

07.1–200 Removal and installation of injection pump

Job no. of flat rates or standard texts and flat rates data 8410 or 8411, 8430, 8431.

Survey model – engine – injection pump

Model	Engine	Injection pump Bosch designation	Regulator Bosch designation	Delivery pump Bosch designation	Test values ¹⁾ 1B-sheet Edition
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Standard version up to 1980

123.193 617.952	PES 5 MW 55/320 RS 16	RW 375/2200 MW 28–1	FP/K 22 MW 22	3.0 g 5th edition
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Standard version starting 1981

123.193 617.952	PES 5 MW 55/320 RS 16	RW 375/2200 MW 28–3 ³⁾	FP/K 22 MW 8	3.0 g 1st edition
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1978/1979 Identification: Green type rating plate

116.120 617.950	PES 5 MW 55/320 RS 16	RW 375/2200 MW 22	FP/K 22 MW 8	3.0 g 4th edition
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1980

116.120 617.950	PES 5 MW 55/320 RS 16	RW 375/2200 MW 22	FP/K 22 MW 22	3.0 g 4th edition
		RW 375/2200 MW 28 ²⁾		

1981

123.193 617.952	PES 5 MW 55/320 RS 16	RW 375/2200 MW 28–1	FP/K 22 MW 22	3.0 g 5th edition
126.120 617.951				

starting model year 1982

123.133	PES 5 MW 55/320 RS 16	RW 375/2200 MW 28–3 ³⁾	FP/K 22 MW 22	3.0 m 1st edition
123.153 617.952				
123.193				
126.120 617.951				

USA starting model year 1984 California

123.133	PES 5 MW 55/320 RS 16—1	RW 375/2200 MW 28—3 ³)	FP/K 22 MW 22	3.0 m 1st edition
123.153 617.952				
123.193				
126.120 617.951				

- 1) Accurate checkup and adjustment of injection pump is possible on an injection pump test bench only. For workshops, where such a test bench is installed, test sheets for the different pumps are available.
 2) Entering production starting February 1980.
 3) Reference impulse verification (RIV), dynamic injection timing (begin of delivery) test possible.

Tightening torques

Nm

Pipe connection for delivery valves

40—50

Injection lines

25

Special tools

Socket 13 mm, 3/8" drive



000 589 21 07 22

Box wrench socket open, 17 mm,
1/2" drive for injection lines



000 589 68 03 00

Overflow pipe



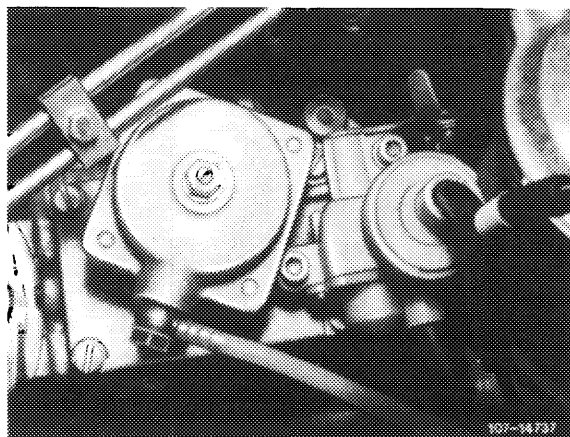
636 589 02 23 00

Conventional tool

Torque wrench 1/2" drive, 15—65 Nm

Removal

- 1 Detach vacuum line at vacuum control unit and at vacuum control valve for automatic transmission.
- 2 Unscrew delivery line at aneroid compensator.

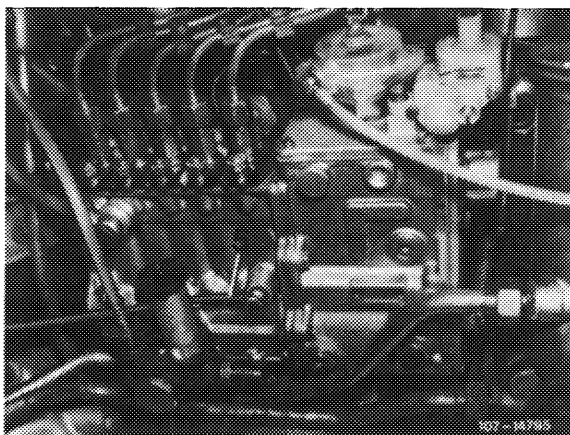


- 3 Disconnect electric cable at temperature sensor, detach control rod, unscrew injection lines and fuel lines at injection pump. Clip caps onto connections for injection lines and fuel hoses at injection pump.

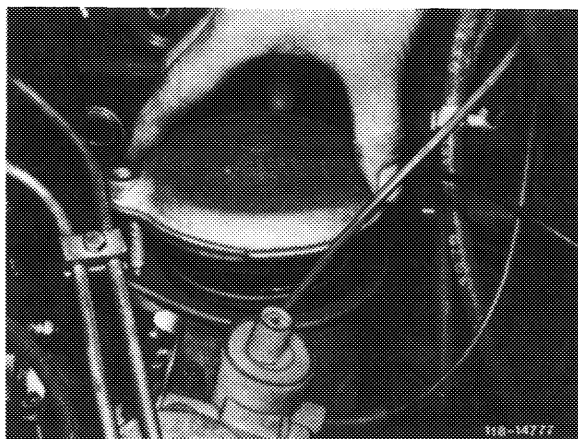
- 4 Unscrew lubricating oil line (5).

Attention:

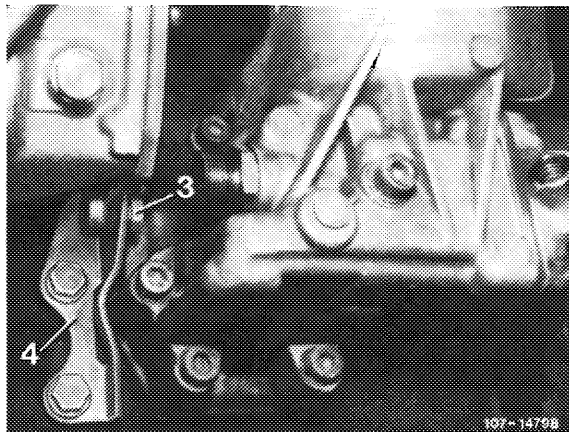
Prior to removal of lubricating oil line (5), clean connecting points.



- 5 Unscrew and remove upper part of oil filter so that engine oil can return to oil pan.



6 Unscrew hex-head bolts at supporting holder (4) as well as 3 nuts holding injection pump. Release fastening bolt (3) to provide adjustment within oblong hole.



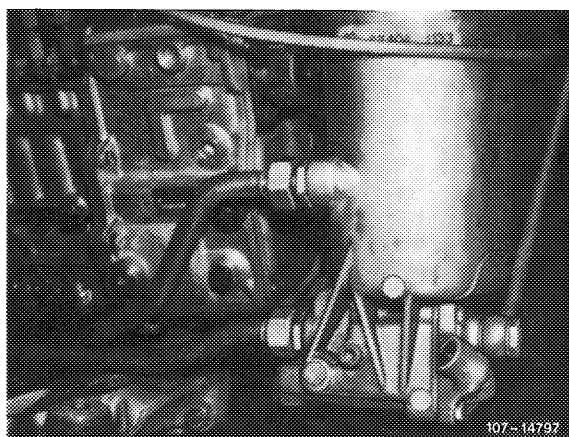
7 Unscrew all engine oil lines at oil filter body, releasing clamps for this purpose.

8 Unscrew and remove oil filter body from crankcase (18–110).

Attention:

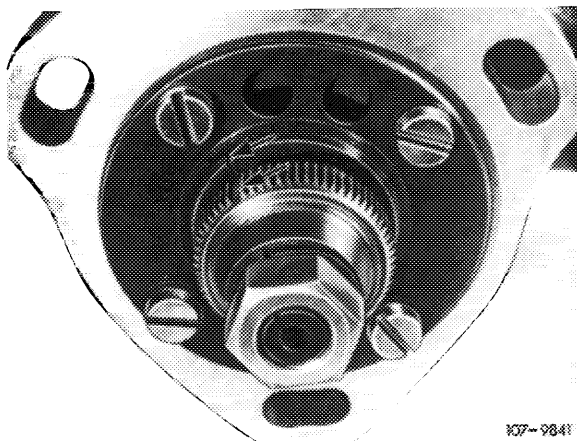
When removing gasket, make sure that no remains drop into oil passages.

9 Withdraw injection pump from crankcase. Detach coupling sleeve from injection pump driver or from drive shaft.



Note: If driver is to be exchanged, lock driver with serrated wrench and release hexagon nut. Then remove driver from injection pump shaft using puller. Clean axle stub and driver, making sure that both cones are absolutely clean and dry.

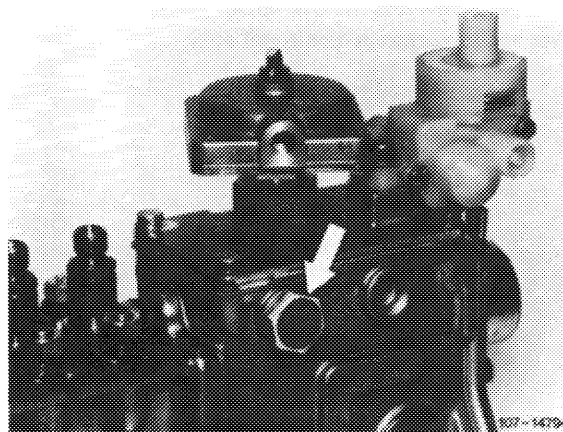
When fitting a new driver, note Woodruff key and marks (arrows).



Installation

Attention:

Prior to installing a replacement injection pump, remove screw plug (arrow) and fill with 0.4 l engine oil (first filling).

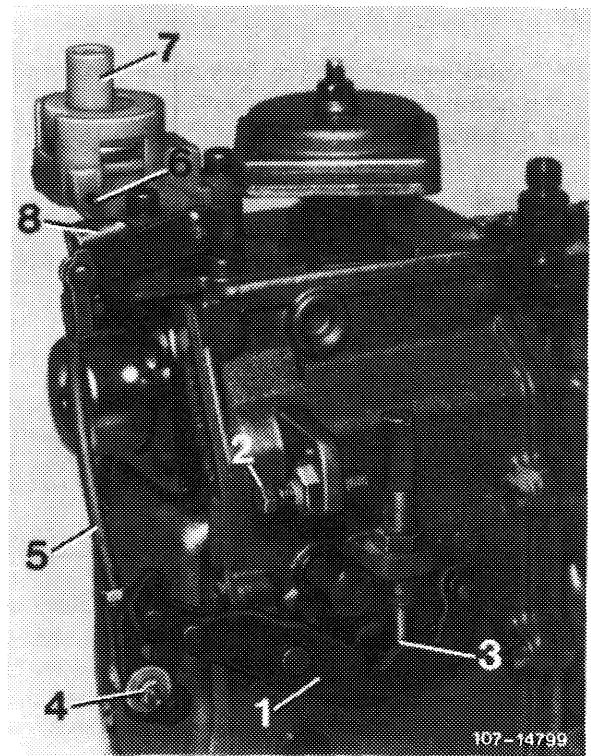


10 Check whether connecting rod (5) is correctly set, moving control lever (1) to full-load stop (2) for this purpose. Operating lever (8) must have approx. 0.5 mm clearance from full-load stop (6).

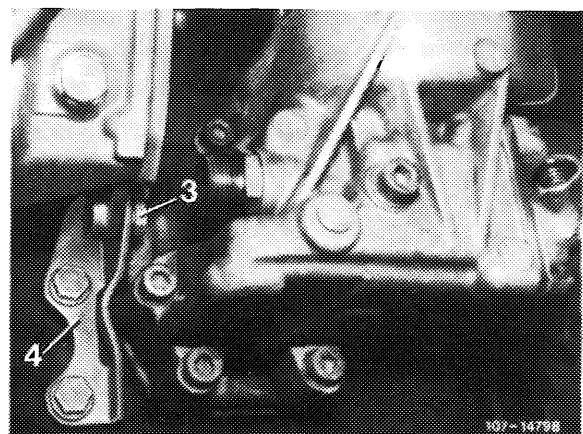
If necessary, adjust connecting rod (5) at adjustable knuckle (4).

- 1 Control lever
- 2 Full-load stop
- 3 Idle speed stop
- 4 Adjustable knuckle
- 5 Connecting rod

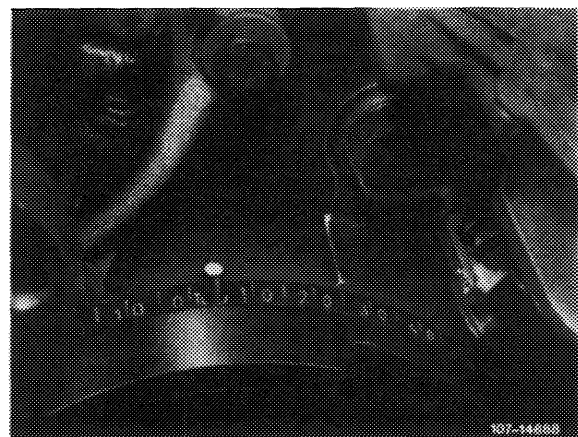
- 6 Full-load stop at vacuum control valve
- 7 Vacuum control valve
- 8 Operating lever for vacuum control valve



11 Detach supporting holder (4) from removed injection pump and bolt to injection pump for installation. Do not tighten fastening bolt (3) because adjustment within oblong hole is still necessary.



12 Move crankshaft to start of delivery in compression stroke.



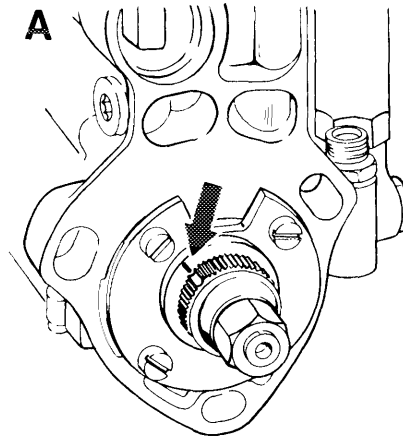
13 Fit new gasket.

14 Move injection pump to mark, turning injection pump camshaft until mark on camshaft agrees with line on flange (arrow).

Attention!

On Bosch production code number "251" (November 1982) the mark for begin of delivery may be applied to the wrong spot on bearing cap.

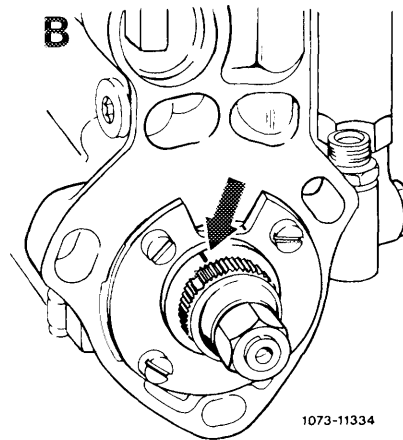
Mark on bearing cap correct
(approx. center of bearing cap screw)



Note

When installing an injection pump with wrong mark on bearing cap, the pinion should be positioned in such a manner that the recess is 3 teeth to the left on the mark of the bearing cap. In this position the injection pump is at begin of delivery (basic position). The engine should be at 24° before TDC, as usual.

Marking on bearing cap wrong
(approx. lefthand edge recess of oil overflow)



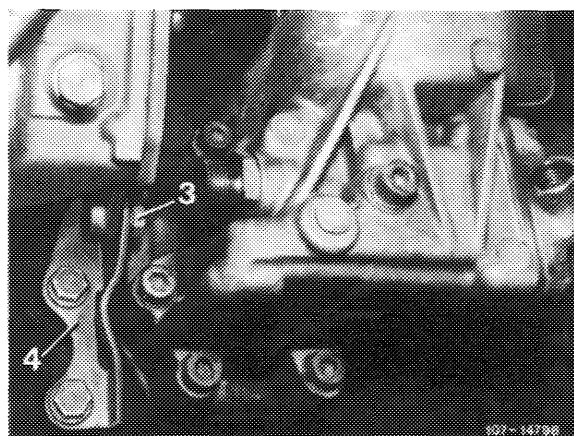
1073-11334

15 Slip coupling sleeve onto driver and insert injection pump. Fit washers and slightly tighten fastening nuts of injection pump.

16 Check and adjust start of delivery (07.1-110 and 115).

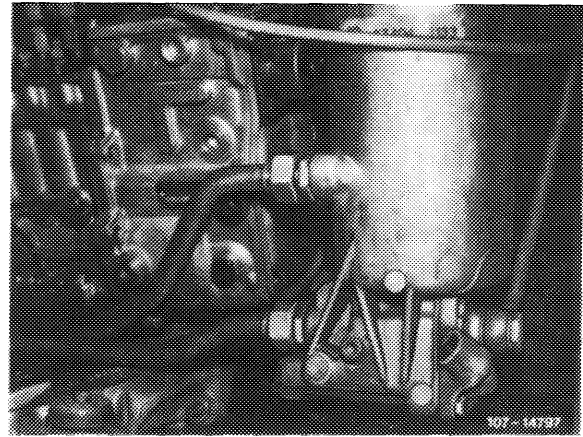
17 Tighten injection pump fastening nuts and attach supporting holder (4) to crankcase. Now tighten fastening bolt (3) in oblong hole of supporting holder. Supporting holder is to be fastened with shims as per part No. 116 990 14 40 and hex-head bolts M 8 x 16.

18 Reconnect lubricating oil line to injection pump.



107-14796

- 19 Fit oil filter and oil filter cover with new seal.
- 20 Connect all oil lines to oil filter.
- 21 Attach temperature sensor cable, connect charge air line and vacuum lines to injection pump, and fit all fuel lines.



22 Vent injection system with hand delivery pump (07.1—140).

23 Check throttle linkage and adjust, if required (30—300).

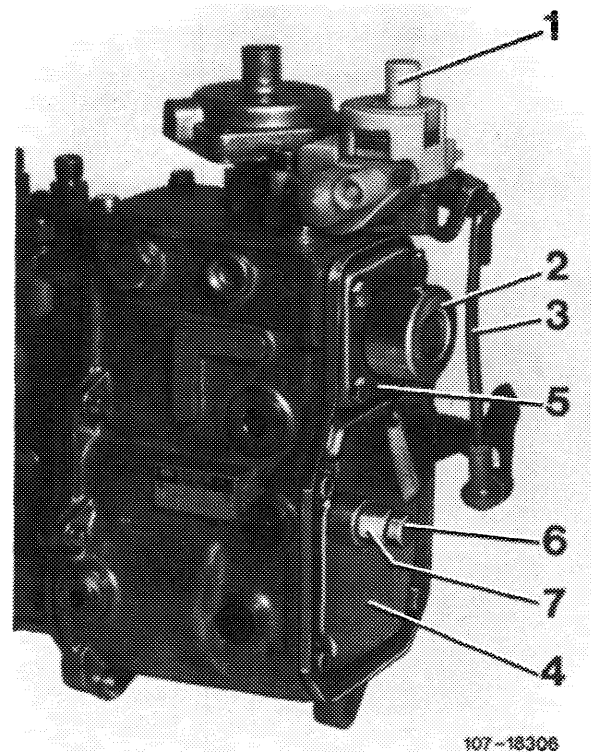
24 Run engine to operating temperature and check all connections for leaks.

25 Check idle speed and adjust, if required (07.1 - 100).

26 Adjust damper for regulator. If a damper (6) is installed on regulator of injection pump, adjust at idle against transverse vibrations of engine.

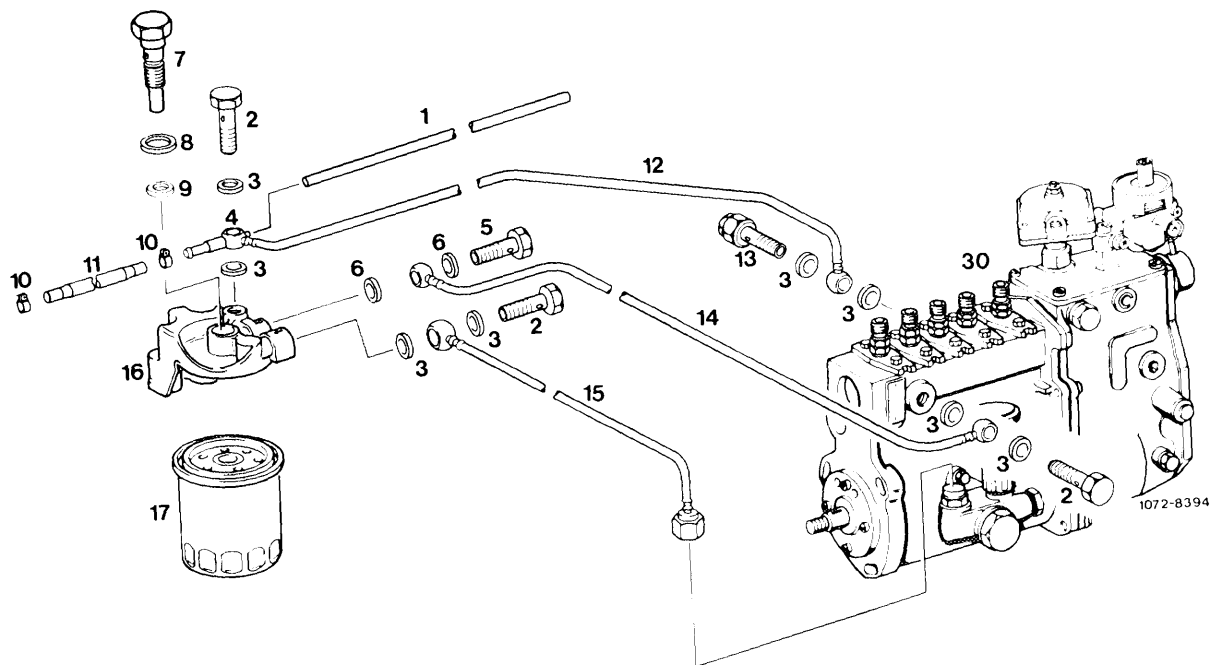
For this purpose, loosen counter nut (7).

Adjust damper (6) at idle speed, screwing damper in until transverse engine vibrations have been remedied. Then tighten counter nut (7) to 20—25 Nm.



6 Damper
7 Counter nut

Fuel filter

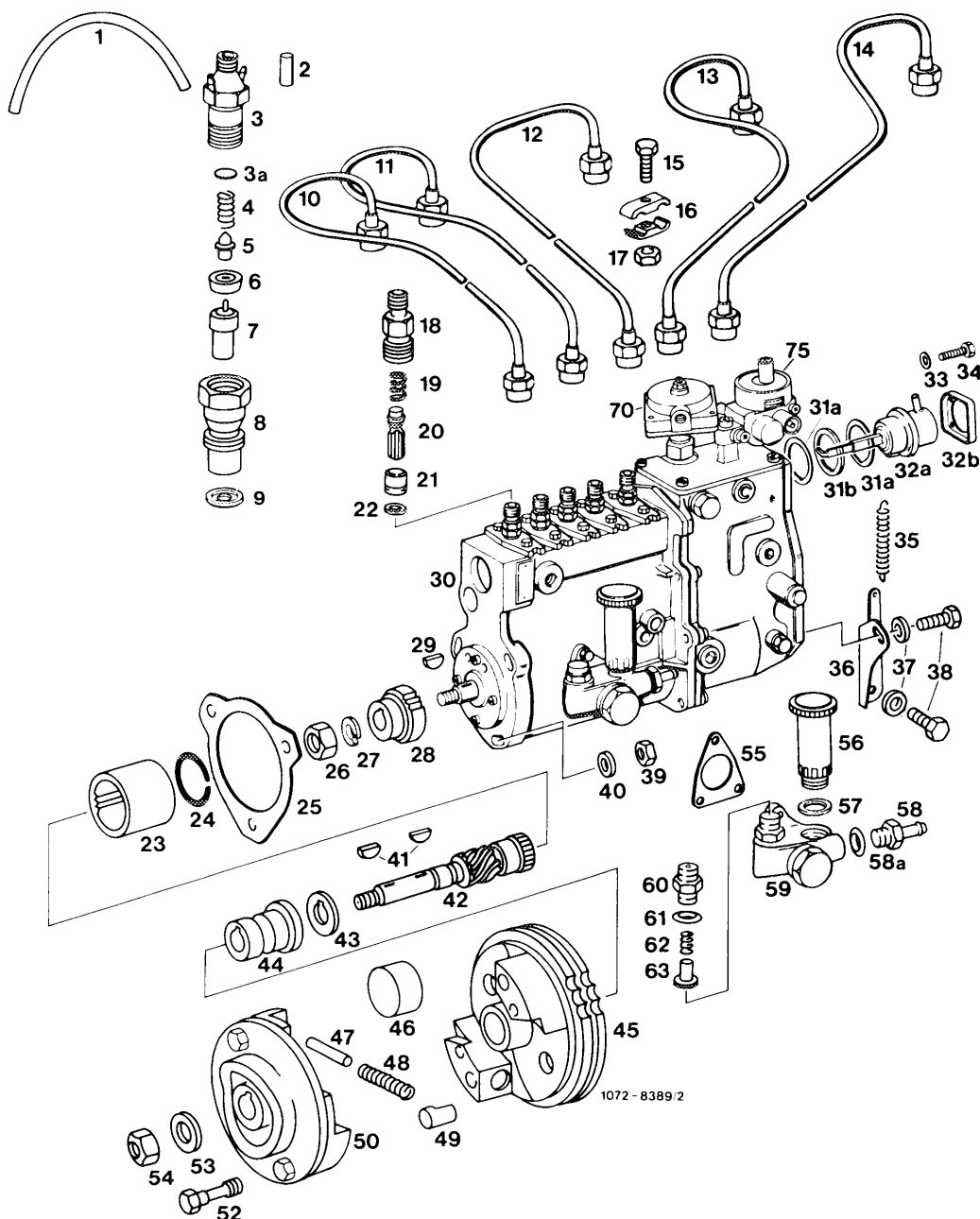


- 1 Leak-off hose from injection nozzle
- 2 Union screw
- 3 Sealing ring
- 4 Banjo connector
- 5 Union screw
- 6 Sealing ring

- 7 Union screw
- 8 Sealing ring
- 9 O-ring
- 10 Hose clamp
- 11 Expansion hose
- 12 Return line from bypass valve

- 13 Bypass valve
- 14 Fuel line
- 15 Fuel line
- 16 Upper part of fuel filter
- 17 Fuel filter
- 30 Injection pump

Mixture Control



- | | | | | | |
|----|------------------------------|-----|---------------------|-----|-------------------------------------|
| 1 | Leak-off hose | 23 | Seal | 44 | Socket |
| 2 | Stopper | 24 | Snap ring | 45 | Segment for injection timing device |
| 3 | Injection nozzle, upper part | 25 | Gasket | 46 | Centrifugal weight |
| 3a | Steel shim | 26 | Nut | 47 | Pin |
| 4 | Compression spring | 27 | Lock washer | 48 | Compression spring |
| 5 | Thrust pin | 28 | Drive pinion | 49 | Pin |
| 6 | Nozzle holder insert | 29 | Woodruff key | 50 | Segmental flange |
| 7 | Nozzle body | 30 | Injection pump | 52 | Waisted bolt |
| 8 | Injection nozzle, lower part | 31a | Gasket | 53 | Washer |
| 9 | Nozzle plate | 31b | Steel washer | 54 | Nut |
| 10 | Injection line | 32a | Vacuum control unit | 55 | Gasket |
| 11 | Injection line | 32b | Flange | 56 | Hand-operated fuel feed pump |
| 12 | Injection line | 33 | Washer | 57 | Rubber sealing ring |
| 13 | Injection line | 34 | Bolt | 58 | Socket |
| 14 | Injection line | 35 | Return spring | 58a | Sealing ring |
| 15 | Bolt | 36 | Holder | 59 | Fuel feed pump |
| 16 | Pipe holder | 37 | Washer | 60 | Screwed union |
| 17 | Nut | 38 | Bolt | 61 | Sealing ring |
| 18 | Pipe connection | 39 | Nut | 62 | Compression spring |
| 19 | Compression spring | 40 | Washer | 63 | Delivery and suction valve |
| 20 | Delivery valve | 41 | Woodruff key | 64 | Aneroid compensator |
| 21 | Delivery valve holder | 42 | Idler gear shaft | 75 | Vacuum control valve |
| 22 | Copper sealing ring | 43 | Thrust ring | | |