INSTALLATION INSTRUCTIONS

91796705
UNIVERSAL TELEMATICS KIT

APPROXIMATE INSTALLATION TIME: 3.0 hours

New - 91796707
Issue date November 2022
EN

91796705 - UNIVERSAL TELEMATICS KIT

ALL BRANDS
CM100
CM110

1 - SAFETY INFORMATION

Safety rules

Personal safety

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

⚠ DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury.

⚠ WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.

⚠ CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.

Machine safety

NOTICE: *Notice indicates a situation that, if not avoided, could result in machine or property damage.*

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine or property damage. The word Notice is used to address practices not related to personal safety.

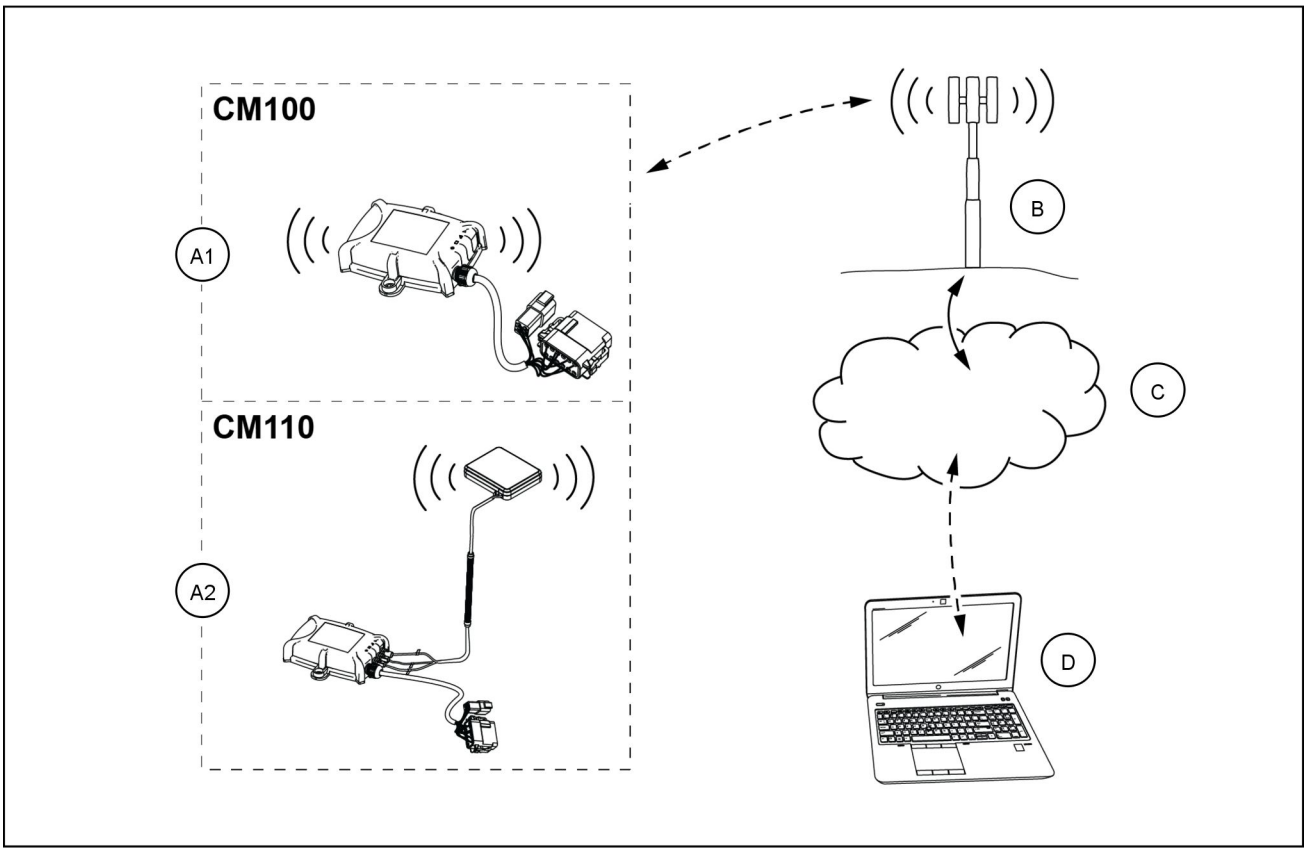
Information

NOTE: *Note indicates additional information that clarifies steps, procedures, or other information in this manual.*

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

2 - KIT CONTENT

Introduction



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Telematics system overview

The telematics system on a vehicle is used for vehicle and fleet management.

The telematics system contains the following items:

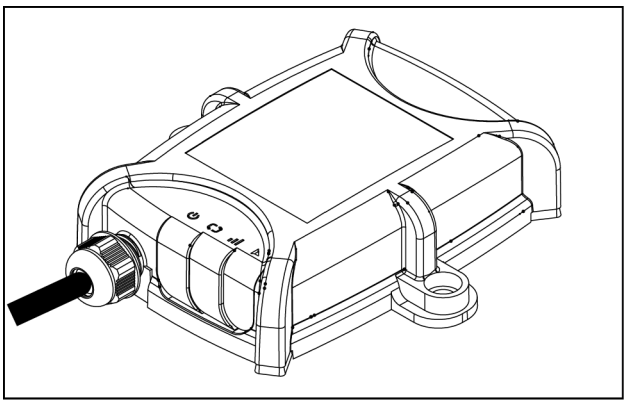
- A connected modem (CM100 **(A1)** with an internal antenna or CM110 **(A2)** with an external antenna) installed in the vehicle to collect and transmit data.
- The wireless cellular network **(B)** and internet infrastructure **(C)** to exchange data between devices.
- A back-end cloud infrastructure to manage your vehicle and to deliver subscriptions wirelessly.
- An internet-connected phone, tablet, or computer **(D)** to remotely access and monitor your vehicle through the AFS Connect™ / MYPLMCONNECT / S-Fleet portal for agricultural equipment and the SiteWatch™ / FleetForce™ portal for construction equipment.

Once installed and activated with a valid subscription, the connected modem can be used for telematics features such as track-and-trace geolocation, messaging, curfews, vehicle status reporting, geofences, error code reporting, and CAN alerts through the associated portal account.

Kit overview

The universal telematics kit provides the necessary wiring harnesses and instruction to install the CM100 or CM110 modem onto a vehicle that is not pre-wired to accept the device.

You must order the modem in addition to the universal telematics kit to complete the installation. For installations that use the CM110, the external dual-mode antenna is also required. Make sure that you order the antenna with the appropriate cable length based on installation requirements.



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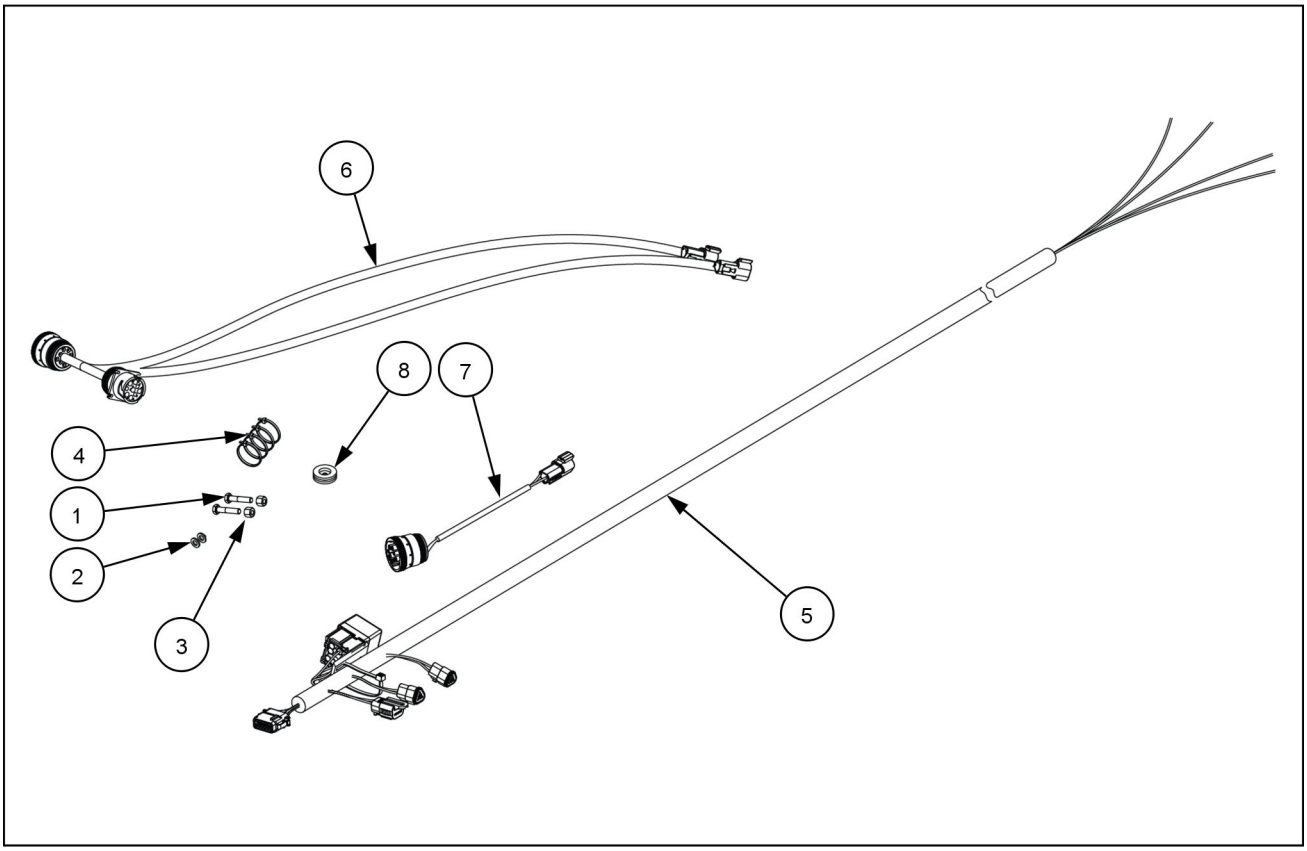
Kit contents



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Kit contents

Item	Description	Quantity
(1)	Screw, hex socket, M6 x 20, Class (CL) 8.8	2
(2)	Washer, flat, 6.6 x 12 x 1.6 mm	2
(3)	Locknut, M6	2
(4)	Cable tie	4
(5)	Wiring harness, universal telematics	1
(6)	Wiring harness, dual CAN-to-diagnostic	1
(7)	Wiring harness, single CAN-to-diagnostic	1
(8)	Grommet, M14	1

3 - GENERAL INFORMATION

Foreword - Important notice regarding equipment servicing

All repair and maintenance work listed in this manual must be carried out only by qualified dealership personnel, strictly complying with the instructions given, and using, whenever possible, the special tools.

Anyone who performs repair and maintenance operations without complying with the procedures provided herein shall be responsible for any subsequent damages.

The manufacturer and all the organizations of its distribution chain, including - without limitation - national, regional, or local dealers, reject any responsibility for damages caused by parts and/or components not approved by the manufacturer, including those used for the servicing or repair of the product manufactured or marketed by the manufacturer. In any case, no warranty is given or attributed on the product manufactured or marketed by the manufacturer in case of damages caused by parts and/or components not approved by the manufacturer.

The manufacturer reserves the right to make improvements in design and changes in specifications at any time without notice and without incurring any obligation to install them on units previously sold. Specifications, descriptions, and illustrative material herein are as accurate as known at time of publication but are subject to change without notice.

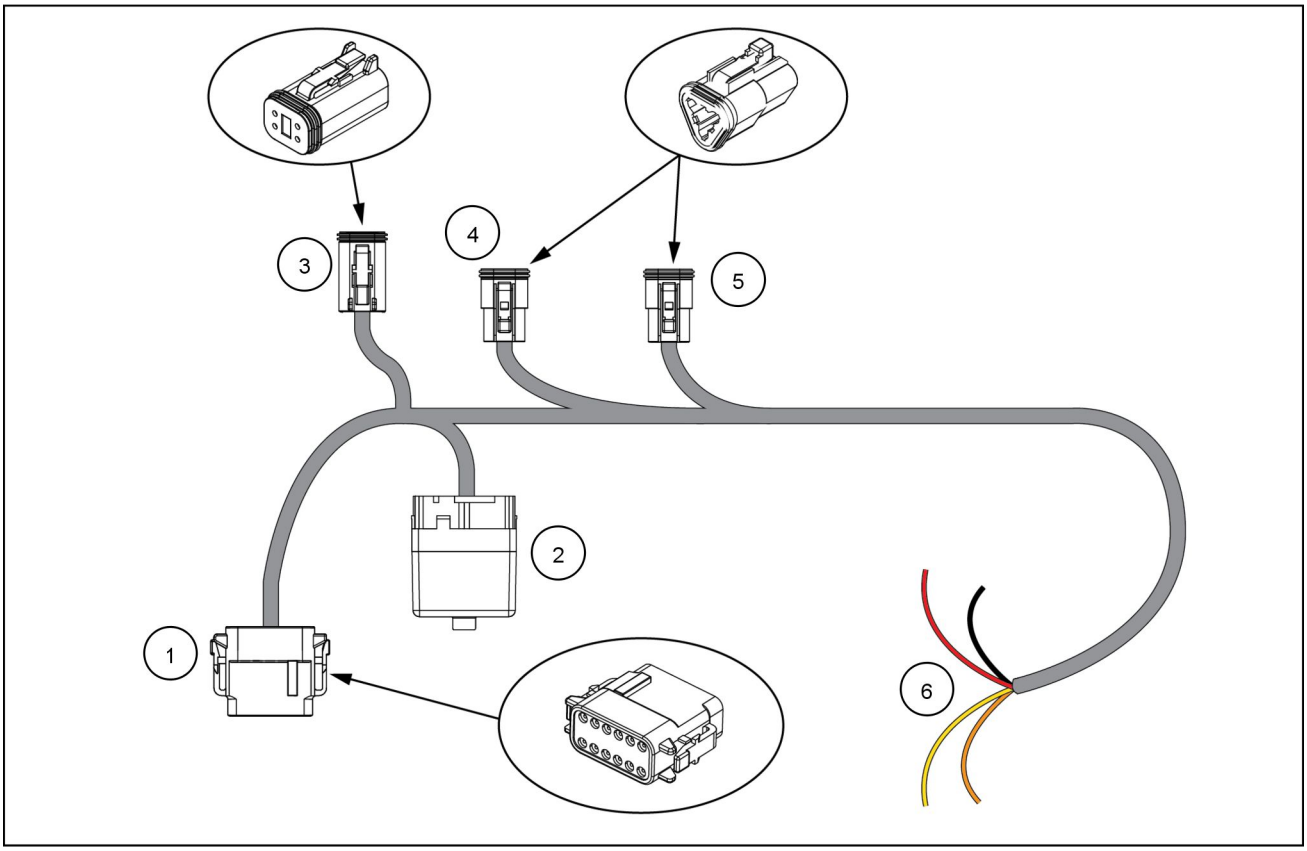
In case of questions, refer to your CNH Industrial Sales and Service Networks.

4 - ASSEMBLY

UNIVERSAL TELEMATICS KIT

Wiring harness identification

Universal telematics wiring harness



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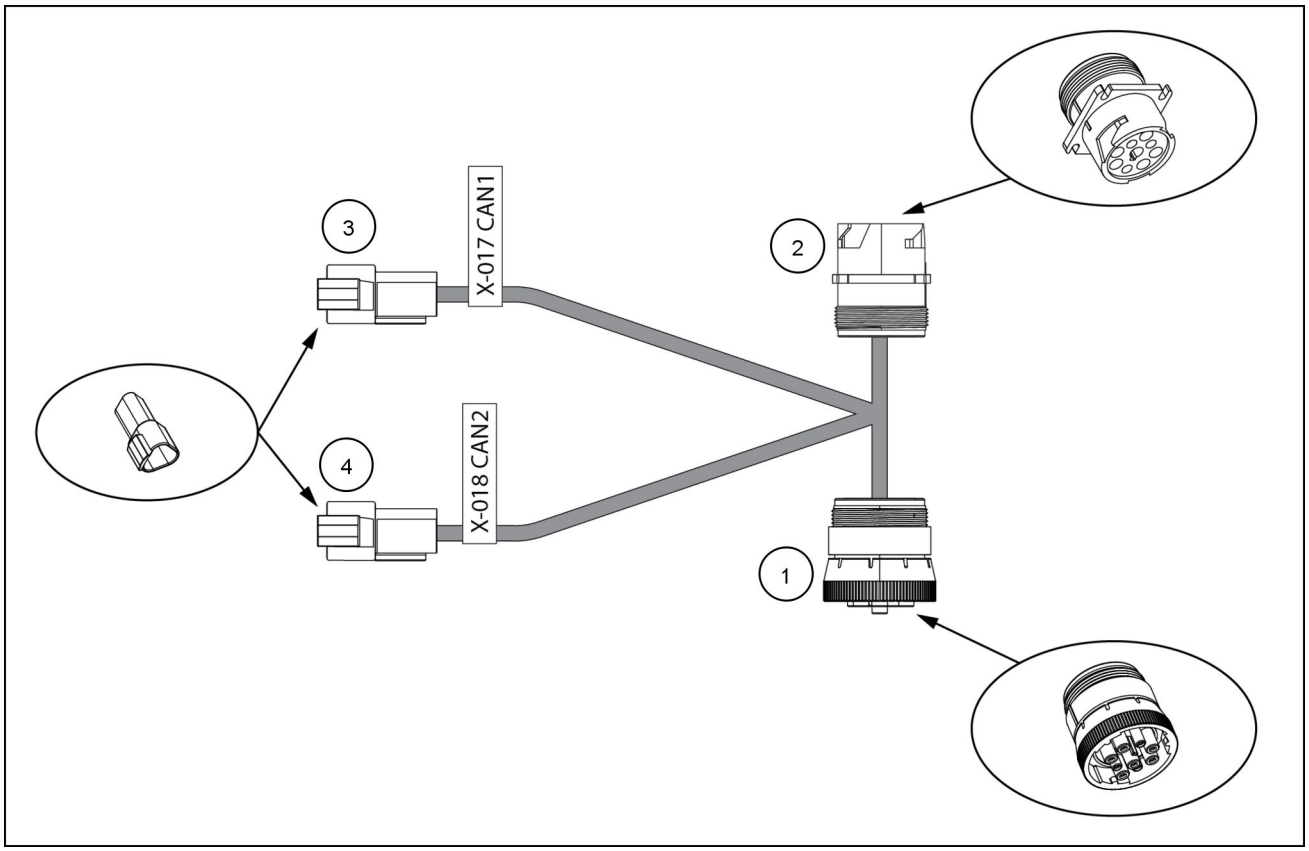
Item	Identifier	Description	Usage
(1)	X-001	CM100/CM110	Connects to the CM100 or CM110 modem
(2)	X-002	FUSES	Contains two **5 A** fuses
(3)	X-003	X-003 TO DIAG	Communication with the vehicle on RS-232 for interfacing with the Electronic Service Tool (EST)
(4)	X-004	X-004 CAN 1	Communication with the vehicle on CAN 1
(5)	X-005	X-005 CAN 2	Communication with the vehicle on CAN 2
(6)	Red wire	B+	Connects to a **12 V** battery power source
	Black wire	GND	Connects to clean battery ground
	Yellow wire	ALT D+	Connects to the excitation circuit of the alternator on non-CAN vehicle installations to monitor engine hours
	Orange wire	SW B+	Connects to a switched **12 V** battery power source

Dual CAN-to-diagnostic wiring harness



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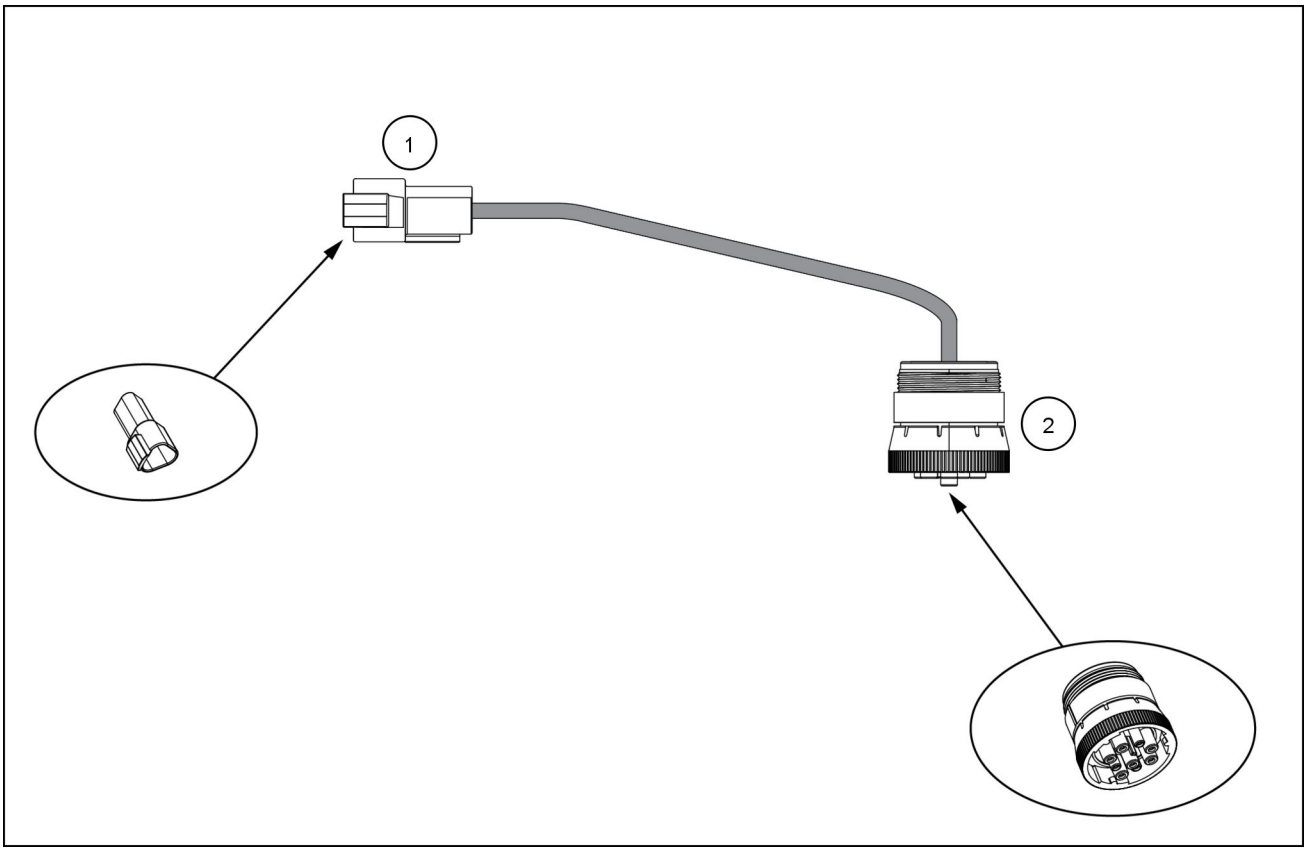
Item	Identifier	Description	Usage
(1)	X-015	MACHINE DIAGNOSTIC PORT CONNECTOR	Connects to the diagnostic port on the vehicle, to communicate with the display over CAN 1 and/or CAN 2
(2)	X-016	PASS-THRU CONNECTOR FOR EST	Provides a new diagnostic port on the vehicle for use with the Electronic Service Tool (EST)
(3)	X-017	CAN 1	Connects to the CAN connectors on the universal telematics wiring harness
(4)	X-018	CAN 2	Connects to one of the CAN connectors on the universal telematics wiring harness

NOTE: *Always confirm the pinout of the vehicle diagnostic connector before attaching the dual CAN-to-diagnostic wiring harness. While connector X-017 is labeled "CAN1" and connector X-018 is labeled "CAN2", always check the wiring at the vehicle diagnostic connector to see which wires are for which CAN bus line. You may need to swap the connections for CAN 1/CAN 2 at the universal harness if the wiring to the diagnostic connector is reversed.*

Single CAN-to-diagnostic wiring harness



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Item	Identifier	Description	Usage
(1)	X-002	MACHINE DIAGNOSTIC PORT CONNECTOR	Connects to the diagnostic port on the vehicle, to communicate with the display over a single CAN bus line
(2)	X-001	CAN	Connects to one of the CAN connectors on the universal telematics wiring harness

Wiring harness installation

Overview

NOTE: *While inspecting the vehicle wiring to ensure proper connections to the universal telematics wiring harness, CAN 1 may be labeled as the primary CAN, and CAN 2 may be labeled as the secondary CAN.*

To ensure proper operation of the telematics system, follow the instructions for the option that applies to the specific vehicle for Controller Area Network (CAN) communication.

- Option 1: No CAN bus connection – Typically used for older, legacy vehicles that do not have a CAN bus. This telematics kit allows for engine hours to be monitored via the yellow input wire on the wiring harness.

  NOTE: *If more inputs other than engine hours are required to be monitored, the non-CAN universal telematics kit should be used.*

- Option 2: Two CAN bus lines on a single diagnostic connector – Typically used for combines, forage harvesters, and CASE IH **Patriot®** sprayers where you can access both CAN 1 and CAN 2 from a single diagnostic connector.

  NOTE: *Check the wiring to the vehicle diagnostic connector to see which wires are for which CAN bus line. You may need to swap the connections for CAN 1/CAN 2 at the universal harness if the wiring to the diagnostic connector is reversed.*

- Option 3: Two CAN bus lines on two separate diagnostic connectors – Typically used on tractors, where you must access CAN 1 and CAN 2 on separate diagnostic connectors.

Prepare the machine

⚠ WARNING

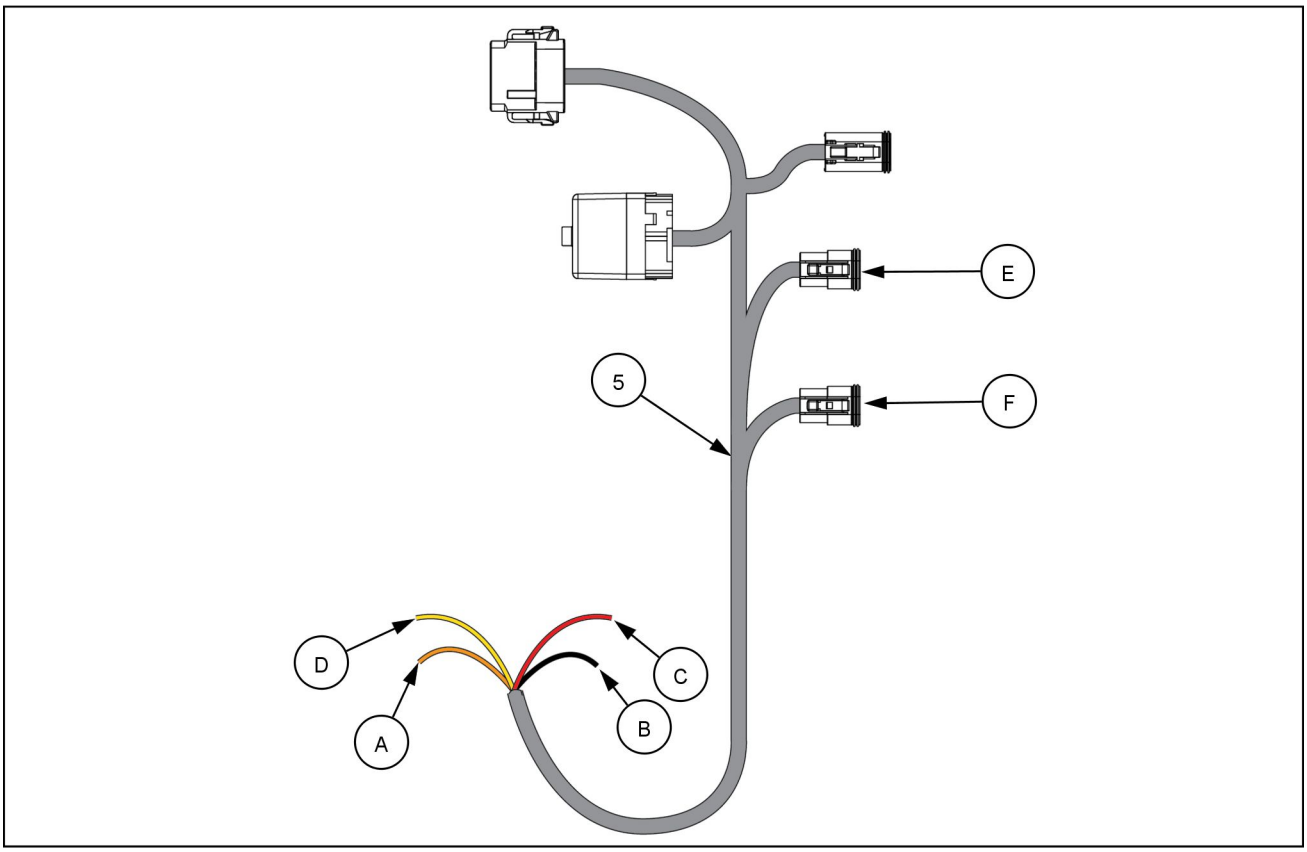
Electrical shock hazard!
Before working on any part of the electrical system, disconnect the battery ground cable. Complete all electrical work before connecting the cable.
Failure to comply could result in death or serious injury.

W0129A

Prepare the machine and work area before installation of the universal telematics kit.

1. Park the machine on a firm, level surface.
2. Lower all attachments to the ground.
3. Apply the parking brake.
4. Stop the engine and remove the key.
5. Disconnect the battery ground cable from the negative (–) terminal of the battery.

Option 1: No CAN connection



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Wiring diagram – No CAN bus connection

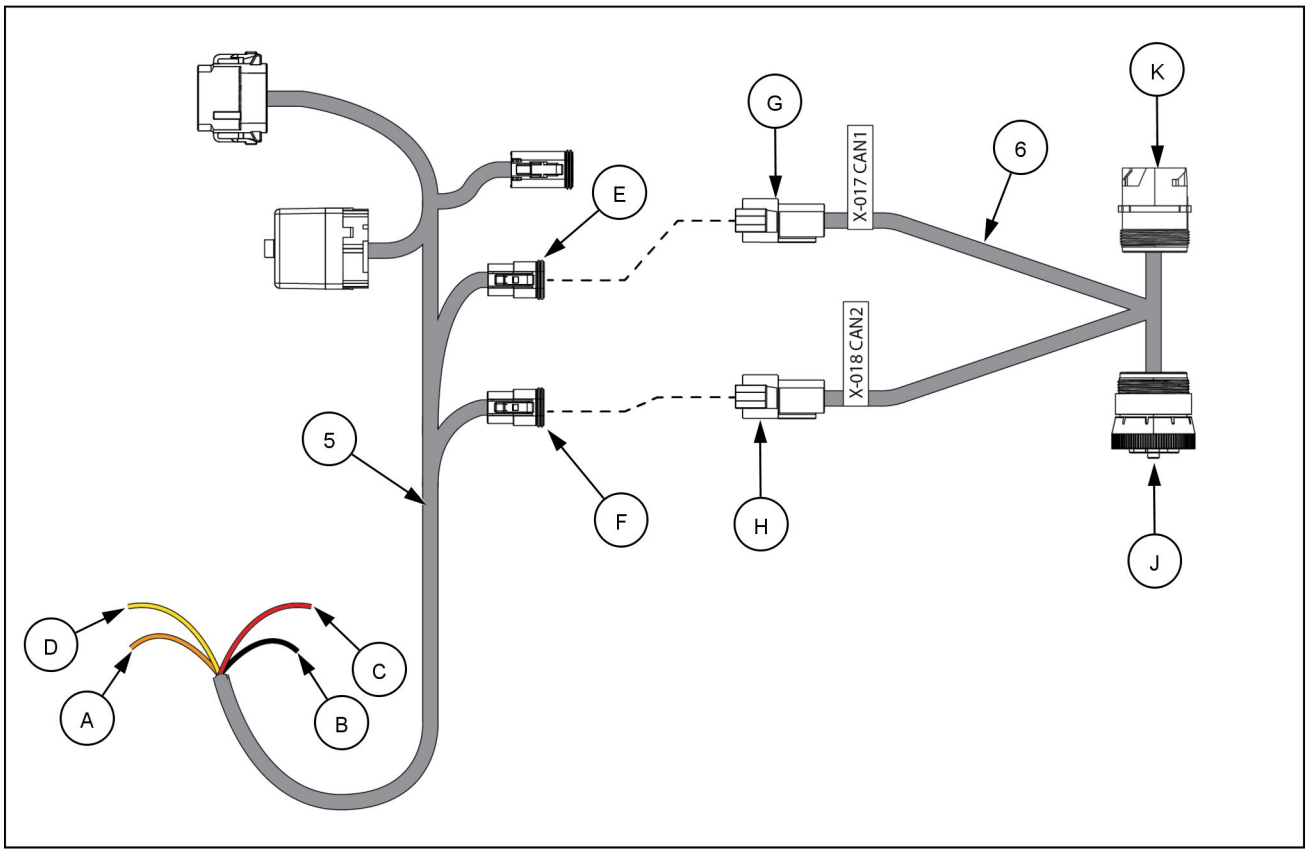
If the vehicle does not have a CAN bus, then you will only need to install the universal telematics harness **(5)**. The yellow wire can be connected to the excitation circuit of the alternator to report engine hours to the portal.

NOTE: *In this scenario, the CAN 1 connector **(E)** and the CAN 2 connector **(F)** are unused.*

Connect the bare wires to the vehicle:

- Orange wire **(A)** – Switched **12 V** battery power (SW B+)
- Black wire **(B)** – Clean ground
- Red wire **(C)** – Unswitched **12 V** battery power (B+)
- Yellow wire **(D)** – ALT D+, connect to the excitation circuit of the alternator

Option 2: Two CAN bus lines on a single diagnostic connector



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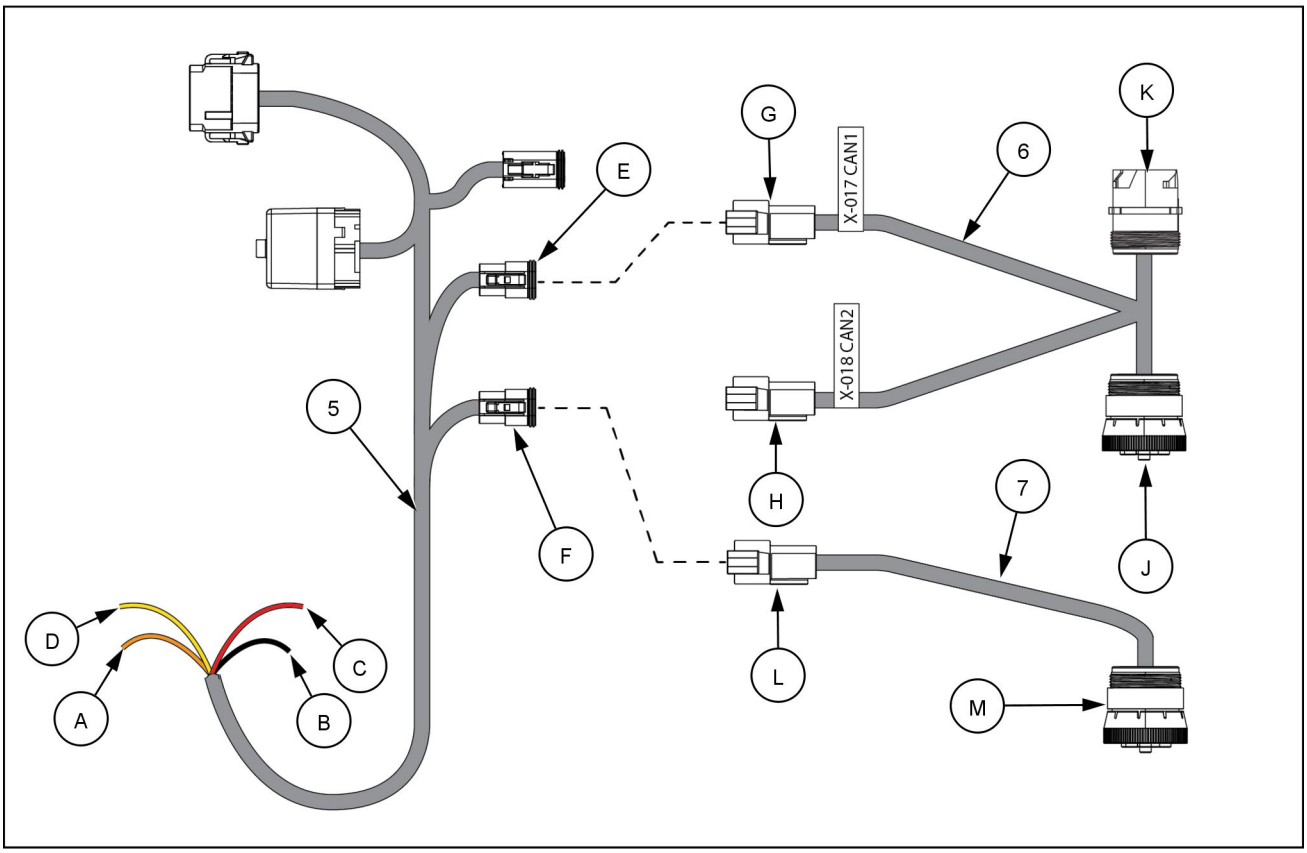
If the installation is on a vehicle that has two CAN bus lines on a single diagnostic connector:

1. Install the universal telematics wiring harness **(5)** and the dual CAN-to-diagnostic wiring harness **(6)**.
   A. Connect the CAN 1 connector **(E)** on the universal telematics wiring harness to the connector labeled “X-017 CAN1” **(G)** on the dual CAN-to-diagnostic wiring harness.
   B. Connect the CAN 2 connector **(F)** on the universal telematics wiring harness to the connector labeled “X-018 CAN2” **(H)** on the dual CAN-to-diagnostic wiring harness.
   C. Connect the diagnostic connector **(J)** on the dual CAN-to-diagnostic wiring harness to the factory diagnostic connector in the cab of the vehicle.
2. Connect the four bare wires to the vehicle power source:
   - Orange wire **(A)** – Switched **12 V** battery power (SW B+)
   - Black wire **(B)** – Clean ground
   - Red wire **(C)** – Unswitched **12 V** battery power (B+)
   - Yellow wire **(D)** – ALT D+, connect to the excitation circuit of the alternator

The dual CAN-to-diagnostic wiring harness **(6)** provides access to the CAN 1 and CAN 2 lines through a replicated factory diagnostic connector **(K)**.

Option 3: Two CAN bus lines on two separate diagnostic connectors



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If the installation is on a vehicle that has two CAN bus lines on two separate diagnostic connectors:

1. Install the universal telematics wiring harness **(5)** and the dual CAN-to-diagnostic wiring harness **(6)**.
   A. Connect the CAN 1 connector **(E)** on the universal telematics wiring harness to the connector labeled “X-017 CAN1” **(G)** on the dual CAN-to-diagnostic wiring harness.
   B. Leave the connector labeled “X-018 CAN2” **(H)** on the dual CAN-to-diagnostic wiring harness unconnected.
   C. Connect the diagnostic connector **(J)** on the dual CAN-to-diagnostic wiring harness to the factory CAN 1 diagnostic connector in the cab of the vehicle.

      NOTE: *The factory diagnostic connector must have CAN 1 on pins C and D. If CAN 1 is on pins H and J, then you must use connector X-018 to interface with the universal telematics wiring harness.*
2. Install the single CAN-to-diagnostic wiring harness **(7)**.
   A. Connect the CAN 2 connector **(E)** on the universal telematics wiring harness to the connector **(L)** on the single CAN-to-diagnostic wiring harness.
   B. Connect the diagnostic connector **(M)** on the single CAN-to-diagnostic wiring harness to the factory CAN 2 diagnostic connector in the cab of the vehicle.

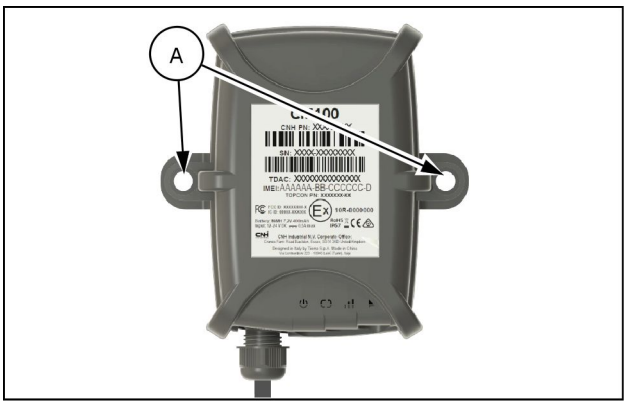
      NOTE: *This factory diagnostic connector must have CAN 2 on pins C and D.*
3. Connect the four bare wires to the vehicle power source:
   - Orange wire **(A)** – Switched **12 V** battery power (SW B+)
   - Black wire **(B)** – Clean ground
   - Red wire **(C)** – Unswitched **12 V** battery power (B+)
   - Yellow wire **(D)** – ALT D+, connect to the excitation circuit of the alternator

Mounting information

CM100 or CM110 modem

The universal telematics kit provides two M6 x 2 0 screws, washers, and M6 nuts to mount the CM100 or CM110 modem to your vehicle. The modem has two mounting holes **(A)** to secure the module to the vehicle or vehicle-specific bracket.

Install the modem in a protected area, such as inside the vehicle cab. The CM110 modem can be installed in any orientation, however, the CM100 modem must be mounted with the top of the device towards the sky to improve the GNSS performance of the internal antenna.



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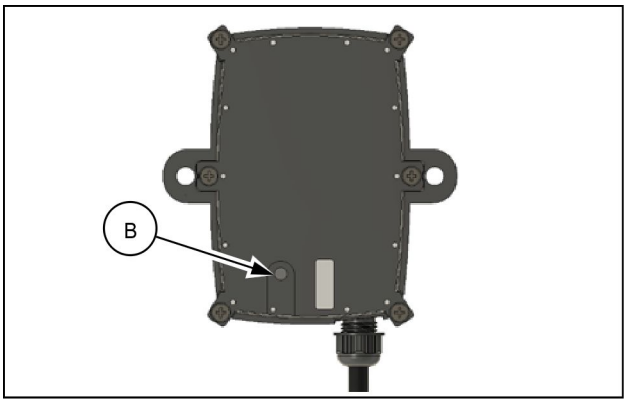
NOTICE: *To prevent damage to the modem, do not torque the bolts more than* ***5 N·m*** *(****44 lb in****).*

NOTICE: *Never cover the vent hole* ***(B)*** *in the bottom of the CM100 or CM110 modem with tape or Velcro®, or device failure may result. The vent hole allows for the release of humidity due to temperature changes.*

NOTE: *Make sure that the device is mounted securely in place. Any motion detected by the internal accelerometer may be a false reading and have a negative impact on performance.*



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If there is uncertainty about the signal quality based on the installation location:

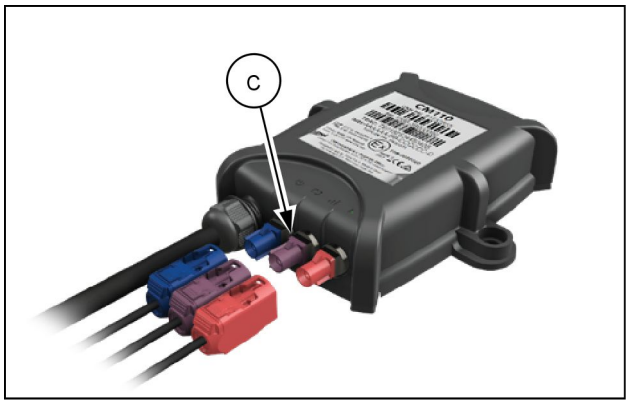
A. Connect an Electronic Service Tool (EST) computer to the “X-003 TO DIAG” connector on the universal telematics wiring harness with programming harness **380100097** and a compatible USB to **RS-232** adapter.

B. In the EST software, navigate to the CM100/ CM110 model (Vehicle ID 0562) under the “ADDITIONAL EQUIPMENT” category.

C. Select the “Request Information” configuration to check the modem signal strength and GNSS satellite reception.

Dual-mode antenna (CM110 modem only)

The CM110 modem requires an external dual-mode antenna for use with cellular networks, which must be ordered separately along with the modem.



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Mount the dual-mode antenna in a suitable location:

- The dual-mode antenna can be placed under plastic or fiberglass surfaces, but not metallic surfaces. Mounting the antenna in a storage compartment inside the cab is acceptable, as long as the antenna is in a location that would not be shielded by a metal surface (such as that found on the cab of tractors that use a loader).
- The dual-mode antenna should not be mounted near obstructions that could produce shadowing or signal degradation. Consider mounting the antenna away from radios (such as AM/FM or CB radios) to avoid interference.

The connectors for the dual-mode antenna attach to the antenna ports **(C)** on the CM110 modem. The dual-mode antenna has three connectors:

Color	Function
Blue	GNSS
Carmin Red	Cellular – Diversity (4G)
Bordeaux	Cellular – Main

Component installation

1. Install the CM100 or CM110 modem with the two M6 x 20 screws, washers, and nuts in a suitable location on the vehicle. See “Mounting information” (**4-15**) for more information.
2. Torque the nuts to a maximum of **5 N·m** (**44 lb in**).

NOTICE: *To prevent damage to the modem, do not over-torque the nuts.*

3. Make sure that the wiring harnesses provided with the kit are installed per the instructions in “Wiring harness installation” (**4-11**).
4. Make sure that the bare wires are connected to the appropriate power, switched power, and ground sources. If the universal telematics kit is installed on a non-CAN machine, make sure that the yellow input wire is connected to the excitation circuit of the alternator to allow for the engine hour reporting.
5. Connect the modem connector on the universal telematics wiring harness to the CM100 or CM110 modem.

CM110 modem only

6. Install the dual-mode antenna in a horizontal position in a place that ensures open sky conditions during operation. Avoid places covered by metallic surfaces that might filter the GNSS signal. See “Mounting information” (**4-15**) for more information.

NOTE: *The dual-mode antenna mounted externally on the cab roof will suffice for most applications.*

7. Route the connectors for the dual-mode antenna to the installation location of the CM110 modem.

NOTE: *Use the provided grommet , if necessary, to pass the connectors through into the vehicle cab.*

8. Connect the three dual-mode antenna connectors to the CM110 modem.

Special consideration for initial internal battery charging

NOTICE: *Upon first connection, you must power the CM100 or CM110 device for ten hours of normal run time to fully charge the internal battery.*

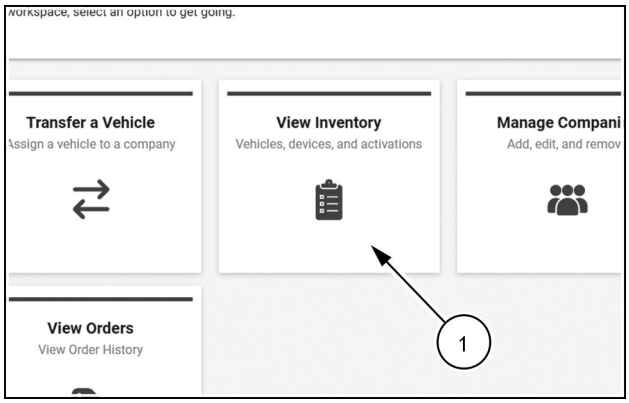
Device activation for agricultural equipment

Activate the CM100 or CM110 modem for agricultural equipment in the Vehicle Management System (VMS).

Before activating the modem, confirm that the customer has a registered account (“company”) that has your dealership set as the servicing dealer. If not, instruct the customer to create an account and associate it with your dealership through the MyCaseIH / MyNewHolland / MySteyr website.

Alternatively, create the customer company through the VMS. Your dealership will be granted temporary access to the account and associated vehicles for 30 days.

1. Place the vehicle, powered on, in an open area with adequate cellular reception.
2. Navigate to the Vehicle Management System (VMS) from the dealer portal (https://portal.cnhind.com/).
3. From the VMS dashboard, select “View Inventory” **(1)**.



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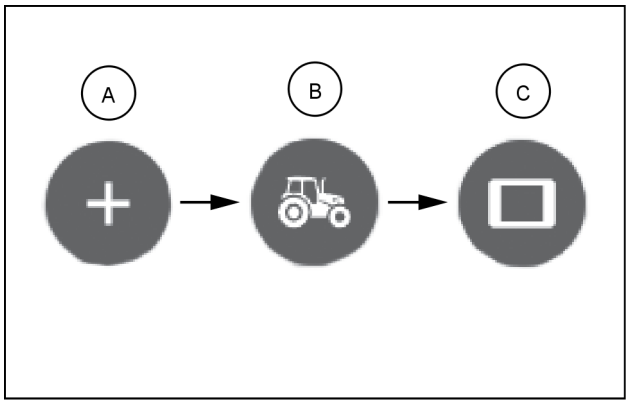
4. Select the plus icon **(A)**.
5. If the vehicle is not currently registered to the customer’s company, select the vehicle icon **(B)** to add the vehicle.

NOTE: *You can also add a vehicle to the customer’s company from the VMS dashboard.*

6. Select the plus icon again, and then select the device icon **(C)** to add the modem.



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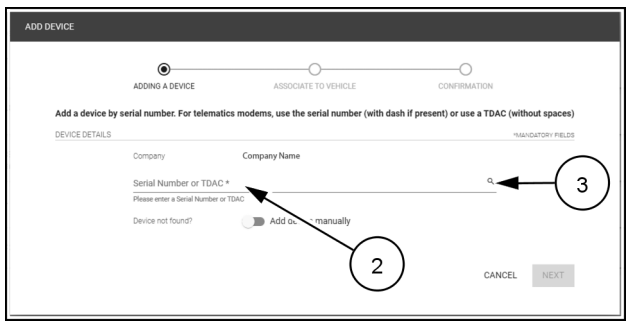
7. Input the serial number of the modem into the field **(2)**, and then select the search icon **(3)**.
8. Select the “NEXT” button to continue.



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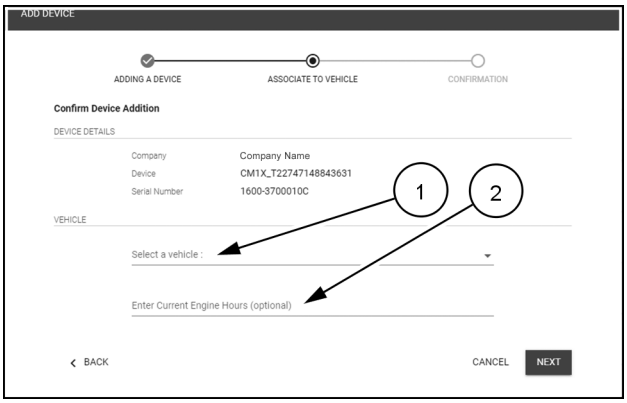
9. Select the vehicle from the drop-down menu **(1)** that you wish to associate the modem to.
10. Optionally, enter the current engine hours of the vehicle into the field **(2)**.

NOTE: *The current engine hours value will serve as a baseline on vehicles that use the D+ circuit of the alternator for engine hour reporting.*

11. Select the “NEXT” button to continue.
12. Review the details and then select the “CONFIRM” button to associate the modem with the vehicle.



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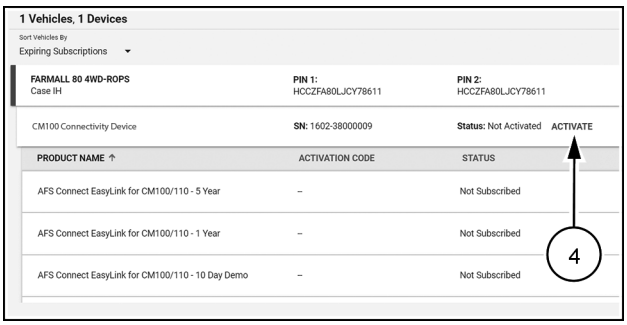
13. Navigate to the newly added modem, and then select “ACTIVATE” **(4)** to perform the telco activation.
14. Purchase the applicable subscription(s). The subscription will be transmitted Over-The-Air (OTA) to the device.



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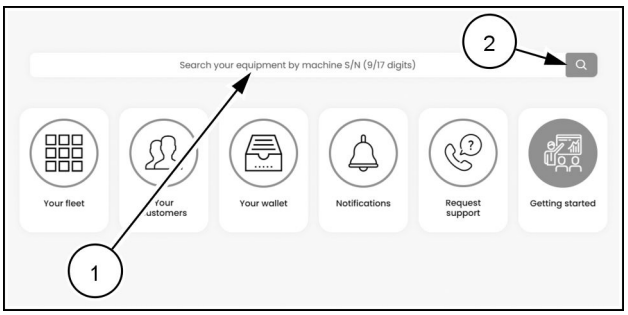
Device activation for construction equipment

Activate the CM100 or CM110 modem for construction equipment in the Telematics Service Portal (TSP).

Before activating the modem, confirm that the customer has a registered account (“company”) with the SiteWatch™ / FleetForce™ portal.

Alternatively, create the customer company through the Telematics Service Portal (TSP). Your dealership will be granted temporary access to the account and associated vehicles to perform the activation.

1. Place the vehicle, powered on, in an open area with adequate cellular reception.
2. Navigate to the Telematics Service Portal (TSP) from the dealer portal (https://portal.cnhind.com/).
3. Input the Product Identification Number (PIN) into the field **(1)**, and then select the search icon **(2)**.



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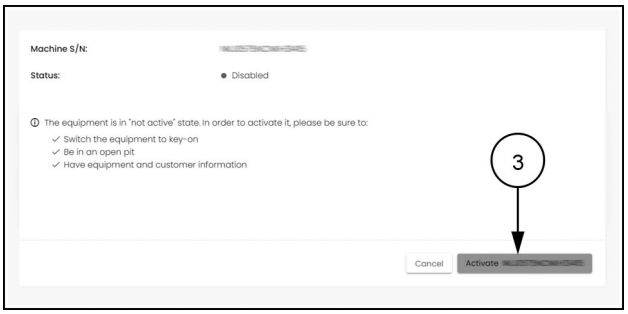
4. Select the “Activate” button **(3)**.



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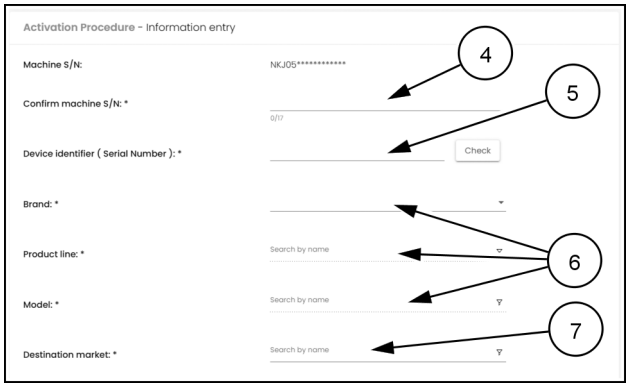
5. Provide the machine and device information in the applicable fields.
   - Enter the machine PIN again into the field **(4)**.
   - Enter the modem serial number into the field **(5)**, and then select the “Check” button to confirm the device.
   - Enter the product information into the fields **(6)**.
   - Select the appropriate destination market **(7)**.

     NOTE: *The correct destination market selection will ensure the appropriate telco activation is performed.*



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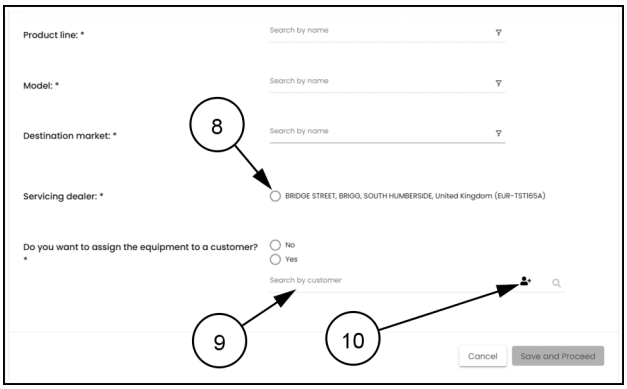
6. • Select the appropriate dealership location **(8)**.
   • If not already assigned, assign the vehicle to a customer. Search the customer account name in the field **(9)**.

   NOTE: *Alternatively, add a new customer by selecting the "add customer" icon **(10)**. Ensure that the customer contact e-mail is accurate, as they must confirm the account creation and accept the End User License Agreement (EULA).*
7. Select the "Save and Proceed" button to continue.
8. Select the appropriate activation and subscriptions and proceed to complete the process.



NHIL22PLM0457AA 4

Start-up test

1. Key on the vehicle.
2. Confirm the Light-Emitting Diode (LED) indicators on the modem.
   - When the modem is booting, all four LED indicators will be solid green.
   - When the modem is operating normally:

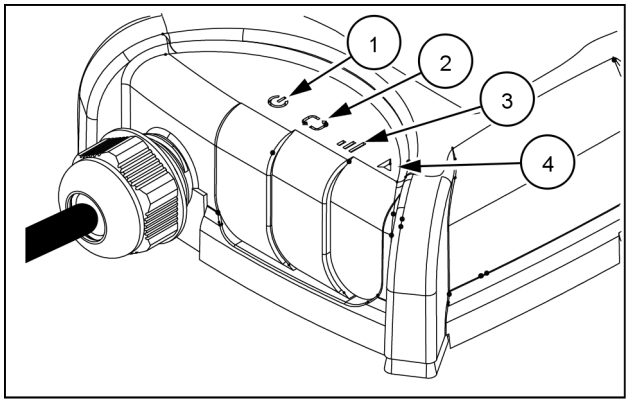
     The Power LED indicator **(1)** will double blink ON.

     The CAN LED indicator **(2)** will be solid ON.

     The Modem LED indicator **(3)** will be solid ON.

     The GPS LED indicator **(4)** will be solid ON.

   If the Power LED indicator is solid, the device does not have a configuration applied. Check the device and wiring harness installation. See “Wiring harness installation” (**4-11**) for more information.

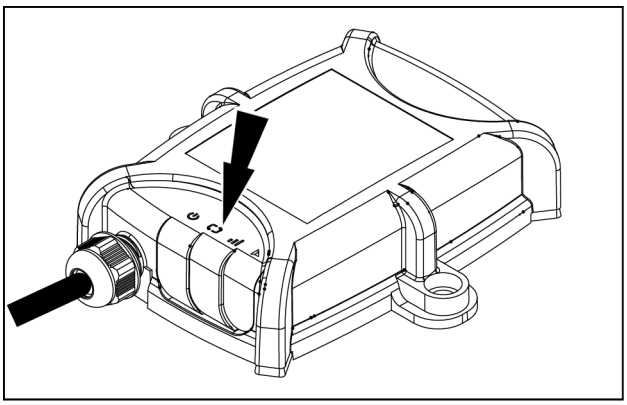


NHIL22PLM0426AA 1

Light Emitting Diode (LED) status indicators

The CM100 and CM110 modem has four Light-Emitting Diode (LED) indicators for diagnostics on the following functions:

- Power
- CAN
- Modem
- GPS



NHIL22PLM300AA 1

Icon	Function	Color	State	Description
	Power	Red	Off	No power supply.
			Double blink	Powered and working.
			Rapid blinking	Key is off.
			Solid	Not configured.
	CAN	Green	Off	CAN bus signal is not available.
			Solid	CAN messages receives from at least one channel.
	Modem	Green	Off	The modem is initializing. No network coverage, or device is in standby/wake mode.
			Slow blink	GSM networks are detected.
			Fast blink	The device is connected to the network, and ready to communicate with the server.
			Solid	GSM communication is ongoing.
	GPS	Green	Off	GPS is initializing, or the device is in standby/wake mode.
			Blinking	Searching for GPS signal.
			Solid	GPS position is fixed.

APPENDIX

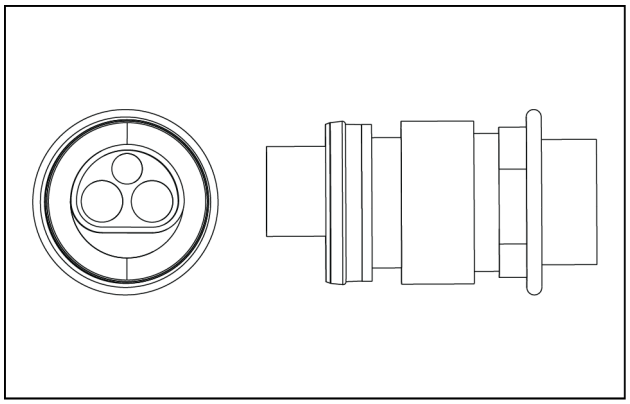
Power and ground connections

The options shown below are the most common power source that is accessible on the vehicle platform.

DIN 9680 power port

If the vehicle has an accessible **DIN 9680** power port near the mounting location of the modem, procure the appropriate connector housing to connect the universal telematics wiring harness to the vehicle power source.

Description	Quantity	Part number
DIN 9680 3-way connector housing	1	82013449
6.3 mm female blade terminal	2	N/A
4.8 mm female blade terminal	1	N/A



NHIL20PLM1597AA 1

Crimp the blade terminals onto the ends of the wires labeled “B+”, “SW B+”, and “CLEAN GND” on the universal telematics wiring harness.

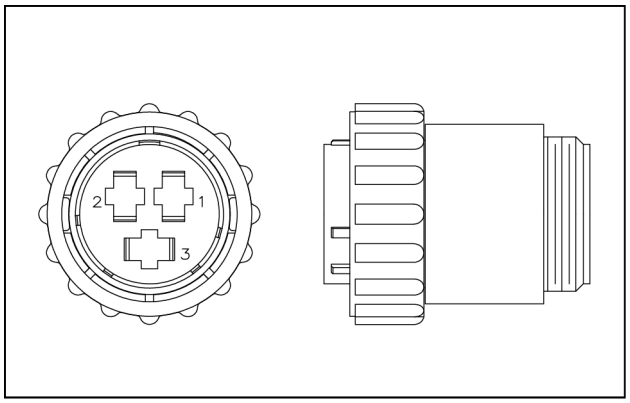
Populate the connector housing according to the pin table.

Pin	Wire	Wire color
82	SW B+	Orange
30	B+	Red
31	CLEAN GND	Black

CPC power port

If the vehicle has an accessible CPC power port near the mounting location of the modem, procure the appropriate connector housing to connect the universal telematics wiring harness to the vehicle power source.

Description	Quantity	Part number
AMP CPC CPC 3-way connector housing	1	87675194
AMP CPC terminal	3	87681942



NHIL20PLM1596AA 2

Crimp the AMP terminals onto the ends of the wires labeled “B+”, “SW B+”, and “CLEAN GND” on the universal telematics wiring harness.

Populate the connector housing according to the pin table.

Pin	Wire	Wire color
1	SW B+	Orange
2	B+	Red
3	CLEAN GND	Black

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