NITE SSI installation manual

Kenworth T680/T880 – Peterbilt 579

using OE Duct

1001914389

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Introduction

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

The ***NITE SSI*** 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 SSI*** is a compact, self-contained, serviceable split 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 SSI*** from Bergstrom.

NOTE:

*The **NITE SSI** 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 SSI** 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 SSI** unit in cooling down the sleeper, start the engine and run the factory A/C until desired temperature is reached. The **NITE SSI** unit will then maintain a comfortable temperature depending on solar load & ambient temperature.*

Please note that the stock alternator will have to be replaced with an alternator with a minimum 30 amps additional charging capacity.

Before You Start

A typical installation of the ***NITE SSI*** 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 SSI***.

If relocation or reinstallation of any pre-installed equipment is necessary for installation of the NITE SSI 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 SSI*** 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 1001275456

NOTICE - Prior to installation:

Installation, service, and repair of these units should be solicited only by trained service technicians who are acquainted with standard service instructions and training material.

All equipment should be installed in accordance with accepted principles and unit installation instructions. Extreme caution should be observed when troubleshooting electrical components. These messages are for your protection and information. Failure to follow these alerted messages may cause bodily injuries to yourself and/or others as well as damages to the specified unit.

Health, Safety, and Environmental Policy

Under any condition Bergstrom Inc. is committed to protecting the health and safety of all working individuals at or visiting our site. We strategize, administer, conduct, and supervise our efforts in agreement with best practice. Hence, we want to ensure all workers have a clear understanding of their accountabilities with that of the company.

Environmental Concerns

Public awareness of and education about the benefits of using green technologies, coupled with energy efficiency, has created renewed interest within the HVAC industry.

When materials are discarded attempt to reclaim and recycle them. To preserve our environment, follow appropriate rules and regulations when disposing of any resources. It is under our obligation to put in place a series of practices and procedures that, when taken together, result in an environmental management system.

Disclaimer of Liability

Descriptions and specifications within this manual were in effect at the time of production. Models and specifications are subject to change.

Refer to nitesystem.com for more information, or contact customer service at 866.204.8570.

Picture Symbols

Observe all warning and caution notices posted on equipment and in instructions and/or manuals. Pay special attention to directives prefixed by symbols and signals indicated as “Warning”, “Caution”, and “Note”. Do not disregard any of these alerts.

Warning

This picture symbol with the remark “Warning” refers to the risk of imminent danger and can be vital to one’s health. The message will convey what the hazards are, results when warnings are not heed to, and/or how to avoid such injury. Under certain circumstances, failure to comply with these instructions can cause severe or life-threatening impairment.

Caution

This picture symbol with the remark “Caution” refers to a hazardous situation for a person and/or the product. Failure to comply with these instructions can cause bodily injuries to yourself and/or others as well as damage to machinery.

Note

This picture symbol with the remark “Note” contains information for use and helpful tips to assist an individual when repairing a specified unit or vehicle.

Precautions for working with HFC134a (R134a) Refrigerant and Polyvinyl Ether (PVE) Refrigerant Oil

WARNING

- Do not breath A/C refrigerant, oil vapor, or mist. Exposure may cause irritation to the eyes, nose, and throat.
- Instances where there are accidental system discharges; ventilate work area before resuming service.
- For additional health and safety information contact the refrigerant and oil manufactures.

CAUTION

- **The air conditioning system uses HFC134a (R134a) refrigerant and polyvinyl ether (PVE) refrigerant oil, which are not compatible with CFC-12 (R12) refrigerant, mineral oil, or PAG oil. If the refrigerants or oils are mixed, the compressor may fail.**
- Do not attempt to use R-12 servicing equipment. Failure to follow this statement may result in personal injury or equipment damages.
- Use service equipment that is only U.L listed and certified in which meets the required standards of SAE J2210 to remove HFC134a (R134a) from the air condition system.
- Before testing, please authenticate the HFC134a (R134a) refrigerant in the vehicle system and recycling equipment / recovery tank are contaminate free by using a refrigerant identifier.

Note

All equipment must be serviced by trained personnel only.

R134a service equipment and/or vehicle air conditioning systems should not be pressure or leak tested with compressed air.

- Air conditioning system may consist of R134a fluorescent dye to determine leak detection. Examine with a high intensity ultraviolet light system.
- Specified labels on unit will identify systems that contain fluorescent dye.

Note

The air conditioning system is designed only for certain polyvinyl ether (PVE) refrigerant oil for HFC134a (R134a) A/C systems and HFC134a (R134a) components. The only recommended oil for this particular system is Idemitsu FVC68D PVE oil. The PVE oil is very hygroscopic, meaning it absorbs water. Without appropriate sealing, the oil will become moisture saturated and should not be used.

Note

Follow the handling procedures listed below:

- Only use the specified FVC68D PVE oil from a sealed container.
- After use, immediately reseal containers of oil.
- To avoid contamination, do not return oil to original container once it has been dispensed. Additionally, never combine oil with other refrigerant oils.
- Do not allow PVE oil to come in contact with styrofoam parts. In such occurrences, damage may result.
- Do not allow PVE oil in contact with vehicle paint. In such occurrences, damage may result.
- In order to diminish the amount of moisture that enters the system, any connection in the refrigerant loop that is open must be closed as soon as possible.
- It is recommended for components that are replaced to have dust caps left in place until the component is ready to be installed in the refrigerant loop.
- Once components are removed from the refrigerant loop they should have dust caps in place as soon as possible in order to limit and minimize moisture intrusion.

Important Safety Notices

WARNING

Ill-advised practices, negligence, and/or ignoring warning signs may cause death, personal injury, equipment or property damages.

Before proceeding please read and understand all safety precautions and warnings. The list as follows contains the general safety provisions that must be followed.

Work areas should be dry, well lit, ventilated, and free of clutter such as loose tools, parts, ignition sources and hazardous substances. All personnel must be aware of hazardous conditions that can coexist.

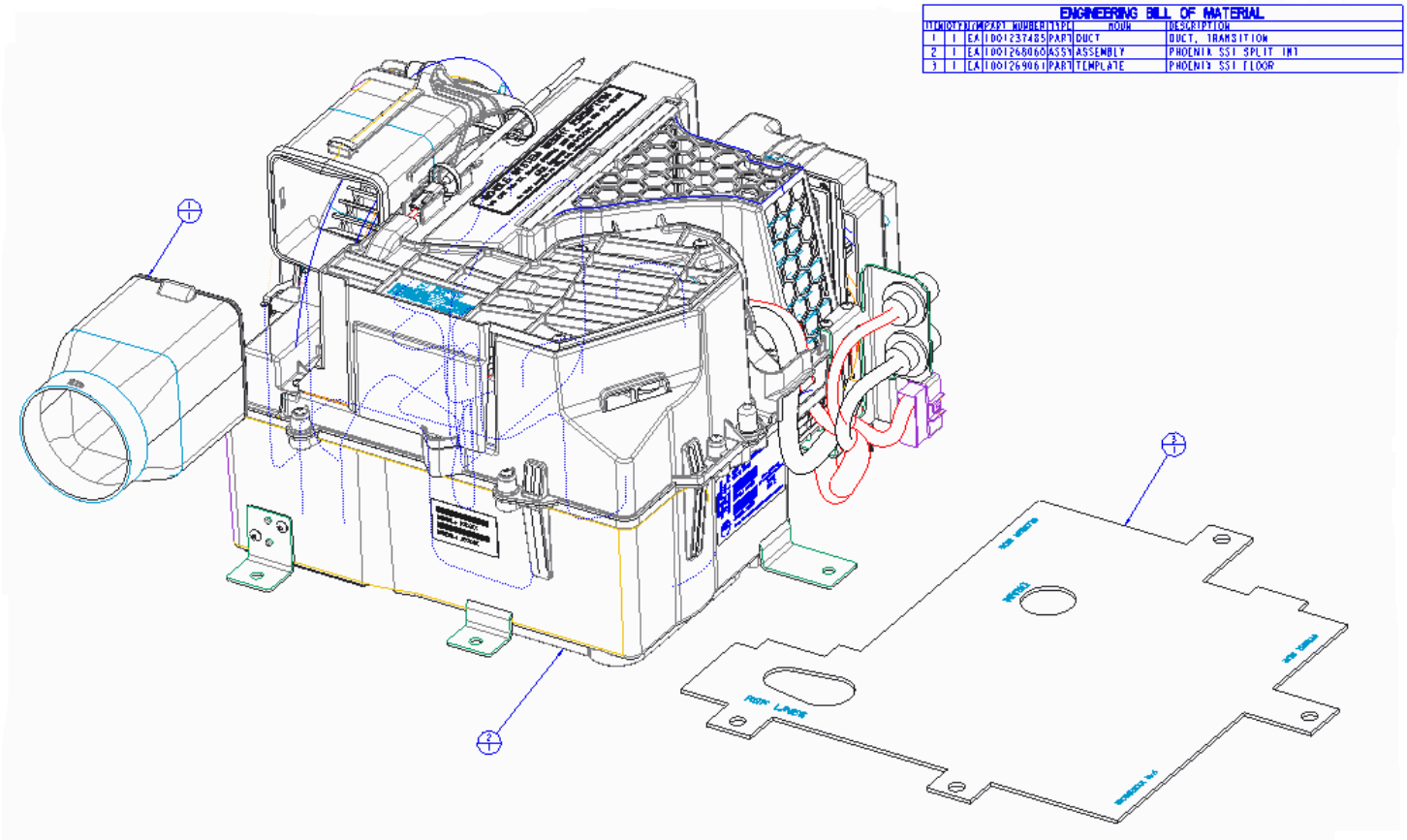
- Wear protective shoes when working. Opened toed shoes are not allowed.
- Rotating parts can cause cuts, mutilation, or strangulation. Be alert at all times when operating machinery.
- When working, do not wear loose-fitting or torn clothing. Additionally, do not wear jewelry. These are hazards that may cause personal injury.
- Before beginning any repairs, disconnect the battery (negative [-] cable) from both battery boxes and discharge any capacitors.
- To prevent accidental engine starting disconnect the air starting motor, if equipped.
- To prevent personal injury or harm to the specified unit place a *"do not operate"* tag in the operator's compartment or on the controls.
- Before operating, allow the engine to cool.
- Always use blocks or proper stands to support the vehicle or vehicle components before executing service repairs. It is important that one does not operate on anything that is supported only by lifting jacks or a hoist.
- To reduce the probability of personal injury, use a hoist or get assistance when lifting components that weigh 23 kg [50 lbs.] or more. Make certain all lifting devices such as chains, hooks, or slings are in good condition and are of the correct load capacity. Furthermore, all lifting devices must be positioned correctly. When needed, always use a spreader bar. Also, lifting hooks must not be side-loaded.
- When handling corrosion inhibitors and lubricating oils avoid exposure to eyes and repeated contact to skin for they may contain alkali. In case of contact, immediately wash skin with soap and water. When cases are severe, please contact a physician. **Store toxic products and substances out of reach of children.**
- Naptha and Methyl Ethyl Ketone (MEK) are flammable and hazardous materials and must be used with attentiveness. Follow manufacture guidelines to ensure safety when handling materials. **Store toxic products and substances out of reach of children.**
- When operating on a vehicle be attentive and cautious for hot parts on systems that have been turned off, exhaust gas flow, and hot fluids in lines, tubs, and compartments. Direct contact to skin may cause severe burns.
- Always use tools that are in good working condition. Service technicians must be trained and have proper understanding on how to use the tools before administering service.
- When replacing items use the same and/or equivalent fastener part number at all times. Conversely, do not use a fastener of reduced quality if replacement is needed.
- To prevent bodily injury or harm do not perform any repairs when impaired, fatigued or after consuming alcohol or drugs that can impair one's functioning.
- According to several states and federal agencies within the United States of America it has been evident that used engine oil can be carcinogenic, causing reproductive toxicity. That being said, avoid inhalation of vapors, ingestion, and prolonged contact with used engine oil.
- Be mindful that liquefied petroleum gas is denser than air and can accumulate near the floor, in slumps, and low-lying area.
- Close the manual fuel valves prior to performing maintenance and repairs and when storing the vehicle inside.
- **California Proposition 65 Warning** – Diesel engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm. To request more information regarding the chemical exposures that are the basis of the warning, contact the manufacture of the product.

Section 609 of the 1990 Clean Air Act also established an important statutory structure to control the release of refrigerants from motor vehicle air conditioners into the atmosphere. Any person repairing or servicing motor vehicle air conditioners for consideration must properly use refrigerant recycling equipment that has been approved by the EPA.

Technicians who repair or service motor vehicle air conditioners for consideration must be trained and certified by an EPA-approved technician training and certification program. Technicians who repair or service MVAC-like appliances must always be certified by an EPA-approved 609 program.

Under Section 609 of the Clean Air Act, EPA-approved technician training and certification programs provide education on the proper use of MVAC servicing equipment, the regulatory requirements of the Clean Air Act, the importance of refrigerant recovery, as well as the effects of improper handling of refrigerants on the ozone layer and climate system. To be certified, technicians must be trained by an EPA-approved program and pass a test demonstrating their knowledge in these areas. Section 609 certification is required to service any motor vehicle air conditioning system for consideration (e.g., payment or bartering), regardless of the refrigerant used in the system.

Unit exploded view



ENGINEERING BILL OF MATERIAL

ITEM	QTY	UM	PART NUMBER	TYPE	NOUN	DESCRIPTION
1	1	EA	1001237485	PART	DUCT	DUCT, TRANSITION
2	1	EA	1001268060	ASSY	ASSEMBLY	PHOENIX SST SPLIT INT
3	1	EA	1001269061	PART	TEMPLATE	PHOENIX SST FLOOR

TO REGISTER YOUR NEW SYSTEM OR FILE A WARRANTY CLAIM FOLLOW LINK LISTED BELOW.

https://warranty.bergstrominc.com

For technical manuals or service parts go to

https://us.bergstrominc.com/eproduct-systems/

Email us at

parts@bergstrominc.com

Or call the Bergstrom Technical Line

1-866-204-8570

Tools Required

For proper charging and/or servicing of the refrigerant system a **REFRIGERANT MACHINE** is required. All service ports are in the HIGH SIDE loop and the equipment must be capable of pushing the refrigerant charge in. Please use a Robinair or equivalent. Failure to use the proper equipment can result in reduced performance and/or system damage.

1. Drill Bit Set
2) Hole saws (1″ to 2- 1/2″) also 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 Bit Set
8) Metric Wrenches
9) SAE Wrenches
10) 1/4″, 3/8″ Drive Ratchets
11) Crimping plyers (for refrigerant lines)
12) SAE Socket Set
13) Metric Socket Set
14) Wire Cutters
15) Terminal Crimpers
16) Wire Strippers
17) Razor Knife
18) Electrical Tape
19) Cable Cutters
20) #4 Professional Grade Cable Crimpers
21) Cable Strippers
22) Work Light
23) Torque Wrench up to 150 in/lbs
24) U-barrel Crimper
25) Pop Rivet Gun
26) Deutsch Crimper

Refrigerant machine

Installation Procedures

1 Raise bunk. Using provided template, locate unit.

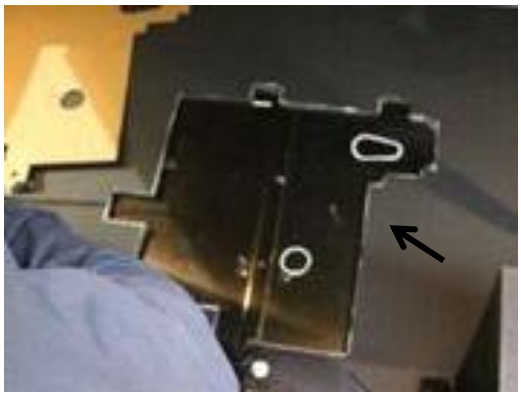
Before drilling check under the truck for obstructions like cross members, harnesses, lines, etc.

2 Test fit the SSI unit prior to cutting. Adjust location to allow for proper clearance at the power cable connections and for servicing unit components.

3 When location of unit has been determined, remove section of rubber mat and reinstall template.

4 Mark the 2 locations for refrigerant lines.

5 Using the appropriate size hole saws, cut and remove the areas marked. After drilling the 2 holes for the lines, trim area between the holes using an air saw or appropriate cutting tool.



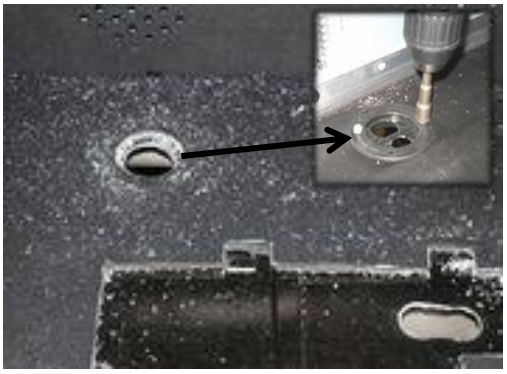
CAUTION! Make sure you do not cut into OE unit or chassis harnesses!

Hole sizes must not exceed the diameter of the sealing area under the unit. Do not cut the holes larger than the template openings.

6

Cut hole for wiring grommet

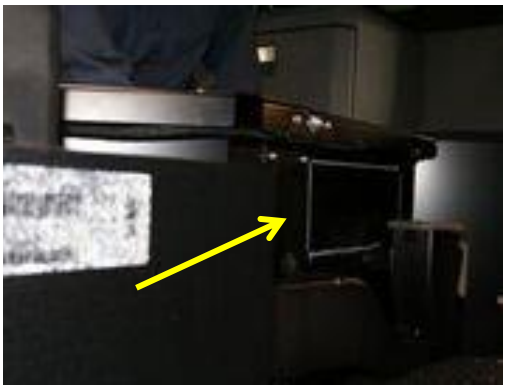
Using a 2″ hole saw, drill a hole for the wiring grommet. We chose the location next to the SSI where the wiring will drop through the floor inside the frame rail. Choose the best location for routing the cables away from heat and sharp edges. Install wiring grommet with 1″ x 5/16 head self-drilling screws. After wiring is complete, seal all voids around wires and grommet with silicone sealant. NOTE: Silicone sealant not included in installation kit.



7

Cut opening for the recirculation grill.

Using provided template, locate center of bunk support and mark area to be cut. Cut and remove marked area. Also if applicable, mark a location for the 2 ½ inch round hole for the optional heater duct.



8

Install Recirculation air grill using black Phillips head screws provided.

9 Install unit. Secure the unit feet to the mounting plate and truck floor using the provided 5/16 head self-drilling screws.

10 Cut and remove back end of SSI duct adapter to install on SSI unit blower outlet.

11 Install adapter on SSI blower housing.

12 **New duct adapter will connect the SSI duct to the OE. Photo to the right shows duct adapter already cut and ready for installation.**

<u>Before removing cross car duct, mark the location for the duct adapter.</u> Line up the side of the adapter with the side of the unit and mark center of adapter location.

13

Now remove both OE duct sections as indicated.

14

15

Cutting the new duct adapter

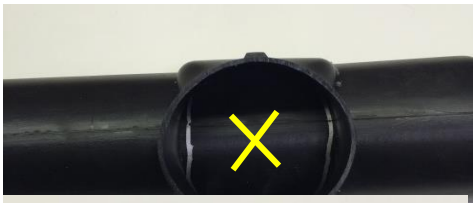
Using the appropriate size hole saw, cut out each side of the new duct adapter.

Now slide adapter onto OE duct and center it on the **X** mark made in step 13.

16

Cut OE duct section as shown.

Using an air saw, remove the marked section. Use caution, do not cut too much. The opening must be inside the adapter when reinstalled.



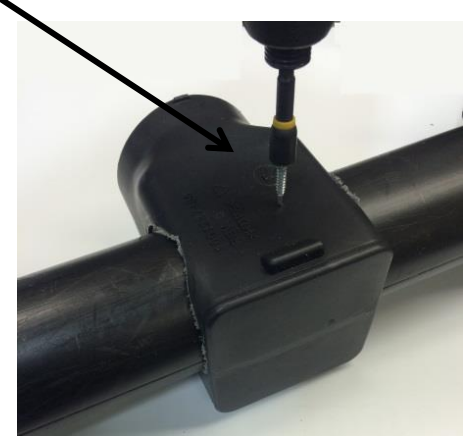
17

Install the adapter onto the OE duct.

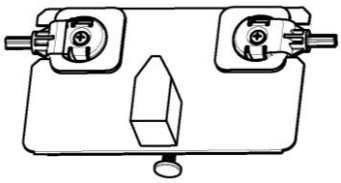
Center adapter over the opening. Fasten in place with self-drilling screws. Seal around the adapter with silicone.

18

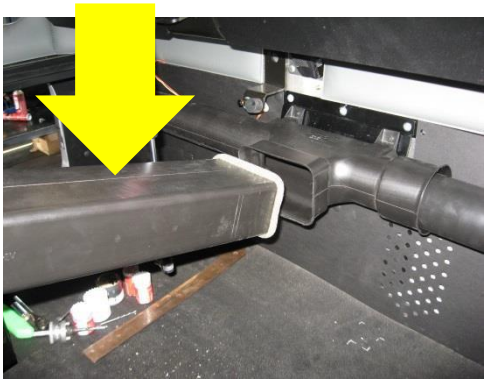
Reinstall duct assembly.



19 Gravity door: The purpose of this door is to prevent the SSI system cool air from flowing backwards through the OE bunk unit.



To install the provided gravity door, please modify OE duct.



NOTE: FOR STANDARD SIZE DUCT CONTINUE WITH STEP 22.

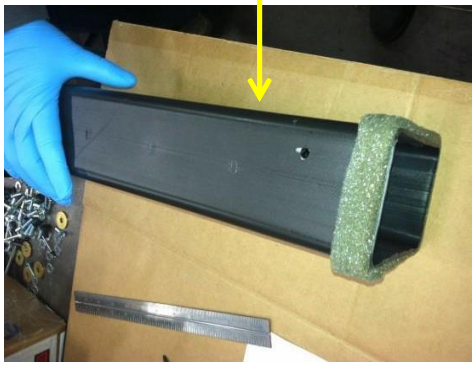
FOR ULTRALOFT DUCT PROCEED TO STEP 24

20 Photo shows gravity door installed correctly.

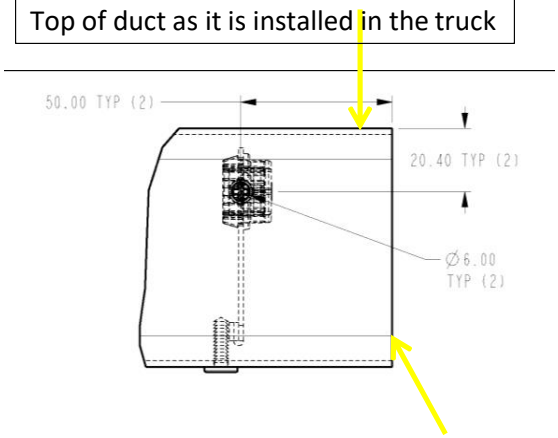
21 Reinstall all ducting after door is installed.

22 Using the dimensions from the drawing, mark 1 hole on each side closer to the top of the OE duct. Make sure the holes are 20.4 mm from the top side of the duct and 50 mm from the rear edge. Dimension of the pivot holes are 6 mm.

Top of duct as it is installed in the truck

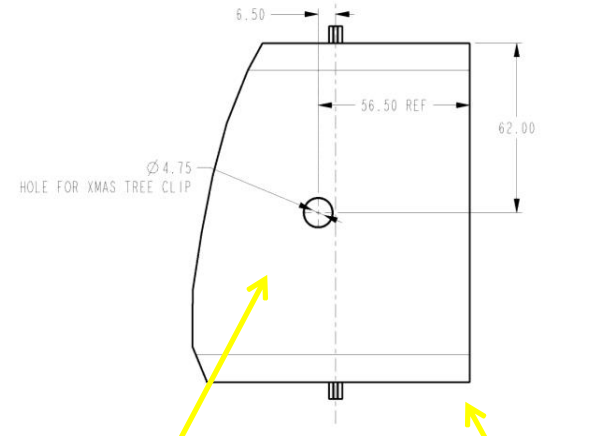


Top of duct as it is installed in the truck



REAR – as it is installed in the truck

23 Door stop: Measure 56.5 mm on the bottom of the OE duct from rear edge and mark center of the duct. Center from side to side should be approx. 62 mm.
Drill one 4.75 mm hole and install the stop button in the hole. This button will sit behind the door and prevent it from opening while the SSI unit is operating.



Bottom – as it is installed in the truck

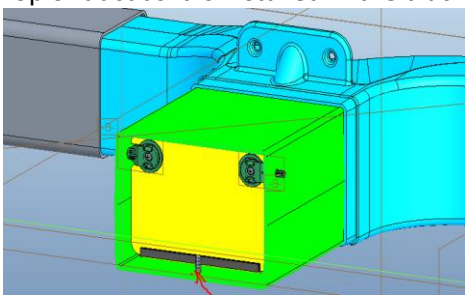
REAR – as it is installed in the truck

24

ULTRALOFT BLEND DOOR:

Using the dimensions from the drawing, mark 1 hole on each side closer to the top of the OE duct. Make sure the holes are 20.9 mm from the top side of the duct and 153 mm from the rear edge. Dimension of the pivot holes are 6 mm.

Top of duct as it is installed in the truck



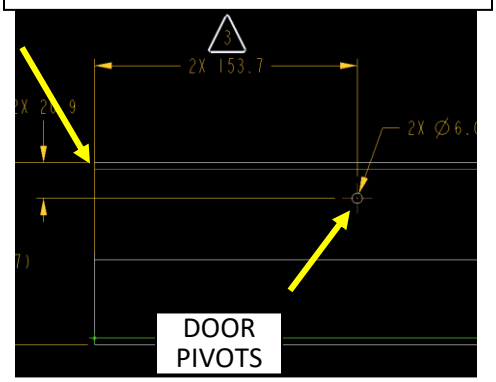
Attention - Gravity door: The purpose of this door is to prevent the Phoenix system cool air from flowing backwards through the OE bunk unit.

25

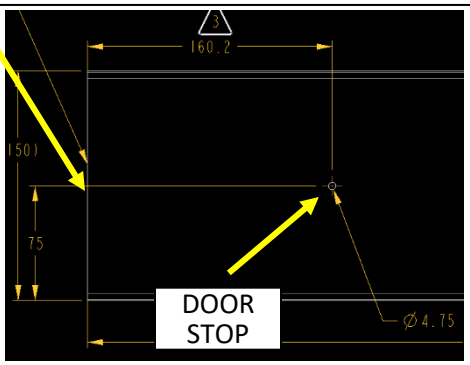
Door stop: Measure 160 mm on the bottom of the OE duct from rear edge and mark center of the duct. Center from side to side should be approx. 75 mm.

Drill one 4.75 mm hole and install the stop button in the hole. This button will sit behind the door and prevent it from opening while the Phoenix unit is operating.

REAR/TOP – as it is installed in the truck



Bottom/REAR – as it is installed in the truck



26 **Connect OE duct and adapter with the Flexible Duct.**

Measure and cut desired length of flex duct. Connect flexible duct to the SSI adapter and the OE duct adapter. Secure with the provided 4″ hose clamps.

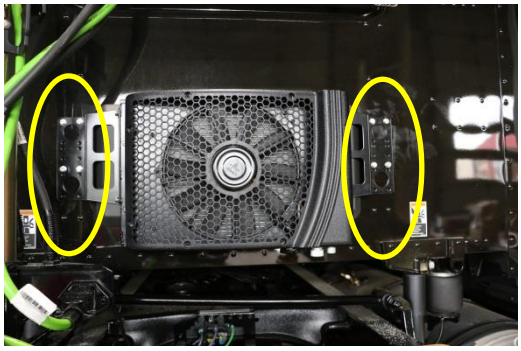
27 **Mounting Condenser using preexisting holes.**

Bottom photo shows condenser mounted in the lower center area of the rear wall. If this location is suitable, proceed with step 25. If you choose to mount the condenser in a different location, go to step 30.

28 Install the universal condenser mounting brackets on condenser and position the assembly in the location shown.

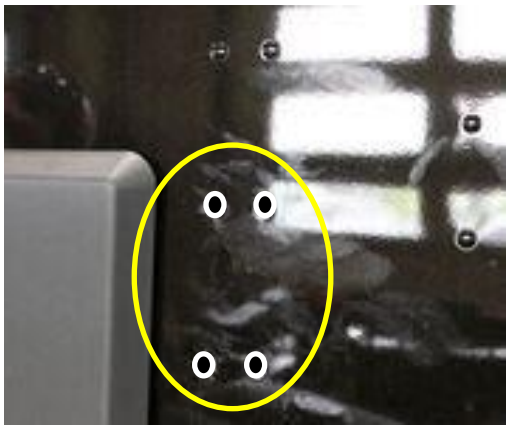
29 Locate the existing rivets that match up with the holes in the condenser brackets and mark them for removal.

Rivets must be removed and bolts/nuts with internal backing plates will be used to mount the condenser. Provided rivet nuts will not work in this locations.

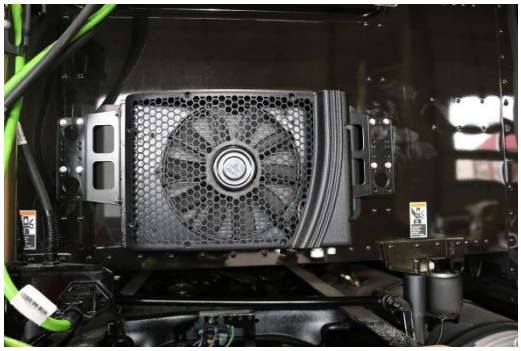


30 Remove lower internal bunk liner

31 Install condenser assembly using the provided stainless bolts / nuts / washers. When needed, install the backing plates inside the truck as shown.



32 **Condenser assembly installed.**



33

Using provided condenser template, choose a location for the condenser. Condenser should always be mounted somewhere on rear of the sleeper. Do not mount it under the truck or on the frame.

Mark 4 holes on each side, preferably 2 at the top and bottom. Space them as wide as your application will allow.

NOTE: Determine which method is needed to install the unit. The kit contains backing plates, bolts and nuts and when used they require some of the inner bunk interior to be removed.

Rivet nuts size M8 are also provided. These require a specific drill size (13.5 mm) for the hole as well as a special tool for setting them in place. They have a predetermined grip range and may not work if you drill through structural rear wall supports.

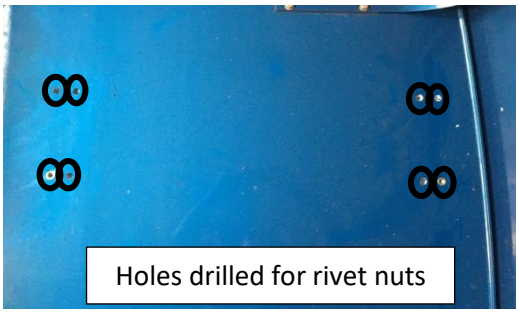
34

If you are mounting with bolts and nuts, install the backing plates inside the trucks rear wall.

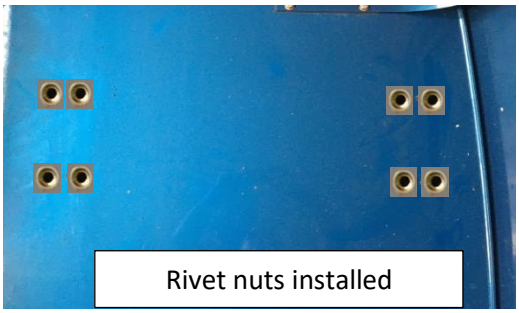
Drill holes the appropriate size for your install method.

Caution: Insulation behind panels can wrap around drill bit. OE wiring harnesses may be present behind panels.

Template location is for demonstration only.



Holes drilled for rivet nuts



Rivet nuts installed

35 REFRIGERANT LINES

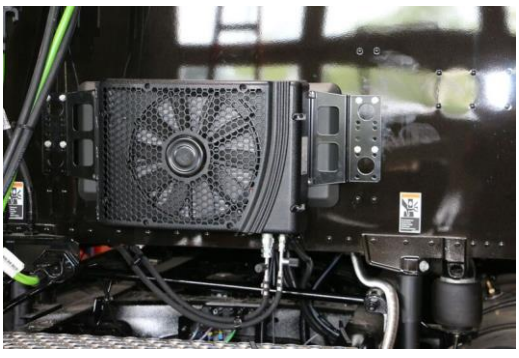
Refrigerant fittings contain a self-sealing plunger assembly that will open during the install. To prevent any moisture from entering the system, do not connect the fittings prior to installing them on the lines and pulling a vacuum.

ATTENTION!:HOSES MUST BE COMPLETELY ASSEMBLED AND VACUUMED PRIOR TO CONNECTING TO ANY UNIT AND/OR CONDENSER!

36 Using the provided bulk hose, determine the routing path and hose length. Cut hose. Measure and record the length. Length will be used with chart on last page to determine final refrigerant charge amount.

37 Assemble 90 degree fittings. Lightly oil the orings prior to installation.

Install the 90 degree fittings on the ends of the hoses for connecting under the truck.



38 Assemble the straight fittings. Lightly oil the orings prior to installation.

Install the straight fittings with service ports at the condenser.

39 90 degree fittings under the truck.

40 Choose a good location for the user interface controller. Use the template provided in the kit, mark and cut an opening for the controller. Install with 4 short torque head screws provided.

Route harness from controller to SSI jumper harness.

Section 3

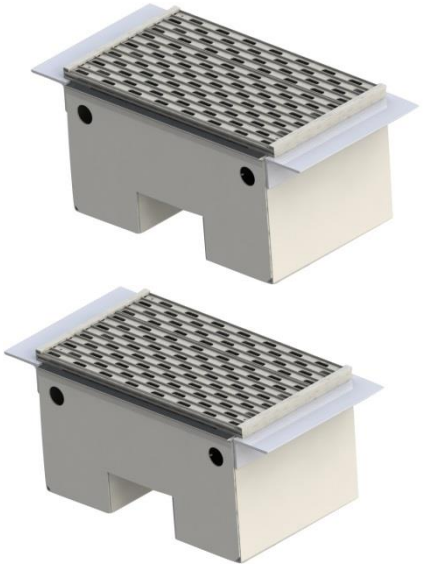
Electrical Installation

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.***

Battery Box Options

Refer to www.nitesystem.com for styles and part numbers. Aluminum clamp-on boxes include between rail and vertical box styles. Install box as suggested by box manufacturer.

Vertical Clamp-On Box



Half Stack Battery box set

Between Rail Clamp-On Box

The batteries are wired parallel only for 12 volt.

Make and Install All Cables described

NOTE: Before performing any wiring, Disconnect Truck Batteries.

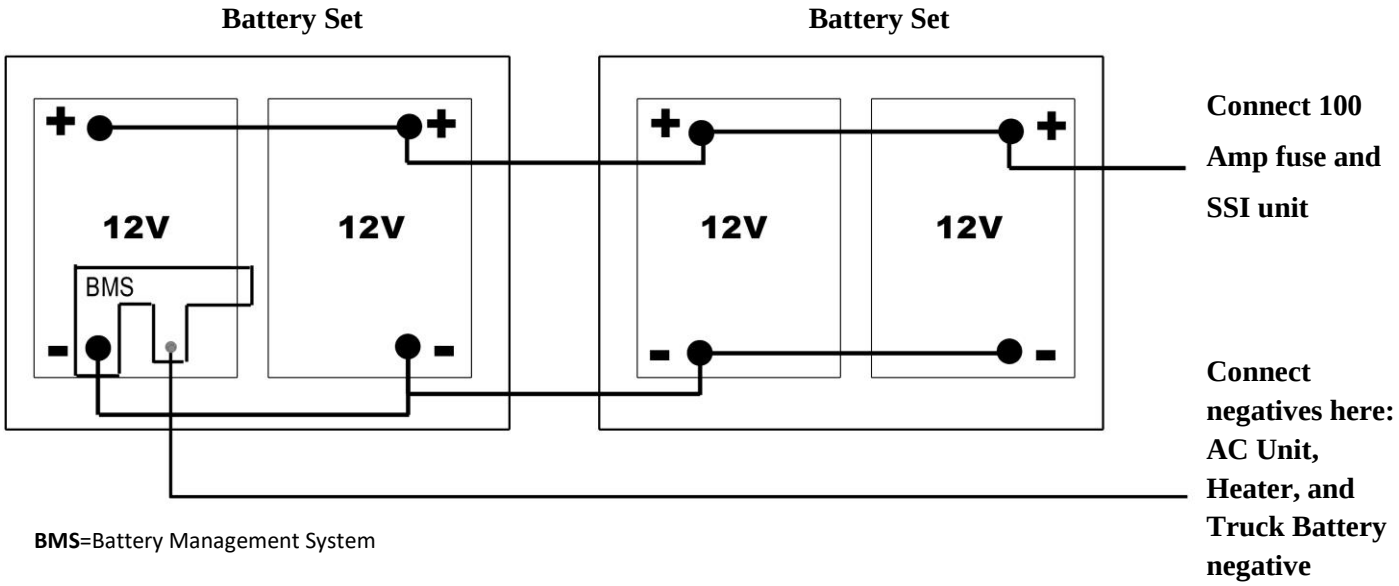
1 Directions for Wiring A 12-Volt Parallel, 4 Battery *NITE SSI.*

Parallel - 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*.

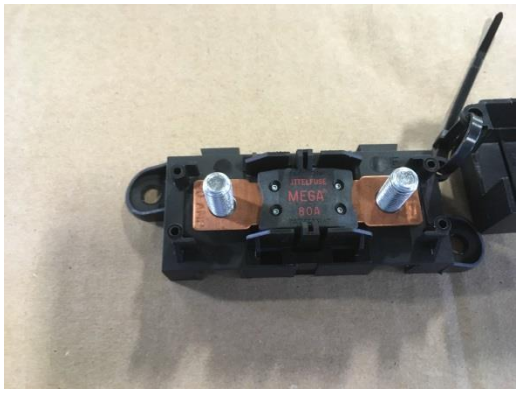
Step2: For the negative to negative connections repeat procedure using black cables. Then loom it. Connect all negative (-) terminals of the 4 *NITE Batteries* together.

Do NOT use truck frame as a ground



BMS=Battery Management System

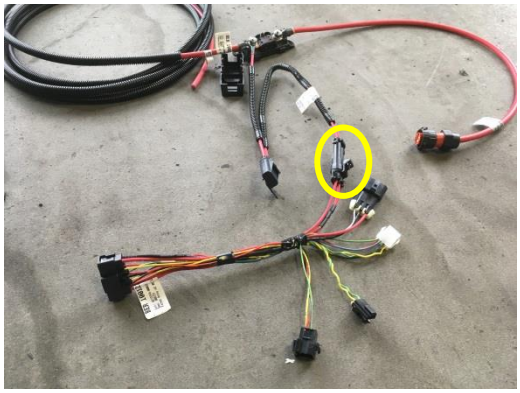
2 Locate one of the inline fuse holders. Place the 80 amp fuse in the holder.



3 Install the provided (short red) power cable on one end of the fuse and secure with the provided hardware. Torque to 44 in lbs.

4 On the opposite side of the fuse holder, install the red (positive) roll of battery cable along with the short power harness that contains the 30 amp system fuse. If necessary, notching the fuse cover will allow the short power harness to exit the side of the assembly. Secure with the provided hardware. Torque to 44 in lbs.

5 Connect the (breakout harness) to the short power harness as shown. This complete assembly will plug into the SSI unit and route to the aux battery box.



6

INSTALL HARNESS ASSEMBLY

Connect Red power cable, Black ground cable and 16 pin breakout harness to the SSI unit and route harness assembly to the aux battery box.

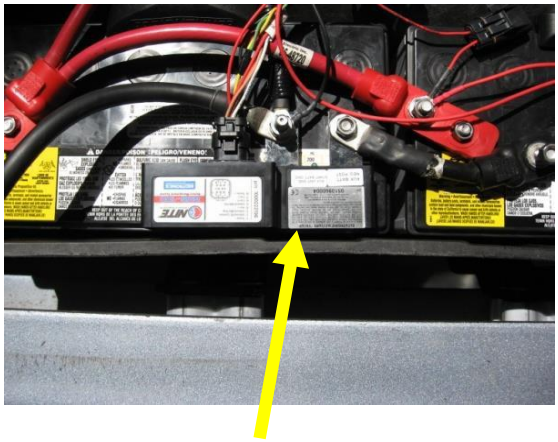
The main positive battery cable will connect to an inline fuse holder.

7

Locate and install the 100 amp fuse into the inline fuse holder. Make a short cable suitable for your install and attach it to one end of the fuse. Kit contains 2 lugs with 5/16 diameter holes for the fuse holder. Short battery cable will connect the fuse to the Aux battery positive terminal of the NITE Batteries. Trim end of lug if necessary to prevent damage to fuse. The other end of the fuse will connect to the main power cable from the SSI unit. Torque fuse terminals to 44 in lb's.

8

Note: Battery management device must be positioned on top of the battery where it is supported. The cork gasket should be installed to help prevent vibrations.



Install Battery Management System

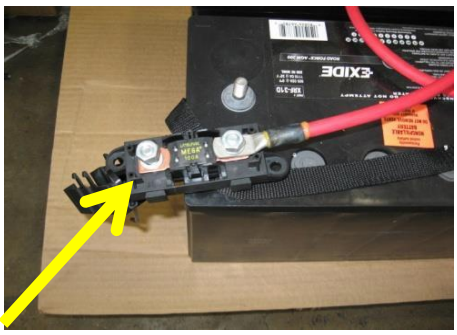
9

Lug with (open hole) mounts on the battery negative post. Grounds for the SSI and Aux heater will connect to the threaded stud post (A) **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. See photo and also see diagram on page 2-2.

A

10

Connect Power Cables from SSI Unit to the *NITE Batteries*. Connect positive cable from the *NITE SSI* unit to the 100 amp mega fuse in the fuse holder. Kit contains 2 lugs with 5/16 diameter holes



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

3-6

WIRING THE TERRA POWER/LITTLE FUSE SEPARATOR

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

11

Install Separator Enclosure

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.

12

Before installing the bracket, secure the separator to the bracket with four 10 x 32 x ¾″ screws and lock washers provided.

13 Install the assembly to the cover using 4 10 x 32 x ¾″ screws, lock and flat washers provided.

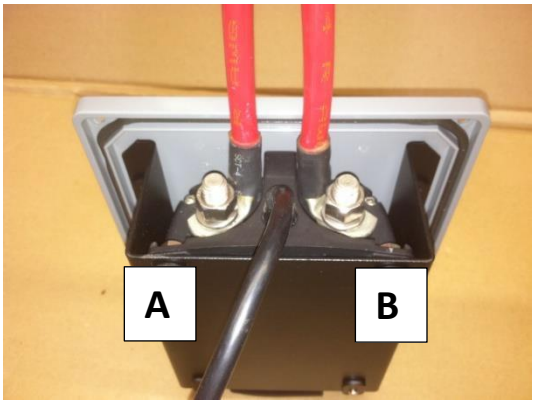
14 Next, drill a 2″ hole in the center of the **bottom** of the box as shown.

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

15 Install enclosure on truck.

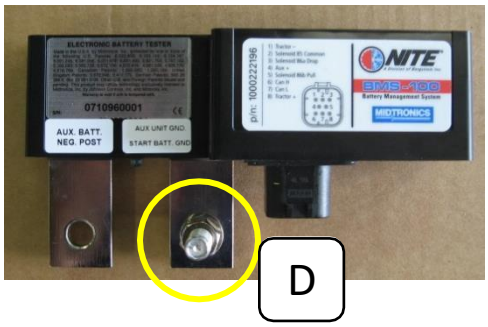
16 **Run Cables from Truck Batteries**

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 (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.

The black (neg) will connect the truck (neg) to the threaded stud (D) of the BMS.

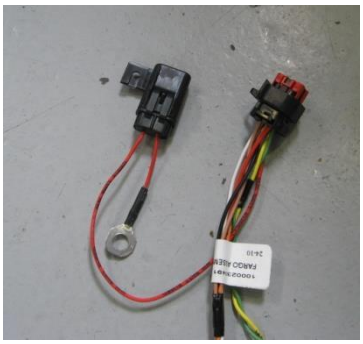


17 **Connect *NITE Batteries* to Battery Separator.** Using red battery cable, measure and cut to proper length. Crimp ring terminals and heat shrink. Connect one end to the most appropriate positive (+) terminal of the *NITE Batteries*. Connect the other end to the AUX terminal (B) of the battery separator.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

Install the separator assembly

Once you have torque the battery cable connections, install the cover assembly on the enclosure

18



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 SSI unit inside the truck. All three must be loomed.

19

Connect Can Bus harness to the Battery Management System wiring harness.

<u>This harness must be loomed.</u>

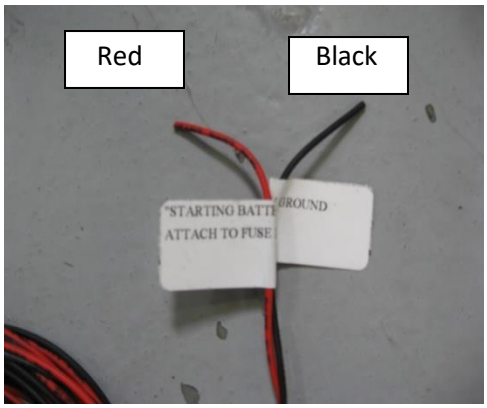
Route the appropriate end of this this harness from inside the truck through the floor grommet and connect at the SSI unit.

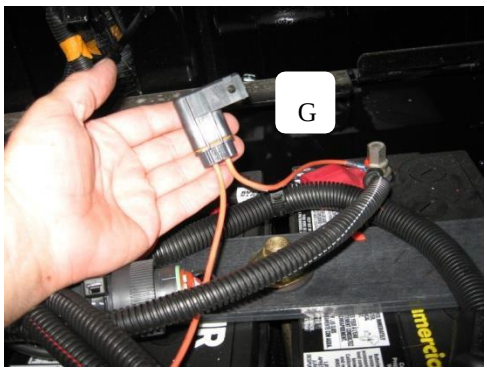
20

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

21

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. **<u>This harness</u> <u>must be loomed.</u>** The red connects through the supplied, field installed, 5 amp mini fuse and holder (G) 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.

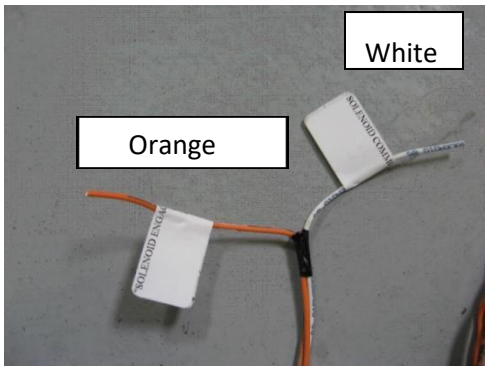




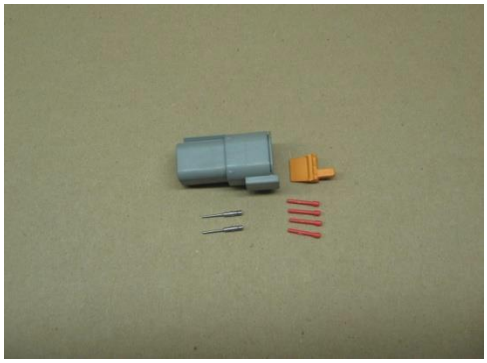
22

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

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



<u>Deutsch connector kit.</u>
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 2-11 before proceeding.



DEUTSCH Industrial

3850 Industrial Avenue • Hemet, CA 92545

Title	Drawing Number
INSTRUCTION GUIDE for HDT-48-00	*0425-071-0000*

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

1. WIRE PREPATION: 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 **AWG**s WIRE Range [mm²s]	Strip Dim **INCH** Strip Dim [mm]
20 PIN **20 S**ocket	0460-202-**20**** 0462-201-**20****	**20** [0.50]	**.156-.218** [3.96-5.54]
16 PIN **16 S**ocket	0460-202-**16**** 0462-201-**16****	**16, 18, 20** [1.5/1.0/0.75/0.50]	**.250-.312** [6.35-7.92]
16 PIN **16 S**ocket	0460-215-**16**** 0462-209-**16****	**14 *** [2.0]	**.250-.312** [6.35-7.92]
12 PIN **12 S**ocket	0460-204-**12**** 0462-203-**12****	**12, 14** [3.0/2.5/2.0]	**.222-.284** [5.64-7.21]

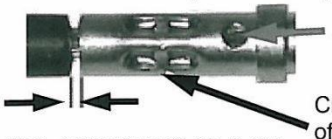
** Plating codes: ** = **31** is "**Gold**" ** = **141** is "**Nickel**"

* 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:



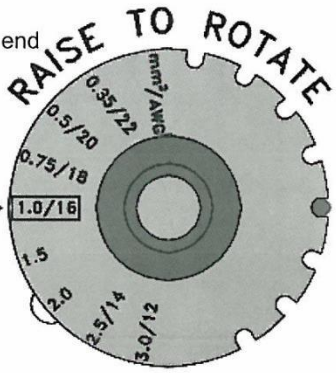
Strands should be visible through inspection hole.

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).

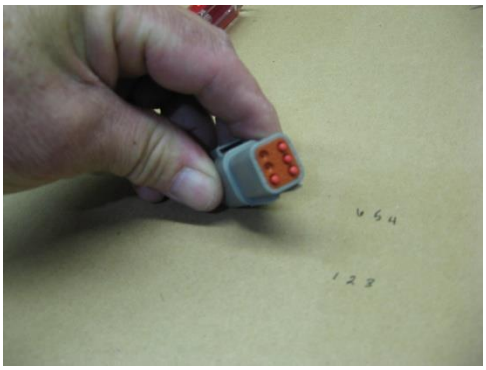
3. MAINTENANCE: Clean tool and remove debris regularly. Inspect for loose or missing hardware. To prevent rust or environmental damage, never leave HDT-48-00 tool outdoors.

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

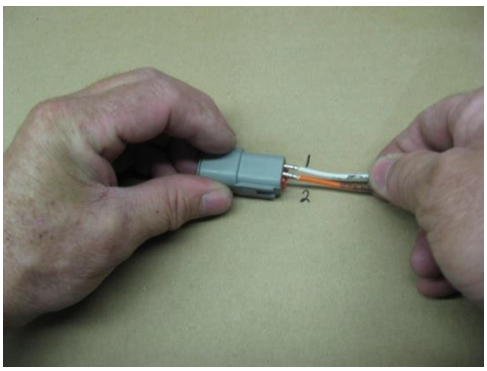
INFORMATION

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

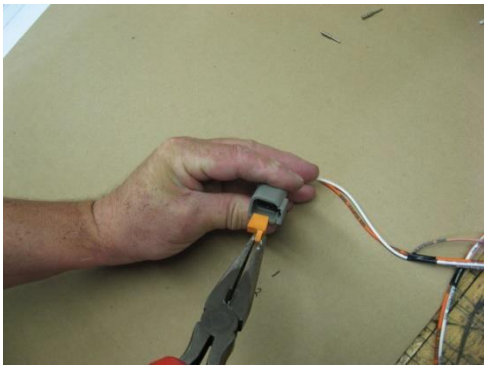
24 Install 4 sealing plugs into the unused terminal locations 3 through 6.



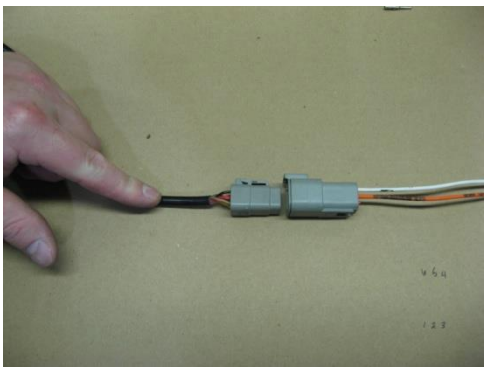
25 Install separator control wires into Deutsch connector
Terminals are marked as:
1– Solenoid common (White wire)
2– Solenoid engage (Orange wire)



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



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



Electrical Installation

This completes the electrical section of the installation. If you are installing the ESPAR heater proceed to section 3. 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 SSI install, you can continue to operate the heater with the existing controller.

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

Section 4

ESPAR Fuel Operated Heater Installation

Heater Installation

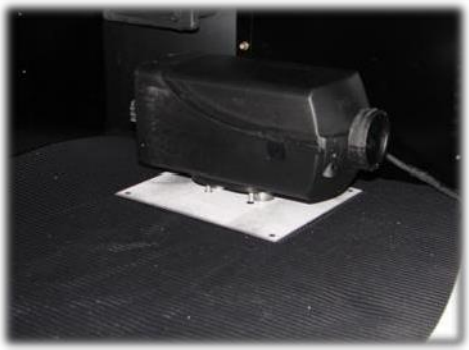
The heater instructions in this manual are generic. For the latest install information please refer to the Espar D2 heater install manual

WARNING: If you have an Espar fuel operated heater that was installed at the factory or prior to the SSI 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 SSI controller, YOU WILL VOID THE FACTORY WARRANTY OF THE HEATER!

1

Unpack Heater Parts

Take out the parts to the heating unit.

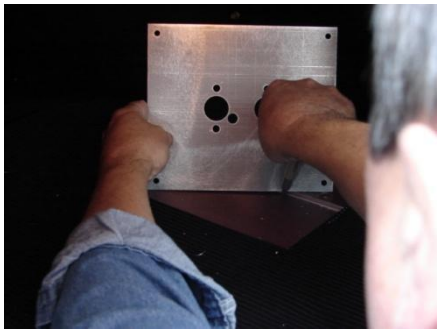


2

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.

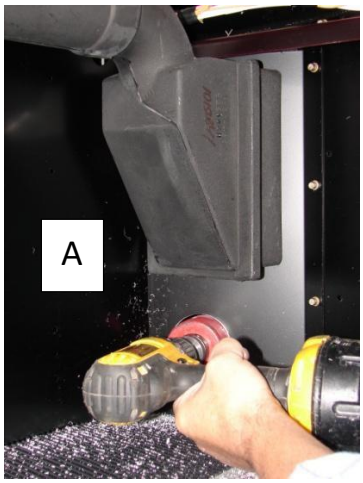
Heater Installation

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 ¼″ 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.



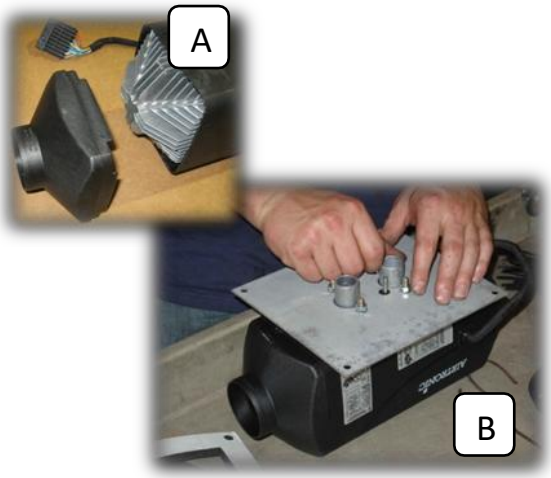
NOTE: DO NOT USE SSI DUCT FOR HEATER VENT

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 ½″ hole (A) to allow distribution of heat into the sleeper. After hole is drilled, use self- tapping screws to attach heat port. Now snap louver into place.



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

Line
Heater Unit Assembly – Attach Fuel

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.

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 ¾″ 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 ¾″ hole, making sure they are not bent, crimped or rubbing on the side of the hole.

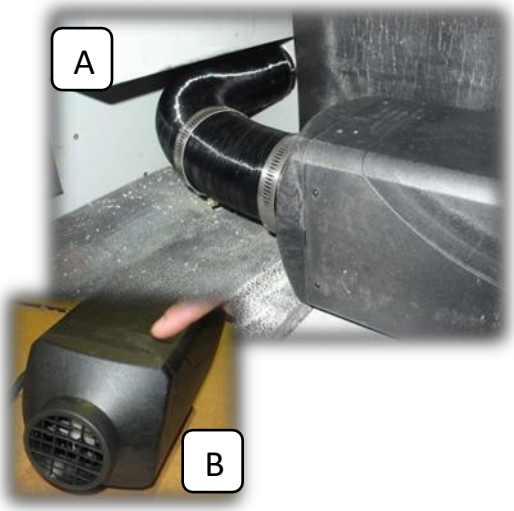
13

Mount Heater Unit to Cab Floor

Make sure that the heater unit is set with the fan (intake) end opposite the 2 ½″ 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.

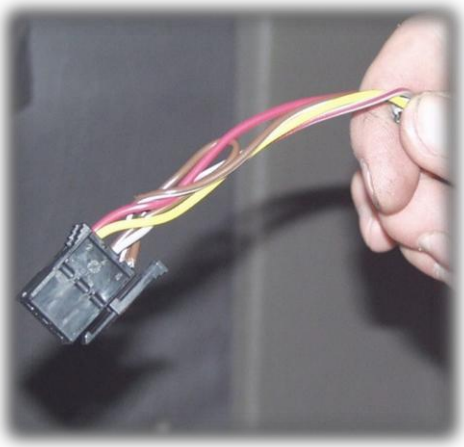
Heater Installation

17 Optional Heater controlled by the SSI controller.

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

Attach Espar Heater Control Harness to SSI 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 SSI 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.

WARNING: 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 pick up 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 snugging 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 blank

Hole drilled in tank

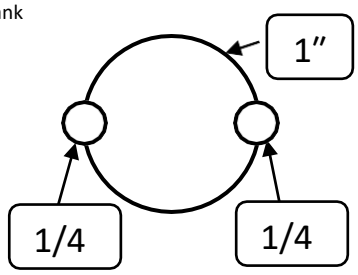
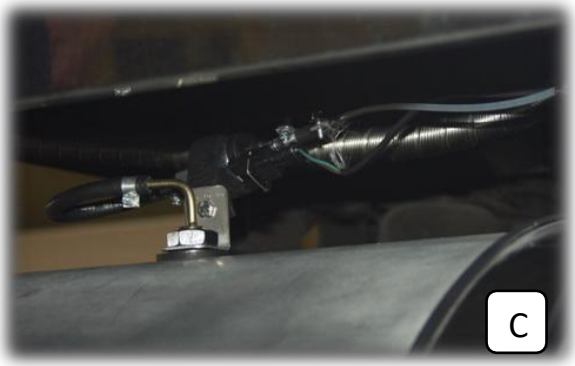


Diagram A

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.



23

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.

24

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.

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 5

Refrigerant Charging

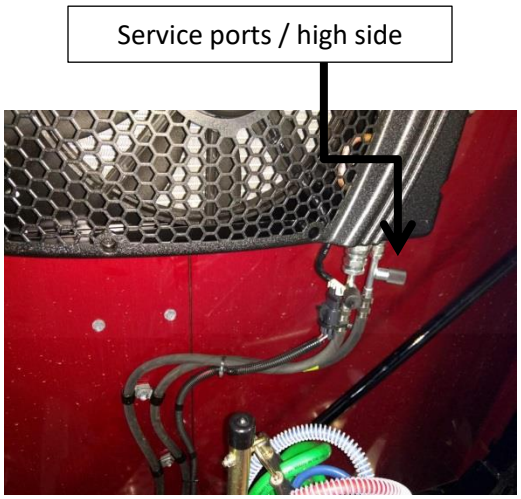
Attention Technicians/ EPA:

Section 609 of the 1990 Clean Air Act also established an important statutory structure to control the release of refrigerants from motor vehicle air conditioners into the atmosphere. Any person repairing or servicing motor vehicle air conditioners for consideration must properly use refrigerant recycling equipment that has been approved by the EPA.

Technicians who repair or service motor vehicle air conditioners for consideration must be trained and certified by an EPA-approved technician training and certification program. Technicians who repair or service MVAC-like appliances must always be certified by an EPA-approved 609 program.

Under Section 609 of the Clean Air Act, EPA-approved technician training and certification programs provide education on the proper use of MVAC servicing equipment, the regulatory requirements of the Clean Air Act, the importance of refrigerant recovery, as well as the effects of improper handling of refrigerants on the ozone layer and climate system. To be certified, technicians must be trained by an EPA-approved program and pass a test demonstrating their knowledge in these areas. Section 609 certification is required to service any motor vehicle air conditioning system for consideration (e.g., payment or bartering), regardless of the refrigerant used in the system.

Refrigerant Charging



PRIOR TO OPERATING THE SYSTEM:

Connect the charging machine to one of the high side ports. Vacuum the system for a min. of 20 minutes.

Perform a leak test.

Charge the system with the proper amount of R143a. See next page!

Refrigerant capacity of R134a can vary with all systems due to field installed universal line kits which create unique line length due to variable condenser locations. Initial installer will determine charge level and should write the quantity on the label provided with the condenser unit.

All servicing of the system is performed through a high side port!

Capacities: Internal unit and condenser - 23 OZ - R134a

Charge the system with a base charge of 23 OZ and add the additional amount as determined by hose length. See chart below.

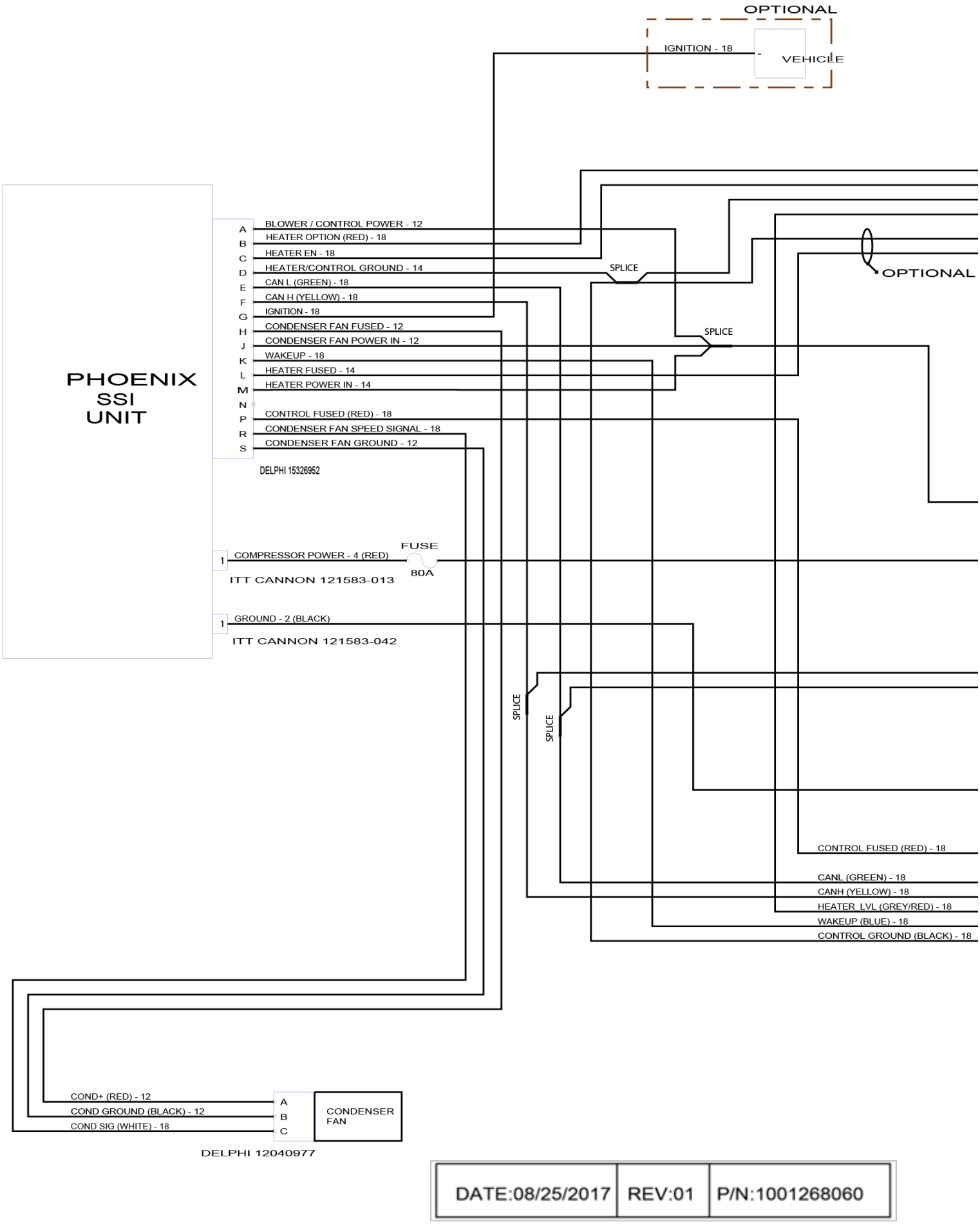
AC Lines: Variable charge – determined by hose length- add OZ per foot of hose

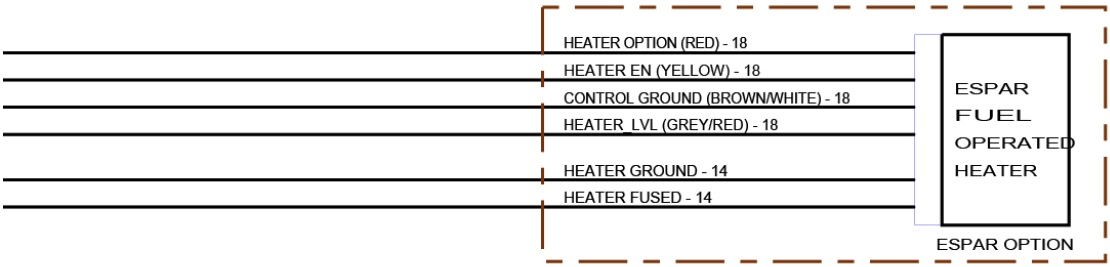
Total Refrigerant Line Length; both lines added together (ft.)	Additional Refrigerant Added to Base Charge Level (oz.)
2	0.75
4	1.5
6	2.25
8	3.0
10	3.75
12	4.5
14	5.25
16	6

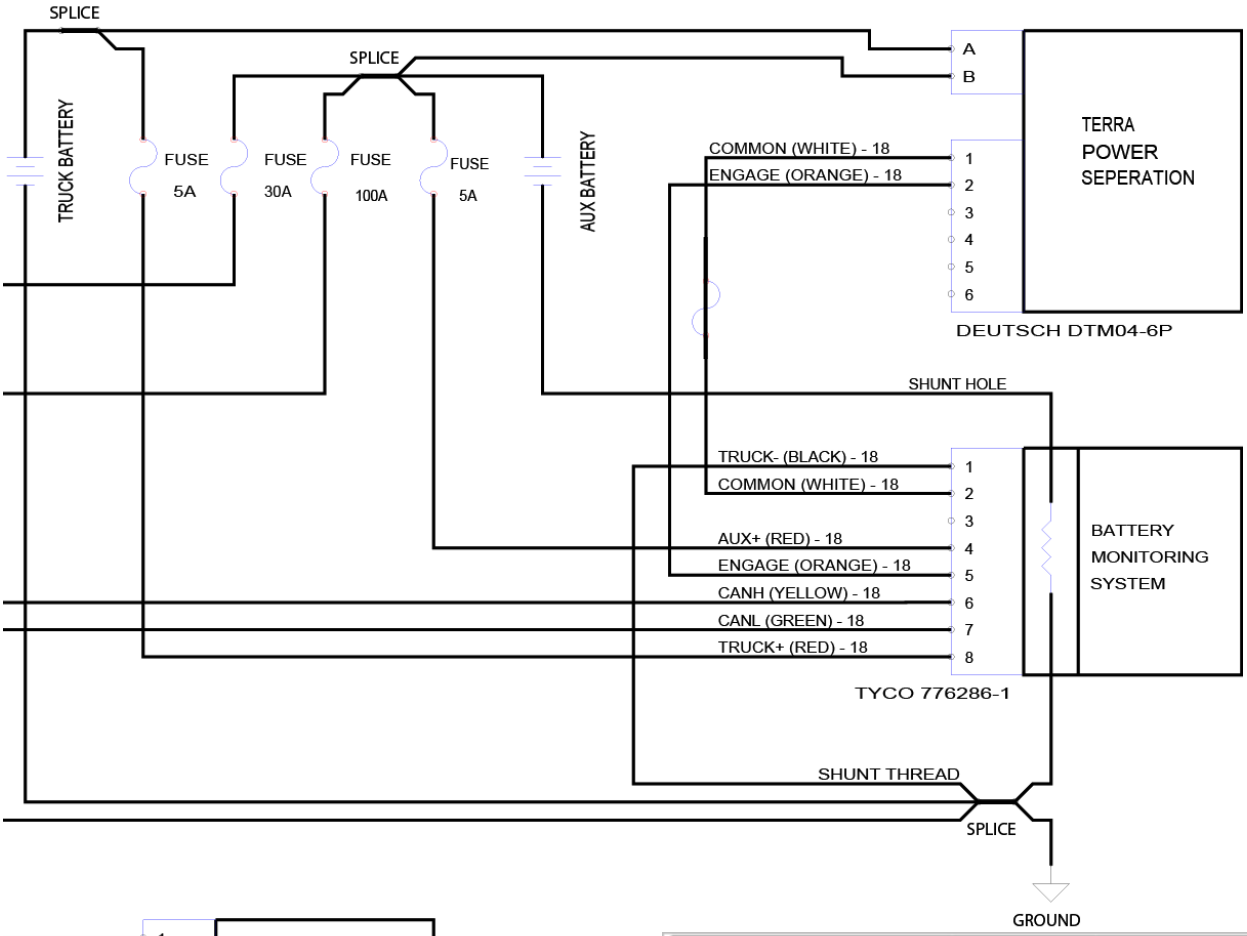
See Nite SSI diagnostics guide for complete system information

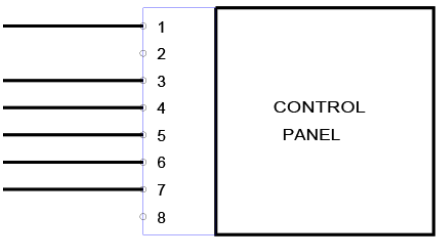
Section 6

Wiring Diagrams


OPTIONAL
IGNITION - 18
VEHICLE
PHOENIX
SSI
UNIT
A BLOWER / CONTROL POWER - 12
B HEATER OPTION (RED) - 18
C HEATER EN - 18
D HEATER/CONTROL GROUND - 14
E CAN L (GREEN) - 18
F CAN H (YELLOW) - 18
G IGNITION - 18
H CONDENSER FAN FUSED - 12
J CONDENSER FAN POWER IN - 12
K WAKEUP - 18
L HEATER FUSED - 14
M HEATER POWER IN - 14
N
P CONTROL FUSED (RED) - 18
R CONDENSER FAN SPEED SIGNAL - 18
S CONDENSER FAN GROUND - 12
DELPHI 15326952
SPLICE
SPLICE
OPTIONAL
1 COMPRESSOR POWER - 4 (RED)
FUSE
80A
ITT CANNON 121583-013
1 GROUND - 2 (BLACK)
ITT CANNON 121583-042
SPLICE
SPLICE
CONTROL FUSED (RED) - 18
CANL (GREEN) - 18
CANH (YELLOW) - 18
HEATER_LVL (GREY/RED) - 18
WAKEUP (BLUE) - 18
CONTROL GROUND (BLACK) - 18
COND+ (RED) - 12
COND GROUND (BLACK) - 12
COND SIG (WHITE) - 18
A
B
C
CONDENSER FAN
DELPHI 12040977
DATE:08/25/2017
REV:01
P/N:1001268060







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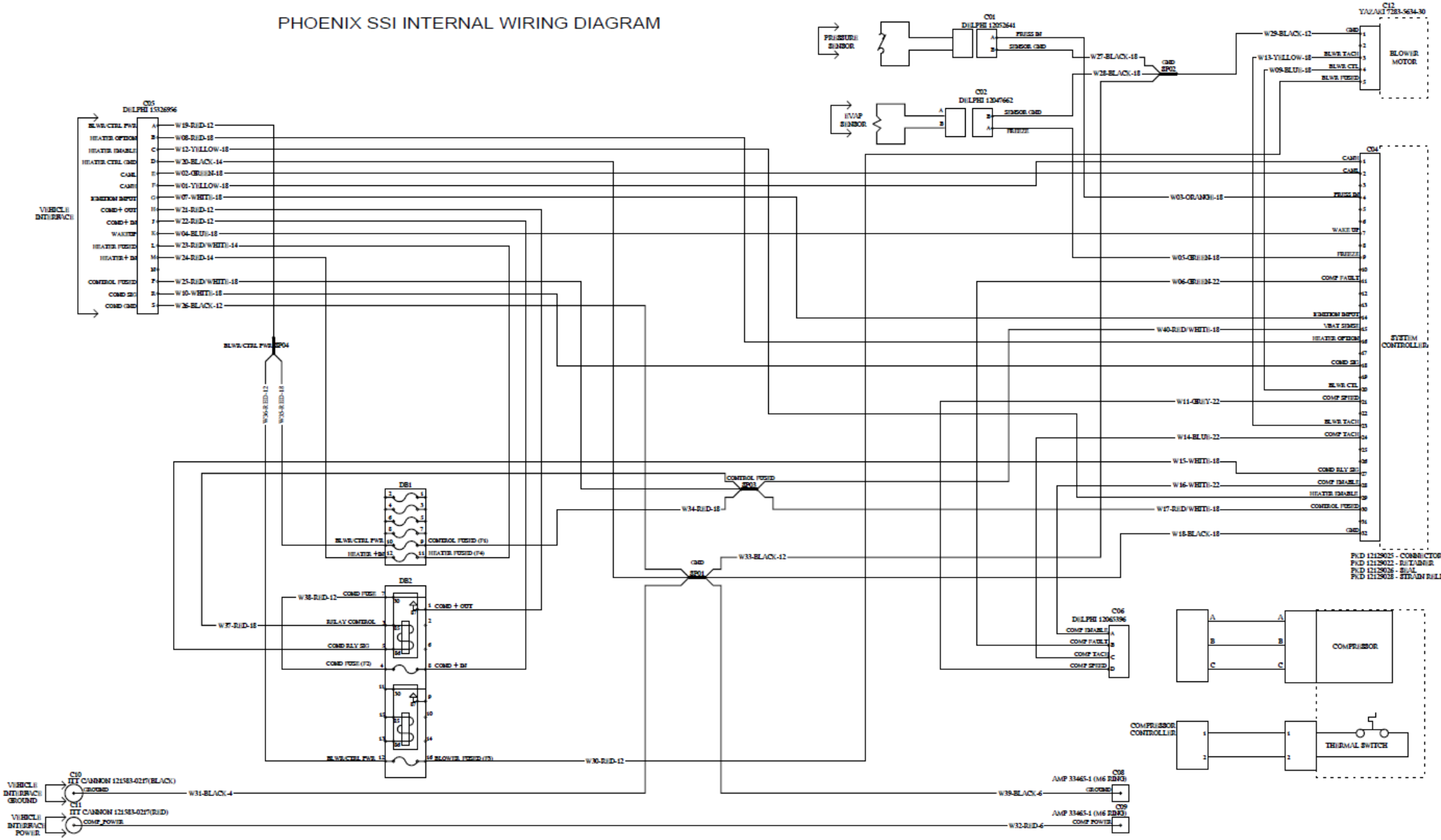
PHOENIX SSI INTERNAL WIRING DIAGRAM



P/N 1000764990	REV 01	DATE 06/01/2016

System Controller Pinout Chart

Connector Pin	Circuit ID	Wire Color	Function	Typical Voltage	Other End of Circuit
1	CANH	Yellow	CAN bus	2.5V+	Control panel, BMS
2	CANL	Green	CAN bus	2.5V-	Control panel, BMS
3	N/C				
4	PRESS_IN	Orange	Pressure switch Input	Ground (switch closed)	Binary Pressure Switch
5	N/C				
6	COMP_SERIAL	White	Not currently used	0-5V	Compressor Controller
7	WAKEUP	Blue	Wakeup from control panel	10-11V (system off) <1V (system on)	Control Panel
8	N/C				
9	FREEZE	Green	Evaporator Freeze protection	1.5V-4V	Freeze sensor
10	N/C				
11	COMP_FAULT		Compressor controller fault output	<1V (no fault) 5V (fault present)	Compressor controller
12	N/C				
13	N/C				
14	IGNITION	White	Ignition switch input	<1V (key off) >10V (key on)	Vehicle ignition circuit
15	BATT_SENSE	Red	Supply voltage sense	Same as NITE batteries	
16	HTR_OPTION	Red	Heater version sensing	>10V (Espar heater) <1V (Webasto	Heater
17	N/C				
18	COND_SIG	White	Condenser PWM control signal	<0.5V (off)	Condenser
19	N/C				
20	BLWR_CTL	Blue	Blower PWM control signal	6.3V (speed 1) 5.0V (speed 2) 2.8V (speed 3)	Blower motor
21	COMP_SPD	Grey	Compressor speed control signal	<0.6V (compressor off) 1-4V (compressor on)	Compressor Controller
22	N/C				
23	BLWR_TACH	Yellow	Tach signal from blower	Not currently used	Blower motor
24	COMP_TACH	Blue	Tach signal from compressor controller	Not currently used	Compressor Controller
25	N/C				
26	N/C				
27	COND_RLY_SIG	White	Condenser relay control signal	12V (relay off) <1V (relay on)	Condenser Relay
28	COMP_ENABLE	White	Compressor controller logic circuit power	<1V (compressor off) >11V (compressor on)	Compressor Controller
29	HTR_ENABLE	Yellow	Activates fuel operated heater	<1V (heater off) >11V (heater on)	Heater
30	CTL_FUSED	Red	Power for ECU	Aux battery voltage	Control fuse
31	N/C				
32	Ground	Black	Ground for ECU	Ground	Harness ground splice

Section 6

Operating Instructions

OPERATING INSTRUCTIONS FOR CONTROLLER

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

First time system is powered on - Initial default setting is Blower Speed 1 / AUTO- MODE / Temp 72 °F

Battery charge level indicator shows 4 bars for fully charged and 1 bar equals low batteries. In most cases, 1 bar will remain visible when system reaches the LVD, low voltage disconnect.

ON/OFF

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.

ENTER

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.

ENTER

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 retain the last Mode and Blower settings but the Temperature will always default back to 72 °F degrees on restarts.

Adjusting

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.

ENTER

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.

ENTER

Operating Instructions

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

Display will show service indicator and a code 00 unless a fault has occurred. If there is an active fault the display will show it as 01, 02, etc. Use up and down arrows to scroll through the Fault Codes. See SSI diagnostics guides for all definitions. These vary by system.

1) Evap sensor open or shorted high
2) Evap sensor shorted low
3) High pressure switch open or shorted high
4)

Press the ENTER button to proceed through the available service screens. Use up/down arrows to scroll through voltages and amps.

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 filter must be cleaned or changed. To reset filter: at screen 1 press and hold enter button for 3 seconds.

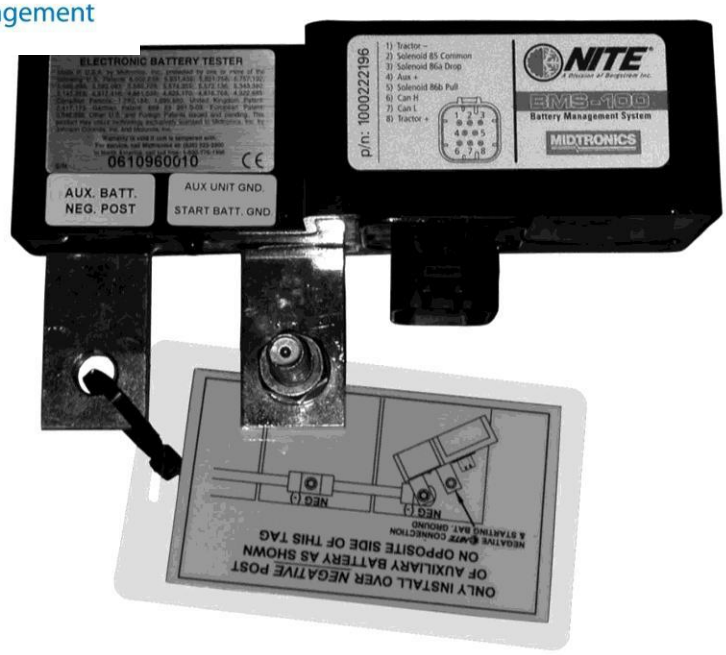
Section 7
Battery Management System (BMS) Installation

Bergstrom
Climate Control Systems

MIDTRONICS

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)

Installation

⚠ DANGER

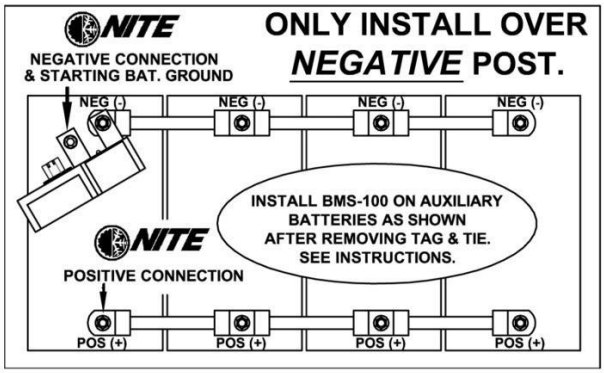
Hazardous voltage.
Can cause death or serious personal injury.

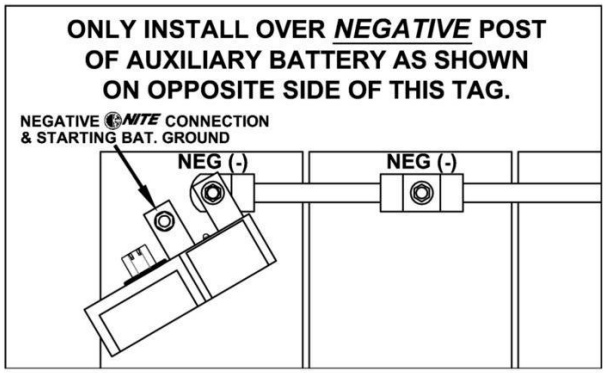
Disconnect the vehicle's auxiliary batteries before installation to avoid electric shock and potential damage to the batteries, vehicle electrical system or the BMS-100.

⚠ CAUTION

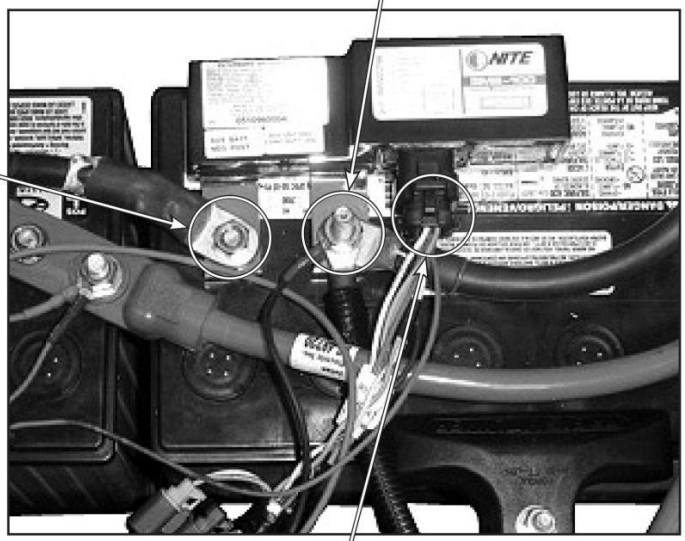
Follow these installation instructions carefully.

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.