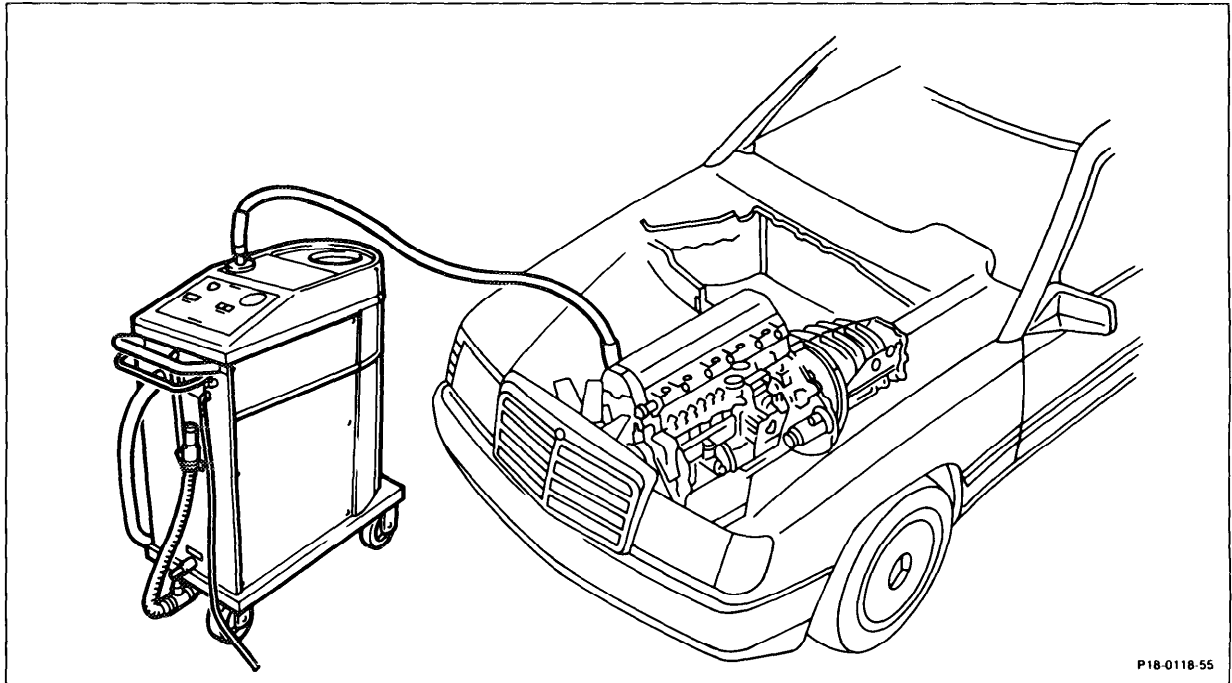




Job No.

Engine oil and filter change	18 – 002
Oil circuit, oil pressure, overpressure and bypass valve, oil filter	18 – 005
Removal and installation of oil spray nozzles	18 – 040
Removal and installation of oil filter	18 – 110
Modifications to oil filter	18 – 115
Removal and installation of oil pump	18 – 210
Replacement of oil pump chain	18 – 212
Removal and installation of oil pressure relief valve	18 – 215
Testing oil level indicator	18 – 220
Function of oil level indicator	18 – 225
Removal and installation of oil level sensor	18 – 226

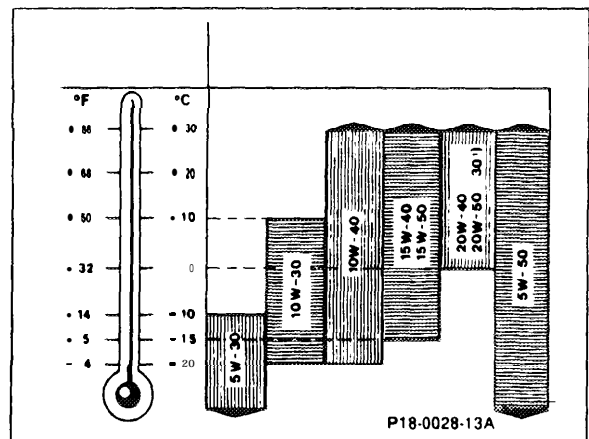
18-002 Engine oil and filter change



Specified viscosity class for engine oil in accordance with SAE at prolonged outside temperatures

Precise use of the SAE class according to outside air temperatures would necessitate frequently changing the engine oil. The temperature limits for the SAE classes should therefore be regarded as guidelines which can be exceeded for short periods.

See “**Service Product Specifications**” for further information on specified viscosity classes and approved engine oils.



- 1) SAE 40 may be used at prolonged outside temperatures above + 30 °C.

Oil capacity in liters

Engine	Model	Capacity for oil and filter change	Dipstick marking		
			Colored marking	Colored marking	Numerical marking on handle (color red)
			Round handle	Handle-shaped like bottle opener	
602.91	201	6.5 (6.8 U.S. Qt.)	-	-	60214 ¹⁾
		7.0 ²⁾ (7.4 U.S. Qt.)	-	green ¹⁾	-
602.96	124, 201	7.0 (7.4 U.S. Qt.)	-	green ³⁾	-
603.96	124	7.5 (8.0 U.S. Qt.)	-	black	-
603.96/97	126	7.5 (8.0 U.S. Qt.)	-	-	60316

1st version - red colored marking

2nd version - black colored marking

3rd version - brown colored marking

2) On engines with exhaust gas recirculation and side part on oil sump

3) 1st version black

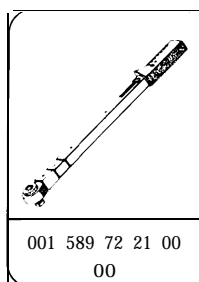
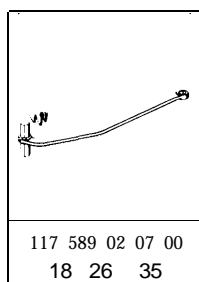
Tightening torques

Nm

Oil filter cover fastening nuts		25
Oil drain plug on oil sump	M 12x1,5x13	30
	M 14x1,5x22	25
Return pipe in oil filter cover ¹⁾		25

1) Only engine 603 in Model 124

Special tools



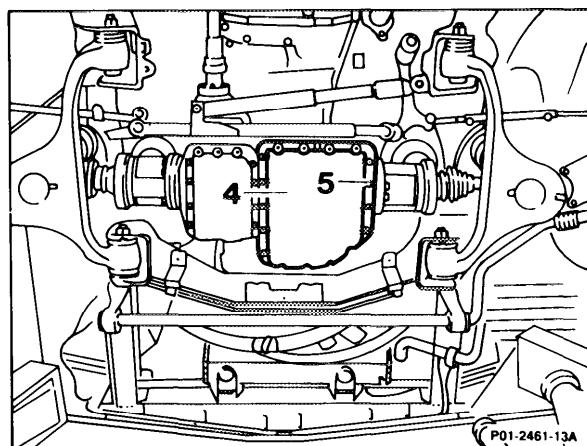
Commercial tool

Engine oil extractor

e.g. Deutsche Tecalimit
Am Metallwerk 11
D-4800 Bielefeld

Note

On models with air-to-oil cooler (turbo engines) the oil does not need to be drained from the air-to-oil cooler.

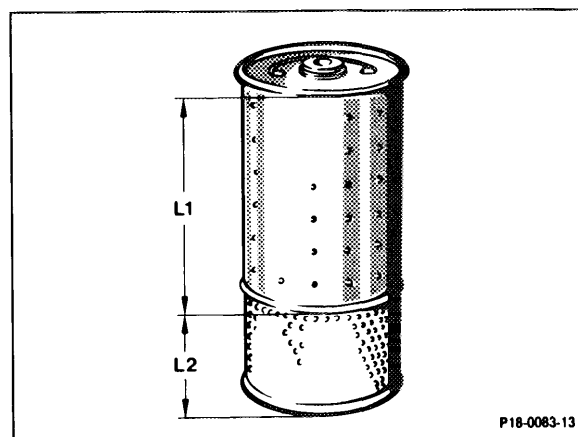


Caution!

The filter element and the rubber seal on the oil filter cover must not be confused with that of engines 615, 616 and 617 as these are different in size.

Engine 602, 603
Size L1 113 mm
L2 49 mm

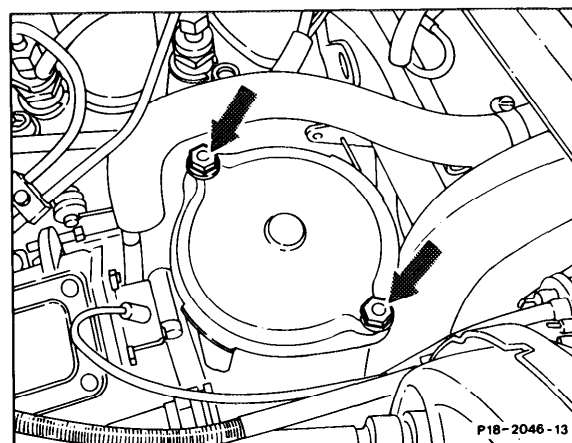
Engine 615, 616, 617
Size L1 131 mm
L2 55 mm



Caution!

Change engine oil only when engine at normal operating temperature.

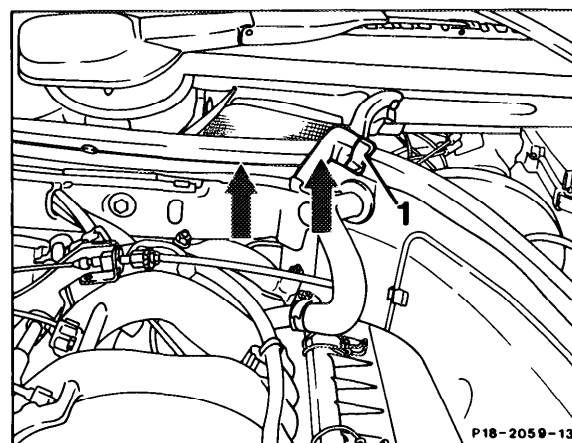
1 Empty oil filter before extracting or draining the engine oil. This is done by unscrewing the nuts (arrows) and taking off the cover.



For reasons of space, when performing this step on engine 603 in Model 124 (up to 01/86), detach rubber gasket or sealing strip on the component partition wall in the manner described below, and pull up slightly.

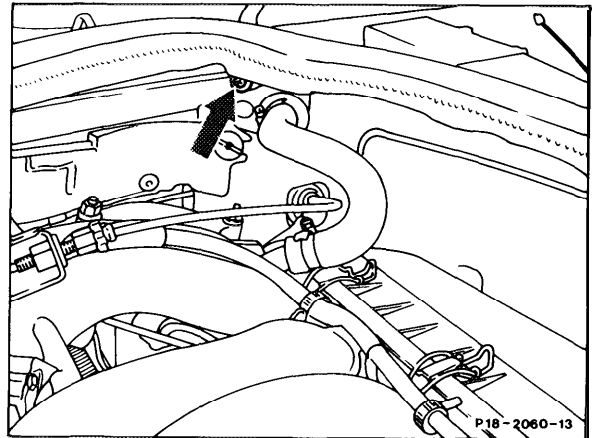
Divided rubber gasket

Pull off retaining clip (1).



One-piece rubber gasket

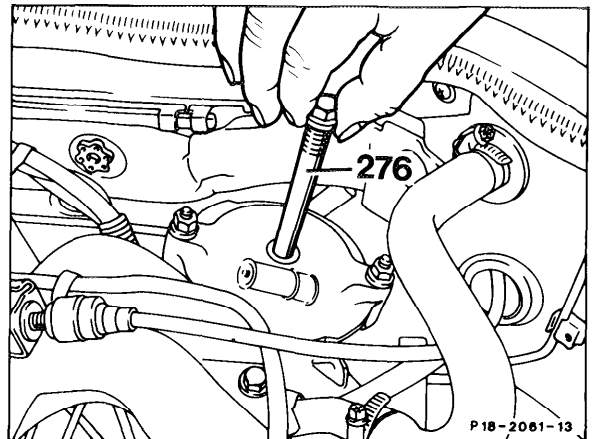
Remove screw (arrow).



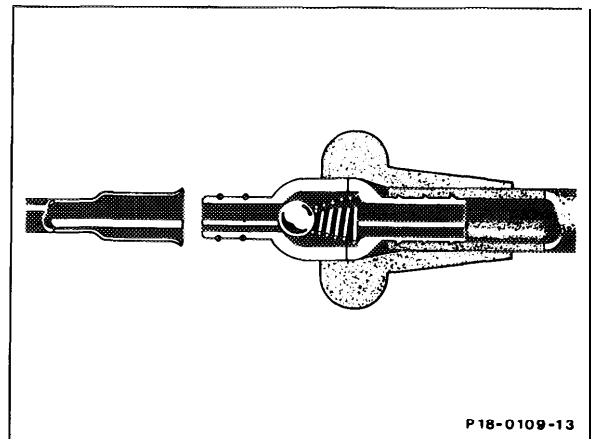
2-part oil filter cover

(effective 02/86, engine 603 in model 124)

Unscrew return pipe (276) and take off. Unscrew oil filter cover fastening nuts and take off cover.



2 Extract engine oil through the dipstick guide tube when the engine is at normal operating temperature.



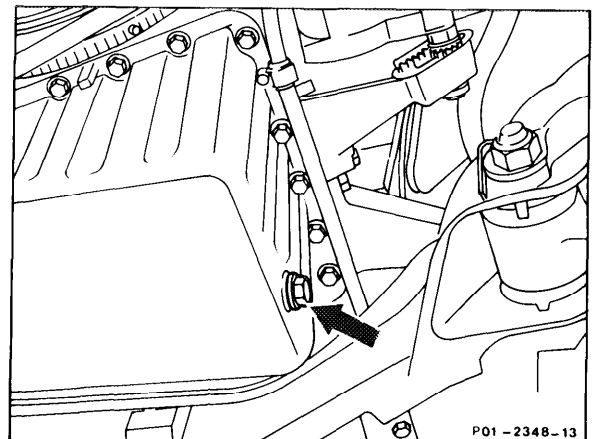
If no extractor is available:

3 Remove engine compartment cover below (01-006).

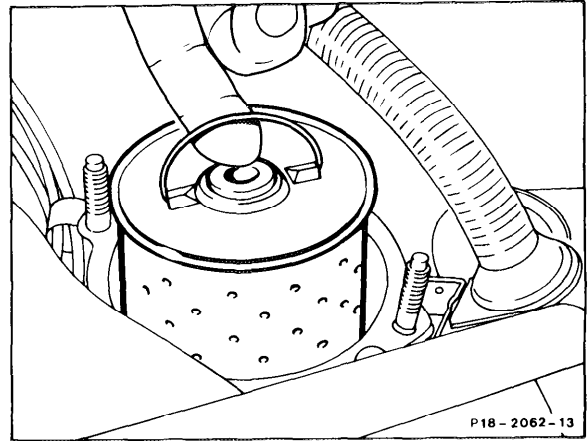
4 Drain engine oil out of sump (arrow).

Note

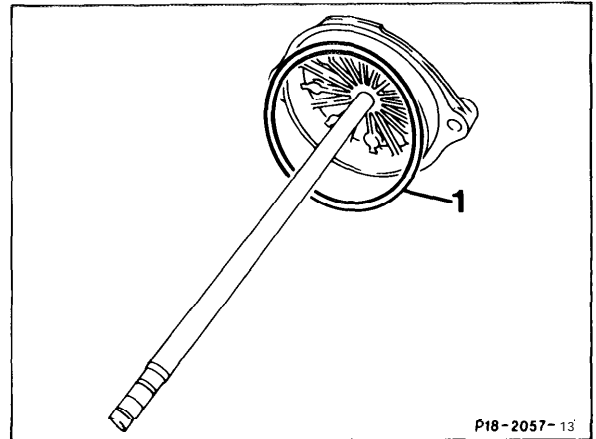
The oil in the air-to-oil cooler does not need to be drained.



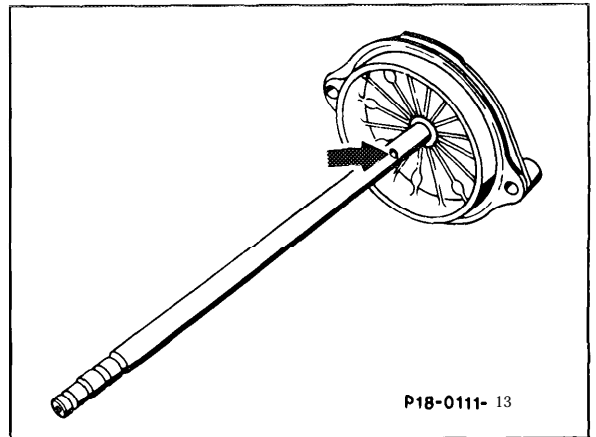
5 Replace filter element.



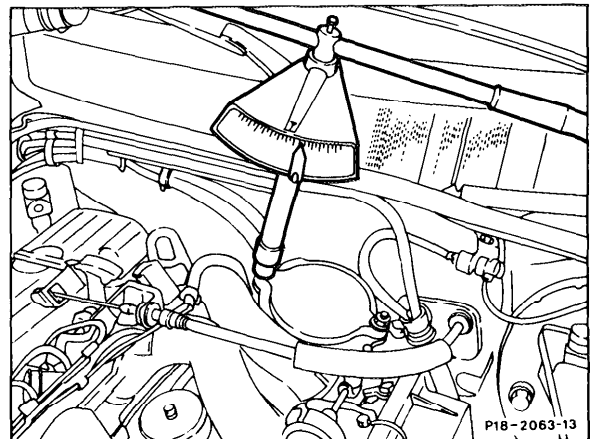
6 Replace rubber seal (1) on the cover.



7 Examine restriction opening on oil pipe for foreign bodies (arrow). If it is blocked, remove foreign bodies by hand. Following this, blow compressed air into restriction opening. Air must be felt to escape at the bottom of the oil pipe. If the restriction opening is not clear or if no air flows out, replace oil filter cover together with oil pipe.



8 Tighten nuts and return pipe to 25 Nm.



9 If the oil has been drained from the sump, replace sealing ring of oil drain plug.

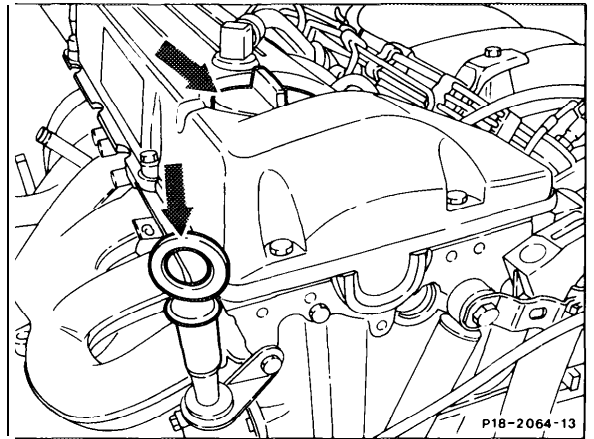
10 Tighten oil drain plug to 30 or 25 Nm, respectively.

11 Add engine oil.

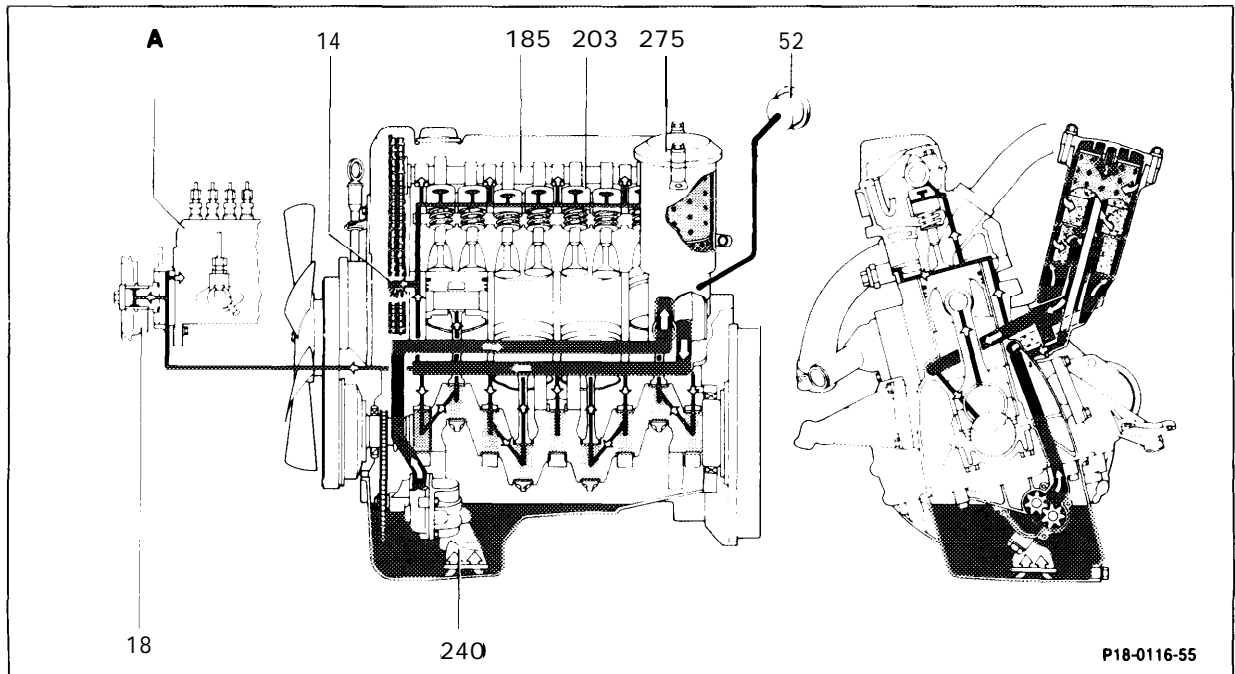
12 Run engine and examine for signs of leaks

13 Check oil level approx. 2 minutes after turning off engine at normal operating temperature.

14 Install engine compartment covering (01-006).

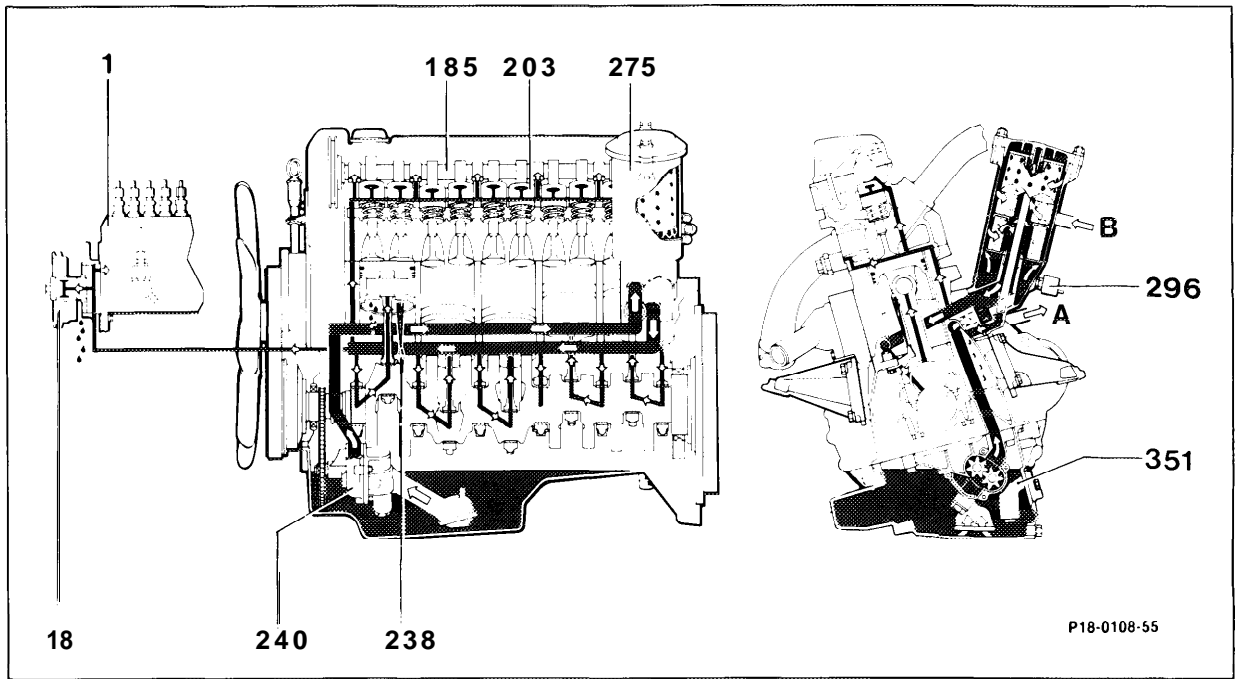


1 8-005 Oil circuit, oil pressure, overpressure and bypass valve, oil filter



Oil circuit diagram engine 602. 91

14	Oil spray nozzle	203	Valve tappet
18	Timing device	240	Oil pump
52	Oil pressure gauge	275	Oil filter
185	Camshaft	A	Injection pump

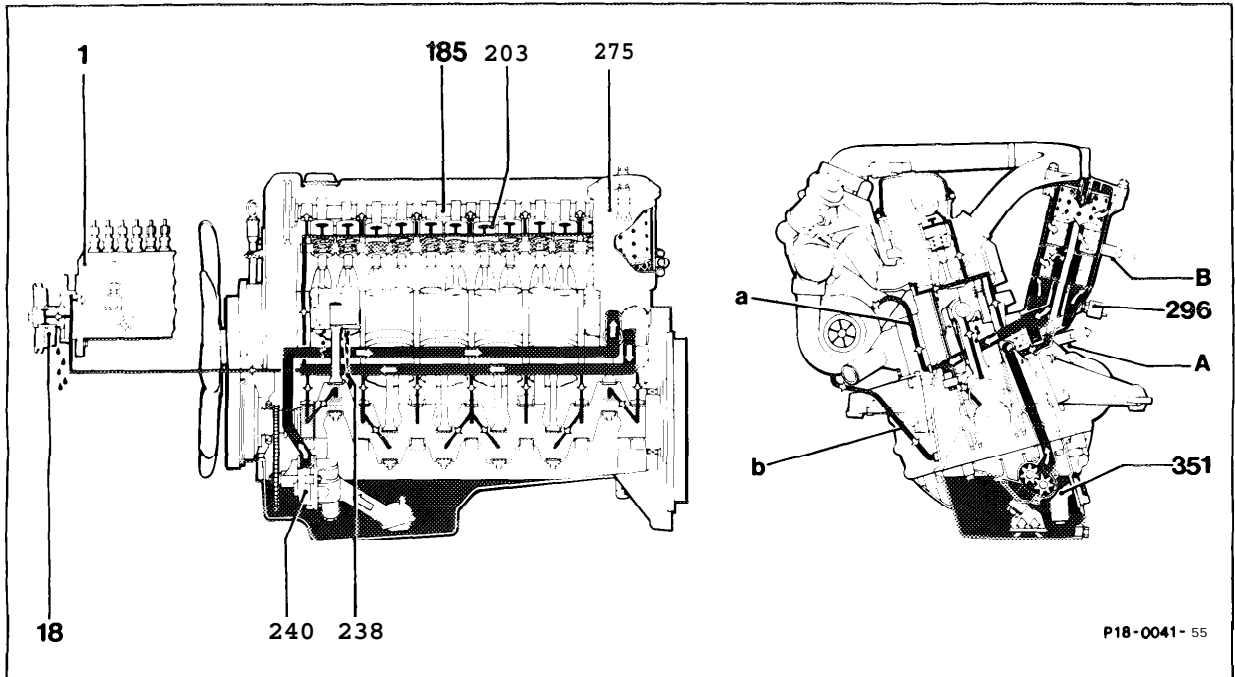


Oil circuit diagram engine 602.91 with exhaust gas recirculation

1	Injection pump	275	Oil filter
18	Timing device	296	Oil pressure switch
185	Camshaft	351	Oil level sensor
203	Valve tappet	A	Unfiltered oil to air-to-oil cooler
238	Oil spray nozzle	B	Unfiltered oil from air-to-oil cooler
240	Oil pump		

Note

Engine 602.91 with exhaust gas recirculation and manual transmission in combination with air conditioning.



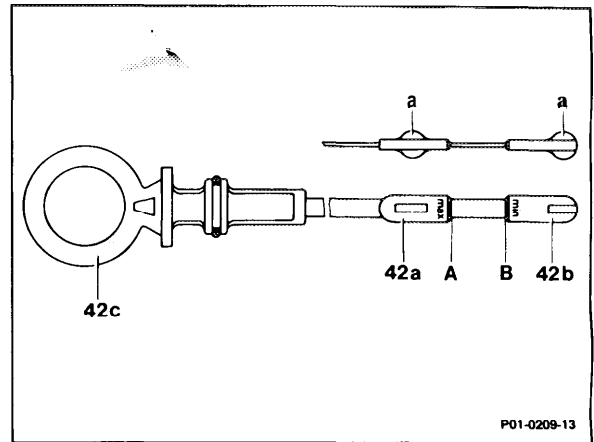
Oil circuit diagram engines 602.96, 603.96197 (Turbo)

1	Injection pump	296	Oil pressure switch
18	Timing device	351	Oil level <i>sensor</i>
185	Camshaft	A	Unfiltered oil to air-to-oil cooler
203	Valve tappet	B	Unfiltered oil from air-to-oil cooler
238	Oil spray nozzle	a	To exhaust gas turbocharger
240	Oil pump	b	From exhaust gas turbocharger
275	Oil filter		

Dipstick

Effective 05/84 the Min and Max markings on engine 601 are made of plastic.

- 42a Max marking
- 42b Min marking
- 42c Round handle
- A - B Filling range

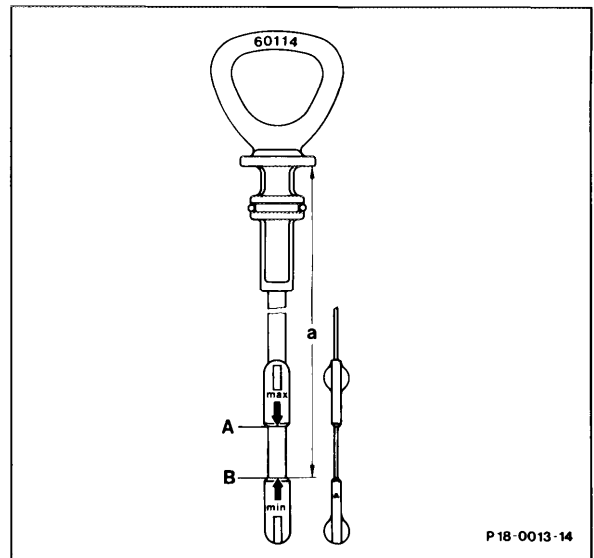


Production breakpoint: 05/84

Model	Engine	Engine End No.		Vehicle Ident End No.	
		manual transmission	automatic transmission	A	F
201.122	601.921	001552	004036	092057	015430

On engine **602** a dipstick with black handle was fitted to achieve standardization with engine 603.

- 42a Max marking
- 42b Min marking
- 42c Handle shaped like a bottle opener
- A - B Filling range



Production breakpoint: 01/86

Model	Engine	Engine End No.		Vehicle Ident End No.	
		manual transmission	automatic transmission	A	F
201	602.911	011154	002690	276209	186941

Effective 01/87 a dipstick with green handle (previously black) is fitted to engine 602.96 (Turbo).

Production breakpoint: 01/87

Model	Engine	Engine End No.		Vehicle Ident End No.	
		manual transmission	automatic transmission	A	F
201.128	1602.961	–	000405	*	*

* not registered

Engine 602.91 is fitted with a dipstick with a brown handle.

Production breakpoint: 02/87

Model	Engine	Engine End No.		Vehicle Ident End No.	
		manual transmission	automatic transmission	A	F
201.126	602.911	036659	009332	*	*

* not registered

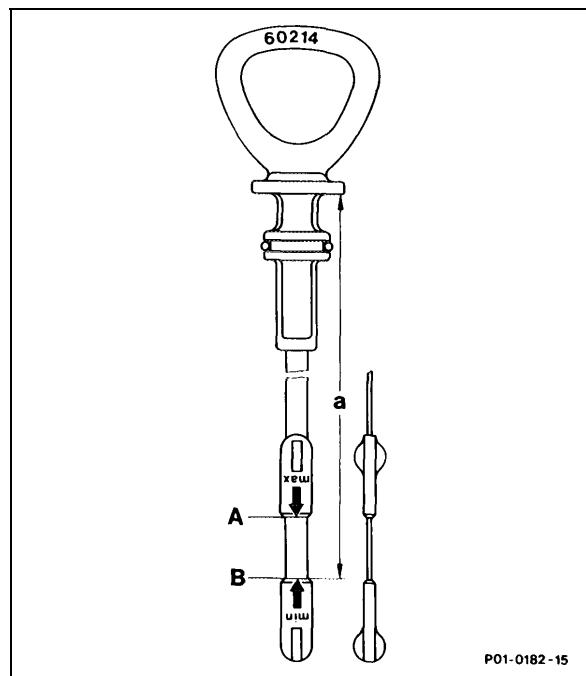
Effective 03/90 the oil level sensor position on engine 602.91 is lowered, which results in a change to the dipstick.

Dipstick marking

Color: red

Marking on handle 60214

Size: A – B previously 28 mm, now **24** mm
a previously 516 mm, now 516 mm

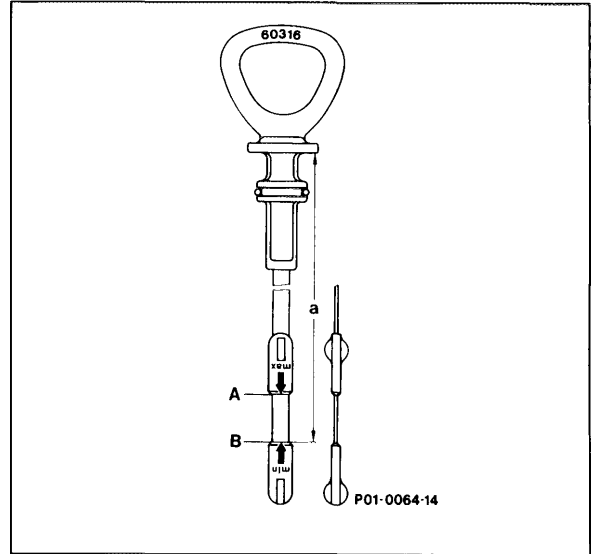


P01-0182 -15

Production breakpoint:03/90

Model	Engine	Engine End No.		Vehicle Ident End No.	
		manual transmission	automatic transmission	A	F
201.122	1602.911	089320	0 17352	558126	723643

On engine 603.970 the dipstick is marked on handle with the number **60316**.



a 512 mm
A - B Filling range

Dipstick marking

Engine	Model	Colored marking Round handle	Colored marking Bottle opener shaped handle	Numerical marking on handle
602.91	201	-	green ²⁾	60214 ¹⁾
602.96	124, 201	-	green ³⁾	-
603.96	124	-	black	-
603.97	126	-	-	60316

1) 1 st version color marking "red"
2nd version color marking "black"
3rd version color marking "brown"

2) Only on engines with exhaust gas recirculation and side part on oil sump

3) 1 st version color marking "black"

Note

The dipsticks must not be interchanged.

Oil pressure and oil pressure indicator

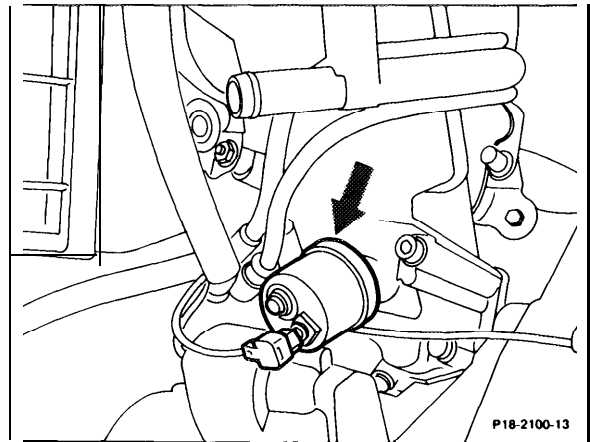
Specified oil pressure at normal operating temperature

	Idle speed	3000 rpm
Oil pressure	≥ 0.3 bar	≥ 3 bar

Voltage exists at the gauge in the instrument cluster when ignition is switched on. In the pressure sensor on the oil filter housing (arrow) ground is switched to the gauge. Any change in oil pressure results in different electrical resistances in the pressure sensor and thus in a different reading in the gauge.

Resistances of pressure sensor as a function of oil pressure

bar	gauge	pressure	0	1	2	3
Resistance approx. Ω	10	69	129	184		

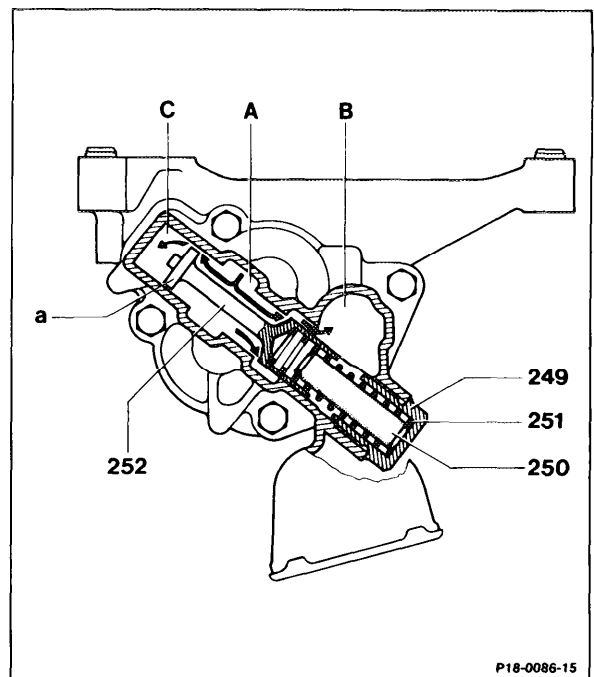


Oil overpressure valve

The oil is drawn through the suction strainer to the suction chamber (B) from the lowest point in the sump. From here, the oil flows through the gears to the pressure chamber (A) and on into the main oil gallery to the filter.

From an oil pressure of 5.8 bar gauge pressure, the piston (252) is pushed against the compression spring (251) and opens the relief bore (arrows) to the suction chamber (8).

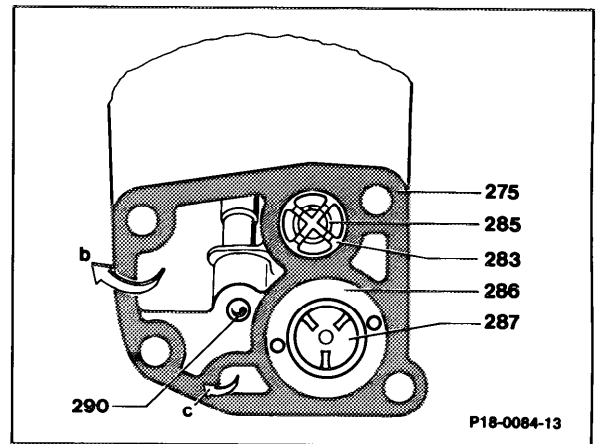
At the same time, the oil flows over two flat faces fitted to the collar (a) into the damping chamber (C). This oil counteracts the piston movements produced by the pulsating oil pressure and results in a damping of the piston.



249 Screw plug
250 Guide pin

Bypass valve

As the filter element becomes increasingly fouled, the lubrication points of the engine are supplied with less and less oil and the pressure in the oil filter rises. Once the filter element is so severely fouled that the oil pressure is 2 bar above the pressure of the oil delivered by the pump, the bypass valve (285) opens. As a result, unfiltered oil flows directly from the sump to the lubrication point, bypassing the filter element.



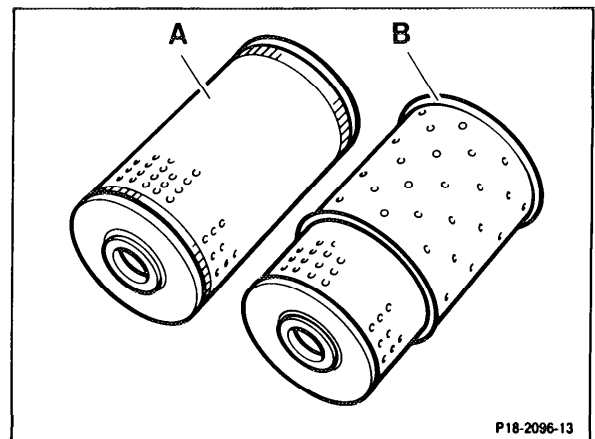
- 275 Oil filter housing
- 283 Spring plate
- 285 Bypass valve
- 286 Return check valve seat
- 287 Return check valve cone
- 290 8 mm \varnothing ball
- b To the bearing points
- c Finely filtered oil to sump

Oil filter element

The full-flow and bypass-flow filter elements are combined in a cartridge.

During the inspection (800 - 1000 miles) the break-in oil filter element (A) should be replaced by the combination oil filter element (B).

The combination oil filter element (B) must be replaced every 7500 miles.

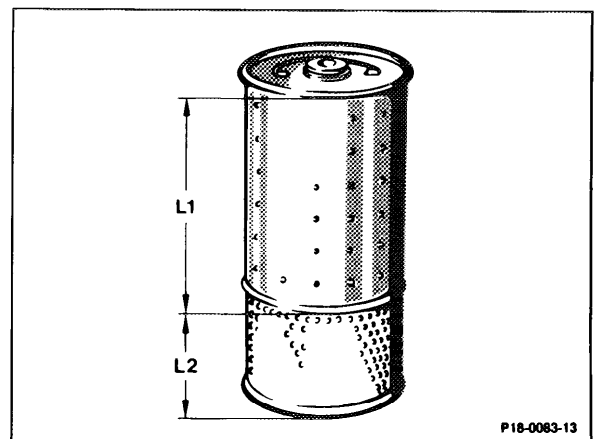


Caution!

The filter element and the rubber seal on the oil filter cover must not be interchanged with those of engines 615, 616 and 617 as they are different in size.

Engine 602, 603
 Size L1 113 mm
 L2 49 mm

Engine 615, 616, 617
 Size L1 131 mm
 L2 55 mm

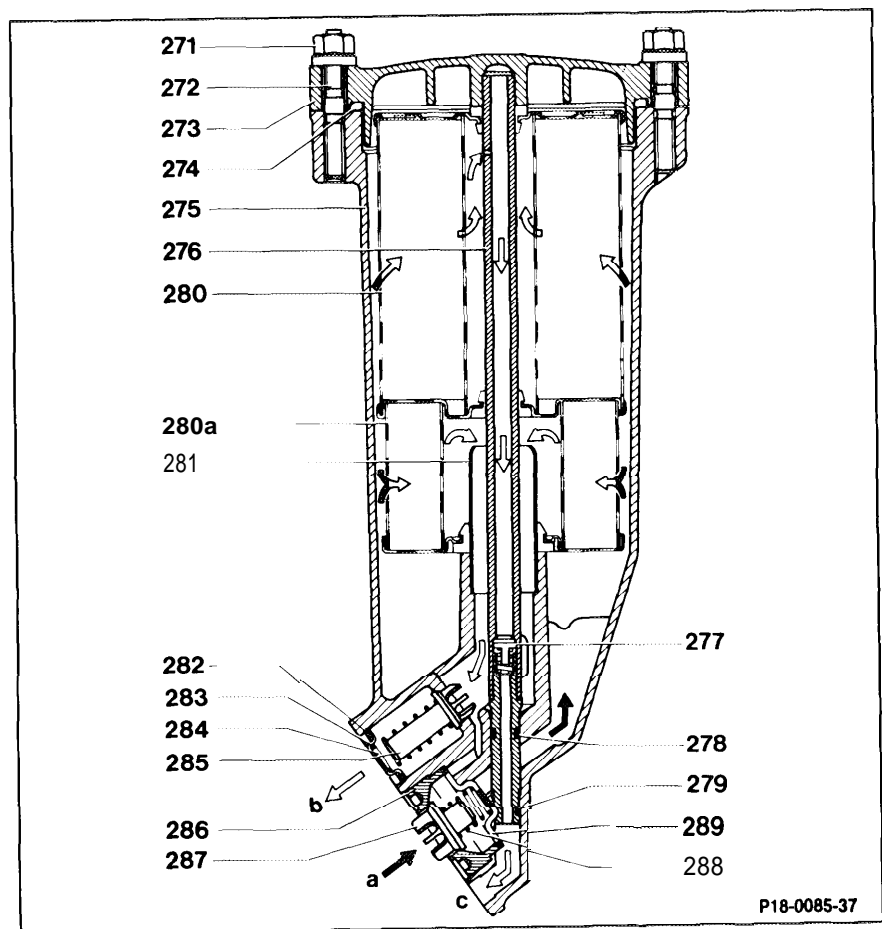


Oil filter (without air-to-oil cooler connections)

The oil flows from the inlet passage (a) through the return check valve (286, 287) into the oil filter housing and flows direct to the oil filter element (280). It flows through the filter element and then through the riser pipe (281) and the passage (b) to the main oil gallery and on to the main bearings. The finely filtered oil flows through the return pipe (276) and the passage (c) to the oil pan.

A rubber seal is fitted in the oil filter element (280) to separate the full flow and bypass flow.

- 271 M 8 nut
- 272 M 8 stud
- 273 Cover
- 274 O-ring
- 275 Oil filter housing
- 276 Return pipe
- 277 Check valve
- 278 O-ring
- 279 O-ring
- 280 Oil filter element
- 280a Full-flow filter
- 281 Riser pipe
- 282 Locking ring
- 283 Spring plate
- 284 Spring
- 285 Bypass valve cone
- 286 Return check valve seat
- 287 Return check valve cone
- 288 Compression spring
- 289 Spring plate



Note

When changing the oil filter element, unscrew the cover (273) and raise it slightly. As a result, the return pipe (276) attached to the cover clears an opening which connects the passages (b) and (c) to each other. The oil in the filter flows back along passage (c) into the oil pan.

The return pipe on engines 601, 602 and in engine 603 - 1st version is press-fitted. On engine 603 in model 124 - 2nd version, this return pipe can be unscrewed when changing oil to more easily remove the oil filter cover.

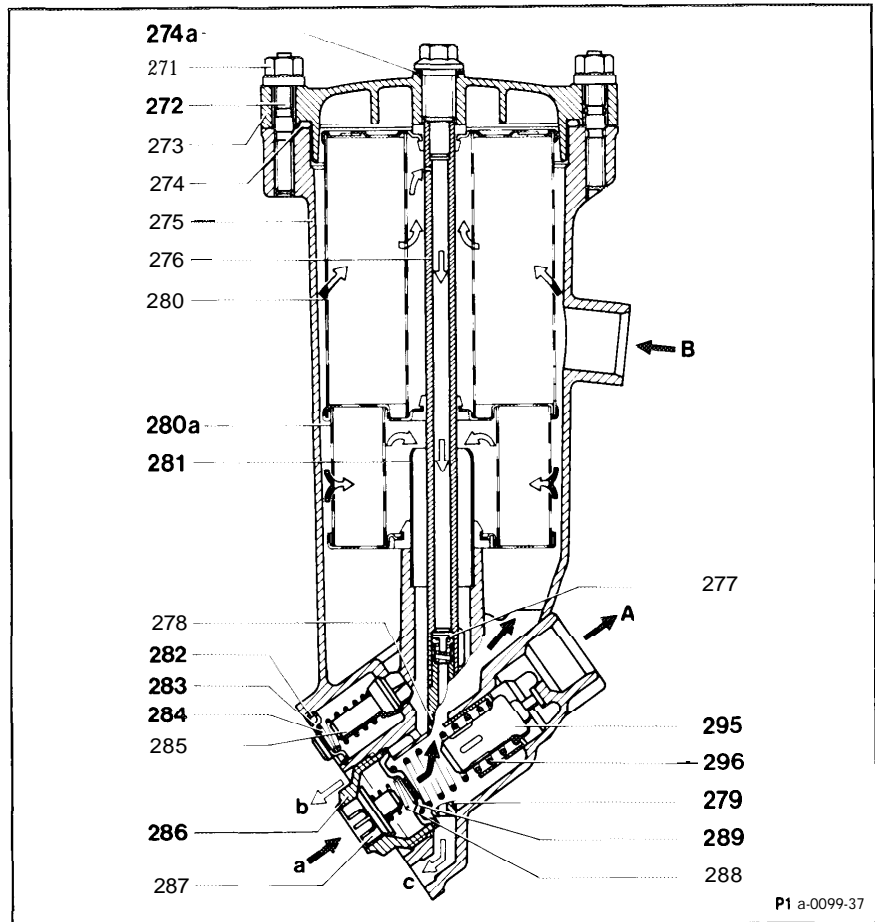
Oil filter (with air-to-oil cooler connections)

A thermostat (295) for controlling the oil circuit through the air-to-oil cooler is fitted in the oil filter.

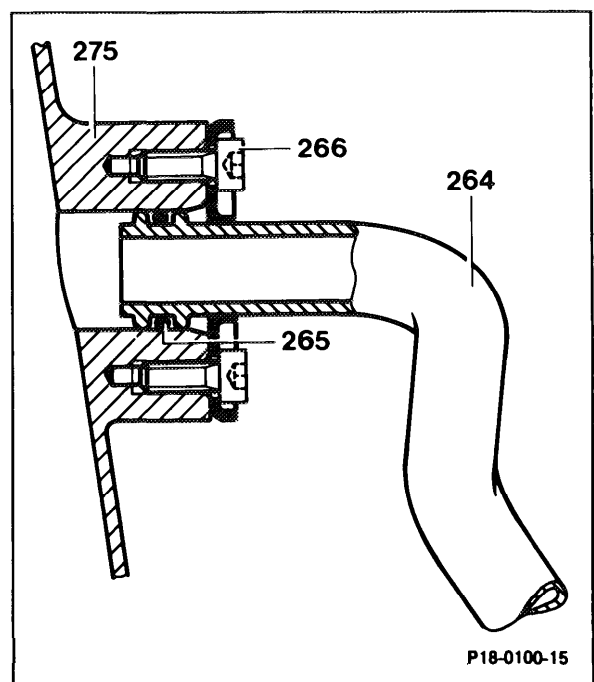
Start of opening approx. 110 °C oil temperature.
Fully open at approx. 125 °C oil temperature.

When the thermostat is fully open, only a slight quantity of oil flows directly to the oil filter element.

- 271 M8 nut
- 272 M8 stud
- 273 Cover
- 274 O-ring
- 274a Seal (only engine 603 in model 124)
- 275 Oil filter housing
- 276 Return pipe
- 277 Check valve
- 278 O-ring
- 279 O-ring
- 280 Oil filter element
- 280a Full-flow filter part
- 281 Riser pipe
- 282 Locking ring
- 283 Spring plate
- 284 Spring
- 285 Bypass valve cone
- 286 Return check valve seat
- 287 Return check valve cone
- 288 Compression spring
- 289 Spring plate
- 295 Thermostat
- 296 Spring
- A Unfiltered oil to air-to-oil cooler
- B Unfiltered oil from air-to-oil cooler
- a To oil filter
- b To bearing points
- c To oil pan



The air-to-oil cooler lines at the oil filter housing are sealed by O-rings (265).



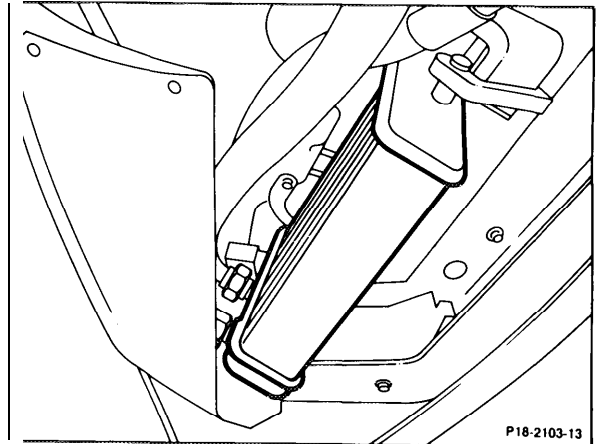
- 264 Air-to-oil cooler lines
- 265 O-ring
- 266 2 screws M 6 x 16
- 275 Oil filter housing

Air-to-oil cooler (engines 602, 603 with exhaust gas circulation and engines with turbocharger)

The air-to-oil cooler is attached to the left wheelhouse behind the bumper.

Oil capacity:

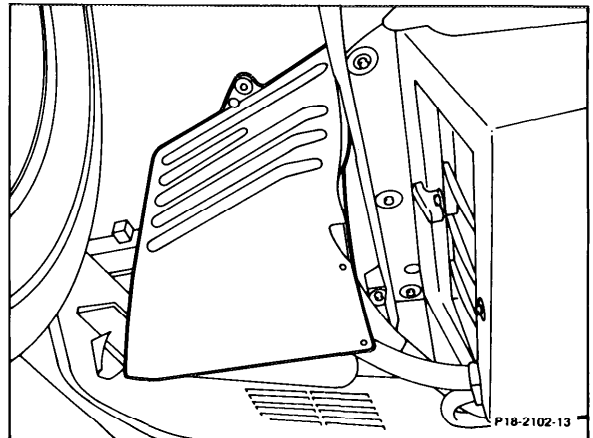
Engine 602.91	0.4 liters
Engines 602.96 1	0.9 liters
Engine 603.96197	0.65 liters



The air-to-oil cooler is shielded by a cover plate.

When changing the oil, it is not necessary to drain the oil in the air-to-oil cooler.

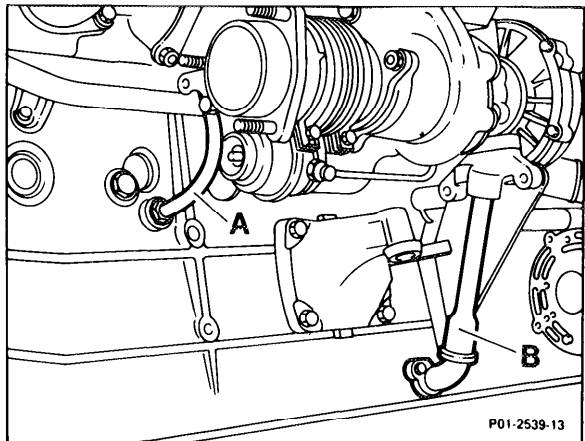
Cover for air-to-oil cooler, shown on model 124



Lubrication of exhaust gas turbocharger

The oil supply of the turbocharger comes from an oil passage in the crankcase and from an oil feed line (A) connected at that point.

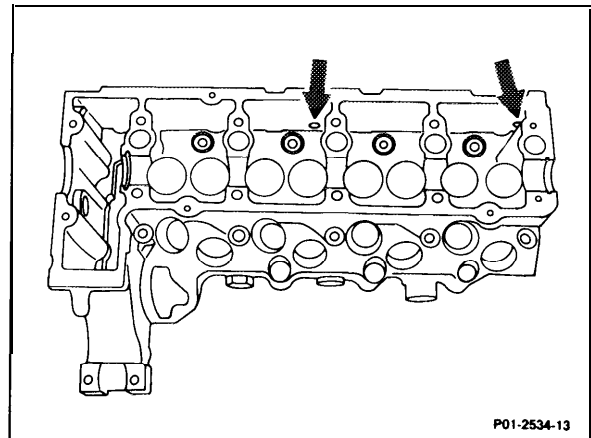
The oil return line (B) is likewise located on the right side of the crankcase and is connected directly above the oil pan.



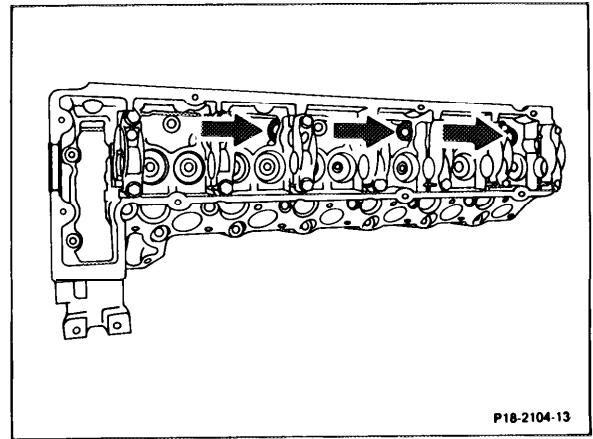
Oil return

Part of the oil from the cylinder head returns to the oil pan through the timing chain case. Because of the installation position tilted 15° to the right, the cylinder heads and crankcase are fitted with two and three return passages (arrows), respectively, for improving the oil return.

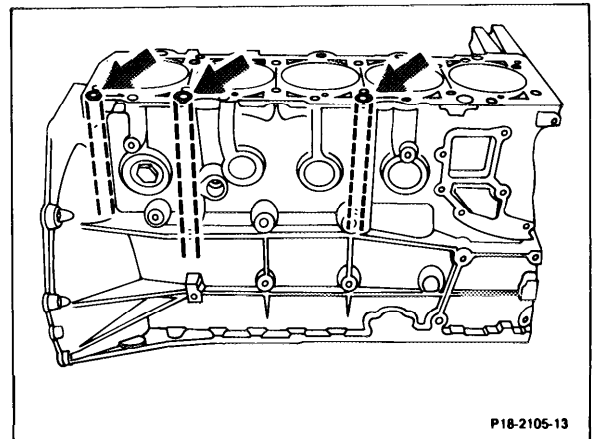
Engine 601
Oil return in cylinder head



Engines 602 and 603
Oil return in cylinder head

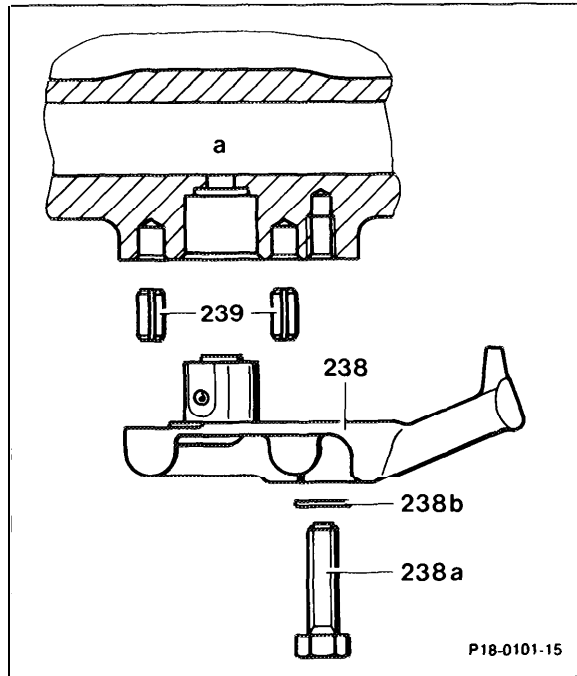


Engines 602 and 603
Oil return in crankcase



18-040 Removal and installation of oil spray nozzles

Preceding work:
Oil pan removed (01-310).



Hex. bolt (238a)	unbolt, bolt in, 10 Nm.
Oil spray nozzle (238)	take off, fit on.

Note

To remove, position crankshaft so that the oil spray nozzle is accessible; do not tilt oil spray nozzle and do not grasp at the nozzle neck. Cover over oil feed bores. Replace oil spray nozzles which have a sharply out-of-round nozzle bore or formation of flash at the nozzle outlet. Blow through oil spray nozzle with compressed air in flow direction of oil. Do not use any hard objects for cleaning. Position oil spray nozzle vertical to the mating surface on the crankcase and press into place.

Caution!

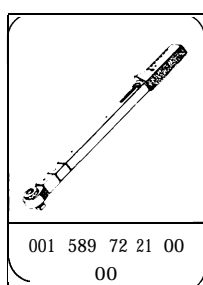
The oil spray nozzles of the naturally aspirated engines (with exhaust gas recirculation and engine 603.970) must not be confused with those of the turbo engines, which have a different spray direction.

Tightening torques

Nm

Hex. bolt of oil spray nozzle

10

Special tool**Note**

Since 1 1/88 die-cast oil spray nozzles have been fitted to the naturally aspirated and turbo engines (previously white heart malleable cast iron).

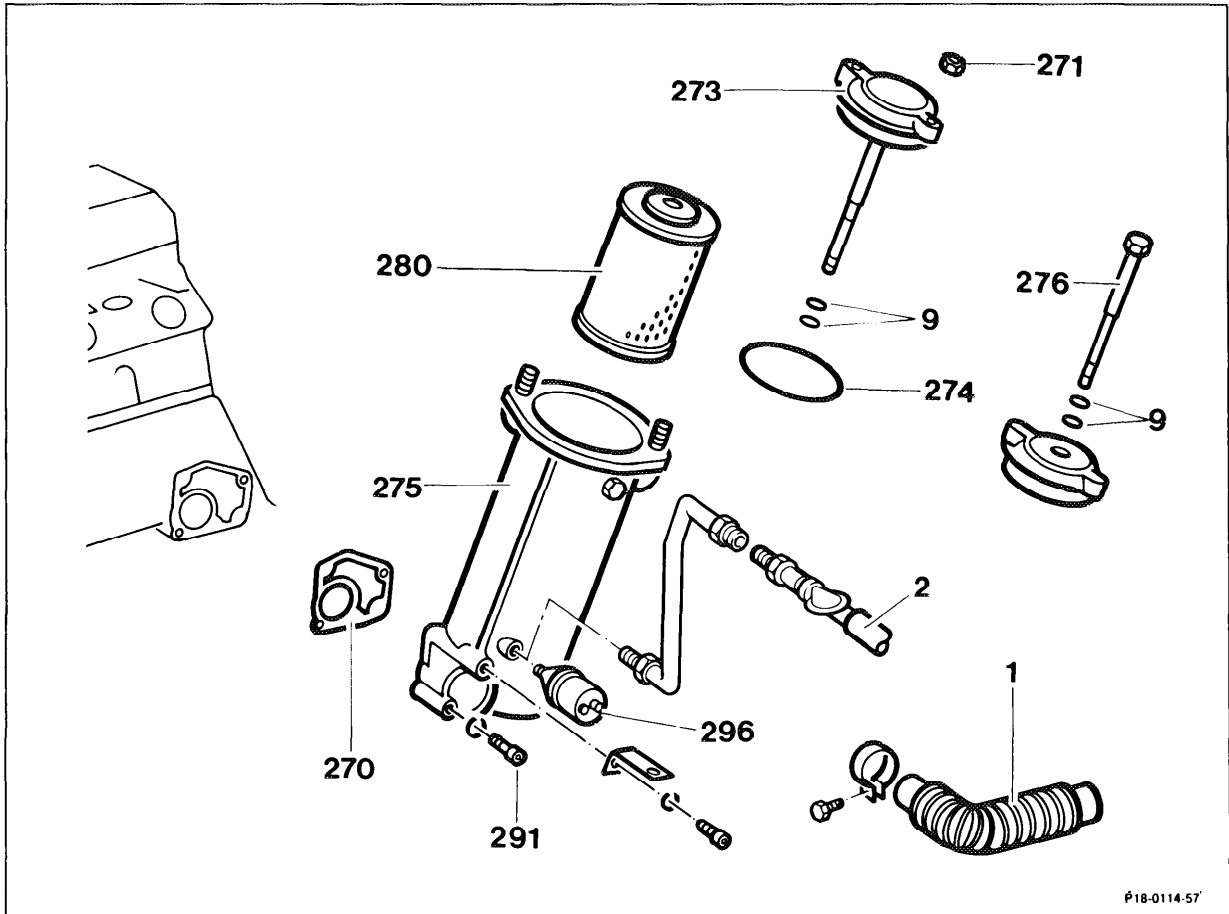
Production breakpoint: 1 1/88

Model	Engine	Engine End No.		Vehicle Ident End No.	
		manual transmission	automatic transmission	A	F
124.128	602.962	-	000597	*	*
124.133 124.193	603.960	-	019838	*	*
201.128	602.961	-	004767	*	*

* not registered

18-110 Removal and installation of oil filter

Preceding work:
Naturally aspirated engine: air filter removed (09-400).



Hex. nuts (271)	.....	on oil filter cover (273), unbolt, bolt on, 25 Nm.
Oil filter cover (273)	.....	remove, refit.
Gasket (274) and seals (9)	.....	remove, insert. Replace gasket and seals.

Engine 603

Return pipe (276)	.....	on oil filter cover, unscrew, screw in, 25 Nm. Replace seals (9).
Oil filter element (280)	.....	withdraw, insert.
Bracket or clips	.....	for starter cable, heater return and vacuum line to oil filter housing, detach, attach.

Engine with exhaust gas recirculation

Pipe(l)

between EGR valve and intake manifold or charge air distribution pipe, detach from oil filter housing, attach.

Oil delivery line (2)

unbolt, reinstall.

Electrical connection

detach from oil pressure sensor (296), attach.

With air-to-oil cooler

Connection line

detach from oil filter housing, attach.

Replace seal.

Hex. socket screws (291)

on flange of oil filter housing (275), unscrew, screw in, 25 Nm.

Oil filter housing (275)

take off from crankcase together with gasket (270), attach. Replace gasket.

Caution!

Seal bores when cleaning sealing surfaces on crankcase.

Tightening torques

Nm

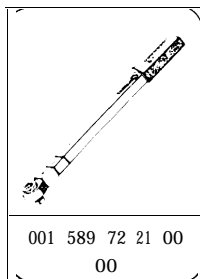
Oil filter cover hex. nut

25

Return pipe

25

Special tool



Removal and installation

1 Unscrew hex. nuts (arrows) on oil filter cover.

Installation instruction

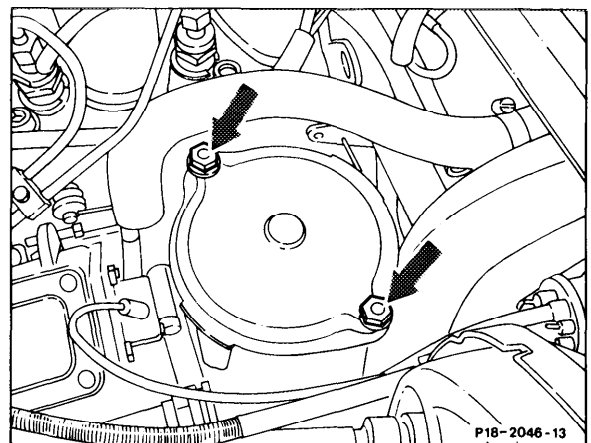
Tightening torque 25 Nm.

2 Take off oil filter cover together with seal.

Installation instruction

Replace seal of oil filter cover.

Check clear passage of return pipe.



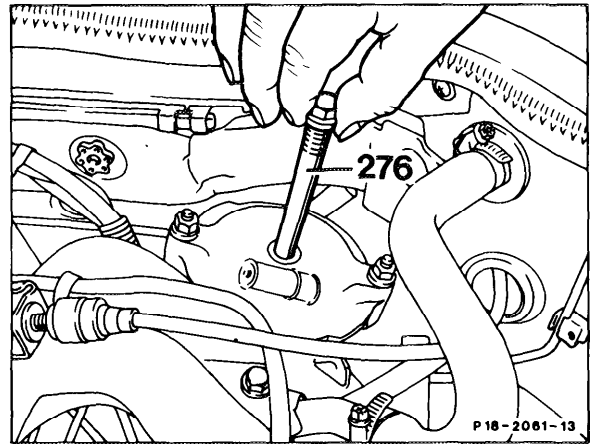
Engine 603

3 Unbolt return pipe (276) and remove, 25 Nm.

Installation instruction

Replace seals.

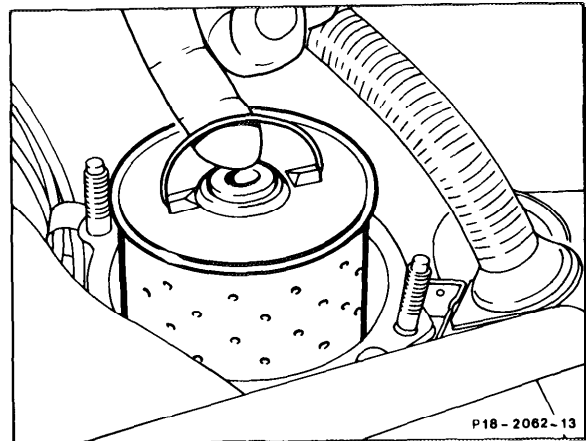
Check that the passage of return pipe is clear.



4 Withdraw oil filter element.

Installation instruction

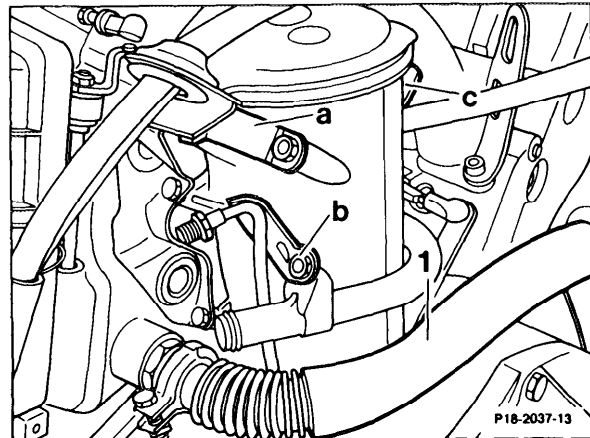
Replace oil filter element.



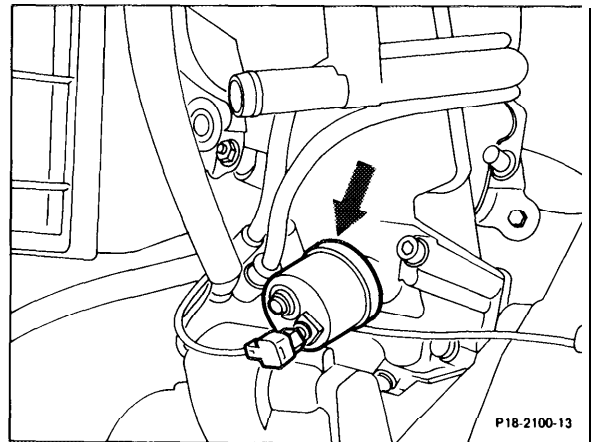
5 Remove brackets (a, b) for starter cable and heater return pipe along with clip (c) for the vacuum line from the oil filter housing.

Engine with exhaust gas recirculation

Remove pipe (1) between EGR valve and intake manifold or charge air distribution pipe from the oil filter housing.



- 6 Detach electrical connection at oil pressure sensor (arrow).



With air-to-oil cooler

- 7 Unscrew hex. socket screws (266) and remove connection line (264) from the oil filter housing (275).

Installation instruction

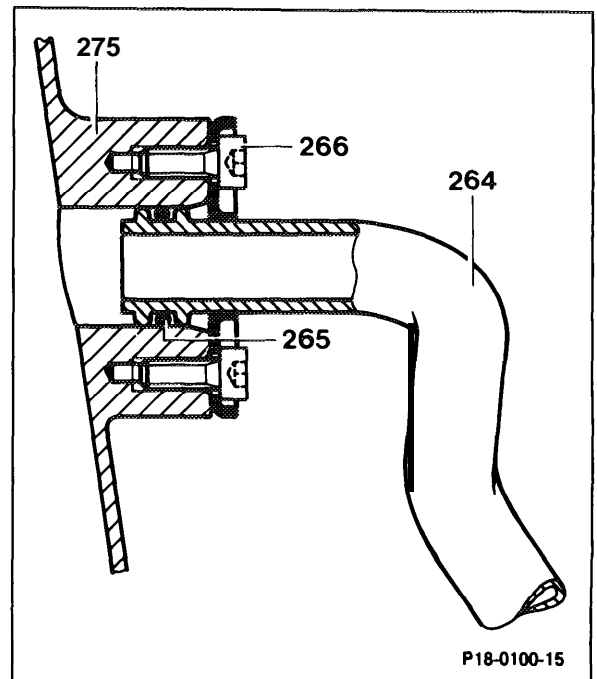
Replace seal (265).

- 8 Unscrew hex. socket screws at the flange of the oil filter housing.

- 9 Remove oil filter housing together with gasket from the crankcase and seal connection bore in the crankcase.

Installation instruction

Clean mating surfaces and replace gasket.



18-115 Modifications to oil filter

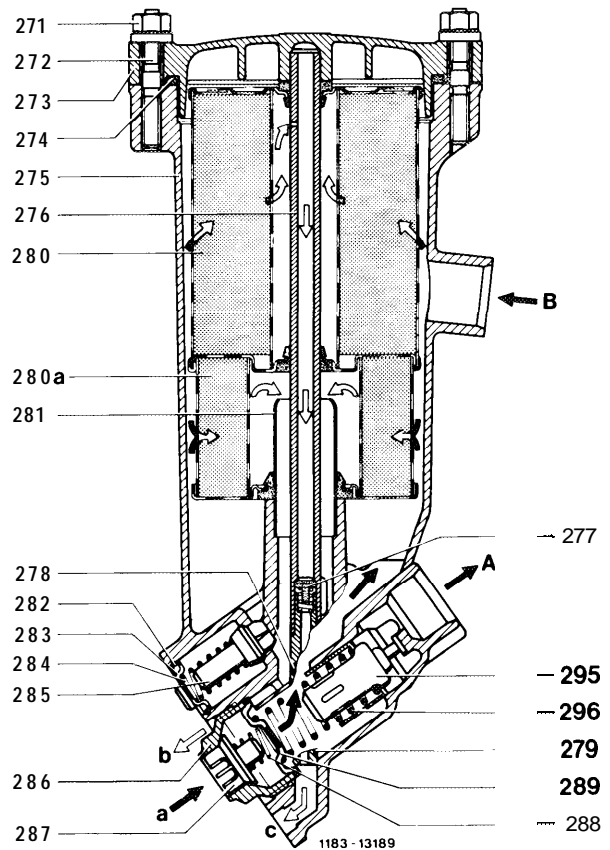
Engine 603.960 in model 124.133/93, Model Year 1987

The oil filter housing has a thermostat (295) between the engine and the oil cooler for controlling the oil cooling.

Start of opening: approx. 11 0°C oil temperature.
Fully opened: approx. 125°C oil temperature.

With the thermostat fully opened, a small quantity of oil will continue to flow to the oil filter element.

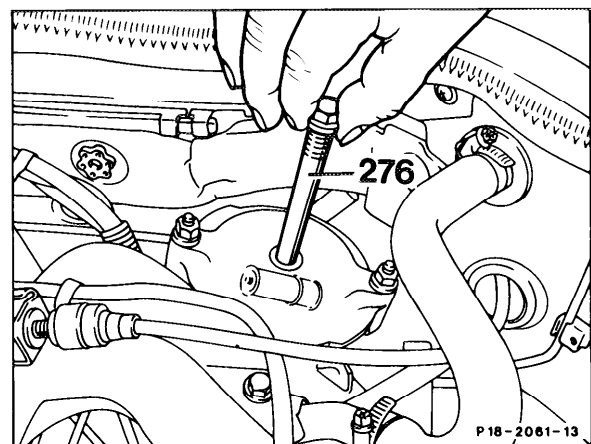
The oil cooler lines on the oil filter are sealed by O-rings (previously screw connections with conical seal).



271	Nut, M 8	286	Valve seat return flow check valve
272	Stud, M 8	287	Valve cone return flow check valve
273	Cover	288	Compression spring
274	O-ring	289	Spring seat
275	Housing	295	Thermostat
276	Return tube	296	Spring
277	Check valve	a	Supply from oil pump
278	O-ring	b	To bearings
279	O-ring	c	Return to oil pan
280	Oil filter element	A	Unfiltered oil to oil cooler
280a	Full flow filter section	B	Unfiltered oil from oil cooler
281	Riser		
282	Retaining ring		
283	Spring seat		
284	Spring		
285	Valve cone bypass va		

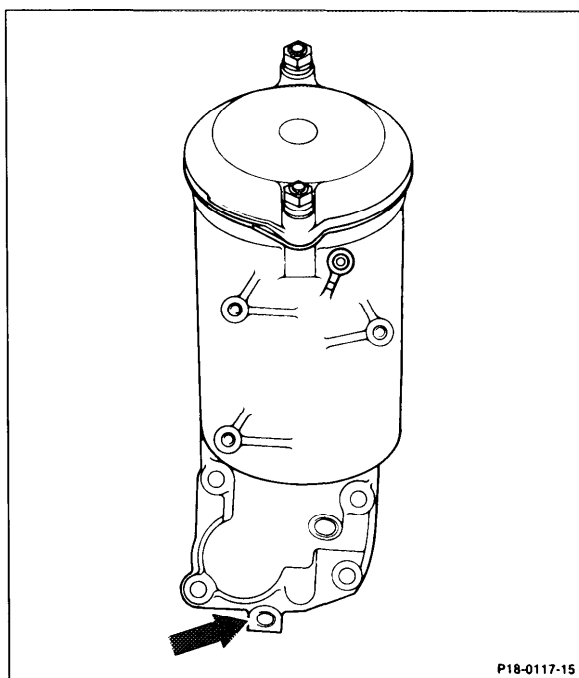
Oil filter cover with removable oil return pipe (only engine 603 in model 124)

The oil filter cover has been modified. The return pipe (276) can be removed. This facilitates the oil change.



Elimination of thread on hole for initial filling

The tapped hole with M 10 x 1 screw plug at the hole for initial filling (arrow) has been modified into a fit hole with ball (8 mm dia.).



P18-0117-15

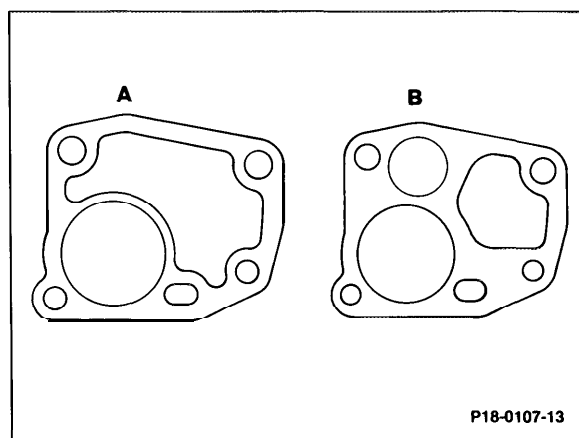
Production breakpoint: 04/86

Model	Engine	Engine End No.		Vehicle Ident End No.	
		manual transmission	automatic transmission	A	F
201.126	602.911	018365	004576	*	*

* not registered

Modification of shape of gasket between oil filter housing and crankcase

The new gasket is pierced only in the area of the supply and return lines. This achieves improved sealing.



A 1 st version
B 2nd version

P18-0107-13

Production breakpoint: 07/87

Model	Engine	Engine End No.		Vehicle Ident End No.	
		manual transmission	automatic transmission	A	F
124.133 124.193	603.960	-	013653	*	*
126.125	603.961	-	013409	*	*
201.126	602.911	046779	010562	*	*
201.128	602.961	-	001540	*	*

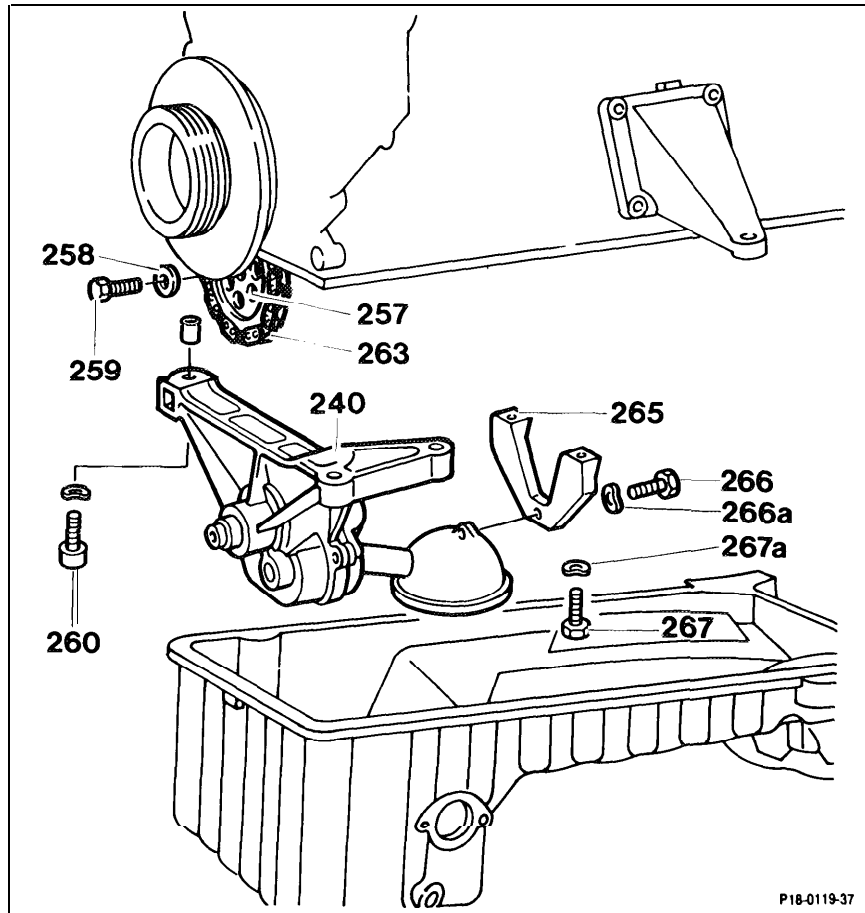
* not registered

18-210 Removal and installation of oil pump

Preceding work:

Oil sump removed (OI -310A).

Front axle housing removed (01-310B).



Engines 602 and 603

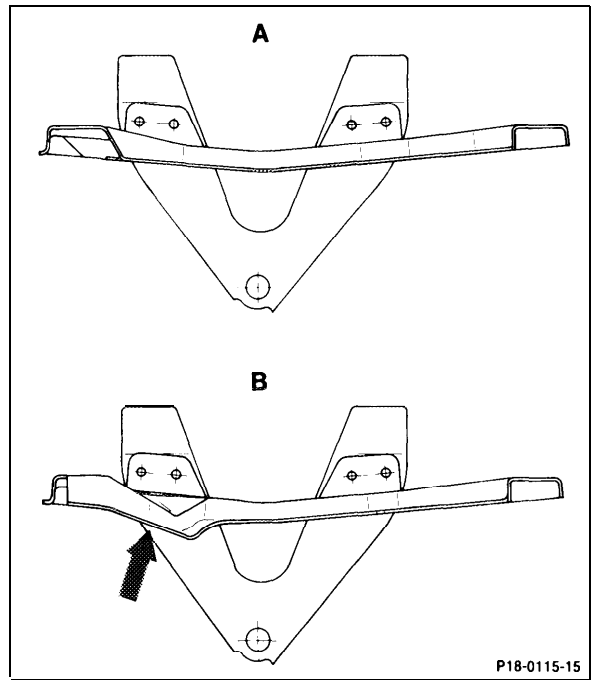
Support (265) unbolt from oil pump pickup, screw on, hex. bolt (266, 267), 10 Nm.

Oil pump (240) detach, attach, hex. socket screws (260), 25 Nm.

Notes

Modification to shape of oil deflector plate

The vibration properties have been improved by modifying the shape of the oil deflector plate (arrow).



A 1st version
B 2nd version

Production breakpoint:04/87

Model	Engine	Engine End No.		Vehicle Ident End No.	
		manual transmission	automatic transmission	A	F
201.128	602.961	—	001144	*	*

* not registered

Production modification of oil pump chain

An oil pump chain with open sleeves is fitted to reduce wear.

Production breakpoint:06/88

Model	Engine	Engine End No.		Vehicle Ident End No.	
		manual transmission	automatic transmission	A	F
201.126	602.911	020788	005193		239528

* not registered

Oil pump, engine 603.96

Since 01/90 oil pumps with relief groove for preventing noise have been fitted to these engines.

Production breakpoint: 01/90

Model	Engine	Engine End No.		Vehicle Ident End No.	
		manual transmission	automatic transmission	A	F
124.133	603.960	025426	025426	*	*
124.193	|	|			

* not registered

Oil pump chain

Engines 602 and 603

Since 03/90 oil pump chains made by the manufacturer Daido have been installed.

Production breakpoint: 03/90

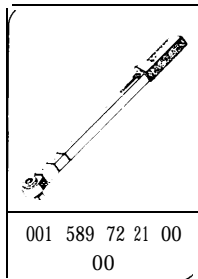
Model	Engine	Engine End No.		Vehicle Ident End No.	
		manual transmission	automatic transmission	A	F
124.128	602.962	002924	004724	*	*
124.133	603.960	-	026253	*	*
124.193					
126.135	603.970	-	000070	*	*
201.126	602.911	089224	017337	*	*
201.128	602.961	001751	007791	*	*

* not registered

Tightening torques

	Nm
Hex. bolt of sprocket wheel	25
Hex. socket screws of oil pump	25
Hex. bolts of intake manifold bracket (engine 602, 603)	25

Special tools



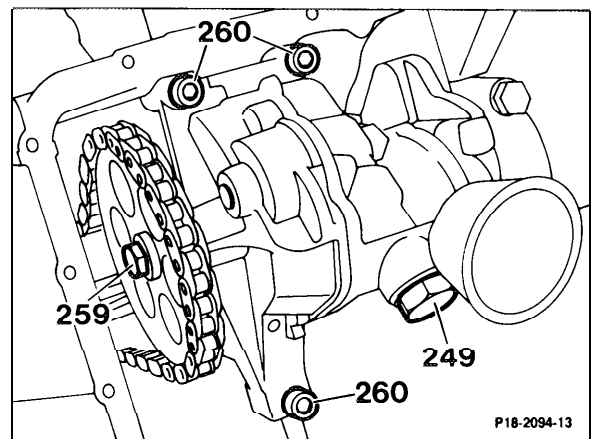
Removal and installation

1 Unbolt hex. bolt (259) and remove sprocket wheel from chain.

Installation instruction

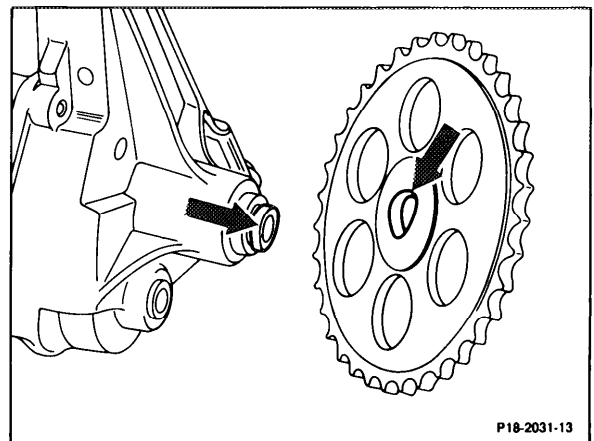
Tightening torque 25 Nm.

- 249 Oil overpressure valve screw plug
- 260 Hex. socketscrews



Installation instruction

Tightening torque 25 Nm. Install sprocket wheel so that the curvature is facing the oil pump (arrows).



Engines 602 and 603

2 Unbolt hex. bolt (266) at the support (265) of the oil pump pickup.

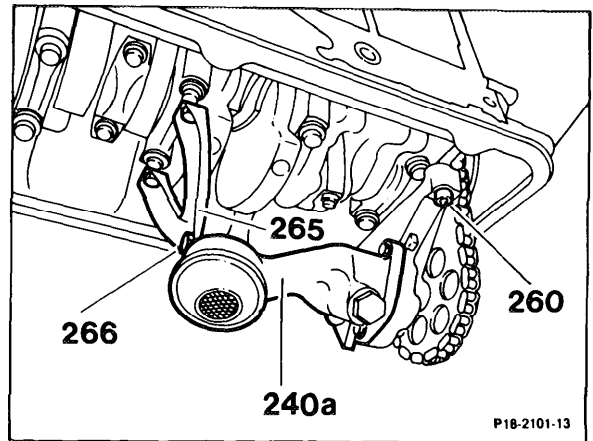
Installation instruction

Tightening torque 25 Nm.

3 Unscrew hex. socket screws (260) of the oil pump (240a) and remove oil pump.

Installation instruction

Tightening torque 25 Nm.



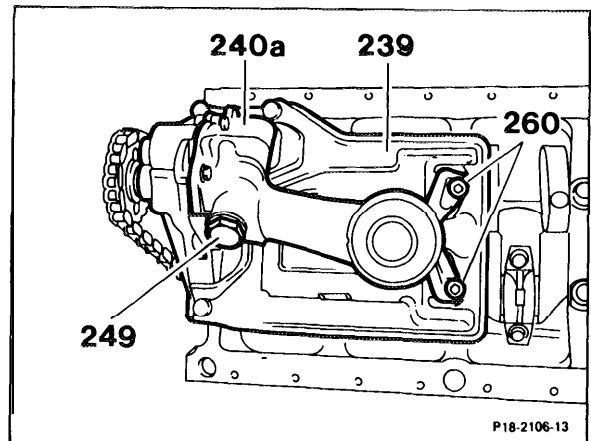
Engine 602.96 and 603.970

4 Unscrew other hex. socket screws (260) and remove oil deflector plate (239).

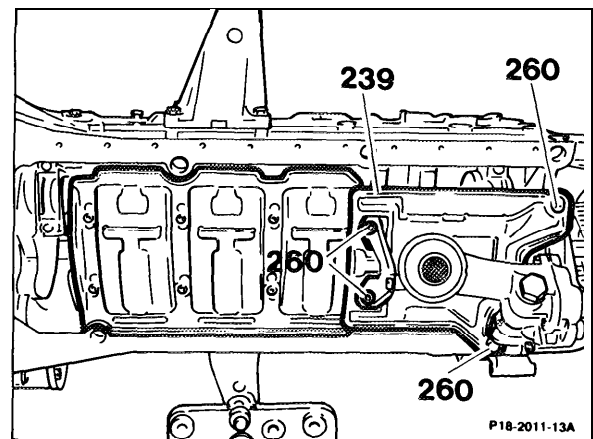
Installation instruction

Tightening torque 25 Nm.

Engine 602.96
240a Oil pump
249 Oil overpressure
valve screw plug



5 Installation is performed in the reverse order.



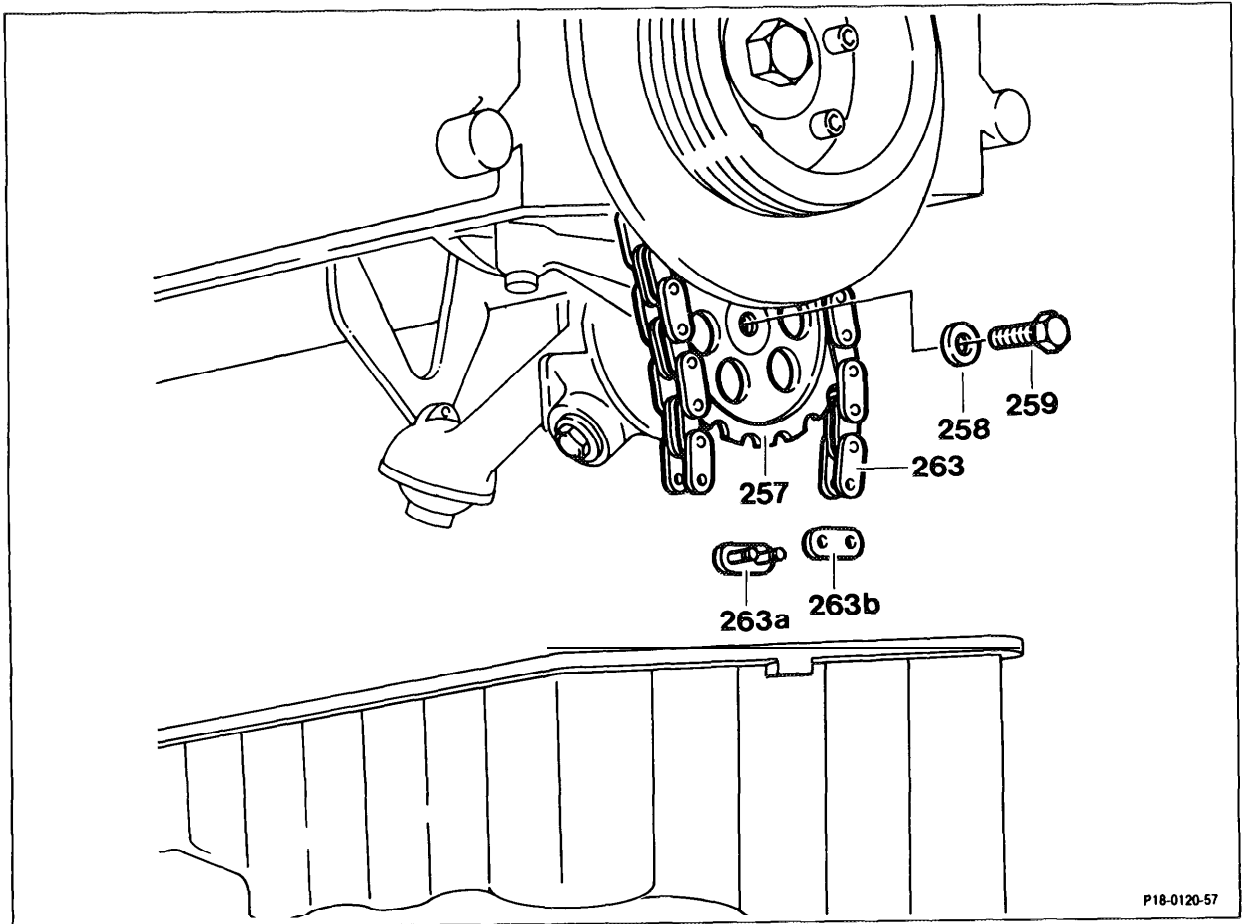
Engine 603.97

18-212 Replacement of oil pump chain

Preceding work:

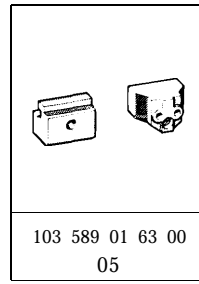
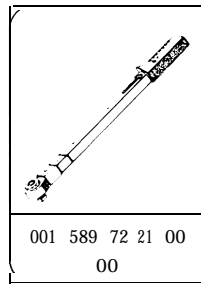
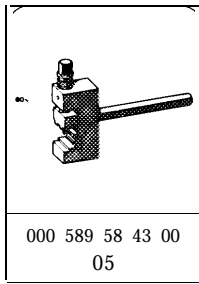
Oil sump removed (01-310A).

Front axle housing removed (01-310B).



Bolt (259)	loosen, tighten, 25 Nm (step 1).
Rivet link pin	grind open (step 2).
Oil pump drive gear (257)	replace (steps 3, 4).
New oil pump chain to old oil pump chain	link, fit on (steps 5, 6).
Rivet link (263a)	insert from behind into oil pump chain (step 7).
Plate (263b)	insert into rivet tool, press on (steps 10 - 12).
Oil pump chain rivet link pins	rivet individually, approx. 30 Nm (step 14).

Special tools

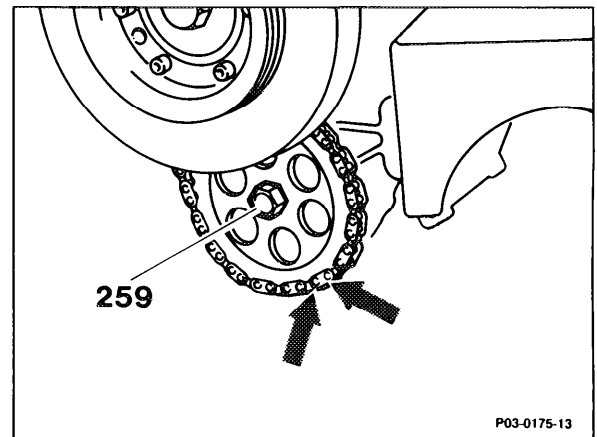


Removal and installation

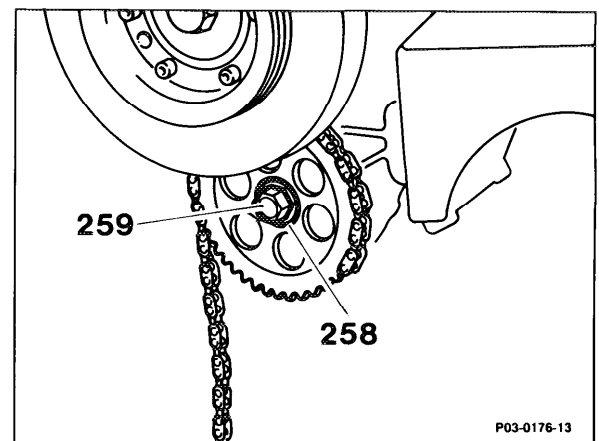
Note

The oil pump drive gear should be replaced together with the oil pump chain.

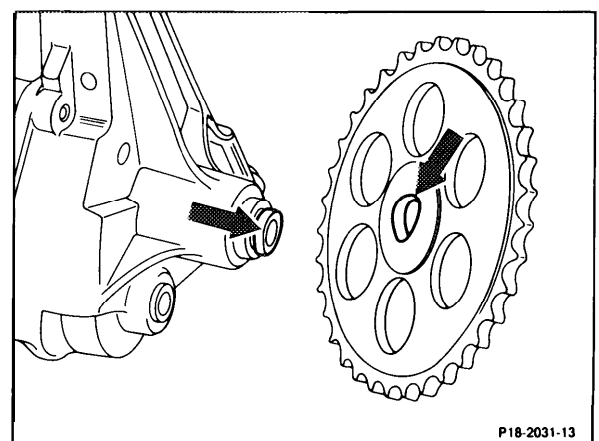
- 1 Loosen bolt (259). Tightening torque 25 Nm.
- 2 Grind open both rivet link pins (arrows) at **a double link** of the oil pump chain. Press out ground open double link.



- 3 Remove bolt (259) together with washer (258).



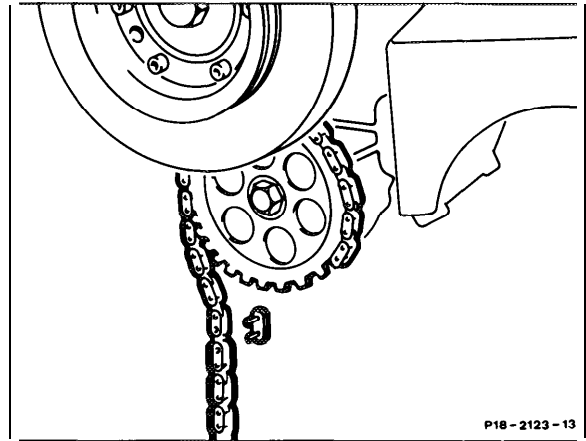
- 4 Insert new oil pump drive gear with the curved face pointing toward oil pump.



5 Attach new oil pump chain with rivet link to the old oil pump chain.

6 Fit on new oil pump chain linked to old oil pump chain by slowly turning the crankshaft in direction of rotation of engine.

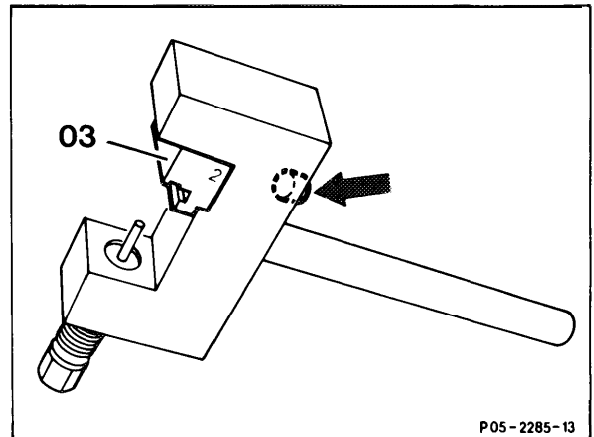
7 Detach old oil pump chain. Insert rivet link from behind into the new oil pump chain.



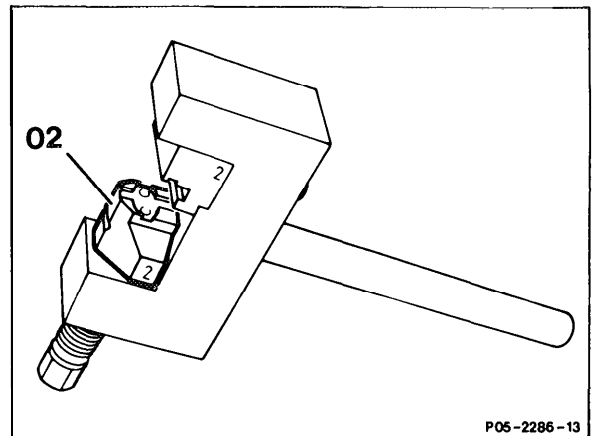
8 Insert thrust piece (03) into the riveting tool as shown in the drawing and tighten with the screw (arrow).

Note

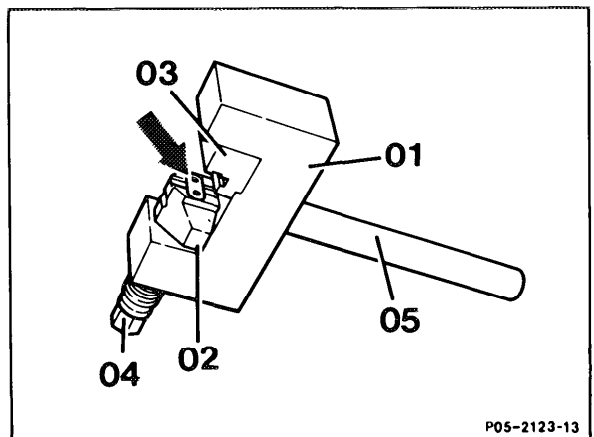
The number 2 is stamped on the side of the thrust piece (03).



9 Insert moving jaw (02) with the figure 2 into the riveting tool as shown in drawing.



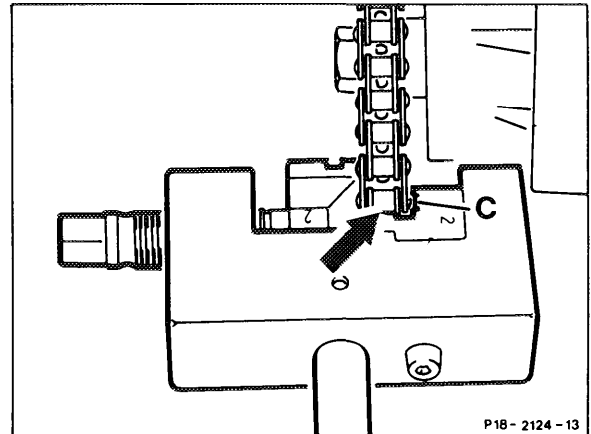
10 Insert plate (arrow) into the moving jaw (02) (magnetic adhesion).



11 Fit web (arrow) onto both rollers at rivet link.

Note

The rivet heads of the rivet link pins must be guided into the groove (C).

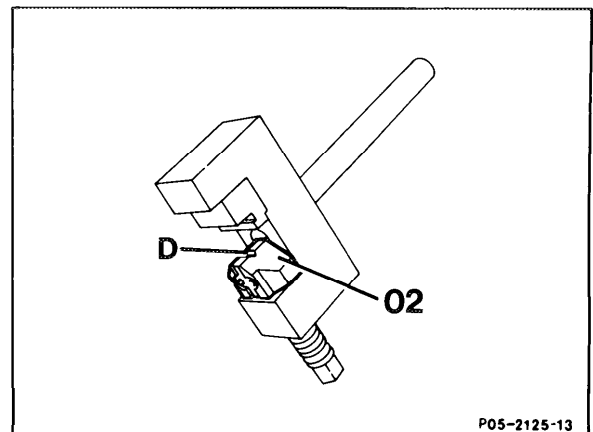


12 Screw in spindle (04) until firm resistance is felt.

Note

During installation, ensure that the pins of the rivet link are guided into the holes of the plate.

13 Remove riveting tool and switch over the moving jaw (02) to the riveting profile (D).

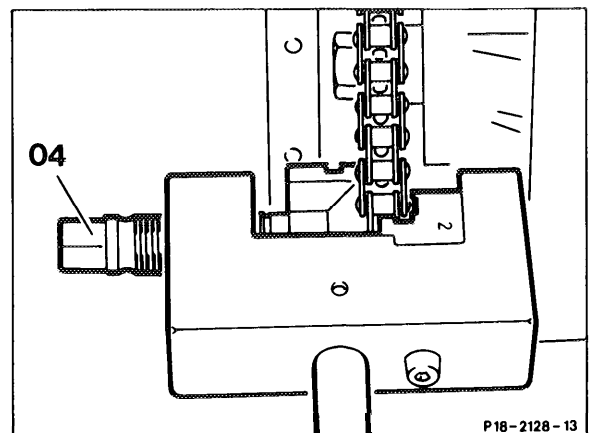


14 Position riveting tool exactly in center of rivet link pin.

Rivet pins of the rivet link individually by tightening the spindle (04) to approx. 30 Nm.

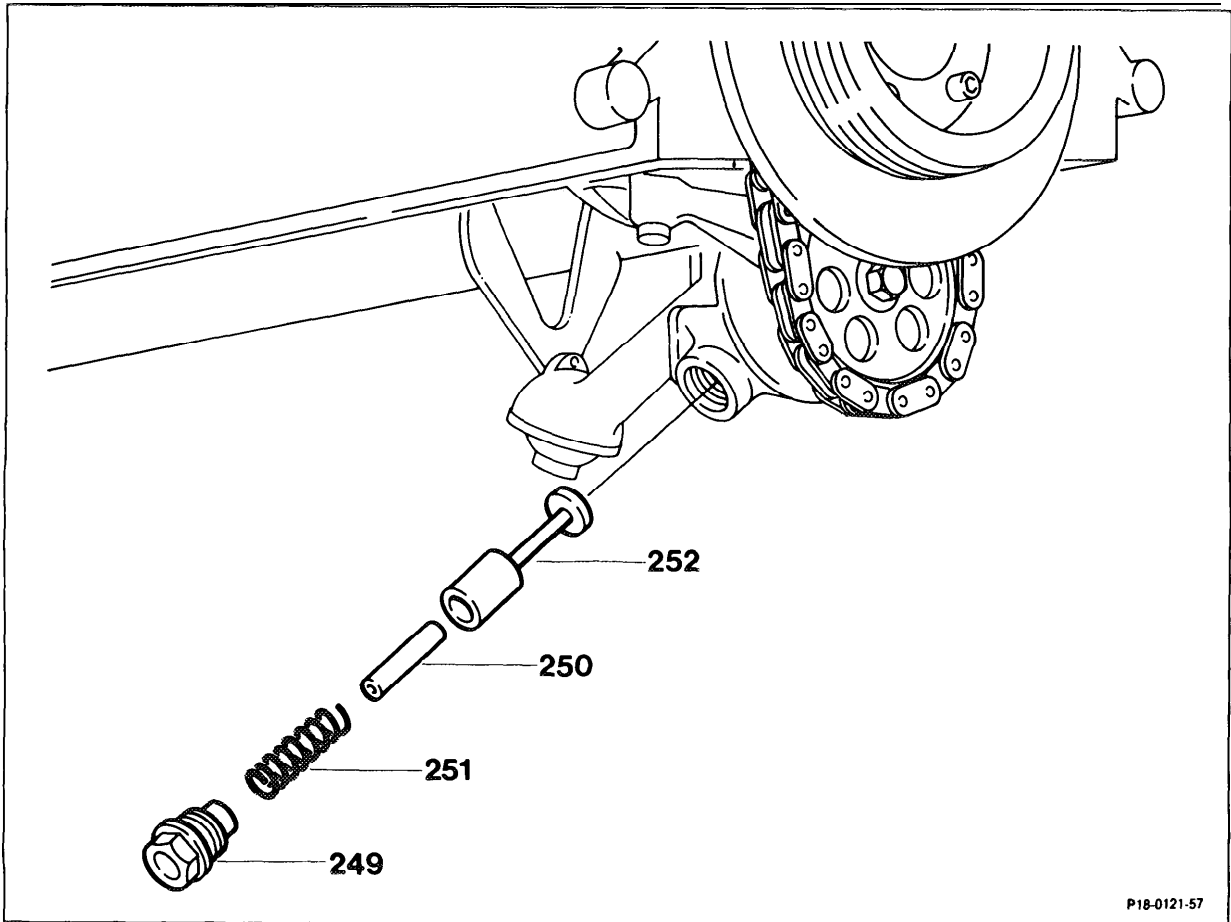
15 Check riveting; re-rivet, if necessary.

16 Install in reverse order.



18-215 Removal and installation of oil pressure relief valve

Preceding work:
Oil pan removed (01-310).



P18-0121-57

Screw plug (249)

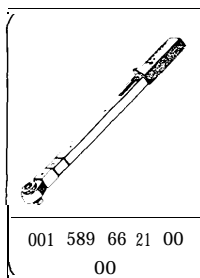
Caution!

The screw plug is spring-tensioned. Unbolt, install, 50 Nm.
Replace seal.

Guide pin (250), compression spring (251) and piston (252)

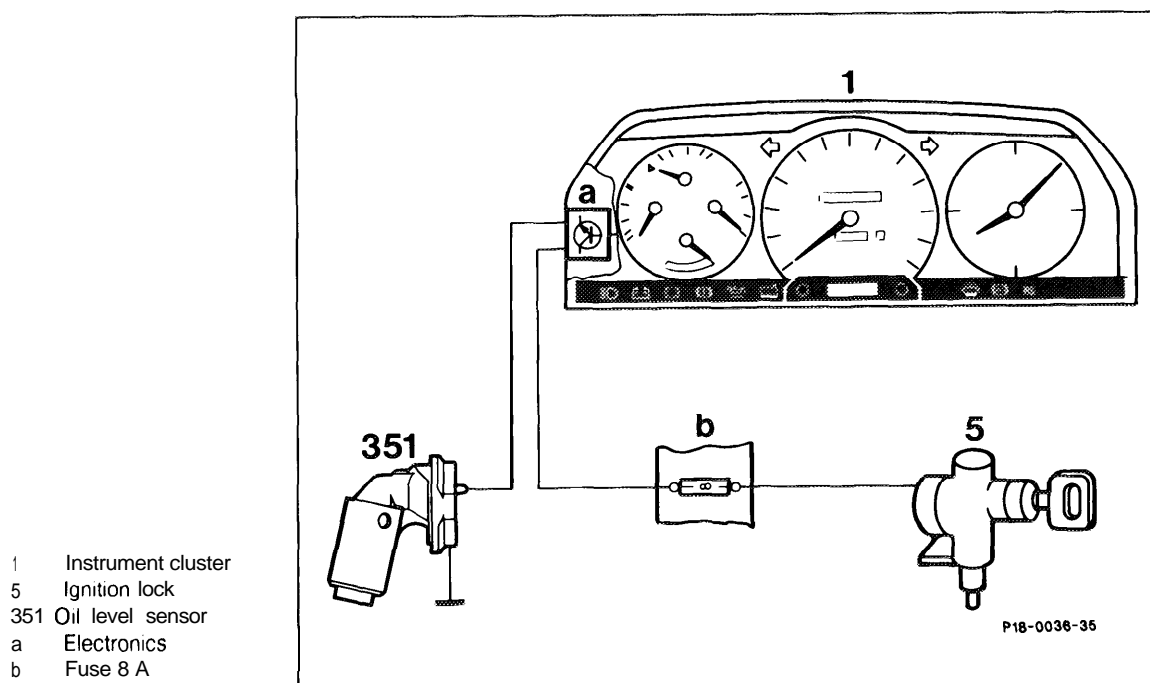
remove, install.

Special tool



001 589 66 21 00
00

18-220 Testing oil level indicator



Problems

- A.** Indicator lamp shows a steady light when engine running and oil level correct.
- B.** Indicator lamp does not light up when key is in position "2".
- C.** Indicator lamp does not light up when engine running, oil temperature $> + 60\text{ }^{\circ}\text{C}$ and oil level below "min".

Test data

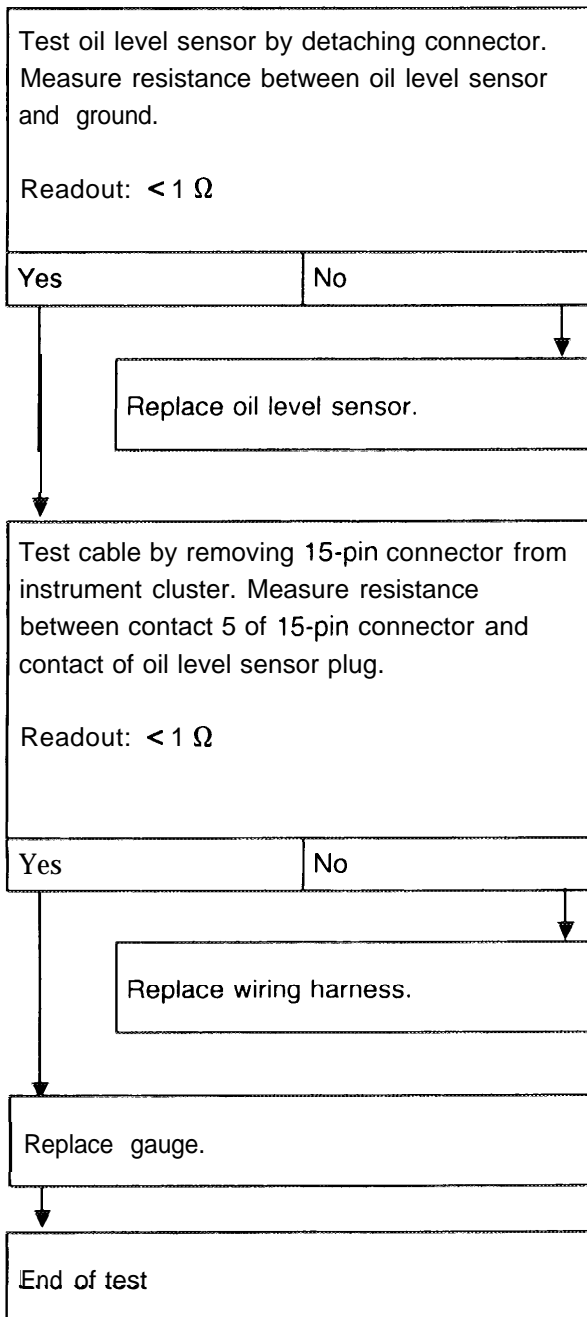
Resistance at max. oil level	$< 1\ \Omega$
Resistance at min. oil level	$\infty\ \Omega$
Battery voltage	approx. 12 V

Commercial tool

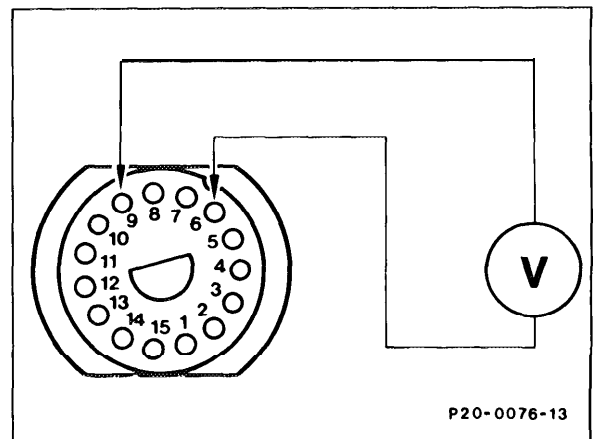
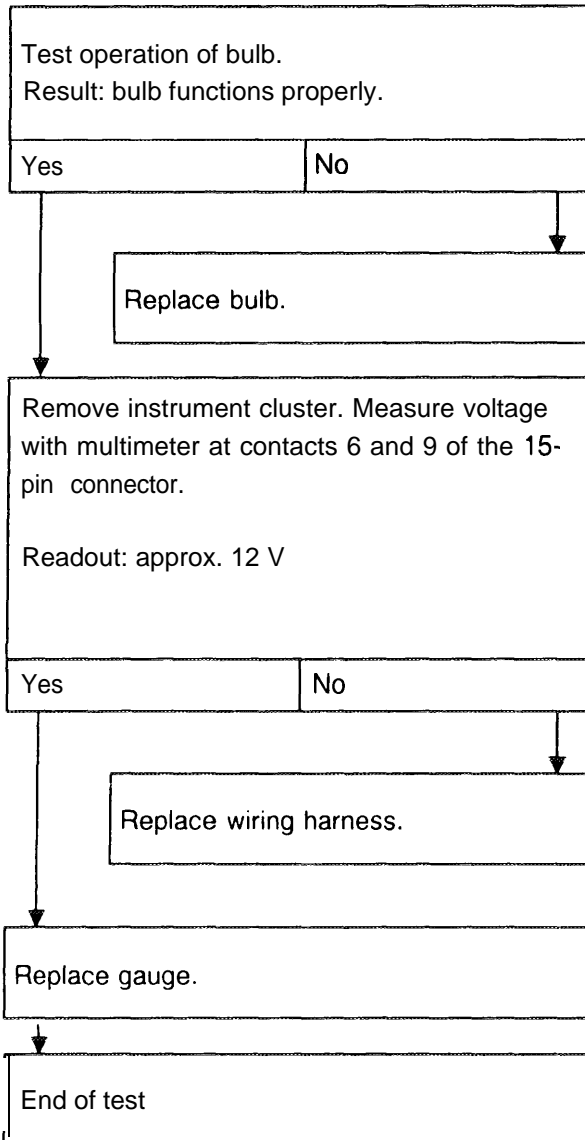
Multimeter e.g. Sun, DMM-5

Testing

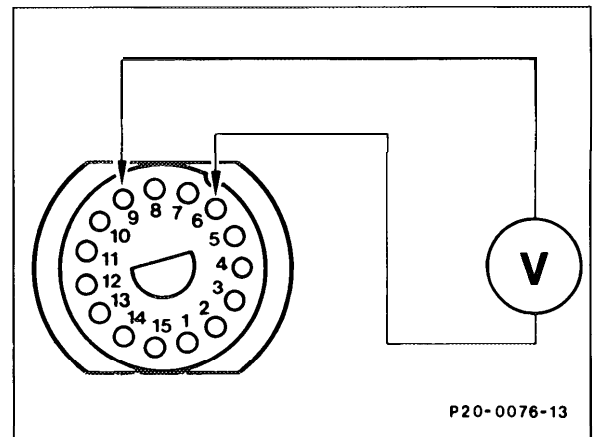
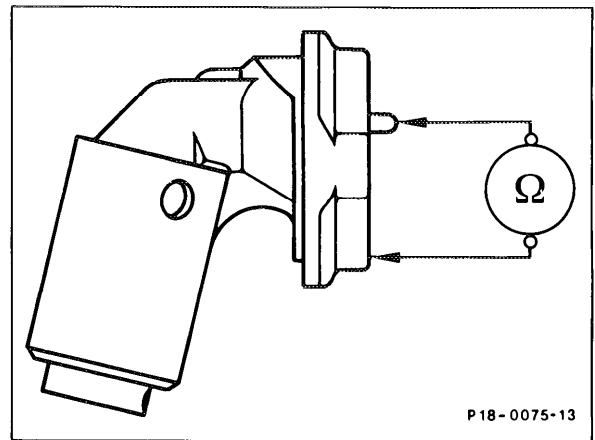
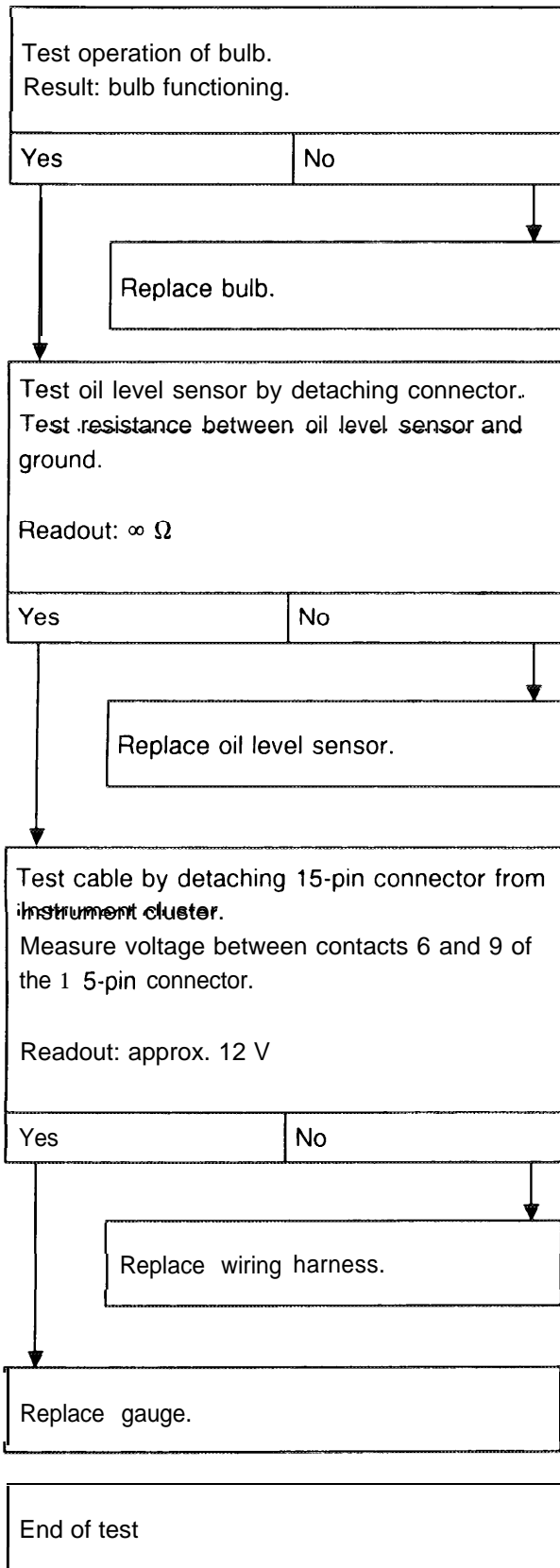
A. Indicator lamp shows a steady light when engine running and oil level correct



B. Indicator lamp does not light up when key is in position "2" (check function)

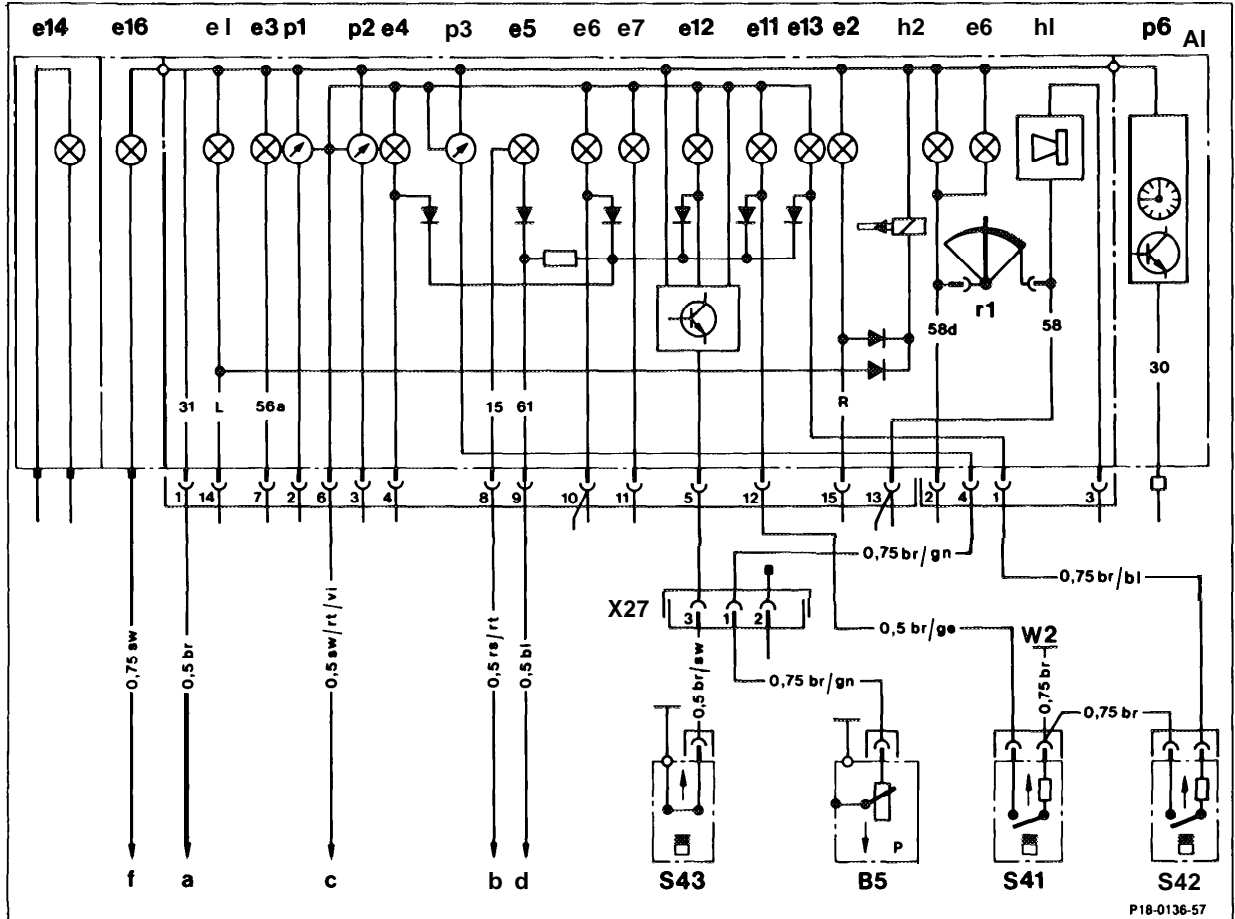


C. Indicator lamp does not light up when engine running, oil temperature > + 60 °C and oil level below “min”



Wiring Diagrams Models 124, 126 and 201

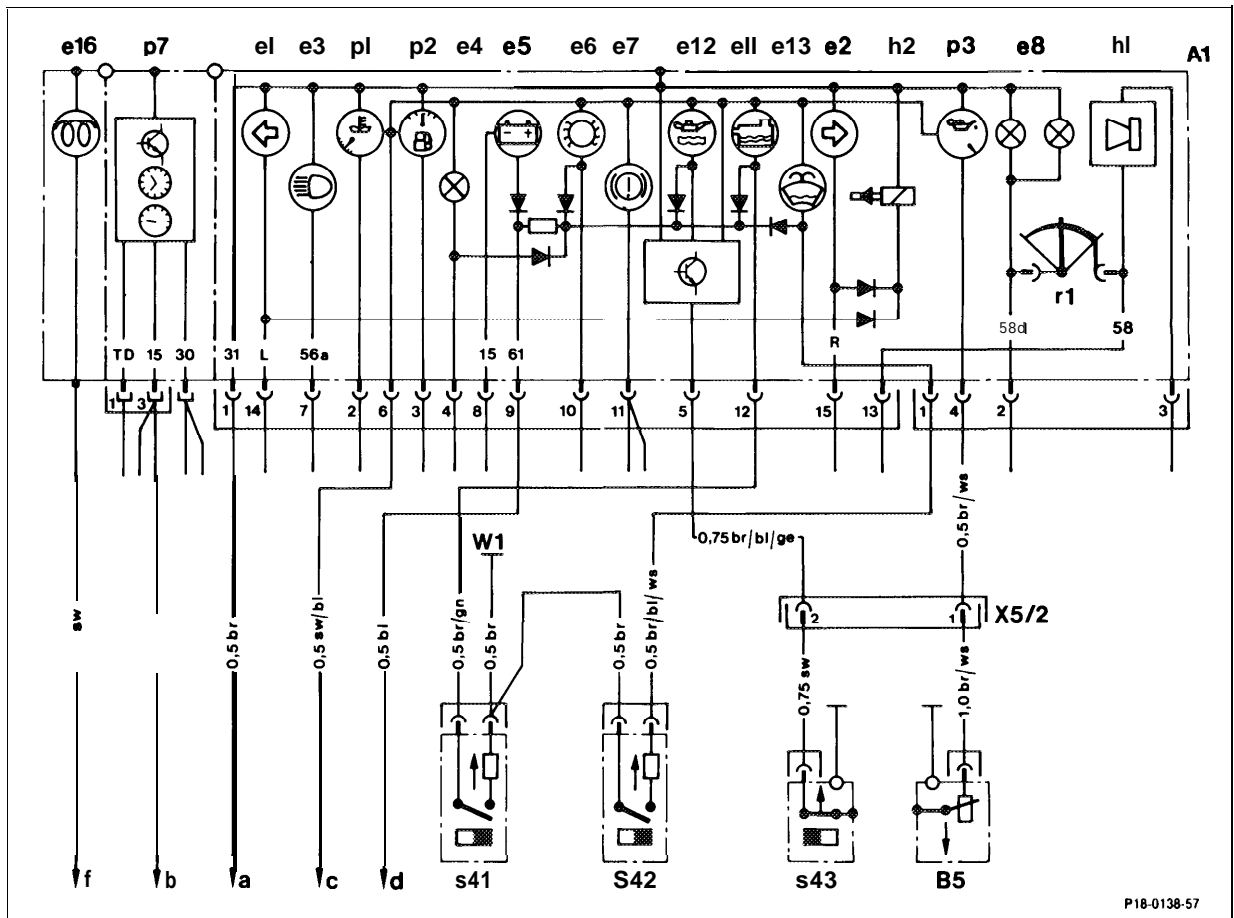
Model 124



Wiring diagram engine oil level indicator, coolant level indicator, windshield washer level indicator (see Wiring Diagrams Volume 3 and Volume 4 for further information)

AI	Instrument cluster	B5	Oil pressure gauge sensor
e1	Left turn signal Indicator lamp	s41	Coolant level indicator lamp switch
e2	Right turn signal indicator lamp	S42	Windshield washer indicator lamp switch
e3	High beam indicator lamp	s43	Oil level indicator lamp switch
e4	Fuel reserve warning lamp	w 2	Ground, front right (next to lamp unit)
e5	Battery charge indicator lamp	X27	Connector, starter wiring harness
e6	Brake pad wear indicator lamp	a	Main ground (behind instrument cluster) W1
e7	Brake fluid and parking brake indicator lamp	b	Fuse 7 terminal 15
e8	Instrument lighting	c	Fuse 5 terminal 15
e11	Coolant level indicator lamp	d	Lamp indicator unit
e12	Oil level Indicator lamp		Preglow time relay terminal La
e13	Windshield washer level indicator lamp		
e14	Exterior lamp failure indicator lamp		
e16	Preglow indicator lamp		
h1	Warning buzzer		
p1	Coolant temperature gauge		
p2	Fuel gauge		
p3	Oil pressure gauge		
p6	Electronic clock		

Model 201

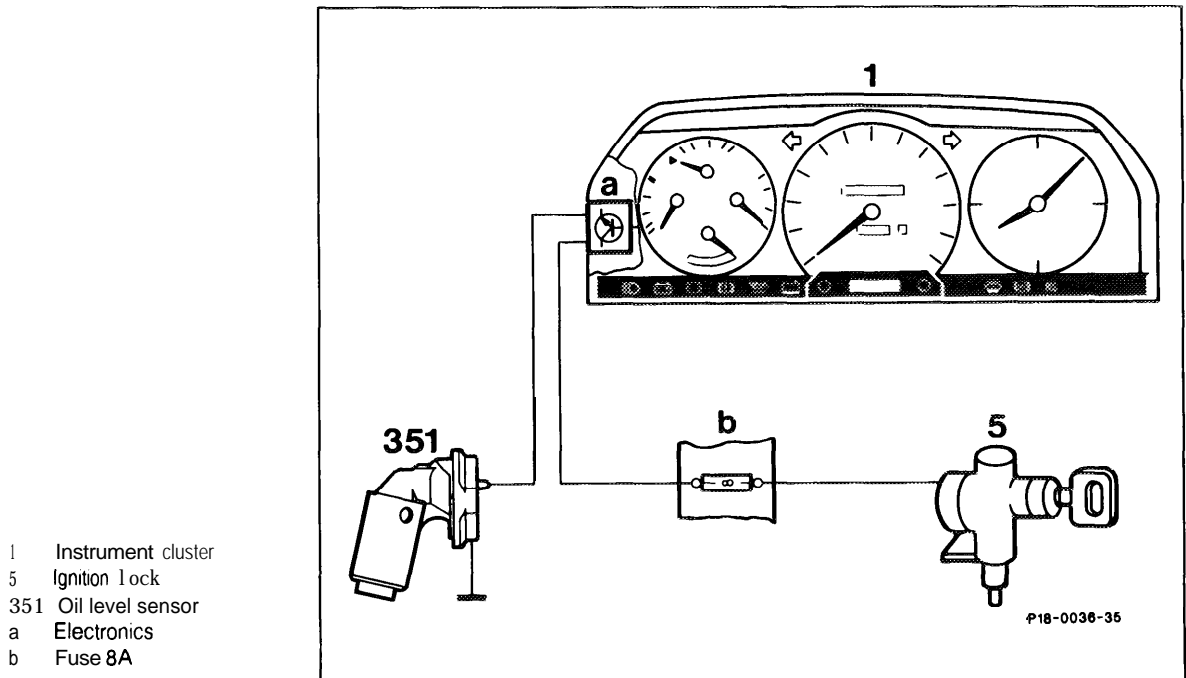


P18-0138-57

Wiring diagram engine oil level indicator, coolant level indicator, windshield washer level indicator (see Wiring Diagrams Volume 5 for further information)

A1	Instrument cluster	B5	Oil pressure gauge sensor
e1	Left turn signal indicator lamp	s41	Coolant level indicator lamp switch
e2	Right turn signal indicator lamp	S42	Windscreen washer indicator lamp switch
e3	High beam Indicator lamp	s43	Oil level indicator lamp switch
e4	Fuel reserve warning lamp	W1	Main ground (behind Instrument cluster)
e5	Battery charge indicator lamp	X5/2	Connector, Interior/starter 4-pole
e6	Brake pad wear indicator lamp	a	Main ground (behind Instrument cluster) W1
e7	Brake fluid and parking brake Indicator lamp	b	Electrical center connector contact 15 terminal 15 unprotected
e8	Instrument lighting	c	Electrical center connector D contact 2 terminal 15 fuse 8
e11	Coolant level indicator lamp	d	Electrical center connector D contact 8 alternator terminal 61
e12	O11 level indicator lamp		Preglow time relay
e13	Windshield washer level indicator lamp		
e16	Preglow Indicator lamp		
hl	Warning buzzer		
h2	Audible turn signal indicator		
p1	Coolant temperature gauge		
p2	Fuel gauge		
p3	Oil pressure gauge		
p6	Electronic clock		

18-225 Function of oil level indicator

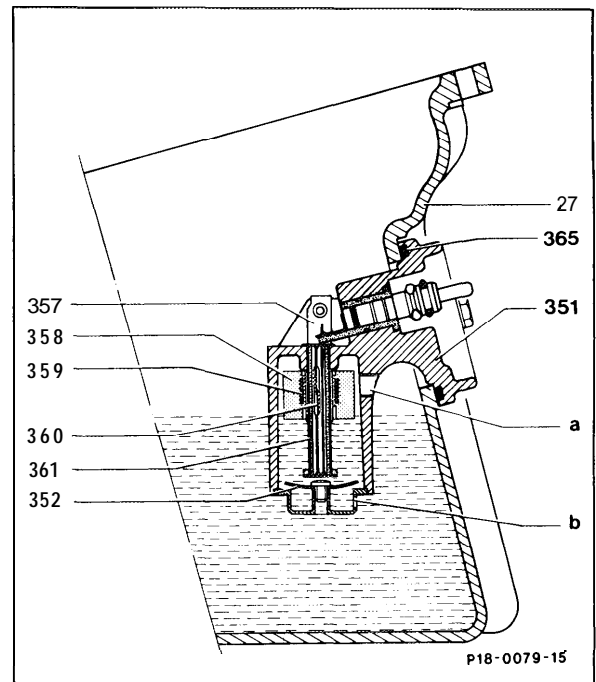


General

The electrical oil level indicator monitors the engine oil level in the sump when the engine is running and engine oil temperature is above + 60 °C. When the ignition is switched on, the indicator lamp lights up with a weak light (check function) and goes out as soon as the engine is started.

Oil level sensor

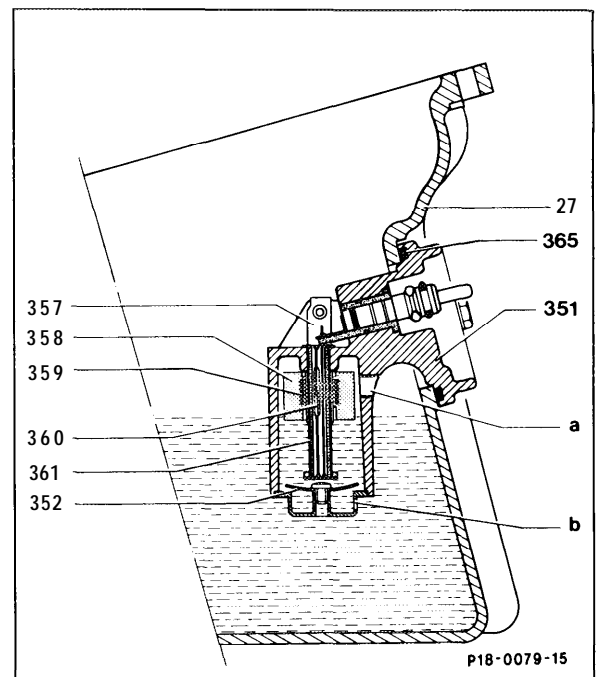
The engine oil level in the oil level sensor (351) is equalized to the oil level in the sump (27) through an outlet bore (b). The float (358) with permanent magnet (359) senses the actual engine oil level. The electronics in the instrument cluster sends a permanent signal to the oil level sensor. If the engine oil level is in the "Min" range of the dipstick, the Reed contact (360) of the float (358) is opened and the permanent signal to the oil level sensor interrupted. The indicator lamp lights up with a bright light (fault signal). The Reed contact (360) is interrupted shortly before the oil level has reached the "Min" marking on the dipstick. If the cable from the oil level sensor to the instrument cluster is interrupted, the permanent signal to the oil level sensor is also interrupted and the indicator lamp shows a bright light (fault signal).



- 352 Bimetal snap plate
- 365 O-ring
- b Outlet bore 4 mm Ø

Avoiding incorrect readings

As the engine oil is viscous below a temperature of + 60 °C and only flows back to the sump slowly, this could result in incorrect signals of the indicator lamp. In this case, the bimetal snap plate (352) closes the outlet bore (b) and the float (358) only registers the oil level in the oil level sensor (351). This eliminates the possibility of an incorrect signal at low engine oil temperatures. Once the oil temperature climbs above + 60 °C, the bimetal snap plate opens and clears the outlet bore (b). Consequently, the float (358) senses the actual engine oil level in the sump (27). The bimetal snap plate closes at an engine oil temperature of approx. + 30 °C.



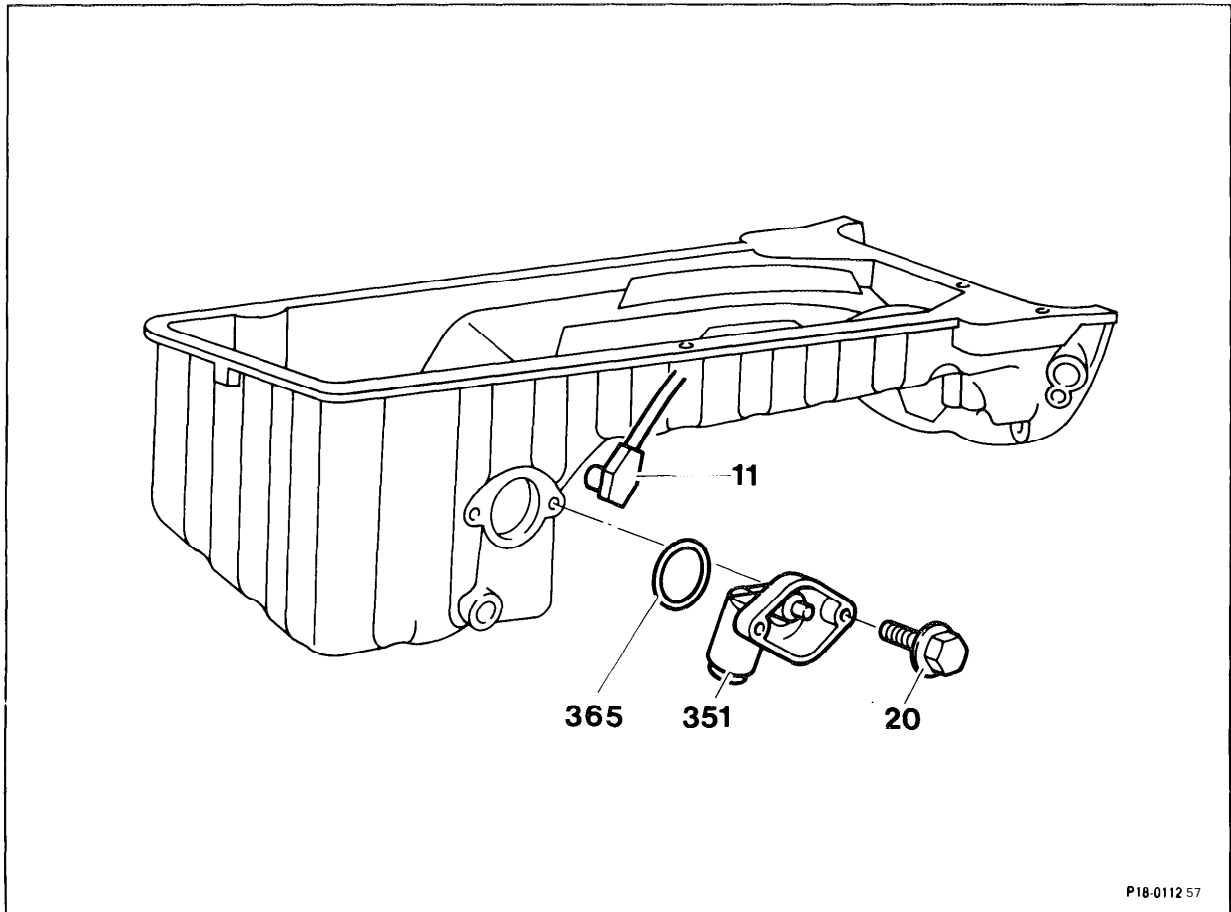
- 359 Permanent magnet
- 365 O-ring

If the engine oil is drained during an oil change, the oil also flows out of the oil level sensor. Because the fresh engine oil added is colder than + 60 °C, the bimetal snap plate closes the outlet bore (b) i.e. there is no engine oil in the oil level sensor and the indicator lamp would signal insufficient engine oil although the engine oil level is sufficient. In order to avoid this, the oil level sensor is filled through the vent bore (a). When driving through sharp corners, the engine oil is pushed against the outer walls of the oil pan. Particularly when negotiating left turns, the engine oil level around the oil level sensor drops and the sensor runs dry. The float (358) briefly interrupts the Reed contact (360) and the indicator lamp would show a bright light. The electronics in the instrument cluster prevent the indicator lamp from lighting up until after the Reed contact (360) has been interrupted for 60 s. This avoids any incorrect signal when negotiating sharp corners.

18-226 Removal and installation of oil level sensor

Preceding work:
Engine oil drained.
Engine compartment cladding bottom removed (01-006).

A. Engine 602, 603



Plug	(11)	.....	for oil level sensor, disconnect, plug in.
Bolts	(20)	.....	unbolt, bolt in, 10 Nm. Remove and install oil level sensor (351). Replace O-ring (365).

Modifications

A larger diameter O-ring made of Viton is fitted for sealing the oil level sensor at the sump.

Color: green (previously black).

Diameter 3.15 mm (previously 3 mm).

Production breakpoint: 09/86

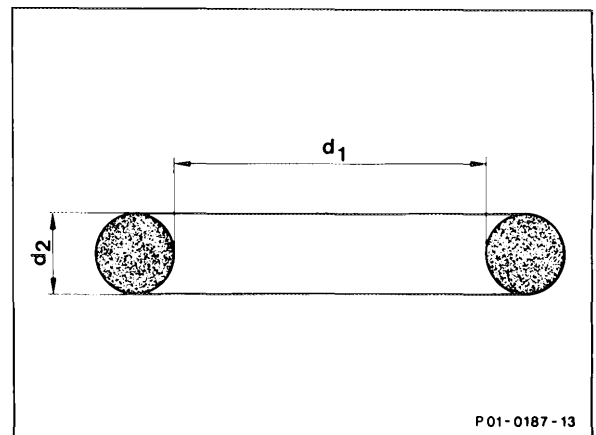
Model	Engine	Engine End No.		Vehicle Ident End No.	
		manual transmission	automatic transmission	A	F
124.133 124.193	603.960	-	004393	*	*
126.125	603.961	-	005852	*	*
201.126	1602.911	027261	006588	*	*

* not registered

The seal of the oil level sensor at the sump has been improved by modifications in size of the O-ring.

New O-ring:

Size	Previous version mm	Present version mm
d_1	40,20	37,20
d_2	3,15	3,20



P 01-0187-13

Production breakpoint: 06/87

Model	Engine	Engine End No.		Vehicle Ident End No.	
		manual transmission	automatic transmission	A	F
124.133 124.193	603.960	-	013429	*	*
126.125	603.961	-	013103	*	*
201.126	602.911	045501	010417	*	*
201.128	602.961	-	001553	*	*

* not registered

Tightening torques

Oil level sensor bolts

Nm

10

Special tool