



# Dual Pole with Aux Backup TRAIL CHARGER with LOCKOUT

284585-01

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## Owners Manual

- Operation
- Installation
- Wiring Diagram
- Troubleshooting
- Parts Breakdown

## DUAL POLE WITH AUX BACKUP

### GENERAL OPERATION

*The Dual Pole with Aux Backup system is the power source to a DC/DC converter called a Trail Charger that is located inside or outside the battery box. The Trail Charger is a power amplifier that maximizes the charging voltage so that the liftgate batteries are kept at a very full state of charge and the liftgate operation is faultless and not impacted by discharged batteries. Both of these systems require no interaction from the driver – as there is logic built into the system that allows them to function in the most effective manner.*

*The Dual Pole with Aux Backup system is designed to allow the maximum flexibility for fleets with trailers that are equipped with liftgates. By utilizing the Dual Pole with Aux Backup, there are now two power source options to charge the liftgate batteries from the tractor. The most optimal way is to use a dual pole stinger cord. Whenever a dual pole stinger cord is connected to the Dual Pole with Aux Backup, a yellow LED light will illuminate on the dual pole nose box indicating the system is operational and that power is being directed to the lift gate batteries. If the tractor is not equipped with a dual pole stinger cord, or the stinger cord is not functioning properly, the Dual Pole with Aux Backup will utilize the 7-way auxiliary circuit (Aux –blue center pin on seven way) as the power source. When power from the Aux circuit is available (the Aux circuit is key switch controlled) a green LED light will illuminate on the dual pole nose box indicating that the Aux circuit is available as a power source. If the Dual Pole with Aux Backup is operating off of the Aux circuit, the control module will automatically turn off the Trail Charger when the brakes are applied. This feature keeps the ABS brake system on the trailer from being interrupted when the brakes are being used so that the ABS brake system receives full voltage.*

## DUAL POLE WITH AUX BACKUP

### INSTALLATION INSTRUCTIONS

**Step 1:** Mount the Trail Charger on the back of the battery box using the supplied self-drilling sheet metal screws. (See Figure 1) The Trail Charger should be mounted about 1 ½" down from the top and just to the right of the grommet. The unit must also be mounted with the plug pointed down (6 o'clock). Note: Be sure that the screws will not interfere with the batteries in the box.

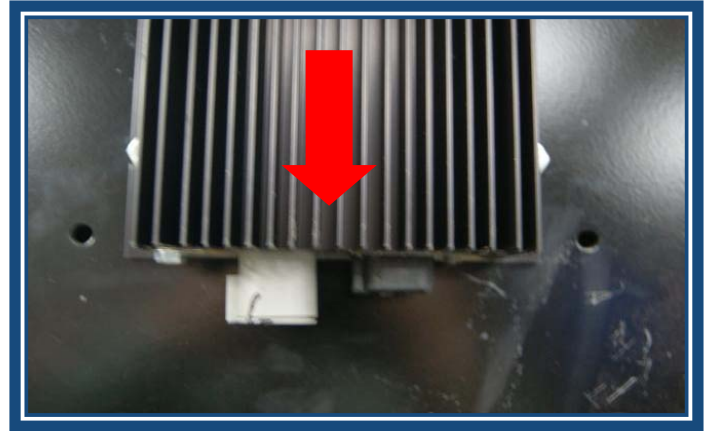


Figure 1

**Step 2:** Route the main harness into the battery box through the hole in the side of the battery box.

**Note:** All wires routed through the battery box should be protected with a rubber grommet or dome nut.

Route the following wires (the Deutsch pins go to the outside) out of the battery box through the hole in the back next to the Trail Charger. (See Figure 2)

- Blue wire "16", labeled "Ignition Pin #4"
- Black wire "17", labeled "12V Input Pin #1"
- Red wire "19", labeled "12V Output Pin #2"
- White wire "18", labeled "GRND Pin #3"
- Orange wire "3", labeled "Lockout Input"

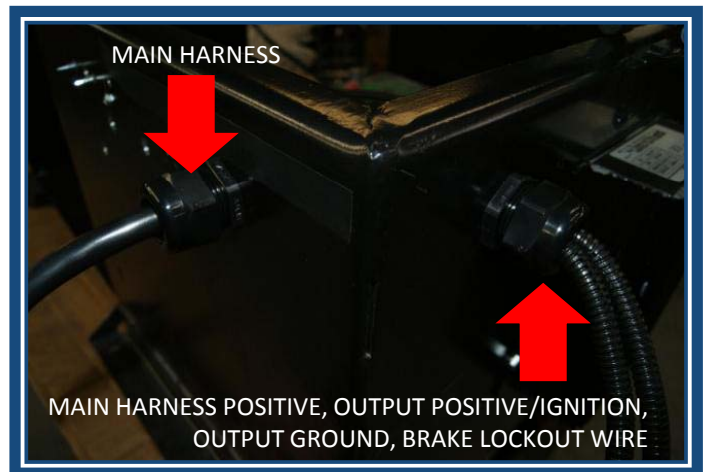


Figure 2

**Step 3:** Mount the included insulated stud (C) to the inside of the battery box using the supplied hardware.

Mount the Extender Module (D) to the inside of the battery box using the supplied hardware.

These should be mounted near the battery box ground stud as shown in the picture to the right. (See Figure 3)

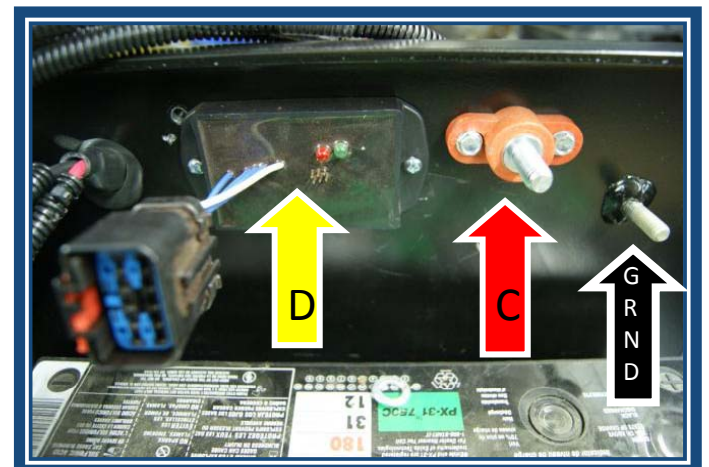


Figure 3

## DUAL POLE WITH AUX BACKUP

### INSTALLATION INSTRUCTIONS

**Step 4:** Connect the Extender harness to the Extender using the 10 pin plug and receptacle. (See Figure 4)



Figure 4

**Step 5:** Connect the following wires to the red insulated junction stud. These are all labeled "Junction Stud".

- Purple wire (#13) from module
  - Black wire (#7) from the dual pole (+)
  - Black wire (#15) from TC (routed in step 2)
- Install the nut and tighten properly. (See Figure 5)



Figure 5

**Step 6:** Locate the four pin Deutsch connector from the bag kit and insert the wires into the correct positions.

- Insert the black input wire (#15) (12V Input Pin #1) into the #1 position (V1) on the connector.
- Insert the red output positive wire (#17) (12V Output Pin #2) into the #2 position (V2) on the connector.
- Insert the white output ground wire (#16) (Ground Pin #3) into the #3 position (V3) on the connector.
- Insert the blue ignition wire (#14) (Ignition Pin #4) from the extender module (P) into the #4 position (V4) on the connector. (See Figure 6)

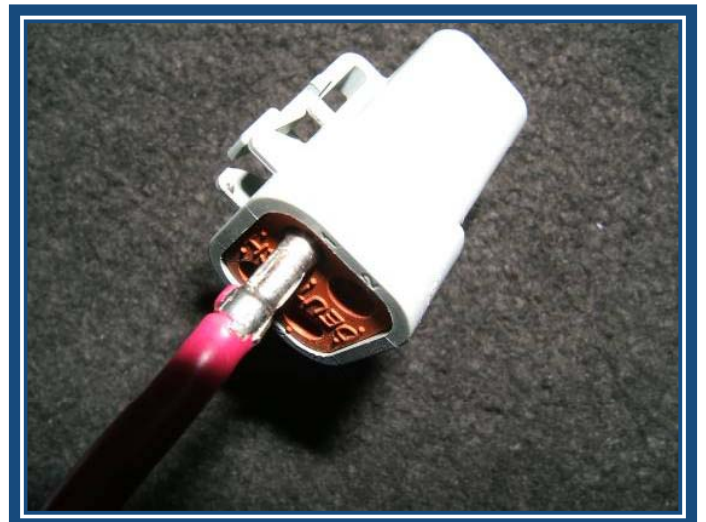


Figure 6



## DUAL POLE WITH AUX BACKUP

### INSTALLATION INSTRUCTIONS

**Step 7:** Verify all the wires are in their correct positions and locked in place. (See Figure 7)

- Figure 5-1: Black 10 AWG 12 Volt input power of the main harness.
- Figure 5-2: Red 10 AWG Trail Charger output power to liftgate battery's positive (+).
- Figure 5-3: White 10 AWG Trail Charger output ground to liftgate battery's negative (-).
- Figure 5-4: Blue 14 AWG ignition input of the main harness.

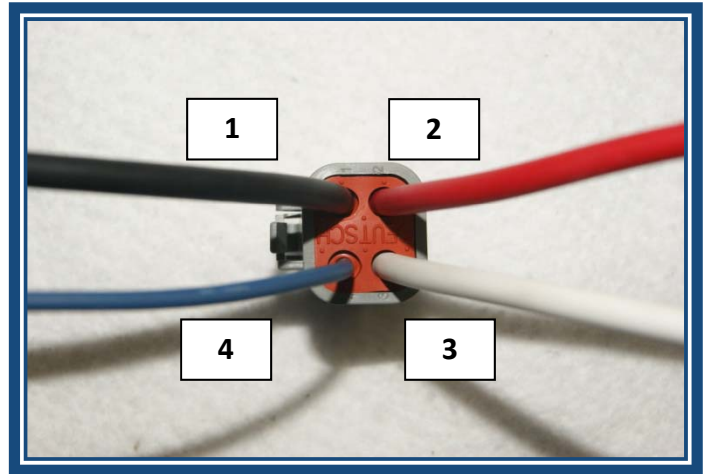


Figure 7

**Step 8:** Once both wires are inserted into the connector the orange lock can be inserted. (See Figure 8)

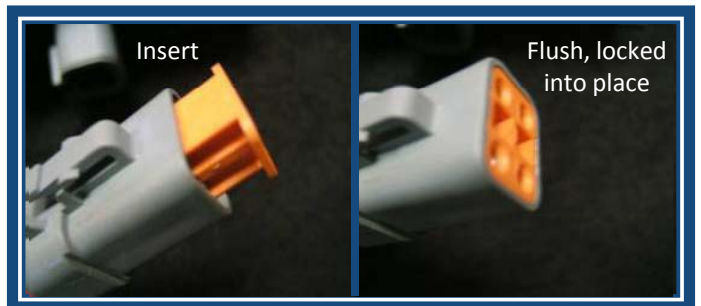


Figure 8

**Step 9:** Insert the brake circuit wire into the 6 way Deutsch connector in the #2 position. The other positions should already have plugs inserted into the empty holes to help prevent corrosion and contamination. (See Figure 9)



Figure 9

## DUAL POLE WITH AUX BACKUP

### INSTALLATION INSTRUCTIONS

**Step 10:** Once the wire is inserted into the connector the orange lock can be inserted. Make sure that the lock is properly seated. (See Figure 10)



Figure 10

**Step 11:** Slide the included clear tubing over the connectors on the Trail Charger. This will help prevent water and contaminants from entering the electrical connections. (See Figure 11)



Figure 11

**Step 12:** The harness plugs may now be inserted into the Trail Charger. Push the 4 wire connector into the tubing and into the appropriate socket on the Trail Charger. Push the 6 wire connector into the tubing and into the appropriate socket on the Trail Charger. It may be necessary to use a screwdriver to make sure the plugs are properly seated. (See Figure 12)



Figure 12

## DUAL POLE WITH AUX BACKUP

### INSTALLATION INSTRUCTIONS

**Step 13:** The last connections can now be made at the liftgate batteries. First install the fuse cube assembly on one of the liftgate positive battery terminals. (See Figure 13)

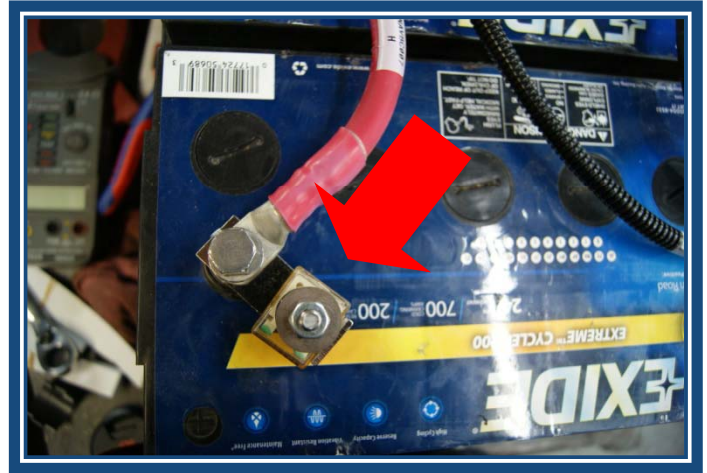


Figure 13

**Step 14:** The red 10 AWG Trail Charger output positive wire labeled "liftgate positive" can now be connected to the fuse cube assembly. Remove the insulated nut, install the wire and reinstall the nut.

The white Trail Charger output ground wire and the white wire from the main harness should be connected to the negative post of the opposite battery as shown. (See Figure 14)

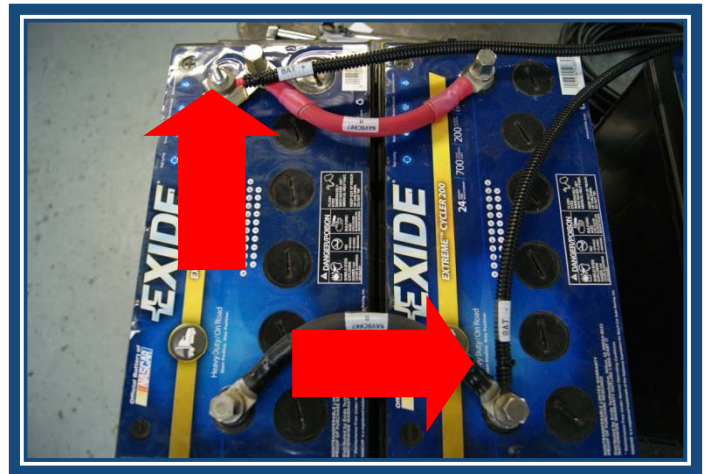


Figure 14

**Step 15:** Once the Trail Charger is mounted the main harness can be routed to the front of the trailer utilizing the factory channels up to the fifth wheel plate and then through the electrical/air line tubes the rest of the way to the front of the trailer. (See Figure 15)



Figure 15



## DUAL POLE WITH AUX BACKUP

### INSTALLATION INSTRUCTIONS

**Step 16:** At the front of the trailer, locate and mark the location where the dual pole nose box will be mounted. Consult the trailer manufacturer for proper location and mounting instructions. This step must be done to ensure that the wiring harness is not cut too short in the following steps. (See Figure 16)



Figure 16

**Step 17:** Route the main harness to the front of the trailer utilizing the factory channels up to the fifth wheel plate and then through the electrical/air line tubes the rest of the way to the front of the trailer. Once the harness is routed, and it has been determined that there is enough cable, cut the harness to length. Be sure to leave enough to be able to strip the outer jacket off and have enough wire to make all the electrical connections. Make sure to secure the harness with wire-ties. (See Figure 17)



Figure 17

**Step 18:** Route the harness into the dual pole nose box through the hole in the bottom. (See Figure 18)

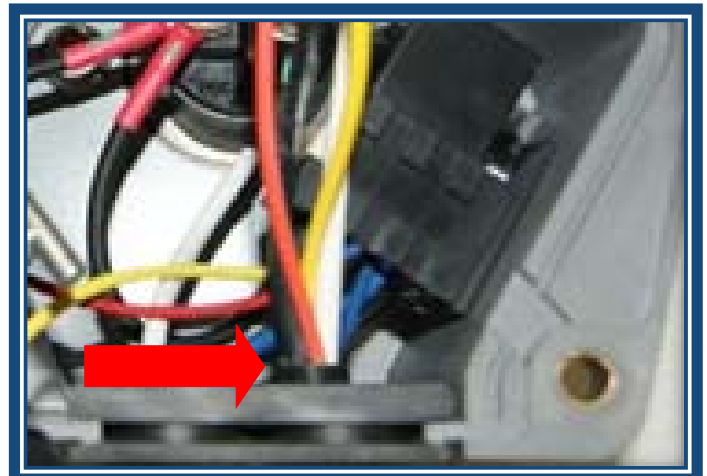


Figure 18



## DUAL POLE WITH AUX BACKUP

### INSTALLATION INSTRUCTIONS

**Step 19:** Connect the black wire (7) from the main harness to the fuse assembly (K) that is already connected to the dual pole positive (L). Strip the end of the black wire (7) approximately  $\frac{1}{4}$ ". Slide a piece of the  $\frac{1}{4}$ " red heat shrink over the wire. Insert the stripped wire into the butt connector of the fuse assembly (K), crimp and solder. Place heat shrink over connection and apply heat. (See Figure 19)

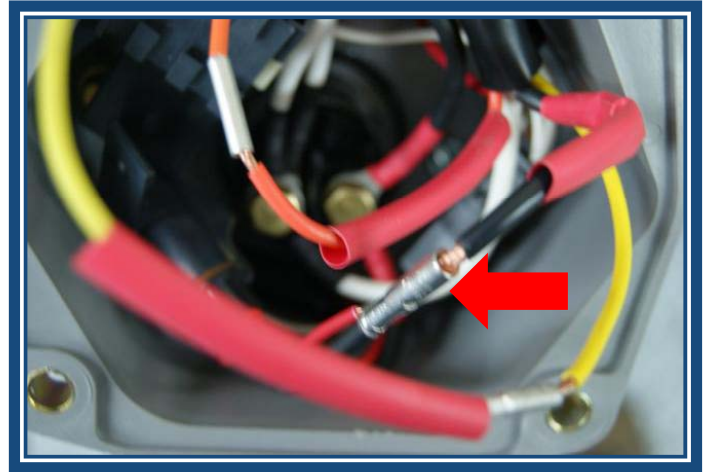


Figure 19

**Step 20:** Connect the yellow wire (6) from the main harness to the fuse assembly (J) that is already connected to the relay (H) 86 terminal. Strip the end of the yellow wire (6) approximately  $\frac{1}{4}$ ". Slide a piece of the  $\frac{1}{4}$ " red heat shrink over the wire. Insert the stripped wire into the butt connector of the fuse assembly (J), crimp and solder. Place heat shrink over connection and apply heat. (See Figure 20)



Figure 20

**Step 21:** Connect the white wire (8) from the main harness to the dual pole negative (M). Strip the end of the white wire (8) approximately  $\frac{1}{4}$ ". Slide a piece of the black heat shrink over the wire. Insert the stripped wire into the  $\frac{1}{4}$ " eyelet from the bag kit, crimp and solder. Place the heat shrink over the connection and apply heat. Connect the eyelet to the dual pole negative (M). Tighten properly. (See Figure 21)

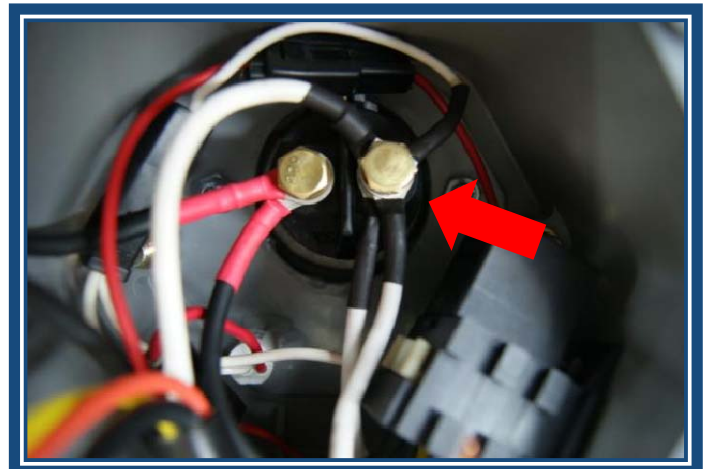


Figure 21

## DUAL POLE WITH AUX BACKUP

### INSTALLATION INSTRUCTIONS

**Step 22:** Route the white wire (2) from the dual pole nose box to the 7-way nose box, cut to length. Strip the end of the white wire (2) approximately  $\frac{1}{4}$ ". Slide a piece of the black heat shrink over the wire. Insert the stripped wire into the #10 eyelet from the bag kit, crimp and solder. Place the heat shrink over the connection and apply heat. Connect the eyelet to the ground pin (D) of the 7-way. Tighten properly. (See Figure 22)



Figure 22

**Step 23:** Connect the blue fuse assembly ((E) 11020FH-2) from the bag kit to the 7-way aux pin (B). Tighten properly. (See Figure 23)

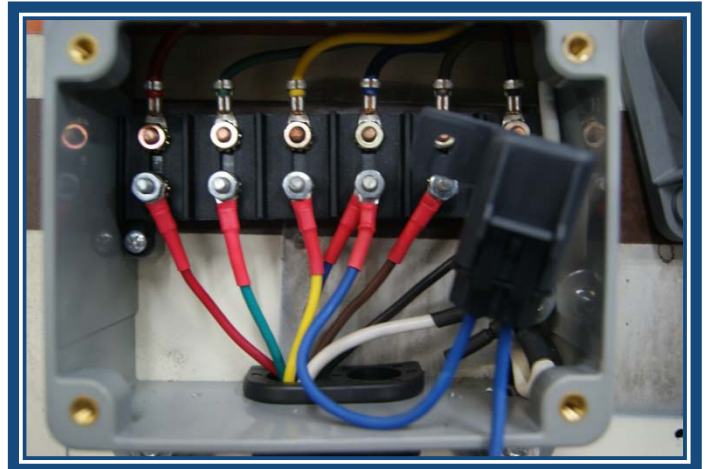


Figure 23

**Step 24:** Route the blue wire (1) from the dual pole nose box that is connected to the relay (H) 87 terminal to the 7-way nose box. Cut the blue wire (1) to length to be able to connect to the fuse assembly (E). Strip the end of the blue wire (1) approximately  $\frac{1}{4}$ ". Slide a piece of the red heat shrink over the wire. Insert the stripped wire into the butt connector of the fuse assembly (E), crimp and solder. Place heat shrink over connection and apply heat. (See Figure 24)



Figure 24

## DUAL POLE WITH AUX BACKUP

### INSTALLATION INSTRUCTIONS

**Step 25:** Connect the orange fuse assembly ((F) FH-3IN1-3) from the bag kit to the 7-way brake pin(C). Tighten properly. . (See Figure 25)

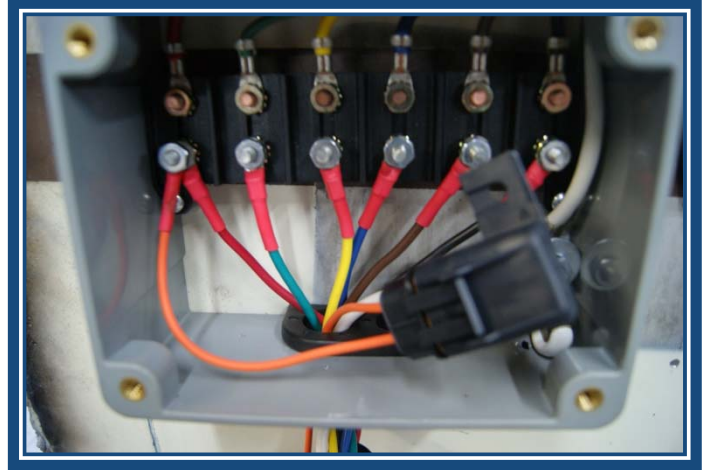


Figure 25

**Step 26:** Route the orange wire of the fuse assembly (F) from the 7-way nose box to the dual pole nose box. Cut the orange wire of the fuse assembly to length to be able to connect to the orange wire(3) of the main harness. Strip the end of both of the orange wires approximately ¼". Slide a piece of the red heat shrink over the wire. Insert the stripped wires into the butt connector from the bag kit, crimp and solder. Place heat shrink over connection and apply heat. (See Figure 26)

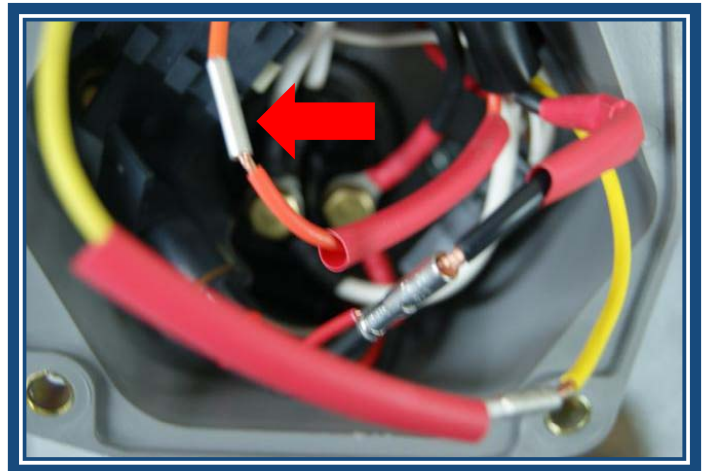


Figure 26

**Step 27:** Mount the dual pole nose box to the front of the trailer using the screws from the hardware kit. (See Figure 27)



Figure 27



## DUAL POLE WITH AUX BACKUP

### INSTALLATION INSTRUCTIONS

**Step 28:** Connect the white chassis ground wire (9) to a good chassis ground on the front of the trailer. (See Figure 28)

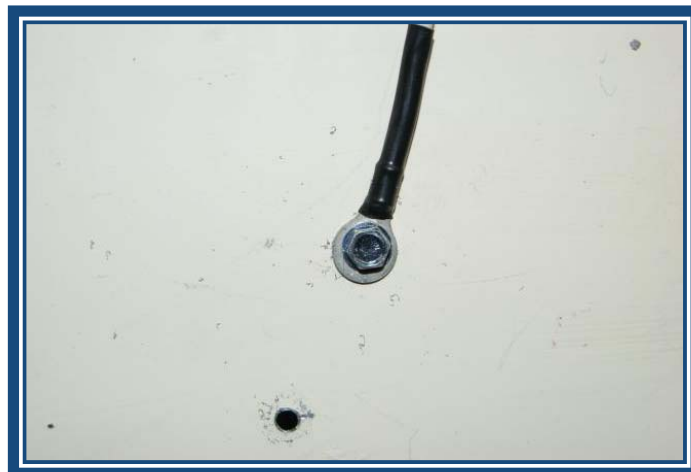


Figure 28

**Step 29:** The system is now ready to test. Check the aux pin powered operation by connecting a tractor to the trailer via the 7-way receptacle, turn the key on and check operation of Trail Charger. (No single or dual pole should be connected.) The Trail Charger's green LED light should be illuminated (See Figure 29). Measure the liftgate battery voltage, should be near 14.0 volts. The red and green LED light (See Figure 30) should be illuminated on the module. Check the brake lockout function by verifying that the green LED on the Trail Charger flashes slowly when the brakes are applied. When the brakes are released, the LED should go back to solid.



Figure 29

**Step 32:** Check the single/dual pole powered operation by connecting a tractor via a single or dual pole stinger cord. The Trail Charger's green LED light (See Figure 30) should be illuminated. The green LED light (See Figure 32) should be illuminated on the module.

**Note:** Tractor needs to be running and the system voltage needs to be approximately 14.0 volts.

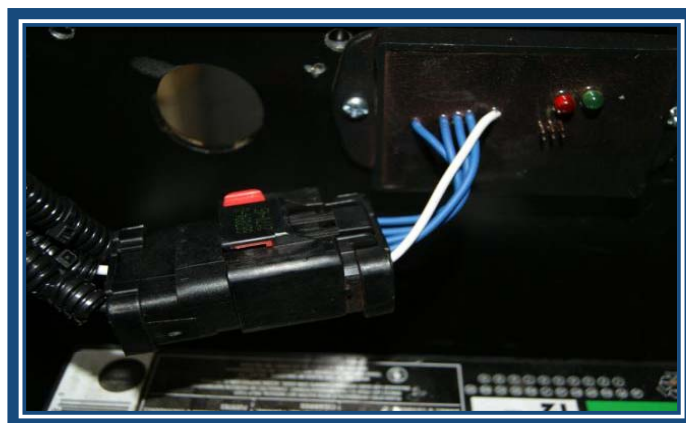


Figure 30



## DUAL POLE WITH AUX BACKUP

### INSTALLATION INSTRUCTIONS

**Step 33:** Now the metal cover can be installed to further protect the Trail Charger from physical damage and road splash. Use four self drilling screws (provided) to attach the cover to the battery box. Check the back side of the mounting location to ensure that nothing will be damaged during installation. (See Figure 31)

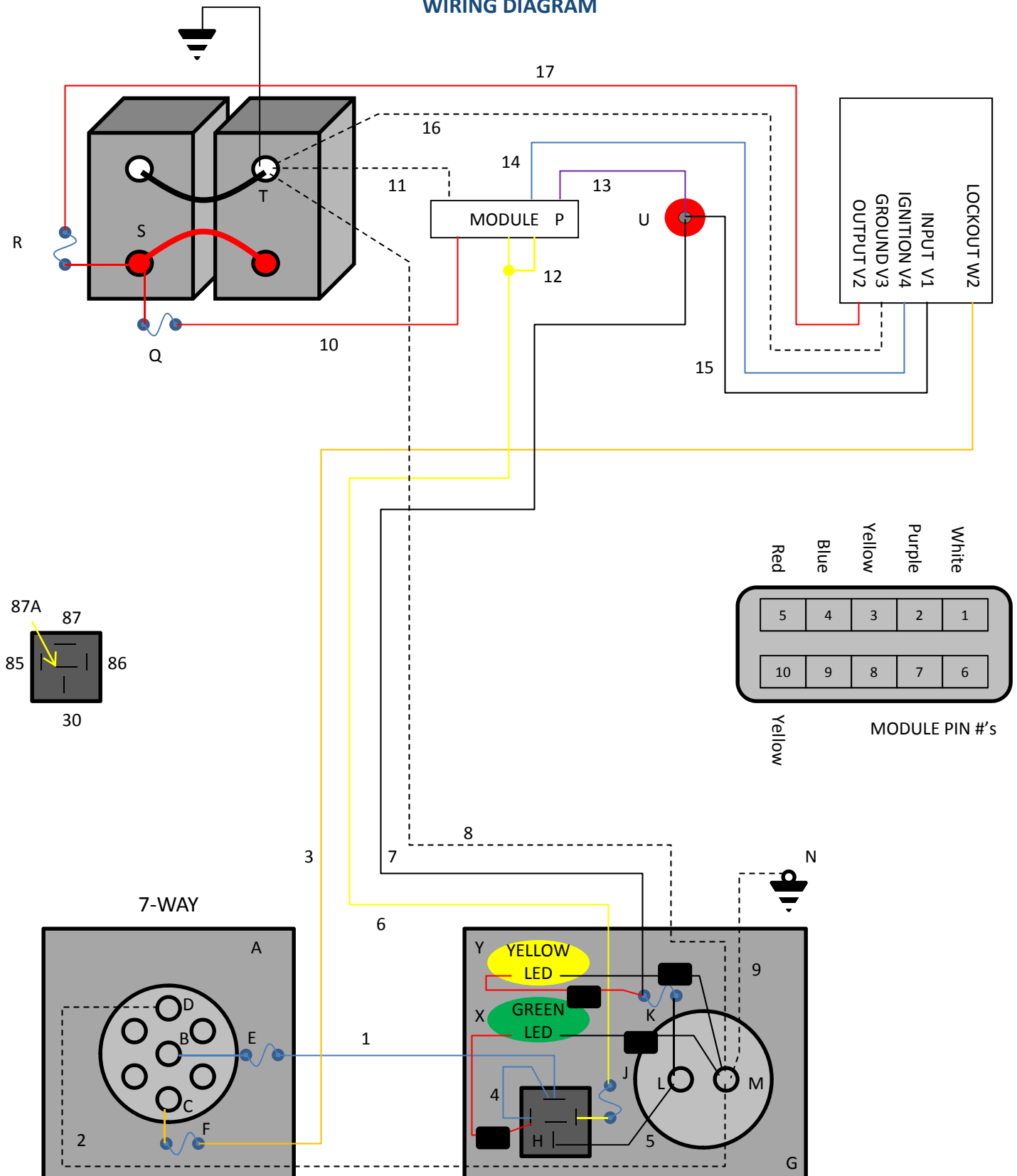
Note: Make sure that the harness has a drip loop for the water to run down away from the Trail Charger.



Figure 31

# DUAL POLE WITH AUX BACKUP

## WIRING DIAGRAM



## DUAL POLE WITH AUX BACKUP

### WIRING DIAGRAM LEGEND

#### Components:

- A. 7-Way Receptacle
- B. Aux Pin of 7-Way
- C. Brake Circuit Pin of 7-Way
- D. Ground Pin of 7-Way
- E. Fuse, 30 Amp
- F. Fuse, 2 Amp
- G. Combo Nose Box (Single and Dual Pole)
- H. Relay, 30 Amp
- J. Fuse, 2 Amp
- K. Fuse, 30 Amp
- L. Dual Pole Receptacle Positive
- M. Dual Pole Receptacle Negative
- N. Frame Ground, Front of Trailer
- P. Module, 3 in 1 Version 2
- Q. Fuse, 2 Amp
- R. Fuse Cube, 30 Amp
- S. Liftgate Battery Positive

#### Components (Cont.):

- T. Liftgate Battery Negative
- U. Junction Stud, Insulated, Red
- V. Trail Charger Four Position Deutsch Connection
  - 1. Input
  - 2. Output
  - 3. Ground
  - 4. Ignition
- W. Trail Charger Six Position Deutsch Connection
  - 1. Not used in this application
  - 2. Lockout Pin
  - 3. Not used in this application
  - 4. Not used in this application
  - 5. Not used in this application
  - 6. Not used in this application
- X. Green LED Assembly
- Y. Yellow LED Assembly

<u>Wire #</u>	<u>Connect From:</u>	<u>Connect To:</u>	<u>Color:</u>
1.	7-Way Aux Pin (B)	Relay 87 Terminal (H-87)	Blue
2.	7-Way Ground Pin (D)	Dual Pole Negative (M)	White
3.	7-Way Brake Pin (C)	Trail Charger Lockout (Y-2)	Orange
4.	Relay 87 Terminal (H-87)	Relay 85 Terminal (H-85)	Blue
5.	Relay 30 Terminal (H-30)	Dual Pole Negative (M)	Black
6.	Relay 86 Terminal (H-86)	Module (R-3)	Yellow
7.	Dual Pole Positive (L)	Junction Stud (W)	Black
8.	Dual Pole Negative (M)	Liftgate Battery Negative (V)	White
9.	Dual Pole Negative (M)	Frame Ground Front of Trailer (Q)	White
10.	Module (R-5)	Liftgate Battery Positive (U)	Red
11.	Module (R-1)	Liftgate Battery Negative (V)	White
12.	Splice From Wire 6	Module (R-10)	Yellow
13.	Module (R-2)	Junction Stud (W)	Purple
14.	Module (R-4)	Trail Charger Ignition (X-4)	Blue
15.	Junction Stud (W)	Trail Charger Input (X-1)	Black
16.	Trail Charger Ground (X-3)	Liftgate Battery Negative (V)	White
17.	Trail Charger Output (X-2)	Liftgate Battery Positive (U)	Red

## DUAL POLE WITH AUX BACKUP

### TROUBLESHOOTING GUIDE

#### Testing the combination nose box (single / dual pole) portion of the 3 in 1 system.

1. Plug in a dual pole stinger cord from the tractor or a battery with a battery charger connected to it. Ensure the system being used has the ability to provide up to 25 amps at 14.0 volts. (Do not plug the 7-way cord in at this time.) The yellow LED light should illuminate. If yes, the dual pole has power and is functioning properly, skip to step 2. If no, continue to step 1-A.
  - A. Unplug the stinger cord and check the voltage at the plug. If voltage is the same as the source voltage continue to step 1-B. If no, repair or replace stinger cord and start over at step 1.
  - B. With the stinger cord plugged in, check the back side of the dual pole receptacle (whichever is being utilized) and see if the voltage is the same as the source voltage. Continue with the following using the section that pertains with the connection being used for the troubleshooting.
    - Dual Pole
      - a) If yes, continue to step 1-C. If no, replace the dual pole receptacle and start over at step 1.
  - C. Check the 30 amp fuse (K) for a good connection or blown fuse. If blown determine the problem and repair then replace and start over at step 1. If no problem found, continue to the next step.
  - D. Unplug the packard connector in the positive wire of the yellow LED that connects to the dual pole positive. Check the voltage of the packard connector that is still connected to the dual pole positive. This should be the same as source voltage. If yes, and the ground wire of the yellow LED appears to be connected correctly with no damage, continue to the next step. If no, there is a problem between the packard connector and the dual pole positive or the ground wire of the yellow LED. Repair or replace wiring as needed.
  - E. Disconnect the yellow LED from the connections in the nose box. Connect a 12 volt power source to the light and check operation. If the yellow light does not come on, replace the yellow LED. If the light does come one, retrace both the positive and negative wiring from the light back to the power source to determine the problem.
2. With power still at the single or dual pole combination box, check the voltage between the junction stud (U) and the liftgate battery negative (T), should be close to the source voltage. If yes, skip to the 7-way aux pin portion of the 3 in 1 system, step 3. If no, check wire #7 for breaks or damage between the junction stud (U) and the dual pole positive (L). Repair or replace as needed. (The 30 amp fuse (K) should have been checked in a previous step. If needed, double check that the fuse (K) is not blown.) Check the ground wire #8 for breaks or damage as well. Repair or replace as needed and repeat this step.



## DUAL POLE WITH AUX BACKUP

### TROUBLESHOOTING GUIDE

#### Testing the 7-way (aux pin) portion of the 3 in 1 system.

3. Make sure the single or dual pole stinger cord is disconnected from the combination nose box. Plug in the 7-way cable from the tractor receptacle to the trailer receptacle make sure that the tractor is running. The green and the yellow LED should illuminate, showing that the combination nose box has power from the 7-way aux pin. If yes, continue to step 4. If green illuminates and the yellow does not, skip to step 3-J. If neither green or yellow illuminate, continue to step 1-A.
  - A. Unplug the 7-way cable from the trailer. Check the voltage between the aux pin and the ground pin, this should be the same as the tractor battery voltage. If yes, plug the 7-way cable back in to the trailer and continue to the next step. If no, check the truck's 7-way circuit and ensure that the circuit meets the O.E.M.'s specifications, then start at step 3 again.
  - B. Plug the 7-way cable back into the trailer. Check the voltage between the aux pin (B) and the ground pin (D) on the back of the 7-way receptacle, should be close to tractor voltage. If yes, continue to the next step. If no, the 7-way receptacle appears to be bad. Follow the 7-way receptacle manufacturer's procedures for further testing and replacement instructions. Start with step 3 again.
  - C. Check the 30 amp fuse (E) for a good connection or blown fuse. If blown determine the problem and repair then replace and start over at step 3. If no problem found, continue to the next step.
  - D. With the 30 amp fuse (E) removed from the holder, check the voltage between the input side of the fuse holder and the 7-way ground pin (D), should be close to tractor voltage. If yes, reinstall fuse and continue to next step. If no, repair or replace wire between the fuse (E) and the 7-way aux pin (B). Start with step 3 again.
  - E. In the combination nose box, check the voltage between the relay 87 terminal (H-87) and the dual pole receptacle ground (M), should be close to tractor voltage. If yes, continue to the next step. If no, repair or replace the #1 wire, then start at step 3 again.
  - F. Check the voltage between the relay 85 terminal (H-85) and the dual pole receptacle ground (M), should be close to tractor voltage. If yes, continue to the next step. If no, repair or replace the #4 wire, then start at step 3 again.
  - G. Unplug the packard connector in the positive wire of the green LED that connects to the relay(H) 85 terminal. Check the voltage of the packard connector that is still connected to the relay (H) 85 terminal. This should be close to tractor voltage. If yes, and the ground wire of the green LED appears to be connected correctly with no damage, continue to the next step. If no, there is a problem between the packard connector and the 7-way aux pin (B) or the ground wire of the yellow LED. Repair or replace wiring as needed.
  - H. Disconnect the green LED from the connections in the nose box. Connect a 12 volt power source to the light and check operation. If the green light does not come on, replace the green LED. If the light does come one, retrace both the positive and negative wiring from the light back to the 7-way aux pin (B) and ground pin (D) to determine the problem.
  - J. In the combination nose box, check the voltage between the relay(H) 86 terminal and the dual pole receptacle ground (M), should be zero. If yes, continue to the next step. If no, check the 2 amp fuse (J) for a good connection or blown fuse. If blown, determine the problem and repair then replace and start over at step 4.
  - K. In the combination nose box, check the voltage between the relay (H) 30 terminal and the dual pole receptacle ground (M), this should be close to battery voltage. If yes, continue to the next step. If no, replace the relay (H).

## DUAL POLE WITH AUX BACKUP

### TROUBLESHOOTING GUIDE

4. Check the voltage between the junction stud (U) and the liftgate battery negative (T), should be close to tractor battery voltage. If yes, skip to the module portion of the 3 in 1 system, step 5. If no, check wires #1, #5, and #7 for breaks or damage between the junction stud (U) and the 7-way aux pin (B). Repair or replace as needed. (The 30 amp fuses (B) and (K) should have been checked in a previous step. If needed, double check that the fuses (E) and (K) are not blown.) Check the ground wires #2 and #8 for breaks or damage as well. Repair or replace as needed and repeat this step.

#### Testing the module portion of the 3 in 1 system.

5. Module LED Lights:
- Red and green LED lights turn on for one second and then off whenever the module is powered.
  - Red and Green LED light on indicates that the module is turning on the relay and the 7-way aux pin is powering the Trail Charger and the Trail Charger ignition is powered.
  - Green LED light on indicates that the module is turning on the Trail Charger.
  - Red and green LED lights alternate on and off rapidly, the module is detecting low voltage from the nose box. The Trail Charger will be turned off until the module sees 13.2 volts or greater from the nose box.

#### Troubleshooting “no LED lights illuminate on the module”

6. Ensure the liftgate batteries are at least 12.3 volts or higher.
7. Unplug the 10 pin connector in the module harness and then reconnect. Both the red and green LED lights should illuminate for one second and then turn off. If yes, the module is getting power from the liftgate batteries and is turned on, skip to step 11. If no, continue to the next step.
8. With the 10 pin connector unplugged, check the voltage between pin #1 and pin #5 of the 10 pin connector from the harness. Should read the same as liftgate battery voltage. If yes, replace the module and start again at step 6. If no, continue to the next step.
9. With the 10 pin connector unplugged, check the voltage between the liftgate battery positive (S) and pin #5 of the 10 pin connector of the harness. Should read zero. If yes, continue to the next step. If no, there is a problem with the #10 wire. Check the fuse (Q) for a good connection or a blown fuse. If blown, determine the problem and repair then replace fuse. Inspect the #10 wire for damage. Repair or replace as necessary. And start again at step 6.
10. With the connector unplugged, check the voltage between the liftgate battery negative (T) and pin #1 of the 10 pin connector of the harness. Should read zero. If yes, module is getting power and needs to be replaced. If no, there is a problem with the #11 wire, inspect for damage and repair or replace as necessary. Start again at step 6.

#### Troubleshooting the output of the module (ignition controller)

11. Unplug the four pin and six pin Deutsch connectors from the Trail Charger.
12. Unplug the 10 pin connector in the module harness. Check the voltage between the insulated junction stud (U) and the #2 pin of the 10 pin connector of the harness. Should read zero. If yes, continue to the next step. If no, there is a problem with the #13 wire, inspect for damage and repair or replace as necessary.

## DUAL POLE WITH AUX BACKUP

### TROUBLESHOOTING GUIDE

13. With the 10 pin connector plugged in, ensure that the module's green LED light is illuminated and then check the voltage between the #4 pin of the four pin Deutsch Connector (V-4) and the liftgate battery negative (T). Should be the same as the voltage reading between the insulated junction stud (U) and the liftgate battery negative (T). If yes, module is working and is turning on the Trail Charger. If no, continue to the next step.
14. Unplug the 10 pin connector. Check the voltage between the #4 pin of the 10 pin connector of the module and the liftgate battery negative (T). Should be the same as liftgate battery voltage. If yes, module is working and is turning on the Trail Charger. If no, the module needs to be replaced.

### Troubleshooting the Trail Charger

**Note:** This portion of testing should be conducted with **NO** single or dual pole power source connected.

15. Disconnect and test the liftgate batteries individually. All of the liftgate batteries must pass a load test or be replaced before proceeding.
16. The STATUS LED light of the Trail Charger will indicate several different conditions. This is accomplished by the use of a Bi-Color LED that will indicate with either a solid color or a blinking color at three different blink rates. (See table below):

RATE	TIMING
Slow	1 second on, 1 second off
Medium	½ second on, ½ second off
High	¼ on, ¼ off

Definition of indications are found below:

LED off	Module off, ignition or input voltage not present	
LED, Red, high blink	FAULT, any on the fault list below	
LED, Green, medium blink	SHUTDOWN mode (Pg. 20)	Input Command Shutdown: ON
LED, Green, slow blink	Reduce power mode, charging (Pg. 20)	Input Command Shutdown: OFF
LED, Green, solid	Charging or Charged ( <b>Working Properly</b> )	Input Command Shutdown: OFF

A RED LED blinking at a high rate indicates one of the following fault conditions exist:

- Input under-voltage limit. (T/S procedure step 17 on pg. 20)
- Input over-voltage limit. (T/S procedure step 18 on pg. 20)
- Output over-voltage limit. (T/S procedure step 19 on pg. 20)
- Output over-current limit / Output FET's over thermal limits. (T/S procedure step 20 on pg. 21)

A fast blinking RED from any fault indication has a higher priority than all other indications if the ignition is on.

## DUAL POLE WITH AUX BACKUP

### TROUBLESHOOTING GUIDE

17. A. Checking for INPUT under voltage condition – High Rate Blinking Red LED
- A. Plug in a know good power source into the trailer (7-way), this can be a tractor or portable battery source.
  - B. With the Trail Charger operating, test the voltage at the input pin (V-1) and the ground pin (V-3). The voltage must be over 9.0 volts. If yes, proceed to step B. If no, record the reading and move to the next step. Voltage reading: \_\_\_\_\_.
  - C. Test the voltage at the aux. pin (B) of the 7-way nose box at the front of the trailer. Note the voltage and amount of current flowing and record. Voltage: \_\_\_\_\_ Amps: \_\_\_\_\_
  - D. Subtract the voltage reading in step 2 from the reading in step 3 and compare to the chart referencing the amp reading in step 3.
    - 1) At 20 amps the allowable voltage drop is 3.0 volts.
    - 2) At 15 amps the allowable voltage drop is 2.25 volts.
    - 3) At 10 amps the allowable voltage drop is 1.5 volts.
    - 4) At 5 amps the allowable voltage drop is .75 volts.
  - E. If higher than allowed, repair the wiring from the nose box to the Trail Charger (wire #7 for positive and wire #8 for negative).
18. Checking for INPUT over voltage condition – High Rate Blinking Red LED
- A. Plug in a know good power source into the trailer, this can be a tractor or portable battery source.
  - B. With the Trail Charger operating, test the voltage at the TC pin #1 and TC pin #3. If the voltage is over 16.7 volts, your voltage source is defective (overcharging) and needs to be either repaired or replaced.
19. Checking for OUTPUT over voltage condition – High Rate Blinking Red LED
- A. Plug in a know good power source into the trailer (7-way), this can be a tractor or portable battery source.
  - B. With the Trail Charger operating, test the voltage at the input pin (V-1) and the ground pin (V-3). Also record the ambient temperature the battery box has been subjected to in the last 24 hours.  
Voltage reading: \_\_\_\_\_ Ambient Temperature: \_\_\_\_\_
  - C. Compare the voltage and ambient temperature recorded in step 2 to the chart below. The voltage and temperature from step 2 should be near the curve on the chart. Note: If a trailer is moved that has sat outside for a day that has been subjected to 0 degrees F temperature into the shop it could take the batteries more than 24 hours to warm up to the shop temperature. When making the comparison, base it on the temperature the trailer has been subjected to before moving the trailer into the shop.

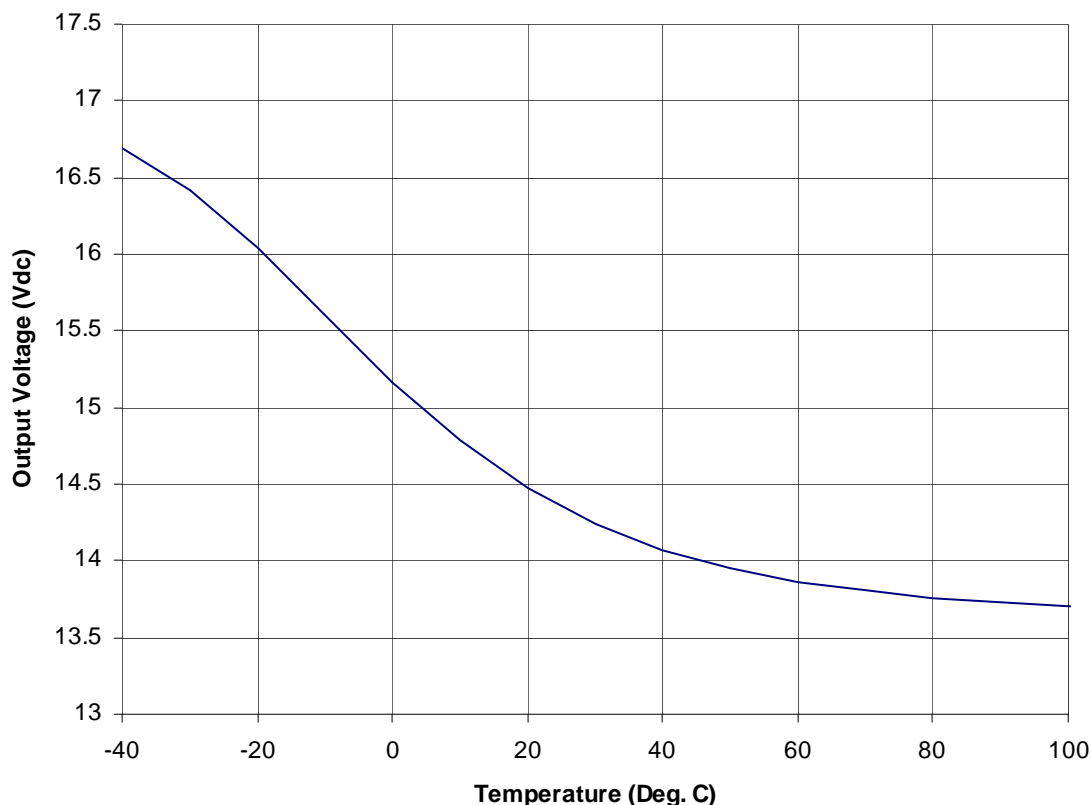
**Note:** Before replacing the Trail Charger it is suggested that each of the liftgate batteries be tested individually or that the system be tested with known good batteries that have been charged and tested. Defective or severely discharged batteries can impact the test results.



## DUAL POLE WITH AUX BACKUP

### TROUBLESHOOTING GUIDE

#### Temperature Compensation



20. Checking for over current condition and/or FET over the thermal limits – High Rate Blinking Red LED

- A. Plug in a know good power source into the trailer (7-way), this can be a tractor or portable battery source.
- B. With the Trail Charger operating, place a clip on ammeter around the output positive wire (17) from the Trail Charger output pin (V-2) to the liftgate battery positive (T). Measure and record the amps.  
Amps: \_\_\_\_\_
  - 1) The amps should not exceed 23 amps.

**Note:** Before replacing the Trail Charger it is suggested that each of the liftgate batteries be tested individually or that the system be tested with known good batteries that have been charged and tested. Defective or severely discharged batteries can impact the test results.

## DUAL POLE WITH AUX BACKUP

### TROUBLESHOOTING GUIDE

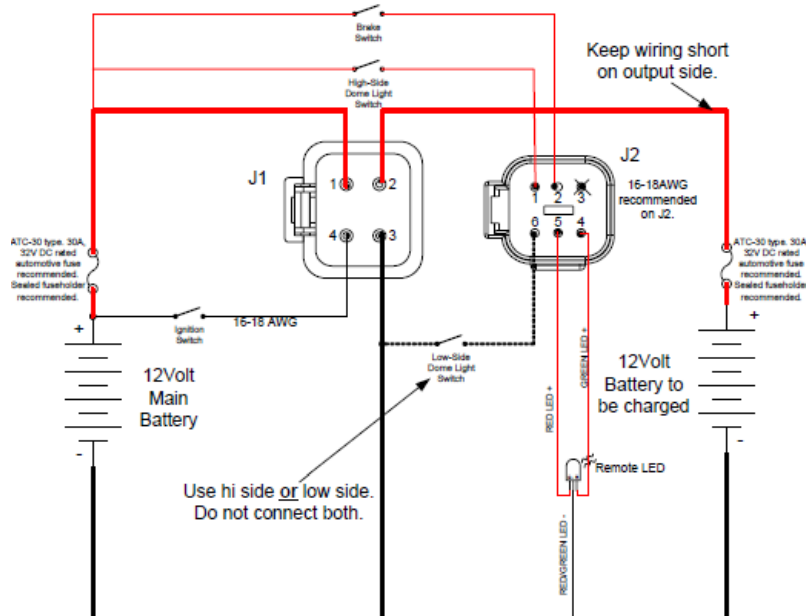
#### 21. Checking the shut down mode – Medium Rate Blinking Green LED

- Plug in a know good power source into the trailer (7-way), that can be a tractor or portable battery source.
- With the Trail Charger operating, unplug the six pin connector (W) from the Trail Charger. The green LED should stop blinking.
- If it does not stop blinking then the Trail Charger is defective and needs to be replaced.
- If it does stop blinking then the lock out pin (W-2) from the six pin plug on the the Trail Charger needs to be checked for voltage.
- If the lock out pin (W-2) has more than 3.0 volts the Trail Charger will turn off and have a medium rate blinking green LED. Normally the brake circuit is connected to this circuit. When the brakes are off, you should see 0.0 volts at the lockout pin (W-2). When the brakes are applied, you should see battery voltage. Repair the circuit as needed.

#### 22. Checking the reduced power mode – Slow Rate Blinking Green LED

**Note:** This circuit is only used when the interior lights are connected.

- Plug in a know good power source into the trailer (7-Way), this can be a tractor or portable battery source.
- With the Trail Charger operating, unplug the six pin connector from the Trail Charger. The green LED should stop blinking.
- If it does not stop blinking then the Trail Charger is defective and needs to be replaced.
- If it does stop blinking then pin #1 from the six pin plug on the Trail Charger needs to be checked for voltage. This should have a reading of 0.0 volts. If voltage is present then make the necessary repairs.
- If the green LED does stop blinking then pin #6 should be checked for voltage. Any voltage under 5.0 volts will cause the green LED to blink slowly.



# DUAL POLE WITH AUX BACKUP

## PARTS BREAKDOWN

284585-01 COMPLETE KIT (TC, 3 in 1 Module, Harness, Bag Kit, Cover, Dual Pole Nose Box)		
<b>Complete Kit Contents:</b>		Qty
283531-10	2IN1 NOSE BOX ASSEMBLY	1
283821-14	3IN1 TRAIL CHARGER 50FT HARNESS	1
283821-15	MODULE WITH HARNESS FOR 3IN1 SELECTOR	1
906849-01	20AMP TRAIL CHARGER WITH LOCK OUTS	1
267522-01	TRAIL CHARGER COVER	1
283821-17	CONDUIT ½" I.D., 2 foot piece	1
284555-01	3IN1 TRAIL CHARGER BAG KIT	1
<b>Bag Kit Contents:</b>		Qty
906874-01	10GA 30" TRAIL CHARGER OUTPUT WIRE	1
907100-01	10GA 30" TRAIL CHARGER GROUND WIRE	1
907087-01	10GA 24" TRAIL CHARGER JUNCTION STUD TO INPUT WIRE	1
907104-01	30AMP FUSE HOLDER ASSEMBLY FOR AUX PIN APPLICATIONS	1
906873-01	SECONDARY LOCK	1
907015-01	DEUTSCH PLUG	1
907089-01	6 WAY SQUARE CONNECTOR	1
907090-01	6 WAY SQUARE LOCK	1
907091-01	DEUTSCH HOLE PLUG	5
906877-01	1-1/4" CLEAR ID TUBING, 0.17 ft	2
906878-01	SINGLE FUSE CUBE BRACKET	1
906879-01	CF NUT FOR FUSE CUBE BRACKET	1
906880-01	FUSE CUBE, 30AMP	1
906881-01	RED 3/8 JUNCTION STUD	1
906882-01	RED RUBBER BOOT	1
907101-01	2 AMP FUSE HOLDER ASSEMBLY FOR BRAKE LOCK OUT	1
*	1/4" RED HEAT SHRINK, 2 inches	6
*	1/4" BLACK HEAT SHRINK, 1 inch	2
*	12-10GA #10 EYELET	1
*	12-10GA 1/4" EYELET	1
*	3 23/32" SMALL ZIP TIES	12
*	14-16GA BUTT CONNECTOR	1
*	3/4" BLACK HEAT SHRINK, 3 inches long	1
284556-01	TRAIL CHARGER HARDWARE BAG KIT	1
<b>Hardware Bag Kit Contents:</b>		Qty
**	5/8" Nylon Clamps	12
**	¼ X 20 Nylon lock nut	8
**	¼" Flat washers	8
**	¼ X 20 ¼" bolts	8
**	#12 X 1 ½" Hex tek screws	1
**	#12 X ¾" Hex tek screws	10
**	#10 X 1" Hex tek screws	5
**	3/8 X 16 jam nut	1
<b>REPLACEMENT ITEMS</b>		Qty
907095	30AMP ATC FUSE	1
907096	2 AMP ATC FUSE	1
907097	LED LIGHT, GREEN, PANEL MOUNT, With Terminals	1
907098	LED LIGHT, YELLOW, PANEL MOUNT, With Terminals	1
907099	Relay, 30 AMP	1

\* Items not available separately, must order 3in1 Trail Charger Bag Kit (284555-01).

\*\* Items not available separately, must order Trail Charger Hardware Bag Kit (284556-01).

## DUAL POLE WITH AUX BACKUP



284585-01



283531-01



283821-14



283821-15



906849-01



267522-01



283821-17



284555-01



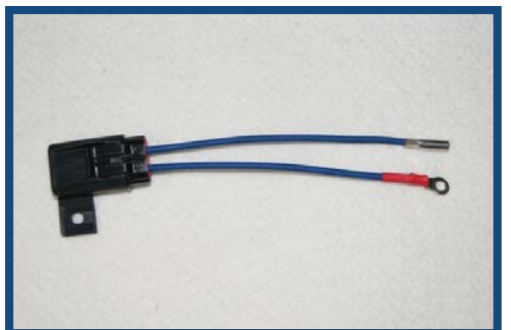
906874-01



907100-01



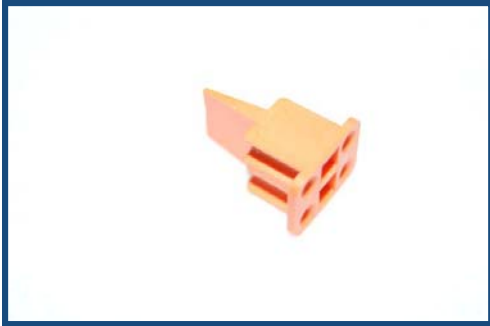
907087-01



907104-01



## DUAL POLE WITH AUX BACKUP



906873-01



907015-01



907089-01 (With Unused Hole Plugs)



907090-01



907091-01



906877-01



906878-01



906879-01



906880-01



906881-01



906882-01



907101-01

## DUAL POLE WITH AUX BACKUP



¼" Red Heat Shrink



¼" Black Heat Shrink



12-10 Ga. #10 Eyelet



12-10 Ga. ¼" Eyelet



Small Zip-Ties



14-16 Ga. Butt Connector



¾" Black Heat Shrink



284556-01



5/8" Nylon Clamps



¼" x 20 Nylon Lock Nut



¼" Flat Washer



¼" x 20 x ¾" Bolts

## DUAL POLE WITH AUX BACKUP



#12 x 1 1/2" Hex Tek Screws



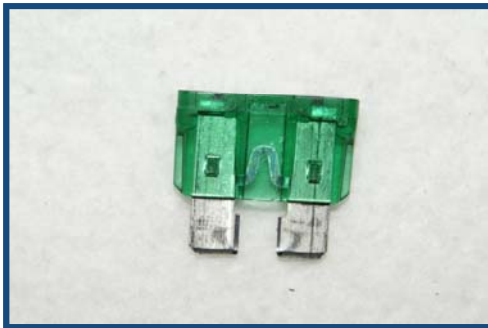
#12 x 3/4" Hex Tek Screws



#10 x 1" Hex Tek Screws



3/8" x 16 Jam Nut



907095



907096



907097



907098



907099