



Installation Manual



Volvo 780 with work station

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Congratulations. You have chosen the premier no-idle climate control system on the market today—the **NITE® Phoenix** from Bergstrom.

The **NITE Phoenix** is a powerful 12V rechargeable DC system that keeps sleeper compartments cool in hot weather and warm in cold weather (with optional heater) without having to idle the truck's engine—and without a genset. It not only dramatically reduces fuel burned, it's also very environmentally friendly.

Your **NITE Phoenix** is a self-contained, hermetically sealed, compact A/C system that produces approximately 7,500 BTU/h and has been quality engineered for years of reliable service. The system operates independently from your truck's engine using its own deep cycle batteries that are completely separated from the truck's starting batteries.

The deep cycle batteries used are the most advanced ever—and will efficiently power the system for 7 to 9 hours. The batteries are then fully recharged after just 4 to 6 hours of driving.

Add it all up, and you have a revolutionary no-idle system that will save you money and fuel year after year—the **NITE Phoenix** from Bergstrom.



NOTE:

*The **NITE Phoenix** A/C system is designed to maintain a comfortable temperature inside the sleeper without running the engine.*

For optimal comfort, the curtain between the cab and the sleeper must be closed when using the unit. To enhance cooling efficiency during the day, solar reflectors or curtains should be placed over windshield and all windows to block sunlight from entering the cab and sleeper.

*The **NITE Phoenix** A/C unit will not pull down a hot sleeper that has been sitting in the sun without the factory A/C running. To assist the **NITE Phoenix** unit in cooling down the sleeper, start the engine and run the factory A/C until desired temperature is reached. The **NITE Phoenix** unit will then maintain a comfortable temperature depending on solar load & ambient temperature.*

Before You Start

1-4

A typical installation of the **NITE Phoenix** generally takes between 8 to 10 hours, although your particular situation may vary. This manual contains step-by-step installation instructions. It is divided into three categories:

- General installation
- Electrical installation
- Heater installation (optional)

There is also a section on how to operate the **NITE Phoenix**.

If relocation or reinstallation of any pre-installed equipment is necessary for installation of the NITE Phoenix equipment - please refer to the components manufacturer's instructions or safety guidelines for proper installation.

Before you start, we highly recommend doing the following to help make your installation as easy as possible.

1. Lay out all parts and check to make sure you have all parts listed on the parts list. **Depending on truck, some hardware may not be used.** If you are missing any parts, please call 1-866-204-8570.
2. To prevent damage to compressor, keep the **NITE Phoenix** unit in an upright position at all times. If unit is tipped, place back in upright position for a minimum of 6 hours prior to running.
3. Check the list of tools needed for installation and make sure you have all of them. Keep all tools within easy reach.
4. Look through the whole installation manual to get an understanding of the order in which components are installed.
5. Make sure you have good lighting and enough space to work in.
6. You may want to get an assistant to help you to reduce the number of times you have to climb in and out of the cab.
7. Make sure you wear all appropriate safety equipment.



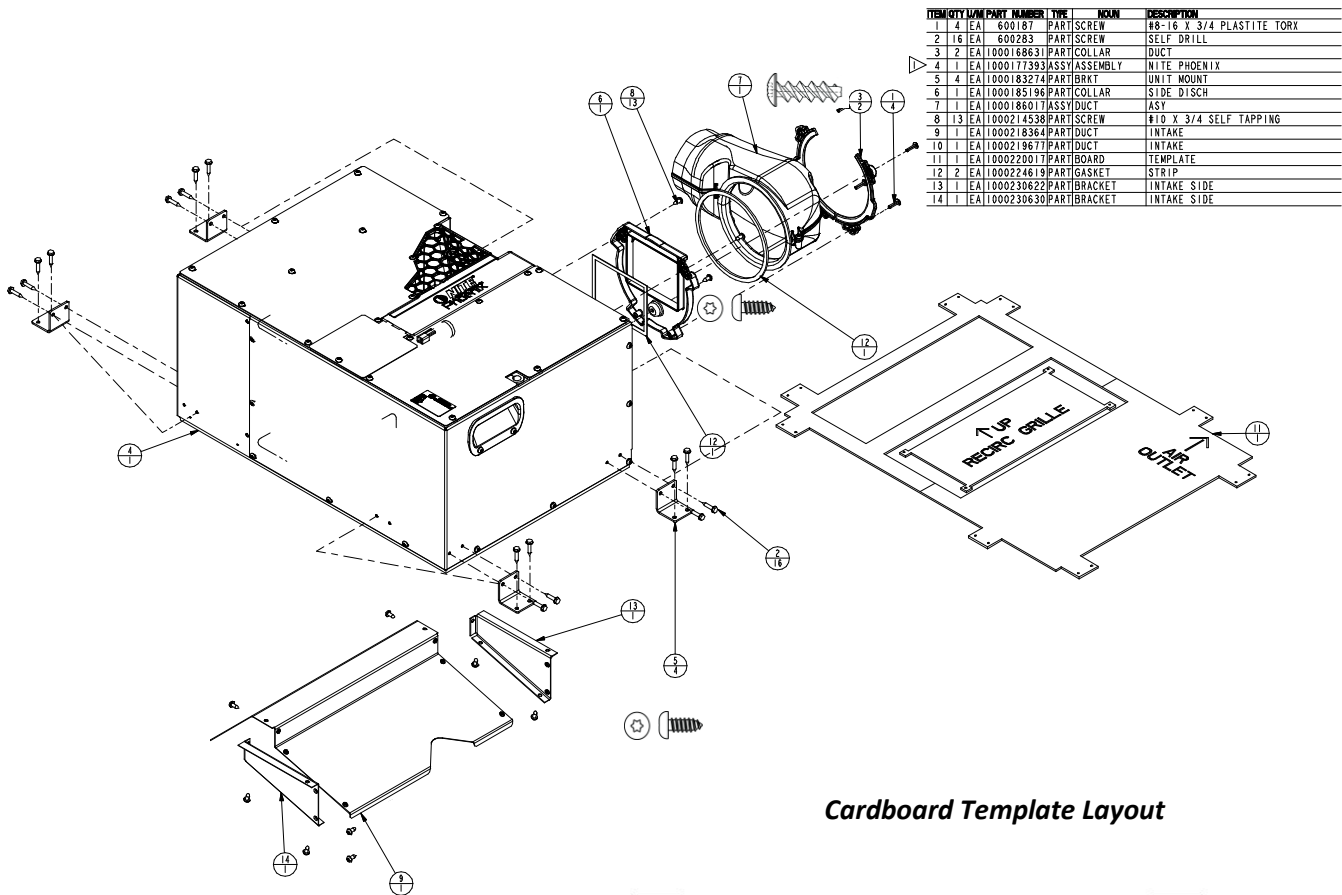
Photo above is representative of kit 1000230731 only.

Bergstrom Part #	Part Description	Quantity
1000230789 NITE PHOENIX AC ONLY		
1000386342	NITE UNIT	1
1000342516	PHOENIX POWER KIT*	1
1000007552	NITE WARRANTY POLICY	1
1000251583	OPERATION CARD	1
585511	NITE WARRANTY CARD/SURVEY	1
1000230787 NITE PHOENIX AC/HEAT - ESPAR		
1000386342	NITE UNIT	1
1000038693	ESPAR HEATER KIT**	1
1000342516	PHOENIX POWER KIT*	1
1000007552	NITE WARRANTY POLICY	1
1000251583	OPERATION CARD	1
585511	NITE WARRANTY CARD/SURVEY	1
1000342523 NITE PHOENIX AC/HEAT-WEBASTO		
1000386342	NITE UNIT	1
Not sold separately	WEBASTO HEATER KIT	1
1000342516	PHOENIX POWER KIT*	1
1000007552	NITE WARRANTY POLICY	1
1000251583	OPERATION CARD	1
585511	NITE WARRANTY CARD/SURVEY	1
1000230792 INSTALLATION KIT		
B290303	CLAMP, HOSE 4.12 I.D.	2
B353760	GASKET .75" X 2.0" X BULK	3 FT
B360692	GROMET-NO6 AND NO10 HOSE ADPTR	1
454753	PLATE, AIR TOP BOX	1
454754	ANGLE, AIR BOX MOUNT	1
454758	ANGLE, OEM UNIT OUTLET	1
500198	GRILLE, AIR RETURN	1
600157	S-CLIP, TINNEMAN	3
870188	ASSEMBLY, VN 61" AIR BOX	1
870192	ASSEMBLY, DUCT OUTLET ADAPTER	1
1000044640	DRAIN TUBE	1
1000081269	TIE, CHRISTMAS TREE WIRE	4
1000168631	COLLAR, DUCT	2
1000183274	BRACKET, UNIT MNT	4
1000185196	COLLAR, SIDE	1
1000186017	DUCT, ASSY	1
1000218364	DUCT, INTAKE	1
1000224619	GASKET, STRIP	2
1000230502	WIRE HARNESS, PHOENIX CONTROL	1
1000230622	BRACKET, INTAKE SIDE	1
1000230630	BRACKET, INTAKE SIDE	1
1000230729	WIRE HARNESS PHOENIX CONTROL XTN	1
1000251573	CD, INSTALLATION MANUALS	1
1000256319	TEMPLATE, PHOENIX CONTROLS	1
1000356459	HOSE, DEFROST 4" ID X 57"	
1000415466	TEMPLATE, RECIRC GRILLE	1
1000513102	TEMPLATE, PHOENIX FLOOR	1

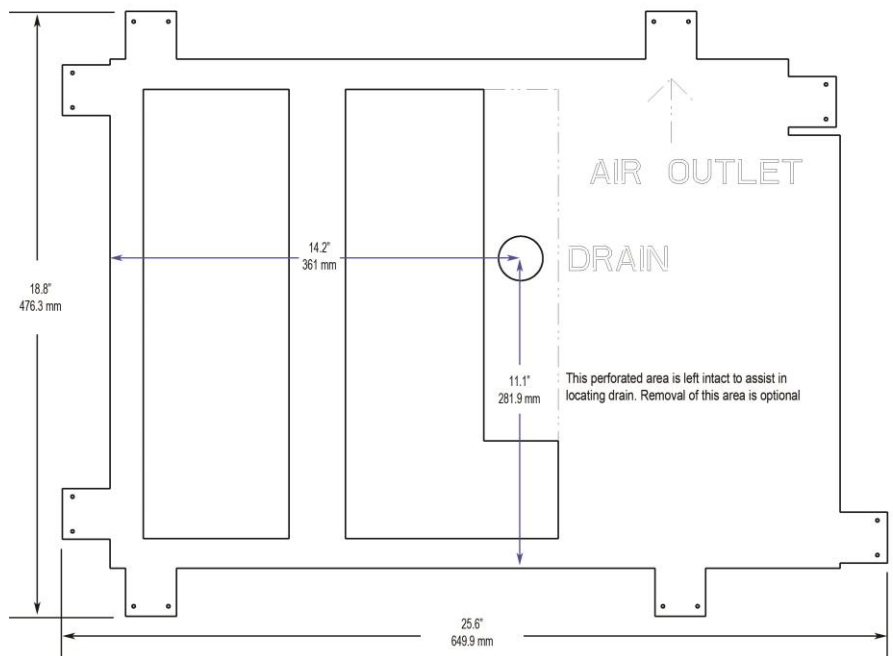
1000230794 KIT, NITE PHOENIX STD HARDWARE		
B203305	NUT, 1/4-20 W/EXT. LOCK WASHER	14
509700	WASHER, .25IN FLAT FS 4B4276	18
600047	SCREW, M6 X 20 MM HEX HD 8T4138	20
600059	SCREW, M6X16MMTORXHD .9X2044	10
600129	SCREW, NO 10 TH 8-15 X .437	5
600159	SCREW, NO 12-16 X 1 INCH HI-LO	20
600187	PLASTITE NO8-16 C.75 IN TORX	10
600282	BOLTCARRIAGE .25-20 X 3 IN	10
600283	SCREW, SELF DRILL	52
605007	WASHER, .25 IN HARD FLAT 6V7646	20
620001	POP RIVET, .125 IN 0 9N1995	6
620002	POP RIVET, .812 IN DIA FS	2
620011	POP RIVET, .812 IN DIA FS	6
621820	SCREW, TRUSS HD NO 10 SLF TP FS	24
1000173097	SCREW, 1/4-20 X 1" HX HS SS	4
1000214538	SCREW, #10 1/2 SELF TAPPING	12
911-C059	SCREW, 10-32 X 3/4 RND HD SLOT	8
912-C006	WASHER, FLAT #10 SS	4
912-C007	WASHER, LOCK #10 SS	8
*1000342516 NITE PHOENIX POWER KIT		
B223109	FUSE HOLDER	1
B360113	TIE-PLASTIC	50
600283	SCREW, SELF DRILL	2
650119	TERM, INS MALE BLADE	3
651462	TUBING HEAT SHRINK	22
660706	ASSY,WIRE,BATT.CABLE 5300MMBL	2
660707	ASSY,WIRE,BATT.CABLE 5000MMRE	3
670136	TERMINAL RING 5/16 4 GA	2
670137	TERMINAL RING 3/8 4 GA	20
1000049325	ENCLOSURE, ELECTRICAL	1
1000173480	HARNESS, DAYCAB POWER 4 GA	1
1000174251	FUSE, MEGA 100A YELLOW	1
1000174286	FUSEHOLDER, MEGA BOLT-ON	1
1000230085	FUSE, 5A ATO	1
1000493450	WIRE HARNESS, PHOENIX CAN BUS	1
1000235371	WIRE LOOM .413 ID X 140 FT	1
1000247777	TERM, 3/8" RING 14-16GA SEALE	1
1000247778	TERM, 3/8" RING 18-22GA SEALE	1
1000247779	BUTT CONN, STEP 14-16 TO 18-2	1
1000282660	POWER RELAY, TERRA 300A	1
1000295771	WIRE HARNESS, NITE PHOENIX	1
1000299202	KIT, NITE PHOENIX CONTROLS	1
1000309203	KIT, CONN DEUTSCH DTM04-6P	1
1000309205	TERM, LUG 4AWG 90 DEG	2
1000376501	BATTERY MONITOR SYS, NITE	1

Parts Breakdown

1-7



Cardboard Template Layout



- 1) Drill Bit Set
- 2) Hole saws (1", 1-5/8", 2", 2-1/2", 4", 4-1/2" and 4-3/4")
- 3) Electric/Air Drill
- 4) Screwdrivers/Assorted Bits (Flat Head & Phillips Head)
- 5) Impact Gun
- 6) Air saw/Jigsaw (Cutting Sheet metal)
- 7) Torx Head (T20-T25) Bit Set
- 8) Metric Wrenches
- 9) SAE Wrenches
- 10) 1/4", 3/8" Drive Ratchets
- 11) SAE Socket Set
- 12) Metric Socket Set
- 13) Wire Cutters
- 14) Terminal Crimpers
- 15) Wire Strippers
- 16) Razor Knife
- 17) Electrical Tape
- 18) Cable Cutters
- 19) #4 Professional Grade Cable Crimpers
- 20) Cable Strippers
- 21) Work Light
- 22) Torque Wrench up to 50 in/lbs
- 23) U-barrel Crimper
- 24) Pop Rivet Gun
- 25) Deutsch Crimpers

1

Prepare the Work Area. Start by disconnecting the ground wire from the starting batteries. Set up your work light, clear the sleeper compartment of loose items.



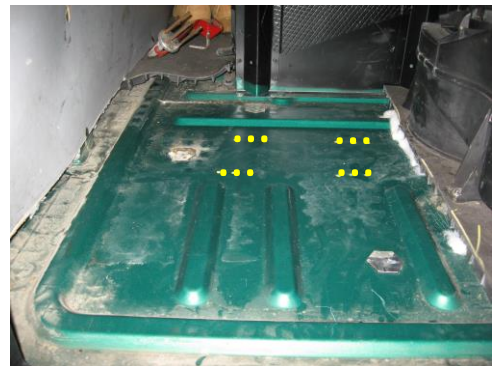
2

Determine Location for NITE Phoenix Unit. Temporarily position the unit close to the passenger side storage compartment bunk door and as close to the OE unit as possible without touching it. (See photo). This will allow enough room for the optional heater (if applicable) as shown in the photo. Mark unit location on rubber mat. Cut and remove this section.



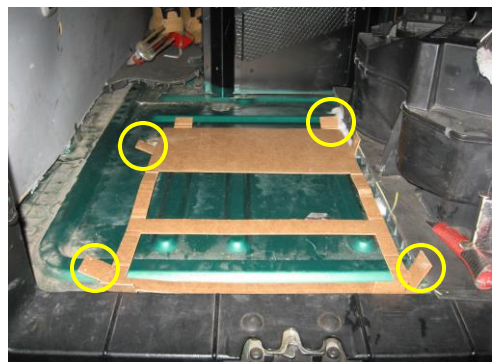
3

Locate possible obstructions
Check under the truck for any obstructions. Locate the edges of any cross members using rivets as guides. Do not cut through cross members. YELLOW DOTS INDICATE CROSSMEMBERS.



4

Determine Location for NITE Phoenix Unit. Position the provided template close to the passenger side door of the bunk and against the edge of the rubber mat. (See photo). Check under the truck for any obstructions. Locate the edges of any cross members using rivets as guides. Do not cut through cross members. Use mounting feet locations as indicated in photo



Installation Procedures

1-10

5

Mark Holes in Truck Floor

Mark the two rectangular openings in the template. Drill starter holes in all four corners of the two areas marked for cutting. Note location of cross members prior to drilling holes. Use air saw/jigsaw to cut through truck floor



6

Position the *NITE Phoenix* mounting template, as shown. Mark and drill

pilot holes for 4 mounting feet. The unit has 8 possible locations but you will only use 4. Use equal spacing to provide adequate stability of the Phoenix unit. See page 11 step 4 for mounting locations.



7

Cut out marked sections

Drill starter holes in all four corners of the two areas marked for cutting. Note location of cross members prior to drilling holes. Use air saw/jigsaw to cut through truck floor.



8

Test fit condenser air deflector

Bend deflector down on the short side and test fit in condenser openings until air flow will not be restricted.

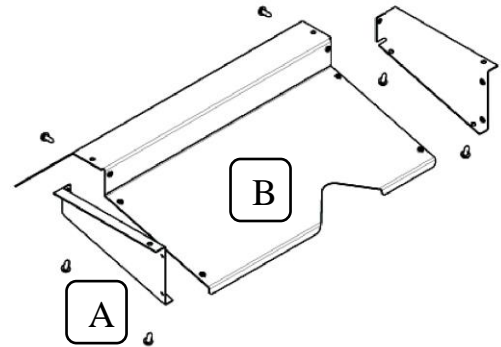


Installation Procedures

1-11

9

Pre-assemble the Condenser air inlet using #10 X 1/2" T20 screws (see below). Place sides (A) on each end of the deflector (B).



10

Install Condenser air deflector
Place assembled unit in the condenser hole. Fasten with 1" screw with 5/16 head self-drilling. **Modification of this assembly may be required to allow proper air flow.** In this application the short side of (B) needs to be bent down to allow proper air flow.



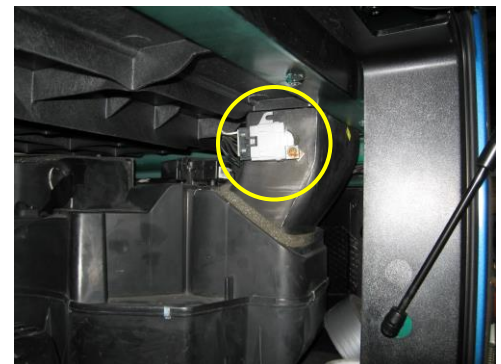
11

Before installing Phoenix unit Add additional foam seal around the condenser openings. This truck has a very deep corrugated floor. The factory installed Phoenix seal will not seal this floor. Using the 3/4" x 2" foam seal strip, cut strip approximately 1 wide creating (2) 3/4" x 1" pieces. Install these strips around condenser openings as show in photo.



12

Remove and relocate OE bunk air sensor



Installation Procedures

1-12

13

Relocate OE sensor. Measure the access hole for the OE sensor. Mark and drill the same diameter hole in the lower section of the OE unit as seen in photo and reinstall the sensor. Now, remove the OE duct section.



14

Cut access hole for Phoenix duct
Position the flex duct connector as shown and mark the inside diameter of the opening.



15

Cut duct as marked using an air saw



- 16** **Temporarily Install the duct adapter**
Preinstall the collar assembly using black $\frac{3}{4}$ " Philips head screws. Once all screw holes are made, remove duct collar assembly as you will permanently install this after the OE duct is reinstalled in the truck.



- 17** **Reinstall the OE duct**
As the OE duct section is installed, place the gravity door assembly (shown below) on top of the OE unit. It will be held in place by the OE duct.



- 18** **Gravity door operation**
Before connecting the duct, operate the OE bunk unit and check the gravity door movement. It should blow open with the OE truck unit blower on and fall closed with the OE blower off. Once this has been checked, apply silicone sealant around flange area and install the flanged duct adapter.



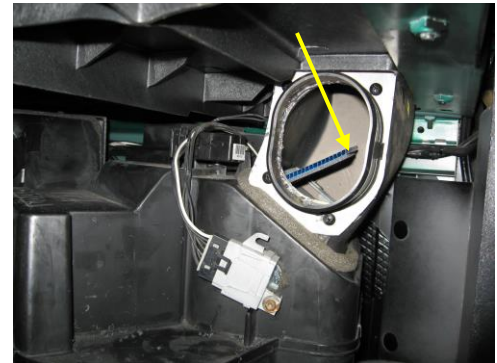
Installation Procedures

1-14

19

OE duct and sensor install complete

NOTE: Blend door is open with the OE bunk blower on.



20

Using the return air template provided, mark the area to be cut for the return air grill. Cut area using an air saw.



21

Install return air grill

Place the return air grill over area cut out and secure with 4 black 3/4" Philips head screws.



22

OPTIONAL HEATER

If you are installing an optional heater it is easier to install it prior to installing the Phoenix unit. Set heater and mounting plate in position, check for clearance and obstructions under the truck.

DO NOT USE NITE DUCT FOR HEATER VENT

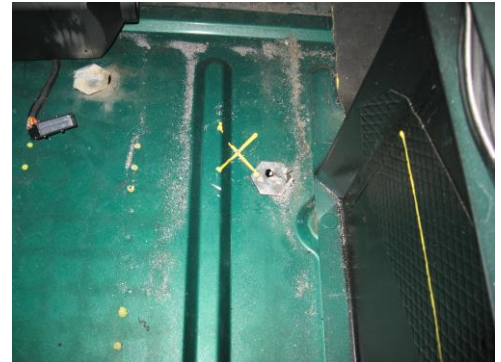


23

OPTIONAL HEATER

Mark the center of the location and cut the 4 ¾" hole and install the heater before the Phoenix unit.

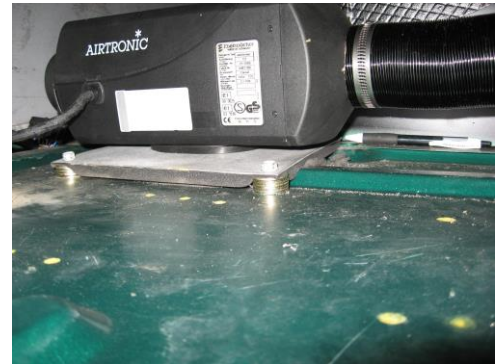
See sections 3-1 OR 4-1 for heater preassembly instructions.



24

Installing the heater

For this application it is necessary to add washers under the mounting plate to prevent the plate from being warped. Be sure to check all areas under the plate for proper seal. Add extra sealing material to any areas that might leak air



25

Heater duct

Using a 2 ½" hole saw, cut 1 access hole in the bunk support wall as seen in photo. Install heater duct collar in access hole using 3 Philips head screws provided in the heater kit. Attach foiled flex hose to duct collar and heater using 2 clamps provided in the kit. Snap heater rotatable bezel into duct collar.



Installation Procedures

1-16

29

Prepare the Phoenix unit for install

The Phoenix unit has 8 predimpled attachment points for duct bracket and elbow.

26



Now secure the 5/16 head self-drilling screws where the case will damage the

30


Install Phoenix

Now secure the 5/16 head self-drilling screws in the predrilled holes. See photos

27

Install the duct elbow mounting bracket to the Phoenix unit using   **bracket to the Phoenix unit using #10 X 1/2" T20 elbow bracket screws.**

28

Now install one half of the elbow support ring  **using elbow flange screws #8 X 3/4" T20. Do not completely tighten screws at this time.**

31

Install Phoenix duct elbow

Slide the elbow into the installed support ring and install the second half using the same screws as step 28 page 18. Once installed, you can snug all screws. With elbow secure, install the 4" flex hose onto the elbow and secure using the 4" hose clamp provided.



32

Connect flex hose to OE duct adapter. Route the 4" flex hose around and over the Phoenix unit. Cut to length and install on the duct adapter. Secure with the 4" hose clamp provided.



33

Install the NITE Phoenix Unit Power Harness Grommet. Chose a good location for the flanged grommet provided. Drill a 2" hole and install provided grommet in the floor (A). Route all Phoenix and heater cables through this grommet.



34

Install Drip Tube Under Truck All drip tubes are the same but photo may not represent actual application



Section 2

Electrical Installation

NOTE: Bergstrom does not condone putting batteries under the sleeper bunk. The floor is not designed to carry that amount of weight and even deep cycle AGM batteries can emit gas under certain circumstances. Bergstrom can only support batteries being placed in battery boxes or tool boxes designed to support the weight of the batteries outside the cab of the truck.

1

Available Battery Boxes Options

Refer to www.nitesystem.com for styles and part numbers. Aluminum clamp-on boxes include between rail and vertical box styles. Steel battery boxes require frame drilling and must be attached to frame rail with bolts (see instructions in the following steps 2 and 3).



Steel Battery Box
(2 required)



Vertical
Clamp-On Box

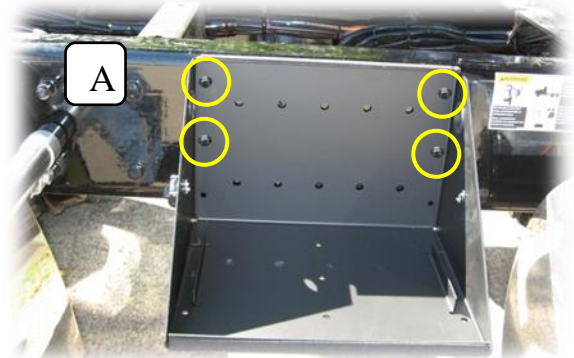
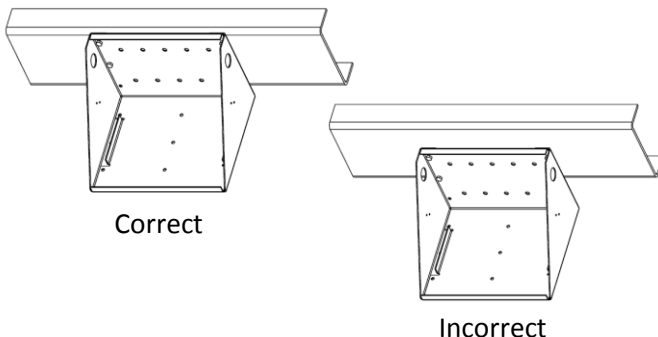


Between Rail
Clamp-On Box

2

Steel Battery Box Installation

Locate the battery box on the frame as close as possible to the sleeper NITE Phoenix unit. When positioning the box, always keep the top of the box as close to the top of the frame rail as possible – **Some manufacturers recommend no drilling within 2" of top or bottom of frame rail. Check truck manufacturer guidelines prior to drilling.** Using box as template, mark and drill a minimum of 4 holes. Always use the holes in the rear outer corner area where you have double walled steel. Of the 3 holes available on each side of the outer most edge of box, choose the top and center holes on each side (see photo A). Drill frame rail using 1/2" HS bit. Install box with 1/2" grade 8 bolts and hardware provided. Tighten securely.



3

Attaching Hold-down Brackets

Set two batteries side-by-side in the battery box and place a hold-down bracket on top, with the u-channel facing up. Take two 5/16" bolts, place a 5/16" flat washer on each, and then put the bolts through the outer holes. Tighten each bolt securely from underneath using the supplied nuts and washers. Repeat the procedure for the other two batteries.



NOTE: Before performing any wiring, Disconnect Truck Batteries.

4

Preparing Cables

The batteries are wired series/parallel for 6 volt or parallel only for 12 volt.

See diagrams on pages 2-3 and 2-4



5

Make and Install All Cables described in steps 6a or 6b depending on which batteries you are using.

6a

Directions for Wiring A 6-Volt Series/Parallel, 4 Battery *NITE Phoenix*

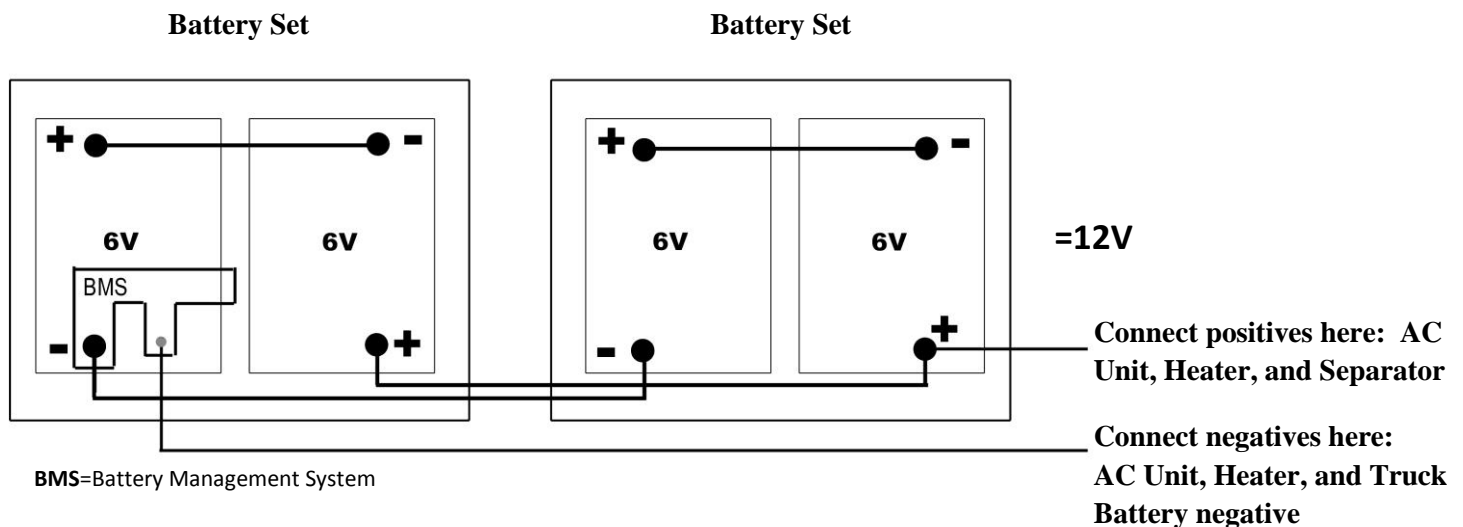
Step 1: Make and install the two short battery cables. These cables connect the positive (+) of one battery to the negative (-) of the other to create a set or bank. We refer to this as a series connection. *See drawing below.* **DO NOT connect any other cables or wires to these terminals.**

Step2: For the positive to positive parallel connections, measure and cut a piece of red cable to the proper length. Attach a ring terminal to each end using a professional grade crimper. Place heat shrink around each

terminal and heat. Then loom it. Use this cable to connect the positive (+) of one bank of batteries to the positive (+) of the other bank of batteries.

Step3: Repeat procedure for the negative to negative connection using a black cable. Then loom it. Use this black cable to connect the negative (-) of one bank of batteries to the negative of the other bank of batteries.

Do NOT use truck frame as a ground



6b

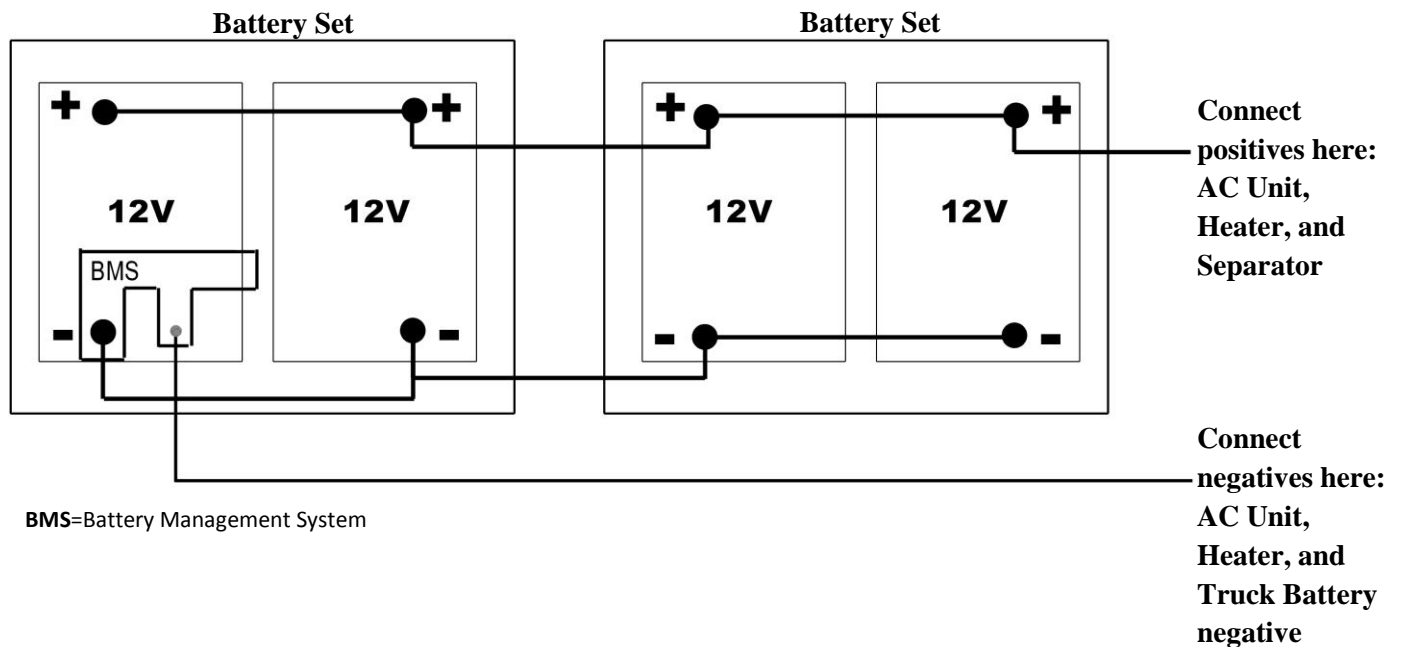
Directions for Wiring A 12-Volt Parallel, 4 Battery *NITE Phoenix*

Parallel is all positives connected together and all negatives connected together.

Step 1: For the positive (+) to positive (+) parallel connections measure and cut pieces of red cable to length. Attach a ring terminal to each end using a professional grade crimper. Place heat shrink around each terminal and heat. Then loom it. Use these cables to connect all positive (+) terminals on all 4 *NITE Batteries*.

Step2: For the negative to negative connections repeat procedure using black cables. Then loom it. Connect all negative (-) terminals of the 4 *NITE Batteries* together.

Do NOT use truck frame as a ground



7

Install the *NITE Phoenix* Power Harness. Take the power harness and place the protective split plastic loom around each cable. Route the cables from the *NITE Phoenix* unit, down through the floor grommet and along the frame rails to the *NITE Batteries*.

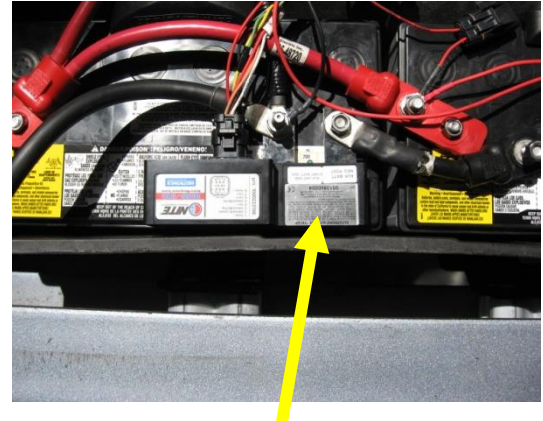
Secure harness at the unit to prevent stress on harness connectors.



8

Install Battery Management System

Lug with (open hole) mounts on the battery negative post. Grounds for the Phoenix and Aux heater will connect to the threaded stud post (A-bottom photo) along with the ground cable from the truck starting batteries. This device is monitoring amps drawn from the batteries as well as the charging current to the batteries. It also controls the separator solenoid.



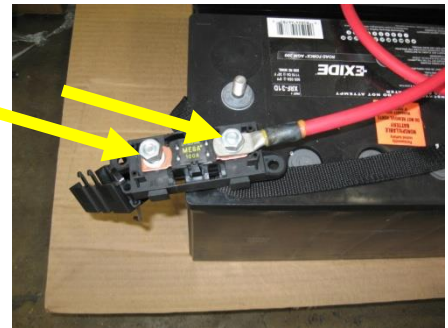
Battery Management System Installed

9

Connect Power Cables from Phoenix Unit to the NITE Batteries. Connect positive cable from the *NITE Phoenix* unit to the 100 amp mega fuse in the fuse holder. Kit contains 2 lugs with 5/16 diameter holes. Make a short (jumper) battery cable to go from the fuse to the Aux battery positive terminal of the *NITE Batteries*. Trim end of lug if necessary to prevent damage to fuse.

Connect the negative cable from the NITE Phoenix unit to the negative threaded stud (A) (see photo at right) on the BMS. Also see diagrams on pages 2-3 and 2-4.

5/16 lugs



DO NOT CONNECT POSITIVE TRUCK BATTERY CABLE YET. WE WILL CONNECT THIS CABLE ONCE FINISHED.

STOP!

FOLLOW STEPS 10-19 FOR **KISSLING** SEPARATOR

PROCEED TO PAGE 2-10, STEPS 20-41 FOR THE **TERRA POWER** SEPARATOR



KISSLING



TERRA POWER

10

Mounting the Separator Enclosure

The battery separator can be located in a battery box or in the supplied protected enclosure. Mark and drill two 1/4" holes through the back of the plastic box and the support it will be mounted to. Before permanently attaching the separator enclosure, prepare and mount the separator in the box. The separator will mount to the side of the box with 2 1/4" bolts and hardware. Drill large holes in the bottom of the box and route the cables through the holes to the separator. Securely fasten the separator and box using the provided 1/4" bolts, washers and lock nuts. *Note: The separator ties to the truck's starting batteries and allows charging priority to the starting batteries. The NITE Batteries begin charging after the starting batteries reach 13.2 volts.*

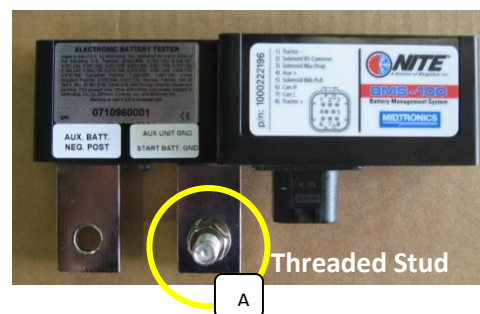
Disregard the enclosure instructions if you mount the separator inside the battery box.



11

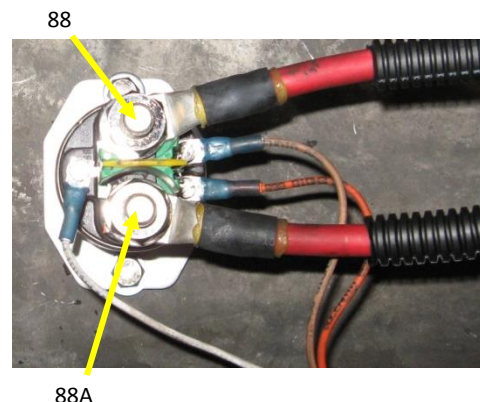
Run Cables from Truck Batteries

Loom 2 full length battery cables, 1 red and 1 black. The red (pos) cable will connect the truck starting batteries positive post to the (start) post #88 of the battery separator. The black (neg) will connect the truck (neg) to the threaded stud (A) of the BMS(see photo).



12

Connect NITE Batteries to Battery Separator. Using red battery cable, measure and cut to proper length. Crimp ring terminals and heat shrink. Connect one end to the appropriate positive (+) terminal of the NITE Batteries. See diagrams on pages 2-3 and 2-4. Connect the other end to the AUX terminal # 88a of the battery separator.

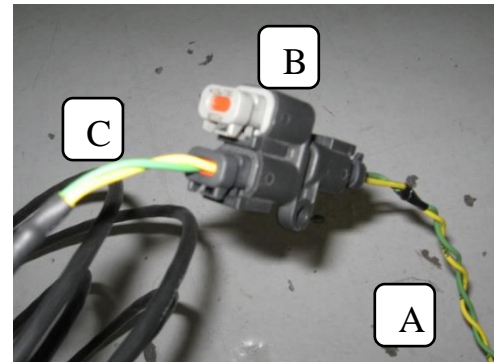


13 Battery Management System Wiring Harness. 8 pin connector plugs into the BMS. Auxiliary battery power wire with fuse connects to battery pos on the aux. batteries. This harness splits three ways: Red/black goes to truck starting batteries, orange/tan/white go to separator, green/yellow go to can bus on Phoenix unit inside the truck. All three must be loomed.



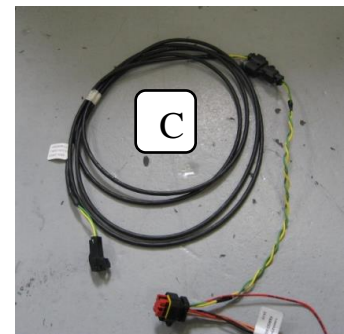
14 Install Y connector at BMS connection (A) - wires green and yellow

15 Install resistor plug (B) into Y connector



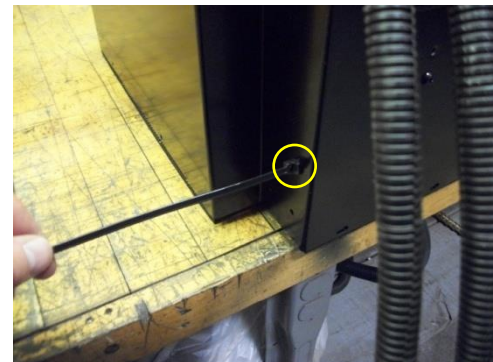
Systems built after 9/1/2013 do not use a Y connector and resistor

16 Connect Can Bus harness from the Battery Management System wiring harness. This harness must be loomed (C). Route this harness inside the truck through the floor grommet and connect at the Phoenix unit.



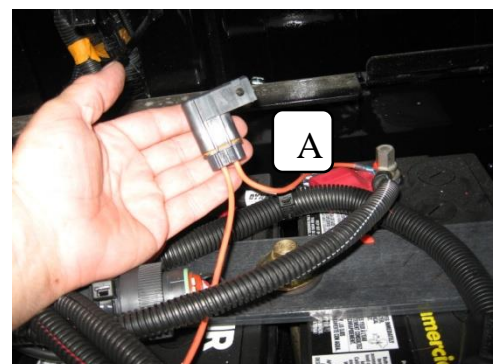
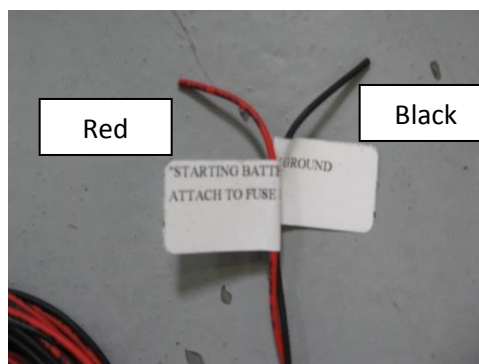
17

Connect Battery Management System to Start Batteries. 2 wire harness from 8 pin connector. This harness routes from the BMS in the Aux battery box to the truck starting battery box. **This harness must be loomed.** The red connects through the supplied, field installed, 5 amp mini fuse and holder (A) to any 12 volt POS post in the truck starting battery box. The black connects to any 12 volt NEG post in the battery box. It is vital that these wires connect in each box.



18

Attach Can Bus Cable to Unit. Connect can bus harness, coming from the BMS, into connector at the *NITE Phoenix* unit – it only fits one way. **Also connect the digital controller harness installed in an earlier step.**



19

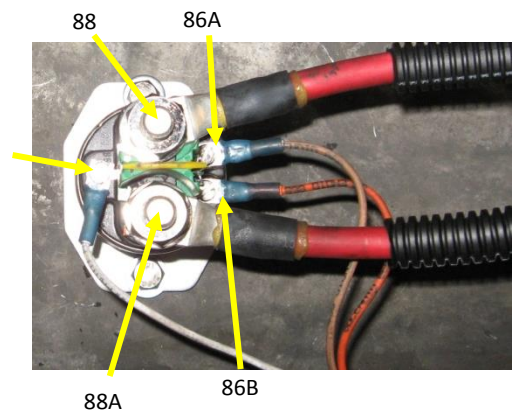
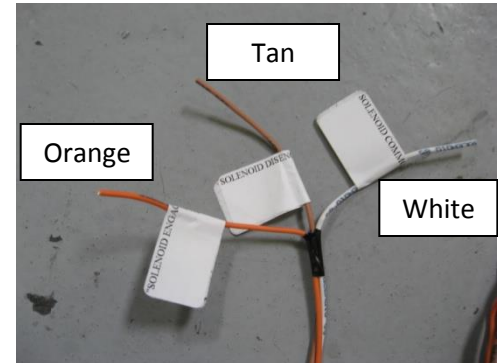
Connect Battery Management System to Battery Separator Solenoid This 3 wire harness from the 8 pin connector routes to the battery separator solenoid. Cut wires to length, crimp snap fork terminals on each wire and connect to designated terminals. This switch separates the Aux batteries from the starting batteries. It closes when the truck batteries are at or above 13.2 and opens at 12.5 volts. Location can be in the AUX battery box, truck starting battery box or the supplied plastic enclosure.

This harness must be loomed.

Notice: the terminal connecting points are printed on each wire.

Terminals are marked as:

- 88 – Starting battery cable (POS)
- 88A – Aux battery cable (POS)
- 85 – Solenoid common (White wire)
- 86A – solenoid disengage (Tan wire)
- 86B – solenoid engage (Orange wire)



WIRING THE TERRA POWER SEPARATOR

Disregard the enclosure instructions if you mount the separator inside the battery box.

Install Separator Enclosure

- 20** Remove the enclosure cover, Place the separator mounting bracket, centered on the inside of the cover. Mark and drill 4 holes to secure the bracket to the cover.



- 21** Before installing the bracket, secure the separator to the bracket with four 10 x 32 x 3/4" screws and lock washers provided.



22

Install the assembly to the cover using 4 10 x 32 x $\frac{3}{4}$ " screws, lock and flat washers provided.



23

Next, drill a 2" hole in the center of the **bottom** of the box as shown.

Trim the hole on each side as shown, creating a 2" slot.



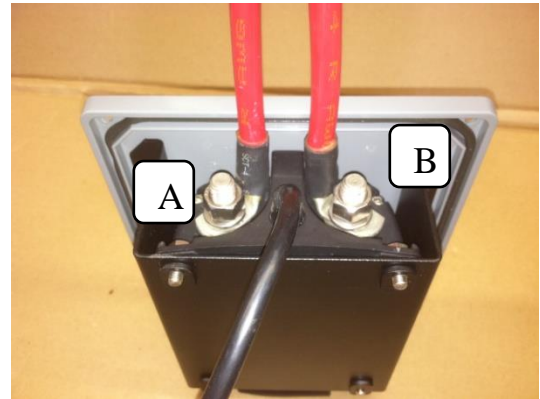
24

Install enclosure on truck

Run Cables from Truck Batteries

- 25** Loom 2 full length battery cables, 1 red and 1 black. The red (pos) cable will connect the truck starting batteries positive post to the (start) post (A) of the battery separator. **You must use the provided 90 degree battery terminal end at the Terra Power separator rotated to the center of the switch.**

*Torque specs for separator terminals
88(recommended) to 132(maximum) inch
lbs.*



- 26** The black (neg) will connect the truck (neg) to the threaded stud (C) of the BMS.



- 27** **Connect NITE Batteries to Battery Separator.** Using red battery cable, measure and cut to proper length. Crimp ring terminals and heat shrink. Connect one end to the most appropriate positive (+) terminal of the *NITE Batteries*. Connect the other end to the AUX terminal (B) of the battery separator. See top photo. **You must use the provided 90 degree battery terminal end at the Terra Power separator rotated to the center of the switch.**

- 28** Install the separator assembly

- 29** Once you have torque the battery cable connections, install the cover assembly on the enclosure.



30

Battery Management System Wiring Harness. 8 pin connector plugs into the BMS. Auxiliary battery power wire with fuse connects to battery pos on the aux. batteries. This harness splits three ways: Red/black goes to truck starting batteries, orange/white go to separator, green/yellow go to can bus on Phoenix unit inside the truck. All three must be loomed.

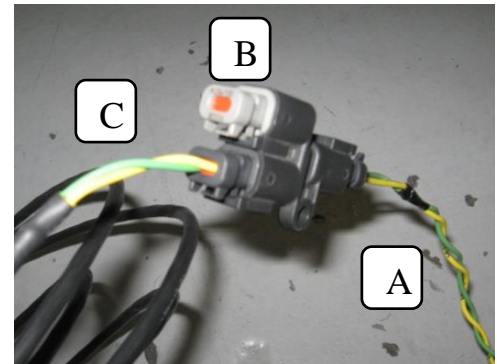


31

Install Y connector at BMS connection (A) - wires green and yellow

32

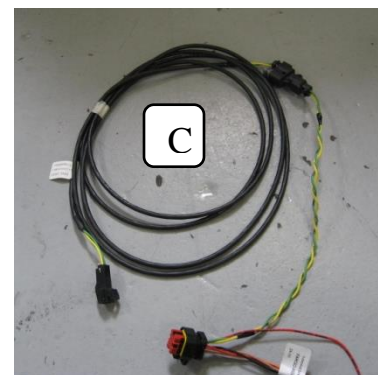
Install resistor plug (B) into Y connector



Systems built after 9/1/2013 do not use a Y connector and resistor

33

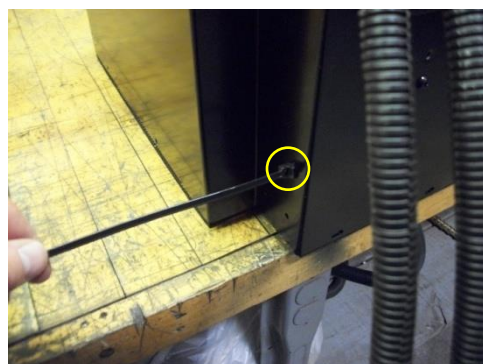
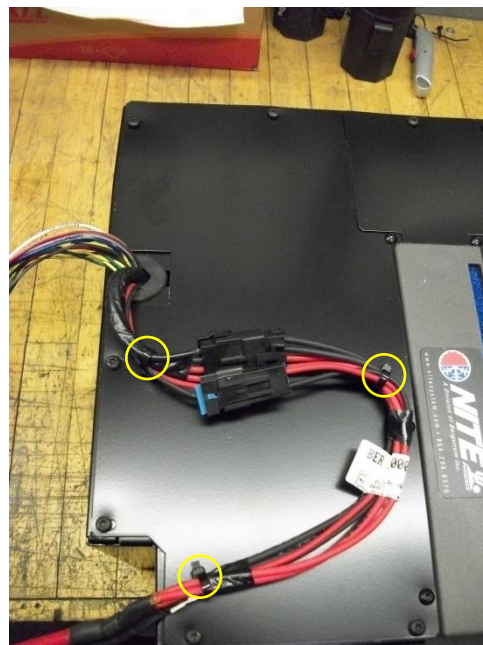
Connect Can Bus harness from the Battery Management System wiring harness. This harness must be loomed (C). Route this harness inside the truck through the floor grommet and connect at the Phoenix unit.



34

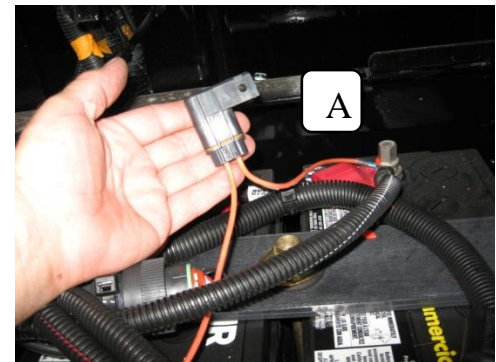
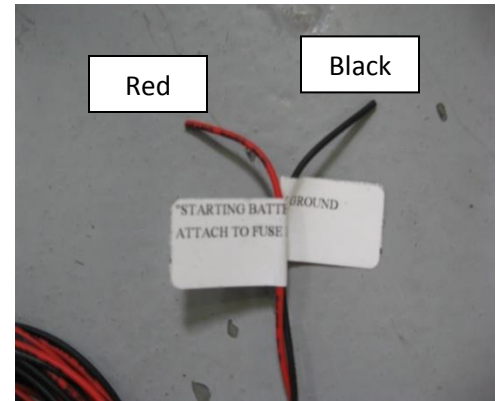
Attach Can Bus Cable to Unit.

Connect can bus harness, coming from the BMS, into connector at the *NITE Phoenix* unit – it only fits one way. **Also connect the digital controller harness installed in an earlier step.**



35

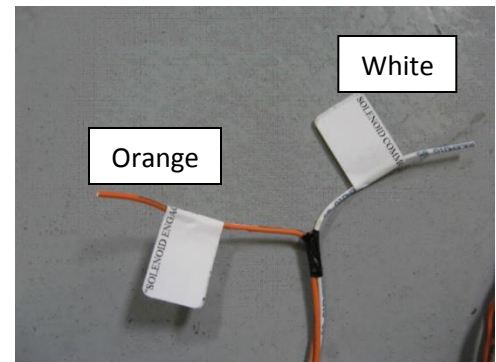
Connect Battery Management System to Start Batteries. 2 wire harness from 8 pin connector. This harness routes from the BMS in the Aux battery box to the truck starting battery box. **This harness must be loomed.** The red connects through the supplied, field installed, 5 amp mini fuse and holder (A) to any 12 volt POS post in the truck starting battery box. The black connects to any 12 volt NEG post in the battery box. It is vital that these wires connect in each box.



36

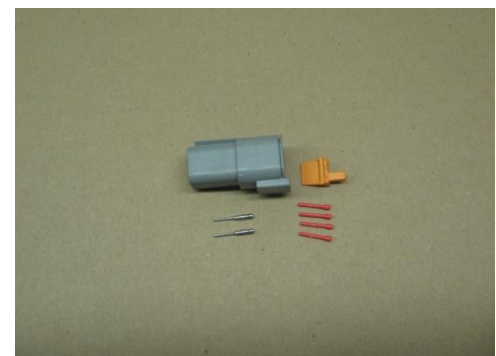
Connect Battery Management System to Battery Separator. This 2 wire harness from the 6 pin connector routes to the battery separator solenoid.

This harness must be loomed. Notice: the terminal connecting points are printed on each wire.



Deutsch connector kit.

This connector connects the orange and white control wires to the Terra Power switch. This requires the special Deutsch crimping tool. See crimping tool instructions on page 2-18 before proceeding.





DEUTSCH Industrial

3850 Industrial Avenue • Hemet, CA 92545

Title
INSTRUCTION GUIDE for HDT-48-00

Drawing Number
0425-071-0000

Revisions			
Sym	Description	Date	Approved
B	Revised per E.O. P19919	6/27/08	R D R

1. WIRE PREPARATION: Use Envelope Drawing HDT-48-00 for ALL wire and contact combinations (this chart simplifies popular sizes). Strip wire as specified. Inspect for damaged/missing strands. The Dial Position is NORMALLY the SAME as WIRE Size (see Envelope Drawing for exceptions).

Contact SIZE	Contact Part Number	WIRE Range AWGs WIRE Range [mm ² s]	Strip Dim INCH Strip Dim [mm]
20 PIN	0460-202-20**	20	.156-.218
20 Socket	0462-201-20**	[0.50]	[3.96-5.54]
16 PIN	0460-202-16**	16, 18, 20	.250-.312
16 Socket	0462-201-16**	[1.5/1.0/0.75/0.50]	[6.35-7.92]
16 PIN	0460-215-16**	14 *	.250-.312
16 Socket	0462-209-16**	[2.0]	[6.35-7.92]
12 PIN	0460-204-12**	12, 14	.222-.284
12 Socket	0462-203-12**	[3.0/2.5/2.0]	[5.64-7.21]

** Plating codes: ** = 31 is "Gold" ** = 141 is "Nickel"

* NOTE: Use 1.5 dial position for these contacts on 14 AWG.

NOTE: Check for missing or nicked strands after wire is stripped.



Before crimping, be sure ALL wire strands are INSIDE of the crimp barrel and visible at the inspection hole (sufficient wire length).

2. CONTACT CRIMPING: Cycle tool to open handles. Remove lock clip. Raise and rotate dial to select wire size. Replace lock clip. Adjust locator to produce crimps as shown below:

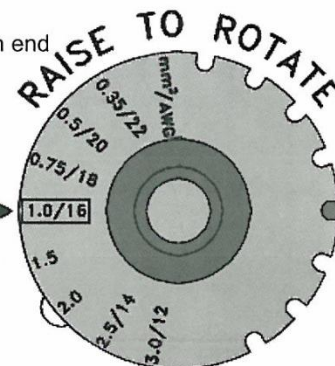


Strands should be visible through inspection hole.

Crimp must be CENTERED between end of wire barrel and inspection hole.
.025-.100" GAP [0.63-2.54] between Contact & Insulation

NOTE: NEVER close tool ON GAGE G454.
Close tool FIRST, THEN insert GAGE G454.
Do NOT use GAGE G454 with the HDP-400.

mm² / AWG
GAGEG454



Use GAGE G454 in Dial Position 1.0/16 to check wear annually under normal conditions. Check more often with high volume use.

CAUTION: To avoid DAMAGE, ALWAYS check Dial Position BEFORE Crimping.
(crimping LARGE wire at a small setting may permanently harm the tool).

3. MAINTENANCE: Clean tool and remove debris regularly. Inspect for loose or missing hardware. To prevent rust or environmental damage, never leave HDT-48-00 tool outdoors.

Revision Letter: B Engineering Order Number: P19919 Page 1 of 1

INFORMATION

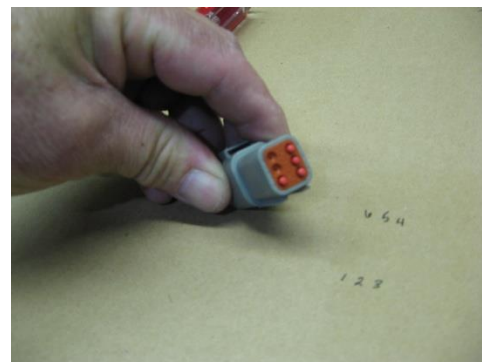
37

Cut wires to length, strip insulation as instructed in the Deutsch tool section. Crimp terminals on each wire.



38

Install 4 sealing plugs into the unused terminal locations 3 through 6.



39

Install separator control wires into Deutsch connector

Terminals are marked as:

- 1- Solenoid common (White wire)
- 2- Solenoid engage (Orange wire)



40

After wires are installed, slide the terminal lock into place, inside the connector

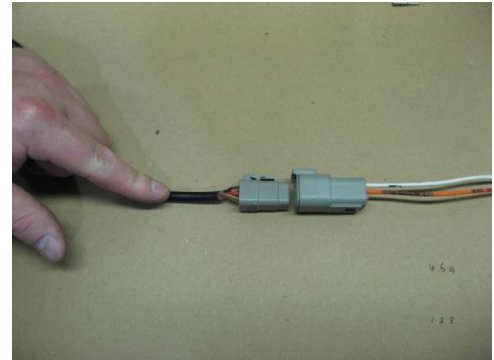


41

Connect the assembled connector to the existing connector on the Terra Power switch

Complete Electrical Wiring

Recheck and tighten all battery and separator connections. Zip tie cables where necessary. Your wiring should look like the diagram on page 5-1.



This completes the electrical section of the installation. If you are installing the ESPAR heater proceed to section 3. If you are installing the WEBASTO heater proceed to section 4. If you are not installing an aftermarket heater, your installation is complete and you may reconnect the truck batteries.

WARNING: If you have a fuel operated heater that was installed at the factory or prior to the Phoenix install, you can continue to operate the heater with the existing controller.

IF you choose to wire the existing factory installed heater to the Phoenix controller, YOU WILL VOID THE FACTORY WARRANTY OF THE HEATER!

Section 3

ESPAR Fuel Operated Heater Installation

Heater Installation

3-1

The heater instructions in this manual are generic. For the latest install information please refer to the Espar D2 heater install manual

WARNING: If you have an Espar fuel operated heater that was installed at the factory or prior to the Phoenix install, you can continue to operate the heater with the existing controller. IF you choose to wire the existing factory installed Espar heater to the Phoenix controller, YOU WILL VOID THE FACTORY WARRANTY OF THE HEATER!

1

Unpack Heater Parts

Take out the parts to the heating unit.



2

Prepare Heater Mounting Location.

Choose the most appropriate location to install the heater—in this case we have chosen a side box floor location. **Check underneath truck for any obstructions or supports.** Use the mounting plate as a template to cut an opening in the rubber mat. Cut around the mounting plate, then remove the piece of rubber to expose truck floor.



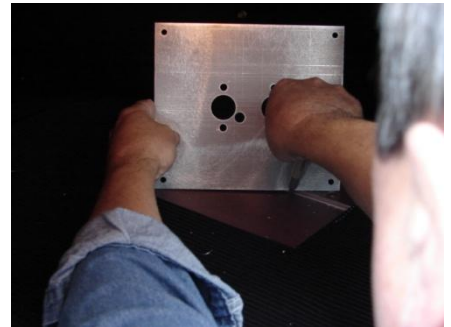
3

Drill Outlet Hole for Heat Unit. Mark the *floor of the truck* using the 5 small holes of the mounting plate. Remove mounting plate, place a 4 1/4" hole saw over the middle of the floor marks, and drill the outlet hole for the heater, intake, exhaust and pickup tube. Also drill a 1/2" hole approximately 1 to 2" from mounting plate corner.

NOTE: DO NOT USE PHOENIX DUCT FOR HEATER VENT

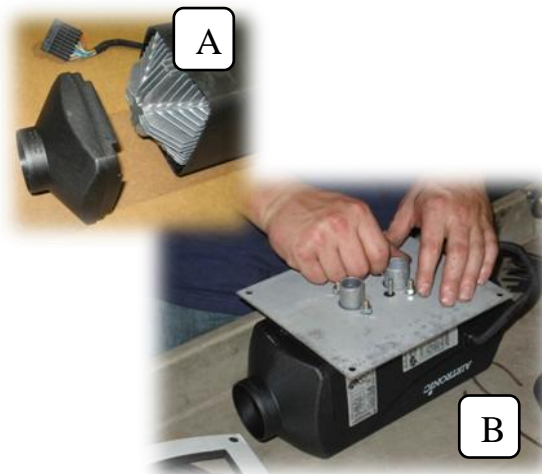
4

Install Sleeper Heat Vent. Select location for the vent in the lower left side of the center support wall closest to heater. Drill a 2 1/2" hole (A) to allow distribution of heat into the sleeper. After hole is drilled, use 5/16" x 1" self-tapping screws to attach heat port then snap louver into place (B).



5

Heater Unit Assembly –Attach Mounting Plate. Snap end cap on heater unit (A). Place mounting plate over heater unit (B). Attach with flat lock washers and 10mm lock nuts—tighten down securely.



6

Heater Unit Assembly – Attach Gasket and Fuel Line Connection Peel off backing from gasket and place gasket over mounting plate edges, sticky-side down. Place small black rubber fuel line connector over the fuel intake tube and push down. Place a small clamp over connector, push to bottom and tighten.



7

Heater Unit Assembly – Attach Fuel Line Now take the clear pick up tube, place a small clamp over it, and push the tube all the way to the bottom of the fuel intake tube. Place clamp flush with top of black connector and tighten securely.



Heater Installation

3-4

8

Heater Unit Assembly – Identify Intake and Exhaust Ports. Look closely at the two small metal tubes. One has an arrow pointing out away from the unit—this is the exhaust. One has an arrow pointing in towards the unit—this is the intake.



9

Heater Unit Assembly – Attach Exhaust Hose. Take the heavy duty silver metal hose and place a large, heavy duty clamp over the end of it. Place the hose and clamp over the exhaust tube, push all the way down, and tighten securely.



10

Heater Unit Assembly –Attach Intake Hose. Take the black flex hose and place a small clamp over the end of it. Place the hose and clamp over the intake tube, push all the way down, and tighten securely.

Heater is now ready to install in the truck.



11

PREPARE TO MOUNT UNIT

Check to make sure truck batteries are still disconnected. Carry unit into truck. It will be mounted over the 4 $\frac{3}{4}$ " hole that was drilled earlier. Make sure hoses and tubes don't get tangled or caught on anything.



12

Run Lines Through Cab Floor

Feed exhaust hose, intake hose, and fuel line through the 4 $\frac{3}{4}$ " hole, making sure they are not bent, crimped or rubbing on the side of the hole.



13

Mount Heater Unit to Cab Floor

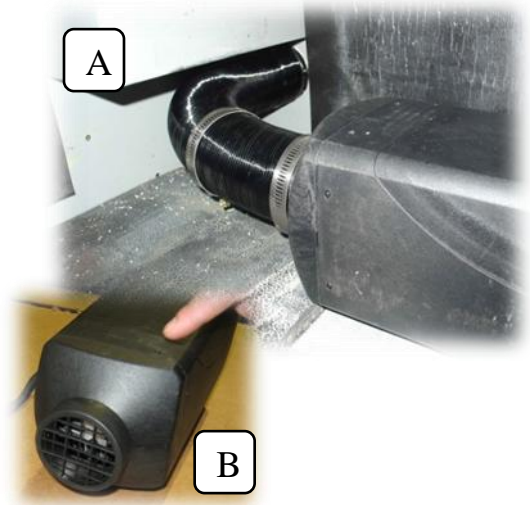
Make sure that the heater unit is set with the fan (intake) end opposite the 2 $\frac{1}{2}$ " hole for the vent/louver drilled earlier. Set unit flush to floor and attach with a self-tapping screw at each corner of the mounting plate.



14

Attach Heat Line to Sleeper Vent.

Take the black metallic flex tube, measure and cut length to run from heater unit to louver/vent opening (A). Place two clamps over ends of tube, and clamp tube to heating unit and louver. Tighten clamps securely but do not over tighten. Snap Intake Grill onto intake end of heater (B). Keep this area clear of debris or install return air hose.



15

Attach Wiring Harness

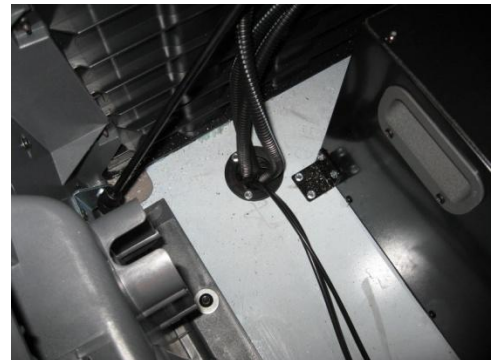
Attach plug end of wiring harness into wiring plug at bottom of heating unit. Be sure the lock-in pin seats securely.



16

Run Power and Fuel Pump Wires

Through Floor. Run the power wire and fuel pump power wire through the grommet (installed in section 1) to the underside of the truck. If the fuel pump wire will not reach using this grommet, use the rubber grommet supplied with the heater and drill a second hole.



17

Optional Heater controlled by the Phoenix controller.

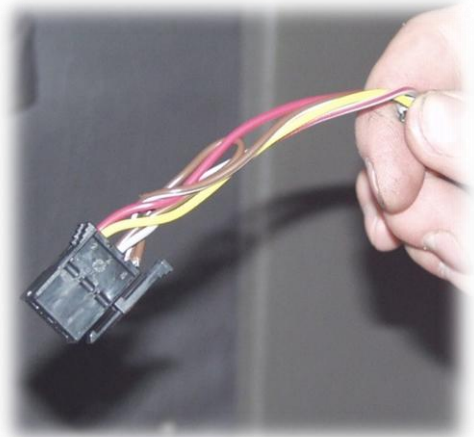
WARNING: If you have an Espar fuel operated heater that was installed at the factory or prior to the Phoenix install, you can continue to operate the heater with the existing controller. IF you choose to wire the existing factory installed heater to the Phoenix controller, **YOU WILL VOID THE FACTORY WARRANTY OF THE HEATER!**

Attach Espar Heater Control Harness to Phoenix Unit

Espar control harness terminates the same as when using the Espar mini controller. Connector kit for the control harness is included in the heater kit.

Route the control cable along the bed towards the heater control panel. Use zip ties as needed. Strip off 6" of black outer jacket from cable coming from heater. Fold all wires back and cut off the outer jacket, the blue, solid gray and solid brown wires. **Save the brown wire and make a jumper wire.** Strip down ends of solid brown wire.

Connect one end of solid brown jumper to brown/white wire. Add clips to ends of wires and crimp on with crimper. On connector, the numbers 1, 3, and 5 are on one side, 2, 4, and 6 are on the other. Insert wires into plug as follows: **1 = red, 2 = yellow, 3 = other end of jumper including brown/white wire, 4 = gray with red stripe, 5 = brown jumper.** Now connect the heater control harness to the Phoenix unit as shown in photo.



18

Finish Intake and Exhaust Hose Installation. First, attach intake air tube to truck structure with zip ties. Put cap on bottom of intake tube. Next, run exhaust hose to the back of cab, attach with clamps to the structure of the truck. Cut off excess exhaust hose, and place End Sleeve on the end of the hose.

NOTE: HOT – Keep exhaust hose away from wiring or flammable material. Make sure exhaust exits behind the vehicle.



19

Assemble the Fuel Pump Mount and Hoses. Take rubber mount bushing and L bracket and put them together to make mounting bracket for fuel pump. Slide fuel pump into rubber bushing (A). Take plastic caps off both ends of fuel pump. Attach large fuel hose to larger diameter end (B), figure out length needed to connect to pickup tube and cut off excess. Secure with clamp. Attach small precut hose to smaller diameter end of the fuel pump and secure with clamp (C).

NOTE: Bracket shown in photo (B) will always set the fuel pump at the desired angle. Make sure the inlet of the fuel pump is down.



20

Drill Hole in Fuel Tank, Insert Pickup Tube and Mount Fuel Assembly. Use a 1" hole saw to scribe initial location for two outer holes. Drill the two outer 1/4" holes centered on scribe. Then complete drilling the 1" hole. **See diagram A. Option: When possible drill holes in the fuel sender block off plate.** Slide pickup tube into fuel tank through hole, install with bottom washer then put on rubber seal and place metal washer on top of pickup tube followed by pump mounting bracket and nut. Tighten slightly. Put clamp over end of large fuel line from fuel pump, attach to pickup tube and clamp down. Finish snug up large nut, but do not over tighten. Cut off excess from small feeder tube fuel line and attach to fuel pump. Secure with clamp.



Hole drilled in tank

Hole drilled in blank sending unit plate

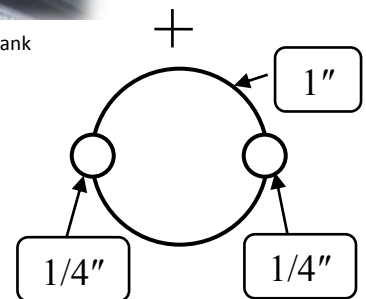
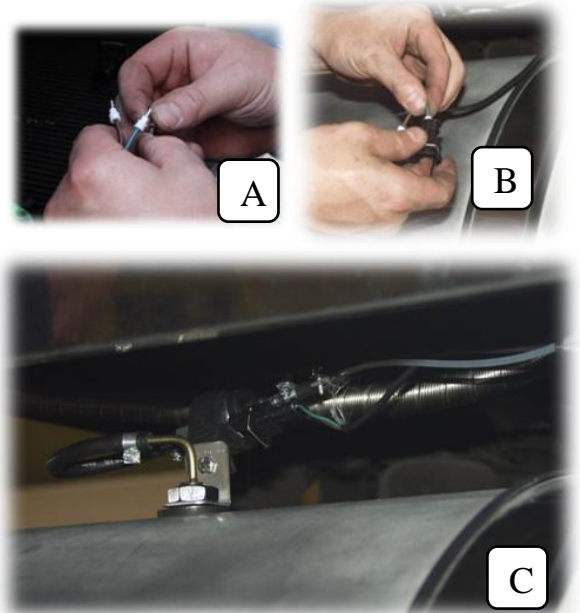


Diagram A

21

Prepare and Attach Fuel Pump Harness. Measure and cut fuel pump harness wires to appropriate length. Strip wires, put on rubber boots, then attach ends and crimp (A). Attach wires to plug: 1 = green, 2 = brown. Make sure rubber boots are seated to keep out moisture (B). Connect the harness spring loaded plug to the fuel pump (C). Secure all wires and hoses with zip ties.



22

Run Heater Unit Power Cable to *NITE* Batteries. Take the heater unit power cable, run it under the truck (attach with zip ties where necessary) over to the *NITE Batteries*. Strip back outer cover to expose two inner wires.



23

Attach Connectors. Strip end off brown wire. Before stripping red wire, put the housing of the fuse holder on, and pull the red wire through. Now strip the end of the red wire, attach terminal and crimp. Pull red wire back into fuse holder. Push rubber seal into place. Attach ring terminal to ground wire and crimp.



24

Attach Wires to *NITE* Batteries. Connect Aux heater ground wire to ground terminal threaded stud of Battery Management System. Connect heater unit positive wire to positive terminal of *NITE Batteries*. Insert 20 amp fuse into fuse holder. Tighten all connections.

YOU CAN NOW RECONNECT THE TRUCK'S BATTERIES TO TEST THE SYSTEM.

Section 4

WEBASTO Fuel Operated Heater Installation

Optional Webasto Heater controlled by the Phoenix controller.

WARNING: If you have a Webasto fuel operated heater that was installed at the factory or prior to the Phoenix install, you can continue to operate the heater with the existing controller. IF you choose to wire the existing factory installed Webasto heater to the Phoenix controller, **YOU COULD VOID THE FACTORY WARRANTY OF THE HEATER!**

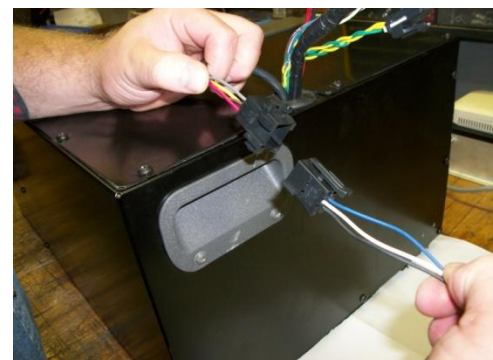
DO NOT USE PHOENIX DUCT FOR HEAT VENT.

ATTN: Refer to Webasto manual for all heater installation instructions then proceed to steps below for connecting Webasto heater to the Phoenix unit.

Attach Webasto heater control harness to Phoenix Unit. Route the control cable along the bed towards the Phoenix unit. Use zip ties as needed.

Now connect the heater control harness to the Phoenix unit harness (as shown in photo). The Webasto heater in the Phoenix kit is prewired to connect directly into the Phoenix unit harness.

For pin numbers and wire colors see wiring diagram in section 5.



Section 5

Wiring Diagrams

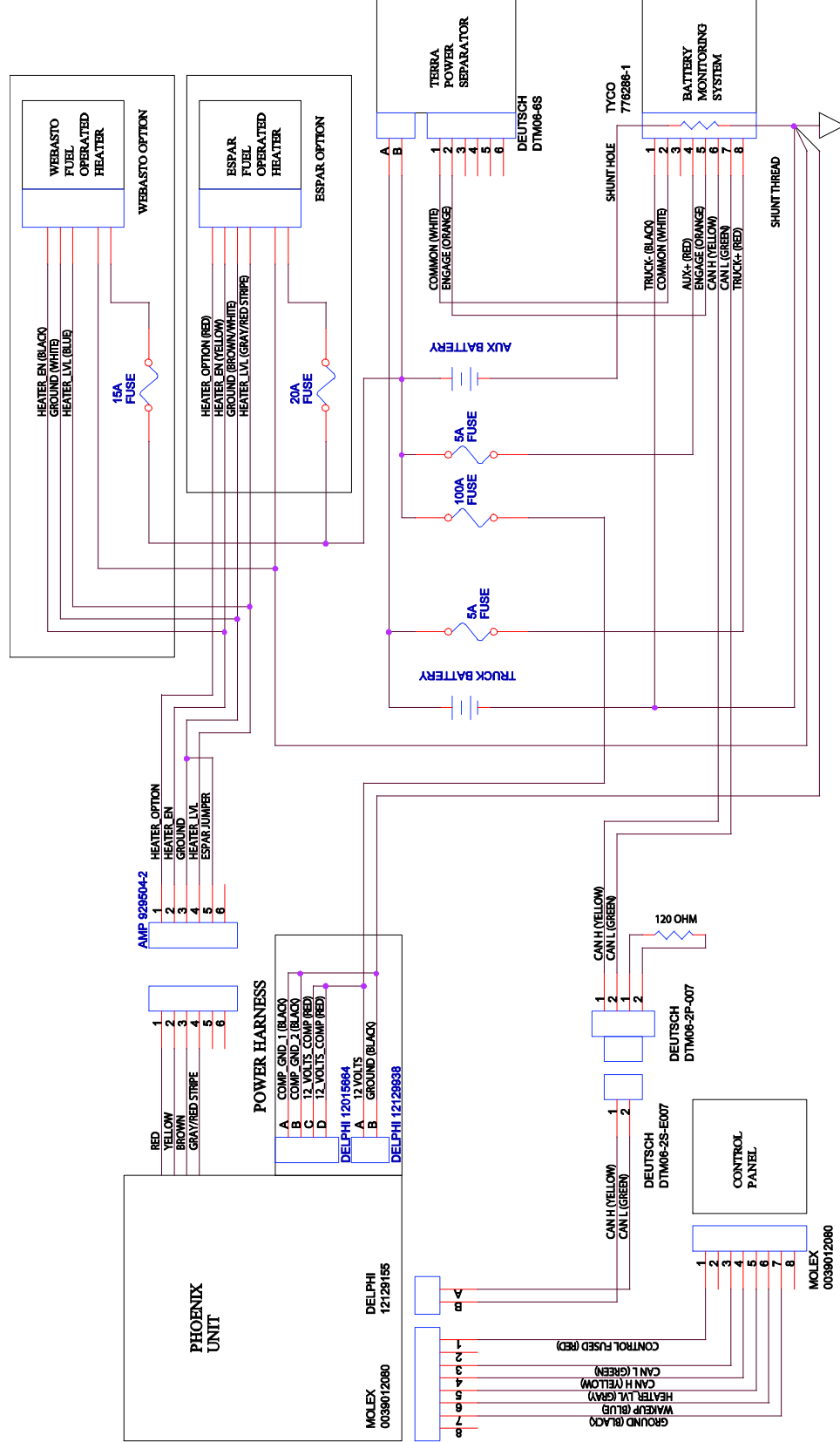
NOTE:

Pages 5-1 and 5-2 are for unit manufactured after 2/8/2012

Pages 5-3 and 5-4 are for units manufactured prior to 2/8/2012

External Wiring Diagram

5-1

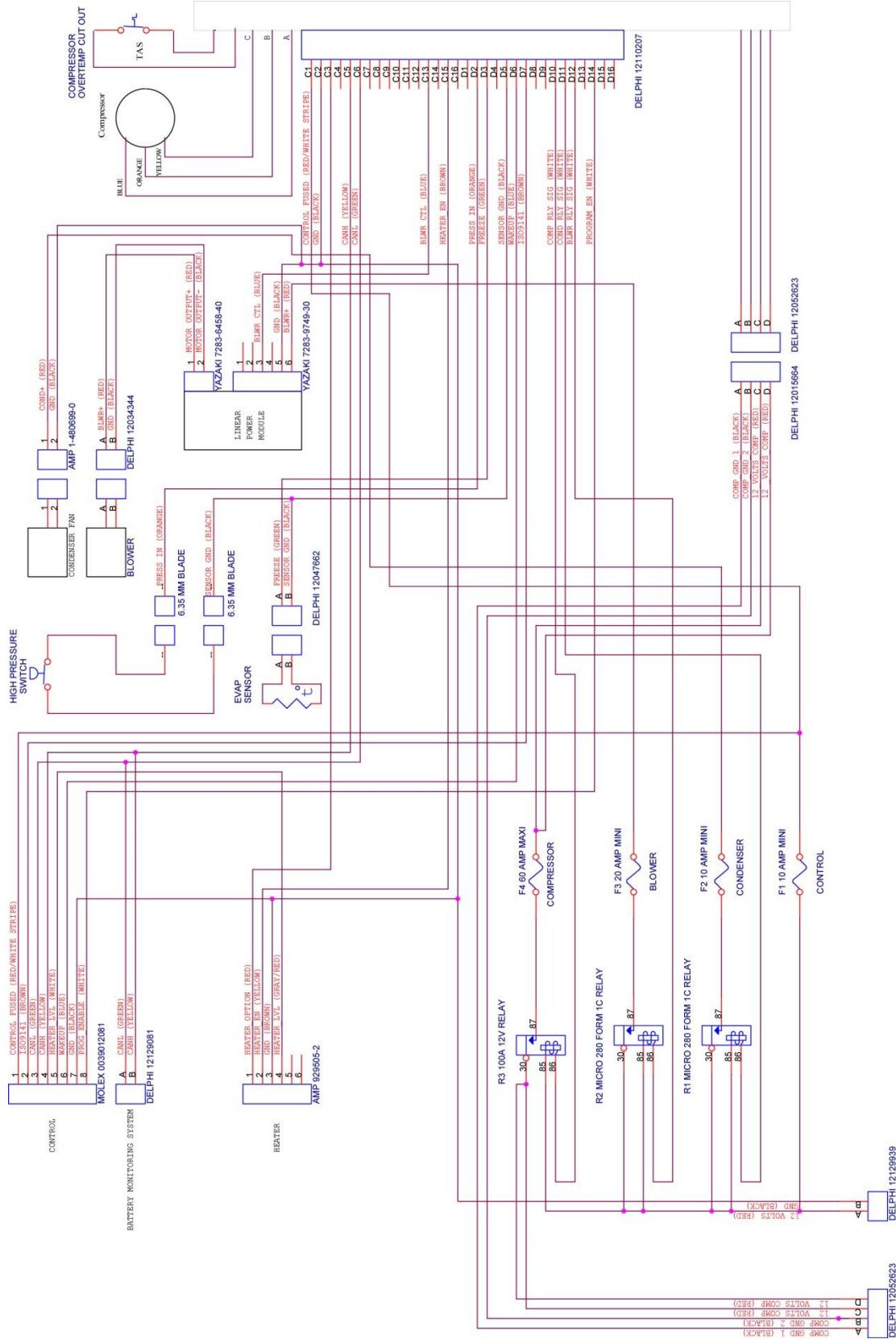


Use for units manufactured after 2/08/2012

Internal Wiring Diagram

5-2

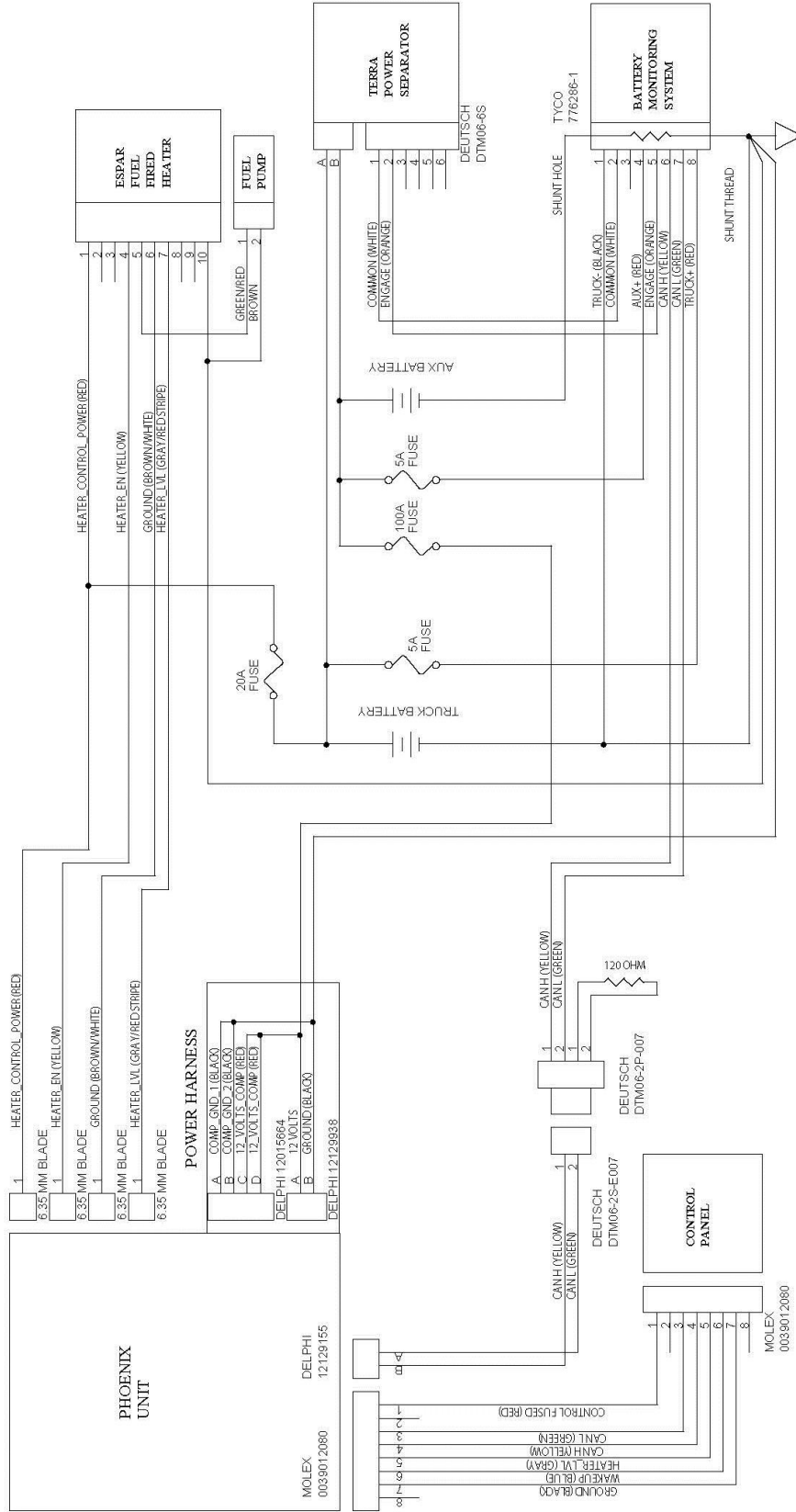
Use for units manufactured after 2/08/2012



External Wiring Diagram

5-3

Use for units manufactured prior to 2/08/2012



5-4



Section 6

Operating Instructions

Operating Instructions

6-1

To start the system push ON/OFF button. Display will show current mode/ temperature setting / battery level.

Initial default setting is blower speed 1/ AUTO- MODE /60 °F



Changing MODE – press ENTER, while mode is flashing use up or down arrows to select AUTO / COOL / HEAT. After 5 seconds selection will be set.



Changing BLOWER SPEED – press ENTER until display shows FAN and SPEED. Press up or down arrows to select 1 – 2 – 3 speed. After 5 seconds selection will be set.



Operating Instructions

6-2

Changing TEMPERATURE set point. Anytime the temperature set point is displayed on the screen, push the up or down arrows to change. Temperature range is from 60 °F (coolest) to 85 °F (warmest).

NOTE: Control will always default to the last setting when the unit is turned on.

To view system runtime/hours – press ENTER until “Hrs” show on display. When hours are displayed, pressing ENTER for 7 seconds will reset the hours to zero.

To change from °F to °C press ENTER until temperature symbol only shows – push the up or down arrow to change. After 5 seconds selection will be locked.

Anytime the control is idle for 5 seconds the screen will return to the temperature set point screen.



Operating Instructions

6-3

To enter SERVICE MODE: Push both the ON/OFF and ENTER button simultaneously at any time.

Display will show service indicator and a code #1 to #3.
Use up and down arrows to scroll through the Fault Codes.

- 1) Evap sensor open or shorted high
- 2) Evap sensor shorted low
- 3) High pressure switch open or shorted high

Press the ENTER button to proceed through the available service screens.

- 1) SV = Starting batteries Voltage
- 2) AV = Auxiliary batteries Voltage
- 3) AA = Unit Amperage draw
- 4)

Pressing ENTER arrow after viewing service screen will return you to the fault code screen.

Pressing the ON/OFF button will return you to the Temperature Display screen.

When necessary, Check Filter light will notify you that the Phoenix filter must be cleaned or changed. To reset filter: at screen 1 press and hold enter button for 3 seconds.



Section 7

Battery Management System (BMS) Installation



Advancing Battery Management

Bergstrom NITE System BMS 100 Installation



Description

The Midtronics BMS-100 battery management system determines the state of charge and state of health of the auxiliary batteries. The device monitors the voltage of the tractor batteries and the auxiliary batteries as well as the current flowing through the auxiliary batteries.

When the truck's engine is running, the BMS-100 switches the solenoid between the tractor batteries and the auxiliary batteries to allow the auxiliary batteries to charge. When the truck's engine is turned off, the tractor batteries and auxiliary batteries will remain connected in parallel until the tractor batteries reach approximately 12.5 volts. At that point, the BMS-100 will switch the solenoid to separate the auxiliary batteries from the tractor batteries to reduce the chance that the truck will no longer start if the auxiliary batteries are significantly drained.

The battery management system also sends important battery related information to your Bergstrom no-idle HVAC unit. You will be able to view the state of charge of the auxiliary batteries to give you an idea how much longer the system will run before the batteries need to be recharged. Information about the voltage of the tractor batteries and auxiliary batteries as well as the current flowing into or out of the auxiliary batteries is also sent to the controller.

The BMS-100 also reports the state of health of the auxiliary batteries. The state of health is based on the capacity of a 4 battery pack with 100 amp hour AGM batteries. As the batteries age, they will lose capacity. The battery management system recognizes this lost capacity over time and reports it to the controller. The system initially assumes that it has been attached to a fully charged, brand new 4 battery pack with 100 amp hour AGM batteries. If the device is attached to older batteries or batteries with less capacity than the specified batteries for the application, then the BMS-100 will report that the state of health of the batteries is less than 100% after it has measured several discharge and charge cycles. Please see your Bergstrom Phoenix system instructions to determine how to access this information.

Kit Contents

- 1 BMS-100 battery management system with nut, split washer, and installation tag attached
- 1 BMS-100 cork vibration dampening gasket
- 1 BMS-100 Instruction Sheet (this document)

Battery Management

7-2

Installation

⚠ DANGER

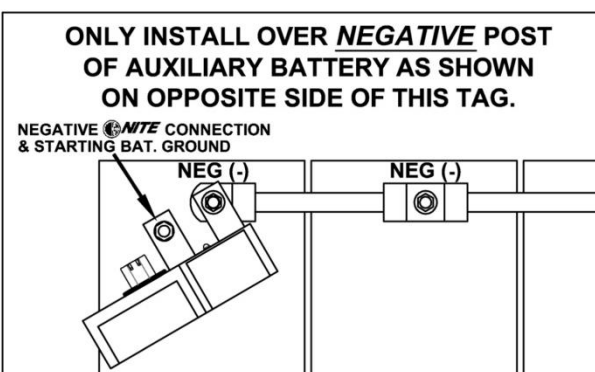
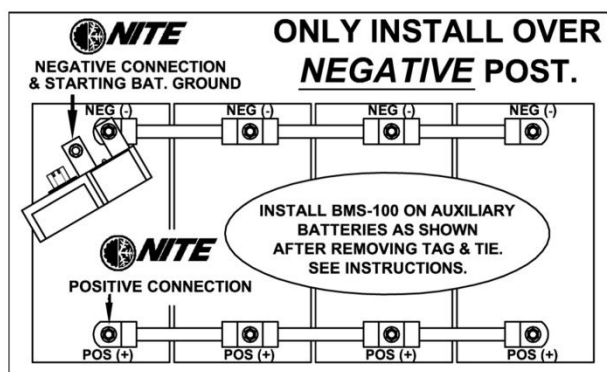
**Hazardous voltage.
Can cause death or serious personal injury.**

Disconnect the vehicle's auxiliary batteries before installation to avoid electric shock and potential damage to the batteries, vehicle electrical system or the BMS-100.

CAUTION

Follow these installation instructions carefully.

Improper installation can reduce the amount of time that your no-idle HVAC unit runs and/or create a situation where you cannot start the truck.



1. All auxiliary loads, including negative NITE connection and starting battery ground should be connected to the threaded post.
2. Tighten provided split washer and nut securely.

1. Negative auxiliary battery post goes through hole in metal bar (shunt).
2. Tighten split washer and nut securely.



NOTE: If there is a gap between the bottom of the BMS-100 and top of the battery, then remove the BMS-100 and attach the included adhesive-backed cork spacer to the underside of the BMS-100. Re-install the BMS-100, split washer, and nut. Tighten securely.



1. Attach connector from NITE system wiring harness to BMS-100 mating connector.
2. Push the two connectors together until the locking tabs are fully engaged.

Refer to the Bergstrom NITE system installation instructions for the procedure to connect the NITE system wiring harness to the truck's electrical system. For reference, the pins on the BMS-100 connector are labeled.

Once the BMS-100 is properly connected to the truck's electrical system, the green LED should begin to blink slowly. This is an indication that the BMS-100 is getting power and beginning to analyze the auxiliary batteries and tractor batteries.

Troubleshooting:

- If the green LED does not slowly blink, check the connection of the metal bar (shunt) to the negative battery post and the wiring to the auxiliary battery positive post. Also be sure that all 4 auxiliary batteries are connected together securely.
- If the tractor battery voltage is not correctly reported by the Bergstrom controller in the service screen, check the connections from the BMS-100 to the tractor batteries.
- If the solenoid between the auxiliary batteries and the tractor batteries does not switch to bring the auxiliary batteries into the truck's charging system when the truck is running, check the solenoid wiring and the tractor battery wiring.
- If the solenoid between the auxiliary batteries and the tractor batteries does not switch to disconnect the auxiliary batteries from the tractor starting batteries when the auxiliary batteries are between 12.4 and 12.6 volts, then check the solenoid wiring and the tractor battery wiring.
- If the current reported by the controller in the service screen is not accurate, verify that all of the loads that are attached to the auxiliary batteries are going through the threaded post of the metal bar (shunt) of the BMS-100.
- If the auxiliary batteries fail to charge, check the wiring from the BMS-100 to the solenoid. Also verify that the solenoid itself is functioning properly. The solenoid may be damaged if the negative and positive connections from the tractor battery are reversed and the solenoid is activated. Lastly, check that the communication wires from the controller are properly connected to the BMS-100.
- If the Bergstrom controller always reports a fully charged battery, then the communication wires between the BMS-100 and the Bergstrom controller may not be properly connected.