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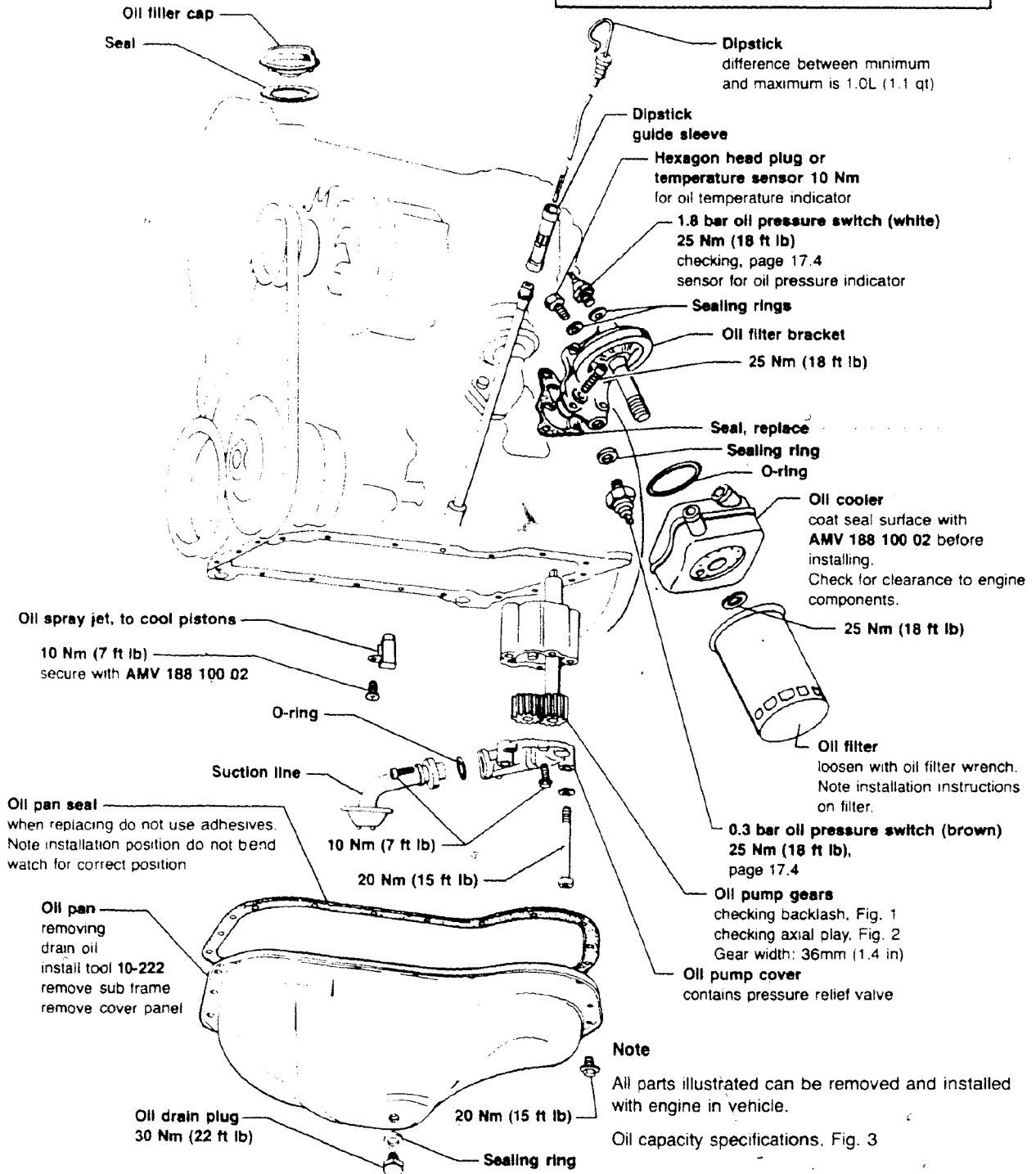
Engine – Lubrication System

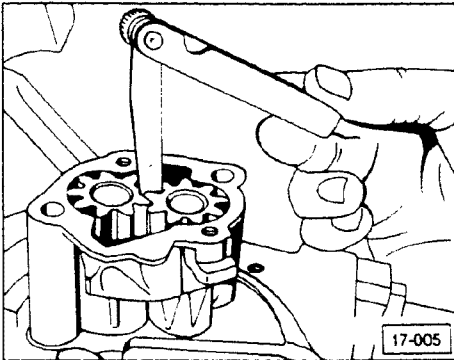
CAUTION

Always replace gaskets and seals.

CAUTION

If, as a result of engine damage, large quantities of metal shavings are found in the engine oil, oil passages should be cleaned and the oil filter replaced.

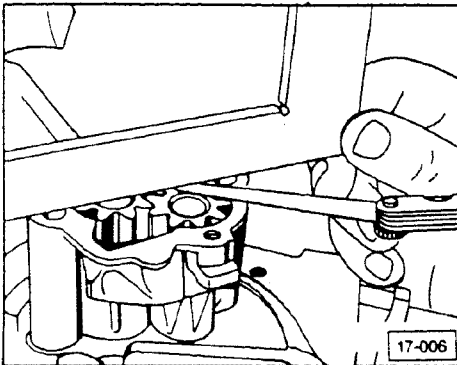




► Fig. 1 Oil pump, checking backlash

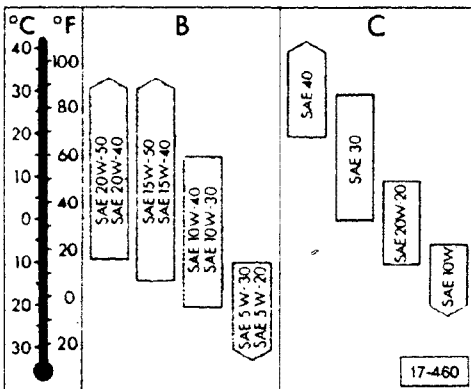
New: 0.05 mm (0.002 in)

Wear limit: 0.20 mm (0.008 in)



► Fig. 2 Oil pump, checking axial play

Wear limit: 0.15 mm (0.006 in)



Oil capacity, specifications

► Fig. 3 Oil specification

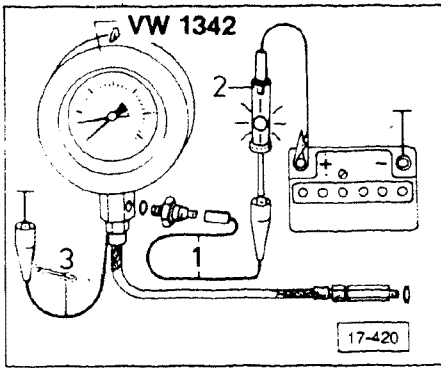
Use only oil marked SF.

B = Multi-grade oil

C = Single-grade oil

Engine oil capacity

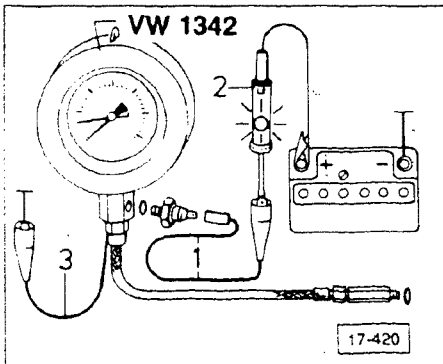
- With oil filter 3.0L (3.2 qts)
- Without oil filter 2.5L (2.7 qts)



Oil pressure switch brown (0.3 bar), checking

- remove 1.8 bar (26 psi) oil pressure switch (white insulation) and install into test gauge
- install **VW 1342** in place of 1.8 bar (26 psi) oil pressure switch
- remove wire to 0.3 bar (4 psi) oil pressure switch, and install blue wire 1 from test device
- connect test lamp 2 to wire 1 and battery **plus** terminal
- connect wire 3 (brown) to suitable ground point on car
 - test light must come on
- start engine and increase RPM slowly
 - at a pressure of 0.15-0.45 bar (2.2-6.5 psi) test light must go out

If **NO**
replace switch



Oil pressure switch white (1.8 bar), checking

- remove wire 1 from 0.3 bar (4 psi) oil pressure switch, and connect to 1.8 bar (26 psi) oil pressure switch (white insulation)
- start engine and increase RPM slowly
 - at a pressure of 1.6-2.0 bar (23-29 psi) test light must come on.

If **NO**
replace switch

- continue to increase RPM
 - at 2000 RPM, minimum pressure must be **at least** 2.0 bar (29 psi)

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Engine – Lubrication System

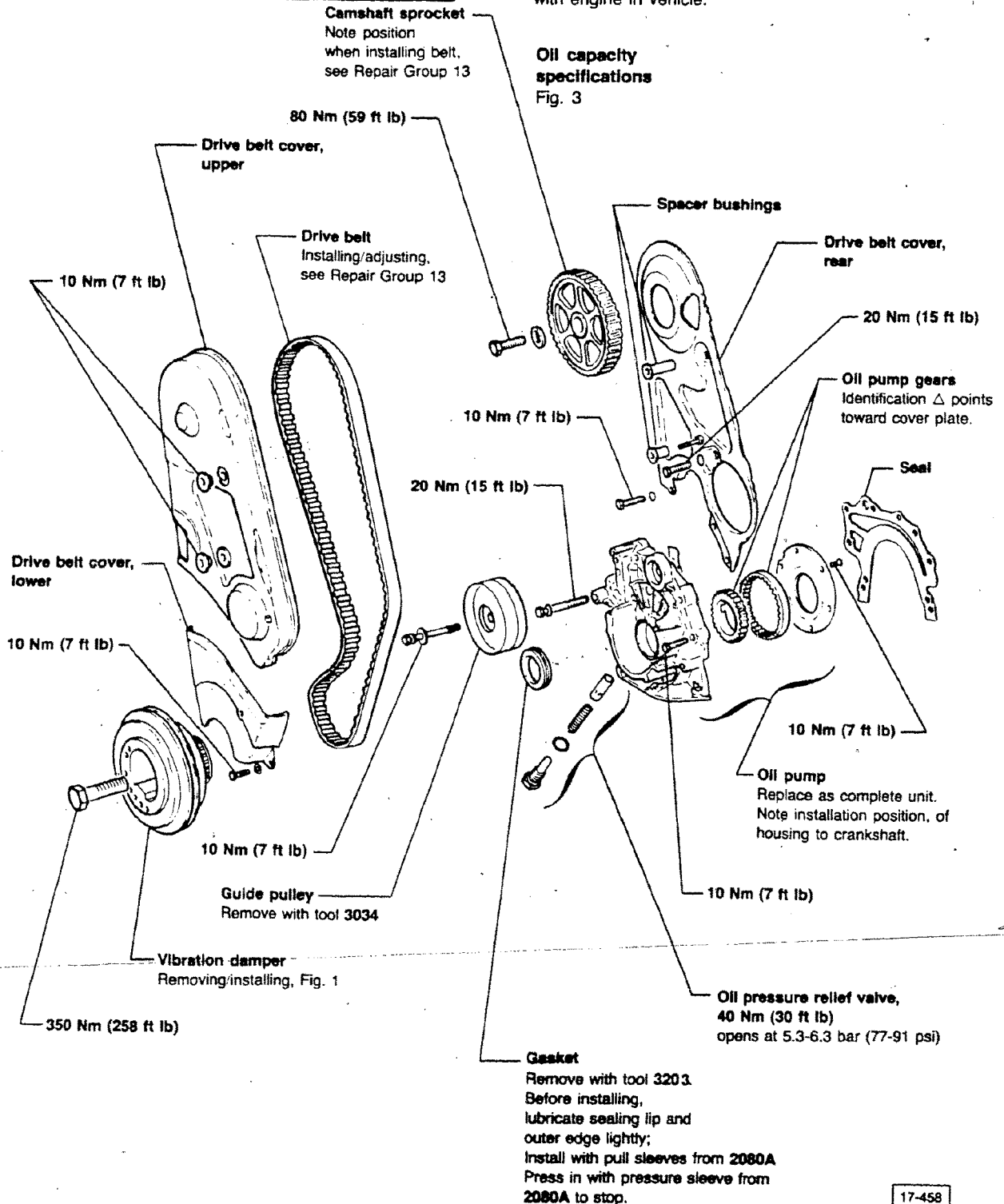
CAUTION

Always replace gaskets and seals.

Note

All parts illustrated can be removed and installed with engine in vehicle.

Oil capacity specifications
Fig. 3

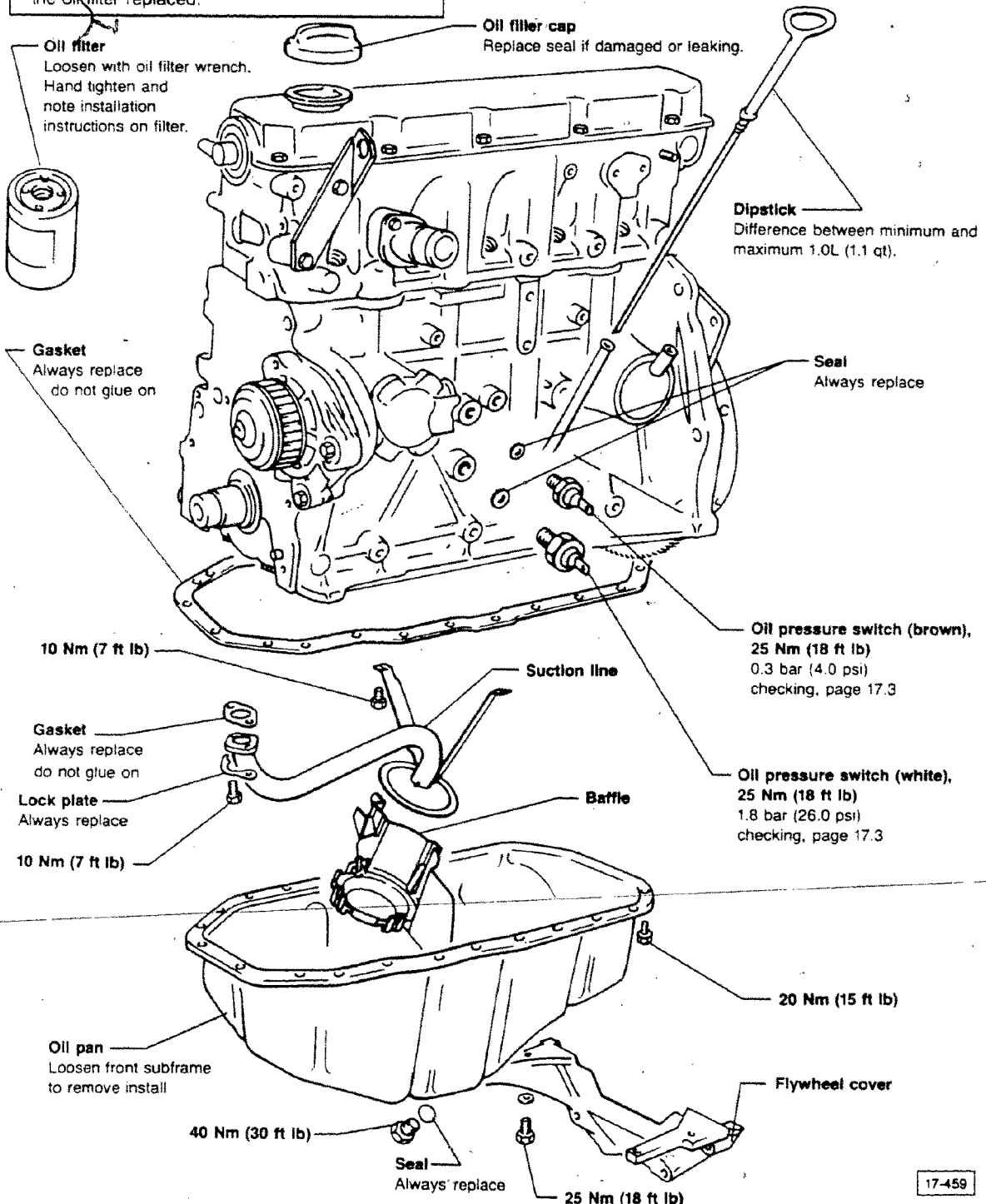


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Engine – Lubrication System

CAUTION

If, as a result of engine damage, large quantities of metal shavings are found in the engine oil, oil passages should be cleaned and the oil filter replaced.



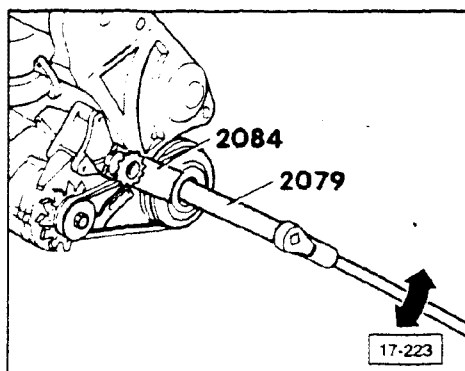
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I-7

5-cylinder

Oil filter
Oil pan
Oil pressure switches

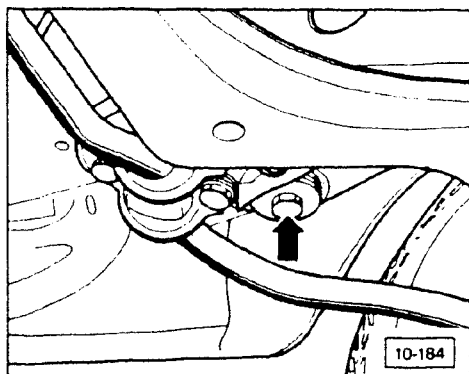
17.6



► Fig. 1 Vibration damper, removing/installing

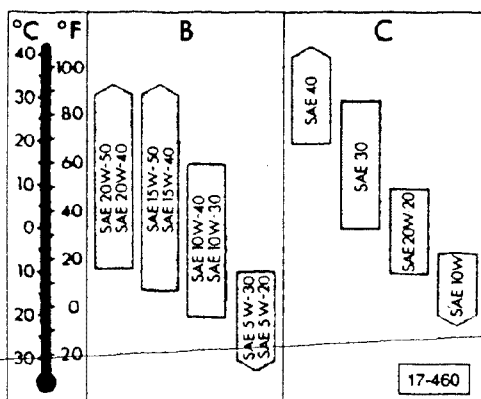
- torque 350 Nm (258 ft lb)

- tighten with extension 2079 in alignment with torque wrench
 - coat threads and contact surfaces of bolt head with anti-corrosion compound
- AMV 188 001 02**



► Fig. 2 Lowering subframe

- remove both screws of subframe (arrow)



► Fig. 3 Oil capacity, specifications

Oil specifications

Use only oil marked **SF**

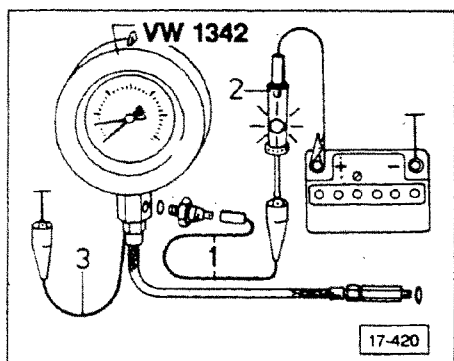
B = multi-grade oil

C = single grade oil

Oil capacity

with filter 3.5L (3.7 qts)

without filter 3.0L (3.2 qts)



Oil pressure switch brown (0.3 bar), checking

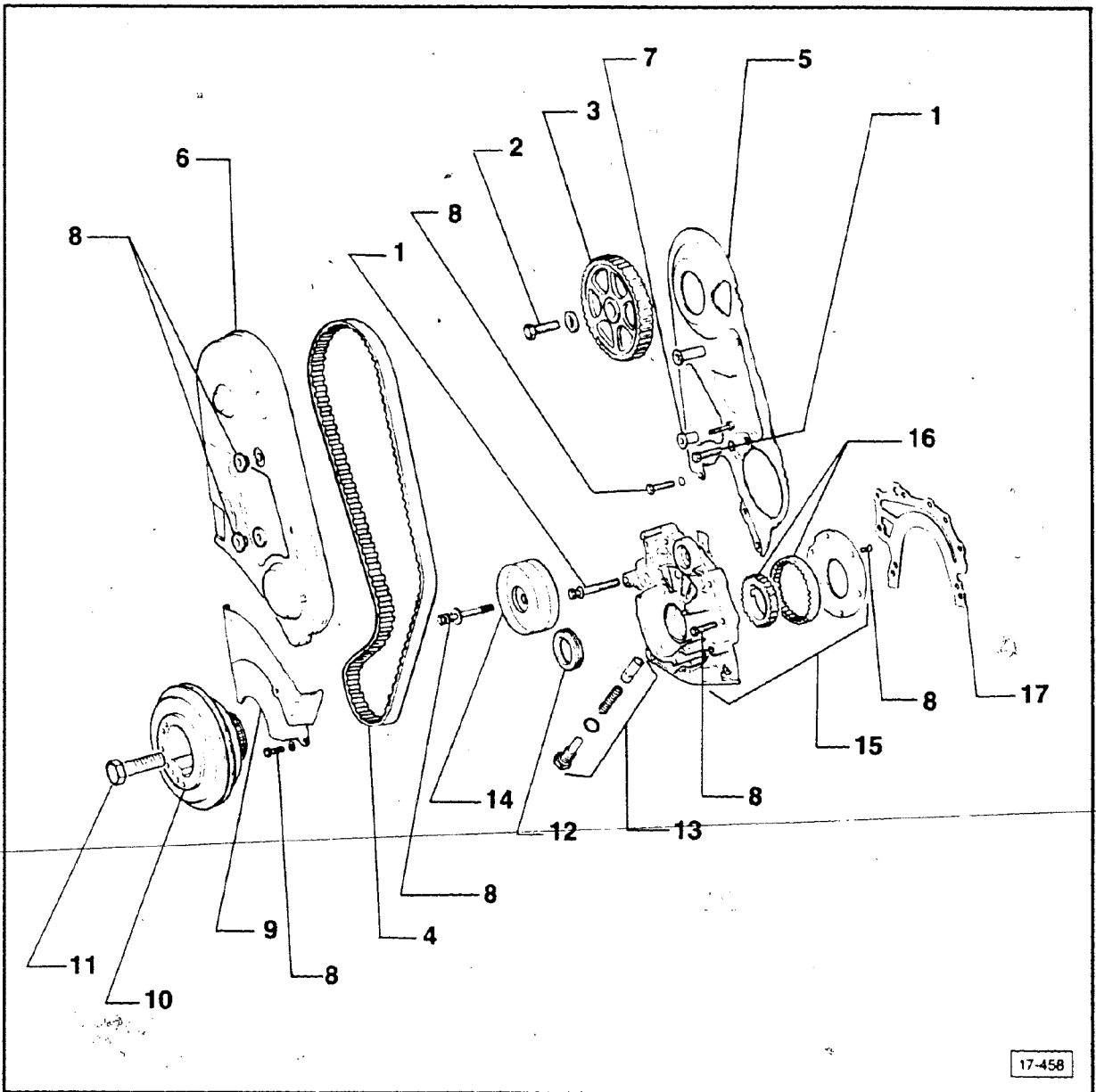
- remove 1.8 bar (26 psi) oil pressure switch (white insulation) and install into test gauge
- install **VW1342** in place of 1.8 bar (26 psi) oil pressure switch
- remove wire to 0.3 bar (4 psi) oil pressure switch, and install blue wire 1 from test device
- connect test lamp 2 to wire 1 and battery **plus** terminal
- connect wire 3 (brown) to suitable ground point on car
 - test light must come on
- start engine and increase RPM slowly
 - at a pressure of 0.15-0.45 bar (2.2-6.5 psi) test light must go out, if **no**, replace switch

Oil pressure switch white (1.8 bar), checking

- remove wire 1 from 0.3 bar (4 psi) oil pressure switch, and connect to 1.8 bar (26 psi) oil pressure switch (white insulation)
 - start engine and increase RPM slowly
 - at a pressure of 1.6-2.0 bar (23-29 psi) test light must come on, if not replace switch
-
- continue to increase RPM
 - at 2000 RPM, minimum pressure must be **at least** 2.0 bar (29 psi), if **no**, replace switch

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Note

All of the components in this illustration can be removed/installed with the engine installed.

1 — 10 Nm (7 ft lb)

2 — 65 Nm (48 ft lb)

3 — Camshaft sprocket

• note position when installing drive belt
also see Group 13

4 — Drive belt

Also see Group 13

5 — Drive belt cover
(rear)

6 — Drive belt cover
(upper)

7 — Spacer bushings

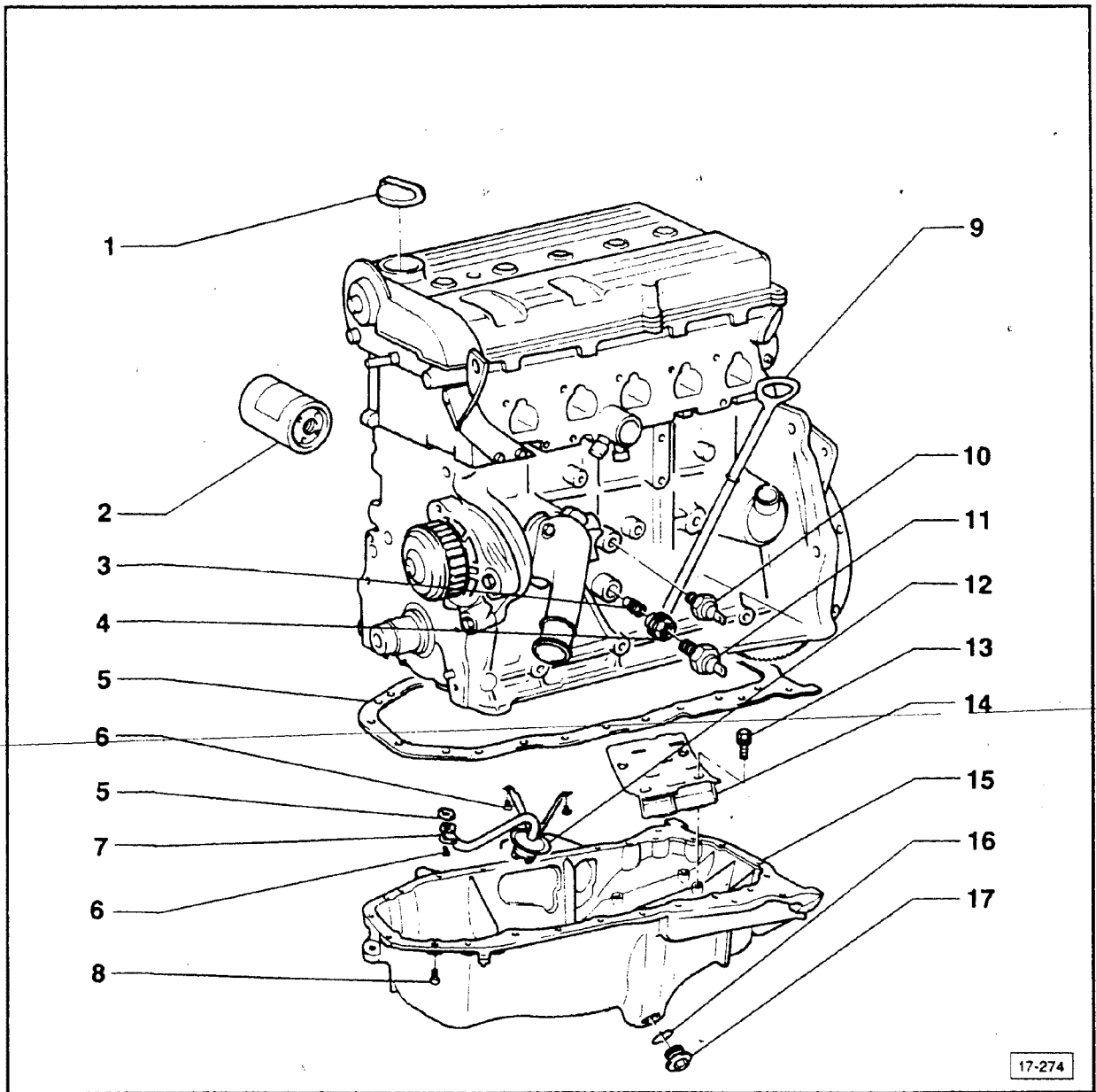
8 — 10 Nm (7 ft lb)

9 — Drive belt cover
(lower)

10 — Vibration damper
also see Group 13

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- 11 — **350 Nm**
Tighten only by using tool **2079** and **2084** (see Group 13)
Coat threads and contact surfaces of screw head with sealing paste **AMV 188 00102**
- 12 — **Oil Seal**
removing/installing see page 17.14
- 13 — **Oil pressure relief valve with oil temperature sensor**
opening pressure: **5 to 8 bar** (73 to 116 psi)
- 14 — **Idler pulley**
removing, page 17.14
- 15 — **Oil Pump**
removing, page 17.13
Replace only as an assembly
Watch for alignment pin on crankshaft when installing
- 16 — **Oil pump gears**
triangular symbol faces in direction of cover
- 17 — **Gasket**
replace



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CAUTION

If, as a result of engine damage, large quantities of metal shavings are found in the engine oil, thoroughly clean the oil passages and replace the oil filter.

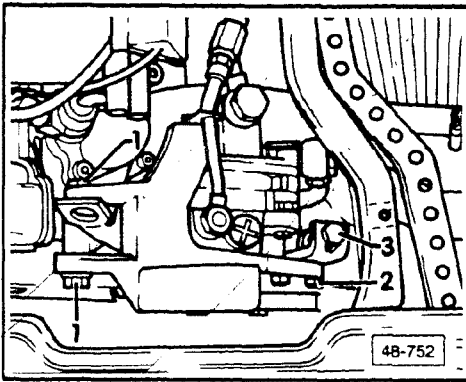
- 1 — Oil filler cap
replace seal if damaged
- 2 — Oil filter
Loosen with wrench
Tighten by hand
Follow instructions on filter

- 3 — Oil check valve
6 Nm (53 in lb)
install using D6 locking compound
- 4 — Adaptor
50 Nm (37 ft lb)
- 5 — Seal
replace
do not attach with adhesives
- 6 — 10 Nm (7 ft lb)
- 7 — Lock tab
replace

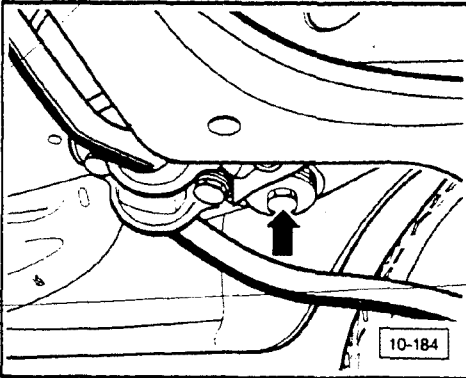
Engine – Lubrication System

- 8 — **M6 10 Nm (7 ft lb)**
M8 20 Nm (15 ft lb)
- 9 — **Oil dip stick**
- 10 — **Oil pressure switch (white)**
1.8 bar (26 psi)
25 Nm (18 ft lb)
checking, page 17.16
- 11 — **Oil pressure switch (brown)**
0.3 bar (4.4 psi)
25 Nm (18 ft lb)
checking, page 17.15
- 12 — **Oil pickup tube**
tighten at oil pump first
- 13 — **10 Nm (7 ft lb)**
- 14 — **Baffle**
- 15 — **Oil pan**
Loosen front mount to remove; install oil pan,
page 17.13
Clean the sealing surfaces before installation
- 16 — **Seal**
replace
- 17 — **30 Nm (22 ft lb)**

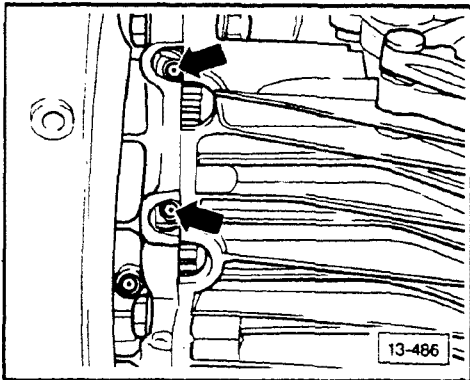
Oil pump, removing



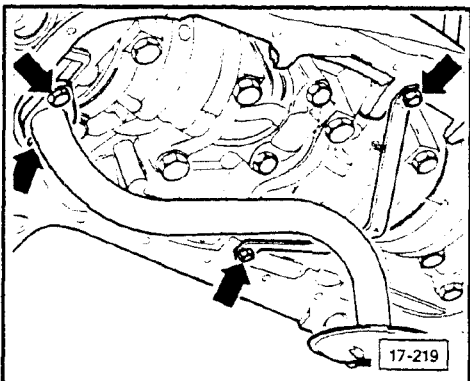
- loosen and remove V-belt for alternator, A/C compressor and Central Hydraulic System pump by loosening both bolts 1 and both nuts 2
- remove Central Hydraulic System pump and lay to one side (hoses left connected)
- remove vibration damper bolt (see Group 13)
- remove drive belt cover



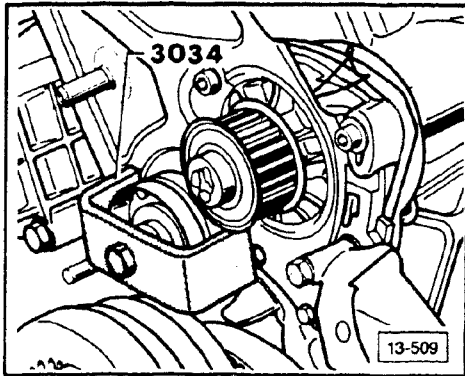
- remove both front bolts (arrow) on subframe
- remove oil dip stick
- drain engine oil



- rotate engine until flywheel recesses align with oil pan bolts (arrows)
- remove oil pan bolts
- remove oil pan
- rotate engine to **TDC** (align with marking on drive belt sprocket, also see Group 15)



- remove oil pickup tube (arrows)



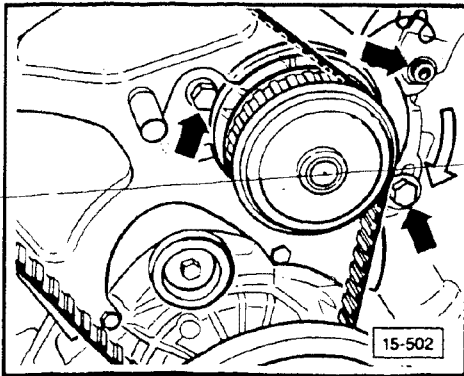
- remove idler pulley using 3034 puller
 - remove idler pulley only if replacing oil pump or if there is bearing damage to the pulley

Note

To remove the oil pump only the mounting bolt needs to be removed.

- remove oil pump

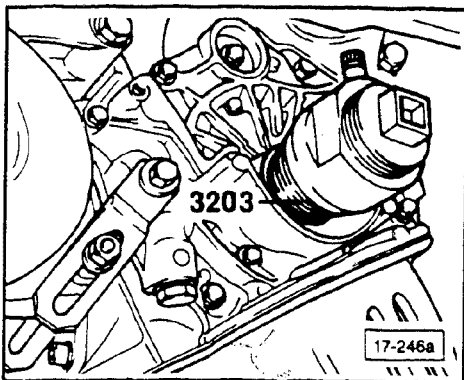
Crankshaft oil seal, removing



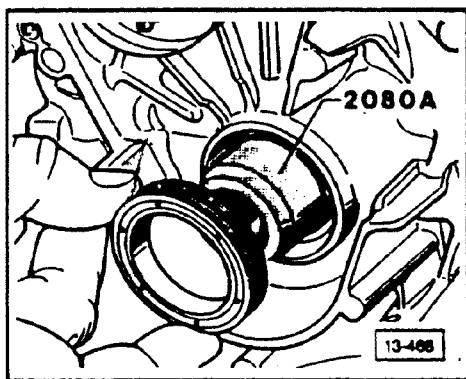
- turn coolant pump in direction of arrow A to remove drive belt, sprocket and pulley

CAUTION

Crankshaft must **NOT** be turned.

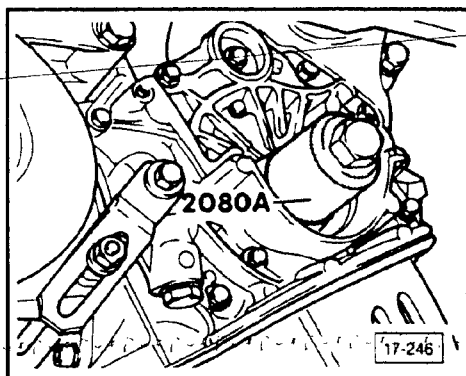


- remove vibration damper assembly, see page 17.7
- remove oil seal using tool 3203



Crankshaft oil seal, installing

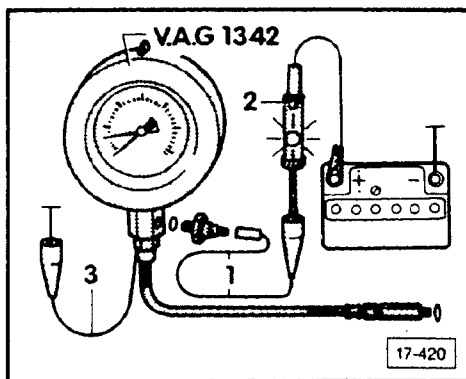
- slip inner seal guide of tool **2080 A** over crankshaft
- coat oil seal lip and outer surface with a light coating of oil
- carefully push seal over seal guide of tool **2080 A**



- slide outer sleeve of tool **2080 A** over seal guide/seal
- tighten outer sleeve against seal using vibration damper bolt until seal is seated

Note

If the crankshaft is scored or worn in the area of oil seal contact; press the seal into the casting until it bottoms. If there is no crankshaft wear; press in the seal flush with the surface of the casting.



Oil pressure switch (0.3 bar), checking

- remove oil pressure switch, install in gauge and connect wire 1 (blue) to switch
- install pressure tester **VW 1342** (arrow) in place of oil pressure switch
- connect test lamp 2 to wire 1 (blue) and battery positive
- connect wire 3 (brown) to suitable ground point
 - test lamp must light up

If NO

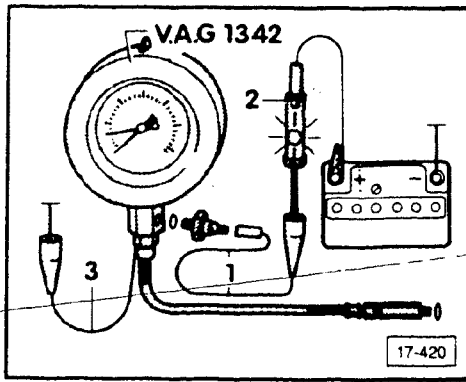
- replace oil pressure switch
- start engine and slowly increase engine speed
 - light must go out when pressure exceeds a minimum of 0.15 bar to a maximum of 0.45 bar (2.2 to 6.5 psi)

If NO

- replace 0.3 bar oil pressure switch

Note

It may be necessary to check the switching point while cranking the engine.



Oil pressure switch (1.8 bar), checking

- remove oil pressure switch, install in gauge and connect wire 1 (blue) to switch
- install pressure tester **VW 1342 (arrow)** in place of oil pressure switch
- connect test lamp 2 to wire 1 (blue) and battery positive terminal
- connect wire 3 (brown) to suitable ground
 - test lamp must **NOT** light up
- start engine and slowly increase engine speed
 - at a pressure of 1.6 to 2.0 bar (23 to 29 psi) test lamp must light up

If NO

- replace 1.8 bar oil pressure switch
- increase engine speed to 2000 RPM
 - oil pressure should be 2.0 bar (29 psi) minimum
- increase engine speed until pressure relief valve opens
 - minimum of 5.0 bar and maximum of 8.0 bar (73 to 116 psi)

Note

The hydraulic valve lifters are subjected to excess pressure if the oil pressure is significantly increased (pressure relief valve is stuck or improperly installed). The engine will then shut down shortly after starting, next when attempting to restart, the engine turns over extremely fast during cranking as a result of low compression (extended lifters).