



# Installation Manual

## TriPac® EVOLUTION™

Auxiliary Heating and Cooling Temperature Management System

Revision A

November 2020

TK 55676-19-IM-EN

TRANE  
TECHNOLOGIES

## Introduction

This manual was written to assist with the installation of the **Thermo King TriPac EVOLUTION** Auxiliary Heating and Cooling System onto a typical semi tractor. While 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 standard TriPac APU components. The **Thermo King TriPac Installation Standards Guide** (TK 56430) provides more detailed information that must be followed to safely and properly complete the entire installation. Thermo King offers numerous options such as Diesel Particulate Filter (DPF), Power Inverters, Hourmeters, etc. which have separate installation instructions. These options should be installed simultaneously with the APU when possible to help reduce overall installation time.

Before beginning the installation, the installer should confirm with the customer the location for each of the TriPac components by using the TriPac Installation Questionnaire. The customer should also be made aware of any modifications to existing equipment that 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 TriPac APU.
- Fuel tank may need to be changed to a smaller size.
- TriPac components will be mounted onto the outside of the sleeper.
- Existing storage space under the bunk will be utilized by TriPac components.
- Heating and A/C duct work will be routed and vents will be installed in existing closets or storage compartments.

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

- are an experienced mechanic.
- can safely lift 75 lbs. (34 kilos).
- are EPA Section 609 certified and trained in the repair and maintenance of diesel powered refrigeration 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.***

## Revision History

Revision A (11/20) New manual format.

## Customer Satisfaction Survey

Let your voice be heard!

Your feedback will help improve our manuals. The survey is accessible through any internet-connected device with a web browser.

Scan the Quick Response (QR) code or click or type the web address [https://tranetechnologies.iad1.qualtrics.com/jfe/form/SV\\_2octfSHoUJxsk6x?Q\\_CHL=qr&Q\\_JFE=qdg](https://tranetechnologies.iad1.qualtrics.com/jfe/form/SV_2octfSHoUJxsk6x?Q_CHL=qr&Q_JFE=qdg) to complete the survey.



# Table of Contents

<b>Safety Precautions</b> .....	<b>7</b>
Danger, Warning, Caution, and Notice .....	7
General Practices .....	7
Battery Cable Installation and Routing .....	8
Refrigerant Hazards .....	9
Refrigerant Oil Hazards .....	9
First Aid .....	9
Heater Safety Precautions .....	10
<b>Tips For a Successful Installation</b> .....	<b>11</b>
Before Beginning the Installation .....	11
APU Installation .....	11
A/C Condenser Installation .....	11
A/C Evaporator Installation .....	12
D2/D4 Heater Installation .....	12
A/C Hose Connections and Routing .....	12
Engine Coolant Hose Connections and Routing .....	13
Closed Loop Cooling .....	13
Electrical Wiring and HMI Controller Installation .....	13
<b>TriPac Evolution Component Dimensions</b> .....	<b>14</b>
APU .....	14
Condenser .....	16
Evaporator .....	17
Control Box .....	18
HMI .....	19
Standard Heater .....	20
High Output Heater .....	21
<b>Required Tools and Additional Supplies</b> .....	<b>22</b>
<b>Typical Component Locations</b> .....	<b>23</b>
TriPac Evolution Components with Truck Coolant Integration .....	24
TriPac Evolution Components with Optional Closed Loop Cooling .....	25
<b>APU Installation</b> .....	<b>26</b>
Standard Installation Method – Mounting Claws .....	26
<b>Exhaust Pipe Installation</b> .....	<b>28</b>
Standard Short Exhaust Tailpipe .....	28

Optional Exhaust Extension.....	28
<b>A/C Condenser Installation .....</b>	<b>29</b>
<b>A/C Receiver Drier Installation.....</b>	<b>31</b>
<b>Ambient Temperature Sensor Installation (Option) .....</b>	<b>32</b>
<b>A/C Evaporator Installation .....</b>	<b>33</b>
Preferred Location – Flush with Front Bulkhead.....	33
Alternative Location – Centered Under Bunk .....	35
<b>D2/D4 Heater Installation .....</b>	<b>37</b>
Heater Location.....	37
Drilling Hole In Floor .....	37
Heater Subassembly and Installation .....	38
Exhaust and Combustion Air Intake Routing .....	40
Exhaust and Combustion Air Intake Installation .....	40
<b>D2/D4 Heater Duct Installation.....</b>	<b>42</b>
Duct Locations.....	42
Installation Procedures.....	42
<b>A/C Duct Installation .....</b>	<b>44</b>
A/C Vent Locations.....	44
Installation Procedures.....	44
<b>A/C Hose Installation .....</b>	<b>46</b>
Installation Procedures.....	46
Compressor Hose Connections .....	46
<b>A/C System Evacuation and Leak Check Procedures .....</b>	<b>49</b>
Evacuation Procedures.....	49
Leak Check Procedures.....	49
<b>Control Box and Main Harness Installation .....</b>	<b>51</b>
Control Box Location.....	51
Main Harness Installation Procedures .....	51
<b>HMI Installation .....</b>	<b>53</b>
HMI Location .....	53
Installation Procedures.....	53
<b>D2/D4 Heater Wiring Installation .....</b>	<b>55</b>
Remote Temperature Sensor - D4 Heater Only .....	56

---

<b>A/C Wiring Installation</b> .....	<b>57</b>
<b>Standby Truck Integration Harness <u>with</u> Switch (Option)</b> .....	<b>59</b>
<b>Standby Truck Integration Harness <u>without</u> Switch (Option)</b> .....	<b>61</b>
<b>Fuel Pickup Tube Installation</b> .....	<b>63</b>
Preferred Installation – Optional Adapter Plate (10–379) .....	63
Alternative Installation – Drilling Hole In Fuel Tank .....	65
<b>Heater Fuel Pump and Fuel Line Installation</b> .....	<b>67</b>
L-Bracket Installation Procedures .....	67
Fuel Tank Bracket Installation Procedures .....	67
Fuel Line Installation Procedures .....	67
<b>APU Fuel Line Installation</b> .....	<b>69</b>
<b>Tractor Coolant Hose Installation</b> .....	<b>70</b>
Preferred Installation – APU Coolant Hoses Tee’d Directly Into Tractor’s Heater Hoses .....	70
Coolant Hose Routing and Connections .....	70
Installation Procedures .....	70
Alternative Installation – APU Coolant Hoses Attached Directly To Fittings On Tractor’s Engine .....	72
Coolant Hose Routing and Connections .....	72
Installation Procedures .....	72
<b>Arctic Switch (Option)</b> .....	<b>74</b>
Installation Procedures .....	74
<b>Heater Fuel Pump Connections</b> .....	<b>76</b>
<b>Fuse Holder and APU Battery Connections</b> .....	<b>77</b>
<b>Priming the Heater Fuel Pump (Heat Option)</b> .....	<b>79</b>
<b>Heater Start-Up Procedures</b> .....	<b>80</b>
Diagnostic Tool Overview .....	80
<b>Connecting Diagnostic Tool</b> .....	<b>81</b>
Perform the Start-Up .....	82
Clearing Faults .....	83
<b>A/C System Charging and APU Engine Start-up Procedures</b> .....	<b>85</b>
Adding Refrigerant Charge .....	85
APU Engine Start-up Procedures .....	86
Bleeding the Coolant System – APU’s Equipped with Traditional Tractor Coolant Integration .....	86
Bleeding the Coolant System – APU’s Equipped with Closed Loop Cooling Option .....	86
<b>Bleeding the Fuel Lines</b> .....	<b>88</b>



Verifying Engine Operation .....	89
Unit Setup Procedures .....	90
Service Run-In Test.....	93
System Check List .....	95

# Safety Precautions

## Danger, Warning, Caution, and Notice

Thermo King recommends that all service be performed by a Thermo King dealer and to be aware of several general safety practices.

Safety advisories appear throughout this manual as required. Your personal safety and the proper installation of this unit depend upon the strict observance of these precautions.

**⚠ DANGER**

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

**⚠ WARNING**

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**⚠ CAUTION**

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury and unsafe practices.

**NOTICE**

Indicates a situation that could result in equipment or property-damage only accidents.

## General Practices

**⚠ DANGER****Asphyxiation Hazard!**

When a TriPac Evolution APU is installed under the cab, behind truck fairings, skirting, etc., the diesel exhaust outlet must be routed out to an open area to prevent exhaust fumes from entering the passenger compartment which could result in carbon monoxide poisoning or death by asphyxiation.

**⚠ DANGER****Hazard of Explosion!**

Never apply heat to a sealed refrigeration system or container. Heat increases internal pressure, which might cause an explosion resulting in death or serious injury.

**⚠ DANGER****Hazardous Gases!**

Refrigerant in the presence of an open flame, spark, or electrical short produces toxic gases that are severe respiratory irritants which can cause serious injury or possible death.

**⚠ DANGER****Refrigerant Vapor Hazard!**

Do not inhale refrigerant. Use caution when working with refrigerant or a refrigeration system in any confined area with a limited air supply. Refrigerant displaces air and can cause oxygen depletion, resulting in suffocation and possible death.

**⚠ DANGER****Risk of Injury!**

Keep your hands, clothing, and tools clear of fans and/or belts when working on a unit that is running or when opening or closing compressor service valves. Loose clothing might entangle moving pulleys or belts, causing serious injury or possible death.



## Safety Precautions

### ⚠ WARNING

#### Hazard of Explosion!

Never close the compressor discharge service valve when the unit is operating. Never operate the unit with the discharge valve closed (front seated). This condition increases internal pressure, which can cause an explosion.

### ⚠ WARNING

#### Personal Protective Equipment (PPE) Required!

Always wear goggles or safety glasses when working on a unit. Refrigerant liquid, oil, and battery acid can permanently damage your eyes. See "First Aid".

### ⚠ WARNING

#### Equipment Damage and Risk of Injury!

Never drill holes into the unit unless instructed by Thermo King. Holes drilled into high voltage cables could cause an electrical fire, severe personal injury, or even death.

### ⚠ WARNING

#### Risk of Injury!

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

### NOTICE

#### Equipment Damage!

All mounting bolts must be the correct length for their applications and torqued to specification. Incorrect bolt lengths and improper torque specifications can damage equipment.

## Battery Cable Installation and Routing

### ⚠ WARNING

#### Hazard of Explosion!

Improperly installed battery cables could result in a fire, explosion, or injury. 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

#### Fire Hazard!

Do not attach fuel lines to battery cables or electrical harnesses. This has the potential to cause a fire and could cause serious injury or death.

### ⚠ WARNING

#### Hazard of Explosion!

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.

### ⚠ CAUTION

#### Hazardous Service Procedures!

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.



**NOTICE****Equipment Damage!**

Do not connect other manufacturer's equipment or accessories to the unit unless approved by Thermo King. Failure to do so can result in severe damage to equipment and void the warranty.

**Refrigerant Hazards****⚠ WARNING****Personal Protective Equipment (PPE) Required!**

Refrigerant in a liquid state evaporates rapidly when exposed to the atmosphere, freezing anything it contacts. Wear butyl lined gloves and other clothing and eye wear when handling refrigerant to help prevent frostbite.

**Refrigerant Oil Hazards****⚠ WARNING****Personal Protective Equipment (PPE) Required!**

Protect your eyes from contact with refrigerant oil. The oil can cause serious eye injuries. Protect skin and clothing from prolonged or repeated contact with refrigerant oil. To prevent irritation, wash your hands and clothing thoroughly after handling the oil. Rubber gloves are recommended.

**First Aid****REFRIGERANT**

- **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 warm water. Do not apply heat. Remove contaminated clothing and shoes. Wrap burns with dry, sterile, bulky dressing to protect from infection. Get prompt medical attention. Wash contaminated clothing before reuse.
- **Inhalation:** Move victim to fresh air and use CPR (cardio pulmonary resuscitation) or mouth-to-mouth resuscitation to restore breathing, if necessary. Stay with victim until emergency personnel arrive.
- **Frost Bite:** In the event of frost bite, the objectives of First Aid are to protect the frozen area from further injury, warm the affected area rapidly, and to maintain respiration.

**REFRIGERANT OIL**

- **Eyes:** Immediately flush with large amounts of water for at least 15 minutes. Get prompt medical attention.
- **Skin:** Remove contaminated clothing. Wash thoroughly with soap and water. Get medical attention if irritation persists.
- **Inhalation:** Move victim to fresh air and use CPR (cardio pulmonary resuscitation) or mouth-to-mouth resuscitation to restore breathing, if necessary. Stay with victim until emergency personnel arrive.
- **Ingestion:** Do not induce vomiting. Immediately contact local poison control center or physician.

**ENGINE COOLANT**

- **Eyes:** Immediately flush with large amounts of water for at least 15 minutes. Get prompt medical attention.
- **Skin:** Remove contaminated clothing. Wash thoroughly with soap and water. Get medical attention if irritation persists.
- **Ingestion:** Do not induce vomiting. Immediately contact local poison control center or physician.

**ELECTRICAL SHOCK**

Take IMMEDIATE action after a person has received an electrical shock. Get quick medical assistance, if possible.

The source of the shock must be quickly stopped, by either shutting off the power or removing the victim. If the power cannot be shut off, the wire should be cut with a non-conductive tool, such as a wood-handle axe or thickly insulated



## Safety Precautions

cable cutters. Rescuers should wear insulated gloves and safety glasses, and avoid looking at wires being cut. The ensuing flash can cause burns and blindness.

If the victim must be removed from a live circuit, pull the victim away with a non-conductive material. Use wood, rope, a belt or coat to pull or push the victim away from the current. **DO NOT TOUCH** the victim. You will receive a shock from current flowing through the victim's body. After separating the victim from power source, immediately check for signs of a pulse and respiration. If no pulse is present, start CPR (cardio pulmonary resuscitation). If a pulse is present, respiration might be restored by using mouth-to-mouth resuscitation. Call for emergency medical assistance.

## 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.

 <b>DANGER</b>	 <b>DANGER</b>
<p><b>Hazard of Explosion or Fire!</b> Failure to follow these instruction could cause a explosion or fire resulting in serious or fatal injury.</p> <ul style="list-style-type: none"> <li>• Heater must be turned off while re-fueling.</li> <li>• Install heater so it will maintain a minimum distance of 2" from any flammable or heat sensitive material.</li> <li>• Install the exhaust system so it will maintain a minimum distance of 2" from any flammable or heat sensitive material.</li> <li>• Stored items in may shift while vehicle is in operation and should be secured adequately to prevent contact with the heater.</li> <li>• Use a protective air intake grille on the air inlet side of the heater to prevent objects from being sucked in.</li> <li>• The heater must only be operated when the maintenance flap is closed and the outlet hood is mounted in position.</li> <li>• Do not install heater in enclosed areas where combustible fumes may be present.</li> <li>• 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.</li> <li>• Ensure that the fuel system is intact and there are no leaks.</li> <li>• Do not route electrical wires, harness or battery cables together with fuel lines.</li> </ul>	<p><b>Asphyxiation Hazard!</b> The correct installation of the exhaust and combustion air intake hoses is extremely important to prevent carbon monoxide poisoning or asphyxiation.</p> <ul style="list-style-type: none"> <li>• Route the heater exhaust so that exhaust fumes can not enter into the passenger compartments.</li> <li>• Ensure an air tight seal will be maintained between the heater and mounting surface and at any exhaust connection points.</li> <li>• Ensure that heating air supply is taken from an area where poisonous gases will not be present.</li> <li>• 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.</li> <li>• If running exhaust components through an enclosed compartment, ensure that it is vented to the outside.</li> <li>• The enclosed compartment must be free of any holes, cracks or rusted out areas to prevent fumes from entering into the passenger compartment.</li> <li>• 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.</li> <li>• The heater must not be operated in closed areas such as garages, buildings, warehouses, etc.</li> <li>• Do not inhale exhaust fumes.</li> </ul>

## NOTICE

### Equipment Damage!

**Disconnect the heater harness at the battery before welding on the truck chassis to prevent damage to the electronic HMI controller.**

# Tips For a Successful Installation

## Before Beginning the Installation

**Important:** *Proper installation of each component onto the vehicle is critical! Refer to the Thermo King TriPac Installation Standards Guide (TK 56498) before beginning the installation. Adhering to the installation standards will help assure the components are installed correctly and the system operates as designed. It is the responsibility of the installer to follow these standards.*

- Read this manual to understand where components are to be located and how they are to be installed.
- Thermo King offers numerous options such as Diesel Particulate Filter (DPF), Power Inverters, Hourmeters, etc. which have separate installation instructions. These options should be installed simultaneously with the APU when possible to help reduce overall installation time.
- Review the TriPac component drawings for important minimum/maximum dimensions and clearances that must be taken into consideration when installing these components.
- Open all TriPac kits and inspect contents before beginning installation.
- Verify tools and special equipment required for the installation are available and in good working condition.
- Review component location diagram and discuss with the customer where each component will be installed on the truck.
- 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.

## APU Installation

- DO NOT weld on any part of the tractor's frame or drill holes in the top or bottom flanges. Serious structural damage could occur. Consult your chassis manufacturer for further information.
- The APU is designed to be mounted only to the existing frame rails. **NO OTHER MOUNTING IS ACCEPTABLE!**
- Determine the best location for installing the APU on the existing chassis frame rail.
- Safely relocate any components on the chassis frame rail that interfere with the installation of the APU.
- Check clearance around APU before installing.
- The use of a motorcycle/ATV lift or modified floor jack to raise APU into position is recommended.
- Only the supplied spacer blocks and mounting claws must be used to install the APU 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 APU mounting bolts are flush with the chassis frame rail before tightening.
- The mounting hardware securing the APU to the tractor's frame must be correctly positioned and torqued using the four-step tightening sequence described in the "APU Installation" section in this manual.
- All APU covers, guards or removable panels must be in place and installed securely while operating the system.

## A/C Condenser Installation

- Always keep A/C system fittings capped and sealed until the installation of the refrigeration hoses.
- 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 finish to prevent damage during the installation process.
- Use the stainless steel mounting hardware (supplied in the kit) to mount the condenser coil.
- 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.

## A/C Evaporator Installation

- Always keep A/C system fittings capped and sealed until the installation of the refrigeration hoses.
- Determine the best location for the A/C evaporator inside the sleeper, typically under the bunk.
- Verify there is no interference with any OEM electrical wiring, internal supports, etc. before drilling any mounting holes.
- The evaporator should be mounted directly onto the floor mat inside the sleeper by using the supplied template to locate the drain and mounting holes.
- Always install the drain valves (kazoos) onto evaporator drain tubes securely with hose clamps.
- 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.

## D2/D4 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.
- Heater must 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.
- The Diagnostic Code Reader (204-1143) must be used to setup and operate the heater in the run-in mode.

## A/C Hose Connections and Routing

- Always keep A/C system fittings capped and sealed until the installation of the refrigeration hoses.
- 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 PAG 100 refrigerant oil (2030502) when assembling to refrigeration hoses.
- Always install and lubricate O-rings with PAG 100 refrigerant oil (2030502) 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 1.2 to 2.0 bs. (depending on hose lengths) of R134a.

## Engine Coolant Hose Connections and Routing

The following steps are for APU's equipped with Tractor Coolant Integration only.

- Coolant hoses should be routed from the APU to the tractor's engine without any sharp bends or kinks.
- Coolant hoses should be installed and routed in such a way as to allow for vibration and movement. **THEY SHOULD NEVER BE STRETCHED TIGHT!**
- Coolant hoses should be protected with supplied plastic sleeving and adequately secured to the chassis with clamps and band wraps.
- Always keep coolant hoses from rubbing or chafing against sharp metal objects, rotating components or hot objects.
- All coolant pipe fittings installed should be of proper material type, (i.e: brass to brass, or copper to copper).
- All coolant fittings should be assembled using pipe thread sealer to prevent leaks.
- Ball type shutoff valves (supplied) should be installed to allow the TriPac cooling system to be closed off and isolated from the tractor's engine cooling system.
- Shutoff valves and fittings must be adequately supported to prevent cracks or leaks from vibration.

## Closed Loop Cooling

Do not start the APU's engine without first adding coolant and bleeding all air from the system.

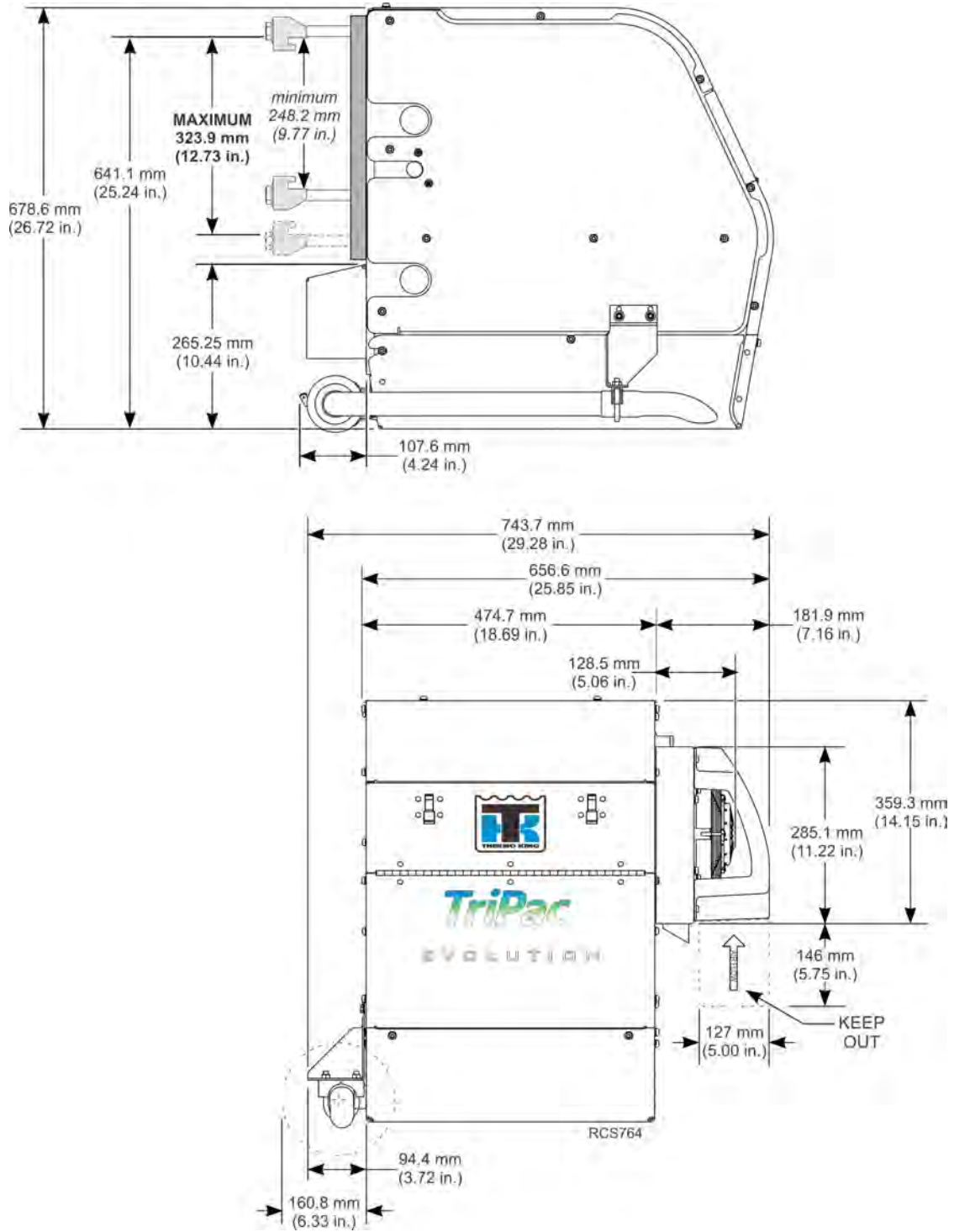
## Electrical Wiring and HMI Controller Installation

- 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 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!**
- The HMI should be visible and mounted away from windows, air vents, out of direct sunlight and not touching anything to accurately measure air temperature.

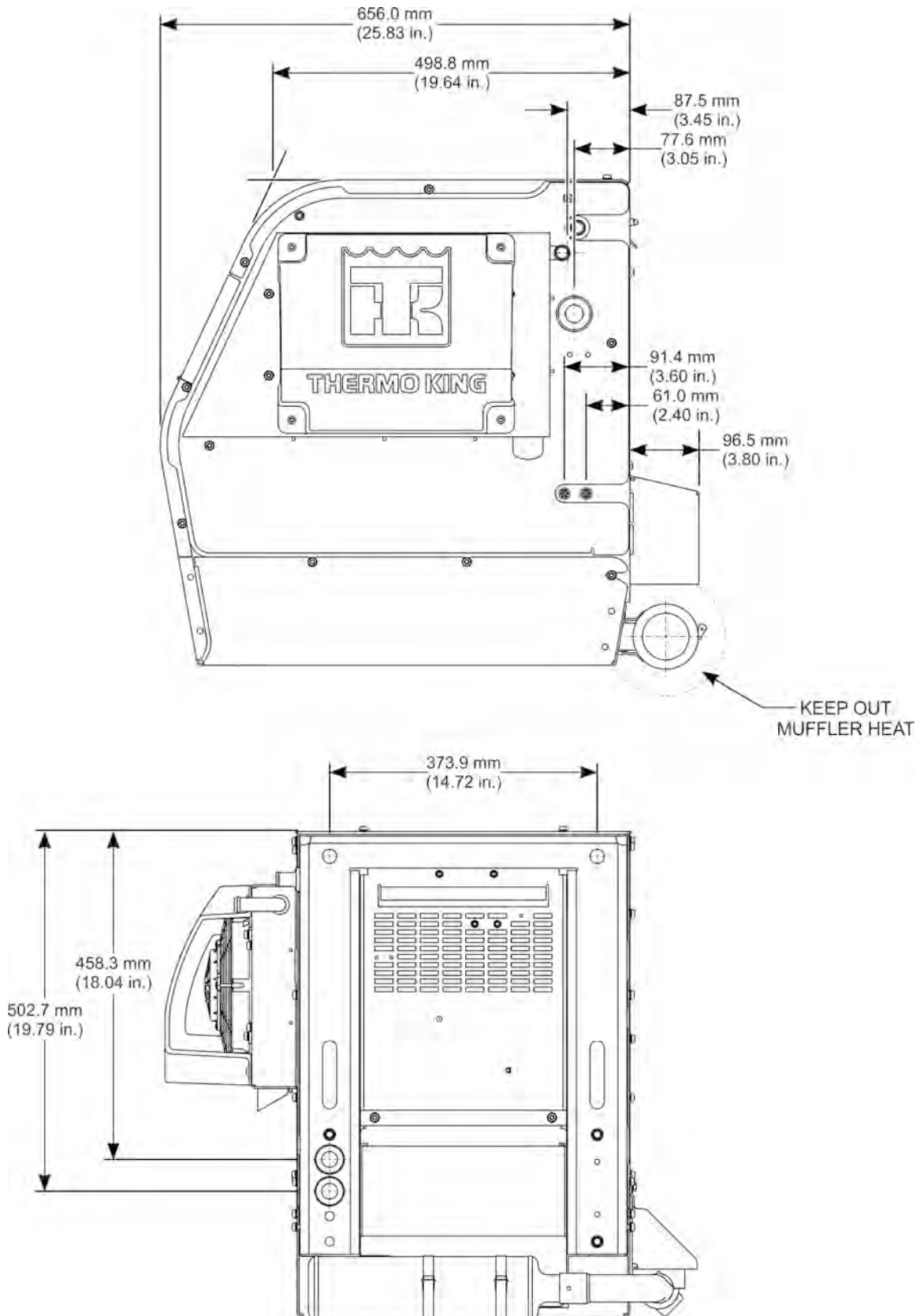
# TriPac Evolution Component Dimensions

## APU

Figure 1. TriPac Evolution APU Dimensions (side and front)



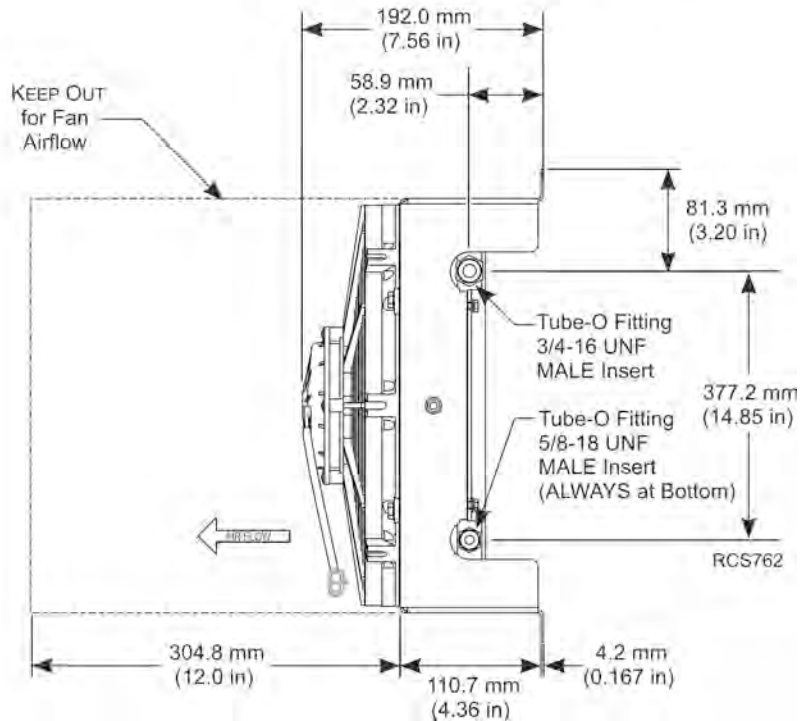
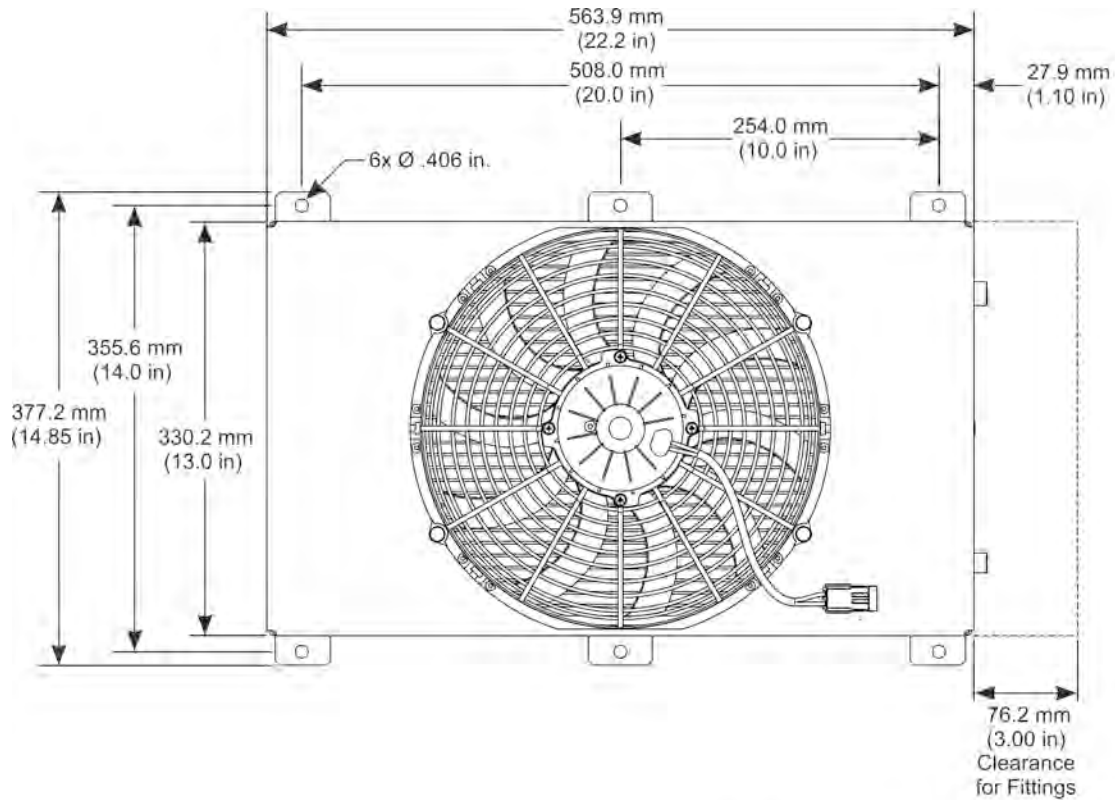
**Figure 2. TriPac Evolution APU Dimensions (side and rear)**





### Condenser

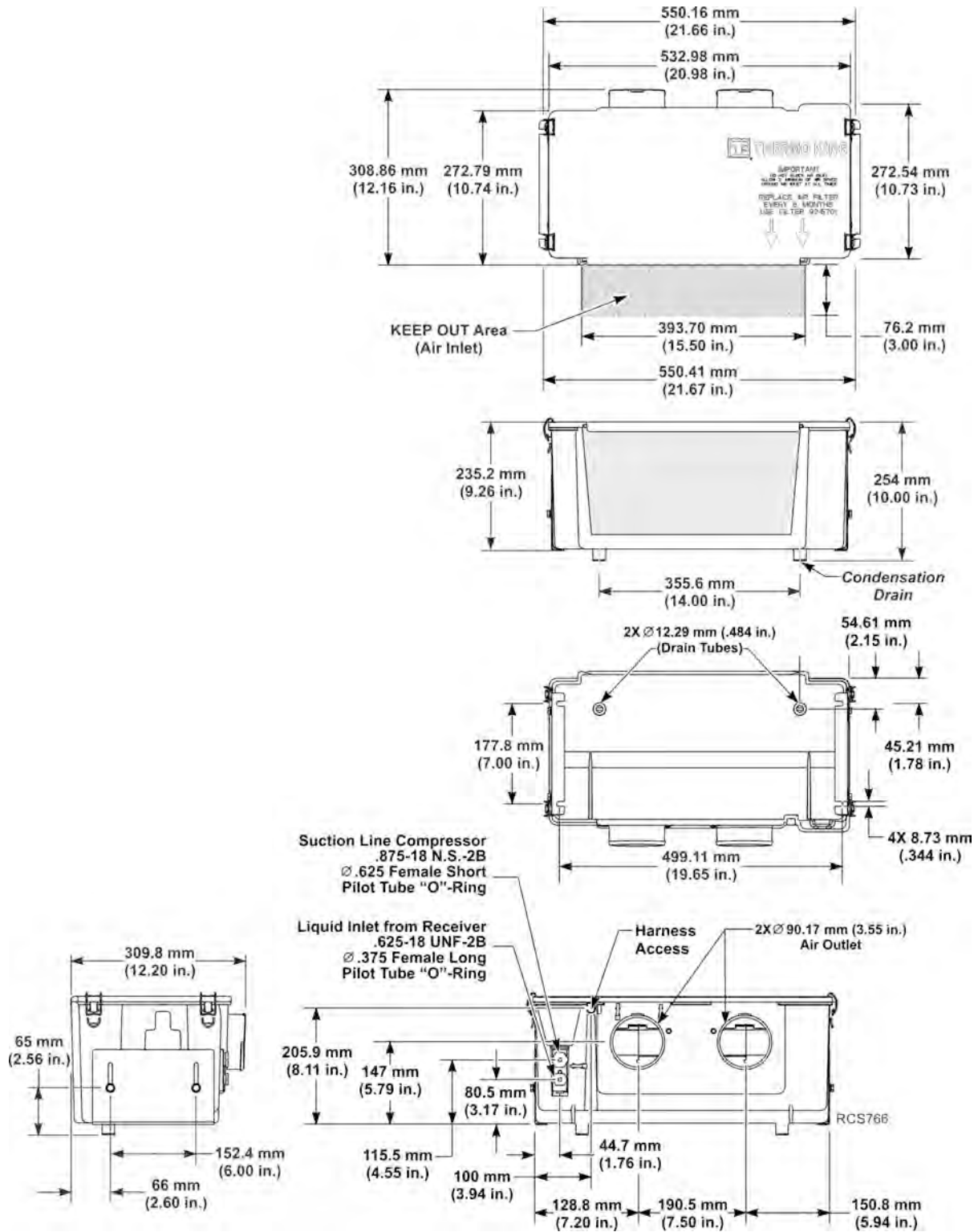
Figure 3. TriPac Evolution Condenser Dimensions





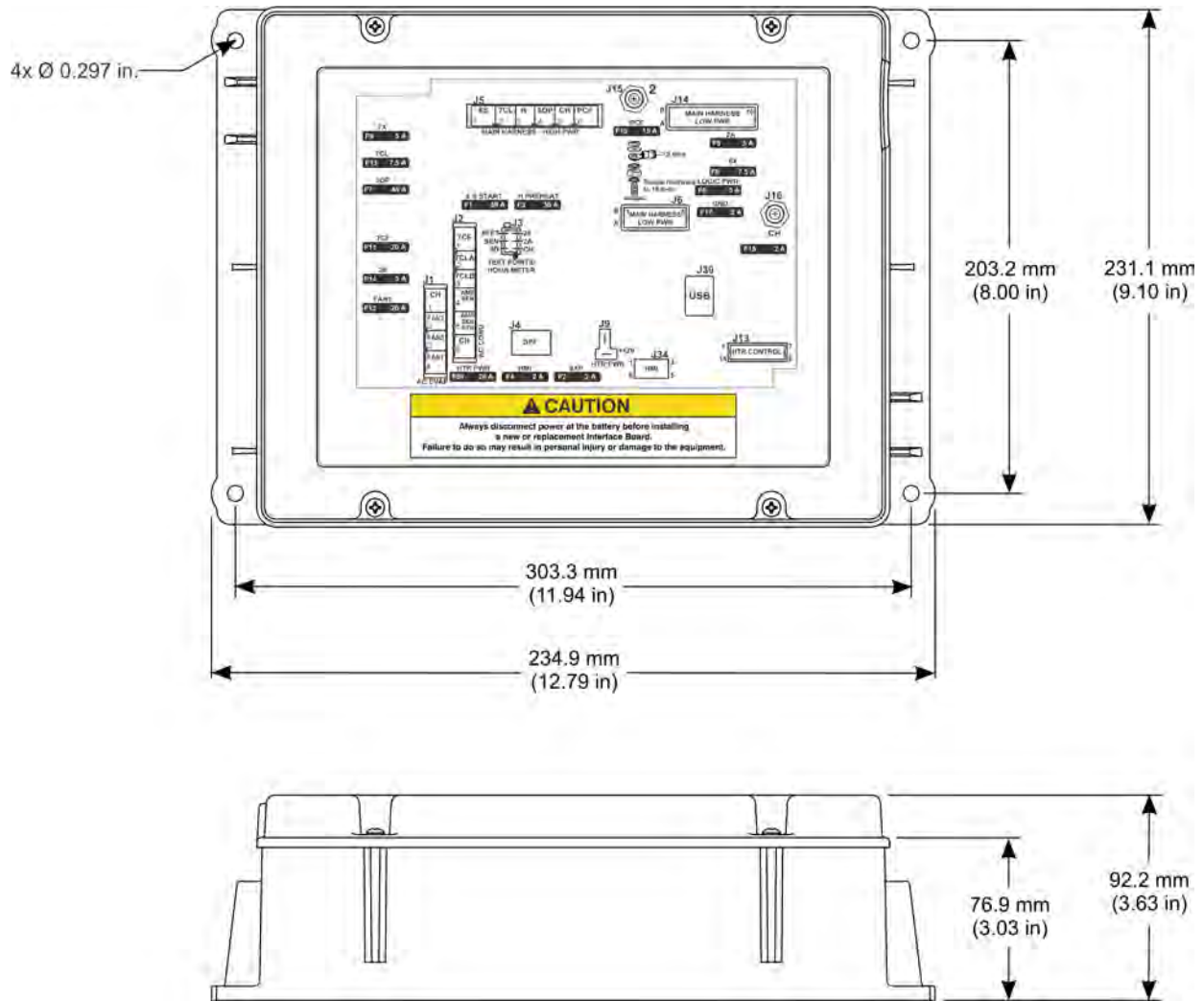
# Evaporator

Figure 4. TriPac Evolution Evaporator Dimensions



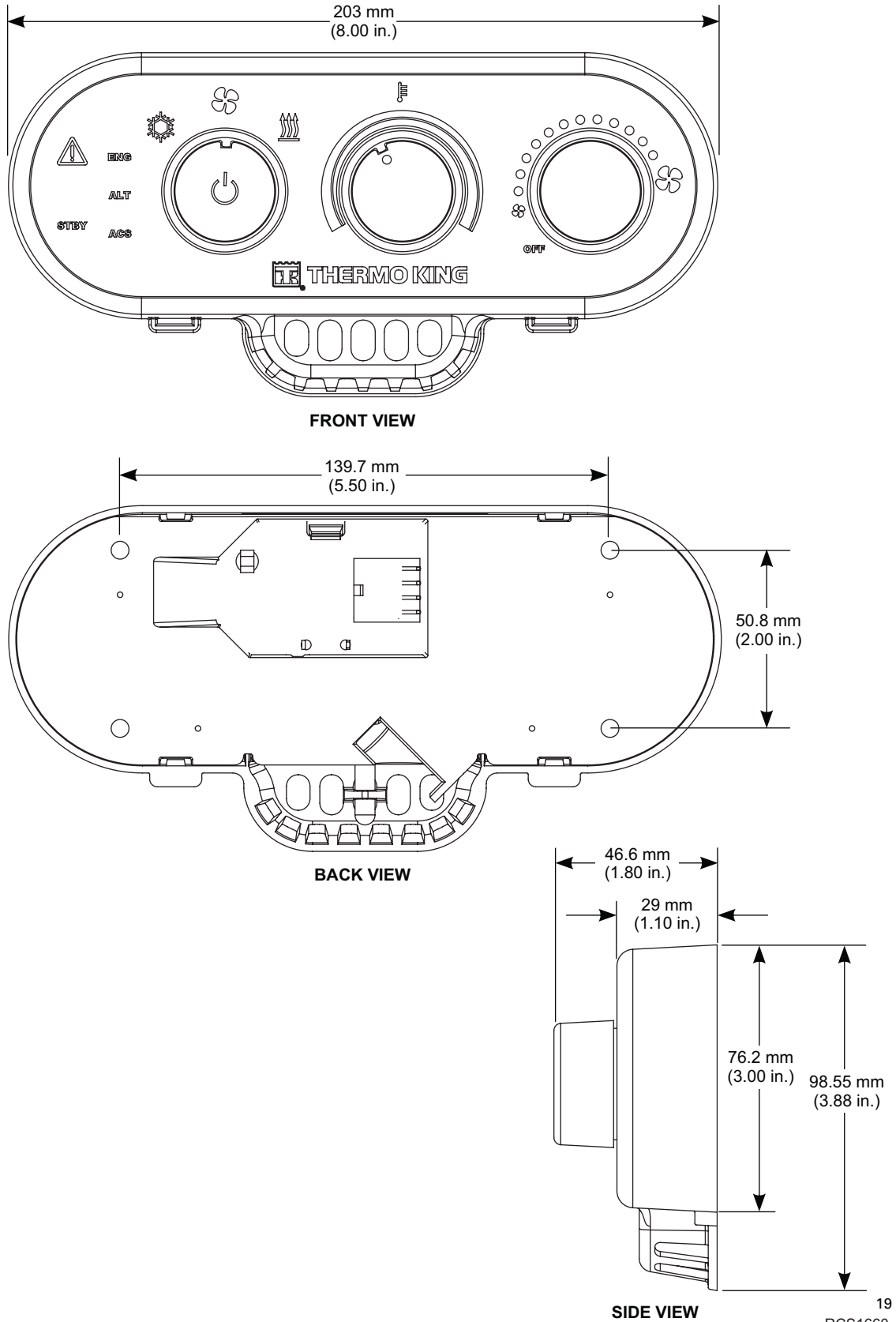
**Control Box**

**Figure 5. TriPac Evolution Control Box Dimensions**



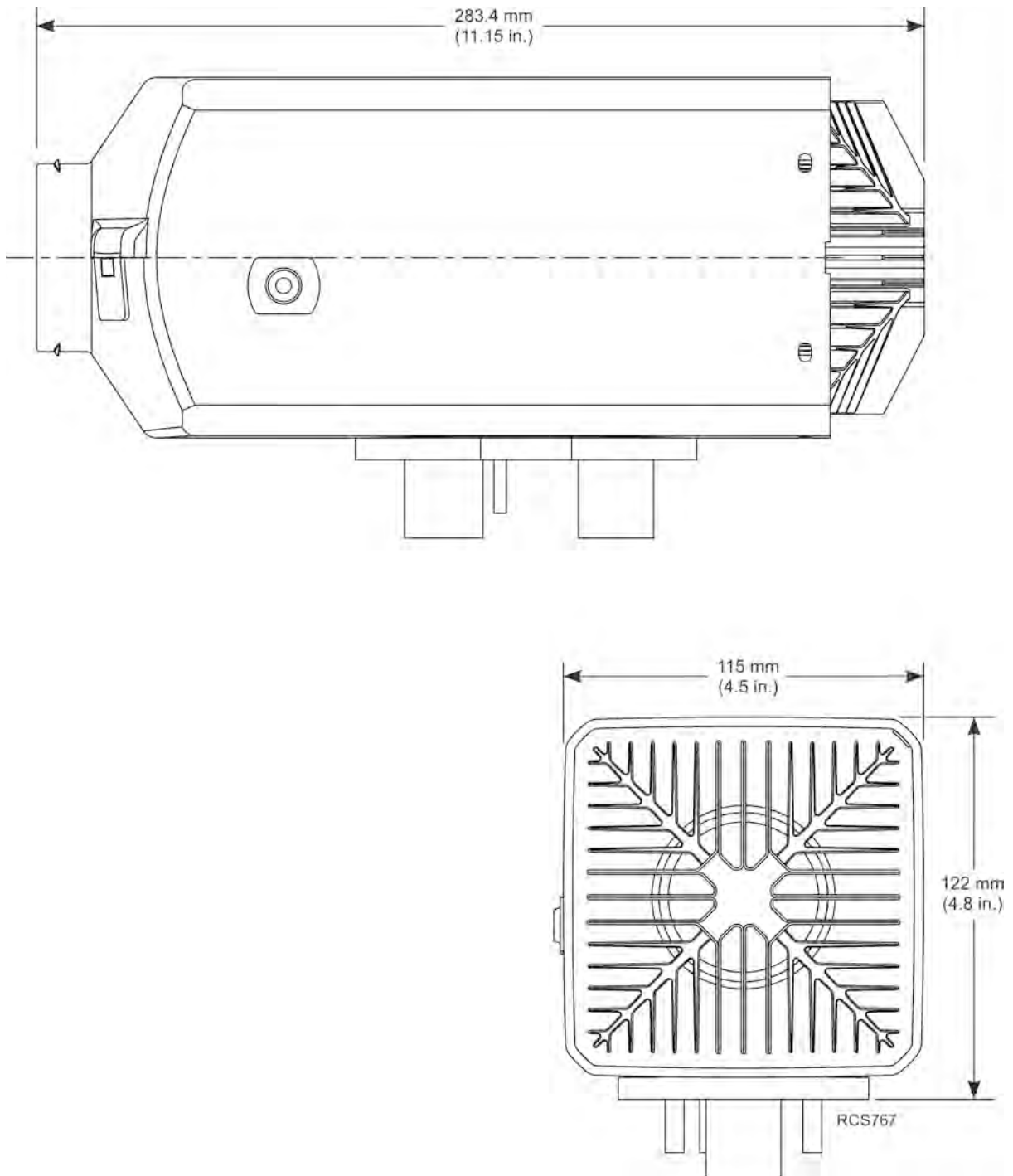
**HMI**

**Figure 6. TriPac Evolution HMI Controller Dimensions**



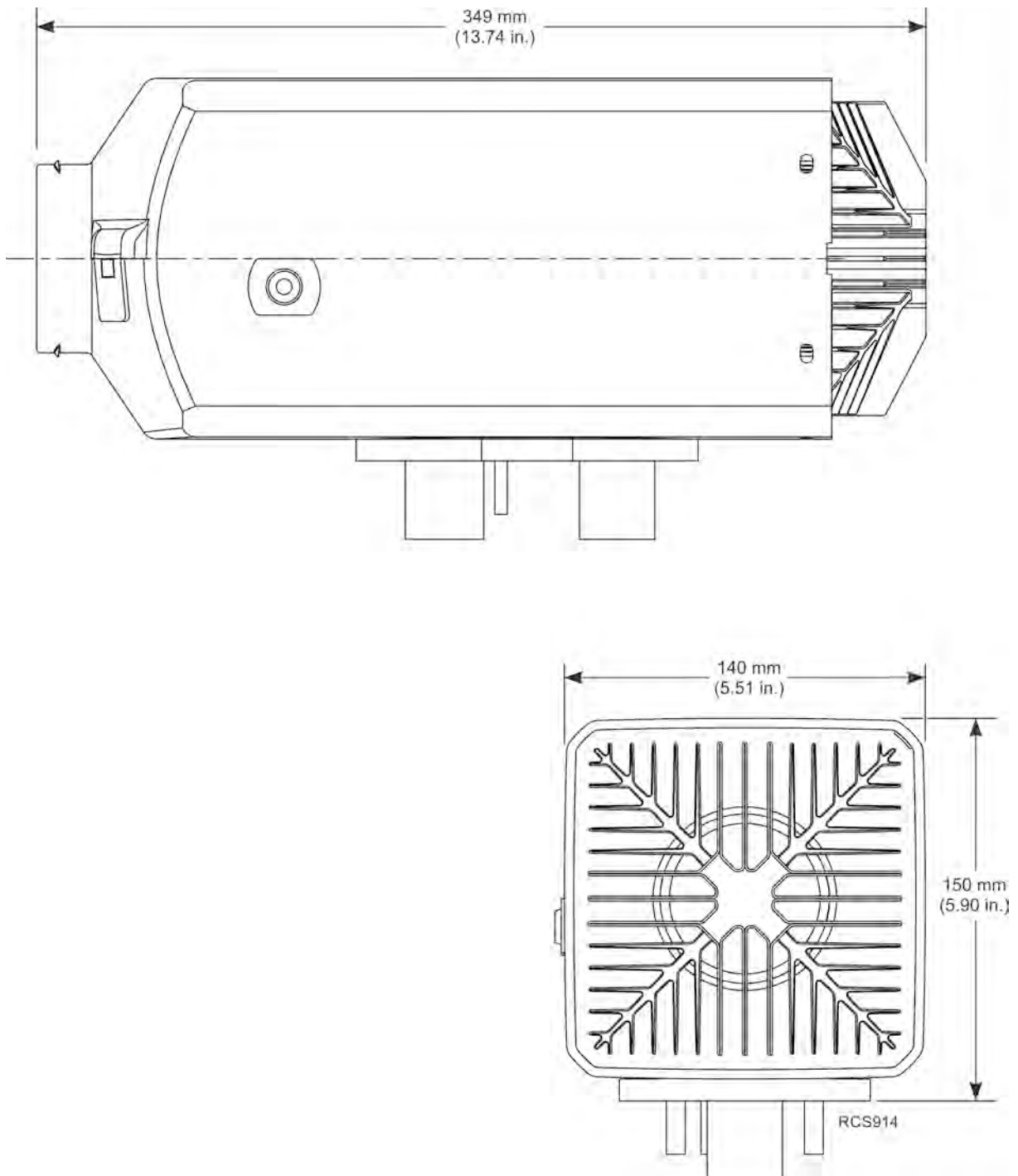
## Standard Heater

Figure 7. Standard Heater Dimensions



## High Output Heater

Figure 8. High Output Heater Dimensions



# Required Tools and Additional Supplies

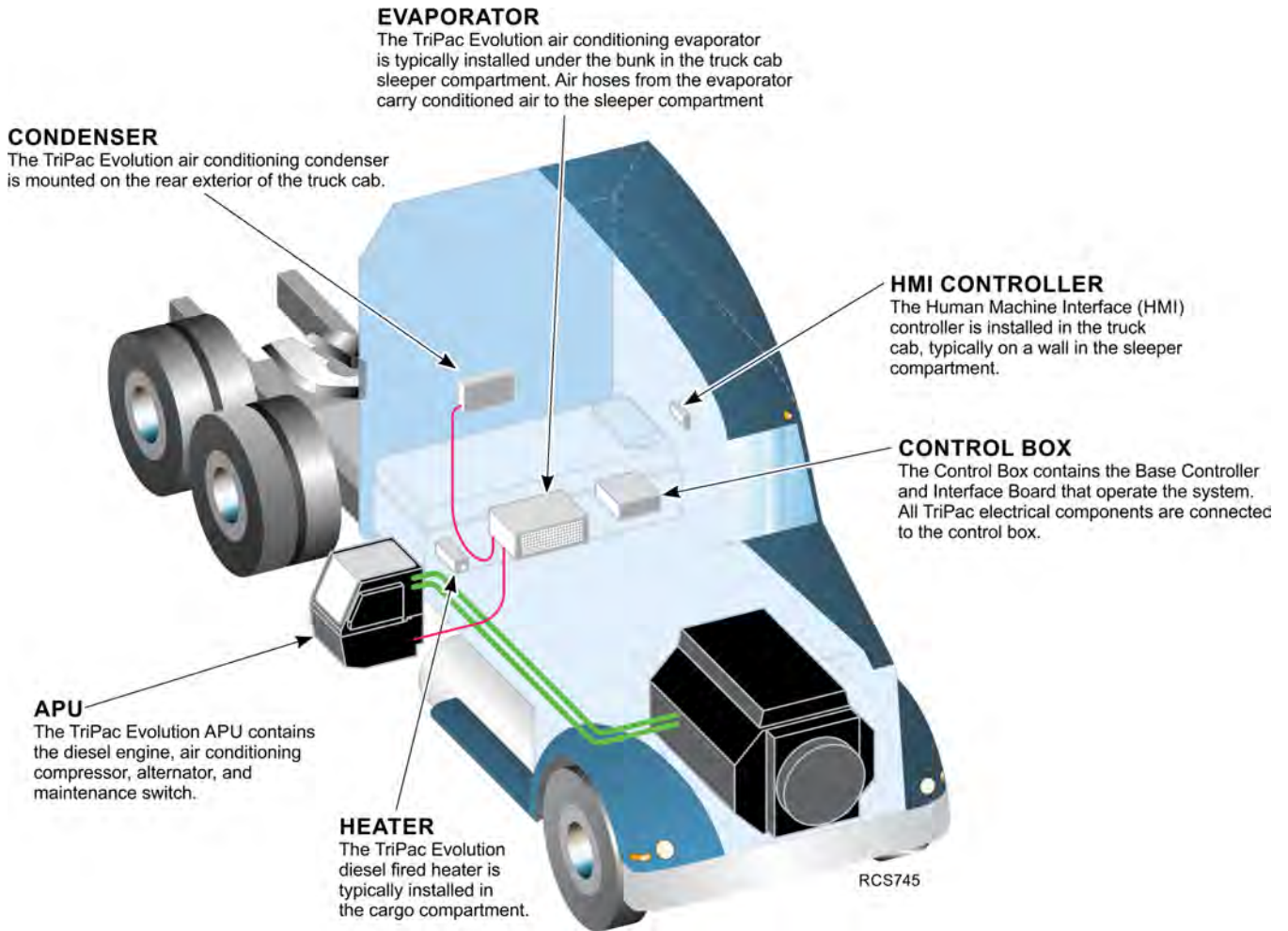
**Note:** While basic mechanics tools and refrigerant service equipment are a necessity, there are also special tools that are required when installing Thermo King TriPac Units. For a complete listing of special tools, See "Special Tool Requirements" Section 3 of the Thermo King TriPac Installation Standards Guide (TK 56498).

TOOLS	SUPPLIES (as required)
<ol style="list-style-type: none"> <li>1. Typical Mechanics Tools</li> <li>2. Floor Jack or Motorcycle/ATV Lift</li> <li>3. Drill Motor</li> <li>4. Drill Bit Set</li> <li>5. 7/8" dia. or 1" Step Reamer (for evaporator drain and controller holes)</li> <li>6. Hole Saws               <ul style="list-style-type: none"> <li>• 1-1/4" dia. (for fuel tank pickup tube)</li> <li>• 2-1/2" dia. (for heater outlet louver)</li> <li>• 3" dia. (access hole for evaporator hoses and electrical wiring)</li> <li>• 4-1/4" dia. (mounting A/C louvers, routing A/C ducts through bulkheads and heater mounting hole)</li> </ul> </li> <li>7. Reciprocating Saw (return air opening)</li> <li>8. 1/2" Drive Torque Wrench</li> <li>9. Level</li> <li>10. Tape Measure</li> <li>11. Utility Knife</li> <li>12. Caulk Gun</li> <li>13. Tubing Cutter (for cutting fuel pickup tubes)</li> <li>14. Strobe Light/Tachometer (204-436)</li> <li>15. Digital Meter (204-615)</li> <li>16. Leak Detector (204-756)</li> <li>17. Hose Fitting Tool (204-1045)</li> <li>18. Hose Cutting Tool (204-677)</li> <li>19. Heater Priming Harness (204-1144)</li> <li>20. Heater Diagnostic Tool (204-1143)</li> <li>21. Shop Vacuum</li> </ol>	<ol style="list-style-type: none"> <li>1. 1/2" Brass Fittings (for coolant lines)               <ul style="list-style-type: none"> <li>• 45 degree elbow, MPT x FPT</li> <li>• 90 degree elbow, MPT x FPT</li> <li>• Tee, FPT x FPT x FPT</li> <li>• Hose Fitting, 1/2" NPT to 3/4" Hose</li> <li>• Closed Nipple, 1/2" NPT</li> </ul> </li> <li>2. Teflon Pipe Thread Tape (for coolant fittings)</li> <li>3. Antifreeze, up to 2 gallons (must be the correct type to match original)</li> <li>4. RTV Silicone</li> <li>5. Sealing Putty (203-391)</li> <li>6. PAG Refrigerant Oil (203-544)</li> <li>7. Refrigerant 134A.</li> <li>8. Return air wall louver approx. 6" x 10" (when needed)</li> <li>9. Shrink Tubing 0.51" to 0.16" w/adhesive (for battery cable terminals)</li> <li>10. Mounting Clamps #24 and #32 (to secure cables and hoses)</li> <li>11. Band wraps (assorted sizes and lengths)</li> <li>12. Upholstery Cleaner (approx. 2 cans)</li> <li>13. Cardboard or blankets (to protect interior)</li> <li>14. Fiberglass Repair Kit (only used for fiberglass and wood composite floors)</li> </ol>

# Typical Component Locations

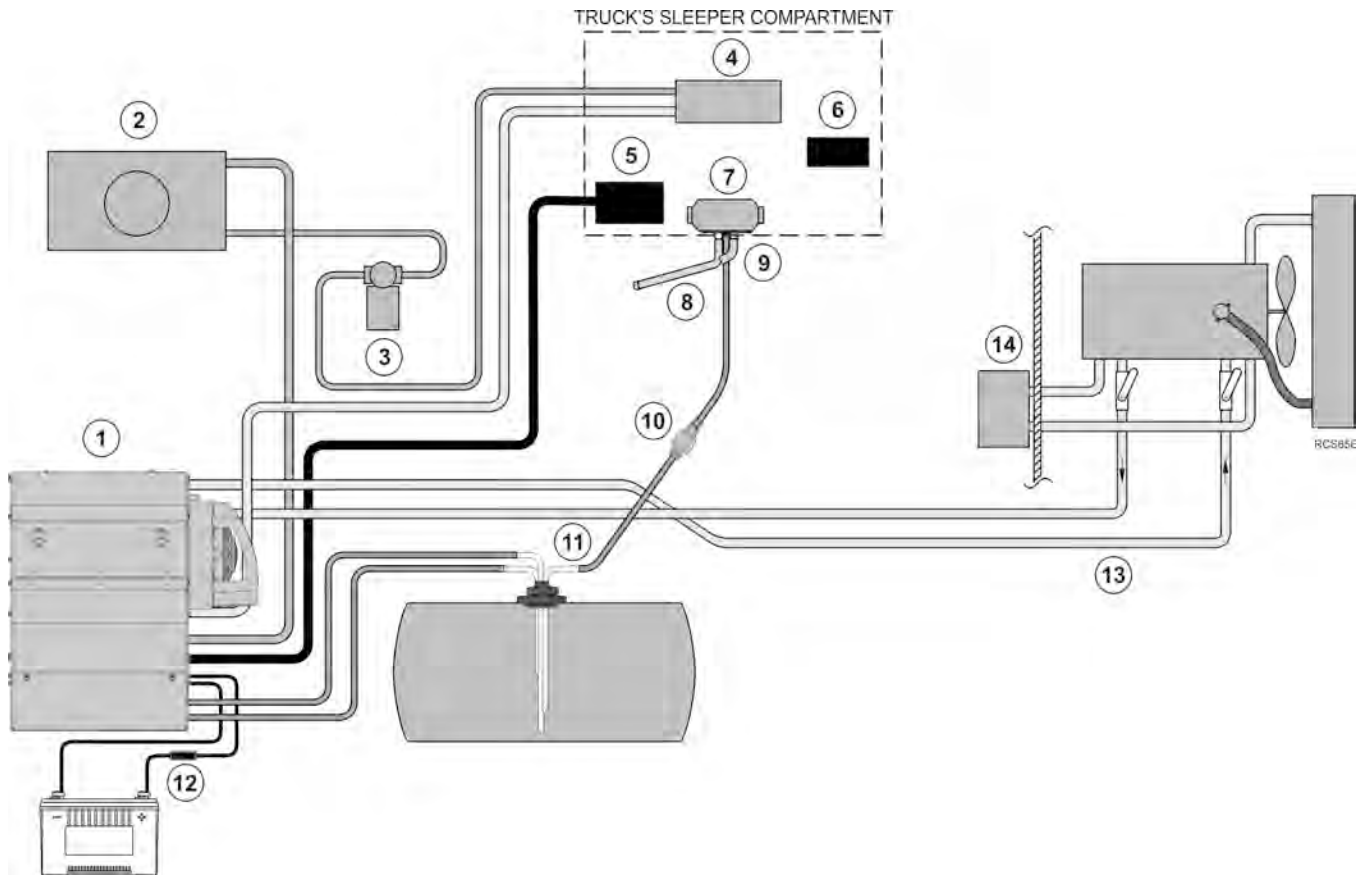
**Important:** Proper installation of each component onto the vehicle is critical! Refer to the Thermo King TriPac Installation Standards Guide (TK 56498) before beginning the installation. Adhering to the installation standards will help assure the components are installed correctly and the system operates as designed. It is the responsibility of the installer to follow these standards.

**Figure 9. Typical TriPac Evolution System Component Locations**



## TriPac Evolution Components with Truck Coolant Integration

Figure 10. TriPac Evolution Components with Truck Coolant Integration

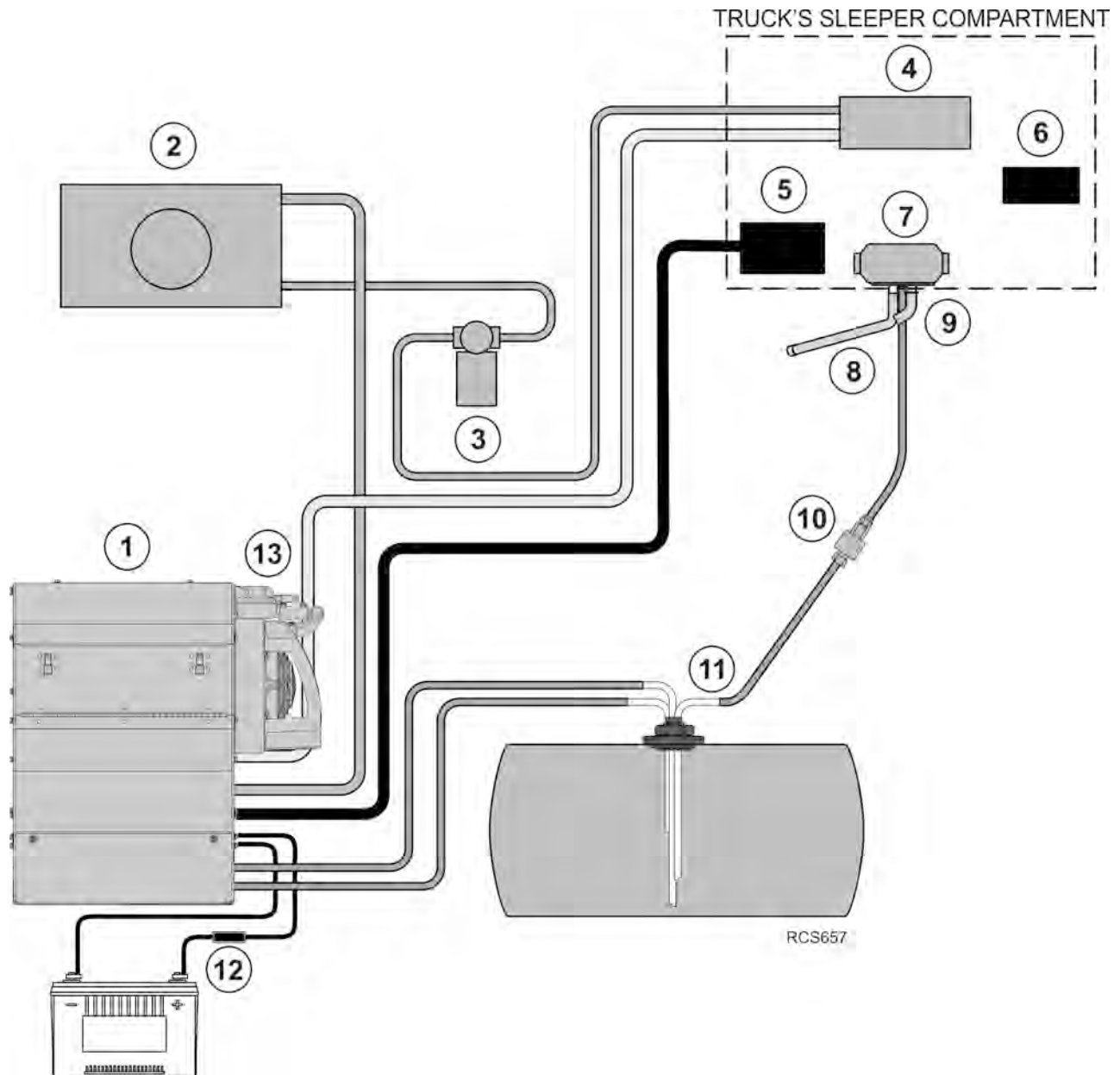


1	APU (Auxiliary Power Unit)	8	Heater Exhaust Tube
2	A/C Condenser	9	Heater Intake Tube
3	A/C Receiver Drier	10	Heater Fuel Pump
4	A/C Evaporator	11	Diesel Fuel Pickup Tube
5	Control Box	12	Main Power Fuse (connects to truck's batteries)
6	HMI Controller	13	Coolant Supply and Return Hoses (connects to truck's engine)
7	Heater	14	Truck's Heater Core (connects to truck's engine)



## TriPac Evolution Components with Optional Closed Loop Cooling

Figure 11. TriPac Evolution Components with Optional Closed Loop Cooling



1	APU (Auxiliary Power Unit)	8	Heater Exhaust Tube
2	A/C Condenser	9	Heater Intake Tube
3	A/C Receiver Drier	10	Heater Fuel Pump
4	A/C Evaporator	11	Diesel Fuel Pickup Tube
5	Control Box	12	Main Power Fuse (connects to truck's batteries)
6	HMI Controller	13	Coolant Expansion Tank
7	Heater		

# APU Installation

## Standard Installation Method – Mounting Claws

**Important:** See “TriPac Evolution Installation Standards” in Section 5 of the Thermo King TriPac Installation Standards Guide (TK 56498). **THESE STANDARDS MUST BE FOLLOWED!**

Special Tools Required
Modified Floor Jack or Motorcycle/ATV Lift
1/2" Drive Torque Wrench

1. Remove top cover of TriPac APU to access and remove mounting hardware securing APU to shipping crate.
2. It is recommended that a modified floor jack or motorcycle/ATV lift be used to install the APU. Protection such as cardboard, shop rags, etc. should be used under the APU to prevent damage during installation.
3. Raise the APU into position. From outside the APU, insert the 3/4 in. mounting bolts and washers through mounting claws and spacer blocks (slots go down) and into APU’s frame mounting holes.
4. From inside the APU, loosely install washers, nut retainers and locking nuts in that order. **DO NOT OIL THE BOLT THREADS!**

**Important:** The following steps are critical and must be followed to ensure the safe installation of the APU to the tractor’s frame.

5. With APU still supported by a lift:
  - a. Push APU and spacer blocks up tight to tractor frame.
  - b. Adjust height of the APU so top and bottom mounting claws and bolts are positioned flat on frame. Review (Detail A).
  - c. 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).

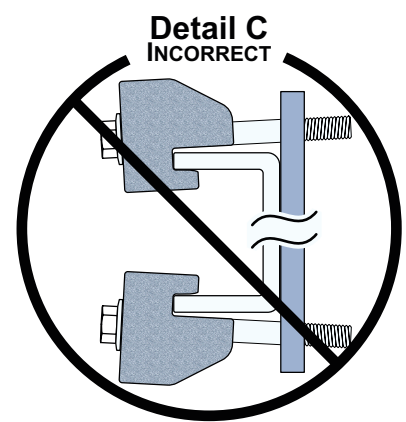
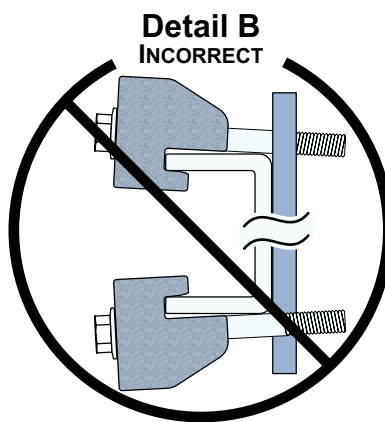
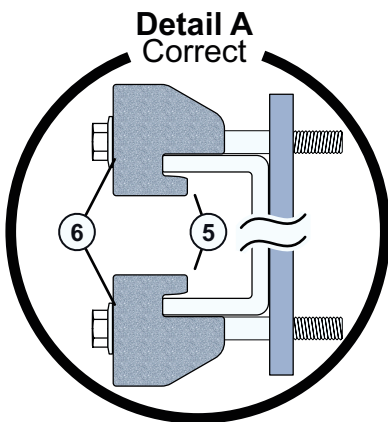
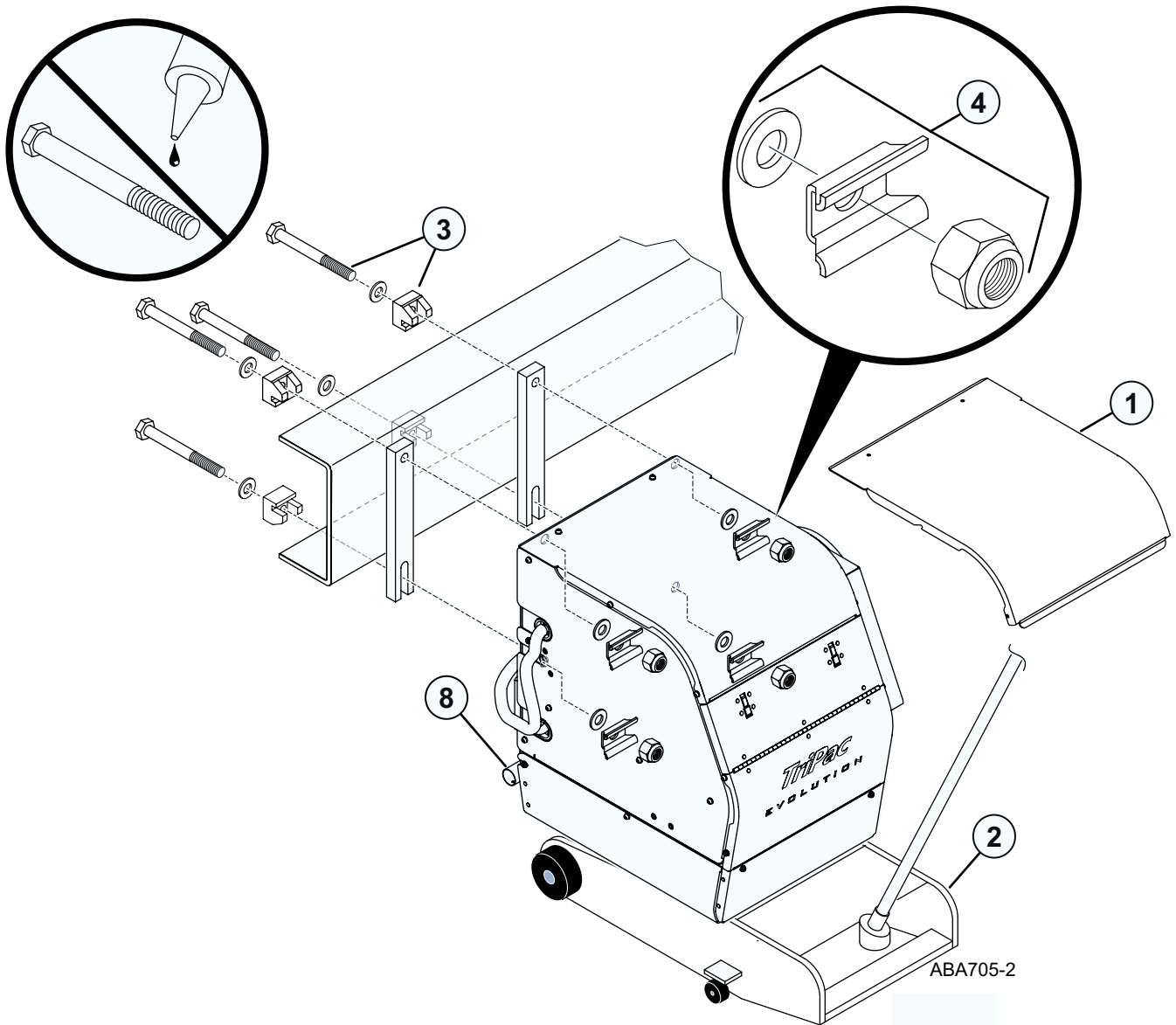
STEP 3: Next, torque top and then bottom bolts to 100 ft-lb. (135.6 N•m).

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 replaced immediately**.

Figure 12. Standard Installation Method with Mounting Claws Shown



## Exhaust Pipe Installation

**Important:** See “APU Exhaust Tailpipe Installation Standards” in Section 5 of the Thermo King TriPac Installation Standards Guide (TK 56498). **THESE STANDARDS MUST BE FOLLOWED!**

**Important:** When the APU is installed under a sleeper, behind fairings, skirting, etc., the exhaust outlet must be routed to an open area to prevent exhaust fumes from entering the passenger compartment which could result in carbon monoxide poisoning or death by asphyxiation. Optional exhaust pipe extensions are available for this purpose. Contact your nearest Thermo King Dealer.

### Standard Short Exhaust Tailpipe

A short exhaust tailpipe is provided standard with each APU.

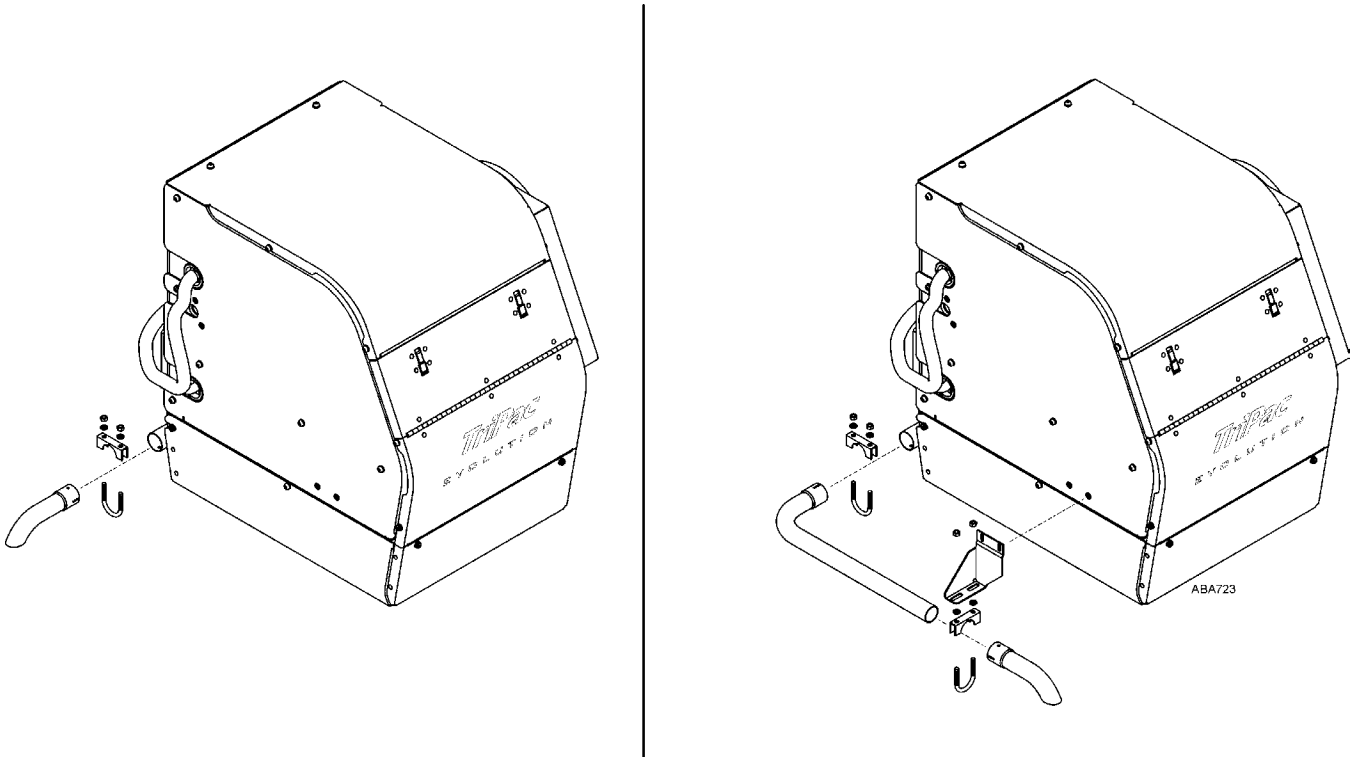
1. Install the short exhaust tailpipe (outlet facing down) onto the end of the muffler and secure with clamp.

### Optional Exhaust Extension

The optional exhaust extension is used along with the standard short tailpipe.

1. Install the mounting bracket onto the side of the APU.
2. Install the extension pipe and clamp onto the end of the muffler.
3. Install the short exhaust tailpipe (supplied with APU) and clamp.
4. Face the tailpipe outlet down or towards the rear of the tractor.
5. Tighten all clamps securely.

**Figure 13. Standard Short Exhaust Tailpipe and Optional Exhaust Extension Shown**



# A/C Condenser Installation

**Important:** See “Condenser Installation Standards” in Section 5 of the Thermo King TriPac Installation Standards Guide (TK 56498). **THESE STANDARDS MUST BE FOLLOWED!**

Locate an area on the exterior of the sleeper to install the condenser 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 four 3/8” bolts with large fender washers inside without disturbing interior panels.

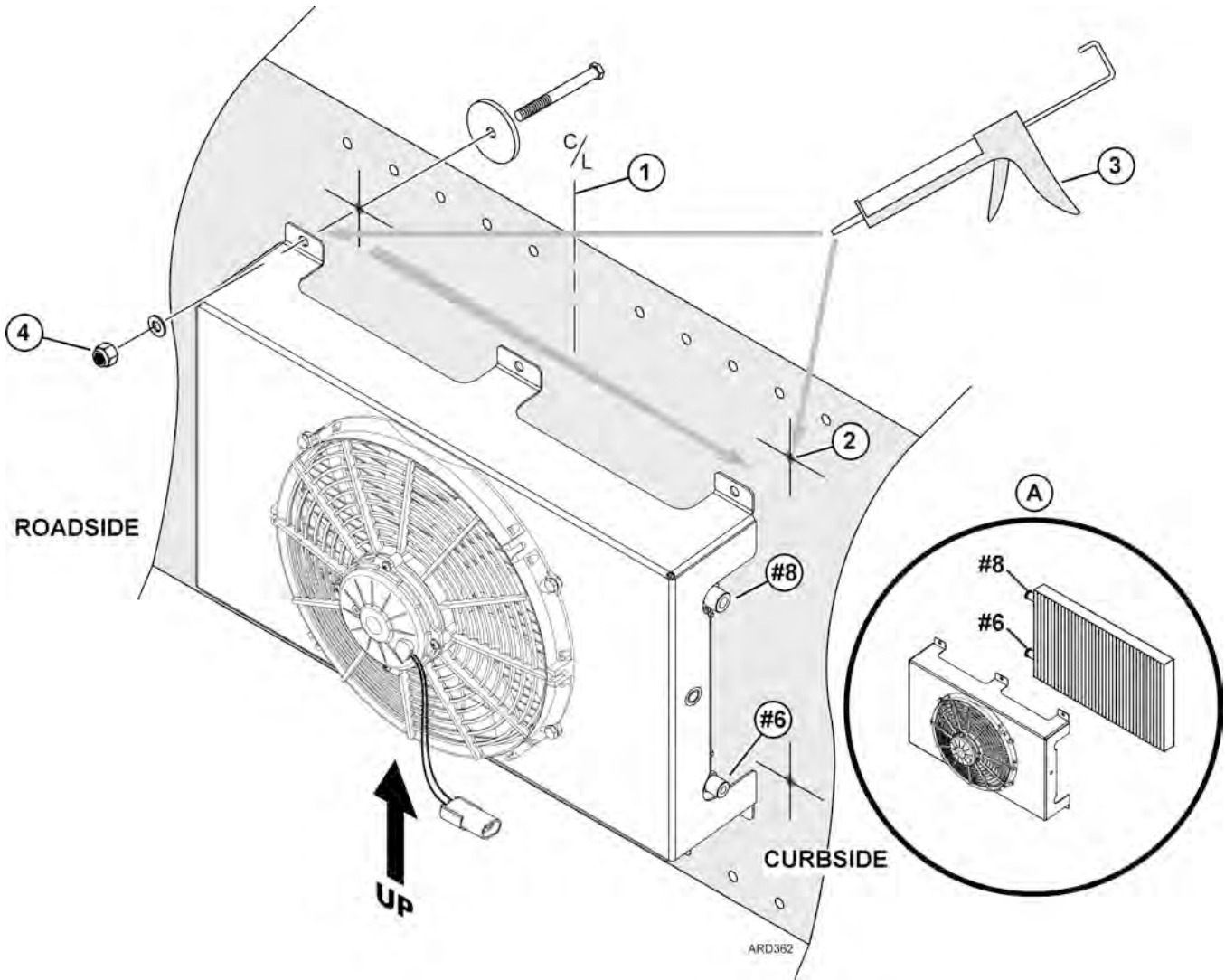
**Important:** Before drilling any holes, check for interference with internal wires, supports or interior panels. Avoid drilling into the truck’s interior support members as this could void the tractor’s OEM warranty.

Special Tools Required
Tape Measure
Level
Drill Motor
3/8” Drill Bit
Caulk Gun and RTV Silicone Sealant

The condenser housing and coil assembly can be also installed with the hose fittings facing towards the roadside (**DETAIL A**) if needed. When doing so, the actual condenser coil must be removed from the housing and rotated so the #8 fitting is on top by:

- a. Rotating the complete condenser housing and coil assembly so the hose fittings are facing towards the roadside.
  - b. Removing the condenser coil from the housing, and rotating it so the #8 fitting is positioned at the top, then install it back into the condenser housing and tighten the hardware securely.
1. Measure and mark the exterior center line of the sleeper.
  2. Center and level the condenser onto the sleeper with the #8 fitting located on top. Mark the mounting holes; typically one in each corner. Drill four 3/8” mounting holes.
  3. Apply a bead of RTV silicone along the entire condenser mounting flanges and around each of the four mounting holes.
  4. Install the condenser with 3/8” stainless mounting bolts and large fender washers from the inside, and 3/8” washers and locking nuts on the outside. Tighten hardware securely.

Figure 14. Typical Condenser Installation Shown



# A/C Receiver Drier Installation

**Important:** See "Receiver Drier Installation Standards" in Section 5 of the Thermo King TriPac Installation Standards Guide (TK 56498). **THESE STANDARDS MUST BE FOLLOWED!**

Special Tools Required
Drill Motor
3/8" Drill Bit
Level

**Note:** It is recommended to mount the receiver drier directly onto the sleeper to reduce hose flexing.

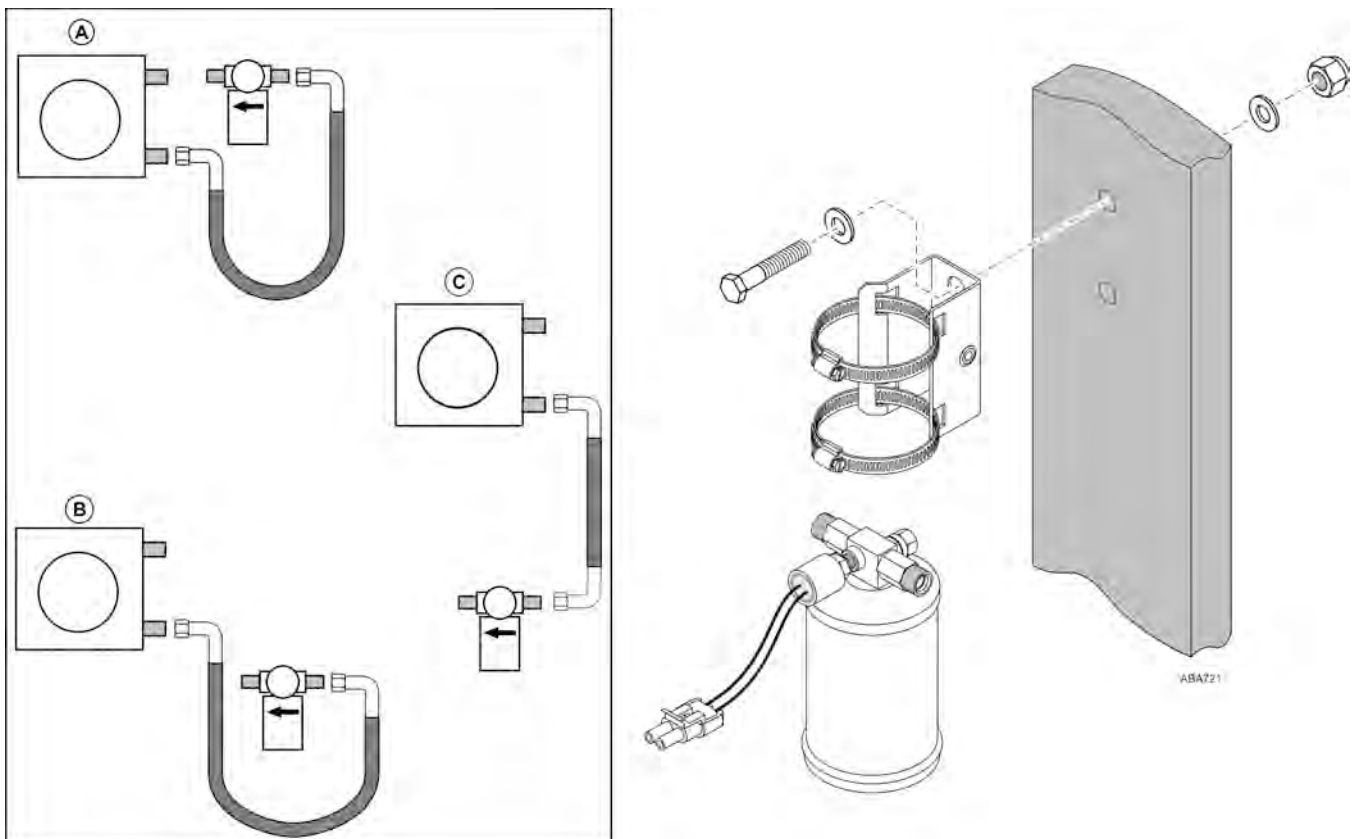
Locate an area on the exterior of the tractor to install the receiver drier.

Typical Mounting Locations:

- a. Side-by-side Mount (**DETAIL A**)
- b. Mid-height Mount (**DETAIL B**).
- c. High Mount (**DETAIL C**).

1. Position and level the receiver drier bracket and mark each of the two mounting holes. Drill two 3/8" holes.
2. Attach two large hose clamps to the bracket with 3/8" stainless mounting bolts, washers and locking nuts (installer supplied) and tighten securely.
3. With the switch facing out, install the receiver drier onto the bracket and tighten the hose clamps securely.

**Figure 15. Receiver Drier Installation Shown**



# Ambient Temperature Sensor Installation (Option)

**Note:** The ambient temperature sensor is included in 120 Amp Alternator Option 073023

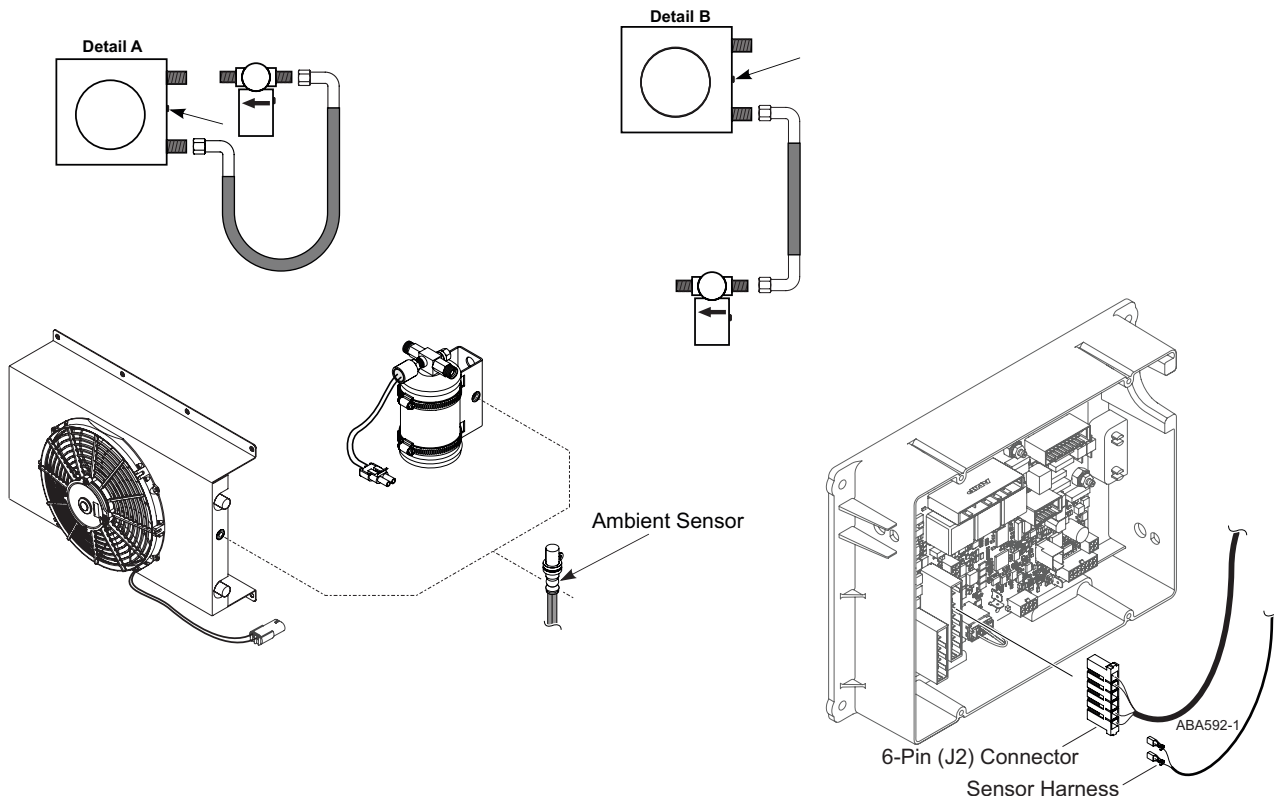
1. Locate ambient temperature sensor harness supplied with unit
2. Sensor should be mounted at highest point on either the receiver drier bracket or the condenser fan housing.
  - **DETAIL A** - sensor can be mounted on either the receiver drier bracket or on the condenser fan housing as both are at equal height.
  - **DETAIL B** - sensor should be mounted to the condenser fan housing as it is higher than the receiver drier.
3. Attach sensor with the provided clamp and mounting hardware as shown.
4. Route sensor harness up inside the sleeper through existing access hole.
 

**Note:** Sensor harness should be secured with cable ties to the other harnesses already installed and routed into sleeper.
5. Route the sensor harness to the control box:
  - a. Unplug 6-pin connector (**J2**) from controller.
  - b. Insert wire (**ATS**) securely into connector (**J2**) pinout #4.
  - c. Insert wire (**ATS\_RTN**) securely into connector (**J2**) pinout #5.
  - d. Reconnect 6-pin connector (**J2**) securely into controller.
  - e. Secure all wires with cable ties.

6. Go to **TK Monitor** and select **Alternator Capacity - 120 Amps**.

**See Unit Setup Procedures at back of manual.**

**Figure 16. Ambient Temperature Sensor Installation Shown**





# A/C Evaporator Installation

## Preferred Location – Flush with Front Bulkhead

**Important:** See “Evaporator Installation Standards” in Section 5 of the Thermo King TriPac Installation Standards Guide (TK 56498). **THESE STANDARDS MUST BE FOLLOWED!**

A template is supplied to represent the amount of area needed to accommodate the evaporator. It also provides locations for the two 7/8” drain holes and the 3” access hole.

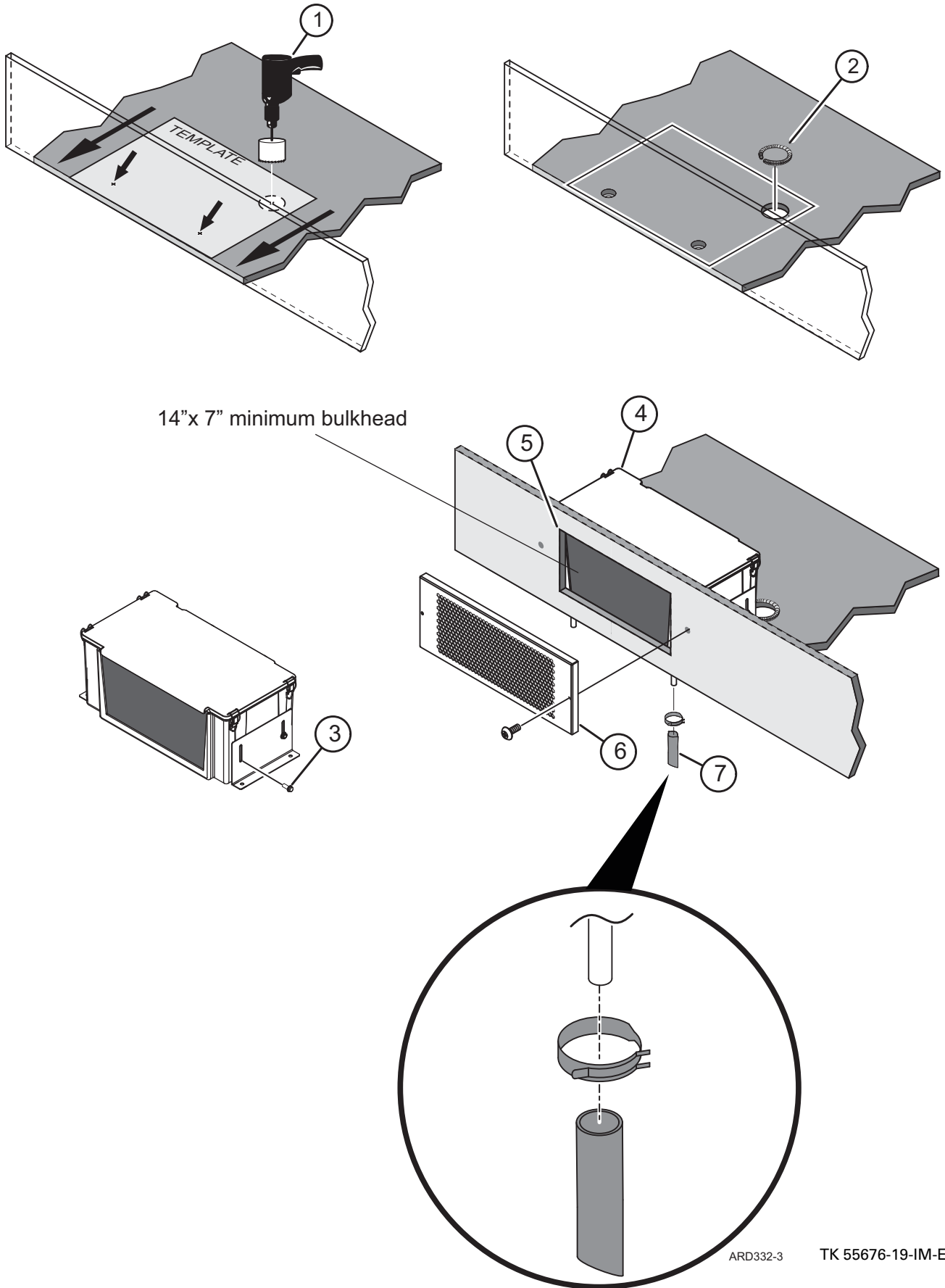
### IMPORTANT ACCESS HOLE INFORMATION:

- The location of the 3” access hole will be determined by your particular sleeper construction, including OEM internal floor supports, electrical wiring, etc. It should be located directly behind the evaporator’s A/C fittings to allow the refrigerant hoses with 90 degree fittings to be attached and routed down through the floor easily.
- Floors made from fiberglass covered wood construction require the edges of the 3” access hole be completely sealed with fiberglass and epoxy resin.
- Before drilling any holes, check for interference with internal wires, supports or interior panels. Avoid drilling into the truck’s support members.

Special Tools Required
Drill Motor
1/4” Drill Bit
7/8” Step Reamer
3” dia. Hole Saw
Reciprocating Saw
Caulk Gun and RTV Silicone Sealant
Sealing Putty (203-391)
Fiberglass Cloth and Resin Kit (if required)

1. Position the template flush with the bulkhead, mark the location of the 7/8” evaporator drain holes and the 3” access hole. Remove the template.
  - a. Drill 1/4” pilot hole for the drain holes followed by a 7/8” step reamer.
  - b. Drill 3” access hole.
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. Reposition the evaporator mounting brackets attached to sides of the evaporator.
4. Set the evaporator in place and determine where the return air opening needs to be located on the bulkhead.
5. Mark the return air opening (minimum opening size 14" x 7"). Remove the evaporator and cut the opening. Install the evaporator to the floor with TEK screws.
6. Install a return air grille (installer supplied).
7. From underneath the sleeper:
  - a. Attach the two water valves (kazoos) onto the evaporator drain tubes and secure with supplied hose clamps
  - b. Seal around the drain tube access holes with sealing putty or silicone sealant.
  - c. Apply silicone sealant around the four evaporator mounting screws.
  - d. Seal any unused holes, cracks, or visible air gaps that might be found.

Figure 17. Preferred Location Flush with Bulkhead Shown



## Alternative Location – Centered Under Bunk

**Important:** See “Evaporator Installation Standards” in Section 5 of the Thermo King TriPac Installation Standards Guide (TK 56498). **THESE STANDARDS MUST BE FOLLOWED!**

A template is supplied to represent the amount of area needed to accommodate the evaporator. It also provides locations for the two 7/8” drain holes and the 3” access hole.

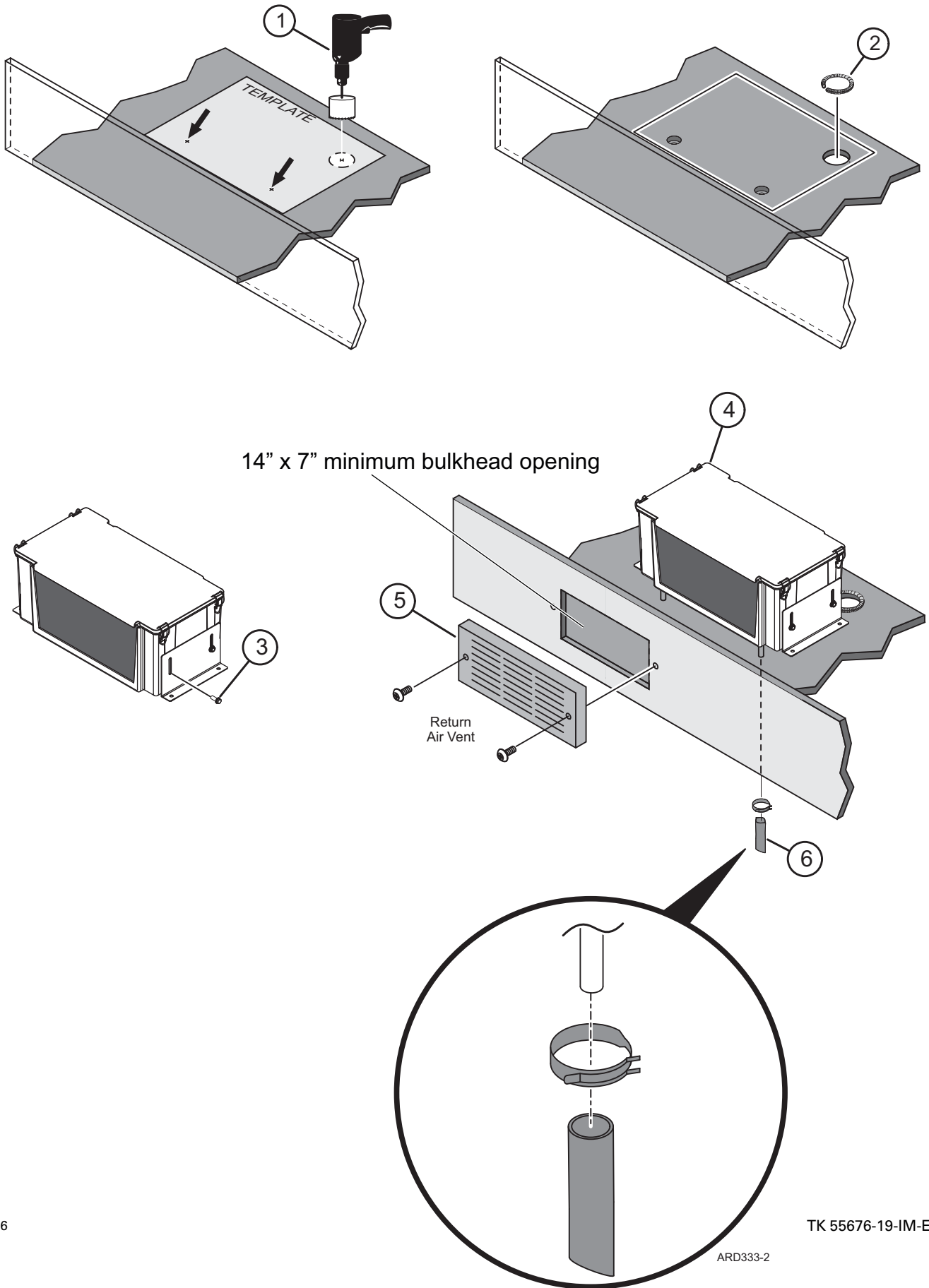
### IMPORTANT ACCESS HOLE INFORMATION:

- The location of the 3” access hole will be determined by your particular sleeper construction, including OEM internal floor supports, electrical wiring, etc. It should be located directly behind the evaporator’s A/C fittings to allow the refrigerant hoses with 90 degree fittings to be attached and routed down through the floor easily.
- Floors made from fiberglass covered wood construction require the edges of the 3” access hole be completely sealed with fiberglass and epoxy resin.
- Before drilling any holes, check for interference with internal wires, supports or interior panels. Avoid drilling into the truck’s support members.

Special Tools Required
Drill Motor
1/4” Drill Bit
7/8” Step Reamer
3” dia. Hole Saw
Reciprocating Saw
Caulk Gun and RTV Silicone Sealant
Sealing Putty (203-391)
Fiberglass Cloth and Resin Kit (if required)

1. Position the template flush with the bulkhead, mark the location of the 7/8” evaporator drain holes and the 3” access hole. Remove the template.
  - a. Drill 1/4” pilot hole for the drain holes followed by a 7/8” step reamer.
  - b. Drill 3” access hole.
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. Reposition the evaporator mounting brackets attached to the sides of the evaporator.
4. Install the evaporator to the floor with TEK screws.
5. Mark a location for a return air opening (minimum opening size 14" x 7") and cut the opening. Install a return air grille (installer supplied).
6. From underneath the sleeper:
  - a. Attach the two water valves (kazoos) onto the evaporator drain tubes and secure with supplied hose clamps
  - b. Seal around the drain tube access holes with sealing putty or silicone sealant.
  - c. Apply silicone sealant around the four evaporator mounting screws.
  - d. Seal any unused holes, cracks, or visible air gaps that might be found.

Figure 18. Alternative Location Centered Under Bunk Shown



# D2/D4 Heater Installation

## Heater Location

**Important:** See “Heater Installation Standards” in Section 7 of the Thermo King TriPac Installation Standards Guide (TK 56498). **THESE STANDARDS MUST BE FOLLOWED!** Correct installation of this heater is necessary to ensure safe and proper operation. **BEFORE** installing the heater, thoroughly read and understand “Heater Safety Precautions” section in this manual along with the heater manufacturer’s manuals included with the heater.

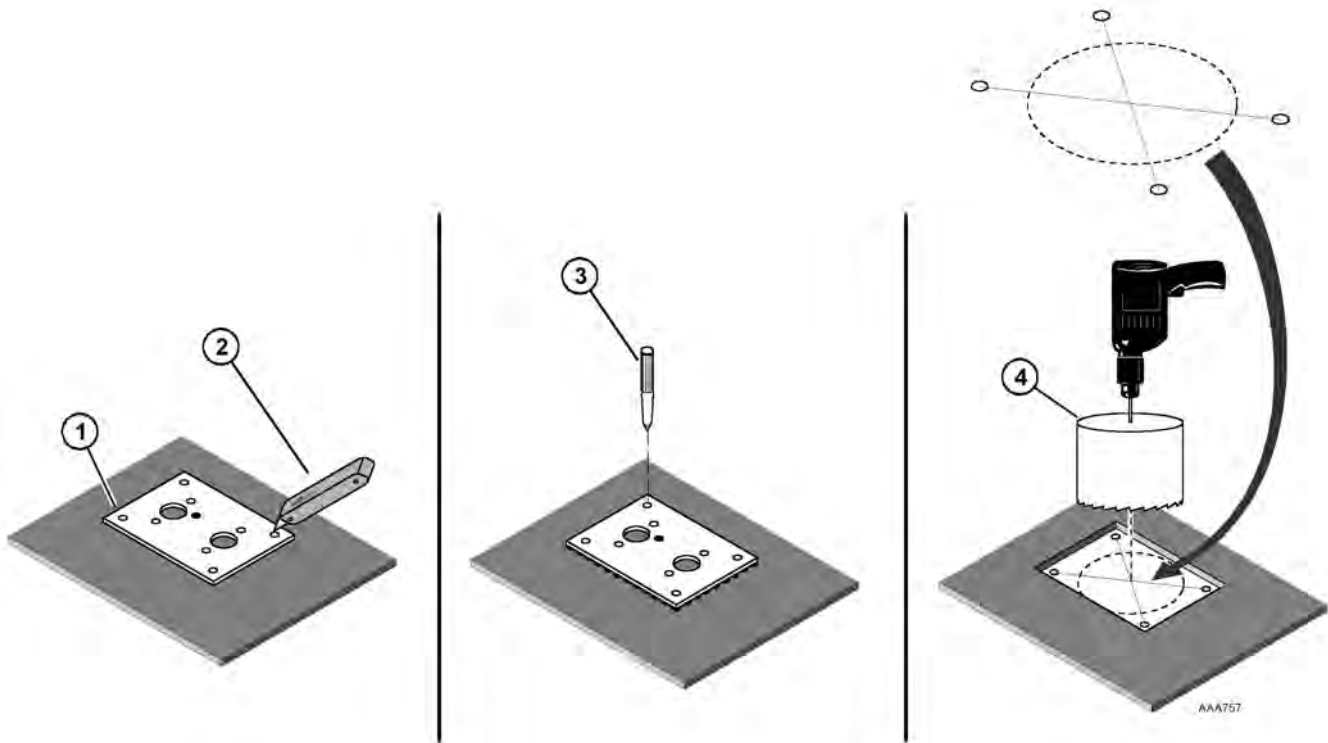
The location for mounting the heater will vary depending on the type of tractor. Typically the heater is mounted inside the sleeper, under the bunk in a storage compartment. However, the heater may be mounted anywhere inside the tractor provided you adhere to the following conditions:

- 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

Special Tools Required
Drill Motor
Utility Knife
Center Punch
4-1/4" dia. Hole Saw
Fiberglass Cloth and Resin Kit (if required)

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.

**Figure 19. Drilling Hole In Floor Shown**


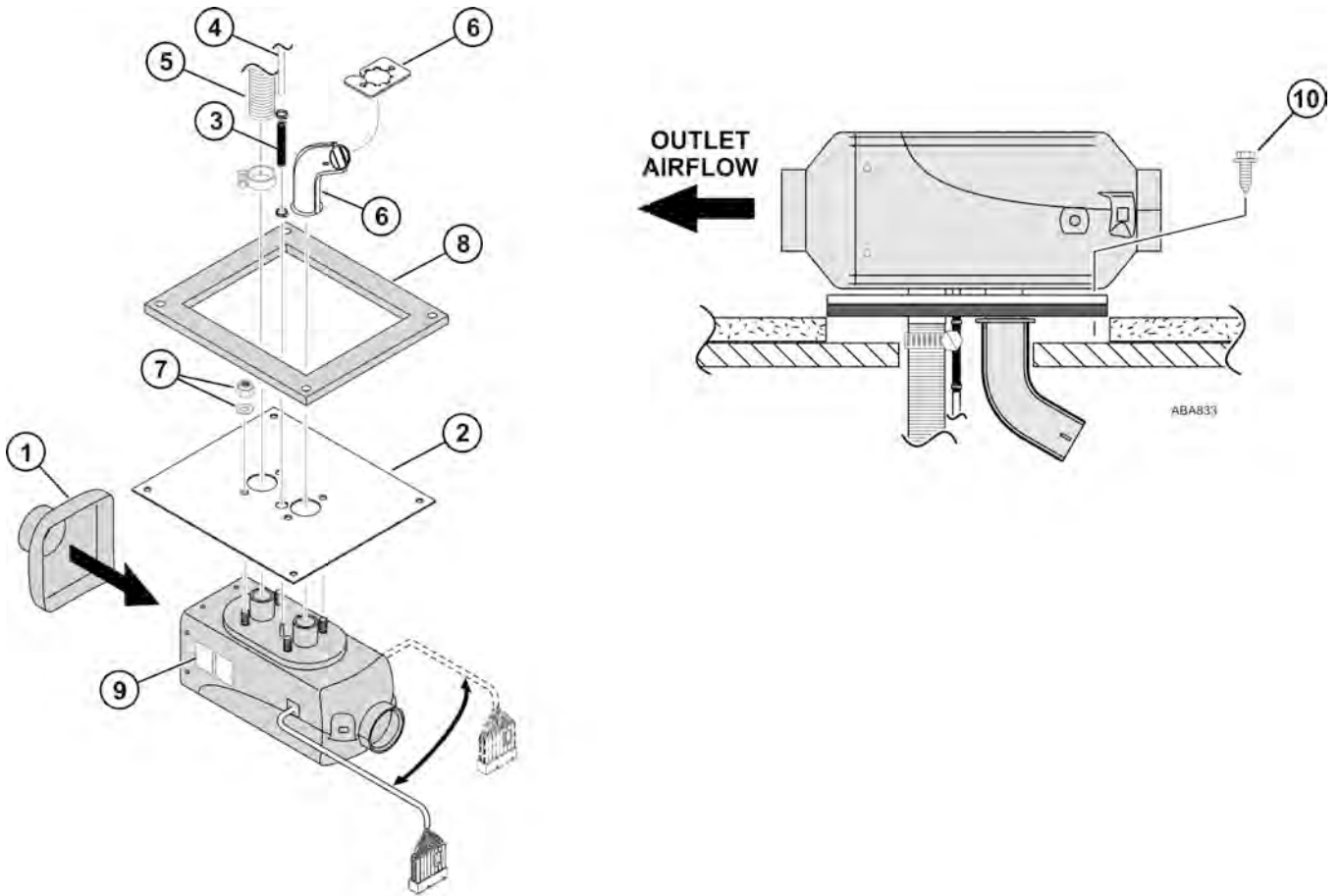
## Heater Subassembly and Installation

Turn the heater upside down and attach the following components:

1. Snap the air outlet hood onto the end of the heater.
2. Place the mounting plate onto the heater studs. Mounting hardware will be installed later.
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.
5. Attach the 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. Insert the plastic air intake tube through the beveled opening of the small plastic mounting plate. Install the plastic plate and tube onto studs located under the INLET end of the heater.
7. Install lock washers and nuts onto each of the mounting studs and tighten hardware securely
8. Install gasket to mounting plate.
9. 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.
10. Position the heater over the access hole with intake and exhaust hose and fuel line exiting the tractor. 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!

Figure 20. Heater Subassembly Shown





### Exhaust and Combustion Air Intake Routing

#### ⚠ DANGER

#### Asphyxiation Hazard!

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 outlet hose and combustion air intake tube so they cannot be plugged by dirt, water or snow.
- Ensure the exhaust outlet and air inlet do not face into the tractor's slip stream to prevent "ram air" effect.
- Keep exhaust outlet and 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 cap onto the end of the exhaust hose.
- 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 tube to the heater.
- **DO NOT** mount the exhaust hose to the tractor's frame. It must be installed to the cab to allow for movement.

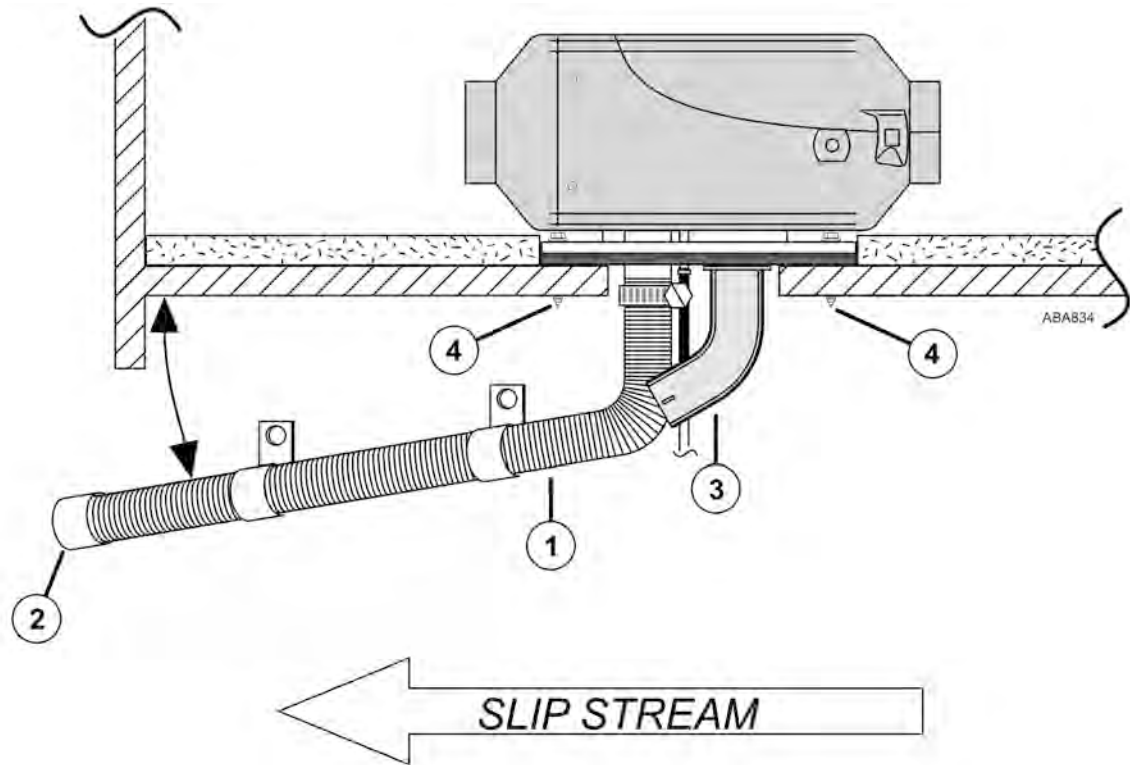
### Exhaust and Combustion Air Intake Installation

1. Route the 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.
  - a. Drill a 1/8" hole in exhaust hose if necessary to allow for water drainage.
2. Attach metal end cap to exhaust hose.
3. Position air intake tube facing towards the rear of the tractor where it can pick up clean, fresh, moisture free air.
4. From underneath the sleeper:
  - a. Apply silicone sealant around **ONLY** the four heater mounting screws.
  - b. **DO NOT** apply any sealant around the access hole!

**Important: ALWAYS VERIFY** the two water valves (kazoos) are installed onto the evaporator drain tubes and are secured with hose clamps.



Figure 21. Correct Exhaust and Combustion Air Intake Routing Shown



# D2/D4 Heater Duct Installation

## Duct Locations

**Important:** See “Discharge and Return Air Duct Standards” in Section 7 of the Thermo King TriPac Installation Standards Guide (TK 56498). **THESE STANDARDS MUST BE FOLLOWED!**

### IMPORTANT INFORMATION:

- **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.

**Notes:** 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 Procedures

Special Tools Required
Drill Motor
2-1/2" Hole Saw (for installing discharge air vent and return air grille)
3" Hole Saw (for routing ducts through compartment walls if required)

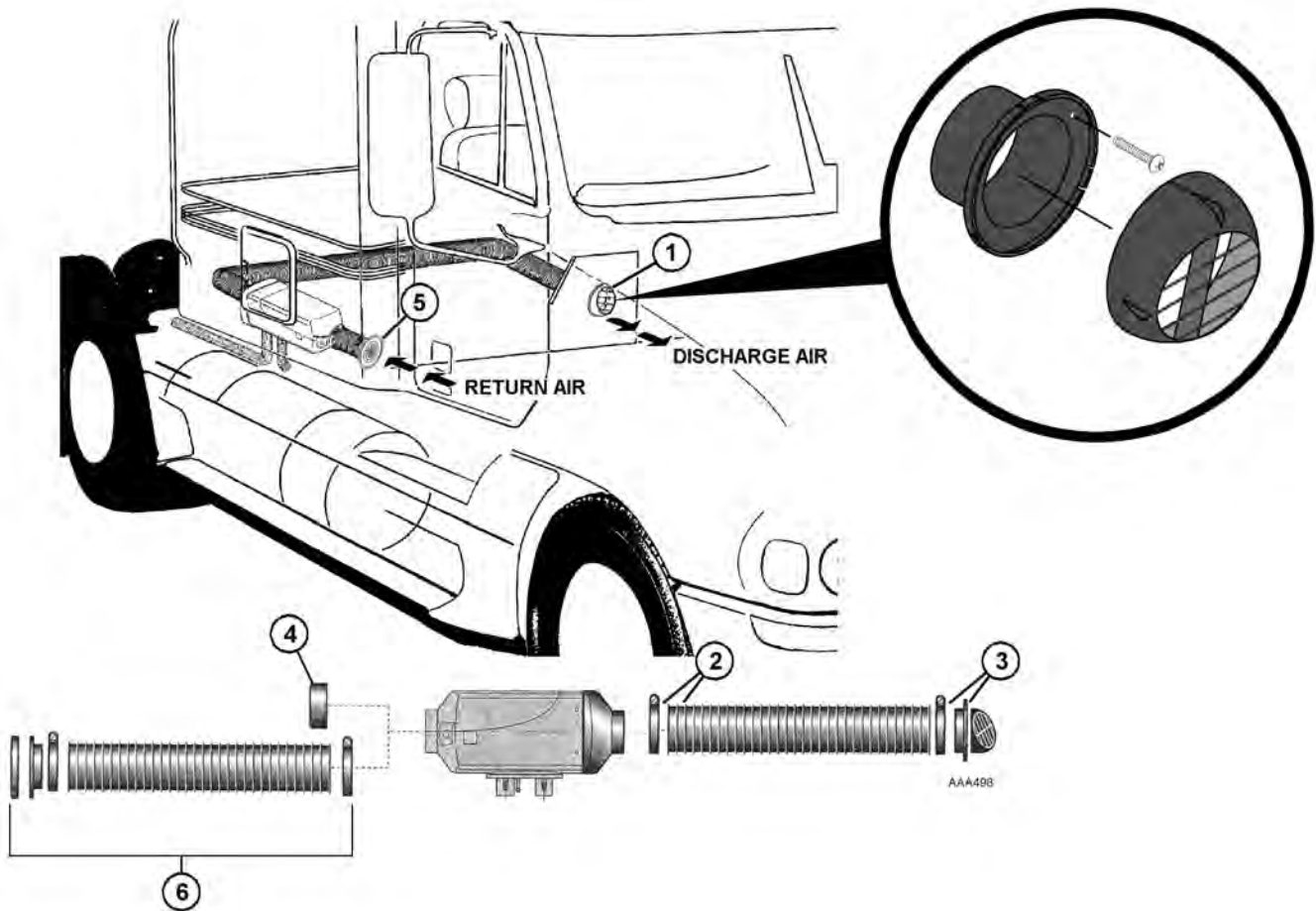
### Discharge Air

1. Find an appropriate location for the floor level discharge air vent and drill a 2-1/2" hole using the correct hole saw.
  - a. Unsnap rotating outer louver assembly from the mounting base.
  - b. Install the base into 2-1/2" hole and secure with supplied screws.
  - c. 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 inlet.
5. Find an appropriate location for the floor level return air grille and drill a 2-1/2" hole using the correct hole saw.
  - a. Install return air grille into the 2-1/2" hole and secure with supplied screws.
6. Attach one end of return air duct to air inlet hood on heater and secure with supplied clamp.
  - a. Route return air duct to return air grille, cut as needed, attach to end of plastic louver vent and secure with supplied hose clamp.

Figure 22. D2/D4 Heater Duct Installation Shown



# A/C Duct Installation

## A/C Vent Locations

**Note:** See “Evaporator Air Discharge Ducts and Vents Installation Standards” in Section 6 of the Thermo King TriPac Installation Standards Guide (TK 56498). **THESE STANDARDS MUST BE FOLLOWED!**

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)

**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.

**IMPORTANT**

To maximize APU efficiencies, the back flow damper kit (710676) must be installed when connecting the TriPac’s air conditioning discharge hose (s) directly into the truck’s OEM HVAC duct(s). The damper will prevent the TriPac’s air from back flowing into the OEM HVAC housing. Failure to install this kit may result in poor system performance.

## Installation Procedures

Special Tools Required
Drill Motor
4-1/4” diameter Hole Saw (for installing plastic A/C louver vents and for routing ducts through compartment walls)

1. Find an appropriate location for the A/C vents and drill 4-1/4” diameter holes.
2. Attach one end of the flexible air duct to one of the air discharge outlets of the evaporator and secure with supplied hose clamps
3. Route the flexible air duct through the A/C vent hole, cut excess duct as needed.
4. Unsnap rotating outer louver assembly from the mounting base.
5. Attach to flexible air duct to the end of the louver base with band wraps.
6. Push the mounting base back into 4-1/4” mounting hole and secure with supplied screws.
7. Reinstall rotating outer louver assembly back into the mounting base and verify that it rotates freely.
8. Install the second A/C vent in the same manner.
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.

Figure 23. Typical A/C Duct Installation Shown

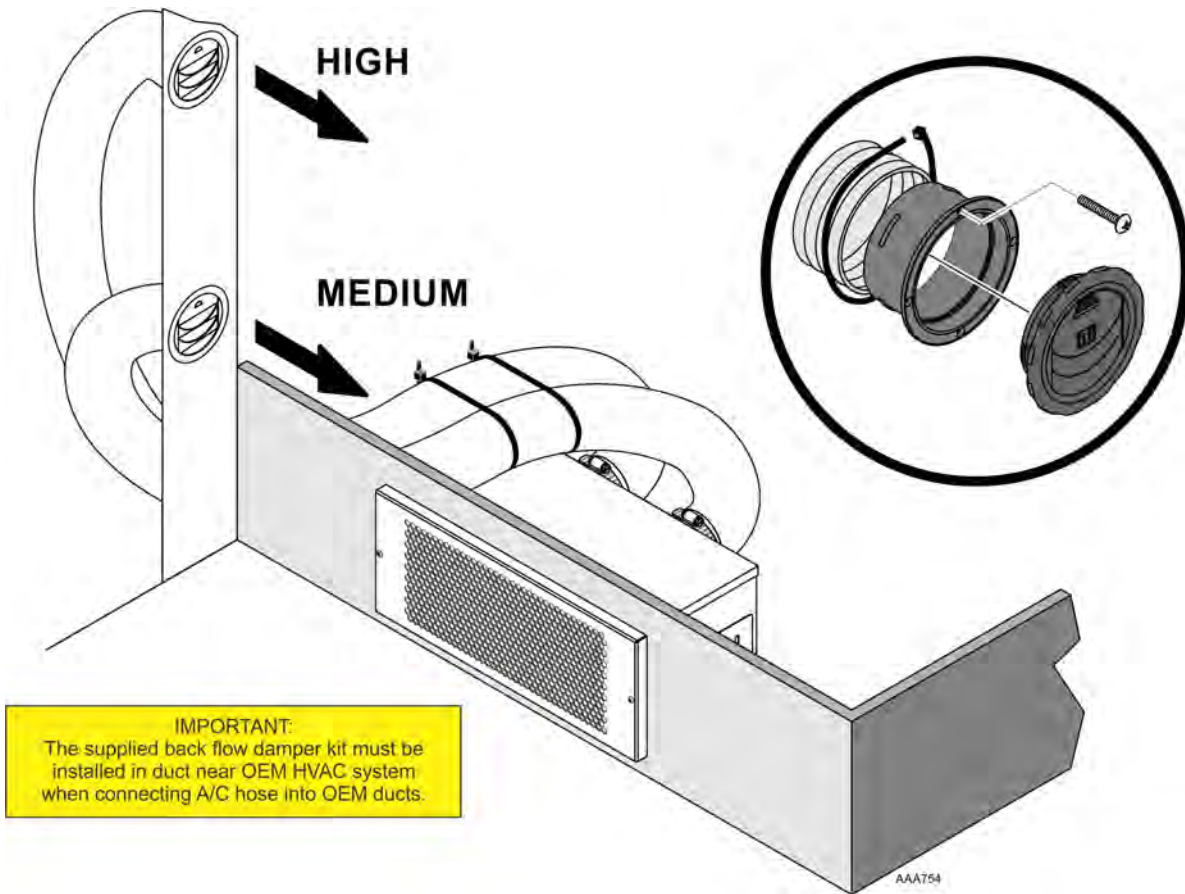
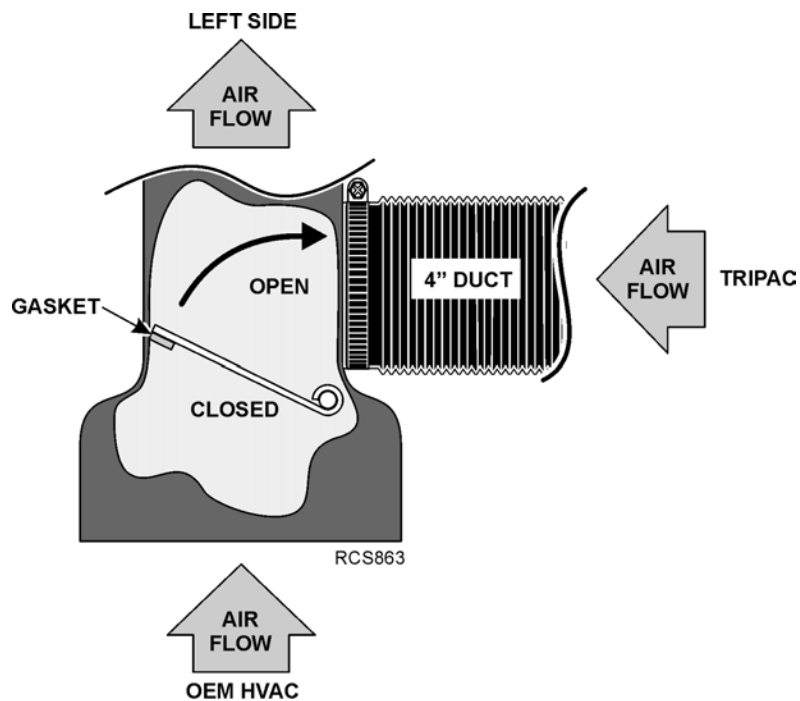


Figure 24. Example of a Back Flow Damper Shown



# A/C Hose Installation

## Installation Procedures

**Note:** See “Refrigerant Hose and Fittings Standards” in Section 8 of the Thermo King TriPac Installation Standards Guide (TK 56498). **THESE STANDARDS MUST BE FOLLOWED!**

Special Tools Required
Hose Fitting Tools (204-1045)
Hose Cutting Tool (204-677)
PAG Refrigerant Oil (2030502)
Torque Wrench

**Tighten all fittings as specified in the chart.**

**Note:** Always use two wrenches while tightening refrigeration fittings.

Fitting Size	Torque Specifications
#6 (3/8")	11-13 lb-ft (15-17 N•m)
#8 (1/2")	15-20 lb-ft (20-27 N•m)
#10 (5/8")	21-27 lb-ft (28-37 N•m)
#12 (3/4")	28-33 lb-ft (38-45 N•m)

## Compressor Hose Connections

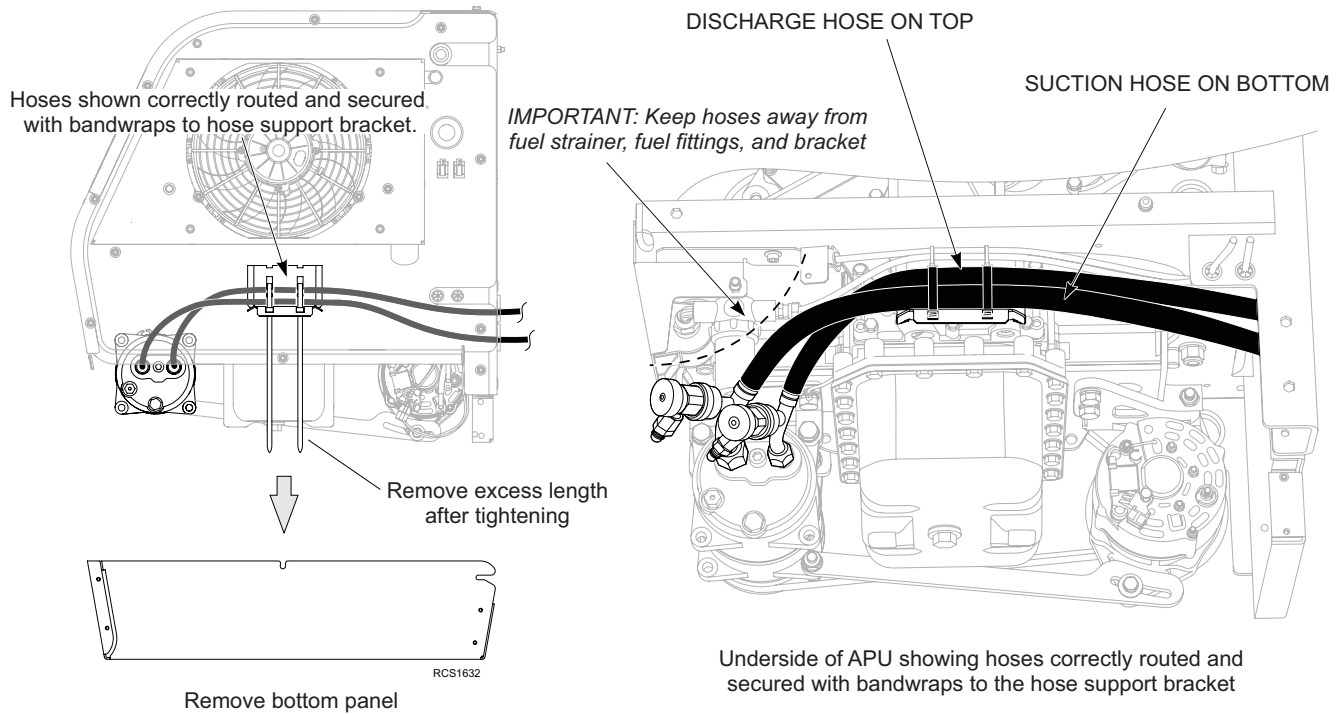
**Important:** The suction and discharge hoses must be secured to the support bracket with the pre-installed bandwraps exactly as shown in the illustration.

1. Begin refrigeration hose installation at the APU compressor fittings. Work away from the compressor towards the other A/C system components to avoid hose slack inside the APU.
2. Start at the rear of the APU and route the #8 hose into the APU through the upper access hole and the #10 hose through the lower access hole making sure you route them through the pre-installed bandwraps attached to the support bracket and then to the compressor.

**Note:** Recommend routing the #8 hose first.

- a. Cut the suction hose to the appropriate length, attach a **#10, 45 degree fitting (with service port)** and loosely connect to the **suction** fitting on the compressor.
  - b. Cut the discharge hose to the appropriate length, attach a **#8, 45 degree fitting (with service port)** and loosely connect to the **discharge** fitting on the compressor.
3. Gently pull the hoses towards the outside of the APU to remove slack.
    - a. Rotate compressor fittings as necessary to allow hoses to clear components and engine. Keep both hoses away from fuel strainer, fuel fittings and bracket.
    - b. Position both hoses to the support bracket exactly as shown in the illustration and then tighten bandwraps securely Cut off excess bandwrap length.
  4. Tighten all refrigeration fittings as specified in the chart.
  5. Re-torque pre-filter bowl to 25 in-lb (2.8 N•m) if it was loosened during the install. Use of tool 204-3103 is recommended.

**Figure 25. Suction and Discharge Hoses Shown Correctly Routed and Secured**



### Compressor to Evaporator

6. From the APU, route the **#10 suction hose** up through the 3" access hole in the tractor floor to the evaporator:
  - a. Cut the hose to the appropriate length, attach a **#10 fitting** and connect to the #10 suction fitting on the evaporator

### APU to Condenser

7. From the APU, route the **#8 discharge hose** to the condenser coil:
  - a. Cut the hose to the appropriate length, attach a **#8 fitting** and connect to the #8 discharge fitting located near the top of the condenser coil.

### Evaporator to Receiver Drier

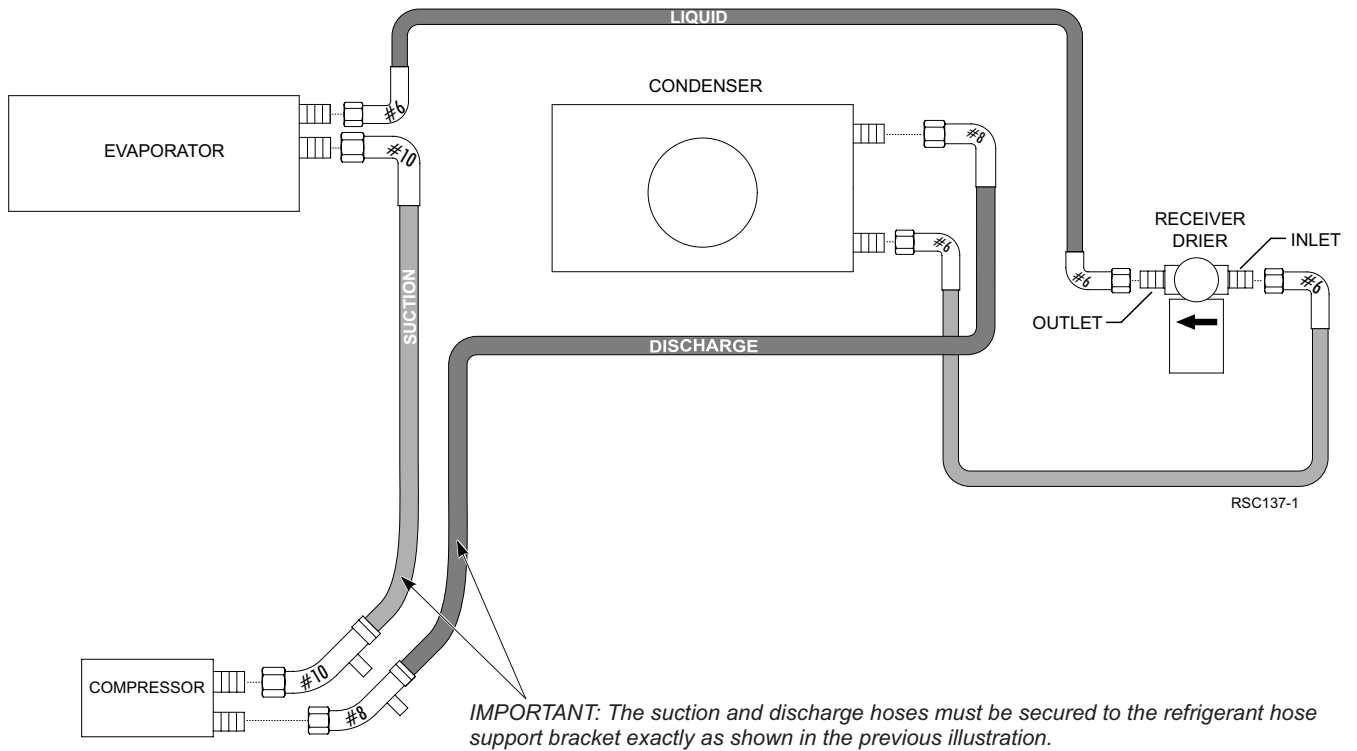
8. Fabricate a **#6 hose** and fitting and attach onto the **#6 liquid line fitting** on the evaporator:
  - a. Route the hose down through the 3" access hole in the tractor floor to the receiver drier.
  - b. Cut the hose to the appropriate length, attach a **#6 fitting** and connect to the **OUTLET** end indicated by arrow on the receiver drier.

### Condenser to Receiver Drier

9. Fabricate a **#6 hose** and fitting and attach onto the **#6 fitting** on the condenser coil:
  - a. Route the hose to the receiver drier.
  - b. Cut the hose to the appropriate length, attach a **#6 fitting** and connect to the **INLET** end on the receiver drier.
10. Tighten all fittings as specified in the chart.
11. Reinstall and secure APU side panel.

**Note:** The bottom pan will be reinstalled in a later step.

Figure 26. A/C Hose Diagram Shown





# A/C System Evacuation and Leak Check Procedures

## Evacuation Procedures

**Note:** See “System Evacuation Standards” in Section 12 of the Thermo King TriPac Installation Standards Guide (TK 56498). **THESE STANDARDS MUST BE FOLLOWED!**

Evacuation Procedures
Thermo King Evacuation Station (P/N 204-725) Recommended
Evacuation Station Operation and Field Application Instructions (TK 40612)
Electronic Leak Detector (204-756)
Gauge Set with R134a Adapters

**Note:** The oil in the evacuation station vacuum pump should be changed after each use.

**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.

1. Connect the gauge manifold to the suction and discharge service ports of the APU’s compressor.
2. Connect the service line of the gauge manifold to the vacuum pump and micron gauge.
3. Open the gauge manifold and vacuum pump valves and gauge manifold hand valves
4. Start the vacuum pump and evacuate until system reaches 500 microns.
5. Once the system reaches 500 microns, continue evacuation for one additional hour.

**Note:** To save installation time, while the system is being evacuated, continue on to the electrical installation beginning with “Control Box and Main Harness Installation” . Return and complete this procedure later.

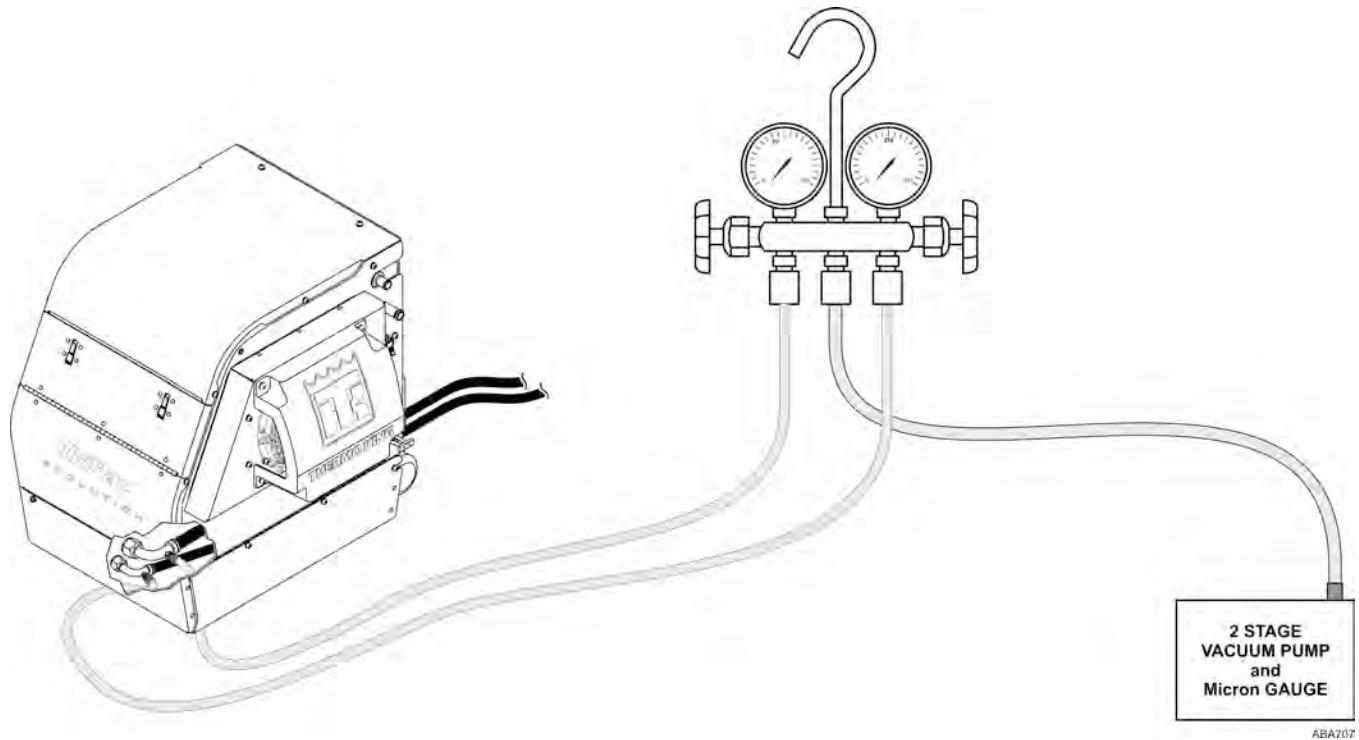
6. Close the vacuum pump valve, switch off the pump, checking that the gauge reading for the vacuum pump does not exceed 2000 microns in the following five minutes. If vacuum level exceeds 2000 microns before five minutes, and continues to rise, proceed to the **Leak Check Procedures** section below.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

## Leak Check Procedures

**Note:** See “System Leak Check Standards” in Section 12 of the Thermo King TriPac Installation Standards Guide (TK 56498). **THESE STANDARDS MUST BE FOLLOWED!**

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.

**Figure 27. Gauge Manifold and Vacuum Pump Shown Connected to APU**



# Control Box and Main Harness Installation

## Control Box Location

Choose a location inside the tractor's sleeper for the control box. The box can be mounted horizontally or vertically. Make sure the location chosen allows access for:

- Installation of wiring
- Servicing of interface board components
- Operation of the reset switch.

**Note: DO NOT** install the control box at this time. It will be installed **AFTER** all the TriPac electrical harnesses have been connected.

### DPF Units Only

Install the Small Engine Control Module (SECM) and harnesses now. Refer to TK 55727-19-IM for details.

### Power Inverter Option Only

Install the power inverter now. Refer to TK 55855-19-IM for details.

### Hourmeter Option Only

Install the hourmeters and harness now. Refer to TK 55701-19-MS for details

## Main Harness Installation Procedures

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

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

**Note:** Exercise care when mating the connection. 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.

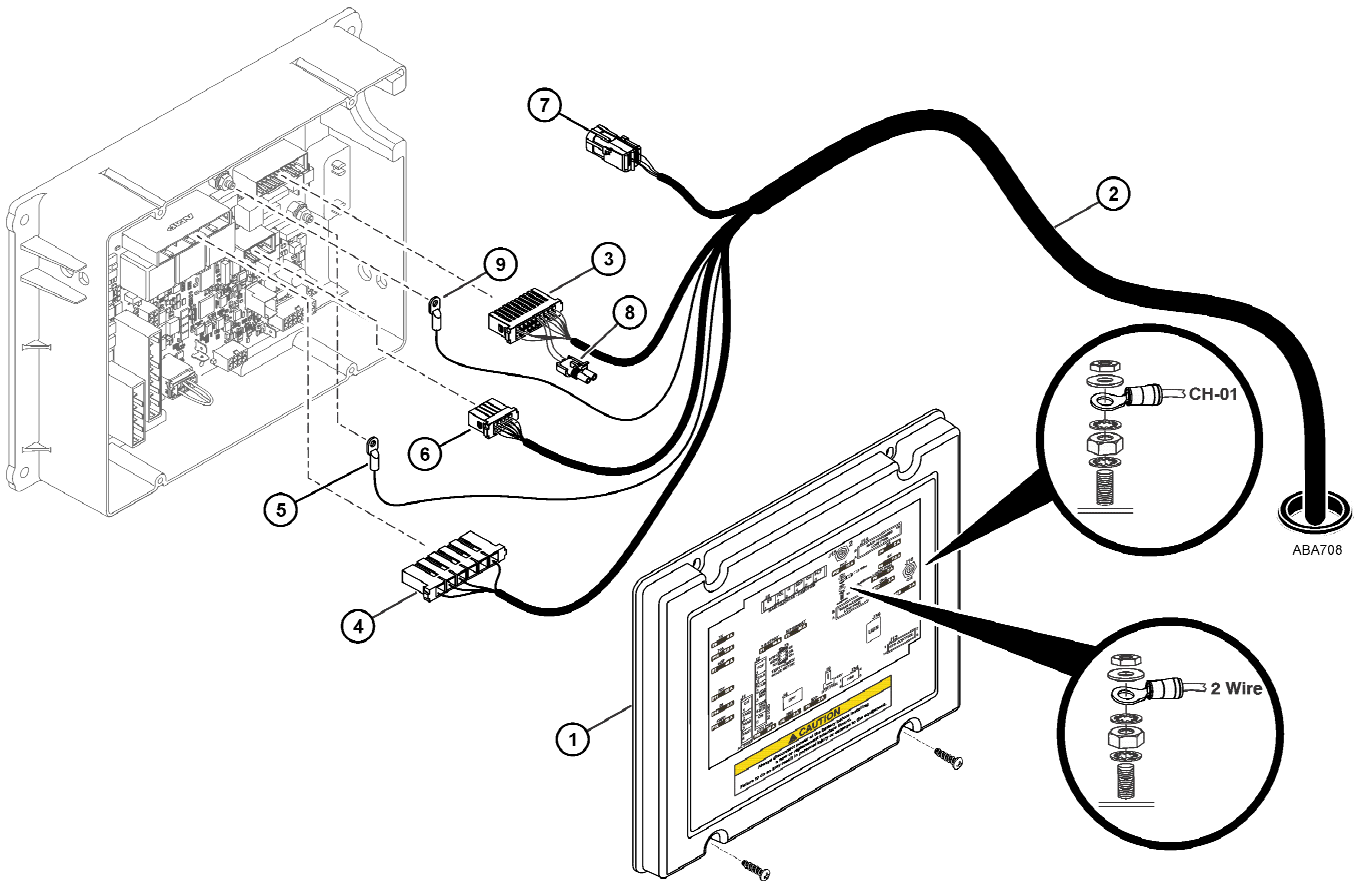
1. Position the control box inside the truck and remove the cover.
2. Route **Main Electrical Harness** from APU up into sleeper through 3" access hole in the floor and into the control box.
3. Connect **20-pin** connector to mating connector (**J14**) on interface board.
4. Connect **6-pin** connector to mating connector (**J5**) on interface board.
5. Attach the separate **CH-01** wire with the terminal ring onto interface board ground stud labeled CH (**J16**) and torque to 18 lb-in (2 N•m).

**Important: IMPORTANT:** The CH-01 wire terminal ring must be positioned correctly onto the ground stud and tightened properly or the unit will not operate.

6. Connect **10-pin** connector to mating connector (**J6**) on interface board.
7. **4-pin** connector (**7CL, 7CLA, COILSEN, COILSEN-RTN**) will be attached to mating connector on A/C evaporator harness that will be installed in a later step.
8. **2-pin** connector (**SBY, 2A**) is for Standby Truck Integration Switch (OPTION).
9. Attach 2 wire with terminal ring onto interface board power stud (**J15 2**) and torque to 18 lb-in (2 N•m).

**Important:** The 2 wire terminal ring must be positioned correctly onto the power stud as shown on decal located on control box cover.

**Figure 28. Main Harness Connections to Control Box Shown**



# HMI Installation

## HMI Location

- Choose a location inside the tractor’s sleeper for the HMI controller that is easily accessible and visible from the drivers bunk.
- The HMI should be visible and mounted away from windows, air vents, out of direct sunlight to accurately measure air temperature.

## Installation Procedures

Special Tools Required
Level
Drill Motor
Drill Bits

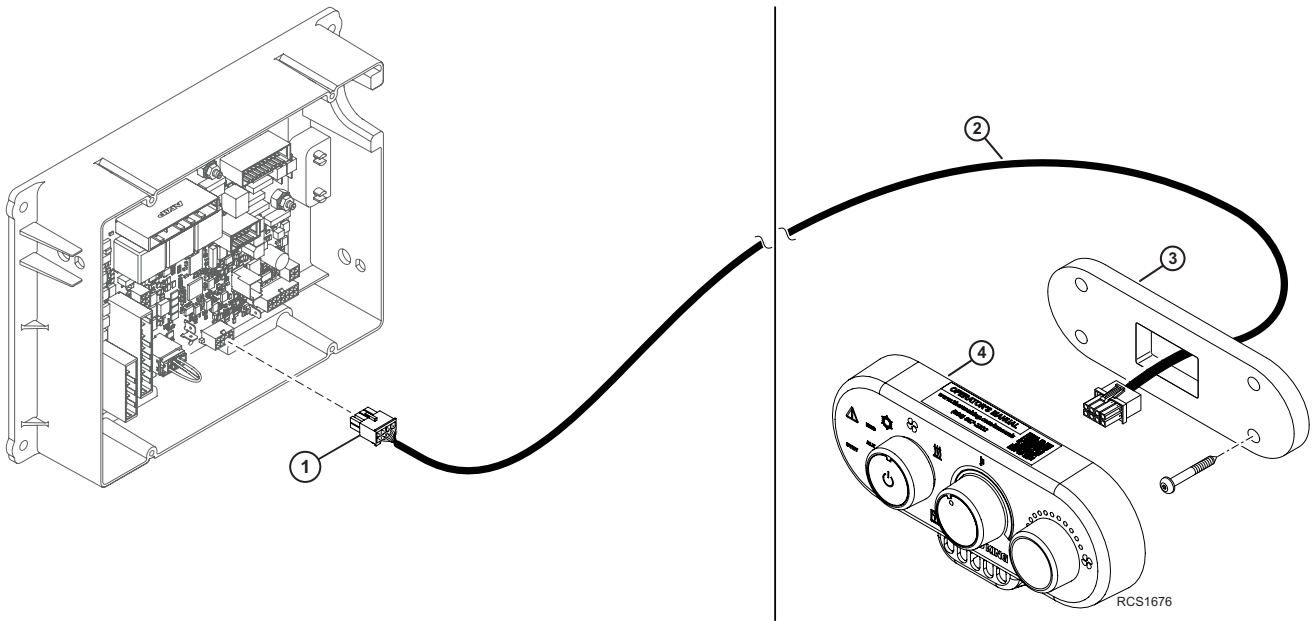
Locate the **HMI Controller Harness** with the **8-pin** connectors on each end supplied loose in the installation kit.

1. Connect one 8-pin harness connector to the HMI (**J34**) connector on the main controller board inside the control box.
2. From the control box, route the harness behind the interior walls (if applicable) to the location chosen to install the HMI controller.
3. Unsnap the rear mounting base from the controller and route the 8-pin harness connector through the access hole.
  - Position and level the mounting base and install securely.
4. Push the connector firmly into the rear of the controller and snap the controller back onto the mounting base.

### DPF Units Only - Exhaust Monitor and Regeneration Switch

Install the exhaust monitor and regeneration switch now. Refer to TK 55727-19-IM for details.

Figure 29. HMI Harness Connections Shown



**Note:** Attach the supplied Operator Manual nameplate in a location inside the tractor chosen by the driver.

Figure 30. Online Access to Operator Manual Nameplate Shown

**THERMO KING**  
**OPERATOR MANUAL**

Manuals can be found by scanning the QR code,  
calling the Cold Line  
**(888) 887-2202**  
or download from  
[www.thermoking.com/manuals](http://www.thermoking.com/manuals)

RCS1677

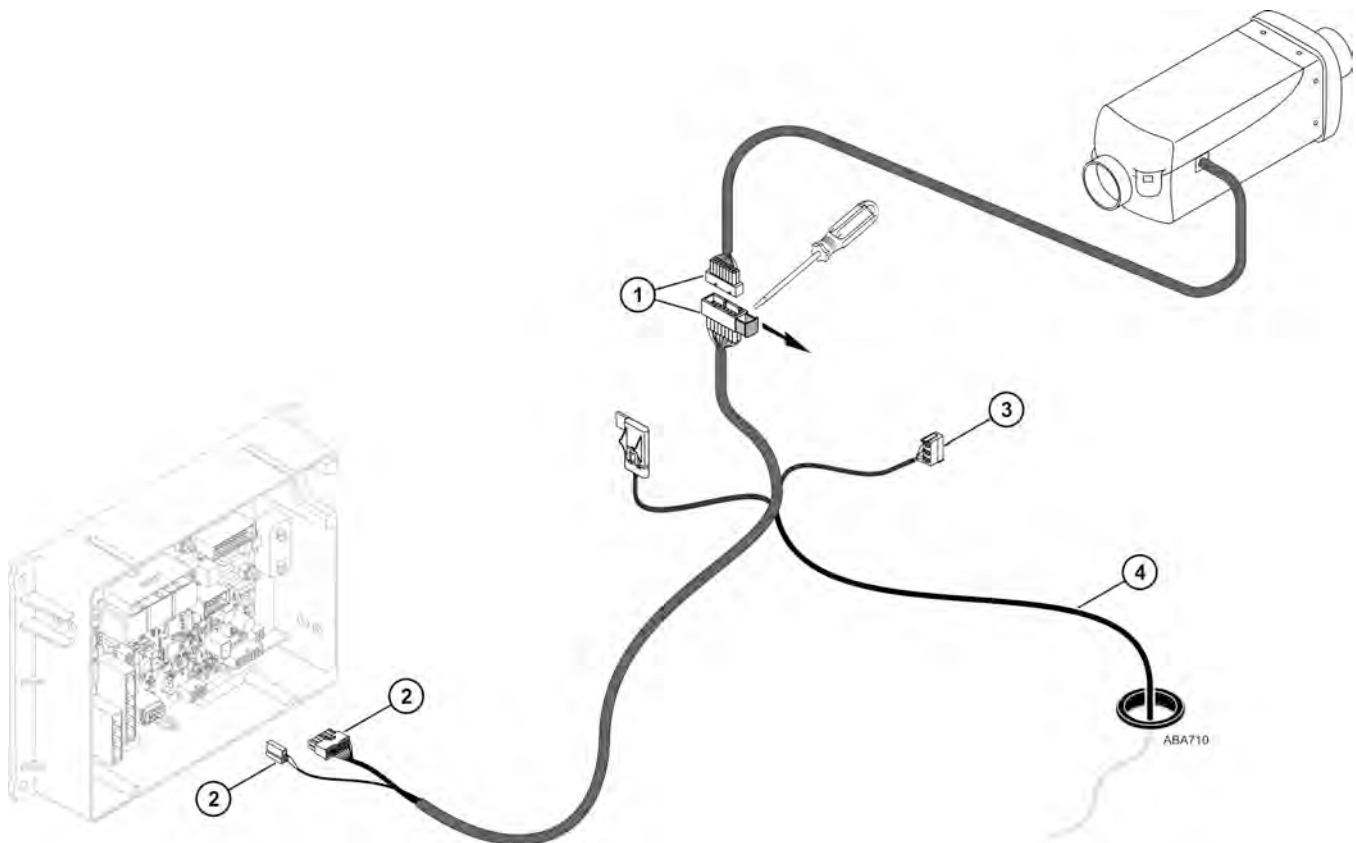
## D2/D4 Heater Wiring Installation

Special Tools Required
Wire Cutters
Terminal Crimping Tool

Locate the heater harness supplied in the 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 16-pin connector to the heater:
  - a. use a large bladed screwdriver to pull the locking tab out (**to unlock**) from the connector body.
  - b. connect the two 16-pin connectors together.
  - c. push locking tab back in (**to lock**) the connector body.
2. Route the heater control harness connectors into the control box, but **DO NOT** make any connections to the interface board at this time. They will be connected later after the Heater Start-Up Procedures are completed.
3. The 8-pin connector (with 4 wires) is used for diagnostic purposes only.
4. 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

**Figure 31. Heater Harness Connections Shown**

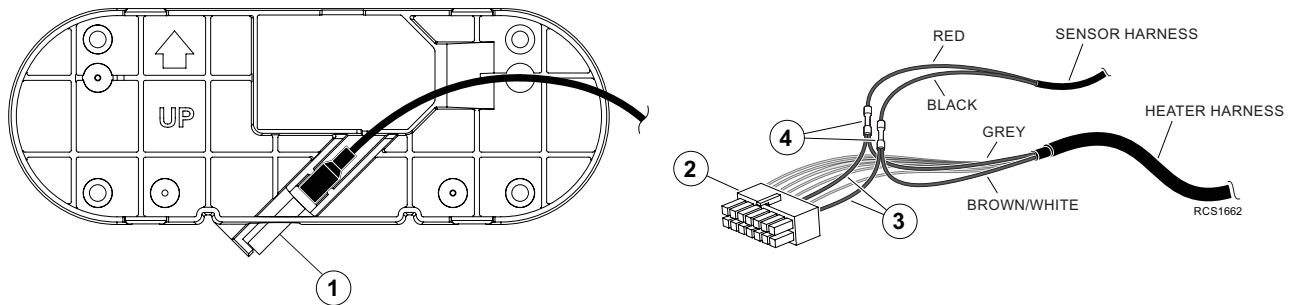


## Remote Temperature Sensor - D4 Heater Only

1. Insert the Espar Remote Temperature Sensor all the way into the holder at the rear of the HMI mounting base as shown and route the sensor harness down to the control box the same way the HMI harness was routed.
2. Locate the 14-pin heater harness connector. This connector should not be connected to the interface board at this time.
3. Carefully remove approximately 203 mm (8.00 in.) of both the outer and inner harness sleeving from the connector end of the Espar Heater Harness to gain access to the 8 individual wires.
4. Measure approximately 102 to 152 mm (4.00 to 6.00 in.) from the connector and splice the following two wires together using butt splice connectors:
  - a. Brown/White wire from heater harness to Black wire from the sensor harness.
  - b. Grey wire from heater harness to RED wire from the sensor harness.
  - c. Seal the splice connections.

**Note:** The 14-pin heater connector should not be connected to the interface board at this time. It will be connected later after the Heater Start-Up Procedures are completed.

**Figure 32. Remote Temperature Sensor Installation and Wiring Shown**





## A/C Wiring Installation

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

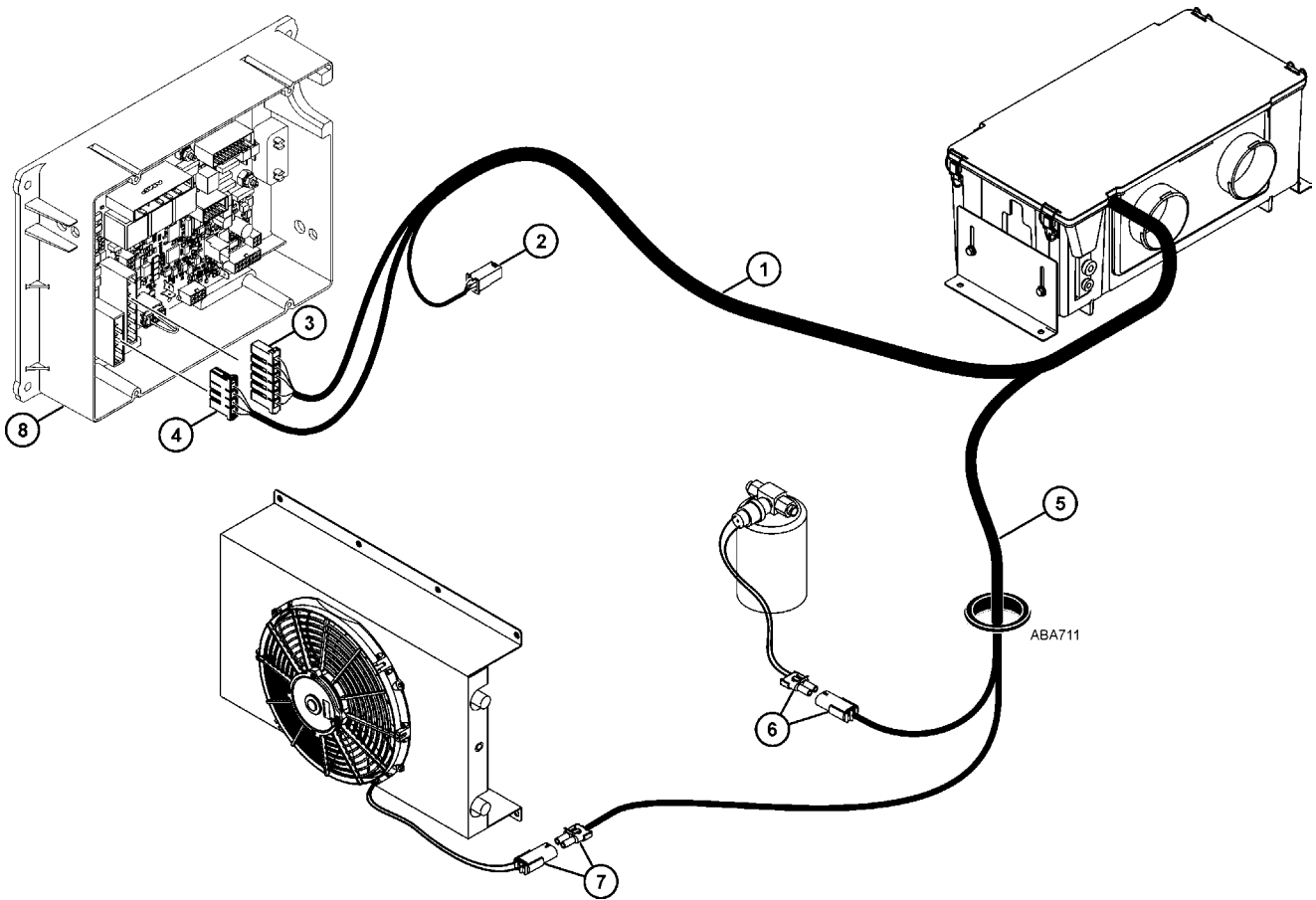
1. Route the A/C harness to the control box.
2. Connect 4-pin connector (7CL, 7CLA, COILSEN, COILSEN-RTN) to the mating connector located on the main harness installed earlier.
3. Connect 6-pin connector to AC COND connector (J2).
4. Connect 4-pin connector to AC EVAP connector (J1).
5. Route harnesses (7CF, 7CF-RTN) and (7CL, 7CLA) out of the sleeper through the 3" access hole towards the condenser coil.
6. Attach connector (7CL, 7CLA) to the receiver drier binary switch.
7. Attach connector (7CF, CH-08) to the condenser fan harness.
8. Install control box securely with TEK screws in location chosen earlier.

### DPF Units Only

Install the following DPF components. Refer to TK 55727-19-IM for details.

- Valve box
- Battery cables and harnesses
- Ambient air sensor
- Pressure transducer
- Air intake and air pressure hoses

Figure 33. A/C Harness Connections Shown



# Standby Truck Integration Harness with Switch (Option)

Special Tools Required
Digital Meter (204-615)
Drill Motor
1/2" Drill Bit

Access the tractor's ignition switch wires at rear of the switch:

- a. Turn ignition switch to the "**ACCESSORY**" position and use a digital meter to locate a wire connection with NO POWER (0 Vdc).
- b. Turn ignition switch to the "**ON**" position and re-check for voltage at the same wire connection tested earlier. If voltage is present, this is where the IGN wire will be connected.

Typically the standby switch is installed in the dashboard in a location that is easily accessible for the driver.

1. Remove dash panel (if required). Mark and drill 1/2" hole.
2. Install the standby switch, nameplate and nut. Confirm the 2A wire on the switch is facing UP and then tighten the nut securely.
3. Connect IGN wire with in-line fuse to:

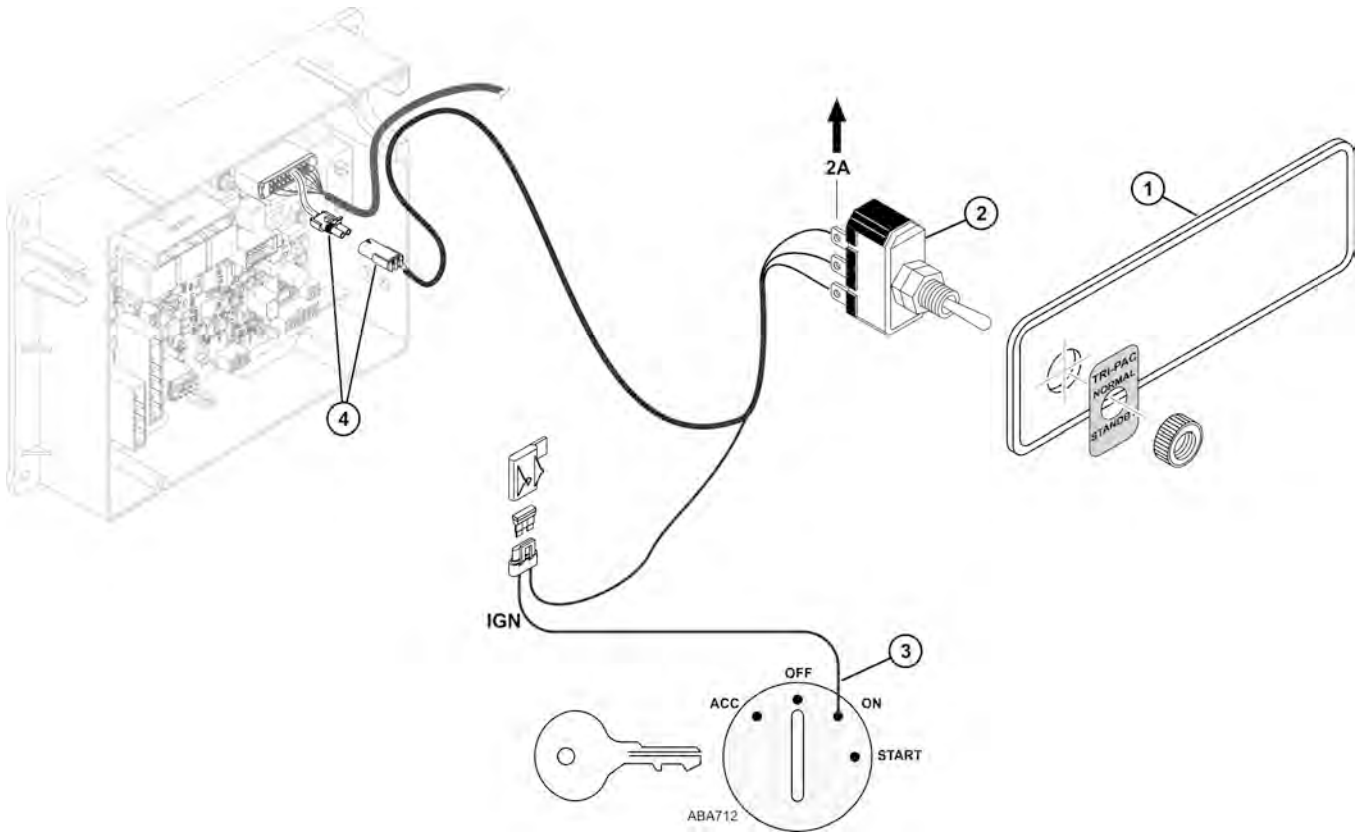
WIRE	VEHICLE CONNECTION
IGN	"ON" circuit of ignition switch or "ON" circuit of fuse panel

4. Route the standby switch harness to the control box and connect the 2-pin connector (**SBY and 2A**) to the mating pigtail connector found on the main harness installed earlier.

### DPF Units Only

Install the DPF regeneration switch now. Refer to TK 55727-19-IM for details.

**Figure 34. Standby Harness with Switch Connections Shown**



# Standby Truck Integration Harness without Switch (Option)

Special Tools Required
Digital Meter (204-615)

Access the tractor’s ignition switch wires at rear of the switch:

- a. Turn ignition switch to the “**ACCESSORY**” position and use a digital meter to locate a wire connection with NO POWER (0 Vdc).
- b. Turn ignition switch to the “**ON**” position and re-check for voltage at the same wire connection tested earlier. If voltage is present, this is where the IGN wire will be connected.

1. Connect **IGN** wire with in-line fuse to:

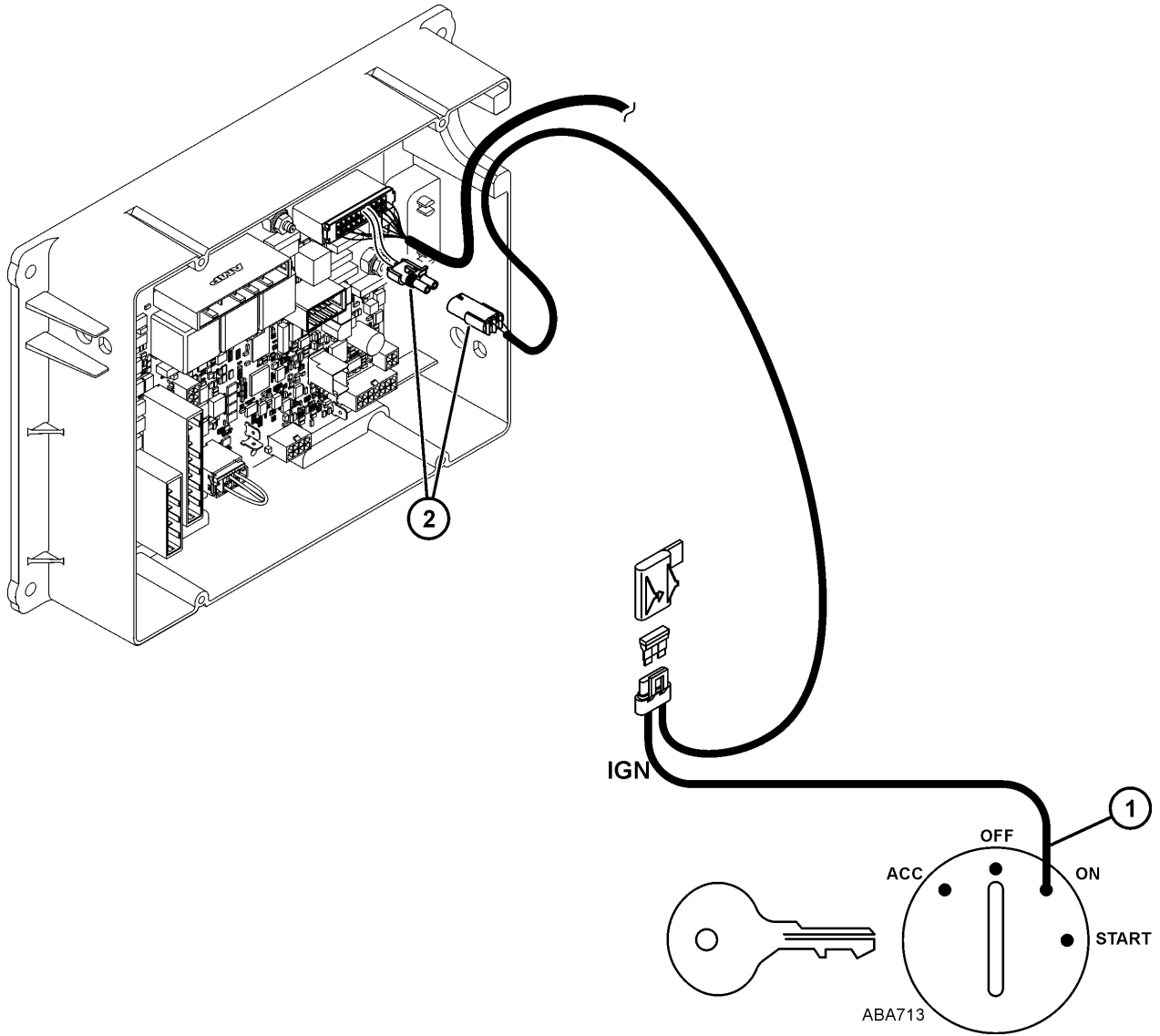
WIRE	VEHICLE CONNECTION
IGN	“ON” circuit of ignition switch or “ON” circuit of fuse panel

2. Route the standby switch harness to the control box and connect the 2-pin connector (**SBY and 2A**) to the mating pigtail connector found on the main harness installed earlier.

### DPF Units Only

Install the DPF regeneration switch now. Refer to TK 55727-19-IM for details.

Figure 35. Standby Harness without Switch Connections Shown



# Fuel Pickup Tube Installation

## Preferred Installation – Optional Adapter Plate (10–379)

*Note: Some OEM's offer a fuel tank option which provides three auxiliary fuel fitting connections. With this option, the fuel pickup tube and adapter plate are not needed. Simply route and connect the APU's fuel supply and return lines and the heater's fuel supply line to these fittings. Always check your fuel tank for these fittings before installing the fuel pickup tube or adapter plate.*

### ⚠ DANGER

#### Hazard of Explosion!

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.

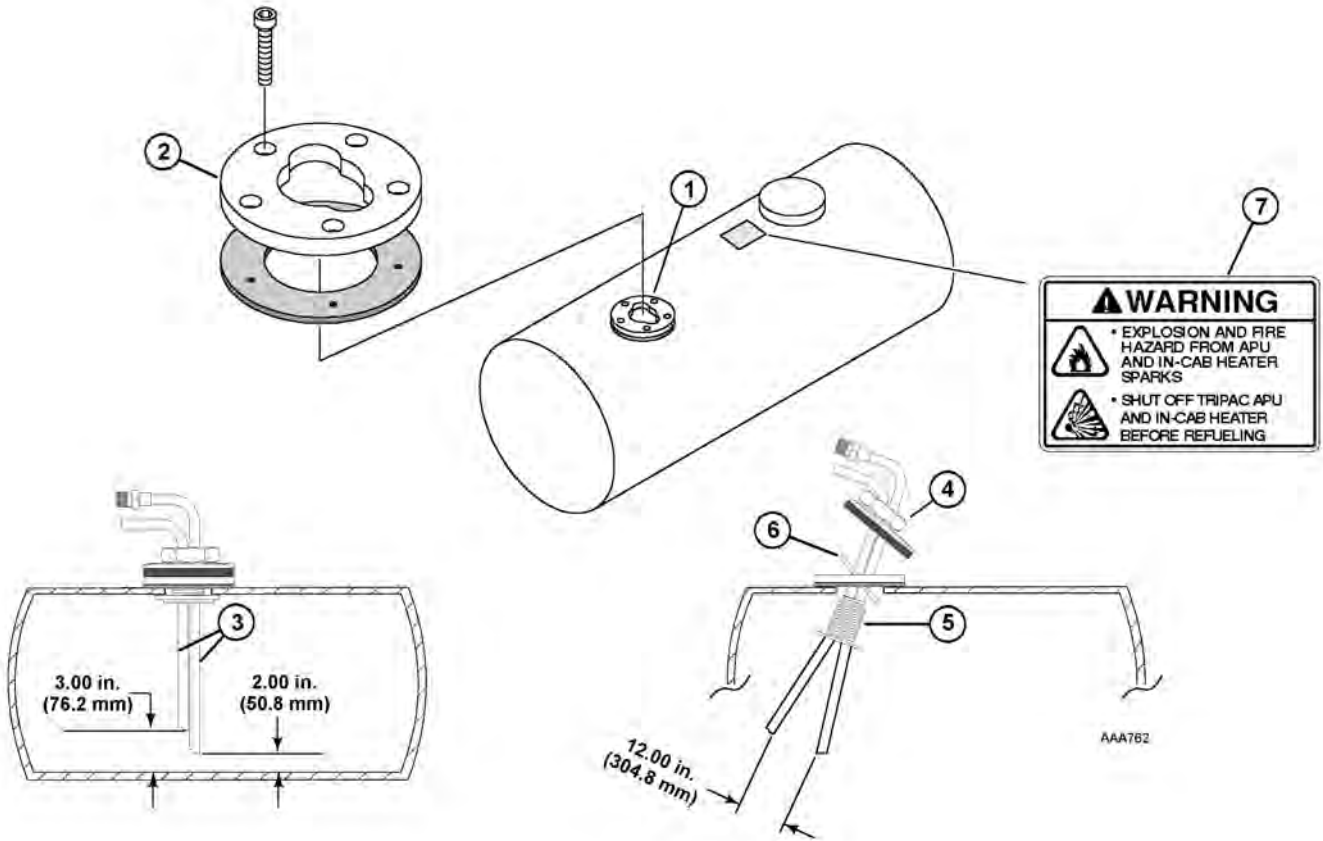
The following installation is for OEM fuel tanks equipped with an auxiliary fuel level sender (FLS) 5 bolt mounting flange.

Special Tools Required
Tape Measure
Tubing Cutter
Torque Wrench

#### IMPORTANT INSTALLATION TIPS

- Identify and mark APU FUEL SUPPLY pickup tube for reference later.
  - Remove protective caps from ends of pickup tubes prior to installation.
  - Do not apply any type of sealant material to fuel pickup assembly. Doing so will result in plugged fuel lines.
1. Locate auxiliary FLS mounting flange and block off plate on tractor's fuel tank. Remove block off plate and clean surface area of all dirt, grease, etc.
  2. Install adapter plate 10-379 (counter sunk holes facing up) and the gasket. Secure with the supplied screws and torque to 90 lb-in. (10.2 N•m) maximum.
  3. The APU diesel engine fuel supply tube is 24" and heater fuel supply tube is 23".
    - a. Measure and cut APU diesel fuel supply tube 2" shorter than fuel tank diameter.
    - b. Measure and cut heater fuel supply tube 3" shorter than fuel tank diameter. The heater fuel supply tube is identified by not having a fitting.
  4. Loosen and slide the hardware to top of the pickup tube assembly.
  5. Spread pickup tubes approximately 12" apart then squeeze pickup tubes back together and insert tubes and bushing into hole of adapter plate.
  6. Tip back-up washer and insert into hole of adapter plate.
    - a. With back-up washer on underside of adapter plate, thread nut onto bushing and hand tighten.
    - b. OPTION - Install supplied fuel pump bracket for fuel heater.
    - c. Position pickup tube as needed to facilitate fuel line connections and tighten nut to 16 to 18 ft-lb. (21 to 24 N•m).
  7. Install supplied warning nameplate onto fuel tank in a visible area near fuel cap.

Figure 36. Optional Adapter Plate Installation Shown





## Alternative Installation – Drilling Hole In Fuel Tank

**Note:** Some OEM's offer a fuel tank option which provides three auxiliary fuel fitting connections. With this option, the fuel pickup tube and adapter plate are not needed. Simply route and connect the APU's fuel supply and return lines and the heater's fuel supply line to these fittings. Always check your fuel tank for these fittings before installing the fuel pickup tube or adapter plate.

### ⚠ DANGER

#### Hazard of Explosion!

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

#### Hazard of Explosion!

Diesel fuel vapors are potentially explosive. Use extreme caution when drilling holes in or around diesel fuel tanks. Sparks from an electric drill or drill bit could cause an explosion. Drain all diesel fuel from the tank and use nitrogen or an inert gas to purge the diesel vapors from the tank prior to drilling into or around the fuel tank. Keep the diesel fuel tank filled with inert gas while drilling.

Special Tools Required
Tape Measure
Drill Motor
Step Reamer Bit
1-1/4" Hole Saw
Tubing Cutter
Heavy Grease
Torque Wrench

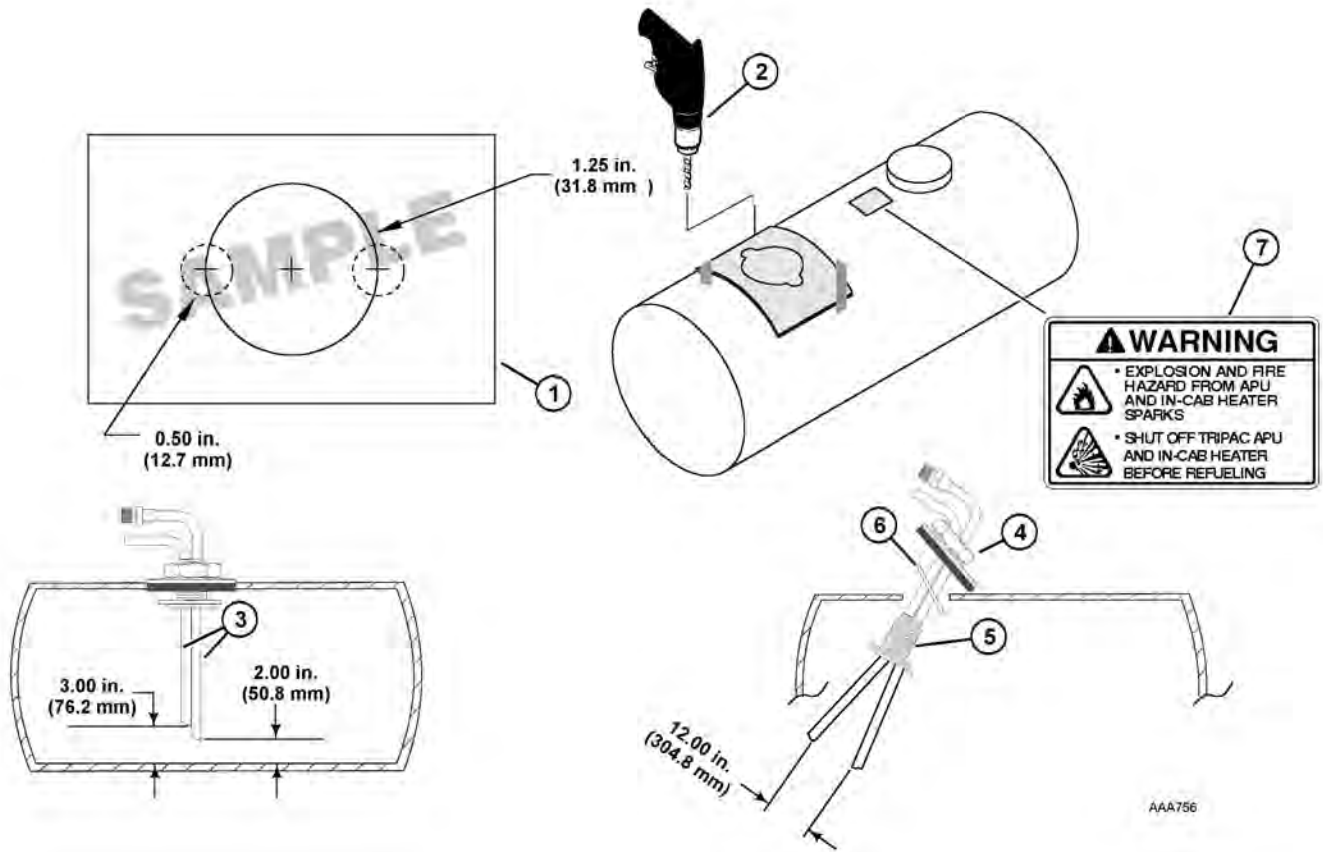
### IMPORTANT INSTALLATION TIPS

- Identify and mark APU FUEL SUPPLY pickup tube for reference later.
  - Remove protective caps from ends of pickup tubes prior to installation.
  - Do not apply any type of sealant material to fuel pickup assembly. Doing so will result in plugged fuel lines.
  - Check for internal baffles in fuel tank BEFORE drilling any holes.
1. Tape paper template (supplied with pickup tube) onto tractor's fuel tank and center punch three holes. Remove template from tank.
  2. Drill a 1/4" pilot hole then drill:
    - a. 1/2" diameter outer holes first with step reamer.
    - b. 1-1/4" diameter inner hole next with hole saw.
    - c. Thoroughly clean and flush the tank to remove any chips.
  3. The APU diesel engine fuel supply tube is 24" and the heater fuel supply tube is 23".
    - a. Measure and cut APU diesel fuel supply tube 2" shorter than fuel tank diameter.
    - b. Measure and cut heater fuel supply tube 3" shorter than fuel tank diameter. The heater fuel supply tube is identified by not having a fitting.
  4. Loosen and slide hardware to top of pickup tube assembly.
  5. Spread pickup tubes approximately 12" apart then squeeze pickup tubes back together and insert tubes and bushing into hole of adapter plate.
  6. Tip back-up washer and insert it to fuel tank hole.
    - a. With back-up washer on underside of fuel tank hole, thread nut onto bushing and hand tighten.

**Fuel Pickup Tube Installation**

- b. OPTION - Install supplied fuel pump bracket for fuel heater.
  - c. Position pickup tube as needed to facilitate fuel line connections and tighten nut to 16 to 18 ft-lb. (21 to 24 N•m).
7. Install supplied warning nameplate onto fuel tank in a visible area near fuel cap.

**Figure 37. Alternative Installation Drilling Hole In Fuel Tank Shown**



# Heater Fuel Pump and Fuel Line Installation

Special Tools Required
Utility Knife
Hose Cutting Tool (204-677)

**Important:** Proper mounting angle of the fuel pump is necessary to allow any air or vapor in the fuel lines to pass through the pump rather than cause a blockage (Detail's A and B).

The fuel pump can be installed using either the L-bracket or the fuel tank mounting bracket (both are supplied).

## L-Bracket Installation Procedures

1. Choose a protected mounting location close to the fuel pick-up tube and heater.
2. Install the fuel pump into the supplied rubber mounting clamp and attach the L-bracket.
3. 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 secure the clamp and bracket. **(Detail A)**.

## Fuel Tank Bracket Installation Procedures

1. Loosen the fuel pickup tube nut and position the supplied fuel pump bracket under the nut then re-tighten the nut to 16 to 18 ft-lb. (21 to 24 N•m).

**Note:** The bracket goes under the nut, not under the washer or rubber gasket.

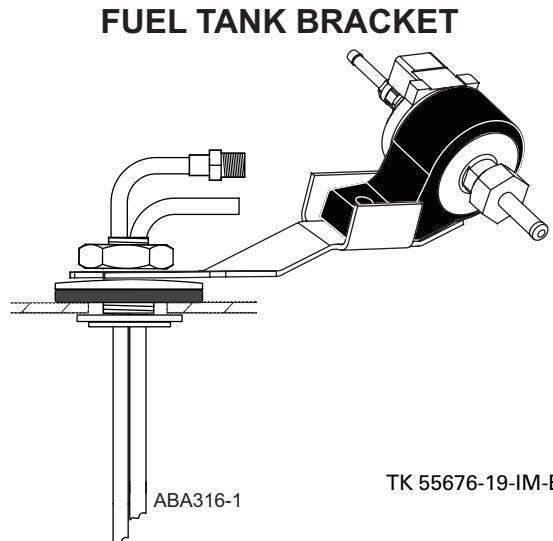
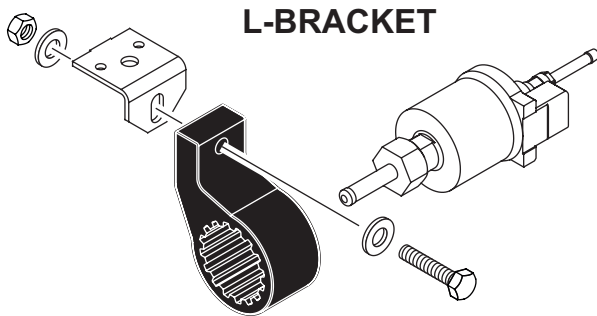
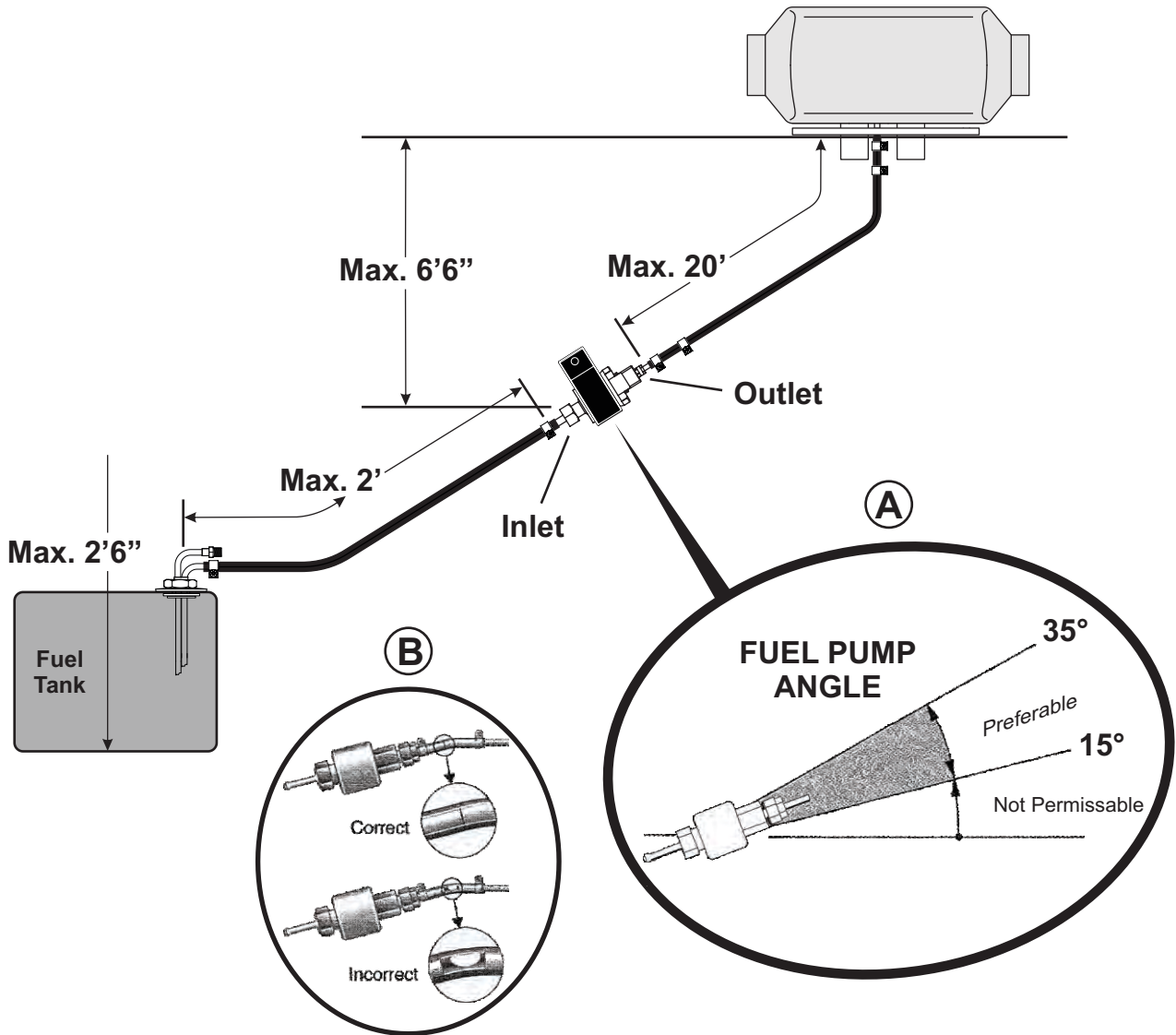
2. Install the fuel pump into the supplied rubber mounting clamp and attach the rubber clamp to the tank mounted bracket securely.

## Fuel Line Installation Procedures

1. Attach the rubber hose connection to the outlet end of the fuel pump and secure with supplied hose clamp.
2. 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 **(Detail B)**. Secure with supplied hose clamp.
  - The fuel line must be installed correctly to prevent air bubbles **(DETAIL B)**.
  - 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.
3. Attach fuel line from the fuel pick-up supply to the inlet end of the fuel pump and secure with supplied hose clamp.

**Note:** The heater fuel pickup supply tube is identified by not having a fitting.

Figure 38. Heater Fuel Pump and Fuel Line Installation Shown



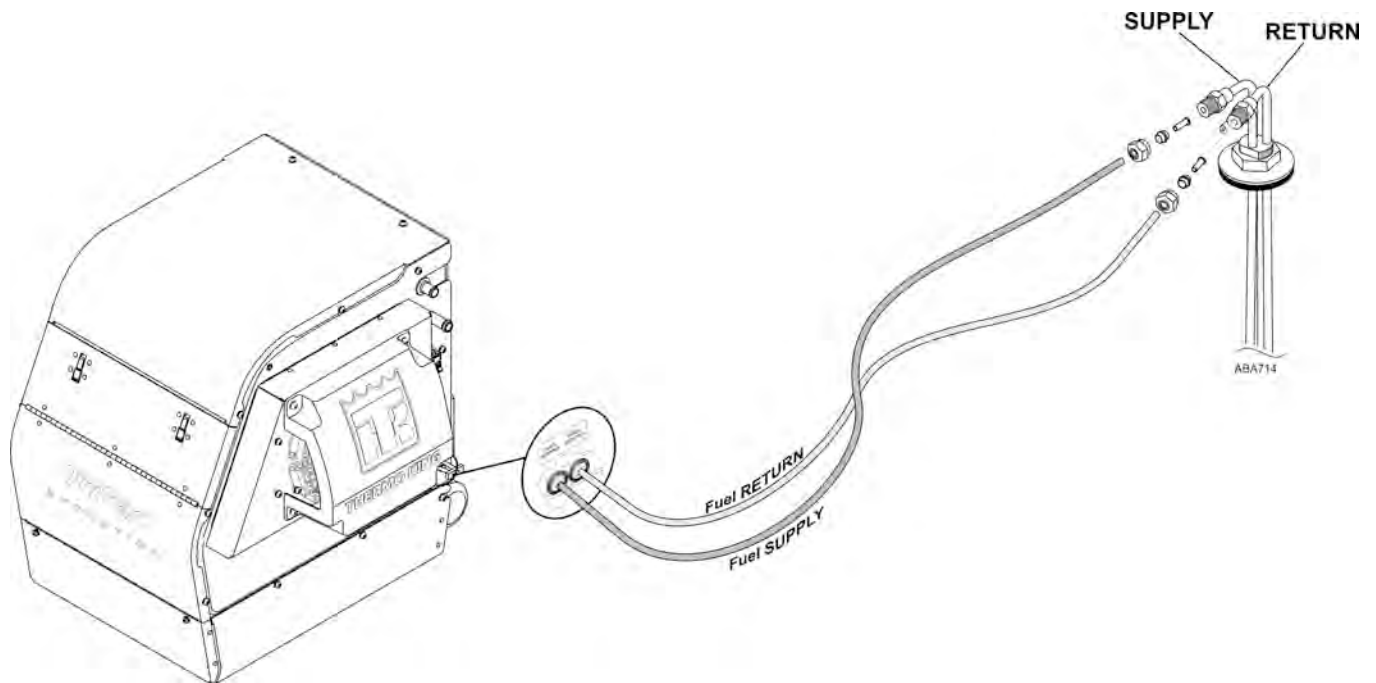
# APU Fuel Line Installation

Special Tools Required
Utility Knife

**Note:** Be sure to connect the APU's fuel supply line to the fuel **SUPPLY** pickup tube connection identified and marked earlier

1. Route APU fuel supply line to **SUPPLY** connection of fuel pickup tube, cut to proper length and attach with compression fittings.
2. Route APU fuel return line to **RETURN** connection of fuel pickup tube, cut to proper length and attach with compression fittings.
3. Route and secure all fuel lines with adequate clamps.

**Figure 39. APU Fuel Line Installation Shown**



# Tractor Coolant Hose Installation

## Preferred Installation – APU Coolant Hoses Tee’d Directly Into Tractor’s Heater Hoses

*Note: Skip this step if your APU has the Closed Loop Cooling Option.*

### Coolant Hose Routing and Connections

*Note: If the Arctic Block Temperature Sensor Option is to be installed, it should be installed at this time.*

Each coolant hose installation will be different. Carefully review the tractor’s engine cooling system to determine the best method for installing the cooling hoses and hand valves. Consult tractor dealer or OEM for assistance in identifying correct coolant hoses or engine fittings required for proper installation.

*Note: All APU coolant hoses should be installed in such a way as to allow the hand valves to isolate the APU cooling system from the tractor’s cooling system. This hand valve must be located as close to the tractor’s engine as possible.*

### Theory of Operation

With the tractor’s engine shut off, and the TriPac APU engine operating, warm coolant is circulated from the APU engine up to the tractor’s engine and then back to the APU engine. This keeps the tractor’s engine warm allowing for easier cold starts.

- When the TriPac APU engine is running and coolant temperature reaches normal operating temperature of 180 F (82 C), the thermostat will open allowing hot coolant to flow from the APU **OUTLET** fitting forward to the tractor’s engine.
- Hot coolant enters the tractor’s engine block through an **INLET** fitting typically located near the water pump.
- Hot coolant circulates through the tractor’s engine block and exits an **OUTLET** fitting typically used for the heater.
- Warm coolant then returns to the TriPac APU and enters the **INLET** fitting.
- Warm coolant circulates through the APU’s engine block to absorb heat before being pumped back out to the tractor’s engine.
- Hand valves are installed to allow the APU’s cooling system to be isolated from the tractor’s cooling system to allow for component servicing.

### Installation Procedures

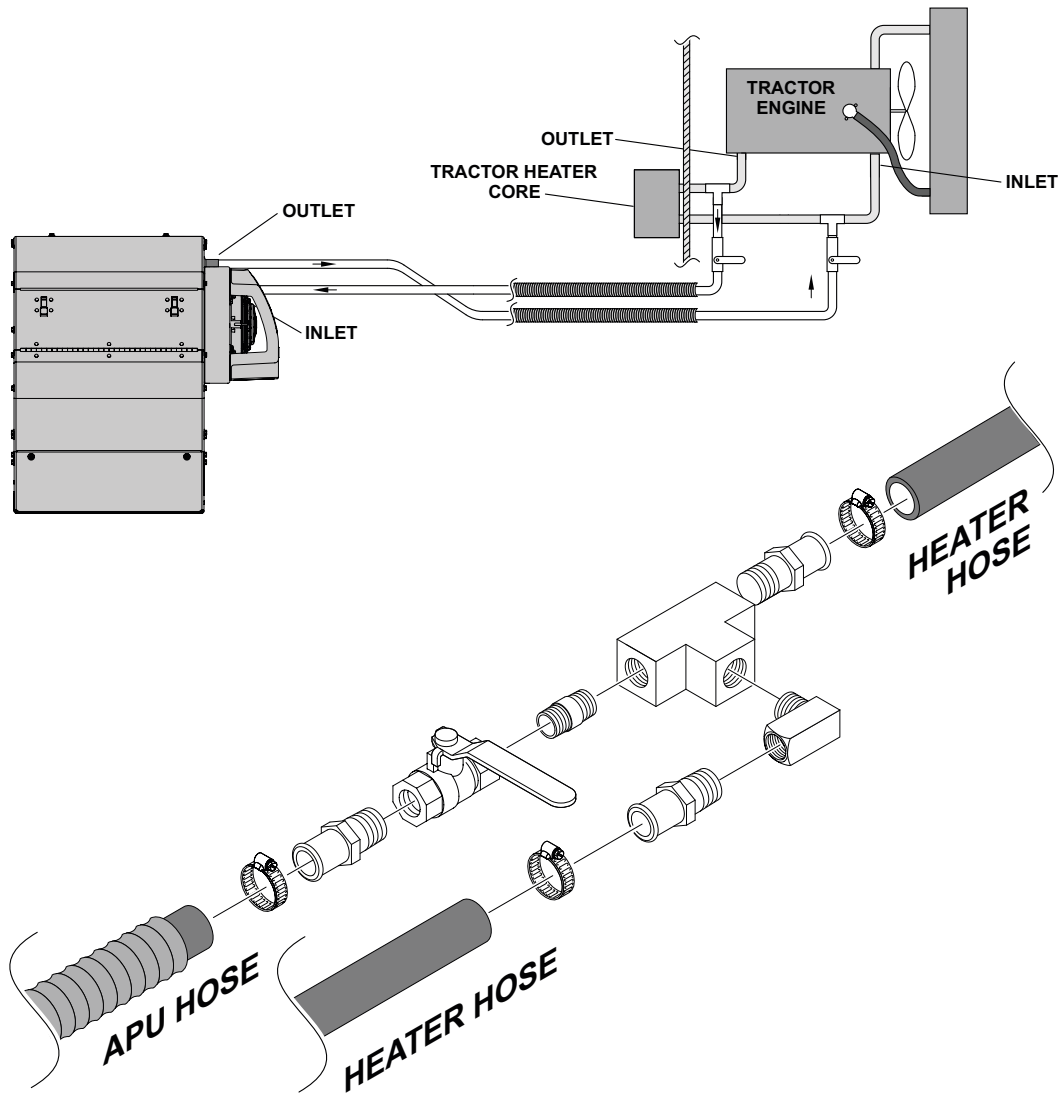
Special Tools Required
Utility Knife
Pipe Thread Sealer

1. Drain coolant from tractor’s radiator and engine. Keep for re-use.
2. Locate **HEATER INLET** coolant hose on tractor’s engine:
  - a. Cut tractor’s heater inlet hose and install pipe fittings, elbow, tee fitting and hand valve.
  - b. From the hand valve, connect and route a new coolant hose back to the **OUTLET** fitting located on the APU.
  - c. **CLOSE** hand valve.
3. Locate **HEATER OUTLET** coolant hose on the tractor’s engine:
  - a. Cut tractor’s heater outlet hose and install pipe fittings, elbow, tee fitting and hand valve.
  - b. From shutoff valve, connect and route a new coolant hose back to the **INLET** fitting located on the APU pre-cooler.
  - c. **OPEN** hand valve.
4. Install protective plastic sleeving on all coolant hoses and secure coolant hoses with clamps.
5. Make sure the APU **OUTLET** hand valve (tractor inlet, next to water pump) is **closed**. If this valve is left open, coolant will be sitting on top of the TriPac thermostat and not allow the TriPac engine to bleed air.

**Note:** The system will be bled of air later by following the “A/C System Charging and APU Engine Start-up Procedures”.

- a. Add coolant removed earlier back into the tractor’s radiator.
  - b. **DO NOT** start the tractor’s engine at this time.
6. Install supplied coolant nameplate in a visible area near the tractor’s coolant fill cap.

**Figure 40. APU Coolant Hoses Tee'd Directly Into Tractor's Heater Hoses Shown**



ABA715-1

**6**

**NOTICE**

This truck is equipped with auxiliary power unit. Coolant system must be bled after main engine coolant system servicing.



### Alternative Installation – APU Coolant Hoses Attached Directly To Fittings On Tractor’s Engine

*Note: Skip this step if your APU has the Closed Loop Cooling Option.*

#### Coolant Hose Routing and Connections

*Note: If the Arctic Block Temperature Sensor Option is to be installed, it should be installed at this time.*

Each coolant hose installation will be different. Carefully review the tractor’s engine cooling system to determine the best method for installing the cooling hoses and hand valves. Consult tractor dealer or OEM for assistance in identifying correct coolant hoses or engine fittings required for proper installation.

*Note: All APU coolant hoses should be installed in such a way as to allow the hand valves to isolate the APU cooling system from the tractor’s cooling system. This hand valve must be located as close to the tractor’s engine as possible.*

#### Theory of Operation

With the tractor’s engine shut off, and the TriPac APU engine operating, warm coolant is circulated from the APU engine up to the tractor’s engine and then back to the APU engine. This keeps the tractor’s engine warm allowing for easier cold starts.

- When the TriPac APU engine is running and coolant temperature reaches normal operating temperature of 180 F (82 C), the thermostat will open allowing hot coolant to flow from the APU **OUTLET** fitting forward to the tractor’s engine.
- Hot coolant enters the tractor’s engine block through an **INLET** fitting typically located near the water pump.
- Hot coolant circulates through the tractor’s engine block and exits an **OUTLET** fitting typically used for the heater.
- Warm coolant then returns to the TriPac APU and enters the **INLET** fitting.
- Warm coolant circulates through the APU’s engine block to absorb heat before being pumped back out to the tractor’s engine.
- Hand valves are installed to allow the APU’s cooling system to be isolated from the tractor’s cooling system to allow for component servicing.

#### Installation Procedures

Special Tools Required
Utility Knife
Pipe Thread Sealer

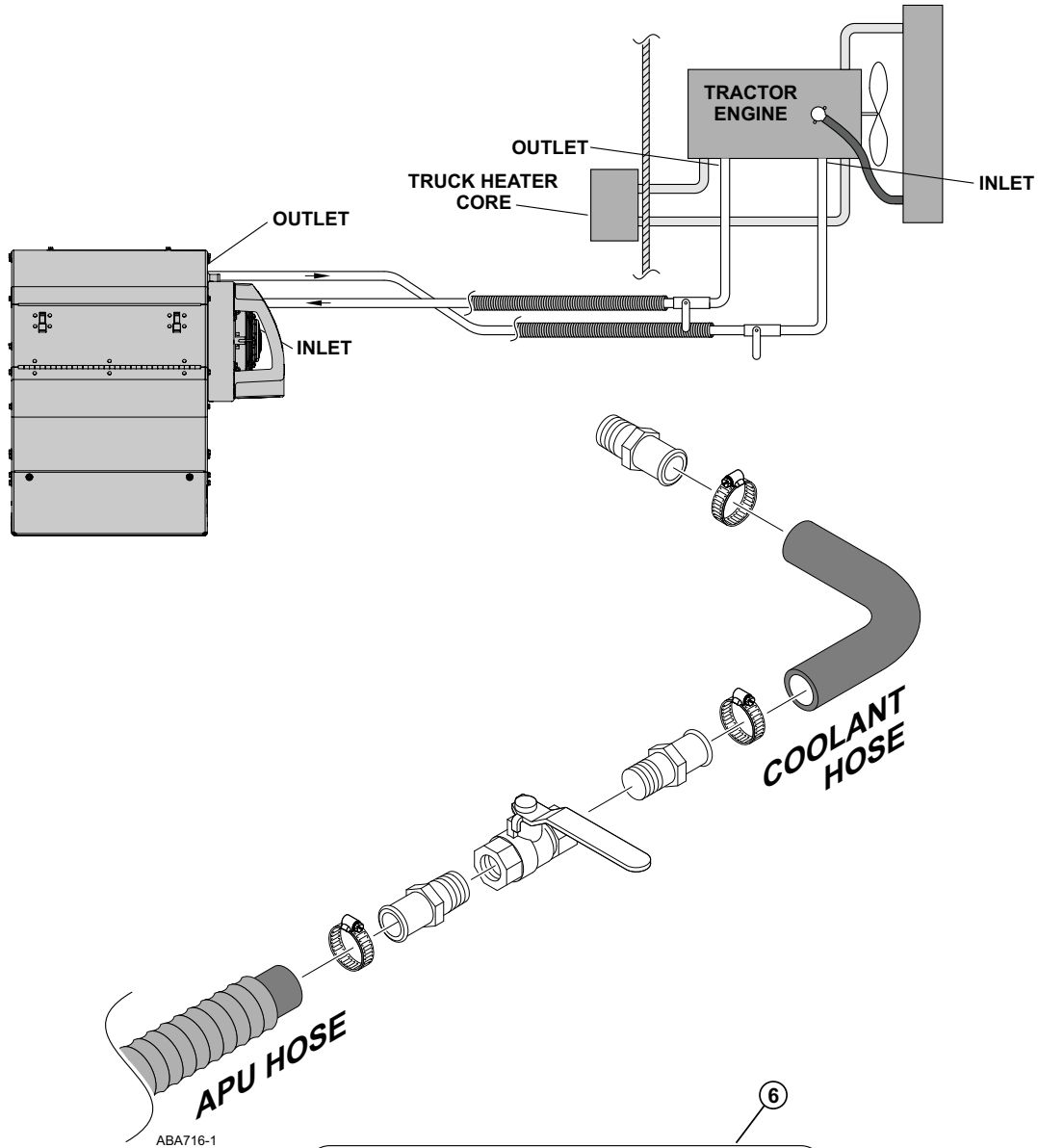
1. Drain coolant from tractor’s radiator and engine. Keep for re-use.
2. Use the tractor’s heater hoses as a guide to locate an **INLET** plug on the engine before the water pump. Remove plug and:
  - a. Install hose fittings, short section of coolant hose and hand valve.
  - b. From the hand valve, install a hose fitting and route a new coolant hose back to the **OUTLET** fitting located on the APU.
  - c. **CLOSE** hand valve.
3. Use the tractor’s heater hoses as a guide to locate an **OUTLET** plug on the engine block. Remove plug and:
  - a. Install hose fittings, short section of coolant hose and hand valve.
  - b. From the hand valve, install a hose fitting and route a new coolant hose back to the **INLET** fitting located on the APU pre-cooler.
  - c. **OPEN** hand valve.
4. Install protective plastic sleeving on all coolant hoses and secure coolant hoses with clamps.
5. Make sure the APU **OUTLET** hand valve (tractor inlet, next to water pump) is **closed**. If this valve is left open, coolant will be sitting on top of the TriPac thermostat and not allow the TriPac engine to bleed air.



**Note:** The system will be bled of air later by following the “A/C System Charging and APU Engine Start-up Procedures”.

- a. Add coolant removed earlier back into the tractor’s radiator.
  - b. **DO NOT** start the tractor’s engine at this time.
6. Install supplied coolant nameplate in a visible area near the tractor’s coolant fill cap.

**Figure 41. APU Coolant Hoses Attached Directly To Fittings On Tractor’s Engine Shown**



**6**

**NOTICE**

This truck is equipped with auxiliary power unit. Coolant system must be bled after main engine coolant system servicing.

## Arctic Switch (Option)

### Installation Procedures

#### ⚠ CAUTION

##### Risk of Injury!

Always wear safety goggles and work gloves when working with antifreeze. The APU and tractor's engine coolant system should be at ambient temperature to prevent hot, pressurized coolant from causing painful burns to exposed skin and eyes.

#### ⚠ CAUTION

##### Risk of Injury!

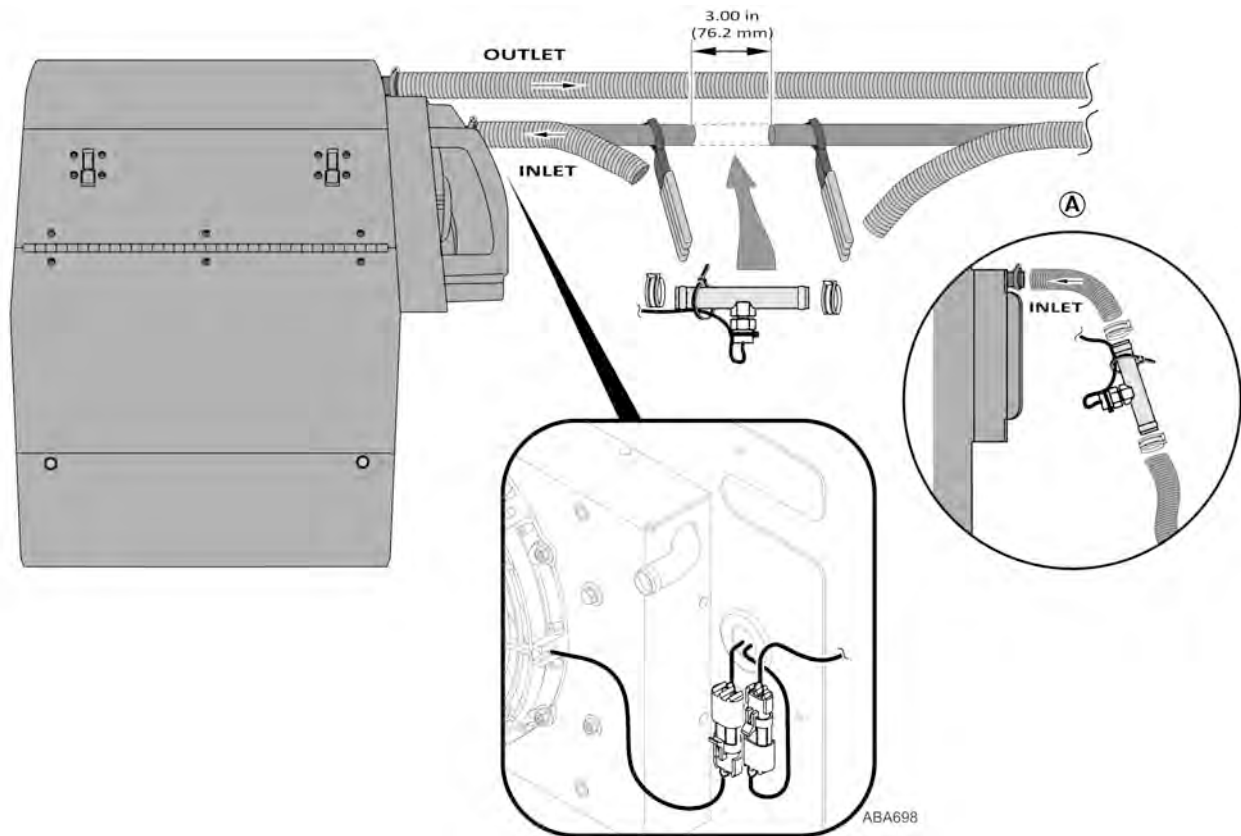
To prevent the APU from starting unexpectedly, set all electrical controls to the OFF position BEFORE connecting wires to battery.

1. Locate Arctic Option harness (**WT2,WT2-RTN**) band wrapped inside unit, near top, right side of frame. Un-band and route harness and connector out of unit, through hole in right side of frame, behind pre-cooler coil. Secure connector to anchor provided on outside of panel as shown in illustration.
2. Locate **INLET** coolant hose and measure approximately 6.00 in. (152.4 mm) out from APU.
3. Slide sleeving away to expose coolant hose and mark 3.00 in. (76.2 mm) to be removed.
4. Clamp off each side of coolant hose with a hose crimper to prevent excessive coolant loss.
5. Use a hose cutter and remove 3.00 in. (76.2 mm) section of coolant hose.
6. Install tube and sensor assembly with hose clamps.

**Important:** When tube and sensor assembly is installed horizontally sensor must face down, when installed vertically sensor must face towards APU (**DETAIL A**).

7. Plug sensor harness to mating 2-pin connector (**WT2, WT2-RTN**) located outside APU.
8. Provide a drip loop and secure all wires adequately with supplied band wraps.
9. Operate unit, check for leaks and reinstall sleeving on coolant hose.

Figure 42. Arctic Switch Installation Shown



# Heater Fuel Pump Connections

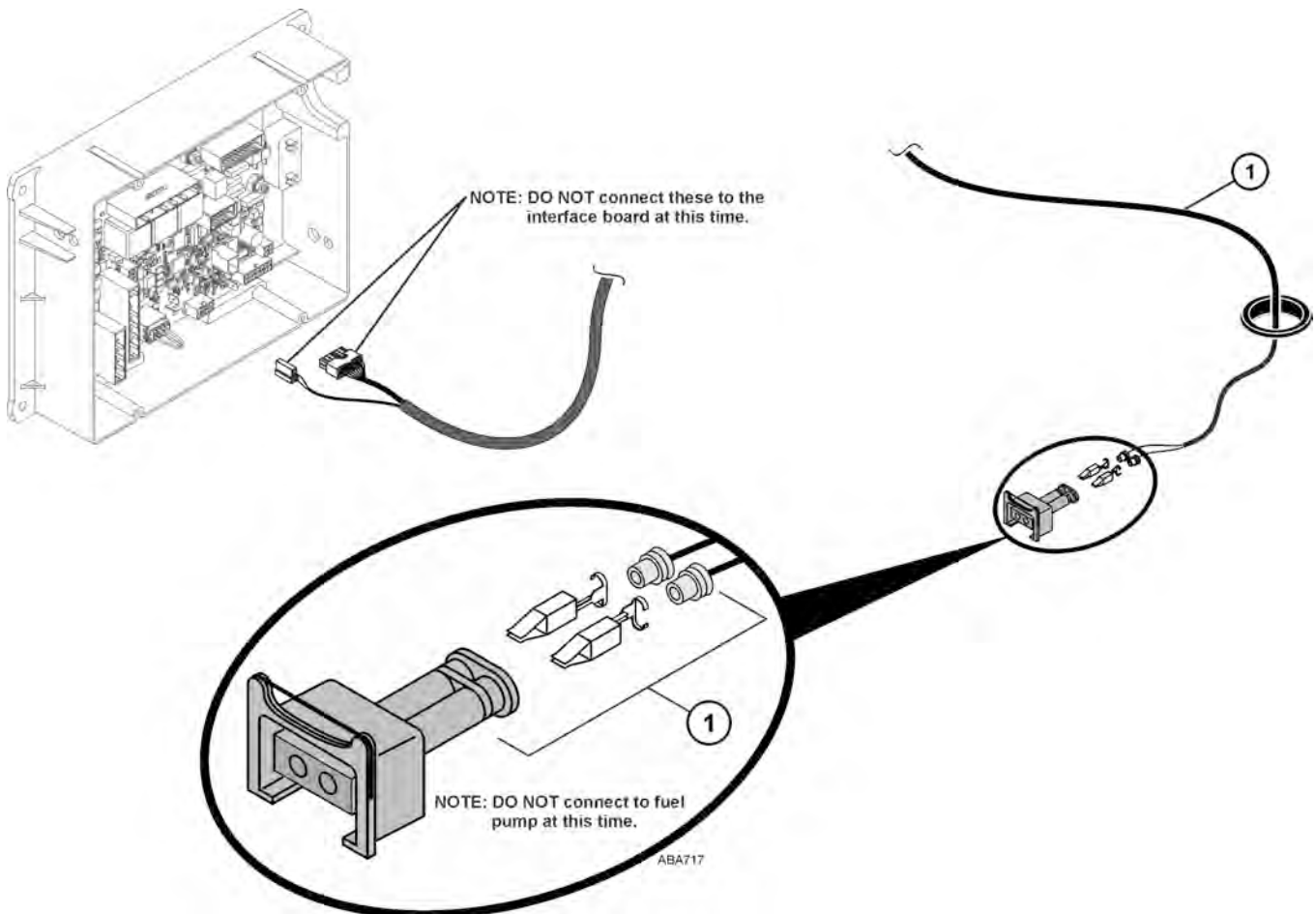
## ⚠ CAUTION

### Risk of Injury!

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

1. Route the heater fuel pump harness down to the fuel pump and cut the wires to the correct length.
  - a. Strip wire ends, slide on rubber sealing boots, attach pin terminals securely with crimping tool.
  - b. 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.*
  - c. Snap locking cover closed on connector body.
  - d. **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.

Figure 43. Heater Fuel Pump Connections Shown



# Fuse Holder and APU Battery Connections

**DPF Units Only** — Route and connect the battery cables to the fuse holder, valve box and DPF now. Refer to TK 55727-19-IM for details.

**Power Inverter Option Only** — Route and connect the power inverter cables to the battery and fuse holder now. Refer to TK 55855-19-IM.

## Important Battery Cable Installation Information

**Important:** 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.

### 1. FUSE HOLDER

- a. Mount fuse holder securely to battery box structure with (installer supplied) 1/4-20 hardware within 12.0 inches (304.8 mm) of positive battery terminal. It is not acceptable to leave fuse holder loose or tied to other cabling.
- b. **DO NOT** install fuse at this time.

### 2. POSITIVE BATTERY CABLE AND VOLTAGE SENSING WIRE

- a. Route positive cable with voltage sensing wire from TriPac to fuse holder.
- b. Cut battery cable to length and strip 1/2 to 3/4 in. (13 to 19 mm) of insulation from cable end.
- c. Slide heat shrink tubing and terminal ring with **small hole** onto end of cable. Attach terminal ring firmly to cable.
- d. Position heat shrink tubing to cover exposed wires on terminal ring and use a heat gun to shrink tubing in place.
- e. Install cable onto fuse holder stud and only hand tighten nut.
- f. Cut voltage sensing wire to length, strip end, attach in-line fuse with splice connector.
- g. Slide heat shrink tubing and terminal ring onto other end of in-line fuse. Attach terminal ring firmly to wire.
- h. Position heat shrink tubing to cover exposed wires on terminal ring and use a heat gun to shrink tubing in place. This wire will be attached in the step 3.

### 3. SHORT POSITIVE BATTERY CABLE

- a. Fabricate short cable (from the excess positive cable) that reaches from the battery positive terminal to fuse holder and strip 1/2 to 3/4 in. (13 to 19 mm) of insulation from cable ends.
- b. Slide heat shrink tubing and terminal ring with **small hole** onto end of cable. Attach terminal ring firmly to cable.
- c. Slide heat shrink tubing and terminal ring with **large hole** onto other end of cable. Attach terminal ring firmly to cable.
- d. Position heat shrink tubing to cover exposed wires on terminal rings and use a heat gun to shrink tubing in place.
- e. Install battery cable end with **small hole** terminal ring followed by the voltage sensing wire onto the fuse holder stud and only hand tighten nut.
- f. Install battery cable end with **large hole** terminal ring connector onto the battery's **POSITIVE (+)** connection and tighten securely.
- g. Apply Superlube (PN 203-524) onto the battery's connection.

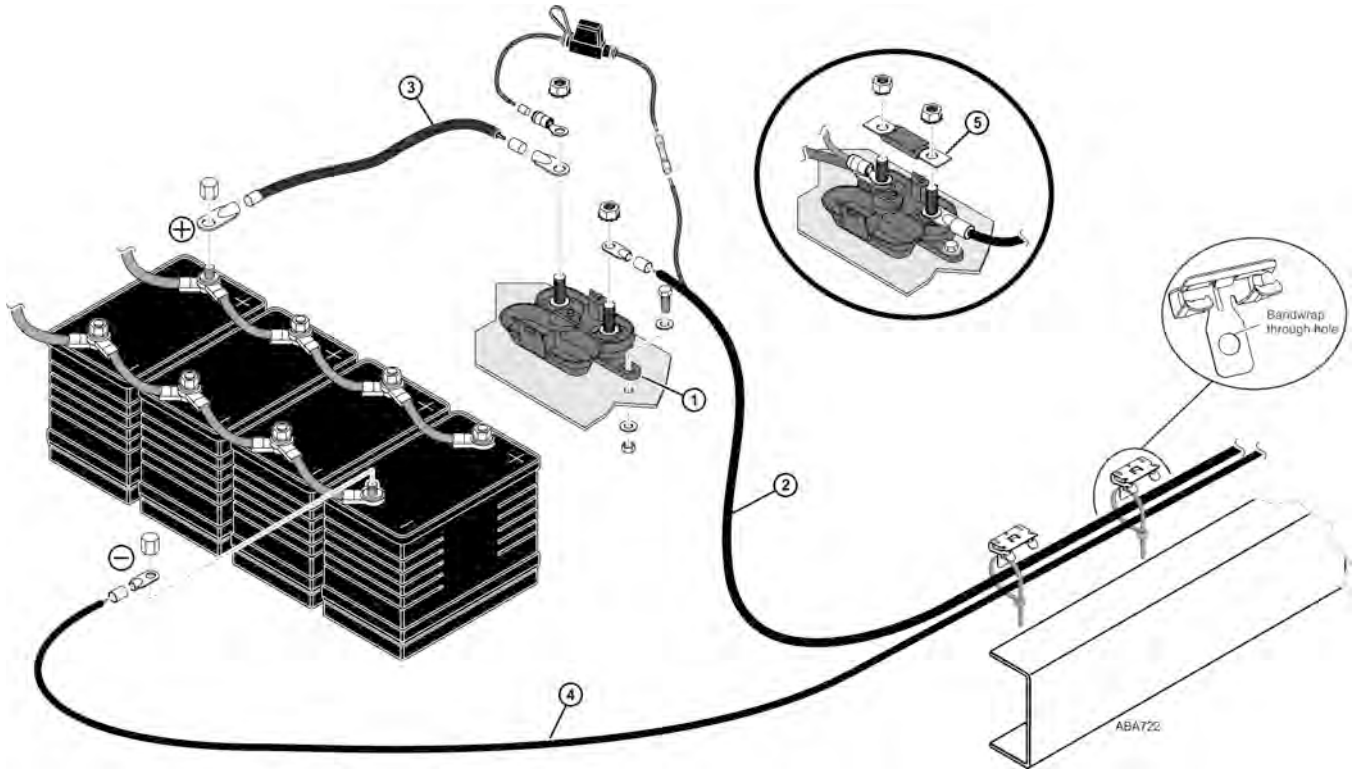
### 4. NEGATIVE BATTERY CABLE

- a. Route negative cable from TriPac to tractor's negative battery, cut to length and strip 1/2 to 3/4 in. (13 to 19 mm) of insulation from cable end.
- b. Slide supplied heat shrink tubing and terminal ring onto end of cable. Attach terminal ring firmly to end of cable.
- c. Position heat shrink tubing to cover exposed wires on terminal ring and use a heat gun to shrink tubing in place.
- d. Install negative cable terminal lug onto the battery's **NEGATIVE (-)** connection and tighten securely.
- e. Apply Superlube (PN 203-524) onto the battery's connection.

### 5. FUSE

- a. Remove nuts from fuse holder and place fuse onto the studs and on top of sensing wire and battery cables lugs, then reinstall nuts.

b. Tighten the nuts to 120 in-lb (13.5 N•m) and close the fuse holder cover securely.



## Priming the Heater Fuel Pump (Heat Option)

**Important:** It is important the heater fuel pump be primed before attempting to operate the heater for the first time. Failure to prime the pump will cause the unit to shutdown, set diagnostic codes and cause damage to the fuel pump.

Special Tools Required
Heater Priming Harness (204-1144)

**Note:** Verify there is a sufficient amount of fuel in the fuel tank before beginning the priming procedures.

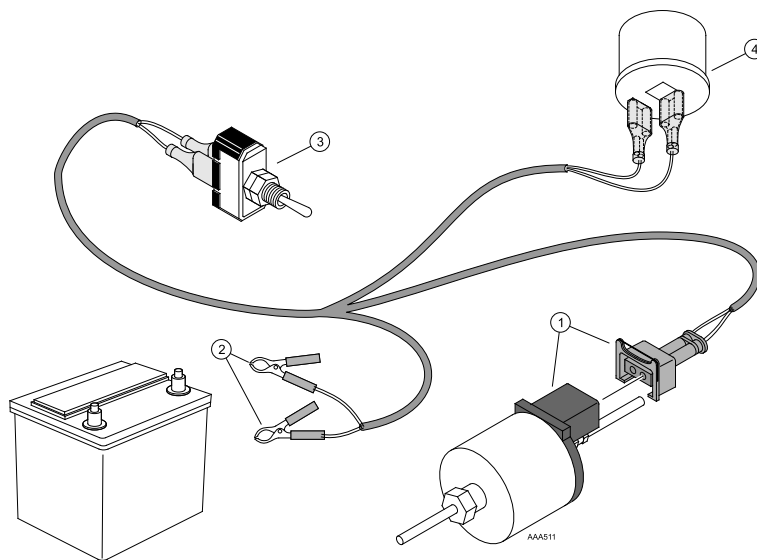
The heater uses a pulse style fuel pump. You must use the heater priming harness to operate the fuel pump to prime the system. Applying continuous power to the pump will not work

1. Attach the **Heater Priming Harness** connector to the heater fuel pump.
2. Attach the alligator clips to the battery:
  - **RED to(+) Positive Battery Connection**
  - **BLACK to(-) Negative Battery Connection**
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.

**Figure 44. Heater Fuel Pump Priming Harness Connections.**



# Heater Start-Up Procedures

*Note: See Operating and Diagnostic Manual TK 53024-19-OD for further diagnosis and service procedures if needed.*

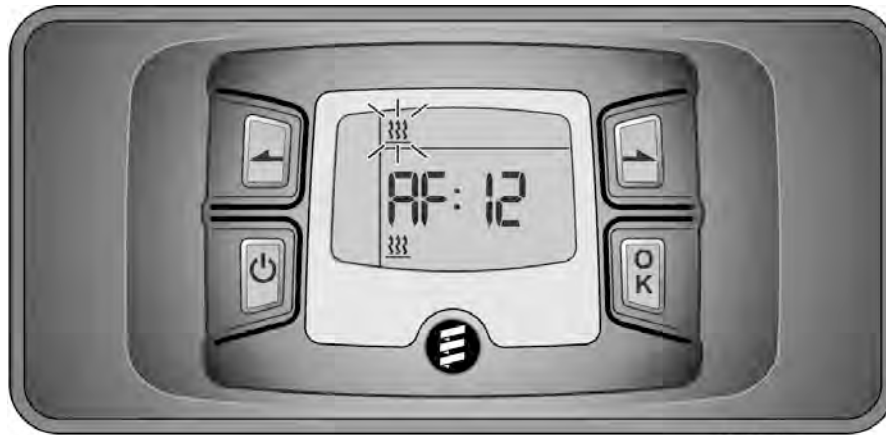
Special Tools Required
Heater Diagnostic Tool (204-1143)

## Diagnostic Tool Overview


The diagnostic tool is used to read out, display and delete faults stored in the heater's electronic control box. It may also be used to start and run the heater.

- The test duration is limited to a maximum of 120 minutes.
- The electronic control box can store up to 5 faults.
- The current fault is displayed as "AF" and a 2-digit number and is always written in memory location F1.
- The stored faults "F1" to "F5" can be queried.
- The four keypads are used to operate the Diagnostic Tool.

**Figure 45. Heater Diagnostic Tool**



ABA730

-  backwards control button
-  forwards control button
-  activation button
-  confirmation button



## Connecting Diagnostic Tool

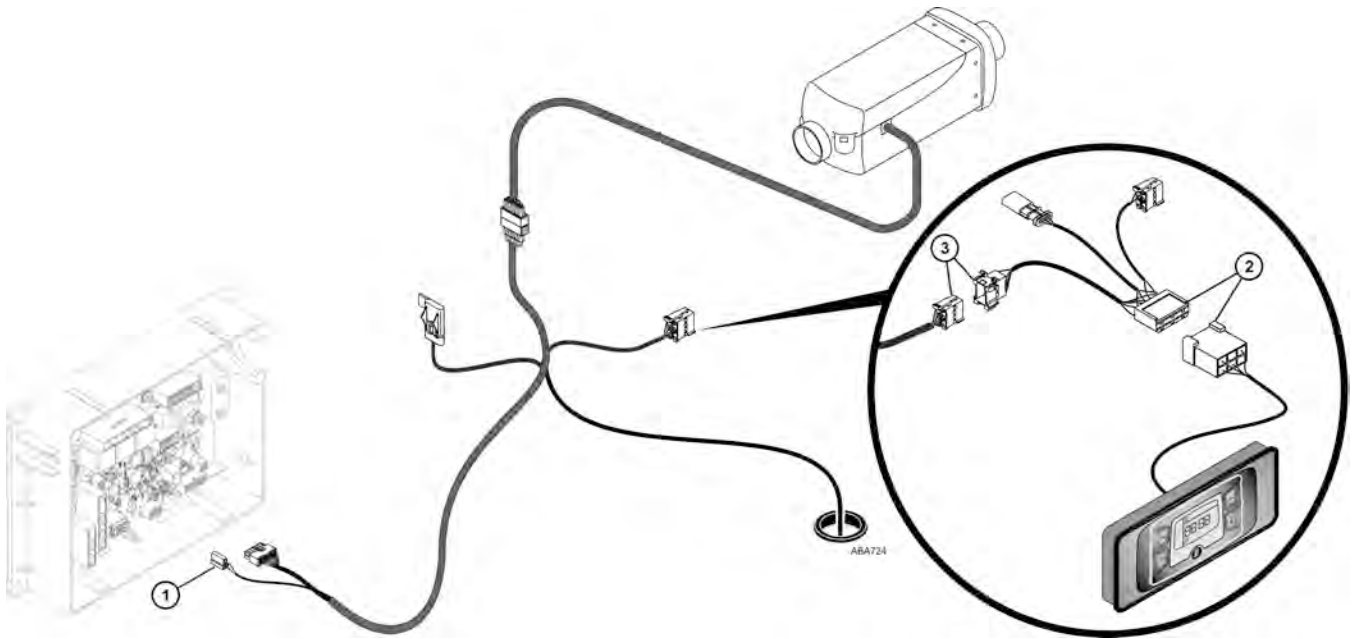
1. Connect only the 2-pin connector (Red, Brown) heater power wire (installed earlier in the control box) to mating connector (J9) on the interface board.

**Note:** *DO NOT* connect the 14-pin connector at this time. It will be connected after the Heater Start-Up Procedures have been completed.

2. Connect the adapter harness to the Diagnostic Tool.
3. Connect the 8-pin diagnostic connector to the mating connector located on the heater harness inside the sleeper near the heater.

**Note:** *The two remaining adapter harness connectors shown in the illustration are not used.*

**Figure 46. Diagnostic Tool Connections to Heater**

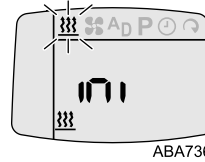


**Perform the Start-Up**

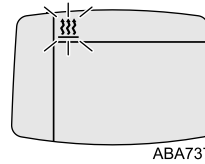
**Automatic Detection** — Five seconds after the diagnostic tool has been connected to the heater using the adapter cable, the automatic detection starts to determine the type of heater to which the diagnostic unit is connected.

**Note:** *If the automatic detection was successful, if necessary, the heater is briefly started and then switches off again.*

- Display until the automatic detection is completed.



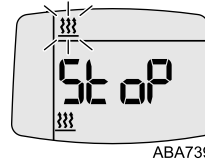
- Heater Icon will display when heater has been detected.



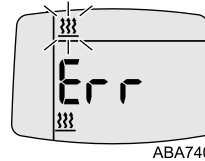
- Confirm flashing symbol with the confirmation button.


**Possible Displays:**

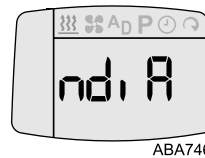
- If no errors/faults exist go to **Heater Start-up**.



- If errors/faults exist go to **Clearing Faults**.



- Communication error exist Go to **Unable to Perform the Diagnosis**.



**Heater Start-Up** —The heater will begin a four minute start up process:

- Blower will start slow and heater will ignite.
  - Heat and blower will ramp up to high boost mode.
- With the heater operating check the following:
- Exhaust and intake hoses are installed and functioning correctly.
  - Heat is blowing out of the heat duct inside the sleeper.

Press confirmation button to stop heater.

- Heater will begin a four-minute cool-down mode.
- Disconnect Diagnostic Unit from the heater harness and connect the 14-pin heater harness connector to the interface board **(J13)**.



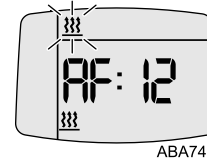
## Clearing Faults

### Display current fault in fault memory

Simultaneously press the backward and forward control buttons to display active or current faults in memory.



Display: e.g. AF: 12

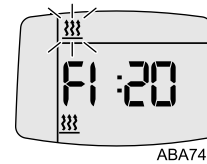


Display fault memory F1 – F5

Press either the backward or forward control buttons to display any faults in memory.



Display: e.g. F1: 20



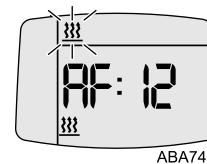
Record all fault codes. Refer to the diagnostic manual for an explanation of fault code diagnosis.

Display current fault in fault memory again.

Simultaneously press the backward and forward control buttons to display active or current faults in memory.



Display: e.g. AF: 12



Delete the fault memory and as a result, at the same time cancel the control box lock.

Current fault or fault F1 – F5

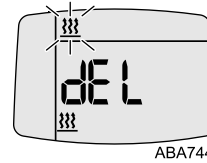
Press confirmation button to clear all faults and cancel control box lock.



## Heater Start-Up Procedures

---

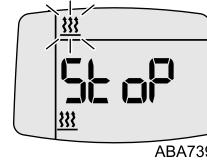
dEL will display



Press confirmation button again to confirm deletion.  
The fault memory is deleted and the control box is unlocked.



Continue with **Heater Start-Up** or **Diagnosis**.



### Quit Start-Up

Switch Off Heater  
Press confirmation button, heater is switched off.



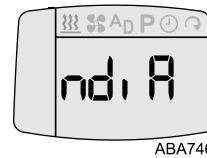
### Perform the Diagnosis Again

Press activation button, display is activated.



### Unable to Perform the Diagnosis

Automatic detection was unsuccessful.  
Display if the automatic detection was not successfully completed.



Possible causes:

- Diagnostic harness not connected to heater harness
- Adapter plug not seated in diagnostic harness
- Defective diagnostic cable
- Defective heater.

# A/C System Charging and APU Engine Start-up Procedures

This is a multi-step procedure consisting of:

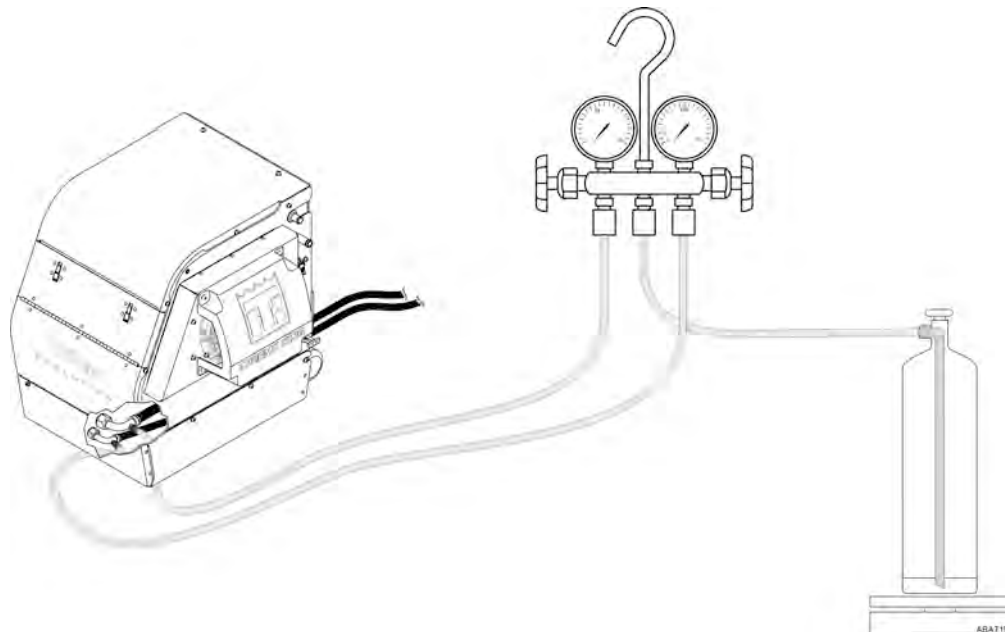
- a. adding a partial refrigerant charge to the system
- b. verifying APU engine has the proper amount of oil
- c. bleeding air from the APU cooling system
- d. bleeding air from the APU fuel lines
- e. running the APU with the A/C operating and adjusting the engine rpm's
- f. system fluids leak check
- g. verifying alternator output voltage
- h. adding a full refrigerant charge to the system

## Adding Refrigerant Charge

**Important:** Before starting the APU engine, oil and coolant levels must be checked to prevent damage to the engine and the A/C system must have a partial charge of refrigerant added to prevent damage to the A/C compressor. See "Bleeding the Coolant System" and "Bleeding the Fuel Lines" before adding a partial refrigerant charge.

Special Tools Required
R134a Refrigerant
Scale

1. Connect refrigerant bottle to gauge manifold and place it on the scale.
2. Open 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. Add refrigerant until reaching 1 lb. 8 oz. of R-134a.
5. Close refrigerant bottle valve and the high side valve of the gauge manifold.





### APU Engine Start-up Procedures

**Important:** To avoid damage to the APU engine and A/C compressor, verify the APU engine has proper amount of oil and the A/C system has a partial refrigerant charge **before** starting the engine.

**Important:** Units equipped with the Closed Loop Cooling Option only - Check sight glass on overflow tank to confirm coolant level before starting the APU's engine.

TriPac APU Oil Specifications	
Oil Capacity	4.5 qts.(including filter) 6.5 qts. Maximum
Oil Type	10W-30 for temperatures at or above -13 F (-25 C) 5W-30 for temperatures at or below -13 F (-25 C)

### Bleeding the Coolant System – APU’s Equipped with Traditional Tractor Coolant Integration

1. Verify **APU OUTLET** hand valve is **CLOSED** (tractor inlet, next to water pump). If this valve is left open, coolant will be sitting on top of the TriPac thermostat and not allow the TriPac engine to bleed air.
2. Open the **APU INLET** hand valve.
3. Place a clean container under the bleed line to catch coolant that is drained.
4. Open the bleed petcock on the APU engine to allow air to bleed out.
5. When a steady stream of coolant flows from the bleed line, close the petcock.
6. Open the **APU OUTLET** hand valve.
7. Replace drained coolant from the TriPac back into the tractor’s radiator.
8. Bleed TriPac fuel system. See “Bleeding the Fuel Lines”.

**Important:** Verify the APU engine has proper amount of oil and the A/C system has a partial refrigerant charge before starting the engine.

**Note:** See “Service Run-In Test” before performing the Run-in Procedures.

9. Start the TriPac engine.
10. The remaining air in the system will be forced to the tractor radiator and the TriPac APU should now be bled of all air.

### Bleeding the Coolant System – APU’s Equipped with Closed Loop Cooling Option

**Important:** Do not start the engine without bleeding the air out of the engine block. If an engine runs with air trapped in the block, the engine may be damaged. The high water temperature switch may not protect an engine that has air trapped in the block, because the high water temperature switch is designed to protect an engine from overheating due to failures in the cooling system and the loss of coolant.

Often when a TriPac unit cooling system is refilled, air is trapped in the engine block and/or under the thermostat. Use the following procedure to bleed air out of the block and the cooling system:

1. Place a clean container under the TriPac bleed line to catch the coolant that is drained.
2. Open bleed petcock on the TriPac engine to allow air to bleed out.

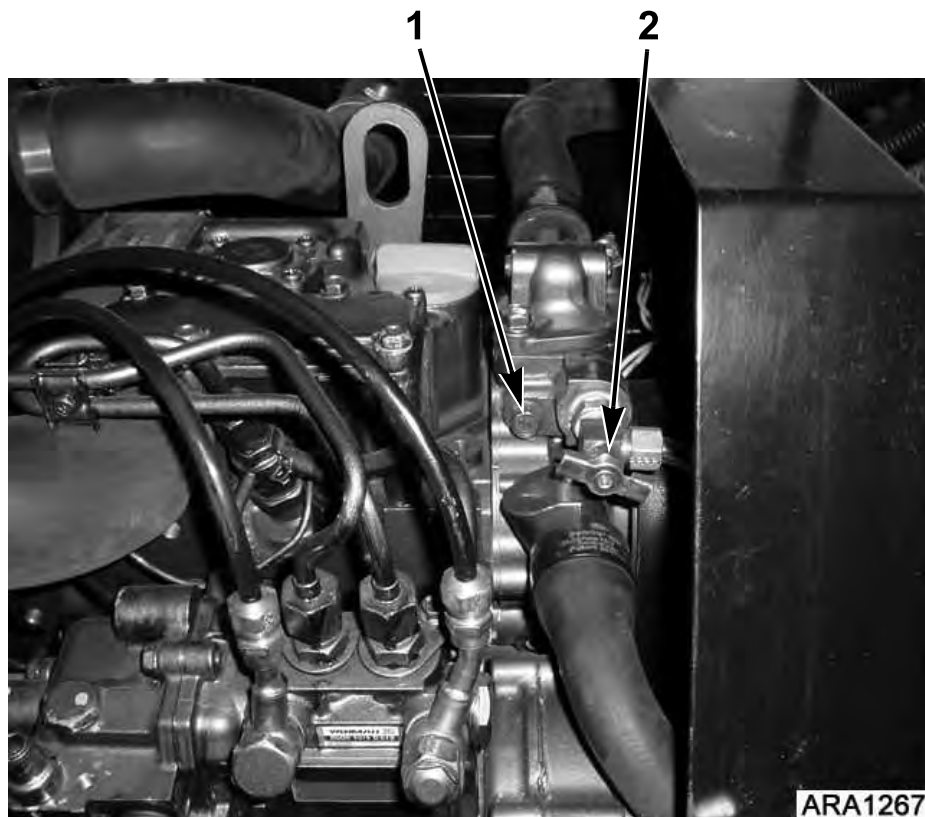
**Note:** Units built prior to September 2006 have the bleed petcock on top of the thermostat housing. On these units, remove the water pump bleeder bolt and bleed the air until there is a steady stream of coolant. Then reinstall the water pump bleeder bolt.

3. Slowly pour coolant into the expansion tank until a steady stream of coolant flows from the bleed line, then close the bleed petcock.
4. Slowly pour coolant to the expansion tank until the coolant level is at the top of the window in the expansion tank.
5. Install the expansion tank cap.
6. Bleed the TriPac fuel system. See “Bleeding the Fuel Lines”.

**Important:** Verify the APU engine has proper amount of oil and the A/C system has a partial refrigerant charge before starting the engine.

7. Start the TriPac engine and use a non-contact thermometer pointed at the water pump bleeder bolt to monitor the coolant temperature. The water pump bleeder bolt located next to the bleed petcock on the water pump.
  8. When the temperature reaches 150 F (66 C) for units with a 160 F (71 C) thermostats, or 170 F (76 C) for units with 180 F (82 C) thermostats, shut off the engine for 2 minutes to allow the thermostat to heat soak and open completely to purge air out of block, head, and water pump.
  9. After 2 minutes, re-start the engine.
  10. Remove the expansion tank cap and slowly pour coolant to the expansion tank until the coolant level is at the top of the window in the expansion tank, then reinstall the expansion tank cap.
- Repeat steps 8 through 10 until the coolant level stabilizes. The TriPac APU cooling system should now be bled of all air.

**Figure 47. Water Pump Bleeder Bolt and Bleed Petcock Locations Shown**



1.	Water Pump Bleeder Bolt	2.	Bleed Petcock
----	-------------------------	----	---------------



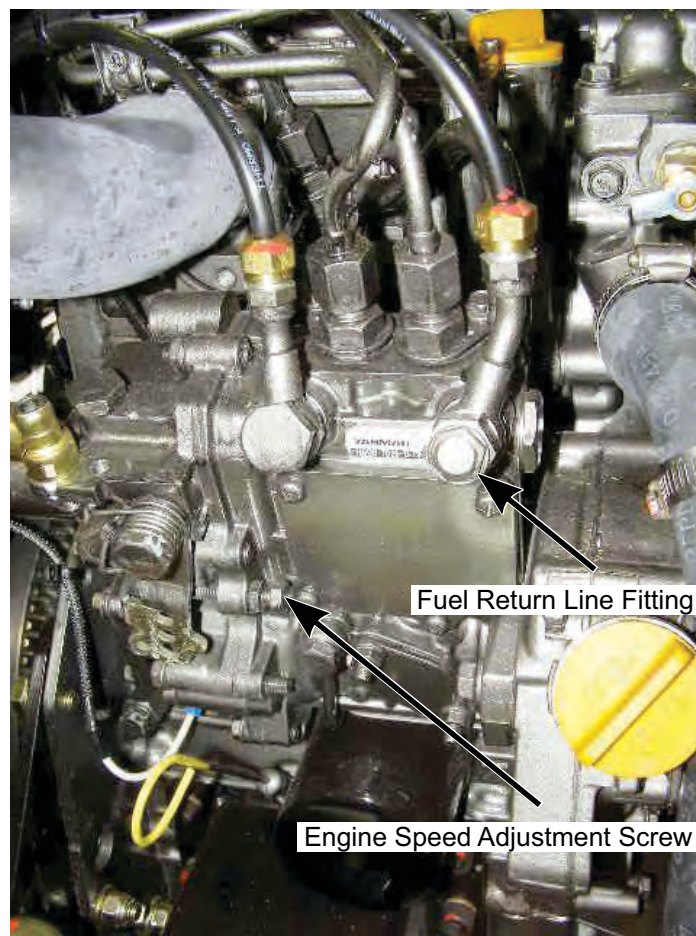
### Bleeding the Fuel Lines

1. Locate the On/OFF switch inside the APU and turn the switch "ON".
2. Crack open the fuel return line banjo fitting on the APU engine.
3. At the HMI:
  - a. press MAIN POWER Key "ON"
  - b. press APU SYSTEM Key "ON"
  - c. press MODE Key to "AC"
  - d. press FAN Key to set fan speed
  - e. press UP or DOWN Keys to set the thermostat to 50 F (10 C)
  - f. multiple start attempts will be required to start the engine.

**Note:** The fuel pump only runs when the engine is turning over. If the engine cranks for 30 seconds and fails to start, a start fault shutdown will be generated. This alarm code will have to be cleared before attempting another start sequence.

4. Close the fuel return line banjo fitting when a steady flow of fuel is observed.
5. Allow engine to start.

**Figure 48. Fuel Return Line Fitting and Engine Speed Adjustment Screw Shown**





## Verifying Engine Operation

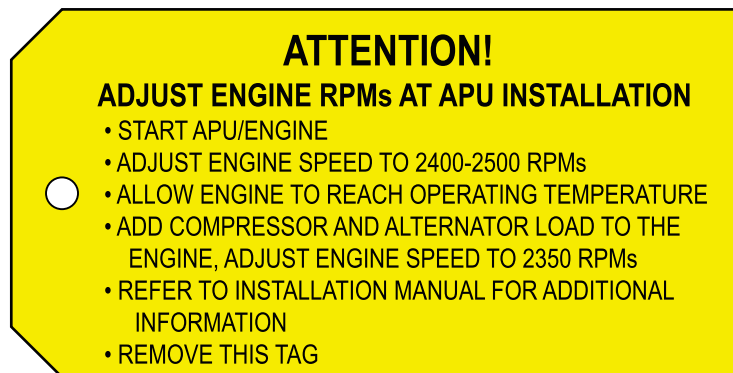
**IMPORTANT**  
**YOU MUST VERIFY AND ADJUST ENGINE RPM'S**

### Engine RPM Adjustment Procedure

*Note: See Engine RPM Adjustment tag attached to APU engine or procedure below.*

1. Start APU/Engine
2. Adjust engine speed to 2400–2500 RPM RPMs
3. Allow engine to reach operating temperature.
4. Add compressor and alternator load to the engine, adjust engine speed to 2350 RPMs

**Figure 49. Engine RPM Adjustment Tag Shown**



RCS1671

With the engine running:

- check cooling system for leaks
- check for fuel leaks
- check for oil leaks
- check for exhaust leaks
- verify with a digital meter that the charging voltage at the battery cables is at least 13.6 Vdc.

## Unit Setup Procedures

Before performing the Run In Procedure and then release unit to customer, the TriPac EVOLUTION control system must be setup. You will program the system configuration and programmable features based on unit options and customer requirements. This procedure will use the TK Monitor communication software that is on the TriPac EVOLUTION Interface Board.

**Note:** For additional information about TK Monitor refer to TK 55739, Section 6, A51A, Communication Using TK Monitor.

**Note:** An Internet connection is not required to operate TK Monitor.

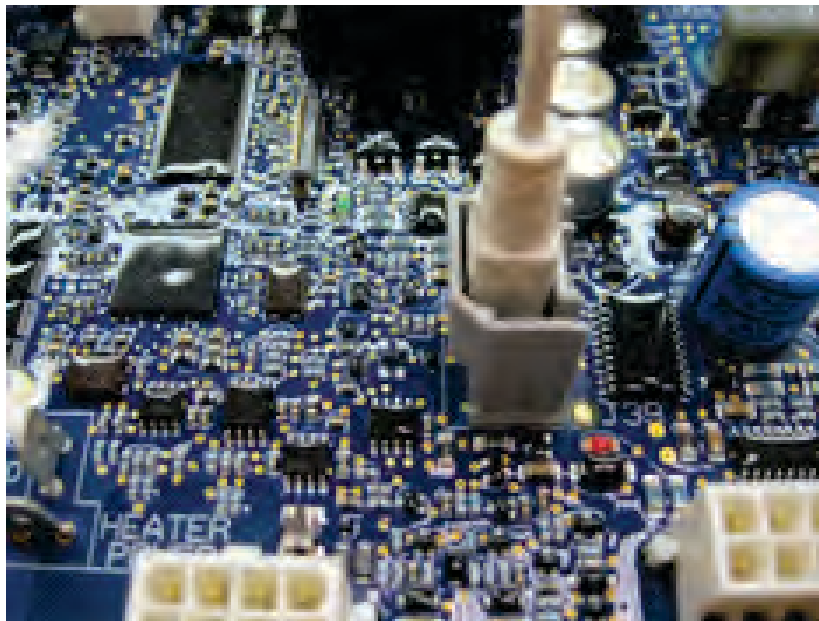
### Required Tools

- PC computer with Internet Explorer 8 or higher.
- Interconnect cable USB to Mini-B (TK 204-2000)

### Enter TK Monitor

1. Turn the unit on by pressing the **Mode** button on the HMI (the knob on the left) for 2 seconds.
2. With control box cover removed. Check the green "heartbeat" LED on the Interface Board. It will flash rapidly when first turned on. After several seconds the flashing rate will slow to the normal rate of one blink per second.
3. Locate the USB Mini-B connector (J39) near the lower right of the Interface Board.
4. Connect the USB interconnect cable to the Interface Board and a laptop computer running Microsoft Windows and Internet Explorer 8 or higher.
5. Open a "My Computer" window on the computer.
6. Locate and double click on the "TK Monitor" drive. This will open up a window showing about 8 files.

**Figure 50. USB Mini-B Connector (J39) Shown**



RCS1665

**Figure 51. Window With 8 Drives Shown**

Name	Date modified	Type	Size
GUT		File folder	
AUTORUN.INF		Setup Information	1 KB
AUTORUN.VBS		VBScript Script File	2 KB
EMC_WS.EXE		Application	117 KB
REQ_S.TXT		Text Document	0 KB
START.BAT		Windows Batch File	1 KB
START.HTM		HTML Document	1 KB
TKLOGO.ICO		Icon	1 KB

Type: Windows Batch File Size: 61 bytes Date modified:
--

RCS1666

7. Double click **"START.BAT"** to launch TK Monitor.
8. TK Monitor opens as an Internet Explorer window to the **Dashboard** Screen. On the left is a menu of the different screens available in TK Monitor. A different screen may be select by mouse-clicking any one of them.



RCS1667

9. Select the **Unit Setup** Screen. This screen allows the technician to configure the unit based on installed options and input unit identification information – an important set up procedure after installation of the unit.

**Figure 52. Unit Setup Screen Shown**


RCS1668

**IMPORTANT STEPS FOR EACH TRIPAC EVOLUTION INSTALLATION**

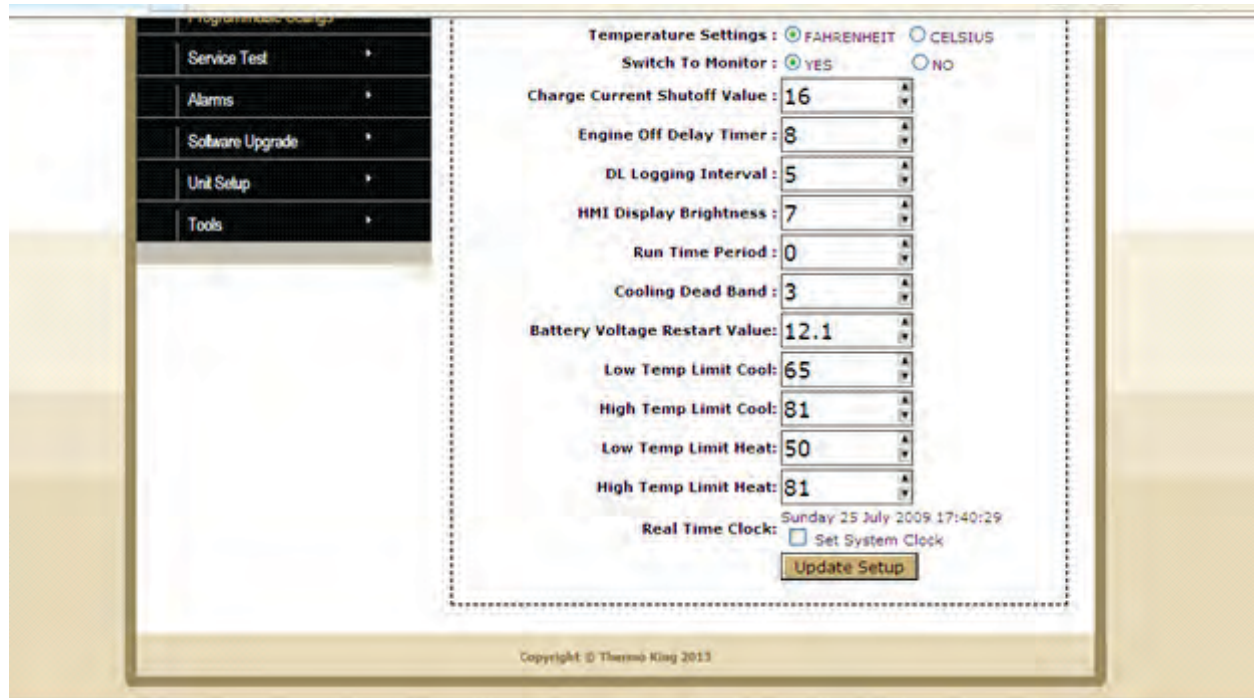
10. Select **Alternator Capacity**. Choose the alternator model installed:
  - a. 65 Amps (Default)
  - b. 120 Amps
11. Select **Engine Cooling Option**:
  - a. **Standard**: The APU engine cooling system is connected to the truck cooling system. Sensor WT2 is mounted on the pre-cooler coil.
  - b. **Standard + Arctic** (Default): The APU engine cooling system is connected to the truck cooling system. The Arctic Option is installed. Sensor WT2 is mounted on the adapter tube in the coolant return line.
  - c. **Closed Loop**: The APU engine cooling system is not connected to the truck cooling system. Closed Loop Cooling Tank is installed. Sensor WT2 is disconnected or not installed.
12. Enter **Unit Serial Number**: Record the 10-digit TriPac EVOLUTION unit serial number from the unit identification plate.
13. Enter **Unit ID**: Enter a unique unit ID number. The truck number is commonly used. Can be any combination of six letters and numbers. It will help identify data logger downloads
14. Select **Update Unit Setup**:
  - a. Setup information will be saved.
  - b. Controller will restart so selections will take effect.
  - c. TK Monitor will lose connection and must be restarted.

**Programmable Feature Setup**

**Note:** *The Battery Voltage Restart Value and Real Time Clock should always be set.*

The TriPac EVOLUTION system allows customizing of many operating features. Refer to Diagnostic Manual TK 55739, Section 3, Software for more information about programmable features. Changes directed by the customer should be made at this time.

15. Restart TK Monitor. Select the **Programmable Setup** screen.

**Figure 53. Programmable Setup Screen Shown**


RCS1669

16. Set **Battery Voltage Restart Value:**
  - a. Determine truck low voltage alarm setting.
  - b. Set TriPac Battery Voltage Restart Value to at least 0.2 volts higher than truck alarm setting. (Default 12.2 volts) - should not be higher than 12.4 volts.
  - c. TriPac EVOLUTION Unit Setup Procedures
17. Make any customer directed changes to other programmable settings.
18. Set Real Time Clock:
  - a. Click on the Set System Clock check box.
  - b. The Real Time Clock will be set to the time on the connected computer.
19. Select **Update Setup:**
  - a. Setup information will be saved.
  - b. Controller will restart so selections will take effect.
  - c. TK Monitor will lose connection and must be restarted.

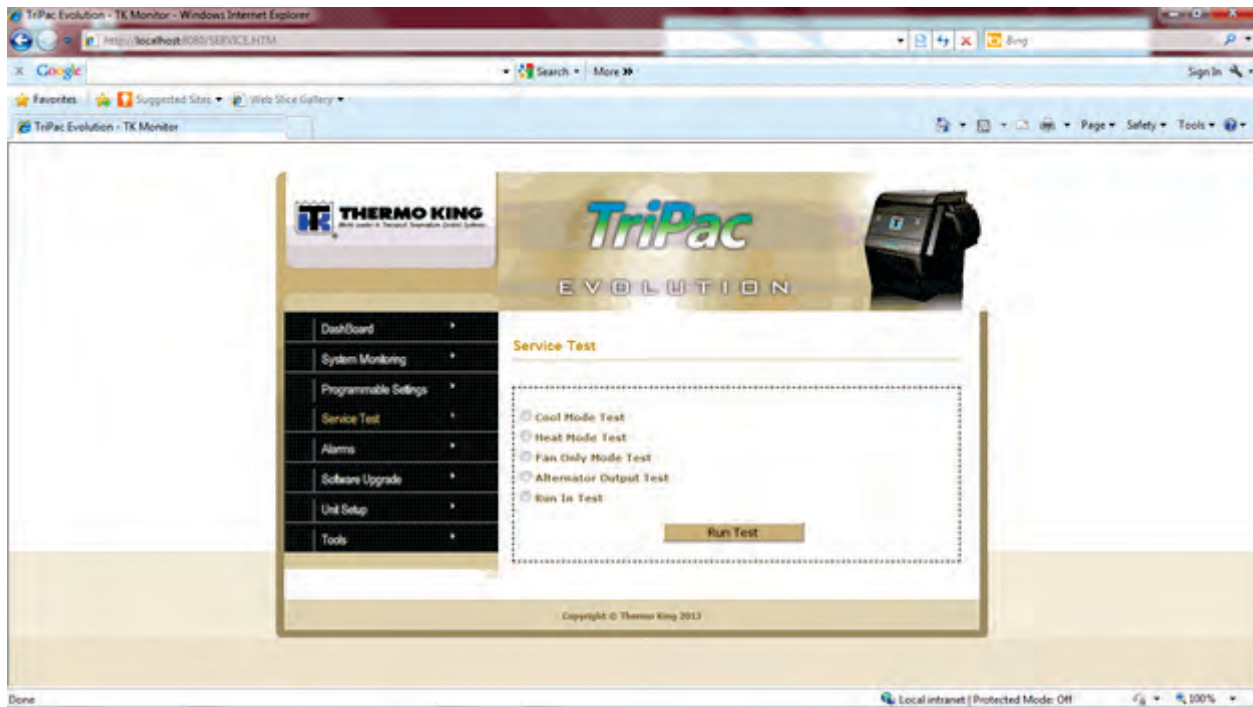
## Service Run-In Test

Before delivery of a TriPac EVOLUTION unit to the customer it must complete a 10 hour run-in with the engine under load. The Run-In Test in the Service Test screen will cause both the air conditioning system (using a low temperature setpoint) and the heating system (using a high temperature setpoint) to run for 10 hours.

**Note:** For additional information about TK Monitor refer to Diagnostic Manual TK 55739, Section 6, A51A, Communication Using TK Monitor.

1. Verify there is sufficient fuel in the fuel tank to operate the system for 10 hours.
2. **Closed Loop Cooling Option Only** - Place a clean container under the overflow hose of the APU's overflow tank. This is to catch any coolant that may be expelled during the initial 10 hour engine run-in.
3. Start TK Monitor. Select **Service Test** from the menu.
4. On the Service Test Screen select **Run In Test**.





RCS1670

5. Select the **Run Test** button.
6. The APU engine will start and heater will ignite.  
**Note:** Do not start truck after Service Test is initiated or the run in test will terminate.
7. Disconnect computer from the interface board – it is not required to complete the test. This test will stop automatically at the end of 10 hours.
8. A shutdown alarm will display on the HMI.
9. Reconnect computer and start TK Monitor.
10. Go to the Alarm screen.
11. Clear the code 54, Test Mode Timeout.
12. If any other alarms are listed diagnose and repair as required. Refer to Diagnostic Manual TK 55739, Section 5, Diagnostics.
13. Check engine oil level. Add oil as required.

## System Check List

- APU Mounting Bolts Positioned, Tightened and Torqued to Specs.
- Coolant Hoses Routed and Secured Properly
- Condenser Mounting Bolts Secured and Sealed with Silicone
- A/C Receiver Drier Mounting Bolts Secured
- A/C Evaporator Mounting Bolts Secured
- Evaporator Drain Tube Water Valves (Kazoos) Installed
- A/C Refrigeration Tubing Routed and Secured
- All Wiring Harnesses Routed, Connected and Secured
- A/C System Charged, Free of Leaks and Operates Correctly
- Heater Intake and Exhaust Hoses Routed Safely and Secured
- Heater System Operates Correctly
- All Fuel Lines are Routed Safely and Secured
- All Fuel Line Connections are Tight and Leak Free
- All Guards, Covers and Grilles Installed Securely
- 3" access hole in the sleeper floor is completely caulked from both inside and underneath
- Verified any unused holes in the sleeper floor are completely sealed closed with caulking
- All System Run-In Procedures Performed
- Coolant Levels for Truck and APU are Topped Off
- Unit Operated For 10 Hours
- Thoroughly Clean and Vacuum Interior of Sleeper
- Release to Customer

Thermo King – by Trane Technologies (NYSE: TT), a global climate innovator – is a worldwide leader in sustainable transport temperature control solutions. Thermo King has been providing transport temperature control solutions for a variety of applications, including trailers, truck bodies, buses, air, shipboard containers and railway cars since 1938. For more information, visit [www.thermoking.com](http://www.thermoking.com) or [www.tranetechnologies.com](http://www.tranetechnologies.com).

Thermo King has a policy of continuous product and product data improvements and reserves the right to change design and specifications without notice. We are committed to using environmentally conscious print practices.