

ROADRELAY™ 5
Installation
Guide



ROADRELAY™ 5

Installation Guide

Bulletin No. 4971214
Revision A

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For technical assistance with installation or the use of the RoadRelay™, call:

1-800-433-9341 in the USA
0800-286646 in the United Kingdom
+1-812-3778136 for international calls

To make your call go as smoothly as possible, please make sure you have the following information handy when you call:

- Make and model of the vehicle in which the RoadRelay is installed
- Engine type (for example, 2010 Cummins ISX)
- Software version number of your RoadRelay unit (for example, 05.01.00.00)
- Any electronic systems on the vehicle (for example, automatic transmission, ABS, etc.)

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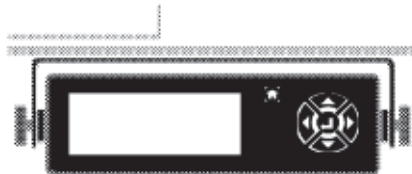
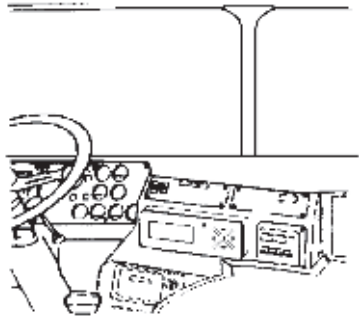
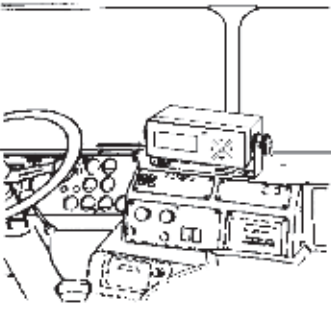
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Overview

The RoadRelay™ 5 is a vehicle monitoring system that works with all electronic engines that conform to the SAE J1939 or SAE J1587 data link protocols. The unit collects, analyzes, and saves vehicle data in memory.

Mounting Choices

Installation of the RoadRelay may be on-dash, under-dash or in-dash. This manual covers the installation for all three locations.

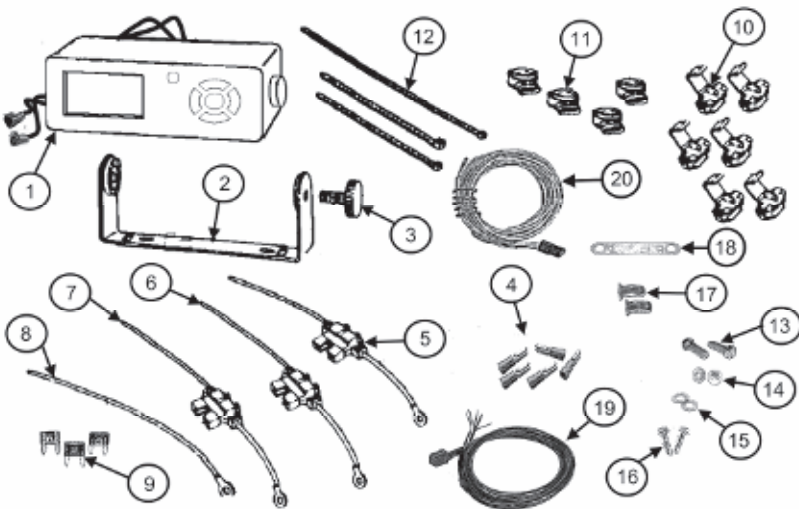


Installation Kit Contents

Identify Components

Before starting, lay out all of the items in installation kit and account for each. If you are missing any of the following, check with the dealer who sold you the unit. Depending on the type of installation, not all parts will be used.

1. RoadRelay 5™ unit
2. U-Bracket
3. Thumb screws (2)
4. Bullet connectors (5)
5. Fuse assembly (red)
6. Fuse assembly (white)
7. Fuse assembly (yellow)
8. Wire with terminal (black)
9. Fuses (3)
10. Quick-splice connectors (6)
11. Pigtail connectors (4)
12. Wire ties
13. 1/4 -20 x 3/4 Hex cap screws (2)
14. 1/4 Hex nuts (2)
15. 1/4 Washers (2)
16. 1/4 -20 x 3/4 Self-drilling screw hex washer (2)
17. 1/4 - 20 x 3/4 Jack nuts (2)
18. Jack nut wrench
19. Power cable assembly
20. J1939 extension cable

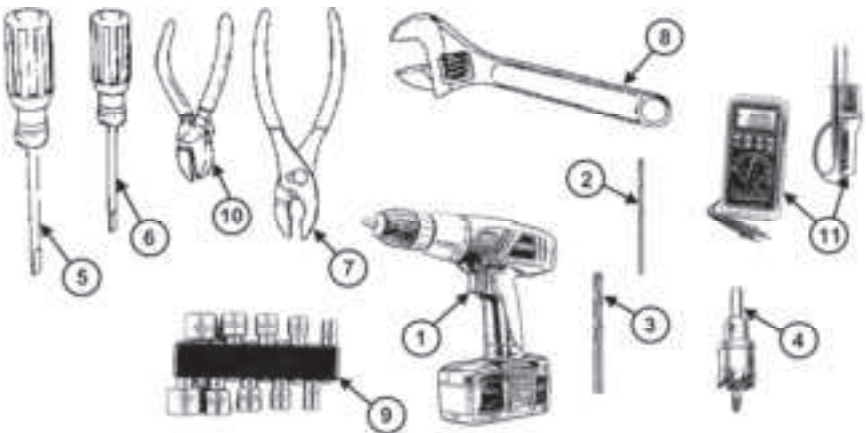


On-Dash/Under-Dash Installation

Tools Needed

These tools are needed for the standard on-dash or under dash installation:

1. 3/8-inch electric drill
2. 1/4-inch bit
3. 1/2-inch bit
4. 1-inch bit (or hole saw)
5. Medium screwdriver
6. Small screwdriver
7. Large pliers
8. Adjustable wrench
9. Set of nut drivers
10. Wire cutter
11. Multimeter or other DC voltage meter



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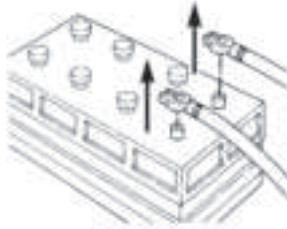
Starting On-Dash/Under-Dash Installation

If all of the components are accounted for, and you have the necessary tools, you are ready to begin.

WARNING: Remove rings, bracelets, watches or other conductive items before working on the system.



IMPORTANT: Before making any electrical connections to vehicle power, disconnect the positive and negative cables from the battery. Check the vehicle electrical system to make sure the power is off before proceeding.



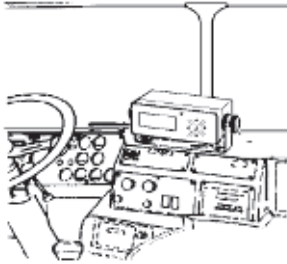
Removal of the In-Dash Mounting Retainer Clips

Using a small Philips screw driver, uninstall and discard the in-dash retainer clip from the right side of the unit by removing the two small screws holding it in place. Repeat this procedure for the left side of the unit.

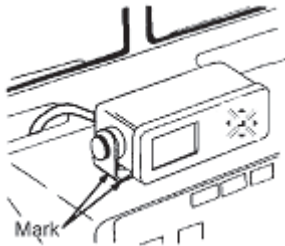
Choosing a Location

This chapter covers units mounted on the vehicle dash or roof. (For in-dash mounting, see later section of this guide.) Choose a location that is both visible and accessible for operation. For best viewing, the unit should be facing the driver and within easy reach.

IMPORTANT: For safety purposes, do **not** mount the unit in any location that will obstruct the driver's vision.

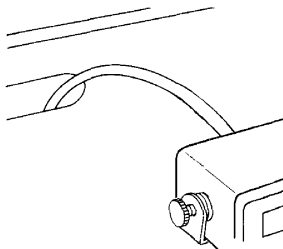


Temporarily install the mounting U-bracket. Position the unit in the desired mounting location. Leave sufficient room for the cable. While holding the unit in position, mark the location of the mounting U-bracket with a pencil or tape. Also, mark the hole for the cable (if necessary).



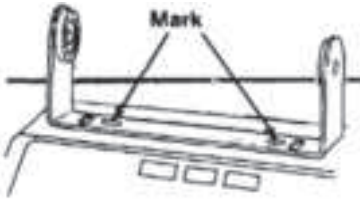
If possible, route the cable to the underside of the dash without drilling a hole. If a hole is necessary, drill a 1-inch hole.

CAUTION: Carefully drill the hole in the dash. Do **not** allow the drill to protrude into the dash area when the bit breaks through the surface, as serious damage could result.



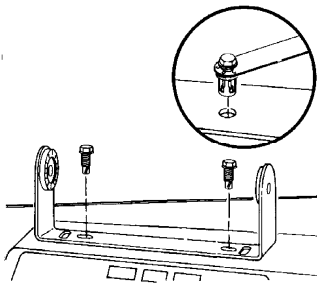
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Remove the U-bracket from the unit. Position the U-bracket on the dash according to your marks. Now mark the holes in the bracket.



Drill two 1/4-inch mounting holes (drill 1/2-inch holes if the jack nuts are used). Install the U-bracket with the fasteners supplied in the installation kit.

CAUTION: Carefully drill the holes in the dash. Do **not** allow the drill to protrude into the dash area when the bit breaks through the surface, as serious damage could result.



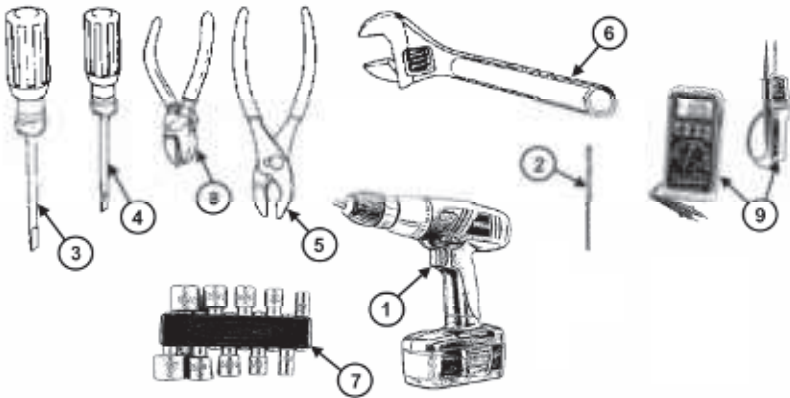
Continue with "Standard Installation" section of this guide.

In-Dash Installation

Tools Needed

These tools are needed for the standard in-dash installation:

1. 3/8-inch electric drill
2. 1/4-inch bit
3. Medium screwdriver
4. Small screwdriver
5. Large pliers
6. Adjustable wrench
7. Set of nut drivers
8. Wire cutter
9. Multimeter or other DC voltage meter



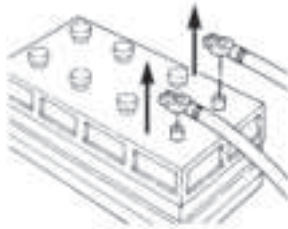
Starting In-Dash Installation

If all of the components are accounted for, and you have the necessary tools, you are ready to begin.

WARNING: Remove rings, bracelets, watches or other conductive items before working on the system.



IMPORTANT: Before making any electrical connections to vehicle power, disconnect the positive and negative cables from the battery. Check the vehicle electrical system to make sure the power is off before proceeding.



Preparing Location

This chapter covers units mounted in the vehicle dash. (For on-dash installation, see other section of this guide.) Choose a location that is both visible and accessible for operation. For best viewing, the unit should be facing the driver and within easy reach.

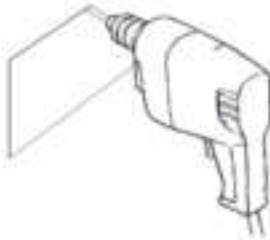


Cutting the Dash

NOTE: Before cutting the hole, make sure there are no obstructions under that area of the dash, such as cables or brackets, which might interfere with mounting the RoadRelay unit.

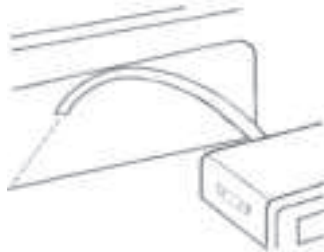
Cut a 183 mm wide by 53 mm high rectangular hole in the dash at the chosen location.

CAUTION: Carefully cut the hole in the dash. Do **not** allow the drill to protrude into the dash area when the bit breaks through the surface, as serious damage could result.



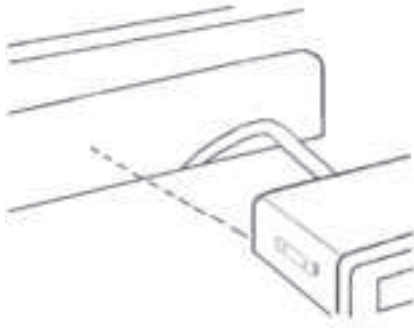
Route the bare wire ends of the RoadRelay Power Cable assembly (Cummins Part No. 4919657) and the RoadRelay J1939 extension cable (Cummins Part No. 4918997) through the rectangular hole in the dash at the chosen location.

Do NOT connect the power cable assembly or the J1939 extension cable to the RoadRelay harness until instructed to do so in the “Connecting the Electrical Wiring” section of this manual.



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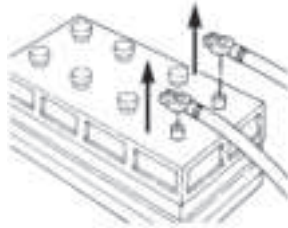
Adjust the side latches on each side of the unit to correspond to the thickness of the dash. The latches are ruled in 1-mm granulations. After the latches have been adjusted to the appropriate measurement, tighten the screws to a torque value of 0.588 Nm [0.434 ft-lb]. Leave the unit outside of the dash opening until instructed to do so in the "Connecting the Electrical Wiring" section of this manual. Slide the RoadRelay unit into the dash opening.



Standard Installation

The following procedures will help you identify battery voltage, switched voltage, illumination power, and chassis ground at the fuse panel or ignition switch.

The vehicle electrical system **must** have battery power for you to make the following checks. If you disconnected the battery, reconnect the cables.



Reconnect the positive battery cable first; negative last. Check the vehicle electrical system to make sure it is receiving power.

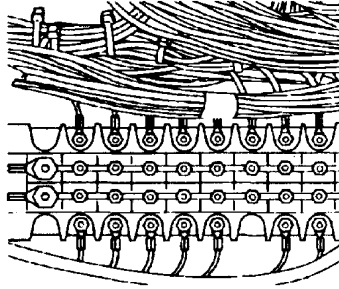
Checking Voltage

For the following procedures, you will need a multimeter. Set the meter to read DC voltage. If a meter is **not** available, a 12-volt tester can be used.



Locate Fuse Panel

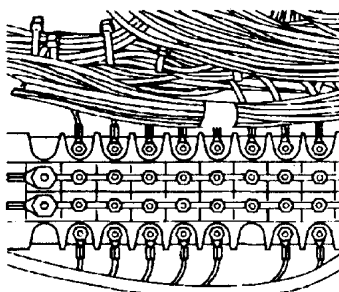
In most vehicles, the fuse panel will be located somewhere in the cab. Also, most fuse panels will have a terminal area where the wires are connected.



NOTE: The RoadRelay connections should **always** be made to the bus side of the fuse or circuit breaker.

If the fuse panel is a circuit breaker type of panel or does **not** have available terminals, test the vehicle wiring just alongside the panel until suitable connection points can be found. These wires should be the wires supplying the bus, **not** the wires supplying vehicle equipment.

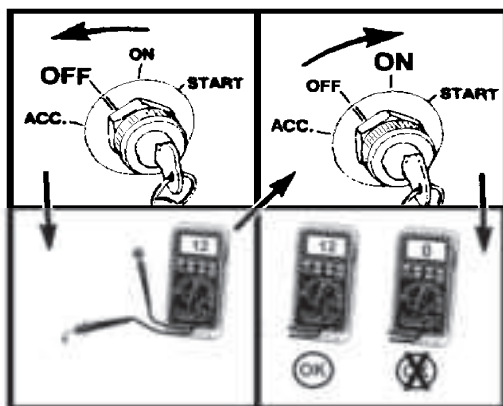
NOTE: Most panels will have a “battery hot” (continuous 12 VDC) connection on them. This connection should be used, if available. Some panels will also have an “ignition ON” +12 VDC connection. If present, this connection should also be used.



CAUTION: The system will **only** operate correctly when the switched power is supplied in the “ignition ON” position. No voltage is present in the ACCESSORY position.

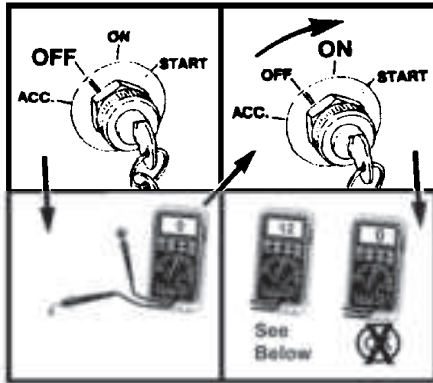
Locate Battery (Unswitched) Voltage

Use the multimeter to check the terminals of the selected switch or electrical accessory for a 12-volt source. When you find a 12-volt source, turn the ignition switch ON and OFF several times. If this power source is continuous, it can be used for battery (unswitched) power. Identify the terminal location with a piece of tape.

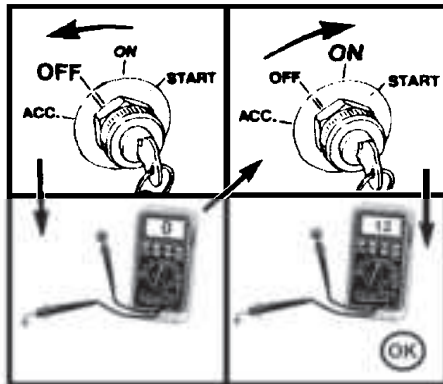


Locate Ignition (Switched) Voltage

Start this check with the ignition switch in the OFF position. Again, use the multimeter to check for the terminals of the selected switch or electrical accessory for NO VOLTAGE. When you locate a terminal that shows NO voltage, turn the ignition to the ON position.

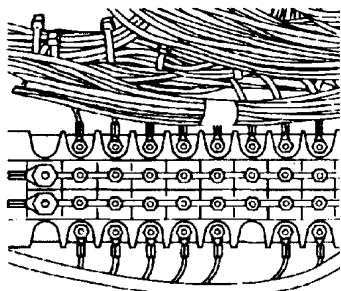


When you find a terminal that powers up with the ignition in the ON position, check it by turning the switch ON and OFF several times. Check the terminal with the ignition in the ACCESSORY position. The terminal **must not** have power in this position. If this source is continuous while the switch is in the ON position, it can be used for switched (ignition) voltage. Identify the terminal location with a piece of tape.

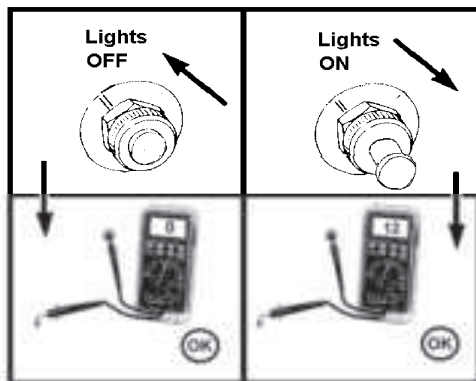


Locate Illumination Voltage

Turn the ignition switch to the OFF position. Turn the vehicle lights ON. Use the multimeter to check the terminals of the selected switch or electrical accessory for a 12-volt source.



When you find a terminal that displays 12 VDC with the ignition OFF and the lights ON, turn the lights OFF. The meter should display NO voltage with the lights turned OFF. Identify the terminal location with a piece of tape.



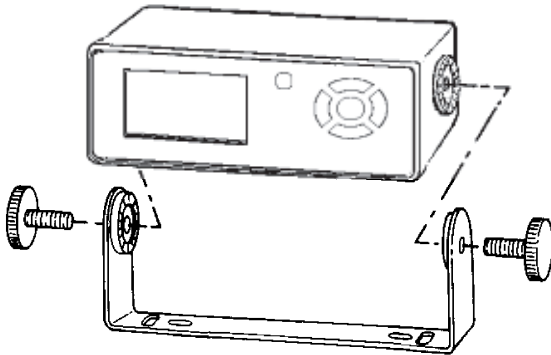
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If you have **not** already done so, route the bare wire end of Power cable assembly (Cummins Part No. 4919657) from the display unit to the underside of the dash in the area of the fuse panel. Also, route the bare wire end of the J1939 extension cable (Cummins Part No. 4918997) to the nearest accessible location to the vehicle's J1939 data link. You should route through an existing opening, if one is available, or through the ½ -inch hole drilled previously under "Choosing a Location".

NOTE: Avoid routing the cables near any radio antenna cable.
If you are unsure about the data line identity, STOP! Contact a local Cummins Dealer for help.

Connect the 6-pin Power cable assembly connector (Cummins Part No. 4919657) to the 6-pin mating connector on the RoadRelay harness. Connect the 3-pin J1939 extension cable connector (Cummins Part No. 4918997) to the 3-pin mating connector on the RoadRelay harness. Do NOT connect the power cable assembly or the J1939 extension cable to the vehicle wiring until instructed to do so in the "Connecting the Electrical Wiring" section of this manual.

For installations using the U-bracket, position the RoadRelay in the U-bracket, and install the thumb retainer screws.



Connecting the Electrical Wiring

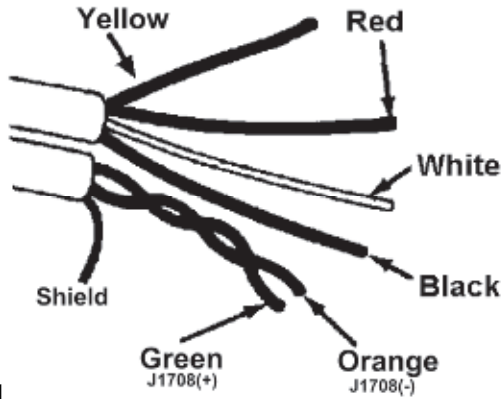
The electrical procedures described in following sections depict connections being made directly to the vehicle's fuse box for power connections and using quick splice connectors for data link connections; however, most new vehicles are equipped with spare electrical circuits designed specifically for owners to add after-market consumer electronics. These circuits can simplify the installation process by providing pre-wired fused connections to vehicle's battery, ignition, and data links. Refer to your vehicles owner's manual to see if these "spare" circuits exist in your vehicle. The RoadRelay installation kit includes bullet, pig tail, and quick splice connectors to aid in your installation regardless of your vehicle's configuration. Choose the connector that best fits your application when making any electrical connection. If you are unsure about your vehicle's electrical system, contact your dealer or the vehicle's manufacturer before making any connections to the RoadRelay.

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Locate the six-wire leg of the Power cable assembly:

Single wires:

RED = Battery voltage
WHITE = Switched voltage (ignition)
YELLOW = Illumination switch



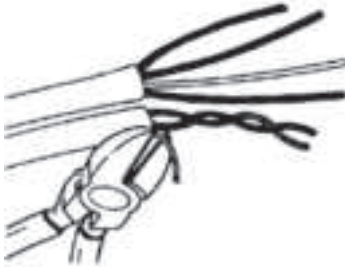
BLACK = Ground

Locate the two-wire leg of the Power cable assembly:

Twisted pair:

GREEN = J1708 (+) Data line
ORANGE = J1708 (-) Data line

NOTE: Cut off the bare wire (shield) that is with the twisted pair.



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Locate the three wire leg of the J1939 extension cable assembly:

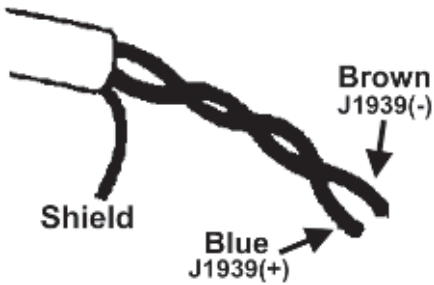
Single wires:

Bare wire = Shield

Twisted pair:

BLUE = J1939 (+) Data line

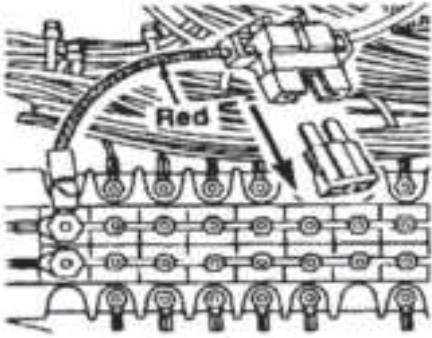
BROWN = J1939 (-) Data line



Connect to Battery (Unswitched) Voltage

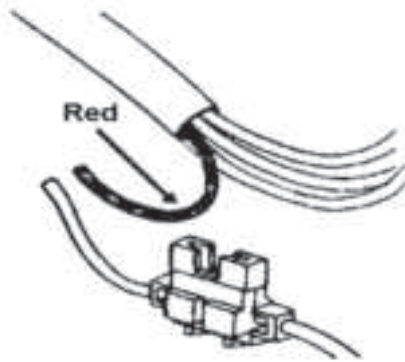
NOTE: Battery voltage is continuous, unswitched power.

Locate the fuse with the RED wire in the kit. Remove the fuse from the holder. Remove the nut from the fuse panel battery connection, which was determined earlier. Place the fuse ring terminal on the terminal, and replace the terminal nut.



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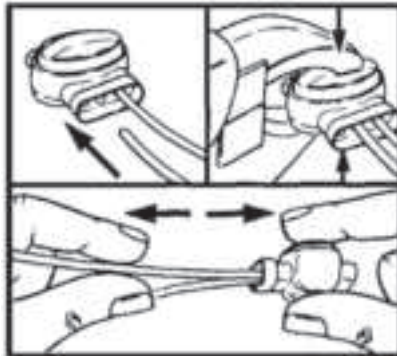
Locate the RED wire in the cable assembly. Pull the wire to the area of the fuse wire. Cut off any unnecessary length of cable wire.



NOTE: Fuses **must** be used in the switched and unswitched power lines.

Locate one of the pigtail wire splices. Insert the ends of the cable assembly wire and the fuse assembly wire into the splice. Using a large pair of pliers, compress the splice button until it is flush.

Pull firmly on each wire with your fingers to make sure the wires are seated in the splice.

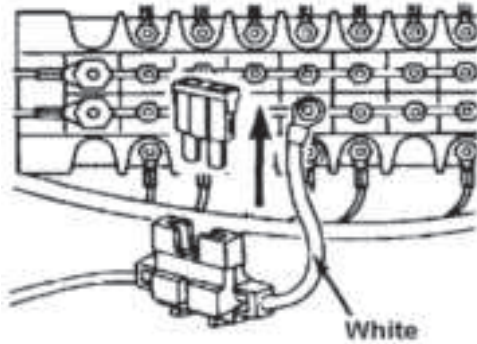


Connecting the Electrical Wiring

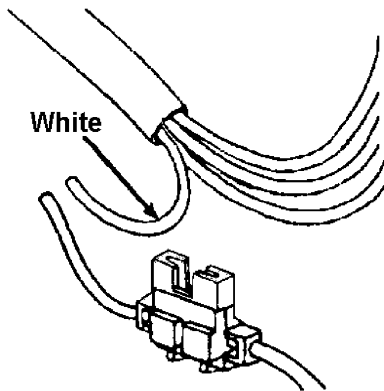
Connect to Switched (Ignition) Voltage

NOTE: The system will **only** operate correctly when the switched power is on (the ignition switch is in the ON position). No voltage is present when the ignition switch is in the ACCESSORY position.

Locate the fuse with the WHITE wire. Remove the fuse from the holder. Remove the nut from the terminal for switched power on the fuse panel, which was determined earlier. Place the fuse ring terminal on the terminal, and replace the terminal nut.



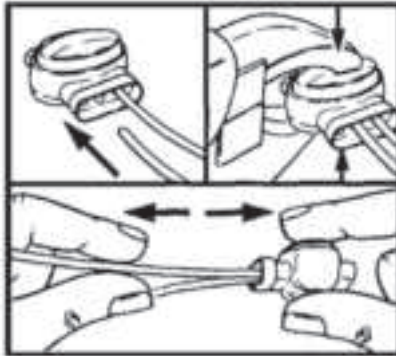
Locate the WHITE wire in the cable assembly. Pull the wire to the area of the fuse wire. Cut off any unnecessary length of cable wire.



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Locate one of the pigtail wire splices. Insert the ends of the cable assembly wire and the fuse assembly wire into the splice. Using a large pair of pliers, compress the splice button until it is flush.

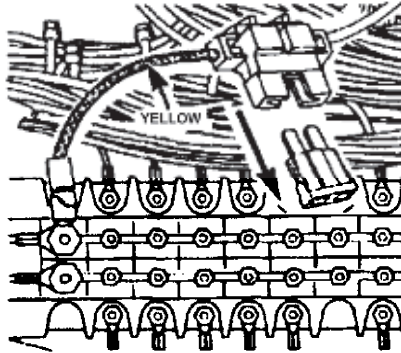
Pull firmly on each wire with your fingers to make sure the wires are seated in the splice.



Connect to Illumination Voltage

The source for this signal is the lights control. Power is applied when the vehicle lights are ON.

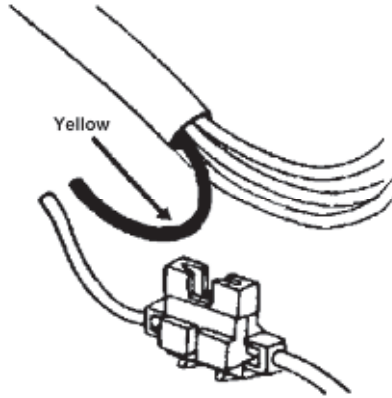
Locate the fuse with the YELLOW wire in the kit. Remove the fuse from the holder. Remove the nut from the fuse panel lights control connection, which was determined earlier. Place the fuse ring terminal on the terminal, and replace the terminal nut.



NOTE: The Illumination input will dim the display brightness when the vehicle's lights are ON. Discrete input shall be considered "on" when voltage is greater than 6.0 (+/- 0.5) VDC.

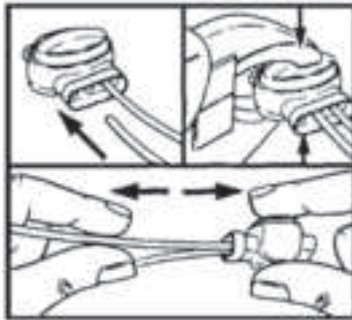
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Locate the YELLOW wire in the cable assembly. Pull the wire to the area of the fuse wire. Cut off any unnecessary length of cable wire.



Locate one of the wire splices. Insert the ends of the cable assembly wire and the fuse assembly wire into the splice. Using a large pair of pliers, compress the splice button until it is flush.

Pull firmly on each wire with your fingers to make sure the wires are seated in the splice.

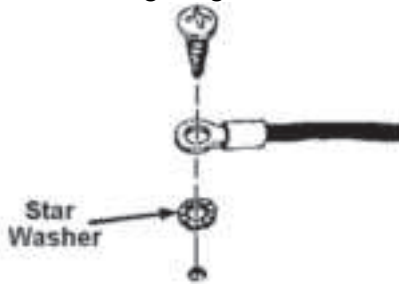


Connect the Ground

IMPORTANT: Do **not** use a ground connection that is shared by another electrical component. Choose an existing screw or bolt on the metal area in the vehicle cab, or on the chassis, for the ground connection. If a suitable fastener can **not** be found, drill a small hole, and install a sheet metal screw (not included).

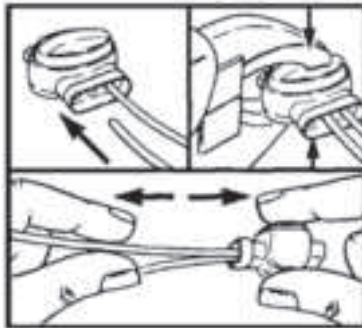
Locate the BLACK wire with ring terminal. Attach the wire terminal to the selected vehicle ground screw or stud. Tighten the ground retainer securely.

NOTE: Use a star washer (not included) under the ring terminal on all ground locations to ensure a good ground connection.



Locate one of the wire splices. Insert the ends of the cable assembly wire and the BLACK ground wire into the splice. Using a large pair of pliers, compress the splice button until it is flush.

Pull firmly on each wire with your fingers to make sure the wires are seated in the splice.



Locate the J1939 Data Link

Locate the J1939 public data link connection in the vehicle:



NOTE: The J1939 data link must be used on all 2007 and newer vehicles. The J1708 data link should only be used on model years prior to 2007. See the section “Connector Pin Assignments” for data link connectors, line identification, and vehicle data link location.

IMPORTANT: If you are unsure about the data line identity, STOP! Contact a local Cummins Dealer for help.



The data link connector may be covered with a flexible split conduit. Open the conduit and pull the connector and wires several inches out.

NOTE: If there are more than two wires leading into the connector, the data lines will be a twisted pair of wires. The J1939 shield line will be in this connector; however, the shield line will not be twisted.

Connecting the Electrical Wiring

Locate the BLUE, BROWN (twisted pair) and the shield wire from the RoadRelay J1939 extension cable.

If you have **not** already done so, route the bare wire end of the J1939 extension cable (Cummins Part No. 4918997) to the nearest accessible location to the vehicle's J1939 data link. Cut off any unnecessary length of wire.



Locate three quick-splice connectors in the kit. Note that the splices have a slit in one side to fit over an existing wire and a hole in the other side to accept the end of a wire. Position the splices over the data link wires so the hole in the splice is away from the data link connector.



Connect the J1939 Data Link Wires

Insert the Blue J1939 (+) extension cable wire into the splice on the (+) data line of the twisted pair from the vehicle. Insert the BROWN J1939 (-) extension cable wire into the other splice. Insert the shield (silver non-insulated) extension cable wire into the splice on the J1939 shield from the vehicle.

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IMPORTANT: With the data link connector configured as described above, RECHECK the wire placement:

BLUE J1939 to vehicle J1939 data link (+) line
BROWN J1939 to vehicle J1939 data link (-) line
J1939 shield to vehicle J1939 data link shield line

Using a large pair of pliers, as shown, compress the splice blade into position, Close the locking tab.



Locate the J1708 Data Link

Locate the J1708 public data link connection in the vehicle:



NOTE: The J1708 data link should only be connected on 2006 and older model years. The J1939 data link must be used on all 2007 and newer vehicles. See the section “Connector Pin Assignments” for data link connectors, line identification, and vehicle data link location.

IMPORTANT: If you are unsure about the data link identity, STOP! Contact a local Cummins Dealer for help.

Connecting the Electrical Wiring

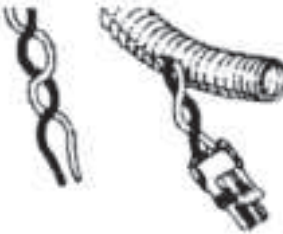
The data link connector may be covered with a flexible split conduit. Open the conduit and pull the connector and wires several inches out.

NOTE: If there are more than two wires leading into the connector, the data line will be a twisted pair of wires.



Locate the GREEN and ORANGE (twisted pair) wires in the RoadRelay cable assembly.

Route the cable assembly wire pair to the area of the data link connector. Cut off any unnecessary length of wire.



Locate two quick-splice connectors in the kit. Note that the splices have a slit in one side to fit over an existing wire and a hole in the other side to accept the end of a wire. Position the splices over the data link wires so the hole in the splice is away from the data link connector.



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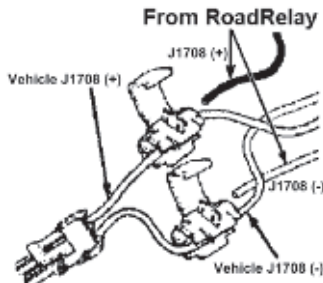
Connect the J1708 Data Link Wires

Insert the GREEN J1708 (+) cable assembly wire into the splice on the (+) data line of the twisted pair from the vehicle. Insert the ORANGE J1708 (-) cable assembly wire into the other splice.

IMPORTANT: With the data link connector configured as described above, **RECHECK** the wire placement:

GREEN J1708 to vehicle J1708 data link (+) line.

ORANGE J1708 to vehicle J1708 data link (-) line.



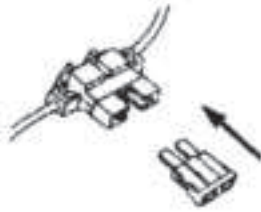
Using a large pair of pliers, as shown, compress the splice blade into position. Close the locking tab.



IMPORTANT: Complete the electrical wiring portion of the installation:

- Check the terminals to make sure they are tight.
- Check the ground connection.
- Check the area to verify that no wires touch.
- Make sure the keyswitch is in the OFF position.

Connecting the Electrical Wiring



Insert the fuses into the three fuse holders.

- Check the RoadRelay display for correct operation.

Turn the keyswitch to the ON position. The display should come on and show the power-up banner screen.



If there is no display, press the “Up” arrow key several times to brighten the display. Or, if the display is too bright, press the “Down” arrow key to dim it.

After pressing the “Up” arrow key several times and the RoadRelay display still does **not** turn on, turn the keyswitch to the OFF position. Press the “Enter” key for 2 seconds and release. The RoadRelay display should come on (only for 15 seconds). If the display did **not** turn on, check the unswitched (battery voltage) connection and the ground connection.



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If the display turned on, do not touch the keypad for 15 seconds and allow the display to turn off. Once the display is off, turn the keyswitch to the ON position. The display should turn on and show the introduction screen. If there is no display, check the switched (ignition voltage) connection.



Once you have the RoadRelay display turning on when the keyswitch is in the ON position, verify the RoadRelay display turns off correctly by performing the following procedure:

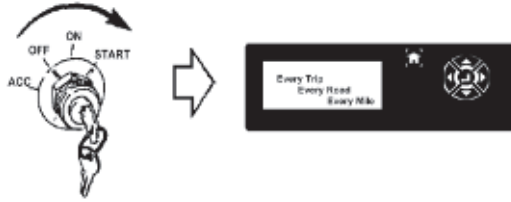
Turn the keyswitch to the OFF position. If the RoadRelay shuts off *immediately*, then unswitched (battery voltage) is NOT connected correctly. Re-check the unswitched battery wiring. The RoadRelay display should shut off **only** after a 15-second delay, which indicates the correct unswitched (battery voltage) connection.



If the RoadRelay display never turns off when the keyswitch is turned to the OFF position, then this is an indication that the switched (ignition voltage) connection is not correct (possibly connected to unswitched power). Check the switched (ignition voltage) connection.

Connecting the Electrical Wiring

With the display on, start the engine.

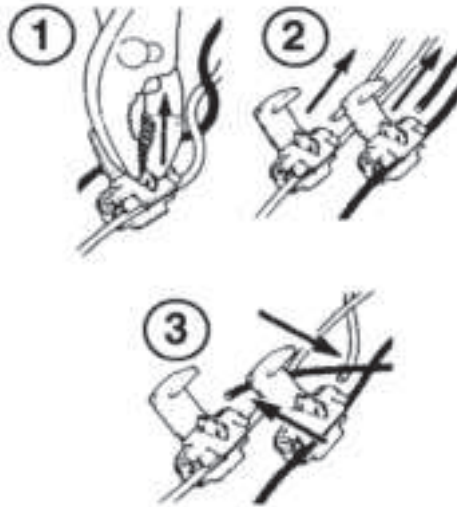


If the RoadRelay unit displays “Improper Data Link Connection,” the data link is wired incorrectly (reversed connection).

Switching the J1708 Data Link Wires



Shut OFF the engine. Using the pliers, carefully pull the metal blade up in both wire splices. Exchange the data link wires. Using the pliers, seat the metal blade in both splices.



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If the RoadRelay unit displays “Data link Status 0x28 Not Receiving” or “Data link Status 0x8C Not Receiving,” the data link is not properly connected.

Check the J1939 data link connections. Verify that the J1939 extension cable is connected to the RoadRelay harness. If using the J1708 data link, check the J1708 data link connections.

This message will also be displayed if you are attempting to use the J1708 data link on vehicles model years 2007 or greater. The J1939 data link must be used on all 2007 and newer vehicles.

Finish Installation

Start the engine and check for proper operation of the display.

If the RoadRelay keypad and display are functional, then it is recommended to run the RoadRelay Self-test feature (located under the Wrench icon). The self-test will verify most electrical connections making it a good starting point for troubleshooting.

Refer to the RoadRelay User’s Guide for further information on the RoadRelay Self-test feature.

Finish the installation by securely fastening the RoadRelay in its mount.

If the display is not functional, refer to the “Troubleshooting” section of this manual.

In addition, the data link splices **must** be sealed to prevent corrosion. Use electrical tape and seal the wire splices and wires around these connections.

RoadRelay Options

GPS

The RoadRelay 5 rear panel serial port can be configured to support a National Marine Electronic Association (NMEA) 0183 ASCII compatible GPS receiver/antenna. If a compatible GPS receiver/antenna is purchased, install the GPS antenna by screwing into the connector provided at the rear of the RoadRelay 5. Make sure it has unobscured visibility to the sky through the windshield or mount outside of the vehicle. The cable should be secured under the dash where it will **not** interfere with the normal operation of the vehicle. Refer to the GPS receiver/antenna manufacturer's documentation for further installation details.

Troubleshooting

Introduction

This is a basic guide to troubleshooting common problems with the RoadRelay unit. If the RoadRelay keypad and display are functional, it is recommended to first run the RoadRelay self-test feature (located under the Wrench icon). The self-test will verify most electrical connections making it a good starting point for troubleshooting. Refer to the RoadRelay User's Guide for further information on the RoadRelay Self-test feature.

Tools Needed

Use a digital multimeter to measure voltages and resistances.

Reading No. 1 is the **only** resistance reading listed. Use the DC voltage setting for the remainder of the readings. Readings No. 4,5,6, and 7 are data link measurements that fluctuate with the data that is moving across the connection, but the readings should be close to those listed below.

The following table lists the readings that should be taken when troubleshooting RoadRelay wiring problems:

Troubleshooting Wiring Problems

Reading No.	RR Harness Wire Color	DB-25 Cavity Position	Signal	DVM Reading
1	Black	23	Ground	Between Position 23 & Vehicle Ground; Less than 1 ohm
2	Red	25	Battery (+) +12 VDC	Between Position 23 & Position 25; Constant +12.0 +/- 2 VDC
3	White	1	Keyswitch +12 VDC	Between Position 23 & Position 1; Constant +12.0 +/- 2 VDC when Keyswitch is ON; 0.0 +/- 0.5 VDC when Keyswitch is OFF
4	Orange	4	J1708 (-)	Between Position 23 & Position 4; +1.0 +/- 0.5 VDC
5	Green	3	J1708 (+)	Between Position 23 & Position 3; +3.5 +/- 1 VDC
6	Lt. Brown	8	J1939 (-)	Between Position 23 & Position 8; +2.5 +/- 1 VDC
7	Blue	6	J1939 (+)	Between Position 23 & Position 6; +2.5 +/- 1 VDC
8	Yellow	2	Illumination	Between Position 23 & Position 2; +12.0 +/- 2 VDC when vehicle light switch is ON; 0.0 +/- 0.5 VDC when vehicle light switch is OFF

General Troubleshooting Procedures

Check the readings listed in the Troubleshooting Wiring Problems table (see previous page) when you encounter one of the RoadRelay problems listed below:

1. RoadRelay does not illuminate when the ignition is switched on.

Possible cause:

1. Improper Ground connection
2. Improper Unswitched battery connection
3. Improper Switched battery connection

Procedure	Fault
Check Reading No. 1	Open to tractor ground
Check Reading No. 2	No +12 VDC present
Check Reading No. 3	No +12 VDC with ignition switch in the ON position

2. RoadRelay goes blank immediately after the ignition switch is turned off.

Possible cause:

- Improper Unswitched battery connection.

Procedure	Fault
Check Reading No. 2	No +12 VDC when the ignition switch is OFF

3. RoadRelay illuminates even when the ignition switch is turned off.

Possible cause:

- Improper Switched battery connection

Procedure	Fault
Check Reading No. 3	+12 VDC present when ignition switch is OFF.

4. RoadRelay display does not dim when the vehicles' lights are turned on.

Possible cause:

- Improper illumination connection.

Procedure	Fault
Check Reading No. 8	No +12 VDC when vehicle's light switch is ON And/or No 0 VDC when vehicle's light switch is OFF

5. RoadRelay displays “Data Link Timeout.”

Possible cause:

- Improper data link connection(s).

Procedure	Fault
Check Reading No. 4	Voltages are outside of the specified range
Check Reading No. 5	Voltages are outside of the specified range
Check Reading No. 6	Voltages are outside of the specified range
Check Reading No. 7	Voltages are outside of the specified range

6. RoadRelay displays “Data Link Status 0x28 Not Receiving.”

Possible cause:

- Improper data link connection(s).

Procedure	Fault
Check Reading No. 4	Voltages are outside of the specified range
Check Reading No. 5	Voltages are outside of the specified range
Check Reading No. 6	Voltages are outside of the specified range
Check Reading No. 7	Voltages are outside of the specified range

7. After initial hook-up, the RoadRelay displays “Improper data link connection.”

Procedure	Fault
Switching J1708 Data Link Wires	The J1708 data link wires have been wired backwards

8. After initial hookup, the RoadRelay displays “No power from back-up battery.”

Possible cause:

1. The RoadRelay internal back-up battery (rechargeable) is not charged.

Procedure	Fault
Finish Installation	The internal backup battery is not charged. The internal backup battery will automatically begin to self-charge once the RoadRelay is connected to the vehicle battery. Fault will become inactive once battery begins to charge.

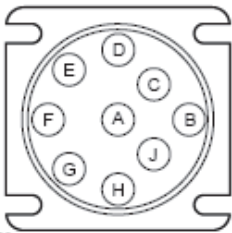
Connector Pin Assignments

Vehicle Connector

On most class 8 heavy duty vehicles and motor coaches, the J1708 and J1939 datalink connections can be made near the vehicle's service port. This service port is typically a round 9-pin (contains both J1939 and J1708 data links) or a round 6-pin (J1708 data link only) Deutsch connector located under the dash, near the driver's side of the vehicle. Below are the pin assignments for these two connectors. Extreme care should be used when connecting the RoadRelay to the data links as improper wiring could affect other vehicle electronic devices utilizing these data links. See sections "Locating the J1708 Data Link" and "Locating the J1939 Data Link", and "Connect Data Link Wires".

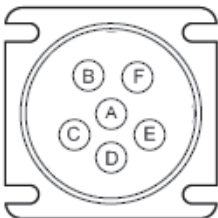
IMPORTANT: If you are unsure about the data line identity, STOP! Contact a local Cummins Dealer for help.

9-Pin Vehicle Service Connector (per SAE J1939-13)



- A = Battery (-)
- B = Battery (+)
- C = J1939 (+)
- D = J1939 (-)
- E = J1939 shield
- F = J1708 (+)
- G = J1708 (-)
- H = OEM proprietary use
- J = OEM proprietary use

6-Pin Vehicle Service Connector (per TMC RP 1202A)



- A = J1708 (+)
- B = J1708 (-)
- C = Battery (+)
- D = Open
- E = Battery (-)
- F = Engine programming

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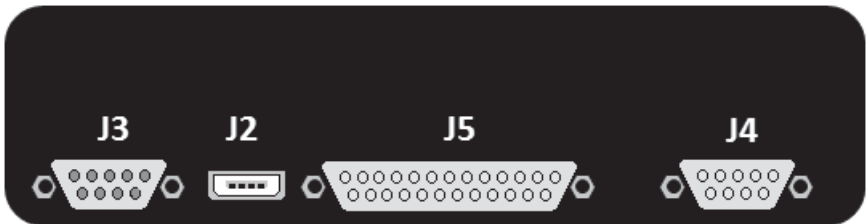
RoadRelay Connectors

The pin assignments for the five RoadRelay connectors are defined below. Details on each connector’s functionality can be found in the RoadRelay 5 User’s Guide.

Front View



Rear View

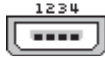


J1 – Mini USB



USB Cavity	Signal Names
1	Vbus
2	Data (-)
3	Data (+)
4	ID
5	Ground

J2 – Standard Type A USB



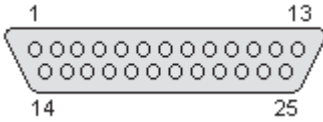
USB Cavity	Signal Names
1	Vbus
2	Data (-)
3	Data (+)
4	Ground

J3 (Female), J4 (Male) 9-pin D Subminiature



DB-9 Cavity	Signal Names
1	Data Carrier Detect
2	Received Data
3	Transmitted Data
4	Data Terminal Ready
5	Signal Ground
6	Data Set Ready
7	Request To Send
8	Clear To Send
9	Fused Device Supply

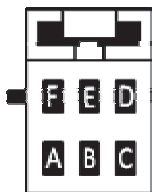
J5 – 25-pin D Subminiature



DB-25 Cavity	Signal Names
1	Switched Battery
2	Illumination
3	J1708(+)
4	J1708(-)
5	Reserved for future use
6	J1939 (+)
7	J1939 Shield
8	J1939 (-)
9	Reserved for future use
10	Reserved for future use
11	Reserved for future use
12	Reserved for future use
13	Reserved for future use
14	Reserved for future use
15	Reserved for future use
16	Reserved for future use
17	Reserved for future use
18	Reserved for future use
19	Reserved for future use
20	Reserved for future use
21	Reserved for future use
22	Reserved for future use
23	Ground
24	Reserved for future use
25	Unswitched Battery(+)

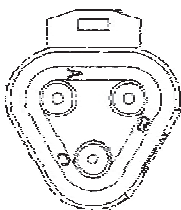
Cable Pin Assignments

Power cable assembly (PN 4919657)



6-pin Cavity	Cable Wire Color	Signal Name
A	Black	Ground
B	Red	Unswitched Battery(+)
C	White	Switched Battery
D	Orange	J1708(-)
E	Green	J1708(+)
F	Yellow	Illumination

J1939 Extension cable (PN 4918997)



3-pin Cavity	Cable Wire Color	Signal Name
A	Blue	J1939(+)
B	Brown	J1939(-)
C	Braid	Shield

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Technical Support

1-800-433-9341

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