12	-	Cooling fan lower cowl
13	-	Radiator bottom hose
14	-	Thermostat assembly
15	-	Intercooler

OVERVIEW

The cooling system employed is the bypass type, which allows coolant to circulate around the engine and the heater circuit while the thermostat is closed. The primary function of the cooling system is to maintain the engine within an optimum temperature range under changing ambient and engine operating conditions. Secondary functions are to provide heating for the passenger compartment and cooling for the Exhaust Gas Recirculation (EGR) system.

The cooling system comprises:

- A radiator
- A passenger compartment heater matrix
- An EGR cooler
- A coolant pump
- An expansion tank
- A cooling fan
- Connecting hoses and pipes

The coolant is circulated by a centrifugal type pump mounted on the front Left Hand (LH) side of the engine and driven by the ancillary drive 'polyvee' belt. The coolant pump circulates coolant around the cylinder block and cylinder head, to the radiator, heater matrix and the EGR cooler, via the coolant hoses.

The thermostat is located in the bottom hose assembly on the inlet side of the cooling circuit and provides a stable control of the coolant temperature in the engine.

The radiator is a cross flow type with an aluminium matrix and moulded plastic end tanks. The radiator end tanks have brackets which allow for the attachment of the fan cowl assembly, intercooler and, if fitted, air conditioning system condenser. The bottom of the radiator is located in rubber bushes supported by brackets on the chassis longitudinals. The top of the radiator is located in rubber bushes secured by brackets fitted to the bonnet locking platform.

An air-to-air intercooler is located in front of the radiator and is used to cool the compressed air from the turbocharger before it enters the inlet side of the engine.
For additional information, refer to: Intake Air Distribution and Filtering (303-12 Intake Air Distribution and Filtering - 2.4L Duratorq-TDCi HPCR (103kW/140PS) - Puma, Description and Operation).

The radiator top hose is connected to a coolant outlet elbow, which is bolted to the cylinder head. The top hose also has a connection for the feed to the heater matrix. The radiator bottom hose is routed around the front of the engine and is connected to the thermostat assembly. The bottom hose also has a return connection from the fuel cooler. The feed for the fuel cooler comes from a connection just below the bottom hose connection on the Right Hand (RH) side of the radiator assembly.

An expansion tank is fitted to the RH suspension turret in the engine compartment. The expansion tank allows for expansion of the coolant when the engine is hot and replaces the coolant into the system as the engine cools down.

The EGR cooler is located in the coolant return line from the engine and top hose. The fluid cools the exhaust gases returning to the inlet manifold, which improves emissions.

The heater matrix outlet hose incorporates a bleed screw to bleed air when filling the cooling system.