DIAGNOSIS MADE EASY

PART OF COOLING SYSTEM
TROUBLE SHOOTING
PART #: 496-2122
The purpose of this booklet is to provide you with more detailed guidance on some specific car problems that involve the engine’s cooling system. The easy-to-follow diagnostic tree structures in this booklet will help you to quickly identify the correct cause of the problem and provide you with a logical flow to the recommended repair procedures!

Liquid or traces of liquid under the bonnet ........................................... 1
Liquid under the vehicle .......................................................................... 2
Wet interior carpet(s) / sweet smell inside cabin / mist on the inside of the windows .................................................. 3
White smoke from the exhaust pipe(s) .................................................. 4
Temperature below normal, fuel consumption increased and/or excessive revving .............................................. 5
Coolant is above maximum level in expansion tank ...................... 6
Coolant is below minimum level in expansion tank ..................... 7
Noise from the water pump ................................................................. 8
Noise caused by air bubbles in the expansion tank ......................... 9
No/insufficient interior heating ......................................................... 10
Steam from under the bonnet ......................................................... 11
Engine is overheating ......................................................................... 12

PLEASE NOTE:
Throughout this booklet, we use symbols to make you aware that more guidelines relating to the topic are to be found in the troubleshooting guide. So wherever you come across the symbol, be sure to read the corresponding page in the guide!
Is there evidence of the leak?

Are you sure the liquid is coolant?

Can you identify the source of the leak?

Overpressure the cooling system. Are there any coolant leaks?

Does the water pump leak while the engine is running?

Repair the leak/replace the component.

The problem is not cooling related. Check oil and other liquids.

Has the coolant level in the expansion tank dropped?

The coolant was spilt during a previous refill.

Can you identify the source of the leak?

Overpressure the cooling system. Are there any coolant leaks?

Repair the leak/replace the component.

The coolant was spilt during a previous refill.
**Liquid under the vehicle**

1. Identify the liquid. Are you sure it is coolant?
2. Overpressure the cooling system. Are there any coolant leaks?
3. Does the water pump leak while the engine is running?
4. Repair the leak/replace the component.
5. The problem is not cooling related. Check oil and other liquids.
6. Can you identify the source of the leak?
7. Is there evidence of a leak?
8. Repair the leak/replace the component.
9. This is normal if the air conditioning system is functioning correctly.

**Wet interior carpet(s) / sweet smell inside cabin / mist on the inside of the windows**

10. Does the level of the coolant in the expansion tank drop?
11. Inspect the heater core as well as all attached hoses and clamps. Is there evidence of a leak?
12. Repair the leak/replace the component.
13. Overpressure the cooling system. Are there any coolant leaks?
14. The problem is not cooling related. Check vehicle for possible water ingress.
15. Repair the leak/replace the component.
16. Repair the leak/replace the component.
Does the problem occur only when the engine is cold?

The problem is not cooling related. Condensed water is evaporating. This is normal.

The problem is not cooling related.

Carry out a compression test on each cylinder. Are the compression values incorrect?

Ensure the surface of the cylinder head is flat and install a new head gasket.

Check the level of the coolant in the expansion tank regularly.

Overpressure the cooling system. Are there any coolant leaks?

Ensure the surface of the cylinder head is flat and install a new head gasket.

Bleed the cooling system. Is the problem solved?

With the engine idling, check the air pressure in the expansion tank. Is the pressure above atmospheric pressure?

Replace the expansion tank cap.

Repair/replace the component(s).

Do the fan and/or thermostat show a problem?

Overpressure the cooling system. Are there any coolant leaks?

Repair the leak/replace the component.

Continue to scheme 12 for further diagnostic guidance: “overheating”.

Is the coolant at the correct level in the expansion tank?

Do you notice any air bubbles in the cooling system?

White smoke from the exhaust pipe(s)
Is the vehicle equipped with a coolant temperature gauge?

Is there any movement of the needle during driving?

Check the temperature sensor. Is it working properly?

Is (are) the radiator fan(s) blowing despite the low engine temperature?

Check the wiring. Is there a problem?

Replace the thermostat.

Check the fan(s).

Replace the temperature sensor.

Check the coolant temperature gauge.

Repair the wiring.
Is the engine at ambient temperature?

Is the coolant in the expansion tank contaminated?

Do(es) the pressure valve(s) in the cap(s) function correctly?

Inspect the coolant hoses. Are there any kinks?

Re-route the hose to the correct position.

Flush all parts of the cooling system. Bleed the air out and refill correctly.

Replace the expansion tank cap.

Reduce coolant to maximum level. Let the engine run hot, then let it cool down again. Is the coolant level correct?

Bleed the air out of the cooling system (interior heating switched on). Is the problem solved?

Run an overpressure test to exclude any chance of a leak. Leaks can lead to infiltration.

Check the level of the coolant in the expansion tank regularly.

Let the engine cool down completely and check again.

Too much coolant was added at the previous fill.
Was the right amount of coolant added?

Overpressure the cooling system. Are there any coolant leaks?

Repair the leak/replace the component.

Replace radiator cap and/or expansion tank cap.

Overpressure the cooling system. Are there any coolant leaks?

Replace the expansion cap.

Does the coolant temperature rise above normal operating temperature?

Add coolant to maximum level. Let the engine run hot, then let it cool down again. Is the coolant level correct?

Coolant is below minimum level in expansion tank

Level was either incorrect at last fill or has not been checked for a long time. Low level caused by natural vapourisation.

Continue to scheme 12 for further diagnostic guidance: “overheating”.

Is the water pump electrically driven?

Bleed the cooling system. Is the problem solved?

Check the level of the coolant in the expansion tank regularly.

Replace the water pump.

Correct the drive alignment and ensure the pulley is seated correctly.

Is the pulley aligned and seated correctly on the water pump shaft?

Is the belt tension correct?

Can you hear the noise while rotating the water pump by hand?

Are you sure the noise is coming from the water pump?

Bleed the cooling system. Is the problem solved?

Install a new belt drive kit and water pump.

This is not a water pump problem.

Check the level of the coolant in the expansion tank regularly.
Are there air bubbles in the expansion tank, even when the engine is cold?

- Carry out a compression test on each cylinder. Are the compression values incorrect?
- Bleed the air out of the cooling system (interior heating switched on). Is the problem solved?
- Check the level of the coolant in the expansion tank regularly.
- Overpressure the cooling system. Are there any coolant leaks?
- With the engine idling, check the air pressure in the expansion tank. Is the pressure above atmospheric pressure?
- Repair the leak/replace the component.
- Ensure the surface of the cylinder head is flat and install a new head gasket.
- Continue to scheme 12 for further diagnostic guidance: “overheating”.

Replace the expansion tank cap.
Does the engine reach normal operating temperature?

Check the inlet and outlet hoses to the interior heater core. Do they seem hot?

Repair/replace the component.

Check the hoses and the heater core for blockages.

Is the vehicle equipped with a coolant temperature gauge?

Does the needle move during driving?

Free the air outlets and the duct valves.

Check the thermostat. Does it open and close easily?

Does the interior heating blower work?

Is the car equipped with an interior thermostat?

Replace the interior thermostat.

Is the temperature sensor working ok?

Check the wiring. Are there any wiring problems?

Replace the temperature sensor.

Check the coolant temperature gauge.

Repair the wiring.

Replace the thermostat.

Is [are] the radiator fan(s) blowing despite the low engine temperature?

Replace the thermostat.

Check the fan(s).
Is the vapour due to climatic conditions or water ingress?

Let the engine slowly heat up. Any natural condensation will soon disappear.

Overpressure the cooling system. Are there any coolant leaks?

Does the level of the coolant in the expansion tank drop?

Repair the leak/replace the component.

The problem is not cooling related.
Once hot, is the temperature gauge continuously in the red zone?

Is there enough coolant in the system?

Add coolant to maximum level.

Is the radiator-fan system operating correctly?

Check temperature sensor and wiring.

Could the coolant be old and contaminated?

Flush the cooling system and refill using new coolant.

Bleed the cooling system. Is the problem solved?

Check the level of the coolant in the expansion tank regularly.

Is the vehicle equipped with an electrically driven water pump?

Is belt tension correct?

Install a new belt drive kit and water pump.

Is the water pump delivering the appropriate flow rate?

If the drive to the water pump is correct, the water pump is the problem. Fit a new water pump.

Replace the thermostat.
Does engine overheating occur only under extreme load in combination with warm weather (climbing, towing, off-road/high performance driving)?

Does engine overheating occur only under extreme idling conditions, in traffic jams or in combination with warm weather (city, traffic jam, idling)?

Is the water pump being driven correctly?

Is the water pump delivering the appropriate flow rate?

Try to improve cooling (there may be components specifically for hot countries).

Is (are) the radiator fan(s) working correctly?

With the engine idling, check the air pressure in the expansion tank. Is the pressure above atmospheric pressure?

Ensure the surface of the cylinder head is flat and install a new head gasket.

Carry out a compression test on each cylinder. Are the compression values incorrect?

Install a new belt drive kit and water pump, or install a new electrical water pump.

Check the level of the coolant in the expansion tank regularly.

Bleed the cooling system. Is the problem solved?

Flush the cooling system. Is the problem solved?

Repair the leak/replace the component.

Check the level of the coolant in the expansion tank regularly.

Overpressure the cooling system. Are there any coolant leaks?

A part of the cooling system was blocked.

Is [are] the radiator fan[s] working correctly?

Install a new belt drive kit and water pump, or install a new electrical water pump.

Bleed the cooling system. Is the problem solved?

Flush the cooling system. Is the problem solved?

Repair/replace the component(s).

Replace the thermostat.

Replace the expansion tank cap.

Is engine overheating occurring only under extreme idling conditions, in traffic jams or in combination with warm weather (city, traffic jam, idling)?

Advise the driver of the vehicle about overload.

If the drive to the water pump is correct, the water pump is the problem. Fit a new water pump.

Repair the leak/replace the component.