## Installation Manual

### Release History

<table>
<thead>
<tr>
<th>Released</th>
<th>04/10</th>
<th>Released manual</th>
</tr>
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<tbody>
<tr>
<td>Rev. 1</td>
<td>(06/10)</td>
<td>Corrected pages 62-63, the positive and negative studs were shown reversed on the Compressor Controller Board.</td>
</tr>
<tr>
<td>Rev. 2</td>
<td>(12/11)</td>
<td>Updated the Safety section by including Battery Installation and Cable Routing warnings on page 7.</td>
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Introduction

This manual was written to assist with the installation of the Thermo King TriPac® Auxiliary Heating and Cooling System onto a typical semi tractor with sleeper. While it is not intended to be specific to a particular vehicle, the information in this manual will provide the installer with details to correctly and safely install each of the APU components.

Before beginning the installation, the installer should confirm with the customer the location for each of the APU’s components by using the APU Installation Questionnaire. The customer should also be made aware that modifications to existing equipment may be necessary to complete the installation.

Modifications may include:

- OEM components on the chassis may need to be relocated to accommodate the installation of the APU battery box.
- OEM fuel tank may need to be changed to a smaller size to accommodate the installation of the APU battery box.
- APU condenser may be directly mounted to the outside of the sleeper.
- APU evaporator, power inverter and/or converter may be installed in existing storage spaces under the bunk or in the tool box areas.
- APU heating and A/C duct work may be routed with vents installed in existing closets or storage compartments.
- Tractor’s engine must be fitted with an upgraded alternator and wiring of 185 amps or more.
- For base level performance - tractor battery box must have four 12 Vdc batteries connected to provide 12 Vdc output.
- For optimum level performance - tractor batteries may be upgraded to Thermo King NXT 1150 CCA absorbed glass mat (AGM) batteries.

Due to its complexity, you should not attempt this installation unless you:

- are an experienced mechanic.
- can safely lift 75 lbs. (34 kilos).
- are EPA Section 609 certified and trained in the repair and maintenance of mobile air conditioning systems.
- have a basic understanding of electricity and electrical wiring.
- have the necessary tools and equipment to complete the installation.

This manual is published for informational purposes only. Thermo King makes no representations warranties express or implied, with respect to the information recommendations and descriptions contained herein. Information provided should not be regarded as all-inclusive or covering all contingencies. If further information is required, Thermo King Corporation Service Department should be consulted.

Thermo King’s warranty shall not apply to any equipment which has been “so installed, maintained, repaired or altered as, in the manufacturer’s judgment, to affect its integrity.”

Manufacturer shall have no liability to any person or entity for any personal injury, property damage or any other direct, indirect, special, or consequential damages whatsoever, arising out of the use of this manual or any information, recommendations or descriptions contained herein.
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Safety Precautions

Caution

SEVERE COMPRESSOR DAMAGE will result from operating the A/C system before completing the installation which includes: installing the condenser, receiver drier, evaporator, connecting the refrigeration lines, leak testing, evacuation, clean-up, and charging the system with the correct type and amount of refrigerant.

Recover Refrigerant

At Thermo King, we recognize the need to preserve the environment and limit the potential harm to the ozone layer that can result from allowing refrigerant to escape into the atmosphere. We strictly adhere to a policy that promotes the recovery and limits the loss of refrigerant into the atmosphere.
Safety Precautions (continued)

The ▼ symbol appears next to a point that is particularly important:

▼ DANGER: Addresses a circumstance that, if encountered, will lead to death or serious injury

▼ WARNING: Addresses a circumstance that, if encountered, might lead to death or serious injury.

▼ CAUTION: Addresses a circumstance that, if encountered, may cause damage to equipment or minor injury.

▼ DANGER: Never apply heat to a sealed refrigeration system or container because it could explode, causing death or serious injury

▼ DANGER: Fluorocarbon refrigerants, in the presence of an open flame or electrical short, produce toxic gases that are severe respiratory irritants capable of causing death.

▼ DANGER: Be careful when working with a refrigerant or refrigeration system in any enclosed or confined area with a limited air supply (i.e., a trailer, container or the hold of a ship). Refrigerant tends to displace air and can cause oxygen depletion which may result in death by suffocation.

▼ WARNING: Always wear goggles or safety glasses. Refrigerant liquid, refrigeration oil, and battery acid can permanently damage the eyes (see First Aid under Refrigeration Oil).

▼ WARNING: Keep your hands away from fans when the unit is running.

▼ WARNING: When using ladders to install or service refrigeration systems, always observe the ladder manufacturer’s safety labels and warnings. A work platform is the recommended method for installations.

▼ WARNING: Never drill holes into the unit. Holes drilled into the unit may weaken structural components. Holes drilled into electrical wiring can cause fire or explosion.

▼ WARNING: Make sure all mounting bolts are tight and are of correct length for their particular application.

▼ WARNING: Installer supplied lifting eyebolts must be forged steel, 1/2” (12 mm) diameter.

▼ WARNING: Use only locking lifting hooks to attach to the lifting eyebolts.
Battery Installation and Cable Routing

WARNING: Improperly installed battery could result in a fire or explosion! A Thermo King approved battery must be installed and properly secured to the battery tray.

WARNING: Improperly installed battery cables could result in fire or explosion! Battery cables must be installed, routed and secured properly to prevent them from rubbing, chaffing or making contact with hot, sharp or rotating components.

WARNING: Do not attach fuel lines or any additional wiring harnesses to the battery cables as this could cause an electrical fire!

CAUTION: Do not connect other manufacturer’s equipment or accessories to the Thermo King unit. This could result in severe damage to equipment and void the warranty!

CAUTION: Set all unit electrical controls to the OFF position before connecting battery cables to the battery to prevent unit from starting unexpectedly and causing personal injury.

CAUTION: Always wear protective clothing, gloves and eye wear when handling and installing batteries. Battery acid can cause serious burns when exposed to eyes or skin. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters your eye, immediately flood it with running cold water for at least twenty minutes and get medical attention immediately.

CAUTION: Always cover battery terminals to prevent them from making contact with metal components during battery installation. Battery terminals grounding against metal could cause the battery to explode.

Refrigerant

WARNING: Although fluorocarbon refrigerants are classified as safe refrigerants, certain precautions must be observed when handling them or servicing a unit in which they are used. When released to the atmosphere in the liquid state, fluorocarbon refrigerants evaporate rapidly, freezing anything they contact.

First Aid

FROST BITE: In the event of frost bite, the objectives of First Aid are to protect the frozen area from further injury, to warm the affected area rapidly and to maintain respiration.

EYES: For contact with liquid, immediately flush eyes with large amounts of water and get prompt medical attention.

SKIN: Flush area with large amounts of lukewarm water. Do not apply heat. Remove contaminated clothing and shoes. Wrap burns with dry, sterile, bulky dressing to protect from infection/injury. Get medical attention. Wash contaminated clothing before reuse.

INHALATION: Move victim to fresh air and use CPR or mouth-to-mouth ventilation, if necessary. Stay with victim until arrival of emergency medical personnel.

Refrigeration Oil

WARNING: Avoid refrigeration oil contact with the eyes. Avoid prolonged or repeated contact of refrigeration oil with skin or clothing. Wash thoroughly after handling refrigeration oil to prevent irritation.

First Aid

NOTE: In case of eye contact, immediately flush with plenty of water for at least 15 minutes. CALL A PHYSICIAN. Wash skin with soap and water.
Heater Safety Precautions

**IMPORTANT:** Correct installation of this heater is necessary to ensure safe and proper operation. **BEFORE installing the heater, thoroughly read and understand this manual and the heater manufacturer’s manuals included with the heater.**

**DANGER: EXPLOSION HAZARD or FIRE HAZZARD!** Failure to follow these instructions could cause an explosion or fire resulting in serious or fatal injury!

- Heater must be turned off while re-fueling.
- Install heater so it will maintain a minimum distance of 2” from any flammable or heat sensitive material.
- Install the exhaust system so it will maintain a minimum distance of 2” from any flammable or heat sensitive material.
- Stored items in may shift while vehicle is in operation and should be secured adequately to prevent contact with the heater.
- Use a protective air intake grille on the air inlet side of the heater to prevent objects from being sucked in.
- The heater must only be operated when the maintenance flap is closed and the outlet hood is mounted in position.
- Do not install heater in enclosed areas where combustible fumes may be present.
- Do not store or transport combustibles (road flares, starting fluids, fuel containers, oil cans, spray cans, gas cartridges, fire extinguishers, cleaning rags, clothing, paper, etc.) in the same compartment as the heater.
- Ensure that the fuel system is intact and there are no leaks.
- Do not route electrical wires, harness or battery cables together with fuel lines.

**DANGER: ASPHYXIATION HAZARD!** Failure to follow these instructions could cause oxygen depletion resulting in serious or fatal injury!

- Route the heater exhaust so that exhaust fumes can not enter into the passenger compartments.
- Ensure an air tight seal will be maintained between the heater and mounting surface and at any exhaust connection points.
- Ensure that heating air supply is taken from an area where poisonous gases will not be present.
- When the heater is installed in a enclosed compartment separate from the evaporator, a inlet for return air must be installed to provide the heater with a fresh air supply.
- If running exhaust components through an enclosed compartment, ensure that it is vented to the outside.
- The enclosed compartment must be free of any holes, cracks or rusted out areas to prevent fumes from entering into the passenger compartment.
- The heater must be installed flush with the floor pan (i.e. sheet metal, fiberglass, etc.) to ensure proper sealing of the mounting plate and gasket.
- The heater must not be operated in closed areas such as garages, buildings, warehouses, etc.
- Do not inhale exhaust fumes.
Tips for a Successful Installation

Before Beginning The Installation

- Read this manual to understand where components are to be located and how they are to be installed.
- Review component location diagram and discuss with the customer where each component will be installed on his tractor.
- Verify tools and special equipment required for the installation are available and in good working condition.
- Open all installation kits and inspect the contents before beginning installation.
- It is recommended that one person performs the installation of all the components outside the sleeper while a second person installs all the components inside the sleeper. This will help minimize any damage to the sleeper’s interior from grease, dirt, etc.

TRACTOR’S BATTERIES

- It is important not to allow the tractor’s batteries to become discharged during the installation process. A battery charger should be connected to the batteries while the installation is in process or shut the tractor’s battery power supply completely off using the OEM main battery disconnect switch. See “Tractor and APU Battery Recommendations” on page 20 for more information.

APU BATTERIES

- Thermo King NXT AGM batteries are shipped fully charged and ready to use. See “Tractor and APU Battery Recommendations” on page 20 for more information.

APU BATTERY BOX INSTALLATION

- IMPORTANT: DO NOT weld or drill holes in the top or bottom flanges of the tractor’s frame. Serious structural damage could occur to the frame! Consult your chassis manufacturer for further information.
- The battery box is designed to be mounted only to the existing frame rails. NO OTHER MOUNTING LOCATION IS ACCEPTABLE!
- Safely relocate components on the chassis that interfere with the installation of the battery box.

- Check clearance around battery box before beginning the installation.
- The use of a motorcycle/ATV lift or modified floor jack to raise battery box into position is recommended.
- Only the supplied spacer blocks and mounting claws must be used to install the battery box to the chassis frame rail.
- If different mounting bolts are used they must be Grade 5 and of the correct length. DO NOT cut off excessive length bolts.
- Verify the upper and lower battery box mounting bolts are square and flat with the chassis frame rail before tightening.
- The mounting hardware securing the battery box to the tractor’s frame must be correctly positioned and torqued using the four-step tightening sequence described in this manual.

A/C CONDENSER INSTALLATION

- Keep all the A/C fittings capped and sealed until the installation of the refrigeration hoses. PVE refrigerant oil is extremely hygroscopic and a system left open for more than 5 minutes may require extensive evacuation time to remove moisture.
- Determine the best location to mount the condenser onto the exterior of the sleeper.
- Verify all measurements before drilling any mounting holes.
- Verify there is no interference with any OEM electrical wiring, internal supports, etc. before drilling mounting holes.
- Confirm the condenser location does not interfere with the service or operation of existing tractor components.
- Provide protection to the tractor’s interior and or exterior finish to prevent damage during the installation process.
- Use the stainless steel mounting hardware (supplied in the kit) to mount the condenser.
- Use the large fender washers (supplied in kit) inside the sleeper to provide additional support.
- All mounting holes must be sealed with silicone caulking to prevent moisture or fumes from entering the sleeper.
Tips for a Successful Installation (continued)

A/C EVAPORATOR/CONTROL BOX INSTALLATION

- Keep all the A/C fittings capped and sealed until the installation of the refrigeration hoses. PVE refrigerant oil is extremely hygroscopic and a system left open for more than 5 minutes may require extensive evacuation time to remove moisture.
- Determine the best location for the A/C evaporator/control box inside the sleeper, typically under the bunk and flush to the front bulkhead.
- Allow adequate clearance for attaching the two air outlet tubes.
- Verify there is no interference with any OEM electrical wiring, internal floor supports, etc. before drilling any mounting holes in the tractor.
- The evaporator/control box should be mounted directly onto the floor mat inside the sleeper. Use the supplied template to properly locate the drain and mounting holes.
- Always install the drain valves (kazoos) into drain holes located on the bottom pan of the evaporator.
- The A/C vents should be located and installed to provide maximum air circulation in the sleeper such as: LOW (floor level), MEDIUM (above lower bunk level) or HIGH (above upper bunk level).
- All mounting holes must be sealed with silicone caulk to prevent moisture or exhaust fumes from entering the sleeper.
- All edges of access holes made in fiberglass and wood composite floors must be sealed correctly with fiberglass cloth and resin.

HEATER INSTALLATION

- Determine the best location of the heater inside the sleeper, typically under the bunk. Allow clearance for dismantling for service.
- Install heater so it will maintain a minimum distance of 2.00 inches (50.8 mm) from any heat sensitive or flammable material.
- The heater must only be mounted on a flat horizontal surface.
- Heater must be installed flush with the floor pan (i.e. sheet metal, fiberglass, etc.) to ensure proper sealing of the mounting plate and gasket.
- All edges of access holes made in fiberglass and wood composite floors must be sealed correctly with fiberglass cloth and resin.
- Outside air intake and exhaust hoses must be installed correctly for the heater to operate safely.
- Exhaust hose should be mounted slightly downwards to help drain off condensation.
- Install exhaust hose so it will maintain a minimum distance of 2.00 inches (50.8 mm) from any heat sensitive or flammable material.
- Inside air inlet and outlet ducts must be installed correctly for the heater to operate safely:
- Pulse fuel pump must be installed at a 15 to 35 degree angle from horizontal to operate correctly.
- Fuel pickup tube must be installed correctly in the fuel tank or the heater will not operate.
- Fuel line from the pickup tube to the fuel pump to the heater should be routed at a continuous rise.
- Use a hose cutter or sharp knife to cut plastic fuel lines. Do not use a wire cutter as this will pinch the plastic fuel line closed.
- Do not route electrical wires, harness or battery cables together with fuel lines.
- BEFORE operating the heater, the fuel lines must be bled of air using the Heater Priming Harness (204-1144) or damage to the fuel pump will result. See “Priming the Heater Fuel Pump” on page 84.
- The Diagnostic Code Reader (204-1143) must be used to setup and operate the heater in the run-in mode. See “Operation Checkout Procedures” on page 90.
A/C HOSE CONNECTIONS AND ROUTING

- Keep all the A/C fittings capped and sealed until the installation of the refrigeration hoses. PVE refrigerant oil is extremely hygroscopic and a system left open for more than 5 minutes may require extensive evacuation time to remove moisture.
- Only cut refrigerant hoses with the correct hose cutting tool (204-677). NEVER USE A SAW!
- Always use the correct hose fitting tool (204-1045) when assembling refrigeration hoses.
- Always lubricate hose fittings with POE refrigerant oil when assembling to refrigeration hoses.
- Always install and lubricate O-rings with POE refrigerant oil when connecting refrigeration hose fittings to component connection fittings.
- Refrigeration hoses should be installed onto components in such a way as to allow for vibration and movement of the cab. THEY SHOULD NEVER BE STRETCHED TIGHT!
- All refrigeration connections should be tightened securely using two wrenches.
- Always keep refrigeration hoses from rubbing or chafing against sharp metal objects, rotating components or hot components.
- Protective covers or sleeving (installer supplied) for the refrigeration hoses may be required depending on the installation.
- Always install the condenser’s receiver drier in the direction indicated by the arrow.
- Thermo King Evacuation Station (204-725) and Evacuation Station Operation and Field Application Instructions (TK-40612) are recommended.
- The oil in the evacuation station vacuum pump should be changed after each use.
- The A/C system must be leak free. Check for leaks by using an electronic leak detector.
- The A/C system will be charged with 2.0 bs. of R134a refrigerant.

ELECTRICAL WIRING AND HMI CONTROLLER INSTALLATION

- Electrical wiring should be installed and routed in such a way as to allow for vibration and movement of the cab. THEY SHOULD NEVER BE STRETCHED TIGHT!
- Always keep electrical wiring from rubbing or chafing against sharp metal objects, rotating components or hot objects.
- All electrical wiring should be neatly routed and secured with band wraps or clamps.
- Do note route or bundle 110 Vac wires together with 12 Vdc wires.
- Do not route electrical wires, harness or battery cables together with fuel lines.
- Excess length of battery cables should be cut off to reduce voltage drop.
- Superlube (203-524) or equivalent should be applied to all electrical connections.
- All main power and ground accessory connections must be installed directly on top of the tractor’s battery terminal posts and tightened securely. DO NOT INSTALL UNDER OEM BATTERY CABLES!
Battery Box Dimensions

Approximate Weight 425 lbs. (193 kg)

NOTE: Dimensions shown in inches.
Evaporator/Control Box Dimensions

**NOTE:** Dimensions shown in inches.

Approximate Weight 52 lbs. (23.5 kg)

**TOP VIEW**

**SIDE VIEW**

**END VIEW**

*NOTE: Dimensions shown in inches.*
Condenser with Receiver Drier Dimensions

NOTE: Dimensions shown in inches.

Approximate Weight 25 lbs. (11.3 kg)
HMI Dimensions

NOTE: Dimensions shown in inches.
1000 Watt Power Inverter Dimensions (Option)

NOTE: Dimensions shown in inches.
AC/DC Power Converter Dimensions (Option)

NOTE: Dimensions shown in inches.
# Required Tools and Additional Supplies

## Tools
1. Typical Mechanics Tools
2. Floor Jack or Motorcycle/ATV Lift
3. Drill Motor
4. Drill Bit Set
5. 7/8” dia. or 1” Step Reamer (for evaporator drain and controller holes)
6. Hole Saws
   - 1” dia. (for fuel tank pickup tube)
   - 2-1/2” dia. (for heater inlet/outlet louver)
   - 3” dia. (access hole for evaporator hoses and electrical wiring)
   - 4-1/4” dia. (mounting A/C louvers, routing A/C ducts through bulkheads and heater mounting hole)
7. Reciprocating Saw (return air opening)
8. 1/2” Wrench
9. Level
10. Tape Measure
11. Utility Knife
12. Caulk Gun
13. Digital Meter (204-615)
14. Refrigerant Leak Detector (204-756)
15. Hose Fitting Tool (204-1045)
16. Hose Cutting Tool (204-677)
17. Heater Priming Harness (204-1144)
18. Shop Vacuum
19. R-134a Gauge Manifold with automotive connectors
20. Vacuum Pump (204-713)
21. Micron Gauge (204-720)
22. Heavy Duty Battery Charger
23. AMP pin removal tool (204-737)
24. AMP pin removal tool (204-1120)
25. Laptop Computer (IBM Compatible) with Microsoft Internet Explorer 6.0 or higher installed.
26. USB Adapter Cable (204-1926)

## Supplies (as required)
1. RTV Silicone
2. Sealing Putty (203-391)
3. POE Refrigerant Oil (for lubricating hose fittings and o-rings)
4. Refrigerant 134a
5. Return air wall louver when needed (approximately 10” x 12”)
6. Mounting Clamps #24 and #32 (to secure cables and hoses)
7. Band wraps (assorted sizes and lengths)
8. Upholstery Cleaner (aprox. 2 cans)
9. Cardboard or blankets (to protect interior)
10. Fiberglass Repair Kit (only used for fiberglass and wood composite floors)
Typical Component Locations

1. Battery Box
2. Condenser / Receiver Drier
3. HMI Controller
4. Cab Heater
5. Evaporator / Control Box
6. Power Inverter (OPTIONAL)
7. Power Converter (OPTIONAL)

NOTE: Component locations will vary with sleeper design.
Tractor and APU Battery Recommendations

Tractor’s Batteries

The tractor’s batteries should not be allowed to become discharged during the APU installation process. Always connect a battery charger to the tractor’s batteries before beginning the installation.

An alternative method is to shut the tractor’s battery power completely off using the OEM main battery disconnect switch.

For base level performance - tractor battery box must have four 12 Vdc batteries connected to provide 12 Vdc output.

For optimum level performance - Thermo King recommends that the tractor’s batteries also be upgraded to Thermo King NXT 1150 CCA absorbed glass mat (AGM) batteries.

NXT AGM Batteries

Charge Maintenance

Thermo King NXT AGM batteries are shipped fully charged. Fully charged NXT AGM batteries that are kept in stock should not require charging for 2 years if kept below 77 F (25 C). NXT AGM batteries should be charged when the open circuit voltage (OCV) falls below 12.50 volts.

To charge the NXT AGM battery, use the following guidelines:

1. Verify the output voltage of your battery charger is capable of maintaining 14.1 to 14.7 charging voltage. The recommended charging voltage range for the NXT AGM battery is 14.1 to 14.7 volts. Voltages are to be measured at the battery terminals with the battery connected to the charger.

   IMPORTANT: Never exceed 15 volts when charging the NXT AGM battery. Exceeding 15 volts will cause pressure relief valves to open and out-gas hydrogen and oxygen from inside the battery. This will shorten the life of the battery and could lead to premature battery failure.

2. Battery chargers with the battery type output setting should be set to AGM type battery. Do not set the output type to gel cell or maintenance free settings.

3. Determine if your battery charger is an automatic or manual charger. Manual battery chargers must be closely monitored during the charge period and for this reason an automatic battery charger is preferred over a manual charger.

   a. Automatic battery chargers either charge up to a preset voltage and shut off, or charge to a present voltage and then switch to a trickle charge mode. Either one of these battery chargers is acceptable; however the automatic charger that shuts off may not fully charge the battery.

   b. Manual battery chargers will have manual controls for setting the charge amperage rate. The charge amperage rate will remain the same until the battery charger is manually shut off.

NOTE: When using a manual battery charger, set the charger to charge at 10 or 20 amps and limit the charging time based on the batteries state of charge (SOC). Use the chart below as a general guide to determine the amount of time necessary to charge the battery. DO NOT overcharge the battery.
### Tractor and APU Battery Recommendations

#### Cleaning a Battery

Use a damp cloth to clean the top of the battery to eliminate conductive paths created by dirt and dried or wet electrolyte, and to prevent corrosion. Use a battery terminal-cleaning tool that has nonconductive (plastic or rubber) cover to clean the battery terminals when corrosion is present. Replace any battery cables (or cable terminals) that are frayed, corroded, swollen, or damaged to the extent that they can not be cleaned.

#### Battery Cable Mounting

On threaded stud type batteries, use only stainless steel nuts to fasten the cable to the battery. Torque the nut to 150 to 200 in-lbs. (17 to 22.5 N•m).

On SAE post type batteries, use only stainless steel battery clamp bolts. Torque the nut to 60 in-lbs. (7 N•m).

#### Battery Hold Down Hardware

Batteries are subjected to extreme shock loads and vibration. It is very important to make sure the battery is secured by the proper mounting hardware. Failure to secure the battery correctly can result in premature battery failure. Using a torque wrench, torque the hold down nuts in two step increments:

- STEP 1 - Torque each hold down nut to 60 in-lbs. (6.8 N•m)
- STEP 2 - Torque each hold down nut to 120 to 144 in-lbs. (13.5 to 16.3 N•m)

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### Determining Maximum Charge Time Using a Manual Charger

<table>
<thead>
<tr>
<th>Voltmeter Reading</th>
<th>State of Charge</th>
<th>Time @ 10 Amps</th>
<th>Time @ 20 Amps</th>
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<tbody>
<tr>
<td>12.84 Volts</td>
<td>100%</td>
<td>0 Hours</td>
<td>0 Hours</td>
</tr>
<tr>
<td>12.50 Volts</td>
<td>75%</td>
<td>2 Hours</td>
<td>1 Hour</td>
</tr>
<tr>
<td>12.20 Volts</td>
<td>50%</td>
<td>4 Hours</td>
<td>2 Hours</td>
</tr>
<tr>
<td>11.88 Volts</td>
<td>25%</td>
<td>6 Hours</td>
<td>3 Hours</td>
</tr>
</tbody>
</table>

**WARNING:** Overcharging can damage the battery and possibly cause a fire or explosion. Follow the battery charger’s recommendations for monitoring batteries while charging. Batteries should be monitored while charging for signs of internal problems. Signs of internal problems include bulging cases, extreme gassing, pungent smell, and extreme heat. If you notice any of these signs turn the charger off and allow the battery to stabilize before handling or testing.
Battery Box Installation

STANDARD INSTALLATION METHOD - MOUNTING CLAWS

⚠️ WARNING: Installer supplied lifting eyebolts must be forged steel, 1/2''(12mm) diameter.

⚠️ WARNING: Use only locking lifting hooks to attach to the lifting eyebolts.

⚠️ WARNING: DO NOT connect any of the TriPac® battery cables to any batteries at this time.

NOTE: DO NOT OIL THE BOLT THREADS!

Special Tools Required

<table>
<thead>
<tr>
<th>Modified Floor Jack or Motorcycle/ATV Lift</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2” Drive Torque Wrench</td>
</tr>
</tbody>
</table>

1. Remove the cover from the battery box to access and remove hardware that secures box to the shipping crate.

2. It is recommended that a modified floor jack or motorcycle/ATV lift be used to install the battery box. Protection such as cardboard, shop rags, etc. should be used under the box to prevent damage during installation.
   - Install lifting eyebolts, washers and nuts securely into the two holes at the top of the battery box.
   - Using locking lifting hooks, raise the battery box and place onto the lift then remove lifting eyebolts, washers and nuts.

3. Using a lift, carefully raise the battery box into position. Install the 3/4” bolts and washers through the mounting claws and the rear of the battery box.

4. Loosely install the retainers and locking nuts inside the battery box.

5. With battery box still supported by a lift:
   - Push battery box up tight to tractor’s frame.
   - Adjust height of box so top and bottom mounting claws and bolts are positioned flat on frame.
   - Review (Detail A) - Lightly tighten mounting hardware only enough to remove excess play.

6. Using a torque wrench, torque mounting bolts in four step increments starting with top bolts, then bottom bolts.

   **STEP 1** - Torque top then bottom mounting bolts to 25 ft-lb. (33.9 N•m).
   **IMPORTANT: STOP and verify all mounting claws and bolts remained flat on frame (Detail A). If they are not, loosen bolts, adjust as necessary and retighten again to 25 ft-lb. (33.9 N•m).**

   **STEP 2** - After first step is successfully completed, torque top then bottom bolts to 50 ft-lb. (67.8 N•m).

   **STEP 3** - Next, torque top and then bottom bolts to 100 ft-lb. (135.6 N•m).

   **STEP 4** - Finally, recheck all bolts to confirm they are at 100 ft-lb. (135.6 N•m)

   **IMPORTANT: DO NOT OVER-TORQUE MOUNTING BOLTS!**

7. Remove the support lift and visually inspect installation for the following:
   - Mounting claws and bolts are correctly installed. They should be square and flat on the frame (Detail A).
   - If any mounting claws and bolts are improperly installed on the frame (i.e. they resemble Details B & C) - adjust as necessary.
   - Damaged, deformed or cracked components during installation - must be replace immediately.

**WARNING:** Installer supplied lifting eyebolts must be forged steel, 1/2”(12mm) diameter.

**WARNING:** Use only locking lifting hooks to attach to the lifting eyebolts.

**WARNING:** DO NOT connect any of the TriPac® battery cables to any batteries at this time.

**NOTE: DO NOT OIL THE BOLT THREADS!**
WARNING: DO NOT connect any of the TriPac® battery cables to any batteries at this time.
Battery Box Installation

OPTIONAL INSTALLATION METHOD - DIRECT MOUNT

WARNING: Installer supplied lifting eyebolts must be forged steel, 1/2” (12 mm) diameter.

WARNING: Use only locking lifting hooks to attach to the lifting eyebolts.

WARNING: DO NOT connect any of the TriPac® battery cables to any batteries at this time.

NOTE: DO NOT OIL THE BOLT THREADS!

Special Tools Required

<table>
<thead>
<tr>
<th>Modified Floor Jack or Motorcycle/ATV Lift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Drill (appropriate size to drill holes in frame rails)</td>
</tr>
<tr>
<td>25/32” or (20 mm) Drill Bit</td>
</tr>
<tr>
<td>1/2” or 3/4” Drive Torque Wrench</td>
</tr>
</tbody>
</table>

1. Remove the cover from the battery box to access and remove hardware that secures box to the shipping crate.

2. It is recommended that a modified floor jack or motorcycle/ATV lift be used to install the battery box. Protection such as cardboard, shop rags, etc. should be used under the box to prevent damage during installation.
   • Install the lifting eyebolts, washers and nuts securely into the two holes at the top of the battery box.
   • Using locking lifting hooks, raise the battery box and place onto the lift then remove the lifting eyebolts, washers and nuts.

3. DETAIL A - Before installing the battery box to the tractor’s frame, insert the 3/4 x 3.00” long bolts and washers through the slotted holes at the rear of the battery box.
   • From inside the battery box, install the retainer and locking nut into the inner frame channel. Hand tighten hardware
   • Position the bolts at the bottom of the slots and tighten to 200 ft-lb. (270 N•m).

4. DETAIL B - IMPORTANT: Observe the positioning of existing OEM fasteners on the tractor’s frame. The four fasteners used in this Direct-Mount Option need to be located on the tractor’s frame no higher and no lower than any existing OEM fasteners.
   • Measure and mark the location of the four mounting holes on the tractor’s frame. Drill four 25/32” (20 mm) holes in the frame.

5. Using the lift, carefully raise the battery box into position and align the battery box mounting holes with the holes in the tractor’s frame.
   • From the backside of the tractor’s frame, insert the bolts and washers through the frame first and through the rear of the battery box.
   • From inside the battery box, install the retainers and locking nuts into the inner frame channel. Hand tighten hardware.

6. With the battery box still supported by a lift and level with the tractor’s frame, use a torque wrench and torque the four frame mounting bolts in three step increments as described below:
   **STEP 1** - Torque top then bottom bolts to 50 ft-lb. (68 N•m).
   **STEP 2** - Torque top then bottom bolts to 100 ft-lb. (135 N•m).
   **STEP 3** - Torque top then bottom bolts to 200 ft-lb. (270 N•m).

7. DO NOT OVER-TORQUE THE MOUNTING BOLTS!

8. Remove the support lift.
Battery Box Installation

OPTIONAL INSTALLATION METHOD - DIRECT MOUNT

WARNING: DO NOT connect any of the TriPac® battery cables to any batteries at this time.
Condenser and Receiver Drier Installation

Sub-Assembly

**IMPORTANT:** Keep all the A/C fittings capped and sealed until the installation of the refrigeration hoses. PVE refrigerant oil is extremely hygroscopic and a system left open for more than 5 minutes may require extensive evacuation time to remove moisture.

**NOTE:** Read and understand “Fabricating Refrigeration Hoses” on page 34 for proper hose fabrication requirements. Always use two wrenches while tightening refrigeration fittings.

**Place the condenser coil onto a work bench ad sub-assemble the following components:**

- Install the receiver drier bracket onto the condenser coil housing with supplied 1/4-20 mounting hardware and tighten securely.
- Attach the two large hose clamps to the bracket.
- Install the receiver drier to the bracket with the hose clamps and tighten securely.
- Fabricate and install a #6 hose (5.00 in. long) with two 90 degree fittings onto the INLET fitting of the drier to the #6 OUTLET fitting on the condenser coil. Tighten fittings to the torque specs shown.

**Installation**

**CAUTION:** Before drilling any holes in the tractor, check for interference with internal wires, supports or interior panels. Avoid drilling into any interior support members as this could void the tractor’s OEM warranty.

<table>
<thead>
<tr>
<th>Special Tools Required</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hose Fitting Tools (204-1045)</td>
<td></td>
</tr>
<tr>
<td>Hose Cutting Tool (204-677)</td>
<td></td>
</tr>
<tr>
<td>PAG Refrigerant Oil (203-544)</td>
<td></td>
</tr>
<tr>
<td>Torque Wrench</td>
<td></td>
</tr>
</tbody>
</table>

Locate an area on the exterior of the sleeper to install the condenser assembly that does not interfere with the operation of existing truck components. If possible mount the condenser below the bunk level. This allows easier access to 3/8” bolts with large fender washers inside the sleeper without disturbing interior panels.

1. Measure and mark the exterior center line of the sleeper.
2. Position the supplied template onto the exterior of the sleeper making sure it is level and centered. Mark and drill the 3/8” mounting holes and remove the template.
3. Apply a bead of RTV silicone around each of the six mounting holes.
4. Install the condenser assembly with the supplied 3/8” stainless mounting hardware. Tighten hardware securely.

<table>
<thead>
<tr>
<th>Fitting Size</th>
<th>Torque Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>#6 (3/8”)</td>
<td>11-13 ft-lb (15-17 N•m)</td>
</tr>
<tr>
<td>#8 (1/2”)</td>
<td>15-20 ft-lb (20-27 N•m)</td>
</tr>
</tbody>
</table>
Condenser and Receiver Drier Installation

NOTE: Receiver drier bracket holes are oversize to fit around frame inserts.

5.00 in.
Evaporator/Control Box Installation

PREFERRED LOCATION - FLUSH WITH FRONT BULKHEAD

**IMPORTANT:** Keep all the A/C fittings capped and sealed until the installation of the refrigeration hoses. PVE refrigerant oil is extremely hygroscopic and a system left open for more than 5 minutes may require extensive evacuation time to remove moisture.

Maximum cooling is obtained when evaporator inlet is installed flush with the bulkhead. This allows the hot air from the sleeper to be drawn directly into the return air inlet filter, through the evaporator coil and out the discharge air vents.

- Floors made from fiberglass covered wood construction require the edges of the 3” access hole be completely sealed with fiberglass and epoxy resin.

**Installation**

1. Position template with **RETURN AIR** flush with bulkhead. Mark location of the 7/8” evaporator drain holes and 3” access hole.
   - Remove the template:
     - Drill a 1/4” pilot hole for drain holes followed by a 7/8” step reamer.
     - Drill a 3” access hole. The 3” access hole may also be located outside the template area as shown.

2. Cut and install a piece of split loom (or similar) around the inside edge of the 3” access hole to provide protection for hoses and wiring.

3. Set evaporator in place and determine where return air opening needs to be located on bulkhead.

4. Mark return air opening (9.00 in. x 8.00 in.).
   - Remove evaporator and cut opening in bulkhead.
   - A return air grille (installer supplied) can be installed to the bulkhead if desired.

5. Remove the two top covers from the evaporator/control box.

6. Install the two drain tubes into drain holes located in the base.

7. Secure the evaporator to the floor with TEK screws.

8. From underneath the sleeper:
   - Seal around drain tube access holes with sealing putty or silicone sealant.
   - Apply silicone sealant around the four evaporator mounting screws.
   - Seal any unused holes, cracks, or visible air gaps that might be found.

---

**Special Tools Required**

<table>
<thead>
<tr>
<th>Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drill Motor</td>
</tr>
<tr>
<td>1/4” Drill Bit</td>
</tr>
<tr>
<td>7/8” Step Reamer</td>
</tr>
<tr>
<td>3” dia. Hole Saw</td>
</tr>
<tr>
<td>Reciprocating Saw</td>
</tr>
<tr>
<td>Caulk Gun and RTV Silicone Sealant</td>
</tr>
<tr>
<td>Sealing Putty (203-391)</td>
</tr>
<tr>
<td>Fiberglass Cloth and Resin Kit (if required)</td>
</tr>
</tbody>
</table>

**Template**

The supplied template represent the amount of area needed to accommodate the evaporator/control box and it also provides the locations for the mounting feet, drain holes and the 3” access hole.

**IMPORTANT ACCESS HOLE INFORMATION:**
- The actual location of the 3” access hole will be determined by your particular sleeper construction, including OEM internal floor supports, electrical wiring, etc. The 3” access hole may also be located outside the template area as shown.
- Before drilling any holes, check for interference with internal wires, supports or interior panels. Avoid drilling into the truck’s support members.
Evaporator/Control Box Installation

PREFERRED LOCATION - FLUSH WITH FRONT BULKHEAD

Alternative access hole locations
Evaporator/Control Box Installation

ALTERNATIVE LOCATION - CENTERED UNDER BUNK

**IMPORTANT:** Keep all the A/C fittings capped and sealed until the installation of the refrigeration hoses. PVE refrigerant oil is extremely hygroscopic and a system left open for more than 5 minutes may require extensive evacuation time to remove moisture.

<table>
<thead>
<tr>
<th>Special Tools Required</th>
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<td>Drill Motor</td>
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<td>Sealing Putty (203-391)</td>
</tr>
<tr>
<td>Fiberglass Cloth and Resin Kit (if required)</td>
</tr>
</tbody>
</table>

**Template**
A template is supplied to represent the amount of area needed to accommodate the evaporator/control box and the two discharge hoses. It also provides locations for the four mounting feet, two 7/8” drain holes and the 3” access hole for routing the refrigerant hoses and electrical harnesses.

**IMPORTANT ACCESS HOLE INFORMATION:**
- The actual location of the 3” access hole will be determined by your particular sleeper construction, including OEM internal floor supports, electrical wiring, etc. The 3” access hole may also be located outside the template area as shown.
- Before drilling any holes, check for interference with internal wires, supports or interior panels. Avoid drilling into the truck’s support members.

- Floors made from fiberglass covered wood construction require the edges of the 3” access hole be completely sealed with fiberglass and epoxy resin.

**Installation**
1. Position the template under the bunk with the RETURN AIR facing forward. Mark the location of the 7/8” evaporator drain holes and the 3” access hole. Remove the template:
   - Drill 1/4” pilot hole for the drain holes followed by a 7/8”.
   - Drill 3” access hole. The 3” access hole may also be located outside the template area as shown.
2. Cut and install a piece of split loom (or similar) around the inside edge of the 3” access hole to provide protection for the hoses and wiring.
3. Remove the two top covers from the evaporator/control box.
4. Install the two drain tubes into drain holes located in the base.
5. Secure the evaporator to the floor with TEK screws.
6. Mark return air opening (9.00 in. x 8.00 in.) on the bulkhead.
   - A return air grille (installer supplied) can be installed to the bulkhead if desired.
7. From underneath the sleeper:
   - Seal around the drain tube access holes with sealing putty or silicone sealant.
   - Apply silicone sealant around the four evaporator mounting screws.
   - Seal any unused holes, cracks, or visible air gaps that might be found.
Evaporator/Control Box Installation

ALTERNATIVE LOCATION - CENTERED UNDER BUNK

Alternative access hole locations
Evaporator/Control Box Installation

ALTERNATIVE LOCATION - SIDEWAYS UNDER BUNK

IMPORTANT: Keep all the A/C fittings capped and sealed until the installation of the refrigeration hoses. PVE refrigerant oil is extremely hygroscopic and a system left open for more than 5 minutes may require extensive evacuation time to remove moisture.

<table>
<thead>
<tr>
<th>Special Tools Required</th>
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</thead>
<tbody>
<tr>
<td>Drill Motor</td>
</tr>
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</tr>
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</tr>
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</tr>
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<td>Fiberglass Cloth and Resin Kit (if required)</td>
</tr>
</tbody>
</table>

Template

A template is supplied to represent the amount of area needed to accommodate the evaporator/control box and the two discharge hoses. It also provides locations for the four mounting feet, two 7/8” drain holes and the 3” access hole for routing the refrigerant hoses and electrical harnesses.

IMPORTANT ACCESS HOLE INFORMATION:

- The actual location of the 3” access hole will be determined by your particular sleeper construction, including OEM internal floor supports, electrical wiring, etc. The 3” access hole may also be located outside the template area as shown.
- Before drilling any holes, check for interference with internal wires, supports or interior panels. Avoid drilling into the truck’s support members.
- Floors made from fiberglass covered wood construction require the edges of the 3” access hole be completely sealed with fiberglass and epoxy resin.

Installation

1. Position the template under the bunk with the RETURN AIR facing sideways as shown. With the evaporator in this position the heat sink will face towards the rear.

NOTE: The location chosen must allow a minimum of 2.00 in. (50.8mm) of space in front of the return air grille.

- Mark the location of the 7/8” evaporator drain holes and the 3” access hole. Remove the template.
- Drill 1/4” pilot hole for the drain holes followed by a 7/8”.
- Drill 3” access hole. The 3” access hole may also be located outside the template area as shown.

2. Cut and install a piece of split loom (or similar) around the inside edge of the 3” access hole to provide protection for the hoses and wiring.

3. Remove the two top covers from the evaporator/control box.

4. Install the two drain tubes into drain holes located in the base.

5. Secure the evaporator to the floor with TEK screws.

6. From underneath the sleeper:

- Seal around the drain tube access holes with sealing putty or silicone sealant.
- Apply silicone sealant around the four evaporator mounting screws.
- Seal any unused holes, cracks, or visible air gaps that might be found.
Evaporator/Control Box Installation

ALTERNATIVE LOCATION - SIDEWAYS UNDER BUNK

Alternative access hole location
Fabricating Refrigeration Hoses

TK 2000 Assembly System
The TK 2000 System is designed for assembly with Multi-Refrigerant hose only.

Assembly Materials Checklist
- Hose Fitting Tool (204-1045)
- Hose Cutting Tools (204-677)
- TK 2000 Multi-Refrigerant Hose
- Nipple Assembly
- Appropriately Sized Clips and Cage
- POE Refrigerant Oil

*NOTE:* The two black O-rings on the nipple assembly are of a specific rubber compound and size. They should not be removed or replaced.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Hose</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Cage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Clips</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Nipple with internal O-ring</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Fabricating Refrigeration Hoses

Cut the Hose

1. Cut the hose to proper length with an appropriate cutting tool. Hand-held hose cutter (204-677) has been specially designed for cutting all non-wire reinforced hose, such as TK 2000 Multi-Refrigerant hose. Be sure the cut is made square to the hose length.

Slip on Two Clamps

2. Install two proper-size clips onto the cut end of the hose. Orientation of the clips does not affect the performance of the connection. However for ease of assembly, both clips should have the same orientation.

⚠️ CAUTION: Failure to slide the clips over the hose at this time will require the clips to be stretched over the hose or fitting later. This may permanently damage the clip.
Oil the Nipple

3. Lubricate the nipple with a generous amount of the POE refrigeration lubricating oil. This MUST be done to lower the force of nipple insertion.

4. Insert the nipple into the hose. To ensure that the nipple is fully inserted, check the gap between the cut end of the hose and the shoulder on the nipple. Care should be taken to avoid kinking or other damage to the hose during nipple insertion.

   NOTE: Be sure to wipe excess oil from the nipple and hose.
Snap on the Cage.
5. Snap the cage into the groove on the nipple. The arms should extend over the hose length. When the cage has been carefully installed in the cage groove, the cage will be able to rotate in the groove. This step must be performed to ensure:
   • The clips will be located over the O-ring on the nipple.
   • The connection will be compatible with the connection’s pressure rating.

Slide the Clips
6. Slide the clips over the cage arms and into the channels on each arm.

Close the Clips
7. Use the fitting tool (204-1045 or 204-1128) to close the clips. The pliers should be positioned squarely on the clip connection points and should remain square during the closing of the clip.

NOTE: For easiest assembly, the clasp should be closed between the cage arms.
Fabricating Refrigeration Hoses

Nose of the pliers should be firmly seated under the assembly bump and lock latch.

If the pliers are not kept square during closing the clip, the clasp may have an offset. Use the piers to correct the clasp alignment.
CAUTION: TK 2000 Speedy Clip System components should not be reused. Failure to follow these instructions and/or the use of TK 2000 Speedy Clip System hose with fittings supplied by other manufacturers could result in sudden or unintended escape of refrigerant gases. Personal injury and/or violations of EPA regulations may occur as a consequence.

NOTE: Thermo King recommends adherence to all guidelines, including EPA guidelines concerning the service of refrigerant systems.
A/C Hose Installation

Installation

IMPORTANT: Keep all the A/C fittings capped and sealed until the installation of the refrigeration hoses. PVE refrigerant oil is extremely hygroscopic and a system left open for more than 5 minutes may require extensive evacuation time to remove moisture.

NOTE: The evaporator/control box system has a Nitrogen holding charge of 5 PSI. This holding charge can safely be vented into the atmosphere.

NOTE: Read and understand “Fabricating Refrigeration Hoses” on page 34 for proper hose fabrication requirements. Always use two wrenches while tightening refrigeration fittings.

Condenser Coil to Evaporator/Control Box

1. Fabricate a #8 hose with a 90 degree fitting and connect to the #8 fitting on the condenser coil. Tighten the fitting to 15-20 ft-lb (20-27 N•m).
   - Route the hose up through the 3” access hole in the tractor floor and into the evaporator/control box.

2. Cut the hose to length, install a 45 degree fitting and attach it to the #8 fitting on the compressor. Tighten the fitting to 15 to 20 ft-lb (20 to 27 N•m).

Receiver Drier to Evaporator/Control Box

3. Fabricate a #6 hose with a 90 degree fitting and attach onto the OUTLET fitting on the receiver drier. Tighten the fitting to 11 to 13 ft-lb (15 to 17 N•m).
   - Route the hose up through the 3” access hole in the tractor floor and into the evaporator/control box.

4. Cut the hose to length, install a 45 degree fitting and attach onto the #6 fitting on the compressor. Tighten the fitting to 11 to 13 ft-lb (15 to 17 N•m).

5. Secure all hoses adequately with clamps or band wraps.
A/C Hose Installation
A/C System Evacuation and Leak Check Procedures

System Evacuation Procedures

<table>
<thead>
<tr>
<th>Special Tools Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacuum Pump (204-713) or equivalent</td>
</tr>
<tr>
<td>Micron Gauge (204-720) or equivalent</td>
</tr>
<tr>
<td>Electronic Leak Detector (204-756)</td>
</tr>
<tr>
<td>Gauge Set with R134a Adapters</td>
</tr>
</tbody>
</table>

**IMPORTANT:** Always use recommended vacuum equipment. Before each use, check that there are no leaks in the vacuum equipment either in the pump itself or in the hoses. The oil in the evacuation station vacuum pump should be changed after each use.

1. Connect gauge manifold to suction and discharge service ports of compressor.
2. Connect service line of the gauge manifold to vacuum pump and micron gauge.
3. Open gauge manifold and vacuum pump valves and gauge manifold hand valves.
4. Start vacuum pump and evacuate until system reaches 500 microns.
5. Once system reaches 500 microns, continue evacuation for **one additional hour**.
6. If it stops in a vacuum continue to evacuate for an additional 30 minutes and recheck. If it stops lower, continue to evacuate system.

**NOTE:** While the system is being evacuated, continue the installation with “D2 Heater Installation” on page 44.

7. Close vacuum pump valve, switch off pump, checking that the gauge reading for the vacuum pump does not exceed **2000 microns** in the following five minutes. If vacuum level exceeds 2000 microns before five minutes, and continues to rise, proceed to the Leak Check Procedures section. If it stops in a vacuum continue to evacuate for an additional 30 minutes.
8. If vacuum level remains below 2000 microns for 5 minutes the system is leak free and ready to be filled with refrigerant.
9. Close manifold hand valves and remove evacuation equipment.

**Leak Check Procedures**

1. Add vapor R-134a to the unit until bottle pressure is reached.
2. Thoroughly leak check the system with an electronic leak detector.
3. If leak(s) are found, recover leak check charge.
4. Repair any leaks and re-evacuate system.
A/C System Evacuation and Leak Check Procedures
D2 Heater Installation

Heater Location

**IMPORTANT:** Correct installation of this heater is necessary to ensure safe and proper operation. **BEFORE** installing the heater, thoroughly read and understand “Heater Safety Precautions” on page 8 of this manual along with the heater manufacturer’s manuals included with the heater.

The location for mounting the heater will vary depending on the type of tractor. Typically the heater is mounted inside the sleeper, under the bunk in a storage compartment. However, the heater may be mounted anywhere inside the tractor provided you adhere to the following conditions:

- Install heater so it will maintain a minimum distance of 2.00 inches (50.8 mm) from any heat sensitive or flammable material.
- Combustion air intake, exhaust and fuel inlet must be located outside the tractor.
- Install exhaust hose so it will maintain a minimum distance of 2.00 inches (50.8 mm) from any heat sensitive or flammable material.
- Heater must be mounted on flat horizontal surface providing an air tight seal between heater and tractor.
- All floor matting, carpet, insulation, etc. must be removed to allow the heater to be mounted directly to the bare floor.
- Heater harness may be repositioned to either side of the heater.
- Floors made of fiberglass covered wood construction require the edges of the access hole be sealed with fiberglass and epoxy resin.

Drilling Hole In Floor

<table>
<thead>
<tr>
<th>Special Tools Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drill Motor</td>
</tr>
<tr>
<td>Utility Knife</td>
</tr>
<tr>
<td>Center Punch</td>
</tr>
<tr>
<td>4-1/4” dia. Hole Saw</td>
</tr>
<tr>
<td>Fiberglass Cloth and Resin Kit (if required)</td>
</tr>
</tbody>
</table>

1. Position the heater’s metal mounting plate onto the floor mat.
2. Use a utility knife to cut the floor mat around the outside edges of the plate. Remove floor mat to access the bare floor.
3. With the mounting plate in position, center punch the four outer holes. Remove the mounting plate and mark an “X” connecting the four center punched outer holes.
4. Center punch the center of the “X” and drill a 4-1/4” hole with a hole saw.
D2 Heater Installation
D2 Heater Installation

Heater Subassembly

Turn the heater upside down and attach the following components:

1. Snap the Air Outlet Hood onto the end of the heater.
2. Install the mounting plate with nuts and lock washers and tighten securely.
3. Attach the short rubber hose and clamps onto the fuel inlet connection located at the base of the heater.
4. Insert the plastic fuel line all the way into the rubber hose until it bottoms out to prevent air gaps. Tighten both hose clamps securely.

*NOTE: The exhaust and intake hose are not interchangeable. They are different in size, type of clamps and end caps. Make sure the correct hose and clamp is installed on the proper heater fitting. All clamps must be turned to the center to allow clearance to go through the 4-1/2” mounting hole.*

5. Attach the **silver exhaust hose** and **metal clamp** onto the fitting located under the **OUTLET** end of the heater. Turn metal clamp to the center and tighten securely.
6. Attach the **black air intake hose** and **hose clamp** onto the fitting located under the **INLET** end of the heater. Turn hose clamp to the center and tighten securely.
7. Install gasket to mounting plate.
8. The heater has two service data nameplates. Remove one and reinstall it onto the top of the heater so that it is visible when the heater is installed.

Heater Installation

9. Position the heater over the access hole with intake hose, exhaust hose and fuel line exiting the tractor.
10. Attach the heater to the floor with TEK screws and tighten securely.

*NOTE: Tighten TEK screws sufficiently to ensure a positive seal between mounting plate and mounting surface. Do not over tighten!*

11. From underneath the sleeper:

- Apply silicone sealant around **ONLY** the four heater mounting screws. **DO NOT** apply any sealant around the access hole!
D2 Heater Installation
D2 Heater Installation

Exhaust and Combustion Air Intake Hose Routing

**IMPORTANT:** Correct installation of this heater is necessary to ensure safe and proper operation. **BEFORE** installing the heater, thoroughly read and understand “Heater Safety Precautions” on page 8 of this manual along with the heater manufacturer’s manuals included with the heater.

**DANGER:** The correct installation of the exhaust and combustion air intake hoses is extremely important to prevent carbon monoxide poisoning or asphyxiation.

**EXTREME CARE MUST BE TAKEN TO:**

- Route the exhaust and combustion air intake hoses so they cannot be plugged by dirt, water or snow.
- Ensure the intake and exhaust hose outlets do not face into the tractor’s slip stream to prevent “ram air” effect.
- Keep exhaust and combustion air intake hoses a minimum of 12” apart.
- Install exhaust hose so it will maintain a minimum distance of 2.00 inches (50.8 mm) from any heat sensitive or flammable material.
- The exhaust hose should be mounted slightly downwards to help drain off condensation.
- Install the protective caps onto the ends of the intake and exhaust hoses.
- Route the exhaust hose to an open area to the rear or side of the tractor so fumes cannot build up and enter the cab or the combustion air inlet hose to the heater.
- **DO NOT** mount the intake or exhaust hoses the tractor’s frame. They must be installed to the cab to allow for movement.

Installation

1. Route the **silver exhaust hose** to an open area to the rear or side of the tractor positioned slightly downwards to help drain off condensation and secure with clamps.
   
   **NOTE:** Drill a 1/8” hole in exhaust hose if necessary to allow for water drainage.

2. Attach **metal** end cap to exhaust hose.

3. Route the **black air intake hose** towards the front underside of the tractor where it can pick up clean, fresh, moisture free air. Form a “U” bend at the inlet end of the hose and secure with clamps or band wraps.

4. Attach **plastic** end cap to intake hose.

   **NOTE:** Combustion air intake and exhaust lengths can be shortened to a minimum of 8” if required.

**DANGER:** The exhaust hose outlet must exit at least 3 feet from the A/C evaporator drains located under the tractor to prevent carbon monoxide poisoning or asphyxiation.

**ALWAYS VERIFY** the two water valves (kazoos) are installed onto the evaporator drain tubes and are secured with hose clamps.
D2 Heater Installation
D2 Heater Duct Installation

Duct Locations

⚠️ ENSURE SUPPLIED HEATER DUCT HOSE ONLY!
- Do not use existing vehicle ducts or outlets. Ducts and outlets must be capable of withstanding a minimum of 300°F (148.9°C) operating temperatures.
- Adjustable air vent must always be installed so it cannot blow hot air directly at living creatures (people, animals) or objects sensitive to temperature.
- Do not position outlet so that it will blow hot air directly at operator or at thermostat.
- Position air outlet so that it cannot be obstructed.
- Use the supplied protective air intake grille on the air inlet side of the heater to prevent objects from being sucked in.
- Do not overtighten duct clamps.
- DO NOT lay or bundle the heater ducts with A/C ducts. They should not touch each other.
- Ensure provisions are made for proper air return ventilation.

The heater is equipped with a Return Inlet and Discharge Outlet for attaching the flexible heater duct hoses.

IMPORTANT: A return air duct to the heater should be provided for best heating efficiency.

- Return Inlet must be provided to return air to the heater. It is typically mounted at the base of the bunk directly opposite the discharge outlet vent.
- Discharge Outlet should be located at floor level to provide maximum heating comfort in the sleeper. It is typically installed at the base of the bunk on one end.
- Heater ducts should be installed and routed with smooth bends and no kinks to provide maximum airflow.

Installation

<table>
<thead>
<tr>
<th>Special Tools Required</th>
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</thead>
<tbody>
<tr>
<td>Drill Motor</td>
</tr>
<tr>
<td>2-1/2” Hole Saw (for installing discharge air vent and return air grille)</td>
</tr>
<tr>
<td>3” Hole Saw (for routing ducts through compartment walls if required)</td>
</tr>
</tbody>
</table>

Discharge Air

1. Find an appropriate location for the floor level discharge air vent and drill a 2-1/2” hole using the correct hole saw.
   - Unsnap rotating outer louver assembly from the mounting base.
   - Install the base into 2-1/2” hole and secure with supplied screws.
   - Reinstall rotating outer louver assembly back into the mounting base ring. Verify that it rotates freely.
2. Attach one end of the heater duct to the discharge outlet hood on the heater and secure with supplied clamp.
3. Route the heater duct to the floor level discharge air vent, cut as needed, attach to the end of the plastic louver vent and secure with supplied hose clamp.

Return Air

4. If a return air duct is not used, the protective grille must be installed onto the heater outlet.
5. Find an appropriate location for the floor level return air grille and drill a 2-1/2” hole using the correct hole saw.
   - Install the return air grille into the 2-1/2” hole and secure with supplied screws.
6. Attach one end of the return air duct to the air inlet hood on the heater and secure with supplied clamp.
   - Route the return air duct to the return air grille, cut as needed, attach to the end of the plastic louver vent and secure with supplied hose clamp.
D2 Heater Duct Installation
D4 High Output Heater Installation (Option)

Heater Location

*IMPORTANT: Correct installation of this heater is necessary to ensure safe and proper operation. BEFORE installing the heater, thoroughly read and understand “Heater Safety Precautions” on page 8 of this manual along with the heater manufacturer’s manuals included with the heater.*

The location for mounting the heater will vary depending on the type of tractor. Typically the heater is mounted inside the sleeper, under the bunk in a storage compartment. However, the heater may be mounted anywhere inside the tractor provided you adhere to the following conditions:

- Install heater so it will maintain a minimum distance of 2.00 inches (50.8 mm) from any heat sensitive or flammable material.
- Combustion air intake, exhaust and fuel inlet must be located outside the tractor.
- Install exhaust hose so it will maintain a minimum distance of 2.00 inches (50.8 mm) from any heat sensitive or flammable material.
- Heater must be mounted on flat horizontal surface providing an airtight seal between heater and tractor.
- All floor matting, carpet, insulation, etc. must be removed to allow the heater to be mounted directly to the bare floor.
- Heater harness may be repositioned to either side of the heater.
- Floors made of fiberglass covered wood construction require the edges of the access hole be sealed with fiberglass and epoxy resin.

Drilling Hole In Floor

<table>
<thead>
<tr>
<th>Special Tools Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drill Motor</td>
</tr>
<tr>
<td>Utility Knife</td>
</tr>
<tr>
<td>Center Punch</td>
</tr>
<tr>
<td>4-1/4” dia. Hole Saw</td>
</tr>
<tr>
<td>Fiberglass Cloth and Resin Kit (if required)</td>
</tr>
</tbody>
</table>

1. Position the heater’s metal mounting plate onto the floor mat.
2. Use a utility knife to cut the floor mat around the outside edges of the plate. Remove floor mat to access the bare floor.
3. With the mounting plate in position, center punch the four outer holes. Remove the mounting plate and mark an “X” connecting the four center punched outer holes.
4. Center punch the center of the “X” and drill a 4-1/4” hole with a hole saw.
D4 High Output Heater Installation (Option)
D4 High Output Heater Installation (Option)

Heater Subassembly

Turn the heater upside down and attach the following components:

1. Snap the Air Outlet Hood onto the end of the heater.
2. Install the mounting plate with nuts and lock washers and tighten securely.
3. Attach the short rubber hose and clamps onto the fuel inlet connection located at the base of the heater.
4. Insert the plastic fuel line all the way into the rubber hose until it bottoms out to prevent air gaps. Tighten both hose clamps securely.

*NOTE: The exhaust and intake hose are not interchangeable. They are different in size, type of clamps and end caps. Make sure the correct hose and clamp is installed on the proper heater fitting. All clamps must be turned to the center to allow clearance to go through the 4-1/2” mounting hole.*

5. Attach the silver exhaust hose and metal clamp onto the fitting located under the OUTLET end of the heater. Turn metal clamp to the center and tighten securely.
6. Attach the black air intake hose and hose clamp onto the fitting located under the INLET end of the heater. Turn hose clamp to the center and tighten securely.
7. Install gasket to mounting plate.
8. The heater has two service data nameplates. Remove one and reinstall it onto the top of the heater so that it is visible when the heater is installed.

Heater Installation

9. Position the heater over the access hole with intake hose, exhaust hose and fuel line exiting the tractor.
10. Attach the heater to the floor with TEK screws and tighten securely.

*NOTE: Tighten TEK screws sufficiently to ensure a positive seal between mounting plate and mounting surface. Do not over tighten!*

11. From underneath the sleeper:

   • Apply silicone sealant around ONLY the four heater mounting screws. DO NOT apply any sealant around the access hole!
D4 High Output Heater Installation (Option)
D4 High Output Heater Installation (Option)

Exhaust and Combustion Air Intake Hose Routing

**IMPORTANT:** Correct installation of this heater is necessary to ensure safe and proper operation. BEFORE installing the heater, thoroughly read and understand “Heater Safety Precautions” on page 8 of this manual along with the heater manufacturer’s manuals included with the heater.

**DANGER:** The correct installation of the exhaust and combustion air intake hoses is extremely important to prevent carbon monoxide poisoning or asphyxiation.

**EXTREME CARE MUST BE TAKEN TO:**
- Route the exhaust and combustion air intake hoses so they cannot be plugged by dirt, water or snow.
- Ensure the intake and exhaust hose outlets do not face into the tractor’s slip stream to prevent “ram air” effect.
- Keep exhaust and combustion air intake a minimum of 12” apart.
- Install exhaust hose so it will maintain a minimum distance of 2.00 inches (50.8 mm) from any heat sensitive or flammable material.
- The exhaust tube should be mounted slightly downwards to help drain off condensation.
- Install the protective caps onto the ends of the intake and exhaust hoses.
- Route the exhaust tube to an open area to the rear or side of the tractor so fumes cannot build up and enter the cab or the combustion air inlet hose to the heater.
- **DO NOT** mount the intake or exhaust hoses the tractor’s frame. They must be installed to the cab to allow for movement.

**Installation**

1. Route the **silver exhaust hose** to an open area to the rear or side of the tractor positioned slightly downwards to help drain off condensation and secure with clamps.
   
   **NOTE:** Drill a 1/8” hole in exhaust hose if necessary to allow for water drainage.

2. Attach **metal** end cap to exhaust hose.

3. Route the **black air intake hose** towards the front underside of the tractor where it can pick up clean, fresh, moisture free air. Form a “U” bend at the inlet end of the hose and secure with clamps or band wraps.

4. Attach **plastic** end cap to intake hose.

   **NOTE:** Combustion air intake and exhaust lengths can be shortened to a minimum of 8” if required.
D4 High Output Heater Installation (Option)
D4 High Output Heater Duct Installation (Option)

Duct Locations

**CAUTION:**
- **USE SUPPLIED HEATER DUCT HOSE ONLY!** Do not use existing vehicle ducts or outlets. Ducts and outlets must be capable of withstanding a minimum of 300F (148.9C) operating temperatures.
- Adjustable air vent must always be installed so it cannot blow hot air directly at living creatures (people, animals) or objects sensitive to temperature.
- Do not position outlet so that it will blow hot air directly at operator or at thermostat.
- Position air outlet so that it cannot be obstructed.
- Use the supplied protective air intake grille on the air inlet side of the heater to prevent objects from being sucked in.
- Do not overtighten duct clamps.
- **DO NOT lay or bundle the heater ducts with A/C ducts. They should not touch each other.**
- Ensure provisions are made for proper air return ventilation.

The heater is equipped with a **Return Inlet** and **Discharge Outlet** for attaching the flexible heater duct hoses.

**IMPORTANT:** A return air duct to the heater should be provided for best heating efficiency.
- **Return Inlet** must be provided to return air to the heater. It is typically mounted at the base of the bunk directly **opposite** the discharge outlet vent.
- **Discharge Outlet** should be located at floor level to provide maximum heating comfort in the sleeper. It is typically installed at the base of the bunk on one end.
- Heater ducts should be installed and routed with smooth bends and no kinks to provide maximum airflow.

Installation

<table>
<thead>
<tr>
<th>Special Tools Required</th>
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</thead>
<tbody>
<tr>
<td>Drill Motor</td>
</tr>
<tr>
<td>4” Hole Saw (for installing discharge air vent, return air grille and for routing ducts through compartment walls if required)</td>
</tr>
</tbody>
</table>

**Discharge Air**

1. Find an appropriate location for the floor level **discharge air vent** and drill a 4” hole using the correct hole saw.
   - Unsnap rotating outer louver assembly from the mounting base.
   - Install the base into 4” hole and secure with supplied screws.
   - Reinstall rotating outer louver assembly back into the mounting base ring. Verify that it rotates freely.

2. Attach one end of the heater duct to the discharge outlet hood on the heater and secure with supplied clamp.

3. Route the heater duct to the floor level discharge air vent, cut as needed, attach to the end of the plastic louver vent and secure with supplied hose clamp.

**Return Air**

4. If a return air duct is not used, the protective grille must be installed onto the heater outlet.

5. Find an appropriate location for the floor level **return air grille** and drill a 4” hole using the correct hole saw.
   - Install the return air grille into the 4” hole and secure with supplied screws.

6. Attach one end of the return air duct to the air inlet hood on the heater and secure with supplied clamp.

7. Route the return air duct to the return air grille, cut as needed, attach to the end of the plastic louver vent and secure with supplied hose clamp.
D4 High Output Heater Duct Installation (Option)
A/C Duct Installation

A/C Vent Locations
The evaporator is equipped with two air discharge outlets to attach the supplied flexible air ducts. The ducts will be attached to plastic air vents that should be located and installed to provide maximum air circulation in the sleeper. Suggested locations of the air vents:

- MEDIUM (above lower bunk level)
- HIGH (above upper bunk level)
- Alternative Location - LOW (floor level)

*NOTE: A/C air ducts and vents are typically routed and installed through closets or storage compartments.*

*IMPORTANT: Extreme care should always be taken when drilling holes in the various types of material found in sleepers such as plastic, steel, aluminum, and upholstery.*

Installation

<table>
<thead>
<tr>
<th>Special Tools Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drill Motor</td>
</tr>
<tr>
<td>4-1/4” diameter Hole Saw (for installing plastic A/C louver vents and for routing ducts through compartment walls)</td>
</tr>
</tbody>
</table>

1. From inside the evaporator, install the **short style** hose adapters into each air discharge outlet.

   **For Side Mounted Evaporators** - Unsnap the rotating outer louver assembly from the hose adapter, reinstall the louver into a **short style** hose adapter and install it into the front air discharge outlet. Install a short style hose dapper into the rear air discharge outlet.

2. Find appropriate locations for the A/C vent(s) inside the sleeper and drill 4-1/4” diameter hole(s).

3. Attach the flexible air duct onto hose adapter(s) and secure with a supplied hose clamp.

4. Route the flexible air duct through the A/C vent hole. Cut excess duct as needed.

5. Unsnap rotating outer louver assembly from the mounting base.

6. Attach to flexible air duct to the end of the hose adapter with band wraps.

7. Push the hose adapter back into 4-1/4” mounting hole and secure with supplied screws.

8. Reinstall rotating outer louver assembly back into the hose adapter and verify that it rotates freely.

9. Verify flexible ducts are installed and routed with smooth bends and no kinks to provide maximum airflow.

10. Secure flexible ducts with large band wraps to prevent excess movement.
A/C Duct Installation

FLUSH MOUNTED EVAPORATOR

SIDE MOUNTED EVAPORATOR

HIGH

MEDIUM

LOW (Alternative Location)

HIGH
Main Harness Installation

Installation

IMPORTANT: Before making any electrical connections, confirm the heater and battery cables are not connected to the batteries.

NOTE: Excessive harnesses lengths should be doubled up and secured with band wraps. DO NOT CUT THE WIRE HARNESS!

NOTE: Always check the male pins for straightness before attempting to mate connectors. If any resistance is felt when mating the connector: recheck the male pin alignment. Exercise care when mating the connections to circuit boards.

Route the two (2) main harnesses attached to the battery box up through the 3” access hole in the tractor floor and into the evaporator/control box.

Compressor Controller Board

1. Connect the 28V terminal lug to the stud marked POS. Tighten the nut to 18 in-lbs.(2.0 N•m).

2. Connect the CH02 terminal lug to the stud marked NEG. Tighten the nut to 18 in-lbs.(2.0 N•m).

IMPORTANT: Make sure the two terminal lugs are not touching each other!

Main Controller Board

3. Connect the #2 terminal lug to stud marked 2. Tighten the nut to 18 in-lbs.(2.0 N•m).

4. Connect the CH01 terminal lug to stud marked CH. Tighten the nut to 20 in-lbs.(2.25 N•m).

5. Connect the 20-pin connector to BATT BOX (J37) connection.
Main Harness Installation

Main Controller Board

Compressor Controller Board

J37

CH

1

2

3

4

5

63
Condenser Fan and Sensor Harness Installation

Installation

**IMPORTANT:** Before making any electrical connections, confirm the Heater and battery cables are not connected to the batteries.

**NOTE:** Excessive harnesses lengths should be doubled up and secured with band wraps. **DO NOT CUT THE WIRE HARNESS!!**

**NOTE:** Always check the male pins for straightness before attempting to mate connectors. If any resistance is felt when mating the connector: recheck the male pin alignment. Exercise care when mating the connections to circuit boards.

Main Controller Board

Locate the **Condenser Fan and Sensor** harness supplied loose in the installation kit. Make the following connections at the **Main Controller Board** located inside the evaporator/control box:

1. Connect the **6-pin** connector to the **COND FAN (J59)** connector pins.
2. Route the harness down through the 3” access hole in the tractor floor and out to the condenser fan.
3. Connect the **4-pin** connector to the matting connector on the condenser fan.
4. Attach the Ambient Air Sensor to the **inside** of the receiver drier bracket with the supplied clamp and mounting hardware. **NOTE:** Always install the sensor to the inside of the drier bracket for best temperature readings and to protect it from damage.
5. Secure all harness adequately with insulated clamps or band wraps.
Condenser Fan and Sensor Harness Installation
Ignition Switch and Harness Installation

Installation

IMPORTANT: The Ignition Sense harness wire must be connected to the ON or RUN position of the tractor’s ignition switch. This will prevent the APU from operating when the tractor’s engine is running.

Locate the Ignition Sense harness supplied loose in the installation kit.

1. Connect end of the harness without the diode and fuse to the IGN connector pin (J70) on the Main Controller Board inside the evaporator/control box.

2. Route the harness out of the rubber grommet on the side of the evaporator/control box towards the tractor’s ignition switch.

3. Connect the end with the diode and fuse to the ON or RUN position of the tractor’s ignition switch.

4. Secure the harness adequately with band wraps.
Ignition Switch and Harness Installation

Main Controller Board

IGN

1

2

3

ARD702
HMI Installation

HMI Controller Location
Choose a location inside the tractor’s sleeper for the HMI controller that is easily accessible and visible from the drivers bunk.

Installation

<table>
<thead>
<tr>
<th>Special Tools Required</th>
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</thead>
<tbody>
<tr>
<td>Level</td>
</tr>
<tr>
<td>Drill Motor</td>
</tr>
<tr>
<td>Drill Bits</td>
</tr>
</tbody>
</table>

Locate the **HMI Controller Harness** with the **8-pin** connectors on each end supplied loose in the installation kit.

1. Route the harness into the evaporator /control box through the rubber grommet on the side.

2. Connect the **8-pin** connector to the **HMI** connector (**J34**) on the Main Controller Board.

3. From the evaporator/control box, route the harness behind the interior walls (if applicable) to the location chosen to install the HMI controller.

4. Unsnap the rear mounting base from the controller and route the harness connector through the access hole.
   - Position and level the mounting base and install securely.

5. Push the connector firmly into the rear of the controller and snap the controller back onto the mounting base.
HMI Installation
Heater Harness Installation

Installation

Locate the **Heater Harness** supplied loose in the installation kit. Remove the two small plastic bags attached to the harness containing the fuel pump electrical connector components and the in-line fuse assembly. Retain these for installation later.

1. Connect the **14-pin** connector (with the locking tab) to the mating connector on the heater:
   - use a large bladed screwdriver to pull the locking tab out (**to unlock**) from the connector body.
   - connect the two connectors together.
   - push locking tab back in (**to lock**) the connector body.

2. Route the other **14-pin** connector and the **2-pin** connector into the evaporator/control box through the rubber grommet on the side.

3. Connect the **14-pin** connector to the **HEATER CONTROL (J54)** connection on the Main Controller Board.

4. Connect the **2-pin** power wire connector to the **HEATER POWER (J65)** connection on the Main Controller Board.

5. Route the **fuel pump harness** out of the sleeper through the 3” access hole. It will be assembled and connected to the fuel pump in a later step.

*NOTE: The Diagnostic Connector is only used for diagnostic purposes.*
Heater Harness Installation
Auxiliary AC Power Accessories (Optional)

1000 Watt Pure Sine Wave Power Inverter Only
Follow the detailed installation instructions (TK-54590-19-IM) supplied with the 1000 Watt Power Inverter.

AC/DC Power Converter Only
Follow the detailed installation instructions (TK-54590-19-IM) supplied with the AC/DC Power Converter.

Dual System - 1000 Watt Pure Sine Wave Power Inverter and AC/DC Power Converter
Follow the detailed installation instructions (TK-54590-19-IM) supplied with the 1000 Watt Power Inverter and AC/DC Power Converter.
Auxiliary AC Power Accessories (Optional)

**IMPORTANT:**
The tractor’s battery power cables must always be connected directly to the POWER INVERTER.
Fuel Pickup Tube Installation

DIRECT TANK INSTALLATION - NO DRILLING

OEM Fuel Tank Fittings

**DANGER:** Use caution when working in or around the area of the diesel fuel tank. Diesel fuel vapors are potentially explosive. Do not smoke while working near the diesel fuel tank.

**NOTE:** Some fuel tanks may have auxiliary fuel connections or 1/4'' NPT connections factory installed. These fitting eliminate the need to drill into the fuel tank to install the heater’s fuel pickup tube.

- **OEM Fuel Connections** - Route and connect the heater’s fuel supply line to one of these fittings.
- **OEM 1/4'' NPT Fitting** - See following installation instructions.

<table>
<thead>
<tr>
<th>Special Tools Required</th>
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<tbody>
<tr>
<td>Tape Measure</td>
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<tr>
<td>Tubing Cutter</td>
</tr>
</tbody>
</table>

**Installation**

**NOTE:** The tank mounted fuel pump bracket cannot be used on direct tank installations. The supplied remote mounted L-bracket must be used.

1. Remove the nut, washers and bushing assembly from the fuel pickup tube as shown. The nut, washers and bushing assembly will not be used.
2. Remove the 1/4” NPT fitting from fuel pickup tube and install it into the fuel tank’s 1/4” NPT fitting securely.
3. Measure the fuel tank diameter and cut the pickup tube 3” shorter.
4. Install the pickup tube with the ferrule nut into the tank.
   - Position the pickup tube as needed to facilitate fuel line connections and tighten ferrule nut securely.
5. Install the supplied warning nameplate onto the fuel tank in a visible area near the fuel cap.

**Important Installation Tips**

- Remove the protective caps from the ends of the pickup tube prior to installation.
- Do not apply any type of sealant material to the fuel pickup tube assembly. Doing so will result in plugged fuel lines.
Fuel Pickup Tube Installation

DIRECT TANK INSTALLATION - NO DRILLING

Nut, washers and bushing assembly not used.

OEM 1/4" NPT Tank Fitting

Ferrule Nut 1/4" NPT Fitting

3.00 in. (76.2 mm)

WARNING
- EXPLOSION AND FIRE HAZARD FROM ELECTRIC HVAC AND IN-CAB HEATER SPARKS
- SHUT OFF TRIPAC-E AND IN-CAB HEATER BEFORE REFUELING
Fuel Pickup Tube Installation

**ALTERNATIVE INSTALLATION - DRILLING HOLE IN FUEL TANK**

**Installation**

1. Measure and mark the mounting holes on the fuel tank as shown.
2. Drill (2) 0.25” outer holes first followed by the 1.00” center hole.
   - Thoroughly clean and flush the tank to remove any chips.
3. Measure the fuel tank diameter and cut the pickup tube 3” shorter.
   - With the pickup tube positioned at the correct height, place a wrench on the flats of the bushing and tighten the 1/4” NPT fitting and the ferrule nut securely.
4. Remove the large nut, metal cupped washer and rubber washer from the bushing assembly.
   - Insert the fuel pickup tube (with the reinforcing washer) into the tank using the slot created by the two 0.25” holes.
   - Lift the pickup tube and bushing into position through the 1.00” hole.
   - Hold the pickup tube in place and reinstall the rubber washer, metal cupped washer, fuel pump bracket and large nut onto the bushing. Hand tighten the large nut.
   - Position the pickup tube as needed to facilitate fuel line connections.
   - Place a wrench on the flats of the bushing and tighten the large nut securely.
5. Install the supplied warning nameplate onto the fuel tank in a visible area near the fuel cap.

**Important Installation Tips**

- Check for internal baffles inside the fuel tank BEFORE drilling any holes.
- Remove protective caps from ends of pickup tube prior to installation.
- Do not apply any type of sealant material to the fuel pickup tube assembly. Doing so will result in plugged fuel lines.
- The ferrule nut and 1/4” NPT fitting must be tightened securely into the bushing before installing the pickup tube into the tank. Failure to tighten the fittings will allow the bushing and washer assembly to slide down the pickup tube and drop into the fuel tank.

**Special Tools Required**

<table>
<thead>
<tr>
<th>Tool</th>
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<tbody>
<tr>
<td>Tape Measure</td>
</tr>
<tr>
<td>Drill Motor</td>
</tr>
<tr>
<td>1/4” and 1” Drill Bits</td>
</tr>
<tr>
<td>Tubing Cutter</td>
</tr>
</tbody>
</table>

**DANGER:** Use caution when working in or around the area of the diesel fuel tank. Diesel fuel vapors are potentially explosive. Do not smoke while working near the diesel fuel tank.

**DANGER:** Before drilling into a fuel tank, drain all fuel from the tank. Use nitrogen or an inert gas to purge the diesel fuel vapors from the tank. Keep the diesel tank filled with inert gas while drilling.

**DANGER:** Use extreme caution when drilling into a diesel fuel tank. Sparks from an electric drill or drill bit could cause an explosion.

**DANGER:** Use caution when working in or around the area of the diesel fuel tank. Diesel fuel vapors are potentially explosive. Do not smoke while working near the diesel fuel tank.

**DANGER:** Before drilling into a fuel tank, drain all fuel from the tank. Use nitrogen or an inert gas to purge the diesel fuel vapors from the tank. Keep the diesel tank filled with inert gas while drilling.

**DANGER:** Use extreme caution when drilling into a diesel fuel tank. Sparks from an electric drill or drill bit could cause an explosion.

**DANGER:** Before drilling into a fuel tank, drain all fuel from the tank. Use nitrogen or an inert gas to purge the diesel fuel vapors from the tank. Keep the diesel tank filled with inert gas while drilling.
Fuel Pickup Tube Installation

ALTERNATIVE INSTALLATION - DRILLING HOLE IN FUEL TANK

IMPORTANT:
The ferrule nut and 1/4" NPT fitting must be tightened securely into the bushing before installing the pickup tube into the tank.
Heater Fuel Pump and Fuel Line Installation

Installation

<table>
<thead>
<tr>
<th>Special Tools Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility Knife</td>
</tr>
<tr>
<td>Hose Cutting Tool (204-677)</td>
</tr>
</tbody>
</table>

Tank Mounted Fuel Pump
1. Install the fuel pump and rubber clamp onto the tank mounted bracket securely.
2. Attach a fuel line hose from the fuel pick-up supply to the **inlet** end of the fuel pump and secure with supplied hose clamps.
3. Attach the short rubber hose connection to the **outlet** end of the fuel pump and secure with supplied hose clamps.
4. Route the plastic fuel line (installed earlier on the heater) to the fuel pump and cut to length. Insert the fuel line into the rubber hose connection until it butts up tight with the fuel pump’s outlet pipe. Secure with supplied hose clamp.
   - *The fuel line must be installed correctly to prevent air bubbles (DETAIL A).*
   - *The fuel line from the pickup tube, to fuel pump, to heater should be routed at a continuous rise.*
   - *Only use a hose cutter or utility knife to cut plastic fuel lines. Do not use a wire cutter as this will pinch the plastic fuel line closed.*

Remote Mounted Fuel Pump with L-Bracket
Choose a protected location under the cab close to the fuel pick-up tube and heater and install the supplied L-bracket securely with TEK screws.
1. Install the fuel pump into the rubber mounting clamp and then onto the L-bracket.
2. Position the fuel pump at a 15 to 35 degree angle with the outlet end facing up (outlet end has connector and smaller barb fitting) and tighten mounting hardware securely.
3. Attach the short rubber hose connection to the **outlet** end of the fuel pump and secure with supplied hose clamp.
4. Route the plastic fuel line (installed earlier on the heater) to the fuel pump and cut to length. Insert the fuel line into the rubber hose connection until it butts up tight with the fuel pump’s outlet pipe. Secure with supplied hose clamp.
   - *The fuel line must be installed correctly to prevent air bubbles (DETAIL A).*
   - *The fuel line from the pickup tube, to fuel pump, to heater should be routed at a continuous rise.*
   - *Only use a hose cutter or utility knife to cut plastic fuel lines. Do not use a wire cutter as this will pinch the plastic fuel line closed.*
5. Attach fuel line from the fuel pick-up supply to the inlet end of the fuel pump and secure with supplied hose clamps.
Heater Fuel Pump and Fuel Line Installation

TANK MOUNTED FUEL PUMP BRACKET

REMOTE MOUNTED L-BRACKET
Heater Fuel Pump Connections

CAUTION: To prevent the heater from starting unexpectedly, set all electrical controls to the OFF position BEFORE connecting wires to battery.

<table>
<thead>
<tr>
<th>Special Tools Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire Cutters</td>
</tr>
<tr>
<td>Terminal Crimping Tool</td>
</tr>
</tbody>
</table>

1. Route the heater fuel pump harness (installed earlier) to the heater’s fuel pump and cut the wires to the correct length.
   - Strip wire ends, slide on rubber sealing boots, attach pin terminals securely with crimping tool.
   - Insert pin terminals into connector body until they lock in place.
   
   NOTE: The pump is not polarity sensitive. The wires can be installed in either location of the connector body.
   - Snap locking cover closed on connector body.
   - **DO NOT** connect the fuel pump harness to the fuel pump at this time. The fuel pump harness will be attached later after the fuel pump has been primed.
Heater Fuel Pump Connections
Installing the Battery Cables

Installation at the Tractor’s Batteries

1. FUSE HOLDER
   - Mount fuse holder securely with (installer supplied) 1/4-20 hardware and within 12.0 inches (304.8 mm) of the tractor’s batteries.
   - **DO NOT** install the fuse at this time.

2. POSITIVE BATTERY CABLE
   - Route the positive cable from the TriPac® to the fuse holder, cut to length and strip 1/2 to 3/4 in. (13 to 19 mm) of insulation from cable end.
   - Slide the supplied RED heat shrink tubing and terminal ring onto the end of the cable. Attach the terminal ring firmly to the cable.
   - Position heat shrink tubing to cover exposed wires on the terminal ring and use a heat gun to shrink the tubing in place.
   - Install the positive cable terminal lug onto the fuse holder stud and hand tighten the nut.

3. SHORT POSITIVE BATTERY CABLE
   - **NOTE:** Do not attach both the positive and the negative cables to a single battery. For best results, attach the positive cable to the first battery and the negative cable to the last battery as shown.
   - This cable has two different size battery lugs. Install cable lug with small hole onto the other fuse holder stud and hand tighten the nut.
   - Install the ring connector with the large hole onto the battery’s POSITIVE (+) connection and tighten securely.
   - Apply Superlube (PN 203-524) onto the battery’s connection.

4. NEGATIVE BATTERY CABLE
   - **NOTE:** Do not attach both the positive and the negative cables to a single battery. For best results, attach the positive cable to the first battery and the negative cable to the last battery as shown.
   - Route the negative cable from the TriPac® to the tractor’s negative battery, cut to length and strip 1/2 to 3/4 in. (13 to 19 mm) of insulation from cable end.
   - Slide the supplied BLACK heat shrink tubing and terminal ring onto the end of the cable. Attach the terminal ring firmly to end of cable.
   - Position heat shrink tubing to cover exposed wires on the terminal ring and use a heat gun to shrink the tubing in place.
   - Install the negative cable terminal lug onto the battery’s NEGATIVE (-) connection and tighten securely.
   - Apply Superlube (PN 203-524) onto the battery’s connection.

Installation at the TriPac® Battery Tray

5. POSITIVE BATTERY CABLES
   - Inside the TriPac® battery box, route and connect each positive battery cable to each corresponding positive battery post and tighten securely.
   - Apply Superlube (PN 203-524) onto the battery’s connections.
   - Position the protective boots over the terminal lugs.

6. FUSE
   - Remove the nuts from the fuse holder, place the fuse onto the studs, and on top of the battery cables lugs and reinstall the nuts. Tighten the nuts to 120 in-lb (13.5 N•m).
   - Close the fuse holder cover securely.
Installing the Battery Cables

Tractor’s Batteries
Priming the Heater Fuel System

<table>
<thead>
<tr>
<th>Special Tools Required</th>
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<tbody>
<tr>
<td>Heater Priming Harness (204-1144)</td>
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</tbody>
</table>

The heater uses a pulse style fuel pump. You must use the heater priming harness to operate the fuel pump to prime the system. Applying continuous power to the pump will not work.

**NOTE:** Verify there is a sufficient amount of fuel in the fuel tank.

1. Attach the **Heater Priming Harness** connector to the heater fuel pump.
2. Attach the alligator clips to the battery:

<table>
<thead>
<tr>
<th>Wire</th>
<th>Battery Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED</td>
<td>POSITIVE</td>
</tr>
<tr>
<td>BLACK</td>
<td>NEGATIVE</td>
</tr>
</tbody>
</table>

3. Turn the priming harness switch to the “ON” position.
4. The flasher unit will operate the fuel pump (ON/OFF/ON/OFF) to prime the system.
5. Allow the system to operate for approximately 5 minutes to bleed air from the fuel lines.

**NOTE:** Running the fuel pump longer than 5 minutes will cause the heater to emit excessive white smoke when operated.

6. Check fuel lines and system for leaks.
7. Turn the priming harness switch to the “OFF” position. Disconnect the positive and then the negative battery connections.
8. Disconnect the priming harness connector from the heater fuel pump.
9. Attach the heater fuel pump harness onto the heater fuel pump.
Priming the Heater Fuel Pump
A/C System Charging Procedures

Adding Refrigerant Charge

NOTE: The system should be charged with refrigerant only after following “A/C System Evacuation and Leak Check Procedures” on page 42.

IMPORTANT: Keep all the A/C fittings capped and sealed until the installation of the refrigeration hoses. PVE refrigerant oil is extremely hygroscopic and a system left open for more than 5 minutes may require extensive evacuation time to remove moisture.

<table>
<thead>
<tr>
<th>Special Tools Required</th>
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</thead>
<tbody>
<tr>
<td>R134a Refrigerant</td>
</tr>
<tr>
<td>Scale</td>
</tr>
</tbody>
</table>

1. Connect the refrigerant bottle to the gauge manifold and place it on a scale.
2. Open the refrigerant bottle valve for liquid and purge the charging line.
3. Keep the low pressure side valve of the gauge manifold closed. Open the high pressure side valve.
4. Slowly add refrigerant until reaching 2 lbs. of R-134a.

NOTE: The system never uses more than 2 lbs. of refrigerant.

5. Close the refrigerant bottle valve and the high side valve of the gauge manifold.
6. Remove the gauge manifold.
7. Reinstall the service valve caps.
8. Reinstall only the access cover over the evaporator coil.
A/C System Charging Procedures
IMPORTANT!
An Operation Checkout Procedure must be performed.

Refer to TK-54678-19-MS

Once this procedure is completed, continue to the system check list.
System Check List

- **BATTERY BOX** - Mounting claws (or direct frame mounted bolts) positioned correctly and torqued to specifications.
- **CONDENSER** - Mounting bolts tightened securely and sealed with silicone.
- **RECEIVER DRIER** - Mounting bands tightened securely.
- **EVAPORATOR / CONTROL BOX** - Mounting bolts tightened securely and sealed with silicone.
- **EVAPORATOR DRAIN TUBES** - Installed and access holes in floor sealed with silicone.
- **REFRIGERATION HOSES** - Routed and secured to allow for movement and vibration.
- **REFRIGERATION FITTINGS** - Tightened to proper torque specifications.
- **ELECTRICAL** - Electrical wiring and battery cables connected tightly, properly routed and secured.
- **A/C SYSTEM** - Properly charged and free of leaks.
- **HEATER INTAKE AND EXHAUST** - Heater intake and exhaust hoses routed safely and secured.
- **HEATER FUEL LINES** - All fuel lines are routed safely and secured.
- **HEATER FUEL LINE CONNECTIONS** - All fuel line connections are tight and leak free.
- **SAFETY GUARDS** - All covers and grilles installed securely.
- **AIR GAPS** - Verified any unused holes in the sleeper floor are completely sealed closed with caulk and the 3” access hole inside the sleeper floor is completely caulked from both inside and underneath.
- **SYSTEM OPERATION** - The Operation Checkout Procedures were run, all system components operate correctly with no error codes.
- **TRACTOR INTERIOR** - Thoroughly cleaned and vacuumed.
- **RELEASE TO CUSTOMER**
Installation Manual

TK 54468-19-IM (Rev. 2, 12/11)

TriPac ™ Auxiliary Heating and Cooling Temperature Management System

Thermo King

Providing equipment and services to manage controlled-temperature environments for food and other temperature-sensitive products, our Climate Control Technologies sector encompasses both transport and stationary refrigeration solutions. Our product brands include Thermo King®, a world leader in transport temperature control systems, and Hussmann®, a manufacturer of refrigeration and food merchandising equipment.


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