Chapter 3 Cooling system

Note:"fn/ess *specifically mentioned in this Chapter, the information given for the 1982 750 Sabre applies to the UK VF750S-C, and that for the 1987 and 1988 700/750 Magnas applies to the UK VF750C-H and C-J respectively.*

Contents

Specifications

Coolant

Mixture type.....	See Chapter 1	*
Capacity.....	See Chapter 1	

Radiator

Cap valve opening (relief) pressure	11 to 15 psi (0.76 to 1.04 Bars)

Thermostat

Opening temperature.....	80 to 84°C (176 to 183°F)
Fully open	95°C (203°F)
Minimum valve lift.....	8 mm (0.32 in) @ 95°C (203°F)

Torque settings

Water pump cover bolts (700/750 models).....	7.5 to 10.5 Nm (6 to 8 ft-lbs)

1 General information

The cooling system uses a water/antifreeze coolant to carry away excess energy in the form of heat. The cylinders are surrounded by a water jacket from which the heated coolant is circulated by thermo-siphonic action in conjunction with a water pump, driven off the oil pump. The hot coolant passes upwards to the thermostat and through to the radiator (mounted on the frame's front downtubes to take maximum advantage of the passing airflow). The coolant then flows across the radiator core, where it is cooled by the passing air, down to the water pump (via the left frame tube) and back up to the engine where the cycle is repeated. A thermostat is fitted in the system to prevent the coolant flowing through the radiator when the engine is cold, therefore accelerating the speed at which the engine reaches normal operating temperature. A thermostatically-controlled cooling fan is also fitted to aid cooling in extreme conditions.

The complete cooling system is partially sealed and pressurized, the pressure being controlled by a valve contained in the spring-loaded radiator cap. By pressurizing the coolant the boiling point is raised, preventing premature boiling in adverse conditions. The overflow pipe from the system is connected to a reservoir tank into which excess coolant is expelled under pressure. The discharged coolant automatically returns to the radiator when the engine cools. **Warning:** *Do not allow antifreeze to come in contact with your skin or painted surfaces of the motorcycle. Rinse off any spills immediately*

with plenty of water. Antifreeze is highly toxic if ingested. Never leave antifreeze lying around in an open container or in puddles on the floor; children and pets are attracted by its sweet smell and may drink it. Check with the local authorities about disposing of used antifreeze. Many communities will have collection centers which will see that antifreeze is disposed of safely.

Warning: *Do not remove the pressure cap from the radiator when the engine is hot. Scalding hot coolant and steam may be blown out under pressure, which could cause serious injury. When the engine has cooled, place a thick rag, like a towel, over the radiator cap; slowly rotate the cap counterclockwise (anticlockwise) to the first stop. This procedure allows any residual pressure to escape. When the steam has stopped escaping, press down on the cap while turning it counter-clockwise (anticlockwise) and remove it.*

2 Radiator cap - check

If problems such as overheating or loss of coolant occur, check the entire system as described in Chapter 1. The radiator cap opening (relief) pressure should be checked by a Honda dealer or service station equipped with the special tester required to do the job. If the cap is defective, replace it with a new one.

3 Coolant reservoir - removal and installation

700/750 Sabre models

Refer to illustration 3.5

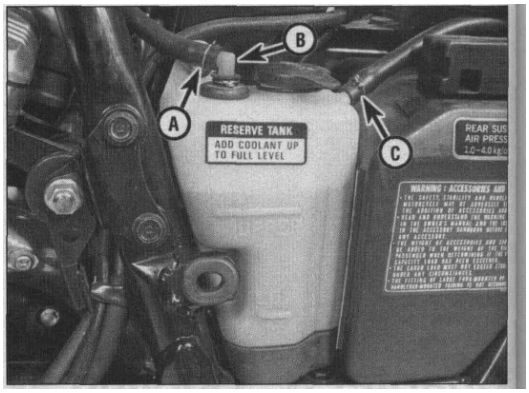
1 Remove the seat.
2 Remove the left side cover (see Chapter 6).
3 On 1982/83 750 models, trace the blue/yellow and green/black wires from the level sensor at the base of the reservoir tank to the connector, then disconnect it.
4 Disconnect the overflow/breather and coolant hoses from the top of the tank.
5 Remove the single mounting bolt and then lift the tank out of position **(see illustration).** The tank is a tight fit between the frame and the tool box but can be removed by lifting up and tilting the top away from the motorcycle. Invert the tank to drain the coolant.
6 If the level sensor is suspected of being faulty, test it as described in Chapter 8.
7 Installation is the reverse of the removal procedure. Top up the reservoir with new coolant (see Chapter 1).

1982 *through 1984 700/750 Magna models*

8 Remove the seat and right side cover.
9 Remove the battery and starter relay, with the bracket, as described in Chapter 8.
10 Free the overflow/breather hose from any retainers. Also disconnect the coolant hose from the top of the tank.
11 The tank can now be lifted out and inverted to drain the coolant.
12 Installation is the reverse of the removal procedure. Top up the reservoir with new coolant (see Chapter 1).

1985 and 1986 700 Magna models

13 Remove the right side cover (see Chapter 6).
14 Remove the rear wheel (see Chapter 7).
15 Remove the rear fender/mudguard.
16 Remove the battery (see Chapter 8).
17 Disconnect its wiring connector and remove the regulator/rectifier unit from the base of the battery holder.
18 Pull the overflow/breather hose off the neck of the reservoir tank and disconnect the coolant hose either from its in-line union or directly from the base of the tank; allow the coolant to drain.
19 Remove the single tank retaining bolt (accessed from the battery holder) and lower the tank free.



3.5 Reservoir tank mounting bolt (A), coolant hose (B) and overflow/breather hose (C)

20 Installation is the reverse of the removal procedure. Top up the reservoir with new coolant (see Chapter 1). When reconnecting the battery leads, remember to connect the negative lead last.

1987 and 1988 700/750 Magna models

Refer to illustration 3.24

21 Remove the right side cover (see Chapter 6).
22 Release the single screw retaining the fusebox and loosen the electrical components mounting plate bolt situated directly behind the fusebox.
23 Disconnect the overflow/breather hose from the top surface of the tank.
24 Remove the single tank mounting bolt and lift the electrical components plate upwards so that the tank can be maneuvered out from behind the frame **(see illustration).** Once free, disconnect the coolant hose and allow the coolant to drain.
25 Installation is the reverse of the removal procedure, noting that the peg on the front of the tank should be engaged with the frame grommet. Top up the reservoir with new coolant (see Chapter 1).

1100 models

26 Remove the right side cover (see Chapter 6).
27 Disconnect the overflow/breather hose and the coolant hose from the top of the tank.
28 Remove the single tank mounting bolt and maneuver it out of the frame sufficiently to gain access to the coolant hose connection. On Sabre models disconnect the hose from the tank's top surface and invert the tank to drain the coolant. On Magnas, pull off the coolant hose from the base of the tank and allow the coolant to drain.
29 Installation is the reverse of the removal procedure. Top up the reservoir with new coolant (see Chapter 1).

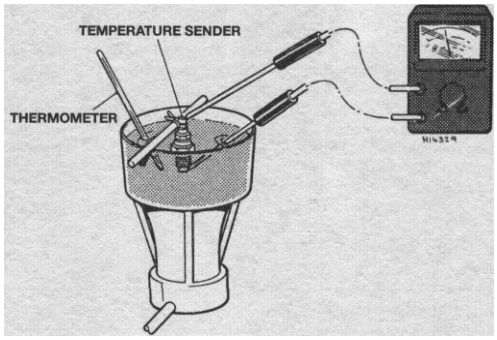
4 Cooling fan and thermostatic switch - check and replacement

Check

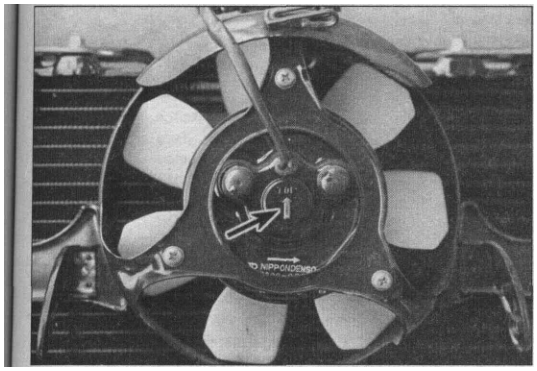
Refer to illustration 4.7

1 If the engine is overheating and the cooling fan isn't coming on, first check the cooling fan switch fuse. If the fuse is blown, check the fan circuit for a short to ground/earth (see the wiring diagrams at the end of this manual).
2 If the fuse is sound, disconnect the wire from the fan switch which

3.24 Reservoir tank mounting bolt on 1987 and 1988 700/750 Magnas



4.7 Cooling fan thermostatic switch test set-up



4.13 Install cooling fan motor with TOP marking upwards

is fitted to the left side of the radiator (remove any covers for access). Using a jumper wire short the two wire connector terminals together and turn the ignition key switch ON; the fan should come on. If it does the fan switch is defective and must be replaced, although a more comprehensive test is described below in Step 5 or Steps 6 to 8 depending on the model.

3 If the fan does not come on the fault lies in either the cooling fan motor or relevant wiring. The wiring can be tested as described in Chapter 8.

4 To test the cooling fan motor, trace the wiring from the fan motor to its connector block. Separate the connector and using a 12 volt battery and two jumper wires, connect the battery across the terminals of the cooling fan block connector. Once connected the fan should operate. If this is not the case the fan motor is faulty and must be replaced.

5 On 700/750 Sabre models and 1982 through 1984 700/750 Magna models, Honda advise that the switch is tested by removing the pressure cap (when cold) and placing a thermometer in the top of the radiator. Run the engine and check the temperature at which the cooling fan cuts in and out; it should cut in between 88 to 92°C (191 to 197°F) and cut out between 83 to 87°C (182 to 188°F). **Warning:** *This must be done very carefully to avoid the risk of personal injury.*

6 On 1985-on 700/750 Magnas and all 1100 models to fully test the fan switch, a heatproof container, a small gas-powered camping stove, a thermometer capable of reading up to 110°C (230°F) and an ohmmeter or multimeter will be required. Remove the switch as described in Steps 14 to 16.

7 Fill the container with coolant of the specified type and strength and suspend the switch on some wire so that just the sensing portion and threads are submerged. Connect one probe of the meter to the switch terminal and the other to the body of the switch. Suspend the thermometer so that its bulb is close to the switch **(see illustration). Note:** *No components should be allowed to touch the container.*

8 Set the meter to the ohms x 1 scale and start to heat the coolant, stirring it gently. No continuity (infinite resistance) should be shown until the coolant is between 98 to 110°C (208 to 215°F). **Warning:** *This must be done very carefully to avoid the risk of personal injury.* With the coolant at this temperature the meter should show continuity (0 ohms), indicating that the switch has closed. Carry on heating the coolant until it reaches 110°C (215°F) then turn the stove off. Note the resistance reading of the switch as the temperature falls. When the coolant cools to 98°C (208°F) there should no longer be continuity between the meter probes. If this is not the case the fan switch is defective and must be replaced.

Replacement

Refer to illustrations 4.13 and 4.15

Fan motor

9 Remove the radiator as described in Section 7.

10 Remove the right and left radiator cover bolts and nuts and lift off the covers and radiator grille, unless already done at radiator removal stage.

11 Remove the three (1987 and 1988 700/750 Magna models) or four (all other models) bolts/nuts that retain the fan and shroud to the radiator and lift them off.

12 Remove the nut from the fan center and separate it from the motor, then remove the three screws or nuts from the shroud and withdraw the fan motor.

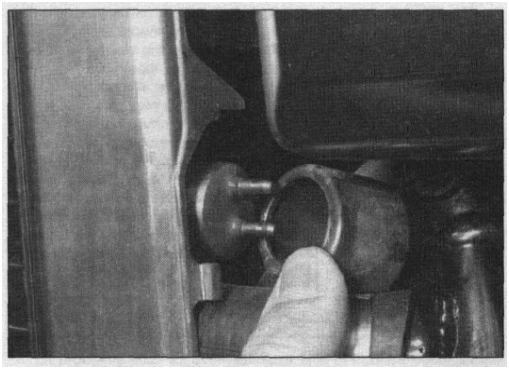
13 Installation is the reverse of removal, while noting the following **(see illustration).**

a) Apply thread locking compound to the fan motor threads before installing the nut.
b) Install the fan motor and fan in the shroud so that the TOP marking on the motor end is upwards.
c) Install the radiator as described in Section 7.

Thermostatic switch

Warning: *The engine must be completely cool before this procedure.*

14 The thermostatic switch, or fan switch, is located on the rear left side of the radiator. On some models a shield or rubber cover will obscure the switch; remove for access.



4.15 Cooling fan thermostatic switch Is located at rear left corner of radiator

15 Disconnect the wiring from the switch **(see illustration).**
16 Have ready a suitable plug so that excessive coolant loss is prevented, then unscrew the switch and recover the O-ring. Swiftly plug the radiator opening.
17 Fit a new O-ring to the switch and apply a smear of sealant to the switch threads.
18 Remove the plug and quickly install the new switch, tightening it to the specified torque setting.
19 Connect the wiring to the switch and install the access covers (where applicable).
20 Check the coolant level and if necessary, top up as described in Chapter 1.

5 Coolant temperature gauge/display/warning light and sender unit - check and replacement

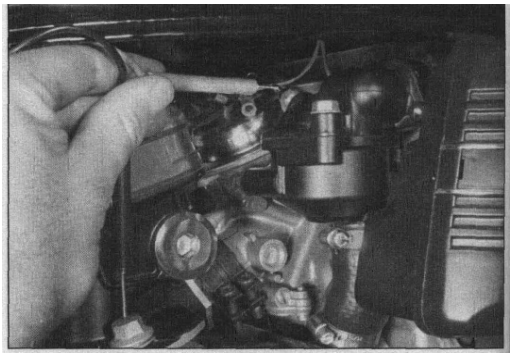
Check

Refer to illustration 5.3

1 The circuit consists of the sender unit mounted in the thermostat housing cover and the gauge assembly (1982 through 1986 700/750 Magnas), LED segments (all Sabres and 1100 Magnas) or coolant overheat warning light (1987 and 1988 700/750 Magnas) mounted in the instrument panel. If the system malfunctions check first that the battery is fully charged and that all fuses are in good condition.
2 To test the circuit, first disconnect the green/blue wire from the temperature sender unit. Removal of the right side air chamber cover is necessary on Magna models to access the thermostat housing. Turn the ignition key switch ON and ground (earth) the sender unit wire on the engine. When the wire is grounded (earthed) the needle, segments or bulb should swing/illuminate immediately over to the H on the gauge. **Caution:** Do *not ground/earth the wire for any longer than is necessary to take the reading, or the gauge may be damaged.* If the gauge operates as described above, the sender unit is defective and must be replaced, although a more comprehensive test is described below. If the gauge doesn't respond, of if it does not move at all, the fault lies in the wiring or the gauge/display/bulb.

Sender unit check -1982 through 1984 700/750 Magna models, all 700/750 Sabre models and all 1100 Magna models

3 Remove the radiator cap (when cold) and insert a thermometer in the top of the radiator. On Magna models remove the right side air chamber cover. Disconnect the wire from the sender unit and connect the probes of an ohmmeter between the sender unit tip and a good ground (earth) on the engine **(see illustration).**



5.3 Testing the temperature gauge sender unit resistance (see text for applicable models)

4 Run the engine and check the meter resistance reading at the temperatures specified. **Warning:** *This must be done very carefully to avoid the risk of personal injury.*

700/750 models

Temperature	Resistance
60°C(140°F)	104 ohms
85°C(176°F)	44 ohms
110°C(230°F)	20 ohms
120°C(248°F)	16 ohms

1100 models

Temperature	Resistance
60°C(140°F)	104 ohms
85°C(176°F)	44 ohms

5 If the resistance reading varies wildly from that stated, the sender unit must be replaced. If the gauge/display appears to be faulty, remove the instrument cluster as described in Chapter 8, and check the relevant wiring connectors. If all appears to be well, the gauge is' defective and must be replaced.

Sender unit check -1985 through 1988 700/750 Magna models and all 1100 Sabre models

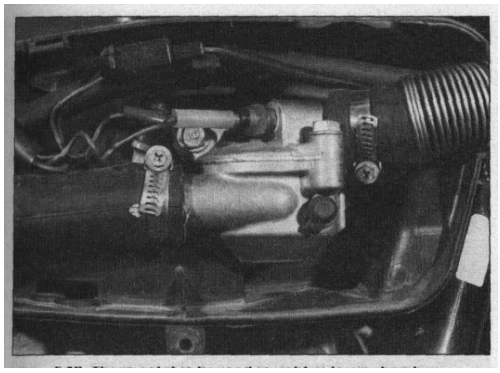
6 Remove the temperature sender unit as described below in Steps! 9 to 11. The sender unit is tested in the same way as the cooling fan thermostatic switch, referring to Steps 6 to 8 of Section 4, noting that the container should be filled with oil rather than coolant and a thermometer capable of reading up to 120°C (248°F) will be required.
7 Heat the oil gently, stirring it slowly to keep a uniform temperature throughout, while noting the resistance readings of the sender unit. A serviceable sender unit should give the following approximate resistance readings at the specified temperatures.

700/750 models

Temperature	Resistance
50°C(122°F)	154 ohms
80°C(176°F)	52 ohms
100°C(212°F)	27 ohms
120°C(248°F)	16 ohms

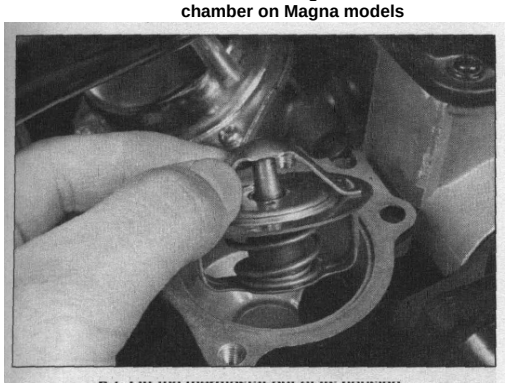
1100 models

Temperature	Resistance
60°C(140°F)	104 ohms
85°C(176°F)	44 ohms
110°C(230°F)	20 ohms
120°C(248°F)	16 ohms



5.10 Thermostat is housed in right side air chamber on Magna models

5.11 Temperature gauge sender unit location



6.7 Lift the thermostat out of its housing

8 If the resistance reading varies wildly from that stated the sender unit must be replaced. If the gauge appears to be faulty, remove the instrument cluster as described in Chapter 8, and check the relevant wiring connectors. If all appears to be well, the gauge/display/warning light bulb is defective and must be replaced.

Replacement

Refer to illustrations 5.10 and 5.11

Temperature sender unit

Warning: *The engine must be completely cool before this procedure.*

9 Remove the fuel tank for improved access (see Chapter 4).

10 On the 1982 750 Sabre model, remove the right side air filter, and on all later 700/750 Sabre models, remove the front side cover on the right side. On Magna models remove the right side air chamber cover (see **illustration).** On all models disconnect the wiring connector from the switch.

11 Unscrew the sender unit from the thermostat housing cover **(see illustration).** Plug the opening to minimize coolant loss.

12 Apply a smear of sealant to the switch threads.

13 Remove the plug and quickly install the new sender unit, tightening it to the specified torque setting.

14 Connect the wiring connector to the sender unit and install the fuel tank as described in Chapter 4.

15 Check the coolant level and, if necessary, top up as described in Chapter 1.

Temperature gauge/display/warning light bulb

16 See Chapter 8.

6 Thermostat - removal, testing and installation

1 The thermostat is automatic in operation and should give many years of service without requiring attention. In the event of a failure, the valve will probably jam open, in which case the engine will take much longer than normal to warm up. Conversely, if the valve jams shut, the coolant will be unable to circulate and the engine will overheat. Neither condition is acceptable, and the fault must be investigated promptly.

Removal

Refer to illustration 6.7

2 Remove the fuel tank (see Chapter 4).

3 Remove the coolant drain plug from the lower left front tube and drain about a quart of coolant from the system.

1982 750 Sabre models

4 Note the positions of the upper radiator hose clamps. If neither one is accessible to be loosened, the right air cleaner element and air cleaner case must be removed. If the hose clamp is accessible, loosen it (preferably, it should be the one that connects directly to the water pipe).

5 Remove the screw that retains the water pipe to the cylinder head.

6 Disconnect the wire from the coolant temperature sender unit.

7 Remove the thermostat cover bolts and lift off the cover. Lift out the thermostat **(see illustration).**

1983 through 1985 700/750 Sabre models

8 On later 700/750 models, disconnect the battery (negative lead first) and pull off the right side electrical components plate cover.

9 Disconnect the wire from the coolant temperature sender unit.

10 Loosen the hose clamp which retains the radiator hose to the thermostat and remove the bolts which retain the thermostat cover. Lift the cover and twist the hose off. Lift out the thermostat.

All 1100 Sabre models

11 Remove the two screws from the front of the thermostat cover to release the water pipe connection. Loosen the clamp of the hose at the bottom of the thermostat housing.

12 Disconnect the wire from the coolant temperature sender unit.

13 Remove the single bolt which retains the thermostat housing to the engine and remove the housing.

14 Remove the two bolts to release the housing cover and lift out the thermostat.

All Magna models

15 Remove the right side air chamber cover. Disconnect the wire from the coolant temperature sender unit. Remove the bolt that attaches the thermostat housing to the air chamber.

16 Loosen the hose clamps on both sides of the thermostat housing.

17 The thermostat housing can now be separated from the hoses. To reach the thermostat, remove the bolts that retain the housing cover to the housing and then lift out the thermostat.

Testing

18 Initially examine the thermostat visually. If it is open at room temperature it should be replaced with a new one. To test it, suspend it by a piece of wire in a pan of cold water. Do not let it touch the bottom of the pan. Place a thermometer in the pan and slowly heat the water. Note at what temperature the thermostat begins to open and compare it to the Specifications. If the thermostat does not open at the correct temperature replace it with a new one.

19 In the event of thermostat failure, as an emergency measure only, it can be removed and the machine used without it. **Note:** *Take care when starting the engine from cold as it will take much longer than usual to warm up. Ensure that a new unit is installed as soon as possible.*

Installation

20 Installation is the reverse of the removal procedure with the following notes.

a) Be sure the thermostat is reinstalled in its original position with the spring down.
b) Always install a new 0-ring on the thermostat housing cover whenever the cover has been removed.
c) On 1982 750 Sabre models and all 1100 Sabre models, install a new O-ring at the junction of the water pipe and thermostat cover.
d) When installing the thermostat housing mounting bolt, ensure that the ground (earth) wire is secured with it.
e) Following installation, refill and bleed the system (see Chapter 1).
f) On 1983 through 1985 700/750 Sabre models, remember to reconnect the battery (negative lead last).

7 Radiator - removal, inspection and installation

Removal

Refer to illustration 7.9a and 7.9b

1 Remove the fuel tank (see Chapter 4).

2 Remove the coolant drain plug from the lower left frame tube and drain the coolant from the radiator. **Note:** 7986 *through 1988 models have a tap on the radiator outlet stub which allows the radiator to be removed without draining the cooling system (see Chapter 1).*

3 Disconnect the reservoir tank tube located at the radiator filler neck.

4 Disconnect the wiring connectors leading to the fan motor and thermostatic switch, and detach the wiring from any clamps or ties.

5 On 1987 and 1988 700/750 Magna models, detach its wires and remove the horn mounting bolt from the left frame tube.

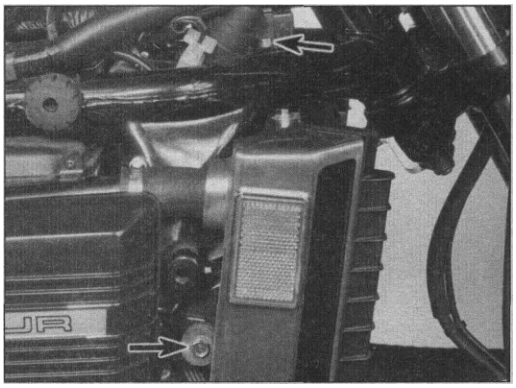
6 Remove their retaining screws/nuts and release the radiator side covers. On 700/750 Sabre models, remove the radiator lower hose cover.

7 On Magna models, also remove the right air chamber cover to gain access to the radiator top hose clamp.

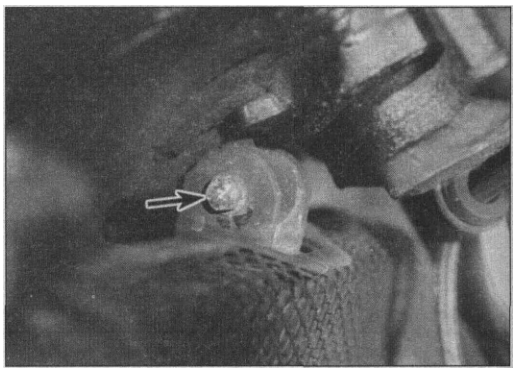
8 Loosen both the upper and lower radiator hose clamps.

9 Remove the radiator mounting bolts/nuts and pull it free from the upper and lower hoses. All models have a mounting bolt on each side which attaches the radiator to the frame downtubes, and have either two nuts or bolts on the top surface, or a single throughbolt and nut **(see illustrations).**

10 Refer to Section 4 for details of fan and fan motor removal.



7.9a Radiator top and side mountings (early model shown)



7.9b Radiator top mounting is formed by single throughbolt on later models (arrow)

Inspection

11 Bugs and dirt can be cleaned from the radiator by using a soft brush. Also use compressed air applied from the rear side of the radiator, but be careful not to bend the cooling fins as this is done.

12 If care is exercised, bent fins can be straightened using two screwdrivers. If the fins are badly damaged or are damaged over a large area, the radiator should be replaced with a new one.

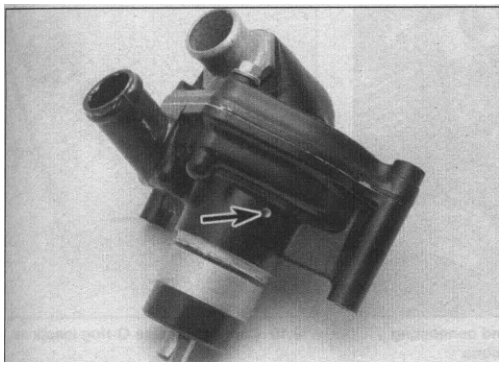
13 If the radiator is in need of welding due to large leaks, it should be done by a professional radiator shop or dealer, as special welding techniques are required.

14 Check the radiator mounting rubbers for signs of damage or deterioration and replace if necessary.

Installation

15 Installation is the reverse of removal, noting the following.

a) Ensure that all mounting dampers are returned to their original locations.
b) Make sure that the fan wiring is correctly routed, in no danger of being caught by the fan and is retained by any relevant clips.
c) Ensure the coolant hoses are securely retained by their clamps -do not overtighten the clamps or the stub may distort.



8.2 Water pump drainage hole (arrow)

d) "~0n completion refill the cooling system as described in Chapter 1 and check that there are no leaks from the radiator hoses.

8 Water pump - check, removal, inspection and installation

Check

Refer to illustration 8.2

1 Remove the left rear crankcase cover. The cover is retained by a single bolt on all 700/750 Sabre models and 1982 through 1984 700/750 Magna models; note the long collar inside the cover. On all 1100 models and 1985-on 700/750 Magna models the cover is retained by three bolts. Visually check the area around the water pump for signs of leakage.

2 To prevent leakage of water or oil from the cooling system to the lubrication system and vice versa, two seals are fitted on the pump shaft. On the underside of the pump body there is also a drainage hole (see **illustration).** If either seal fails this hole should allow the coolant or oil to escape and prevent the oil and coolant mixing.

3 The seal on the water pump side is of the mechanical type which bears on the rear face of the impeller. The second seal, which is mounted behind the mechanical seal is of the normal feathered lip type. However, neither seal is available as a separate item as the pump is a sealed unit. Therefore, if on inspection the drainage hole shows signs of leakage, the pump must be removed and replaced.

Removal

Refer to illustrations 8.5, 8.6 and 8.10

4 Remove the left rear crankcase cover (see Step 1).

5 Remove the coolant drain plug from the lower left frame tube and drain the coolant **(see illustration).**

6 Also remove the drain bolt at the water pump and the two drain plugs from the front cylinders **(see illustration).**

7 Disengage the wiring from any clamps on the water pump cover bolts and position it out of the way.

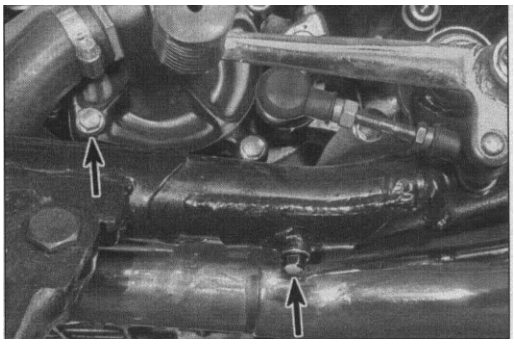
8 Disconnect the water hose from the water pump cover.

9 Remove the remaining water pump cover bolts and lift off the cover.

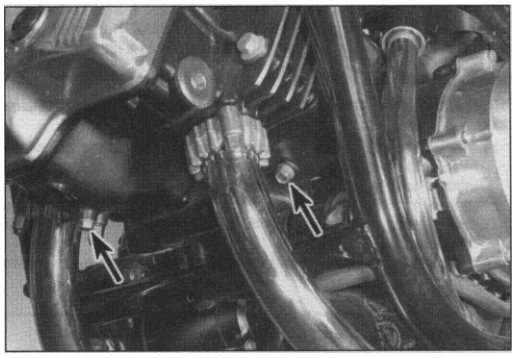
10 Remove the inlet water pipe mounting bolt located on the front of the engine **(see illustration).** It may be necessary on certain models to remove the left front engine mount bolt for clearance.

11 Loosen the hose clamps that secure the water hose between the water pump housing and the water pipe.

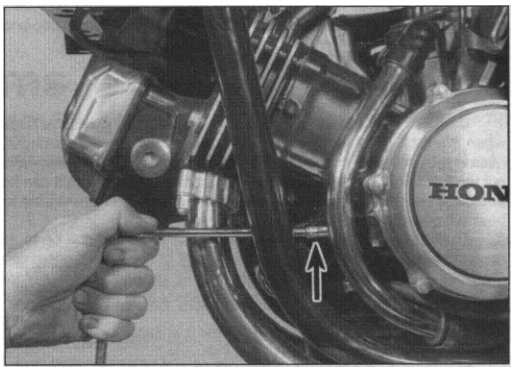
12 Pull the water pump out from the crankcase and then separate the water pipe from the pump.



8.5 Coolant drain plug in frame section (right arrow), and water pump drain plug (left arrow)



8.6 Front cylinder bank drain plugs (arrows)

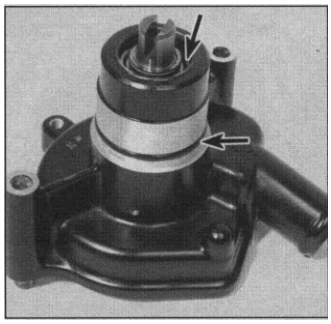


8.10 Inlet water pipe clamp bolt location (arrow)

Inspection

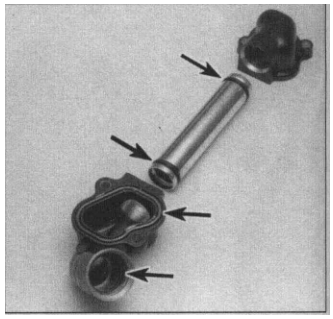
Refer to illustration 8.14

13 Wiggle the water pump impeller back-and-forth and in-and-out. If there is excessive movement the pump must be replaced.



8.14 Check the water pump seal for damage and replace the O-ring whenever the pump is removed (arrows)

9.7 Coolant inlet and connecting pipe locations



9.10 Connecting pipe O-ring locations

14 Check the bearing and oil seal for damage **(see illustration).** Make sure the bearing spins easily without noise. The water pump cannot be rebuilt and, if faulty, must be replaced as a unit.

Installation

15 Installation is the reverse of the removal procedure with the following notes.

a) Always replace the O-rings on the water pump, at the top of the water pipe and in the water pump cover. The water pump O-ring should be lubricated with engine oil before installing it.

b) When installing the water pump into the crankcase, be sure the water pump shaft meshes with the oil pump shaft, which drives the pump.

c) Following installation, refill and bleed the cooling system (see Chapter 1).

9 Coolant hoses and pipes - removal and installation

Note: *Before removing a hose or pipe, drain the coolant as described in Chapter 1. Total draining of the system is not always necessary, particularly if the hose is at the top of the system, but it does provide a good opportunity to drain, flush and refill the system with fresh coolant.*

Flexible hoses

1 Use a screwdriver to loosen the hose clamps, then slide them back along the hose and clear of the stub.

2 Caution: *The radiator stubs are fragile. Do not use excessive force when attempting to remove the hoses.* If a hose proves stubborn, release it by rotating it on its stub before working it off. If all else fails, cut the hose with a sharp knife then slit it at each stub so that it can be peeled off in two pieces. While this is expensive it is preferable to buying a new radiator.

3 To install, slide the clips onto the hose and then work it on to its respective union. **Note:** *Do not use a lubricant of any kind. If necessary the hose can be softened by soaking it in very hot water before installing, although care is obviously necessary to prevent the risk of personal injury while doing this.*

4 Rotate the hose on its stubs to settle it in position before sliding the clips into place and tightening them securely.

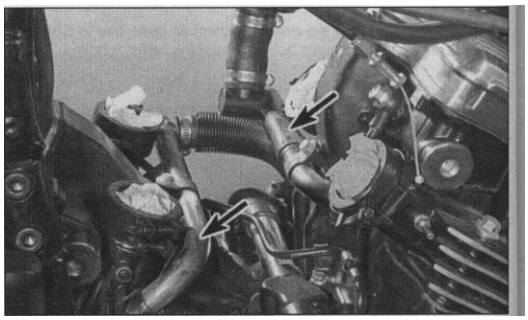
5 The short radiator top hose on Sabre models is linked to the thermostat by a solid pipe. Release the two screws to release the pipe flange from the thermostat housing. Use a new O-ring on installation.

6 Refill and bleeding the cooling system (see Chapter 1).

Metal coolant inlet pipe

Refer to illustrations 9.7 and 9.10

7 The curved inlet pipe delivers coolant from the water pump to the



9.13 Coolant crossover pipe locations

a union on the crankcase, where it is routed to cylinders No. 1 and 2; a link pipe connects the first union to a second on the right side of the crankcase, which supplies cylinders No. 3 and 4 **(see illustration).**

8 Remove the pipe mounting bolt on the front of the engine, noting that the front engine mounting bolt on the left side may have to be removed on some models for access. -»

9 Loosen the hose clamps at both ends of the pipe and work the pipe off the water pump hose and out of the crankcase union.

10 Remove the two bolts that attach each union to the crankcase. Once removed, the connecting pipe can be separated from the unions and the O-rings replaced **(see illustration).**

11 Installation is the reverse of the removal procedure, noting that all O-rings must be replaced with new ones.

12 Refill and bleed the cooling system (see Chapter 1).

Coolant crossover pipes

Refer to illustration 9.13

13 The coolant crossover pipes carry the coolant from the cylinder heads to the thermostat housing **(see illustration).** To gain access to them, first remove the carburetors as described in Chapter 4.

14 Loosen the hose clamp securing the coolant hose to the bottom of the thermostat housing.

15 Remove the coolant pipe clamp bolts and lift off the clamps.

16 Pull the pipes out of the cylinder head; if used with care, a screwdriver can be used to pry them out.

17 If necessary, separate the pipes from the connecting hoses.

18 Installation is the reverse of the removal procedure, noting that new sealing rings should be used on all joints.

19 Refill and bleed the cooling system (see Chapter 1).