Engine diagnosis warning lamp activated - Fault code P012800

Topic number	LI20.10-P-061231
Version	1
Design group	20.10 Coolant pump, coolant thermostat
Date	04-08-2015
Validity	Model series 205 with engine 274
Reason for change	Revision of parts validity - Priority to be given to the EPC.
Reason for block	

Complaint:

Engine diagnosis warning lamp activated - The fault code P012800 "The coolant temperature is below the coolant thermostat specified temperature" is stored in the engine control unit.

Cause:

After engine start, the engine coolant warms up more slowly than specified in the curve stored in the engine control unit.

Remedy:

Perform guided test "Check component 'R48 (coolant thermostat heating element)'"..

Regardless of the result:

Program air conditioner control unit with BD/DVD 07/2014 or higher

Program engine control unit with BD/DVD 12/2014 or higher

If the guided test "Check component 'R48 (coolant thermostat heating element)'" is not OK, the coolant system must be checked for silica contamination.

To do this, proceed as follows:

- Open cap on coolant expansion reservoir and release pressure in engine cooling system
- Close cap again
- Remove lower engine compartment paneling complete (AR61.20-P-1105LW)
- Drain coolant via drain screw on radiator (AR20.00-P-1142LW)
- Close off coolant hose (1) between coolant expansion reservoir (2) and radiator (3) using a suitable tool or a clamp (000 589 54 37 00) (see Figure 01)
- Disconnect coolant hose (1) from radiator (3)
- Check coolant hose (1) for silica contamination in area of connection to radiator (3) (see Figure 02)

Note: Even very small quantities (1 or 2 grains) of silica are an indication of a defective expansion reservoir.

If no silica contamination can be detected, a PTSS case must be created before performing further work. The following must be attached to the PTSS case:

- The quick test

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- A printout of the guided test "Check component 'R48 (coolant thermostat heating element)'"

If grains of silica are found, the cooling and heating system must be thoroughly flushed as follows:

IMPORTANT:

- Even very small amounts of silica grains can lead to a reoccurrence of the problem if they are not flushed out.

- All open electrical connectors must be protected against moisture.

- New parts should only be installed after the engine cooling system has been flushed.

- Remove cooling system expansion reservoir (AR20.30-P-4950LW).

- Detach return line for heat exchanger to interior at pipe line.

- Detach connecting line between expansion reservoir and radiator from radiator and remove from engine compartment.

- Disconnect connecting line between radiator and electric coolant pump from radiator and close off using a suitable tool.

- Disconnect connecting line between radiator and thermostat from radiator and close off using a suitable tool.

- Disconnect connecting line between exhaust gas recirculation positioner and radiator at connecting point and close off using a suitable tool (only vehicles with stratified charge (DES) code 920)

- Disconnect connecting line between engine and interior heat exchanger (see arrow in Figure 03) at both ends and remove from engine compartment.

- Lengthen connecting line between heat exchanger and interior using a suitable hose (see Figure 04).

Flush heater heat exchanger:

Heater heat exchanger flushing sequence:

Flush heater heat exchanger thoroughly against the flow direction with at least 40 liters of clean water. When doing this, keep turning the water supply on and off (pinch the hose) to provoke pulsating blasts of water (see Figure 05).

Thoroughly flush out heater heat exchanger in flow direction with at least 40 liters of clean water (see Figure 06).

Prepare cleaner for flushing the heater heat exchanger:

Prepare a bucket of 10 liters of warm water (temperature min. 40°C), add 0.5 liters of cleaner to the bucket and mix thoroughly (use cleaner A 002 986 42 71 in a 5% solution)

Note: Follow the safety information and handling instructions for the cleaner!

Procedure for flushing the heater heat exchanger with cleaner against the flow direction.

Attach connecting line to heater heat exchanger inlet, route the hose extension downwards and flush the heater heat exchanger with cleaner against the flow direction. Leave the cleaner to act for approx. 1 minute and repeat the process 2 times (see Figure 07).

Flush heater heat exchanger thoroughly against the flow direction with compressed air. When doing this, keep switching the compressed air supply on and off to provoke pulsating blasts of air (see Figure 08).

Flush any cleaner residue using clean water out of the heater heat exchanger (see picture 05), to do so thoroughly clean heater heat exchanger opposite the flow direction using at least 40 liters of clean water. When doing this, keep turning the water supply on and off (pinch the hose) to provoke pulsating blasts of water (see Figure 05).

Flush the engine:

Thoroughly flush out the engine with at least 70 liters of clean water (see Figure 09). When doing this, keep turning the water supply on and off (pinch the hose) to provoke pulsating blasts of water.

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Note: The lines which are NOT flushed must be sealed off using suitable tools.

Prepare cleaner for flushing the engine:

Prepare a bucket of 10 liters of warm water (temperature min. 40°C), add 0.5 liters of cleaner to the bucket and mix thoroughly (use cleaner A 002 986 42 71 in a 5% solution).

Note: Follow the safety information and handling instructions for the cleaner!

Flush engine with cleaner, leave cleaner to act for approx. 1 minute and repeat the process 2 times (see Figure 09), keeping all coolant lines and openings closed with a suitable tool.

Preparation for flushing the engine with compressed air:

Disconnect connecting line between coolant pipe and electric coolant pump (see Figure 10).

Insert compressed air gun into coolant line and seal using a suitable tool.

Flush engine thoroughly with compressed air. When doing this, keep switching the compressed air supply on and off to provoke pulsating blasts of air (see Figure 11).

Install connecting line between coolant pipe and electric coolant pump and flush engine with compressed air in flow direction (see Figure 10).

Flush cleaner residue out of the engine, while doing so all open all the coolant openings on the engine alternately (see picture 09), to do so, thoroughly flush engine with at least 70 liters of clean water (see picture 09). When doing this, keep turning the water supply on and off (pinch the hose) to provoke pulsating blasts of water.

Flush the exhaust gas recirculation system (only vehicles with stratified charge (DES) code 920):

Preparation for flushing the exhaust gas recirculation system:

Disconnect coolant lines at connecting points.

Procedure for flushing the exhaust gas recirculation system (only vehicles with code 920):

Connect water hose to coolant line (see Figure 12).

Thoroughly flush the exhaust gas recirculation unit with at least 20 liters of clean water, while turning the water supply on and off or provoking pulsating blasts of water (pinch the hose) (see Figure 12).

Prepare cleaner for flushing the exhaust gas recirculation system:

Prepare a bucket of 5 liters of warm water (temperature min. 40°C).

Add 0.25 liters of cleaner to the bucket and mix thoroughly (use cleaner A 002 986 42 71 in a 5% solution).

Note: Follow the safety information and handling instructions for the cleaner!

Flushing the exhaust gas recirculation with cleaner:

Connect hose with funnel to coolant line.

Close off drain hose using a suitable tool, poor in cleaner and leave to act for approx. 1 minute.

Open drain hole and allow the cleaner to drain. Repeat the process 2 times.

Blow out cleaner and silica residues with compressed air.

Rinse residues of cleaner out of exhaust gas recirculation system with at least 20 liters of clean water.

After flushing, the following components must be replaced:

- Coolant thermostat (48)
- Expansion reservoir (2)

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- Radiator (1)
- Oil-water heat exchanger (5)
- Electric coolant pump of engine (M75/11)
- Electric circulation pump (M13/5)
- Switchover valve (82)

Note on parts validity: Because of the repair scope involved, it is not possible to list every single engine variant here or to guarantee that the parts scopes are up to date. Therefore, the parts validity as per the EPC should always be noted.

Attachments	
File	Description
Bild 01.JPG	Coolant expansion reservoir
Bild 02.JPG	Silica residues in coolant hose
Bild 03.JPG	Flush inside of heat exchanger
Bild 04.JPG	Hose extension
Bild 05.JPG	Flushing the heater heat exchanger against the flow direction
Bild 06.JPG	Flushing the heater heat exchanger in the flow direction
Bild 07.JPG	Flushing the heater heat exchanger with cleaner against the flow direction
Bild 08.JPG	Blowing remaining silica grains out of heater circuit with compressed air
Bild 09.JPG	Flushing the engine against the flow direction
Bild 10.JPG	Flushing the engine in the flow direction
Bild 11.JPG	Flushing the engine with compressed air against the flow direction
Bild 12.JPG	Flushing the EGR cooler
Bild13.JPG	Flushing the EGR cooler with cleaner

Symptoms
Power generation / Engine cooling system / Cooling system function / Does not reach operating temperature
Body / Air conditioning / Heater / Insufficient heat output
Power generation / Engine management / Engine management indicator lamp / Engine diagnosis / lit

Parts						
Part number	ES1	ES2	Designation	Quantity	Note	EPC
A 274 200 01 15			Coolant thermostat	1	Only if silica contamination is found - observe validity as per EPC.	X
A 099 500 22 03			Radiator	1	Only if silica contamination is found - observe validity as per EPC.	X
A 099 500 21 03			Radiator	1	Only if silica contamination is found - observe validity as per EPC.	X
A 205 500 00 49			Expansion reservoir	1	Only if silica contamination is found - Damage-causing component - Observe validity as per EPC.	X

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A 274 188 01 01			Oil cooler	1	Only if silica contamination is found - observe validity as per EPC.	X
A 274 200 01 07			Electric coolant pump	1	Only if silica contamination is found (only for vehicles with electrical water pump) - Observe validity as per EPC.	X
A 204 835 03 64			Electric circulation pump	1	Only if silica contamination is found - observe validity as per EPC.	X
A 274 200 02 31			Switchover valve	1	Only if silica contamination is found - observe validity as per EPC.	X
A 274 200 07 01			Mechanical coolant pump	1	Only if silica contamination is found (only for vehicles with mechanical water pump) - Observe validity as per EPC.	X
A 133 188 00 01			Oil cooler to timing case cover	1	Only if silica contamination is found (only for vehicles with mechanical water pump) - Observe validity as per EPC.	X

Work units

Op. no.	Operation text	Time	Damage code	Note
54-1011	PERFORM QUICK TEST		54575 90	If test "Check component 'R48 (coolant thermostat heating element)'" is OK
07-0641	ENGINE COMPONENTS:.....CHECK PER FAULT CODE		54575 90	If test "Check component 'R48 (coolant thermostat heating element)'" is OK
54-0991	PROGRAM CONTROL UNIT (AFTER QUICK TEST)		54575 90	If test "Check component 'R48 (coolant thermostat heating element)'" is OK
20-5410	REMOVE/INSTALL EXPANSION RESERVOIR FOR COOLANT, REPLACE IF NECESSARY		50101 07	Only if silica contamination is found
20-2470	REMOVE/INSTALL COOLANT THERMOSTAT, REPLACE IF NECESSARY		50101 07	Only if silica contamination is found
20-1030	FLUSH COOLING SYSTEM		50101 07	Only if silica contamination is found
54-1011	PERFORM QUICK TEST		50101 07	Only if silica contamination is found
07-0641	ENGINE COMPONENTS:.....CHECK PER FAULT CODE		50101 07	Only if silica contamination is found

Validity

Vehicle	Engine	Transmission
C (205)	274	*

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