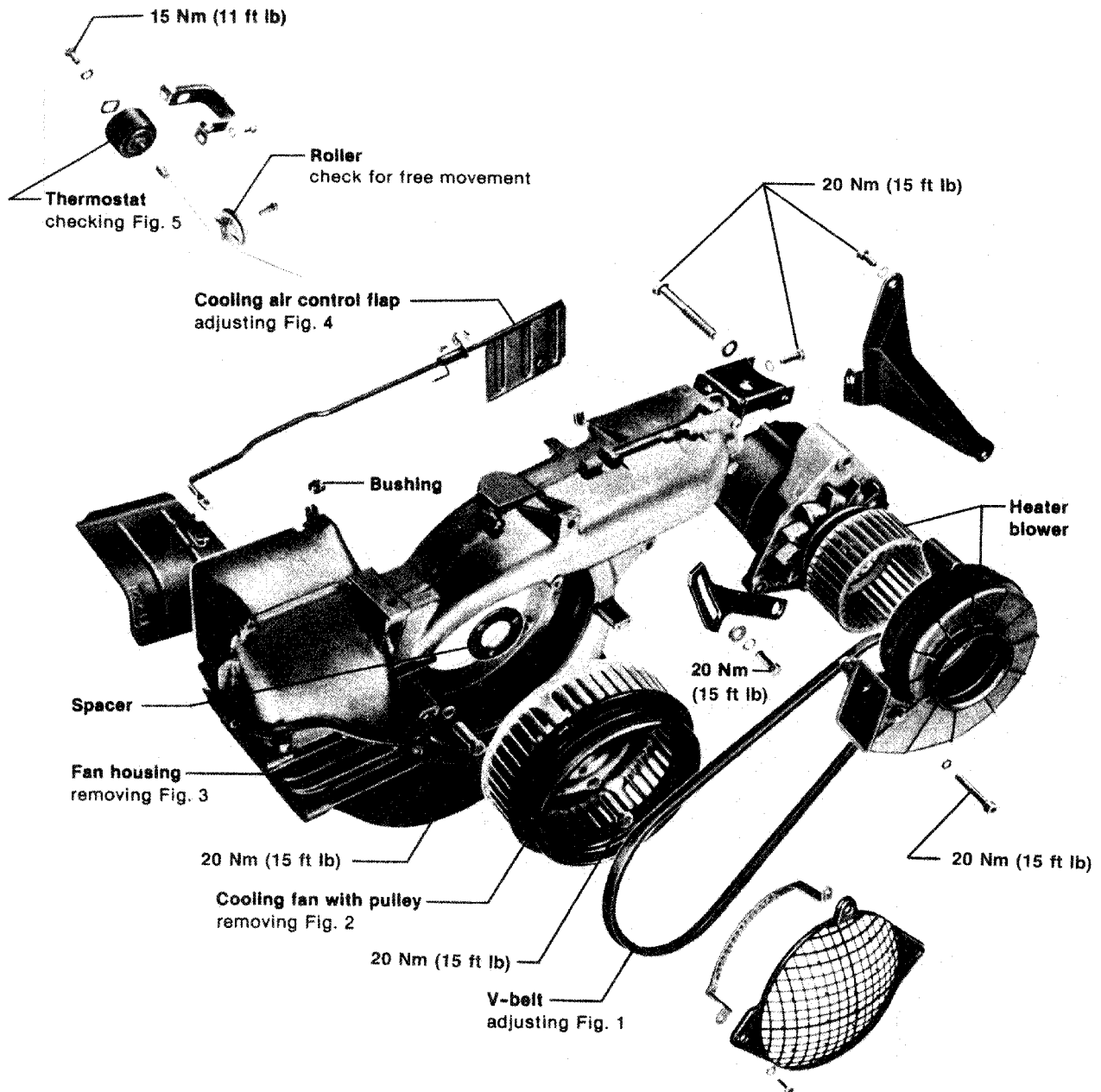


Engine Cooling System

Quick Data	Index	
<p>Air-cooled</p> <p>V-belt deflection 10-15 mm (3/8-9/16 in.)</p> <p>Tightening Torques</p> <p>alternator brackets 20 Nm (15 ft lb) cooling fan 20 Nm (15 ft lb) thermostat 15 Nm (11 ft lb)</p> <p>Diesel</p> <p>water pump v-belt deflection 5-10 mm (3/16-3/8 in.) coolant capacity 16.9 US qt (16.0 ltr)</p> <p>Tightening Torques</p> <p>shim pulley bolts 20 Nm (15 ft lb) thermostat housing 10 Nm (7 ft lb) thermoswitches 30 Nm (22 ft lb)</p> <p>Water-cooled — Digi-jet</p> <p>water pump V-belt deflection 10-15 mm (3/8-9/16 in.) coolant capacity 18.4 US qt (17.5 ltr)</p> <p>Tighting Torques</p> <p>thermostat housing 7 Nm (61 in lb)</p>	<p>Air-cooled</p> <ul style="list-style-type: none"> — Air control flaps 19.3 — Assembly 19.2 — Fan/Housing 19.3 — Thermostat 19.3 — V-belt adjustment 19.3 <p>Diesel</p> <ul style="list-style-type: none"> — Assembly 19.4 — Breather valve 19.5 — Checking 19.7 — Coolant temperature sender 19.4 — Draining/filling 19.6 — Expansion tank 19.4 — Fan assembly 19.5 — Glow plug relay sender 19.4 — Mixture ratio 19.6 — Pressure cap 19.7 — Radiator 19.5 — Thermostat 19.4 — Thermoswitches 19.5 — Water pump belt 19.4 	<p>Water-cooled /Syncro</p> <ul style="list-style-type: none"> — Assembly 19.8 — Bleeder screw 19.9 — Bleeder valve 19.9 — Checking 19.12 — Draining/filling 19.15 — Expansion tank cap checking 19.18 — Fan 19.12 — Hose layout 19.10 — Mixture ratio 19.18 — Radiator 19.12 — Thermostat 19.8 <p>1986 MY</p> <ul style="list-style-type: none"> — Assembly 19.11 - 19.14 — Draining 19.15

19 Engine-Cooling System



19-076

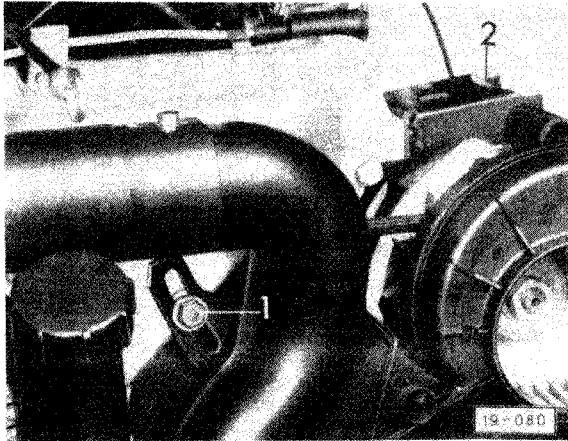


Fig. 1 V-belt tension, adjusting

- loosen bolts 1 and 2
- move alternator to tension belt
 - belt deflection must be 10–15mm (3/8–9/16 in.) in middle when pressing firmly with thumb
- tighten bolts

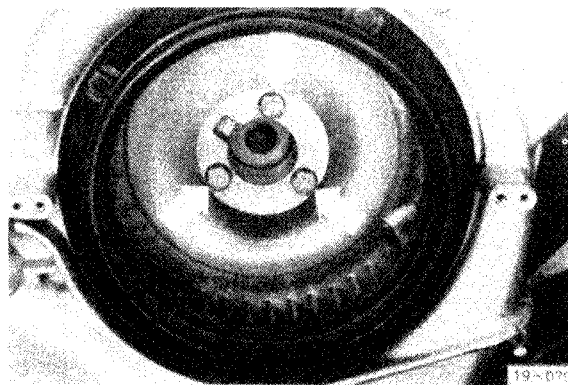


Fig. 2 Cooling fan with pulley, removing

- remove bolts (arrows)

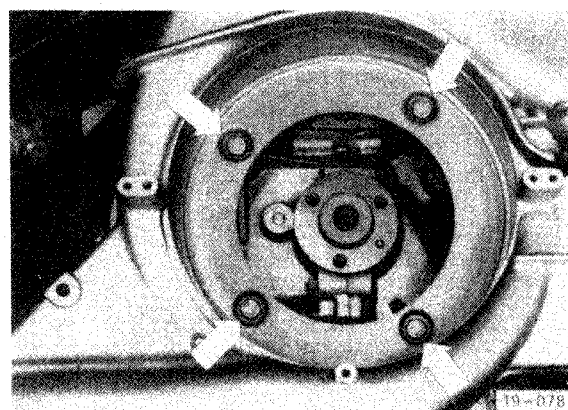


Fig. 3 Fan housing, removing

- disconnect cooling air control flap cable
- remove bolts (arrows)
- remove housing

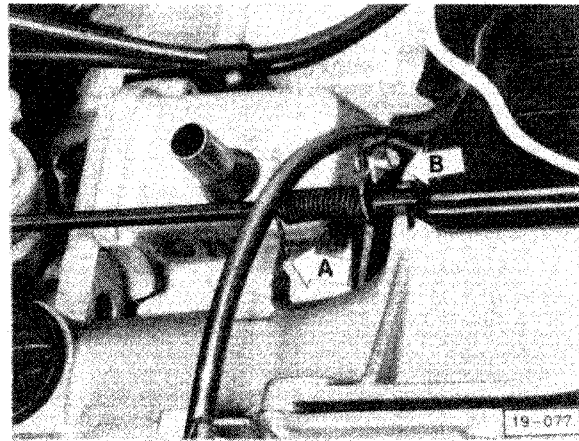


Fig. 4 Cooling air control flap, adjusting

- press flaps to fully closed position and tighten cable clamp

Note

Bent ends of return spring must rest on boss of housing (arrow A) and on cable guide (arrow B)

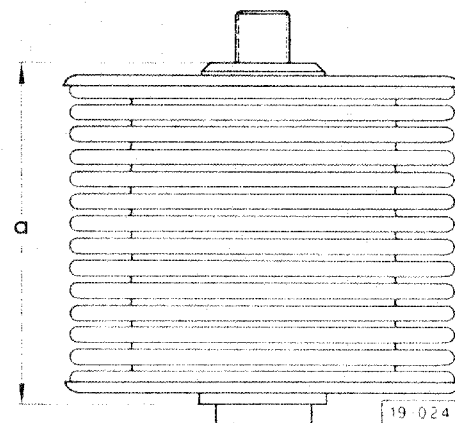


Fig. 5 Thermostat, checking

- put thermostat in water 85–90°C (185–194°F)
 - a = min. 46 mm (1 13/16 in.)

19 Engine-Cooling System

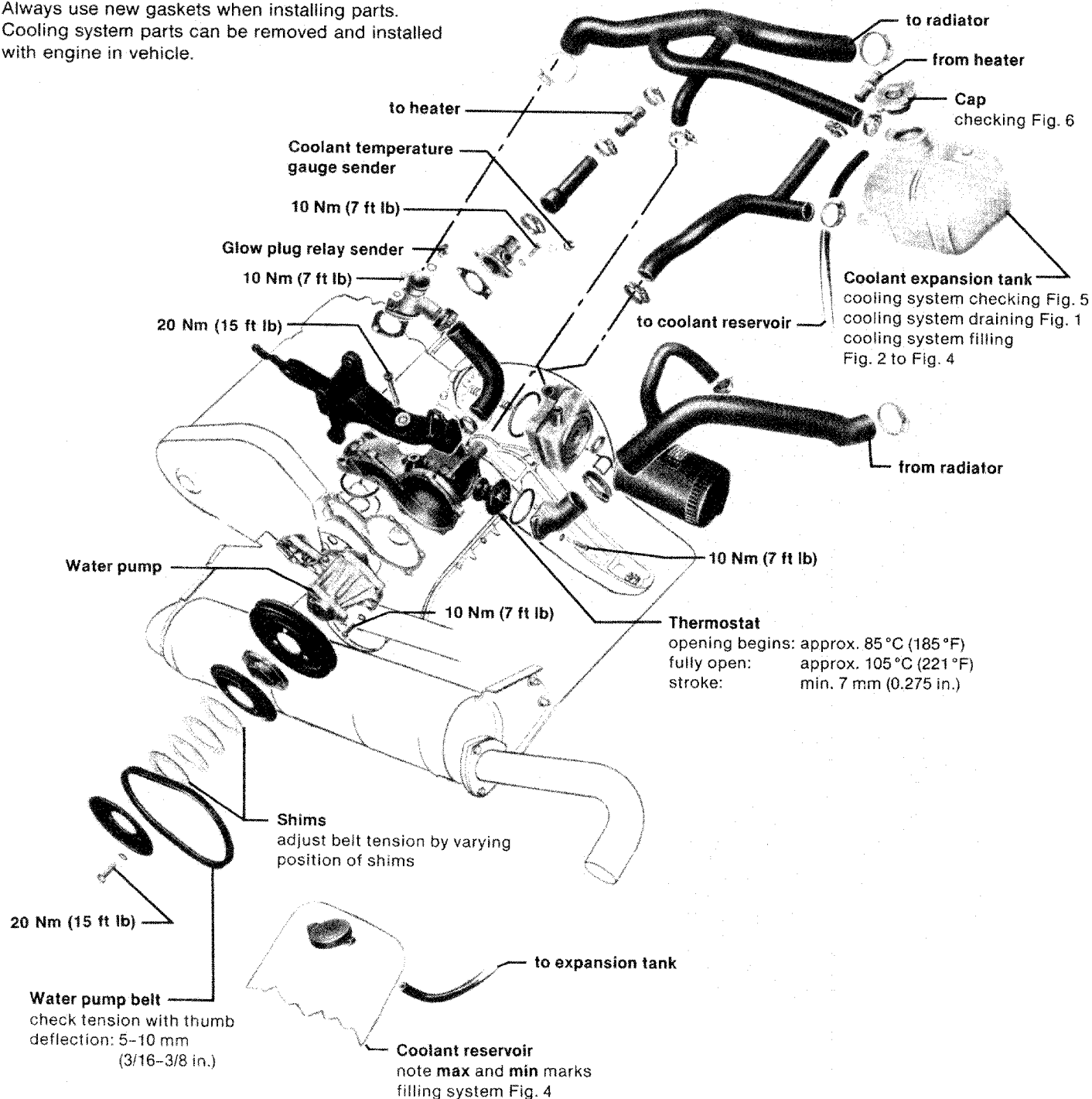
Note

Cooling system is filled at factory with mixture of water and antifreeze solution with corrosion inhibitors. Use coolant mixture year-round. When replacing coolant/antifreeze, only a phosphate-free product must be used. Part No. ZVW 237 102 may be mixed with pre-9/83 factory-filled, phosphate-free antifreeze, Part No. ZVW 244 101.

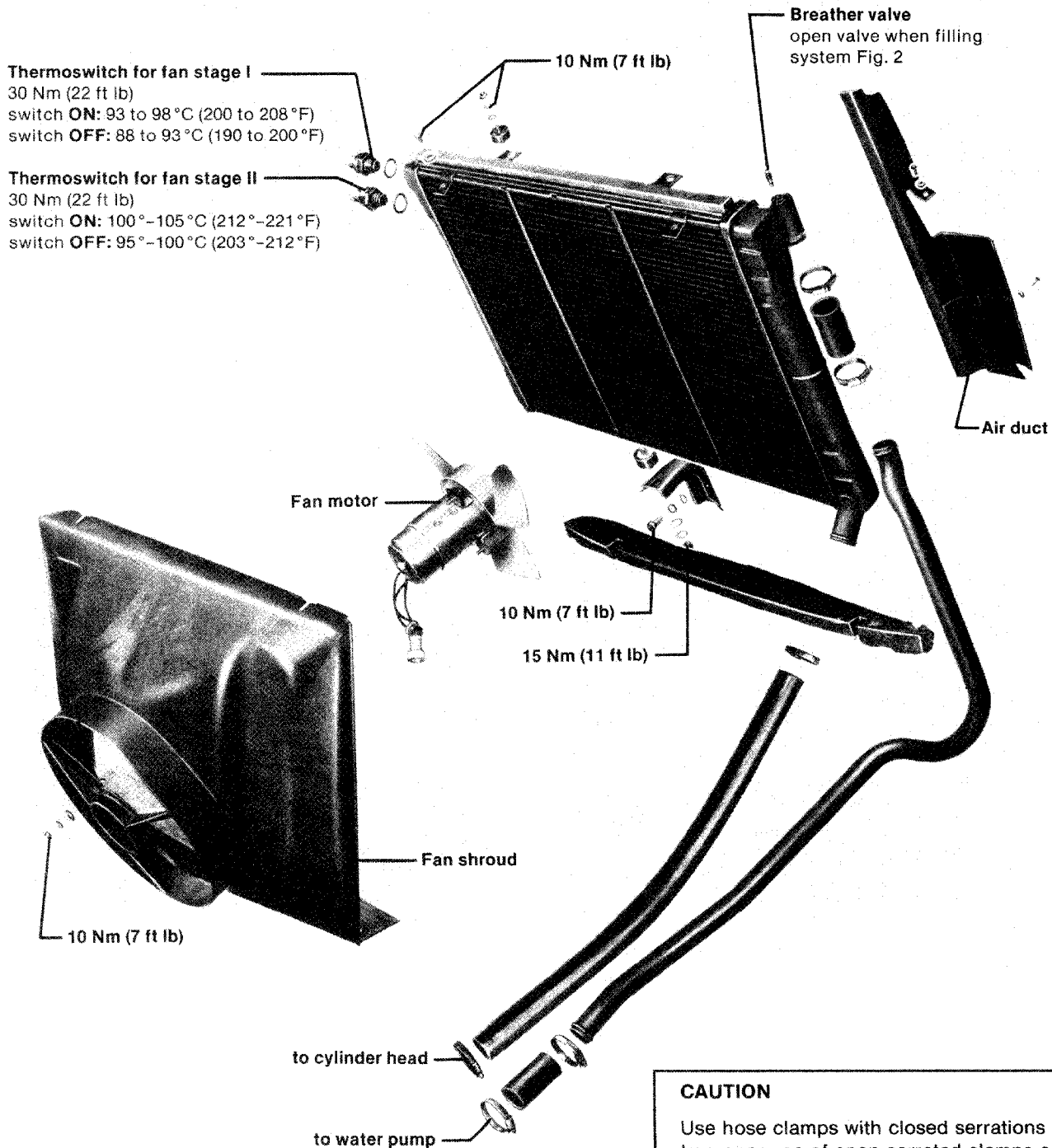
Always use new gaskets when installing parts. Cooling system parts can be removed and installed with engine in vehicle.

CAUTION

Antifreeze other than specified by Volkswagen may cause corrosion of the cooling system thus leading to engine overheating and damage.



19-212



CAUTION

Use hose clamps with closed serrations only. Improper use of open serrated clamps can tear hose and cause coolant leaks.

19-215

19 Engine-Cooling System

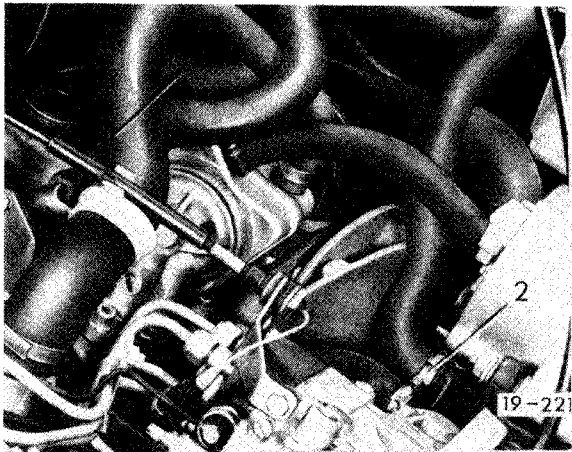


Fig. 1 Cooling system, draining

- fully open heater controls
- open cap on expansion tank
- disconnect lower coolant hose 1 from water pump at connection pipe
- disconnect center coolant hose 2 from water pump

Note

When removing radiator, drain rest of coolant by detaching lower hose from radiator

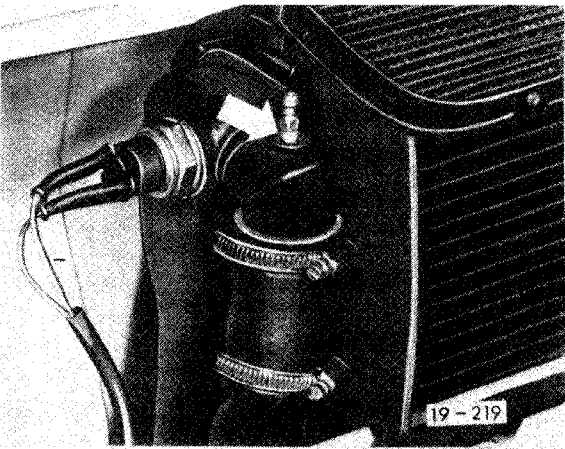


Fig. 2 Cooling system, filling

- set heater controls to position **WARM**
- open breather valve (arrow) on radiator

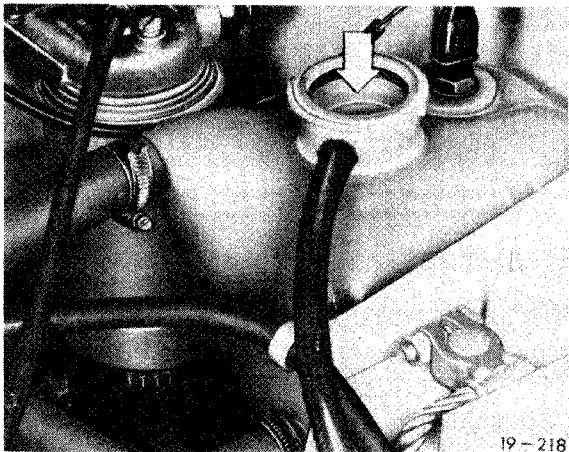


Fig. 3 Cooling system, filling

- fill cooling system via expansion tank (arrow) until tank is filled to brim and remains filled
- run engine at about 2500 rpm until coolant flows at breather valve with **NO** bubbles
- close breather valve
- check coolant level and top up as necessary
- close expansion tank with cap

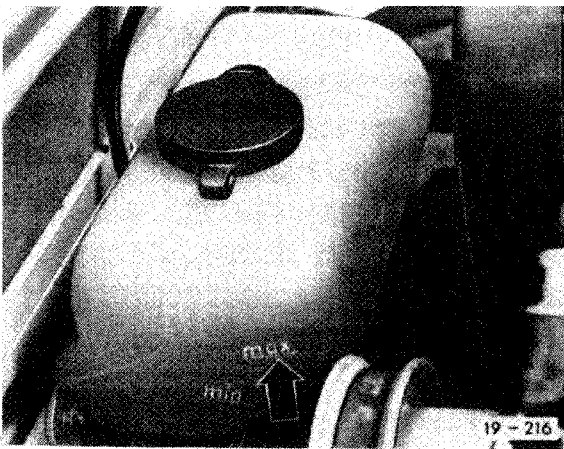


Fig. 4 Cooling system, filling

- fill reservoir up to mark **max** (arrow)

Coolant mixture ratio

Coolant capacity 16.0 ltr (16.9 US qt)

Outside Temperature	Antifreeze	Water
– 25 °C (– 13 °F)	6.4 ltr (6.75 US qt)	9.6 ltr (10.15 US qt)
– 35 °C (– 30 °F)	8.0 ltr (8.45 US qt)	8.0 ltr (8.45 US qt)

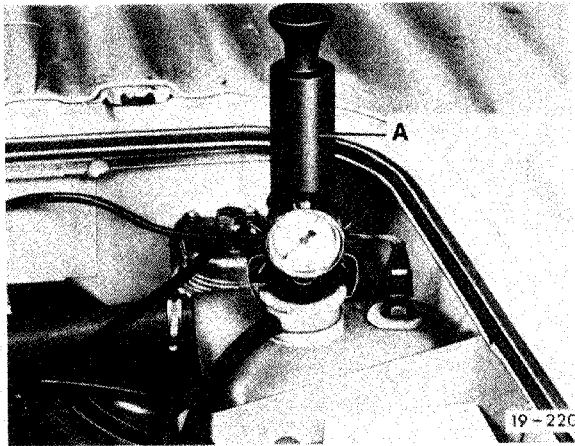


Fig. 5 Cooling system, checking

- attach tester A in place of pressure cap
 - A = Stant tester ST-255A, AC-PCT-3 or equivalent
- apply pressure of approximately 1 bar (14 psi)
 - if pressure remains constant, system is OK

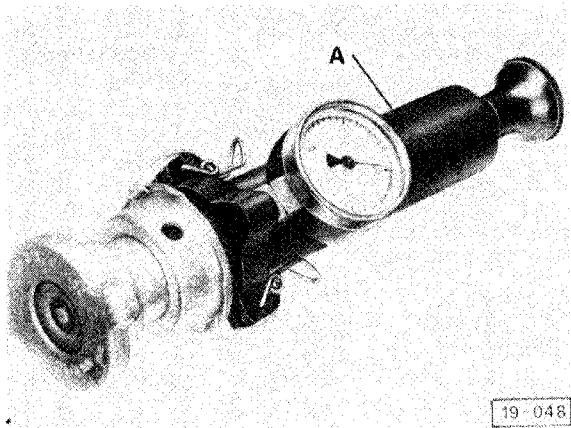


Fig. 6 Pressure cap, checking

- attach cap on tester A
 - A = Stant tester ST-255A, AC-PCT-3 or equivalent
- apply a pressure of 0.9 to 1.15 bar (11 to 16 psi)
 - if pressure relief valve opens within this range, cap is OK

19 Engine-Cooling System

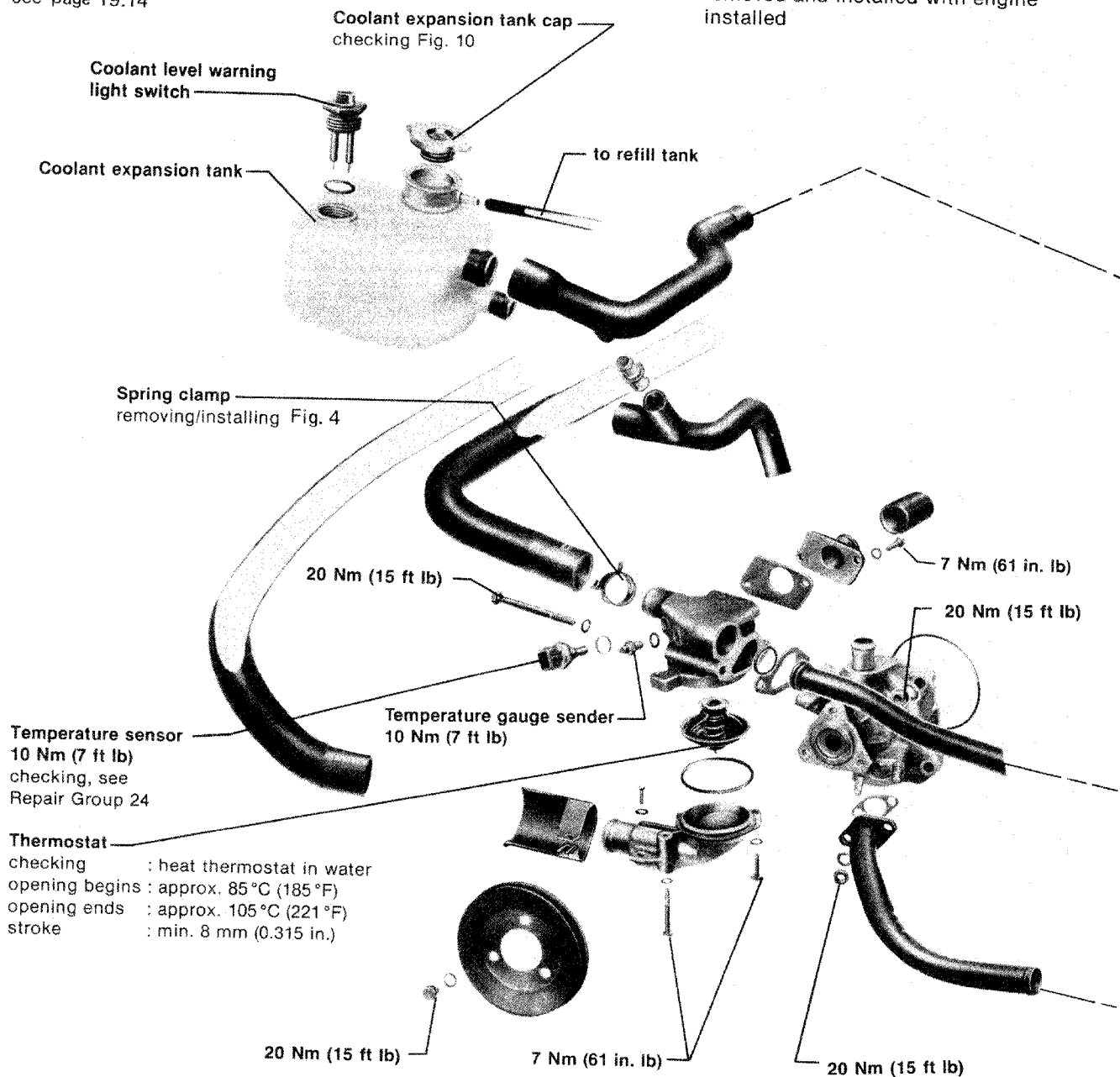
Cooling system

draining Fig. 1 to Fig. 4
checking for leaks Fig. 9

Cooling hoses layout
see page 19.14

Note

Always replace all gaskets.
All parts of cooling system can be
removed and installed with engine
installed



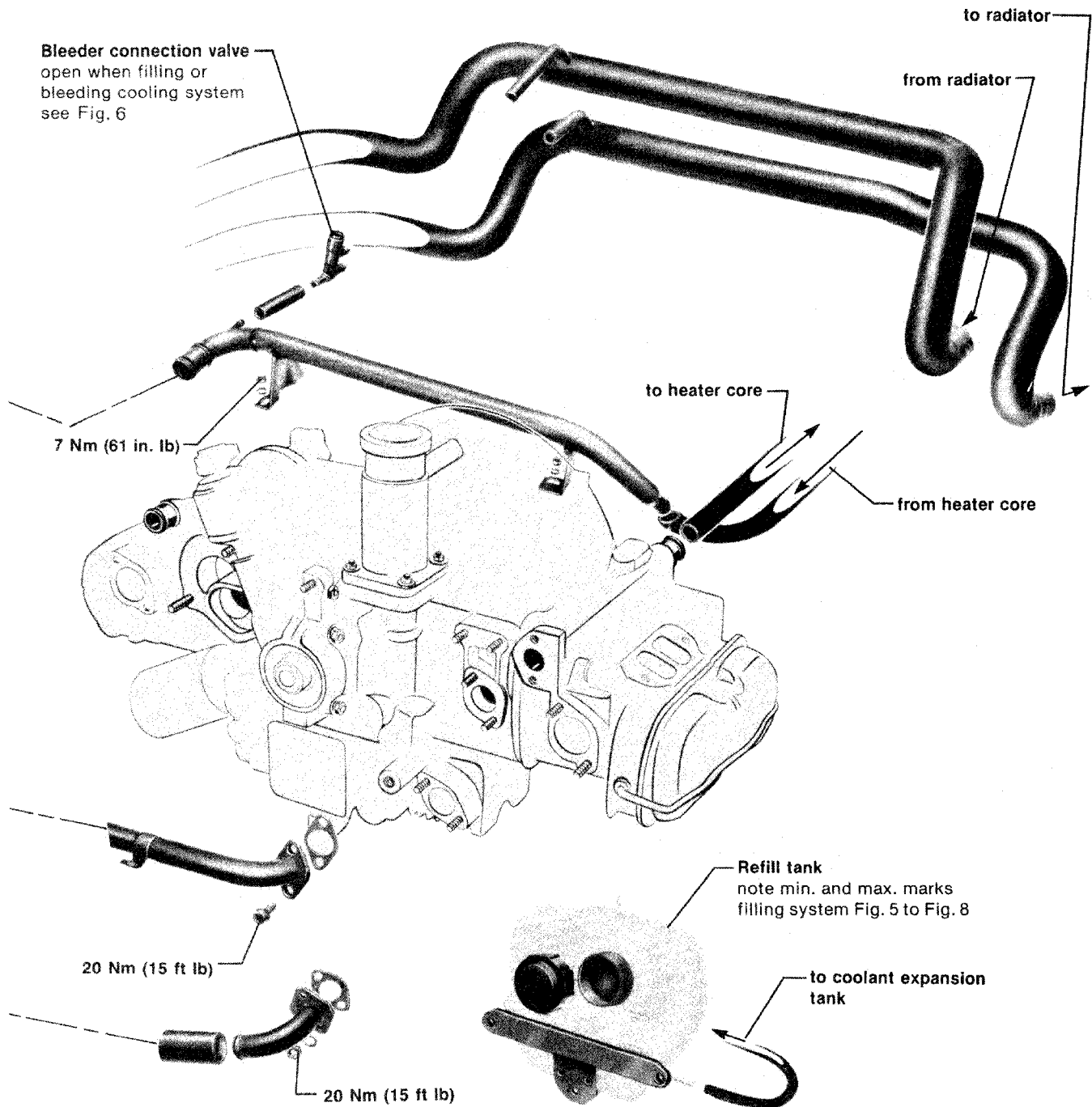
19-280

19.8

Cooling system

Water-cooled

1983-1985



19-281

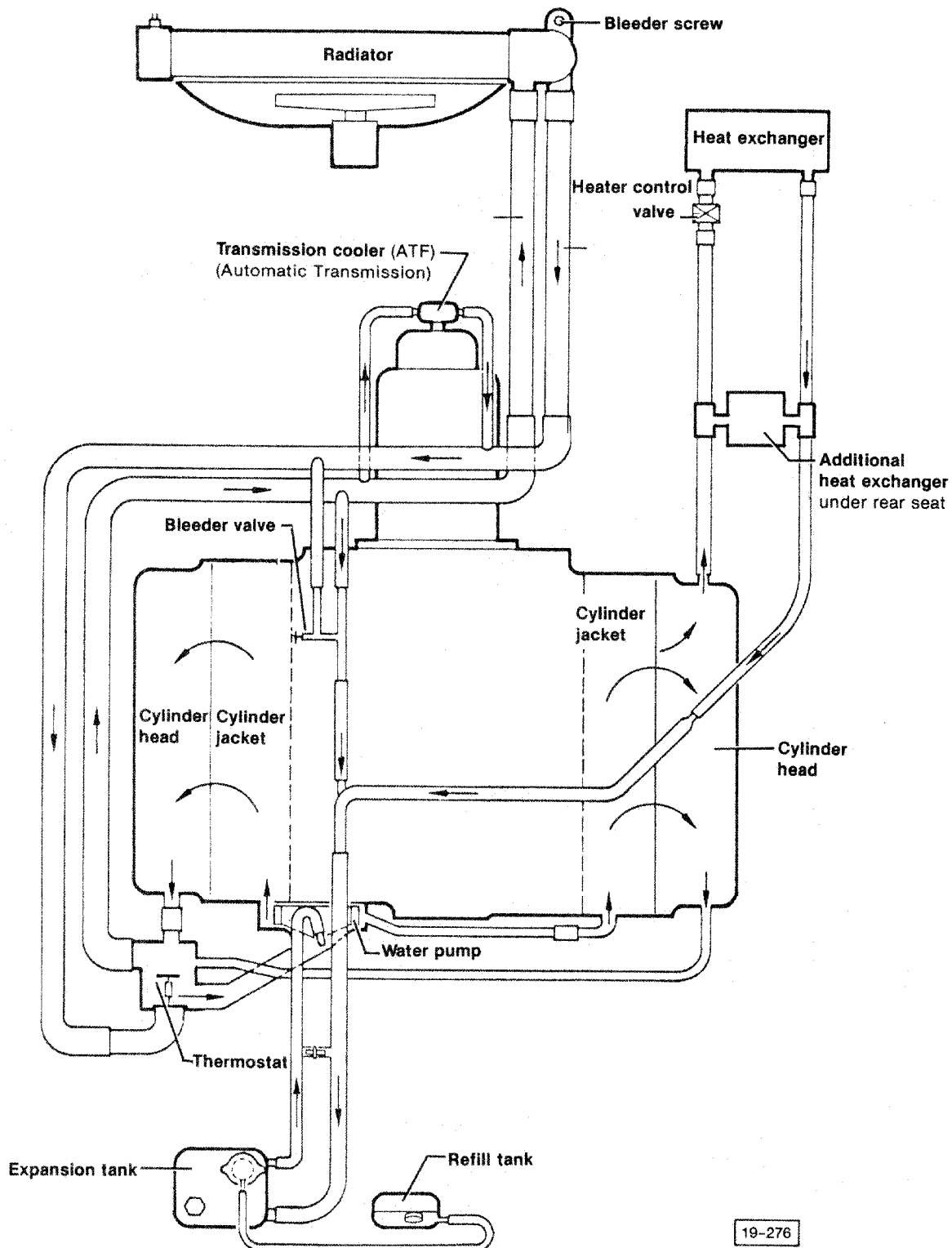
1983-1985

Water-cooled

Cooling system

19.9

19 Engine-Cooling System



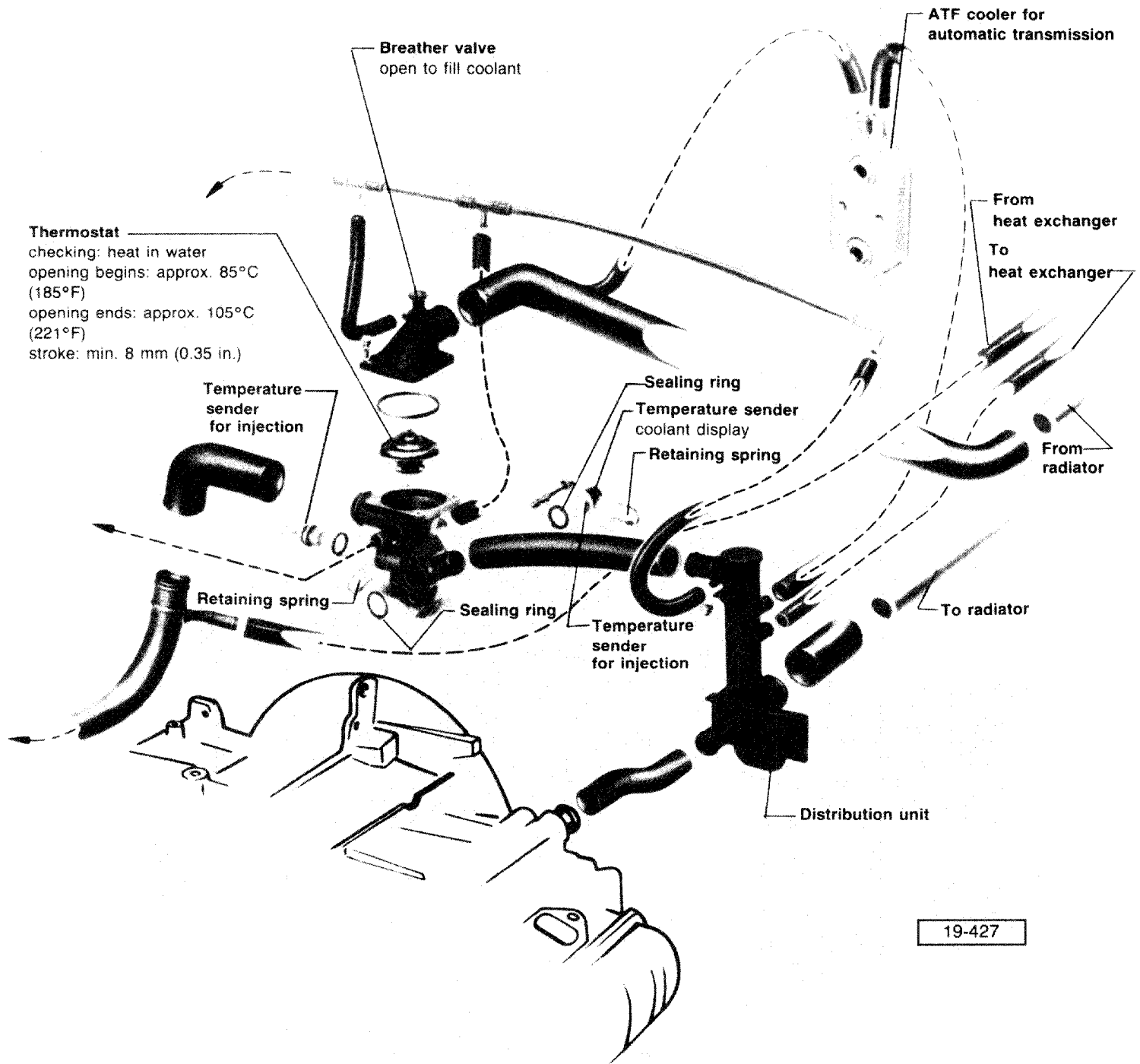
19-276

19.10

Coolant hose layout

Water-cooled

1983-1985



19 Engine-Cooling System

Note

Use coolant, Part No. ZVW 237 102, which has corrosion inhibiting agents especially formulated to help prevent corrosion damage to the water jacket sealing surfaces of the cylinder head.

CAUTION

Antifreeze other than specified by Volkswagen may cause corrosion of the cooling system thus leading to engine overheating and damage

Note

Secure coolant hoses with hose clamps

Thermo-switch for fan

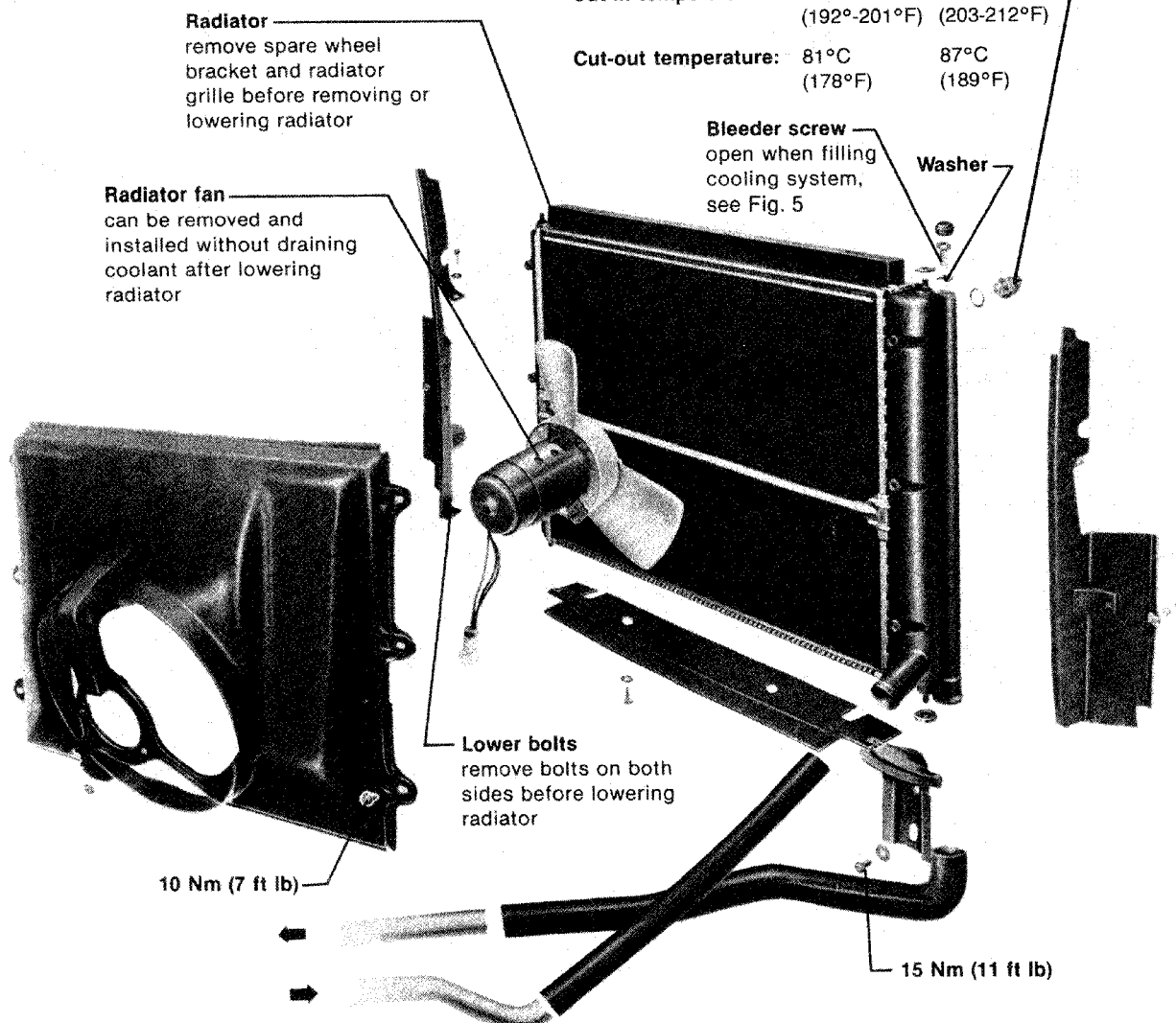
(located at left on radiator)
removing/installing: remove radiator grille and move left cardboard air deflector to side

Thru 1985

	I. Stage	II. Stage
Cut-in temperature:	93°C-98°C (199-208°F)	99°C-105°C (210°-221°F)
Cut-out temperature:	88°C-93°C (190-199°F)	91°C-97°C (196-206°F)

From 1986

	I. Stage	II. Stage
Cut-in temperature:	89°C-94°C (192°-201°F)	95°C-100°C (203-212°F)
Cut-out temperature:	81°C (178°F)	87°C (189°F)



19-254

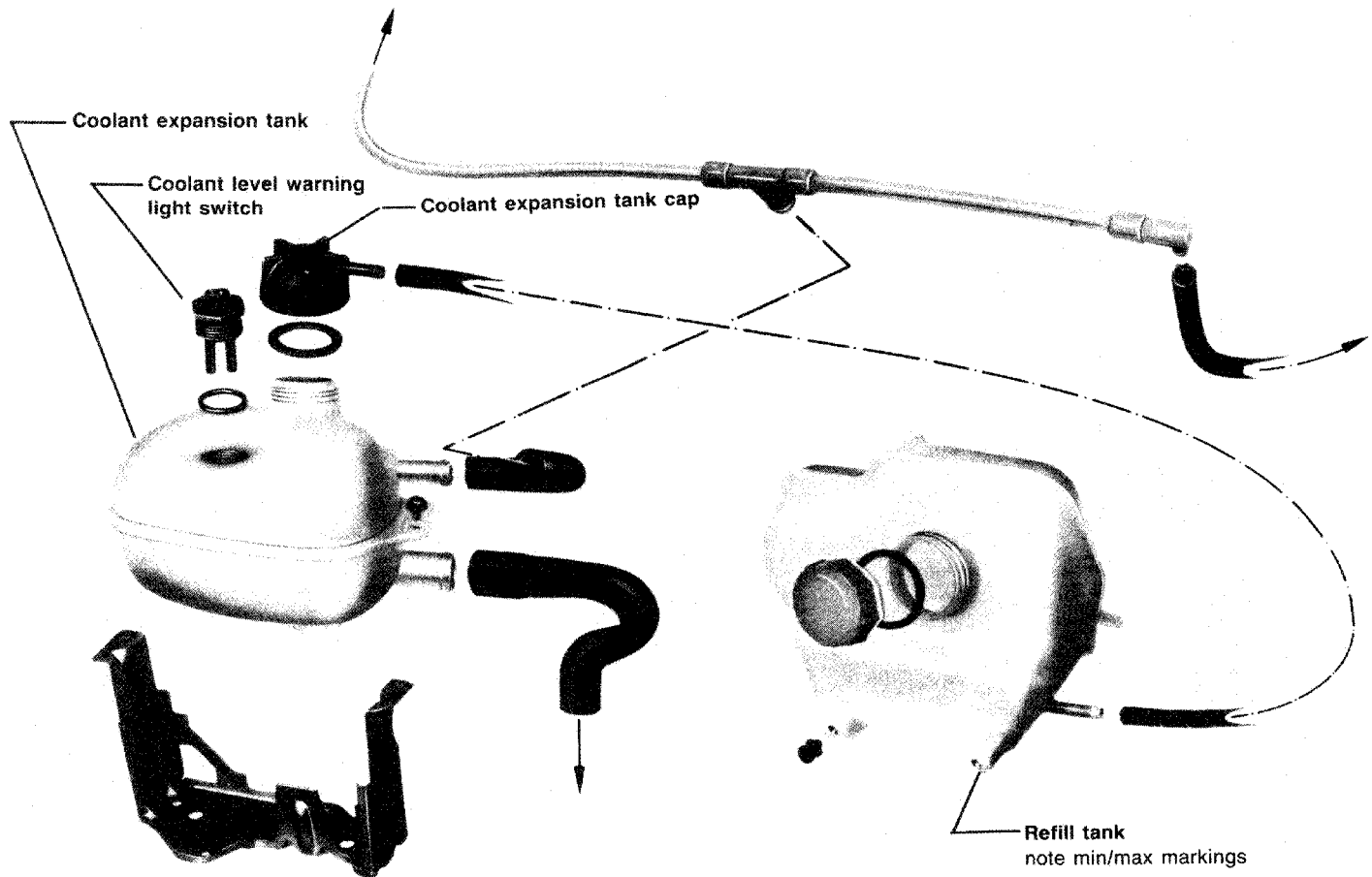
19.12

Radiator assembly
Thermo-switch

Water-cooled

Note

Always replace all gaskets. All parts of cooling system can be removed and installed with engine installed in vehicle.



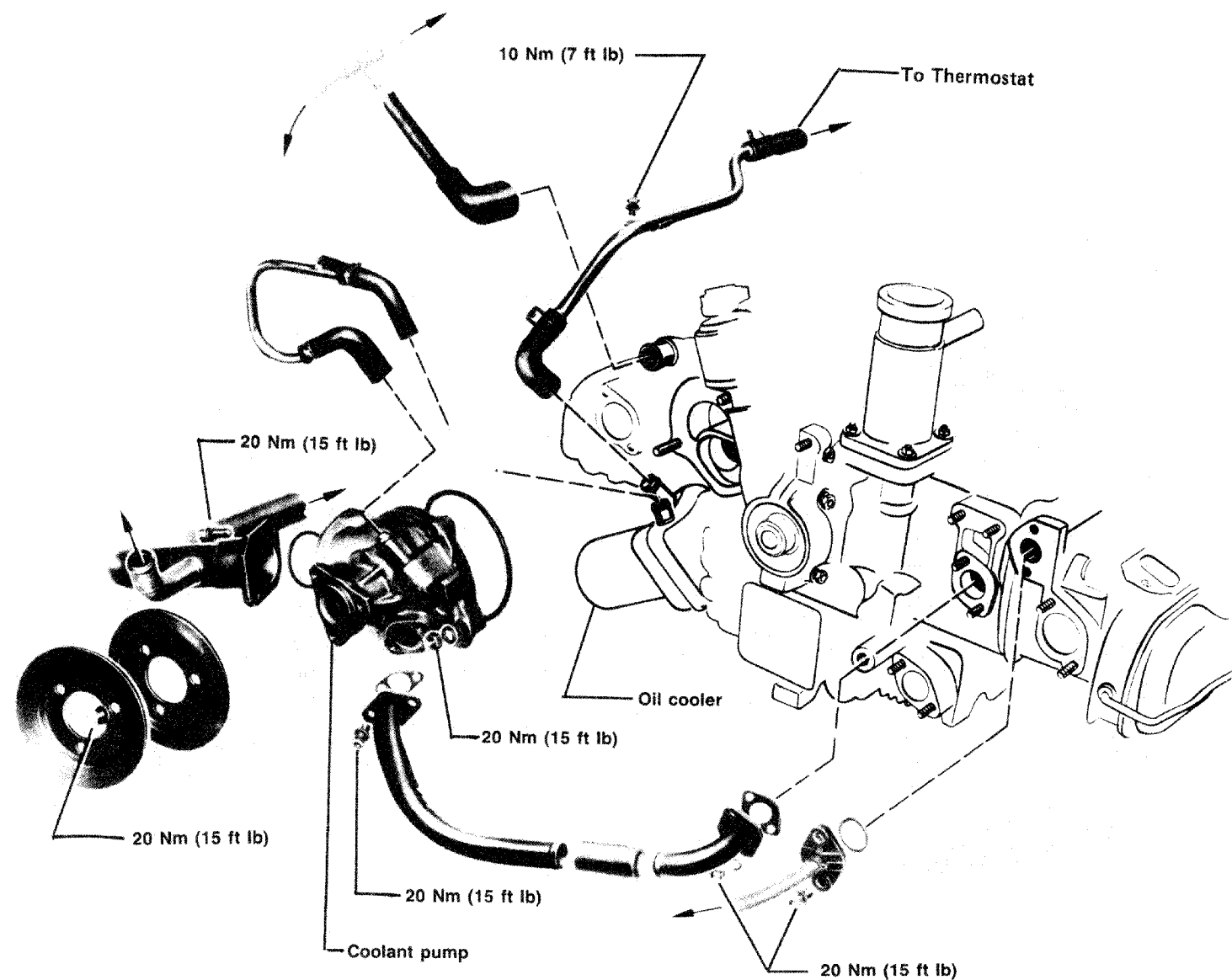
19-410

Water-cooled from 1986

Cooling system

19.13

19 Engine-Cooling System



19-411

19.14

Cooling system

Water-cooled from 1986

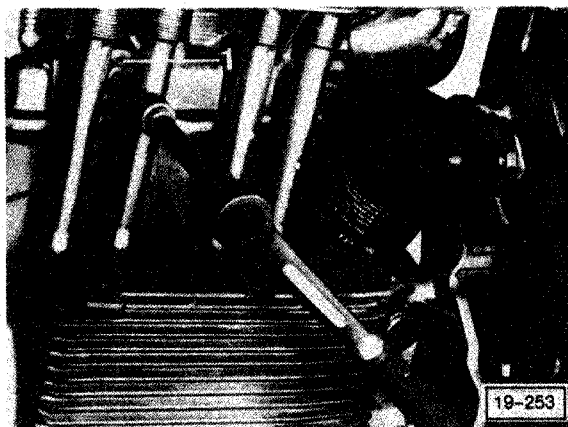


Fig. 1 Coolant system, draining

- open coolant expansion tank cap
- drain coolant at drain plugs 1 on cylinder heads

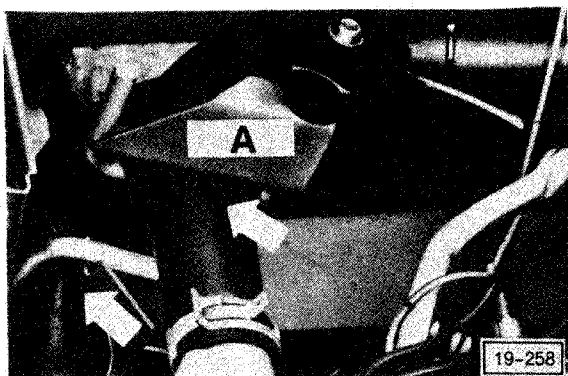


Fig. 2 Coolant system, draining (when removing engine)

- pinch coolant hoses with hose clamp (A-local supply) (arrows) before removing

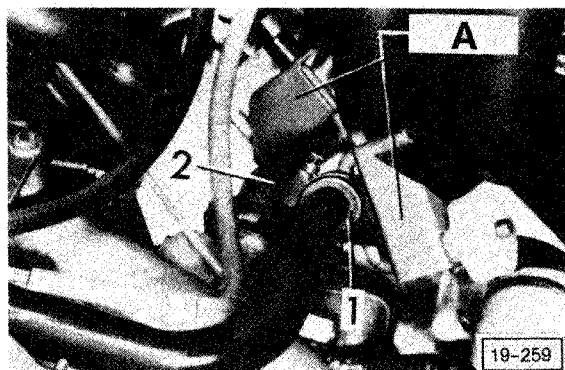
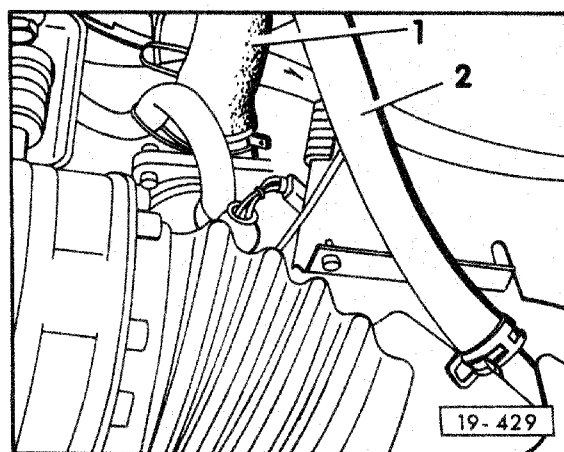


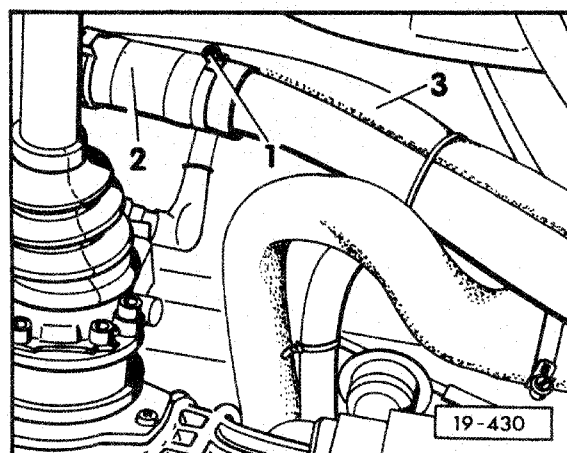
Fig. 3 Coolant system, draining

- in case that coolant hoses 1 and 2 for heat exchanger have to be removed, pinch hoses with hose clamp (A-local supply)

Draining - From 1986



- close hose 1 from radiator to thermostat with hose clamp
- close hose 2 from heat exchanger to coolant pipe with hose clamp



- loosen hose clamp 1, close hose 2 from radiator to distribution piece with hose clamp
- close hose 3 from heat exchanger to distribution piece with hose clamp
- drain coolant at drain plugs (Fig. 1)
- open coolant expansion tank cap

19 Engine-Cooling System

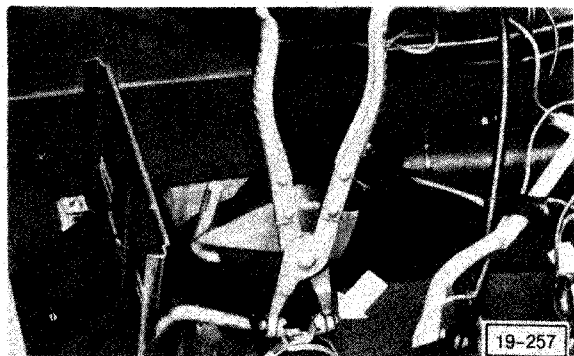


Fig. 4 Hose spring clamp, removing/installing

- use universal pliers or hose clamp pliers to remove or install clamp (arrow)

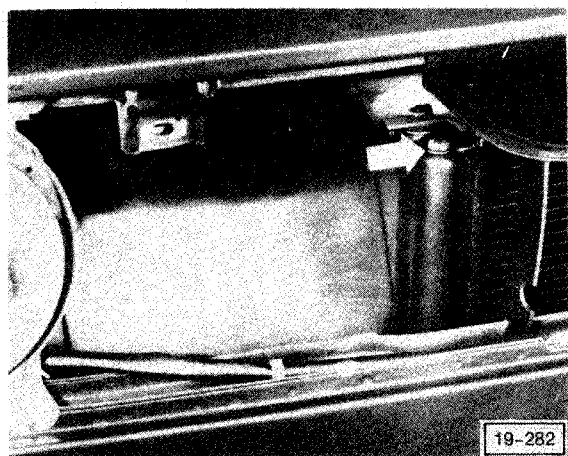


Fig. 5 Cooling system, filling

- set heater control to maximum heating
- open control valve for auxiliary heater under rear seat
- remove radiator grille
- raise vehicle approx. 40 cm (15 3/4 in.) at front under cross-member with floor jack and wooden support or equivalent
- open bleeder screw (arrow) on radiator

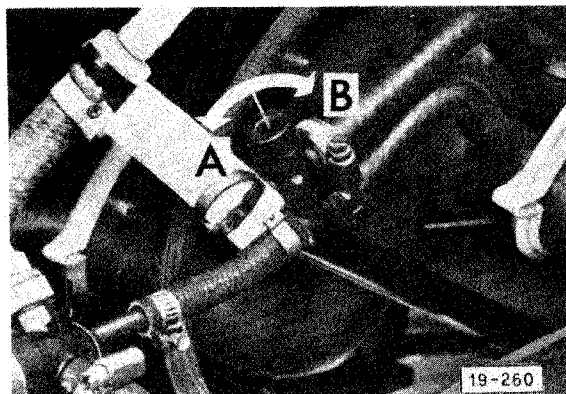


Fig. 6 Cooling system, filling

- open bleeder valve in engine compartment
- A = open
- B = closed

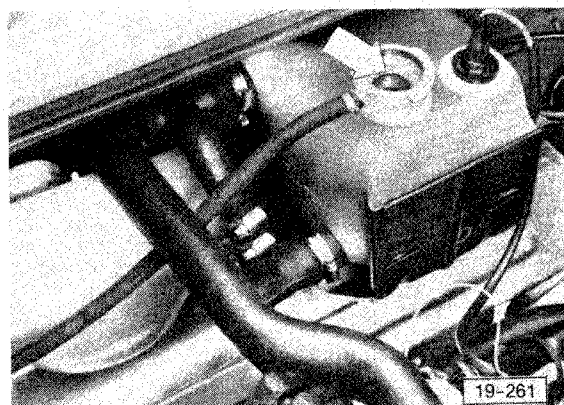


Fig. 7 Cooling system, filling

- fill coolant until expansion tank is full (approx. 4-5 ltr/4.25-5.3 US qt)
- start engine
- at approx. 2000 rpm, top up tank until coolant flows from bleeder screw on radiator (bubble free)
- add coolant until tank is full and close tank with cap
- turn ignition off and start engine again after approx. 20 seconds
- at about 2000 rpm open cap of expansion tank
- close bleeder screw on radiator when coolant flows out
- add coolant if necessary and close expansion tank
- close bleeder valve in engine compartment
- switch engine off
- top up refill tank with coolant

19.16

Cooling system, draining/filling

Water-cooled

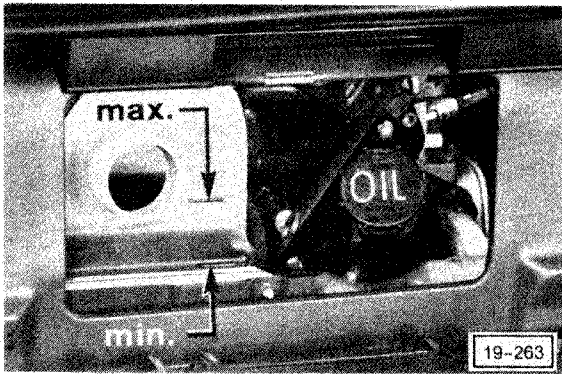


Fig. 8 Cooling system, filling

— fill refill tank up to max. mark (arrow)

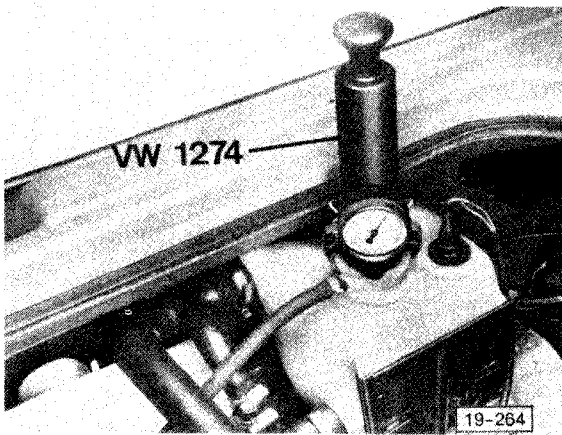
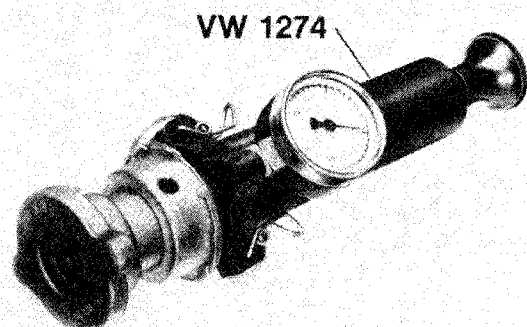


Fig. 9 Cooling system, checking for leaks

- attach tester in place of pressure cap
 - Stant tester St-255 A, AC-PCT3 or equivalent
- apply pressure of approx. 1 bar (14.5 psi)
 - if pressure remains constant, system is OK
 - if pressure drops, look for leaks and eliminate

19 Engine-Cooling System



19-048

Fig. 10 Expansion tank cap, checking

- attach cap on tester
 - Stant tester ST-255 A, AC-PCT-3 or equivalent
- apply pressure of 0.9 to 1.15 bar (13–17 psi)
 - If pressure relief valve opens within this range, cap is **OK**

Note

Cap has 3 important functions:

1. it opens at pressure of 0.9–1.15 bar (13–17 psi) allowing flow **to** expansion tank
2. it opens at a vacuum of 0.02–0.1 bar (0.3–1.45 psi) allowing flow **from** expansion tank
3. it seals radiator neck

Only item 1 can be checked with tester.

If it is suspected that items 2 and 3 are not in order, replace cap

Coolant mixture ratio

- coolant capacity 17.5 ltr (18.4 US qt)

Note

Cooling system is filled at factory with mixture of water and antifreeze/corrosion protective solution.

Coolant mixture should be used all year.

When replacing coolant only use ethylene glycol based antifreeze (phosphate-free).

Due to higher boiling point, coolant is an aid to operating on full load, particularly in warm climates

Outside Temperature	Antifreeze	Water
– 25°C (– 13°F)	7.0 ltr (7.4 US qt)	10.5 ltr (11 US qt)
– 35°C (– 30°F)	8.75 ltr (9.2 US qt)	8.75 ltr (9.2 US qt)

19.18

Expansion tank cap, checking
Coolant mixture ratio

Water-cooled