a new gasket in the valve cover. Press the clamp ends of the gasket into the notches in the cover.



INSTALLATION OF NEW GASKET IN VALVE COVER

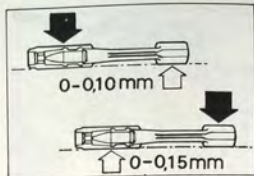
NOTE

Before the valve covers of the cylinder heads are refitted, the lubrication of the rocker shaft must be checked with the engine running.

21. Reinstall the distributor cap and attach the ignition cables.
22. Reinstall the carburetor, together with its gasket.
23. Reconnect the fuel and vacuum lines.

NOTE

Retighten the cylinder head bolts and adjust the valves when the car has been driven for about 1,200 miles (2,000 km).

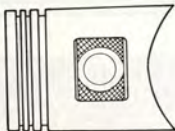


CHECKING THE CONNECTING ROD

S 5284

Installation

1. Place the piston on a flat surface (3/4-1 in./20-25 mm wide) so that the outer surface in the rectangular recess at the piston pin end rests on the surface (see the markings in the illustration).



S 5285

RECTANGULAR RECESS AT THE PISTON PIN END

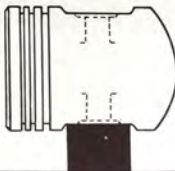
Piston pins

The piston and piston pin comprises a complete unit and the two must be replaced together. The piston pin bore and the piston pin are colour coded according to class and must agree. The colour marking is located at the bottom of the piston and on the outer edge of the piston pin.

The piston pin is shrunk into the small end of the connecting rod. It is therefore of utmost importance to install the piston pin swiftly and correctly in the small end of the connecting rod while it is still hot since the position of the piston pin cannot be altered once the connecting rod has cooled.

Removal

1. Using a press, press the piston pin out of the piston (use a drift with a diameter a few millimeters smaller).
Scrap the piston and piston pin.
2. Measure the connecting rod by means of a gauge and a surface plate.



S 5286

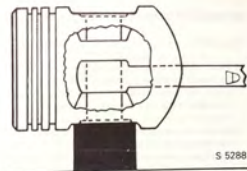
POSITION FOR DOLLY

2. On installation, ensure that the mark on the front of the piston and the lubricating hole in the connecting rod are aligned as shown in the illustration.

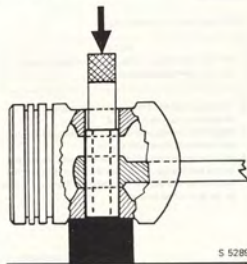


MOUNTING POSITION OF THE PISTON

3. Heat the small end of the connecting rod to a temperature of between 500 and 570°F (260–300°C). Before heating, coat the small end of the connecting rod with pyrometric paint (e.g. Faber Castelli 2815) to facilitate temperature checking. When the correct temperature has been reached, the paint will change colour in accordance with the tone of colour given on the package for the paint.
4. Once the correct temperature has been obtained, insert the connecting rod as swiftly as possible in the piston so that it butts against the lower piston pin bearing in the piston. Using a drift, fully insert the piston pin through the connecting rod, again, as quickly as possible.
N.B. Ensure that the connecting rod is correctly aligned in the piston (see point 2).



CONNECTING ROD POSITION AT INSTALLATION OF PISTON PIN



INSERTING THE PISTON PIN

5. Keep the connecting rod in this position until it has cooled.

CRANKSHAFT BEARINGS

Disassembly

1. Install the engine on a work stand.
2. To prevent oil sludge and impurities from entering the engine, the oil pan must be removed downwards with the engine in the normal position.
3. Remove the oil pump with its drive shaft.
4. Remove the crankshaft bearing cap nuts and take off the bearing caps and bearing inserts.
5. Press the connecting rod away from the crankshaft and remove the bearing insert.

Reassembly

1. Fit new connecting rod bolts.

NOTE

Fit new connecting rod bolts every time the crankshaft has been disassembled.

2. To ensure that the fitting clearance is correct, the clearance should be measured.
3. Install the bearing inserts dry in the connecting rods and then coat them with engine oil.
4. Pull the connecting rod against the crank pin and put on the bearing cap. Make sure that the marks on connecting rod and bearing cap coincide. Tighten the nuts to the prescribed torque.



MARKING OF PISTONS AND CONNECTING RODS

5. Slide the oil pump onto its drive shaft and install it with the gasket. Tighten the two bolts for the actual pump first and then the suction line bolt.
6. Insert the rubber seal in the groove in the rear main bearing cap.
7. If a new crankshaft or new bearing inserts have been installed, check that the correct fitting clearance is obtained.

MEASURING THE CLEARANCE, CRANKSHAFT AND CONNECTING ROD BEARINGS

The clearance is measured with Plastigage. Plastigage is available under spare part number 78 60 505. Plastigage is supplied in three different thicknesses. Type PG-1 (green) must be used, since this type allows measurement of clearances from 0.00098 to 0.00299 in. (0.025–0.076 mm).

Instructions for the use of Plastigage

1. Position the engine with the cylinder head facing downwards to prevent the weight of the crankshaft from influencing the measurement of main bearing clearance. The weight of the crankshaft does not influence the measurement of the connecting rod bearing clearance.
2. Make sure that the parts to be measured are free of oil and dirt. Install a dry bearing insert in the bearing cap and position a strip of Plastigage in the insert about 0.236 in. (6 mm) off center.



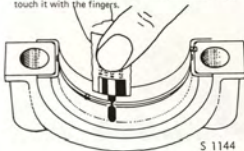
MEASURING PLACE FOR PLASTIGAGE

3. Make sure that the crankshaft is shortly behind the lower dead center (about 30°). With the crankshaft in this position, install the bearing cap with insert and Plastigage and tighten the bearing cap nuts to the prescribed torque.

NOTE

Do not turn the crankshaft during the measuring procedure. When measuring the connecting rod bearing clearance, also make sure that the connecting rod is not moved.

4. Remove the bearing cap. The Plastigage strip will be found pressed in the bearing cap or on the crankshaft journal.
5. Measure the width of the flat pressed Plastigage strip by means of the scale printed on the Plastigage packing and read off the clearance. One side of the packing gives the reading in mm and the other side in thousand of an inch.
Measure the Plastigage at its widest point but do not touch it with the fingers.



MEASURING OF FLAT PRESSED PLASTIGAGE STRIP

Conicity of a crankshaft journal

Conicity of a crankshaft journal exists if one end of the flat pressed Plastigage strip is wider than the other.

Ovality of a crankshaft journal

Having completed the above measurement, another measurement must be undertaken after having turned the crankshaft through 90° . The difference between the two measurements indicates the ovality of the crankshaft journal.

Consider a rectangular plate of width b and height h . The plate is subjected to a uniform load q acting downwards. The plate is supported by a pin support at the left end and a roller support at the right end. The plate is divided into two equal parts by a vertical line passing through the center. The left part is of width $b/2$ and the right part is of width $b/2$. The plate is divided into two equal parts by a vertical line passing through the center. The left part is of width $b/2$ and the right part is of width $b/2$. The plate is divided into two equal parts by a vertical line passing through the center. The left part is of width $b/2$ and the right part is of width $b/2$.

Problem 1

1. The plate is divided into two equal parts by a vertical line passing through the center. The left part is of width $b/2$ and the right part is of width $b/2$.
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4. The plate is divided into two equal parts by a vertical line passing through the center. The left part is of width $b/2$ and the right part is of width $b/2$.

OIL PAN

REMOVAL

1. Install the engine on a work stand.
2. To prevent oil sludge and impurities from entering the engine, the oil pan must be removed downwards with the engine in the normal position.

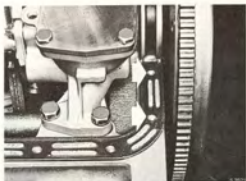
INSTALLATION

1. Insert the rubber seal in the groove in the rear main bearing cap.



INSTALLATION OF OIL PAN GASKET

2. Apply a coat of sealing compound to the two corner joints where the transmission cover, the intermediate plate and the edges of the oil pan meet. Position the oil pan gasket on the block and insert the two tabs on the cork gasket under the recesses in the rear bearing cap rubber seal.
3. Install and secure the oil pan. Position the two bolts with the rubber washers at the rear balance shaft bearing.



FITTING THE TWO BOLTS WITH RUBBER WASHERS

REMOVAL

1. Install the engine on a work stand.
2. To prevent oil leakage and improve oil draining, the engine oil pan must be removed downstream with the engine in the normal position.
3. Apply a coat of sealing compound to the two corners of the oil pan where the two corners meet. The sealing compound must be applied to the oil pan and the two corners of the oil pan must be removed in the normal position.
4. Install the engine on the work stand. Position the two corners of the oil pan where the two corners meet.
5. Install the engine on the work stand. Position the two corners of the oil pan where the two corners meet.

INSTALLATION

1. Install the engine on the work stand.
2. To prevent oil leakage and improve oil draining, the engine oil pan must be removed downstream with the engine in the normal position.



REMOVING THE OIL PAN FROM THE ENGINE



INSTALLING THE OIL PAN TO THE ENGINE

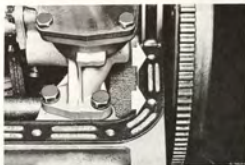
OIL PUMP

REMOVAL

1. Install the engine on a work stand.
2. To prevent oil sludge and impurities from entering the engine, the oil pan must be removed downwards with the engine in the normal position.
3. Remove the two bolts in the oil pump flange and the retaining screw for the oil pump suction line. Remove the oil pump and its drive shaft.
2. Push the oil pump onto the drive shaft and install it. Tighten the actual pump bolts first and then the suction line bolt.
3. Apply a coat of sealing compound to the two corner joints where the transmission cover, the intermediate plate and the edges of the oil pan meet. Position the oil pan gasket on the block and insert the two tabs on the cork gasket under the recesses in the rear bearing cap rubber seal.
4. Install and secure the oil pan. Position the two bolts with the rubber washers at the rear balance shaft bearing.



REMOVAL OF OIL PUMP



FITTING THE TWO BOLTS WITH RUBBER WASHERS

INSTALLATION

1. Pass the drive shaft into the engine block with the pointed end facing the distributor.
NOTE! The holding ring must be located on the drive shaft.

NOTE

The gasket between the oil pump and the engine block has been left out and need not be fitted when removing and installing the pump.



DRIVE SHAFT WITH HOLDER RING

OVERHAULING WITH A REPAIR KIT

Disassembly

1. Unscrew the suction line from the oil pump.
2. Unscrew the oil pump cover. Remove the inner and outer rotor from the oil pump housing.
3. Make a hole in the relief valve cover plate with a drift. Pull out the cover plate with a suitably sized selftapping screw.



REMOVAL OF RELIEF VALVE COVER PLATE

4. Remove the spring and the oil relief valve.



OIL PUMP, DISMANTLED

- | | |
|--------------------------|-----------------|
| 1. Housing | 5. Spring |
| 2. Inner and outer rotor | 6. Cover plate |
| 3. Cover | 7. Gasket |
| 4. Relief valve | 8. Suction line |

Reassembly

1. Insert a new outer and inner rotor in the pump housing. Check the clearance between the sealing surface of the pump housing and the front sides of the outer and inner rotor with a ruler and a feeler gage. If necessary, grind the sealing surface of the oil pump housing or the rotor sides with a fine emery cloth on a face plate.



CHECKING AXIAL CLEARANCE OF ROTOR

Correct clearance 0.004 in. (0.1 mm)

2. Check the clearance between the outer rotor and the oil pump housing with a feeler gage. If the maximum permissible clearance is exceeded, a new pump housing must be used.



CHECKING RADIAL CLEARANCE OF ROTOR

Correct clearance 0.012 in. (0.3 mm)

NOTE

Take great pains to remove all grinding dust from the parts before assembling. The inner rotor and the drive shaft constitute one spare part.

3. Install the relief valve and spring and coat them lightly with engine oil.
4. Install a new cover plate with the flat side pointing outwards. Press it in until it bottoms out against the stop.
5. Using a blunt, round-tipped drift with a diameter of about 0.48 in. (12 mm), tap the middle of the cover plate in order to press it home.
6. Install the rotors and coat them with engine oil. Put the cover on the pump housing and tighten the bolts to the prescribed torque. Insert the drive shaft in the rotor shaft and check that the pump runs easily.
7. Install the suction line with a new gasket to the oil pump housing.

OIL FILTER

CHANGING OF FILTER CARTRIDGE

Use tool 78 62 014 to remove the oil filter cartridge. Unscrew the cartridge. The cartridge cannot be cleaned and should therefore be renewed at the prescribed intervals (every 6,000 miles or 10,000 km). Apply a little oil to the rubber gasket on the new cartridge. Screw in the cartridge until the gasket makes contact with the engine block and then tighten half a turn.

NOTE

Excessive tightening of the cartridge involves a risk of leakage, as the rubber seal may then tilt in its groove.



REMOVAL OF OIL FILTER CARTRIDGE

Tool 78 62 014



FIGURE 1. OIL FILTER REMOVAL



FIGURE 2. OIL FILTER REMOVAL

A. Remove the spring and the oil filter cover



FIGURE 3. OIL FILTER COVER

- | | |
|---------------------|-----------|
| 1. Remove | 2. Spring |
| 3. Cover and spring | 4. Cover |
| 5. Cover | 6. Spring |
| 7. Cover | 8. Spring |

Preassembly

1. Mark a point on the oil filter cover to be used as a reference point. The marking should be made on the oil filter cover and the location of the oil filter cover should be marked with a marker or a marker. The marking should be made on the oil filter cover and the location of the oil filter cover should be marked with a marker or a marker.

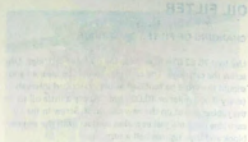
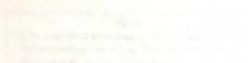


FIGURE 4. OIL FILTER INSTALLATION

2. Check the oil level in the oil pan. If the oil level is low, add oil to the oil pan. If the oil level is high, remove oil from the oil pan.



FIGURE 5. OIL FILTER INSTALLATION



3. Check the oil level in the oil pan. If the oil level is low, add oil to the oil pan. If the oil level is high, remove oil from the oil pan.



FIGURE 7. OIL FILTER INSTALLATION

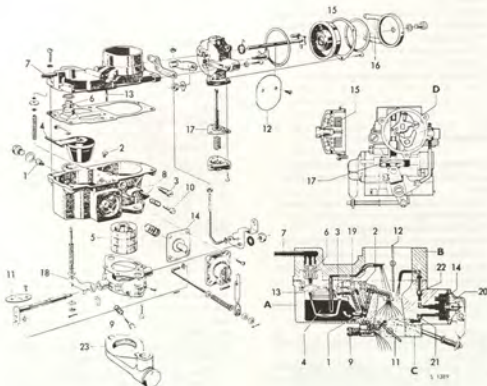
CARBURETOR

Carburetor, make Solex, models 1967 and 1968

REMOVAL

1. Drain off some of the cooling water
2. Remove the air cleaner.

3. Disconnect the hoses from the automatic choke.
4. Disconnect the throttle control linkage and the vacuum line.
5. Disconnect the fuel line.
6. Remove the carburetor.
7. Carburetor 32 PDSIT-4:
Disconnect the hose from the valve cover. Then it is possible to remove the intermediate flange.
8. Carefully cover the opening in the induction pipe.



CARBURETOR, SOLEX, PRINCIPLES

- A Float chamber
- B Float chamber cover
- C Throttle body assembly
- D Housing, automatic choke
- 1. Main jet
- 2. Emulsion jet
- 3. Idling jet, fuel
- 4. Float
- 5. Choke tube
- 6. Float valve
- 7. Connection, fuel hose
- 8. Connection, vacuum hose, distributor
- 9. Air-regulating screw, idling mixture
- 10. Adjusting screw, idling

- 11. Throttle valve
- 12. Choke valve
- 13. Ascending pipe, additional system (econostat)
- 14. Diaphragm, acceleration pump
- 15. Bimetal spring for automatic choke
- 16. Coolant connections
- 17. Diaphragm for vacuum control of automatic choke
- 18. Regulating device, float chamber ventilation (only on carburetor 32 PDSIT-4)
- 19. Idling air jet (drilling)
- 20. Acceleration pump
- 21. Inlet valve, acceleration pump
- 22. Outlet valve, acceleration pump
- 23. Intermediate flange

DISASSEMBLY

1. Remove the retaining ring from the control rod between the automatic choke and the throttle valve. Detach the link from the throttle valve arm.
2. Unscrew and lift off the float chamber cover. Remove the gasket.
3. Screw out the needle valve.
4. Take the float out of the float chamber.
5. Remove the plug from the float chamber and remove the jet.
6. Pull off the acceleration pump jet (over the acceleration pump).
7. Screw off the idling jet and the emulsion tube jet.
8. Screw off the acceleration pump cover and check the diaphragm.
9. Screw off the idling mixture air-regulating screw.
10. Carburetor 32 PDSIT-4:
Remove the intermediate flange valve.

REASSEMBLY

NOTE! Clean all passages and jets with a blast of compressed air. Change all parts included in the gasket and repair kit.

1. Install the spring, diaphragm and cover for the acceleration pump.
2. Insert the acceleration pump jet.
3. Screw in the idling jet and the emulsion tube jet.
4. Advance the idling mixture air-regulating screw carefully until it bottoms out then back it off one complete turn.
5. Insert the float.
6. Screw the needle valve with original gasket into the float chamber cover.
7. Install a new cover gasket.
8. Put on the float chamber cover and replace the retaining screws.
9. Pass the rod between the automatic choke and the throttle valve into the throttle valve arm and secure with the retaining ring.
10. Set the valve arm in the semi-open position and at the same time fully close the choke valve with the fingers. Meanwhile, hold the valve arm firmly and make sure that the throttle valve is ajar. The clearance between the valve and the flange must be 0.032 in. (0.8 mm). This can be checked with a wire or drill bit of the same diameter. To adjust the clearance, slacken the nuts on the linkage rod for the fastidling system and then adjust the rod so that the valve takes up the correct position. Then retighten the rod and lock it in the correct position. For final adjustment, see under "Adjustment of automatic choke".
11. Carburetor 32 PDSIT-4:
Fit the intermediate flange valve.

INSTALLATION

1. Carburetor 32 PDSIT-4:
Fit the intermediate flange, with new gaskets.
2. Install a new gasket, put on the carburetor and tighten it up evenly.
3. Reconnect the fuel and vacuum lines.
4. Reconnect the throttle control.
5. Reconnect the coolant hoses and tighten the hose clamps.
6. Refill the cooling system and bleed the system.
7. Install the air cleaner.

CHECKING AND ADJUSTMENT OF FLOAT LEVEL

The fuel level in the float chamber should be measured while the engine is idling and should be nominally 0.59 in. \pm 0.04 in. (15 \pm 1 mm).

The level is decided by the thickness of the float valve sealing washer. If the level is too high, a thicker washer should be fitted and conversely a thinner washer must be fitted to adjust too low a level. The float level is measured from the top of the float chamber cover to the fuel level. Measuring can appropriately be carried out with tool 78 60 984 which is connected at the site of the jet plug in the float chamber.

IDLING ADJUSTMENT

NOTE! The idling speed must be adjusted when the engine has reached the normal working temperature and the headlights switched on. Depending on the mileage, the adjustment should be preceded by a check of the spark plug electrode gap, the ignition setting and the valve play.

1. Reduce the engine speed so that the engine runs as slowly as possible or at max. 500 rev/min.
2. Adjust the volume control screw until the engine runs as smoothly as possible.
3. Switch on the headlights (high beam) and increase the speed to 800–900 rev/min with the idle adjusting screw.

ADJUSTMENT OF AUTOMATIC CHOKE

Adjustment of the automatic choke involves two operations, viz. setting of the choke lights and fast-idling adjustment. These two tasks are described below.

Adjustment of choke flap

Temperature setting

The automatic choke is set for the choke valve to open wide at a temperature of 60–65°C (140–149°F).

The setting mark on the rotatable thermostat housing must coincide with the middle one of the five fixed setting marks comprising the adjustment range.

Turning clockwise makes the choke open later.



ADJUSTMENT OF THERMOSTAT HOUSING

Adjustment of thermostat housing after removal

1. Hook the bimetal spring onto the driver cam. Turn the thermostat housing the shortest way until the setting marks coincide.
2. Check that the choke valve stretches towards the closed position.

Fast-idling adjustment

1. Remove the air cleaner.
2. Operate the engine until it reaches normal working temperature. Then switch on the headlights.
3. Connect a tachometer to the engine.
4. Adjust the engine to the correct idling speed, i.e. 800–900 rev/min.
5. Close the choke valve a little, in order to make it contact the ratchet wheel in the starting automatics. Hold the choke valve in this position, and keep pressing it towards the ratchet wheel.
6. Open the throttle valve cautiously, enough to allow the choke valve to move to the next position. First release the throttle valve cautiously, and then the choke valve. The step which serves to increase the idling speed, is now in the first position (first step) of the ratchet wheel.
7. The throttle control must not be touched at this stage, as the ratchet wheel would then revert to the neutral position. For safety's sake, the control rod should be pushed up hard with the fingers.
8. When the throttle valve is in this position, the engine speed should be between 1 200–1 300 rev/min. Adjust the length of the control rod.
To increase the speed = lengthen the rod
To reduce the speed = shorten the rod

NOTE

After having performed this adjustment, check that the control rod does not jam in the throttle control lever owing to twisting during tightening of the two adjusting nuts.

9. In order to check the good functioning of all stages of the fast-idling (see page 200–7), check the number of revolutions of the third step. Same shall be 2 600–3 000 rev/min.
10. Recheck the idling speed and adjust if necessary.
11. Disconnect the tachometer and install the air cleaner. In principle, the above adjustments shall be performed only if the engine is difficult to start at low temperatures and when a check has shown that there are not other faults in the system.

Carburetor, make FoMoCo, models 1969-1975

REMOVAL

1. Remove the air cleaner.
2. Detach the coolant hoses from the automatic choke.
3. Remove the throttle control.
4. Detach fuel- and vacuum hoses.
5. Remove the carburetor.
6. Cover the orifice of the suction pipe.

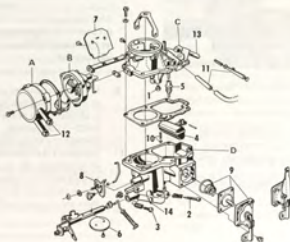


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REMOVAL OF THERMOSTATIC SPRING HOUSING BOLTS

DISASSEMBLY

1. Remove the three bolts and detach the thermostatic spring housing.
2. Unscrew the step cam from the throttle body.
3. Unscrew the bolts retaining the float chamber cover, and lift the cover off. Collect the spring of the float chamber cover. Remove gasket. By holding the float chamber upside down, remove the ball and the weight from the accelerating fuel channel.



S 4196

CARBURETOR, FOMOCO, PRINCIPLES

- | | |
|---------------------------------|---|
| A. Thermostatic spring housing | 6. Throttle valve |
| B. Choke flap housing | 7. Choke valve |
| C. Float chamber cover | 8. Step cam |
| D. Float chamber | 9. Acceleration pump |
| 1. Main jet | 10. Ball and weight, accelerating pump fuel channel |
| 2. Volume screw, idling mixture | 11. Float chamber ventilation, alternative designations |
| 3. Idling screw | 12. Coolant connections |
| 4. Float | 13. Fuel connection |
| 5. Float valve | 14. Vacuum connection, distributor |



BALL AND WEIGHT, ACCELERATING PUMP FUEL CHANNEL



LOCATION OF FITTED THROTTLE VALVE

4. Unscrew the bolts in the accelerating pump cover. Remove cover, diaphragm and spring.
5. Remove accelerating pump rod from the lever of the throttle valve shaft. Remove the lever.
6. Remove idle mixture control screw, and idle adjusting screw as well. Collect the springs.
7. Remove throttle valve.
8. Remove (by using a contact file) the possible burrs from the threaded bores in the throttle valve shaft. Only then pull out the shaft.
9. Remove the float. Unscrew float needle valve.
10. Unscrew main jet.
11. Unscrew the automatic choke housing from the carburetor.
12. Pull out the pins of the air cleaner mounting yoke. Remove yoke.
13. Remove choke plate.
14. Remove (by using a contact file) the possible burrs from the threaded bores in the choke plate shaft. Only then pull out the shaft.

REASSEMBLY

Clean the carburetor. Clean with compressed air all channels, passages and jets. Renew gaskets and possibly defective parts.

1. Mount the throttle valve shaft in the throttle body. Fit the accelerating pump lever on the throttle valve shaft, turn the side marked "O" upwards.
2. Fit the throttle valve so, that the face featuring two punched marks faces downward when the throttle is kept closed. Prior to tightening the bolts, see to it that the valve centers in closed position. Check that the shaft moves easily.

3. Fit the following screws of the idle device: mixture control, and idle adjusting. Fit the springs too.
4. Fit the accelerating pump rod, between the levers of the accelerating pump and the throttle valve.
5. Fit the accelerating pump diaphragm, and its spring. NOTE! The small end of the spring shall face the diaphragm. Fit the cover.
6. Fit the choke plate shaft. Prior to tightening the bolts, see to it that the choke plate centers in closed position. Check that the shaft moves easily.



CHECKING LOCATION OF FITTED CHOKE PLATE

7. Fit the air cleaner mounting yoke, and drive the pins in.
8. Fit the automatic choke housing, with its gasket, and connect accelerating pump rod to choke plate shaft.
9. Screw the main jet on.
10. Screw needle valve on and fit float. Regarding checking and adjustment of float level, see page 231-6.
11. Insert ball and weight in the accelerating pump channel.



BALL AND WEIGHT, ACCELERATING PUMP FUEL CHANNEL

12. Fit the float chamber valve spring into the carburetor cover. Fit the cover, and insert the float chamber valve push-rod into the cover. Tighten cover.
13. Screw step cam on.
14. Fit the thermostatic spring housing.

INSTALLATION

1. Fit new gaskets beneath the intermediate flange and carburetor.
NOTE! Turn the face marked "Oben" upward.



LOCATION OF FITTED GASKET

NOTE

A special gasket is required for this carburetor and must not be mixed up with the gasket for the Solex carburetor.

2. Refit fuel- and vacuum hoses.
3. Refit the throttle control.
4. Refit the coolant hoses.
5. Refit the air cleaner.

CHECKING AND ADJUSTMENT OF FLOAT LEVEL

1. When checking the measurement A, which shall be 1.08 in. (27.5 mm), hold the float chamber cover perpendicularly, with a view not to press in the spring-loaded ball of the float valve. When adjusting, bend the stop gently at the arrow.
2. The lower end position of the float is checked by measuring the measurement B, which shall be 1.34 in. (34 mm). When adjusting, bend the stop gently at the arrow.



CHECK MEASUREMENT, FLOAT

A = 1.08 in. (27.5 mm)

B = 1.34 in. (34 mm)

ADJUSTMENT OF ACCELERATING PUMP

1. Fill the float chamber with fuel, using a funnel and a hose connected to the inlet pipe.
2. Slacken the idle adjusting screw completely so that full pump strokes are obtained. Open the throttle valve a few times in order to fill the fuel ducts.
3. Hold the carburetor over a glass measuring cylinder with a funnel as shown in the illustration. Open the throttle valve ten times with smooth movements. Compare the measured amount of fuel with the specifications in group D.



CHECKING THE ACCELERATING PUMP SETTING

4. If the measured amount of fuel does not lie within the stipulated tolerances, adjust the accelerating pump setting by bending or straightening the connecting-rod lever. Bending the lever increases the pump capacity. Conversely, if the lever is straightened out, the pump capacity is reduced.



CONNECTING ROD LEVER

SETTING OF FLOAT CHAMBER VALVE

1. The measurement "A" = 0.32–0.40 in. (8–10 mm) is measured with the throttle valve wide open.
2. The measurement "B" = 0.008–0.012 in. (0.2–0.3 mm) is measured with the throttle valve fully closed.



MEASURING DIMENSIONS "A" AND "B"

- A = 0.32–0.40 in. (8–10 mm)
B = 0.008–0.012 in. (0.2–0.3 mm)

3. Adjustment of measurement "A" is obtained by bending the lower part of the lever stop towards the tension pin. Adjustment of measurement "B" is obtained by bending the lever at the push rod.



ADJUSTMENT OF MEASUREMENTS "A" AND "B"

SETTING OF AUTOMATIC CHOKE

Normally, the functioning of the automatic choke should not be altered in any way. The setting mark on the thermostatic spring housing to be in line with the center mark on the automatic choke housing. The free end of the thermostatic spring to be fitted in the center slit of the thermostatic spring lever.



FITTING THERMOSTATIC SPRING



LOCATION OF THERMOSTATIC SPRING HOUSING

Setting the choke valve vacuum adjustment

A. Carburetor without modulating choke (C8 GH-G, 71 TW-JB, 71 TW-JC and USA-C8 GH-H)

1. Remove the thermostatic spring housing.
2. Depress the vacuum piston fully. Move the choke valve towards closed position, until the tongue of the thermostatic spring lever contacts the vacuum piston lever. In this position, the opening of the choke valve shall be 0.18–0.20 in. (4.5–5.0 mm). As gauge, a drill may be used.



VACUUM PISTON END POSITION



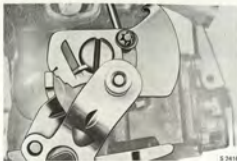
CHECKING THE SETTING

Adjustment by bending the tongue of the thermostatic spring lever.



ADJUSTMENT OF THERMOSTATIC SPRING LEVER TONGUE

3. Fit the thermostatic spring housing. See to it that the spring takes up the correct position.
4. Check position of step cam, by inserting a gauge, see point 2. In this position, the mark on the 3rd catch of the step cam shall be exactly in front of the stop dog of the throttle valve lever.



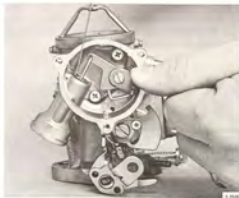
CHECKING POSITION OF STEP CAM

Adjustment by bending the link rod.



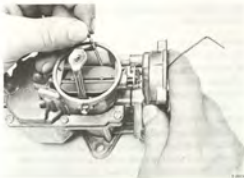
ADJUSTMENT OF LINK ROD

- B. Carburetor with modulating choke (71 TW-JD, 72 TF-KGA, 72 TF-KEA, USA-70 TW-AA, USA-71 TW-LA, USA-72 TF-KEA and USA-72 TF-KFA).
1. Remove the thermostatic spring housing.
 2. Position a piece of 0.040" (1.01 mm) thick wire in the inner slot above the piston and hold the vacuum piston lever to keep piston and wire in position.



SETTING OF CHOKE VALVE

3. The lower opening of the choke valve shall now be: Standard carburetors 0.11 ± 0.008 " (2.8 ± 0.2 mm), USA carburetors $0.08-0.10$ " ($2.0-2.5$ mm). Check the opening with a drill or similar.



CHECKING THE CHOKE VALVE OPENING

4. Adjust by bending the thermostatic spring lever tongue.



ADJUSTMENT OF THERMOSTATIC SPRING LEVER TONGUE

5. Check position of step cam, by inserting a gauge, see point 3. In this position, the mark on the third catch of the step cam shall be exactly in front of the stop dog of the throttle valve lever.



CHECKING POSITION OF STEP CAM

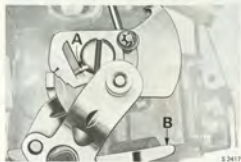
Adjust by bending the link rod.



ADJUSTMENT OF LINK ROD

Setting of the mechanical opening of the choke valve

1. Open the throttle valve fully. This forces the choke valve to open, in the way that an arm (B) on the throttle spindle contacts a stop (A) on the step cam.



CHOKE VALVE ARM (B) AND STEP CAM STOP (A)

2. When the throttle valve is fully open, the choke valve shall open 0.19–0.23 in. (4.8–5.8 mm), which is checked with a drill.



CHECKING CHOKE VALVE OPENING

3. Adjustment by gently bending the stop (A) on the step cam.

Checking the automatic choke

(Carburetor installed in the car)

1. a. If the engine is cold, start checking as per point 2 below.
b. If the engine is warm, begin by removing the automatic choke cover from the housing. Next, fasten the lower screw and stretch a rubber band between the screw and the lever where the thermostatic spring is normally located. The rubber band then performs the same service as is normally done by the thermostatic spring when the engine is cold.



THE THERMOSTATIC SPRING HAS BEEN REPLACED BY A RUBBER BAND

2. Remove the air cleaner and depress the accelerator pedal. Check that the choke valve closes completely and that the step cam engages the highest (fourth) catch.
3. Start the engine and let it run with the step cam set at the highest (fourth) catch.
4. Check that the choke valve opens so that the distance between it and the neck of the carburetor is 0.18–0.20 in. (4.5–5.0 mm). This is not applicable to carburetors with modulating choke, because the opening is depending on the vacuum. The opening shall be: Standard carburetors 0.11 ± 0.008" (2.8 ± 0.2 mm), USA carburetors 0.08–0.10" (2.0–2.5 mm). Also check the function of the choke valve by putting it to the closed position and then releasing it. The choke valve should then return rapidly to the original position (opening 0.18–0.20 in./4.5–5.0 mm). If the choke valve does not open to the prescribed amount, this may be due to incorrect adjustment or to leakage, for instance at the bottom cover of the vacuum piston or between the choke housing and the carburetor.



CHECKING THE SETTING

Adjustment by bending the tongue of the thermostatic spring lever.



ADJUSTMENT OF THERMOSTATIC SPRING LEVER TONGUE

- Depress the accelerator pedal. The engine speed should slow down when the step cam moves down to the third catch. Check that the mark < on the third catch of the step cam is exactly opposite the stop on the throttle spindle. If necessary, adjust the connecting rod so that the correct position is obtained.
- Stop the engine. Depress the accelerator pedal fully and check that the choke valve opens 0.19–0.23 in. (4.8–5.8 mm). If necessary, adjust by carefully bending the stop on the cam disc.
- Remove the rubber band and refit the cover of the automatic choke if this item has been removed. Check that the spring takes up the correct position. Warm up the engine and check the volume control screw setting, the idling speed and the fast idling speed.

FAST IDLE ADJUSTMENT

- Run the engine until it reaches normal working temperature. Remove the air cleaner.
- Connect a tachometer.
- Hold the throttle valve shaft and the step cam so, that the stop dog contacts the mark on the third catch of the step cam.
- The engine speed shall now be 1 800–2 000 rev/min. When adjusting, bend the stop of the throttle valve shaft.



BENDING THROTTLE VALVE STOP

- Check the fast idle setting.
- Fit the air cleaner.

IDLE ADJUSTMENT

NOTE! This adjustment should be made when the engine has been warmed up to normal working temperature. Depending on the mileage, adjustment should be preceded by checking the electrode gap of the spark plugs, the ignition setting and the valve clearance.

- Reduce the engine speed so that the engine runs as slowly as possible or at max. 500 rev/min.
- Adjust the volume control screw until the engine runs as smoothly as possible.
- Switch the headlights on (high beam) and the speed to 800–900 rev/min with idle adjusting screw.

Carburetor, make Ford, models 1976 and 1977

REMOVAL

1. Remove the air cleaner.
2. Disconnect the fuel line, the ventilation hose and the vacuum hose from the carburetor.
3. Unscrew the choke control from the carburetor and unhook the throttle cable.
4. Remove the carburetor.



REMOVING THE CARBURETOR

5. Blank off the end of the inlet channel.

Dismantling

1. Undo the float chamber cover retaining bolts and lift off the cover, at the same time unhooking the link to the choke.



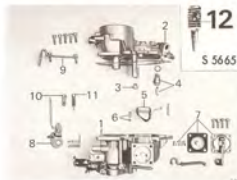
THE FLOAT CHAMBER COVER IS LIFTED OFF

Remove the gasket. Remove the ball and the weight from the acceleration fuel passage by inverting the housing.



BALL AND WEIGHT IS REMOVED

2. Remove the acceleration pump cover bolts and remove the cover, diaphragm and spring. Remove the connecting rod from between the throttle valve lever and the acceleration pump. Unbolt the acceleration pump arm from the throttle shaft.
3. Remove the mixture screw and the idling screw and save the springs. On 1977 model cars, first remove the seal from above the mixture adjusting screw. Make a hole in the top of the plastic plug and then work it free.
4. Remove the throttle valve.
5. File away any burrs around the screw holes in the throttle shaft. Remove the shaft.
6. Remove the float. Unscrew the needle valve, saving the filter.
7. Unbolt the choke lever and save the spring.
8. Remove the main jet.
9. Dismantle the choke valve.
10. File off any burrs around the screw holes in the choke valve shaft. Withdraw the shaft.



CARBURETOR, EXPLODED

1. Float chamber with throttle valve
2. Float chamber cover with choke valve
3. Main jet
4. Float valve
5. Float
6. Ball and weight, acceleration fuel passage
7. Acceleration pump
8. Choke arm with fast idling cam
9. Choke wire bracket
10. Idling screw, throttle valve
11. Mixture screw, idling fuel, model 1976
12. Mixture screw, idling fuel, model 1977

ASSEMBLY

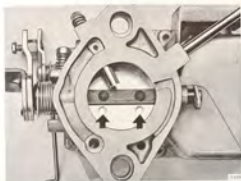
Clean the carburetor. Blow compressed air through all passages and jets. Replace gaskets and any defective parts.

1. Install the throttle valve shaft in the carburetor housing. Mount the acceleration pump lever to the throttle shaft with the side marked "O" facing outwards.



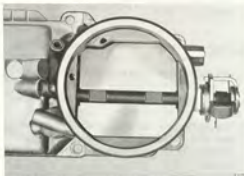
FITTING THE ACCELERATION PUMP LEVER

2. Install the throttle valve in such a way that when the valve is closed, the two punched marks will face down. Ensure that the valve is correctly centred in the closed position before tightening the bolt. Check that the shaft moves freely.



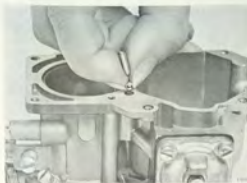
INSTALLING THE THROTTLE VALVE

3. Install the idling screw and mixture screw complete with springs. Model 1977: After the carburetor has been adjusted, reseal the mixture adjusting screw.
4. Hook the acceleration pump rod onto the throttle valve lever.
5. Install the diaphragm and spring of the acceleration pump.
N.B. The larger end of the spring should face towards the diaphragm. Hook the connecting rod onto the pump arm and fit the cover.
6. Install the choke valve shaft. Ensure that the valve centres correctly in the closed position before tightening the bolts. Check that the shaft moves freely.



INSTALLING THE CHOKE VALVE

7. Bolt the main jet in position.
8. Screw in the needle valve together with the fuel filter. Install the float and check the float level. See "Checking and adjustment of the float level".
9. Insert the ball and the weight into the acceleration pump passage.



BALL AND WEIGHT ARE PLACED IN THE ACCELERATION PUMP PASSAGE

10. Fit the carburetor housing with a new gasket and replace the float chamber cover. Insert the bolts and mount the choke cable bracket. Tighten the cover.
11. Install the choke lever together with spring, at the same time, hooking the link onto the driver on the choke valve.

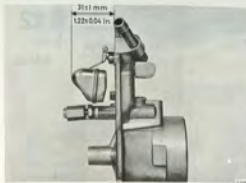
INSTALLATION

1. Fit new gaskets between the intermediate flange and the carburetor.
2. Mount the carburetor.
3. Connect the throttle cable and choke cable to the carburetor.
4. Connect the fuel line, ventilation hose and the vacuum hose to the carburetor.
5. Install the air cleaner.

SETTING

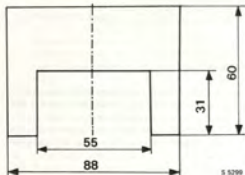
Checking and adjustment of float level

1. Remove the float chamber cover (see under "Dismantling").
 2. Hold the float chamber cover vertically so that the float closes the needle valve. However, the spring-loaded ball of the needle valve should not be depressed.
- The distance between the sealing edge and the bottom of the float should be 1.12 in. (31 mm) (see illustration).



FLOAT LEVEL

To adjust the distance, carefully bend the lever stop at the arrow. The distance can be measured by means of a vernier scale or by means of a gauge made from a piece of metal (see illustration).



GAUGE FOR MEASURING OF FLOAT LEVEL



MEASURING THE FLOAT LEVEL WITH A GAUGE

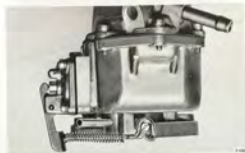
Adjusting the acceleration pump

1. Using a funnel and a hose connected to the inlet pipe, fill the float chamber with fuel.
2. Completely unscrew the throttle valve screw so that full pump strokes are obtained. Open the throttle valve a few times to fill the fuel passages.
3. Hold the carburetor over a measuring glass with funnel as shown in the illustration. Open the throttle valve gradually ten times. Compare the measured quantity of fuel with the specification given in group D.



CHECKING THE SETTING OF THE ACCELERATION PUMP

4. If the measured fuel quantity does not lie within the prescribed values, adjust the accelerator pump setting by bending or straightening the pump connecting rod. When the rod is straightened the pump capacity will increase.



ADJUSTING THE ACCELERATION PUMP SETTING

Checking and adjusting of fast idling

1. Remove the air cleaner.
2. Run the engine until hot and check the idling setting.
3. Hold the choke valve in the fully open position with one hand, at the same time, turning the choke into the position where the choke valve starts to close.



CHECKING FAST IDLING SETTING

Read off the engine speed and refer to the specifications in group D.

4. Adjustment is made by bending the tongue on the throttle driver connected to the cam on the choke lever.

CAUTION

The vacuum control unit in the distributor may cause an increase in the fast idling speed. Before checking the fast idling speed, therefore, disconnect the vacuum hose from the vacuum control unit. The deceleration valve can cause higher fast idle speed. Squeeze together the hose between the carburetor and the deceleration valve when checking and setting the fast idling speed.

Checking and adjustment of choke valve stop

1. Move the choke lever to the limit of its travel against the stop on the choke cable bracket.
2. Using a drill, check that the valve in this position can open 0.15 in. (3.8 mm) at the bottom. Adjustment is made by bending the stop on the bracket.



ADJUSTING THE CHOKE FLAP STOP

On model 1977 a modified mixture adjusting screw has been introduced which is sealed by means of a plastic plug. Before any adjustment can be made, the plastic plug must be removed (and thereby destroyed) and then replaced, as follows:

Using a small screwdriver, make a hole in the top of the plug and then work it loose.



REMOVING THE PLASTIC PLUG

Idling adjustment, engine speed and CO-value

N.B. Adjustment should be carried out with the engine at its normal running temperature and, with due consideration given to mileage, the adjustment should be preceded by a check on spark plug gaps, the ignition setting and the valve clearance.

1. Ensure that the snorkel on the air cleaner is in the "Summer" position.
2. Connect the tachometer and CO meter. Switch on the headlights on low beam.
3. Adjust the engine speed and CO value by means of the throttle valve screw and the idling mixture screw.



ADJUSTING THE IDLING SETTING

1. Screw
2. Idling mixture screw

After the adjustment, fit a new (blue) plug by means of a drift and hammer.



FITTING A NEW PLASTIC PLUG

**DECELERATION VALVE, MODEL 1977
(SWEDEN-VERSION AS FROM MODEL 1976 AND
USA-VERSION AS FROM MODEL 1970)**

Removal and installation

1. Remove the carburetor.
2. Disconnect the crankcase ventilation hose and remove the intermediate flange with the deceleration valve.



REMOVAL OF DECELERATION VALVE

3. Unscrew the valve from the angle nipple (only if the valve is to be exchanged).

Installation is carried out in the reverse order.

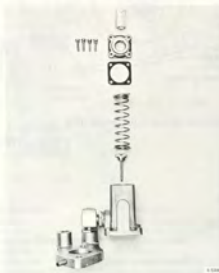
Dismantling and assembling

1. Remove the bottom cover retaining bolt and remove the cover, diaphragm and spring.

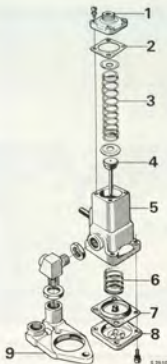


DECELERATION VALVE WITH BOTTOM COVER REMOVED

2. Undo the top cover retaining bolts and remove the cover complete with adjusting screw, gasket, spring and spring seat and valve.



DECELERATION VALVE TOP COVER REMOVED



S 2010

DECELERATION VALVE

1. Adjusting screw
2. Gasket
3. Spring
4. Valve
5. Body
6. Spring
7. Diaphragm
8. Bottom cover
9. Intermediate flange

Assembly is carried out in the reverse order.

Setting

Checking

NOTE

The air cleaner must be fitted.

1. Run the engine until normal operating temperature.
2. Check that the deceleration valve is not working at idling speed. This can be done by disconnecting one of the hoses between carburetor and deceleration valve.

If the valve is open, i.e. vacuum is pressing the valve, the adjusting screw on the deceleration valve has to be screwed further in until the valve is closed. Connect the hose.

If the deceleration valve is working at idling speed, you will get a very fast idle (1 200–1 400 r/min). It is not possible to adjust this in a normal way.

3. Connect a tachometer and adjust the idling speed in accordance with the specifications in group 0.
4. Advance the engine speed to 3 000 r/min with the throttle. Let down the throttle rapidly and measure the time as require to drop the engine speed from 3 000 r/min to idle.

An engine fitted with a correctly adjusted deceleration valve should drop from 3 000 r/min to idle in 4 to 6 seconds. (USA-version as from model 1970 7 to 8 seconds.)

Adjustment

1. Remove the air cleaner.
2. a. If the requisite time from 3 000 r/min to 900 r/min is more than the prescribed, the deceleration valve adjusting screw should be screwed clockwise until the desired figure is reached.
- b. If the requisite time is less than the prescribed, the adjusting screw should be screwed anti-clockwise until the desired figure is reached.



ADJUSTING THE DECELERATION VALVE

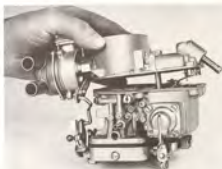
3. Fit the air cleaner and check the requisite time again. If necessary, repeat the procedure until the requisite time is correct.

Failure of the diaphragm will allow air to pass from the bleed hole in the cover, through the diaphragm and straight into the inlet manifold. Normal adjustment of idling speed is not possible. Replace the diaphragm if combustion exhaust emission control is demanded. If not, just cover up the bleed hole in the cover.

Carburetor, make Solex, as from model 1977 B

REMOVAL

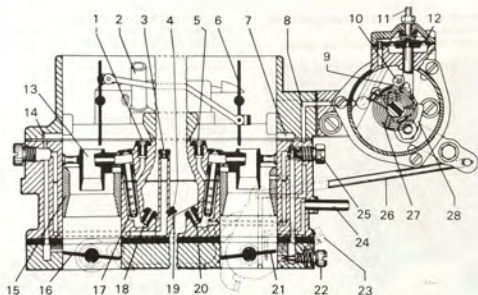
1. Remove the air cleaner.
2. Disconnect the coolant hoses from the automatic choke.
3. Disconnect the throttle from the carburetor.
4. Disconnect the fuel and vacuum hoses.
5. Remove the carburetor.
6. Blank off the end of the suction pipe.



DISMANTLING

1. Remove the bolts securing the top section to the carburetor housing. Lift off the top section and undo the linkage between the throttle valve lever and the automatic choke mechanism.

REMOVING TOP SECTION OF CARBURETOR



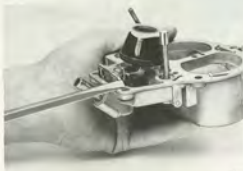
CARBURETOR

1. Air jet, main system
2. Ventilation pipe, float chamber ventilation
3. Air jet, transition system
4. Fuel jet, transition system
5. Air jet, main system
6. Choke valve
7. Air passage, idling system
8. Vacuum passage
9. Step cam, fast idling
10. Driver

11. Adjusting screw
12. Diaphragm
13. Spray pipe
14. Air passage, transition system
15. Throat ring
16. Throttle valve
17. Emulsion pipe
18. Main jet
19. Emulsion pipe
20. Main jet

21. Throttle valve
22. Mixture adjusting screw, idling
23. Idling adjusting screw
24. Vacuum passage
25. Idling jet
26. Push rod, fast idling
27. Bi-metal spring, automatic choke
28. Stop lever, fast idling

2. Remove the float lever spindle and remove the float.



REMOVING FLOAT SPINDLE

3. Remove the float retaining spring and unscrew the float valve.
4. Remove the bi-metallic spring housing retaining screws.
5. Remove the cover retaining bolts from the vacuum control unit for the choke valve. Remove the cover, spring and diaphragm with thrust rod.



REMOVING VACUUM CONTROL COVER

6. Remove the bolts securing the choke housing to the carburetor. Do not neglect the O-ring at the vacuum passage.
7. Unscrew the jets for the main system and transition system, and remove the idling jet and full-load booster valve. Use a special screwdriver for the booster valve. Use a small screwdriver to carefully lever free the injection jet for the acceleration system.



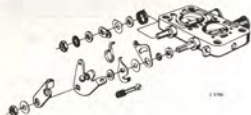
REMOVING ACCELERATION JET

8. Remove the acceleration pump cover retaining bolts and disconnect the linkage between the acceleration pump and the throttle valve lever. Remove the spring and diaphragm.
9. Remove the bolts securing the throttle valve section to the carburetor housing.
10. Remove the circlip from the push rod for the float chamber ventilation and remove the push rod and springs.
11. Remove the lever for the float chamber ventilation.

Assembly

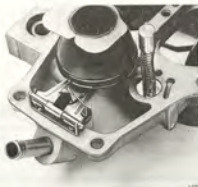
Clean the carburetor and flush all passages and fixed jets with compressed air. On reassembly, fit new gaskets and seals in the carburetor.

1. Connect the levers, springs and washers to the throttle spindle. Fit them in the order shown in the illustration. The throttle adjusting screw for the secondary stage has been preset at the factory and this setting must not be altered.



INSTALLATION POSITION FOR THE WASHERS

2. Fit the lever for the float chamber ventilation.
3. From above, fit the push rod for the float chamber ventilation in the carburetor, with the soft spring. Then fit the stiffer spring and connect the push rod to the lever.
4. Bolt the throttle valve section to the carburetor housing. Use a new gasket.
5. Connect the control linkage for the acceleration pump system to the throttle valve lever and install the acceleration pump with spring and diaphragm.
6. Insert a new O-ring in the spray pipe for the acceleration system and insert the spray pipe in the carburetor housing. Screw in the jets for the main system and transition system and install the idling jet and booster valve. The various jets in the primary and secondary stages are of different sizes. Refer to the jet specifications in section 020 to ensure that the jets are fitted in the correct positions.
7. Bolt the choke housing to the carburetor housing. Note the O-ring for the vacuum passage.
8. Fit the vacuum control for the choke valve.
9. Screw in the float valve and fit the float retaining spring.
10. Install the float. Note the position of the float retaining spring. Check the level of the float (refer to section "Checking and adjusting the float level").



FLOAT RETAINING SPRING

11. Connect the control linkage between the throttle valve lever and the automatic choke. Fit a new gasket on the carburetor housing and bolt on the top section of the carburetor.
12. Fit the bi-metallic spring housing so that the driver arm on the choke spindle is in line above the lug on the bi-metallic spring.



FITTING BI-METALL HOUSING

13. Twist the bi-metallic spring housing until the installation marks coincide and then secure the housing.



INSTALLATION MARK, AUTOMATIC CHOKE

14. Check the functioning of the throttle and choke valves, and the automatic choke, acceleration pump and float chamber ventilation.

REFITTING

Refit the carburetor in the reverse order. Fit the carburetor with a new gasket.

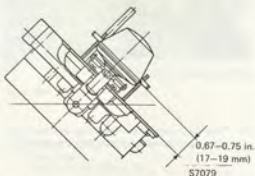
CHECKING AND ADJUSTING OF FLOAT LEVEL

Remove the top section of the carburetor if this has not already been done. Twist the top section to an angle of 45° to the horizontal.

Note! Do not depress the ball at the end of the float valve while measuring. Any adjustments should be made by bending the float lever.

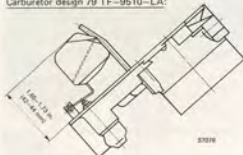
There are two different types of floats.

Carburetor design 77 TF-9510-SA:



Using a vernier gauge, measure the distance between the upper flat part of the carburetor and the upper flange of the float. The distance shall be $0.67-0.75$ in. (17-19 mm) and equal on both sides.

Carburetor design 79 TF-9510-LA:

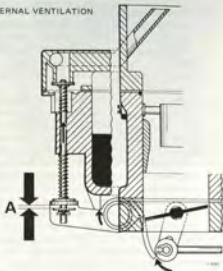


The distance between the lowest part of the float (in normal position) and the flat surface of the carburetor cover shall be $1.65-1.73$ in. (42-44 mm).

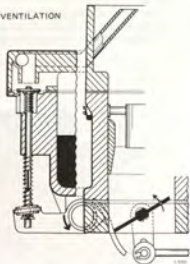
CHECKING AND ADJUSTING OF FLOAT CHAMBER VENTILATION

Operation of the float chamber ventilation is controlled by the throttle valve lever. Check the ventilation, therefore, after the idling speed has been set. The valve moves by means of two springs of different strengths. With the throttle closed, the distance between the lower washer on the push rod and the lever should be $0.01-0.03$ in. (0.4-0.7 mm). Make any adjustments by bending the lever for the float chamber ventilation against the throttle valve lever.

EXTERNAL VENTILATION



INTERNAL VENTILATION



FLOAT CHAMBER VENTILATION

CHECKING AND ADJUSTING OF VACUUM CONTROL (PULL-DOWN) OF CHOKE VALVE

Remove the bi-metallic spring housing. Press up the diaphragm rod for the vacuum control and hold it in this position. Turn the primary choke valve towards the closed position until obvious resistance is felt. By means of a drill, measure the distance between the upper edge of the choke valve disc and the carburetor housing. The distance should be 0.13 ± 0.007 in. (3.3 ± 0.2 mm). Make any adjustments by means of the adjusting screw above the diaphragm chamber.



CHECKING THE VACUUM CONTROL, CHOKE VALVE
1. Adjustment screw

SETTING THE AUTOMATIC CHOKE

The installation line on the rotatable bi-metallic spring housing should coincide with the central mark of the five. The bi-metallic spring is then set so that the choke will open completely when the temperature of the coolant exceeds $178-187^{\circ}\text{F}$ ($60-65^{\circ}\text{C}$). Rotation clockwise away from the basic setting will cause the choke to open later.

It is essential that the choke valve spindles move freely, if the automatic choke is to operate correctly.



INSTALLATION MARK, AUTOMATIC CHOKE

CHECKING AND SETTING THE FAST IDLING SPEED

Start the checking with the engine warm at a standstill. Turn the throttle lever so that the choke valve can be closed completely. Then, first release the throttle lever and then the choke valve. This procedure sets the throttle valve in the fast idling position without the aid of the bi-metallic spring.

Note! Do not now move either the throttle control or the accelerator.

Start the engine and check the fast idling speed which should be 3 000–3 200 rev/min. Make any necessary adjustment by backing off the screw in the dual lever projecting from the choke housing, whereupon the relative position of the lever sections can be adjusted.

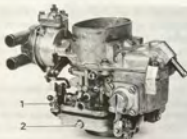


FAST IDLING ADJUSTING SCREW

ADJUSTING THE IDLING SPEED AND CO-SETTING

Checking and adjusting should be made with the engine warm, the headlamps switched to low beam and within five minutes of the time that the thermostat opens. Depending on the mileage on the speedometer, check the breaker points, spark plugs, timing and valve clearance before attempting to adjust the idling speed and CO-setting.

1. Remove the air cleaner.
2. Remove the seal on the mixture adjusting screw.
3. By means of the idling adjusting screw, set the engine speed to 875 ± 20 rev/min.
4. When necessary, use the mixture adjusting screw to achieve the correct setting ($1 \pm 0.5\%$).
5. Fit a new plastic plug (for sealing) to the mixture adjusting screw.



ADJUSTING SCREWS

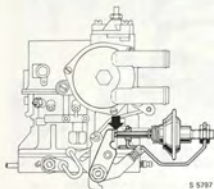
1. Idling setting screw
2. Mixture adjusting screw

CHECKING AND ADJUSTING OF THROTTLE VALVE DAMPER

The throttle valve damper is designed to delay the return of the throttle valve during engine overrun. Checking and adjusting are carried out with the engine warm and with the CO-setting and idling speed correctly adjusted.

The time taken to return to idling speed from 3 000 rev/min should be between 4 and 6 seconds. Make any necessary adjustment by removing the retaining nuts, whereupon the damper can be moved towards or away from the stop on the throttle valve lever.

Moving the damper towards the stop will increase the delay time.



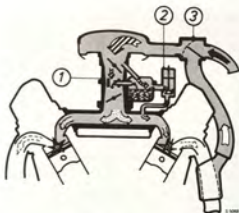
ADJUSTING THE THROTTLE VALVE DAMPER

AIR CLEANER

THERMOSTATICALLY REGULATED AIR PRE-HEATER

(Sweden-version model 1976 and 1977, USA-version as from model 1970)

A thermostatically controlled valve device is mounted at the air cleaner intake and this is designed to ensure that the intake air maintains a constant temperature of around 86°F (30°C). There are two air intakes, one for cold air and one for heated air. The cold air intake points forward while the preheated air is supplied by a hose connected to a box mounted on the exhaust pipe.



THERMOSTATICALLY CONTROLLED AIR PREHEATER

1. Carburetor
2. Deceleration valve
3. Thermostatically controlled valve

Checking

To carry out the following check, disconnect the cold air intake from the valve assembly and observe the position of the valve.

1. With the engine switched off and cold, and an ambient temperature of less than 68°F (25°C), the valve should shut off the cold air intake.
2. When the engine is running and the ambient air temperature is less than 86°F (30°C), the valve should be in the intermediate position, allowing cold and warm air to mix to a suitable temperature. At very low temperatures, the cold air intake will be shut off completely. When the ambient temperature exceeds 86°F (30°C), the warm air supply will be completely shut off.

Checking dismantled valve assembly

Sweden-version, model 1976 and 1977

1. Remove the air preheater from the air cleaner.
2. Place the flap valve under running water with a temperature of 68°F (25°C). The flap valve will now shut the cold air intake.
3. Raise the water temperature to 95°F (35°C). The flap valve will now shut the warm air intake.



CHECKING A DISMANTLED AIR PREHEATER

USA-version, as from model 1970

1. Place the flap valve under running water with a temperature of 82–85°F (28–30°C).
Note! The valve should be kept at an angle of 15° against the manouvre rod to give the thermostat strength to move the valve.



HOLDING THE FLAP VALVE IN POSITION

2. Let go the flap valve a minute, and it will remain in the same position.
3. Let the temperature of the water rise to 87–90°F (31–32°C). The flap valve will now move to the central position.



THE FLAP VALVE HAS MOVED TO ITS CENTRAL POSITION

4. When the temperature of the water is 95–105°F (35–40°C), the flap valve has moved to its left position.



THE FLAP VALVE HAS MOVED TO ITS LEFT POSITION

If these requirements are not met the thermostatic unit should be replaced.

FUEL PUMP

REMOVAL AND INSTALLATION

Separate the fuel line from the fuel pump. Take off the nuts and lock washers and remove the pump and push rod. Remove the old gasket. Always use a new gasket when reassembling the fuel pump.

NOTE

Mark the end of the pump push rod that rests against the camshaft to ensure that the push rod is reinstalled the right way round.

EARLIER VERSION

Overhauling with a repair kit



REPAIR KIT, FUEL PUMP

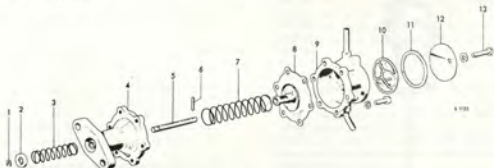
Disassembly

1. Screw off the cover and remove the gasket and strainer.
2. Make a mark over the flange on the lower and upper part of the pump so that they can be reinstalled in the same position.
3. Back off and remove the screws and separate the upper and lower parts of the pump from each other.
Note! The upper part with its valves is an integral unit and cannot be disassembled further.
4. Stand the lower part of the pump with the diaphragm on a flat surface. Press the spiral spring lock washer down with a 10 mm open-end spanner and remove the lock ring from its groove in the diaphragm rod. Remove the spring lock washer and the spring. Replace the lock ring on the diaphragm rod.

NOTE

A small shaft seal is provided to afford a seal between the diaphragm rod and the lower part of the pump. This is not replaceable. As the lips on the shaft seal face the ring groove for the lock ring in the diaphragm rod, the shaft seal would withdrawn from the lower part of the pump towards the diaphragm. Because of this, always proceed exactly as follows.

5. Hold the lower part of the pump in the hand, press the diaphragm lightly inwards and remove the lock ring again. Then, release the diaphragm only far enough to allow the pins which hold the diaphragm to the diaphragm rod to be removed by pressing with a drawing pin.
6. Pull the diaphragm rod away from the lower part of the pump towards the drive side. Remove the diaphragm and the compression spring.



FUEL PUMP, EARLIER VERSION

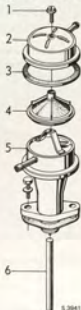
- | | |
|--------------------------|--------------------------|
| 1. Lock washer | 8. Diaphragm |
| 2. Sleeve | 9. Pump body, upper part |
| 3. Spring | 10. Filter |
| 4. Pump body, lower part | 11. Gasket |
| 5. Diaphragm rod | 12. Cover |
| 6. Retaining pin | 13. Screw for cover |
| 7. Spring | |

Reassembly

1. Apply a little grease to the diaphragm rod and connect it with the pin to the new diaphragm. Put on the spring.
2. Pass the lower part of the pump against the spring pressure onto the diaphragm rod until the diaphragm makes contact.
3. Stand the lower part of the pump with the diaphragm on a flat surface. Install the compression spring with the lock washer. Hold the lock washer with a 0.40 in. (10 mm) spanner, press it down on the push rod and insert the lock ring.
4. Align the upper part of the pump according to the marks on the flanges. Press the push rod in so far that the diaphragm is not under tension. In this position, insert the screws and join the upper and lower parts of the pump together.
5. Install a new strainer and a new gasket. Screw on the cover.

LATER VERSION

The fuel pump cannot be dismantled and cannot be repaired if there is any defect in the diaphragm or the valves. If the pump is faulty, the whole unit must be replaced. If the cover is removed the fuel filter can be replaced or cleaned. The gasket should also be replaced.



FUEL PUMP, LATER VERSION

1. Screw
2. Cover
3. Gasket
4. Filter
5. Pump body
6. Push rod

CHECKING THE FUEL PUMP PRESSURE

To carry out this check, a T-nipple and a suitable pressure gauge will be needed. Connect up as shown in the figure. Measuring can now be done throughout the entire speed range. For figures, see "Technical data".



MEASURING FUEL PRESSURE

FUEL TANK AND FUEL LINES

FUEL TANK

Disassembly

1. Remove the drain plug, accessible from under the car, and empty the tank.
2. Remove the rear seat cushion and backrest.
3. Saab 95: Remove the sheathing over the tank by unhooking the two spiral fasteners.
Saab 96: Lift out the spare wheel and remove the front part of the trunk floor.
4. Disconnect the tank earth wire from the body and detach the cables from the fuel gage sender unit. Note the positions of the cable connections.
5. Detach the fuel line from the tank.
6. Disconnect the two tank retaining straps. On the Saab 96, the nuts for these straps are accessible through holes in the rear sloping panel.
7. Jack up the car and undo the clips for the venting and filler tubes under the rear fender.
8. Raise the right side of the tank and remove the tank in an upwards and rearwards direction.
9. Collect the rubber seal in the wheel house wall.

Reassembly

1. Refit the rubber seal on the venting and filler tubes. This seal should be provided with a leather thong or suchlike in its groove to facilitate fitting.
2. Make sure that the tank retaining straps are correctly located. Cover the top of the tank filler connection and the fuel gage sender unit with masking tape.
3. Pass the tank filler connection and the ends of the leather thong through the hole in the wheel house wall and place the tank in position.
4. Refit the rubber seal in the wheel house wall by drawing out the previously inserted leather thong from the groove.
5. Remove the masking tape, rejoin the venting and filler tubes and replace the clamps.
6. Refit the wheel and lower the car.
7. Reattach the fuel line to the tank and then tighten the tank retaining straps.
8. Reconnect the tank earth wire to the body and the cables to the fuel gage sender unit. The grey cable must be connected to "G" and the brown cable to "W".
9. Refit the trunk floor or sheathing, as applicable. Replace seats and cushions.

Checking fuel tank ventilation, as from model 1970

It is vitally important for the ventilation hose not to be clogged. If it is, the fuel pump will be unable to draw fuel or else the tank will be sucked together and collapse. Check, therefore, that the hose opening under the rear bumper is not clogged with dirt, etc., and that the hose does not get squeezed in connection with assembly work.

FUEL LINES

To replace the fuel line, the power unit must be lifted out of the car. Joins in the line should be made with great care and only if absolutely essential. In no circumstances may joins in the line be made inside the passenger compartment.

Removal

1. Remove the hood, the front panel and the radiator.
2. Take the seats, cushions and mats out of the car.
3. Remove the front part of the trunk floor.
4. Disconnect the fuel line from the tank and pump, and bend open all clips and floor brackets. Collect all rubber cushions from around the line inside the car.
5. Cut the fuel line off about 6-8 in. (15-20 cm) behind the supporting beam for the rear seat cushion and collect the rear part of the line.
6. Pull the fuel line out in the forward direction through the engine compartment.

Installation

1. Refix the rear nut for the fuel line and cover the opening with masking tape.
2. Blow the fuel line floor channel clean, and adjust floor brackets and clips as necessary to ensure that the line runs clear.
3. Insert the fuel line from the front through the hole in the dash panel.
4. Bend the rear section of the fuel line to the same shape as the cut-off part.
5. Tear off the masking tape and reconnect the fuel line to the fuel tank and pump.
6. Fit the rubber cushions round the fuel line and the rubber seal in the dash panel. Then bend down all clips and floor brackets.
7. Refit the trunk floor, mats, seats and cushions.
8. Refit the front panel, the horn and the hood.

CLEANING THE FUEL SYSTEM

If impurities are found in the fuel tank, both tank and line must be cleaned. This can be done by emptying the tank and flushing it out with pure gasoline or spirit. Make sure that the tank is horizontal, so that the impurities and foreign matter do not collect at one corner. To flush the system more thoroughly, remove the fuel gauge sender unit and direct the stream of liquid through the hole towards different parts of the tank. An extremely dirty tank should be removed for cleaning. Disconnect the fuel line from the tank and the pump and blow it clean with compressed air. Remove and clean the fuel pump filter. Lift off the carburetor cover, take out the float and the main jet and blow clean with compressed air.

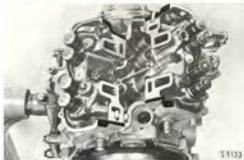
INLET MANIFOLD

REMOVAL

1. Remove the air cleaner.
2. Drain the coolant through the tap at the bottom of the radiator.
3. Disconnect the earth cable from the battery.
4. Remove the distributor cap and detach the ignition cables.
5. Disconnect the vacuum hose and primary cable from the distributor.
6. Remove the distributor.
7. Disconnect the hoses from the radiator and heater element.
8. Disconnect the fuel line.
9. Remove the carburetor.
10. Remove the valve covers.
11. Remove the bolts and nuts from the inlet manifold, separate the induction manifold from the gasket and remove it.
12. Remove the gasket.

INSTALLATION

1. Remove all residual gasket fragments from the mounting surfaces.
2. Apply sealing compound to the surfaces of the cylinder heads as shown in the figure. Install the induction manifold gasket. The protruding part of the righthand cylinder head gasket shall enter the aperture in the induction manifold gasket.



ASSEMBLED CYLINDER HEADS WITH MARKED SURFACES FOR APPLICATION OF SEALING COMPOUND

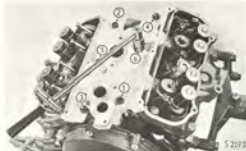
3. Install the inlet manifold. Tighten the screws and nuts in the sequence indicated below in two stages to the correct torque.

Up to and incl. engine No. 91279, the following tightening torques must be applied:

| Stage | Screws | Nuts |
|-------|---|---|
| 1 | 3.9–7.9 Nm (2.9–5.8 ft.lb.) (0.4–0.8 kpm) | 2.9–4.9 Nm (2.2–3.6 ft.lb.) (0.3–0.5 kpm) |
| 2 | 22–28 Nm (16–21 ft.lb.) (2.2–2.9 kpm) | 15–18 Nm (11–13 ft.lb.) (1.5–1.8 kpm) |

As from engine No. 91280, the following tightening torques must be applied:

| Stage | Screws | Nuts |
|-------|---|---|
| 1 | 3.9–7.9 Nm (2.9–5.8 ft.lb.) (0.4–0.8 kpm) | 3.9–7.9 Nm (2.9–5.8 ft.lb.) (0.4–0.8 kpm) |
| 2 | 21–25 Nm (15–18 ft.lb.) (2.1–2.5 kpm) | 21–25 Nm (15–18 ft.lb.) (2.1–2.5 kpm) |



TIGHTENING SEQUENCE, INLET MANIFOLD BOLTS

IMPORTANT

To ensure effective sealing, the bolts must be tightened in two stages to the prescribed torque in the sequence indicated.

4. Install the distributor in the engine block and adjust it in accordance with the instructions in group 3, section 342.
5. Install the valve covers, with new gaskets if necessary. Tighten the bolts evenly to the prescribed torque.
6. Install the distributor cap and attach the ignition cables.
7. Install the carburetor.
8. Reconnect the fuel and vacuum lines.
9. Reconnect all water hoses.
10. Fill the system with coolant and bleed the system.
11. Reconnect the battery earth cable.
12. Install the air cleaner.

| Stage | Torque | Note |
|-------|---|---|
| 1 | 3.9-7.9 Nm (2.9-5.8 ft.lb.) (0.4-0.9 kpm) | 3.9-7.9 Nm (2.9-5.8 ft.lb.) (0.4-0.9 kpm) |
| 2 | 21-25 Nm (15-18 ft.lb.) (2.1-2.5 kpm) | 21-25 Nm (15-18 ft.lb.) (2.1-2.5 kpm) |

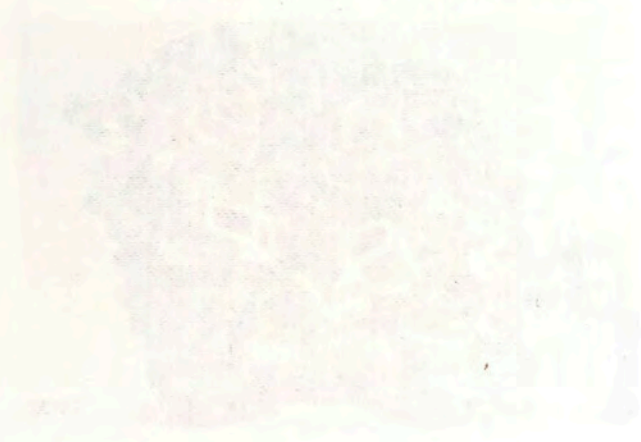


TIGHTENING SEQUENCE, INLET MANIFOLD BOLTS

IMPORTANT
To ensure effective sealing, the bolts must be tightened in two stages to the prescribed torque in the sequence indicated.

- ### REMOVAL
1. Remove the air cleaner.
 2. Drain the coolant through the tap at the bottom of the radiator.
 3. Disconnect the earth cable from the battery.
 4. Remove the distributor cap and detach the ignition cables.
 5. Disconnect the vacuum hose and remove cable from the distributor.
 6. Remove the distributor.
 7. Disconnect the pump from the inlet and exhaust manifold.
 8. Disconnect the fuel line.
 9. Remove the carburetor.
 10. Remove the valve covers.
 11. Remove the bolts and lift from the inlet manifold, separate the inlet manifold from the gasket and remove it.
 12. Remove the gasket.

- ### INSTALLATION
1. Fit the inlet manifold gasket to the inlet manifold and secure it with the bolts.
 2. Position the inlet manifold on the engine block and secure it with the bolts. The inlet manifold must be secured to the engine block with the bolts. The inlet manifold must be secured to the engine block with the bolts. The inlet manifold must be secured to the engine block with the bolts.



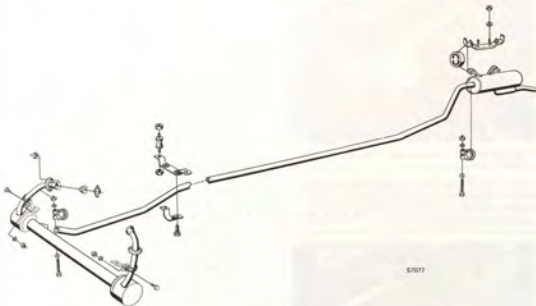
- ### ADJUSTMENT
1. Adjust the carburetor to the correct setting. The carburetor must be adjusted to the correct setting. The carburetor must be adjusted to the correct setting. The carburetor must be adjusted to the correct setting.

EXHAUST SYSTEM

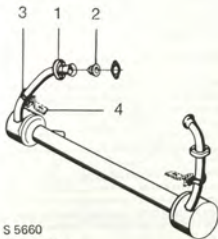
The exhaust system contains three main parts: front muffler, exhaust pipe and rear muffler.

NOTE

Exhaust pipes of later design having no intermediate suspension, is to be equipped with the intermediate suspension shown in fig. in connection with changing the exhaust system.



FRONT MUFFLER



S 5660

FRONT MUFFLER

1. Sleeve
2. Spacer
3. Clamp
4. Bracket

Removal

1. Remove the hood.
2. Jack up the front of the car.

3. Disconnect the battery cables, preheater cover, snorkel and air cleaner.
4. Disconnect the starter motor cables.
5. Remove the nuts at the engine connections and the clamps and brackets at the engine mountings. Remove the spacers at the engine. Withdraw the clamps and sleeves through the hole in the engine compartment floor.
6. Remove the exhaust pipe clamp and separate the exhaust pipe from the muffler.
7. Lower the muffler so that the left-hand pipe rests on top of the starter motor and the end of the pipe is fixed against the engine block.



LEFT-HAND PIPE FIXED AGAINST THE ENGINE BLOCK

From this position, it is possible to withdraw the right-hand pipe through the hole in the engine compartment floor.



RIGHT-HAND PIPE IS WITHDRAWN THROUGH THE HOLE IN THE FLOOR

Pull the left-hand pipe of the muffler down and to the left. At the same time, rotate the muffler so that the right-hand pipe is moved backwards under the car towards the left front wheel.



RIGHT-HAND PIPE IS MOVED TOWARDS THE LEFT FRONT WHEEL

The left-hand pipe can now be removed through the hole in the engine compartment floor.



LEFT-HAND PIPE IS REMOVED THROUGH THE HOLE IN THE FLOOR

CAUTION

During model 1973, the guard pipes between the front muffler and the spacers were discontinued. These should not be refitted when a muffler is replaced. This also applies to cars which previously had guard pipes.

Assembly

1. Insert the left-hand muffler pipe in the hole in the engine compartment floor. Then move the right-hand pipe forward towards the right-hand hole in the floor. At the same time, lift the left-hand pipe over the starter motor towards the engine block. From this position, insert the right-hand pipe through the hole in the floor.
2. Raise the muffler for connection to the engine. Fit the spacers, position the muffler over the pin bolts and screw on the nuts.
3. Fit the exhaust pipe to the muffler and tighten the clamp.
4. Loosely fit the brackets and clamps to the muffler pipe and engine mounting.
5. Position the muffler so that there is clearance between the pipes and the edge of the hole in the floor and ensure that the muffler is clear of the sump. Tighten the muffler, brackets and clamps.
6. Connect the starter motor cable, battery cables, pre-heater cover, snorkel and air cleaner.
7. Lower the car and replace the hood.

Sealing between muffler and engine block

In the event of leakage between the muffler and the engine block, tighten the bolts. If this doesn't help, new gaskets must be fitted. Tighten the bolts carefully to avoid damaging the flanges.

Sealing between mufflers and exhaust pipe

In the event of leakage at the connection between the exhaust pipe and the front muffler or between the exhaust pipe and the rear muffler, carry out the following measures:

1. Undo the clamp.
2. Push the exhaust pipe into the muffler pipe connection.
3. Check that the exhaust pipe is not out of true, which would cause stresses at the connections.
4. Secure the clamp by tightening its bolt and nut. If these measures prove inadequate, check the alignment of the pipe and straighten if necessary.

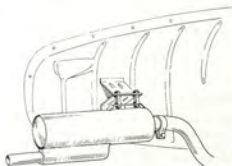
Cracks

Cracked exhaust pipes or mufflers must be replaced or repaired by welding. Make sure that there are no residual stresses or permanent distortions in these parts after welding.

REAR MUFFLER

Removal

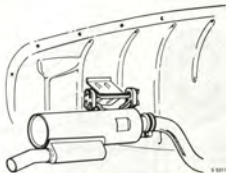
1. Jack up the R.H. side of the car. Remove the rear wheel, and loosen the exhaust pipe clamp at the rear muffler.
2. Up to and incl. model 1975: Back off the two upper nuts by means of which the muffler is suspended.



S 550

REAR MUFFLER SUSPENSION, UP TO AND INCL. MODEL 1975

As from model 1976: Unhook the rubber suspension from the hooks.



S 551

REAR MUFFLER SUSPENSION, AS FROM MODEL 1976

3. Detach the muffler from the exhaust pipe and remove the muffler.

Installation

1. Pass the muffler onto the exhaust pipe. Don't forget the clamp.
2. Fit the muffler to the bracket on the wheel house wall.
3. Tighten the clamp at the exhaust pipe connection to the muffler.
4. Check that the exhaust system is not mounted under tension, vibrations can in this case occur and give noise in the car body.
5. Start the engine and check for leaks.
6. Remount the rear wheel, and lower the car.

EXHAUST PIPE

Removal

Jack up the right side of the car before starting work.

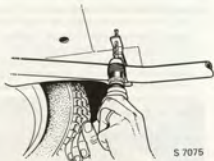
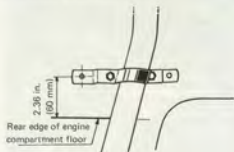
1. Take off the right rear wheel and release the clamp joining the exhaust pipe to the rear muffler.
2. Loosen the muffler suspensions at the body.
Up to and incl. model 1975: Back off and remove the upper nuts with which the rear muffler is suspended. As from model 1976: Unhook the rubber suspensions from the hooks. Pull the muffler off the exhaust pipe.
3. Undo the clamp joining the exhaust pipe to the front muffler.
4. Up to and incl. model 1975: Back off and remove the nuts with which the exhaust pipe is secured under the floor.
5. Pull the exhaust pipe off the front muffler.

Reassembly

Reassembly takes place in the reverse order.

Make sure that the exhaust pipe is properly fitted in the muffler pipe connections, thus ensuring effective sealing when the clamps are tightened and precluding tension in the rubber cushions at the floor plate. If the exhaust pipe is mounted under tension, vibrations may easily develop in the body of the car.

Exhaust pipes of later design having no intermediate suspension, are to be equipped with suspension kit 72 85 182. Place the mounting 2.36 in. (60 mm) behind the rear edge of the engine compartment floor.



RUBBER CUSHIONS, UP TO AND INCL. MODEL 1975



RUBBER CUSHIONS, EXHAUST SYSTEM, UP TO AND INCL. MODEL 1975

Removal

This work is facilitated if the right side of the car is jacked up and the right rear wheel removed.

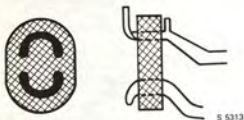
1. Separate the exhaust pipe rubber cushions from the floor. The two nuts can be reached from inside the car if the rear mat is folded back out of the way.
2. Back off and remove the nuts holding the rubber cushions to the exhaust pipe.
3. Back off and remove the upper nuts holding the rear muffler rubber cushions to the bracket on the wall of the wheel house.
4. Back off and remove the nuts holding the rubber cushions to the muffler. It may possibly be necessary also to remove the muffler.

Reassembly

1. Fit the exhaust pipe rubber cushions under the floor.
2. Screw the rubber cushions onto the rear muffler.
3. Refit the muffler, together with the rubber cushions, to the bracket on the wall of the wheel house.
4. Secure the exhaust pipe over the rubber cushions in the floor. Make sure that it is not under tension.

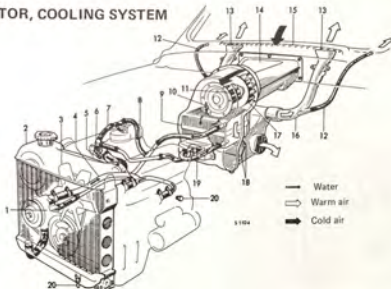
RUBBER SUSPENSION, EXHAUST SYSTEM, AS FROM MODEL 1976

The exhaust system is suspended at the rear by means of two rubber suspension pieces located at the rear muffler.



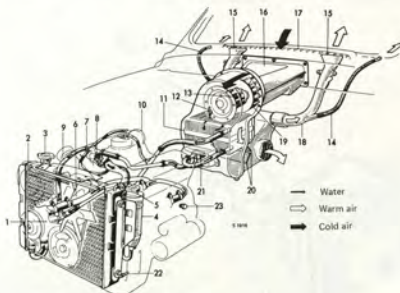
RUBBER SUSPENSION, EXHAUST SYSTEM, AS FROM MODEL 1976

RADIATOR, COOLING SYSTEM



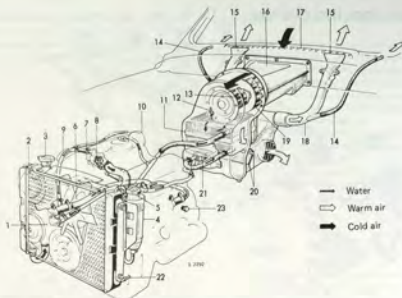
COOLING AND HEATING SYSTEM, UP TO AND INCL. MODEL 1968

- | | | |
|----------------------------|----------------------------------|------------------------------------|
| 1. Water pump | 8. Water jacket, automatic choke | 15. Cold-air intake |
| 2. Radiator | 9. Heat exchanger | 16. Defroster hose |
| 3. Fan | 10. Bleeding nipple | 17. Fan wheel |
| 4. Water distribution pipe | 11. Fan motor | 18. Air distributor |
| 5. Temperature transmitter | 12. Side defroster hose | 19. Thermostat valve |
| 6. Thermostat | 13. Defroster jet | 20. Drain plugs (one on each side) |
| 7. By-pass | 14. Collector box | |



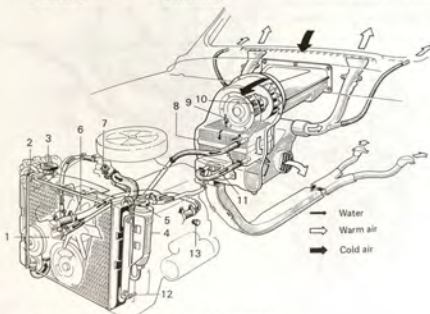
COOLING AND HEATING SYSTEM, MODEL 1969

- | | | |
|----------------------------|-----------------------------------|------------------------------------|
| 1. Water pump | 9. By-pass | 17. Cold-air intake |
| 2. Radiator | 10. Water jacket, automatic choke | 18. Defroster pipe |
| 3. Radiator cap | 11. Heat exchanger | 19. Fan wheel |
| 4. Expansion tank | 12. Bleeding nipple | 20. Air distributor |
| 5. Pressure cap | 13. Fan motor | 21. Thermostat valve |
| 6. Fan | 14. Side defroster hose | 22. Drain valve |
| 7. Temperature transmitter | 15. Defroster jet | 23. Drain plugs (one on each side) |
| 8. Thermostat | 16. Collector box | |



COOLING AND HEATING SYSTEM, MODEL 1970-1975

- | | | |
|----------------------------|-----------------------------------|------------------------------------|
| 1. Water pump | 9. By-pass | 17. Cold-air intake |
| 2. Radiator | 10. Water jacket, automatic choke | 18. Defroster pipe |
| 3. Radiator cap | 11. Heat exchanger | 19. Fan wheel |
| 4. Expansion tank | 12. Bleeding nipple | 20. Air distributor |
| 5. Pressure cap | 13. Fan motor | 21. Thermostat valve |
| 6. Fan | 14. Side defroster hose | 22. Drain valve |
| 7. Temperature transmitter | 15. Defroster jet | 23. Drain plugs (one on each side) |
| 8. Thermostat | 16. Collector box | |



COOLING AND HEATING SYSTEM, AS FROM MODEL 1976

- | | |
|-------------------|--|
| 1. Water pump | 8. Heat exchanger |
| 2. Radiator | 9. Bleeding nipple |
| 3. Radiator cap | 10. Fan |
| 4. Expansion tank | 11. Thermostatically regulated water valve |
| 5. Pressure cap | 12. Drain cock |
| 6. Radiator fan | 13. Drain plugs (one on each side) |
| 7. Thermostat | |

COOLING SYSTEM

Draining

1. Remove the filler cap of the radiator. As from the 1969 model, remove also the pressure cap of the expansion tank.
2. The coolant is first drained off through the drain valve in the lower part of the radiator. If the system is to be drained completely, loosen also the two hexagon plugs, one on each side of the lower part of the cylinder block. Empty the expansion tank by loosening it and then holding it so high that the fluid pours into the radiator.
3. The heat control of the fresh-air heater should point to maximum heat, otherwise the system cannot be fully drained.

Refilling

Coolant is filled through the radiator opening. When doing this, make the heat control point to maximum heat and open the bleeding nipple of the heat exchanger, in order to have the system filled completely. As from model 1969, fill the expansion tank up to the maximum mark or, at the most 0.79 in. (20 mm) above it.

Once the cooling system is completely full, start the engine and run it at a varying speed for approx. a minute or until coolant escapes through the open bleeding nipple of the heat exchanger. Now, shut the bleeding nipple. Pour additional coolant into the radiator, as required, then put both the caps on.

Only clean coolant is permissible. Never fill much of cold water, if the engine is hot, or the cylinder block may crack.

Check the level in the expansion tank after driving for a few days, as a complete bleeding is achieved only when the system has been warmed up and cooled off a few times.

Top up once the level is at the minimum mark again. Use a recommended coolant only.

Cleaning

1. Drain off the water.
2. Flush the system with clean water.
3. Fill the system with clean water to which a suitable commercial solvent has been added. Follow the solvent manufacture's instruction.
4. Shield the radiator and run the engine until warm.
5. Stop the engine and, after waiting a few minutes, drain off the water.
6. Flush the system again with clean water, treating the engine jacket and radiator separately. This time, flush against the normal direction of coolant flow, i.e. flush the engine jacket from the cylinder head and downwards, and the radiator through the lower connection pipe and upwards. Before flushing the system this time, back off the upper water neck and remove the thermostat.
7. Flush the heat exchanger also against the normal direction of circulation.
8. Check the function of the tap in the line to the heat exchanger.
9. Refit the thermostat, water neck and hoses. Test the system, also check that the radiator overflow pipe is not choked up with foreign matter. If the cleaning method described does not suffice to clear all deposits from the radiator, take the radiator out of the car and send it to a specialist.

Pressure testing

It is often difficult to discover leakage in the cooling system, as the pressure in the system reaches its full value only while the car is being driven. One good method is to put the system under pressure with the aid of a pressure tester, whereupon the radiator, hoses and seals can be checked. The maximum permissible pressure is 1 bar (kp/cm^2 , 14 psi).



TESTING THE COOLING SYSTEM FOR LEAKS

The opening pressure of the pressure cap can also be checked with the pressure tester. Concerning opening pressures, see specifications in group 0.



CHECKING THE OPENING PRESSURE OF THE PRESSURE CAP

RADIATOR

Removal

Always take care when working with the radiator in order to avoid damage and leaks.

1. Remove the hood.
2. Drain off the water.
3. Disconnect the water hoses.
4. Back off the upper and lower radiator retaining screws.



REMOVAL OF RADIATOR

5. Lift out the radiator.

Installation

1. Replace the radiator in position and screw in the upper and lower retaining screws.
2. Reconnect the hoses. Be sure to stretch them properly in order to avoid kinks. Refit the clamps.
3. Refill the radiator with water.
4. Remount the hood.

Testing

If the radiator is removed it can be tested for leaks by sealing the pipe connections, submerging it in water and testing with compressed air at max. 1 bar (kp/cm^2 , 14 psi).

A leaky radiator can be repaired by soldering. Patent sealers which are added to the cooling water should be used only in emergencies. These compounds can choke jackets and pipes and impede circulation. The cells of the radiator may at times be so clogged up with dust, smashed insects, etc., that the air flow is reduced. The radiator must then be washed and blown clear with compressed air.

WATER DISTRIBUTION PIPE AND WATER HOSES

Removal

1. Drain the coolant through the tap in the lower part of the radiator.
2. Slacken the three hose clamps so that the hoses remain on the water distribution tube.
3. Slacken the clamp which holds the water pipes together.
4. Remove the water distribution tube from the engine together with the hoses.



WATER DISTRIBUTION PIPE

Installation

1. Moisten the hoses and pass them onto the water distribution pipe.
2. Hold the distribution pipe over the engine connection tail-pieces and slide on the hoses.
3. Tighten all hose clamps and pipe clamps.
4. Fill the system with coolant and bleed the system.

It is often difficult to determine whether an observed structure is a native structure or a non-native structure. The native structure is the structure that the protein adopts in the presence of water. The non-native structure is the structure that the protein adopts in the absence of water. The native structure is the structure that the protein adopts in the presence of water. The non-native structure is the structure that the protein adopts in the absence of water.



FIGURE 10-10 THE PROTEIN STRUCTURE FOR LEUEN

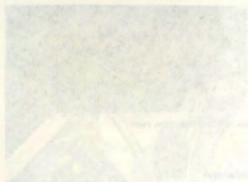
The crystallographic structure of the protein can also be checked with the molecular model. Concerning leucine, the structure was in group D.



FIGURE 10-11 THE LEUCINE STRUCTURE FOR LEUEN

Protein

1. Draw the structure of the protein in the presence of water.
2. Draw the structure of the protein in the absence of water.
3. Draw the structure of the protein in the presence of water.
4. Draw the structure of the protein in the absence of water.



1. Draw the structure of the protein in the presence of water.
2. Draw the structure of the protein in the absence of water.
3. Draw the structure of the protein in the presence of water.
4. Draw the structure of the protein in the absence of water.

Protein

1. Draw the structure of the protein in the presence of water.
2. Draw the structure of the protein in the absence of water.
3. Draw the structure of the protein in the presence of water.
4. Draw the structure of the protein in the absence of water.

Protein

1. Draw the structure of the protein in the presence of water.
2. Draw the structure of the protein in the absence of water.
3. Draw the structure of the protein in the presence of water.
4. Draw the structure of the protein in the absence of water.

WATER PUMP

REMOVAL

1. Drain the coolant through the tap at the bottom of the radiator.
2. Remove the alternator and its bracket and take off the belt.
3. Slacken the water pump bolts, but allow them to remain in the transmission cover. Remove the water pump.

INSTALLATION

1. Remove all residual gasket fragments from the gasket surfaces.
2. Install the water pump with a new gasket. Refit the bolts.
3. Install the alternator and its bracket.
4. Put on the belt and tighten it with the alternator. Tighten the alternator brackets.
5. Fill the cooling system. Check for water leaks.

OVERHAULING WITH A REPAIR KIT



REPAIR KIT, WATER PUMP

1. Tool 78 62 204
2. Tool 78 62 196

Disassembly

Using a drift, press the pump shaft with bearing and impeller simultaneously out of the pulley and pump housing. Use tool 78 62 436 as pressure base. Reject all parts except the pulley and the pump housing.



REMOVAL OF PUMP BEARING

Reassembly

1. Place the pump housing on tool 78 62 204 and press the long end of the shaft into the upper pump housing face with the aid of tool 78 62 196 (short hole). To secure the new pump bearing in the old pump housing, the outer bearing race should be coated with Loctite prior to installation. Loctite is available as spare part, No. 78 60 513.



INSERTION OF PUMP BEARING

Tools 78 62 196 and 78 62 204

- Place the housing with tool 78 62 196 and 78 62 204 respectively in the reverse position on the pressing table. Position the seal and press it in firmly with the small edge of tool 78 62 204.



INSERTION OF PUMP SEAL
Tools 78 62 196 and 78 62 204

- In the same position, mount the impeller on the pump shaft and press it in with tool 78 62 204 in the same way until it bottoms out.

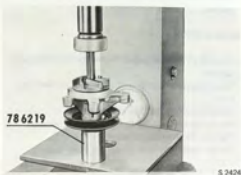


FITTING OF IMPELLER
Tools 78 62 196 and 78 62 204

- Install the pulley in tool 78 62 196 and press with the aid of a mandrel the pump shaft into the pulley so that it protrudes 0.03–0.08 in. (0.8–2.0 mm).

NOTE

Press against the pump shaft and not against the impeller.



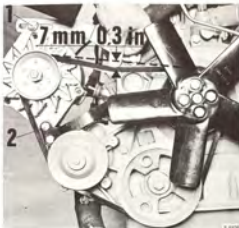
INSTALLATION OF PULLEY
Tool 78 62 196

Concerning replacement of fan bearing see "Transmission", section 215.

FAN

REPLACING AND TENSIONING THE FAN BELT

Back off the alternator retaining bolts and remove the belt. Fit the new belt and tension it with the alternator. Secure the alternator firmly. The belt should be so tensioned that it can be pressed down approx. 0.28 in. (7 mm) at a load of 15 N (3.3 lb./1.5 kp).



ADJUSTMENT OF BELT TENSION

1. Adjusting bolt
2. Retaining bolt

THERMOSTAT

REMOVAL

1. Drain the coolant through the tap at the bottom of the radiator.
2. Remove the air filter and the carburetor.
3. Disconnect the water hoses.
4. Back off and remove the bolts and lift the upper part of the thermostat housing. Remove the thermostat.

REASSEMBLY

1. Clean the thermostat housing gasket surface to remove all residual gasket fragments.

NOTE

The thermostat retaining bracket must be perpendicular to the longitudinal axis of the car, as otherwise the bracket will be squeezed by the water outlet tailpiece.



INSTALLATION POSITION, THERMOSTAT

2. Insert the thermostat, position a new gasket and screw on the upper part.
3. Reconnect the water hoses.
4. Reinstall the air filter and the carburetor.
5. Fill the system with coolant and bleed the system.

INSPECTION OF REMOVED THERMOSTAT

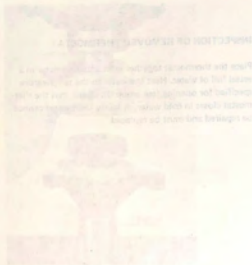
Place the thermostat together with a thermometer in a vessel full of water. Heat the water to the temperature specified for opening (see group 0). Check that the thermostat closes in cold water. A faulty thermostat cannot be repaired and must be replaced.

For the first time, the world's largest and most powerful
 The world's largest and most powerful
 The world's largest and most powerful
 The world's largest and most powerful
 The world's largest and most powerful



THE WORLD'S LARGEST AND MOST POWERFUL
 THE WORLD'S LARGEST AND MOST POWERFUL

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THE WORLD'S LARGEST AND MOST POWERFUL
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SUNDRIES

SERVICE ENGINE

Service engines supplied as a spare part will consist of a cylinder block with pistons and axles. These engines will be delivered with a provisional plastic plug in the hole in the cylinder block where the hose for the air filter is connected in the case of semi-enclosed crankcase ventilation. This hole should either be sealed with a cover or else a connection pipe must be fitted, depending on the type of crankcase ventilation with which the exchanged engine was equipped.

If the exchanged engine had totally enclosed crankcase ventilation, the hole in the cylinder block must be sealed with a cover instead of with the plastic plug. See the Spare parts catalogue. The cover must be mounted with its cupped side facing downwards. Press the cover in about 0.049–0.089 in. (1.25–2.25 mm) under the face of the cylinder block. Use sealing compound when fitting the cover.

If the exchange engine had semi-enclosed crankcase ventilation, a connection pipe must be installed in place of the plastic plug. See the Spare parts catalogue. Use sealing compound.

EXCHANGE ENGINE

For all models with V4-engine, there is a new exchange engine. The engine is factory-new, thus both cylinder bore and crankshaft are of standard dimensions.

With the exchange engine go the following parts: cylinder head, oil pan, oil pump, induction manifold, water pump, oil filter, and transmission cover, but not: carburetor, fuel pump, flywheel, clutch, thermostat housing, fan and electrical equipment.

SERVO ENGINE

servo engine supplied as a spare part will consist of a cylinder block with pistons and valves. These engines will be delivered with a flywheel and pin in the hole in the cylinder block where the hole for the flywheel is located in order to avoid excessive ventilation. This hole should either be sealed with a cover or else a ventilation pipe must be fitted, depending on the type of crankcase ventilation with which the expanded engine was equipped.

If the expanded engine has partly enclosed crankcase ventilation, the hole in the cylinder block must be sealed with a cover instead of with the elastic plug. See the spare part catalogue. The cover must be mounted with its clipped side facing downwards. From the cover is about 0.045-0.055 in. (1.12-1.38 mm) under the face of the cylinder block. The sealing compound when fitted is as follows.

If the expanded engine has semi-enclosed crankcase ventilation, a ventilation pipe must be installed in place of the elastic plug. See the spare part catalogue. The sealing compound is as follows.

EXHAUST ENGINE

For 16 models with V4-engines, there is a new exhaust manifold. The engine is factory-new, and both cylinder and crankcase are to be sealed dimensionally. The exhaust engine is the following parts: cylinder, crank, flywheel, induction manifold, water pump, oil pump, belt tensioner cover, belt, belt rollers, belt pulley, flywheel, crank, piston, connecting rod and belt tensioner. The exhaust engine is shown in the spare part catalogue.

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GENERAL

The electrical system works on 12 volts and comprises the following units:

Battery, starter, generator, voltage regulator, ignition distributor, ignition coil, spark plugs, road lights and interior lighting, clock (model 1967), warning lamps, temperature transmitter, fuel gauge and -transmitter, manoeuvre relay for headlights, oil pressure switch, direction indicators, flasher unit, windshield wipers, horns, fan motor, stop light switch, cable harnesses, wiring, switches and fuses. As from model 1967 all USA versions have a warning flasher system. As from model 1969 are all versions equipped with this system.

As from model 1968, all cars are equipped with electric windshield washer and a brake warning contact.

As from model 1971, headlight wipers and washers are provided for certain markets.

As from model 1972, the cars are fitted with electric heating of the drivers seat.

As from model 1976 all L.H.D. Saab 96 cars are equipped with electrically heated rear window.

As from model 1977 all Saab 95 L and R.H.D. Saab 96 L are equipped with electrically heated rear window.

BATTERY

The 12-volt, 6-cell lead battery has a capacity of 44 amp-hours (Ah). It is placed on a shelf on the right hand wheel house. The negative cable is grounded to the body.

L.H.D. cars as from model 1971 has 60 Ah batteries.

GENERATOR

The generator is of the AC type. An indicator light shows whether the generator is charging or not.

STARTER

The starter up to and incl. model 1968 has a rated output of 0.6 kW (0.8 h.p.). The pinion is engaged by means of a solenoid switch that is turned on with the ignition key.

As from model 1969 the starter has a rated output of 0.7 kW (1.0 h.p.).

IGNITION SYSTEM

The engine is equipped with a battery ignition system which, apart from the battery, comprises an ignition coil and a distributor equipped with a centrifugal governor in combination with a vacuum governor.

The ignition is switched on with the ignition key.

The suppressors which eliminate radio interference are mounted in the rotor and in the ignition cable terminals. For further suppression see section 346 "Interference suppression".

LIGHTING

The road lights comprise the headlights, front direction indicators and parking lights, the number plate light, stop lights, rear direction indicators, and tail lights.

The headlight inserts can easily be adjusted both vertically and laterally. Lights on/off by means of a switch on the steering column stand. As from model 1963 the switch is placed on the instrument panel. Up to and incl. model 1968 the headlights are dimmed with a footoperated switch.

In the Monte Carlo¹¹, the R.H.D. Saab 95/96 cars and as from model 1969 also the L.H.D. cars, there is a device that provides headlight flashing and dimming via relays operated by moving the direction indicator switch lever toward the wheel.

Up to and incl. model 1968, all cars of the USA version have foot operated dimmer and no device for headlight flashing. As from model 1969 all cars have a handoperated device for dimming and for headlight flashing.

A warning lamp on the instrument panel glows when the headlights are in high beam.

The parking lights are always on together with the headlights, regardless of whether these are dimmed or not.

The headlight/parking light switch knob can be turned to regulate the intensity of the instrument lighting.

As from model 1968 the intensity of the instrument panel lighting is regulated by means of a rheostat placed to the left of the light switch.

As from model 1970 the Saab 96 is fitted with trunk light. The switch is placed at the left hinge of the trunk lid.

As from chassis Nos. 95753001200 and 96752010045 (Scandinavian market) the cars are equipped with a new headlight function, town lights.

The town lights, together with the rear lights and license plate light, are switched on automatically when the engine is started.

Full headlight power at both high and low beam will be obtained when the headlights are switched on by means of the normal switch.

MISCELLANEOUS ELECTRICAL EQUIPMENT

The interior lighting consists of a dome lamp operated by a switch on the lamp itself and by door switches. The direction indicators are operated by means of an automatically re-set switch located under the steering wheel. A green warning lamp on the instrument panel indicates when the flashers are operating.

The horns emit a dual-tone signal, composed of harmonized high and low tone (up to and incl. model 1971). As from model 1972 there is only one horn mounted.

In the model 1967 the horns are operated with a signal ring at the steering wheel, in models 1968-69 with the same lever as the windshield wipers and as from the 1970 model with a signal contact in the steering wheel upholstery.

The two windshield wipers are driven, at two speeds, by a motor via twin linkages. They are turned on and off with a switch on the instrument panel. (As from model 1968, with a switch beneath the steering wheel.) This switch is combined with the windshield washer control. The same switch is also used to operate the headlamp wipers and washers on cars which, as from model 1971, are provided with this equipment.

As from model 1976 all L.H.D. Saab 96 (as from model 1977 even Saab 95 L and R.H.D. Saab 96 L) are equipped with electrically heated rear window. The switch for which is placed in the instrument panel. A control lamp in the switch lights with green light when the current is on.

1) Excl. the USA version.

WIRING AND FUSES

The various wires from the battery or generator to the different electric power consumers are gathered into a harness network that is arranged in groups. The individual wires are color-marked for easy identification throughout the network.

The wiring connections consist of solderless AMP connectors. Fuses are provided to protect wiring etc. from abnormally high current intensities (due to short circuits, for instance) and to reduce fire hazards. The fuses are grouped in a fuse box located to the right on the instrument panel in the engine compartment. A spare fuse is provided for extra equipment.

BRAKE WARNING SYSTEM

Faults in the brake system in the form of leakage or neglected adjustment of the rear brakes, are indicated by the brake warning light located in the speedometer. The lamp is lighted by a contact placed above the brake pedal.

WARNING FLASHER

As from model 1969 all cars are equipped with a warning flasher. The switch is located on the steering column stand (up to and incl. model 1969). When the knob is pulled out, all the direction indicator lights and connected indicators are flashing. As from model 1970 the switch is placed on the instrument panel.

BATTERY

GENERAL

The battery is a 12-volt lead accumulator with six cells, the working voltage per cell being roughly 2 volts. The electrolyte is diluted sulfuric acid with a spec. gravity of 1.28 at 68°F (20°C) when the battery is fully charged. All cars up to and incl. model 1970 are equipped with 44 Ah batteries. As from model 1971 L.H.D. cars are equipped with 60 Ah batteries and R.H.D. cars with 44 Ah. The positive pole of the battery is connected to the starter and other consumer units, while the negative pole is earthed through the chassis.

REMOVAL AND INSTALLATION

To remove the battery from the car, first disconnect the negative cable, in order to prevent shorting, and then the positive cable. Note! Engine with an alternator must be stopped before detachment of cable.

Having done this, back off the two wing nuts on the holder and lift the battery out.

Before reinstalling, make sure that the outside of the battery is clean and that posts and terminals are also clean, thus ensuring good contact. When the battery is in place again, coat the posts and terminals with acidfree vaseline.

BATTERY MAINTENANCE

The condition of the battery determines the ease of starting, and regular testing and attention is therefore essential. Negligence in this respect may cause starting difficulties, particularly in the winter, when starting loads are higher and battery capacity lower because of the low temperature. An insufficiently charged battery is liable to freeze.

ELECTROLYTE LEVEL

Evaporation and decomposition of electrolyte water will cause the level to decrease gradually. Top up, using distilled water only, until the electrolyte level is approx. 0.4 in. (10 mm) above the plates.

Sulfuric acid may be added only to compensate for leakage or to refill the battery if it has been emptied. The specific gravity must be checked whenever sulfuric acid has been refilled.

SPECIFIC GRAVITY OF ELECTROLYTE

The specific gravity of the electrolyte can be checked with a syringe-type hydrometer. The result of the test indicates the charging condition of the battery.

| Charging condition | Spec. gravity of electrolyte |
|--------------------|------------------------------|
| Fully charged | approx. 1.28 |
| Half charged | approx. 1.21 |
| Discharged | approx. 1.12 |



CHECKING THE BATTERY WITH A SYRINGE

CELL VOLTAGE

A more accurate test of the state of the battery is made by using a cell tester, which consists of a voltmeter and a resistance, connected in parallel, giving a load of 80–100 amps.

Each cell is tested individually by placing the tips of the cell tester against the cell terminals.

The indicated voltage should not fall below 1.6 V after 10–15 sec. discharge. A bigger voltage drop is a sign of a defective or discharged cell.

The normal no-load cell voltage is 2 volts, and the difference in voltage between any two cells should not exceed 0.2 volts.



CHECKING THE BATTERY WITH A CELL TESTER

Batteries of more recent design have covered cell terminals which makes it impossible to test separate cells. The rest voltage of the battery can, however, be measured by connecting a voltmeter between the positive and negative terminals.

CHARGING

The charging rate must be adapted to the capacity of the battery.

The battery is fully charged when the cell voltage amounts to 2.5–2.7 volts without load and has remained constant for the last three hours of charging.

Decomposition of water causes the electrolyte to boil, and in view of this the plugs should be unscrewed while the battery is being charged.

CAUTION

Do not misconnect the battery. Reversing the pole connections, even momentarily, will damage the alternator rectifier. Connect the positive cable to the positive pole of the battery (both marked +) and the negative cable (ground lead) to the negative pole (both marked –). If an external battery is temporarily connected to the car battery, connect the poles positive-to-positive and negative-to-negative. The battery must not be connected to or disconnected from the electrical system of the car while the engine is running. When quick-charging the battery, first disconnect the positive cable.

GENERATOR

Up to and incl. chassis No. 47.295 and
443.386

GENERAL

The car is equipped with an alternator. The most important advantages of the alternator compared with the D.C. generator are the following.

The charging current commences earlier in an alternator, and feeds current to battery and consumers already at engine idling speed.

Return current relay and current regulator are missing. Only a voltage regulator is needed.

IMPORTANT

The battery must always be connected, when the alternator is running.

Do not mix up the battery connections, confusion leads to serious damage to the alternator.

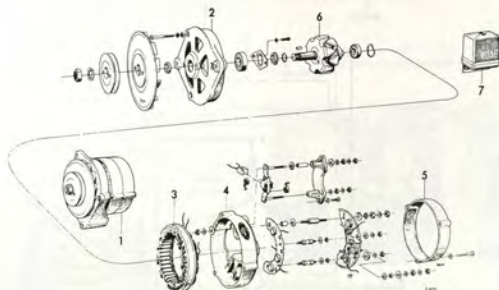
The alternator requires very little maintenance, because carbon brushes and commutators are not needed for the output current. In consequence, periodical attention is not prescribed for this type of generator. Repair of the alternator should be made by a specialized service garage, as it is most important that disassembly and testing is made in the proper way, for even a minor inadequacy may result in a serious damage.

NOTE

For excitation of the alternator, use the charge indicator light. This must be of minimum 2 watts.

WARNING

When electrowelding on a car equipped with an alternator, the ground connection shall be disconnected before. Otherwise damage will be caused to the rectifiers.



ALTERNATOR

1. Alternator assy.
2. Bearing, gear side
3. Stator
4. Slip ring end bracket
5. Protective ring
6. Rotor
7. Voltage regulator

INTERNAL WIRING

The alternator is for 12 V and internally air-cooled, has a 12-pole, fork-type rotor and is equipped with six silicon diodes for rectification. To each of the three winding loops is connected an exciter diode. Their common junction constitutes the terminal D+/61.

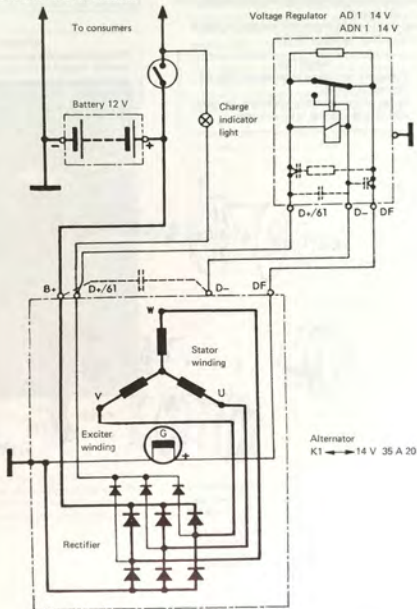
The six rectification diodes are arranged as an A.C. bridge-coupling, i.e. three diodes are connected for normal polarity (anode on supply terminal), and three diodes for reversed polarity (anode on housing).

According to polarity, the diode carrier is fitted insulated

from ground or direct connected to a ground contact, respectively. Between these two carriers is located insulated the carrier of the exciter diode.

The stator windings are star-coupled (see wiring diagram). The rotor carries the ring-shaped exciter coil and is of the fork type execution, one fork having north polarity (six poles) and the other south polarity (six poles). The two forks then give the assembled rotor alternately a south and a north pole.

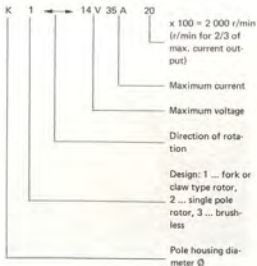
The exciter coil ends are connected to the slip rings to receive the exciter current.



WIRING DIAGRAM FOR A.C. ALTERNATOR

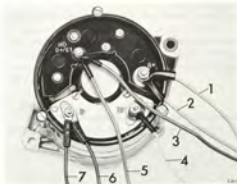
DESIGNATION

The Bosch designation of the alternator is
K 1 → 14 V 35 A 20
 The meaning of the type designation is



TERMINALS

- D+/61: Output of exciter diodes, connection of regulator D+ and of charge indicator light.
 DF: Input of exciter coil, connection of regulator DF
 B+: Battery connection
 D-: Ground, connection to regulator D-



CABLE CONNECTIONS AND CABLE COLOURS, ALTERNATOR UP TO AND INCL. CHASSIS NO. 47.295 RESP. 443.386

- | | |
|--------------------|--------------------|
| 1. 85 grey to B+ | 5. 61 red to D+/61 |
| 2. 74 grey to B+ | 6. 49 black to D- |
| 3. 72 red to D+/61 | 7. 47 black to D- |
| 4. 73 yellow to DF | |

DISASSEMBLY

1. Hold the belt pulley with a suitable tool, and loosen the nut with a 0.87 in. (22 mm) open end wrench. Loosen the belt pulley.
2. On the drive end plate, mark out the location of the attachment ear. Remove the cover ring, and the brush holder plate – the carbon brushes are going with it.



REMOVAL OF BRUSH HOLDER PLATE

3. Loosen the fixing screws of the drive end plate, and take out of the stator the rotor together with the drive end plate.



REMOVAL OF DRIVE END PLATE AND ROTOR

4. Place the drive end plate on a suitable support, and press out the rotor – gently. Now it is possible to remove the bearing. Take care that the rotor – when same comes loose from the drive end plate – not fall down and be damaged.
5. Remove the ball bearing at the slip ring end, by means of a suitable puller.

REASSEMBLY

1. Fill the ball bearing with Bosch grease Ft 1 v 34. Press the ball bearing into the drive end plate, the enclosed side facing the drive side.
2. Ease the drive end plate onto the rotor.
3. By pressing, fasten the ball bearing to the slip ring end.

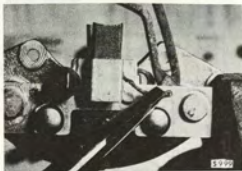


PRESSING IN THE SLIP RING END BEARINGS

4. Put the rotor in, and assemble the alternator by screwing. When doing this, make sure that the drive end plate gets correctly positioned as regards the slip ring end plate. Fit the brush holder plate and the cover ring. Fasten the belt pulley by screwing, torque 34–39 Nm (25–29 ft.-lb., 3.5–4.0 kpm).

RENEWAL OF CARBON BRUSHES

Remove the brush holder plate, see fig., the carbon brushes are going with it. Detach the cable connections, by heating, then it is possible to remove the carbon brushes. When soldering the carbon brush connections on, it is necessary to make sure that the tin does not flow into the cable. Minimum length of the carbon brushes to be approx. 0.34 in. (9 mm).



SOLDERING THE CARBON BRUSH CONNECTION

TESTING

General

Please note the following points before testing the alternator or parts thereof:

Diodes may only be tested with D.C. voltages not exceeding 24 V.

Glim glowing lamps (110 V or 220 V) may not be used for insulation or short circuit tests, if the diodes are in the circuit.

The 80 V 40 W test voltage for the stator winding insulation test may only be applied if the diodes are disconnected.

While the engine is running, battery terminals may not be disconnected to check the charging current on the vehicle.

Semi-conductors are extremely sensitive to heat. To prevent excessive heat when soldering, use a pair of flat pliers to hold the supply wire near the diode. (Use a hot iron and be as quick as possible.) Any mechanical damage to the diode connecting wires must be avoided, e.g. do not bend or load the wire directly on the diode (breakage due to vibration).

The battery must be switched off or disconnected before any repair work commences on the alternator, either while in the vehicle or on the test bench.

Only instruments having not more than 8 V power supply may be used for measuring resistances on the assembled alternator.

Testing the alternator in test bench

On the test bench, the alternator must be driven with its own pulley. All connections must be made with correct size cable shoes, or on the regulator with spade terminals. Do not improvise the battery connection.

A 12 V battery must be connected parallel to the alternator before any testing commences except for the regulating voltage test and the nominal voltage and speed tests. The battery will act as a buffer and smooth off any peak voltages arising from switching on or off the load.

Peak voltages exceeding the maximum permissible value will damage the rectification effect of diodes. The maximum permissible peak voltage on silicon diodes is approx. 50 V.

Excitation

As opposed to D.C. generators, alternators can lose their self-exciting properties after long storage. Therefore a

charge indicator light of 12 V and minimum 2 W must be connected between terminals 61 and B+ according to wiring diagram. The pre-exciting current will then flow through the charge indicator light, D+/61 on the alternator, D+/61 on the regulator, the closed regulator contacts and DF to the exciter coil fitted to the rotor. It is most important that the charge indicator light bulb is minimum 2 W. Self-exciting commences as soon as the exciter diodes are conducting at about 1 to 2 volts. From there on, the voltage increases rapidly, the voltage difference on the charge indicator light bulb decreases, and the bulb will go out as soon as battery voltage is achieved.

Mounting of the alternator

The shape of the alternator housing does not permit a perfect mounting on the V block of the test bench. Therefore, a special mounting unit is available.

WARNING

When testing the alternator it must be mounted in its ordinary attachments. It must not be clamped on to the test bench.

Testing with regulator

Mount the regulator to the test bench. Connect the alternator to the voltage regulator. Do not interchange connections! Connect the exciter current ammeter to terminal DF on alternator. Switch on battery; switch on charge indicator light. Connect voltmeter to terminal B+. To pre-excite the alternator, increase the speed from zero until the output voltage is approx. 14 V and decrease speed again.

let från 0 tills man får en generatorspänning på ca 14 V och sedan sänks varvtalet åter.

Testing the regulating voltage at half exciter current

Connect voltmeter to terminal D+/61. Run the still excited alternator without load and without battery. Increase speed until exciter current falls to half its maximum value. Check the voltage. Regulating voltage 13.5 to 14.2 V (68°F = 20°C).

Testing the nominal voltage speed

Connect Voltmeter to B+. The alternator should also run without load and without battery. Adjust the speed until the output voltage is exactly 12 V. Check with tachometer.

Nominal voltage speed 800–900 r/min.

Testing 2/3 of maximum output current

Switch on battery and load the alternator. Adjust the speed to exactly 2 000 r/min. The alternator output must now be 2/3 of maximum current = 23 A.

Testing the RPM at maximum output

Leave the battery switched on. Increase the load on alternator and let it warm up. Increase speed. Max. output (35 A—14 V) must be achieved at 2 700—3 700 r/min (warm).

Testing the alternator components

Testing of diodes

Use only a test lamp not exceeding 24 V or an Ohmmeter. Always disconnect the diodes from the stator windings before individual testing commences. Due to the 3-phase bridge connection of the rectifier, a faulty diode could otherwise not be detected. The positive diodes connected between B+ and phase are conducting from supply wire to the housing and insulate in the reverse direction. The diodes between phase and B- (reversed polarity) are conducting from housing to supply and insulate from supply to housing.

Connect the test lamp (up to 24 V) in series to the diode to be tested. On diodes of normal polarity, the test lamp will light up if B+ is connected to the anode. The lamp must not light up if B+ is applied to the housing (cathode). On diodes of reversed polarity, the bulb must light up if B+ is connected to the supply (cathode) but not if the direction of current is reversed. Faults of diodes can be open circuit in the conducting direction due to excessive current and too much heat or conducting in both directions, in most cases due to excessive voltages during operation.

Testing of diodes with OHM-meter

Similarly, diodes can be tested with an Ohm-meter. The resistance of a good diode is very small in the conducting direction (e.g. a few Ohms), whereas the resistance in the insulating direction is very much higher (e.g. a few K Ohms).

Testing of stator

Short Circuit to Ground (diodes unsoldered).

Short circuit to ground of stators can be tested as usual with a test lamp up to 40 V.

With diodes connected, short circuit to ground can be tested if their insulating direction is considered. The positive terminal of the tester must be applied to the stator winding and the negative to the housing.

Note the test voltage: Not more than 24 V.

Short circuit of windings (diodes unsoldered)

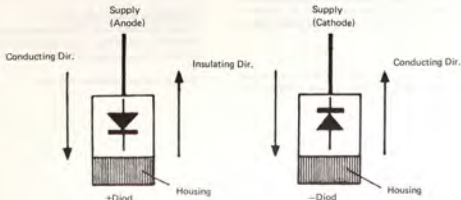
As for D.C. generators a short circuit tester can be used to test the stator. However, this test is only possible if the alternator is dismantled, i.e. the stator must be removed. Furthermore, short circuit of windings can also be ascertained with an Ohm-meter. Three measurements must be taken, one each on every two-phase wires: U - V, U - W and V - W.

The resistance value of each measurement must be the same, 0.26 ohm \pm 10 % (at 68°F = 20°C).

Testing the exciter winding (rotor)

The Testers (test voltage 40 V) are suitable to test the insulation of exciter winding and slip rings.

Check the exciter winding resistance from slip ring to slip ring. The resistance value must be 4.0—4.4 Ohms.



As from chassis No. 47.296 and 443.387

GENERAL

During driving, the alternator supplies the current required by the various consumer units and also charges the battery.
The alternator pulley is finned to induce a current of air through the alternator, thus dissipating the heat developed there while it is running.
The alternator is driven by a belt from the crankshaft belt pulley, and is located to the right of the engine.

IMPORTANT

The battery must always be connected, when the alternator is running.
Do not mix up the battery connections, confusion leads to serious damage to the alternator.
The alternator requires very little maintenance, because carbon brushes and commutators are not needed for the output current.
The alternator has two slip rings respectively two carbon brushes to transmit exciting current to the alternator field windings on the rotor.
The load on these brushes and slip rings is, however, that light that normally they do not require supervision.
Maintenance with regular intervals is therefore not prescribed for this alternator. Repair of the A.C. generator should be carried out by a specialized service garage, as it is vital that disassembly and testing are carried out correctly. Even minor mistakes may cause great damage.

NOTE

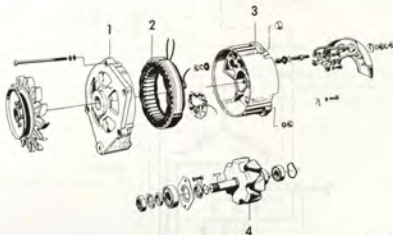
For excitation of the alternator, use the charge indicator light. This must be of 1.2–2.0 W.

WARNING

When electrowelding on a car equipped with an alternator, the battery ground- and all connections on the alternator shall be disconnected before. Otherwise damage will be caused to the rectifier diodes.

As from chassis No. 95753002472 and 96752013172 an alternative alternator is used. It is identical with the one used in Saab 99 up to and incl. model 1974, but minor modifications are made.

The slip ring bearing bracket is turned half turn to suit the installation bracket. The fan disc is exchanged against the Saab 95/96 disc. A new alternator stay is introduced which is interchangeable with earlier design. The alternator which is not stocked as spare part is marked with Bosch No. 0 120 400 850. Concerning integral parts, see spare parts catalogue, Saab 99.



S 2157

ALTERNATOR

1. Drive end frame
2. Stator
3. Slip ring end bracket
4. Rotor

INTERNAL WIRING

The alternator is for 12 V and internally air-cooled, has a 12-pole; fork-type rotor and is equipped with six silicon diodes for rectification. To each of the three stator winding loops is connected an exciter diode. Their common junction constitutes the terminal D+.

The six rectification diodes are arranged as an A.C. bridge-coupling, i.e. three diodes are connected for normal polarity (anode on supply terminal), and three diodes for reversed polarity (anode on housing).

According to polarity, the diode carrier is fitted insulated from ground or direct connected to a ground contact, respectively. Between these two carriers is located insulated the carrier of the exciter diode.

The stator winding are star-coupled (see wiring diagram). The rotor carries the ring shaped exciter coil and is of the fork-type design, one fork having north polarity and the other south polarity.

The exciter coil ends are connected to the slip-rings to receive the exciter current.

DESCRIPTION

When the ignition key is turned to ignition position, the circuit is closed.

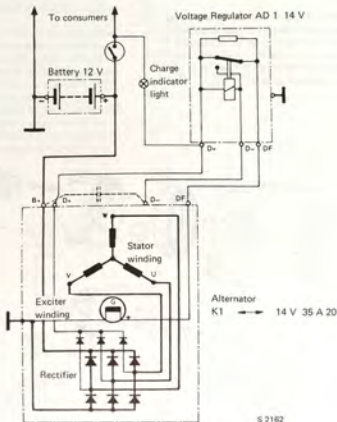
The current goes from the ignition lock to the charge indicator light, to connection D+ on the voltage regulator, via the breaker contact to connection DF on the alternator, to the carbon brushes and the exciter coil, whereupon the circuit is grounded.

In this way the rotor is excited, and a magnetic field initiated. When the rotor begins to rotate, an alternating current is formed in the stator windings, which when passing the rectifier diodes is rectified and led to the battery via connection B+.

The voltage received from the stator windings is also passing via the exciter rectifiers to the voltage regulator, and affects the coil in the voltage regulator that guides the breaker.

When the voltage reaches 14 V or more, the magnetic field of the coil becomes so strong that the current passing the breaker is cut off.

The current to the exciter winding is then forced to go



WIRING DIAGRAM FOR A.C. ALTERNATOR

through the resistance and is thus reduced, whereupon the magnetic field strength diminishes, and with it the strength of the alternating current generated in the stator winding. Thus, the voltage regulator limits the voltage to maximum approx. 14 V.

The charge indicator light is also affected by the voltage from the stator windings via connection D+ on the regulator so, that the difference in voltage on either side of the charge indicator light is equalized and the light goes out. Thus, you can make sure that the alternator charges.

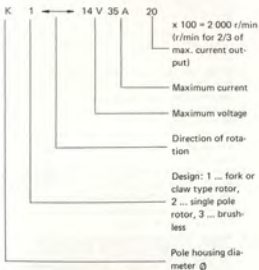
A current limiting relay is not required, since the alternator itself limits the current intensity. At high RPM on the alternator, when the periodicity of the created, alternative voltage is high and when the intensity of the current consumed has reached a certain height, the resulting resistance (impedance) is so great that a further current increase is not possible.

DESIGNATION

The Bosch designation of the alternator is

K 1 — 14 V 35 A 20

The meaning of the type designation is:



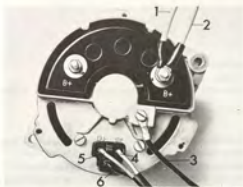
TERMINALS

D+: Output of exciter diodes, connection of regulator D+.

DF: Connection to the exciter coil and for the DF of the regulator.

B+: Battery connection.

The control lamp is connected to D+ on the voltage regulator. Connection to the D- of the regulator is made via a cable in the 3-pole connector.

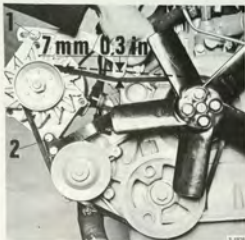


CABLE CONNECTIONS AND CABLE COLOURS, ALTERNATOR, AS FROM CHASSIS NO. 47.296 RESP. 443.387

1. 85 grey to B+
2. 74 grey to B+
3. Black to ground (only model 1970)
4. 73 yellow to DF
5. 72e red to D+
6. 49 black to D-

QUICK CHECKING

If the charge indicator light does not go out, the first thing to do is to check that the alternator belt is not slipping and/or that the cable connections have not loosened.



ADJUSTMENT OF FAN BELT TENSION

1. Adjusting screw
2. Retaining screw

If the lamp still glows after checking in this way, the cause can be determined in the following manner.

Remove the connector from the charging regulator. Connect a cable between the red cable's terminal D+ and the yellow cable's terminal DF.



TERMINALS DF AND D+ CONNECTED

Start the engine and let it run at max. 2 000 r/min while watching the charge indicator light.

WARNING

Do not run the engine at a higher speed than 2 000 r/min, as there is a risk of damage to the power consumers being caused by overvoltage.

If the indicator light goes out immediately, the charging regulator is defective and must be renewed.

If the indicator light flashes or lights continuously, the alternator must be overhauled.

REMOVAL AND INSTALLATION

1. Disconnect the battery negative cable.
NOTE! The engine must be stopped before detachment of cable.
2. Disconnect the alternator cables, retaining and adjusting bolts and take off the fan belt.
3. Lift out the alternator.
4. Refit the alternator in the reverse sequence.
5. Adjust the fan belt tension so that the belt can be pressed down approx. 0.3 in. (approx. 7 mm) at a load of 15 N (3.5 lb., 1.5 kp) half way between the pulleys.

DISASSEMBLY

1. Hold the belt pulley with a suitable tool, and loosen the nut with a 0.87 in. (22 mm) open end wrench. Loosen the belt pulley and the fan.
2. On the drive end plate, mark out the location of the attachment ear.
Loosen the fixing screws of the drive end plate, and take out of the stator the rotor together with the drive end plate.
3. Place the drive end plate on a suitable support, and press out the rotor — gently. Now it is possible to remove the bearing. Take care not to allow the rotor — when same comes loose from the drive end plate — to fall down and be damaged.
4. Remove the ball bearing at the slip ring end, by means of a suitable puller.

ASSEMBLING

The length of the brushes must be checked before the alternator is assembled. The minimum is 0.354 in. (9 mm), but if they are under 0.551 in. (14 mm) they should be replaced. See "Changing brushes".

1. Pack the ball bearings with Bosch Ft 1 v 34 grease. Press the ball bearing into the housing with the enclosed side facing the drive end.
2. Press the drive bearing housing on to the rotor.
3. Press on the ball bearing on the slip ring side. The enclosed side faces the slip rings.



S 998

PRESSING THE SLIP RING BALL BEARING INTO POSITION

4. Put the spring washer into the bearing seat. Push up the brushes and secure them with the brush springs (this is easier if the brush unit assembly is removed).



BRUSHES PUSHED UP AND SECURED

5. Insert the rotor and screw the assembly together. Make sure that the drive bearing housing is correctly positioned relative to the slip ring bearing housing. Press the brushes down from the outside with a screwdriver or similar.



PRESSING DOWN THE BRUSHES

6. Fit the fan and belt pulley. The large spacer is to be placed between the fan and the belt pulley. The small spacer is to be placed between the belt pulley and the spring washer. Tighten the nut to a torque of 23–29 ft.lb. (34–39 Nm, 3.5–4 kpm).

CHANGING BRUSHES

Min. length of the brushes is 0.354 in. (9 mm). If the alternator is renovated the brushes shall be replaced if they are under 0.551 in. (14 mm).

1. Mark the position of the tension lug on the drive bearing housing. Undo the bearing housing retaining screws and remove the rotor with the bearing housing from the stator.
2. Undo both nuts holding the rectifier bridge in place.
3. Undo the terminal screw of the connecting wire to the brush unit assembly.
(Later alternator models are fitted with AMP-connections.)



DISCONNECTING THE BRUSH UNIT ASSEMBLY WIRE

4. Undo the brush unit assembly retaining screws and remove the assembly.



REMOVING THE BRUSH UNIT ASSEMBLY

5. Disconnect the wires with the help of a soldering iron; the brushes can then be removed. When resoldering the wire connections, make sure that no solder flows into the wires.



UNSOLDERING THE BRUSH UNIT TERMINALS

6. Push up the brushes and secure them with the brush springs. Fit the brush unit assembly and make sure that the spring washer is in its correct place in the bearing seat.
7. Insert the rotor and screw the assembly together. Make sure that the drive bearing housing is correctly positioned relative to the slip ring bearing housing. Press the brushes down from the outside with a screwdriver or similar.



UNSCREWING THE BRUSH UNIT ASSEMBLY

TESTING

Please note the following points before testing the alternator or parts thereof.
Diodes may only be tested with D.C. voltages not exceeding 24 V.

Glim glowing lamps (110 V or 220 V) may not be used for insulation or short circuit tests, as they may damage the diodes.

The 80 V 40 W test voltage for the stator winding insulation test may only be applied if the diodes are disconnected.

While the engine is running, battery terminals may not be disconnected to check the charging current on the vehicle. Semi-conductors are extremely sensitive to heat. To prevent excessive heat when soldering, use a pair of flat pliers to hold the supply wire near the diode. (Use a hot iron and be as quick as possible.) Any mechanical damage to the diode connecting wires must be avoided, e.g. do not bend or load the wire directly on the diode.

The battery must be switched off or disconnected before any repair work commences on the alternator, either while in the vehicle or on the test bench.

Only instruments having not more than 8 V voltage may be used for measuring resistances on the assembled alternator.

Testing alternator on bench

On the test bench, the alternator must be driven with its own pulley only. All connections must be made with correct size cable shoes, or with spade terminals. Do not improvise the battery connection.

A 12 V battery must be connected parallel to the alternator when testing. The battery will act as a buffer and smooth off any peak voltages arising from switching on or off the load.

Peak voltages exceeding the maximum permissible value will damage the rectification effect of diodes. The maximum permissible peak voltage on silicon diodes is approx. 50 V.

Excitation

Contrary to D.C. generators, alternators lose their self-exciting properties after long storage. Therefore a charge in-

dicator light of 12 V and minimum 1.2–2.0 W must be connected between terminals D+ and B+ according to wiring diagram. The pre-exciting current will then flow through the charge indicator light, D+ on the alternator, DF to the exciter coil fitted to the rotor. It is most important that the charge indicator light bulb is minimum 1.2–2.0 W. Self-exciting commences as soon as the alternator voltage opens the exciter diodes, which occurs at about 1 to 2 volts. From there on, the voltage increases rapidly, the voltage difference on the charge indicator light bulb decreases, and the bulb will go out as soon as battery voltage is achieved.

Mounting of the alternator

The alternator can be tested in most types of alternator test benches. In some cases it may be necessary to add special mounting- and driving devices.

CAUTION

When testing the alternator, it must be mounted in its normal attachment and not e.g. fastened by damping.

Testing with regulator

Mount the alternator to the test bench and connect it to the voltage regulator.

Do not mix up connections!

Connect the exciter current ammeter to terminal DF on alternator. Switch on battery; switch on charge indicator light. Connect voltmeter to terminal B+. To pre-excite the alternator, increase the speed from zero until the output voltage is approx. 14 V, then decrease speed again.

Testing 2/3 of maximum output current

Switch on battery and load the alternator. Adjust the speed to exactly 2 000 r/min. The alternator output must now be 2/3 of maximum current = 23 A.

Testing the r/min at maximum output

Leave the battery switched on. Increase the load on alternator and let it warm up. Increase speed. Max. output (35 A at 14 V) must be achieved at 2 700–3 700 r/min.

Testing alternator parts

Testing of diodes

Use only a test lamp not exceeding 24 V or an Ohm-meter.

Always disconnect the silicon diodes from the stator windings before individual testing of the conducting- and insulating directions commences, a faulty diode could otherwise not be detected. The positive diodes connected between B+ and phase are conducting from supply wire to the housing and insulate in the reverse direction. The negative diodes between phase and B- (reversed polarity) are conducting from housing to supply and insulate from supply to housing.

Connect the test lamp in series to the diode to be tested. On diodes of normal polarity, the test lamp will light up if B+ is connected to the anode. The lamp must not light up if B+ is applied to the housing (cathode).

On diodes of reversed polarity, the bulb must light up if B+ is connected to the supply (cathode) but not if the direction of current is reversed.

Faults of diodes can be open circuit in the conducting direction due to excessive current and, as a consequence, too much heat. Conducting in both directions is in most cases due to excessive voltages during operation.

Testing of diodes with ohm-meter

The diodes can also be tested with an Ohm-meter. The resistance of a good diode is small in the conducting direction (e.g. a few Ohms), whereas the resistance in the insulating direction is considerably higher (e.g. a few kilo Ohms).

Testing of stator windings

Short Circuit to Ground (diodes unsoldered).

Short circuit to ground of stator winding can be tested as usual with a test lamp of max. 40 V.

Also with diodes connected, short circuit to ground can be tested if their insulating direction is considered. The positive terminal of the tester must be applied to the stator winding and the negative to the diode housing. Note the test voltage: Not more than 24 V.

Short circuit of stator windings (diodes unsoldered)

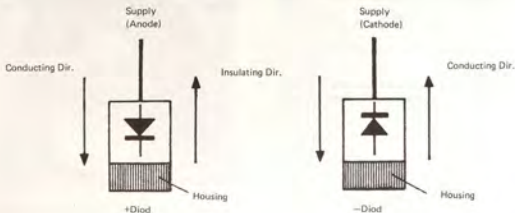
This short circuit can be established with a winding tester, but is only possible with the alternator dismantled. A further possibility is to measure simultaneously the resistance for two phases. By three measurements you can find out the stator windings resistance deviations. If the phases are marked U, V and W, the measurements shall be made between U-V, U-W and V-W. The value of each measurement shall be 0.20-0.22 Ohms (at 68°F = +20°C).

Testing the exciter winding (rotor)

With an Ohm-meter, check the exciter winding resistance from slip ring to slip ring.

The resistance value must be 4.0-4.4 Ohms.

The exciter windings and the insulation of slip rings is tested with regard to short circuit to ground (test voltage 40 V).



STARTER

REMOVAL

1. Disconnect negative cable from battery.
2. Disconnect supply cable from the solenoid switch.
3. Disconnect positive cable from starter.
4. Unscrew the two retaining screws and remove starter.

INSTALLATION

IMPORTANT

Before installing starter, check for wear on ring gear and starter pinion. Clean all mating surfaces.

1. Secure starter with the two retaining screws.
2. Connect cables to starter.



CABLE CONNECTIONS AND CABLE COLOURS, STARTER

1. Red from battery
2. 65 grey
3. 84 yellow

3. Connect negative battery cable.

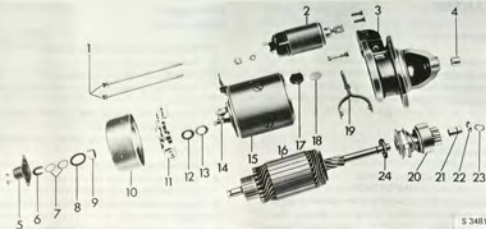
DISASSEMBLY

(See fig. overleaf)

1. Disconnect the solenoid feeder cable.
2. Remove the solenoid retaining screws.
3. Unhook and remove the solenoid.
4. Undo the two retaining screws from the capsule bracket.
5. Remove the capsule bracket, U-washer, spacers and rubber gasket (pos. 5-8).
6. Undo the screws from the commutator bearing housing (1).
7. Remove the commutator bearing housing (10).
8. Lift the brush springs off their retainers with a wire hook and remove the brushes.
9. Remove the brush plate, fiber washer and steel washer (11-13).
10. Pull the starter assembly off the drive and bracket assembly.
11. Undo the engaging lever arm locating screw.
12. Remove the rubber and steel washers from the drive and bracket housing (17-18).
13. Remove the rotor and engaging lever arm.
14. Press the stop ring towards the cog with a piece of tubing.



PRESSING DOWN THE STOP RING



S 3481

STARTER, DISASSEMBLED

- | | |
|-------------------------------------|--------------------------------------|
| 1. Screws, commutator end frame | 13. Steel washer |
| 2. Solenoid switch | 14. Field winding |
| 3. Pinion housing | 15. Starter housing |
| 4. Bearing bushing, drive side | 16. Armature |
| 5. Protective cap | 17. Rubber washer |
| 6. U-shaped washer | 18. Steel washer |
| 7. Shims | 19. Engaging lever |
| 8. Rubber gasket | 20. Starter pinion |
| 9. Bearing bushing, commutator side | 21. Bearing, bushing, starter pinion |
| 10. Commutator end frame | 22. Stop ring |
| 11. Brush plate assembly | 23. Retaining ring |
| 12. Fiber washer | 24. Gasket ring |

15. Remove the lock ring with lock ring pliers. Remove the pinion and the gasket ring.

16. Inspect the spiral splines on the rotor shaft for burrs. If there are any, file them off.
17. Check the gear ring, starter drive cog and the bushings.



S 1240

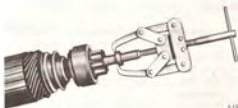
REMOVAL OF LOCKING RING

NOTE

Check all components and exchange or repair any that are damaged. Soak the bearing bushings in warm oil before reassembling.

ASSEMBLY

1. Place the gasket ring on the rotor shaft. Lubricate the spiral splines and the drive cog engaging ring with silicone grease.
2. Mount the pinion, stop ring and lock ring on the rotor shaft.
3. Use pliers to seat the lock ring in its groove in the rotor shaft.
4. Push up the stop ring using a press or claw puller.



PRESSING UP THE STOP RING

- Fit the engaging lever arm to the cog engaging ring and insert the assembly, together with the rotor, into the drive housing.
- Secure the engaging lever arm with its locating screw.
- Place the washers in the drive housing, first the steel washer and then the rubber washer. The lips must be turned towards the rotor.
- Fit the starter housing with the notches above the guide pin and the lip of the rubber washer.
- Slip the steel washer and fiber washer over the rotor shaft.
- Fit the brush plate. Lift the brush springs with a wire hook and insert the brushes.
- Mount the commutator bearing housing with the notches above the feed cable's rubber insulation.
- Fit the rubber gasket, shims and U-washer.
- Locate the capsule bracket and secure it with the two screws.
- Insert and tighten the bearing housing screws.
- Check the axial play of the shaft 0.002–0.012 in. (0.05–0.30 mm) and correct with shims if necessary.
- Hook the solenoid to the engaging lever arm and secure with the two screws.
- Connect the feeder cable.
- Test the starter (see group 9 for specifications and test values).

SOLENOID SWITCH

Starter removed

Removal

- Disconnect supply cable.
- Remove the two retaining screws and then the solenoid switch.

Installation

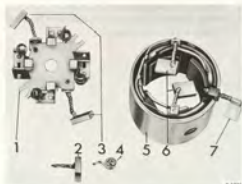
- Hook solenoid switch in engaging lever and secure with the two retaining screws.
- Connect supply cable.
- Test starter. See group 0, Specifications.

CARBON BRUSHES

Starter removed

Removal

- Remove the two screws from the capsule bracket.
- Remove the capsule bracket, U-washer, shims and rubber gasket (pos. 5–8).
- Remove the screws from the commutator bearing housing (1).
- Remove the commutator bearing housing (10).
- Lift the brush springs from the holders with a wire hook and take out the brushes.
- Remove the brush plate.
- Unsolder the brush wiring connections from the brush plate and field winding.



BRUSH HOLDER PLATE AND FIELD WINDING

- Brush holder plate
- Brush
- Brush, negative
- Brush spring
- Starter housing
- Brush, positive with field winding
- Field winding lead

Installation

1. Wire the new brushes to the brush plate and field winding by soldering.
2. Fit the brush plate in position. Lift the springs with a wire hook and insert the brushes.
3. Mount the commutator bearing housing with the notches above the feed cables rubber insulation.
4. Fit the rubber gasket, shims and U-washer.
5. Locate the capsule bracket and secure it with the two screws.
6. Insert and tighten the bearing housing screws.
7. Check the operation of the starter (see group 0).

STARTER PINION

Starter removed

Disassembly

1. Disconnect the feeder cable from the solenoid.
2. Undo the solenoid retaining screws.
3. Unhook the solenoid and remove it.
4. Undo the engaging lever arm locating screw.
5. Remove the commutator bearing housing screws (1).
6. Pull off the drive housing. Save the rubber and steel washer (17-18).
7. Push down the stop ring towards the pinion.
8. Remove the lock ring with lock ring pliers.
9. Remove the stop ring and the pinion.
10. Check the spiral splines on the rotor shaft for burrs. If there are any, file them off.

Assembly

1. Lubricate the spiral splines on the rotor shaft and the pinion engaging ring with silicone grease.
2. Mount the pinion, stop ring and lock ring on the rotor shaft.
3. Use pliers to seat the lock ring in its groove in the rotor shaft.
4. Push up the stop ring using a claw puller.
5. Fit the engaging lever arm to the pinion engaging ring and put on the drive housing.
6. Secure the engaging lever arm with its locating screw.
7. Place the washers in the drive housing, first the steel washer and then the rubber washer. The lips must be turned towards the rotor.
8. Mount the drive housing so that the notches on the starter housing are above the guide pin and the lip of the rubber washer.
9. Insert and tighten the bearing housing screws.
10. Hook the solenoid to the engaging lever arm and secure it with the two screws.
11. Connect the feeder cable.
12. Check the operation of the starter.

IGNITION COIL

REMOVAL

1. Disconnect leads from coil.
2. Back off retaining screws and remove coil.

INSTALLATION

1. Secure coil with the retaining screw.
2. Connect leads.



IGNITION COIL

TEST

1. Disconnect leads.
2. Connect test equipment and proceed as follows:
 - a. Measure resistance of primary winding between terminals 1 and 15.
 - b. Measure coil performance in volts or millimeters of spark length. See group 0, Specifications.

NOTE! Check that distributor gap and dwell angle are correct.

Faults often become evident only after the coil has heated up. If in doubt, connect coil to test stand load half an hour prior to testing — after which it shall function perfectly.

1. Disconnect the battery cable from the negative terminal.
2. Disconnect the negative terminal from the engine block.
3. Disconnect the negative terminal from the engine block.
4. Disconnect the negative terminal from the engine block.
5. Disconnect the negative terminal from the engine block.
6. Disconnect the negative terminal from the engine block.
7. Disconnect the negative terminal from the engine block.
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10. Disconnect the negative terminal from the engine block.

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6. Disconnect the negative terminal from the engine block.

7. Disconnect the negative terminal from the engine block.

8. Disconnect the negative terminal from the engine block.

9. Disconnect the negative terminal from the engine block.

10. Disconnect the negative terminal from the engine block.

Section removed

Disassembly

1. Disconnect the battery cable from the negative terminal.
2. Under the alternator, disconnect the negative terminal from the engine block.
3. Under the alternator, disconnect the negative terminal from the engine block.
4. Under the alternator, disconnect the negative terminal from the engine block.
5. Remove the alternator from the engine block.
6. Pull off the three locking bolts and the three washers (12-101).
7. Push down the connecting through the alternator.
8. Remove the back ring with the three washers.
9. Remove the three locking bolts and the three washers.
10. Check the three locking bolts and the three washers.

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IGNITION COIL

DISTRIBUTOR

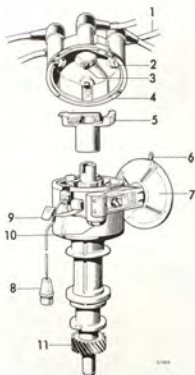
GENERAL

The distributor, make Bosch, is mounted at the rear of the engine block.

The distributor rotates clockwise and is driven by the camshaft via an angle drive. The firing order is 1-3-4-2. The distributor is equipped with a centrifugal governor in combination with a vacuum governor. The centrifugal governor regulates the ignition setting relative to the engine speed. The vacuum governor regulates the ignition setting relative to the load.

See instructions in group 1, Maintenance, for information about distributor lubrication.

Different distributors occur, see group 0.



DISTRIBUTOR

1. Ignition cable
2. Contact
3. Center carbon
4. Distributor cap
5. Rotor
6. Vacuum hose connection
7. Vacuum chamber
8. Primary cable
9. Retaining spring
10. Capacitor
11. Gear

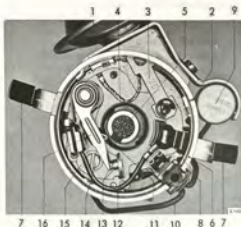
REMOVAL

1. Remove ignition cables from spark plugs.
2. Release retaining springs and remove cap.
3. Remove primary cable.
4. Remove vacuum hose.
5. Crank engine until the mark on the rotor and the mark (line) on the distributor housing are directly opposite each other. This is the firing position for cylinder 1.
6. Unscrew retaining clamp screw and remove clamp.



REMOVING DISTRIBUTOR

7. Remove distributor from engine.



DISTRIBUTOR

- | | |
|---------------------|--------------------------------------|
| 1. Vacuum chamber | 9. Capacitor |
| 2. Adjustment mark | 10. Primary cable |
| 3. Adjustment rod | 11. Fiber peg |
| 4. Ground lead | 12. Adjuster for fixed breaker point |
| 5. Lubricating felt | 13. Breaker points |
| 6. Assembly mark | 14. Locking screw |
| 7. Retaining spring | 15. Fixed breaker point |
| 8. Bearing | 16. Movable breaker point |

INSTALLATION

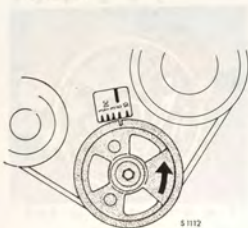
1. Turn distributor shaft until rotor is directly opposite assembly mark (point).



MARKS

1. Installation mark
2. Adjusting mark

2. Insert distributor in engine.
3. See that gears mesh properly. Rotate the crankshaft clockwise until the distributor shaft engages the oil pump drive shaft properly.
4. Check that the mark on the pulley coincides with the mark on the transmission cover (firing position for cylinder 1).



MARKS FOR IGNITION SETTING

5. Turn distributor housing so that the mark on the rotor is directly opposite the adjusting mark (line) on the edge of the distributor housing.
6. Tighten retaining clamp slightly with the screw so that the distributor can still be turned.
7. Connect primary cable.
8. Connect dwell angle tester and close ignition circuit. Check and adjust dwell angle at starter r/min.
9. Fit cap (correct position is indicated by rear retaining spring). Secure it with retaining springs and connect ignition cables.
10. Connect a stroboscope. Check and adjust ignition setting at starter r/min or start engine and let it run at max. 800 r/min (vacuum hoses disconnected). At higher engine speeds the centrifugal governor commences to operate and invalidates the setting.
11. Tighten the distributor clamp.
12. Adjust the idling r/min.

**DISASSEMBLY, UP TO AND INCL. CHASSIS NO.
49.092 RESP. 453.129**

1. Remove the rotor
2. Remove the breaker arm connection.
3. Remove the capacitor retaining screw and remove the capacitor together with the connection.
4. Remove the lock ring from the pivot of the vacuum chamber control rod.
5. Remove the two screws from the vacuum chamber and remove same.
6. Remove the two cap retaining spring screws.
7. Lift up the breaker plate.
8. Drive with the aid of a 0.16 in. (4 mm) mandrel out the tension pin from the gear.
9. Remove the gear with the aid of a suitable puller.



REMOVAL OF DISTRIBUTOR GEAR

10. Lift up the entire distributor shaft.
11. Remove the two coil springs from the governor.



IGNITION GOVERNOR

- | | |
|---------------------|----------------------|
| 1. Lubricating felt | 6. Coil spring |
| 2. Retaining ring | 7. Retaining ring |
| 3. Wear washer | 8. Governor weights |
| 4. Breaker cam | 9. Distributor shaft |
| 5. Spacer ring | |

12. With the aid of two screwdrivers, press away the cam from the centrifugal governor weights.
13. Remove the lubricating felt, the lock ring and wear washer from the breaker cam.
14. Remove the lock ring and the washers from the breaker arm pivots. Valid for distributor 0 231 146 044 and 0 231 146 024.
15. Press leaf spring out of hole in contact support and remove breaker arm. Collect any shims (applies to distributors 0 231 146 044 and 0 231 146 024).
16. Remove retaining screw that secures fixed breaker point.
17. Remove the breaker point (breaker unit distributor 0 231 146 033).
18. If necessary, remove bearing bushing by the aid of a mandrel. During this operation, the distributor housing should be turned upside down.
19. Check all parts. Clean and replace as required.

**ASSEMBLY, UP TO AND INCL. CHASSIS NO. 49.092
RESP. 453.129**

1. Soak bearing bushing in warm oil prior to mounting. Then use mandrel 78 62 154 to press it into same plane as edge of distributor housing.
2. Smear distributor shaft with oil, fit breaker cam and hook the two coil springs in place.
3. Insert wear washer and retaining ring in breaker cam. Press retaining ring into place using a tubular drift; inside diameter 0.25 in. (6 mm), outside diameter 0.32 in. (8 mm), length approx. 2 in. (50 mm).
4. Insert lubricating felt and soak with oil.
5. Fit distributor shaft in distributor housing after smearing it with oil.
6. Fit a new gear to the shaft so that the holes in the gear and the shaft correspond. If the shaft must be turned to align the holes, use a 0.24 in. (6 mm) in-hexagonal key in the hole in the shaft end.
7. Place the distributor in a suitable dolly and drill up the hole through gear and shaft, using a 0.20 in. (5 mm) drill. Clean thoroughly and drive in a new tension pin so deep that its end is level with the gear.

NOTE

The gear must not be driven or pressed on to the shaft because this can spoil the ignition advance device.

8. Fit breaker plate in distributor housing (turn spring with ball toward, Primary terminal.)
9. Screw on retaining spring with lug (that determines cap position) on primary terminal side.
10. Screw on retaining spring on other side.
11. Fit the fixed breaker point or breaker unit and insert retaining screw without tightening it firmly.
12. Lubricate pivot and bearing bushing on breaker arm with Bosch Ft 1 v 22 grease.
13. Insert breaker arm leaf spring in hole in contact support (applies to distributors 0 231 146 044 and 0 231 146 024). The faces of the points must be parallel to each other. Correct any misalignment with shims or by aligning the fixed breaker point.
14. Fit shims and clip on the pivot (applies to distributors 0 231 146 044 and 0 231 146 024).
15. Smear the breaker cam and fiber peg with Bosch Ft 1 v 4 grease.
16. Turn distributor shaft until breaker arm is lifted all the way from the fixed breaker point. Insert a screwdriver between the two adjusting lugs and slot. Turn screwdriver to set gap. Tighten retaining screw and re-check gap.
17. Hook vacuum chamber adjusting rod to pivot and secure with locking ring.
18. Secure vacuum chamber with the two retaining screws.
19. Fit capacitor terminal to distributor housing and screw capacitor in place.
20. Connect breaker arm lead.
21. Fit rotor.

DISASSEMBLY/OF DISTRIBUTOR, AS FROM CHASSIS NO. 49.093 RESP. 453.130

As from chassis No. 49.093 resp. 453.130, the design of the distributors has been modified. The breaker plate is not removable. Repair kits have not been prepared.

1. Remove the rotor.
2. Remove the breaker arm connection cable.
3. Back off the capacitor retaining screw and remove the capacitor together with the connection.
4. Remove the lock ring from the pivot for the vacuum regulator control rod.
5. Back off the two retaining screws for the vacuum regulator and remove the regulator.
6. Back off the retaining screw for the fixed breaker point.
7. Remove the breaker point - point unit.
8. Using an 0.16 in. (4 mm) mandrel, drive the tension pin out of the gear.
9. Remove the gear with the aid of a suitable puller.



REMOVAL OF DISTRIBUTOR GEAR

ASSEMBLY, AS FROM CHASSIS NO. 49.093 RESP. 453.130

1. Fit a new gear to the shaft so that the holes in the gear and the shaft correspond. If the shaft must be turned to align the holes, use a 0.24 in. (6 mm) hexagonal key in the hole in the shaft end.
2. Place the distributor in a suitable dolly and drill up the hole through gear and shaft, using a 0.20 in. (5 mm) drill. Clean thoroughly and drive in a new tension pin so deep that its end is level with the gear.

NOTE

The gear must not be driven or pressed on to the shaft because this can spoil the ignition advance device.

3. Fit the fixed breaker point or the breaker unit and insert the retaining screw without tightening it firmly.
4. Smear the breaker cam and fiber block with Bosch grease Ft 1 v 4.
5. Turn the distributor shaft until the breaker arm is lifted completely from the fixed breaker point. Apply a screwdriver between the two adjusting lugs and the slot. Turn the screwdriver to adjust the gap. Tighten the retaining screw and recheck the gap.
6. Hook the vacuum regulator control rod onto the pivot and secure with the lock ring.
7. Secure the vacuum regulator with the screw.
8. Pass the capacitor terminal into the distributor housing and screw the capacitor in place.
9. Reconnect the breaker arm connection cable.
10. Refit the rotor.

CHANGING OF BREAKER POINTS, REMOVED DISTRIBUTOR

Disassembly

1. Disconnect breaker arm lead.
2. Remove clip and washers from breaker pivot (applies to distributors 0 231 146 044 and 0 231 146 024).
3. Press leaf spring out of hole contact support and remove breaker arm. Collect any shims (applies to distributors 0 231 146 044 and 0 231 146 024).
4. Remove retaining screw that secures fixed breaker point.
5. Remove breaker point (breaker unit on distributor 0 231 146 033).

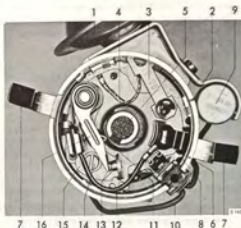
Assembly

NOTE

Do not get any oil or grease on contact surfaces (may cause oxidation).

1. Insert the fixed breaker point or breaker unit and insert retaining screw without tightening it.
2. Lubricate pivot and bearing bushing on breaker arm with Bosch Ft 1 v 22 grease.
3. Insert breaker arm leaf spring in hole in contact support (applies to distributor 0 231 146 044 and 0 231 146 024). The faces of the points must be parallel to each other. Correct any misalignment with shims or by aligning the fixed breaker point.
4. Fit shims and clip on the pivot (applies to distributors 0 231 146 044 and 0 231 146 024).

5. Smear the breaker cam and fiber peg with Bosch Ft 1 v 4 grease.
6. Turn distributor shaft until breaker arm is lifted all the way from the fixed breaker point. Insert a screwdriver between the two adjusting lugs and slot. Turn screwdriver to set gap. Tighten retaining screw and re-check gap.
7. Connect breaker arm lead.



DISTRIBUTOR

- 10. Primary terminal
- 12. Adjuster for fixed breaker point
- 14. Locking screw

CHANGING BREAKER POINTS, INSTALLED DISTRIBUTOR

Disassembly

1. Release retaining springs and remove cap.
2. Remove rotor.
3. Disconnect breaker arm lead.
4. Remove clip and washers from breaker pivot (applies to distributors O 231 146 044 and O 231 146 024).
5. Press leaf spring out of hole in contact support and remove breaker arm. Collect any shims (applies to distributors O 231 146 044 and O 231 146 024).
6. Remove retaining screw that secures fixed breaker point.
7. Remove breaker point (breaker unit on distributor O 231 146 033).

Assembly

NOTE

Do not get any oil or grease on contact surfaces (may cause oxidation).

1. Insert the fixed breaker point or breaker unit and insert retaining screw without tightening it firmly.
2. Lubricate pivot and bearing bushing on breaker arm with Bosch Ft 1 v 22 grease.
3. Insert breaker arm leaf spring in hole in contact support (applies to distributors O 231 146 044 and O 231 146 024). The faces of the points must be parallel to each other. Correct any misalignment with shims or by aligning the fixed breaker point.
4. Fit shims and clip on the pivot (applies to distributors O 231 146 044 and O 231 146 024).
5. Smear the breaker cam and fiber peg with Bosch Ft 1 v 22 grease.
6. Connect breaker arm lead.
7. Adjust gap and dwell angle.

a. Breaker point gap.

Crank engine until breaker arm is lifted all the way from the fixed breaker point. Insert a screwdriver between the two adjusting lugs and slot, turn screwdriver to set gap. Tighten retaining screw and re-check gap.

b. Dwell angle.

Connect a dwell angle tester. Turn on ignition and crank engine with starter. Compare indicated value with specified value. See Group 0, Specifications. Correct if necessary by adjusting the fixed breaker point. Tighten retaining screw and re-check gap.

IMPORTANT

When the breaker points are new they should be set for the narrower dwell angle since the dwell angle increases as the points wear.

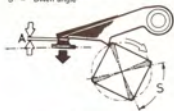


DISTRIBUTOR

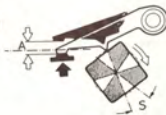
- 10. Primary cable
- 12. Adjuster for fixed breaker point
- 14. Locking screw

The three drawings shown below illustrate the relationship between gap A and dwell angle S. The cross-hatched point illustrates the gap at the highest position of the cam.

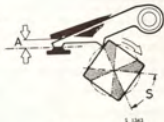
A = Breaker point gap
S = Dwell angle



Gap A too narrow
Angle S too wide



Gap A too wide
Angle S too narrow



Gap A correct
Angle S correct

MEASURING DWELL ANGLE

8. Soak the lubricating felt in the distributor shaft with oil and fit the rotor.
9. Fit cap and secure with the two retaining springs.
10. Connect a stroboscope and check the ignition setting at starter speed or when running engine at max. 800 r/min. Remove vacuum hose for this check. Adjust if necessary.

CAPACITOR

(Distributor removed)

Removal

1. Disconnect breaker arm lead.
2. Remove capacitor retaining screw. Remove capacitor together with terminal.

Installation

1. Insert capacitor terminal in distributor housing and screw capacitor in place.
2. Connect up breaker arm lead.
3. Check that the distributor cap does not touch the capacitor.

VACUUM CHAMBER

(Distributor removed)

Removal

1. Remove the lock ring from the pivot for the vacuum regulator control rod.
2. Back off the two vacuum regulator retaining screws (one screw as from chassis No. 49.093 resp. 453.130) and remove the regulator.



VACUUM CHAMBER

Installation

1. Hook the control rod onto the pivot and secure with the lock ring.
2. Secure the vacuum regulator with the two screws (one screw as from chassis No. 49.093 resp. 453.130).

DISTRIBUTOR CAP

Removal

1. Remove all ignition cables with rubber protectors from cap.
2. Release retaining springs and remove cap.

NOTE

The distributor caps are of different design and suits only the determined distributor.

Installation

1. Position cap. Note that its position is determined by the rear retaining spring. Secure cap with springs.
2. Connect up ignition cables in correct firing order.

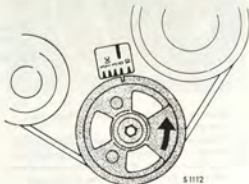
CHECKING AND ADJUSTING THE IGNITION SETTING

1. Connect the ignition service instrument or separate dwell angle tester, tachometer and stroboscope.



IGNITION SERVICE INSTRUMENT

2. Disconnect vacuum hose.
3. Turn on ignition and check dwell angle at starter r/min and with the engine idling. Adjust if required.
4. Check, and adjust if required, the ignition setting at starter r/min or with engine running at max. 800 r/min .



MARKS FOR IGNITION SETTING

5. If necessary, loosen retaining clamp and adjust ignition setting by turning distributor housing (to the left to advance the ignition, to the right to retard it). See Group 0, Specifications, for correct values. Reconnect vacuum hose. Adjust engine idling speed. Disconnect the test instruments.

TESTING DISTRIBUTOR IN TEST BENCH

Test as instructed by manufacturer of test bench. See table and ignition timing curves for correct test values.

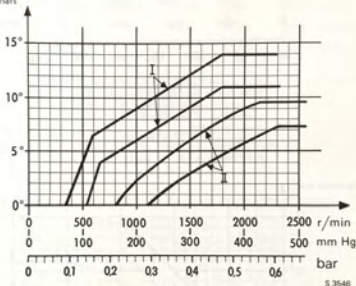
NOTE

1. Distributor speed is half the engine speed.
2. Camshaft angle is half the crankshaft angle.

If the distributor is to be tested while still in the engine, timing angle readings and speed readings shall be doubled when compared with those valid when testing in test bench. Moreover, engine vibrations may cause a certain amount of deviation from these values.

Distributor settings when testing in a test bench

Degrees on distributor shaft



CENTRIFUGAL AND VACUUM ADVANCE
DISTRIBUTOR O 231 146 044 AND O 231 146 024

Saab 96 up to and incl. chassis No. 46137

Saab 96 up to and incl. chassis No. 434173

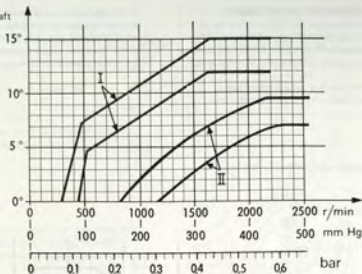
Dwell angle $50 \pm 2^\circ$

Contact pressure 3.9–5.2 N (400–530 g)

I = Centrifugal advance r/min = Distributor rev/min

II = Vacuum advance mmHg = Underpressure

Degrees on distributor shaft



S 3547

CENTRIFUGAL AND VACUUM ADVANCE

DISTRIBUTOR O 231 146 033 AND O 231 146 072

Saab 95 chassis No. 46138-49092

Saab 96 chassis No. 434171-453129

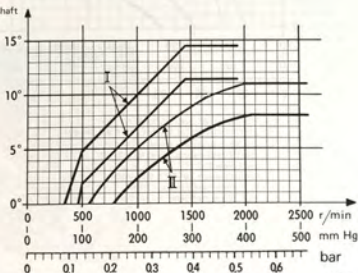
Dwell angle $50 \pm 2^\circ$

Contact pressure 3.9-5.2 N (400-530 p)

I = Centrifugal advance r/min = Distributor rev/min

II = Vacuum advance mmHg = Underpressure

Degrees on distributor shaft



S 3548

CENTRIFUGAL AND VACUUM ADVANCE

DISTRIBUTOR O 231 146 073

Saab 95 chassis No. 49093-62059

Saab 96 chassis No. 453130-507018

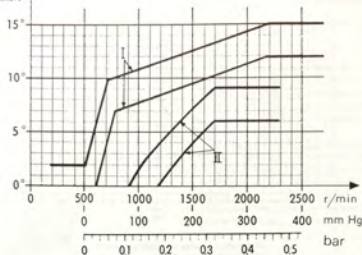
Dwell angle $50 \pm 2^\circ$

Contact pressure 3.9-5.2 N (400-530 p)

I = Centrifugal advance r/min = Distributor rev/min

II = Vacuum advance mmHg = Underpressure

Degrees on distributor shaft



CENTRIFUGAL AND VACUUM ADVANCE
DISTRIBUTOR 0 231 146 084 AND 0 231 146 092

S 3549

Saab 95 chassis No. 65001-95722006000

Saab 96 chassis No. 520001-96722017000

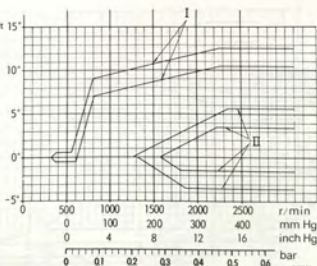
Dwell angle $50 \pm 2^\circ$

Contact pressure 4.9-6.2 N (500-630 p)

I = Centrifugal advance r/min = Distributor rev/min

II = Vacuum advance mmHg = Underpressure

Degrees on distributor shaft



S 3561

CENTRIFUGAL AND VACUUM ADVANCE
DISTRIBUTOR 0 231 167 039 AND 0 231 176 010

USA cars as from model 1971

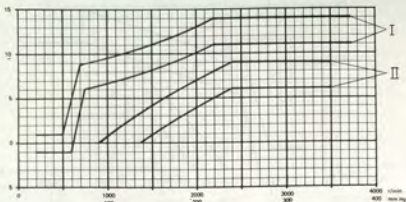
Dwell angle $50 \pm 2^\circ$

Contact pressure 4.9-6.2 N (500-630 p)

I = Centrifugal advance r/min = Distributor rev/min

II = Vacuum advance mmHg = Underpressure

Degrees on distributor shaft



15654

CENTRIFUGAL AND VACUUM ADVANCE

DISTRIBUTOR 0 231 170 031

Saab 95 chassis No. 95722006001-96752002048,

-95753003018, -95756000281

Saab 96 chassis No. 96722017001-96752015165,

-96756007419

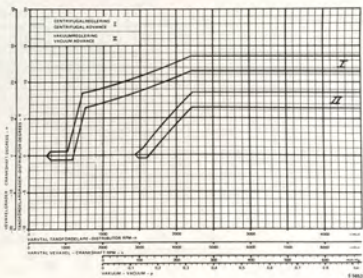
Dwell angle $50 \pm 3^\circ$

Contact pressure 4.9-6.2 N (500-630 p)

I = Centrifugal advance r/min = Distributor rev/min

II = Vacuum advance mmHg = Underpressure

Degrees on distributor shaft



15654

CENTRIFUGAL AND VACUUM ADVANCE

DISTRIBUTOR 0 231 170 183

As from model 1976

Dwell angle $50 \pm 3^\circ$

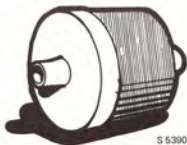
Contact pressure 4.9-6.2 N (500-630 p)

I = Centrifugal advance r/min = Distributor rev/min

II = Vacuum advance mmHg = Underpressure

DELAY VALVE

A delay valve is mounted in the vacuum passage between the carburetor and the vacuum control unit of the distributor. The valve delays the formation of a vacuum by around six seconds. The ignition advance is therefore also delayed during acceleration and the emission of nitric oxide (NO_x) is reduced.



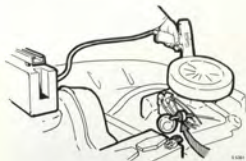
DELAY VALVE

Checking

Checking is carried out by means of a stop watch, a tachometer and a stroboscope.

1. Connect the tachometer and stroboscope.
2. Let the engine run at normal idling speed.
3. a. Have an assistant open the throttle valve suddenly and let the engine run at around 3 000 r/min. Take the time from the moment the throttle valve was opened.
- b. Check the firing point using the stroboscope light. The vacuum regulator should cut in after six seconds (\pm two seconds) and the ignition advance should be increased.

Faulty delay valve should be replaced.



CHECKING THE DELAY VALVE

DISTRIBUTOR WITH DOUBLE ACTING VACUUM CONTROL UNIT

USA-Version as from model 1971

The distributor is equipped with a centrifugal regulator which depending on engine speed controls the ignition advance. The distributor has also a double acting vacuum regulator. The outer part of the vacuum regulator (connection 2) is controlled by the underpressure that is present just above the throttle and adjusts the ignition relative to engine speed.

The inner part of the vacuum regulator (connection 2) is controlled by the underpressure that is present under the throttle and gives ignition advance when the throttle is closed. The hose is connected to the carburetor intermediate flange.

The membran surface is bigger on the side which is increasing the ignition advance when the underpressure is equal in both vacuum lines.



DISTRIBUTOR WITH DOUBLE ACTING VACUUM CONTROL UNIT

1. Connection for hose from the carburetor
2. Connection for hose from the intermediate flange

SPARK PLUGS

REMOVAL

1. Disconnect ignition cable.
2. Blow cylinder head clean around spark plug.
3. Unscrew spark plug.

INSTALLATION

1. Screw in spark plug by hand.
2. Tighten the plug with a torque wrench, 29–39 Nm (3–4 kpm, 22–28 ft.-lb.).
3. Connect ignition cable.

TEST

Spark plug removed

1. Clean spark plug by sandblasting.
2. Check gap and adjust, if necessary by bending the side electrode.
3. Test spark plug under pressure in a spark plug tester.

SUPPRESSION OF INTERFERENCE

Car radio with installation kit is available as extra equipment. The kit contains installation details and suppression components necessary for normal installation. If the suppression components does not work satisfactory the following completions may be made.

IGNITION INTERFERENCE

The car is delivered with suppressed rotor and suppressed spark plug connections. As from engine No. ~ 242.000 are the engines equipped with resistance ignition cables and resistor spark plugs. Resistor spark plugs are not necessary but can in certain cases give better results. Extra suppression can be made on the ignition coil + connection (capacitor $2.2\mu\text{F}$).

ALTERNATOR INTERFERENCE

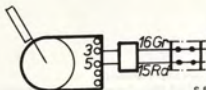
If alternator interference in the form of squeaks occur, a capacitor ($2.2\mu\text{F}$) can be installed of connection B+ on the alternator.

REGULATOR INTERFERENCE

If regulator interference occurs on the medium wave band, Bosch suppression filter 0 290 002 011 can be installed at the regulator.

WINDSHIELD WIPER MOTOR INTERFERENCE

Allowed completion on the windshield wiper motor:
Bosch No. 0 290 002 013 (normal suppression)
Beru FK 225 (when further suppression is needed).



S 5316

INSTALLATION OF SUPPRESSOR ON WINDSHIELD WIPER MOTOR

LIGHTING

HEADLIGHTS, UP TO AND INCL. MODEL 1968 AND CARS WITH SEALED BEAM HEADLIGHTS

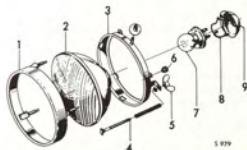
The headlights are recessed in the front panel. The left and right headlight inserts are identical and can be fitted on either side. The headlight bulbs have two filaments, one for high beam and one for dipped beam, regulated with a foot dipper switch. In the R.H.D. Saab 95/96, the changingover from high beam to dipped beam is, however, made by means of the flasher switch lever. Up to and incl. model 1968, all cars to the USA are, however, equipped with foot dipper switch. For certain markets, Sealed

Beam headlights are mounted.

As from model 1969, all cars have a handoperated device for dimming and for headlight flashing.

A warning lamp glows red or blue when the headlights are on high beam. The dipper switch is located on the lower part of the dash panel to the left of the pedals. The car is equipped with left dipping or right dipping asymmetric lamps, or — for certain markets — Sealed Beam units.

To modify the asymmetric lamps so that they produce ordinary symmetric light, for instance when travelling by car abroad, the asymmetric section can be masked with untransparent tape or in some other suitable way.



HEADLIGHT, ASYMMETRIC

- | | |
|----------------------|---------------------|
| 1. Ring | 6. Mounting nut |
| 2. Insert with glass | 7. Bulb |
| 3. Adjusting ring | 8. Fastening spring |
| 4. Adjusting screw | 9. Rubber seal |
| 5. Adjusting nut | |



HEADLIGHT, SEALED BEAM

- | | |
|-----------------------|--------------------|
| 1. Ring | 4. Nut |
| 2. Sealed beam insert | 5. Shell |
| 3. Adjusting ring | 6. Adjusting screw |

Changing bulbs

A headlight bulb normally has full power for the first 100 hours of the burning time. Even if the lamps work longer, the light power decreases considerably after this time. In order to have as much light as possible, it is therefore advisable to change the headlight bulbs about once a year, with normal driving.

Another factor of importance to effective lighting is that the reflector is undamaged and that the cable terminals have good contact.

1. Lift the hood and push the rubber grommet behind the headlight out of the way.
2. Press and release the retainer spring, whereupon the bulb socket can be withdrawn.
3. Change the bulb. Use a clean cloth or the cardboard box when fitting the new bulb. Do not touch the bulb by hand.
4. Refit the lamp socket, making sure that the locating lug is correctly positioned. Make sure that the retainer spring holds the socket properly, keeping it in the proper position.
5. Refit the rubber grommet, making sure that it seals properly round the socket. Check that the cable terminals have good contact.

IMPORTANT

If the bulb is incorrectly located in the reflector, a faulty light pattern will result, and it will therefore be impossible to get a correct setting.

Alignment of right dipping and left dipping asymmetric lights

1. Check the tire pressures and place the unladen car on a flat surface about 16 1/2 feet (5 meters) from the screen.
2. Switch on to dipped beam and shield one of the headlights.
3. Check and adjust the beam so that the horizontal part of the light dark border is exactly 2.0 in. (50 mm) lower than and to the left (to the right for left dipping asymmetric lights) of the measured headlight center point. The sloping part of the light dark border must be entirely to the right (to the left for left dipping asymmetric lights) of the mark and thus meet the horizontal part exactly under the headlight center.



ALIGNMENT OF RIGHT DIPPING ASYMMETRIC HEADLIGHTS

H = Height of headlight center above ground

A = 415 mm

B = 50 mm



ALIGNMENT OF LEFT DIPPING ASYMMETRIC HEADLIGHTS

H = Height of headlight center above ground

A = 415 mm

B = 50 mm

4. Check the other headlight in the same way.
5. Check that the full beam is evenly distributed. If the beam is unevenly distributed, or if it proves difficult to get correct dipped-beam settings, make sure that the bulb is correctly fitted or, if necessary, fit a new bulb.

Changing the Sealed Beam unit

1. Disconnect the cables from the unit.
2. Remove the three nuts holding the chromed ring, and remove the ring.
3. Renew the Sealed Beam unit.
4. Make sure that the guide shoulders fit into the shell's recesses.

Adjustment of Sealed Beam headlights

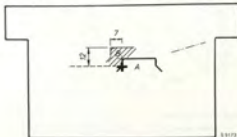
Adjustment with beam aligning apparatus

1. Check the tire pressures and load the car as it would normally be loaded and place the car at right angles to the apparatus.

CAUTION

If the lateral position is set incorrectly this can completely prejudice the alignment work.

- a. When the apparatus is suspended from above:
Place the left hand wheels of the car along the line. A maximum deviation of 1.2 in. (3 cm) in the distance of the front and rear wheels from the line is permitted.
 - b. When the beam aligning apparatus is equipped with an aperture:
Place the apparatus in front of one of the headlights, switch on the beam light and turn the apparatus until the beam strikes the same point on the front fenders (measured from the front edge).
2. Switch the headlight to low beam.
 - a. Set the height by means of the upper cross on the check plate.
 - b. Adjust the lateral setting of the headlight in such a way that the zone with the highest intensity of light (A, see illustration) comes as near the centre as possible. The tolerance band (B) for the light dark border can be used to obtain the optimum setting.



ALIGNMENT BY MEANS OF BEAM ALIGNING APPARATUS

- A = High intensity zone
B = Tolerance band, light dark border

3. Check the other headlight in a similar manner.
4. If difficulty is encountered in adjusting the beam, check the light distribution on high beam.



CORRECT HIGH BEAM SETTING FOR SEALED BEAM HEADLIGHT



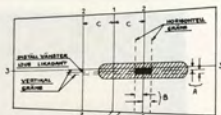
CORRECT LOW-BEAM SETTING FOR SEALED BEAM HEADLIGHT

Alignment towards a screen

The various lines on the screen correspond to: the center line of the car 1, the vertical center lines of the two headlights 2-2, and the horizontal center lines of the headlights 3-3.

1. Check the tire pressure and load the car as it would normally be loaded.
2. Up to and incl. model 1973: Remove the trim frame so that the adjusting screws are accessible. Put the car 25 ft. (7.6 m) from the screen.
3. Switch on the high beam and shield one headlight at a time.
4. Check and adjust the headlight so that the beams come 2 in. (50 mm) under the intersections of lines 2-2 and 3-3. The tolerance limits which may not be exceeded by the center of the beam under any circumstances are marked by the black area on the screen. The transversal limits are 6 in. (150 mm) to the right or left of line 2-2, and vertically the center of the beam may not be above line 3-3 or more than 4 in. (100 mm) below line 3-3.

5. Check both headlights and make sure that the beam is symmetric. If not, or if it proves difficult to get a correct setting, fit a new Sealed Beam unit.
6. If the high beams are correctly aligned it will not be necessary to adjust the dipped beams separately.



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ALIGNMENT OF SEALED BEAM UNITS

1. Center line of car
 - 2-2. Vertical center line of headlight
 - 3-3. Horizontal center line of headlight
- A = 2 in. (50 mm)
B = 6 in. (150 mm)
C = 10.5/16 in. (415 mm)

HEADLIGHTS, AS FROM MODEL 1969

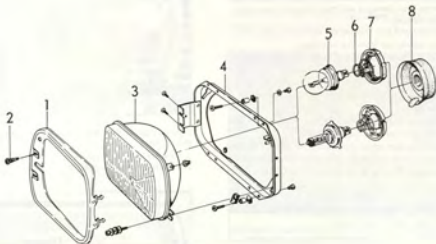
General

The headlights are recessed in the front panel. The left and right headlight inserts are identical and can be fitted on either side without alteration. The headlight bulbs have two filaments, one for high beam and one for dimmed beam, regulated with the dimmer switch (flasher-switch) lever. A warning lamp on the instrument panel glows with blue light when the headlight are on high beam. The car is equipped with right-dimming asymmetric lights, or — for export markets — left-dimming asymmetric or Sealed Beam units.

To modify the asymmetric lights so that they produce ordinary symmetric light, for instance when travelling by car abroad, the asymmetric section can be masked with untransparant tape or in some other suitable way.

As from model 1973, cars for certain markets are equipped with Halogen headlights.

As from model 1976, the distribution of light from the headlights has been improved. For this improvement to be fully realised additional care must be taken in adjusting the headlight beams.



HEADLIGHTS, EXPLODED VIEW

1. Decor frame
2. Fixing screw for decor frame
3. Headlamp insert
4. Mounting plate
5. Bulb
6. Spring
7. Bulb retainer
8. Seal

Changing headlight insert

1. Open hood, pull out bulb connector.
2. Close hood, loosen decor frame screw, remove decor frame.
3. Loosen the four screws which retain the headlight. Lift out headlight along with mounting plate.
4. Slacken the adjustment screws, until they can be pulled out of the headlight insert attachments. Remove the insert from the mounting plate.

Fitting is made in the reverse order.

NOTE

When changing headlight insert or bulb, always align the headlights.



CHANGING HEADLIGHT BULB

Changing bulbs

A headlight bulb normally has full power for the first 100 hours of the burning time. Even if the lamps work longer, the light power decreases considerably after this time. In order to have as much light as possible, it is therefore advisable to change the headlight bulbs about once a year, with normal driving.

Another factor of importance to effective lighting is that the reflector is undamaged and that the cable terminals have good contact.

1. Open the hood and remove the contact housing and rubber sealing cap from the headlight.
2. Push in the bulb retainer and twist it counterclockwise. The bulb can then be withdrawn.
3. Fit the new bulb. Do not touch the glass with your fingers. Make sure that the locating lug is correctly positioned.
4. Fit the bulb retainer. Make sure that the spring locates the bulb securely in its correct position.
5. Push on the connector. Fold down the edge of the sealing cap, making sure that it fits snugly round the bulb retainer and that the drain hole is at the bottom.

IMPORTANT

If the bulb is incorrectly located in the reflector, a faulty light pattern will result.

Aligning right and left asymmetric beams

Headlight beams are normally adjusted with the help of special apparatus, but can also be made against a marked panel or a wall.



SCREWS FOR ADJUSTING HEADLIGHTS, UP TO AND INCL. MODEL 1973

1. Screw for horizontal adjustment
2. Screw for vertical adjustment



SCREW FOR ADJUSTING HEADLIGHTS, AS FROM MODEL 1974

1. Screw for horizontal adjustment
2. Screw for vertical adjustment

Adjustment with beam aligning apparatus

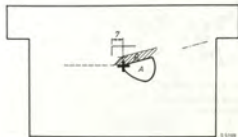
1. Check the tire pressures and load the car as it would normally be loaded and place the car at right angles to the apparatus.

Set the lens of the apparatus to the correct height relative to the headlight and to the correct lateral position relative to the asymmetrical part of the headlight glass.

CAUTION

If the lateral position is set incorrectly this can completely prejudice the alignment work.

- a. When the apparatus is suspended from above: Place the left hand wheels of the car along the line. A maximum deviation of 1.2 in. (3 cm) in the distance of the front and rear wheels from the line is permitted.
 - b. When the beam aligning apparatus is equipped with an aperture: Place the apparatus in front of one of the headlights, switch on the beam light and turn the apparatus until the beam strikes the same point on the front fenders (measured from the front edge).
2. Switch on the headlight at low beam.
 - a. Adjust the height relative to the left hand (left asymmetric light: the right hand) horizontal line. Adjust the vertical alignment using as reference the light dark border which is between 0 and 1.18 in. (0 and 30 mm) to the left (to the right for left asymmetric light) of the centre line.
 - b. Adjust the lateral setting of the headlight in such a way that the zone with the highest intensity of light (A, see illustration) comes as near the centre as possible. The tolerance band (B) for the light dark border can be used to obtain the optimum setting.



ALIGNMENT BY MEANS OF BEAM ALIGNING APPARATUS

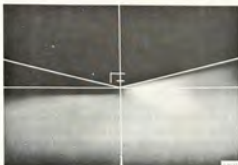
- A = High intensity zone
B = Tolerance band, light dark border



CORRECT SETTING FOR HEADLIGHTS, UP TO AND INCL. MODEL 1975 (RIGHT ASYMMETRIC LIGHT)



CORRECT SETTING FOR HEADLIGHTS, AS FROM MODEL 1976 (RIGHT ASYMMETRIC LIGHT)

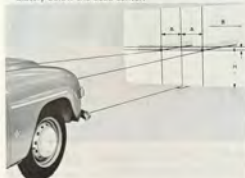


INCORRECT SETTING FOR HEADLIGHTS, AS FROM MODEL 1976 (RIGHT ASYMMETRIC LIGHT)

3. Check the other headlights in a similar manner.
4. If difficulty in making the necessary adjustments should be encountered, check the distribution of light from the headlight at full beam and check the seating of the bulbs.

Adjustment against panel or wall

1. Check the tire pressures and place the car, loaded in the same way as normally, on a flat surface and at a distance of 16 ft. 6 in. (5 m) from the panel.
2. Up to and incl. model 1973: Remove the decor frame in order to uncover the adjustment screws.
3. Mark the height of the headlight center above the ground on the panel.
4. Switch on the headlights with the beam dimmed and mask one light.
5. Check and adjust the beam so that the horizontal part of the dividing line between light and darkness lies 2.0" (50 mm) below the measured dead center of the headlight and to the left of the center (or to the right in the case of a left asymmetric beam). The sloping part of the light dark dividing line should lie fully to the right of the mark (to the left for a left asymmetric beam) and should thus meet the horizontal part immediately below the dead center.



ALIGNMENT, TOWARDS SCREEN

- H = Height of headlight center above ground
 A = 11.3 in. (288 mm)
 B = 2.0 in. (50 mm)

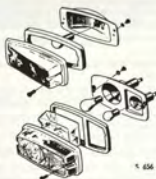
6. Check the beam of the other light in the same way.
7. Check that the high beam has an even spread. If the light pattern is irregular or if any difficulty is experienced in setting the dimmed beam correctly, check that the bulb is properly mounted or, if necessary, fit a new bulb.

PARKING AND STOP LIGHTS

General, up to and incl. model 1968

The front parking lights are mounted in the front panel and are combined with the direction-indicating flashers. The rear parking lights are integral with the stop lights and flashers in the tail lights.

The stop light switch is located in the engine compartment on the master brake cylinder.

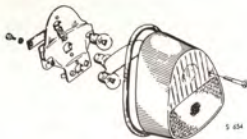


FLASHER AND PARKING LIGHT, FRONT, STANDARD AND EXPORT VERSION



TAIL LIGHT, SAAB 95

1. Stop and flasher light
2. Parking light



TAIL LIGHT, SAAB 96

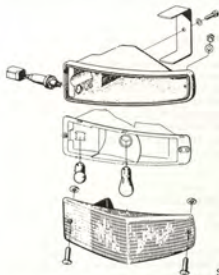
General, as from model 1969

As from model 1969, the front parking lights are mounted in the front fenders and combined with the direction-indicating flashers.

The rear parking lights are integral with the stop lights and flashers in the tail lights.

As from model 1969, the Saab 95 has a new light-arrangement at the rear. It comprises a stop- and tail light, and a flashing- and back-up light.

The stop light switch, which is mechanical, is located on a bracket by the brake pedal.

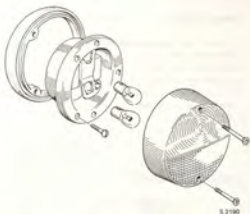


S 2191

FLASHER AND PARKING LIGHT, FRONT, UP TO AND INCL. MODEL 1977



FLASHER AND PARKING LIGHT, FRONT, AS FROM MODEL 1978



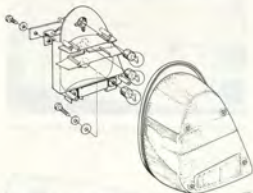
S 2190

FLASHING AND BACK-UP LIGHT AND TAIL- AND STOP LIGHT, SAAB 95



S 654

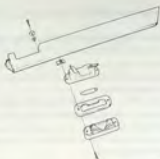
TAIL LIGHT, SAAB 96, UP TO AND INCL. MODEL 1977



TAIL LIGHT, SAAB 96, AS FROM MODEL 1978

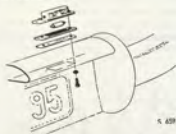
Changing bulbs

1. Back off and remove the two retaining screws and remove the lens together with frame and screws.
2. Take the bulb out of its bayonet socket.
3. Clean the bulb socket and the lens.
4. Fit a new bulb. Make sure that good contact is obtained, particularly at the earth connection.
5. Refit the lens.



NUMBER PLATE LIGHT, SAAB 96, AS FROM MODEL 1978

NUMBER PLATE LIGHT



NUMBER PLATE LIGHT, SAAB 95, UP TO AND INCL. MODEL 1975



NUMBER PLATE LIGHT, SAAB 95, AS FROM MODEL 1976

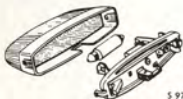
Changing bulbs

1. Back off and remove the retaining screws and take off the lamp housing, enabling the bulb to be removed.
2. Clean the socket and the lamp housing.
3. When fitting the new bulb, make sure that it is firmly seated and that good contact is obtained.
4. Refit the housing and tighten the retaining screws. Check that sealing is effective between the rubber gasket and the housing.

INTERIOR LIGHTING

General

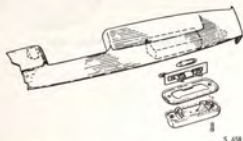
The ceiling lamp and switch are fitted on the ceiling rail. In the Saab 95 there are two interior lamps, one at the front and one at the rear of the passenger compartment. These lamps can be switched on either with the door switch or with the switch on the lamp housing.



INTERIOR LIGHTING

Changing bulbs

1. Remove the cover, by bending one holder and pulling the cover outwards.
2. Make sure that the new bulb have good contact.
3. Refit the lamp cover.



NUMBER PLATE LIGHT, SAAB 96, UP TO AND INCL. MODEL 1977

DIRECTION INDICATORS

GENERAL

The direction indicators consist of flashing lights at front and rear. At the front, the flashers are combined with the parking lights and flash with white or (as from model 1969) orange light. At the rear, separate lamps are provided for the flashers. These are mounted in the same housings as the stop lights and tail lights and flash with orange light.

The flasher unit, which is installed under the instrument panel, is combined with a control relay which indicates, by means of green warning lamps on the instrument panel, that the direction indicator is on and that both lamps are working.

If one of the flashers fails to operate, the warning lamp will not glow and the remaining light will flash more rapidly. If the flasher unit is in good condition and correct bulbs are fitted, the direction indicator will flash at the rate of 60–120 flashers per minute.

The flasher unit is not adjustable. If the other parts of the direction-indicating system (switch, wires and lamps) are in good order, erratic flashing must be due to a faulty flasher unit. In these circumstances, a new flasher unit must be fitted.

As from model 1966, the flasher in cars for USA serves also as sender for the warning flasher system. That relay is of a special type, and — in case of replacement — must not be confused with relays of types formerly used. Instructions for attachment of the direction-indicator switch and return mechanism are given below.

NOTE

The fitting of bulbs with incorrect ratings will result in abnormal flashing frequency.

DIRECTION INDICATOR RETURN YOKE

The clearance between the return yoke and the projection on the directional indicator switch should be 0.008–0.024 in. (0.2–0.6 mm) with the switch at neutral. Adjust by inserting shims between the switch and the column stand.

NOTE

Fit the return yoke so that its center axis coincides with the center axis of the switch housing, when the wheels are straight ahead.

See also Group 6.



The return indicator is a device which is used to return the indicator to its normal position after it has been used to indicate a turn or lane change. It is a mechanical device which is operated by the driver's hand or foot. It is a simple device which is easy to use and which is reliable.

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Diagram of a return indicator mechanism showing a lever and a spring.



Diagram of a return indicator mechanism showing a lever and a spring.



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HORNS, SIGNALING DEVICE

GENERAL

The horns are mounted inside the front panel. One high-pitched and one low-pitched horn are harmonized to give a high-penetration signal.

If the horns produce a discordant tone, first localize the defective horn and adjust by turning the contact screw, marked with red paint, on the rear of the horn until a pure note is obtained.

As from model 1972, there is only one horn mounted. It is placed to the right, inside the front sheet.

SIGNALING DEVICE MODEL 1967



S 2372

STEERING WHEEL AND SIGNALING DEVICE, MODEL 1967

Removal

1. Disconnect the horn lead at the joint sleeve under the instrument panel.
2. Release the central button by prying carefully under its edge with a knife or similar implement.



S 240

REMOVAL OF HORN BUTTON, MODEL 1967

3. Disconnect the horn lead from the contact plate.
4. Back off and remove the nut and take away the spring washer.
5. Remove the horn ring.

Installation

Install the horn ring and the spring washer and tighten up the nut.

Reconnect the horn lead to the contact plate.

Install the central button so that the three springs on the horn ring enter the recesses on the bottom of the button. Reconnect the horn lead.

SIGNALING DEVICE MODELS 1968 AND 1969

General

On the 1968 and 1969 models of Saab 95 and 96, the horn is operated with the same lever as is used for the windshield wipers and the electric windshield washer. To sound the horn, the lever is moved towards the steering wheel.



S 1902

SIGNALING DEVICE, MODEL 1968 AND 1969

Horn: Move the lever towards the steering wheel (positions Q—3)

SIGNALING DEVICE MODEL 1970-1975

Removal

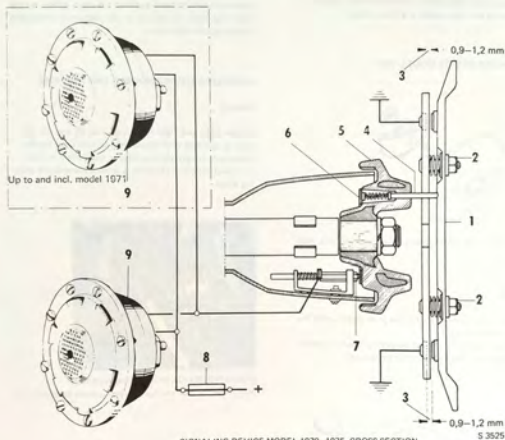
Remove the guard with the horn contact from the steering wheel by undoing the four screws which are accessible from under the steering wheel. Next, back off and re-

move the two nuts which hold the horn contact to the guard.

Reassembly takes place in the reverse order.

To remove the sliding contact, commence by removing the steering wheel, see group 6.

The sliding contact can then be detached from the casing by undoing the retaining screw.



SIGNALING DEVICE MODEL 1970-1975, CROSS-SECTION

1. Horn contact
2. Adjusting nut
3. Contact gap
4. Spring-loaded contact
5. Steering wheel
6. Slip ring
7. Sliding contact
8. Fuse, 8 A
9. Horn

SIGNALING DEVICE, AS FROM MODEL 1976

Removal and installation

1. Remove the guard and the horn contact by pulling the unit straight from the steering wheel. The unit is fitted to the steering wheel by means of three spring-fasteners.



REMOVING THE GUARD AND HORN CONTACT

2. Pull off the electric connection from the horn contact.



DISCONNECTING THE ELECTRIC CONNECTION

Installation is made in the reverse order. See also group 6.

WINDSHIELD WIPERS AND -WASHERS, HEADLIGHT WIPERS AND -WASHERS

General

The windshield wiper motor can be set for two wiper speeds. The higher speed is intended for fast driving in heavy rain. During heavy snowfalls or when the windshield is almost dry, the lower speed should be used to avoid overloading the wiper motor.

The motor has an automatic "parking device", which make them stop always in a horizontal position, notwithstanding the position they are in when they are switched off.

WIPER MOTOR

Function

In the wiper motor the movement is transmitted to the operating rods via a gear housing. Current for the wiper motor is supplied by the battery through the ignition contact via a fuse and switch and a contact device in the gear housing. That device is connected during the largest part of the working cycle, thus giving the motor two alternative earth connections, if the switch is on. Every time the wiper blades are in their horizontal position, where they are normally parked, the contact in the gear housing cover is cut off. If the switch at that moment is not on, the motor stops and so will the wiper blades in this position. The parking position can be adjusted by slackening the gear housing bolts thus enabling the cover to be turned a little, which moves the fixed contact plate.

Removal and installation

1. Disconnect the linkage from the crank arm on the wiper motor (accessible from under the instrument panel).
2. Disconnect the power leads and remove the motor retaining screws. Lift out the wiper motor.

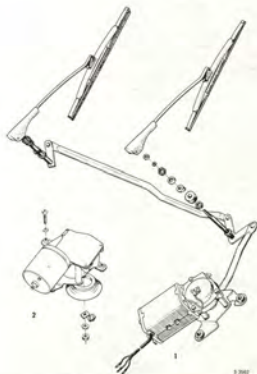
Install in the reverse order.

NOTE

Check before testing, that the crank arm on the right spindle (on R.H.D. cars, the left spindle) is turned upwards. If it is turned downwards, the wiper arm goes in the wrong direction and damages the paintwork.

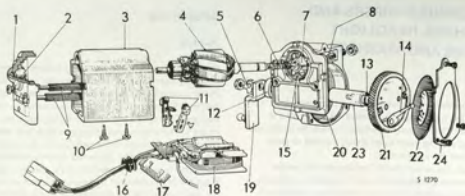
Lubrication

The motor armature is mounted in self-lubricating bearings. The gear housing is factory-lubricated. Periodical lubrication is not needed.



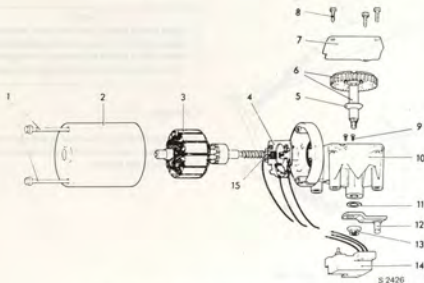
WINDSHIELD WIPER

1. Windshield wiper motor, up to and incl. model 1969
2. Windshield wiper motor, as from model 1970



WINDSHIELD WIPER MOTOR, UP TO AND INCL. MODEL 1969

- | | |
|---|--------------------------------------|
| 1. Thrust pad | 13. Washer |
| 2. Self-aligning spherical bearing | 14. Limit switch moving contact |
| 3. Yoke | 15. Bearing retaining ring |
| 4. Armature | 16. Grommet |
| 5. Tab washer | 17. Brush lever retainer |
| 6. Worm gear | 18. Field coil |
| 7. Self-aligning spherical bearing | 19. Rotating output crank |
| 8. End play adjuster and thrust pad | 20. Drive end bracket |
| 9. Through bolts and insulating sleeves | 21. Final gear |
| 10. Pole piece securing screws | 22. Limit switch fixed contact plate |
| 11. Brushgear | 23. Porous bronze bushing |
| 12. Bushing | 24. Gear box cover |



WINDSHIELD WIPER MOTOR, AS FROM MODEL 1970

- | | |
|-----------------------------|----------------------------|
| 1. Retaining screws, casing | 8. Retaining screws, cover |
| 2. Casing and bearing | 9. Screws, parking contact |
| 3. Armature | 10. Gear box |
| 4. Brushgear | 11. Flat washer |
| 5. Cupped washer | 12. Drive arm |
| 6. Shaft and gear | 13. Nut, drive arm |
| 7. Gear box cover | 14. Parking contact |

WINDSHIELD WIPER MECHANISM

Removal and installation

Left side, L.H.D. cars (Right side, R.H.D. cars)

1. Remove the wiper arm, outer nut and sealings.
2. Remove the combination instrument. This is attached with a bracket and two nuts. The accessibility will be improved, if the speedometer is removed.
3. Prize apart the ball joints between the linkages and the spindle.
4. Unscrew the spindle, using the lower nut. (This nut is riveted to the spindle.) The fixing nut is located inside the bracket together with a rubber bushing. Hold this nut, e.g. with a screw-driver, when you unscrew the spindle.

Install in the reverse order. Check that the rubber bushing and the nut are properly placed in the bracket.

NOTE

Check before testing, that the crank arm on the right spindle (on R.H.D. cars, the left spindle) is turned upwards. If it is turned downwards, the wiper arm goes in the wrong direction and damages the paintwork.

Right side, L.H.D. cars (Left side, R.H.D. cars)

1. Remove the wiper arm, outer nut and sealings.
2. Remove the fresh-air channel between the fresh-air intake and the heater fan casing.
3. Remove the spindle fixing nut inside the fresh-air intake. Prize apart the ball joint and remove the spindle. Note the fibre washer at the riveted nut on the spindle.



REMOVAL OF RIGHT WIPER SPINDLE, L.H.D. CAR

Install in the reverse order. L.H.D. cars: Remove the glove compartment for better accessibility.

NOTE

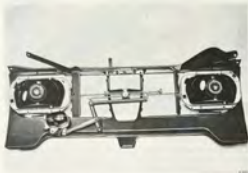
Check before testing, that the crank arm on the right spindle (on R.H.D. cars, the left spindle) is turned upwards. If it is turned downwards, the wiper arm goes in the wrong direction and damages the paintwork.

WINDSHIELD WASHER

Cars of model 1967 are fitted with a mechanical windshield washer, the pump being combined with the switch for the windshield wipers. As from model 1968, the cars have an electric pump which is started with the same switch as is used for the windshield wipers.

ELECTRICAL CONTROLS AND SWITCHES

As from model 1971, the Saab V4 is equipped for certain markets with a cleaning device for the headlights. The device consists of a wiper and washer unit driven by separate electric motors and started with the same switch as the windshield wipers and -washers. As from model 1972, the two washer systems has a common pump.



HEADLIGHT CLEANING DEVICE

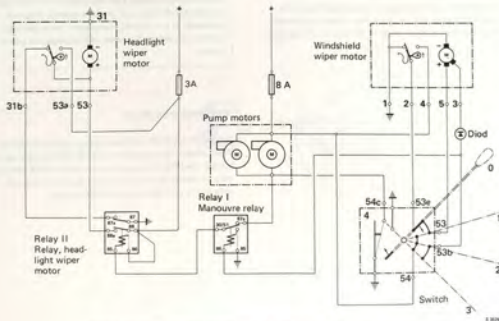
ELECTRICAL CONNECTION AND OPERATION, MODEL 1971

Switch in position 0

If the ignition lock is engaged, voltage is available at the wiper motor connections 4 and 53a respectively. The motors take up the parking position when a spring loaded contact in each motor has broken the connection between 4 and 2 in the windshield wiper motor and between 53a and 53 in the headlight wiper motor. The motors start very quickly when connections 1 and 31b respectively have been actuated by the contact device and thus shorted the rotor windings. This is necessary in order for the motor to have time to stop during the time the cam is actuating the contact. Otherwise, the motor would continue to rotate despite the switch being switched off, especially when the wipers move easily and the voltage across the motor is high.

Switch in position 1

Current goes only to the windshield wiper motor (low speed) via connections 54 and 53 on the switch.



WIRING DIAGRAM, HEADLIGHT WIPERS AND WASHERS, MODEL 1971

Switch in position 2

Current goes to the windshield wiper motor (high speed) and to relay 1 via connections 54 and 53b on the switch. The current goes through the coil in relay 1 and the coil attracts the relay contact to the lower position, whereupon the coil in relay 2 is actuated and both relay contacts are pulled downwards. Via the lower relay contact, current is provided to the motor for the windshield wipers, whereas the upper contact breaks the connection between terminals 87a and 87 to avoid short circuiting when the contact device in the motor interconnects connections 53 and 31b. A diode is connected before connection 3 on the windshield wiper motor and serves to prevent current from going "backwards" through the extra winding in the wiper motor and thus switching on the headlight wipers when the windshield wipers are operating at low speed (position 1).

Switch in position 3

The same functions as in position 2, but the switch now connects connections 54c with earth and by this means both pump motors are engaged.

Switch in position 4

When the switch lever is moved towards the steering wheel, a spring loaded contact is activated and switches on both pump motors by earthing terminal 54c. At the same time, the headlight wipers are also switched on in that connection 85 on relay 2 is connected to earth via relay 1 (the contact in this relay in the upper position) and connection 54c.

Electrical connection and operation, as from model 1972

As from model 1972, the switch for wipers/washer has been changed. The manoeuvre relay (1) and the diode have been dispensed with. Regarding the wiring, see group 371.

NOTE

For normal use of the wipers, a fuse for a maximum current of 3 amp. is to be fitted in order to avoid damage to the wiper motor if the wipers freeze on to the glass.

While testing the assembly (dry headlight glass), an 8 amp. fuse may be temporarily fitted.

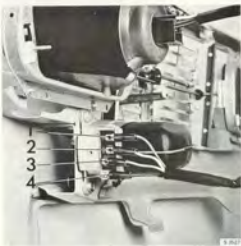
WIPER MOTOR

Removing

1. Remove the left grille plate (as from model 1974, the grille).
2. Unscrew the nut on the wiper motor spindle. Undo the push rod from the motor crank arm.
3. Disconnect the cable connections at the wiper motor and up to and incl. model 1973, remove the washer container.
4. Remove both motor retaining screws and lift out the motor.

Installing

1. Mount the crank arm to the motor, if it has been removed. Tighten the crank arm screw to a torque of 7.2 ft.-lb. (10 Nm, 1.0 kpm) and lock with Loctite.
2. Place the motor and mount the push rod to the crank arm. Refit the screws and tighten the spindle nut.
3. Connect the cables, see ill. and test the wipers.



CABLE CONNECTIONS AND CABLE COLORS, HEADLIGHT WIPER MOTOR

1. Brown to 53
2. Yellow to 31b
3. Red to 53a
4. Black to 31

4. Remount the grille and up to and incl. model 1973, the washer container.

WIPER MECHANISM

Removal and installation, up to and incl. model 1973

1. Remove the decor frames and the grille plates. Model 1973, remove the plastic cover in front of the wiper mechanism.



WIPER MECHANISM WITH PROTECTIVE COVER, MODEL 1973

2. Unhook the springs which hold the wiper shaft bushings, to the front sheet.
3. Remove the screw which holds the central bushing to the anchorage bracket. Model 1973, remove the tension pin.



FITTING THE CENTRAL BUSHING



CENTRAL BUSHING FIXED WITH TENSION PIN, MODEL 1973

4. Prize apart the push rod from the crank arm, which is mounted in bearings to the front sheet and lift out the mechanism sideways. Remove the remaining links and crank arms.

Install in the reverse order. If the motor crank arm has been removed, tighten the screw to a torque of 7.2 ft.-lb. (10 Nm, 1.0 kpm) and lock with Loctite. Before springs and bushings are fitted, the recesses in the front sheet must be greased on both sides.

Removal and installation, as from model 1974

1. Remove the grille.
2. Remove the wiper blade from the right wiper shaft.
3. Remove the four screws which hold the protective cover to the front sheet.
4. Unhook the springs which hold the wiper shaft bushings to the front sheet.
5. Prize apart the ball joint between the push rod and the connecting arm which is journaled in the front sheet.



REMOVING THE PUSH ROD FROM THE CONNECTING ARM

6. Remove the protective plate, including the central bushing and the wiper shafts, to the left.



REMOVING THE PROTECTIVE PLATE, AS FROM MODEL 1974

Reassemble in reverse order.

Adjustment

1. The parking position of the wipers is adjusted by altering the length of the short push rod.



ADJUSTING THE LENGTH OF THE SHORT PUSH ROD

2. Adjust the tension of the cords by slackening the locking screw in the retaining bushings for the cords and then moving these in order to stretch the cords.

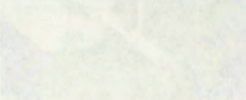


ADJUSTMENT OF CORD LENGTH

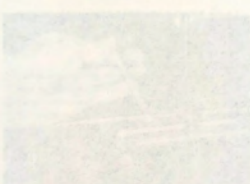
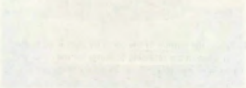
3. Check the pressure of the wiper blades on the headlight glasses and make sure that the bushing does not stick in the recesses in the front sheet. The pressure of the wiper blades, measured in the parked position, must not exceed 11 oz. (3 N, 300 pl). CRC 5.56 or similar is a suitable lubricant for the bushings.
4. Check that the wiper shafts are parallel (as seen from the front). If necessary, adjust by removing the grille plate and bending the bracket on the front sheet upwards or downwards.
5. Check that the central bushing is not loose and that it does not follow the movement of the wipers. Lubricate the central bushing with CRC 5.56 or similar.

Changing wiper blades

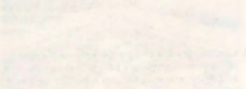
1. Remove the circlip from the wiper shaft and pull off the wiper blade.
2. Fit a new wiper blade and refit the circlip.



1. Remove the circlip from the wiper shaft and pull off the wiper blade.



2. Fit a new wiper blade and refit the circlip.



3. Fit a new wiper blade and refit the circlip.

4. Fit a new wiper blade and refit the circlip.

5. Fit a new wiper blade and refit the circlip.

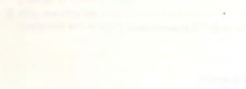
6. Fit a new wiper blade and refit the circlip.



7. Fit a new wiper blade and refit the circlip.



8. Fit a new wiper blade and refit the circlip.



9. Fit a new wiper blade and refit the circlip.



10. Fit a new wiper blade and refit the circlip.

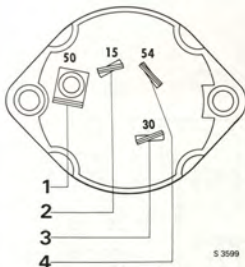
ELECTRICAL CONTROLS AND SWITCHES

GENERAL

The ignition lock is located on the steering column stand and is combined with the starter switch.

To separate the ignition lock and the gear lever lock, unscrew the two retaining screws.

Concerning removal of the gear lever lock, see Group 6.



CABLE CONNECTIONS, IGNITION LOCK

1. 84 yellow to 50
2. 75 red and 118 white to 15
3. 4 green to 54
4. 5 red to 30

Up to and incl. chassis No. 46.815 resp. 439.333 the stop light switch is hydraulic and it is placed on the master cylinder.

As from chassis No. 46.816 resp. 439.334, a mechanically operated stop light switch has been introduced. This switch is actuated directly by the brake pedal.

As from model 1968, a brake warning system has been introduced. If the brake pedal stroke becomes abnormally big, the pedal actuates a switch located above it. This switch then completes the circuit to a warning lamp in the speedometer.



BRAKE WARNING SWITCH AND STOP LIGHT SWITCH

1. Brake warning switch
2. Stop light switch

SPECIAL SWITCHES

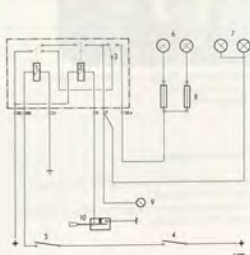
As from model 1969, a back-up light switch has been introduced in the Saab 95.

The switch is located by the gearbox and is actuated by the gear shift mechanism.

LIGHTING RELAY

The lighting relay contains devices for flashing the high beam and switching high beam and low beam. Function (see wiring diagram):

If the ignition switch (4) and the light switch (5) are on, current will pass through relay coil (1). The coil contact is pulled down and connects either high or low beam via contact (3). Contact (3) can change position as it is mechanically influenced by the contact at relay coil (2). This coil is connected with the headlight dimmer and flasher switch (10) (i.e. the same lever as the direction indicator switch), if either the ignition switch or the light switch – or both – are switched off, the high beam signal can be used. The contact at coil (1) is then in the upper



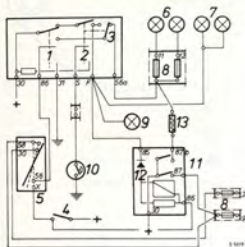
WIRING DIAGRAM, LIGHTING RELAY, MODEL 1970-1975

- | | |
|--------------------|---|
| 1,2. Relay coils | 7. High beam |
| 3. Contact | 8. Fuses |
| 4. Ignition switch | 9. High beam indicator light |
| 5. Light switch | 10. Headlight dimmer and flasher switch |
| 6. Low beam | |

position and the high beam is connected through the contact at coil (2), which is grounded through the light switch.

TOWN LIGHT RELAY

If the ignition switch (4) is on, current will flow through the coil (11) in the town light relay. The contact is pushed down and the low beam lights are connected via the resistor (13) which drops the voltage to around 10 V. The function of the diode (12) is to prevent that the light is on when the ignition is switched off with the light switch in position full beam.



WIRING DIAGRAM, LIGHTING RELAY, AS FROM MODEL 1976

- | | |
|------------------------|-----------------------------------|
| 1,2. Relay coils | 8. Fuses |
| 3,11. Contact | 9. High beam indicator light |
| 4. Ignition switch | 10. Light switch (steering wheel) |
| 5. Light switch, panel | 11. Relay coil |
| 6. Low beam | 12. Diode |
| 7. High beam | 13. Resistance |

OIL PRESSURE SWITCH

Removal

1. Disconnect lead.
2. Unscrew and remove oil pressure switch 1.06 in. (27 mm) wrench opening.



OIL PRESSURE SWITCH

Installation

NOTE

Smear sealing compound on threads before installing.

1. Screw in oil pressure switch and tighten to 9–10 ft.-lb. (12–15 Nm, 1.2–1.5 kpm).
2. Connect lead.

ELECTRICAL TEMPERATURE TRANSMITTER

Removal

1. Drain off coolant.
2. Disconnect lead.
3. Unscrew transmitter. 1/2 in. wrench opening.



TEMPERATURE TRANSMITTER

Installation

NOTE

Smear sealing compound on threads before installing.

1. Screw in transmitter.
2. Connect lead.
3. Fill cooling system with coolant.
4. Run engine until hot and check temperature gauge reading.
5. Check coolant level and replenish if necessary.

WARNING SYSTEM FOR UNFASTENED SEAT BELT

Sweden, Norway, Finland, as from model 1974

A warning lamp on the instrument panel lights up if the driver and/or the front seat passenger has not fastened his seat belt.

The following components are included in the warning system:

Warning lamp — on the panel

Seat contact — in the passenger seat

Handbrake contact, up to and incl. model 1975

Belt contact — in the flap lock

The lamp lights up in the following cases:

If the ignition is on, the handbrake is released up to and incl. model 1975 and:

- a. the driver has not fastened his seat belt
- b. the front seat passenger actuates the seat contact but has not fastened his seat belt.

USA cars, as from model 1972

If the driver or the front seat passenger forgets the seat belt a buzzer and a warning light start working.

The following components are included in the warning device:

Buzzer — below instrument panel

Warning light — on instrument panel

Seat contact — in passenger seat

Handbrake contact — at handbrake lever

Retractor contacts — in front seat retractors

The buzzer will be heard in the following cases:

If the ignition is on, the handbrake released and

- a. the driver does not use the belt
- b. the front seat passenger activates the seat contact and does not use the belt.

ELECTRICALLY HEATED REAR WINDOW, AS FROM MODEL 1976

As from model 1976 all L.H.D. Saab 96 cars are equipped with electrically heated rear window. As from model 1977 also Saab 95 and R.H.D. Saab 96 are equipped with electrically heated rear window. The switch for the heating is placed on the instrument panel. An indicator light in the switch gives a green light when the current is on. The control relay is mounted at the dash panel near the light- and windshield wiper relays.



WIRING AND FUSES

WIRING

The cables and wires lead the current from the battery or generator to the various items of consumer equipment. In order to protect the wiring and to reduce the risk of shorting, the wires are gathered into harnesses wherever possible, i.e. a number of individually insulated wires are carried in an enclosing plastic sheath.

The harnesses are divided into two groups, one at the dash panel and in the engine compartment, and one running to the rear part of the car. Provided that the wiring is fitted in strict accordance with the different wiring diagrams reproduced further on, removal and installation of wires and cables should not present any difficulties. The individual wires and cables in each harness are color-marked for ready identification in accordance with the numbers given.

The cable connections are made with AMP connectors and thus require no soldering.

Make sure that all cables and wires are properly connected, thus avoiding unnecessary voltage drops and flashovers.

Make sure that the wire from the horn button is routed so that it will not get torn off when the steering wheel is turned.

If frequent fuse burn out occurs, and if damaged insulation is suspected, check the insulation of the harnesses by testing. Bear in mind, however, that fuses will not burn out if a short occurs before the fuse.

When installing new wiring, always check positively that the rating of the selected wires and cables is adequate to cope with the load involved, and make sure that the cables are properly protected where they pass through panels and at clamps.

FUSES

To protect wiring etc., from abnormal current intensities, for instance in the event of a short circuit, and to reduce the fire hazard involved by such occurrences, the electrical system is provided with fuses, grouped in a block attached to the R.H. side of the dash panel in the engine compartment. In addition to the aforesaid fuses, there is a 3 amp. fuse for the headlamp cleaning device. This fuse is located in a special holder.

One of the fuses are intended for the protection of extra equipment or as reserve.

All the components included in the electrical system except the headlight (as from model 1969), instrument lighting and ignition system are fused. On the inside of the fuse block cover is an identification text, showing which items are protected by the individual fuses.



FUSE BLOCK



FUSE BOX, HEAD LIGHT CLEANING DEVICE

IMPORTANT

When fitting a new fuse, take pains to secure good contact. If wire fracture is suspected, check that the fuse concerned makes good contact before taking any further steps. Use a voltmeter for this check: the maximum permissible voltage drop is 0.1 V.

WIRING DIAGRAM, SAAB 95 R.H.D., MODEL 1967

The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

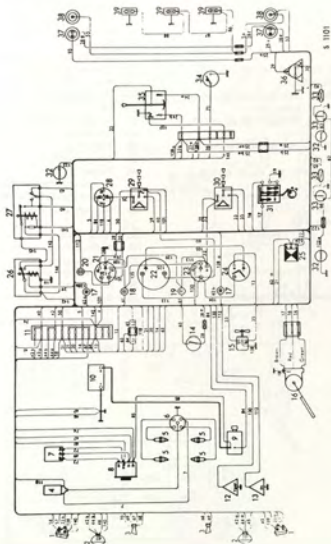
Wires

- Black: 7, 7b, 18, 19, 45, 46, 47, 49, 71, 105, 109, 125, 135, 136, 138, 139, 140.
- Red: 5, 21, 28, 28e, 28f, 28g, 32, 39, 61, 63, 65, 67, 68, 72, 92, 111, 113, 126, 129.
- Green: 16, 22, 50, 51, 53, 54, 55, 57, 58, 60, 86, 87, 88, 101, 104, 110, 133, 143.
- Grey: 4, 25b, 25be, 29, 29e, 35, 44a, 62a, 62b, 64, 69, 70, 74, 75, 85, 93, 142, 144.
- White: 20, 23b, 24b, 40, 42b, 66, 82, 83, 118, 122, 122e, 128a.
- Yellow: 17, 23a, 24a, 33, 43, 44b, 73, 84, 128b.
- Brown: 14, 30, 30e, 130, 137, 141.
- Blue: 13, 25a, 25ae, 41, 42a, 112, 145.

Components

1. Direction indicator lights and parking lights
2. Headlights
3. Horns
4. Ignition coil
5. Spark plugs
6. Distributor
7. Voltage regulator

8. Alternator
9. Starter motor
10. Battery
11. Fuse box
12. Temperature sender
13. Oil pressure switch
14. Stop light switch
15. Heater motor
16. Windshield wiper motor
17. Direction indicator warning lights
18. High beam warning light
19. Generator warning light
20. Oil pressure warning light
21. Fuel gauge
22. Speedometer with odometer
23. Temperature gauge
24. Clock
25. Flasher
26. Headlight control relay
27. Dimmer relay
28. Ignition and starter switch
29. Headlight and side light switch with instrument illumination rheostat
30. Heater switch
31. Windshield wiper switch
32. Courtesy light switches
33. Interior light with switch
34. Horn ring
35. Direction indicators switch with headlight flasher and dimmer switch
36. Fuel tank gauge
37. Stop lights and direction lights
38. Rear lights
39. Number plate light



WIRING DIAGRAM, SAAB 95 R.H.D., MODEL 1967

WIRING DIAGRAM, SAAB 95 L.H.D., MODEL 1967

The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

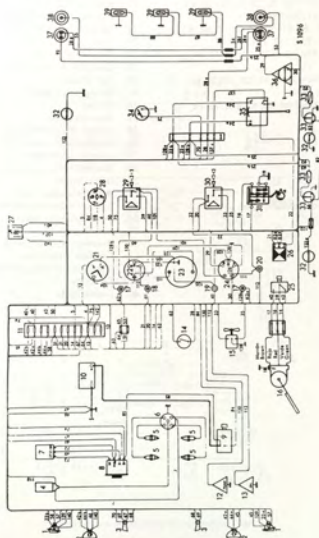
Wires

- Black: 7, 18, 19, 45, 46, 47, 49, 71, 105, 109, 125, 135, 136, 138, 139, 140.
- Red: 5, 21, 28, 28e, 28f, 28g, 32, 39, 61, 63, 65, 67, 68, 72, 92, 111, 113, 126, 129.
- Green: 16, 22, 50, 51, 53, 54, 55, 57, 58, 60, 86, 87, 88, 101, 104, 110.
- Grey: 4, 25b, 29, 35, 44a, 62a, 62b, 64, 69, 70, 74, 75, 85, 93, 142.
- White: 20, 23b, 24b, 40, 40c, 42b, 66, 82, 83, 118, 122, 122e, 128a.
- Yellow: 17, 23a, 24a, 33, 43, 44b, 73, 84, 128b.
- Brown: 14, 15, 30, 130, 137, 137c.
- Blue: 13, 25a, 41, 42a, 112.

Components

1. Direction indicators and parking lights
2. Headlights
3. Horn
4. Ignition coil
5. Spark plugs
6. Distributor

7. Voltage regulator
8. Alternator
9. Starter
10. Battery
11. Fuse box
12. Temperature gauge sending unit
13. Oil pressure switch
14. Stop light switch
15. Heater fan motor
16. Wiper motor
17. Direction indicator repeater lights
18. Charge indicator light
19. High beam indicator light
20. Oil pressure warning light
21. Clock
22. Temperature gauge
23. Speedometer with odometer
24. Fuel gauge
25. Dimmer switch
26. Flasher
27. Control relay for headlight flasher
28. Ignition and starter switch
29. Headlight switch and instrument illumination rheostat
30. Heater fan switch
31. Windshield wiper switch
32. Courtesy light switch
33. Courtesy light with switch
34. Horn button
35. Direction indicator switch with headlight flasher
36. Fuel tank gauge
37. Stop lights and direction indicators
38. Tail lights
39. Number plate lights



WIRING DIAGRAM, SAAB 95 L.H.D., MODEL 1967

WIRING DIAGRAM, SAAB 95 USA, MODEL 1967

The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Black: 7, 18, 19, 45, 46, 47, 49, 71, 80, 105, 109, 125, 135, 136, 138, 139, 140.

Red: 5, 21, 28, 28e, 28f, 28g, 32, 39, 61, 63, 65, 67, 68, 72, 92, 111, 113, 126, 129.

Green: 16, 22, 22e, 22f, 50, 51, 53, 54, 55, 57, 58, 60, 86, 87, 88, 101, 104, 110, 133.

Grey: 4, 25b, 29, 35, 44a, 62a, 62b, 64, 69, 70, 74, 75, 85, 93.

White: 20, 23b, 24b, 24be, 24bf, 40, 42b, 66, 82, 83, 118, 122, 122e, 128a.

Yellow: 17, 23a, 24a, 24ae, 24af, 33, 43, 44b, 73, 84, 128b.

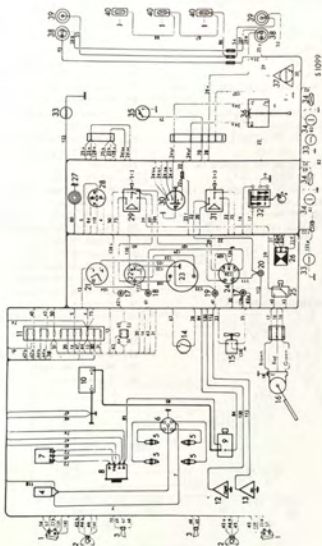
Brown: 14, 30, 130, 137.

Blue: 13, 25a, 41, 42a, 112.

Components

1. Parking and direction indicator lights
2. Headlights
3. Horns
4. Ignition coil
5. Spark plugs
6. Distributor
7. Voltage regulator
8. Alternator

9. Starter motor
10. Battery
11. Fuse box
12. Temperature gauge sending unit
13. Oil pressure switch
14. Stop light switch
15. Heater motor
16. Windshield wiper motor
17. Direction indicator warning lights
18. Charge indicator light
19. High beam indicator light
20. Oil pressure warning light
21. Clock
22. Temperature gauge
23. Speedometer with odometer
24. Fuel gauge
25. Foot dimmer switch
26. Flasher
27. Cigarette lighter
28. Ignition and starter switch
29. Headlight and parking light switch with instrument illumination rheostat
30. Warning flasher switch with control light
31. Heater switch
32. Windshield wiper switch
33. Automatic door switch for dome light
34. Dome light with switch
35. Horn ring
36. Direction indicator switch
37. Fuel tank sending unit
38. Stop light and direction indicator light
39. Tail lights
40. License lights



WIRING DIAGRAM, SAAB 95 USA, MODEL 1967

WIRING DIAGRAM, SAAB 96 R.H.D., MODEL 1967

The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

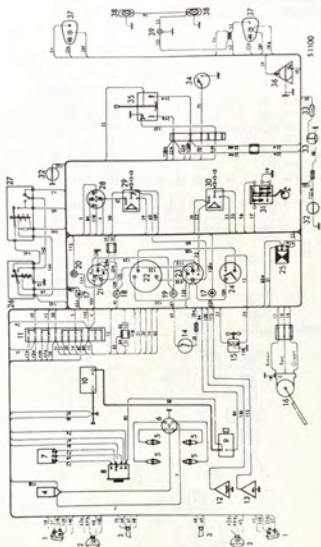
Wires

- Black: 7, 18, 19, 45, 46, 47, 49, 71, 105, 109, 125, 135, 136, 138, 139, 140.
- Red: 5, 21, 28, 28e, 28f, 32, 39, 61, 63, 65, 67, 68, 72, 111, 113, 126, 129.
- Green: 16, 22, 50, 51, 52, 53, 54, 55, 56, 57, 58, 60, 101, 104, 110, 121, 133, 143.
- Grey: 4, 25b, 25be, 29, 29e, 35, 44a, 62a, 62b, 64, 69, 70, 74, 75, 85, 142, 144.
- White: 20, 23b, 24b, 40, 42b, 66, 118, 122, 122e, 128a.
- Yellow: 17, 23a, 24a, 33, 43, 44b, 73, 84, 128b.
- Brown: 14, 30, 30e, 130, 137, 141.
- Blue: 13, 25a, 25ae, 41, 42a, 112, 145.

Components

1. Direction indicator lights and side lights
2. Headlights
3. Horns
4. Ignition coil
5. Spark plugs
6. Distributor

7. Voltage regulator
8. Generator
9. Starter motor
10. Battery
11. Fuse box
12. Temperature sender
13. Oil pressure switch
14. Stop light switch
15. Heater motor
16. Windshield wiper motor
17. Direction indicator warning lights
18. High beam warning light
19. Generator warning light
20. Oil pressure warning light
21. Fuel gauge
22. Speedometer with odometer
23. Temperature gauge
24. Clock
25. Flasher
26. Headlamp control relay
27. Dimmer relay
28. Ignition and starter switch
29. Headlights and side lights switch with instrument illumination rheostat
30. Heater switch
31. Windshield wiper switch
32. Courtesy light switches
33. Interior light with switch
34. Horn ring
35. Direction indicators switch with headlight flasher and dimmer switch
36. Fuel tank gauge
37. Stop lights, direction indicator and rear lights
38. Number plate lights
39. Trunk lights



WIRING DIAGRAM, SAAB 96 R.H.D., MODEL 1967

WIRING DIAGRAM, SAAB 96 L.H.D., MODEL 1967

The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

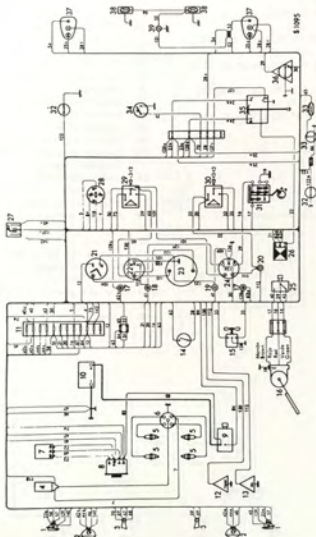
Wires

- Black: 7, 18, 19, 45, 46, 47, 49, 71, 105, 109, 125, 135, 136, 138, 139, 140.
Red: 5, 21, 28, 28e, 28f, 32, 39, 61, 63, 65, 67, 68, 72, 111, 113, 126, 129.
Green: 16, 22, 50, 51, 52, 53, 54, 55, 56, 57, 58, 60, 101, 104, 110, 121, 133.
Grey: 4, 25b, 29, 35, 44a, 62a, 62b, 64, 69, 70, 74, 75, 85, 142.
White: 20, 23b, 24b, 40, 40c, 42b, 66, 118, 122, 122e, 128a.
Yellow: 17, 23a, 24a, 33, 43, 44b, 73, 84, 128b.
Brown: 14, 30, 130, 137, 137c.
Blue: 13, 25a, 41, 42a, 112.

Components

1. Direction indicators and side lights
2. Headlights
3. Horn
4. Ignition coil
5. Spark plugs
6. Distributor

7. Voltage regulator
8. Alternator
9. Starter
10. Battery
11. Fuse box
12. Temperature gauge, sending unit
13. Oil pressure switch
14. Stop light switch
15. Heater fan motor
16. Wiper motor
17. Direction indicator repeater lights
18. Charge indicator light
19. High beam indicator light
20. Oil pressure warning light
21. Clock
22. Temperature gauge
23. Speedometer with odometer
24. Fuel gauge
25. Dimmer switch
26. Flasher
27. Control relay for headlight flasher
28. Ignition and starter switch
29. Headlight switch and instrument illumination rheostat
30. Heater fan switch
31. Windshield wiper switch
32. Courtesy light switch
33. Courtesy light with switch
34. Horn button
35. Direction indicator switch with headlight flasher
36. Fuel tank gauge
37. Stop lights, direction indicators and tail lights
38. Number plate lights
39. Trunk light



WIRING DIAGRAM, SAAB 96 L.H.D., MODEL 1967

WIRING DIAGRAM, SAAB 96 USA, MODEL 1967

The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Black: 7, 18, 19, 45, 46, 47, 49, 71, 80, 105, 109, 125, 135, 136, 138, 139, 140.

Red: 5, 21, 28, 28e, 28f, 32, 39, 61, 63, 65, 67, 68, 72, 111, 113, 126, 129.

Green: 16, 22, 22e, 22f, 50, 51, 52, 53, 54, 55, 56, 57, 58, 60, 101, 104, 110, 121, 133.

Grey: 4, 25b, 29, 35, 44a, 62a, 62b, 64, 69, 70, 74, 75, 85.

White: 20, 23b, 24b, 24be, 24bf, 40, 42b, 66, 95, 97, 98, 118, 122, 122e, 128a, 131.

Yellow: 17, 23a, 24a, 24ae, 24af, 33, 43, 44b, 73, 84, 128b.

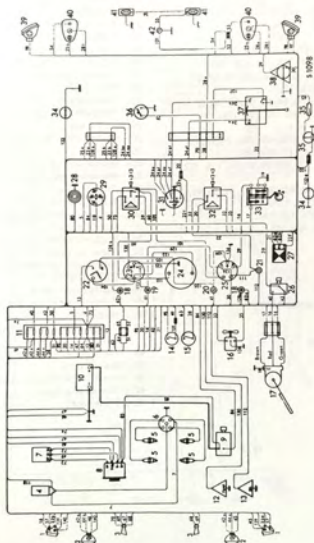
Brown: 14, 30, 130, 137.

Blue: 13, 25a, 41, 42a, 112.

Components

1. Parking and direction indicator lights
2. Headlights
3. Horns
4. Ignition coil
5. Spark plugs
6. Distributor
7. Voltage regulator
8. Alternator
9. Starter motor

10. Battery
11. Fuse box
12. Temperature gauge, sending unit
13. Oil pressure switch
14. Back-up light switch
15. Stop light switch
16. Heater motor
17. Windshield wiper motor
18. Direction indicator warning lights
19. Charge indicator light
20. High beam indicator light
21. Oil pressure warning light
22. Electric clock
23. Temperature gauge
24. Speedometer with odometer
25. Fuel gauge
26. Foot dimmer switch
27. Flasher
28. Cigarette lighter
29. Ignition and starter switch
30. Headlight and parking light switch with instrument illumination rheostat
31. Warning flasher switch with control light
32. Heater switch
33. Windshield wiper switch
34. Automatic door switch for dome light
35. Dome light with switch
36. Horn ring
37. Direction indicator switch
38. Fuel tank sending unit
39. Back-up lights
40. Stop lights, direction indicator and tail lights
41. License lights
42. Trunk light



WIRING DIAGRAM, SAAB 96 USA, MODEL 1967

WIRING DIAGRAM, MONTE CARLO R.H.D., MODEL 1967

The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

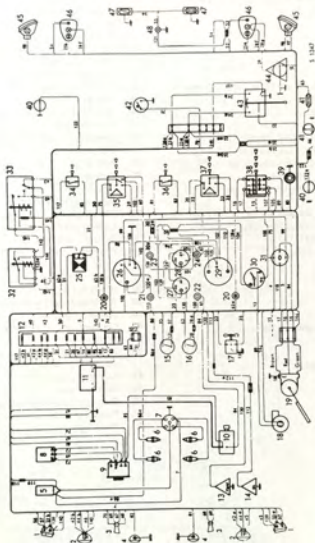
Wires

- Black: 7, 7b, 18, 45, 46, 47, 49, 71, 80, 105, 106, 107, 108, 109, 123e, 124, 135, 138, 139, 140.
- Red: 5, 21, 28, 28e, 28f, 32, 39, 61, 63, 65, 67, 68, 72, 83, 86, 86e, 126, 129.
- Green: 16, 22, 50, 51, 52, 53, 54, 55, 56, 57, 58, 60, 82, 101, 102, 103, 104, 110, 119, 121, 133, 143.
- Grey: 4, 25b, 25be, 29, 29e, 35, 44a, 62a, 64, 69, 70, 74, 75, 85, 89, 113, 117, 142, 144.
- White: 20, 23b, 24b, 40, 42b, 66, 95, 97, 98, 118, 122, 122e, 128a, 131.
- Yellow: 17, 23a, 24a, 33, 43, 44b, 62b, 73, 81, 84, 99, 100, 100e, 112, 112e, 128b, 130.
- Brown: 14, 14c, 15, 30, 30e, 137, 141.
- Blue: 13, 25a, 25ae, 41, 42a, 145.

Components

1. Direction indicators and side lights
2. Headlights
3. Horn
4. Foglight and spotlight
5. Ignition coil
6. Spark plugs
7. Distributor
8. Voltage regulator
9. Alternator

10. Starter
11. Battery
12. Fuse box
13. Temperature meter
14. Oil gauge
15. Back-up light switch
16. Stop light switch
17. Heater fan motor
18. Windshield washer pump
19. Wiper motor
20. Direction indicator repeater lights
21. Charge indicator light
22. Indicator light, oil pressure
23. High beam indicator light
24. Indicator light, fuel
25. Flasher
26. Tachometer
27. Temperature gauge
28. Fuel gauge
29. Speedometer, odometer and trip meter
30. Clock
31. Ignition and starter switch
32. Manoeuvre relay, light
33. Dimming relay
34. Spotlight switch
35. Headlight switch and instrument illumination rheostat
36. Fog light switch
37. Heater fan switch
38. Windshield wiper and washer switch
39. Cigarette lighter
40. Courtesy light switch
41. Courtesy light with switch
42. Horn button
43. Direction indicator switch with headlight flasher and dimmer switch
44. Fuel tank gauge
45. Back-up lights
46. Stop lights, direction indicators and tail lights
47. Number plate lights
48. Trunk light



WIRING DIAGRAM, MONTE CARLO R.H.D., MODEL 1967

WIRING DIAGRAM, MONTE CARLO L.H.D., MODEL 1967

The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

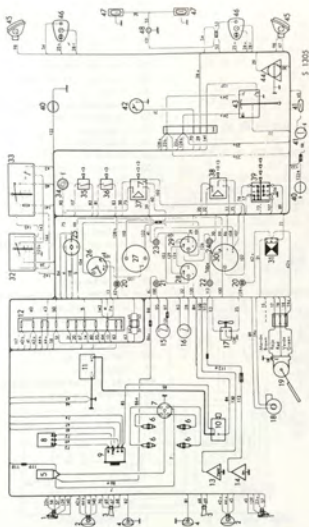
Wires

Black: 7, 7b, 18, 45, 46, 47, 49, 71, 80, 105, 106, 107, 108, 109, 123e, 124, 135, 138, 139, 140.
Red: 5, 21, 28, 28e, 28f, 32, 39, 61, 63, 65, 67, 68, 72, 83, 86, 86e, 126, 129.
Green: 16, 22, 50, 51, 52, 53, 54, 55, 56, 57, 58, 60, 82, 101, 102, 103, 104, 110, 119, 121, 133, 143.
Grey: 4, 25b, 29, 35, 44a, 62a, 62b, 64, 69, 70, 74, 75, 85, 89, 113, 117, 142, 144.
White: 20, 23b, 24b, 40, 42b, 66, 95, 97, 98, 118, 122, 122e, 128a, 131.
Yellow: 17, 23a, 24a, 33, 43, 44b, 62b, 73, 81, 84, 99, 100, 100e, 112, 112e, 128b, 130.
Brown: 14, 14c, 15, 30, 137, 141.
Blue: 13, 25a, 41, 42a, 145.

Components

1. Direction indicators and side lights
2. Headlights
3. Horn
4. Foglight and spotlight
5. Ignition coil
6. Spark plugs
7. Distributor
8. Voltage regulator
9. Alternator
10. Starter

11. Battery
12. Fuse box
13. Temperature meter
14. Oil gauge
15. Back-up light switch
16. Stop light switch
17. Heater fan motor
18. Windshield washer pump
19. Wiper motor
20. Direction indicator repeater lights
21. Charge indicator light
22. Indicator light, oil pressure
23. High beam indicator light
24. Indicator light, fuel
25. Ignition and starter switch
26. Electric clock
27. Speedometer, odometer and trip meter
28. Temperature gauge
29. Fuel gauge
30. Tachometer
31. Flasher
32. Manoeuvre relay, light
33. Dimming relay
34. Cigarette lighter
35. Spotlight switch
36. Fog light switch
37. Headlight switch and instrument illumination rheostat
38. Heater fan switch
39. Windshield wiper and washer switch
40. Courtesy light switch
41. Courtesy light with switch
42. Horn button
43. Direction indicator switch with headlight flasher and dimmer switch
44. Fuel tank gauge
45. Back-up lights
46. Stop lights, direction indicators and tail lights
47. Number plate lights
48. Trunk light



WIRING DIAGRAM, MONTE CARLO L.H.D., MODEL 1967

WIRING DIAGRAM, MONTE CARLO USA, MODEL 1967

The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

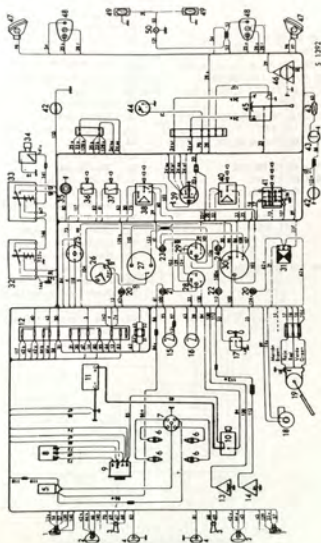
Wires

- Black: 7, 7b, 18, 19, 45, 46, 47, 49, 71, 80, 105, 106, 107, 108, 109, 123e, 124, 135, 138, 139, 140.
- Red: 5, 21, 28, 28e, 28f, 32, 39, 61, 63, 65, 67, 68, 72, 83, 86, 86e, 126, 129.
- Green: 16, 22, 22e, 22f, 50, 51, 52, 53, 54, 55, 56, 57, 58, 60, 82, 101, 102, 103, 104, 110, 119, 121, 133, 146, 147.
- Grey: 4, 25b, 29, 35, 44a, 62a, 62b, 64, 69, 70, 74, 75, 85, 89, 113, 117, 142, 144.
- White: 20, 23b, 24b, 24be, 24bf, 40, 42b, 66, 95, 97, 98, 118, 122, 122e, 128a, 131.
- Yellow: 17, 23a, 24a, 24ae, 24af, 33, 43, 44b, 62b, 73, 81, 84, 99, 100, 100e, 112, 112e, 128b, 130.
- Brown: 14, 14c, 15, 30, 137, 141, 141e.
- Blue: 13, 25a, 41, 42a.

Components

1. Direction indicators and side lights
2. Headlights
3. Horn
4. Foglight and spotlight
5. Ignition coil
6. Spark plugs
7. Distributor
8. Voltage regulator
9. Alternator
10. Starter

11. Battery
12. Fuse box
13. Temperature meter
14. Oil gauge
15. Back-up light switch
16. Stop light switch
17. Heater fan motor
18. Windshield washer pump
19. Wiper motor
20. Direction indicator repeater lights
21. Charge indicator light
22. Indicator light, oil pressure
23. High beam indicator light
24. Indicator light, fuel
25. Ignition and starter switch
26. Clock
27. Speedometer, odometer and trip meter
28. Temperature gauge
29. Fuel gauge
30. Tachometer
31. Flasher
32. Manoeuvre relay, light
33. Dimming relay
34. Dimming switch
35. Cigarette lighter
36. Spotlight switch
37. Foglight switch
38. Headlight switch and instrument illumination rheostat
39. Warning flasher switch
40. Heater fan switch
41. Windshield wiper and washer switch
42. Courtesy light switch
43. Courtesy light with switch
44. Horn button
45. Direction indicator switch
46. Fuel tank gauge
47. Back-up lights
48. Stop lights, direction indicators and tail lights
49. Number plate lights
50. Trunk light



WIRING DIAGRAM, SAAB 95 R.H.D., MODEL 1968

The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

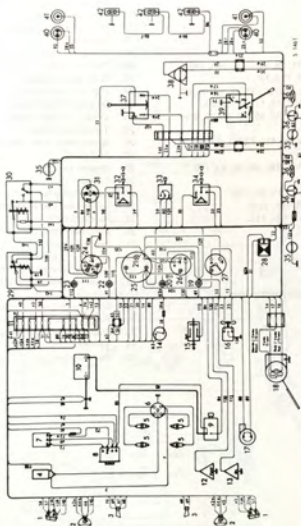
Wires

- Black: 7, 19, 45, 46, 47, 49, 71, 88, 88e, 105, 109, 124, 125, 135, 136, 138, 139, 140.
- Red: 5, 21, 28, 28e, 28f, 28g, 32, 39, 61, 63, 65, 67, 68, 72, 72e, 92, 111, 113, 116, 126, 129.
- Green: 22, 50, 51, 53, 54, 55, 57, 58, 59, 60, 86, 86e, 86f, 101, 104, 110, 143.
- Grey: 4, 16, 16e, 25b, 25be, 29, 35, 44a, 62b, 64, 69, 70, 74, 75, 85, 93, 142, 144.
- White: 20, 23b, 24b, 40, 40c, 42b, 66, 82, 83, 118, 122, 122e.
- Yellow: 23a, 24a, 33, 43, 44b, 73, 84, 115.
- Brown: 14, 30, 30e, 89, 130, 137, 141.
- Blue: 13, 17, 17e, 25a, 15ae, 41, 42a, 112, 145.

Components

1. Direction indicators and parking lights
2. Headlights
3. Horn
4. Ignition coil
5. Spark plugs
6. Distributor
7. Voltage regulator
8. Alternator

9. Starter
10. Battery
11. Fuse box
12. Temperature gauge, sending unit
13. Oil pressure switch
14. Stop light switch
15. Brake warning contact
16. Heater fan motor
17. Windshield washer pump
18. Wiper motor
19. Charge indicator light
20. Direction indicator repeater light
21. Brake warning light
22. High beam indicator light
23. Oil pressure warning light
24. Fuel gauge
25. Speedometer with odometer
26. Temperature gauge
27. Clock (extra equipment)
28. Flasher
29. Manoeuvre relay, light
30. Dimmer relay
31. Ignition and starter switch
32. Headlight switch
33. Instrument illumination rheostat
34. Heater fan switch
35. Courtesy light switch
36. Courtesy light with switch
37. Direction indicator switch with headlight flasher and dimmer switch
38. Fuel tank gauge
39. Switch for windshield wiper, -washer and signal horn
40. Stop lights and direction indicators
41. Tail lights
42. Number plate light



WIRING DIAGRAM, SAAB 95 R.H.D., MODEL 1968

WIRING DIAGRAM, SAAB 95 L.H.D., MODEL 1968

The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

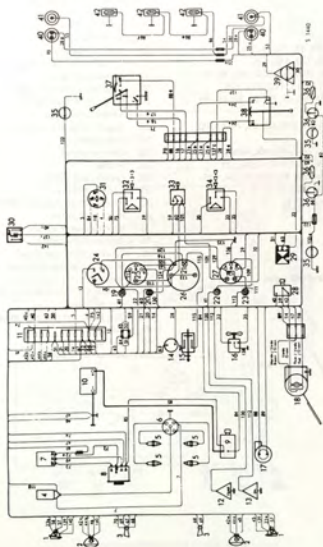
Wires

- Black: 7, 45, 46, 47, 49, 71, 88, 88e, 105, 109, 124, 125, 135, 136, 138, 139, 140.
- Red: 5, 21, 28, 28e, 28f, 28g, 32, 39, 61, 63, 65, 67, 68, 72, 72e, 92, 111, 113, 116, 126, 129.
- Green: 22, 50, 51, 53, 54, 55, 57, 58, 59, 60, 86, 86e, 86f, 101, 104, 110.
- Grey: 4, 16, 16e, 25b, 29, 35, 44a, 62, 64, 69, 70, 74, 75, 85, 93, 142.
- White: 20, 23b, 24b, 40, 40c, 42b, 66, 82, 83, 118, 122, 122e.
- Yellow: 23a, 24a, 33, 43, 44b, 73, 84, 115.
- Brown: 14, 15, 30, 89, 130, 137, 137c.
- Blue: 13, 17, 17e, 25a, 41, 42a, 112.

Components

1. Direction indicators and parking lights
2. Headlights
3. Horn
4. Ignition coil
5. Spark plugs
6. Distributor
7. Voltage regulator
8. Alternator

9. Starter
10. Battery
11. Fuse box
12. Temperature gauge, sending unit
13. Oil pressure switch
14. Stop light switch
15. Brake warning contact
16. Heater fan motor
17. Windshield washer pump
18. Wiper motor
19. Charge indicator light
20. Direction indicator repeater light
21. Brake warning light
22. High beam indicator light
23. Oil pressure warning light
24. Clock (extra equipment)
25. Temperature gauge
26. Speedometer with odometer
27. Fuel gauge
28. Dimmer switch
29. Flasher
30. Control relay for headlight flasher
31. Ignition and starter switch
32. Headlight switch
33. Instrument illumination rheostat
34. Heater fan switch
35. Courtesy light switch
36. Courtesy light with switch
37. Switch for windshield wiper, -washer and signal horn
38. Direction indicator switch with headlight flasher
39. Fuel tank gauge
40. Stop lights and direction indicators
41. Tail lights
42. Number plate light



WIRING DIAGRAM, SAAB 95 L.H.D. MODEL 1968

WIRING DIAGRAM, SAAB 95 USA, MODEL 1968

The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

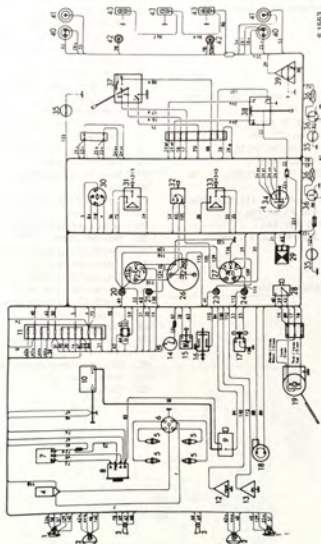
Wires

Black: 7, 45, 46, 47, 48, 49, 69, 70, 88, 88e, 109, 124, 125, 135, 136, 138, 139, 140.
Red: 5, 21, 28, 28e, 28f, 28g, 32, 39, 61, 63, 65, 67, 68, 72, 72e, 92, 111, 113, 116, 126, 129.
Green: 22, 22e, 22f, 50, 51, 53, 54, 55, 57, 58, 59, 60, 86, 86e, 86f, 101, 110.
Grey: 4, 16, 16e, 25b, 29, 35, 44a, 62, 64, 74, 75, 85, 93.
White: 20, 23b, 24b, 24be, 24bf, 40, 40c, 42b, 66, 82, 83, 95, 97, 97ae, 98, 118, 112, 122e, 131.
Yellow: 23a, 24a, 24ae, 24af, 33, 43, 44b, 73, 84, 115.
Brown: 14, 15, 30, 89, 130, 137.
Blue: 17, 17e, 25a, 41, 42a, 112.

Components

1. Direction indicators and side lights
2. Headlights
3. Horn
4. Ignition coil
5. Spark plugs
6. Distributor
7. Voltage regulator
8. Alternator

9. Starter
10. Battery
11. Fuse box
12. Temperature gauge, sending unit
13. Oil pressure switch
14. Back-up light switch
15. Stop light switch
16. Brake warning contact
17. Heater fan motor
18. Windshield washer pump
19. Wiper motor
20. Charge indicator light
21. Direction indicator repeater light
22. Brake warning light
23. High beam indicator light
24. Oil pressure warning light
25. Temperature gauge
26. Speedometer with odometer
27. Fuel gauge
28. Dimmer switch
29. Flasher
30. Ignition and starter switch
31. Headlight switch
32. Instrument illumination rheostat
33. Heater fan switch
34. Warning flasher switch
35. Courtesy light switch
36. Courtesy light with switch
37. Switch for windshield wiper, -washer and signal horn
38. Direction indicator switch with headlight flasher
39. Fuel tank gauge
40. Stop lights and direction indicators
41. Tail lights
42. Back-up lights
43. Number plate light



WIRING DIAGRAM, SAAB 95 USA, MODEL 1968

WIRING DIAGRAM, SAAB 96 R.H.D., MODEL 1968

The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

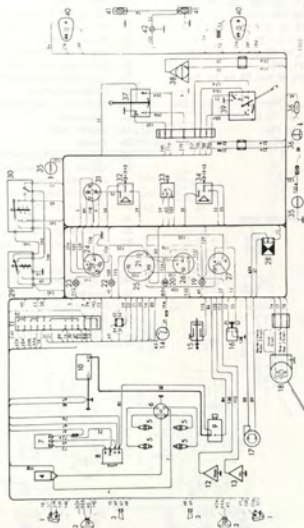
Wires

Black: 7, 19, 45, 46, 47, 49, 71, 88, 88e, 105, 109, 124, 125, 135, 136, 138, 139, 140.
Red: 5, 21, 28, 28e, 28f, 32, 39, 61, 63, 65, 67, 68, 72, 72e, 111, 113, 116, 126, 129.
Green: 22, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 101, 104, 110, 121, 133, 143.
Grey: 4, 16, 16e, 25b, 25be, 29, 29e, 35, 44a, 62b, 64, 69, 70, 74, 75, 85, 142, 144.
White: 20, 23b, 24b, 40, 40c, 42b, 66, 118, 122, 122e.
Yellow: 23a, 24a, 33, 43, 44b, 73, 84, 115.
Brown: 14, 30, 30e, 89, 130, 137, 141.
Blue: 13, 17, 17e, 25a, 25ae, 41, 42a, 112, 145.

Components

1. Direction indicators and side lights
2. Headlights
3. Horn
4. Ignition coil
5. Spark plugs
6. Distributor
7. Voltage regulator
8. Alternator
9. Starter

10. Battery
11. Fuse box
12. Temperature gauge, sending unit
13. Oil pressure switch
14. Stop light switch
15. Brake warning contact
16. Heater fan motor
17. Windshield washer pump
18. Wiper motor
19. Charge indicator light
20. Direction indicator repeater light
21. Brake warning light
22. High beam indicator light
23. Oil pressure warning light
24. Fuel gauge
25. Speedometer with odometer
26. Temperature gauge
27. Clock (extra equipment)
28. Flasher
29. Manoeuvre relay, light
30. Dimmer relay
31. Ignition and starter switch
32. Headlight switch
33. Instrument illumination rheostat
34. Heater fan switch
35. Courtesy light switch
36. Courtesy light with switch
37. Direction indicator switch with headlight flasher and dimmer switch
38. Fuel tank gauge
39. Switch for windshield wiper, -washer and signal horn
40. Stop lights, direction indicators and tail lights
41. Number plate light
42. Trunk light



WIRING DIAGRAM, SAAB 96 R.H.D., MODEL 1968

WIRING DIAGRAM, SAAB 96 L.H.D., MODEL 1968

The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

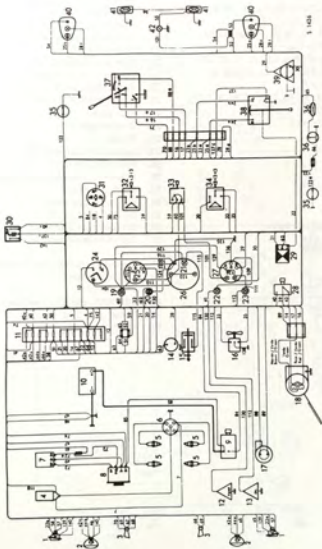
Wires

Black: 7, 45, 46, 47, 49, 71, 88, 88e, 105, 109, 124, 125, 135, 136, 138, 139, 140.
Red: 5, 21, 28, 28e, 28f, 32, 39, 61, 63, 65, 67, 68, 72, 72e, 111, 113, 116, 126, 129.
Green: 22, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 101, 104, 110, 121, 133.
Grey: 4, 16, 16e, 25b, 29, 35, 44a, 62, 64, 69, 70, 74, 75, 85, 142.
White: 20, 23b, 24b, 40, 40c, 42b, 66, 118, 122, 122e.
Yellow: 23a, 24a, 33, 43, 44b, 73, 84, 115.
Brown: 14, 30, 89, 130, 137, 137c.
Blue: 13, 17, 17e, 25a, 41, 42a, 112.

Components

1. Direction indicators and side lights
2. Headlights
3. Horn
4. Ignition coil
5. Spark plugs
6. Distributor
7. Voltage regulator
8. Alternator

9. Starter
10. Battery
11. Fuse box
12. Temperature gauge, sending unit
13. Oil pressure switch
14. Stop light switch
15. Brake warning contact
16. Heater fan motor
17. Windshield washer pump
18. Wiper motor
19. Charge indicator light
20. Direction indicator repeater light
21. Brake warning light
22. High beam indicator light
23. Oil pressure warning light
24. Clock (De luxe version only)
25. Temperature gauge
26. Speedometer with odometer
27. Fuel gauge
28. Dimmer switch
29. Flasher
30. Control relay for headlight flasher
31. Ignition and starter switch
32. Headlight switch
33. Instrument illumination rheostat
34. Heater fan switch
35. Courtesy light switch
36. Courtesy light with switch
37. Switch for windshield wiper, -washer and signal horn
38. Direction indicator switch with headlight flasher
39. Fuel tank gauge
40. Stop lights, direction indicators and tail lights
41. Number plate light
42. Trunk light



WIRING DIAGRAM, SAAB 96 L.H.D., MODEL 1968

WIRING DIAGRAM, SAAB 96 USA, MODEL 1968

The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Black: 7, 45, 46, 47, 69, 70, 71, 88, 88e, 109, 124, 125, 135, 136, 138, 139, 140.

Red: 5, 21, 28, 28e, 28f, 32, 39, 61, 63, 65, 67, 68, 72, 72e, 111, 113, 116, 126, 129.

Green: 22, 22e, 22f, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 101, 110, 121, 133.

Grey: 4, 16, 16e, 25b, 29, 35, 44a, 62, 64, 74, 75, 85.

White: 20, 23b, 24b, 24be, 24bf, 40, 42b, 66, 95, 97, 98, 118, 122, 122e, 131.

Yellow: 23a, 24a, 24ae, 24af, 33, 43, 44b, 73, 84, 115.

Brown: 14, 30, 89, 130, 137.

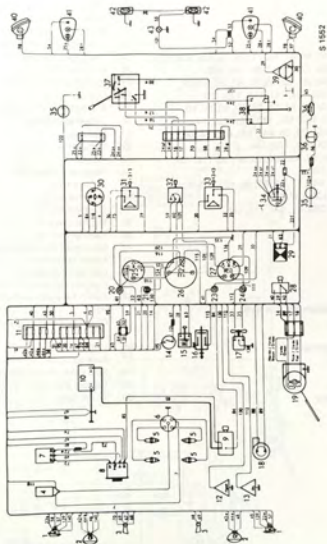
Blue: 17, 17e, 25a, 41, 42a, 112.

Wires

Components

1. Direction indicators and side lights
2. Headlights
3. Horn
4. Ignition coil
5. Spark plugs
6. Distributor
7. Voltage regulator
8. Alternator
9. Starter

10. Battery
11. Fuse box
12. Temperature gauge, sending unit
13. Oil pressure switch
14. Back-up light switch
15. Stop light switch
16. Brake warning contact
17. Heater fan motor
18. Windshield washer pump
19. Wiper motor
20. Charge indicator light
21. Direction indicator repeater light
22. Brake warning light
23. High beam indicator light
24. Oil pressure warning light
25. Temperature gauge
26. Speedometer with odometer
27. Fuel gauge
28. Dimmer switch
29. Flasher
30. Ignition and starter switch
31. Headlight switch
32. Instrument illumination rheostat
33. Heater fan switch
34. Warning flasher switch
35. Courtesy light switch
36. Courtesy light with switch
37. Switch for windshield wiper, washer and signal horn
38. Direction indicator switch with headlight flasher
39. Fuel tank gauge
40. Back-up light
41. Stop lights, direction indicators and tail lights
42. Number plate light
43. Trunk light



WIRING DIAGRAM, SAAB 96 USA, MODEL 1968

WIRING DIAGRAM, MONTE CARLO L.H.D., MODEL 1968

The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

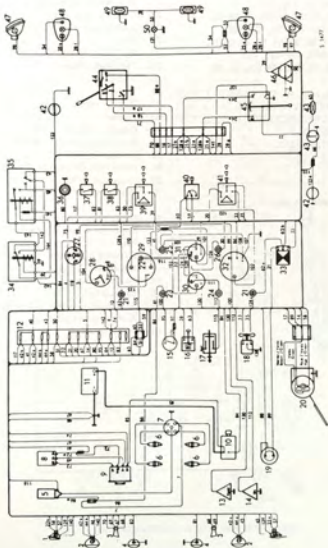
Wires

Black: 7, 19, 23a, 45, 46, 47, 49, 71, 80, 88, 88e, 105, 107, 108, 109, 124, 135, 138, 139, 140.
Red: 5, 21, 28, 28e, 28f, 32, 39, 61, 63, 65, 67, 68, 72, 72e, 83, 86, 86e, 111, 116, 126, 129.
Green: 22, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 82, 101, 102, 103, 104, 110, 121, 133, 143.
Grey: 4, 16, 16e, 25b, 29, 35, 44a, 62a, 62b, 64, 69, 70, 74, 75, 85, 117, 142, 144.
White: 20, 23b, 24b, 40, 42b, 66, 95, 97, 98, 118, 122, 122e, 128a, 131.
Yellow: 24a, 33, 43, 44b, 73, 81, 84, 99, 100, 115, 128b.
Brown: 14, 30, 89, 130, 137, 141.
Blue: 13, 17, 17e, 25a, 41, 42a, 112, 145.

Components

1. Direction indicators and side lights
2. Headlights
3. Horn
4. Foglight and spotlight
5. Ignition coil
6. Spark plugs
7. Distributor
8. Voltage regulator
9. Alternator
10. Starter
11. Battery
12. Fuse box

13. Temperature gauge, sending unit
14. Oil pressure switch
15. Back-up light switch
16. Stop lamp switch
17. Brake warning contact
18. Heater fan motor
19. Windshield washer pump
20. Wiper motor
21. Direction indicator repeater light
22. Brake warning light
23. Charge indicator light
24. Indicator light, oil pressure
25. High beam indicator light
26. Indicator light, fuel
27. Ignition and starter switch
28. Clock
29. Speedometer, odometer and trip meter
30. Temperature gauge
31. Fuel gauge
32. Tachometer
33. Flasher
34. Manoeuvre relay, light
35. Dimmer relay
36. Cigarette lighter
37. Spotlight switch
38. Fog light switch
39. Headlight switch
40. Instrument illumination rheostat
41. Heater fan switch
42. Courtesy light switch
43. Courtesy light with switch
44. Switch for windshield wiper, -washer and signal horn
45. Direction indicator switch with headlight flasher and dimmer switch
46. Fuel tank gauge
47. Back-up lights
48. Stop lights, direction indicators and tail lights
49. Number plate light
50. Trunk light



WIRING DIAGRAM, MONTE CARLO L.H.D., MODEL 1968

WIRING DIAGRAM DE LUXE USA, MODEL 1968

The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

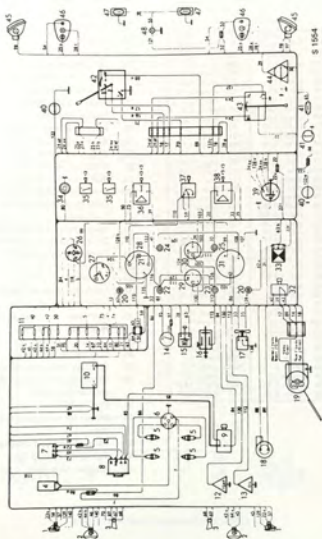
Wires

- Black: 7, 23a, 45, 46, 47, 49, 71, 80, 88, 88e, 105, 107, 108, 109, 124, 135, 138, 139, 140.
- Red: 5, 21, 28, 28e, 28f, 32, 39, 61, 63, 65, 67, 68, 72, 72e, 86, 86e, 111, 113, 116, 126, 129.
- Green: 22, 22e, 22f, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 101, 102, 103, 104, 110, 121, 133.
- Grey: 4, 16, 16e, 25b, 29, 35, 44a, 62a, 62b, 64, 69, 70, 74, 75, 85.
- White: 20, 23b, 24b, 24be, 24bf, 40, 42b, 66, 95, 97, 98, 99, 118, 122, 122e, 128a, 131.
- Yellow: 24a, 24ae, 24af, 33, 43, 44b, 73, 84, 115, 128b.
- Brown: 14, 30, 89, 130, 137, 137c.
- Blue: 13, 17, 17e, 25a, 41, 42a, 112.

Components

1. Direction indicators and side lights
2. Headlights
3. Horn
4. Ignition coil
5. Spark plugs
6. Distributor
7. Voltage regulator
8. Alternator
9. Starter
10. Battery
11. Fuse box

12. Temperature gauge, sending unit
13. Oil pressure switch
14. Back-up light switch
15. Stop light switch
16. Brake warning contact
17. Heater fan motor
18. Windshield washer pump
19. Wiper motor
20. Direction indicator repeater light
21. Brake warning light
22. Charge indicator light
23. Indicator light, oil pressure
24. High beam indicator light
25. Indicator light, fuel
26. Ignition and starter switch
27. Clock
28. Speedometer, odometer and trip meter
29. Temperature gauge
30. Fuel gauge
31. Tachometer
32. Dimmer switch
33. Flasher
34. Cigarette lighter
35. Switches for extra equipment
36. Headlight switch
37. Instrument illumination rheostat
38. Heater fan switch
39. Warning flasher switch
41. Courtesy light with switch
42. Switch for windshield wiper, washer and signal horn
43. Direction indicator switch with headlight flasher and dimmer switch
44. Fuel tank gauge
45. Back-up lights
46. Stop lights, direction indicators and tail lights
47. Number plate light
48. Trunk light



WIRING DIAGRAM, DE LUXE USA, MODEL 1968

WIRING DIAGRAM, SAAB 95 R.H.D., MODEL 1969

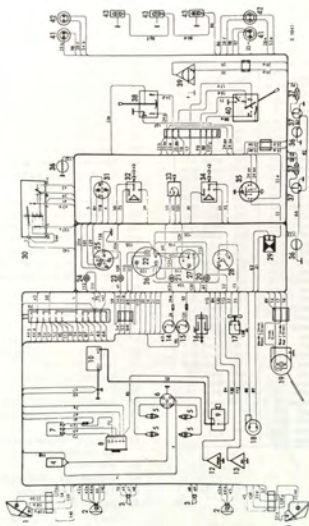
The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Wires

| No. | Color | Area mm ² | No. | Color | Area mm ² | No. | Color | Area mm ² |
|------|--------|----------------------|-----|--------|----------------------|------|--------|----------------------|
| 4 | grey | 1,5 | 43 | yellow | 2,5 | 86e | green | 0,75 |
| 5 | red | 1,5 | 44a | grey | 1,5 | 86f | green | 0,75 |
| 7 | black | 1,5 | 44b | yellow | 1,5 | 88 | black | 0,75 |
| 12 | blue | 0,75 | 45 | black | 1,5 | 88a | black | 0,75 |
| 14 | brown | 1,0 | 46 | black | 2,5 | 89 | brown | 0,75 |
| 16 | grey | 1,0 | 47 | black | 4,0 | 92 | red | 0,75 |
| 16e | grey | 1,0 | 49 | black | 1,0 | 95 | white | 1,5 |
| 17 | blue | 1,0 | 50 | green | 1,0 | 97 | white | 1,5 |
| 17e | blue | 1,0 | 53 | blue | 0,75 | 98 | white | 1,0 |
| 20 | white | 1,0 | 53a | blue | 0,75 | 101 | green | 0,75 |
| 21 | red | 1,0 | 54 | green | 0,75 | 104 | green | 0,75 |
| 22 | green | 1,0 | 54b | green | 0,75 | 105 | black | 0,75 |
| 22e | green | 1,0 | 57 | blue | 0,75 | 109 | black | 0,75 |
| 23a | yellow | 1,0 | 57a | blue | 0,75 | 110 | green | 0,75 |
| 23ae | yellow | 1,0 | 58 | green | 0,75 | 111 | red | 0,75 |
| 22b | white | 1,0 | 58b | green | 0,75 | 112 | blue | 1,0 |
| 22be | white | 1,0 | 59 | green | 0,75 | 113 | white | 0,75 |
| 24a | yellow | 0,75 | 60 | green | 0,75 | 115 | yellow | 0,75 |
| 24ae | yellow | 0,75 | 61 | red | 0,75 | 116 | red | 0,75 |
| 24b | white | 0,75 | 62 | grey | 0,75 | 118 | white | 1,0 |
| 24be | white | 0,75 | 63 | red | 0,75 | 122 | white | 0,75 |
| 25a | blue | 1,0 | 64 | grey | 0,75 | 124 | black | 0,75 |
| 25ae | blue | 1,0 | 65 | red | 0,75 | 125 | black | 0,75 |
| 25b | grey | 1,0 | 66 | white | 0,75 | 126 | white | 0,75 |
| 25be | grey | 1,0 | 67 | red | 1,5 | 129 | white | 0,75 |
| 28 | red | 1,0 | 68 | red | 1,0 | 130 | brown | 1,0 |
| 28e | red | 1,0 | 69 | black | 1,0 | 131 | white | 1,5 |
| 28f | red | 0,75 | 70 | black | 1,5 | 133 | green | 0,75 |
| 29 | grey | 0,75 | 71 | black | 1,5 | 135 | black | 0,75 |
| 29e | grey | 0,75 | 72 | red | 1,0 | 136 | black | 0,75 |
| 30 | brown | 0,75 | 72e | red | 1,0 | 137 | brown | 0,75 |
| 30e | brown | 0,75 | 73 | yellow | 1,0 | 137c | brown | 0,75 |
| 32 | red | 0,75 | 74 | grey | 4,0 | 138 | black | 1,0 |
| 33 | yellow | 1,0 | 75 | grey | 2,5 | 139 | black | 1,0 |
| 35 | grey | 1,0 | 82 | white | 0,75 | 139a | black | 1,0 |
| 39 | red | 2,5 | 83 | white | 0,75 | 139b | black | 1,0 |
| 41 | blue | 0,75 | 84 | yellow | 1,5 | 140 | black | 1,5 |
| 42a | blue | 1,5 | 85 | grey | 4,0 | 142 | grey | 1,5 |
| 42b | white | 2,5 | 86 | green | 0,75 | 144 | grey | 0,75 |

Components

1. Parking light and direction indicators
2. Headlights
3. Horn
4. Ignition coil
5. Spark plugs
6. Distributor
7. Voltage regulator
8. Alternator
9. Starter
10. Battery
11. Fuse box
12. Temperature transmitter
13. Oil pressure switch
14. Stop light switch
15. Back-up light switch
16. Brake warning contact
17. Heater fan motor
18. Windshield washer pump
19. Windshield wiper motor
20. Charge indicator light
21. Direction indicator repeater light
22. Brake warning light
23. High beam indicator light
24. Oil pressure warning light
25. Fuel gauge
26. Speedometer and odometer
27. Temperature gauge (coolant)
28. Clock (extra equipment)
29. Flasher unit
30. Dimmer relay
31. Ignition and starter switch
32. Headlight switch
33. Instrument illumination rheostat
34. Heater fan switch
35. Warning flasher switch
36. Courtesy light switch
37. Courtesy light with switch
38. Direction indicator switch with headlight flasher and dimmer switch
39. Fuel transmitter
40. Switch for windshield wiper, -washer and signal horn
41. Back-up light and direction indicators
42. Tail light and stop light
43. Number plate light



WIRING DIAGRAM, SAAB 95 R.H.D. MODEL 1969

WIRING DIAGRAM, SAAB 95 L.H.D., MODEL 1969

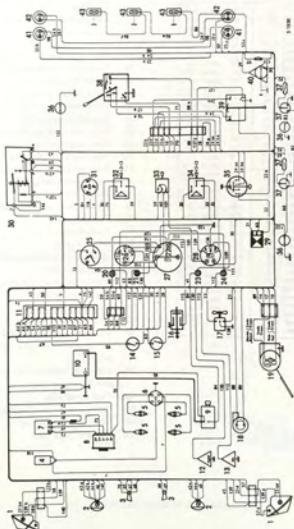
The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Wires

| No. | Color | Area mm ² | No. | Color | Area mm ² | No. | Color | Area mm ² |
|------|--------|----------------------|-----|--------|----------------------|------|--------|----------------------|
| 4 | grey | 1,5 | 45 | black | 1,5 | 88 | black | 0,75 |
| 5 | red | 1,5 | 46 | black | 2,5 | 88e | black | 0,75 |
| 7 | black | 1,5 | 47 | black | 4,0 | 89 | brown | 0,75 |
| 13 | blue | 0,75 | 49 | black | 1,0 | 92 | red | 0,75 |
| 14 | brown | 1,0 | 50 | green | 1,0 | 95 | white | 1,5 |
| 16 | grey | 1,0 | 53 | blue | 0,75 | 97 | white | 1,5 |
| 16e | grey | 1,0 | 53a | blue | 0,75 | 98 | white | 1,0 |
| 17 | blue | 1,0 | 54 | green | 0,75 | 101 | green | 0,75 |
| 17e | blue | 1,0 | 54b | green | 0,75 | 104 | green | 0,75 |
| 20 | white | 1,0 | 57 | blue | 0,75 | 105 | black | 0,75 |
| 21 | red | 1,0 | 57a | blue | 0,75 | 109 | black | 0,75 |
| 22 | green | 1,0 | 58 | green | 0,75 | 110 | green | 0,75 |
| 22e | green | 1,0 | 58b | green | 0,75 | 111 | red | 0,75 |
| 23a | yellow | 1,0 | 59 | green | 0,75 | 112 | blue | 1,0 |
| 23ae | yellow | 1,0 | 60 | green | 0,75 | 113 | white | 0,75 |
| 23b | white | 1,0 | 61 | red | 0,75 | 115 | yellow | 0,75 |
| 23be | white | 1,0 | 62 | grey | 0,75 | 116 | red | 0,75 |
| 24a | yellow | 0,75 | 63 | red | 0,75 | 118 | white | 1,0 |
| 24ae | yellow | 0,75 | 64 | grey | 0,75 | 122 | white | 0,75 |
| 24b | white | 0,75 | 65 | red | 0,75 | 124 | black | 0,75 |
| 24be | white | 0,75 | 66 | white | 0,75 | 125 | black | 0,75 |
| 25a | blue | 1,0 | 67 | red | 1,5 | 126 | white | 0,75 |
| 25b | grey | 1,0 | 68 | red | 1,0 | 129 | white | 0,75 |
| 26 | red | 1,0 | 69 | black | 1,0 | 130 | brown | 1,0 |
| 26e | red | 1,0 | 70 | black | 1,5 | 131 | white | 1,5 |
| 28f | red | 0,75 | 71 | black | 1,5 | 133 | green | 0,75 |
| 29 | grey | 0,75 | 72 | red | 1,0 | 135 | black | 0,75 |
| 30 | brown | 0,75 | 72a | red | 1,0 | 136 | black | 0,75 |
| 32 | red | 0,75 | 73 | yellow | 1,0 | 137 | brown | 0,75 |
| 33 | yellow | 1,0 | 74 | grey | 4,0 | 137c | brown | 0,75 |
| 35 | grey | 1,0 | 75 | grey | 2,5 | 138 | black | 1,0 |
| 39 | red | 2,5 | 82 | white | 0,75 | 139 | black | 1,5 |
| 41 | blue | 0,75 | 83 | white | 0,75 | 139a | black | 1,0 |
| 42a | blue | 1,5 | 84 | yellow | 1,5 | 139b | black | 1,0 |
| 42b | white | 2,5 | 85 | grey | 4,0 | 140 | black | 1,5 |
| 43 | yellow | 2,5 | 86 | green | 0,75 | 142 | grey | 1,5 |
| 44a | grey | 1,5 | 86e | green | 0,75 | 144 | grey | 0,75 |
| 44b | yellow | 1,5 | 86f | green | 0,75 | | | |

Components

1. Parking light and direction indicators
2. Headlights
3. Horn
4. Ignition coil
5. Spark plugs
6. Distributor
7. Voltage regulator
8. Alternator
9. Starter
10. Battery
11. Fuse box
12. Temperature transmitter
13. Oil pressure switch
14. Back-up light switch
15. Stop light switch
16. Brake warning contact
17. Heater fan motor
18. Windshield washer pump
19. Windshield wiper motor
20. Charge indicator light
21. Direction indicator repeater light
22. Brake warning light
23. High beam indicator light
24. Oil pressure warning light
25. Clock (extra equipment)
26. Temperature gauge (coolant)
27. Speedometer with odometer
28. Fuel gauge
29. Flasher unit
30. Dimmer relay
31. Ignition and starter switch
32. Headlight switch
33. Instrument illumination rheostat
34. Heater fan switch
35. Warning flasher switch
36. Courtesy light switch
37. Courtesy light with switch
38. Switch for windshield wiper, -washer and signal horn
39. Direction indicator switch with headlight flasher and dimmer switch
40. Fuel transmitter
41. Back-up light and direction indicators
42. Tail light and stop light
43. Number plate light



WIRING DIAGRAM, SAAB 95 L.H.D., MODEL 1969

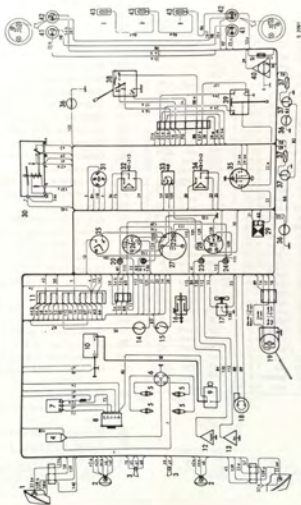
The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Wires

| No. | Color | Area mm ² | No. | Color | Area mm ² | No. | Color | Area mm ² |
|------|--------|----------------------|-----|--------|----------------------|------|--------|----------------------|
| 4 | grey | 1,5 | 46 | black | 2,5 | 88 | black | 0,75 |
| 5 | red | 1,5 | 47 | black | 4,0 | 89a | black | 0,75 |
| 7 | black | 1,5 | 48 | black | 1,0 | 89b | brown | 0,75 |
| 13 | blue | 0,75 | 50 | green | 1,0 | 92 | red | 0,75 |
| 14 | brown | 1,0 | 53 | blue | 0,75 | 95 | white | 1,5 |
| 16 | grey | 1,0 | 53a | blue | 0,75 | 97 | white | 1,5 |
| 16a | grey | 1,0 | 53b | green | 0,75 | 98 | white | 1,0 |
| 17 | blue | 1,0 | 54 | green | 0,75 | 101 | green | 0,75 |
| 17a | blue | 1,0 | 54a | green | 0,75 | 104 | green | 0,75 |
| 20 | white | 1,0 | 54b | green | 0,75 | 105 | black | 0,75 |
| 21 | red | 1,0 | 57 | blue | 0,75 | 106 | black | 0,75 |
| 22 | green | 1,0 | 57a | blue | 0,75 | 110 | green | 0,75 |
| 22a | green | 1,0 | 58 | green | 0,75 | 111 | red | 0,75 |
| 23a | yellow | 1,0 | 58b | green | 0,75 | 112 | blue | 1,0 |
| 23aa | yellow | 1,0 | 59 | green | 0,75 | 113 | white | 0,75 |
| 23b | white | 1,0 | 60 | green | 0,75 | 115 | yellow | 0,75 |
| 23ba | white | 1,0 | 61 | red | 0,75 | 116 | red | 0,75 |
| 24a | yellow | 0,75 | 62 | grey | 0,75 | 118 | white | 1,0 |
| 24aa | yellow | 0,75 | 63 | red | 0,75 | 122 | white | 0,75 |
| 24b | white | 0,75 | 64 | grey | 0,75 | 124 | black | 0,75 |
| 24ba | white | 0,75 | 65 | red | 0,75 | 125 | black | 0,75 |
| 25a | blue | 1,0 | 66 | white | 0,75 | 126 | white | 0,75 |
| 25b | grey | 1,0 | 67 | red | 1,5 | 129 | white | 0,75 |
| 28 | red | 1,0 | 68 | red | 1,0 | 130 | brown | 1,0 |
| 28a | red | 1,0 | 69 | black | 1,0 | 131 | white | 1,5 |
| 28f | red | 0,75 | 70 | black | 1,5 | 133 | green | 0,75 |
| 29 | grey | 0,75 | 71 | black | 1,5 | 135 | black | 0,75 |
| 30 | brown | 0,75 | 72 | red | 1,0 | 136 | black | 0,75 |
| 32 | red | 0,75 | 72a | red | 1,0 | 137 | green | 0,75 |
| 33 | yellow | 1,0 | 73 | yellow | 1,0 | 137a | brown | 0,75 |
| 35 | grey | 1,0 | 74 | grey | 4,0 | 138 | black | 1,0 |
| 39 | red | 2,5 | 75 | grey | 2,5 | 139 | black | 1,0 |
| 41 | blue | 0,75 | 82 | white | 0,75 | 139a | black | 1,0 |
| 42a | blue | 1,5 | 83 | white | 0,75 | 139b | black | 1,0 |
| 42b | white | 2,5 | 84 | yellow | 1,5 | 140 | black | 1,5 |
| 43 | yellow | 2,5 | 85 | grey | 4,0 | 142 | grey | 1,5 |
| 44a | grey | 1,5 | 86 | green | 0,75 | 144 | grey | 0,75 |
| 44b | yellow | 1,5 | 86a | green | 0,75 | | | |
| 45 | black | 1,5 | 86f | green | 0,75 | | | |

Components

1. Parking light and direction indicators
2. Headlights
3. Horn
4. Ignition coil
5. Spark plugs
6. Distributor
7. Voltage regulator
8. Alternator
9. Starter
10. Battery
11. Fuse box
12. Temperature transmitter
13. Oil pressure switch
14. Back-up light switch
15. Stop light switch
16. Brake warning contact
17. Heater fan motor
18. Windshield washer pump
19. Windshield wiper motor
20. Charge indicator light
21. Direction indicator repeater light
22. Brake warning light
23. High beam indicator light
24. Oil pressure warning light
25. Clock (extra equipment)
26. Temperature gauge
27. Speedometer and odometer
28. Fuel gauge
29. Flasher unit
30. Dimmer relay
31. Ignition and starter switch
32. Headlight switch
33. Instrument illumination rheostat
34. Heater fan switch
35. Warning flasher switch
36. Courtesy light switch
37. Courtesy light with switch
38. Switch for windshield wiper, washer and signal horn
39. Direction indicator switch with headlight flasher and dimmer switch
40. Fuel transmitter
41. Back-up light and direction indicators
42. Tail light and stop light
43. Number plate light



WIRING DIAGRAM, SAAB 95 USA, MODEL 1969

WIRING DIAGRAM, SAAB 96 R.H.D., MODEL 1969

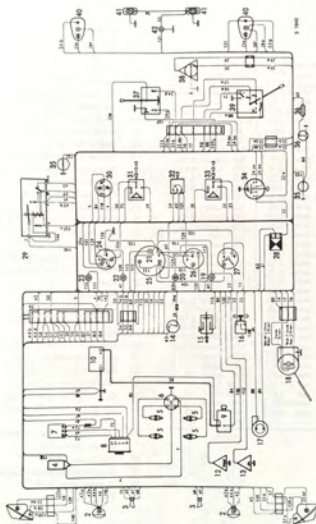
The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Wires

| No. | Color | Area mm ² | No. | Color | Area mm ² | No. | Color | Area mm ² |
|------|--------|----------------------|-----|--------|----------------------|------|--------|----------------------|
| 4 | grey | 1,5 | 42a | blue | 1,5 | 75 | grey | 2,5 |
| 5 | red | 1,5 | 42b | white | 2,5 | 84 | yellow | 1,5 |
| 7 | black | 1,5 | 43 | yellow | 2,5 | 85 | grey | 4,0 |
| 13 | blue | 0,75 | 44a | grey | 1,5 | 88 | black | 0,75 |
| 14 | brown | 1,0 | 44b | yellow | 1,5 | 88e | black | 0,75 |
| 16 | grey | 1,0 | 45 | black | 1,5 | 89 | brown | 0,75 |
| 16a | grey | 1,0 | 46 | black | 2,5 | 101 | green | 0,75 |
| 17 | blue | 1,0 | 47 | black | 4,0 | 104 | green | 0,75 |
| 17a | blue | 1,0 | 49 | black | 1,0 | 105 | black | 0,75 |
| 20 | white | 1,0 | 50 | green | 1,0 | 109 | black | 0,75 |
| 21 | red | 1,0 | 53 | blue | 0,75 | 110 | green | 0,75 |
| 22 | green | 1,0 | 53a | blue | 0,75 | 111 | red | 0,75 |
| 22a | green | 1,0 | 54 | green | 0,75 | 112 | blue | 1,0 |
| 23a | yellow | 1,0 | 54b | green | 0,75 | 113 | white | 0,75 |
| 23ae | yellow | 1,0 | 55 | green | 0,75 | 115 | yellow | 0,75 |
| 23b | white | 1,0 | 56 | green | 0,75 | 116 | red | 0,75 |
| 23be | white | 1,0 | 57 | blue | 0,75 | 118 | white | 1,0 |
| 24a | yellow | 0,75 | 57a | blue | 0,75 | 121 | green | 0,75 |
| 24ae | yellow | 0,75 | 58 | green | 0,75 | 122 | white | 0,75 |
| 24b | white | 0,75 | 58b | green | 0,75 | 124 | black | 0,75 |
| 24be | white | 0,75 | 59 | green | 0,75 | 125 | black | 0,75 |
| 25a | blue | 1,0 | 60 | green | 0,75 | 126 | white | 0,75 |
| 25ae | blue | 1,0 | 61 | red | 0,75 | 129 | white | 0,75 |
| 25b | grey | 1,0 | 62 | grey | 0,75 | 130 | brown | 1,0 |
| 25be | grey | 1,0 | 63 | red | 0,75 | 133 | green | 0,75 |
| 28 | red | 1,0 | 64 | grey | 0,75 | 135 | black | 0,75 |
| 28a | red | 1,0 | 65 | red | 0,75 | 136 | black | 0,75 |
| 28f | red | 0,75 | 66 | white | 0,75 | 137 | brown | 0,75 |
| 29 | grey | 0,75 | 67 | red | 1,5 | 137c | brown | 0,75 |
| 29a | grey | 0,75 | 68 | red | 1,0 | 138 | black | 1,0 |
| 30 | brown | 0,75 | 69 | black | 1,0 | 139 | black | 1,0 |
| 30e | brown | 0,75 | 70 | black | 1,5 | 139a | black | 1,0 |
| 32 | red | 0,75 | 71 | black | 1,5 | 139b | black | 1,0 |
| 33 | yellow | 1,0 | 72 | red | 1,0 | 140 | black | 1,5 |
| 35 | grey | 1,0 | 72a | red | 1,0 | 142 | grey | 1,5 |
| 39 | red | 2,5 | 73 | yellow | 1,0 | 144 | grey | 0,75 |
| 41 | blue | 0,75 | 74 | grey | 4,0 | | | |

Components

1. Parking light and direction indicators
2. Headlights
3. Horn
4. Ignition coil
5. Spark plugs
6. Distributor
7. Voltage regulator
8. Alternator
9. Starter
10. Battery
11. Fuse box
12. Temperature transmitter
13. Oil pressure switch
14. Stop light switch
15. Brake warning contact
16. Heater fan motor
17. Windshield washer pump
18. Windshield wiper motor
19. Charge indicator light
20. Direction indicator repeater light
21. Brake warning light
22. High beam indicator light
23. Oil pressure warning light
24. Fuel gauge
25. Speedometer with odometer
26. Temperature gauge (coolant)
27. Clock (De luxe only)
28. Flasher unit
29. Dimmer relay
30. Ignition and starter switch
31. Headlight switch
32. Instrument illumination rheostat
33. Heater fan switch
34. Warning flasher switch
35. Courtesy light switch
36. Courtesy light with switch
37. Direction indicator switch with headlight flasher and dimmer switch
38. Fuel transmitter
39. Switch for windshield wiper, -washer and signal horn
40. Stop lights, direction indicators and tail light
41. Number plate light
42. Trunk light



WIRING DIAGRAM, SAAB 96 R.H.D., MODEL 1969

WIRING DIAGRAM, SAAB 96 L.H.D., MODEL 1969

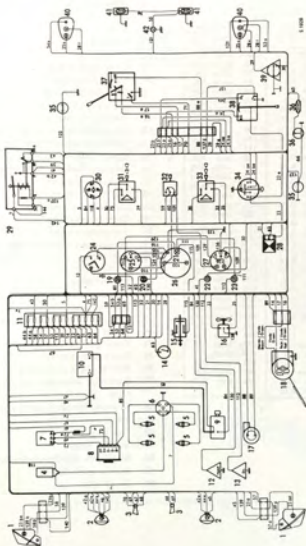
The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Wires

| No. | Color | Area mm ² | No. | Color | Area mm ² | No. | Color | Area mm ² |
|------|--------|----------------------|-----|--------|----------------------|------|--------|----------------------|
| 4 | grey | 1,5 | 43 | yellow | 2,5 | 75 | grey | 2,5 |
| 5 | red | 1,5 | 44a | grey | 1,5 | 84 | yellow | 1,5 |
| 7 | black | 1,5 | 44b | yellow | 1,5 | 85 | grey | 4,0 |
| 13 | blue | 0,75 | 45 | black | 1,5 | 88 | black | 0,75 |
| 14 | brown | 1,0 | 46 | black | 2,5 | 88e | black | 0,75 |
| 16 | grey | 1,0 | 47 | black | 4,0 | 89 | brown | 0,75 |
| 16a | grey | 1,0 | 49 | black | 1,0 | 101 | green | 0,75 |
| 17 | blue | 1,0 | 50 | green | 1,0 | 104 | green | 0,75 |
| 17e | blue | 1,0 | 53 | blue | 0,75 | 105 | black | 0,75 |
| 20 | white | 1,0 | 53a | blue | 0,75 | 109 | black | 0,75 |
| 21 | red | 1,0 | 54 | green | 0,75 | 110 | green | 0,75 |
| 22 | green | 1,0 | 54b | green | 0,75 | 111 | red | 0,75 |
| 22e | green | 1,0 | 55 | green | 0,75 | 112 | blue | 1,0 |
| 23a | yellow | 1,0 | 56 | green | 0,75 | 113 | white | 0,75 |
| 23ae | yellow | 1,0 | 57 | blue | 0,75 | 115 | yellow | 0,75 |
| 23b | white | 1,0 | 57a | blue | 0,75 | 116 | red | 0,75 |
| 23be | white | 1,0 | 58 | green | 0,75 | 118 | white | 1,0 |
| 24a | yellow | 0,75 | 58b | green | 0,75 | 121 | green | 0,75 |
| 24ae | yellow | 0,75 | 59 | green | 0,75 | 122 | white | 0,75 |
| 24b | white | 0,75 | 60 | green | 0,75 | 124 | black | 0,75 |
| 24be | white | 0,75 | 61 | red | 0,75 | 125 | black | 0,75 |
| 25a | blue | 1,0 | 62 | grey | 0,75 | 126 | white | 0,75 |
| 25b | grey | 1,0 | 63 | red | 0,75 | 129 | white | 0,75 |
| 26 | red | 1,0 | 64 | grey | 0,75 | 130 | brown | 1,0 |
| 26e | red | 1,0 | 65 | red | 0,75 | 133 | green | 0,75 |
| 28f | red | 0,75 | 66 | white | 0,75 | 136 | black | 0,75 |
| 29 | grey | 0,75 | 67 | red | 1,5 | 137 | brown | 0,75 |
| 30 | brown | 0,75 | 68 | red | 1,0 | 137e | brown | 0,75 |
| 32 | red | 0,75 | 69 | black | 1,0 | 138 | black | 1,0 |
| 33 | yellow | 1,0 | 70 | black | 1,5 | 139 | black | 1,5 |
| 35 | grey | 1,0 | 71 | black | 1,5 | 139a | black | 1,0 |
| 39 | red | 2,5 | 72 | red | 1,0 | 139b | black | 1,0 |
| 41 | blue | 0,75 | 72e | red | 1,0 | 140 | black | 1,5 |
| 42a | blue | 1,5 | 73 | yellow | 1,0 | 142 | grey | 1,5 |
| 42b | white | 2,5 | 74 | grey | 4,0 | 144 | grey | 0,75 |

Components

- Parking light and direction indicators
- Headlights
- Horn
- Ignition coil
- Spark plugs
- Distributor
- Voltage regulator
- Alternator
- Starter
- Battery
- Fuse box
- Temperature transmitter
- Oil pressure switch
- Stop light switch
- Brake warning contact
- Heater fan motor
- Windshield washer pump
- Windshield wiper motor
- Charge indicator light
- Direction indicator repeater light
- Brake warning light
- High beam indicator light
- Oil pressure warning light
- Clock (De luxe only)
- Temperature gauge (coolant)
- Speedometer with odometer
- Fuel gauge
- Flasher unit
- Dimmer relay
- Ignition and starter switch
- Headlight switch
- Instrument illumination rheostat
- Heater fan switch
- Warning flasher switch
- Courtesy light switch
- Courtesy light with switch
- Switch for windshield wiper, -washer and signal horn
- Direction indicator switch with headlight flasher and dimmer switch
- Fuel transmitter
- Stop lights, direction indicators and tail light
- Number plate light
- Trunk light



WIRING DIAGRAM, SAAB 96 L.H.D., MODEL 1969

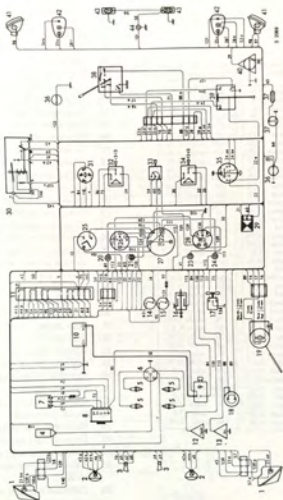
The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Wires

| No. | Color | Area mm ² | No. | Color | Area mm ² | No. | Color | Area mm ² |
|------|--------|-------------------------|-----|--------|-------------------------|------|--------|-------------------------|
| 4 | gray | 1.5 | 44b | yellow | 1.5 | 88e | black | 0.75 |
| 5 | red | 1.5 | 45 | black | 1.5 | 89 | brown | 0.75 |
| 7 | black | 1.5 | 46 | black | 2.5 | 95 | white | 1.5 |
| 13 | blue | 0.75 | 47 | black | 4.0 | 97 | white | 1.5 |
| 14 | brown | 1.0 | 49 | black | 1.0 | 98 | white | 1.0 |
| 16 | gray | 1.0 | 50 | green | 1.0 | 101 | green | 0.75 |
| 16e | gray | 1.0 | 53 | blue | 0.75 | 104 | green | 0.75 |
| 17 | blue | 1.0 | 53a | blue | 0.75 | 105 | black | 0.75 |
| 17e | blue | 1.0 | 54 | green | 0.75 | 109 | black | 0.75 |
| 20 | white | 1.0 | 54b | green | 0.75 | 110 | green | 0.75 |
| 21 | red | 1.0 | 55 | green | 0.75 | 111 | red | 0.75 |
| 22 | green | 1.0 | 56 | green | 0.75 | 112 | blue | 1.0 |
| 22e | green | 1.0 | 57 | blue | 0.75 | 113 | white | 0.75 |
| 23a | yellow | 1.0 | 57a | blue | 0.75 | 115 | yellow | 0.75 |
| 23ae | yellow | 1.0 | 58 | green | 0.75 | 116 | red | 0.75 |
| 23b | white | 1.0 | 58b | green | 0.75 | 118 | white | 1.0 |
| 23be | white | 1.0 | 59 | green | 0.75 | 121 | green | 0.75 |
| 24a | yellow | 0.75 | 60 | green | 0.75 | 122 | white | 0.75 |
| 24ae | yellow | 0.75 | 61 | red | 0.75 | 124 | black | 0.75 |
| 24b | white | 0.75 | 62 | gray | 0.75 | 125 | black | 0.75 |
| 24be | white | 0.75 | 63 | red | 0.75 | 126 | white | 0.75 |
| 25a | blue | 1.0 | 64 | gray | 0.75 | 129 | white | 0.75 |
| 25b | gray | 1.0 | 65 | red | 0.75 | 130 | brown | 1.0 |
| 28 | red | 1.0 | 66 | white | 0.75 | 131 | white | 1.5 |
| 28e | red | 1.0 | 67 | red | 1.5 | 133 | green | 0.75 |
| 28f | red | 0.75 | 68 | red | 1.0 | 135 | black | 0.75 |
| 29 | gray | 0.75 | 69 | black | 1.0 | 136 | black | 0.75 |
| 30 | brown | 0.75 | 70 | black | 1.5 | 137 | brown | 0.75 |
| 32 | red | 0.75 | 71 | black | 1.5 | 137c | brown | 0.75 |
| 33 | yellow | 1.0 | 72 | red | 1.0 | 138 | black | 1.0 |
| 35 | gray | 1.0 | 72e | red | 1.0 | 139 | black | 1.0 |
| 39 | red | 2.5 | 73 | yellow | 1.0 | 139a | black | 1.0 |
| 41 | blue | 0.75 | 74 | gray | 4.0 | 139b | black | 1.0 |
| 42a | blue | 1.5 | 75 | gray | 2.5 | 140 | black | 1.5 |
| 42b | white | 2.5 | 84 | yellow | 1.5 | 142 | gray | 1.5 |
| 43 | yellow | 2.5 | 85 | gray | 4.0 | 144 | gray | 0.75 |
| 44a | gray | 1.5 | 88 | black | 0.75 | | | |

Components

1. Parking light and direction indicators
2. Headlights
3. Horn
4. Ignition coil
5. Spark plugs
6. Distributor
7. Voltage regulator
8. Alternator
9. Starter
10. Battery
11. Fuse box
12. Temperature transmitter
13. Oil pressure switch
14. Stop light switch
15. Back-up light switch
16. Brake warning contact
17. Heater fan motor
18. Windshield washer pump
19. Windshield wiper motor
20. Charge indicator light
21. Direction indicator repeater light
22. Brake warning light
23. High beam indicator light
24. Oil pressure warning light
25. Clock (extra equipment)
26. Temperature gauge
27. Speedometer with odometer
28. Fuel gauge
29. Flasher unit
30. Dimmer relay
31. Ignition and starter switch
32. Headlight switch
33. Instrument illumination rheostat
34. Heater fan switch
35. Warning flasher switch
36. Courtesy light switch
37. Courtesy light with switch
38. Switch for windshield wiper, -washer and signal horn
39. Direction indicator switch with headlight flasher and dimmer switch
40. Fuel transmitter
41. Back-up lights
42. Stop lights, direction indicators and tail light
43. Number plate light
44. Trunk light



WIRING DIAGRAM, SAAB 96 USA, MODEL 1969

WIRING DIAGRAM, DE LUXE USA, MODEL 1969

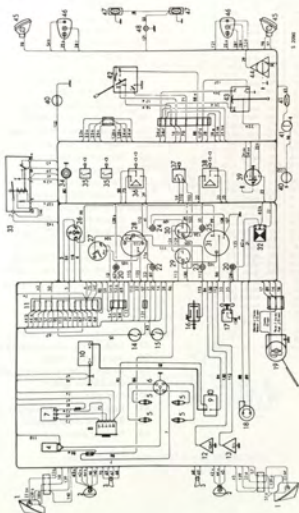
The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Wires

| No. | Color | Area mm ² | No. | Color | Area mm ² | No. | Color | Area mm ² |
|------|--------|----------------------|-----|--------|----------------------|------|--------|----------------------|
| 4 | grey | 1,5 | 45 | black | 1,5 | 89 | brown | 0,75 |
| 5 | red | 1,5 | 46 | black | 2,5 | 95 | white | 1,5 |
| 7 | black | 1,5 | 47 | black | 4,0 | 97 | white | 1,5 |
| 13 | blue | 0,75 | 48 | black | 1,0 | 98 | white | 1,0 |
| 14 | brown | 1,0 | 50 | green | 1,0 | 99 | white | 1,0 |
| 16 | grey | 1,0 | 53 | blue | 0,75 | 101 | green | 0,75 |
| 16a | grey | 1,0 | 53a | blue | 0,75 | 102 | green | 0,75 |
| 17 | blue | 1,0 | 54 | green | 0,75 | 103 | green | 0,75 |
| 17a | blue | 1,0 | 54b | green | 0,75 | 104 | green | 0,75 |
| 20 | white | 1,0 | 55 | green | 0,75 | 105 | black | 0,75 |
| 21 | red | 1,0 | 56 | green | 0,75 | 107 | black | 0,75 |
| 22 | green | 1,0 | 57 | blue | 0,75 | 108 | black | 0,75 |
| 22a | green | 1,0 | 57a | blue | 0,75 | 109 | black | 0,75 |
| 23a | yellow | 1,0 | 58 | green | 0,75 | 110 | green | 0,75 |
| 23aa | yellow | 1,0 | 58b | green | 0,75 | 111 | red | 0,75 |
| 23b | white | 1,0 | 59 | green | 0,75 | 112 | blue | 1,0 |
| 23ba | white | 1,0 | 61 | red | 0,75 | 113 | white | 0,75 |
| 24a | yellow | 0,75 | 62a | grey | 0,75 | 115 | yellow | 0,75 |
| 24aa | yellow | 0,75 | 62b | grey | 0,75 | 116 | red | 0,75 |
| 24af | yellow | 1,0 | 63 | red | 1,0 | 118 | white | 1,0 |
| 24b | white | 0,75 | 64 | grey | 0,75 | 121 | green | 0,75 |
| 24ba | white | 0,75 | 65 | red | 0,75 | 122 | white | 0,75 |
| 24bf | white | 1,0 | 66 | white | 0,75 | 124 | black | 0,75 |
| 25a | blue | 1,0 | 67 | red | 1,5 | 126 | white | 0,75 |
| 25b | grey | 1,0 | 68 | red | 1,0 | 128a | white | 0,75 |
| 26 | red | 1,0 | 69 | black | 1,0 | 128b | yellow | 0,75 |
| 26a | red | 1,0 | 70 | black | 1,5 | 129 | white | 0,75 |
| 26f | red | 0,75 | 71 | black | 1,5 | 130 | brown | 1,0 |
| 29 | grey | 0,75 | 72 | red | 1,0 | 131 | white | 1,5 |
| 30 | brown | 0,75 | 72a | red | 1,0 | 133 | green | 0,75 |
| 32 | red | 0,75 | 73 | yellow | 1,0 | 135 | black | 0,75 |
| 33 | yellow | 1,0 | 74 | grey | 4,0 | 137 | brown | 0,75 |
| 35 | grey | 1,0 | 75 | grey | 2,5 | 137a | brown | 0,75 |
| 39 | red | 2,5 | 80 | black | 1,5 | 138 | black | 1,0 |
| 41 | blue | 0,75 | 84 | yellow | 1,5 | 139 | black | 1,0 |
| 42a | white | 1,5 | 85 | grey | 4,0 | 139a | black | 1,0 |
| 42b | white | 2,5 | 86 | red | 1,0 | 139b | black | 1,0 |
| 43 | yellow | 2,5 | 86a | red | 1,0 | 140 | black | 1,5 |
| 44a | grey | 1,5 | 88 | black | 0,75 | 142 | grey | 1,5 |
| 44b | yellow | 1,5 | 88a | black | 0,75 | 144 | grey | 0,75 |

Components

- Parking light and direction indicators
- Headlights
- Horn
- Ignition coil
- Spark plugs
- Distributor
- Voltage regulator
- Alternator
- Starter
- Battery
- Fuse box
- Temperature transmitter
- Oil pressure switch
- Back-up light switch
- Stop light switch
- Brake warning contact
- Heater fan motor
- Windshield washer pump
- Windshield wiper motor
- Direction indicator repeater light
- Brake warning light
- Charge indicator light
- Oil pressure warning light
- High beam indicator light
- Indicator light, fuel
- Ignition and starter switch
- Electric clock
- Speedometer, odometer and trip meter
- Temperature gauge
- Fuel gauge
- Tachometer
- Flasher unit
- Dimmer relay
- Cigarette lighter
- Switches for extra equipment
- Headlight switch
- Instrument illumination rheostat
- Heater fan switch
- Warning flasher switch
- Courtesy light switch
- Courtesy light with switch
- Switch for windshield wiper, -washer and signal horn
- Direction indicator switch with headlight flasher and dimmer switch
- Fuel transmitter
- Back-up lights
- Stop lights, direction indicators and tail lights
- Number plate light
- Trunk light



WIRING DIAGRAM, DE LUXE USA, MODEL 1969

WIRING DIAGRAM, SAAB 95 R.H.D., MODEL 1970

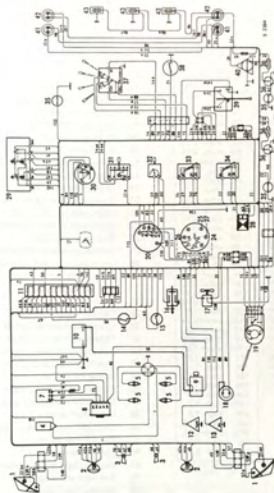
The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Wires

| No. | Color | Area mm ² | No. | Color | Area mm ² | No. | Color | Area mm ² |
|------|--------|----------------------|-----|--------|----------------------|------|--------|----------------------|
| 4 | grey | 1,5 | 32 | red | 0,75 | 74 | grey | 4,0 |
| 5 | red | 1,5 | 33 | yellow | 1,0 | 75 | red | 1,0 |
| 7 | green | 1,5 | 35 | grey | 1,0 | 76 | grey | 1,0 |
| 13 | blue | 0,75 | 39 | yellow | 0,75 | 82 | white | 0,75 |
| 14 | brown | 1,0 | 41 | blue | 0,75 | 83 | white | 0,75 |
| 14a | brown | 1,0 | 42a | blue | 1,5 | 84 | yellow | 1,5 |
| 14f | brown | 1,0 | 42b | white | 2,5 | 85 | grey | 4,0 |
| 15 | red | 1,0 | 43 | yellow | 2,5 | 86 | green | 0,75 |
| 15a | red | 1,0 | 44a | grey | 1,5 | 86a | green | 0,75 |
| 16 | grey | 1,0 | 44b | yellow | 1,5 | 86f | green | 0,75 |
| 16a | grey | 1,0 | 45 | black | 1,5 | 88 | black | 0,75 |
| 17 | blue | 1,0 | 46 | black | 2,5 | 88a | black | 0,75 |
| 17a | blue | 1,0 | 47 | black | 4,0 | 89 | brown | 0,75 |
| 18 | black | 1,0 | 49 | black | 1,0 | 92 | red | 0,75 |
| 20 | white | 1,0 | 50 | green | 1,0 | 95 | white | 1,5 |
| 21 | red | 1,0 | 53 | blue | 0,75 | 97 | white | 1,5 |
| 22 | green | 1,0 | 53a | blue | 0,75 | 98 | white | 1,5 |
| 22a | green | 1,0 | 54 | green | 0,75 | 101 | green | 0,75 |
| 23a | yellow | 1,0 | 54b | green | 0,75 | 109 | black | 0,75 |
| 23aa | yellow | 1,0 | 57 | blue | 0,75 | 110 | green | 0,75 |
| 23b | white | 1,0 | 57a | blue | 0,75 | 111 | red | 0,75 |
| 23aa | white | 1,0 | 58 | green | 0,75 | 112 | blue | 1,0 |
| 24a | yellow | 1,0 | 58b | green | 0,75 | 115 | yellow | 0,75 |
| 24aa | yellow | 1,0 | 59 | green | 0,75 | 118 | white | 1,0 |
| 24b | white | 1,0 | 60 | green | 0,75 | 122 | white | 0,75 |
| 24ba | white | 1,0 | 61 | red | 0,75 | 130 | brown | 1,0 |
| 25a | blue | 1,0 | 62 | grey | 0,75 | 131 | white | 1,5 |
| 25aa | blue | 1,0 | 63 | red | 1,0 | 136 | black | 1,0 |
| 25b | grey | 1,0 | 64 | grey | 0,75 | 138 | black | 1,0 |
| 25ba | grey | 1,0 | 65 | red | 0,75 | 139 | black | 1,5 |
| 28 | red | 1,0 | 66 | white | 0,75 | 139a | black | 1,0 |
| 28a | red | 1,0 | 67 | red | 1,5 | 139b | black | 1,0 |
| 28f | red | 0,75 | 68 | red | 1,0 | 140 | black | 1,5 |
| 29 | grey | 0,75 | 69 | black | 1,0 | 141 | brown | 0,75 |
| 29a | green | 0,75 | 70 | black | 1,5 | 141a | brown | 0,75 |
| 29f | grey | 0,75 | 71 | black | 1,5 | 142 | grey | 2,5 |
| 30a | brown | 0,75 | 72 | red | 1,0 | 147 | black | 0,75 |
| 30f | brown | 0,75 | 73 | yellow | 1,0 | | | |

Components

- Parking light and direction indicators
- Headlights
- Horn
- Ignition coil
- Spark plugs
- Distributor
- Voltage regulator
- Alternator
- Starter
- Battery
- Fuse box
- Temperature transmitter
- Oil pressure switch
- Back-up light switch
- Stop light switch
- Brake warning contact
- Heater fan motor
- Windshield washer pump
- Windshield wiper motor
- Speedometer and odometer
- High beam indicator light
- Direction indicator repeater light
- Brake warning light
- Temperature and fuel gauges
- Indicator light, fuel amount
- Oil pressure warning light
- Charge indicator light
- Flasher unit
- Dimmer relay
- Ignition and starter switch
- Hazard warning flasher switch
- Instrument illumination rheostat
- Headlight switch
- Heater fan switch
- Courtesy light switch
- Courtesy light with switch
- Switch for windshield wiper, and washer
- Signal horn contact
- Direction indicator switch with headlight flasher and dimmer switch
- Fuel transmitter
- Back-up light and direction indicators
- Tail light and stop light
- Number plate light



WIRING DIAGRAM, SAAB 95 L.H.D., MODEL 1970

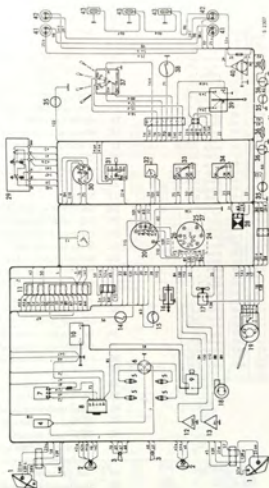
The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Wires

| No. | Color | Area mm ² | No. | Color | Area mm ² | No. | Color | Area mm ² |
|-----|--------|----------------------|-----|--------|----------------------|------|--------|----------------------|
| 4 | grey | 1,5 | 35 | grey | 1,0 | 74 | grey | 4,0 |
| 5 | red | 1,5 | 39 | yellow | 0,75 | 75 | red | 1,0 |
| 7 | green | 1,5 | 41 | blue | 0,75 | 76 | grey | 1,0 |
| 13 | blue | 0,75 | 42a | blue | 1,5 | 82 | white | 0,75 |
| 14 | brown | 1,0 | 42b | white | 2,5 | 83 | white | 0,75 |
| 14a | brown | 1,0 | 43 | yellow | 2,5 | 84 | yellow | 1,5 |
| 14f | brown | 1,0 | 44a | grey | 1,5 | 85 | grey | 4,0 |
| 15 | red | 1,0 | 44b | yellow | 1,5 | 86 | green | 0,75 |
| 15a | red | 1,0 | 45 | black | 1,5 | 86a | green | 0,75 |
| 16 | grey | 1,0 | 46 | black | 2,5 | 86f | green | 0,75 |
| 16a | grey | 1,0 | 47 | black | 4,0 | 88 | black | 0,75 |
| 17 | blue | 1,0 | 49 | black | 1,0 | 88a | black | 0,75 |
| 17a | blue | 1,0 | 50 | green | 1,0 | 89 | brown | 0,75 |
| 18 | black | 1,0 | 53 | blue | 0,75 | 92 | red | 0,75 |
| 20 | white | 1,0 | 53a | blue | 0,75 | 95 | white | 1,5 |
| 21 | red | 1,0 | 54 | green | 0,75 | 97 | white | 1,5 |
| 22 | green | 1,0 | 54b | green | 0,75 | 98 | white | 1,0 |
| 22a | green | 1,0 | 57 | blue | 0,75 | 101 | green | 0,75 |
| 22a | yellow | 1,0 | 57a | blue | 0,75 | 109 | black | 0,75 |
| 23a | yellow | 1,0 | 58 | green | 0,75 | 110 | green | 0,75 |
| 23b | white | 1,0 | 58b | green | 0,75 | 111 | red | 0,75 |
| 23b | white | 1,0 | 59 | green | 0,75 | 112 | blue | 1,0 |
| 24a | yellow | 1,0 | 60 | green | 0,75 | 115 | yellow | 0,75 |
| 24a | yellow | 1,0 | 61 | red | 0,75 | 118 | white | 1,0 |
| 24b | white | 1,0 | 62 | grey | 0,75 | 122 | white | 0,75 |
| 24b | white | 1,0 | 63 | red | 1,0 | 130 | brown | 1,0 |
| 25a | blue | 1,0 | 64 | grey | 0,75 | 131 | white | 1,5 |
| 25b | grey | 1,0 | 65 | red | 0,75 | 136 | black | 1,0 |
| 28 | red | 1,0 | 66 | white | 0,75 | 138 | black | 1,0 |
| 28a | red | 1,0 | 67 | red | 1,5 | 139 | black | 1,5 |
| 28f | red | 0,75 | 68 | red | 1,0 | 139a | black | 1,0 |
| 29 | grey | 0,75 | 69 | black | 1,0 | 139b | black | 1,0 |
| 29a | green | 0,75 | 70 | black | 1,5 | 140 | black | 1,5 |
| 30 | brown | 0,75 | 71 | black | 1,5 | 141 | brown | 0,75 |
| 30a | brown | 0,75 | 72 | red | 1,0 | 141a | brown | 0,75 |
| 32 | red | 0,75 | 72a | red | 1,0 | 142 | grey | 2,5 |
| 33 | yellow | 1,0 | 73 | yellow | 1,0 | 147 | black | 0,75 |

Components

- Parking light and direction indicators
- Headlights
- Horn
- Ignition coil
- Spark plugs
- Distributor
- Voltage regulator
- Alternator
- Starter
- Battery
- Fuse box
- Temperature transmitter
- Oil pressure switch
- Back-up light switch
- Stop light switch
- Brake warning contact
- Heater fan motor
- Windshield washer pump
- Windshield wiper motor
- Speedometer and odometer
- High beam indicator light
- Direction indicator repeater light
- Brake warning light
- Temperature and fuel gauges
- Indicator light, fuel amount
- Oil pressure warning light
- Charge indicator light
- Flasher unit
- Dimmer relay
- Ignition and starter switch
- Hazard warning flasher switch
- Instrument illumination rheostat
- Headlight and parking light switch
- Heater fan switch
- Courtesy light with switch
- Switch for windshield wiper, and washer
- Signal horn contact
- Direction indicator switch with headlight flasher and dimmer switch
- Fuel transmitter
- Back-up light and direction indicators
- Tail light and stop light
- Number plate light



WIRING DIAGRAM, SAAB 95 L.H.D., MODEL 1970

WIRING DIAGRAM, SAAB 95 USA, MODEL 1970

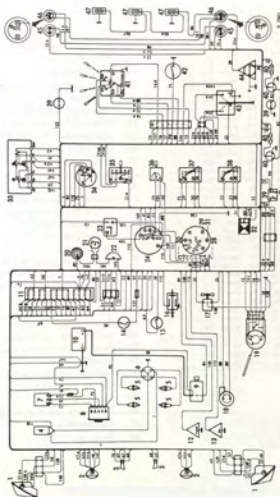
The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Wires

| No. | Color | Area mm ² | No. | Color | Area mm ² | No. | Color | Area mm ² |
|-----|--------|----------------------|-----|--------|----------------------|------|--------|----------------------|
| 4 | grey | 1,5 | 42a | blue | 1,5 | 82 | white | 0,75 |
| 5 | red | 1,5 | 42b | white | 2,5 | 83 | white | 0,75 |
| 7 | green | 1,5 | 43 | yellow | 2,5 | 84 | yellow | 1,5 |
| 13 | blue | 0,75 | 44a | grey | 1,5 | 85 | grey | 4,0 |
| 14 | brown | 1,0 | 44b | yellow | 1,5 | 86 | green | 0,75 |
| 14a | brown | 1,0 | 45 | black | 1,5 | 86a | green | 0,75 |
| 14b | brown | 1,0 | 46 | black | 2,5 | 86b | green | 0,75 |
| 15 | red | 1,0 | 47 | black | 4,0 | 88 | black | 0,75 |
| 15a | red | 1,0 | 49 | black | 1,0 | 88a | black | 0,75 |
| 16 | grey | 1,0 | 50 | green | 1,0 | 89 | brown | 0,75 |
| 16a | grey | 1,0 | 53 | blue | 0,75 | 92 | red | 0,75 |
| 17 | blue | 1,0 | 53a | blue | 0,75 | 95 | white | 1,5 |
| 17a | blue | 1,0 | 53b | green | 0,75 | 97 | white | 1,5 |
| 18 | black | 1,0 | 54 | green | 0,75 | 98 | white | 1,0 |
| 20 | white | 1,0 | 54b | green | 0,75 | 101 | green | 0,75 |
| 21 | red | 1,0 | 54c | green | 0,75 | 104 | green | 0,75 |
| 22 | green | 1,0 | 57 | blue | 0,75 | 105 | black | 0,75 |
| 22a | green | 1,0 | 57a | blue | 0,75 | 109 | black | 0,75 |
| 23a | yellow | 1,0 | 58 | green | 0,75 | 110 | green | 0,75 |
| 23b | yellow | 1,0 | 58b | green | 0,75 | 111 | red | 0,75 |
| 23c | white | 1,0 | 59 | green | 0,75 | 112 | blue | 1,0 |
| 23d | white | 1,0 | 60 | green | 0,75 | 115 | yellow | 0,75 |
| 24a | yellow | 1,0 | 61 | red | 0,75 | 118 | white | 1,0 |
| 24b | yellow | 1,0 | 62 | grey | 0,75 | 122 | white | 0,75 |
| 24c | white | 1,0 | 63 | red | 1,0 | 130 | brown | 1,0 |
| 24d | white | 1,0 | 64 | grey | 0,75 | 131 | white | 1,5 |
| 25a | blue | 1,0 | 65 | red | 0,75 | 136 | black | 1,0 |
| 25b | grey | 1,0 | 66 | white | 0,75 | 138 | black | 1,0 |
| 26 | red | 1,0 | 67 | red | 1,5 | 139 | black | 1,5 |
| 26a | red | 1,0 | 68 | red | 1,0 | 139a | black | 1,0 |
| 26b | red | 0,75 | 69 | black | 1,0 | 139b | black | 1,0 |
| 29 | grey | 0,75 | 70 | black | 1,5 | 140 | black | 1,5 |
| 29a | green | 0,75 | 71 | black | 1,5 | 141 | brown | 0,75 |
| 30 | brown | 0,75 | 72 | red | 1,0 | 141a | brown | 0,75 |
| 30a | brown | 0,75 | 72a | red | 1,0 | 142 | grey | 2,5 |
| 32 | red | 0,75 | 73 | yellow | 1,0 | 147 | black | 0,75 |
| 33 | yellow | 1,0 | 74 | grey | 4,0 | 190 | yellow | 0,75 |
| 35 | grey | 1,0 | 75 | red | 1,0 | 191 | grey | 0,75 |
| 39 | yellow | 0,75 | 76 | grey | 1,0 | 192 | black | 0,75 |
| 41 | blue | 0,75 | 80 | black | 1,0 | | | |

Components

- Parking light and direction indicators
- Headlights
- Horn
- Ignition coil
- Spark plugs
- Distributor
- Voltage regulator
- Alternator
- Starter
- Battery
- Fuse box
- Temperature transmitter
- Oil pressure switch
- Back-up light switch
- Stop light switch
- Brake warning contact
- Heater fan motor
- Windshield washer pump
- Windshield wiper motor
- Cigarette lighter
- Contact for warning buzzer
- Buzzer
- Clock
- Speedometer and odometer
- High beam indicator light
- Direction indicator repeater light
- Brake warning light
- Temperature and fuel gauges
- Indicator light, fuel amount
- Oil pressure warning light
- Charge indicator light
- Flasher unit
- Dimmer relay
- Ignition and starter switch
- Hazard warning flasher switch
- Instrument illumination rheostat
- Headlight switch
- Heater fan switch
- Dome lamp switch
- Dome lamp with switch
- Switch for windshield wiper, and washer
- Signal horn contact
- Direction indicator switch with headlight flasher and dimmer switch
- Fuel transmitter
- Back-up light and direction indicators
- Tail light and stop light
- Number plate light



WIRING DIAGRAM, SAAB 95 USA, MODEL 1970

WIRING DIAGRAM, SAAB 96 R.H.D., MODEL 1970

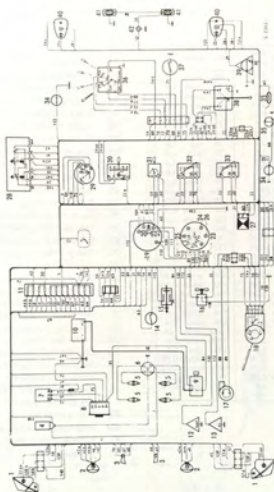
The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Wires

| No. | Color | Area mm ² | No. | Color | Area mm ² | No. | Color | Area mm ² |
|-----|--------|----------------------|-----|--------|----------------------|------|--------|----------------------|
| 4 | grey | 1,5 | 30 | brown | 0,75 | 67 | red | 1,5 |
| 5 | red | 1,5 | 30a | brown | 0,75 | 68 | red | 1,0 |
| 7 | green | 1,5 | 30f | brown | 0,75 | 69 | black | 1,0 |
| 13 | blue | 0,75 | 32 | red | 0,75 | 70 | black | 1,5 |
| 14 | brown | 1,0 | 33 | yellow | 1,0 | 71 | black | 1,5 |
| 14a | brown | 1,0 | 35 | grey | 1,0 | 72 | red | 1,0 |
| 14f | brown | 1,0 | 39 | yellow | 0,75 | 72a | red | 1,0 |
| 15 | red | 1,0 | 41 | blue | 0,75 | 73 | yellow | 1,0 |
| 15a | red | 1,0 | 42a | blue | 1,5 | 74 | grey | 4,0 |
| 16 | grey | 1,0 | 42b | white | 2,5 | 75 | red | 1,0 |
| 16a | grey | 1,0 | 43 | yellow | 2,5 | 76 | grey | 1,0 |
| 17 | blue | 1,0 | 44a | grey | 1,5 | 84 | yellow | 1,5 |
| 17a | blue | 1,0 | 44b | yellow | 1,5 | 85 | grey | 4,0 |
| 18 | black | 1,0 | 45 | black | 1,5 | 86 | black | 0,75 |
| 20 | white | 1,0 | 46 | black | 2,5 | 86a | black | 0,75 |
| 21 | red | 1,0 | 47 | black | 4,0 | 89 | brown | 0,75 |
| 22 | green | 1,0 | 49 | black | 1,0 | 101 | green | 0,75 |
| 22a | green | 1,0 | 50 | green | 1,0 | 109 | black | 0,75 |
| 22a | yellow | 1,0 | 53 | blue | 0,75 | 110 | green | 0,75 |
| 23a | yellow | 1,0 | 53a | blue | 0,75 | 111 | red | 0,75 |
| 23b | white | 1,0 | 54 | green | 0,75 | 112 | blue | 1,0 |
| 23b | white | 1,0 | 54b | green | 0,75 | 115 | yellow | 0,75 |
| 24a | yellow | 1,0 | 55 | green | 0,75 | 118 | white | 1,0 |
| 24a | yellow | 1,0 | 56 | black | 0,75 | 121 | green | 0,75 |
| 24b | white | 1,0 | 57 | blue | 0,75 | 122 | white | 0,75 |
| 24b | white | 1,0 | 57a | blue | 0,75 | 130 | brown | 1,0 |
| 25a | blue | 1,0 | 58 | green | 0,75 | 136 | black | 1,0 |
| 25a | blue | 1,0 | 58b | green | 0,75 | 138 | black | 1,0 |
| 25b | grey | 1,0 | 59 | green | 0,75 | 139 | black | 1,5 |
| 25b | grey | 1,0 | 60 | green | 0,75 | 139a | black | 1,0 |
| 28 | red | 1,0 | 61 | red | 0,75 | 139b | black | 1,0 |
| 28a | red | 1,0 | 62 | grey | 0,75 | 140 | black | 1,5 |
| 28f | red | 0,75 | 63 | red | 1,0 | 141 | brown | 0,75 |
| 29 | grey | 0,75 | 64 | grey | 0,75 | 141a | brown | 0,75 |
| 29a | green | 0,75 | 65 | red | 0,75 | 142 | grey | 2,5 |
| 29f | grey | 0,75 | 66 | white | 0,75 | 147 | black | 0,75 |

Components

- Parking light and direction indicators
- Headlights
- Horn
- Ignition coil
- Spark plugs
- Distributor
- Voltage regulator
- Alternator
- Starter
- Battery
- Fuse box
- Temperature transmitter
- Oil pressure switch
- Stop light switch
- Brake warning contact
- Heater fan motor
- Windshield washer pump
- Windshield wiper motor
- Speedometer with odometer
- High beam indicator light
- Direction indicator repeater light
- Brake warning light
- Temperature and fuel gauges
- Indicator light, fuel amount
- Oil pressure warning light
- Charge indicator light
- Flasher unit
- Dimmer relay
- Ignition and starter switch
- Hazard warning flasher switch
- Instrument illumination rheostat
- Headlight switch
- Heater fan switch
- Courtesy light switch
- Courtesy light with switch
- Switch for windshield wiper, and washer
- Signal horn contact
- Direction indicator switch with headlight flasher and dimmer switch
- Fuel transmitter
- Stop lights, direction indicators and tail light
- Number plate light
- Trunk light



WIRING DIAGRAM, SAAB 96 R.H.D., MODEL 1970

WIRING DIAGRAM, SAAB 96 L.H.D., MODEL 1970

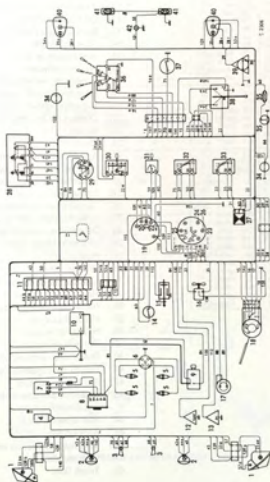
The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Wires

| No. | Color | Area mm ² | No. | Color | Area mm ² | No. | Color | Area mm ² |
|------|--------|----------------------|-----|--------|----------------------|------|--------|----------------------|
| 4 | grey | 1,5 | 32 | red | 0,75 | 69 | black | 1,0 |
| 5 | red | 1,5 | 33 | yellow | 1,0 | 70 | black | 1,5 |
| 7 | green | 1,5 | 35 | grey | 1,0 | 71 | black | 1,5 |
| 13 | blue | 0,75 | 39 | yellow | 0,75 | 72 | red | 1,0 |
| 14 | brown | 1,0 | 41 | blue | 0,75 | 72a | red | 1,0 |
| 14a | brown | 1,0 | 42a | blue | 1,5 | 73 | yellow | 1,0 |
| 14f | brown | 1,0 | 42b | white | 2,5 | 74 | grey | 4,0 |
| 15 | red | 1,0 | 43 | yellow | 2,5 | 75 | red | 1,0 |
| 15e | red | 1,0 | 44a | grey | 1,5 | 75 | grey | 1,0 |
| 16 | grey | 1,0 | 44b | yellow | 1,5 | 84 | yellow | 1,5 |
| 16a | grey | 1,0 | 45 | black | 1,5 | 85 | grey | 4,0 |
| 17 | blue | 1,0 | 46 | black | 2,5 | 88 | black | 0,75 |
| 17a | blue | 1,0 | 47 | black | 4,0 | 88a | black | 0,75 |
| 18 | black | 1,0 | 49 | black | 1,0 | 89 | brown | 0,75 |
| 20 | white | 1,0 | 50 | green | 1,0 | 101 | green | 0,75 |
| 21 | red | 1,0 | 53 | blue | 0,75 | 109 | black | 0,75 |
| 22 | green | 1,0 | 53a | blue | 0,75 | 110 | green | 0,75 |
| 22a | green | 1,0 | 54 | green | 0,75 | 111 | red | 0,75 |
| 22a | yellow | 1,0 | 54b | green | 0,75 | 112 | blue | 1,0 |
| 22ae | yellow | 1,0 | 55 | green | 0,75 | 115 | yellow | 0,75 |
| 22b | white | 1,0 | 56 | black | 0,75 | 118 | white | 1,0 |
| 22be | white | 1,0 | 57 | blue | 0,75 | 121 | green | 0,75 |
| 24a | yellow | 1,0 | 57a | blue | 0,75 | 122 | white | 0,75 |
| 24ae | yellow | 1,0 | 58 | green | 0,75 | 130 | brown | 1,0 |
| 24b | white | 1,0 | 58b | green | 0,75 | 136 | black | 1,0 |
| 24be | white | 1,0 | 59 | green | 0,75 | 138 | black | 1,0 |
| 25a | blue | 1,0 | 60 | green | 0,75 | 139 | black | 1,5 |
| 25b | grey | 1,0 | 61 | red | 0,75 | 139a | black | 1,0 |
| 28 | red | 1,0 | 62 | grey | 0,75 | 139b | black | 1,0 |
| 28e | red | 1,0 | 63 | red | 1,0 | 140 | black | 1,5 |
| 28f | red | 0,75 | 64 | grey | 0,75 | 141 | brown | 0,75 |
| 29 | grey | 0,75 | 65 | red | 0,75 | 141a | brown | 0,75 |
| 29e | grey | 0,75 | 66 | white | 0,75 | 142 | grey | 2,5 |
| 30 | brown | 0,75 | 67 | red | 1,5 | 147 | black | 0,75 |
| 30e | brown | 0,75 | 68 | red | 1,0 | | | |

Components

- Parking light and direction indicators
- Headlights
- Horn
- Ignition coil
- Spark plugs
- Distributor
- Voltage regulator
- Alternator
- Starter
- Battery
- Fuse box
- Temperature transmitter
- Oil pressure switch
- Stop light switch
- Brake warning contact
- Heater fan motor
- Windshield washer pump
- Windshield wiper motor
- Speedometer with odometer
- High beam indicator light
- Direction indicator repeater light
- Brake warning light
- Temperature and fuel gauges
- Indicator light, fuel amount
- Oil pressure warning light
- Flasher unit
- Dimmer relay
- Ignition and starter switch
- Hazard warning flasher switch
- Instrument illumination rheostat
- Headlight and parking light switch
- Heater fan switch
- Courtesy light with switch
- Switch for windshield wiper, and washer
- Signal horn contact
- Direction indicator switch with headlight flasher and dimmer switch
- Fuel transmitter
- Stop lights, direction indicators and tail light
- Number plate light
- Trunk light



WIRING DIAGRAM, SAAB 96 L.K.D., MODEL 1970

WIRING DIAGRAM, SAAB 96 USA, MODEL 1970

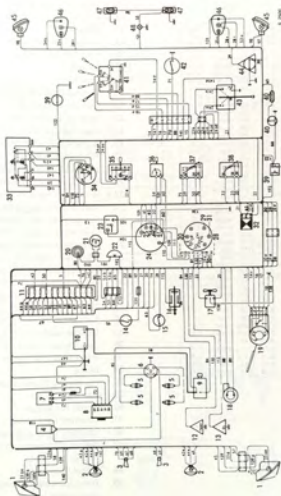
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Wires

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| 5 | red | 1,5 | 41 | blue | 0,75 | 75 | red | 1,0 |
| 7 | green | 1,5 | 42a | blue | 1,5 | 76 | grey | 1,0 |
| 13 | blue | 0,75 | 42b | white | 2,5 | 80 | black | 1,0 |
| 14 | brown | 1,0 | 43 | yellow | 2,5 | 84 | yellow | 1,5 |
| 14a | brown | 1,0 | 44a | grey | 1,5 | 85 | grey | 4,0 |
| 14f | brown | 1,0 | 44b | yellow | 1,5 | 88 | black | 0,75 |
| 15 | red | 1,0 | 45 | black | 1,5 | 88a | black | 0,75 |
| 15a | red | 1,0 | 46 | black | 2,5 | 89 | brown | 0,75 |
| 16 | grey | 1,0 | 47 | black | 4,0 | 95 | white | 1,5 |
| 16a | grey | 1,0 | 49 | black | 1,0 | 97 | white | 1,5 |
| 17 | blue | 1,0 | 50 | green | 1,0 | 98 | white | 1,0 |
| 17a | blue | 1,0 | 53 | blue | 0,75 | 101 | green | 0,75 |
| 18 | black | 1,0 | 53a | blue | 0,75 | 104 | green | 0,75 |
| 20 | white | 1,0 | 54 | green | 0,75 | 105 | black | 0,75 |
| 21 | red | 1,0 | 54b | green | 0,75 | 109 | black | 0,75 |
| 22 | green | 1,0 | 55 | green | 0,75 | 110 | green | 0,75 |
| 22a | green | 1,0 | 56 | black | 0,75 | 111 | red | 0,75 |
| 22a | yellow | 1,0 | 57 | blue | 0,75 | 112 | blue | 1,0 |
| 23a | yellow | 1,0 | 57a | blue | 0,75 | 115 | yellow | 0,75 |
| 23b | white | 1,0 | 58 | green | 0,75 | 118 | white | 1,0 |
| 23b | white | 1,0 | 58b | green | 0,75 | 121 | green | 0,75 |
| 24a | yellow | 1,0 | 59 | green | 0,75 | 122 | white | 0,75 |
| 24a | yellow | 1,0 | 60 | green | 0,75 | 130 | brown | 1,0 |
| 24b | white | 1,0 | 61 | red | 0,75 | 131 | white | 1,5 |
| 24b | white | 1,0 | 62 | grey | 0,75 | 136 | black | 1,0 |
| 25a | blue | 1,0 | 63 | red | 1,0 | 138 | black | 1,0 |
| 25b | grey | 1,0 | 64 | grey | 0,75 | 139 | black | 1,5 |
| 26 | red | 1,0 | 65 | red | 0,75 | 139a | black | 1,0 |
| 26a | red | 1,0 | 66 | white | 0,75 | 139b | black | 1,0 |
| 26f | red | 0,75 | 67 | red | 1,5 | 140 | black | 1,5 |
| 29 | grey | 0,75 | 68 | red | 1,0 | 141 | brown | 0,75 |
| 29a | green | 0,75 | 69 | black | 1,0 | 141a | brown | 0,75 |
| 30 | brown | 0,75 | 70 | black | 1,5 | 142 | grey | 2,5 |
| 30a | brown | 0,75 | 71 | black | 1,5 | 147 | black | 0,75 |
| 32 | red | 0,75 | 72 | red | 1,0 | 190 | yellow | 0,75 |
| 33 | yellow | 1,0 | 72a | red | 1,0 | 191 | grey | 0,75 |
| 35 | grey | 1,0 | 73 | yellow | 1,0 | 192 | black | 0,75 |

Components

- Parking light and direction indicators
- Headlights
- Horn
- Ignition coil
- Spark plugs
- Distributor
- Voltage regulator
- Alternator
- Starter
- Battery
- Fuse box
- Temperature transmitter
- Oil pressure switch
- Back-up light switch
- Stop light switch
- Brake warning contact
- Heater fan motor
- Windshield washer pump
- Windshield wiper motor
- Cigarette lighter
- Contact for warning buzzer
- Buzzer
- Clock
- Speedometer with odometer
- High beam indicator light
- Direction indicator repeater light
- Brake warning light
- Temperature and fuel gauges
- Indicator light, fuel amount
- Oil pressure warning light
- Charge indicator light
- Flasher unit
- Dimmer relay
- Ignition and starter switch
- Hazard warning flasher switch
- Instrument illumination rheostat
- Headlight switch
- Heater fan switch
- Dome lamp switch
- Dome lamp with switch
- Switch for windshield wiper and washer
- Signal horn contact
- Direction indicator switch with headlight flasher and dimmer switch
- Fuel transmitter
- Back-up light
- Stop lights, direction indicators and tail light
- Number plate light
- Trunk light



WIRING DIAGRAM, SAAB 96 USA, MODEL 1970

WIRING DIAGRAM, SAAB 95 R.H.D., MODEL 1971

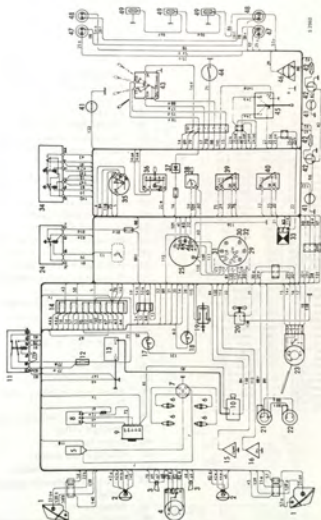
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Wires

| No. | Color | Area mm ² | No. | Color | Area mm ² | No. | Color | Area mm ² |
|------|--------|----------------------|-----|--------|----------------------|------|--------|----------------------|
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| 5 | Red | 1.5 | 42a | Blue | 1.5 | 81a | Blue | 0.75 |
| 7 | Green | 1.5 | 42b | White | 2.5 | 82 | White | 0.75 |
| 12 | Blue | 0.75 | 43 | Yellow | 2.5 | 82 | Yellow | 0.75 |
| 14 | Brown | 1.0 | 44a | Grey | 1.5 | 82a | Black | 0.75 |
| 14a | Brown | 1.0 | 44b | Yellow | 1.5 | 83 | White | 0.75 |
| 14c | Brown | 1.0 | 45 | Black | 1.5 | 83 | Black | 0.75 |
| 15 | Red | 1.0 | 46 | Black | 2.5 | 83a | Black | 0.75 |
| 15a | Red | 1.0 | 49 | Black | 1.0 | 84 | Yellow | 1.5 |
| 16 | Grey | 1.0 | 50 | Green | 1.0 | 85 | Grey | 4.0 |
| 16a | Grey | 1.0 | 53 | Blue | 0.75 | 86 | Green | 0.75 |
| 17 | Blue | 1.0 | 53a | Blue | 0.75 | 86a | Green | 0.75 |
| 17a | Blue | 1.0 | 54 | Green | 0.75 | 86f | Green | 0.75 |
| 18 | Black | 1.0 | 54a | Green | 0.75 | 88 | Black | 0.75 |
| 20 | White | 1.0 | 57 | Blue | 0.75 | 88a | Black | 0.75 |
| 21 | Red | 1.0 | 57a | Blue | 0.75 | 88f | Black | 0.75 |
| 22 | Green | 1.0 | 58 | Green | 0.75 | 88g | Black | 0.75 |
| 22a | Green | 1.0 | 58a | Green | 0.75 | 89 | Brown | 0.75 |
| 23a | Yellow | 1.0 | 59 | Green | 0.75 | 89a | Yellow | 0.75 |
| 23aa | Yellow | 1.0 | 60 | Green | 0.75 | 92 | Red | 0.75 |
| 23b | White | 1.0 | 61 | Red | 0.75 | 95 | White | 1.5 |
| 23ba | White | 1.0 | 62 | Grey | 0.75 | 97 | White | 1.5 |
| 24a | Yellow | 1.0 | 63 | Red | 1.0 | 98 | White | 1.0 |
| 24aa | Yellow | 1.0 | 64 | Grey | 0.75 | 101 | Green | 0.75 |
| 24b | White | 1.0 | 65 | Red | 0.75 | 109 | Black | 0.75 |
| 24ba | White | 1.0 | 66 | White | 0.75 | 110 | Green | 0.75 |
| 25a | Blue | 1.0 | 67 | Red | 1.5 | 111 | Red | 0.75 |
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| 25b | Grey | 1.0 | 69 | Black | 1.0 | 115 | Yellow | 0.75 |
| 25ba | Grey | 1.0 | 70 | Black | 1.5 | 118 | White | 1.0 |
| 26 | Red | 1.0 | 71 | Black | 1.5 | 122 | White | 0.75 |
| 26a | Red | 1.0 | 72 | Red | 1.0 | 130 | Brown | 0.75 |
| 28f | Red | 0.75 | 72a | Red | 1.0 | 131 | White | 1.5 |
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| 29a | Grey | 0.75 | 74 | Grey | 4.0 | 138 | Black | 1.0 |
| 29f | Grey | 0.75 | 75 | Red | 1.0 | 139 | Black | 1.5 |
| 30 | Brown | 0.75 | 76 | Grey | 1.0 | 139a | Black | 1.0 |
| 30a | Brown | 0.75 | 77 | Red | 0.75 | 139b | Black | 1.0 |
| 30f | Brown | 0.75 | 77a | Red | 0.75 | 140 | Black | 1.5 |
| 32 | Red | 0.75 | 77b | Red | 0.75 | 141 | Brown | 0.75 |
| 33 | Yellow | 1.0 | 77f | Red | 0.75 | 141a | Brown | 0.75 |
| 35 | Grey | 1.0 | 78 | Brown | 0.75 | 142 | Grey | 2.5 |
| 39 | Yellow | 0.75 | 79 | Green | 0.75 | 147 | Black | 0.75 |

Components

- Parking light and direction indicators
- Headlights
- Horn
- Headlight wiper motor
- Ignition coil
- Spark plugs
- Distributor
- Voltage regulator
- Alternator
- Starter
- Relay, headlight wiper
- Fuse for headlight wiper
- Battery
- Fuse box
- Temperature transmitter
- Oil pressure switch
- Back-up light switch
- Stop light switch
- Brake warning contact
- Heater fan motor
- Windshield washer pump
- Headlight washer pump
- Windshield wiper motor
- Manoeuvre relay, headlight wiper
- Speedometer and odometer
- High beam indicator light
- Direction indicator repeater light
- Brake warning light
- Temperature and fuel gauges
- Indicator light, fuel amount
- Oil pressure warning light
- Charge indicator light
- Flasher unit
- Dimmer relay
- Ignition and starter switch
- Hazard warning flasher switch
- Diode
- Instrument illumination rheostat
- Headlight switch
- Heater fan switch
- Courtesy light switch
- Courtesy light with switch
- Switch for windshield wiper, headlight wiper and washer
- Signal horn contact
- Direction indicator switch with headlight flasher and dimmer switch
- Fuel transmitter
- Back-up light and direction indicators
- Tail light and stop light
- Number plate light



WIRING DIAGRAM, SAAB 95 R.H.D., MODEL 1971

WIRING DIAGRAM, SAAB 95 L.H.D., MODEL 1971

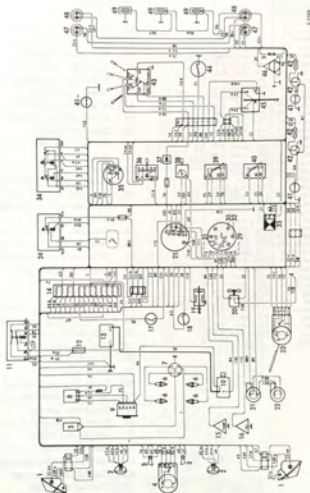
The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Wires

| No. | Color | Area mm ² | No. | Color | Area mm ² | No. | Color | Area mm ² |
|-----|--------|----------------------|-----|--------|----------------------|------|--------|----------------------|
| 4 | gray | 1,5 | 43 | yellow | 2,5 | 82 | white | 0,75 |
| 6 | red | 1,5 | 44a | gray | 1,5 | 82 | yellow | 0,75 |
| 7 | green | 1,5 | 44b | yellow | 1,5 | 82a | black | 0,75 |
| 13 | blue | 0,75 | 45 | black | 1,5 | 83 | white | 0,75 |
| 14 | brown | 1,0 | 46 | black | 2,5 | 83 | black | 0,75 |
| 14a | brown | 1,0 | 49 | black | 1,0 | 83a | black | 0,75 |
| 14b | brown | 1,0 | 50 | green | 1,0 | 84 | gray | 4,0 |
| 15 | red | 1,0 | 53 | blue | 0,75 | 85 | gray | 4,0 |
| 15a | red | 1,0 | 53a | blue | 0,75 | 86 | green | 0,75 |
| 16 | gray | 1,0 | 54 | green | 0,75 | 86a | green | 0,75 |
| 16a | gray | 1,0 | 54b | green | 0,75 | 86b | green | 0,75 |
| 17 | blue | 1,0 | 57 | blue | 0,75 | 86 | black | 0,75 |
| 17a | blue | 1,0 | 57a | blue | 0,75 | 86a | black | 0,75 |
| 18 | black | 1,0 | 58 | green | 0,75 | 86b | black | 0,75 |
| 20 | white | 1,0 | 58a | green | 0,75 | 86g | black | 0,75 |
| 21 | red | 1,0 | 59 | green | 0,75 | 89 | brown | 0,75 |
| 22 | green | 1,0 | 60 | green | 0,75 | 89a | yellow | 0,75 |
| 22a | green | 1,0 | 61 | red | 0,75 | 92 | red | 0,75 |
| 22a | yellow | 1,0 | 62 | gray | 0,75 | 95 | white | 1,5 |
| 23a | yellow | 1,0 | 63 | red | 1,0 | 97 | white | 1,5 |
| 23b | white | 1,0 | 64 | gray | 0,75 | 98 | white | 1,0 |
| 23a | white | 1,0 | 65 | red | 0,75 | 101 | green | 0,75 |
| 24a | yellow | 1,0 | 66 | white | 0,75 | 109 | black | 0,75 |
| 24a | yellow | 1,0 | 67 | red | 1,5 | 110 | green | 0,75 |
| 24b | white | 1,0 | 68 | red | 1,0 | 111 | red | 0,75 |
| 24a | white | 1,0 | 69 | black | 1,0 | 112 | blue | 1,0 |
| 25a | blue | 1,0 | 70 | black | 1,5 | 115 | yellow | 0,75 |
| 25b | gray | 1,0 | 71 | black | 1,5 | 118 | white | 1,0 |
| 26 | red | 1,0 | 72 | red | 1,0 | 122 | white | 0,75 |
| 26a | red | 1,0 | 72a | red | 1,0 | 130 | brown | 1,0 |
| 26b | red | 0,75 | 73 | yellow | 1,0 | 131 | white | 1,5 |
| 28 | gray | 0,75 | 74 | gray | 4,0 | 136 | black | 1,0 |
| 29a | green | 0,75 | 75 | red | 1,0 | 138 | black | 1,0 |
| 30 | brown | 0,75 | 76 | gray | 1,0 | 139 | black | 1,5 |
| 30a | brown | 0,75 | 77 | red | 0,75 | 139a | black | 1,0 |
| 32 | red | 0,75 | 77a | red | 0,75 | 139b | black | 1,0 |
| 33 | yellow | 1,0 | 77a | red | 0,75 | 140 | black | 1,5 |
| 35 | gray | 1,0 | 77b | red | 0,75 | 141 | brown | 0,75 |
| 39 | yellow | 0,75 | 78 | brown | 0,75 | 141a | brown | 0,75 |
| 41 | blue | 0,75 | 79 | green | 0,75 | 142 | gray | 2,5 |
| 42a | blue | 1,5 | 81 | gray | 0,75 | 147 | black | 0,75 |
| 42b | white | 2,5 | 81a | blue | 0,75 | | | |

Components

- Parking light and direction indicators
- Headlights
- Horn
- Headlight wiper motor
- Ignition coil
- Spark plugs
- Distributor
- Voltage regulator
- Alternator
- Starter
- Relay, headlight wiper
- Fuse for headlight wiper
- Battery
- Fuse box
- Temperature transmitter
- Oil pressure switch
- Back-up light switch
- Stop light switch
- Brake warning contact
- Heater fan motor
- Windshield washer pump
- Headlight washer pump
- Windshield wiper motor
- Manoeuvre relay, headlight wiper
- Speedometer and odometer
- High beam indicator light
- Direction indicator repeater light
- Brake warning light
- Temperature and fuel gauges
- Indicator light, fuel amount
- Oil pressure warning light
- Charge indicator light
- Flasher unit
- Dimmer relay
- Ignition and starter switch
- Hazard warning flasher switch
- Diode
- Instrument illumination rheostat
- Headlight switch
- Heater fan switch
- Courtesy light switch
- Courtesy light with switch
- Switch for windshield wiper, headlight wiper and washer
- Signal horn contact
- Direction indicator switch with headlight flasher and dimmer switch
- Fuel transmitter
- Back-up light and direction indicators
- Tail light and stop light
- Number plate light



WIRING DIAGRAM, SAAB 95 L.H.D., MODEL 1971

WIRING DIAGRAM, SAAB 95 USA, MODEL 1971

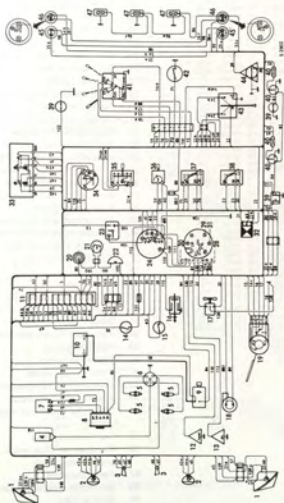
The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Wires

| No. | Color | Area mm ² | No. | Color | Area mm ² | No. | Color | Area mm ² |
|-----|--------|----------------------|-----|--------|----------------------|------|--------|----------------------|
| 4 | grey | 1.5 | 42a | blue | 1.5 | 82 | white | 0.75 |
| 5 | red | 1.5 | 42b | white | 2.5 | 83 | white | 0.75 |
| 7 | green | 1.5 | 43 | yellow | 2.5 | 84 | yellow | 1.5 |
| 13 | blue | 0.75 | 44a | grey | 1.5 | 85 | grey | 4.0 |
| 14 | brown | 1.0 | 44b | yellow | 1.5 | 86 | green | 0.75 |
| 14a | brown | 1.0 | 45 | black | 1.5 | 86a | green | 0.75 |
| 14f | brown | 1.0 | 46 | black | 2.5 | 86f | green | 0.75 |
| 15 | red | 1.0 | 47 | black | 4.0 | 88 | black | 0.75 |
| 15a | red | 1.0 | 49 | black | 1.0 | 88a | black | 0.75 |
| 16 | grey | 1.0 | 50 | green | 1.0 | 89 | brown | 0.75 |
| 16a | grey | 1.0 | 53 | blue | 0.75 | 92 | red | 0.75 |
| 17 | blue | 1.0 | 53a | blue | 0.75 | 95 | white | 1.5 |
| 17a | blue | 1.0 | 53b | green | 0.75 | 97 | white | 1.5 |
| 18 | black | 1.0 | 54 | green | 0.75 | 98 | white | 1.0 |
| 20 | white | 1.0 | 54a | green | 0.75 | 101 | green | 0.75 |
| 21 | red | 1.0 | 54b | green | 0.75 | 104 | green | 0.75 |
| 22 | green | 1.0 | 57 | blue | 0.75 | 105 | black | 0.75 |
| 22a | green | 1.0 | 57a | blue | 0.75 | 109 | black | 0.75 |
| 23a | yellow | 1.0 | 58 | green | 0.75 | 110 | green | 0.75 |
| 23a | yellow | 1.0 | 58b | green | 0.75 | 111 | red | 0.75 |
| 23b | white | 1.0 | 59 | green | 0.75 | 112 | blue | 1.0 |
| 23b | white | 1.0 | 60 | green | 0.75 | 115 | yellow | 0.75 |
| 24a | yellow | 1.0 | 61 | red | 0.75 | 118 | white | 1.0 |
| 24a | yellow | 1.0 | 62 | grey | 0.75 | 122 | white | 0.75 |
| 24b | white | 1.0 | 63 | red | 1.0 | 130 | brown | 1.0 |
| 24b | white | 1.0 | 64 | grey | 0.75 | 131 | white | 1.5 |
| 25a | blue | 1.0 | 65 | red | 0.75 | 136 | black | 1.0 |
| 25b | grey | 1.0 | 66 | white | 0.75 | 138 | black | 1.0 |
| 28 | red | 1.0 | 67 | red | 1.5 | 139 | black | 1.5 |
| 28a | red | 1.0 | 68 | red | 1.0 | 139a | black | 1.0 |
| 28f | red | 0.75 | 69 | black | 1.0 | 139b | black | 1.0 |
| 29 | grey | 0.75 | 70 | black | 1.5 | 140 | black | 1.5 |
| 29a | green | 0.75 | 71 | black | 1.5 | 141 | brown | 0.75 |
| 30 | brown | 0.75 | 72 | red | 1.0 | 141a | brown | 0.75 |
| 30a | brown | 0.75 | 72a | red | 1.0 | 142 | grey | 2.5 |
| 32 | red | 0.75 | 73 | yellow | 1.0 | 147 | black | 0.75 |
| 33 | yellow | 1.0 | 74 | grey | 4.0 | 190 | yellow | 0.75 |
| 35 | grey | 1.0 | 75 | red | 1.0 | 191 | grey | 0.75 |
| 39 | yellow | 0.75 | 76 | grey | 1.0 | 192 | black | 0.75 |
| 41 | blue | 0.75 | 80 | black | 1.0 | | | |

Components

- Parking light and direction indicators
- Headlights
- Horn
- Ignition coil
- Spark plugs
- Distributor
- Voltage regulator
- Alternator
- Starter
- Battery
- Fuse box
- Temperature transmitter
- Oil pressure switch
- Back-up light switch
- Stop light switch
- Brake warning contact
- Heater fan motor
- Windshield washer pump
- Windshield wiper motor
- Cigarette lighter
- Contact for warning buzzer
- Buzzer
- Clock
- Speedometer and odometer
- High beam indicator light
- Direction indicator repeater light
- Brake warning light
- Temperature and fuel gauges
- Indicator light, fuel amount
- Oil pressure warning light
- Charge indicator light
- Flasher unit
- Dimmer relay
- Ignition and starter switch
- Hazard warning flasher switch
- Instrument illumination rheostat
- Headlight switch
- Heater fan switch
- Dome lamp switch
- Dome lamp with switch
- Switch for windshield wiper, and washer
- Signal horn contact
- Direction indicator switch with headlight flasher and dimmer switch
- Fuel transmitter
- Back-up light and direction indicators
- Tail light and stop light
- Number plate light



WIRING DIAGRAM, SAAB 95 USA, MODEL 1971

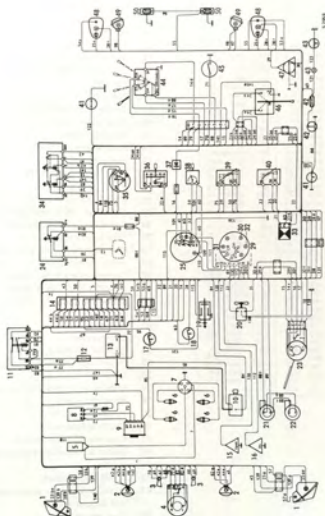
The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Wires

| No. | Color | Area sqm.2 | No. | Color | Area sqm.2 | No. | Color | Area sqm.2 |
|-----|--------|---------------|-----|--------|---------------|------|--------|---------------|
| 4 | Grey | 1.5 | 41 | Blue | 0.75 | 77 | Red | 0.75 |
| 5 | Red | 1.5 | 42a | Blue | 1.5 | 78 | Brown | 0.75 |
| 7 | Green | 1.5 | 42b | White | 2.5 | 79 | Green | 0.75 |
| 13 | Blue | 0.75 | 43 | Yellow | 2.5 | 81 | Grey | 0.75 |
| 14 | Brown | 1.0 | 44a | Grey | 1.5 | 81a | Blue | 0.75 |
| 14a | Brown | 1.0 | 44b | Yellow | 1.5 | 82 | Yellow | 0.75 |
| 141 | Brown | 1.0 | 45 | Black | 1.5 | 82a | Black | 0.75 |
| 15 | Red | 1.0 | 46 | Black | 2.5 | 83 | Black | 0.75 |
| 15a | Red | 1.0 | 49 | Black | 1.0 | 83a | Black | 0.75 |
| 16 | Grey | 1.0 | 50 | Green | 1.0 | 84 | Yellow | 1.5 |
| 16a | Grey | 1.0 | 53 | Blue | 0.75 | 85 | Grey | 4.0 |
| 17 | Blue | 1.0 | 53a | Blue | 0.75 | 88 | Black | 0.75 |
| 17a | Blue | 1.0 | 54 | Green | 0.75 | 88a | Black | 0.75 |
| 18 | Black | 1.0 | 54b | Green | 0.75 | 88b | Black | 0.75 |
| 20 | White | 1.0 | 55 | Green | 0.75 | 88g | Black | 0.75 |
| 21 | Red | 1.0 | 56 | Black | 0.75 | 89 | Brown | 0.75 |
| 22 | Green | 1.0 | 57 | Blue | 0.75 | 99 | Yellow | 0.75 |
| 22a | Green | 1.0 | 57a | Blue | 0.75 | 95 | White | 1.0 |
| 23a | Yellow | 1.0 | 58 | Green | 0.75 | 97 | White | 1.0 |
| 23b | White | 1.0 | 58a | Green | 0.75 | 98 | White | 0.75 |
| 23b | White | 1.0 | 59 | Green | 0.75 | 101 | Green | 0.75 |
| 24a | Yellow | 1.0 | 60 | Green | 0.75 | 109 | Black | 0.75 |
| 24a | Yellow | 1.0 | 61 | Red | 0.75 | 110 | Green | 0.75 |
| 24b | White | 1.0 | 62 | Grey | 0.75 | 111 | Red | 0.75 |
| 24b | White | 1.0 | 63 | Red | 1.0 | 112 | Blue | 1.0 |
| 25a | Blue | 1.0 | 64 | Grey | 0.75 | 115 | Yellow | 0.75 |
| 25a | Blue | 1.0 | 65 | Red | 0.75 | 118 | White | 1.0 |
| 25b | Grey | 1.0 | 66 | White | 0.75 | 121 | Green | 0.75 |
| 25b | Grey | 1.0 | 67 | Red | 1.5 | 122 | White | 0.75 |
| 26 | Red | 1.0 | 68 | Red | 1.0 | 123 | Blue | 0.75 |
| 26a | Red | 0.75 | 70 | Black | 1.5 | 130 | Brown | 1.0 |
| 28 | Red | 0.75 | 71 | Black | 1.5 | 131 | White | 1.0 |
| 29 | Grey | 0.75 | 72 | Red | 1.0 | 136 | Black | 1.0 |
| 29a | Grey | 0.75 | 72a | Red | 1.0 | 138 | Black | 1.0 |
| 29b | Grey | 0.75 | 73 | Yellow | 1.0 | 139 | Black | 1.5 |
| 30 | Brown | 0.75 | 74 | Grey | 4.0 | 139a | Black | 1.0 |
| 30a | Brown | 0.75 | 75 | Red | 1.0 | 140 | Black | 1.5 |
| 30b | Brown | 0.75 | 76 | Grey | 1.0 | 141 | Brown | 0.75 |
| 32 | Red | 0.75 | 77 | Red | 0.75 | 141a | Brown | 0.75 |
| 33 | Yellow | 1.0 | 77a | Red | 0.75 | 142 | Grey | 2.5 |
| 35 | Grey | 1.0 | 77b | Red | 0.75 | 147 | Black | 0.75 |
| 39 | Yellow | 0.75 | | | | | | |

Components

- Parking light and direction indicators
- Headlights
- Horn
- Headlight wiper motor
- Ignition coil
- Spark plugs
- Distributor
- Voltage regulator
- Alternator
- Starter
- Relay, headlight wiper
- Fuse for headlight wiper
- Battery
- Fuse box
- Temperature transmitter
- Oil pressure switch
- Back-up light switch
- Stop light switch
- Brake warning contact
- Heater fan motor
- Windshield washer pump
- Headlight washer pump
- Windshield wiper motor
- Manoeuvre relay, headlight wiper
- Speedometer with odometer
- High beam indicator light
- Direction indicator repeater light
- Brake warning light
- Temperature and fuel gauges
- Indicator light, fuel amount
- Oil pressure warning light
- Charge indicator light
- Flasher unit
- Dimmer relay
- Ignition and starter switch
- Hazard warning flasher switch
- Diode
- Instrument illumination rheostat
- Headlight switch
- Heater fan switch
- Courtesy light switch
- Courtesy light with switch
- Trunk light with contact
- Switch for windshield wiper, headlight wiper and washer
- Signal horn contact
- Direction indicator switch with headlight flasher and dimmer switch
- Fuel transmitter
- Stop lights, direction indicators and tail light
- Back-up light
- Number plate light



WIRING DIAGRAM, SAAB 96 R.H.D., MODEL 1971

WIRING DIAGRAM, SAAB 96 L.H.D., MODEL 1971

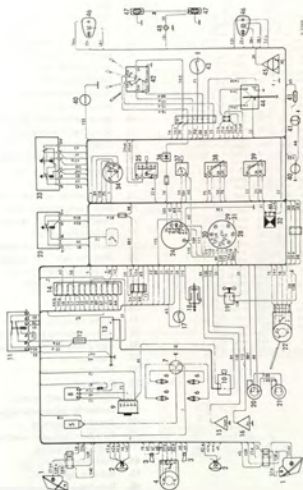
The range of the electrical system is shown by the wiring system on the next page. To simplify the identification, the wires have been covered with insulation of different shades.

Wires

| No. | Color | Area mm ² | No. | Color | Area mm ² | No. | Color | Area mm ² |
|-----|--------|----------------------|-----|--------|----------------------|------|--------|----------------------|
| 4 | grey | 1,5 | 42a | blue | 1,5 | 77a | red | 0,75 |
| 5 | red | 1,5 | 42b | white | 2,5 | 77f | red | 0,75 |
| 7 | green | 1,5 | 43 | yellow | 2,5 | 78 | brown | 0,75 |
| 13 | blue | 0,75 | 44a | grey | 1,5 | 79 | green | 0,75 |
| 14 | brown | 1,0 | 44b | yellow | 1,5 | 81 | grey | 0,75 |
| 14a | brown | 1,0 | 45 | black | 1,5 | 81a | blue | 0,75 |
| 14f | brown | 1,0 | 46 | black | 2,5 | 82 | yellow | 0,75 |
| 15 | red | 1,0 | 49 | black | 1,0 | 82a | black | 0,75 |
| 15a | red | 1,0 | 50 | green | 1,0 | 83 | black | 0,75 |
| 16 | grey | 1,0 | 53 | blue | 0,75 | 83a | black | 0,75 |
| 16a | grey | 1,0 | 53a | blue | 0,75 | 84 | yellow | 1,5 |
| 17 | blue | 1,0 | 54 | green | 0,75 | 85 | grey | 4,0 |
| 17a | blue | 1,0 | 54b | green | 0,75 | 86 | black | 0,75 |
| 18 | black | 1,0 | 55 | green | 0,75 | 88a | black | 0,75 |
| 20 | white | 1,0 | 56 | black | 0,75 | 88f | black | 0,75 |
| 21 | red | 1,0 | 57 | blue | 0,75 | 88g | black | 0,75 |
| 22 | green | 1,0 | 57a | blue | 0,75 | 89 | brown | 0,75 |
| 22a | green | 1,0 | 58 | green | 0,75 | 89f | yellow | 0,75 |
| 23a | yellow | 1,0 | 58b | green | 0,75 | 101 | green | 0,75 |
| 23a | yellow | 1,0 | 59 | green | 0,75 | 109 | black | 0,75 |
| 23b | white | 1,0 | 60 | green | 0,75 | 110 | green | 0,75 |
| 23b | white | 1,0 | 61 | red | 0,75 | 111 | red | 0,75 |
| 24a | yellow | 1,0 | 62 | grey | 0,75 | 112 | blue | 1,0 |
| 24a | yellow | 1,0 | 63 | red | 1,0 | 115 | yellow | 0,75 |
| 24b | white | 1,0 | 64 | grey | 0,75 | 118 | white | 1,0 |
| 24b | white | 1,0 | 65 | red | 0,75 | 121 | green | 0,75 |
| 25a | blue | 1,0 | 66 | white | 0,75 | 122 | white | 0,75 |
| 25b | grey | 1,0 | 67 | red | 1,5 | 123 | blue | 0,75 |
| 28 | red | 1,0 | 68 | red | 1,0 | 130 | brown | 1,0 |
| 28a | red | 1,0 | 69 | black | 1,0 | 136 | black | 1,0 |
| 28f | red | 0,75 | 70 | black | 1,5 | 138 | black | 1,0 |
| 29 | grey | 0,75 | 71 | black | 1,5 | 139 | black | 1,5 |
| 29a | green | 0,75 | 72 | red | 1,0 | 139a | black | 1,0 |
| 30 | brown | 0,75 | 72a | red | 1,0 | 140 | black | 1,5 |
| 30a | brown | 0,75 | 73 | yellow | 1,0 | 141 | brown | 0,75 |
| 32 | red | 0,75 | 74 | grey | 4,0 | 141a | brown | 0,75 |
| 33 | yellow | 1,0 | 75 | red | 1,0 | 142 | grey | 2,5 |
| 35 | grey | 1,0 | 76 | grey | 1,0 | 147 | black | 0,75 |
| 39 | yellow | 0,75 | 77 | red | 0,75 | | | |
| 41 | blue | 0,75 | 77a | red | 0,75 | | | |

Components

- Parking light and direction indicators
- Headlights
- Horn
- Headlight wiper motor
- Ignition coil
- Spark plugs
- Distributor
- Voltage regulator
- Alternator
- Starter
- Relay, headlight wiper
- Fuse for headlight wiper
- Battery
- Fuse box
- Temperature transmitter
- Oil pressure switch
- Stop light switch
- Brake warning contact
- Heater fan motor
- Windshield washer pump
- Headlight washer pump
- Windshield wiper motor
- Manoeuvre relay, headlight wiper
- Speedometer with odometer
- High beam indicator light
- Direction indicator repeater light
- Brake warning light
- Temperature and fuel gauges
- Indicator light, fuel amount
- Oil pressure warning light
- Charge indicator light
- Flasher unit
- Dimmer relay
- Ignition and starter switch
- Hazard warning flasher switch
- Diode
- Instrument illumination rheostat
- Headlight switch
- Heater fan switch
- Courtesy light switch
- Courtesy light with switch
- Switch for windshield wiper, headlight wiper and washer
- Signal horn contact
- Direction indicator switch with headlight flasher and dimmer switch
- Fuel transmitter
- Stop lights, direction indicators and tail light
- Number plate light
- Trunk light with contact



WIRING DIAGRAM, SAAB SEDAN L.H.D., MODEL 1971

WIRING DIAGRAM, SAAB 96 USA, MODEL 1971

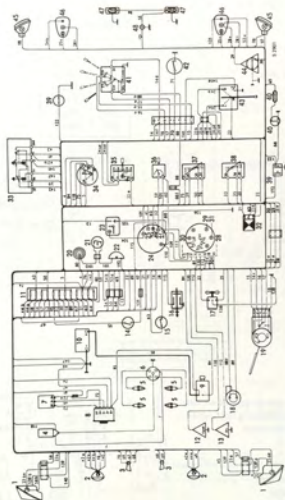
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Wires

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| 4 | grey | 1,5 | 39 | yellow | 0,75 | 74 | grey | 4,0 |
| 5 | red | 1,5 | 41 | blue | 0,75 | 75 | red | 1,0 |
| 7 | green | 1,5 | 42x | blue | 1,5 | 76 | grey | 1,0 |
| 13 | blue | 0,75 | 42b | white | 2,5 | 80 | black | 1,0 |
| 14 | brown | 1,0 | 43 | yellow | 2,5 | 84 | yellow | 1,5 |
| 14a | brown | 1,0 | 44a | grey | 1,5 | 85 | grey | 4,0 |
| 14b | brown | 1,0 | 44b | yellow | 1,5 | 88 | black | 0,75 |
| 15 | red | 1,0 | 45 | black | 1,5 | 88a | black | 0,75 |
| 15a | red | 1,0 | 46 | black | 2,5 | 89 | brown | 0,75 |
| 16 | grey | 1,0 | 47 | black | 4,0 | 95 | white | 1,5 |
| 16a | grey | 1,0 | 49 | black | 1,0 | 97 | white | 1,5 |
| 17 | blue | 1,0 | 50 | green | 1,0 | 98 | white | 1,0 |
| 17a | blue | 1,0 | 53 | blue | 0,75 | 101 | green | 0,75 |
| 18 | black | 1,0 | 53a | blue | 0,75 | 104 | green | 0,75 |
| 20 | white | 1,0 | 54 | green | 0,75 | 105 | black | 0,75 |
| 21 | red | 1,0 | 54a | green | 0,75 | 109 | black | 0,75 |
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| 23a | yellow | 1,0 | 57a | blue | 0,75 | 115 | yellow | 0,75 |
| 23b | white | 1,0 | 58 | green | 0,75 | 118 | white | 1,0 |
| 23b | white | 1,0 | 58a | green | 0,75 | 121 | green | 0,75 |
| 24a | yellow | 1,0 | 59 | green | 0,75 | 122 | white | 0,75 |
| 24a | yellow | 1,0 | 60 | green | 0,75 | 130 | brown | 1,0 |
| 24b | white | 1,0 | 61 | red | 0,75 | 131 | white | 1,5 |
| 24b | white | 1,0 | 62 | grey | 0,75 | 136 | black | 1,0 |
| 25a | blue | 1,0 | 63 | red | 1,0 | 138 | black | 1,0 |
| 25a | blue | 1,0 | 64 | grey | 0,75 | 139 | black | 1,5 |
| 26 | red | 1,0 | 65 | red | 0,75 | 139a | black | 1,0 |
| 26a | red | 1,0 | 66 | white | 0,75 | 139b | black | 1,0 |
| 26b | red | 0,75 | 67 | red | 1,5 | 140 | black | 1,5 |
| 29 | grey | 0,75 | 68 | red | 1,0 | 141 | brown | 0,75 |
| 29a | green | 0,75 | 69 | black | 1,0 | 141a | brown | 0,75 |
| 30 | brown | 0,75 | 70 | black | 1,5 | 142 | grey | 2,5 |
| 30a | brown | 0,75 | 71 | black | 1,5 | 147 | black | 0,75 |
| 32 | red | 0,75 | 72 | red | 1,0 | 190 | yellow | 0,75 |
| 33 | yellow | 1,0 | 72a | red | 1,0 | 191 | grey | 0,75 |
| 35 | grey | 1,0 | 73 | yellow | 1,0 | 192 | black | 0,75 |

Components

- Parking light and direction indicators
- Headlights
- Horn
- Ignition coil
- Spark plugs
- Distributor
- Voltage regulator
- Alternator
- Starter
- Battery
- Fuse box
- Temperature transmitter
- Oil pressure switch
- Back-up light switch
- Stop light switch
- Brake warning contact
- Heater fan motor
- Windshield washer pump
- Windshield wiper motor
- Cigarette lighter
- Contact for warning buzzer
- Buzzer
- Clock
- Speedometer with odometer
- High beam indicator light
- Direction indicator repeater light
- Brake warning light
- Temperature and fuel gauges
- Indicator light, fuel amount
- Oil pressure warning light
- Charge indicator light
- Flasher unit
- Dimmer relay
- Ignition and starter switch
- Hazard warning flasher switch
- Instrument illumination rheostat
- Headlight switch
- Heater fan switch
- Dome lamp switch
- Dome lamp with switch
- Switch for windshield wiper and washer
- Signal horn contact
- Direction indicator switch with headlight flasher and dimmer switch
- Fuel transmitter
- Back-up light
- Stop lights, direction indicators and tail light
- Number plate light
- Trunk light



WIRING DIAGRAM, SAAB 96 USA, MODEL 1971

WIRING DIAGRAM, SAAB 96 R.H.D. AND DETAIL OF WIRING DIAGRAM, SAAB 95 R.H.D., MODEL 1972-1974

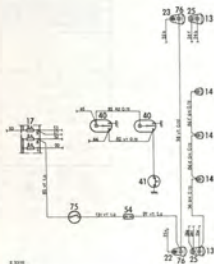
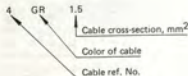
The range of the electrical system is shown by the wiring system on the next page.

1. Battery
2. Alternator
3. Voltage regulator
4. Starter motor
5. Ignition coil
6. Ignition distributor
7. Lighting relay
8. Headlight dimmer/flasher switch
9. Light switch
10. High beam
11. Dimmed beam
12. Front parking light
13. Tail light
14. License plate light
15. Resistance switch, instrument panel, illumination
16. Ignition switch
17. Fuse box
18. Direction indicator flasher unit
19. Direction indicator switch
20. Hazard warning signal switch
21. Hazard warning signal repeater
22. Direction indicator lights, L
23. Direction indicator lights, R
24. Stop light contact
25. Stop lights
26. Ventilator fan switch
27. Ventilator fan motor
28. Horn
29. Horn contact
30. Brake warning contact
31. Oil warning contact
32. Temperature transmitter
33. Fuel level transmitter
34. Combination instrument: fuel gauge, fuel warning light, temperature gauge, oil warning light, ignition light, instrument panel illumination
35. Speedometer
36. Brake warning light
37. High beam indicator light
38. Direction indicator repeater light
39. Instrument panel illumination
40. Dome light
41. Door contact, interior lighting
42. Trunk light
43. Trunk light contact
44. Wiper system switch
45. 2-speed windshield wiper
46. Washer motor
47. Fuse holder
48. Headlight wiper motor
49. Headlight wiper motor relay

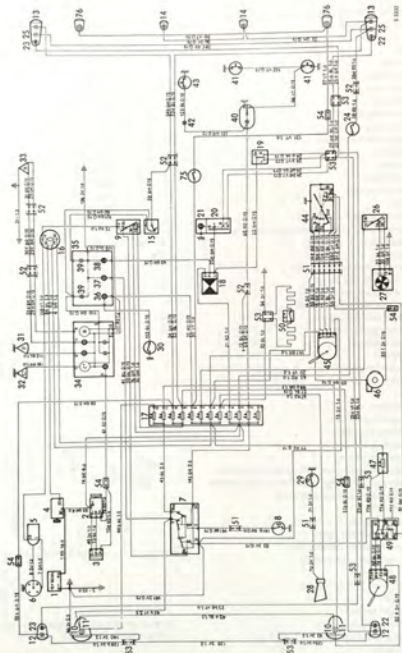
50. Seat heating element with thermostat
51. 8-pin connector
52. 3-pin connector
53. 2-pin connector
54. 1-pin connector
75. Back-up light contact
76. Back-up lights

Color code

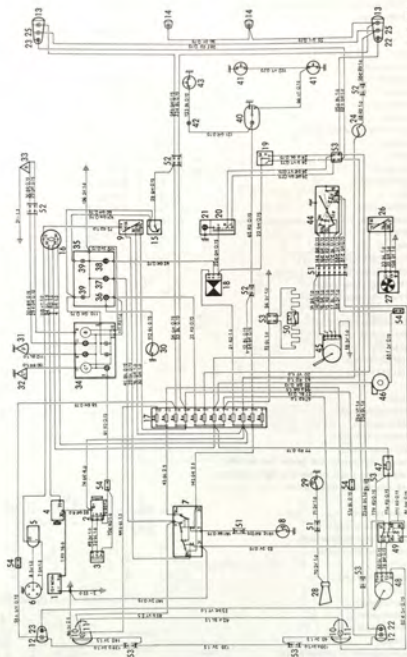
| | |
|----|--------|
| BL | Blue |
| BR | Brown |
| GL | Yellow |
| GN | Green |
| RD | Red |
| SV | Black |
| VT | White |



DETAIL OF WIRING DIAGRAM, SAAB 95 R.H.D., MODEL 1972-1974



WIRING DIAGRAM, SAAB 96 R.H.D., MODEL 1972-1974



WIRING DIAGRAM, SAAB 96 L.H.D., MODEL 1972-1973

WIRING DIAGRAM, SAAB 96 USA AND DETAIL OF WIRING DIAGRAM, SAAB 95 USA, MODEL 1972-1973

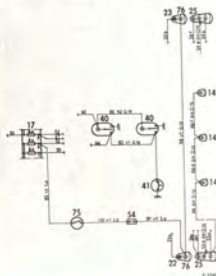
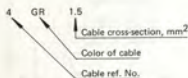
The range of the electrical system is shown by the wiring system on the next page.

1. Battery
2. Alternator
3. Voltage regulator
4. Starter motor
5. Ignition coil
6. Ignition distributor
7. Lighting relay
8. Headlight dimmer/flasher switch
9. Light switch
10. High beam
11. Dimmed beam
12. Front parking light
13. Tail light
14. License plate light
15. Resistance switch, instrument panel illumination
16. Ignition switch
17. Fuse box
18. Direction indicator flasher unit
19. Direction indicator switch
20. Hazard warning signal switch
21. Hazard warning signal repeater
22. Direction indicator lights, L
23. Direction indicator lights, R
24. Stop light contact
25. Stop lights
26. Ventilator fan switch
27. Ventilator fan motor
28. Horn
29. Horn contact
30. Brake warning contact
31. Oil warning contact
32. Temperature transmitter
33. Fuel level transmitter
34. Combination instrument: fuel gauge, fuel warning light, temperature gauge, oil warning light, ignition light, instrument panel illumination
35. Speedometer
36. Brake warning light
37. High beam indicator light
38. Direction indicator repeater light
39. Instrument panel illumination
40. Dome light
41. Door contact, interior lighting
42. Trunk light
43. Trunk light contact
44. Wiper system switch
45. 2-speed windshield wiper
46. Washer motor
50. Seat heating element with thermostat

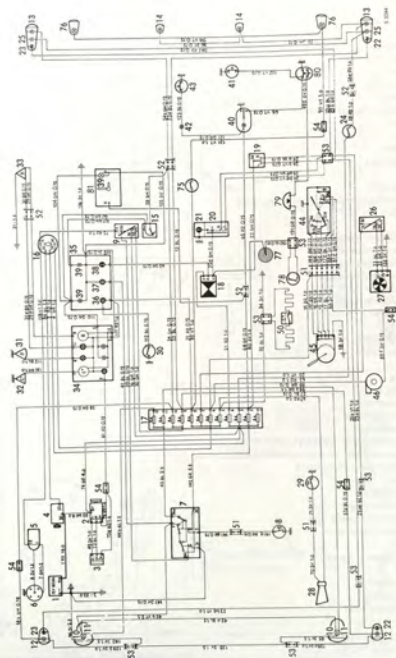
51. 8-pin connector
52. 3-pin connector
53. 2-pin connector
54. 1-pin connector
75. Back-up light contact
76. Back-up lights
77. Cigarette lighter
78. Key contact (buzzer)
79. Buzzer
80. 2-pin door contact
81. Clock

Color code

| | |
|----|--------|
| BL | Blue |
| BR | Brown |
| GL | Yellow |
| GN | Green |
| RD | Red |
| SV | Black |
| VT | White |



DETAIL OF WIRING DIAGRAM, SAAB 95 USA, MODEL 1972-1973



WIRING DIAGRAM, SAAB 96 USA, MODEL 1972-1973

WIRING DIAGRAM, SAAB 96 L.H.D., AND DETAIL OF WIRING DIAGRAM, SAAB 95 L.H.D., MODEL 1974

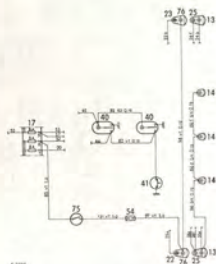
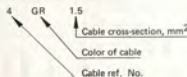
The range of the electrical system is shown by the wiring system on the next page.

1. Battery
2. Alternator
3. Voltage regulator
4. Starter motor
5. Ignition coil
6. Ignition distributor
7. Lighting relay
8. Headlight dimmer/flasher switch
9. Light switch
10. High beam
11. Dimmed beam
12. Front parking light
13. Tail light
14. License plate light
15. Resistance switch, instrument panel, illumination
16. Ignition switch
17. Fuse box
18. Direction indicator flasher unit
19. Direction indicator switch
20. Hazard warning signal switch
21. Hazard warning signal repeater
22. Direction indicator lights, L
23. Direction indicator lights, R
24. Stop light contact
25. Stop lights
26. Ventilator fan switch
27. Ventilator fan motor
28. Horn
29. Horn contact
30. Brake warning contact
31. Oil warning contact
32. Temperature transmitter
33. Fuel level transmitter
34. Combination instrument: fuel gauge, fuel warning light, temperature gauge, oil warning light, ignition light, instrument panel illumination
35. Speedometer
36. Brake warning light
37. High beam indicator light
38. Direction indicator repeater light
39. Instrument panel illumination
40. Dome light
41. Door contact, interior lighting
42. Trunk light
43. Trunk light contact
44. Wiper system switch
45. 2-speed windshield wiper

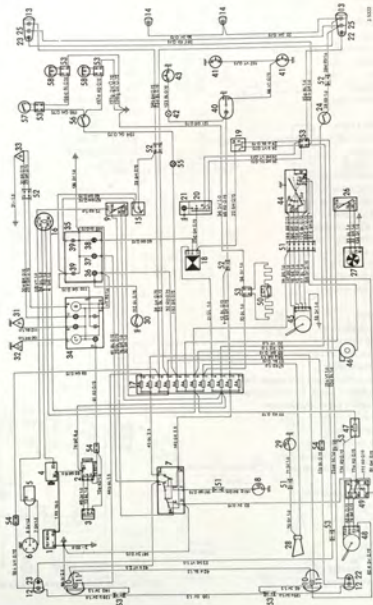
46. Washer motor
47. Fuse holder
48. Headlight wiper motor
49. Headlight wiper motor relay
50. Seat heating element with thermostat
51. 8-pin connector
52. 3-pin connector
53. 2-pin connector
54. 1-pin connector
55. Seat belt warning light
56. Handbrake contact
57. Seat contact
58. Belt contact
75. Back-up light contact
76. Back-up lights

Color code

| | |
|----|--------|
| BL | Blue |
| BR | Brown |
| GL | Yellow |
| GN | Green |
| RD | Red |
| SV | Black |
| VT | White |



DETAIL OF WIRING DIAGRAM SAAB 95 L.H.D., MODEL
1974



WIRING DIAGRAM, SAAB 96 L.H.D., MODEL 1974

WIRING DIAGRAM, SAAB 96 R.H.D., AND DETAIL OF WIRING DIAGRAM, SAAB 95 R.H.D., MODEL 1975

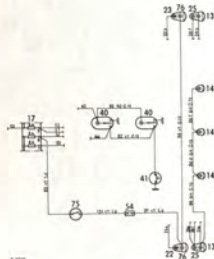
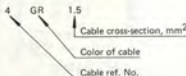
The range of the electrical system is shown by the wiring system on the next page.

1. Battery
2. Alternator
3. Voltage regulator
4. Starter motor
5. Ignition coil
6. Ignition distributor
7. Lighting relay
8. Headlight dimmer/flasher switch
9. Light switch
10. High beam
11. Dimmed beam
12. Front parking light
13. Tail light
14. License plate light
15. Resistance switch, instrument panel, illumination
16. Ignition switch
17. Fuse box
18. Direction indicator flasher unit
19. Direction indicator switch
20. Hazard warning signal switch
21. Hazard warning signal repeater
22. Direction indicator lights, L
23. Direction indicator lights, R
24. Stop light contact
25. Stop lights
26. Ventilator fan switch
27. Ventilator fan motor
28. Horn
29. Horn contact
30. Brake warning contact
31. Oil warning contact
32. Temperature transmitter
33. Fuel level transmitter
34. Combination instrument: fuel gauge, fuel warning light, temperature gauge, oil warning light, ignition light, instrument panel illumination
35. Speedometer
36. Brake warning light
37. High beam indicator light
38. Direction indicator repeater light
39. Instrument panel illumination
40. Dome light
41. Door contact, interior light
42. Trunk light
43. Trunk light contact
44. Wiper system switch
45. Windshield wiper
46. Washer motor
47. Fuse holder, headlight wiper
48. Headlight wiper motor

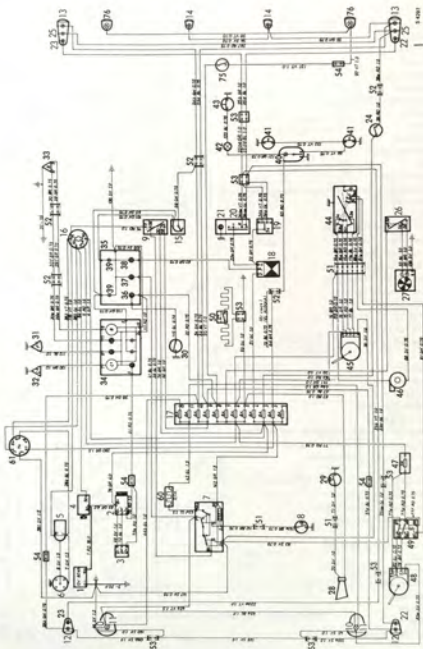
49. Headlight wiper motor relay
50. Seat heating element with thermostat
51. 8-pin connector
52. 3-pin connector
53. 2-pin connector
54. 1-pin connector
60. Resistance, dimmed light
61. Service outlet, ignition system
75. Back-up light contact
76. Back-up lights

Color code

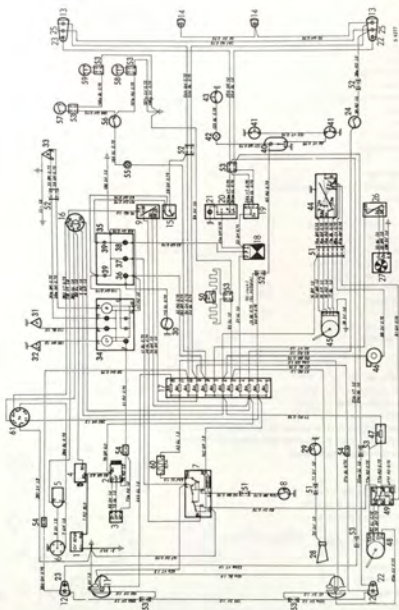
| | |
|----|--------|
| BL | Blue |
| BR | Brown |
| GL | Yellow |
| GN | Green |
| RD | Red |
| SV | Black |
| VT | White |



DETAIL OF WIRING DIAGRAM, SAAB 95 R.H.D., MODEL 1975



WIRING DIAGRAM, SAAB 96 R.H.D., MODEL 1975



WIRING DIAGRAM, SAAB 96 L.H.D., MODEL 1975

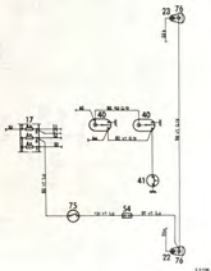
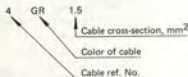
WIRING DIAGRAM, SAAB 96 R.H.D., AND DETAIL
OF WIRING DIAGRAM, SAAB 95 R.H.D., MODEL
1976

1. Battery
2. Alternator
3. Voltage regulator
4. Starter motor
5. Ignition coil
6. Ignition distributor
7. Lighting relay
8. Headlight dimmer/flasher switch
9. Light switch
10. High beam
11. Dimmed beam
12. Front parking light
13. Tail light
14. License plate light
15. Rheostat, instrument panel illumination
16. Ignition switch
17. Fuse box
18. Direction indicator flasher unit
19. Direction indicator switch
20. Hazard warning signal switch
21. Hazard warning signal repeater
22. Direction indicator lights, L
23. Direction indicator lights, R
24. Brake light switch
25. Brake light
26. Ventilator fan switch
27. Ventilator fan motor
28. Horn
29. Horn switch
30. Brake warning switch
31. Oil warning switch
32. Temperature transmitter
33. Fuel level transmitter
34. Combination instrument: fuel gauge, fuel warning light, temperature gauge, oil warning light, charging light, instrument panel illumination
35. Speedometer
36. Brake warning light
37. High beam indicator light
38. Direction indicator warning light
39. Instrument panel illumination
40. Dome light
41. Door switch, interior lighting
42. Trunk light
43. Trunk light switch
44. Wiper system switch
45. Windshield wiper
46. Washer motor
50. Seat heating elements with thermostat
51. 8-pin connector

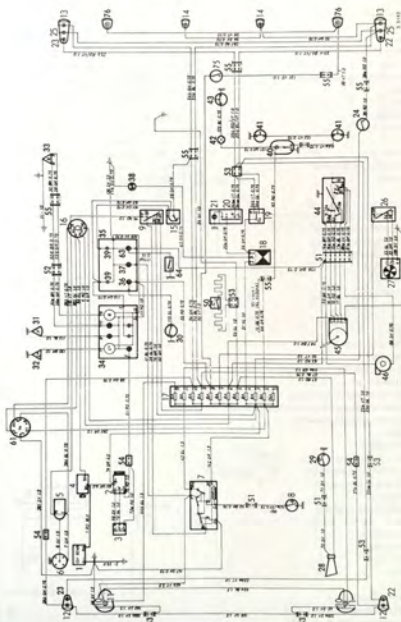
52. 3-pin connector
53. 2-pin connector
54. 1-pin connector
55. 12-pin connector
60. Resistance, dimmed light
61. Service outlet, ignition
63. Warning light, choke
64. Contact, choke control
75. Back-up light switch
76. Back-up lights

Color code

| | |
|----|--------|
| BL | Blue |
| BR | Brown |
| GL | Yellow |
| GN | Green |
| GR | Grey |
| RD | Red |
| SV | Black |
| VT | White |



DETAIL OF WIRING DIAGRAM, SAAB 95 R.H.D., MODEL
1976



WIRING DIAGRAM, SAAB 96 R.H.D., MODEL 1976

WIRING DIAGRAM, SAAB 96 L.H.D. AND DETAIL OF WIRING DIAGRAM, SAAB 95 L.H.D., MODEL 1976

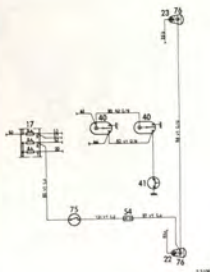
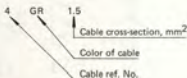
The range of the electrical system is shown by the wiring system on the next page.

1. Battery
2. Alternator
3. Voltage regulator
4. Starter motor
5. Ignition coil
6. Ignition distributor
7. Lighting relay
8. Headlight dimmer/flasher switch
9. Light switch
10. High beam
11. Dimmed beam
12. Front parking light
13. Tail light
14. License plate light
15. Resistance switch, instrument
16. Ignition switch
17. Fuse box
18. Direction indicator flasher unit
19. Direction indicator switch
20. Hazard warning signal switch
21. Hazard warning signal repeater
22. Direction indicator lights, L
24. Stop light contact
25. Stop lights
26. Ventilator fan switch
27. Ventilator fan motor
28. Horn
29. Horn contact
30. Brake warning contact
31. Oil warning contact
32. Temperature transmitter
33. Fuel level transmitter
34. Combination instrument: fuel gauge, fuel warning light, temperature gauge, oil warning light, ignition light, instrument panel illumination
35. Speedometer
36. Brake warning light
37. High beam indicator light
38. Direction indicator repeater light
39. Instrument panel illumination
40. Dome light
41. Door contact, interior lighting
42. Trunk light
43. Trunk light contact
44. Wiper system switch
45. Windshield wiper
46. Washer motor
47. Fuse holder
48. Headlight wiper motor
49. Headlight wiper motor relay
50. Seat heating element with thermostat
51. 8-pin connector
52. 3-pin connector
53. 2-pin connector

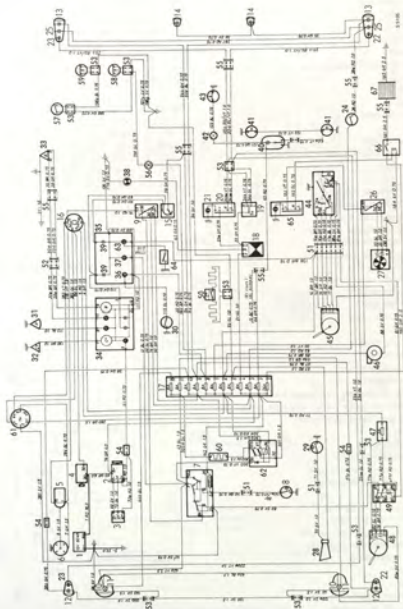
54. 1-pin connector
55. 12-pin connector
56. Seat belt warning light
57. Seat contact
58. Belt contact, L
59. Belt contact, R
60. Resistance, dimmed beam
61. Service outlet, ignition system
62. Town-light relay
63. Choke control lamp
64. Choke control contact
65. Switch, electrically heated rear window
66. Electrically heated rear window
75. Back-up light contact
76. Back-up lights

Color code

| | |
|----|--------|
| BL | Blue |
| BR | Brown |
| GL | Yellow |
| GN | Green |
| RD | Red |
| SV | Black |
| VT | White |



DETAIL OF WIRING DIAGRAM, SAAB 95 L.H.D., MODEL 1976



WIRING DIAGRAM, SAAB 96 L.H.D., MODEL 1976

WIRING DIAGRAM, SAAB 96 L.H.D. AND DETAIL OF WIRING DIAGRAM SAAB 95 L.H.D., MODEL 1977

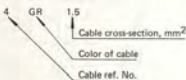
The range of the electrical system is shown by the wiring system on next page.

1. Battery
2. Alternator
3. Voltage regulator
4. Starter motor
5. Ignition coil
6. Ignition distributor
7. Lighting relay
8. Headlight dimmer/flasher switch
9. Light switch
10. High beam
11. Low beam
12. Front parking light
13. Tail light
14. Number plate light
15. Reostat, instrument panel illumination
16. Ignition switch
17. Fuse box
18. Direction indicator flasher unit
19. Direction indicator switch
20. Hazard warning flasher switch
21. Hazard warning flasher repeater
22. Direction indicator lights, L
23. Direction indicator lights, R
24. Brake light switch
25. Brake light
26. Ventilator fan switch
27. Ventilator fan motor
28. Horn
29. Horn switch
30. Brake warning switch
31. Oil warning switch
32. Temperature transmitter
33. Fuel level transmitter
34. Combination instrument: fuel gauge, fuel warning light, temperature gauge, oil warning light, charging light, instrument panel illumination
35. Speedometer
36. Brake warning light
37. High beam indicator light
38. Direction indicator warning light
39. Instrument panel illumination
40. Dome light
41. Door switch, interior lighting
42. Luggage compartment light
43. Luggage compartment light switch
44. Wiper and washers system switch
45. Windshield wiper motor
46. Washer motor
47. Fuse holder
48. Headlight wiper motor
49. Headlight wiper motor relay
50. Seat heating elements with thermostat
51. 8-pin connector
52. 3-pin connector
53. 2-pin connector

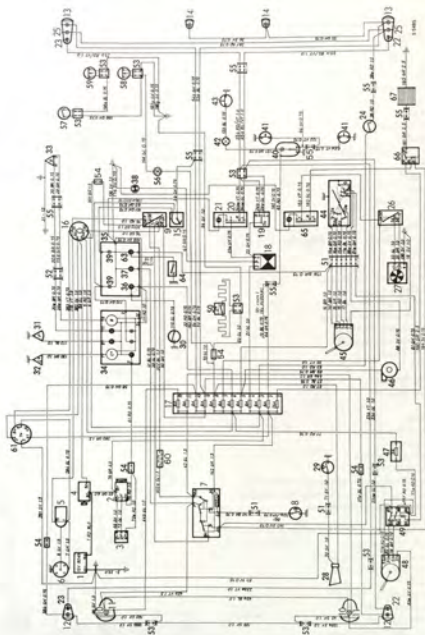
54. 1-pin connector
55. 12-pin connector
56. Seat belt warning light
57. Seat contact
58. Belt contact, L
59. Belt contact, R
60. Resistance, town light
61. Service outlet, ignition
63. Warning light, choke
64. Contact, choke control
65. Switch, electrically heated rear window
66. Relay, electrically heated rear window
67. Electrically heated rear window
75. Reversing light switch
76. Reversing lights

Color code

| | |
|----|--------|
| BL | Blue |
| BR | Brown |
| GL | Yellow |
| GN | Green |
| RD | Red |
| SV | Black |
| VT | White |



DETAIL OF WIRING DIAGRAM, SAAB 95 L.H.D., MODEL 1977



WIRING DIAGRAM, SAAB 96 L.H.D., MODEL 1977

WIRING DIAGRAM SAAB 96 L.H.D. AND DETAIL OF WIRING DIAGRAM SAAB 95 L.H.D., MODEL 1977 B

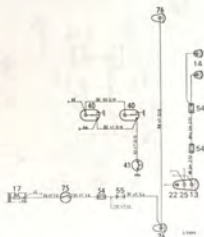
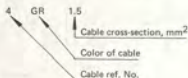
The range of the electrical system is shown by the wiring system on next page.

1. Battery
2. Alternator
3. Voltage regulator
4. Starter motor
5. Ignition coil
6. Ignition distributor
7. Lighting relay
8. Headlight dimmer/flasher switch
9. Light switch
10. High beam
11. Low beam
12. Front parking light
13. Tail light
14. Number plate light
15. Rheostat, instrument panel illumination
16. Ignition switch
17. Fuse box
18. Direction indicator flasher unit
19. Direction indicator switch
20. Hazard warning flasher switch
21. Hazard warning flasher repeater
22. Direction indicator lights, L
23. Direction indicator lights, R
24. Brake light switch
25. Brake light
26. Ventilator fan switch
27. Ventilator fan motor
28. Horn
29. Horn switch
30. Brake warning switch
31. Oil warning switch
32. Temperature transmitter
33. Fuel level transmitter
34. Combination instrument: fuel gauge, fuel warning light, temperature gauge, oil warning light, charging light, instrument panel illumination
35. Speedometer
36. Brake warning light
37. High beam indicator light
38. Direction indicator warning light
39. Instrument panel illumination
40. Dome light
41. Door switch, interior lighting
42. Luggage compartment light
43. Luggage compartment light switch
44. Wiper and washers system switch
45. Windshield wiper motor
46. Washer motor
47. Fuse holder
48. Headlight wiper motor
49. Headlight wiper motor relay
50. Seat heating elements with thermostat

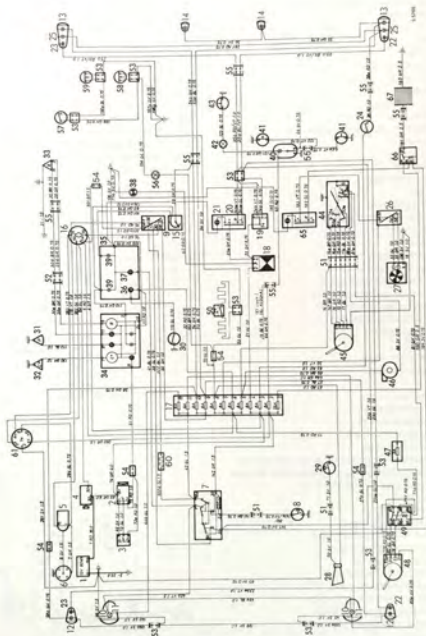
51. 8-pin connector
52. 3-pin connector
53. 2-pin connector
54. 1-pin connector
55. 12-pin connector
56. Seat belt warning light
57. Seat contact
58. Belt contact, L
59. Belt contact, R
60. Resistance, town light
61. Service outlet, ignition
65. Switch, electrically heated rear window
66. Relay, electrically heated rear window
67. Electrically heated rear window
75. Reversing light switch
76. Reversing lights

Color code

| | |
|----|--------|
| BL | Blue |
| BR | Brown |
| GL | Yellow |
| GN | Green |
| RD | Red |
| SV | Black |
| VT | White |



DETAIL OF WIRING DIAGRAM, SAAB 95 L.H.D., MODEL 1977 B



WIRING DIAGRAM, SAAB 96 L.H.D., MODEL 1977 B

WIRING DIAGRAM SAAB 96 L.H.D. MODELS 1978 AND 1979, AND DETAIL OF WIRING DIAGRAM SAAB 95 L.H.D. MODEL 1978

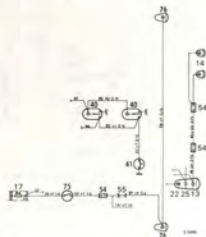
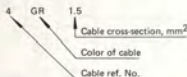
The range of the electrical system is shown by the wiring system on next page.

1. Battery
2. Alternator
3. Voltage regulator
4. Starter motor
5. Ignition coil
6. Ignition distributor
7. Lighting relay
8. Headlight dimmer/flasher switch
9. Light switch
10. High beam
11. Low beam
12. Front parking light
13. Tail light
14. Number plate light
15. Rheostat, instrument panel illumination
16. Ignition switch
17. Fuse box
18. Direction indicator flasher unit
19. Direction indicator switch
20. Hazard warning flasher switch
21. Hazard warning flasher repeater
22. Direction indicator lights, L
23. Direction indicator lights, R
24. Brake light switch
25. Brake light
26. Ventilator fan switch
27. Ventilator fan motor
28. Horn
29. Horn switch
30. Brake warning switch
31. Oil warning switch
32. Temperature transmitter
33. Fuel level transmitter
34. Combination instrument: fuel gauge, fuel warning light, temperature gauge, oil warning light, charging light, instrument panel illumination
35. Speedometer
36. Brake warning light
37. High beam indicator light
38. Direction indicator warning light
39. Instrument panel illumination
40. Dome light
41. Door switch, interior lighting
42. Luggage compartment light
43. Luggage compartment light switch
44. Wiper and washers system switch
45. Windshield wiper motor
46. Washer motor
47. Fuse holder
48. Headlight wiper motor

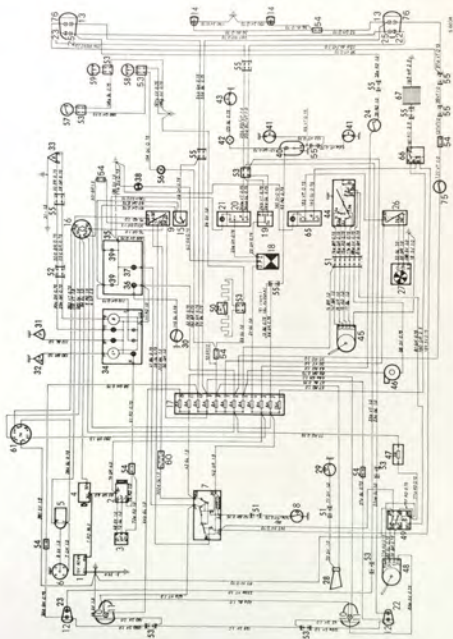
49. Headlight wiper motor relay
50. Seat heating elements with thermostat
51. 8-pin connector
52. 3-pin connector
53. 2-pin connector
54. 1-pin connector
55. 12-pin connector
56. Seat belt warning light
57. Seat contact
58. Belt contact, L
59. Belt contact, R
60. Resistance, town light
61. Service outlet, ignition
65. Switch, electrically heated rear window
66. Relay, electrically heated rear window
67. Electrically heated rear window
75. Reversing light switch
76. Reversing lights

Color code

| | |
|----|--------|
| BL | Blue |
| BR | Brown |
| GL | Yellow |
| GN | Green |
| RD | Red |
| SV | Black |
| VT | White |



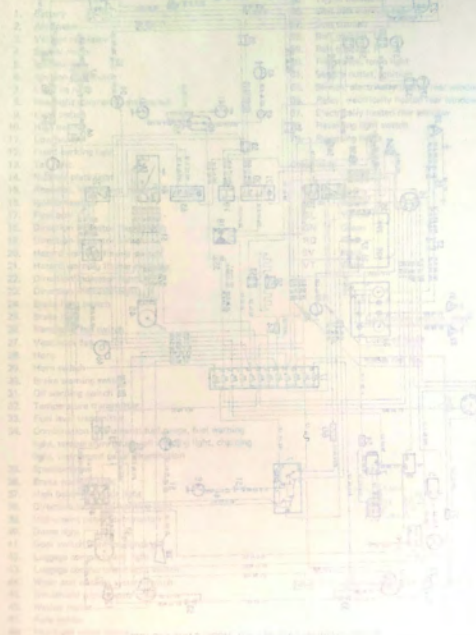
DETAIL OF WIRING DIAGRAM, SAAB 95 L.H.D., MODEL 1978



WIRING DIAGRAM, SAAB 96 L.H.D., MODELS 1978 AND 1979

KEYING OF THE WIRING DIAGRAM BY THE NUMBER OF THE
AND THE AND DETAIL OF THE WIRING DIAGRAM
GIVEN IN THE MODEL 1000

The diagram of the electrical system is shown by the wiring
system in the model 1000.



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CONTENT

400 GENERAL

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GEAR BOX

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CONTENTS

FOREWORD

ACKNOWLEDGMENTS

ABBREVIATIONS

CHAPTER I

THEORY OF THE ATOM

THEORY OF THE MOLECULE

THEORY OF THE CRYSTAL

THEORY OF THE LIQUID

GENERAL

CLUTCH

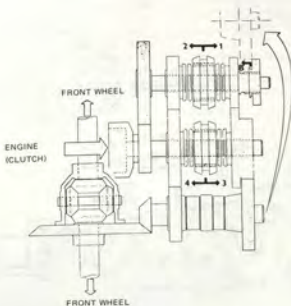
The clutch is a single dry plate type, comprising clutch disc, pressure plate assembly and release bearing. The clutch plate consists of a resilient steel disc attached to a splined hub sliding on the clutch shaft. The clutch facings are riveted to both faces of the disc. The pressure plate assembly, which consists of the clutch cover and a cast pressure plate under pressure from spiral springs, is attached to the flywheel by means of bolts. The coil springs are kept in place by guides on the pressure plate and the clutch cover. Three clutch release levers are carried on struts and riveted to the clutch cover. The pressure plate assembly is held together by the three clutch levers, which are secured by lugs on the struts. A spring loaded steel disc, against which the release bearing is pressed when declutching, rests on the inner ends of the clutch levers. The release bearing comprises a ball bearing held in a bearing housing, which is retained in the clutch fork by springs. A teflon coating on the ball bearing presses against the release plate when declutching. The power is transmitted from the flywheel via the clutch cover and pressure plate to the clutch disc, and from there to the clutch shaft. One end of the clutch shaft is carried in a self lubricating bearing in the crankshaft, and the other in a needle bearing in the gear box primary shaft. In the middle of the

clutch shaft is a ball bearing with radial clearance in the clutch cover but locked axially by means of retaining rings. Axial guiding of the clutch shaft is provided for by this bearing. The pressure plate is pressed against the clutch disc by the coil springs, and is when declutching moved away from the flywheel by the three clutch levers. The release bearing is supported by the clutch fork which is attached to the vertical release shaft carried in the gear box cover. The clutch operation is hydraulic. It comprises a master cylinder that is actuated by the clutch pedal. A hose connects the master cylinder to a slave cylinder which influences the clutch lever and release bearing.

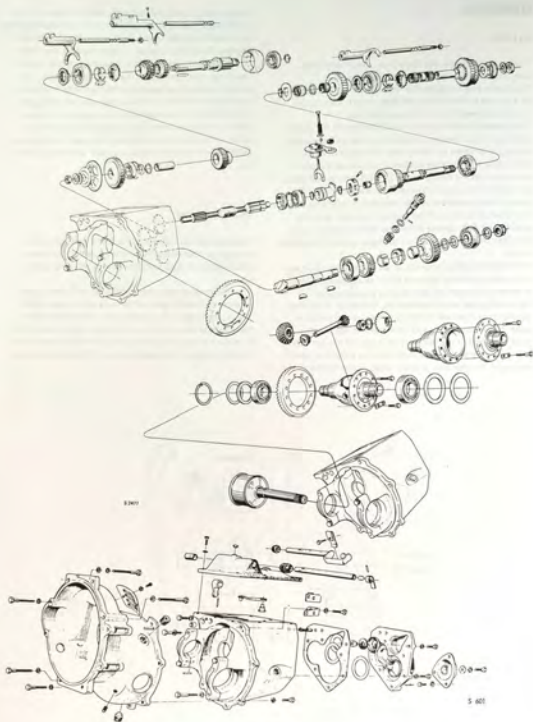
TRANSMISSION

The transmission is designed for front wheel drive and arranged so that all shafts with their gears, free wheel, differential and inner universal joint form a complete unit.

The transmission has synchromesh for all forward gears, whereas the reverse gear comprises a sliding gear wheel. The transmission train comprises an input clutch shaft, freewheel, primary shaft, countershaft, pinion shaft, differential and inner universal joints. The shafts are carried in ball bearings in the gear box cover. The unit is connected



DIAGRAMMATIC ARRANGEMENT OF TRANSMISSION



TRANSMISSION

ted to the engine by means of a clutch housing of light alloy, which also encases the differential. All gear wheels, except the reverse gear wheel, are helical cut and in constant mesh with one another.

Shaft borne gears are either carried on needle bearings or directly splined.

The transmission has synchronizers on both the primary shaft and the countershaft.

Gear changing movements are transmitted from the steering column gear shift lever to three shift forks. These shift forks are able to slide on their shafts and are locked in their respective gear positions by spring loaded poppet balls, which fit into recesses made for this purpose on the shafts.

In addition, arrangements are provided which make it impossible to engage two gears simultaneously.

The working of the transmission is shown by the explanatory sketch.

In 1st gear, power is transmitted from the primary shaft to the counter shaft via an intermediate gear behind the freewheel. The 1st speed gear, which is carried on the countershaft, is locked to the shaft by a sliding sleeve.

The power is then transmitted to the 3rd speed gear, which is borne on the primary shaft, and thence to the 3rd gear on the pinion shaft.

In 2nd gear, power is transmitted to the pinion shaft in the same way as when driving in 1st gear, except that the engagement sleeve now locks the 2nd speed gear, instead of the 1st to the countershaft.

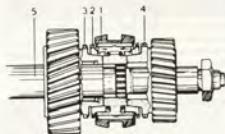
The power is then transmitted to the 4th speed gear on the main shaft and thence to the 4th gear on the pinion shaft.

In 3rd and 4th gears, power is transmitted from the primary shaft to the 3rd or 4th speed gear, as applicable, which is then locked to the primary shaft by means of a sliding sleeve. In reverse, power is transmitted from the primary shaft to the countershaft by way of the previously mentioned intermediate gear behind the freewheel. The reverse gear, splined to and sliding on the countershaft, meshes directly with the 3rd gear on the pinion shaft, thus turning the latter, together with the gears, in the reverse direction.

Synchronizer unit

The synchronizer unit functions as described in the following:

When the synchronizer sleeve is made to mesh with, for instance, the dog ring on the 3rd speed gear, it pushes in front of it an internally tapered bronze ring. This ring has external teeth corresponding to those of the gear dog ring. The bronze ring is able to change its position in relation to the sleeve by half a tooth space, and it also rotates at the same speed as the primary shaft. If the speed of the 3rd speed gear differs from that of the primary shaft at the moment when engagement should commence, the teeth on the bronze ring will move into the way of the internal teeth on the sleeve, thus preventing the sleeve from moving in the direction of the 3rd speed gear. The internal taper of the bronze ring is then forced over the external 3rd gear taper and the friction will cause the gear and sleeve to rotate at the same speed. The path is thus opened for the sleeve, enabling the synchronizer sleeve teeth to engage the teeth of the dog ring on the 3rd speed gear.



DIAGRAMMATIC ARRANGEMENT OF FREEWHEEL

1. Clutch shaft
2. Freewheel hub
3. Freewheel sleeve
4. Roller
5. Coil spring

Freewheel

The freewheel transmits the power from the clutch shaft to the transmission primary shaft. The freewheel hub, which is splined to the clutch shaft, has six roller seats each containing a roller. Each of the rollers is individually spring loaded by means of a coil spring and a plunger, which constantly try to press the roller up into the curved roller seat. The freewheel hub is enclosed in a cylindrical sleeve which is an integral part of the primary shaft. As from transmission No. F114860, the freewheel comprises ten rollers each with two springs and plungers. As from transmission No. 369279, more powerful springs and plungers have been introduced. Complete freewheels of earlier and later versions are fully interchangeable.

The clutch shaft is connected to the engine crankshaft, and when the engine is driving the car the freewheel engages, being caused to do so because the freewheel hub tends to rotate faster than the primary shaft. The rollers are then forced up onto the curve shaped roller seats in the freewheel hub.

When the rollers are held between the freewheel hub and the sleeve, the primary shaft is forced to rotate at the same speed as the clutch shaft, with which it is thus virtually united. If, on the other hand, the primary shaft tends to rotate faster than the clutch shaft, as may occur when running downhill with the engine idling, for example, the rollers are released, i.e. they are carried back to their curve shaped seats by the freewheel sleeve. Consequently, the sleeve — the primary shaft — is able to rotate faster than the clutch shaft.

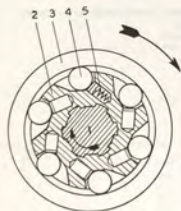
The freewheel is equipped with a blocking device by means of which it can be completely locked.

Differential and speedometer drive

The speedometer drive is taken from the transmission pinion shaft, being transmitted by way of a worm gear to the connection for the speedometer cable.

The differential comprises two differential gears and two front drive shaft gears, one for each front drive shaft.

The differential and front drive shaft gears have plain bevel teeth. The shaft gears are splined on stubs, through which they are connected with inner universal joints and inner drive shafts. The ring gear, to which the pinion shaft transmits the transmission torque, is bolted to the differential case.



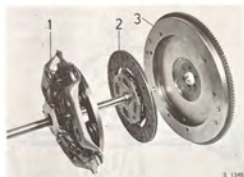
DIAGRAMMATIC ARRANGEMENT OF FREEWHEEL

- | | |
|---------------------|----------------|
| 1. Clutch shaft | 4. Roller |
| 2. Freewheel hub | 5. Coil spring |
| 3. Freewheel sleeve | |

CLUTCH

REMOVAL

1. Lift the engine out of the car, see section 201.
2. Slacken successively and back off the six bolts holding the pressure plate assembly to the flywheel.
3. Remove the pressure plate assy, and the clutch disc.



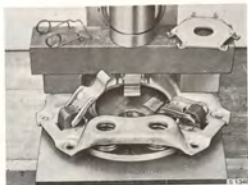
CLUTCH WITH FLYWHEEL

1. Clutch housing with pressure plate
2. Clutch disc
3. Flywheel

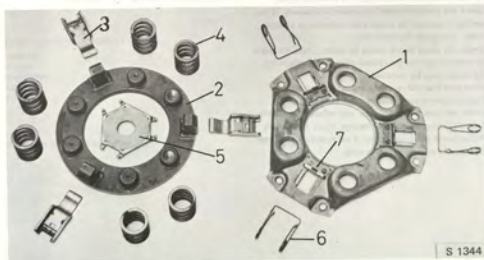
DISASSEMBLY AND REASSEMBLY

Before disassembling the pressure plate assembly, mark all the parts in order to ensure reassembly in the same relative positions. This is important in view of clutch balance.

1. Lift the three retaining springs, and remove the release plate.
2. Compress the clutch springs in a press.



DISASSEMBLY OF CLUTCH IN A PRESS

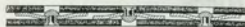


CLUTCH, DISASSEMBLED

1. Clutch cover
2. Pressure plate
3. Clutch release lever
4. Spring
5. Release plate
6. Retaining spring
7. Strut

3. Remove the clutch release levers from the clutch cover.
4. Reduce slowly the pressure in the press.
5. Remove the clutch cover from the pressure plate.
6. Remove the clutch springs.

Reassemble in the reverse order.



LOCATION OF FACING RIVETS

8. After having fitted new facings, the clutch disc should be checked for skewness. Check with the aid of a dial indicator and an arbor.

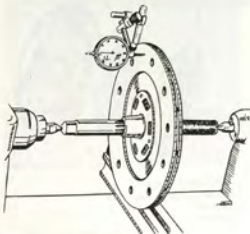
INSTALLATION

1. Insert the clutch disc, and refit the pressure plate assembly in the flywheel.
2. Center the clutch disc with the arbor, tool 78 40 648, which fits into the clutch disc bearing in the crankshaft end.
3. Tighten gradually the six retaining bolts of the clutch.
4. Install the engine, see section 201.

CLUTCH DISC

Checking the clutch and changing disc facings

1. Examine the clutch face in the flywheel. Burns or small scratches on the face are of minor importance. If deep scores are present, on the other hand, the flywheel should be machined or a new one fitted.
2. Check the pressure plate for scores or skewness. If the surface is uneven, fit a new pressure plate or alternatively, face grind the worn face.
3. Check the three clutch levers for wear. These are worn by pressure against the release plate. When checking, the latter must be removed.
4. Make sure that the release plate is undamaged.
5. Examine the release bearing.
6. Check the clutch disc for wear and reface if necessary.
7. Before riveting on the new facings, check the setting of the clutch plate and adjust if necessary. All the segments must have the same setting.



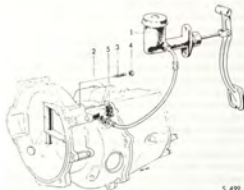
CHECKING THROW OF CLUTCH DISC

CLUTCH OPERATION

Up to and incl. model 1968

REMOVAL AND INSTALLATION OF CLUTCH PEDAL

1. Remove the cotter and washer, and pull out the pin retaining the master cylinder push rod.
2. Remove the cotter and washer from the pedal shaft.
3. Lift the pedal clear of the spring and pull it off the shaft.
4. Remove the spring.
5. Before reinstalling, grease the pedal bearings with chassis grease.



CLUTCH PEDAL WITH ADJUSTMENT DEVICE

1. Master cylinder
2. Slave cylinder
3. Adjustment screw
4. Stop nut
5. Bleeder nipple

Installation takes place in the reverse sequence.

ADJUSTMENT OF CLUTCH PEDAL FREE MOVEMENT

The clearance between release bearing and release plate is gradually decreased by wear on the clutch facings. Adjust the clutch pedal free movement with the screw on the clutch housing. This screw is located on the opposite side in relation to the slave cylinder. The free movement is increased by turning the screw counter clockwise.

The clearance is checked by pressing the slave cylinders connection to the clutch arm. A movement of 0.16 in. (4 mm) here, gives the correct clutch clearance.



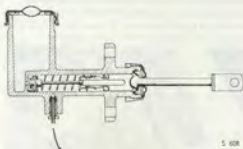
ADJUSTING THE CLUTCH CLEARANCE

Correct clutch clearance: A = 0.16 in. (4 mm)

MASTER CYLINDER

General

The master cylinder is a cast unit containing the cylinder and fluid reservoir.



MASTER CYLINDER, CUT-AWAY VIEW

The cylinder consists of a housing of light alloy with a surface polished bore and with an inner assembly, made up to the push rod, cupped washer, lock ring, piston, end seal, piston seal, spring retainer, piston return spring, valve spacer, elastic washer, valve spindle and valve seal. The open end of the cylinder is protected by a rubber dust cap.

When the piston returns to the position of rest, the valve which affords a seal in the bottom of the cylinder during disengagement opens. When the valve is open the fluid is able to pass freely from the slave cylinder to the reservoir.

Removal

1. Detach the hose from the slave cylinder and pump out the fluid into a clean vessel.
2. Separate the push rod from the clutch pedal by removing the cotter, the plain washer and the pin.
3. Back off and remove the retaining bolts and remove the master cylinder from the dash panel.

Disassembly

Ease the rubber dust cap back and remove the lock ring, using long nosed pliers. It is now possible to remove the push rod and the cupped washer. Removal of the push rod reveals the piston and its seal. Remove the complete piston assembly. The assembly can be disassembled by lifting the retainer spring leaf over the tongued end of the piston. Carefully take the piston seal off the piston and remove the end seal.

Push down the piston return spring, thus enabling the valve spindle to slide through the key shaped hole in the retainer so that the spring lets go. Remove the valve spacer, taking care not to damage the elastic washer located under the valve head. Remove the seal from the valve head. Examine the cylinder bore and if it is not scored or distorted, and feels smooth to the touch, new seals may safely be fitted. If, on the other hand, the slightest doubt is entertained about the condition of the bore, a new cylinder should be fitted.

If the old seals are loose on the piston and too big, contamination by mineral oil may be suspected. This is the commonest cause of cylinder trouble, and often sufficient



MASTER CYLINDER, DISASSEMBLED

- | | |
|---------------------|---------------------------------|
| 1. Cylinder housing | 8. Spring retainer |
| 2. Hose | 9. Seal |
| 3. Seal | 10. Piston |
| 4. Rod | 11. Rubber dust cap |
| 5. Elastic washer | 12. Push rod with cupped washer |
| 6. Valve spacer | 13. Lock ring |
| 7. Spring | 14. Clutch pedal |

pains are not taken to prevent it. Seals of natural rubber are highly susceptible, and even minute quantities of oil can gradually cause considerable swelling. If the slightest trouble in this respect is suspected, fit new seals throughout the system and flush the system clean with pure brake fluid.

Reassembly

Fit the seal with its flat side properly located on the valve head. Then put on the elastic washer with its cupped side facing the lower side of the valve head, retaining it in position by means of the valve spacer, the legs of which are turned towards the valve seal. Refit the piston return spring, centering it on the washer, insert the spring retainer in the spring and press down until the valve spindle bottoms through the key shaped hole. At the same time, check that the spindle is correctly located in the middle of the retainer. Check that the spring is still centered on the spacer. Fit a new seal on the piston with its flat side towards the seat of the piston.

Insert the small end of the piston in the retainer until the retainer spring leaf engages the piston tongue. Press the retainer leaf fully home.

Lubricate the piston thoroughly with Wakefield/Girling Rubber Grease 3 and refit the assembly in the cylinder bore, valve end first, at the same time easing the piston seal lips slowly into the bore.

Remount the push rod in the cylinder, followed by the lock ring, placing this in the milled groove in the cylinder body. Replace the rubber dust cap or, if it is damaged, fit a new one.

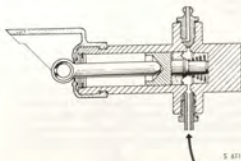
Installation

1. Install the master cylinder in position on the dash panel.
2. Attach the push rod to the clutch pedal by inserting the pin through the holes in the push rod fork and the hole in the clutch pedal. Refit the plain washer and secure with the cotter.
3. Reconnect the hose.
4. Bleed the system.

SLAVE CYLINDER

General

The slave cylinder is secured to the clutch housing by means of a screw. The inner assembly comprises the push rod, lock ring, piston and piston spring. The open end of the cylinder is protected by a rubber dust cap and a bleed nipple is located in the bleeder opening.



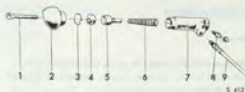
SLAVE CYLINDER, CUT-AWAY VIEW

Removal

1. Disconnect the hose and pump out the fluid into a clean vessel.
2. Back off the retaining screw(s) for the cylinder.
3. Separate the cylinder from the push rod and clutch housing.

Disassembly

Ease the dust cap back and remove the lock ring, using long nosed pliers. The piston with seal can now be removed, followed by the spring. Examine the cylinder bore and if it is not scored or distorted, and feels smooth to the touch, a new seal can be fitted. If, on the other hand, the slightest doubt is entertained about the condition of the bore, a new cylinder should be fitted.



SLAVE CYLINDER, DISASSEMBLED

- | | |
|--------------------|------------------|
| 1. Push rod | 6. Spring |
| 2. Rubber dust cap | 7. Cylinder body |
| 3. Lock ring | 8. Bleeder screw |
| 4. Seal | 9. Hose |
| 5. Piston | |

Reassembly

Reassemble by following in reverse sequence the instructions given for "Disassembly", taking pains to lubricate the seal and to pack the rubber boot with Wakefield/Girling Rubber Grease No. 3. Always lubricate the cylinder bore with brake fluid when reassembling this unit.

Installation

1. Locate the slave cylinder on the clutch housing and pass the push rod through the hole in the rubber dust cap.
2. Refit and tighten the retaining screw.
3. Reconnect the hose.
4. Bleed the system.

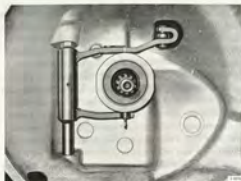
BLEEDING THE MASTER CYLINDER AND SLAVE CYLINDER

1. Connect a hose (internal diameter approx. 0.25 in., 6 mm) to bleeding nipple of the slave cylinder. Place the free end of the hose in a collecting vessel partly filled with brake fluid.
2. Fill the master cylinder reservoir with brake fluid.
3. Open the bleed nipple of the slave cylinder half a turn.
4. Place a cooling system tester at the filling hole of the master cylinder.
5. Pump several times with the hand pump, until all air has left the system.
6. Close the bleeding nipple of the slave cylinder.
7. By depressing the clutch pedal, check that there is no air left.

RELEASE BEARING

Removal and installation

1. Lift the engine out of the car, see section 201.
2. Turn the clutch lever forward and remove the two spring clips retaining the release bearing in the fork.



RELEASE BEARING ATTACHMENT

3. Remove the release bearing. After changing the bearing, reinstall in the reverse sequence. If the release bearing is provided with a graphite ring, the ring must not be worn with its retainer.

IMPORTANT

Always make sure that the spring clips are correctly located.

As from model 1969

REMOVAL AND INSTALLATION OF CLUTCH PEDAL

1. Remove the protective cover of the steering wheel shaft.
2. Remove the cotter pin and washer, and pull out the push rod of the master cylinder.
3. Slacken the return spring of the clutch pedal.
4. Remove the lock washer of the pedal shaft. Remove the pedal.
5. If necessary, remove the springs.
6. Before the refitting, grease the pedal bearings with chassis grease.

Installation takes place in the reverse order.

ADJUSTMENT OF CLUTCH PEDAL FREE MOVEMENT

The clearance between release bearing and release plate is gradually decreased by wear on the clutch facings. Adjust the clutch pedal free movement with the screw on the clutch housing, located in the opposite side in relation to the slave cylinder. The free movement is increased by turning the screw counter clockwise. The clearance is checked by pressing the slave cylinders connection to the clutch arm. A movement of 0.16 in. (4 mm) here, gives the correct clutch clearance.



ADJUSTING THE CLUTCH CLEARANCE
Correct clutch clearance: A = 0.16 in. (4 mm)

MASTER CYLINDER

General

The master cylinder consists of a cast body with a fluid container of plate enclosing the cylinder housing. The operating unit consists of the following main parts: push rod, piston, piston seal and return spring. For sealing at the push rod end there is a pair of rubber bellows.



MASTER CYLINDER, EXPLODED VIEW

1. Housing
2. Spring
3. Spring retainer
4. Gasket
5. Washer
6. Piston
7. Gasket
8. Lock ring
9. Seal bellows
10. Push rod
11. Axle bolt

Removal

1. Detach the hose from the slave cylinder and pump the fluid into a clean container.
2. Separate the push rod attachment from the clutch pedal by removing the cotter pin and the axle bolt.
3. Back off and remove the retaining bolts and remove the master cylinder.

Disassembly

Ease the rubber dust cap back and remove the lock ring, using long nosed pliers. Remove the push rod and its washer. The piston and its seal now become visible. Remove the piston, washer, piston seal and spring. Gently take the seal off the piston.

Examine the cylinder bore and if it is not scored or distorted, and feels smooth to the touch, new seals can be fitted. If, on the other hand, the slightest doubt is entertained about the condition of the bore, a new cylinder should be fitted.

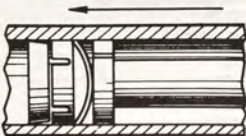
If the old seals are loose on the piston and too big, contamination by mineral oil may be suspected. This is the commonest cause of cylinder trouble. Seals of natural rubber are highly susceptible to mineral oil, and even minute quantities of oil can gradually cause considerable swelling. If oil is suspected, fit new seals throughout the system and flush the system clean with pure brake fluid.

Reassembly

Fit the return spring and spring retainer. Lubricate the piston and seals thoroughly with Wakefield/Girling Rubber Grease 3 and refit gasket, washer, and piston with gaskets.

NOTE

When fitting the washer, make the convex side face the piston.



POSITIONING OF WASHER

Fit the push rod into the cylinder, followed by the washer and the lock ring, placing the latter in the cylinder housing groove. Refit the seal bellows, or fit new ones if the old ones are damaged.

Installation

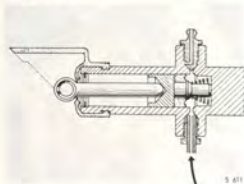
1. Install the master cylinder in position.
2. Attach the push rod to the clutch pedal by inserting the pin through the holes in the push rod fork and the hole in the clutch pedal. Refit and secure with the cotter pin.
3. Reconnect the hose.
4. Bleed the system.

SLAVE CYLINDER

General

The slave cylinder is fastened to the clutch cover with a bolt.

The inner assembly comprises the push rod, lock ring, piston and piston spring. The open end of the cylinder is protected by a rubber dust cap. A bleed nipple is located in the bleeder opening.



SLAVE CYLINDER, CUT-AWAY VIEW

Removal

1. Disconnect the hose and pump the fluid into a clean vessel.
2. Back off the retaining screw for the cylinder.
3. Separate the cylinder from the push rod and clutch housing.

Disassembly

Ease the dust cap back and remove the lock ring, using long nosed pliers. The piston with seal attached can now be removed, followed by the spring. Examine the cylinder bore and if it is not scored or distorted, and feels smooth to the touch, a new seal can be fitted. If, on the other hand, the slightest doubt is entertained about the condition of the bore, a new cylinder should be fitted.



SLAVE CYLINDER, DISASSEMBLED

- | | |
|--------------------|------------------|
| 1. Push rod | 6. Spring |
| 2. Rubber dust cap | 7. Cylinder body |
| 3. Lock ring | 8. Bleeder screw |
| 4. Seal | 9. Hose |
| 5. Piston | |

Reassembly

Reassemble by following in reverse sequence the instructions given for "Disassembly", taking pains to lubricate the seal and to pack the rubber boot with Wakefield/Girling Rubber Grease No. 3. Always lubricate the cylinder bore with brake fluid when reassembling this unit.

Installation

1. Locate the slave cylinder on the clutch housing and pass the push rod through the hole in the rubber dust cap.
2. Refit and tighten the retaining screw.
3. Reconnect the hose.
4. Bleed the system.

BLEEDING THE MASTER CYLINDER AND SLAVE CYLINDER

1. Connect a hose (internal diameter approx. 0.25 in, 6 mm) to bleeding nipple of the slave cylinder. Place the free end of the hose in a collecting vessel partly filled with brake fluid.
2. Fill the master cylinder reservoir with brake fluid.
3. Open the bleed nipple of the slave cylinder half a turn.
4. Place a cooling system pressure tester at the filling hole of the master cylinder.



BLEEDING THE CLUTCH SYSTEM

5. Pump several times with the hand pump, until all air has left the system.
6. Close the bleeding nipple of the slave cylinder.
7. By depressing the clutch pedal, check that there is no air left.

Remove the master cylinder from the vehicle and place it on a clean work surface. The master cylinder is located in the rear of the vehicle. The master cylinder is the main source of hydraulic pressure for the entire system. It is located in the rear of the vehicle, behind the rear wheel. The master cylinder is the main source of hydraulic pressure for the entire system. It is located in the rear of the vehicle, behind the rear wheel. The master cylinder is the main source of hydraulic pressure for the entire system. It is located in the rear of the vehicle, behind the rear wheel.

1. Inspect the master cylinder for leaks and damage. If there are any leaks, the master cylinder must be replaced.
2. Clean the master cylinder with a clean cloth. Do not use any solvents or cleaners.
3. Check the master cylinder for proper operation. The master cylinder should move smoothly and without any resistance.
4. If the master cylinder is not working properly, it must be replaced.

SLAVE CYLINDER DISASSEMBLY

General

1. Remove the master cylinder from the vehicle.

2. Remove the master cylinder from the vehicle.

3. Remove the master cylinder from the vehicle.

4. Remove the master cylinder from the vehicle.

5. Remove the master cylinder from the vehicle.

6. Remove the master cylinder from the vehicle.

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SLAVE CYLINDER DISASSEMBLY

General

1. Remove the master cylinder from the vehicle.

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BLEEDING THE MASTER CYLINDER AND SLAVE CYLINDERS

1. Connect a hose between the master cylinder and the slave cylinder. The hose should be connected to the master cylinder and the slave cylinder. The hose should be connected to the master cylinder and the slave cylinder. The hose should be connected to the master cylinder and the slave cylinder.
2. The master cylinder is the main source of hydraulic pressure for the entire system. It is located in the rear of the vehicle, behind the rear wheel. The master cylinder is the main source of hydraulic pressure for the entire system. It is located in the rear of the vehicle, behind the rear wheel.
3. Open the bleed nipple of the slave cylinder. The bleed nipple is located on the slave cylinder. The bleed nipple is located on the slave cylinder. The bleed nipple is located on the slave cylinder.
4. Place a clean system pressure gauge on the bleed nipple of the slave cylinder. The pressure gauge should be placed on the bleed nipple of the slave cylinder. The pressure gauge should be placed on the bleed nipple of the slave cylinder. The pressure gauge should be placed on the bleed nipple of the slave cylinder.

Place a clean system pressure gauge on the bleed nipple of the slave cylinder. The pressure gauge should be placed on the bleed nipple of the slave cylinder. The pressure gauge should be placed on the bleed nipple of the slave cylinder. The pressure gauge should be placed on the bleed nipple of the slave cylinder. The pressure gauge should be placed on the bleed nipple of the slave cylinder.



Remove the master cylinder from the vehicle. The master cylinder is the main source of hydraulic pressure for the entire system. It is located in the rear of the vehicle, behind the rear wheel. The master cylinder is the main source of hydraulic pressure for the entire system. It is located in the rear of the vehicle, behind the rear wheel. The master cylinder is the main source of hydraulic pressure for the entire system. It is located in the rear of the vehicle, behind the rear wheel.

1. Pump several times with the hand pump until all the air is removed from the system. The hand pump is located on the master cylinder. The hand pump is located on the master cylinder. The hand pump is located on the master cylinder.
2. Close the bleed nipple of the slave cylinder. The bleed nipple is located on the slave cylinder. The bleed nipple is located on the slave cylinder. The bleed nipple is located on the slave cylinder.
3. By operating the clutch pedal, check that there is no air in the system. The clutch pedal is located on the floor of the vehicle. The clutch pedal is located on the floor of the vehicle. The clutch pedal is located on the floor of the vehicle.



Remove the master cylinder from the vehicle. The master cylinder is the main source of hydraulic pressure for the entire system. It is located in the rear of the vehicle, behind the rear wheel. The master cylinder is the main source of hydraulic pressure for the entire system. It is located in the rear of the vehicle, behind the rear wheel. The master cylinder is the main source of hydraulic pressure for the entire system. It is located in the rear of the vehicle, behind the rear wheel.

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REMOVAL, INSTALLATION

REMOVAL

If work is to be done on the transmission unit only, the entire power unit must be lifted out. The engine is then separated from the transmission unit.

1. Disconnect the battery earth cable from the battery.
2. Remove the hood by opening it wide and then removing the locking springs for the hood hinges. Disconnect the hose for the windshield washer. Now grip the hinge stay, bending it slightly inwards to release the pin on one side. An assistant will hold the hood on the other side and help to lift it off.



REMOVAL OF ENGINE HOOD

Remove the windshield washer container and the washer pump.

3. Drain off the cooling water through the radiator draining tap. To ensure that draining will be as effective as possible, bleed the system through the bleed nipple on the heat exchanger. Save the coolant.

Up to and incl. model 1968

4. Disconnect the headlight and direction indicator cables.
5. Back off the four screws for the front panel and detach the two radiator supports from the car body. Detach the clamping straps from the radiator and remove the hood lock and control wire.

Model 1969-1970

4. Remove the headlight decor frames. Disconnect the headlight cables.
5. Back off the four screws for the front panel and detach the two radiator supports from the car body. Detach the clamping straps from the radiator and remove the engine hood control wire.

As from model 1971 (with headlight washer)

4. Remove the headlight decor frames. Disconnect the hoses for the headlight washers from the respective nozzles. Disconnect the headlight cables.

5. a. Back off the four screws for the front panel and detach the two radiator supports from the car body. Detach the clamping straps from the radiator and remove the control wire.
b. Bend the upper bracket on the expansion tank backwards so that the headlight washer motor goes clear.
c. Detach the cables from the headlight washer motor (note the connection positions of the cables).



REMOVAL OF FASTENING SCREWS, FRONT PLATE

6. Remove the front panel, taking great care to avoid damaging the paintwork.



REMOVAL OF FRONT PLATE

7. Disconnect the upper coolant hose from the engine and the lower coolant hose from the radiator.
8. Back off and remove the two lower radiator retaining screws and remove the radiator and the expansion tank.
9. Disconnect all hoses and cables from the engine. Note the positions of the cable connections on the alternator.
10. Remove the air cleaner. Cover the carburetor air inlet to prevent the entry of foreign matter into the engine.
11. Remove the throttle control, the preheater cover and the engine's lateral support. Leave the attachment yoke for the lateral support on the engine.
12. Back off and remove the flange nuts for the exhaust pipes at the cylinder heads. Remove the lower clamps for the exhaust pipes at the engine cushions.
13. Remove the rubber cushions for the middle exhaust pipe from under the floor.
14. Remove the spacers at the cylinder heads and lower the muffler as far as possible.
15. Remove the two front engine cushions, working from above.
16. Disconnect the freewheel control from the gearbox.
17. Back off the rear retaining screw holding the clutch cylinder and hang the cylinder up in a suitable position. Collect the shims, if any, fitted between the cylinder and the gearbox.
18. Remove the gear shift rod joint from the gearbox after removal of the taper pin.
19. Disconnect the speedometer cable from the gear box.
20. Lift up the front part of the floor mat and remove the rubber plug so that the center screw of the rear engine bracket becomes accessible. As from model 1971: Remove the warm air channel and fold away the insulating felt. Remove the screw with the aid of a 9/16 in. socket with extension.
21. Jack up the car and place trestles in the front edges of the sills so that the front wheels are clear of the floor.
22. Undo the large clamps round the rubber boots on the inner universal joints.
23. Fit lifting beam 78 62 022. Lifting beams of recent design have a special hook on one side designed to be hooked into the attachment yoke for the lateral support. See the picture.

24. Attach the lifting hook to a suitable hoist and lift the engine carefully about 2 in. (50 mm). Pull the transmission pin out of the rear engine bracket.
25. Open up the inner universal joints, first on the right side and then on the left. Do this with the T-shaped pieces of the drive shafts located vertically and with the engine unit pushed over as far as possible in the opposite direction. Fit protective cover 73 23 736 in the rubber boots and 78 38 469 on the inner drivers.
26. Lift the power unit out of the engine compartment. Make sure that the distributor vacuum chamber is not damaged against the engine compartment cross stay.



REMOVAL AND INSTALLATION OF POWER UNIT

27. Clean the power unit and separate the transmission unit from the engine.

INSTALLATION

1. Check that the inner universal joints are filled with the appropriate grease. The joints must be completely filled with grease upon assembly.
2. Lift the power unit into the engine compartment, using the lifting hook, tool 78 62 022.
3. Lower the power unit so far that the engine brackets are about 2 in. (50 mm) from the engine cushions.
4. a. Place the T-pieces of the drive shafts in the inner universal joints. Do this with the T-pieces located vertically and with the power unit pushed over as far as possible in the opposite direction. Assembling is done first on the left side and then on the right.
b. Align the power unit to the rear engine bracket.
5. Lower the unit into position and tighten the front engine cushions.
6. Fit the engine side support and tighten it up when the engine is in place.
7. Lower the car onto the wheels.
8. Fit the clamps round the inner universal joints.
9. Tighten the bolt for rear engine bracket.

NOTE

Check that the limiting washer on the rear of the engine bracket is in position. This washer serves to limit the forward movement of the power unit. If the washer is missing, there is a risk that the cooling fan will collide with the radiator if the brakes are powerfully applied.

10. Refit the rubber plug and put back the floor mat. As from model 1971: Refold the insulating felt and refit the warm air channel. Put back the floor mat.
11. Reconnect the speedometer cable and the freewheel control to the gearbox.
12. Refit the gear shift rod joint.
13. Refit the clutch cylinder, together with any shims. Adjust the clutch.
14. Reconnect the exhaust pipes to the cylinder heads. Fit new gaskets.
15. Refit the clamps for the exhaust pipes and the suspension under the car.
16. Reconnect the throttle control.
17. Reconnect all hose and cable connections to the engine.

CAUTION

Do not confuse the cables to the alternator, as this may result in ruining the latter. First connect the black leads to D—, whereafter there will be little risk of intermixing the other cables.

18. Refit the air cleaner.
19. Refit the radiator and the expansion tank. Connect the lower coolant hose before tightening the two lower retaining screws.
20. Connect the upper coolant hose.
21. Refit the front panel and the radiator clamping straps.
22. Refit the radiator stays and the hood lock.
23. Reconnect the headlight and direction indicator cables. Refit the windshield washer container and the washer pump.
24. Refill the cooling system and bleed the system.
25. Check the gearbox oil level. Top up if necessary.
26. Check the engine oil level. Top up if necessary.
27. Reconnect the earth cable to the battery and refit the hood.
28. Check the headlight alignment. Adjust if necessary.
29. Teststart engine. Note the oil pressure and coolant temperature. Check the coolant level when the engine has been run up to the warm condition.
30. Take the car out for a test run.

DIVISION OF ENGINE — GEARBOX

Disassembly

1. Remove the flywheel guard plate from under the clutch housing.
2. Back off the screws between the engine and the transmission.
3. Remove the starter.
4. Separate the engine from the gearbox.

Reassembly

1. Reinstall the gearbox, checking that the guide sleeves take up the correct positions in the clutch housing.
2. Tighten the screw for the clutch housing uniformly and with the correct torque.
3. Refit the guard plate for the flywheel.

1. The first step in the process of identifying a problem is to define the problem. This involves identifying the symptoms of the problem and determining the scope of the problem. Once the problem has been defined, the next step is to identify the causes of the problem. This involves identifying the factors that are contributing to the problem and determining the relationships between these factors. Once the causes of the problem have been identified, the next step is to develop a plan of action. This involves identifying the steps that need to be taken to solve the problem and determining the resources that will be needed to implement the plan. Finally, the last step in the process is to implement the plan and monitor the results. This involves putting the plan into action and tracking the progress of the solution.

2. The second step in the process of identifying a problem is to identify the causes of the problem. This involves identifying the factors that are contributing to the problem and determining the relationships between these factors. Once the causes of the problem have been identified, the next step is to develop a plan of action. This involves identifying the steps that need to be taken to solve the problem and determining the resources that will be needed to implement the plan. Finally, the last step in the process is to implement the plan and monitor the results. This involves putting the plan into action and tracking the progress of the solution.

3. The third step in the process of identifying a problem is to develop a plan of action. This involves identifying the steps that need to be taken to solve the problem and determining the resources that will be needed to implement the plan. Finally, the last step in the process is to implement the plan and monitor the results. This involves putting the plan into action and tracking the progress of the solution.

4. The fourth step in the process of identifying a problem is to implement the plan and monitor the results. This involves putting the plan into action and tracking the progress of the solution. Once the plan has been implemented, it is important to monitor the results to determine if the problem has been solved. If the problem has not been solved, it may be necessary to revise the plan and try again.

5. The fifth step in the process of identifying a problem is to evaluate the results. This involves assessing the effectiveness of the solution and determining if the problem has been solved. Once the results have been evaluated, it is important to document the solution and share it with others who may be facing the same problem.

6. The sixth step in the process of identifying a problem is to prevent the problem from recurring. This involves identifying the factors that contributed to the problem and taking steps to prevent them from occurring again. This may involve implementing new policies or procedures, or it may involve providing training to employees.

7. The seventh step in the process of identifying a problem is to communicate the results. This involves sharing the findings of the investigation with the relevant stakeholders. This may involve writing a report or giving a presentation. Once the results have been communicated, it is important to follow up with the stakeholders to ensure that they understand the findings and agree on the next steps.

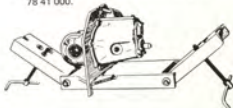
8. The eighth step in the process of identifying a problem is to review the process. This involves reflecting on the steps that were taken to identify and solve the problem and determining if there are any lessons learned. This may involve conducting a post-mortem analysis or a debriefing session. Once the process has been reviewed, it is important to make any necessary adjustments to improve the process for the future.

DISASSEMBLY, REASSEMBLY

DISASSEMBLY

Proceed step by step as described in the following until the part concerned has been removed.

1. Clean the outside of the transmission unit and drain off the oil.
2. Remove the inner universal joints and shafts. See section 473.
3. Separate the transmission at the joint between the clutch housing and the transmission case. After having removed all the screws, the clutch shaft will have to be turned to a specific position to allow separation of the cases. Therefore, turn the clutch shaft to locate this position while removing the clutch housing.
4. Remove the transmission case cover together with the gear shift fork shaft.
5. Fit the transmission case in the fixture, tool 78 41 000.



TRANSMISSION CASE HELD IN FIXTURE

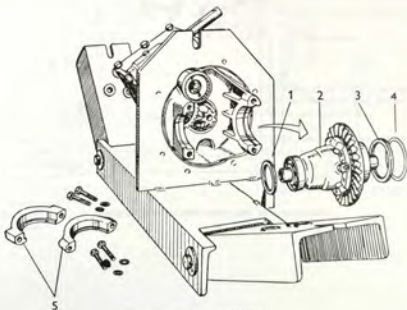
Tool 78 41 000

Differential and freewheel

NOTE

Before continuing to dismantle the transmission unit, always check the location of the pinion and measure the ring gear clearance to ascertain if the setting has been incorrect.

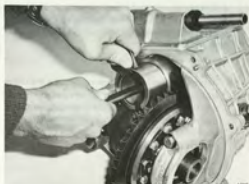
6. Release the two bearing caps and lift out the differential assembly. Collect the spacers and shims outside the bearings for subsequent refitting, provided that differential backlash has not been altered by the fitting of a new part. Disassembly of the differential is described in section 473.



DISASSEMBLY OF DIFFERENTIAL

- 1, 3, 4. Spacer rings and shims
2. Differential case
5. Bearing caps

7. Remove the freewheel hub from the freewheel sleeve, using tool 87 90 305.



DISASSEMBLY OR REASSEMBLY OF FREEWHEEL HUB
Tool 87 90 305

8. Take the needle bearing out of the freewheel sleeve. Check that none of the rollers is missing. If the pinion shaft or bearings are to be dismantled, measure the location of the shaft before removing the end cover. See section 473.

Gear shift forks

9. Back off the end cover bolts and drive out the 1st—2nd and 3rd—4th gear shift fork shaft from the front, using an arbor or similar tool.
10. When the cover is free, take it off rearwards, keeping the gear shift forks in position and preventing them from tipping on the shafts.
Note the location of shims in the cover and collect the shims.
Take care to prevent ejection of the poppet balls in the gear shift forks.



DISASSEMBLY OF END COVER AND SHIFT FORK RAILS

11. If only the rear pinion shaft bearing is to be removed, this can be done now as follows: Engage two gears (reverse and 3rd), release the retainer and back off the left hand threaded end nut on the shaft, whereupon the bearing can be removed with the aid of puller 78 41 15 . As from transmission No. F 39522, a new rear pinion bearing with a split inner ring has been introduced. This bearing has to be removed in two stages.
Pull the bearing off the shaft, using puller 78 41 158 and then remove the inner part of the inner ring, which remains on the shaft, using puller 78 60 521. A new bearing can now be fitted and the pinion shaft shimmed.
12. Release the reverse gear shift fork shaft from the rear by means of a brass arbor or similar implement and withdraw it forwards. Collect the poppet ball in the gear shift fork.
13. Lift out the three gear shift forks.

Countershaft with bearings and gears

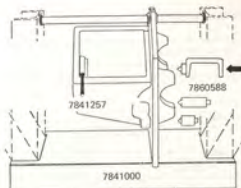
14. Engage two gears simultaneously, e.g. reverse and 3rd.
15. Back off the nut on the front end of the counter shaft. Remove the friction wheel and friction washer. Back off the end nuts of the pinion shaft and/or primary shaft if these items are also to be removed.

As from transmission No. 108911, an oil cup is fitted for lubrication of the counter shaft. This must be removed before the end nut. When removing the end nut, tool 78 61 321 will be used.

NOTE

The pinion shaft nut is left hand threaded.

16. Return the synchronizer sleeve to the neutral position.
17. Locate arbor 78 60 588 fitted with the shortest point between the front press screw and the counter shaft and press in the shaft until the arbor rests against the gear wheel.
Meanwhile, the dolly 78 41 257 should be located between the 1st speed gear and the rear end wall of the transmission case.
Change the arbor point to the next longer one and press the shaft in again. Repeat the procedure with the longest point until the bearing and counter shaft gear are released.



DRIVING OUT COUNTER SHAFT

Tools 78 41 000, 78 41 257 and 78 60 588



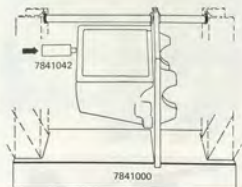
LOCATING OF HOLDING-UP TOOL DURING DRIVING-OUT OF COUNTER SHAFT

Tool 78 41 257

18. Pull the shaft out rearwards, whereupon the counter shaft gear will be released. Collect the spacer and key for the countershaft gear.
If necessary:
 - a. Remove the retaining ring from the shaft and drive off the rear ball bearing and the bearing seat, enabling the reverse gear to be removed.
 - b. The front counter shaft bearing cannot be changed without removing the primary shaft.

Primary shaft with bearings and gears

19. Back off the primary shaft end nut and remove the retaining washer.
20. Place arbor 78 41 040 between the rear press screw and the shaft, and press the shaft out.



DRIVING OUT PRIMARY SHAFT

Tools 78 41 000 and 78 41 042

21. Lift out the shaft, gear and synchronizer as a single unit.
22. When the primary shaft has been removed, the front bearing of the counter shaft is released and can be removed by gently tapping it out with a fiber mallet towards the differential side.
23. Drive out the rear primary shaft bearing, using the front press screw, tool 78 41 091 and the extension sleeve 78 41 067.
If necessary:
 - a. Remove the thrust washer and locking pin from the shaft.
 - b. Remove the retaining ring from the shaft and drive off the front bearing with the aid of dolly 83 90 098 and the ring halves 83 90 080.

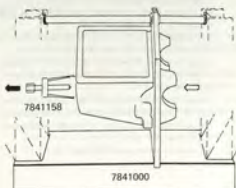
Pinion shaft with bearings and gears

NOTE

The rear pinion shaft bearing can be removed separately for bearing renewal or pinion adjustment as soon as the end cover has been removed, i.e. without removing the primary shaft and counter shaft.

24. Remove the speedometer drive gear.

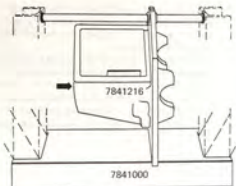
25. Remove the left hand threaded end nut from the shaft and pull out the rear pinion shaft bearing with the puller, tool 78 41 158, using the front press screw to support the shaft. Collect the spacer and shims from inside the bearing.



DRIVING OUT PINION SHAFT BEARING

Tools 78 41 000 and 78 41 158

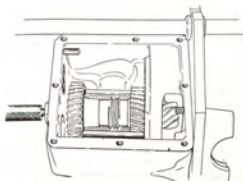
- As from transmission No. F 39522, a new rear pinion bearing with a split inner ring has been introduced. This bearing has to be removed in two stages. Pull the bearing off the shaft, using puller 78 41 158, and then remove the inner part of the inner ring, which remains on the shaft, using puller 78 60 521.
26. Locate the supporting tool 78 41 216, on the lower side of the shaft between the rear gear wheel and the front end of the case. Make sure that the tool is centered on the gear wheel so that the gear does not tip on the shaft.



DRIVING OUT PINION SHAFT

Tools 78 41 000 and 78 41 216

27. Press the pinion shaft out in the forward direction. Lift the 3rd gear out of the transmission case, with- drawing the shaft at the same time. If necessary:



DRIVING OUT THE PINION SHAFT

- a. Press the front roller bearing and pinion shaft 4th gear from the shaft, proceeding as follows:
Remove the retaining ring from the roller bearing, if the latter is to be refitted. If the bearing is to be rejected there will be no need to remove the ring. Place the pinion shaft and the supporting tool 78 41 232 in an arbor press and drive out the shaft. Make sure that the outer bearing race is flush against the gear wheel.



PRESSING OFF THE FRONT PINION SHAFT BEARING AND 4TH GEAR IN A PRESS

Tool 78 41 232

The bearing should on no account be taken apart, if it is to be refitted. See to it that the rollers do not fall out and refit the retaining ring immediately, expanding it first so that it springs properly in the groove.

- b. Press the oil collector gently out of the transmis- sion case.

NOTE

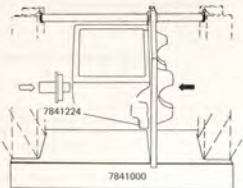
When installing new gears in the transmission unit, remember that the 3rd speed gear and pinion shaft 3rd gear are supplied in matched sets, as are the 4th speed gear and the pinion shaft 4th gear. Quiet opera- tion is ensured only if both the gears in the set are re- newed at the same time. The pinion shaft and ring gear are also matched and must be changed in pairs.

REASSEMBLY

When the part concerned has been removed, clean the cover dividing plane and remove any gasket fragments and residual sealing compound. Inspect and clean all disassembled parts, as well as the transmission case, in kerosene or the like. Make sure that such items as poppet balls, needles from broken bearing, etc., are not left in the case. Then commence reassembly at the appropriate point in the following description.

Pinion shaft with bearings and gears

- Using an arbor press and tool 78 41 067 drive the roller bearing and pinion shaft 4th gear in until the inner bearing race is flush with the pinion gear. Mount the spacers and speedometer drive on the pinion shaft.
On earlier gear units make sure that the matching number faces the same way as on the 4th speed gear. On later gear units there are no matching number. The 4th speed gear is marked with a X on that side, which will face from the gear end of the pinion shaft.
- Next, pass the pinion shaft through the end of and into the transmission case from the differential side, and then locate the pinion shaft 3rd gear on the shaft inside the case. Make sure that the Woodruff key for the 3rd gear has been fitted to the pinion shaft. In some older units, the pinion shaft 4th gear is also held by a Woodruff key instead of being press fitted.
- Turn the shaft to align the Woodruff key in relation to the groove in the 3rd gear.
- Insert the guiding arbor 78 41 224, in the rear bearing seat so that the pinion shaft passes into it.
- Secure the arbor with the rear press screw so that its flange is flush against the transmission case end.



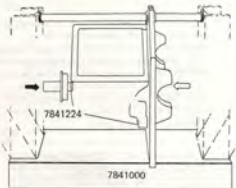
DRIVING IN PINION SHAFT
Tools 78 41 000 and 78 41 224

- Drive the pinion shaft finally home with the front press screw, checking that the key engages in the pinion shaft 3rd gear.
- Back off the rear press screws and remove the arbor from the bearing seat.
- Place an 0.14 in. (3.6 mm) spacer on the shaft end.
NOTE! If the rear pinion bearing is equipped with split inner ring, the spacer washer has to be placed next to the bearing. The washer diameter will be 1.4 in. (36 mm).

NOTE

If no part of the pinion shaft assembly has been renewed, the previously used spacer and shims may be refitted.

- Using the press screw and arbor 78 41 224, press the rear ball bearing, complete with retaining ring, into the transmission case end. Use the press screw at the front end of the pinion shaft as a support during this operation.



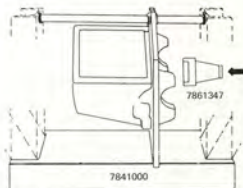
DRIVING IN PINION SHAFT BEARING
Tools 78 41 000 and 78 41 224

In case of a split bearing, fit the inner ring first and then the principal part of the bearing on the shaft. Then press the bearing in, as described above.

- Fit a new tabbed washer and lock nut (**NOTE!** Left hand threaded) on the pinion shaft. Note that the nut should not be tightened until the primary and counter shaft are installed. See position 26.

Primary shaft with bearings and gears

11. Up to and incl. gear box 276503:
Refit the front bearing (using tool 78 41 075) and place the retaining ring, locking pin, thrust washer and 4th speed gear needle bearing on the primary shaft. Check that the locking pin prevents the thrust washer from rotating.
As from gear box 276504:
Fit the oil thrower and the front bearing (using tool 78 41 075) and place the retaining ring, washer and 4th speed gear needle bearing on the primary shaft.
12. Before pressing in the primary shaft, the counter shaft front bearing must be placed in position. Press the bearing in from the front with the aid of the arbor 78 61 347, until it rests hard against the retaining ring in the bearing seat.



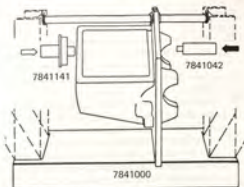
DRIVING IN COUNTER SHAFT BEARING
Tools 78 41 000 and 78 61 347

13. Assemble the primary shaft components, the 3rd and 4th speed gears together with the synchronizer sleeve and rings, and lift the entire assembly into the transmission case while passing the aligning arbor 78 41 141 into the 3rd speed gear through the rear bearing seat, and secure the arbor with the press screw.
14. Pass the shaft in carefully from the front until its splines enter the synchronizer hub.
15. Fit the arbor 78 41 042 into the freewheel sleeve.

NOTE

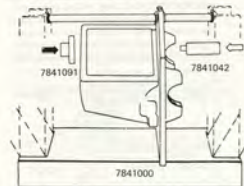
The needle bearing must be removed from the freewheel sleeve while this is being done.

16. Using the press screw, drive the primary shaft carefully in against the arbor in the freewheel sleeve until the 3rd speed gear rests against the rear end of the case. Check that the synchronizer hub does not tip.



DRIVING IN PRIMARY SHAFT
Tools 48 41 000, 78 41 042 and 78 41 141

17. Remove the aligning arbor from the 3rd speed gear and locate the needle bearing, spacer sleeve and bushing for this gear on the shaft inside the gear hub.
18. Place the spacer — with the bevelled side facing outwards — and the rear bearing on the primary shaft, and then drive the bearing in with tool 78 41 091. Note that the front press screw and the arbor in the freewheel sleeve serve to hold up the shaft.



DRIVING IN PRIMARY SHAFT BEARING
Tools 78 41 000, 78 41 042 and 78 41 091

19. Place a new tabbed washer, with the tab facing outwards, and a nut on the shaft. Do not tighten the nut with a torque wrench until the counter shaft has been refitted. See point 28.

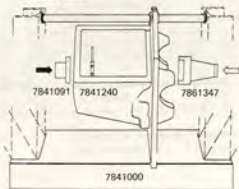
Countershaft with bearings and gears

20. Place the countershaft gear wheel in its correct position with the machined part facing the clutch housing. The front press screw and tool 78 61 347 should hold the counter shaft gear and bearing in place.
21. Reassemble the 1st and 2nd speed gears, the latter complete with needle bearing, spacer and bushing, and the synchronizer unit with its rings.
22. Lift this assembly into the transmission case, passing the countershaft, complete with the 1st speed gear needle bearing, through the rear end of the transmission case at the same time.
As from transmission No. 108911, the 1st and 2nd speed gears are splines mounted.

NOTE

If the rear bearing, bearing seat and reverse gear have not been removed, they may remain on the shaft during reassembly. In this case, however, the bearing must first be pressed into the seat and the rear retaining ring removed from the shaft.

23. Place the spacer on the shaft between the 2nd speed gear and the front ball bearing. Then pass the shaft through the front bearing and into the counter shaft gear wheel.
24. Drive the countershaft in with the pass screw and tool 78 41 091. In so doing, make sure that the shaft splines engage with the synchronizer hub and that the shaft passes into the countershaft gear. Use the peg wrench 78 41 240, to turn the shaft. Refit the retaining ring for the rear bearing after pressing home.



DRIVING IN COUNTER SHAFT

Tools 78 41 000, 78 41 091, 78 41 240 and 78 61 347

NOTE

If the countershaft is refitted complete with reverse gear and bearing, use tool 78 41 091. This tool is also to be used if the reverse gear and the seat with the bearing are mounted separately.

25. Engage two gears simultaneously, e.g. 2nd and 4th, and turn the 3rd speed gear in order to align the key grooves in the counter shaft and the counter shaft wheel. Drive the key in with an arbor.
26. Refit the friction wheel together with a new friction washer and star washer. Tighten the counter shaft end nut with a torque of 80 Nm (60 ft.lb., 8 kpm). The primary shaft and pinion shaft nuts, the latter left hand threaded, should also be tightened with a torque wrench at this stage. Tighten the pinion shaft nut initially with a torque of 120 Nm (90 ft.lb., 12 kpm), back off, and re-tighten with a torque of 60 Nm (45 ft.lb., 6 kpm). The primary shaft nut is to be tightened with a torque of 50 Nm (35 ft.lb., 5 kpm).

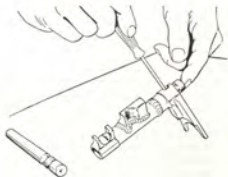
NOTE

Check that the friction wheel is not located outside the opposing gear and that there is sufficient clearance between the primary shaft ball bearing and the counter shaft gear. See "Friction brake".

27. Secure the nuts on the main- and pinion shaft. The main shaft lock washer tab is bent over the nut. The pinion shaft nut is locked as follows:
 - a. Use the press screw as dolly against the front end of the pinion shaft so that a small clearance is obtained between the flange ring on the rear pinion bearing and the gear box cover. Thereby preventing damage to the bearing when the nut is upset.
 - b. Upset the nut collar in the three recesses in the lock washer with a rounded drift.
If the pinion adjustment is not already correct, leave the pinion shaft nut unlocked until adjustment is carried out.

Gear shift forks

26. Return the synchronizer sleeve and the reverse gear to the neutral position and insert the gear shift forks. Note that springs and poppet balls must be fitted with tool 78 40 697 before the forks are inserted in the transmission case.



LOCATING POPPET BALL IN REVERSE SHIFT FORK
Tool 78 40 697

29. Pass the reverse gear shift fork in through the rear end of the transmission case and collect the tool.



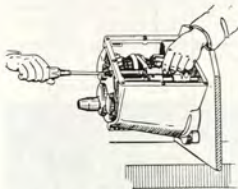
COLLECTING TOOL 78 40 697 WHEN SHIFT FORK RAIL
HAS BEEN DRIVEN IN

30. Check that the rubber washer and plastic plug have been mounted in the end cover and the oil collector in the transmission case end.
31. Fit a new gasket. **IMPORTANT!** The gasket must not be glued.
32. Pass the 1st-and-2nd and 3rd-and-4th gear shift fork shafts through the rear end, positioning them so that the forks engage with their respective shafts.
33. Do not forget to fit the previously used or newly selected shims in the end cover after coating them with a little grease so that they adhere to the end cover during assembly.
34. Collect the two fixing tools as they are pressed out at the front ends of the forks, and tighten the end cover bolts with a torque of 25 Nm (18 ft.lb., 2.5 kpm).

WARNING

Check that the bolt opposite the reverse gear shift fork is not too long, which would impede fork movement.

35. If necessary, adjust the gear shift fork shafts, so that the forks are not subjected to axial pressure when a gear is engaged. Roughly the same amount of clearance should exist between the synchronizer sleeve and the gear concerned in all gear positions.



ADJUSTING THE 1ST-2ND AND 3RD-4TH GEAR SHIFT
SHAFTS

36. **NOTE!** The pinion shaft should be measured and adjusted as necessary at this point. See section 473.

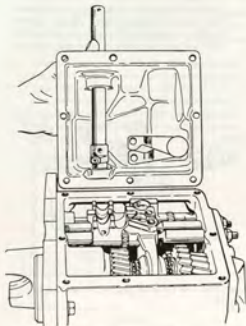
Differential

37. Refit the differential assembly and spacers, and tighten the bearing cap screws with a torque of 40 Nm (28 ft.lb., 4 kpm). NOTE! Fit the short screws in the small bearing cap.

NOTE

If the pinion shaft setting has been altered or parts of the differential assembly renewed, always check the side clearance of the bevel gear and adjust if necessary. See section 473.

38. Refit the speedometer drive gear.
39. Coat the top cover with sealing compound and check that the three gear shift forks in the transmission case as well as the dogs and catch in the cover are set at the neutral position. Then fit the cover on the transmission case.



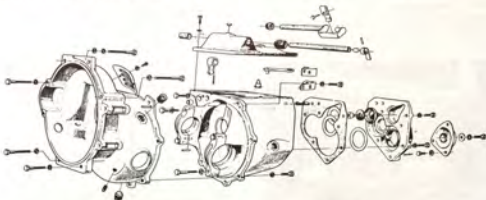
GEAR SHIFT MECHANISM AND CATCH IN TRANSMISSION CASE COVER

40. Check the function of the gear shift mechanism.
41. Check that the freewheel hub and an undamaged needle bearing are inserted in the primary shaft/freewheel sleeve. The hub should engage firmly when twisted to the right. Use tool 87 90 305 for assembling.

NOTE

Check the clutch shaft seal and drive shaft seals and renew as necessary. Fit the seals so that the dust guard lips face outwards. Fill the space between the lips with chassis grease.

42. Coat the sealing surface of the clutch housing with sealing compound and attach the clutch housing to the transmission case. Turn the clutch shaft so that it clears the differential. Make sure that the clutch shaft is not subjected to lateral stress and that the freewheel hub engages with the splines of the clutch.
43. Check the sealing rings in the clutch housing and mount the two output shafts, taking care to avoid damaging the sealing rings or dislocating the retaining springs.
44. Smear the clutch shaft splines with graphite grease and fill the unit with transmission oil.



TRANSMISSION CASE, CLUTCH HOUSING AND END COVER

Transmission case, clutch housing

The transmission unit comprises two principal parts, viz. the transmission case proper and the clutch housing, these being correctly positioned in relation to each other by means of a locating pin. The sealing surface between the parts has no gasket, but should be coated with a suitable sealing compound.

End cover

The end cover of the transmission unit is screwed to the transmission case and sealed with a gasket. Sealing compound must not be used. Inside the transmission case there is a cup which collects the oil and passes it through a passage, by means of a rubber washer and a plastic plug, to the primary shaft. Always make sure that the rubber washer presses the plastic plug against the end of the shaft and that the oil passage is not clogged.

Shims located inside the end cover serve to retain the outer races of the three rear bearings. See table.

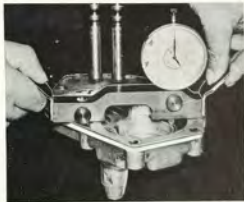
A new combination of shims will have to be selected if the end cover or any of the three bearings in the rear end of the transmission case are renewed, as otherwise the bearings will not be properly secured or leakage may occur at the gasket when the end cover bolts have been tightened. Shims for the three shafts are available in three different thicknesses, viz. 0.004, 0.006 and 0.012 in. (0.1, 0.15 and 0.30 mm). The spare part numbers etc. are listed in the table.

Shimming

1. Remove the end cover gasket, and clean the sealing surfaces of the cover and the transmission case.
2. Make sure that all the bearings are pressed fully home.
3. Place the measuring tool 7B 42 370 according to figure and fit-up to the plane which the end cover seals. The point of the dial indicator to be fit-up to the machined plane in one of the bearing positions. The measurement to be made without shims.

NOTE

Always fit a new end cover gasket before measuring.



MEASUREMENT OF REAR END COVER
Tool 7B 42 370

S 955

4. Set the dial indicator to zero.
5. Place the measuring tool in the corresponding bearing in the transmission case and with the measuring point towards the rear plane of the transmission case. Read off the dial indicator.



S 966

MEASUREMENT OF REAR END
Tool 78 42 370

6. Into the bearing position of the end cover, put a shim combination which corresponds to the read-off measure. A deviation of ± 0.002 in. (0.05 mm) is permissible.

| Location of shims or part | 4-speed transmission | | |
|---------------------------|----------------------|---------------|--------------|
| | Spare part No. | Thickness in. | Thickness mm |
| On primary shaft | 70 80 930 | 0.004 | 0.10 |
| | 70 81 011 | 0.006 | 0.15 |
| | 70 81 029 | 0.012 | 0.30 |
| On counter shaft | 70 80 948 | 0.004 | 0.10 |
| | 70 81 037 | 0.006 | 0.15 |
| | 70 81 045 | 0.012 | 0.30 |
| On pinion | 70 80 955 | 0.004 | 0.10 |
| | 70 81 052 | 0.006 | 0.15 |
| | 70 81 060 | 0.012 | 0.30 |

7. Proceed in the same way for the remaining bearing positions. Check that the dial indicator be fitted in the proper hole in the measuring tool.
8. Refit the end cover.
9. Tighten the screws with a torque of 25 Nm (18 ft.lb., 2.5 kpm).

CLUTCH SHAFT

The clutch shaft is borne up in the clutch housing in the axial direction only. A sealing ring is fitted outside the bearing.

Changing the sealing ring

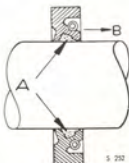
1. Remove the engine and transmission unit and separate these two assemblies.
2. Remove the release bearing.
3. Pry the sealing ring out of the clutch housing, using tool 78 42 206.



REMOVAL OF THE SEALING RING FROM THE CLUTCH SHAFT

Tool 78 42 206

4. Obtain a new sealing ring and fill the space between the sealing lips, if these are double, with chassis grease. Then fit the ring with tool 78 42 206, taking care to turn it in the correct direction.

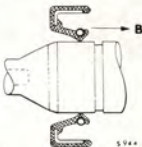


S 252

CLUTCH SHAFT SEAL WITH DOUBLE SEALING LIPS

A. The space between the sealing lips is to be filled with chassis grease.

B. Turn this side to face transmission case.



S 944

CLUTCH SHAFT SEAL WITH SINGLE SEALING LIP

B. Turn this side inwards, towards the transmission case.



FITTING THE CLUTCH SHAFT SEAL

Tool 78 42 206

- Refit the release bearing and fit the engine and transmission case together again.
- Reinstall the power unit in the car.

Changing the clutch shaft or bearing

Disassembly

- Lift out the transmission case, remove the inner universal joints, separate the clutch housing from the transmission case, remove the release bearing and the clutch shaft sealing ring.
- Remove the retaining ring from the bearing seat inside the sealing ring, as well as the retaining ring which forms the rear stop for the locking sleeve on the shaft.

NOTE

This bearing, which is primarily intended to locate the shaft in the axial direction, has a large radial clearance in the bearing seat.

- Pull the clutch shaft forwards, and collect the locking sleeve and freewheel operating fork which are now released.
- Remove the retaining rings from the shaft and drive the bearing off.

Reassembly

- Place the rear retaining ring in the clutch housing bearing seat.
- Press the bearing onto the shaft and refit the two retaining rings.



S 480

CLUTCH SHAFT WITH BEARING AND FREEWHEEL OPERATING MECHANISM

- Place the freewheel operating fork and the locking sleeve in position in the clutch housing.
- Pass the clutch shaft in from the front so that it engages with the locking sleeve. Then fit the rear retaining ring on the shaft, behind the sleeve.
- Refit the front retaining ring in the clutch housing bearing seat and check the function of the freewheel operating mechanism.
- Fit a new sealing ring and replace the release bearing, filling the space between the sealing lips with chassis grease first. Attach the clutch housing to the transmission case and refit the universal joints.

FREEWHEEL

Disassembly and reassembly

- Lift the transmission out of the car, dismantle the universal joints and separate the clutch housing from the transmission case.
- Rotate the differential so that the large opening for the differential gear is in line with the freewheel sleeve.
- Insert tool 87 90 321 in the splines of the freewheel hub.
- Position sleeve 87 90 313 against the freewheel hub. Rotate the hub counter-clockwise, withdrawing it at the same time.



REMOVING THE FREEWHEEL

Tools 87 90 313 and 87 90 321

Assemble in the reverse order. When spare-part freewheels are to be installed, transfer the freewheel assembly in the packaging sleeve straight onto installation tool 87 90 305.

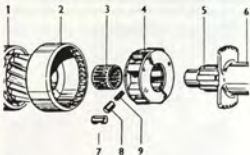
Freewheel hub

When disassembling the freewheel for repairs it is generally sufficient to fit a new hub complete with rollers. If, however, the freewheel sleeve is also defective, a new primary shaft must be fitted.

Disassembly

Place a clean rag over the freewheel and tool and press the hub out of the sleeve.

Clean the hub and rollers with kerosene.



FREEWHEEL ASSEMBLY

- | | |
|-------------------------------------|-------------------|
| 1. Ball bearing | 5. Clutch shaft |
| 2. Freewheel sleeve (primary shaft) | 6. Locking device |
| 3. Needle bearing | 7. Roller |
| 4. Freewheel hub | 8. Plunger |
| | 9. Spring |

Reassembly

IMPORTANT

Fit the hub so that the freewheel engages firmly when the hub is turned clockwise.

- Set up the sleeve of tool 87 90 305 in a vise.

2. Orient the hub so that the figures will face outward when the hub is mounted in the free wheel sleeve.
3. Insert drift 87 90 321 into the splines of the hub and place the hub inside tool sleeve 87 90 313.



PLACING THE HUB IN THE TOOL
Tool 87 90 305 (87 90 313 + 87 90 321)

4. Insert the springs, plungers and rollers. Turn the hub to the left with wrench 87 90 321, at the same time pushing down the roller against the springs with the thumb until the roller slips under the edge of the tool. The installation is made easier if two rollers, facing each other, are put in. Then place the hub in the sleeve for centering.



THE ROLLERS ARE INSTALLED
Tool 87 90 305 (87 90 313 + 87 90 321)

5. When all the rollers have been inserted, turn the hub just enough to hold the last one in place in the sleeve — otherwise the first one will jump out again.
6. In this position, slide the hub into the unrecessed end of the tool sleeve, letting the rollers project for half their length so that they will slip easily into the free wheel drive sleeve. This locates the hub in relation to the sleeve. Push and at the same time twist the hub to the right with wrench 87 90 321, to seat the hub in the free wheel drive sleeve.

COUNTER SHAFT

General

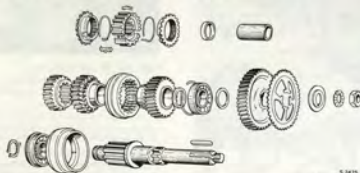
The counter shaft should be disassembled and reassembled in accordance with the instructions at the beginning of this section.

The 1st and 2nd speed gears on the counter shaft are carried on needle bearings, whereas the reverse gear slides on

splines. Between the 1st and 2nd speed gears is a synchronizer unit for these gears. The synchronizer units on the counter shaft and primary shaft are identical. The synchronizer unit is obtainable only as a complete unit, excluding synchronizer rings.

The counter shaft gear is provided with a friction brake which serves to take up the gearing backlash.

As from transmission No. F 108911, the 1st and 2nd speed gears are directly splined.



COUNTERSHAFT WITH GEARS, BEARINGS AND SYNCHRONIZER UNIT,
UP TO AND INCL. TRANSMISSION NO. F 108910

FRICTION BRAKE

General

The counter shaft gear is fitted with a friction brake which serves to eliminate gearing backlash and thus to reduce noise.

The device comprises a friction wheel which has one tooth less than the counter shaft gear, implying that the friction wheel will turn slowly in relation to the gear during the rotation. Spring loading of the friction wheel provides the brake power required to counteract the gearing backlash against the primary shaft.



FRICTION WHEEL

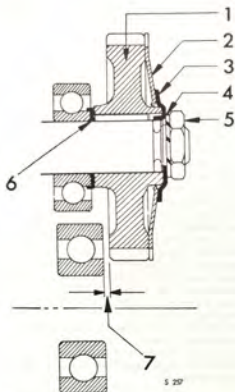
Dim. A = 0.146–0.157 in. (3.7–4.0 mm)

- When installing the friction brake, make sure that the counter shaft gear is turned so that the machined part of the hub comes out towards the friction wheel.
- Check that the clearance on the back of the counter shaft gear at the primary shaft bearing is at least 0.02 in. (0.5 mm), and if not, fit a special shim between the front counter shaft bearing and the counter shaft gear.

Installation instructions

When installing the friction brake, note the following points.

- Check that the friction wheel has a smooth contact surface at the teeth, and that the spring tongues are located within the prescribed distance from the contact surface.



FRICION BRAKE

1. Counter shaft gear
2. Friction wheel
3. Friction washer
4. Retaining washer
5. Nut
6. Shim. To be used only if the clearance at 7 is less than 0.02 in. (0.5 mm)
7. Clearance between bearing and countershaft gear

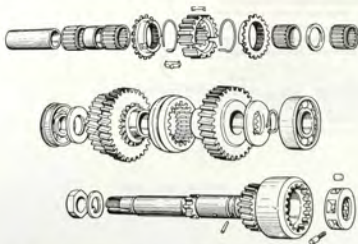
4. After fitting the friction wheel, and when the friction washer with its retaining tab has been put on, check that there is some springiness in the spring tongues.
5. Take care not to squeeze the spring tongues when tightening the counter shaft gear nut. Tighten with a torque of 80 Nm (58 ft.lb., 8.0 kpm).

PRIMARY SHAFT

General

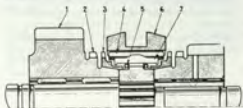
The primary shaft should be disassembled and reassembled in the manner described at the beginning of this section, where it is stated that the counter shaft must be removed before the primary shaft can be disassembled. The primary shaft, which is carried in two ball bearings in the transmission case, is made in one piece with the freewheel sleeve and the counter shaft gear wheel. Carried in needle bearings on the primary shaft are the 3rd and 4th speed gears. These are matched with their mating gears on the pinion shaft. The synchronizer unit is splined between the speed gears. It is available only as a complete assembly, excluding synchronizing rings.

The primary shaft has a drilled passage for lubrication of the 4th speed needle bearings and of the freewheel. Always make sure that this passage is not clogged. A thrust washer is fitted against the front primary shaft bearing and is locked by means of a pin in the shaft to prevent it from rotating.



PRIMARY SHAFT WITH GEARS, BEARINGS AND SYNCHRONIZER UNIT

SYNCHRONIZER UNIT



1 291

SYNCHRONIZER UNIT

1. Gear wheel
2. Dog ring
3. Synchronizer ring
4. Synchronizer hub
5. Spring loaded ring
6. Synchronizer sleeve
7. Dog

Synchronizer rings

For satisfactory synchromesh function, it is essential that the synchronizer rings rest correctly against the tapers. If the ring tilts when pressed against the taper, lapping is called for.

The ring is lapped by applying fine grain carborundum to the gear taper and then twisting the ring against this in both directions.

When the ring fits properly, clean the parts thoroughly to remove all traces of grinding dust.

When the synchronizer ring is installed, the clearance between it and the dog ring must be at least 0.04 in. (1 mm), which leaves an allowance for wear. The clearance, however, must always amount to at least 0.012 in. (0.3 mm). A special synchronizer ring for the 1st speed has been introduced, in order to make it easier to engage the 1st speed gear when driving very slowly and when the car is standing still. When reconditioning gear boxes as from gear box No. 139984 — which was the first with 6th synchronizer cone — the said ring should be fitted. With a view easily to tell the rings apart, three cogs have been taken away from the new ring for the 1st speed gear.

Synchronizing force

During a gear change, the synchronizer ring is pressed against the gear taper with a certain force, the magnitude of which depends on the tension of the synchronizer springs located inside the hub. If it is suspected that this force is incorrect, measure it as described in the following, using a spring balance or weights.

Place the gear on a flat surface with the taper facing upwards. Place the synchronizer rings and the complete synchronizer unit over it.

Lightly oil all the parts. Next, press the synchronizer sleeve down a few times, causing the ring to take up the correct position. Now put a ring or similar object on the synchronizer sleeve and place a weight on top of it. For the synchronization of the 1st and 2nd speed gears, the weight shall be 6.5 lb. (3 kg). The sleeve must not now move downwards. If, on the other hand, the load is increased by a further 9 lb. (4 kg), the sleeve should slide downwards. The force required to move the synchronizer sleeve over the dog rings on the speed gear should thus amount to 6.5–15.5 lb. (3–7 kg). It can be adjusted by stretching the circular synchronizer springs.

For the 3rd and 4th speed gears, the applicable weight is 13–20 lb. (6–9 kg).

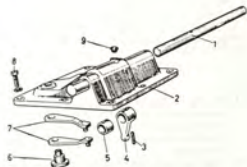
In gear boxes of the old design with equal synchronization force for all the gears, it is recommended to have — in connection with reconditioning — the spring loaded ring for the 1st and 2nd speed gears replaced with the harder one now used.

GEAR SHIFT MECHANISM

If the task in hand concerns the gear shift mechanism only, it will suffice to lift the power unit out of the car and remove the transmission case top cover and the end cover.

Disassembly

1. Back off the screws holding the transmission case cover and lift off the cover.



TRANSMISSION CASE COVER WITH SHIFTER MECHANISM AND CATCH ASSEMBLY

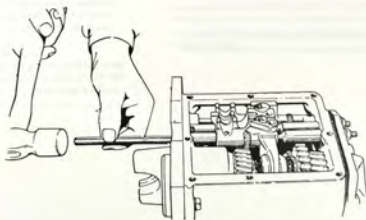
- | | |
|--------------------|----------------|
| 1. Operating shaft | 6. Catch shaft |
| 2. Cover | 7. Catches |
| 3. Tension pin | 8. Screw |
| 4. Shifter yoke | 9. Plug |
| 5. Spacer | |

2. Back off and remove the end cover bolts and loosen the cover by inserting a slender screw driver between the cover and the transmission case at both sides and carefully prying it loose.

NOTE

Proceed with great care, collecting the shims from inside the cover and noting their locations at the respective bearings.

3. Remove the end cover, which will be accompanied by two of the gear shift fork shafts. Collect the gear shift fork poppet balls, which are ejected when the shafts are removed.
4. Using an arbor, knock the reverse gear shift fork shaft out from the rear. Collect the poppet ball from the fork, so that it does not drop down into the transmission case.
5. Lift out the three gear shift forks.
6. If any of the parts fitted in the top cover — shifter yoke, shaft or catch — are to be renewed, the rivet or counter sunk head in the cover must be drilled out. After reassembly, fit a rubber plug or a self tapping screw in the hole in the cover, this hole being provided to permit the pin to be driven out of the shifter shaft.



REMOVAL OF END COVER

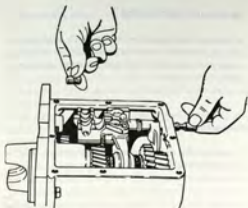
Reassembly

Before commencing reassembly, remove all gasket fragments and all traces of old sealing compound.

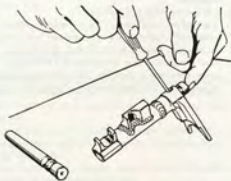
1. Check positively, for instance with the aid of a magnet, that none of the poppet balls has dropped down into the transmission case.
2. Place the synchronizer sleeves and reverse gear at neutral and put in the three gear shift forks.

NOTE

The gear shift forks must be fitted with their springs and poppet balls before being placed in the transmission case. Hold the poppet ball in place with tool 78 40 697.



TOOL 78 40 697 IS COLLECTED AS THE GEAR SHIFT FORK SHAFT IS DRIVEN IN



HOLDING THE POPPET BALL IN THE REVERSE GEAR SHIFT FORK

Tool 78 40 697

3. Drive in the reverse gear shift fork shaft and collect the tool as it is ejected at the front end of the fork.

4. Pass the two gear shift fork shafts on the end cover through the end wall and into their respective forks. Don't forget to fit the end cover gasket. Check also that the rubber washer and plastic plug are mounted in the cover.
5. Place the sims inside the end cover in the same position as prior to removal of the cover, or select a new combination of sims. See "Transmission case and end cover" in this section. Smear a little grease onto the sims to hold them in the cover, thus facilitating reassembly.
6. Refit the end cover. If tool 78 40 697 is not available, the task is facilitated by sliding one of the forks in onto its shaft (engaging one gear), thus assembling this slightly before or after the other one.
7. Screw in the end cover bolts and tighten with a torque of 25 Nm (18 ft.lb., 2.5 kpm).

CAUTION

Make sure that the bolt opposite the reverse gear shift fork is not too long, thereby impeding the movement of the fork.

8. Check the gear shift fork shafts and adjust as necessary, so that the forks are not subjected to axial pressure when a gear is engaged. In all gear positions, there must be a noticeable clearance of the same magnitude between the synchronizer sleeve and the respective gear.
9. Place the three gear shift forks at neutral, as well as the shifter yoke and catch in the top cover.
10. Coat the surface of the transmission case with sealing compound. Then refit the cover and tighten up the screws.
11. Check the function of the gear shift mechanism.

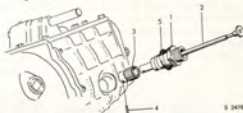
NOTE

The transmission case is ventilated through the operating shaft and the hole in the lower side, under the universal joint for the gear shift rod. Make sure that this hole is not clogged, since this could lead to oil leakage at the seals.

SPEEDOMETER DRIVE GEAR

Disassembly and reassembly

1. Disconnect the speedometer drive cable from the transmission case.
2. Back off and remove the bearing sleeve (1), together with the spindle (2) and the speed gear (3). Collect the gasket (5).
3. Drive out the tension pin (4) which holds the speed gear to the spindle. The speed gear, spindle and bearing sleeve can now be separated.



SPEEDOMETER DRIVE GEAR

1. Bearing sleeve
2. Spindle
3. Speed gear
4. Tension pin
5. Gasket

Change all worn or defective parts and reassemble in the reverse order.

Shimming

To prevent oil leakage, the axial spindle clearance should be between 0.002 and 0.008 in. (0.05–0.2 mm). This clearance can be adjusted by inserting shims, 0.008 and 0.02 in. (0.2–0.5 mm) thick, between the speed gear and the bearing sleeve.

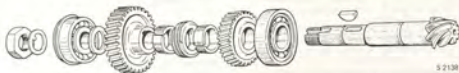
DIFFERENTIAL AND PINION/RING GEAR

PINION SHAFT AND RING GEAR

General

The pinion shaft and differential ring gear should be disassembled and reassembled in the manner described in section 471. The counter shaft must be removed first, followed by the primary shaft, before the pinion shaft can be disassembled. The pinion shaft is carried in a roller bearing and a double row ball bearing which constitutes the axial bearing. The pinion shaft carries the keyed 3rd gear wheel, while the 4th gear wheel is press-fitted. The speed motor drive is located between the gear wheels. The gears are matched with the corresponding gear wheels

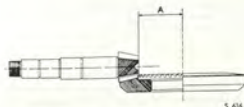
on the primary shaft and in course of assembly care must be taken to ensure that the matching numbers face the same way on both pinion shaft and primary shaft. The ring gear and pinion shaft, too, form a matched set, implying that these two components can only be changed as a pair. These parts have been tested together for noise and the most favourable setting for quiet running has been measured. Measurements of particular importance for the pinion and ring gear are the distance between the end face of the pinion and the center of the ring gear, and the gearing backlash. These measurements, as well as the matching numbers, are stamped into the parts concerned in conjunction with the noise test. When assembling the pinion and ring gear, these measurements must be adjusted very accurately with shims and a special measuring tool. The pinion shims are located by the rear pinion shaft bearing, and the shims for the differential ring gear by both bearings.



PINION SHAFT WITH BEARINGS AND GEARS, UP TO AND INCL. CHASSIS NO. 470,000 AND 52,000

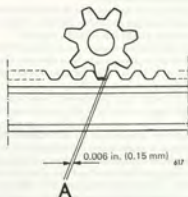


PINION SHAFT WITH BEARINGS AND GEARS, AS FROM CHASSIS NO. 470,001 AND 52,001



ADJUSTMENT OF DISTANCE BETWEEN PINION END FACE AND CENTER OF RING GEAR BY SHIMMING THE PINION SHAFT

The measurement A to be adjusted by shimming the pinion shaft



GEARING BACKLASH IS ADJUSTED BY SHIMMING THE DIFFERENTIAL

The backlash A = 0.006 in. (0.15 mm) is to be adjusted by shimming the differential bearing

Adjustment of pinion

To facilitate adjustment of the distance between the pinion and the center of the ring gear, certain data are stamped into the end face of the pinion.



THE PINION END FACE

- +3 = Measurement for pinion adjustment.
- R013 = Matching number, also to be found on ring gear.
- 0 = Pinion is not displaced, but the pinion shaft is directed towards the center of the ring gear. All pinions are marked with an "0", and this information has no influence on the adjustment.

IMPORTANT

Before disassembling the transmission unit, always measure the relative positions of the pinion and ring gear, in order to determine whether the adjustment has possibly been incorrect. If the pinion and ring gear have been used only for a short mileage (less than 6000 miles/10,000 km), the unit can be readjusted. However, after longer mileages, when the gears will have become worn in at a certain position, adjustment should be made to agree with the readings obtained prior to disassembly.

Remedies before measuring

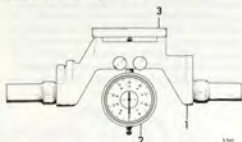
During all measurements of the pinion setting, the following points must be observed.

1. The pinion shaft end nut must be correctly tightened, first with a torque of 120 Nm (85 ft.lb., 12 kpm), then with a torque of 60 Nm (45 ft.lb., 6 kpm).
2. The transmission case end cover must be shimmed, fitted with its gasket, and its bolts tightened with a torque of 25 Nm (18 ft.lb., 2.5 kpm). For shimming of end cover, see section 471.
3. The differential must be removed to allow application of the measuring tool 78 41 463, which comprises a jig carrying a dial indicator. A ground gage block is provided for adjustment of the dial indicator. The gage block is placed against the setting lugs of the tool, and the distance between these and the center of the ring gear is always 60.94 mm. The tool is suitable for use in all types of transmission cases, and therefore has different stops to suit the various diameters of bearing seats.

Measuring

The dial indicator has two scales, one of which is graduated counter-clockwise and gives a lower reading when the measuring point is pressed in. This scale must always be used.

Place the ground gage block against the two setting lugs and against the measuring point. Now zero the dial indicator, i.e. both the hands shall point to zero. Then carry out the measurement as follows: Locate the dial indicator in one of the measuring tool holes.



ZEROING THE DIAL INDICATOR

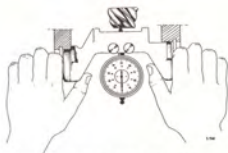
1. Measuring tool 78 41 463
2. Dial indicator
3. Gage block



HOLES FOR FITTING OF DIAL INDICATOR

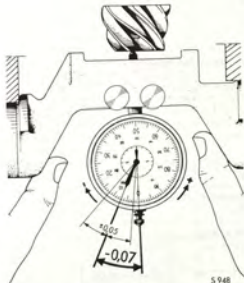
- A = Transmission case of cast iron
- B = Transmission case of aluminium

1. Check the dial indicator so that the hands point at 0.00 when the measuring point rests against the gage block.
2. Locate the measuring tool in the differential bearing seats with the measuring point in contact with the ground face of the pinion and take a reading.



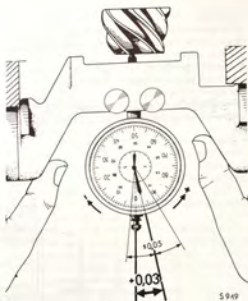
PLACING OF MEASURING TOOL WHEN MEASURING

3. When the pinion is correctly adjusted, the dial indicator should show the same figure, in hundredths of a millimeter, as that marked on the pinion, with a permissible deviation of ± 0.05 mm. Note that the dial indicator scale which goes counter-clockwise must be used, i.e. + is counter counter-clockwise and - clockwise.



EXAMPLE OF DIAL INDICATOR READING WHEN ADJUSTMENT IS CORRECT

If the pinion is marked -7, the indicating hands should point to -0.07 mm. From this value a deviation of ± 0.05 mm is permissible.



EXAMPLE OF DIAL INDICATOR READING WHEN ADJUSTMENT IS CORRECT

If the pinion is marked +3, the indicating hands should point to +0.03. From this value a deviation of ± 0.05 mm is permissible.

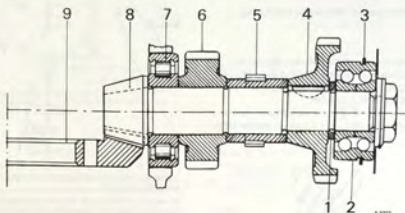
Shimming

If the measured value deviates from the correct one more than permitted by the tolerance, the pinion shaft must be adjusted.

The adjustment is to be made with spacer and shims, which shall be placed between the rear thrust bearing and the 2nd- and reverse gear.

When doing this, always place the shims next to the bearing and the spacer against the gear. The spacers are avail-

able in two thicknesses and the shims can be had in three different thicknesses. See table. When adjusting, take only one of the spacers plus maximum three shims in a suitable combination. This covers the adjustment range from 3.1 mm up to 4.2 mm with intervals of 0.05 mm. **NOTE!** If the gear box is equipped with the new, rear pinion bearing with split inner ring, the spacer washer has to be placed next to the bearing.

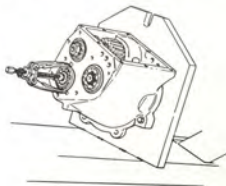


ADJUSTMENT OF PINION SHAFT WITH SHIMS AND SPACER

- | | | |
|---------------------|----------------------|-------------------|
| 1. Spacer and shims | 4. 3rd gear | 7. Roller bearing |
| 2. Ball bearing | 5. Speedometer drive | 8. Pinion gear |
| 3. Lock ring | 6. 4th gear | 9. Ring gear |

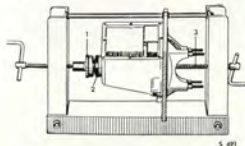
| Gear box | Location | Spacers | | Shims | |
|--------------------|--|-----------|----------------|--------------------|-------------------------------------|
| | | Thickness | Spare part No. | Thickness | Spare part No. |
| Model 1967 | Pinion shaft between thrust bearing and gear | 3.1 | 78 22 075 | 0.1 0.15 0.3 | 78 22 083 78 22 091 78 22 109 |
| | | 3.6 | 78 22 158 | | |
| As from model 1968 | | 3.1 | 78 39 533 | | |
| | | 3.6 | 78 39 541 | | |

1. Remove the end cover and back off the pinion shaft end nut.
2. Pull out the pinion shaft axial bearing, using puller 78 41 158. The front press screw can be used to support the shaft.



REMOVING PINION SHAFT BEARING
Tool 78 41 158

3. Remove the spacer and shims.
4. Change the shimming as per the following rules:
If the dial indicator reading was too high, increase the thickness of the shims combination.
If the dial indicator reading was too low, reduce the thickness of the shims combination. Note that + is counted counter-clockwise and - clockwise. The amount by which the shimming thickness is to be increased or decreased is the same as the difference between measured and true values.
5. Having selected the correct combination of shims, place the spacer, followed by the shims, on the pinion shaft. Drive the pinion shaft bearing in with tool 78 41 224, using the front press screw to support the shaft.



DRIVING IN PINION SHAFT THRUST BEARING

1. Tool 78 41 224
2. Bearing or bearing seat
3. Press screw for supporting the shaft

6. Fit the retaining ring. Then tighten the pinion shaft end nut, first with a torque of 120 Nm (85 ft.lb., 12 kpm) and then with 60 Nm (45 ft.lb., 6 kpm). Secure the nut. See section "Reassembly of transmission unit".
7. Refit the end cover and appurtenant shims. Tighten the end cover screws with a torque of 25 Nm (18 ft.lb., 2.5 kpm).

As from transmission No. F 39522 and 274571 respectively, a new rear pinion bearing with a split inner ring has been introduced.

This new bearing has to be disassembled in two stages. The bearing is pulled off the shaft as before with puller 78 41 158, but the inner part of the inner ring now remains on the shaft. It can subsequently be removed with puller 78 60 521.

The diameter of the spacer has been decreased to simplify removal of the inner ring.

In reassembling, place the loose inner ring on the shaft, followed by the main part of the bearing. Then press the entire bearing into place in the usual manner.

Note that in this version the shims are to be located between the washer and the gear.

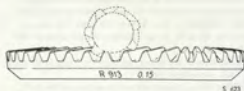
Rechecking

After shimming, refit the measuring jig in the differential bearing seat and check that the dial indicator gives the correct reading (± 0.05 mm). Readjust if necessary.

Adjustment of ring gear backlash

During adjustment and measurement of ring gear backlash, the pinion shaft end nut must always be tightened to the correct torque and the end cover must be properly shimmed and tightened to the correct torque.

To facilitate adjustment of ring gear backlash, certain data are stamped into the ring gear as per the following:



MARKS ON RING GEAR

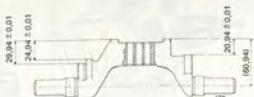
R913 = Matching number

0.15 = Ring gear backlash.

Note! If this figure is not given, 0.15 mm applies.
This backlash may be measured at any point.

Checking the measuring tool

The measuring tool is made with great precision. It should therefore be handled with great care, in order to avoid blow marks and/or deformation. If the tool is suspected damaged, check its measures, so that reliable results are obtained when using it. To this effect check the measures indicated.



MEASURES FOR CHECKING THE MEASURING TOOL 78 41 463

Check the backlash at 4 points round the circumference of the ring gear. The deviation from the indicated value must not exceed ± 0.05 mm. The gear ring backlash can be adjusted to the correct value with spacers and shims. There are two different thicknesses of spacers and three of shims for each bearing, see table. For shimming, use one of the spacers together with up to three shims in different combinations.

| Location by differential bearings | Spacers | | Shims | |
|-----------------------------------|-----------------------|-------------------|-----------------------|-------------------|
| | Thickness in. (mm) | Spare part No. | Thickness in. (mm) | Spare part No. |
| Right | 0.13 (3.4) | 78 24 899 | 0.004 (0.1) | 78 24 915 |
| | 0.15 (3.9) | 78 24 907 | 0.006 (0.15) | 78 24 923 |
| | | | 0.012 (0.3) | 78 24 931 |
| Left | 0.13 (3.4) | 78 13 918 | 0.004 (0.1) | 78 13 926 |
| | 0.15 (3.9) | 78 22 125 | 0.006 (0.15) | 78 13 983 |
| | | | 0.012 (0.3) | 78 13 991 |

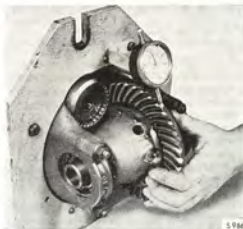
Measuring and shimming

1. Locate the differential and ring gear assembly in the bearing seats.
2. Insert a suitable spacer at the smaller bearing seat and then fit a suitable combination of shims between the spacer and the bearing so that roughly the correct amount of backlash is obtained.
3. Insert the spacer and shims for the other bearing seat, again with the shims nearest the bearing. Select a suitable total thickness which ensures that there will be no axial play on the differential side, but which does not give rise to tension between the bearings. It should be possible to drive the spacer into its position with thumb pressure.
4. Fit the bearing caps and tighten the bolts with a torque of 40 Nm (29 ft.lb., 4 kpm).

NOTE

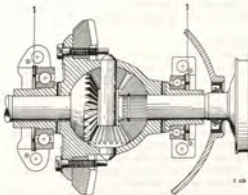
The screws are of different lengths for the left and right sides.

5. Measure the backlash with the dial indicator screwed into the holder belonging to the transmission case fixture. Fit the indicator with a short measuring point and align it at right angles to the tooth flank at the ring gear periphery.



MEASURING RING GEAR BACKLASH

6. Lock the pinion shaft by passing a screwdriver or other suitable implement into the aperture for the speedometer drive. Turn the ring gear gently back and forth while checking the backlash reading. The gear teeth must be dry and the measured backlash must not differ by more than ± 0.002 in. (0.05 mm). Check the backlash at four more points on the ring gear.
7. If the backlash does not agree with the figure 0.006 in. (0.15 mm) on the ring gear, remove the bearing caps and select new combinations of spacer and shims. Note that if shims are removed from one side, the same thickness must be added on the other side.



LOCATION OF SPACER AND SHIMS

1. Spacers and shims

A change of 0.004 in. (0.1 mm) in shimming results in a change of 0.002 in. (0.05 mm) in backlash.

8. Recheck the adjustment after any changing of shimming.

IMPORTANT

Before disassembling the transmission unit, always measure the relative positions of the pinion and ring gear, in order to determine whether the adjustment has possibly been incorrect. If the pinion and ring gear have been used only for a short mileage (less than 6000 miles/10,000 km), the unit can be readjusted. However, after longer mileages, when the gears will have become worn in at a certain position, adjustment should be made to agree with the readings obtained prior to disassembly.

Replacement of axial bearing

To change the rear axial bearing on the pinion shaft, separate the clutch housing from the transmission case and mount the latter in the transmission case fixture.

Removal

1. Remove the differential and record the position of the pinion.
2. Remove the transmission case cover and end cover.
3. Engage two gears simultaneously and back off the left hand threaded, pinion shaft end nut.
4. Withdraw the pinion shaft axial bearing with puller 78 41 158. Then, if the bearing is split, remove the inner ring from the shaft with tool 78 60 521, using the front press screw to support the shaft.

Installation

1. Drive the bearing into its sleeve.
2. Make sure that the shims and spacer have been fitted, with the spacer closest to the bearing, and drive the bearing into the transmission case with tool 78 41 224. If a split bearing is to be fitted, place the inner ring, followed by the outer ring with rollers, on the shaft and then drive the bearing on with tool 78 41 224. If a bearing of earlier design was fitted and is to be replaced by a bearing with a split inner ring, it will also be necessary to change the spacer. Use the front press screw to support the shaft.
3. Tighten the pinion shaft end nut initially with a torque of 120 Nm (85 ft.lb., 12 kpm). Loosen the nut and tighten again with a torque of 60 Nm (45 ft.lb., 6 kpm).
4. As the new axial bearing will have changed the adjustment of the pinion as well as the pinion shaft shimming in the end cover, the end cover shimming must be readjusted. See section 471.
5. Refit the end cover and tighten the bolts with a torque of 25 Nm (18 ft.lb., 2.5 kpm).
6. Measure and adjust the position of the pinion as described in this section.
7. After final adjustment, secure the pinion shaft end nut. Then refit the cover and tighten the bolts finally with a torque wrench.
8. Refit the differential and transmission case cover with the appurtenant shims. Remove the transmission case from the fixture and refit the clutch housing to it.

DIFFERENTIAL



DIFFERENTIAL

Disassembly

If it is not necessary to fix the transmission case in the fixture in order to disassemble the differential, although doing so would facilitate checking and adjustment of ring gear backlash.

NOTE

To renew parts inside the differential assembly, only the two long ring gear bolts which lock the differential pinion shaft need be removed. The shaft and the pinions can then be removed without disassembling the differential.

1. Remove the universal joints and clutch housing.
2. Remove the differential bearing caps and lift out the differential assembly. Collect the spacers from outside the bearings.
3. If necessary, drive both bearings off the differential assembly.
4. Back off and remove the ring gear bolts and remove the ring gear.
5. Drive out the differential pinion shaft.
6. Remove the pinions and gear wheels from the differential. Remove the retaining rings or circlips from the differential wheels.

IMPORTANT

The ring gear must not be changed without fitting a new pinion shaft, since these two parts are supplied in matched sets.

1. Change all worn or defective parts.
2. Fit circlips in the two differential wheels.
3. Locate the wheels and pinions in the differential casing and drive the differential pinion shaft in.

NOTE

As from transmission No. F 68929, a new differential casing and new differential wheels, retaining rings and inner drivers have been introduced. The new parts have a somewhat larger diameter and a larger number of lands in the splined joint and are thus not interchangeable with the old ones.

4. Refit the ring gear and tighten the bolts with a torque of 25 Nm (18 ft.lb., 2.5 kpm).
Note that the two long screws also serve to lock the differential pinion shaft axially.

5. Secure the ring gear bolts with retaining rings and then press the bearings on if they have been removed.

6. Position the differential in its bearing seats and place spacers and shims at the outside of the bearings. Check that the differential has no axial play and that the bearings are not jammed. Use thumb pressure only when fitting the spacer.

If any part affecting the total width of the differential assembly has been renewed, for instance a bearing, the ring gear backlash must be checked. The backlash is adjusted by changing the combination of spacers and shims as described under "Pinion shaft and ring gear".

7. Refit the two bearing caps and tighten the screws with a torque of 40 Nm (29 ft.lb., 4 kpm). Reassemble the clutch housing and universal joints.

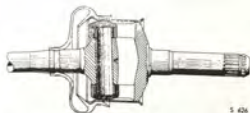
INNER UNIVERSAL JOINT

GENERAL

The inner universal joint comprises a driver which is borne up in the differential casing and splined to the differential wheels, to which it is locked by means of an elastic retaining ring located in a groove in the differential wheel. When the driver is to be removed or refitted, the retaining ring springs out in its groove.

Externally, the drive shaft is carried in needle bearings. When the car is in motion, the shaft is axially slidable and also articulated. The universal joint is lubricated with Saab Special Chassis Grease and is protected by a rubber boot. Lubrication is only necessary after reconditioning or if the universal joint has been removed for some other reason.

Always use Saab Special Chassis Grease.



INNER UNIVERSAL JOINT

MIDDLE SHAFT AND INNER

Disassembly universal joint

1. Jack up the front part of the car and remove the wheel.
2. Detach the brake housing, and hang it up by the wheel house so that the brake hose will not get damaged. Remove the wheel hub and brake disc.
3. Remove the large clip holding the rubber boot in position.
4. Remove the upper ball joint from the steering arm and the lower ball joint from the steering knuckle.
5. Open up the inner universal joint and fit a cover, tool 73 23 736 in the rubber boot to keep the needle bearings in and dirt out. On the inner driver, fit protective cover 78 38 489.
6. Withdraw the middle shaft together with the rubber boot through the wheel house.



REMOVAL AND INSTALLATION OF INNER DRIVE SHAFT

7. Next, possibly tap the driver off the transmission case, using an arbor, and remove it.
8. If the rubber boot at the inner or outer universal joint needs to be changed, separate the shaft from the outer joint. See "Outer universal joint". The rubber boots can then be removed from the shaft.
9. If the sleeve of the inner driver is worn, you may (with a suitable tool) press off the sleeve from the driver, and turn it 90° or, fit a new sleeve. Press until the sleeve flushes with the end surface of the driver.

Reassembly

1. Thoroughly clean the inner driver and then pack the needle bearing grooves with a soft, lithium-based EP grease. The correct amount will be applied if the driver is packed completely full with grease.
2. Refit the inner driver by sliding it into the transmission case.
Check that the retainer in the differential gear engages correctly.
3. Pass the rubber boots onto the middle drive shaft and fit the shaft and rubber boot to the outer universal joint. See "Outer universal joint".
4. Apply Saab Special Chassis Grease to the needle bearings and fit these to the shaft journals.

NOTE

As from transmission No. F 68929, a new differential casing and new differential wheels, retaining rings and inner drivers have been introduced. The new parts have a somewhat larger diameter and a larger number of lands in the splined joint and are thus not interchangeable with the old ones.

Fit the cover 73 23 736 in the rubber boot to protect the needle bearings and to prevent them from falling out. Then pass the shaft and rubber boot in through the wheel house.

5. Remove the cover from the rubber boot and pass the shaft and needle bearings into the inner driver. Then refit the rubber boot and the clips.
6. Refit the upper and lower ball joints to the steering knuckle.
7. Refit the brake disc and wheel hub, as well as the brake housing and friction pads.
8. Refit the wheel.

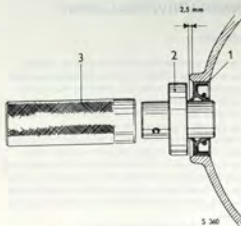
REPLACEMENT OF SEALING RING

1. Detach the steering knuckle from the upper and lower ball joints and hang it up to prevent damage to the brake hose.
2. Drive the inner universal joint out of the transmission case with the aid of an arbor, and pull the shaft out without disassembling the inner universal joint.
3. Prise the sealing ring off with a screwdriver, making sure that it is accompanied by its spring.



REMOVAL OF SEALING RING AROUND OUTPUT SHAFT

4. Drive a new sealing ring in, using arbors 78 40 333 and 78 40 309. The ring must be driven in 0.1 in. (2.5 mm) as shown in the figure in order to ensure sufficient clearance.



FITTING A NEW SEALING RING

1. Sealing ring
2. Arbor 78 40 333
3. Handle 78 40 309

5. Refit the universal joint to the transmission case and connect the ball joints to the steering knuckle.

IMPORTANT

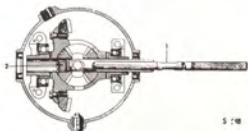
Before refitting the universal joint, fill the space between the lips of the sealing ring with Saab Special Chassis Grease. Take great care when reassembling the universal joint, so that the splines do not damage the seal.

REPLACEMENT OF BROKEN INNER DRIVER

If the pin for the inner driver has broken inside the transmission case, a special tool can be used to remove it without any necessity of disassembling the transmission unit.

1. Remove the defective inner driver. On the opposite side, remove the middle shaft and outer universal joint.
2. Using the driving arbor 78 41 422, first tap out the broken pin with the short part of the tool, inserting it from the side opposite that where the broken pin

is located. Then reverse the tool and tap the pin out completely with the fork shaped part.



TAPPING OUT BROKEN INNER DRIVER

1. Driving out arbor 78 41 422
2. Shaft pin

3. Fit new parts.

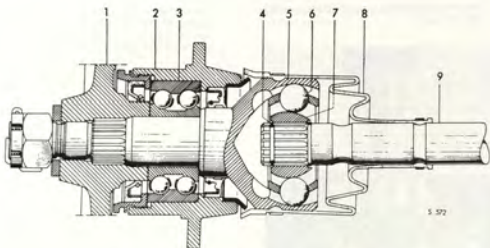
OUTER UNIVERSAL JOINT

GENERAL

On the outer universal joints, the outer drive shaft is in the form of a dome with spherical grooves, in which six balls transmit the power from a hub. The middle drive shaft and the hub are splined, and a retaining spring is used to hold the shaft at the hub. When installing the shaft, the retaining spring is compressed with a special tool, and the shaft is then passed into the hub. A special tool is also used to drive the shaft out of the hub in disassembling.

The only spare parts available are the outer drive shaft, complete with hub, ball holders and balls. These parts are matched and must not be mixed up.

Lubrication is necessary only after reconditioning, or if the universal joint has been removed for some other reason. Saab Special Chassis Grease shall be used.



OUTER UNIVERSAL JOINT

- | | | |
|-----------------------------|----------------------|----------------------|
| 1. Wheel hub | 4. Lock ring | 7. Hub |
| 2. Steering knuckle housing | 5. Outer drive shaft | 8. Rubber bellows |
| 3. Ball bearing | 6. Balls | 9. Inner drive shaft |

DISASSEMBLY

1. Jack up the front part of the car and take off the wheel. Remove the brake housing and hang it up by the wheel house to prevent damage to the brake hose. Then remove the hub and the brake disc.
2. Remove the steering arm and upper ball joint from the steering knuckle.
3. Back off the clamping screw which holds the lower ball joint to the steering knuckle.
4. Remove the large clamp for the rubber boot on the inner universal joint and open up the joint. Fit cover 73 23 736 into the rubber boot to prevent the needle bearings from dropping out and dirt from entering the joint. See "Inner universal joint". Fit protective cover 78 38 469 onto the inner driver.
5. Pull the drive shaft out through the wheel house and remove the front axle assembly. Wash this assembly thoroughly.
6. Remove the nut and shaft seal from the steering knuckle. Use the pegged key 78 40 200. First prise up the nut retainer with an arbor or other suitable tool.
7. Remove the outer drive shaft by applying pressure to its outer end. The outer drive shaft will be accompanied by the universal joint, rubber boot and middle drive shaft.



PRESSING OUT THE OUTER DRIVE SHAFT

8. If necessary, drive the bearing out of the steering knuckle from the inside.
9. Remove the two sealing rings from their seats in the steering knuckle nut if they require changing.
10. Secure the middle drive shaft in a vise and strike the hub off the shaft with the aid of arbor 78 42 024.



REMOVAL OF INNER DRIVE SHAFT FROM OUTER UNIVERSAL JOINT
Tool 78 42 024

NOTE

The hub, ball holder and balls can be removed from the dome if the hub is turned 90° in a certain position. Disassembly, however, should be carried out only if absolutely essential.

REASSEMBLY

Clean all the component parts thoroughly, and replace worn or damaged parts by new ones. Pay particular attention to shaft seals and rubber boots.

1. Grease the outer universal joint using Saab Special Chassis Grease. The correct quantity will be obtained by packing the dome containing the hub and balls full with grease. Take the utmost care in preventing dirt from entering the joints and bearings.
2. Slide the rubber bellows and clips onto the intermediate drive shaft. Mount the rubber bellows on the universal joint.
3. Mount a new circlip on the intermediate drive shaft and compress by means of tool 78 41 612.

NOTE

The circlip ends should overlap under a jaw of the pliers. They will therefore not be clear of each other when the pliers are closed.



PLACING THE LOCK RING IN TOOL 78 41 612

4. Insert the shaft in the hub and lightly tap the shaft end so that the circlip clicks in. Remove the pliers and fully insert the shaft in the hub.



INSTALLATION OF INNER DRIVE SHAFT

Tool 78 41 612

5. If the seal in the steering knuckle housing has been removed, insert a new one.
6. Pack the ball bearing with Saab Special Chassis Grease. Use only original ball bearings.
7. Press the bearing into the steering knuckle housing with the numbered designation on the outer race facing outwards. Use tool 78 40 754 and 78 40 309.



PRESSING IN THE BALL BEARING IN THE STEERING KNUCKLE. THE MARK ON THE BALL BEARING FACING OUTWARDS.

Tools 78 40 309 and 78 40 754

8. Tighten the nut and shaft seal using hook wrench 78 40 200. Lock the nut.
9. Pack the space between the lips and the inner seal with chassis grease.
10. Mount the outer drive shaft (with intermediate drive shaft already mounted) in a press and press on the steering knuckle housing and bearing. Use sleeve 78 41 067 locating on the inner ring of the bearing.



PRESSING THE KNUCKLE HOUSING AND BEARING ONTO THE OUTER DRIVE SHAFT

Tool 78 41 067

11. Fit the two clamps on the outer rubber boot and the clamp for the inner boot at the shaft.
12. If the needle bearings have been removed, lubricate them with Saab Special Chassis Grease and mount them on their journals. Fit cover 73 23 736 as protection for the needle bearings and pass the drive shaft in through the wheel house. Make sure that the inner driver is clean and that it has been packed with Saab Special Chassis Grease, see "Inner universal joint". Reassemble the inner universal joint and tighten the clamp round the rubber boot.
13. Refit the steering knuckle to the steering arm and lower ball joint. Remember to provide tabbed washers at the screws, and to secure these.
14. Refit the hub and the brake disc, followed by the brake housing and friction pads. Secure the screws with tabbed washers.
15. Refit the wheel and lower the car to the floor. Tighten the axle nut to a torque of 180 Nm (130 ft.lb., 18 kpm), and secure.
16. Refit the hub cap.

CAUTION

The friction pads must be returned to their positions near the brake disc. To ensure correct positioning, pump repeatedly with the brake pedal. Negligence in this respect will result in brake failure.

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1940-1941

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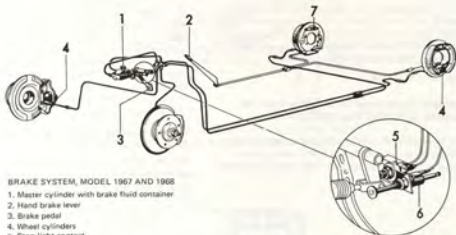
GENERAL

The car has disc brakes in front and drum brakes at rear. The hydraulic footbrake acts on all four wheels. The brake system is of the two-circuit type, which means that the master cylinder controls the left front and right rear wheels simultaneously with, but independently of, the right front and left rear wheels. Consequently, if leakage occurs as a result of damage to the brake system, braking effect will be lost only on one diagonal pair of wheels, while remaining for the other pair. Leakage is revealed both by excessive pedal travel and by a tendency for the car to swerve towards the side at which brake pressure remains on the front wheel when the brakes are applied.

The mechanical handbrake acts on the rear wheels. The brake lever is located between the two front seats and the braking effect is transmitted to the rear wheels by two sealed Bowden cables.

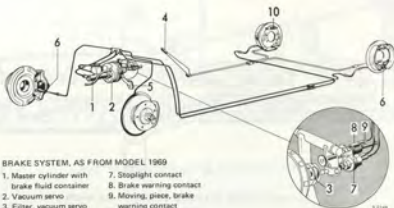
The footbrake system as from model 1969 is hydraulic with vacuum servo. The vacuum servo cylinder is connected to the suction line of the engine. When the brake pedal is depressed, the vacuum servo cylinder is affected, which in turn strengthens the pedal power and transmits the movement to the master cylinder.

The car has a brake warning system which consists of a mechanical contact above the brake pedal and a warning light, located in the speedometer. The light begins to glow when the brake pedal travel becomes too long, e.g. at a leak in the brake system.



BRAKE SYSTEM, MODEL 1967 AND 1968

1. Master cylinder with brake fluid container
2. Hand brake lever
3. Brake pedal
4. Wheel cylinders
5. Stop light contact
6. Brake warning contact
7. Adjustment screw, rear wheel brake



BRAKE SYSTEM, AS FROM MODEL 1969

1. Master cylinder with brake fluid container
2. Vacuum servo
3. Filter, vacuum servo
4. Handbrake lever
5. Brake pedal
6. Wheel cylinders
7. Stoplight contact
8. Brake warning contact
9. Moving piece, brake warning contact
10. Adjusting screw, rear brake

FUNCTION

When the brake pedal is depressed, the master cylinder pistons apply a force to the brake fluid, which is transmitted through brake pipes and hoses to the pistons of the brake cylinders, causing the brake pads to contact the brake disc and the brake linings the drums. The master cylinder has two pistons which work simultaneously, but independently, so that one acts on the left front and right rear wheels while the other acts on the right front and left rear wheels. Consequently, if leakage occurs in one circuit, the piston in the damaged circuit moves without affecting the brake pads.

Every application of the brakes thus pumps a certain amount of brake fluid out of the system, but as the upper part of the brake cylinder forms two chambers separated by a partition, the system can only be emptied as far as the partition. The brake fluid remaining for the undamaged circuit is sufficient to allow the car to be driven safely to a garage to have the damage repaired. Since the two-circuit brakes operate on the diagonal wheels, always approx. half the braking effect remains at leakage in one circuit. Furthermore, this affords greater safety when steering the car, as one front wheel and one rear wheel roll freely at the same time and are not locked.

MASTER CYLINDER

LHD up to and incl model 1970, RHD up to and incl chassis No. 96722017570 and 95722006474.

The tandem master cylinder comprises a body housing, a primary piston and a secondary piston, which are actuated by the push-rod from the brake pedal. The distance

between the pistons is determined by a spiral spring and a wire clamp. The secondary piston has a primary cup and a secondary cup at front and rear respectively. Fitted behind the primary cup is a dished piston washer, which prevents the cup from being extruded into the feed holes in the piston flange. The primary cup of the primary piston also has a dished piston washer and a secondary, rear cup.

The spiral springs return the pistons to the initial position. In their initial position, the pistons are retained by the spring pressure and as a consequence the channels open between the fluid container and the master cylinder.

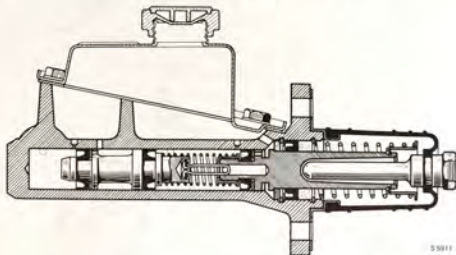
When the brake pedal is depressed, the push-rod actuates the primary piston, making the inlet channel between fluid container and cylinder close, and the pressure in front of the primary piston rise which in turn affects the secondary piston making it move and in this way the same overpressure is obtained in front of both pistons. Now brake fluid is forced out through the brake lines to the wheel cylinders and puts the brakes into action.

If a leakage occurs in the brake circuit served by the primary piston, the spring is compressed until the primary piston contacts the secondary piston. Then the latter can work normally.

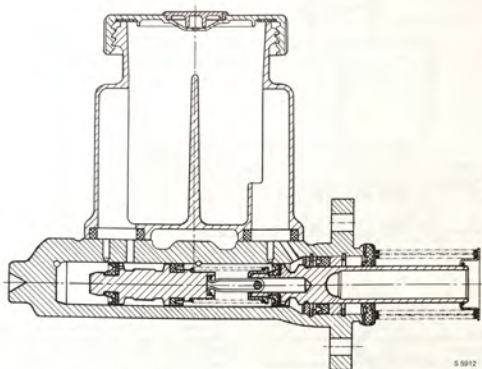
At a leakage in the secondary piston circuit, the secondary piston is pressed forward by the primary piston and the spring, until the secondary piston strikes the bottom of the cylinder. Then, brake fluid can be pressed out into the undamaged circuit.

LHD as from model 1971, RHD as from chassis No. 96722017571 and 95722006474.

The pistons are equipped with three seals on each, and the distance between the pistons is determined by a spiral spring and a screw.

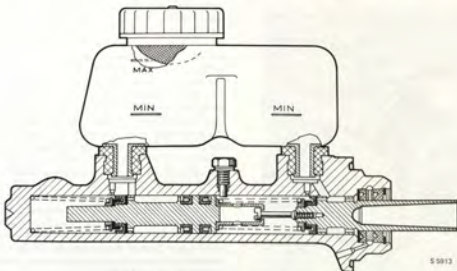


MASTER CYLINDER, SECTIONED, UP TO AND INCL. MODEL 1968



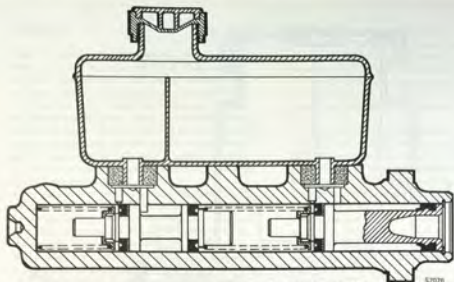
S 5912

MASTER CYLINDER, SECTIONED, LHD MODEL 1969-1970,
RHD MODEL 1969 - CH. No. 96722017570, 95722006474



S 5913

MASTER CYLINDER LHD AS FROM MODEL 1971



MASTERCYLINDER, AS FROM CHASSIS NO.
96722017571 AND 95722006475 RHD

FRONT WHEEL BRAKE

The front wheels are equipped with disc brakes with only one cylinder.

The principal parts of this brake are the support bracket, brake body assembly, cylinder body and friction pad assemblies.

The support bracket, which is bolted to the steering knuckle housing, keeps the brake in place and transmits

the braking forces to the knuckle housing.

The brake body assembly is fitted to the support bracket by means of a hinge pin and a friction unit. It is thus movable in relation to the support bracket, the torsional centre being provided by the hinge pin.

The brake cylinder has an outer wiper seal, which prevents the entry of dust, and an inner fluid seal.

The friction pad assemblies consist of frictional material which is glued to a pressure plate. The friction pads are wedge-shaped in order to compensate for the irregular wear which occurs on account of the movement taking place around the hinge pin. The outer friction pad is mounted in the brake body assembly whereas the inner pad rests against the brake piston and is held in position by the support bracket and the brake body assembly.

The hydraulic pressure is built up in the master cylinder and is transmitted to the brake cylinder. The pressure actuates the brake piston, causing this to move outwards and press the friction pad against the brake disc. The movable brake unit is then influenced, so that the outer friction pad is also pressed against the brake disc.

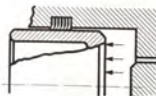
When the piston is being pressed outwards in the cylinder, a certain resilience occurs in the piston seal which surrounds the piston. This springiness is sufficient to pull the piston back when the hydraulic pressure decreases, thus providing a clearance between the friction pad and the disc. The outer friction pad is moved back on account of the movement of the brake body assembly in relation to the support bracket. Wear on the brake linings is compensated for automatically, as the brake piston moves outwards by means of the seal.



5 1040

FRONT AXLE ASSEMBLY WITH DISC BRAKE

- | | |
|---------------|------------------|
| 1. Brake disc | 3. Brake housing |
| 2. Wheel hub | 4. Brake pads |

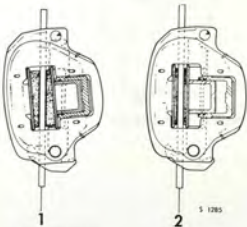


Braking position

S 1723

THE BRAKE PISTON IS RETURNED TO REST BY THE ACTION OF THE PISTON SEAL.

The effect of this combination of the simple brake cylinder and the movable brake unit is that both friction pads are pressed together with a torsional movement which tends to give irregular wear on the friction pads. This wear is made up for by the fact that the pads are wedge-shaped. As the friction pads get worn, the brake body assembly turns around the hinge pin, thus causing the angle of wear to be continuously changed, thus causing the linings have become so worn as to necessitate changing the friction pads, the angle has become so small that the lining is practically parallel with the pressure plate.



NEW AND WORN PADS

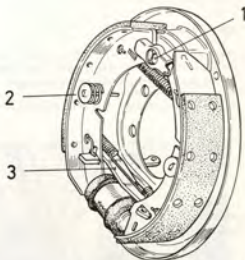
1. New pads
2. Worn pads

S 1285

REAR WHEEL BRAKES AND HANDBRAKE

The rear wheel brakes have one wheel cylinder mounted in the backplate. The cylinder is fitted with two pistons, each of which acts on one brake shoe. The brake shoes are manually adjustable.

The braking movement is transmitted by sealed Bowden cables to levers for the rear wheel brake shoes.



S 712

REAR WHEEL BRAKE

1. Adjustment
2. Spring
3. Handbrake link

SERVO UNIT

The servo unit consists of a vacuum cylinder which is actuated by the brake pedal. The cylinder is connected to the engine inlet manifold by means of a hose. The function of the system can be seen from the description below.

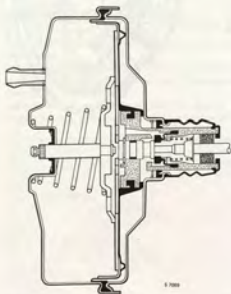
NOTE

The vacuum servo shall not be disassembled.

Initial position

When "off", the return spring holds the valve piston and the push-rod in the right hand end position in the guide housing. In this position, the atmospheric air channel is kept closed and the vacuum channel open.

The vacuum is equal on both sides of the diaphragm.



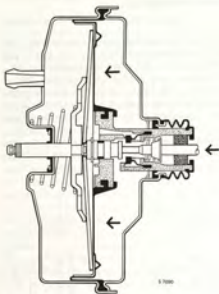
SERVO UNIT, INITIAL POSITION

Brake position

When pressing the brake pedal, the valve piston is moved to the left, the vacuum channel is closed and air of atmospheric pressure flows in on the right hand side of the membrane.

As vacuum prevails on the L.H. side of the diaphragm and atmospheric pressure on the R.H. side an increased force is obtained on the cylinder. The brake action can be increased further by larger pressure on the pedal. Once the pedal pressure ceases, the return spring forces the valve piston back. The vacuum channel opens, and the atmospheric air channel closes. The vacuum servo returns to its "off" position.

Should a fault occur in the power brake unit, the brake system of the car will function without servo effect. The servo cylinder will in that case serve only as a lengthened push-rod. In the latter case is, of course, a larger pedal pressure required.

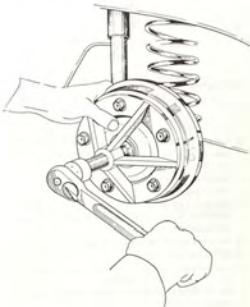


SERVO UNIT, BRAKE POSITION

BRAKE SHOES

REMOVAL OF BRAKE DRUM FOR INSPECTION OF BRAKE LINING, REAR WHEEL

1. Remove the cotter pin and the shaft nut.
2. Jack up the car.
3. Remove the wheel.
4. Release the handbrake and adjust the rear brake shoes with the adjusting screw.
5. Remove the brake drum, using puller 78 40 028.



WHEEL PULLER 78 40 028

6. Examine the linings on all shoes. If they are worn to a thickness of 0.1 in. (2.5 mm), or unevenly worn, or covered with grease, new linings must be fitted. On rear linings. It may then be sufficient to change the two rear linings only.
7. An exchange system is operative for complete brake shoes with fitted automatic adjustment device. Replacement of linings thus calls for exchange of the entire brake shoe.
If linings only are replaced, they must be ground in a special machine to a radius of about 0.010–0.012 in. (0.25–0.30 mm) less than that of the drum in order to ensure perfect contact. The ends of the linings must not be chamfered; the edge should be left as sharp as possible.

NOTE

Never fit new brake linings on one side only.

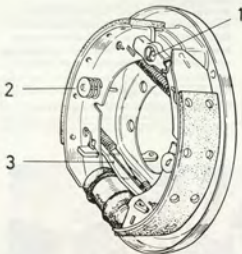


INSPECTION HOLE IN BRAKE DRUM

1. Inspection hole

DISASSEMBLY

1. Use a piece of wire or a clamp to keep the brake pistons in the cylinder while carrying out this operation.
2. Remove the springs which hold the brake shoes against the backplate.



REAR WHEEL BRAKES

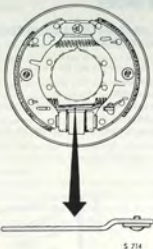
§ 712

1. Adjustment
2. Spring
3. Handbrake link

3. Lift the brake shoes off from the wheel cylinder and handbrake levers, first at the top and then at the bottom end.

REASSEMBLY

1. Hook on the springs between the shoes.
2. Locate the front shoe with the handbrake lever in the oblong hole.



FITTING THE HANDBRAKE LEVER

3. Lift the rear shoe with the handbrake lever into the large hole. Make sure that the spring presses against the lever as shown in the fig.
4. Remove the wire or clamp used to keep the brake pistons in position.
5. Adjust the shoes to a position concentric with the backplate. Refit the springs holding the shoes against the backplate.
6. Refit the wheel hub and the wheel.
7. Adjust the brake shoes.

WARNING

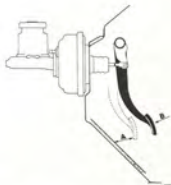
Do not allow oil or grease to contaminate brake linings or drums.

ADJUSTMENT

General

Brake shoe wear is revealed by excessive travel of the brake pedal or hand brake lever before the brakes work. The distance between the pedal and the lower part of the dash panel must not be less than the values mentioned in the pictures, with a pedal pressure of approx. 250 N (55 lb., 25 kp) and the engine idling.

The front wheels have self-adjusting brakes. Consequently, it will only be necessary to adjust the brake shoes on the rear wheel brakes.



THE MINIMUM DISTANCE PERMISSIBLE BETWEEN DE-PRESSED PEDAL AND TOE-BOARD

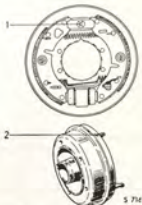
A = 2.6 in. (65 mm)

B = approx. 250 N (55 lb., 25 kp)

Adjustment of rear brake shoes

1. Jack up the car so that the rear wheels are clear of the ground. Be sure to locate the jack in the correct position. It is possible to adjust the brake without removing the wheels.
2. Release the handbrake and check that the brake levers return all the way. If the cable runs sluggishly in its sheathing, the lever must be pulled off by hand.

3. Depress the brake pedal hard several times in order to center the brake shoes.
4. The adjusting screw for the rear brakes consists of a square peg located on the rear of the backplate. Turn with a special spanner until the wheel is locked. Then back off one or more steps until the rear wheel again rotates freely.



FOOT BRAKE ADJUSTING SCREW, REAR WHEELS

1. Adjustment device
2. Adjustment point

5. After adjusting, check that the free movement of the pedal is 0.12–0.24 in. (3–6 mm). See section 524. If the clearance is less than this measure, the brake shoes don't return when the brake pedal is released.
6. If the adjusting screw cannot be tightened up enough to lock the wheel, the brake linings are worn and must be renewed. Always change brake linings simultaneously on both wheels and NEVER on one wheel only. The reason for this is to ensure that the braking effect will be even. When changing brake linings, always use genuine Saab replacements or linings recommended by Saab. After adjusting the brakes, always make sure that the rear wheels revolve easily — this is done by depressing the brake pedal, releasing it and then rotating the wheels.

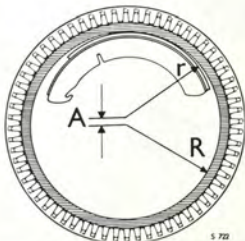
BRAKE LININGS

REPLACEMENT

At intervals not exceeding 6 000 miles (10 000 km) the wheels shall be removed and the thickness of the brake linings checked. For the brake drums this is made through the inspection holes. The brake linings should be exchanged at a thickness of 0.1 in. (2.5 mm), the friction pads at 0.06 in. (1.5 mm) thickness of the very lining. An exchange system is operative for complete brake shoes. Replacement of linings thus calls for exchange of the entire shoe.

If linings only are to be changed, they must be ground in a special machine to a radius of 0.010–0.012 in. (0.25–0.30 mm) less than that of the brake drum in order to ensure perfect contact. The ends of the linings must not be chamfered; the edge should be as sharp as possible.

1. Remove the old brake linings.
2. Wash the brake shoes in gasoline or kerosene and blow clean with compressed air.
3. Place the new linings on the shoes and fix them with two rivets in the center.
4. Fix the other rivets in turn, proceeding from the center and out towards the ends. Stretch the lining well to secure good contact with the shoe. Any clearance left between the shoe and its lining may jeopardize the function of the brakes and cause unwanted noise.
5. Grind the lining to a radius of about 0.010–0.012 in. (0.25–0.30 mm) less than that of the drum.



CENTERLESS GRINDING OF BRAKE LININGS

- R = Radius of brake drum
r = Radius of brake lining. Thus, r to be 0.010–0.012 in. (0.25–0.30 mm) less than R
A = Measurement 0.010–0.012 in. (0.25–0.30 mm)

NOTE

To secure perfect contact between the lining and the drum, and speedy running-in, the linings should be ground after riveting to a radius of 0.010–0.012 in. (0.25–0.30 mm) less than that of the drum. This is particularly important when the brake drum has been machined. Special equipment is required for this grinding operation.

NOTE

The ends of the linings must not be chamfered, but should have as sharp an edge as possible.

NOTE

To ensure optimal safety, use only genuine Saab linings or exchange shoes.

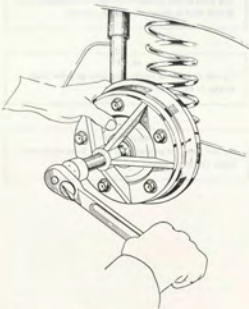
WARNING

Do not allow oil or grease to come in contact with brake linings or drums.

BRAKE DRUMS

REMOVAL AND INSTALLATION

1. Remove the cotter pin and the shaft nut.
2. Jack up the car.
3. Remove the wheel
4. Release the handbrake and adjust the rear brake shoes with the adjusting screw.
5. Remove the brake drum, using puller 78 40 028.



WHEEL PULLER 78 40 028

6. After refitting the brake drum, tighten the shaft nut with a torque wrench set at 90 Nm (65 ft.-lb., 9 kpm).

MACHINING

If the brake drums are moderately scored, and more or less equally on both left and right sides, this will not influence the braking effect or the life of the brakes. If, on the other hand, only one drum is scored or both drums severely scored, they should be renewed or perhaps machined. Renewal or machining is also necessary if the brake drum is out-of-round, which is betrayed by jerky pedal action when the brakes are applied. The brake drum may be machined to a maximum diameter of 8.059 in. (204.7 mm).

When new brake drums are being installed, new wheel bearings should also be fitted.

BRAKE DISCS

REPLACEMENT

When the brake disc shows signs of heavy wear after considerable mileage, it must be replaced. Moderate scoring, on the other hand, does not necessitate replacement. To change the brake disc, proceed as follows:

1. Remove the hub cap and slacken the shaft nut.
2. Jack up the front of the car, take off the wheel and remove the shaft nut.
3. Remove the two bolts holding the brake housing to the steering knuckle housing. These bolts are accessible from the inside of the brake disc. Lift the brake housing clear of the brake disc.

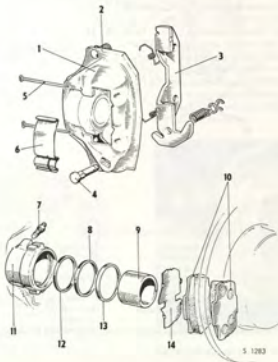
NOTE

Do not disconnect the brake hose, instead place the brake housing in such a way that the hose is not exposed to tension.

4. Pull off the wheel hub with the brake disc attached, using wheel puller 7840028.
5. Detach the brake disc from the wheel hub. Reassemble in reverse order. When refitting the brake housing bolts in the steering knuckle housing, always use a new locking plate.

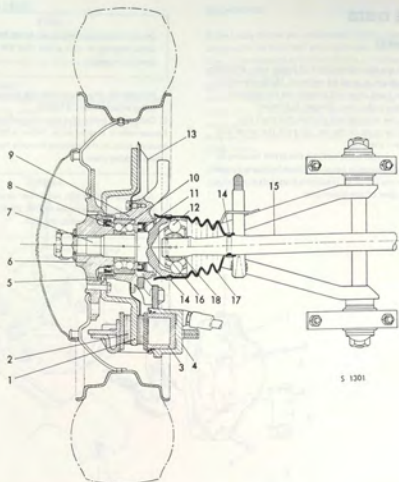
NOTE

After the reassembly, remember to pump repeatedly with the brake pedal so that the brake pistons will move out towards the disc.



DISC BRAKE COMPONENTS

- | | |
|-----------------------------|-----------------------------|
| 1. Brake body assembly | 8. Wiper seal |
| 2. Spring loaded steady pin | 9. Piston |
| 3. Support bracket | 10. Friction pad assemblies |
| 4. Hinge pin | 11. Cylinder body |
| 5. Split pins | 12. Fluid seal |
| 6. Spring clip | 13. Retainer |
| 7. Bleed screw | 14. Shim |



FRONT AXLE UNIT WITH DISC BRAKE

- | | |
|-----------------------------|--|
| 1. Brake disc | 10. Ball bearing |
| 2. Brake pad | 11. Shaft seal |
| 3. Brake piston | 12. Ball |
| 4. Brake housing | 13. Backing plate |
| 5. Nut | 14. Clamp |
| 6. Wheel hub | 15. Inner drive shaft |
| 7. Outer drive shaft | 16. Circlip |
| 8. Shaft seal | 17. Bellows |
| 9. Steering knuckle housing | 18. Spacer ring (on certain cars only) |

FRICITION PADS

GENERAL

As the disc brakes are selfadjusting, it is not possible to decide by the length of the pedal stroke whether the brake linings are worn. At intervals not exceeding 6 000 miles (10 000 km) the wheels shall be removed and the thickness of the brake linings checked. The friction pads must be removed when the thickness of the lining is less than 0.06 in. (1.5 mm).

REPLACEMENT

1. Jack up the car and remove the wheel.
2. Remove the cotter pins, and the spring holding the friction pads. Remove the friction pads.
3. Clean thoroughly the uncovered part of the piston, and make sure that there is no rust or dirt on the friction pads surfaces which contact the bracket and the yoke.

NOTE

When cleaning, use only brake fluid or methylated spirit.

4. Drive the piston back into the brake housing with the aid of screw vise 78 60 430.



PRESSING IN THE BRAKE PISTON

Tool 78 60 430

NOTE

When the brake piston is forced back into the cylinder, the brake fluid level in the reservoir will rise appreciably, and it may then be necessary to drain off superfluous fluid.

5. Clean the brake disc thoroughly with trichlorethylene.

6. Turn the movable brake part towards the wheel, and fit the outer friction pad. Make sure that it moves freely in its position in the yoke. Possibly, protruding parts will have to be trimmed with a file.

IMPORTANT

If used friction pads are refitted, they must be placed in their original locations.

7. Turn the movable brake part backwards as far as possible.
8. Fit damping shims to the back of the friction pads, and make sure that the shim does not exceed the contours of the pressure plate.
9. Be sure that the damping shim is fitted with the two recesses directed downwards, in such a way that they are centred on the ends of the piston recess. Fit the inner friction pad. Also make sure that the recess in the piston is directed downwards. The brake piston of the latest design has a face ground contact surface facing the friction pad. In this connection the damping shim has been altered in such a way that the piston has the corresponding fit-up facing the friction pad.
10. Fit the spring. The recess in the spring shall lie as near as possible to the outer friction pad. Fit new cotter pins, and lock them. Fit the upper cotter pin first. When fitting the lower cotter pin, press the spring upwards with the aid of a screwdriver.



INSTALLATION OF BRAKE PADS

NOTE

Fit a new spring, if the old one is worn out.

11. Pump repeatedly with the brake pedal in order for the friction pads to be adjusted in towards the brake

disc.

12. Top up with brake fluid in the reservoir.

WARNING

Do not forget to pump repeatedly with the brake pedal, otherwise the pedal will go all the way down when the brakes are applied.

FRICTION PADS

GENERAL

As the disc brakes are self-adjusting, it is not necessary to adjust the length of the brake cable. The brake cable should be checked at intervals of 1000 miles (1600 km). The cable must be checked and the cable must be replaced if necessary. The cable must be replaced when the cable is damaged or the cable is broken.

1. Check the cable for damage and the cable for proper adjustment.
2. Adjust the cable for proper adjustment.
3. Check the cable for damage and the cable for proper adjustment.
4. Adjust the cable for proper adjustment.

NOTE
If the cable is damaged, it must be replaced.

Check the cable for damage and the cable for proper adjustment.



Diagram showing the location of the brake cable and the brake pads.

Check the cable for damage and the cable for proper adjustment.

Adjust the cable for proper adjustment.

Check the cable for damage and the cable for proper adjustment.

Adjust the cable for proper adjustment.



Diagram showing the location of the brake cable and the brake pads.

Check the cable for damage and the cable for proper adjustment.

Adjust the cable for proper adjustment.

Check the cable for damage and the cable for proper adjustment.

Adjust the cable for proper adjustment.

HYDRAULIC FOOTBRAKE SYSTEM

OVERHAUL

If it is found necessary to dismantle the brake system, or any part thereof, this must be done under conditions of scrupulous cleanliness. Clean off all dirt and grease before removing any parts. Do not swill a dismantled unit in gasoline, kerosene or trichloroethylene, etc., because these solvents will ruin the rubber parts. Dismantle the units on a bench covered with a sheet of clean paper. Do not touch internal parts with dirty hands, particularly rubber items. After dismantling, place all metal parts in a tray of clean brake fluid to soak. Having done this, dry off with a clean, lint-free cloth and lay the parts out in order on a sheet of clean paper. To ensure unfailing reliability, we would recommend that all rubber parts be replaced by new ones. These are ready available in the form of repair kits containing all the rubber parts required for each particular unit.

The main bodies of units may be swilled in industrial methylated spirit or brake fluid, but if spirit is used all traces must be dried out before reassembly. All internal parts should be dipped in brake fluid according to Spec. DOT 3, DOT 4 or SAE J 1703 and assembled wet.

INSPECTION

For reasons of safety, it is of the utmost importance for the hydraulic system to be checked at regular intervals.

BRAKE FLUID

General

Always keep the brake fluid reservoir properly filled. Check the level every 6 000 miles (10 000 km) or every three months, whichever comes first. It is essential to use the recommended brake fluid. Inferior brake fluids can seriously damage the entire brake system. Apart from ruining rubber cups and seals, such fluids may lack lubricating properties and initiate corrosion. Furthermore, they may be excessively viscous at low temperatures or have a low boiling point, which would cause vaporization in the system upon heavy brake applications. This would result in brake failure, the consequences of which would be disastrous.

Even the best brake fluids deteriorate after prolonged use, owing to oxidation and absorption of water, which lowers the boiling point.

For racing and rallying, and for driving in mountainous territory, brake fluid should be changed at yearly intervals.

The brake fluid should be changed after any repairs to the brake system and after 24 000 miles (40 000 km) or at intervals of two years.

The brake fluid shall always be kept in a closed container.

IMPORTANT

Use only brake fluid satisfying the minimum requirements of specification DOT 3, DOT 4 or SAE J 1703.

Replenishing

Before unscrewing the filler cap, clean the top part of the brake fluid reservoir to prevent dirt entering when the cap is removed. Be careful not to spill any brake fluid on the paintwork of the car when pouring in brake fluid, as this fluid is injurious to paint. Check that the air vents in the filler cap are not choked.

If brake fluid consumption is found to be excessive, examine all lines, hoses, connections and cylinders, applying firm pressure to the brake pedal meanwhile.

Changing

1. Open the primary circuit nipples (left front and right rear wheel) and connect hoses as when bleeding. Pump the brake pedal until the fluid container is almost empty. Fill new fluid and continue pumping until the entire system is filled with new fluid. Close the bleed nipples. Repeat the procedure for the secondary circuit (right front and left rear wheel). Pump through at least half a quart (half a liter). Replenish the container.
2. Bleed the brake system.

BLEEDING

Bleeding is not a routine service measure and is necessary only when part of the brake system has been disassembled and when the brake fluid has been drained off. Sure signs that air has entered the system are excessive pedal travel, springy pedal action or absence of braking effect until the brake pedal has been firmly depressed several times. A bleed nipple is provided for each wheel. Bleed nipples for the disc brakes are located on the wheel cylinder.



LOCATION OF BLEEDING NIPPLES, REAR WHEEL BRAKE



LOCATION OF BLEEDING NIPPLE, FRONT WHEEL BRAKE

The best result is obtained with the aid of bleeding equipment. The makers instructions should be followed. Bleeding can also be done according to the following description.

1. Check that the reservoir is completely full of brake fluid and that the air vents in the reservoir cover are not choked.
2. Bleed either one wheel at a time or two wheels at the same time. One circuit should be bled completely before bleeding of the other circuit is started. Up to and incl. model 1970 (make Lockheed) the left front wheel and the right rear wheel must be bled first.
3. Fit suitable hoses to the bleed nipples on both wheels.
4. Dip the hose end in a glass vessel containing clean brake fluid.
5. Back off both nipples $1/2-1$ turn.
6. Have an assistant pump the brake pedal and watch until escaping brake fluid is free of air bubbles. Keep the hose ends below the fluid level in the glass vessel the whole time.
7. Close the bleed nipples, keeping the pedal depressed meanwhile.
8. Check that the brake fluid in the reservoir does not run out while the system is being bled.
9. Top up the reservoir with fresh brake fluid after bleeding the two circuits.

MASTER CYLINDER

Up to and incl. model 1968

GENERAL

All work on the brake system must be done under conditions of scrupulous cleanliness and carefulness. See section 520.

REMOVAL

1. Disconnect the connections for outlet brake lines from the master cylinder.
2. Remove the rubber boot from the push rod, or back

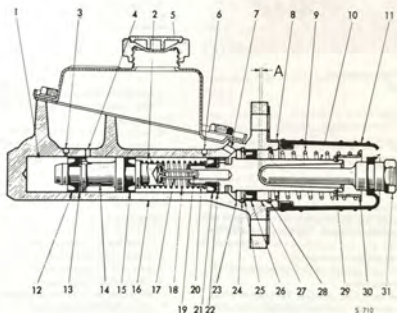
off the locking nut and unscrew the push rod from the fork on the brake pedal.

3. Back off and remove the two master cylinder retaining bolts. The lower one is a stud bolt and the nut is accessible from the engine compartment. The upper one is a screwbolt, accessible from inside the car.
4. Remove the master cylinder.

DISMANTLING

The master cylinder should only be dismantled if there is no exchange system for this unit.

1. Remove the rubber bellows (11) together with retaining plate (8) and the push rod (31).



MASTER CYLINDER, SECTIONED, UP TO AND INCL. MODEL 1968

A = 0.024-0.047 in. (0.6-1.2 mm)

- | | | |
|------------------------------------|----------------------|------------------------|
| 1. Outlet to the secondary circuit | 12. Primary cup | 22. Piston washer |
| 2. Outlet to the primary circuit | 13. Piston washer | 23. Piston stop |
| 3. By-pass port | 14. Secondary piston | 24. Circlip |
| 4. Feed hole | 15. Secondary cup | 25. Washer |
| 5. Brake fluid reservoir | 16. Body | 26. Secondary cup |
| 6. By-pass port | 17. Clip | 27. Guide bearing |
| 7. Feed hole | 18. Spring | 28. Circlip |
| 8. Retaining plate | 19. Retaining pin | 29. "Spirolox" circlip |
| 9. Spring | 20. Spring holder | 30. Spring retainer |
| 10. Primary piston | 21. Primary cup | 31. Push rod |
| 11. Rubber boot | | |

2. Press down the spring retainer (30) and remove the spiral clip (29) with the aid of a small screwdriver.
3. Remove the outer lock ring (28), the nylon bearing (27), the cup (26), and the washer (25).
4. Remove the inner lock ring (24) with the aid of special tool 78 41 992 and remove the pistons.



REMOVING THE LOCK RING

Tool 78 41 992

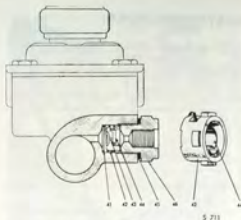
NOTE

Be careful when removing the locking ring and the washer so that the surface of the pistons not be damaged.

5. Compress the intermediate spring (18) together with spring holder (20) and drive out the retaining pin (19), using a suitable pin punch. This will separate the two pistons (10 and 14), and allows the withdrawal of the spring (18) and spring holder (20).

NOTE! It is not possible to remove the clip (17) on the secondary piston.

6. Withdraw the non-return valves. Take care not to distort the spring clip (44) when removing it from the valve body.



NON-RETURN VALVE IN MASTER CYLINDER

- 41. Spring
- 42. Valve body
- 43. Equalizing hole
- 44. Spring clip
- 45. Gasket
- 46. Adapter

7. Remove the six bolts retaining the cover of the brake fluid reservoir (5) and take off the cover together with the gasket.
8. Put the parts in a vessel containing brake fluid for cleaning. Methylated spirit can be used for cleaning but the parts must then be wiped thoroughly dry.

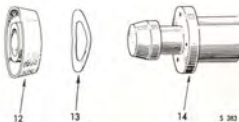
INSPECTION

1. Check that the cylinder bore is not scored.
2. Check that the by-pass holes are clean by probing with a piece of thin steel wire.
3. Check all parts, and renew any defective ones. Internal rubber parts should be replaced by new ones, which are available in suitable kits.

REASSEMBLY

Before reassembling the master cylinder, dip all parts in brake fluid.

1. Locate the cups on the pistons and check that they are correctly positioned, see fig.



FITTING THE PISTON WASHER

- 12. Primary cup
- 13. Piston washer (dished)
- 14. Secondary piston

2. Install the spring (18) on the pistons and press them together so that the retaining pin (19) can be installed.
3. Fit the pistons in the cylinder. NOTE! Be careful so that the gaskets not be damaged.
4. Install the piston stop (23).
5. Mount spiral clip (24) with the aid of tool 78 41 992.
6. Install the washer (25), the secondary cup (26) and the nylon bearing (27). Lock with spiral clip (28).
7. Install spring (9) and spring retainer (30) on the primary piston (10).
8. Compress the retain spring (9) and install the spiral clip (29).
9. Lubricate the small end of the push rod (31) with silicon grease and install the rubber bellows (11) with retainer (8).
10. Screw on the outlet adapters and non return valves. Tighten to 38 Nm (28 ft.-lb., 3.8 kpm).
11. Install the cover 5 and tighten the screws to 7 Nm (6 ft.-lb., 0.7 kpm).

INSTALLATION

1. Cover all openings to prevent the entry of foreign matter into the cylinder during the installation work.
2. Attach the brake cylinder.
3. Refit the rubber boot to the push rod. Reassemble the push rod if it has been disassembled.
4. Reconnect the outlet brake lines and refill the system with brake fluid.
5. Adjust the brake pedal free movement. See section 524.
6. Bleed the system. See section 520.

As from model 1969

If it is necessary to dismantle the brake system, or any part thereof, this must be done under conditions of scrupulous cleanliness. See section 520.

REMOVAL AND INSTALLATION OF MASTER CYLINDER WITH VACUUM SERVO

1. Remove the protective cover of the steering wheel shaft.
2. Loosen the screw joints of the outlet brake lines at the master cylinder. Disconnect the vacuum hose from the vacuum servo.
3. Detach the push rod at the brake pedal.
4. Loosen the four nuts retaining the vacuum servo to the dash panel. The nuts are accessible from inside the car. Remove the master cylinder.

The installation is made in the reverse order.

REMOVAL AND INSTALLATION OF MASTER CYLINDER

When removing and installing the master cylinder, it is not necessary to remove the vacuum servo.

1. Loosen the screw joints of the outlet brake lines at the master cylinder.
2. Remove the two nuts retaining the master cylinder to the vacuum servo.
3. Remove the master cylinder.

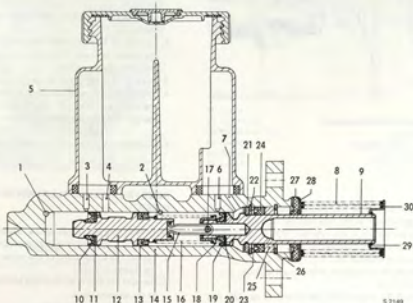
The installation is made in the reverse order. Bleeding the brake system, see section 520.

Model 1969–1970

DISMANTLING

The master cylinder should only be dismantled if there is no exchange system for this unit.

1. Depress the spring retainer (30) and, using a small screwdriver, unwind the spiral clip (29) from the groove of the primary piston, taking care not to distort the coils; remove the spring retainer (30) together with the spring (8). Remove the washer (28) and the gasket (27).



MASTER CYLINDER, SECTIONED, MODEL 1969-1970

- | | | |
|------------------------------------|----------------------|------------------------|
| 1. Outlet to the secondary circuit | 11. Piston washer | 21. Piston stop ring |
| 2. Outlet to the primary circuit | 12. Secondary piston | 22. Circlip |
| 3. By-pass port | 13. Secondary cup | 23. Washer |
| 4. Feed hole | 14. Body | 24. Secondary cup |
| 5. Brake fluid reservoir | 15. Wire clip | 25. Guide bearing |
| 6. By-pass port | 16. Spring | 26. Circlip |
| 7. Feed hole | 17. Retaining pin | 27. Gasket |
| 8. Spring | 18. Spring holder | 28. Washer |
| 9. Primary piston | 19. Primary cup | 29. "Spinolox" circlip |
| 10. Primary cup | 20. Piston washer | 30. Spring retainer |

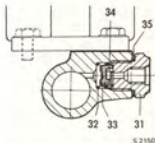
2. Remove the circlip (26), taking great care not to damage the surface finish of the primary piston (9). Lightly tap the mounting flange of the cylinder body on the bench, and remove the nylon guide bearing (25), the secondary cup (24) and the plain washer (23).
3. Using special circlip pliers with long, narrow jaws, tool 78 41 992 remove the inner circlip (22), again taking great care not to damage the surface finish of the primary piston (9).



REMOVING THE LOCK RING

Tool 78 41 992

4. Removal of the circlip will allow the withdrawal of both pistons together with the piston stop (21).
5. Compress the intermediate spring (16) together with spring holder (18) and drive out the retaining pin (17), using a suitable pin punch. This will separate the two pistons (9 and 12), and allows the withdrawal of the spring (16) and spring holder (18).
6. Remove the primary cups (10 and 19) together with the piston washers (11 and 20) from the primary and secondary pistons. Remove the secondary cup (13) from the back of the secondary piston. Do not attempt to move the clip (15) from the secondary piston, as this part is permanently peened in position.
7. Unscrew the outlet adapters (31) and remove them together with the gaskets.
8. Withdraw the non-return valves, comprising the spring (32), valve body (33) and spring clip (34). Take care not to distort the spring clip (34) when removing it from the valve body.



FITTING THE PISTON WASHER

- 10, Primary cup
- 11, Piston washer (dished)
- 12, Secondary piston

9. Remove the 4 bolts retaining the cover of the brake fluid reservoir (5) and take off the cover together with the gasket.
10. Clean the parts in brake fluid or methylated spirit.

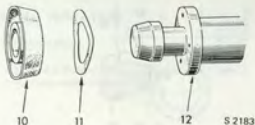
INSPECTION

1. Check that the cylinder bore is not scored.
2. Check that the by-pass holes are clean by probing with a piece of thin steel wire.
3. Check all parts, and renew any defective ones. Internal rubber parts should be replaced by new ones.

REASSEMBLY

Before reassembling the master cylinder, dip all parts in brake fluid.

1. Using the fingers only, stretch the secondary cup (13) over the large end of the secondary piston with the lip pointing towards the peened clip. Gently work round the cup with the fingers to ensure correct bedding.
2. Locate the piston washer on the secondary piston spigot. Using the fingers only, ease the primary cup (10) over the nose of the spigot and into the groove, with the lip of the cup pointing away from the head of the piston.



NON-RETURN VALVE

- 31. Outlet screw joint
- 32. Spring
- 33. Valve body
- 34. Valve spring
- 35. Gasket

3. Adopt the same procedure with the primary cup (19) and piston washer (20) of the primary piston. Ease the spring holder (18) into the end of the spring (16) and fit the other end of the spring over the rear of the secondary piston (12).
4. Locate the retaining pin (17) in the hole in the primary piston, but do not push fully home. Compress the spring until the secondary piston clip (15) is visible. Place the clip in position in the primary piston and secure it by pushing the retaining pin fully home. Release the spring and check that the spring holder (18) is correctly positioned.

5. Ease the pistons gently into the cylinder bore and slide the piston stop (21) over the primary piston. Fit the circlip (22) in the inner groove, using special circlip pliers with long, narrow jaws, tool 78 41 992, and check that it is correctly located. Take great care not to damage the surface finish of the primary piston since this could cause leakage past the secondary cup.
6. Fit the plain washer (23) into the cylinder bore against the circlip, followed by the secondary cup (24).
7. Place the nylon guide bearing (25) in position and secure with the outer circlip (26). Fit the gasket (27) and the washer (28).
8. Mount the return spring (8) and the spring retainer (30) on the primary piston (9). Compress the spring until the piston circlip groove is visible behind the spring retainer and locate the spiral circlip (29).
9. Ease the spring clip (34) into the non-return valve body and check that it is correctly positioned. Fit the return spring over the valve body and locate the parts within the outlet port, inserting the spring first.
10. Screw the outlet adapter (31), together with the gasket (35) into the outlet port and tighten to a torque of 38 Nm (28 ft.-lb., 3.8 kpm). Adopt the same procedure for the remaining outlet port.
11. Place the brake fluid reservoir (5) in position together with the gaskets, and tighten the four bolts.

As from model 1971

DISMANTLING

1. Separate the power assist unit from the master cylinder by backing off the nuts from the two retaining bolts.
2. Remove the lock ring (20) that holds the primary piston (12) in place.
3. Back off the stop screw (13).
4. Pull out the primary piston (12) with spring (5) and the secondary piston (4) with spring (5) and seals.
5. To change the seal ring (6) on the primary piston, the screw (9) with spring must be completely unscrewed and the spring retainer, support ring and support washer removed to gain access to the seal ring.
6. Clean the parts in brake fluid or methylated spirit.

INSPECTION

1. Check that the cylinder bore is not scratched.
2. Check that the through flow holes are clear by testing with a fine iron wire.

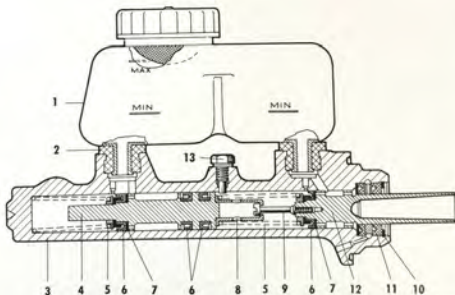
3. Check all parts and exchange any that are worn or defective.

Rubber gaskets and seals should be replaced by new ones. Repair kits containing complete replacement sets of rubber gaskets and seals are available.

REASSEMBLY AND INSTALLATION

(Dip all parts in brake fluid before assembling.)

1. Insert the secondary piston (4) with spring and seals.
2. Insert the primary piston (12) with spring and seals.
3. Fit the lock ring (10).
4. Bolt the master cylinder to the power assist unit.
5. Cover all openings to keep dirt out of the cylinder during installation.
6. Fit the master cylinder complete with power assist unit to the dash panel and connect the push rod to the brake pedal.
7. Connect the brake lines.
8. Connect the vacuum hose and the clip that holds the speedometer cable to the power assist unit.
9. Mount the air cleaner.
10. Fill the container with brake fluid and bleed the system.



MASTER CYLINDER, AS FROM MODEL 1971

- | | |
|---------------------|--------------------|
| 1. Container | 8. Sleeve |
| 2. Rubber seal | 9. Screw |
| 3. Housing | 10. Lock ring |
| 4. Secondary piston | 11. Seal ring |
| 5. Spring | 12. Primary piston |
| 6. Piston seals | 13. Screw |
| 7. Washer | |

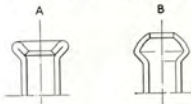
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BRAKE LINES

The brake pipes are of 3/16 in. Bundy tube. The ends of all the pipes are flanged and fitted with compression nuts, which must be passed onto the pipes before the ends are flanged. It is important to ensure that the pipes are properly flanged so that there will be no leakage at the joints. For reasons of safety, it is essential that all pipes, rubber hoses and connections in the brake system be kept in first class condition at all times. Bearing this in mind, check regularly that the hoses have not been damaged by flying stones or by abrasion. Pipes, too, must be installed so that they cannot rub or chafe against anything. Check that the pipes are correctly arranged beneath the rear seat, and that the pipes do not rub against plating. All pipe and hose connections must be properly tightened to ensure leak free joints. Make sure that the copper gaskets in the pipe connections are flawless, and change any defective ones. Copper gaskets which have become so hard that they no longer seal effectively may, however, be annealed and reused.

Pipes which are to be installed must fit well at both ends and at the clips. Never stretch a badly fitting pipe by means of the compression nuts or bend an already fitted pipe. Both of these courses could give rise to stresses which may result in leakage, pipe fracture or stripped threads.

Pipes for connection to brake hoses are flanged as per type "A". Other pipes are flanged as per type "B".



FLANGING OF BUNDY TUBE

The brake system incorporates two front and two rear brake hoses, affording the communication between the body and the wheel cylinders. These hoses are of different lengths and must not be confused. Install the hoses with the wheels freely suspended and aligned straight ahead. When tightening the brake pipe, hold the brake hose nipple (not the locking nut) to prevent the hose from twisting and changing position.

WARNING

When fitting brake hoses it is highly important to position them correctly, thereby ensuring that steering or suspension movements do not bring them into contact with other parts of the car. The brake hoses must not be wrung or twisted but shall be mounted in a neutral position. In addition, see to it that the front hoses form a downward directed curve.

The brake pipes are of 3/4 in. heavy pipe. The ends of the pipes are flared and fitted with compression nuts which must be flared into the pipes before the ends are flared. It is important to ensure that the pipes are properly flared so that there will be no leakage at the joints. For reasons of safety, it is essential that all pipes, rubber hoses and connections of the brake system be kept in

first-class condition at all times. Damaged or worn parts, especially those that have not been damaged by flaring, should be replaced. Pipes that must be installed in long runs or by means of a pipe must be installed so that they cannot rub or chafe against anything.

Check that the pipes are correctly arranged between the rear axle and that the pipes do not rub against anything. All pipes and hose connections must be properly flared. The pipes must have joints. Check that the pipes are in the proper position, the flares, and change any defective ones. Copper pipes which have become too hard and dry no longer seal effectively and, however, be annealed and reused.

Pipes which are to be installed must fit well in both ends and be fitted with a double flared pipe by which the connection can be made in a double flared pipe. Both of these connections give rise to stresses which may result in leakage, pipe fracture or rupture.

Figure 1 is a diagram of a brake pipe as flared at both ends. Figure 2 is a diagram of a brake pipe as flared at one end.



FIGURE 1. BRAKE LINES

The brake system is composed of two parts and two lines. The brake lines, which are connected to the brake body and the wheel cylinder, must be of the correct size and must be of the correct material. The brake lines must be of the correct size and must be of the correct material. The brake lines must be of the correct size and must be of the correct material.

WARNING

When fitting brake lines it is highly important to ensure that the lines are correctly fitted. If the lines are not correctly fitted, they may cause a leak or a rupture. The lines must be of the correct size and must be of the correct material. The lines must be of the correct size and must be of the correct material.

WHEEL CYLINDERS

GENERAL

All work on the brake system must be done under conditions of scrupulous cleanliness and carefulness. See section 520.

REAR WHEEL CYLINDERS

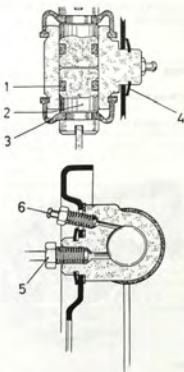
The Saab 96 is equipped with smaller wheel cylinders at rear than those of the Saab 95.

The location of their steady pins differs from that of the Saab 95 — with a view to avoid misfitting.

As from model 1970, Saab 95 is equipped with rear wheel brake cylinders of the same dimension (5/8") as those earlier used in the Saab 96.

WARNING

The steady pin must not be removed, same securing the wheel cylinder to the backplate.



REAR WHEEL CYLINDER

- | | |
|----------------|--------------------------|
| 1. Piston cup | 4. Retainer |
| 2. Piston | 5. Brake hose connection |
| 3. Rubber boot | 6. Bleeding nipple |

Removal

1. Remove the wheel, brake drum and brake shoes.
2. Disconnect the hand brake wire from the levers.
3. Disconnect the brake line from the rear of the back plate.
4. Remove the wheel cylinder retaining ring and the bleed nipple from the rear of the back plate.
5. Remove the wheel cylinder.

Disassembly

1. Remove the rubber boots from the cylinder.
2. Pull out the pistons.
3. Take the rubber seals off the pistons.

Inspection

1. Clean the parts in brake fluid or methylated spirit. Wipe the parts dry.

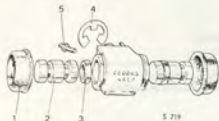
NOTE

Do not allow gasoline or oil come into contact with the rubber sealing rings or boots.

2. Check that the cylinder bore is unscored.
3. Check that the rubber sealing rings and boots are flawless. The use of unsuitable brake fluids can cause rubber parts to swell. Any rubber parts that are even slightly damaged or swollen must be renewed.

Reassembly

Scrupulous cleanliness must be observed when reassembling the wheel cylinder. Lubricate the cylinder bore, seals, cups and pistons with brake fluid before reassembling. Reassemble as shown in the illustration, making sure that the piston seal is facing the right way. Use the fingers only.



REAR WHEEL CYLINDER

- | | |
|----------------|-------------------|
| 1. Rubber boot | 4. Locking washer |
| 2. Piston | 5. Bleed nipple |
| 3. Piston seal | |

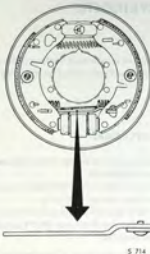
Installation

1. Refit the wheel cylinder to the back plate and locate the retaining ring and bleed nipple. The cylinder has a steady pin, a hole to receive this being provided in the back plate.



ATTACHMENT OF REAR WHEEL CYLINDER

2. Reconnect the brake line.
3. Refit the brake shoes, brake drum and wheel, taking great care not to damage the axle seal.
4. Reconnect the handbrake wire. Note that the hand brake lever must be installed with the bent part facing upwards.



FITTING THE HANDBRAKE LEVER

Remember to bleed the system whenever a brake line or a wheel cylinder has been removed.

DISC BRAKES

Removal of brake pistons and seals

For this task, a special screw wise tool 78 60 430, will be required.



SCREW VISE
Tool 78 60 430

1. Remove the friction pads as described previously.
2. Bend up the retaining plates and remove the two retaining bolts which hold the brake housing to the steering knuckle housing. Lift the brake housing away from the brake disc. Do not disconnect the brake hose, but place the brake housing so that the hose does not get stretched.

NOTE

Never allow the brake housing to hang from the brake hose. Collect the brake fluid when the piston is removed.

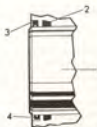
3. Press the brake pedal down carefully, thus forcing the piston out far enough for it to be taken off by hand. Keep a clean container handy, so that you will be able to collect the brake fluid when the piston is removed.
4. Disconnect the brake hose from the brake cylinder. Insert a plug in the hose to prevent the escape of the brake fluid and also to prevent the entry of impurities into the system.
5. Remove the two springs which hold the cylinder in place and remove the cylinder.
6. If the piston seal needs replacing, it can now be removed from its groove in the cylinder.
7. If it is necessary to remove the wiper seal, it can now be taken out with the aid of a screwdriver.

IMPORTANT

Always use either brake fluid or denatured alcohol (methylated spirit) for cleaning.

Reassembly of brake piston and seals

1. Coat a new, dry seal with special lubricant (Lockheed Disc Brake Lubricant) and place it carefully in its groove in the cylinder, making sure that it is properly seated.
2. Check that the piston and cylinder are thoroughly clean and coat them with the special lubricant. Press the piston into the cylinder, making sure that the recess in the contact surface facing the friction pad is pointing downwards. The brake piston of the latest design has a face ground contact surface facing the friction pad. In this connection the damping shim has been altered in such a way that the piston has the corresponding fit-up facing the friction pad. To facilitate refitting of the wiper seal, do not press the piston fully home, but leave about 0.4 in. (10 mm) outside the cylinder.



S 1286

FITTING THE WIPER SEAL

1. Piston
 2. Piston seal
 3. Seal retainer, wiper seal
 4. Wiper seal
3. If the wiper seal has been removed previously, smear a new, dry seal with the special lubricant and place it in the retainer with its groove turned towards the piston.
 4. Press the retainer and seal home with the aid of screw vise 78 60 430 and distance piece.
 5. Replace the brake cylinder in the brake body assembly and refit the springs.
 6. Remove the plug from the brake hose, fit a new copper washer and tighten the hose securely in the cylinder.
 7. Put the brake in place and tighten the retaining bolts. Remember to secure the hose with the retaining plate.

WARNING

Make quite sure that the brake hose is not twisted. If it is not mounted in a neutral position, slacken its attachment at the wheel housing and then retighten it in the correct position.

8. Refit the friction pads, spring and new cotter pins as described earlier.

NOTE

Fit a new spring if the old one seems to be exhausted.

9. Bleed the brake system and pump repeatedly up and down with the brake pedal in order to adjust the friction pads in against the disc. Top up with brake fluid in the reservoir.

WARNING

Do not forget to pump repeatedly with the brake pedal, as otherwise the pedal will go all the way down when the brakes are applied.

Replacement of complete brake cylinder

Disassembly

1. Remove the friction pads as described earlier.
2. Bend up the retaining plate and remove the two brake retaining bolts from the steering knuckle housing. Lift the brake away from the brake disc.
3. Disconnect the hose from the brake cylinder. Insert a plug in the hose to prevent the escape of brake fluid and also prevent the entry of impurities into the system.
4. Remove the two springs which hold the cylinder in place and remove the cylinder.
5. Clean the entire brake housing thoroughly.

NOTE

Take the opportunity to check for brake wear, especially on the hinge pin.

Reassembly

1. Insert the new brake cylinder in the brake body assembly and refit the springs.
2. Remove the plug from the brake hose, fit a new copper washer and tighten the hose securely in the cylinder.
3. Put the brake housing in place and tighten the retaining bolts. Remember to secure the bolts with the retaining plate.

WARNING

Make quite sure that the brake hose is not twisted. If it is not mounted in a neutral position, slacken its attachment at the wheel housing and then retighten it in the correct position.

4. Refit the friction pads, spring and new cotter pins as described earlier.

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Fit a new spring if the old one seems to be exhausted.

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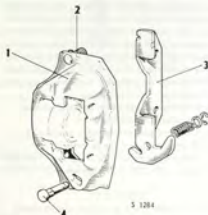
WARNING

Do not forget to pump repeatedly with the brake pedal, as otherwise the pedal will go all the way down when the brakes are applied.

Dismantling of brake body assembly and support bracket

If it should be necessary to replace the brake body assembly or the support bracket, these items can be disassembled as follows:

1. Remove the brake from the steering knuckle housing as described earlier.
2. Compress the spring on the hinge pin and take away the lock washer and spacer.
3. Remove the spring and lift the support bracket away from the hinge.
4. Reassembly takes place in the reverse order.



DISC BRAKE COMPONENTS

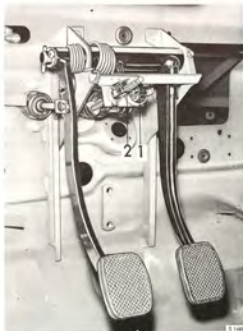
1. Brake body assembly
2. Spring loaded steady pin
3. Support bracket
4. Hinge pin

BRAKE OPERATION

Up to and incl. model 1968

BRAKE PEDAL

The brake pedal is carried on the same shaft as the clutch pedal and is fitted with self-lubricating bushings.



PEDAL STAND WITH PENDANT PEDALS

1. Stop light switch
2. Brake warning contact

Removal and installation

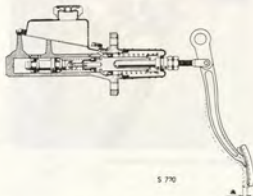
1. Remove the steering column and gear shift shaft.
2. Detach the fork for the clutch cylinder from the clutch pedal.
3. Remove the cotter pins from both ends of the shaft.

4. Remove the clutch pedal and return spring from the shaft.
5. Unscrew the master cylinder push rod at the adjusting nut.
6. Pull out the shaft leftwards and remove the brake pedal.
7. Check the bearing for wear and fit new bushings if necessary.

Reinstall in the reverse order, and then adjust the brake pedal free movement.

Adjustment

In order to ensure that the piston in the master cylinder will return fully every time the brake pedal is released, there must always be a clearance between the master cylinder piston and the brake pedal push rod when the pedal is at rest. This clearance, measured at the tip of the pedal, should be 0.12–0.24 in. (3–6 mm). Measured between the push rod and the piston, the clearance should amount to 0.024–0.047 in. (0.6–1.2 mm).



ADJUSTMENT OF BRAKE PEDAL CLEARANCE

A = 0.12–0.24 in. (3–6 mm)

Adjust as follows:

1. Back off the locking nut.
2. Turn the hexagonal part of the push rod until the correct clearance is obtained at the tip of the pedal.
3. Tighten the locking nut.

As from model 1969

BRAKE PEDAL

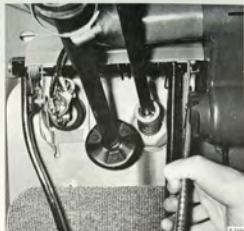
The brake pedal is carried on the same shaft as the clutch pedal and is equipped with self-lubricating bushings.

Removal and installation

1. Remove the protective cover of the steering wheel shaft.
2. Remove the bracket of the brake light and the brake warning contacts.



REMOVAL OF CONTACT BRACKET



REMOVAL OF COTTER PIN

4. Loosen the clutch pedal spring.
5. Remove the cotter pin from the R.H. end of the pedal shaft.
6. Pull the shaft out to the left, and remove brake pedal.
7. Check the bearing for wear, renew bushings as necessary.

Installation is made in the reverse order.

3. Loosen the brake cylinder push rod, by removing cotter pin and shaft bolt.

HANDBRAKE SYSTEM

GENERAL

The mechanical handbrake acts on the rear wheels only. When the handbrake lever is pulled, the movement is transmitted by the handbrake cables to levers on the rear wheel brakes. These actuate the brake shoes mechanically, and press them against the brake drums.

HANDBRAKE CABLES

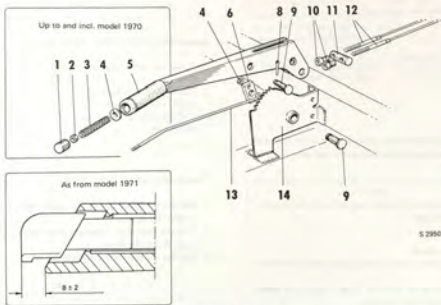
The permanently lubricated handbrake cables comprise inner steel wires in plastic coated spiral sheathing, led through a sleeve under the backrest cushion of the rear seat. The cables are fitted with protective grommets where they pass through panels. The cables are clamped to the rear axle, the inner wires being attached to the back plate levers by means of clevis-and-pin connections. A return spring is fitted between the clevis and the spiral sheathing.

Removal

1. Remove one of the front seats and the rear seat cushions. Jack up the car.
2. Remove the rear wheel.
3. Back off and remove the adjusting nut under the handbrake lever.
4. Pull the cable sheathing out of the sleeve under the rear seat cushion.
5. Remove the clamps used to hold the cable to the rear axle.
6. Remove the pin holding the clevis on the brake lever.
7. Ease the grommet out of the inclined panel in the rear axle tunnel.
8. Pull out the entire brake cable rearwards.

Installation

1. If the grommet in the rear axle tunnel has been removed, ease it on to the cable.
2. Pass the cable, threaded end first, up through the inclined panel in the rear axle tunnel and on through the sleeve under the rear seat to the handbrake lever. Make sure that the grommet in the front inclined pan-

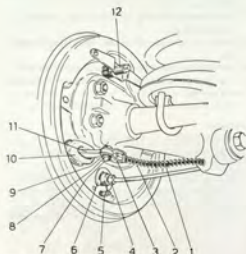


S 2950

HANDBRAKE LEVER COMPONENTS

- | | |
|--------------------|--------------------------|
| 1. Release button | 8. Cotter pin or circlip |
| 2. Nut | 9. Pin |
| 3. Return spring | 10. Adjusting nut |
| 4. Washer | 11. Cable pin |
| 5. Handbrake lever | 12. Threaded wire rods |
| 6. Pawl | 13. Pawl rod |
| 7. Spacer sleeves | 14. Ratchet |

- el has not been dislocated.
3. Refit the adjusting nut.
4. Reconnect the clevis to the brake lever and secure the pin.



REVERSE SIDE OF REAR, LEFT BACKPLATE

- | | |
|--------------------------|-----------------------|
| 1. Handbrake wire | 7. Pin |
| 2. Coil spring | 8. Cotter pin |
| 3. Clevis | 9. Washer |
| 4. Brake pipe connection | 10. Rubber boot |
| 5. Bleed nipple | 11. Brake lever |
| 6. Locking washer | 12. Adjustment device |

5. Fit the grommet in the inclined panel in the rear axle tunnel and secure the cable to the rear axle with two clamps.

NOTE

Make sure that the spiral sheathing does not touch the brake pipe.

6. Refit the wheel.
 7. Put back the cushions and seats and adjust the handbrake.
 8. Lower the car to the floor. Finally tighten the wheel bolts and refit the hub caps.
- Instructions for fitting the brake shoe lever in the backplate are given in section 511.

HANDBRAKE LEVER

See the illustration, which shows the handbrake lever and its component parts.

Removal

1. Push back the front seats, possibly removing one of them to provide better accessibility.
2. Remove the rubber boot from the handbrake lever.
3. Back off and remove the adjusting nuts.
4. Remove the locking washer and the lever bearing pin from the ratchet. Collect the spacer sleeves.
5. Remove the handbrake lever.

Disassembly, up to and incl. model 1970

1. Remove the cotter pin and the pin for the pawl.
2. Slide the pawl lever out towards the handgrip.
3. Back off the locking nut and remove the release button, locking nut, spring and washer.
4. Remove the pawl rod, the pawl and the washer by the pawl.

Reassembly, up to and incl. model 1970

1. Check that the spring, pawl, ratchet and pins are flawless.
2. Refit the ratchet mechanism in the lever. The release button should project about 0.4 in. (10 mm) beyond the brake lever handgrip when the pawl engages with the ratchet.

Disassembly, as from model 1971

1. Remove the cotter pin and the shaft bolt for the pawl. Collect the washer.
2. Slide the pawl lever out and unscrew the button. Remove the return spring.
3. Remove the pawl rod and the pawl.

Reassembly, as from model 1971

1. Before reassembling, check that all the parts are in perfect condition.
2. Mount the pawl on the pawl rod and insert the rod in the lever.
3. Refit the return spring. Screw the button on until it bottoms in the thread and then, to ensure correct positioning, not more than one additional turn. Check the position of the button after having fitted the brake lever in the car.
4. Refit the washer, the shaft bolt and the cotter pin.

Installation

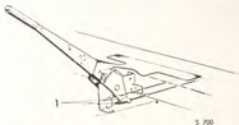
1. Refit the lever to the ratchet with spacers, pin and circlip.
2. Reconnect the brake wires to the lever.
3. Adjust the handbrake.
4. Refit the rubber boot.

ADJUSTMENT OF HANDBRAKE

Adjustment of handbrake lever travel or of the brake cables, which may be necessary after the car has been driven for a lengthy period or after removal of the handbrake lever, should always be preceded by adjustment of the footbrake. If the handbrake still requires adjustment, this can be done in the manner described below with the adjusting nuts, which are accessible from the driver's seat.

NOTE

Always adjust the brake shoes before adjusting the handbrake.



HANDBRAKE LEVER AND ADJUSTING NUTS

1. Adjusting nuts

1. Jack up the rear part of the car so that both rear wheels are clear of the floor.
2. Remove the right front seat and move the handbrake lever to its bottom position.
3. Tighten the left adjusting nut until the brake shoe presses against the left drum. Use a suitable hex, socket wrench to tighten the nut.
4. Back off the nut enough to allow the wheel to rotate freely and then back off one more full turn.
5. Repeat this procedure with the right adjusting nut.
6. Test by pulling the handbrake lever firmly and then returning it to the bottom position. The wheels should turn freely when the lever has been pulled up two cogs from the off position, but should be locked at the third cog.
7. Check that the braking effect is equal on both wheels.

1. The first step is to identify the problem.
2. The second step is to define the problem.
3. The third step is to analyze the problem.



1. The first step is to identify the problem.
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3. The third step is to analyze the problem.
4. The fourth step is to develop a solution.
5. The fifth step is to implement the solution.
6. The sixth step is to evaluate the solution.
7. The seventh step is to document the solution.
8. The eighth step is to communicate the solution.
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- 631 STEERING KNUCKEL HOUSING AND BALL JOINTS
- 632 CONTROL ARMS
- 641 STEERING WHEEL AND COLUMN SHIFT GEAR
- 642 STEERING GEAR
- 643 TIE-ROD ENDS

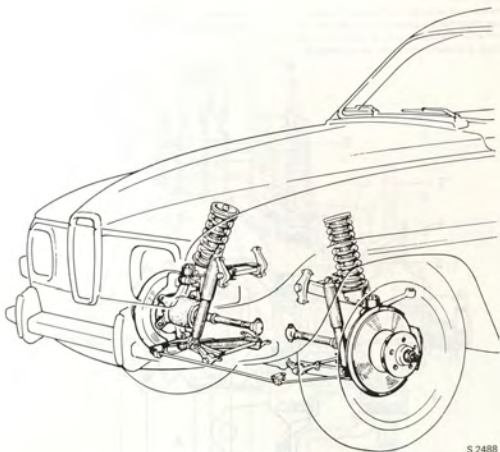
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GENERAL

All four wheels have coil springs. Each front wheel is attached to the steering knuckle, which is suspended thor-

oughly the medium of ball joints in two vee-shaped, transverse control arms. The inner ends of these are carried in rubber-clad bearings on the body. The vertical spring travel of the wheels is limited by rubber bumpers.



FRONT SUSPENSION

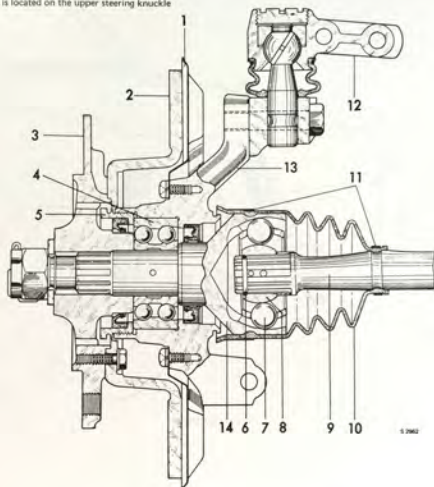
S 2488

STEERING KNUCKLE

The front assembly comprises one lefthand and one right-hand unit. The steering knuckle forms a frame for the front axle, its components being a bearing housing with two inward-inclined arms, an upper and a lower. The outer drive shaft is carried in ball bearings enclosed in the bearing housing. The wheel hub with disc is mounted on the outer end of the drive shaft, while the backplate or brake housing with its front brake assembly is bolted to the steering knuckle.

Ball joints are attached to the steering knuckle arms, where they afford flexible connections for the ends of the control arms. The steering arm, to which the tie-rod is connected, is located on the upper steering knuckle

arm. When the steering wheel is turned, the steering knuckle, together with the wheel hub and wheel, turns around an imagined axis – the king-pin axis – passing through the centers of both ball joints and intercepting the ground plane near the center line of the wheel. The outer and inner drive shafts are interconnected through the outer universal joint, the turning center of which is on the aforesaid king-pin axis. A pleated rubber boot prevents dirt and foreign matter from entering the outer universal joint and contains the grease for that joint. The inner end of the inner drive shaft is connected to the inner universal joint which is located on the stub of the differential output shaft.



FRONT AXLE UNIT

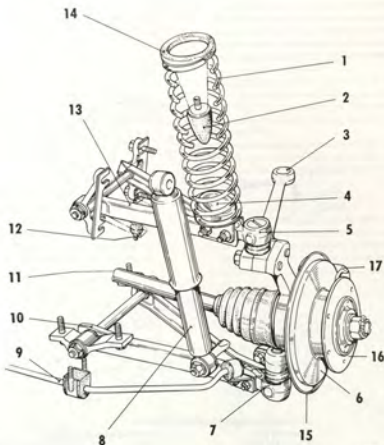
- | | | |
|----------------------|----------------------|------------------------------|
| 1. Protective shield | 6. Lock ring | 11. Clamp |
| 2. Brake disc | 7. Ball | 12. Ball joint |
| 3. Wheel hub | 8. Hub | 13. Steering knuckle housing |
| 4. Ball bearing | 9. Inner drive shaft | 14. Outer universal joint |
| 5. Nut | 10. Rubber bellows | |

CONTROL ARMS

The front axle assembly, which comprises a separate unit on each side, is connected to the ball joints which form the ends of the control arms. There are two control arms on either side, each of them being carried in rubber bushings on two mounting brackets bolted to the body.

The upper control arms are equipped with seats for coil springs and rubber bumpers.

The two lower control arms are on Saab 96 up to and incl. chassis No. 96722013535 and Saab 95 up to and incl. chassis No. 95722004645 interconnected by means of a stabilizer bar.



S 5271

FRONT SUSPENSION, LEFT

- | | | | |
|-------------------|---------------------|-----------------------|-----------------------|
| 1. Coil spring | 5. Upper ball joint | 9. Stabilizer bar | 13. Upper control arm |
| 2. Rubber bumper | 6. Brake disc | 10. Lower control arm | 14. Rubber spacer |
| 3. Steering arm | 7. Lower ball joint | 11. Inner drive shaft | 15. Protective shield |
| 4. Spring support | 8. Shock absorber | 12. Rubber bumper | 16. Hub |
| | | | 17. Brake housing |

STEERING AND COLUMN SHIFT GEAR

The steering gear is made in two versions, one for right-hand and one for left-hand steering. In principle, however, the two versions are identical. The steering gear is of rack-and-pinion type, consisting of a spiral pinion meshed with skew teeth on a rack. The gear is enclosed in a light-alloy housing which also carries the toothed rack. Movement of the steering wheel, which is splined to the center stub of the steering column, is transmitted through the column to the pinion. The pinion imparts to the rack (6) — see fig. — a reciprocating movement, which actuates the two tie-rods (8) that are attached to the ends of the rack with ball joints. The tie-rods then transmit the movement to the steering arms (4) which are attached to the steering

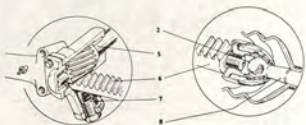
knuckles and connected to the tie-rods through the outer ball joints (3).

The car is equipped with a column shift gear. The gear shift shaft is pivoted to the operating rod in the transmission case by means of a universal joint. This joint comprises a short shaft, connected through universal joints to the gear shift shaft and to the operating rod.

The car is equipped with a gear lever lock in combination with the ignition lock. The gear lever lock consists of a twist stop secured to the gear shift shaft by two clamping screws and knurls. The twist stop has a hole into which the lock plunger slides when the gear shift lever is locked. The gear shift mechanism can only be locked when the reverse gear is engaged.



S 170



S 732

STEERING AND GEAR-SHIFT MECHANISM

- | | |
|---------------------------------------|--------------------------------|
| 1. Steering gear | 5. Steering column with pinion |
| 2. Inner ball joint | 6. Rack |
| 3. Outer ball joint | 7. Spring and plug |
| 4. Steering knuckle with steering arm | 8. Tie-rod |

WHEEL ALIGNMENT

GENERAL

It is of the utmost importance that the front wheels be correctly aligned, since incorrect steering geometry can cause:

1. Driving fatigue, due to impaired roadability.
2. Increased tire and repair costs due to abnormal wear of tires and steering mechanism.

If there is reason to suspect incorrect front wheel alignment as the result of an accident or of driving into the ditch, for example, or if road behaviour is noticeably impaired, the car should immediately be taken to an authorized service shop for inspection and adjustment. Even if there is no direct reason to suspect faulty wheel alignment, the car should nevertheless be checked at regular intervals and adjusted whenever necessary.

The angles and dimensions directly affecting the front-wheel alignment, all of which are closely interrelated, are the following:

King-pin inclination

Caster

Camber

Toe-in and

Wheel turning angles

1. Check that the tire pressure is correct and that the front tires are not too unevenly worn.
2. Check the front wheel bearings, control arm bearings, ball joints and tie-rod ends, adjusting or replacing as necessary in order to eliminate errors that can be caused by worn parts.

3. Check the steering gear and adjust any faults — see section 642.
4. Check the function of the shock absorbers and renew any defective shock absorbers and rubber bushings.
5. If the car has been involved in an accident, driven into the ditch, etc., any damage incurred must be repaired before the alignment check. Distorted steering arms must be rejected and new ones fitted, as restraighening is not permitted.
6. Immediately prior to the check, drive the car with normal suspension movement but without hard cornering in order to avoid deceptive misalignment. For the same reason, the car should also be rocked a few times.

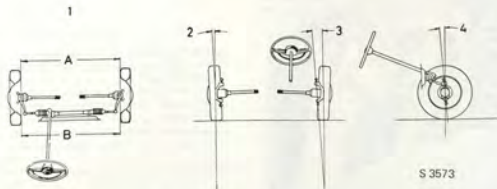
The car must be unladen during the alignment check and standing on a flat, horizontal floor, as otherwise measurements will not be reliable.

All adjustment with shims must be kept within reasonable limits. Deformation resulting from crash damage, etc., must be corrected by thorough realignment of the body. Distorted control arms must be rejected and new ones fitted.

For checking wheel alignment there are various standard tools, which are fitted either to the rim or directly on the stub axle. Tool handling is described in the instructions for each individual tool.

NOTE

When using axle-fitted tools on cars with a front wheel drive, the wheels must stand on turn-stands or similar devices and should be locked with the brakes during the course of the check.



FRONT-WHEEL ALIGNMENT

1. Toe-in
2. Camber
3. King-pin inclination
4. Caster

TOE-IN

Viewed from above, the wheels should have a certain relationship to each other, expressed as the difference between dimensions A and B, measured rim-to-rim at axle height.

The setting is called toe-in when dimension A is less than dimension B. When dimension A is greater than dimension B, the wheel setting is referred to as toe-out.

Toe-in or toe-out is expressed in inches or millimeters, being — as stated — the difference between the two measurements A and B. If the wheels are parallel, so that there is neither toe-in nor toe-out, the difference will be 0.

The toe-in should be 0.08 ± 0.04 in. (2 ± 1 mm) if the car is fitted with diagonal tires (5.20 x 15 or 5.60 x 15) and 0.00 ± 0.04 in. (0 ± 1 mm) if the car is fitted with radial tires (155 SR 15).

Checking and adjustment

1. Roll the car slowly straight ahead on a level floor and stop it without using the brakes. Do not move the car backwards again.
2. Check the measure A using the special measuring rule 78 40 010, between the edges of the rims at axle height. Make a scribed mark at the measure points. Move the car forward until the scribed mark comes in axle height again. Check measure B. If adjustment is called for, alter the length of the tie-rods.
3. Back off the lock nut on the outer end of the tie-rod.



ADJUSTMENT OF TOE-IN

1. Lock nut
2. Clamp ring

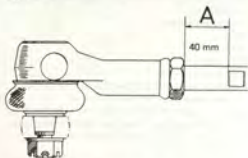
4. Turn the tie-rod to right or left, and search until obtaining the right toe-in.

In steering gears of earlier design, the tie-rod has a key grip. In the later design there is no grip and then the tie-rod must be turned with a pair of pliers.

NOTE

If the rubber boot is so tightly clamped that it accompanies the tie-rod when turned, the clamping ring must first be slackened.

If the toe-in is correct, and when both wheels are pointing straight ahead, the two tie-rods should be of equal length, or else be so set that the wheels have the same amount of clearance from fenders and wheel houses when turned hard right or hard left. Check also that the spokes of the steering wheel are horizontal when the wheels are centered. Remember to tighten the tie-rod lock nuts after adjustment.

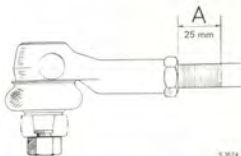


CHECKING THE LENGTH OF A TIE-ROD WITH KEY GRIP

NOTE

After adjustment of toe-in, the measurement A for a tie-rod of the earlier design must on no account exceed 1.57 in. (40 mm).

For tie-rods opposed to each other, the difference between the measurements A must not exceed 0.08 in. (2 mm).



CHECKING THE LENGTH OF A TIE-ROD WITHOUT KEY GRIP

NOTE

After adjustment of toe-in, the measurement A for a tie-rod of the later design must on no account exceed 1.0 in. (25 mm).

For tie-rods opposed to each other, the difference between the measurements A must not exceed 0.08 in. (2 mm).

CAMBER

Camber is understood to mean the deviation of the wheel from the vertical. If the wheel tilts inwards, camber is said to be negative (—).

The camber should be $3/4^{\circ} \pm 1/4^{\circ}$ if the car is fitted with diagonal tires (5.20 x 15 or 5.60 x 15) and $1/3^{\circ} \pm 1/2^{\circ}$ if the car is fitted with radial tires (155 SR 15).

Checking and adjustment

Camber, and thus king-pin inclination also, can be adjusted by inserting shims under the bearing brackets of the upper control arms. The desired result can thus be obtained by the addition or removal of shims.

Increasing the thickness of shims under both brackets by 0.1 in. (2.5 mm) reduces camber by approx. $1/2^{\circ}$.

If, on the other hand, an 0.1 in. (2.5 mm) shim is removed from under each bracket, camber will be increased by approx. $1/2^{\circ}$.

Shims of equal thickness must always be used under both brackets.

CASTER

Caster is the deviation of the king-pin axis from the vertical when viewed from the side, and is generally expressed in degrees. Caster varies greatly from car to car. In most cases, the king-pin is inclined rearwards, as illustrated, and caster is then said to be positive (+). If the king-pin is inclined forwards, caster is said to be negative (—). Finally, the king-pin may be perfectly vertical, in which case caster is 0. The caster should be $2^{\circ} \pm 1/2^{\circ}$ positive.

Checking and adjustment

If caster adjustment is called for, this can be done by inserting shims under the bearing brackets of the upper control arms.

Transference of shims with a thickness of 0.02 in. (0.5 mm) from under the front bracket to under the rear bracket results in a $1/2^{\circ}$ increase in caster.

Transference of shims with a thickness of 0.02 in. (0.5 mm) from under the rear bracket to under the front bracket results in a $1/2^{\circ}$ decrease in caster.

The same thickness of shims as is removed from under one bracket must thus always be fitted under the other bracket.

KING-PIN INCLINATION

In point of fact, there is no king-pin in the true sense of the term in the Saab car, and the term king-pin inclination is therefore instead applied to the inclination of the imaginary axis which passes through the centers of the two ball joints and meets the ground near the center line of the wheel. The correct inclination is $7^{\circ} \pm 1^{\circ}$.

Checking and adjustment

King-pin inclination is adjusted at the same time as camber and is changed by the same angle. It is not possible to adjust king-pin inclination alone, as this is determined by the steering knuckle. If the king-pin inclination is incorrect after adjustment of camber, the fault is to be found in the steering knuckle which should be renewed.

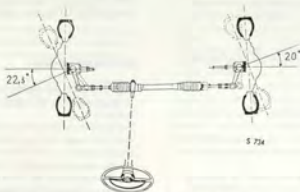
WHEEL TURNING ANGLES

Wheel alignment which allows perfect running of all four wheels on bends varies somewhat depending on speed and the sharpness of the bend owing to suspension movement and tire deformation.

ment and tire deformation.

The turning angles have been adapted to the most common driving conditions.

As the tie-rods point slightly inwards in relation to the travelling direction (driving straight ahead), the steering angle of the inside wheel on a bend will be slightly greater.



CORNERING POSITIONS OF FRONT WHEELS

Checking and adjustment

Before checking of turning angles is commenced, the toe-in must be correctly adjusted. To measure the turning angles, use is made of two standard type turn-tables with arc graduations or optical measuring equipment. Position the turn-tables as close to the wheel turning center as possible.

Turn the steering wheel to the left, until the graduated

disc for the front wheel shows a reading of 20° . If the turning setting is correct, the other disc should give a reading of $22\frac{1}{2}^{\circ} \pm 1\frac{1}{2}^{\circ}$.

Measure in the corresponding manner when the steering wheel is turned in the opposite direction. If measurement reveals that the turning angles are incorrect, one or both steering arms is deformed. Defective steering arms must not be restraightened but must be changed instead.



WHEEL ALIGNMENT WITH OPTICAL MEASURING EQUIPMENT

Inner wheel = 22.5°



WHEEL ALIGNMENT WITH OPTICAL MEASURING EQUIPMENT

Outer wheel = 20°

WHEEL ALIGNMENT TABLES

The use of the following tables facilitates adjustment of wheel alignment.

Camber — caster

The table is used as described in the following example.

- In checking the front wheel angles, the following figures, for example, are noted:
 camber = $1\frac{1}{4}^{\circ}$
 caster = $2\frac{3}{4}^{\circ}$

- Look for these figures in the table, and you will find $F \pm 3.5$
 $B \pm 1.5$

This means that:

Shims with a thickness of 0.14 in. (3.5 mm) must be inserted under the front bracket.



Shims with a thickness of 0.06 in. (1.5 mm) must be inserted under the rear bracket.

- After adjustment of the shimming, the correct figures for both camber and caster will be obtained at the same time.

4.

The framed figures in the table lie within the permissible tolerance limits and thus do not require adjustment.

DIAGONAL TIRES

| | |  Caster reading | | | | | | | | | | | | | |
|---|------------|--|----------------|----------------|----------------|----------------|----------------|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|--|
| | | 1/2 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | 2 | 2 1/4 | 2 1/2 | 2 3/4 | 3 | 3 1/4 | 3 1/2 | |
| Camber reading  | 2 | F+4 B+8 | F+4,5 B+7,5 | F+5 B+7 | F+5 B+7 | F+5,5 B+6,5 | F+6 B+6 | F+6 B+6 | F+6 B+6 | F+6,5 B+5,5 | F+7 B+5 | F+7 B+5 | F+7,5 B+4,5 | F+8 B+4 | |
| | 1 3/4 | F+2,5 B+6,5 | F+3 B+6 | F+3,5 B+5,5 | F+3,5 B+5,5 | F+4 B+5 | F+4,5 B+4,5 | F+4,5 B+4,5 | F+4,5 B+4,5 | F+5 B+4 | F+5,5 B+3,5 | F+5,5 B+3,5 | F+6 B+3 | F+6,5 B+2,5 | |
| | 1 1/2 | F+1,5 B+5,5 | F+2 B+5 | F+2,5 B+4,5 | F+2,5 B+4,5 | F+3 B+4 | F+3,5 B+3,5 | F+3,5 B+3,5 | F+3,5 B+3,5 | F+4 B+3 | F+4,5 B+2,5 | F+4,5 B+2,5 | F+5 B+2 | F+5,5 B+1,5 | |
| | 1 1/4 | F+0,5 B+4,5 | F+1 B+4 | F+1,5 B+3,5 | F+1,5 B+3,5 | F+2 B+3 | F+2,5 B+2,5 | F+2,5 B+2,5 | F+2,5 B+2,5 | F+3 B+2 | F+3,5 B+1,5 | F+3,5 B+1,5 | F+4 B+1 | F+4,5 B+0,5 | |
| | 1 | F-1 B+3 | F-0,5 B+2,5 | F±0 B+2 | F±0 B+2 | F+0,5 B+1,5 | F+1 B+1 | F+1 B+1 | F+1 B+1 | F+1,5 B+0,5 | F+2 B±0 | F+2 B±0 | F+2,5 B-0,5 | F+3 B-1 | |
| | 3/4 | F-2 B+2 | F-1,5 B+1,5 | F-1 B+1 | F-1 B+1 | F-0,5 B+0,5 | F±0 B±0 | Correct setting | F±0 B±0 | F+0,5 B-0,5 | F+1 B-1 | F+1 B-1 | F+1,5 B-1,5 | F+2 B-2 | |
| | 1/2 | F-3 B+1 | F-2,5 B+0,5 | F-2 B±0 | F-2 B±0 | F-1,5 B-0,5 | F-1 B-1 | F-1 B-1 | F-1 B-1 | F-0,5 B-1,5 | F±0 B-2 | F±0 B-2 | F+0,5 B-2,5 | F+1 B-3 | |
| | 1/4 | F-4,5 B-0,5 | F-4 B-1 | F-3,5 B-1,5 | F-3,5 B-1,5 | F-3 B-2 | F-2,5 B-2,5 | F-2,5 B-2,5 | F-2,5 B-2,5 | F-2 B-3 | F-1,5 B-3,5 | F-1,5 B-3,5 | F-1 B-4 | F-0,5 B-4,5 | |
| | 0 | F-5,5 B-1,5 | F-5 B-2 | F-4,5 B-2,5 | F-4,5 B-2,5 | F-4 B-3 | F-3,5 B-3,5 | F-3,5 B-3,5 | F-3,5 B-3,5 | F-3 B-4 | F-2,5 B-4,5 | F-2,5 B-4,5 | F-2 B-5 | F-1,5 B-5,5 | |
| | -1/4 | F-6,5 B-2,5 | F-6 B-3 | F-5,5 B-3,5 | F-5,5 B-3,5 | F-5 B-4 | F-4,5 B-4,5 | F-4,5 B-4,5 | F-4,5 B-4,5 | F-4 B-5 | F-3,5 B-5,5 | F-3,5 B-5,5 | F-3 B-6 | F-2,5 B-6,5 | |
| -1/2 | F-8 B-4 | F-7,5 B-4,5 | F-7 B-5 | F-7 B-5 | F-6,5 B-5,5 | F-6 B-6 | F-6 B-6 | F-6 B-6 | F-5,5 B-6,5 | F-5 B-7 | F-5 B-7 | F-4,5 B-7,5 | F-4 B-8 | | |

In the event of the adjusting possibilities being too small to allow you to obtain the prescribed values, there are special bearings with better adjusting possibilities. See the Spare Parts Catalogue.

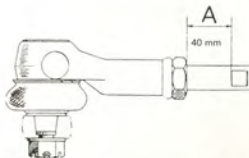
RADIAL TIRES

| | | Caster reading | | | | | | | | | | | | |
|----------------|-------|----------------|----------------|----------------|----------------|----------------|----------------|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | 1/2 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | 2 | 2 1/4 | 2 1/2 | 2 3/4 | 3 | 3 1/4 | 3 1/2 |
| Camber reading | 1 1/2 | F+4 B-8 | F+4,5 B+7,5 | F+5 B+7 | F+5 B+7 | F+5,5 B+6,5 | F+6 B+6 | F+6 B+6 | F+6 B+6 | F+6,5 B+5,5 | F+7 B+5 | F+7 B+5 | F+7,5 B+4,5 | F+8 B+4 |
| | 1 1/4 | F+2,5 B+6,5 | F+3 B+6 | F+3,5 B+5,5 | F+3,5 B+5,5 | F+4 B+5 | F+4,5 B+4,5 | F+4,5 B+4,5 | F+4,5 B+4,5 | F+5 B+4 | F+5,5 B+3,5 | F+5,5 B+3,5 | F+6 B+3 | F+6,5 B+2,5 |
| | 1 | F+1,5 B+5,5 | F+2 B+5 | F+2,5 B+4,5 | F+2,5 B+4,5 | F+3 B+4 | F+3,5 B+3,5 | F+3,5 B+3,5 | F+3,5 B+3,5 | F+4 B+3 | F+4,5 B+2,5 | F+4,5 B+2,5 | F+5 B+2 | F+5,5 B+1,5 |
| | 3/4 | F+0,5 B+4,5 | F+1 B+4 | F+1,5 B+3,5 | F+1,5 B+3,5 | F+2 B+3 | F+2,5 B+2,5 | F+2,5 B+2,5 | F+2,5 B+2,5 | F+3 B+2 | F+3,5 B+1,5 | F+3,5 B+1,5 | F+4 B+1 | F+4,5 B+0,5 |
| | 1/2 | F-1 B+3 | F-0,5 B+2,5 | F±0 B+2 | F±0 B+2 | F+0,5 B+1,5 | F+1 B+1 | F+1 B+1 | F+1 B+1 | F+1,5 B+0,5 | F+2 B±0 | F+2 B±0 | F+2,5 B-0,5 | F+3 B-1 |
| | 1/3 | F-2 B+2 | F-1,5 B+1,5 | F-1 B+1 | F-1 B+1 | F-0,5 B+0,5 | F±0 B±0 | Correct setting | F±0 B±0 | F+0,5 B-0,5 | F+1 B-1 | F+1 B-1 | F+1,5 B-1,5 | F+2 B-2 |
| | 0 | F-3 B+1 | F-2,5 B+0,5 | F-2 B±0 | F-2 B±0 | F-1,5 B-0,5 | F-1 B-1 | F-1 B-1 | F-1 B-1 | B-0,5 B-1,5 | F±0 B-2 | F±0 B-2 | F+0,5 B-2,5 | F+1 B-3 |
| | -1/4 | F-4,5 B-0,5 | F-4 B-1 | F-3,5 B-1,5 | F-3,5 B-1,5 | F-3 B-2 | F-2,5 B-2,5 | F-2,5 B-2,5 | F-2,5 B-2,5 | F-2 B-3 | F-1,5 B-3,5 | F-1,5 B-3,5 | F-1 B-4 | F-0,5 B-4,5 |
| | -1/2 | F-5,5 B-1,5 | F-5 B-2 | F-4,5 B-2,5 | F-4,5 B-2,5 | F-4 B-3 | F-3,5 B-3,5 | F-3,5 B-3,5 | F-3,5 B-3,5 | F-3 B-4 | F-2,5 B-4,5 | F-2,5 B-4,5 | F-2 B-5 | F-1,5 B-5,5 |
| | -3/4 | F-6,5 B-2,5 | F-6 B-3 | F-5,5 B-3,5 | F-5,5 B-3,5 | F-5 B-4 | F-4,5 B-4,5 | F-4,5 B-4,5 | F-4,5 B-4,5 | F-4 B-5 | F-3,5 B-5,5 | F-3,5 B-5,5 | F-3 B-6 | F-2,5 B-6,5 |
| | -1 | F-8 B-4 | F-7,5 B-4,5 | F-7 B-5 | F-7 B-5 | F-6,5 B-5,5 | F-6 B-6 | F-6 B-6 | F-6 B-6 | F-5,5 B-6,5 | F-5 B-7 | F-5 B-7 | F-4,5 B-7,5 | F-4 B-8 |

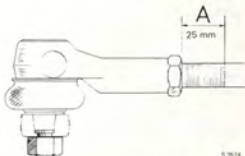
Toe-in (toe-out) at wheel rim

When adjusting toe-in (toe-out), remember that:

1. Measurement A must not exceed the figures mentioned in the illustrations.



CHECKING THE LENGTH OF A TIE-ROD WITH KEY GRIP



S 3674

CHECKING THE LENGTH OF A TIE-ROD WITHOUT KEY GRIP

2. The difference between measurements A for left and right sides must not exceed 0.08 in. (2 mm).
- 3.

The framed values are within the permissible tolerances, and thus do not need to be adjusted.

| Reading value of toe-in | Screw tie-rod in or out the following turns | |
|-------------------------|---|-------------------------|
| | Diagonal tires | Radial tires |
| Toe-out in mm and in. | -8 -0.31" | 2 out |
| | -7 -0.28" | 2 1/4 out 1 3/4 out |
| | -6 -0.24" | 2 out 1 1/2 out |
| | -5 -0.20" | 1 3/4 out 1 1/4 out |
| | -4 -0.16" | 1 1/2 out 1 out |
| | -3 -0.12" | 1 1/4 out 3/4 out |
| | -2 -0.08" | 1 out 1/2 out |
| | -1 -0.04" | 3/4 out 1/4 out |
| | 0 | 1/2 out Correct setting |
| | 1 0.04" | 1/4 out 1/4 in |
| Toe-in in mm and in. | 2 0.08" | Correct setting 1/2 in |
| | 3 0.12" | 1/4 in 3/4 in |
| | 4 0.16" | 1/2 in 1 in |
| | 5 0.20" | 3/4 in 1 1/4 in |
| | 6 0.24" | 1 in 1 1/2 in |
| | 7 0.28" | 1 1/4 in 1 3/4 in |
| | 8 0.31" | 1 1/2 in 2 in |
| | 9 0.35" | 1 3/4 in 2 1/4 in |
| | 10 0.39" | 2 in |

REAR-WHEEL ALIGNMENT

Checking

If the rear axle has been subjected to abnormal stresses, for instance in connection with a collision or other accident, it must be carefully checked for signs of fracture or deformation.

Normally, rear wheel alignment does not require adjustment. If, however, the rear axle has been subjected to such abnormal stresses that faulty alignment of the rear wheels is suspected, the wheel angles should be checked. If the wheels are correctly aligned, the angles should be within the following limits:

| | |
|---|-----------------------------|
| Camber | $0^{\circ} \pm 1^{\circ}$ |
| Toe-in (toe-out) must not exceed: | |
| per wheel | $0^{\circ} \pm 3/4^{\circ}$ |
| both wheels together | $0^{\circ} \pm 1^{\circ}$ |
| both wheels together measured rim-to-rim | 0 ± 0.28 in. (7 mm) |
| Max. difference in wheelbase, left and right (front wheels pointing straight ahead) | 0.6 in. (15 mm) |

On condition that the wheel angles are within the values stipulated above, the difference in wheelbase between the left and right sides may amount to a maximum of 0.6 in. (15 mm).

NOTE

Special wheel-angle measuring equipment is needed to establish faults in to-in (toe-out).

NOTE

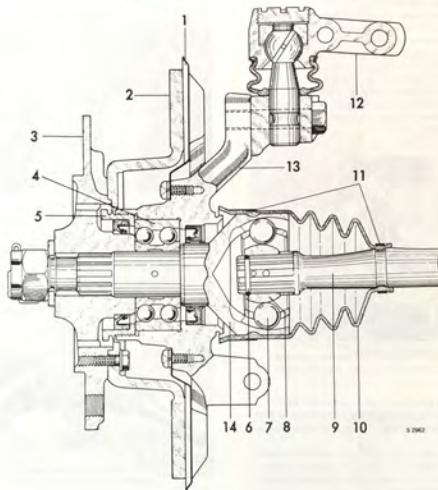
If the difference in wheelbase exceeds 0.2 in. (5 mm), the wheel alignment must be checked. Wheel alignment can be incorrect without this affecting the wheelbase.

STEERING KNUCKEL HOUSING AND BALL JOINTS

REPLACEMENT OF FRONT WHEEL BEARINGS

Bearing play is measured at the rim. If any existing play, measured at the rim, exceeds 0.08 in. (2 mm), the bear-

ing must be changed. Note that an arbor press will be needed for removal and installation of wheel bearings. Do not subject the bearing to blows under any circumstances, as such treatment could easily damage them. Always use genuine replacement bearings, as these have tolerances specially adapted for the axle and steering knuckle.



FRONT AXLE UNIT

- | | | |
|----------------------|----------------------|------------------------------|
| 1. Protective shield | 6. Lock ring | 11. Clamp |
| 2. Brake disc | 7. Ball | 12. Ball joint |
| 3. Wheel hub | 8. Hub | 13. Steering knuckle housing |
| 4. Ball bearing | 9. Inner drive shaft | 14. Outer universal joint |
| 5. Nut | 10. Rubber bellows | |

Removal

1. Jack up the front part of the car and remove the wheel. Remove the brake housing and hang it up near the wheel house in order to prevent damage to the brake hose. Then remove the hub with the brake disc.
2. Remove the steering arm and upper ball joint from the steering knuckle.
3. Back off the clamping screw which holds the lower ball joint to the steering knuckle.
4. Remove the large clamp for the rubber bellows on the inner universal joint and open up the joint. Fit the cover 73 23 736, in the rubber bellows to keep the needle bearings in and dirt out. Fit protective cover 78 38 469 on the inner driver.
5. Pull the drive shaft out through the wheel house and remove the front axle assembly. Wash this unit thoroughly.



REMOVAL OF INNER DRIVE SHAFT

6. Remove the nut and shaft seal from the steering knuckle. Use the pegged key 78 40 200. First prise up the nut retainer with an arbor or other suitable tool.
7. Remove the outer drive shaft by applying pressure to its outer end. The outer drive shaft will be accompanied by the universal joint, rubber bellows and middle drive shaft.



PRESSING OUT THE OUTER DRIVE SHAFT

8. Press the bearing out of the steering knuckle from the inside.
9. Remove the two sealing rings, their seats in the steering knuckle and nut if they need to be changed.
10. Secure the middle drive shaft in a vise and strike the hub off the shaft, using arbor 78 42 024.



REMOVAL OF HUB
Tool 78 42 024

NOTE

The hub, ball holder and balls can be removed from the dome if the hub is turned through 90° in a certain position. These items should only be removed, however, if absolutely necessary.

Installation

Clean all the component parts thoroughly, and replace worn or damaged parts by new ones. Pay particular attention to shaft seals and rubber bellows.

1. Grease the outer universal joint using Saab special chassis grease. The correct quantity will be obtained by packing the dome containing the hub and balls full with grease. Take the utmost care in preventing dirt from entering the joints and bearings.
2. Slide the rubber bellows and clips onto the intermediate drive shaft. Mount the rubber bellows on the universal joint.
3. Mount a new circlip on the intermediate drive shaft and compress by means of tool 78 41 612.

NOTE

The circlip ends should overlap under a jaw of the pliers. They will therefore not be clear of each other when the pliers are closed.



PLACING OF LOCK RING IN THE TOOL
Tool 78 41 612

4. Insert the shaft in the hub and lightly tap the shaft end so that the circlip clicks in. Remove the pliers and fully insert the shaft in the hub.



ASSEMBLY OF MIDDLE DRIVE SHAFT IN THE HUB
Tool 78 41 612

5. If the seal in the steering knuckle housing has been removed, insert a new one.
6. Pack the ball bearing with Saab special grease. Use only original ball bearings.
7. Press the bearing into the steering knuckle housing with the numbered designation on the outer race facing outwards. Use tool 78 40 754 and 78 40 309.



PRESSING IN THE BALL BEARING IN THE STEERING
KNUCKLE HOUSING
Tools 78 40 754 and 78 40 309

8. Tighten the nut and shaft seal using hook wrench 78 40 200. Lock the nut.
9. Pack the space between the lips and the inner seal with chassis grease.
10. Mount the outer drive shaft (with intermediate drive shaft already mounted) in a press and press on the steering knuckle housing and bearing. Use sleeve 78 41 067 locating on the inner ring of the bearing.



PRESSING THE KNUCKLE HOUSING AND BEARING ONTO THE OUTER DRIVE SHAFT
Tool 78 41 067

11. Fit the two clamps on the outer rubber bellows and the clamp for the inner bellows at the shaft.
12. If the needle bearings have been removed, lubricate them with Saab special grease and mount them on their journals. Fit the cover 73 23 736 to protect the needle bearings, and pass the drive shaft in through the wheel house. Make sure that the inner driver is clean and that it has been packed with Saab special grease. Then reassemble the inner universal joint and tighten the clamp round the rubber bellows.
13. Refit the steering knuckle to the steering arm and lower ball joint. Remember to provide lock plates at the screws, and to secure these.
14. Refit the hub and the brake disc, followed by the brake housing and friction pads. Secure the bolts with lock plates.
15. Refit the wheel and lower the car. Tighten the axle nut to a torque of 180 Nm (130 ft.lb., 18 kpm), and secure.
16. Refit the hub cap.

WARNING

The friction pads must be returned to their position near the brake disc. To ensure correct positioning, pump repeatedly with the brake pedal. Neglect in this respect will result in brake failure.

REPLACEMENT OF BALL JOINTS

1. Jack up the car and remove the wheel. Wash the ball joint and adjacent parts carefully.
2. If the upper ball joint is to be changed, compress the spring with the aid of the spring scissors 89 95 847 and spring cups.

WARNING

Unconditionally, the spring scissors must be fitted with the cups fitted in the way shown by the fig.



POSITIONING OF SPRING SCISSORS AND SPRING CUPS, LEFT SIDE

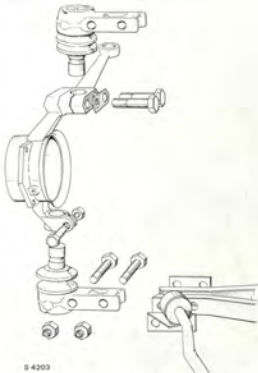


POSITIONING OF SPRING SCISSORS AND SPRING CUPS, RIGHT SIDE

3. Remove the ball joint from the steering knuckle. The upper ball joint has two screws and the lower ball joint one.
4. Remove the ball joint from the control arm.
5. Fit a new ball joint and attach the pivot pin to the steering knuckle. Secure the screws.
6. Fit the ball joint to the control arm and release the spring scissors.
7. Refit the wheel and lower the car.

NOTE

Ball joints must never be dismantled but should be renewed as complete units.



ATTACHMENT OF STEERING KNUCKLE AND BALL JOINTS

REPLACEMENT OF BALL JOINT DUST EXCLUDERS

To protect the ball joints from wear by foreign matter, they are fitted with rubber dust excluders (boots). Damaged boots must be replaced by new ones.

TIGHTENING OF CONTROL ARM BALL JOINTS

If play develops in the control arm ball joints, adjustment is called for, as such play adversely influences the steering characteristics of the car and gives rise to unwanted noise.

1. Jack up the car and remove the wheel. Wash the ball joint and adjacent parts carefully.
2. Detach the ball joint from the steering knuckle. The upper ball joint has two screws and the lower ball joint one. Clean the ball joint and remove the rubber dust excluder.
3. Release the securing flange on the tightening cap, using an arbor.
4. Turn the cap with a suitable implement until the ball joint begins to feel slightly stiff.

NOTE

Do not tighten the ball joint excessively: it should be possible to move it all the way in all directions by hand.

5. Secure the tightening cap by bending down the flange into the grooves on both sides with an arbor. Take great pains to secure effectively, making new retaining grooves if the old ones cannot be used. Lubricate the ball joint copiously.
6. Fit a new rubber dust excluder and connect the ball joint to the steering knuckle. Secure the screws.
7. Refit the wheel and lower the car.

1. The first step in the process of the...
 2. The second step in the process of the...
 3. The third step in the process of the...
 4. The fourth step in the process of the...
 5. The fifth step in the process of the...
 6. The sixth step in the process of the...
 7. The seventh step in the process of the...
 8. The eighth step in the process of the...
 9. The ninth step in the process of the...
 10. The tenth step in the process of the...

11. The eleventh step in the process of the...
 12. The twelfth step in the process of the...
 13. The thirteenth step in the process of the...
 14. The fourteenth step in the process of the...
 15. The fifteenth step in the process of the...
 16. The sixteenth step in the process of the...
 17. The seventeenth step in the process of the...
 18. The eighteenth step in the process of the...
 19. The nineteenth step in the process of the...
 20. The twentieth step in the process of the...

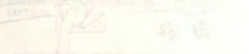
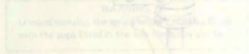


21. The twenty-first step in the process of the...
 22. The twenty-second step in the process of the...
 23. The twenty-third step in the process of the...
 24. The twenty-fourth step in the process of the...
 25. The twenty-fifth step in the process of the...

26. The twenty-sixth step in the process of the...
27. The twenty-seventh step in the process of the...
28. The twenty-eighth step in the process of the...
29. The twenty-ninth step in the process of the...
30. The thirtieth step in the process of the...
31. The thirty-first step in the process of the...
32. The thirty-second step in the process of the...
33. The thirty-third step in the process of the...
34. The thirty-fourth step in the process of the...
35. The thirty-fifth step in the process of the...
36. The thirty-sixth step in the process of the...
37. The thirty-seventh step in the process of the...
38. The thirty-eighth step in the process of the...
39. The thirty-ninth step in the process of the...
40. The fortieth step in the process of the...

41. The forty-first step in the process of the...
 42. The forty-second step in the process of the...
 43. The forty-third step in the process of the...
 44. The forty-fourth step in the process of the...
 45. The forty-fifth step in the process of the...

46. The forty-sixth step in the process of the...
 47. The forty-seventh step in the process of the...
 48. The forty-eighth step in the process of the...
 49. The forty-ninth step in the process of the...
 50. The fiftieth step in the process of the...

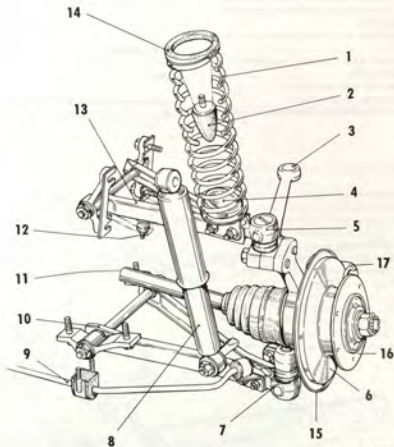


CONTROL ARMS

CONTROL ARMS AND STEERING KNUCKLE

Removal

1. Jack up the front part of the car and remove the front wheels.
2. Remove the shock absorbers.
3. Detach the tie-rod ends from the steering arms, using tool 78 60 448 for the tie-rod end.
4. Remove the brake housing and hang it up in such a way that the brake hose not be stretched or damaged.
5. Detach the steering arm and upper ball joint from the steering knuckle.
6. Back off the clamping screw which holds the lower ball joint to the steering knuckle.
7. Open up the inner universal joint and remove the entire front axle assembly. Clean thoroughly.
8. Remove the coil springs as described in section 631.
9. Remove the upper and lower control arms.
10. Remove the stabilizer bar by undoing its brackets on the body. The nuts can be reached from inside the engine compartment. Detach both body brackets and end brackets from the stabilizer bar, thus enabling it to be pulled out to the right.



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FRONT SUSPENSION, LEFT

- | | | | |
|-------------------|---------------------|-----------------------|-----------------------|
| 1. Coil spring | 5. Upper ball joint | 9. Stabilizer bar | 13. Upper control arm |
| 2. Rubber bumper | 6. Brake drum | 10. Lower control arm | 14. Rubber spacer |
| 3. Steering arm | 7. Lower ball joint | 11. Inner drive shaft | 15. Protective shield |
| 4. Spring support | 8. Shock absorber | 12. Rubber bumper | 16. Hub |
| | | | 17. Brake housing |

11. Remove the lower rebound rubber bumpers.
12. If necessary, remove the steering gear, see section 642.

NOTE

In conjunction with overhauls of the front suspension, it is also appropriate to disassemble and adjust the steering gear, see section 642.

Installation

Clean all parts thoroughly. After careful examination, reject all worn or damaged parts and fit new ones in place of them, unless they can be adjusted in accordance with the description. The steering gear should be adjusted as described in section 642.

1. Pass the stabilizer bar in from the right and bolt it to the body.
2. Reinstall the steering gear, if this unit has been removed. See section 642.
3. Refit the upper and lower control arms.
4. Refit the coil springs, see section 631.
5. Refit the front axle assemblies. If removed, lubricate

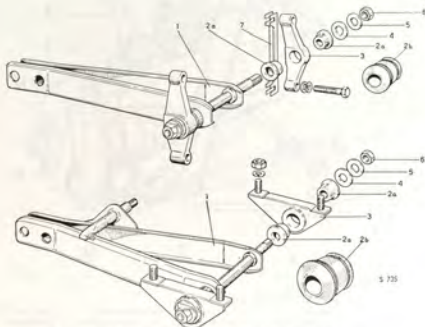
the needle bearings with Saab special chassis grease, then fit them to the T-shaped end of the axle. Fit the protective cover 73 23 736 to protect the needle bearings, and insert the drive shaft through the wheel housing. See to it that the inner driver is clean and has fresh Saab special chassis grease, see section 475. Then fit the inner universal joint, and tighten the clip round the rubber bellows. Do not forget to secure, with tab washers, the upper clamp bolts of the ball joints.

6. Refit the shock absorbers.
7. Refit the wheels and the brake housings and lower the car. Return the brake pads to their position near the brake disc.
8. Take the car out for a test run. Check the wheel alignment and adjust if necessary. See section 601.

UPPER CONTROL ARM

Removal

1. Jack up the front part of the car and remove the wheel.
2. Remove the shock absorber.



UPPER AND LOWER CONTROL ARMS, FRONT SUSPENSION

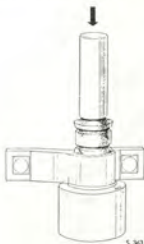
- | | |
|---------------------------|----------------|
| 1. Control arm | 4. Washer |
| 2a. Rubber bushing, split | 5. Lock washer |
| 2b. Rubber bushing, whole | 6. Nut |
| 3. Bracket | 7. Shim |

3. Compress the coil spring, using the spring scissors 89 95 847. See section 631.
4. Back off and remove the two screws holding the ball joint and lower spring seat to the upper control arm.
5. Back off the bolts holding the control arm bearing brackets.
6. Remove the compressed coil spring.
7. Remove the control arm and the bearing brackets. Collect the shims from under the brackets.
8. Back off and remove both nuts from the bearing, thus enabling the brackets and bushings to be taken off the control arm.
9. As alternatives, there are either two split bushings or one whole bushing in the bracket. To remove the whole bushing use tool 78 41 331 for the upper one and 78 41 349 for the lower one.

Reassembly

All components must be thoroughly cleaned before refitting and new parts should be provided in place of any worn or damaged ones.

1. Refit the rubber bushings in the brackets. Note that there are two types of bushings. If the whole type is used, drive it into the bracket with the aid of tool 78 41 331 (upper bushing) or 78 41 349 (lower bushing). Lubricate the bushing with soft soap and water before pressing in.



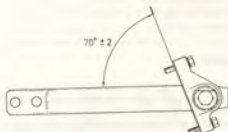
DRIVING IN A WHOLE RUBBER BUSHING

Tool 78 41 331 for upper bushing
Tool 78 41 349 for lower bushing

NOTE

In no circumstances may oil or grease be used to facilitate insertion of rubber bushings. If lubrication is needed, use soft soap and water.

2. Refit the bearings, complete with bushings, to the control arm. When the two nuts have been tightened and secured, the angle between the control arm and the brackets should be $70 \pm 2^\circ$.



ANGLE BETWEEN UPPER CONTROL ARM AND BEARING BRACKET

3. Put the control arm in position, but do not insert the bracket bolts.
4. Check that the rubber and metal washers in the upper spring seat are in place, and that the rubber bumpers have been fitted under the control arm.
5. Insert the compressed coil spring in its position and refit the ball joint and lower spring seat to the arm.
6. Tighten the bolts of the control arm bearing brackets. Remember to insert the shims.
7. Slacken the screws of the spring scissors successively, until the tool can be removed.
8. Refit the shock absorber.
9. Refit the wheel and lower the car.
10. Take the car out for a test run and then check the wheel alignment, adjusting if necessary as described in section 601.

LOWER CONTROL ARM

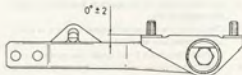
Removal

1. Jack up the car and take off the wheel.
2. Detach the lower shock absorber attachment.
3. Back off and remove the two bolts holding the ball joint to the control arm, thus releasing also the stabilizer bar bearing.
4. Back off from inside the engine compartment the nuts holding the bearing brackets to the floor pan, whereupon the control arm and brackets can be removed.
5. Back off and remove the two nuts from the control arm bearing and remove the brackets and bushings.

Reassembly

All components must be thoroughly cleaned before refitting and new parts should be provided in place of any worn or damaged ones.

1. Refit the rubber bushings and brackets to the control arm. When the two nuts have been tightened and secured, the angle between the control arm and the contact surface of the brackets should be $0^\circ \pm 2^\circ$.



ANGLE BETWEEN LOWER CONTROL ARM AND BEARING BRACKET

2. Refit the control arm by bolting the bearing brackets to the body.
3. Attach the ball joint and stabilizer bar bearing to the control arm. Remember to insert stiffeners on the rear of the control arm.
4. Refit the lower shock absorber bracket.
5. Refit the wheel and lower the car.
6. Take the car out for a test run.
7. Check the wheel alignment, adjusting if necessary as described in section 601.

NOTE

In no circumstances may oil or grease be used to facilitate insertion of rubber bushings. If lubrication is needed, use soft soap and water.

CHECKING CONTROL ARMS

If the control arms have been subjected to severe stresses on account of a collision or other accident, they should be carefully examined for signs of fracture or deformation. Distorted arms must be rejected and new ones fitted in their place.

STEERING WHEEL AND COLUMN SHIFT GEAR

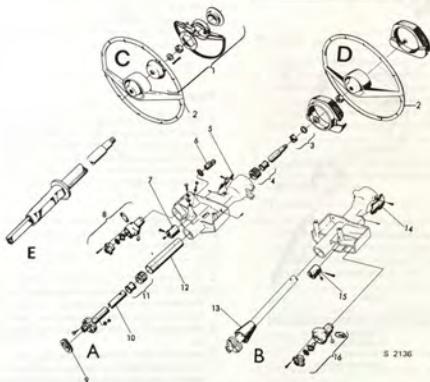
General

The car is made for both righthand and lefthand steering. The steering mechanism is the same for all models. As from model 1969 steering wheel shaft of the safety type has been introduced. This shaft is in two parts, which are shut up into each other when exposed to heavy pressure. NOTE! If the safety steering wheel shaft has been deformed, a new one must be fitted.

WARNING

The collapsible steering wheel shaft introduced as from model 1969 must be handled with care. It must not be subjected to impacts, jolts or other rough treatment liable to alter the adjusted length of the telescope joint or impair its shock-absorbing effect.

When installing the steering wheel shaft, take special care to ensure that the splined lower end is pushed into the intermediate shaft until the clamping screw comes opposite the groove in the shaft. The intermediate shaft should normally slide freely on the shaft. If the splines stick, do not on any account knock on the top end of the steering wheel shaft. This also applies to removing and fitting the steering wheel. The wheel must not be knocked off or on.

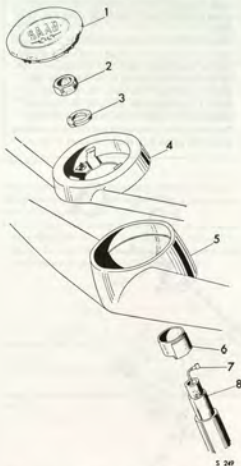


STEERING WHEEL AND STEERING COLUMN STAND

- A. L H D Car
- B. R H D Car
- C. Steering wheel and horn assembly model 1967
- D. Steering wheel with safety pad as from model 1968
- E. Steering wheel shaft as from model 1969

- 1. Horn button assy
- 2. Steering wheel
- 3. Washer and return yoke
- 4. Bushings
- 5. Cover
- 6. Lock cylinder
- 7. Twist stop
- 8. Gear lever lock
- 9. Rubber grommet
- 10. Steering wheel shaft with universal joint
- 11. Bushings
- 12. Cardboard sleeve
- 13. Plastic cone
- 14. Cover
- 15. Twist stop
- 16. Gear lever lock

STEERING WHEEL AND HORN BUTTON ASSEMBLY, MODEL 1967



STEERING WHEEL AND HORN ASSEMBLY, MODEL 1967

- | | |
|---------------------|--------------------|
| 1. Horn button | 5. Steering wheel |
| 2. Nut | 6. Return yoke |
| 3. Retaining washer | 7. Horn wire |
| 4. Horn ring | 8. Steering column |

Removal

1. Disconnect the horn wire at the connector under the instrument panel.
2. Remove the central button by prying gently with a knife or other suitable implement under the edge of the button.



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REMOVAL OF HORN BUTTON, MODEL 1967

3. Disconnect the horn wire from the contact plate.
4. Back off the nut and remove the retaining washer.
5. Remove the horn ring.
6. Lift away the steering wheel.
7. The return yoke for the directional switch can now be removed.

Reassembly

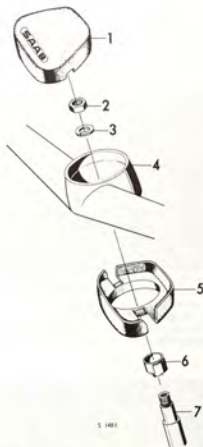
1. Refit the return yoke if this item has been removed.
2. Check the clearance between the return yoke and the projection on the directional indicator switch. The correct clearance is 0.008–0.024 in. (0.2–0.6 mm) with the switch at neutral. Adjust by inserting shims between the switch and the column stand.

NOTE

Fit the return yoke so that its center axis coincides with the center axis of the switch housing, when the wheels are straight ahead.

3. Fit the steering wheel on the column. Make sure that the front wheels are aligned straight ahead and push the steering wheel on the column center pin so that the spokes of the wheel are aligned horizontally.
4. Refit the horn ring and retaining washer. Tighten the nut.
5. Reconnect the horn wire to the contact plate.
6. Fit the center button so that the three clips on the horn ring pass into the notches in the bottom of the button.
7. Connect up the horn wire.

STEERING WHEEL WITH SAFETY PAD, MODEL 1968-1969



STEERING WHEEL WITH SAFETY PAD, MODEL 1968-1969

- | | |
|---------------------|--------------------|
| 1. Safety pad | 5. Cover |
| 2. Nut | 6. Return yoke |
| 3. Retaining washer | 7. Steering column |
| 4. Steering wheel | |

Removal

1. Remove the safety pad by turning it counter-clockwise.
2. Unscrew the nut and remove the spring washer.
3. Lift away the steering wheel.
4. The return yoke for the directional signal switch can now be removed.

WARNING

The collapsible steering wheel shaft introduced as from model 1969 must be handled with care. It must not be subjected to impacts, jolts or other rough treatment liable to alter the adjusted length of the telescope joint or impair its shock-absorbing effect. The wheel must not be knocked off or on.

Reassembly

1. If removed, refit the return yoke.
2. Check the clearance between the return yoke and the projection on the directional indicator switch. The correct clearance is 0.008-0.024 in. (0.2-0.6 mm) with the switch at neutral. Adjust by inserting shims between the switch and the column stand.

NOTE

Fit the return yoke so that its center line coincides with the center axis of the switch housing, when the wheels are straight ahead.

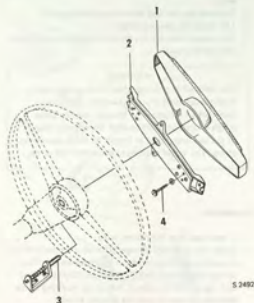
3. Fit the steering wheel on the column. Make sure that the front wheels are aligned straight ahead, and push the steering wheel on the column center pin so that the spokes of the wheel are aligned horizontally.
4. Refit the spring washer and the nut.

NOTE

To protect the safety pad when fitting, smear with a suitable lubricant its underside, which comes into contact with the cover.

5. Fit the safety pad by screwing it downwards until resistance is felt, then tighten the safety pad approx. a further revolution, until the cuts, made at the bottom side of the pad, grip and lock tight against the spokes of the steering wheel.

STEERING WHEEL WITH SAFETY PAD, MODEL 1970-1975



SIGNALING DEVICE, MODEL 1970-1975

1. Safety pad
2. Horn contact
3. Sliding contact
4. Retaining screw

Removal

1. Remove the steering wheel pad and the horn contact from the steering wheel by removing the four cross recess screws in the underside of the steering wheel spokes.
2. Unscrew the nut and remove the spring washer.
3. Lift away the steering wheel.
4. The return yoke for the directional signal switch can now be removed.

Reassembly

WARNING

The collapsible steering wheel shaft must be handled with care. It must not be subjected to impacts, jolts or other rough treatment liable to alter the adjusted length of the telescope joint or impair its shockabsorbing effect. The wheel must not be knocked off or on.

1. If removed, refit the return yoke.
2. Check the clearance between the return yoke and the projection on the directional indicator switch. The correct clearance is 0.008-0.024 in. (0.2-0.6 mm) with the switch at neutral. Adjust by inserting shims between the switch and the column stand.

NOTE

Fit the return yoke so that its center line coincides with the center axis of the switch housing, when the wheels are straight ahead.

3. Fit the steering wheel on the column. Make sure that the front wheels are aligned straight ahead, and push the steering wheel on the column center pin so that the spokes of the wheel are aligned horizontally.
4. Refit the spring washer and the nut.
5. Fit the steering wheel pad and the horn contact to the steering wheel.

STEERING WHEELS WITH SAFETY PAD, AS FROM MODEL 1976

Removal

1. Remove the safety padding and horn contact finger by lifting the unit up and away from the steering wheel. The unit is secured to the steering wheel by means of three spring-type fasteners.



THE SAFETY PADDING IS REMOVED

2. Disconnect the electric connection from the horn contact.



THE ELECTRIC CONNECTION IS REMOVED FROM THE HORN CONTACT

3. Remove the steering wheel nut and spring washer.



REMOVING THE STEERING WHEEL NUT

4. Lift off the steering wheel.
5. The direction indicator switch actuator can now be removed.

Assembly

WARNING

The collapsible steering wheel shaft must be handled with care. It must not be subjected to impacts, jolts or other rough treatment liable to alter the adjusted length of the telescope joint or impair its shock-absorbing effect.

The wheel must not be knocked off or on.

1. Mount the actuator if it was removed.
2. Check the clearance between the actuator and the "tooth" of the switch which should be 0.008–0.024 in. (0.2–0.6 mm) when the switch is in the neutral position. The play can be adjusted by placing washers between the actuator and the bearing bracket.

NOTE

Fit the return yoke so that its center line coincides with the center axis of the switch housing, when the wheels are straight ahead.

3. Mount the steering wheel on the steering column. The front wheels should be aligned straight-ahead and the steering wheel mounted with the spokes horizontal and the central fastener upwards.
4. Mount the spring washer and nut.
5. Connect the electric cable to the horn contact and mount the horn contact finger and safety pad to the steering wheel.

STEERING COLUMN STAND WITH STEERING WHEEL SHAFT AND GEAR-SHIFT MECHANISM

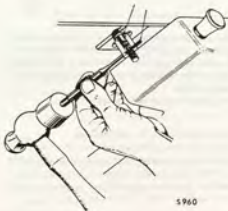
Disassembly

Disassembly of the steering column also involves removal of the gear-shift mechanism, since these two units are mounted on the same stand.

1. Remove the steering wheel and horn-button assembly as described above.
2. Back off and remove the clamping screw at the column, connection to the steering-gear pinion.
3. Back off and remove the nut from the upper end of the gear-shift shaft universal joint and drive out the taper pin.

If the taper pin is threaded at both ends, proceed as follows: Remove the nut and place it on the other end of the taper pin. Tighten the nut, thus loosening the pin. Collect the return spring if there is one above the joint.

4. Undo the two screws for the steering-column stand after having driven out the locking pins. The stand and steering column, together with the gear-shift shaft and lever, are now loose, and can be removed from the car.



REMOVING LOCKING PINS ON STEERING-COLUMN STAND

5. Draw the column out of its bearing.

WARNING

The collapsible steering wheel shaft introduced as from model 1969 must be handled with care. It must not be subjected to impacts, jolts or other rough treatment liable to alter the adjusted length of the telescope joint or impair its shockabsorbing effect.

When installing the steering wheel shaft, take special care to ensure that the splined lower end is pushed into the intermediate shaft until the clamping screw comes opposite the groove in the shaft. The intermediate shaft should normally slide freely on the shaft. If the splines stick, do not on any account knock on the top end of the steering wheel shaft.

This also applies to removing and fitting the steering wheel. The wheel must not be knocked off or on.

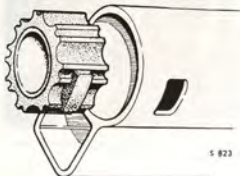
6. Remove the two rubber bushings together with the steering-column bushings.
7. Remove the cardboard sleeve between the bushings and if necessary the electric cables.

Reassembly

1. Refit the rubber bushings together with the steering-column bushings. Between the bushings fit the protective sleeve and the cables to the direction indicator switch.

NOTE

The upper rubber bushing is thinner than the lower one. Moreover, both bushings are tapered and must therefore be fitted so that the arrow on the locating lug points towards the steering wheel.



BUSHINGS, STEERING-COLUMN STAND

2. Pass the steering column into its bearing. On R.H.D. cars first put the plastic cone on the steering column.
3. Refit the assembly in the car. Adjust the position as described under "Adjustment of steering column stand" and secure the stand by tightening the two screws. Drive in the locking pins.
4. Refit the return spring and connect the gear-shift shaft to the universal joint with the taper pin.
5. Reconnect the steering-column joint to the steering-gear pinion and tighten the clamping screw.
6. Refit the steering wheel and horn-button assembly as described above.
7. Make sure that the steering column stand is correctly adjusted in its vertical position, since this determines the gear positions. Adjust the twist stop of the gear lever lock, see separate descriptions.

Adjustment of steering column stand and gear positions

The steering column stand is mounted to a bracket under the instrument panel by means of two screws. The screws are carrying washers and are locked by tensioning pins. The screws can be loosened enough to make possible adjustment of the gear positions. If the steering column stand should be removed, the tensioning pins must first be taken away with the aid of a mandrel.

The gear lever lock consists of a twist stop mounted to the gear shift shaft and held by two clamping screws, one stop screw and splines.

The twist stop has a hole in which the lock plunger goes when locking.

Make sure that the steering column stand is correctly adjusted in the vertical direction, since this entirely determines the gear shift positions. The gear shift lever play in the plane of the gear shift shaft axis should be checked in the following manner:

Engage top gear and move the gear shift shaft firmly but not roughly in both axial directions. When this is done the lever knob should move in the same direction as the shaft (in plane of shaft axis) 0.3–0.5 in. (8–12 mm).

NOTE

Readjustment of the twist stop for the lock plunger is essential whenever the gear shift mechanism has been dismantled and after adjustment of gear positions.

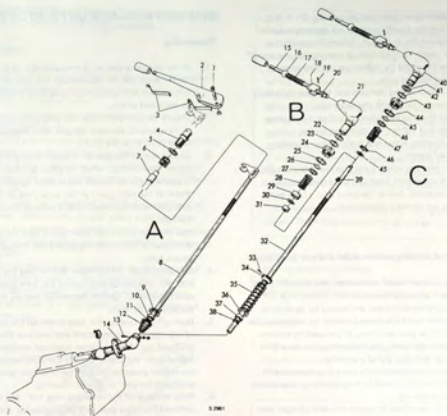
GEAR SHIFT MECHANISM, LEFT HAND DRIVE

Disassembly

1. If the complete gear shift mechanism is to be removed from the car, disassemble the steering column stand with column and gear shift mechanism as described above.
If only the gear shift lever and gear shift shaft are to be removed, separate the gear shift shaft universal joint from the shaft.
2. On the rear of the gear shift lever housing is a square hole through which an arbor or other suitable implement can be passed and pressed against one shank of the turn guard at the same time as the gear shift lever is pressed in and rotated through 1/4 turn.
3. Pull the gear shift shaft downwards past the gear shift lever so that it can be passed out through the square hole.
4. Screw the knob off the lever and remove the lever entirely. The plastic ball, spring and turn guard will now be released. Collect the plastic bearing from the end of the lever.
5. Back off and remove the stop screw on the bottom of the steering column stand and unscrew the bright chromed nut. The gear lever head can now be removed from the stand. Collect the fiber washer and the rubber grommet located between the gear shift shaft and the gear shift lever housing.
6. After removal of the retaining ring, the nut can be removed from the gear shift lever housing. Collect the fiber washer and any shims.
7. If the gear shift shaft is to be removed, take away the locking pin for the return spring on the lower end of the shaft.
8. Now move the gear shift shaft downwards until it is released from the stand.
9. Remove the turn guard from the gear shift lever lock, if fitted, and collect the return spring and the spring holder.
10. Remove the washer, spring, bushing, washer and felt ring from the steering column stand. There are two different types.

Reassembly

1. Refit the felt ring, washer, bushing, spring and washer in the steering column stand.
2. Fit the return spring, spring holder and gear shift lever twist stop on the gear shift shaft, with the marking on the latter facing upwards. Then slide the gear shift shaft into the steering column stand from underneath.



GEAR SHIFT MECHANISM

A. R.H.D.

1. Screw
2. Gear shift lever
3. Spring
4. Fork nut
5. Washer
6. Spring
7. Felt ring
8. Gear shift rod
9. Bracket
10. Bushing
11. Bushing

12. Return spring
13. Tapered pin
14. Universal joint

B. L.H.D.

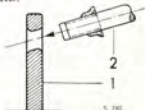
15. Gear shift lever
16. Ball
17. Spring
18. Turn stop
19. Pin
20. Plastic bearing
21. Lever housing
22. Washers

24. Nut
25. Fiber washer
26. Snap ring
27. Washer
28. Spring
29. Bushing
30. Washer
31. Felt ring
32. Gear shift rod
33. Pin
34. Spring retainer
35. Spring

36. Bracket

37. Rubber bushing
38. Bushing
39. Rubber ball
40. Lever housing
41. 42. Washers
43. Nut
44. Fibre washer
45. Snap ring
46. Washer
47. Spring

3. Refit the pin above the spring holder.
4. Put the fiber washer and the nut on the gear shift lever housing and insert the retaining ring in its groove. Check the clearance between nut and retaining ring and fit the necessary number of shims under the fiber washer. The nut should have no clearance and be slightly stiff to turn. Note! Apply a moderate coating of Saab special chassis grease to the fiber washer and the internal bearing surfaces of the nut.
5. Refit the gear shift lever housing in the steering column stand. Be sure to turn the shaft so that its slanted hole comes in the right direction as shown in the fig. While the lever head is being passed down towards the stand, refit the rubber grommet between the gear shift shaft and the lever housing. Place the grommet on the same side as the gear shift lever.



LOCATION OF GEAR SHIFT LEVER IN THE GEAR SHIFT ROD

1. Gear shift rod
2. Gear shift lever

6. Tighten the bright chromed nut and secure it with the stop screw.
7. Check that the plastic bearing with plastic ring and the roll pin are mounted on the gear shift lever.
8. Pass the turn guard, the spring and the plastic ball onto the gear shift lever.
9. Press the gear shift shaft downwards and pass the gear shift lever in through the square hole in its housing. Then screw on the knob.
10. Pull the gear shift lever outwards in the knob, at the same time releasing the gear shift shaft so that the lever enters the hole. Make sure that the plastic ring is not pulled off the lever in course of assembly.
11. Using an arbor or other suitable implement, press against one shank of the turn guard, at the same time turning the gear shift lever through 1/4 turn, thus locking the lever.
12. Reassemble the complete steering column stand with column and gear shift mechanism if previously removed.
13. Refit the gear shift shaft universal joint to the shaft.
14. Adjust the steering column stand in the vertical direction to ensure correct gear shift positions and then adjust the twist stop for the gear shift lever lock.

GEAR SHIFT MECHANISM, RIGHT HAND DRIVE

Disassembly

1. If the complete gear shift mechanism is to be removed, disassemble the steering column stand with column and gear shift mechanism as described above. If only the gear shift lever and gear shift shaft are to be removed, separate the gear shift shaft universal joint from the shaft, collecting the spring for the return movement. Then remove the steering wheel and the directional signal switch with its plastic cover.
2. Back off the nut and remove the screw passing through the gear shift lever. The lever can now be removed.
3. Back off the three screws which hold the twist stop of the gear shift lever lock. These screws are accessible through the three holes in the steering column stand.
4. Pull the gear shift shaft out of the stand.
5. Back off the fork nut and remove the washer, the spring and the felt bushing from down inside the stand.



REVERSE CATCH R.H.D.

29. Washer
30. Plastic hose
31. Spring
32. Plastic washer
33. Washer
34. Casing
35. Pin
36. Carrier sleeve

As right hand drive cars are equipped with a special reverse catch, the following additional steps must be taken for these cars: Before pulling the gear shift shaft out of the column, remove the yoke sleeve on the gear shift shaft is pulled out of the stand, insert a pipe about 9.85 in. (250

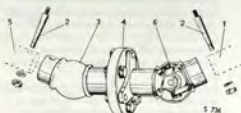
mm) long and 0.63 in (16 mm) in diameter up through the casing for the reverse catch, thus preventing the spring and the washers can now be removed, pull the pipe downwards so that the upper washer can be extracted sideways. Note that the spring must be compressed while this is being done. After having removed the washer, release the spring carefully. Collect the plastic washer, the pipe and the metal washer from under the spring.

Reassembly

1. Insert a new felt bushing in the stand. Lubricate the bushing with Saab special chassis grease.
2. Place the spring and the washer on the fork nut.
3. Screw in the fork nut far enough to leave about 0.04 in. (1 mm) clearance between the fork flange and the edge of the stand.
4. Pass the gear shift shaft into the stand and, at the same time, slide on the twist stop for the gear shift lever lock with the marking turned upwards to face the steering wheel. Turn the ignition key to the locked position so that the lock plunger slides into the recess in the twist stop.
5. Refit the gear lever, making sure that the three leaf springs are correctly positioned.
6. Pass the bolt through the gear shift lever and the oval hole in the gear shift shaft. Tighten the nut to eliminate all play but without impairing free lever movement.
7. Refit the direction indicator switch with its plastic cover.
8. Reassemble the complete steering column stand with column and gear shift mechanism if previously removed. Reassemble the gear shift shaft universal joint and the spring for the return movement.
9. Refit the steering wheel and horn button assembly.
10. Adjust the steering column stand in the vertical direction to ensure correct gear shift positions and then adjust the twist stop for the gear shift lever lock. See the description in the section concerned.

Right hand drive are equipped with a special reverse catch. Refit the casing for the reverse stop by passing through it a pipe or other suitable implement with a length of about 9.85 in. (250 mm) and 0.63 in. (16 mm) in diameter. Then pass onto the pipe the metal washer and the plastic washer forming the lower seat for the spring as well as the plastic collar. Next, pass the spring onto the pipe. Compress the spring and mount the upper metal washer from the side in order to lock the spring and then slide the pipe up through the washer. Now screw the casing, complete with spring and washers, to the stand. While the gear shift shaft is being passed into the stand and the casing for the reverse catch, pull the pipe used for assembly of the spring out gradually. When the gear shift shaft has been passed through the casing, secure the yoke sleeve to the shaft by driving in the pin.

GEAR SHIFT SHAFT UNIVERSAL JOINT



GEAR SHIFT SHAFT UNIVERSAL JOINT, L.H.D. CAR

1. Gear shift rod
2. Conical pin with lock nut
3. Rubber boot
4. Rubber disc
5. Operating shaft, gear box
6. Spring



GEAR SHIFT SHAFT UNIVERSAL JOINT, R.H.D. DRIVE CAR

Disassembly and reassembly

The universal joints can be lubricated without being disassembled if the rubber dust excluders are turned aside.

1. Remove the fastener and drive out the taper pin.

If the taper pin is threaded at both ends, proceed as follows: Remove the nut and place it on the other end

of the taper pin. Tighten the nut, thus loosening the pin.

2. Release the universal joint from the gear shift shaft, collecting the gear lever return spring which is located on the gear shift shaft.
3. Remove the fastener and drive out the other taper pin in the same way.
4. Pull the joint off the transmission operating rod. Check the joint for excessive play or stiffness. If new dust excluders are to be fitted, remove the old grease and pack the joints with Saab special chassis grease before fitting the new dust excluders.
5. Refit the universal joint to the operating rod and drive in the taper pin. Make sure that the tapers in the joint and operating rod are properly aligned.

NOTE

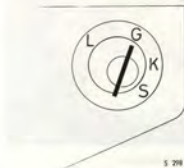
The gear shift rod joint on L.H.D. cars has the links displaced. The color marked end of the joint should be mounted against the gear box.

6. Refit the return spring to the gear shift shaft if it has been removed. Then pass the universal joint onto the shaft and drive in the taper pin.
7. Refit the taper pin fastener.

GEAR LEVER LOCK, IGNITION LOCK

General

The car is fitted with a combined ignition and gear lever lock. The gear shift lever is locked when the reverse gear is engaged and the key is removed. The gear lever and ignition lock has the following positions:



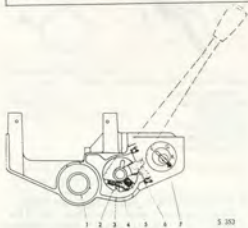
GEAR LEVER AND IGNITION LOCK

- L. Locked. The lighting is out when the key is turned to locked position. The key can be taken out only when reverse gear is engaged.
- G. Garage. Ignition, etc., is switched off but the gear shift lever is unlocked. The key cannot be removed in this position.
- D. Driving. Ignition is on. Current is supplied via the ignition switch to the fuel tank gauge, direction indicator flashers, fan motor, windshield wipers, horn and charge indicator light.
- S. Starting. This position has a spring return action. The steering column stand is secured to a bracket under the instrument panel by means of two screws. These screws have waists and are locked with roll pins. They can be slackened enough to allow adjustment of gear positions, but if the steering column stand is to be removed, the roll pins must first be knocked out with an arbor.

The gear lever lock consists of a twist stop secured to the gear shift shaft by means of two clamping screws, one stop screw and knurls. The twist stop has a hole into which the lock plunger slides when the gear shift lever is locked.

NOTE

Readjustment of the twist stop for the lock plunger is essential whenever the gear shift mechanism has been dismantled and after adjustment of gear positions.

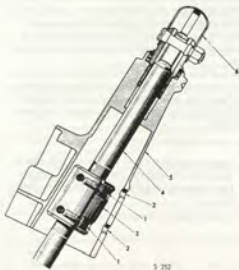


TWIST STOP AND LOCK PLUNGER

1. Steering column
2. Twist stop
3. Clamping screw
4. Gear shift shaft
5. Stop screw
6. Lock plunger
7. Lock cylinder with key

Removal of twist stop

1. Engage 1st gear, thus providing access to two clamping screws on the twist stop through the holes (2) on the bottom of the steering column stand. Undo these internal hexagon screws with a 3/16" spanner.
2. Engage reverse gear and turn the ignition key to the locked position (L), enabling the stop screw which holds the twist stop to be backed off through the lower hole 2, in the steering column stand.



GEAR LEVER LOCK, CUT-AWAY VIEW

1. Clamping screw
2. Adjusting hole
3. Twist stop
4. Gear shift shaft
5. Steering column stand
6. Gear shift lever

3. The gear positions can now be adjusted by moving the steering column stand in the ordinary way. If the ignition key is turned to position G, thereby releasing the twist stop, the gear shift mechanism can then be dismantled.

NOTE

The clamping screws of the twist stop are always accessible when 1st gear is engaged and the stop screws when reverse gear is engaged.

Adjustment of twist stop

After adjustment of gear positions, readjustment of the twist stop is called for. The procedure is the following:

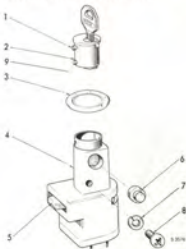
1. The twist stop is marked on the side that is to face upwards towards the steering wheel. The marking shows for which version the twist stop is designed, e.g. V-4 means left hand drive, 4-speed.
2. Engage reverse gear and push the twist stop up. At the same time, turn the ignition key to the locked position (L) and check that the lock plunger finds its position in the twist stop.
3. The twist stop now hangs on the lock plunger. Move the twist stop up about 0.08 in. (2 mm) and tighten the stop screw slightly. Note! Do not tighten the screw up too hard, its purpose being merely to hold the twist stop during adjustment.
4. Turn the ignition key to position G and engage 1st gear, enabling two clamping screws on the twist stop to be tightened. Then engage reverse gear and slacken the stop screw. Return to 1st gear and tighten the clamping screws permanently. Now engage reverse gear again and tighten the stop screw enough to prevent it from working loose.



ADJUSTMENT OF TWIST STOP

Note! On right hand drive cars there is a spring on the gear shift shaft which serves as a reverse catch. This spring must be in place when the twist stop is adjusted.

**LOCK CYLINDER, UP TO AND INCL. CHASSIS NO.
95773000341 AND 96773000960**

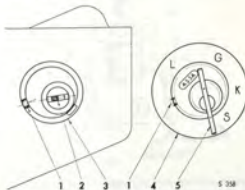


LOCK CYLINDER AND GEAR LEVER LOCK

1. Catch pin
2. Lock cylinder
3. Sign plate
4. Gear lever lock
5. Lock plunger
6. Lock plug
7. Retaining washer
8. Cross-recess screw
9. Catch pin (as from model 1970)

Disassembly

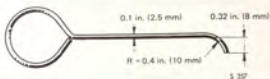
1. Insert the ignition key and turn to right hand edge of the "ASSA" mark.



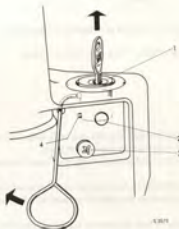
POSITION OF KEY AND LOCK PLUNGER DURING ASSEMBLY OR DISASSEMBLY

1. Catch pin
2. Position of locking pin during assembly of lock cylinder
3. Gear lever lock
4. Sign plate
5. Position of key during assembly of lock cylinder

2. When the key is in this position, the catch pin in the lock cylinder can be pressed in by inserting a wire picklock in a hole on the underside of the steering column stand. See figures.



WIRE PICKLOCK



REMOVING LOCK CYLINDER

1. Lock cylinder
2. Lock plug
3. Retaining screw
4. Catch pin (as from model 1970)

3. Pull out the lock cylinder and remove the lock plug through the cylinder hole.
4. The gear lever lock can now be removed, after removal of the retaining screw.

NOTE

When the lock cylinder is removed the key has no stop positions and can thus be turned a complete revolution. If the key takes up an incorrect position, the locking pins inside the cylinder may get in the way so that the key cannot be returned to the working position. To remedy this, tap the key and lock cylinder lightly against a wooden object with the retainer on the outside of the cylinder turned upwards.

Disassembly when key is missing

If the key has been lost or if it is necessary to remove the lock or the lock cylinder, the cylinder must be drilled before the catch pin can be pressed in. Drill an 0.12 in. (3 mm) hole in the cylinder to a depth of about 0.4 in. (10 mm).



DRILLING LOCK CYLINDER FOR REMOVAL WHEN KEY IS MISSING

1. Hole, diameter 0.12 in. (3 mm), depth 0.4 in. (10 mm)

Reassembly

1. Slide the lock plunger into the gear lever lock and then fit the lock into the steering column stand.
2. Insert the screw and drive it in slightly. Insert the lock plug.
3. Using flat nose pliers, turn the pin in the lock until it enters the groove in the end of the lock cylinder, see fig.
4. Turn the key so that it comes to the right hand part of the "ASSA" mark, and press the catch pin in.
5. Now place the sign plate over the pin so that it is held in the pressed-in position. Adjust the sign plate so that it fits against the retaining lug on the outside of the cylinder.
6. Insert the lock cylinder with the sign plate in the gear lever lock and tighten the screw.

LOCK CYLINDER, AS FROM CHASSIS NO. 95773000542 AND 96773000961

Removal

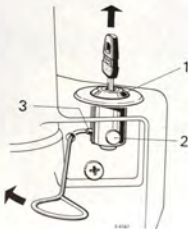
1. Put the gear lever in reverse and turn the key to a position mid-way between position "L" and "G".



POSITION OF KEY FOR REMOVAL AND INSTALLATION OF LOCK CYLINDER

1. Cylinder ring
2. Key

2. Insert a wire picklock in the hole underneath the steering wheel bearing bracket and depress the lock cylinder locking pin.



REMOVING THE LOCK CYLINDER

1. Lock cylinder
2. Plug
3. Locking pin

3. Withdraw the lock cylinder.

Installation

1. Check that the driver is correctly positioned in the lock sleeve. Adjust as necessary using flat-nose pliers.



POSITION OF DRIVER FOR INSTALLATION OF CYLINDER

1. Hole for locking pin
2. Driver

2. Insert the cylinder in the lock sleeve. Insert the locking pin.



Legend: 1. Lock sleeve, 2. Lock sleeve, 3. Lock sleeve, 4. Lock sleeve, 5. Lock sleeve, 6. Lock sleeve, 7. Lock sleeve, 8. Lock sleeve, 9. Lock sleeve, 10. Lock sleeve, 11. Lock sleeve, 12. Lock sleeve, 13. Lock sleeve, 14. Lock sleeve, 15. Lock sleeve, 16. Lock sleeve, 17. Lock sleeve, 18. Lock sleeve, 19. Lock sleeve, 20. Lock sleeve, 21. Lock sleeve, 22. Lock sleeve, 23. Lock sleeve, 24. Lock sleeve, 25. Lock sleeve, 26. Lock sleeve, 27. Lock sleeve, 28. Lock sleeve.

- | | |
|-----------------|----------------|
| 1. Lock sleeve | 15. Driver pin |
| 2. Lock sleeve | 16. Driver pin |
| 3. Lock sleeve | 17. Driver pin |
| 4. Lock sleeve | 18. Driver pin |
| 5. Lock sleeve | 19. Driver pin |
| 6. Lock sleeve | 20. Driver pin |
| 7. Lock sleeve | 21. Driver pin |
| 8. Lock sleeve | 22. Driver pin |
| 9. Lock sleeve | 23. Driver pin |
| 10. Lock sleeve | 24. Driver pin |
| 11. Lock sleeve | 25. Driver pin |
| 12. Lock sleeve | 26. Driver pin |
| 13. Lock sleeve | 27. Driver pin |
| 14. Lock sleeve | 28. Driver pin |

STEERING GEAR

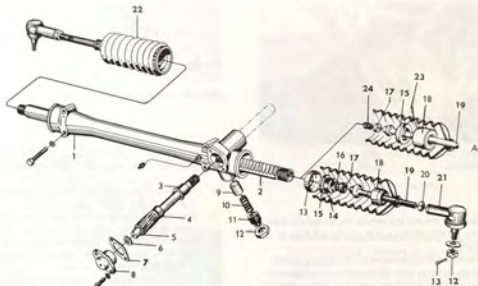
General

To lubricate the steering gear, turn the steering wheel as far as it goes to the left, to the right on R.H.D. cars. Use Saab special chassis grease.

To ensure satisfactory function, the steering gear must be lubricated copiously, but not so excessively that the steer-

ing gear rubber bellows are completely filled with grease. Unwanted noise in the steering gear is a sign that adjustment is necessary, see below. Worn or damaged parts should be replaced by new ones.

The illustration shows a steering gear for a car with left hand drive, but as the steering gear for cars with right hand drive is similar in principle, the following instructions are equally applicable to both versions.



STEERING GEAR, L.H.D. CAR, DISASSEMBLED

S 4204

A. Alternative design

- | | |
|--------------------------|------------------------|
| 1. Steering gear housing | 13. Cotter pin |
| 2. Rack | 14. Shim |
| 3. Bushing | 15. Nut |
| 4. Spacer sleeve | 16. Flat spring |
| 5. Pinion | 17. Bearing cup, inner |
| 6. Washer | 18. Bearing cup, outer |
| 7. Shim | 19. Tie-rod |
| 8. Bearing | 20. Nut |
| 9. Piston | 21. Tie-rod end |
| 10. Spring | 22. Rubber bellows |
| 11. Screw | 23. Locking pin |
| 12. Nut | 24. Spring |

REMOVAL, UP TO AND INCL. MODEL 1968 (R.H.D. CARS UP TO AND INCL. MODEL 1969)

The following description is applicable on left hand drive cars and right hand drive cars as well. (Text in brackets is applicable on right hand drive cars.)

1. Remove the hood.
2. Disconnect one of the battery cables.
3. Jack up the front part of the car so that both wheels are clear of the floor.
4. Take off the front wheels.
5. Disconnect the tie-rod ends from the steering arms. Use tool 78 60 448 for the tie-rod end.



REMOVAL OF TIE-ROD END
Tool 78 60 448

6. Back off the nut and remove the tie-rod end from the left tie-rod on a L.H.D. car (on a R.H.D. car the right).
7. Remove the lower taper pin from the gear shift shaft universal joint. Remove the nut and place it on the other end of the taper pin. Tighten the nut, thus loosening the pin. Release the joint from the gear box.
8. Release the freewheel control from the transmission.
9. Detach the slave cylinder from the clutch housing and hang it up on the hoses for the fresh-air heater.
10. Release the throttle return spring and attach it in some suitable way so that the throttle spindle is fully deflected.
11. Disconnect the speedometer drive cable from the transmission case.
12. Turn the steering wheel to full left lock on a L.H.D. car (and full right lock on a R.H.D. car). Back off and remove the clamping screw in the steering column yoke and lift the steering wheel to pull the column out of the yoke. Remove the dash panel cardboard lining where the steering gear stub passes through the dash panel.
13. Back off and remove the four steering gear retaining bolts.
14. Remove the rubber grommet in the dash panel. Lift the left hand (resp. right hand on R.H.D. cars) side of the steering gear forwards over the gear shift fork shaft until the stub axle on the steering gear is clear of the dash panel.

15. Pass the steering gear out a little through the right hand (resp. left hand) wheel house until the left tie-rod clears the wheel house wall. Lift the steering gear out forwards and upwards between the wheel house stay and the left hand wheel house.



REMOVAL OF STEERING GEAR

INSTALLATION, UP TO AND INCL. MODEL 1968 (R.H.D. CARS UP TO AND INCL. MODEL 1969)

1. Remove the tie-rod end from the left hand tie-rod (right hand on a R.H.D. car).
2. Slide the rack over so that left hand (resp. right hand) tie-rod takes up its inner position.
3. Insert the steering gear between the left hand, (resp. right hand) wheel house and the wheel house stay in the opposite way to removal.
4. Pass the steering gear in towards the dash panel in the opposite way to removal and place the rubber seal on the stub axle to avoid damaging it.
5. Pass the stub axle through the dash panel and refit the rubber seal in the dash panel hole.
6. Refit the four retaining bolts in the steering gear. Before tightening these bolts, make sure that the speedometer drive cable is not caught between the steering gear and the dash panel.
7. Refit the left hand (resp. right hand) tie-rod end.
8. Reconnect the tie-rod ends to the steering arms.
9. Put on the wheels and lower the car to the floor.
10. Refit the freewheel control and gear shift shaft universal joint.
11. Reconnect the speedometer drive cable to the transmission case.
12. Refit the slave cylinder to the clutch housing.
13. Reconnect the throttle return spring.
14. Align the wheels straight ahead, refit the cardboard dash panel lining and reconnect the steering column.
15. Check the toe-in and tighten the lock nuts at the tie-rod ends.

16. Check the alignment of the steering wheel and refit the clamping screw in the yoke on the steering column.
17. If necessary, grease the tie-rod ends.
18. Reconnect the battery cable.
19. Refit the engine hood.

REMOVAL, AS FROM MODEL 1969 (R.H.D. CARS AS FROM MODEL 1970)

As from model 1968, there is an alternative steering gear featuring a different inner ball joint. As from model 1969, only the new type is used.

As from model 1969, the brake system is equipped with vacuum servo (on R.H.D. cars as from model 1970).

The placement of the servo cylinder has made necessary another way of removal and installation of the steering gear.

The following description is applicable on left hand drive cars and right hand drive cars as well. (Text in brackets is applicable on right hand drive cars.)

1. Remove the hood.
2. Disconnect one of the battery cables.
3. Jack up the front part of the car so that both wheels are clear of the floor.
4. Take off the front wheels.
5. Remove the tie rod ends from the steering arms. Use tool 78 60 448.



REMOVAL OF TIE-ROD END
Tool 78 60 448

6. Remove the lower taper pin from the gear shift shaft universal joint as follows: Remove the nut and place it on the other end of the taper pin. Tighten the nut, thus loosening the pin. Release the freewheel control from the transmission.
7. Release the throttle control spring. The spring can then be used as a support for the gear shift shaft joint. Disconnect the speedometer cable from the transmission case.
8. Back off and remove the clamping screw in the steering column yoke and lift the steering wheel to pull the column out of the yoke. In certain cases the screws for support of the steering column stand must be backed off so that the stand can be moved to its upper position.

WARNING

The collapsible steering wheel shaft introduced as from model 1969 must be handled with care. It must not be subjected to impacts, jolts or other rough treatment liable to alter the adjusted length of the telescope joint or impair its shock absorbing effect.

9. Back off the lock nut on the underside of the steering gear. Use ring spanner 1 1/4". Remove the screw with the aid of spanner 11/16". Note! The screw is not hexagon, it has only one key grip. Remove the pressure spring and the piston.



PRESSURE SPRING AND PISTON REMOVED

10. Remove the screws holding the pinion bearing. Remove the bearing. Take care of the shims. Pull out the pinion.
11. Back off and remove the four steering gear fastening screws.
12. Pass the steering gear out through the left hand wheel housing (resp. right hand on R.H.D. cars). Avoid damage on the rubber bellows. Check and adjust, see instructions on page 642-5 and following pages.

INSTALLATION, AS FROM MODEL 1969 (R.H.D. CARS AS FROM MODEL 1970)

If a new steering gear is installed, the steering gear pinion must first be removed, see pos. 9 above.

1. Pass the steering gear in through the left hand wheel housing (right hand on R.H.D. cars). For making it possible to pass the gear by the gear shift shaft the gear must be turned so that its mounting heads comes in the best possible position. Do not damage the rubber bellows.
2. Mount the steering gear to the dash panel.
3. Install the steering gear. Use same shims as used when checking. Check that the pinion moves easily.

4. Mount piston, spring and screw for adjustment of the radial play of the rack. Tighten the screw so that smallest possible play is obtained without jamming the rack. Tighten the lock nut.
5. Fit the tie-rod ends to the steering arms. Tighten the nuts and lock them with cotter pins.
6. Fit the wheels. Align the wheels straight ahead. Fit the steering wheel shaft to the pinion.

WARNING

The collapsible steering wheel shaft introduced as from model 1969 must be handled with care. It must not be subjected to impacts, jolts or other rough treatment liable to alter the adjusted length of the telescope joint or impair its shockabsorbing effect.

When installing the steering wheel shaft, take special care to ensure that the splined lower end is pushed into the intermediate shaft until the clamping screws comes opposite the groove in the shaft. The intermediate shaft should normally slide freely on the shaft. If the splines stick, do not on any account knock on the top end of the steering wheel shaft.

This also applies to removing and fitting the steering wheel. The wheel must not be knocked off or on.

7. Install the gear shift shaft joint. Tighten the screws for the steering column stand if this has been loosened. Check the gear positions.
8. Mount the free-wheel control and throttle control spring.
9. Lower the front of the car and check toe-in.
10. Connect the battery cable. Mount the engine hood.

DISASSEMBLY, EARLIER DESIGN

1. Back off and remove the lock nuts and remove the tie-rod ends.
2. Release the clamps and take off the rubber bellows.
3. Bend up the tabs on the retaining washers.
4. If the gear pinion has been removed, put it back in place.
5. Release the two tie-rod ball joints with tool 78 40 713. If the nut is left on the rack, it can be removed using the shaft of wrench 78 40 713.



S 783

REMOVAL AND FITTING OF NUT
Tool 78 40 713

6. Remove the pinion.
 7. Disassemble the ball joints and collect the shims, the inner ball seats and the retainer.
 8. Withdraw the rack from the steering gear housing.
 9. Remove the pinion spacer. If they are to be renewed, drive out the pinion bushing and the bushing on the R.H. side of the steering gear.
- The last mentioned bushing may be found locked with a pin.

REASSEMBLY, EARLIER DESIGN

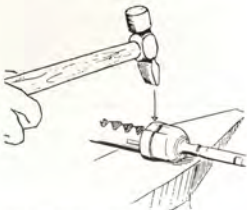
The steering gear must be reassembled under conditions of scrupulous cleanliness. Lubricate the rack and pinion, bearing points and other sliding surfaces with Saab special chassis grease.

1. If removed, drive the pinion bushing into the steering gear housing.
2. Place a new retaining washer on the pinion end of the rack and screw on the nut with tool 78 40 713.
3. Locate the shims on the nut and place the inner ball seat and retainer inside the nut. Position the retainer with its concave side facing the ball seat.
4. Pass the rack and pinion into the steering gear housing.

NOTE

In assembling the steering gear, the pinion spacer must be refitted before the rack is passed into the housing.

5. Pass the outer seat onto the tie-rod and secure it to the nut with the aid of the special tool, 78 40 713.
6. Check that the ball joint is correctly shimmed. If not, release the ball seat and alter the shim combination as indicated below under "Adjustment".
7. After proper adjustment of the ball joint, bend the tabs of the retaining washers down into the grooves on the outer ball seat and into the notches in the nut.



SECURING INNER BALL JOINT

8. Refit the other ball joint and adjust in the same way. Remember to refit the pinion first.
9. First adjust the axial play of the pinion and then the radial play of the rack. See below under "Adjustment".
10. Ease the bellows over the tie-rod and clamp them to the steering gear housing and tie-rods. Do not tighten hard enough to prevent rotation of the tie-rods.
11. Refit the lock nuts and screw the tie-rod ends to the tie-rods.

DISASSEMBLY, LATER DESIGN

1. Slacken the lock nuts, and remove the tie-rod ends.
2. Release the clamps, and take off the rubber bellows.
3. Remove, by drilling, the lock pins from the inner ball joints 3/16 in. (4.75 mm).



BORING THE LOCK PIN

4. Remove the outer bearing cup and the lock nut with the tools 78 40 713 and 78 39 624.



REMOVAL OF OUTER BEARING CUP AND LOCK NUT
Tools 78 40 713 and 78 39 624

5. Loosen nut and bolt, and remove piston and spring from the steering gear housing.
6. Loosen the bolts of the pinion bearing, and lift out bearing and pinion.
7. Pull the rack out.
8. Remove the spacer ring from the pinion. Press the pinion bushing out.

REASSEMBLY, LATER DESIGN

Exercise the greatest cleanliness when reassembling. Lubricate the rack and pinion, bearing points and other sliding surfaces with Saab special chassis grease.

1. If removed, press the pinion bushing into the steering gear housing.
2. Fit the inner ball joint to the pinion end of the rack. Adjust to the correct play, tighten the lock nut, drill a new hole for the lock pin 3/16 in. (4.75 mm), and drive the latter in. Furthermore, see the section "Adjustment".
3. Pass the rack into the steering gear housing. Place the spacer sleeve behind the rack, and then fit the pinion. Adjust, first the axial play of the pinion, then the radial play of the rack. See "Adjustment".
4. Refit the other ball joint, and adjust in the way described under paragraph 2.
5. Ease the rubber bellows on, and clamp them to the steering gear and tie-rods respectively. See to it that the tie-rod can be turned in the bellows.
6. Refit the lock nuts and screw the tie-rod ends to the tie-rods.

INSPECTION

After considerable mileage, and especially if lubrication is unsatisfactory, the rack may wear unevenly. If there is appreciable wear on its cylindrical part, the rack should be rejected and a new one fitted. Also check the rack bearing in the steering gear housing, appropriately by comparison with a new rack. If wear is excessive, the bushing which is pressed into the housing can be changed. Examine the teeth of both the rack and the pinion for wear. All the teeth do not get worn uniformly, and those which are in mesh when the car is driven straight ahead will be worn the most. However, if lubrication is satisfactory there will be very little wear even on the most affected teeth.

If the rack teeth are abnormally worn the function of the steering gear will deteriorate and adjustment becomes more difficult. In these circumstances a new rack should be fitted.

Moderate wear on the pinion, on the other hand, may be corrected by rotating this item through half a turn, so that the teeth worn the most will be farthest away from the rack when the car is being driven straight ahead. Nevertheless, the provision of a new pinion is advocated.

Check the outer and inner tie-rod ball joints. The outer ones are self-adjusting for moderate amounts of wear, but if free play has developed the entire ball joint must be rejected and a new one fitted. The components of the inner ball joints are subjected to but little wear if lubrication is satisfactory. However, if noticeable wear has occurred, the affected parts should be changed.

ADJUSTMENT

The following adjustments may be necessary:

1. Pinion axial play.
2. Rack radial play.
3. Tie-rod inner ball joints.

Adjustment number 3 necessitates removal of the steering gear, but the other adjustments can be done quite simply in the car, unless removal of the steering gear is necessary for some other reason. The inner ball joint very seldom requires adjustment, since there is very little wear here and the ball joint is to some extent selfadjusting.

Adjustment of pinion axial play

The occurrence of noise, knocking, etc., in the steering mechanism indicates the advisability of examining the pinion for axial and radial play.

Excessive play may occur after a new part has been fitted or as the result of wear. Normally, wear is very slight and adjustment on this account is very seldom called for, provided that lubrication is satisfactory.

Excessive axial play in the pinion (the column) can be corrected by inserting shims under the pinion cover. The clearance between the pinion and the cover should be 0.005 in. (0.12 mm).

1. To carry out the adjustment, which can be done without removing the steering gear, jack up the front part of the car so that both wheels are clear of the floor.
2. Back off the lock nut, and retard the adjusting screw for rack radial play enough to completely relax the spring tension.
3. Back off the two cover bolts at the pinion end.
4. Remove the cover, together with the shims located under it.
5. The shim combination thickness is obtained by measuring in the following way:
 - a. Refit the flat washer and the cover without shims. Do not tighten the cover hard so that the cover is deformed.
 - b. Measure the play between housing and cover with a feeler gauge.



MEASURING THE PLAY

- c. The obtained value shall be increased so that there is play max. 0.005 in. (0.12 mm) between cover and pinion.

Example:

| | |
|---|------------------------|
| Value obtained when measuring with feeler gauge | 0.028 in. (0.70 mm) |
| Play | +0.0028 in. (+0.07 mm) |
| Total shim thickness | 0.031 in. (0.77 mm) |

The shims are measured with the aid of a micrometer. Shims are available in the following thicknesses: 0.0276 in. (0.07 mm), 0.004 in. (0.10 mm), 0.010 in. (0.3 mm) and 0.028 in. (0.7 mm).



MEASURING THE SHIMS

6. Check that the washer is in position, and apply a blob of Saab special chassis grease around the pinion stub. Refit the cover and shims, and tighten the bolts. Remember to fit the retaining washers.
7. After adjustment, check that the pinion moves freely. If the pinion is stiff, the thickness of the shim combination is too small, and readjustment is called for.
8. Adjust the radial play of the rack as described in the following section.

NOTE

On cars equipped with vacuum servo the pinion of the steering gear must be removed before the gear is installed in the car. The pinion is refitted after that the pinion is bolted to the dash panel.

Adjustment of rack radial play

After adjustment of the axial play of the pinion, the radial play of the rack must be adjusted, using the adjusting screw located underneath the steering gear. This adjustment, too, is most easily carried out without removing the steering gear from the car.

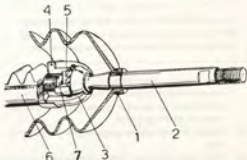
1. Back off the lock nut.
2. Tighten the adjusting screw to the smallest possible play without the rack moving stiffly.
3. Tighten the lock nut.
4. Turn the steering wheel as far as it goes in both directions and check that rack movement is not stiff in any position.

Adjustment of tie-rod inner ball joints

The tie-rods, as illustrated, are identical for the right and left sides. The rack end of the tie-rods is made with double balls, while at the other end the tie-rods are threaded for connection to the outer ball joints.

Earlier design

1. The steering gear must be removed before the inner ball joint can be adjusted.
2. Release the clamps and remove the rubber bellows.



INNER BALL JOINT, EARLIER DESIGN

- | | |
|--------------------|--------------------|
| 1. Clamp | 5. Inner ball seat |
| 2. Tie-rod | 6. Rack |
| 3. Outer ball seat | 7. Washer |
| 4. Nut | |

3. Pull the rack out to one side first. Bend up the tab on the retaining washer and detach the outer ball seat and nut with the aid of tool 78 40 713.



REMOVAL OF OUTER BALL SEAT FROM THE NUT, WHEN RE-SHIMMING

Tools 78 40 713 and 78 39 624

4. Fit a new retaining washer and then tighten the nut, using tool 78 40 713.
5. Place a suitable combination of shims on the nut, and insert the inner ball seat and locating washer inside the nut. Position the washer with the concave side facing the ball seat.
6. Pass the outer ball seat onto the tie-rod and tighten with tool 78 40 713.
7. Check that the shimming is correct. The ball joint should not have any play at all, but nor should it move stiffly in any direction. If the rack and tie-rod are held vertically, the ball joint should be tightened so much that the tie-rod, with tie-rod end attached, can be set at any angle whatsoever without falling down of its own weight.

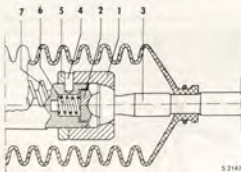
CAUTION

The tie-rod must not on any account be excessively stiff in any position. It should be possible to move it fully in all directions by light manual pressure.

8. If shimming is unsatisfactory, the outer ball seat must be removed again and the number of shims increased or decreased as necessary. After this, secure the retaining washer.
9. Repeat the adjustment procedure for the other tie-rod.
10. Refit the bellows and install the steering gear in the car.

Later design

1. The steering gear must be removed before the inner ball joints can be adjusted.
2. Release the clamps, and remove the rubber bellows.



INNER BALL JOINT, LATER DESIGN

- | | |
|----------------------|-------------|
| 1. Outer bearing cup | 5. Lock nut |
| 2. Inner bearing cup | 6. Spring |
| 3. Tie-rod | 7. Rack |
| 4. Lock pin | |

3. Pull the rack out to one side. Remove, by drilling, the lock pin from the ball joint.
4. Remove the outer bearing cup and the lock nut with the tools 78 40 713 and 78 39 624.



REMOVAL OF OUTER BEARING CUP AND LOCK NUT
Tools 78 40 713 and 78 39 624

5. Clean and inspect the parts. Renew the may-be defective parts.
6. Refit the nut to the rack. Pass the outer bearing cup onto the tie-rod, and fill the cup with Saab special chassis grease. Fit the spring and the inner bearing cup, and tighten the bearing cup.
7. When tightening the bearing cup, remember: the ball joint should not have any play at all, but nor should it move stiffly in any direction. If the rack and tie-rod are held vertically, the ball joint should be tightened so much that the tie-rod, with the tie-rod end attached, can be set at any angle whatsoever without falling down of its own weight.

CAUTION

The tie-rod must not on any account be excessively stiff in any position. It should be possible to move it fully in all directions by light manual pressure.

8. Tighten the lock nut to the bearing cup with the tools 78 39 624 and 78 40 713. Check again that the ball joint is tightened up correctly. Drill a new hole for the lock pin 3/16" (4.75 mm), depth 4.48 in. (112 mm), and fit a new lock pin. Secure the lock pin by 4 center punches at the edge of the hole. See to it that the new hole be located at least 45° from the key grip hole in the lock nut. Take every precaution to prevent drillings from entering the steering gear.



SECURING LOCK PIN WITH CENTER PUNCHES

9. The final adjustment is then made in the same way as that used for the other tie-rod.
10. Fit the rubber bellows, and install the steering gear into the car.

NOTE

Removal of the steering gear from the car provides a convenient opportunity for checking and adjusting the axial play of the pinion and then the radial play of the rack.

Other measures

If the steering gear is still stiff in any position after adjustment of the rack and pinion, this is probably due to stresses incurred when tightening the bolts. Back off the two retaining bolts at the end farthest away from the pinion and insert a spacer under the steering gear at the bolt where it does not lie flush. On some cars, a spacer has already been fitted.

REPLACEMENT OF DUST EXCLUDER

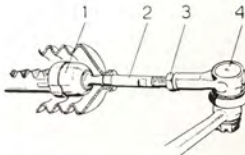
If the bellows on the steering gear are damaged, they should be renewed without delay, as otherwise dirt and foreign matter may enter the steering gear and cause seizing.

1. Jack up the front part of the car and take off the wheel.
2. Remove the tie-rod ends as described in section 643.
3. Release the bellows clamps at the steering gear housing and tie-rod, and remove the bellows.
4. Remove all old grease and put on a new bellows. Tighten the clamps.
5. Refit the tie-rod end and reconnect it to the steering arm.
6. Refit the wheel and lower the car to the floor.
7. Grease the steering gear and adjust the toe-in as described in section 501. Tighten the lock nut.

TIE-ROD ENDS

GENERAL

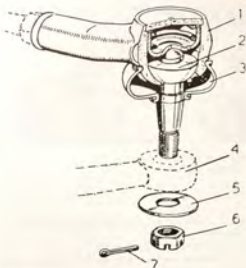
The outer ball joints, or tie-rod ends, are screwed to the tie-rods and secured with the lock nuts. The total length of the tie-rod can be reduced or increased by slackening the lock nuts and turning the tie-rod to the right or left with a wrench applied to its flats. This is necessary in order to adjust the toe-in.



TIE-ROD ASSEMBLY

1. Inner ball joint
2. Tie-rod
3. Lock nut
4. Tie-rod end

The tie-rod is connected to the steering arm of the steering knuckle by means of a tapered pivot, which fits into correspondingly tapered holes in the steering arm. The pivot is secured by a castle nut and cotter pin. The tie-rod ends cannot be dismantled. They are selfadjusting for moderate wear, and consequently seldom need changing. Damage arising through external influences, such as a collision or other accident, may, however, make it necessary to change both tie-rods and tie-rod ends. As a safety measure, damaged tie-rod ends should be changed as soon as possible after the damage is discovered.



TIE-ROD END

1. Body
2. Pivot
3. Rubber seal
4. Steering arm
5. Washer
6. Castle nut
7. Cotter pin

REPLACEMENT

The tie-rod ends cannot be disassembled. Consequently, if excessive play develops the tie-rod ends must be renewed.

1. Jack up the front part of the car and take off the wheel.
2. Remove the cotter pin (7), the castle nut (6) and the washer (5).
3. Apply the puller, tool 78 60 448 and release the pivot from the steering arm. Do not strike off the pivot, since such action could damage both the pivot itself and other parts of the unit.



REMOVAL OF TIE ROD END
Tool 78 60 448

4. Back off the nut which secures the tie-rod end to the tie-rod.
5. Screw the tie-rod end off the rod.
6. Screw a new tie-rod end onto the rod, but do not secure it by tightening the lock nut.
7. Connect the pivot to the steering arm. Tighten the castle nut to a torque of 35–50 Nm (25–36 ft.-lb., 3.5–5 kpm), and fit a new cotter pin.
8. Refit the wheel and lower the car to the floor.
9. Check and adjust toe-in as described in section 601.

IMPORTANT

Remember to retighten the lock nut after adjustment.

REPLACEMENT OF RUBBER SEAL

A rubber seal is fitted to each ball joint. If this is damaged so that it no longer affords an effective seal, it must be rejected and a new one fitted. The procedure is as follows.

1. Jack up the car and remove the wheel.
2. Remove the cotter pin, the castle nut and the washer from under the tie-rod end pivot.
3. Apply the puller, tool 78 60 448, and release the pivot from the steering arm.

Do not attempt to strike off the pivot, since such action could damage both the pivot itself and other parts.

4. Remove the damaged rubber seal from the pivot and fit a new seal.
5. Refit the pivot in the steering arm, put the washer in place and tighten the castle nut with 35–50 Nm (25–36 ft.-lb., 3.5–5 kpm). Secure the nut with a new cotter pin.
6. Refit the wheel and lower the car.

CONTENTS

700 GENERAL

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732 COIL-SPRING SUSPENSION, REAR

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762 STABILIZER

771 WHEELS

772 TIRES

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FIGURE 1. FRONT SUSPENSION

1. Coil spring
2. Shock absorber
3. Steering arm
4. Spring isolator
5. Lower ball joint
6. Drive shaft

7. Lower ball joint
8. Shock absorber
9. Drive shaft
10. Spring isolator
11. Drive shaft
12. Drive shaft

13. Upper control arm
14. Steering arm
15. Propeller shaft
16. Hub
17. Drive shaft

STUDY

1. The first part of the study is to determine the scope of the problem.

2. The second part of the study is to determine the causes of the problem.

3. The third part of the study is to determine the effects of the problem.

4. The fourth part of the study is to determine the solutions to the problem.

5. The fifth part of the study is to determine the results of the solutions.

6. The sixth part of the study is to determine the conclusions of the study.

7. The seventh part of the study is to determine the recommendations of the study.

8. The eighth part of the study is to determine the final report of the study.

GENERAL

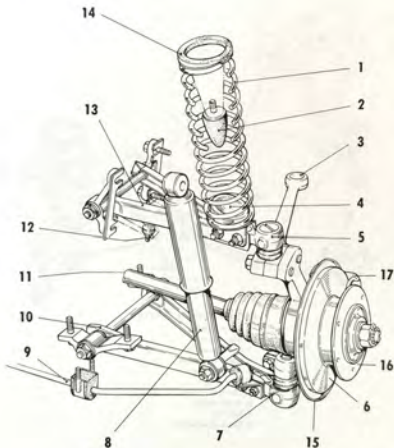
FRONT SUSPENSION

The upper control arms are provided with seats for the coil springs which are fitted between these seats and similar ones on the body. These latter seats are fitted with rubber bumpers, see fig., which act as stops and limit upward suspension travel. Rebound travel is limited by two rubber bumpers attached to the body under the upper control arms.

The lower control arms on Saab 96 up to and incl. chassis

No. 9672201535 and Saab 95 up to and incl. chassis No. 95722004645 are interconnected by means of a stabilizer bar. The stabilizer bar is held to the body by two rubber bushed mounting brackets under the floor of the engine compartment and to the two lower control arms by rubber bushed bearings on the front of these arms. The shock absorbers are of hydraulic, telescopic type.

They are attached by means of rubber-bushed connections to the lower control arms at their bottom ends and to the body at their top ends.



\$ 5271

FRONT SUSPENSION

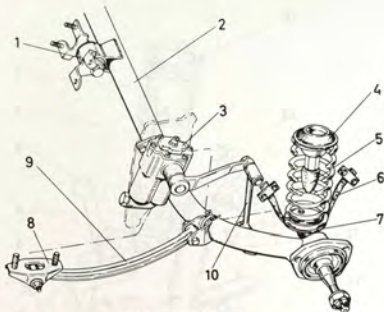
- | | | |
|---------------------|-----------------------|-----------------------|
| 1. Coil spring | 7. Lower ball joint | 13. Upper control arm |
| 2. Rubber bumper | 8. Shock absorber | 14. Rubber spacer |
| 3. Steering arm | 9. Stabilizer bar | 15. Protective shield |
| 4. Spring support | 10. Lower control arm | 16. Hub |
| 5. Upper ball joint | 11. Inner drive shaft | 17. Brake housing |
| 6. Brake disc | 12. Rubber bumper | |

REAR SUSPENSION

The rear axle is movably attached to the body at three points by means of rubber-bushed bearings. It comprises a unit consisting of a tube (2) with swept-back ends fitted with end plates to carry the press-fitted stub axles. The wheel hubs and brake drums are carried in ball bearings on the stub axles, while the back plates and appurtenant rear brakes are bolted to the outside of the end plates. At its center, the rear axle is attached to the body by means of a rubber bushed bearing bracket (1). In addition, it is braced to the body at the sides through the me-

dium of longitudinal side links, attached to both the body and the rear axle by means of rubber bushed bearings. The lower coil spring seats are bolted to the stub axle extension on the inside of the rear axle end plates. The upper seats for these springs are attached to the body by means of spring isolators (4) and combined with the rubber buffers (5) which limit upward travel of the rear axle and thus also of the wheels. Rebound wheel travel is restricted by the stop straps (6).

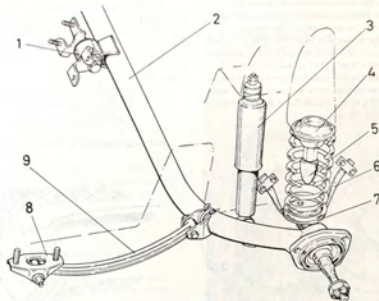
The rear shock absorbers for the Saab 95 are of arm type. They are bolted to the body and connected to the rear axle by links.



REAR SUSPENSION, SAAB 95

1. Center bearing
2. Rear axle tube
3. Shock absorber
4. Upper spring seat
5. Rubber bumper
6. Stop strap
7. Lower spring seat
8. Body bracket
9. Side link
10. Shock-absorber link

The rear shock absorbers for the Saab 96 are of telescopic type. They are connected by means of rubber bushed bearings to the body at the top and to the rear axle at the bottom.



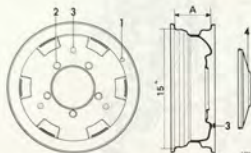
REAR SUSPENSION, SAAB 96

1. Center bearing
2. Rear axle tube
3. Shock absorber
4. Upper spring seat
5. Rubber bumper
6. Stop strap
7. Lower spring seat
8. Body bracket
9. Side link

WHEELS

The dished wheels and wide base rims are manufactured of pressed sheet steel and riveted or welded together to form an integral unit.

A pierced hole in the rim accommodates the air valve, while five pressed and countersunk holes in the wheel itself are intended for the wheel bolts. The hole is used when adjusting the brakes, and when the wheels are assembled this hole should be located opposite the corresponding hole in the brake drum. The rim is also fitted with three pegs to retain the hub cap. As from model 1972, the wheels have ventilation holes with the openings against the periphery of the wheel. This reduces the risk of getting dirt on the disc brakes.



ROAD WHEEL AND HUB CAP

1. Valve hole
2. Wheel bolt hole
3. Hub cap button
4. Hub cap

A. Rim width: 4" up to and incl. model 1975,
4.5 " as from model 1976

HUBS

The wheel hubs on the rear wheels also serve as brake drums. The hubs are shaped to form an annular seal against the back plate, thus preventing water, sand and other foreign matter from entering the hubs and brakes. The hubs have five threaded holes for the wheel bolts and a guide ring for centering the wheel during the mounting.

TIRES

The tires are tubeless and equipped with a balancing mark in the form of a colored circle. The marking shows the lighter side of the tire, and when the tire is fitted, the mark should be by the valve. The illustration below shows how the externally corrugated wall and bead of the tubeless tire seals against the inside of the rim (the bead seat).



BALANCING MARKS IN TIRES



SEAL OF TIRE TRIM

As from model 1971 the tires are equipped with profile dept indicator: this means that when the thread pattern has worn down to a thickness of 1/16 in. (1.6 mm), un-patterned cross bars will appear on the tread. At this point the tire should be exchanged.

NOTE! Avoid fitting of tires of different type or make, or tires that are remarkably different worn, on the same axle.

COIL-SPRING SUSPENSION, FRONT

REPLACEMENT OF COIL SPRINGS AND RUBBER BUMPERS

All four wheels are fitted with coil springs. The front and rear springs must on no account be confused as the rear ones are shorter and much softer than the front ones. On later models, front coil springs of a new type are introduced. These springs are somewhat longer and harder than the springs previously used. The new ones are color-marked, see group 0, and may under no circumstances be installed together with springs of other design. The springs should always be changed in pairs.

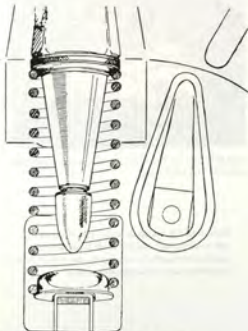
Two alternative methods are described below.

Alternative 1 is removal and installation of the front coil springs using spring clamp 78 40 820 and spring compression tool 78 40 812.

Alternative 2 is removal and installation of the front coil springs using spring scissors 89 95 060 (also designed for Saab 99 up to and incl. model 1972) and spring cups 78 61 248.

Removal, alternative 1

1. Jack up the front part of the car and remove the wheel.
2. Insert a suitable gripping tool (a Polygrip or the like) in the spring and unscrew the rubber bumper from the rubber bumper, allowing it to drop down inside the spring.



FRONT SPRING SEAT AND RUBBER BUMPER

NOTE

If the upper rubber bumper cannot be removed because the bolt has rusted on, the spring can be taken out by cutting off the lower bumper, thereby allowing the control arm to drop down towards the support plates.

3. Remove the shock absorber.
4. Compress the spring with the aid of the spring clamp, tool 78 40 820.



REMOVAL OF FRONT COIL SPRING
Tool 78 40 820

WARNING

Unconditionally, the spring clamp must be fitted with the retainers fitted in the way shown by the fig.

5. Back off and remove the two bolts holding the ball

joint to the upper control arm. Remove the lower spring seat.

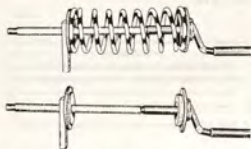


REMOVAL OF UPPER BALL JOINT AND LOWER SPRING SEAT

6. Remove the compressed spring.
7. Carefully examine the rubber sealing ring in the upper spring seat and fit a new one if necessary.
8. Examine the two rubber buffers under the upper control arm which form the rebound travel limit, and fit new ones if necessary.

Installation, alternative 1

1. Compress the coil spring with the spring compressor, tool 78 40 812.



SPRING COMPRESSOR, TOOL 78 40 812, WITH AND WITHOUT SPRING

2. Apply the spring clamp, tool 78 40 820 to the spring and withdraw the spring from the compressor.
3. Check that the rubber sealing ring and metal washer are fitted in the upper spring seat and that the rubber buffers are mounted under the upper control arm.
4. Place the spring against its upper seat, at the same time inserting the previously removed upper bumper in the spring.
5. Locate the lower spring seat between the spring and the control arm and refit the ball joint.
6. Back off the spring clamp screws successively until this tool can be removed.
7. Screw on the upper rubber bumper.
8. Refit the shock absorber.
9. Refit the wheel and lower the car to the floor.

Removal, alternative 2

1. Jack and block up the front of the car. Remove the wheel. Remove the shock absorber on the right side.
2. Fit spring cups 78 61 248 as close to the ends of the springs as possible as follows:
Left side: Fit the upper spring cup diagonally outwards—backwards and the lower cup diagonally inwards—frontwards. The spring scissors should be applied diagonally outwards—backwards.



THE POSITION OF THE SPRING SCISSORS AND THE SPRING CUPS ON THE LEFT SIDE

Right side: Fit the upper spring cup diagonally inwards—backwards and the lower diagonally outwards—frontwards. The spring scissors should be applied diagonally outwards—frontwards.



THE POSITION OF THE SPRING SCISSORS AND THE SPRING CUPS ON THE RIGHT SIDE

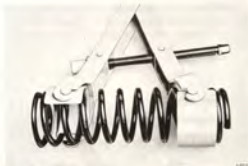
CAUTION

Under no circumstances may the spring cups be simultaneously turned towards the spring scissors. Otherwise the spring may bend out and spring loose from the tool.

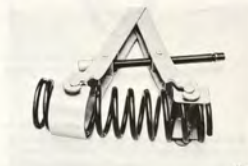
3. Compress the spring. Avoid tightening with the nut runner. The shanks of the spring scissors should not be brought together completely.
4. Remove the lower spring seat to facilitate removal and fitting of the spring.
5. Remove the spring.
6. Check and, if necessary, replace the rubber spacer on the upper spring support.
7. Check the two rubber buffers under the upper control arm, which limit the downward movement of the control arm, and replace them if necessary.

Installation, alternative 2

1. Place the spring in the tool as shown in the pictures below and compress the spring. Avoid tightening with a nut runner. The shanks of the spring scissors should not be brought together completely.



THE POSITION OF THE SPRING IN THE TOOL ON THE LEFT SIDE



THE POSITION OF THE SPRING IN THE TOOL ON THE RIGHT SIDE

2. Check that the rubber spacer and the washer for the upper spring seat and the rubber buffers under the upper control arm have been fitted.
3. Put the compressed spring into place.
4. Fit the lower spring seat and the ball joint to the control arm.
5. Release the spring scissors and make sure that the spring assumes the proper position. The lower end of the spring coil should butt up against the stop in the spring support.
6. Fit the shock absorber on the right side.
7. Mount the wheel and lower the car.

to the upper cord. A 2" x 4" x 1/2" piece of wood is used to hold the cord in place. The cord is then pulled down to the bottom of the box and the box is closed. The cord is then pulled up to the top of the box and the box is closed. The cord is then pulled down to the bottom of the box and the box is closed. The cord is then pulled up to the top of the box and the box is closed.



THE POSITION OF THE CORD IN THE BOX ON THE LEFT SIDE

1. Remove the top board of the box.
2. Carefully pull the cord down to the bottom of the box. The cord should be pulled down to the bottom of the box and then up to the top of the box.
3. Push the cord up to the top of the box. The cord should be pushed up to the top of the box and then down to the bottom of the box.



THE POSITION OF THE CORD IN THE BOX ON THE RIGHT SIDE

1. Push the cord up to the top of the box. The cord should be pushed up to the top of the box and then down to the bottom of the box.
2. Pull the cord down to the bottom of the box. The cord should be pulled down to the bottom of the box and then up to the top of the box.
3. Check that the cord is in the right position and the box is closed. The cord should be in the right position and the box should be closed.



THE POSITION OF THE CORD IN THE BOX ON THE RIGHT SIDE

Boxed, after the 2

1. Push and pull the cord up and down. The cord should be pushed up to the top of the box and then down to the bottom of the box.
2. Push and pull the cord up and down. The cord should be pushed up to the top of the box and then down to the bottom of the box.

When the cord is in the right position, the box is closed. The cord is then pulled down to the bottom of the box and the box is closed. The cord is then pulled up to the top of the box and the box is closed.



THE POSITION OF THE CORD IN THE BOX ON THE LEFT SIDE

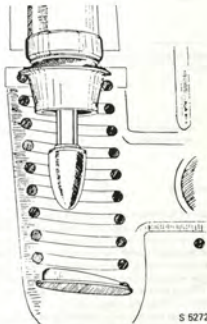
When the cord is in the right position, the box is closed. The cord is then pulled down to the bottom of the box and the box is closed. The cord is then pulled up to the top of the box and the box is closed.

COIL-SPRING SUSPENSION, REAR

REPLACEMENT OF REAR COIL SPRINGS AND/OR RUBBER BUMPERS

Removal

1. Jack up one side of the car, applying the jack under the rear end of the sill.
2. Remove the rear wheel.
3. Unfasten the stop strap at its rear bracket and allow the axle to fall down, thus enabling the spring to be removed without the use of tools. On the Saab 95 first remove the shock absorber link.
4. If the rubber buffer needs changing, unscrew it with a suitable pair of pliers, gripping the steel washer at the thick end.

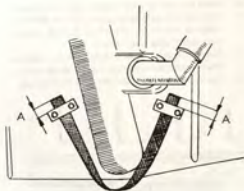


REAR COIL SPRING SEATS AND RUBBER BUMPERS

5. Check the condition of the stop strap to see if a new one is required.

Reassembly

1. If the rubber buffer has been removed, screw a new one in place.
2. Refit the spring. Fit the spring with the unground end facing downwards and turn until it is correctly located in the lower spring seat.
3. If the stop strap has been removed, fix a new one to the front bracket, bearing in mind that the end should project 0.6 in. (15 mm) beyond the bracket.



FITTING THE REAR AXLE STOP STRAPS

A = 0.6 in. (15 mm)

4. Refit the wheel and lower the car.
5. Secure the stop strap at the rear end, again bearing in mind that the end of the strap should project 0.6 in. (15 mm) beyond the bracket.

STOP STRAP

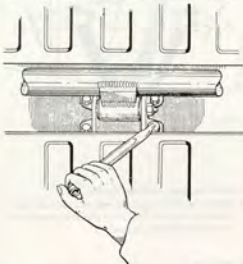
Replacement

When fitting a new rear axle stop strap, make sure that the ends project 0.6 in. (15 mm) beyond the brackets.

REAR AXLE

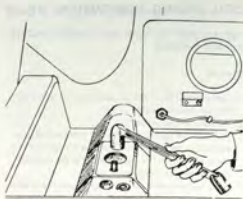
Removal

1. Remove the rear seat and back cushions.
2. Jack up the rear part of the car and remove the wheels.
3. Disconnect the exhaust pipe and rear muffler from the floor and wheel house.
4. Disconnect the brake hoses from the body.
5. Unscrew the rear brackets for the stop straps and remove the coil springs, which can be done without the use of tools.
6. Hand the axle up provisionally in the stop straps.
7. Disconnect the shock absorbers. On the Saab 95, unfasten at the rear axle. On the Saab 96, disconnect at the upper connection.
8. Detach the brake cable clamps from the shaft and the wire connections from the rear brake levers.
9. Disconnect the rear axle bearing from the body.



DISCONNECTING THE REAR AXLE CENTER BEARING BRACKET

10. Unfasten the side link body brackets. The nuts are accessible from inside the car under the rear seat cushion.



NUTS FOR SIDE STAY BODY BRACKET UNDER THE REAR SEAT

11. Unfasten the stop straps again and remove the entire rear axle assembly.

Installation

Clean all parts thoroughly and, after a careful check, renew all worn or damaged parts. Installation is carried out in the reverse order to removal. Bear in mind, however, that the rubber bushed bearings must be fitted in such a way that no stresses are incurred when the car is resting on the wheels, i.e. such bearings must not be tightened at the axle and body brackets until the car has been lowered to the floor and is unladen.

The ends of the stop straps should project 0.6 in. (15 mm) beyond the brackets.

NOTE

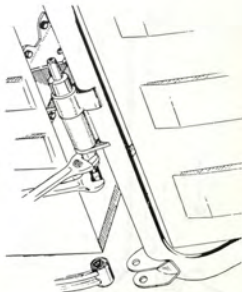
1. Take pains to protect the rubber bushings against contact with rubber solvents such as grease, gasoline, etc.
2. If a rubber bushing has rusted on, it must be rejected, but great care must be taken when removing it to avoid damage to shafts and stays. After removal of the bushing, clean the bearing surfaces with very fine emery cloth.
3. Elastic retaining nuts which have lost their grip after repeated backing off and retightening must be rejected and replaced by new ones.

Center bearing

If the bushing in the center bearing is to be changed, the entire rear axle assembly should be removed. It is, however, possible to change the bushing while the axle remains in place.

Replacement of bushing without removing the rear axle

1. Jack up the rear part of the car.
2. Disconnect the brackets for the rear muffler and exhaust pipe from the wheel house and floor respectively.
3. Back off and remove the bolt through the center bearing.
4. Pull the rear axle down and place an assembly bar across the tunnel between the body and the axle on either side of the center bearing.
5. Remove the rubber bushing with tool 78 40 739.



EXTRACTION AND INSERTION OF CENTER BEARING RUBBER BUSHING WITHOUT REMOVING THE REAR AXLE ASSEMBLY

Tool 78 40 739

6. Drive a new bushing in, using the same tool. Locate the bushing in the center of the bearing.
7. Refit the center bearing, but do not tighten the nut until after the car has been lowered.
8. Refit the rear muffler and exhaust pipe to their brackets on the wheel house and floor respectively.
9. Lower the car.
10. Tighten the nut on the rear axle center bearing bolt.

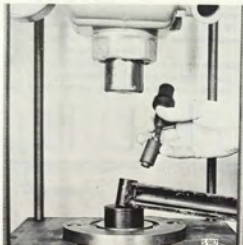
Replacement of bushing on a removed rear axle

Change the bushing with the same tools and in the same manner as described above.

SIDE LINKS

Replacement of rubber bushings

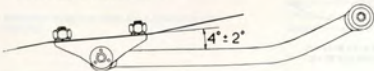
1. Disconnect the links from the brackets on the rear axle.
2. Detach the body brackets from the links.
3. The bushings are best removed by gently heating the link bearing sleeves with a burner flame or other suitable source of heat, whereupon the bushings may be eased off with tool 78 40 762, a special tool which is also used to fit the new bushings.



PRESSING IN RUBBER BUSHINGS

Tool 78 40 762

4. Refit the body brackets to the links, noting that the angle between the link and the bracket should be $4^{\circ} \pm 2^{\circ}$ when the bushing has been tightened.



CORRECT ANGLE BETWEEN SIDE LINK AND BODY BRACKET

5. Refit the links to the rear axle but do not tighten the nuts. These nuts must never be tightened until the car is resting on the wheels. Insert the bolts from the outside towards the center bearing.
6. Lower the car, and tighten the nuts on the side link rear bearing brackets. Check the elastic retaining nuts for fatigue, and fit new ones if necessary.

SHOCK ABSORBERS

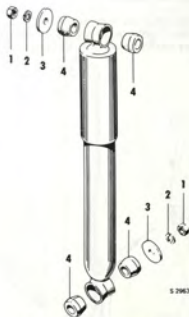
GENERAL

Defective shock absorbers must be rejected, and new ones fitted. This is a matter of the utmost importance, since the shock absorbers have a pronounced effect on the roadability and steering qualities of the car.

FRONT SHOCK ABSORBERS

Removal

1. Jack up the car and remove the wheel.
2. Remove the shock absorbers, collecting the washers and rubber items.



FRONT SHOCK ABSORBERS AND CONNECTING PARTS

1. Nut
2. Spring washer
3. Washer
4. Rubber bushing

NOTE

Before reassembling, provide new rubber items in place of any defective ones.

When a shock absorber is to be refitted, be sure to use only genuine rubber bushings at the upper and lower seats, as the use of wrong parts may give rise to noise. Before a shock absorber is fitted, any air in it must be expelled. To do this, hold the shock absorber in the same position as it has on the car and pump it up and down several full strokes. Now fit the shock absorber to the car immediately — if it is put down, air may re-enter its valve system.

Reassembly

1. Put on the rubber bushings and washers. Refit the shock absorber on the car. Smear the pin threads with grease before screwing on the nuts. Tighten the nuts hard.
2. Refit the wheel and lower the car.

REAR SHOCK ABSORBER, SAAB 95



REAR SHOCK ABSORBER, SAAB 95

Removal

1. Jack up the car and remove the wheel.

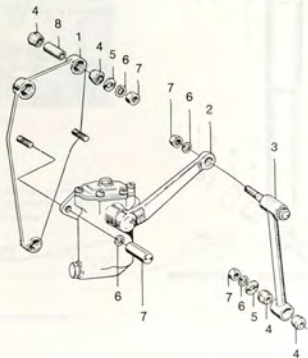
2. Disconnect the shock absorber from the body and the rear axle.
3. Remove the shock absorber, collecting the washers and rubber items.

Reassembly

Fit new rubber items in place of any defective ones. Always use genuine replacement parts. Refit the shock absorber and its connecting parts, smear the pin threads with grease and tighten the nuts hard. The connecting parts belonging to the shock absorber are shown in the figure below.

Topping up shock absorbers

The rear shock absorbers on the Saab 95 must be inspected every 12 000 miles (20 000 km) and topped up as necessary with shock absorber fluid of good quality.



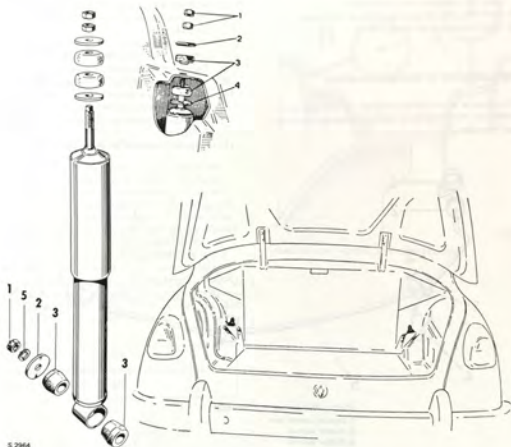
REAR SHOCK ABSORBER WITH CONNECTING PARTS, SAAB 95

- | | |
|------------------------|----------------|
| 1. Bracket | 5. Washer |
| 2. Shock absorber | 6. Lock washer |
| 3. Shock absorber link | 7. Nut |
| 4. Rubber bushing | 8. Spacer tube |

Removal

1. Jack up the car and remove the wheel.
2. Disconnect the shock absorber from its upper and lower brackets.
3. Remove the shock absorber, collecting the washers and rubber items.

Install rubber bushings and washers. Fit the shock absorber. Make sure that the rubber bushings in the upper connection are correctly located, then ease the upper bushing flange into the hole in the body so that the shock absorber is properly centered in the hole. Negligence in this respect may result in noise. Smear the pin threads with grease before screwing on the nuts. Tighten the nuts hard.



REAR SHOCK ABSORBER AND CONNECTING PARTS, SAAB 96

1. Nuts
2. Washer
3. Rubber bushings
4. Washer
5. Spring washer

STABILIZER

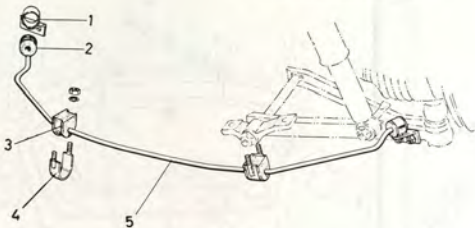
REPLACEMENT

1. Jack up the front part of the car and remove both front wheels.
2. Remove the stabilizer bar by disconnecting its mounting brackets from the body. The nuts are accessible from inside the engine compartment. Detach the bar from both body, end bearings and brackets, then remove the bar towards the right.
3. Pass the new stabilizer bar in from the right and secure it to the body with its bearings.
4. Refit the two end bearings to the control arms.
5. Refit the wheels and lower the car.

REPLACEMENT OF RUBBER BUSHINGS

If renewal of the rubber bushings on the stabilizer bar is called for, this is best done without removing the bar itself from the car.

1. Jack up the front part of the car and remove both front wheels.
2. Back off and remove the two bolts on either side that hold the ball joints and stabilizer bar brackets to the lower control arm.
3. Detach the stabilizer bar brackets from the control arms.
4. Turn the stabilizer bar downwards and remove its two end bearings, in which the rubber bushings are pressed.
5. Back off the nuts and remove one stabilizer bar mounting bracket from the body. These nuts are accessible from inside the engine compartment.
6. Fit a new bushing in the mounting bracket and refit the bracket.
7. Repeat the procedure according to points 5 and 6 above with the opposite mounting bracket.
8. Fit new rubber bushings in both end bearings.
9. Refit the two end bearings on the stabilizer bar.
10. Reconnect the stabilizer bar end bearings and ball joints to the lower control arms and tighten up the bolts. Do not forget the stiffener on the rear of the control arm.
11. Refit the wheels and lower the car.



STABILIZER BAR AND BEARINGS

1. Bracket, control arm
2. Rubber bushing
3. Rubber bushing
4. Bracket, body
5. Stabilizer bar

WHEELS

FITTING OF WHEELS

From the viewpoints of comfort and safety, it is important that the wheels be fitted correctly. The following procedure is recommended:

1. Check the taper and threads of the bolts. Bolts which stick or which are worn should be replaced.
2. Mount the wheel on the hub and tighten the bolts sufficiently to centre the wheel.
3. Tighten the bolts to a torque of 79–98 Nm (8–10 kpm).

N.B.

Pneumatic nut tighteners may be used only in combination with a torque sleeve. Bolts which have been overtightened can damage the wheel and make it impossible for the motorist to remove them in the event of a puncture.

ADJUSTING AND REPAIRING

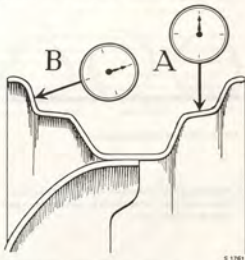
Wheels may be damaged in collisions or if the car runs off the road or is driven on underinflated tires. As the tubeless tires seal direct against the wheel rims, air will leak out if the rim is deformed or otherwise damaged. If a leak occurs due to rim deformation, the tire should be taken off so that the wheel can be inspected and adjusted if necessary. If the rim is rusty at the bead seating, the rust must be removed; this can suitably be done with a steel brush or a pad of steel wool. If rust has pitted the rim, a file should be used. Any minor pits remaining after adjustment should be coated with thick rubber solution; the tire is then coated in the same way and mounted on the wheel before the solution dries.

NOTE

Check before mounting the tire that the rim is not out-of-round or out-of-true.

On a correctly journaled rotating rim, the difference between the highest and lowest point measured at A (see illustration) must not exceed 0.059 in. (1.5 mm), as from model 1976 0.047 in. (1.2 mm). The side throw B (see illustration) should be measured in the same way and must not exceed 0.059 in. (1.5 mm), as from model 1976 0.047 in. (1.2 mm).

When these measurements are made, the rim should be mounted in the usual way, either on a wheel hub or in a special apparatus, so that the rim can be rotated.



MEASUREMENT POINTS ON THE WHEEL RIM

TIRES

MAINTENANCE

The working life of a tire depends very much on the care it receives and the conditions under which it has to work. Some of the factors affecting tire wear are listed below.

1. Inflation pressure. It is important to maintain the correct inflation pressure and to adjust the pressure according to load. For correct tire pressures, see group O.



Correct Overinflated Underinflated

TREAD CONTACT WITH ROADWAY

2. Wheel balancing is necessary to avoid vibration and consequent wear. Wheels must be balanced both statically and dynamically.

3. Wheel alignment. Faulty alignment of the wheels can cause heavy wear on the tires.
4. Speed. Tire mileage diminishes sharply with rising speed, mainly due to the greater friction heat generated.
5. Engine power. Powerful engines give rapid acceleration and high speed, which in turn demand powerful brakes. This contributes to faster wear on the tires.
6. Road surface. Dry roads offering a good grip for the tires cause a great deal of wear.
7. Manner of driving. The temperament of the driver may weigh more heavily than any other factor. If the acceleration and braking resources of the car are regularly utilized to the limit, this will quickly wear down the tires.

A statically balanced wheel should be able to come to rest in any position when suspended and free to rotate.

A dynamically balanced wheel should rotate in a plane perpendicular to the axis of rotation, i.e. it should have no tendency to skew during rotation.

The balancing operation should not be performed on new wheels, but only after some 600–900 miles (1 000–1 500 km) motoring; this is to give the tire time to “shake down” on the rim.

Wheels need rebalancing after long mileage because tire wear alters the distribution of weight.

NOTE

When a wheel spinner is used, the speedometer reading must not exceed 40 mph (70 km/h).

HUBS

GENERAL

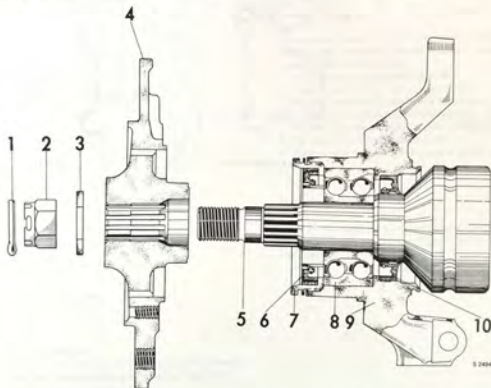
The hub and brake drum on the rear wheels are made as an integral casting, while the front wheels feature a special hub.

After considerable mileage, especially if lubrication has not been satisfactory, the wheel bearings may become worn and play will develop. Since this has a highly detrimental effect on the steering characteristics, the bearings must be renewed. Bearing play is easily checked if the car is jacked up. Hold the wheel at top and bottom and try to wiggle it: this will immediately reveal any unwanted play. If the play, measured at the edge of the rim, exceeds 0.08 in. (2 mm), the bearing must be changed. Do not subject the bearings to blows under any circumstances, since such treatment could easily damage them. In addition to the tools mentioned in the instructions, an arbor press will be needed for removal and installation of wheel bearings.

FRONT WHEEL HUB

The front wheel hub is splined to the outer drive shaft and secured by means of a castle nut and cotter pin. The sliding surface on the inside of the hub must be well protected against scratches and blow marks when the hub is removed. It must seal properly against the shaft seal, and its rounded edge towards the end face must also be protected. If the sliding surface is scratched or otherwise damaged it must be trimmed and polished. This job should be done in a lathe, but great pains must be taken to avoid appreciable reduction of the diameter of the sliding surface.

Due attention of these precautionary measures is of the utmost importance, as neglect in this respect results in rapid wear of the shaft seal: grease from the ball bearings may enter the wheel hub and be carried to the brake drum where it will ruin the brake linings. Instructions for replacement of front wheel bearings and seal are given in group 6.

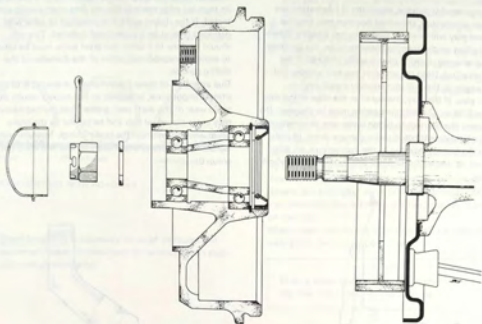


FRONT WHEEL HUB

- | | |
|----------------|-----------------------------|
| 1. Cotter pin | 6. Shaft seal |
| 2. Castle nut | 7. Nut |
| 3. Washer | 8. Ball bearing |
| 4. Hub | 9. Steering knuckle housing |
| 5. Drive shaft | 10. Sealing ring |

REAR WHEEL HUB

Ball bearings are fitted in the rear wheel hubs. These, together with the shaft seal, accompany the hub when it is removed.

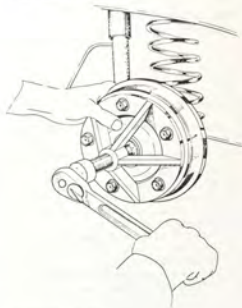


REAR WHEEL HUB

S 2495

REMOVAL

1. Before starting work, make sure that the car is thoroughly cleaned under the fenders. Scrape off all dirt that might loosen and enter the bearings.
2. Remove the hub cap and back off the wheel bolts.
3. When the rear hub is involved, remove the dust cap, followed by the cotter pin, the castle nut and the washer.
4. Jack up the front or rear part of the car, as appropriate.
5. Take off the wheel.
6. If dealing with the rear wheel hub, check that the handbrake is released and back off the brake adjusting bolts. Remove the brake housing and hang it on the wheel housing in such a way that the brake hose not be damaged. Remove the cotter pin, crown nut and washer. Apply the hub puller — and secure it with the ordinary wheels bolts.



HUB PULLER, 78 40 028

7. Pull off the hub.
8. Prevent sand and other foreign matter from entering the hub seals and bearings by covering these items over with clean clothes.

INSTALLATION

Clean the hub thoroughly and make sure that there is no dirt in the shaft seal.

1. Before installing, grease the tongue and sliding surface of the shaft seal.
2. Fit the hub on the shaft. Put on the washer and tighten the castle nut using a torque of 180 Nm (130 ft.-lb., 18 kpm) for the front hub and 90 Nm (68 ft.-lb., 9.0 kpm) for the rear hub, on front wheel hubs: refit the brake housing.
3. Secure the castle nut with the cotter pin. Refit the wheel and the hub cap.

REPLACEMENT OF BALL BEARING IN REAR WHEEL HUB

Changing the front wheel bearings, see group 6.

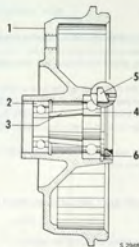
REMOVAL

Before starting work, make sure that the car is thoroughly cleaned under the fenders. Scrape off all dirt that might loosen and enter the bearings.

1. Jack up the car and remove the wheel.
2. Remove the dust cap, using a screwdriver.
3. Remove the cotter pin, castle nut and washer.
4. Check that the handbrake is fully released.
5. Pull off the brake drum, using puller 78 40 028.
6. Remove the shaft seal and the circlip.
7. From outside the brake drum, press out both bearings.

INSTALLATION

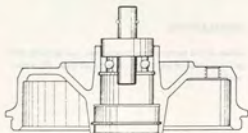
Clean all the components thoroughly, and provide new parts in place of any worn or damaged ones. Fit a new shaft seal.



COMPONENTS OF REAR WHEEL BEARINGS

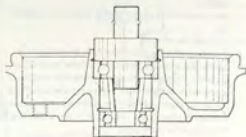
1. Brake drum
2. Outer bearing
3. Spacer sleeve
4. Inner bearing
5. Lock ring
6. Sealing ring

1. Pack the ball bearings with Saab Special Chassis Grease. See section 120, "Lubrication".
2. Press in the small bearing 0.5 in. (12 mm) from the edge, using tool 78 40 333.



PRESSING IN THE SMALL BEARING
Tool 78 40 333

3. Turn the hub over and fill the brake drum with enough Saab Special Chassis Grease to occupy about half the space between the bearings. Note! If too much grease is applied, it may ooze out and ruin the brake linings.
4. Insert the spacer sleeve and press in the big bearing, using tool 78 40 325.



PRESSING IN THE BIG BEARING
Tool 78 40 325

5. Refit the circlip.

NOTE

The circlip is of a special type and must always be mounted as shown in the figure.

6. Fit a new shaft seal.
7. Check that the axle stub sliding surface for the seal is flawless. If damaged, adjust it and polish with a very fine emery cloth. Grease the sliding surface with Saab Special Chassis Grease.
8. Refit the brake drum and tighten the castle nut with a torque of 90 Nm (65 ft.-lb., 9 kpm). Secure with the cotter pin.
9. Refit the dust cap, using tool 78 40 366.
10. Refit the wheel and lower the car.

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GENERAL

The car has a body of unit construction. Fenders, doors, hood and luggage compartment lid are removable. The body is composed of a relatively small number of pressed steel parts which are joined together by spot welded or tackwelded overlapping seams. In addition, all vital junctions are solid welded.

The Saab 95 differs from the Saab 96 in that the rear end and the roof are different.

The roof panel is a single pressed steel part, extending from the dash panel to the leading edge of the luggage compartment lid. Pressed reinforcement frames are fitted round the windshield and rear window. Tubular reinforcement is provided in the windshield pillars, while steel-section roof rails add rigidity to the sides of the roof.

The cowl section of the roof panel terminates in front of the windshield with a vertical reinforcement panel which, together with the dash panel and the windshield reinforcement frame, forms a closed compartment. The space thus enclosed serves as a collecting chamber for ventilation air, which flows in through the opening in the upper side of the chamber and which can be admitted to the car either through a flap on the right hand side of the dash panel or through the fresh-air heater.

The floor consists of a single smooth panel, with longitudinal channels affording the necessary stiffening. At the sides, rigidity is provided by the sills, to which the jack supports are welded. At the front, the center floor adjoins the dash panel, and at the rear the rear axle tunnel. The engine compartment floor pan is joined to the center floor at the dash panel, and the luggage compartment floor pan behind the rear axle tunnel.

The wheel house walls are of pressed steel, channeled for reinforcement. The two front wheel houses are pierced for the control arms and tie-rods, as well as to allow evacuation of the current of air passing through the radiator. Some of the air outlets are fitted with gills. The brackets for the front control arms are welded to the inside of the wheel house walls and to the engine compartment floor. One of the rear wheel house walls is pierced for the fuel filler pipe, the other being fitted with a bracket for fitting the rear muffler. The upper spring seats and shock absorber brackets are welded to the wheel houses at both front and rear.

The luggage compartment of the Saab 96 comprises the rear most part of the body and is limited at the front end by the removable back cushion of the rear seat. The compartment floor consists of a sheet of plywood, divided into two parts, under which the fuel tank and spare wheel are housed. The luggage compartment lid is carried on two hinges and fitted with a counterbalanced check device.

BODY INSULATION

Passenger and rear compartments are internally insulated with waffle pattern paperboard.

A layer of insulation compound has also been sprayed on the underside of the body assembly and inside the wheel houses. This compound affords protection against flying stones and corrosion, besides having certain sound absorbing properties. When cleaning the car, never scrape the inside of the wheel houses.

BODY FITMENTS

The interior fitments of the car comprise chairs and seats and door and side linings retained by quick-release spring clips, headlining and mats.

The headlining in the Saab 95 is stretched on pianowire bows and retained by wire spirals in the roof rails. Because of the simplicity of the retaining devices, all parts are easy to remove. Saab 96 is equipped with a headlining that is wrapped round the upper edges of the frames for the windshield-, side- and rear window frames fastened with tape carrying adhesive on both sides.

The door linings are retained with quick-release spring clips at the lower and rear edges. At the leading edge, the trimming is secured by a U-shaped bar, while at the upper edge there is a protective strip, also secured with quick-release springs.

Proteins and amino acids are the building blocks of the body. They are used to build and repair tissues, and to produce energy. The body uses amino acids to build and repair tissues, and to produce energy. The body uses amino acids to build and repair tissues, and to produce energy. The body uses amino acids to build and repair tissues, and to produce energy.

BODY FITNESS

The fitness of the body is determined by the amount of energy it can produce and use. The body uses energy to build and repair tissues, and to produce energy. The body uses energy to build and repair tissues, and to produce energy. The body uses energy to build and repair tissues, and to produce energy. The body uses energy to build and repair tissues, and to produce energy.

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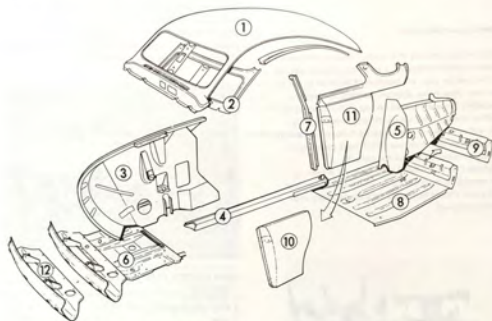
The body uses energy to build and repair tissues, and to produce energy. The body uses energy to build and repair tissues, and to produce energy. The body uses energy to build and repair tissues, and to produce energy. The body uses energy to build and repair tissues, and to produce energy. The body uses energy to build and repair tissues, and to produce energy. The body uses energy to build and repair tissues, and to produce energy.

BODY ASSEMBLY

GENERAL

Any parts of the body assembly that have been so seriously damaged as the result of a collision or other acci-

dent that correction by beating or realigning is not suitable should be replaced by new ones. In many cases, even minor damage may be more quickly and cheaply repaired, and with better results, if the affected parts are replaced rather than repaired.



BODY ASSEMBLY COMPONENTS AVAILABLE AS SPARE PARTS

- | | |
|------------------------------|--------------------------------|
| 1. Roof sheet, water channel | 7. Rear pillar |
| 2. Windshield frame | 8. Floor sheet, rear floor |
| 3. Front wheelhouse | 9. Rear part |
| 4. Sill | 10. External valance, lower |
| 5. Rear wheel house | 11. External valance, complete |
| 6. Front floor | 12. Front sheet |

ALIGNMENT JIG FOR ACCIDENT DAMAGED BODIES

An alignment jig with trueing-up tools and accessories to fit both Saab 95/96 and Saab 99 cars has been designed to facilitate the repair of car bodies damaged in road accidents. There are two types of aligning jigs, one earlier version and one later and more up-to-date version.

Alignment jig, earlier version

The alignment jig consists of a rigidly constructed frame with plane surfaces containing a series of precision drilled holes. Fixtures for accurate location of body parts can be screwed into these holes. Special checking fixtures are also provided; these are placed on top of the locating fixtures. When the car is set up on the alignment jig, it is possible with the help of the checking fixtures to measure any deformation of the chassis attachment points without having to remove parts of the chassis.

The alignment jig is provided with a pair of wheels to make it mobile. It need not be secured to the floor, but when in use it should be placed on a level surface with the wheels removed.



ALIGNMENT JIG, EARLIER VERSION

Draw aligner, earlier version

The draw aligner is used to straighten out deformed portions of the car body. It consists of a lever which is secured at the bottom by a chain to two of the legs of the alignment jig. A hydraulic pressure cylinder is attached to the middle of the lever, and a draw chain is attached to the top. This arrangement makes the tool compact and easily portable, and also allows the direction of pull to be varied within very wide limits. The draw aligner doesn't need to be anchored to the floor.

Before the trueing-up tool is used it is mounted on the alignment jig in the following manner:



DRAW ALIGNER, EARLIER VERSION

1. Draw chain
2. Anchor chain
3. Pressure cylinder
4. Lever
5. Pressure beam
6. Hand pump

1. Select the desired direction of pull, first laterally by positioning the draw aligner accordingly, and then vertically by attaching the draw chain at a suitable height on the lever.
2. Secure the draw aligner to the alignment jig by fastening both ends of the anchor chain to two of the legs of the jig in such a way that tension will be applied to both halves of the chain.
3. Place the pressure cylinder against the pressure beam and alignment jig, first locating it laterally with respect to the jig so that the cylinder comes just about vertically below the draw chain. Then adjust the vertical position of the cylinder on the lever so that the lines of the draw chain and pressure cylinder, if ex-

tended, will intersect at the same point on the floor or will be almost parallel.

4. Adjust chain lengths as necessary, prize apart the quick-release extension of the pressure cylinder, and wrap the safety chain one turn around the beam of the alignment jig.

Application of draw aligner, earlier version, principle

The draw chain and hydraulic cylinder must be placed so that the extended lines drawn through them intersect at the same point on the floor or are nearly parallel. There are then no free forces tending to lift the tool or the alignment jig.



APPLICATION OF DRAW ALIGNER

S 4212

Hoisting gear, etc. for alignment jig, earlier version

Before the alignment jig can be used, the car body or complete car must be lifted on to it. The best method is to use a fork lift trolley or overhead traveling crane. If these are not available, the job can be done with a high lift garage jack and a mobile collapsible trestle set consisting of four legs on wheels and two cross-pieces. The trestles can also be used for assembly and disassembly work on chassis, etc. and for blocking up and moving cars with the wheels off.

The procedure for mounting the car body on the jig is as follows:

Place the cross piece on the jack and then push the latter under the car from the side at the rear edge of the threshold. Raise the rear of the car so that the legs can be fitted to the cross piece. Then repeat the same procedure at the front. The car can then be maneuvered over the jig with the trestle legs straddling the jig and lowered into position with the jack.

A suitable bench or platform about 1 1/2–2 ft. (450–600 mm) high should be available for work on the roof of the car or upper parts of the body.

Alignment jig, later version

The alignment jig of the later version has the same clamp sets as the earlier jig, but is lower, providing a more favorable working height and simplifying mounting. The draw aligner is secured directly to the jig, which makes it easier to work with.

The jig is mounted on four castors and is designed to stand on these even during the aligning work.



ALIGNMENT JIG, LATER VERSION

mounted on castors and can be secured at any point round the frame of the jig. It is secured to the jig by means of a forked bracket and a locking pin. It is of the utmost importance that this always be locked securely during operation of the draw aligner.



DRAW ALIGNER, LATER VERSION

Draw aligner, later version

The Caroline draw aligner, in a version designed specially for this alignment jig, is equipped with a hydraulic cylinder which can apply a load of ten tons. The draw aligner is



DRAW ALIGNER, LATER VERSION



LOADS MAY BE APPLIED IN AN UPWARD DIRECTION BY MEANS OF AN ADDITIONAL HYDRAULIC CYLINDER AND AN EXTENSION PIECE

Equipment, later design



SIDE SUPPORT



SIDE MOUNTING FOR USE WITH A 4-TON HYDRAULIC CYLINDER



SIDE MOUNTING USED FOR APPLICATION OF DOWNWARD LOAD



EXTENSION PIECE MOUNTED TO DRAW-ALIGNER ARM FOR THE APPLICATION OF LOADS AT ROOF HEIGHT



ALIGNMENT JIG WITH EQUIPMENT

1. Alignment jig, later design
2. Wheels
3. Side support
4. Draw aligner
5. Extension
6. Support set, Saab 99 (also for alignment jig of earlier design)
7. Support set, Saab 95 L, 96 L (also for alignment jig of earlier design)

Mounting the car in the jig

The simplest method of mounting the car in the jig is to use a side car lifting ramp with one or two pillars.



MOUNTING THE CAR IN THE JIG

The car can also be mounted in the jig by hoisting it onto high trestles by means of a high-lift jack, and then rolling the jig in under the car. A side lifting ramp should then be used to lift the car onto the jig mountings.



LIFT WITH TRESTLES AND JACK

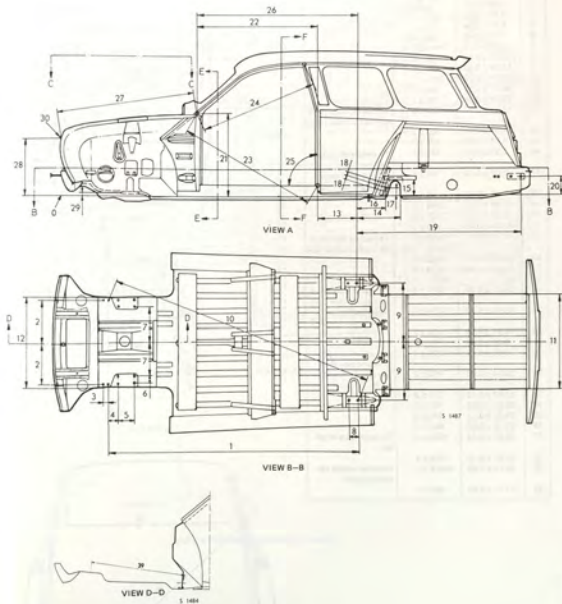
Description of alignment jig and draw aligner

A description of the alignment jig and accessories and draw aligner is available and can be ordered from Saab-Scania in Nyköping under the ordering number 101733.

CHECKING BODY DIMENSIONS

If any part of the body has had to be renewed or straightened, it is important to check the measurements of the

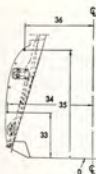
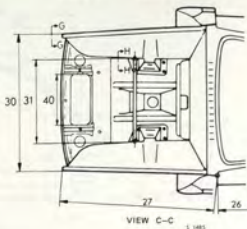
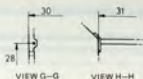
door openings and the attachment points of the suspension and power unit. Diagonal measurements should also be made to check that there is no residual skew or asymmetry after repairs.



BASIC BODY MEASUREMENTS, SAAB 95

Body measurements, Saab 95

| Item | in. | mm | Remarks |
|------|--------------|-------------|--|
| 0 | — | — | Underside of sill |
| 1 | 84.17 ± 0.08 | 2138 ± 2 | |
| 2 | 13.66 ± 0.04 | 347 ± 1 | |
| 3 | 1.50 ± 0.02 | 38 ± 0.5 | |
| 4 | 3.33 ± 0.06 | 84.5 ± 1.5 | |
| 5 | 8.27 ± 0.04 | 210 ± 1 | |
| 6 | 3.90 ± 0.02 | 99 ± 0.5 | |
| 7 | 9.82 ± 0.06 | 249.5 ± 1.5 | |
| 8 | 3.94 ± 0.02 | 100 ± 0.5 | |
| 9 | 19.09 ± 0.06 | 485 ± 1.5 | |
| 10 | 90.31 ± 0.12 | 2294 ± 3 | |
| 11 | 30.87 ± 0.12 | 784 ± 3 | |
| 12 | 28.74 ± 0.08 | 730 ± 2 | |
| 13 | 12.87 ± 0.12 | 327 ± 3 | To leading edge of pillar reinforcement tube |
| 14 | 14.37 ± 0.12 | 365 ± 3 | |
| 15 | 5.47 ± 0.12 | 139 ± 3 | |
| 16 | 9.33 ± 0.04 | 237 ± 1 | To middle of center bearing |
| 17 | 2.09 ± 0.12 | 53 ± 3 | To middle of center bearing |
| 18 | 1.18 ± 0.02 | 30 ± 0.5 | |
| 19 | 52.95 ± 0.16 | 1345 ± 4 | |
| 20 | 6.34 ± 0.16 | 161 ± 4 | |
| 21 | 27.80 ± 0.12 | 706 ± 3 | |
| 22 | 41.34 ± 0.12 | 1050 ± 3 | To leading edge of pillar reinforcement tube |
| 23 | 47.52 ± 0.16 | 1207 ± 4 | |
| 24 | 40.28 ± 0.16 | 1023 ± 4 | |
| 25 | 90° | 90° | |
| 26 | 54.21 ± 0.20 | 1377 ± 5 | Tongue of dash panel, elev. A and plan C—C |
| 27 | 49.45 ± 0.12 | 1256 ± 3 | Measured parallel to wheelhouse. See C—C |
| 28 | 16.54 ± 0.08 | 420 ± 2 | |
| 29 | 0.98 ± 0.08 | 25 ± 2 | |
| 30 | 42.68 ± 0.08 | 1084 ± 2 | See elev. A and plan C—C and plan G—G |
| 31 | 28.74 ± 0.08 | 730 ± 2 | See plan C—C and H—H |
| 33 | 10.67 ± 0.12 | 271 ± 3 | |
| 34 | 29.92 ± 0.08 | 760 ± 2 | |
| 35 | 25.31 ± 0.12 | 643 ± 3 | |
| 36 | 26.10 ± 0.08 | 663 ± 2 | |
| 37 | 39.61 ± 0.12 | 1006 ± 3 | To upper edge of pillar |
| 38 | 59.21 ± 0.16 | 1504 ± 4 | |
| 39 | 26.24 ± 0.08 | 666.5 ± 2 | Holes for engine suspension pads |
| 40 | 17.71 ± 0.04 | 450 ± 1 | |

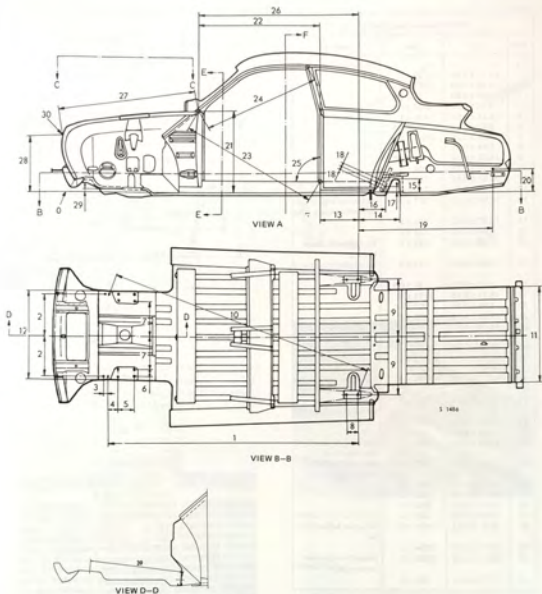


VIEW E-E



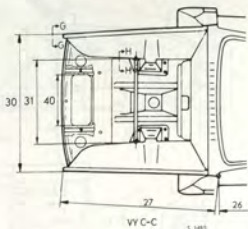
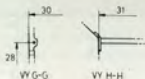
VIEW F-F

S 811

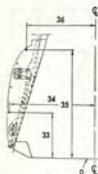


BASIC BODY MEASUREMENTS, SAAB 90

| Body measurements, Saab 96 | | | |
|----------------------------|--------------|-------------|--|
| Item | in. | mm | Remarks |
| 0 | — | — | Underside of sill |
| 1 | 84.17 ± 0.08 | 2138 ± 2 | |
| 2 | 13.66 ± 0.04 | 347 ± 1 | |
| 3 | 1.50 ± 0.02 | 38 ± 0.5 | |
| 4 | 3.33 ± 0.06 | 84.5 ± 1.5 | |
| 5 | 8.27 ± 0.04 | 210 ± 1 | |
| 6 | 3.90 ± 0.02 | 99 ± 0.5 | |
| 7 | 9.82 ± 0.06 | 249.5 ± 1.5 | |
| 8 | 3.94 ± 0.02 | 100 ± 0.5 | |
| 9 | 19.09 ± 0.06 | 485 ± 1.5 | |
| 10 | 90.31 ± 0.12 | 2294 ± 3 | |
| 11 | 30.87 ± 0.12 | 784 ± 3 | |
| 12 | 28.74 ± 0.08 | 730 ± 2 | |
| 13 | 12.87 ± 0.12 | 327 ± 3 | To leading edge of pillar reinforcement tube |
| 14 | 14.37 ± 0.12 | 365 ± 3 | |
| 15 | 5.47 ± 0.12 | 139 ± 3 | |
| 16 | 9.33 ± 0.04 | 237 ± 1 | To middle of center bearing |
| 17 | 2.09 ± 0.12 | 53 ± 3 | To middle of center bearing |
| 18 | 1.18 ± 0.02 | 30 ± 0.5 | |
| 19 | 45.71 ± 0.16 | 1161 ± 4 | |
| 20 | 7.99 ± 0.16 | 203 ± 4 | |
| 21 | 27.80 ± 0.12 | 706 ± 3 | |
| 22 | 41.34 ± 0.12 | 1050 ± 3 | To leading edge of pillar reinforcement tube |
| 23 | 47.52 ± 0.16 | 1207 ± 4 | |
| 24 | 40.28 ± 0.16 | 1023 ± 4 | |
| 25 | 90° | 90° | |
| 26 | 54.21 ± 0.20 | 1377 ± 5 | Tongue of cowl plate view A and C—C |
| 27 | 49.45 ± 0.12 | 1256 ± 3 | Measured parallel to wheelhouse. See C—C |
| 28 | 16.54 ± 0.08 | 420 ± 2 | |
| 29 | 0.98 ± 0.08 | 25 ± 2 | |
| 30 | 42.68 ± 0.08 | 1084 ± 2 | See view A, view C—C and view G—G |
| 31 | 28.74 ± 0.08 | 730 ± 2 | See view C—C and view H—H |
| 33 | 10.67 ± 0.12 | 271 ± 3 | |
| 34 | 29.92 ± 0.08 | 760 ± 2 | |
| 35 | 25.31 ± 0.12 | 643 ± 3 | |
| 36 | 26.10 ± 0.08 | 663 ± 2 | |
| 37 | 39.61 ± 0.12 | 1006 ± 3 | To upper edge of pillar |
| 38 | 59.21 ± 0.16 | 1504 ± 4 | |
| 39 | 26.24 ± 0.08 | 666.5 ± 2 | Holes for engine suspension pads |
| 40 | 17.71 ± 0.04 | 450 ± 1 | |



S 1485



VV E-E

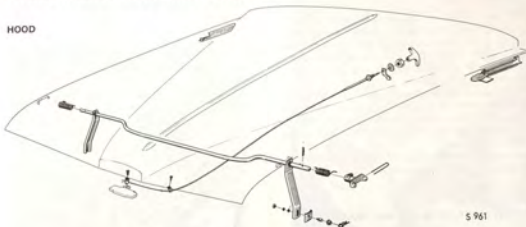


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S 811

HOOD, FRONT PANEL AND FENDERS

HOOD



HOOD WITH ATTACHMENT COMPONENTS

Removal

1. Open the hood with the control mechanism under the instrument panel. The hood then opens half-way. To open the hood wide, move the latch at its rear edge forwards and lift the hood forwards.



HOOD CATCH



REMOVAL OF HOOD

Installation

1. Lift up the hood and hold it upright beneath the front panel.
 2. Press the hinge stays inwards and slide the pins into the bearings.
 3. Fit locking needles, if the pins already had such ones.
 4. Close the hood.
2. Remove the locking needles of the pivot pins, then press one of the hinge stays slightly inwards to free the pin. The assistant holding the hood on the other side helps to lift it off.

Hood lock

The hood is fitted with a locking pin, longitudinally adjustable by means of two nuts. This adjustment can be used to obtain the wanted amount of tension on the hood in the locked position. The lock can be centered in relation to the pin in the hood by slackening the two retaining screws in the front panel.

If the hood control should be damaged so that the hood cannot be opened from inside the car, proceed as follows. Pass a screwdriver through the grille immediately under the lock and press the control arm to the right. The hood can now be opened.

As from model 1976, a stay is introduced, by which the hood be kept in the open position.

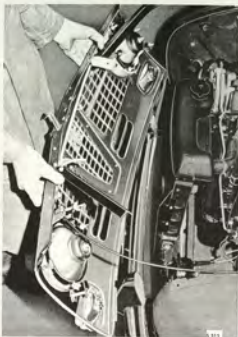
FRONT PLATE, UP TO AND INCL. MODEL 1968

To remove the front panel, back off and remove the two screws on either side and the screws for the radiator supports and wheel housing brackets.



REMOVAL OF SCREWS, FRONT PANEL

Disconnect the hood control and the cable connections for the headlights and direction indicators/and parking lights.



REMOVAL OF FRONT PANEL

Headlight shells

The headlight shells are incorporated in the front panel which is pressed in a special fashion in order to accommodate them. When replacing the front panel or shells, the parts must be drilled and riveted to each other.

Grille

The grille is attached to the front panel by means of six bolts which are screwed directly into the grille panel and are accessible from inside the front panel.

FRONT PLATE, MODEL 1969-1970

Decor frames, headlights

The decor frame is attached to the front plate as follows: Two pins in the lateral part of the decor frame are pressed into the rubber bushings in the outer ends of the front plate, and a selftapping screw is inserted through the opposite side of the decor frame.

At removal, loosen the self tapping screw, then pull the frame out.

Front plate

The front plate has, at its lower part, three pins which are attached to brackets on the front member. Between pins and brackets, there are rubber spacers. Inside each decor frame, there is a screw and a clamp, which retain the front plate to the wheel housing.

At its upper edge, the front plate is attached to each fender and wheel housing stay with a screw. At removal, first loosen the decor frames, and the screws retaining the front plate. Then loosen the hood lock control from the dash panel and the wheel housing stay. Loosen the connectors from the headlights. Move the front plate forward, and lift it out of the brackets.



REMOVAL OF SCREWS, FRONT PANEL



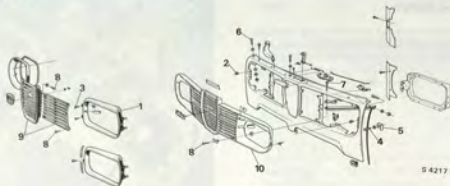
REMOVAL OF FRONT PANEL

Installation is made in the corresponding way.

Grille

The grille consists of three parts, attached to the front plate with self tapping screws. All the screws are within easy reach from the front.

FRONT PLATE WITH HEADLIGHT WIPERS, AS FROM MODEL 1971



FRONT PLATE WITH GRILL

- | | |
|--|---|
| 1. Decor frame, up to and incl. model 1973 | 6. Fixing screw, fender |
| 2. Rubber bushings | 7. Fixing screw, wheel housing stay |
| 3. Self tapping screw, decor frame | 8. Self tapping screws for grille plate |
| 4. Fixing screw for front plate | 9. Grille, up to and incl. model 1973 |
| 5. Clamp | 10. Grille, as from model 1974 |

Disassembly and installation

1. To remove the front plate first loosen the decor frames. Loose the headlight washer hoses from the jets and the cable connections from the headlights. Unscrew the front plate retaining screws. Loosen the radiator stays from the body, the radiator suspension straps and the hood lock control wire.
2. Unscrew the lower screw for the expansion tank bracket a few turns and fold the bracket rearwards so that the wiper motor goes free. Remove the cables from the wiper motor. Note the cable connections.
3. Move the front plate forwards and lift it out of the brackets.

Installation is made in the reverse order. See to it that the rubber strips in the ends of the front plate are fitted and that the plate is correctly positioned in the guides.

Grille

The grille consists of three parts, attached to the front. On cars up to and incl. model 1973, the grille is divided into three parts. As from model 1974, the grille is moulded in plastic in one piece which also encloses the headlights. The grille is fixed to the front sheet by means of self tapping screws, all of which are easily accessible from the front.



REMOVING THE GRILLE

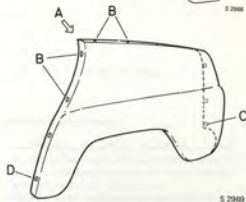
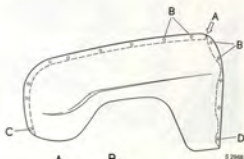
FENDERS

After considerable mileage, especially on gravel roads, the underbody coating may be worn away at exposed points, and should therefore be examined at regular intervals and touched up as required. The rear fenders are particularly exposed to the effects of flying gravel and stones.

Removal

When removing the rear left fender, plug the fuel filler pipe with a piece of clean linen rag to prevent dirt from entering the fuel tank during the course of the work, when the cap is removed.

1. Take off the wheel.
2. Back off and remove the fender retaining screws, starting at C and D.
3. Disconnect the electrical cables as necessary, and then back off and remove the screws at B.
4. Release and remove the fender, collecting the tadpole sealing bead.



DISASSEMBLY AND REASSEMBLY OF FENDERS

Installation

After having treated the fender with underbody coating and refitted the moldings, lights and possible rubber grommet (left rear fender), reinstall as follows:

1. Locate the fender and tadpole sealing bead in position and insert screws B and C.
2. Align corner A and tighten screws B and C enough to retain the fender firmly while permitting further alignment if necessary.
3. Insert the remaining screws.
4. Check the fender alignment and tighten all the screws finally, but not so hard as to buckle the fender panel at the tadpole sealing bead.
5. Reconnect cables, as applicable, and refit the cable sleeves. Pass the filler pipe through the rubber grommet and screw on the filler cap after removing the linen rag or similar plugging material. Tighten the clamps, if previously slackened.
6. Cut off surplus sealing bead below the fender and refit the wheel.

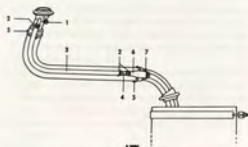
The clearance between the front fender and the door can be adjusted by removing the fender and hammering the vertical panel to which the fender is attached forwards or rearwards as necessary.

Left rear fender

As from model 1970 the fuel filler tube opening in the left rear fender is located lower down than in earlier models. Only the new type of rear fender is available for replacements. A new filler tube has therefore been produced for Saab 95 up to and incl. chassis No. 95.010.115, while for other cars up to and incl. model 1969 an adapter set has been made up containing parts for the new filler tube that are needed to be able to fit fenders of the new type to older cars. Where replacements for the old type of fender are needed, you should order the new fender plus the appropriate adapter set. For Saab 95 up to and incl. chassis No. 95.010.115 order only the new filler tube.

Installation

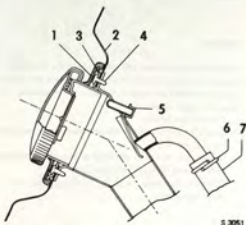
1. Remove the old fender. Clean the wheel housing to prevent dirt from entering the fuel tank.
2. Remove the filler tube and connecting hose. Leave the vent tube connecting hose in place on the vent tube of the tank.
3. Fit a plastic plug into the small vent tube of the new filler tube. Connect the filler hose between the fuel tank and filler tube, using the existing hose clamps. Fit the vent tube and connecting tube.



CONNECTING FILLER TUBE TO FUEL TANK

1. Plastic plug
2. Hose clamp
3. Vent hose
4. Connecting tube
5. Hose clamp
6. Connecting hose
7. Hose clamp

4. Mount the fender. Spread a string of sealant between the filler tube flange and the fender, and tighten the flange and holder with the four self tapping screws. Fit the filler cap.
NOTE! Use only the old type of filler cap (with ventilation).



CONNECTING FILLER TUBE TO REAR FENDER

1. Sealing collar
2. Fender
3. Holder
4. Philips screw
5. Plastic plug
6. Hose clamp
7. Vent hose

DOORS AND LIDS

DOORS

Removal

1. Remove the interior door trim.
2. Release the door stop by driving out the pin at the upper hinge.
3. Let the door rest on a suitable support or suspend it in a suitable way in order to relieve the hinges of its weight.
4. Bend back the locking tabs for the externally sited nuts.
5. Back off the two nuts, accessible from inside the door, and remove the door.

NOTE

Be careful not to damage the outside of the door with the tools used to release the nuts.



REMOVAL OF DOOR

6. Remove the hinges from the body.

Installation and adjustment

1. Refit the hinges to the body, of previously removed. Also fit the inner locking nuts on the hinge pivot pins.
2. Block up or suspend the door in the correct position and pass it onto the hinge pivot pins.
3. Refit the washers and hinge nuts inside the door.
4. Check carefully to see if the door fits properly into the opening.

NOTE

Be careful not to damage the front fender when opening the door without the door stop being fitted.

5. Adjust the door in the longitudinal direction of the car by advancing or backing off the nuts a little at a time. To adjust the vertical position of the door, move it up or down in the elongated holes after loosening the nuts slightly.
6. When the door is correctly positioned and fits snugly against the weather strips, tighten the nuts and secure with the locking tabs.
7. Refit the door stop pin and the interior trim.

Window regulator

Removal and installation

1. Remove the door trim.
2. Back off the four nuts accessible through the hole in the toothed segment of the window regulator, holding the window pane in position meanwhile. The screws can then be removed.
3. Release the control arm pin from the retainer groove and remove the window regulator.



REMOVAL OF WINDOW REGULATOR

To reinstall the window regulator, proceed in the reverse order to that given above.

Door lock

Replacement

1. Close the door window.
2. Remove the interior door trim.
3. Unscrew the inner door handle remote control retainer. Note the return spring on cars as from model 1969.
4. Back off and remove door lock retaining screws, and unscrew the button used to lock the door.
5. Release and remove the lock. Note that locks as from model 1968 must be in "closed" position when removed.



REMOVAL OF DOOR LOCK

6. If necessary, the outside door handle can be removed by backing off and removing the two retaining screws, one inside and one on the back of the door.

To reinstall the door handle and door lock, proceed in the reverse order to that given above. Before refitting, check that the moving parts of the lock, and the lock springs, are well lubricated with Saab Special Chassis Grease.

Check with the button of the outside handle pushed in that there is a play of about 0.04" (1 mm) when the door is closed. If the play is less than this, adjust as follows:

- a. Cars up to and incl. model 1971: File down the part of the push button arm that actuates the door lock.
- b. Cars as from model 1972: Bend the outer part of the push button arm.

After refitting the door, adjust the striker plate so that the door opens and closes easily.

Door striker plate

Adjustment

The striker plate is adjustable and can be moved if the screws are slackened. Adjust the striker plate so that the door opens and closes easily without being forced up or down by the location of the plate.



ADJUSTMENT OF DOOR STRIKER PLATE

Lock cylinder

Removal

After removing the interior door trim, take off the outside door handle by removing the two retaining screws, one inside and one on the rear edge of the door.

Disassembly, up to and incl. chassis No. 95773000541 and 96773000960

1. Up to and incl. model 1971:

Depress the push button (7) and drive out the pin (2) with a driver (max. 0.12 in/3 mm). Remove the arm (1) and the washers (3 and 4).

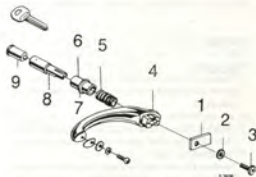


OUTER HANDLE, UP TO AND INCL. MODEL 1971

- | | |
|-----------|------------------|
| 1. Arm | 6. Sleeve |
| 2. Pivot | 7. Push button |
| 3. Washer | 8. Catch pin |
| 4. Washer | 9. Lock cylinder |
| 5. Spring | |

1. As from model 1972:

Remove the screw holding the push button arm (1) and pull out push button (8) and spring (5).



OUTER HANDLE, AS FROM MODEL 1972 UP TO AND INCL. CHASSIS NO. 95773000541 AND 96773000960

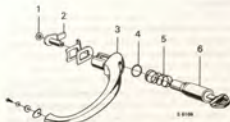
- | | |
|-----------|------------------|
| 1. Arm | 6. Sleeve |
| 2. Washer | 7. Sealing ring |
| 3. Screw | 8. Push button |
| 4. Handle | 9. Lock cylinder |
| 5. Spring | |

- Press the push button out of the sleeve (6).
- Insert the key and turn it 35° to the right.
- Press the catch pin (8) in with a driver (max. 0.12 in./3 mm).
- Pull the lock cylinder (9) out of the push button. If the key has been lost, the catch pin can be driven into the lock cylinder by force, using a driver or pin (with a diameter of max. 0.12 in./3 mm), thus enabling the cylinder to be removed from the push button. This treatment ruins the lock cylinder and a new one must therefore be fitted.

Disassembly, as from chassis Nos. 95773000542 and 96773000961

- Remove lock washer (1) securing push button (6) to the handle (3).
- Now remove the push button with the lock cylinder (6).

The push button and lock cylinder form an integral unit and must not be taken apart.



OUTSIDE DOOR HANDLE, AS FROM CHASSIS NOS. 95773000542 AND 96773000961

- | | |
|----------------|---|
| 1. Lock washer | 4. Ring |
| 2. Driver | 5. Spring |
| 3. Handle | 6. Push button and lock cylinder assembly |

Reassembly, up to and incl. chassis No. 95773000541 and 96773000960

- Drive in the catch pin and press the lock cylinder into the push button.
- Ease the sleeve onto the push button and then fit the push button, together with the spring, in the handle.
- Up to and incl. model 1971:
Insert the arm and the washers and drive in the pin. Note that the two washers have different sizes of holes.
 - As from model 1972:
Install the push button arm.

WARNING

Up to and incl. model 1971:

Do not press out the pivot that holds driver. The pivot is guided by two spring loaded balls and can not be refitted unless a special tool is used.

Assembly, as from chassis Nos. 95773000542 and 96773000961

- Insert the push button with lock cylinder and spring in the door handle.
- Slide on the driver (2) and press on a new lock washer (1) using a suitable sleeve.

Spare parts

If a lock cylinder for a door, luggage compartment or ignition lock is damaged, a new lock cylinder can be ordered, in which case the key number and spare part number must be quoted. See Spare Parts Catalogue. The system whereby only one key is used for all the car locks can thus be retained without any necessity of replacing a complete lock kit.

Lubrication

If the lock cylinder is lubricated with oil or grease, the lock pins may get caught in the cylinder. The reason for this is that dirt adheres to the key and thus gets into the lock cylinder. Because of this, the lock cylinder itself should never be lubricated.

If the key moves stiffly in the lock, so that lubrication is called for, a little glycerine may be applied to the back of the key. NOTE! Never lubricate the indented side of the key. After lubricating in this way, turn the key back and forth a few times.

REAR DOOR, SAAB 95

Removal and installation

1. Open the door.
2. Remove the sealing strip between door and body by loosening and removing the self tapping screws in the upper edge of the door.
3. Remove the retaining screw in each hinge which are accessible when the door is open.
4. Remove the lever of the door lift from the gate by removing the nuts. Be careful when removing the lever as it is spring loaded.
5. Close the door.
6. Remove the attachment screws of the remaining hinges.
7. Remove the door.
8. Installation is made in the opposite way.

Adjustment of balance spring tension

The rear door on the Saab 95 is fitted with two balance springs, the tension of which can be adjusted with a nut. The spring, which is accessible after removal of the trim between the rear door and the quarter window, should be tightened hard enough for the door to stop in any position after opening.

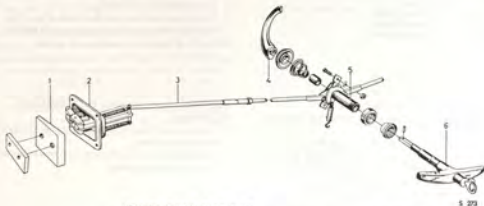


ADJUSTMENT OF REAR DOOR BALANCE SPRING TENSION

Door lock

Replacement

1. Remove the inner handle by removing the plastic shield and the lock pin. Note the spacer sleeve inside the spring.
2. Pry off the door lining.
3. Back off the lock nuts on the rods to the door locks. (Note that the outer rods are left handed.) Remove the adjusting nuts.
4. Remove the door lock retaining screws and lift out the locks.



LOCKING DEVICE, REAR DOOR

1. Locking plate
2. Door lock
3. Switch rod, adjustable
4. Inner handle (up to and incl. model 1975)
5. Latch
6. Outside handle

5. Fit new door locks and put the rods loosely together with the adjusting nuts.
6. Adjust the length of the rods so that the two door locks are in the outmost position when the control handle is standing horizontally. Tighten the lock nuts.



ADJUSTMENT OF RODS, DOOR LOCK

7. Check the flush fit of the door. Adjust the striker plates if necessary. Lubricate door lock and controls. Refit handle and door trim.

Changing the latch

- 1-3. See position 1-3 "Changing door lock". Pull out the outer handle.
4. Back off the serrated nut inside the door with the aid of polygrip pliers.
5. Remove the chromium plated nut on the outside of the door by placing mandrels in the two recesses and turn with a screwdriver.



REMOVING THE NUT

6. Remove the two retaining screws and hook the spring off the clamp, whereupon the latch can be removed.
7. Put the new latch in place with the serrated nut threaded on as far as possible. The latch should be turned, so that the joint for the right hand side door lock rod is facing the bottom of the door.
8. Hook on the spring and install the nut on the outside of the door.
9. Fit the two retaining screws and tighten the serrated nut.
10. Fit the adjusting nuts on the rods. Turn the latch with the aid of the outer handle to separate the ends of the rods so that the adjusting nuts can be mounted.
- 11-
12. Adjust rods and door according to positions 6-7 "Changing door lock".

Replacement of lock cylinder, up to and incl. chassis No. 96773000541

1. Fit the key and turn it 35° clockwise.
2. Push in the catch pin with the aid of a mandrel or the like and pull out the lock cylinder.



REMOVAL OF LOCK CYLINDER

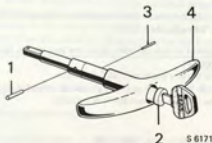
3. Push in the catch pin on the new lock cylinder. Note that this can be done only when the key is turned 35° clockwise. Engage the lock cylinder in the handle and check that the catch pin gets locking position.

Replacement of lock cylinder, as from chassis No. 95773000542

1. Remove the door trim.
2. Remove the split pin in the outside door handle (4).
3. Withdraw the outside handle (4) and insert the key.
4. Knock out the tubular pin (3) using a 2.5 mm drift.
5. Turn the key clockwise and carefully withdraw the lock cylinder (2), ensuring that the locking pin (1) is not lost.

N.B.

Never withdraw the key unless the lock cylinder is in position in the handle, as the tumblers will otherwise fall out.



LOCK, REAR DOOR, SAAB 95

1. Locking pin
2. Lock cylinder
3. Tubular pin
4. Handle

Fitting is carried out in the reverse order. Position the locking pin so that the recess in the pin mates with the driver on the lock cylinder.

TRUNK LID, SAAB 96

Removal and replacement

1. Raise the trunk lid and detach the stay.
2. Disconnect the wires to the number plate lights and trunk lamp.
3. Back off and remove the hinge retaining screws on the lid and lift off the lid.

NOTE

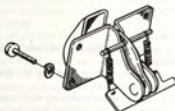
Take care to avoid damaging the body paintwork when removing and replacing the trunk lid.

4. Replace the lid, proceeding in the reverse order.

Lock mechanism

Replacement

1. Unscrew the four retaining screws and remove the mechanism.
2. Install a new mechanism.
3. Adjust the flush fit of the trunk lid by moving the yoke up or down.



LOCK MECHANISM

Trunk lid lock

Disassembly, up to and incl. chassis No. 96773000960

1. Unscrew the four retaining screws and remove the lock mechanism.
2. Back off the two cross recess head screws holding the lock mechanism installation washer. (The screws are accessible through holes from the luggage compartment.) Turn the washer so that the lock can be removed.
3. Make a wire picklock (1) to the dimensions shown in the fig.
4. Remove the retaining ring (2).
5. Remove the housing (3) and the torsion spring (4).
6. Turn the key 35° to the right.
7. Pass the picklock in towards the locking pin (7), turning to force the latter in towards the cylinder.
8. Withdraw the cylinder (6) from the lock.

Assembly, up to and incl. chassis No. 96773000960

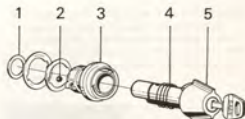
1. Press the locking pin (7) into the lock cylinder (6) and insert the cylinder in the sleeve (5). Note! This can be done only when the key has been turned 35° to the right.
2. Refit the torsion spring (4) and the housing (3), making sure that the spring is inserted in the smallest of the notches in the sleeve and in the hole in the housing.
3. Refit and press together the lock ring (2).
4. Install lock and lock mechanism in the car.

Disassembly, as from chassis No. 96773000961

1. Unscrew the locking mechanism and luggage compartment lock from the lid.
 2. Remove the circlip (1) and carefully withdraw the knob and lock cylinder assembly (5), taking care not to lose the two balls (2).
- The push button and lock cylinder form an integral unit and must not be taken apart.

Assembly, as from chassis No. 96773000961

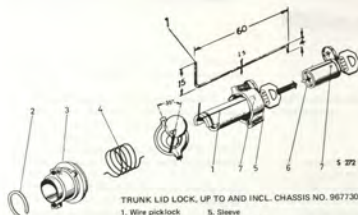
1. Insert the knob and lock cylinder assembly and the spring (4) in sleeve (3) and fit the circlip (1).
2. Fit the lock and locking mechanism.



S 6170

TRUNK LID LOCK, AS FROM CHASSIS NO. 96773000961

- | | |
|----------------------------|---------------------------|
| 1. Retaining ring | 4. Spring |
| 2. Ratchet balls (two off) | 5. Lock cylinder assembly |
| 3. Sleeve | |



TRUNK LID LOCK, UP TO AND INCL. CHASSIS NO. 96773000960

- | | |
|-------------------|------------------|
| 1. Wire picklock | 5. Sleeve |
| 2. Retaining ring | 6. Lock cylinder |
| 3. Housing | 7. Catch pin |
| 4. Spring | |

GLASS

GENERAL

The windshield is made of laminated glass and all other windows of toughened glass. When fitting new windows, use only Saab original parts to ensure approved glass quality and a perfect fit.

WINDSHIELD

Replacement

1. Remove the windshield wiper arms.
2. Press the windshield outwards with the hand from inside the car, after having removed the rubber weather strip from the bodywork.



REMOVAL OF WINDSHIELD

3. Clean the contact surface of the weather strip on the body, and remove all traces of old sealing compound.
4. Fit a new weather strip to the windshield. Be sure to locate the weather strip joint (possibly marked with a yellow dot) in the middle of the lower edge of the windshield.
5. Cars with chromium plated molding: Press the trim molding deep into its groove, using the thumb, and fit the two joint clips.
6. Insert a cord in the slit in the rubber weather strip. The ends of the cord are to be centered on the upper edge of the windshield.
7. Coat the body opening and the weather strip with soapy water and put the windshield in position. The lower edge of the bodywork shall enter the groove in the weather strip.
8. From inside the car, pull the cord so that the edge of the weather strip is drawn over the edge of the panneling. Pull left and rightsides alternately while an assistant presses the glass from the outside and successively, with great care, pounds the rubber weather strip with a rubber mallet.



INSTALLATION OF WINDSHIELD

9. Check that the inside flange of the weather strip is inside the edge of the bodywork all round the windshield. Cars with plastic windshield molding: Moisten the weather strip with soapy water and fit the molding, using tool 82 91 023. Fit the joint pieces.



INSTALLATION OF WEATHER STRIP

Tool 82 91 023

10. Inject sealing compound both between the weather strip and the body and between the weather strip and the glass.
11. Remove excess sealing compound from the body and glass, using kerosene or a similar solvent, and rinse thoroughly with water afterwards.

REAR WINDOW AND SIDE WINDOWS

Replacement

The windows are replaced in the same manner as the windshield. When replacing the rear window in a Saab 96, first remove the shelf over the luggage compartment.

Opening side windows

Opening side windows are fitted on some models. The only spare part available is the window glass complete with frame.



OPENING SIDE WINDOW, SAAB 96

DOOR WINDOW

The bottom of the door window glass is pressed into a retainer channel with a slot for the window regulator winder arm. A hinge is fitted to the front end of the retainer channel and secured to the door frame by means of two screws. A run channel guides the rear edge of the window glass.

Removal

1. Wind down the window until its rear edge is just below the weather seal.
2. Remove the door trim.
3. Remove the protective paper that covers the triangular hole in the front part of the door and undo the inner door handle remote control retainer. Note the return spring in cars as from model 1969.
4. Back off the two retaining screws at the hinge.



REMOVING THE HINGE RETAINING SCREWS

5. Pull off the glass from the window regulator pin, twist the glass to bring its rear end upwards and take it out through the hole in the door.



REMOVAL OF DOOR WINDOW

6. Release the glass from the retainer channel, if necessary.

UPHOLSTERY AND INTERIOR FITMENT

DOOR AND SIDE TRIMS

The door trims and side trims are attached to the doors and body, as applicable, by means of spring clips. The door trim can be removed, when the inner door handle, window regulator crank and upholstery have been removed. Pry off the spring clips by means of a screw driver or similar, making sure that the porous wallboard do not get teared.

DOOR PILLAR TRIM

The door pillars in the Saab 96 are fitted with trim. The trim is fastened with tape carrying adhesive on both sides.

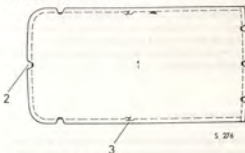


INSTALLATION OF DOOR PILLAR TRIM

COWL PLATE TRIM

The cardboard cowl plate trim is secured to the dash panel with sheet metal screws and spring clips. Insulation against sound and heat is afforded by a thick quilt of glass fiber between the dash panel and the trim.

HEADLINING, SAAB 95



HEADLINING, SAAB 95

1. Headlining
2. Retainer
3. Wire spiral with hooks

Removal and installation

To install, first attach the headlining to the three hooks in the upper part of the windshield frame. Then stretch the lining rearwards while putting on the bows. Using tool 82 90 579, fit the rear edge of the headlining over the three hooks. Finally, stretch the longitudinal wire spirals. These are divided in the middle and fitted with hooks. Using two double folded steel wires, get hold of



INSTALLATION OF HEADLINING, SAAB 95

these hooks and hook them into one another. Disassemble in the reverse order.

As from model 1971 there is a crash pad in the form of a plastic strip fitted on the inner edge around the roof.

The headlining is stretched on piano wire bows, and retained in the following way. The cloth is wrapped round the upper edges of all the frames for the windshield-, side- and rear window strips, using tape with adhesive on both sides when fastening.

Fitting and removal

First fit tape carrying adhesive on both sides, round the upper edges of all the window frames and to the upper edge of the door frames. Hang the headlining on to the bows.



FITTING DOUBLE ADHESIVE TAPE

1. Middle mark in the roof
2. Middle mark in the headlining

Start with the rear bow, and hang this on to the rear door pillar, with the free ends of the bow pointing forward. Then proceed forward, hanging the other bows on in the same way and making sure that the first bow comes as near as possible to the windshield frame.

Fit the headlining to the windshield frame, starting at the centre mark and proceeding towards the side. Stretch the headlining a little. The outer edge of the headlining shall end approx. at the score in the windshield pillar trim. Pull the headlining backwards in the following way. With one hand grip the last bow and pull backwards, and at the same time, with the other hand, stretch bow by bow backwards. Make sure that the headlining stretches evenly. This is done by comparing the distance between the seam at the rear border of the headlining and the welding seam between roof and side sheet. If necessary, the headlining can be stretched with the last bow.

IMPORTANT

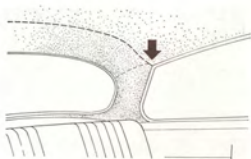
Do not stretch from the headlining's border.

Fit the headlining to the rear windshield frame, starting at the seam on the side, thereby placing the seam upon the welding seam between roof and side sheet. Then fasten the headlining on towards the middle, and check at the centre mark that the headlining is correctly positioned. Go into the car, and check that the headlining is centred on each bow, before you raise same. Raise all the bows, and insert the dome lamp cables through the hole in the headlining.



LOCATION OF SIDE SEAM OVER THE WELDING SEAM BETWEEN ROOF AND SIDE VALANCE

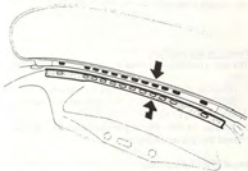
Fit the headlining to the side, starting at the last bow. Place the seam for the last bow in the side window frame's rear corner, and fit as far as the door pillar. Make sure that the recess for the door pillar be correctly positioned. Proceed fitting the headlining as far as to the windshield pillar. Make sure that there are no wrinkles at the windshield pillar.



S 1296

PLACEMENT OF SEAM AT REAR BOW

Now, stretch the headlining round the lower edge of the rear window in such a way that there are no wrinkles. Then fasten with tape, as described before. Fit the headlining at the rear cross bar, and make sure that the holes in the headlining and those in the sheet are centred on each other.



S 1297

INSTALLATION OF MOULDING AT THE REAR CROSS BAR

Fit the rear shelf, windows, sun visors, dome lamp, curve loop brackets, side trims, and rear seat cushion with back rest.

The removal is made in the reverse order.

MATS

The rubber mats at the front sides are glued to the wheel houses, while the front and rear mats are loose. As from model 1968, the mats are of nylon fiber on jute backing. They are secured by snap buttons and velcro grips. Insulating sheets of wallboard are fitted under the floor mats.

SEATS

Front seats, Saab 95 up to and incl. model 1977 and Saab 96 up to and incl. model 1976

The front seats are made of resilient steel tubing with foam rubber cushions and covers fitted on transverse coil springs. The front seats are adjustable for legroom, and are secured in the desired position by means of a spring loaded latch. The slope of the seat back can be altered with a lever located between the seat and the door. Wedge shaped wooden blocks are fitted under the seats, thus affording a higher sitting position for the driver. To prevent the back of the right hand seat from being jack knifed in response to sudden application of the brakes, a special safety catch is fitted at the rear left side of this seat. As from model 1969, a new type of safety catch is introduced. The front seats are also equipped with sockets for fitting of headrests. Headrests and cushions to fit them are available as optional extras.

Removal

Depress the seat adjustment catch and slide the seat forwards until the seat rails are clear of the floor rails, after which the seat can be removed. As from model 1972, the electric wiring to the heating elements in the drivers seat, has to be disconnected before the seat is removed. The connector is located under the seat cushion. The seat floor rails should be inspected at regular intervals, to make sure that the retaining bolts are tight and that the rails are not laterally displaced. If the seats move stiffly, grease the upper rails.

Front seats, Saab 96 as from model 1977 and Saab 95 as from model 1978

The front seats are built up on a sheet steel frame to which the backrest is mounted. The upholstery consists of moulded rubber cushions laid on rubber sheets and covered with textile and plastic coated fabric. Both front seats are mounted on rails to allow legroom adjustment. At the front of the driver seat rails is an adjustment bolt with which the height of the seat can be adjusted.



FRONT SEAT, SAAB 96 AS FROM MODEL 1977 AND SAAB 95 AS FROM MODEL 1978

1. Legroom adjustment catch
2. Backrest release, to drop backrest forward
3. Backrest angle adjusting knob

To enable passengers to enter or leave the back seat the front seat backrest can be folded forward by releasing the catch by means of one of the handles. The front handle is for use from the outside of the car while the rear handle is designed for rear seat passengers.

Removing and installing

The seat is removed and installed together with the seat rails.

1. Disconnect the cable connectors for the seat heating pads and where applicable, the contacts for the seat belt warning system.
2. Remove the four retaining screws (insex screws) which hold the rails to the body.

Install in the reverse order.

Legroom adjustment

Move the catch 1 up, (see illustration) and slide the seat forward or backward to the desired position.

Adjustment mechanism

The front seat adjustment mechanism is continuously adjustable and features a friction device that locks the seat frame to the rails.

The friction device must lock equally hard on both sides when the release catch is in its normal position (i.e. locked). This is best checked with the seat mounted in the car. The release catch must not touch the stop when in this position. If the friction device is not working properly, the seat must be taken out and the adjustment mechanism readjusted. It is normally sufficient to adjust the inner side only, as follows.

1. Separate the splined joint with a screwdriver.

NOTE

Make sure that the eccentric does not slip out of the hole in the locking arm. If this happens, the eccentric shaft tension spring will lose its grip.



SPLINED JOINT, DISASSEMBLED

1. Lock arm
2. Eccentric
3. Splines
4. Spring
5. Twist ring
6. Intermediate tube

2. Turn the twist ring and intermediate tube counterclockwise until all play is eliminated and the release button is about 0.4" (10 mm) above the stop. Put the splined joint together in this position.

NOTE

The foregoing instructions apply to the left hand seat. In the case of the right hand seat, turn the twist ring and intermediate tube clockwise.

Dropping the backrest forward

To drop the backrest forward, press down catch 2 (see illustration, page 850—4).

Backrest adjustment

Turn knob 3 (see illustration, page 850–4) forward to raise and backward to lower the backrest.

NOTE! Do not press on the backrest while adjusting.

Separating backrest–seat cushion

1. Remove the two Philips head screws, according to fig.



REMOVAL OF SCREWS FOR THE RECLINING CONTROL

2. Remove the lock ring on the opposite side. (The ring is holding the back rest frame stud to the seat frame.) Then the backrest can be hooked off from the seat.



REMOVAL OF LOCK RING

Changing the backrest upholstery

1. Remove the seat from the car.
2. Undo the zip in the lower edge and unhook the hooks at the bottom on each side.
3. Roll up the upholstery as far as the band in the middle of the backrest. Undo the clip at the rear of the backrest and pull the band and clip to the front of the seat.



CLIP AT REAR OF BACKREST



PULLING THE BAND TO THE FRONT

4. Unhook the thread which secures the upholstery at the front and below the hole in the backrest.



UNHOOKING THE THREAD

5. Bend the plastic ring which secures the upholstery at the hole and thread it through the hole from the back to the front.



COMPRESSING THE PLASTIC RING



THREADING THE PLASTIC RING OUT FORWARDS

6. Fold back the flaps in the grooves inside the hole.



FOLDING BACK THE FLAPS

7. Remove the cover.

Fitting is carried out in the reverse order.

Electric heating of the driver's seat as from model 1972

As from model 1972, the driver's seat is electrically heated. Heating elements consisting of resistance wiring and reflectors held by a plastic net is mounted in seat and back-rest cushions and via a thermostat connected to the ignition lock.

The elements are switched on when the seat temperature is below 50°F (+10°C). The thermostat, mounted in the seat cushion, cuts out the current when the temperature is higher than 81°F (+27°C).

Checking of heating pads

1. Undo the wire connection 67/93 (red and yellow wires) from fuse 5. Connect a test lamp between the wire connection and the fuse terminal.
2. Switch on the ignition.
3. Find the thermostat in the seat (feel with fingers) and cool the area in a suitable manner, for example with a cooling spray of the same type used for radio and TV service.



COOLING THE THERMOSTAT

After a while the thermostat will cut in and the lamp should light.

If the lamp does not light it may be due to:

Faulty fuse

Wire fracture in the wiring or the heating pads

Faulty thermostat

Faulty grounding

Defective test lamp

Possible wiring fracture in heating pads, check with the aid of a buzzer

(Disassembled, heated seat)

A. Backrest heating pad:

Connect one of the leads of the buzzer to the pad leads (the splicing sleeve is pushed into the PVC tube). If there is no fault in the wiring, the buzzer will sound when its other lead is connected to one of the two pins in the dual-pole splice cover.



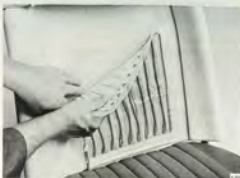
CHECKING WIRE FRACTURES

B. Seat heating pad:

Cool the thermostat until it is below the cut-in temperature and connect the buzzer as under A but to the other pin in the dual-pole splice cover. Note that even a thermostat fault can mean that the buzzer will not sound in this case.

Changing the heating pads

1. Take out the seat.
2. Remove the seat upholstery. The backrest cover can be removed when the zip at the bottom has been opened. The seat cover is removed by undoing all the staples at the front bottom of the seat and unhooking the two retainers holding the seat cover to the seat frame.
3. Remove the heating pad(s). Dissolve the glue with pure gasoline (cleaning gasoline) so as not to tear off large pieces of the foam rubber cushioning.



REMOVING THE HEATING PAD

4. Glue on the new heating pad(s) with suitable impact adhesive such as Bostik A3. Connect the wiring so that the pads are in series.
5. Replace the upholstery and mount the seat.

Changing the thermostat

Remove the seat cover, see points 1-2 "Changing the heating pads". Remove the binding threads from the thermostat connection wires, after which the thermostat can be pulled out and replaced. Fit binding threads to the new thermostat to eliminate the risk of the wires working loose after a time.



CHANGING THE THERMOSTAT

Rear seat and auxiliary jump seat, Saab 95

In the Saab 95 the rear seats are made of foam rubber on a base which serves as a luggage deck when the seats are folded down. The rear seat cushion has a safety catch in the front edge.

The backrest cushion is locked by means of a lock mechanism in each end. The lock mechanisms are released by pulling up the buttons in the upper edge of the seat rest.



LOCKING DEVICE FOR CUSHION, REAR SEAT, SAAB 95

The auxiliary jump seat backrest is kept upright by two rubber straps fitted to the upper edge of the rear seat backrest.

As from model 1971 it is possible to use the auxiliary jump seat even when the rear seat is folded down and used as luggage space. This is obtained by two catches in the lower edge of the backrest.



CATCH, AUXILIARY JUMP SEAT, SAAB 95 MODEL 1971-1975

As from model 1976, the auxiliary jump seat is removed. The rear seat is moved rearward, giving the rear seat passengers improved legroom.

Rear seat, Saab 96, up to and incl. model 1969

In the Saab 96, the rear seat cushion and back consist of a spring filled frame with padding and upholstery. Both cushions have a sheet of plywood as the base. Up to and incl. model 1967, the seat cushion is loose, being held in position by the transverse floor member at its front edge. The base of the back cushion rests on two brackets secured to the inclined rear panel. This cushion is also secured at the top, to prevent objects in the luggage compartment from rushing forwards when the brakes are applied hastily.

As from model 1968 on, the seat cushion is secured to the floor with a strap. The back cushion is secured with two pins on the back of the cushion. The locking pins are accessible from inside the luggage compartment. A device for adjusting the height of the rear seat is provided under the rear seat cushion.



LOCKING DEVICE FOR CUSHIONS, REAR SEAT, SAAB 96

Conversion to freight space

The back seat be collapsed to provide extra freight space on the station wagon principally by rearrangement of the cushions.

Pull up the catch buttons at the top of the backrest to release the retaining catch. Then swing the seat cushion upward and forward to stand it on edge behind the front seats. Drop the backrest forward. Up to and incl. model 1975 there are two yokes on the underside of the seat cushion and catches at the bottom which fit into recesses in the backrest. Fold out the yokes so that the hooks engage the recesses, and continue to twist the yokes until the hooks hold the backrest securely.



CONVERSION OF REAR SEAT

Cleaning upholstery

When attempting to remove stains from fabrics it is recommended that the area adjacent to the stain first be moistened with the solvent before working on the stain itself. Otherwise, a soil ring may be left around the cleaned spot.

Specific stains

Grease, oil and lipstick can be removed with carbon tetrachloride. Large stains are best dealt with by moistening in the normal manner and then pouring solvent over the entire stain and soaking it up with blotting paper.

Chocolate, ice-cream, fruit and vomit stains should be treated initially with lukewarm water, possibly with the addition of a little soap solution. After drying, any residual stains may be removed with carbon tetrachloride. Battery acid should be treated instantly with large quantities of cold water, as otherwise the acid may burn holes in the upholstery. If possible, add a few drops of ammonia to the first water.

Blood stains should never be allowed to dry, but should be removed immediately with cold water.

Unidentified stains

Try the following solvents in the order named:

Cold or lukewarm water

Lukewarm soap solution

Before making further attempts, remove the soap solution with lukewarm water and allow the material to dry, since the following solvents are not miscible with water.

Continue with

Carbon tetrachloride

Trichloroethylene

Pure gasoline

Rub the spot while the solvent evaporates, first hard and gradually more gently as evaporation continues.

Do not forget the initial moistening round the stain. The bigger the stain, the bigger the area to be moistened.

Lighter fluid can be used instead of carbon tetrachloride.

Cleaning plasticized fabrics

Plasticized fabrics are impermeable to dirt, being completely dust tight and proof against oil and gasoline. A dirty plastic surface can easily be cleaned by washing with water and a synthetic detergent. Large oil stains, etc., can be treated with white spirit, trichloroethylene and similar solvents. Such organic solvents, however, should not be used too frequently, as they tend to cause stiffness in the plastic.

INSTRUMENT PANEL

Removal and installation

1. Release from the point of attachment to the body the brace located in the center of the instrument panel.
2. Back off and remove the two screws on either side, collect nuts and washers, and pull out the instrument panel.



GLUEING ON THE OVERLAY

3. Disconnect cable terminals, speedometer wire, hoses for the sidedefroster and the controls for the heating system.
4. Reinstall in the reverse order.

Replacement of panel overlay

1. Remove the instrument panel and take off the instruments and glove compartment.
2. Release the molding by pushing out the clips from the rear.
3. Release the clips at the upper edge, which possibly also retain the defroster duct, and remove the overlay from the panel.
4. When refitting, apply glue only to the projecting part of the instrument panel and the corresponding part of the overlay. Then press the overlay in position.



INSTRUMENT PANEL SCREWS

5. Refit the molding and clips, cutting off the part of the overlay that projects beyond the molding.
6. Refit the instruments and glove compartment.

1. The first step is to find the right place. The Black Sea is a large body of water, and the anemones are found in the deep, dark waters. The anemones are found in the deep, dark waters of the Black Sea, and they are found in the deep, dark waters of the Black Sea.

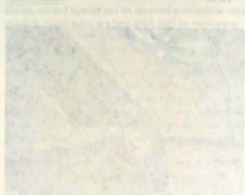
2. The second step is to find the right time. The anemones are found in the deep, dark waters of the Black Sea, and they are found in the deep, dark waters of the Black Sea. The anemones are found in the deep, dark waters of the Black Sea, and they are found in the deep, dark waters of the Black Sea.



CONFESSION OF NEAR DEATH

3. The third step is to find the right way. The anemones are found in the deep, dark waters of the Black Sea, and they are found in the deep, dark waters of the Black Sea. The anemones are found in the deep, dark waters of the Black Sea, and they are found in the deep, dark waters of the Black Sea.

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CONFESSION OF NEAR DEATH

4. The fourth step is to find the right way. The anemones are found in the deep, dark waters of the Black Sea, and they are found in the deep, dark waters of the Black Sea. The anemones are found in the deep, dark waters of the Black Sea, and they are found in the deep, dark waters of the Black Sea.

5. The fifth step is to find the right way. The anemones are found in the deep, dark waters of the Black Sea, and they are found in the deep, dark waters of the Black Sea. The anemones are found in the deep, dark waters of the Black Sea, and they are found in the deep, dark waters of the Black Sea.

Black Sea, Black Sea, with mysterious black sea anemones

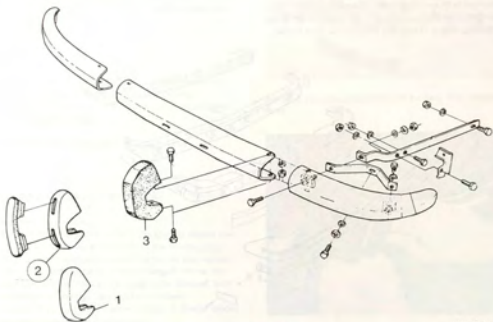
6. The sixth step is to find the right way. The anemones are found in the deep, dark waters of the Black Sea, and they are found in the deep, dark waters of the Black Sea. The anemones are found in the deep, dark waters of the Black Sea, and they are found in the deep, dark waters of the Black Sea.

BUMPERS

Up to and incl. model 1975

Each bumper comprises a middle bar and two outer bars,

two overrides and two brackets with braces. Up to and incl. model 1968 there are splash guards in the rear overrides to prevent flying stones from attacking the body.



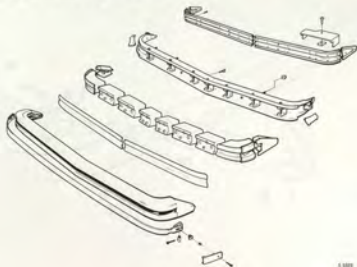
BUMPER, FRONT

1. Override, up to and incl. model 1968
2. Override, up to and incl. model 1971
3. Override, as from model 1972

As from model 1976

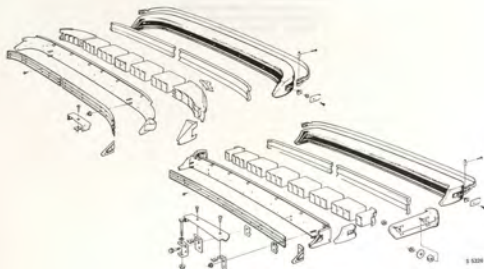
The shells of the bumpers consist of U-shaped aluminium bars to which the bumper brackets are mounted. There are shock absorbant cellular blocks of polyethylene in the bars. Outside the blocks there are polyethylene braces and the bumpers are coated with a layer of rubber. This layer is provided with anchorage bars on the inside and with a bracing strip on the outside. Up to and incl. model 1976, the bracing strip is of stainless steel and, as from model

1977, of rubber with a plastic strip with a chromium insert. Provision has been made on the front bumper for the attachment of license plates and additional lights. The rear bumper of the Saab 95 is equipped with two separate outer parts consisting of steel covered with rubber. The outer parts are bolted directly to the body. The bumper brackets are masked with filler plates fastened with special clips.



FRONT BUMPER

S 530X



REAR BUMPER

S 530H

REMOVAL AND INSTALLATION

Front bumper and rear bumper, Saab 96

Remove the filler plates and loosen the two bumper brackets.

Installation is made in the reverse order.

Rear bumper, Saab 95

Remove the filler plates, loosen the cable harness from the bumper clamp and the two bumper brackets. The outer parts are removed by removing the two fastening nuts inside the fender.

Installation is made in the reverse order.

CHANGING THE CELLULAR BLOCKS

1. Remove the bumper.
2. Remove the bracing strip. Note the spacing sleeves under the filling plates at each end of the bracing strip.
3. Remove the anchorage bars on the side of the bumper where the cellular block is to be changed. (If the center block on the front bumper has to be changed, both the longer anchorage bars must be removed.)
4. Pull off the rubber layer, after which the cellular blocks are accessible and can be removed.



CHANGING THE CELLULAR BLOCKS

5. Refit the rubber layer and bracing strip.



FITTING THE BRACING STRIP, UP TO AND INCL. MODEL 1976

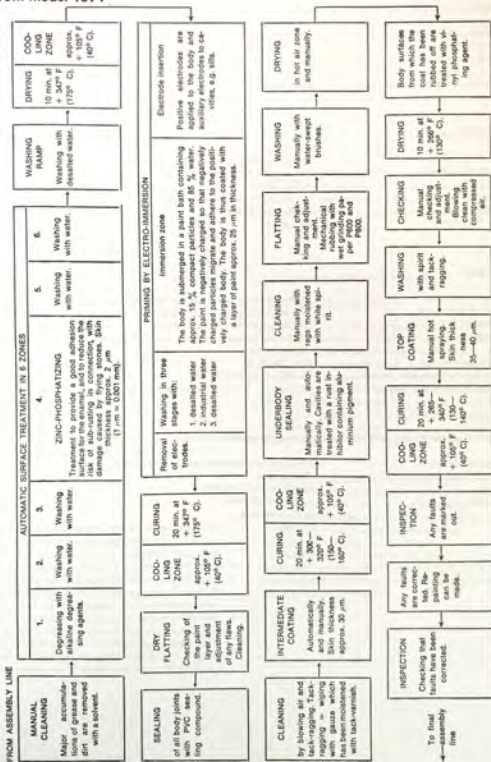


FITTING THE BRACING STRIP, AS FROM MODEL 1977

6. Mount the filling plates and their spacing sleeves together with the anchorage bars. Remount the bumper.

BODY FINISHING

As from model 1971



TECHNICAL DATA

Primer

| | |
|------------------------------|--------------------------|
| Mode of application | Electro-immersion |
| Hardening | 20 min. at 347°F (175°C) |
| Manufacturer | AB Wilhelm Beckers |
| | Dr Kurt Herberts |
| Skin thickness after stoving | appr. 25 μ m |

Intermediate coat

| | |
|---------------------|--|
| Spraying viscosity | 35–45 sec. (Saab standard 860 at 68°F/20°C) |
| Mode of application | Hot spraying. Paint temperature approx. 122°F (50°C) |
| Curing | 20 min. at 320–338°F (160–170°C) |
| Supplier | AB Wilhelms Beckers |
| Skin thickness | appr. 25 μ m |

Top coat

| | |
|---|---|
| Spraying viscosity | 35–40 sec. (Saab standard 860 at 68°F/20°C) |
| Mode of application | Hot spraying at approx. 122°F (50°C) |
| Curing | 20 min. at 320–338°F (160–170°C) |
| Supplier | AB Wilhelm Beckers |
| | Dr Kurt Herberts |
| Skin thickness | appr. 35–40 μ m |
| Total skin thickness after stoving (primer, intermediate coat, top coat) | 70–100 μ m (0.07–0.10 mm) |

Touch up enamel (factory paint with added hardener and enamel)

| | |
|---------------------|---|
| Spraying viscosity | 18–22 sec. (Saab standard 860 at 68°F/20°C) |
| Mode of application | Cold spraying |
| Curing | 60 min. at 212°F (100°C) |
| Supplier | AB Wilhelm Beckers |
| | Dr Kurt Herberts |
| | Du Pont |

TOUCH-UP AND REFINISH INSTRUCTIONS

General

For all touch-up or refinish jobs, use synthetic stoving or air-drying enamel of the same quality type as that for the original paintwork.

For perfect results, it is essential that the premises in which the work is to be done, i.e. the paintshop, be kept absolutely free of dust. It should also be free of drafts and must naturally not be used as a means of access to other departments. The floor should be kept thoroughly damp while spraying. A paint job ruined by dust cannot be restored by polishing — flattening and respraying will be necessary.

Body finishing

Before undertaking any partial refinishing, always spray a test area to check that the shade used is identical with the color of the parts that are not to be refinished. Any deviations must be corrected by toning the paint. The painting job involves the following operations:

- Removal of rust and old paint
- Rubbing down
- Cleaning with a solvent
- Priming of bare metal surfaces, for instance with wash primer
- Filling, if necessary
- Flattening
- Application of intermediate coat, for instance Surfacor or Non Sanding, if necessary
- Flattening, if necessary
- Finishing
- Air-drying, stoving with infra-red radiant heat or in a drying oven, depending on the type of enamel used.

Cleaning

If the old paintwork shows defects such as cracking, pitting due to the impact of flying stones, etc., apply a paint remover or flatten down to the bare metal. After removal of the old paintwork by one or the other of these methods, degrease the metal with spirit, thinner or some other suitable solvent. In principle, the same procedure should be used even if the old paintwork has merely been rubbed down instead of being removed. Realign any distorted panels and grind, for instance with a disc grinder, if necessary, before flattening with wet abrasive paper P 400. Finally, reclean the parts with spirit or cellulose thinner. Thoroughness in this respect is vital to good adhesion.

Priming

Coat all bare metal surfaces with primer. The drying time and temperature for oven-drying or air-drying should be as prescribed by the paint suppliers. An infra-red radiation lamp may also be used for drying, but care must be taken to keep it at a distance of not less than 16 in. (40 cm) from the metal. After drying, fill as necessary, applying the putty in thin layers and allowing the stipulated drying time for each layer before the next application.

Rubbing down

Rub down the primed and filled surface with wet abrasive paper P 400 and then with grade P 600. After removing all water, rewash the surfaces with spirit or cellulose and wipe with a piece of gauze drenched in slow drying varnish (tack-ragging).

Equipment and procedure for refinishing

A. Stoving touch-up enamel

Oven:

A convection oven with an air temperature of 194–212°F (90–100°C) is needed. A radiation oven can be used, and in this case the metal temperature should be about 176°F (80°C). It is important for the air temperature to be even throughout the oven and for the temperature to be continuously checked. For this purpose, it is appropriate to use, for example, a calibrated max. and min. thermometer or a thermo-element with a compensator. Only this latter measuring method can be used to check the plate temperature.

Enamel:

Hardener must be added to the touch-up paint used in the amount stipulated by the paint supplier. The enamel can be sprayed either hot or cold, and the viscosity should be adjusted accordingly with the thinner recommended by the paint supplier to the following:

Hot spraying — viscosity approx. 35 sec.

Cold spraying — viscosity approx. 21 sec.

Measure the viscosity with a beaker according to the method described in the Saab standard 860 at a temperature of approx. 68°F (20°C).



MEASURING VISCOSITY WITH AN SIS BEAKER

Procedure:

First of all, clean the body and chassis of the car thoroughly, thus ensuring that dust will not spread in the spraying booth or drying oven. The glasses for the tail lights, brake lights and back-up light, as well as the control relay for the Eberspächer BL2 ZW parking heater, must be removed to prevent them from being damaged by the heat.

The air inlets and air outlets from the passenger compartment must be masked.

Cover the insides of all glass windows with sheafs of board or the like to prevent the temperature from becoming too high.

On account of fire risk the battery cable must always be disconnected and the fuel filler cap removed. The tank should contain only a very small quantity of fuel.

If the luggage compartment lid, the hood, or one of the doors has to remain open, the opening must be masked to prevent the air temperature inside the car from rising above 167°F (75°C).

When the car is being pretreated and painted it should be at normal room temperature. When the car is placed in the oven, the latter should have reached the prescribed temperature of 194–212°F (90–100°C).

Leave the car there for one hour.

B. Air-drying touch-up enamel (68–176°F/20–80°C)

When air-drying enamel is used, no special arrangements are necessary other than a well heated, dustless booth.

The drying time can, however, be speeded up considerably by stoving the enamel with an infra-red radiation lamp or in an oven with an air temperature of not more than 176°F (80°C).



USE OF RADIATION LAMP TO DRY REFINISHED PART

The enamel can be sprayed either hot or cold, and the viscosity should be adjusted accordingly with the thinner recommended by the paint supplier to the following:

Hot spraying — viscosity approx. 35 sec.

Cold spraying — viscosity approx. 21 sec.

Measure the viscosity with a beaker according to the method described in the Saab standard 860 at a temperature of approx. 68°F (20°C).

The metal must have adapted normal room temperature prior to pretreatment and painting.

NOTE

Under the chassis sign is a sign indicating by means of a code the original body color. Always quote this code when placing orders for touch-up enamel. This is particularly important as enamel conforming to the same color specification may be supplied by several different manufacturers.

GENERAL MAINTENANCE WORK

Proper care and maintenance of the care is necessary to retain the gloss and durability of the enamel finish and the protective properties of the underbody sealing. Recommendations in these respects are given in Group 1.

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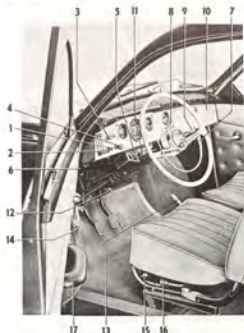
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Model 1967

CONTROLS



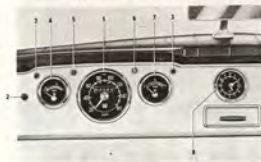
CONTROLS, MODEL 1967

1. Switch for extra equipment. (USA, warning flasher switch).
2. Heating and ventilation controls.
3. Ventilator fan switch.
4. Switch for windshield wipers, 2 speeds, and windshield washer pump. To start the wipers, turn the knob clockwise. The first position is for low speed, and the second position for high speed. To wash the windshield, first pull the knob out, then let it go.
5. Switch for headlights and instrument panel lights. When the knob is pulled out to the first stop, the side and rear lights as well as the number plate light are lighted. Pulling the knob all the way out lighted the headlights as well. When the knob is pulled in either position, the intensity of the instrument panel lights may be adjusted by turning the knob.
6. Hood lock.

The hood hinges upwards and forwards towards the front of the car and is released in the following manner:

 - a. Pull out the knob situated under the instrument panel. This opens the hood to the half-locked position.
 - b. Push aside the lock mechanism which is situated at the main lock under the front part of the hood.
 - c. Lift up the hood.

7. Horn button.
8. Ashtray. Also provided in rear passenger compartment.
9. Gear lever.
10. Lockable glove compartment. The door is provided with a detachable plate for the installation of a radio if desired.
11. Direction indicator switch and except USA versions headlight flasher.
12. Free wheel control. To lock out the free wheel action, pull the handle right out. See page 19.
13. Handbrake.
14. Dimmer switch.
15. Seat adjustment. When the catch is pressed down, the seat is released and can be moved forward or backward as desired.
16. Control for adjusting angle of seat backrest.
17. Armrest. This can be adjusted to three different positions by means of the fastening screws.



INSTRUMENTS, MODEL 1967

INSTRUMENTS

1. Speedometer with odometer. The speedometer is graduated in m.p.h. or km/h. The odometer shows the distance covered in miles (kilometers).
2. Indicator light, oil pressure.

The lamp glows when the oil pressure of the engine is too low. Never race the engine until the lamp is out. If the lamp begins to glow when driving, the engine should be stopped immediately and the cause be traced.
3. Direction indicator repeating lights. Flash green in time with the indicators.
4. Fuel gauge. The amount of fuel in the tank is shown when the ignition is switched on. An indicator light glows red when there is less than 1.5 imp. gals. (7 lit.) left.
5. High beams indicator light; shows a blue light when the headlights are on with the beam undimmed.
6. Charge indicator light; glows orange when the alternator is not charging.
7. Temperature gauge. The green zone indicates normal operating temperature.
8. Electric clock with setting screw. The regulating screw is at the back of the clock.

Model 1968

CONTROLS



CONTROLS, MODEL 1968

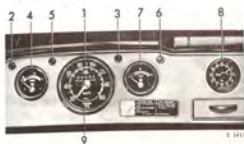
1. Heating and ventilation controls.
2. Switch for extra equipment.
3. Ventilator fan switch.
4. Rheostat for instrument illumination. The intensity of the instrument lights is adjusted by turning the knob clockwise, (functions only when the lights are on).
5. Switch for lighting units. In the first position, when pulling out the knob, the parking lights are on as well as the licence plate lights. In the second position, the knob pulled all the way out, also the headlights are switched on.
6. Direction indicator switch. Also functioning as switch for high beam headlight signal when the lever is moved towards the steering wheel.
7. Ashtray. Also provided in rear passenger compartment.
8. Switch for signal horn, windshield wipers/washer.
Operation:
 - a. The lever moved towards the steering wheel—signal horn activated. (Pos. 0-3).
 - b. Position 1. (See symbols)—windshield wipers, low speed.
 - c. Position 2. —Windshield wipers, high speed.
 - d. Position 3. Windshield wipers, high speed, and windshield washers.



SWITCH FOR SIGNAL HORN AND WINDSHIELD WIPERS/
WASHER
(Pos. 0-3)

0. Windshield wipers — neutral position
 1. Windshield wipers — low speed
 2. Windshield wipers — high speed
 3. Windshield wipers — high speed and washer
9. Gear lever.
 10. Lockable glove compartment. The lid is provided with a detachable plate for the installation of a radio if desired.
 11. Hood lock.
The hood hinges upwards and forwards towards the front of the car and is released in the following manner:
 - a. Pull out the knob situated under the instrument panel. This opens the hood to the half-locked position.
 - b. Push aside the lock mechanism which is situated at the main lock under the front part of the hood.
 - c. Lift up the hood.
 12. Dimmer switch.
 13. Armrest. This can be adjusted to three different positions by means of the fastening screws.
 14. Switch for brake warning light.
 15. Free wheel control. To lock the free wheel action, pull the handle right out.
 16. Handbrake.
 17. Seat adjustment. When the catch is pressed down, the seat is released and can be moved forward or backward as desired.
 18. Control for adjusting angle of seat backrest.
 19. Fresh air ventilation lid. The lid may be opened by pushing the handle of the lid forward.
- The interior rear-view mirror has two different positions of height. To adjust, turn the mirror half a turn.

INSTRUMENTS



INSTRUMENTS, MODEL 1968

1. Speedometer with odometer. The speedometer is graduated in m.p.h. or km/h. The odometer shows the distance covered in miles (km).
2. Indicator light, oil pressure. The lamp glows when the oil pressure of the engine is too low. Never race the engine until the lamp is out. If the lamp begins to glow when driving, the engine should be stopped immediately and the cause be traced.
3. Direction indicator repeating light. Flashes green in time with the indicators.
4. Fuel gauge. The amount of fuel in the tank is shown when the ignition is switched on. An indicator light glows red when there is less than 1.5 imp. gals (7 lit.) left.
5. High beam indicator light. Shows a blue light when the headlights are on with the beam undimmed.
6. Charge indicator light. Glows orange when the alternator is not charging.
7. Temperature gauge. The green zone indicates normal operating temperature.
8. Electric clock with setting screw. The regulating screw is at the back of the clock. (De Luxe version only.)
9. Brake warning light. Will glow red as soon as the brake pedal travel becomes too large due to any of the following faults:
 - a. Leakage in one of the two brake system circuits.
 - b. Rear brakes need adjustment.
 If the warning light glows an authorized Saab Service garage should be consulted for investigation and necessary remedy.

Model 1969

CONTROLS



CONTROLS, MODEL 1969

1. Heating and ventilation controls.
2. Switch for extra equipment.
3. Ventilator fan switch.
4. Rheostat for instrument illumination. The intensity of the instrument lights is adjusted by turning the knob clockwise, (functioning only when the lights are on).
5. Switch for lighting units. In the first position, when pulling out the knob, the parking lights are on as well as the licence plate lights. In the second position, the knob pulled all the way out, also the headlights are switched on.
6. Direction indicator switch. Also functioning as dimmer switch and switch for high beam headlight signal when the lever is moved towards the steering wheel.
7. Ashtray. Also provided in rear passenger compartment.
8. Switch for signal horn, windshield wipers/washer. Operation:
 - a. The lever moved towards the steering wheel — signal horn activated.
 - b. Position 1. (See symbols) — windshield wipers, low speed.
 - c. Position 2. — windshield wipers, high speed.
 - d. Position 3. — windshield wipers, high speed and windshield washer.



SWITCH FOR SIGNAL HORN AND WINDSHIELD WIPERS/WASHER

Signal horn: The lever to be moved towards the steering wheel. (Pos. 0-3).

- 0. Windshield wipers — neutral position
- 1. Windshield wipers — low speed
- 2. Windshield wipers — high speed
- 3. Windshield wipers — high speed and washer

9. Gear lever.

The back-up light on the Saab V4 station wagon is automatically lighted when the reverse gear is engaged.

10. Locking glove compartment. The lid is provided with a detachable plate for installation of a radio if desired.

11. Hood lock.

The hood hinges upwards and forwards towards the front of the car and is released in the following manner:

- a. Pull out the knob situated under the instrument panel. This opens the hood to the half-locked position.
- b. Push aside the safety latch which is situated at the main lock under the front part of the hood.
- c. Lift up the hood.

12. Warning flasher switch. When the knob is pulled out, all the direction indicator lights and connected indicator lights are flashing. The warning flasher must be used only in case of an accident, a breakdown or similar and provided the car stands on the road endangering or hindering the traffic.

13. Armrest. This can be adjusted to two different positions by means of the fastening screws.

14. Switch for brake warning light.

15. Free wheel control. To lock the free wheel action, pull the handle right out.

16. Handbrake.

17. Seat adjustment. When the catch is pressed down, the seat is released and can be moved forward or backward as desired.

18. Control for adjusting angle of seat backrest.

19. Fresh air ventilation lid. The lid may be opened by pushing the handle of the lid forward.

The interior rear-view mirror has two different positions of height. To adjust, turn the mirror half a turn.

INSTRUMENTS



INSTRUMENTS, MODEL 1969

1. Speedometer with odometer. The speedometer is graduated in m.p.h. or km/h. The odometer shows the distance covered in miles (km).

2. Indicator light, oil pressure.

The lamp glows when the oil pressure of the engine is too low. Never race the engine until the lamp is out. If the lamp begins to glow when driving, the engine should be stopped immediately and the cause be traced.

3. Direction indicator repeating light. Flashes green in time with the indicators.

4. Fuel gauge. The amount of fuel in the tank is shown when the ignition is switched on. An indicator light glows red when there is less than 1.5 imp. gals (7 lit.) left.

5. High beam indicator light. Shows a blue light when the headlights are on with the beam undimmed.

6. Charge indicator light. Glows orange when the alternator is not charging.

7. Temperature gauge. The green zone indicates normal operating temperature.

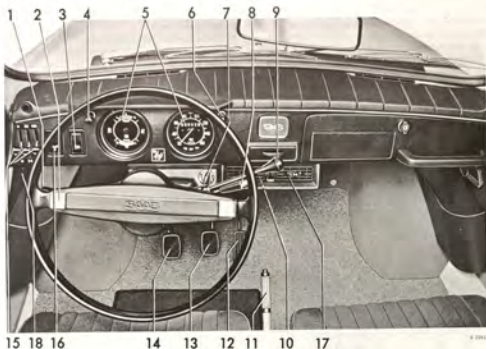
8. Electric clock with setting screw. The regulating screw is at the back of the clock. (De Luxe version only.)

9. Brake warning light. Will glow red as soon as the brake pedal travel becomes too large due to any of the following faults:

- a. Leakage in one of the two brake system circuits.
 - b. Rear brakes need adjustment.
- If the warning light glows, the cause should be traced, and then the eventual fault remedied by an authorized service garage.

Model 1970-1975

CONTROLS



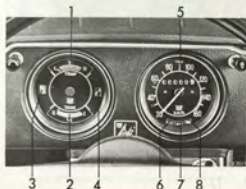
CONTROLS, MODEL 1970-1975

1. Combined direction indicator lever and headlight dimmer and flasher switch.
2. Horn control.
3. Headlight and parking light switch. Flicking the switch to first position turns on the parking lights, irrespective of the ignition switch position. Flicking to second position turns on the headlights as well. As from model 1971, the switch is provided with a catch to prevent unintentional switching off.
4. Hazard warning signal switch. All direction indicator lights flash together when the button is pulled out. The hazard warning signal must only be used when the vehicle is stalled in the roadway, e.g. after an accident or breakdown, in a position where it is liable to endanger or obstruct traffic.
5. Instruments and indicator lights.
6. Instrument lighting rheostat. Turn the switch to control the intensity of illumination. This switch operates only when the parking lights or headlights are on.
7. Combined ignition switch and gear lever lock.
8. Windshield wiper and washer control.
 - a. The lever to be moved towards the steering wheel: Windshield washer.
 - b. Pos. 1 — windshield wipers, low speed
 - c. Pos. 2 — windshield wipers, high speed
 - d. Pos. 3 — windshield wipers, high speed and windshield washer.
9. Gear lever. The back-up light on the Saab V4 station wagon is automatically lighted when the reverse gear is engaged.
10. Free wheel drive control. To lock the free wheel pull the handle fully.
11. Handbrake.
12. Accelerator pedal.
13. Brake pedal.
14. Clutch pedal.
15. Heating and ventilation controls.
16. Ventilator fan switch.

17. Fresh-air vent with control.
18. Hood lock release handle. The handle is located on the left-hand side under the instrument panel. The hood opens forward.
To open, proceed as follows:
 - a. Pull the handle. The hood will then open to the semilocked position, retained by a safety catch at the leading edge.
 - b. Press the front of the hood down slightly and push back the safety catch. The front can now spring up, and you can open the hood by lifting the rear end.

The interior rear-view mirror has two different positions of height. To adjust, turn the mirror half a turn.

INSTRUMENTS

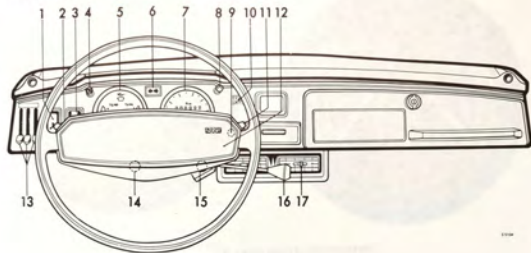


INSTRUMENTS, MODEL 1970-1976

5. Speedometer and odometer. The speedometer is graduated in MPH and the odometer shows the total mileage of the vehicle.
 6. Brake warning light. Blows red to indicate excessive brake pedal stroke, which means:
 - a. one of the two brake line circuits is leaking, or
 - b. the back wheel brakes need adjusting.If this light comes on, investigate the cause of the trouble without delay and have the fault repaired by an authorized Saab service shop.
 7. Direction indicator repeater light. Flashes green in time with the direction indicators.
 8. High beam warning light. Glows blue when the headlights are on high beam.
-
1. TEMP Coolant temperature gauge. The green zone indicates normal operating temperature.
 2. TANK Fuel gauge. Indicates the amount of fuel in the tank when the ignition is switched on. A red warning light comes on when there are less than 1 3/4 US gallons (7 liters) left in the tank.
 3. Charge indicator light. Glows orange when the alternator is not charging.
 4. Oil pressure warning light. Glows when engine oil pressure is too low. When starting, never race the engine until the lamp is out. If it lights up when you are driving, switch off the engine immediately and investigate the cause.

As from model 1976

CONTROLS



CONTROLS, AS FROM MODEL 1976

- | | |
|---|--|
| 1. Ventilator fan switch. | 10. Warning light for safety belt. |
| 2. Combined direction indicator, headlight dimmer and flasher switch. | 11. Windshield wiper and washer control. |
| 3. Headlight and parking light switch. | 12. Horn control. |
| 4. Hazard warning signal switch. | 13. Heater and ventilation controls. |
| 5. Combination instrument with warning lights. | 14. Choke (up to and incl. model 1977). |
| 6. Direction indicator warning light. | 15. Ignition and gear lever lock. |
| 7. Speedometer with warning lights. | 16. Gear lever. |
| 8. Instrument illumination rheostat. | 17. Fresh-air vent and control. |
| 9. Hazard warning signal switch. | |



INSTRUMENTS, AS FROM MODEL 1976

TEMP Coolant temperature gauge.

TANK Fuel gauge. Shows the amount of fuel in the tank when the ignition is on. A red warning light shows a steady glow if there is less than 1 1/2 imp. gallons (7 liters) left in the tank.



Charge indicator light. Glows orange when the alternator is not charging.



Oil pressure warning light. Glows red to indicate dangerously low oil pressure or oil level. When starting, never move off until this light has gone out. If it lights up while you are driving, switch off the engine at once and investigate the cause.

MPH Speedometer and odometer. This speedometer is graduated in MPH and the odometer shows the total mileage of the vehicle in miles and tenth of a mile.



Brake warning light. The light shows a red light when there is excessive pedal travel caused by:

- Leakage in one of the two circuits of the braking system.
 - The rear wheel brakes needing adjustment.
- If the light comes on while the car is being driven, the cause should be traced immediately and any faults should be remedied by an authorized Saab dealer as soon as possible.



Choke warning light, up to and incl. model 1977. The light shows an orange light when the choke control is withdrawn.



High beam indicator light. Glows blue when the headlights are on high beam.

INSTRUMENTS

SPEEDOMETER AND MILEAGE RECORDER

Removal and installation

Since the speedometer and mileage recorder form an independent unit, removal and installation can be carried out without interfering with any of the other instruments in the cluster.

1. Disconnect the cables to the earth terminal, withdraw the lampholders together with their connection wires, and disconnect the speedometer drive cable.
2. Saab 96: Back off the knurled center nut retaining the yoke. Saab 95: Back off the two knurled nuts retaining the yoke.
3. Remove the instrument from the panel.
4. Install in the reverse order, making sure that the stamped mark or line on the periphery of the housing coincides with the notch in the hole for the instrument in the panel.

Repairs and adjustments of the speedometer and mileage recorder should always be entrusted to a specialist firm.

Speedometer drive cable

When handling the speedometer drive cable, never coil it in rings with a diameter of less than about 12 inches (300 mm). Otherwise, there is a risk of damaging the flexible inner wire, which might lead to unwanted noise after installing.

When fitting the speedometer drive cable, note the following points:

1. Release the dash-panel trim at the hole where the cable enters through the dash panel.
2. Secure the upper nut to the speedometer drive cable with adhesive tape and then pass the cable up from the engine compartment and through the hole in the dash panel.
3. When fitting the cable, take care to arrange it smoothly, without any sharp bends.

As from model 1970 the speedometer cable is equipped with a bayonet fitting.

FUEL AND TEMPERATURE GAUGES, CLOCK

General

These instruments are independent units and can be removed separately from the instrument panel by disconnecting the wires and removing the retaining clips.

Instrument lighting and indicator lights as from model 1970

All the bulbs in the instrument panel are mounted in bayonet fittings and are accessible from the back of the panel.

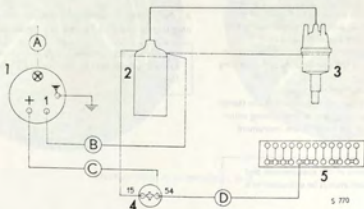
Repairs and adjustments of any of these instruments should always be entrusted to a specialist firm.

REVOLUTION COUNTER

The Saab 96 Monte Carlo is equipped with an electric revolution counter, connected to the ignition primary circuit. See the wiring diagram in Section 3. When installing a revolution counter in the other models, follow the wiring diagram below.

CAUTION

Do not confuse plus and minus leads, or the instrument may get ruined.



WIRING DIAGRAM FOR FITTING AN ELECTRIC REVOLUTION COUNTER

1. Revolution counter
2. Ignition coil
3. Distributor
4. Ignition switch
5. Fuse block
- A. Instrument-lighting lead
- B. Lead between ignition coil and terminal 1 on counter
- C. Lead between terminal 54 on ignition switch and plus lead on revolution counter
- D. Outgoing lead from ignition switch to fuse block

ACCESSORIES, MECHANICAL

Seat belts, front seats

General

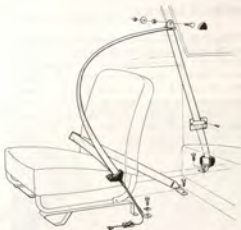
All cars are equipped with seat belts of the so called three points type and as from model 1968 on, the belts are of the yoke type. —When not used, the strap of the 3-point type is hung on a hook at the door pillar.



SEAT BELT, 3-POINT TYPE, MODEL 1967



SEAT BELT, 3-POINT TYPE, AS FROM MODEL 1968 UP TO AND INCL. MODEL 1973



SEAT BELT WITH BUCKLE LOCK, AS FROM MODEL 1974

USA-cars model 1972 and 1973

The front seats are provided with lap- and shoulder belts with an automatic adjusting device, a retractor, for the lap belt.

The shoulder belts are to be adjusted manually.

Two lap belts of retractor type are provided for the rear-seat passengers. The front seat retractors are placed below the rear seat cushion. The rear seat retractors are placed below the rear backrest.

Sweden, Norway and Finland, as from model 1974

The belt consists of a strap with one end secured at the bottom. The free end runs through an eye up on the door pillar and into the reel which is located inside of the rear side trim.

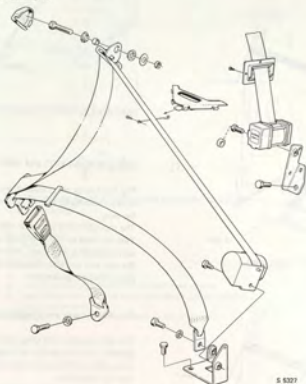
The belt is fastened by pulling the strap out and inserting it directly into the buckle lock and dropping the yoke, which locks automatically. The strap can run freely through the buckle lock and the running eye and is thereby automatically adjusted. The belt is released by pressing the key marked "press".

The reels have two locking mechanisms. One mechanism is actuated by sudden acceleration of the reel (i.e. when the strap is pulled out at high speed). The other is actuated by a pendulum which senses the movements of the car.

SEAT BELTS, REAR SEAT

As from model 1975, cars for certain markets are equipped with 3-point type seat belts in the rear seat. The belt reel is installed on the wheel housing behind the rear seat back rest. On Saab 96 the band runs through an inlet in the parcel shelf. On the Saab 96 the reel is placed inside the rear side lining. The band runs through an opening in the upper edge of the lining. The fixed band end is fitted below the rear seat back rest at the wheel housing wall. The band has a sliding buckle which is secured in a locking device between the passengers.

To fasten the belt, pull out the strap carefully and feed it under the yoke located between the front seats (see illustration). Press the yoke down to lock it. Pull the lower strap as low as possible across the hips. Then pull the upper part of the strap upwards so that the lower parts fits properly against the body. The belt provides best protection when the lower strap is worn low across the hips and the upper part runs over the shoulder (see illustration). Check that the belt is not twisted or rubbing against any sharp edges. To release the belt, depress the red button.



SEAT BELT, REAR SEAT

ACCESSORIES, ELECTRICAL

GENERAL

The radio and any other electrical accessories, such as extra lights, etc., must be properly fused off and should therefore be connected to the ignition switch or to the fuse block on the dash panel, which is provided with spare fuse for this purpose.

The wiring for electrical accessories should be so dimensioned as to ensure the least possible voltage drop. As a general rule, the following applies:

Current consumption less than 8 A (96 W): use a wire with a sectional area of 0.002 sq.in. (1.5 sq.mm).

Current consumption more than 8 A (96 W): use a wire with a sectional area of 0.003 sq.in. (2.5 sq.mm).

For all connections and splices made when installing electrical accessories, use AMP crimped terminals. See group 3.

RADIO INSTALLATION

The most convenient site in which to install the radio receiver is in the space provided under the instrument panel. A bracket is available as extra equipment.



RADIO INSTALLATION

ANTENNA LOCATION

The antenna is to be fitted at the lower edge of the windshield. Seal carefully at passage of plate underneath.



LOCATION OF ANTENNA

HEATING AND VENTILATION SYSTEM

GENERAL

The heating system is separate and connected to the cooling system. Through the fresh air intake (17) in front of the windshield, air enters a "collector box" (16). The air goes through a channel via the fan wheel (19) to the heat exchanger (11) from where it is led into the passenger compartment. The fan and heat exchanger has a common casing. The air is heated when passing the heat exchanger heated by the cooling liquid, the temperature of which can be varied by the thermostat valve (22). The thermostat bulb is located in the current of air injected into the passenger compartment. The distribution of air to the passenger compartment is controlled by air distributors (20) via controls. The current of air can either be

led to the floor or through the defroster jets, or both ways at the same time.

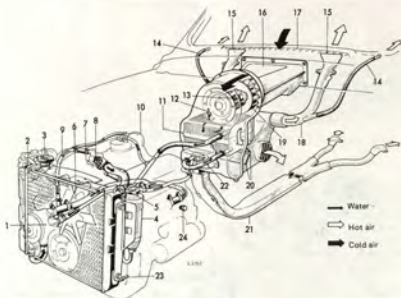
As from model 1971 the cars are equipped with air channels to the floor space in the rear seat.

When the road speed exceeds 30 m.p.h. (50 km/h), the speed wind is generally sufficient to ensure satisfactory function of the heat exchanger. The best effect of the heating system is obtained with closed windows.

On hot summer days, driving comfort may be improved by using the fan to draw fresh air into the car. Needless to say, the control lever should then be set at cold.

The heat exchanger is fitted with a bleed nipple (12), with which the exchanger is to be bled whenever the cooling system is refilled.

As from model 1974, a new heat exchanger has been installed which is smaller in size but has a new cellular package design which makes it even more effective.



HEATING SYSTEM, PRINCIPLE

1. Water pump
2. Radiator
3. Radiator cap
4. Expansion tank
5. Pressure cap
6. Fan
7. Temperature transmitter
8. Thermostat
9. By-pass
10. Water jacket, automatic choke (not models 1976 and 1977)
11. Heat exchanger

12. Bleeding nipple
13. Fan motor
14. Side defroster hose
15. Defroster jet
16. Collector box
17. Fresh-air intake
18. Defroster pipe
19. Fan wheel
20. Air distributor
21. Air channel to rear floor (as from model 1971)
22. Thermostat valve
23. Drain valve
24. Drain plugs (one on each side)

FAN MOTOR

Removal and installation

1. Disconnect the three cables from the fan motor, noting their respective locations.
2. Back off and remove the six screws retaining the front cover of the fan housing.
3. Pull out the cover, together with the fan motor.
4. Remove the nuts holding the motor to the front cover. The fan motor and impeller are balanced together in order to ensure vibrationfree running. An exchange system is operative in respect of the complete fan unit.

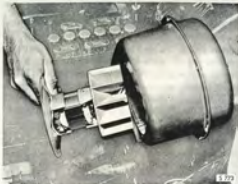
Reinstall in the reverse order.

HEAT EXCHANGER

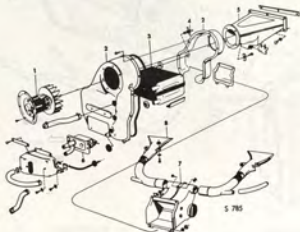
Removal and installation

1. Drain off the cooling water and disconnect the two hoses from the heat exchanger.

2. Disconnect the three cables from the fan motor, noting their respective locations.
Back off and remove the six screws retaining the front cover of the fan housing. Lift out the fan motor.



REMOVAL OF FAN MOTOR



HEATER

1. Fan and motor
2. Casings
3. Heat exchanger
4. Bleeder screw
5. Fresh-air duct
6. Thermostat valve
7. Damper housing
8. Defroster jet

3. Back off the screws holding together the fan housing casings. Eight screws are accessible from the engine compartment and two nuts from inside the car. To provide access to these two nuts, fold back the rubber mat, unscrew the freewheel control handle and loosen the two trim clips, whereupon the insulation can be turned back from the cowl plate and the nuts removed.
 4. Pull the front part of the fan housing casing out so far as to allow removal of the heat exchanger.
- Note: Proceed with care, to avoid damaging the thermostat bulb.



REMOVAL OF HEAT EXCHANGER

Before refitting the heat exchanger, check that the sealing rings on the water pipe are in place. Install the heat exchanger in the reverse order. Then refill the cooling system with water and check the hose connections for leaks.

THERMOSTAT VALVE

Removal and installation

1. Drain off the cooling water and disconnect the hoses from the heat exchanger and thermostat valve.
 2. Divide the throttle linkage at the rubber joint and pull the shaft out of the thermostat valve casing.
 3. Remove the four screws holding the thermostat valve casing to the fan housing casing.
 4. Remove the three cables from the fan motor, noting their respective locations.
- Back off and remove the six screws retaining the front cover of the fan housing. Lift out the fan motor.



SEPARATING THE HEATER CASING

5. Back off and remove the screws holding together the fan housing casings. Eight screws are accessible from the engine compartment and two nuts from inside the car. To provide access to these two nuts, turn back the rubber mat, unscrew the freewheel control handle and loosen the two trim clips, whereupon the insulation can be turned back from the cowl plate and the nuts removed.
6. Pull out the front part of the fan housing casing and lift out the heat exchanger. Disconnect the thermostat coil by bending up the sheet metal tabs on the inside of the heater casing. Loosen the control and the two screws holding the protective casing to the thermostat valve. The valve can now be removed.

Reinstall the thermostat valve in the reverse order. Then refill the cooling system with water and check the hose connections for leaks.

THE TOPIC

THE TOPIC

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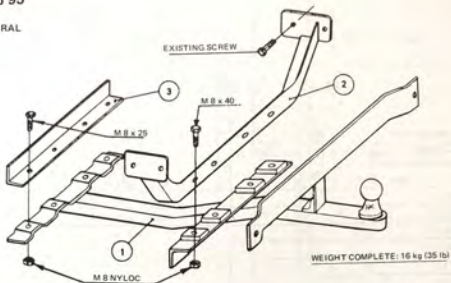
THE TOPIC

THE TOPIC

TOWHOOK ASSEMBLY

Saab 95

GENERAL



S 3601

TOWHOOK ASSEMBLY, SAAB 95

The towhook assembly for the Saab 95 is designed for a maximum trailer weight of 910 kg (2000 lb).

To fit the towhook, proceed as follows:

1. Undo the four screws from the rear bumper mounts in the legroom well of the extra seat. Remove the rubber matting and mount the strut (2) with the bumper attachment screws. Cut away the corrugated cardboard so that the strut makes direct contact with the deck plating.
2. Undo the screws that secure the bumper to the rear mounts. Lift up the towhook (1) and secure it by the rear mounting bar with the bumper retaining screws.
3. Chip away the underbody coating with a chisel or similar so that the other attachment points of the towhook make direct contact with the deck plating. Drill four 8.5 mm (1/3") holes through the deck plating and strut (2), using the towhook as a jig. Mount the four MB fasteners.
4. Cut away the corrugated cardboard as before and

mount the angle iron (3) in the same way. Relay the rubber matting.

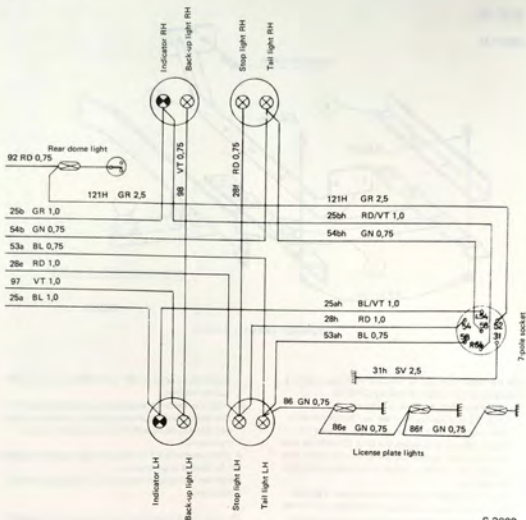
5. After the towhook assembly has been approved by the appropriate inspecting authority, coat any exposed metal surfaces with fresh underbody sealing compound.

A wiring assembly kit for 7-pole trailer connecting socket can be bought as an accessory. Install the wiring according to the wiring diagram and instructions.

The assembly kit comprises the following components:

- 7-pole socket connector
- Wiring harness
- Screw
- Nut
- Spring washer
- Cable shoe
- Self-tapping screw

WIRING DIAGRAM



S 3602

WIRING DIAGRAM

NOTE

The cable 121H GR 0,75 is, according to the wiring instructions, intended to be connected to 121 GR 0,75. This method of connection is sufficient to provide normal interior lighting in a house trailer (max. output about 50 W).

If any other items of current-consuming equipment in the trailer (e.g. outside lights) have to be supplied through cable 121H, a 2,5 mm² cable should be run instead from cable 121H GR 2,5 direct to fuse No. 2 in the car.

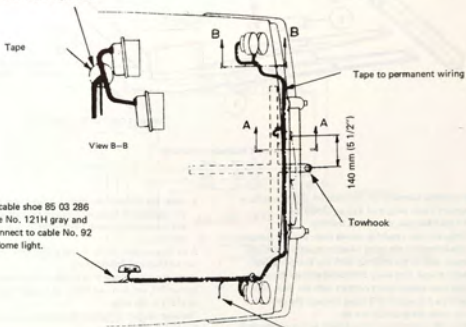
COLOR CODE

| | |
|-------|--------------|
| VT | = WHITE |
| RD | = RED |
| GR | = GRAY |
| RD/VT | = RED/WHITE |
| GN | = GREEN |
| BL | = BLUE |
| SV | = BLACK |
| BL/VT | = BLUE/WHITE |

WIRING INSTRUCTIONS

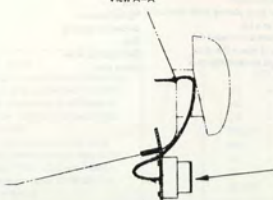
Remove tape from protective tubes to lamps. Pull wiring from the towhook assembly through the tube to the lamps and then mount five cable shoes 85 03 286 on the ends. Retape the opening to keep water out. Same procedure for both left and right side.

----- Permanent wiring
 ——— Towhook wiring system



Mount cable shoe 85 03 286 on cable No. 121H gray and then connect to cable No. 92 red at dome light.

View A-A

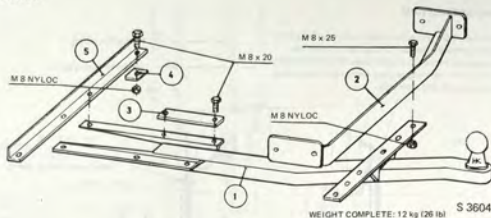


Ground connection. Scrape surface clean to obtain good ground contact.

Tighten cable shoe with self-tapping screw 79 22 800 in inside side plating. Hole diameter 3.8 mm (0.15").

7-pole socket connector secured by fastener sets bolt 79 34 490 nut 79 10 474 spring washer 79 10 532

S 3603



TOWHOOK ASSEMBLY, SAAB 96

The towhook assembly for the Saab 96 is designed for a maximum trailer weight of 910 kg (2000 lb).

To fit the towhook, proceed as follows:

1. Undo the four retaining screws from the rear bumper attachments in the spare wheel compartment in the trunk. Mount the strut (2) with the bumper attachment screws. Cut away the corrugated cardboard so that strut makes direct contact with the deck plating.
2. Drill six 8.5 mm (1/3") holes through the deck plating, using the strut (2) as a jig.
3. Mark off the towhook attachment points on the deck plating and chip away the underbody coating from these points with a chisel or similar. Bolt the rear mounting bar of the towhook in position.
4. Drill the other holes through the deck plating from beneath, using the towhook (1) as a jig.
5. Cut away the corrugated cardboard and mount the reining bars (3) and angle iron (5) above the deck plating. The square washers (4) go beneath the deck plating.

6. After the towhook assembly has been approved by the appropriate inspecting authority, coat any exposed metal surfaces with fresh underbody sealing compound.

A wiring assembly kit for 7-pole trailer connecting socket can be bought as an accessory.

Install the wiring according to the wiring diagram and instruction, and drill two holes 25 mm (1") and 3.8 mm (0.152") in the body.

The assembly kit comprises the following components:

7-pole socket connector

Wiring harness

Bolt

Nut

Spring washer

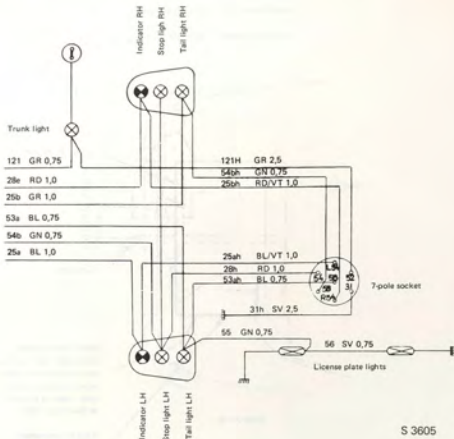
Grommet bushing

Clip

Self-tapping screw

Cable shoe

WIRING DIAGRAM



WIRING DIAGRAM

NOTE

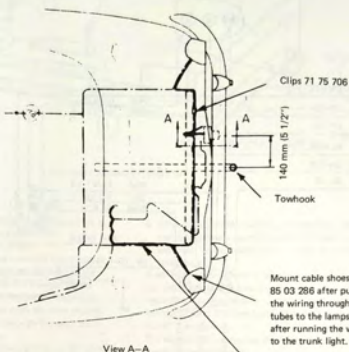
The cable 121H GR 2,5 is, according to the wiring instructions, intended to be connected to 92 RD 0,75. This method of connection is sufficient to provide normal interior lighting in a house trailer (max. output about 50 W).

If any other items of current-consuming equipment in the trailer (e.g. outside lights) have to be supplied through cable 121H, a 2,5 mm² cable should be run instead from cable 121H GR 2,5 direct to fuse No. 2 in the car.

COLOR CODE

| | | |
|-------|---|------------|
| VT | = | WHITE |
| RD | = | RED |
| GR | = | GRAY |
| RD/VT | = | RED/WHITE |
| GN | = | GREEN |
| BL | = | BLUE |
| SV | = | BLACK |
| BL/VT | = | BLUE/WHITE |

----- Permanent wiring
 ————— Towhook wiring system

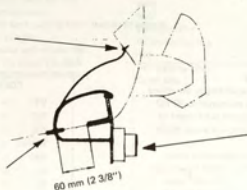


Mount cable shoes
 85 03 286 after pulling
 the wiring through the
 tubes to the lamps and
 after running the wire
 to the trunk light.

Tape to permanent
 wiring

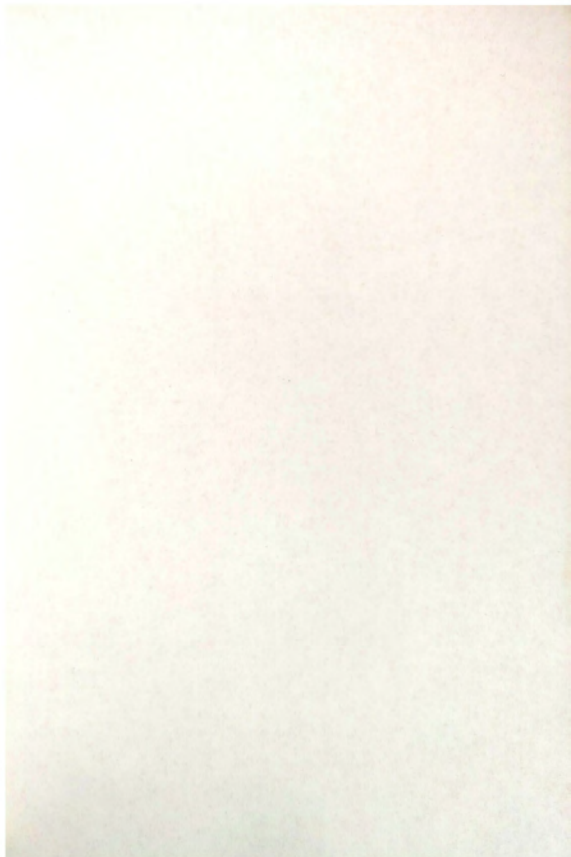
Ground connection.
 Scrape surface clean
 to obtain good ground
 contact.
 Secure cable shoe with
 self-tapping screw
 79 22 800, hole dia-
 meter 3.8 mm (0.15").

Opening for grommet
 bushing 73 26 093,
 hole diameter 25 mm
 (1").



7-pole socket connector
 secured by fastener sets,
 bolt 79 34 490
 nut 79 10 474
 spring washer 79 10 532.

S 3606



— pressure transducer output
 — feedback signal to the

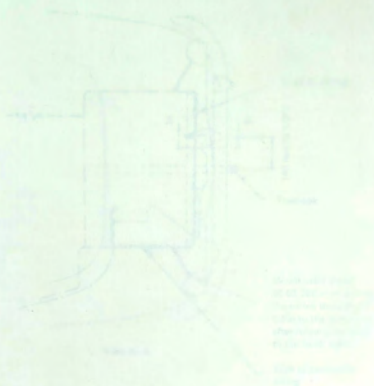


Figure 10.1

Output controller
 Output signal - 1000
 No reference signal
 Output signal - 1000
 Output signal - 1000
 Output signal - 1000
 Output signal - 1000

Output signal - 1000
 Output signal - 1000
 Output signal - 1000
 Output signal - 1000
 Output signal - 1000



Ordering Number 305631