

Special Instruction

i02847350

Installation Guide for the 256-7511 PL1000T Communication ECM

SMCS Code: 7606; 7610

Electric Power Generation

All

Engine Industrial, Marine, and Generator Set that Use Flash Programming

All

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Introduction

This Special Instruction provides information for the installation of the 256-7511 PL1000T Communication ECM. Refer to Systems Operation, RENR7945 for more information about the 256-7511 PL1000T Communications ECM.

Do not perform any procedure that is outlined in this publication, or order any parts until this information has been read and is understand.

Required Tools

The following tools will be required to install the 256-7511 PL1000T Communications ECM. The list below contains the recommended Caterpillar service tools.

Table 1

Part Number	Description
	Laptop Computer
JERD2124	Caterpillar Electronic Technician (Cat ET) Version 2007B or later
JERD2129	Date Subscription for all engines and machines
EERP1000	Caterpillar Tool Kit Version 2007B or later
171 - 4400	Communication Adapter Gp (CAT ET TO ECM INTERFACE) (optional) ⁽¹⁾
9U - 7330	Digital Multimeter
7X - 1710	Multimeter Probe
1U - 5804	Crimp Tool (12-AWG TO 18-AWG)
175 - 3700	Connector Repair Kit (DT)
	Two short jumper wires ⁽²⁾
	Long extension wire ⁽³⁾
	4 mm (5/32 inch) Allen wrench

⁽¹⁾ The 7X - 1700 Communication Adapter Gp or the ECM's embedded communication adapter may also be used.

⁽²⁾ Two short jumper wires are needed to check the continuity of some wiring harness circuits by shorting two adjacent terminals together in a connector.

⁽³⁾ A long extension wire may also be needed to check the continuity of some wiring harness circuits.

Parts List

Table 2

Contents of the 271 - 2204 PL1000T Communications ECM Field Installation Kit ⁽¹⁾		
Quantity	Part Number	Description
10	7K - 1181	Cable Strap
4	8C - 5608	Spacer
4	8C - 8451	Bolt
8	9X - 6165	Washer
8	9X - 9896	Isolation Mount
4	117 - 1660	Rubber Bumper ⁽²⁾
4	129 - 3178	Locknut
1	256 - 7511	PL1000T Communications ECM with Flashed application software
1	270 - 1732	Harness Assembly

⁽¹⁾ This Kit contains parts that are not used in all applications. Discard any unused parts.

⁽²⁾ Self stick adhesive back. Applied to the bottom of the ECM when shock mounting is not required. For use when mounting the ECM on a table or desk only.

Additional Parts that may be needed

For most applications the 270 - 1732 Harness Assembly will require additional wiring. Table 3 lists optional components that may be needed in order to complete the wiring for the intended application.

Table 3

Additional Wiring Components		
Quantity	Part Number	Description
1-70	9X-3402	Connector Socket (16 AWG - 18 AWG)
1-70	126-1768	Connector Socket (14 AWG)
1-3	163-5620	Plug Assembly (DB-9 Style)
1-3	163-6484	Receptacle Assembly (DB-9 Style)
1-3	162-1722	Plug Assembly (DB-15 Style)
1-2	163-5618	Plug Assembly (DB-25 Style)
1-2	163-5619	Receptacle Assembly (DB-25 Style)
1-4	5N-4988	Isolation Diode (Single)
1	7C-2668	Isolation Diode (4- Pack)
1-2	134-2540	Receptacle Assembly – J1939 Terminating Resistor
	199-9785	Wire Assembly - Splice
	207-3814	Wire Assembly - Splice
	115-8109	Wire Splice (Single Sealed)

Some installations may require additional mounting hardware to secure the ECM to a mounting surface. These installation methods are detailed in Section “ECM Module Installation”. Table 4 lists optional components for ECM mounting.

Table 4

Additional ECM Mounting Components		
Quantity	Part Number	Description
4	Various	M6 x 1 bolt or weld stud (length varies depending on mounting method)
4	Various	M6 x 1 weld boss, nut, or similar fastener

ECM Mounting Considerations

Identify a mounting location for the ECM. Measure the location to ensure correct spacing for the ECM “footprint” and harness routing.

Determine the appropriate mounting method (shock mount or desk mount), for the specific application.

Keep in mind the mounting location of the PL1000T.

The PL1000E 256-7511 Communication Electronic Control Module v4, must be mounted in a location that will not expose the PL1000E to temperatures above 85 °C (185 °F). If the temperature at the location is unknown, mount the PL1000E in a location that can be properly ventilated.

The PL1000E 256-7511 Communication Electronic Control Module v3, must be mounted in a location that will not expose the PL1000E to temperatures above 70 °C (158 °F). If the temperature at the location is unknown, mount the PL1000E in a location that can be properly ventilated.

NOTICE

For mounting applications where the ECM may be subjected to shock or vibration, use the shock mounting method. Use the desk mounting method for mounting applications where the ECM will not be exposed to shock or vibration.

When mounting the ECM, orient so that the ECM connector is not subjected to high pressure spray or underwater submersion. Exposure to high pressure spray or underwater submersion may compromise the connector seal and lead to connection failure.

When mounting the ECM, orient so that the ECM is not used as a “boot step” or a fulcrum point for a dealer mechanic or tradesperson. The ECM is made of a high strength cast aluminum, but can still be damaged.

ECM Module Installation

Desk Mounting Method

1. When mounting the ECM on a stable surface such as a table or desk, apply the four 117-1660 Rubber Bumpers to the bottom side of the ECM at each corner. The bottom side of the ECM is the side opposite of the ECM connector.
2. Place the ECM in the desired location on a flat level surface.

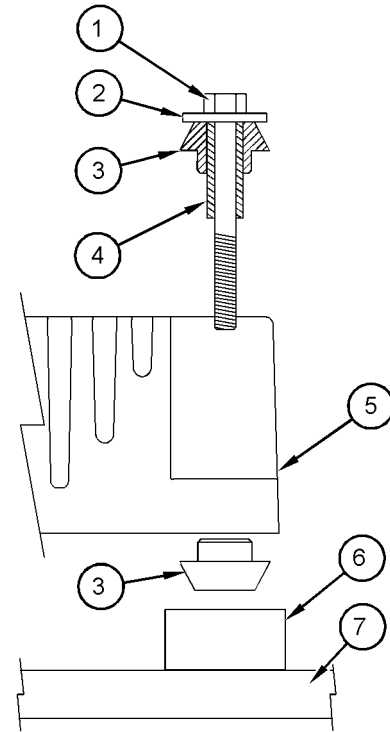
Shock Mounting Method

There are several different methods for shock mounting the ECM. Select a shock mounting method that is appropriate for the intended application and environment.

Preferred Shock Mounting Method using weld bosses or weld studs

The preferred shock mounting method requires the use of weld bosses or weld studs to mount the ECM. Refer to Illustrations 1 and 2.

1. Locate the ECM mounting hole template (Illustration 18) and place the template in the desired ECM mounting location.
2. Mark each mounting hole location.
3. Remove the template.
4. Weld the weld bosses or weld studs at the marked locations.
5. Mount the ECM onto the weld bosses or weld studs as shown in Illustration 1 or Illustration 2.
6. Tighten the bolts or locknuts to 12 N·m (9 lb ft).



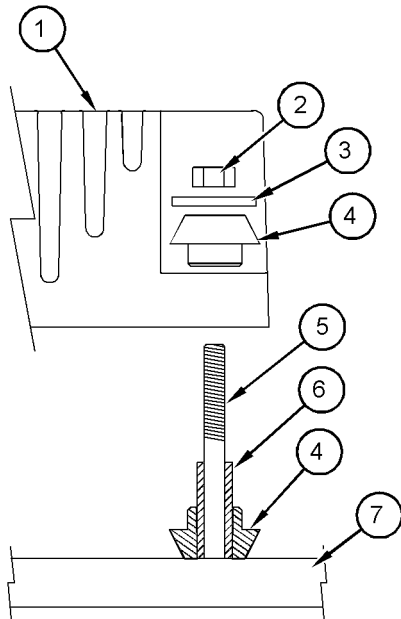
Shock Mounting Method using bolts and weld bosses

Illustration 1

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Shock Mounting Method using bolts and weld bosses

- (1) M6 x 1, 43 mm (1.75 inch) bolt
- (2) 9X - 6165 Washer
- (3) 9X - 9896 Mount
- (4) 8C - 5608 Spacer
- (5) 256-7511 PL1000T Communications ECM
- (6) M6 x 1 weld boss, weld nut, or similar fastener
- (7) Mounting plate



Shock Mounting Method using weld studs

Illustration 2

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Shock Mounting Method using weld studs

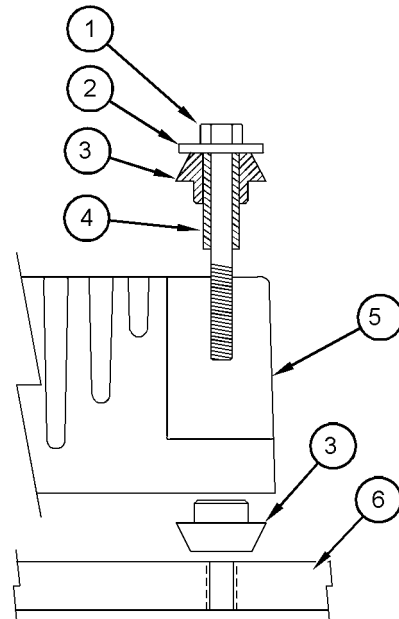
- (1) 256-7511 PL1000T Communications ECM
- (2) M6 x 1 Locknut
- (3) 9X-6165 Washer
- (4) 9X-9896 Mount
- (5) M6 x 1, 43 mm (1.75 inch) weld stud
- (6) 8C-5608 Spacer
- (7) Mounting plate

Shock Mounting Method using bolts and threaded mounting holes

Shock mounting the ECM using threaded mounting holes requires the use of drilled and tapped holes to mount the ECM. Refer to Illustration 3.

1. Locate the ECM mounting hole template (Illustration 18) and place the template in the desired ECM mounting location.
2. Mark each mounting hole location.
3. Remove the template.
4. Drill a 4 mm (11/64 inch) hole at each marked location.

5. Tap each hole with a M6 x 1 tap to provide the threaded holes for the M6 x 1 bolts.
6. Mount the ECM as shown in Illustration 3.
7. Tighten the bolts to 12 N·m (9 lb ft).



Shock Mounting Method using bolts and threaded mounting holes

Illustration 3

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Shock Mounting Method using threaded mounting holes

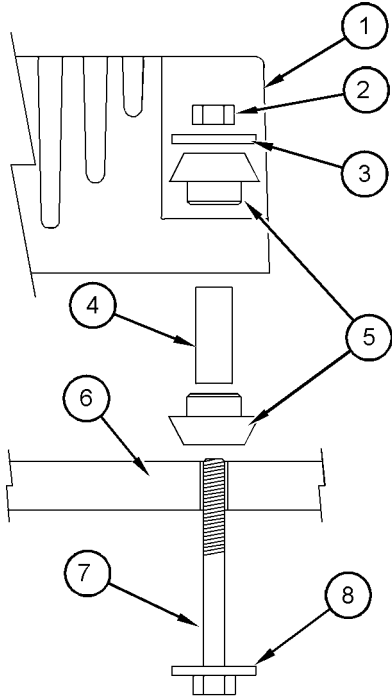
- (1) M6 x 1, 43 mm (1.75 inch) bolt
- (2) 9X-6165 Washer
- (3) 9X-9896 Mount
- (4) 8C-5608 Spacer
- (5) 256-7511 PL1000T Communications ECM
- (6) Mounting plate

Shock Mounting Method using bolts and through holes

Shock mounting the ECM using through holes requires drilling four clearance holes for mounting the ECM. Refer to Illustration 4.

1. Locate the ECM mounting hole template (Illustration 18) and place the template in the desired ECM mounting location.
2. Mark each mounting hole location.
3. Remove the template.

4. Drill a 6.35 mm (0.25 inch) hole at each marked location.
 5. Mount the ECM as shown in Illustration 4.
 6. Tighten the bolts to 12 N·m (9 lb ft).
-



Shock Mounting Method using bolts and through holes

Illustration 4

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Shock Mounting Method using through holes

- (1) 256-7511 PL1000T Communications ECM
- (2) M6 x 1 Locknut
- (3) 9X-6165 Washer
- (4) 8C-5608 Spacer
- (5) 8C-5607 Mount
- (6) Mounting plate
- (7) M6 x 1, bolt - Length = 43 mm + mounting plate thickness

Wiring Requirements and Installation

The 270-1732 Harness Assembly is supplied to provide the basic power and communications with the 256-7511 PL1000T Communications ECM. The harness connectors are shown in Table 5.

Table 5

Connector	Part Number	Description
ECM	160 - 7690	70-pin AMP rectangular plug. Provides the connection to the PL1000T Communications ECM.
Power	3E - 3376	4-pin Duetsch DT style rectangular receptacle. The connector provides ready access to the Battery and Key Switch connections on the PL1000T Communications ECM.
Service Tool	8T - 8735	9-pin Duetsch HD-10 style round plug. The Connector is the standard service tool connector found on most Caterpillar machine and engine connections for use with the 171 - 4400 Communications Adapter II or similar communications device. The communications device is connected to a PC serial port or parallel port allowing the PC to communicate with the CAT Data Link network or the J1939 #1 network using standard Caterpillar tools such as CAT ET.
Embedded Comm Adapter	257 - 2719	9-pin AMP DB style plug. The connector provides a similar function as the Service Tool connector expect that the connector can plug directly into a PC rather than having to go through a 171 - 4400 Communications Adapter II or similar device. Refer to the section "Embedded Comm Adapter Connectin Group" in Table 6 for more information.

NOTICE

The technician must provide additional wiring in order to complete the installation of the ECM into a custom communication system. The 270 - 1732 Harness Assembly electrical diagram is shown in Illustration 5. The wiring of individual power and communication circuits is detailed in subsequent sections.

ECM Connector and Wiring Harness Pin-out

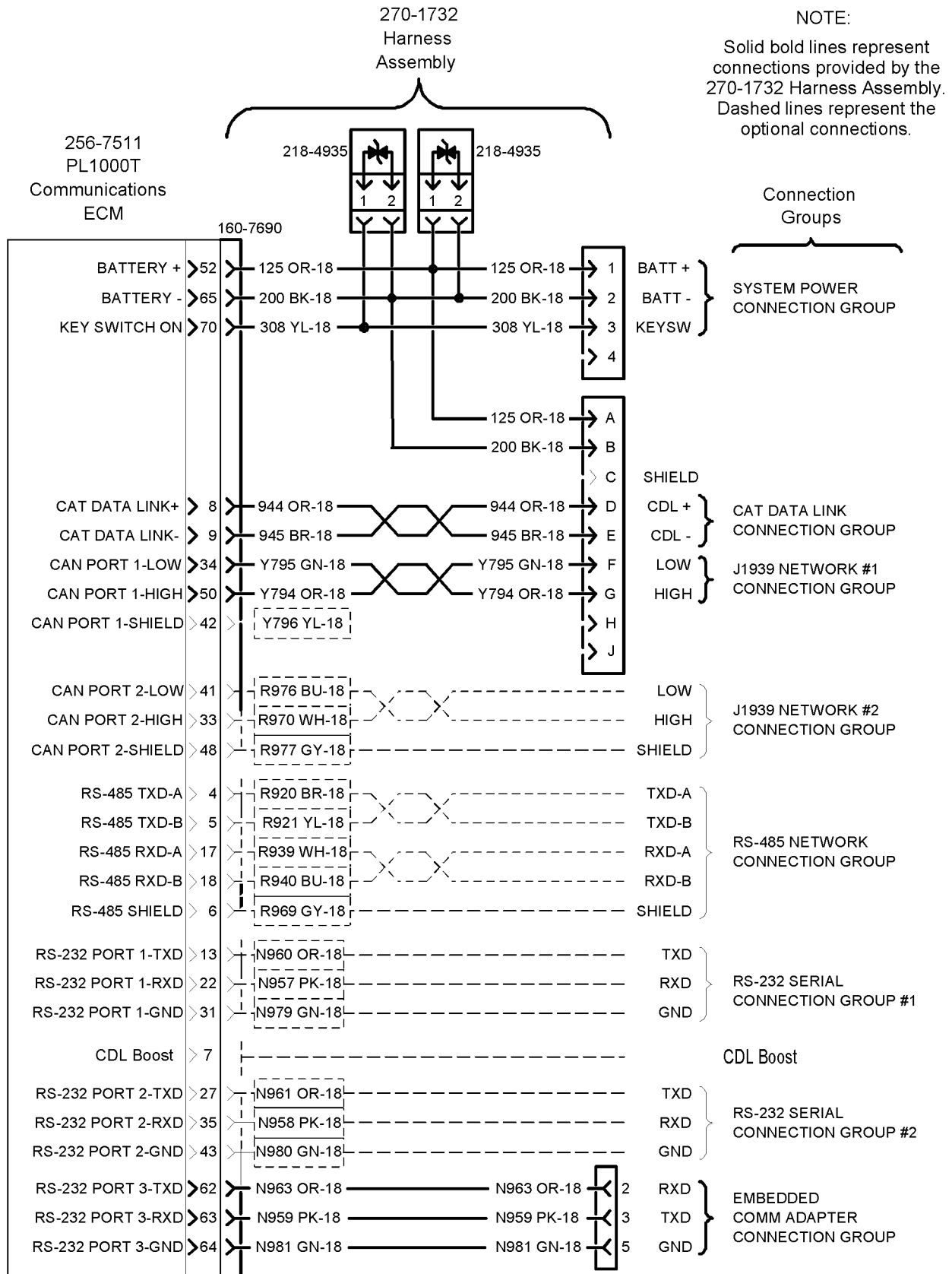


Illustration 5

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Note: CDL boost that is available for the PL1000T 256-7511 Communications ECM (v3). The 258-4550 ECM must be used. CDL boost for the PL1000T 256-7511 Communications ECM (v3) is enabled or disabled through a Cat ET and the Communications Toolkit.

Note: CDL boost that is available for the PL1000T 256-7511 Communications ECM (v4) that uses the 285-1140 ECM. CDL boost for the PL1000T 256-7511 Communications ECM (v4) is enabled by grounding pin 7. Cat ET and the Communications Toolkit will show a status flag that shows if CDL boost is enabled.

Refer to Illustration 5 for possible connections that can be made to the 256-7511 PL1000T Communications ECM for specific applications. The Connection Groups shown in Illustration 5 are described in Table 6. Use only the connection groups that are necessary for the specific application.

Note: Most of these connection groups require special configurations of the PL1000T 256-7511 Communications ECM. Use Cat ET 2007B or higher version or use Caterpillar Toolkit 2007B or higher version in order to configure the PL1000T as referenced in Table 1. Refer to System Operation, RENR7945 for specific information about these special configurations.

Table 6

Connection Group Applications	
System Power Connection Group	The System Power Connection Group provides a standard Electronic Control power connection between system power and the ECM. Refer to the section "System Power Wiring Requirements" for specific wiring requirements.
CAT Data Link (CDL) Connection Group	The CAT Data Link Group provides a standard CAT Data Link connection. This connection must be used when implementing the PL1000T Communications ECM's Embedded Communications Adapter (ECA) feature to service a CDL-compatible device using standard Caterpillar service tools, such as CAT ET. Refer to the section "Cat Data Link Communications Wiring Requirements" for specific wiring requirements.
J1939 Network #1 Connection Group & J1939 Network #2 Connection Group	The J1939 Network Connection Groups provide a standard CAN bus connection operating at 250,000 baud. The J1939 Network Connection Groups must be connected in order to implement the PL1000T Communication ECM's J1939 Bridge or CAN Extension Bridge features. Additionally, the J1939 Network Connection Groups may also be connected in order to facilitate connections to J1939 compatible devices using the PL1000T Communications ECM's Embedded Communications Adapter feature for standard Caterpillar service tools, such as CAT ET. Refer to "SAE J1939-11", "SAE J1939-15", and the section "J1939 Communications Wiring Requirements" for specific wiring requirements.
RS-485 Network Connection Group	The RS-485 Network Connection Group provides a proprietary RS-485 serial interface operating up to 250K baud rate. The RS-485 Network Connection Group must be connected in order to implement the PL1000T Communications ECM's CAN Extension Bridge feature. Refer to the section "RS-485 Harness Requirements" for specific wiring requirements.
RS-232 Serial Connection Group #1 & RS-232 Serial Connection Group #2	The RS-232 Serial Connection groups provide a standard RS-232 serial interface programmable to operate in the range of 4800 to 115200 baud. These serial connection groups correspond to the PL1000T Communications ECM Serial Ports #1 and #2 respectively. These serial ports support standard NMEA device string translations from NMEA-183 standard messages to CDL and J1939. Refer to "NMEA 0183 Interface Standard (Version 3.0)" and to the section "NMEA Device Communications Wiring Requirements" for specific wiring requirements.
Embedded Communications Adapter Connection Group	The Embedded Communications Adapter Connection Group provides a standard RS-232 serial interface that can operate anywhere in the range of 9600 baud through 115K baud. The Embedded Communications Adapter Connection Group must be connected in order to implement the PL1000T Communications ECM's Embedded Communications Adapter feature. The Embedded Communications Adapter feature allows standard Caterpillar service tools, such as CAT ET to interface with a CDL device or J1939 device.

System Power Wiring Requirements

The power connector in the 270 - 1732 Harness Assembly provides a direct connection to the PL1000T's switched power inputs and un-switched power inputs.

NOTICE

The 270-1732 Harness Assembly contains 218-4935 Arc Suppressors to protect the internal circuitry of the 257-7511 PL1000T Communications ECM from high voltage transients. **DO NOT** remove these transient devices from the 270-1732 Harness Assembly or rewire the system to remove the transient devices from the wiring. Doing so will void the warranty on the 257-7511 PL1000T Communications ECM.

Basic power connection parameters are shown in Table 7. Basic electrical connections are shown for single power sources in Illustration 6. Basic electrical connections are shown for multiple power sources in Illustration 7.

Table 7

Basic Power Connection Parameters			
Parameter	Value		
	Min	Nominal	Max
Voltage between BATT+ and BATT-	9V	12V or 24V	32V
Current Draw ⁽¹⁾	0.5A		5A

⁽¹⁾ Provide fuse protection for the BATT+ and KEYSW to not allow the current to exceed 5 Amps

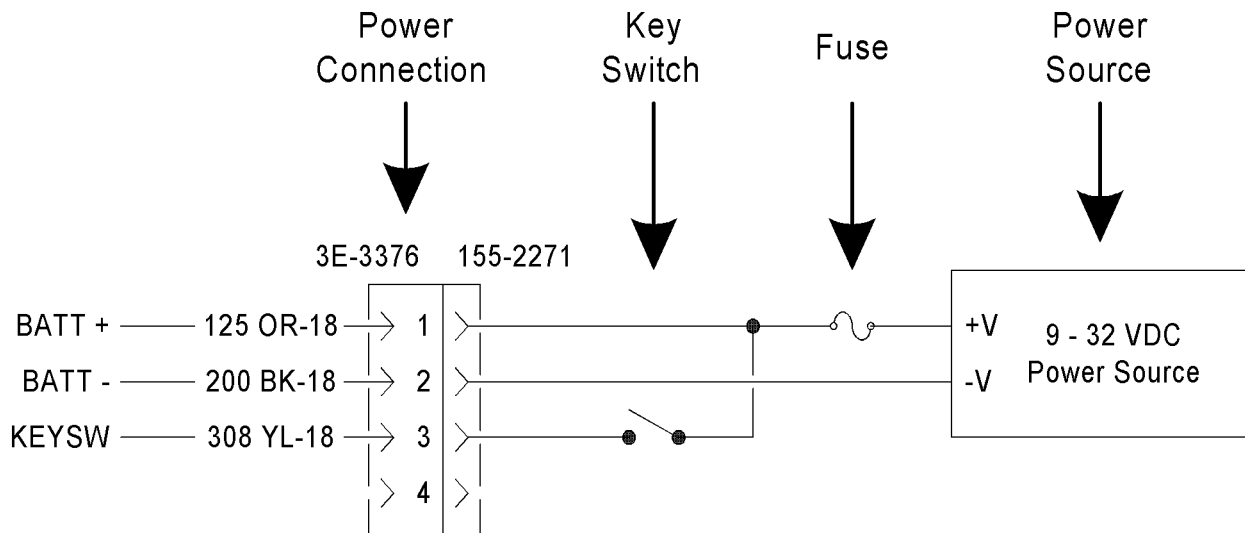


Illustration 6

Power Connection - Single Power Source

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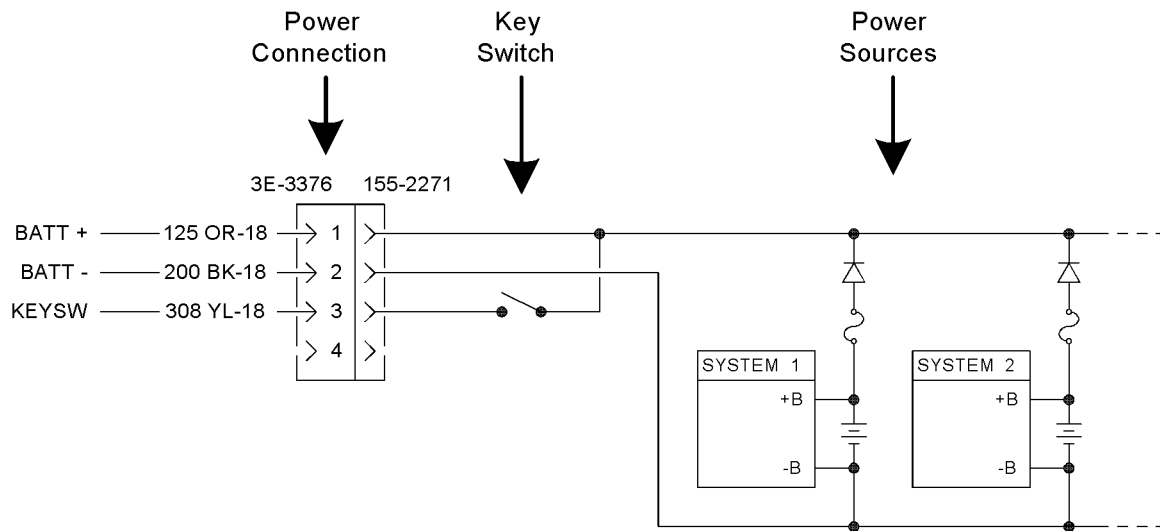


Illustration 7

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Power Connection - Multiple Power Source

Additional power connection information to consider:

- Minimum 18 AWG wire should be used for KEYSW, BATT+, and BATT- connections and harnessing.
- The key switch connection “activates” the PL1000T. If a key switch does not exist in the electrical system, or if it is desired to have the PL1000T powered at all times, then connect the KEYSW connection directly to BATT+.
- The BATT- must connect to a ground signal common with the rest of the system components obtaining voltage from the same power supply. Grounding requirements may vary from application to application. Consult the system’s schematics and other system documentation for grounding requirements.
- Provide fuse protection for BATT+ and KEYSW to not allow the current to exceed 5 Amps.
- Provide diode isolation where multiple power sources are used. The diodes isolate the power sources allowing the PL1000T to remain powered if at least one power source is operational.
- Use good wire routing and wire securing practices to avoid damage to the cable.
- Run cable away from high power and high frequency sources to avoid injecting electrical noise into the wiring.
- Install sealing plugs (8T-8737) into any unused sockets at the rear of the connector.

CAT Data Link Communications Wiring Requirements

The Cat Datalink communications connection provides a connection between the PL1000T Communications ECM and the Cat Datalink network. The PL1000T can connect close to the system “Boost Disabled” with a total network wiring length of 33 m (100 ft), or locate a distance away from the system (Boost Enabled) with a total network length of up to 455 m (1493 ft). These wiring distances are dependant on wire gauge, wire resistance, and cable capacitance. Reference Table 8 for specific wiring requirements and basic parameters. Basic electrical connections are shown in Illustration 8 and Illustration 10.

Table 8

Cat Data Link Port Characteristics			
Parameter		Value	
		CDL Boost Disabled	CDL Boost Enabled
Maximum Cable Length ⁽¹⁾		19 m (62 ft) 18 AWG wire 30 m (100 ft) 16 AWG wire	300 m (984 ft) 18 AWG wire 455 m (1493 ft) 16 AWG wire
Maximum Cable Capacitance ⁽²⁾	Conductor to Conductor	.0023 μ F	.035 μ F
	Conductor to Shield	.0044 μ F	.006 μ F
Maximum cable resistance for a single conductor ⁽³⁾		0.43 Ω	6.5 Ω
Maximum number of devices ⁽⁴⁾		11	11

- (1) This length is the total length of all wiring in the Cat Datalink network, including the wiring for the ECM. Refer to Illustration 10 for explanation of how to properly calculate cable length.
- (2) To measure cable capacitance, disconnect all devices from the network at the device connection such that the network wires are open between the two conductors. Measure the capacitance between the two wires.
- (3) To measure cable resistance, disconnect all devices from the network at the device connection such that the network wires are open between the two conductors. Short the wires at the PL1000T Communications ECM device connection. Measure the resistance between the two wires at all other device connections. For the maximum reading taken, divide the resistance measurement by 2 and compare to the value shown.
- (4) This is the number of devices on the network including the PL1000T Communications ECM.

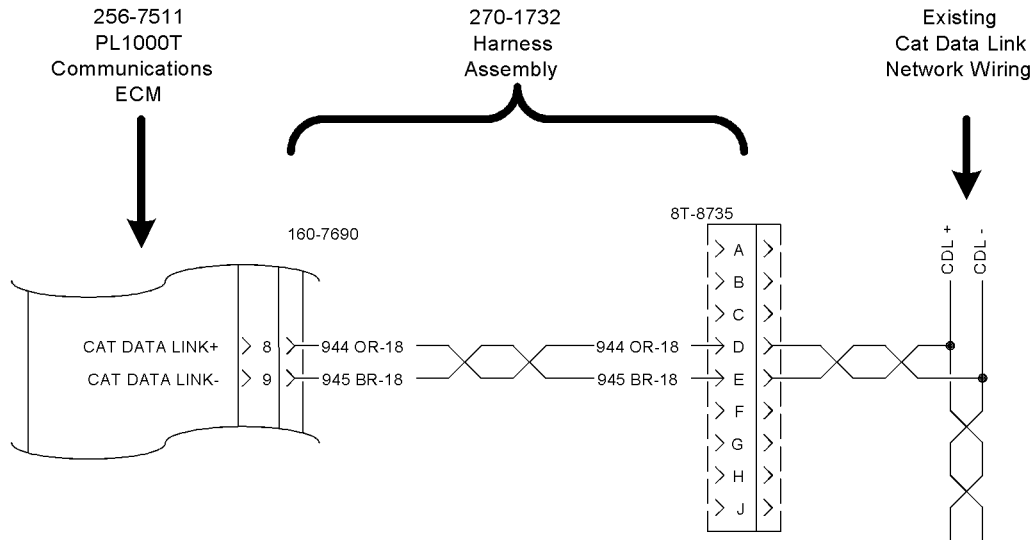


Illustration 8

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Typical Cat Datalink Communications Wiring-Using Service Tool Connector

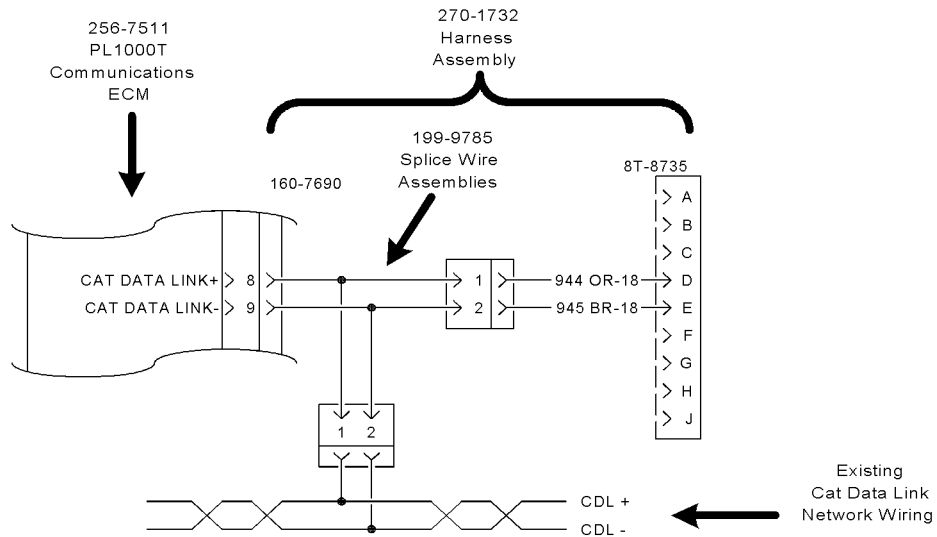
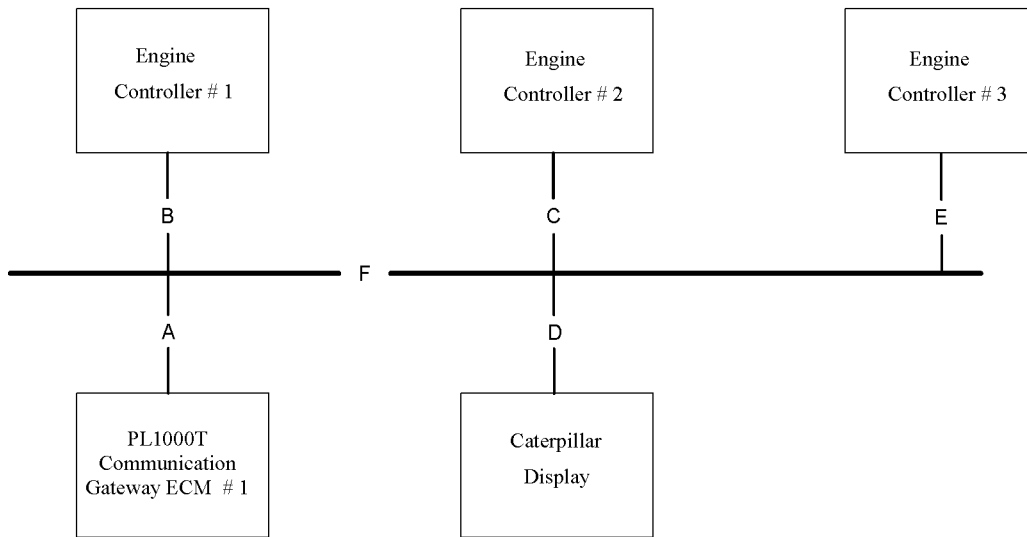


Illustration 9
 Typical Cat Datalink Splicing into 270-1732 Harness Assembly

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Where total cable length = A + B + C + D + E + F

Illustration 10

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Additional Cat Datalink connection information to consider:

- Connecting to the Cat Datalink network is NOT necessary for operation of the PL1000T Communications ECM.
- Connecting multiple Cat Datalink networks together, without properly configuring the ECMs on the networks, may cause communications conflicts among the ECMs and possible shutdown of the engines or other devices controlled by the ECMs.
- If connecting to a Cat Datalink network, connect to one network only.

- 16 AWG or 18 AWG common harness wire should be used for wiring the Cat Datalink network as a twisted pair with 1/3 to 1 full twist per inch.
- Use good wire routing and wire securing practices to avoid damage to the cable.
- Run cable away from high power and high frequency sources to avoid injecting electrical noise into the wiring.
- Each ECM installed on the Cat Datalink network should have power system electrical connections such that they all share a common ground (BATT-).
- Install sealing plugs (8T-8737) into any unused sockets at the rear of the connector.

J1939 Communications Wiring Requirements

The J1939 communications connection provides a connection between the PL1000T and the J1939 network. The J1939 network contains a bus along with stub wiring to connect nodes to the bus. The bus is terminated on each end to complete the network. Table 9 shows the parameters for the J1939 network and Illustration 11 shows a typical J1939 network layout. Illustration 12 and Illustration 13 show electrical connection methods for J1939 Port 1 and Illustration 14 shows the electrical connection method for J1939 Port #2.

Table 9

J1939 Port Characteristics		
Parameter	Value	
	Shielded (SAE J1939-11)	Unshielded (SAE J1939-15)
Maximum Nodes (n)	30	10
Maximum Bus Length ⁽¹⁾ (L)	40 m (132 ft)	
Maximum Stub Length ⁽²⁾ (S)	1 m (3.3 ft)	3 m (9.8 ft)
Node Distance (d)	0.1 m - 40.0 m (0.3 ft - 98.5 ft)	
Minimum distance to terminating resistor (d ₀)	0.0 m	
Terminating Resistors (R _T)	120 Ω, 0.5 Watt	

⁽¹⁾ Do not include cable stubs in the calculations.

⁽²⁾ Subtract 0.33 meters if the cable stub is for a service port connector.

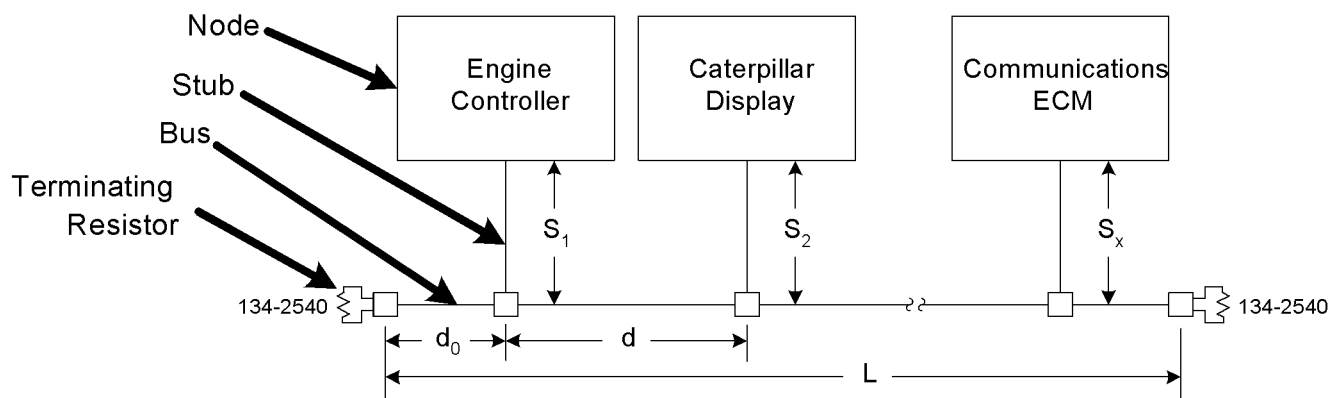


Illustration 11

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Typical J1939 Communications Network Layout

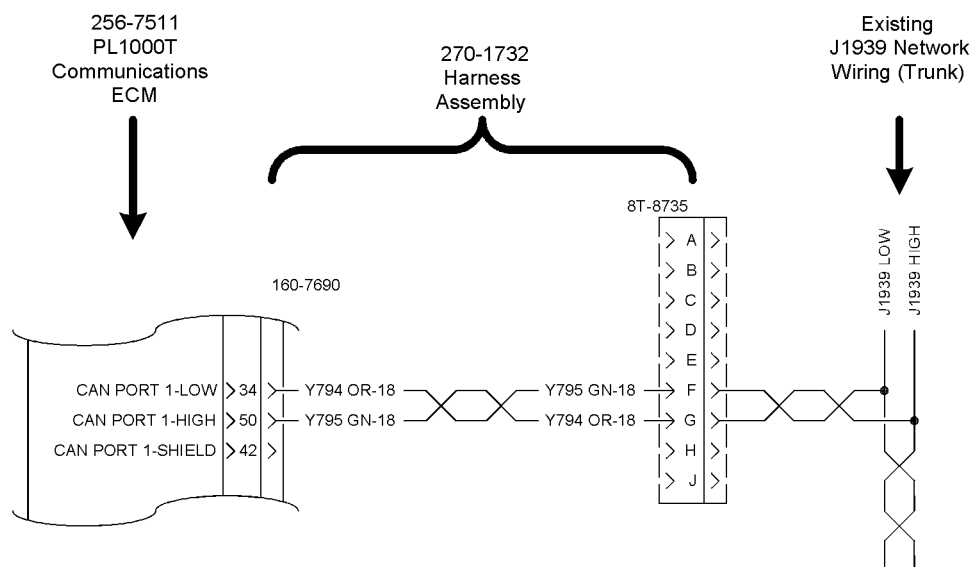


Illustration 12

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J1939 Port 1 Communications Wiring - Using Service Tool Connector

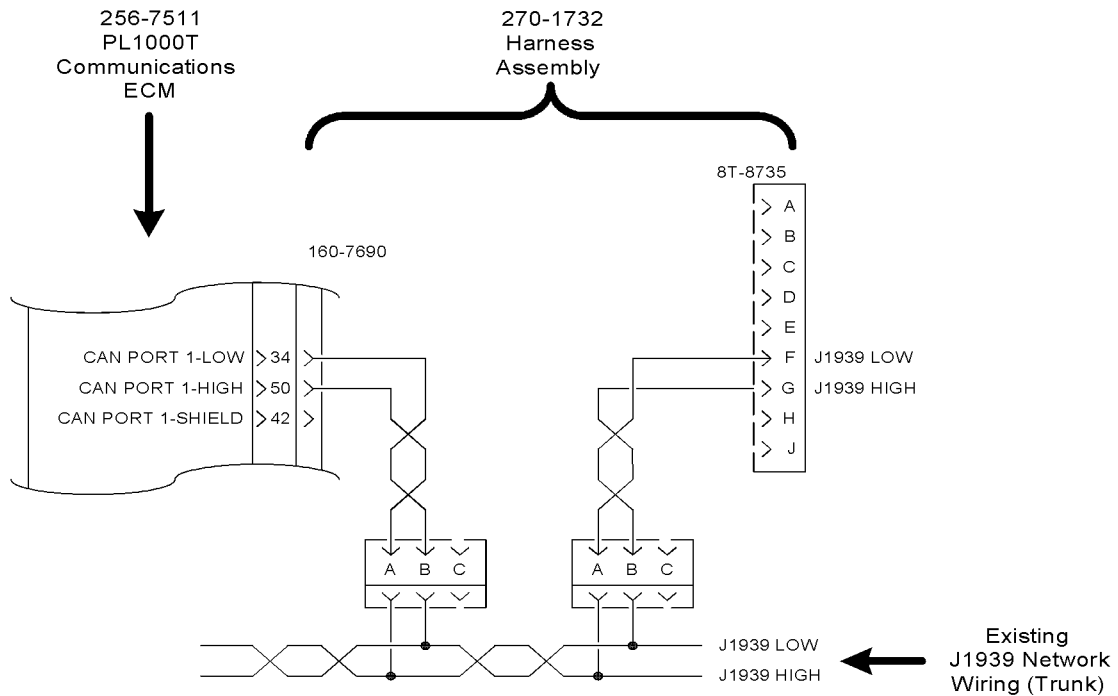


Illustration 13

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J1939 Port 1 Communications Wiring - Alternate Routing of 270- 1732 Harness Assembly

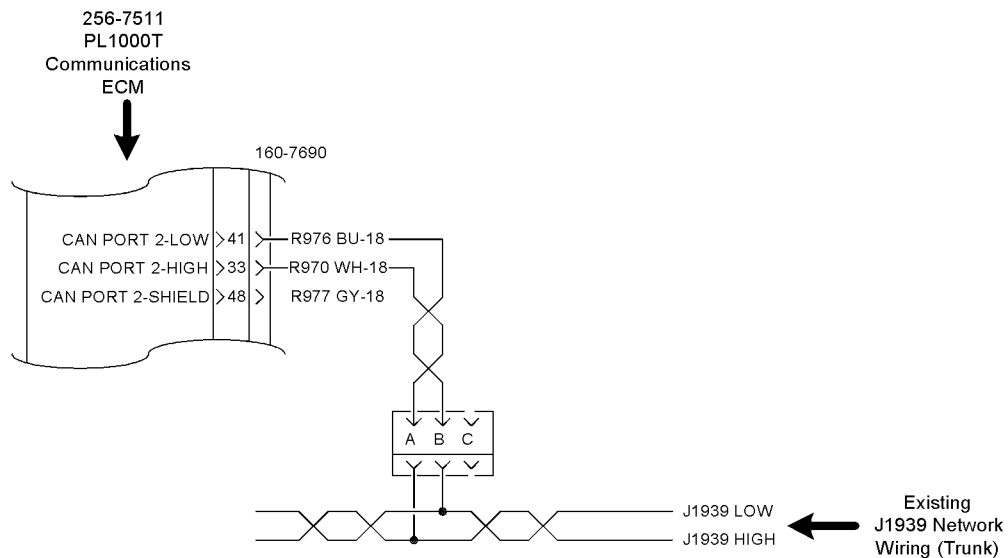


Illustration 14

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J1939 Port 2 Communications Wiring

Additional J1939 connection information to consider:

- A terminating resistor must be connected to both ends of the J1939 communications bus for proper operation of the network.

- 16 AWG or 18 AWG common harness wire should be used for wiring the J1939 network as a twisted pair with 1 full twist per inch.
- Use good wire routing and wire securing practices to avoid damage to the cable.

- Run cable away from high power and high frequency sources to avoid injecting electrical noise into the wiring.
- Each device installed on the J1939 network should have power system electrical connections such that they all share a common ground (BATT-).
- Install sealing plugs (8T-8737) into any unused sockets at the rear of the connector.

RS-485 Harness Requirements

The RS-485 Communications connection provides a connection between two PL1000Ts in a “CAN Extension Bridge” configuration. The basic parameters are shown in Table 10. Basic electrical connections are shown in Illustration 15.

Table 10

RS-485 Port Characteristics	
Parameter	Value
Maximum Cable Length	305 m (1000 ft)
Maximum Conductor to Conductor Cable Capacitance ⁽¹⁾	.022 μ F
Maximum Cable Resistance for a single Conductor ⁽²⁾	39 Ω

⁽¹⁾ To measure cable capacitance, disconnect all devices from the network at the device connection such that the network wires are open between the two conductors. Measure the capacitance between the two wires.

⁽²⁾ To measure cable resistance, disconnect all devices from the network at the device connection such that the network wires are open between the two conductors. Short the wires at the PL1000T Communications ECM device connection. Measure the resistance between the two wires at all other device connections. For the maximum reading taken, divide the resistance measurement by 2 and compare to the value shown.

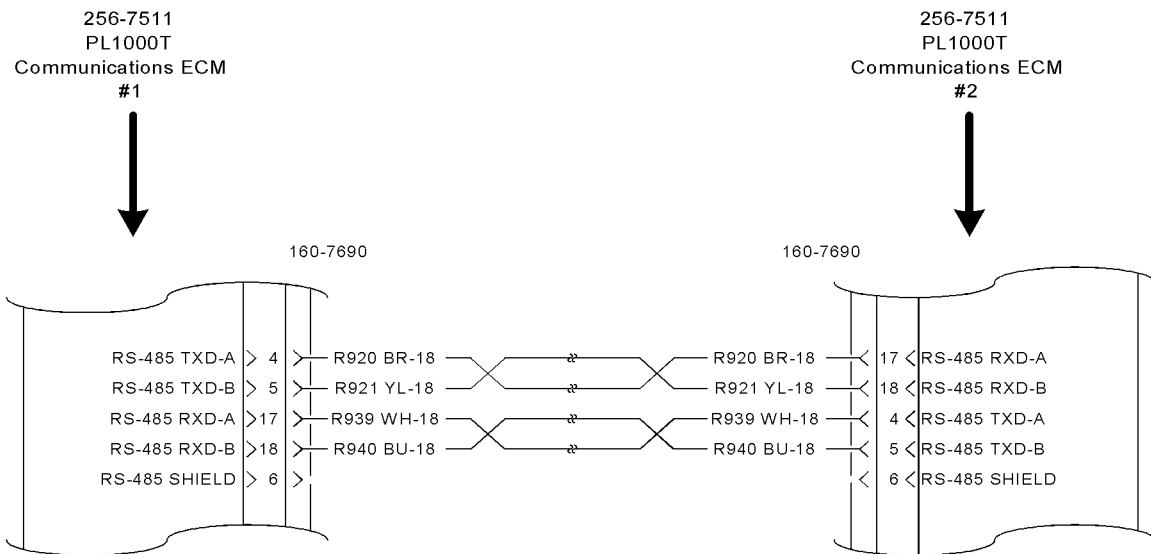


Illustration 15

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Additional RS-485 connection information to consider:

- A terminating resistor must be connected to both ends of the J1939 communications bus for proper operation of the network.
- 16 AWG or 18 AWG common harness wire should be used for wiring the J1939 network as a twisted pair with 1 full twist per inch.
- Use good wire routing and wire securing practices to avoid damage to the cable.

- Run cable away from high power and high frequency sources to avoid injecting electrical noise into the wiring.
- Each device installed on the RS-485 network should have power system electrical connections such that they all share a common ground (BATT-).
- Install sealing plugs (8T-8737) into any unused sockets at the rear of the connector.

NMEA Device Communications Wiring Requirements

The “NMEA Device Communications” connection provides a connection between the PL1000T and NMEA devices. The connection conforms to EIA RS-232 standards and will work with any NMEA devices that also conform to EIA RS-232 standards. Table 11 shows the parameters for the “NMEA Device” connections and Illustration 16 shows a typical electrical connections to NMEA devices.

Table 11

NMEA Port Characteristics	
Parameter	Value
Maximum Cable Length	30.5 m (100 ft)
Maximum Conductor to Conductor Cable Capacitance ⁽¹⁾	.002 μ F
Maximum Cable Resistance for a single Conductor ⁽²⁾	25 Ω

⁽¹⁾ To measure cable capacitance, disconnect all devices from the network at the device connection such that the network wires are open between the two conductors. Measure the capacitance between the two wires.

⁽²⁾ To measure cable resistance, disconnect all devices from the network at the device connection such that the network wires are open between the two conductors. Short the wires at the PL1000T Communications ECM device connection. Measure the resistance between the two wires at all other device connections. For the maximum reading taken, divide the resistance measurement by 2 and compare to the value shown.

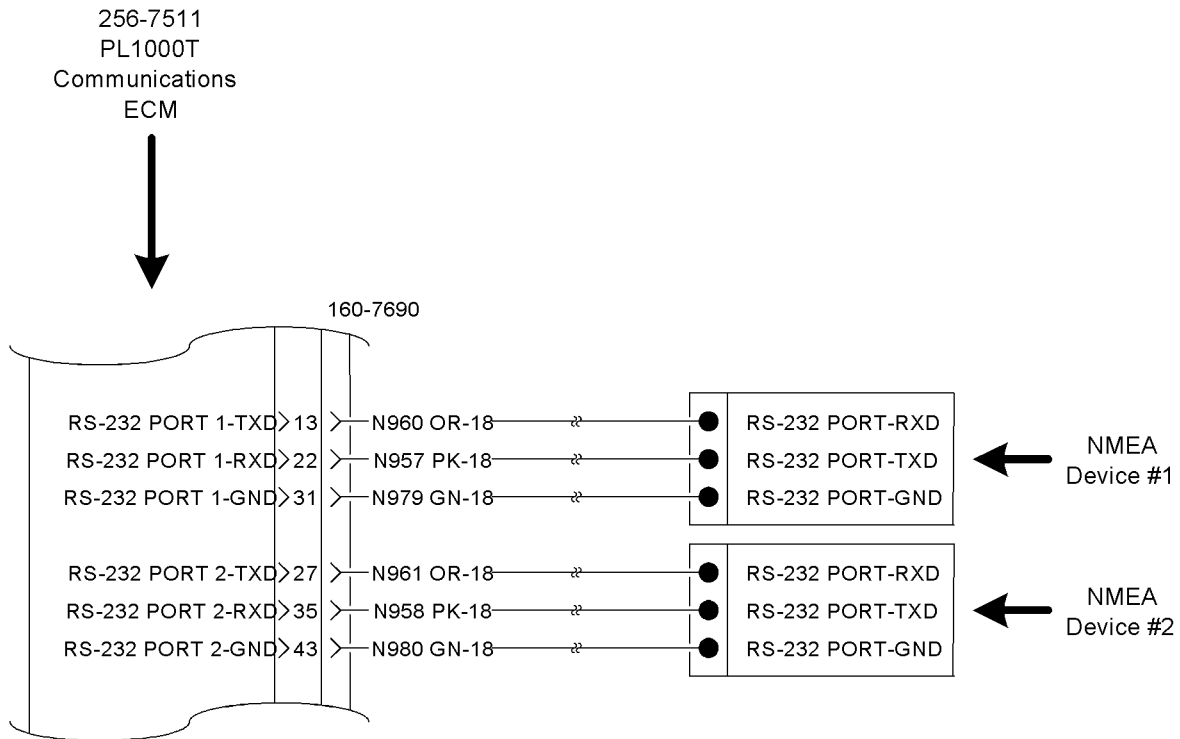


Illustration 16

g01145762

Additional NMEA device connection information to consider:

- Either 16 AWG or 18 AWG wire should be used for all RS-232 serial port connections and harnessing.
- Use good wire routing and wire securing practices to avoid damage to the cable.
- Run cable away from high power and high frequency sources to avoid injecting electrical noise into the wiring.
- Each device installed on the NMEA device connection should have power system electrical connections such that they all share a common ground (BATT-).
- Install sealing plugs (8T-8737) into any unused sockets at the rear of the connector.

Building the Custom Harness Assembly

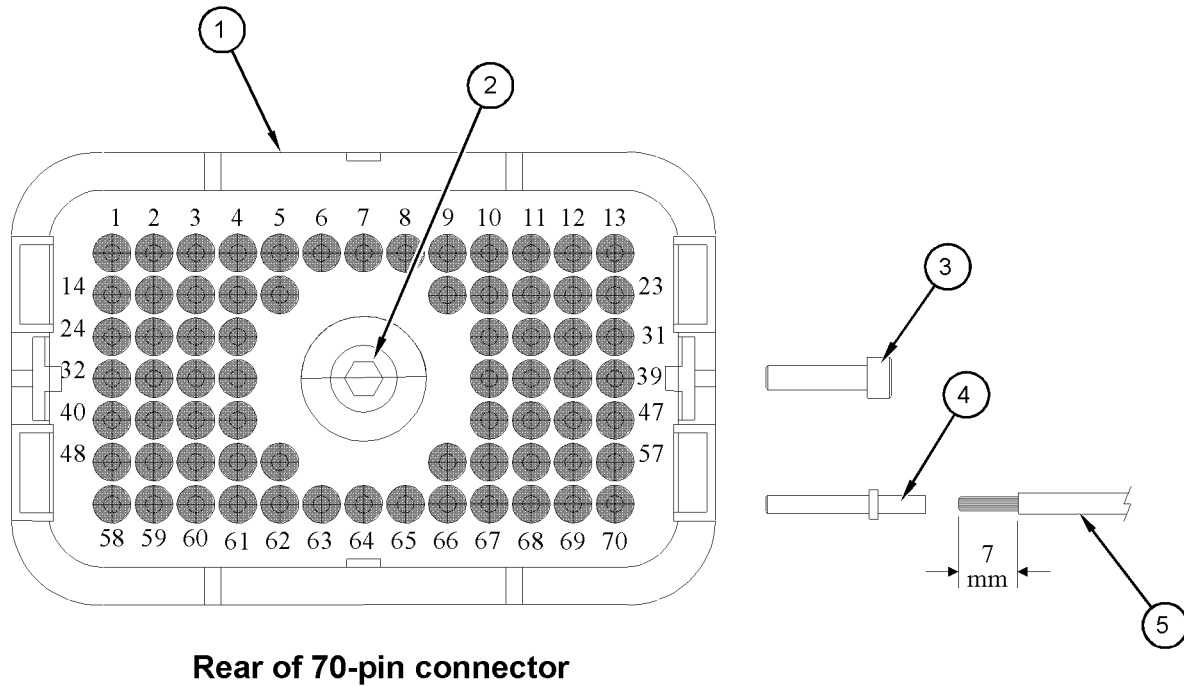


Illustration 17

g01112044

Harness ECM connector details

- (1) 160 - 7690 Connector
- (2) Allen bolt
- (3) 8T - 8737 Seal Plug

- (4) 126 - 1768 Connector Socket (14 AWG) or 9X - 3402 Connector Socket (16-18 AWG)

- (5) Wire showing stripped length

1. Refer to Illustration 17 and Illustration 5 to match the correct wires on the harness to the correct socket positions on the connector.
 2. Locate the sealing plugs that will need to be removed from the connector. Then, using a fully insulated piece of 18 AWG wire as a tool, push the sealing plugs through the connector body from the front side of the connector.
 3. Strip 7 mm (0.275 inch) of insulation from the end of each wire that is to be installed into the connector.
- Note:** Ensure that the wires are the correct gauge for the intended application.
4. Crimp a socket onto the end of each stripped wire.
 5. Locate the correct position on the connector and push the socket (with attached wire) into the connector body (from the rear of the connector) until fully seated.
 6. Repeat Step 5 for each wire and socket that is to be installed into the connector.

Connecting the Harness Assembly to the PL1000T Communications ECM

1. Place the 160 - 7690 70-pin Connector of the harness assembly onto the ECM connector.
2. Tighten the connector bolt with a 4 mm (5/32 inch) Allen wrench.

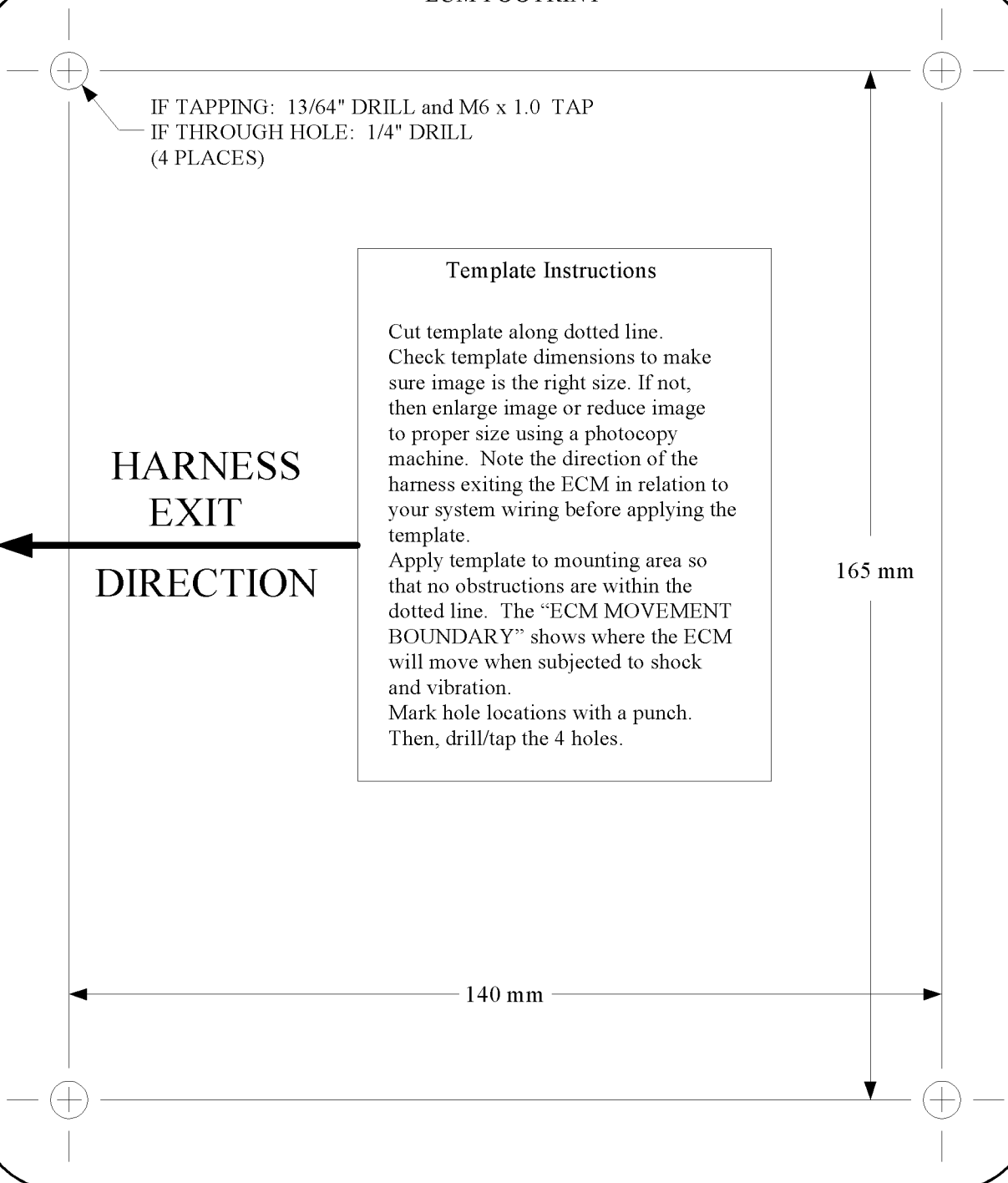
Connecting the Custom Harness to the System

Consult the application's system schematics for information which will aid in the connection of the custom harness into the system.

ECM Mounting Hole Template

ECM MOVEMENT BOUNDARY

ECM FOOTPRINT



ECM MOUNTING HOLE TEMPLATE

