

# PURKEYS

A MISSION CRITICAL ELECTRONICS BRAND

## PLUS/FLEX/MAX NOSEBOX

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### INSTALLATION GUIDE





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## GENERAL INFORMATION

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The Purkeys Direct™ nosebox system combines all the best features of our original liftgate charging systems with a space-saving nosebox that helps standardize the front of the trailer. It also includes an interior light controller (harness sold separately) designed to turn the lights on inside a trailer and automatically shut them off either:

- via a timer
- if the truck starts
- if the liftgate batteries drop to a low state of charge.

The Direct improves the charging of liftgate batteries by utilizing a DC/DC Converter to boost the voltage for optimal charging. The boost in voltage overcomes the normal voltage drop caused by the extended distance between the liftgate batteries and the vehicle charging system. Also, in cold temperatures batteries require increased charging voltages to maintain a high state of charge. The DC/DC Converter in the Direct system compensates for temperature as well as for voltage drop and provides the best voltage to the remotely located liftgate batteries. The result is well-charged liftgate batteries that will last longer and have ample power for liftgate operation.

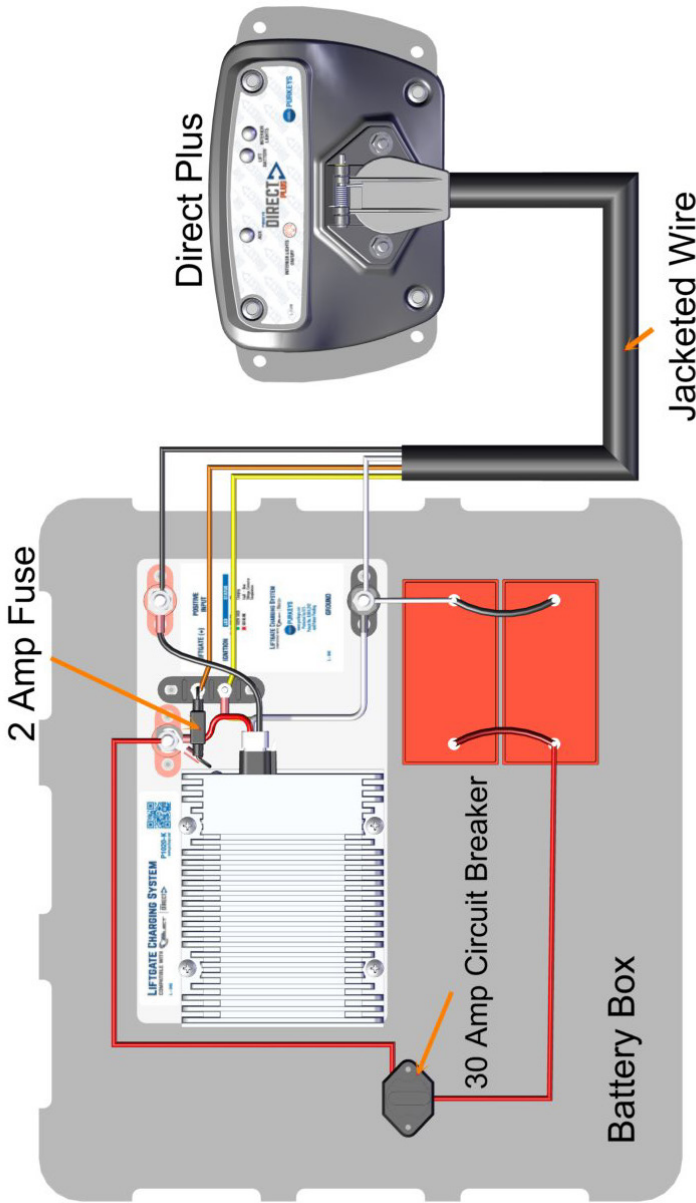
The Direct nosebox system is automatic and has easy to interpret LED indicators to assure drivers and technicians of proper system function. The LED indicators clearly show the status of the source as well as the status of the liftgate batteries. A quick glance at the Direct Controller assures the driver that the liftgate batteries are ready to go, or alerts the driver that the batteries need maintenance.

**NOTE:** Our liftgate charging systems are designed to work with flooded cell and AGM batteries. If you are using this system to charge any other type of battery, please contact us at 479-419-4800 before installation.

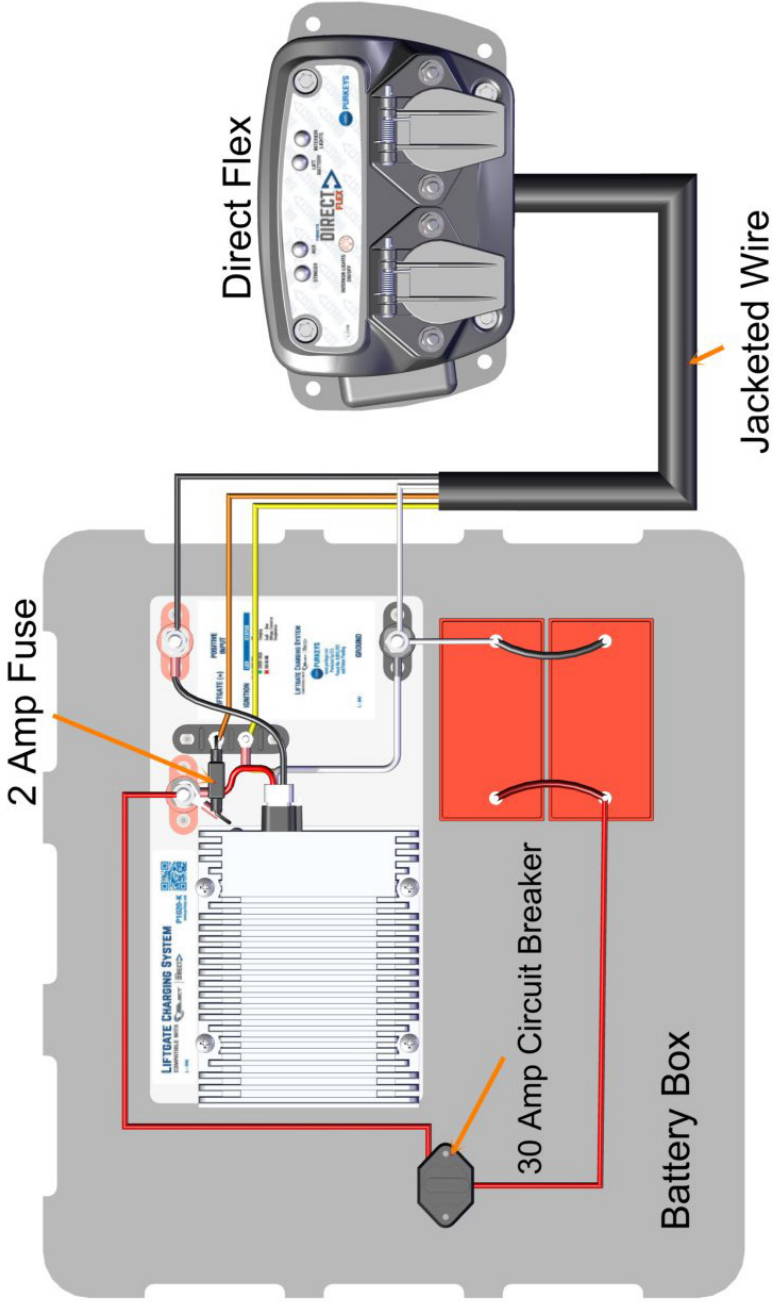
# DIRECT NOSEBOX INSTALLATION GUIDE

## DIAGRAMS

### DIRECT PLUS

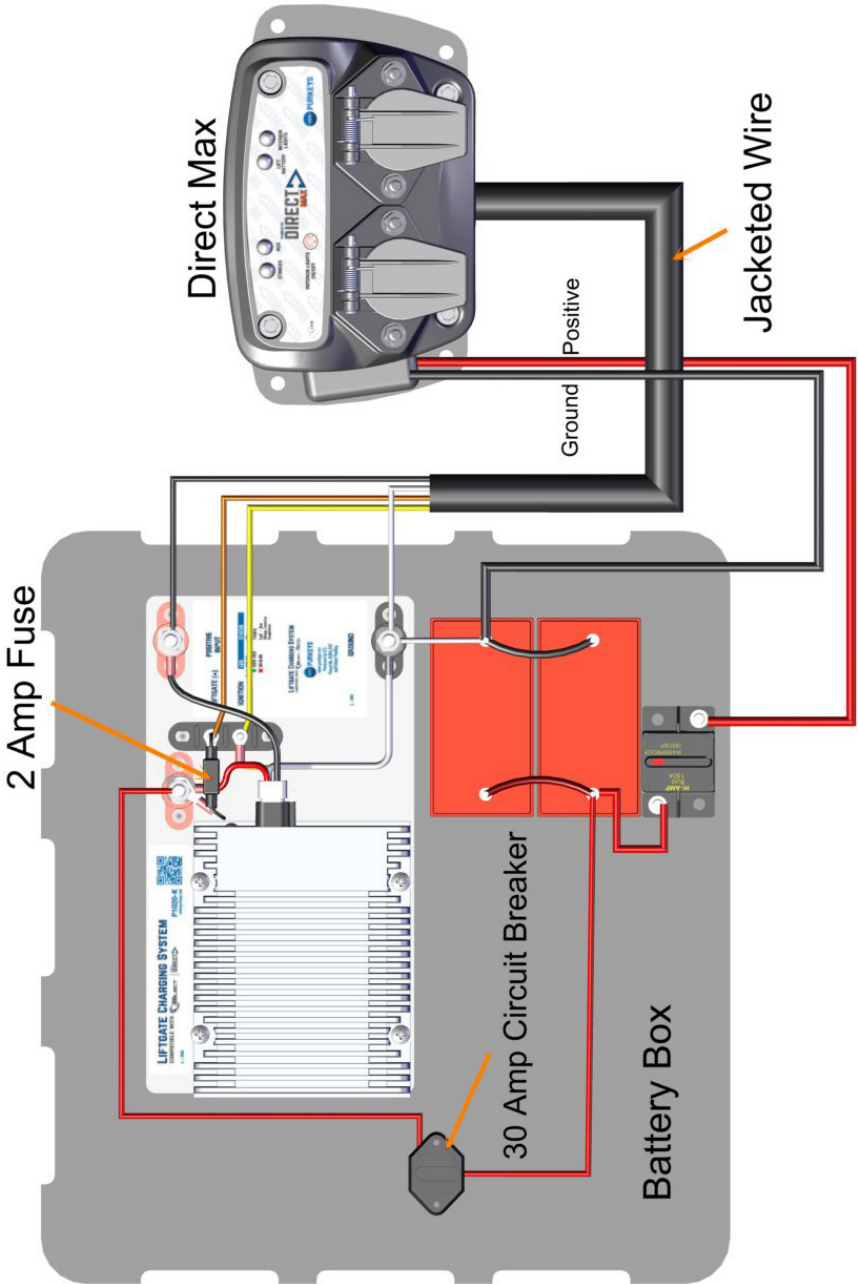


**DIRECT FLEX**



# DIRECT NOSEBOX INSTALLATION GUIDE

## DIRECT MAX

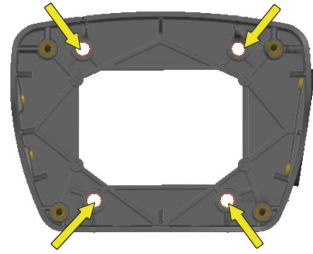


## MOUNTING THE NOSEBOX

Step 1: Mount the Direct nosebox at the front of the trailer via the mounting holes on the mounting plate.



Note: The mounting plate can be removed if space is an issue or if a standard bolt pattern is wanted. Simply remove the plate and mount the nosebox to the trailer using the supplied mounting screws and the standard bolt holes inside the nosebox.



Note: Do not block the LED status decal on the side of the Direct when mounting the nosebox.



Note: The Direct Plus nosebox must be mounted with the wires facing down to help prevent water intrusion.

Direct Controller Mounting Complete.



# DIRECT NOSEBOX INSTALLATION GUIDE

## MAIN HARNESS INSTALLATION

Step 1: Route the Direct jacketed 4-conductor main harness for the DC/DC converter behind the front plate then behind the header plate through the air/electrical tube to the center channel.



Step 2: Route the Direct jacketed 4-conductor main harness in the center channel toward the back of the trailer. Secure with wire ties or cable clamps as you go.



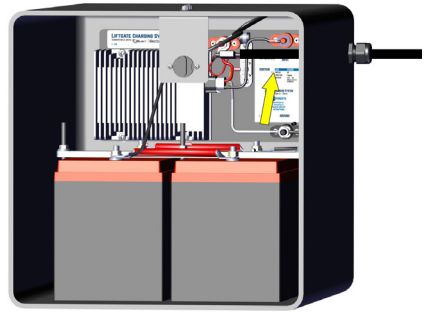
Note: Place the cable clamps along the 4-conductor jacketed main harness every 6 inches to ensure proper support for the cable. Avoid sharp edges and possible chaffing points.

Step 3: Once you are near the liftgate battery box, begin routing the Direct jacketed 4-conductor main harness into the liftgate battery box through a dome nut or rubber grommet.



Note: Ensure that the jacketed 4-conductor main harness enters the liftgate battery box through a dome nut or rubber grommet to prevent chaffing the harness, which could result in a possible electrical short in the system.

Step 4: Position the Direct jacketed 4-conductor main harness so it will reach the 2-stud strip and all the slack has been taken up. Mark the jacketed 4-conductor main harness so it can be taken back out of the battery box to be terminated.

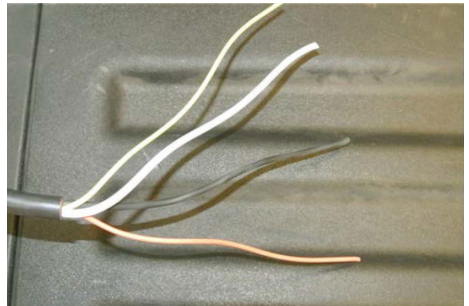


Note: If your battery box includes a slide-out tray, include enough slack to allow the tray to fully extend without tugging the wire connections.

Step 5: Pull the jacketed 4-conductor main harness out of the box (making it easier to work on), and cut off the excess at the mark.

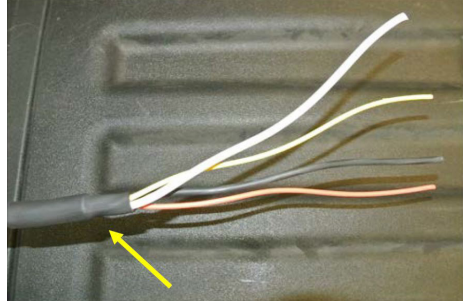


Step 6: Cut about 8 inches off the jacketed portion of the 4 wires.

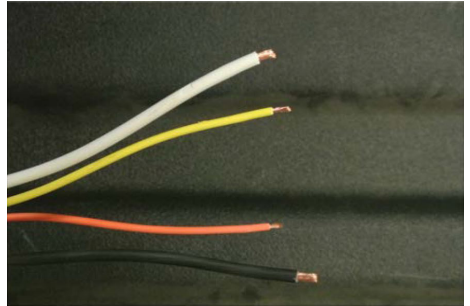


# DIRECT NOSEBOX INSTALLATION GUIDE

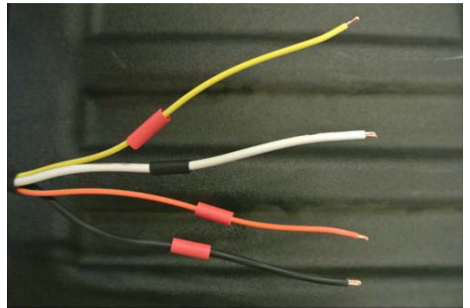
Step 7: Apply the supplied 3/4 inch black heat shrink where the jacket was stripped off.



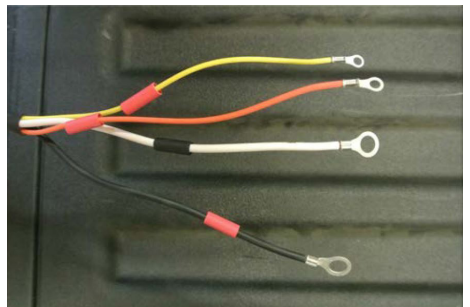
Step 8: Strip 3/8 inch of insulation off all 4 wires.



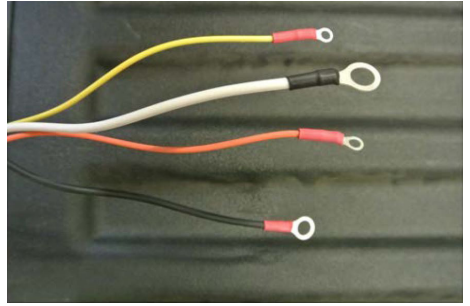
Step 9: Slide the supplied red 1/4 inch heat shrink over the orange, yellow, and black wires. Slide the supplied black 1/4 inch heat shrink over the white wire.



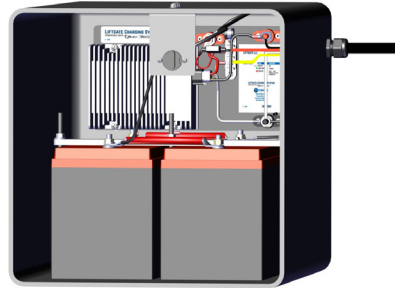
Step 10: Crimp 3/8 ring terminals onto the white and black 8-gauge wires. Crimp #10 ring terminals onto the 14-gauge orange and 16-gauge yellow wires.



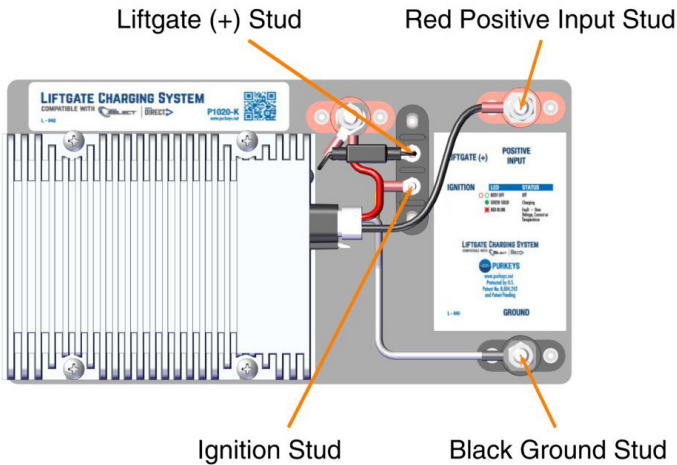
Step 11: Position the heat shrink over the crimps and apply heat to the 4 terminals.



Step 12: Re-route the jacketed 4-conductor main harness back into the battery box.



- Connect the 8-gauge black wire to the red positive input stud.
- Connect the 8-gauge white wire to the black ground stud.
- Connect the 14-gauge orange wire to the liftgate (+) stud.
- Connect the 16-gauge yellow wire to the ignition stud.



Main Harness Installation Complete.

# DIRECT NOSEBOX INSTALLATION GUIDE

## INTERIOR LIGHT INSTALLATION WITHOUT SEVERE SERVICE

These interior light instructions apply if you are installing the Purkeys interior light harness (Purkeys Part Number H-00522: 50 ft Interior Light Harness) to power interior lights off of the liftgate or auxiliary battery.

Note: The Purkeys interior light harness (Purkeys Part Number H-00522: 50 ft Interior Light Harness) is sold separately as it is an optional device.

### Installation Connections Inside the Nosebox:

Step 1: Route the Interior light input harness from the liftgate/aux battery to the nosebox and cut to length.

Note: Do NOT connect to the batteries until the interior light installation is complete. Doing so may result in coming in contact with a live wire.

Step 2: Terminate the positive input with a #10 ring terminal and connect to the Interior light input power stud inside the nosebox (see Figure 1).

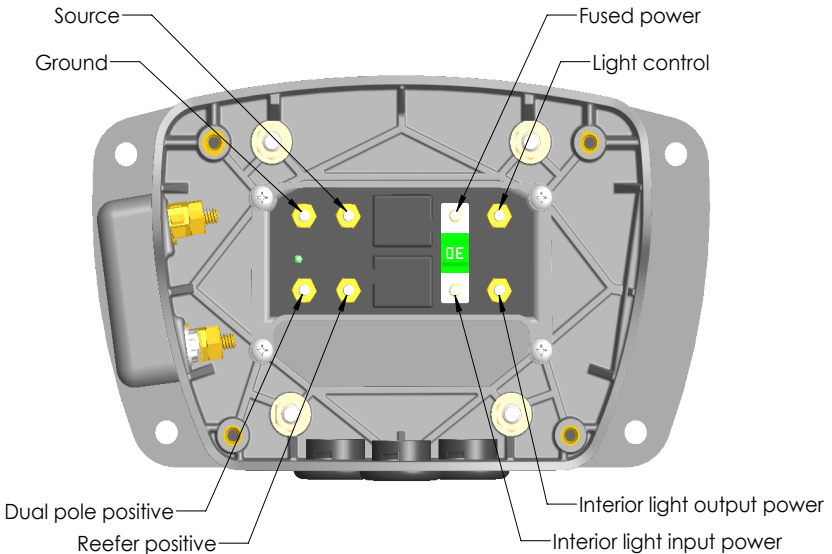


Figure 1

Step 3: Terminate the negative input with a #10 ring terminal and connect to the Ground pin inside the nosebox (see Figure 1).

## INTERIOR LIGHT INSTALLATION WITH SEVERE SERVICE

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These interior light instructions apply if you are installing the Purkeys severe service kit (Direct Max only).

Step 1: Inside the nosebox, connect the severe service positive terminal to the interior light input power terminal (see Figure 2) using a 10 gauge wire.

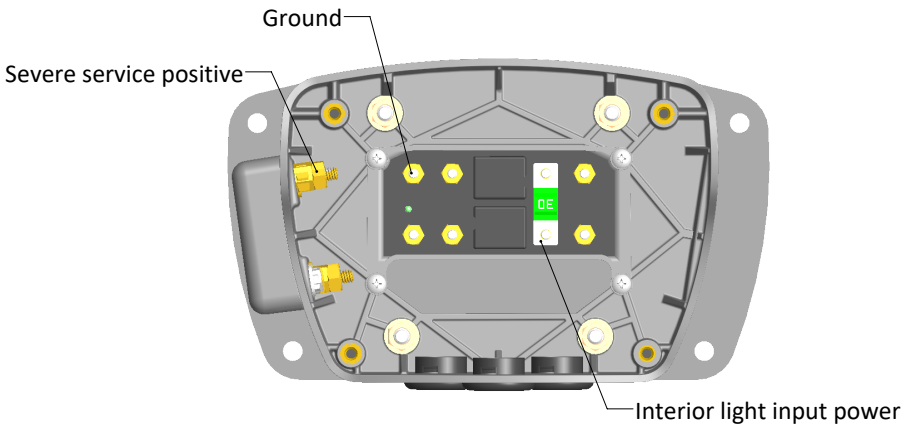


Figure 2

Step 2: Terminate the Interior light positive wire with a #10 ring terminal and connect to the Interior light input power (see Figure 2).

Step 3: Terminate the Interior light negative wire with a #10 ring terminal and connect to Ground (see Figure 2).

Interior Light with Severe Service Installation Complete.

# DIRECT NOSEBOX INSTALLATION GUIDE

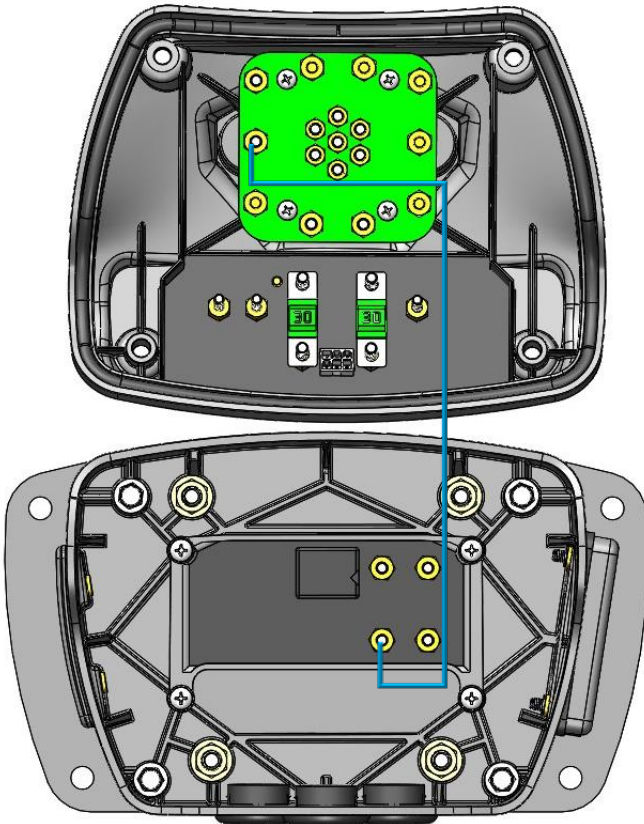
## INTERIOR LIGHT POWER FROM THE 7-WAY AUXILIARY CIRCUIT

These interior light instructions apply if your preferred power source is the 7-way auxiliary circuit.

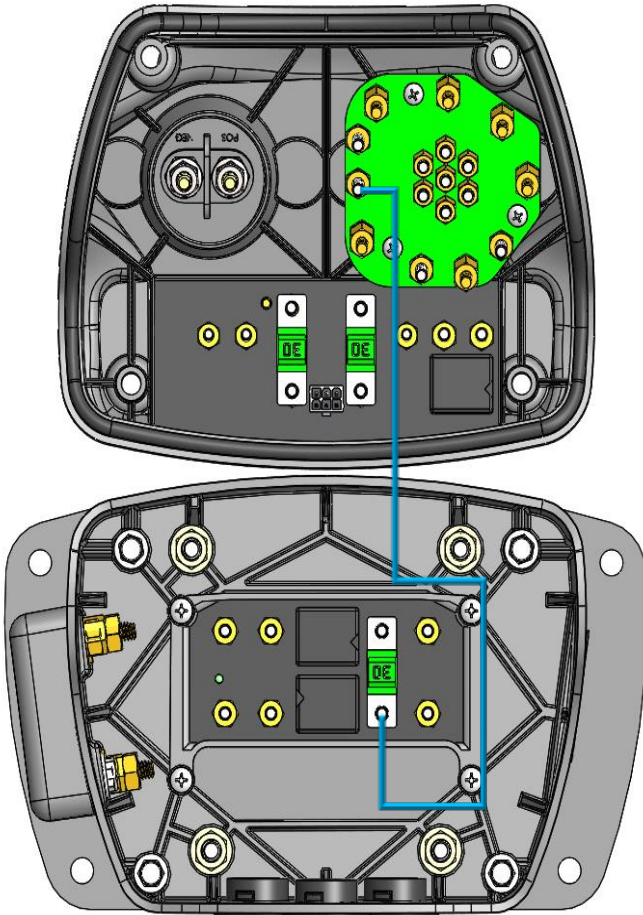
Refer to the images in this section to see how to wire the connections.

- The connection wires **MUST** be 10 AWG or larger.
- Connections **MUST** be made with ring terminals or eyelets.
- Make sure each fastened connection is torqued to at least 48 in-lbs.
- It is required that you insulate each terminal crimp.

### Direct Plus Diagram: 7-way Interior Light Connection



# Direct Flex and Max Diagram: 7-way Interior Light Connection



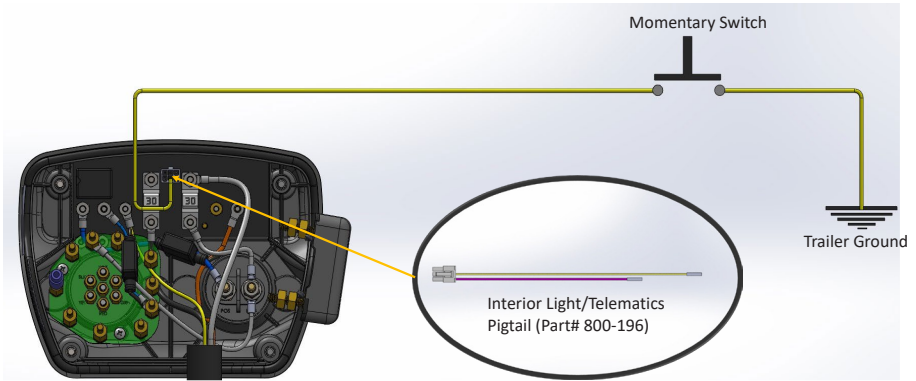


# DIRECT NOSEBOX INSTALLATION GUIDE

## MOMENTARY SWITCH (OPTIONAL)

If your trailer is being spec'd with a momentary switch at the back of the trailer (the momentary switch is not included in the Purkeys kit), wire the circuit as shown below using the supplied pigtail harness shown in the drawing below (Purkeys Part Number 800-196).

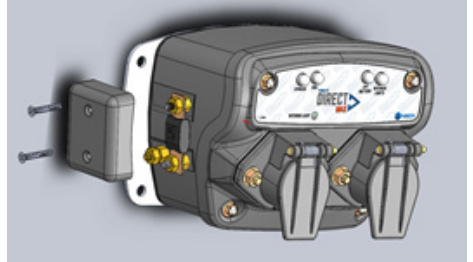
If you are using the pigtail harness for interior lights, but not for telematics, trim off and heat shrink the purple telematics wire.



## SEVERE SERVICE INSTALLATION

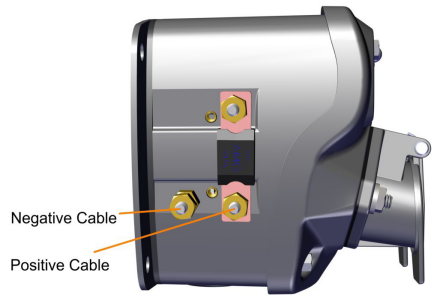
### Installing Cables to the Nosebox (Direct Max Only)

Step 1: Remove cover on the side of the DIRECT MAX.

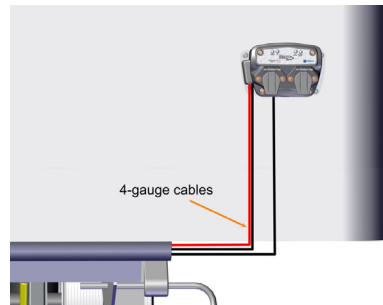


Step 2: Install 4-gauge cables as shown. Make sure each connection is torqued to 5 ft-lbs. Replace the side cover.

Note: The mega fuse used here is a 200 amp fuse.



Step 3: Route the 4-gauge red and black cables behind the front cover, then under the header plate through the air/electrical tube to the center channel.



Important: Avoid sharp edges and possible chaffing points.

# DIRECT NOSEBOX INSTALLATION GUIDE

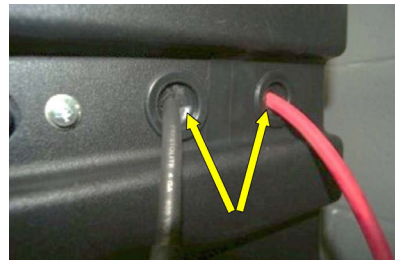
## Routing the Severe Service Cables

Step 1: Route the red and black 4-gauge cable toward the back of the trailer via the center channel. Secure with wire ties as you go.



**Important:** Avoid sharp edges and possible chaffing points.

Step 2: When near the liftgate battery box, route the two 4-gauge red and black cables to the liftgate battery box. Again, secure the cables with wire ties as you go.



Step 3: Determine if the pre-terminated cables are an appropriate length. If they are, skip to Step 9.

If they are not the appropriate length, continue to Step 4. Use the supplied hardware (BK-1055) to terminate the cables.

Step 4: Mark how much excess will need to be cut off of the 4-gauge red and black cables so that the 4-gauge red cable will reach the left (input) side of the 150 amp circuit breaker and the 4-gauge black cable will reach the liftgate battery negative post.



Step 5: Pull the 4-gauge red and black cables back out of the battery box so it is easier to work on them. Cut off the excess.



Step 6: Strip 1/2 inch of the insulation off the 4-gauge red and black cables.



Step 7: Install the 1/4 inch ring terminal on the 4-gauge red cable and the 3/8 inch ring terminal on the black cable. Crimp the connections.

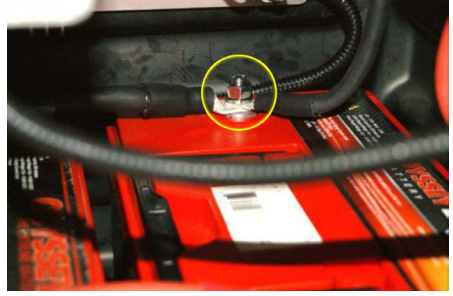


Step 8: Install the red heat shrink to the crimp area of the red cable and the black heat shrink to the crimp area of the black cable. Apply heat to both pieces to seal the connection.

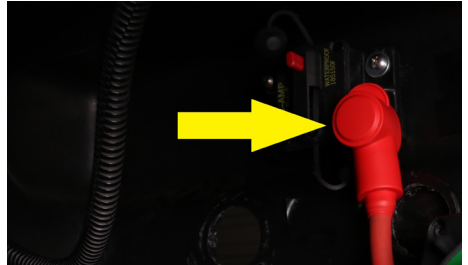


## DIRECT NOSEBOX INSTALLATION GUIDE

Step 9: Route the 4-gauge red and black cables back into the liftgate battery box. Connect the 4-gauge black cable to the liftgate battery negative post.

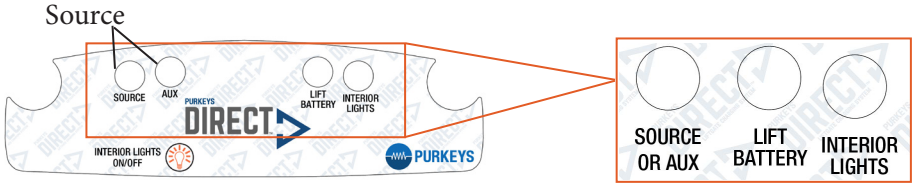


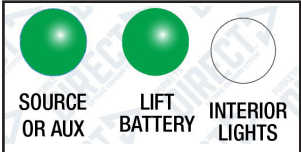
Step 10: Slide the supplied red rubber boot over the 4-gauge red cable and connect this cable to the left side of the 150 amp circuit breaker.



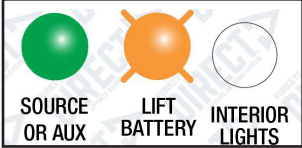
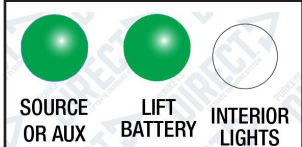
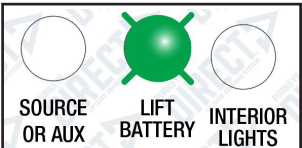
Severe Service Installation Complete.

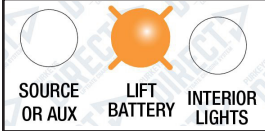
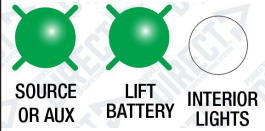
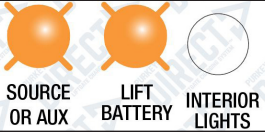
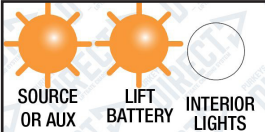
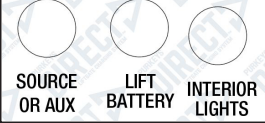
## LED LOGIC



LED STATUS		LOGIC
	<p>Solid Green on Lift Battery and Source</p>	<p>Charging State – DC/DC converter is on and system is charging.</p> <p>Note: For aux source, the turn-on voltage is 13.2 V. For dual pole source, the turn-on voltage is 13.2 V after 5 minutes or 13.8 V immediately. This is because, in dual pole in parallel state, the Direct input is now connected to liftgate batteries via the dual pole cables. If the liftgate batteries had been charging using the DC/DC converter, that voltage would be above 13.2 volts, so the Direct would turn on and continue to charge even if the tractor was shut off.</p>

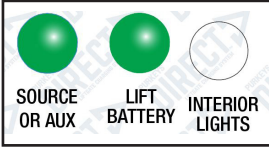
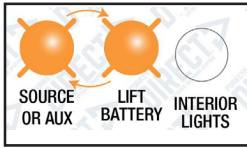
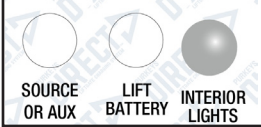
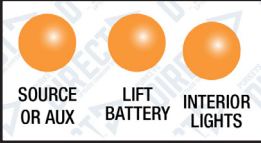
# DIRECT NOSEBOX INSTALLATION GUIDE

LED STATUS			LOGIC
 <p>SOURCE OR AUX      LIFT BATTERY      INTERIOR LIGHTS</p>	<p>Solid Green on Source Slow Flashing Orange on Lift Battery</p>		<p>Charging State – Tractor connected and running. DC/DC converter is operating, but the liftgate batteries are defective or below 12.4 volts.</p> <p>Applies to all charging sources.</p>
 <p>SOURCE OR AUX      LIFT BATTERY      INTERIOR LIGHTS</p>	<p>Solid Green on Lift Battery and Source</p>		<p>Extend State – Source voltage drops below 12.8 volts. DC/DC converter is on for 1 hour. Every two minutes the controller turns off the DC/DC converter, so there is no current flow (no voltage drop) and measures the battery voltage on the tractor batteries. If over 12.4 volts, the controller turns on for another two minutes. This will repeat until 60 minutes has expired, or the voltage drops below 12.4 volts. The Direct will then look for next available source.</p>
 <p>SOURCE OR AUX      LIFT BATTERY      INTERIOR LIGHTS</p>	<p>No Source LED Lift Battery LED Slow Flashing Green</p>		<p>Static State – No tractor connected to the trailer and the liftgate batteries are more than 12.4 volts.</p>

LED STATUS	LOGIC	
 <p>SOURCE OR AUX    LIFT BATTERY    INTERIOR LIGHTS</p>	<p>No Source LED Lift Battery LED Slow Flashing Orange</p>	<p>Static State – No tractor connected to the trailer and the liftgate batteries are less than 12.4 volts.</p>
 <p>SOURCE OR AUX    LIFT BATTERY    INTERIOR LIGHTS</p>	<p>Slow Flashing Green on Lift Battery and Source</p>	<p>Off State – Source voltage below 12.8 volts and extend period is over. Voltage at the lift batteries and the source is above 12.4 volts.</p> <p>Applies to all charging sources.</p>
 <p>SOURCE OR AUX    LIFT BATTERY    INTERIOR LIGHTS</p>	<p>Slow Flashing Orange on Lift Battery and Source</p>	<p>Off State (Low Voltage) – Lift battery and source voltage below 12.4 volts. DC/DC converter is off.</p> <p>Applies to all charging sources.</p>
 <p>SOURCE OR AUX    LIFT BATTERY    INTERIOR LIGHTS</p>	<p>Rapid Flashing Orange on Lift Battery and/or Source</p>	<p>Off State (Fault) – Voltage between 2 and 8 volts. Check fuses and wiring.</p>
 <p>SOURCE OR AUX    LIFT BATTERY    INTERIOR LIGHTS</p>	<p>No LED</p>	<p>Off State (Fault) – Open circuit in lift battery or source circuit. This could also be caused by the liftgate battery voltage being below 6 volts, a blown 2 amp fuse, or a bad/tripped 30 amp fuse.</p>



# DIRECT NOSEBOX INSTALLATION GUIDE

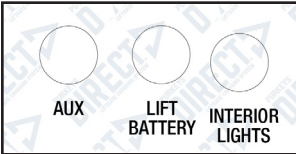
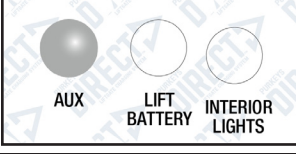
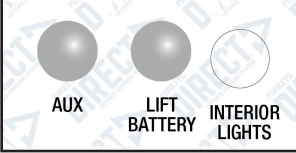
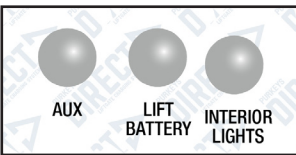
LED STATUS	LOGIC
 <p>SOURCE OR AUX      LIFT BATTERY      INTERIOR LIGHTS</p>	 <p>SOURCE OR AUX      LIFT BATTERY      INTERIOR LIGHTS</p> <p>Excessive Voltage Drop – Tractor is running and the voltage is above 13.8 volts. The controller turns on the DC/DC converter and current starts to flow. If the voltage drops below 9 volts, the controller will tell the DC/DC converter to turn off. What the operator will see is the Source and Lift Battery go Solid Green. Both LEDs will toggle orange for a few seconds. The cycle then repeats.</p> <p>NOTE: Low voltage shut off in the first 5 minutes is 9.5 volts.</p>
 <p>SOURCE OR AUX      LIFT BATTERY      INTERIOR LIGHTS</p>	<p>Solid White on Interior Lights</p> <p>The interior lights in the trailer will turn off either via a timer (which can be set to 15, 30, 60, or 90 minutes) or if the liftgate batteries are below 12.2 volts.</p>
 <p>SOURCE OR AUX      LIFT BATTERY      INTERIOR LIGHTS</p>	<p>Solid Orange on All LEDs</p> <p>Off State (Fault) – Board temperature has reached 100C and turned off charging from all sources. Charging will begin again after board temperature is below 65C.</p>

## Interior Light Control

The interior light timer defaults to 60 minutes. However, it can be changed to 15, 30, 60, or 90 minutes. To change the timer length:

- Press the “ON/OFF” button 10 times within 10 seconds
- All LEDs will flash white once, then display current timer setting (see table below)
- Press the “ON/OFF” button to toggle to the desired timeout period (see table below)
- Timer set mode will exit 10 seconds after the last button press (setting will be saved as the most recent setting entered by user )

Note: if there is a Source LED (depending on product) it will be illuminated in all cases.

LED STATUS	LOGIC	
	No LED	15 minute timer is enabled/active
	Solid White on Aux	30 minute timer is enabled/active
	Solid White on Aux and Lift Battery	60 minute timer is enabled/active
	Solid White on Aux, Lift Battery, and Interior Lights	90 minute timer is enabled/active

# DIRECT NOSEBOX INSTALLATION GUIDE

## Interior Light Control Timer

When there are 3 minutes remaining on the timer, the interior lights (inside the trailer, as well as the LED indicator on the front of the nosebox) will blink 3 times. At 2 minutes, the lights will blink 2 times; at 1 minute, they will blink once.

If the interior trailer lights are on, and the system detects power on the 7-way aux pin, the timer will automatically set to 3 minutes to ensure the interior trailer lights are turned off while the vehicle is in motion.

If the battery voltage is below 12.2 volts, the timer will automatically set to 3 minutes to preserve the battery.

# NOTES

# DIRECT NOSEBOX INSTALLATION GUIDE

## NOTES



# DIRECT NOSEBOX INSTALLATION GUIDE

## LIMITED COMMERCIAL WARRANTY POLICY

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MCE Purkeys FE, LLC (hereafter “Purkeys”), warrants each product to be free of defects in material or workmanship under normal use and service. This warranty is for the benefit of Original Equipment Manufacturers, Dealers, Warehouse Distributors, Fleets, or other End Users (hereafter “Customers”) and covers products manufactured by Purkeys and sold new to Customers either directly by Purkeys or by its authorized dealers, distributors, or agents. The length of the Warranty Period is 36 months.

The warranty period commences on the in-service or install date and is not transferable. Failure to provide the in-service or install date on the warranty claim form will cause the warranty period to begin on the date the part was manufactured, or date of sale recorded on the original sales invoice, whichever is earlier.

A completed warranty claim form should accompany all parts submitted to Purkeys for consideration for repair or replacement under warranty. The submitted claim form should contain all of the information required. Lack of a properly or fully completed claim form will result in delay or denial of warranty claim. Claims must be submitted no later than 30 days after part is removed.

This warranty does not apply if, in sole judgement of Purkeys, the product has been damaged or subjected to accident, faulty repair, improper adjustment, improper installation or wiring, neglect, misuse, or alteration or if the product failure is caused by defects in peripheral vehicle components or components attached to the Product or failure of a part not manufactured by Purkeys.

This warranty shall not apply if any Purkeys product is used for a purpose for which it is not designed or is in any way altered without the specific prior written consent of Purkeys. ANY product alleged by a Customer to be defective must be inspected by Purkeys as a part of the warranty claims process in order to confirm that the part has failed as a result of a defect in material or workmanship.

Transportation for products and parts submitted to Purkeys for warranty consideration must be prepaid by Customer. Repaired or replaced products and or components will be returned to Customer pre-paid by Customer or “freight collect” to the address provided by Customer in the warranty claim form. No charge will be made for labor or material in effecting such repairs.

The Warranty provided by Purkeys hereunder is specifically limited to repair or replacement of the Product as Purkeys deems most appropriate in its sole discretion. Purkeys neither assumes nor authorizes any other person to assume on its behalf any other warranty or liabilities in connection with Purkeys products. The Warranty does not apply to fuses or other “consumable” or maintenance items which are or may be a part of any Purkeys product.

**THIS WARRANTY DOES NOT APPLY TO LOSS OF VEHICLE OR EQUIPMENT, LOSS OF TIME, INCONVENIENCE, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES. PURKEYS SPECIFICALLY DISCLAIMS AND SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES arising out of or from the use of Purkeys products by the Customer.**

**THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, INCLUDING COMMON LAW WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, AND ANY OTHER EXPRESS OR IMPLIED WARRANTIES. ALL OTHER SUCH WARRANTIES ARE SPECIFICALLY DISCLAIMED.**

This Limited Commercial Warranty supersedes all previous Warranty Policies issued by Purkeys and any of its suppliers.



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