SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Left Front Wheel Speed Sensor Circuit	C1221	This DTC indicates a failure in the left front wheel speed sensor circuit either due to a short or line interruption.	Line interruption or short to plus for 200mS	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is "ON" Exceptions: Not Applicable	Continuous / Latched for ignition cycle 20 samples @ 10 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Left Front Wheel Speed Sensor Circuit Range/Performance	C1225	This DTC indicates a performance failure in the left front wheel speed sensor circuit.	1. Total loss of wheel speed signal within 10ms to 20 ms at a vehicle speed > 40km/h. 2. Two wheel speeds > 12 km/h and the wheel speed of one wheel < 5 km/h for 20 s. (If one wheel speed > 90 km/h and FZREF equals VMIN, the monitoring period is reduced to 1.2 s.) 3. Two wheel speeds > 24 km/h and wheel speed of two wheels < 5 km/h for 20 s. (If one wheel speed > 90 km/h and FZREF equals VMIN, the monitoring period is reduced to 1.2 s. 4. <u>FZREF < 100 km/h</u> - Deviation of two wheel speeds at either side of the vehicle > 6km/h or at the front axle > 10km/h. If at least one wheel is at 5km/h or lower, a wheel speed deviation of adjoining wheels of 12km/h is permitted. <u>FZREF > 100 km/h</u> - Deviation of two wheel speeds at either side of the vehicle > (6% * FZ_REF) or at the front axle > (4km + 6% *FZREF).	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is "ON" Exceptions: Not Applicable	Continuous / Latched for ignition cycle 20 samples @ 10 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
			<u>detection filter time</u> - The detection time is dependent on the amount of the deviation as shown below. 20 s - if fault threshold is exceeded by > 0 km/h(%) 13 s - if fault threshold is exceeded by > 3 km/h(%) 10 s - if fault threshold is exceeded by > 6 km/h(%) <u>spinning wheel, decelerating wheel</u> - If any wheel is doing a shows strong deceleration (e.g. caused by hand brake) the fault detection filter time is set to 20 s. If any spinning wheel is detected the fault detection filter time is set to 80 s. Interference on wheel speed signal for 20 s with the brake pedal applied or for 5 s when the brake pedal is not applied			

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Right Front Wheel Speed Sensor Circuit	C1222	This DTC indicates a failure in the right front wheel speed sensor circuit either due to a short or line interruption	Line interruption or short to plus for 200mS	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is "ON" Exceptions: Not Applicable	Continuous / Latched for ignition cycle 20 samples @ 10 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Right Front Wheel Speed Sensor Circuit Range/Performance	C1226	This DTC indicates a performance failure in the right front wheel speed sensor circuit.	1. Total loss of wheel speed signal within 10ms to 20 ms at a vehicle speed > 40km/h. 2. Two wheel speeds > 12 km/h and the wheel speed of one wheel < 5 km/h for 20 s. (If one wheel speed > 90 km/h and FZREF equals VMIN, the monitoring period is reduced to 1.2 s.) 3. Two wheel speeds > 24 km/h and wheel speed of two wheels < 5 km/h for 20 s. (If one wheel speed > 90 km/h and FZREF equals VMIN, the monitoring period is reduced to 1.2 s. 4. <u>FZREF < 100 km/h</u> - Deviation of two wheel speeds at either side of the vehicle > 6km/h or at the front axle > 10km/h. If at least one wheel is at 5km/h or lower, a wheel speed deviation of adjoining wheels of 12km/h is permitted. <u>FZREF > 100 km/h</u> - Deviation of two wheel speeds at either side of the vehicle > (6% * FZ_REF) or at the front axle > (4km + 6% *FZREF).	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is "ON" Exceptions: Not Applicable	Continuous / Latched for ignition cycle 20 samples @ 10 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
			<u>detection filter time</u> - The detection time is dependent on the amount of the deviation as shown below. 20 s - if fault threshold is exceeded by > 0 km/h(%) 13 s - if fault threshold is exceeded by > 3 km/h(%) 10 s - if fault threshold is exceeded by > 6 km/h(%) <u>spinning wheel, decelerating wheel</u> - If any wheel is doing a shows strong deceleration (e.g. caused by hand brake) the fault detection filter time is set to 20 s. If any spinning wheel is detected the fault detection filter time is set to 80 s. Interference on wheel speed signal for 20 s with the brake pedal applied or for 5 s when the brake pedal is not applied.		

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Left Rear Wheel Speed Sensor Circuit	C1223	This DTC indicates a failure in the left rear wheel speed sensor circuit either due to a short or line interruption	Line interruption or short to plus for 200mS	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is "ON" Exceptions: Not Applicable	Continuous / Latched for ignition cycle 20 samples @ 10 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Left Rear Wheel Speed Sensor Circuit Range/Performance	C1227	This DTC indicates a performance failure in the left rear wheel speed sensor circuit.	1. Total loss of wheel speed signal within 10ms to 20 ms at a vehicle speed > 40km/h. 2. Two wheel speeds > 12 km/h and the wheel speed of one wheel < 5 km/h for 20 s. (If one wheel speed > 90 km/h and FZREF equals VMIN, the monitoring period is reduced to 1.2 s.) 3. Two wheel speeds > 24 km/h and wheel speed of two wheels < 5 km/h for 20 s. (If one wheel speed > 90 km/h and FZREF equals VMIN, the monitoring period is reduced to 1.2 s. 4. <u>FZREF < 100 km/h</u> - Deviation of two wheel speeds at either side of the vehicle > 6km/h or at the front axle > 10km/h. If at least one wheel is at 5km/h or lower, a wheel speed deviation of adjoining wheels of 12km/h is permitted. <u>FZREF > 100 km/h</u> - Deviation of two wheel speeds at either side of the vehicle > (6% * FZ_REF) or at the front axle > (4km + 6% *FZREF).	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is "ON" Exceptions: Not Applicable	Continuous / Latched for ignition cycle 20 samples @ 10 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
			<u>detection filter time</u> - The detection time is dependent on the amount of the deviation as shown below. 20 s - if fault threshold is exceeded by > 0 km/h(%) 13 s - if fault threshold is exceeded by > 3 km/h(%) 10 s - if fault threshold is exceeded by > 6 km/h(%) <u>spinning wheel, decelerating wheel</u> - If any wheel is doing a shows strong deceleration (e.g. caused by hand brake) the fault detection filter time is set to 20 s. If any spinning wheel is detected the fault detection filter time is set to 80 s. Interference on wheel speed signal for 20 s with the brake pedal applied or for 5 s when the brake pedal is not applied			

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Right Rear Wheel Speed Sensor Circuit	C1224	This DTC indicates a failure in the right rear wheel speed sensor circuit either due to a short or line interruption	Line interruption or short to plus for 200mS	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is "ON" Exceptions: Not Applicable	Continuous / Latched for ignition cycle 20 samples @ 10 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
Right Rear Wheel Speed Sensor Circuit Range/Performance	C1228	This DTC indicates a performance failure in the right rear wheel speed sensor circuit.	1. Total loss of wheel speed signal within 10ms to 20 ms at a vehicle speed > 40km/h. 2. Two wheel speeds > 12 km/h and the wheel speed of one wheel < 5 km/h for 20 s. (If one wheel speed > 90 km/h and FZREF equals VMIN, the monitoring period is reduced to 1.2 s.) 3. Two wheel speeds > 24 km/h and wheel speed of two wheels < 5 km/h for 20 s. (If one wheel speed > 90 km/h and FZREF equals VMIN, the monitoring period is reduced to 1.2 s. 4. <u>FZREF < 100 km/h</u> - Deviation of two wheel speeds at either side of the vehicle > 6km/h or at the front axle > 10km/h. If at least one wheel is at 5km/h or lower, a wheel speed deviation of adjoining wheels of 12km/h is permitted. <u>FZREF > 100 km/h</u> - Deviation of two wheel speeds at either side of the vehicle > (6% * FZ_REF) or at the front axle > (4km + 6%	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is "ON" Exceptions: Not Applicable	Continuous / Latched for ignition cycle 20 samples @ 10 ms loop	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
			*FZREF). - <u>detection filter time</u> - The detection time is dependent on the amount of the deviation as shown below. 20 s - if fault threshold is exceeded by > 0 km/h(%) 13 s - if fault threshold is exceeded by > 3 km/h(%) 10 s - if fault threshold is exceeded by > 6 km/h(%) <u>spinning wheel, decelerating wheel</u> - If any wheel is doing a shows strong deceleration (e.g. caused by hand brake) the fault detection filter time is set to 20 s. If any spinning wheel is detected the fault detection filter time is set to 80 s. Interference on wheel speed signal for 20 s with the brake pedal applied or for 5 s when the brake pedal is not applied.			
EBCM Hardware Fault	C1FFF	Left Front ABS solenoid #1 circuit malfunction OR	The valve and pump motor test actuates all valves in series (to detect short cuts or shunts between the valve lines). Faults are detected by monitoring the valve response signals. Deviation of feedback and actuation for 20mS	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is “ON” Exceptions: Not Applicable	Once per ignition cycle at first drive off / Latched for ignition cycle Continuous / Latched for ignition cycle	DTC Type B

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
		Left Front ABS solenoid #2 circuit malfunction OR	The valve and pump motor test actuates all valves in series (to detect short cuts or shunts between the valve lines). Faults are detected by monitoring the valve response signals. Deviation of feedback and actuation for 20mS		Once per ignition cycle at first drive off / Latched for ignition cycle Continuous / Latched for ignition cycle	
		Right Front ABS solenoid #1 circuit malfunction OR	The valve and pump motor test actuates all valves in series (to detect short cuts or shunts between the valve lines). Faults are detected by monitoring the valve response signals. Deviation of feedback and actuation for 20mS		Once per ignition cycle at first drive off / Latched for ignition cycle Continuous / Latched for ignition cycle	
		Right Front ABS solenoid #2 circuit malfunction OR	The valve and pump motor test actuates all valves in series (to detect short cuts or shunts between the valve lines). Faults are detected by monitoring the valve response signals. Deviation of feedback and actuation for 20mS		Once per ignition cycle at first drive off / Latched for ignition cycle Continuous / Latched for ignition cycle	
EBCM Hardware Fault (cont.)	C1FFF (cont.)	Left Rear ABS solenoid #1 circuit malfunction OR	The valve and pump motor test actuates all valves in series (to detect short cuts or shunts between the valve lines). Faults are detected by monitoring the valve response signals. Deviation of feedback and actuation for 20mS		Once per ignition cycle at first drive off / Latched for ignition cycle Continuous / Latched for ignition cycle	

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
		Left Rear ABS solenoid #2 circuit malfunction OR	The valve and pump motor test actuates all valves in series (to detect short cuts or shunts between the valve lines). Faults are detected by monitoring the valve response signals. Deviation of feedback and actuation for 20mS		Once per ignition cycle at first drive off / Latched for ignition cycle Continuous / Latched for ignition cycle	
		Right Rear ABS solenoid #1 circuit malfunction OR	The valve and pump motor test actuates all valves in series (to detect short cuts or shunts between the valve lines). Faults are detected by monitoring the valve response signals. Deviation of feedback and actuation for 20mS		Once per ignition cycle at first drive off / Latched for ignition cycle Continuous / Latched for ignition cycle	
		Right Rear ABS solenoid #2 circuit malfunction OR	The valve and pump motor test actuates all valves in series (to detect short cuts or shunts between the valve lines). Faults are detected by monitoring the valve response signals. Deviation of feedback and actuation for 20mS		Once per ignition cycle at first drive off / Latched for ignition cycle Continuous / Latched for ignition cycle	

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
EBCM Hardware Fault (cont.)	C1FFF (cont.)	Pump motor circuit malfunction OR	The pump motor voltage (UM) must be present within a time of 60 ms after actuation of the motor relay. A high level of UM with no actuation of the motor relay for more than 2.5 s. The pump motor voltage UM is monitored to verify the time of continued high level. The time depends on the supply voltage and is in the range of 70ms to 140ms. During that time low levels of UM up to 40 ms are tolerated. If the run-on conditions are not met, the pump is activated for 700 ms again. This behavior is repeated at most 3 times. If, after the last pump activation, the pump motor run-on is still too short, a failure is detected.		Once per ignition cycle at first drive off / Latched for ignition cycle Continuous / Latched for ignition cycle After the actuation of the motor relay has elapsed / Latched for ignition cycle	
		Valve relay circuit malfunction OR	The UVR monitor function tests the supply voltage UVR of the valves via the Valve feedback lines VRM. If three or more valve response faults occur simultaneously, a fault "supply voltage of valves" is registered. The valve relay cannot be switched off. UVR remains High although VR = Low (valve relay frozen).		Continuous / Latched for ignition cycle Once per ignition cycle at first drive off / Latched for ignition cycle	
		ABS/TCS brake switch circuit malfunction OR	Fault is set immediately when ECM message $300 Byte 5, Bit 3 is set.	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is “ON” Exceptions: Not Applicable	Continuous / Latched for ignition cycle	

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EBCM Hardware Fault (cont.)	C1FFF (cont.)	TCS RPM signal circuit malfunction OR	1. Fault is detected if the Engine Speed message is marked as invalid for 1000ms. 2. Fault is detected if the Engine Torque message is marked as invalid for 100ms. Fault is detected if the Driver Torque message is marked as invalid for 100ms.	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is "ON" and 3s or more after startup. Exceptions: Executed once ABS sees $300 Engine Running Status non-zero.	Continuous / Latched for ignition cycle	
		PCM indicated requested torque malfunction OR	Fault is detected if the Engine Torque Reduction Failure Status bit is set $120 byte 2 bit 7.	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is "ON" and 3s or more after startup. Exceptions: Not Applicable	Continuous / Continuous	
		Gear information error OR	Fault is detected if the gear information message is marked as invalid for 1000ms in $320.	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is "ON" and 3s or more after start-up Exceptions: Only run when engine running status equals nonzero.	Continuous / Latched for ignition cycle	
		Wheel speed sensor frequency error OR	Interference on one or more wheel speed sensor for 200 ms.		Continuous / Latched for ignition cycle	
		ECU malfunction OR	The control unit is Continuously monitored for proper operation.		Continuous / Latched for ignition cycle	
		Option configuration error OR	Fault is detected if the ECU detects a mismatch between itself and the programmed BCM vehicle by monitoring the BCM message $ 388 Byte 3 , Bit 4. (FWD vs. AWD)	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is "ON" and 3s or more after startup Exceptions: Test is only run if VIN digits 2-9 in $670 are non-zero.	Continuous / Latched for ignition cycle.	

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
EBCM Hardware Fault (cont.)	C1FFF (cont.)	System high/low voltage	UZ is monitored for a level < 9.4V outside ABS control, or a level < 8.8V during ABS control, and for a level > 17.4V. If any one of these conditions exist for >500ms, the fault is detected.	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is "ON" Exceptions: Fault is only stored if vehicle speed is >= 6km/h for both high and low voltage.	Continuous / Low voltage is fully recoverable; High voltage is recoverable as long as a hardware shutdown does not occur (at 21 volts approx.).	
EBCM Communication Fault	U1FFF	CAN bus communication malfunction OR	Monitoring includes line short to ground, line short to supply voltage, and mutual line short. Line interruptions are detected by CAN message monitor. After detecting a bus off failure a bus off failure is established immediately. The transmission is reinitialized and attempted again. Reinitialization is retried every 4 seconds until the bus off condition is removed.	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is "ON" Exceptions: Under voltage condition exists	Continuous / Continuous	DTC Type B
		Lost communications with Engine Control System OR	Fault is detected if the node is missing, or disappeared for 250 ms in normal mode.	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is "ON" and 3s after start-up. Exceptions: Not Applicable	Continuous / Continuous	
		Lost communications with Transmission Control System OR	Fault is detected if the node is missing, or disappeared for 250 ms in normal mode.	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is "ON" and 3s after start-up. Exceptions: Test not run if U2105 failure exists.	Continuous / Continuous	
		Lost communications with Body Control System	Fault is detected if the node is missing, or disappeared for 250 ms in normal mode.	Vehicle Power Mode/VN Activation condition: Run/Crank Vehicle Operating Conditions: Valve relay is "ON" and 3s after start-up Exceptions: Test not run if U2105, U2106 failure exists.	Continuous / Continuous	

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE

Note: Any one of these diagnostics if set will set the message $140 – Wheel Slip Status message to – "Slip Detection Fault". This flag causes regenerative braking to be disabled.