ENGINE COOLING SYSTEM

GROUP 07

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ENGINE COOLING SYSTEM

COOLING SYSTEM

4 cylinders  1.6  1.8  2.0  2.0

ALFETTA Engines 1600 (016.00) - 1800 (016.78) - 2000 (016.55)

1. Radiator
2. Cooling fan
3. Radiator cap
4. Pump vent screw
5. Thermostat
6. Temp. gauge sending unit
7. Manifold vent screw
8. Water temp. gauge
9. High water temp. indicator
10. High water temp. indicator sending unit
11. Fan temp. switch
12. Expansion tank cap
13. Expansion tank
14. Water pump
15. Engine block water drain
16. Heater
17. Heater cock
18. Heater cock control

GIULIETTA Engines 1600 (016.00) - 1800 (016.78) - 2000 (016.55)

April 1986
ENGINE COOLING SYSTEM

GENERAL DESCRIPTION

A water temp. gauge sending unit located on supply manifold is connected to a dashboard mounted water temp. gauge. Moreover, a high water temp. indicator sending unit on cylinder head is connected to a dashboard mounted high water temp. indicator which lights up when the system temperature exceeds 105°C (221°F).

Forced-feed water cooling system incorporates centrifugal pump U-belt driven from engine crankshaft.
Thermostat on water manifold controls engine temperature and permits speedy warm-up after starting from cold. To this end thermostat valve will only open when temperature approximates 80°C (176°F).

In addition to ram effect, radiator cooling is helped by an electric fan activated by radiator mounted temperature switch.
GENERAL DESCRIPTION

The cooling circuit is of the sealed type with circulation by means of a centrifugal pump operated by the crankshaft through a V-belt. Rotation of water pump creates a vacuum in the return circuit which draws the liquid coming from the cylinder group through manifold pipe or from radiator-heater when control cock is open (circulation of the liquid in the radiator-heater).

At the outlet of manifold pipe there is a thermostat whose function is to ensure that the engine reaches normal running temperature in a short time and subsequently ensure that it is kept in the optimal temperature range.

THERMOSTAT VALVE CLOSED

FROM MANIFOLD PIPE

TO PUMP

THERMOSTAT VALVE OPEN

FROM MANIFOLD PIPE

TO RAD eator

Until the engine temperature reaches 81 to 85°C (178 to 185°F) the thermostat valve remains closed, diverting the liquid directly towards pump. At higher temperatures the opening of the thermostat valve permits the passage of the liquid to the radiator.

The radiator, in addition to the dynamic air, is also cooled by an electric fan activated by thermal contact whenever the temperature of the lower part of the radiator reaches about 88°C (190°F). The circulation of the water in the radiator is governed by cock opened by the heater control knob.

Connected to the delivery duct there is also a pipe to cool the oil circulating in the turbocharger.
LEAKAGE TEST

GTV 2.0  Alfa 75  Alfa 90

1. Unscrew pressurized cap from the expansion tank 1.
2. Screw on instrument 2 for the testing on the hydraulic system onto the filler neck of the expansion tank.
3. Pressurize the system and check on gauge that the pressure is maintained at the required level.
4. If the pressure is not maintained check the circuit for leaks from sleeves or radiator or.
If necessary, proceed with radiator removal as directed under «Radiator».

Coolant system leakage test pressure
107.9 kPa
(1.08 bar; 1.1 kg/cm²; 15.6 psi)

Coolant system leakage test pressure
107.9 kPa
(1.0 bar or 1.1 kg/cm²; 15.6 psi)

---

 Alfetta  Giulietta

a. Remove pressurized radiator cap 1.
b. Apply tester to filler neck.
c. Pressurize system and check on gauge 2 that pressure reaches and stays at the specified rating.
d. If the system does not hold the specified pressure, check radiator for leakage. If necessary, remove radiator and test as directed under «Radiator».

Coolant system leakage test pressure
107.9 kPa
(1.0 bar or 1.1 kg/cm², 15.6 psi)

---

1. Radiator
2. Tester

1. Expansion tank
2. Tester
1. Fan
2. Air scoop
3. Capscrew
4. Washer
5. Spacer
6. Retainer
7. Supply hose
   (expansion tank to radiator)
8. Outlet hose
9. Temp. switch
10. Seal
11. Radiator
12. Radiator cap
13. Cushion pad
14. Hose
   (thermostat to radiator)
15. Washer
16. Cushion pads
17. Spacer
18. Washer
19. Washer
20. Capscrew
21. Spacer
22. Cushion pad
23. Washer
24. Washer
25. Nut
ENGINE COOLING SYSTEM

REMOVAL

a. Place a container of adequate capacity under the vehicle for coolant draining.

If the engine is warm proceed with care to prevent scalding.

b. Remove plug 1 from engine block and allow to drain completely.

c. Drain radiator as follows:
   — slacken hose clip and disconnect radiator outlet hose 2;
   — slacken hose clip and disconnect radiator inlet hose 1;
   — slacken hose clip and disconnect supply hose 3 from radiator;
   — to facilitate draining remove cap from filler 10 and open heater cocks.

d. Disconnect electrical leads from fan 4 and temp. switch 5.

e. Back off capscrews 6 and remove interposed radiator washers.

f. Lift radiator clear of engine compartment and take off radiator cushion pads.

g. Back off four capscrews 7 with interposed washers and remove fan 9 with attached air scoops 9.

LEAKAGE TEST

a. Plug radiator inlet and outlet ports.

b. Dip radiator in a water tank, admit compressed air to radiator through supply hose, pressurize to 98.1 to 107.9 kPa (0.9 to 1.0 bar or 1 to 1.1 kg/cm², 14.2 to 15.6 psi) and check for leakage.

c. If leakage is detected, wire brush the affected area and deoxidize using -cured- hydrochloric acid (zinc chloride).

d. Tin solder the affected area.

e. Repeat leakage test as directed in para b. and recoat radiator using black synthetic enamel.

If leakage is detected on radiators fitted with tank seals, replace radiator without hesitation.

f. Install radiator in engine compartment (see: -Radiator - Removal and Installation-), fill the system and check for leakage.

FAN TEMPERATURE SWITCH

1.6 1.8 2.0 2.0 [iniezione]

1.8 turbo

OPERATION TEST

Test temp. switch as follows:

a. Back off and remove switch from engine.

b. Install switch 1 on thermostat tester.

c. Pour water in bowl and turn on switch to heat the water.

d. When indicator bulb 2 lights up check that tester temperature is equal to specified switch calibration setting (88 to 92°C, 190 to 198°F).
LEAKAGE TEST

a. Fasten connector 1 to tester and insert in pressurized cap 2.
b. Apply pressure and check on tester that upon reaching the specified pressure setting the unload valve cracks off.

WATER PUMP

b. Back off nuts 4 retaining alternator 5, move the latter to loosen drive belt 6 and take off belt.

Remove nuts 4.
c. Back off and remove nine nuts and washers retaining water pump 1 to studs 2 on engine block.

d. Remove water pump 1 and associated gasket 3.

INSPECTION

The water pump cannot be overhauled. If defective the water pump should be replaced without hesitation.

a. Check pump body and impeller; if they are found to be badly rusted or corroded, replace without hesitation.
b. Check impeller for radial and end play. If undue play is detected replace the pump.

1. Water supply hose
2. Heater water return adapter
3. Radiator water return hose
4. Alternator capscrews
5. Alternator
6. Drive belt
7. Bolt
ENGINE COOLING SYSTEM

THERMOSTAT

REMOVAL
a. Remove hose connecting warm air intake to air cleaner (1).
b. Disconnect HT leads (2) from spark plugs.
c. Drain coolant until level is down to the bottom of thermostat chamber.

1. Air cleaner
2. HT leads
3. Water outlet hose
4. Thermostat cover

1. Thermostat cover
2. Thermostat
3. Sealing ring

1. Temperature gauge
2. Thermostat

b. Pour water in bowl and energize tester to heat the water.

c. Check that thermostat opening temperature indicated by the gauge (1) is 81° to 85°C (178° to 185°F).
d. Also check that at 95°C (203°F) thermostat is fully open and that valve travel is 7.5 mm (0.30 in) min.
e. If the above requirements are not met replace the thermostat.

INSPECTION
Check thermostat as follows:

a. Install thermostat (2) on tester.

WATER PUMP
a. Install water pump with a new gasket on front cover and tighten retaining nuts to the specified torque.

T : Tightening torque
Water pump nuts
14 to 22 Nm
(1.36 to 2.25 kgm)
10.3 to 16.2 ft.lb

b. Install water pump and alternator drive belt reversing the removal sequence.
c. Connect hose to water pump and tighten hose clips.
d. Tension water pump/alternator drive belt correctly.
For belt tension adjustment see Group 00 - Engine Maintenance.

TEMPERATURE SWITCH
a. To install reverse the removal sequence.
b. After installation, fill cooling system (see: Cooling System Filling) and run engine to warm up coolant (84° to 88°C, 183° to 190°F) and check for fan cut-in.

T : Tightening torque
Fan control switch (wet with anti-seize compound)
20 to 25 Nm
(2 to 2.5 kgm)
14.8 to 18.4 ft.lb

RADIATOR
For radiator installation reverse the removal sequence.

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PA346980000000
ENGINE COOLING SYSTEM

COOLING SYSTEM FILLING
a. Fill cooling system using the coolant indicated under «Inspection Specifications».
b. Remove vent screw 1 on water pump.
c. Remove vent screw 1 on supply manifold.
d. Pour coolant through radiator filler until coolant flows out of water pump vent hole. Install vent screw on water pump.
e. Resume pouring until coolant flows out of vent hole in supply manifold.
f. Start engine and run at idle speed until all air remaining in engine has been expelled. Stop engine.
g. Install vent screw on supply manifold.
h. Top up radiator and install radiator cap.
i. Fill expansion tank up to max. level shown on tank itself and install expansion tank cap.
j. Start engine and run for a few minutes ensuring no loss of coolant takes place.

1. Vent screw

1. Vent screw

INSPECTION SPECIFICATIONS

| FAN | Cut-in temperature | 84 to 88°C (183 to 190°F) |

GENERAL COOLANT

<table>
<thead>
<tr>
<th>Summer</th>
<th>Winter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>liters (Imp.Gal)</td>
</tr>
<tr>
<td>Min. temp.</td>
<td>°C</td>
</tr>
<tr>
<td>Antifreeze liquid</td>
<td>liters (Imp.Gal)</td>
</tr>
<tr>
<td>Distilled water</td>
<td>liters (Imp.Gal)</td>
</tr>
<tr>
<td>Antifreeze mixture</td>
<td>liters (Imp.Gal)</td>
</tr>
</tbody>
</table>

CAUTION:
Antifreeze reacts with paint. Keep away from bodywork.

NOTES:

a. For increased protection from -20°C to -35°C (-4 to -22°F) without emptying system, drain off part of the mixture from radiator and expansion tank and replace using an equal volume of antifreeze liquid Part No. 3681-69956 to be poured in radiator and expansion tank in the following proportion:
- radiator | 1.66 liters (0.4 Imp.Gal)
- expansion tank | 0.34 liters (0.6 pints)

b. On vehicles incorporating pressurized cooling system, after replacing low water level indicator sending unit located in tank, fully tighten retaining cap to prevent water leakage.

THERMOSTAT
| TEMPERATURE |
|---|---|
| Initial opening | 81 to 85°C (178 to 195°F) |
| Fully open | 95°C (203°F) |
| Bulb travel | ≥7.5 mm (0.3 in) |

RADIATOR
| Leakage test pressure | 107.9 kPa (1.0 bar; 1.1 kg/cm², 15.6 psi) |

PRESSURIZED CAP
| Calibration pressure | 68.6 kPa (0.69 bar; 0.7 kg/cm², 10 psi) |
COOLING SYSTEM DESCALER
NALCO: 1006
INTERPROIND: Jal Auto
Part No. 3681-69955

FLUIDS AND LUBRICANTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Recommended product</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiator fan switch thread</td>
<td>Antiseize</td>
<td>R. GOR: Never Seez</td>
<td>Part No. 3671-69850</td>
</tr>
</tbody>
</table>

SEALANTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
<th>Recommended product</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling system leak preventer</td>
<td>Powder</td>
<td>AREXONS</td>
<td>Part No. 3522-00101</td>
</tr>
</tbody>
</table>
Alternative product: ALUMASEAL.

TIGHTENING TORQUES

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit of measure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nm</td>
<td>kgm</td>
</tr>
<tr>
<td>Sending unit, water temp. gauge</td>
<td>34 to 39</td>
<td>3.5 to 4</td>
</tr>
<tr>
<td>Nuts, water pump to front cover</td>
<td>14 to 22</td>
<td>1.36 to 2.25</td>
</tr>
<tr>
<td>Capscrews, thermostat cover</td>
<td>10 to 16</td>
<td>1 to 1.6</td>
</tr>
<tr>
<td>Temp. switch (1), radiator fan (wet, antiseize, see above)</td>
<td>20 to 25</td>
<td>2 to 2.5</td>
</tr>
<tr>
<td>Sending unit, high water temp. indicator</td>
<td>20 to 25</td>
<td>2 to 2.5</td>
</tr>
</tbody>
</table>

(1) For guidance only (using standard wrench)

TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Defect</th>
<th>Possible Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water leakage</td>
<td>• Radiator damaged</td>
<td>Repair or replace radiator</td>
</tr>
<tr>
<td></td>
<td>• Hose leakage</td>
<td>Replace hoses</td>
</tr>
<tr>
<td></td>
<td>• Hose clips loose or failed</td>
<td>Tighten or replace hose clips</td>
</tr>
<tr>
<td></td>
<td>• Thermostat leakage</td>
<td>Replace gasket and/or thermostat</td>
</tr>
<tr>
<td></td>
<td>• Cylinder head gasket damaged</td>
<td>Replace. Check for oil contamination</td>
</tr>
<tr>
<td></td>
<td>• Cylinder head capscrew loose</td>
<td>Tighten to correct torque</td>
</tr>
</tbody>
</table>

April 1986
07-10
<table>
<thead>
<tr>
<th>Defect</th>
<th>Possible Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low water flow</td>
<td>• Line obstruction</td>
<td>Check lines and clean system</td>
</tr>
<tr>
<td></td>
<td>• Low coolant level</td>
<td>Top up to correct level</td>
</tr>
<tr>
<td></td>
<td>• Defective water pump</td>
<td>Replace water pump</td>
</tr>
<tr>
<td></td>
<td>• Alternator/water pump drive belt loose</td>
<td>Adjust belt tension</td>
</tr>
<tr>
<td>Corrosion and scale</td>
<td></td>
<td>Replace coolant at the specified time intervals; for use follow instructions printed on product containers</td>
</tr>
<tr>
<td>Overheating</td>
<td>• Failed thermostat</td>
<td>Replace thermostat</td>
</tr>
<tr>
<td></td>
<td>• Scaled or dirty radiator</td>
<td>Clean internally using special descaler specified; For use follow instructions printed on product containers</td>
</tr>
<tr>
<td></td>
<td>• Incorrect ignition timing</td>
<td>Adjust timing</td>
</tr>
<tr>
<td></td>
<td>• Insufficient lubrication</td>
<td>Top up oil level</td>
</tr>
<tr>
<td></td>
<td>• Water pump failure</td>
<td>Replace water pump</td>
</tr>
<tr>
<td></td>
<td>• Low coolant level</td>
<td>Top up and check system for leakage</td>
</tr>
</tbody>
</table>
1. Thermostat
2. Bulb for coolant temperature indicator and max water temperature warning lamp
3. Heater
4. Heater cock
5. Heater control
6. Max coolant temperature warning lamp
7. Coolant temperature indicator
8. Radiator
9. Electric fan
10. Electric fan control bulb
11. Water pump
12. Header tank
13. Header tank cap
14. Electric fan control relay
COOLING SYSTEM

6 cylinders Alfa 90 2.0 Iniezione
6 cylinders Alfa 90 2.5 Iniezione
6 cylinders Alfa 75 2.5 Iniezione

GENERAL DESCRIPTION

1 Header tank
2 Coolant level sensor
3 Pressurized cap
4 Min coolant level warning lamp (ALFA ROMEO Control)
5 Heater cock
6 Heater
7 Heater control
8 Coolant temperature indicator
9 Max coolant temperature warning lamp
10 Bulbs for coolant temperature indicator and max water temp. warning lamp
11 Water pump
12 Thermostat
13 Radiator
14 Electric fan
15 Electric fan control thermal switch

(1) ALFA 90 only
(2) ALFA 75 only
ENGINE COOLING SYSTEM

Cooling system is of the sealed type, with forced circulation by centrifugal pump belt - driven by crankshaft. A thermostat permits the engine to be brought quickly at the normal running temperature and kept at the optimal values; thermostat opens when coolant reaches 80°C (176°F) approx. In addition to the air ram effect, the radiator is also cooled by an electric fan controlled by a thermal switch located on radiator.

The system is fitted with a coolant temperature sensor which supplies the max temperature indicator and warning lamp, on cluster. The warning lamp illuminates when coolant temperature exceeds 105°C (221°F).

A sensor, on header tank provides an indication (through "ALFA ROMEO Control") whenever coolant level in the tank goes below the min value.

HYDRAULIC SYSTEM TIGHTNESS TEST

1. Unscrew the header tank pressurized cap.
2. Screw tester on header tank union.
3. Pressurize the system and verify, on tester, that pressure remains within the prescribed value.

Cooling system check pressure
107.9 KPa (1.08 bar; 1.1 Kg/cm²; 15.64 psi)
RADIATOR

Alfa 90   Alfa 75

1. Radiator breather hose
2. Bracket
3. Screw securing radiator to body
4. Coolant outlet sleeve from radiator
5. Return hose to heater
6. Coolant-to-pump delivery sleeve
7. Electric fan
8. Connector for electric fan supply cable
9. Screw securing electric fan to radiator
10. Coolant-to-radiator delivery sleeve
11. Radiator
12. Connector for electric fan control cables
13. Electric fan control thermal switch
14. Rubber pad

REMOVAL

Alfa 90   Alfa 75

1. Disconnect battery.
2. Disconnect sleeve 8 from radiator; drain and recover coolant.
3. Detach sleeve 11 and hose 4 from radiator.
4. Detach connector 5 of electric fan supply cables, and connector 7 from thermal switch 6.
5. Unscrew screw 1 which secured radiator to body; remove radiator from engine compartment, and withdraw rubber pads.
6. If required, unscrew screws 9 and remove electric fan 10.

WARNING:
Take the utmost care when draining coolant with hot engine, to avoid being burned.

1. Radiator securing screw
2. Bracket
3. Radiator
4. Breather hose
5. Electric fan supply cables connector
6. Thermal switch
7. Connector
8. Sleeve
9. Electric fan securing screw
10. Electric fan
11. Sleeve

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07-15
December 1985
Alfa 90  Alfa 75

To increase the antifreeze protection from 
$-20^\circ$C ($-4^\circ$F) to $-35^\circ$C ($-31^\circ$F) 
without draining the whole system, replace 
2.5 litres (0.55 imp.gall) mixture with as 
many litres of specific concentrated an-
tifreeze.

GTV 6 2.5

To increase the antifreeze protection from 
$-20^\circ$C ($-4^\circ$F) to $-35^\circ$C ($-31^\circ$F) 
without draining the whole system, replace 
2.9 litres (0.63 imp.gall) mixture with as 
many litres of specific concentrated an-
tifreeze.

**CAUTION:**

Products harmful to paint. 
Avoid contact with painted surfaces.

**LEAKAGE TEST**

1. Remove radiator from vehicle as 
described in «Removal and Installation».
2. Close the radiator liquid inlet/outlet 
union.
3. Immerge radiator into a tank; previously 
filled with water, and identify any leaks 
by blowing compressed air from radiator 
breather hose, until reaching pressure 

$$107.9 \text{ kPa}$$

(1.08 bar; 1.1 kg/cm²; 15.64 psi)

4. If leaks are present, replace radiator 
operating as described in «Removal and In-
stallation».

**ELECTRIC FAN CONTROL THERMAL SWITCH**

**REPLACEMENT**

1. Drain and recover coolant.
2. Detach connectors from thermal switch 
on radiator.
3. Unscrew thermal switch and remove it 
from radiator.
4. Lubricate thermal switch threading with 
Anti-seize E. GORI: Never Seez, then 
screw it on taking care to interpose a new 
gasket; then tighten it to the prescribed 
torque.

**T**

**Tightening torque**

<table>
<thead>
<tr>
<th>Thermal switch for electric fan control on radiator</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 to 25 N·m</td>
</tr>
<tr>
<td>(2 to 2.5 kg·m)</td>
</tr>
<tr>
<td>14.5 to 18.1 ft·lb</td>
</tr>
</tbody>
</table>

5. Restore liquid level in the cooling 
system.
6. Start the engine and warm it up until 
coolant reaches a temperature within 84 to 
$88^\circ$C (183.2 to 190.4°F).
7. Verify that, at this temperature, ther-
mal switch enables electric fan.

**PRESSURIZED CAP**

**LEAKAGE TEST**

Refer to: 4 cylinders

| 1.6 | 1.8 | 2.0 | 2.0 | Iniezione |

Pressurized cap setting pressure

<table>
<thead>
<tr>
<th>88.3 to 107.9 kPa</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.88 to 1.08 bar)</td>
</tr>
<tr>
<td>(0.9 to 1.1 kg/cm²)</td>
</tr>
<tr>
<td>(12.8 to 15.64 psi)</td>
</tr>
</tbody>
</table>
RADIATOR

1. Radiator
2. Coolant outlet sleeve from radiote
3. Radiator filling sleeve
4. Radiator breather hose
5. Coolant return sleeve
6. Coolant delivery hose
7. Connector for electric fan supply cable
8. Electric fans
9. Connector for electric fan control cable
10. Electric fan control thermal switch
11. Screw securing radiator to body
12. Rubber pad
13. Screws securing electric fan to radiator

REMOVAL

GTV 6 2.5

1. Place a suitable container under the vehicle to collect the coolant.

WARNING:
Take the utmost care when draining coolant with hot engine to avoid burns.

2. Remove sleeve 2 from radiator 1 and drain coolant.
3. Disconnect hose 4 and sleeve 6 from the radiator.
4. Disconnect connector 7 of electric fan supply cables 8 and connector 9 from thermal switch 10.
5. Unscrew screw 11 which secures radiator to body; remove radiator from engine compartment and withdraw rubber pads 12.
6. If necessary, unscrew screws 13 and remove the electric fans.

INSTALLATION

Alfa 90  Alfa 75  GTV 6 2.5

1. Carry out installation by reversing the order of removal; then carry out refilling, operating as follows:
   - Remove header tank cap, and refill cooling system with the liquid prescribed.

Cooling system refill

<table>
<thead>
<tr>
<th>Min. external temperature °C</th>
<th>—20</th>
<th>—35</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(°F)</td>
<td>(—4)</td>
</tr>
<tr>
<td>—31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concentrated antifreeze std. No. 3681-69956</td>
<td>3.6 (0.79) (1)</td>
<td>5 (1.10) (1)</td>
</tr>
<tr>
<td>4.2 (0.92) (2)</td>
<td>6 (1.32) (2)</td>
<td></td>
</tr>
<tr>
<td>Dilution distilled water</td>
<td>6.4 (1.11) (1)</td>
<td>5 (1.10) (1)</td>
</tr>
<tr>
<td>7.8 (1.71) (2)</td>
<td>6 (1.32) (2)</td>
<td></td>
</tr>
<tr>
<td>Antifreeze ready to use std. No. 3681-69958</td>
<td>10 (2.20) (1)</td>
<td>—</td>
</tr>
<tr>
<td>12 (2.64) (2)</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>

(1) For vehicle Alfa 90 and Alfa 75
(2) For vehicle GTV 6 2.5

December 1985

07-16

PA346980000002
WATER PUMP

REMOVAL
1. Detach the battery negative terminal.
2. Detach connectors 3, 5, and 7 from thermostat unit 2, then disconnect ground cable 4.
3. Disconnect sleeve 6 from radiator and drain coolant; disconnect sleeves 5 and 8 from thermostat unit.

GTV 6 2.5: Disconnect sleeve 9 from the thermostat unit.

Recover coolant.

4. Release the spark plug supply cables from fasteners 1 on timing case covers.

5. Loosen and remove the drive belts of the following components:
   - air conditioner compressor
   - (if present)
   - power steering pump
   - water/alternator pump

6. Remove distributor covers and disconnect the related cap; remove the covers on timing case.
7. Engage the 5th speed, move vehicle forwards so as to rotate crankshaft in the running direction, until notch P (marked on engine pulley) is aligned with the reference pin (piston of first cylinder in the expansion stroke).
8. In addition, the middle of distributor rotor arm must be towards the first cylinder.
9. Lift belt tighten arm 1 and insert pin A.2.0363 into the arm hose, so as to keep arm itself lifted.
10. Unscrew nuts 2 and 3, so as to loosen the timing system drive belt; then remove both belt and tighter.
11. By means of tool A.2.0361, unscrew the screw which secures distributor drive pulley; remove pulley.
12. Loosen clamps of hoses 1 and detach these last from thermostat unit 2.
ENGINE COOLING SYSTEM

1. Coolant return hoses from heads
2. Thermostat unit

13. Unscrew the screws which secure pump body to engine block; then remove pump together with thermostat unit.
14. If required, operating at bench, unscrew the four screws which secure pump body to thermostat unit and separate them.

CHECKS AND INSPECTIONS

1. Thoroughly clean pump body and the related mating surfaces.

REMOVAL

1. Drain and recover coolant, up to lower edge of thermostat housing.
2. Detach sleeve 1 from thermostat 3.
3. Unscrew the three securing screws of thermostat, then remove it together with gasket and bracket 2.

CAUTION:
Take care not to detach lower gasket between thermostat intermediate spacer and thermostat housing.

2. Check pump body and impeller; in the event of serious oxidation signs replace pump.
3. Verify that there is no excessive play in the rotation and axial movement of impeller.

INSTALLATION

Install pump by reversing the order of removal, complying with the following indications.

- Thoroughly clean the mating surfaces between pump body, engine block and thermostat unit; interpose new gaskets.
- Tighten to the prescribed torque:

1: Tightening torques
Screws securing pump body to engine block
8.1 to 9.3 N·m
(0.83 to 0.95 Kgf·m; 6 to 6.9 ft·lb)

- Carry out timing system adjustment, fit timing system belt and restore correct tensioning (refer to: [Alfa Romeo WORKSHOP MANUAL - Group 00 - Engine Maintenance - Engine Main Mechanical Unit - Check of Timing System and Drive Belt Tensioning].
- Restore correct tensioning of drive belts related to pump of coolant and alternator, and pump of power steering and air conditioner compressor (if present) (refer to [Alfa Romeo WORKSHOP MANUAL - Group 00 - Engine Maintenance - Engine Main Mechanical Unit. Checking Good Conditions, Replacing and Adjusting Drive Belts of Alternator, Air Conditioner Compressor, Power Steering Pump].
- Restore coolant level
- Start the engine, run it to the normal running temperature and check for leaks from system.

THERMOSTAT

1. Coolant - to radiator delivery sleeve
2. ECU wiring support bracket
3. Thermostat

CHECKS AND INSPECTIONS
By means of suitable equipment, verify that:
- Thermostat opens when coolant temperature is between 81 to 85°C (177.8 to 185°F)
- When coolant temperature reaches 95°C (203°F) thermostat opens fully, also verify that, when in this conditions, the thermostat movement is greater or equal to 7.5 mm (0.295 in).

If not so, replace thermostat.

INSTALLATION

1. Clean the mating surfaces of thermostat.
2. Position thermostat on intermediate spacer, interposing a new gasket; reconnect the sleeve for coolant delivery to radiator.
3. Restore coolant level.
ENGINE COOLING SYSTEM

INSPECTION AND SPECIFICATIONS

CHECK AND ADJUSTMENTS
Refer to: 4 cylinders «Checks and Adjustments».

GENERAL

COOLANT

<table>
<thead>
<tr>
<th>Min. external temperature (°C)</th>
<th>—20</th>
<th>—35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (°F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (Imp. gall)</td>
<td>3.6 (0.79)</td>
<td>5.1 (1.10)</td>
</tr>
<tr>
<td>Concentrated antifreeze</td>
<td>4.2 (0.92)</td>
<td>6.1 (1.32)</td>
</tr>
<tr>
<td>std. No. 3681-69956</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dilution distilled water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4 (1.41)</td>
<td>7.8 (1.71)</td>
<td></td>
</tr>
<tr>
<td>1 (Imp. gall)</td>
<td>5.1 (1.10)</td>
<td>6.1 (1.32)</td>
</tr>
<tr>
<td>Antifreeze ready to use</td>
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<td>12 (2.64)</td>
</tr>
<tr>
<td>std. No. 3681-69956</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) For vehicle Alfa 90 and Alfa 75
(2) For vehicle GTV 6 2.5

CAUTION:

[Alfa 90] [Alfa 75]

a. To increase the antifreeze protection from —20°C (—4°F) to —35°C (—31°F), without draining the whole system, replace part of mixture with as many litres of concentrated antifreeze (2.5 litres; 0.55 Imp. gall).

GTV 6 2.5

b. If the coolant level sensor is to be replaced, take care, when reassembling, to tighten cap thoroughly so as to ensure tightness.

WARNING:
Products harmful to paint. Avoid contact with painted surfaces.

FLUIDS AND LUBRICANTS

<table>
<thead>
<tr>
<th>Application</th>
<th>Type</th>
<th>Name</th>
<th>Q.ty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threading of electric fan control thermal switch on radiator</td>
<td>Anti-seize</td>
<td>R. GORI: Never Seez</td>
<td>Std. No. 3671-69850</td>
</tr>
<tr>
<td>Threading of coolant temperature sender, engine temperature sensor and thermo - time switch</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SEALANT AND FIXING AGENTS

<table>
<thead>
<tr>
<th>Application</th>
<th>Type</th>
<th>Name</th>
<th>Q.ty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling system sealant</td>
<td>Sealing powder</td>
<td>AREXONS</td>
<td>Std. No. 3522-00101</td>
</tr>
</tbody>
</table>

In alternative ALUMASEAL can be used.
# ENGINE COOLING SYSTEM

## TIGHTENING TORQUES

<table>
<thead>
<tr>
<th>Item</th>
<th>Measurement unit</th>
<th>N·m</th>
<th>Kg·m</th>
<th>ft·lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coolant temperature sender on thermostat housing (1)</td>
<td></td>
<td>20</td>
<td>2</td>
<td>14.5</td>
</tr>
<tr>
<td>Electric fan control thermal switch on radiator (1)</td>
<td></td>
<td>20</td>
<td>2</td>
<td>14.5</td>
</tr>
<tr>
<td>Engine temperature sensor on thermostat casing (1)</td>
<td></td>
<td>15</td>
<td>1.5</td>
<td>10.8</td>
</tr>
<tr>
<td>Thermo-time switch on thermostat housing (1)</td>
<td></td>
<td>29</td>
<td>3</td>
<td>21.7</td>
</tr>
<tr>
<td>Screws securing pump body to engine block</td>
<td></td>
<td>8.1</td>
<td>0.83</td>
<td>6</td>
</tr>
</tbody>
</table>

(1) With anti-seize R. GORI: Never Seaz

## TROUBLE DIAGNOSIS AND CORRECTIVE ACTION

<table>
<thead>
<tr>
<th>Condition</th>
<th>Probable cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coolant leakage</td>
<td>• Radiator damaged</td>
<td>Replace radiator</td>
</tr>
<tr>
<td></td>
<td>•Leaks in system couplings</td>
<td>Replace</td>
</tr>
<tr>
<td></td>
<td>• Loose or broken clamps</td>
<td>Tighten or replace</td>
</tr>
<tr>
<td></td>
<td>• Leakages from thermostat</td>
<td>Replace gasket or thermostat</td>
</tr>
<tr>
<td></td>
<td>• Damaged cylinder head gasket</td>
<td>Replace. Check engine oil for contamination</td>
</tr>
<tr>
<td></td>
<td>• Loose cylinder head tightening screws</td>
<td>Restore correct tightening</td>
</tr>
<tr>
<td>Poor circulation of coolant</td>
<td>• Pipes obstructed</td>
<td>Check pipes and clean system</td>
</tr>
<tr>
<td></td>
<td>• Insufficient coolant</td>
<td>Top up</td>
</tr>
<tr>
<td></td>
<td>• Inoperative coolant pump</td>
<td>Replace</td>
</tr>
<tr>
<td></td>
<td>• Coolant pump and alternator driving belt loosen</td>
<td>Adjust</td>
</tr>
</tbody>
</table>