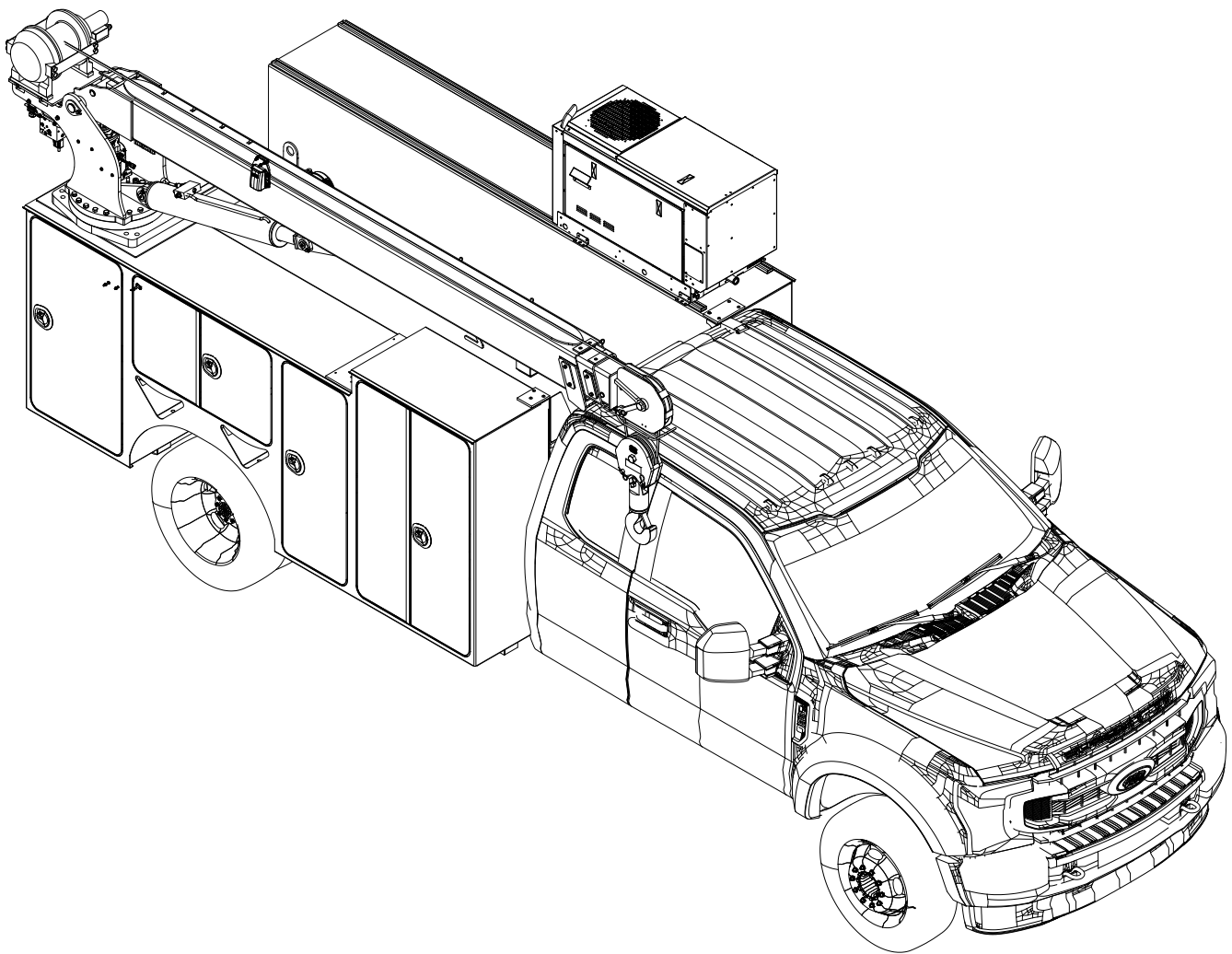




IoT RETROFIT KIT INSTALLATION MANUAL



475107009-0726-A

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Product Registration

Thank you for purchasing an Auto Crane® product and taking a few moments to register it online at <https://www.autocrane.com/product-registration/>. Your registration helps us keep you up to date on product information and gives you one of the strongest manufacturer's limited warranties available.

By completing the product registration, you may be eligible for valuable supplemental coverage under Auto Crane's Limited Warranty. For more information and a list of eligible products, visit our Warranty page found at <https://www.autocrane.com/warranty/>.

Before You Register

What do I need to get started?

We'll ask for:

- The product model and serial number for each product you purchased
- Your contact information so we can send confirmation of your registration and communicate product bulletins
- The date you purchased the product, date of installation or in-service (e.g. copy of bill of sale)
- Truck VIN (if applicable)
- The name, address and phone number of the dealer who sold and installed your equipment.

NOTE: Much of this information will be on the invoice provided by your dealer. If you need help, please contact your installing dealer.

At the time of publishing this manual is accurate to the best of our knowledge. Auto Crane reserves the right to change any or all items, components and parts, necessary for any reason. This right does not obligate Auto Crane to immediately update the manual. If in doubt, please call your local Auto Crane distributor for the most up-to-date information.

Auto Crane Company issues a limited warranty with each unit sold. See warranty pages at the end of the manual.

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Safety Tips and Precautions

DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates information considered important, but not hazard-related.

WARNING

Federal law (49 CFR part 571) requires that the Final Stage Manufacturer of a vehicle certify that the vehicle complies with all applicable federal regulations. Any modifications performed on the vehicle prior to the final state are also considered intermediate stage manufacturing and must be certified as to compliance. The installer of this crane and body is considered one of the manufacturers of the vehicle. As such a manufacturer, the installer is responsible for compliance with all applicable federal and state regulations and is required to certify that the vehicle is in compliance.

WARNING

It is the further responsibility of the installer to comply with the OSHA Truck Crane Stability Requirements as specified by 29 CFR part 1910.180 (C) (1). In applications, where the rotation of the load is hazardous, a tag or restraint line should be used, (ref. OSHA 1910.180(h)(3)(xvi)). To reduce the potential for the load to rotate or rope twist, operate at minimal boom angles and extension.

WARNING

Do not weld, modify, or use unauthorized components on any Auto Crane unit! This will void any warranty or liability. Also failure of the crane may result.

WARNING

Vehicle must meet Federal Law (49 CFR 393), which states the required parts and accessories are necessary for safe operation. This includes lighting, reflectors, etc..

WARNING

Federal Law (49 CFR 568) requires each final-stage manufacturer to complete the vehicle in such a manner that it conforms to the standards in effect on the date of manufacture of the incomplete vehicle, the date of the final completion, or a date between those two dates. This requirement shall, however, be superseded by any conflicting provisions of a standard that applies by its terms to vehicles manufactured in two or more stages. Each final-stage manufacturer shall affix a label to the completed vehicle in accordance with 49 CFR 567.5.

Introduction

IoT Retrofit Installation Kit Manual

This manual contains detailed instructions to install the RC57 unit on existing 4 NexStar Cranes by using the IoT Retrofit Installation Kit and the instructions for software installation, crane data testing, and troubleshooting of the RC57 unit.

The instructions are divided into sections based on the crane model, body model, differences in installation procedure. Refer to the applicable sections for the correct installation instructions. If you have any questions, contact Auto Crane.

IoT RC57 unit

All NexStar 4–equipped cranes are now compatible with Ramsey Connect™ IoT functionality, providing enhanced visibility, diagnostics, and connectivity for your equipment. To begin using these features, customers must first register their device through the Ramsey Connect platform. Registration can be completed by downloading the Ramsey Connect mobile application or by navigating to the web portal at <https://ramseyconnect.com/login.aspx>. Once registered, users can access real-time equipment data, monitor usage, and leverage remote diagnostic capabilities designed to improve uptime and operational efficiency.

For customers with existing NexStar 4 cranes, Ramsey Connect IoT capability can be added through a retrofit solution. Retrofit Kit 475107000 is available for installation on compatible units, allowing legacy equipment to benefit from the same connected features as new production models. Please refer to the installation instructions provided in further sections of this manual. If you have any questions, contact Auto Crane Technical Support for additional guidance on compatibility and installation requirements.

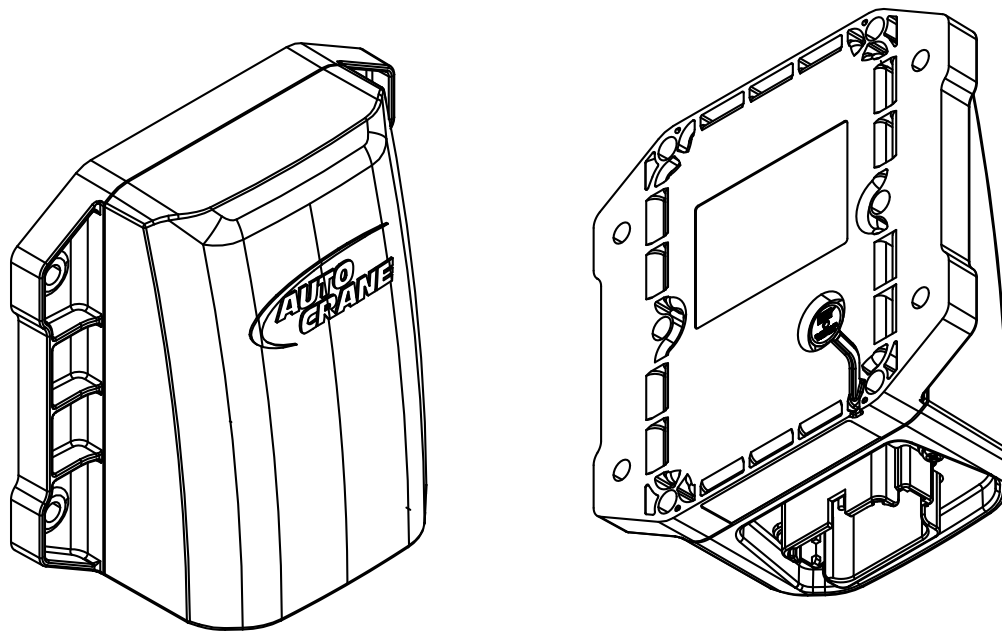


Figure 1 – RC57 Unit

IoT Retrofit Installation Kit

Each IoT retrofit installation kit contains the following items:

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	5	020000000	WASHER FL #10 ZP
2	5	015801000	NUT HX NYLK #10-24 UNC ZP
3	8	020400000	WASHER FL SAE 1/4
4	4	016300000	NUT HX NYLK 1/4-20 UNC
5	6	772043000	ZIP TIE STRAP, 12 IN, NYLON, BLACK
6	4	366367003	CONTACT, DEUTSCH CONNECTOR 0462-201-16141
7	1	475107020	BODY HARNESS, RC57
8	1	475107030	CRANE HARNESS, RC57, RETRO FIT
9	4	360755000	CAVITY PLUG, DEUTSCH 114017
10	5	475107051	SCREW CARR HD #10 UNC X 1 ZP GR2
11	4	475107052	SCREW HX HD 1/4 UNC X 1 1/2 ZP GR5
12	1	475107011	MOUNTING PLATE, RC57, RETRO FIT
13	1	475107001	IOT CONTROL BOX, RC57
14	2	475107012	BACKING PLATE, RC57, RETRO FIT
15	3	475107053	CABLE TIE MOUNT, MAGNETIC
16	3	475107050	750 MA x 250 V FUSE, SLOW BLOW, GLASS, 3AG
17	1	475107057	6-PIN CONNECTOR, DEUTSCH, PLUG
18	1	475107058	WEDGE, 6-PIN CONNECTOR, DEUTSCH
19	2	360764002	WEDGE DEUTSCH 3-PIN
20	1	475107021	IoT ENPAK HARNESS, BAUD ROUTER
21	1	475107023	J1939 CAN GATEWAY, BAUD ROUTER, 250 KBPS - 500 KBPS
22	3	772043000	ZIP TIE STRAP, 12 IN, NYLON, BLACK

Table – 1

Please check to make sure that the above items have been supplied in the IoT Retrofit Installation Kit. If any items are missing, please notify your dealer, or contact Auto Crane.

NOTE: The G11/G12 Bluetooth Modem for software installation is not included in this kit. Please contact your local dealer or RSM.

Introduction

Top-Level Installation Kit - P/N 475107000

This kit is used to install the RC57 unit on the crane boom. Refer to "Gateway Physical Mount" section in "RC57 Installation: HC5-HC14" for the installation instructions of the RC57 unit.

Body Harness - P/N 475107020

This harness connects the chassis to the crane harness, which is connected to the RC57 unit. It transmits the data from the chassis CAN network to the RC57 unit. The data and performance parameters can be viewed in the Ramsey Connect portal.

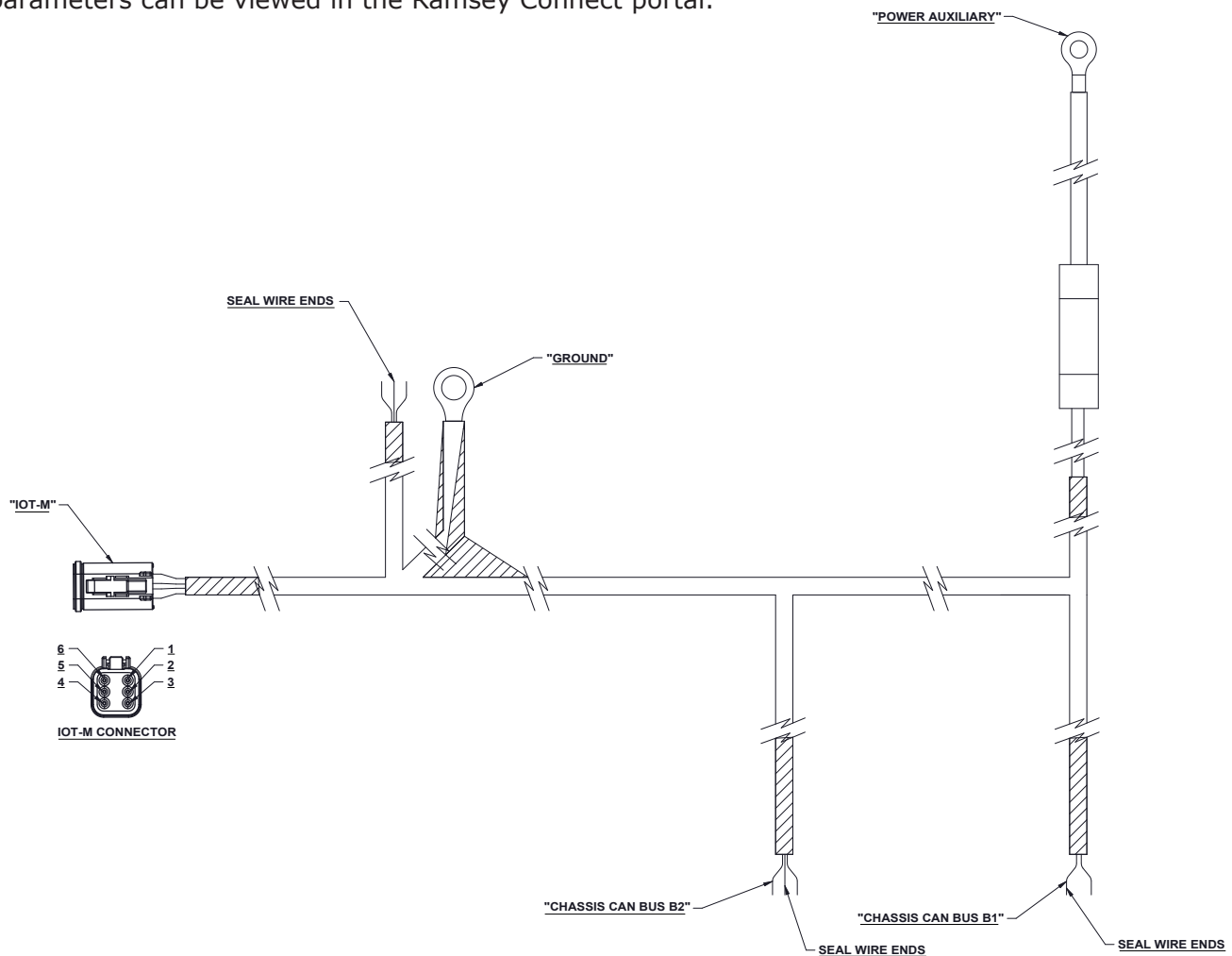


Figure 2 – Body Harness

Crane Harness - P/N 475107030

This harness connects the crane to the RC57 unit and interfaces with the body harness. It transmits the data from the crane MC43 CAN network to the RC57 unit. The data and performance parameters can be viewed in the Ramsey Connect portal.

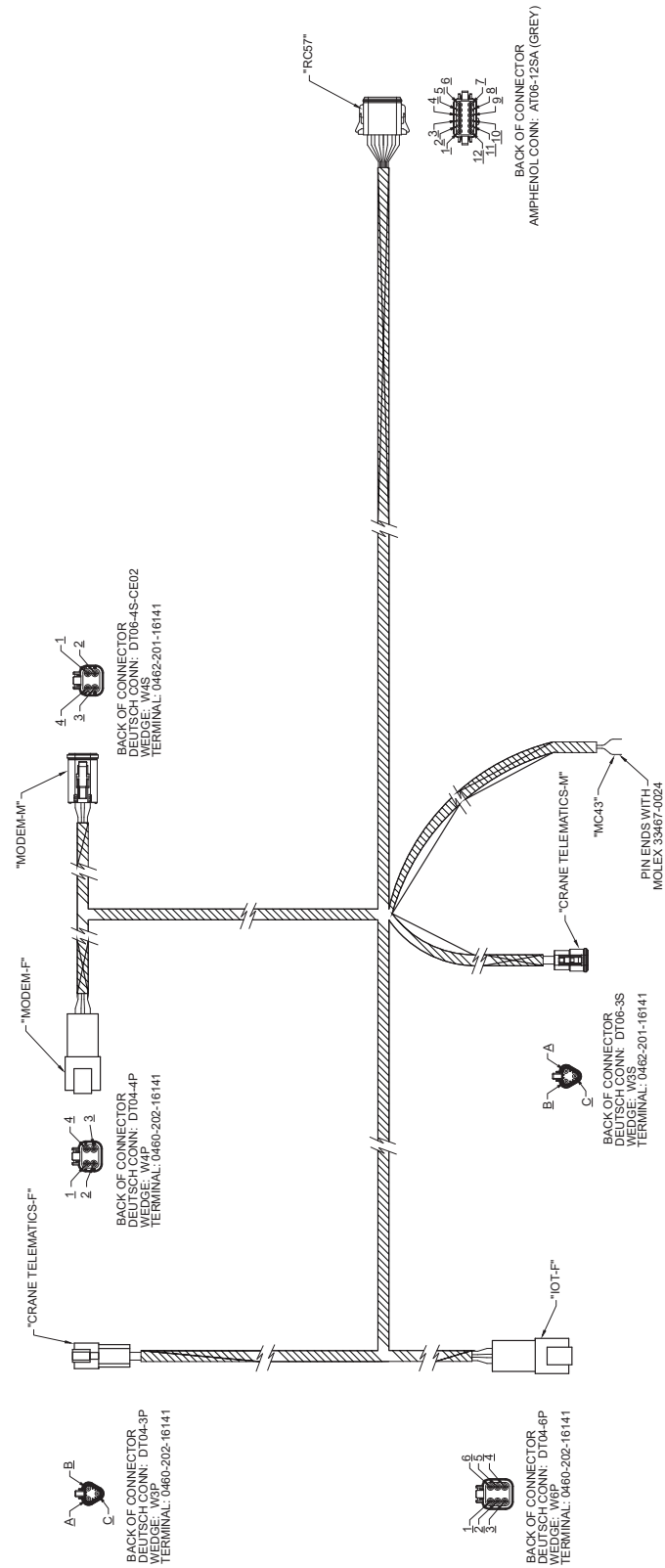


Figure 3 – Crane Harness

Introduction

Baud Router Kit - P/N 475107022

If an EnPAK Miller unit is installed and the chassis baud rate does not match the baud rate of the EnPAK Miller unit or any other accessories, install the Baud Router Kit. This router kit acts as a translator and transfers CAN data by converting the incoming baud rate to the required baud rate.

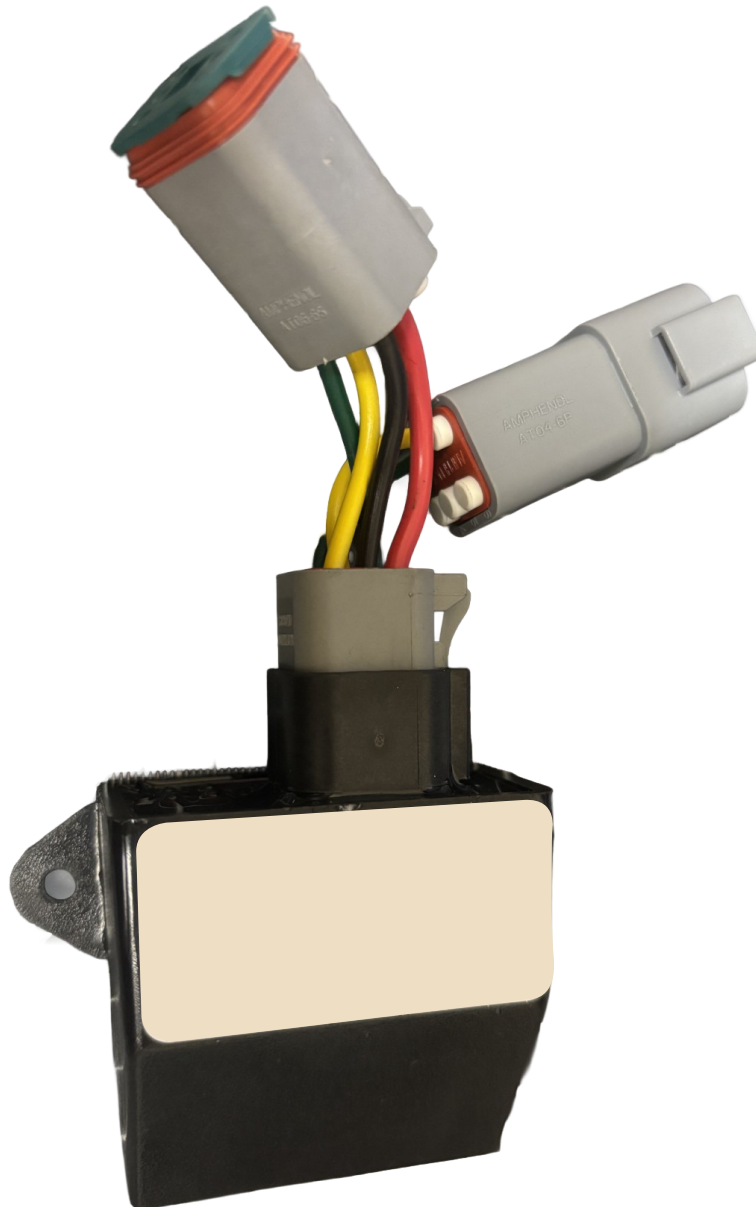


Figure 4 – Baud Router Kit

Titan Connect

Titan Connect is an electrical system that uses J1939 CAN communication to connect the engine and transmission through a smart power distribution module, a keypad, and the Nexstar crane.

For additional information, contact Auto Crane.

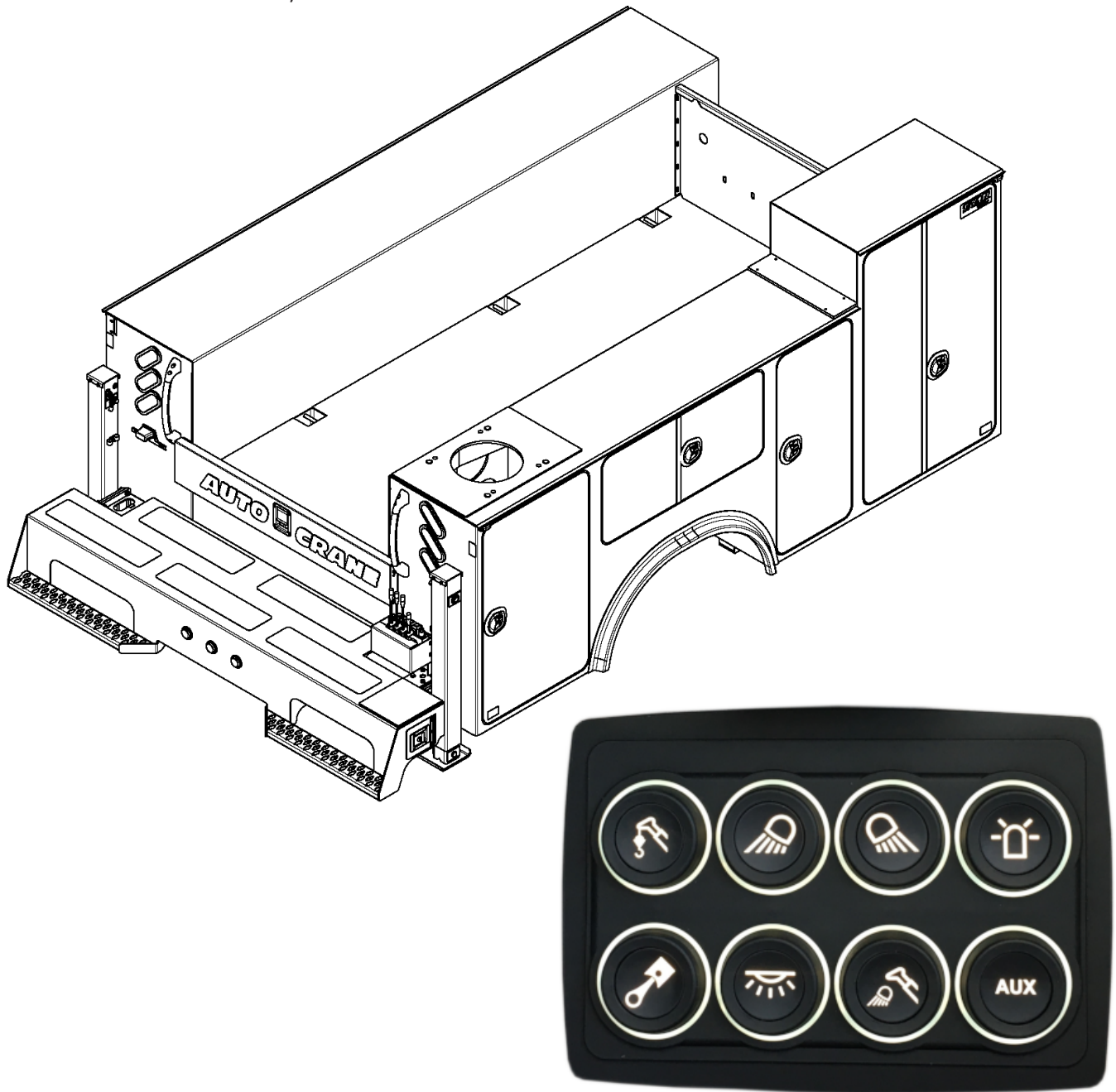


Figure 5 – Titan Connect

Introduction

EnPAK – Auxiliary Power Source

The EnPAK by Miller unit, referenced in the supplier manual, is a fully integrated power system. It combines a rotary-screw air compressor, hydraulic pump, generator, and diesel engine to operate work-truck tools while the truck engine is off.

This system improves operating efficiency by reducing fuel consumption, saving vehicle space, and reducing noise levels through a single on-demand power source.

For additional information, contact Auto Crane.

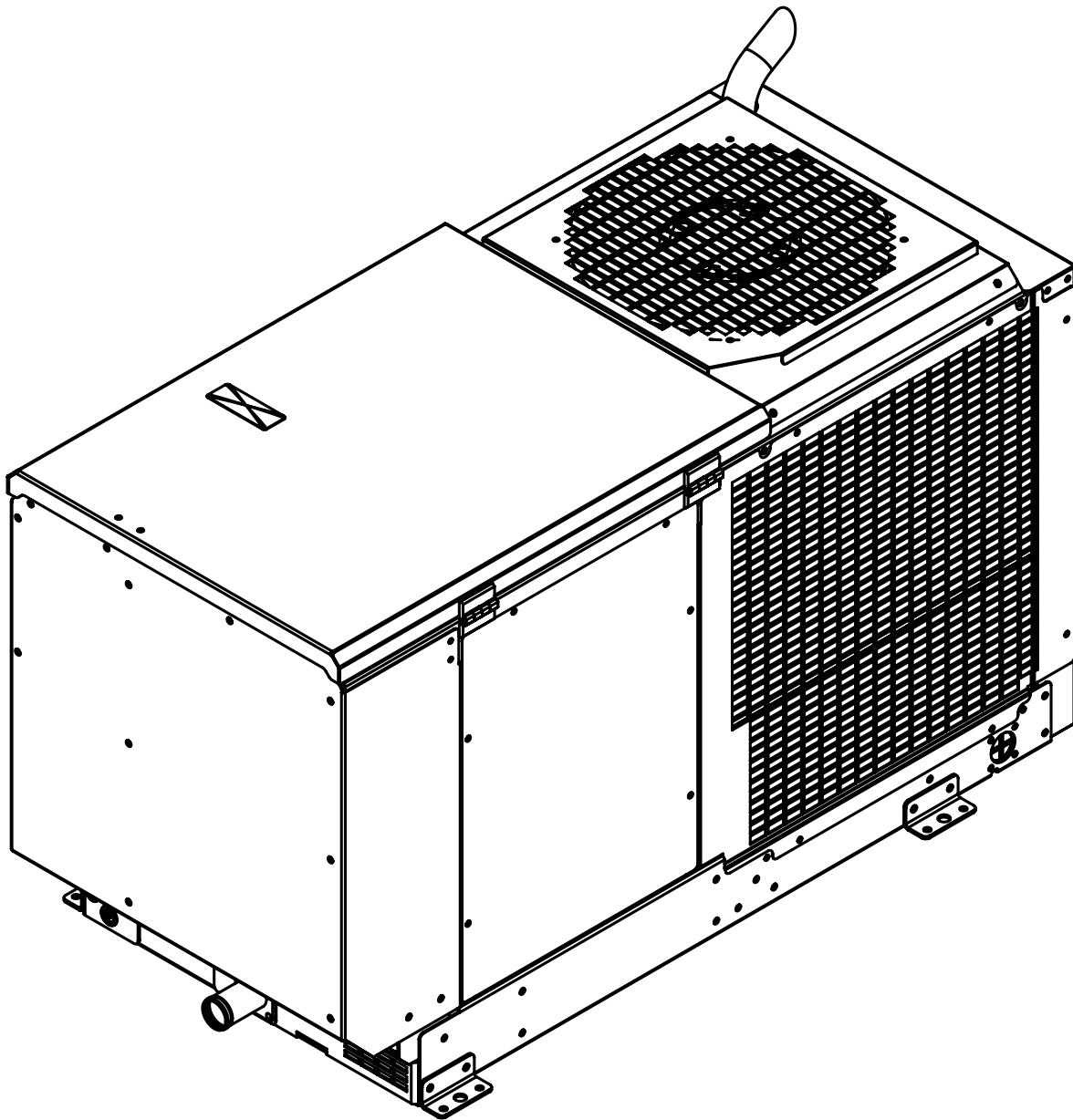


Figure 6 – EnPAK Unit

RC57 Installation: HC5-HC14

This procedure applies to the crane models listed in the Table - 2 below.

Top Level Assembly P/N	Crane Model
366664003	EHC-6, NEXSTAR
460179012	HC-10, NEXSTAR
470103008	HC-14, NEXSTAR
475000016	HC-12S, NEXSTAR
475000017	HC-12, NEXSTAR
477000004	HC-7X, NEXSTAR
477000009	HC-7, NEXSTAR
479000017	HC-8X, NEXSTAR
479000016	HC-8, NEXSTAR
480989013	8406H, NEXSTAR
361106530	HC-5, NEXSTAR
360646003	EHC-5, NEXSTAR
492000010	HC-6, NEXSTAR

Table – 2

IMPORTANT: All illustrations are for reference only. The actual crane configuration may differ. If you have any questions, contact Auto Crane.

NOTE: The numbers in parentheses in the installation steps are item numbers. They are not item quantities. Refer to Table - 3 for the quantity of each item.

RC57 Installation: HC5-HC14

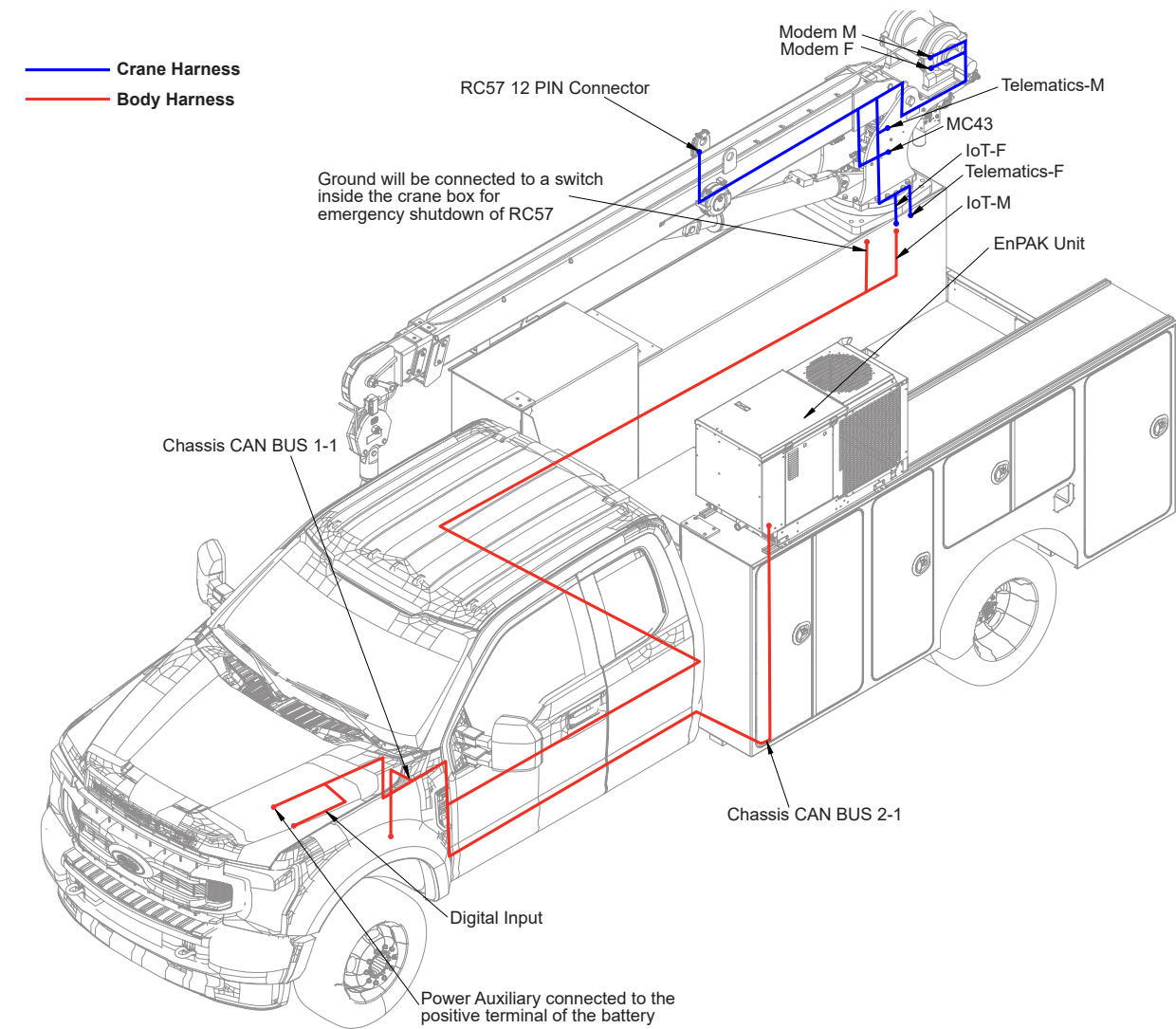


Figure 7 – Harness Routing

Gateway Physical Mount

1. Install the RC57 unit (8) after the crane is mounted on the chassis or body as follows:

RC57 Installation: HC5-HC14

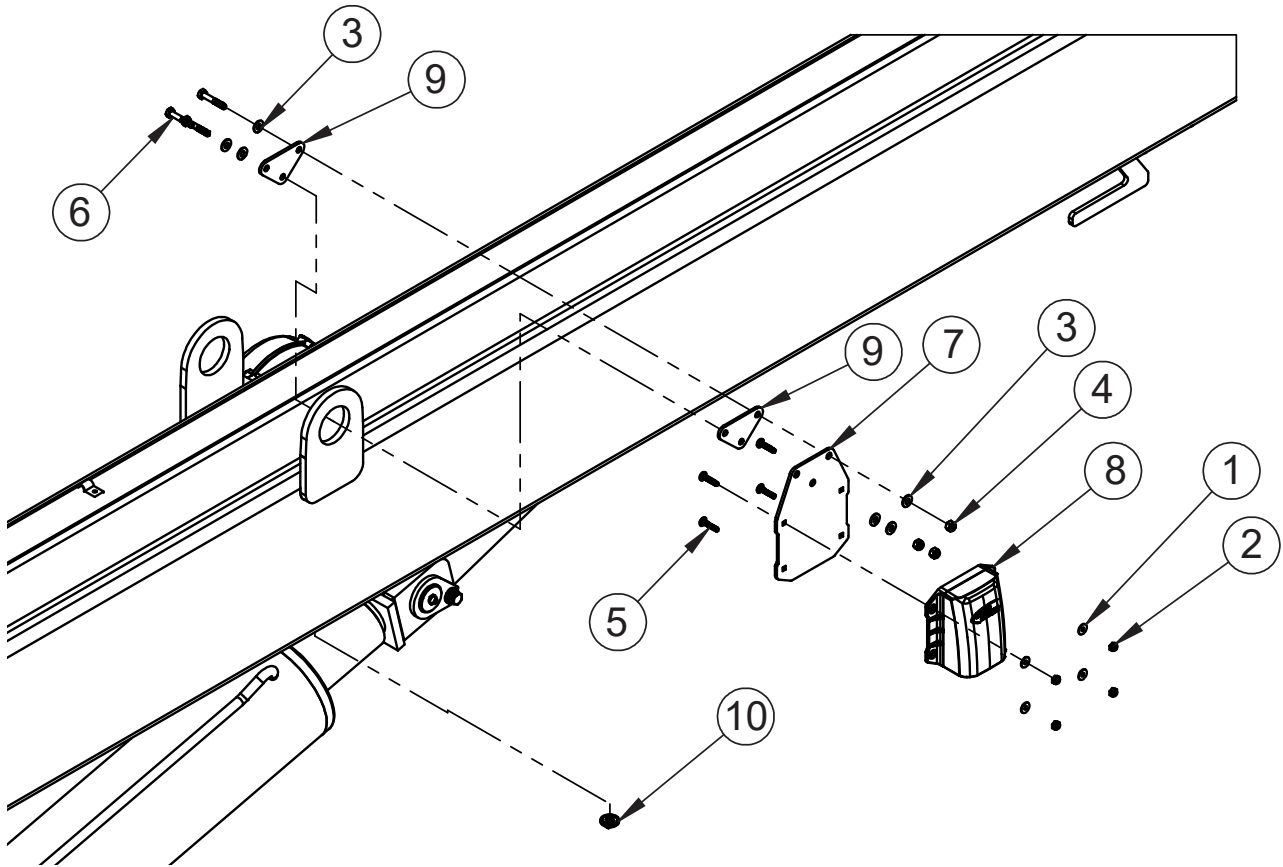


Figure 8 – RC57 Retrofit Installation Kit

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	5	020000000	WASHER FL #10 ZP
2	5	015801000	NUT HX NYLK #10-24 UNC ZP
3	8	020400000	WASHER FL SAE 1/4
4	4	016300000	NUT HX NYLK 1/4-20 UNC
5	5	475107051	SCREW CARR HD #10 UNC X 1 ZP GR2
6	4	475107052	SCREW HX HD 1/4 UNC X 1 1/2 ZP GR5
7	1	475107011	MOUNTING PLATE, RC57, RETRO FIT
8	1	475107001	IOT CONTROL BOX, RC57
9	2	475107012	BACKING PLATE, RC57, RETRO FIT
10	3	475107053	CABLE TIE MOUNT, MAGNETIC

Table – 3

RC57 Installation: HC5-HC14

- A. Record the serial number from the bottom of the RC57 unit (8).

IMPORTANT: This serial number is required for registration in Ramsey Connect and for the software update process.

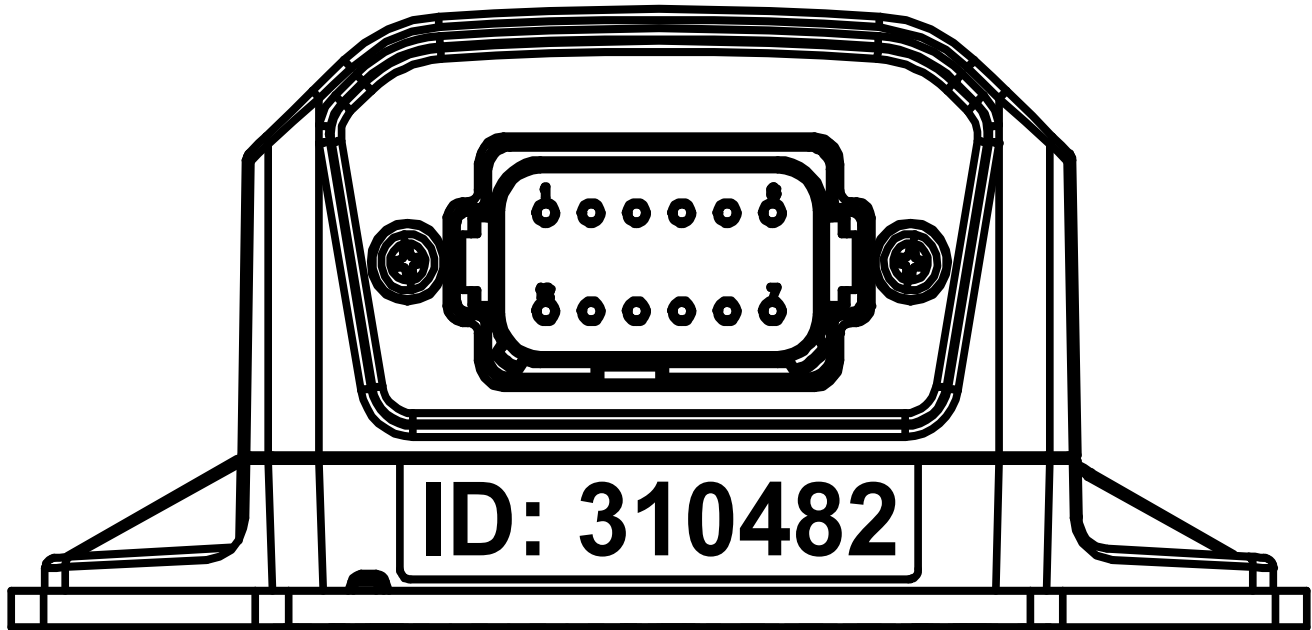


Figure 9 - Bottom view of RC57 unit

- B. Position the RC57 unit (8) on the mounting plate (7). Hold the RC57 unit (8) in position. Install the screws (5), washers (1), and nuts (2).
- C. Tighten the nuts (2).
- D. On the inner side of the boom lug, position the backing plate (9) and washers (3). Install the screws (6).
- E. On the outer side of the boom lug, position the other backing plate (9) and the mounting plate (7). Install the remaining washers (3) and nuts (4).
- F. Tighten the nuts (4).

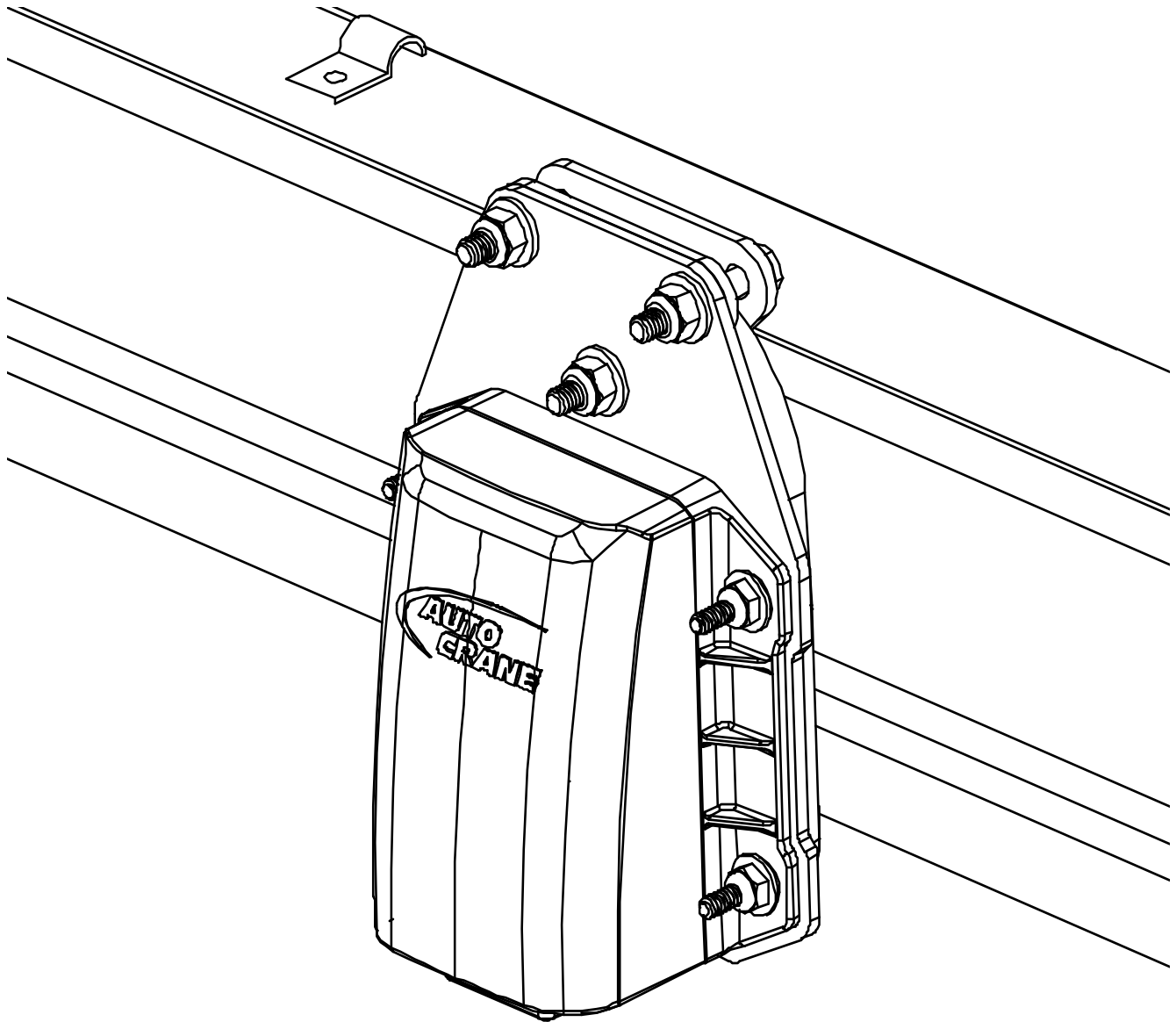


Figure 10 – RC57 Installation

RC57 Installation: HC5-HC14

Gateway Crane Harness Wiring

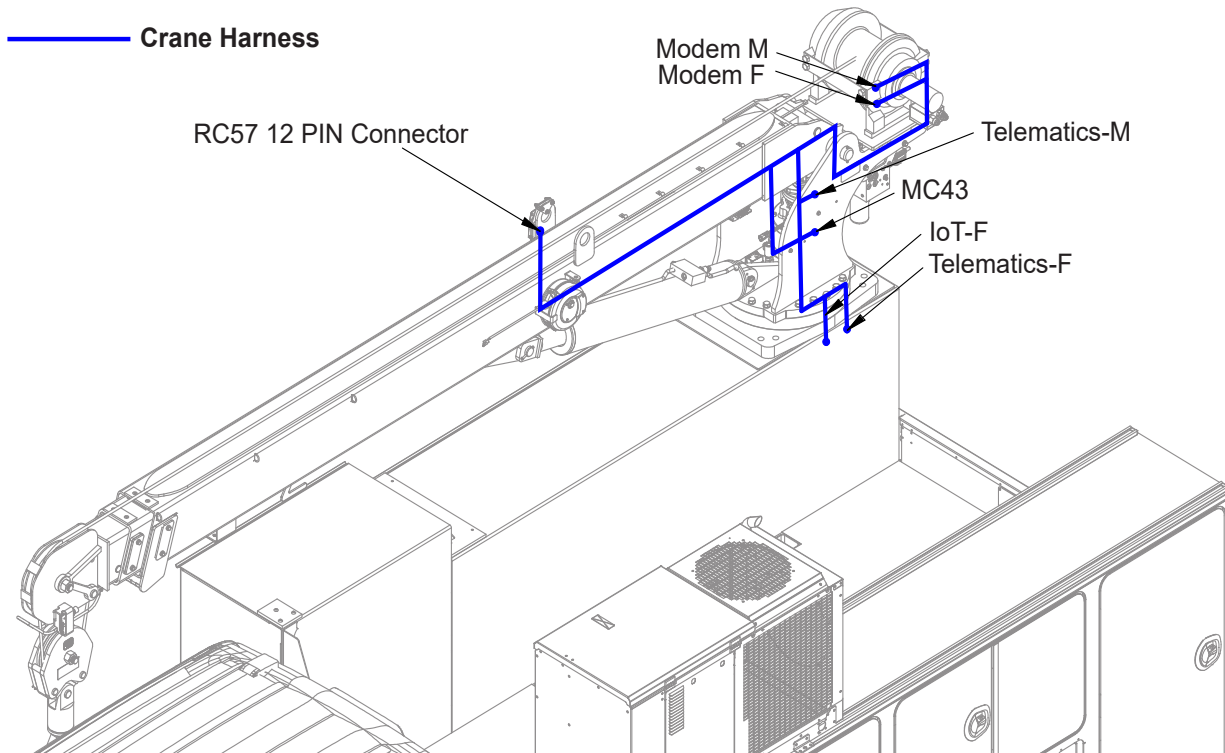


Figure 11 – Crane Harness Routing

2. Connect the RC57 12-pin connector as follows:
 - A. Connect the RC57 12-pin connector from the crane harness to the RC57 unit (8).
 - B. Use the magnetic lugs (10) and zip ties to secure the harness under the pedestal.

IMPORTANT: Make sure that the harness has enough slack for boom up and boom down movement.

RC57 Installation: HC5-HC14

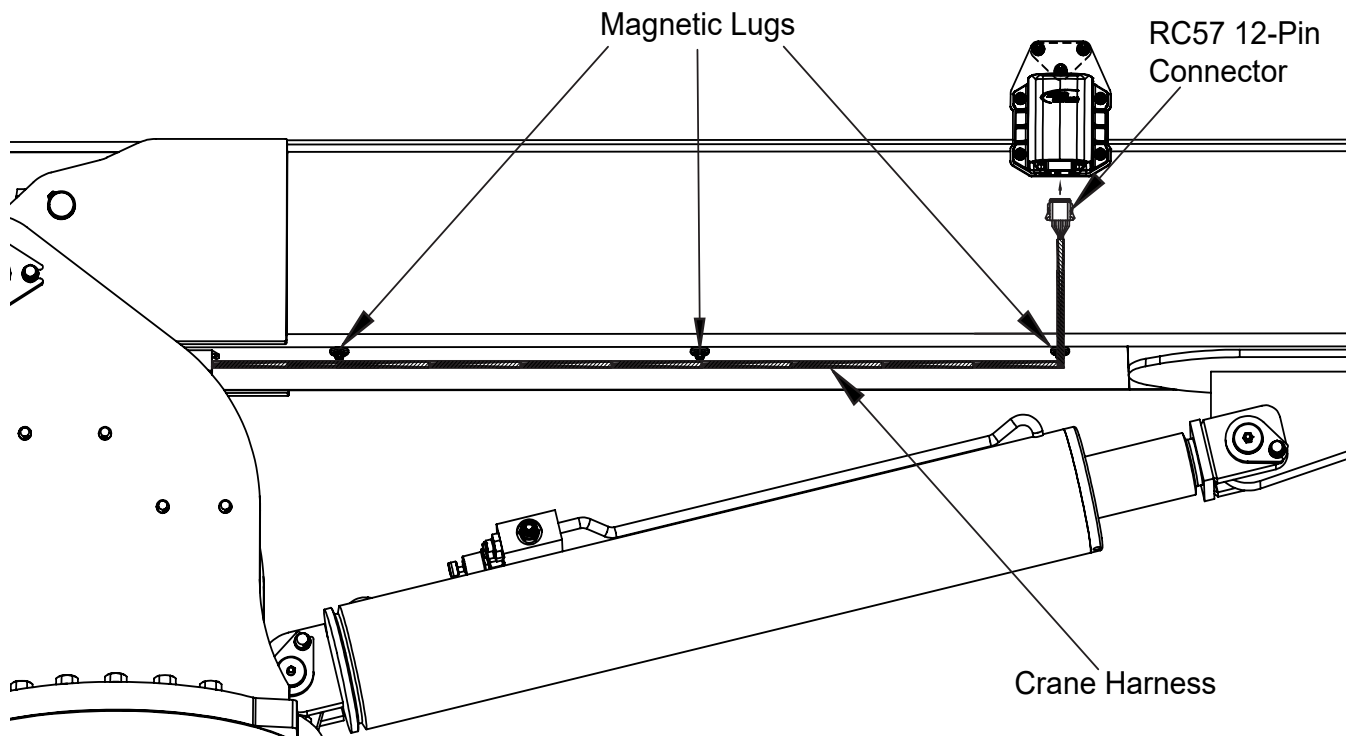


Figure 12 – RC57 Connection with Crane Harness

RC57 Installation: HC5-HC14

Telematics and IoT-F connections

3. Connect the Telematics and IoT-F connectors as follows:
 - A. If Titan Connect is installed, in the crane box, below the pedestal, disconnect the J4 Telematics "green and yellow 3 pin deutsch connector" from the Titan Connect harness.
 - B. On the pedestal, remove the cord grip that secures the J4 Telematics "green and yellow 3 pin deutsch connector".

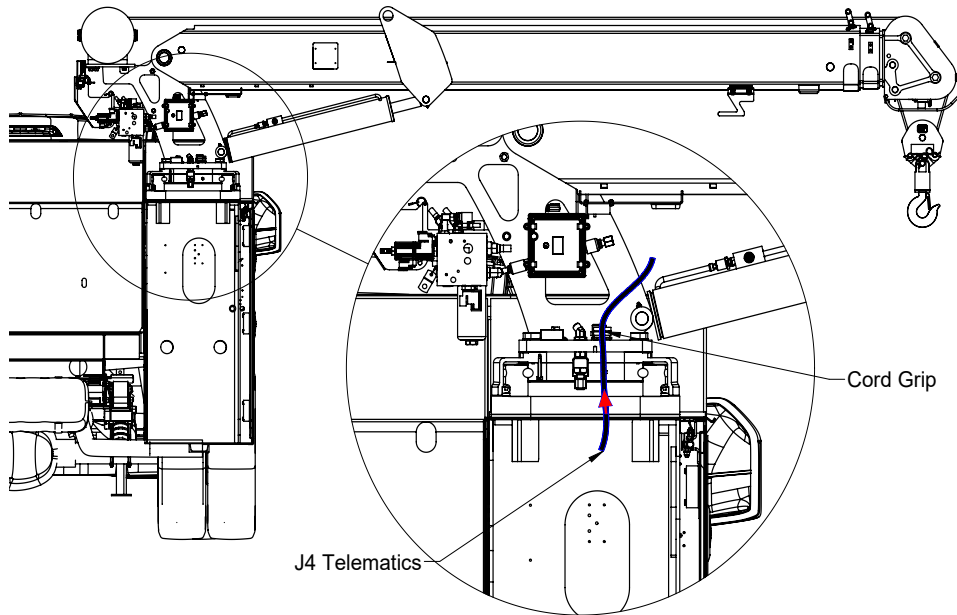


Figure 13 – Telematics Connector

- C. Remove the J4 Telematics "green and yellow 3 pin deutsch connector" from the cord grip.
 - D. Remove the connectors from the Telematics-F and IoT-F wires.

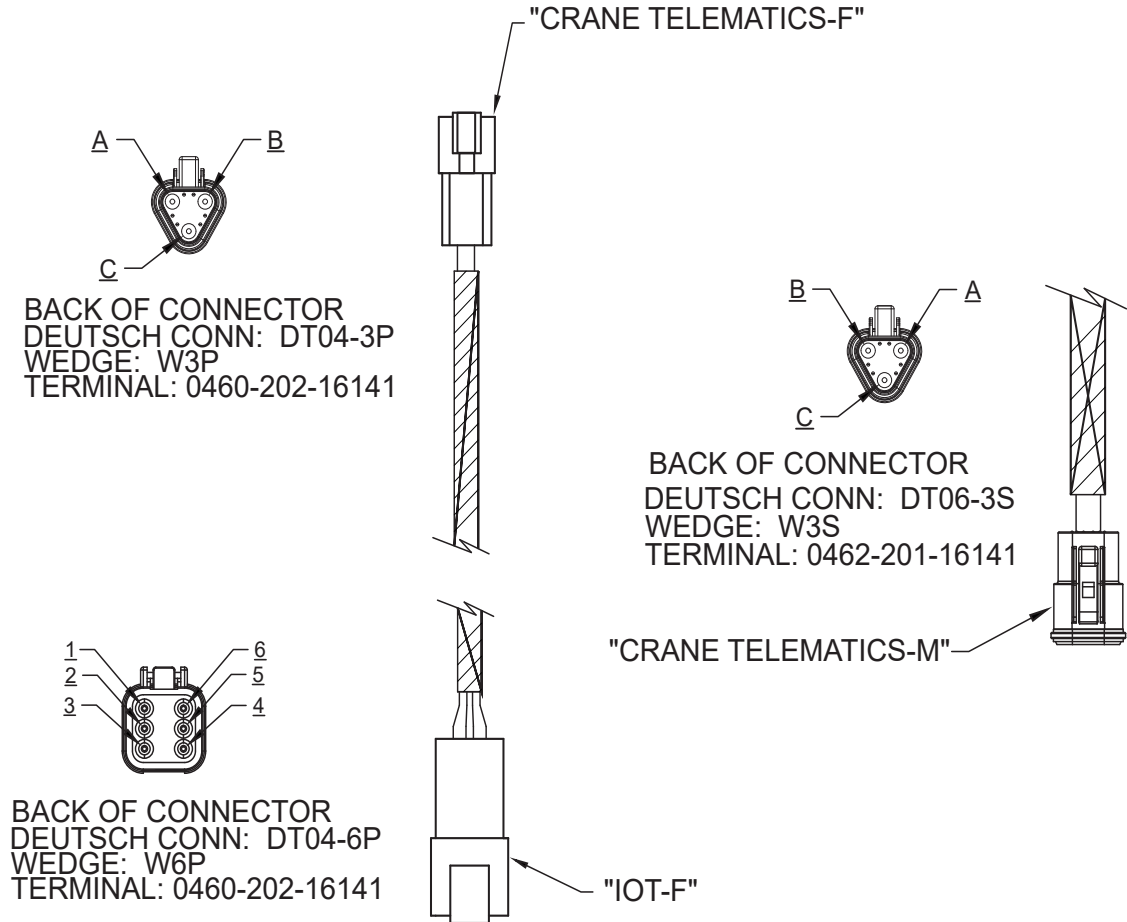


Figure 14 – Telematics and IoT-F Connectors

E. Route the Telematics-F and IoT-F wires through the cord grip and below the pedestal.

RC57 Installation: HC5-HC14

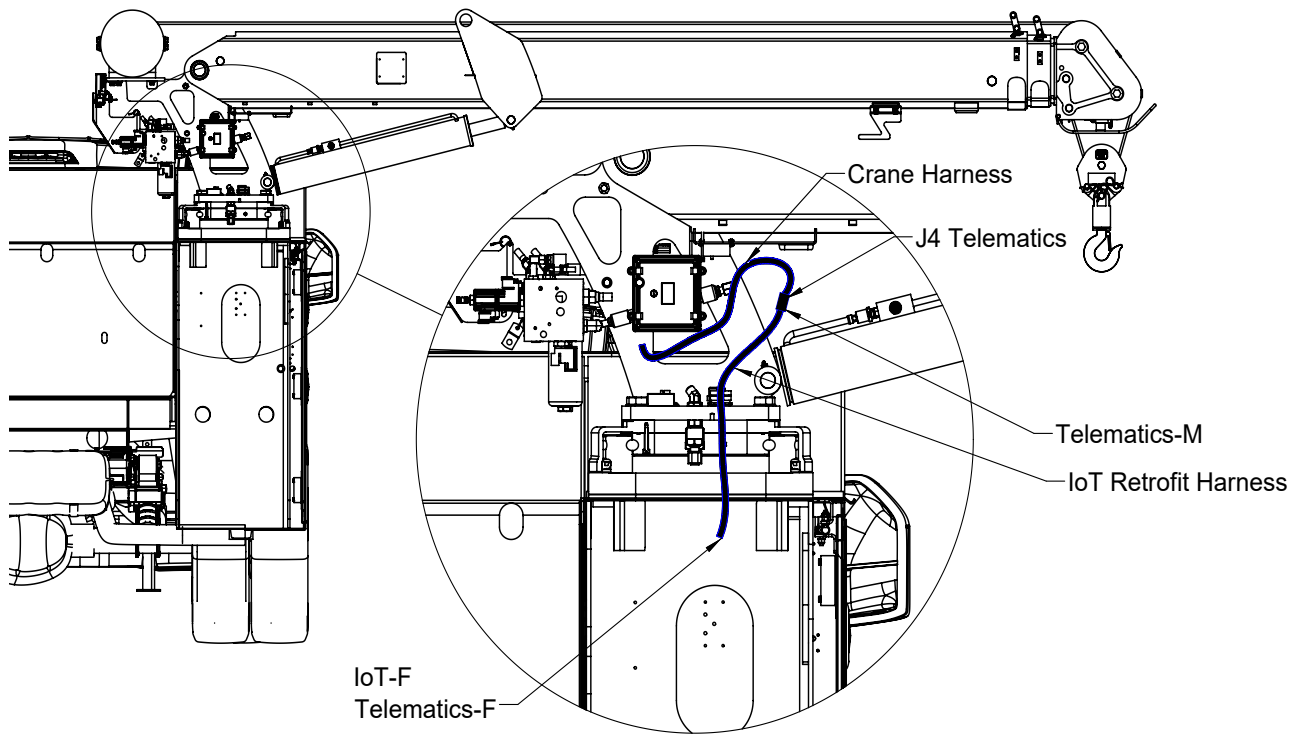


Figure 15 – Telematics and IoT-F Routing & Installation

- F. Install the connectors that were removed from the Telematics-F and IoT-F wires.
- G. Install the cord grip.
- H. In the pedestal area, connect the J4 Telematics “green and yellow 3 pin deutsch connector” to the Telematics-M connector. If necessary, secure the harnesses to the pedestal.
- I. Keep the IoT-F connector safely aside until the body harness installation is complete.

IMPORTANT: The IoT-F connector will be connected to the IoT-M connector from the body harness.

- J. If Titan Connect is not installed, secure the Telematics-F wire to the structure.

NOTE: Telematics-F will not be used without Titan Connect.

- K. If Titan Connect is installed, refer to “Titan Connect – Auxiliary Wiring” section in “Accessories” for details about the Telematics-F connection.

Modem Connections

4. Connect the Modem-F and Modem-M connectors as follows:

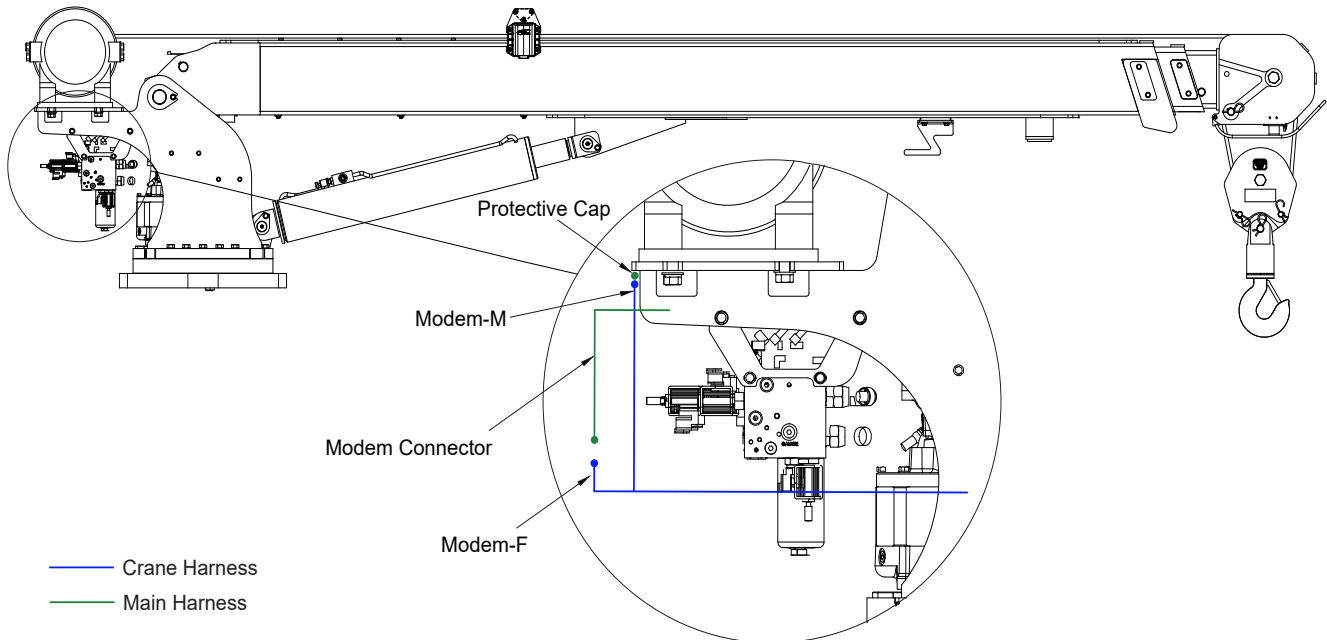


Figure 16 – Modem Connections

- A. In the hoist area behind the pedestal, remove the modem connector from the protective cap or the existing modem.

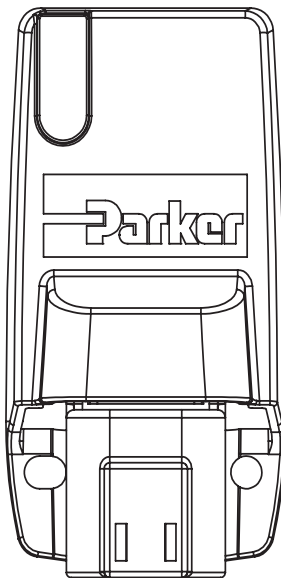


Figure 17 – Bluetooth Modem

RC57 Installation: HC5-HC14

- B. Connect the modem connector to the Modem-F connector from the crane harness.

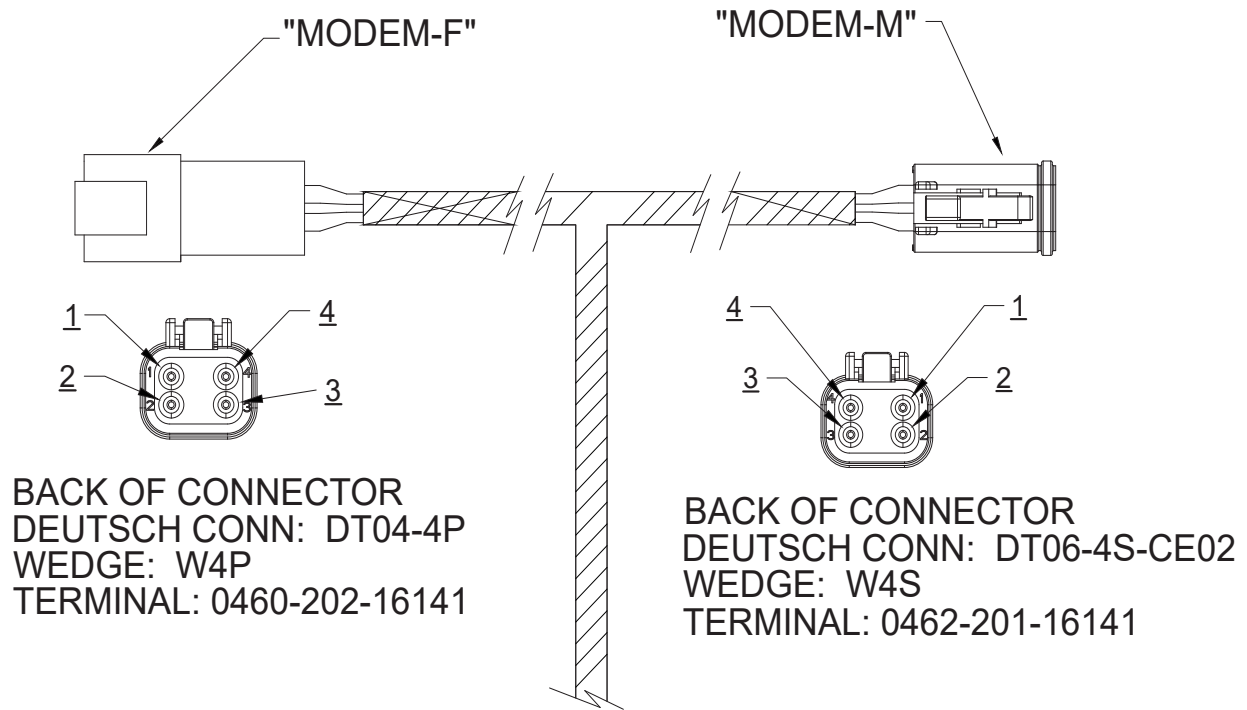


Figure 18 – Modem Connectors from Crane Harness

- C. Connect the Modem-M connector to the protective cap or the existing modem.
D. Secure the remaining wire from the crane harness to the pedestal.

RC57 Installation: HC5-HC14

MC43 Connections

5. Connect the MC43 wires to Pins 1 and 17 of the C2 controller as follows:

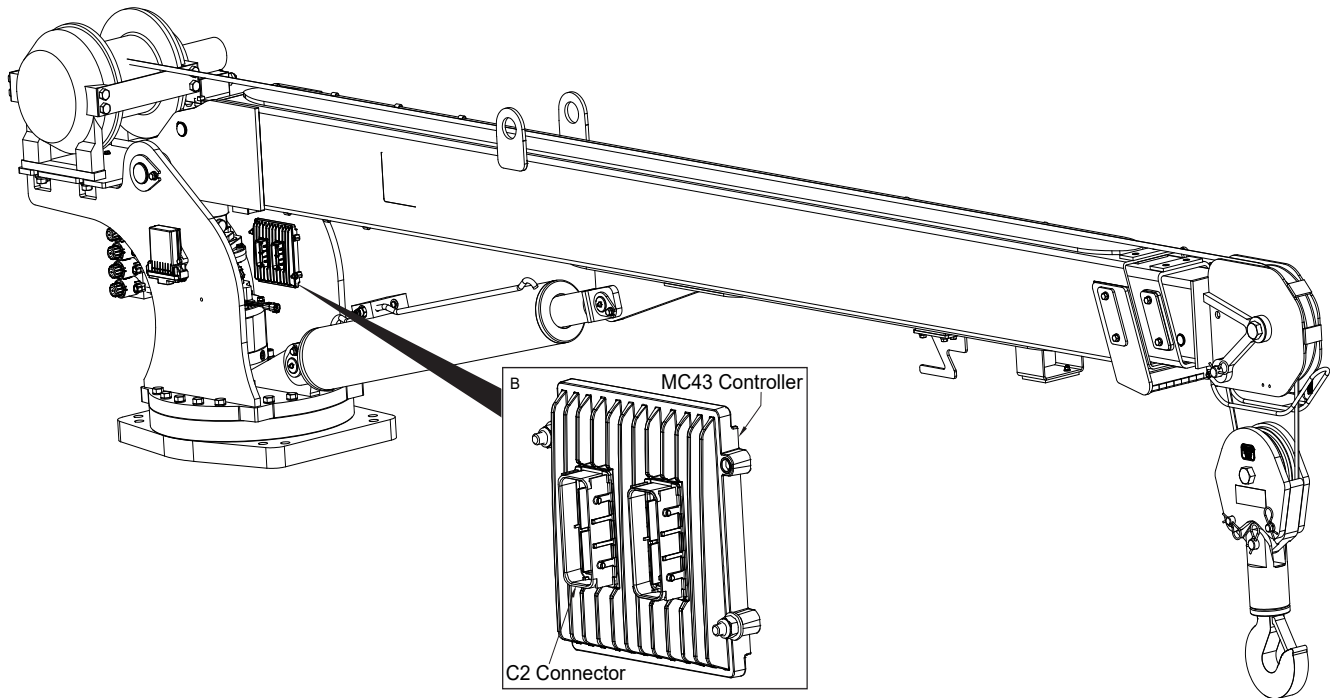


Figure 19 – MC43 Connections

- A. Disconnect the C2 connector from the MC43 controller.
- B. Remove the cover from the C2 connector.

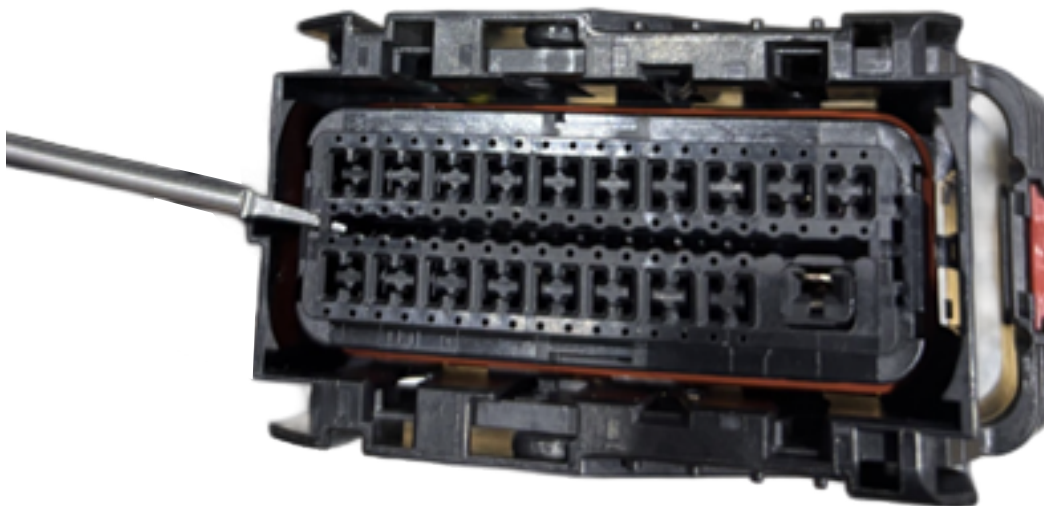


Figure 20 – C2 Connector Cover

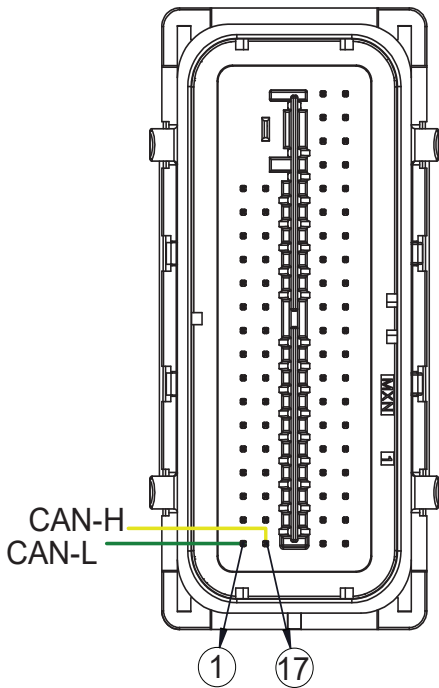
RC57 Installation: HC5-HC14

C. Install the RC57 crane harness MC43 wires as follows:

Connector, MC43, C2

Connector C2 pin assignments

Connector kit	Parker no. 20085115
Housing	Molex no. 34566-0103 (old) Molex no. 216739-0001 (new)
Cover	Molex no. 34565-0003 (old) Molex no. 34565-0005 (new)
Pin types	Molex 33467-0024 (0.64 mm) Yazaki 7116-4152-02 (2.8 mm)
Seal	Yazaki 7158-3113-40 (2.8 mm)
Cables	0.75 mm ² /18 AWG (0.64 mm) 1.50-2.50 mm ² / 14 AWG (2.8 mm)
Plugs (empty pos.)	Molex no. 34586-0001 (0.64 mm)
Crimping tool (all pins)	Parker no. 20085120
Prototype cable	Parker no. 20085117



Pin	Symbol	Primary Function	Alt. Function	Alt. Function	Alt. Function	Alt. Function
1	CAN-L_D	CAN low, bus 4				
17	CAN_H_D	CAN high, bus 4				

Figure 21 – C2 Connector

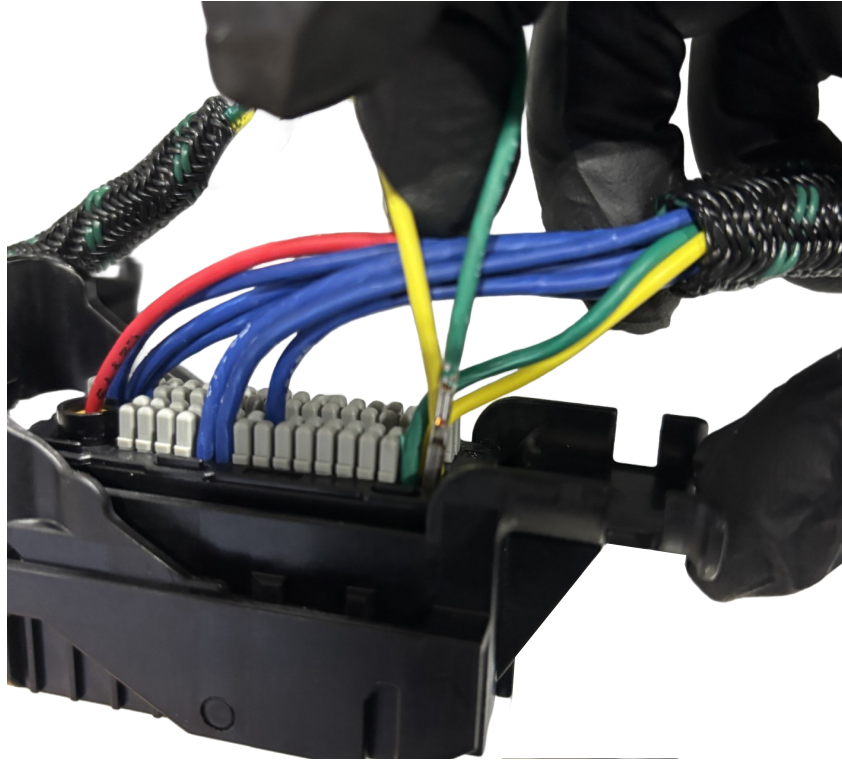


Figure 22 – CAN L & H Installation in C2 Connector

- i. Connect the CAN-H yellow wire to Pin 17.
 - ii. Connect the CAN-L green wire to Pin 1.
 - iii. Make sure that the wires are fully engaged in the C2 connector.
- D. Secure the MC43 wires and the existing harness together at the C2 connector with zip tie(s).



Figure 23 – Securing C2 Connector Harness

RC57 Installation: HC5-HC14

- E. Secure the remaining wire from the crane harness to the pedestal.
- F. Install the cover on the C2 connector.
- G. Connect the C2 connector to the MC43 controller.

Chassis Connections – Body harness

- 6. Refer to “Chassis Connections” section for the details about chassis connections to the body harness.

Connect the Body Harness to the Crane Harness

- 7. Refer to “Body Harness Installation” section for the details about the connection between the IoT-F and IoT-M connectors.

RC57 Installation: EHC-3 and EHC-4

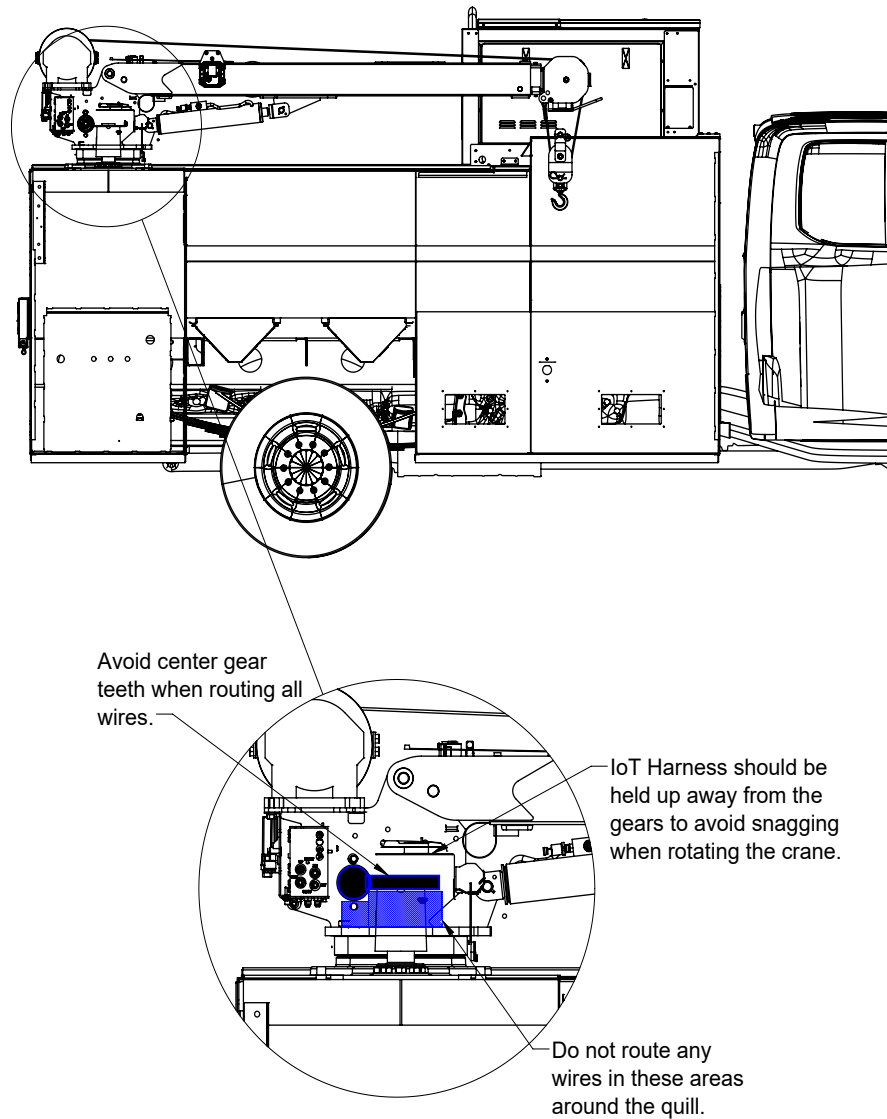
This procedure applies to the crane models listed in the Table - 4 below.

Top Level Assembly P/N	Crane Model
320992003	EHC-3.2 PRFX NEXSTAR
404243003	EHC-4, 20 FT. BOOM, NEXSTAR

Table - 4



During the installation procedure, make sure that the harness does not touch or come near the pedestal gear. During pedestal rotation, contact with the pedestal gear can damage the harness.



DETAIL B

Figure 24 – Pedestal Gear Warning

RC57 Installation: EHC-3 and EHC-4

IMPORTANT: All illustrations are for reference only. The actual crane configuration may differ. If you have any questions, contact Auto Crane.

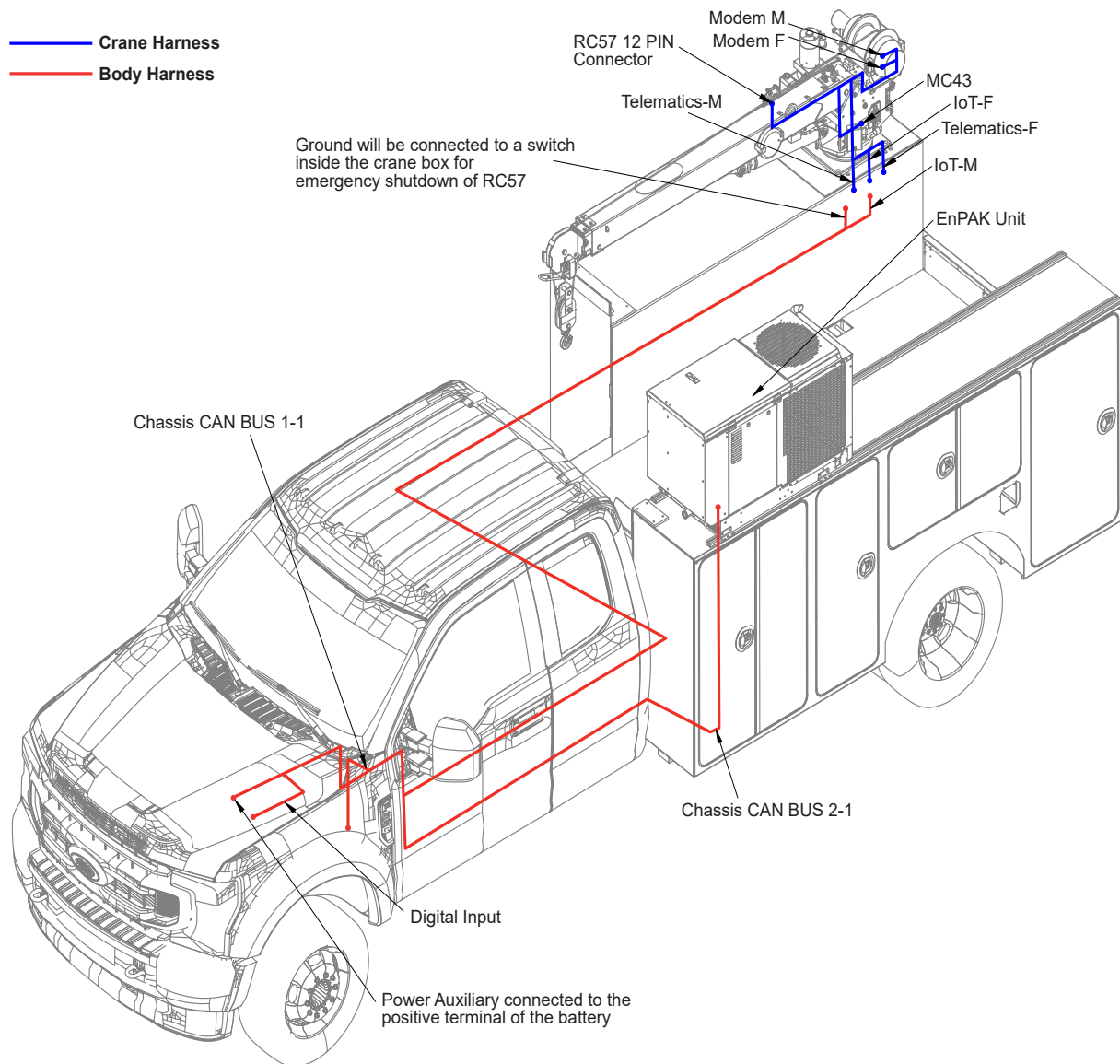


Figure 25 – Harness Routing

Gateway Physical Mount

1. Refer to "Gateway Physical Mount" section in "RC57 Installation: HC5-HC14" for the installation instructions of the RC57 unit.

RC57 Installation: EHC-3 and EHC-4

Telematics and IoT-F connections

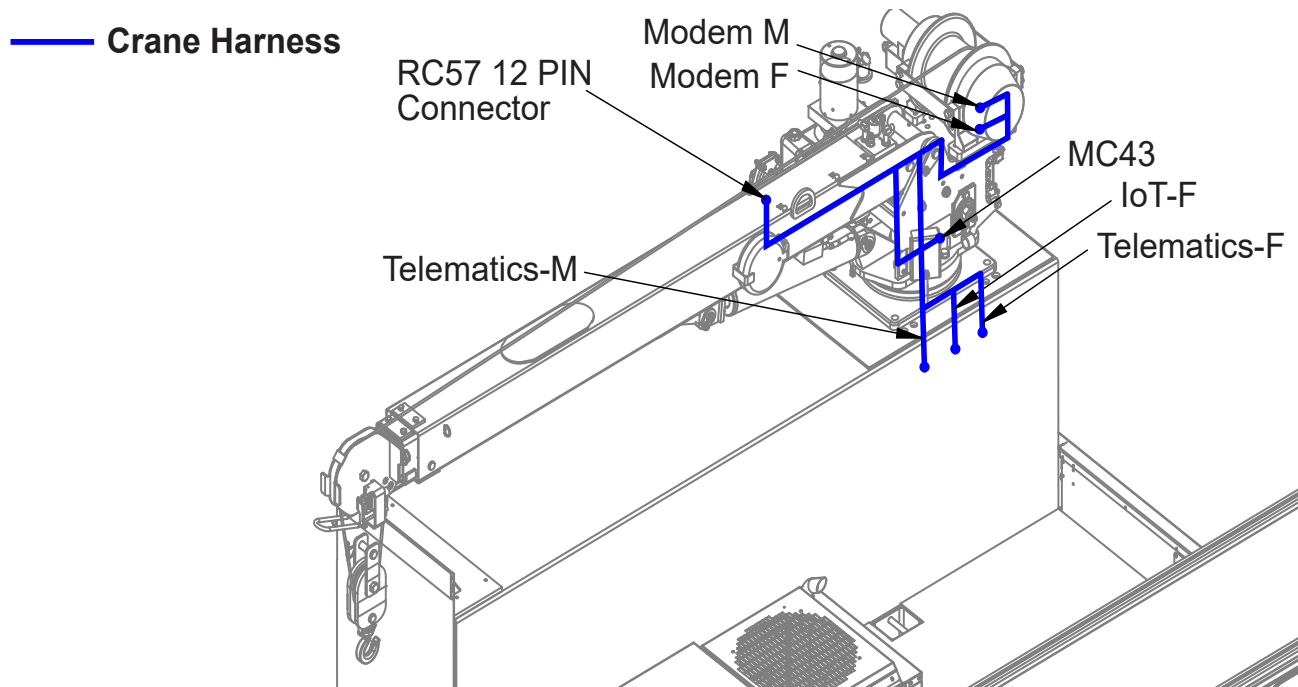
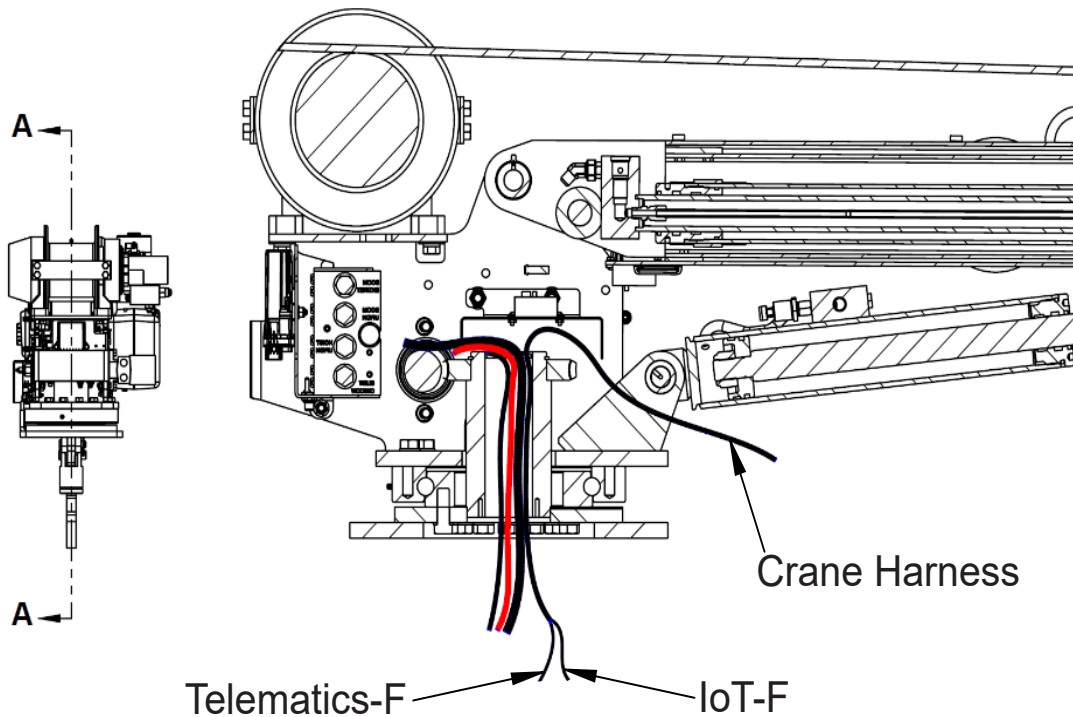


Figure 26 – Crane Harness Routing

2. Connect the Telematics and IoT-F connectors as follows:



RC57 Installation: EHC-3 and EHC-4

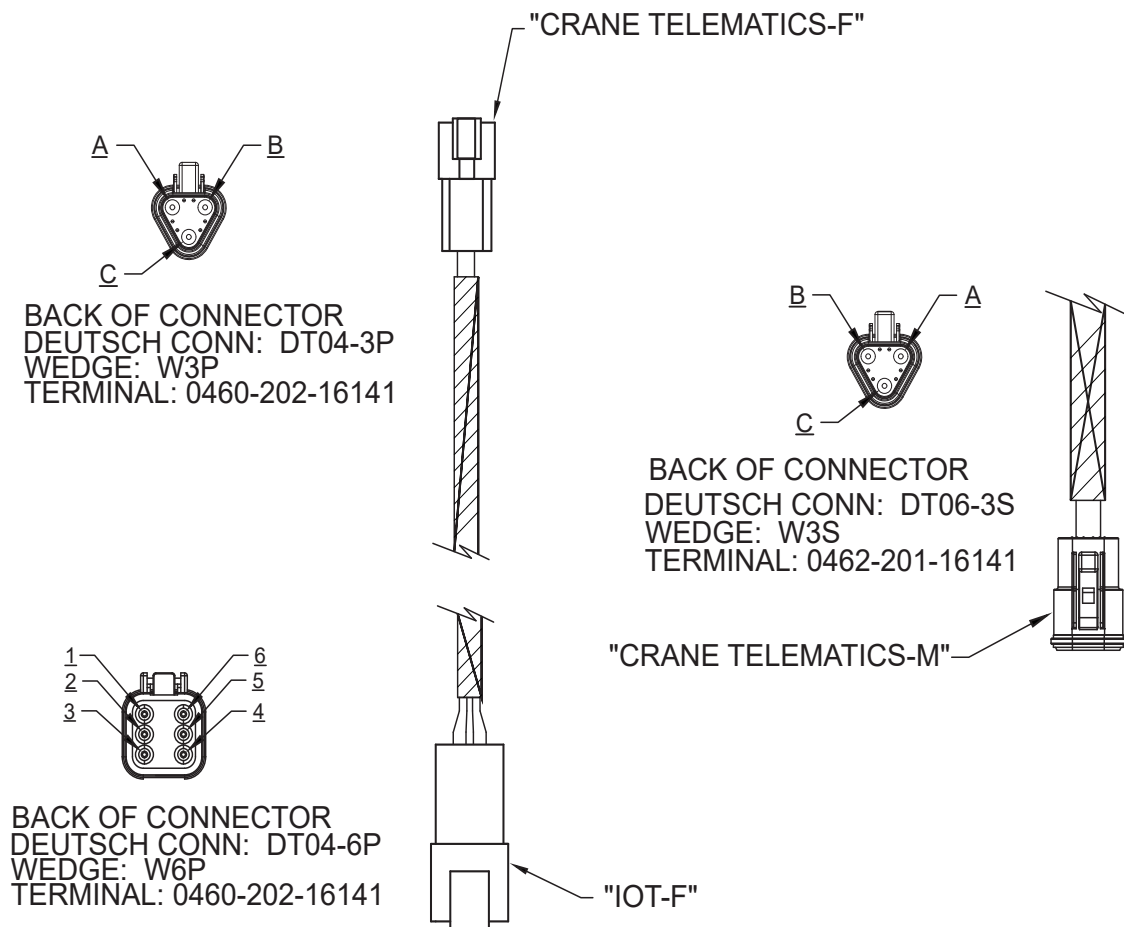


Figure 27 – Telematics and IoT-F Routing

- A. Remove the connectors from the IoT-F, Telematics-F and Telematics-M wires.
- B. Remove the sealant from the area around the main harness and the center quill.
- C. Route the IoT-F, Telematics-F and Telematics-M wires through the center quill.
- D. Install the connectors that were removed from the IoT-F, Telematics-F and Telematics-M wires.
- E. Keep the IoT-F connector safely aside until the body harness installation is complete.

IMPORTANT: The IoT-F connector will be connected to the IoT-M connector from the body harness.

- F. Secure the Telematics-M wire inside the pedestal together with the main harness.
- G. If Titan Connect is not installed, secure the Telematics-F wire inside the pedestal together with the main harness.

NOTE: Telematics-F will not be used without Titan Connect.

- H. If Titan Connect is installed, refer to "Titan Connect – Auxiliary Wiring" section in "Accessories" for the details about the Telematics-F connection.
- I. Apply sealant around the main harness and the center quill to prevent water intrusion.

RC57 Installation: EHC-3 and EHC-4

Modem Connections

3. Refer to “Modem Connections” section in “RC57 Installation: HC5-HC14” for the installation instructions related to the Modem connections. Refer to Figure – 28 below for location.

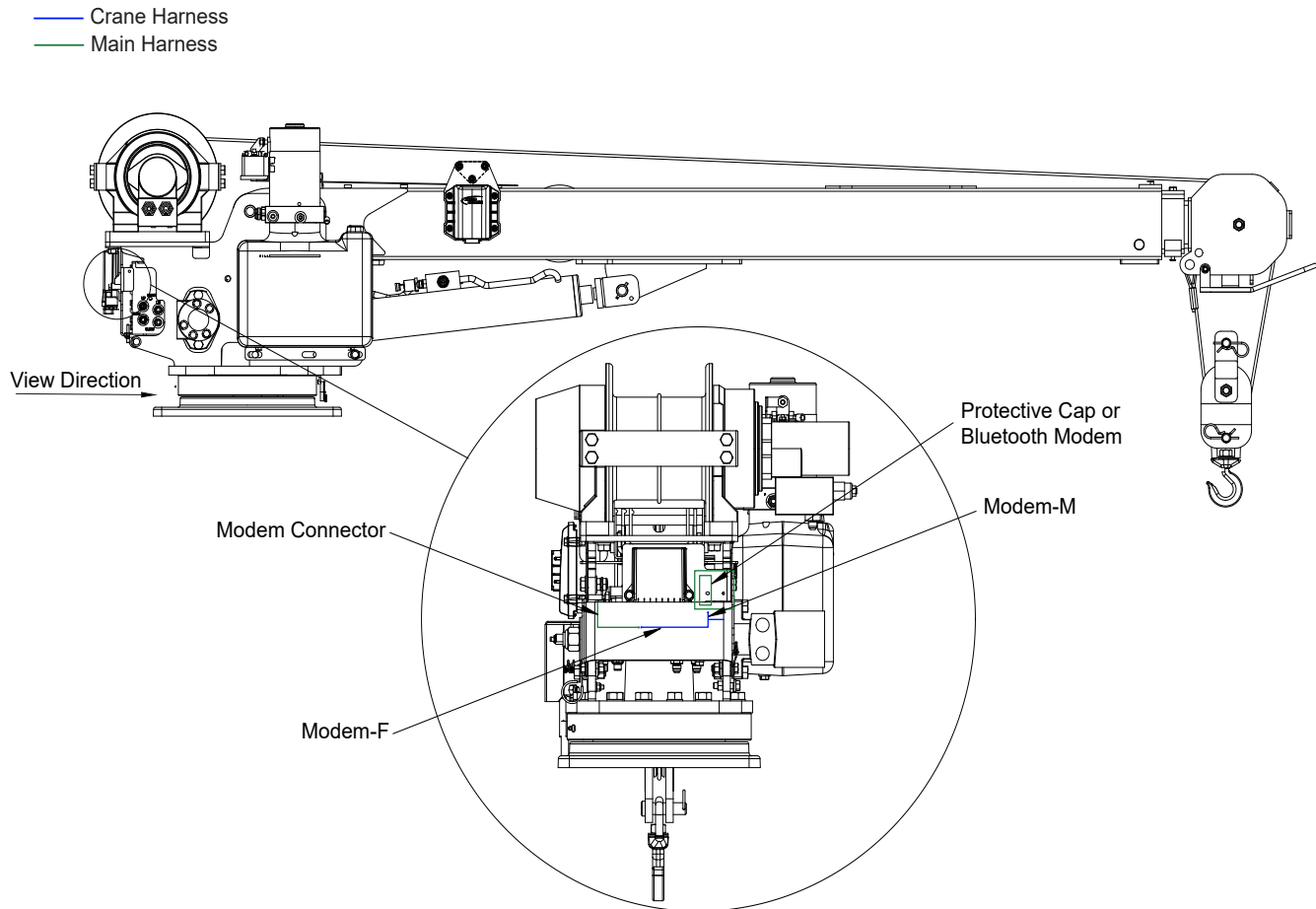


Figure 28 – Modem Connections

RC57 Installation: EHC-3 and EHC-4

MC43 Connections

4. Refer to "MC43 Connections" section in "RC57 Installation: HC5-HC14" for the installation instructions related to the MC43 connections. Refer to Figure – 29 below for location.

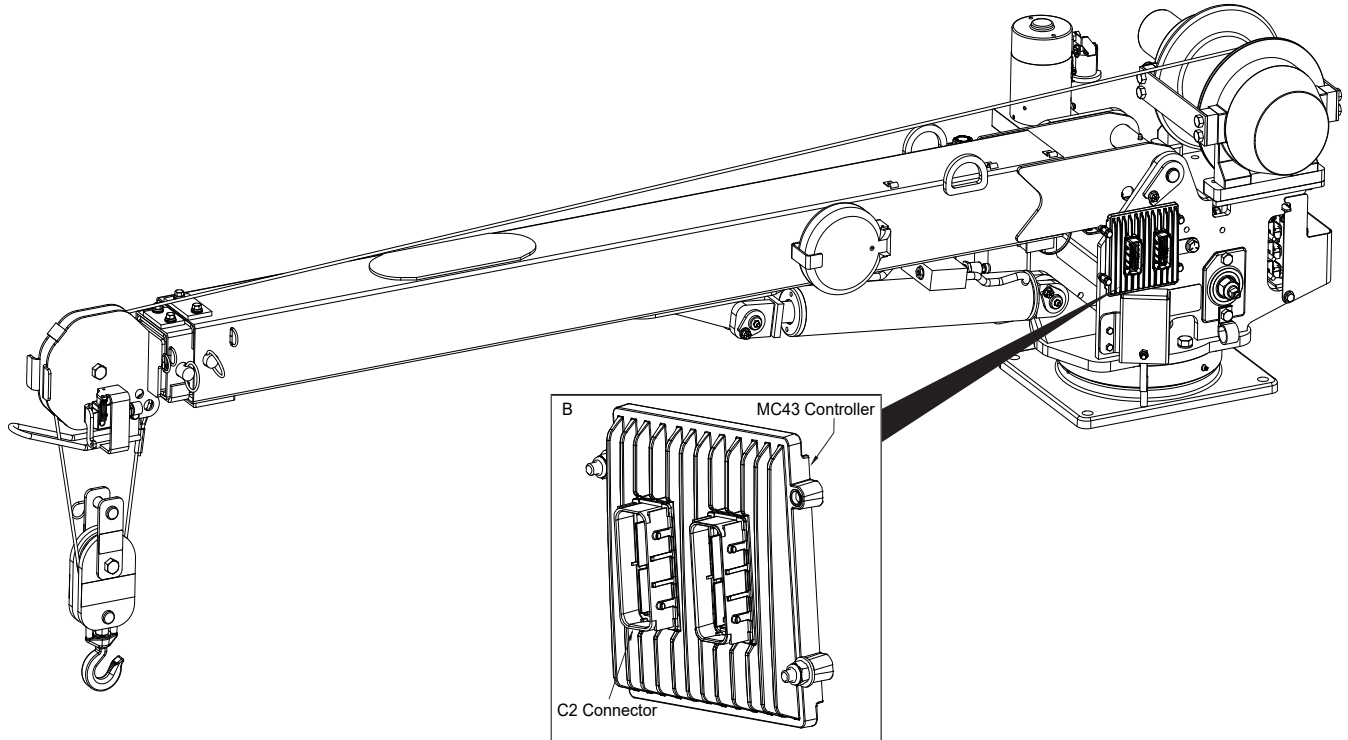


Figure 29 – MC43 Connections

Gateway Crane Harness Wiring

5. Refer to "Gateway Crane Harness Wiring" section in "RC57 Installation: HC5-HC14" for the instructions related to RC57 connection with crane harness.

Chassis Connections – Body harness

6. Refer to "Chassis Connections" section for the details about chassis connections to the body harness.

Connect the Body Harness to the Crane Harness

7. Refer to "Body Harness Installation" section for the details about the connection between the IoT-F and IoT-M connectors.

RC57 Installation: EHC-6.1 and HC-6.1

This procedure applies to the crane models listed in the Table - 5 below.

Top Level Assembly P/N	Crane Model
492000012	HC-6, NEXSTAR LESS AUTO CRANE LOGO
492000013	EHC-6, NEXSTAR
492000014	HC-6, NEXSTAR
492000015	EHC-5, NEXSTAR
492000016	HC-5, NEXSTAR

Table – 5

IMPORTANT: All illustrations are for reference only. The actual crane configuration may differ. If you have any questions, contact Auto Crane.

RC57 Installation: EHC-6.1 and HC-6.1

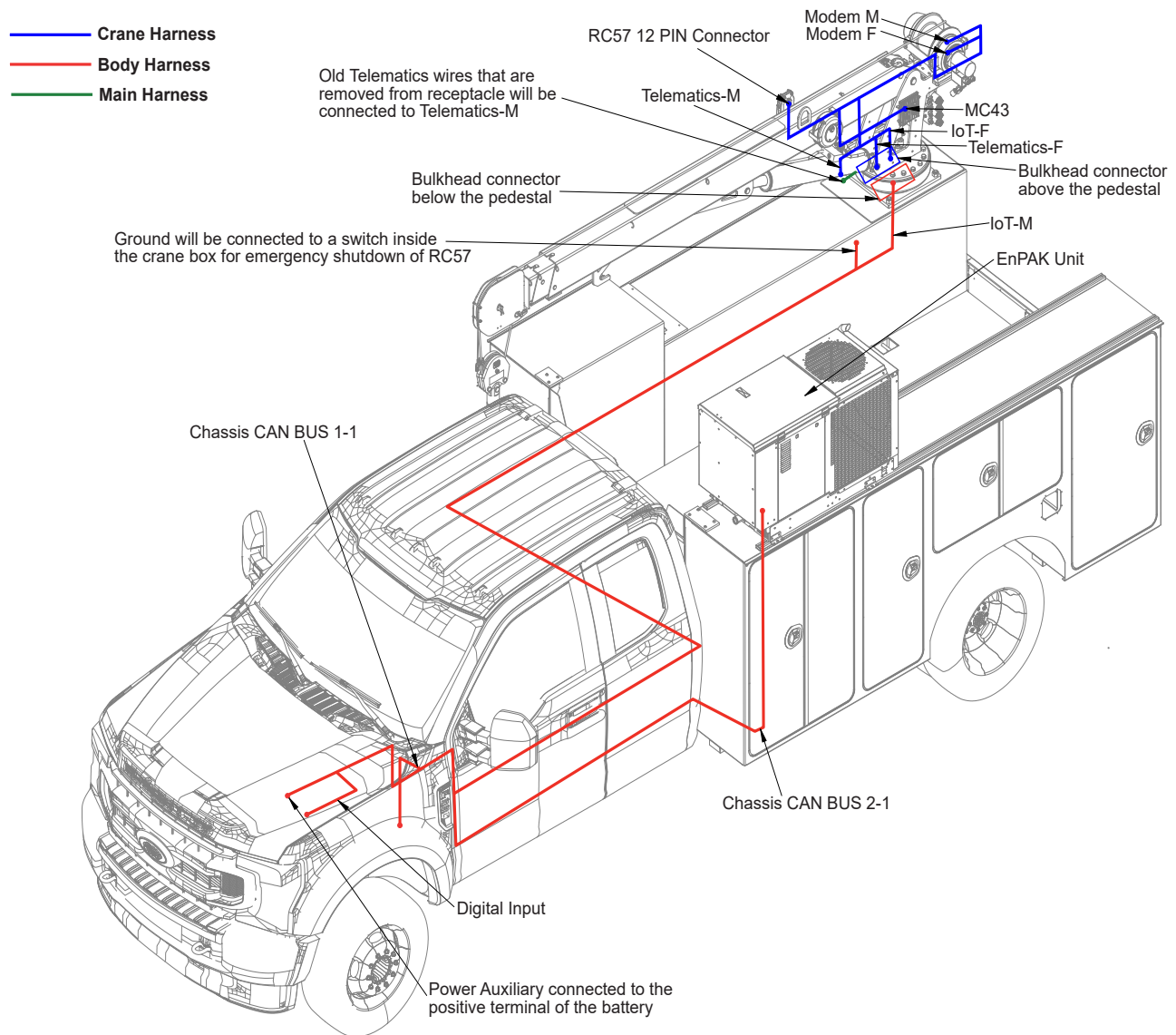


Figure 30 – Harness Routing

Gateway Physical Mount

1. Refer to "Gateway Physical Mount" section in "RC57 Installation: HC5-HC14" for the installation instructions of the RC57 unit.

Gateway Crane Harness Wiring

2. Refer to "Gateway Crane Harness Wiring" section in "RC57 Installation: HC5-HC14" for the instructions related to RC57 connection with crane harness.

RC57 Installation: EHC-6.1 and HC-6.1

Telematics and IoT-F connections

3. Connect the Telematics and IoT-F connectors for the crane models listed in the Table - 6 below as follows:

Top Level Assembly P/N	Crane Model
492000012	HC-6, NEXSTAR LESS AUTO CRANE LOGO
492000014	HC-6, NEXSTAR
492000016	HC-5, NEXSTAR

Table – 6



Make sure that you identify the correct installation positions of all wires during this procedure. Installation in wrong pin can cause faulty operation or can damage the equipment.

- A. If required, remove the receptacle and plug from the pedestal as follows:

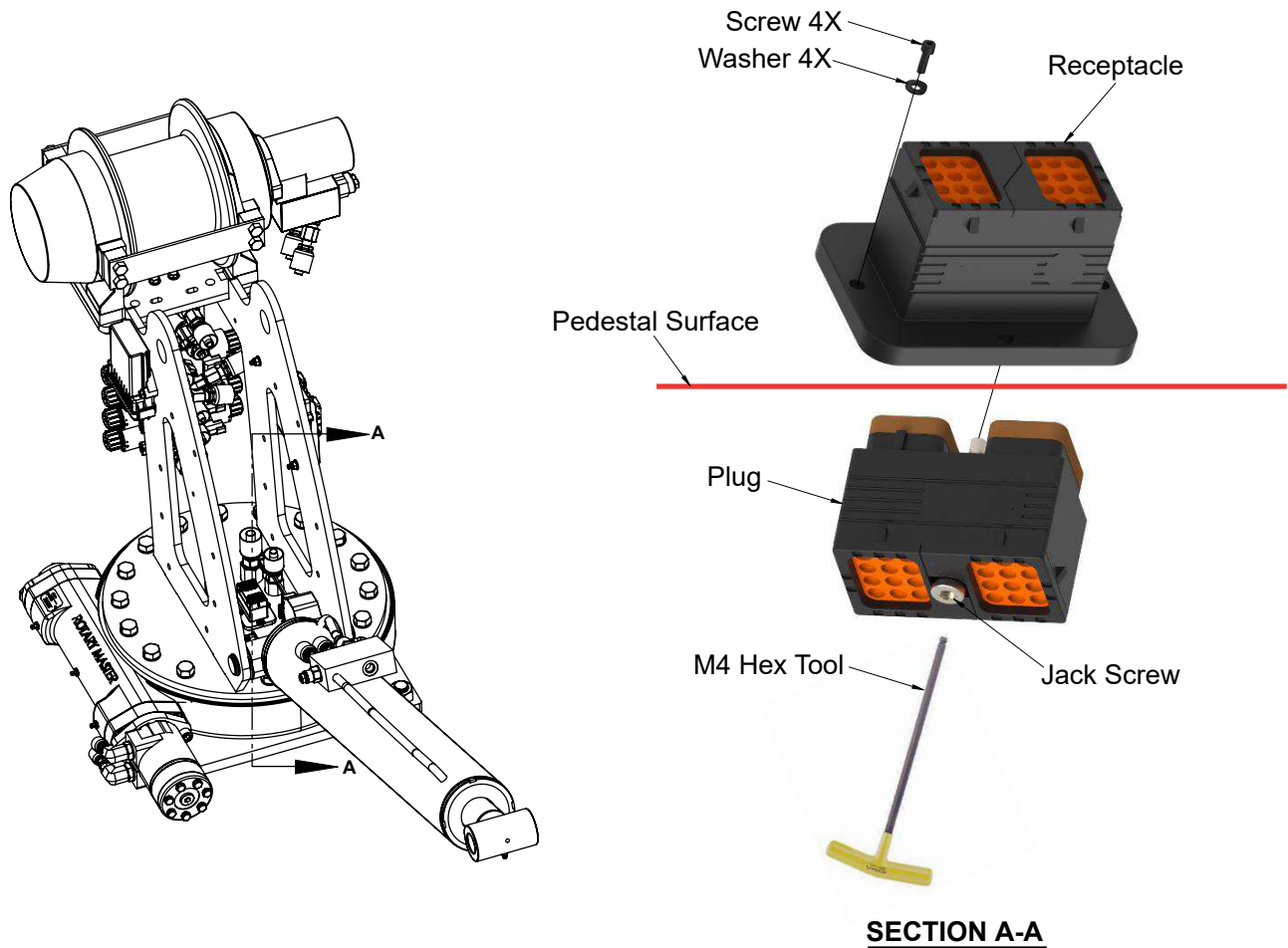


Figure 31 – Removal of plug and receptacle

RC57 Installation: EHC-6.1 and HC-6.1

- i. In the crane box, below the pedestal, loosen the jackscrew on the plug with an M4 Hex tool.
- ii. Disconnect the plug from the receptacle.
- iii. Remove the screws, washers, and the receptacle.

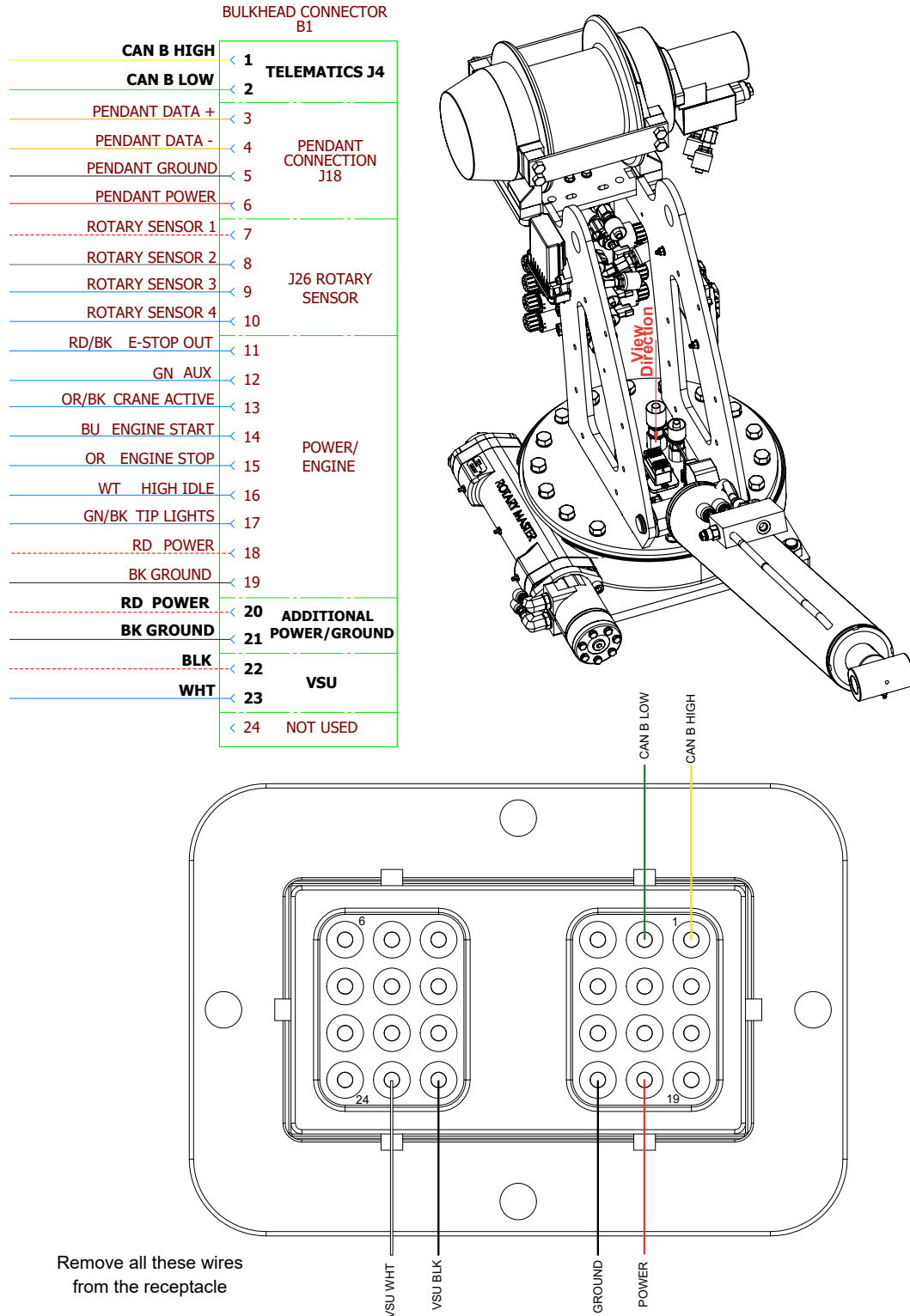
NOTE: The bulkhead plug below the pedestal and the bulkhead receptacle on the pedestal remain connected to the crane box harness and the main harness.

B. Remove the wires listed in the Table – 7 below from the receptacle as follows:

DESCRIPTION	COLOR	PIN ON THE RECEPTACLE
TELEMATICS J4 CAN B HIGH	YELLOW	1
TELEMATICS J4 CAN B LOW	GREEN	2
POWER	RED	20
GROUND	BLACK	21
VSU BLK	BLACK	22
VSU WHT	WHITE	23

Table – 7

RC57 Installation: EHC-6.1 and HC-6.1



Top View of Receptacle

Figure 32 – Removal of existing wires from the receptacle

RC57 Installation: EHC-6.1 and HC-6.1

- i. Position the extraction tool on the required pin.

Part Number	Contact Size	Wire Gauge Range	Extraction Tool
0411-291-1405	Size 16	14-16 AWG	
0411-310-1605	Size 16	16-20 AWG	
0411-336-1605	Size 16	16-20 AWG (E-Seal)	

Figure 33 – Extraction Tool

- ii. Insert the wire into the entry slot of the extraction tool.
iii. Push the extraction tool into the pin until it engages the pin retainer.
iv. Pull the extraction tool and the wire out together.
v. Repeat these steps for all required wires.
vi. Secure all the removed wires in an accessible location.

IMPORTANT: Do not secure old telematics wires. These old telematics wires will be connected to Telematics-M connector.

- C. Prepare the wires listed in the Table – 8 below for installation on the receptacle as follows:

DESCRIPTION	COLOR
TELEMATICS-F CAN B LOW	GREEN
TELEMATICS-F CAN B HIGH	YELLOW
IoT-F DIGITAL INPUT	WHITE
IoT-F POWER AUXILIARY	RED
IoT-F CHASSIS CAN LOW	GREEN
IoT-F CHASSIS CAN HIGH	YELLOW

Table – 8

RC57 Installation: EHC-6.1 and HC-6.1

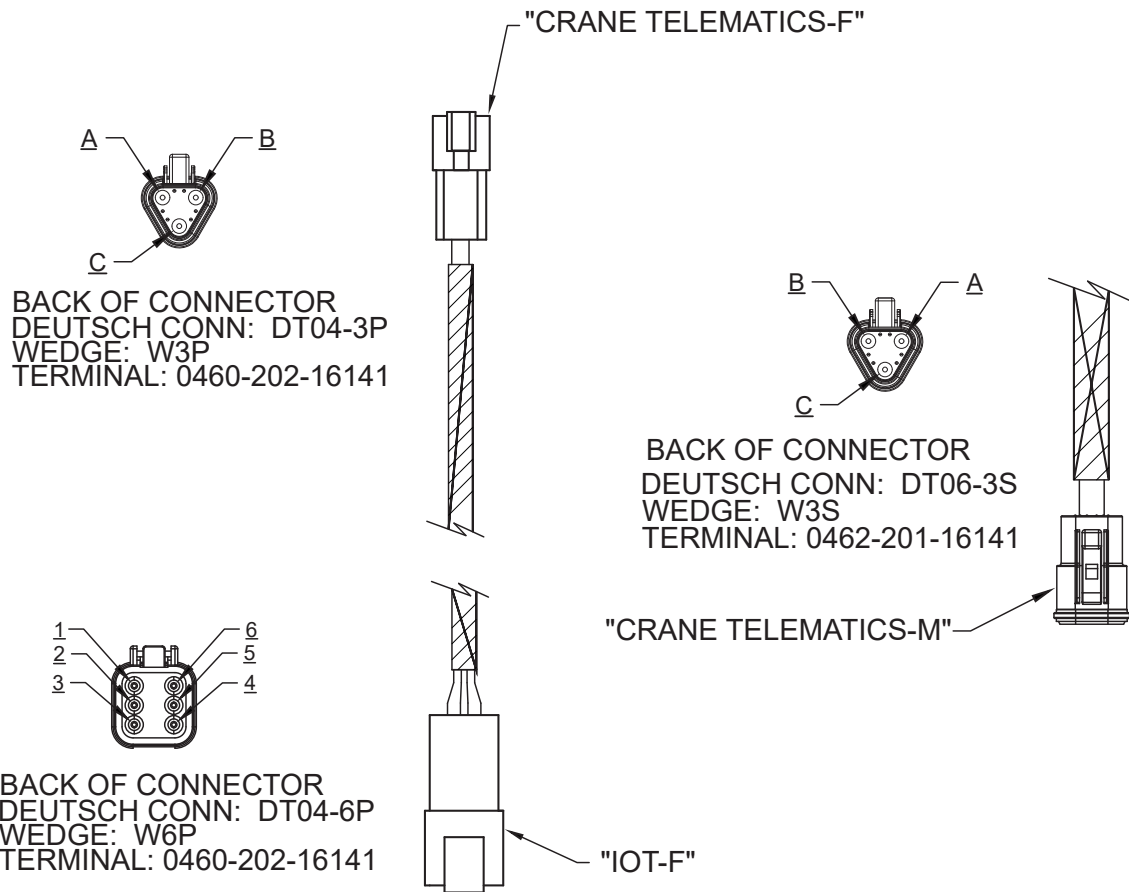


Figure 34 – Telematics and IoT-F Connectors

- i. Remove the connectors from Telematics-F and IoT-F wires.

IMPORTANT: Do not discard the connector removed from the Telematics-F connector. This connector will be installed onto the old telematics wires.

- ii. Strip the wire insulation to the specified length.
- iii. Position a new pin contact in the crimping tool.



Figure 35 – Pin Contact

RC57 Installation: EHC-6.1 and HC-6.1

iv. Close the crimping tool until it holds the pin contact.

NOTE: Use the correct pin contact size and configuration.

v. Insert the wire into the pin contact.

vi. Crimp the pin contact.

vii. Make sure that the wire is secure in the pin contact.

viii. Repeat these steps for all required wires.

D. Install the wires listed in the Table – 9 below on the receptacle as follows:

DESCRIPTION	COLOR	PIN ON THE RECEPTACLE
TELEMATICS-F CAN B HIGH	YELLOW	1
TELEMATICS-F CAN B LOW	GREEN	2
IoT-F DIGITAL INPUT	WHITE	20
IoT-F POWER AUXILIARY	RED	21
IoT-F CHASSIS CAN LOW	GREEN	22
IoT-F CHASSIS CAN HIGH	YELLOW	23

Table – 9

Install all these wires on the receptacle

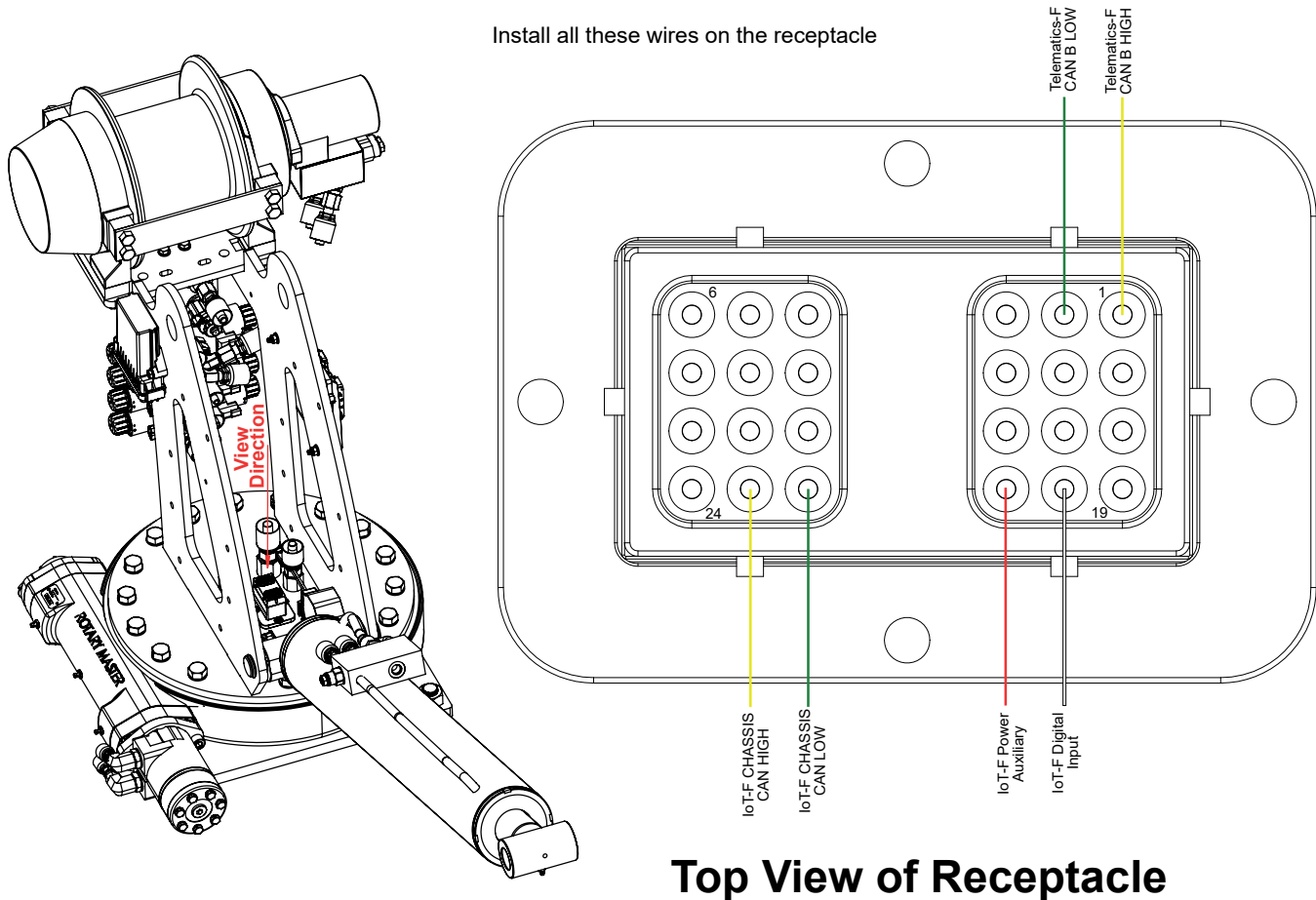


Figure 36 – Installation of wires on the receptacle

RC57 Installation: EHC-6.1 and HC-6.1

- i. Insert the wire into the colored side of the insertion tool.

Part Number	Contact Size	Mil-Spec	Color Insertion
M15570-16	16	M81969/14-03	Blue



Figure 37 – Insertion Tool

- ii. Make sure that the shoulder of the pin contact touches the tip of the insertion tool.
 - iii. Push the insertion tool into the correct pin until the pin contact engages the pin retainer.
 - iv. Hold the wire and remove the insertion tool.
 - v. Make sure that the pin contact is secure on the pin retainer.
 - vi. Repeat these steps for all required wires.
- E. Connect the old telematics wires to the Telematics-M connector as follows:
- i. Install the “green and yellow 3 pin deutsch connector” that you removed from IoT-F wires in the previous steps onto the old telematics wires.
 - ii. Make sure that the wires are secure on the “green and yellow 3 pin deutsch connector”.
 - iii. Connect old telematics wires with “green and yellow 3 pin deutsch connector” to the Telematics-M connector from the crane harness.
- F. Keep the connectors, wires, plug, and receptacle safely aside until the body harness installation is complete.

IMPORTANT: IoT-M connector wires from the body harness will be connected to the plug from inside the crane box below the pedestal.

RC57 Installation: EHC-6.1 and HC-6.1

4. Connect the Telematics and IoT-F connectors for the crane models listed in the Table - 10 below as follows:

Top Level Assembly P/N	Crane Model
492000013	EHC-6, NEXSTAR
492000015	EHC-5, NEXSTAR

Table – 10

- Crane Harness
- Body Harness
- Crane Box Harness

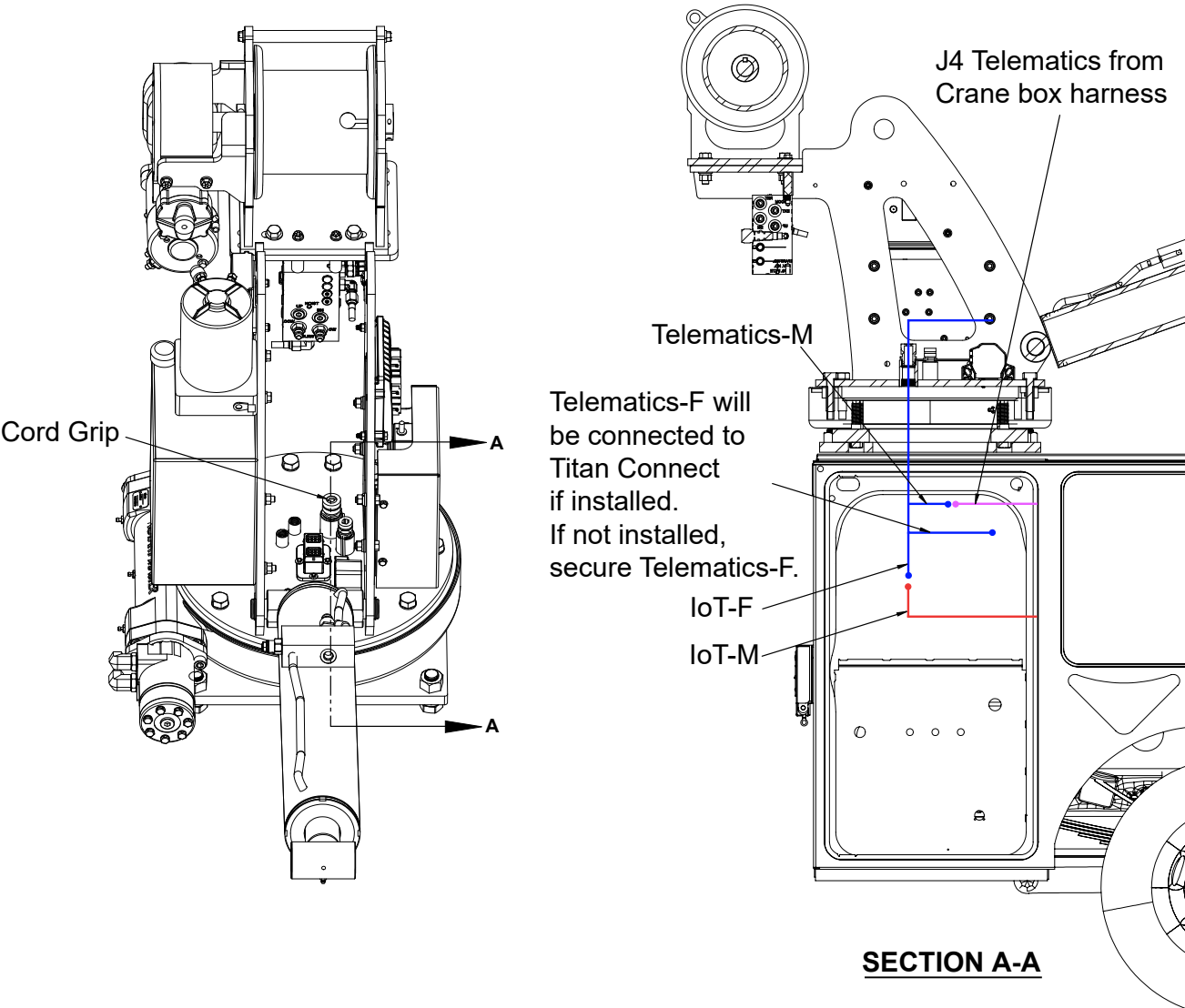


Figure 38 – Telematics and IoT-F routing through Cord grip

RC57 Installation: EHC-6.1 and HC-6.1

- A. If Titan Connect is installed, in the crane box, below the pedestal, disconnect the J4 Telematics “green and yellow 3 pin deutsch connector” from the Titan Connect harness.
- B. Remove the cord grip from the pedestal and discard the cord grip.
- C. Remove the connectors from the Telematics and IoT-F wires.
- D. Route the Telematics and IoT-F wires through the cord grip opening and below the pedestal.
- E. Install the connectors on the Telematics and IoT-F wires.
- F. In the crane box, below the pedestal, connect the J4 Telematics “green and yellow 3 pin deutsch connector” to the Telematics-M connector. If necessary, secure the harnesses.
- G. Keep the IoT-F connector safely aside until the body harness installation is complete.

IMPORTANT: The IoT-F connector will be connected to the IoT-M connector from the body harness.

- H. If Titan Connect is not installed, secure the Telematics-F wire to the structure.

NOTE: Telematics-F will not be used without Titan Connect.

- I. If Titan Connect is installed, refer to “Titan Connect – Auxiliary Wiring” section in “Accessories” for details about the Telematics-F connection.
- J. Apply sealant around the harness and the cord grip quill to prevent water intrusion.

Modem Connections

5. Refer to “Modem Connections” section in “RC57 Installation: HC5-HC14” for the installation instructions related to the Modem connections. Refer to Figure – 39 below for location.

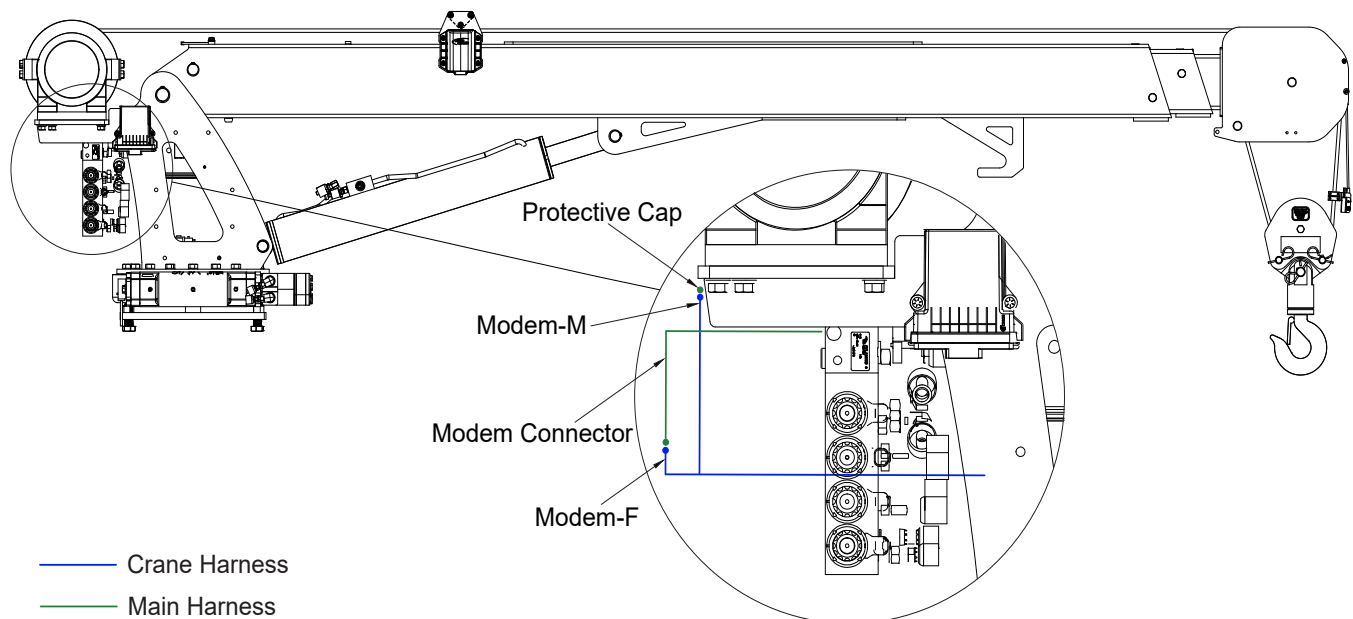


Figure 39 – Modem Connections

RC57 Installation: EHC-6.1 and HC-6.1

MC43 Connections

- Refer to "MC43 Connections" section in "RC57 Installation: HC5-HC14" for the installation instructions related to the MC43 connections. Refer to Figure – 40 below for location.

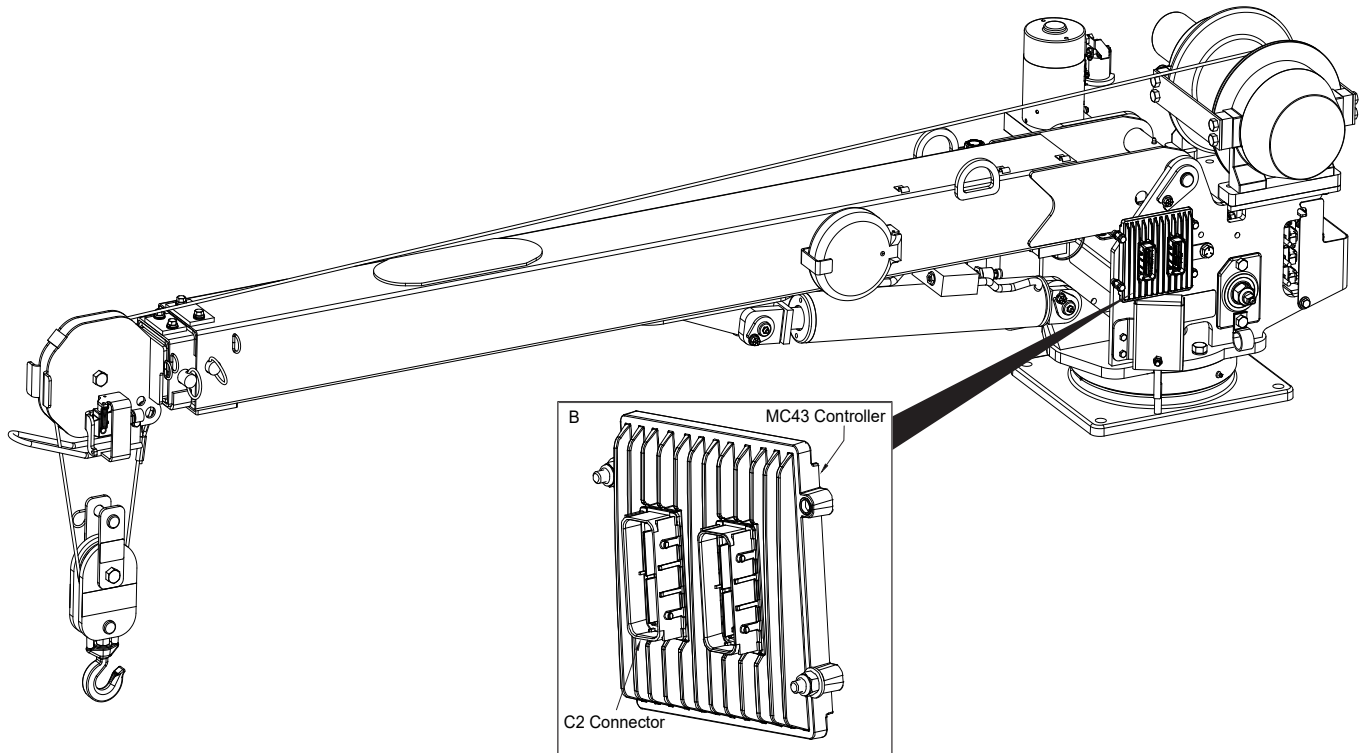


Figure 40 – MC43 Connections Location Reference for HC-6.1 and EHC-6.1

Chassis Connections – Body harness

- Refer to "Chassis Connections" section for the details about chassis connections to the body harness.

Connect the Body Harness to the Crane Harness

- Refer to "Body Harness Installation" for the details about the connection between the IoT-F and IoT-M connectors.

Connect the Body Harness to the Chassis

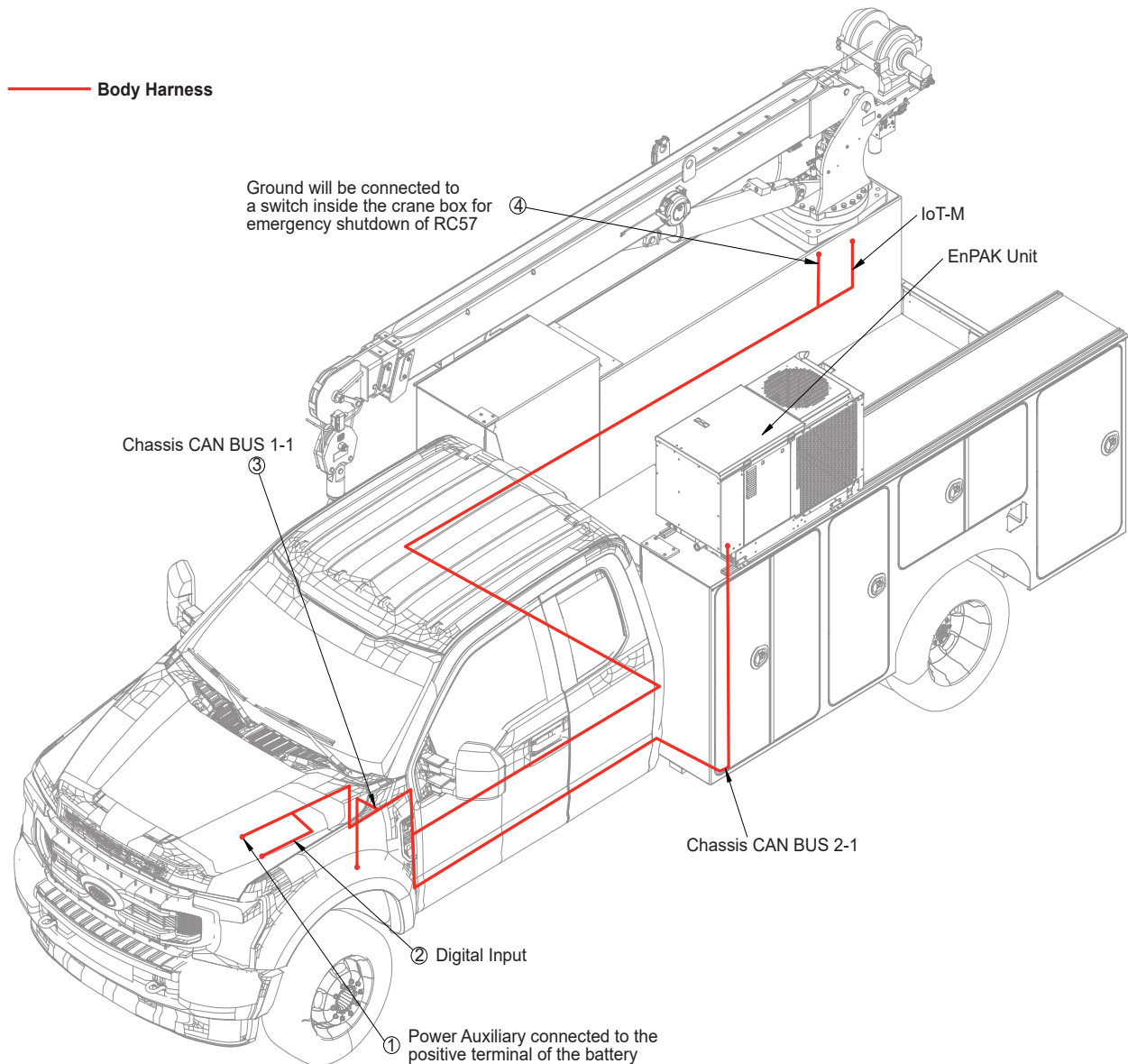


Figure 41 – Body Harness Routing

Chassis Connections

Power Auxiliary and Fuse Holder

1. Connect the power auxiliary and fuse holder as follows:

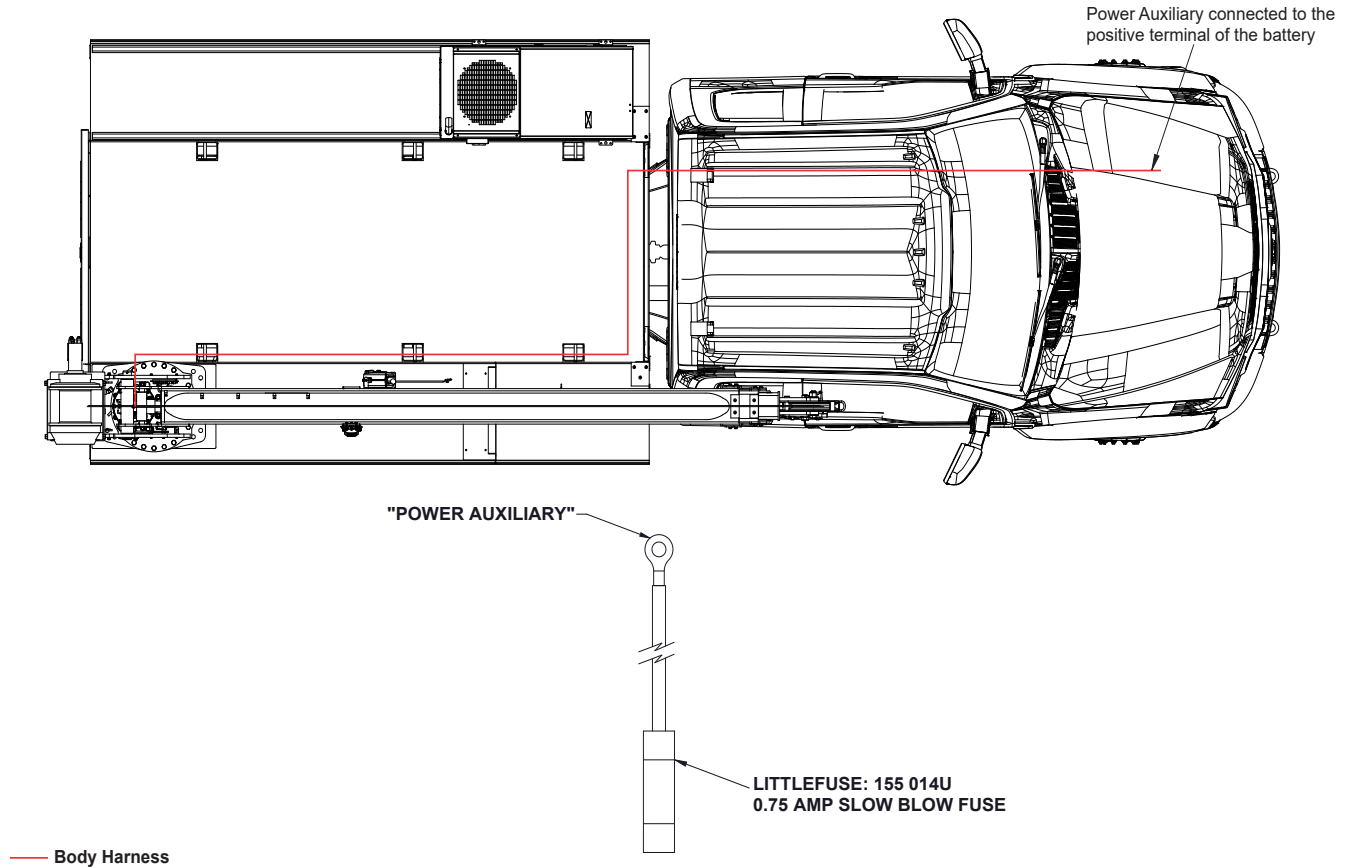


Figure 42 – Power Auxiliary Connection

- A.  Do not connect the power auxiliary at this time. If you connect the power auxiliary at this time, a short circuit can occur. This can damage the equipment or cause an electrical shock.

Refer to Detail 1 in Figure 41 for the connection location. Under the chassis hood, route the RC57 power auxiliary wire from the body harness to the positive battery terminal.

- B. Do this step last. Connect the power auxiliary only after you complete all other body harness-to-chassis connections.
C. Make sure that the fuse holder is easily accessible.

NOTE: On large chassis, the battery may be located inside the cab under the passenger seat. You may need to splice an additional length of wire to reach the battery.

Chassis Connections

Digital Input and Ground

2. Connect the digital input and ground as follows:

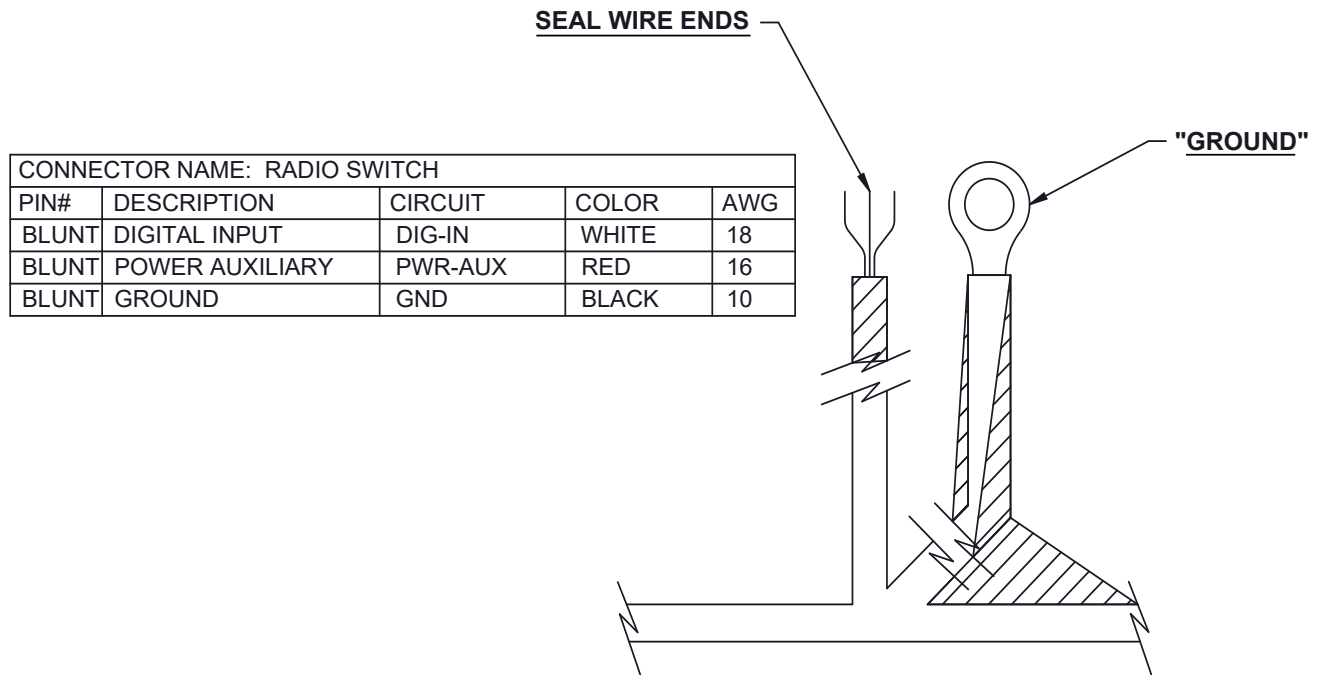


Figure 43 – Digital Input

- A. Refer to Detail 2 in Figure 41 for the connection location of the digital input.
- B. Route the digital input into the cab from under the dashboard.
- C. Secure the digital input in an accessible location for future use.
- D. Refer to Detail 4 in Figure 41 for the connection location.
- E. IMPORTANT:** Do not connect the ground wire to the battery under the hood. This ground wire is for the Mining Mode switch in the crane box.

If the Mining Mode switch is installed in the crane box, route the ground wire into the crane box along the chassis frame and connect the ground wire to the switch.

- F. If the Mining Mode switch is not installed, secure the ground wire in an accessible location for future use.

Chassis CAN BUS 1-1

3. Connect the Chassis CAN BUS 1-1 as follows:
- A. Refer to Detail 3 in Figure 41 for the connection location. Route the Chassis CAN BUS 1-1 wires to the chassis CAN wires connection location.

IMPORTANT: Refer to the Body Builder Book (BBB) for the correct connection location. The connection location may vary depending on the vehicle manufacturer.

Chassis Connections

- B. Connect the Chassis CAN BUS 1-1 wires from the body harness to the non-proprietary chassis CAN wires.
- C. For the Ford F550 Chassis, make sure that the Upfitter Integration System (UIS) is installed. Refer to "Upfitter Integration System (UIS)" section in "Accessories" for the installation procedure.
- D. If the Upfitter Integration System (UIS) is not installed on the Ford F550 Chassis, it is required to install the J1939 Translator Kit. Refer to "J1939 Translator Kit – P/N 475107024" section in "Accessories" for the installation procedure.
- E. For Ford chassis models between years 2023 to 2026, it is required to install the J1939 Translator Kit. Refer to "J1939 Translator Kit – P/N 475107024" section in "Accessories" for the installation procedure.

IMPORTANT: The J1939 Translator Kit is not included in the IoT Retrofit Installation Kit. Purchase the J1939 Translator Kit separately for Ford chassis models between years 2023 to 2026. Please contact your local dealer or RSM.

Chassis CAN BUS 2-1

- 4. Connect the Chassis CAN BUS 2-1 as follows:
 - A. If EnPAK Miller unit is not installed, secure the Chassis CAN BUS 2-1 wires in an accessible location for future use.
 - B. If EnPAK Miller unit is installed, Refer to "EnPAK connection to Chassis CAN BUS 2-1" section in "Accessories" for details about the Chassis CAN BUS 2-1 connection.

NOTE: All illustrations are for reference only. The actual location may differ. If you have any questions, contact Auto Crane.

Titan Connect – Auxiliary Wiring

1. This step applies to the crane models listed in the Table – 11 below. Refer to the Figure - 44 below for the location.

Top Level Assembly P/N	Crane Model
366664003	EHC-6, NEXSTAR
460179012	HC-10, NEXSTAR
470103008	HC-14, NEXSTAR
475000016	HC-12S, NEXSTAR
475000017	HC-12, NEXSTAR
477000004	HC-7X, NEXSTAR
477000009	HC-7, NEXSTAR
479000017	HC-8X, NEXSTAR
479000016	HC-8, NEXSTAR
480989013	8406H, NEXSTAR
361106530	HC-5, NEXSTAR
360646003	EHC-5, NEXSTAR
492000010	HC-6, NEXSTAR
320992003	EHC-3.2 PRFX NEXSTAR
404243003	EHC-4, 20 FT. BOOM, NEXSTAR
492000013	EHC-6, NEXSTAR
492000015	EHC-5, NEXSTAR

Table – 11

- A. If Titan Connect is installed, connect the Telematics-F connector as follows:
 - i. Route the Telematics-F connector to the telematics connector from the Titan Connect harness.
 - ii. Connect the Telematics-F connector to the telematics connector from the Titan Connect harness.

Accessories

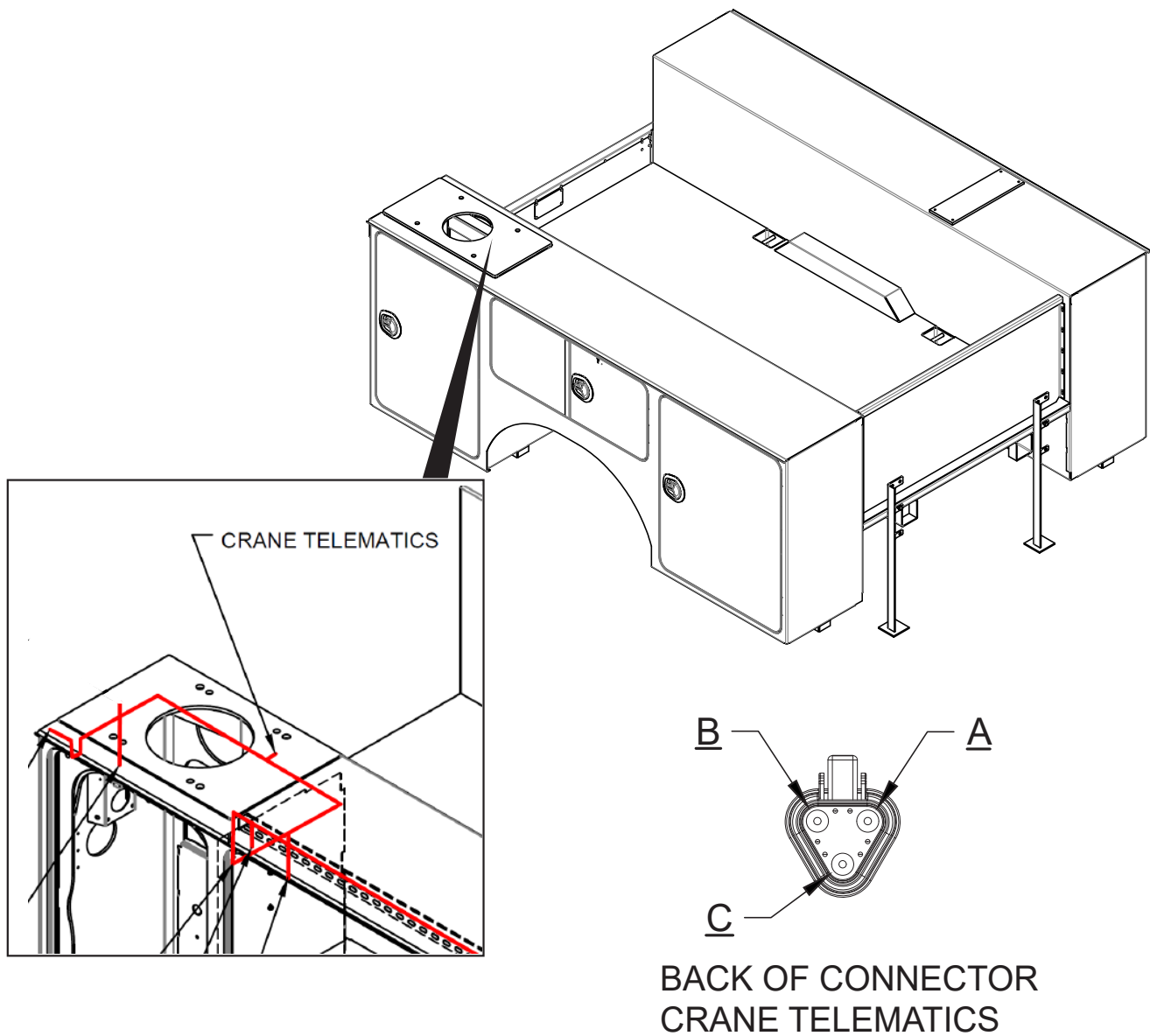


Figure 44 - Location Reference for Telematics Connector from Titan Connect Harness

2. This step applies to the crane models listed in the Table – 12 below. Refer to the Figure - 44 above for the location.

Top Level Assembly P/N	Crane Model
492000012	HC-6, NEXSTAR LESS AUTO CRANE LOGO
492000014	HC-6, NEXSTAR
492000016	HC-5, NEXSTAR

Table – 12

- A. If Titan Connect is installed, connect the Telematics-F connector as follows:
 - i. Below the pedestal, make sure that the telematics connector from the Titan Connect harness is connected to the J4 Telematics “green and yellow 3 pin deutsch connector” from the existing crane box harness.

Accessories

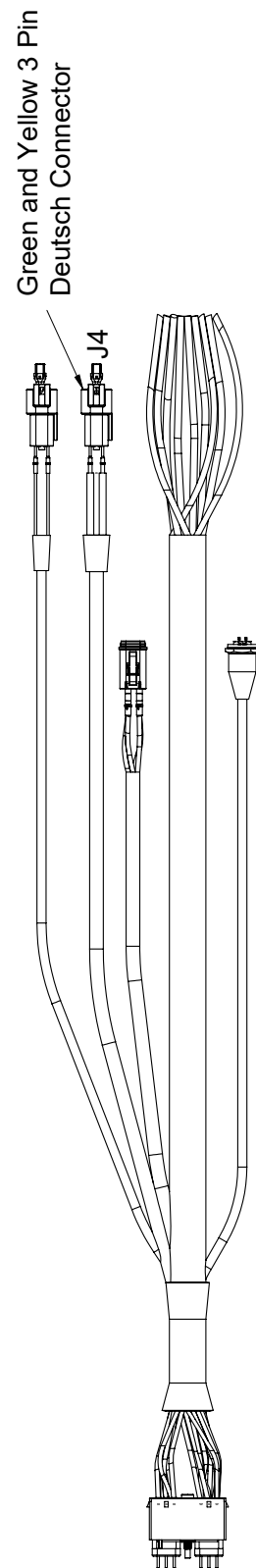


Figure 45 – Crane Box Harness

- ii. If they are not connected, route the J4 Telematics “green and yellow 3 pin deutsch connector” from the existing crane box harness to the telematics connector from the Titan Connect harness and connect them.

EnPAK connection to Chassis CAN BUS 2-1

1. If the EnPAK Miller unit is installed, connect Chassis CAN BUS 2-1 as follows:
 - A. Route the Chassis CAN BUS 2-1 wires to the EnPAK location.
 - B. Refer to the Figure - 46 below for the location.

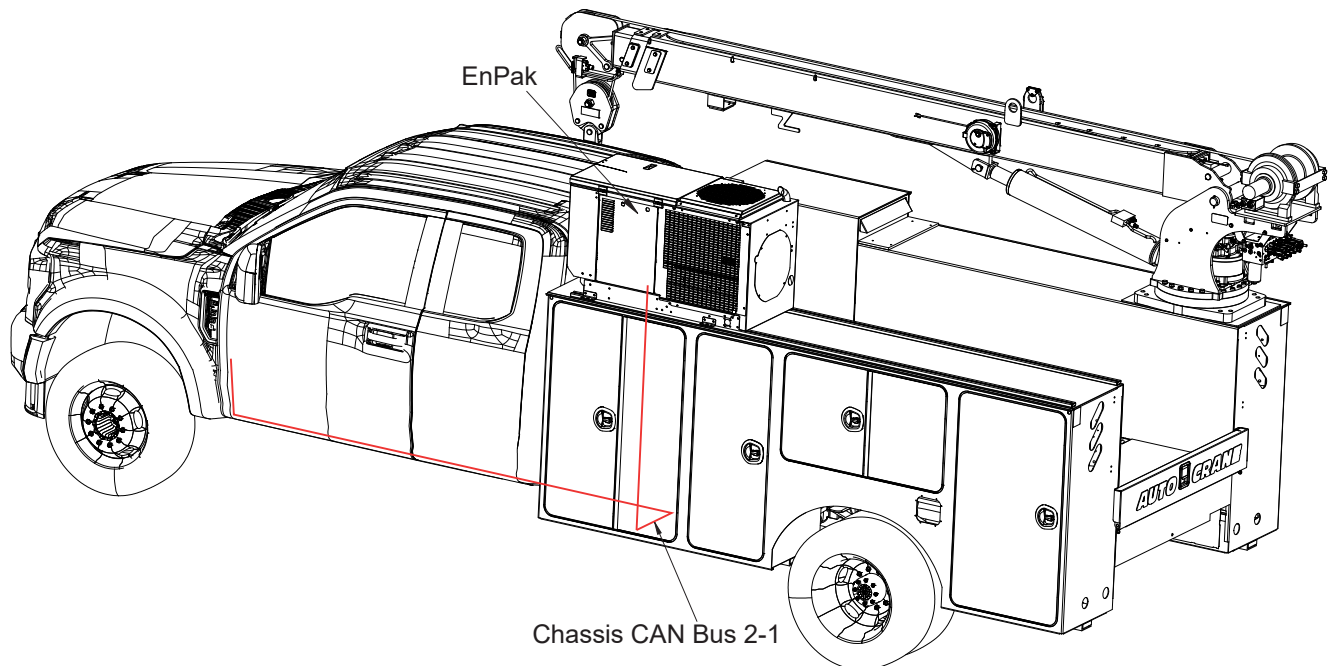


Figure 46 – Chassis CAN BUS 2-1 Routing

- C. Connect the Chassis CAN BUS 2-1 wires from the body harness to the CAN BUS C3 connector on the EnPAK Miller unit.

Accessories

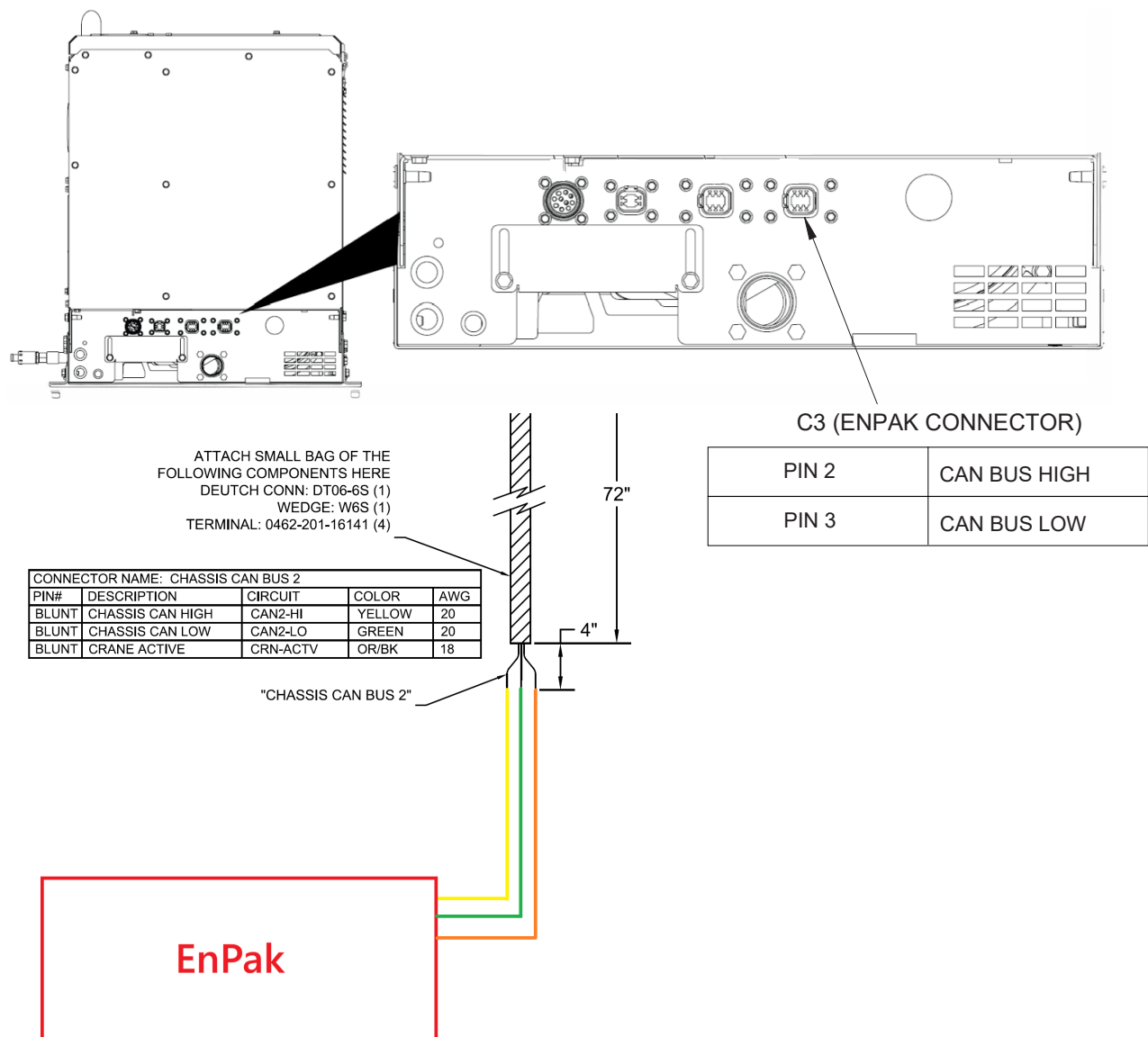


Figure 47 – EnPAK Unit and Chassis CAN BUS 2-1 Connection

D. NOTE: Refer to the owner's manual for the instructions about how to find the baud rate for the accessories.

If the baud rates do not match, install a baud router kit.

E. NOTE: The chassis and accessories must use the same baud rate for communication with the RC57.

Refer to "Baud Router Kit Installation" section in "Accessories" for the details about the baud router kit installation.

Baud Router Kit Installation

2. Install the baud router kit as follows:

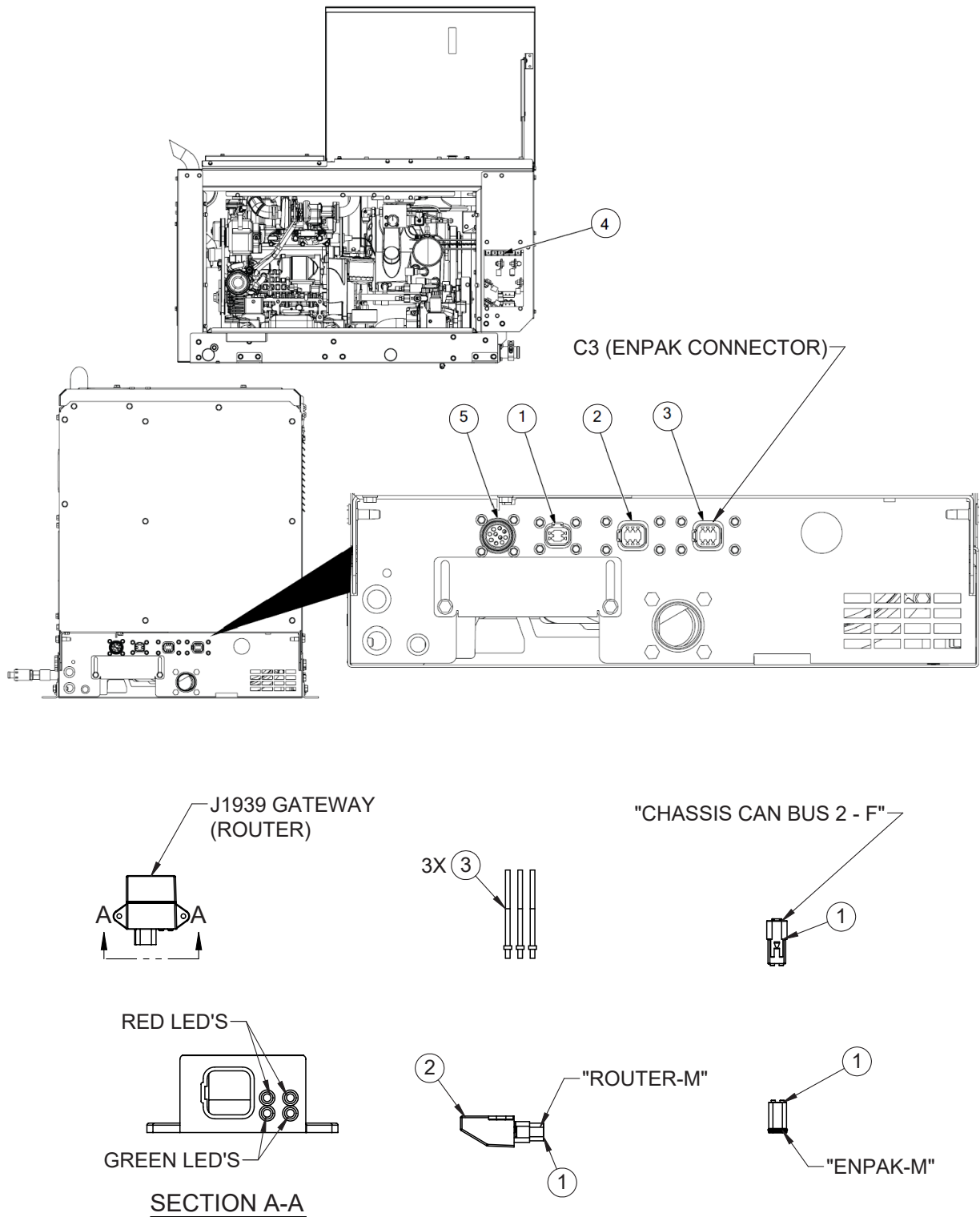


Figure 48 – Baud Router Kit

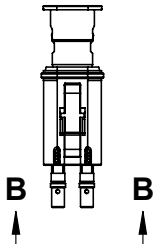
Accessories

- A. Disconnect the CAN BUS C3 connector from the EnPAK Miller unit.
- B. Connect the EnPAK-M connector to the CAN BUS C3 connector on the EnPAK Miller unit.

CONNECTOR NAME [SEC B-B]: "ENPAK-M"				
PIN#	DESCRIPTION	CIRCUIT	COLOR	AWG
1	CAVITY PLUG			
2	CAN H (ENPAK C3)	CAN1-HI	YELLOW	20
3	CAN L (ENPAK C3)	CAN1-LO	GREEN	20
4	GROUND	GRD	BLACK	16
5	+12VDC OUT (1AMP)	BAT	RED	16
6	CAVITY PLUG			



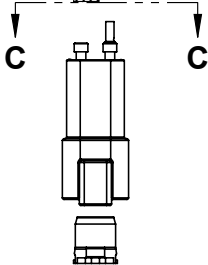
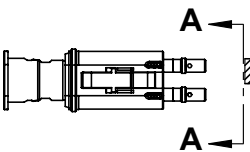
SECTION B-B



CONNECTOR NAME [SEC A-A]: "ROUTER-M"				
PIN#	DESCRIPTION	CIRCUIT	COLOR	AWG
1	+BATTERY	BAT	RED	16
2	GROUND	GRD	BLACK	16
3	CAN H (250K BUS)	CAN1-HI	YELLOW	20
4	CAN L (250K BUS)	CAN1-LO	GREEN	20
5	CAN H (500K BUS)	CAN2-HI	YELLOW	20
6	CAN L (500K BUS)	CAN2-LO	GREEN	20



SECTION A-A



CONNECTOR NAME [SEC C-C]: "CHASSIS CAN BUS 2 - F"				
PIN#	DESCRIPTION	CIRCUIT	COLOR	AWG
1	CAVITY PLUG			
2	CHASSIS CAN HIGH	CAN2-HI	YELLOW	20
3	CHASSIS CAN LOW	CAN2-LO	GREEN	20
4	CAVITY PLUG			
5	CAVITY PLUG			
6	CAVITY PLUG			



SECTION C-C

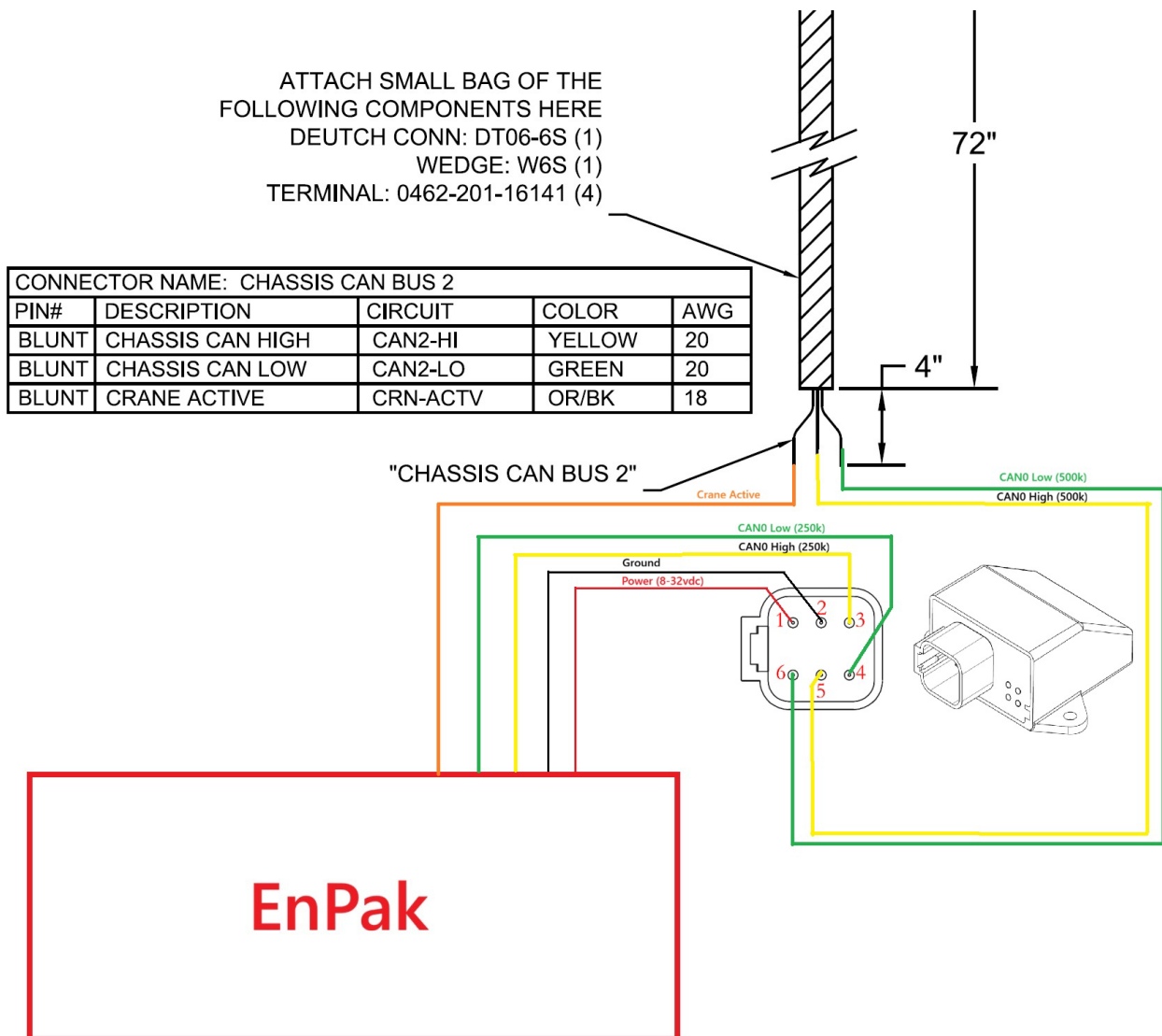


Figure 49 – Baud Router Kit Connections with EnPAK Unit and Chassis CAN BUS 2-1

- C. Connect the CAN BUS C3 connector that was removed from the EnPAK Miller unit to the Chassis CAN BUS 2-F connector.
- D. Connect the J1939 gateway to the Router-M connector.
- E. Make sure that the J1939 gateway is connected to a power source.

NOTE: This baud router harness is designed for 250 kbps to 500 kbps communication.

- F. If the power supply is correct, two green LED indicators illuminate.
- G. Check the CAN traffic. If the CAN traffic is correct, two red LED indicators flash.
- H. Use zip ties to secure the gateway to the harness or to another safe location.

NOTE: The user can make decision about the installation location and mounting method for the J1939 gateway.

Accessories

Upfitter Integration System (UIS)

Introduction

Vehicles built with UIS after June 12, 2023, have updated software and the following functionality:

- Upfitter Integration System (UIS) module, Pigtail Harness/Blunt Cut-Jumper provided, J1939 Signals Access, and J1939 Reference documents.
- Programmability via the UIS Logic Tool (<https://www.fordpro.com/en-us/upfit/uis>) including customizable soft switches on the SYNC screen.

Vehicles built with UIS before June 12, 2023, contain the following components and functionality:

- Upfitter Integration System (UIS) module, Pigtail Harness/Blunt Cut-Jumper provided, J1939 Signals Access, and J1939 Reference documents.

NOTE: Pre-June 12, 2023, built trucks with UIS module can be updated to enable the programming capability with the UIS Logic Tool. The UIS module, APIM, and BCM modules will require a software reflash to allow communication/functionality with the UIS Tool. A software reflash can be performed with the use of FDRS tool.

UIS – Information & Support

The UIS website <https://www.fordpro.com/en-us/upfit/uis> will provide information and support for fleet and upfitter communities with information about the Upfitter Integration System (UIS).

The websites provides:

- System & Network Requirements
- UIS Overview
- UIS Logic Tool Application
- UIS Tool Quick Start Guide
- UIS Features
- Introductory Training

In order to obtain access, you will need to have a valid Upfitter Fleet Identification Number (FIN) and username/password.

Support for UIS website user log-in, inquiries can be directed to Ford Pro Contact Center of Excellence (Ford Pro CCoE) at: (1-800-343-5338).

Electrical Overview

IMPORTANT: 2023MY Super Duty has a new electrical architecture and includes CAN encryption. The new electrical architecture will no longer use the Gateway module/OBDII connector, instead it will have a central Gateway module connecting all the networks and provide channels via the standalone OBDII connector for diagnostic commands.

NOTE: The new Super Duty electrical architecture will no longer provide a wired circuit for electronic park brake signal/status output. The electronic park brake signal/status output will now be available as a signal output for vehicles equipped with the UIS.
(This signal would be equivalent to sending a diagnostic command to the ABS module for Park Brake status or gaining access to the vehicle CAN network and decode the message/signal.)

Upfitter Integration System Overview

The 2023MY Super Duty provides an improved upfitter experience through the Ford Pro Upfitter Integration System (UIS) that simplifies the upfitting process by providing vehicle CAN output access in the preferred J1939 format while enabling one-way communication between the second unit body (SUB) and the vehicle.

As noted above, the UIS programming capability will remain non-functional until it is programmed using the UIS logic tool (J1939 Signals will remain present in UIS).

After the UIS has been programmed, the UIS can command functions via SYNC screen utilizing input/output control circuits specific to vocational upfit.

NOTE: UIS can be installed to a vehicle if it was not ordered or equipped from factory (module installation referenced later in this document and/or referenced in the BBB). Additionally, replacement of UIS is available through authorized Ford Dealers – UIS availability is impacted as a result of chip shortages.

- UIS Service Part Number: PC3Z-14G372-B*
(Reference Engineering Part Number: PC3T-14G589-A*).
- UIS Pigtail Harness/Blunt Cut-Jumper Service Part Number: PC3Z-14A303-A
(Reference Engineering Part Number: PC3T-14A303-D*).

UIS Power ON/OFF Strategy

UIS is powered at all times during 'Key-On' and 'Accessory' modes – UIS module will be 'awakened' and/or 'asleep,' in a maximum of 5 seconds. In 'Key-Off' mode, the UIS will not transmit any constant signal(s).

- AWAKE FUNCTION: The 'awaking' conditions are of two types:
 1. a soft interruption (network management call from CAN) and
 2. a circuit stimulation (any change of state inputs).
- ASLEEP FUNCTION: The trigger to go to sleep is based on the network management call from CAN network, this is dependent on conditions required for the module to sleep and/or 'Key-Off' mode.

The UIS provides access to a subset (see below) of J1939 Signal access.

UIS Output Customer CAN-Signal Access

1. Access to the UIS and connectors is achieved by Glove compartment removal.
2. Refer to Body Builder Book (BBB) for detailed UIS module connectors and necessary modifications.
3. Identified circuits will be used to perform the cut and splice to obtain the signals.
4. Ensure Ford Repair Guidelines are followed.
5. Reinstall the UIS, and Glove compartment following the reinstallation procedure outlined by Motorcraft Service, www.motorcraftservice.com.
6. UIS J1939 DBC files are available by request from fordbbas.com. DBC can be referenced to decode J1939 signals.

UIS Location

2023MY SUPER DUTY - The UIS module is located in the interior of the vehicle on the passenger side, behind and below the lower Glove compartment, along with Ford-provided pigtail harness/blunt cut-jumper.

NOTE: Functionality will be provided via the Ford-provided pigtail harness/blunt cut-jumper.

Accessories

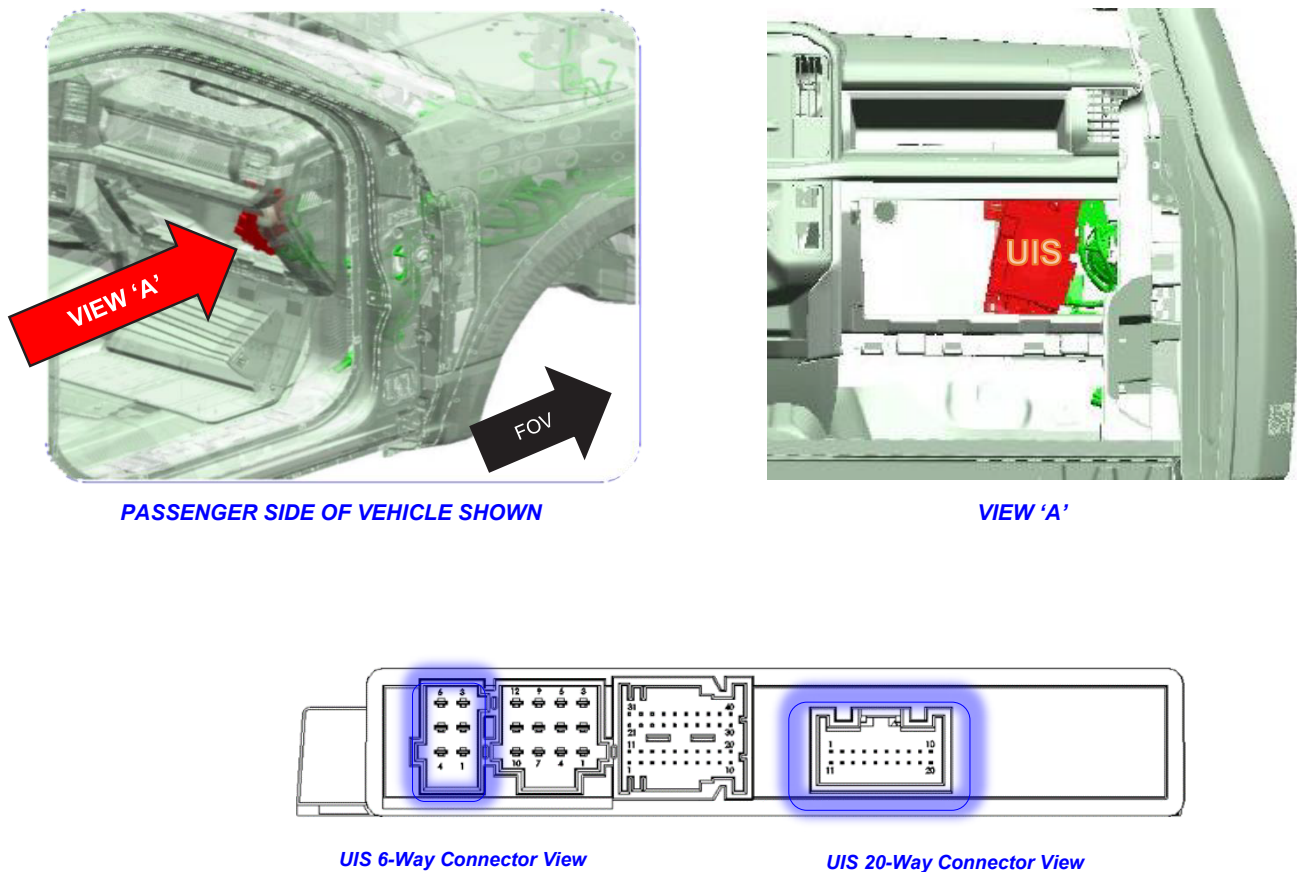


Figure - 50

Connection of the CHASSIS CAN BUS 1-1 wires to the UIS

1. Remove the Glove compartment to get access to the UIS and connectors. Refer to the Motorcraft Service Procedure for the procedure related to the Glove compartment removal.
2. With the Glove compartment removed, refer to the UIS module and 2 connectors: Black 20-Way & Blue 6-Way. Refer to Figure - 50 above.
3. Disconnect the Black 20-Way and Blue 6-Way connectors from the module to ensure no power is being delivered to module. (Refer to 23MY Super Duty Body Builder Book (BBB) for circuits/pin-outs details.)
4. The Black 20-Way circuits will be used to access the J1939 signals. Focusing on the Black 20-Way connector, carefully begin to unravel/unwrap the flocked tape around the harness such that enough workable length is available to expose the wire circuits. Stow away the unraveled/unwrapped flock tape so it can be reused for reinstallation later.
5. Route the CHASSIS CAN BUS 1-1 wires to the Black 20-Way connector located inside the glove compartment.
6. Locate the J1939 wired circuits 3 & 4 (wire 3 CAN⁺ + GN/BU & wire 4 CAN⁻ - GY/BU). These 2 circuits will be used in order to perform the cut and splice to obtain the signals.

NOTE: The circuits remaining in the harness will not be used and no longer need to be

connected. Recommend taping the circuits back securely and stowed away from the splice.

NOTE: Follow the Ford approved procedure for soldering circuits to complete the splice.

These are CAN network circuits that are a twisted pair, and for the added length ensure it meets the twists per foot requirement (4 twists per 50mm).

7. Complete the splice between CHASSIS CAN BUS 1-1 wires and J1939 wires from pins 3 & 4 of the Black 20-Way connector, following the Ford Repair Guidelines, rewrap the flock tape removed in Step 4 or use an acceptable substitute ensuring that circuits are wrapped within 50mm from the back of the connector.
8. Reconnect the Black 20-Way, and Blue 6-Way connectors to the UIS module.
9. Reinstall the UIS, and glove compartment following the reinstallation procedure outlined by Motorcraft Service, <http://www.motorcraftservice.com>.

For every input into UIS, the voltage range must be within the recommended minimum and maximum range, refer to the Super Duty Body Builder Book (BBB) or refer to the [Ford Pro™ | Commercial Fleet Vehicles, Services & Telematics](https://www.fordpro.com/en-us/upfit/uis) website, <https://www.fordpro.com/en-us/upfit/uis>.

For every Pulse Width Modulation (PWM), the maximum and minimum frequencies should be within the recommended high and low amperage outputs, reference the Super Duty Body Builder Book (BBB) or refer to the Ford Pro website, <https://www.fordpro.com/en-us/upfit/uis>.

NOTE: UIS Grounding - recommendation is that the UIS must be grounded up to 40 Amps, and additional grounds must be routed/connected to chassis/frame. IT IS NOT RECOMMENDED TO UTILIZE EXISTING OEM GROUNDS, follow recommended grounding guidelines in General Body Builder Book (BBB) or <http://www.motorcraftservice.com>.

NOTE: During vehicle cranking and/or stop-start function, the voltage may drop below 9-Volts, UIS operation will be interrupted momentarily (pause in functionality), until the voltage is recovered and UIS will resume.

Refer to the Body Builder Book (BBB) for additional guidelines and recommendations. If you have any questions, please contact the Ford Body Builders Advisory Service.

J1939 Translator Kit – P/N 475107024

Introduction

The J1939 Translator module plugs into the vehicle's Gateway connector and acquires proprietary vehicle data which it translates and transmits over a separate J1939 protocol network.

This allows third-party J1939 devices to be installed on light duty vehicles which do not support J1939 protocol. By moving third-party devices off of the OEM network and onto a separate J1939 network, OEM network bandwidth traffic problems are eliminated as well as conflicts between multiple third-party devices.

IMPORTANT: The J1939 Translator Kit is not included in the IoT Retrofit Installation Kit. Purchase the J1939 Translator Kit separately for Ford chassis models between years 2023 to 2026. Please contact your local dealer or RSM.

J1939 Translator Module Installation Instructions



Disconnect vehicle battery before proceeding with installation.

Accessories

IMPORTANT: It is the installer's responsibility to route and secure all wiring harnesses where they cannot be damaged by sharp objects, mechanical moving parts and high heat sources. Failure to do so could result in damage to the system or vehicle and create possible safety concerns for the operator and passengers.

Avoid placing the module where it could encounter strong magnetic fields from high current cabling connected to motors, solenoids, etc. Avoid radio frequency energy from antennas or inverters next to the module. Avoid high voltage spikes in vehicle wiring by always using diode clamped relays when installing upfitter circuits.

1. Install the J1939 Translator module as follows:

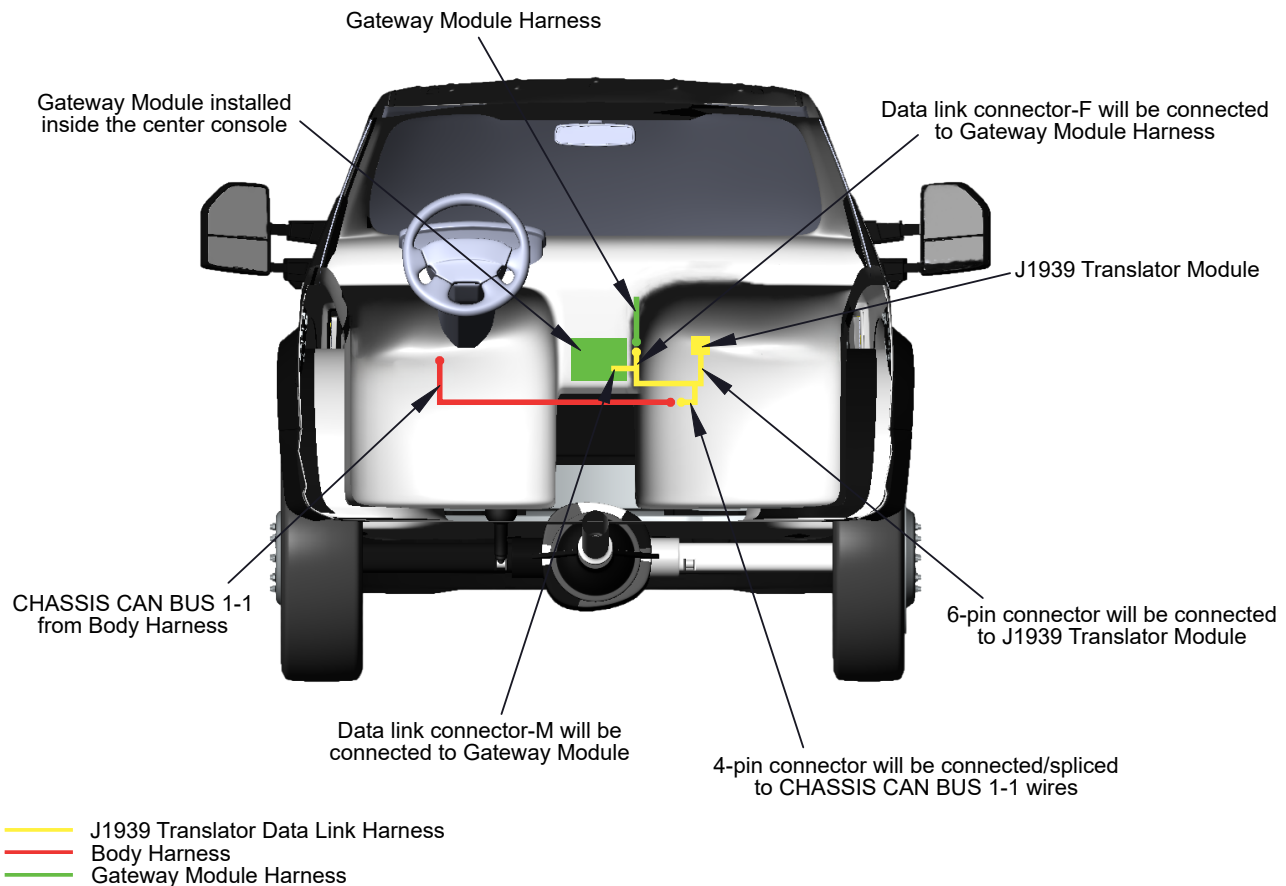


Figure - 51

- A. Remove the Glove compartment. Refer to the Motorcraft Service Procedure for the procedure related to the Glove compartment removal.
- B. In the Glove compartment, find a suitable location to mount the J1939 Translator module.
- C. Locate the J1939 Translator module in an area away from any external heat sources (engine heat, heater ducts, etc.).
- D. Do not actually mount the J1939 Translator module until all wire harnesses are routed and secure.

E. Install the data link harness as follows:

- i. **IMPORTANT:** The Ford Super Duty has an OEM Gateway module located on the other side of the SYNC 4 module, which is behind the center console.

Remove the RH instrument panel trim using a trim removal tool. The trim starts at the ignition switch and ends at the silver clip, refer to Figure – 52 below. The glove compartment can be opened to better access the back side of the trim.



Figure – 52

Accessories

- ii. Using a trim removal tool, pop out the upper right corner of the lower steering column close out panel. Position it away from the center console.



Figure – 53

- iii. Remove the four bolts (Size: 7mm) located at the top of the center console.



Figure - 54

Accessories

- iv. Release the clips on both sides of the center stack using a trim removal tool. Position the center console away from the mounting points.



Figure – 55

- v. Disconnect the two connectors behind the center console.

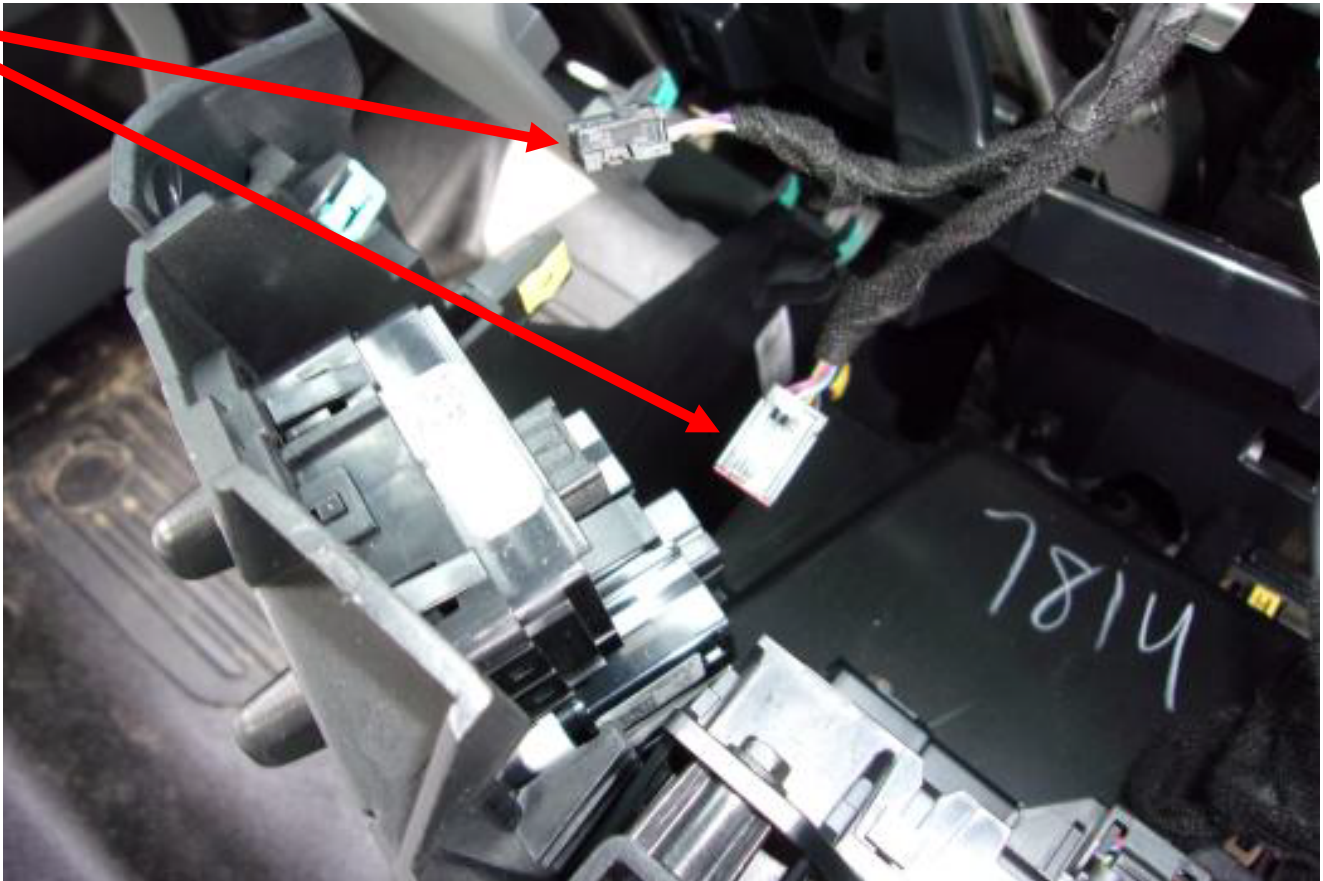


Figure - 56

Accessories

- vi. Detach the push-mount cable tie from the bracket and position the cable out of the way.

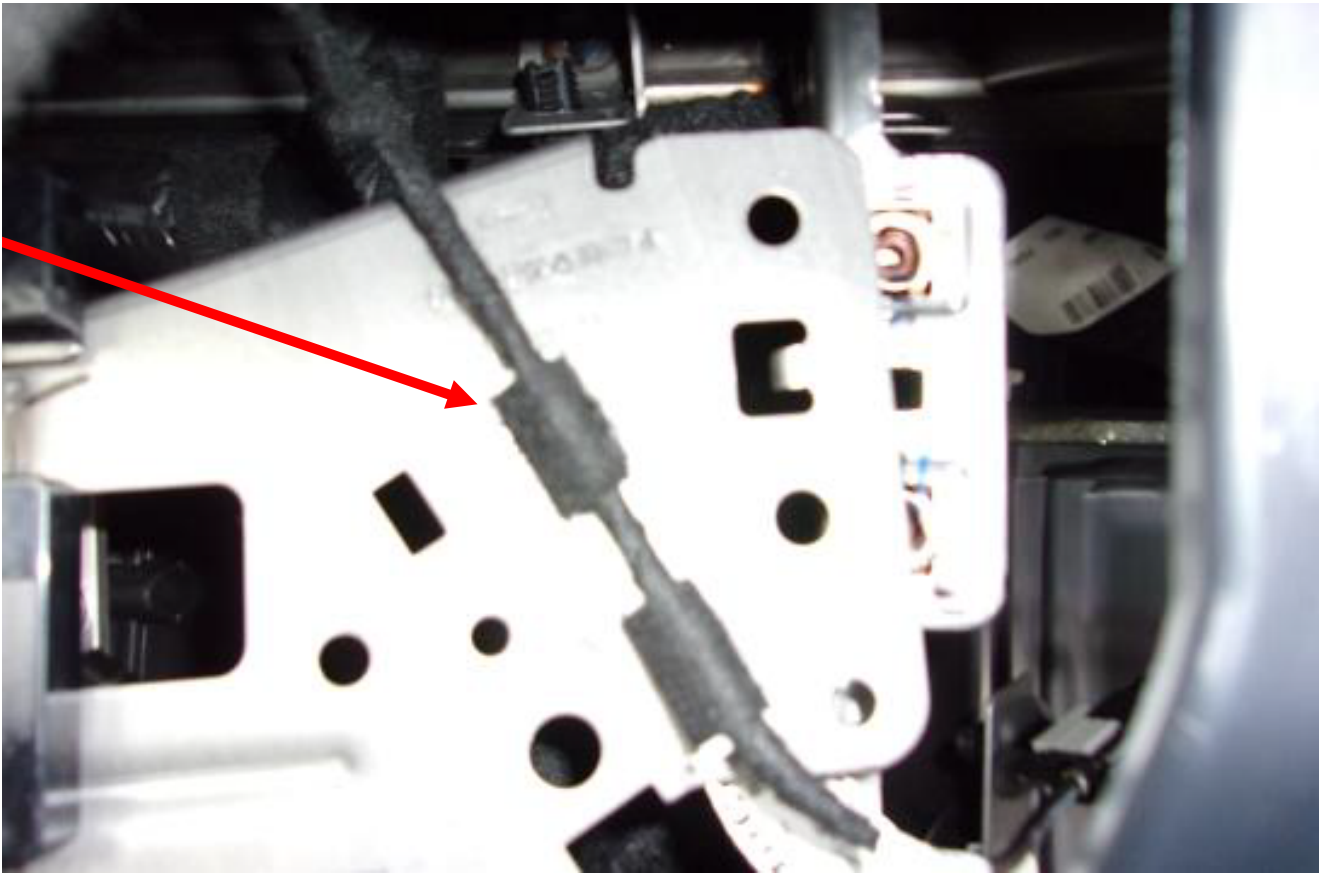


Figure – 57

- vii. Remove the 4 bolts (Size: 7mm) and position the bracket away from the mounting points to access the Gateway module. The Gateway module is located behind the bracket.



Figure - 58

Accessories

- viii. Disconnect the Gateway connector by pressing down on the tab and pulling the connector away from the Gateway module.

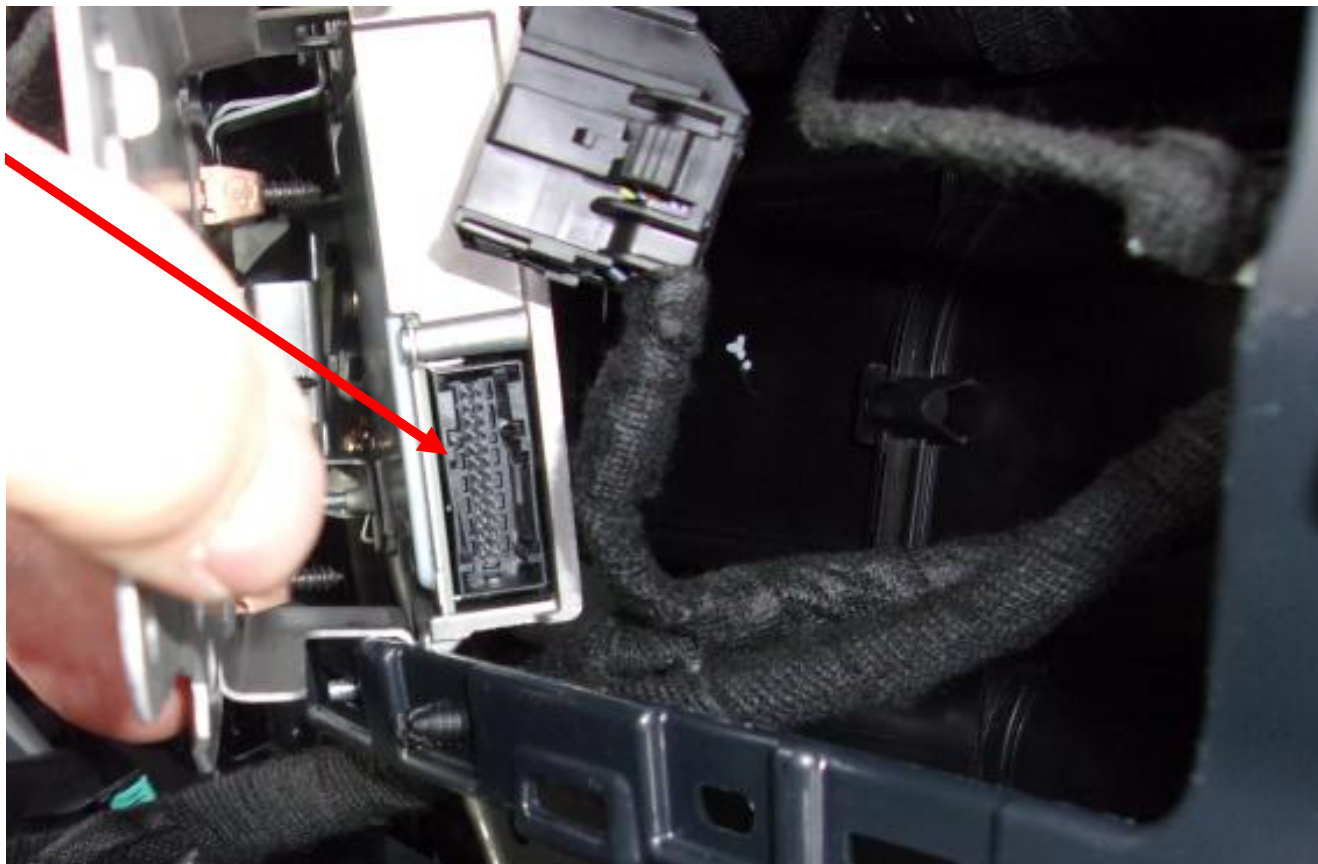


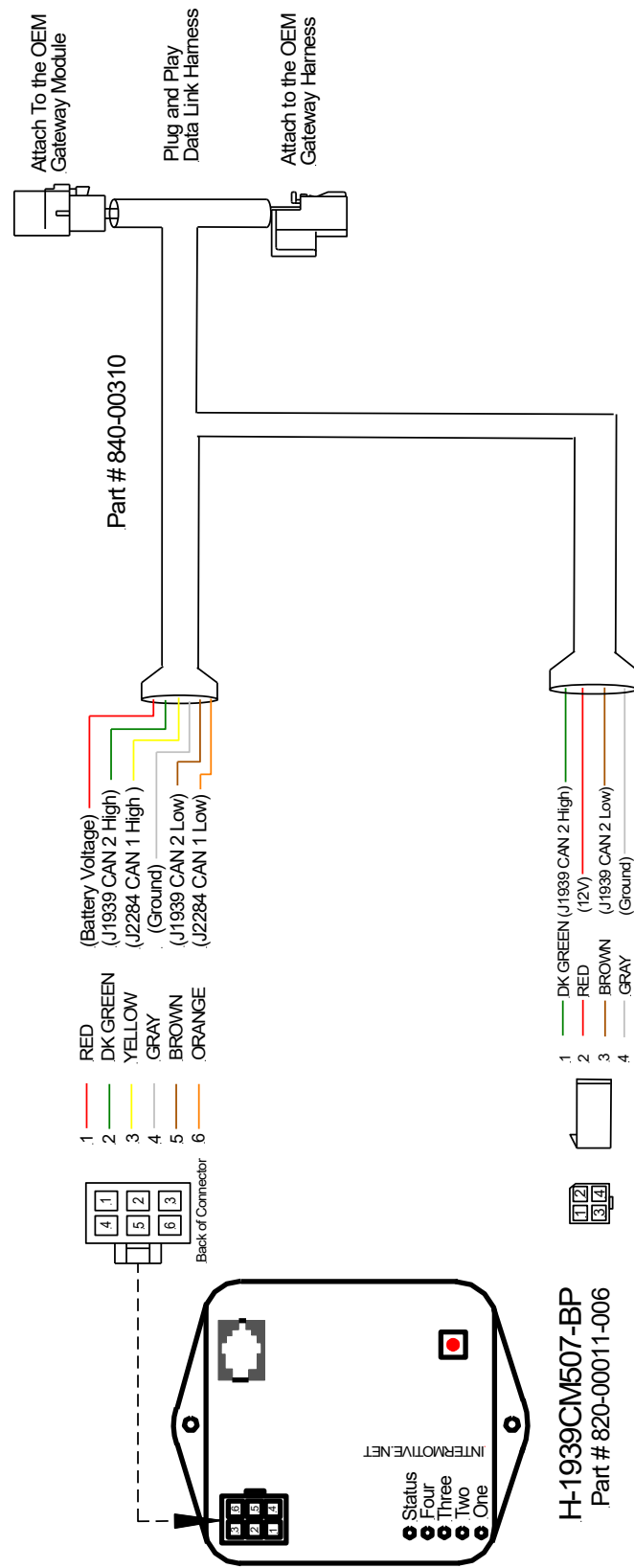
Figure – 59

- ix. Install the data link harness between the Gateway module and the disconnected Gateway connector as follows:



Figure – 60

Accessories



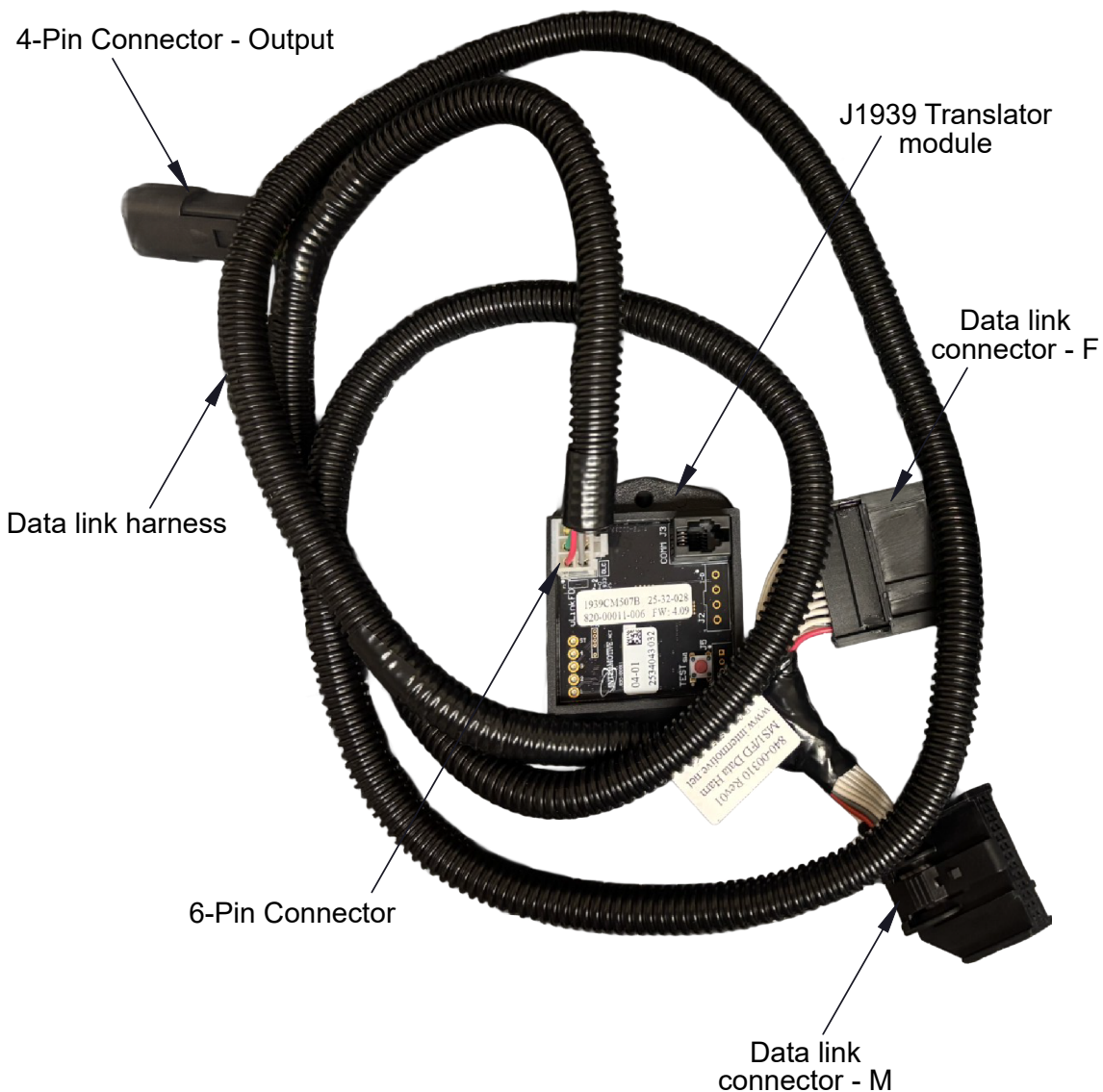


Figure - 61

1. Route the data link harness to the Gateway module.
2. Connect the data link connector-M to the Gateway module.
3. Connect the data link connector-F to the Gateway connector that you removed from the Gateway module.
- x. Route the 6-pin connector of the data link harness to the mounting location of the J1939 Translator module and connect the 6-pin connector to the J1939 Translator module.
- xi. After the data link harness is installed, reverse the installation procedure to reassemble all the components that you have removed.

IMPORTANT: The J1939 Translator module data link harness has a 4-Pin white connector that provides J1939 CAN 2 High and CAN 2 Low signals for connecting to CHASSIS CAN BUS 1-1 wires from the body harness.

Accessories

Pin 1 Dark Green Wire - J1939 CAN 2 High
Pin 3 Brown Wire - J1939 CAN 2 Low

Pin 2 Red Wire - Battery Voltage
Pin 4 Gray Wire - Ground

Mating connectors: Molex 39012040 Termination: 39000038 18-24 AWG 39000077 16 AWG

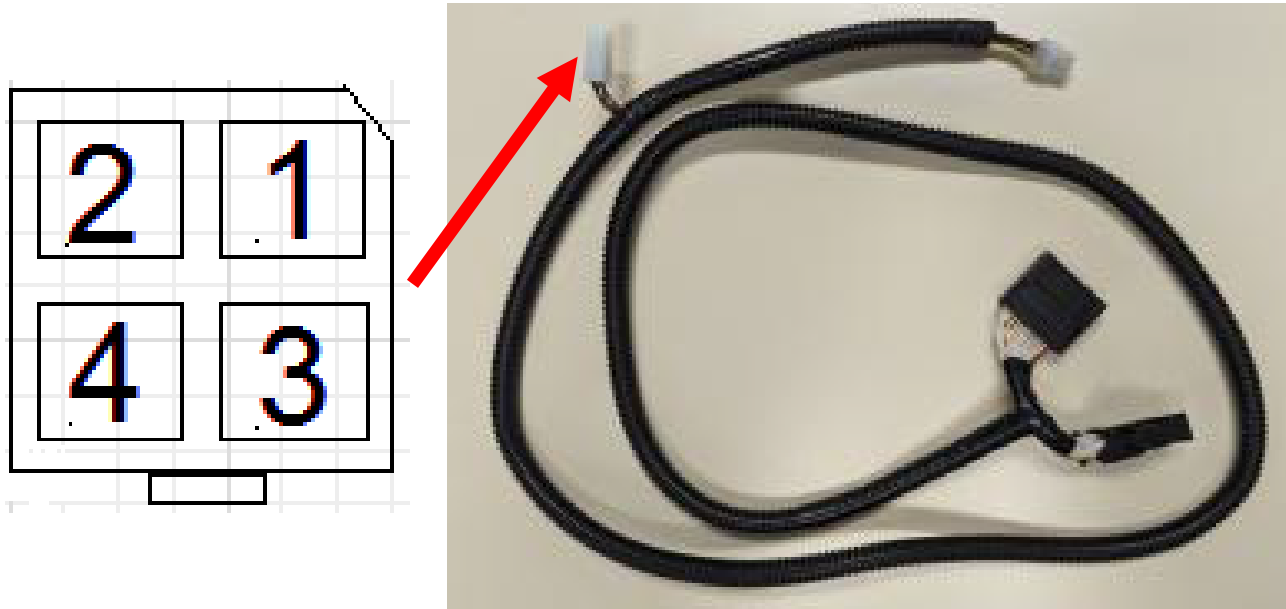


Figure - 62

- xii. Route the CHASSIS CAN BUS 1-1 wires from the Body harness to the 4-pin connector of the data link harness.
- xiii. Remove the connector from the 4-pin connector.

NOTE: The Molex connector is the stock connector that comes with the kit.

- xiv. J1939 CAN 2 High from Pin 1 and J1939 CAN 2 LOW from Pin 3 will be used in order to perform the cut and splice to obtain the signals.

NOTE: The circuits remaining in the harness will not be used and no longer need to be connected. Recommend taping the circuits back securely and stowed away from the splice.

NOTE: Follow the Ford approved procedure for soldering circuits to complete the splice. These are CAN network circuits that are a twisted pair, and for the added length ensure it meets the twists per foot requirement (4 twists per 50mm).

- F. Make sure the data link harness is properly connected and routed and not hanging below the dash area.
- G. Mount the J1939 Translator module mentioned in step (1.d.) and secure using supplied screws or double-sided tape.

Initial Installation

1. With the vehicle in PARK, Park Brake ON, key in RUN, plug the 6-pin connector of the data link harness into the J1939 Translator module.

2. On this first boot-up, the J1939 Translator module sends a request to see what optional PGNs are available on the vehicle. The J1939 Translator module stores this information internally and uses it on subsequent boot-up sequences.
3. To verify a successful initial power-up sequence, observe the J1939 Translator module LEDs. There should be no LEDs ON. If LEDs 1-4 are scrolling, this indicates two possible things:
 - A. The J1939 Translator module is trying to acquire the VIN.
 - B. The J1939 Translator module acquired the VIN and deemed it to be invalid.

In the first case, repeat Step 1 to make sure the ignition is in the right state for the vehicle to provide VIN to the J1939 Translator module.

In the second case, one LED will remain on after the scrolling pattern has completed. See "Error Mode" on the next page for details.

If errors persist, contact InterMotive Technical Support.

Module Configurations

Starting with Firmware version 4.07, the J1939 Translator module allows for four different configuration options. The options allow for baud rates of 250kbps or 500kbps and for active data to be enabled or disabled.

The configurations are defined as the following:

- **CM507-02P** has a J1939 baud rate of 250kbps and active data disabled. This is the default configuration.
- **CM507-02A** has a J1939 baud rate of 250kbps and active data enabled.
- **CM507-05P** has a J1939 baud rate of 500kbps and active data disabled.
- **CM507-05A** has a J1939 baud rate of 500kbps and active data enabled.

Operational Instructions

Optional PGN Enable

Some vehicles support additional network data (PGNs/SPNs) which may be required by the 3rd party device that will be connected to the J1939 Translator module. The J1939 Translator module comes from the factory with this optional data disabled. If the 3rd party device requires this data, perform the following sequence to enable this additional data:

1. Ensure the vehicle is in PARK, the Park Brake ON, and the key in RUN.
Be ready to apply the Service Brake. You need to apply Service Brake several times right after pressing the Test button on the J1939 Translator module. Press the Test button once to start the procedure.
2. Apply and release the Service Brake four times within five seconds and then observe the J1939 Translator module LEDs. The J1939 Translator module recognizes this sequence and enables acquisition of the optional data. As a visual feedback that this occurred, the J1939 Translator module will scroll the LEDs twice. If this did not occur, wait five seconds and try again.

NOTE: The optional PGNs/SPNs can be disabled again by executing the same procedure.

3. Once the optional data has been enabled, press the Test button to put the J1939 Translator module into the "PGNcheck" diagnostic mode and observe which PGNs are active.

Accessories

Normal Operation

Once power is applied to the J1939 Translator module or it wakes up on CAN traffic, there is a period of two seconds before the J1939 Translator module starts transmitting data on the J1939 port. If there is no connection on the J1939 port, the J1939 Translator module will sense this and stop transmitting until proper equipment (terminated with 120 ohms) is attached.

Inactive Operation

When the key is turned off and the vehicle's CAN traffic stops, the J1939 Translator module ceases operation after 15 seconds and goes into a low-power state. It will remain in this state until it detects CAN traffic again, at which point it will wake up and begin transmitting data. If optional PGNs are enabled, the J1939 Translator module will not request this data until the key is in the RUN position.

Diagnostic Modes

The J1939 Translator module has three diagnostic modes spanning five diagnostic pages that utilize its LEDs. This can be helpful in troubleshooting or determining what vehicle data is available. The first press of the Test button will cause the J1939 Translator module to enter Page 1, and each subsequent press will enter the next diagnostic page. The "ST" LED on the J1939 Translator module will blink out the number of the page that is currently active (e.g. blink once on Page 1, blink twice on Page 2, etc.).

Page 1 is called "TestDiag" mode. Pages 2, 3, and 4 are called "PGNcheck" mode. Finally, Page 5 is a Baud rate mode for the J1939 output. In this mode with the appropriate vehicle conditions, the J1939 Baud rate can be toggled between 250kbps and 500kbps if necessary. Without the appropriate conditions, the J1939 Translator module will flash LEDs to indicate the current Baud rate. The J1939 Translator module will automatically exit these diagnostic modes and shut off the LEDs. The J1939 Translator module continues to operate normally in all modes. Each diagnostic mode and its LED definition start below and continue on the next page.

TestDiag Mode

The LEDs defined below will blink depending on certain actions performed by the J1939 Translator module.

ST LED – Indicates current diagnostic page

Page 1

LED1 – Unused

LED2 – Toggles when vehicle CAN messages are being received

LED3 – Toggles when data is being received over laptop connection

LED4 – Toggles when data is being transmitted from the J1939 port (normal)

PGNcheck Mode

Three diagnostic pages indicate optional PGN data that is being acquired. Each LED will indicate that the particular data shown below was received. All LEDs are turned OFF together every 2 seconds in this mode. Note that not all PGN data is available on all vehicles.

Page 2

LED1 – MAF Mass Air Flow

LED2 – AAT Ambient Air Temperature

LED3 – EOT Engine Oil Temperature

LED4 – BP Barometric Pressure

Page 3

LED1 – IMP Intake Manifold Pressure

LED2 – IAT Intake Air Temperature

LED3 – ELD Engine Load

LED4 – EFR Engine Fuel Rate

Page 4

LED1 – TP Throttle Position

LED2 – N/A Unused

LED3 – DTC Number of Ford Diagnostic Trouble Codes (Emissions Related DTCs)

BAUDdiag Mode

Page 5

This page will either show the current J1939 Baud rate or toggle it depending on certain conditions of the vehicle.

If the Transmission is **NOT** in PARK and the Service Brake is **APPLIED** while entering this mode, the LEDs will blink according to the following:

LED1 only – Changing Baud rate to 250kbps

LED1 & LED2 – Changing Baud rate to 500kbps

If the conditions above are not satisfied, the LEDs will blink according to the following:

LED1 only – Baud rate is currently 250kbps

LED1 & LED2 – Baud rate is currently 500kbps

Error Mode

Some events can lead to an error condition which halts the J1939 Translator module operation. These error states are indicated by certain patterns displayed by the LEDs.

Error Modes are defined as follows:

- Failed to check all available PGNs: LEDs 1 - 4 scrolling in ascending order.
- Invalid VIN Errors:
 - ◇ No VIN received: All LEDs scroll back and forth three times.
 - ◇ Invalid manufacturer: All LEDs scroll back and forth three times and **LED1** stays on.
 - ◇ Invalid model: All LEDs scroll back and forth three times and **LED2** stays on.
 - ◇ Invalid engine type: All LEDs scroll back and forth three times and **LED3** stays on.
 - ◇ Invalid model year: All LEDs scroll back and forth three times and **LED4** stays on.

Body Harness Installation

Connect the Body Harness to the Crane Harness

This procedure applies to the body models listed in the Table - 13 below:

Body Assembly P/N	Body Model
715320004	Titan 16, 9 ft
715330001	Titan 16, 11 ft
739770002	Titan 38, 9 ft
739322001	Titan 38, 11 ft
739322002	Titan 38, 11 ft
739322000	Titan 38, 11 ft
739322006	Titan 38, 11 ft
760322002	Titan 60, 11 ft
772322102	Titan 85, 11 ft
772322001	Titan 85, 14 ft

Table – 13

IMPORTANT: If the truck is idle for more than 5 days, disconnect the RC57 unit from the battery. If the RC57 has firmware version 60.39 or above, low power mode is enabled and there is no need to disconnect the power.

1. Connect the IoT-F and IoT-M connectors as follows:

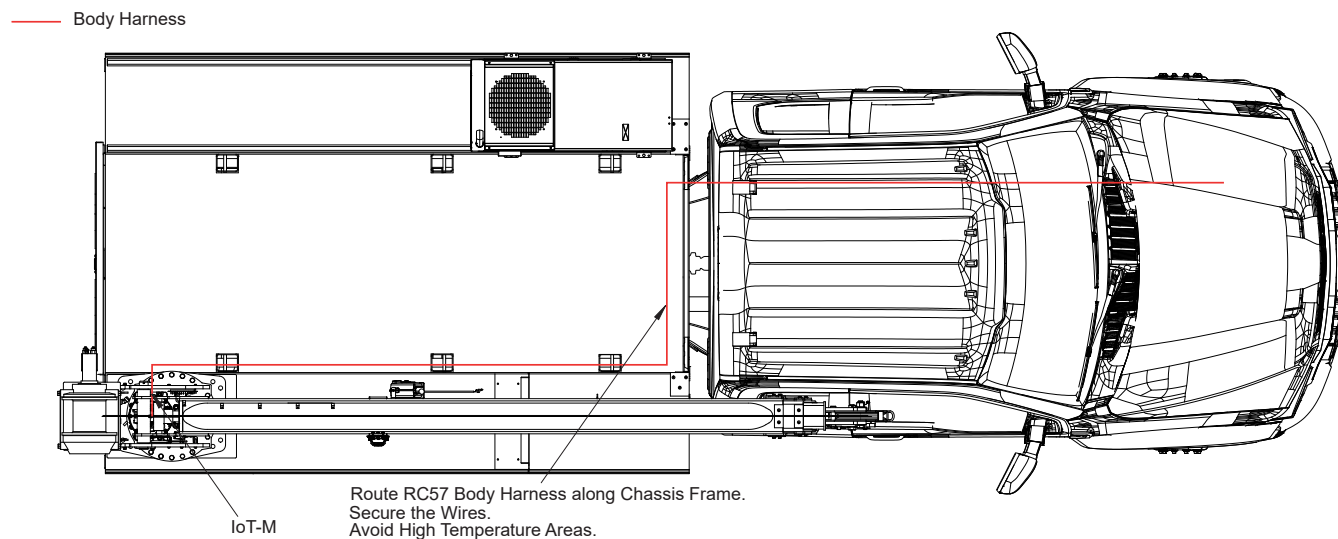


Figure 63 – IoT-M Routing

- A. Route the IoT-M harness along the chassis frame to the crane box.
- B.  High temperatures can damage the harness.

Make sure that the IoT-M harness does not pass through high-temperature areas during routing.

Body Harness Installation

- C. Secure the harness to the chassis frame along the routing path.
- D. This step applies to the crane models listed in the Table - 14 below.

Top Level Assembly P/N	Crane Model
366664003	EHC-6, NEXSTAR
460179012	HC-10, NEXSTAR
470103008	HC-14, NEXSTAR
475000016	HC-12S, NEXSTAR
475000017	HC-12, NEXSTAR
477000004	HC-7X, NEXSTAR
477000009	HC-7, NEXSTAR
479000017	HC-8X, NEXSTAR
479000016	HC-8, NEXSTAR
480989013	8406H, NEXSTAR
361106530	HC-5, NEXSTAR
360646003	EHC-5, NEXSTAR
492000010	HC-6, NEXSTAR
320992003	EHC-3.2 PRFX NEXSTAR
404243003	EHC-4, 20 FT. BOOM, NEXSTAR
492000013	EHC-6, NEXSTAR
492000015	EHC-5, NEXSTAR

Table - 14

- i. Inside the crane box, below the pedestal, connect the IoT-M connector from the body harness to the IoT-F connector from the crane harness.

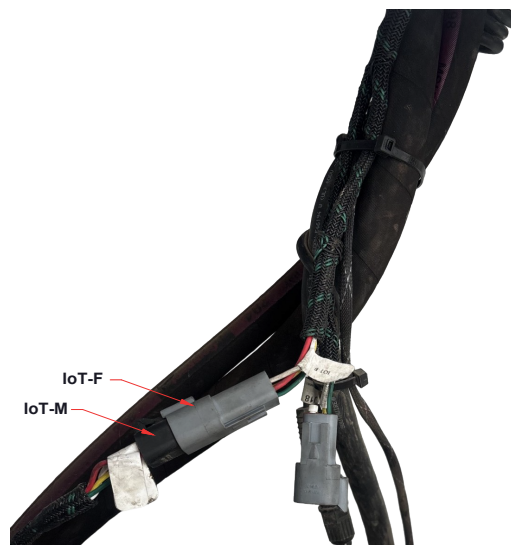


Figure 64 – IoT-F & IoT-M Connection Inside Crane Box

Body Harness Installation

E. This step applies to the crane models listed in the Table – 15 below.

Top Level Assembly P/N	Crane Model
492000012	HC-6, NEXSTAR LESS AUTO CRANE LOGO
492000014	HC-6, NEXSTAR
492000016	HC-5, NEXSTAR

Table – 15

- i. In the crane box, below the pedestal, install the IoT-M wires on the plug. Refer to “Telematics and IoT-F Connections” section in “RC57 Installation: EHC-6.1 and HC-6.1” for the procedures to:
 1. Remove wires from the plug.
 2. Prepare the wires for installation.
 3. Install the wires into the plug.
- ii. Remove the wires listed in the Table - 16 below. Follow the procedure in step (1.e.i).

DESCRIPTION	COLOR	PIN ON THE PLUG
CRANE ACTIVE	OR/BK	13
POWER	RED	20
GROUND	BLACK	21
VSU BLK	BLACK	22
VSU WHT	WHITE	23

Table – 16

Body Harness Installation

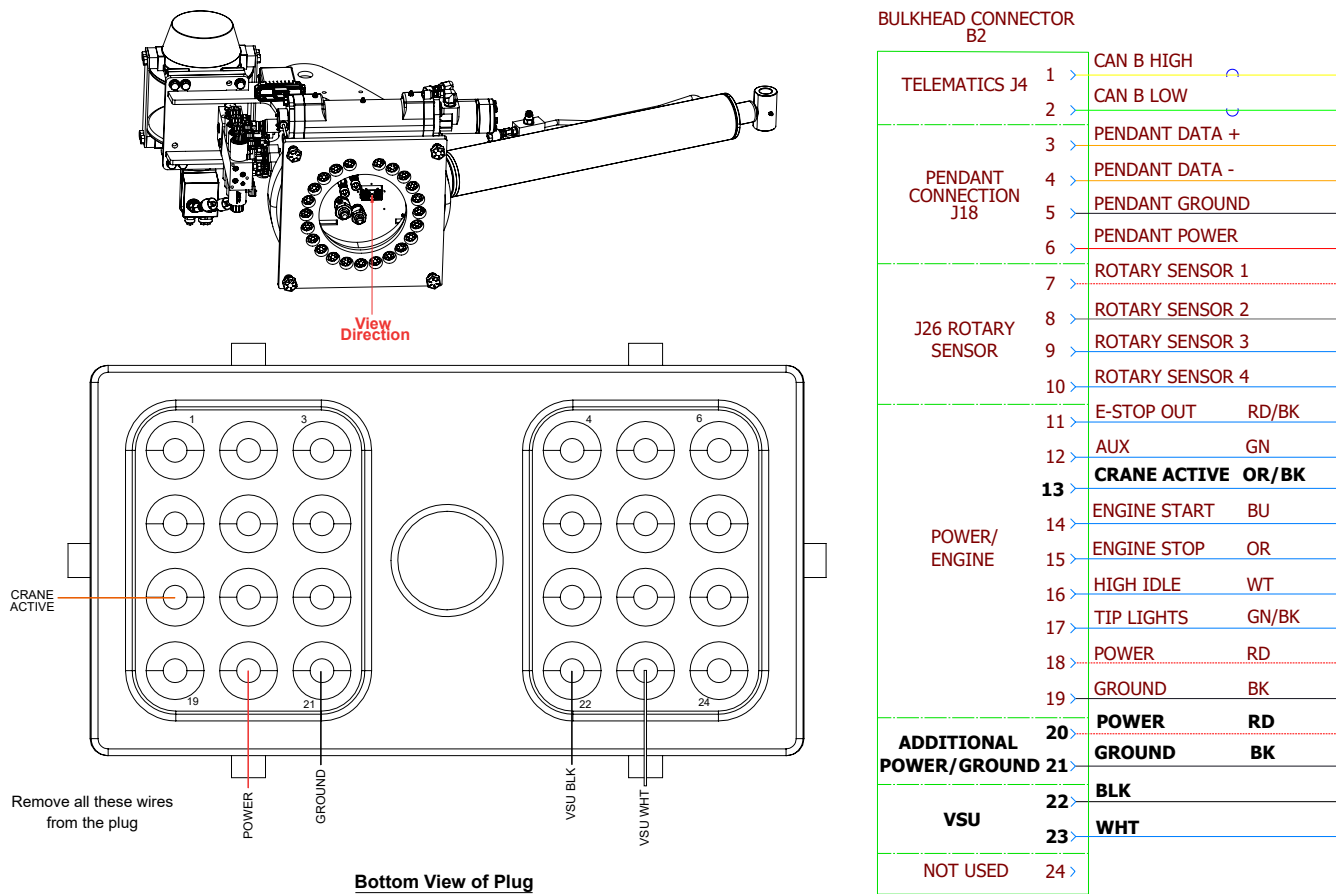


Figure 65 – Removal of Plug Connections

- iii. Prepare the IoT-M wires listed in the Table - 17 below. Follow the procedure in step (1.e.i).
- iv. Install the IoT-M wires listed in the Table - 17 below. Follow the procedure in step (1.e.i).

DESCRIPTION	COLOR	PIN ON THE PLUG
CRANE ACTIVE	OR/BK	13
DIGITAL INPUT	WHITE	20
POWER AUXILIARY	RED	21
CHASSIS CAN LOW	GREEN	22
CHASSIS CAN HIGH	YELLOW	23

Table – 17

Body Harness Installation

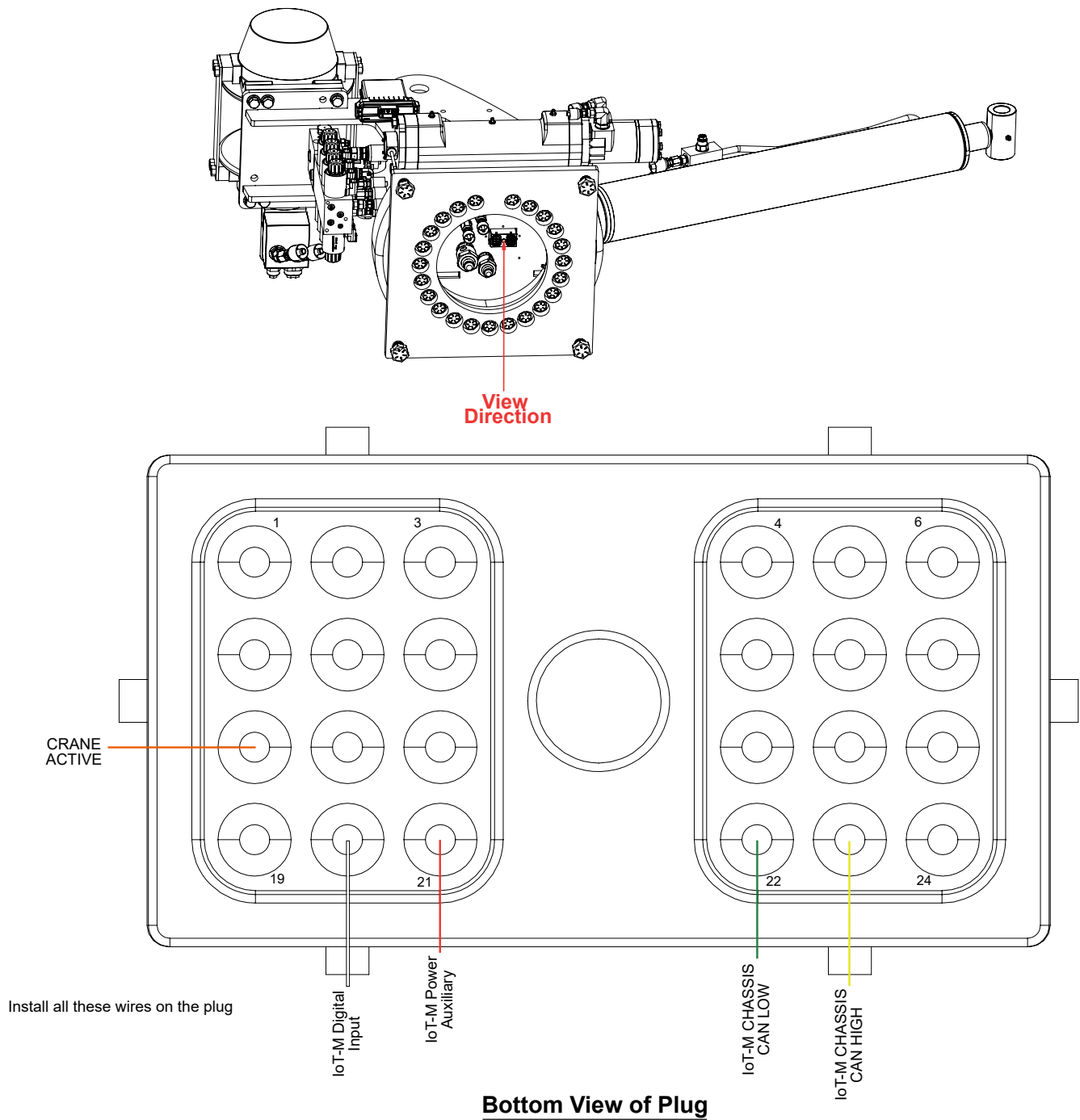


Figure 66 – Installation of Plug Connections

- v. Make sure that all wires are fully engaged in the plug.
- vi. If you removed the receptacle and the plug from the pedestal, install them as follows:

Body Harness Installation

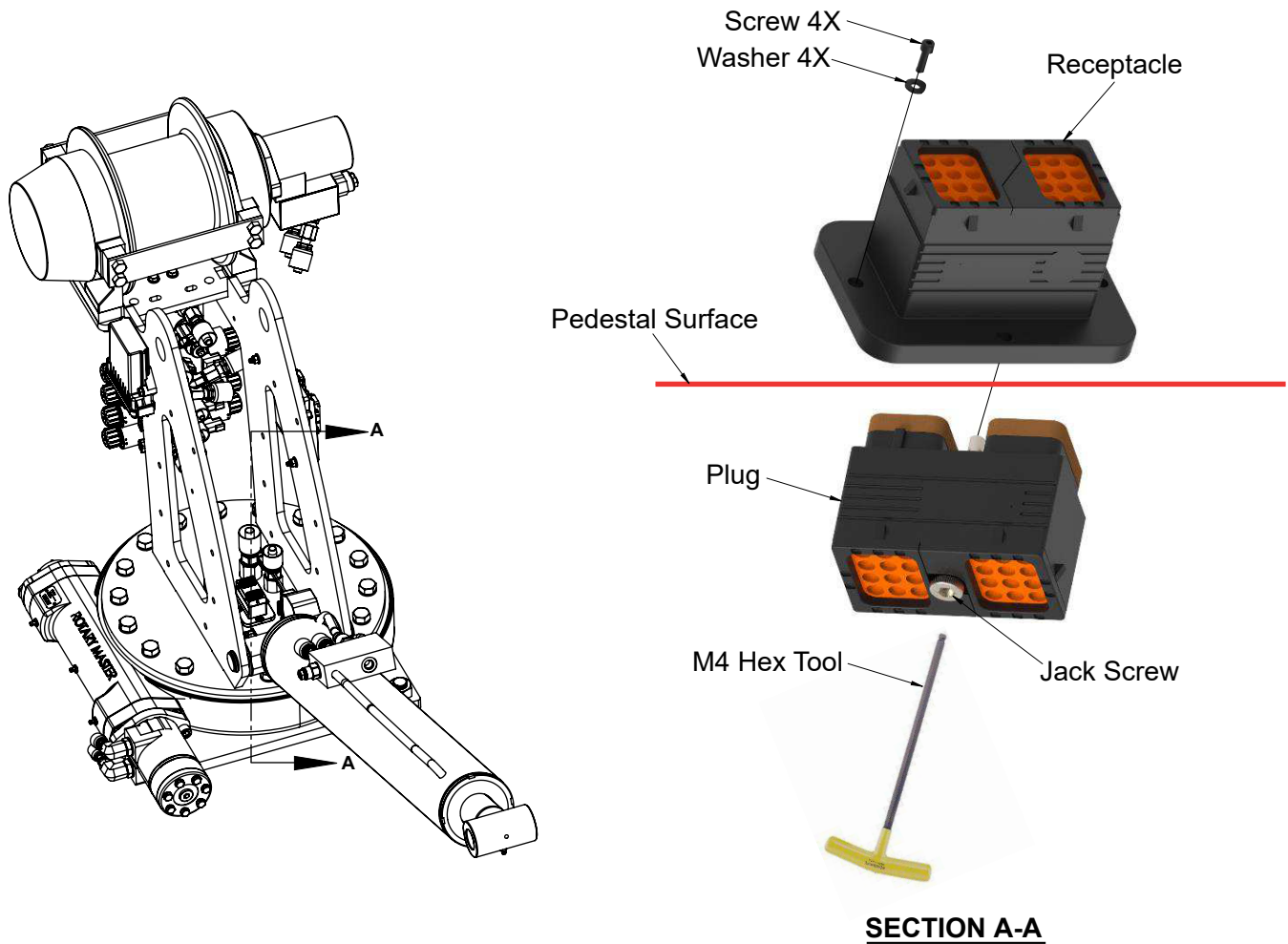


Figure 67 – Installation of the receptacle and the plug

1. Position the receptacle on the pedestal.
2. Install the washers and the screws.
3. Tighten the screws to the specified torque.
4. Position the plug inside the crane box below the pedestal and make sure that it aligns with the receptacle.
5. Tighten the jackscrew from inside the crane box with an M4 Hex tool.

NOTE: After this procedure, the plug and receptacle are assembled and attached to the pedestal.

Body Harness Installation

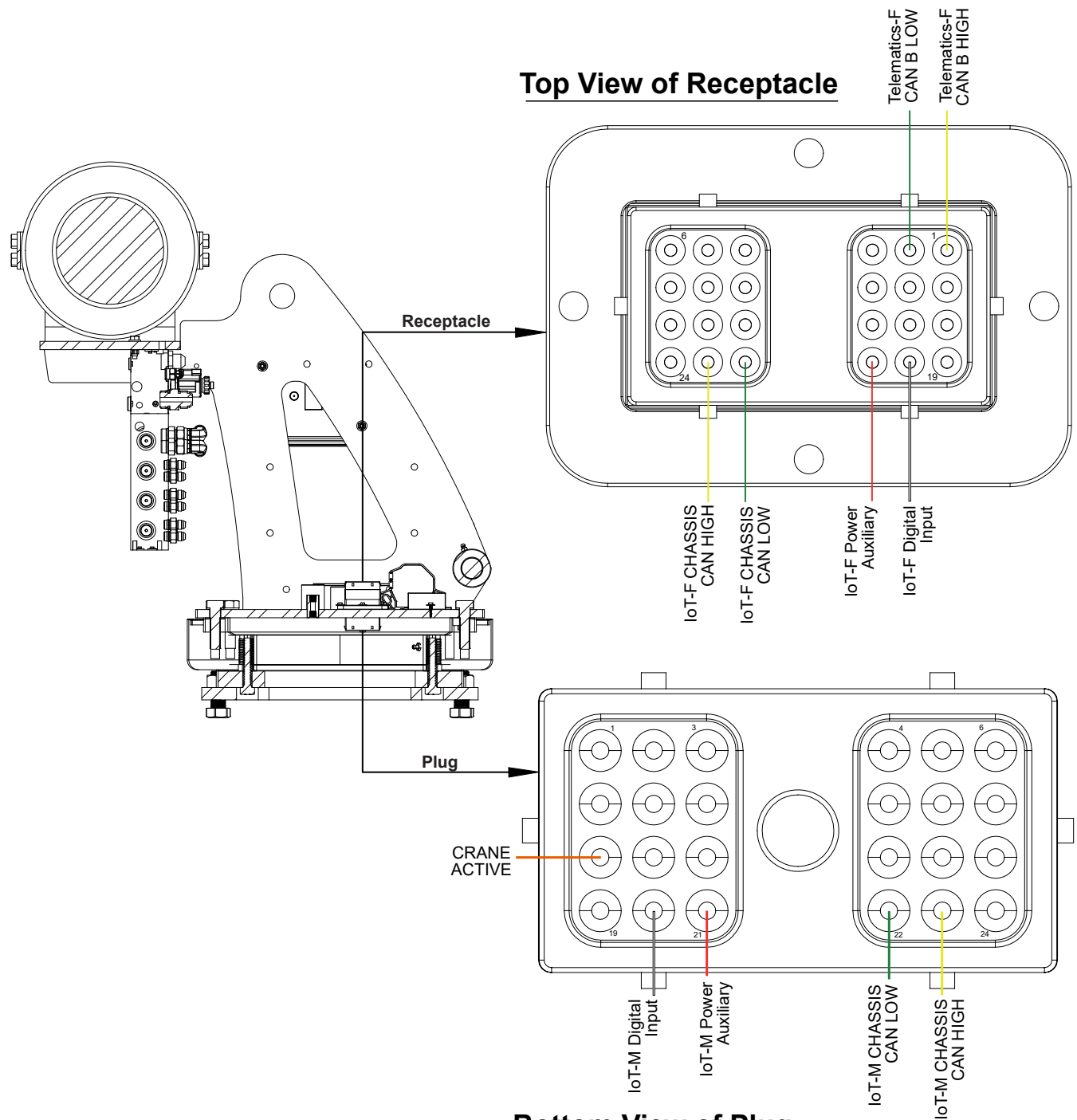


Figure 68 – Wiring Scheme Post installation

Installation of MC43 Software

NOTE: The G11/G12 Bluetooth Modem for software installation is not included in the IoT Retrofit Kit. Please contact your local dealer or RSM.

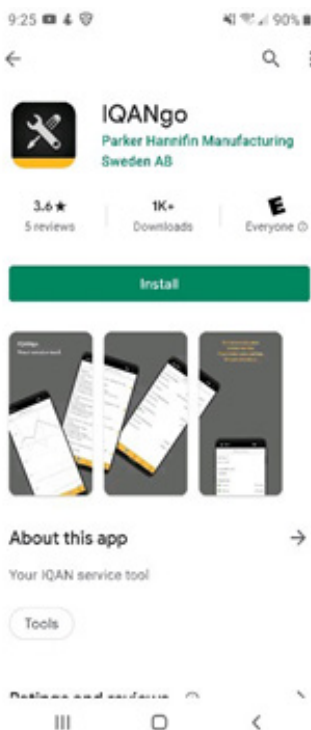
1. Download the IQANgo application on a smartphone or tablet.

IMPORTANT: This application is required to update the NexStar software.

IMPORTANT: Auto Crane will send an email to the personnel responsible for the NexStar software update.

IMPORTANT: A Bluetooth modem is required for communication with the crane.

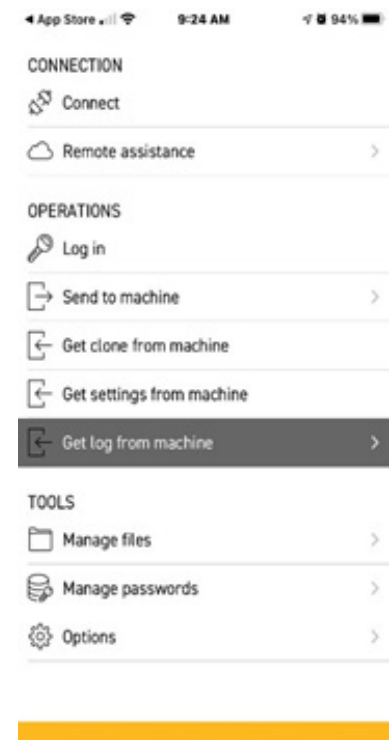
2. Install the IQANgo application and allow all requested permissions for correct operation.



Google Play Store



Apple App Store



IQANgo

Figure - 69

3. When the installation is complete, close the application and continue with the modem installation.

NOTE: The smartphone or tablet must be connected to a mobile network to download IQANgo. MSG and DATA charges may apply.

Installation of MC43 Software

4. On the crane harness near the hoist, connect the Modem-M connector to the Bluetooth modem.

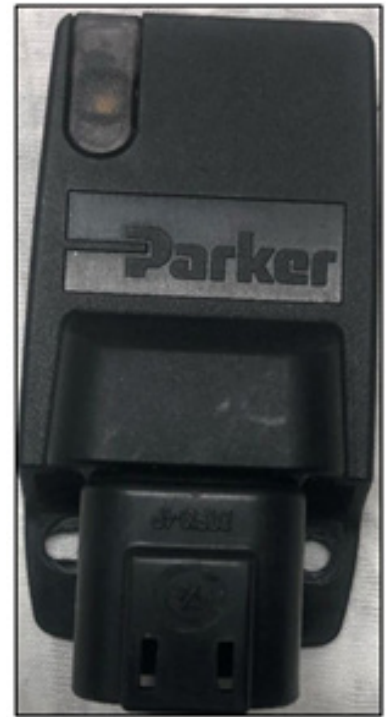
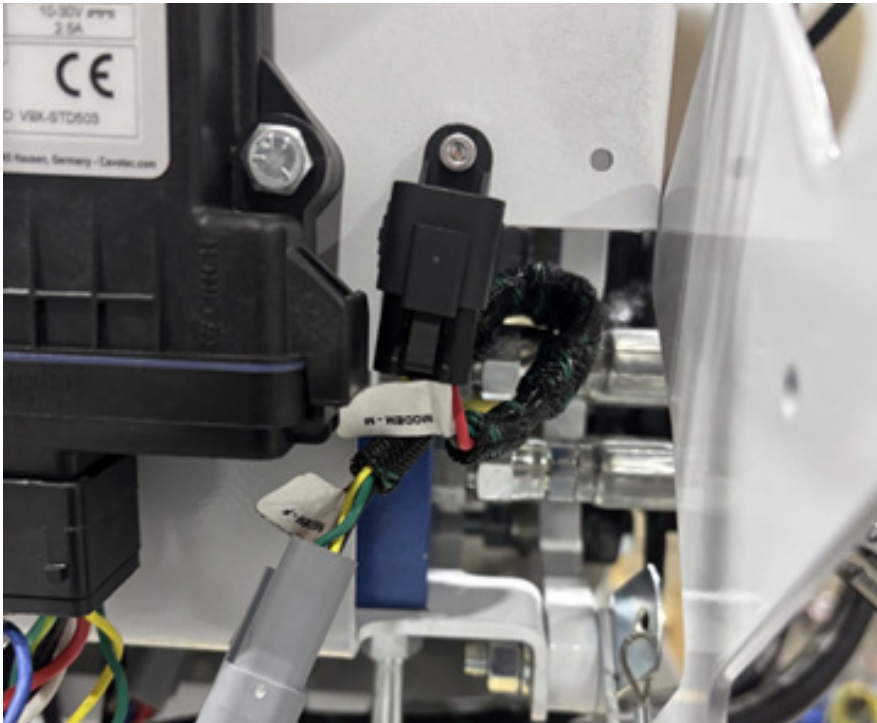


Figure - 70

5. When the Bluetooth modem is connected, energize the crane as follows:
 - A. If the crane is mounted, use the appropriate upfitter switch to energize the crane.
 - B. If the crane is not mounted, connect the POWER and GROUND wires to a 12 VDC source. Make sure that the wire ends are properly stripped. If required, remove insulation to the correct length for connection to the power source.

Installation of MC43 Software

6. When the crane is energized, the amber indicator light on the modem flashes.

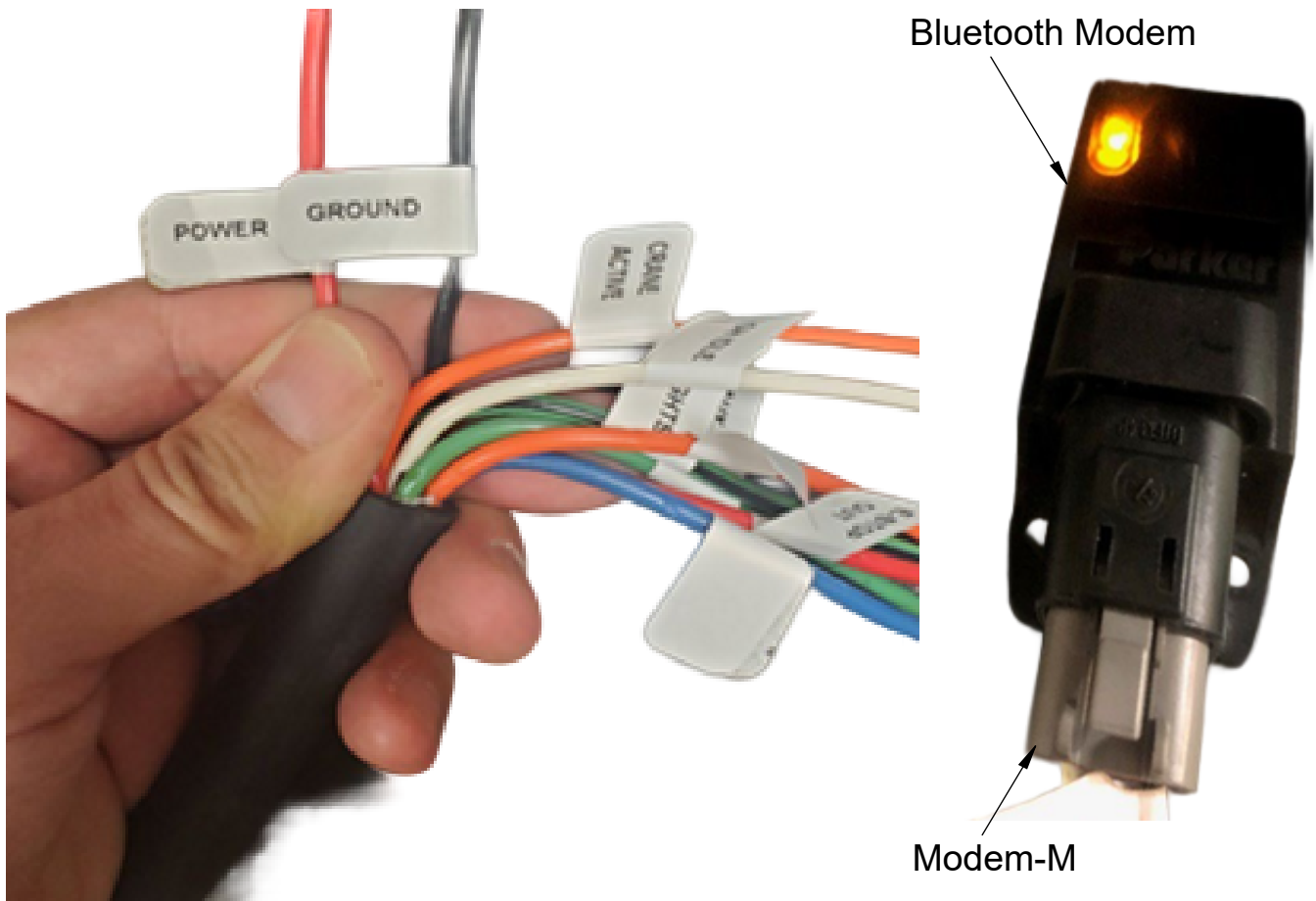


Figure - 71

7. On the smartphone or tablet where the IQANgo application is installed, make sure that Bluetooth is turned on.

Installation of MC43 Software

8. Open the email received from Auto Crane and download the file to the smartphone or tablet.

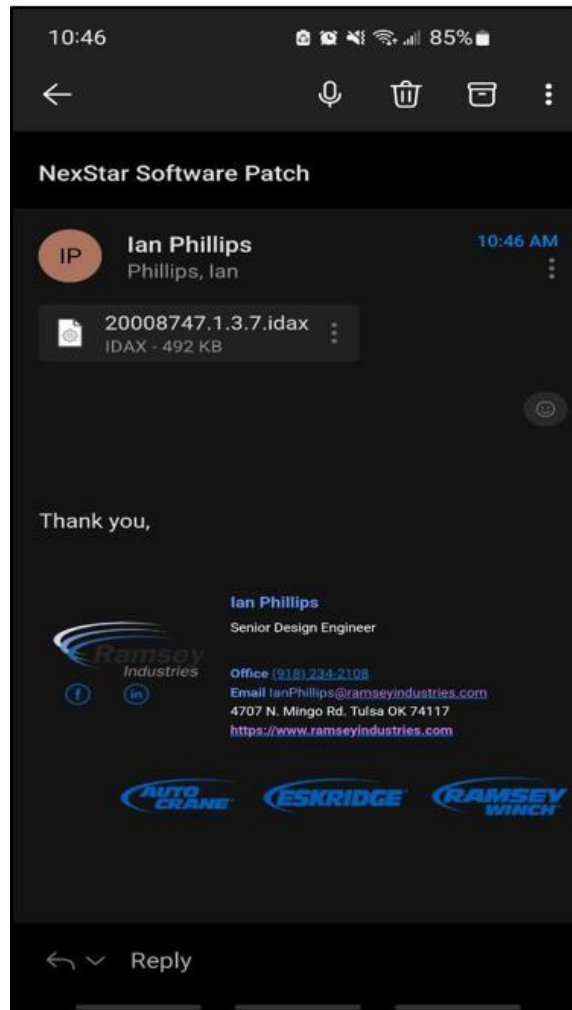


Figure - 72

9. A pop-up appears to select an application to open the file. Select IQANgo.

Installation of MC43 Software

10. The IQANgo application opens and displays a screen with software and send options.
Reference the Figure - 73 below.

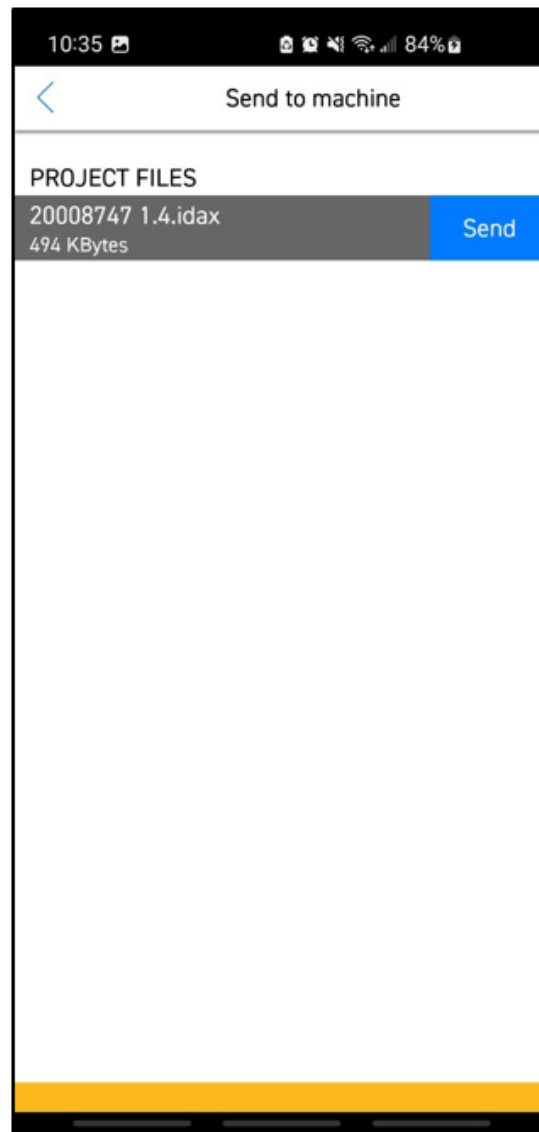


Figure - 73

11. Click "Send". A machine selection screen appears.

IMPORTANT: Keep the smartphone or tablet close to the modem during the entire update process.

Installation of MC43 Software

12. Select the correct crane and click "Connect".

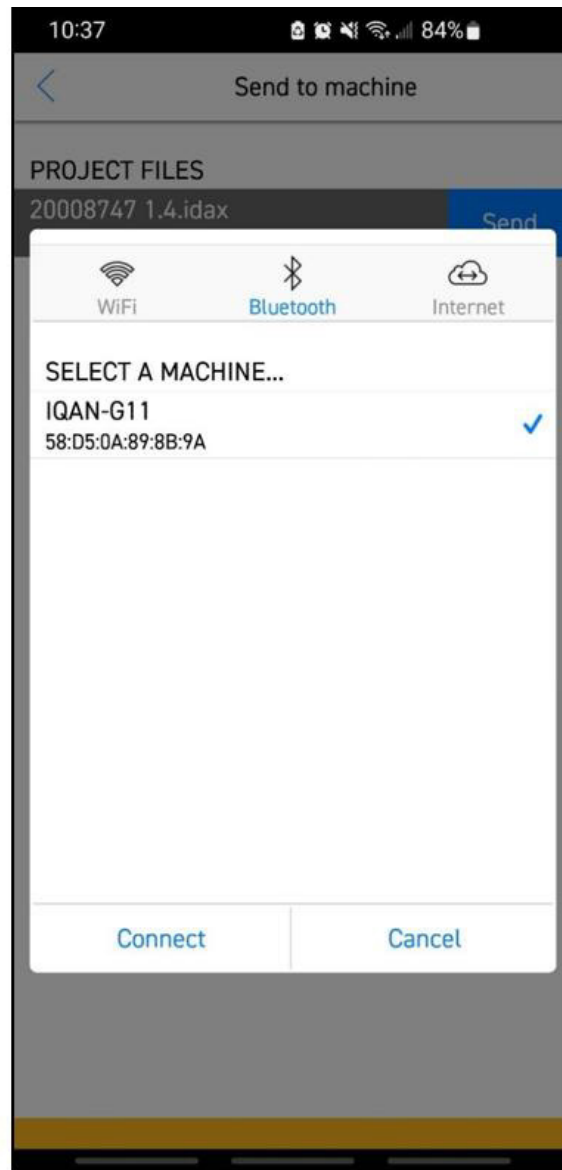


Figure - 74

Installation of MC43 Software

13. A screen appears showing file information. Verify that the file name is correct and click "Yes".

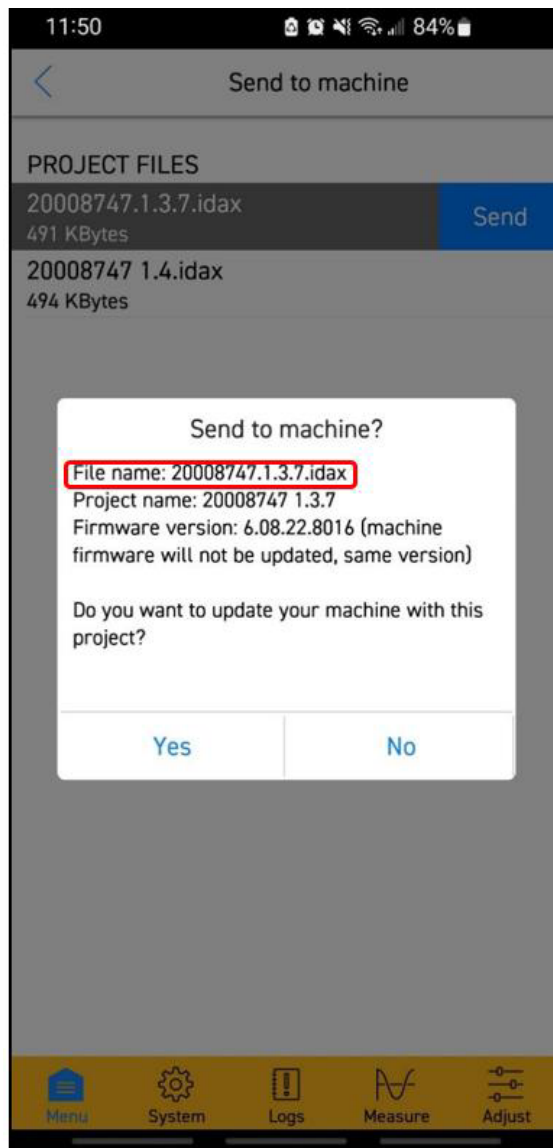


Figure - 75

Installation of MC43 Software

14. A warning screen appears and displays the message "Attention! Make sure that the machine is not moving and the engine is shut down. If not, click "Cancel". Click "OK" to start update."

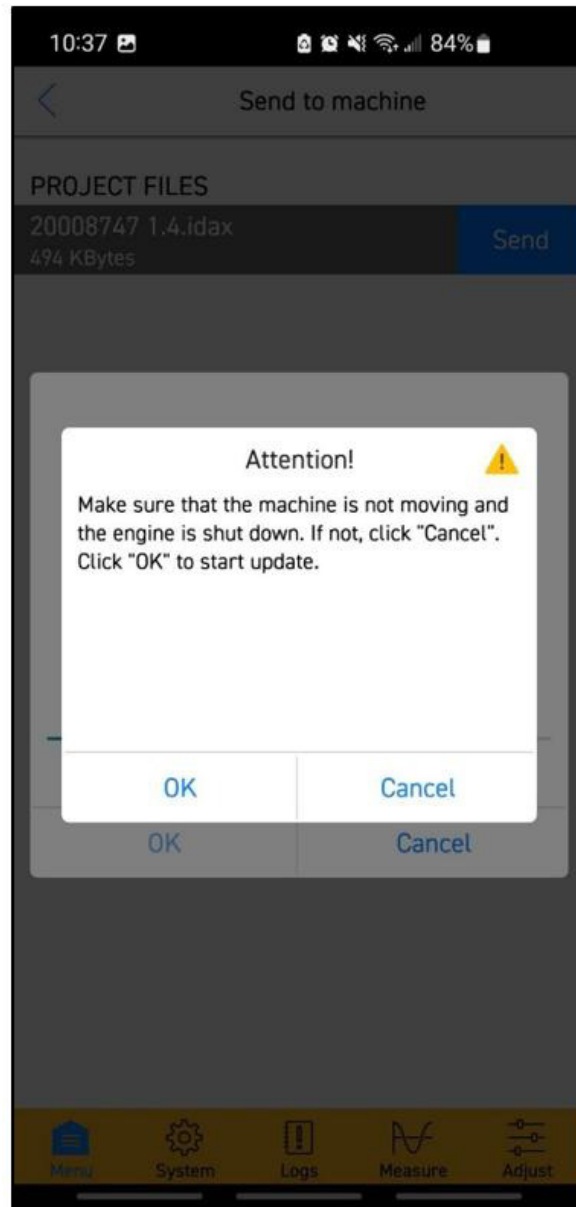


Figure - 76

Installation of MC43 Software

15. Make sure that the warning instructions are followed correctly. Click "OK".



Figure - 77

16. The upload process starts and the software is transferred to the crane.

NOTE: Progress can be monitored using the green indicator at the bottom of the screen.

IMPORTANT: Keep the smartphone or tablet close to the modem during the entire update process.

Installation of MC43 Software

17. When the upload is complete, the system restarts and displays the message "The complete system was updated successfully."

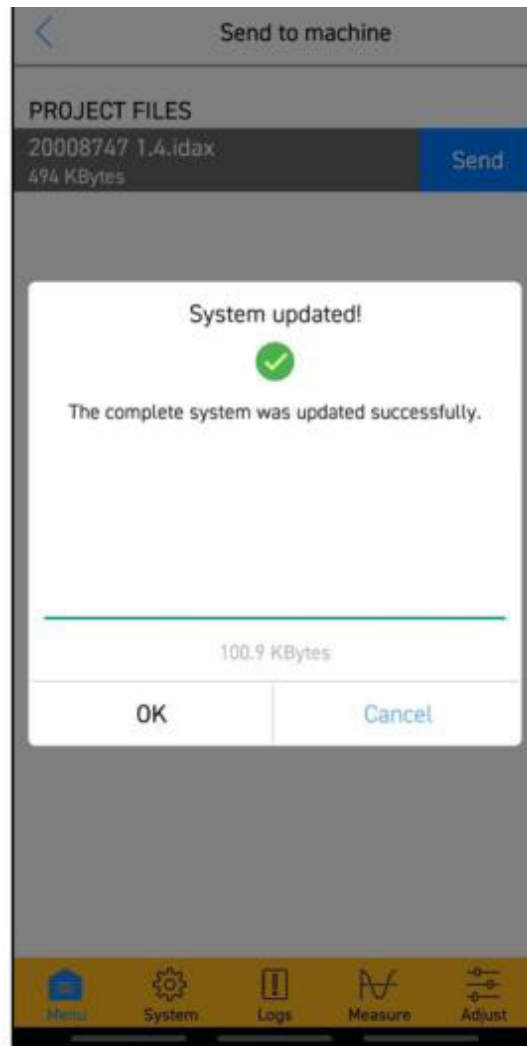


Figure - 78

18. De-energize the crane as follows:
- A. If the crane is mounted, turn off the upfitter switch.
 - B. If the crane is not mounted, disconnect the POWER and GROUND wires from the 12 VDC source.
19. Disconnect the Modem-M connector from the Bluetooth modem.
20. If the Bluetooth modem does not remain with the crane, connect the Modem-M connector to the protective cap.

1. Perform the crane data test as follows:
 - A. Make sure that the crane is connected to the network.
 - B. Download the Ramsey Connect application on a smartphone or tablet and complete the sign-in process through the link <https://ramseyconnect.com/login.aspx>.

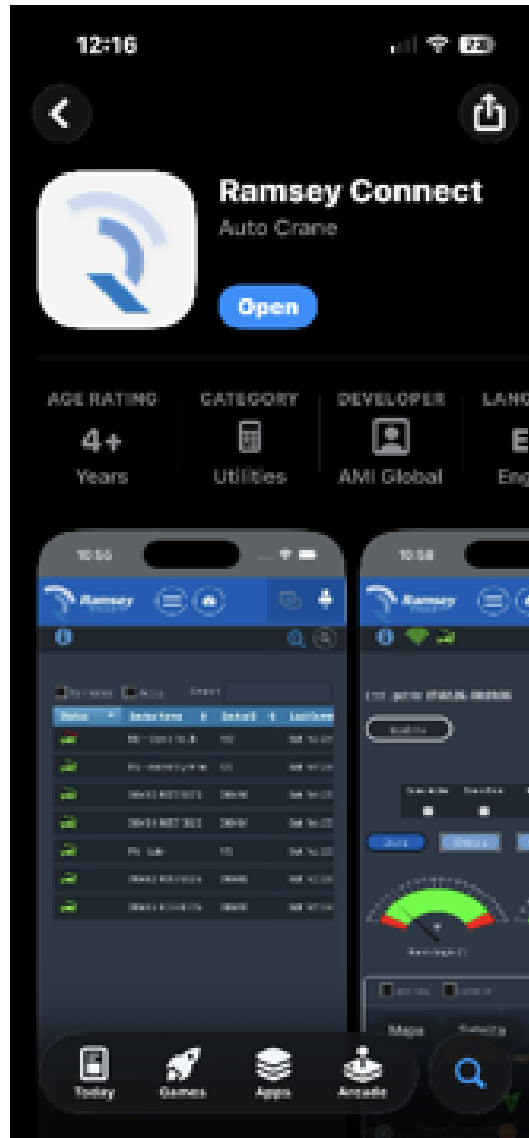


Figure - 79

Crane Data Testing

- C. Energize the truck and the crane.
- D. Verify CAN Bus 1-1 and CAN Bus 2-1 are transmitting J1939 CAN data via the RC57's blink codes. When initially powering on the RC57, you will see a sequence of LED flashes. Refer to the Figure - 80 for specifics.

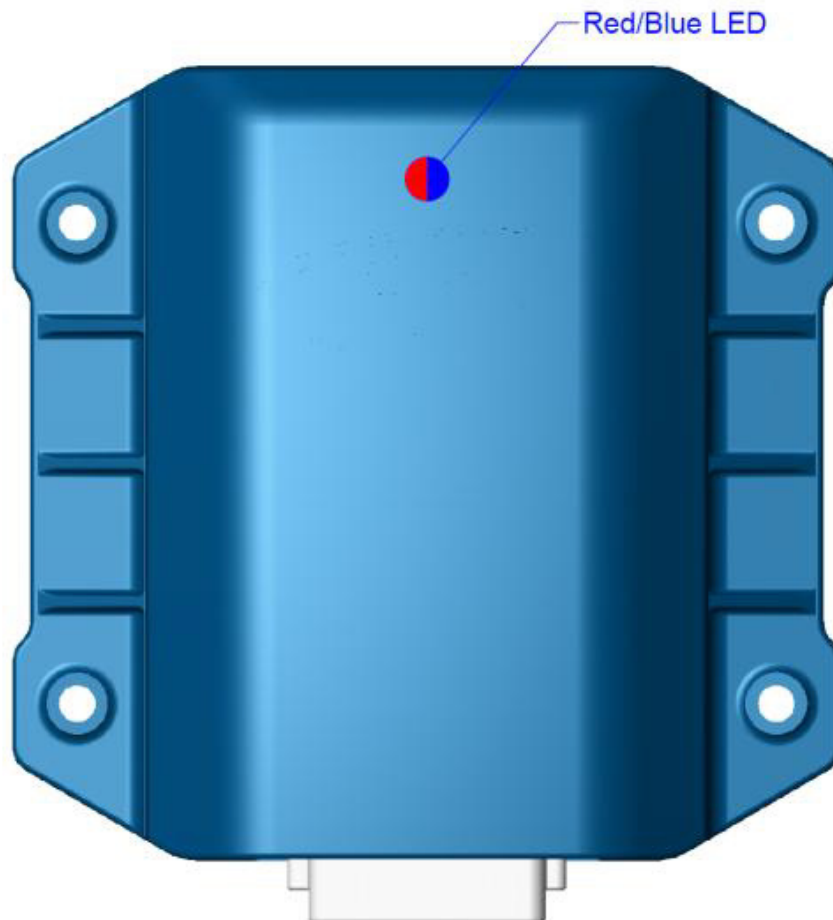


Figure – 80

i. Customer Verification Instructions

1. After the unit is reset, watch the **blue** and **red** LEDs to confirm the startup check is working correctly.
2. **Blue LED startup confirmation**
Shortly after reset, the **blue LED should blink twice**.
3. **CAN A check**
The unit will check **CAN A** for about **5 seconds**.
If activity is detected, the **red LED will turn ON**.
4. **CAN A complete**
After the CAN A check is finished, the **red LED will turn OFF**.
The **blue LED will blink twice** to show the CAN A check is complete.

Crane Data Testing

5. CAN B check

The unit will then check **CAN B** for about **5 seconds**.

If activity is detected, the **red LED will turn ON**.

6. CAN B complete

After the CAN B check is finished, the **red LED will turn OFF**.

The **blue LED will blink twice** to show the CAN B check is complete.

7. Normal operation

After both checks are complete, the **blue LED will return to its normal operating pattern**.

ii. Simple Pass/Fail Check

The startup check is working correctly if:

1. The **blue LED blinks twice after reset**.
2. The unit checks **CAN A**, then the **blue LED blinks twice**.
3. The unit checks **CAN B**, then the **blue LED blinks twice**.
4. The **blue LED returns to normal operation** after both checks are complete.
5. The **red LED turns ON during a check when communication activity is detected**.

E.



Make sure that no personnel are near the crane during this procedure. Crane movement can cause injury to the personnel.

If Titan Connect is installed, use the Titan Connect keypad and press the crane button to energize the crane.

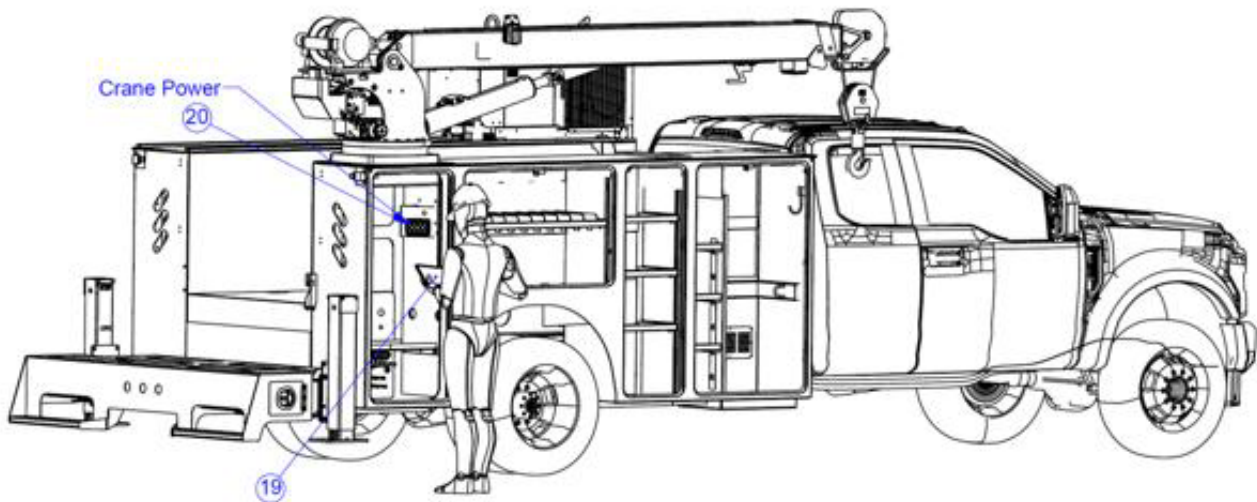


Figure – 81

Crane Data Testing

F. Lift the crane from the cradle until the boom reaches a 30° position.

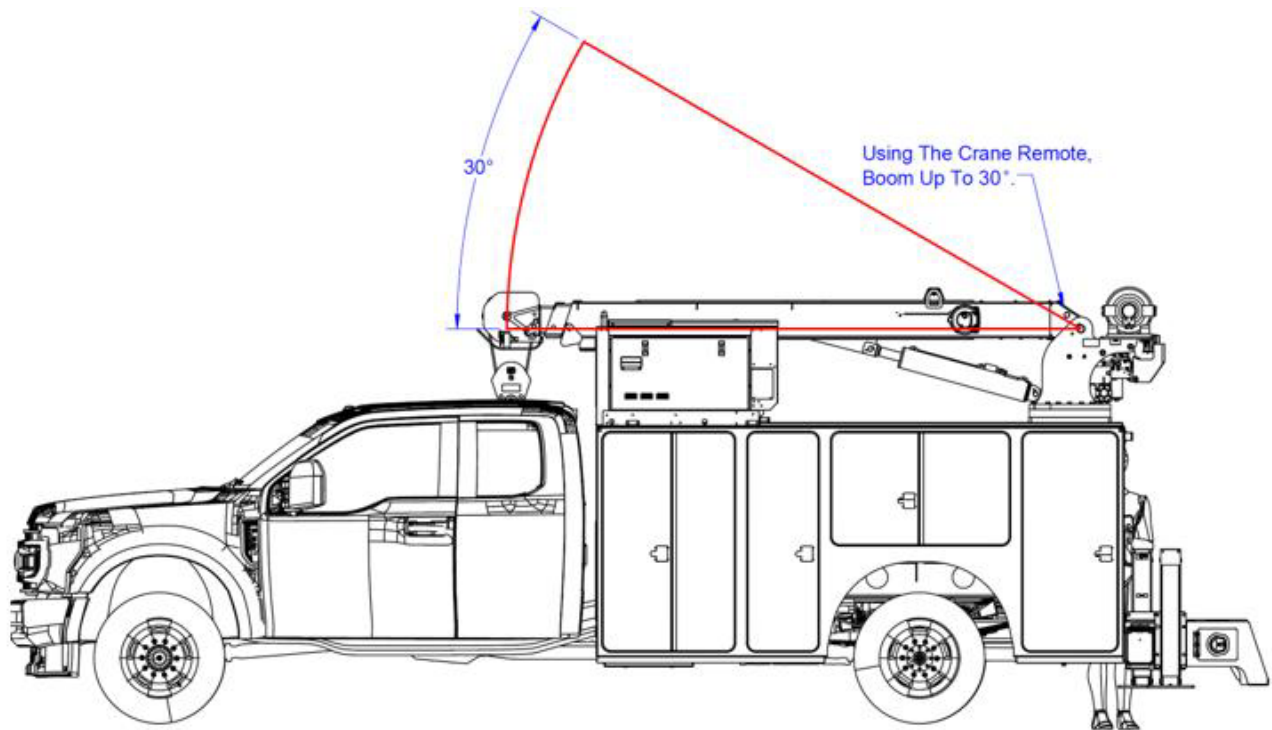


Figure - 82

G. Leave the boom in the same position for 5 minutes.

NOTE: If Titan Connect Power On Demand is installed, a 3-minute high-idle timer or a 5-minute chassis shutdown may occur.

H. Record the change in the crane angle.

NOTE: Figure - 83 is for reference purposes only.

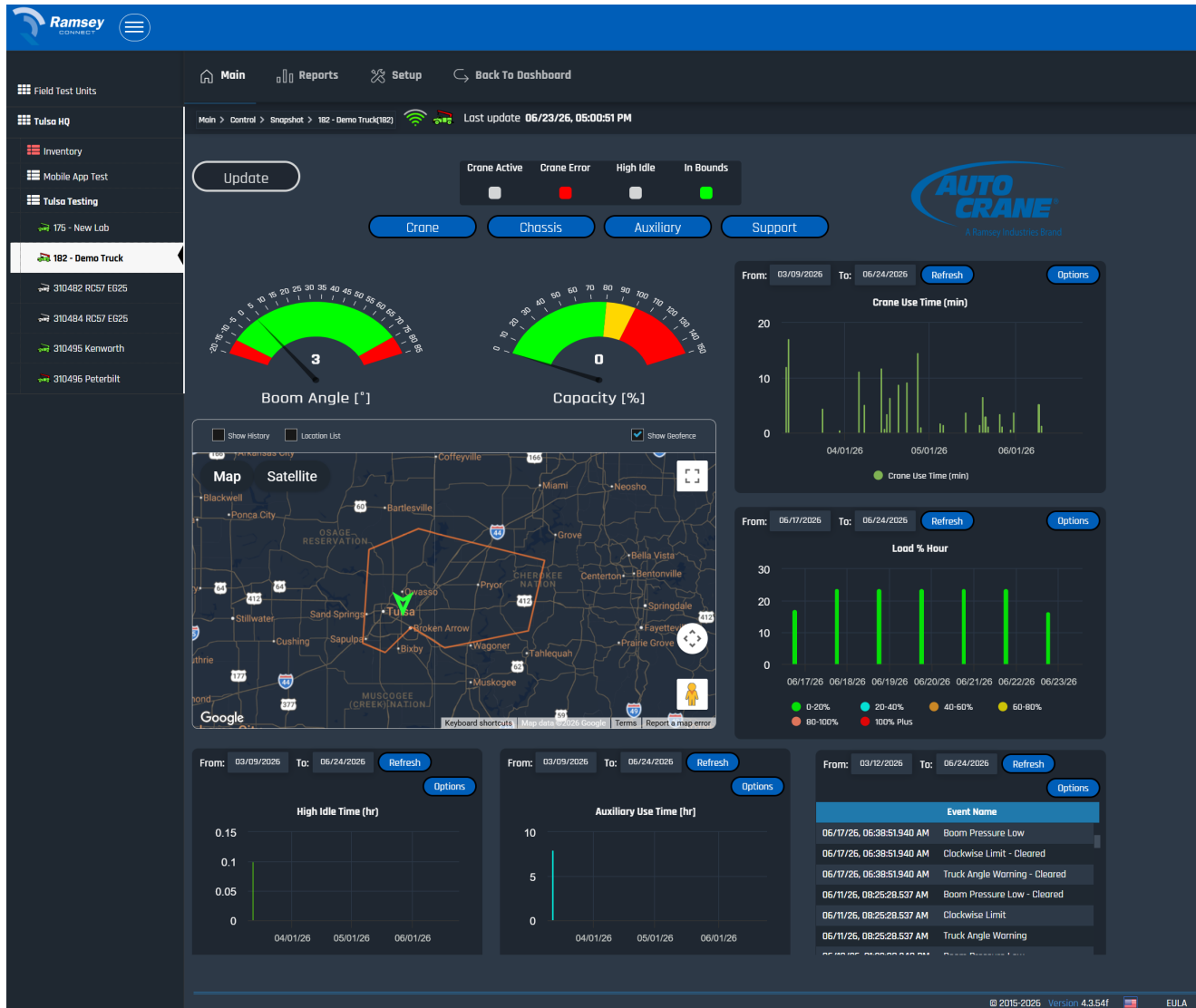


Figure - 83

- Make sure that the recorded value matches the value shown on the Ramsey Connect dashboard.
- Verify the engine data in the Ramsey Connect dashboard, including engine temperature, oil temperature, and RPM.

Troubleshooting

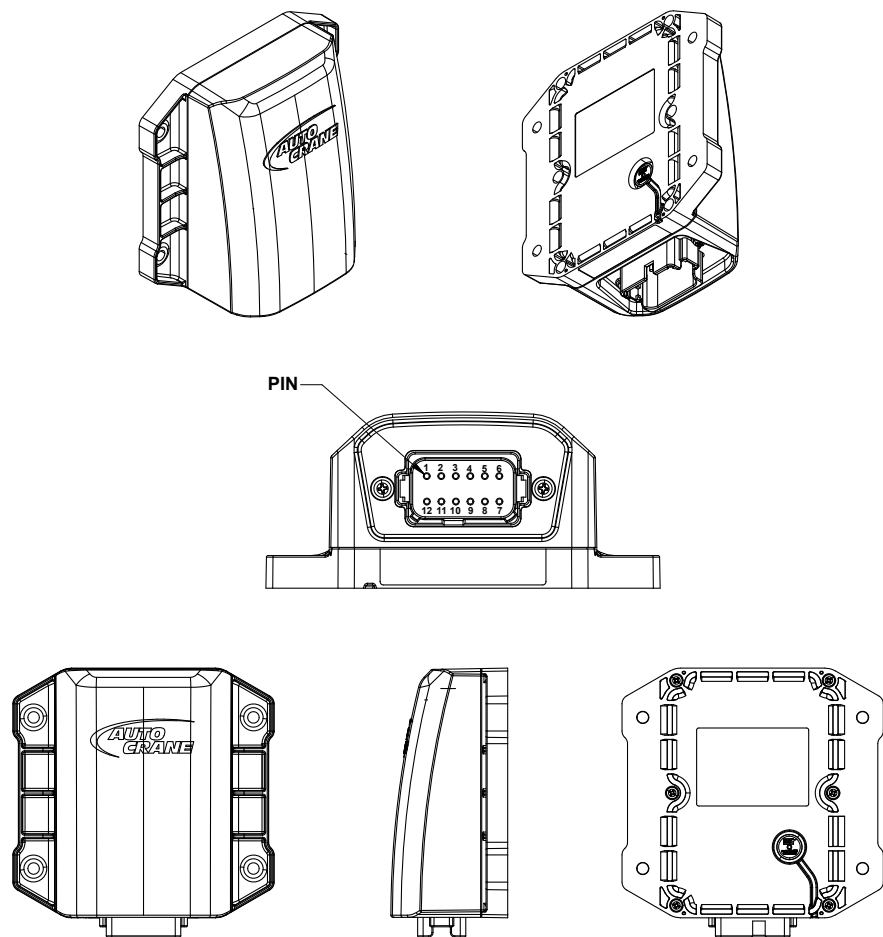


Figure – 84

PINOUT	
PIN	DESCRIPTION
1	PROGRAMMING POWER
2	TX - OUT
3	BOOT ON
4	RX - IN
5	RESET
6	DIGITAL INPUT
7	CAN BUS A HIGH (MC43 BUS D, C2 PIN 17)
8	CAN BUS A LOW (MC43 BUS D, C2 PIN 1)
9	CAN BUS B HIGH (CHASSIS / PERIPHERALS)
10	CAN BUS B LOW (CHASSIS / PERIPHERALS)
11	RC57 POWER
12	GROUND

Table – 18

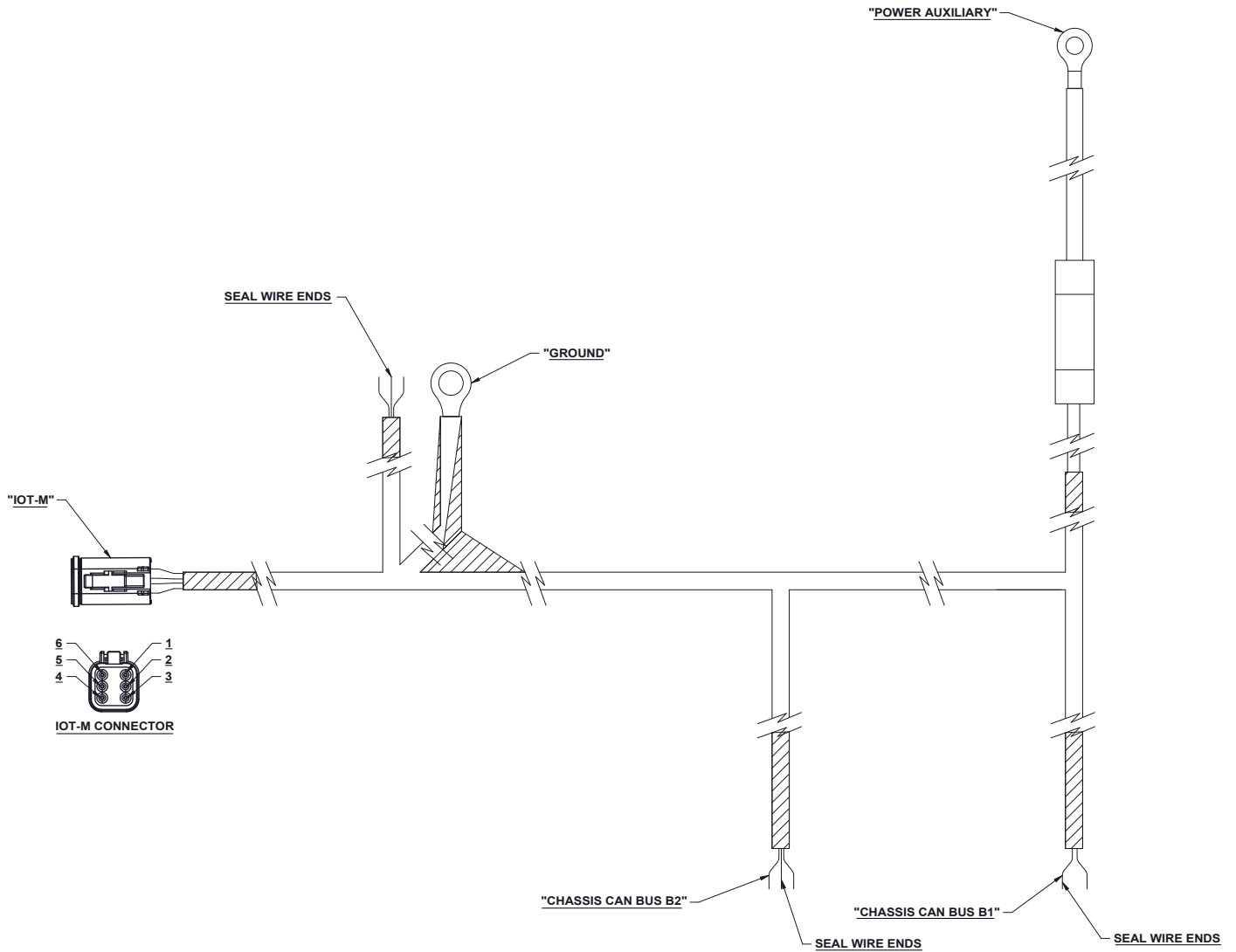


Figure – 85

Troubleshooting

CONNECTOR NAME: IOT-M				
PIN#	DESCRIPTION	CIRCUIT	COLOR	AWG
1	DIGITAL INPUT	DIG-IN	WHITE	18
2	POWER AUXILIARY	PWR-AUX	RED	16
3	CHASSIS CAN LOW	CAN2-LO	GREEN	20
4	CHASSIS CAN HIGH	CAN2-HI	YELLOW	20
5	CRANE ACTIVE	CRN-ACTV	OR/BK	18
6	CAVITY PLUG			

CONNECTOR NAME: RADIO SWITCH				
PIN#	DESCRIPTION	CIRCUIT	COLOR	AWG
BLUNT	DIGITAL INPUT	DIG-IN	WHITE	18
BLUNT	POWER AUXILIARY	PWR-AUX	RED	16
BLUNT	GROUND	GND	BLACK	10

CONNECTOR NAME: CHASSIS CAN BUS B1				
PIN#	DESCRIPTION	CIRCUIT	COLOR	AWG
BLUNT	CHASSIS CAN HIGH	CAN2-HI	YELLOW	20
BLUNT	CHASSIS CAN LOW	CAN2-LO	GREEN	20

CONNECTOR NAME: CHASSIS CAN BUS B2				
PIN#	DESCRIPTION	CIRCUIT	COLOR	AWG
BLUNT	CHASSIS CAN HIGH	CAN2-HI	YELLOW	20
BLUNT	CHASSIS CAN LOW	CAN2-LO	GREEN	20
BLUNT	CRANE ACTIVE	CRN-ACTV	OR/BK	18

CONNECTOR NAME: POWER				
END	DESCRIPTION	CIRCUIT	COLOR	AWG
3/8" EYELET	POWER AUXILIARY	PWR-AUX	RED	16

CONNECTOR NAME: GROUND				
END	DESCRIPTION	CIRCUIT	COLOR	AWG
3/8" EYELET	GROUND	GND	BLACK	10

Table – 19

Troubleshooting

RC57 Troubleshooting

SYMPTOMS	LIKELY CAUSE	RESOLUTION / CHECKS
No Power (No LEDs)	No supply voltage	Check Pin 11 (+12 –24 VDC) and Pin 12 (GND)
	Blown fuse	Verify inline fuse (0.75A slow-blow recommended)
	Connector not seated	Inspect Deutsch connector, bent pins
	Harness damage	Check continuity of power / ground wires
	Reverse polarity	Verify correct wiring
Blue LED OFF	No power	Verify supply voltage and ground
	Device not booting	Power cycle unit
	Internal failure	Replace device
Blue LED ON (Breathing)	Normal operation	No action required
	No CAN activity	Verify CAN traffic present
Red LED ON / Flashing	Fault condition	Power cycle device
	CAN fault	Check CAN bus wiring at the RC57, Chassis, and Accessories (HI / LO)
	Firmware / config issue	Reload firmware / config. Contact Ramsey Industries for assistance
	Internal hardware fault	Replace unit
No Cellular / No Cloud Link	Poor signal	Relocate Crane and/or RC57 to different location
	Antenna obstruction	*Verify internal antenna path
	SIM / provisioning issue	Confirm device activation
	Cloud / server issue	*Verify backend status
	Modem hung	Power cycle device
No CAN Data (Local)	No CAN traffic	*Verify ECU (MC43) transmitting
	Wiring issue	Check CAN A / B HI (Pin 7, 9), LO (Pin 8, 10)
	Termination issue	Verify 120 Ohm resistors present at both ends of CAN wires
	Baud rate mismatch	*Confirm bus speed (250k vs 500k)
	Wrong CAN channel	*Verify CAN A vs CAN B usage
No CAN Data (Remote)	No cellular upload	Verify connectivity
	PGN not configured	*Check PGN whitelist (~40 max)
	No data changes	Device logs on change or interval
	Upload delay	Allow ~15 min cycle

Troubleshooting

SYMPTOMS	LIKELY CAUSE	RESOLUTION / CHECKS
GUI Cannot Connect	Wrong interface	Verify COM / connection settings
	No power	Confirm device powered
	Firmware mismatch	*Update GUI / firmware
	Debug pins misused	Avoid reserved pins (boot / reset / tx / rx)
Data Present but Incorrect	Wrong SPN mapping	*Verify PGN / SPN setup
	Scaling issue	*Check J1939 scaling / offset
	Wrong source address	*Verify ECU source filtering
	Multiple ECUs	*Filter correct PGN source
Intermittent CAN / Link Drop	EMI / noise	Check routing near high current lines
	Loose connector	Inspect connector retention
	Harness interference	Inspect retrofit wiring if applicable
	CAN overload	*Reduce PGN list
	Voltage drop	Check supply under load

Table – 20

* Contact your local dealer and/or Ramsey Industries for continued assistance as specific tool may be required.

Note: The following figures are for reference only. Use them to compare the voltage measurements during troubleshooting.

Auto CANbus 60 Ohm Network Test

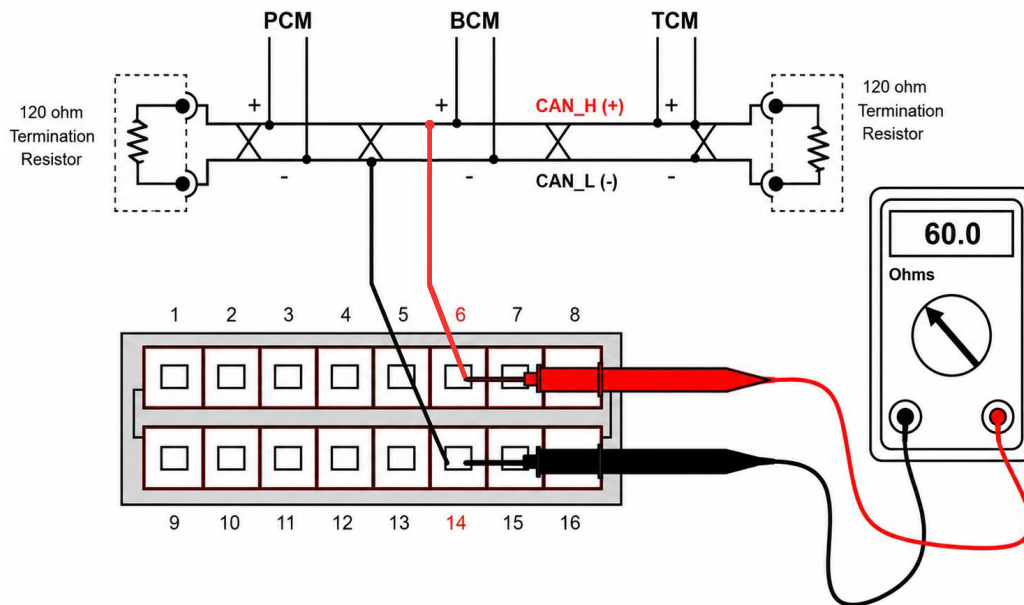


Figure – 86

Truck & Heavy Duty 60 Ohm Network Test

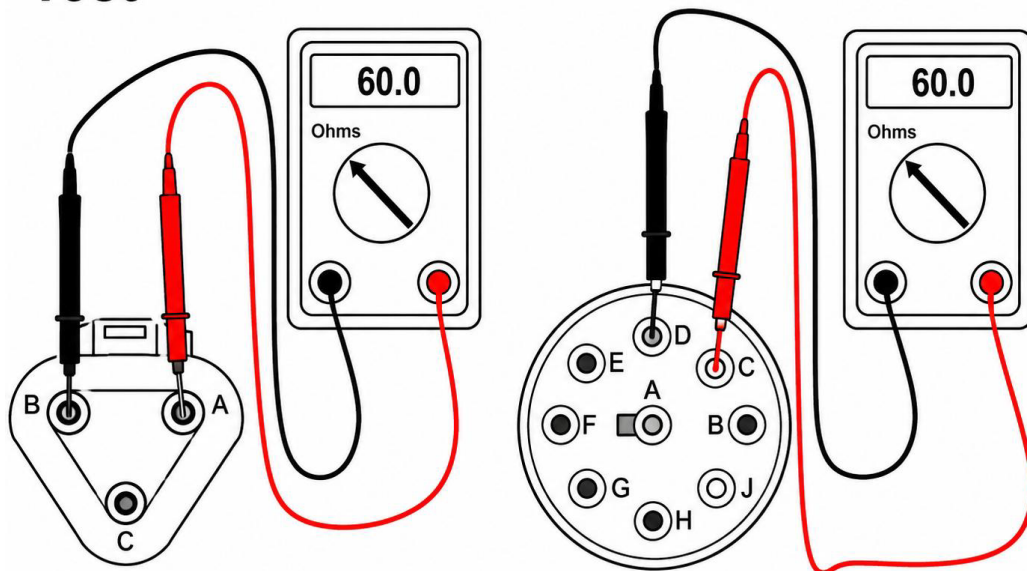


Figure – 87

Importance of the CANbus Network Resistance

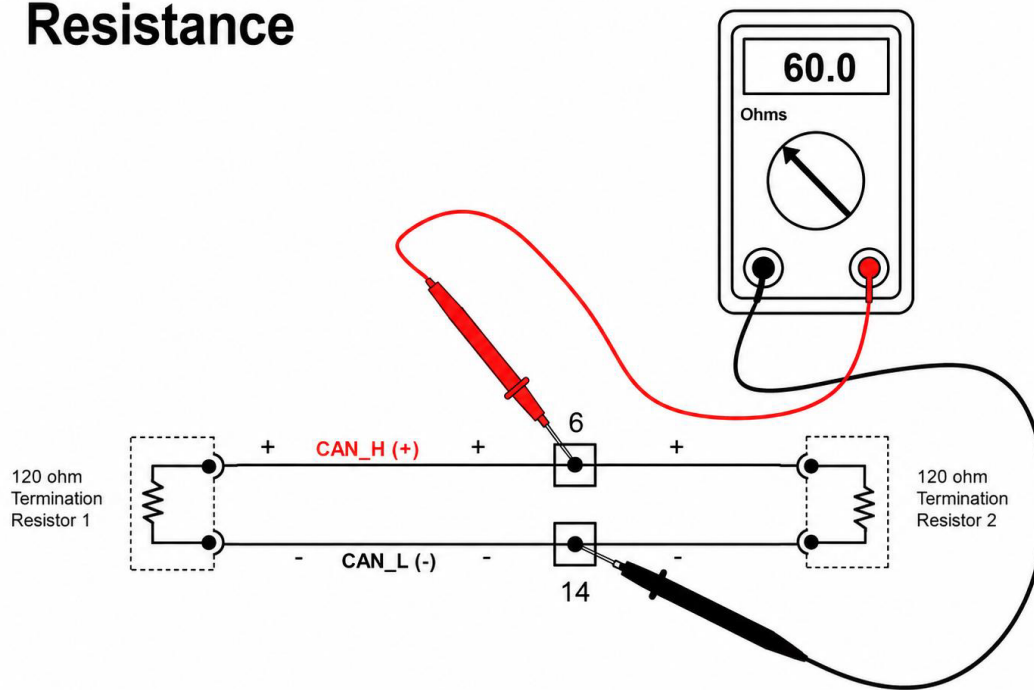


Figure – 88

Break in CAN_H(+) Wire (Open)

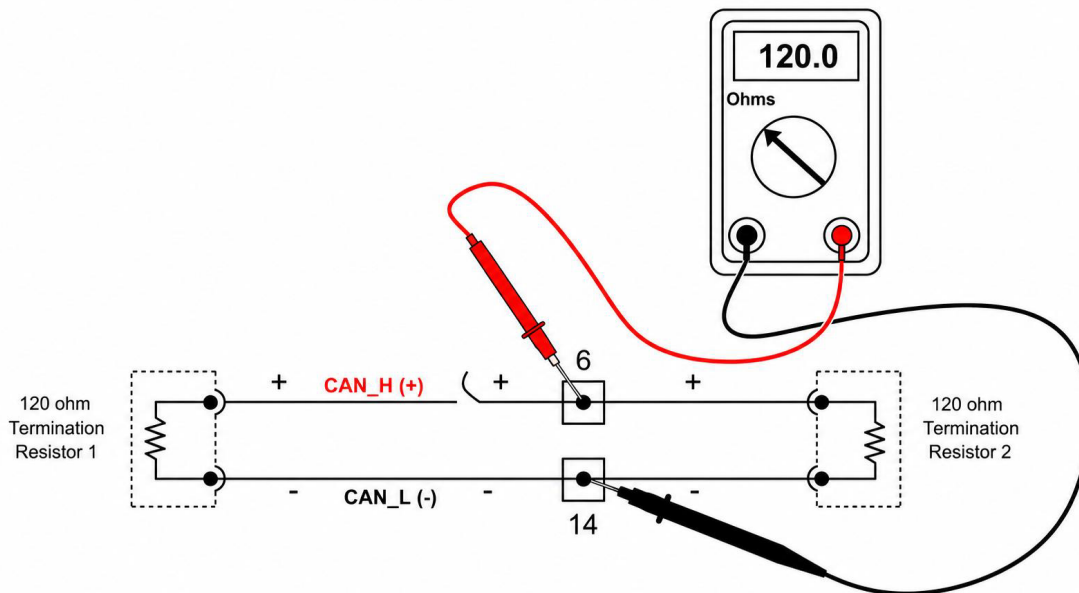


Figure – 89

CAN_H(+) wire is OK

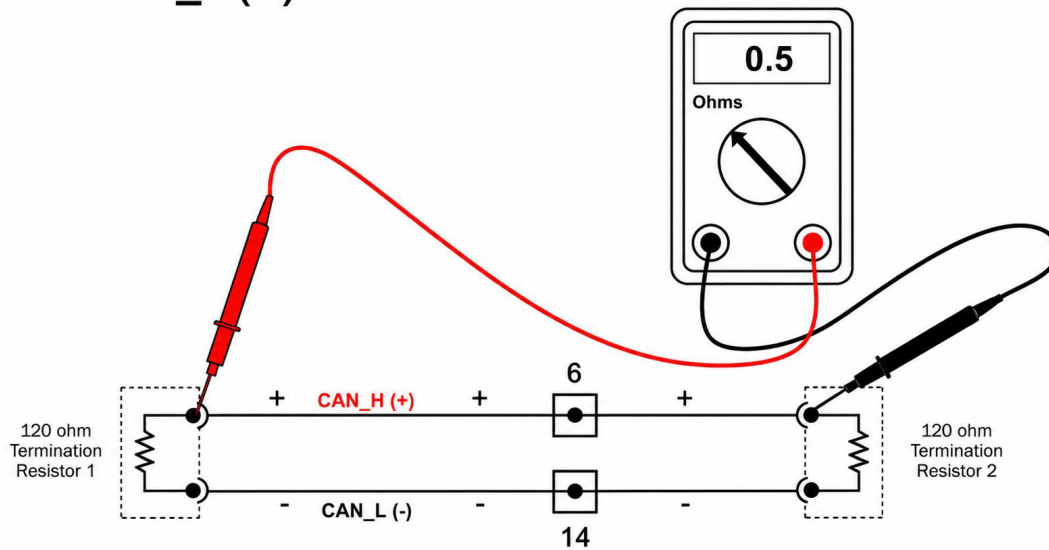


Figure – 90

CAN_H(+) wire is open

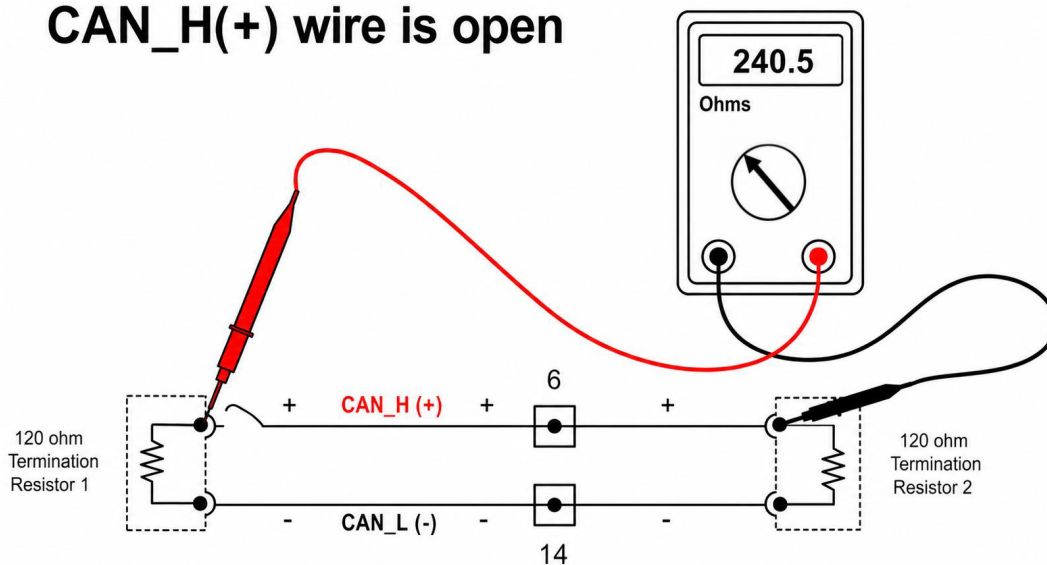


Figure – 91

Troubleshooting

CAN_L(-) wire is OK

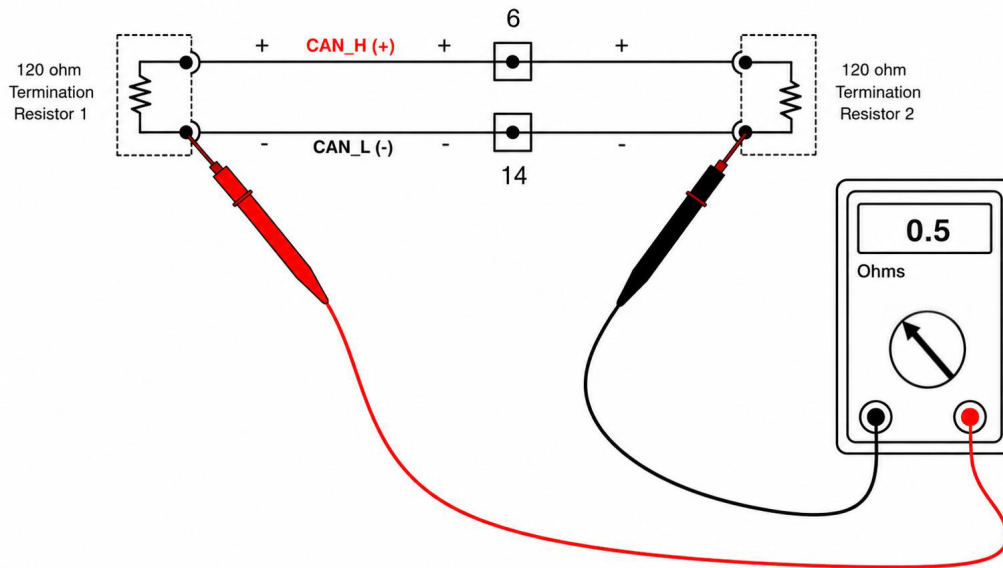


Figure – 92

240 ohm readings

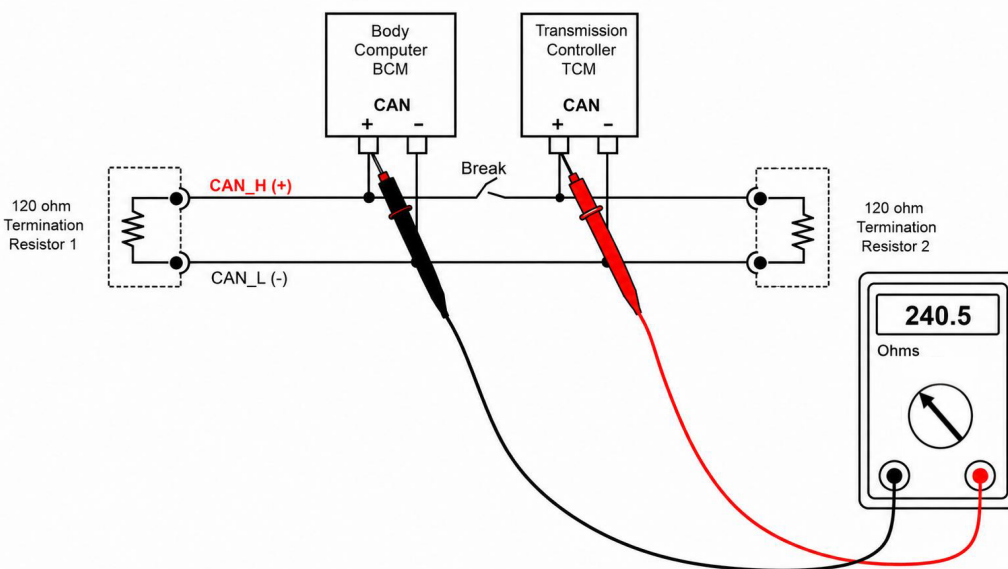


Figure – 93

.5 ohm readings

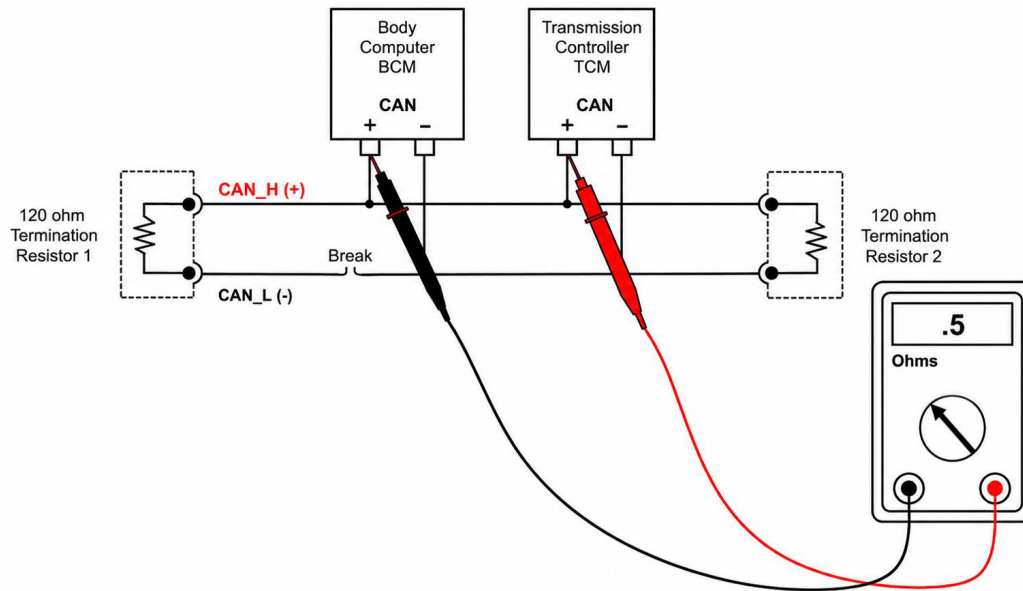


Figure – 94

TCM CAN + wire is OK

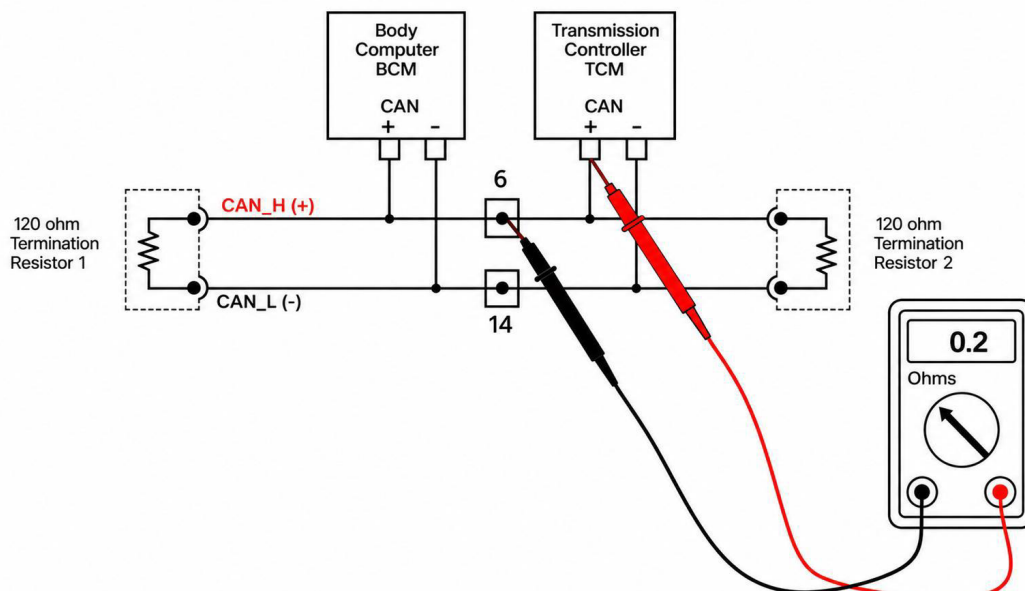


Figure – 95

TCM CAN + wire is broken

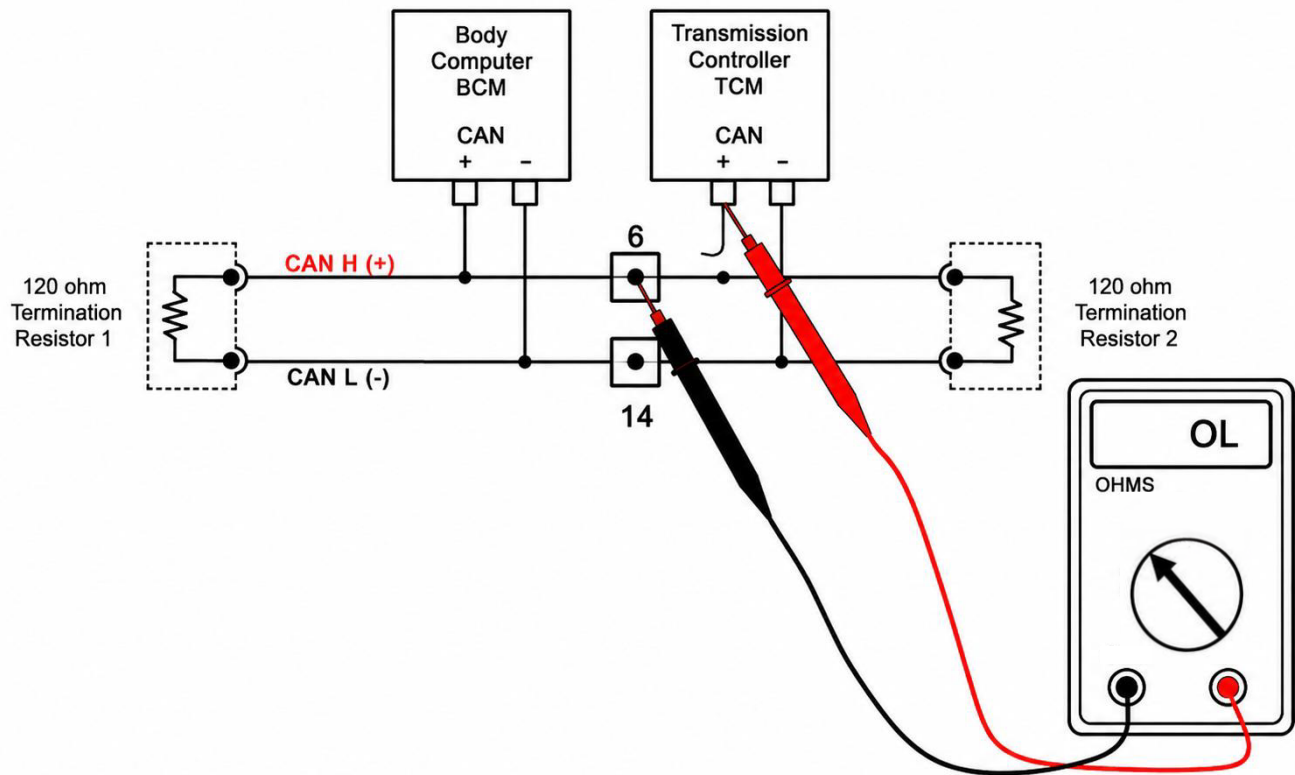


Figure – 96

TCM CAN - wire is OK

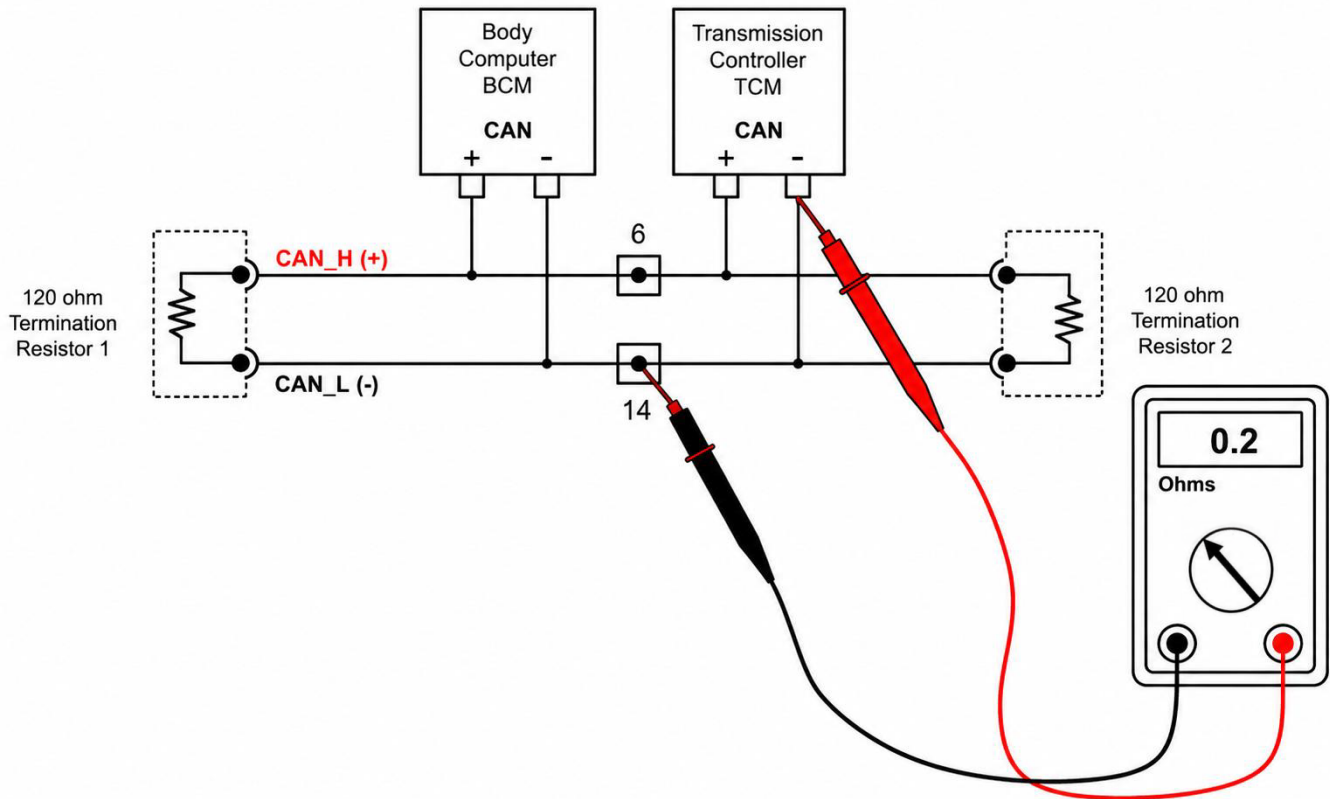


Figure – 97

Testing CANbus shield for proper grounding (Short)

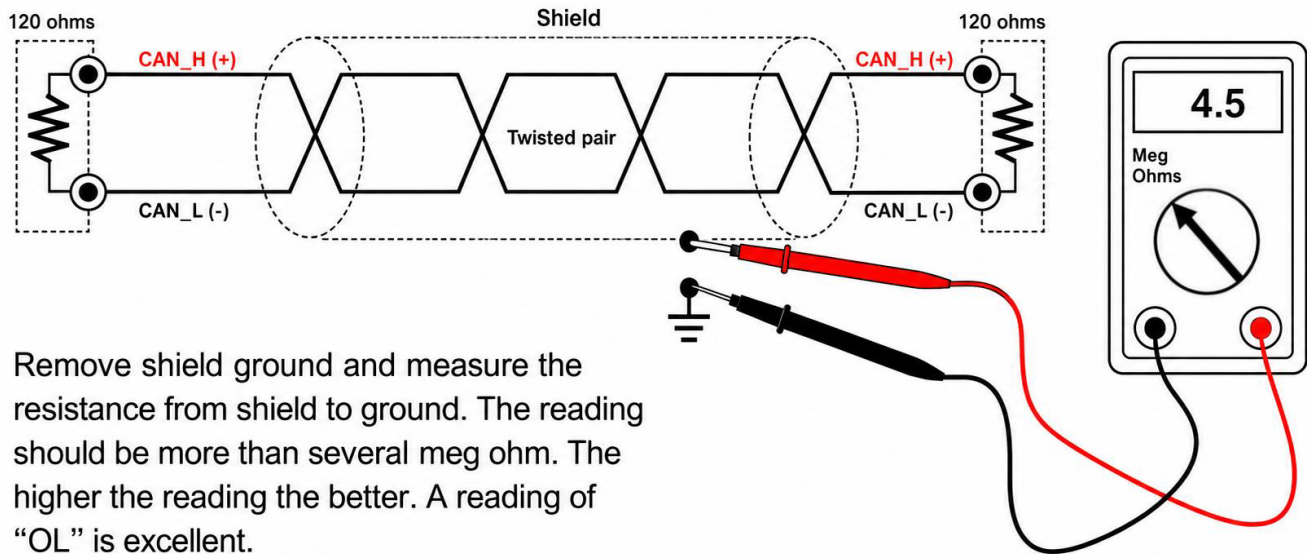


Figure – 98

AUTO CRANE NEW CRANES LIMITED WARRANTY

1.1 **Scope of Warranty Coverage.** Upon the terms and subject to the conditions set forth in this limited warranty:

(a) AUTO CRANE (referred to herein as “**AUTO CRANE**” or the “**Manufacturer**”) warrants to each initial end user customer (a “**Purchaser**”) of a new crane together with any accessories manufactured and sold directly from AUTO CRANE (the “**Product**”) that the Product shall be free from defects in material and workmanship, under normal working and service conditions, for a period of eighteen (18) months from the date the Product is shipped from AUTO CRANE. (the “**Warranty Term**”). A Purchaser shall be eligible for an additional eighteen (18) months of coverage in addition to the Warranty Term (also referred to as the “**Standard (+) PLUS benefit**”) only if the Purchaser (i) complies with Section 1.2(a) and (ii) registers the Product during the Warranty Term at myproduct.autocrane.com.

(b) Notwithstanding the foregoing, this warranty does not cover components damaged by accident, abuse, misuse, neglect, untrained operators, collision, overloading, modification, disassembly, rework, misapplication, improper installation, lack of lubrication or maintenance, or improper service. This warranty does not cover the paint or material finish, removal or reinstallation of the crane or components, or normal wear and tear and loss of functionality due to aging of the Product (which may include but is not limited to bearings, bushings, seals, O-rings, gaskets, brake material, motor brushes, electrical cables and more).

1.2 **Eligibility of Warranty Coverage.**

(a) A Purchaser shall be eligible for warranty coverage under this Limited Warranty during the Warranty Term only if:

(i) Prior to placing a Product in service, and throughout use of the Product during the Warranty Term, the Purchaser provides (or causes to be provided) proper storage such that foreign objects (e.g. rain or debris) cannot enter any Product through entry ports which are normally closed during operation.; and

(ii) The Purchaser maintains, or causes to be maintained, the Product according to commercially reasonable standards and utilizes the Product for the purposes for which it was created; and

(iii) No repairs or alterations have been made by any party other than AUTO CRANE, including Purchaser, unless otherwise authorized in writing by AUTO CRANE.

1.3 **Transferability of Warranty.**

(a) This warranty is transferable only from the Purchaser to the first subsequent transferee (the “**Transferee**”) of the Product from Purchaser upon (i) written notification to AUTO CRANE and (ii) registration of the transfer, both within 30 days of such Product transfer.

(b) Upon satisfaction of transfer requirements set forth in Section 1.3(a), the Transferee shall succeed to all the rights and obligations of the Purchaser set forth in this Limited Warranty.

1.4 **Certain Limitations on Scope of Warranty Service.**

(a) Any obligation of AUTO CRANE under this warranty, statutory or otherwise, is limited to the repair of the Product, at its factory or Authorized Service Centers. Notwithstanding the foregoing, if field service or repair is performed by AUTO CRANE at the request of the Purchaser and no defect is found with material or workmanship of the Product, the Purchaser shall compensate AUTO CRANE for its time and expenses within thirty (30) days of delivery of an invoice relating to the same. If repair is determined by AUTO CRANE in its sole, absolute and uncontrolled discretion to be impossible or impractical, then AUTO CRANE may satisfy this warranty by replacing the Product. AUTO CRANE will not provide any cash payment or credits for defective materials or workmanship.

Warranty

(b) Purchaser shall be responsible for any and all freight charges for any Product receiving warranty service under this limited warranty. Any travel time, transportation charges, freight charges, or similar costs incurred by AUTO CRANE in connection with the replacement or repair of defective parts, shall, be the responsibility of the Purchaser. If applicable, AUTO CRANE shall invoice Purchaser for the total amount of such charges within sixty (60) days of fulfilling its duties under this warranty, payable within thirty (30) days of delivery of such invoice. In no event shall AUTO CRANE be liable for bills for service, labor or other expenses that have been incurred by the Purchaser without approval or prior authorization by AUTO CRANE for inspection, maintenance, or repair of the Product.

(c) If a Product is found to be operable upon inspection, the Product, at Purchaser's election, may be either (1) returned to the Purchaser with a service charge from AUTO CRANE for inspection, cleaning, and routine replacement of all rubber components and any other parts that show wear; or (2) AUTO CRANE can dispose of the product safely.

1.5 Limitations of Liability. AUTO CRANE shall in no event be liable for punitive, special or consequential damages relating to the Product or this Warranty. AUTO CRANE makes no warranty in respect to third-party accessories, upgrades, or additions to the Product.

1.6 Improving Product. AUTO CRANE reserves the right to improve the Product through changes in design or materials as it may deem desirable or necessary without being obligated to incorporate, upgrade, or otherwise modify previously manufactured products.

1.7 Limitations of Warranty.

(a) THE WARRANTY SET FORTH ABOVE IS THE ONLY EXPRESS WARRANTY. AUTO CRANE HEREBY DISCLAIMS AND EXCLUDES ANY OTHER EXPRESS, IMPLIED, OR STATUTORY WARRANTIES, ARISING BY OPERATION OF LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE, OF TRADE, OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND INTELLECTUAL PROPERTY RIGHTS OF A THIRD PARTY.

(b) ANY IMPLIED WARRANTY WHICH BY LAW MAY NOT BE EXCLUDED IS LIMITED IN DURATION TO ONE (1) YEAR FROM THE DATE OF ORIGINAL RETAIL PURCHASE OF THE PRODUCT.

(c) This warranty gives you specific legal rights, and you may also have other rights which vary from jurisdiction to jurisdiction.

(d) This warranty is valid only in the U.S.A. and Canada. For warranty outside the U.S.A. and Canada contact your nearest AUTO CRANE Distributor.

1.8 No Modifications to Warranty. No AUTO CRANE dealer, distributor, agent or employee is authorized to make any modification, extension or addition to this warranty.

1.9 How to Apply for Warranty Coverage.

All claims are handled by contacting your nearest Auto Crane Dealer. For questions, please contact customer support: accustomersupport@ramseyindustries.com.

Visit [Dealer Locator - Auto Crane](#) for Auto Crane Dealer locations and contact information.

Additional warranty, service support, product information, and parts information can be found on www.autocrane.com.