SMCS - 1900

i09430636

Use this procedure if a fault is suspected in the CAN data links. Also, use this procedure if one of the following diagnostic codes is active:

Table 1

Diagnostic Trouble Codes for the CAN Data Link Circuit			
J1939 Code	**CDL Code**	**Code Description**	**Comments**
-	247-9	J1939 Network #1 : Abnormal Update Rate	The Electronic Control Module (ECM) detects the following conditions: Another controller has incorrectly stopped transmitting a J1939 speed request (TSC1)or another controller has started transmitting a J1939 speed request incorrectly. If equipped, the warning lamp will come on and the diagnostic code will be logged. Some system functions may not operate correctly.
-	247-12	J1939 Network #1 : Failure	The Electronic Control Module (ECM) detects the following conditions: There is an unexpected loss of a continuous J1939 Torque Speed Controller (TSC1) signal on the J1939 data link. The expected continuous TSC1 signal has never been received on the J1939 data link. If equipped, the warning lamp will come on and the diagnostic code will be logged.. Engine speed functions that are controlled through TSC1 will be disabled until the fault is rectified and the keyswitch is cycled through the OFF position and the ON position If there is no secondary throttle, the engine speed will be reduced to a low idle. If the engine is equipped with a secondary throttle, the engine speed will change to the speed that is demanded by the secondary throttle. Check the configuration of the ECM. If the ECM for the engine has been incorrectly configured to expect a continuous TSC1 signal, remove "Continuous" for the TSC1 signal on the main "J1939" screen on the electronic service tool. Use the OEM information to determine the machine ECM that provides the continuous speed signal. Refer to the troubleshooting procedures for the machine in order to diagnose the faulty speed signal.

The following background information is related to this procedure:

The CAN Data Link is also known as J1939 Data Link. The data link is an industry standard for sending data between different devices in the same application.

High speed data is transferred via the data link. The data link cannot be accurately tested without complicated equipment. The data link requires a resistance of 60 Ohms between the two wires to correctly transmit the data. This resistance is made up of two 120 Ohm resistors. The two resistors are known as "Terminating Resistors". The terminating resistors should be at opposite ends of a data link network. If this resistance is not present, then the data will be intermittent or completely unreadable.

Note: The wiring for the J1939 data link is a shielded twisted pair cable. If the wiring is damaged the replacement type must be shielded twisted pair cable.

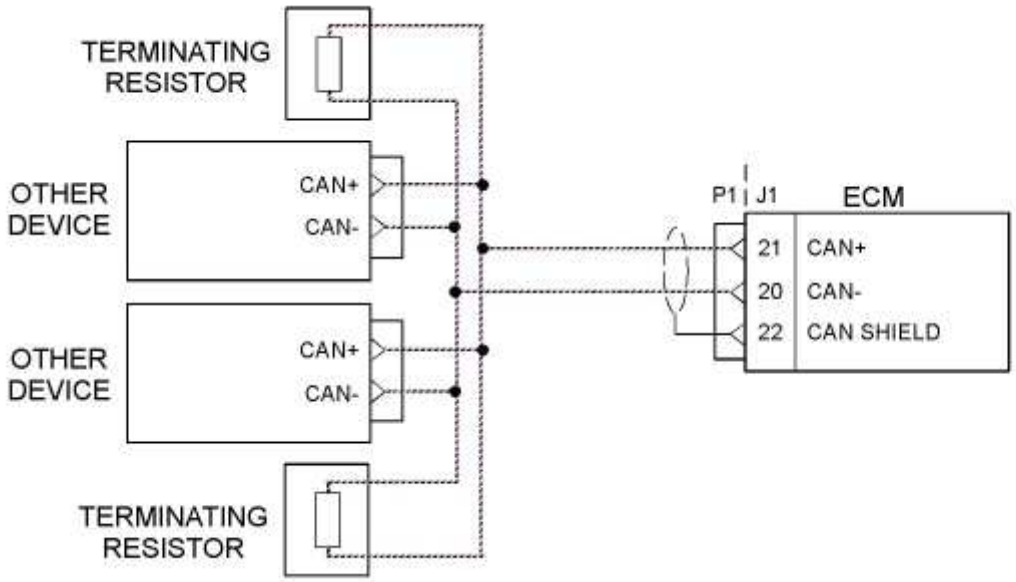

Illustration 1 g07376313
Typical example of the schematic for the CAN data link

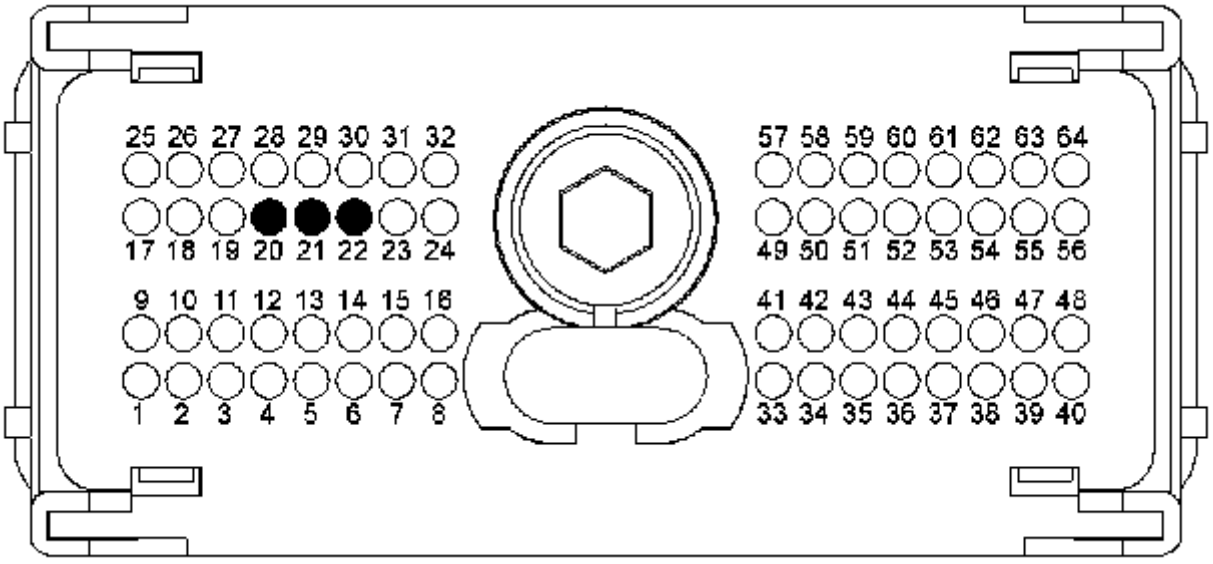

Illustration 2 g01801913

Typical view of the pin locations on the P1 connector
(20) CAN-
(21) CAN+
(22) CAN Shield

Complete the procedure in the order in which the steps are listed.

Table 2

Troubleshooting Test Steps	Values	Results
1. Inspect Electrical Connectors and Wiring **A.** Turn the keyswitch to the OFF position. **B.** Thoroughly inspect the harness connector P1/J1 and any other connectors in the CAN data link circuit. Refer to Troubleshooting, "Electrical Connectors - Inspect" for details. **C.** Perform a 45 N (10 lb) pull test on each of the wires that are associated with the CAN data link. **D.** Check the harness for abrasion and pinch points from the keyswitch to the Electronic Control Module (ECM). All connectors, pins and sockets should be completely coupled and/or inserted. The harness should be free of corrosion, abrasion and/or pinch points.	Connectors and Wiring	**Result:** All connectors, pins, and sockets are correctly coupled and/or inserted. The harness is free of corrosion, abrasion, and pinch points. Proceed to Test Step 2. **Result:** There is a fault with the harness and/or connectors. **Repair:** Repair the connectors or the harness and/or replace the connectors or the harness. Ensure that all the seals are correctly in place and ensure that the connectors are correctly connected. Use the electronic service tool to clear all logged diagnostic codes and then verify that the repair has eliminated the fault.
2. Check the Data Link Terminating Resistance **A.** Disconnect the P1 connector from the ECM. **B.**Measure the resistance between P1:20 and P1:21.	50 - 70 Ohms	**Result:** The resistance is between 50 and 70 Ohms. The fault may be in the connection to other devices on the data link. Proceed to Test Step 3. **Result:** The resistance is less than 50 Ohms. There is a short circuit in the harness. **Repair:** Repair the connectors or the harness and/or replace the connectors or the harness. Ensure that all of the seals are correctly in place and ensure that the connectors are completely coupled. Use the electronic service tool in order to clear all logged diagnostic codes and then verify that the repair eliminates the fault.

		Result: The resistance is between 110 and 130 Ohms. One of the terminating resistors may have failed. **Repair:** Locate the two terminating resistors and remove the two terminating resistors from the harness. Depending on the application, one or both of the terminating resistors may be located in other ECMs on the data link. Measure the resistance of the two terminating resistors. If one of the terminating resistors is incorrect, replace the faulty terminating resistor. If the two terminating resistors are between 50 and 70 Ohms, proceed to Test Step 4. **Result:** The resistance is greater than 150 Ohms. There may be a break in the harness. Proceed to Test Step 3.
3. Check the Data Link Wiring **A.** Disconnect each of the connectors that connect other devices on the data link. **B.** Use a multimeter in order to measure the resistance between P1:20 to each of the CAN+ pins that connect other devices on the data link. **C.** Use a multimeter in order to measure the resistance between P1:21 to each of the CAN- pins that connect other devices on the data link. **D.** Use a multimeter in order to measure the resistance between P1:22 to each of the CAN SHIELD pins that connect other devices.	<2.0 Ohms	**Result:** The resistance of each wire is less than 2.0 Ohms. Proceed to Test Step 4. **Result:** The resistance is less than 50 Ohms. There is a short circuit in the harness. **Result:** Some resistances are more than 2.0 Ohms. **Result:** Repair the connectors or the harness and/or replace the connectors or the harness. Ensure that all seals are correctly in place and ensure that the connectors are completely coupled. Use the electronic service tool in order to clear all logged diagnostic codes and then verify that the repair has eliminated the fault.
4. Check the Other Devices on the J1939 Data Link	Other Devices	**Result:** The other devices are working correctly.

A. Use the appropriate service tools in order to diagnose other devices on the data link.		**Repair:** Repeat this test procedure from Test Step 1. **Result:** The other devices are not working correctly. **Result:** Use the appropriate service tools in order to diagnose other devices on the data link. Use the electronic service tool in order to clear all logged diagnostic codes and then verify that the repair eliminates the fault.