

Thor CV31 & CV61

Direct Vehicle Wiring Kit

Installation Instructions

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About the Direct Wiring Kit

Use the direct wiring kit to wire the internal DC-DC converter from a Thor™ CV31 or CV61 computer directly to a low-voltage forklift. The direct connection reduces installation problems and improves battery filtering.

Direct Wiring Kit Requirements

Computer	Computer Electrical Rating	Vehicle Voltage
CV31	9-36 V, 5.1 A	9-36 VDC
CV61	12 V, 4 A	12-60 VDC



Note: The direct wiring kit does not support the CV61 with a heated display. You need to purchase an external DC-DC converter to use the heater. For help, contact your local sales representative.

What You Get

The direct wiring kit includes all of the necessary hardware to connect your CV31 or CV61 to your vehicle battery.

What You Need

You need these additional parts and tools:

- Common hand tools
- Wire crimping and stripping tool
- Electric drill and drill bits
- Heat gun
- Multimeter
- (Optional for CV31) CV31 ignition sensing cable (P/N 236-316-001)

About the Vehicle Voltage

Make sure that your vehicle electrical system is in good working condition for all types of installations. The charging circuit must work properly and vehicle generated electrical “noise” must be minimized.

Excess electrical noise can be severe enough to defeat the electrical filtering that is built into Intermec products. Defective ignition wiring, damaged insulation, or a faulty vehicle electrical component can cause electrical noise, possibly causing unpredictable behavior in printers and docks.



Note: If the vehicle voltage is too high or too low, the equipment may not work.

How to Secure Cables

When you install cables, follow these installation guidelines:

- Use the cable clamps or wire-ties provided to secure the cables at least every 46 cm (18 in).
- Do not secure cables to any moving parts on the vehicle. Make sure the cable is at least 15.2 cm (6 in) away from the exhaust system.

About the Power Cable

Before connecting to the forklift battery or computer, assemble the power cable by attaching the terminal rings to the individual wires and to the fuse link assembly. Follow these installation guidelines:

- The power supply can draw up to 0.25 A, even with no load. So, for gas-powered vehicles, you also need to install an On/Off switch with a minimum of 15 A DC rating or an automatic shut-off device in series with the inline fuse holder.
- Place the fuse link assembly as close to the vehicle battery as possible to protect the power cable and CV31 or CV61 internal power supply from catastrophic short-

circuit failure. If the fuse fails for any reason, replace it with a new fuse.



Note: If the fuse is blowing repeatedly, check the vehicle power to see if excessive voltage spikes are occurring.

Replacement Fuse Specifications

Fuse	Specification
Type	3 AB (0.25 x 1.25 in cartridge fuse)
Volts	250 VDC
Amps	20 A

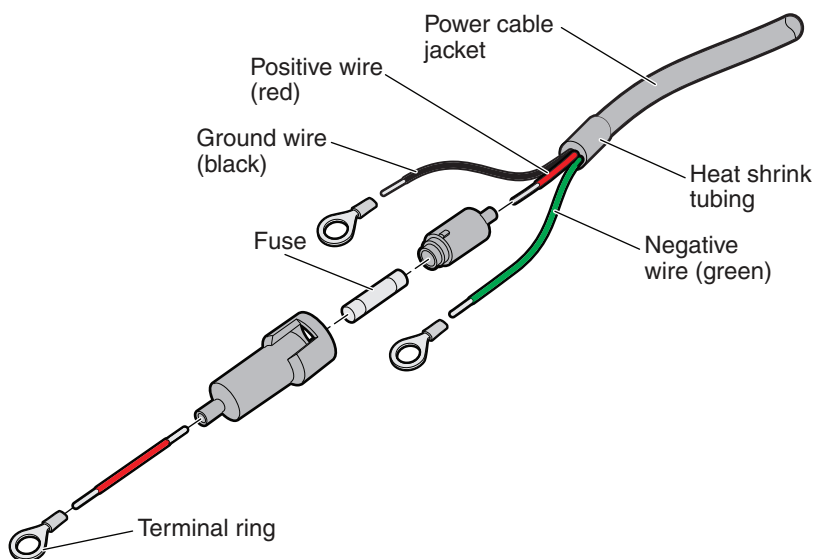
Optionally, you can also use one of these replacement fuses:

- 10 A to 14 V input
- 6 A to 36 V input
- 5 A to 48 V input or higher

Assemble the Power Cable

- 1 Route the power cable from the computer to the vehicle battery.
- 2 Cut the power cable near the battery leaving enough of the cable to reach the battery terminals.
- 3 Strip the power cable jacket back 31 to 36 cm (12 to 14 in).

- 4** Install heat shrink tubing on the power cable jacket.



- 5** Insert and secure the fuse in the fuse holder assembly.

- 6** Assemble the red wire:

- a** Cut a strip of red wire that is 5.08 cm (2 in) long.
- b** Strip 0.60 cm (0.25 in) of insulation from the red wire attached to the battery cable and on both ends of the wire that you just cut.
- c** Crimp the red wire you cut to the other end of the fuse block.
- d** Crimp a 3/8-inch terminal ring onto the red wire.

- 7** Assemble the green and black wires:

- a** Strip 0.60 cm (0.25 in) of insulation.
- b** Crimp a 3/8-inch terminal ring onto the wires.

- 8** Connect the power cable to the vehicle battery. For more information, see the next section.

How to Connect to the Vehicle Battery

The procedure you use to connect to the vehicle battery depends on the location of the battery terminal:

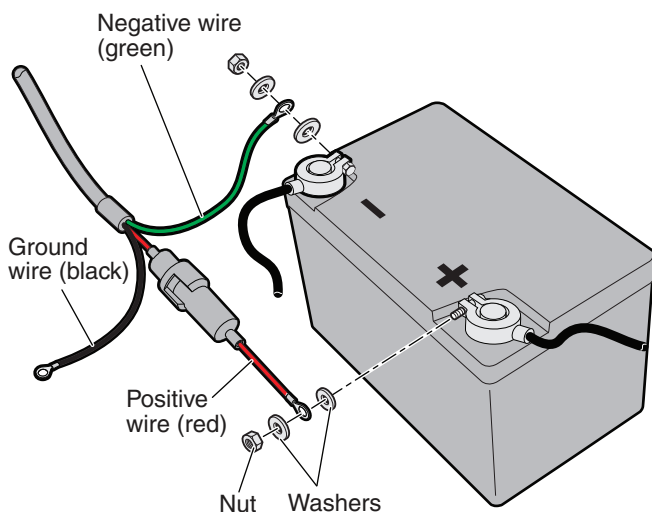
- Top
- Side



Warning: Verify that the cable to battery connections are correct. Electrical energy from vehicle batteries can harm equipment and people.

Connect to the Top Battery Terminal

- 1 Remove positive battery terminal side post bolt from the vehicle battery.



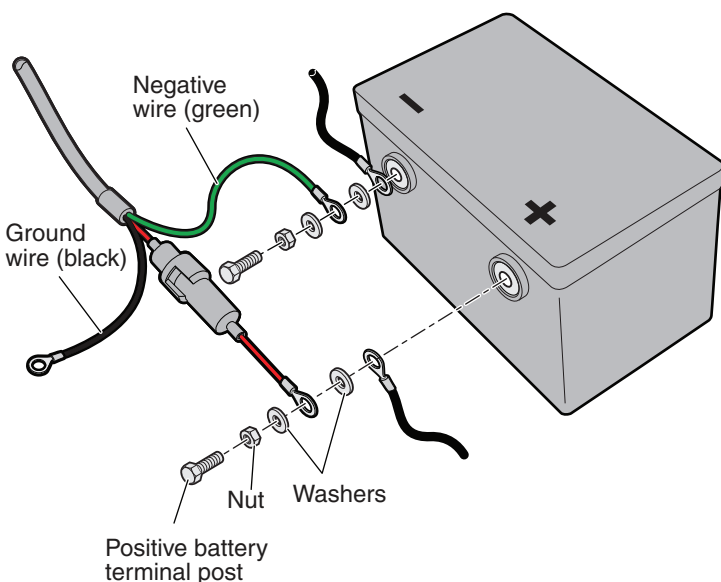
- 2 Fasten a 3/8-inch nut to one of the 3/8 x 1-1/2-inch battery terminal posts.
- 3 Place a 3/8-inch washer on the battery terminal post.
- 4 Slide the positive wire (red) fuse link terminal ring from the power input cable onto the positive battery post.
- 5 Place another 3/8-inch washer on the battery terminal post.

- 6 Slide the vehicle positive wire onto the battery terminal post.
- 7 Thread the post assembly (Steps 2 through 6) into the positive battery terminal.
- 8 Tighten the battery terminal post securely.
- 9 Tighten the nut installed in Step 2 to secure the washers and cables firmly in place.
- 10 Repeat Steps 1 through 9 for the negative wire.
- 11 Connect the 6-pin connector the computer.
- 12 Connect the ground strap. For help, see **“Fasten the Ground Wire” on page 11.**

Connect to the Side Battery Terminal

When you remove the battery terminal side post bolts from the vehicle battery, the vehicle computer and radio return to their default settings.

- 1 Remove both battery terminal side post bolts.



- 2 Place a 3/8-inch washer on each end of the positive battery clamp bolt.

- 3 Slide the positive fuse link terminal ring from the power cable onto positive battery clamp bolt.
- 4 Place another 3/8-inch washer onto the battery clamp.
- 5 Thread another 3/8-inch nut onto the battery clamp bolt, and tighten the nut securely.
- 6 Repeat Steps 2 through 5 for the negative wire.
- 7 Connect the ground wire. For help, see the next section.

Fasten the Ground Wire

The black wire on the vehicle battery cable is the ground wire. To ensure proper cable shielding, you need to fasten the ground strap to the vehicle's sheet metal.

- 1 Drill a small hole into the metal you intend to fasten the ground strap to.
- 2 Use a punch to dimple and enlarge the hole until it is the same size as the screw.
- 3 Scrape off a small circle of paint around the hole to make sure bare metal is exposed.
- 4 Secure the wire with a #8 5/8-inch screw and flat washer.

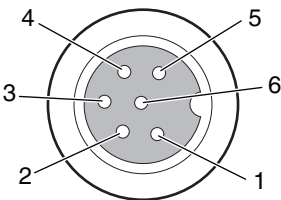
Install the CV31 Ignition Sensing Cable (Optional)

Install the CV31 ignition sensing cable to automatically turn on the CV31 when the operator turns on the vehicle.

- 1 Connect the ignition (blue) wire to the ignition circuitry of the vehicle (up to 60 V).
- 2 Connect the grounding (black) wire to the vehicle chassis for electrostatic discharge (ESD) protection. If the vehicle chassis is not a suitable ground, connect the wire to the negative terminal of the power source.
- 3 Connect adapter cable P/N VE027-8024-C0 to the ignition sensing cable, and then connect the ignition sensing cable to the CV31.

Power Connector Pin Assignments

The location of the pins for the CV31 and CV61 power connector are the same, but the port pin assignments are different. Non-regulated inputs require an external fuse.



CV31 and CV61 Power Connector

CV31 Power Connector Pin Assignments

Pin	Signal	Description
1	GND	Chassis GND
2	Vin+	12 V regulated DC+ input (not used)
3	Vin-	DC- power return
4		Not connected (not used)
5	Ignition	Ignition sensing input (not used)
6	Vin+	9 to 36 V non-regulated DC+ input

CV61 Power Connector Pin Assignments

Pin	Signal	Description
1	GND	Chassis GND
2	Vin+	12 V regulated DC+ input (not used)
3	Vin-	DC- power return
4	Vin- heater	DC- power return for heated display (not used)
5	Vin+ heater	12 V regulated DC+ for heated display (not used)
6	Vin+	12 to 60 V non-regulated DC+ input

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