PowerBox™ Installation Guide

This device complies with Part 15 of the FCC Rules and Industry Canada License-Exempt RSS Stadard(s).

Operation is subject to the following two conditions:
(1) This device may not cause harmful interface, and
(2) This device must accept any interferences received, including interference that may cause undesired operation.

L ' utilisation de ce dispositif est autorisée seulement aux conditions suivantes :
(1) il ne doit pas produire de brouillage et
(2) l' utilisateur du dispositif doit étre prêt à accepter tout brouillage radioélectrique reçu, même si ce brouillage est susceptible de compromettre le fonctionnement du dispositif.

The transmitter must not be co-located or operated in conjunction with any other antenna or transmitter. This equipment complies with the FCC RF/IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and any part of your body.

Note: This equipment has been tested and found to comply with the limits for digital device, pursuant to Part 15 of FCC Rules.
These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with FCC instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try correcting the interference by one or more of the following measures:

1.1. Reorient or relocate the receiving antenna,
1.2. Increase the separation between the equipment and receiver.
1.3. Connect the equipment into an outlet on a circuit different from that to which receiver is connected.
1.4. Consult the dealer or experienced radio/TV technician for help.

WARNING
Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

VAC4 Bill of Materials

Description	Qty
Vehicle Asset Communicator (VAC)	1
VAC Mounting Bracket	1
Impact sensor kit	1
Hardware installation kit	1
Electrical component kit	1
Relay Kit	1

Recommended Tools

Metric socket set
Metric combination wrench set
Phillips and flathead screwdriver set
Flashlight
Channel lock pliers
Wire stripper/cutter
Electrical tape
Utility knife
Multimeter
Needle nose pliers
Allen Wrench set

1 **System coordinator should first refer to the *PowerBox VAC4 Getting Started Guide* for complete product overview.**

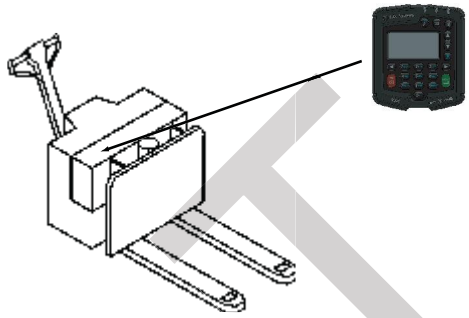
I.D. Systems PowerBox™ 201.996.9000 www.id-systems.com

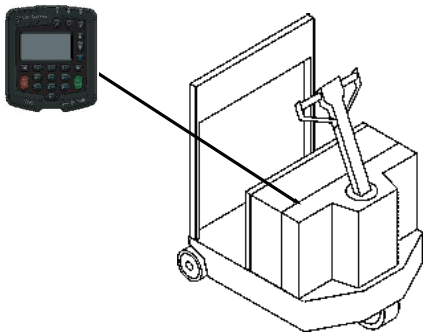
READ THIS FIRST!

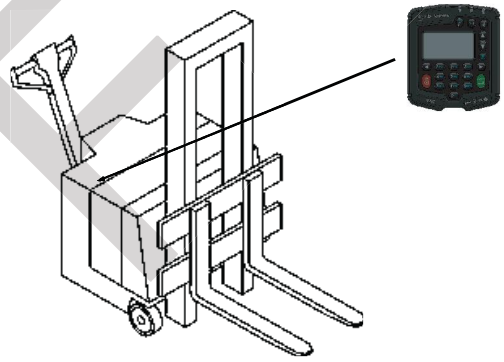
For System Coordinator Responsible for PowerBox™ System Implementation

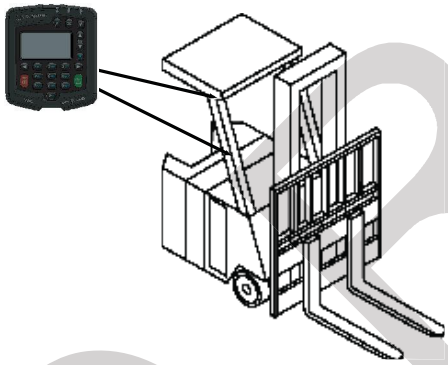
201.996.9000 support@id-systems.com

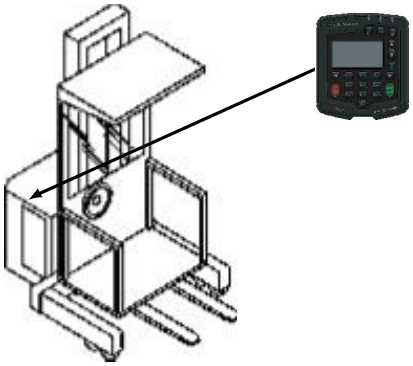
2 Choose the VAC location.

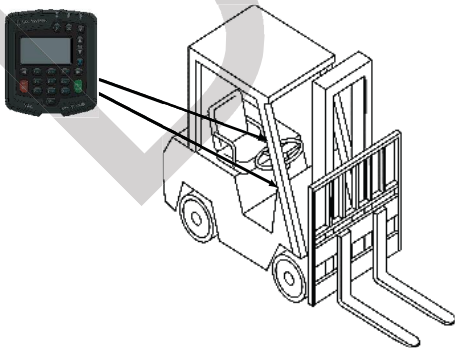


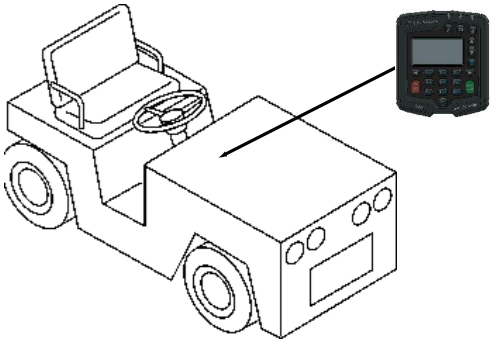






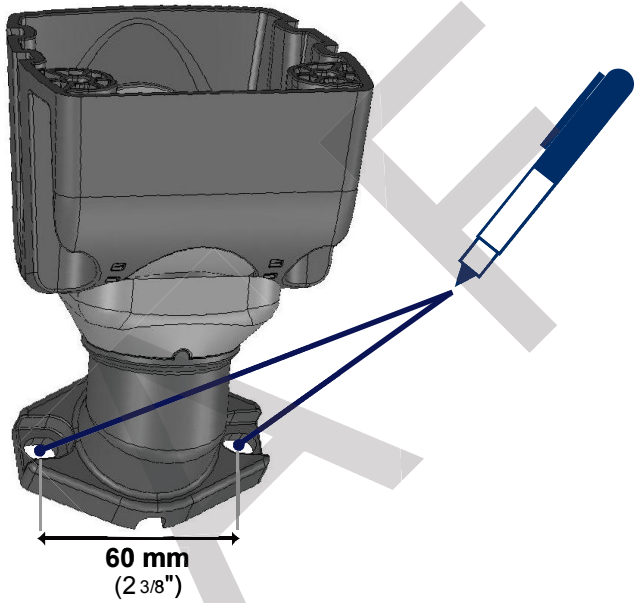




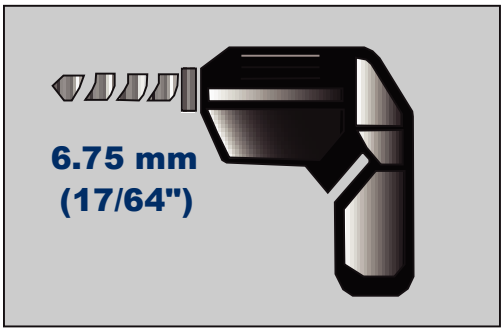


3 The VAC mounting bracket can be configured in multiple ways to accomodate the desired mounting location. If needed, change the VAC mounting bracket orientation by following the instruction sheet supplied with the bracket.

4 Using the bracket base as a template, mark the mounting hole locations on the vehicle mounting surface, as shown below. Verify that the marked locations are 60 mm (2 3/8") apart.

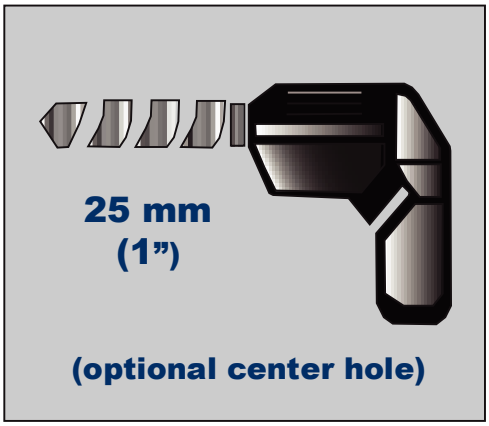


5 Remove the bracket. Using a 6.75 mm (17/64") bit, drill holes at the two marked locations.

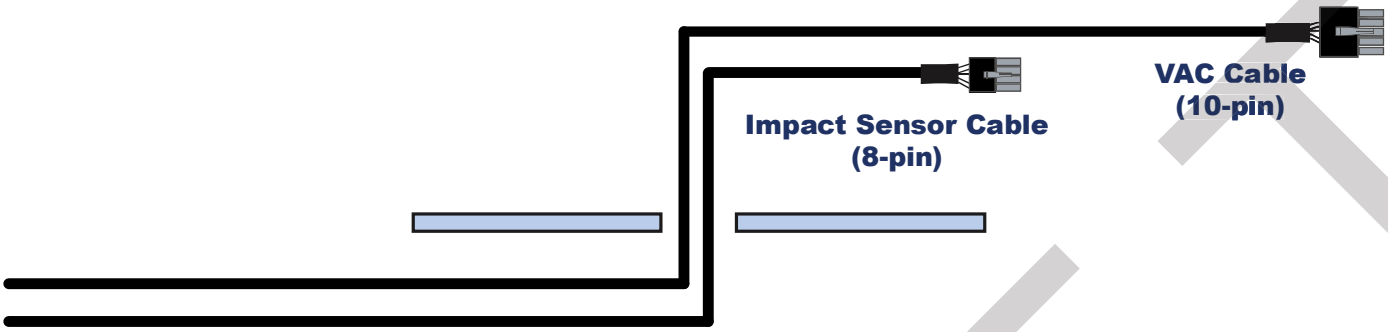


If the VAC to vehicle and Impact Sensor cables will be routed through the vehicle's mounting surface, drill a 25 mm (1") hole at the exact center point between the two holes marked in Step 4 [30 mm (1 3/16") from either hole].

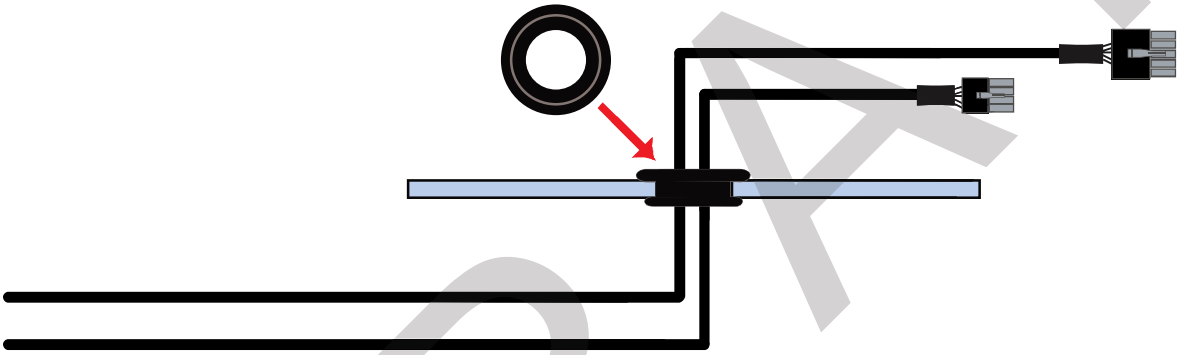
If the cables will be routed along the vehicle's mounting surface, do not drill a center hole and skip to Step 9.



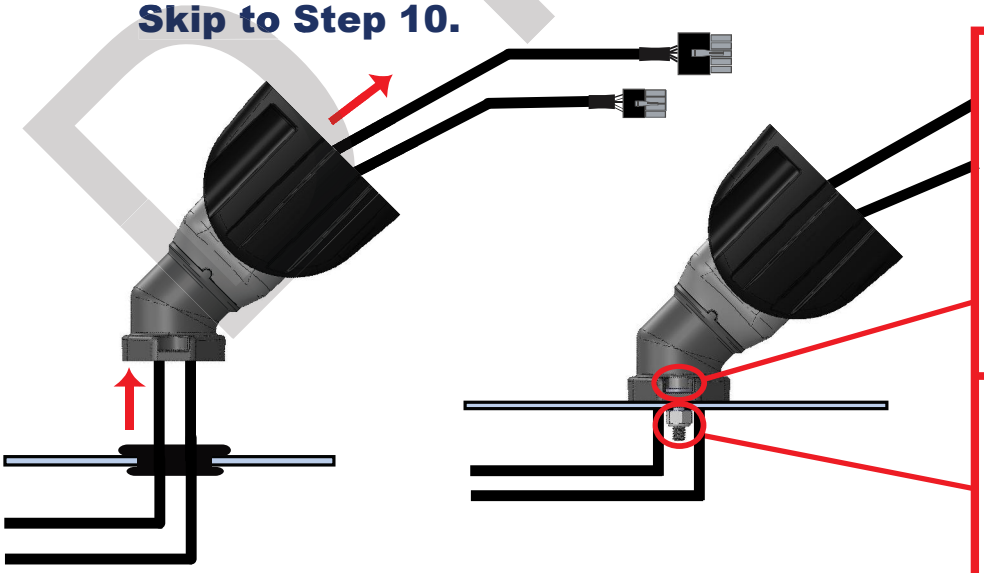
6 Route the VAC cable (with 10-pin connector) and Impact Sensor cable (with 8-pin connector) up through the center hole.



7 Route the VAC and Impact Sensor cables through the grommet, and then fit the grommet snugly into the center hole.

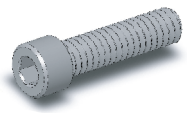


8 Feed the VAC and Impact Sensor cables through the VAC bracket. Attach the bracket to the vehicle using the supplied bolts and nuts. Skip to Step 10.



Use supplied hardware:

Topside of Vehicle Mounting Surface



M6 X 1.0 X 25 mm
Socket Head Screw

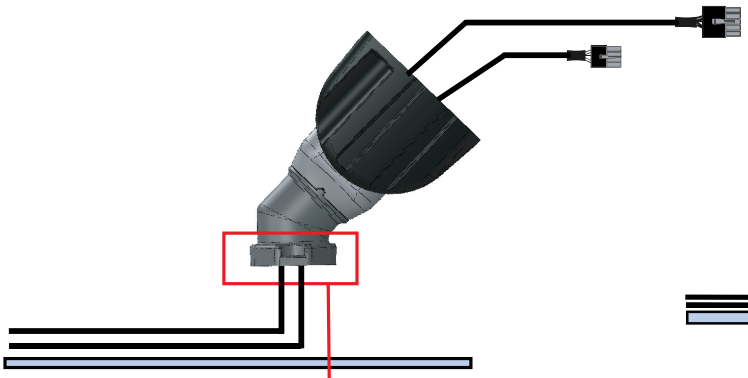
M6
ID Washer

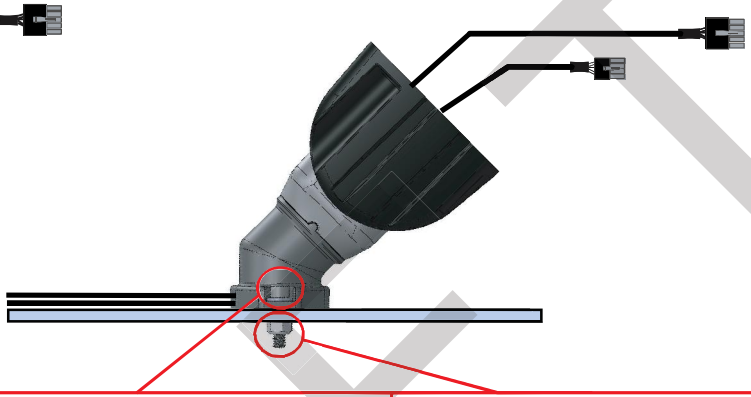
Underside of Vehicle Mounting Surface

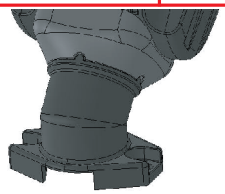
M6
ID Washer

M6
Nylon Lock Nut

9 If the VAC and Impact Sensor cables are being routed along the mounting surface, route the cables through the slot at the base of the VAC bracket. Attach the bracket to the vehicle using the supplied bolts and nuts. Proceed to Step 10.



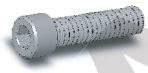




Slot at base of VAC bracket to be used for cable routing

Use supplied hardware:

Topside of Vehicle Mounting Surface



M6 X 1.0 X 25 mm Socket Head Screw

M6 ID Washer

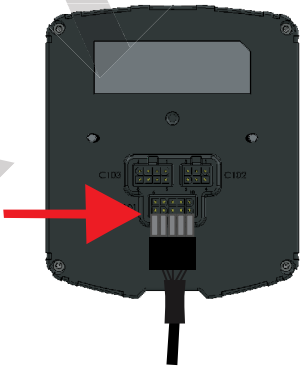
Underside of Vehicle Mounting Surface

M6 ID Washer

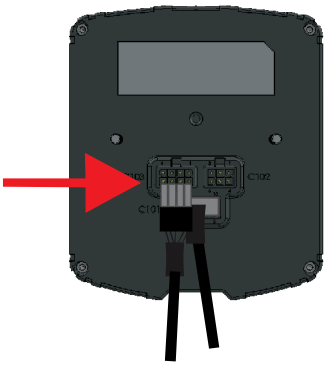
M6 Nylon Lock Nut

10 Connect the VAC and Impact Sensor cables pin connectors to their respective ports.

Note: Verify that the connector latches are engaged to ensure that the cables are secured to the VAC.



The 10-pin VAC cable connector to port C101.

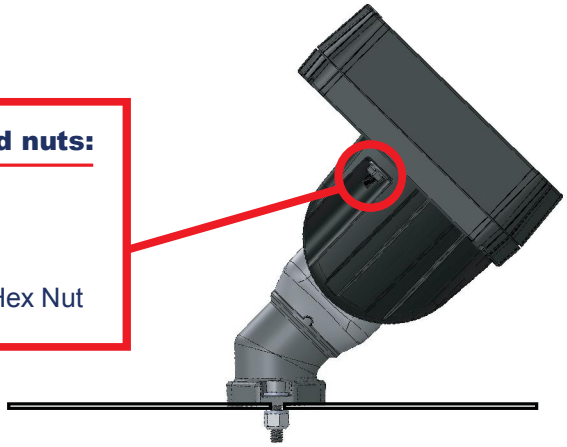


The 8-pin Impact Sensor cable connector to port C103.

11 Slide the VAC onto the bracket and secure using the supplied nuts and threaded studs.

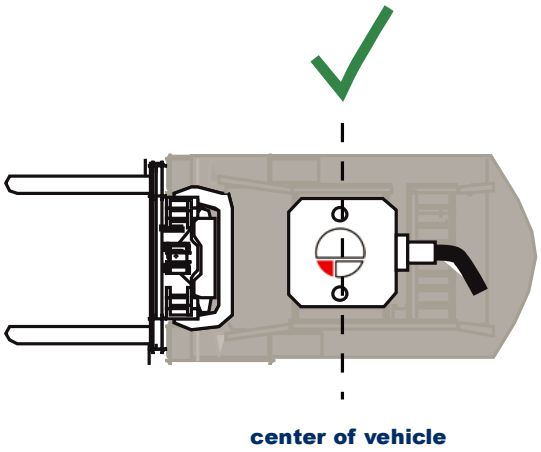
Use supplied nuts:

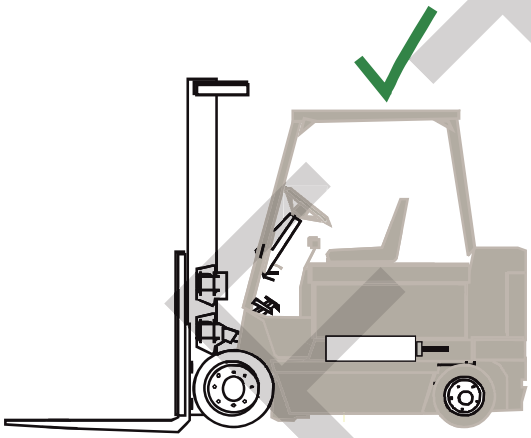
M5 Serrated Hex Nut

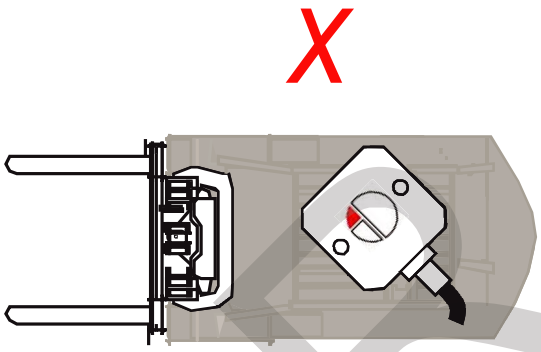


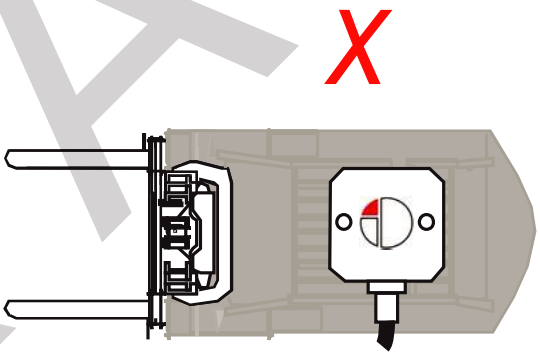
Mounting the Impact Sensor

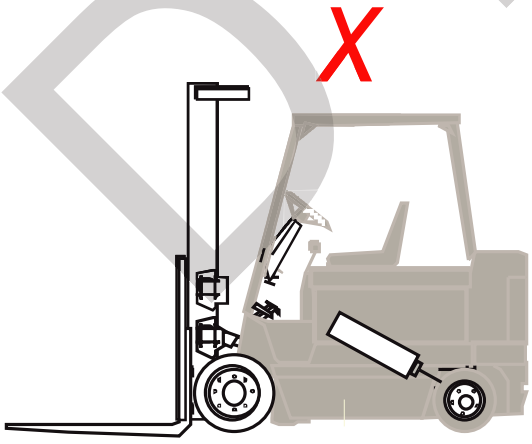
12 **Mount the impact sensor at a stable section of the vehicle's frame. Select a location that is not prone to vibration or routine shock and is as close to the center of the vehicle as possible (see below).**











! **Clean the vehicle surface prior to adhering the impact sensor's double-sided tape.**

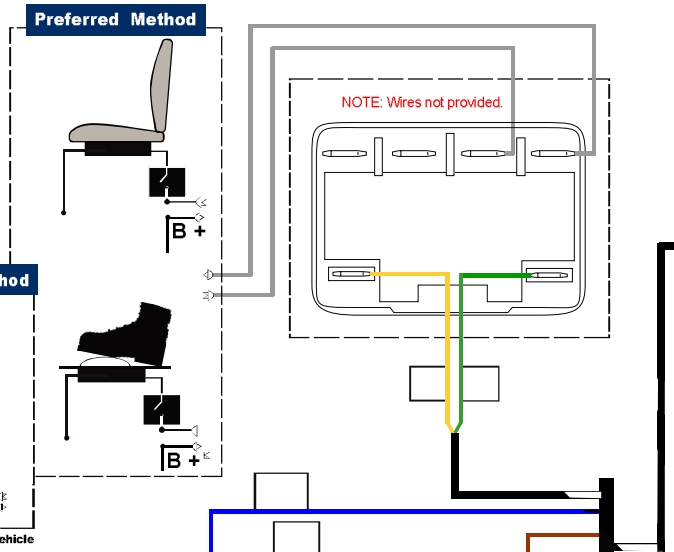
! **The supplied tape cannot be reused. If the sensor must be moved, new tape must be used.**

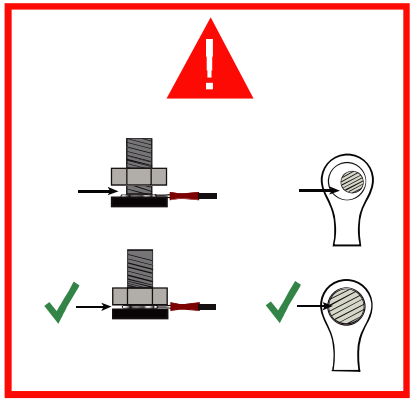
! **Do not bolt down the impact sensor.**

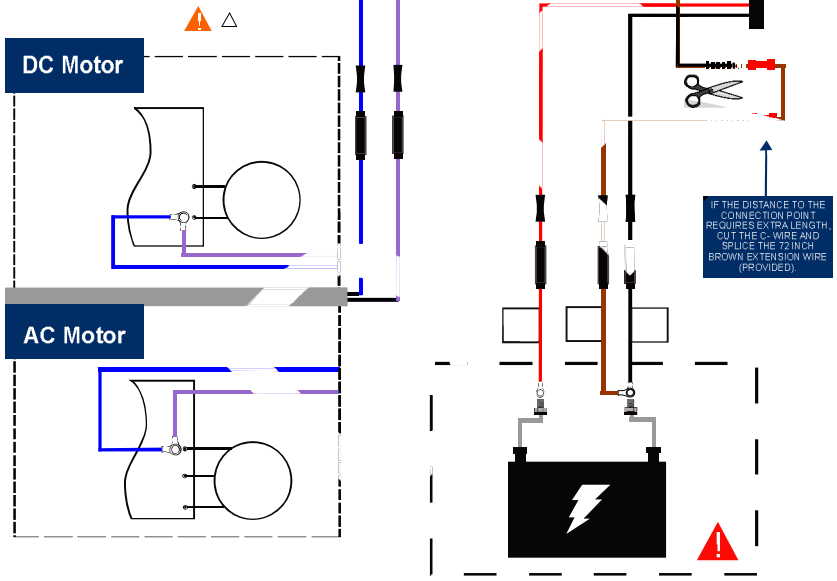
PowerBox VAC4 Installation Wiring Guide

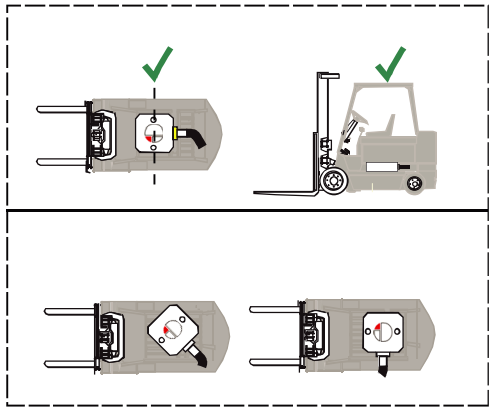
See 13 - Appendix for more detail

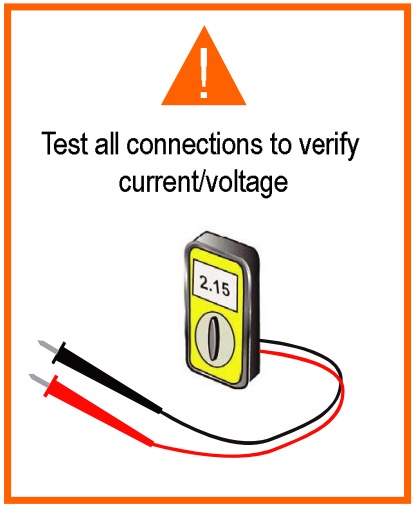
Electric Vehicles Only









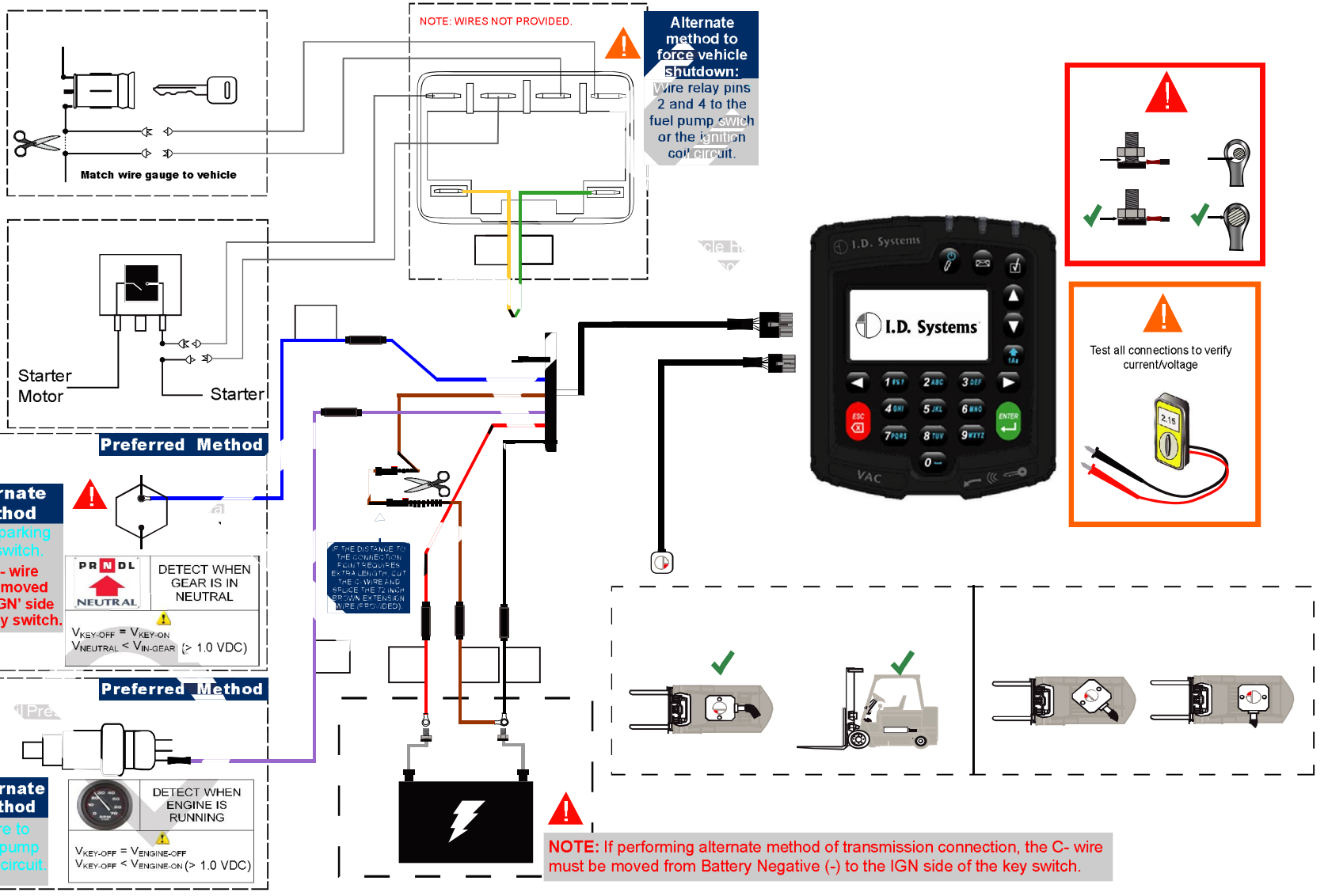


13b PowerBox VAC4 Installation Wiring Guide

Internal Combustion Vehicles

See 13 - Appendix for more detail

IC Vehicles Only



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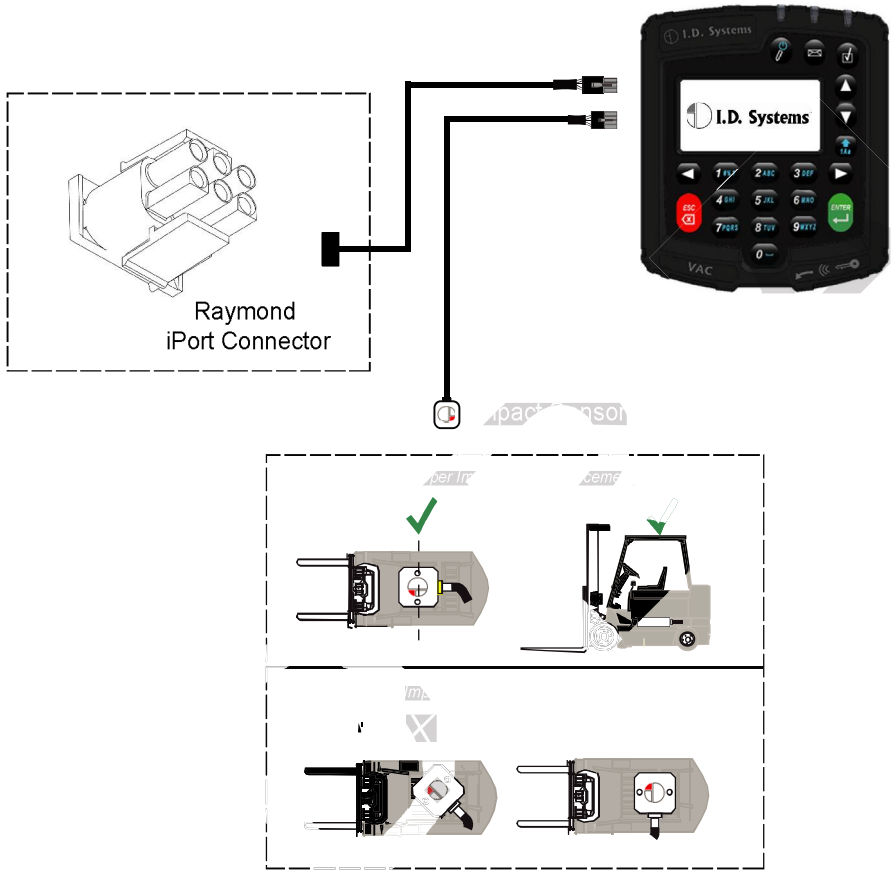
PowerBox VAC4 Installation Wiring Guide

OEM Custom Vehicle Harness Only

Raymond iPort



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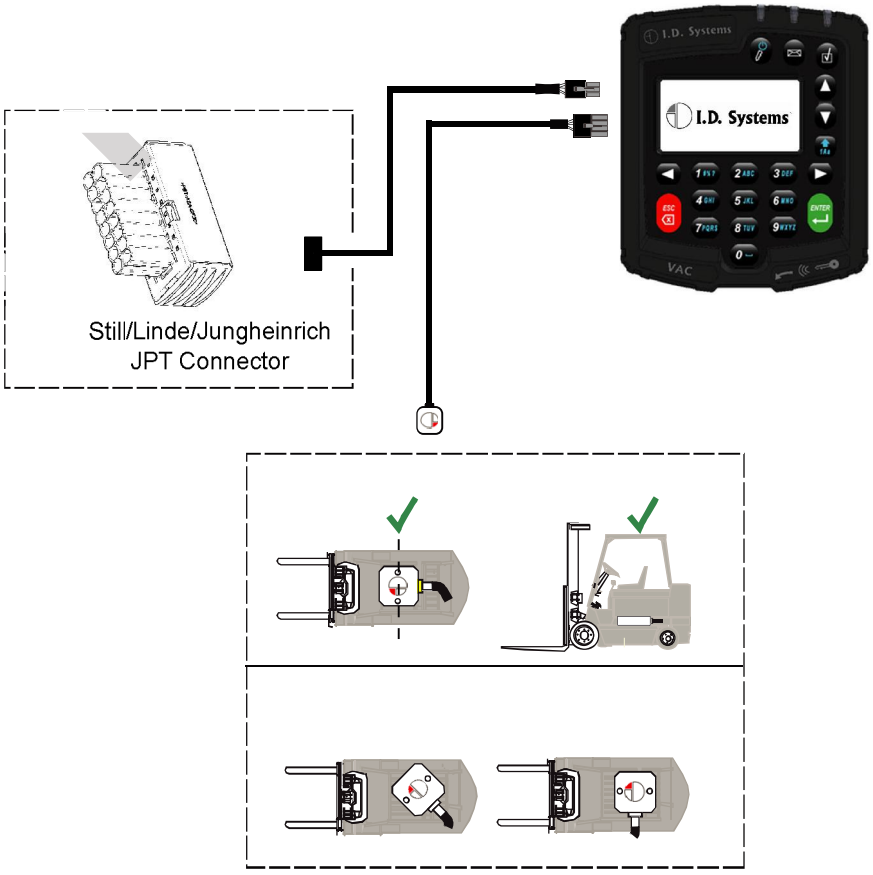

Step 13a: Electric Vehicle Wiring

Wiring methods

B+

"B+" always routes to battery positive ("B+"). Ideally this would be in a location as close to the battery terminals as possible to minimize voltage drop-out and other effects For high-voltage trucks (>72V), route this connection (and "B-") to the output of an on-board voltage converter (e.g. 24V DC converter) that can source 1A nominal and 3A peak, full time (not switched via the vehicle key).

B -

"B-" is routed to battery negative ("B-"). Ideally this would be in a location as close to the battery terminals as possible to minimize voltage drop-out and other effects. Avoid connecting this to the vehicle chassis.

U/A1

"U/A1" is used in conjunction with "C-" for monitoring the vehicle traction motor. There must always be greater than 1.00 VDC voltage sensed between 'motion on' and 'motion off'. For AC motor vehicles, this wire routes to the "U" terminal of the motor.

C-

"C-" is used as the voltage reference (e.g. ground) for "U/A1" for monitoring the vehicle motion motor, and for "E" to monitor Lift or Seat. This may not be the same as the vehicle ground and is intended to be the 'ground' of the 'controller' (or component generating the U/A1 signal). There must always be greater than 1.00VDC sensed between 'motion on' and 'motion off'.

E

"E" is used in conjunction with "C-" for monitoring either the lift motor (ED-L) or seat switch (ED-S). NOTE: The signal being monitored must use the same reference as the U/A1 connection (otherwise, different grounds may become interconnected). There must always be greater than 1.00 VDC voltage sensed between 'on' and 'off' conditions.

1 0

"1" and "0" route to the "1" and "0" terminals on the supplied relay. They will switch 12 VDC to the relay coil. The relay is chosen based on the power required on the contacts. For electric trucks, this is normally low-current; and the relay marked 'Seat' would be used.

2 4

Relay terminals "2" and "4" are used for access control. They have to be wired to a location on the vehicle that, when the relay is open, the vehicle cannot be operated, and which, if the vehicle is in use, will disable the vehicle. The seat switch or deadman switch are preferred, since when they are disconnected, vehicle error messages are rarely generated, yet the vehicle deactivates. Locate the seat or deadman switch wiring, split the wire, and route the "B+" side of the wire to terminal "4" (terminal connectors are provided in the kit). The other side of the split wire is routed to terminal "2" on the relay. Make sure the current routed through this line falls within the limits of the relay chosen from the two options provided. NOTE: High current may cause relay failure, while low current will ultimately lead to relay contact oxidation and intermittent results.

Alternative method: If the seat or deadman switch cannot be used (i.e. it does not exist or the current is too low), the key switch can be used to adequately prevent vehicle operation when required, however some vehicles may generate error messages when the relay is open but the key is in the "on" position. Locate the key switch wiring, split the wire, and route the "B+" side of the wire to terminal "4" (terminal connectors are provided in the kit). The other side of the split wire is routed to terminal "2" on the relay. Another location to consider is the parking brake circuit.

Step 13b: IC Vehicle Wiring

Wiring methods

B+

"B+" is routed to battery positive ("B+"). Ideally this would be in a location as close to the battery terminals as possible to minimize voltage drop-out and other effects.

B-

"B-" is routed to battery negative ("B-"). Ideally this would be in a location as close to the battery terminals as possible to minimize voltage drop-out and other effects. Avoid connecting this to the vehicle chassis.

E

"E" is routed to vehicle's oil pressure sensing unit to determine when the vehicle engine is running. The voltage reference is the "C-" connection. There must always be greater than 1.00VDC sensed between the "key on/engine on" and the "key off/engine off" AND between "key on/engine on" and "accessory mode/engine off" (if it exists). It is important that the voltage differential be measured both with the key off AND in the 'accessory' position.

Alternative method: If the oil pressure sensing unit cannot be used, wire "E" to the fuel pump relay circuit. This will adequately determine when the engine is running or is off.

C- U/A1

"U/A1" is routed to the neutral safety switch to determine whether or not the vehicle is in a gear. "C-" is routed to battery negative ("B-") to be used as the voltage reference for the "U/A1" and "E" signals. There must always be greater than 1.00VDC between the "U/A1" connection and the "C-" signal to differentiate 'in gear/key on' and 'in neutral/key on', and also to distinguish between 'in gear/key on' and 'key off'. When the unit senses the vehicle 'in gear' and with the "engine on" it will report the vehicle as 'in motion'. If the gear signal drops out when the key is off, and 'in-gear' cannot be distinguished from neutral with the key off, then try wiring the "C-" signal to the "IGN" wire of the key switch instead of "B-".

Alternative method: If there is no neutral safety switch, "U/A1" may be routed to the parking brake switch. As above, verify that there is always more than 1.00VDC differential voltage sensed between 'brake off' and 'brake on', both with the key on and the key off. Using this method, the vehicle will be considered 'in motion' any time the parking brake is not applied and the engine is running. If the brake signal drops out when the key is off, and 'brake off' cannot be distinguished from 'brake on' with the key off, then try wiring the "C-" signal to the "IGN" wire of the key switch instead of "B-".

1 0

"1" and "0" route to the "1" and "0" terminals on the supplied relay.

2 4

Relay terminals "2" and "4" are used for access control via the key switch. Locate the key switch wiring, split the wire that controls the vehicle on/off, and route one side of the wire to terminal "4" and the other side to terminal "2" (terminal connectors are provided in the kit). Make sure the current routed through this line falls within the limits of the relay chosen from the two options provided. NOTE: High current may cause relay failure, while low current will ultimately lead to relay contact oxidation and intermittent results.

Alternative method: If the key switch cannot be used to shut the vehicle down, the fuel pump switch or the ignition coil circuit can be used to adequately prevent vehicle operation when required. Locate the device desired, split the wire that controls the vehicle on/off, and route one side of the wire to terminal "4" and the other side to terminal "2" (terminal connectors are provided in the kit).

6 8

Relay terminals "6" and "8" are used to disable the starter relay when the access control circuit prevents the vehicle from being used. This prevents operators from 'burning out' the starter on the vehicle. Locate the wire on the starter side of the starter relay, split the wire and route one side of the wire to terminal "6" and the other side to terminal "8" (terminal connectors are provided in the kit). Make sure a minimum of 100 mA is routed through this line, since extremely low current will ultimately lead to relay contact oxidation and intermittent results.