Troubleshooting - PMCI-2 ECU sensor power supply circuits

General information on PMCI-2 ECU sensor power supply circuits

The PMCI-2 ECU (D365) contains several separate 5 V power supplies which provide power to many of the sensors. These power supplies are isolated from the PMCI-2 ECU main power supply to prevent short circuits in any of the sensors from damaging the PMCI-2 ECU.

For each of these sensor power supplies, the voltage specification is 5 V ± 0.2 V. If any of the power supplies fall outside this specification, the PMCI-2 ECU generates DTCs related to each sensor connected to that specific power supply.

Voltage deviations in the power supplies to the sensor can only be caused by an overload of the power supply or a short/open circuit. Short and open-circuit DTCs are detected in the PMCI-2 ECU and can be found using DAVIE. Overload situations however cannot be detected with DAVIE.

It is possible to diagnose these power supplies with a digital multimeter, but this is best done using an oscilloscope (scope) and the appropriate breakout harness. See Table 1 for breakout harness descriptions and part numbers.

The breakout harness provides easy access to all sensor circuits without disconnecting the sensor and while the engine is running. The scope has a graphical display and a very fast measurement rate, making it easier to find subtle problems in sensor power or signal.

Table 1. Part numbers for PCI breakout harness tools

Part number	Description
42-02451	PMCI-2 A Breakout Harness

42-02452	PMCI-2 B Breakout Harness
42-02465	PMCI-2 C Breakout Harness
42-02470	Adapter for tool 42-02465 to vehicle harness

Table 2 shows the power supplies used for powering analog sensors.

- Power supply 1 - If there is a problem with internal PMCI-2 ECU power supply 1, DTCs related to the following sensors will appear: Boost pressure sensor (F802), BPV position sensor (F811), and EGR valve position sensor (L033).

  The coolant level sensor (F772) and oil pressure sensor (F810) operate at slower rates than the other sensors on the power supply 1 circuit, and are therefore more resistant to noise in the power supply. Sensor voltage must only be measured using the breakout harness.
- Power supply 2 - If there is a problem with internal PMCI-2 ECU power supply 2, DTCs related to the following sensors will appear: Fuel pressure sensor (F801), EGR differential pressure sensor (F751), pressure after BPV sensor (F823), and pressure before turbine sensor (F826). All of these sensors operate at the same rate. The output for all of these sensors can vary between 0.5 V and 4.5 V. Sensor voltage must only be measured using the breakout harness.
- Power supply 4- The temperature sensors which are fed by power supply 4 function by changing the resistance of the sensing element. Therefore there is no need for separate power and signal wires.

  Not using the breakout harness might result in open circuit DTCs. These DTCs must be cleared immediately after verifying

the sensor.

Table 2. Detailed information for 5 V power supply circuits, analog engine sensors.

Power supply	PMCI-2 connector	Sensor name	ECN	PMCI-2 connector pins			Breakout harness		
				V(+)	V(-)	V (signal)	V(+)	V(-)	V (signal)
1	A	Boost pressure	F802	A47	A39	A51	68	64	70
	C	BPV position	F811	C65	C63	C66	71	69	72
		EGR position	L033	C51	C27	C05	56	27	5
		Coolant level	F772	C53	C29	C07	58	29	7
		Oil pressure	F810	C62	C39	C84	68	39	90
2	A	Fuel pressure	F801	A46	A38	A50	67	63	69
	C	EGR pressure difference	F751	C58	C35	C80	64	35	86
		Pressure after BPV	F823	C59	C36	C81	65	36	87
		Pressure before turbine	F826	C61	C38	C92	67	38	89
4	A	Fuel temperature	F803		A60	A42		4	65
		Boost temperature	F804		A62	A43		6	66
	C	Coolant temperature	F566		C57	C79		63	85
		Intercooler temperature	F750		C40	C17		40	17
		Ambient temperature	OEM		C56	C78		84	62
		Oil temperature	F808		C15	C16		15	16

- V(+) is the power supply pin. V(-) is the power ground pin.
- V (signal) is the sensor signal circuit.
- To read the voltage signal, measure across the V (signal) and V(-) pins.

Step-by-step troubleshooting - PMCI-2 ECU 5 V power supply circuits

Step 1 - Check for DTCs

Step 1A - Check for DTCs	
Action 1. Key the ignition off for at least 15 seconds and key it ON again.	
Are any sensor-related active DTCs present?	
YES	NO
	PMCI-2 ECU sensor power supply troubleshooting not necessary.
Go to step 2A.	Proceed with DTC-specific information on Engine Rapido

Step 2 - Determine the 5 V power supply of the sensor that caused the active DTC

Step 2A - Determine the 5 V power supply of the sensor that caused the active DTC	
Action 1. Determine whether the sensor is powered by one of the PMCI-2 ECU 5 V power supply circuits. See "Table 2. Detailed information for 5 V power supply circuits analog engine sensors"	
Is the sensor powered by one of the PMCI-2 ECU 5 V power supply circuits?	
YES	NO
Go to 3A	Proceed with DTC-specific information on Engine Rapido

Step 3 - Check electrical components

Step 3A - Check the 5 V power supply group related to the active DTCs
Action 1. Key off the ignition. 2. Connect the breakout wiring harness. 3. Key on the ignition. 4. Check the voltage on the sensor power supply according to "Table 2. Detailed information for 5 V power supply circuits analog engine sensors".

Is 5 V present on the power supply connection of the sensor?	
YES	NO
5 V power supply from PMCI-2 ECU is OK.	5 V power supply might by deactivated by the PMCI-2 ECU for protection of the circuit.
Follow sensor checking procedures according to Engine Rapido information	Go to 3B

Step 3B - Check the 5 V power supply in question at the PMCI-2 ECU side

Action

1. Key off the ignition.
2. Disconnect the sensors that are fed by the specific 5 V power supply group one-by-one.

   After disconnecting each sensor:

   1. Key on the ignition.
   2. Check the voltage on the 5 V power supply of the PMCI-2 ECU.

- The 5 V sensor power supply must only be measured using the breakout harness.
- Disconnecting sensors will result in open circuit DTCs. These DTCs must be cleared immediately after verifying the sensor.

Is 5 V now present on the power supply connection of the PMCI-2 ECU?	
YES	NO
Replace the faulty sensor.	The PMCI-2 sensor power supply circuit may have been temporary deactivated for protection against circuit overload.
Go to 4A	Go to 3C

Step 3C - Locate the cause of the deactivated power supply circuit

Action

1. Check sensor wiring and connectors.

Defects found?	
YES	NO
Repair accordingly.	PMCI-2 ECU sensor power supply circuit is damaged. Replace the PMCI-2 ECU according to job (Replace electronic control unit, engine management system (Elec.system, engine)).
Go to 4A	Go to 4A

Step 4 - Reset the DTCs.

Step 4A - Reset the DTCs.	
Action ■ Reset the DTCs. ■ If DTCs are still active, troubleshoot the active DTCs.	
DTCs reset?	
YES	NO
	Restart troubleshooting steps.
Repair complete	Go to 1A

M041790 - 04/18/2014 07:04:48