

2013 PACCAR MX-13

Diagnostic Service Manual EPA2013

(P1676 to P3756)



Index

<u>P1676</u>	<u>P1677</u>	<u>P1678</u>	<u>P1679</u>	<u>P1681</u>	<u>P1682</u>	<u>P1693</u>	<u>P1694</u>	<u>P1704</u>	<u>P1705</u>	<u>P1706</u>	<u>P1707</u>	<u>P1708</u>	<u>P1709</u>
<u>P170A</u>	<u>P170B</u>	<u>P170C</u>	<u>P170D</u>	<u>P170E</u>	<u>P170F</u>	<u>P1710</u>	<u>P1711</u>	<u>P1717</u>	<u>P1718</u>	<u>P1719</u>	<u>P171B</u>	<u>P171C</u>	<u>P171E</u>
<u>P1722</u>	<u>P1723</u>	<u>P1724</u>	<u>P1727</u>	<u>P1751</u>	<u>P1863</u>	<u>P2104</u>	<u>P2147</u>	<u>P2148</u>	<u>P2150</u>	<u>P2151</u>	<u>P2181</u>	<u>P2183</u>	P2199
P2226	<u>P2228</u>	P2229	P2237	<u>P2238</u>	<u>P2239</u>	<u>P2266</u>	<u>P2275</u>	<u>P228C</u>	<u>P228D</u>	<u>P228E</u>	P2294	P2295	P2296
<u>P229A</u>	<u>P229B</u>	<u>P229D</u>	<u>P2457</u>	<u>P2458</u>	<u>P2459</u>	<u>P250C</u>	<u>P250D</u>	<u>P252F</u>	<u>P253B</u>	<u>P2541</u>	P2542	<u>P2560</u>	P2563
P2579	<u>P2580</u>	P2581	P2603	P2609	<u>P3003</u>	<u>P30B3</u>	<u>P3405</u>	<u>P3407</u>	<u>P3408</u>	<u>P3413</u>	<u>P3415</u>	<u>P3416</u>	<u>P3421</u>
<u>P3423</u>	<u>P3424</u>	<u>P3429</u>	<u>P3431</u>	<u>P3432</u>	<u>P3437</u>	<u>P3439</u>	<u>P3440</u>	<u>P3445</u>	<u>P3447</u>	<u>P3448</u>	<u>P3750</u>	<u>P3751</u>	<u>P3752</u>
P3753	P3754	P3755	P3756										



Code number	P1676		
Fault code description	ECU PCI – Faulty or incorrec	t software	
Fault code information	1 trip MIL		
	3 drive cycle recovery		
	Readiness group – None		
	Freeze frame type - Compre	hensive	
Description of component(s)	This information not require		Lissue
Location of component(s)	This information not require		
Diagnostic condition	This diagnostic runs during s		
Set condition of fault code	Programmed data in the EC		
Reset condition of fault code	This DTC changes to inactive		detected
Electrical diagram(s)	This information not require		
Technical data	This information not require		
Possible causes	Reprogram the ECU.	ed since this is an internal r	: 133UE
Additional information		art un	
	The PCI ECU does not st Engine cannot be started	-	
Diagnostic Step-by-Step	Engine cannot be starte Porform the trouble	ca. eshooting steps below using	the breakout barness if
Diagnostic Step-by-Step			
		•	as sensors, electrical control
			mended, as it could damage
	9	nition should always be in th	•
	_	nnecting electrical compone	ints in order to reduce the
	Address of the Control of the Contro	e to electrical components.	
			g the troubleshooting process
	will result in multiple errors.		
	 For specific electrical component information and pinout locations always refer to the technical data. 		
	-		
	 It is necessary to exit the fault code menu in DAVIE and run diagnostic test again to identify a change in errors. 		
	_		
		or mechanical issues may be	
		use of both active and inacti	ve fault codes. Refer to the
	possible ca	uses' section.	
	l Guard	CL ID 4676	CDT
	Step 1	Step ID 1676a	SRT
		ble connectors (bent, broker	• •
		n, damage, and rubbing dur	ing each step of the
	diagnostic procedure. Proc	ceea to step 2.	
		T	1
	Step 2	Step ID 1676b	SRT
	DAVIE Direct: ECU Informa		
		ation with current configura	
	through Engine Rapido, or by contacting the PACCAR Engine Support Call Cente		
	Is installed ECU software in		
			nent replacements. Contact
	_		chorization and assistance in
		or updating the correspondi	ng software.
	No - Proceed to st	ep 3	
	I		



	Step 3	Step ID 1676c	SRT	
For further assistance in diagnosing this issue or for conreplacement of suspect components, contact the Engine 1-800-477-0251.			-	
Verification Drive Cycle	To validate the repair, with	the brakes set, turn the key t	to the ON position with the	
	engine off, and allow 10 sec	conds for the system to initia	lize and run diagnostics.	
			Back to Choose Code	
			Back to Index	



Code number	P1677
Fault code description	ECU PCI - faulty or incorrect software
Fault code information	1 trip MIL
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type - Comprehensive
Description of component(s)	This information not required since this is an internal PCI issue.
Location of component(s)	This information not required since this is an internal PCI issue.
Diagnostic condition	This diagnostic runs during start-up of the PCI ECU.
Set condition of fault code Programmed data in the ECU not correct.	
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected.
Electrical diagram(s)	This information not required since this is an internal PCI issue.
Technical data	This information not required since this is an internal PCI issue.
Possible causes	Reprogram the ECU.
Additional information	The PCI ECU does not start up.
	Engine cannot be started.
Diagnostic Step-by-Step	
Verification Drive Cycle [Verification drive cycle not specified. Please contact the Engine Support Co	
	Back to Choose Code
	Back to Index



Code number	P1678		
Fault code description	ECU PCI - faulty or incorrect software		
Fault code information	1 trip MIL		
	3 drive cycle recovery		
	Readiness group – None		
	Freeze frame type - Comprehensive		
Description of component(s)	This information not required since this is an internal PCI issue.		
Location of component(s)	This information not required since this is an internal PCI issue.		
Diagnostic condition	This diagnostic runs during start-up of the PCI ECU.		
Set condition of fault code	Programmed data in the ECU not correct.		
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected.		
Electrical diagram(s)	This information not required since this is an internal PCI issue.		
Technical data	This information not required since this is an internal PCI issue.		
Possible causes	Reprogram the ECU.		
Additional information	The PCI ECU does not start up.		
	Engine cannot be started.		
Diagnostic Step-by-Step			
Verification Drive Cycle	[Verification drive cycle not specified. Please contact the Engine Support Center]		
	Back to Choose Code		
	Back to Index		



Code number	P1681			
Fault code description	ECU PCI – Internal Error			
Fault code information	1 trip MIL			
	3 drive cycle recovery			
	Readiness group – None			
	Freeze frame type - Comprehensive			
Description of component(s)	This information not required since this is an internal PCI issue			
Location of component(s)	This information not required since this is an internal PCI issue			
Diagnostic condition	This diagnostic runs during start-up of the PCI ECU.			
Set condition of fault code	Programmed data in the ECU not correct.			
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected.			
Electrical diagram(s)	This information not required since this is an internal PCI issue			
Technical data	This information not required since this is an internal PCI issue			
Possible causes	Reprogram the ECU.			
Additional information	The PCI ECU does not start up.			
	Engine cannot be started.			
Diagnostic Step-by-Step	Perform the troubleshooting steps below using the breakout harness, if			
	necessary, to check electrical components, such as sensors, electrical control			
	units, and harnesses. Back probing is not recommended, as it could damage			
	the harness. The ignition should always be in the OFF position when			
	connecting or disconnecting electrical components in order to reduce the			
	likelihood of damage to electrical components.			
	Disconnecting the EAS connectors during the troubleshooting			
	process will result in multiple errors.			
	For specific electrical component information and pinout locations,			
	always refer to the technical data.			
	 It is necessary to exit the fault code menu in DAVIE and run the 			
	diagnostic test again to identify a change in errors.			
	 Remember that the truck's operational or mechanical issues may be 			
	the root cause of both active and inactive fault codes. Refer to the			
	'possible causes' section.			
	Step 1 Step ID 3986a SRT			
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins)			
	and harnesses for corrosion, damage, and rubbing during each step of the			
	diagnostic procedure. Proceed to step 2.			
	Step 2 Step ID 1679b SRT			
	Electrical Checks			
	Ensure that the ignition key/switch has been set to OFF before disconnecting			
	related cables.			
	Based on the fault message provided, confirm that the following electrical values			
	are within specified ranges or limits:			
	Supply and signal voltages (12V).			
	Cable continuity (no opens or shorts).			
	Are measured electrical values outside of expected range or limits?			
	Yes - Proceed to step 3			
	No - Proceed to step 4			



	Step 3	Step ID 1679c	SRT		
	Repair or replace	Repair or replace component and use DAVIE to re-check for the presence of active			
	faults.				
	Fault inaction	Fault inactive – issue resolve			
	Fault acti	ve - Proceed to step 4			
	·				
	Step 4 Step ID 1679d SRT				
	For further assistance in diagnosing this issue or for confirmation prior to the				
	replacement of suspect components, contact the Engine Support Call Center at				
	1-800-477-0251.				
Verification Drive Cycle	To validate the repair, with the brakes set, start the engine and allow it to run at idle				
	for 2 minutes				
	Back to Choose Code				
			Back to Index		



Code number	P1681			
Fault code description	ECU PCI – Internal Error			
Fault code information	1 trip MIL			
	3 drive cycle recovery			
	Readiness group – None			
	Freeze frame type - Comprehensive			
Description of component(s)	This information not required since this is an internal PCI issue			
Location of component(s)	This information not required since this is an internal PCI issue			
Diagnostic condition	This diagnostic runs during start-up of the PCI ECU.			
Set condition of fault code	Programmed data in the ECU not correct.			
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected.			
Electrical diagram(s)	This information not required since this is an internal PCI issue			
Technical data	This information not required since this is an internal PCI issue			
Possible causes	Reprogram the ECU.			
Additional information	The PCI ECU does not start up.			
	Engine cannot be started.			
Diagnostic Step-by-Step	Perform the troubleshooting steps below using the breakout harness, if necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as it could damage			
	the harness. The ignition should always be in the OFF position when			
	connecting or disconnecting electrical components in order to reduce the			
	likelihood of damage to electrical components.			
	Disconnecting the EAS connectors during the troubleshooting process			
	will result in multiple errors.			
	For specific electrical component information and pinout locations,			
	always refer to the technical data.			
	 It is necessary to exit the fault code menu in DAVIE and run the 			
	diagnostic test again to identify a change in errors.			
	 Remember that the truck's operational or mechanical issues may be 			
	the root cause of both active and inactive fault codes. Refer to the			
	'possible causes' section.			
	Step 1 Step ID 1681a SRT			
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins)			
	and harnesses for corrosion, damage, and rubbing during each step of the			
	diagnostic procedure. Proceed to step 2.			
	- 10 110 Process of the Process of t			
	Step 2 Step ID 1681b SRT			
	Electrical Checks			
	Ensure that the ignition key/switch has been set to OFF before disconnecting related cables.			
	Based on the fault message provided, confirm that the following electrical values			
are within specified ranges or limits:				
	Supply and signal voltages (12V).			
	Cable continuity (no opens or shorts).			
	Are measured electrical values outside of expected range or limits?			
	Yes - Proceed to step 3			
	No - Proceed to step 4			



	Step 3	Step ID 3986c	SRT
	Repair or replace component and use DAVIE to re-check for the presence of active		
	faults.		
	Fault inactive – iss	sue resolve	
	Fault active - Proc	ceed to step 4	
	Step 4 Step ID 1681d SRT		SRT
	For further assistance in d	iagnosing this issue or for cor	nfirmation prior to the
	replacement of suspect components, contact the Engine Support Call Center		
	1-800-477-0251.		
Verification Drive Cycle	To validate the repair, with	the brakes set, start the engi	ne and allow it to run at idle
	for 2 minutes.		
			Back to Choose Code
			Back to Index



Code number	P1682
Fault code description	Oil level – Current too low or open circuit on ECU D420 pin B35
Fault code information	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Comprehensive
Description of component(s)	For further assistance: Contact the PACCAR Engine Support Call Center 1-800-477-0251 Please contact the Engine Support Center
Location of component(s)	
Diagnostic condition	
Set condition of fault code	
Reset condition of fault code	
Electrical diagram(s)	
Technical data	
Possible causes	
Additional information	
Diagnostic Step-by-Step	Please refer to chassis wiring information.
Verification Drive Cycle	N/A
	Back to Choose Code
	Back to Index



Code number	P1693
Fault code description	Cold starting aid - Voltage too high or short circuit to supply on ECU D420 pin C72 or
ruait coue description	C49
Fault code information	
rault code information	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Comprehensive
Description of component(s)	For further assistance: Contact the PACCAR Engine Support Call Center 1-800-477-0251 Please contact the Engine Support Center
Location of component(s)	
Diagnostic condition	
Set condition of fault code	
Reset condition of fault code	
Electrical diagram(s)	
Technical data	
Possible causes	
Additional information	
Diagnostic Step-by-Step	Please refer to chassis wiring information.
Verification Drive Cycle	N/A
	Back to Choose Code
	Back to Index



Code number	P1694
Fault code description	Cold starting aid - Voltage too low or short circuit to ground on ECU D420 pin C72 or
•	C49
Fault code information	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Comprehensive
Description of component(s)	For further assistance: Contact the PACCAR Engine Support Call Center 1-800-477-0251
	Please contact the Engine Support Center
Location of component(s)	
Diagnostic condition	
Set condition of fault code	
Reset condition of fault code	
Electrical diagram(s)	
Technical data	
Possible causes	
Additional information	
Diagnostic Step-by-Step	Please refer to chassis wiring information.
Verification Drive Cycle	N/A
·	Back to Choose Code
	Back to Index



P1704		
Code number	P1704	
Fault code description	Lambda-Data erratic, intermittent or incorrect during over-run	
Fault code information	2 trip MIL	
	3 drive cycle recovery	
	Readiness group – Exhaust gas sensors	
	Freeze frame type – Exhaust gas	
Description of component(s)	The lambda sensor measures the oxygen concentration in the exhaust gases after BPV valve.	
	Air/fuel ratio The PCI ECU uses the measured oxygen concentration in the exhaust to determine	
	the air/fuel ratio of the combustion process. Typical air/fuel ratios are 18 to 45. A high value indicates a high oxygen concentration measured by the lambda sensor. Sensor heater	
	The sensor has an integrated heater to maintain a sensor operating temperature of approximately 750°C [1382°F]. The PCI ECU controls the heater. Sensor heating control	
	 The first stage starts when the ignition is keyed on. The sensor is heated to a value at which any condensate evaporates from the sensor. 	
	 The second stage starts after the 'dew point' is reached. The sensor is heated to its operating temperature of approximately 750°C [1382°F]. The PCI ECU determines the 'dew point' by calculating how much 	



Location of component(s)	 energy (heat by burning fuel in the engine) is pumped through the exhaust. If the 'dew point' is not/no longer reached, the sensor temperature stays at/drops to the standby temperature, similar to the first stage heating. Effect on the system Determines the air/fuel ratio of the combustion process Controls the smoke limit; where the measured exhaust gas oxygen concentration is compared with a target value for smoke limitation. A higher measured oxygen concentration results in lower calculated soot formation by the engine. Controls NOx emissions; determines whether the target Exhaust Gas Recirculation is being achieved to control NOx emissions. A higher measured oxygen concentration results in higher calculated NOx formation by the engine. Controls regeneration of the diesel particulate filter (DPF). The soot particles in the DPF are 'burned' using the oxygen present in the exhaust gas.
	F834
Diagnostic condition	 This diagnostic runs: engine speed above 1200 rpm, and; during coasting (no fuel injection), and coolant temperature is above 50°C [122°F], and; the lambda sensor (F834) is in the operating mode.
Set condition of fault code	The PCI ECU (D420) detects that the measured oxygen concentration in the exhaust differs too much from the expected oxygen concentration during coasting (fuel injection cut off) for more than 2 seconds.



Reset condition of fault code This DTC changes to inactive when the fault is no longer detected. To validate the repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, proceed to a road with a speed limit of 80km/h [50mph] in the highest gear possible with the engine speed at a minimum of 1800 rpm within the legal speed limit. Once the target rpm has been reached, leave the vehicle in gear and release the accelerator pedal and allow the vehicle to coast until the engine speed has reached 900 rpm. This test should be conducted four times within the specified operational targets. Be aware of the traffic situation. For Eaton Ultrashift transmissions, idle drop can only go to 1000 rpm. For Alison Autoshift transmission, this test will not be able to be conducted. Electrical diagram(s) C45 C21 C22 C23 C46 D420 46 23 24 ,aeaeaeaeaeaeaeae 70 47 92 69 E504139 Wiring harness connector D420.C front view



Technical data	Wiring harness connector F834 front view D420 F834 Function C21 5 Trimming resistor C22 2 Ground, sensor element C23 6 Signal, nernst sensor C45 1 Signal, pump cell current C46 3 Ground, heater element 4 Power supply, heater element Component check, lambda sensor (F834) Preparation • Key the ignition off • Disconnect connector F834 • Measure on component connector F834 Pin Pin Value Additional information (+ probe) (- probe) Value Additional information Heater element resistance		
	at 20°C [68°C] Component & circuit check, ECU (D420) Preparation Key the ignition off Disconnect connector F834		
	Measure on the front side of wiring harness connector F834		
	Pin Pin Value Additional information (+ probe)		
	4 Ground Ubat Heater element power supply with ignition keyed on		
Possible causes	Faulty fuel system		
	Lambda sensor deviation		
Additional information	The PCI ECU uses the oxygen concentration in the exhaust, measured by the lambda sensor (F834) to determine the air/fuel ratio of the combustion process.		



Diagnostic Step-by-Step



Perform the troubleshooting steps below using the breakout harness, if necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as it could damage the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components.



- Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors.
- For specific electrical component information and pinout locations, always refer to the technical data.
- It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors.
- Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 'possible causes' section.

Step 1 Step ID 1704a SRT

Visual inspection - Visually inspect the associated component connections and wiring for any of the following:

- Damaged or loose connectors
- Bent, broken, corroded or loose connector pins
- Moisture or dirt in the connections
- Damage to the wire harness or insulation
- ECU connections are not damaged or disconnected
- Batteries are not okay, contacts are not tight

Was there evidence of any of the above?

- No: Issue resolved.
- Yes: Clean, adjust, repair, or replace affected components for any issues identified.

Use DAVIE to re-check for the presence of active faults. Proceed to step 3

- If this related fault is no longer active, then this issue has been resolved.
- If this related fault is still active, continue to the step 2 in the troubleshooting process.

Step 2 Step ID 1704b SRT

Replace the identified component.

Use DAVIE to re-check for the presence of active faults.

- If this related fault is no longer active, then this issue has been resolved.
- If this related fault is still active, continue to the next step in the troubleshooting process.

Step 3 Step ID 1704c SRT

Contact the PACCAR Engine Support Call Center

For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the PACCAR Engine Support Call Center at 1-800-477-0251.

Verification Drive Cycle

To validate the repair:

With the System Initiation cycle complete, proceed to a road with minimum speed limit of 50 mph. While remaining within the legally posted speed limit, get the truck in



the highest gear possible with the engine speed at a minimum of 1800 rpm. Once the target engine speed has been reached, leave the truck in gear and release the accelerator pedal, allowing the truck to coast until the engine speed has reached 900 rpm. Perform this cycle 4 times. • For Eaton Ultrashift transmissions, idle drop can only go to 1000 rpm • For Alison Autoshift transmission, this test will not be able to be conducted
Back to Choose Code
Back to Index



P1705		
Code number	P1705	
Fault code description	Lambda response rate – too low	
Fault code information	2 trip MIL	
	3 drive cycle recovery	
	Readiness group – Exhaust gas sensors	
	Freeze frame type – Exhaust gas	
Description of component(s)	The lambda sensor measures the oxygen concentration in the exhaust gases after the BPV valve.	
	Air/fuel ratio The PCI ECU uses the measured oxygen concentration in the exhaust to determine	
	the air/fuel ratio of the combustion process. Typical air/fuel ratios are 18 to 45. A high value indicates a high oxygen concentration measured by the lambda sensor. Sensor heater	
	The sensor has an integrated heater to maintain a sensor operating temperature of approximately 750°C [1382°F]. The PCI ECU controls the heater. Sensor heating control	
	 The first stage starts when the ignition is keyed on. The sensor is heated to a value at which any condensate evaporates from the sensor. 	
	 The second stage starts after the 'dew point' is reached. The sensor is heated to its operating temperature of approximately 750°C [1382°F]. The PCI ECU determines the 'dew point' by calculating how much 	



Location of component(s)	energy (heat by burning fuel in the engine) is pumped through the exhaust. If the 'dew point' is not/no longer reached, the sensor temperature stays at/drops to the standby temperature, similar to the first stage heating. Effect on the system • Determines the air/fuel ratio of the combustion process • Controls the smoke limit; where the measured exhaust gas oxygen concentration is compared with a target value for smoke limitation. A higher measured oxygen concentration results in lower calculated soot formation by the engine. • Controls NOx emissions; determines whether the target Exhaust Gas Recirculation is being achieved to control NOx emissions. A higher measured oxygen concentration results in higher calculated NOx formation by the engine. • Controls regeneration of the diesel particulate filter (DPF). The soot particles in the DPF are 'burned' using the oxygen present in the exhaust gas.
Diagnostic condition	This diagnostic runs.
Diagnostic condition	 This diagnostic runs: engine speed between 1200 and 2100 rpm, and; coolant temperature is above 50°C [122°F], and; the lambda sensor (F834) is in the operating mode. the engine mode is DOC heating or DPF regeneration or SCR heating or SCR high efficiency or standard or protection.
Set condition of fault code	The PCI ECU (D420) detects that the measured oxygen concentration in the exhaust differs too much from the expected oxygen concentration.



Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the			
	repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once			
	the minimum target temperature has been reached, perform several low to higher			
	speed accelerations with moderate engine load. Also perform high load to low load			
	transitions. This activity should be conducted within the range of 15 km/h [10 mph]			
	to 65 km/h [40 mph], for no more than 5 to 8 km [3 to 5 miles].			
Electrical diagram(s)				
	2 F834 123E F834 4 1 5 2 6 3 C45 C21 C22 C23 C46 D420			
	46 23 24 1			
	92 69 70 47			
	E504139			
	Wiring harness connector D420.C front view			



Technical data	Wiring harness connector F834 front view D420 F834 Function C21 5 Trimming resistor C22 2 Ground, sensor element C23 6 Signal, nernst sensor C45 1 Signal, pump cell current C46 3 Ground, heater element 4 Power supply, heater element Component check, lambda sensor (F834) Preparation • Key the ignition off • Disconnect connector F834 • Measure on component connector F834		
	Pin Pin Value Additional information (+ probe)		
	4 3 2.4–4.0 Ω Heater element resistance at 20°C [68°C]		
	Component & circuit check, ECU (D420) Preparation • Key the ignition off • Disconnect connector F834 • Measure on the front side of wiring harness connector F834 Pin Pin Value Additional information (+ probe) (- probe) 4 Ground Ubat Heater element power supply with ignition keyed on		
Possible causes	Lambda sensor deviation		
Additional information	The PCI ECU uses the oxygen concentration in the exhaust, measured by the lambda sensor (F834) to determine the air/fuel ratio of the combustion process.		



Diagnostic Step-by-Step	necessary units, and the harne connectin likelihood D w Fo al It di Re th	harnesses. Back probing is not ss. The ignition should always bg or disconnecting electrical composition of damage to electrical composition of the EAS connector ill result in multiple errors. For specific electrical component ways refer to the technical data is necessary to exit the fault conagnostic test again to identify a semember that the truck's operations.	es, such as sensors, electrical contro recommended, as it could damage be in the OFF position when imponents in order to reduce the ments. Its during the troubleshooting process information and pinout locations, as de menu in DAVIE and run the
	Step 1	Step ID 1705a	SRT
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.		
	Step 2	Step ID 1705b	SRT
	Use DAVIE to re- • If this rel • If this re	tified component. check for the presence of active lated fault is no longer active, the lated fault is still active, continu hooting process.	nen this issue has been resolved.
	Ston 2	Stop ID 1705 c	CDT
	Step 3	Step ID 1705c CAR Engine Support Call Center	SRT
		tance in diagnosing this issue or	
		suspect components, contact th	·
Verification Drive Cycle	To validate the repair, with the System Initiation cycle complete, under moderate engine load (A/C and Fan both ON), perform a series of brief accelerations, progressing from a lower to a higher speed until reaching a top speed of 40 mph. Once the top speed has been reached, perform several decelerations from a higher to a lower speed until reaching a bottom speed of 10 mph. Perform this cycle 5 times.		
			Back to Choose Coo
			Back to Inde



P1706			
Code number	P1706		
Fault code description	Lambda response rate – Too high		
Fault code information	2 trip MIL		
	3 drive cycle recovery		
	Readiness group – Exhaust gas sensors		
	Freeze frame type – Exhaust gas		
Description of component(s)	The lambda sensor measures the oxygen concentration in the exhaust gases after the		
	BPV valve.		
	Air/fuel ratio		
	The PCI ECU uses the measured oxygen concentration in the exhaust to determine		
	the air/fuel ratio of the combustion process.		
	Typical air/fuel ratios are 18 to 45. A high value indicates a high oxygen concentration		
	measured by the lambda sensor.		
	Sensor heater		
	The sensor has an integrated heater to maintain a sensor operating temperature of		
	approximately 750°C [1382°F]. The PCI ECU controls the heater.		
	Sensor heating control		
	The first stage starts when the ignition is keyed on. The conserve is booked to a value at which any condensate avancement from the		
	The sensor is heated to a value at which any condensate evaporates from the sensor.		
	 The second stage starts after the 'dew point' is reached. 		
	The sensor is heated to its operating temperature of approximately 750°C		
	[1382°F]. The PCI ECU determines the 'dew point' by calculating how much		
	terms of the second of the sec		



Location of component(s)	energy (heat by burning fuel in the engine) is pumped through the exhaust. If the 'dew point' is not/no longer reached, the sensor temperature stays at/drops to the standby temperature, similar to the first stage heating. Effect on the system • Determines the air/fuel ratio of the combustion process • Controls the smoke limit; where the measured exhaust gas oxygen concentration is compared with a target value for smoke limitation. A higher measured oxygen concentration results in lower calculated soot formation by the engine. • Controls NOx emissions; determines whether the target Exhaust Gas Recirculation is being achieved to control NOx emissions. A higher measured oxygen concentration results in higher calculated NOx formation by the engine. • Controls regeneration of the diesel particulate filter (DPF). The soot particles in the DPF are 'burned' using the oxygen present in the exhaust gas.
Location of component(s)	F834
Diagnostic condition	This diagnostic runs: • Engine speed between 1200 and 2100 rpm, and;
	 Coolant temperature is above 50°C [122°F], and; The lambda sensor (F834) is in the operating mode.
	The engine mode is DOC heating or DPF regeneration or SCR heating or SCR high efficiency or standard or protection.
Set condition of fault code	The PCI ECU (D420) detects that the measured oxygen concentration in the exhaust

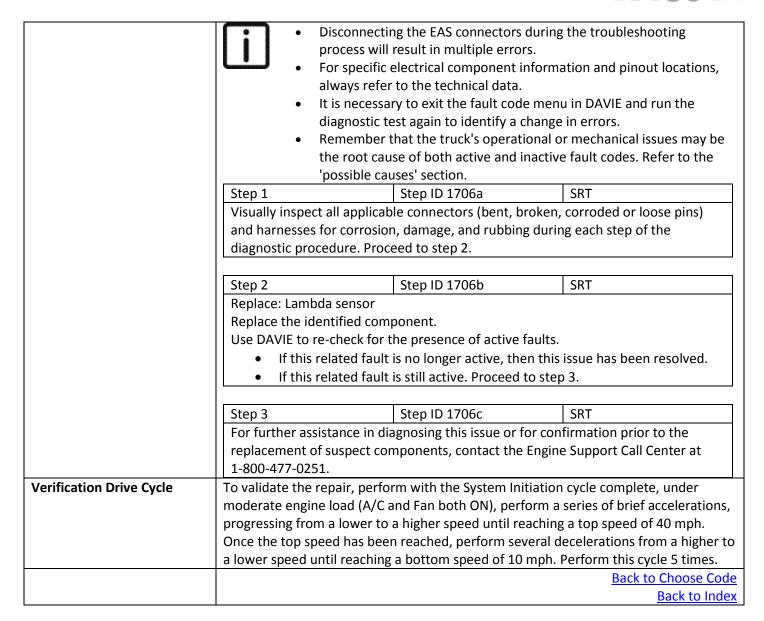


	Programme to the control of the cont	
	differs too much from the expected oxygen concentration.	
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the	
	repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once	
	the minimum target temperature has been reached, perform several low to higher	
	speed accelerations with moderate engine load. Also perform high-load to low-load	
	transitions. This activity should be conducted within the range of 15 km/h [10 mph] to	
	65 km/h [40 mph] for no more than 5 to 8 km [3 to 5 miles].	
Electrical diagram(s)		
	2	
	46 23 24 1	
	92 69 70 47	
	E504139	
	Wiring harness connector D420.C front view	



Technical data	 Discond Measure Pin (+ probe) 4 Component & Go Preparation Key the Discond 	Function Trimming res Ground, sens Signal, nerns Signal, pump Ground, heat Power supply eck, lambda se e ignition off nect connecto re on compone Pin (- probe) 3 circuit check, E	r F834 ent connect Value 2.4–4.0 Ω ECU (D420) r F834 t side of wirk Value	or F834 Additional information Heater element resistance at 20°C [68°C] ing harness connector F834 Additional information
Descible source	4	Ground	linat	Heater element power supply with gnition keyed on
Possible causes	Lambda sensor		concontrat:	on in the exhaust measured by the least 1-
Additional information		, 0		on in the exhaust, measured by the lambda ratio of the combustion process.
Diagnostic Step-by-Step	Perform necess units, a the har connect	n the troubles ary, to check e and harnesses. mess. The ignit ting or discon	hooting step electrical cor Back probin tion should necting elec	ps below using the breakout harness, if mponents, such as sensors, electrical controling is not recommended, as it could damage always be in the OFF position when trical components in order to reduce the I components.







P1707		
Code number	P1707	
Fault code description	Lambda – Too low compared with engine out NOx sensor O2 signal	
Fault code information	2 trip MIL	
	3 drive cycle recovery	
	Readiness group – None	
	Freeze frame type – Exhaust gas	
Description of component(s)	The lambda sensor measures the oxygen concentration in the exhaust gases after the BPV valve.	
	Air/fuel ratio The PCI ECU uses the measured oxygen concentration in the exhaust to determine	
	the air/fuel ratio of the combustion process.	
	Typical air/fuel ratios are 18 to 45. A high value indicates a high oxygen concentration	
	measured by the lambda sensor.	
	Sensor heater	
	The sensor has an integrated heater to maintain a sensor operating temperature of	
	approximately 750°C [1382°F]. The PCI ECU controls the heater.	
	Sensor heating control	
	The first stage starts when the ignition is keyed on. The content is boated to a value at which are conducted as a start of the s	
	The sensor is heated to a value at which any condensate evaporates from the sensor.	
	 The second stage starts after the 'dew point' is reached. 	
	The sensor is heated to its operating temperature of approximately 750°C	
	[1382°F]. The PCI ECU determines the 'dew point' by calculating how much	



	energy (heat by burning fuel in the engine) is pumped through the exhaust. If the 'dew point' is not/no longer reached, the sensor temperature stays
	at/drops to the standby temperature, similar to the first stage heating.
	 Effect on the system Determines the air/fuel ratio of the combustion process Controls the smoke limit; where the measured exhaust gas oxygen concentration is compared with a target value for smoke limitation. A higher measured oxygen concentration results in lower calculated soot formation by the engine. Controls NOx emissions; determines whether the target Exhaust Gas Recirculation is being achieved to control NOx emissions.
	A higher measured oxygen concentration results in higher calculated NOx
	formation by the engine.
	 Controls regeneration of the diesel particulate filter (DPF). The soot particles in the DPF are 'burned' using the oxygen present in the exhaust gas.
Location of component(s)	in the Diri are burned using the oxygen present in the exhaust gas.
,	F834
Diagnostic condition	This diagnostic runs:
	when the engine speed is between 950 and 2000 rpm, and;
	when coolant temperature is above 50°C [122°F], and; the length decorate (F834) is in a partition mode.
	• the lambda sensor (F834) is in operating mode; • the NOv sensor before satalyst (F844) is in operating mode;
	the NOx sensor before catalyst (F844) is in operating mode; the engine mode is SCR high efficiency or standard or protection.
Set condition of fault code	 the engine mode is SCR high efficiency or standard or protection. The PCI ECU (D420) detects that the oxygen concentration measured by the lambda
Set condition of fault code	The Fee Leo (D420) detects that the oxygen concentration measured by the lambua



the minimum target temperature has been reached, proceed at a minimum speed 80 km/h [50 mph] in the highest gear possible with the engine speed between 1100 and 1500 rpm and set the cruise control. This test is best performed with a loaded		concer is lower than the everyon concentration measured by the NOV concerning
This DTC changes to inactive when the fault is no longer detected. To validate the repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, proceed at a minimum speed 80 km/h [50 mph] in the highest gear possible with the engine speed between 1100 and 1500 rpm and set the cruise control. This test is best performed with a loaded vehicle/trailer, but if load is unavailable, turn as many engine power consumers on produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3 separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is unachievable. Use a flat road, if possible. Electrical diagram(s)		
2 123E F834 1 5 2 6 3 C45 C21 C22 C23 C46 D420		This DTC changes to inactive when the fault is no longer detected. To validate the repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, proceed at a minimum speed of 80 km/h [50 mph] in the highest gear possible with the engine speed between 1100 and 1500 rpm and set the cruise control. This test is best performed with a loaded vehicle/trailer, but if load is unavailable, turn as many engine power consumers on to produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3 separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is
46 23 24 1	Electrical diagram(s)	123E F834 4 1 5 2 6 3 C45 C21 C22 C23 C46
92 69 70 47 E504139 Wiring harness connector D420.C front view		92 69 70 47 E504139



	Wiring harness connector F834 front view
	D420 F834 Function C21 5 Trimming resistor
	C22 2 Ground, sensor element
	C23 6 Signal, nernst sensor
	C45 1 Signal, pump cell current C46 3 Ground, heater element
	4 Power supply, heater element
Technical data	Component check, lambda sensor (F834)
	Preparation • Key the ignition off
	Disconnect connector F834
	Measure on component connector F834
	Pin Pin Value Additional information (+ probe)
	Heater element resistance
	4 3 2.4–4.0 Ω at 20°C [68°C]
	Component & circuit check, ECU (D420) Preparation
	Key the ignition off
	Disconnect connector F834
	Measure on the front side of wiring harness connector F834 Pin Pin Pin A Line Connector F834
	(+ probe) (- probe) Value Additional information
	4 Ground Ubat Heater element power supply with ignition keyed on
Possible causes	Lambda sensor deviation
Additional information	 NOx sensor before catalyst deviation The PCI ECU uses the oxygen concentration in the exhaust, measured by the
Additional information	 The PCLECO uses the oxygen concentration in the exhaust, measured by the lambda sensor (F834), to determine the air/fuel ratio of the combustion process. The oxygen concentration in the exhaust, measured by the lambda sensor, is compared with the oxygen concentration measured by the NOx sensor before
	catalyst (F844).



Perform the troubleshooting steps below using the breakout harness, if **Diagnostic Step-by-Step** necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as it could damage the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components. Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors. For specific electrical component information and pinout locations, always refer to the technical data. It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 'possible causes' section. SRT Step 1 Step ID 1707a Test Drive to Confirm Fault Perform the following pre-check steps to confirm this fault before continuing troubleshooting: Clear the existing active faults Take the truck for a 30 minute test drive Are the faults still active No - Issue Resolved Yes - Proceed to step 2 Step ID 1707b **SRT** Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 3. Step ID 1707c Step 3 SRT Repairs or component replacements appropriate component and use DAVIE to recheck for the presence of active faults. Fault inactive - issue resolve Fault active - Proceed to step 4 Step 4 Step ID 1707d SRT For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the Engine Support Call Center at 1-800-477-0251. **Verification Drive Cycle** To validate the repair: This cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON. With the System Initiation cycle complete, proceed to a road with a minimum

speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5



miles is unachievable.	
	Back to Choose Code
	Back to Index

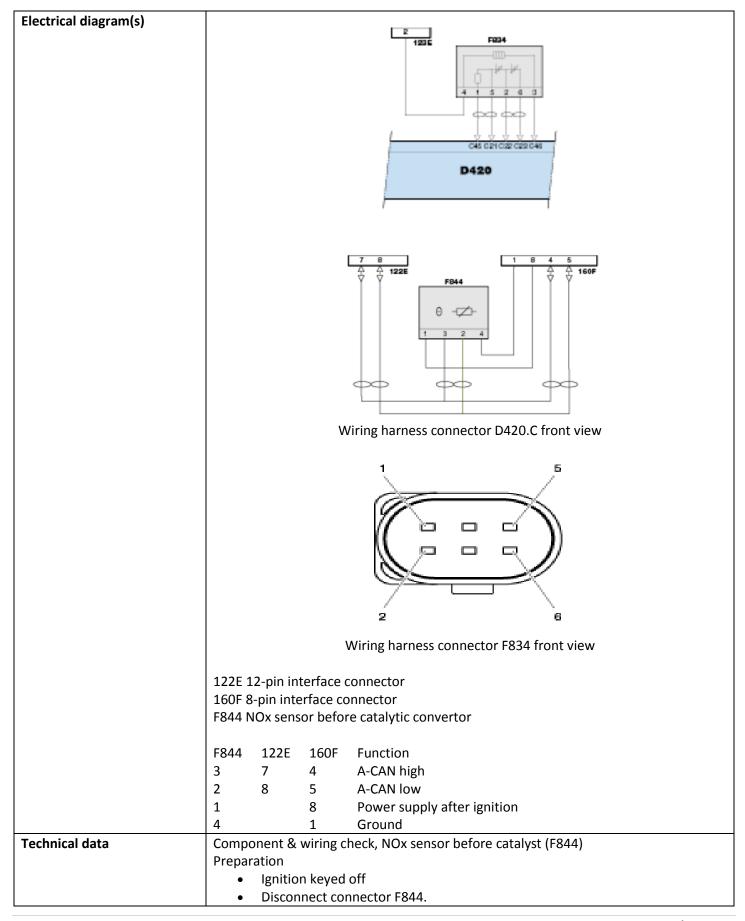


F1700			
Code number	P1708		
Fault code description	Lambda – Too high compared with engine out NOx sensor O2 signal		
Fault code information	2 trip MIL		
	3 drive cycle recovery		
	Readiness group – None		
	Freeze frame type - Exhaust gas		
Description of component(s)	The NOx concentration emitted by the engine is measured in the exhaust gases after		
	the BPV valve.		
	The NOx sensor before catalyst consists of:		
	Electronic control unit		
	This unit communicates with the PCI ECU and EAS-3 ECU via A-CAN		
	Sensor element		
	The sensor element contains an internal heater. The sensor cannot be		
	separated from the electronic control unit.		
	Sensor heating control The first stage starts when the ignition is keyed on		
	• The first stage starts when the ignition is keyed on. • The conserving heated to approximately 100°C [313°F], and any condensate		
	The sensor is heated to approximately 100°C [212°F], and any condensate overlands from the sensor.		
	evaporates from the sensor.		
	The second stage starts after the 'dew point' message is received from		
	the PCI ECU		
	 The sensor is heated to its operating temperature of approximately 800°C [1472°F]. The PCI ECU determines the 'dew point' by calculating how 		
	much energy (heat by burning fuel in the engine) is pumped through the		
	exhaust.		
	If the 'dew point' message is not/no longer received, the sensor		
	temperature stays at/drops to the standby temperature of approximately		
	100°C [212°F].		
	100 0 [212 1].		



	Effect on the protection
	Effect on the system:
	Controls the engine NOx emission. Potentials at the DEF decime are contained as TAC 2 protection.
	Determines the DEF dosing amount by the EAS-3 system Ulabor recovered angles NOv projector records in higher DEF dosing.
	Higher measured engine NOx emission results in higher DEF dosing
Location of component(s)	amount.
Location of component(s)	F844
Diagnostic condition	This diagnostic runs:when the engine speed is between 950 and 2000 rpm, and;
	 when coolant temperature is above 50°C [122°F], and;
	 the lambda sensor (F834) is in operating mode;
	 the NOx sensor before catalyst (F844) is in operating mode;
	the engine mode is SCR high efficiency or standard or protection
Set condition of fault code	The PCI ECU (D420) detects that the measured oxygen concentration in the exhaust is
	too low while coasting (fuel injection cut off) for more than 21 seconds.
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the
	repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once
	the minimum target temperature has been reached, perform several low to higher
	speed accelerations with moderate engine load. Also perform high-load to low-load transitions. This activity should be conducted within the range of 15 km/h [10 mph] to
	65 km/h [40 mph] for no more than 5 to 8 km [3 to 5 miles].
	as any it is impulsion to more than a to a and to to a mines.







	Measu	ure on the front side	of wiring ha	rness connector F844.
	Pin	Pin	Value	Additional information
	(+ probe)	(- probe)		
	4	1	Ubat	Key on the ignition
	1	Battery negative	>0.5 V	Key on the ignition and switch on
	_	pole	7 0.5 1	all consumers
	2	3	± 60 Ω	Key off the ignition
	_	_		 Disconnect the ground cable
				from the battery.
				 Disconnect the vehicle
				communication interface (VCI)
				of DAVIE.
Possible causes	Lambda s	ensor deviation		
	NOx sense	or before catalyst dev	viation	
Additional information	The PCI Ed	CU uses the oxygen c	oncentratio	n in the exhaust, measured by the
	lambda se	ensor (F834), to deter	rmine the ai	r/fuel ratio of the combustion process.
				measured by the lambda sensor, is
	-		ncentration	measured by the NOx sensor before
	catalyst (F			
Diagnostic Step-by-Step			• .	ow using the breakout harness, if
	<i>y</i> •		-	ents, such as sensors, electrical control
	Construction of the last of th			ot recommended, as it could damage
		_	-	s be in the OFF position when
		-	_	components in order to reduce the
	likelin	ood of damage to ele		•
	lili	will result in multip		tors during the troubleshooting process
	LL .	·		ent information and pinout locations,
		always refer to the	-	
	•	•		code menu in DAVIE and run the
				y a change in errors.
	•			erational or mechanical issues may be
		the root cause of b	oth active a	ind inactive fault codes. Refer to the
		'possible causes' se	ection.	
	Step 1	Step	ID 1708a	SRT
	Test Drive to	Confirm Fault		
		~ .	steps to con	firm this fault before continuing
	troubleshoot	•		
		the existing active fa		
		the truck for a 30 mi	inute test dr	rive
	Are the fault			
		Issue Resolved		
	• Yes -	Proceed to step 2		
	Chair 2		ID 4700L	CDT
	Step 2	· · · · · · · · · · · · · · · · · · ·	ID 1708b	SRT
			=	nt, broken, corroded or loose pins)
		ocedure. Proceed to	-	obing during each step of the
	uiagiiostic pi	ocedure. Froceed to	σιεμ σ.	



	Step 3	Step ID 1708c	SRT	
	Repairs or component replacements appropriate component and use DAVIE to			
	check for the presence of active faults.			
	Fault inactive – issue resolve			
	Fault active - Proceed to step 4			
	Step 4	Step ID 1708d	SRT	
	For further assistance in di	iagnosing this issue or for cor	nfirmation prior to the	
	replacement of suspect co	mponents, contact the Engir	ne Support Call Center at	
	1-800-477-0251.			
Verification Drive Cycle	To validate the repair:			
	This cycle is best performed	I on a level grade road (least	amount of incline possible)	
		er. If a loaded trailer is unava	illable, produce engine load	
	by turning the A/C and fan t			
	With the System Initiation of	cycle complete, proceed to a	road with a minimum speed	
	limit of 50 mph, then get to	the highest gear possible wi	th the engine speed between	
	1100-1500 rpm, and set the	cruise control. Run this cycle	e for roughly 3 to 5 miles or in	
	three separate 1-mile incre	ments if a steady 3 to 5 miles	is unachievable.	
			Back to Choose Code	
			Back to Index	



P1709

P1709		
Code number	P1709	
Fault code description	Lambda - Data valid but too low, during overrun	
Fault code information	2 trip MIL	
	3 drive cycle recovery	
	Readiness group – None	
	Freeze frame type - Exhaust gas	
Description of component(s)	The lambda sensor measures the oxygen concentration in the exhaust gases after the	
	BPV valve.	
	Air/fuel ratio	
	The PCI ECU uses the measured oxygen concentration in the exhaust to determine	
	the air/fuel ratio of the combustion process.	
	Typical air/fuel ratios are 18 to 45. A high value indicates a high oxygen concentration	
	measured by the lambda sensor.	
	Sensor heater	
	The sensor has an integrated heater to maintain a sensor operating temperature of	
	approximately 750°C [1382°F]. The PCI ECU controls the heater.	
	Sensor heating control The first stage starts when the ignition is keyed on	
	 The first stage starts when the ignition is keyed on. The sensor is heated to a value at which any condensate evaporates from the 	
	sensor.	
	 The second stage starts after the 'dew point' is reached. 	
	The sensor is heated to its operating temperature of approximately 750°C	
	The state of the s	



	 [1382°F]. The PCI ECU determines the 'dew point' by calculating how much energy (heat by burning fuel in the engine) is pumped through the exhaust. If the 'dew point' is not/no longer reached, the sensor temperature stays at/drops to the standby temperature, similar to the first stage heating. Effect on the system Determines the air/fuel ratio of the combustion process Controls the smoke limit; where the measured exhaust gas oxygen concentration is compared with a target value for smoke limitation. A higher measured oxygen concentration results in lower calculated soot formation by the engine. Controls NOx emissions; determines whether the target Exhaust Gas Recirculation is being achieved to control NOx emissions. A higher measured oxygen concentration results in higher calculated NOx formation by the engine. Controls regeneration of the diesel particulate filter (DPF). The soot particles in the DPF are 'burned' using the oxygen present in the exhaust gas.
Location of component(s)	F834
Diagnostic condition	 This diagnostic runs: while coasting (no fuel injection), and; when coolant temperature is above 50°C [122°F], and; the lambda sensor (F834) is in the operating mode.
Set condition of fault code	The PCI ECU (D420) detects that the measured oxygen concentration in the exhaust is too low while coasting (fuel injection cut off) for more than 21 seconds.



Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, proceed at a minimum speed of 80 km/h [50 mph] in the highest gear possible with the engine speed between 1100 and 1500 rpm and set the cruise control. This test is best performed with a loaded vehicle/trailer, but if load is unavailable, turn as many engine power consumers on to produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3 separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is unachievable. Use a flat road, if possible.
Electrical diagram(s)	123E F834 1 5 2 6 3 C45 C21 C22 C23 C46 D420
	92 69 70 47
	Wiring harness connector D420.C front view



Technical data	Wiring harness connector F834 front view D420 F834 Function C21 5 Trimming resistor C22 2 Ground, sensor element C23 6 Signal, nernst sensor C45 1 Signal, pump cell current C46 3 Ground, heater element 4 Power supply, heater element Component check, lambda sensor (F834) Preparation
	 Key the ignition off Disconnect connector F834
	Measure on component connector F834
	Pin Pin
	(+ probe) (- probe) Value Additional information
	4 3 2.4–4.0 Ω Heater element resistance at 20°C [68°C]
	Component & circuit check, ECU (D420) Preparation • Key the ignition off • Disconnect connector F834 • Measure on the front side of wiring harness connector F834
	Pin Pin Value Additional information (+ probe)
	4 Ground Ubat Heater element power supply with ignition keyed on
Possible causes	Lambda sensor deviation
Additional information	The PCI ECU uses the oxygen concentration in the exhaust, measured by the lambda sensor (F834), to determine the air/fuel ratio of the combustion process. Typically, low air/fuel ratio indicates low oxygen concentration in the exhaust system. When no combustion takes place, the oxygen concentration must be almost equal to the ambient air concentration (approximately 20%) after some time



Perform the troubleshooting steps below using the breakout harness, if **Diagnostic Step-by-Step** necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as it could damage the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components. Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors. For specific electrical component information and pinout locations, always refer to the technical data. It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 'possible causes' section. Step ID 1709a SRT Step 1 Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2. Step 2 Step ID 1709b SRT Replace: Lambda sensor Replace the identified component. Use DAVIE to re-check for the presence of active faults. If this related fault is no longer active, then this issue has been resolved. If this related fault is still active, continue to the next step in the troubleshooting process. Step ID 1709c SRT Step 3 For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the PACCAR Engine Support Call Center at 1-800-477-0251. **Verification Drive Cycle** To validate the repair: This cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON. With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable. Back to Choose Code **Back to Index**



P170A

P170A		
Code number	P170A	
Fault code description	Lambda Data valid but too low, most severe	
Fault code information	2 trip MIL	
	3 drive cycle recovery	
	Readiness group – Exhaust gas sensors	
	Freeze frame type – Exhaust gas	
Description of component(s)	The lambda sensor measures the oxygen concentration in the exhaust gases after the	
	BPV valve.	
	Air/fuel ratio The PCI ECU uses the measured oxygen concentration in the exhaust to determine the air/fuel ratio of the combustion process. Typical air/fuel ratios are 18 to 45. A high value indicates a high oxygen concentration	
	measured by the lambda sensor. Sensor heater	
	The sensor has an integrated heater to maintain a sensor operating temperature of	
	approximately 750°C [1382°F]. The PCI ECU controls the heater.	
	Sensor heating control	
	The first stage starts when the ignition is keyed on.	
	The sensor is heated to a value at which any condensate evaporates from the	
	sensor.	
	The second stage starts after the 'dew point' is reached. The second stage starts after the 'dew point' is reached.	
	The sensor is heated to its operating temperature of approximately 750°C	
	[1382°F]. The PCI ECU determines the 'dew point' by calculating how much	



Location of component(s)	energy (heat by burning fuel in the engine) is pumped through the exhaust. If the 'dew point' is not/no longer reached, the sensor temperature stays at/drops to the standby temperature, similar to the first stage heating. Effect on the system • Determines the air/fuel ratio of the combustion process • Controls the smoke limit; where the measured exhaust gas oxygen concentration is compared with a target value for smoke limitation. A higher measured oxygen concentration results in lower calculated soot formation by the engine. • Controls NOx emissions; determines whether the target Exhaust Gas Recirculation is being achieved to control NOx emissions. A higher measured oxygen concentration results in higher calculated NOx formation by the engine. • Controls regeneration of the diesel particulate filter (DPF). The soot particles in the DPF are 'burned' using the oxygen present in the exhaust gas.
Location of component(s)	F834
Diagnostic condition	This diagnostic runs: • When the engine speed is between 950 and 2000 rpm, and;
	 When the engine is running at a steady load, and; When coolant temperature is above 50°C [122°F], and;
	 The engine mode is SCR high efficiency or standard or protection; The lambda sensor (F834) is in the operating mode.
Set condition of fault code	The PCI ECU (D420) detects that the air/fuel ratio is too low for more than 40



	seconds.
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, proceed at a minimum speed of 80 km/h [50 mph] in the highest gear possible with the engine speed between 1100 and 1500 rpm and set the cruise control. This test is best performed with a loaded vehicle/trailer, but if load is unavailable, turn as many engine power consumers on to produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3 separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is unachievable. Use a flat road, if possible.
Electrical diagram(s)	23



Technical data	Wiring harness connector F834 front view D420 F834 Function C21 5 Trimming resistor C22 2 Ground, sensor element C23 6 Signal, nernst sensor C45 1 Signal, pump cell current C46 3 Ground, heater element 4 Power supply, heater element Component check, lambda sensor (F834) Preparation • Key the ignition off • Disconnect connector F834 • Measure on component connector F834 Pin Pin Value Additional information • Key the ignition off • Disconnect connector F834 • Measure on the front side of wiring harness connector F834 Pin Pin Value Additional information • Key the ignition off • Disconnect connector F834 • Measure on the front side of wiring harness connector F834 Pin Pin Value Additional information • Key the ignition off • Disconnect connector F834 • Measure on the front side of wiring harness connector F834 Pin Pin Value Additional information • Key the ignition off • Disconnect connector F834 • Measure on the front side of wiring harness connector F834 Pin Pin Value Additional information • Key the ignition off • Disconnect connector F834 • Measure on the front side of wiring harness connector F834 Pin Pin Value Additional information • Key the ignition off • Disconnect connector F834 • Measure on the front side of wiring harness connector F834 • Measure on the front side of wiring harness connector F834 • Measure on the front side of wiring harness connector F834 • Measure on the front side of wiring harness connector F834 • Measure on the front side of wiring harness connector F834 • Measure on the front side of wiring harness connector F834
Possible causes	4 Ground Ubat ignition keyed on • Faulty fuel system
Additional information	 Faulty Index system Faulty inlet air system Lambda sensor deviation The PCI ECU uses the oxygen concentration in the exhaust, measured by the lambda sensor (F834), to determine the air/fuel ratio of the combustion process. Typically, low air/fuel ratio indicates low oxygen concentration in the exhaust system.



Diagnostic Step-by-Step	Perform the troubleshooting steps below using the breakout harness, if necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as it could damage the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components. • Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors. • For specific electrical component information and pinout locations, always refer to the technical data. • It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. • Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 'possible causes' section.		
	Step 1 Step ID 170A-a SRT		
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.		
	Step 2 Step ID 170A-b SRT		
	Replace: Lambda sensor Replace the identified component. Use DAVIE to re-check for the presence of active faults. • If this related fault is no longer active, then this issue has been resolved. • If this related fault is still active. Proceed to step 3		
	Step 3 Step ID 170A-c SRT		
	For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the Engine Support Call Center at 1-800-477-0251.		
Verification Drive Cycle	To validate the repair, perform with the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.		
	Back to Choose Code Back to Index		



P170B

P170B	
Code number	P170B
Fault code description	Lambda - Data valid but too high, most severe
Fault code information	2 trip MIL
	3 drive cycle recovery
	Readiness group – Exhaust gas sensors
	Freeze frame type – Exhaust gas
Description of component(s)	The lambda sensor measures the oxygen concentration in the exhaust gases after the
	BPV valve.
	Air/fuel ratio The PCI ECU uses the measured oxygen concentration in the exhaust to determine the air/fuel ratio of the combustion process. Typical air/fuel ratios are 18 to 45. A high value indicates a high oxygen concentration measured by the lambda sensor.
	Sensor heater The conser has an integrated heater to maintain a conser energing temperature of
	The sensor has an integrated heater to maintain a sensor operating temperature of approximately 750°C [1382°F]. The PCI ECU controls the heater.
	Sensor heating control
	The first stage starts when the ignition is keyed on.
	The sensor is heated to a value at which any condensate evaporates from the sensor.
	The second stage starts after the 'dew point' is reached.
	The sensor is heated to its operating temperature of approximately 750°C
	[1382°F]. The PCI ECU determines the 'dew point' by calculating how much



Location of component(s)	energy (heat by burning fuel in the engine) is pumped through the exhaust. If the 'dew point' is not/no longer reached, the sensor temperature stays at/drops to the standby temperature, similar to the first stage heating. Effect on the system • Determines the air/fuel ratio of the combustion process • Controls the smoke limit; where the measured exhaust gas oxygen concentration is compared with a target value for smoke limitation. A higher measured oxygen concentration results in lower calculated soot formation by the engine. • Controls NOx emissions; determines whether the target Exhaust Gas Recirculation is being achieved to control NOx emissions. A higher measured oxygen concentration results in higher calculated NOx formation by the engine. • Controls regeneration of the diesel particulate filter (DPF). The soot particles in the DPF are 'burned' using the oxygen present in the exhaust gas.
	F834
Diagnostic condition Set condition of fault code	This diagnostic runs: • when the engine speed is between 950 and 2000 rpm, and; • when the engine is running at a steady load, and; • when coolant temperature is above 50°C [122°F], and; • the engine mode is SCR high efficiency or standard or protection; • the lambda sensor (F834) is in the operating mode. The PCI ECU (D420) detects that the air/fuel ratio is too high for more than 40 seconds.



Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, proceed at a minimum speed of 80 km/h [50 mph] in the highest gear possible with the engine speed between 1100 and 1500 rpm and set the cruise control. This test is best performed with a loaded vehicle/trailer, but if load is unavailable, turn as many engine power consumers on to produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3 separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is unachievable. Use a flat road, if possible.
Electrical diagram(s)	2 123E F934 1 1 5 2 6 3 C45 C21 C22 C23 C46 D420
	92 69 70 47
	E504139
	Wiring harness connector D420.C front view



Technical data	Wiring harness connector F834 front view D420 F834 Function C21 5 Trimming resistor C22 2 Ground, sensor element C23 6 Signal, nernst sensor C45 1 Signal, pump cell current C46 3 Ground, heater element 4 Power supply, heater element Component check, lambda sensor (F834) Preparation • Key the ignition off • Disconnect connector F834 • Measure on component connector F834 Pin Pin (+ probe) (- probe) Value Additional information • Key the ignition off • Disconnect connector F834 Pin Pin (+ probe) (- probe) Value Additional information • Key the ignition off • Disconnect connector F834 • Measure on the front side of wiring harness connector F834 Pin Pin Pin Value Additional information • Key the ignition off • Disconnect connector F834 • Measure on the front side of wiring harness connector F834 Pin Pin Pin Value Additional information
	(+ probe) (- probe) Heater element power supply with ignition keyed on
Possible causes	Leaking exhaust system
Additional information	 Faulty fuel system Lambda sensor deviation The PCI ECU uses the oxygen concentration in the exhaust, measured by the lambda
	sensor (F834), to determine the air/fuel ratio of the combustion process. Typically, high value air/fuel ratio indicates high oxygen concentration in the exhaust system.



Perform the troubleshooting steps below using the breakout harness, if **Diagnostic Step-by-Step** necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as it could damage the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components. Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors. For specific electrical component information and pinout locations, always refer to the technical data. It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 'possible causes' section. Step 1 Step ID 170B-a **SRT** Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2. Step 2 Step ID 170B-b SRT Check for Lambda sensor broken or not installed correctly. Replace the identified component or install it correctly Use DAVIE to re-check for the presence of active faults. If this related fault is no longer active, then this issue has been resolved. If this related fault is still active, proceed to step 3. Step 3 Step ID 170B-c SRT For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the Engine Support Call Center at 1-800-477-0251. **Verification Drive Cycle** This DTC changes to inactive when the fault is no longer detected. To validate the repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, proceed at a minimum speed of 80 km/h [50 mph] in the highest gear possible with the engine speed between 1100 and 1500 rpm and set the cruise control. This test is best performed with a loaded vehicle/trailer, but if load is unavailable, turn as many engine power consumers on to produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3 separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is unachievable. Use a flat road, if possible. **Back to Choose Code Back to Index**



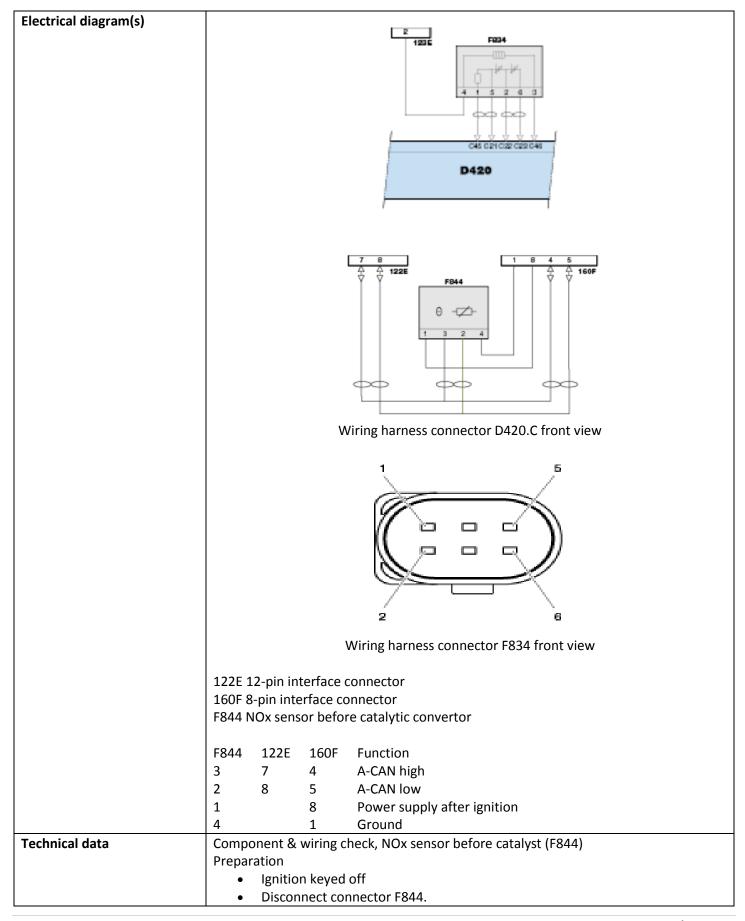
P170C

Code number	P170C		
Fault code description	NOx sensor before catalyst response - Data erratic, intermittent, or incorrect during		
·	overrun		
Fault code information	2 trip MIL		
	3 drive cycle recovery		
	Readiness group – Exhaust gas sensors		
	Freeze frame type – Exhaust gas		
Description of component(s)	The NOx concentration emitted by the engine is measured in the exhaust gases after		
	the BPV valve.		
	The NOx sensor before catalyst consists of:		
	Electronic control unit		
	This unit communicates with the PCI ECU and EAS-3 ECU via A-CAN		
	Sensor element		
	The sensor element contains an internal heater. The sensor cannot be		
	separated from the electronic control unit.		
	separated from the electronic control unit.		
	Sensor heating control		
	• The first stage starts when the ignition is keyed on. The sensor is bested to approximately 100°C [212°C], and any sendence to		
	The sensor is heated to approximately 100°C [212°F], and any condensate avaparates from the sensor.		
	 evaporates from the sensor. The second stage starts after the 'dew point' message is received from 		
	the PCI ECU		
	 The sensor is heated to its operating temperature of approximately 800°C 		
	[1472°F]. The PCI ECU determines the 'dew point' by calculating how		
	much energy (heat by burning fuel in the engine) is pumped through the		
	exhaust.		
	 If the 'dew point' message is not/no longer received, the sensor 		
	temperature stays at/drops to the standby temperature of approximately		



	100°C [212°F].
	Effect on the system:
	Controls the engine NOx emission.
	Determines the DEF dosing amount by the EAS-3 system
	Higher measured engine NOx emission results in higher DEF dosing
	amount.
Location of component(s)	F844
	F044
Diagnostic condition	This diagnostic runs:
	 Engine speed above 1200 rpm, and;
	 During coasting (no fuel injection), and
	 Coolant temperature is above 50°C [122°F], and;
	The NOx sensor before catalyst (F844) is in the operating mode.
Set condition of fault code	The PCI ECU (D420) detects that the measured engine NOx emissions differ too much
	from the expected engine NOx emissions after 3 seconds during coasting (fuel
	injection cutoff).
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the
	repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once
	the minimum target temperature has been reached, proceed to a road with a speed
	limit of 80 km/h [50mph] in the highest gear possible with the engine speed at a
	minimum of 1800 rpm within the legal speed limit. Once the target rpm has been
	reached, leave the vehicle in gear, release the accelerator pedal, and allow the vehicle
	to coast until the engine speed reaches 900 rpm. This test should be conducted four
	times within the specified operational targets. Be aware of the traffic situation.
	For Eaton Ultrashift transmissions, idle drop can only go to 1000 rpm.
	For Alison Autoshift transmission, this test cannot be conducted.







	Measure on the	ront side of wiring harnes	s connector F844.	
	Pin Pin	_	l information	
	(+ probe) (- probe)		
	4 1	Ubat Key on th	e ignition	
	1 Battery	· ·	e ignition and switch on all	
	negative p	· ·	_	
	2 3		f the ignition	
			nect the ground cable from the	
		batter		
		 Discon 	nect the vehicle communication	
		interfa	ce (VCI) of DAVIE.	
Possible causes	Faulty fuel system			
	 NOx sensor before ca 	talyst deviation		
Additional information	The measured engine	NOx emission is compare	ed with the expected engine NOx	
	emissions during coa	sting (fuel injection cutoff).	
	The engine NOx emis	sions are measured by the	e NOx sensor before catalyst (F844).	
Diagnostic Step-by-Step	Perform the trou	bleshooting steps below ι	using the breakout harness, if	
			such as sensors, electrical control	
			ecommended, as it could damage	
		-	in the OFF position when	
	_	_	ponents in order to reduce the	
	likelihood of dan	age to electrical compone	ents.	
	• Disconne	cting the EAS connectors	during the troubleshooting	
		_	_	
		process will result in multiple errors. • For specific electrical component information and pinout locations,		
	always refer to the technical data.			
	-		e menu in DAVIE and run the	
		c test again to identify a c		
	_	_	onal or mechanical issues may be	
		-	nactive fault codes. Refer to the	
	'possible	causes' section.		
	Step 1	Step ID 170C-a	SRT	
	Visually inspect all appli	cable connectors (bent, b	roken, corroded or loose pins)	
	and harnesses for corro	sion, damage, and rubbing	g during each step of the	
	diagnostic procedure. P			
	Step 2	Step ID 170C-b	SRT	
	The NOx Sensor, Before	Catalyst is broken or inco	rrectly installed.	
	Replace the identified c	omponent or install it cor	rectly	
	Use DAVIE to re-check f	or the presence of active	faults.	
	If this related fa	ult is no longer active, the	en this issue has been resolved.	
	If this related fa	ult is still active, proceed	to step 3.	
		· •		
	Step 3	Step ID 170C-c	SRT	
	· ·		or confirmation prior to the	
			Engine Support Call Center at	
	1-800-477-0251.		- ''	
Verification Drive Cycle		ive when the fault is no lo	onger detected.	
			polant temperature is at least 70°C	



[158°F]. Once the minimum target temperature has been reached, proceed to a road with a speed limit of 80 km/h [50mph] in the highest gear possible with the engine speed at a minimum of 1800 rpm within the legal speed limit. Once the target rpm has been reached, leave the vehicle in gear, release the accelerator pedal, and allow the vehicle to coast until the engine speed reaches 900 rpm. This test should be conducted four times within the specified operational targets.
Back to Choose Code Back to Index



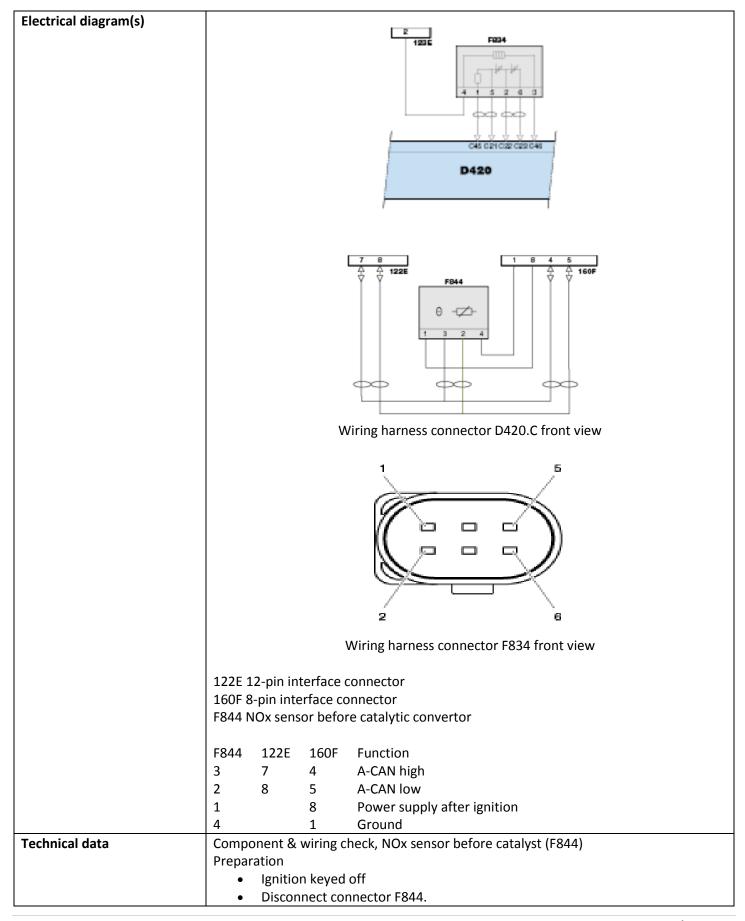
P170D

P1/0D			
Code number	P170D		
Fault code description	NOx sensor before catalyst response - Incorrect		
Fault code information	2 trip MIL 3 drive cycle recovery Readiness group – Exhaust gas sensors Freeze frame type – Exhaust gas		
Description of component(s)	The NOx concentration emitted by the engine is measured in the exhaust gases after the BPV valve. The NOx sensor before catalyst consists of: • Electronic control unit This unit communicates with the PCI ECU and EAS-3 ECU via A-CAN • Sensor element The sensor element contains an internal heater. The sensor cannot be separated from the electronic control unit.		
	 Sensor heating control The first stage starts when the ignition is keyed on. The sensor is heated to approximately 100°C [212°F], and any condensate evaporates from the sensor. 		
	 The second stage starts after the 'dew point' message is received from the PCI ECU The sensor is heated to its operating temperature of approximately 800°C [1472°F]. The PCI ECU determines the 'dew point' by calculating how 		
	 much energy (heat by burning fuel in the engine) is pumped through the exhaust. If the 'dew point' message is not/no longer received, the sensor temperature stays at/drops to the standby temperature of approximately 100°C [212°F]. 		



	Effect on the system:
	Controls the engine NOx emission.
	Determines the DEF dosing amount by the EAS-3 system Ulabor recovered angles NOv emission results in higher DEF dosing
	Higher measured engine NOx emission results in higher DEF dosing
	amount.
Location of component(s)	F844
Diagnostic condition	This diagnostic runs when:
	 engine is running at a steady load and speed between 1200 and 1700 rpm,
	and;
	• coolant temperature is above 50°C [122°F], and;
	the engine mode is DOC heating or DPF regeneration or SCR heating or SCR
	high efficiency or standard or protection, and;
	the NOx sensor before catalyst (F844) is in the operating mode
Set condition of fault code	The PCI ECU (D420) detects that measured engine NOx emissions differ too much
	from the expected engine NOx emissions during transient operation of the engine
	(expected increase of NOx emissions).
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected.
	To validate the repair, drive the vehicle until the coolant temperature is at least 70°C
	[158°F]. Once the minimum target temperature has been reached, perform several
	low to higher speed accelerations with moderate engine load. Also perform high-load
	to low-load transitions. This activity should be conducted within the range of 15 km/h
	[10 mph] to 65 km/h [40 mph] for no more than 5 to 8 km [3 to 5 miles].







	Meas	ure on the front	side of wirin	ng harness connector F844.
	Pin	Pin		Additional information
	(+ probe)	(- probe)		
	4	1	Ubat K	Key on the ignition
	1	Battery		Key on the ignition and switch on all
		negative pole		consumers
	2	3	± 60 Ω •	Key off the ignition
			•	Disconnect the ground cable from the
				battery.
			•	Disconnect the vehicle communication
				interface (VCI) of DAVIE.
Possible causes		efore catalyst de		
Additional information		_		are compared with the expected engine NOx
		during transien		
		e NOx emissions	s are measur	red by the NOx sensor before catalyst
	(F844).			
Diagnostic Step-by-Step	-			s below using the breakout harness, if
	/ \	-		ponents, such as sensors, electrical control
	Construction of the last of th		-	g is not recommended, as it could damage
		_		lways be in the OFF position when
		-	_	rical components in order to reduce the
	likelir	ood of damage		•
	II i I	will result in r	_	nnectors during the troubleshooting process
			•	ponent information and pinout locations,
		always refer t		
		•		fault code menu in DAVIE and run the
	 diagnostic test again to identify a change in errors. Remember that the truck's operational or mechanical issues may be 			
	the root cause of both active and inactive fault codes. Refer to the			
		'possible caus		
	Step 1	· ·	Step ID 170D	D-a SRT
				(bent, broken, corroded or loose pins)
	and harnesses for corrosion, damage, and rubbing during each step of the			
		rocedure. Proce	_	
	Step 2		Step ID 170D	D-b SRT
	Repair or rep	olace 'NOx Senso	or, Before Ca	italyst' and use DAVIE to re-check for the
	presence of	active faults.		
	• Faul	t inactive – issue	e resolve	
	• Faul	t active – Procee	ed to step 3	
	Step 3		Step ID 170D	O-c SRT
	For further a	ssistance in diag	gnosing this is	issue or for confirmation prior to the
	replacement	of suspect com	ponents, con	ntact the Engine Support Call Center at
	1-800-477-0	251.		
Verification Drive Cycle		•		ntil the coolant temperature is at least 70°C
				rature has been reached, perform several
	low to higher	speed accelerat	ions with mo	oderate engine load. Also perform high-load



to low-load transitions. This activity should be conducted within the range of 15 km/h [10 mph] to 65 km/h [40 mph] for no more than 5 to 8 km [3 to 5 miles].
Back to Choose Code
Back to Index



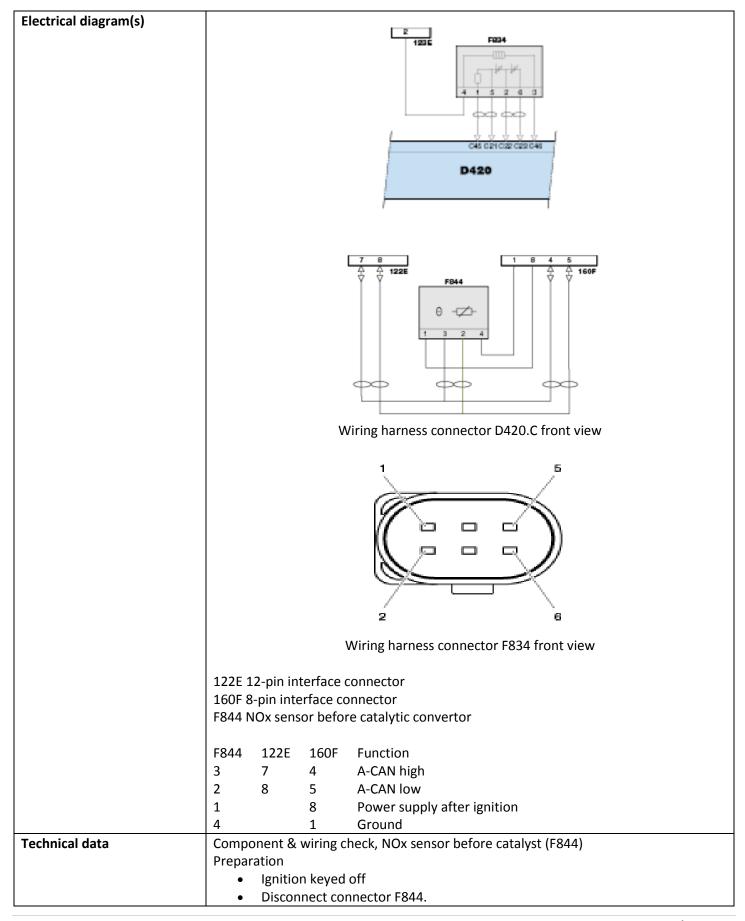
P170E

P170E			
Code number	P170E		
Fault code description	NOx sensor before catalyst response - Incorrect		
Fault code information	2 trip MIL		
	3 drive cycle recovery		
	Readiness group – None		
	Freeze frame type – Exhaust Gas		
Description of component(s)	The NOx concentration emitted by the engine is measured in the exhaust gases after		
	the BPV valve.		
	The NOx sensor before catalyst consists of:		
	Electronic control unit		
	This unit communicates with the PCI ECU and EAS-3 ECU via A-CAN		
	• Sensor element		
	The sensor element contains an internal heater. The sensor cannot be		
	separated from the electronic control unit.		
	Separateu nom the electronic control unit.		
	Sensor heating control		
	• The first stage starts when the ignition is keyed on. • The sensor is heated to approximately 100°C [213°E], and any condensate		
	• The sensor is heated to approximately 100°C [212°F], and any condensate evaporates from the sensor.		
	The second stage starts after the 'dew point' message is received from		
	the PCI ECU		
	 The sensor is heated to its operating temperature of approximately 800°C 		
	[1472°F]. The PCI ECU determines the 'dew point' by calculating how		
	much energy (heat by burning fuel in the engine) is pumped through the		
	exhaust.		
	 If the 'dew point' message is not/no longer received, the sensor 		
	temperature stays at/drops to the standby temperature of approximately		
	100°C [212°F].		



	Effect on the system.
	Effect on the system:
	Controls the engine NOx emission. Potentials at the DES decime are count but the EAS 2 portions.
	Determines the DEF dosing amount by the EAS-3 system
	Higher measured engine NOx emission results in higher DEF dosing
	amount.
Location of component(s)	F844
Diagnostic condition	This diagnostic runs:
	engine is running at a steady load and speed between 1200 and 1700 rpm, and;
	coolant temperature is above 50°C [122°F], and;
	the engine mode is DOC heating or DPF regeneration or SCR heating or SCR high
	efficiency or standard or protection, and;
	the NOx sensor before catalyst (F844) is in the operating mode
Set condition of fault code	The PCI ECU (D420) detects that measured engine NOx emissions differ too much
	from the expected engine NOx emissions during transient operation of the engine
	(expected decrease of NOx emissions).
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the
	repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once
	the minimum target temperature has been reached, perform several low to higher
	speed accelerations with moderate engine load. Also perform high-load to low-load
	transitions. This activity should be conducted within the range of 15 km/h [10 mph] to 65 km/h [40 mph] for no more than 5 to 8 km [3 to 5 miles].
	05 king ii [40 inpir] for no more than 5 to 6 kin [5 to 5 innes].







	Measure on the front side of wiring harness connector F844.			
	Pin Pi		Additional inf	
	(+ probe) (- pro	obe)		
	4 1	L Ubat	Key on the igi	nition
	1 Batt			nition and switch on all
	negativ	•	consumers	
	2 3	•		e ignition
			•	t the ground cable from the
			battery.	
			•	t the vehicle communication
				VCI) of DAVIE.
Possible causes	NOx sensor before	e catalyst deviat		•
Additional information	The measured engine NOx emissions are compared with the expected engine			
	NOx emissions during transient operation of the engine.			
	The engine NOx emissions are measured by the NOx sensor before catalyst			
	(F844).			
Diagnostic Step-by-Step	· · · · · · · · · · · · · · · · · · ·	roubleshooting s	teps below using	the breakout harness, if
		necessary, to check electrical components, such as sensors, electrical control		
			•	nmended, as it could damage
	Commence of the Commence of th	•	•	he OFF position when
		-	•	ents in order to reduce the
	_	damage to electri	•	
	ARTICLE CO.	_	•	ng the troubleshooting process
		esult in multiple e		
	• For sp	pecific electrical o	component infor	mation and pinout locations,
	always refer to the technical data.			
	It is necessary to exit the fault code menu in DAVIE and run the			
	diagnostic test again to identify a change in errors.			
	Remember that the truck's operational or mechanical issues may be			
	the root cause of both active and inactive fault codes. Refer to the			
	'possi	ble causes' section	on.	
	Step 1	Step ID 1	.70Ea	SRT
	Visually inspect all a	pplicable connec	tors (bent, broke	en, corroded or loose pins)
	and harnesses for co	and harnesses for corrosion, damage, and rubbing during each step of the		
	diagnostic procedure	e. Proceed to ste	p 2.	
	Step 2	Step ID 1	.70Eb	SRT
	Replace: NOx Sensor	•		
	Replace the identifie	•		
	Use DAVIE to re-che	•		
		_		nis issue has been resolved.
		d fault is still acti	ve, continue to t	he Step 3 in the
	troubleshooting process.			
	Step 3	Step ID 1	70Ec	SRT
	Contact the PACCAR Engine Support Call Center			
	For further assistance in diagnosing this issue or for confirmation prior to the			
	replacement of susp	ect components,	contact the PAC	CCAR Engine Support Call



	Center at 1-800-477-0251.
Verification Drive Cycle	To validate the repair: This cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON. With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.
	Back to Choose Code Back to Index



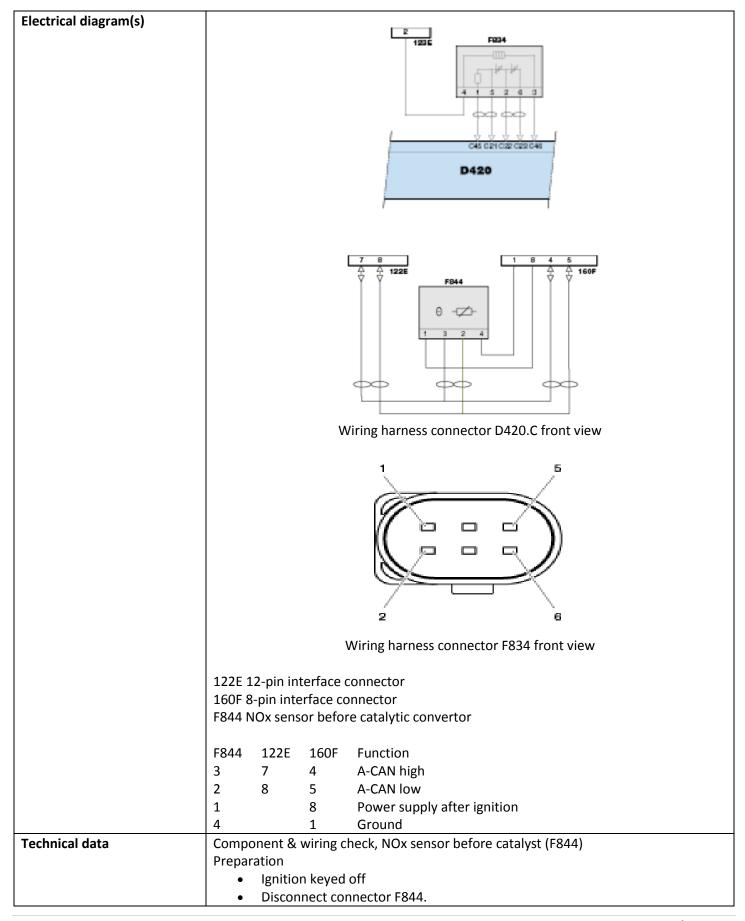
P170F

P1/UF				
Code number	P170F			
Fault code description	NOX before catalyst – Data valid but too high during overrun (deceleration)			
Fault code information	2 trip MIL 3 drive cycle recovery Readiness group – Exhaust gas sensors Freeze frame type – Exhaust gas			
Description of component(s)	The NOx concentration emitted by the engine is measured in the exhaust gases after the BPV valve. The NOx sensor before catalyst consists of: • Electronic control unit This unit communicates with the PCI ECU and EAS-3 ECU via A-CAN • Sensor element The sensor element contains an internal heater. The sensor cannot be separated from the electronic control unit.			
	Sensor heating control			
	 The first stage starts when the ignition is keyed on. The sensor is heated to approximately 100°C [212°F], and any condensate evaporates from the sensor. The second stage starts after the 'dew point' message is received from the PCI ECU 			
	 The sensor is heated to its operating temperature of approximately 800°C [1472°F]. The PCI ECU determines the 'dew point' by calculating how much energy (heat by burning fuel in the engine) is pumped through the exhaust. If the 'dew point' message is not/no longer received, the sensor temperature stays at/drops to the standby temperature of approximately 100°C [212°F]. 			



	Effect on the system:		
	Controls the engine NOx emission.		
	 Determines the DEF dosing amount by the EAS-3 system 		
	Higher measured engine NOx emission results in higher DEF dosing		
	amount.		
Location of component(s)	F844		
Diagnostic condition	This diagnostic runs:		
	 While coasting (no fuel injection), and; 		
	 When coolant temperature is above 50°C [122°F], and; 		
	The NOx sensor before catalyst (F844) is in the operating mode.		
Set condition of fault code	The PCI ECU (D420) detects that the measured engine NOx emissions are too high for		
	a fuel injection cutout situation for more than 21 seconds.		
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the		
	repair, drive the vehicle until the coolant temperature is at least 70°C [158°F].		
	Once the minimum target temperature has been reached, proceed to a road with		
	a speed limit of 80 km/h [50mph] in the highest gear possible with the engine		
	speed at a minimum of 1800 rpm within the legal speed limit. Once the target		
	rpm has been reached, leave the vehicle in gear, release the accelerator pedal,		
	and allow the vehicle to coast until the engine speed reaches 900 rpm. This test		
	should be conducted four times within the specified operational targets. Be		
	aware of the traffic situation.		
	For Eaton Ultrashift transmissions, idle drop can only go to 1000 rpm.		
	For Alison Autoshift transmission, this test cannot be conducted.		







	Measure on the front side of wiring harness connector F844.			
	Pin	Pin Value	_	
	(+ probe) (-	probe)		
	4	1 Ubat	Key on the igni	ition
	1 B	attery >0.5 V	Key on the igni	ition and switch on all
	nega	ative pole	consumers	
	2	3 ± 60 Ω	• Key off the	ignition
			 Disconnect 	the ground cable from the
			battery.	
			 Disconnect 	the vehicle communication
			interface (V	CI) of DAVIE.
Possible causes	NOx sensor before	catalyst deviation		
Additional information	The measured	engine NOx emissi	ons are compared	with the expected engine NOx
	emissions while	e coasting (fuel inje	ection cutout).	
	The engine NO	x emissions are me	easured by the NO	s sensor before catalyst (F844).
Diagnostic Step-by-Step		~		the breakout harness, if
			•	as sensors, electrical
	Construction of the last of th			t recommended, as it could
	_	_	· · · · · · · · · · · · · · · · · · ·	be in the OFF position
		_	-	nponents in order to
	ATTENDED TO THE PARTY OF THE PA		age to electrical co	
		_		g the troubleshooting
		ocess will result in	•	
				nation and pinout locations,
		vays refer to the te		over the DANIE and more than
		•		nu in DAVIE and run the
		-	to identify a chang	
	Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to			
	the 'possible causes' section.			
		possible eduses	section.	
	Step 1	Step ID	170F-a	SRT
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the			
	diagnostic procedure. Proceed to step 2.			
			•	
	Step 2	Step ID	170F-b	SRT
	· ·			e DAVIE to re-check for the
	presence of active		,	
	Fault inaction	tive – issue resolve	<u>ş</u>	
	Fault activ	ve – Proceed to ste	p 3	
			•	
	Step 3	Step ID	170F-c	SRT
	 '			nfirmation prior to the
				ne Support Call Center at
	1-800-477-0251.			
Verification Drive Cycle	To validate	the repair, drive t	he vehicle until the	e coolant temperature is at
_		•		mperature has been reached,
	proceed to	a road with a spec	ed limit of 80 km/h	[50mph] in the highest gear
	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		



possible with the engine speed at a minimum of 1800 rpm within the legal speed limit. Once the target rpm has been reached, leave the vehicle in gear, release the accelerator pedal, and allow the vehicle to coast until the engine speed reaches 900 rpm. This test should be conducted four times within the specified operational targets. Be aware of the traffic situation. For Eaton Ultrashift transmissions, idle drop can only go to 1000 rpm. For Alison Autoshift transmission, this test cannot be conducted.
Back to Choose Code
Back to Index



P1710

11/10				
Code number	P1710			
Fault code description	NOx before catalyst – Data valid but too low			
Fault code information	2 trip MIL			
	3 drive cycle recovery			
	Readiness group – None			
	Freeze frame type – Exhaust gas			
Description of someonet(s)	The NOx concentration emitted by the engine is measured in the exhaust gases after			
Description of component(s)				
	the BPV valve.			
	The NOx sensor before catalyst consists of:			
	Electronic control unit			
	This unit communicates with the PCI ECU and EAS-3 ECU via A-CAN			
	Sensor element			
	The sensor element contains an internal heater. The sensor cannot be			
	separated from the electronic control unit.			
	Sensor heating control			
	 The first stage starts when the ignition is keyed on. 			
	 The sensor is heated to approximately 100°C [212°F], and any condensate 			
	evaporates from the sensor.			
	The second stage starts after the 'dew point' message is received from the			
	PCI ECU			
	 The sensor is heated to its operating temperature of approximately 800°C 			
	[1472°F]. The PCI ECU determines the 'dew point' by calculating how			
	much energy (heat by burning fuel in the engine) is pumped through the			
	exhaust.			
	If the 'dew point' message is not/no longer received, the sensor tomporature stays at /drops to the standby tomporature of approximately.			
	temperature stays at/drops to the standby temperature of approximately			
	100°C [212°F].			



	Effect on the system:
	· ·
	Controls the engine NOx emission. Paterwise at the DEE design are exact but the EAC 2 materials.
	Determines the DEF dosing amount by the EAS-3 system
	Higher measured engine NOx emission results in higher DEF dosing
	amount.
Location of component(s)	F844
Diagnostic condition	This diagnostic runs:
	when the engine is running at a steady load and its speed is between 1050 and
	1850 rpm, and;
	when coolant temperature is above 50°C [122°F], and;
	 the engine mode is SCR high efficiency or standard or protection, and;
	 the NOx sensor before catalyst (F844) is in operating mode;
Set condition of fault code	The PCI ECU (D420) detects that measured engine NOx emissions are lower than the
	expected engine NOx emissions for more than 40 seconds.
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the
	repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the
	minimum target temperature has been reached, proceed at a minimum speed of 80
	km/h [50 mph] in the highest gear possible with the engine speed between 1100 and
	1500 rpm and set the cruise control. This test is best performed with a loaded
	vehicle/trailer, but if load is unavailable, turn as many engine power consumers on to
	produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3
	separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is unachievable.
	Use a flat road, if possible.
	Ose a natitoda, ii possible.



Electrical diagram(s) F034 C45 C21 C22 C22 C46 D420 F844 0 --Wiring harness connector D420.C front view Wiring harness connector F834 front view 122E 12-pin interface connector 160F 8-pin interface connector F844 NOx sensor before catalytic convertor 122E 160F F844 **Function** 3 7 4 A-CAN high 2 8 5 A-CAN low 1 8 Power supply after ignition Ground Component & wiring check, NOx sensor before catalyst (F844) **Technical data** Preparation Ignition keyed off Disconnect connector F844.



	Measure on the	ront side of wiring harness con	nector F844.	
	Pin Pin	Value Additional info		
	(+ probe) (- probe			
	4 1	, Ubat Key on the ignit	rion	
	1 Battery	, ,	tion and switch on all	
	negative p	, ,	tion and switch on an	
	2 3	$\pm 60 \Omega$ • Key off the i	gnition	
	2	,	he ground cable from the	
		battery.	The ground cable from the	
		•	he vehicle communication	
		interface (VC		
Possible causes	Clogged EGR pressure	e difference sensor venturi	.,	
	Humidity sensor deviation			
	NOx sensor before ca			
Additional information		NOx emission is compared with	the expected engine NOx	
	emission.		and employees and make the many	
		sions are measured by the NOx	sensor before catalyst (F844).	
Diagnostic Step-by-Step	Perform the trou	bleshooting steps below using t	he breakout harness, if	
	necessary, to che	ck electrical components, such	as sensors, electrical control	
	units, and harne	ses. Back probing is not recomr	nended, as it could damage	
		ignition should always be in the	_	
	connecting or dis	connecting electrical componer	nts in order to reduce the	
		age to electrical components.		
	ARTHUR DESIGNATION .	cting the EAS connectors during	the troubleshooting	
		vill result in multiple errors.	,	
		fic electrical component inform	ation and pinout locations.	
	·	efer to the technical data.	μ,	
	1	ssary to exit the fault code men	u in DAVIF and run the	
		c test again to identify a change		
	_	er that the truck's operational c		
		cause of both active and inactiv		
		causes' section.	e radic edaesi herer to the	
	Step 1	Step 1710a	SRT	
	Visually inspect all appl	cable connectors (bent, broken,	corroded or loose pins)	
	and harnesses for corro	sion, damage, and rubbing duri	ng each step of the	
	diagnostic procedure. P		-	
		•		
	Step 2	Step 1710b	SRT	
	Replace: NOx Sensor, B	efore Catalyst		
	1. Replace the ide	•		
		-check for the presence of activ	e faults.	
		fault is no longer active, then t		
		fault is still active, continue to		
	sins related	The second of second of the se		
	Step 3	Step 1710c	SRT	
		diagnosing this issue or for con	firmation prior to the	
		components, contact the PACC	•	
	Center at 1-800-477-02	•	0	
	300. 21 2 000 177 02			



Verification Drive Cycle	To validate the repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, proceed at a minimum speed of 80 km/h [50 mph] in the highest gear possible with the engine speed between 1100 and 1500 rpm and set the cruise control. This test is best performed with a loaded vehicle/trailer, but if load is unavailable, turn as many engine power consumers on to produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3 separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is unachievable. Use a flat road, if possible.
	Back to Index



P1711

Code number	P1711
Fault code description	NOx before catalyst – Data valid but too high
Fault code information	2 trip MIL
	3 drive cycle recovery
	Readiness group – Exhaust gas sensors
	Freeze frame type – Exhaust gas
Description of	The NOx concentration emitted by the engine is measured in the exhaust gases after the
component(s)	BPV valve.
	The NOx sensor before catalyst consists of:
	Electronic control unit
	This unit communicates with the PCI ECU and EAS-3 ECU via A-CAN
	Sensor element
	The sensor element contains an internal heater. The sensor cannot be separated
	from the electronic control unit.
	Sensor heating control
	The first stage starts when the ignition is keyed on.
	The sensor is heated to approximately 100°C [212°F], and any condensate
	evaporates from the sensor.

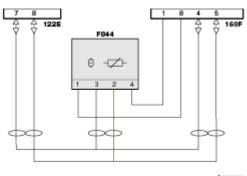


The second stage starts after the 'dew point' message is received from the PCI ECU The sensor is heated to its operating temperature of approximately 800°C [1472°F]. The PCI ECU determines the 'dew point' by calculating how much energy (heat by burning fuel in the engine) is pumped through the exhaust. If the 'dew point' message is not/no longer received, the sensor temperature stays at/drops to the standby temperature of approximately 100°C [212°F]. Effect on the system: Controls the engine NOx emission. Determines the DEF dosing amount by the EAS-3 system Higher measured engine NOx emission results in higher DEF dosing amount. Location of F844 component(s) **Diagnostic condition** This diagnostic runs: when the engine is running at a steady load and its speed is between 1050 and 1850 rpm, and; when coolant temperature is above 50°C [122°F], and; the engine mode is SCR high efficiency or standard or protection, and; the NOx sensor before catalyst (F844) is in the operating mode Set condition of fault The PCI ECU (D420) detects that the measured engine NOx emissions are higher than the



code	expected engine NOx emissions for more than 40 seconds.
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, proceed at a minimum speed of 80 km/h [50 mph] in the highest gear possible with the engine speed between 1100 and 1500 rpm and set the cruise control. This test is best performed with a loaded vehicle/trailer, but if load is unavailable, turn as many engine power consumers on to produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3 separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is unachievable. Use a flat road, if possible
	steady a to a minited and a minited and a material

Electrical diagram(s)



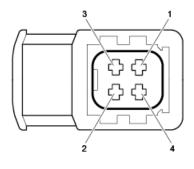
402300

F844 NOx sensor before catalytic convertor

122E 12-pin interface connector

160F 8-pin interface connector

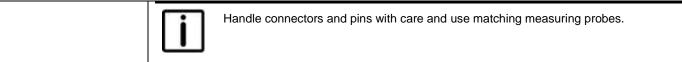
F844	122E	160F	Function
3	7	4	A-CAN high
2	8	5	A-CAN low
1		8	Power supply after ignition
4		1	Ground



E504061

Wiring harness connector F844 front view





Technical data

Component and wiring checks, NOx sensor before catalyst (F844)

Component check, NOx sensor before catalyst (F844)

This type of component check cannot be checked with a multimeter or oscilloscope. Perform the following to assess the component:

- Monitor/test the component with DAVIE
- Perform the corresponding wiring check

Wiring check, NOx sensor before catalyst (F844)

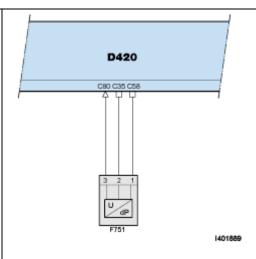
Preparation

- Key off the ignition
- Disconnect connector F844
- Measure on the front side of wiring harness connector F844

Pin (+ probe)	Pin (- probe)	Value	Additional information
1	4	Ubat	Key on the ignition
4	Battery negative pole	< 0.5 V	Key on the ignition and switch on all consumers
2	3	± 60 Ω	Key off the ignition Disconnect the ground cable from the battery. Disconnect the vehicle communication interface (Voor DAVIE.

Component and wiring checks, EGR pressure difference sensor (F751)

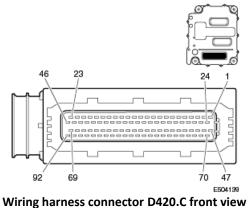


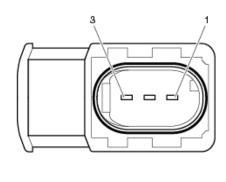


D420 PCI ECU

F751 EGR pressure difference

D420	F751	Function
C35	2	Ground
C58	1	Power supply
C80	3	Signal, EGR pressure





E504129

view Wiring harness connector F751 front view

i

Handle connectors and pins with care and use matching measuring probes.

Component check, EGR pressure difference sensor (F751)

This type of component cannot be checked with a multimeter or oscilloscope. Perform the following to assess the component:

Perform the wiring check



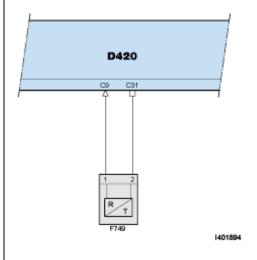
Component & wiring check, ECU (D420)

Preparation

- Key off the ignition
- Disconnect connector F751
- Measure on the front side of wiring harness connector F751

Pin (+ probe)	Pin (- probe)	Value	Additional information
1	2	5V	Ignition keyed on

Component and wiring checks, EGR temperature sensor (F749)



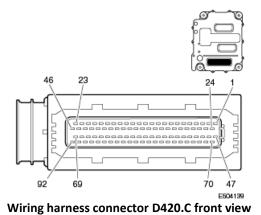
D420 PCI ECU

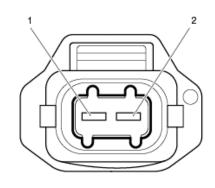
F749 EGR temperature sensor

			_
D420	F749	Function	Ī



C9	1	Signal, EGR temperature
C31	2	Ground





Wiring harness connector F749 front view



Handle connectors and pins with care and use matching measuring probes.

Component check, EGR temperature sensor (F749)

Preparation

- Key off the ignition
- Disconnect connector F749
- Measure on the component connector F749

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
1	2	97.7–100.3 Ω	Resistance value at 0°C [32°F]
		107.4–108.2 Ω	Resistance value at 20°C [68°F]
		137.5–139.1 Ω	Resistance value at 100°C [212°F]
		167.3–169.7 Ω	Resistance value at 180°C [356°F]
		192.5–195.5 Ω	Resistance value at 250°C [482°F]

Component & circuit check, ECU (D420)

Preparation

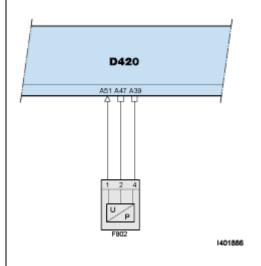
- Key off the ignition
- Disconnect connector F749



• Measure on the front side of wiring harness connector F749

Pin (+ probe)	Pin (- probe)	Value	Additional information
1	2	5V	Ignition keyed on

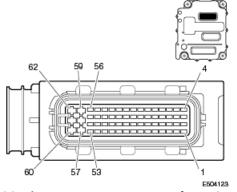
Component and wiring checks, Boost pressure sensor (F802)



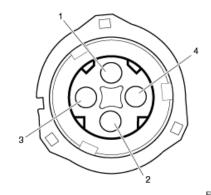
D420 PCI ECU

F802 Boost pressure sensor

D420	F802	Function
A39	4	Ground
A47	2	Power supply
A51	1	Signal, boost pressure



Wiring harness connector D420.A front view



Wiring harness connector F802 front view





Handle connectors and pins with care and use matching measuring probes.

Component check, boost pressure sensor (F802)

This type of component cannot be checked with a multimeter or oscilloscope. Perform the following to assess the component:

- Monitor/test the component with DAVIE
- Perform the wiring check
- Component & wiring check, ECU (D420)

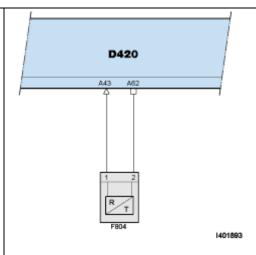
Preparation

- Key off the ignition
- Disconnect connector F802
- Measure on the front side of wiring harness connector F802

Pin (+ probe)	Pin (- probe)	Value	Additional information
2	4	5V	Ignition keyed on

Component and wiring checks, Boost temperature senor (F804)

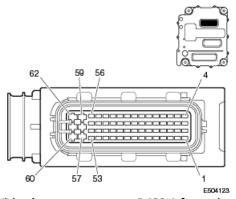


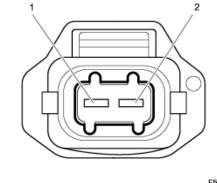


D420 PCI ECU

F804 Boost temperature sensor

D420	F804	Function	
A43	1	Signal, boost temperature	
A62	2	Ground	





Wiring harness connector D420.A front view

Wiring harness connector F804 front view



Handle connectors and pins with care and use matching measuring probes.

Component check, fuel temperature sensor (F804)

Preparation

- Key off the ignition
- Disconnect connector F804
- Measure on the component connector F804



Piı	n	Pin	Value	Additional information
(+ pro	obe)	(- probe)		
1		2	5248–5732 Ω	Resistance value at 0°C [32°F]
			2334–2505 Ω	Resistance value at 20°C [68°F]
			1133–1198 Ω	Resistance value at 40°C [104°F]
			593–619 Ω	Resistance value at 60°C [140°F]
			331–341 Ω	Resistance value at 80°C [176°F]
			195–199 Ω	Resistance value at 100°C [212°F]

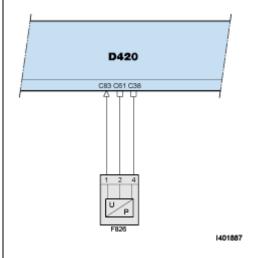
Component & circuit check, ECU (D420)

Preparation

- Ignition keyed off
- Disconnect connector F804
- Measure on the front side of wiring harness connector F804

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
1	2	5V	Ignition keyed on

Component and wiring checks, Before turbine pressure sensor (F826)

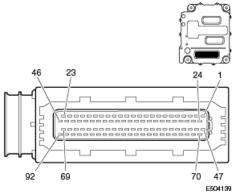


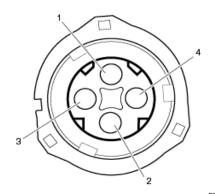
D420 PCI ECU

F826 pressure sensor before turbine



D420	F826	Function	
C38	4	Ground	
C61	2	Power supply	
C83	1	Signal, pressure before turbine	





Wiring harness connector D420.C front view

Wiring harness connector F826 front view



Handle connectors and pins with care and use matching measuring probes.

Component check, pressure sensor after BPV (F826)

This type of component cannot be checked with a multimeter or oscilloscope. Perform the following to assess the component:

- Monitor/test the component with DAVIE
- Perform the wiring check

Component & wiring check, ECU (D420)

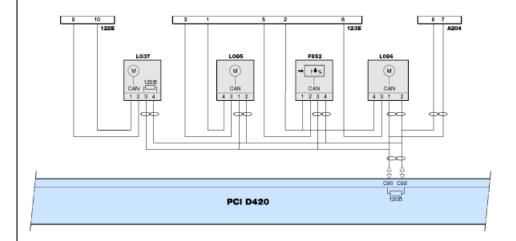
Preparation

- Key of the ignition
- Disconnect connector F826
- Measure on the front side of wiring harness connector F826

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
2	4	5V	Ignition keyed on



Component and wiring checks, EGR valve module (L095)



122E 12-pin interface connector

123E 7-pin interface connector

A204 electronic fan interface connector

D420 PCI ECU

F852 humidity sensor

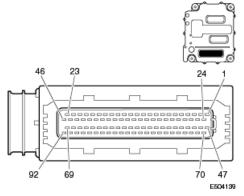
L037 VTG turbocharger actuator

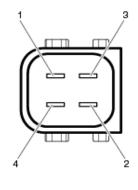
L095 EGR valve module

L096 BPV valve

D420	L095	Function	
C90	1	E-CAN high	
C92	2	E-CAN low	
	3	Ground	
	4	Power supply after ignition	







Wiring harness connector D420.C front view

Wiring harness connector L095 front view



Handle connectors and pins with care and use matching measuring probes.

Component check, EGR valve module (L095)

This type of component cannot be checked with a multimeter or oscilloscope. Perform the following to assess the component:

- Monitor/test the component with DAVIE
- Perform the wiring check

Wiring check, EGR valve module (L095)

Preparation

- Key off the ignition
- Disconnect connector L095
- Measure on the front side of wiring harness connector L095

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
3	4	Ubat	Ignition keyed on
1	2	± 60 Ω	 Ignition keyed off Ground cable from the battery disconnected DAVIE Vehicle Communication Interface (VCI) disconnected

Possible causes

- Diesel fuel used is not in accordance with EN590
- Leakage in inlet air system



			
	Clogged EGR pressure difference sensor venturi		
	Humidity sensor deviation		
	NOx sensor before catalyst deviation		
Additional information	 The measured engine NOx emissions are compared with the expected engine NOx emissions. The engine NOx emissions are measured by the NOx sensor before catalyst (F844). 		
Diagnostic Step-by-Step	The ignition should always be in the OFF position when connecting or		
	disconnecting electrical components to reduce the likelihood of damage to the		
	components.		
	 This troubleshooting procedure is based on the assumption that supply power and ground to the PMCI are functioning properly. 		
	 Disconnecting the PMCI connectors during the troubleshooting process will result in multiple errors. 		
	 Specific electrical component information and pin out locations are provided in this procedure as a reference only. Always refer to the technical data sections in Rapido for the most up-to-date changes. 		
	 It is necessary to use DAVIE to clear all current trouble codes from the PCI and EAS- 3 ECUs, and then run the Quick Check to identify a change in fault status. 		
	 This DTC can be set as a result of multiple failure modes. For proper fault isolation, complete all troubleshooting steps in the sequence provided. 		
	Step 1. Investigate Related Trouble Codes		
	Before troubleshooting this code, take notice of any other active or inactive trouble codes.		
	One or multiple other codes could have been the cause for this code.		
	Step 1.A Investigate related trouble codes		
	Action		
	Use DAVIE Diagnostics to perform a Quick Check for current trouble codes.		



Stop troubleshooting P1711 and refer to the troubleshooting information for these		Error! Reference source not found.	
Yes		No	
before catalyst	P3873; P3877; P3881		
NOx sensor,	P3863; P3864; P3865; P3866; P3867; P3868; P3869; P3870; P3871;		
	P2580; P2581		
P1351; P1352; P1354; P1356; P1580; P1581; P1727; P2563; F		356; P1580; P1581; P1727; P2563; P2579;	
VGT	P0046; P0049; P102C; P103F; P104E; P104F; P1111; P1235; P135		
	P1717; P1718; P171B; P171C; P2457		
	·	488; P1489; P1490; P1494; P1496; P1572;	
	P1288; P1400; P1409; P14	458; P1480; P1481; P1482; P1483; P1484;	
	P1030; P127A; P127B; P1	27C; P1280; P1281; P1284; P1285; P1286;	
EGR	P0405; P0406; P0407; P04	408; P040B; P040C; P040D; P0486; P102D;	
Are these or any other related codes active?			

Step 2. EGR System Checks

Step 2. A Visual Inspection: EGR Pressure Difference sensor (F751)

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - ECU connections are damaged or disconnected
 - Battery not fully charged, contacts not tight
 - Signs of exhaust or coolant leaks on the EGR
 - Broken or missing clamps on any air system component
 - Improper seal between the sensor and mounting block
 - Improper seal at pipe fittings

Was there evidence of any of the above?



Yes	No
Correct any issues found. If the Lambda sensor (F834) is found to be damaged or broken, replace it. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step Error! Reference source not found.	Error! Reference source not found.

Step 2.B Electrical checks, EGR pressure difference sensor (F751)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

2.B.1 Supply voltage

Action

1. Confirm the supply voltage level as outlined in the checking data, <u>component</u> <u>check, EGR pressure difference sensor (F751)</u>.

Are measured values within expected range?

Are measured values within expected range	
Yes	No
Go to step 2.C	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.C.

Step 2. C Visual inspection, EGR temperature sensor (F749)

Action

- 2. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins
 - Moisture or dirt in the connections



•	Damage to the	e wire harness	or insulation
-	Duillage to thi	c will chariness	OI IIISAIALIOII

- ECU connections damaged or disconnected
- Batteries are not okay, contacts are not tight
- Signs of exhaust or coolant leaks on the EGR
- Sensor damaged

Was there evidence of any of the above?

was there evidence of any of the above:		
Yes	No	
Correct any issues found, or replace the sensor if damaged. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.D	2.D	

Step 2.D Electrical checks, EGR pressure temperature sensor (F749)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

2.D.1 Resistance checks

Action

1. Confirm the sensor resistance as outlined in the corresponding checking data, component check, EGR temperature sensor (F749).

Are measured values within expected range?

The mediated values within expected range:		
Yes	No	
Go to step 2.D.2	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.D.2	

2.D.2 Supply voltage

Action

1. Confirm the supply voltage to the EGR temperature sensor (F749) as outlined in the corresponding checking data, <u>component & circuit check, ECU (D420).</u>

Are measured values within expected range?



Yes	No
Go to step 2.E	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.E

Step 2. E Visual inspection, Boost pressure sensor (F802)

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins
 - Moisture or dirt in the connections
 - Soot buildup on the sensor orifice or around the sensor port

Was there evidence of any of the above?

was there evidence of any of the above.		
Yes	No	
Correct any issues found, or replace the sensor if damaged. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.F	2.F	

Step 2.F Electrical checks, boost pressure sensor (F802)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

2.F.1 Supply voltage

Action

1. Confirm the supply voltage to the boost pressure sensor (F801) as outlined in the corresponding checking data, component & wiring check, ECU (D420).



Are measured values within expected range?		
Yes	No	
Go to step 2.G	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.G.	

Step 2. G Visual inspection, boost temperature sensor (F804)

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - Loose or broken clamps on the air system
 - ECU connections are not damaged or disconnected
 - Batteries are not okay, contacts are not tight
 - Soot buildup on the sensor orifice or around the sensor port

Was there evidence of any of the above?		
Yes	No	
Correct any issues found, or replace the sensor if damaged. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.H	2.H	



Step 2.H Electrical checks, boost temperature sensor (F804)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

2.H.1 Resistance checks

Action

1. Confirm the resistance values as outlined in the corresponding checking data, component check, boost temperature sensor (F804).

Are measured values within expected range?

Yes	No
Go to step 2.G.2	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.G.2.

2.H.2 Supply voltage

Action

1. Confirm the supply voltage to the boost temperature sensor (F804) as outlined in the corresponding checking data, component & circuit check, ECU (D420).

•				_
Are measured	values	within	evnected	rangel
	values	** C	CADCCICA	Tuliec:

Yes	No
Go to step 2.I	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.I.



Step 2. I Visual inspection, before-turbine pressure sensor (F826)

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - Batteries are not okay, contacts are not tight
 - Loose or broken clamps on the air system
 - Visible signs of exhaust leaks on the EGR
 - Related sensor not installed correctly

Was there evidence of any of the above?

Yes	No
Correct any issues found, or replace the sensor if damaged. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.J	2.J

Step 2.J Electrical checks, before-turbine pressure sensor (F826)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

2.J.1 Supply voltage

Action

 Confirm the supply voltage to the before turbine pressure sensor (F826) as outlined in the corresponding checking data, <u>component & wiring check, ECU</u> (<u>D420</u>).

Are measured values within expected range?



Yes	No
Go to step 3.A	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 3.A.

Step 3. Intake and Exhaust Leak Check

otep 5. Intuke and Exhaust Leak eneck		
Step 3.A Special test, Intake/Exhaust Leak		
Action		
1. Refer to the identified procedure to inspect the exhaust system for leaks.		
Were any leaks in the intake or exhaust system detected? Yes No		
Correct any issues found. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 4.A	4.A	



Step 4. Check for EGR Restrictions

Step 4.A Visual inspection, EGR valve module (L095)

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - ECU connections are not damaged or disconnected
 - Batteries are not okay, contacts are not tight
 - EGR Module not installed correctly
 - Signs of damage to the EGR valve and module

Was there evidence of any of the above?

Yes	No
Correct any issues found, or replace the EGR valve if damaged. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step	4.B
4.B	

Step 4.B Electrical checks, EGR valve module (L095)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

4.B.1 Resistance checks

Action

1. Confirm the resistance values as outlined in the corresponding checking data, wiring check, EGR valve module (L095).

Are measured values within expected range?



Yes	No
Go to step 4.B.2	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.B.2.

4.B.2 Supply voltage

Action

1. Confirm supply voltage to the EGR valve module (L095) as outlined in the corresponding checking data, <u>wiring check, EGR valve module (L095).</u>

Are measured values within expected range?

Yes	No
Go to step 4.C	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 4.C.

Step 4.C Visual inspection, EGR cooler

Action

- 1. Visually inspect the associated component connections and the coolant reservoir for the following:
 - Signs of exhaust or coolant leaks on the EGR
 - Low coolant level

Was there evidence of any of the above?



Yes	No
Correct any issues found.	4.D
Refer to Step 7.A to perform the corresponding repair verification cycles.	
Use DAVIE Diagnostics to perform a Quick	
Check for current trouble codes.	
If this code is still present, proceed to Step	
4.D	

Step 4.D Special test, EGR cooler internal leak

Action

1. Perform the prescribed test to determine if there is a coolant leak affecting EGR performance.

Does the test fail to complete or result in a failed state?

Does the test fail to complete of result in a failed state.	
Yes	No
Correct any issues found, or replace the EGR cooler if found damaged. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 4.E	4.E

Step 4.E DAVIE Performance test, EGR service

Action

1. Run the prescribed DAVIE performance test to determine if the EGR Valve has any mechanical issues by monitoring related parameters while opening and closing the EGR Valve.

Does the test fail to complete or result in a failed state?

Yes	No
Correct any issues found, or replace the	5.A
EGR valve actuator if found to be	
damaged.	
Refer to Step 7.A to perform the	
corresponding repair verification cycles.	
Use DAVIE Diagnostics to perform a Quick	
Check for current trouble codes.	



If this code is still present, proceed to Step	
5.A	

Step 5. Turbocharger (VGT) Actuator Checks

Step 5.A Visual inspection, VGT

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors?
 - Bent, broken, corroded or loose connector pins?
 - Moisture or dirt in the connections?
 - Damage to the wire harness or insulation?
 - ECU connections are not damaged or disconnected?
 - Batteries are not okay, contacts are not tight?
 - Broken or missing clamps around the Turbo?
 - Incorrect parts are installed?
 - Turbo or Turbo Actuator not properly installed?
 - Alternator is damaged or functioning outside of manufacturer's specifications?

Was there evidence of any of the above?

Yes	No
Correct any issues found.	5.B
Refer to Step 7.A to perform the	
corresponding repair verification cycles.	
Use DAVIE Diagnostics to perform a Quick	
Check for current trouble codes.	
If this code is still present, proceed to Step	
5.B	



Step 5.B DAVIE Performance test, Turbocharger (VGT) Actuator Effort

Action

1. Run the prescribed DAVIE performance test to determine correct operation of the VGT actuator.

Does this test fail to complete or result in a failed state?

Yes	No
Correct any issues found.	6.A
Refer to Step 7.A to perform the	
corresponding repair verification cycles.	
Use DAVIE Diagnostics to perform a Quick	
Check for current trouble codes.	
If this code is still present, proceed to Step	
6.A	

Step 6. NOx Sensor Before Catalyst Checks

Step 6.A Visual inspection, NOx sensor before catalyst (F844)

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - ECU connections are damaged or disconnected
 - Batteries are not okay, contacts are not tight
 - The NOx Sensor, before catalyst is broken or incorrectly installed
 - The correct parts are not installed
 - Broken or missing clamp around the Turbo and BPV

Nas there evidence of any of the above?	
Yes	No
Correct any issues found, or replace the EGR valve if damaged. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 6.8	6.B



Step 6.B Electrical checks, NOx sensor before catalyst (F844)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

6.B.1 Resistance checks

Action

1. Confirm the resistance values as outlined in the corresponding checking data, wiring check, NOx sensor before catalyst (F844).

Are measured values within expected range?

Ale measured values within expected range:	
Yes	No
Go to step 6.B.2	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 6.B.2.

6.B.2 Supply voltage

Action

1. Confirm supply and signal voltage values as outlined in the corresponding checking data, <u>wiring check, NOx sensor before catalyst (F844).</u>

Are measured values within expected range?

The measured values within expected range.	
Yes	No
Go to step 8.A	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 8.A.



Step 7. Repair Verification

Step 7.A Repair Verification Cycles

Perform these repair verification cycles following any corrective actions taken, to confirm that this fault is no longer active.



Before beginning these repair verification cycles, use the DAVIE Quick Check function to clear all current DTCs from the PCI and EAS-3 ECUs.

Action

1. Steady State

This cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON.

With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.

Step 8. Contacting PACCAR Engine Support Center

Step 8.A Contact PACCAR Engine Support Center

Action

1. For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the PACCAR Engine Support Call Center at 1-800-477-0251.

Back to Index



P1717

	T
Code number	P1717
Fault code description	Temperature after BPV - Data erratic, intermittent, or incorrect
Fault code information	2 trip MIL
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type - Comprehensive
Description of component(s)	The exhaust gas temperature after BPV is measured after the back pressure valve (BPV).
	Effect on the system:
	Calculates the NOx composition for correction of the NOx emissions by the
	engine
	Higher measured temperature after BPV results in a higher calculated NO2
	emission by the engine.
	Calculate temperature before turbine
	Higher measured temperature after BPV results in higher calculated exhaust
	gas temperature before the turbine.
Location of component(s)	gas temperature before the turbine.
Location of component(s)	F853
Diagnostic condition	This diagnostic runs when:
	 when the engine is running at a steady load, and;
	 when the engine is running at a steady load, and, when coolant temperature is above 50°C [122°F], and;
	the engine mode is SCR high efficiency or standard or protection, and; the first desire up to (FAS) is disabled.
	the fuel dosing valve (EAS) is disabled. The post-solution of the
Set condition of fault code	The PCI ECU (D420) detects that the temperature after BPV differs by more than 421°C [790°F] from the temperature before DOC (EAS) for more than 50 seconds.



Reset condition of fault code This DTC changes to inactive when the fault is no longer detected. To validate the repair: Key the ignition off for at least 15 seconds, then key it on again. Then start the engine and let it idle for 2 minutes, and; Drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, proceed at a minimum speed of 80 km/h [50 mph] in the highest gear possible with the engine speed between 1100 and 1500 rpm and set the cruise control. This test is best performed with a loaded vehicle/trailer, but if load is unavailable, turn as many engine power consumers on to produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3 separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is unachievable. Use a flat road, if possible. Electrical diagram(s) D420 C11 C33 ______ 70 Wiring harness connector D420.C front view Wiring harness connector F853 front view



	D420 PCI ECU		
	F853 temperature sensor after BPV		
	1000 temperature sensor arter Br V		
	D420 F853 Function		
	C11 3 Signal, temperature after BPV		
	C33 1 Ground		
Technical data	Component check, temperature sensor after BPV (F853)		
	Preparation		
	Key off the ignition		
	Disconnect connector F853		
	Measure on component connector F853		
	Pin Pin		
	(+ probe) (- probe) Value Additional information		
	1 3 197.6–204.6 Ω Resistance value at 0°C [34°F]		
	217.1–224.15 Ω Resistance value at 25°C [77°F]		
	349.5–356.1 Ω Resistance value at 200°C [392°F]		
	622.5–634.1 Ω Resistance value at 600°C [1112°F]		
	Component & circuit check, ECU (D420)		
	Preparation		
	Key off the ignition		
	Disconnect connector F853		
	Measure on the front side of wiring harness connector F853		
	Pin Pin (+ probe) (- probe) (- probe)		
	(+ probe) (- probe) Value Additional information		
	3 1 5V Ignition keyed on		
Possible causes	More than expected loss of heat between the engine exhaust and after treatment		
	system inlet (e.g., damaged exhaust pipe insulation)		
	Temperature after BPV sensor deviation Temperature before DOC sensor deviation.		
Additional information	Temperature before DOC sensor deviation The temperature of the RDN is compared with the temperature before DOC (FAS).		
Additional information	• The temperature after BPV is compared with the temperature after BPV sensor.		
	• The temperature after BPV is measured by the temperature after BPV sensor (F853).		
	The temperature before DOC is measured by the ECU DOC-DPF temperature		
	sensors (D418).		
Diagnostic Step-by-Step	Perform the troubleshooting steps below using the breakout harness, if		
	necessary, to check electrical components, such as sensors, electrical control		
	units, and harnesses. Back probing is not recommended, as it could damage		
	the harness. The ignition should always be in the OFF position when		
	connecting or disconnecting electrical components in order to reduce the		
	likelihood of damage to electrical components.		
	Disconnecting the EAS connectors during the troubleshooting process		
	will result in multiple errors.		
	For specific electrical component information and pinout locations, always refer to the technical data.		
	 always refer to the technical data. It is necessary to exit the fault code menu in DAVIE and run the 		
	diagnostic test again to identify a change in errors.		
	Remember that the truck's operational or mechanical issues may be		
	The member and the tracks operational of mechanical issues may be		



the root cause of both active and inactive fault codes. Refer to the 'possible causes' section.

SRT

Step 1 Step ID 1717a

Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.

Step 2 Step ID 1717b SRT

DAVIE Direct: Monitor EGR and Post BPV temperature sensors

Use DAVIE to monitor the following temperatures:

- EGR Temperature
- Post BPV Temperature

Idle the engine for a minimum of 10 minutes to allow temperatures to stabilize. While monitoring, temperature values from sensor to sensor should not vary more than $\pm 30^{\circ}F$.

Do any monitored values vary by more than ±30°F?

- Yes Proceed to step 3
- No Proceed to step 4

Step 3 Step ID 1482c SRT

Repairs or replacement of appropriate component and use DAVIE to re-check for the presence of active faults.

- Fault inactive issue resolve
- Fault active Proceed to step 4

Step 4 Step ID 1482d SRT

Replace: Post BPV Temperature sensor

If no problems were detected in the preceding steps, an internal problem has most likely occurred with the post BPV temperature sensor.

Replace the identified smart sensor and use DAVIE to re-check for the presence of active faults.

- Fault inactive issue resolve
- Fault active Proceed to step 5

Step 5 Step ID 1482e SRT

For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the Engine Support Call Center at 1-800-477-0251.

Verification Drive Cycle

To validate the repair, with the brakes set, start the engine and allow it to run at idle for 2 minutes.

This cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON.

With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.

Back to Index



P1718			
Code number	P1718		
Fault code description	EGR mass flow - Data valid but too high		
Fault code information	1 trip MIL		
	3 drive cycle recovery		
	Readiness group – EGR		
	Freeze frame type - EGR		
Description of	The NOx concentration emitted by the engine is measured in the exhaust gases after the		
component(s)	BPV valve.		
	The NOx sensor before catalyst consists of:		
	Electronic control unit		
	This unit communicates with the PCI ECU and EAS-3 ECU via A-CAN		
	Sensor element		
	The sensor element contains an internal heater. The sensor cannot be separated		
	from the electronic control unit.		
	Sensor heating control		
	The first stage starts when the ignition is keyed on.		
	The sensor is heated to approximately 100°C [212°F], and any condensate		
	evaporates from the sensor.		



The second stage starts after the 'dew point' message is received from the PCI ECU
The sensor is heated to its operating temperature of approximately 800°C
[1472°F]. The PCI ECU determines the 'dew point' by calculating how much energy (heat by burning fuel in the engine) is pumped through the exhaust. If the 'dew point' message is not/no longer received, the sensor temperature stays at/drops to the standby temperature of approximately 100°C [212°F].

Effect on the system:

Controls the engine NOx emission.
Determines the DEF dosing amount by the EAS-3 system Higher measured engine NOx emission results in higher DEF dosing amount.

Location of component(s)

Location of component(s) F844

Diagnostic condition This diagnostic runs: when the engine speed is between 1000 and 1900 rpm, and; when the engine is running at a steady load, and; the engine mode is SCR high-efficiency mode or standard mode, and; the NOx sensor before catalyst (F844) is in the operating mode. Set condition of fault code The PCI ECU (D420) detects that the EGR mass flow is too high for more than 90 seconds. Reset condition of fault This DTC changes to inactive when the fault is no longer detected.



code Electrical diagram(s) NOx Sensor Before Catalyst (F844) F844 0 --FB44 E497 D374 Wiring harness connector F844 front view 122E 12-pin interface connector 160F 8-pin interface connector F844 NOx sensor before catalytic convertor



F844	122E	160F	Function
3	7	4	A-CAN high
2	8	5	A-CAN low
1		8	Power supply after ignition
4		1	Ground

Technical data

Component and wiring checks, NOx sensor before catalyst (F844)

Component check, NOx sensor before catalyst (F844)

This type of component check cannot be checked with a multimeter or oscilloscope. Perform the following to assess the component:

- Monitor/test the component with DAVIE
- Perform the corresponding wiring check

Wiring check, NOx sensor before catalyst (F844)

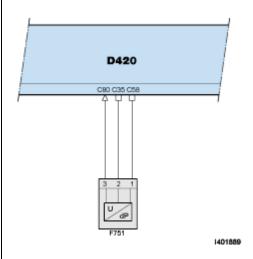
Preparation

- Key off the ignition
- Disconnect connector F844
- Measure on the front side of wiring harness connector F844

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
1	4	Ubat	Key on the ignition
4	Battery negative pole	< 0.5 V	Key on the ignition and switch on all consumers
2	3	± 60 Ω	Key off the ignition Disconnect the ground cable from the battery. Disconnect the vehicle communication interface (VCI) of DAVIE.



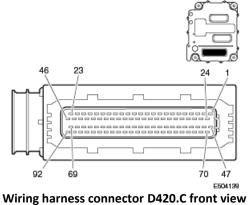
Component and wiring checks, EGR pressure difference sensor (F751)

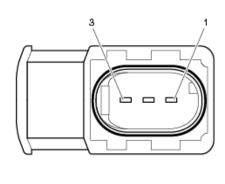


D420 PCI ECU

F751 EGR pressure difference

D420	F751	Function	
C35	2	Ground	
C58	1	Power supply	
C80	3	Signal, EGR pressure	





w V

Wiring harness connector F751 front view



Handle connectors and pins with care and use matching measuring probes.

E504129



Component check, EGR pressure difference sensor (F751)

This type of component cannot be checked with a multimeter or oscilloscope. Perform the following to assess the component:

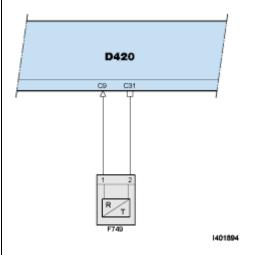
- Perform the wiring check
- Component & wiring check, ECU (D420)

Preparation

- Key off the ignition
- Disconnect connector F751
- Measure on the front side of wiring harness connector F751

Pin (+ probe)	Pin (- probe)	Value	Additional information
1	2	5V	Ignition keyed on

Component and wiring checks, EGR temperature sensor (F749)

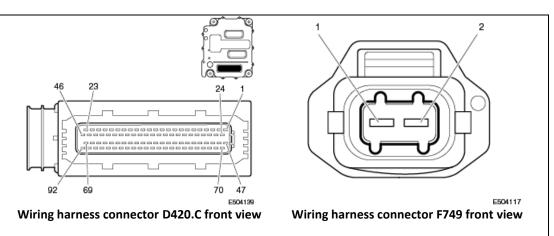


D420 PCI ECU

F749 EGR temperature sensor

D420	F749	Function	
C 9	1	Signal, EGR temperature	
C31	2	Ground	







Handle connectors and pins with care and use matching measuring probes.

Component check, EGR temperature sensor (F749)

Preparation

- Key off the ignition
- Disconnect connector F749
- Measure on the component connector F749

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
1	2	97.7–100.3 Ω	Resistance value at 0°C [32°F]
		107.4–108.2 Ω	Resistance value at 20°C [68°F]
		137.5–139.1 Ω	Resistance value at 100°C [212°F]
		167.3–169.7 Ω	Resistance value at 180°C [356°F]
		192.5–195.5 Ω	Resistance value at 250°C [482°F]



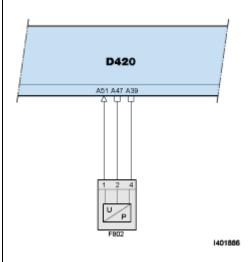
Component & circuit check, ECU (D420)

Preparation

- Key off the ignition
- Disconnect connector F749
- Measure on the front side of wiring harness connector F749

Pin (+ probe)	Pin (- probe)	Value	Additional information
1	2	5V	Ignition keyed on

Component and wiring checks, Boost pressure sensor (F802)

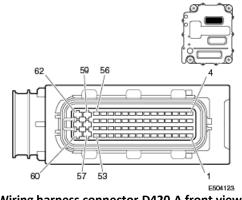


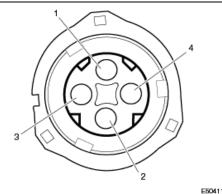
D420 PCI ECU

F802 Boost pressure sensor

D420	F802	Function	
A39	4	Ground	
A47	2	Power supply	
A51	1	Signal, boost pressure	







Wiring harness connector D420.A front view

Wiring harness connector F802 front view



Handle connectors and pins with care and use matching measuring probes.

Component check, boost pressure sensor (F802)

This type of component cannot be checked with a multimeter or oscilloscope. Perform the following to assess the component:

- Monitor/test the component with DAVIE
- Perform the wiring check
- Component & wiring check, ECU (D420)

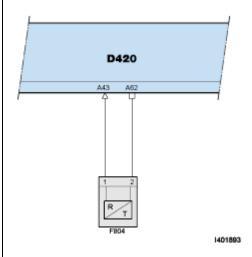
Preparation

- Key off the ignition
- Disconnect connector F802
- Measure on the front side of wiring harness connector F802

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
2	4	5V	Ignition keyed on



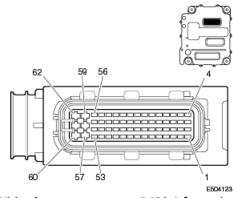
Component and wiring checks, Boost temperature senor (F804)

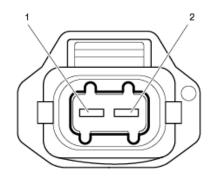


D420 PCI ECU

F804 Boost temperature sensor

D420	F804	Function	
A43	1	Signal, boost temperature	
A62	2	Ground	





E504117

Wiring harness connector D420.A front view

Wiring harness connector F804 front view



Handle connectors and pins with care and use matching measuring probes.



Component check, fuel temperature sensor (F804)

Preparation

- Key off the ignition
- Disconnect connector F804
- Measure on the component connector F804

Pin	Pin	Value	ue Additional information	
(+ probe)	(- probe)			
1	2	5248–5732 Ω	Resistance value at 0°C [32°F]	
		2334–2505 Ω	Resistance value at 20°C [68°F]	
		1133–1198 Ω	Resistance value at 40°C [104°F]	
		593–619 Ω	Resistance value at 60°C [140°F]	
		331–341 Ω	Resistance value at 80°C [176°F]	
		195–199 Ω	Resistance value at 100°C [212°F]	

Component & circuit check, ECU (D420)

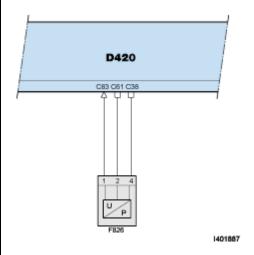
Preparation

- Ignition keyed off
- Disconnect connector F804
- Measure on the front side of wiring harness connector F804

Pin	Pin	Value	Additional information	
(+ probe)	(- probe)			
1	2	5V	Ignition keyed on	



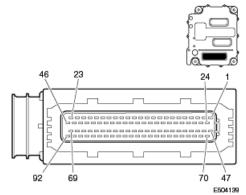
Component and wiring checks, Before turbine pressure sensor (F826)

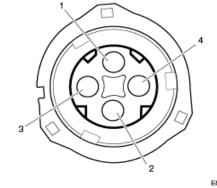


D420 PCI ECU

F826 pressure sensor before turbine

D420	F826	Function	
C38	4	Ground	
C61	2	Power supply	
C83	1	Signal, pressure before turbine	





Wiring harness connector D420.C front view

Wiring harness connector F826 front view



Handle connectors and pins with care and use matching measuring probes.

Component check, pressure sensor after BPV (F826)

This type of component cannot be checked with a multimeter or oscilloscope. Perform the following to assess the component:



- Monitor/test the component with DAVIE
- Perform the wiring check

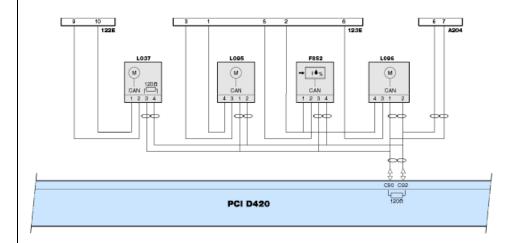
Component & wiring check, ECU (D420)

Preparation

- Key of the ignition
- Disconnect connector F826
- Measure on the front side of wiring harness connector F826

Pin	Pin	Value	Additional information	
(+ probe)	(- probe)			
2	4	5V	Ignition keyed on	

Component and wiring checks, EGR valve module (L095)



122E 12-pin interface connector

123E 7-pin interface connector

A204 electronic fan interface connector

D420 PCI ECU

F852 humidity sensor

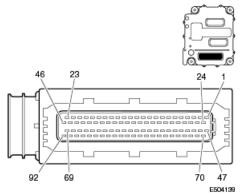
L037 VTG turbocharger actuator

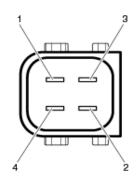
L095 EGR valve module

L096 BPV valve



D420	L095	Function	
C90	1	E-CAN high	
C92	2	-CAN low	
	3	Ground	
	4	Power supply after ignition	





Wiring harness connector D420.C front view

Wiring harness connector L095 front view



Handle connectors and pins with care and use matching measuring probes.

Component check, EGR valve module (L095)

This type of component cannot be checked with a multimeter or oscilloscope. Perform the following to assess the component:

- Monitor/test the component with DAVIE
- Perform the wiring check

Wiring check, EGR valve module (L095)

Preparation

- Key off the ignition
- Disconnect connector L095
- Measure on the front side of wiring harness connector L095

Pin	Pin	Value	Additional information	
(+ probe)	(- probe)			
3	4	Ubat	Ignition keyed on	
1	2	± 60 Ω	Ignition keyed offGround cable from the battery disconnected	



	DAVIE Vehicle Communication				
	Interface (VCI) disconnected				
	interrace (v.s.) also intested				
Possible causes	EGR valve failure				
Additional information	NOx sensor before catalyst deviation The continue NOvember is a great pathogs controlled by your input he ECD flow.				
Additional information	The engine NOx emission is, among others, controlled by varying the EGR flow toward the inlet manifold of the engine.				
	The engine NOx emissions are measured by the NOx sensor before catalyst (F844).				
Diagnostic Step-by-Step	<u> </u>				
	The ignition should always be in the OFF position when connecting or				
	disconnecting electrical components to reduce the likelihood of damage to the				
	components.				
	This troubleshooting procedure is based on the assumption that supply power and				
	ground to the PMCI are functioning properly.				
	 Disconnecting the PMCI connectors during the troubleshooting process will result in multiple errors. 				
	Specific electrical component information and pin out locations are provided in this				
	procedure as a reference only. Always refer to the technical data sections in Rapido for the most up-to-date changes.				
	 It is necessary to use DAVIE to clear all current trouble codes from the PCI and EAS-3 ECUs, and then run the Quick Check to identify a change in fault status. 				
	 This DTC can be set as a result of multiple failure modes. For proper fault isolation, complete all troubleshooting steps in the sequence provided. 				
	Step 1. Investigate Related Trouble Codes				
	Before troubleshooting this code, take notice of any other active or inactive trouble				
	codes. One or multiple other codes could have been the cause for this code.				
	Step 1.A Investigate related trouble codes				
	Action				
	Use DAVIE Diagnostics to perform a Quick Check for current trouble codes.				



Are these or any	other related codes active?	
EGR	P1030; P127A; P127B; P127C; P1288; P1400; P1409; P1458;	P040B; P040C; P040D; P0486; P102D; P1280; P1281; P1284; P1285; P1286; P1480; P1481; P1482; P1483; P1484; P1489; P1490; P1494; P1496; P1572; P2457
VGT		P104E; P104F; P1111; P1235; P1350; P1580; P1581; P1727; P2563; P2579;
NOx sensor, before catalyst		P3867; P3868; P3869; P3870; P3871;
Yes		No
Stop troubleshooting P1711 and refer to the troubleshooting information for these trouble codes.		2.A

Step 2. EGR System Checks

Step 2. A Visual Inspection: EGR Pressure Difference sensor (F751)

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - ECU connections are damaged or disconnected
 - Battery not fully charged, contacts not tight
 - Signs of exhaust or coolant leaks on the EGR
 - Broken or missing clamps on any air system component
 - Improper seal between the sensor and mounting block
 - Improper seal at pipe fittings

Was there evidence of any of the above?



Yes	No
Correct any issues found. If the Lambda sensor (F834) is found to be damaged or broken, replace it. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.B	2.B

Step 2.B Electrical checks, EGR pressure difference sensor (F751)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

2.B.1 Supply voltage

Action

1. Confirm the supply voltage level as outlined in the checking data, <u>component</u> check, EGR pressure difference sensor (F751).

Are measured values within expected range?

- не	
Yes	No
Go to step 2.C	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.C.

Step 2. C Visual inspection, EGR temperature sensor (F749)

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins



		10		
•	Moistiire	or dirt ii	n the	connections

- Damage to the wire harness or insulation
- ECU connections damaged or disconnected
- Batteries are not okay, contacts are not tight
- Signs of exhaust or coolant leaks on the EGR
- Sensor damaged

Was there evidence of any of the above?

Yes	No
Correct any issues found, or replace the sensor if damaged. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.D	

Step 2.D Electrical checks, EGR pressure temperature sensor (F749)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

2.D.1 Resistance checks

Action

1. Confirm the sensor resistance as outlined in the corresponding checking data, component check, EGR temperature sensor (F749).

Are measured values within expected range?

Yes	No
Go to step 2.D.2	Correct any issues found, or replace the sensor if measured values indicate a sensor error.
	Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick
	Check for current trouble codes. If this code is still present, proceed to Step



		2.D.2
2.D.2	Supply voltage	
Action		
1.	Confirm the supply valte	
т.	Commit the supply voice	age to the EGR temperature sensor (F749) as outlined
1.	• • •	ecking data, <u>component & circuit check, ECU (D420).</u>
1.	• • •	• • • • • • • • • • • • • • • • • • • •
	• • •	ecking data, <u>component & circuit check, ECU (D420).</u>
	in the corresponding ch	ecking data, <u>component & circuit check, ECU (D420).</u>
Are me	in the corresponding ch	ecking data, <u>component & circuit check, ECU (D420).</u> pected range? No
Are me	in the corresponding ch	ecking data, component & circuit check, ECU (D420). pected range?
Are me	in the corresponding ch	ecking data, component & circuit check, ECU (D420). Pected range? No Correct any issues found, or replace the sensor if measured values indicate a sensor error.
Are me	in the corresponding ch	ecking data, component & circuit check, ECU (D420). Pected range? No Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the
Are me	in the corresponding ch	ecking data, component & circuit check, ECU (D420). Pected range? No Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles.
Are me	in the corresponding ch	ecking data, component & circuit check, ECU (D420). Pected range? No Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quicle
Are me	in the corresponding ch	ecking data, component & circuit check, ECU (D420). Pected range? No Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the

Step 2. E Visual inspection, Boost pressure sensor (F802)

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins
 - Moisture or dirt in the connections
 - Soot buildup on the sensor orifice or around the sensor port

Was there evidence of any of the above?

Yes	No
Correct any issues found, or replace the sensor if damaged.	2.F
Refer to Step 7.A to perform the corresponding repair verification cycles.	
Use DAVIE Diagnostics to perform a Quick	
Check for current trouble codes.	



If this code is still present, proceed to Step	
2.F	

Step 2.F Electrical checks, boost pressure sensor (F802)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

2.F.1 Supply voltage

Action

1. Confirm the supply voltage to the boost pressure sensor (F801) as outlined in the corresponding checking data, component & wiring check, ECU (D420).

Are measured values within expected range?

Yes	No
Go to step 2.G	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.G.

Step 2. G Visual inspection, boost temperature sensor (F804)

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - Loose or broken clamps on the air system
 - ECU connections are not damaged or disconnected
 - Batteries are not okay, contacts are not tight
 - Soot buildup on the sensor orifice or around the sensor port

Was there evidence of any of the above?



Yes	No
Correct any issues found, or replace the sensor if damaged. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.H	2.H

Step 2.H Electrical checks, boost temperature sensor (F804)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

2.H.1 Resistance checks

Action

1. Confirm the resistance values as outlined in the corresponding checking data, component check, boost temperature sensor (F804).

Are measured values within expected range?

Yes	No
Go to step 2.G.2	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.G.2.

2.H.2 Supply voltage

Action

1. Confirm the supply voltage to the boost temperature sensor (F804) as outlined in the corresponding checking data, component & circuit check, ECU (D420).

Are measured values within expected range?

Yes	No



Go to step 2.I	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick
	Check for current trouble codes.
	If this code is still present, proceed to Step 2.I.

Step 2. I Visual inspection, before-turbine pressure sensor (F826)

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - Batteries are not okay, contacts are not tight
 - Loose or broken clamps on the air system
 - Visible signs of exhaust leaks on the EGR
 - Related sensor not installed correctly

Was there evidence of any of the above?

Yes	No
Correct any issues found, or replace the sensor if damaged. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.J	2.J



Step 2.J Electrical checks, before-turbine pressure sensor (F826)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

2.J.1 Supply voltage

Action

2. Confirm the supply voltage to the before turbine pressure sensor (F826) as outlined in the corresponding checking data, component & wiring check, ECU (D420).

Are measured values within expected range?

The measured values within expected range.	
Yes	No
Go to step 3.A	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 3.A.

Step 3. Intake and Exhaust Leak Check

Step 3.A Special test, Intake/Exhaust Leak

Action

1. Refer to the identified procedure to inspect the exhaust system for leaks.

Were any leaks in the intake or exhaust system detected?

Yes	No
Correct any issues found.	4.A
Refer to Step 7.A to perform the	
corresponding repair verification cycles.	
Use DAVIE Diagnostics to perform a Quick	
Check for current trouble codes.	
If this code is still present, proceed to Step	
4.A	

Step 4. Check for EGR Restrictions



Step 4.A Visual inspection, EGR valve module (L095) **Action** 1. Visually inspect the associated component connections and wiring for any of the following: Damaged or loose connectors Bent, broken, corroded or loose connector pins Moisture or dirt in the connections Damage to the wire harness or insulation ECU connections are not damaged or disconnected Batteries are not okay, contacts are not tight EGR Module not installed correctly Signs of damage to the EGR valve and module Was there evidence of any of the above? No Yes Correct any issues found, or replace the 4.B EGR valve if damaged. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 4.B Step 4.B Electrical checks, EGR valve module (L095) Refer to the corresponding Checking Data in Engine Service - Rapido for associated supply and signal voltages, resistance values, and related connector pin test points. 4.B.1 Resistance checks **Action** 1. Confirm the resistance values as outlined in the corresponding checking data, wiring check, EGR valve module (L095). Are measured values within expected range?

No

Yes



Goto	o step 4.B.2	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 2.B.2.
4.B.2	Supply voltage	
Actio	on	
1	Confirm supply voltage to the EGR volume corresponding checking data, wiring	
Are r	neasured values within expected range	?
Yes		No
Goto	o step 4.C	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 4.C.
Step	4.C Visual inspection, EGR cooler	
Actio	 Visually inspect the associated com reservoir for the following: Signs of exhaust or coolant leak 	
	Low coolant level	
	there evidence of any of the above?	N .
Yes		No



Correct any issues found.	4.D
Refer to Step 7.A to perform the	
corresponding repair verification cycles.	
Use DAVIE Diagnostics to perform a Quick	
Check for current trouble codes.	
If this code is still present, proceed to Step	
4.D	

Step 4.D Special test, EGR cooler internal leak

Action

1. Perform the prescribed test to determine if there is a coolant leak affecting EGR performance.

Does the test fail to complete or result in a failed state?

2005 the test fail to complete of result in a failed state.	
Yes	No
Correct any issues found, or replace the EGR cooler if found damaged. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 4.E	4.E

Step 4.E DAVIE Performance test, EGR service

Action

1. Run the prescribed DAVIE performance test to determine if the EGR Valve has any mechanical issues by monitoring related parameters while opening and closing the EGR Valve.

Does the test fail to complete or result in a failed state?

boes the test fail to complete of result in a failed state.	
Yes	No
Correct any issues found, or replace the EGR valve actuator if found to be damaged. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 5.A	5.A



Step 5. Turbocharger (VGT) Actuator Checks

Step 5.A Visual inspection, VGT

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors?
 - Bent, broken, corroded or loose connector pins?
 - Moisture or dirt in the connections?
 - Damage to the wire harness or insulation?
 - ECU connections are not damaged or disconnected?
 - Batteries are not okay, contacts are not tight?
 - Broken or missing clamps around the Turbo?
 - Incorrect parts are installed?
 - Turbo or Turbo Actuator not properly installed?
 - Alternator is damaged or functioning outside of manufacturer's specifications?

Was there evidence of any of the above?

Yes	No
Correct any issues found.	5.B
Refer to Step 7.A to perform the	
corresponding repair verification cycles.	
Use DAVIE Diagnostics to perform a Quick	
Check for current trouble codes.	
If this code is still present, proceed to Step	
5.B	

Step 5.B DAVIE Performance test, Turbocharger (VGT) Actuator Effort

Action

1. Run the prescribed DAVIE performance test to determine correct operation of the VGT actuator.

Does this test fail to complete or result in a failed state?

Yes No



Correct any issues found.	6.A
Refer to Step 7.A to perform the	
corresponding repair verification cycles.	
Use DAVIE Diagnostics to perform a Quick	
Check for current trouble codes.	
If this code is still present, proceed to Step	
6.A	

Step 6. NOx Sensor Before Catalyst Checks

Step 6.A Visual inspection, NOx sensor before catalyst (F844)

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - ECU connections are damaged or disconnected
 - Batteries are not okay, contacts are not tight
 - The NOx Sensor, before catalyst is broken or incorrectly installed
 - The correct parts are not installed
 - Broken or missing clamp around the Turbo and BPV

Yes Correct any issues found, or replace the EGR valve if damaged. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 6.B

Step 6.B Electrical checks, NOx sensor before catalyst (F844)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.



6.B.1 Resistance checks

Action

1. Confirm the resistance values as outlined in the corresponding checking data, wiring check, NOx sensor before catalyst (F844).

Are measured values within expected range?

Yes Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 6.B.2.	•	3
sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step	Yes	No
	Go to step 6.B.2	sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step

6.B.2 Supply voltage

Action

1. Confirm supply and signal voltage values as outlined in the corresponding checking data, wiring check, NOx sensor before catalyst (F844).

Are measured values within expected range?

Are measured values within expected range:	
Yes	No
Go to step 8.A	Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to Step 7.A to perform the corresponding repair verification cycles. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. If this code is still present, proceed to Step 8.A.

Step 7. Repair Verification

Step 7.A Repair Verification Cycles

Perform these repair verification cycles following any corrective actions taken, to confirm that this fault is no longer active.



İ	Before beginning these repair verification cycles, use the DAVIE Quick Check function clear all current DTCs from the PCI and EAS-3 ECUs.
Action	
1.	Steady State
	This cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON. With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.
Sten 8	a steady 3 to 5 miles is unachievable. Contacting PACCAR Engine Support Center
Step 8.	.A Contact PACCAR Engine Support Center
	
Action	

Back to Index



P1719

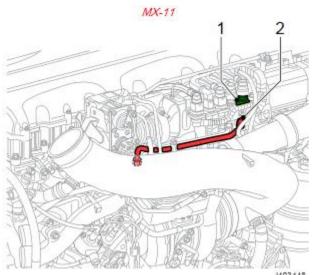
Code number	P1719
Fault code description	EGR mass flow - Data valid but too low
Fault code information	1 trip MIL 3 drive cycle recovery Readiness group – EGR Freeze frame type – EGR
Description of	Description, boost pressure sensor (F802)
component(s)	 The boost pressure is measured in the inlet manifold near cylinder 1. Effect on the system: Determines the smoke limit A higher measured boost pressure increase results in higher torque for the same smoke level Determines soot emissions A higher measured boost pressure results in lower calculated soot emission by the engine. Determines NOx emissions A higher measured boost pressure results in higher calculated NOx emission by the engine. Calculates exhaust gas mass flow used for DEF dosing estimation by the EAS-3 system A higher measured boost pressure results in higher calculated exhaust gas mass flow. Calculates the temperature after the compressor (VTG turbo charger) A higher measured boost pressure results in higher calculated temperature after the compressor. Calculates the temperature before the turbine. A higher measured boost pressure results in lower calculated exhaust gas temperature before the turbine.
	Description, pressure sensor before turbine (F826) The exhaust gas pressure before the
	turbine is measured with sensor (1) via
	a steel tube (2) before the EGR valve.



Effect on the system:

- Control of the VTG turbo charger
- Control of the EGR flow
- Control of the BPV valve
- Control of the engine brake
- Calculates the exhaust gas temperature before the turbine

Lower measured exhaust gas pressure before turbine results in higher calculated exhaust gas temperature before the turbine.

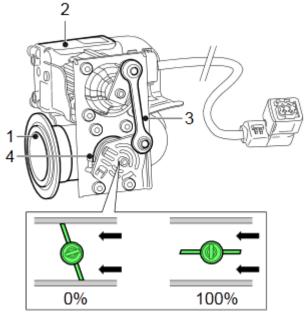


Description, EGR valve module (L095)

The EGR module consists of an actuator and an EGR valve.

The main task of the EGR valve is to control the EGR flow to the inlet manifold.

The EGR position does not necessarily indicate the amount of EGR flow to the inlet manifold. The amount of EGR gas fed back mainly depends on the pressure difference between the pressure before turbine and the boost pressure, in combination with the EGR valve position.



1402295

- **Butterfly valve** 1
- 2 EGR valve actuator
- 3 Lever



4 Spring

The main components of the EGR valve actuator are:

- ECU
- Electromotor

The electromotor rotates the output shaft via internal gears.

- output shaft
 - The butterfly is moved via a lever by rotating the output shaft
- electromotor position sensor

The position of the electromotor is monitored.

- output shaft position sensor
 - The position of the output shaft is monitored.
- temperature sensor

The temperature of the printed circuit board of the ECU is monitored.

Control

The EGR valve actuator is a smart actuator that communicates with the PCI ECU via E-CAN. The actuator ECU is controlled by the PCI ECU but has its own diagnostics on the following actuator inputs and outputs:

- power supply voltage
- electromotor position
- electromotor current
- output shaft position
- ECU printed circuit board temperature
- ECU hardware and software

After the ignition is keyed on, the valve position is 0% until the PCI ECU commands the actuator.

Unpowered and fail-safe position

The unpowered and the fail-safe positions of the valve are controlled by a spring and are fully closed (0%). If a failure is detected the EGR valve moves to the fail-safe position, if possible.

Effect on the system:

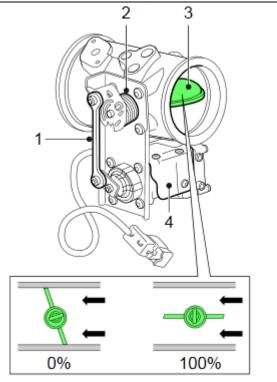
Controlling the EGR gas flow to the inlet manifold.
 A higher opening percentage results in a higher amount of EGR flow at the same pressure difference between the pressure before turbine and the boost pressure

Description, back pressure valve (BPV) actuator (L096)

The BPV actuator consists of an actuator and a BPV valve.

The main task of the BPV valve is to create back pressure in the engine exhaust system and control exhaust gas mass flow.





1402268

- 1 Lever
- 2 Spring
- 3 Butterfly valve
- 4 BPV actuator

The main components of the BPV actuator are:

- FCU
- Electromotor

The electromotor rotates the output shaft via internal gears.

output shaft

The butterfly is moved via a lever by rotating the output shaft

• electromotor position sensor

The position of the electromotor is monitored.

output shaft position sensor

The position of the output shaft is monitored.

• temperature sensor

The temperature of the printed circuit board of the ECU is monitored.

Contro

The BPV actuator is a smart actuator that communicates with the PCI ECU via E-CAN. The actuator ECU is controlled by the PCI ECU but has its own diagnostics on the following actuator inputs and outputs:

- power supply voltage
- electromotor position
- electromotor current
- output shaft position
- ECU printed circuit board temperature
- ECU hardware and software



After the ignition is keyed on, the valve position is 100% until the actuator is controlled by the PCI ECU.

Unpowered and fail-safe position

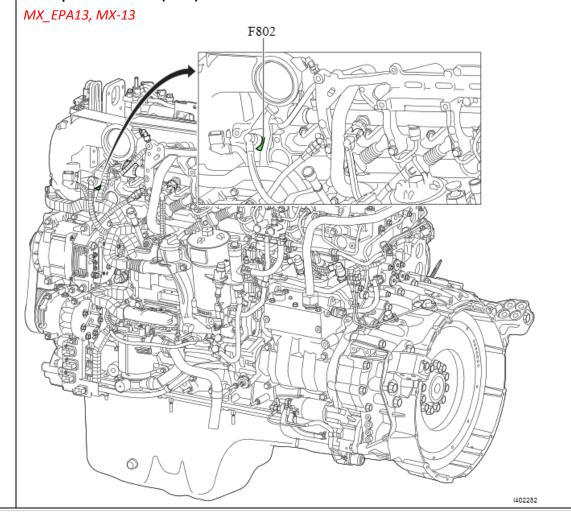
The unpowered and fail-safe positions of the valve are controlled by a spring and are fully open (100%). If a failure is detected the BPV valve moves to the fail-safe position, if possible.

Effect on the system:

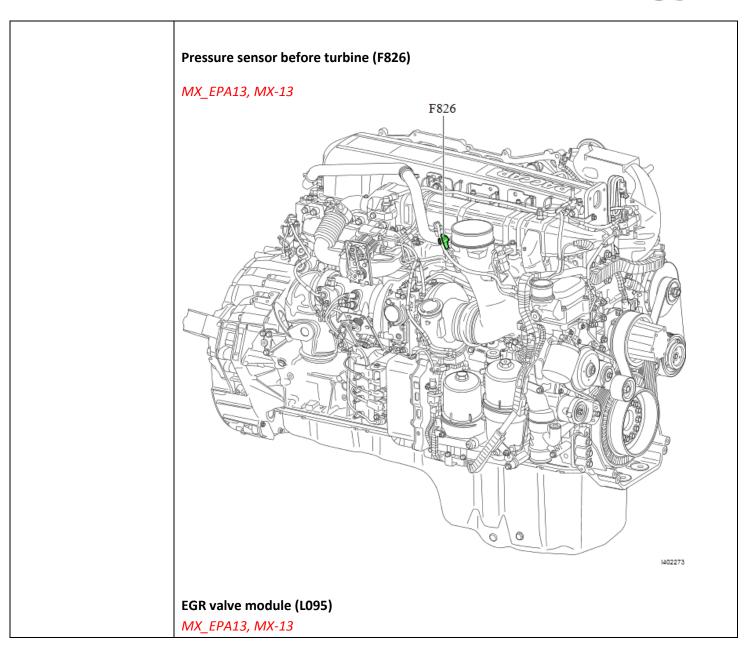
- Creating heat in the exhaust system to heat up the EAS system.
 A lower opening percentage results in a higher back pressure and more heat.
- Decreasing the exhaust gas flow in the exhaust system to heat up the EAS system.
 A lower opening percentage results in a lower exhaust gas flow in the exhaust system and more heat.
- Altering the pressure drop across the turbine rotor for VTG turbo control.
- Creating back pressure to create EGR gas flow.
- Creating back pressure to create engine braking.

Location of component(s)

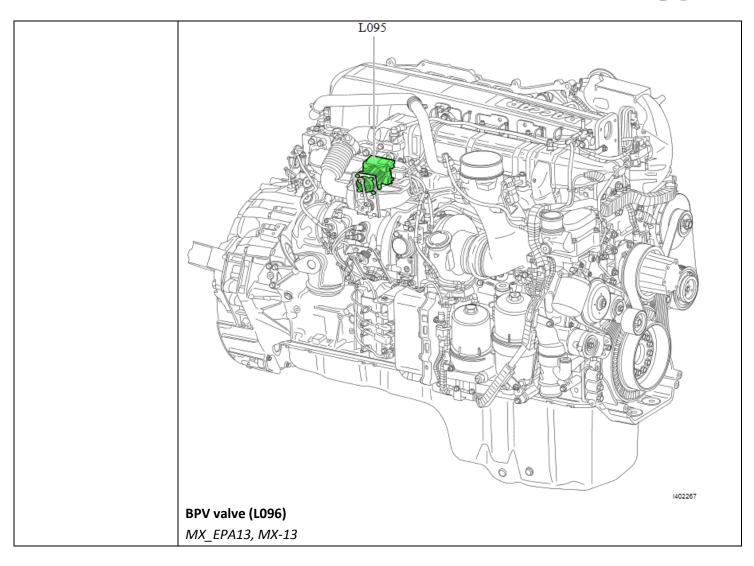
Boost pressure sensor (F802)



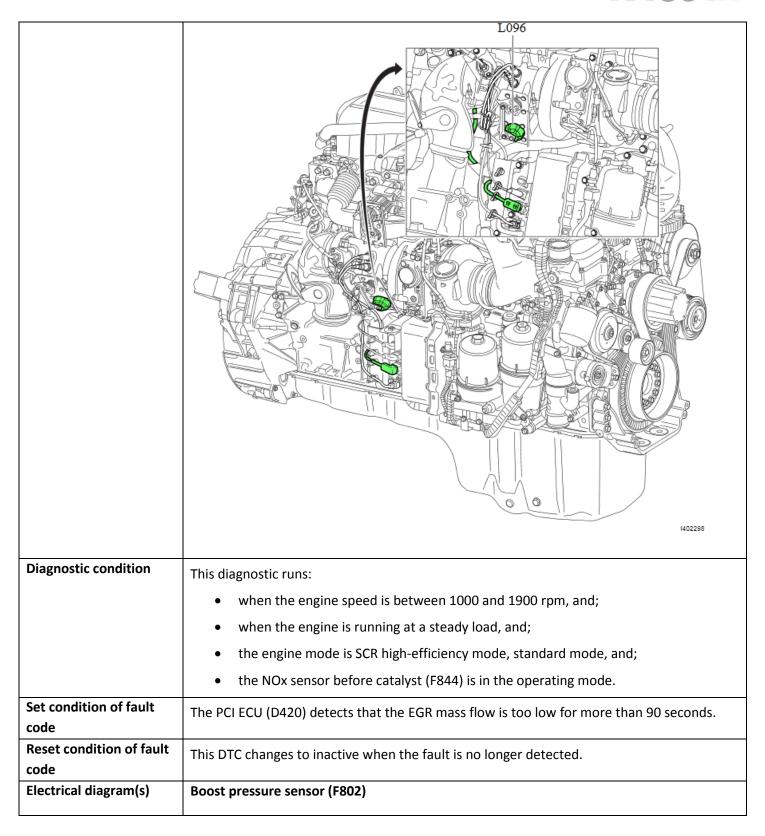




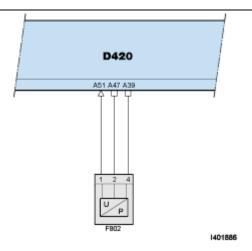








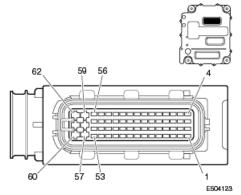


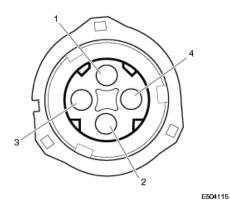


D420 PCI ECU

F802 Boost pressure sensor

D420	F802	Function	
A39	4	Ground	
A47	2	ower supply	
A51	1	Signal, boost pressure	





Wiring harness connector D420.A front view

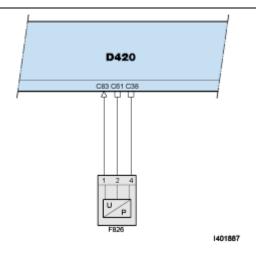
Wiring harness connector F802 front view



Handle connectors and pins with care and use matching measuring probes.

Before turbine pressure sensor (F826)

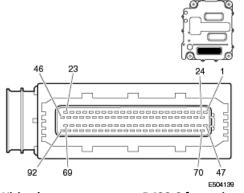


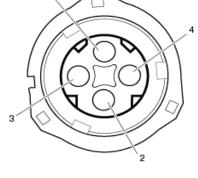


D420 PCI ECU

F826 pressure sensor before turbine

D420	F826	Function	
C38	4	Ground	
C61	2	ower supply	
C83	1	signal, pressure before turbine	





Wiring harness connector D420.C front view

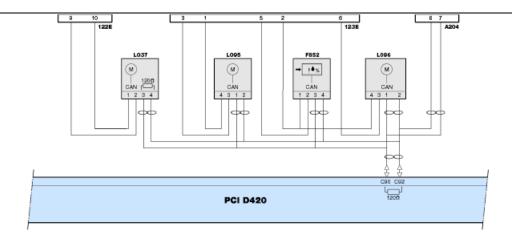
Wiring harness connector F826 front view



Handle connectors and pins with care and use matching measuring probes.

EGR valve module (L095)





122E 12-pin interface connector

123E 7-pin interface connector

A204 electronic fan interface connector

D420 PCI ECU

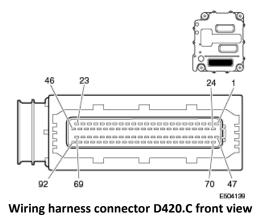
F852 humidity sensor

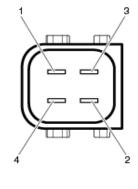
L037 VTG turbocharger actuator

L095 EGR valve module

L096 BPV valve

D420	L095	Function	
C90	1	E-CAN high	
C92	2	-CAN low	
	3	Ground	
	4	Power supply after ignition	





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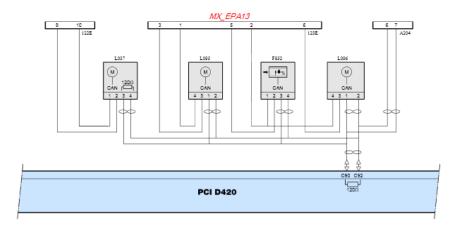
Wiring harness connector L095 front view



Handle connectors and pins with care and use matching measuring probes.



Checking data, BPV valve (L096)



1402111

122E 12-pin interface connector

123E 7-pin interface connector

A204 electronic fan interface connector

D420 PCI ECU

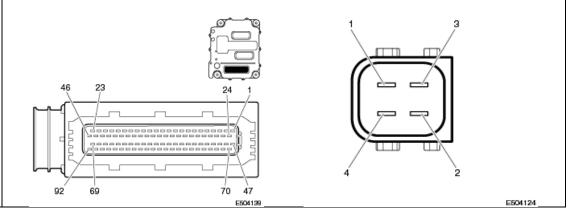
F852 humidity sensor

L037 VTG turbocharger actuator

L095 EGR valve module

L096 BPV valve

D420	L096	Function	
C90	1	E-CAN high	
C92	2	-CAN low	
	3	Ground	
	4	Power supply after ignition	





	Wiring harness connector D420.C front view	Wiring harness connector L096 front view	
	Handle connectors and pins with care a	and use matching measuring probes.	
Technical data	Component check, boost pressure sensor (F80	2)	

This type of component cannot be checked with a multimeter or oscilloscope. Perform the following to assess the component:

- Monitor/test the component with DAVIE
- Perform the wiring check as follows:

Wiring check, boost pressure sensor (F802) - ECU (D420)

Preparation

- Key off the ignition
- Disconnect connector F802
- Measure on the front side of wiring harness connector F802

Pin (+ probe)	Pin (- probe)	Value	Additional information
2	4	5V	Ignition keyed on

Component check, before turbine pressure sensor (F826)

This type of component cannot be checked with a multimeter or oscilloscope. Perform the following to assess the component:

- Monitor/test the component with DAVIE
- Perform the corresponding wiring check as follows:

Wiring check, before turbine pressure sensor (F826) - ECU (D420)

Preparation

- Key of the ignition
- Disconnect connector F826
- Measure on the front side of wiring harness connector F826

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
2	4	5V	Ignition keyed on

Component check, EGR valve module (L095)



This type of component cannot be checked with a multimeter or oscilloscope. Perform the following to assess the component:

- Monitor/test the component with DAVIE
- Perform the wiring check

Wiring check, EGR valve module (L095)

Preparation

- Key off the ignition
- Disconnect connector L095
- Measure on the front side of wiring harness connector L095

Pin (+ probe)	Pin (- probe)	Value	Additional information
(+ probe)	(- probe)		
3	4	Ubat	Ignition keyed on
1	2	± 60 Ω	 Ignition keyed off Ground cable from the battery disconnected DAVIE Vehicle Communication Interface (VCI) disconnected

Component check, BPV valve (L096)

This type of component cannot be checked with a multimeter or oscilloscope. Perform the following to assess the component:

- Monitor/test the component with DAVIE
- Perform the wiring check

Wiring check, BPV valve (L096)

Preparation

- Key off the ignition
- Disconnect connector L096
- Measure on the front side of wiring harness connector L095

Pin (+ probe)	Pin (- probe)	Value	Additional information
4	3	Ubat	Ignition keyed on
1	2	± 60 Ω	 Ignition keyed off Ground cable from the battery disconnected DAVIE Vehicle Communication Interface (VCI) disconnected



Possible causes	Restricted air flow through intercooler/radiator.		
	This can be caused by:		
	 A fouled bug screen 		
	o A fouled intercooler		
	 The use of a winter front at temperatures above 4°C [40°F] 		
	 The use of an aftermarket winter front with excessive airflow restriction through the intercooler/radiator. 		
	Leaking EGR system		
	Clogged EGR system (contaminated EGR cooler, contaminated EGR pressure difference sensor venturi)		
	Sticking EGR valve		
	NOx sensor before catalyst deviation		
Additional information	The engine NOx emission is, among others, controlled by varying the EGR flow toward the inlet manifold of the engine.		
	The engine NOx emissions are measured by the NOx sensor before catalyst (F844).		
Diagnostic Step-by-Step	The ignition should always be in the OFF position when connecting or disconnecting electrical components to reduce the likelihood of damage to the components.		
	This troubleshooting procedure is based on the assumption that supply power and ground to the PCI are functioning properly.		
	 Disconnecting the PCI connectors during the troubleshooting process will result in multiple errors. 		
	 Specific electrical component information and pin out locations are provided in this procedure as a reference only. Always refer to the technical data sections in Rapido for the most up-to-date changes. 		
	 It is necessary to use DAVIE to clear all current trouble codes from the PCI and EAS-3 ECUs, and then run the Quick Check to identify a change in fault status. 		
	 This DTC can be set as a result of multiple failure modes. For proper fault isolation, complete all troubleshooting steps in the sequence provided. 		
	Step 1 Investigate Related DTCs		
	Before troubleshooting this DTC, take notice of any other active or inactive DTCs. One or multiple other DTCs could have been the cause for this DTC.		
	Step 1A Investigate related DTCs		





Troubleshoot P1719 if the DTC is active or inactive and has occurred within the previous 5,000 miles or 30 days.

Action

1. Use DAVIE Diagnostics to perform a Quick Check for current DTCs.

Are these or any other related DTCs active?

EGR P0405; P0406; P127A; P127C; P1480; P1486; P1487; P1488; P1489;

P1490

VGT P0046; P0049; P102C; P104E; P1235; P1350; P1351; P1354; P1580;

P1581; P1727; P2563; P2579; P2580; P2581

P1042; P104D; P1057; P1723; P1724

BPV P101E; P101F; P1026; P1722

Pressure

sensor before

turbine

NOx sensor, P103C; P171B; P171C; P3863; P3864; P3865; P3866; P3867; P3868;

before catalyst P3869; P3870; P3871; P3873; P3877; P3881

P0069; P0095; P0097; P0098; P0107; P0108; P0102; P0103; P0127; Intercooler

Efficiency P1010; P1027; P1028; P1573

Yes	No
Stop troubleshooting P1719 and refer to the troubleshooting information for these DTCs.	
	Go to step 2A

Step 2 Intercooler Checks

Step 2A Visual inspection, airflow to intercooler

Action

- 1. Visually inspect for airflow restrictions to the intercooler, including any of the following:
 - Improper use of a winterfront at temperatures above 4 °C [40 °F]
 - Use of an aftermarket winterfront with excessive restriction through the intercooler.
 - A contaminated intercooler

Was there evidence of any of the above?



Yes	No
Correct any issues found. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.	
If this DTC is still present, go to step 2B	Go to step 2B

Step 2B Visual inspection, engine fan

Action

- 1. Visually inspect the engine fan for any of the of the following:
 - improper operation
 - damage to the fan blades

Was there evidence of any of the above?

Yes	No
Correct any issues found. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.	
If this DTC is still present, go to step 3A	Go to step 3A

Step 3 Pressure Sensor Before Turbine Checks

Step 3A Visual inspection, connections and wiring, pressure sensor before turbine (F826)

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - The correct parts are not installed
 - ECU connections are damaged or disconnected



- Batteries not fully charged or contacts are not tight
- Soot build-up on sensor pressure port
- Damage to the pressure line to the sensor
- Restrictions or blockages in pressure lines to the sensor

Was there evidence of any of the above?

Yes	No
Correct any issues found. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.	
If this DTC is still present, go to step 3B	Go to step 3B

Step 3B Electrical checks, supply voltage, pressure sensor before turbine (F826)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

1. Confirm the supply voltage level as outlined in the corresponding checking data, "Component check, pressure sensor before turbine (F826)."

Are measured values within expected range?

Yes	No
	Correct any issues found. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.
Go to step 4A	If this DTC is still present, go to step 4A

Step 4 Boost Pressure Sensor Checks

Step 4A Visual inspection, connections and wiring, boost pressure sensor (F802)

Action

1. Visually inspect the associated component connections and wiring for any of the



following:

- Damaged or loose connectors
- Bent, broken, corroded or loose connector pins
- Moisture or dirt in the connections
- Damage to the wire harness or insulation
- The correct parts are not installed
- ECU connections are damaged or disconnected

Was there evidence of any of the above?

Yes	No
Correct any issues found. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.	
If this DTC is still present, go to step 4B	Go to step 4B

Step 4B Electrical checks, supply voltage, boost pressure sensor (F802)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

1. Confirm the supply voltage level as outlined in the corresponding checking data, "Component check, boost pressure sensor (F802)."

Are measured values within expected range?

Yes	No
	Correct any issues found. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.
Go to step 4C	If this DTC is still present, go to step 4C

Step 4C Special check, boost pressure sensor (F802) and pressure sensor before turbine (F826)



Action

- 1. Use DAVIE to monitor the following values with the ignition switch set to ON and the engine NOT running:
 - Ambient pressure
 - Exhaust gas pressure before turbine
 - Exhaust gas pressure before turbine (absolute)
 - Inlet air pressure before compressor
 - Inlet air pressure in inlet manifold (absolute)
 - Inlet air pressure in inlet manifold (relative)

Expected results:

- The exhaust gas pressure before turbine (absolute) must be equal to the ambient pressure.
- The exhaust gas pressure before turbine must be equal 0 psi [0 kPa].
- The inlet air pressure in the inlet manifold (absolute) must be equal to the ambient pressure.
- The inlet air pressure in the inlet manifold (relative) must be equal 0 psi [0 kPa].

Do the exhaust gas pressure before the turbine and inlet air pressure in inlet manifold agree within 1 psi (16 kPa) of the other values?

Yes	No
	Correct any issues found, or replace the corresponding sensor if measured values indicate a sensor error. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.
Go to step 5A	If this DTC is still present, go to step 5A

Step 5 Exhaust System Checks

Step 5A Visual inspection, exhaust leaks, turbocharger

Action

1. Visually inspect the exhaust system between the cylinder head and the turbocharger turbine for the presence of leaks.



Soot accumulation observed at the exhaust manifold sliding connections is not to be considered an exhaust leak. For additional information, refer to the topic, "<u>Exhaust</u> manifold leakage" located under Power source\Inlet & Exhaust.



Was there evidence of any of the above?	
Yes	No
Correct any issues found. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.	
If this DTC is still present, go to step 5B	Go to step 5B
Step 5B Visual inspection, EGR leaks	
 Visually inspect the EGR system for 	exhaust leaks.
Was there evidence of any of the above?	
Was there evidence of any of the above? Yes	No
·	No
Yes Correct any issues found. Refer to step 10A to perform the corresponding repair verification cycles	No Go to step 5C
Yes Correct any issues found. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.	
Correct any issues found. Refer to step 10A to perform the corresponding repair verification cycles and rechecks. If this DTC is still present, go to step 5C	

No

Yes



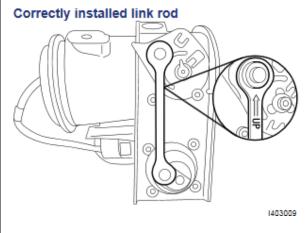
Correct any issues found. Go to step 6A before reconnecting the flexible exhaust pipe.	
Go to step 6A	Go to step 6A

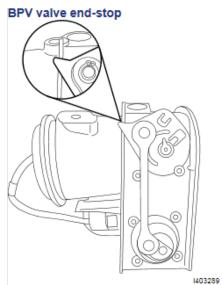
Step 6 BPV Check

Step 6A Visual inspection, BPV mechanism

Action

- 1. Switch OFF the ignition.
- 2. Visually check that the link rod of the BPV mechanism is installed correctly. The arrow must point upward.
- 3. Visually check that the contact area of the BPV end-stop is clean and free of damage.





Is the link rod correctly installed and the BPV end-stop clean and free of damage?

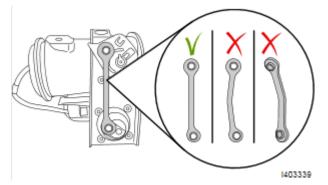
Yes	No
	Install the link rod correctly, clean the BPV end-stop, or if damage is found replace the BPV. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.
Go to step 6B	If this DTC is still present, go to step 6B



Step 6B Visual inspection, link rod, BPV actuator (L096)

Action

- 1. Switch OFF the ignition.
- 2. Visually check that the link rod of the BPV mechanism is free of damage.



Is the link rod free of damage?

Yes	No
	Replace the BPV. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.
Go to step 6C	If this DTC is still present, go to step 6C

Step 6C Visual inspection, movement of the BPV mechanism



Always switch the ignition OFF when working on the BPV mechanism.

- The valve mechanism can move when the ignition switched ON. Touching the mechanism can result in physical injury.
- Maintain a safe distance if the valve is monitored with the ignition keyed on.



Action

- 1. Switch ON the ignition.
- 2. Check for free movement of the BPV mechanism by manually moving the link rod (1).

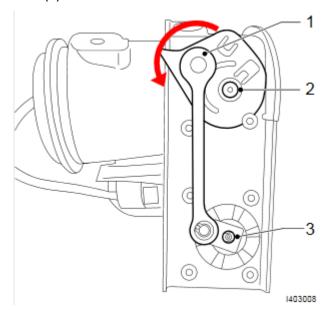


The movement requires some force because of the presence of a return spring.

Do not use a tool to move the mechanism.

During the movement check that:

- the resistance of the mechanism to move is uniform over the full travel path of the link rod (1), and
- the actuator shaft (3) and valve shaft (2) rotate over the full travel path of the link rod (1).



Does the BPV mechanism move freely over the full travel path of the link rod?

Yes	No
	Possible blockage/soot accumulation in the valve housing. Correct any issues found, or replace the BPV if damaged. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.
Go to step 6D	If this DTC is still present, go to step 6D



Step 6D Visual inspection, blockage in the BPV housing



Always switch the ignition OFF when working on the BPV mechanism.

- The valve mechanism can move when the ignition switched ON.
 Touching the mechanism can result in physical injury.
- Maintain a safe distance if the valve is monitored with the ignition keyed on.

Action

1. Switch OFF the ignition.

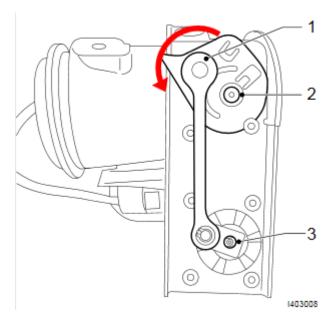
Loosen the exhaust pipe between turbocharger and flexible pipe as outlined in the maintenance procedure "replace assembly Back Pressure Valve (Aftertreatment, eng.)," (job code: J 1435 264406 001 033).

2. Check if there is an internal blockage or excessive soot accumulation around the butterfly valve and housing. Open the valve by moving the link rod (1).



The movement requires some force because of the presence of a return spring.

Do not use a tool to move the mechanism.



Is there evidence of internal blockage or excessive soot accumulation around the butterfly valve and housing?

Yes

No



1.	Remove blockage/clean the internal valve housing.	A malfunctioning BPV has been detected. Replace the BPV.
2.	Monitor the BPV position with DAVIE to check that the cleaning was effective.	Refer to step 10A to perform the corresponding repair verification cycles and rechecks.
3.	Install the exhaust pipe between turbocharger and flexible pipe as outlined in the maintenance procedure, "replace assembly Back Pressure Valve (Aftertreatment, eng.)" (job code: J 1435 264406 001 033)	
coı	fer to step 10A to perform the responding repair verification cycles d rechecks.	
If t	his DTC is still present, go to step 6E	Go to step 6E

Step 6E Visual inspection, BPV butterfly valve blade

Action

- 1. Switch OFF the ignition
- 2. With the flexible exhaust pipe after the back pressure valve removed, inspect the BPV butterfly valve blade for the following:
 - The blade should be riveted to the shaft
 - The valve should open and close fully when the valve mechanism is operated

Was the butterfly valve plate secure on the shaft and does the valve open and close fully?

Yes	No
	Replace the BPV actuator. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.
Go to step 6F	If this DTC is still present, go to step 6F

Step 6F Visual inspection, connections and wiring, BPV actuator (L096)



Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - The correct parts are not installed
 - ECU connections are damaged or disconnected

Was there evidence of any of the above?

Yes	No
Correct any issues found, or replace the sensor if measured values indicate a sensor error. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.	
If this DTC is still present, go to step 6G	Go to step 6G

Step 6G Electrical checks, supply voltage, BPV actuator (L096)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Monitor the vehicle power supply during engine startup and operation.
- 2. Check the actuator power supply as outlined in, "Checking data BPV actuator (L096)."

Are measured values within expected range?

Yes No



Go to step 7A	If this DTC is still present, go to step 7A
	Correct any issues found. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.

Step 7 EGR Valve Module Checks

Step 7A Visual inspection, EGR valve module (L095)

Action

- 1. Switch OFF the ignition
- 2. Visually inspect the link rod of the EGR valve mechanism for any of the following:
 - Incorrect installation
 - Damage to the valve lever and link rod







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Is the EGR valve mechanism installed correctly and free of damage?

Yes	No
	Replace the EGR valve module. Refer to step 10A to perform the corresponding repair verification cycles.
Go to step 7B	If this DTC is still present, go to step 7B

Step 7B Visual inspection, movement of the EGR valve mechanism



Always switch the ignition OFF when working on the EGR valve mechanism.

- The EGR valve mechanism can move when the ignition switched ON. Touching the mechanism can result in physical injury.
- Maintain a safe distance if the EGR valve is monitored with the ignition keyed on.



Action

- Switch OFF the ignition.
 The EGR valve mechanism cannot be moved if the ignition is keyed on.
- 2. Check for free movement of the valve mechanism by manually moving the actuator lever (2).

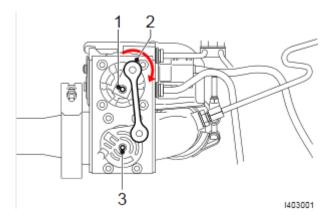


The movement requires some force because of the presence of a return spring.

Do not use a tool to move the mechanism.

Check during the movement that:

- the movement resistance of the mechanism is equal over the full travel path of the actuator lever (2), and
- The actuator shaft (1) and valve shaft (3) rotate over the full travel path of the actuator lever (2).



Does the EGR valve mechanism move freely over the full travel path of the actuator lever?

Yes	No
	Possible blockage/soot accumulation in the valve housing or a sticking valve.
Go to step 7E	If the EGR valve cannot be moved out of its closed position at all: Go to step 7C If the EGR valve mechanism has excessive resistance or has limited travel: Go to step 7D

Step 7C Check for sticking EGR valve mechanism





Always switch OFF the ignition when working on the EGR valve mechanism.

- The valve mechanism can move when the ignition is switched on. Touching the mechanism can result in physical injury.
- Maintain a safe distance if the valve is monitored with the ignition keyed on.



Not observing these instructions can seriously damage the EGR valve module:

- Do not use any tool other than that indicated to move the mechanism
- Do not use a hammer or an extension to move the spanner
- Only rotate the actuator lever in the correct direction
- Do not rotate the actuator lever further than the maximum opening position

Action

- Switch OFF the ignition.
 The EGR valve mechanism cannot be moved if the ignition is keyed on.
- 2. Place a 13/16 inch open end wrench on the actuator lever (1). Do not put a wrench on the link rod (2).

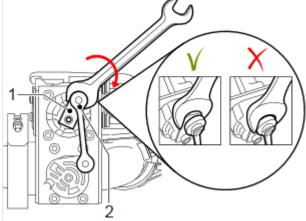
Use a wrench with a length no greater than 12 inches.

- 3. Rotate the actuator lever with the wrench by hand in the direction shown (clockwise), out of the closed position. Use only moderate force to rotate the actuator lever.
- 4. Rotate the actuator lever carefully to the maximum open position and remove the wrench.

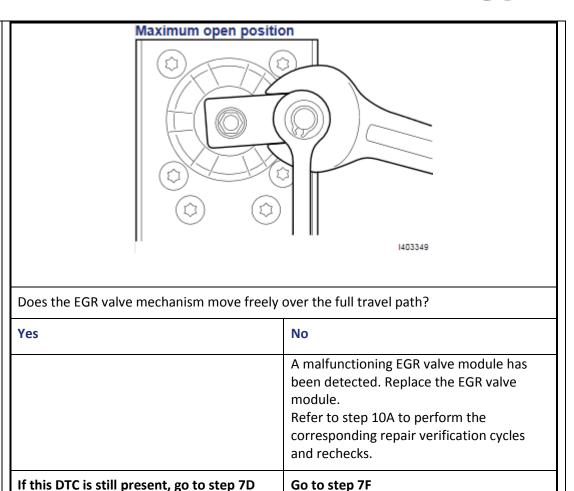
The EGR valve must rotate itself back into the closed position.

5. Check for free movement of the valve mechanism by manually moving the actuator lever.









Step 7D Visual inspection, blockage, EGR valve housing



Always switch OFF the ignition when working on the EGR valve mechanism.

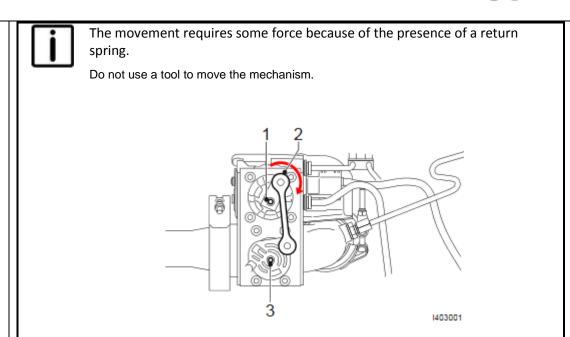
- The valve mechanism can move when the ignition is switched on. Touching the mechanism can result in physical injury.
- Maintain a safe distance if the valve is monitored with the ignition keyed on.

Action

- Switch OFF the ignition.
 The EGR valve mechanism cannot be moved if the ignition is keyed on.
- 2. Remove the flexible EGR pipe as outlined in the maintenance procedure, "replace flexible EGR pipe from control valve to cooler (EGR system)" (job code: J 1435 264406 001 033).
- 3. Visually inspect the EGR to determine if there is an internal blockage or excessive soot accumulation around the butterfly valve and housing.

 Open the valve by moving the actuator lever/connecting rod (2).





Was an internal blockage or excessive soot accumulation around the butterfly valve and housing found?

Yes	No
 Remove blockage/clean the internal valve housing. Monitor the EGR valve position with DAVIE to check that the cleaning was effective. Reinstall the flexible EGR pipe as outlined in the maintenance procedure, "replace flexible EGR pipe from control valve to cooler (EGR system)" (job code: J 1435 264406 001 033). 	A malfunctioning EGR valve module has been detected. Replace the EGR valve module. Refer to step 10A to perform the corresponding repair verification cycles and rechecks
Refer to step 10A to perform the corresponding repair verification cycles and rechecks	
If this DTC is still present, go to step 7E	If this DTC is still present, go to step 7E

Step 7E Visual inspection, connections and wiring, EGR valve module (L095)

Action

1. Visually inspect the associated component connections and wiring for any of the following:



•	Damaged c	r loose	connectors
---	-----------	---------	------------

- Bent, broken, corroded or loose connector pins
- Moisture or dirt in the connections
- Damage to the wire harness or insulation
- The correct parts are not installed
- ECU connections are damaged or disconnected

Was there evidence of any of the above?

Yes No

Correct any issues found.
Refer to step 10A to perform the corresponding repair verification cycles and rechecks.

If this DTC is still present, go to step 7F Go to step 7F

Step 7F Electrical checks, supply voltage, EGR valve module (L095)

Action

- 1. Monitor the vehicle power supply during engine startup and operation.
- 2. Check the EGR valve module supply voltage as outlined in, "checking data EGR valve module (L095)"

Are measured values within expected range?

Yes	No
	Correct any issues found. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.
Go to step 8A	If this DTC is still present, go to step 8A

Step 8 DAVIE Tests

Step 8A DAVIE test, EGR Service





ABORTING A DAVIE-INITIATED DIAGNOSTIC TEST IS NOT RECOMMENDED.

However, if aborting a test is required, a key cycle must be performed to reset the engine ECM.

Failure to reset the engine ECM in this instance could result in personal injury or damage to the vehicle.

Action

1. Use DAVIE to run the EGR Service test.

Does the test fail to complete or result in a failed state?

Yes	No
Correct any issues found. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.	
Go to step 8B	If this DTC is still present, go to step 8B

Step 8B DAVIE test, BPV Service



ABORTING A DAVIE-INITIATED DIAGNOSTIC TEST IS NOT RECOMMENDED.

However, if aborting a test is required, a key cycle must be performed to reset the engine ECM.

Failure to reset the engine ECM in this instance could result in personal injury or damage to the vehicle.

Action

1. Use DAVIE to run the BPV Service test.

Does the test fail to complete or result in a failed state?

Yes No



Correct any issues found. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.	
Go to step 9A	If this DTC is still present, go to step 9A

Step 9 EGR Cooler Checks

Step 9A Evaluating freeze frame data for signs of EGR cooler fouling

Action

- 1. Examine the P1719 freeze frame data from the DAVIE log. Note the values for the following parameters:
 - Boost air pressure (absolute)
 - Before turbine pressure target (absolute)
 - EGR valve position
- 2. If the EGR valve position is 80% or greater:
 - Calculate the difference between the Before turbine pressure target (absolute) and Boost air pressure (absolute)

Is the EGR valve positon greater than 80% AND is Before turbine pressure target (absolute) - Boost air pressure (absolute) greater than 6 psi (41 kPa)?

Yes	No
The EGR cooler may be fouled.	
Go to step 9B	If all steps have been completed and this DTC is still present, contact PACCAR Engine Support Center for further assistance.

Step 9B Visual inspection, fouling, EGR cooler

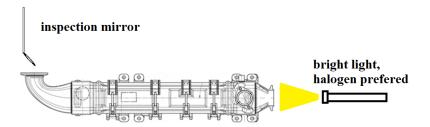
Build-up of soot and other deposits can block the exhaust gas passages in the EGR cooler. If the blockage is greater than 25%, the flow of EGR through the cooler into the intake manifold may be reduced and corresponding engine out NOx levels may exceed the normal operating levels. DTC P1719 is set when measured engine output NOx emissions exceed the modeled engine out NOx emissions by 150% over 90 seconds.

Action



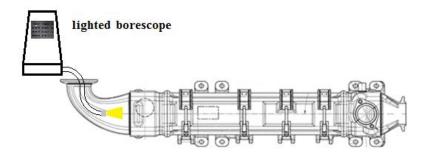
- 1. Visually inspect the EGR gas inlet side of the EGR cooler for signs of fouling using either of the following recommended methods:
 - Inspection using a light and mirror

Use an inspection mirror inserted into the EGR cooler gas inlet end of the EGR cooler in combination with a bright light shining through the EGR cooler from the gas outlet end.



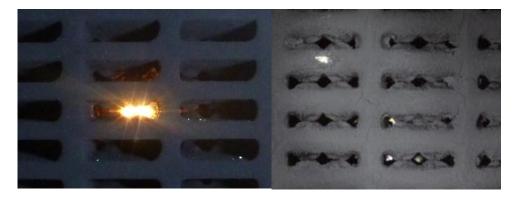
• Inspection using a borescope

Use an illuminated borescope inserted into the EGR cooler gas inlet end of the EGR cooler. Record pictures if possible.



2. Determine the extent of EGR cooler fouling. Estimate if the open area of the gas passages are blocked greater than 25%.

EGR cooler visual inspection example



EGR cooler fouling < 25% EGR Cooler OK EGR cooler fouling >25%
EGR Cooler requires cleaning



Is the EGR cooler fouling greater than 25%?			
	Yes	No	
	Clean EGR cooler (EGR system) as outlined in the maintenance procedure "clean EGR cooler (EGR system)," job code: J 1419 318900 012 000. Refer to step 10A to perform the corresponding repair verification cycles and rechecks.		
	If all steps have been completed and this DTC is still present, contact the PACCAR Engine Support Center for further assistance.	If all steps have been completed and this DTC is still present, contact the PACCAR Engine Support Center for further assistance.	

Step 10 Repair Verification

Step 10A Repair verification cycles

Perform these repair verification cycles following any corrective actions taken, to confirm that this fault is no longer active.



Before beginning these repair verification cycles, use the DAVIE Quick Check function to clear all current DTCs from the PCI and EAS-3 ECUs.

Action

1. Steady State

This cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON.

With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1000-1500 rpm, and set the cruise control.

Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.

Were the identified repair verification cycles able to be completed?

Yes	No
	Investigate and correct any issues preventing these repair verification cycles from being completed, then re-run. For additional assistance, contact the PACCAR Engine Support Center.



Go to step 10B		
Step 10B DAVIE Diagnostics, Quick	Check	
	Action 1. Use DAVIE Diagnostics to perform a Quick Check for current DTCs to determine whether the actions taken have cleared this DTC.	
Has P1719 been cleared?	Has P1719 been cleared?	
Yes	No	
Problem resolved. No further actions	Continue with the next step in this troubleshooting procedure. If all steps have been completed and this DTC is still present, contact the PACCAR Engine Support Center for further assistance.	
L	Back to Inde	



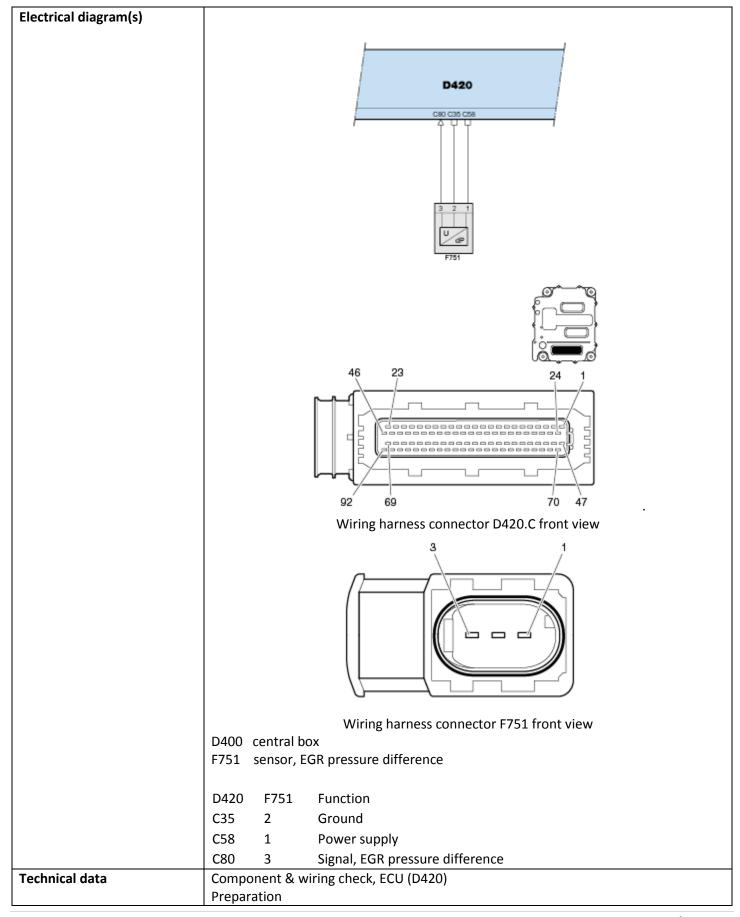
P171B

Code number	P171B	
Fault code description	EGR flow response - Decrease too slow	
Fault code information	2 trip MIL	
	3 drive cycle recovery	
	Readiness group – None	
	Freeze frame type – EGR	
Description of component(s)	The sensor measures the EGR gas pressure before and after a venturi in the EGR pipe	
	between the EGR cooler and the engine intake pipe.	
	The sensor operating temperature is limited to 125°C [257°F]. To prevent	
	overheating, the sensor is cooled by the engine cooling system.	
	overneating, the sensor is cooled by the engine cooling system.	
	1 Coolant out	
	2 Electrical connection	
	3 EGR gas flow direction	
	4 Coolant in	
	EGR flow	
	The EGR pressure difference sensor contains two internal pressure sensors with	
	electronics. One pressure sensor measures before the venturi and the other after the	
	venturi. The electronics in the EGR pressure difference sensor converts this to one	
	differential pressure signal. The PCI ECU uses the signal to calculate the EGR flow.	
	Effect on the system:	
	Calculates EGR gas flow	



Location of component(s)	
Location of component(s)	
Diagnostic condition	This diagnostic runs:
	engine speed is more than 1000 rpm, and;
	 The engine mode is DPF regeneration or SCR heating or SCR high efficiency or standard.
Set condition of fault code	The PCI ECU (D420) detects that the EGR mass flow decrease is too slow during
	changes in the commanded EGR mass flow from a high to low rate.
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the
	repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once
	the minimum target temperature has been reached, perform several low to higher
	speed accelerations with moderate engine load. Also perform high-load to low-load
	transitions. This activity should be conducted within the range of 15 km/h [10 mph] to
	65 km/h [40 mph] for no more than 5 to 8 km [3 to 5 miles].







	. Vov off the cignition		
	Key off the ignition.Disconnect connector F751		
	 Measure on the front side of wiring harness connector F751 Pin Pin 		
	(+ probe) (- probe) Value Additional information		
Barrier and	1 2 5 V Ignition keyed on		
Possible causes	Clogged EGR system Clossed EGR green and difference concernment with		
	Clogged EGR pressure difference sensor venturi. Sticking EGR valve.		
Additional information	Sticking EGR valve The province NOv provision is a great at the great trailed by continuous the EGR flow.		
Additional information	The engine NOx emission is, among others, controlled by varying the EGR flow toward the inlet manifold of the engine.		
	toward the inlet manifold of the engine.		
	For this diagnostic, the EGR pressure difference sensor (F751) is used to measure the EGR mass flow during changes in the commanded EGR mass flow from a		
	higher to lower flow rate.		
Diagnostic Step-by-Step	Perform the troubleshooting steps below using the breakout harness, if		
Linguistic step 27 step	necessary, to check electrical components, such as sensors, electrical control		
	units, and harnesses. Back probing is not recommended, as it could damage the		
	harness. The ignition should always be in the OFF position when connecting or		
	disconnecting electrical components in order to reduce the likelihood of		
	damage to electrical components.		
	Disconnecting the EAS connectors during the troubleshooting process		
	will result in multiple errors.		
	For specific electrical component information and pinout locations,		
	always refer to the technical data.		
	It is necessary to exit the fault code menu in DAVIE and run the		
	diagnostic test again to identify a change in errors.		
	Remember that the truck's operational or mechanical issues may be		
	the root cause of both active and inactive fault codes. Refer to the		
	'possible causes' section.		
	Step 1 Step ID 171B-a SRT		
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins)		
	and harnesses for corrosion, damage, and rubbing during each step of the		
	diagnostic procedure. Proceed to step 2.		
	Step 2 Step ID 171B-b SRT		
	Use DAVIE to monitor the following temperatures: • EGR Temperature		
	EGR Pressure Difference EGR Resition		
	EGR Position Are the values manitered for each of the items above within specifications?		
	Are the values monitored for each of the items above within specifications?		
	No: Continue to step 3 Vos: Proceed to step 4		
	Yes: Proceed to step 4		
	Step 3 Step ID 171B-c SRT		
	Run the prescribed DAVIE Direct test to determine if there is an internal problem		
	with the EGR Valve Sensor.		
	Does the test fail to complete or result in a failed state?		



	No: Issue resolved		
	Yes: Continue to step 4		
	Step 4	Step ID 171B-d	SRT
	If no problems were detec	cted in the preceding steps, a	n internal problem has most
	likely occurred with the post BPV temperature sensor.		
	Replace the identified smart sensor.		
	Is the fault still active?		
	Yes: Proceed to step 5		
	No: Issue resolved		
	Step 5	Step ID 171B-e	SRT
	For further assistance in diagnosing this issue or for confirmation prior to the		
	replacement of suspect components, contact the Engine Support Call Center at		
	1-800-477-0251.		
Verification Drive Cycle	To validate the repair, with the System Initiation cycle complete, under moderate		
	engine load (A/C and Fan both ON), perform a series of brief accelerations,		
	progressing from a lower to a higher speed until reaching a top speed of 40 mph.		
	Once the top speed has been reached, perform several decelerations from a higher to		
	a lower speed until reaching a bottom speed of 10 mph. Perform this cycle 5 times.		
	Back to Choose Code		
	Back to Index		



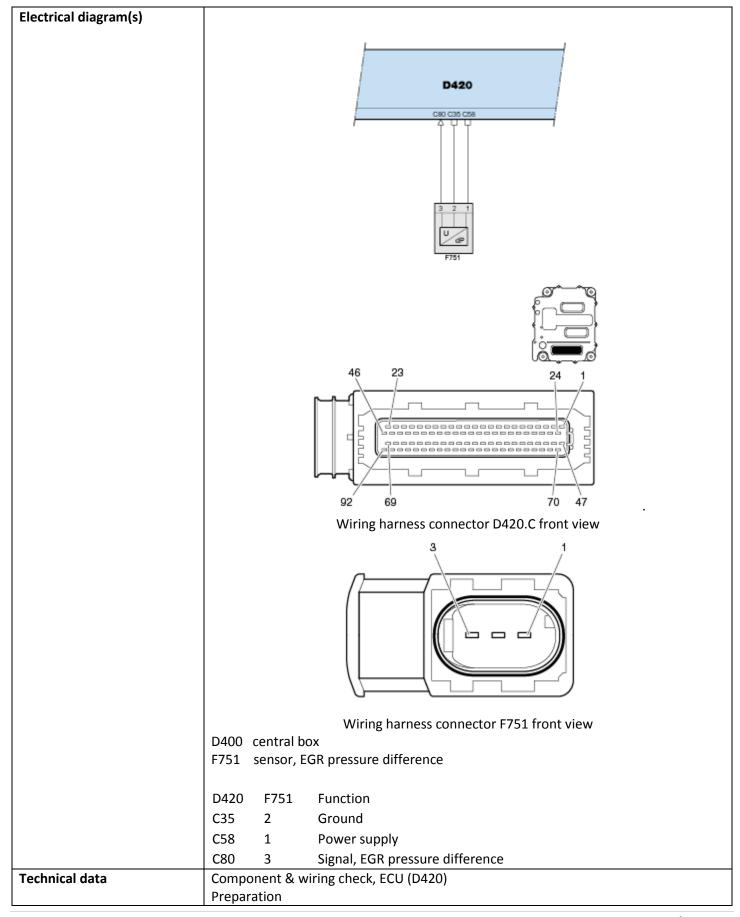
P171C

Code number	P171C	
Fault code description	EGR flow response - Increase too slow	
Fault code information	2 trip MIL	
	3 drive cycle recovery	
	Readiness group – None	
	Freeze frame type – Egr	
Description of component(s)	The sensor measures the EGR gas pressure before and after a venturi in the EGR pipe	
	between the EGR cooler and the engine intake pipe.	
	The sensor operating temperature is limited to 125°C [257°F]. To prevent	
	overheating, the sensor is cooled by the engine cooling system.	
	overneating, the sensor is cooled by the engine cooling system.	
	1 Coolant out	
	2 Electrical connection	
	3 EGR gas flow direction	
	4 Coolant in	
	EGR flow	
	The EGR pressure difference sensor contains two internal pressure sensors with	
	electronics. One pressure sensor measures before the venturi and the other after the	
	venturi. The electronics in the EGR pressure difference sensor converts this to one	
	differential pressure signal. The PCI ECU uses the signal to calculate the EGR flow.	
	500 at a silver at a si	
	Effect on the system:	
	Calculates EGR gas flow	



	Ţ	
Location of component(s)		
Diagnostic condition	This diagnostic runs:	
	 Engine speed is between 1000 and 1450 rpm, and; 	
	The engine mode is DPF regeneration or SCR heating or SCR high efficiency or	
	standard.	
Set condition of fault code	The PCI ECU (D420) detects that the EGR mass flow increase is too slow during	
	changes in the commanded EGR mass flow from a low to high rate.	
Reset condition of fault code	e This DTC changes to inactive when the fault is no longer detected. To validate the	
	repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once	
	the minimum target temperature has been reached, perform several low to higher	
	speed accelerations with moderate engine load. Also perform high-load to low-load	
	transitions. This activity should be conducted within the range of 15 km/h [10 mph] to	
	65 km/h [40 mph] for no more than 5 to 8 km [3 to 5 miles].	







	W. off the tradition		
	Key off the ignition. Piecemport connector 5751		
	Disconnect connector F751 Advances on the free tride of wiring however connector F751		
	Measure on the front side of wiring harness connector F751		
	Pin Pin		
	(+ probe) (- probe) Value Additional information		
	1 2 5 V Ignition keyed on		
Possible causes	Leaking EGR system		
	Clogged EGR system		
	Clogged EGR pressure difference sensor venturi		
	Sticking EGR valve		
Additional information	The engine NOx emission is, among others, controlled by varying the EGR flow		
	toward the inlet manifold of the engine.		
	For this diagnostic, the EGR pressure difference sensor (F751) is used to measure		
	the EGR mass flow during changes in the commanded EGR mass flow from a		
	lower to higher flow rate.		
Diagnostic Step-by-Step	Perform the troubleshooting steps below using the breakout harness, if		
	necessary, to check electrical components, such as sensors, electrical control		
	units, and harnesses. Back probing is not recommended, as it could damage the		
	harness. The ignition should always be in the OFF position when connecting or		
	disconnecting electrical components in order to reduce the likelihood of		
	damage to electrical components.		
	Disconnecting the EAS connectors during the troubleshooting process		
	will result in multiple errors.		
	For specific electrical component information and pinout locations, The specific electrical data.		
	always refer to the technical data.		
	It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors.		
	diagnostic test again to identify a change in errors.		
	Remember that the truck's operational or mechanical issues may be the rest severe of high the action and inserting fault and as Reference the		
	the root cause of both active and inactive fault codes. Refer to the		
	'possible causes' section.		
	Step 1 Step ID 171C-a SRT		
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.		
	Step 2 Step ID 171C-b SRT		
	Test: EGR Service		
	Determine if the EGR Valve has any mechanical issues by monitoring certain parameters while opening and closing the EGR Valve.		
	Does the test fail to complete or result in a failed state?		
	No: Proceed to Step 3		
	Yes: Proceed to step 8.		
	tes. Proceed to step 8.		
	Step 3 Step ID 171C-c SRT		
	Ancillary Test: Air Side Pressure		
	Perform the prescribed testing to determine whether there are any leaks in the Air		
	system.		



Does the test fail to complete or result in a failed state?

• No: Proceed to Step 4.

Yes: Proceed to Step 8

Step 4 Step ID 171C-d SRT

Ancillary Test: Coolant Leak

Perform the prescribed testing to determine if there is a coolant leak affecting the EGR.

Does the test fail to complete or result in a failed state?

No: Proceed to Step 5Yes: Proceed to Step 8

Step 5 Step ID 171C-e SRT

Visual Inspection: EGR Pressure Difference Sensor and Lines

Remove the EGR Pressure Difference sensor and inspect tip of the sensor for any of the following:

Damaged

• Excessive build-up of deposits

Visually inspect the Pressure Difference lines for any of the following

Damage

• Kinks or restrictions

Was there evidence of any of the above?

• No: Proceed to step 6

• Yes: Proceed to step 8.

Step 6 Step ID 171C-f SRT

Visual Inspection: NOx Sensor Before Catalyst

Remove the before catalyst NOx sensor and inspect tip for any of the following:

Damage

Excessive build-up of deposits

Was there evidence of any of the above?

• No: Proceed to step 7

Yes: Proceed to Step 8

Step 7 Step ID 171C-g SRT

DAVIE Direct: Monitor EGR and Related Temperature Sensors

Using DAVIE Monitor, select and observe the following values to confirm they are within recommended specifications:

- EGR Temperature
- EGR Pressure
- EGR Position
- After Intercooler Temperature
- Coolant Temperature
- Boost Temperature
- Boost Pressure
- Before Turbine Pressure
- After Turbine Pressure

Do any of the monitored values appear incorrect?



	No: Issue Resolve	ud.		
	Yes: Proceed to s	Yes: Proceed to step 8.		
	Step 8	Step ID 171C-h	SRT	
	Repairs or component re	placements appropriate comp	oonent and use DAVIE to re-	
	check for the presence of	check for the presence of active faults.		
	Fault inactive – is	Fault inactive – issue resolved		
	Fault active - Pro	ceed to step 9		
	Step 9	Step ID 171C-i	SRT	
	Contact the PACCAR Engine Support Call Center			
	For further assistance in diagnosing this issue or for confirmation prior to the			
	replacement of suspect components, contact the PACCAR Engine Support Call			
	Center at 1-800-477-0251.			
Verification Drive Cycle	To validate the repair, with the System Initiation cycle complete, under moderate			
	engine load (A/C and Fan both ON), perform a series of brief accelerations,			
	progressing from a lower t	progressing from a lower to a higher speed until reaching a top speed of 40 mph.		
	Once the top speed has been reached, perform several decelerations from a higher to			
	·	a lower speed until reaching a bottom speed of 10 mph. Perform this cycle 5 times.		
		Back to Choose Code		
	Back to Index			



P171E

Code number	P171E	
Fault code description	Air management control, air mass flow - Data valid but too high	
Fault code information	2 trip MIL	
	3 drive cycle recovery	
	Readiness group – Boost	
	Freeze frame type – Boost	
Description of component(s)	For further assistance: Contact the PACCAR Engine Support Call Center 1-800-477-0251 Please Contact the Engine Support Center	
Location of component(s)		
Diagnostic condition		
Set condition of fault code		
Reset condition of fault code		
Electrical diagram(s)		
Technical data		
Possible causes		
Additional information		
Diagnostic Step-by-Step		
Verification Drive Cycle		
	Back to Choose Code	
	Back to Index	

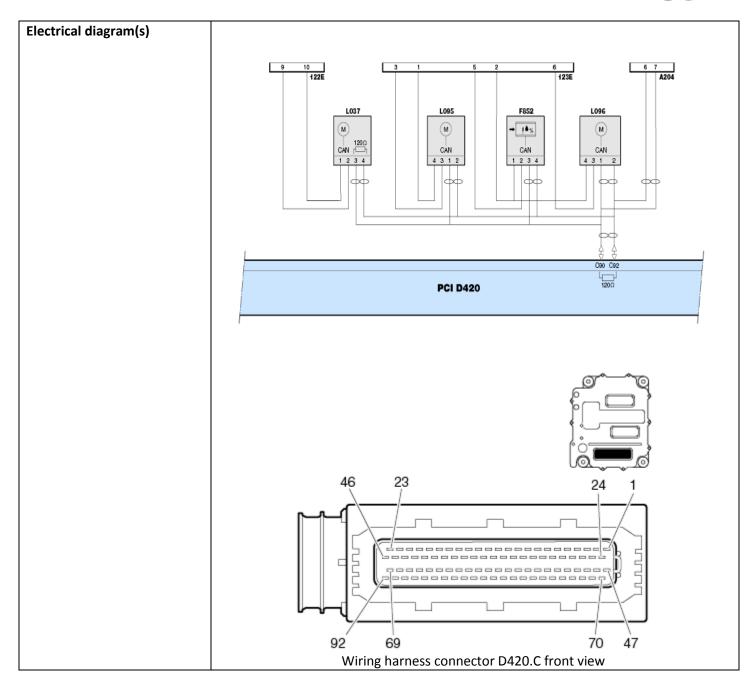


Code number	P1722	
Fault code description	BPV valve control-Data erratic, intermittent or incorrect.	
Fault code information	2 trip MIL	
	3 drive cycle recovery	
	Readiness group – None	
	Freeze frame type – Comprehensive	
Description of component(s)	The BPV actuator consists of an actuator and a BPV valve.	
Description of component(s)	The main task of the BPV valve is to create back pressure in the engine exhaust	
	system and control exhaust gas mass flow.	
	• Lever	
	• Spring	
	Butterfly valve	
	BPV actuator	
	The main components of the BPV actuator are:	
	• ECU	
	Electromotor	
	The electromotor rotates the output shaft via internal gears.	
	output shaft	
	The butterfly is moved via a lever by rotating the output shaft	
	electromotor position sensor	
	The position of the electromotor is monitored.	
	·	
	output shaft position sensor The position of the position sensor	
	The position of the output shaft is monitored.	
	temperature sensor	
	The temperature of the printed circuit board of the ECU is monitored.	
	Control	
	The BPV actuator is a smart actuator that communicates with the PCI ECU via E-CAN.	
	The actuator ECU is controlled by the PCI ECU but has its own diagnostics on the	
	following actuator inputs and outputs:	
	power supply voltage	
	electromotor position	
	electromotor current	
	output shaft position	
	ECU printed circuit board temperature	
	ECU hardware and software	
	After the ignition is keyed on, the valve position is 100% until the actuator is	
	controlled by the PCI ECU.	
	Unpowered and fail-safe position	
	The unpowered and fail-safe positions of the valve are controlled by a spring and are	
	fully open (100%). If a failure is detected the BPV valve moves to the fail-safe position,	
	if possible.	
	Effect on the system:	
	Creating heat in the exhaust system to heat up the EAS system.	
	A lower opening percentage results in a higher back pressure and more heat.	
	A lower opening percentage results in a higher back pressure and more field.	



	Decreasing the exhaust gas flow in the exhaust system to heat up the EAS system.
	A lower opening percentage results in a lower exhaust gas flow in the exhaust
	 system and more heat. Altering the pressure drop across the turbine rotor for VTG turbo control.
	 Creating back pressure to create EGR gas flow.
	 Creating back pressure to create Edit gas now. Creating back pressure to create engine braking.
Location of component(s)	ereuting back pressure to create engine braking.
	L096
Diagnostic condition	This diagnostic runs continuously when the engine is running.
Set condition of fault code	The PCI ECU (D420) detects that the actual BPV valve position measured by the BPV
	actuator differs too much from the commanded position (by the PCI ECU) for more
	than 40 seconds.
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the
	repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once
	the minimum target temperature has been reached, proceed at a minimum speed of 80 km/h [50 mph] in the highest gear possible with the engine speed between 1100
	and 1500 rpm and set the cruise control. This test is best performed with a loaded
	vehicle/trailer, but if load is unavailable, turn as many engine power consumers on to
	produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3
	separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is
	unachievable. Use a flat road, if possible.







Technical data	123E 7-pin interface A204 electronic face D420 PCI ECU F852 humidity ser L037 VTG turboch L095 EGR valve m L096 BPV valve D420 L096 Fun C90 1 E-C/ C92 2 E-C/ 3 Gro	123E 7-pin interface connector A204 electronic fan interface connector D420 PCI ECU F852 humidity sensor L037 VTG turbocharger actuator L095 EGR valve module L096 BPV valve D420 L096 Function C90 1 E-CAN high C92 2 E-CAN low 3 Ground		
	Key off the ignit	ion.		
	Disconnect conn	nector L096		
	Measure on the	Measure on the front side of wiring harness connector L096		
	Pin Pin		A Limit of the control of the contro	
	(+ probe) (- pro		Additional information	
	4 3 1 2	Ubat ± 60 Ω	ignition keyed on	
	1 2	I 00 77	Ignition keyed offGround cable from the battery	
			disconnected	
			Vehicle Communication Interface	
Danible at the	Catality	DDV	(VCI) of DAVIE disconnected	
Possible causes Additional information		Sticking or blocked BPV valve or mechanism.		
Additional information	The BPV valve is supposed to create back pressure in the engine exhaust system and control exhaust gas mass flow. During normal engine control, the BPV valve position is commanded by the PCI ECU. The actual control of the valve is carried out by the BPV actuator (L020), a smart actuator that communicates with the PCI ECU via E-CAN. The actuator provides feedback to the PCI ECU about the valve position.			



Diagnostic Step-by-Step



Perform the troubleshooting steps below using the breakout harness, if necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as it could damage the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components.



- Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors.
- For specific electrical component information and pinout locations, always refer to the technical data.
- It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors.
- Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 'possible causes' section.

Step 1 Step ID 1722a SRT

Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.

Step 2 Step ID 1722b SRT

DAVIE Direct Test: BPV Actuator

Run the prescribed DAVIE Direct test to determine correct operation of the BPV Actuator.

Does the test fail to complete or result in a failed state?

No: Proceed to step 5.

• Yes: Proceed to step 4.

Step 3 Step ID 1722c SRT

Visual Inspection: BPV

Remove the exhaust pipe from the BPV outlet. Visually inspect the inside of the back pressure valve for any blockage that would restrict valve movement.

Was there evidence of any blockage?

No: Issue resolved.

Yes: Proceed to step 4.

Step 4 Step ID 1722d SRT

Reframe this sentence as Repair or replace appropriate component and use Davie to recheck for the presence of active faults

- Fault inactive Issue resolved.
- Fault active Proceed to step 5.

Step 5 Step ID 1722e SRT

For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the Engine Support Call Center at 1-800-477-0251.

Verification Drive Cycle

To validate the repair, this cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable,



produce engine load by turning the A/C and fan to ON. With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.
Back to Choose Code Back to Index



Code number	P1723
Fault code description	Pressure before turbine-Data valid but too high.
Fault code information	1 trip MIL
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Boost
Description of component(s)	The exhaust gas pressure before the turbine is measured with sensor (1) via a steel
	tube (2) before the EGR valve.
	Effect on the system:
	Control of the VTG turbo charger
	Control of the EGR flow
	Control of the BPV valve
	Control of the engine brake Color lateral than the second and the formula that the second and the second
	Calculates the exhaust gas temperature before the turbine
	Lower measured exhaust gas pressure before turbine results in higher calculated
	exhaust gas temperature before the turbine.



Location of component(s)	F826
Diagnostic condition	This diagnostic runs: • When the engine speed is between 1000 and 1900 rpm, and;
	 When the engine is running at a steady load, and; The engine mode is SCR heating or SCR high efficiency or standard or protection.
Set condition of fault code	The PCI ECU (D420) detects that measured pressure before turbine is higher than the
	requested pressure before turbine for more than 40 seconds.
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the
	repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, proceed at a minimum speed of
	80 km/h [50 mph] in the highest gear possible with the engine speed between 1100
	and 1500 rpm and set the cruise control. This test is best performed with a loaded
	vehicle/trailer, but if load is unavailable, turn as many engine power consumers on to
	produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3
	separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is
	unachievable. Use a flat road, if possible.



Electrical diagram(s) D420 003-001-030 23 70 Wiring harness connector D420.C front view Wiring harness connector F826 front view D420 **PCI ECU** F826 pressure sensor before turbine D374 F829 Function C38 4 Ground Power supply C61 2



	C83 1 Signal, pressure before turbine			
Technical data	Component & wiring check, ECU (D420)			
	Preparation			
	Key off the ignition.			
	 Disconnect connector F826 Measure on the front side of wiring harness connector F826 			
	_			
	Pin Pin			
	(+ probe) (- probe) Value Additional information			
	2 4 5 V Ignition keyed on			
Possible causes	Pressure sensor before turbine deviation			
	Restriction in exhaust system			
Additional information	The PCI ECU uses the pressure before turbine for, among other things, controlling			
	the VTG turbocharger, EGR valve position, BPV valve position and engine braking.			
	 The pressure before turbine is measured by the pressure sensor before turbine 			
	(F826).			
Diamentia Stan bu Stan				
Diagnostic Step-by-Step	Perform the troubleshooting steps below using the breakout harness, if			
	necessary, to check electrical components, such as sensors, electrical control			
	units, and harnesses. Back probing is not recommended, as it could damage			
	the harness. The ignition should always be in the OFF position when			
	connecting or disconnecting electrical components in order to reduce the			
	likelihood of damage to electrical components.			
	 Disconnecting the EAS connectors during the troubleshooting process 			
	will result in multiple errors.			
	 For specific electrical component information and pinout locations, always refer to the technical data. It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 			
	'possible causes' section.			
	possible eduses section.			
	Step 1 Step ID 1723a SRT			
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins)			
	and harnesses for corrosion, damage, and rubbing during each step of the			
	diagnostic procedure. Proceed to step 2.			
	diagnostic procedure. Proceed to step 2.			
	Cton 2 Cton ID 1732b CDT			
	Step 2 Step ID 1723b SRT			
	following:			
	Damaged or loose connectors			
	Moisture or dirt accumulation			
	Was there evidence of any of the above?			
	No: Continue to the step 3 in the troubleshooting process.			
	Yes: Proceed to step 6.			
	Step 3 Step ID 1723c SRT			
	Ancillary Test: Air Side Pressure			
	Perform the prescribed testing to determine if there is an air leak that could be			



causing this fault. Does the test fail to complete or result in a failed state? No: Proceed to step 7 • Yes: Proceed to step 6. SRT Step ID 1723d Run the prescribed DAVIE Direct test to determine correct operation of the turbocharger. Does the test fail to complete or result in a failed state? No: Proceed to step 7. Yes: Proceed to step 6. Step 5 Step ID 1723e SRT DAVIE Direct Test: Turbo Actuator Effort Run the prescribed DAVIE Direct test to determine correct operation of the turbo Does the test fail to complete or result in a failed state? No: Proceed to step 7. Yes: Proceed to step 6. Step 6 Step ID 1723f **SRT** Repairs or component replacements appropriate component and use DAVIE to recheck for the presence of active faults. Fault inactive - Issue resolve Fault active - Proceed to step 7 Step 7 Step ID 1723g For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the Engine Support Call Center at 1-800-477-0251. **Verification Drive Cycle** To validate the repair, this cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON. With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable. Back to Choose Code Back to Index

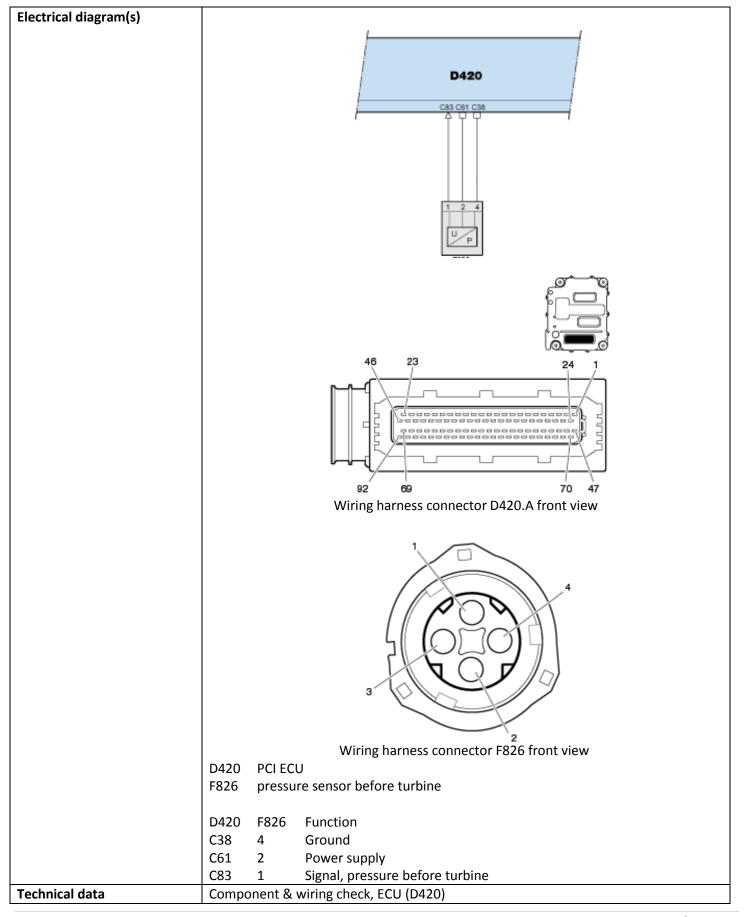


Code number	P1724	
Fault code description	Pressure before turbine – Data valid but too low	
Fault code information	1 trip MIL	
	3 drive cycle recovery	
	Readiness group – None	
	Freeze frame type - Boost	
Description of component(s)	The exhaust gas pressure before the turbine is measured with sensor (1) via a steel	
	tube (2) before the EGR valve.	
	Effect on the system: Control of the VTG turbo charger Control of the EGR flow	
	 Control of the EGR flow Control of the BPV valve 	
	Control of the Bry Valve Control of the engine brake	
	 Calculates the exhaust gas temperature before the turbine 	
	Lower measured exhaust gas pressure before turbine results in higher calculated	
	exhaust gas temperature before the turbine.	



Location of component(s)			
Location of component(s)			
	F826		
Diagnostic condition	This diagnostic runs:		
	engine speed 1000 and 1900 rpm, and;		
	when the engine is running at a steady load, and;		
Cat and distance of facilities de	• the engine mode is SCR heating or SCR high efficiency or standard or protection.		
Set condition of fault code	The PCI ECU (D420) detects that measured pressure before turbine is lower than the requested pressure before turbine for more than 40 seconds.		
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the		
Reset condition of rault code	repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once		
	the minimum target temperature has been reached, proceed at a minimum speed of		
	80 km/h [50 mph] in the highest gear possible with the engine speed between 1100		
	and 1500 rpm and set the cruise control. This test is best performed with a loaded		
	vehicle/trailer, but if load is unavailable, turn as many engine power consumers on to		
	produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3		
	separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is		
	unachievable. Use a flat road, if possible.		







	Duana antia a		
	Preparation • Key off the ignition		
	Key off the ignition.		
	Disconnect connector		
	Measure on the front side of wiring harness connector F826 Big. Big. Big. Big. Big. Big. Big. Big. Big. Big.		
	Pin Pin		
	(+ probe) (- probe)	Value Additional information	on
	2 4	5V Ignition keyed on	
Possible causes	Leaking exhaust system		
	 Leaking pressure senso 	or before turbine tube	
	Pressure sensor before turbine deviation		
Additional information	The PCI ECU uses the pressure before turbine for, among other things, controlling		
	·		e position and engine braking.
		rbine is measured by the pre	
	(F826).	, .	
Diagnostic Step-by-Step	, ,	leshooting steps below using	the breakout harness. if
, , , , , , , , , , , , , , , , , , ,			n as sensors, electrical control
	1 × 1	•	nmended, as it could damage
		gnition should always be in th	
		onnecting electrical compone	•
	_	ge to electrical components.	
		ting the EAS connectors during	ng the troubleshooting
		ill result in multiple errors.	.B the tradecondeting
		c electrical component inforr	mation and ninout locations
	-	•	nation and pinear recations,
	 always refer to the technical data. It is necessary to exit the fault code menu in DAVIE and run the 		
	diagnostic test again to identify a change in errors.		
	Remember that the truck's operational or mechanical issues may be		
	the root cause of both active and inactive fault codes. Refer to the		
	'possible causes' section.		
	possible	auses seedom	
	Step 1	Step ID 1724a	SRT
	 	ly inspect all applicable conne	
		ubbing during each step of th	
	Proceed to step 2.	abbing during each step of the	ic diagnostic procedure.
	1 Tocced to step 2.		
	Step 2	Step ID 1724b	SRT
	Electrical Checks	2(ch in 1/24)	31(1
		env/switch has been set to OF	T hefere disconnecting
	Ensure that the ignition key/switch has been set to OFF before disconnecting		
	related cables.		
	Based on the fault message provided, confirm that the following electrical values		
	are within specified ranges or limits:		
	Supply and signal voltages (12V).		
	Cable continuity (no opens or shorts).		
	Are measured electrical values outside of expected range or limits?		
	Yes - Proceed to step 3		
	No - Proceed to step 7		
	Step 3	Step ID 1724c	SRT
	Ancillary Test: Air Side Pr	occuro	



Perform the prescribed testing to determine if there is an air leak that could be causing this fault. Does the test fail to complete or result in a failed state? No: Proceed to step 4 • Yes: Proceed to step 6 Step 4 Step ID 1724d SRT **DAVIE Direct Test: EGR and Turbo Condition** Run the prescribed DAVIE Direct test to determine correct operation of the turbocharger. Does the test fail to complete or result in a failed state? No: Proceed to step 5 Yes: Proceed to step 6 Step ID 1724e Step 5 SRT 5. DAVIE Direct Test: Turbo Actuator Effort Run the prescribed DAVIE Direct test to determine correct operation of the turbo Does the test fail to complete or result in a failed state? No: Proceed to Step 7 • Yes: Proceed to step 6 Step ID 1724f **SRT** Step 6 6. Replace: Turbo Speed sensor Replace the identified faulty component. Use DAVIE to check for the presence of active faults. No: Issue resolved Yes: Proceed to step 7 Step 7 Step ID 1724g **SRT** Contact the PACCAR Engine Support Call Center For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the PACCAR Engine Support Call Center at 1-800-477-0251. **Verification Drive Cycle** To validate the repair, this cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON. With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable. **Back to Choose Code** Back to Index



Code number	P1727
Fault code description	VTG turbocharger control - Data erratic, intermittent or incorrect
Fault code information	2 trip MIL
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type - Boost
Description of component(s)	ring position.
	The gas flow guidance into the turbine rotor is controlled by the position of the turbo charger nozzle ring.
	A 1 2 B B
	100%
	The main components of the VTG turbo charger actuator are:
	ECU
	Electromotor
	The electromotor rotates the output shaft via internal gears.
	output shaft
	The nozzle ring mechanism is moved via a sector gear by rotating the output shaft
	output shaft position sensor
	The position of the actuator output shaft is monitored with an internal sensor and
	a reference magnet (reference point).
	temperature sensor
	The temperature of the printed circuit board of the ECU is monitored.



Control

The VTG turbo charger actuator is a smart actuator that communicates with the PCI ECU via E-CAN. The actuator ECU is controlled by the PCI ECU but has its own diagnostics on the following actuator inputs and outputs:

- Power supply voltage
- Electromotor current

The effort to move the nozzle ring is monitored.

· Output shaft position

The mechanical end positions of the nozzle ring mechanism are monitored.

- ECU printed circuit board temperature
- ECU hardware and software

Learn sweep

After the ignition is keyed on, a learn sweep is performed by the actuator. During this sweep the VTG turbo charger nozzle ring is fully opened and fully closed to check the mechanical end positions of the nozzle ring mechanism.

Unpowered and fail-safe position

The unpowered and fail-safe position of the actuator is 80%. If a failure is detected the VTG actuator moves to the fail-safe position, if possible.

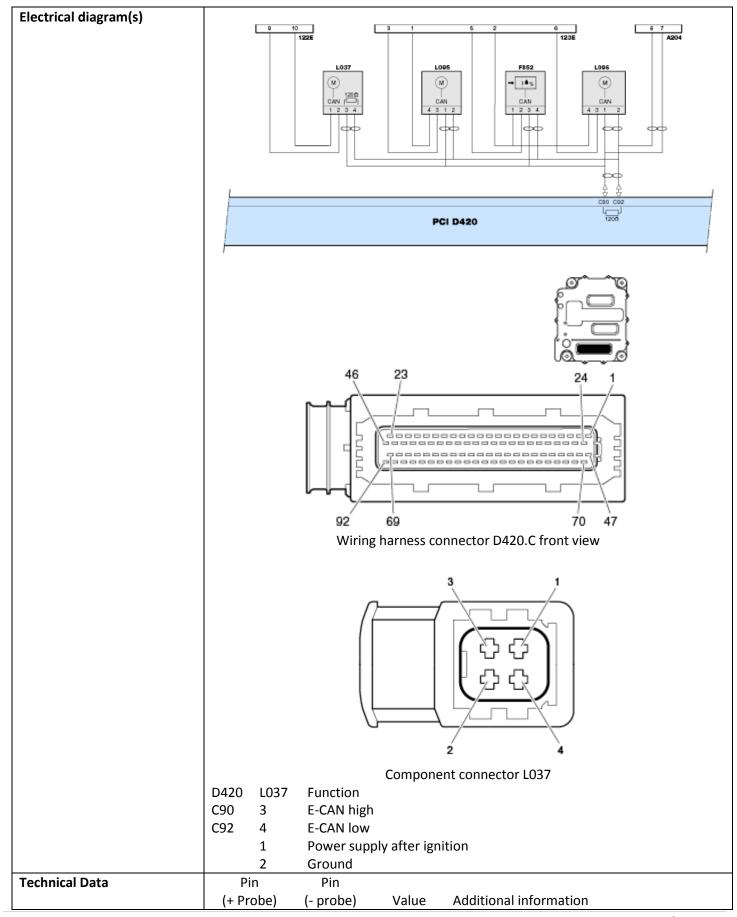
Effect of actuator on the system:

- Controlling the VTG turbo charger
 In general, a lower opening percentage results in a higher turbo speed and therefore in a higher boost pressure. The controlled opening percentage also depends on other conditions, such as the required EGR flow (pressure before turbine).
- Controlling the pressure before turbine to generate EGR flow and back pressure during engine braking.



Location of component(s)	1.027
Diagnostic condition	This diagnostic runs: • When the engine is running, and;
	The engine mode is SCR high efficiency or standard or protection.
Set condition of fault code	The PCI ECU (D420) detects that the actual VTG turbocharger nozzle ring position measured by the VTG turbocharger actuator differs too much from the commanded position (by the PCI ECU) for more than 40 seconds.
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, proceed at a minimum speed of 80 km/h [50 mph] in the highest gear possible with the engine speed between 1100 and 1500 rpm and set the cruise control. This test is best performed with a loaded vehicle/trailer, but if load is unavailable, turn as many engine power consumers on to produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3 separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is unachievable. Use a flat road, if possible.







			1.11.			
	1	2		gnition keyed on		
	3	4	± 120 Ω	Ignition keyed off		
			•	Ground cable from the battery		
				disconnected		
			•	• Vehicle Communication Interface		
	 			(VCI)of DAVIE disconnected		
Possible causes	Faulty actuator or turbo charger nozzle ring mechanism. Check the actuator and turbocharger nozzle ring mechanism.					
	Remove the actuator. Check the sector gear travel. Check the actuator output gear for demage.					
	2. Check the actuator output gear for damage.					
	Check the actuator output gear for adequate rotation (minimum of one complete rotation)					
	complete rotation). 4. Re-initialize the turbo actuator after installation.					
Additional information						
Additional information	In order to create a requested boost pressure and exhaust gas pressure, the exhaust					
	gas flow guidance into the turbine rotor is controlled by the position of the					
	turbocharger nozzle ring. During normal engine control, the turbocharger nozzle ring					
	position is commanded by the PCI ECU. The actual control of the nozzle ring is carried out by the VTG turbocharger actuator (1.037), a smart actuator that communicates					
	out by the VTG turbocharger actuator (L037), a smart actuator that communicates with the PCI ECU via E-CAN. The actuator provides feedback to the PCI ECU about the					
	nozzle ring position.					
Diagnostic Step-by-Step			hleshooting ster	as helow using the breakout barness if		
Diagnostic step by step	Perform the troubleshooting steps below using the breakout harness, if necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as it could damage the harness. The ignition should always be in the OFF position when					
	connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components. • Disconnecting the EAS connectors during the troubleshooting					
	process will result in multiple errors.					
	For specific electrical component information and pinout locations,					
	always refer to the technical data.					
	 It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 					
		'possible	causes' section.			
				27		
	Step 1		Step ID 172			
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins)					
	and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.					
	Chair 2		Chair ID 477	CDT CDT		
	Step 2	t - T 1 1 1	Step ID 172	27b SRT		
	Ancillary Test: Turbo Actuator Span Perform the prescribed testing to manually check the turbo sector gear range of					
		e prescribed	testing to manu	ially check the turbo sector gear range of		
	 motion. Does the test fail to complete or result in a failed state? The test does not fail to complete or result in a failed state, Skip to Step 5 in this troubleshooting process, to recalibrate the turbocharger actuator. 					
		 The test does fail to complete or result in a failed state, Continue to Step 3 				
	• The	e test does fa	iii to complete o	or result in a falled state, Continue to Step 3		



	in this troubleshooting process, to replace the turbocharger.					
	Step 3	Step ID 1727c	SRT			
	Replace: Turbocharger Contact the PACCAR Engine Support Call Center (1-800-477-0251) to confirm replacing the turbocharger. Replace the turbocharger as confirmed. Continue to the next step in this troubleshooting process and perform the DAVIE Direct Test: Turbocharger Actuator (VGT) Replacement to initialize the new turbocharger actuator					
	Step 4	Step ID 1727d	SRT			
	DAVIE Direct Test: Turbocharger Actuator (VGT) Replacement					
	Run the prescribed DAVIE Direct test to re-calibrate the turbocharger actuator. Re-install the Turbo Actuator. Start the engine and verify if the fault has gone inactive.					
	 If this related fault is no longer active, then this issue has been resolved. If this related fault is still active, continue to the step 5 in the troubleshooting Process. 					
	Step 5 Contact the PACCA	Step ID 1727e AR Engine Support Call Center	SRT			
	For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the PACCAR Engine Support Call Center at 1-800-477-0251.					
Verification Drive Cycle	To validate the repair, with the brakes set, starts the engine and allow it to run at idle					
	for 2 minutes.		Back to Choose Code Back to Index			

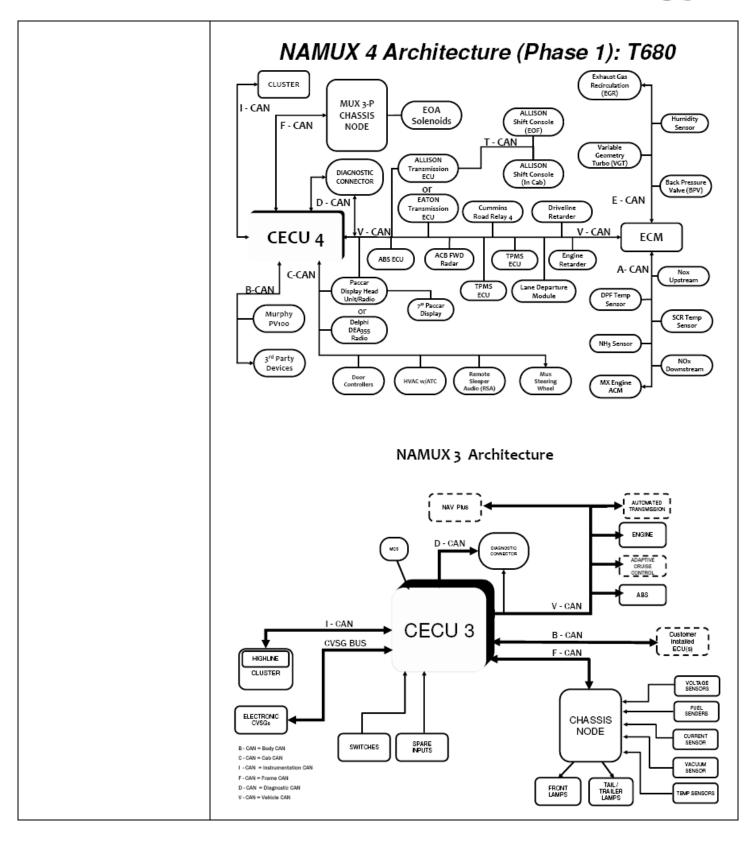


Code number	P1751			
Fault code description	Malfunction Indicator Lamp (MIL) – Voltage too high or short circuit to supply on ECU			
	D420 pin B23			
Fault code information	3 drive cycle recovery			
	Readiness group – None			
	Freeze frame type – Comprehensive			
Description of component(s)	Not available/required for this code			
Location of component(s)	Not available/required for this code			
Diagnostic condition	This diagnostic runs continuously when the ignition is on.			
Set condition of fault code	If voltage is across the MIL circuit is zero volt.			
Reset condition of fault code	This fault code will change to inactive immediately after the diagnostic runs and			
	passes			
Electrical diagram(s)	Not available/required for this code			
Technical data	Not available/required for this code			
Possible causes	Faulty wiring			
	Faulty connector			
Additional information	Not available/required for this code			
Diagnostic Step-by-Step	Please refer to chassis wiring information.			
Verification Drive Cycle	Not available/required for this code			
	Back to Choose Code			
	Back to Index			

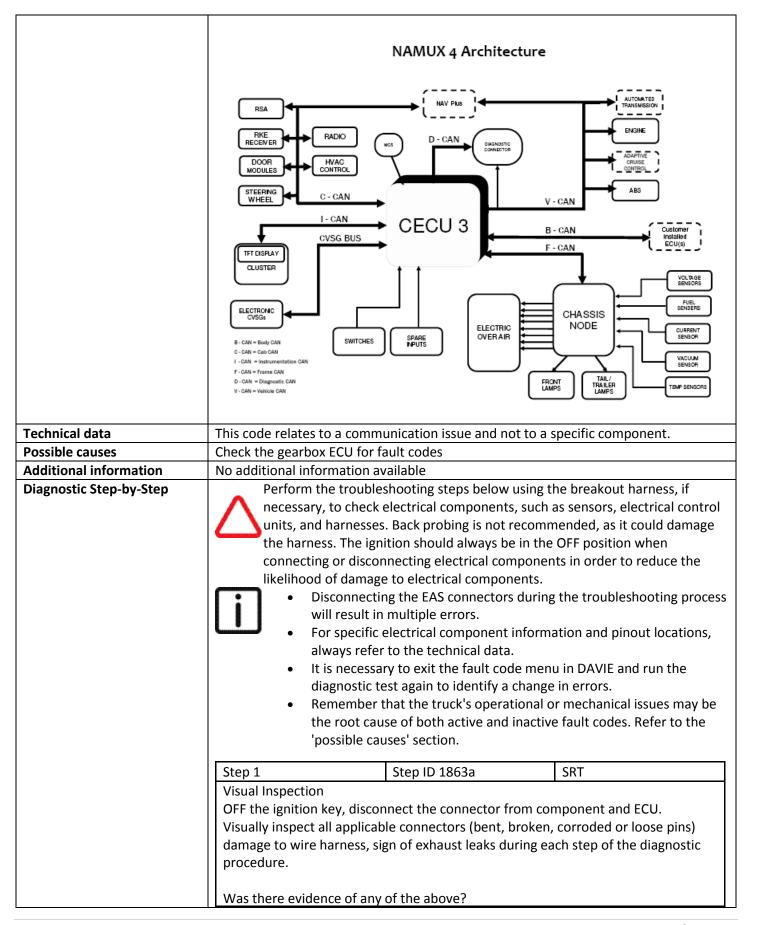


Code number	P1863			
Fault code description	CAN communication - Message (PROPB_AST) out of range – Maneuvering Mode from			
	transmission			
Fault code information	3 drive cycle recovery			
	Readiness group – None			
	Freeze frame type – Generic			
Description of component(s)	This code relates to a communication issue and not to a specific component.			
Location of component(s)	This code relates to a communication issue and not to a specific component.			
Diagnostic condition	This diagnostic runs continuously when the ignition is on.			
Set condition of fault code				
Reset condition of fault code	This DTC changes to inactive as soon as the error is no longer detected.			
Electrical diagram(s)				
	This DTC changes to inactive as soon as the error is no longer detected. **NAMUX 3 Architecture: 2010 B-Cab** **Diagnostic OAN** Diagnostic OAN** Diagnostic O			











	No: Proceed	ed to sten 2				
	 No: Proceed to step 2. Yes: Make the appropriate repairs or component replacements. 					
	res. Make the appropriate repairs of component replacements.					
	Use DAVIE to re-ch	neck for the presence of active	faults.			
	If this related fault is no longer active, then this issue has been resolved.					
		If this related fault is still active, Proceed to step 2				
	Step 2	Step ID 1863b	SRT			
	Data check	•	•			
	 Lookup th 	e technical data of the specific	system			
	Perform the second that the second that the second term to the se	ne checking data test of the spe	ecific component			
	Is test pass?					
	No: Proceed	ed to step 3				
	Yes : Proce	eed to step4				
	Step 3	Step ID 1863c	SRT			
	Repair or replace of	-				
		 Repair or replace the component, also check for electrical connection and wiring harness. 				
	Reconnect	t the connector				
	ON the igr	nition key				
	Use DAVIE to re-ch	neck for the presence of active	faults:			
	Is DTC fau	lt active: Proceed to step 4				
	 Is DTC fau 	lt inactive: Issue resolved. Clear	inactive fault.			
	Step 4	Step ID 1863d	SRT			
	For further assista	nce in diagnosing this issue or f	or confirmation prior to the			
		spect components, contact the	Engine Support Call Center			
	at 1-800-477-02	51.				
Verification Drive Cycle		To verify the repair:				
	With the brakes set, turn the key to the ON position with the engine off, and allow 10					
	seconds for the system to initialize and run diagnostics. With the brakes set, start the engine and allow it to run at idle for 2 minutes.					
	vvitri trie brakes set	, start the engine and allow it to				
	Back to Choose Code Back to Index					
			Dack to fildex			



Code number	P2104			
Fault code description	Engine protection system - Warning active			
Fault code information	1 trip Check Engine lamp			
	3 drive cycle recovery			
	Readiness Group - None			
	Freeze frame type – Engine protection			
Description of component(s)	Not available/required for this code			
Location of component(s)	Not available/required for this code			
Diagnostic condition	Not available/required for this code			
Set condition of fault code	This DTC becomes active if the DTC from which it originates has been active for a			
	certain period of time.			
Reset condition of fault code	This DTC becomes inactive as soon as the DTC from which it originates has become			
	inactive.			
Electrical diagram(s)	Not available/required for this code			
Technical data	Not available/required for this code			
Possible causes	This DTC is activated through the occurrence of another active DTC			
Additional information	This DTC only activates a warning to the driver.			
	This DTC is part of the engine protection system and can become active			
	simultaneously with an active DTC related to:			
	Low oil pressure			
	High coolant temperature			
	High oil temperature			
	High intercooler temperature			
	Low coolant level			
	Low/high PCI ECU power supply			
	High aftertreatment system temperatures			
Diagnostic Step-by-Step				
	Step 1. Investigate Related Trouble Codes			
	Step 1.A Investigate related trouble codes			
	This diagnostic trouble code is activated by the presence of one or more other related trouble codes.			



	Action 1. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes. Are these or any other related codes active? P0217; P0A1F; P1115; P1127; P1298; P1524; P1560; P2560; P3003			
	Yes	No		
	Refer to the troubleshooting information for these codes.	Contact the PACCAR Engine Support Center for further assistance.		
		this issue or for confirmation prior to the s, contact the PACCAR Engine Support Call		
		Back to Index		



Code number	P2147
Fault code description	Common rail pump unit 1 – Voltage too low or short circuit to ground on ECU D420 pin A26
Fault code information	1 trip MIL 3 drive cycle recovery Readiness group – None Freeze frame type – Comprehensive
Description of component(s)	DESCRIPTION, COMMON RAIL PUMP UNIT 1 AND 2 (L092, L093) Common rail pump units 1 and 2 supply fuel to the common rail.
	10 3 4 5 6 7
	 Outlet port Solenoid connector Sealing ring fuel supply gallery - outside Sealing ring fuel supply gallery - fuel return gallery Sealing ring fuel return gallery - crankcase Spring Roller lifter Common rail pump unit cam Fuel return port Fuel supply port Effect on the system: Rail pressure control: The rail pressure is closed-loop controlled. A comparison is made between the actual rail pressure and rail pressure demands determined by the ECU. The rail pressure is adjusted by pumping more or less fuel to the rail with the common rail pump units.



Location of component(s)	1		
Diagnostic condition	This diagnostic runs continuously when the power stage hardware is active		
Set condition of fault code	High side voltage on the injector (before injection) compared to battery voltage is less than 20,00% of the threshold value.		
	 less than 20.00% of the threshold value Driver bank C High side driver voltage @ 6, 9 and/or 12 us is greater than 0.45; 		
	0.75; 1.05 V of the threshold value		
Reset condition of fault code			
	passes.		



Electrical diagram(s) D420 L093 L092 59 56 62 Wiring harness connector D420.A front view D420 PCI ECU L092 Common rail pump unit 1 Common rail pump unit 2 L093 D420 L092 L093 Function A25 2 Signal low, common rail pump unit 1 A26 1 Signal high, common rail pump unit 1 A27 1 Signal high, common rail pump unit 2 A28 2 Signal low, common rail pump unit 2 **Technical data** Component check, common rail pump unit 1 (L092) Preparation Key off the ignition Disconnect connector L092 Measure on component connector L092 Pin Pin (+ probe) (- probe) Value Additional information 1 2 $\pm 0.67 \Omega$ Resistance value at 20°C [68°F] maximum 0.94Ω Resistance value at 120°C [248°F]



Component check, common	Component check, common rail pump unit 2 (L093)				
Preparation					
 Key off the ignition 	Key off the ignition				
 Disconnect connecto 	or L093				
 Measure on compon 	ent connector L093				
Pin Pin (+ probe) (- probe)	Pin Pin Value Additional information				
1 2	± 0.67 Ω Resistance value at 20°C [68°F]				
ma	ximum 0.94 Ω Resistance value at 120°C [248°F]				
Possible causes • Faulty wiring					
Faulty connector					
Faulty solenoid valve					
Additional information No additional information av	ailable.				
Diagnostic Step-by-Step Perform the troubles	shooting steps below using the breakout harness, if				
necessary, to check ε	electrical components, such as sensors, electrical contro				
units, and harnesses.	. Back probing is not recommended, as it could damage				
harness. The ignition	should always be in the OFF position when connecting				
disconnecting electri	cal components in order to reduce the likelihood of dan				
to electrical component					
Disconnecting	ng the EAS connectors during the troubleshooting proces				
will result in	multiple errors.				
• For specific ϵ	electrical component information and pinout locations,				
always refer	to the technical data.				
It is necessar	ry to exit the fault code menu in DAVIE and run the				
diagnostic te	diagnostic test again to identify a change in errors.				
Remember t	Remember that the truck's operational or mechanical issues may be the				
root cause of	root cause of both active and inactive fault codes. Refer to the 'possible				
causes' section	causes' section.				
This pump unit circuit test pr	ocedure will address the following pump unit error				
types:					
Short circuit across p	oump unit				
Pump unit open circu	uit				
Pump unit low side s	hort circuit to ground				
Pump unit low side s	hort circuit to battery voltage				
Step 1	Step 1 Step ID 2147a SRT				
Visual inspection - Visually i	Visual inspection - Visually inspect all applicable connectors and harnesses for				
corrosion, damage, and rub	bing during each step of the diagnostic procedure.				
Proceed to step 2.	Proceed to step 2.				
Step 2	Step ID 2147b SRT				
	ne pump unit connector. Turn the key ON and measure				
	gnal circuit terminal on the connector and a battery				
ground:					
	proximately 7.0 V – Proceed to step 3.				
Measured voltage is bel	Measured voltage is below 5.0 V or above 9.0 V – Proceed to step 5.				
Step 3	Step ID 2147c SRT				



With key OFF, disconnect the pump unit connector and perform a diode check between the connector ground circuit terminal and battery ground. Please refer to your multimeter operation manual for the correct diode check procedure: If the circuit is open during the REVERSE bias test and indicates 600 mV ±200 mV during the FORWARD bias test – Replace the pump unit. Proceed to the verification procedure listed at the end of this document. If any result other than open circuit during the REVERSE bias test and 600 mV ±200 mV during the FORWARD bias test is found - Proceed to step 4. SRT Step 4 Step ID 2147d With key OFF, disconnect the encapsulated harness at the PMC and perform a diode check between the ground circuit terminal on the PMC and battery ground. Please refer to your multimeter operation manual for the correct diode check procedure: If the circuit is open during the REVERSE bias test and measures 600 mV ±200 mV during the FORWARD bias test – Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document. If any result other than open circuit during the REVERSE bias test and 600 mV ±200 mV during the FORWARD bias test is found - Proceed to step 6. SRT Step 5 Step ID 2147e Disconnect the encapsulated harness from the PMC. Turn the key ON and measure the voltage between the signal circuit terminal on the PMC and battery ground: Measured voltage is approximately 7.0 V – Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document. Measured voltage is below 5.0 V or above 9.0 V – Proceed to step 6. Step 6 Step ID 2147f **SRT** Possible PMC failure – Contact the Engine Support Center for further instructions on replacement of the PMC **Verification Drive Cycle** To validate the repair: With DAVIE connected and the key ON, clear the errors. Start the engine and let it idle to verify with DAVIE that the errors do not recur. **Back to Choose Code** Back to Index



Code number	P2148
Fault code description	Common rail pump unit 1 – Voltage too high or short circuit to supply on ECU D420 pin A26
Fault code information	1 trip MIL 3 drive cycle recovery Readiness group – None Freeze frame type - Comprehensive
Description of component(s)	Common rail pump units 1 and 2 supply fuel to the common rail.
	10 9 3 4 5 6 6 7
	 Outlet port Solenoid connector Sealing ring fuel supply gallery - outside Sealing ring fuel supply gallery - fuel return gallery Sealing ring fuel return gallery - crankcase Spring Roller lifter Common rail pump unit cam Fuel return port Fuel supply port
	Operation The internal plunger is actuated via a roller lifter on the camshaft. Each pump has three pump events every two crankshaft revolutions. Fuel from the fuel gallery can enter the pump plunger area via an internal valve. A pump event starts when the plunger travels up, the PCI ECU activates the solenoid briefly, and the internal valve closes the opening to the fuel gallery. The internal valve



is kept closed hydraulically, and the fuel is pumped to the rail via a check valve in the outlet bore of the pump unit.

The pump event stops when the roller lifter passes the top of the camshaft lobe, causing the plunger to travel downward again. Due to this, the pressure above the plunger decreases and the internal valve opens the opening to the fuel gallery. The check valve in the outlet bore closes and prevents fuel from flowing back from the rail to the plunger area.

Control

The amount of fuel pumped to the rail depends on the duration of the pump event. The earlier the solenoid is activated by the PCI ECU in the up stroke of the pump plunger, the more (mg/stroke) fuel is pumped to the rail.

Effect on the system:

Rail pressure control: The rail pressure is closed-loop controlled. A comparison is made between the actual rail pressure and rail pressure demands determined by the ECU. The rail pressure is adjusted by pumping more or less fuel to the rail with the common rail pump units.

Location of component(s) L092

Diagnostic condition

The diagnostic runs when power stage hardware is active

Set condition of fault code

The condition is set:



	High side voltage on the injector (before injection) compared to battery			
	voltage is greater than 80% of threshold value			
	Driver bank C High side driver voltage @ 6, 9 and/or 12 us is greater than threshold value 0.45: 0.75: 1.05 V.			
Reset condition of fault code	threshold value 0.45; 0.75; 1.05 V			
neset condition of fault code	This fault code will change to inactive immediately after the diagnostic runs and passes.			
Electrical diagram(s)	passes.			
	D420 A26 A25 A27 A28			
	62 59 56 4			
	Wiring harness connector D420.A front view			
	D420 PCI ECU L092 common rail pump unit 1 L093 common rail pump unit 2			
	D420 L092 L093 Function			
	A25 2 Signal low, common rail pump unit 1			
	A26 1 Signal high, common rail pump unit 1			
	A27 1 Signal high, common rail pump unit 2			
	A28 2 Signal low, common rail pump unit 2			
Technical data	Component check, common rail pump unit 1 (L092) Preparation			



	T				
	Key off the ignition				
	Disconnect connector L092				
	Measure on component connector L092				
	Pin	Pin			
	(+ probe)	(- probe)	Value	Additional information	
	1	2	± 0.67 Ω	Resistance value at 20°C [68°F]	
			maximum 0.94Ω	Resistance value at 120°C [248°F]	
				6	
	-	check, comm	on rail pump unit 2	(L093)	
	Preparation				
	-	off the ignition			
		onnect conne			
			oonent connector LO	093	
	Pin	Pin			
	(+ probe)	(- probe)	Value	Additional information	
	1	2	± 0.67 Ω	Resistance value at 20°C [68°F]	
			maximum 0.94 Ω	Resistance value at 120°C [248°F]	
Possible causes	1. Faulty w	_			
	2. Faulty co				
	,	lenoid valve			
Additional information		l information			
Diagnostic Step-by-Step				elow using the breakout harness, if	
	<i>y</i> •	•	•	nents, such as sensors, electrical control	
	Construction of the last of th			not recommended, as it could damage	
			-	ys be in the OFF position when	
	connecting or disconnecting electrical components in order to reduce the				
	likelihood of damage to electrical components.				
	Disconnecting the EAS connectors during the troubleshooting process will provide a great state of the control of the				
	will result in multiple errors.For specific electrical component information and pinout locations,				
			fer to the technical	t code menu in DAVIE and run the	
	'		•		
		-	-	ify a change in errors. perational or mechanical issues may be	
	'			and inactive fault codes. Refer to the	
			causes' section.	and mactive radit codes. Never to the	
		роззівіс	causes section.		
	Step 1		Step ID 2148a	SRT	
	<u> </u>	ection - Visua		able connectors and harnesses for	
	corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.				
	Troceed to step 2.				
	Step 2 Step ID 2148b SRT				
	With key OFF, disconnect the pump unit connector. Turn the key ON and measure the voltage between the signal circuit terminal on the connector and a battery				
	ground:				
	 Measured voltage is approximately 7.0 V – Proceed to step 3. 				
	 Measured voltage is approximately 7.0 V = Proceed to step 5. Measured voltage is below 5.0 V or above 9.0 V = Proceed to step 5. 				
	- IVIE	asarca VUILA	5c 13 DC10W J.U V UI	above 5.0 v Troceed to step 5.	
	1				



	Step 3	Step ID 2148c	SRT		
	With key OFF, disconnect the pump unit connector and perform a diode c				
	between the connector ground circuit terminal and battery ground. Please refer to your multimeter operation manual for the correct diode check procedure:				
	If the circuit is open during the REVERSE bias test and indicates 600 mV				
	- - - - - - - -	_			
	_		place the pump unit. Proceed		
		procedure listed at the end			
	If any result other than open circuit during the REVERSE bias test and 600				
	mV ±200 mV durin	ig the FORWARD bias test i	s found - Proceed to step 4.		
		T			
	Step 4	Step ID 2148d	SRT		
	· · · · · · · · · · · · · · · · ·	•	t the PCI and perform a diode		
	_		I and battery ground. Please		
	refer to your multimeter o	peration manual for the co	rrect diode check procedure:		
	 If the circuit is ope 	n during the REVERSE bias	test and measures 600 mV		
	±200 mV during th	ie FORWARD bias test – Re	place the encapsulated		
	harness. Proceed t	to the verification procedur	re listed at the end of this		
	document.				
	If any result other than open circuit during the REVERSE bias test and 600				
	mV ±200 mV during the FORWARD bias test is found - Proceed to step 6.				
	Step 5 Step ID 2148e SRT				
	Disconnect the encapsulated harness from the PCI. Turn the key ON and measure				
	the voltage between the signal circuit terminal on the PCI and battery ground:				
	Measured voltage is approximately 7.0 V – Replace the encapsulated				
	harness. Proceed to the verification procedure listed at the end of this				
	document.				
	 Measured voltage 	is below 5.0 V or above 9.0	V – Proceed to step 6.		
			•		
	Step 6	Step ID 2148f	SRT		
		1	ter for further instructions on		
	replacement of the PCI.	0			
Verification Drive Cycle	To validate the repair:				
	·	the key ON, clear the error	s. Start the engine and let it idle		
	to verify with DAVIE that the errors do not recur.				
	,		Back to Choose Code		
			Back to Index		



PZ150	
Code number	P2150
Fault code description	Common rail pump unit 1 – Voltage too low or short circuit to ground on ECU D420 pin A27
Fault code information	1 trip MIL
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type - Comprehensive
Description of component(s)	Common rail pump units 1 and 2 supply fuel to the common rail.
	10 3 4 5 5 6 7 7 8
	 Outlet port Solenoid connector Sealing ring fuel supply gallery - outside Sealing ring fuel supply gallery - fuel return gallery Sealing ring fuel return gallery - crankcase Spring Roller lifter Common rail pump unit cam Fuel return port Fuel supply port Operation The internal plunger is actuated via a roller lifter on the camshaft. Each pump has three pump events every two crankshaft revolutions. Fuel from the fuel gallery can enter the pump plunger area via an internal valve. A pump event starts when the plunger travels up, the PCI ECU activates the solenoid briefly, and the internal valve closes the opening to the fuel gallery. The internal valve is kept closed hydraulically, and the fuel is pumped to the rail via a check valve in the



outlet bore of the pump unit.

The pump event stops when the roller lifter passes the top of the camshaft lobe, causing the plunger to travel downward again. Due to this, the pressure above the plunger decreases and the internal valve opens the opening to the fuel gallery. The check valve in the outlet bore closes and prevents fuel from flowing back from the rail to the plunger area.

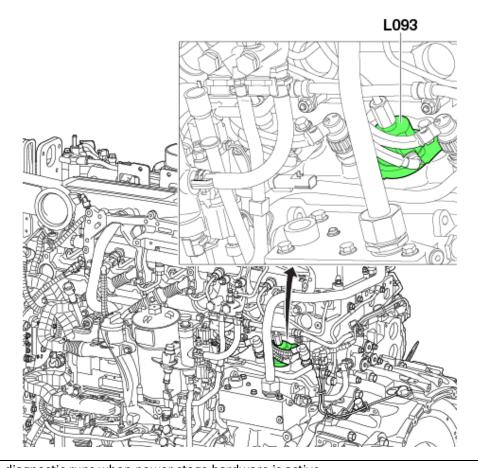
Control

The amount of fuel pumped to the rail depends on the duration of the pump event. The earlier the solenoid is activated by the PCI ECU in the up stroke of the pump plunger, the more (mg/stroke) fuel is pumped to the rail.

Effect on the system:

Rail pressure control: The rail pressure is closed-loop controlled. A comparison is made between the actual rail pressure and rail pressure demands determined by the ECU. The rail pressure is adjusted by pumping more or less fuel to the rail with the common rail pump units.

Location of component(s)



Diagnostic condition

The diagnostic runs when power stage hardware is active

Set condition of fault code

The condition is set:

- High side voltage on the injector (before injection) compared to battery voltage is less than 20% of threshold value
- river bank D High side driver voltage @ 6, 9 and/or 12 us is greater than threshold value 0.45; 0.75; 1.05 V



Reset condition of fault code	This fault code will change to inactive immediately after the diagnostic runs and
	passes.
Electrical diagram(s)	
	D420 A26 A25 A27 A28 1 2 1 2 L062 L063
	Wiring harness connector D420.A front view
	D420 PCI ECU
	L092 common rail pump unit 1
	L093 common rail pump unit 2
	D420 L092 L093 Function A25 2 Signal low, common rail pump unit 1 A26 1 Signal high, common rail pump unit 1 A27 1 Signal high, common rail pump unit 2 A28 2 Signal low, common rail pump unit 2
Technical data	Component check, common rail pump unit 1 (L092) Preparation
	Key off the ignition
	Disconnect connector L092
	Measure on component connector L092
	Pin Pin (Laraba) (Araba) Value Additional information
	(+ probe) (- probe) Value Additional information



	1 2 LOGZO Desistance value et 20°C [G9°F]		
	1 2 $\pm 0.67 \Omega$ Resistance value at 20°C [68°F]		
	maximum 0.94 Ω Resistance value at 120°C [248°F]		
	Component check, common rail pump unit 2 (L093) Preparation		
	Key off the ignition		
	Disconnect connector L093		
	Measure on component connector L093		
	Pin Pin		
	(+ probe) (- probe) Value Additional information		
	1 2 $\pm 0.67 \Omega$ Resistance value at 20°C [68°F]		
	maximum 0.94 Ω Resistance value at 120°C [248°F]		
Possible causes	1. Faulty wiring		
	2. Faulty connector		
	3. Faulty solenoid valve		
Additional information	No additional information available.		
Diagnostic Step-by-Step	Perform the troubleshooting steps below using the breakout harness, if necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as it could damage the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components. • Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors. • For specific electrical component information and pinout locations, always refer to the technical data. • It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. • Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 'possible causes' section. This pump unit circuit test procedure will address the following pump unit error types: • Short circuit across pump unit • Pump unit low side short circuit to ground • Pump unit low side short circuit to battery voltage		
	Following each step, the connector removed for testing MUST be reconnected before proceeding to the next test.		
	Step 1 Step ID 2150a SRT		
	Visual inspection - Visually inspect all applicable connectors and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.		
	Step 2 Step ID 2150b SRT		
	With key OFF, disconnect the pump unit connector. Turn the key ON and measure the voltage between the signal circuit terminal on the connector and a battery ground:		



• Measured voltage is approximately 7.0 V – Proceed to step 3.

• Measured voltage is below 5.0 V or above 9.0 V – Proceed to step 5.

Step 3 Step ID 2150c SRT

With key OFF, disconnect the pump unit connector and perform a diode check between the connector ground circuit terminal and battery ground. Please refer to your multimeter operation manual for the correct diode check procedure:

- If the circuit is open during the REVERSE bias test and indicates 600 mV ±200 mV during the FORWARD bias test Replace the pump unit. Proceed to the verification procedure listed at the end of this document.
- If any result other than open circuit during the REVERSE bias test and 600 mV ±200 mV during the FORWARD bias test is found Proceed to step 4.

Step 4 Step ID 2150d SRT

With key OFF, disconnect the encapsulated harness at the PCI and perform a diode check between the ground circuit terminal on the PCI and battery ground. Please refer to your multimeter operation manual for the correct diode check procedure:

- If the circuit is open during the REVERSE bias test and measures 600 mV ±200 mV during the FORWARD bias test – Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document.
- If any result other than open circuit during the REVERSE bias test and 600 mV ±200 mV during the FORWARD bias test is found Proceed to step 6.

Step 5 Step ID 2150e SRT

Disconnect the encapsulated harness from the PCI. Turn the key ON and measure the voltage between the signal circuit terminal on the PCI and battery ground:

- Measured voltage is approximately 7.0 V Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document.
- Measured voltage is below 5.0 V or above 9.0 V Proceed to step 6.

Step 6 Step ID 2150f SRT

Possible PCI failure – Contact the Engine Support Center for further instructions on replacement of the PCI.

Verification Drive Cycle

To validate the repair:

With DAVIE connected and the key ON, clear the errors. Start the engine and let it idle to verify with DAVIE that the errors do not recur.

Back to Choose Code
Back to Index

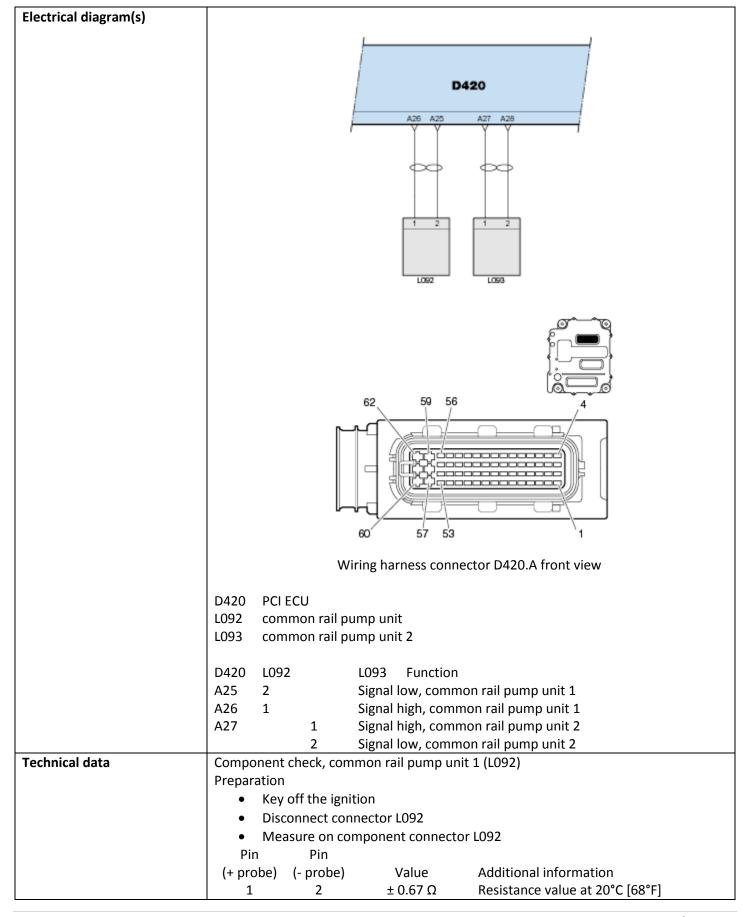


Code number	P2151
Fault code description	Common rail pump unit 2 – Voltage too high or short circuit to supply on ECU D420
	pin A27
Fault code information	1 trip MIL
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Comprehensive
Description of component(s)	Common rail pump units 1 and 2 supply fuel to the common rail.
	10 9 4 5 6 7
	1 Outlet port
	2 Solenoid connector
	3 Sealing ring fuel supply gallery - outside
	4 Sealing ring fuel supply gallery – fuel return gallery
	5 Sealing ring fuel return gallery - crankcase
	6 Spring
	7 Roller lifter
	8 Common rail pump unit cam
	9 Fuel return port
	10 Fuel supply port



Location of component(s)	
	L093
Diagnostic condition	Diagnostic condition runs when power stage hardware is active
Set condition of fault code	High side voltage on the injector (before injection) compared to battery voltage is
	greater than 80% of the threshold value
	 Driver bank D High side driver voltage @ 6, 9 and/or 12 us is greater than 0.45;0.75; 1.05V
Reset condition of fault code	This fault code will change to inactive immediately after the diagnostic runs and
	passes.







		avimum 0.04.0	Posistanco	value at 120°C [240°E]
	m	axiiiiuiii U.94 Ω	Resistance \	value at 120°C [248°F]
	Component check, commo	n rail pump unit	2 (L093)	
	Preparation			
	Key off the ignition			
	Disconnect connect			
	Measure on component connector L093			
	Pin Pin			
	(+ probe) (- probe)	Value	Additional i	nformation
	1 2	± 0.67 Ω	Resistance v	value at 20°C [68°F]
	m.	aximum 0.94 Ω	Resistance	value at 120°C [248°F]
Possible causes	Faulty wiring			
	Faulty connector			
	 Faulty sensor 			
Additional information	No additional information	available		
Diagnostic Step-by-Step	Perform the troubl	eshooting steps	below using	the breakout harness, if
	necessary, to checl	k electrical comp	onents, such	as sensors, electrical control
	units, and harnesse	es. Back probing	is not recomi	mended, as it could damage
	the harness. The ig	nition should al	ways be in the	e OFF position when
	_	-	•	nts in order to reduce the
	likelihood of dama	ge to electrical o	components.	
		_		g the troubleshooting
		ll result in multi _l		
	•	•		nation and pinout locations,
	 always refer to the technical data. It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. 			
	 Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 			
			ve and inactiv	e fault codes. Refer to the
	possible Ca	auses' section.		
	Step 1	Step ID 2151a	<u> </u>	SRT
	Visually inspect all applica			
	and harnesses for corrosic		-	• •
	diagnostic procedure. Pro		i rubbing duri	ing each step of the
	alagnostic procedure. Fro	eccu to step 2.		
	Step 2	Step ID 2151I		SRT
	•			rn the key ON and measure
	the voltage between the			
	ground:	היים בורכמונ נפון	initial off the t	connector and a battery
	 Measured voltage is a 	approximately 7	0 V – Proceed	d to step 3.
	Measured voltage is beginning.			-
	Step 3	Step ID 21510	 C	SRT



With key OFF, disconnect the pump unit connector and perform a diode check between the connector ground circuit terminal and battery ground. Please refer to your multimeter operation manual for the correct diode check procedure: If the circuit is open during the REVERSE bias test and indicates 600 mV ±200 mV during the FORWARD bias test – Replace the pump unit. Proceed to the verification procedure listed at the end of this document. If any result other than open circuit during the REVERSE bias test and 600 mV ±200 mV during the FORWARD bias test is found - Proceed to step 4 **SRT** Step 4 Step ID 2151d With key OFF, disconnect the encapsulated harness at the PCI and perform a diode check between the ground circuit terminal on the PCI and battery ground. Please refer to your multimeter operation manual for the correct diode check procedure: If the circuit is open during the REVERSE bias test and measures 600 mV ±200 mV during the FORWARD bias test – Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this If any result other than open circuit during the REVERSE bias test and 600 mV ±200 mV during the FORWARD bias test is found - Proceed to step 6. Step 5 **SRT** Step ID 2151e Disconnect the encapsulated harness from the PCI. Turn the key ON and measure the voltage between the signal circuit terminal on the PCI and battery ground: Measured voltage is approximately 7.0 V – Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document. Measured voltage is below 5.0 V or above 9.0 V – Proceed to step 6. Step 6 Step ID 2151f **SRT** Possible PCI failure – Contact the Engine Support Center for further instructions on replacement of the PCI. **Verification Drive Cycle** To validate the repair: With DAVIE connected and the key ON, clear the errors. Start the engine and let it idle to verify with DAVIE that the errors do not recur. Back to Choose Code Back to Index



Code number	P2181
Fault code description	Coolant temperature – Does not match engine operation conditions
Fault code information	2 trip MIL
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type - Cooling
Description of component(s)	The coolant temperature is measured in the coolant return gallery at the right rear end of the cylinder block. Effect on the system: Calculates the quantity of fuel to inject and the injection timing Displays the coolant temperature to the driver Displays warnings to the driver concerning high coolant temperature Limits the engine torque when the coolant temperature is too high
	Limits the maximum engine speed when the engine is cold
	Enables condition for severity of (OBD) diagnostic checks
	Fast idle speed control
	Cold start aid
Location of component(s)	F566
Diagnostic condition	This diagnostic runs:
Diagnostic condition	150 seconds after an engine start;
	 When ambient temperature is between -8 and 40°C [17 and 104°F];
	vvnen ambient temperature is between -6 and 40 C [17 and 104 F];



	When the engine mode is DOC heating or DPF regeneration or SCR heating or
	SCR high efficiency or standard or protection.
Set condition of fault code	The PCI ECU (D420) detects that the measured coolant temperature differs by more
	than 10°C [50°F] from the expected coolant temperature for more than 30 seconds.
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the
	repair, drive the vehicle until the coolant temperature is at least 70°C [158°F] in
	normal driving conditions. This activity can be best conducted with a loaded
	vehicle/trailer.
Electrical diagram(s)	
	D420
	5420
	A58 A61
	7 7
	1 2
	R
	F566
	وهــــــــــــــــــــــــــــــــــــ
	Frank
	<u> </u>
	62 59 56 4
	7 (21,7,0000000000)
	60 57 53 1
	30 31 30
	Wiring harness connector D420.A front view
	1 2
	$\bigvee [\bigcirc] \bigvee$
	Wiring harness connector F566 front view



	D420 PCI ECU		
	·		
	D420 F566 Function A58 1 Signal, coolant temperature		
Taskaisal data	A61 2 Ground		
Technical data	Component check, coolant temperature sensor (F566)		
	Preparation		
	Key off the ignition		
	Disconnect connector F566		
	Measure on component connector F566		
	Pin Pin		
	(+ probe) (- probe) Value Additional information		
	1 2 14936–15961 Ω Resistance value at -20°C [-4°F]		
	5727–6056 Ω Resistance value at 0°C [32°F]		
	2439–2557 Ω Resistance value at 20°C [68°F]		
	1151–1197 Ω Resistance value at 40°C [104°F]		
	585–604 Ω Resistance value at 60°C [140°F]		
	318–327 Ω Resistance value at 80°C [176°F]		
	185–188 Ω Resistance value at 100°C [212°F]		
	111–114 Ω Resistance value at 120°C [248°F]		
	Commonant & singuit shock FCLL (D420)		
	Component & circuit check, ECU (D420) Preparation		
	·		
	Key off the ignition		
	Disconnect connector F566		
	 Measure on the front side of wiring harness connector F566 		
	Pin Pin		
	(+ Probe) (- Probe) Value Additional Information		
	1 2 5V Ignition Keyed on		
Possible causes	Blocked open thermostat		
	Excessive heat drawn from the cooling system		
	Coolant temperature sensor deviation		
Additional information	The engine coolant temperature is monitored by the coolant temperature sensor (F566).		
Diagnostic Step-by-Step	Perform the troubleshooting steps below using the breakout harness, if		
	necessary, to check electrical components, such as sensors, electrical control		
	units, and harnesses. Back probing is not recommended, as it could damage		
	the harness. The ignition should always be in the OFF position when		
	connecting or disconnecting electrical components in order to reduce the		
	likelihood of damage to electrical components.		
	Disconnecting the EAS connectors during the troubleshooting		
	process will result in multiple errors.		
	For specific electrical component information and pinout locations,		
	always refer to the technical data.		
	 It is necessary to exit the fault code menu in DAVIE and run the 		
	diagnostic test again to identify a change in errors.		
	 Remember that the truck's operational or mechanical issues may be 		
	the root cause of both active and inactive fault codes. Refer to the		
	'possible causes' section.		



Step 1 Step ID 2181a SRT

Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.

Step 2 Step ID 2181b SRT

Ancillary Test: Coolant Leak

Perform the prescribed testing to determine correct operation of the associated engine or after treatment system.

Does the test fail to complete or result in a failed state?

- No: Continue to the step 3 in the troubleshooting process.
- Yes: Make the appropriate repairs or component replacements.

Use DAVIE to re-check for the presence of active faults.

- If this related fault is no longer active, then this issue has been resolved.
- If this related fault is still active, continue to the step 3 in the troubleshooting

Step 3 Step ID 2181c SRT

Visual inspection: Thermostat

Remove and inspect the thermostat to verify it is not stuck in the open or closed position.

This issue may also be the result of an excessive heat draw, such as the use of a heated trailer.

Was the thermostat stuck in the open or closed position?

- No: Continue to the step 4 in the troubleshooting process.
- Yes: Clean, adjust, repair, or replace affected components for any issues identified.

Use DAVIE to check for the presence of active faults.

- If this related fault is no longer active, then this issue has been resolved.
- If this related fault is still active, continue to the step 4 in the troubleshooting process.

Step 4 Step ID 2181d SRT

Replace the identified faulty sensor.

Use DAVIE to check for the presence of active faults.

- If this related fault is no longer active, then this issue has been resolved.
- If this related fault is still active, continue to the step 5 in the troubleshooting process.

Step 5 Step ID 2181e SRT

Contact the PACCAR Engine Support Call Center

For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the PACCAR Engine Support Call Center at 1-800-477-0251.



Verification Drive Cycle	To validate the repair, this cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON. With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.
	Back to Choose Code Back to Index



Code number	P2183	
Fault code description	Coolant temperature - Data erratic	
Fault code information	2 trip MIL	
	3 drive cycle recovery	
	Readiness group – None	
	Freeze frame type – Cooling	
Description of component(s)	The coolant temperature is measured in the coolant return gallery at the right rear end of the cylinder block.	
	Effect on the system:	
	Calculates the quantity of fuel to inject and the injection timing	
	Displays the coolant temperature to the driver	
	Displays warnings to the driver concerning high coolant temperature	
	Limits the engine torque when the coolant temperature is too high	
	Limits the maximum engine speed when the engine is cold	
	Enables condition for severity of (OBD) diagnostic checks	
	Fast idle speed control	
	Cold start aid	
Location of component(s)		
, ,		
	F566	
	V ALTERIAL	
Diagnostic condition	This diagnostic runs:	
	150 seconds after an engine start, and;	
	 When ambient temperature is above -8°C [17°F], and; 	
	When the calculated coolant temperature is below 65°C [149°F] or above	
	85°C [185°F], and;	
	The engine mode is DOC heating or DPF regeneration or SCR heating or SCR	



	high efficiency or standard or protection.
Set condition of fault code	The PCI ECU (D420) detects that the measured coolant temperature differs by more
	than 20°C [68°F] from the expected coolant temperature for more than 45 seconds.
	A short circuit to battery or open circuit is detected for 10 consecutive seconds.
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the
	repair, drive the vehicle until the coolant temperature is at least 70°C [158°F] in
	normal driving conditions. This activity can be best conducted with a loaded
	vehicle/trailer.
Electrical diagram(s)	
	D 400
	D420
	A58 A51
	4 4
	1 2
	RT
	F366
	62 59 56 4
	60 57 53 1
	Wiring Harness Connector D420.A front view
	Thing harness connector B 1207/ Hone view
	1 2
	Wiring harness connector F566 front view
	D420 PCI ECU



	F566 Coolant temperature sensor.			
	'			
	D420 F566 Function			
	_			
	A61 2 Grou			
Technical data	Handle connectors and pins with care and use matching measuring probes			
	Component check, coolant temperature sensor (F566)			
	Preparation			
	Key off the ignitionDisconnect connector F566			
	 Disconnect connector F566 Measure on component connector F566 			
	Pin Pin			
	(+ probe) (- probe)	Value	Additional information	
	1 2	14936–15961 Ω	Resistance value at -20°C [-4°F]	
		5727–6056 Ω	Resistance value at 0°C [32°F]	
		2439–2557 Ω	Resistance value at 20°C [68°F]	
		1151–1197 Ω	Resistance value at 40°C [104°F]	
		585-604 Ω	Resistance value at 60°C [140°F]	
		318–327 Ω	Resistance value at 80°C [176°F]	
		185–188 Ω	Resistance value at 100°C [212°F]	
		111–114 Ω	Resistance value at 120°C [248°F]	
	Component & circuit check, ECU (D420)			
	Preparation Kou off the ignition			
	Key off the ignition Disconnect connector FE66			
	 Disconnect connector F566 Measure on the front side of wiring harness connector F566 			
	Pin Pin			
	(+ probe) (- probe)	Value	Additional information	
	1 2	5V	Ignition keyed on	
Possible causes	Faulty thermostat			
	Excessive heat drawn from the cooling system			
	Coolant temperature sensor deviation			
Additional information	The engine coolant temperature is monitored by the coolant temperature sensor			
	(F566).			
Diagnostic Step-by-Step	Perform the troubleshooting steps below using the breakout harness, if			
	necessary, to check electrical components, such as sensors, electrical control			
	units, and harnesses. Back probing is not recommended, as it could damage			
	the harness. The ignition should always be in the OFF position when			
	connecting or disconnecting electrical components in order to reduce the			
	likelihood of damage to electrical components. • Disconnecting the EAS connectors during the troubleshooting			
	process will result in multiple errors.			
	For specific electrical component information and pinout locations,			
	always refer to the technical data.			
	It is necessary to exit the fault code menu in DAVIE and run the			
	diagnostic test again to identify a change in errors.			
	Remem	ber that the truck's	operational or mechanical issues may be	
2013 DACCAR MY Diagnostic Service Manual				



the root cause of both active and inactive fault codes. Refer to the 'possible causes' section.

Step 1 Step ID 2183a SRT

Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.

Step 2 Step ID 2183b SRT

Ancillary Test: Coolant Leak

Perform the prescribed testing to determine correct operation of the associated engine or after treatment system.

Does the test fail to complete or result in a failed state?

- No: Continue to the next step 3 in the troubleshooting process.
- Yes: Make the appropriate repairs or component replacements.

Use DAVIE to re-check for the presence of active faults.

- If this related fault is no longer active, then this issue has been resolved.
- If this related fault is still active, continue to the next step 3 in the troubleshooting process.

Step 3 Step ID 2183c SRT

Visual inspection: Thermostat

Remove and inspect the thermostat to verify it is not stuck in the open or closed position.

This issue may also be the result of an excessive heat draw, such as the use of a heated trailer.

Was the thermostat stuck in the open or closed position?

- No: Continue to the next step 4 in the troubleshooting process.
- Yes: Make the appropriate repairs or component replacements.

Use DAVIE to re-check for the presence of active faults.

- If this related fault is no longer active, then this issue has been resolved.
- If this related fault is still active, continue to the next step 4 in the troubleshooting process.

Step 4 Step ID 2183d SRT

Replace: Coolant temperature sensor

Replace the identified faulty sensor.

Use DAVIE to re-check for the presence of active faults.

- If this related fault is no longer active, then this issue has been resolved.
- If this related fault is still active, continue to the next step 4 in the troubleshooting process.

Step 5 Step ID 2183e SRT

For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the Engine Support Call Center at



	1-800-477-0251.
Verification Drive Cycle	To validate the repair, this cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON. With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.
	Back to Choose Code Back to Index

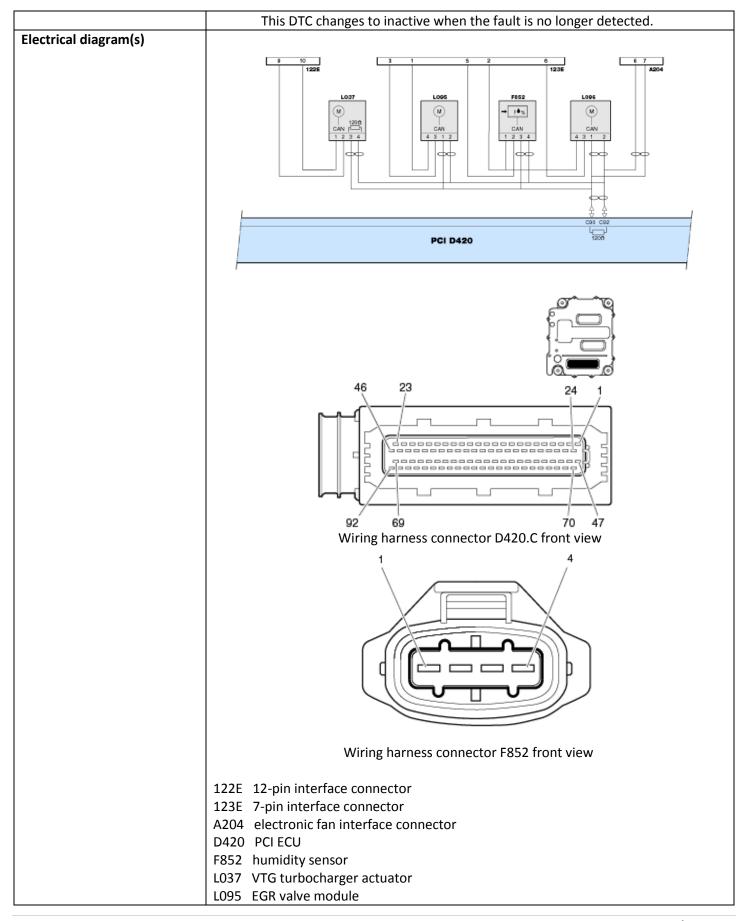


Code number	P2199
Fault code description	Temperature before turbo (humidity sensor) - Data erratic, intermittent, or incorrect
	at ignition on
Fault code information	2 trip MIL
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Comprehensive
Description of component(s)	The humidity sensor is a smart sensor that communicates with the PCI ECU via E-CAN. The sensor measures the following three properties of the drawn in precompressor (VTG turbo charger) air in the inlet air pipe: Relative humidity Pressure
	Temperature
	- Temperature
	Relative humidity
	The relative humidity refers to the moisture content percentage of the air compared with the saturated moisture level at the same temperature and pressure.
	Effect on the system:
	Determines NOx emissions
	Higher measured relative humidity results in a lower calculated NOx emission
	 Precompressor temperature Effect on the system: Determines soot emissions Higher measured precompressor temperature results in lower calculated soot formation in the engine. Calculates exhaust gas pressure before the turbine; Higher measured precompressor temperature results in lower calculated exhaust gas pressure before the turbine. Limits the maximum engine torque; for example, to limit the cylinder pressures during cold ambient conditions or driving at high altitudes. Determines turbocharger compressor flow and thus the detection of VTG surge Surge can typically occur at high compressor pressure ratios and low compressor mass flows. Calculates the temperature after the turbocharger compressor Higher measured precompressor temperature results in higher calculated temperature after the turbocharger compressor.
	Precompressor pressure Effect on the system: • Corrects pressure before turbine Higher measured precompressor pressure results in higher calculated exhaust gas pressure before the turbine. • Determines soot emissions Higher measured precompressor pressure results in lower calculated soot formation in the engine.



	 Calculates the temperature after the turbocharger compressor Lower measured precompressor pressure results in higher calculated temperature after the turbocharger compressor. Limits the maximum engine torque when driving at high altitudes (low air density) Lower measured precompressor pressure results in higher engine torque reduction. Detects VTG surge, the sensor is used to determine the compressor pressure ratio; surge can typically occur at high compressor pressure ratios and low compressor mass flows.
Location of component(s)	F852
Diagnostic condition	 This diagnostic runs: when the ignition has been keyed off continuously for at least 8 hours; when the difference between the coolant temperature and ambient temperature is less than 15°C [59°F]; ambient temperature is more than -20°C [-4°F]
Set condition of fault code	The PCI ECU (D420) detects that the measured temperature reading of the humidity sensor differs by more than 3°C [37°F] from the average of other temperature sensor readings on the engine for more than 5 seconds (after the ignition has been keyed off for at least 8 hours).
Reset condition of fault code	 The 8-hour ignition off diagnostics consists of three separate steps: The vehicle ignition may NOT be switched on or engine started for 8-10 consecutive hours (ideal situation would be overnight). Once the 8 to 10 consecutive hours have been reached, key on the ignition (NO engine start) and wait for 10 seconds to allow the system to power up and the diagnostics to run. Start the engine and let it idle for 2 minutes.







	LOOK DDV/valva		
	L096 BPV valve		
	D420 F852 Function		
	C90 3 E-CAN high		
	C92 4 E-CAN low		
	1 Power supply after ignition		
	2 Ground		
Technical data	Component & wiring check, humidity sensor (F852)		
	Preparation		
	Key off the ignition.		
	Disconnect connector F852		
	Measure on the front side of wiring harness connector F852		
	Pin Pin		
	1 2 Ubat ignition keyed on		
	3 4 $\pm 60 \Omega$ • Ignition keyed off		
	 Ground cable from the battery 		
	disconnected		
	 Vehicle Communication Interface (VCI) 		
	of DAVIE disconnected		
Possible causes	Humidity sensor deviation		
Additional information	The humidity sensor (F852) is a smart sensor that communicates with the PCI ECU vi		
	E-CAN. The sensor measures the following three properties of the drawn in		
	precompressor (VTG turbo charger) air in the inlet air pipe:		
	Relative humidity		
	·		
	• Pressure		
	Temperature		
	For this diagnostic, the temperature reading of the humidity sensor is compared with an average of other temperature sensors on the engine after the ignition has been		
	keyed off for at least 8 hours.		
Diagnostic Step-by-Step	Perform the troubleshooting steps below using the breakout harness, if		
	necessary, to check electrical components, such as sensors, electrical contro		
	units, and harnesses. Back probing is not recommended, as it could damage		
	the harness. The ignition should always be in the OFF position when		
	connecting or disconnecting electrical components in order to reduce the		
	likelihood of damage to electrical components.		
	 Disconnecting the EAS connectors during the troubleshooting proce. 		
	will result in multiple errors.		
	 For specific electrical component information and pinout locations, 		
	always refer to the technical data.		
	 It is necessary to exit the fault code menu in DAVIE and run the 		
	diagnostic test again to identify a change in errors.		
	 Remember that the truck's operational or mechanical issues may be 		
	·		
	the root cause of both active and inactive fault codes. Refer to the 'possible causes' section.		
	Step 1 Step ID 2199a SRT		
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins)		
and harnesses for corrosion, damage, and rubbing during each step of th			
	diagnostic procedure. Proceed to step 2.		
	<u>'</u>		



	Step 2	Step ID 2199b	SRT	
	Ancillary Test: Ai	· · · · · · · · · · · · · · · · · · ·	5.11	
	1 I		e are any leaks in the air system.	
	Does the test fail to complete or result in a failed state?			
	Yes - Proceed to step 3			
		No - Proceed to step 4		
	3 110 110			
	Step 3	Step ID 2199c	SRT	
	Electrical Checks	· ·	'	
	Ensure that the i	gnition key/switch has been set	to OFF before disconnecting	
		It message provided, confirm the led ranges or limits:	at the following electrical values	
	· ·	nd signal voltages (12V).		
		ntinuity (no opens or shorts).		
		ectrical values outside of expect	ed range or limits?	
		ceed to step 4		
	No - Pro	ceed to step 5		
		•		
	Step 4	Step ID 2199d	SRT	
	Repairs or compo	onent replacements appropriate	component and use DAVIE to re-	
	check for the pre	sence of active faults.		
	Fault ina	ctive – issue resolve		
	 Fault act 	ive - Proceed to step 5		
	Step 5	Step ID 2199e	SRT	
	For further assistance in diagnosing this issue or for confirmation prior to the			
	· · · · · · · · · · · · · · · · · · ·	uspect components, contact the	Engine Support Call Center at	
	1-800-477-0251.			
Verification Drive Cycle		•	the key to the ON position with the	
	engine off, and all	ow 10 seconds for the system to		
			Back to Choose Code	
			Back to Index	



P2226	
Code number	P2226
Fault code description	Internal ECU ambient pressure - Data erratic, intermittent, or incorrect at ignition on
Fault code information	2 trip MIL
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Comprehensive
Description of component(s)	Besides a microprocessor and the electronics to sense the inputs and control the
	outputs, two sensors can be found in the electronic control unit:
	Atmospheric pressure sensor
	Temperature sensor
	A(J1) B(J2) C(J3)
	 ECU atmospheric pressure sensor The PCI ECU has an internal atmospheric pressure sensor in the housing. Air can enter the ECU housing via the air vent (1).
	 Effect on the system: Reduces the maximum engine torque when driving at high altitudes (low air pressure).
	ECU temperature sensor The PCI ECU has an internal temperature sensor on the printed circuit board.
	Effect on the system: • Monitors the temperature of the electronic control unit.
	Injector codes Every fuel injector is calibrated during production to compensate for any production tolerances. An injector calibration code is present on the housing and connector of the injector. These injector codes must be (re)programmed with DAVIE if one or more injectors have been replaced or fitted in another position, or if the PCI ECU is replaced.



Location of component(s)	D420		
Diagnostic condition	This diagnostic runs: • When the ignition is on and the engine is not running, and;		
	When ambient temperature is above -20°C [-4°F].		
Set condition of fault code	The PCI ECU (D420) detects that the measured ambient pressure differs by more than		
	0.06 bar [0.87 psi] from the average readings of other pressure sensors on the		
	engine/after treatment system for more than 5 seconds.		
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the		
	repair, key the ignition off for at least 15 seconds, key it on again, then wait for at		
Electrical diagram/s)	least 5 seconds. Then start the engine and let it idle for 2 minutes.		
Electrical diagram(s) Technical data	This information not required since this is an internal PCI issue This information not required since this is an internal PCI issue		
Possible causes	Monitor the following pressure sensors with DAVIE and check for deviation:		
	PCI ECU internal ambient pressure sensor (D420)		
	• humidity sensor (F852)		
	• intake pressure (humidity sensor (F852))		
	DPF pressure sensor (F837)		
Additional information	The PCI ECU has an internal ambient pressure sensor in the housing. The ambient		
	pressure sensor is not serviceable.		
	For this diagnostic, the ambient pressure sensor reading is compared with the		
	average readings from the intake pressure (humidity sensor (F852)), boost		
	pressure sensor (F802) and DPF pressure sensor (F837).		



Perform the troubleshooting steps below using the breakout harness, if **Diagnostic Step-by-Step** necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as it could damage the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components. Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors. For specific electrical component information and pinout locations, always refer to the technical data. It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. • Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 'possible causes' section. Step 1 Step ID 2226a SRT Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2. Step 2 Step ID 2226b SRT With key OFF, gently clean excessive dirt off the PCI ECU. When cleaning the exterior of the PCI ECU, do not use cleaning solvents or high-pressure water. Navigate through DAVIE and monitor errors. If the ambient air pressure sensor over range error is still active – Proceed to step 3. If the ambient air pressure sensor over range error is no longer active – Proceed to the verification procedure. Step 3 Step ID 2226c With DAVIE connected and key ON, program the PCI basis software with the most recent PRS file available in Parts Rapido: Navigate through DAVIE and monitor errors. If the ambient air pressure sensor over range error is still active – Proceed to step 4. If the ambient air pressure sensor over range error is no longer active Proceed to the verification procedure. Step ID 2226d **SRT** Step 4 Possible PCI failure – Contact the Engine Support Center for further instructions on replacement of the PCI. To validate the repair, with DAVIE connected and key on, clear the errors. Start the **Verification Drive Cycle** engine and let it idle to verify with DAVIE that the errors do not recur. Back to Choose Code **Back to Index**



Code number	P2228			
Fault code description	Internal ECU ambient pressure-Faulty			
Fault code information	1 trip MIL	,		
	3 drive cycle recovery			
	Readiness group – None			
	Freeze frame type –Compreh	ensive		
Description of component(s)	Not available/required for this code.			
Location of component(s)	Not available/required for thi			
Diagnostic condition	This diagnostic runs continuo			
Set condition of fault code	The PCI ECU (D420) detects the	<u> </u>		
Reset condition of fault code		This fault code will change to inactive immediately after the diagnostic runs and		
	passes.			
Electrical diagram(s)	Not available/required for thi	is code.		
Technical data	Not available/required for thi			
Possible causes	Faulty ECU			
Additional information	The PCI ECU has an internal a	mbient pressure sensor in t	he housing. The ambient	
	pressure sensor is not service	•	9	
Diagnostic Step-by-Step	•	hooting steps below using t	he breakout harness, if	
			as sensors, electrical control	
		•	nended, as it could damage	
		tion should always be in the		
	_	necting electrical componer	•	
	_		its in order to reduce the	
	likelihood of damage to electrical components.			
	 Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors. 			
	 Will result in multiple errors. For specific electrical component information and pinout locations, 			
	always refer to the technical data.			
	It is necessary to exit the fault code menu in DAVIE and run the			
	diagnostic test again to identify a change in errors.			
	 Remember that the truck's operational or mechanical issues may be 			
	the root cause of both active and inactive fault codes. Refer to the			
	'possible causes' section.			
	possione dads			
	Step 1	Step ID 2228a	SRT	
	-			
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the			
	diagnostic procedure. Proceed to step 2.			
	and procedure. I rocced to step 2.			
	Step 2	Step ID 2228b	SRT	
	•			
	Visual inspection - Visually inspect the PCI-2 ECU for dirt or road debris accumulation on the exterior of the PCI-2 ECU, especially close to the PCI-2 vent.			
	Refer to Description of Component(s) for vent location.			
	If dirt or debris accumulation is found – Proceed to step 3. If NO. division and additional information is found at the standard of the			
	• II NO dirt or debris a	If NO dirt or debris accumulation is found – Proceed to step 4.		
	Ston 2	Ston ID 2220c	SRT	
	Step 3	Step ID 2228c	3/11	



		•	PCI-2 ECU. When cleaning the	
			lvents or high-pressure water.	
		DAVIE and monitor errors.		
	If the ambi	ient air pressure sensor over r	ange error is still active – Proceed	
	to step 4.			
	If the ambi	ient air pressure sensor over r	ange error is no longer active –	
	Proceed to	the verification procedure.		
	Step 4	Step ID 2228d	SRT	
	With DAVIE connec	cted and key ON, program the	PCI-2 basis software with the	
	most recent PRS file available in Parts Rapido:			
	Navigate through DAVIE and monitor errors.			
	If the ambient air pressure sensor over range error is still active – Proceed			
	to step 5.			
	If the ambi	ient air pressure sensor over r	ange error is no longer active –	
		the verification procedure.		
		·		_
	Step 5	Step ID 2228e	SRT	
	For further assistar	nce in diagnosing this issue or	for confirmation prior to the	
	replacement of suspect components, contact the Engine Support Call Center at			
	1-800-477-0251.			
Verification Drive Cycle	To validate the repa	ir, with the brakes set, turn th	ne key to the ON position with the	
_	-		o initialize and run diagnostics.	
			Back to Choose Coo	de
			Back to Ind	ex



Code number	P2229		
Fault code description	Internal ECU ambient pressure-Faulty		
Fault code information	1 trip MIL		
	3 drive cycle recovery		
	Readiness group – None		
	Freeze frame type –Comprehensive		
Description of component(s)	The PCI ECU (D420) detects that the internal ambient pressure sensor is faulty.		
Location of component(s)	The PCI ECU has an internal ambient pressure sensor in the housing. Non-Serviceable		
Diagnostic condition	This diagnostic runs continuously when the ignition is on.		
Set condition of fault code	The PCI ECU (D420) detects that the internal ambient pressure sensor is faulty.		
Reset condition of fault code	This fault code will change to inactive immediately after the diagnostic runs and		
	passes.		
Electrical diagram(s)	Not available/required for this code.		
Technical data	Not available/required for this code.		
Possible causes	Faulty ECU		
Additional information	The PCI ECU has an internal ambient pressure sensor in the housing. The ambient		
	pressure sensor is not serviceable.		
Diagnostic Step-by-Step	Perform the troubleshooting steps below using the breakout harness, if		
	units, and harnesses. Back probing is not recommended, as it could damage the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components.		
	 Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors. For specific electrical component information and pinout locations, always refer to the technical data. It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 'possible causes' section. 		
	Step 1 Step ID 2229a SRT		
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.		
	Step 2 Step ID 2229b SRT		
	Visual inspection - Visually inspect the PCI-2 ECU for dirt or road debris		
	accumulation on the exterior of the PCI-2 ECU, especially close to the PCI-2 vent.		
	Refer to Description of Component(s) for vent location.		
	If dirt or debris accumulation is found – Proceed to step 3.		
	If NO dirt or debris accumulation is found – Proceed to step 4.		
	Step 3 Step ID 2229c SRT		
·			



			PCI-2 ECU. When cleaning the	
		-2 ECO, do not use cleaning so DAVIE and monitor errors.	lvents or high-pressure water.	
			ango orror is still activo – Procoo	٨
	to step 4.	nent an pressure sensor over i	ange error is still active – Proceed	u
		signt air prossure consor ever	ange error is no longer active –	
		o the verification procedure.	ange error is no longer active –	
	Froceedit	o the verification procedure.		
	Step 4	Step ID 2229d	SRT	\neg
			PCI-2 basis software with the	
		le available in Parts Rapido:		
		DAVIE and monitor errors.	anna annania atili aatina. Daasaa	
	to step 5.	ilent air pressure sensor over i	ange error is still active – Proceed	a
		pient air pressure sensor over i	ange error is no longer active –	
		o the verification procedure.		
	Step 5	Step ID 2229e	SRT	
	For further assistance in diagnosing this issue or for confirmation prior to the			
	replacement of suspect components, contact the Engine Support Call Center at			
	1-800-477-0251.			
Verification Drive Cycle	·		ne key to the ON position with the	e
	engine off, and allo	w 10 seconds for the system t	o initialize and run diagnostics.	
			Back to Choose C	
			Back to In	<u>ıdex</u>



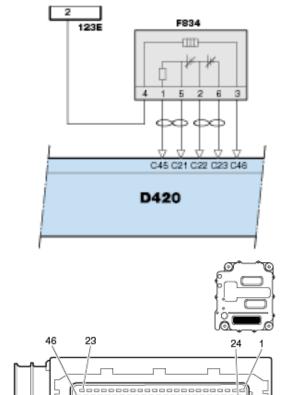
P2237	T
Code number	P2237
Fault code description	Lambda - Open circuit on ECU D420 pin C45
Fault code information	1 trip MIL
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Exhaust Gas
Description of component(s)	The lambda sensor measures the oxygen concentration in the exhaust gases after the BPV valve.
	Air/fuel ratio The PCI ECU uses the measured oxygen concentration in the exhaust to determine the air/fuel ratio of the combustion process. Typical air/fuel ratios are 18 to 45. A high value indicates a high oxygen concentration measured by the lambda sensor.
	Sensor heater The sensor has an integrated heater to maintain a sensor operating temperature of approximately 750°C [1382°F]. The PCI ECU controls the heater.
	 Sensor heating control The first stage starts when the ignition is keyed on. The sensor is heated to a value at which any condensate evaporates from the sensor. The second stage starts after the 'dew point' is reached.
	The sensor is heated to its operating temperature of approximately 750°C



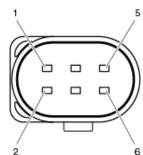
Location of component(s)	 [1382°F]. The PCI ECU determines the 'dew point' by calculating how much energy (heat by burning fuel in the engine) is pumped through the exhaust. If the 'dew point' is not/no longer reached, the sensor temperature stays at/drops to the standby temperature, similar to the first stage heating. Effect on the system Determines the air/fuel ratio of the combustion process Controls the smoke limit; where the measured exhaust gas oxygen concentration is compared with a target value for smoke limitation. A higher measured oxygen concentration results in lower calculated soot formation by the engine. Controls NOx emissions; determines whether the target Exhaust Gas Recirculation is being achieved to control NOx emissions. A higher measured oxygen concentration results in higher calculated NOx formation by the engine. Controls regeneration of the diesel particulate filter (DPF). The soot particles in the DPF are 'burned' using the oxygen present in the exhaust gas.
	F834
Diagnostic condition	If Pump current is less than 0.4 for more than 0.5 sec
Diagnostic condition	If Pump current is less than 0 A for more than 0.5 sec
Set condition of fault code	This condition is set when pump current is lower or greater than 0A
Reset condition of fault code	This fault code will change to inactive immediately after the diagnostic runs and
	passes.



Electrical diagram(s)



Wiring harness connector D420.C front view



Wiring harness connector F834 front view

123E	7-pin	interface	connector
------	-------	-----------	-----------

D420 PCI ECU

F834 lambda sensor

D420	F834	Function
C21	5	Trimming resistor
C22	2	Ground, sensor element
C23	6	Signal, nernst sensor
C45	1	Signal, pump cell current
C46	3	Ground, heater element



	4	Pow	er supply, he	ater element			
Technical data	Component check, lambda sensor (F834)						
	Preparation	Preparation					
	Key the ignition off						
	• Disc	Disconnect connector F834					
	Measure on component connector F834						
	Pin Pin						
	(+probe)	(- probe)	Value	Additional inf	ormation		
	4	3	2.4 -4.0 Ω	Heater eleme	nt resistance at 20°C [68°C]		
	Preparation	Component & circuit check, ECU (D420) Preparation					
	• Key	the ignition	off				
	• Disc	onnect conn	ector F834				
	• Mea	sure on the	front side of	wiring harness o	connector F834		
	Pin	Pin					
	(+probe)	(- probe)	Value	Additional inf	ormation		
	4	Ground	Ubat	Heater eleme ignition keyed	nt power supply with don		
Possible causes	Faulty w	riring					
	Faulty co	onnector					
	Faulty se	ensor					
Additional information	No addition		n available				
	unit the con likel	s, and harne harness. The hecting or disibood of dan Disconne will resu For specialways rediagnost Remember the root	ignition shows connecting of the electrical effect to the test again over that the test accuse of both e causes' sect	obing is not recould always be in electrical component S connectors duerrors. component inforchical data. the fault code not identify a charuck's operation h active and ination.\	ormation and pinout locations, menu in DAVIE and run the ange in errors. That or mechanical issues may be ctive fault codes. Refer to the		
	Step 1		Step ID	2237a	SRT		
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.						
	Step 2		Step ID	2237h	SRT		
	Electrical C	hacks	Jiep ID	22370	1 31(1		
		t the ignition	key/switch I	nas been set to (OFF before disconnecting		
	Based on t	he fault mes	sage provide	d, confirm that t	the following electrical values		



	are within specified ranges or limits:	
	 Supply and signal voltages (12) 	2V).
	Cable continuity (no opens or)	shorts).
	Are measured electrical values outside	e of expected range or limits?
	 Yes - Proceed to step 3 	
	 No - Proceed to step 4 	
	Step 3 Step ID 22	237c SRT
	Make the appropriate repairs or comp	ponent replacements and use DAVIE to re-
	check for the presence of active faults.	S
	Fault inactive – issue resolved	1
	Fault active - Proceed to step	0.4
	Step 4 Step ID 22	
	· · ·	PAVIE to re-check for the presence of active
	faults.	
	Fault inactive – issue resolved	
	Fault active - Proceed to step	0.5
	Grant Basis	227.
	Step 5 Step ID 22	
		nis issue or for confirmation prior to the
	1-800-477-0251.	contact the Engine Support Call Center at
Verification Drive Cycle		performed on a level grade road (least amount
Verification Drive Cycle	· · · · · · · · · · · · · · · · · · ·	ng a trailer. If a loaded trailer is unavailable,
	produce engine load by turning the A/C	-
		ete, proceed to a road with a minimum speed
		t gear possible with the engine speed between
	•	trol. Run this cycle for roughly 3 to 5 miles or in
	three separate 1-mile increments if a st	, , , , , , , , , , , , , , , , , , , ,
		Back to Choose Code
		Back to Index



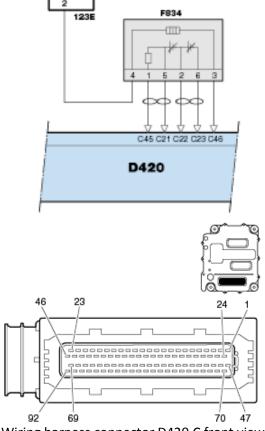
P2238	
Code number	P2238
Fault code description	Lambda - Current too low on ECU D420 pin C45
Fault code information	1 trip MIL
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Exhaust gas
Description of component(s)	The lambda sensor measures the oxygen concentration in the exhaust gases after the BPV valve.
	Air/fuel ratio The PCI ECU uses the measured oxygen concentration in the exhaust to determine the air/fuel ratio of the combustion process. Typical air/fuel ratios are 18 to 45. A high value indicates a high oxygen concentration measured by the lambda sensor.
	Sensor heater The sensor has an integrated heater to maintain a sensor operating temperature of approximately 750°C [1382°F]. The PCI ECU controls the heater.
	 Sensor heating control The first stage starts when the ignition is keyed on. The sensor is heated to a value at which any condensate evaporates from the sensor. The second stage starts after the 'dew point' is reached.
	The sensor is heated to its operating temperature of approximately 750°C



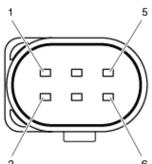
Location of component(s)	 [1382°F]. The PCI ECU determines the 'dew point' by calculating how much energy (heat by burning fuel in the engine) is pumped through the exhaust. If the 'dew point' is not/no longer reached, the sensor temperature stays at/drops to the standby temperature, similar to the first stage heating. Effect on the system Determines the air/fuel ratio of the combustion process Controls the smoke limit; where the measured exhaust gas oxygen concentration is compared with a target value for smoke limitation. A higher measured oxygen concentration results in lower calculated soot formation by the engine. Controls NOx emissions; determines whether the target Exhaust Gas Recirculation is being achieved to control NOx emissions. A higher measured oxygen concentration results in higher calculated NOx formation by the engine. Controls regeneration of the diesel particulate filter (DPF). The soot particles in the DPF are 'burned' using the oxygen present in the exhaust gas.
	F834
Diagnostic condition	If Pump current is less than -0.002 A for more than 0.5 sec
Set condition of fault code	This fault is set when pump current is less than -0.002 A for longer than 0.5 sec.
Reset condition of fault code	This fault code will change to inactive immediately after the diagnostic runs and
neset condition of launt code	passes.
	μαιισι.



Electrical diagram(s)



Wiring harness connector D420.C front view



Wiring harness connector F834 front view

123E 7-pin interface connector

D420 PCI ECU

F834 lambda sensor

D420	F834	Function
C21	5	Trimming resistor
C22	2	Ground, sensor element
C23	6	Signal, nernst sensor
C45	1	Signal, pump cell current
C46	3	Ground, heater element
	4	Power supply, heater element



Technical data	Preparation Key Disc Mea Pin (+probe) 4 Component Preparation Key Disc	3 & circuit che the ignition c onnect conne	off ector F834 ponent conn Value 2.4 -4.0 Ω ck, ECU (D42 off ector F834	ector F834 Additional inform Heater element r	resistance at 20°C [68°C]
	(+probe) 4	(- probe) Ground	Value Ubat	Additional inform Heater element p ignition keyed on	power supply with
Possible causes	Faulty wFaulty coFaulty se	onnector		_ ,	
Additional information	-	al information	n available		
Diagnostic Step-by-Step	nece unit: the confidence likel	essary, to che s, and harnes harness. The necting or dis ihood of dam Disconne will resul For speci always re diagnosti Rememb the root of	ck electrical ses. Back proignition show connecting ender to electricity the EAR in multiple fic electrical efer to the tessary to exitic test again the that the trocuse of both causes' sections.	components, such obing is not recomruld always be in the electrical components. So connectors during errors. Component information identify a change ruck's operational continuative and inactive on.	or mechanical issues may be re fault codes. Refer to the
	and harnes diagnostic Step 2 Electrical C Ensure that related cab	ses for corro procedure. Procedure. Procedur	sion, damage roceed to ste Step ID key/switch h	etors (bent, broken e, and rubbing duri ep 2. 2238b has been set to OFF	SRT , corroded or loose pins) ng each step of the SRT before disconnecting following electrical values
		specified rang			. 0 :



	Supply and s	ignal voltages (12V).	
	Cable contin	uity (no opens or shorts).	
	Are measured electr	ical values outside of expect	ed range or limits?
	Yes - Proceed	d to step 3	
	No - Procee	d to step 4	
			-
	Step 3	Step ID 2238c	SRT
	Make the appropriat	e repairs or component repl	acements and use DAVIE to re-
	check for the presen	ce of active faults.	
	Fault inactive	e – issue resolved	
	Fault active -	- Proceed to step 4	
	Step 4	Step ID 2238d	SRT
	Replace Lambda sen	sor and use DAVIE to re-ched	ck for the presence of active
	faults.		
	Fault inactive	e – issue resolve	
	Fault active -	- Proceed to step 5	
		·	
	Step 5	Step ID 2238e	SRT
	For further assistanc	e in diagnosing this issue or	for confirmation prior to the
	replacement of susp	ect components, contact the	PACCAR Engine Support Call
	Center at 1-800-477-	-0251	
Verification Drive Cycle			on a level grade road (least amount
-	of incline possible) an	d under load using a trailer.	If a loaded trailer is unavailable,
	produce engine load b	by turning the A/C and fan to	ON. With the System Initiation
	cycle complete, proce	ed to a road with a minimun	n speed limit of 50 mph, then get to
	the highest gear possi	ble with the engine speed be	etween 1100-1500 rpm, and set the
	cruise control. Run thi	is cycle for roughly 3 to 5 mil	es or in three separate 1-mile
	increments if a steady	3 to 5 miles is unachievable	ı.
			Back to Choose Code
			Back to Index



P2239	T
Code number	P2239
Fault code description	Lambda - Current too high on ECU D420 pin C45
Fault code information	1 trip MIL
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Exhaust gas
Description of component(s)	The lambda sensor measures the oxygen concentration in the exhaust gases after the BPV valve.
	Air/fuel ratio The PCI ECU uses the measured oxygen concentration in the exhaust to determine the air/fuel ratio of the combustion process. Typical air/fuel ratios are 18 to 45. A high value indicates a high oxygen concentration measured by the lambda sensor.
	Sensor heater The sensor has an integrated heater to maintain a sensor operating temperature of approximately 750°C [1382°F]. The PCI ECU controls the heater.
	 Sensor heating control The first stage starts when the ignition is keyed on. The sensor is heated to a value at which any condensate evaporates from the sensor. The second stage starts after the 'dew point' is reached.
	The sensor is heated to its operating temperature of approximately 750°C



F834	
energy (heat by burning fuel in the engine) is pumped through the exhall fithe 'dew point' is not/no longer reached, the sensor temperature star at/drops to the standby temperature, similar to the first stage heating. Effect on the system • Determines the air/fuel ratio of the combustion process • Controls the smoke limit; where the measured exhaust gas oxygen concentration is compared with a target value for smoke limitation. A higher measured oxygen concentration results in lower calculated sor formation by the engine. • Controls NOx emissions; determines whether the target Exhaust Gas Recirculation is being achieved to control NOx emissions. A higher measured oxygen concentration results in higher calculated N formation by the engine. • Controls regeneration of the diesel particulate filter (DPF). The soot part in the DPF are 'burned' using the oxygen present in the exhaust gas.	ys Ot



Electrical diagram(s) F834 -IIII) C45 C21 C22 C23 C46 D420 Wiring harness connector D420.C front view Wiring harness connector F834 front view 7-pin interface connector 123E **PCI ECU** D420 F834 lambda sensor D420 Function F834 C21 5 Trimming resistor C22 2 Ground, sensor element C23 6 Signal, nernst sensor C45 1 Signal, pump cell current C46 3 Ground, heater element



		4	Pov	ver supply, heate	r element	
Technical data	Component check, lambda sensor (F834) Preparation • Key the ignition off • Disconnect connector F834					
	Measure on component connector F834 Pin Pin Pin					
	(+probe)	(- probe)	Value	Additional info		
	4	3	2.4 -4.0 Ω	Heater elemen	t resistance at 20°C [68°C]	
	Preparation	Component & circuit check, ECU (D420) Preparation				
	•	,,				
		 Disconnect connector F834 Measure on the front side of wiring harness connector F834 Pin Pin 				
	(+probe)	(- probe) Ground	Value Ubat	Additional info Heater elemen	rmation t power supply with	
Possible causes		k in closed p		ignition keyed	on	
Additional information Diagnostic Step-by-Step	nece units the l	ennector ensor al information form the troucessary, to che es, and harne tharness. The frecting or dis indicate the control of dan indicate th	ubleshooting eck electrical sses. Back properties in the second score and score and seconnecting enage to elect	components, suctobing is not recorded always be in telectrical comporrical components S connectors dur	g the breakout harness, if ch as sensors, electrical con mmended, as it could dam he OFF position when hents in order to reduce th i. ing the troubleshooting pr	age e
	 For specific electrical component information and pinout locations, always refer to the technical data. It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 'possible causes' section. 					
	Step 1		Step ID	2239a	SRT	
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.					
	Step 2		Step ID	2239b	SRT	
	Electrical C	t the ignition	, ,		FF before disconnecting	



Based on the fault message provided, confirm that the following electrical values are within specified ranges or limits: Supply and signal voltages (12V). Cable continuity (no opens or shorts). Are measured electrical values outside of expected range or limits? Yes - Proceed to step 3 No - Proceed to step 4 Step 3 Step ID 2239c **SRT** Make the appropriate repairs or component replacements and use DAVIE to recheck for the presence of active faults. Fault inactive - issue resolved Fault active - Proceed to step 4 Step ID 2239d Replace Lambda sensor and use DAVIE to re-check for the presence of active faults. Fault inactive - issue resolved Fault active - Proceed to step 5 Step ID 2239e **SRT** Step 5 For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the PACCAR Engine Support Call Center at 1-800-477-0251 **Verification Drive Cycle** To validate the repair, this cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON. With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable. **Back to Choose Code Back to Index**



Code number	P2266		
Fault code description	Water in fuel - Voltage too low or short circuit to ground on ECU D420 pin A49		
Fault code information	3 drive cycle recovery		
	Readiness group – None		
	Freeze frame type – Comprehensive		
Description of component(s)	For further assistance: Contact the PACCAR Engine Support Call Center 1-800-477-0251 Please contact the Engine Support Center		
Location of component(s)			
Diagnostic condition			
Set condition of fault code			
Reset condition of fault code			
Electrical diagram(s)			
Technical data			
Possible causes			
Additional information			
Diagnostic Step-by-Step	Please refer to chassis wiring information.		
Verification Drive Cycle	N/A		
	Back to Choose Code		
	Back to Index		



Code number	P2275		
Fault code description	Water in fuel - Voltage too high or short circuit to supply on ECU D420 pin A49		
Fault code information	3 drive cycle recovery		
	Readiness group – None		
	Freeze frame type – Comprehensive		
Description of component(s)	For further assistance: Contact the PACCAR Engine Support Call Center 1-800-477-0251 Please contact the Engine Support Center		
Location of component(s)			
Diagnostic condition			
Set condition of fault code			
Reset condition of fault code			
Electrical diagram(s)			
Technical data			
Possible causes			
Additional information			
Diagnostic Step-by-Step	Please refer to chassis wiring information.		
Verification Drive Cycle	N/A		
	Back to Choose Code		
	Back to Index		



P228C

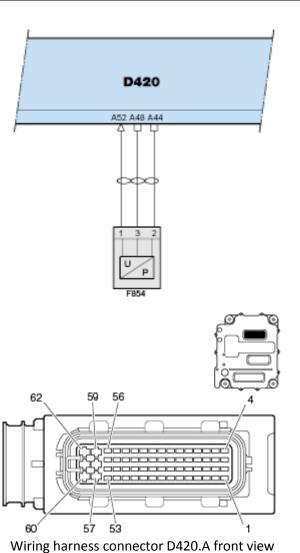
On the second	P2200		
Code number	P228C		
Fault code description	Engine rail pressure control – Incorrect		
Fault code information	1 trip MIL		
	3 drive cycle recovery		
	Readiness group – Fuel System		
	Freeze frame type – Fuel		
Description of component(s)	The rail pressure is measured in the common rail.		
Description of component(s)	The rail pressure sensor is part of the common rail and is not interchangeable as a		
	separate part.		
	Effect on the system:		
	 Feedback on the rail pressure control. 		
	The rail pressure is closed-loop controlled. A comparison is made between		
	the rail pressure demands determined by the ECU and the rail pressure		
	feedback measured by the common rail pressure sensor.		
Location of component(s)	recuback measured by the common run pressure sensor.		
Location of component(s)			
	F854		
Diagnostic condition	This diagnostic runs:		
5	 When the engine is running at a steady load and speed. 		
0. 10. 66 5	When the rail pressure operating state is: Pump unit only		
Set condition of fault code	The PCI ECU (D420) detects that the measured rail pressure is more than 200 bar		
	(2900 PSI) higher than the commanded rail pressure for more than 3 seconds.		
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the		



repair:

- Drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once
 the minimum target temperature has been reached, perform several low to
 higher speed accelerations with moderate engine load. Also perform highload to low-load transitions. This activity should be conducted within the
 range of 15 km/h [10 mph] to 65 km/h [40 mph] for no more than 5 to 8 km
 [3 to 5 miles], and;
- Drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, proceed at a minimum speed of 80 km/h [50 mph] in the highest gear possible with the engine speed between 1100 and 1500 rpm and set the cruise control. This test is best performed with a loaded vehicle/trailer, but if load is unavailable, turn as many engine power consumers on to produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3 separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is unachievable. Use a flat road, if possible.

Electrical diagram(s)





	Wiring harness connector F854 front view		
	D420 PCI ECU F854 Engine rail pressure sensor		
	D420 F854 Function A44 2 Ground		
	A48 3 Power supply		
	A52 1 Signal, common rail pressure		
Technical data	Component & wiring check, ECU (D420)		
	Preparation		
	Key off the ignition. Disconnect connector F854		
	 Disconnect connector F854 Measure on the front side of wiring harness connector F854 		
	Pin Pin		
	(+ probe) (- probe) Value Additional information		
	3 2 5V Ignition keyed on		
Possible causes	common rail pressure sensor deviation		
Additional to form at the	common rail pump unit failure		
Additional information	The rail pressure is closed-loop controlled. A comparison is made between the rail pressure commanded by the ECU and the rail pressure feedback measured by the common rail pressure sensor.		
	• The rail pressure is measured in the common rail by the common rail pressure sensor (F854).		
	· · ·		
Diagnostic Step-by-Step	Engine torque is reduced. Perform the troubleshooting steps below using the breakout harness, if necessary, to check electrical components, such as sensors, electrical control		
	units, and harnesses. Back probing is not recommended, as it could damage the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of		
	damage to electrical components.		
	Disconnecting the EAS connectors during the troubleshooting process		
	will result in multiple errors. • For specific electrical component information and pinout locations		
	 For specific electrical component information and pinout locations, always refer to the technical data. 		
	It is necessary to exit the fault code menu in DAVIE and run the		
	diagnostic test again to identify a change in errors.		



	ro	•	onal or mechanical issues may be t ive fault codes. Refer to the 'possik
	Step 1	Step ID 228C-a	SRT
	Visual inspection - Visually inspect all applicable connectors and harnesses for corrosion, damage and rubbing during each step of the diagnostic procedure. Proceed to step 2.		
	Step 2	Step ID 228C-b	SRT
	DAVIE Direct Test	1	
	Run the prescribed DAVIE Direct test to determine if the electronic unit pumps ar working correctly. Does the test fail to complete or result in a failed state? No: Processed to step 4 Yes: Processed to step 3		
	Step 3	Step ID 228C-c	SRT
	Make the appropriate repairs or component replacements and use DAVIE to check for the presence of active faults. • Fault inactive – issue resolve • Fault active - Proceed to step 4		
	Step 4	Step ID 228C-d	SRT
	For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the PACCAR Engine Support Call Center at 1-800-477-0251.		
Verification Drive Cycle	To validate the repair, with the brakes set, start the engine and allow it to run at for 2 minutes.		engine and allow it to run at idle
			Back to Choose Code
			Back to Inde



P228D

1 220D			
Code number	P228D		
Fault code description	Engine rail pressure control - Incorrect		
Fault code information	1 trip MIL 3 drive cycle recovery Readiness group – Fuel System Freeze frame type - Fuel		
Description of component(s)	Common rail pump unit 1 (L092) and unit 2 (L093)		
	Common rail pump units 1 and 2 supply fuel to the common rail.		
	1 Outlet port 2 Solenoid connector 3 Sealing ring fuel supply gallery - outside		
	9 4 Sealing ring fuel supply gallery - fuel return gallery		
	5 Sealing ring fuel return gallery - crankcase		
	6 Spring		
	8 7 Roller lifter		
	8 Common rail pump unit cam 9 Fuel return port		
	10 Fuel supply port		
	10 3 4 5 5 6 6 7 7 8 8 N403451		
	Operation		
	The internal plunger is actuated via a roller lifter on the camshaft. Each pump has three		



pumping events for every two crankshaft revolutions.

Fuel from the fuel gallery can enter the pumping plunger area via an internal valve.

A pumping event starts when the plunger travels up, the PCI ECU activates the solenoid briefly and the internal valve closes the opening to the fuel gallery. The internal valve is kept closed hydraulically, and the fuel is pumped to the rail via a check valve in the outlet bore of the pump unit.

The pumping event stops when the roller lifter passes the top of the camshaft lobe, causing the plunger to travel downwards again. Due to this, the pressure above the plunger decreases and the internal valve opens the opening to the fuel gallery. The check valve in the outlet bore closes and prevents fuel from flowing back from the rail to the plunger area.

Control

The amount of fuel pumped to the rail depends on the duration of the pumping event (pump delivery percentage). The earlier the solenoid is activated by the PCI ECU in the up stroke of the pumping plunger the more fuel (mg/stroke) is pumped to the rail.

Effect on the system

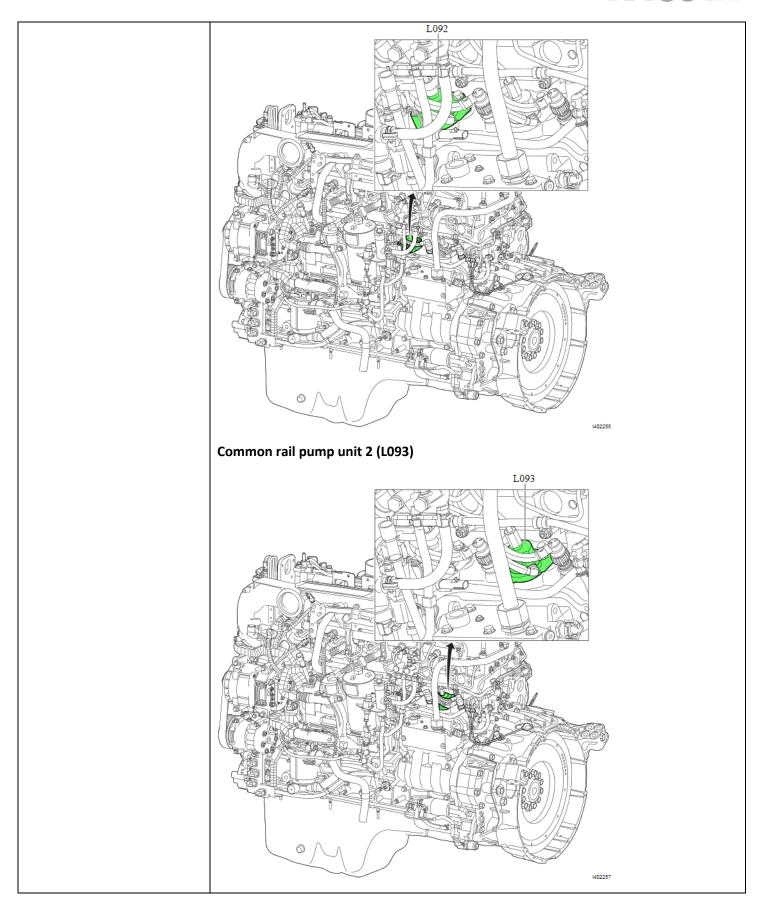
• Rail pressure control.

The rail pressure is closed-loop controlled. A comparison is made between the actual rail pressure and rail pressure demands determined by the ECU. The rail pressure is adjusted by pumping more or less fuel to the rail with the common rail pump units.

Location of component(s)

Common rail pump unit 1 (L092)







Diagnostic condition	This dia	gnostic r	uns whe	n the rail pressure operating state is: Pump unit only.
Set condition of fault code	The PCI ECU (D420) detects that the actual rail pressure is more than 200 bar lower than the commanded rail pressure for more than 3 seconds.			
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected.			
Electrical diagram(s)	Common rail pump units 1 (L092) and unit 2 (L093)			
	D420 PCI ECU L092 common rail pump unit 1 L093 common rail pump unit 2			
	D420	L092	L093	Function
	A25	2		Signal low, common rail pump unit 1
	A26	1		Signal high, common rail pump unit 1
	A27		1	Signal high, common rail pump unit 2
	A28		2	Signal low, common rail pump unit 2
	62 59 56 4			



	Wiring harno	ess connecto	r D420.A front v	view			
	i	Handle conne	ctors and pins w	vith care and use matching measuring probes.			
Technical data	Component	check, com	mon rail pump	unit 1 (L092)			
	Preparation						
	• Disco	Disconnect connector L092					
	Pin (+ probe)	Pin (- probe)	Value	Additional information			
			±0.67 Ω	Resistance value at 20°C [68°F]			
	1	2	maximum 0.94 Ω	Resistance value at 120°C [248°F]			
	• Disco	off the ignit onnect conr sure on con		ector L093			
	Pin (+ probe)	Pin (- probe)	Value	Additional information			
			±0.67 Ω	Resistance value at 20°C [68°F]			
	1	2	maximum 0.94 Ω	Resistance value at 120°C [248°F]			
Possible causes	If the fue	 Air present in the fuel system. If the fuel system or parts of it have been emptied during maintenance or repair, this DTC may become active temporarily after the engine is started. If the DTC 					
		stays inactive when the engine is running, no further investigation is necessary.					
	An exter	 Malfunction in the low pressure fuel system An external or internal leakage on the high-pressure fuel system components. Common rail pump unit failure 					



Additional information The rail pressure is closed-loop controlled. A comparison is made between the rail pressure commanded by the ECU and the rail pressure feedback measured by the common rail pressure sensor. The actual rail pressure is measured in the common rail by the common rail pressure sensor (F854). P0094 can also be active when this DTC is active. **Diagnostic Step-by-Step** The ignition should always be in the OFF position when connecting or disconnecting electrical components to reduce the likelihood of damage to the components. This troubleshooting procedure is based on the assumption that supply power and ground to the PCI are functioning properly. Disconnecting the PCI connectors during the troubleshooting process will result in multiple errors. Specific electrical component information and pin out locations are provided in this procedure as a reference only. Always refer to the technical data sections in Rapido for the most up-to-date changes. It is necessary to use DAVIE to clear all current DTCs from the PCI and EAS-3 ECUs, and then run the Quick Check to identify a change in fault status. This DTC can be set as a result of multiple failure modes. For proper fault isolation, complete all troubleshooting steps in the sequence provided. Step 1 Investigate Related DTCs Before troubleshooting this DTC, take notice of any other active or inactive DTCs. One or multiple other DTCs could have been the cause for this DTC. Step 1A Investigate related DTCs Action 1. Use DAVIE Diagnostics to perform a Quick Check for current DTCs. Are these or any other related codes present? P0087; P1087; P1091; P1195; P1196 Yes No Possible restriction in the fuel supply, fuel primer pump, or rail pressure sensor. Go to the troubleshooting information for these DTCs before continuing with this procedure. Go to step 2A



Step 2 Fuel System, High Pressure Rail Check

Step 2A DAVIE Monitor, rail pressure; actual vs. requested

Action

1. Using DAVIE to monitor individual component selections for rail pressure, confirm that the actual value measures 200 bar below the requested value.

Were the corresponding set conditions confirmed?

Yes	No
	Use DAVIE to perform a Quick Check for current DTCs.
Go to step 3A	If this DTC is still present, go to step 3A. If this DTC is no longer present, then this may have been an isolated occurrence. Stop troubleshooting.

Step 3 Fuel System, Low Pressure Checks

Step 3A Visual inspection: low pressure circuit

Action

- 1. Inspect the associated components or systems for any of the following:
 - Low fuel level in fuel tank
 - Damaged fuel filtration system (L097) that needs replacement
 - Air in fuel system
 - Fuel leaks
 - Damaged or kinked fuel lines

Was there evidence of any of the above?

Yes	No
Correct any issues found.	
Go to step 7A to perform the corresponding repair verification cycles	



and rechecks.	
If this DTC is still present, go to step 3B.	Go to step 3B

Step 3B Rapido maintenance: check fuel system, low pressure (job ID 68721)

Action

1. Perform the identified maintenance job, outlined in "check fuel system low pressure (Fuel system)."



The procedure outlined in "<u>check fuel system, low pressure (Fuel system)</u>" requires bleeding the fuel system. For the MX engine (North American markets), ensure that "<u>bleed (Fuel system)," job ID 66537</u> is used when bleeding the fuel system.

Do any of the tests result in a failed state based on the criteria provided?

Yes	No
Investigate and correct any issues found.	
Go to step 7A to perform the corresponding repair verification cycles and rechecks.	
If this DTC is still present, go to step 4A	Go to step 4A

Step 4 Fuel System, High Pressure Checks

Step 4A Visual inspection, high pressure common rail

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Fuel leaks
 - A fuel line from the high pressure common rail to the injector is damaged
 - Bent or broken fuel lines
 - Common rail pressure sensor (F854) not installed correctly
 - Common rail pressure release valve (L094) not installed correctly



 High pressure fuel lines not installed correctly 		
 Common rail pump unit 1 (Lo correctly 	Common rail pump unit 1 (L092) and unit 2 (L093) are not installed correctly	
Damaged electrical components/connections		
Was there evidence of any of the above?		
Yes	No	
Correct any issues found.		
Go to step 7A to perform the corresponding repair verification cycles and rechecks.		
If this DTC is still present, go to step 4B.	Go to step 4B	

Step 4B Visual inspection, common rail pressure sensor (F854)

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - The correct sensor (F854) is not installed
 - ECU connections are damaged or disconnected
 - Batteries not fully charged or contacts are not tight
 - Common rail pressure sensor (F854) broken or not installed correctly

Was there evidence of any of the above?

Yes No

Correct any issues found.

Go to step 7A to perform the corresponding repair verification cycles and rechecks.



If this DTC is still present, go to step 4C.	Go to step 4C

Step 4C Electrical checks, supply voltage, common rail pressure sensor (F854)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

2. Confirm the supply voltage level as outlined in the corresponding checking data, "Component Check, Common Rail Pressure Sensor (F854)."

Are measured values within expected range?

Yes	No
	Correct any issues found.
	Go to step 7.A to perform the corresponding repair verification cycles and rechecks.
Go to step 4D	If this DTC is still present, go to step 4D.

Step 4D Rapido maintenance: common rail pressure release valve (L094) leak down test

Action

1. Refer to Rapido procedure "Check fuel system high pressure (fuel system)" to verify common rail pressure release valve does not leak.

Does the high pressure valve pass the leak test?

Yes	No
	Contact the PACCAR Engine Support Center for confirmation in replacing the failed common rail.
	Go to step 7A to perform the corresponding repair validation cycles and rechecks.
Go to step 5A	If this DTC is still present, go to step 5A.



Step 5 Common Rail Pump Unit 1 (L092) and Unit 2 (L093) Checks

Step 5A Electrical checks, resistance, common rail pump unit 1 (L092) and unit 2 (L093)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

1. Confirm the resistance as outlined in the corresponding checking data, "Component check, Common Rail Pump Unit 1 (L092) and Unit 2 (L093)."

Are measured values within expected range?

Yes	No
	Contact the PACCAR Engine Support Center for confirmation in replacing the failed electronic unit pump.
	Go to step 7A to perform the corresponding repair validation cycles and rechecks.
Go to step 5B	If this code is still present, go to step 5B.

Step 5B Special test, isolating common rail pump unit 1 (L092) and unit 2 (L093)

Action

- 1. Set the ignition switch to OFF.
- 2. Disconnect the pump unit 1 pump (L092) electrical connector.
- 3. Start the engine and monitor how smoothly it runs.

A smooth running engine indicates that the unit 2 pump (L093) is functioning properly. A rough running engine indicates the unit 2 pump (L093) is not functioning properly.

- 4. Set the ignition switch to OFF.
- 5. Reconnect the unit 1 pump (L092) electrical connector.
- 6. Disconnect the unit 2 pump (L093) electrical connector.
- 7. Start the engine and monitor how smoothly it runs.

A smooth running engine indicates that the unit 1 pump (L092) is functioning properly. A rough running engine indicates that the unit 1 pump



(L092) not functioning correctly.	
Did the engine run smoothly in both instances (3 and 7)?	
Yes	No
	Correct any issues found, or replace the corresponding unit pump as needed.
	Refer to step 7A to perform the corresponding repair verification cycles and rechecks.
Go to step 6A	If this DTC is still present, go to step 6A.

Step 6 Injector (B421, B422, B423, B424, B425, B426) Checks

Step 6A DAVIE test: automated cylinder performance (B421, B422, B423, B424, B425, B426)



This test requires Master Technician level access.

Action

1. Run the prescribed DAVIE performance test to determine if there is a problem with one of the injectors.

Does the test fail to complete or result in a failed state?

Yes	No
For any related issues found, contact the PACCAR Engine Support Center on further isolating possible issues with or replacing a failed injector.	
Go to step 7A to perform the corresponding repair verification cycles and rechecks.	
If this DTC is still present, go to step 7A.	Go to step 7A

Step 7 Repair Verification

Step 7A Repair verification cycles



Perform these repair verification cycles following any corrective actions taken, to enable related OBD monitors to reach a readiness state associated with the DTC or system being investigated.



Before beginning these repair verification cycles, use the DAVIE Diagnostics, Quick Check function to clear all current DTCs from the PCI and EAS-3 ECUs.

Action

1. System Initiation

Drive the truck under normal conditions until the coolant temperature reaches a minimum of 150°F. This cycle can be conducted with a loaded trailer or bobtail.

2. Steady State

This cycle is best performed on a level grad road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON.

With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.

Were the identified repair verification cycles able to be completed?

Yes	No
	Investigate and correct any issues preventing these repair verification cycles and rechecks from being completed, then re-run. For additional assistance, contact the PACCAR Engine Support Center.
Go to step 7B	Go to step 7B

Step 7B DAVIE Diagnostics, Quick Check	
Action	
 Use DAVIE Diagnostics to perform a Quick Check for current DTCs to determine whether the actions taken have cleared this DTC. 	
Has P228D been cleared?	
Yes	No



Problem resolved. No further actions.	If all steps have been completed and this DTC is still present, contact the PACCAR Engine Support Center for further assistance.
	upport Center g this issue or for confirmation prior to the ts, contact the PACCAR Engine Support Call
	Back to Index



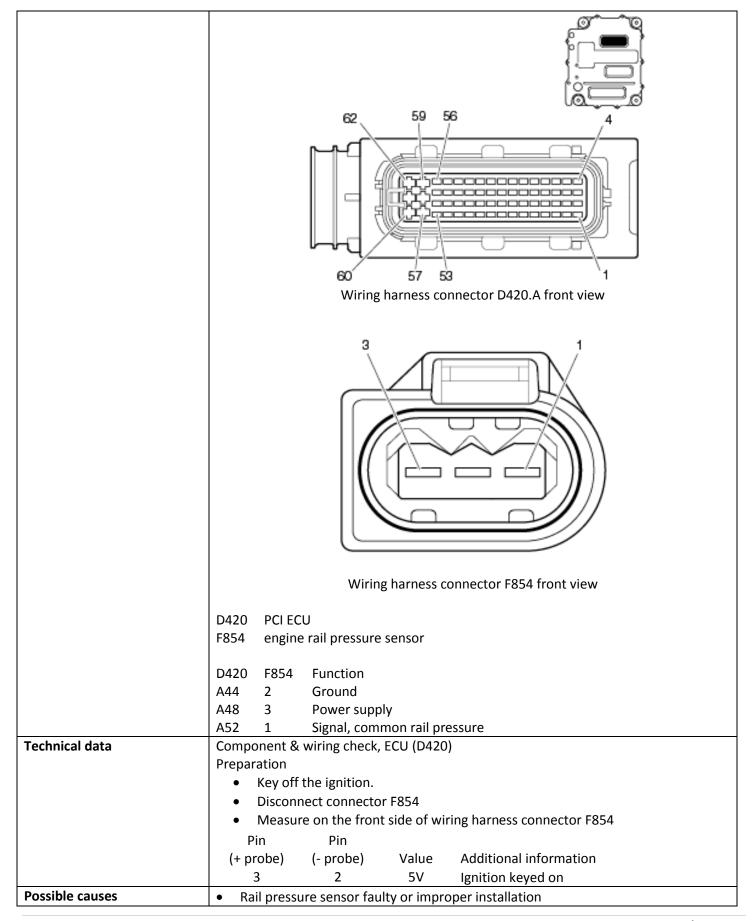
P228E

1 ZZOL		
Code number	P228E	
Fault code description	Engine rail pressure control - Incorrect	
Fault code information	1 trip MIL	
	3 drive cycle recovery	
	Readiness group – Fuel System	
	Freeze frame type - Fuel	
Description of component(s)	The rail pressure is measured in the common rail.	
	The rail pressure sensor is part of the common rail and is not interchangeable as a	
	separate part.	
	Effect on the system:	
	Feedback on the rail pressure control.	
	The rail pressure is closed-loop controlled. A comparison is made between	
	the rail pressure demands determined by the ECU and the rail pressure	
	feedback measured by the common rail pressure sensor.	
Location of component(s)	F054	
	F854	
Diagnostic condition	This diagnostic runs when:	
Diagnostic condition	This diagnostic runs when:	
	 Engine is running at a steady load and engine speed. 	
	Rail pressure operating state is: Pump unit only	
Set condition of fault code	The PCI ECU (D420) detects that the measured rail pressure is more than 20 bar	
	higher than the commanded rail pressure for more than 6 seconds	
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the	
neset condition of fault code	This Die changes to mactive when the fault is no longer detected. To validate the	



repair: Drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, perform several low to higher speed accelerations with moderate engine load. Also perform highload to low-load transitions. This activity should be conducted within the range of 15 km/h [10 mph] to 65 km/h [40 mph] for no more than 5 to 8 km [3 to 5 miles], and; Drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, proceed at a minimum speed of 80 km/h [50 mph] in the highest gear possible with the engine speed between 1100 and 1500 rpm and set the cruise control. This test is best performed with a loaded vehicle/trailer, but if load is unavailable, turn as many engine power consumers on to produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3 separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is unachievable. Use a flat road, if possible. **Electrical diagram(s) D420** A52 A48 A44







	Loose connection or broken pin at ECU	
Additional information	 The rail pressure is closed-loop controlled. A comparison is made between the rail pressure commanded by the ECU and the rail pressure feedback measured by the common rail pressure sensor. The rail pressure is measured in the common rail by the common rail pressure sensor (F854). 	
Diagnostic Step-by-Step	Perform the troubleshooting steps below using the breakout harness, if necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as it could damage the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components. • Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors. • For specific electrical component information and pinout locations, always refer to the technical data. • It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. • Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 'possible causes' section. Step 1 Step ID 228E-a SRT Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.	
	Step 2 Step ID 228E-b SRT	
	High Pressure Fuel Pump Unit Run the prescribed DAVIE Direct test to determine if the electronic unit pumps are working correctly.	
	 Does the test fail to complete or result in a failed state? No: Continue to the next step in the troubleshooting process. Yes: Make the appropriate repairs or component replacements. Use DAVIE to re-check for the presence of active faults. P228E inactive: Issue resolved P228E active: Proceed to step 3. 	
	Step 3 Step ID 228E-c SRT For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the Engine Support Call Center at 1-800-477-0251.	
Verification Drive Cycle	To validate the repair: • Drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, perform several low to higher speed accelerations with moderate engine load. Also perform high-load to low-load transitions. This activity should be conducted within the range of 15 km/h [10 mph] to 65 km/h [40 mph] for no more than 5 to 8 km [3 to 5 miles], and;	



• Drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, proceed at a minimum speed of 80 km/h [50 mph] in the highest gear possible with the engine speed between 1100 and 1500 rpm and set the cruise control. This test is best performed with a loaded vehicle/trailer, but if load is unavailable, turn as many engine power consumers on to produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3 separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is unachievable. Use a flat road, if possible.
Back to Choose Code
Back to Index

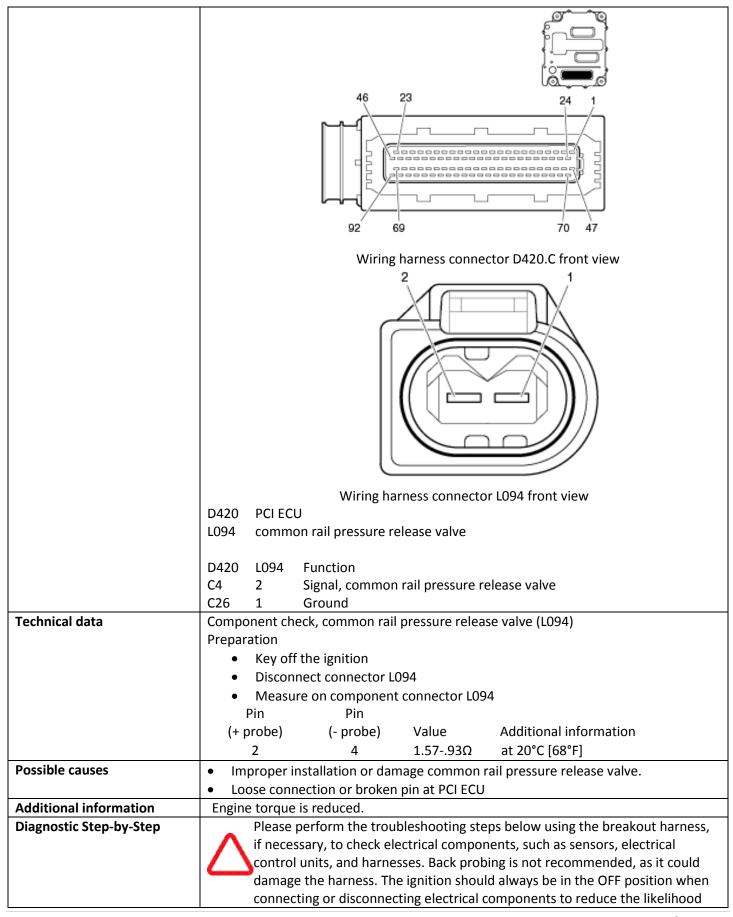


Code number	P2294
Fault code description	Common rail pressure release valve – Current too low or open circuit on ECU D420
	pin C4
Fault code information	1 trip MIL + 1 trip red fault lamp
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type - Fuel
Description of component(s)	The common rail pressure release valve is used to control the rail pressure during a malfunction in the rail pressure control situation. Secondly, it has a pressure-limiting valve so that the rail pressure does not exceed 3250 ± 300 bar $[47138 \pm 4351 \text{ psi}]$ in emergency situations (e.g., loss of rail pressure control). The common rail pressure release valve is part of the common rail and is not interchangeable as a separate part.
	Control During normal rail pressure control, the valve is controlled (duty cycle) to keep it closed. The current to keep the valve closed varies and depends on the required rail pressure. If it is not electronically controlled (e.g., faulty valve or wiring), the valve is normally closed and opens at approximately 320 ± 70 bar [4641 ± 1015 psi]. The opening pressure can vary depending on engine speed, fuel temperature, and other factors. If the valve opens, the fuel is dumped into the supply pipe of the fuel module.
	Learning function The current to control the common rail pressure release valve is determined by the PCI ECU and is stored in its memory. If a common rail pressure release valve is changed, the stored value in the PCI ECU must be reset with DAVIE. Effect of output signal on the system: Controlling the rail pressure in case the normal rail pressure control is lost (for example, a failure on high-pressure fuel system components is detected). Limits the maximum rail pressure in emergency situations



Location of component(s)		
Location of component(s)	L094	
Diagnostic condition	This diagnostic runs continuously, 10 seconds after the ignition is on with engine off.	
Set condition of fault code	The PCI ECU (D420) detects that the High Pressure Common Rail Fuel Pressure Relief	
Set condition of fault code	Valve measured voltage is greater than 13.7volts.	
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected.	
Electrical diagram(s)		
	1 2 C28 C4 D420	







of damage to electrical components.



- This troubleshooting tree is based on the assumption that supply power and ground to the PCI is functioning properly.
- Disconnecting the PCI connectors during the troubleshooting process will result in multiple errors.
- For specific electrical component information and pin out locations, always refer to the technical data in Rapido.
- It is necessary to exit the 'active errors' screen in DAVIE and run the diagnostic test again to identify a change in errors.
- Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive codes. Refer to the 'possible causes' section in Rapido.

Step 1 Step ID 2294a SRT

Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.

Step 2 Step ID 2294b SRT

Electrical Checks

Ensure that the ignition key/switch has been set to OFF before disconnecting related cables.

Based on the fault message provided, confirm that the following electrical values are within specified ranges or limits:

- Supply and signal voltages (12V).
- Cable continuity (no opens or shorts).

Are measured electrical values outside of expected range or limits?

- Yes Proceed to step 3
- No Proceed to step 4

Step 3 Step ID 2294c SRT

Replace: Common Rail Pressure Release Valve (Common Rail)

Replace the Common Rail assembly, which includes the Common Rail Pressure Release Valve.

NOTE: The entire Common Rail must be replaced. The common rail pressure release valve is a non-serviceable part and cannot be replaced or repaired separately.

Re-check for the presence of active faults

- Fault inactive issue resolved
- Fault active Proceed to step 4

Step 4	Step ID 2294d	SRT
For further assistance in dia	ignosing this issue or for con	firmation prior to the
replacement of suspect components, contact the Engine Support Call Center at		Support Call Center at
1-800-477-0251.		

Verification Drive Cycle

To validate the repair, perform with the brakes set, start the engine and allow it to run at idle for 2 minutes.

Back to Choose Code
Back to Index



Code number	P2295
Fault code description	Common rail pressure release valve - Voltage too low or short circuit to earth on ECU
	D420 pin C4
Fault code information	For further assistance: Contact the PACCAR Engine Support Call Center 1-800-477-0251
Description of component(s)	
Location of component(s)	
Diagnostic condition	
Set condition of fault code	
Reset condition of fault code	
Electrical diagram(s)	
Technical data	
Possible causes	
Additional information	
Diagnostic Step-by-Step	
Verification Drive Cycle	
	Back to Choose Code
	Back to Index



Code number	P2296
Fault code description	Common rail pressure release valve - Voltage too high or short circuit to supply on
	ECU D420 pin C4
Fault code information	For further assistance: Contact the PACCAR Engine Support Call Center 1-800-477-0251 Please Contact the Engine Support Center
Description of component(s)	
Location of component(s)	
Diagnostic condition	
Set condition of fault code	
Reset condition of fault code	
Electrical diagram(s)	
Technical data	
Possible causes	
Additional information	
Diagnostic Step-by-Step	
Verification Drive Cycle	
·	Back to Choose Code
	Back to Index



P229A

Code number	P229A
Fault code description	HPV closed loop current control min saturation
Fault code information	1 trip MIL
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Generic
Fault code information	For further assistance: Contact the PACCAR Engine Support Call Center 1-800-477-0251 Please Contact the Engine Support Center
Location of component(s)	
Diagnostic condition	
Set condition of fault code	
Reset condition of fault code	
Electrical diagram(s)	
Technical data	
Possible causes	
Additional information	
Diagnostic Step-by-Step	
Verification Drive Cycle	
	Back to Choose Code
	Back to Index



P229B

Code number	P229B
Fault code description	HPV closed loop current control max saturation
Fault code information	1 trip MIL
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Generic
Fault code information	For further assistance: Contact the PACCAR Engine Support Call Center 1-800-477-0251 Please Contact the Engine Support Center
Location of component(s)	
Diagnostic condition	
Set condition of fault code	
Reset condition of fault code	
Electrical diagram(s)	
Technical data	
Possible causes	
Additional information	
Diagnostic Step-by-Step	
Verification Drive Cycle	
	Back to Choose Code
	Back to Index



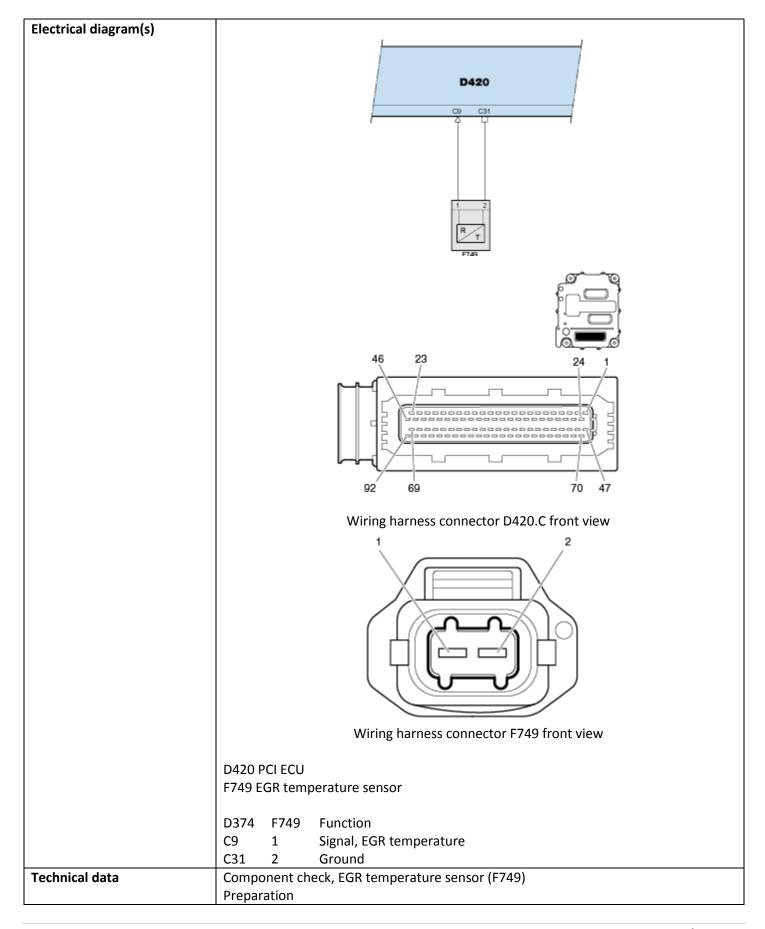
P229D

Code number	P229D
Fault code description	Detects if HPV current drifts too far off the open loop characteristic, during CLOSED
	LOOP
Fault code information	For further assistance: Contact the PACCAR Engine Support Call Center 1-800-477-0251 Please Contact the Engine Support Center
Description of component(s)	
Location of component(s)	
Diagnostic condition	
Set condition of fault code	
Reset condition of fault code	
Electrical diagram(s)	
Technical data	
Possible causes	
Additional information	
Diagnostic Step-by-Step	
Verification Drive Cycle	
	Back to Choose Code
	Back to Index



Code number	P2457		
Fault code description	EGR temperature - Data valid but too high, most severe		
Fault code information	1 trip MIL		
Taute code information	3 drive cycle recovery		
	,		
	Readiness group – None		
	Freeze frame type – Egr		
Description of component(s)	The EGR gas flow temperature is measured after the EGR cooler.		
	Effect on the system:		
	Corrects EGR gas flow calculation (the temperature is an indication of the gas		
	density)		
	• •		
	Closes the EGR valve when the EGR temperature is too high		
	Monitors EGR cooler performance		
Location of component(s)			
	F749		
Diagnostic condition	This diagnostic runs continuously when the ignition is keyed on and when the engine is running.		
Set condition of fault code	The PCI ECU (D420) detects that measured coolant temperature is more than 240°C		
out condition of iddit code	[464°F] for more than 30 seconds.		
Poset condition of fault sada			
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the		
	repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once		
	the minimum target temperature has been reached, perform several low to higher		
	speed accelerations with moderate engine load. Also perform high-load to low-load		
	transitions. This activity should be conducted within the range of 15 km/h [10 mph] to		
	65 km/h [40 mph] for no more than 5 to 8 km [3 to 5 miles].		
	I as well to what to me me a men a man a to a min for a a mineal.		







	Key off the ignition	1	
	Disconnect connector F749		
	Measure on component connector F749		
			Additional information
		Value	Additional information
	(+ probe) (- probe)	077 100 2 0	Desistance value at 0°C [22°C]
	1 2	97.7–100.3 Ω	Resistance value at 0°C [32°F]
		107.4–108.2 Ω	Resistance value at 20°C [68°F]
		137.5–139.1 Ω	Resistance value at 100°C [212°F]
		167.3–169.7 Ω	Resistance value at 180°C [356°F]
		192.5–195.5 Ω	Resistance value at 250°C [482°F]
	Component & circuit chec	k, PCI (D420)	
	Preparation		
	Key off the ignition	า	
	 Disconnect connect 	ctor F749	
	 Measure on the fr 	ont side of wiring	harness connector F749
	Pin Pin		0 100
	(+ probe) (- probe	Value e)	Condition
	1 2	5V	Ignition keyed on
Possible causes	Coolant level too low		
	 Reduced coolant flow, 	EGR cooler	
	EGR temperature sensor deviation		
Additional information	•		by the EGR temperature sensor (F749).
Diagnostic Step-by-Step	-		elow using the breakout harness, if
bidgitostic step by step			onents, such as sensors, electrical control
		•	s not recommended, as it could damage
	The state of the s		
			ays be in the OFF position when
	connecting or disconnecting electrical components in order to reduce the		
	likelihood of damage to electrical components.		
	Disconnecting the PCI connectors during the troubleshooting process		
	will result in multiple errors.		
	For specific electrical component information and pinout locations,		
	always refer to the technical data.		
	 It is necessary to exit the fault code menu in DAVIE and run the 		
	diagnostic test again to identify a change in errors.		
			operational or mechanical issues may be
	the root cause of both active and inactive fault codes. Refer to the		
	·	auses' section.	
	Step 1	Step ID 2457a	SRT
	1 1	-	pent, broken, corroded or loose pins)
			rubbing during each step of the
	diagnostic procedure. Pro	oceed to step 2.	
	Step 2	Step ID 2457b	SRT
	Monitor EGR and related	•	sors
	Monitor the following temperatures:		
	EGR Temperature		
	Ambient Temperature		
	Intercooler Temper		
	II - intercooler reint	ciatuit	

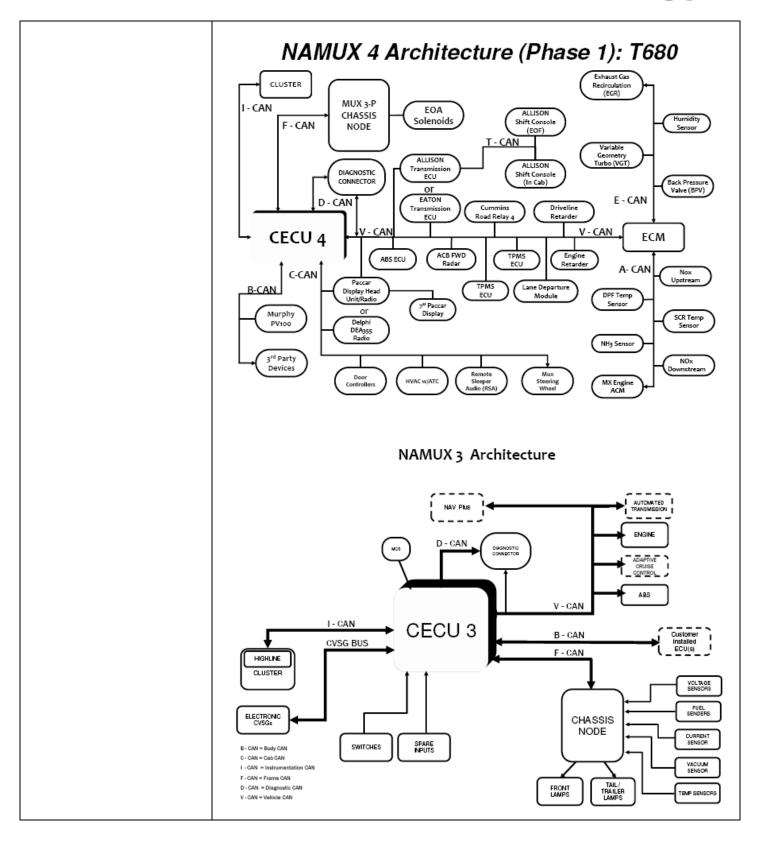


		rbine Temperature		
		emperature		
	Idle the engine for a minimum of 10 minutes to allow temperatures to stabilize. While monitoring, temperature values from sensor to sensor should not vary more than ±30°F.			
	· · · · · · · · · · · · · · · · · · ·	Do any monitored values vary by more than ±30°F?		
		eed to step 3		
	No - Proc	eed to step 4		
	Step 3	Step ID 2457c	SRT	
	Pressure Test: Cod	olant Leak Check		
	Perform the preso	cribed testing to determine if the	ere is a coolant leak affecting the	
	EGR.			
	Does the test fail	to complete or result in a failed	state?	
	 No - issue resolved Yes - Proceed to step 4 			
Step 4 Step ID			SRT	
	Repairs or component replacements appropriate component and use DAVIE to recheck for the presence of active faults. • Fault inactive – issue resolved • Fault active - Proceed to step 5			
			_	
	Step 5	Step ID 2457e	SRT	
	For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the Engine Support Call Center at			
	1-800-477-0251.			
Verification Drive Cycle	To validate the rep	air:	<u> </u>	
-	The truck must remain off (key to OFF and the engine OFF) for 8-10 consecutive			
	hours. Wait for this time to elapse before continuing.			
	Perform the Ele	ectrical & Power-Up cycle.		
	Perform the Sta	art-Up cycle.		
			Back to Choose Code	
			Back to Index	

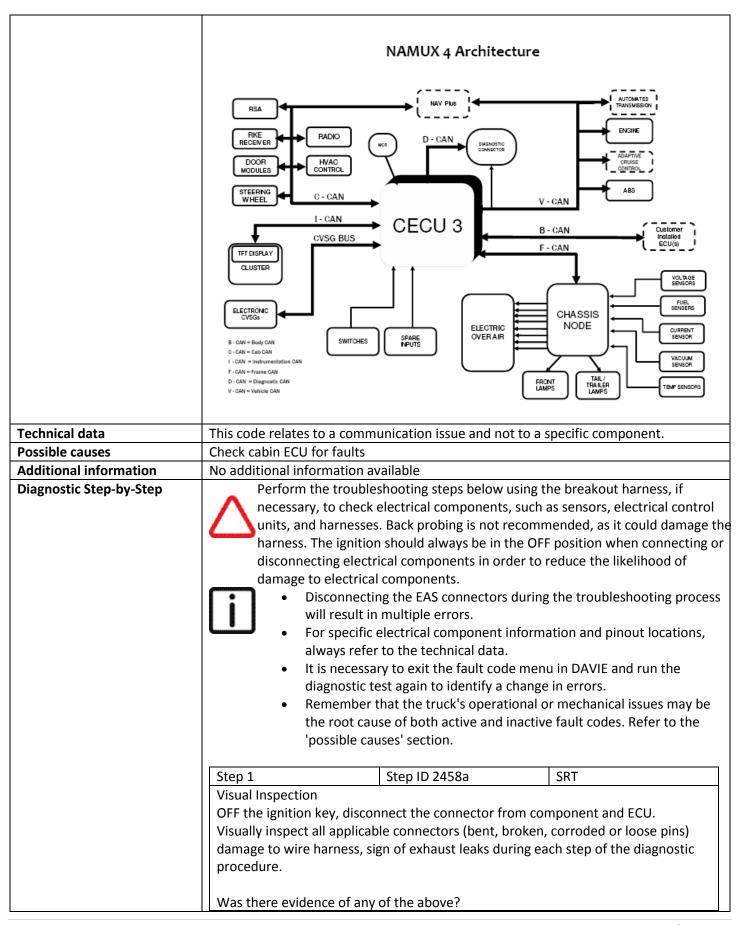


Code number	P2458	
Fault code description	CAN communication - Message (CM1) out of range - DPF regeneration force switch	
	from vehicle controller	
Fault code information	3 drive cycle recovery	
	Readiness group – None	
	Freeze frame type – Generic	
Description of component(s)	This code relates to a communication issue and not to a specific component.	
Location of component(s)	This code relates to a communication issue and not to a specific component.	
Diagnostic condition	This diagnostic runs continuously when the ignition is on.	
Set condition of fault code		
Reset condition of fault code	This DTC changes to inactive as soon as the error is no longer detected.	
Electrical diagram(s)		
	NAMUX 3 Architecture: 2010 B-Cab FIREWALL Aftertreatment CAN ITAMISMISSION, WHEEL ADDITIVE ORNING ONNECTOR PACCAR DISPRIY ACUIUM ACUIUM SENSOR SENSOR SPARE INPUTS FIREWALL Aftertreatment CAN LAUTO ABS PACCAR PACCAR PACCAR ONTENDA ACUIUM SENSOR FUEL SENSOR SENSOR FORD TAIL/ TRAILE TEMP SENSORS TEMP SENSORS TEMP SENSORS TEMP SENSORS	









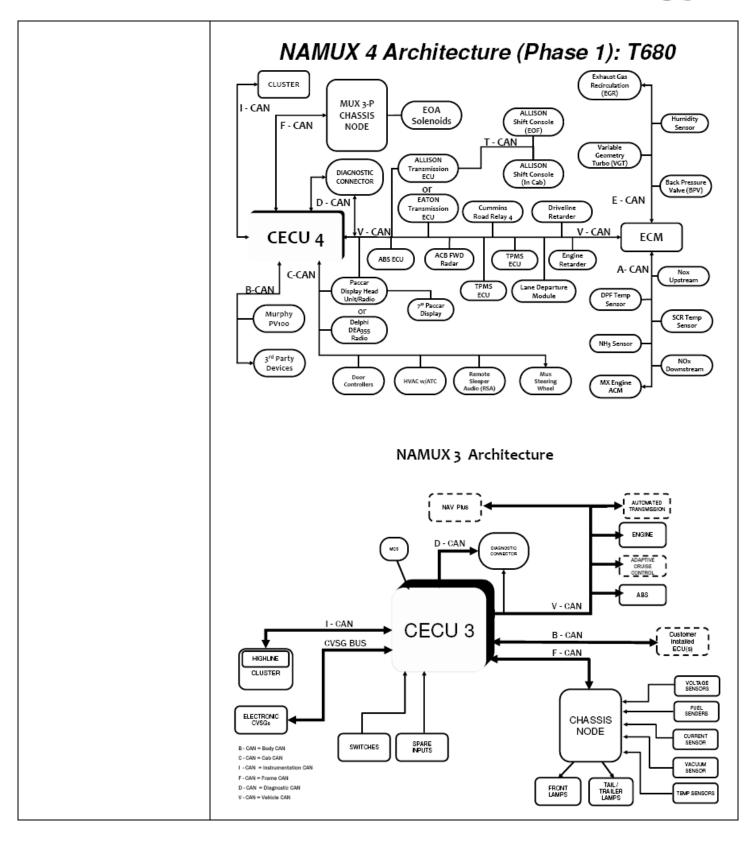


	 No: Proceed to step 2. Yes: Make the appropriate repairs or component replacements. 		
	Use DAVIE to re-check for the presence of active faults. • If this related fault is no longer active, then this issue has been resolved. • If this related fault is still active, Proceed to step 2		
	Step 2 Step ID 2458b SRT		
	Data check		
	 Lookup the technical data of the specific system Perform the checking data test of the specific component 		
	Is test pass?		
	No: Proceed to step 3Yes: Proceed to step4		
	Chan ID 2450s		
	Step 3 Step ID 2458c SRT Repair or replace component		
	 Repair or replace tomponent. Repair or replace the component, also check for electrical connection and wiring harness. Reconnect the connector ON the ignition key 		
	Use DAVIE to re-check for the presence of active faults: Is DTC fault active: Proceed to step 4 Is DTC fault inactive: Issue resolved. Clear inactive fault		
	Step 4 Step ID 2458d SRT		
	For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the Engine Support Call Center at 1-800-477-0251.		
Verification Drive Cycle	To validate the repair, with the brakes set, turn the key to the ON position with the		
	engine off, and allow 10 seconds for the system to initialize and run diagnostics. With the brakes set, start the engine and allow it to run at idle for 2 minutes.		
	Back to Choose Code		
	Back to Index		

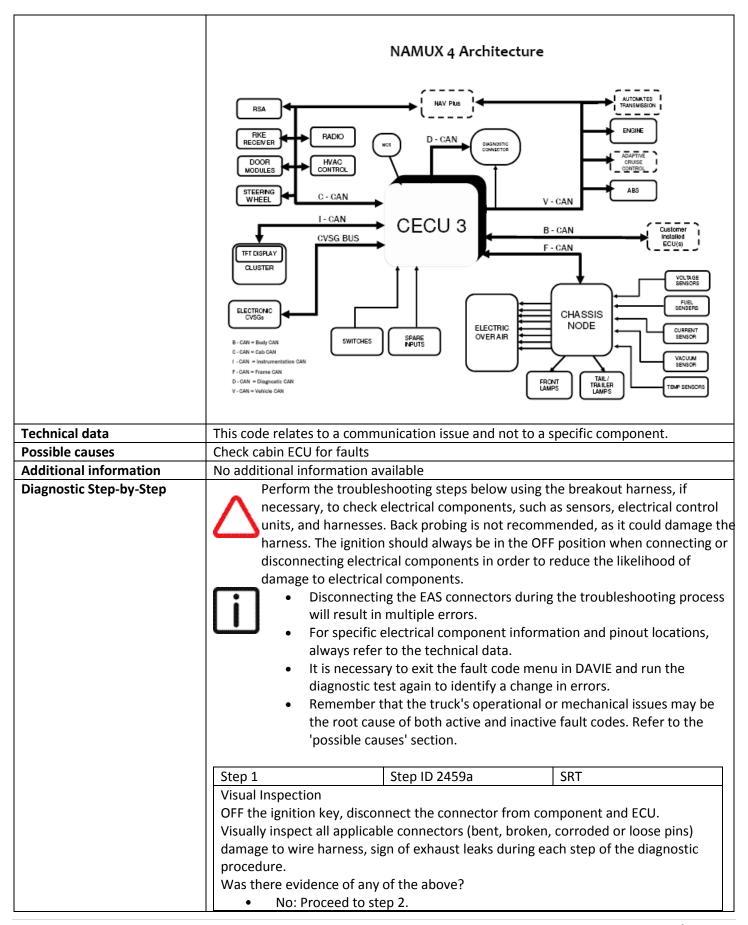


Code number	P2459	
Fault code description	CAN communication - Message (CM1) out of range - DPF regeneration inhibit switch	
·	from vehicle controller	
Fault code information	3 drive cycle recovery Readiness group – None	
	Freeze frame type – Generic	
Description of component(s)	This code relates to a communication issue and not to a specific component.	
Location of component(s)	This code relates to a communication issue and not to a specific component.	
Diagnostic condition	This diagnostic runs continuously when the ignition is on.	
Set condition of fault code		
Reset condition of fault code	This DTC changes to inactive as soon as the error is no longer detected.	
Electrical diagram(s)		
	Cluster Cab Can Cab Can Connector Connec	











	Yes: Make the appropriate repairs or component replacements.			
	Use DAVIE to re-check for the presence of active faults. • If this related fault is no longer active, then this issue has been resolved. • If this related fault is still active, Proceed to step 2			
	Step 2 Step ID 2459b SRT			
	Data check			
	Lookup the technical data of the specific system			
	Perform the checking data test of the specific component			
	Is test pass?			
	No: Proceed to step 3			
	Yes : Proceed to step4			
	Chara 2 Chara ID 24FC : CDT			
	Step 3 Step ID 2459c SRT Repair or replace component			
	Repair or replace component Repair or replace the component, also check for electrical connection and			
	wiring harness.			
	Reconnect the connector			
	ON the ignition key			
	Use DAVIE to re-check for the presence of active faults:			
	Is DTC fault active: Proceed to step 4			
	Is DTC fault inactive: Issue resolved. Clear inactive fault			
	Step 4 Step ID 2459d SRT			
	For further assistance in diagnosing this issue or for confirmation prior to the			
	replacement of suspect components, contact the Engine Support Call Center at			
	1-800-477-0251.			
Verification Drive Cycle	To validate the repair, with the brakes set, turn the key to the ON position with the			
	engine off, and allow 10 seconds for the system to initialize and run diagnostics.			
	With the brakes set, start the engine and allow it to run at idle for 2 minutes. Back to Choose Code			
	Back to Index			



P250C

Code number	P250C
Fault code description	Oil level - Voltage too low or short circuit to ground on ECU D420 pin B35
Fault code information	For further assistance: Contact the PACCAR Engine Support Call Center 1-800-477-0251 Please Contact the Engine Support Center
Description of component(s)	
Location of component(s)	
Diagnostic condition	
Set condition of fault code	
Reset condition of fault code	
Electrical diagram(s)	
Technical data	
Possible causes	
Additional information	
Diagnostic Step-by-Step	
Verification Drive Cycle	
	Back to Choose Code
	Back to Index



P250D

Code number	P250D
Fault code description	Oil level out of range high
	Voltage too high or short circuit to supply on ECU D420 pin B35
Fault code information	For further assistance: Contact the PACCAR Engine Support Call Center 1-800-477-0251 Please Contact the Engine Support Center
Description of component(s)	
Location of component(s)	
Diagnostic condition	
Set condition of fault code	
Reset condition of fault code	
Electrical diagram(s)	
Technical data	
Possible causes	
Additional information	
Diagnostic Step-by-Step	
Verification Drive Cycle	
	Back to Choose Code
	Back to Index



P252F

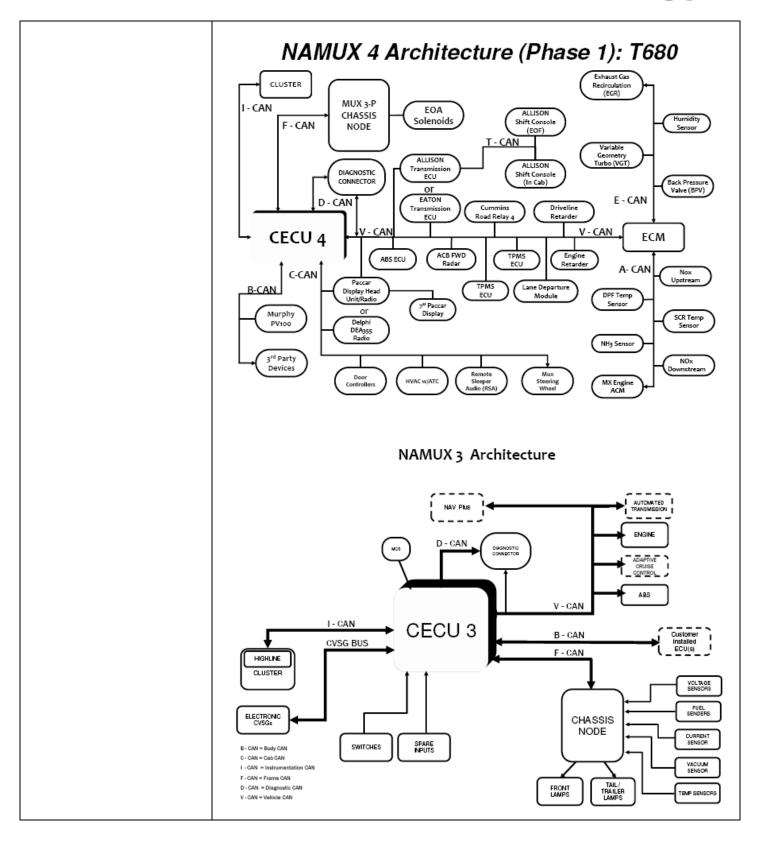
Code number	P252F
Fault code description	Oil level high warning level
Fault code information	For further assistance: Contact the PACCAR Engine Support Call Center 1-800-477-0251 Please Contact the Engine Support Center
Description of component(s)	
Location of component(s)	
Diagnostic condition	
Set condition of fault code	
Reset condition of fault code	
Electrical diagram(s)	
Technical data	
Possible causes	
Additional information	
Diagnostic Step-by-Step	
Verification Drive Cycle	
	Back to Choose Code
	Back to Index



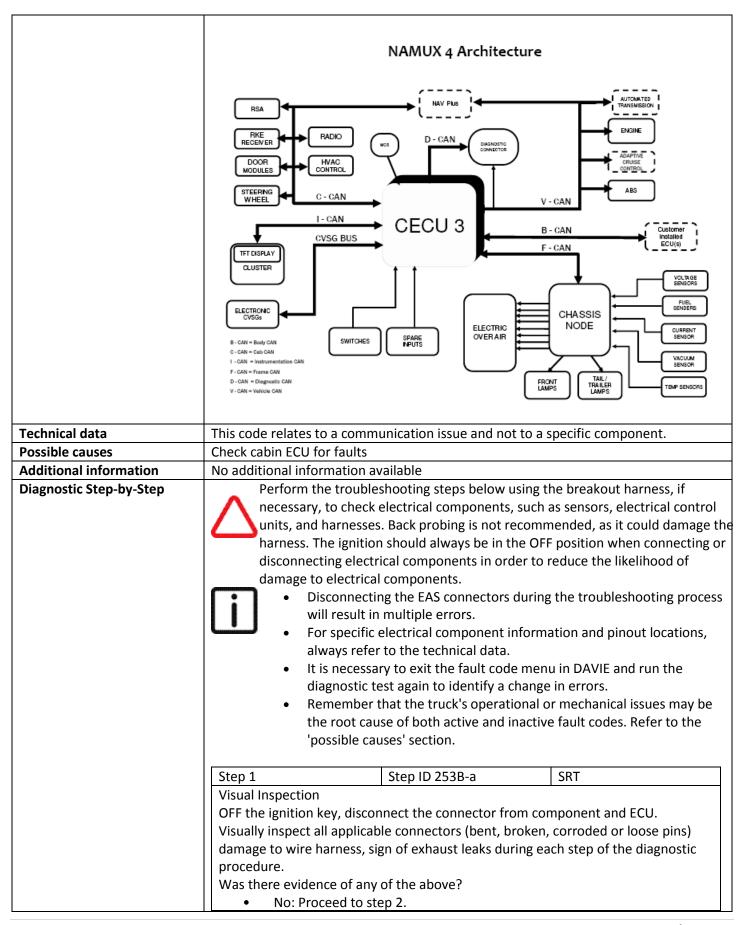
P253B

Code number	P253B			
Fault code description	CAN communication - Message (PTO) out of range - Engine PTO governor set switch			
Fault code information	3 drive cycle recovery			
	Readiness group – None			
	Freeze frame type – Generic			
Description of component(s)	This code relates to a communication issue and not to a specific component.			
Location of component(s)	This code relates to a communication issue and not to a specific component.			
Diagnostic condition	This diagnostic runs continuously when the ignition is on.			
Set condition of fault code				
Reset condition of fault code	This DTC changes to inactive as soon as the error is no longer detected.			
Electrical diagram(s)				
	NAMUX 3 Architecture: 2010 B-Cab FIREWALL Aftertreatment CAN Aftertreatment CAN ITANSMISSION, PACCAR OSMETIC CONTROL CVSG BUS FIREWALL After-treatment CAN After-treatment CAN After-treatment CAN After-treatment CAN PACCAR Display Voltage SENDERS SENDERS SENDERS SENDERS SENDERS SENDORS SENSORS S			











	Yes: Make the appropriate repairs or component replacements.			
	Use DAVIE to re-check for the presence of active faults.			
	If this related fault is no longer active, then this issue has been resolved.			
	If this related fault is still active, Proceed to step 2			
	Step 2 Step ID 253B-b SRT			
	Data check			
	Lookup the technical data of the specific system			
	Perform the checking data test of the specific component			
	Is test pass?			
	No: Proceed to step 3			
	Yes : Proceed to step4			
	Step 3 Step ID 253B-c SRT			
	Repair or replace component			
	Repair or replace the component, also check for electrical connection and			
	wiring harness.			
	Reconnect the connector			
	ON the ignition key			
	Use DAVIE to re-check for the presence of active faults:			
	Is DTC fault active: Proceed to step 4			
	Is DTC fault inactive: Issue resolved. Clear inactive fault			
	Step 4 Step ID 253B-d SRT			
	For further assistance in diagnosing this issue or for confirmation prior to the			
	replacement of suspect components, contact the Engine Support Call Center at			
	1-800-477-0251.			
Verification Drive Cycle	To validate the repair, with the brakes set, turn the key to the ON position with the			
	engine off, and allow 10 seconds for the system to initialize and run diagnostics.			
	With the brakes set, start the engine and allow it to run at idle for 2 minutes.			
	Back to Choose Code			
	Back to Index			

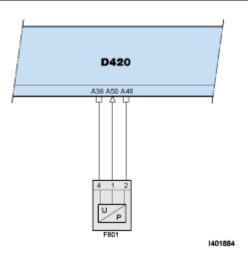


P2541

12311				
Code number	P2541			
Fault code description	Fuel pressure - Voltage too low or short circuit to ground on ECU (D420) pin (A50)			
Fault code information	1 trip MIL			
	3 drive cycle recovery			
	Readiness group – None			
	Freeze frame type – Fuel			
Description of component(s)	The low-pressure fuel pressure is measured at the end of the low-pressure fuel supply			
, , , , , , , , , , , , , , , , , , , ,	gallery.			
	Effect on the system:			
	Limitation of the engine torque when the fuel pressure is too low.			
Location of component(s)	F801			
Diagnostic condition	This diagnostic runs continuously when the engine is running			
Set condition of fault code	The PCI-2 detects sensor output voltage is too low (below 0.25 V).			
Reset condition of fault code	This fault code will change to inactive immediately after the diagnostic runs and passes.			



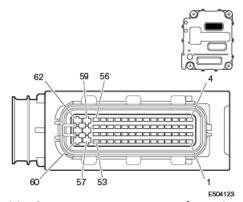
Electrical diagram(s)

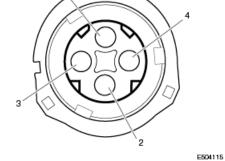


D420 PCI ECU

F801 Fuel pressure sensor

D420	F751	Function	
A38	4	Ground	
A46	2	Power supply	
A50	1	Signal, fuel pressure	





Wiring harness connector D420.A front view

Wiring harness connector F801 front view



Handle connectors and pins with care and use matching measuring probes.

Technical data

Component and wiring check, fuel pressure sensor (F801)

Component check, fuel pressure sensor (F801)

This type of component cannot be checked with a multimeter or oscilloscope. Perform



the following to assess the component: Monitor/test the component with DAVIE Perform the wiring check Component & wiring check, ECU (D420) Preparation Key off the ignition. Disconnect connector F801 Attach test leads to the identified connector pins, located on the front side of wiring harness connector F801 Key on the ignition to apply power Pin Pin Value **Additional information** (+ probe) (- probe) 2 4 5V Ignition keyed on **Possible causes** Faulty wiring Faulty connector Faulty sensor **Additional information** No additional information available **Diagnostic Step-by-Step** The ignition should always be in the OFF position when connecting or disconnecting electrical components to reduce the likelihood of damage to the components. This troubleshooting procedure is based on the assumption that supply power and ground to the PMCI are functioning properly. Disconnecting the PMCI connectors during the troubleshooting process will result in multiple errors. Specific electrical component information and pin out locations are provided in this procedure as a reference only. Always refer to the technical data sections in Rapido for the most up-to-date changes. It is necessary to use DAVIE to clear all current trouble codes from the PCI and EAS-3 ECUs, and then run the Quick Check to identify a change in fault status. This DTC can be set as a result of multiple failure modes. For proper fault isolation, complete all troubleshooting steps in the sequence provided. Step 1. Fuel Pressure Sensor (F801) Checks Step 1.A Visual inspection, fuel pressure sensor (F801)



Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - ECU connections are damaged or disconnected

Was there evidence of any of the above?

Yes	No
Correct any issues found, or replace the sensor if found to be damaged.	
Refer to step 2.A to perform the corresponding repair verification cycles	
and rechecks.	
If this code is still present, go to step 1.B	Go to step 1.B

Step 1.B Electrical checks, supply voltage, fuel pressure sensor (F801)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

1. Use a multimeter to confirm the supply voltage for the fuel pressure sensor (F801) as outlined in <u>Checking data</u>, <u>fuel pressure sensor (F801)</u>.

	Ŀ	s the measured	l voltag	e within	expected	l range?
--	---	----------------	----------	----------	----------	----------

is the measured voltage vittim expected range.		
Yes	No	
	Correct any issues found.	
	Refer to Step 2.A to perform the	
	corresponding repair verification cycles	
	and rechecks.	
Go to step 1.C	If this code is still present, go to step	
	1.C.	

Step 1.C Electrical checks, isolation of electrical short in sensor, fuel pressure sensor (F801)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector



	pin test points.			
Action				
	With ignition key set to OFF, install a jumper wire between the supply and signal terminals of the pressure sensor (F801) connector on the engine harness.			
2.	Set the ignition key to ON.			
3.	Use DAVIE Diagnostics to perform	a Quick Check for current trouble codes.		
If P254	2 is active	If P2541 is active		
Replace and rec Refer to	ailed fuel pressure sensor (F801). The the fuel pressure sensor (F801) Connect the harness. To Step 2.A to perform the conding repair verification cycles sheeks			
the abo	If P2541 is still present after performing the above steps, contact the PACCAR Engine Support Center for additional assistance in diagnosing this issue.			
Step 1. (F801)	Step 1.D Electrical checks, isolation of electrical short in PCI, fuel pressure sensor (F801)			
i		g Data in Engine Service – Rapido for es, resistance values, and related connector		
Action				
1.	Set the ignition switch to OFF			
2.	 Disconnect the engine harness from the PCI and install a jumper wire on the PCI between the supply and signal, terminals of the sensor circuit. 			
3.	3. Set the ignition key to ON			
4.				
If P254	2 is active	If P2541 is active		



Possible PCI fault. Contact the PACCAR Engine Support Center for assistance in confirming this issue and replacing the harness replacing the PCI. Refer to Step 2.A to perform the corresponding repair verification cycles	Likely short circuit in the harness. Contact the PACCAR Engine Support Center for assistance in confirming this issue and replacing the harness. Refer to Step 2.A to perform the corresponding repair verification cycles and rechecks.
and rechecks.	
If all steps have been completed and this trouble code is still present, contact the PACCAR Engine Support Center for further assistance.	If all steps have been completed and this trouble code is still present, contact the PACCAR Engine Support Center for further assistance.

Step 2. Repair Verification

Step 2.A Repair verification cycles

Perform these repair verification cycles following any corrective actions taken, to enable related OBD monitors to reach a readiness state associated with the trouble code or system being investigated.



Before beginning these repair verification cycles, use the DAVIE Diagnostics, Quick Check function to clear all current DTCs from the PCI and EAS-3 ECUs.

Action

1. Start-up

With the brakes set, start the engine and allow it to run at idle for 2 minutes.

Go to step 2.B

Were the identified repair verification cycles able to be completed?	
Yes	No
	Investigate and correct any issues preventing these repair verification cycles from being completed, then rerun. For additional assistance, contact the PACCAR Engine Support Center.

Step 2.B DAVIE Diagnostics, Quick Check

Action

Go to step 2.B

1. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes to determine whether the actions taken have cleared this trouble code.

Has P2541 been cleared?



Yes	No
Problem resolved. No further actions. Contacting the PACCAR Engine Support For further assistance in diagnosing	Continue with the next step in this troubleshooting procedure. If all steps have been completed and this trouble code is still present, contact the PACCAR Engine Support Center for further assistance.
	Back to Index

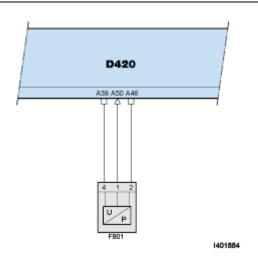


P2542

PZ54Z			
Code number	P2542		
Fault code description	Fuel pressure – Voltage too high or short circuit to supply on ECU D420 pin A50		
Fault code information	1 trip MIL		
	3 drive cycle recovery		
	Readiness group – None		
	Freeze frame type – Fuel		
Description of component(s)	The low-pressure fuel pressure is measured at the end of the low-pressure fuel supply		
	gallery.		
	Effect on the system:		
	Limitation of the engine torque when the fuel pressure is too low.		
Location of component(s)	F801		
	MX5285		
Diagnostic condition Set condition of fault code	This diagnostic runs continuously when the engine is running		
Set condition of fault code	The PCI-2 detects sensor output voltage is too high (above 4.75 V).		
Reset condition of fault code	To validate the repair, this fault code will change to inactive immediately after the diagnostic runs and passes.		



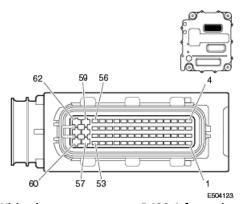
Electrical diagram(s)

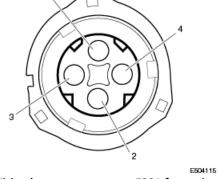


D420 PCI ECU

F801 Fuel pressure sensor

D420	F751	Function	
A38	4	Ground	
A46	2	Power supply	
A50	1	Signal, fuel pressure	





Wiring harness connector D420.A front view

Wiring harness connector F801 front view



Handle connectors and pins with care and use matching measuring probes.



Technical data	Component and wiring check , fuel pressure sensor (F801)			
	Component check, fuel pressure sensor (F801) This type of component cannot be checked with a multimeter or oscilloscope. Perform the following to assess the component: • Monitor/test the component with DAVIE • Perform the wiring check Component & wiring check, ECU (D420) Preparation • Key off the ignition. • Disconnect connector F801 • Measure on the front side of wiring harness connector F801			
	Pin	Pin	Value	Additional information
	(+ probe) 2	(- probe)	5V	Ignition keyed on
Possible causes	 Faulty wiring Faulty connector Faulty sensor 			
Additional information	No addition	al informatio	n available	
Diagnostic Step-by-Step	The ignition should always be in the OFF position when connecting or disconnecting electrical components to reduce the likelihood of damage to the components. This troubleshooting procedure is based on the assumption that supply power and ground to the PMCI are functioning properly. Disconnecting the PMCI connectors during the troubleshooting process will result in multiple errors.			
		this procedu Rapido for t	ure as a refer he most up-to ary to use DA	enent information and pin out locations are provided in ence only. Always refer to the technical data sections in odate changes. EVIE to clear all current trouble codes from the PCI and un the Quick Check to identify a change in fault status.
	•			a result of multiple failure modes. For proper fault subleshooting steps in the sequence provided.



Step 1. Fuel Pressure Sensor (F801) Checks

Step 1.A Visual inspection, fuel pressure sensor (F801)

Action

- 1. Visually inspect the associated component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - ECU connections are damaged or disconnected

Was there evidence of any of the above?

,	
Yes	No
Correct any issues found, or replace the sensor if found to be damaged. Refer to step 2.A to perform the corresponding repair verification cycles and rechecks.	
If this code is still present, go to step 1.B	Go to step 1.B

Step 1.B Electrical checks, response from disconnected sensor, fuel pressure sensor (F801)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Set the ignition key to OFF
- 2. Disconnect the fuel pressure sensor (F801) from the harness.
- 3. Set the ignition key to ON
- 4. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes.

If P2541 is active	If P2542 is active
	Correct any issues found. Refer to Step 2.A to perform the corresponding repair verification cycles and rechecks.
Go to step 1.C	If this code is still present, go to step 1.D.



Step 1.C Electrical checks, supply voltage, fuel pressure sensor (F801)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

1. Use a multimeter to confirm the supply voltage for the fuel pressure sensor (F801) as outlined in <u>Checking data</u>, <u>fuel pressure sensor (F801)</u>.

Is the measured voltage value within the expected range?	
Yes	No
	Investigate possible issues in the related wiring, connectors, harness, or PCI. Correct any issues found. Refer to Step 2.A to perform the corresponding repair verification cycles and rechecks.
Go to step 1.D	If this code is still present, go to step 1.D.

Step 1.D Electrical checks, isolation of electrical short in harness, fuel pressure sensor (F801)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Set the ignition switch to OFF.
- 2. Disconnect the engine harness from the PCI.
- 3. Set the ignition key to ON.
- 4. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes.

If P2541 is active	If P2542 is active
Contact the PACCAR Engine Support	Contact the PACCAR Engine Support
Center for assistance in confirming this	Center for assistance diagnosing this
issue and replacing the harness.	issue.
Refer to Step 2.A to perform the	Refer to Step 2.A to perform the
corresponding repair verification cycles	corresponding repair verification cycles
and rechecks.	and rechecks.



If all steps have been completed and this trouble code is still present, contact the PACCAR Engine Support Center for further assistance.

If all steps have been completed and this trouble code is still present, contact the PACCAR Engine Support Center for further assistance.

Step 2. Repair Verification

Step 2.A Repair verification cycles

Perform these repair verification cycles following any corrective actions taken, to enable related OBD monitors to reach a readiness state associated with the trouble code or system being investigated.



Before beginning these repair verification cycles, use the DAVIE Diagnostics, Quick Check function to clear all current DTCs from the PCI and EAS-3 ECUs.

Action

1. Start-up

With the brakes set, start the engine and allow it to run at idle for 2 minutes.

Were the identified repair verification cycles able to be completed?

Yes	No
	Investigate and correct any issues preventing these repair verification cycles from being completed, then rerun. For additional assistance, contact the PACCAR Engine Support Center.
Go to step 2.B	Go to step 2.B

Step 2.B DAVIE Diagnostics, Quick Check

Action

1. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes to determine whether the actions taken have cleared this trouble code.

Has P2542 been cleared?

Yes	No
Problem resolved. No further actions.	Continue with the next step in this troubleshooting procedure. If all steps have been completed and this trouble code is still present, contact the PACCAR Engine Support Center for further assistance.



i	Contacting the PACCAR Engine Support Center For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the PACCAR Engine Support Call Center.
	Back to Index



P2560

Code number	P2560
Fault code description	Coolant level Data valid but too low, most severe
Fault code information	1 trip, Stop Engine lamp
	3 drive cycle recovery
	Readiness Group - None
	Freeze frame type – Cooling
	Related engine protection code – P2104
Description of component(s)	The coolant level sensor is used to measure the level of the engine coolant in the
	radiator top tank reservoir. The coolant level sensor is normally immersed in the
	coolant and returns a different signal voltage when immersed in coolant versus being
	out of coolant. The ECU monitors the change in the signal voltage to determine the
	level of the engine coolant.
Location of component(s)	The engine coolant level sensor is located in the radiator top tank or surge tank.
Diagnostic condition	This diagnostic runs continuously when the key switch is in the ON position or when
	the engine is running.
Set condition of fault code	The ECU detected the coolant level sensor signal voltage is between 3.25 VDC and
See condition of fault code	4.25 VDC for more than 20 seconds, indicating very low coolant level.
	into vocation more than 20 seconds) maisdainig very four coolding reven
Reset condition of fault code	Perform a key cycle, start the engine and let it idle for 1 minute. The fault code should
	change to inactive immediately after passing the diagnostic run.
Electrical diagram(s)	SIGNAL—NOT USED B H H H H H H H H H H H H
	Float Type, Non-Immersion Coolant Level Sensor (Behr/GenTech) Float Type, Non-Immersion Coolant Level Sensor Connector
	(-) (+)
	SCALE 2:1
	CONNECTOR TAB



Coolant Level Sensor, Contact Type, Connector

Technical data	Coolant Level Sensor Voltage Output Ranges				
	2-wire, contact type sensor				
	Pin	Pin	Level	Signal (VDC)	
	(+ probe)	(- probe)		1	
	A	С	Normal Low	0.75V – 1.75V 2.00V – 3.00V	
			Very Low	3.25V – 4.25V	
			VCI y LOW	3.23 \ 4.23 \	
	3-wire, floating	g type sensor			
	Pin (+ probe)	Pin (- probe)	Level	Signal (VDC)	
	В	С	Normal	0.75V – 1.75V	
			Low	2.00V - 3.00V	
			Very Low	3.25V – 4.25V	
Additional information	 Faulty wiring The OEM coolant level sensor is connected to the coolant level sensor connector (F772). See the OEM documentation for detailed information 				
	about the electrical system.The red warning has been activated on the driver's display.				
Diagnostic Step-by-Step	The ignition should always be in the OFF position when connecting or disconnecting electrical components to reduce the likelihood of damage to the components.				
	the	components.		ents to reduce the likelihood of damage to	
	the	This troublesh		e is based on the assumption that supply are functioning properly.	
		This troubleshed	und to the PMCI	e is based on the assumption that supply	
	i ·	This troubleshed power and group Disconnecting result in multip	und to the PMCI the PMCI conne le errors.	e is based on the assumption that supply are functioning properly. ectors during the troubleshooting process will ent information and pin out locations, always	
	<u>i</u> :	This troubleshed power and group Disconnecting result in multip For specific elements to the technique.	und to the PMCI the PMCI conne le errors. ectrical compone hnical data in Ra to exit the 'Activ	e is based on the assumption that supply are functioning properly. ectors during the troubleshooting process will ent information and pin out locations, always	

Coolant Level Sensor, Contact Type



Step 1. Investigate Related Trouble Codes

Before troubleshooting this code, take notice of any other active or inactive trouble codes. One or multiple other codes could have been the cause for this code.

Step 1.A Investigate related trouble codes		
Action		
1. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes.		
Are these or any other related codes active?		
P2558; P2559		
Yes	No	
Possible coolant level sensor or related		
wiring fault. Refer to the troubleshooting		
information for these faults before		
continuing with this procedure.		

Step 2. Coolant Level Checks

Step 2. A Visual inspection, coolant level

Action

- 1. Visually inspect the expansion tank reservoir for any of the following:
 - Coolant is below the appropriate fill level



Coolant level can be lower under either of the following conditions:

- if the truck is equipped with Auxiliary Power Unit or devices that require additional coolant volume
- if recent cooling system service was performed without fully purging air out of the system

Step 2.A

Is the coolant level below the appropriate fill level?		
Yes	No	
Possible external coolant leak.	Possible electrical problem with the sensor or wiring from the PCI ECU (D420).	
Step 2.B Step 3.A		

Step 2.B Visual inspection, external coolant leaks



Action

 Inspect for visible signs of a restriction or a coolant leak around the radiator and expansion tank reservoir, coolant pump, thermostat housing, coolant filter, VGT, EGR cooler, and aftertreatment system (DEF heating lines), as well as all related hoses, fittings, connections, and seals.



A suspected coolant leak originating from the coolant pump pulley shaft seal should be evaluated using the diagnosis information outlined in, <u>Coolant leakage</u>, <u>coolant pump shaft seal</u>, to determine if the leak is severe enough (a class III leak) to require replacement of the coolant pump.

Were signs of a restriction or coolant leak visible?		
Yes	No	
Correct any issues found or replace the coolant pump if the leak matches the criteria for a class III leak. Refer to step 4.A to perform the corresponding repair verification cycles and rechecks.	Possible internal coolant leak.	
If this code is still present, go to step	Step 2.C	
2.C.		

Step 2.C Special test, cooling system pressure

Action

1. Perform a basic system pressure test to determine if there may be an external leak in the cooling system.



To avoid causing damage to seals and fittings, do not apply more than 20 psi of air pressure to the cooling system.

Does the cooling system pass a basic pressure test?	
Yes No	
	Locate and correct the source of the leak. Fill coolant to the appropriate level. Refer to step 4.A to perform the corresponding repair verification cycles and rechecks.
Step 2.D	If this code is still present, go to step 2.D.

Step 2.D Special test, radiator cap pressure	
Action	



	standard test kit to confirm t ated pressure level.	hat the radiator cap functions correctly	
effe ove	ectively lower the boiling point of	erly regulate coolant pressure, this can the liquid, leading to a possible engine appens, coolant temperature and/or system	
tem		which typically reaches very high operation. If this is the case, leaked coolant ap edges.	
Does the radia for the current		t and have the correct pressure rating	
Yes	N	0	
	Fi R co	eplace the radiator cap. Ill coolant to the appropriate level. efer to step 4.A to perform the prresponding repair verification cycles and rechecks.	
Step 3.A		this code is still present, go to step .A.	
Action			
	w inspect the coolant level se	ensor for any of the following:	
	maged or loose connectors	income and an energy and a series in the ser	
• Be	Bent, broken, corroded or loose connector pins		
• Mo	 Moisture or dirt in the connections 		
• Da	Damage to the wire harness or insulation		
ECU connections damaged or disconnected		isconnected	
Batteries are not okay, contacts are not tight		s are not tight	
• Sig	ns of exhaust or coolant leak	ss on the EGR	
• Se	nsor damaged		
Are any of the	above conditions present?		
Yes		No	
Correct any issues found, or replace the coolant level sensor if found to be damaged or broken. Refer to Step 4.A to perform the			

corresponding repair verification cycles.



If this code is still present, go to Step 3.B. Go to step 3.B.

Step 3.B Electrical checks, signal voltage, coolant level sensor (OEM)



Refer to the corresponding OEM data resources for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

1. Ensure the coolant level is normal, the sensor is connected, and ignition key is set to ON.

If the sensor is three wire:

a. Measure the voltage drop across pins B and C of the coolant level sensor.

If the sensor is a two wire:

b. Measure the voltage drop across pins A and B of the coolant level sensor.

Is the measured voltage value within 0.75V – 1.75V?

Yes	No
	Correct any issues found, or replace the sensor if measured values indicate a
	sensor error.
	Refer to Step 4.A to perform the
	corresponding repair verification cycles.
If all steps have been completed and	
this trouble code is still present, contact	
the PACCAR Engine Support Center for	
further assistance.	

Step 4. Repair Verification

Step 4.A Repair verification cycles

Perform these repair verification cycles following any corrective actions taken, to enable related OBD monitors to reach a readiness state associated with the trouble code or system being investigated.



Before beginning these repair verification cycles, use the DAVIE Diagnostics, Quick Check function to clear all current DTCs from the PCI and EAS-3 ECUs.

Action

Power-Up/Electrical
 With the brakes set, turn the key to the ON position with the engine off,
 and allow 10 seconds for the system to initialize and run diagnostics.

Were the identified repair verification cycles able to be completed?



Yes	No	
	Investigate and correct any issues preventing these repair verification cycles from being completed, then run. For additional assistance, contact the PACCAR Engine Support Center	
	Go to step 4.B	
Step 4.B DAVIE Diagnostics, Quick Check Action 1. Use DAVIE Diagnostics to perform	a Quick Check for current trouble o	
Use DAVIE Diagnostics to perform a Quick Check for current trouble code to determine whether the actions taken have cleared this trouble code. Has P2560 reset?		
Yes	No	
Continue with the next step in this troubleshooting procedure. If all steps have been completed and this trouble code is still present, contact the PACCAR Engine Support Center for further assistance.	Problem resolved. No further actineeded.	
	this issue or for confirmation prior to the contact the PACCAR Engine Support	



P2563

P2563		
Code number	P2563	
Fault code description	VTG turbo charger actuator position – No or too slow movement	
Fault code information	1 trip MIL	
	3 drive cycle recovery	
	Readiness group – None	
	Freeze frame type –Boost	
Description of component(s)	The main task of the VTG turbo charger actuator is to control the turbo charger nozzle	
	ring position.	
	The gas flow guidance into the turbine rotor is controlled by the position of the turbo	
	charger nozzle ring.	
	A 1 2 B	
	100%	
	The main components of the VTG turbo charger actuator are:	
	ECU	
	Electromotor	
	The electromotor rotates the output shaft via internal gears.	
	output shaft	
	 The nozzle ring mechanism is moved via a sector gear by rotating the output 	
	shaft	
	output shaft position sensor	
	 The position of the actuator output shaft is monitored with an internal sensor 	
	and a reference magnet (reference point).	
	temperature sensor	
	temperature seriosi	



• The temperature of the printed circuit board of the ECU is monitored.

Control

The VTG turbo charger actuator is a smart actuator that communicates with the PCI ECU via E-CAN. The actuator ECU is controlled by the PCI ECU but has its own diagnostics on the following actuator inputs and outputs:

- power supply voltage
- electromotor current
- The effort to move the nozzle ring is monitored.
- output shaft position
- The mechanical end positions of the nozzle ring mechanism are monitored.
- ECU printed circuit board temperature
- ECU hardware and software

Learn sweep

After the ignition is keyed on, a learn sweep is performed by the actuator. During this sweep the VTG turbo charger nozzle ring is fully opened and fully closed to check the mechanical end positions of the nozzle ring mechanism.

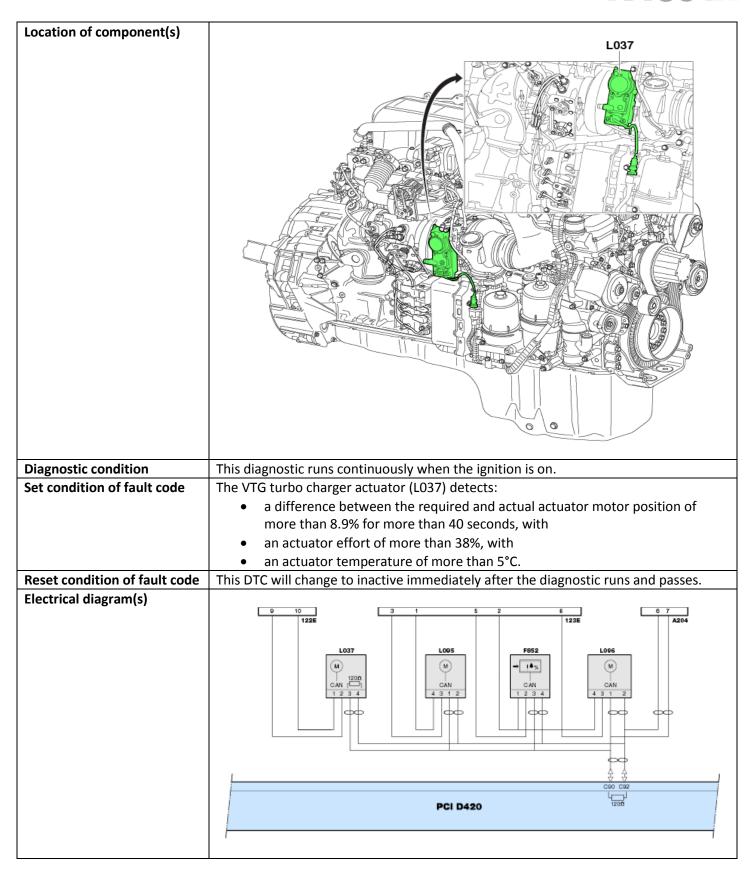
Unpowered and fail-safe position

The unpowered and fail-safe position of the actuator is 80%. If a failure is detected the VTG actuator moves to the fail-safe position, if possible.

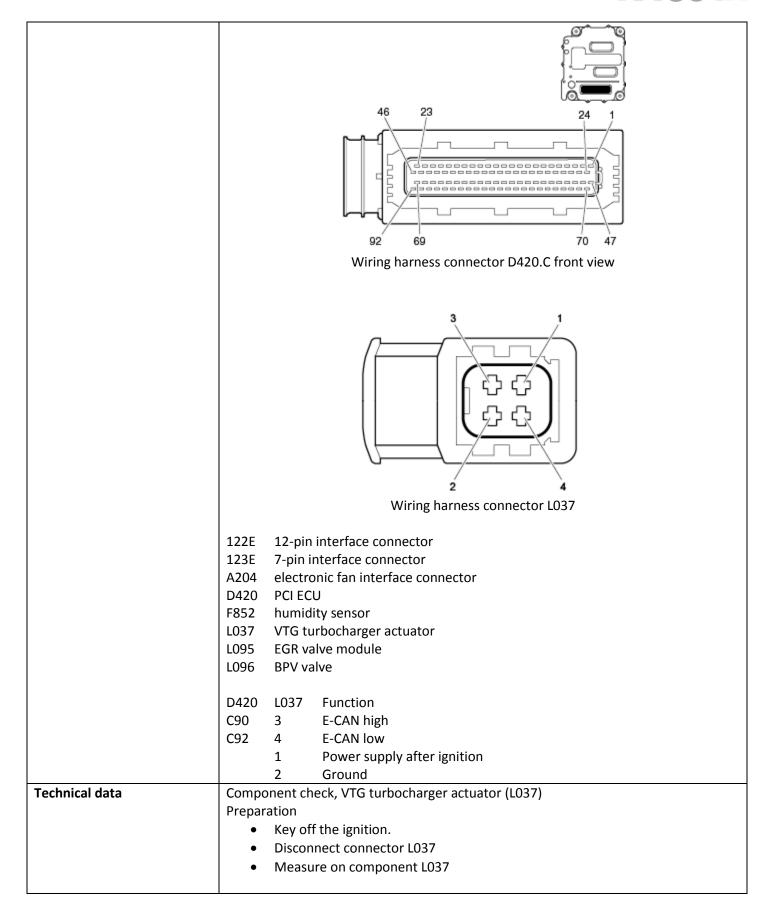
Effect of actuator on the system:

- controlling the VTG turbo charger
 In general, a lower opening percentage results in a higher turbo speed and therefore in a higher boost pressure. The controlled opening percentage also depends on other conditions, such as the required EGR flow (pressure before turbine).
- controlling the pressure before turbine to generate EGR flow and back pressure during engine braking.











	Pin	Pin		
	(+ probe)	(- probe)	Value	Additional information
	3	4	± 120 Ω	
	Wiring check, VTG turbocharger actuator (L037) Preparation • Key off the ignition.			
	Disconnect connector L037 Measure on component connector L037			
	Measure on component connector L037			
	Pin	Pin		
	(+ probe)	(- probe)	Value	Additional information
	1	2	Ubat	Ignition keyed on
	_	_		
	3	4	± 120 Ω	Ignition keyed off Crown deable from the bettern.
				 Ground cable from the battery disconnected
				Vehicle Communication Interface
				(VCI) of DAVIE disconnected
Possible causes	Faulty actuator or turbo charger nozzle ring mechanism. Check the actuator and the turbo charger nozzle ring mechanism: Remove the actuator. Check the sector gear travel. Check the actuator output gear for damage Check the actuator output gear for adequate rotation (minimum of one complete rotation). Re-initialize the turbo actuator after installation.			
Additional information	The VTG turbo charger actuator controls the actuator motor position and therefore			
	the turbo charger nozzle ring and the effort to move the nozzle ring.			
Diagnostic Step-by-Step	Please perform the troubleshooting steps below utilizing the breakout harness, if necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as			
	it could damage the harness. The ignition should always be in the OFF			
	position when connecting or disconnecting electrical components to reduce			
	the likelihood of damage to electrical components.			
	This troubleshooting tree is based on the assumption that supply power and ground to the DCL is functioning properly.			
	 and ground to the PCI is functioning properly. Disconnecting the PCI connectors during the troubleshooting process will result in multiple errors. For specific electrical component information and pin out locations, always refer to the technical data in Rapido. 			
	It is necessary to exit the 'active errors' screen in DAVIE and run the diagnostic test again to identify a change in errors.			
	 diagnostic test again to identify a change in errors. Remember that the truck's operational or mechanical issues may be the 			
	root cause of both active and inactive codes. Refer to the 'possible			
	causes' section in Rapido.			
	Stop 1		Cton ID 3	EG22 CDT
	Step 1	ect all annlica	Step ID 2	563a SRT ors (bent, broken, corroded or loose pins)
	visually IIISP	ect an applica	ואפווווטא פועג	ors (bent, broken, corroded or loose pins)



and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.

Step 2 Step ID 2563b SRT

DAVIE Direct Test: Turbo Actuator Effort

Run the prescribed DAVIE Direct test to determine correct operation of the VGT Actuator.

Does the test fail to complete or result in a failed state?

- No: Continue to the next step in the troubleshooting process.
- Yes: Make the appropriate repairs or component replacements.

Use DAVIE to re-check for the presence of active faults.

- Fault inactive issue resolved.
- Fault active Proceed to step 3

Step 3 Step ID 2563c SRT

Ancillary Test: Air Side Pressure

Perform the prescribed testing to determine if there are any leaks in the air system.

Does the test fail to complete or result in a failed state?

- No: Continue to the next step in the troubleshooting process.
- Yes: Make the appropriate repairs or component replacements.

Use DAVIE to re-check for the presence of active faults.

- Fault inactive issue resolved.
- Fault active Proceed to step 4

Step 4 Step ID 2563d SRT

Ancillary Test: Turbo Actuator Span

Perform the prescribed testing to manually check the turbo sector gear range of motion.

Does the test fail to complete or result in a failed state?

- No: Skip to Step 6 in this troubleshooting process, to recalibrate the turbocharger actuator.
- Yes: Continue to Step 5 in this troubleshooting process, to replace the turbocharger actuator.

Step 5 Step ID 2563e SRT

Replace: Turbocharger Actuator

If no problems were detected in the preceding steps, an internal problem has most likely occurred with the turbocharger actuator.

Replace the identified faulty component.

- Fault inactive issue resolved.
- Fault active Proceed to step 6

Step 6 Step ID 2563f SRT

DAVIE Direct Test: Turbo Actuator (VGT) Replacement

Run the prescribed DAVIE Direct test to initialize/calibrate the turbocharger actuator.

To run the Turbocharger Actuator (VGT) Replacement, the actuator needs to be



	electrically connected but NOT installed. Re-install the Turbo Actuator. Start the engine and allow it to idle for a minimum of 10 minutes before verifying if the fault has gone inactive. • Fault inactive – issue resolved. • Fault active – Proceed to step 7		
	Step 7	Step ID 2563g	SRT
		ce in diagnosing this issue or the components, contact the	for confirmation prior to the Engine Support Call Center at
Verification Drive Cycle	To validate the repair for 2 minutes.	, with the brakes set, start th	e engine and allow it to run at idle
			Back to Choose Code
			Back to Index



Fault code information 1 trip MIL 3 drive cycle recovery Readiness group – None Freeze frame type –Boost The turbo speed is monitored on the turbine-compressor shaft. Effect on the system: 1 trip to charger speed limiting The expression of component(s) 2 The turbo charger speed limiting The engine torque is limited if the speed is too high. Stalled turbo charger detection Calculates the exhaust gas temperature before the turbine A higher measured turbo speed results in lower calculated exhaust gas temperature before the turbine. Diagnostic check on the boost pressure system.	Code number	P2579		
Fault code information 1 trip MII. 3 drive cycle recovery Readiness group – None Freeze frame type –Boost The turbo speed is monitored on the turbine-compressor shaft. Effect on the system: • Turbo charger speed limiting • The engine torque is limited if the speed is too high. • Stalled turbo charger detection • Calculates the exhaust gas temperature before the turbine • A higher measured turbo speed results in lower calculated exhaust gas temperature before the turbine. • Diagnostic check on the boost pressure system. F683 F683				
3 drive cycle recovery Readiness group – None Freeze frame type – Boost The turbo speed is monitored on the turbine-compressor shaft. Effect on the system: • Turbo charger speed limiting • The engine torque is limited if the speed is too high. • Stalled turbo charger detection • Calculates the exhaust gas temperature before the turbine • A higher measured turbo speed results in lower calculated exhaust gas temperature before the turbine. • Diagnostic check on the boost pressure system. Location of component(s) F683				
Readiness group – None Freeze frame type – Boost The turbo speed is monitored on the turbine-compressor shaft. Effect on the system:	rault code illioillation	· ·		
Preeze frame type —Boost Description of component(s) The turbo speed is monitored on the turbine-compressor shaft. Effect on the system: 1 Turbo charger speed limiting 1 The engine torque is limited if the speed is too high. 1 Stalled turbo charger detection 1 Calculates the exhaust gas temperature before the turbine. 2 A higher measured turbo speed results in lower calculated exhaust gas temperature before the turbine. 3 Diagnostic check on the boost pressure system. 1 Diagnostic check on the boost pressure system. 1 F683				
The turbo speed is monitored on the turbine-compressor shaft. Effect on the system: • Turbo charger speed limiting • The engine torque is limited if the speed is too high. • Stalled turbo charger detection • Calculates the exhaust gas temperature before the turbine • A higher measured turbo speed results in lower calculated exhaust gas temperature before the turbine. • Diagnostic check on the boost pressure system.				
Effect on the system: • Turbo charger speed limiting • The engine torque is limited if the speed is too high. • Stalled turbo charger detection • Calculates the exhaust gas temperature before the turbine • A higher measured turbo speed results in lower calculated exhaust gas temperature before the turbine. • Diagnostic check on the boost pressure system.				
Turbo charger speed limiting The engine torque is limited if the speed is too high. Stalled turbo charger detection Calculates the exhaust gas temperature before the turbine A higher measured turbo speed results in lower calculated exhaust gas temperature before the turbine. Diagnostic check on the boost pressure system.	Description of component(s)			
The engine torque is limited if the speed is too high. Stalled turbo charger detection Calculates the exhaust gas temperature before the turbine A higher measured turbo speed results in lower calculated exhaust gas temperature before the turbine. Diagnostic check on the boost pressure system. F683				
Stalled turbo charger detection Calculates the exhaust gas temperature before the turbine A higher measured turbo speed results in lower calculated exhaust gas temperature before the turbine. Diagnostic check on the boost pressure system. F683		Turbo charger speed limiting		
Calculates the exhaust gas temperature before the turbine A higher measured turbo speed results in lower calculated exhaust gas temperature before the turbine. Diagnostic check on the boost pressure system. F683 F683		 The engine torque is limited if the speed is too high. 		
A higher measured turbo speed results in lower calculated exhaust gas temperature before the turbine. Diagnostic check on the boost pressure system. F683		Stalled turbo charger detection		
A higher measured turbo speed results in lower calculated exhaust gas temperature before the turbine. Diagnostic check on the boost pressure system. F683		Calculates the exhaust gas temperature before the turbine		
temperature before the turbine. • Diagnostic check on the boost pressure system. F683				
• Diagnostic check on the boost pressure system. F683				
Location of component(s) F683				
F683	Location of component(s)	- Diagnostic check on the boost pressure system.		
	(o)	F683		
Diagnostic condition This diagnostic supercontinuously when the engine is superior				
	Diamostic condition	This diagnostic was continuously when the survive is average.		
	Diagnostic condition	This diagnostic runs continuously when the engine is running		
Set condition of fault code The PCI ECU (D420) detects that the measured turbo speed signal is changing abnormally.	Set condition of fault code	The PCI ECU (D420) detects that the measured turbo speed signal is changing abnormally.		
Reset condition of fault code This DTC changes to inactive when the fault is no longer detected. To validate the	Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected. To validate the		



repair, drive the vehicle until the coolant temperature is at least 70°C [158°F]. Once the minimum target temperature has been reached, proceed at a minimum speed of 80 km/h [50 mph] in the highest gear possible with the engine speed between 1100 and 1500 rpm and set the cruise control. This test is best performed with a loaded vehicle/trailer, but if load is unavailable, turn as many engine power consumers on to produce engine load. Perform this test for roughly 5 to 8 km [3 to 5 miles] or in 3 separate 1.5 km [1 mile] increments if a steady 5 to 8 km [3 to 5 miles] is unachievable. Use a flat road, if possible. Electrical diagram(s) D420 -----Wiring harness connector D420.C front view Component connector F683 D420 PCI ECU F683 turbo speed sensor



D420 F683 Function
Component check, turbo speed sensor (F683)
Preparation
Key off the ignition.
Disconnect connector F683.
Measure on component connector F683.
Pin Pin
(+ probe) (- probe) Value Additional information
1 2 600–1000 Ω Resistance value at 20°C [68°F]
causes • Faulty turbo speed sensor wiring
Faulty turbo speed sensor
• The turbo speed is measured by the turbo speed sensor (F683).
tic Step-by-Step Perform the troubleshooting steps below using the breakout harness, if
necessary, to check electrical components, such as sensors, electrical control
units, and harnesses. Back probing is not recommended, as it could damage
the harness. The ignition should always be in the OFF position when
connecting or disconnecting electrical components to reduce the likelihood of
damage to electrical components.
This troubleshooting tree is based on the assumption that supply power and ground to the BCL are functioning preparty.
and ground to the PCI are functioning properly.
Disconnecting the PCI connectors during the troubleshooting process will provide in additional agency.
will result in multiple errors.
For specific electrical component information and pinout locations,
always refer to the technical data in Rapido.
It is necessary to exit the 'active errors' screen in DAVIE and run the
diagnostic test again to identify changes in errors.
Remember that the truck's operational or mechanical issues may be the
root cause of both active and inactive codes. Refer to the 'possible
causes' section in Rapido.
Step 1 Step ID 2579a SRT
Visually inspect all applicable connectors (bent, broken, corroded or loose pins)
and harnesses for corrosion, damage, and rubbing during each step of the
diagnostic procedure. Proceed to step 2.
Step 2 Step ID 2579b SRT
With key OFF, disconnect the turbo speed sensor. Measure the resistance
between the signal and ground pins of the turbo speed sensor.
Resistance values change with temperature.
If the resistance is acceptable – Proceed to step 3
If the resistance is NOT acceptable – Replace the sensor and reconnect the
harness, then proceed to the verification procedure listed at the end of
this document
Step 3 Step ID 2579c SRT



With key OFF, disconnect the engine harness from the PCI. Perform a continuity test on all the wires associated with the turbo speed sensor: If the continuity is acceptable – Proceed to step 4. If the continuity is NOT acceptable – Replace and reconnect the harness then proceed to the verification procedure listed at the end of this document. Step 4 Step ID 2579d SRT With key OFF, inspect the connection pins of the harness, sensor, and PCI: If the pins are acceptable – Proceed to step 5. If the pins are NOT acceptable – Replace and reconnect the engine harness. Proceed to the verification procedure listed at the end of this document. Step 5 Step ID 2579e SRT With key OFF, disconnect the turbo speed sensor and remove it from the turbo. Check for damaged housing or contact with the shaft: If no damage is found – Proceed to step 6. If damage is found – Contact the Engine Support Center for further instructions Step ID 2579f SRT Step 6 For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the Engine Support Call Center at 1-800-477-0251. To validate the repair, with the System Initiation cycle complete, under moderate **Verification Drive Cycle** engine load (A/C and Fan both ON), perform a series of brief accelerations, progressing from a lower to a higher speed until reaching a top speed of 40 mph. Once the top speed has been reached, perform several decelerations from a higher to a lower speed until reaching a bottom speed of 10 mph. Perform this cycle 5 times. **Back to Choose Code** Back to Index



F 2300			
Code number	P2580		
Fault code description	Turbo speed – Voltage too low or short circuit to ground on ECU D420 pin C87		
Fault code information	1 trip MIL		
	3 drive cycle recovery		
	Readiness group – None		
	Freeze frame type –Comprehensive		
Description of component(s)	The turbo speed is monitored on the turbine-compressor shaft.		
Description of component(s)	Effect on the system:		
	Turbo charger speed limiting		
	The engine torque is limited if the speed is too high.		
	Stalled turbo charger detection		
	Calculates the exhaust gas temperature before the turbine		
	A higher measured turbo speed results in lower calculated exhaust gas		
	temperature before the turbine.		
	Diagnostic check on the boost pressure system.		
Location of component(s)			
, ,	F683		
Diagnostic condition	This diagnostic runs when:		
	the engine speed is above 1000 rpm, and		
	the engine is moderately loaded.		
i	,		



Set condition of fault code	The PCI ECU (D420) detects that the turbo speed is below 30,000 rpm for more than
	20 seconds.
Reset condition of fault code	This DTC changes to inactive when the fault is no longer detected.
Electrical diagram(s)	D420 C87 C88 A A F683
	Wiring harness connector D420.C front view
	Component connector F683
	D420 PCI ECU F683 turbo speed sensor
	D420 F683 Function C87 2 Signal, turbo speed C88 1 Ground
Technical data	Component check, turbo speed sensor (F683) Preparation



	v col t w			
	Key off the ignition. Disconnect connector FC82			
	Disconnect connector F683.			
	Measure on component connector F683.			
	Pin Pin			
	(+ probe) (- probe) Value Additional information			
	1 2 600–1000 Ω Resistance value at 20°C [68°F]			
Possible causes	Faulty wiring			
	Faulty connector			
	Faulty sensor			
Additional information	Engine torque is reduced.			
Diagnostic Step-by-Step	Perform the troubleshooting steps below using the breakout harness, if			
	necessary, to check electrical components, such as sensors, electrical control			
	units, and harnesses. Back probing is not recommended, as it could damage			
	the harness. The ignition should always be in the OFF position when			
	connecting or disconnecting electrical components to reduce the likelihood of			
	damage to electrical components.			
	This troubleshooting tree is based on the assumption that supply power			
	and ground to the PCI are functioning properly.			
	Disconnecting the PCI connectors during the troubleshooting process			
	will result in multiple errors.			
	 For specific electrical component information and pinout locations, 			
	always refer to the technical data in Rapido.			
	It is necessary to exit the 'active errors' screen in DAVIE and run the			
	diagnostic test again to identify changes in errors.			
	Remember that the truck's operational or mechanical issues may be the			
	root cause of both active and inactive codes. Refer to the 'possible			
	causes' section in Rapido.			
	Step 1 Step ID 2580a SRT			
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins)			
	and harnesses for corrosion, damage, and rubbing during each step of the			
	diagnostic procedure. Proceed to step 2.			
	Step 2 Step ID 2580b SRT			
	With key OFF, disconnect the turbo speed sensor. Measure the resistance			
	between the signal and ground pins of the turbo speed sensor.			
	Posistance values change with temperature			
	Resistance values change with temperature. • If the resistance is acceptable – Proceed to step 3			
	 If the resistance is acceptable – Proceed to step 3 If the resistance is NOT acceptable – Replace the sensor and reconnect the 			
	harness, then proceed to the verification procedure listed at the end of			
	this document			
	this document			
	Step 3 Step ID 2580c SRT			
	With key OFF, disconnect the engine harness from the PCI. Perform a continuity			
	test on all the wires associated with the turbo speed sensor:			
	If the continuity is acceptable – Proceed to step 4.			
	 If the continuity is acceptable – Proceed to step 4. If the continuity is NOT acceptable – Replace and reconnect the harness, 			
	then proceed to the verification procedure listed at the end of this			
	document.			
	document.			

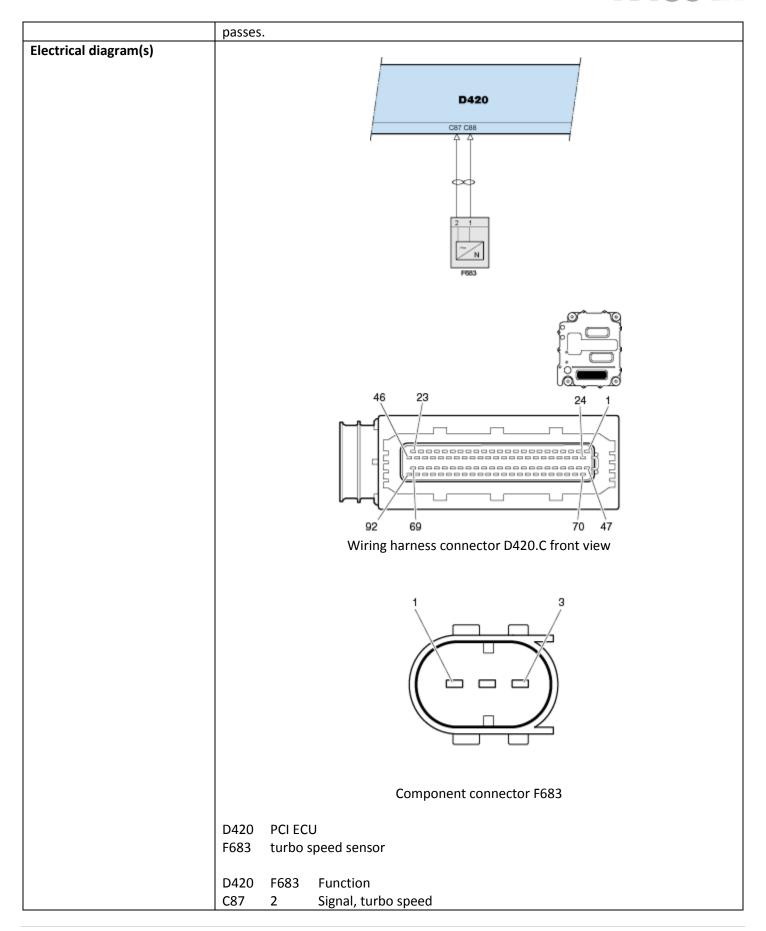


	Step 4	Step ID 2580d	SRT		
	With key OFF, inspect the connection pins of the harness, sensor, and PCI:				
	If the pins are	acceptable - Proceed to step 5			
	If the pins are	NOT acceptable – Replace and	reconnect the engine harness.		
	Proceed to the	e verification procedure listed a	t the end of this document.		
	Step 5	Step ID 2580e	SRT		
	With key OFF, disc	connect the turbo speed sensor	and remove it from the turbo.		
	Check for damage	d housing or contact with the s	haft:		
	If no dama	age is found – Proceed to step 6	5.		
	 If damage 	If damage is found – Contact the Engine Support Center for further			
	instruction	instructions			
	Step 6	Step ID 2580f	SRT		
	For further assista	nce in diagnosing this issue or f	for confirmation prior to the		
	replacement of suspect components, contact the Engine Support Call Center at				
	1-800-477-0251.				
Verification Drive Cycle	To validate the repa	air, with the System Initiation co	ycle complete, under moderate		
	engine load (A/C ar	nd Fan both ON), perform a seri	es of brief accelerations,		
	progressing from a	lower to a higher speed until re	eaching a top speed of 40 mph.		
	Once the top speed	I has been reached, perform se	veral decelerations from a higher to		
	a lower speed until	reaching a bottom speed of 10	mph. Perform this cycle 5 times.		
			Back to Choose Code		
			Back to Index		



1 2 3 0 1		
Code number	P2581	
Fault code description	Turbo speed – Voltage too high or short circuit to supply on ECU D420 pin C87	
Fault code information	1 trip MIL	
	3 drive cycle recovery	
	Readiness group – None	
	Freeze frame type –Comprehensive	
Description of component(s)	The turbo speed is monitored on the turbine-compressor shaft.	
	Effect on the system:	
	Turbo charger speed limiting	
	The engine torque is limited if the speed is too high.	
	Stalled turbo charger detection	
	Calculates the exhaust gas temperature before the turbine	
	A higher measured turbo speed results in lower calculated exhaust gas	
	temperature before the turbine.	
	Diagnostic check on the boost pressure system.	
Location of component(s)	F683	
Diagnostic condition	This diagnostic runs continuously when the engine is running	
Set condition of fault code	The PCI-2 detects a turbo speed above 129,999 rpm for more than 3 seconds.	
Reset condition of fault code	This fault code will change to inactive immediately after the diagnostic runs and	
	The state of the s	







	C88 1	Ground			
Technical data			speed sensor (E6	831	
recilincal data	Component check, turbo speed sensor (F683) Preparation				
	-	off the ignitio	n		
	Key off the ignition.Disconnect connector F683.				
				- FC02	
		-	onent connecto	r F683.	
	Pin	Pin	Value	Additional in	formation
	(+ probe)	(- probe)			
	1	2	600–1000 Ω	Resistance v	alue at 20°C [68°F]
Possible causes	Faulty wi	ring			
	Faulty co	nnector			
	 Faulty se 	nsor			
Additional information	Engine torqu	e is reduced.			
Diagnostic Step-by-Step	Perfo	orm the trouk	leshooting steps	s below using t	he breakout harness, if
	/\ nece	ssary, to ched	ck electrical com	ponents, such	as sensors, electrical control
	units	, and harness	ses. Back probing	g is not recomn	nended, as it could damage
	the h	arness. The i	gnition should a	ways be in the	OFF position when
	conn	ecting or disc	onnecting electi	rical componer	nts to reduce the likelihood of
	dama	age to electri	cal components.		
	\Box	This trouble	shooting tree is I	pased on the a	ssumption that supply power
		and ground	to the PCI are fu	nctioning prop	erly.
	٠.	Disconnecti	ng the PCI conne	ctors during th	e troubleshooting process
		will result in multiple errors.			
	For specific electrical component information and pinout locations,				
	always refer to the technical data in Rapido.				
	It is necessary to exit the 'active errors' screen in DAVIE and run the				
	diagnostic test again to identify changes in errors.				
	Remember that the truck's operational or mechanical issues may be the				
	root cause of both active and inactive codes. Refer to the 'possible				
	causes' section in Rapido.				
	Step 1		Step ID 2581	.a	SRT
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins)				
	and harnesses for corrosion, damage, and rubbing during each step of the				
	diagnostic procedure. Proceed to step 2.				
	Step 2		Step ID 2581	.b	SRT
	With key Ol	F, disconnec	t the turbo spee	d sensor. Meas	sure the resistance
	between th	e signal and g	ground pins of th	e turbo speed	sensor.
	Resistance	values change	with temperatu	ıre.	
	If the resistance is acceptable – Proceed to step 3			3	
	• If th	ne resistance	is NOT acceptab	le – Replace th	e sensor and reconnect the
	harness, then proceed to the verification procedure listed at the end of				
	this document.				
	and documents				



With key OFF, disconnect the engine harness from the PCI. Perform a continuity test on all the wires associated with the turbo speed sensor: If the continuity is acceptable – Proceed to step 4. If the continuity is NOT acceptable – Replace and reconnect the harness, then proceed to the verification procedure listed at the end of this document. Step 4 Step ID 2581d SRT With key OFF, inspect the connection pins of the harness, sensor, and PCI: If the pins are acceptable – Proceed to step 5. If the pins are NOT acceptable – Replace and reconnect the engine harness. Proceed to the verification procedure listed at the end of this document. Step 5 Step ID 2581e **SRT** With key OFF, disconnect the turbo speed sensor and remove it from the turbo. Check for damaged housing or contact with the shaft: If no damage is found – Proceed to step 6. If damage is found – Contact the Engine Support Center for further instructions Step ID 2581f **SRT** Possible PCI failure – Contact the Engine Support Center for further instructions on replacement of the PCI. Step 7 Step ID 2581g SRT For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the Engine Support Call Center at 1-800-477-0251. **Verification Drive Cycle** To validate the repair, with the System Initiation cycle complete, under moderate engine load (A/C and Fan both ON), perform a series of brief accelerations, progressing from a lower to a higher speed until reaching a top speed of 40 mph. Once the top speed has been reached, perform several decelerations from a higher to a lower speed until reaching a bottom speed of 10 mph. Perform this cycle 5 times. Back to Choose Code **Back to Index**



Code number	P2603
Fault code description	Coolant pump speed - Voltage too high or short circuit to supply on ECU D420 pin C64
Fault code information	1 trip red fault lamp
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Comprehensive
Description of component(s)	For further assistance:
	Contact the PACCAR Engine Support Call Center 1-800-477-0251
	Please contact the Engine Support Center
Location of component(s)	
Diagnostic condition	
Set condition of fault code	
Reset condition of fault code	
Electrical diagram(s)	
Technical data	
Possible causes	
Additional information	
Diagnostic Step-by-Step	Please refer to chassis wiring information.
Verification Drive Cycle	N/A
	Back to Choose Code
	Back to Index



Code number	P2609
Fault code description	Grid heater relay - Current too low or open circuit
Fault code information	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Comprehensive
Description of component(s)	For further assistance: Contact the PACCAR Engine Support Call Center
	Please contact the Engine Support Center
Location of component(s)	
Diagnostic condition	
Set condition of fault code	
Reset condition of fault code	
Electrical diagram(s)	
Technical data	
Possible causes	
Additional information	
Diagnostic Step-by-Step	Please refer to chassis wiring information.
Verification Drive Cycle	N/A
	Back to Choose Code
	Back to Index



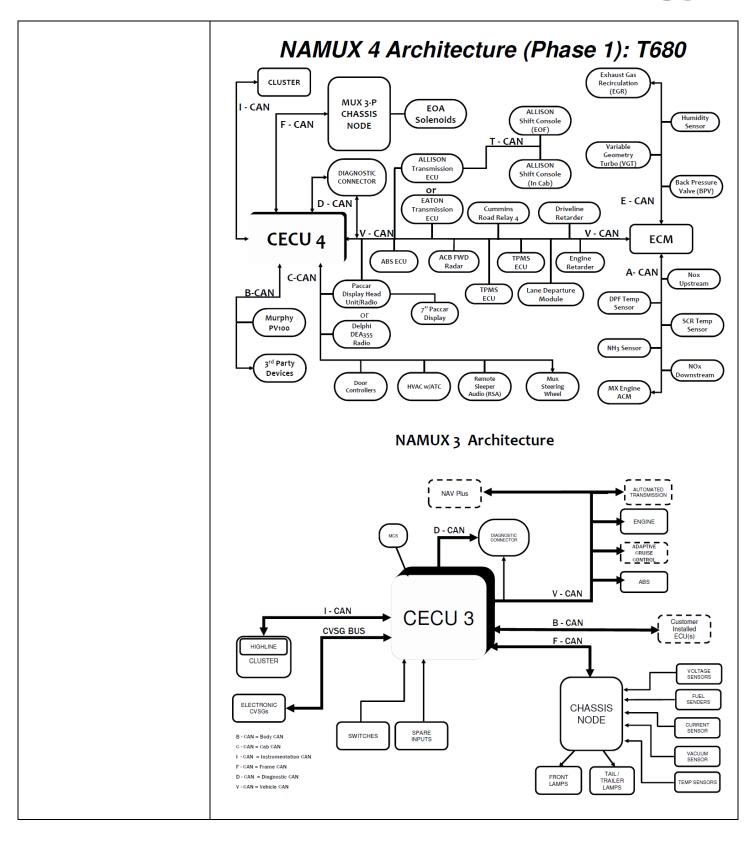
Code number	P3003
Fault code description	Battery supply low
Fault code information	1 trip red fault lamp
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Engine protection
Description of component(s)	For further assistance: Contact the PACCAR Engine Support Call Center 1-800-477-0251 Please contact the Engine Support Center
Location of component(s)	
Diagnostic condition	
Set condition of fault code	
Reset condition of fault code	
Electrical diagram(s)	
Technical data	
Possible causes	
Additional information	
Diagnostic Step-by-Step	Please refer to chassis wiring information.
Verification Drive Cycle	N/A
	Back to Choose Code
	Back to Index



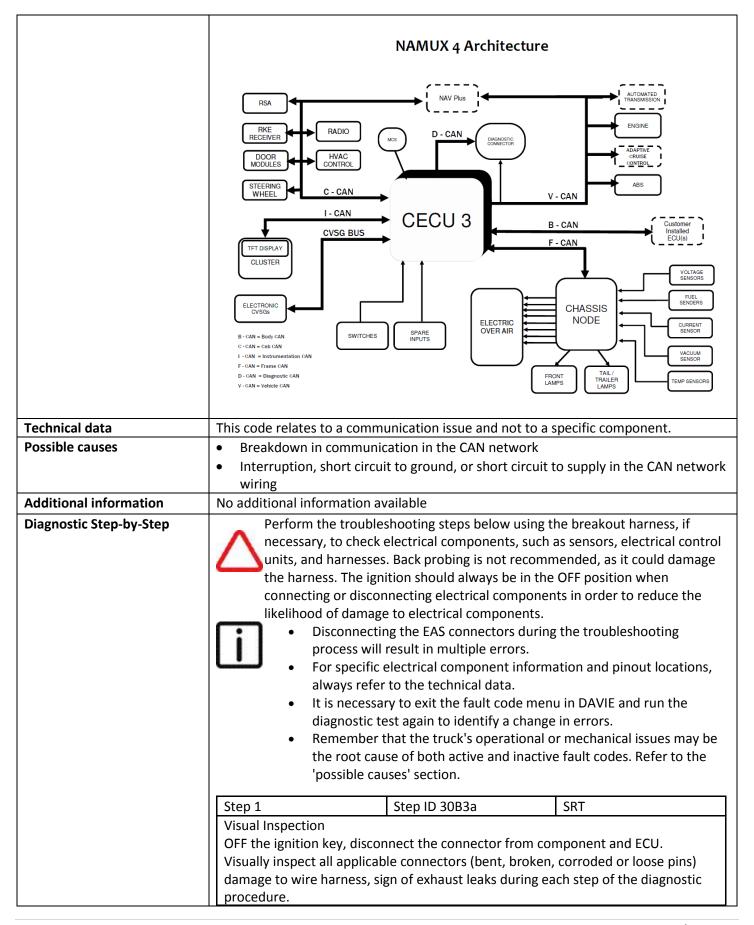
P30B3

Code number	P30B3							
Fault code description	CAN communication – Message (AT1IG1) rate too low from NOx sensor before							
	catalyst							
Fault code information	1 trip MIL							
	3 drive cycle recovery							
	Readiness group – None							
	Freeze frame type – Generic							
Description of component(s)	This code relates to a communication issue and not to a specific component.							
Location of component(s)	This code relates to a communication issue and not to a specific component.							
Diagnostic condition	This diagnostic runs continuously when the ignition is on.							
Set condition of fault code	CAN command message (AT1IG1) is missing for more than 3 seconds.							
Reset condition of fault code	This DTC changes to inactive as soon as the error is no longer detected.							
Electrical diagram(s)								
	NAMUX 3 Architecture: 2010 B-Cab							
	FIREWALL Aftertreatment CAN							
	Diagnostic CAN STEERING WHEEL Diagnostic CAN TRANSMISSION ENGINE ADAPTIVE							
	MCS DIAGNOSTIC CONNECTOR PACCAR Display Display Diagnostic CONNECTOR DIAGNOSTIC CONNECTOR PACCAR Display							
	Cluster Cab CAN Vehicle CAN Vehicle CAN OCU OCU OCU OCU OCU OCU OCU OC							
	CECU 3 Vehicle CAN							
	CVSG BUS VOLTAGE SENSORS FUEL							
	ELECTRONIC CVSG'S CURRENT SENSOR							
	NODE PRESSURE SENSORS VACUUM VACUUM							
	SPARE INPUTS I FRONT TAIL / TEMP SENSORS FIREWALL LAMPS LAMPS							







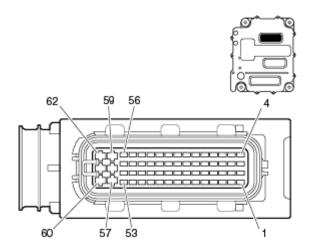




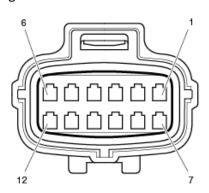
		Marthur Starrage Starrage Starrage						
		Was there evidence of any of the above?						
	No: Proceed	·						
	 Yes: Make th 	ie appropriate repairs or con	nponent replacements.					
	Use DAVIE to re-ched	Use DAVIE to re-check for the presence of active faults.						
	If this related	If this related fault is no longer active, then this issue has been resolved.						
	If this related	d fault is still active, Proceed	to step 2					
		Step 2 Step ID 30B3b SRT						
	Step 2							
	Data check	-						
	 Lookup the t 	echnical data of the specific	system					
	-	checking data test of the spe						
	Is test pass?	· ·	'					
	No: Proceed	to step 3						
	Yes : Proceed	•						
	Step 3	Step ID 30B3c	SRT					
	Repair or replace cor							
	· ·	•	neck for electrical connection and					
	wiring harne							
	Reconnect the second control of the sec	ne connector						
	 ON the igniti 	on key						
	Use DAVIE to re-ched	ck for the presence of active	faults:					
	Is DTC fault a	active: Proceed to step 4						
	Is DTC fault i	nactive: Issue resolved. Clea	r inactive fault.					
	Step 4	Step ID 30B3d	SRT					
			for confirmation prior to the					
	800-477-0251.	ect components, contact the	Engine Support Call Center at 1-					
Verification Drive Cycle	To verify the repair:							
			on with the engine off, and allow 10					
		n to initialize and run diagno						
	With the brakes set, s	tart the engine and allow it t						
			Back to Choose Code					
		Back to Index						



Code number	P3405						
Fault code description	Engine brake solenoid valve Cylinder 1 - Current too low or open circuit on ECU D420						
	pin A17						
Fault code information	3 drive cycle recovery						
	Readiness group – None						
	Freeze frame type – Comprehensive						
Description of component(s)	This information will be added to the diagnostic when it becomes available.						
Location of component(s)							
	L147						
Diagnostic condition	This information will be added to the diagnostic when it becomes available.						
Set condition of fault code	This information will be added to the diagnostic when it becomes available.						
Reset condition of fault code	This information will be added to the diagnostic when it becomes available.						
Electrical diagram(s)	This information will be duded to the diagnostic when it becomes available.						
	D420 A17 A18 A16 A15 A24 A23 A21 A22 A13 A14 A20 A19 4 10 5 11 6 12 B460 B461 L147 L148 L140 L150 L151 L152 I401918						



Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view

B460 Connector cylinders 1-3

B461 Connector cylinders 4-6

D420 PCI ECU

L147 MX Engine Brake solenoid valve cylinder 1

L148 MX Engine Brake solenoid valve cylinder 2

L149 MX Engine Brake solenoid valve cylinder 3

L150 MX Engine Brake solenoid valve cylinder 4

L151 MX Engine Brake solenoid valve cylinder 5

L152 MX Engine Brake solenoid valve cylinder 6

MX Engine Brakes cylinder 1-3

D420	B460	L147	L148	L149	Function
A15	11		1		Ground
A16	5		1		Signal, MX Engine Brake solenoid valve cylinder 2
A17	4	1			Signal, MX Engine Brake solenoid valve
					cylinder 1
A18	10	1			Ground
A23	12			1	Ground
A24	6			1	Signal, MX Engine Brake solenoid valve cylinder 3
A17 A18 A23	4 10 12	1	1	_	cylinder 2 Signal, MX Engine Brake solenoid vocylinder 1 Ground Ground Signal, MX Engine Brake solenoid vo



	MX Engine 8								
		60 L150	L151	L152	Function				
	A13 1	1	1		Signal, MX Engine Brake solenoid valve cylinder 5				
	A14 5	;	1		Ground				
	A19 4	ļ		1	Ground				
	A20 1	0		1	Signal, MX Engine Brake solenoid valve cylinder 6				
	A21 1	2 1			Signal, MX Engine Brake solenoid valve cylinder 4				
	A22 6				Ground				
Technical data	-		Engine I	Brake so	lenoid valve cylinder 1 (L147)				
	Preparation		cc						
		the ignitio		2460					
		onnect cor			anasta a RACO				
	• Mea		ring nar	ness cor	nnector B460				
		Pin (prob	o)	Valu	ue Additional information				
	(+ probe)		2)		S Ω Resistance value at 20°C [68°F]				
	4	10		± 30.	of the nesistance value at 20 C [08 F]				
	Component check, MX Engine Brake solenoid valve cylinder 2 (L148) Preparation								
	Key the ignition off								
	· · · · · · · · · · · · · · · · · · ·								
		Measure on wiring harness connector B460							
	Pin								
	(+ probe)	(- prob	e)	Valu	ue Additional information				
	5	11	•	± 36.	S Ω Resistance value at 20°C [68°F]				
	Component check, MX Engine Brake solenoid valve cylinder 3 (L149) Preparation								
	· ·	the ignitio	n off						
		onnect cor		3460					
	Measure on wiring harness connector B460								
	Pin	Pin							
	(+ probe)	(- prob	e)	Valu	ie Additional information				
	6	12		± 36.	Resistance value at 20°C [68°F]				
	Component check, MX Engine Brake solenoid valve cylinder 4 (L150) Preparation								
	• Key	the ignitio	n off						
		onnect cor		3461					
	• Mea	asure on w	ring har	ness cor	nector B461				
	Pin	Pin	-						
	/	/							
	(+ probe)	(- prob	e)	Valu	ue Additional information				



	Component check, MX Engine Brake solenoid valve cylinder 5 (L151)						
	Preparation						
	Key the ignition off						
	Disconnect connector B461						
	Measure on wiring harness connector B461						
	Pin Pin						
	(+ probe) (- probe) Value Additional information						
	5	11	± 36.5 Ω	Resistance value at 20°C [68°F]			
	Component check, MX Engine Brake solenoid valve cylinder 6 (L152) Preparation						
	-	the ignition off	D.4.C.1				
		onnect connecto		DAG4			
		_	arness connector	B461			
	Pin	Pin	Malina	A -			
	(+ probe)		Value	Additional information			
	6		± 36.5 Ω	Resistance value at 20°C [68°F]			
Possible causes				ic when it becomes available.			
Additional information Diagnostic Step-by-Step		l information av		ow using the breakout harness, if			
	ents, such as sensors, electrical control not recommended, as it could damage is be in the OFF position when components in order to reduce the ponents. It cors during the troubleshooting process ent information and pinout locations, ata. It code menu in DAVIE and run the lay a change in errors. It is errored in err						
	Step 1		Step ID 3405a	SRT			
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.						
	Step 2		Step ID 3405b	SRT			
	With key OFF, disconnect the pass-through connector located on the exter the engine. Turn the key ON, and measure the voltage between the signal on the encapsulated harness and a battery ground: • If the measured voltage is approximately 3.5 V – Proceed to step 3 • If the measured voltage is 0.0 V – Proceed to step 7						
	Step 3		Step ID 3405c	SRT			



With key OFF, disconnect the pass-through connector and measure the resistance between the ground terminal on the encapsulated harness and a battery ground:

- Closed circuit found Proceed to step 4.
- If open circuit or >100,000 ohms are found Proceed to step 8

Step 4 Step ID 3405d SRT

With key OFF, disconnect the signal connector circuit from the engine brake solenoid. Turn the key ON, and measure the voltage between the signal terminal connector and a battery ground:

- If the measured voltage is approximately 3.5 V Proceed to step 5.
- If the measured voltage is 0.0 V Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.

Step 5 Step ID 3405e SRT

With key OFF, disconnect the ground connector from the engine brake solenoid, and measure the resistance between the ground terminal wire and battery ground:

- Closed circuit found Proceed to step 6.
- If open circuit or >100,000 ohms are found Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.

Step 6 Step ID 3405f SRT

With key OFF, disconnect both connectors from the engine brake solenoid, and measure the resistance between the terminals on the solenoid (refer to your multimeter operation manual for the correct resistance test procedure).

- Closed circuit found Proceed to step 7.
- If open circuit or >100,000 ohms are found Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.

Step 7 Step ID 3405g SRT

With key OFF, disconnect the encapsulated harness at the PCI. Turn the key ON, and measure the voltage between the engine brake signal circuit terminal of the PCI and battery ground:

- If the measured voltage is approximately 3.5 V Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document.
- If the measured voltage is 0.0 V Proceed to step 9.

Step 8 Step ID 3405h SRT

With key OFF, disconnect the encapsulated harness at the PCI, and measure the resistance across the ground terminal on the PCI and a battery ground:

- Closed circuit found Replace the encapsulated harness. Proceed to the listed at the end of this document.
- If open circuit or >100,000 ohms are found Proceed to step 9

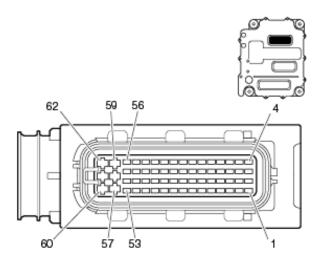
Step 9Step ID 3405iSRTPossible PCI failure – Contact the Engine Support Center for further instructions on



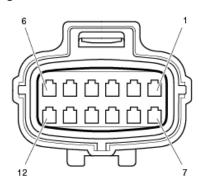
	replacing the PCI.
Verification Drive Cycle	To verify the repair: With DAVIE connected and key ON, clear the errors. Start the engine and let it idle to
	verify with DAVIE that the errors do not recur.
	Back to Choose Code
	Back to Index



Code number	P3407					
Fault code description	Engine brake solenoid valve Cylinder 1 - Voltage too low or short circuit to ground on					
radic code description	ECU D420 pin A17					
Fault code information	3 drive cycle recovery					
rault code illioillation	Readiness group – None					
	Freeze frame type – Comprehensive					
Description of component(s)	This information will be added to the diagnostic when it becomes available.					
Description of component(s)	This information will be added to the diagnostic when it becomes available.					
Location of component(s)	L147					
Diagnostic condition	This information will be added to the diagnostic when it becomes available.					
Set condition of fault code	This information will be added to the diagnostic when it becomes available.					
Reset condition of fault code	This information will be added to the diagnostic when it becomes available.					
Electrical diagram(s)	B460 D420 A17 A18 A16 A15 A24 A23 A21 A22 A13 A14 A20 A19 A 10 5 11 6 12 B461 L147 L148 L149 L150 L151 L152 401918					



Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view

B460 Connector cylinders 1-3

B461 Connector cylinders 4-6

D420 PCI ECU

L147 MX Engine Brake solenoid valve cylinder 1

L148 MX Engine Brake solenoid valve cylinder 2

L149 MX Engine Brake solenoid valve cylinder 3

L150 MX Engine Brake solenoid valve cylinder 4

L151 MX Engine Brake solenoid valve cylinder 5

L152 MX Engine Brake solenoid valve cylinder 6

MX Engine Brakes cylinder 1-3

D420	B460	L147	L148	L149	Function
A15	11		1		Ground
A16	5		1		Signal, MX Engine Brake solenoid valve
					cylinder 2
A17	4	1			Signal, MX Engine Brake solenoid valve
					cylinder 1
A18	10	1			Ground
A23	12			1	Ground
A24	6			1	Signal, MX Engine Brake solenoid valve cylinder 3



	_	rakes cylinder 4						
	D420 B46		.51 L152	Function				
	A13 13	1	1	Signal, MX Engine Brake solenoid valve				
			_	cylinder 5				
	A14 5		1	Ground				
	A19 4		1	Ground				
	A20 10)	1	Signal, MX Engine Brake solenoid valve cylinder 6				
	A21 12	2 1		Signal, MX Engine Brake solenoid valve cylinder 4				
	A22 6	1		Ground				
Technical data	Component	check, MX Engi	ne Brake sol	enoid valve cylinder 1 (L147)				
	Preparation	, 3		, , ,				
		the ignition off						
	•	onnect connect	or B460					
	• Mea	sure on wiring	harness con	nector B460				
	Pin	Pin						
	(+ probe)	(- probe)	Valu	e Additional information				
	4	10	± 36.5	Ω Resistance value at 20°C [68°F]				
	Key Disc	Disconnect connector B460						
	Pin	Pin						
	(+ probe)	(- probe)	Valu	e Additional information				
	5	11	± 36.5	Ω Resistance value at 20°C [68°F]				
	Component check, MX Engine Brake solenoid valve cylinder 3 (L149) Preparation							
	·	the ignition off						
	•	onnect connect	or B460					
		sure on wiring		nector B460				
	Pin	Pin	110111633 6011	nector B 100				
	(+ probe)	(- probe)	Valu	e Additional information				
	6	12	± 36.5					
			_ 50.5					
	Component check, MX Engine Brake solenoid valve cylinder 4 (L150) Preparation							
	• Key	the ignition off						
		onnect connect	or B461					
	• Mea	sure on wiring	harness con	nector B461				
	Pin	Pin						
	(+ probe)	(- probe)	Valu	e Additional information				
	4	10	± 36.5	Ω Resistance value at 20°C [68°F]				
				• •				



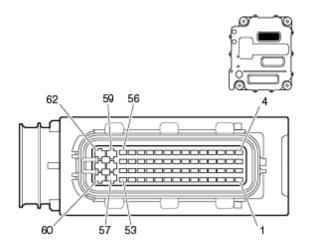
	Component check, MX Engine Brake solenoid valve cylinder 5 (L151)							
	Preparation							
	• Key	The state of the s						
	Disconnect connector B461							
	Measure on wiring harness connector B461							
	Pin Pin							
	(+ probe)	(+ probe) (- probe) Value Additional information						
	5	11	± 36.5 Ω	Resistance value at 20°C [68°F]				
	Component	check, MX Engin	e Brake solenoid	valve cylinder 6 (L152)				
	Preparation							
	Key t	the ignition off						
	• Disco	onnect connecto	r B461					
	• Mea	sure on wiring h	arness connector	B461				
	Pin	Pin						
	(+ probe)	(- probe)	Value	Additional information				
	6	12	± 36.5 Ω	Resistance value at 20°C [68°F]				
Possible causes	This informa	tion will be adde		ic when it becomes available.				
Additional information		I information av						
Diagnostic Step-by-Step				low using the breakout harness, if				
Jugitosiie step 27 step				ents, such as sensors, electrical control				
	<i>y</i> •	•	•	not recommended, as it could damage				
	Construction of the last of th			s be in the OFF position when				
		_	-	components in order to reduce the				
		_	to electrical com					
		nood of damage		ponental				
	Disconnecting the EAS connectors during the troubleshooting process							
			multiple errors.	0 · · · · · · · · · · · · · · · · · · ·				
	Ľ.		•	ent information and pinout locations,				
		•	to the technical o	•				
		•		code menu in DAVIE and run the				
			•	fy a change in errors.				
		_	_	erational or mechanical issues may be				
		the root caus	se of both active a	and inactive fault codes. Refer to the				
		'possible cau						
		·						
	Step 1		Step ID 3407a	SRT				
		pect all applicable	•	nt, broken, corroded or loose pins)				
		• • •	· · · · · · · · · · · · · · · · · · ·	bbing during each step of the				
			_					
	diagnostic procedure. Proceed to step 2.							
	Step 2		Step ID 3407b	SRT				
	· ·	FF. disconnect th	· · · · · · · · · · · · · · · · · · ·	onnector located on the exterior of				
				e voltage between the signal terminal				
	_			nector and a battery ground:				
				ately 3.5 V – Proceed to step 4.				
				ately above 0.0 V – Proceed to step 3.				
	- 11 (1	ic measured voi	tabe is approxime	actly above 0.0 v 110ccca to step 5.				
	Step 3		Step ID 3407c	SRT				
	archa		215h ID 34010	JIVI				



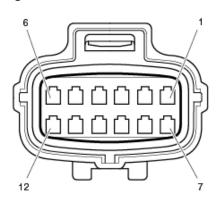
	With key OFF, disconnect the encapsulated harness at the PCI connector. Turn the key ON, and measure the voltage between the signal terminal of the PCI and a battery ground: • If the measured voltage is approximately 3.5 V – Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document. • If the measured voltage is approximately above 0.0 V – Proceed to step 5.						
	Step 4	Step ID 3407d	SRT				
	 With key OFF, disconnect the signal connector from the engine brake solenoid. Turn the key ON, and measure the voltage between the signal terminal wire and a battery ground: Measured voltage is approximately 3.5 V – Proceed to the verification procedure listed at the end of this document. If the measured voltage is approximately above 0.0 V – Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document. 						
	Step 5	Step ID 3407e	SRT				
	Possible PCI failure – Contact the Engine Support Center for further instructions on replacement of the PCI.						
Verification Drive Cycle	To validate the repair: With DAVIE connected and the key ON, clear the errors. Start the engine and let it idle						
		to verify with DAVIE that the errors do not recur.					
			Back to Choose Code				
			Back to Index				



Code number	P3408						
Fault code description	Engine brake solenoid valve Cylinder 1 - Voltage too high or short circuit to supply on						
,	ECU D420 pin A17						
Fault code information	1 trip red fault lamp						
	3 drive cycle recovery						
	Readiness group – None						
	Freeze frame type – Comprehensive						
Description of component(s)	This information will be added to the diagnostic when it becomes available.						
Location of component(s)	This information will be added to the diagnostic when it becomes available.						
	L147						
Diagnostic condition	This information will be added to the diagnostic when it becomes available.						
Set condition of fault code	This information will be added to the diagnostic when it becomes available.						
Reset condition of fault code	This information will be added to the diagnostic when it becomes available.						
Electrical diagram(s)	, , , , , , , , , , , , , , , , , , ,						
	D420 A17 A18 A16 A15 A24 A23 A21 A22 A13 A14 A20 A19 4 10 5 11 6 12 B460 L147 L148 L140 L150 L151 L152						



Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view

B460 connector cylinders 1-3

B461 connector cylinders 4-6

D420 PCI ECU

L147 MX Engine Brake solenoid valve cylinder 1

L148 MX Engine Brake solenoid valve cylinder 2

L149 MX Engine Brake solenoid valve cylinder 3

L150 MX Engine Brake solenoid valve cylinder 4

L151 MX Engine Brake solenoid valve cylinder 5

L152 MX Engine Brake solenoid valve cylinder 6

MX Engine Brakes cylinder 1-3

	O	,			
D420	B460	L147	L148	L149	Function
A15	11		1		Ground
A16	5		1		Signal, MX Engine Brake solenoid valve
					cylinder 2
A17	4	1			Signal, MX Engine Brake solenoid valve
					cylinder 1
A18	10	1			Ground
A23	12			1	Ground
A24	6			1	Signal, MX Engine Brake solenoid valve
					cylinder 3



	MX Engine B	MX Engine Brakes cylinder 4-6						
	D420 B46	0 L150 L1	51 L152	Function				
	A13 11	. <u>-</u>	1	Signal, MX Engine Brake solenoid valve cylinder 5				
	A14 5	-	1	Ground				
	A19 4		1	Ground				
	A20 10)	1	Signal, MX Engine Brake solenoid valve cylinder 6				
	A21 12	1		Signal, MX Engine Brake solenoid valve cylinder 4				
	A22 6	1		Ground				
echnical data	Component of Preparation	Component check, injector solenoid valve cylinder 1 (L147) Preparation						
	• Key t	the ignition off	:					
	• Disco	onnect connec	tor B460.					
	• Mea	sure on wiring	harness cor	nector B460.				
	Pin	Pin						
	(+ probe)	(- probe)	Value	Condition				
	4	10	± 38.5 Ω	Resistance value at 20°C [68°F]				
	Preparation • Key t	Key the ignition off.						
		Disconnect connector B460.Measure on wiring harness connector B460.						
	Pin							
	(+ probe)	(- probe)	Value	Condition				
	5	11	± 38.5 Ω	Resistance value at 20°C [68°F]				
	Component of Preparation	Component check, injector solenoid valve cylinder 3 (L149) Preparation						
	• Key t	Key the ignition off.						
	• Disco	Disconnect connector B460.						
	• Mea	 Measure on wiring harness connector B460. 						
	Pin	Pin						
	(+ probe)	(- probe)	Value	Condition				
	6	12	± 38.5 Ω	Resistance value at 20°C [68°F]				
	Component check, injector solenoid valve cylinder 4 (L150) Preparation							
	• Key t	Key the ignition off.						
		Disconnect connector B461.						
	• Mea	 Measure on wiring harness connector B461. 						
	Pin	Pin Pin						
	(+ probe)	(- probe)	Value	Condition				
				Resistance value at 20°C [68°F]				



	Component check, injector solenoid valve cylinder 5 (L151)				
	Preparation				
	Key the ignition off.				
	 Disconnect connector B461. 				
				or R/61	
	Measure on wiring harness connector B461. Big. Big. Big. Big. Big. Big. Big. Big.				
	Pin Pin				
	(+ probe)		Value	Condition	
	5	11	± 38.5 Ω	Resistance value at 20°C [68°F]	
	Component check, injector solenoid valve cylinder 1 (L152)				
	Preparation				
	Key the ignition off.				
	Disconnect connector B461.				
	 Disconnect connector B461. Measure on wiring harness connector B461. 				
	Pin	Pin	marriess connect	.or b401.	
	(+ probe)		Malina	Condition	
		• •	Value	Condition	
	6	12	± 38.5 Ω	Resistance value at 20°C [68°F]	
Possible causes				ostic when it becomes available.	
Additional information Diagnostic Step-by-Step		al information a		below using the breakout harness, if	
	necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as it could damage the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components. Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors. For specific electrical component information and pinout locations, always refer to the technical data. It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 'possible causes' section.				
	Step 1		Step ID 3408a	SRT	
	Visual inspection - Visually inspect all applicable connectors and harnesses for				
	corrosion, damage and rubbing during each step of the diagnostic procedure. Proceed to step 2. Step 2 Step ID 3408b SRT				
	With key OFF, disconnect the pass-through connector located on the exterior of				
	the engine. Turn the key ON and measure the voltage between the signal on the encapsulated harness side of the connector and a battery ground: If the measured voltage is approximately 3.5 V – Proceed to step If the measured voltage is approximately 4.75 V – Proceed to step				

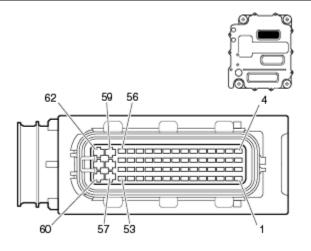


	Step 3	Step ID 3408c	SRT				
	With key OFF, disconnect the encapsulated harness at the PCI connector. Turn the						
	key ON, and measure the voltage between the signal terminal of the PCI and a						
	 battery ground: If the measured voltage is approximately 3.5 V – Replace the encapsulated 						
	harness. Pro	harness. Proceed to the verification procedure listed at the end of this document.					
	document.						
	If the measu	 If the measured voltage is approximately 4.75 V – Proceed to step 5. 					
	Step 4	Step ID 3408d	SRT				
		_	m the engine brake solenoid.				
		d measure the voltage betwee	en the signal terminal wire and a				
	battery ground:						
		If the measured voltage is approximately 3.5 V – Proceed to the					
	 verification procedure listed at the end of this document. If the measured voltage is approximately 4.75 V – Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document. 						
	Cton F	Cton ID 24000	SRT				
	Step 5	Step ID 3408e					
	Possible PCI failure - Contact the Engine Support Center for further instructions						
Verification Drive Cycle	about replacing the PCI.						
vernication brive cycle	To validate the repair:						
	With DAVIE connected and the key ON, clear the errors. Start the engine and let it idle to verify with DAVIE that the errors do not recur.						
	to verify with DAVIE ti	iat the entris do not recur.	Back to Choose Code				
	Back to Index						
			<u>back to muck</u>				

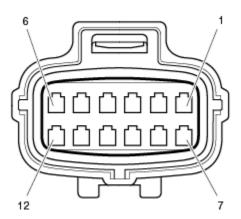


Code number	P3413		
Fault code description	Engine brake solenoid valve Cylinder 2 – current too low or open circuit on ECU D420		
l dans doub description	pin A16		
Fault code information	3 drive cycle recovery		
Tuut coue imormation	Readiness group – None		
	Freeze frame type – Comprehensive		
Description of component(s)	This information will be added to the diagnostic when it becomes available.		
Location of component(s)	This information will be added to the diagnostic when it becomes available.		
Location of component(s)	1.140		
	L148		
Diagnostic condition	This information will be added to the diagnostic when it becomes available.		
Set condition of fault code	This information will be added to the diagnostic when it becomes available.		
Reset condition of fault code	This information will be added to the diagnostic when it becomes available.		
Electrical diagram(s)			
	D420 A17 A18 A16 A15 A24 A23 A21 A22 A13 A14 A20 A19 4 10 5 11 6 12 B460 B461 L147 L148 L140 L150 L151 L152 J401918		





Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view

B460	connector cylinders 1-3
B461	connector cylinders 4-6
D420	PCI ECU
L147	MX Engine Brake solenoid valve cylinder 1
L148	MX Engine Brake solenoid valve cylinder 2
L149	MX Engine Brake solenoid valve cylinder 3
L150	MX Engine Brake solenoid valve cylinder 4
L151	MX Engine Brake solenoid valve cylinder 5
L152	MX Engine Brake solenoid valve cylinder 6

D420	B460	L147	L148	L149	Function
A15	11		1		Ground
A16	5		1		Signal, MX Engine Brake solenoid valve cylinder 2
A17	4	1			Signal, MX Engine Brake solenoid valve cylinder 1
A18	10	1			Ground
A23	12			1	Ground
A24	6			1	Signal, MX Engine Brake solenoid valve cylinder 3



D420 B461 L150 L151 L152 Function A13 5 1 Signal, MX Engine Brake solenoid valve cylinder 5 A14 11 1 Ground A19 12 1 Ground A20 6 1 Signal, MX Engine Brake solenoid valve cylinder 6 A21 4 1 Signal, MX Engine Brake solenoid valve cylinder 6 A21 5 Signal, MX Engine Brake solenoid valve cylinder 4 A22 10 1 Ground Component check, MX Engine Brake solenoid valve cylinder 1 (L147) Preparation • Key the ignition off • Disconnect connector B460 • Measure on wiring harmess connector B460 Pin Pin (+ probe) (- probe) Value Additional information • Key the ignition off • Disconnect connector B460 Pin Pin (+ probe) (- probe) Value Additional information • Key the ignition off • Disconnect connector B460 Pin Pin (+ probe) (- probe) Value Additional information 5 11 ± 36.5 Ω Resistance value at 20°C [68°F] Component check, MX Engine Brake solenoid valve cylinder 3 (L149) Preparation • Key the ignition off • Disconnect connector B460 Pin Pin (+ probe) (- probe) Value Additional information • Key the ignition off • Disconnect connector B460 Pin Pin (+ probe) (- probe) Value Additional information • Key the ignition off • Disconnect connector B460 Pin Pin (+ probe) (- probe) Value Additional information • Key the ignition off • Disconnect connector B460 Pin Pin (+ probe) (- probe) Value Additional information • Key the ignition off • Disconnect connector B461 • Measure on wiring harness connector B461 Pin Pin (+ probe) (- probe) Value Additional information • Key the ignition off • Disconnect connector B461 • Measure on wiring harness connector B461 Pin Pin (+ probe) (- probe) Value Additional information • Key the ignition off • Disconnect connector B461 • Measure on wiring harness connector B461 Pin Pin (+ probe) (- probe) Value Additional information		MX Engine Brakes cylinder 4-6						
A13 5 1 Signal, MX Engine Brake solenoid valve cylinder 5 A14 1 1 1 Ground A20 6 1 Signal, MX Engine Brake solenoid valve cylinder 6 A21 4 1 Signal, MX Engine Brake solenoid valve cylinder 4 A22 10 1 Ground Component check, MX Engine Brake solenoid valve cylinder 4 A22 10 1 Ground Component check, MX Engine Brake solenoid valve cylinder 1 (L147) Preparation • Key the ignition off • Disconnect connector B460 • Measure on wiring harness connector B460 Pin Pin (+ probe) (- probe) Value Additional information 4 10 ± 36.5 Ω Resistance value at 20°C [68°F] Component check, MX Engine Brake solenoid valve cylinder 2 (L148) Preparation • Key the ignition off • Disconnect connector B460 • Measure on wiring harness connector B460 Pin Pin (+ probe) (- probe) Value Additional information 5 11 ± 36.5 Ω Resistance value at 20°C [68°F] Component check, MX Engine Brake solenoid valve cylinder 3 (L149) Preparation • Key the ignition off • Disconnect connector B460 Pin Pin (+ probe) (- probe) Value Additional information 6 Disconnect connector B460 Pin Pin (+ probe) (- probe) Value Additional information 6 12 ± 36.5 Ω Resistance value at 20°C [68°F] Component check, MX Engine Brake solenoid valve cylinder 4 (L150) Preparation • Key the ignition off • Disconnect connector B461 Pin Pin (+ probe) (- probe) Value Additional information • Key the ignition off • Disconnect connector B461 Pin Pin (+ probe) (- probe) Value Additional information • Key the ignition off • Disconnect connector B461 Pin Pin (+ probe) (- probe) Value Additional information		D420 B461 L150 L151 L152 Function						
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A19 12 1 Ground A20 6 1 Signal, MX Engine Brake solenoid valve cylinder 6 A21 4 1 Ground Technical data Component check, MX Engine Brake solenoid valve cylinder 4 A22 10 1 Ground Technical data Component check, MX Engine Brake solenoid valve cylinder 1 (L147) Preparation • Key the ignition off • Disconnect connector 8460 • Measure on wiring harness connector 8460 Pin Pin (+ probe) (- probe) Value Additional information 4 10 ± 36.5 Ω Resistance value at 20°C [68°F] Component check, MX Engine Brake solenoid valve cylinder 2 (L148) Preparation • Key the ignition off • Disconnect connector 8460 Pin Pin (+ probe) (- probe) Value Additional information 5 11 ± 36.5 Ω Resistance value at 20°C [68°F] Component check, MX Engine Brake solenoid valve cylinder 3 (L149) Preparation • Key the ignition off • Disconnect connector 8460 Pin Pin (+ probe) (- probe) Value Additional information 6 Disconnect connector 8460 Pin Pin (+ probe) (- probe) Value Additional information 6 12 ± 36.5 Ω Resistance value at 20°C [68°F] Component check, MX Engine Brake solenoid valve cylinder 4 (L150) Preparation • Key the ignition off • Disconnect connector 8461 Pin Pin (+ probe) (- probe) Value Additional information • Key the ignition off • Disconnect connector 8461 Pin Pin (+ probe) (- probe) Value Additional information • Key the ignition off • Disconnect connector 8461 Pin Pin (+ probe) (- probe) Value Additional information		,						
A20 6 1 Signal, MX Engine Brake solenoid valve cylinder 6 A21 4 1 Signal, MX Engine Brake solenoid valve cylinder 4 A22 10 1 Ground Component check, MX Engine Brake solenoid valve cylinder 1 (L147) Preparation • Key the ignition off • Disconnect connector B460 • Measure on wiring harness connector B460 Pin Pin (+ probe) (- probe) Value Additional information 4 10 ± 36.5 Ω Resistance value at 20°C [68°F] Component check, MX Engine Brake solenoid valve cylinder 2 (L148) Preparation • Key the ignition off • Disconnect connector B460 Pin Pin (+ probe) (- probe) Value Additional information 5 11 ± 36.5 Ω Resistance value at 20°C [68°F] Component check, MX Engine Brake solenoid valve cylinder 3 (L149) Preparation • Key the ignition off • Disconnect connector B460 Pin Pin (+ probe) (- probe) Value Additional information 6 Ley the ignition off • Disconnect connector B460 Pin Pin (+ probe) (- probe) Value Additional information 6 12 ± 36.5 Ω Resistance value at 20°C [68°F] Component check, MX Engine Brake solenoid valve cylinder 4 (L150) Preparation • Key the ignition off • Disconnect connector B461 • Measure on wiring harness connector B461 Pin Pin (+ probe) (- probe) Value Additional information • Key the ignition off • Disconnect connector B461 • Measure on wiring harness connector B461 Pin Pin (+ probe) (- probe) Value Additional information								
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4 10 ± 36.5 Ω Resistance value at 20°C [68°F]								
Component check, MX Engine Brake solenoid valve cylinder 5 (L151)		4 10 \pm 36.5 Ω Resistance value at 20°C [68°F]						
Preparation								



	Key the ignition off			
	Disconnect connector B461			
	Measure on wiring harness connector B461			
	Pin Pin			
	(+ probe) (- probe) Value Additional information			
	5 11 ± 36.5 Ω Resistance value at 20°C [68°F]			
	Component check, MX Engine Brake solenoid valve cylinder 6 (L152)			
	Preparation			
	Key the ignition off			
	Disconnect connector B461			
	Measure on wiring harness connector B461			
	Pin Pin			
	(+ probe) (- probe) Value Additional information			
	6 12 ± 36.5 Ω Resistance value at 20°C [68°F]			
Possible causes	This information will be added to the diagnostic when it becomes available.			
Additional information	No additional information available.			
Diagnostic Step-by-Step	Perform the troubleshooting steps below using the breakout harness, if			
	necessary, to check electrical components, such as sensors, electrical control			
	units, and harnesses. Back probing is not recommended, as it could damage			
	the harness. The ignition should always be in the OFF position when			
	connecting or disconnecting electrical components in order to reduce the			
	likelihood of damage to electrical components.			
	Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors.			
	 will result in multiple errors. For specific electrical component information and pinout locations, 			
	always refer to the technical data.			
	It is necessary to exit the fault code menu in DAVIE and run the			
	diagnostic test again to identify a change in errors.			
	Remember that the truck's operational or mechanical issues may be			
	the root cause of both active and inactive fault codes. Refer to the			
	'possible causes' section.			
	Step 1 Step ID 3413a SRT			
	Visual inspection - Visually inspect all applicable connectors and harnesses for			
	corrosion, damage and rubbing during each step of the diagnostic procedure.			
	Proceed to step 2.			
	Step 2 Step ID 3413b SRT			
	With key OFF, disconnect the pass-through connector located on the exterior of			
	the engine. Turn the key ON, and measure the voltage between the signal terminal			
	on the encapsulated harness and a battery ground:			
	• If the measured voltage is approximately 3.5 V – Proceed to step 3.			
	If the measured voltage is 0.0 V – Proceed to step 7.			
	Step 3 Step ID 3413c SRT			
	With key OFF, disconnect the pass-through connector and measure the resistance			
	between the ground terminal on the encapsulated harness and a battery ground:			
	Closed circuit found – Proceed to step 4.			
	• If open circuit or >100,000 ohms are found – Proceed to step 8.			



Step 4 Step ID 3413d SRT

With key OFF, disconnect the signal connector circuit from the engine brake solenoid. Turn the key ON, and measure the voltage between the signal terminal connector and a battery ground:

- If the measured voltage is approximately 3.5 V Proceed to step 5.
- If the measured voltage is 0.0 V Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.

Step 5 Step ID 3413e SRT

With key OFF, disconnect the ground connector from the engine brake solenoid, and measure the resistance between the ground terminal wire and battery ground:

- Closed circuit found Proceed to step 6.
- If open circuit or >100,000 ohms are found Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.

Step 6 Step ID 3413f SRT

With key OFF, disconnect both connectors from the engine brake solenoid, and measure the resistance between the terminals on the solenoid (refer to your multimeter operation manual for the correct resistance test procedure).

- Closed circuit found Proceed to step 7.
- If open circuit or >100,000 ohms are found Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.

Step 7 Step ID 3413g SRT

With key OFF, disconnect the encapsulated harness at the PCI. Turn the key ON, and measure the voltage between the engine brake signal circuit terminal of the PCI and battery ground:

- If the measured voltage is approximately 3.5 V Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document.
- If the measured voltage is 0.0 V Proceed to step 9.

Step 8 Step ID 3413h SRT

With key OFF, disconnect the encapsulated harness at the PCI, and measure the resistance across the ground terminal on the PCI and a battery ground:

- Closed circuit found Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document.
- If open circuit or >100,000 ohms are found Proceed to step 9.

Step 9 Step ID 3413i SRT

Possible PCI failure – Contact the Engine Support Center for further instructions on replacing the PCI.

Verification Drive Cycle

To validate the repair:

With DAVIE connected and key ON, clear the errors. Start the engine and let it idle to verify with DAVIE that the errors do not recur.

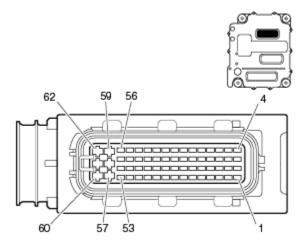


Back to Choose Code
Back to Index

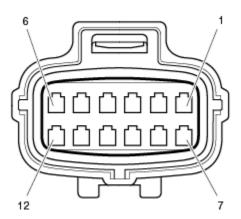


Code number	P3415		
	Engine brake solenoid valve Cylinder 2 – Voltage too low or short circuit to ground on		
Fault code description	ECU D420 pin A16		
E. D. and C. C. and C. C.			
Fault code information	3 drive cycle recovery		
	Readiness group – None		
	Freeze frame type – Comprehensive		
Description of component(s)	This information will be added to the diagnostic when it becomes available.		
Location of component(s)	L148		
Diagnostic condition	This information will be added to the diagnostic when it becomes available.		
Set condition of fault code	This information will be added to the diagnostic when it becomes available.		
Reset condition of fault code			
Electrical diagram(s)	This information will be added to the diagnostic when it becomes available.		
	D420 A17 A18 A16 A15 A24 A23 A21 A22 A13 A14 A20 A19 4 10 5 11 6 12 B460 B461 L147 L148 L149 L150 L151 L152 A01918		





Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view

B460	connector cylinders 1-3
B461	connector cylinders 4-6
D420	PCI ECU
L147	MX Engine Brake solenoid valve cylinder 1
L148	MX Engine Brake solenoid valve cylinder 2
L149	MX Engine Brake solenoid valve cylinder 3
L150	MX Engine Brake solenoid valve cylinder 4
L151	MX Engine Brake solenoid valve cylinder 5
L152	MX Engine Brake solenoid valve cylinder 6

D420 B460 L147 L148 L149 Function	
A15 11 1 Ground	
A16 5 1 Signal, MX Engine Brake solenoid valve cylinder	2
A17 4 1 Signal, MX Engine Brake solenoid valve cylinder	1
A18 10 1 Ground	
A23 12 1 Ground	
A24 6 1 Signal, MX Engine Brake solenoid valve cylinder	3



D420 B461 L150 L151 L152 Function A13 5 1 Signal, MX Engine Brake s A14 11 1 Ground A19 12 1 Ground A20 6 1 Signal, MX Engine Brake s A21 4 1 Signal, MX Engine Brake s A22 10 1 Ground Technical data Component check, MX Engine Brake solenoid valve cylinder Preparation Key the ignition off Disconnect connector B460 Measure on wiring harness connector B460 Pin Pin	colenoid valve cylinder 6 colenoid valve cylinder 4 er 1 (L147)					
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Component check, MX Engine Brake solenoid valve cylinde Preparation	er 5 (L151)					



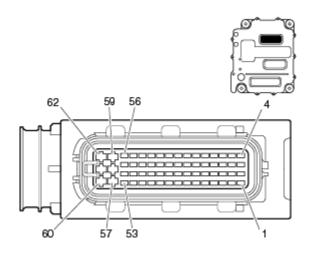
Disconnect connector B461 • Measure on wiring harness connector B461 Pin Pin (+ probe) (- probe) Value Additional information 5 11 ± 36.5 Ω Resistance value at 20°C [68°F] Component check, MX Engine Brake solenoid valve cylinder 6 (L152) Preparation • Key the ignition off • Disconnect connector B461 • Measure on wiring harness connector B461 Pin Pin (+ probe) (- probe) Value Additional information 6 12 ± 36.5 Ω Resistance value at 20°C [68°F] Possible causes This information will be added to the diagnostic when it becomes available. No additional information Diagnostic Step-by-Step Perform the troubleshooting steps below using the breakout harness, if necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as it could damage the harness. The lignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components in order to reduce the likelihood of damage to electrical components. • Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors. • For specific electrical component information and pinout locations, always refer to the technical data. • It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. • Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 'possible causes' section. Step 1 Step ID 3415a SRT Visual inspection - Visually inspect all applicable connectors and harnesses for corrosion, damage and rubbing during each step of the diagnostic procedure. Proceed to step 2. Step 2 Step ID 3415b SRT With key OFF, disconnect the pass-through connector located on the exterior of the engine. Turn the key ON and measure the voltage between the signal terminal on the encapsulated harness side of the connector and a battery ground: •		Key the ignition off		
• Measure on wiring harness connector B461 Pin Pin (+ probe) (- probe) (- probe) Value Additional information 5 11 ± 36.5 Ω Resistance value at 20°C [68°F] Component check, MX Engine Brake solenoid valve cylinder 6 (L152) Preparation • Key the ignition off • Disconnect connector B461 • Measure on wiring harness connector B461 Pin Pin (+ probe) (- probe) Value Additional information 6 12 ± 36.5 Ω Resistance value at 20°C [68°F] Possible causes Additional information wallable. Perform the troubleshooting steps below using the breakout harness, if necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as it could damage the harness. The lignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components. • Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors. • Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors. • For specific electrical components in order to reduce the diagnostic test again to identify a change in errors. • For specific electrical component information and pinout locations, always refer to the technical data. • It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. • Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the elviosible causes' section. Step 1 Step 1D 3415a SRT Visual inspection - Visually inspect all applicable connectors and harnesses for cornosion, damage and rubbing during each step of the diagnostic procedure. Proceed to step 2. Step 2 Step 1D 3415b SRT With key OFF, disconnect the pass-through connector located on the exterior of the engine. Turn the key ON and measure the voltage between the signal terminal on the encapsulated harness side of the connect				
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Step 3 Step ID 3415c SRT		The measured voltage is approximately above 0.0 v - Froteed to step 5.		
		Sten 3 Sten ID 3415c SRT		
With key OFF, disconnect the encapsulated harness at the PCI connector. Turn the				
key ON, and measure the voltage between the signal terminal of the PCI and a				
battery ground:				
If the measured voltage is approximately 3.5 V – Replace the encapsulated				



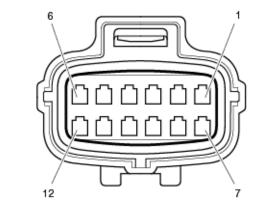
	harness. Proceed to the verification procedure listed at the end of this document. • If the measured voltage is approximately above 0.0 V – Proceed to step 5.		
	Step 4	Step ID 3415d	SRT
	 With key OFF, disconnect the signal connector from the engine brake solenoid. Turn the key ON, and measure the voltage between the signal terminal wire and a battery ground: If the measured voltage is approximately 3.5 V – Proceed to the verification procedure listed at the end of this document. If the measured voltage is approximately above 0.0 V – Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document. 		
	Step 5	Step ID 3415e	SRT
	Possible PCI failureplacing the PC		Center for further instructions on
Verification Drive Cycle		ected and key ON, clear the erro that the errors do not recur.	rs. Start the engine and let it idle to
			Back to Choose Code
			Back to Index



Code number	P3416		
Fault code description	Engine brake solenoid valve Cylinder 2 - Voltage too high or short circuit to supply on		
i auit coue description	ECU D420 pin A16		
Fault code information			
rauit coue information	1 trip MIL		
	3 drive cycle recovery		
	Readiness group – None		
Description of the second (Freeze frame type – Comprehensive		
Description of component(s)	This information will be added to the diagnostic when it becomes available.		
Location of component(s)	L148		
Diagnostic condition	This information will be added to the diagnostic when it becomes available.		
Set condition of fault code	This information will be added to the diagnostic when it becomes available.		
Reset condition of fault code	This information will be added to the diagnostic when it becomes available.		
Electrical diagram(s)			
	D420 A17 A18 A16 A15 A24 A23 A21 A22 A13 A14 A20 A19 4 10 5 11 6 12 B460 L147 L148 L149 L150 L151 L152		



Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view

B460 connector cylinders 1-3

B461 connector cylinders 4-6

D420 PCI ECU

L147 MX Engine Brake solenoid valve cylinder 1

L148 MX Engine Brake solenoid valve cylinder 2

L149 MX Engine Brake solenoid valve cylinder 3

L150 MX Engine Brake solenoid valve cylinder 4

L151 MX Engine Brake solenoid valve cylinder 5

L152 MX Engine Brake solenoid valve cylinder 6

D420	B460	L147	L148	L149	Function
A15	11		1		Ground
A16	5		1		Signal, MX Engine Brake solenoid valve cylinder 2
A17	4	1			Signal, MX Engine Brake solenoid valve cylinder 1
A18	10	1			Ground
A23	12			1	Ground
A24	6			1	Signal, MX Engine Brake solenoid valve



	1					
						cylinder 3
	_		kes cylir			
	D420		L150		L152	Function
	A13	11		1		Signal, MX Engine Brake solenoid valve
		_		4		cylinder 5
	A14	5		1		Ground
	A19	4			1	Ground
	A20	10			1	Signal, MX Engine Brake solenoid valve cylinder 6
	A21	12	1			Signal, MX Engine Brake solenoid valve cylinder 4
	A22	6	1			Ground
Technical data	Compo	nent ch	neck, MX	Engine	e Brake s	solenoid valve cylinder 1 (L147)
	Prepara		,	0		()
	•	Key th	e ignitio	n off		
	•	Discor	nect co	nnecto	r B460	
	•	Measu	ire on w	iring ha	arness co	onnector B460
	Pir		Pin			
		be) ((- probe)		/alue	Additional information
	4		10	± 3	36.5 Ω	Resistance value at 20°C [68°F]
	Prepara • • • Pir	Key th Discor Measu	e ignitio nnect co ure on w Pin	nnecto		onnector B460
	(+ pro		(- probe	٠١	Value	Additional information
	(+ pro	ibe)	11		: 36.5 Ω	
		nent ch				solenoid valve cylinder 3 (L149)
	Prepara •		e ignitio	n off		
	•		nect co		r B460	
	•	Measu	ire on w	iring ha	arness co	onnector B460
	Pir	1	Pin			
	(+ pro	be)	(- probe	•	Value	Additional information
	6		12	±	36.5 Ω	Resistance value at 20°C [68°F]
	Compo Prepara	ation			e Brake s	solenoid valve cylinder 4 (L150)
	•	-	e ignitio		. D.4C4	
	•		nect co			own actor DAC1
	D:			iring na	arness co	onnector B461
	Pir (+ pro		Pin (- probe	, ,	Value	Additional information
	4	Jej	10		36.5 Ω	Resistance value at 20°C [68°F]
	-		10	<u> -</u>	30.3 12	



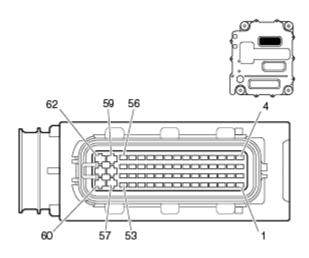
	Component check, MX Engine Brake solenoid valve cylinder 5 (L151)							
	Preparation							
	Key t	the ignition o	ff					
	• Disco	onnect conne	ector B461					
	• Mea	sure on wirin	g harness cor	nnector B461				
	Pin	Pin						
	(+ probe)	(- probe)	Value	Additional information				
	5	11	± 36.5 Ω	Resistance value at 20°C [68°F]				
		check, MX En	gine Brake so	olenoid valve cylinder 6 (L152)				
	Preparation							
	-	the ignition o						
		onnect conne						
			g harness cor	nnector B461				
	Pin	Pin						
	(+ probe)	(- probe)	Value	Additional information				
	6	12	± 36.5 Ω	Resistance value at 20°C [68°F]				
Possible causes	Faulty w	iring						
	Faulty co	nnector						
	Faulty so	lenoid valve						
Additional information	-		dded to the d	iagnostic when it becomes available.				
Diagnostic Step-by-Step				teps below using the breakout harness, if				
	units harn disco	ess. The ignit onnecting ele age to electri Disconne will result For specif always re It is neces diagnosti Remembe	ses. Back prolicion should alvertical composite components of the EAS to the tector of	connectors during the troubleshooting process errors. omponent information and pinout locations, hnical data. he fault code menu in DAVIE and run the pidentify a change in errors. uck's operational or mechanical issues may be the ve and inactive fault codes. Refer to the 'possible or mechanical inactive fault codes.				
				applicable connectors and harnesses for				
	corrosion, o	•	ubbing during	g each step of the diagnostic procedure.				
	Step 2		Step ID 3	416b SRT				
		FF. disconnec		rough connector located on the exterior of				
	the engine. on the enca • Me	Turn the key apsulated har asured voltag	ON and mea ness side of t ge is approxin	sure the voltage between the signal terminal he connector and a battery ground: nately 3.5 V – Proceed to step 4. nately 4.75 V – Proceed to step 3.				
			2 12 2-1	,				



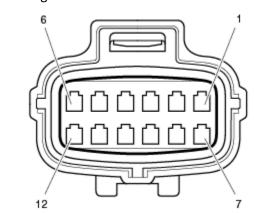
	Step 3	Step ID 3416c	SRT						
	With key OFF, disconne	ct the encapsulated harn	ess at the PCI connector. Turn the						
	key ON and measure th	key ON and measure the voltage between the signal terminal of the PCI and a							
	battery ground:								
		•	– Replace the encapsulated						
	harness. Proceed document.	harness. Proceed to the verification procedure listed at the end of this document.							
	Measured volta	ge is approximately 4.75	V – Proceed to step 5.						
	Step 4	Step ID 3416d	SRT						
	1 I	_	om the engine brake solenoid.						
	1 1	easure the voltage betwe	en the signal terminal wire and a						
	battery ground:								
		ige is approximately 3.5 V d at the end of this docun	Proceed to the verification nent.						
			e 4.75 V – Replace the pass-						
	through harnes this document.	s. Proceed to the verificat	tion procedure listed at the end of						
	Step 5	Step ID 3416e	SRT						
	Possible PCI failure - Co about replacing the PCI	Possible PCI failure - Contact the Engine Support Center for further instructions about replacing the PCI.							
Verification Drive Cycle	To validate the repair:		·						
	With DAVIE connected a	nd key ON, clear the erro	rs. Start the engine and let it idle to						
	verify with DAVIE that th	e errors do not recur.							
			Back to Choose Code						
			<u>Back to Index</u>						



Code number	P3421								
Fault code description	Engine brake solenoid valve Cylinder 3 - Current too low or open circuit on ECU D420								
•	pin A24								
Fault code information	3 drive cycle recovery								
	Readiness group – None								
	Freeze frame type – Comprehensive								
Description of component(s)	This information will be added to the diagnostic when it becomes available.								
Location of component(s)									
,	L149								
Diagnostic condition	This information will be added to the diagnostic when it becomes available.								
Set condition of fault code	This information will be added to the diagnostic when it becomes available.								
Reset condition of fault code	This information will be added to the diagnostic when it becomes available.								
Electrical diagram(s)									
	D420 A17 A18 A16 A15 A24 A23 A21 A22 A13 A14 A20 A19 4 10 5 11 6 12 B460 B461 L147 L148 L149 L150 L151 L152								



Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view

B460 connector cylinders 1-3

B461 connector cylinders 4-6

D420 PCI ECU

L147 MX Engine Brake solenoid valve cylinder 1

L148 MX Engine Brake solenoid valve cylinder 2

L149 MX Engine Brake solenoid valve cylinder 3

L150 MX Engine Brake solenoid valve cylinder 4

L151 MX Engine Brake solenoid valve cylinder 5

L152 MX Engine Brake solenoid valve cylinder 6

D420	B460	L147	L148	L149	Function
A15	11		1		Ground
A16	5		1		Signal, MX Engine Brake solenoid valve
					cylinder 2
A17	4	1			Signal, MX Engine Brake solenoid valve
					cylinder 1
A18	10	1			Ground
A23	12			1	Ground
A24	6			1	Signal, MX Engine Brake solenoid valve
					cylinder 3



	<u> </u>							
	MX Engine Brak	as cylinda	ar 1-6					
	_	-	.151 L152	Function				
	A13 11	1		Signal, MX Engine Brake solenoid valve				
	7.13	_	-	cylinder 5				
	A14 5	1	[Ground				
	A19 4		1	Ground				
	A20 10		1	Signal, MX Engine Brake solenoid valve				
				cylinder 6				
	A21 12	1		Signal, MX Engine Brake solenoid valve				
				cylinder 4				
	A22 6	1		Ground				
Technical data	Component che	ck, MX Er	ngine Brake	solenoid valve cylinder 1 (L147)				
	Preparation							
	 Key the 	ignition o	off					
	 Disconn 	ect conn	ector B460					
	 Measure 	e on wirir	ng harness o	connector B460				
	Pin	Pin						
	(+ probe) (-	probe)	Value					
	4	10	± 36.5 Ω	Resistance value at 20°C [68°F]				
	Component check, MX Engine Brake solenoid valve cylinder 2 (L148)							
	Preparation							
	Key the ignition off Property of the PAGE							
	Disconnect connector B460							
	Measure on wiring harness connector B460 Big. Big. Big. Big. Big. Big. Big. Big.							
	Pin Pin							
	' ' ' '	probe)	Value					
	5	11	± 30.5 \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Resistance value at 20°C [68°F]				
	Component check, MX Engine Brake solenoid valve cylinder 3 (L149)							
	Preparation							
		ignition off						
	Key the ignition offDisconnect connector B460							
				connector B460				
	Pin	Pin	ing mariness c	Somector B400				
		probe)	Value	Additional information				
	6	12	± 36.5 Ω	Resistance value at 20°C [68°F]				
			_ 00.0 11	,				
	Component check, MX Engine Brake solenoid valve cylinder 4 (L150)							
	Preparation	,	Ü	, , ,				
	· ·	ignition o	off					
	-	_	ector B461					
				connector B461				
	Pin	Pin	5					
		probe)	Value	Additional information				
	4	10	± 36.5 Ω					
	Component che	ck, MX Er	ngine Brake	solenoid valve cylinder 5 (L151)				



	1_	Description						
	Preparation							
		he ignition (
		nnect conn						
			ng harness	connector B462	-			
	Pin	Pin						
	(+ probe)	(- probe)	Value	Additional inf				
	5	11	± 36.5 Ω	Resistance va	lue at 20°C [68°F]			
	Component of	heck, MX E	ngine Brake	e solenoid valve	cylinder 6 (L152)			
	Preparation							
	• Key t	he ignition (off					
	• Disco	nnect conn	ector B461					
	• Meas	sure on wiri	ng harness	connector B462	•			
	Pin	Pin						
	(+ probe)	(- probe)	Value	Additional inf	ormation			
	6	12	± 36.5 Ω	Resistance va	lue at 20°C [68°F]			
Possible causes	Faulty wi	ring						
	Faulty co	nnector						
		lenoid valve	<u>)</u>					
Additional information				e diagnostic wh	en it becomes availal	ole.		
Diagnostic Step-by-Step	↑ Perfo	rm the trou	ıbleshootin	g steps below u	sing the breakout har	ness, if		
	/ 1			• .	such as sensors, elect	· ·		
		-			commended, as it co			
				-	ne OFF position when	_		
		_		•	er to reduce the likeli	_		
		ige to electi		•				
	· ·	_	-		during the troublesho	oting process		
			It in multip		J	01		
	Ľ.				formation and pinou	t locations,		
		-		technical data.	·	,		
	•	•			menu in DAVIE and i	run the		
			•		hange in errors.			
	•	Rememb	er that the	truck's operati	onal or mechanical iss	sues may be the		
		root cau	se of both a	active and inact	ve fault codes. Refer	to the 'possible		
		causes' s	section.					
	Step 1		Step I	D 3421a	SRT			
	Visual inspe	ction - Visua	ally inspect	all applicable c	onnectors and harnes	ses for		
	corrosion, d	amage and	rubbing du	ring each step o	of the diagnostic proc	edure.		
	Proceed to s	step 2.						
						_		
	Step 2		Step I	D 3421b	SRT			
	With key OF	F, disconne	ct the pass	through conne	ctor located on the ex	xterior of		
	the engine.	Turn the ke	y ON, and r	neasure the vol	tage between the sig	nal terminal		
	on the enca	psulated ha	rness and a	battery ground	l :			
	• If th	e measured	d voltage is	approximately	3.5 V – Proceed to ste	ep 3.		
	• If th	e measured	d voltage is	0.0 V – Proceed	to step 7.			
	Step 3		Step I	D 3421c	SRT			



With key OFF, disconnect the pass-through connector and measure the resistance between the ground terminal on the encapsulated harness and a battery ground:

- Closed circuit found Proceed to step 4.
- If open circuit or >100,000 ohms is found Proceed to step 8.

Step 4 Step ID 3421d SRT

With key OFF, disconnect the signal connector circuit from the engine brake solenoid. Turn the key ON, and measure the voltage between the signal terminal connector and a battery ground:

- If the measured voltage is approximately 3.5 V Proceed to step 5.
- If the measured voltage is 0.0 V Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.

Step 5 Step ID 3421e SRT

With key OFF, disconnect the ground connector from the engine brake solenoid, and measure the resistance between the ground terminal wire and battery ground:

- Closed circuit found Proceed to step 6.
- If open circuit or >100,000 ohms is found Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.

Step 6 Step ID 3421f SRT

With key OFF, disconnect both connectors from the engine brake solenoid, and measure the resistance between the terminals on the solenoid (refer to your multimeter operation manual for the correct resistance test procedure).

- Closed circuit found Proceed to step 7.
- If open circuit or >100,000 ohms is found Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.

Step 7 Step ID 3421g SRT

With key OFF, disconnect the encapsulated harness at the PCI. Turn the key ON, and measure the voltage between the engine brake signal circuit terminal of the PCI and battery ground:

- If the measured voltage is approximately 3.5 V Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document.
- If the measured voltage is 0.0 V Proceed to step 9.

Step 8 Step ID 3421h SRT

With key OFF, disconnect the encapsulated harness at the PCI, and measure the resistance across the ground terminal on the PCI and a battery ground:

- Closed circuit found Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document.
- If open circuit or >100,000 ohms is found Proceed to step 9.

Step 9	Step ID 3421i	SRT				
Possible PCI failure – Contact the Engine Support Center for further instructions on						



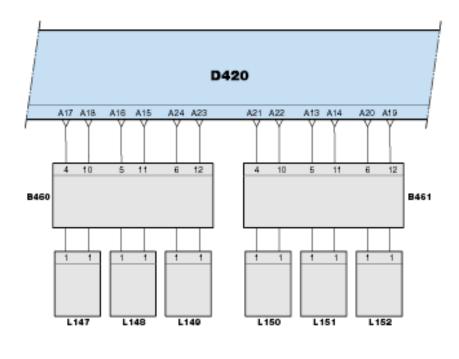
	replacement of the PCI.
Verification Drive Cycle	To validate the repair:
	With DAVIE connected and the key ON, clear the errors. Start the engine and let it idle
	to verify with DAVIE that the errors do not recur.
	Back to Choose Code
	Back to Index

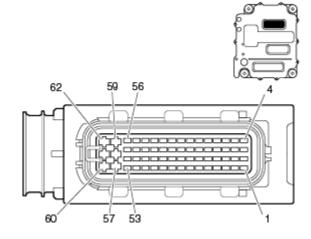


Code number	P3423							
Fault code description	Engine brake solenoid valve Cylinder 3 - Voltage too low or short circuit to ground on							
	ECU D420 pin A24							
Fault code information	3 drive cycle recovery							
	Readiness group – None							
	Freeze frame type – Comprehensive							
Description of component(s)	This information will be added to the diagnostic when it becomes available.							
Location of component(s)	L149							
Diagnostic condition	This information will be added to the diagnostic when it becomes available.							
Set condition of fault code	This information will be added to the diagnostic when it becomes available.							
Reset condition of fault code	This information will be added to the diagnostic when it becomes available.							

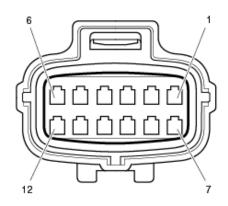


Electrical diagram(s)





Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view



	D460 cc	nnocto	r cylind	orc 1 2					
	B460 connector cylinders 1-3 B461 connector cylinders 4-6								
	D420 P		r cyllnae	215 4-6					
	_		o Brako	calanai	d valvo	cylinder 1			
		_				cylinder 1			
		_				cylinder 2			
	L149 MX Engine Brake solenoid valve cylinder 3 L150 MX Engine Brake solenoid valve cylinder 4								
	L150 MX Engine Brake solenoid valve cylinder 5 L152 MX Engine Brake solenoid valve cylinder 6								
	L132 W	V	c brake	Joichioi	a vaive	cymiaer o			
	MX Eng	MX Engine Brakes cylinder 1-3							
	D420	B460	, L147	L148	L149	Function			
	A15	11		1		Ground			
	A16	5		1		Signal, MX Engine Brake solenoid valve			
	7110	J		-		cylinder 2			
	A17	4	1			Signal, MX Engine Brake solenoid valve			
						cylinder 1			
	A18	10	1			Ground			
	A23	12			1	Ground			
	A24 6 1 Signal, MX Engine Brake solenoid valve cylinder 3								
	MX Eng	ine Bral	kes cylin	der 4-6	6	,			
	D420	B460	L150	L151	L152	Function			
	A13	11		1		Signal, MX Engine Brake solenoid valve			
	A14	5		1		cylinder 5 Ground			
				1					
	A19	4			1	Ground			
	A20	10			1	Signal, MX Engine Brake solenoid valve cylinder 6			
	A21	12	1			Signal, MX Engine Brake solenoid valve			
	,,,,,		-			cylinder 4			
	A22	6	1			Ground			
Technical data	Compoi	nent ch	eck. MX	Engine	Brake s	solenoid valve cylinder 1 (L147)			
		omponent check, MX Engine Brake solenoid valve cylinder 1 (L147) eparation							
	•	Key the	e ignitio	n off					
	•	•	nect cor		B460				
	Measure on wiring harness connector B460								
	Pin	l	Pin						
	(+ pro				Value	Additional information			
	4		10	±	36.5 Ω	Resistance value at 20°C [68°F]			
	Component check, MX Engine Brake solenoid valve cylinder 2 (L148)								
	Prepara		con, iviA	-1181110	Di anc 3	Sichola valve cylinder 2 (E170)			
	•		e ignitio	n off					
	•	•	nect cor		B460				
	•					onnector B460			
	Pin		Pin						
	(+ pro		- probe)	Value	Additional information			
L	<u> </u>								



	5	11	± 36.5 Ω	Resistance value at 20°C [68°F]		
	Component check, MX Engine Brake solenoid valve cylinder 3 (L149) Preparation					
	1	the ignition o	off			
		onnect conne				
			ng harness con	nector B460		
	Pin	Pin	9			
	(+ probe)	(- probe)	Value	Additional information		
	6	12		Resistance value at 20°C [68°F]		
	Component Preparation	check, MX En	ngine Brake so	lenoid valve cylinder 4 (L150)		
	• Key	the ignition o	off			
	• Disc	onnect conne	ector B461			
	• Mea	sure on wirin	ng harness con	nector B461		
	Pin	Pin				
	(+ probe)	(- probe)	Value	Additional information		
	4	10	± 36.5 Ω	Resistance value at 20°C [68°F]		
	Component check, MX Engine Brake solenoid valve cylinder 5 (L151) Preparation					
	Key the ignition off					
	Disconnect connector B461					
			ng harness con	inector B461		
	Pin	Pin	· ·			
	(+ probe)	(- probe)	Value	Additional information		
	5	11	± 36.5 Ω			
	Component Preparation	check, MX En	ngine Brake so	lenoid valve cylinder 6 (L152)		
	1	the ignition o	off			
	1	onnect conne				
			ng harness con	inector B461		
	Pin	Pin	J 11230 0311	-		
	(+ probe)	(- probe)	Value	Additional information		
	6	12	± 36.5 Ω	Resistance value at 20°C [68°F]		
Possible causes	Faulty w	iring				
	Faulty co	_				
	· · · · · · · · · · · · · · · · · · ·	olenoid valve				
Additional information			dded to the di	iagnostic when it becomes available.		
Diagnostic Step-by-Step				eps below using the breakout harness, if		
J	necessary, to check electrical components, such as sensors, electrical control					
	units, and harnesses. Back probing is not recommended, as it could damage the					
	harness. The ignition should always be in the OFF position when connecting or					
	disconnecting electrical components in order to reduce the likelihood of					
		_	ical componer			
<u> </u>						





- Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors.
- For specific electrical component information and pinout locations, always refer to the technical data.
- It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors.
- Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 'possible' causes' section.

Step 1 Step ID 3423a

SRT Visual inspection - Visually inspect all applicable connectors and harnesses for

corrosion, damage and rubbing during each step of the diagnostic procedure. Proceed to step 2.

Step ID 3423b **SRT** Step 2

With key OFF, disconnect the pass-through connector located on the exterior of the engine. Turn the key ON and measure the voltage between the signal terminal on the encapsulated harness side of the connector and a battery ground:

- If the measured voltage is approximately 3.5 V Proceed to step 4.
- If the measured voltage is approximately above 0.0 V Proceed to step 3.

Step ID 3423c SRT Step 3

With key OFF, disconnect the encapsulated harness at the PCI connector. Turn the key ON, and measure the voltage between the signal terminal of the PCI and a battery ground:

- If the measured voltage is approximately 3.5 V Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document.
- If the measured voltage is approximately above 0.0 V Proceed to step 5.

Step ID 3423d SRT

With key OFF, disconnect the signal connector from the engine brake solenoid. Turn the key ON, and measure the voltage between the signal terminal wire and a battery ground:

- Measured voltage is approximately 3.5 V Proceed to the verification procedure listed at the end of this document.
- If the measured voltage is approximately above 0.0 V Replace the passthrough harness. Proceed to the verification procedure listed at the end of this document.

SRT Step 5 Step ID 3423e Possible PCI failure - Contact the Engine Support Center for further instructions about replacing the PCI.

Verification Drive Cycle

To validate the repair:

With DAVIE connected and key ON, clear the errors. Start the engine and let it idle to verify with DAVIE that the errors do not recur.

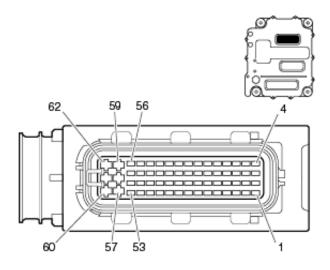
> **Back to Choose Code Back to Index**



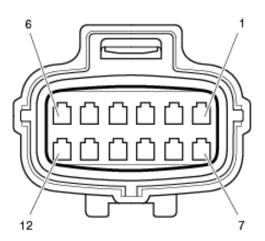


Code number	P3424
Fault code description	Engine brake solenoid valve Cylinder 3 – Voltage too high or short circuit to supply on
	ECU D420 pin A24
Fault code information	1 trip red fault lamp
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Comprehensive
Description of component(s)	This information will be added to the diagnostic when it becomes available.
Location of component(s)	
	L149
Diagnostic condition	This information will be added to the diagnostic when it becomes available.
Set condition of fault code	This information will be added to the diagnostic when it becomes available.
Reset condition of fault code	This information will be added to the diagnostic when it becomes available.
Electrical diagram(s)	
	D420 A17 A18 A18 A15 A24 A23 A21 A22 A13 A14 A20 A19 4 10 5 11 6 12 B460 B461
	L147 L148 L149 L150 L151 L152 401918





Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view

B460	connector cylinders 1-3
B461	connector cylinders 4-6
D420	PCI ECU
L147	MX Engine Brake solenoid valve cylinder 1
L148	MX Engine Brake solenoid valve cylinder 2
L149	MX Engine Brake solenoid valve cylinder 3
L150	MX Engine Brake solenoid valve cylinder 4
L151	MX Engine Brake solenoid valve cylinder 5
L152	MX Engine Brake solenoid valve cylinder 6

	_				
D420	B460	L147	L148	L149	Function
A15	11		1		Ground
A16	5		1		Signal, MX Engine Brake solenoid valve cylinder 2
A17	4	1			Signal, MX Engine Brake solenoid valve cylinder 1
A18	10	1			Ground
A23	12			1	Ground
A24	6			1	Signal, MX Engine Brake solenoid valve cylinder 3



	MX Engine Brakes cylinder 4-6						
	D420 B461 L150 L151 L152 Function						
	A13 5 1 Signal, MX Engine Brake solenoid valve cylinder 5						
	A14 11 1 Ground						
	A19 12 1 Ground						
	A20 6 1 Signal, MX Engine Brake solenoid valve cylinder 6						
	A21 4 1 Signal, MX Engine Brake solenoid valve cylinder 4						
	A22 10 1 Ground						
Technical data	Component check, MX Engine Brake solenoid valve cylinder 1 (L147)						
	Preparation						
	Key the ignition off						
	Disconnect connector B460						
	 Measure on wiring harness connector B460 						
	Pin Pin						
	(+ probe) (- probe) Value Additional information						
	4 10 ± 36.5 Ω Resistance value at 20°C [68°F]						
	Component check, MX Engine Brake solenoid valve cylinder 2 (L148)						
	Preparation						
	Key the ignition off						
	Disconnect connector B460						
	 Measure on wiring harness connector B460 						
	Pin Pin						
	(+ probe) (- probe) Value Additional information						
	5 11 ± 36.5 Ω Resistance value at 20°C [68°F]						
	Component check, MX Engine Brake solenoid valve cylinder 3 (L149) Preparation						
	Key the ignition off						
	Disconnect connector B460						
	 Measure on wiring harness connector B460 						
	Pin Pin						
	(+ probe) (- probe) Value Additional information						
	6 12 ± 36.5 Ω Resistance value at 20°C [68°F]						
	Component check, MX Engine Brake solenoid valve cylinder 4 (L150) Preparation						
	Key the ignition off						
	Disconnect connector B461						
	 Measure on wiring harness connector B461 						
	Pin Pin						
	(+ probe) (- probe) Value Additional information						
	4 10 ± 36.5 Ω Resistance value at 20°C [68°F]						
	Component check, MX Engine Brake solenoid valve cylinder 5 (L151)						
	Preparation						



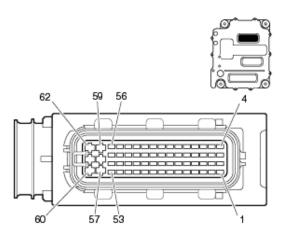
	Key t	he ignition off			
	Disconnect connector B461				
	Measure on wiring harness connector B461				
	Pin Pin				
	(+ probe)	(- probe)	Value	Additional information	
	5	11	± 36.5 Ω	Resistance value at 20°C [68°F]	
	Component	heck MX Engi	na Braka sola	noid valve cylinder 6 (L152)	
	Preparation	TICCK, WIX LIIGH	ne brake sole	Hold valve cylinder o (£132)	
	•	he ignition off			
	-	nnect connect	or B/161		
		sure on wiring l		ector R461	
	Pin	Pin	marriess comm	ector B401	
	(+ probe)	(- probe)	Value	Additional information	
	' '				
Descible serves	6	المام معا النب معا	± 36.5 Ω	Resistance value at 20°C [68°F]	
Possible causes		linformation a		gnostic when it becomes available.	
Additional information Diagnostic Step-by-Step				as below using the breakout begans if	
Diagnostic Step-by-Step	Perform the troubleshooting steps below using the breakout harness, if necessary, to check electrical components, such as sensors, electrical conunits, and harnesses. Back probing is not recommended, as it could dama the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components. • Disconnecting the EAS connectors during the troubleshooting prowill result in multiple errors. • For specific electrical component information and pinout location always refer to the technical data. • It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. • Remember that the truck's operational or mechanical issues may the root cause of both active and inactive fault codes. Refer to the 'possible causes' section. Step 1 Step ID 3424a SRT Visual inspection - Visually inspect all applicable connectors and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.				
	the engine. on the enca • Mea • Mea Step 3 With key OF	Turn the key O psulated harne asured voltage asured voltage FF, disconnect t	ess side of the is approxima is approxima Step ID 342 the encapsula	ugh connector located on the exterior of the the voltage between the signal terminal econnector and a battery ground: tely 3.5 V – Proceed to step 4. tely 4.75 V – Proceed to step 3. 24c SRT ated harness at the PCI connector. Turn the	
	key ON and battery grou		oltage betwe	en the signal terminal of the PCI and a	



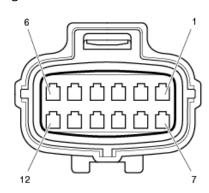
	 Measured voltage is approximately 3.5 V – Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document. Measured voltage is approximately 4.75 V – Proceed to step 5. 				
	Step 4	Step ID 3424d	SRT		
	 With key OFF, disconnect the signal connector from the engine brake solenoid. Turn the key ON and measure the voltage between the signal terminal wire and a battery ground: Measured voltage is approximately 3.5 V – Proceed to the verification procedure listed at the end of this document. Measured voltage is approximately above 4.75 V – Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document. 				
	Step 5	Step ID 3424e	SRT		
	replacement of the PCI.	tact the Engine Support	Center for further instructions on		
Verification Drive Cycle	To validate the repair:				
		With DAVIE connected and the key ON, clear the errors. Start the engine and let it idle			
	to verify with DAVIE that the	ne errors do not recur.	Pack to Chasse Code		
			<u>Back to Choose Code</u> Back to Index		
			Dack to much		



T
P3429
Engine brake solenoid valve Cylinder 4 - Current too low or open circuit on ECU D420
pin A21
3 drive cycle recovery
Readiness group – None
Freeze frame type – Comprehensive
This information will be added to the diagnostic when it becomes available
This information will be duded to the diagnostic when it becomes available
L150
This information will be added to the diagnostic when it becomes available
This information will be added to the diagnostic when it becomes available
This information will be added to the diagnostic when it becomes available
This information will be duded to the diagnostic when it becomes available
D420 A17 A18 A16 A15 A24 A23 A21 A22 A13 A14 A20 A19 4 10 5 11 6 12 B460 B461 L147 L148 L149 L150 L151 L152 I401918



Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view

B460 connector cylinders 1-3

B461 connector cylinders 4-6

D420 PCI ECU

L147 MX Engine Brake solenoid valve cylinder 1

L148 MX Engine Brake solenoid valve cylinder 2

L149 MX Engine Brake solenoid valve cylinder 3

L150 MX Engine Brake solenoid valve cylinder 4

L151 MX Engine Brake solenoid valve cylinder 5

L152 MX Engine Brake solenoid valve cylinder 6

D420	B460	L147	L148	L149	Function
A15	11		1		Ground
A16	5		1		Signal, MX Engine Brake solenoid valve cylinder 2
A17	4	1			Signal, MX Engine Brake solenoid valve cylinder 1
A18	10	1			Ground
A23	12			1	Ground
A24	6			1	Signal, MX Engine Brake solenoid valve cylinder 3



	MX Engine Brakes cylinder 4-6
	D420 B460 L150 L151 L152 Function
	A13 11 1 Signal, MX Engine Brake solenoid valve cylinder 5
	A14 5 1 Ground
	A19 4 1 Ground
	A20 10 1 Signal, MX Engine Brake solenoid valve cylinder 6
	A21 12 1 Signal, MX Engine Brake solenoid valve cylinder 4
	A22 6 1 Ground
Technical data	Component check, MX Engine Brake solenoid valve cylinder 1 (L147) Preparation
	Key the ignition off
	Disconnect connector B460
	 Measure on wiring harness connector B460
	Pin Pin
	(+ probe) (- probe) Value Additional information
	4 10 \pm 36.5 Ω Resistance value at 20°C [68°F]
	Component check, MX Engine Brake solenoid valve cylinder 2 (L148) Preparation Key the ignition off Disconnect connector B460
	 Measure on wiring harness connector B460
	Pin Pin (+ probe) Value Additional information
	(+ probe) (- probe) Value Additional information $5 11 \pm 36.5 \Omega Resistance value at 20^{\circ}C [68^{\circ}F]$
	Component check, MX Engine Brake solenoid valve cylinder 3 (L149)
	Preparation
	Key the ignition off
	Disconnect connector B460
	Measure on wiring harness connector B460
	Pin Pin
	(+ probe) (- probe) Value Additional information $6 12 \pm 36.5 \Omega Resistance value at 20°C [68°F]$
	6 12 ± 50.5 \(\text{12} \) Resistance value at 20 \(\text{C} \) [00 \(\text{1} \)]
	Component check, MX Engine Brake solenoid valve cylinder 4 (L150) Preparation
	Key the ignition off
	Disconnect connector B461
	 Measure on wiring harness connector B461
	Pin Pin
	(+ probe) (- probe) Value Additional information
	4 10 ± 36.5 Ω Resistance value at 20°C [68°F]

Component check, MX Engine Brake solenoid valve cylinder 5 (L151)



Preparation Key the ignition off Disconnect connector B461 Measure on wiring harness connector B461 Pin Pin (+ probe) (- probe) Value Additional information Resistance value at 20°C [68°F] 5 11 ± 36.5 Ω Component check, MX Engine Brake solenoid valve cylinder 6 (L152) Preparation Key the ignition off Disconnect connector B461 Measure on wiring harness connector B461 Pin Pin (+ probe) (- probe) Value Additional information Resistance value at 20°C [68°F] 12 ± 36.5 Ω This information will be added to the diagnostic when it becomes available **Possible causes Additional information** This information will be added to the diagnostic when it becomes available **Diagnostic Step-by-Step** Perform the troubleshooting steps below using the breakout harness, if necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as it could damage the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components. Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors. For specific electrical component information and pinout locations, always refer to the technical data. It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 'possible causes' section. Step ID 3429a SRT Step 1 Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2. **SRT** Step 2 Step ID 3429b With key OFF, disconnect the pass-through connector located on the exterior of the engine. Turn the key ON, and measure the voltage between the signal terminal on the encapsulated harness and a battery ground: If the measured voltage is approximately 3.5 V – Proceed to step 3. If the measured voltage is 0.0 V – Proceed to step 7 Step ID 3429c SRT Step 3 With key OFF, disconnect the pass-through connector and measure the resistance between the ground terminal on the encapsulated harness and a battery ground:



- Closed circuit found Proceed to step 4.
- If open circuit or >100,000 ohms are found Proceed to step 8

Step 4 Step ID 3429d SRT

With key OFF, disconnect the signal connector circuit from the engine brake solenoid. Turn the key ON, and measure the voltage between the signal terminal connector and a battery ground:

- If the measured voltage is approximately 3.5 V Proceed to step 5.
- If the measured voltage is 0.0 V Replace the pass-through harness.
 Proceed to the verification procedure listed at the end of this document.

Step 5 Step ID 3429e SRT

With key OFF, disconnect the ground connector from the engine brake solenoid, and measure the resistance between the ground terminal wire and battery ground:

- Closed circuit found Proceed to step 6.
- If open circuit or >100,000 ohms are found Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.

Step 6 Step ID 3429f SRT

With key OFF, disconnect both connectors from the engine brake solenoid, and measure the resistance between the terminals on the solenoid (refer to your multimeter operation manual for the correct resistance test procedure).

- Closed circuit found Proceed to step 7.
- If open circuit or >100,000 ohms are found Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.

Step 7 Step ID 3429g SRT

With key OFF, disconnect the encapsulated harness at the PCI. Turn the key ON, and measure the voltage between the engine brake signal circuit terminal of the PCI and battery ground:

- If the measured voltage is approximately 3.5 V Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document.
- If the measured voltage is 0.0 V Proceed to step 9.

Step 8 Step ID 3429h SRT

With key OFF, disconnect the encapsulated harness at the PCI, and measure the resistance across the ground terminal on the PCI and a battery ground:

- Closed circuit found Replace the encapsulated harness. Proceed to the listed at the end of this document.
- If open circuit or >100,000 ohms are found Proceed to step 9

Step 9 Step ID 3429i SRT

Possible PCI failure – Contact the Engine Support Center for further instructions on replacing the PCI.

Verification Drive Cycle

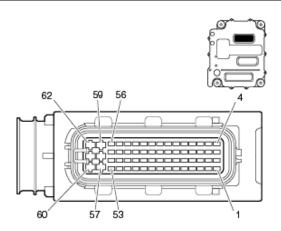
To validate the repair:



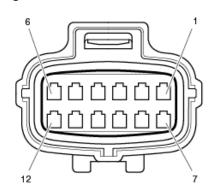
With DAVIE connected and key ON, clear the errors. Start the engine and let it idle to verify with DAVIE that the errors do not recur.			
Back to Choose Code			
Back to Index			



P3431					
Engine brake solenoid valve Cylinder 4 - Voltage too low or short circuit to ground on					
ECU D420 pin A21					
3 drive cycle recovery					
Readiness group – None					
Freeze frame type – Comprehensive.					
This information will be added to the diagnostic when it becomes available					
This information will be daded to the diagnostic when it becomes available					
L150					
This information will be added to the diagnostic when it becomes available					
This information will be added to the diagnostic when it becomes available This information will be added to the diagnostic when it becomes available					
This information will be added to the diagnostic when it becomes available					
This information will be duded to the diagnostic when it becomes available					
B460 D420 A17 A18 A16 A15 A24 A23 A21 A22 A13 A14 A20 A19 4 10 5 11 6 12 4 10 5 11 6 12 B461 L147 L148 L149 L150 L151 L152 401918					



Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view

B460 connector cylinders 1-3

B461 connector cylinders 4-6

D420 PCI ECU

L147 MX Engine Brake solenoid valve cylinder 1

L148 MX Engine Brake solenoid valve cylinder 2

L149 MX Engine Brake solenoid valve cylinder 3

L150 MX Engine Brake solenoid valve cylinder 4

L151 MX Engine Brake solenoid valve cylinder 5

L152 MX Engine Brake solenoid valve cylinder 6

D420	B460	L147	L148	L149	Function
A15	11		1		Ground
A16	5		1		Signal, MX Engine Brake solenoid valve cylinder 2
A17	4	1			Signal, MX Engine Brake solenoid valve cylinder 1
A18	10	1			Ground
A23	12			1	Ground
A24	6			1	Signal, MX Engine Brake solenoid valve



						cylinder 3
	MY Eng	ina Bra	kes cylir	ndar 1-6		
	D420		•			Function
	A13	11	2130	1	1132	Signal, MX Engine Brake solenoid valve cylinder 5
	A14	5		1		Ground
	A19	4			1	Ground
	A20	10			1	Signal, MX Engine Brake solenoid valve cylinder 6
	A21	12	1			Signal, MX Engine Brake solenoid valve cylinder 4
	A22	6	1			Ground
Technical data	Compo Prepara		eck, MX	Engine	Brakes	solenoid valve cylinder 1 (L147)
	•		e ignitio	n off		
	•	•	nect cor		B460	
	•	Measu	re on w	iring ha	rness co	onnector B460
	Pin		Pin			
		be) (- probe)			Additional information
	4		10	± 36	5.5 Ω	Resistance value at 20°C [68°F]
	-		eck, MX	Engine	Brake s	solenoid valve cylinder 2 (L148)
	Prepara					
	•	•	e ignitio		D4C0	
			nect cor			onnector B460
	Pir		Pin	11 11 15 11 I	111033 0	officetor 5400
	(+ pro	be) (- probe)	Va	lue	Additional information
	5		11	± 36	5.5 Ω	Resistance value at 20°C [68°F]
	Component check, MX Engine Brake solenoid valve cylinder 3 (L149) Preparation					
	•	-	e ignitio		D.4.CO	
	•		nect cor			onnector B460
	Pin		Pin	ii ii ig i ia	111633 (office to b400
	(+ pro		- probe)	Va	lue	Additional information
	6		12	± 36	5.5 Ω	Resistance value at 20°C [68°F]
	Component check, MX Engine Brake solenoid valve cylinder 4 (L150) Preparation					
	•		e ignitio			
	•		nect cor			
	•			iring ha	rness co	onnector B461
	Pir (+ pro		Pin - probe)	\/2	llue	Additional information
	(+ bio	ne) (probe)	v d	iiuc	Additional information



	4	10	± 36.5 Ω	Resistance value at 20°C [68°F]				
	Component check, MX Engine Brake solenoid valve cylinder 5 (L151) Preparation • Key the ignition off							
	Disconnect connector B461							
	Measure on wiring harness connector B461							
	Pin	Pin	J					
	(+ probe)	(- probe)	Value	Additional information				
	5							
	Component check, MX Engine Brake solenoid valve cylinder 6 (L152) Preparation							
	-	the ignition						
		onnect conn						
	• Mea	sure on wiri Pin	ng harness co	onnector B461				
	(+ probe)		Value	Additional information				
	6	12	± 36.5 Ω					
Possible causes	This informa	tion will be		diagnostic when it becomes available				
Additional information	This information will be added to the diagnostic when it becomes available							
Diagnostic Step-by-Step	Perform the troubleshooting steps below using the breakout harness, if necessary, to check electrical components, such as sensors, electrical counits, and harnesses. Back probing is not recommended, as it could dam the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components. • Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors. • For specific electrical component information and pinout locational always refer to the technical data. • It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. • Remember that the truck's operational or mechanical issues may the root cause of both active and inactive fault codes. Refer to the possible causes' section.			components, such as sensors, electrical control obing is not recommended, as it could damage uld always be in the OFF position when electrical components in order to reduce the rical components. S connectors during the troubleshooting multiple errors. component information and pinout locations, echnical data. the fault code menu in DAVIE and run the to identify a change in errors. ruck's operational or mechanical issues may be h active and inactive fault codes. Refer to the ion.				
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2. Step 2 Step ID 3431b SRT With key OFF, disconnect the pass-through connector located on the exterior of							
	 the engine. Turn the key ON and measure the voltage between the signal terminal on the encapsulated harness side of the connector and a battery ground: If the measured voltage is approximately 3.5 V – Proceed to step 4. If the measured voltage is approximately 0.0 V – Proceed to step 3. 							

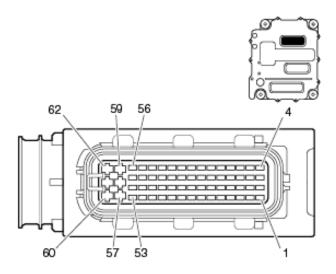


	Step 3	Step ID 3431c	SRT				
	With key OFF, disco	onnect the encapsulated harne	ss at the PCI connector. Turn the				
	key ON, and measure the voltage between the signal terminal of the PCI and a						
	battery ground:						
	 If the meas 	ured voltage is approximately	3.5 V – Replace the encapsulated				
	harness. Pr	oceed to the verification proce	edure listed at the end of this				
	document.						
	If the meas	ured voltage is approximately	0.0 V – Proceed to step 5.				
	Step 4	Step ID 3431d	SRT				
	With key OFF, disco	onnect the signal connector fro	m the engine brake solenoid.				
	Turn the key ON, ar	nd measure the voltage between	en the signal terminal wire and a				
	battery ground:						
		ured voltage is approximately					
	verification procedure listed at the end of this document.						
			0.0 V – Replace the pass-through				
		oceed to the verification proce	edure listed at the end of this				
	document						
	Step 5	Step ID 3431e	SRT				
	Possible PCI failure	- Contact the Engine Support (Center for further instructions				
	about replacing the	PCI.					
Verification Drive Cycle	To validate the repai	r:					
		• •	s. Start the engine and let it idle to				
	verify with DAVIE that	at the errors do not recur.					
			Back to Choose Code				
			Back to Index				

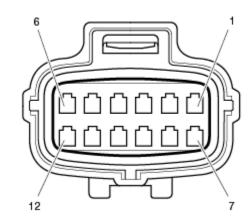


1 3 1 3 2	-						
Code number	P3432						
Fault code description	Engine brake solenoid valve Cylinder 4 – Voltage too high or short circuit to supply on						
	ECU D420 pin A21						
Fault code information	1 trip red fault lamp						
	3 drive cycle recovery						
	Readiness group – None						
	Freeze frame type – Comprehensive						
Description of component(s)	This information will be added to the diagnostic when it becomes available.						
Location of component(s)	5						
,	L150						
	200						
	6000						
Diagnostic condition	This information will be added to the diagnostic when it becomes available.						
Set condition of fault code	This information will be added to the diagnostic when it becomes available.						
Reset condition of fault code	This information will be added to the diagnostic when it becomes available.						
Electrical diagram(s)							
	j						
	D						
	D420						
	<u> </u>						
	A17 A18 A16 A15 A24 A23 A21 A22 A13 A14 A20 A19						
	4 10 5 11 8 12 4 10 5 11 6 12						
	B460 B461						
	L147 L148 L149 L150 L151 L152 401918						





Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view

B460	connector cylinders 1-3
B461	connector cylinders 4-6
D420	PCI ECU
L147	MX Engine Brake solenoid valve cylinder 1
L148	MX Engine Brake solenoid valve cylinder 2
L149	MX Engine Brake solenoid valve cylinder 3
L150	MX Engine Brake solenoid valve cylinder 4
L151	MX Engine Brake solenoid valve cylinder 5
L152	MX Engine Brake solenoid valve cylinder 6

D420	B460	L147	L148	L149	Function
A15	11		1		Ground
A16	5		1		Signal, MX Engine Brake solenoid valve cylinder 2
A17	4	1			Signal, MX Engine Brake solenoid valve cylinder 1
A18	10	1			Ground
Δ23	12			1	Ground



	A24 6 1 Signal, MX Engine Brake solenoid valve cylinder 3						
	MX Engine Brakes cylinder 4-6						
	D420 B461 L150 L151 L152 Function						
	A13 5 1 Signal, MX Engine Brake solenoid valve cylinder 5						
	A14 11 1 Ground						
	A19 12 1 Ground						
	A20 6 1 Signal, MX Engine Brake solenoid valve cylinder 6						
	A21 4 1 Signal, MX Engine Brake solenoid valve cylinder 4						
	A22 10 1 Ground						
Technical data	Component check, MX Engine Brake solenoid valve cylinder 1 (L147)						
	Preparation						
	Key the ignition off						
	Disconnect connector B460						
	 Measure on wiring harness connector B460 						
	Pin Pin						
	(+ probe) (- probe) Value Additional information						
	4 10 ± 36.5 Ω Resistance value at 20°C [68°F]						
	 Preparation Key the ignition off Disconnect connector B460 Measure on wiring harness connector B460 						
	Pin Pin						
	(+ probe) (- probe) Value Additional information						
	5 11 ± 36.5 Ω Resistance value at 20°C [68°F]						
	Component check, MX Engine Brake solenoid valve cylinder 3 (L149) Preparation						
	Key the ignition off						
	Disconnect connector B460						
	Measure on wiring harness connector B460 Big. Big. Big. Big. Big. Big. Big. Big.						
	Pin Pin (+ probe) Value Additional information						
	6 12 \pm 36.5 Ω Resistance value at 20°C [68°F]						
	2 2 30.3 12 Nesistance value at 20 e [00 1]						
	Component check, MX Engine Brake solenoid valve cylinder 4 (L150) Preparation						
	Key the ignition offDisconnect connector B461						
	 Disconnect connector B461 Measure on wiring harness connector B461 						
	Pin Pin						
	(+ probe) (- probe) Value Additional information						
	4 10 $\pm 36.5 \Omega$ Resistance value at 20°C [68°F]						
	To ± 50.5 12 Resistance value at 20 C [00 1]						
	Component check, MX Engine Brake solenoid valve cylinder 5 (L151)						



Preparation Key the ignition off Disconnect connector B461 Measure on wiring harness connector B461 Pin Pin (+ probe) (- probe) Additional information Value Resistance value at 20°C [68°F] 5 11 ± 36.5 Ω Component check, MX Engine Brake solenoid valve cylinder 6 (L152) Preparation Key the ignition off Disconnect connector B461 Measure on wiring harness connector B461 Pin Pin (+ probe) (- probe) Value Additional information Resistance value at 20°C [68°F] ± 36.5 Ω **Possible causes** This information will be added to the diagnostic when it becomes available. Additional information No additional information available. **Diagnostic Step-by-Step** Perform the troubleshooting steps below using the breakout harness, if necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as it could damage the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components. Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors. For specific electrical component information and pinout locations, always refer to the technical data. It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 'possible causes' section. Step 1 Step ID 3432a SRT Visual inspection - Visually inspect all applicable connectors and harnesses for corrosion, damage and rubbing during each step of the diagnostic procedure. Proceed to step 2. Step 2 Step ID 3432b SRT With key OFF, disconnect the pass-through connector located on the exterior of the engine. Turn the key ON and measure the voltage between the signal terminal on the encapsulated harness side of the connector and a battery ground: If the measured voltage is approximately 3.5 V – Proceed to step 4. If the measured voltage is approximately 4.75 V – Proceed to step 3. Step 3 Step ID 3432c **SRT** With key OFF, disconnect the encapsulated harness at the PCI connector. Turn the

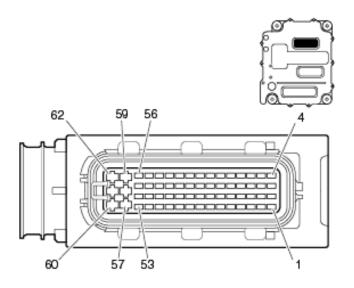


	 key ON, and measure the voltage between the signal terminal of the PCI and a battery ground: If the measured voltage is approximately 3.5 V – Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document. If the measured voltage is approximately 4.75 V – Proceed to step 5. 					
	Step 4	Step ID 3432d	SRT			
	Turn the key ON, and mea	the signal connector from the sure the voltage between the	_			
		oltage is approximately 3.5 V dure listed at the end of this				
	If the measured voltage is approximately 4.75 V – Replace the pass- through harness. Proceed to the verification procedure listed at the end of this document.					
	Step 5 Step ID 3432e SRT					
	Possible PCI failure – Cont replacement of the PCI.	act the Engine Support Cente	r for further instructions on			
Verification Drive Cycle	To validate the repair: With DAVIE connected and to verify with DAVIE that th		Start the engine and let it idle			
			Back to Choose Code Back to Index			

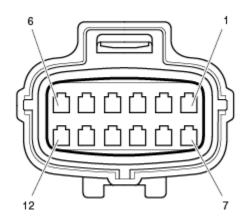


Code number	P3437
Fault code description	Engine brake solenoid valve Cylinder 5 – Current too low or open circuit on ECU D420
	pin A13
Fault code information	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Comprehensive
Description of component(s)	This information will be added to the diagnostic when it becomes available.
Location of component(s)	0
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	L151
Diagnostic condition	This information will be added to the diagnostic when it becomes available.
Set condition of fault code	This information will be added to the diagnostic when it becomes available.
Reset condition of fault code	
	This information will be added to the diagnostic when it becomes available.
Electrical diagram(s)	
	B460 B460 B460 B460 B461 B461 B461





Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view

B460	connector cylinders 1-3
B461	connector cylinders 4-6
D420	PCI ECU
L147	MX Engine Brake solenoid valve cylinder 1
L148	MX Engine Brake solenoid valve cylinder 2
L149	MX Engine Brake solenoid valve cylinder 3
L150	MX Engine Brake solenoid valve cylinder 4
L151	MX Engine Brake solenoid valve cylinder 5
L152	MX Engine Brake solenoid valve cylinder 6

ı		-	•			
	D420	B460	L147	L148	L149	Function
	A15	11		1		Ground
	A16	5		1		Signal, MX Engine Brake solenoid valve cylinder 2
	A17	4	1			Signal, MX Engine Brake solenoid valve cylinder 1
	A18	10	1			Ground
	A23	12			1	Ground
	A24	6			1	Signal, MX Engine Brake solenoid valve cylinder 3



	MX Engine Brakes cylinder 4-6								
	D420 B461 L150 L151 L152 Function								
	A13 5 1 Signal, MX Engine Brake solenoid valve cylinder 5								
	A14 11 1 Ground								
	A19 12 1 Ground								
	A20 6 1 Signal, MX Engine Brake solenoid valve cylinder 6								
	A21 4 1 Signal, MX Engine Brake solenoid valve cylinder 4								
	A22 10 1 Ground								
Technical data	Component check, MX Engine Brake solenoid valve cylinder 1 (L147)								
	Preparation								
	Key the ignition off								
	Disconnect connector B460								
	Measure on wiring harness connector B460								
	Pin Pin								
	(+ probe) (- probe) Value Additional information								
	4 10 \pm 36.5 Ω Resistance value at 20°C [68°F]								
	Component check, MX Engine Brake solenoid valve cylinder 2 (L148)								
	Preparation								
	Key the ignition off								
	Disconnect connector B460								
	 Measure on wiring harness connector B460 								
	Pin Pin								
	(+ probe) (- probe) Value Additional information								
	5 11 ± 36.5 Ω Resistance value at 20°C [68°F]								
	Component check, MX Engine Brake solenoid valve cylinder 3 (L149) Preparation								
	Key the ignition off								
	Disconnect connector B460								
	Measure on wiring harness connector B460								
	Pin Pin								
	(+ probe) (- probe) Value Additional information								
	6 12 ± 36.5 Ω Resistance value at 20°C [68°F]								
	Component check, MX Engine Brake solenoid valve cylinder 4 (L150) Preparation								
	Key the ignition off								
	Disconnect connector B461								
	 Measure on wiring harness connector B461 								
	Pin Pin								
	(+ probe) (- probe) Value Additional information								
	4 10 \pm 36.5 Ω Resistance value at 20°C [68°F]								
	Component check, MX Engine Brake solenoid valve cylinder 5 (L151) Preparation								



	Key the ignition off					
	Disconnect connector B461					
	Measure on wiring harness connector B461					
	Pin					
	(+ probe)	(- probe)	Value	Additional inform	mation	
	5	11	± 36.5 Ω	Resistance value	at 20°C [68°F]	
	Component of	Component check, MX Engine Brake solenoid valve cylinder 6 (L152)				
	Preparation	,		•	,	
	•	he ignition off				
		nnect connect				
		ure on wiring		nector B461		
	Pin	Pin	namess con	IIICCCOI D-OI		
	(+ probe)		مبراد/\	Additional infor	mation	
	6	12		Resistance valu		
Possible causes				lagnostic when it	becomes available.	
Additional information		information a				
Diagnostic Step-by-Step			•		he breakout harness, if	
	<i>y</i> •	• •		•	as sensors, electrical control	
	Construence of the Construence o		•	-	nended, as it could damage	
		_		•	OFF position when	
		-	_	•	nts in order to reduce the	
	likelih			cal components.		
			_		g the troubleshooting process	
	will result in multiple errors.					
	For specific electrical component information and pinout locations, The specific electrical data.					
		 always refer to the technical data. It is necessary to exit the fault code menu in DAVIE and run the 				
	•	It is necess:	ary to exit tl	ne fault code men	u in DAVIE and run the	
		_	_	identify a change		
	•	Remember	that the tru	ıck's operational c	or mechanical issues may be	
		the root ca	use of both	active and inactive	e fault codes. Refer to the	
	'possible causes' section.					
			•			
	Step 1		Step ID 3	437a	SRT	
	Visual inspe	ction - Visually	inspect all	applicable connec	tors and harnesses for	
	corrosion, d	amage and rul	bbing during	g each step of the	diagnostic procedure.	
	Proceed to s	step 2.				
					_	
	Step 2		Step ID 3	437b	SRT	
	With key OF	F, disconnect	the pass-thr	ough connector lo	ocated on the exterior of	
	1 1		•	-	petween the signal terminal	
		psulated harne		_		
					– Proceed to step 3.	
				V – Proceed to st	*	
	Step 3		Step ID 3	437c	SRT	
	· ·	F. disconnect	<u> </u>		nd measure the resistance	
	1 1		•	-	ness and a battery ground:	
		ed circuit four		•	icos ana a battery ground.	
	UIOS	eu circuit 1001	iu – FIULEE	u 10 316h 4.		



SRT

• If open circuit or >100,000 ohms are found – Proceed to step 8.

Step 4 Step ID 3437d

With key OFF, disconnect the signal connector circuit from the engine brake solenoid. Turn the key ON, and measure the voltage between the signal terminal connector and a battery ground:

- If the measured voltage is approximately 3.5 V Proceed to step 5.
- If the measured voltage is 0.0 V Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.

Step 5 Step ID 3437e SRT

With key OFF, disconnect the ground connector from the engine brake solenoid, and measure the resistance between the ground terminal wire and battery ground:

- Closed circuit found Proceed to step 6.
- If open circuit or >100,000 ohms are found Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.

Step 6 Step ID 3437f SRT

With key OFF, disconnect both connectors from the engine brake solenoid, and measure the resistance between the terminals on the solenoid (refer to your multimeter operation manual for the correct resistance test procedure).

- Closed circuit found Proceed to step 7.
- If open circuit or >100,000 ohms are found Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.

Step 7 Step ID 3437g SRT

With key OFF, disconnect the encapsulated harness at the PCI. Turn the key ON, and measure the voltage between the engine brake signal circuit terminal of the PCI and battery ground:

- If the measured voltage is approximately 3.5 V Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document.
- If the measured voltage is 0.0 V Proceed to step 9.

Step 8 Step ID 3437h SRT

With key OFF, disconnect the encapsulated harness at the PCI, and measure the resistance across the ground terminal on the PCI and a battery ground:

- Closed circuit found Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document.
- If open circuit or >100,000 ohms are found Proceed to step 9.

Step 9 Step ID 3437i SRT

Possible PCI failure – Contact the Engine Support Center for further instructions on replacing the PCI.

Verification Drive Cycle

To validate the repair:

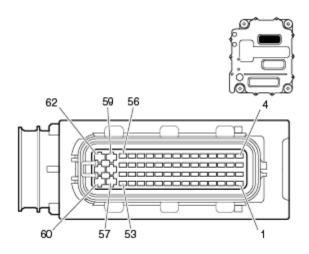
With DAVIE connected and key ON, clear the errors. Start the engine and let it idle to



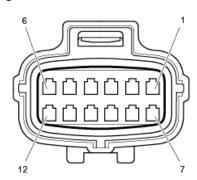
verify with DAVIE that the errors do not recur.	
	Back to Choose Code
	Back to Index



Codo numbos	D2420
Code number	P3439
Fault code description	Engine brake solenoid valve Cylinder 5 - Voltage too low or short circuit to ground on
	ECU D420 pin A13
Fault code information	3 drive cycle recovery
	Readiness group – None
	Freeze frame type – Comprehensive
Description of component(s)	This information will be added to the diagnostic when it becomes available
Location of component(s)	
, , , , , , , , , , , , , , , , , , ,	L151
Diagnostic condition	This information will be added to the diagnostic when it becomes available
Set condition of fault code	This information will be added to the diagnostic when it becomes available
Reset condition of fault code	This information will be added to the diagnostic when it becomes available
	This information will be added to the diagnostic when it becomes available
Electrical diagram(s)	B460 B460 B461 L147 L148 L149 L150 L151 L152



Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view

B460 connector cylinders 1-3

B461 connector cylinders 4-6

D420 PCI ECU

L147 MX Engine Brake solenoid valve cylinder 1

L148 MX Engine Brake solenoid valve cylinder 2

L149 MX Engine Brake solenoid valve cylinder 3

L150 MX Engine Brake solenoid valve cylinder 4

L151 MX Engine Brake solenoid valve cylinder 5

L152 MX Engine Brake solenoid valve cylinder 6

_		,			
D420	B460	L147	L148	L149	Function
A15	11		1		Ground
A16	5		1		Signal, MX Engine Brake solenoid valve cylinder 2
A17	4	1			Signal, MX Engine Brake solenoid valve cylinder 1
A18	10	1			Ground
A23	12			1	Ground
A24	6			1	Signal, MX Engine Brake solenoid valve cylinder 3



	MX Engine Brakes cylinder 4-6	
	D420 B460 L150 L151 L152 Function	
	A13 11 1 Signal, MX Engine Brake solenoid valve cylinder 5	
	A14 5 1 Ground	
	A19 4 1 Ground	
	A20 10 1 Signal, MX Engine Brake solenoid valve cylinder 6	
	A21 12 1 Signal, MX Engine Brake solenoid valve cylinder 4	
	A22 6 1 Ground	
Technical data	Component check, MX Engine Brake solenoid valve cylinder 1 (L147) Preparation	
	Key the ignition off	
	Disconnect connector B460	
	 Measure on wiring harness connector B460 	
	Pin Pin	
	(+ probe) (- probe) Value Additional information	
	4 10 \pm 36.5 Ω Resistance value at 20°C [68°F]	
	Component check, MX Engine Brake solenoid valve cylinder 2 (L148) Preparation • Key the ignition off	
	Disconnect connector B460	
	 Measure on wiring harness connector B460 	
	Pin Pin	
	(+ probe) (- probe) Value Additional information	
	5 11 \pm 36.5 Ω Resistance value at 20°C [68°F]	
	Component check, MX Engine Brake solenoid valve cylinder 3 (L149) Preparation	
	Key the ignition off	
	Disconnect connector B460	
	 Measure on wiring harness connector B460 	
	Pin Pin	
	(+ probe) (- probe) Value Additional information	
	6 12 \pm 36.5 Ω Resistance value at 20°C [68°F]	
	Component check, MX Engine Brake solenoid valve cylinder 4 (L150) Preparation	
	Key the ignition off	
	Disconnect connector B461	
	Measure on wiring harness connector B461	
	Pin Pin	
	(+ probe) (- probe) Value Additional information	
	4 10 ± 36.5 Ω Resistance value at 20°C [68°F]	

Component check, MX Engine Brake solenoid valve cylinder 5 (L151)



Preparation Key the ignition off Disconnect connector B461 Measure on wiring harness connector B461 Pin Pin (+ probe) (- probe) Value Additional information Resistance value at 20°C [68°F] 5 11 ± 36.5 Ω Component check, MX Engine Brake solenoid valve cylinder 6 (L152) Preparation Key the ignition off Disconnect connector B461 Measure on wiring harness connector B461 Pin Pin (+ probe) (- probe) Value Additional information Resistance value at 20°C [68°F] 12 ± 36.5 Ω This information will be added to the diagnostic when it becomes available **Possible causes Additional information** This information will be added to the diagnostic when it becomes available **Diagnostic Step-by-Step** Perform the troubleshooting steps below using the breakout harness, if necessary, to check electrical components, such as sensors, electrical control units, and harnesses. Back probing is not recommended, as it could damage the harness. The ignition should always be in the OFF position when connecting or disconnecting electrical components in order to reduce the likelihood of damage to electrical components. Disconnecting the EAS connectors during the troubleshooting process will result in multiple errors. For specific electrical component information and pinout locations, always refer to the technical data. It is necessary to exit the fault code menu in DAVIE and run the diagnostic test again to identify a change in errors. Remember that the truck's operational or mechanical issues may be the root cause of both active and inactive fault codes. Refer to the 'possible causes' section. Step ID 3439a SRT Step 1 Visual inspection - Visually inspect all applicable connectors and harnesses for corrosion, damage and rubbing during each step of the diagnostic procedure. Proceed to step 2. **SRT** Step ID 3439b Step 2 With key OFF, disconnect the pass-through connector located on the exterior of the engine. Turn the key ON and measure the voltage between the signal terminal on the encapsulated harness side of the connector and a battery ground: If the measured voltage is approximately 3.5 V – Proceed to step 4. If the measured voltage is approximately above 0.0 V – Proceed to step 3. Step ID 3439c SRT Step 3 With key OFF, disconnect the encapsulated harness at the PCI connector. Turn the key ON, and measure the voltage between the signal terminal of the PCI and a

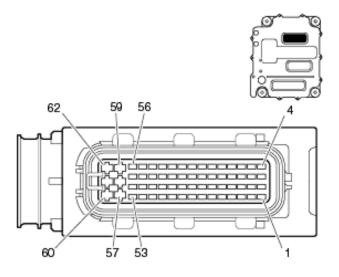


	battery ground:				
	 If the measured voltage is approximately 3.5 V – Replace the encapsulated 				
	harness. Proceed to the verification procedure listed at the end of this				
	document.				
	 If the measured voltage is approximately above 0.0 V – Proceed to step 5. 				
	Step 4 Step ID 3439d SRT				
	With key OFF, disconnect the signal connector from the engine brake solenoid.				
	Turn the key ON, and measure the voltage between the signal terminal wire and a				
	battery ground:				
	If the measured voltage is approximately 3.5 V – Proceed to the				
	verification procedure listed at the end of this document.				
	If the measured voltage is approximately above 0.0 V – Replace the pass-				
	through harness. Proceed to the verification procedure listed at the end of this document.				
	this document.				
	Step 5 Step ID 3439e SRT				
	Possible PCI failure - Contact the Engine Support Center for further instructions				
	about replacing the PCI.				
Verification Drive Cycle	To validate the repair:				
	With DAVIE connected and key ON, clear the errors. Start the engine and let it idle to				
	verify with DAVIE that the errors do not recur.				
	Back to Choose Code				
	Back to Index				

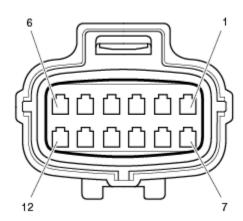


Code number	P3440					
Fault code description	Engine brake solenoid valve Cylinder 5 – Voltage too high or short circuit to supply on					
rauit code description	ECU D420 pin A13					
Fault code information	1 trip red fault lamp					
rault code illiorillation	3 drive cycle recovery					
	Readiness group – None					
	Freeze frame type – Comprehensive					
Description of component(s)	This information will be added to the diagnostic when it becomes available.					
Location of component(s)	This intermution will be duded to the diagnostic when it becomes available.					
Location of component(s)	L151					
Diagnostic condition	This information will be added to the diagnostic when it becomes available.					
Set condition of fault code	This information will be added to the diagnostic when it becomes available.					
Reset condition of fault code	This information will be added to the diagnostic when it becomes available.					
Electrical diagram(s)						
	D420 A17 A18 A16 A15 A24 A23 A21 A22 A13 A14 A20 A19 4 10 5 11 6 12 B460 B461 L147 L148 L149 L150 L151 L152 I401918					





Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view

B460	connector cylinders 1-3
B461	connector cylinders 4-6
D420	PCI ECU
L147	MX Engine Brake solenoid valve cylinder 1
L148	MX Engine Brake solenoid valve cylinder 2
L149	MX Engine Brake solenoid valve cylinder 3
L150	MX Engine Brake solenoid valve cylinder 4
L151	MX Engine Brake solenoid valve cylinder 5
L152	MX Engine Brake solenoid valve cylinder 6

D420	B460	L147	L148	L149	Function
A15	11		1		Ground
A16	5		1		Signal, MX Engine Brake solenoid valve cylinder 2
A17	4	1			Signal, MX Engine Brake solenoid valve cylinder 1
A18	10	1			Ground
A23	12			1	Ground
A24	6			1	Signal, MX Engine Brake solenoid valve cylinder 3



	MX Er	ngine B	rakes (cylind	er 4-6			
		_		•	L152	Funct	ion	
	A13	5		1		Signa	I, MX Engine Brake solenoid valve cylinder 5	
	A14	11		1		Grou	•	
	A19	12			1	Grou		
		6			1		I, MX Engine Brake solenoid valve cylinder 6	
	A21		1		_	_	I, MX Engine Brake solenoid valve cylinder 4	
	A21	10	1			Grou	,	
Technical data				NAVE	ngino D		olenoid valve cylinder 1 (L147)	
reclifical data		ration	check,	IVIA	iigiiie b	iake so	oleffold valve cyffider 1 (L147)	
	РТЕРА		the ign	vition (off			
		•	_		ector B	160		
							nnector B460	
		Pin		n wiin Pin	iig iiaiii	1633 60	Timector b400	
					V	عاراه	Additional information	
	(,)	4		100e, 10			Resistance value at 20°C [68°F]	
		4		10	<u> 1</u> 3	0.5 12	Resistance value at 20 C [00 F]	
	Comn	onont	مامماد	NAVE	naina D	ماده د	alanaid valva sylindar 2 (L148)	
	Component check, MX Engine Brake solenoid valve cylinder 2 (L148) Preparation							
	РТЕРА		tha ian	vition (off			
	Key the ignition offDisconnect connector B460							
							anactor P460	
		in		ii wiii Pin	iig iiai i	1633 CO	nnector B460	
					٧	میباد/	Additional information	
		5		11				
	,	5	•	11	I	0.5 12	Resistance value at 20°C [68°F]	
	Component check, MX Engine Brake solenoid valve cylinder 3 (L149) Preparation							
	Key the ignition off							
	Disconnect connector B460							
	Measure on wiring harness connector B460							
	Pin Pin							
		robe)		robe)	Va	alue	Additional information	
	1	6		12			Resistance value at 20°C [68°F]	
	2 20.5 12 Resistance value at 20 C [00 1]							
	Component check, MX Engine Brake solenoid valve cylinder 4 (L150) Preparation							
	Key the ignition off							
	Disconnect connector B461							
							nnector B461	
	F	Pin		Pin				
		robe)		robe)	V	alue	Additional information	
	'	4		10		86.5 Ω		
		•	•		± 5		Resistance value at 20 e [00 1]	
	-	onent ration	check,	MX E	ngine B	rake so	olenoid valve cylinder 5 (L151)	



	Key t	he ignition of	f					
	Disconnect connector B461							
	Measure on wiring harness connector B461							
	Pin Pin							
	(+ probe)	(- probe)	Value	Additional information	n			
	5	11	± 36.5 Ω	Resistance value at 20	°C [68°F]			
			_ 00.0 11					
	Component check, MX Engine Brake solenoid valve cylinder 6 (L152)							
	Preparation							
	Key t	he ignition of	f					
	-	nnect connec						
	Meas	sure on wiring	harness co	nnector B461				
	Pin	Pin	,					
	(+ probe)	(- probe)	Value	Additional information	n			
	6	12		Resistance value at 20				
Possible causes				diagnostic when it beco				
Additional information		l information		Alagnostic Wilein it beed	ines available.			
Diagnostic Step-by-Step				teps below using the bi	reakout harness, if			
Linguistic step by step			_	-	ensors, electrical control			
		• •		bing is not recommend	•			
	Contract of the last of the la		•	ld always be in the OFF	_			
		_		lectrical components in	-			
		_	_	ical components.				
	·		-	•	troubleshooting process			
			in multiple	_	Вресов			
	L.		•		and pinout locations.			
	For specific electrical component information and pinout locations, always refer to the technical data.							
	It is necessary to exit the fault code menu in DAVIE and run the							
	diagnostic test again to identify a change in errors.							
	Remember that the truck's operational or mechanical issues may be							
	the root cause of both active and inactive fault codes. Refer to the							
	'possible causes' section.							
	· ·							
	Step 1		Step ID 3	3440a SR1	Γ			
	Visual inspection - Visually inspect all applicable connectors and harnesses for							
	corrosion, damage and rubbing during each step of the diagnostic procedure.							
	Proceed to step 2.							
	Step 2		Step ID 3	3440b SR1	Γ			
	With key Of	F, disconnect	the pass-th	rough connector locate	ed on the exterior of			
	the engine.	Turn the key	ON and mea	sure the voltage betwe	een the signal terminal			
	on the enca	psulated harr	ess side of	the connector and a bat	ttery ground:			
	• If th	ne measured v	oltage is ap	proximately 3.5 V – Pro	oceed to step 4.			
				proximately 4.75 V – Pr	-			
				. ,	,			
	Step 3		Step ID 3	3440c SR1	Γ			
	· · · · · · · · · · · · · · · · · · ·	F, disconnect		ulated harness at the Po	CI connector. Turn the			
	1 1		•	ween the signal termin				
	battery grou		J	J				
	, , , ,							

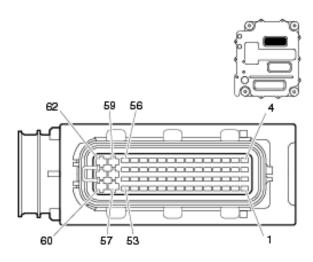


	 If the measured voltage is approximately 3.5 V – Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document. If the measured voltage is approximately 4.75 V – Proceed to step 5. 							
	Step 4	Step ID 3440d	SRT					
	 With key OFF, disconnect the signal connector from the engine brake solenoid. Turn the key ON, and measure the voltage between the signal terminal wire and a battery ground: If the measured voltage is approximately 3.5 V – Proceed to the verification procedure listed at the end of this document. If the measured voltage is approximately 4.75 V – Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document. 							
	Step 5 Step ID 3440d SRT							
	Possible PCI failure - Contact the Engine Support Center for further instructions about replacing the PCI.							
Verification Drive Cycle	To validate the repair:							
	With DAVIE connected and key ON, clear the errors. Start the engine and let it idle to verify with DAVIE that the errors do not recur.							
			Back to Choose Code					
			Back to Index					

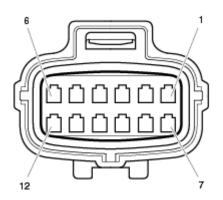


Code number	P3445						
	Engine brake solenoid valve Cylinder 6 - Current too low or open circuit on ECU D420 pin						
Fault code description	A20						
Foult and information							
Fault code information	This information will be added to the diagnostic when it becomes available.						
Description of component(s)	This information will be added to the diagnostic when it becomes available.						
Location of component(s)	L152						
Diagnostic condition	This information will be added to the diagnostic when it becomes available.						
Set condition of fault code	This information will be added to the diagnostic when it becomes available.						
Reset condition of fault code Electrical diagram(s)	This information will be added to the diagnostic when it becomes available. D420						





Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view

B460 connector cylinders 1-3

B461 connector cylinders 4-6

D420 PCI ECU

L147 MX Engine Brake solenoid valve cylinder 1

L148 MX Engine Brake solenoid valve cylinder 2

L149 MX Engine Brake solenoid valve cylinder 3

L150 MX Engine Brake solenoid valve cylinder 4

L151 MX Engine Brake solenoid valve cylinder 5

L152 MX Engine Brake solenoid valve cylinder 6

U		,			
D420	B460	L147	L148	L149	Function
A15	11		1		Ground
A16	5		1		Signal, MX Engine Brake solenoid valve cylinder 2
A17	4	1			Signal, MX Engine Brake solenoid valve cylinder 1
A18	10	1			Ground
A23	12			1	Ground
A24	6			1	Signal, MX Engine Brake solenoid valve



	cylinder 3							
	MX Engine Brakes cylinder 4-6							
	D420 B461 L150 L151 L152 Function							
	A13 5 Signal, MX Engine Brake solenoid valve cylinder 5							
	A14 11 1 Ground							
	A19 12 1 Ground							
	A20 6 Signal, MX Engine Brake solenoid valve cylinder 6							
	A21 4 1 Signal, MX Engine Brake solenoid valve cylinder 4							
	A22 10 1 Ground							
Technical data	Component check, MX Engine Brake solenoid valve cylinder 1 (L147) Preparation							
	Key the ignition off							
	Disconnect connector B460							
	Measure on wiring harness connector B460							
	Pin Pin							
	(+ probe) (- probe) Value Additional information							
	4 10 ± 36.5 Ω Resistance value at 20°C [68°F]							
	 Key the ignition off Disconnect connector B460 Measure on wiring harness connector B460 							
	Pin Pin							
	(+ probe) (- probe) Value Additional information							
	5 11 ± 36.5 Ω Resistance value at 20°C [68°F]							
	Component check, MX Engine Brake solenoid valve cylinder 3 (L149) Preparation							
	Key the ignition off							
	Disconnect connector B460							
	Measure on wiring harness connector B460							
	Pin Pin							
	(+ probe) (- probe) Value Additional information							
	6 12 \pm 36.5 Ω Resistance value at 20°C [68°F]							
	Component check, MX Engine Brake solenoid valve cylinder 4 (L150) Preparation							
	Key the ignition offDisconnect connector B461							
	 Measure on wiring harness connector B461 Pin Pin 							
	(+ probe) (- probe) Value Additional information							
	(+ probe) (- probe) Value Additional information 4 10 \pm 36.5 Ω Resistance value at 20°C [68°F]							



	Component check, MX Engine Brake solenoid valve cylinder 5 (L151)							
	Preparation							
	Key the ignition off							
	Disconnect connector B461							
	Measure on wiring harness connector B461							
	Pin Pin							
	(+ probe)	(- probe)	Value	Additional information				
	5	11	± 36.5 Ω	Resistance value at 20°C [68°F]				
	Component check, MX Engine Brake solenoid valve cylinder 6 (L152) Preparation • Key the ignition off • Disconnect connector B461							
		sure on wiring		nector B461				
	Pin	Pin						
	(+ probe)	(- probe)	Value	Additional information				
	6	12	± 36.5 Ω	Resistance value at 20°C [68°F]				
Possible causes	This informat	ion will be add	ded to the dia	agnostic when it becomes available.				
Additional information	This informat	ion will be add	ded to the dia	agnostic when it becomes available.				
Diagnostic Step-by-Step	/\ Perfo	rm the troubl	eshooting ste	eps below using the breakout harness, if				
	units harnedisco dama	, and harnesse ess. The ignition nnecting elect age to electrica Disconnect will result i For specific always refe It is necess diagnostic Remember	es. Back probion should alwarical component ing the EAS con multiple ender to the techary to exit the test again to that the true of both activition.	onnectors during the troubleshooting process rors. mponent information and pinout locations, nical data. e fault code menu in DAVIE and run the identify a change in errors. ck's operational or mechanical issues may be the e and inactive fault codes. Refer to the 'possible				
	Step 1		Step ID 34	l.				
	Visually inspect all applicable connectors (bent, broken, corroded or loose pins) and harnesses for corrosion, damage, and rubbing during each step of the diagnostic procedure. Proceed to step 2.							
	Step 2		Step ID 34	45b SRT				
	<u> </u>	E disconnect	<u> </u>	ough connector located on the exterior of				
	the engine. on the enca • If th	Turn the key (psulated harn ne measured v	ON, and meas ess and a bat oltage is appr	sure the voltage between the signal terminal				
	Step 3 Step ID 3445c SRT							
	with key Ol	-r, aisconnect	tne pass-thro	ough connector and measure the resistance				



between the ground terminal on the encapsulated harness and a battery ground:

- Closed circuit found Proceed to step 4.
- If open circuit or >100,000 ohms are found Proceed to step 8.

Step 4 Step ID 3445d SRT

With key OFF, disconnect the signal connector circuit from the engine brake solenoid. Turn the key ON, and measure the voltage between the signal terminal connector and a battery ground:

- If the measured voltage is approximately 3.5 V Proceed to step 5.
- If the measured voltage is 0.0 V Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.

Step 5 Step ID 3445e SRT

With key OFF, disconnect the ground connector from the engine brake solenoid, and measure the resistance between the ground terminal wire and battery ground:

- Closed circuit found Proceed to step 6.
- If open circuit or >100,000 ohms are found Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.

Step 6 Step ID 3445f SRT

With key OFF, disconnect both connectors from the engine brake solenoid, and measure the resistance between the terminals on the solenoid (refer to your multimeter operation manual for the correct resistance test procedure).

- Closed circuit found Proceed to step 7.
- If open circuit or >100,000 ohms are found Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.

Step 7 Step ID 3445g SRT

With key OFF, disconnect the encapsulated harness at the PCI. Turn the key ON, and measure the voltage between the engine brake signal circuit terminal of the PCI and battery ground:

- If the measured voltage is approximately 3.5 V Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document.
- If the measured voltage is 0.0 V Proceed to step 9.

Step 8 Step ID 3445h SRT

With key OFF, disconnect the encapsulated harness at the PCI, and measure the resistance across the ground terminal on the PCI and a battery ground:

- Closed circuit found Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document.
- If open circuit or >100,000 ohms are found Proceed to step 9.

Step 9 Step ID 3445i SRT

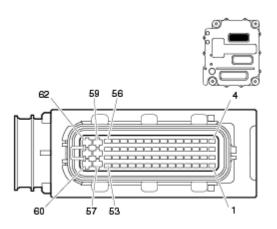
Possible PCI failure – Contact the Engine Support Center for further instructions about replacing the PCI.



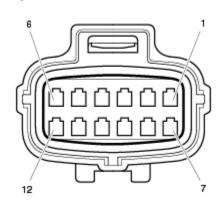
Verification Drive Cycle	To validate the repair: With DAVIE connected and key ON, clear the errors. Start the engine and let it idle to verify with DAVIE that the errors do not recur.
	Back to Choose Code Back to Index



Code number	P3447							
Fault code description	Engine brake solenoid valve Cylinder 6 - Voltage too low or short circuit to ground on							
	ECU D420 pin A20							
Fault code information	This information will be added to the diagnostic when it becomes available.							
Description of component(s)	This information will be added to the diagnostic when it becomes available.							
Location of component(s)	5							
Location of component(s)	L152							
Diagnostic condition	This information will be added to the diagnostic when it becomes available.							
Set condition of fault code	This information will be added to the diagnostic when it becomes available.							
Reset condition of fault code	This information will be added to the diagnostic when it becomes available.							
Electrical diagram(s)	B450 B460 B47 A18 A16 A15 A24 A23 A21 A22 A13 A14 A20 A19 4 10 5 11 6 12 4 10 5 11 8 12 B461 L147 L148 L149 L150 L151 L152							



Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view

B460 connector cylinders 1-3

B461 connector cylinders 4-6

D420 PCI ECU

L147 MX Engine Brake solenoid valve cylinder 1

L148 MX Engine Brake solenoid valve cylinder 2

L149 MX Engine Brake solenoid valve cylinder 3

L150 MX Engine Brake solenoid valve cylinder 4

L151 MX Engine Brake solenoid valve cylinder 5

L152 MX Engine Brake solenoid valve cylinder 6

MX Engine Brakes cylinder 1-3

D420	B460	L147	L148	L149	Function
A15	11		1		Ground
A16	5		1		Signal, MX Engine Brake solenoid valve cylinder 2
A17	4	1			Signal, MX Engine Brake solenoid valve cylinder 1
A18	10	1			Ground
A23	12			1	Ground
A24	6			1	Signal, MX Engine Brake solenoid valve cylinder 3



	_	akes cylinder			
	D420 B4	61 L150 L:	151 L152	Function	
	A13 5	1		Signal, MX Engine Brake solenoid valve cylinder 5	
	A14 11	1		Ground	
	A19 12	1	1	Ground	
	A13 12		1	Signal, MX Engine Brake solenoid valve	
	A20 6		1	cylinder 6	
	A21 4	1		Signal, MX Engine Brake solenoid valve	
	A21 4	1		cylinder 4	
	A22 10	1		Ground	
Technical data	Component	check, MX En	igine Brake s	solenoid valve cylinder 1 (L147)	
	Preparation				
		the ignition o			
		onnect conne			
	• Mea	asure on wirin Pin	ig harness co	onnector B460	
	(+ probe)		Value	Additional information	
	4	(- probe) 10	± 36.5 Ω		
		10	± 30.3 12	Resistance value at 20 0 [00 1]	
	Component	check. MX En	ngine Brake s	solenoid valve cylinder 2 (L148)	
	Preparation	,	0	(-,	
	• Key	the ignition o	off		
	• Disc	Disconnect connector B460			
		 Measure on wiring harness connector B460 			
	Pin	Pin			
	(+ probe)				
	5	11	± 36.5 Ω	Resistance value at 20°C [68°F]	
	Component	Component check, MX Engine Brake solenoid valve cylinder 3 (L149)			
	Preparation	CHECK, IVIA EI	igille blake :	Solellold valve cyllider 3 (L149)	
	,	the ignition o	off		
		connect conne			
				onnector B460	
	Pin	Pin	Ü		
	(+ probe)	(- probe)	Value	Additional information	
	6	12	± 36.5 Ω	Resistance value at 20°C [68°F]	
	-	Component check, MX Engine Brake solenoid valve cylinder 4 (L150)			
	· ·	Preparation (Kayatha invition off			
		the ignition o			
		connect conne		onnector R461	
	Pin	Pin	ig 11a111655 C	onnector B461	
	(+ probe)	(- probe)	Value	Additional information	
	4	10	± 36.5 Ω		
			-	• •	



	Component check, MX Engine Brake solenoid valve cylinder 5 (L151)					
	Preparation					
	Key the ignition off					
	• Disco	onnect connec	tor B461			
	Measure on wiring harness connector B461					
	Pin	Pin Pin				
	(+ probe)	(- probe)	Value	Additional information		
	5	11	± 36.5 Ω	Resistance value at 20°C [68°F]		
	Preparation	check, MX Eng		enoid valve cylinder 6 (L152)		
	• Disco	onnect connec	tor B461			
	• Mea	sure on wiring	harness conr	nector B461		
	Pin	Pin				
	(+ probe)	(- probe)	Value	Additional information		
	6	12	± 36.5 Ω	Resistance value at 20°C [68°F]		
Possible causes	This informa	tion will be add	ded to the dia	agnostic when it becomes available.		
Additional information	This informa	tion will be add	ded to the dia	agnostic when it becomes available.		
Diagnostic Step-by-Step	nece units the h	ssary, to check a, and harnesse harness. The ig lecting or disco hood of damag Disconnect will result i For specific always refe It is necess diagnostic Remember the root ca	e electrical co es. Back probi nition should onnecting elec ge to electrica ing the EAS co n multiple error e electrical co er to the technary to exit the test again to it	mponent information and pinout locations, nical data. fault code menu in DAVIE and run the identify a change in errors. k's operational or mechanical issues may be ctive and inactive fault codes. Refer to the		
	and harnes		on, damage, a	rs (bent, broken, corroded or loose pins) and rubbing during each step of the		
	Step 2		Step ID 34	47b SRT		
		FF, disconnect		ough connector located on the exterior of		
	on the enca	psulated harn ne measured v	ess side of the oltage is appr	ure the voltage between the signal terminal e connector and a battery ground: roximately 3.5 V – Proceed to step 4. roximately 0.0 V – Proceed to step 3.		
	Step 3 With key O	FF, disconnect	Step ID 34- the encapsula	47c SRT ated harness at the PCI connector. Turn the		
	., ,	· · · · · · · · · · · · · · · · · · ·				

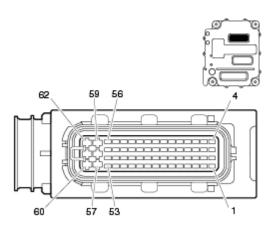


	 key ON, and measure the voltage between the signal terminal of the PCI and a battery ground: If the measured voltage is approximately 3.5 V – Replace the encapsulated harness. Proceed to the verification procedure listed at the end of this document. If the measured voltage is approximately 0.0 V – Proceed to step 5. 				
	Step 4	Step ID 3447d	SRT		
	· •	<u> </u>	the engine brake solenoid.		
	•	_	the signal terminal wire and a		
	battery ground:				
		voltage is approximately 3.5 edure listed at the end of the			
	If the measured voltage is approximately 0.0 V – Replace the pass-through harness. Proceed to the verification procedure listed at the end of this document.				
	Step 5	Step ID 3447e	SRT		
	Possible PCI failure - Contact the Engine Support Center for further instructions about replacing the PCI.				
Verification Drive Cycle	To validate the repair:				
	With DAVIE connected and key ON, clear the errors. Start the engine and let it idle to verify with DAVIE that the errors do not recur.				
			Back to Choose Code		
			Back to Index		

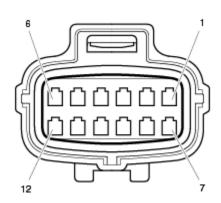


P3448

P3448
Engine brake solenoid valve Cylinder 6 – Voltage too high or short circuit to supply on
ECU D420 pin A20
1 red fault lamp
·
3 drive cycle recovery
Readiness group – None
Freeze frame type – Comprehensive
This information will be added to the diagnostic when it becomes available.
L152
This information will be added to the diagnostic when it becomes available.
This information will be added to the diagnostic when it becomes available.
This information will be added to the diagnostic when it becomes available.
D420 A17 A18 A16 A15 A24 A23 A21 A22 A13 A14 A20 A19 4 10 5 11 6 12 4 10 5 11 8 12 B461 L147 L148 L140 L150 L151 L152



Wiring harness connector D420.A front view



Wiring harness connector B460 & B461 front view

B460 connector cylinders 1-3

B461 connector cylinders 4-6

D420 PCI ECU

L147 MX Engine Brake solenoid valve cylinder 1

L148 MX Engine Brake solenoid valve cylinder 2

L149 MX Engine Brake solenoid valve cylinder 3

L150 MX Engine Brake solenoid valve cylinder 4

L151 MX Engine Brake solenoid valve cylinder 5

L152 MX Engine Brake solenoid valve cylinder 6

MX Engine Brakes cylinder 1-3

D420	B460	L147	L148	L149	Function
A15	11		1		Ground
A16	5		1		Signal, MX Engine Brake solenoid valve cylinder 2
A17	4	1			Signal, MX Engine Brake solenoid valve cylinder 1
A18	10	1			Ground
A23	12			1	Ground
A24	6			1	Signal, MX Engine Brake solenoid valve cylinder 3



	1					
	47.5					
	_	akes cylinder 4-6				
	D420 B46	61 L150 L151				
	A13 5	1	valve cy	MX Engine Brake solenoid rlinder 5		
	A14 13	1 1	Ground			
	A19 12	2	1 Ground			
	A20 6		1 -	MX Engine Brake solenoid		
	7.20		valve cy			
	A21 4	1	Signai, i valve cy	MX Engine Brake solenoid rlinder 4		
	A22 10) 1	Ground			
Technical data	Component	check, MX Engine	e Brake solenoid	valve cylinder 1 (L147)		
	Preparation	_				
	• Key	the ignition off				
	• Disc	onnect connecto	r B460			
		sure on wiring h	arness connector	B460		
	Pin	Pin				
	(+ probe)					
	4	10	± 36.5 Ω	Resistance value at 20°C [68°F]		
	Preparation • Key • Disc	the ignition off onnect connecto	r B460	valve cylinder 2 (L148)		
	• Mea	isure on wiring na Pin	arness connector	s connector B460		
	(+ probe)		Value	Additional information		
	5	11	± 36.5 Ω	Resistance value at 20°C [68°F]		
	Component	check MX Engine	e Brake solenoid	valve cylinder 3 (L149)		
	Preparation		0 2. a 0 00.0 0	(12.15)		
		the ignition off				
	• Disc	onnect connecto	r B460			
	• Mea	sure on wiring h	arness connector	r B460		
	Pin	Pin				
	(+ probe)	(- probe)	Value	Additional information		
	6	12	± 36.5 Ω	Resistance value at 20°C [68°F]		
	Preparation • Key	the ignition off		valve cylinder 4 (L150)		
		onnect connecto		r R461		
	Measure on wiring harness connector B461 Big					
	Pin	Pin				
	Pin (+ probe)	Pin (- probe)	Value	Additional information		



	•	Component check, MX Engine Brake solenoid valve cylinder 5 (L151)					
	,	Preparation					
	-						
		Disconnect connector B461					
	• Mea	Measure on wiring harness connector B461					
	Pin	Pin Pin					
	(+ probe)	(- probe)	Value	Additional inf	formation		
	5	11	± 36.5 Ω	Resistance va	lue at 20°C [68°F]		
	Component check, MX Engine Brake solenoid valve cylinder 6 (L152) Preparation • Key the ignition off • Disconnect connector B461						
	• Mea	sure on wiring	harness conn	ector B461			
	Pin	Pin					
	(+ probe)	(- probe)	Value	Additional info	ormation		
	6	12	± 36.5 Ω	Resistance val	ue at 20°C [68°F]		
Possible causes	Faulty wi	ring					
	Faulty co	nnector					
	-	lenoid valve					
Additional information		l information a	available.				
Diagnostic Step-by-Step				ns helow using t	he breakout harness, i	f	
	control dama when the li	rol units, and hage the harness connecting of kelihood of day Disconnect process with For specific always referred it is necess diagnostic Remember the root ca	narnesses. Backs. The ignition of disconnection of disconnection of the EAS could result in much electrical context to the technary to exit the test again to inter that the tructuse of both a guses' section	ck probing is not a should always ag electrical component onnectors during liple errors. In a change the fault code mendentify a change k's operational cotive and inactive.	g the troubleshooting ation and pinout location and pinout location in DAVIE and run the ein errors. For mechanical issues me fault codes. Refer to	ions,	
	Step 1		Step ID 34		SRT		
				· ·	, corroded or loose		
				-	during each step of		
	the diagnos	tic procedure.	Proceed to st	ep 2.			
					T	_	
	Step 2		Step ID 34	48b	SRT		
	With key Of	F, disconnect	the pass-thro	ugh connector le	ocated on the exterior		
	of the engir	e. Turn the ke	y ON and me	asure the voltage	e between the signal		
	terminal on	the encapsula	ited harness s	ide of the conne	ector and a battery		
	ground:						
	• If th	ne measured v	oltage is appr	oximately 3.5 V	– Proceed to step 4.		
					/ – Proceed to step 3.		
					•		



	Step 3	Step ID 3448c	SRT					
	With key OFF, disc	onnect the encapsulated harne	ss at the PCI connector.					
	Turn the key ON, a	Turn the key ON, and measure the voltage between the signal terminal of the						
	PCI and a battery g	PCI and a battery ground:						
		If the measured voltage is approximately 3.5 V – Replace the						
	-	encapsulated harness. Proceed to the verification procedure listed at						
		the end of this document.						
	If the mea	• If the measured voltage is approximately 4.75 V – Proceed to step 5.						
	Step 4	Step ID 3448d	SRT					
		onnect the signal connector fro						
	-	key ON, and measure the volta	_					
	terminal wire and	•						
		sured voltage is approximately	3.5 V – Proceed to the					
		n procedure listed at the end of						
	If the mea	If the measured voltage is approximately 4.75 V – Replace the pass-						
	through harness. Proceed to the verification procedure listed at the							
	end of this document.							
	Chan E							
	Step 5	Step ID 3448e	SRT					
	Possible PCI failure - Contact the Engine Support Center for further instructions about replacing the PCI.							
	instructions about	replacing the PCI.						
	Step 6	Step ID 3448f	SRT					
		•						
		For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the Engine Support Call Center						
	at 1-800-477-025	•						
Verification Drive Cycle	To validate the repa	nir:	<u>, </u>					
	With DAVIE connect	ted and key ON, clear the error	s. Start the engine and let it idle to					
	verify with DAVIE th	nat the errors do not recur						
			Back to Choose Code					
			Back to Index					



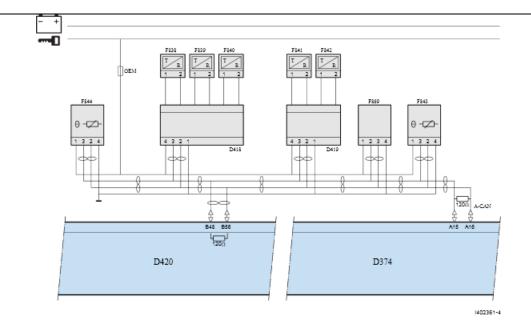
P3750

Code number	P3750					
Fault code description	Exhaust gas temperature before DOC - Voltage too high or short circuit to supply					
Fault code information	1 trip MIL 3 drive cycle recovery Readiness group – None Freeze frame type –NMHC					
Description of	DOC/DPF temperature sensors ECU (D418)					
component(s)	The exhaust gas temperature is measured at three different positions in the DOC/DPF unit.					
	 The temperature sensors are connected to the DOC/DPF temperature sensors ECU (D418). 					
	• The DOC/DPF temperature sensors ECU (D418) transmit the temperature sensor values to the A-CAN.					
	 The temperature sensors cannot be disconnected or replaced separately from the DOC/DPF temperature sensors ECU (D418). 					
	The temperature sensors are thermocouple sensors.					
	Exhaust gas temperature sensor before DOC (F838)					
	Measure the exhaust gas temperature before the DOC.					
	Effect on the system:					
	• Calculates the temperature rise over the DOC, in combination with the signal of the exhaust gas temperature sensor before DPF (F839).					
	Determines whether a regeneration can be started.					
	Calculates the amount of fuel that must be injected.					
	 Determines whether the NOx sensor before the catalyst must be heated to the operating temperature. 					
	Warning activation if the exhaust gas temperature before the DOC is too high.					
	Exhaust gas temperature sensor before DPF (F839)					
	Measure the exhaust gas temperature before the DPF.					
	Effect on the system:					
	• Calculates the temperature rise over the DOC, in combination with the signal of the exhaust gas temperature sensor before DOC (F838).					
	Determines whether a regeneration is started.					
	Controls the regeneration temperature.					
	Calculates the amount of fuel that must be injected.					
	Diagnoses DOC efficiency.					



	Warning activation if the exhaust gas temperature before the DPF is too high.					
	Exhaust gas temperature sensor after DPF (F840)					
	Measure the exhaust gas temperature after the DPF.					
	Effect on the system:					
	Protect the DPF against temperatures that are too high.					
	Warning activation if the exhaust gas temperature after the DPF is too high.					
Location of component(s)	DOC/DPF temperature sensors ECU (D418)					
	F839 D418					
	1402018					
	F838 F839					
Diagnostic condition	This diagnostic runs continuously when the ignition is on.					
Set condition of fault code	A short circuit to supply or open circuit occurs for 10 consecutive seconds.					
Reset condition of fault code	This DTC changes to inactive after the diagnostic runs and passes.					
Electrical diagram(s)	DOC/DPF temperature sensors ECU (D418, with F838, F839, and F840)					





D374 EAS-3 ECU

D418 DOC/DPF temperature sensors ECU

D419 Catalytic convertor temperature sensors ECU

D420 PCI ECU

F838 Sensor, exhaust temperature before DOC

F839 Sensor, exhaust temperature before DPF

F840 Sensor, exhaust temperature after DPF

F841 Sensor, exhaust temperature before catalyst

F842 Sensor, exhaust temperature after catalyst

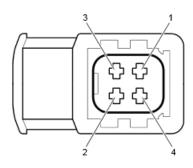
F843 NOx sensor after catalyst

F844 NOx sensor before catalyst

F869 NH3 sensor

D374	D418	Function	
A15	3	A-CAN High	
A16	2	-CAN Low	
	1	Ground	
	4	Power supply	





E504061

Wiring harness connector D418, front view

Technical data

Component & wiring check, DOC/DPF temperature sensors ECU (D418)

Preparation

- Disconnect connector D418
- Ignition switched to ON
- Measure on the connector D418

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
4	1	Ubat	
	Battery		
1	negative	< 0.5 V	Switch on all consumers
	pole		

Component & wiring check, A-CAN

Preparation

- Ignition switched to OFF
- Disconnect connector D418
- Measure on the connector D418

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
2	3	± 60 Ω	



Refer to the corresponding OEM service manual for more information regarding specific connector pin designations and locations specific to the vehicle.

Possible causes

- Malfunctioning DOC/DPF temperature sensors ECU (D418).
- Sensor signal wire short circuit to supply.



	Sensor signal wire open circuit.	
Additional information	The DOC/DPF temperature sensor ECU (open circuit.	D418) reports a short circuit to supply or
	An active mobile DPF regeneration is dis	abled.
	Only a stationary DPF regeneration is po	ssible.
	• The sensor value is replaced by the exha (F839).	ust gas temperature sensor before DPF
Diagnostic Step-by-Step	disconnecting electrical components. This troubleshooting procedure ground to the PCI are functioning	the OFF position when connecting or ents to reduce the likelihood of damage to the is based on the assumption that supply power and ag properly.
	 multiple errors. Specific electrical component ir procedure as a reference only. 	formation and pin out locations are provided in this Always refer to the technical data sections in
		changes. clear all current DTCs from the PCI and EAS-3 Check to identify a change in fault status.
		t of multiple failure modes. For proper fault ooting steps in the sequence provided.
	Step 1 Investigate Related DTCs	
	Before troubleshooting this DTC, take notice multiple other DTCs could have been the care	e of any other active or inactive DTCs. One or use for this DTC.
	Step 1A Investigate related DTCs	
	Action 1. Use DAVIE Diagnostics to perform	a Quick Check for current DTCs.
	Are these or any other related DTCs active	?
	P3942; P3943; P3945; P3987; P399	00
	Yes	No
	Refer to the troubleshooting information for these DTCs before performing this procedure.	
		Go to step 2A



Step 2 DOC/DPF Temperature Sensors ECU Module (D418) Checks

Step 2A Visual inspection, electrical connections

Action

- 1. Set the ignition switch to OFF.
- 2. Visually inspect the DOC/DPF temperature sensors ECU module (D418) component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded, or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - Damage to the ECU module

Were there any signs of the above?

Yes	No
Correct any issues found. Refer to step 3A to perform the corresponding repair verification cycles and rechecks.	Possible malfunction of the DOC/DPF temperature sensor ECU module (D418).
If this DTC is still present, go to step 2B	Go to step 2B

Step 2B Electrical checks, resistance, DOC/DPF Temperature Sensors ECU Module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect DOC-DPF temperature sensor ECU (D418) connector.
- 3. Measuring between pins 3 and 2 on the D418 wiring harness connector, confirm the resistance value for the A-CAN connection as outlined in the corresponding checking data, "Component & wiring check, DOC/DPF temperature sensors ECU (D418).



Go to step 2C	Go to step 2D
Possible problem in the harness or ECU.	
Yes	No
Is the measured resistance value within expected range?	

Step 2C Electrical checks, supply voltage, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect DOC-DPF temperature sensor ECU (D418) connector.
- 3. Turn the key switch ON.
- 4. Measuring on the D418 connector, confirm the supply voltage value as outlined in the corresponding checking data, "Component & wiring check, DOC/DPF temperature sensors ECU (D418).

Are measured values within expected range?

Yes	No
	Possible problem in the harness.
Go to step 2E	Go to step 2D

Step 2D Electrical checks, open in harness, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.



Refer to the OEM service manual for more information regarding connector pin designation and locations specific to the vehicle.

Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect DOC-DPF temperature sensor ECU (D418) connector.



Check the ground connection between DOC/DPF temperature sensors ECU (D418) connector and the Power Distribution Center (PDC) / Chassis Load Center (CLC): Measure the resistance of the ground wire between the engine ground stud and the DOC/DPF temperature sensor ECU (D418) connector, pin 1. The expected value is < 10 ohms. Is the measured resistance less than 10 ohms? Yes No Possible open condition in the harness. Contact the PACCAR Engine Support Center for further assistance in diagnosing this issue, and possible replacement of the wiring harness. Refer to step 3A to perform the corresponding repair verification cycles and rechecks. Go to step 2E If this DTC is still present, contact the **PACCAR Engine Support Center for** further assistance in diagnosing this issue.

Step 2E Electrical checks, short in harness, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect the DOC/DPF temperature sensor ECU (D418) connector.
- 3. Measure the resistance between pin 1 and pin 4 of the DOC/DPF temperature sensor ECU (D418) connector.

Is the measured resistance greater than 100K ohms?

Yes	No
Likely issue with the DOC/DPF temperature sensor ECU module (D418). Replace this module. Refer to step 3A to perform the	Possible short condition in the harness. Contact the PACCAR Engine Support Center for further assistance in diagnosing this issue, and possible replacement of the wiring harness.



corresponding repair verification cycles and rechecks.	Refer to step 3A to perform the corresponding repair verification cycles and rechecks.
If all steps have been completed and this DTC is still present, contact the PACCAR Engine Support Center for further assistance.	If all steps have been completed and this DTC is still present, contact the PACCAR Engine Support Center for further assistance.

Step 3 Repair Verification

Step 3A Repair verification cycles

Perform these repair verification cycles following any corrective actions taken, to enable related OBD monitors to reach a readiness state associated with the DTC or system being investigated.



Before beginning these repair verification cycles, use the DAVIE Diagnostics, Quick Check function to clear all current DTCs from the PCI and EAS-3 ECUs.

Action

1. Steady State

This cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON.

With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.

Were the identified repair verification cycles able to be completed?

Yes	No
	Investigate and correct any issues preventing these repair verification cycles from being completed, then re-run. For additional assistance, contact the PACCAR Engine Support Center.
Go to step 3B	

Step 3B DAVIE Diagnostics, Quick Check



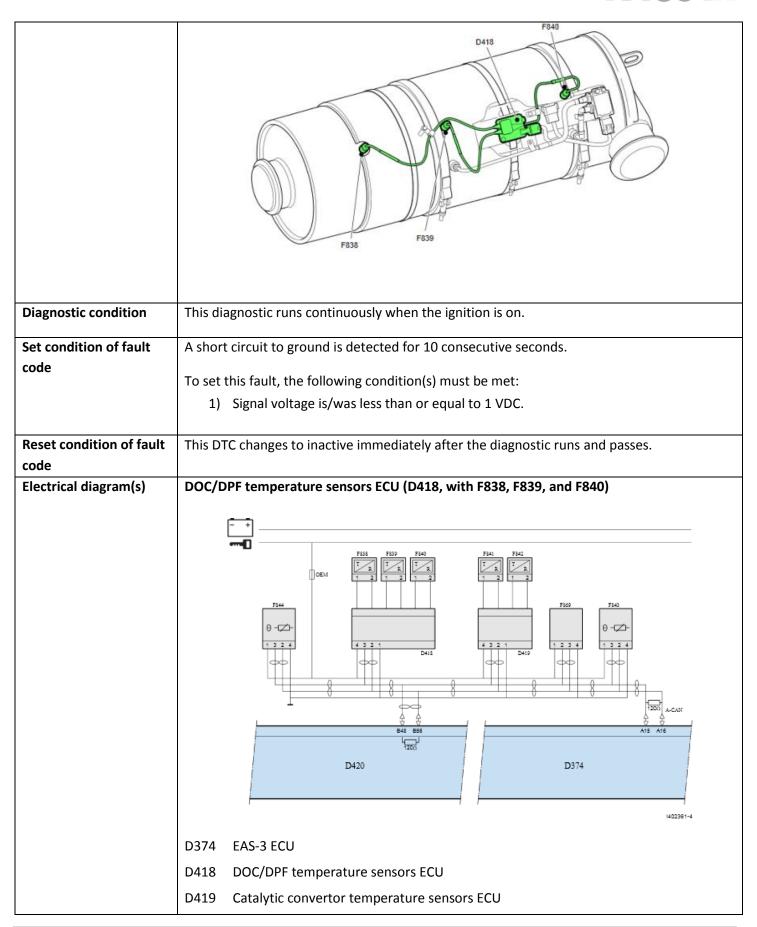
Acti	on	
	DAVIE Diagnostics to perform a Quiether the actions taken have cleared	ck Check for current DTCs to determine this DTC.
	 Confirm that the corresponding displayed as "Ready." 	OBD Monitor Readiness Status value is
	•	the corresponding OBD monitor has run s been resolved—no further action. ady," continue to action step 2.
	2. View the DTC overview display,	and confirm that P3750 has been cleared.
Has	P3750 been cleared?	
Yes		No
Prob	olem resolved. No further actions.	Continue with the next step in this troubleshooting procedure. If all steps have been completed and this DTC is still present:
		 continue to operate the truck to extend the run time, allowing the corresponding OBD monitor sufficient time to complete
		 or, return to step 3A and perform this repair verification again.
		If this issue is still present after extending or re-running the repair verification, contact the PACCAR Engine Support Center for further assistance.
Γi	Contacting the PACCAR Engine	Support Center
		ing this issue or for confirmation prior to the ents, contact the PACCAR Engine Support Call
		Back to Index



P3751

Code number	P3751
Fault code description	Exhaust gas temperature before DOC - Data valid but too low
Fault code information	1 trip MIL
	3 drive cycle recovery
	Readiness group – None
	Freeze frame type –NMHC
Description of	DOC/DPF temperature sensors ECU (D418, with F838, F839, and F840)
component(s)	The exhaust gas temperature is measured at three different positions in the DOC/DPF unit.
	 The temperature sensors are connected to the DOC/DPF temperature sensors ECU (D418).
	 The DOC/DPF temperature sensors ECU (D418) transmits the temperature sensor values to the A-CAN.
	The temperature sensors cannot be disconnected or replaced separately from the DOC/DPF temperature sensors ECU (D418).
	The temperature sensors are thermocouple sensors.
Location of	DOC/DPF temperature sensors ECU (D418, with F838, F839, and F840)
component(s)	F840
	F04U
	F839 D418
	1402018

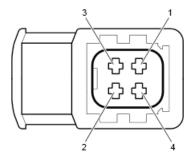






D420	PCI ECU
F838	Sensor, exhaust temperature before DOC
F839	Sensor, exhaust temperature before DPF
F840	Sensor, exhaust temperature after DPF
F841	Sensor, exhaust temperature before catalyst
F842	Sensor, exhaust temperature after catalyst
F843	NOx sensor after catalyst
F844	NOx sensor before catalyst
F869	NH3 sensor

D374	D418	Function
A15	3	A-CAN High
A16	2	A-CAN Low
	1	Ground
	4	Power supply



E504061

Wiring harness connector D418, front view

Technical data

Component & wiring check, DOC/DPF temperature sensors ECU (D418)

Preparation

- Disconnect connector D418
- Ignition switched to ON
- Measure on the connector D418

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
4	1	Ubat	10 to 14 VDC
	Battery		
1	negative	< 0.5 V	Switch on all consumers
	pole		



Component & wiring check, A-CAN

Preparation

- Ignition switched to OFF
- Disconnect connector D418
- Measure on the connector D418

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
2	3	~ 60 Ω	



Refer to the corresponding OEM service manual for more information regarding specific connector pin designations and locations specific to the vehicle.

Possible causes

- Malfunctioning DOC/DPF temperature sensors ECU (D418).
- Malfunctioning exhaust gas temperature sensor before DOC (F838)
- Open return/ground circuit in harness, connectors, or sensor.

Additional information

- The DOC/DPF temperature sensor ECU (D418) reports a short circuit to ground.
- Mobile active DPF regeneration is disabled.
- Only a stationary DPF regeneration is possible.
- The sensor value is replaced by the exhaust gas temperature sensor before DPF (F839).

Diagnostic Step-by-Step



The ignition should always be in the OFF position when connecting or disconnecting electric components to reduce the likelihood of damage to the components.



- This troubleshooting procedure is based on the assumption that supply power and ground to the
 PMCI are functioning properly.
- Disconnecting the PMCI connectors during the troubleshooting process will result in multiple en
- Specific electrical component information and pin out locations are provided in this procedure a
 reference only. Always refer to the technical data sections in Rapido for the most up-to-date
 changes.
- It is necessary to use DAVIE to clear all current trouble codes from the PCI and EAS-3 ECUs, then run the Quick Check to identify a change in fault status.
- This DTC can be set as a result of multiple failure modes. For proper fault isolation, complete a troubleshooting steps in the sequence provided.



Step 1. Investigate Related Trouble Codes

Before troubleshooting this code, take notice of any other active or inactive trouble codes. One or multiple other codes could have been the cause for this code.

Step 1.A Investigate related trouble codes

Action

1. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes.

Are these or any other related codes active?

P3942; P3943; P3945; P3987; P3990

Yes	No
Refer to the troubleshooting information for these codes before performing this procedure.	Go to step 2.A

Step 2. DOC/DPF Temperature Sensors ECU Module (D418) Checks

Step 2. A Visual inspection, electrical connections

Action

- 1. Set the ignition switch to OFF.
- 2. Visually inspect the DOC/DPF temperature sensors ECU module (D418) component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded, or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - Damage to the ECU module

Were there any signs of the above?		
Yes	No	
Correct any issues found. Refer to Step 3.A to perform the corresponding repair verification cycles and rechecks.	Possible malfunction of the DOC/DPF temperature sensor ECU module (D418).	
If this code is still present, go to Step 2.B	Go to step 2.B	



Step 2.B Electrical checks, resistance, DOC/DPF Temperature Sensors ECU Module (D418)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect DOC-DPF temperature sensor ECU (D418) connector.
- 3. Measuring between pins 3 and 2 on the D418 wiring harness connector, confirm the resistance value for the A-CAN connection as outlined in the corresponding checking data, "Component & wiring check, DOC/DPF temperature sensors ECU (D418).

|--|

is the measured value within expected range.	
Yes	No
	Possible problem in the harness or EAS-3 ECU.
Go to step 2.C	Go to step 2.D

Step 2.C Electrical checks, supply voltage, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect DOC-DPF temperature sensor ECU (D418) connector.
- 3. Turn the key switch ON.
- 4. Measuring on the D418 connector, confirm the supply voltage value as outlined in the corresponding checking data, "Component & wiring check, DOC/DPF temperature sensors ECU (D418).

Are measured values within expected range?

Yes	No
Possible problem with the DOC/DPF	Possible problem in the harness.
temperature sensors ECU module (D418).	
Go to step 2.E	Go to step 2.D



Step 2.D Electrical checks, open in harness, DOC/DPF temperature sensors ECU module (D418)			
	Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.		
	Refer to the OEM service manual for more information regarding specific pinout location/designation specific to the vehicle.		
Action			
1. Ensure the ignition	n switch is set to OFF.		
2. Disconnect DOC-D	PF temperature sensor ECU (D418) connector.		
_	(D418) connector and the Power Distribution Center (PDC) / Chassis Load Center		
	tance of the ground wire between the engine ground stud and perature sensor ECU (D418) connector, pin 1.		
Is the measured resistance	e less than 10 ohms?		
Yes	No		
	Possible open condition in the harness. Contact the PACCAR Engine Support Center for further assistance in diagnosing this issue, and possible replacement of the wiring harness.		
Go to step 2.E	Go to step 3.A to perform the corresponding repair verification cycles and rechecks.		
Step 2.E Electrical checks, short in harness, DOC/DPF temperature sensors ECU module (D418)			
Refer to the corresponding Checking Data in Engine Service – Rapido for associated supply and signal voltages, resistance values, and related connector pin test points.			
Action			
1. Ensure the ignition switch is set to OFF.			
2. Disconnect DOC-D	2. Disconnect DOC-DPF temperature sensor ECU (D418) connector.		
3. Measure the resistance between pin 1 and pin 4 of the DOC/DPF temperature sensor ECU (D418) connector.			
Is the measured resistance greater than 100K ohms?			
Ves	No		



Likely issue with the DOC/DPF temperature sensor ECU module (D418). Replace this module. Refer to step 3.A to perform the corresponding repair verification cycles and rechecks.	Possible short condition in the harness. Contact the PACCAR Engine Support Center for further assistance in diagnosing this issue, and possible replacement of the wiring harness. Go to step 3.A to perform the corresponding repair verification cycles and rechecks.
If all steps have been completed and this trouble code is still present, contact the PACCAR Engine Support Center for further assistance.	

Step 3. Repair Verification

Step 3.A Repair verification cycles

Perform these repair verification cycles following any corrective actions taken, to enable related OBD monitors to reach a readiness state associated with the trouble code or system being investigated.



Before beginning these repair verification cycles, use the DAVIE Diagnostics, Quick Check function to clear all current DTCs from the PCI and EAS-3 ECUs.

Action

1. Steady State

This cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON.

With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.

Were the identified repair verification cycles able to be completed?

Yes	No
	Investigate and correct any issues preventing these repair verification cycles from being completed, then re-run. For additional assistance, contact the PACCAR Engine Support Center.
Go to step 3.B	



	Step 3.B DAVIE Diagnostics, Quick Check Action 1. Use DAVIE Diagnostics to perform a Quick Check for current trouble codes to	
	determine whether the actions t	aken have cleared this trouble code.
	Has P3751 been cleared?	
	Yes	No
	Problem resolved. No further actions.	Continue with the next step in this troubleshooting procedure. If all steps have been completed and this trouble code is still present, contact the PACCAR Engine Support Center for further assistance.
		ng this issue or for confirmation prior to the nts, contact the PACCAR Engine Support Call Center.
		Back to Index



P3752

-	·
Code number	P3752
Fault code description	Exhaust gas temperature before DOC - Unlikely, not changing during operation
Fault code information	2 trip MIL 3 drive cycle recovery Readiness group – None Freeze frame type –NMHC
Description of component(s)	DOC/DPF temperature sensors ECU (D418)
	The exhaust gas temperature is measured at three different positions in the DOC/DPF unit.
	The temperature sensors are connected to the DOC/DPF temperature sensors ECU (D418).
	 The DOC/DPF temperature sensors ECU (D418) transmit the temperature sensor values to the A-CAN.
	The temperature sensors cannot be disconnected or replaced separately from the DOC/DPF temperature sensors ECU (D418).
	The temperature sensors are thermocouple sensors.
	Exhaust gas temperature sensor before DOC (F838)
	Measure the exhaust gas temperature before the DOC.
	Effect on the system:
	 Calculates the temperature rise over the DOC, in combination with the signal of the exhaust gas temperature sensor before DPF (F839). Determines whether a regeneration can be started.
	Calculates the amount of fuel that must be injected.
	Determines whether the NOx sensor before the catalyst must be heated to the operating temperature.
	Warning activation if the exhaust gas temperature before the DOC is too high.
	Exhaust gas temperature sensor before DPF (F839)
	Measure the exhaust gas temperature before the DPF.
	Effect on the system:
	Calculates the temperature rise over the DOC, in combination with the signal of the contract and the second process of the DOC (1932).
	exhaust gas temperature sensor before DOC (F838).Determines whether a regeneration is started.
	 Controls the regeneration temperature.
	 Calculates the amount of fuel that must be injected.
	Diagnoses DOC efficiency.
	 Warning activation if the exhaust gas temperature before the DPF is too high.
	1 2

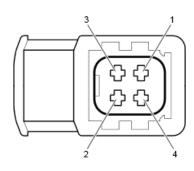


	Exhaust gas temperature sensor after DPF (F840)
	Measure the exhaust gas temperature after the DPF. Effect on the system.
	Effect on the system:
	Protect the DPF against temperatures that are too high.
	Warning activation if the exhaust gas temperature after the DPF is too high.
Location of component(s)	DOC/DPF temperature sensors ECU (D418, with F838, F839, and F840)
	F839 D418
	I402018
Diagnostic condition	P838 F839
Diagnostic condition	This diagnostic runs continuously when the entry conditions are fulfilled:
	Ignition is keyed on and the engine is running.
	No active faults on any sensor used to calculate the engine mass flow.
	No active faults on any of the EAS-3 exhaust gas temperature sensors.
	No active faults on the DPF pressure sensor (F837).
	No CAN communication faults on the EAS-3 exhaust gas temperature sensors.
	The exhaust gas flow must be high enough.
Set condition of fault code	The EAS-3 ECU (D374) detects that the difference between the exhaust gas temperature sensor before DOC (F838) data and the exhaust gas temperature sensor



	before DPF (F839) does not match the expected value for the present engine operating conditions.		
Reset condition of fault code	This DTC changes to inactive after the diagnostic runs and passes.		
Electrical diagram(s)	DOC/DPF temperature sensors ECU (D418, with F838, F839, and F840)		
	T34 D420 D374 EAS-3 ECU		
	D418 DOC/DPF temperature sensors ECU		
	D419 Catalytic convertor temperature sensors ECU D420 PCI ECU		
	F838 Sensor, exhaust temperature before DOC		
	F839 Sensor, exhaust temperature before DPF		
	F840 Sensor, exhaust temperature after DPF		
	F841 Sensor, exhaust temperature before catalyst		
	F842 Sensor, exhaust temperature after catalyst		
	F843 NOx sensor after catalyst		
	F844 NOx sensor before catalyst		
	F869 NH3 sensor		
	D374 D418 Function		
	A15 3 A-CAN High		
	A16 2 A-CAN Low		
	1 Ground		
	4 Power supply		





E504061

Wiring harness connector D418, front view

Technical data

Component & wiring check, DOC/DPF temperature sensors ECU (D418)

Preparation

- Disconnect connector D418
- Ignition switched to ON
- Measure on the connector D418

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
4	1	Ubat	10 to 14 VDC
1	Battery negative	< 0.5 V	Switch on all consumers
	pole	, 0.5 V	Switch on an consumers

Component & wiring check, A-CAN

Preparation

- Ignition switched to OFF
- Disconnect connector D418
- Measure on the connector D418

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
2	3	± 60 Ω	



Refer to the corresponding OEM service manual for more information regarding specific connector pin designations and locations specific to the vehicle.

Possible causes

• Malfunctioning DOC/DPF temperature sensors ECU (D418).



	Stuck in-range exhaust gas temperature	sensor before DOC (F838).
	Diesel Oxidation Catalyst (DOC) face plug	ging.
Additional information	First solve other EAS temperature so	ensor related DTCs.
	 The reading of the exhaust gas temp changing with changing conditions. 	erature sensor before DOC (F838) is not
Diagnostic Step-by-Step	disconnecting electrical components.	ne OFF position when connecting or nts to reduce the likelihood of damage to
	 This troubleshooting procedure in and ground to the PMCI are fund 	s based on the assumption that supply power ctioning properly.
	Disconnecting the PMCI connecting the PMC	tors during the troubleshooting process will
		ormation and pin out locations are provided in ly. Always refer to the technical data sections e changes.
		clear all current trouble codes from the PCI and Quick Check to identify a change in fault status.
		of multiple failure modes. For proper fault poting steps in the sequence provided.
	Step 1 Investigate Related DTCs Before troubleshooting this DTC, take notice or multiple other DTCs could have been the o	•
	Step 1A Investigate related DTCs	
	1. Use DAVIE Diagnostics to perform a	Quick Check for current DTCs.
	Are these or any other related DTCs active?	
	P3942; P3943; P3945; P3987; P3990 Yes	No
		NO .
	Refer to the troubleshooting information for these DTCs before performing this procedure.	
		Go to step 2A



Step 2 DOC/DPF Temperature Sensors ECU Module (D418) Checks

Step 2A Visual inspection, electrical connections Action 1. Set the ignition switch to OFF. 2. Visually inspect the DOC/DPF temperature sensors ECU module (D418) component connections and wiring for any of the following: Damaged or loose connectors Bent, broken, corroded, or loose connector pins Moisture or dirt in the connections Damage to the wire harness or insulation Damage to the ECU module Were there any signs of the above? Yes No Correct any issues found. Refer to step 4A to perform the corresponding repair verification cycles and rechecks. If this DTC is still present, go to step 2B Go to step 2B Step 2B Electrical checks, resistance, DOC/DPF temperature sensors ECU module (D418) Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points. Action 1. Ensure the ignition switch is set to OFF. 2. Disconnect DOC-DPF temperature sensor ECU (D418) connector. 3. Measuring between pins 3 and 2 on the D418 wiring harness connector, confirm the resistance value for the A-CAN connection as outlined in the corresponding checking data, "Component & wiring check, DOC/DPF temperature sensors ECU (D418). Is the measured value within expected range? Yes No Possible problem in the harness or EAS-3 ECU.



	C Electrical checks, supply voltage, e (D418)	DOC/DPF temperature sensors ECU
i	Refer to the corresponding checkin voltages, resistance values, and re	ng data for associated supply and signal lated connector pin test points.
Action		
1.	Ensure the ignition switch is set to	OFF.
2.	Disconnect DOC-DPF temperature	sensor ECU (D418) connector.
3.	Turn the key switch ON.	
4.	•	confirm the supply voltage value as king data, " <u>Component & wiring check, J (D418)</u> .
Are me	easured values within expected rang	e?
	•	e? No
Yes Possib	•	



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.



Refer to the OEM service manual for more information regarding specific pinout location/designation specific to the vehicle.

Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect DOC-DPF temperature sensor ECU (D418) connector.
- 3. Check the ground connection between DOC/DPF temperature sensors ECU (D418) connector and the Power Distribution Center (PDC) / Chassis Load Center (CLC):

Measure the resistance of the ground wire between the engine ground stud and the DOC/DPF temperature sensor ECU (D418) connector, pin 1.



Is the measured resistance less than 10 ohms?	
Yes	No
	Possible open condition in the harness. Contact the PACCAR Engine Support Center for further assistance in diagnosing this issue, and possible replacement of the wiring harness. Refer to step 4A to perform the corresponding repair verification cycles and rechecks.
Go to step 2E	

Step 2.E Electrical checks, short in harness, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect DOC-DPF temperature sensor ECU (D418) connector.
- 3. Measure the resistance between pin 1 and pin 4 of the DOC/DPF temperature sensor ECU (D418) connector.

Is the measured resistance greater than 100K ohms?

Yes	No
Likely issue with the DOC/DPF temperature sensor ECU module (D418). Replace this module. Refer to step 4A to perform the corresponding repair verification cycles and rechecks.	Possible short condition in the harness. Contact the PACCAR Engine Support Center for further assistance in diagnosing this issue, and possible replacement of the wiring harness. Refer to step 4A to perform the corresponding repair verification cycles and rechecks.
If this DTC is still present, go to step 3A	If this DTC is still present, go to step 3A

Step 3 Diesel Oxidation Catalyst (DOC) Checks

Step 3A Visual inspection, DOC
Action



1.	Set the	ignition	switch	to OFF.

2. Remove and inspect the DOC for damage, contamination, or blocking (face plugging) as outlined in "check/clean Diesel Oxidation Catalyst (DOC) (Diesel Partic. Filter)" – job ID 80043.

Were there any signs of damage, contamination, or blocking?

were there any signs of damage, containination, or blocking:		
Yes	No	
Correct any issues found by cleaning or replacing the DOC as necessary. Refer to step 4A to perform the corresponding repair verification cycles and rechecks.	Refer to step 4A to perform the corresponding repair verification cycles and rechecks.	
If all steps have been completed and this DTC is still present, contact the PACCAR Engine Support Center for further assistance.	If all steps have been completed and this DTC is still present, contact the PACCAR Engine Support Center for further assistance.	

Step 4 Repair Verification

Step 4A Repair verification cycles

Perform these repair verification cycles following any corrective actions taken, to enable related OBD monitors to reach a readiness state associated with the trouble code or system being investigated.



Before beginning these repair verification cycles, use the DAVIE Diagnostics, Quick Check function to clear all current DTCs from the PCI and EAS-3 ECUs.

Action

1. Steady State

This cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON. With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.

Were the identified repair verification cycles able to be completed?

Yes	No
	Investigate and correct any issues preventing these repair verification cycles from being completed, then re-run. For



	additional assistance, contact the PACCAR Engine Support Center.
Go to step 4B	
Step 4B DAVIE Diagnostics, Quick Chec	k
Action	
 Use DAVIE Diagnostics to perfor determine whether the actions 	m a Quick Check for current DTCs to taken have cleared this DTC.
Has P3752 been cleared?	
Yes	No
Problem resolved. No further actions.	Continue with the next step in this troubleshooting procedure. If all steps have been completed and this trouble code is still present, contact the PACCAR Engine Support Center for further assistance.
	ing this issue or for confirmation prior to the ents, contact the PACCAR Engine Support Call
	Back to Index



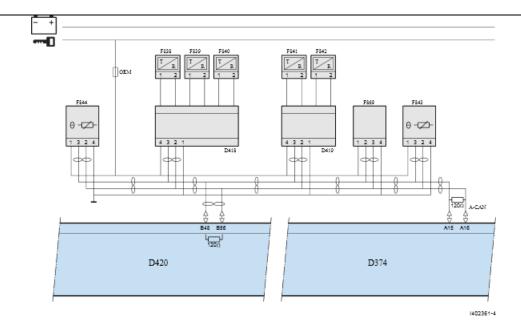
P3753

Code number	P3753
Fault code description	Exhaust gas temperature before DPF - Voltage too high or short circuit to supply
Fault code information	1 trip MIL 3 drive cycle recovery Readiness group – None Freeze frame type –NMHC
Description of component(s)	DOC/DPF temperature sensors ECU (D418)
	The exhaust gas temperature is measured at three different positions in the DOC/DPF unit.
	 The temperature sensors are connected to the DOC/DPF temperature sensors ECU (D418).
	 The DOC/DPF temperature sensors ECU (D418) transmit the temperature sensor values to the A-CAN.
	 The temperature sensors cannot be disconnected or replaced separately from the DOC/DPF temperature sensors ECU (D418).
	The temperature sensors are thermocouple sensors.
	Exhaust gas temperature sensor before DOC (F838)
	Measure the exhaust gas temperature before the DOC.
	Effect on the system:
	• Calculates the temperature rise over the DOC, in combination with the signal of the exhaust gas temperature sensor before DPF (F839).
	Determines whether a regeneration can be started.
	Calculates the amount of fuel that must be injected.
	Determines whether the NOx sensor before the catalyst must be heated to the operating temperature.
	Warning activation if the exhaust gas temperature before the DOC is too high.
	Exhaust gas temperature sensor before DPF (F839)
	Measure the exhaust gas temperature before the DPF.
	Effect on the system:
	Calculates the temperature rise over the DOC, in combination with the signal of the exhaust gas temperature sensor before DOC (F838).
	Determines whether a regeneration is started.
	Controls the regeneration temperature.



 Calculates the amount of fuel that must be injected. Diagnoses DOC efficiency. Warning activation if the exhaust gas temperature before the DPF is too high Exhaust gas temperature sensor after DPF (F840) Measure the exhaust gas temperature after the DPF. Effect on the system: Protect the DPF against temperatures that are too high. Warning activation if the exhaust gas temperature after the DPF is too high. Location of component(s) DOC/DPF temperature sensors ECU (D418, with F838, F839, and F840) 	
 Warning activation if the exhaust gas temperature before the DPF is too high Exhaust gas temperature sensor after DPF (F840) Measure the exhaust gas temperature after the DPF. Effect on the system: Protect the DPF against temperatures that are too high. Warning activation if the exhaust gas temperature after the DPF is too high. 	
 Exhaust gas temperature sensor after DPF (F840) Measure the exhaust gas temperature after the DPF. Effect on the system: Protect the DPF against temperatures that are too high. Warning activation if the exhaust gas temperature after the DPF is too high. 	
 Measure the exhaust gas temperature after the DPF. Effect on the system: Protect the DPF against temperatures that are too high. Warning activation if the exhaust gas temperature after the DPF is too high. 	
 Effect on the system: Protect the DPF against temperatures that are too high. Warning activation if the exhaust gas temperature after the DPF is too high. 	
 Protect the DPF against temperatures that are too high. Warning activation if the exhaust gas temperature after the DPF is too high. 	
Warning activation if the exhaust gas temperature after the DPF is too high.	
Location of component(s) DOC/DPF temperature sensors FCU (D418, with F838, F839, and F840)	
, , , , , , , , , , , , , , , , , , ,	
F839 D418	
F838 F839	
Diagnostic condition This diagnostic runs continuously when the ignition is on.	
Set condition of fault code A short circuit to supply or open circuit occurs for 10 consecutive seconds.	
Reset condition of fault code This DTC changes to inactive after the diagnostic runs and passes.	
Electrical diagram(s) DOC/DPF temperature sensors ECU (D418, with F838, F839, and F840)	





D374 EAS-3 ECU

D418 DOC/DPF temperature sensors ECU

D419 Catalytic convertor temperature sensors ECU

D420 PCI ECU

F838 Sensor, exhaust temperature before DOC

F839 Sensor, exhaust temperature before DPF

F840 Sensor, exhaust temperature after DPF

F841 Sensor, exhaust temperature before catalyst

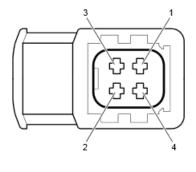
F842 Sensor, exhaust temperature after catalyst

F843 NOx sensor after catalyst

F844 NOx sensor before catalyst

F869 NH3 sensor

D374	D418	Function
A15	3	A-CAN High
A16	2	A-CAN Low
	1	Ground
	4	Power supply



E504061



	Wiring harn	ess connecto	r D418, front v	iew	
Technical data	Component and wiring check, temperature sensors DOC-DPF ECU (D418) Preparation Disconnect connector D418 Ignition switched on Measure on connector D418				
	Pin	Pin	Value	Additional information	
	(+ probe) 4	(- probe)	Ubat		
	4	Battery	Obat		
	1	negative pole	< 0.5 V	Switch on all consumers	
	Component and wiring check, A-CAN Preparation Ignition switched off Disconnect connector D418 Measure on connector D418				
	Pin (+ probe)	Pin (- probe)	Value	Additional information	
	2	3	± 60 Ω		
Possible causes	 Malfunctioning DOC-DPF temperature sensors ECU (D418) Sensor signal short circuit to supply Sensor signal open circuit 				
Additional information	 The DOC-DPF temperature sensors ECU (D418) reports a short circuit to supply An active mobile DPF regeneration is disabled Only a stationary DPF regeneration is possible The sensor value is replaced by the exhaust temperature sensor after DPF 				
Diagnostic Step-by-Step The ignition should always be in the OFF position when connecting electrical components to reduce the likelihood of the components.					
	 This troubleshooting procedure is based on the assumption that supply power and ground to the PCI are functioning properly. 				
	 Disconnecting the PCI connectors during the troubleshooting process will result in multiple errors. 				
	 Specific electrical component information and pin out locations are provided in this procedure as a reference only. Always refer to the technical data sections 				



in Rapido for the most up-to-date changes.

- It is necessary to use DAVIE to clear all current DTCs from the PCI and EAS-3 ECUs, and then run the Quick Check to identify a change in fault status.
- This DTC can be set as a result of multiple failure modes. For proper fault isolation, complete all troubleshooting steps in the sequence provided.

Step 1 Investigate Related DTCs

Before troubleshooting this DTC, take notice of any other active or inactive DTCs. One or multiple other DTCs could have been the cause for this DTC.

Step 1A Investigate related DTCs Action 1. Use DAVIE Diagnostics to perform a Quick Check for current DTCs. Are these or any other related DTCs active? P3942; P3943; P3945; P3987; P3990 Yes No Refer to the troubleshooting information for these DTCs before performing this procedure. Go to step 2A

Step 2 DOC/DPF Temperature Sensors ECU Module (D418) Checks

Step 2A Visual inspection, electrical connections

Action

- 1. Set the ignition switch to OFF.
- 2. Visually inspect the DOC/DPF temperature sensors ECU module (D418) component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded, or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - Damage to the ECU module



Were there any signs of the above?		
Yes	No	
Correct any issues found. Refer to step 3A to perform the corresponding repair verification cycles and rechecks.	Possible malfunction of the DOC/DPF temperature sensor ECU module (D418).	
If this DTC is still present, go to step 2B	Go to step 2B	

Step 2B Electrical checks, resistance, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect DOC-DPF temperature sensor ECU (D418) connector.
- Measuring between pins 3 and 2 on the D418 wiring harness connector, confirm the resistance value for the A-CAN connection as outlined in the corresponding checking data, "Component & wiring check, DOC/DPF temperature sensors ECU (D418).

Is the measured resistance value within expected range?

Go to step 2C	Go to step 2D
	Possible problem in the harness or EAS-3 ECU.
Yes	No

Step 2C Electrical checks, supply voltage, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

1. Ensure the ignition switch is set to OFF.



2.	Disconnect DOC-DPF temperature	sensor FCU (D418) connector.	
3.	Turn the key switch ON.		
4.	,		
Are measured values within expected range?			
Yes No		No	
		Possible problem in the harness.	
Go to s	tep 2E	Go to step 2D	
H	Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points. Refer to the OEM service manual for more information regarding connector pin		
designation and locations specific to the vehicle.			
Action			
1.	1. Ensure the ignition switch is set to OFF.		
2.	Disconnect DOC-DPF temperature sensor ECU (D418) connector.		
	Check the ground connection between DOC/DPF temperature sensors ECU (D418) connector and the Power Distribution Center (PDC) / Chassis Load Center (CLC):		
3.	(D418) connector and the Power		
3.	(D418) connector and the Power Center (CLC): Measure the resistance of the ground statement of the gr	·	

No

Yes



	Possible open condition in the harness. Contact the PACCAR Engine Support Center for further assistance in diagnosing this issue, and possible replacement of the wiring harness. Refer to step 3A to perform the corresponding repair verification cycles and rechecks.
Go to step 2E	If this DTC is still present, contact the PACCAR Engine Support Center for further assistance in diagnosing this issue.

Step 2E Electrical checks, short in harness, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect the DOC/DPF temperature sensor ECU (D418) connector.
- 3. Measure the resistance between pin 1 and pin 4 of the DOC/DPF temperature sensor ECU (D418) connector.

Is the measured resistance greater than 100K ohms?

Yes	No
Likely issue with the DOC/DPF temperature sensor ECU module (D418). Replace this module. Refer to step 3A to perform the corresponding repair verification cycles and rechecks.	Possible short condition in the harness. Contact the PACCAR Engine Support Center for further assistance in diagnosing this issue, and possible replacement of the wiring harness. Refer to step 3A to perform the corresponding repair verification cycles and rechecks.
If all steps have been completed and this DTC is still present, contact the PACCAR Engine Support Center for further assistance.	If all steps have been completed and this DTC is still present, contact the PACCAR Engine Support Center for further assistance.

Step 3 Repair Verification

Step 3A Repair verification cycles



Perform these repair verification cycles following any corrective actions taken, to enable related OBD monitors to reach a readiness state associated with the DTC or system being investigated.



Before beginning these repair verification cycles, use the DAVIE Diagnostics, Quick Check function to clear all current DTCs from the PCI and EAS-3 ECUs.

Action

1. Steady State

This cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON. With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.

Were the identified repair verification cycles able to be completed?

Yes	No
	Investigate and correct any issues preventing these repair verification cycles from being completed, then re-run. For additional assistance, contact the PACCAR Engine Support Center.
Go to step 3B	

Step 3B DAVIE Diagnostics, Quick Check

Action

Use DAVIE Diagnostics to perform a Quick Check for current DTCs to determine whether the actions taken have cleared this DTC.

1. Confirm that the corresponding OBD Monitor Readiness Status value is displayed as "Ready."

A status of Ready indicates that the corresponding OBD monitor has run successfully and the problem has been resolved—no further action. If the displayed status is "Not ready," continue to action step 2.

2. View the DTC overview display, and confirm that P3753 has been cleared.

Has	D3.	753	been	cle	ar	2ha
Has	ГЭ	133	חבבוו	CIC	aıv	zu:

Yes	No
Problem resolved. No further actions.	Continue with the next step in this troubleshooting procedure.



	If all steps have been completed and this DTC is still present: • continue to operate the truck to extend the run time, allowing the corresponding OBD monitor sufficient time to complete • or, return to step 3A and perform this repair verification again. If this issue is still present after extending or re-running the repair verification, contact the PACCAR Engine Support Center for further assistance. upport Center g this issue or for confirmation prior to the ts, contact the PACCAR Engine Support Call
Center.	Back to Index



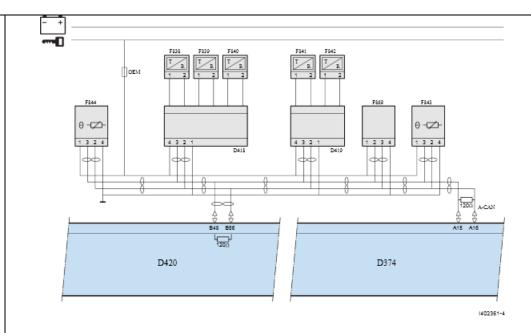
P3754

13731		
Code number	P3754	
Fault code description	Exhaust gas temperature before DPF - Voltage too low or short circuit to ground	
Fault code information	1 trip MIL 3 drive cycle recovery Readiness group – None Freeze frame type –NMHC	
Description of component(s)	DOC/DPF temperature sensors ECU (D418)	
	The exhaust gas temperature is measured at three different positions in the DOC/DPF unit.	
	The temperature sensors are connected to the DOC/DPF temperature sensors ECU (D418).	
	 The DOC/DPF temperature sensors ECU (D418) transmit the temperature sensor values to the A-CAN. 	
	The temperature sensors cannot be disconnected or replaced separately from the DOC/DPF temperature sensors ECU (D418).	
	The temperature sensors are thermocouple sensors.	
	Exhaust gas temperature sensor before DOC (F838)	
	Measure the exhaust gas temperature before the DOC.	
	Effect on the system:	
	 Calculates the temperature rise over the DOC, in combination with the signal of the exhaust gas temperature sensor before DPF (F839). 	
	Determines whether a regeneration can be started.	
	Calculates the amount of fuel that must be injected.	
	 Determines whether the NOx sensor before the catalyst must be heated to operating temperature. 	
	Warning activation if the exhaust gas temperature before the DOC is too high.	
	Exhaust gas temperature sensor before DPF (F839)	
	Measure the exhaust gas temperature before the DPF.	
	Effect on the system:	
	 Calculates the temperature rise over the DOC, in combination with the sign of the exhaust gas temperature sensor before DOC (F838). 	
	Determines whether a regeneration is started.	
	Controls the regeneration temperature.	
	Calculates the amount of fuel that must be injected.	



<u> </u>			
	Diagnoses DOC efficiency.		
	Warning activation if the exhaust gas temperature before the DPF is too high.		
	Exhaust gas temperature sensor after DPF (F840)		
	Measure the exhaust gas temperature after the DPF.		
	Effect on the system:		
	Protect the DPF against temperatures that are too high.		
	Warning activation if the exhaust gas temperature after the DPF is too high.		
Location of component(s)	DOC/DPF temperature sensors ECU (D418)		
	F839 D418 F838 D418 D418 F838 F839		
Diagnostic condition	This diagnostic runs continuously when the ignition is on.		
Set condition of fault code	A short circuit to ground is detected for 10 consecutive seconds.		
Reset condition of fault code	This DTC changes to inactive after the diagnostic runs and passes.		
Electrical diagram(s)	DOC/DPF temperature sensors ECU (D418, with F838, F839, and F840)		





D374 EAS-3 ECU

D418 DOC/DPF temperature sensors ECU

D419 Catalytic convertor temperature sensors ECU

D420 PCI ECU

F838 Sensor, exhaust temperature before DOC

F839 Sensor, exhaust temperature before DPF

F840 Sensor, exhaust temperature after DPF

F841 Sensor, exhaust temperature before catalyst

F842 Sensor, exhaust temperature after catalyst

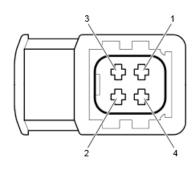
F843 NOx sensor after catalyst

F844 NOx sensor before catalyst

F869 NH3 sensor

D374	D418	Function
A15	3	A-CAN High
A16	2	A-CAN Low
	1	Ground
	4	Power supply





E504061

Wiring harness connector D418, front view

Technical data

Component & wiring check, DOC/DPF temperature sensors ECU (D418)

Preparation

- Disconnect connector D418
- Ignition switched to ON
- Measure on the connector D418

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
4	1	Ubat	10 to 14 VDC
	Battery		
1	negative	< 0.5 V	Switch on all consumers
	pole		

Component & wiring check, A-CAN

Preparation

- Ignition switched to OFF
- Disconnect connector D418
- Measure on the connector D418

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
2	3	± 60 Ω	



Refer to the corresponding OEM service manual for more information regarding specific connector pin designations and locations specific to the vehicle.

Possible causes

• Malfunctioning temperature sensors DOC/DPF ECU (D418).



	Sensor signal wire short circuit to ground.		
Additional information	 The DOC/DPF temperature sensors ECU (D418) report a short circuit to ground. An active mobile DPF regeneration is disabled. Only a stationary DPF regeneration is possible. The sensor value is replaced by the exhaust gas temperature sensor after DPF (F840). 		
Diagnostic Step-by-Step	The ignition should always be in the OFF position when connecting or disconnecting electrical components to reduce the likelihood of damage to the components. This troubleshooting procedure is based on the assumption that supply power and ground to the PCI are functioning properly. Disconnecting the PCI connectors during the troubleshooting process will result in multiple errors. Specific electrical component information and pin out locations are provided in this procedure as a reference only. Always refer to the technical data sections in Rapido for the most up-to-date changes. It is necessary to use DAVIE to clear all current DTCs from the PCI and EAS-3 ECUs, and then run the Quick Check to identify a change in fault status. This DTC can be set as a result of multiple failure modes. For proper fault isolation, complete all troubleshooting steps in the sequence provided. Step 1 Investigate Related DTCs Before troubleshooting this DTC, take notice of any other active or inactive DTCs. One or multiple other DTCs could have been the cause for this DTC.		
	Action 1. Use DAVIE Diagnostics to perform a Quick Check for current DTCs.		
	1. Use DAVIE Diagnostics to perform a Quick Check for current DTCs.		
	1. Use DAVIE Diagnostics to perform a Quick Check for current DTCs. Are these or any other related DTCs active? P3942; P3943; P3945; P3987; P3990		
	Are these or any other related DTCs active?		
	Are these or any other related DTCs active? P3942; P3943; P3945; P3987; P3990		



Step 2 DOC/DPF Temperature Sensors ECU Module (D418) Checks

Step 2A Visual inspection, connections and wiring

Action

- 1. Set the ignition switch to OFF.
- 2. Visually inspect the DOC/DPF temperature sensors ECU module (D418) component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded, or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - Damage to the ECU module

Were there any signs of the above?

Yes	No
Correct any issues found. Refer to step 3A to perform the corresponding repair verification cycles and rechecks.	Possible malfunction of the DOC/DPF temperature sensor ECU module (D418).
If this DTC is still present, go to step 2B	Go to step 2B

Step 2B Electrical checks, resistance, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect DOC-DPF temperature sensor ECU (D418) connector.
- 3. Measuring between pins 3 and 2 on the D418 wiring harness connector, confirm the resistance value for the A-CAN connection as outlined in the corresponding checking data, "Component & wiring check, DOC/DPF temperature sensors ECU (D418).



Is the measured resistance value within expected range?		
Yes	No	
	Possible problem in the harness or EAS-3 ECU.	
Go to step 2C	Go to step 2D	

Step 2C Electrical checks, supply voltage, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect DOC-DPF temperature sensor ECU (D418) connector.
- 3. Turn the key switch ON.
- 4. Measuring on the D418 connector, confirm the supply voltage value as outlined in the corresponding checking data, "Component & wiring check, DOC/DPF temperature sensors ECU (D418).

Are measured values within expected range?

Yes	No
	Possible problem in the harness.
Go to step 2E	Go to step 2D

Step 2D Electrical checks, open in harness, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.



Refer to the OEM service manual for more information regarding connector pin designation and locations specific to the vehicle.



Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect DOC-DPF temperature sensor ECU (D418) connector.
- Check the ground connection between DOC/DPF temperature sensors ECU (D418) connector and the Power Distribution Center (PDC) / Chassis Load Center (CLC):

Measure the resistance of the ground wire between the engine ground stud and the DOC/DPF temperature sensor ECU (D418) connector, pin 1.

The expected value is < 10 ohms.

Is the measured resistance less than 10 ohms?

Yes	No
	Possible open condition in the harness. Contact the PACCAR Engine Support Center for further assistance in diagnosing this issue, and possible replacement of the wiring harness. Refer to step 3A to perform the corresponding repair verification cycles and rechecks.
Go to step 2E	If this DTC is still present, contact the PACCAR Engine Support Center for further assistance in diagnosing this issue.

Step 2E Electrical checks, short in harness, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.



Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect the DOC/DPF temperature sensor ECU (D418) connector.
- 3. Measure the resistance between pin 1 and pin 4 of the DOC/DPF temperature sensor ECU (D418) connector.

Is the measured resistance greater than 100K ohms?

Yes	No	
Likely issue with the DOC/DPF temperature sensor ECU module (D418). Replace this module. Refer to step 3A to perform the corresponding repair verification cycles and rechecks.	Possible short condition in the harness. Contact the PACCAR Engine Support Center for further assistance in diagnosing this issue, and possible replacement of the wiring harness. Refer to step 3A to perform the corresponding repair verification cycles and rechecks.	
If all steps have been completed and this DTC is still present, contact the PACCAR Engine Support Center for further assistance.	If all steps have been completed and this DTC is still present, contact the PACCAR Engine Support Center for further assistance.	

Step 3 Repair Verification

Step 3A Repair verification cycles

Perform these repair verification cycles following any corrective actions taken, to enable related OBD monitors to reach a readiness state associated with the DTC or system being investigated.



Before beginning these repair verification cycles, use the DAVIE Diagnostics, Quick Check function to clear all current DTCs from the PCI and EAS-3 ECUs.

Action

1. Steady State

This cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON. With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.



Were the identified repair verification cycles able to be completed?	
Yes	No
	Investigate and correct any issues preventing these repair verification cycles from being completed, then rerun. For additional assistance, contact the PACCAR Engine Support Center.
Go to step 3B	

Step 3B DAVIE Diagnostics, Quick Check

Has P3754 been cleared?

Action

Use DAVIE Diagnostics to perform a Quick Check for current DTCs to determine whether the actions taken have cleared this DTC.

- 1. Confirm that the corresponding OBD Monitor Readiness Status value is displayed as "Ready."
 - A status of Ready indicates that the corresponding OBD monitor has run successfully and the problem has been resolved—no further action. If the displayed status is "Not ready," continue to action step 2.
- 2. View the DTC overview display, and confirm that P3754 has been cleared.

Yes	No				
Problem resolved. No further actions.	Continue with the next step in this troubleshooting procedure. If all steps have been completed and this DTC is still present:				
	 continue to operate the truck to extend the run time, allowing 				

- extend the run time, allowing the corresponding OBD monitor sufficient time to complete

 or, return to step 3A and
- perform this repair verification again.

If this issue is still present after extending or re-running the repair verification, contact the PACCAR Engine Support Center for further assistance.



Contacting the PACCAR Engine Support Center For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the PACCAR Engine Support Call Center.
Back to Index



P3755

Code number	P3755				
Fault code description	Exhaust gas temperature before DPF - Data erratic, intermittent, or incorrect, not changing during operation				
Fault code information	2 trip MIL 3 drive cycle recovery Readiness group – None Freeze frame type –NMHC				
Description of	DOC/DPF temperature sensors ECU (D418)				
component(s)	The exhaust gas temperature is measured at three different positions in the DOC/DPF unit.				
	• The temperature sensors are connected to the DOC/DPF temperature sensors ECU (D418).				
	The DOC/DPF temperature sensors ECU (D418) transmit the temperature sensor values to the A-CAN.				
	 The temperature sensors cannot be disconnected or replaced separately from the DOC/DPF temperature sensors ECU (D418). 				
	The temperature sensors are thermocouple sensors.				
	Exhaust gas temperature sensor before DOC (F838)				
	Measure the exhaust gas temperature before the DOC.				
	Effect on the system:				
	 Calculates the temperature rise over the DOC, in combination with the signal of the exhaust gas temperature sensor before DPF (F839). 				
	Determines whether a regeneration can be started.				
	Calculates the amount of fuel that must be injected.				
	 Determines whether the NOx sensor before the catalyst must be heated to the operating temperature. 				
	Warning activation if the exhaust gas temperature before the DOC is too high.				
	Exhaust gas temperature sensor before DPF (F839)				
	Measure the exhaust gas temperature before the DPF.				
	Effect on the system:				
	 Calculates the temperature rise over the DOC, in combination with the signal of the exhaust gas temperature sensor before DOC (F838). 				
	Determines whether a regeneration is started.				
	Controls the regeneration temperature.				
	Calculates the amount of fuel that must be injected.				
	Diagnoses DOC efficiency.				



Warning activation if the exhaust gas temperature before the DPF is too high. Exhaust gas temperature sensor after DPF (F840) Measure the exhaust gas temperature after the DPF. Effect on the system: Protect the DPF against temperatures that are too high. Warning activation if the exhaust gas temperature after the DPF is too high. Location of **DOC/DPF temperature sensors ECU (D418)** component(s) F838 1402018 **Diagnostic condition** This diagnostic runs continuously when the entry conditions are fulfilled: Ignition is keyed on and the engine is running. No active faults on any sensor used to calculate the engine mass flow. No active faults on any of the EAS-3 exhaust gas temperature sensors. No active faults on the DPF pressure sensor (F837). No CAN communication faults on the EAS-3 exhaust gas temperature sensors. The exhaust gas flow must be high enough.



Set condition of fault code	The EAS-3 ECU (D374) detects that the temperature difference over the DOC compared with the temperature difference over the DPF does not match the expected value for the present engine operating conditions.				
Reset condition of fault code	This DTC char	nges to inact	ive after the d	iagnostic runs and passes.	
Electrical diagram(s)	DOC/DPF ten	nperature se	ensors ECU (D4	118, with F838, F839, and F840)	
	F839 D418 IA02018 F838 F839				
Technical data	Component and wiring check, temperature sensors DOC-DPF ECU (D418)				
	Preparation				
	Disconnect connector D418				
	Ignition switched on				
	Measure on connector D418				
	Pin Pin Value Additional information			Additional information	
	(+ probe)	(- probe)	2 3		
	4	1	Ubat		



	1	Battery negative pole	< 0.5 V	Switch on all consumers	
	Component and wiring check, A-CAN				
	Preparation				
	 Ignition switched off Disconnect connector D418 Measure on connector D418 				
	Pin	Pin	Value	Additional information	
	(+ probe)	(- probe)			
	2	3	± 60 Ω		
Possible causes	Malfunct	ioning DOC/	DPF temperat	ture sensors ECU (D418).	
	Stuck in-r	ange exhau	st gas tempera	ature sensor before DPF (F839).	
	Diesel Ox	idation Cata	lyst (DOC) fac	e plugging.	
Additional information	• Active DPF regeneration is disabled.			I.	
	 Fuel dosing in the aftertreatment system is disabled. 				
	 First solve other EAS temperature sensor related DTCs. 				
	 The reading of the exhaust gas temperature sensor before DPF (F839) is not changing under varying conditions. 				
Diagnostic Step-by-Step	The ignition should always be in the OFF position when connecting or disconnecting electrical components to reduce the likelihood of damage to the components.				





- This troubleshooting procedure is based on the assumption that supply power and ground to the PCI are functioning properly.
- Disconnecting the PCI connectors during the troubleshooting process will result in multiple errors.
- Specific electrical component information and pin out locations are provided in this procedure as a reference only. Always refer to the technical data sections in Rapido for the most up-to-date changes.
- It is necessary to use DAVIE to clear all current DTCs from the PCI and EAS-3 ECUs, and then run the Quick Check to identify a change in fault status.
- This DTC can be set as a result of multiple failure modes. For proper fault isolation, complete all troubleshooting steps in the sequence provided.

Step 1 Investigate Related DTCs

Before troubleshooting this DTC, take notice of any other active or inactive DTCs. One or multiple other DTCs could have been the cause for this DTC.

Step 1A Investigate related DTCs Action 1. Use DAVIE Diagnostics to perform a Quick Check for current DTCs. Are these or any other related DTCs active? P3942; P3943; P3945; P3987; P3990 Yes No Refer to the troubleshooting information for these DTCs before performing this procedure. Go to step 2A

Step 2 DOC/DPF Temperature Sensors ECU Module (D418) Checks

Step 2A Visual inspection, connections and wiring



Action

- 1. Set the ignition switch to OFF.
- 2. Visually inspect the DOC/DPF temperature sensors ECU module (D418) component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded, or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - Damage to the ECU module

Were there any signs of the above?

Yes	No
Correct any issues found. Refer to step 4A to perform the corresponding repair verification cycles and rechecks.	Possible malfunction of the DOC/DPF temperature sensor ECU module (D418).
If this DTC is still present, go to step 2B	Go to step 2B

Step 2B Electrical checks, resistance, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect DOC-DPF temperature sensor ECU (D418) connector.
- 3. Measuring between pins 3 and 2 on the D418 wiring harness connector, confirm the resistance value for the A-CAN connection as outlined in the corresponding checking data, "Component & wiring check, DOC/DPF temperature sensors ECU (D418).

Is the measured resistance value within expected range?



Yes	No
	Possible problem in the harness or EAS-3 ECU.
Go to step 2C	Go to step 2D

Step 2C Electrical checks, supply voltage, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect DOC-DPF temperature sensor ECU (D418) connector.
- 3. Turn the key switch ON.
- 4. Measuring on the D418 connector, confirm the supply voltage value as outlined in the corresponding checking data, "Component & wiring check, DOC/DPF temperature sensors ECU (D418).

Are measured values within expected range?

Yes	No
	Possible problem in the harness.
Go to step 2E	Go to step 2D

Step 2D Electrical checks, open in harness, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.



Refer to the OEM service manual for more information regarding connector pin designation and locations specific to the vehicle.



Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect DOC-DPF temperature sensor ECU (D418) connector.
- Check the ground connection between DOC/DPF temperature sensors ECU (D418) connector and the Power Distribution Center (PDC) / Chassis Load Center (CLC):

Measure the resistance of the ground wire between the engine ground stud and the DOC/DPF temperature sensor ECU (D418) connector, pin 1.

The expected value is < 10 ohms.

Is the measured resistance less than 10 ohms?

Yes	No Possible open condition in the harness. Contact the PACCAR Engine Support Center for further assistance in diagnosing this issue, and possible replacement of the wiring harness.
	Refer to step 4A to perform the corresponding repair verification cycles and rechecks.
Go to step 2E	If this DTC is still present, contact the PACCAR Engine Support Center for further assistance in diagnosing this issue.

Step 2E Electrical checks, short in harness, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect the DOC/DPF temperature sensor ECU (D418) connector.
- 3. Measure the resistance between pin 1 and pin 4 of the DOC/DPF temperature sensor ECU (D418) connector.



Is the measured resistance greater than 100K ohms?	
Yes	No
Likely issue with the DOC/DPF temperature sensor ECU module (D418). Replace this module. Refer to step 4A to perform the corresponding repair verification cycles and rechecks.	Possible short condition in the harness. Contact the PACCAR Engine Support Center for further assistance in diagnosing this issue, and possible replacement of the wiring harness. Refer to step 4A to perform the corresponding repair verification cycles and rechecks.
Go to step 3A	If this DTC is still present, go to step 3A

Step 3 Diesel Oxidation Catalyst (DOC) Checks

Sten	3Δ	Visual	inspection,	DOC
JLED	3	visuai	III3DECLIOII.	

Action

- 1. Set the ignition switch to OFF.
- 2. Remove and inspect the DOC for damage, contamination, or blocking (face plugging) as outlined in <u>"check/clean Diesel Oxidation Catalyst (DOC) (Diesel Partic. Filter)" job ID 80043</u>.

Were there any signs of damage, contamination, or blocking?

were there any signs of damage, contamination, or blocking:		
Yes	No	
Correct any issues found by cleaning or replacing the DOC as necessary. Refer to step 4A to perform the corresponding repair verification cycles and rechecks.	Refer to step 4A to perform the corresponding repair verification cycles and rechecks.	
If all steps have been completed and this DTC is still present, contact the PACCAR Engine Support Center for further assistance.	If all steps have been completed and this DTC is still present, contact the PACCAR Engine Support Center for further assistance.	

Step 4 Repair Verification

Step 4A Repair verification cycles

Perform these repair verification cycles following any corrective actions taken, to enable related OBD monitors to reach a readiness state associated with the DTC or system being investigated.





Before beginning these repair verification cycles, use the DAVIE Diagnostics, Quick Check function to clear all current DTCs from the PCI and EAS-3 ECUs.

Action

1. Steady State

This cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON.

With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.

Were the identified repair verification cycles able to be completed?

Yes	No
	Investigate and correct any issues preventing these repair verification cycles from being completed, then re-run. For additional assistance, contact the PACCAR Engine Support Center.
Go to step 4B	

Step 4B DAVIE Diagnostics, Quick Check

Action

Use DAVIE Diagnostics to perform a Quick Check for current DTCs to determine whether the actions taken have cleared this DTC.

 Confirm that the corresponding OBD Monitor Readiness Status value is displayed as "Ready."

A status of Ready indicates that the corresponding OBD monitor has run successfully and the problem has been resolved—no further action. If the displayed status is "Not ready," continue to action step 2.

2. View the DTC overview display, and confirm that P3755 has been cleared.

Has P3755 been cleared?	
Yes	No
Problem resolved. No further actions.	Continue with the next step in this troubleshooting procedure. If all steps have been completed and this DTC is still present:



i	 continue to operate the truck to extend the run time, allowing the corresponding OBD monitor sufficient time to complete or, return to step 4A and perform this repair verification again. If this issue is still present after extending or re-running the repair verification, contact the PACCAR Engine Support Center for further assistance.
	Back to Index



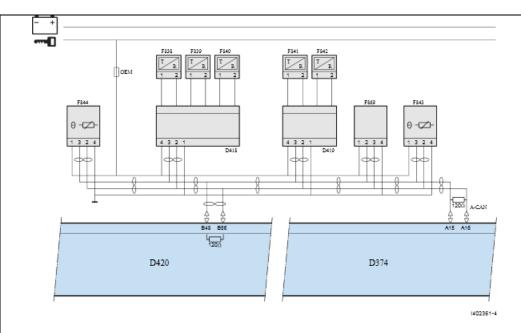
P3756

Code number	P3756	
Fault code description	Exhaust gas temperature after DPF - Voltage too high or short circuit to supply	
Fault code information	1 trip MIL 3 drive cycle recovery Readiness group – None Freeze frame type –PM filter	
Description of component(s)	DOC/DPF temperature sensors ECU (D418)	
	The exhaust gas temperature is measured at three different positions in the DOC/DPF unit.	
	• The temperature sensors are connected to the DOC/DPF temperature sensors ECU (D418).	
	 The DOC/DPF temperature sensors ECU (D418) transmit the temperature sensor values to the A-CAN. 	
	The temperature sensors cannot be disconnected or replaced separately from the DOC/DPF temperature sensors ECU (D418).	
	The temperature sensors are thermocouple sensors.	
	Exhaust gas temperature sensor before DOC (F838)	
	Measure the exhaust gas temperature before the DOC.	
	Effect on the system:	
	 Calculates the temperature rise over the DOC, in combination with the signal of the exhaust gas temperature sensor before DPF (F839). 	
	Determines whether a regeneration can be started.	
	Calculates the amount of fuel that must be injected.	
	Determines whether the NOx sensor before the catalyst must be heated to the operating temperature.	
	Warning activation if the exhaust gas temperature before the DOC is too high.	
	Exhaust gas temperature sensor before DPF (F839)	
	Measure the exhaust gas temperature before the DPF.	
	Effect on the system:	
	 Calculates the temperature rise over the DOC, in combination with the signal of the exhaust gas temperature sensor before DOC (F838). 	
	Determines whether a regeneration is started.	
	Controls the regeneration temperature.	
	Calculates the amount of fuel that must be injected.	
	Diagnoses DOC efficiency.	



	Warning activation if the exhaust gas temperature before the DPF is too high.	
	Exhaust gas temperature sensor after DPF (F840)	
	Measure the exhaust gas temperature after the DPF.	
	Effect on the system:	
	Protect the DPF against temperatures that are too high.	
	Warning activation if the exhaust gas temperature after the DPF is too high.	
Location of component(s)	DOC/DPF temperature sensors ECU (D418)	
	F839 D418 H02019 F838 F839 F839	
Diagnostic condition	This diagnostic runs continuously when the ignition is on.	
Set condition of fault code	A short circuit to supply or open circuit occurs for 10 consecutive seconds.	
Reset condition of fault code	This DTC changes to inactive after the diagnostic runs and passes.	
Electrical diagram(s)	DOC/DPF temperature sensors ECU (D418, with F838, F839, and F840)	
	l .	





D374 EAS-3 ECU

D418 DOC/DPF temperature sensors ECU

D419 Catalytic convertor temperature sensors ECU

D420 PCI ECU

F838 Sensor, exhaust temperature before DOC

F839 Sensor, exhaust temperature before DPF

F840 Sensor, exhaust temperature after DPF

F841 Sensor, exhaust temperature before catalyst

F842 Sensor, exhaust temperature after catalyst

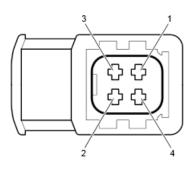
F843 NOx sensor after catalyst

F844 NOx sensor before catalyst

F869 NH3 sensor

D374	D418	Function	
A15	3	A-CAN High	
A16	2	A-CAN Low	
	1	Ground	
	4	Power supply	





504061

Wiring harness connector D418, front view

Technical data

Component and wiring check, temperature sensors DOC-DPF ECU (D418)

Preparation

- Disconnect connector D418
- Ignition switched on
- Measure on connector D418

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
4	1	Ubat	
	Battery		
1	negative	< 0.5 V	Switch on all consumers
	pole		

Component and wiring check, A-CAN

Preparation

- Ignition switched off
- Disconnect connector D418
- Measure on connector D418

Pin	Pin	Value	Additional information
(+ probe)	(- probe)		
2	3	± 60 Ω	

Possible causes

Malfunctioning DOC/DPF temperature sensors ECU (D418).



Sensor signal wire open circuit The DOC/DPF temperature sensor ECU (D418) reports a short circuit to supply or open circuit. An active mobile DPF regeneration is disabled. Only a stationary DPF regeneration is possible. The sensor value is replaced by the exhaust gas temperature sensor before DPF (F839). Diagnostic Step-by-Step The ignition should always be in the OFF position when connecting or disconnecting electrical components to reduce the likelihood of damage to the components. This troubleshooting procedure is based on the assumption that supply power and ground to the PCI are functioning properly. Disconnecting the PCI connectors during the troubleshooting process will result in multiple errors. Specific electrical component information and pin out locations are provided in this procedure as a reference only. Always refer to the technical data sections in Rapido for the most up-to-date changes. It is necessary to use DAVIE to clear all current DTCs from the PCI and EAS-3 ECUs, and then run the Quick Check to identify a change in fault status. This DTC can be set as a result of multiple failure modes. For proper fault isolation, complete all troubleshooting steps in the sequence provided. Step 1 Investigate Related DTCs Before troubleshooting this DTC, take notice of any other active or inactive DTCs. One or multiple other DTCs could have been the cause for this DTC. Step 1A Investigate related DTCs Action 1. Use DAVIE Diagnostics to perform a Quick Check for current DTCs. Are these or any other related DTCs active? P3942; P3943; P3945; P3987; P3990
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· · · · · · · · · · · · · · · · · · ·
P3942; P3943; P3945; P3987; P3990
Yes No
Refer to the troubleshooting information for these DTCs before performing this procedure.
Go to step 2A



Step 2 DOC/DPF Temperature Sensors ECU Module (D418) Checks

Step 2A Visual inspection, connections and wiring

Action

- 1. Set the ignition switch to OFF.
- 2. Visually inspect the DOC/DPF temperature sensors ECU module (D418) component connections and wiring for any of the following:
 - Damaged or loose connectors
 - Bent, broken, corroded, or loose connector pins
 - Moisture or dirt in the connections
 - Damage to the wire harness or insulation
 - Damage to the ECU module

Were there any signs of the above?

Yes	No
Correct any issues found. Refer to step 3A to perform the corresponding repair verification cycles and rechecks.	Possible malfunction of the DOC/DPF temperature sensor ECU module (D418).
If this DTC is still present, go to step 2B	Go to step 2B

Step 2B Electrical checks, resistance, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect DOC-DPF temperature sensor ECU (D418) connector.
- 3. Measuring between pins 3 and 2 on the D418 wiring harness connector, confirm the resistance value for the A-CAN connection as outlined in the corresponding checking data, "Component & wiring check, DOC/DPF



temperature sensors ECU (D418).		
Is the measured resistance value within expected range?		
Yes	No	
	Possible problem in the harness or EAS-3 ECU.	
Go to step 2C	Go to step 2D	

Step 2C Electrical checks, supply voltage, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.

Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect DOC-DPF temperature sensor ECU (D418) connector.
- 3. Turn the key switch ON.
- 4. Measuring on the D418 connector, confirm the supply voltage value as outlined in the corresponding checking data, "Component & wiring check, DOC/DPF temperature sensors ECU (D418).

Yes No
Possible problem in the harness.

Go to step 2E Go to step 2D

Step 2D Electrical checks, open in harness, DOC/DPF temperature sensors ECU module (D418)



	Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.		
İ	Refer to the OEM service manual for more information regarding connecto designation and locations specific to the vehicle.	or pin	
Action	n		
1.	Ensure the ignition switch is set to OFF.		
2.	Disconnect DOC-DPF temperature sensor ECU (D418) connector.		
3.	Check the ground connection between DOC/DPF temperature sensors ECU (D418) connector and the Power Distribution Center (PDC) / Chassis Load Center (CLC):		
	Measure the resistance of the ground wire between the engine ground stud and the DOC/DPF temperature sensor ECU (D418) connector, pin 1.		
	The expected value is < 10 ohms.		
	measured resistance less than 10 ohms?		
Is the r	measured resistance less than 10 ohms?		
		rt	

Step 2E Electrical checks, short in harness, DOC/DPF temperature sensors ECU module (D418)



Refer to the corresponding checking data for associated supply and signal voltages, resistance values, and related connector pin test points.



Action

- 1. Ensure the ignition switch is set to OFF.
- 2. Disconnect the DOC/DPF temperature sensor ECU (D418) connector.
- 3. Measure the resistance between pin 1 and pin 4 of the DOC/DPF temperature sensor ECU (D418) connector.

Is the measured resistance greater than 100K Ω ?

· ·	
Yes	No
Likely issue with the DOC/DPF temperature sensor ECU module (D418). Replace this module. Refer to step 3A to perform the corresponding repair verification cycles and rechecks.	Possible short condition in the harness. Contact the PACCAR Engine Support Center for further assistance in diagnosing this issue, and possible replacement of the wiring harness. Refer to step 3A to perform the corresponding repair verification cycles and rechecks.
If all steps have been completed and this DTC is still present, contact the PACCAR Engine Support Center for further assistance.	If all steps have been completed and this DTC is still present, contact the PACCAR Engine Support Center for further assistance.

Step 3 Repair Verification

Step 3A Repair verification cycles

Perform these repair verification cycles following any corrective actions taken, to enable related OBD monitors to reach a readiness state associated with the DTC or system being investigated.



Before beginning these repair verification cycles, use the DAVIE Diagnostics, Quick Check function to clear all current DTCs from the PCI and EAS-3 ECUs.

Action

1. Steady State

This cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON. With the System Initiation cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.



Were the identified repair verification cycles able to be completed?	
Yes	No
	Investigate and correct any issues preventing these repair verification cycles from being completed, then rerun. For additional assistance, contact the PACCAR Engine Support Center.
Go to step 3B	

Step 3B DAVIE Diagnostics, Quick Check

Action

Use DAVIE Diagnostics to perform a Quick Check for current DTCs to determine whether the actions taken have cleared this DTC.

- 1. Confirm that the corresponding OBD Monitor Readiness Status value is displayed as "Ready."
 - A status of Ready indicates that the corresponding OBD monitor has run successfully and the problem has been resolved—no further action. If the displayed status is "Not ready," continue to action step 2.
- 2. View the DTC overview display, and confirm that P3756 has been cleared.

Has P3756 been cleared?	
Yes	No
Problem resolved. No further actions.	Continue with the next step in this troubleshooting procedure. If all steps have been completed and this DTC is still present:
	 continue to operate the truck to extend the run time, allowing the corresponding OBD monitor sufficient time to complete or, return to step 3A and perform this repair verification again.
	If this issue is still present after extending or re-running the repair verification, contact the PACCAR Engine Support Center for further assistance.



İ	Contacting the PACCAR Engine Support Center For further assistance in diagnosing this issue or for confirmation prior to the replacement of suspect components, contact the PACCAR Engine Support Call Center.
	Back to Index