

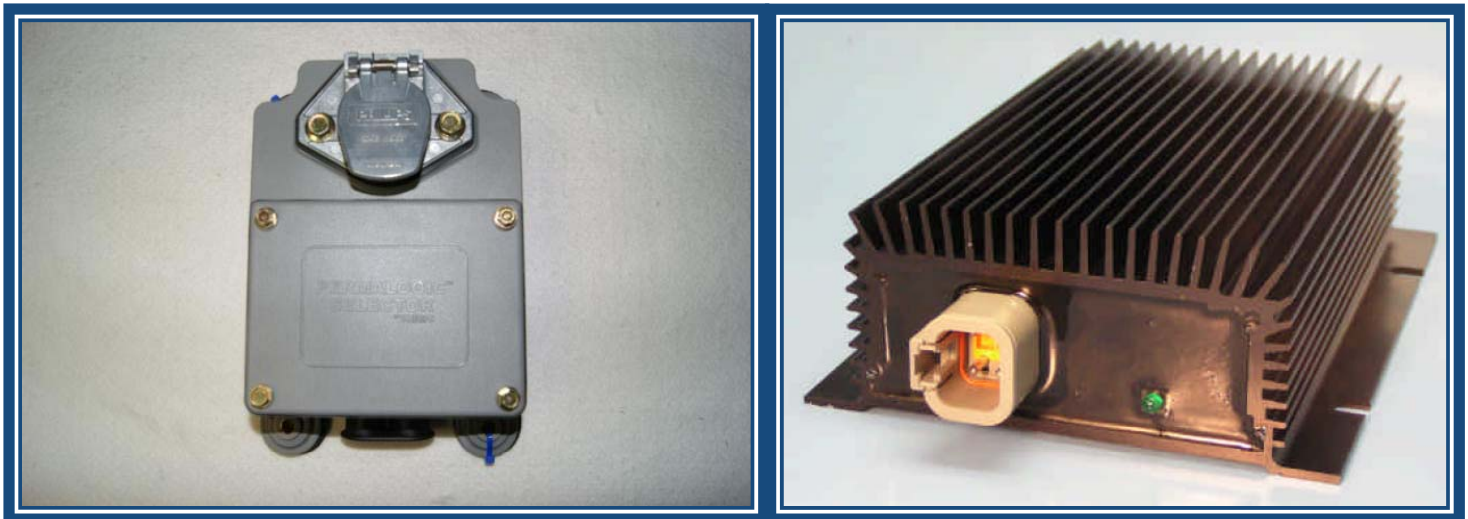
**PURKEYS**  
**FLEET ELECTRIC**

# PHILLIPS PERMALOGIC SELECTOR

284582-01

Version 1.03

05/05/2011



## Owners Manual

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



## TRAIL CHARGER WITH PERMALOGIC SELECTOR

### INSTALLATION INSTRUCTIONS

**Step 1:** Mount the Trail Charger on the back of the battery box using the supplied self-drilling sheet metal screws. Check the back-side of the mounting location to ensure that nothing will be damaged during installation. (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). (See Figure 1)

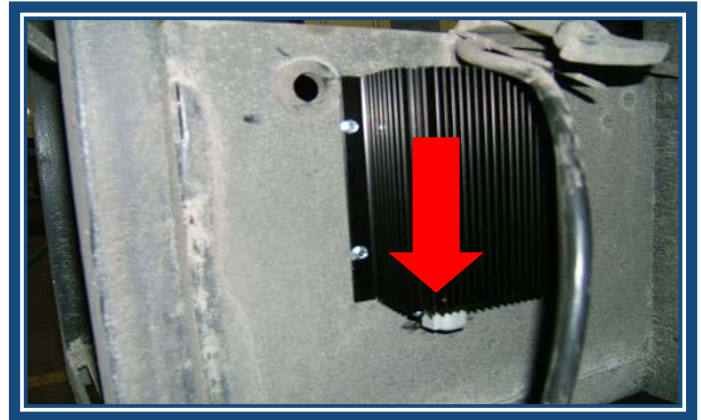


Figure 1

**Step 2:** Route the main harness into the liftgate battery box through the hole in the side of the battery box. **All wires routed through the battery box should be protected with a rubber grommet or dome nut.** (See Figure 2)

Route the following wires (the Deutsch pins go to the outside) out of the liftgate battery box through the hole in the back next to the Trail Charger. (The wire #'s are in reference to the diagram on page 10.)

- Blue wire #1, labeled "Ignition Pin #4"
- Red wire #5, labeled "12V Input Pin #1"
- Red wire #6, labeled "12V Output Pin #2"
- Black wire #7, labeled "GRND Pin #3"

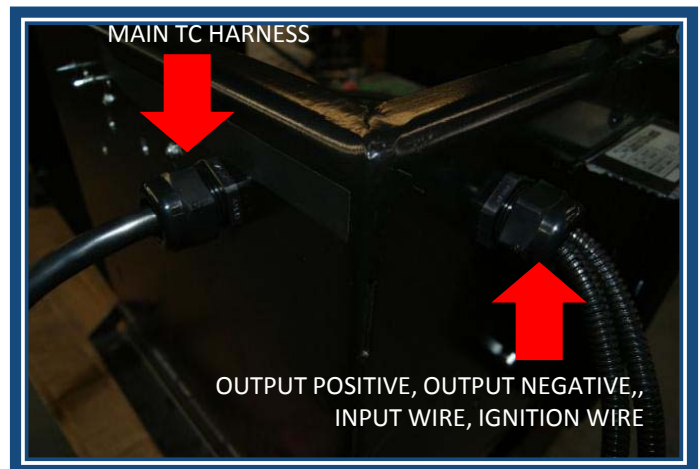


Figure 2

**Step 3:** Locate the Deutsch connector from the bag kit and insert the wires into the correct positions.

- Insert the input wire (12V Input Pin #1) into the #1 position on the connector.
- Insert the output positive wire (12V Output Pin #2) into the #2 position on the connector.
- Insert the output ground wire (Ground Pin #3) into the #3 position on the connector.
- Insert the ignition wire (Ignition Pin #4) from the extender module into the #4 position on the connector. (See Figure 3)



Figure 3

## TRAIL CHARGER WITH PERMALOGIC SELECTOR

### INSTALLATION INSTRUCTIONS

**Step 4:** Verify that the wires are inserted into the connector correctly, in the correct position, and locked into place. (See Figure 4)

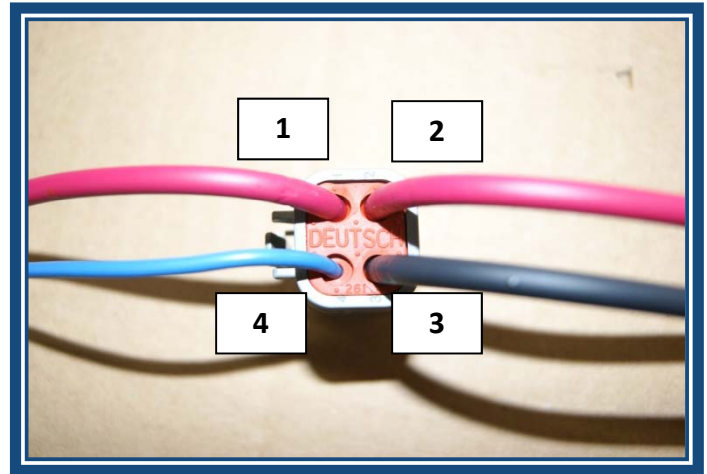


Figure 4

**Step 5:** Locate the orange lock from the bag kit and insert into the Deutsch connector. Make sure that the lock is pushed in flush with the end of the connector and locked into place. (See Figure 5)



Figure 5

**Step 6:** Slide the included clear tubing over the connector on the Trail Charger. This will help prevent water and contaminants from entering the electrical connection. (See Figure 6)



Figure 6



# TRAIL CHARGER WITH PERMALOGIC SELECTOR

## INSTALLATION INSTRUCTIONS

**Step 7:** Connect the Deutsch connector to the Trail Charger. It may be necessary to use a screwdriver to make sure it is properly seated. (See Figure 7)

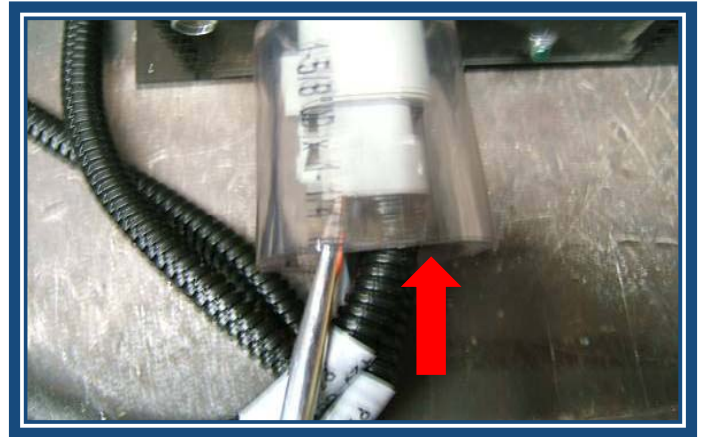


Figure 7

**Step 8:** Install the fuse cube assembly to the positive post of battery A. (See Figure 8)



Figure 8

**Step 9:** Attach the output positive wire (Lift Gate Battery (+)) to the top of the fuse cube using the insulated fuse cube nut.

Attach the output ground wire (Lift Gate Battery (-)) and the main harness ground wire (Lift Gate Battery (-)) to the negative post of battery B. Please note that the positive connection and the negative connection should be done on opposite batteries. (See Figure 9)



Figure 9

## TRAIL CHARGER WITH PERMALOGIC SELECTOR

### INSTALLATION INSTRUCTIONS

**Step 10:** At the front of the trailer, locate and mark the location where the Phillips Permalogic Selector 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 10)



Figure 10

**Step 11:** Route the main power harness from inside the battery box to the front of the trailer. Utilize 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 to the dual pole receptacle. 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 11)



Figure 11

**Step 12:** Mount the Phillips Permalogic Selector box on the front of the trailer where you had previously marked in step #10. Remove the cover to access the connection points. (See Figure 12)



Figure 12



# TRAIL CHARGER WITH PERMALOGIC SELECTOR

## INSTALLATION INSTRUCTIONS

**Step 13:** Route the reefer harness (pink and white wires) to the reefer from the Phillips Permalogic Selector box.



Figure 13

**Step 14:** Connect the pink wire with the 40 amp fuse assembly to the reefer starter B(+) post.

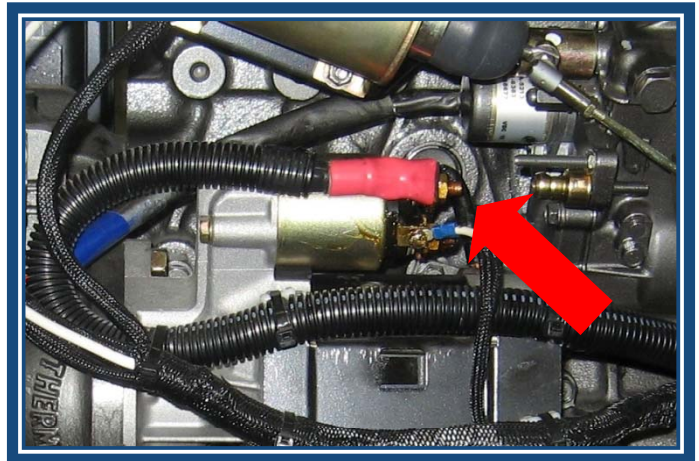


Figure 14

**Step 15:** Connect the white wire to the reefer's engine block ground.

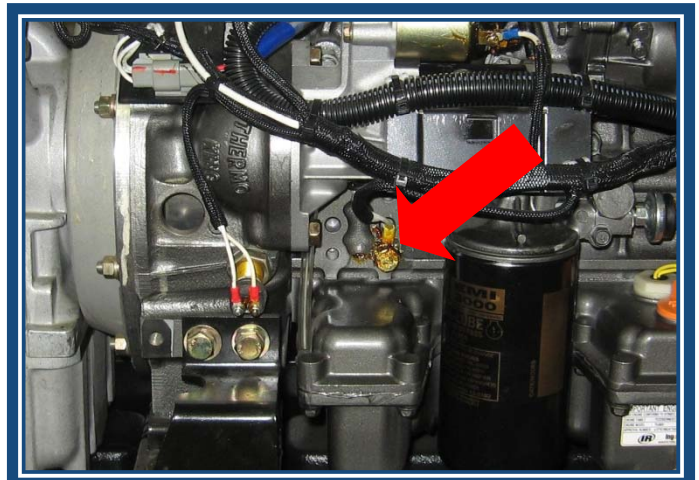


Figure 15

# TRAIL CHARGER WITH PERMALOGIC SELECTOR

## INSTALLATION INSTRUCTIONS

**Step 16:** Route the pink and white wires from the reefer harness and the red, black, and blue wires from the Trail Charger harness into the Phillips Selector nose box. Cut them to length, leaving enough to connect to the Phillips Selector connection points.



Figure 16

**Step 17:** Complete the following steps to pink, white, red, black, and blue wires that were just routed into the Phillips Selector nose box.

- A. Strip  $\frac{1}{4}$ " of the insulation off
- B. Slide piece of heat shrink over the wire
- C. Crimp and solder a #10 eyelet on to the wire
- D. Cover the connection with the heat shrink and apply heat

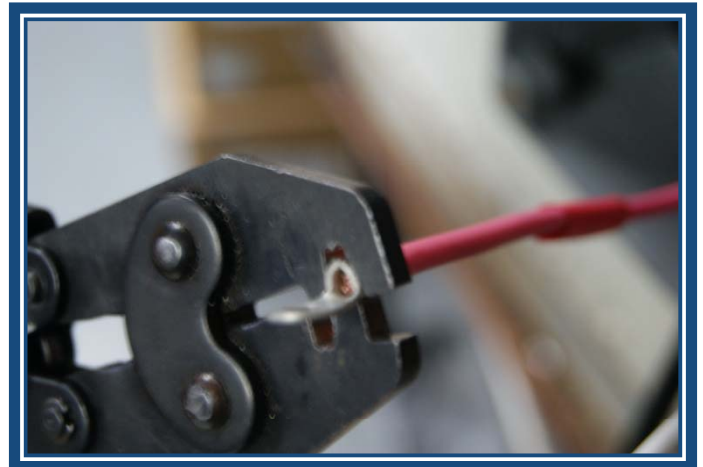


Figure 17

**Step 18:** Make the following connections in the Phillips Selector nose box. (See Figure 18)

- A. Connect the pink wire to the terminal marked "REEFER"
- B. Connect the white wire to the terminal marked "GROUND" (the one on the left)
- C. Connect the blue wire to the terminal marked "TCE"
- D. Connect the black wire to the terminal marked "GROUND" (the one on the right)
- E. Connect the red wire to the terminal marked "TC"

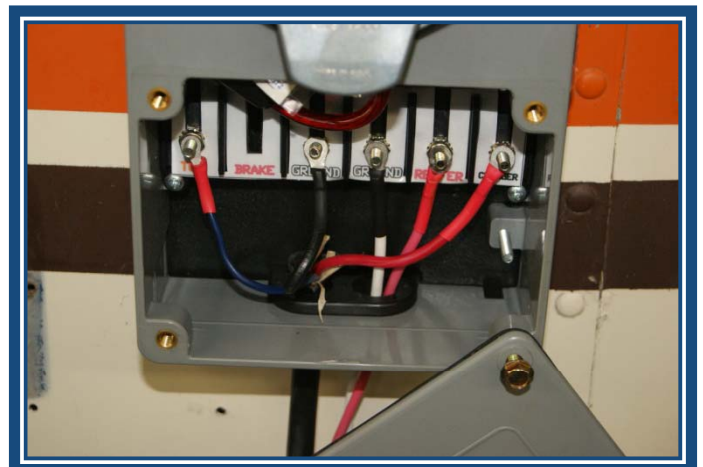


Figure 18

## TRAIL CHARGER WITH PERMALOGIC SELECTOR

### INSTALLATION INSTRUCTIONS

**Step 19:** Reinstall the cover of the Phillips Permalogic Selector. Installation is now complete, check each power source for correct operation of the Phillips Permalogic Selector.

#### Reefer Power Source

With the dual pole stinger cord removed and the reefer running (voltage must be at least 13.3 volts or higher), the LED light on the Selector should turn blue. (See Figure 19) This indicates that the reefer is being used for the power source. Check to see if the green LED light on the Trail Charger is illuminated. If so, the reefer is powering the Trail Charger. (See Figure 21)

#### Tractor Power Source

With the reefer turned off and the dual pole stinger cord plugged in, start the tractor. The LED light on the selector should turn yellow. (See Figure 20) This indicates that the tractor is being used for the power source. Check to see if the green LED light on the Trail Charger is illuminated. If so, the tractor is powering the Trail Charger. (See Figure 21)



Figure 19



Figure 20



Figure 21



## TRAIL CHARGER WITH PERMALOGIC SELECTOR

### INSTALLATION INSTRUCTIONS

**Step 23:** 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 22)

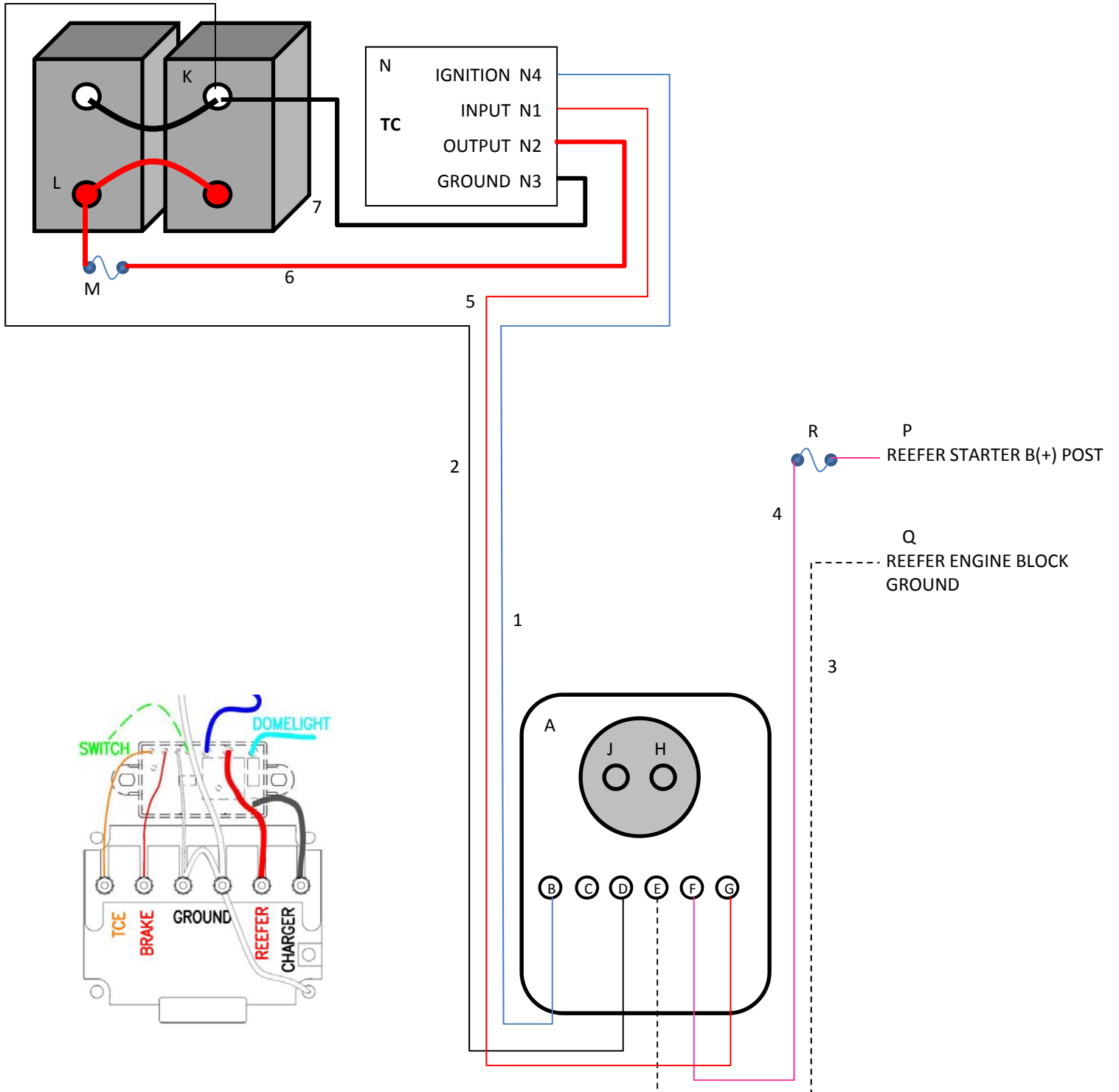
Note: Make sure that the harness has a drip loop for the water to run down away from the Trail Charger.



Figure 22

# TRAIL CHARGER WITH PERMALOGIC SELECTOR

## WIRING DIAGRAM



# TRAIL CHARGER WITH PERMALOGIC SELECTOR

## WIRING DIAGRAM LEGEND

### Components

- A. Phillips Permalogic Selector Nose Box
- B. TCE (Trail Charger Exciter) Terminal - Output
- C. Brake Terminal - Input
- D. Ground Terminal 1
- E. Ground Terminal 2
- F. Reefer Positive Terminal - Input
- G. Charger Terminal - Output
- H. Dual Pole Positive - Input
- J. Dual Pole Negative
- K. Liftgate Battery Negative
- L. Liftgate Battery Positive
- M. Fuse Cube, 30 Amp
- N. Trail Charger
  - 1. Input
  - 2. Output
  - 3. Ground
  - 4. Ignition
- P. Reefer Positive
- Q. Reefer Negative
- R. Fuse, 30 Amp

<u>Wire #</u>	<u>Connection 1</u>	<u>Connection 2</u>	<u>Wire Color</u>
1.	TCE Terminal	Trail Charger Ignition	Blue
2.	Ground Terminal 1	Liftgate Battery Negative	Black
3.	Ground Terminal 2	Reefer Negative	White
4.	Reefer Terminal	Reefer Positive	Pink
5.	Charger Terminal	Trail Charger Input	Red
6.	Trail Charger Output	Liftgate Battery Positive	Red
7.	Trail Charger Ground	Liftgate Battery Negative	Black





## TRAIL CHARGER WITH PERMALOGIC SELECTOR

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### TROUBLESHOOTING

#### Testing the Selector - Reefer Input

1. With the dual pole stinger cord unplugged, start the reefer.
2. The LED light on the Phillips Selector nose box should illuminate blue. If no, wait two minutes and allow the reefer alternator to reach regulated voltage. If yes (blue light illuminates), continue to step 3. If no, continue to step 2-A.
  - A. Check the voltage between the "REEFER" terminal (F) and the "GROUND" terminal (E). This should be 13.3 volts or greater. If yes, continue to step 3. If no, continue to the next step.
  - B. Check the voltage between the reefer starter B+ (P) and the reefer engine block ground (Q). This should be near 14.0 volts. If yes, continue to the next step. If no, repair the reefer's charging circuit per the reefer manufacturer's guidelines. Start over with step 2.
  - C. Check the fuse (R) for a good connection or a blown fuse. If blown fuse, determine the reason and repair, then replace the fuse and start over at step 2. If no problem is found, continue to the next step.
  - D. Examine the pink wire (4) for crimps or breaks. Repair or replace as necessary. Start over with step 2.
3. Check the voltage between the "CHARGER" terminal (G) and the "GROUND" terminal (D). This should be close to reefer battery voltage. If yes, the Phillips Selector is powering the input of the Trail Charger. Continue to the step 4.
4. Check the voltage between the "TCE" terminal (B) and the "GROUND" terminal (D). This should be close to reefer battery voltage. If yes, the Phillips Selector is powering the ignition of the Trail Charger. Continue to step 5.
5. Check the voltage between the "GROUND" terminal (E) and the reefer engine block ground (Q). This should be zero. If yes, continue to step 7. If no, check the ground wire (3) between (E) and (Q) for shorts or breaks. Repair as needed and start over at step 3.
6. If no battery voltage for step 3 and or step 4, and step 5 reads zero, the Phillips Selector is bad. Replace the Phillips Selector and start over at step 1.

## TRAIL CHARGER WITH PERMALOGIC SELECTOR

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### TROUBLESHOOTING

#### Testing the Selector - Tractor Input

7. Make sure the dual pole stinger cord is plugged in and the tractor running. The reefer unit should be turned off.
8. The LED light on the Phillips Selector nose box should illuminate yellow. If no, wait two minutes and allow the tractor's alternator to reach regulated voltage. If yes (yellow light illuminates), continue to step 9. If no, continue to step 8-A.
  - A. With the tractor running, remove the dual pole stinger cord from the Phillips Selector nose box. Check the voltage of the dual pole stinger cord. Should be close to tractor's charging voltage. If yes, continue to the next step. If no, check the dual pole stinger cord and the tractor's dual pole circuit, repair or replace as needed. Start over at step 8.
  - B. Check the circuit breaker inside the Phillips Selector between the dual pole positive and the Phillips Selector control module. If good, continue to step 10. If bad, repair or replace as needed and start over at step 8.
9. Check the voltage between the "CHARGER" terminal (G) and the "GROUND" terminal (D). This should be close to reefer battery voltage. If yes, the Phillips Selector is powering the input of the Trail Charger. Continue to the step 10.
10. Check the voltage between the "TCE" terminal (B) and the "GROUND" terminal (D). This should be close to tractor battery voltage. If yes, the Phillips Selector is powering the ignition of the Trail Charger. Continue to step 11.
11. Check the voltage between the "GROUND" terminal (D) and the dual pole negative (H). This should be zero. If yes, continue to step 13. If no, check the ground wire inside the Selector between the dual pole negative and the "GROUND" terminal (E) for shorts or breaks. Repair as needed and start over at step 9.
12. If no battery voltage for step 9 and or step 10, and step 11 reads zero, the Phillips Selector is bad. Replace the Phillips Selector and start over at step 7.



**TROUBLESHOOTING GUIDE**

Testing the Trail Charger Operation

**Note:** Before continuing with the following steps, it is necessary that steps 1 through 12 have been completed and the Phillips Selector nose box has been determined work properly.

13. Disconnect and test the liftgate batteries.

	Battery 1	Battery 2	Battery 3	Battery 4
Rated CCA	_____	_____	_____	_____
Rated RC	_____	_____	_____	_____
Open Circuit Voltage	_____	_____	_____	_____
Test Results	_____	_____	_____	_____
Tester Used	_____	_____	_____	_____

**Note:** All batteries must pass load test or be replaced before proceeding.

**Note:** For steps 13 through 23 refer to the wiring diagram on page 10.

14. Turn input power on to the Trail Charger. The dual pole stinger cord must be connected from the tractor to the dual pole receptacle on the Phillips Selector nose box or make sure the reefer is running. The tractor needs to be running.

15. Is the green LED on the Trail Charger illuminated ? (yes or no) \_\_\_\_\_  
If yes move to step 18 . If no go to step 16.

**Note:** If the liftgate batteries are completely charged the Trail Charger might not turn on. To ensure this is not the case run the lift one complete cycle.

Did the green light turn on? (yes or no) \_\_\_\_\_



## TRAIL CHARGER WITH PERMALOGIC SELECTOR

### TROUBLESHOOTING GUIDE

16. Remove the harness plug from the Trail Charger. (See Figure 1) Check the voltage reading at the input pin (N1) and the liftgate battery negative (K). This should be the same as the input source voltage. (i.e. source in the Phillips Selector nose box, "CHARGER" terminal (G), "GROUND" (D))

Input Source Voltage: \_\_\_\_\_

(N1) Pin Voltage: \_\_\_\_\_

If these are the same or close to the same, skip to step 17. If the input source voltage and the voltage at (N1) are NOT the same, continue to step 16-A.

- A. Check the voltage between the Phillips Selector "CHARGER" terminal (G) and the Trail Charger input pin (N1). Should read zero. If yes, skip to step 4-B. If no, check the input wire (5) for damage or breaks and repair as needed, then continue to step 16-B.
- B. Check the voltage between the Phillips Selector "GROUND" terminal (D) and the liftgate battery negative (K). Should read zero. If yes, start over at step 16. If no, check the ground wire (2) for damage or breaks and repair as needed, then repeat step 16.

17. With the harness plug still removed from the Trail Charger. (See Figure 1) Check the voltage reading at the ignition pin (N4) and the liftgate battery negative (K). This should be the same as the ignition source voltage. (i.e. source in the Phillips Selector nose box, "TCE" terminal (B), "GROUND" (D))

Ignition Source Voltage: \_\_\_\_\_

(N1) Pin Voltage: \_\_\_\_\_

If these are the same or close to the same, skip to step 18. If the ignition source voltage and the voltage at (N1) are NOT the same, continue to step 17-A.

- A. Check the voltage between the Phillips Selector "TCE" terminal (B) and the Trail Charger ignition pin (N4). Should read zero. If yes, skip to step 17-B. If no, check the ignition wire (1) for damage or breaks and repair as needed, then continue to step 17-B.
- B. Check the voltage between the Phillips Selector "GROUND" terminal (D) and the liftgate battery negative (K). Should read zero. If yes, start over at step 17. If no, check the ground wire (2) for damage or breaks and repair as needed, then repeat step 17.

18. With the harness plug removed, check the voltage reading between the ground pin (N3) and the liftgate battery positive (L). This should be the same as battery voltage. If yes, continue to step 19. If no, repair the ground wire (7) from pin (N3) to liftgate battery negative (L), then repeat step 18.



# TRAIL CHARGER WITH PERMALOGIC SELECTOR

## TROUBLESHOOTING GUIDE

19. With the harness plug removed, check the voltage reading between the output pin (N2) and the liftgate battery negative (K). This should be the same as battery voltage. If yes, continue to step 20. If no, check the 30 amp fuse cube (M). If the fuse is blown, repair the circuit and replace the fuse cube (M), then repeat step 19. If the voltage reading between the output pin (N2) and the liftgate battery negative (K) is still not the same as battery voltage, repair the output wire (6) from the output pin (N2) to the liftgate battery positive (L), then repeat step 19.

20. Reconnect the harness plug back into the Trail Charger.

21. Hook a clip-on ammeter around the output wire (6) between the output pin (N2) on the Trail Charger plug and the liftgate battery positive (L) then check the voltage with a voltmeter between (K) and (L).

Record the readings \_\_\_\_\_volts \_\_\_\_\_amps \_\_\_\_\_temp

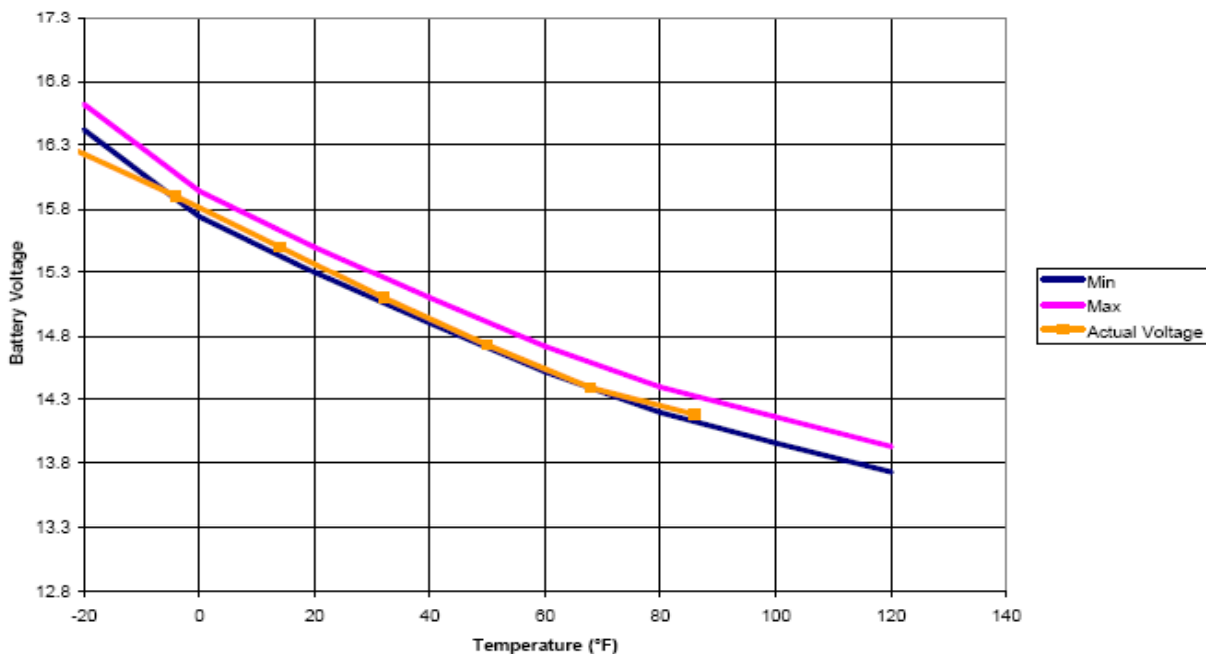
Allow the unit to operate for five to ten minutes and retest.

Record the readings \_\_\_\_\_volts \_\_\_\_\_amps \_\_\_\_\_temp

22. What is the ambient temperature of the liftgate batteries? \_\_\_\_\_F

**Note:** In cold weather, the voltage may increase up to 15.0 volts. See chart below for recommended charging voltages vs. temperature.

23. If the Trail Charger does not produce the specified voltage parameters below and or does not produce at least 16 amps of output, replace the Trail Charger.



# TRAIL CHARGER WITH PERMALOGIC SELECTOR

## TROUBLESHOOTING GUIDE



Figure 1

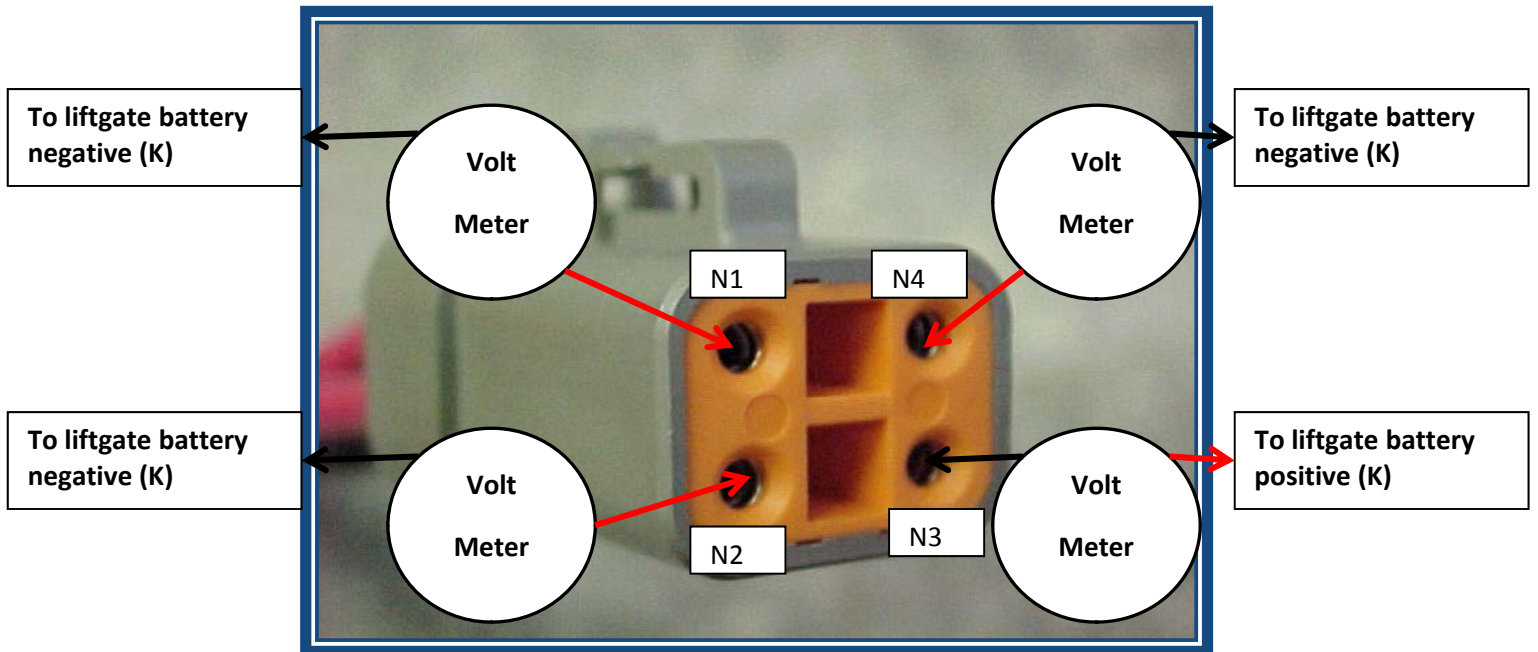


Figure 2



# TRAIL CHARGER WITH PERMALOGIC SELECTOR

## PARTS BREAKDOWN

284582-01		COMPLETE KIT (Selector, TC, Harnesses, Bag Kit, Cover)	
<b>Complete Kit Contents:</b>			Qty
906484-01	TRAIL CHARGER		1
906592-01	PHILLIPS PERMALOGIC SELECTOR NOSE BOX		1
284582-10	PHILLIPS PERMALOGIC SELECTOR REEFER HARNESS		1
284569-01	53FT MOD4 TRAIL CHARGER POWERED HARNESS		1
267522-01	TRAIL CHARGER COVER		1
284583-01	53FT MOD4 TRAIL CHARGER POWERED BAG KIT		1
<b>Bag Kit Contents:</b>			Qty
906874-01	10GA 30" TRAIL CHARGER OUTPUT WIRE		1
906875-01	10GA 30" TRAIL CHARGER GROUND WIRE		1
906873-01	SECONDARY LOCK		1
907015-01	DEUTSCH PLUG		1
906877-01	1-1/4" CLEAR ID TUBING, 0.17 ft.		1
906878-01	SINGLE FUSE CUBE BRACKET		1
906879-01	CF NUT FOR FUSE CUBE BRACKET		1
906880-01	FUSE CUBE,30AMP		1
*	1/4" RED HEAT SHRINK, 2 inches long		2
*	1/4" BLACK HEAT SHRINK, 1 inch long		1
*	14-16GA #10 EYELET		1
*	12-10GA #10 EYELET		4
*	3 23/32" SMALL ZIP TIES		12
*	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
**	1/4 X 20 Nylon lock nut		8
**	1/4" Flat washers		8
**	1/4 X 20 3/4" bolts		8
**	#12 X 1 1/2" Hex tek screws		1
**	#12 X 3/4" Hex tek screws		10
**	#10 X 1" Hex tek screws		5
**	3/8 X 16 jam nut		1

REPLACEMENT ITEMS		Qty
907095	30AMP ATC FUSE	1

\* Items not available separately, must order 50 ft Trail Charger Selector Bag Kit (284583-01).

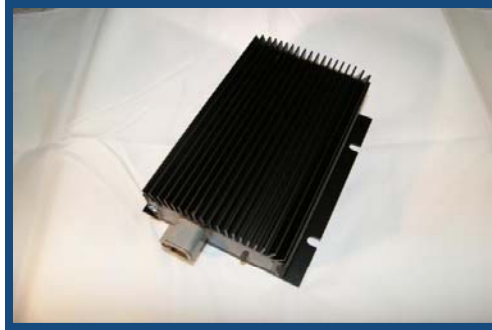
\*\* Items not available separately, must order Trail Charger Hardware Bag Kit (284556-01).



# TRAIL CHARGER WITH PERMALOGIC SELECTOR



284582-01



906484-01



906592-01



284582-10



284569-01



267522-01



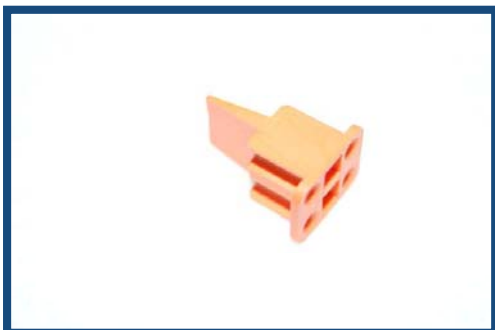
284583-01



906874-01



906875-01



906873-01



907015-01



906877-01

## TRAIL CHARGER WITH PERMALOGIC SELECTOR



906878-01



906879-01



906880-01



¼" Red Heat Shrink



¼" Black Heat Shrink



14-16 Ga. #10 Eyelet



12-10 Ga. #10 Eyelet



Small Zip-Ties



¾" Black Heat Shrink



284556-01



5/8" Nylon Clamps



¼" x 20 Nylon Lock Nut



## TRAIL CHARGER WITH PERMALOGIC SELECTOR



1/4" Flat Washer



1/4" x 20 x 3/4" Bolts



#12 x 1 1/2" Hex Tek Screws



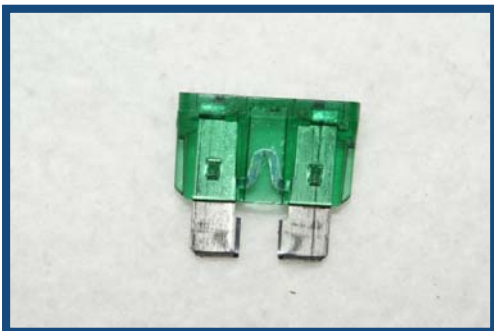
#12 x 3/4" Hex Tek Screws



#10 x 1" Hex Tek Screws



3/8" x 16 Jam Nut



907095

