



THERMO KING

Installation Manual

Trailer Edition Precedent™ Multi-Temperature Systems

Installation (A) for Host Units
S-600M, S-610M, C-600M , S-600DE and S-610DE

Revision D

August 2016

TK 55745-2-IM-EN

 **Ingersoll Rand.**

Introduction

This manual was written to assist with the installation of the Thermo King Precedent Multi-Temperature host refrigeration systems onto trailers specifically designed and built for refrigerated applications. Installation Manual (B) TK 55774 covers the installation of the remote evaporators along with the necessary procedures required to complete the multi-temperature installation.

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

- Are an experienced mechanic
- Can safely lift 34 kilos (75 lbs.)
- Are certified or 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

OPTIONS: Installation instructions for Thermo King optional equipment are available on line @thermoking.com or iService.

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. The procedures described herein should only be undertaken by suitably qualified personnel. Failure to implement these procedures correctly may cause damage to the Thermo King unit or other property or personal injury.

Revision History

Revision A	(09/15) Released new manual format.
Revision B	(09/15) Corrected text error.
Revision C	(11/15) Added S-600DE.
Revision D	(08/16) Added S-610M, S-610DE and options information to introduction.



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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**Hazardous Voltage!**

Dangerous three phase AC electric power is present whenever the unit is operating in either Diesel Mode or Electric Mode and whenever the unit is connected to a source of external standby power. Voltages of this magnitude can be lethal. Exercise extreme caution when working on the unit.

⚠ 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.



⚠ 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 tight and are the correct length for their applications. Improper torque and incorrect bolt lengths can damage equipment.

Battery Installation and Cable Routing

⚠ WARNING

Hazard of Explosion!

An improperly installed battery could result in a fire, explosion, or injury. A Thermo King approved battery must be installed and properly secured to the battery tray.

⚠ 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 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 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.

Installation Summary

Precedent installs the same as SB SPECTRUM with the following exceptions:

1. Precedent unit is approximately 6.00 inches wider than a SB which may interfere with trailer mounted fresh air exchange doors. See "Evaporator Opening Requirements," p. 14.
2. Evaporator opening and mounting bolt locations on front wall of trailer did not change. However, two particular mounting bolts should be trimmed to 2.25 to 2.50 inches in length from surface of the trailer wall. All other bolts should be trimmed to 2.25 to 2.75 inches in length from the surface of the trailer wall. See "Mounting Hardware Requirements," p. 16.
3. A new two point lifting bar is required to safely lift unit during installation. See "Lifting Bar Dimensions," p. 24.
- **C-600M, S-610DE and S-610M Only** - The supplied heat shield must be installed onto front wall of trailer prior to unit installation. See "Installing the Heat Shield (C-600M, S-610M and S-610DE Only)," p. 29.
- **S-600M and S600DE Only** - Some engine components must be removed to gain access to the center side mounting bolt located directly behind the engine. See "Engine Component Removal (S-600M and S-600DE Only)," p. 32.
4. **IMPORTANT: Using the wrong fuel system fittings may void your engine warranty! All Thermo King supplied fuel line fittings (except fuel line connector) are nickel plated brass for Precedent units.**
DO NOT use fuel fittings (main body) made of brass, copper, zinc, zinc plated or galvanized steel where it would make direct contact with flowing diesel fuel. Diesel fuel flowing through these types of fittings allows those metals to leach into the fuel forming deposits on the injector tips which fouls them prematurely.
Fuel fitting nuts, compression sleeves, and fuel line connectors made of brass are acceptable because diesel fuel does not flow across their surfaces.
- **DO NOT** use a SB fuel tank with a Precedent unit as they may contain fittings made from brass, zinc plated or galvanized steel.
- Precedent specific fuel tanks have plated brass fittings and aluminum drain plug.
- **IMPORTANT: The factory installed fuel tank air vent must be in place and functional for the Thermo King unit's fuel system to operate correctly and for the fuel tank to remain in compliance with Federal Motor Carrier Safety Administration specifications (title 49, paragraph 393.67). A plugged or restricted fuel tank air vent can result in premature damage to the fuel pump and could also cause severe damage to the fuel tank. NEVER remove or install any other component in place of the fuel tank air vent.**
5. Two different electric fuel pumps are used depending on model and diesel engine configuration. Always install correct fuel pump included in installation kit. See "Installing the Fuel Pump and Harness," p. 36.
6. New fuel pump and bracket supplied needs to be installed onto trailer cross member as close as possible to the fuel tank. The pump should be installed in an area that helps protect it from damage from road debris. All fuel line fittings supplied are now nickel plated brass. Any additional fittings required must also be nickel plated brass. See "Installing the Fuel Pump and Harness," p. 36.
7. Fuel supply and return lines need to be routed to bottom of unit and fed up inside through provided chase. Lines will need to be cut to length and connected to the fuel filter or optional fuel heater with supplied nickel plated brass fittings. **DO NOT use PTFE thread sealing tape on fuel fittings.** See "Installing the Fuel Lines – Trailer Applications," p. 38.
8. It is recommended installer provide a separate conduit or chase under trailer with a minimum inside diameter of 25.4 mm (1.00 in.) to accommodate both the standard fuel pump harness and ultrasonic fuel sensor harness. See "Installing the UFLS Harness – Trailer Applications," p. 40.
9. Fuel pump harness supplied will need to be routed through a conduit or chase from fuel pump to bottom of unit. Harness needs to be attached to wires provided under the unit and



also to the fuel pump using supplied butt splice connectors and heat shrink. Four connections total.

Note: *The electric fuel pump is polarity sensitive and must be wired properly. Failure to do so will cause failure of the electric fuel pump. See "Installing the Fuel Pump and Harness," p. 36.*

10. Ultrasonic Fuel Level Sensor harness supplied needs to be routed from fuel tank to bottom of unit through same conduit or chase as the fuel pump harness. Harness needs to be attached to wires provided inside control box and to sensor at tank using supplied butt splice connectors and heat shrink. Six connections total. See "Installing the UFLS Harness – Trailer Applications," p. 40.
11. SmartPower™ units come pre-wired with power cable and receptacle secured inside unit with tie bands for shipment. The installer will need to secure receptacle under roadside of unit with supplied hardware. Cable needs to be secured to trailer wall with supplied cable clamps and screws. See "Installing the Power Receptacle (Option) – Trailer Applications," p. 42. This does not apply to units with the Remote Receptacle option.
12. Battery installation requires removal of roadside door and a bracket to access battery tray and cables. See "Installing the Battery," p. 44.
13. Bottom panel and two top covers need to be installed with supplied hardware. The top fairing should be removed if it interferes with maximum trailer height restrictions. See "Installing the Top Covers and Bottom Pan – Trailer Applications," p. 46.
14. **S-600M, S-610M, S-610DE (3 Zone) and C-600M Units** – Do not operate the unit until the installation is complete or damage to the compressor will result. See "Important Information – Completing The Installation," p. 47.
15. **S-600DE and S-610DE (2 Zone) Units** – To complete the installation, refer to Installation Manual "B" (TK 55774) for information regarding the Center Wall Divider, Unit Run-In, and Checkout procedures.

Trailer Requirements

Approximate Weight of Precedent Multi-Temperature Units:

S-600M	820 kg (1808 lbs.)
w/SmartPower™ 12 HP/230V	920 kg (2030 lbs.)
w/SmartPower™ 12 HP/460V or 19 HP/460V	937 kg (2065 lbs.)
C-600M	866 kg (1910 lbs.)
w/SmartPower™ 12 HP/230V	970 kg (2138 lbs.)
w/SmartPower™ 12 HP/460V or 19 HP/460V	985 kg (2171 lbs.)
S-600DE	828 kg (1825 lbs.)
S-610M	874 kg (1926 lbs.)
w/SmartPower™ 12 HP/230V	976 kg (2151 lbs.)
w/SmartPower™ 12 HP/460V, 15 or 16 HP/460V, and 19 HP/460V	990 kg (2184 lbs.)
S-610DE (2 Zone) (3 Zone add 4.5 kg 10 lbs.)	881 kg (1943 lbs.)
w/SmartPower™ 12 HP/230V	980 kg (2162 lbs.)
w/SmartPower™ 12 HP/460V, 15 or 16 HP/460V, and 19 HP/460V	995 kg (2195 lbs.)

Front Wall Requirements

⚠ DANGER

Risk of Injury!

The front wall of the trailer must be structurally strong enough to support the weight of the refrigeration unit.

Evaporator Opening Requirements

Important: The location of the evaporator opening in the front wall of the trailer is critical to the proper installation and operation of the Thermo King unit. See "Evaporator Opening Requirements," p. 14.

Unit Mounting Hardware

⚠ DANGER

Risk of Injury!

The use of mounting hardware other than specified for installing the refrigeration unit could result in severe damage to equipment, void the warranty, or cause personal injury or death.

Important: The location of the unit mounting bolts in the front wall of the trailer is critical for proper unit installation. See "Mounting Hardware Requirements," p. 16.

Unit Dimensions

Important: Adequate clearance must be provided to allow for routine service and maintenance of the Thermo King unit. See "Unit Dimensions," p. 18.



Fuel Tank Mounting

⚠ DANGER

Risk of Injury!

An improperly installed fuel tank could lead to serious injury or death. Consult your trailer manufacturer for specific details on proper fuel tank installation and recommendations.

King Pin Dimensions

NOTICE

Equipment Damage!

The minimum distance from the king pin to the front of the trailer must be at least 609.6 mm (24.00 in.) or severe damage to the equipment will result. **VERIFY THIS DIMENSION BEFORE INSTALLING UNIT!** See "Swing Radius and King Pin Requirements".

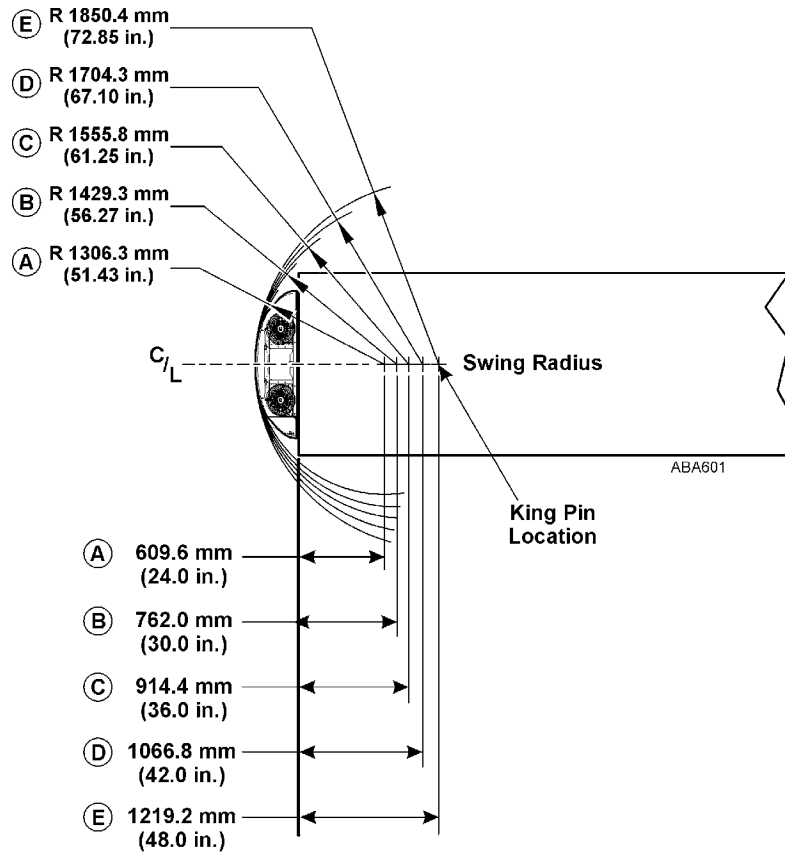
Swing Radius Clearance

NOTICE

Equipment Damage!

The minimum clearance required for the swing radius must be 1306.3 mm (51.43 in.) or severe damage to the equipment will result. **VERIFY THIS DIMENSION BEFORE INSTALLING UNIT!** See "Swing Radius and King Pin Requirements".

Swing Radius and King Pin Requirements



Evaporator Opening Requirements

⚠ DANGER

Risk of Injury!

The front wall of the trailer must be structurally strong enough to support the weight of the refrigeration unit.

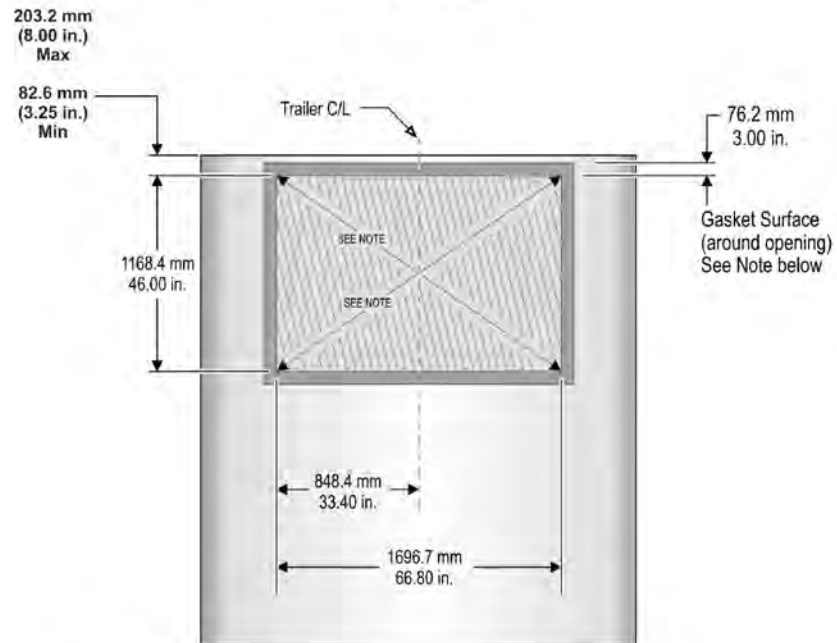
Important: The location of the unit mounting bolts and evaporator opening in the front wall is critical. **VERIFY ALL DIMENSIONS BEFORE INSTALLING THE UNIT.**

Note: It may be necessary to relocate the trailer's front corner clearance lights to the corner radius of the trailer to prevent damage.

1. The evaporator opening must be square. The diagonal measurements must be ± 3.0 mm (0.12 in.).
2. The gasket surface around the opening must be at least 76.2 mm (3.00 in.) wide, be flat ± 3.2 mm (0.12 in.) and free of rivets, seams, or bolt heads.

Note: The Precedent unit is 152.4 mm (6.00 in.) wider than the SB. Verify adequate clearance is available for trailer fresh air exchange doors, if applicable. Thermo King fresh air exchange option 070026 is also available.

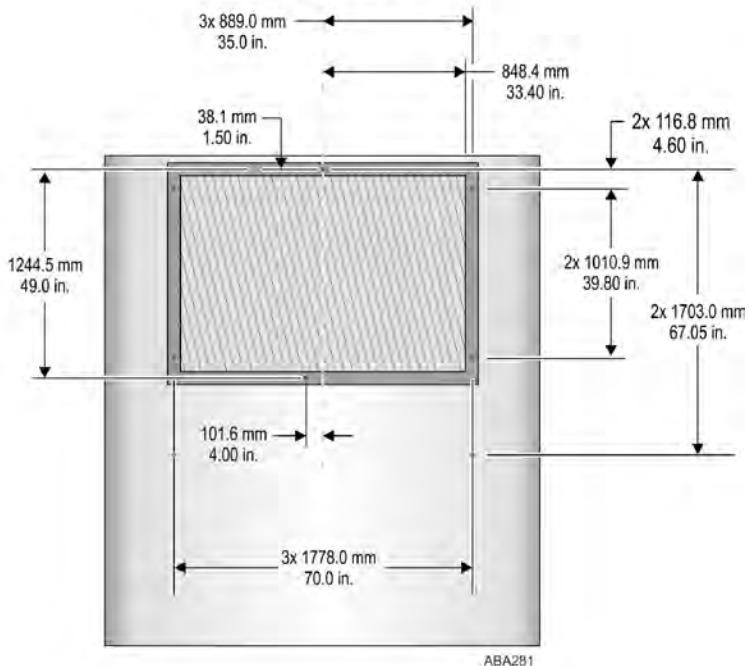
**EVAPORATOR OPENING REQUIREMENTS
FRONT VIEW**



NOTE: Corners of Evaporator opening **MUST** be Square. The diagonal measurement must be within 3.2 mm (0.12 in.).

NOTE: Gasket Surface **must** be free of rivets, seams, & bolt heads

**UNIT MOUNTING BOLT LOCATIONS
FRONT VIEW**



Mounting Hardware Requirements

Mounting Bolts

⚠ DANGER

Risk of Injury!

Eight mounting bolts must be installed to properly secure the unit to the trailer front wall. Failure to do so could result in severe damage to equipment, void the warranty, or cause personal injury or death.

Note: The location of the unit mounting bolts in the trailer front wall is critical to proper unit installation.

All mounting bolts must be square with the front wall and securely fastened to the trailer wall in such a manner to allow the mounting nuts be torqued to 82 N•m (60 ft. lbs.) from outside the trailer.

Refer to "Evaporator Opening Requirements," p. 14 regarding the following mounting bolt details:

- Surface of all mounting bolts are to be flat within 2.50 mm (0.10 in.).
- **Six** unit mounting bolts should be trimmed to extend a **minimum** 57.2 mm (2.25 in.) and a **maximum** of 69.8 mm (2.75 in.) beyond the surface of the front wall.
- **Two** unit mounting bolts should be trimmed to extend a **minimum** 57.2 mm (2.25 in.) and a **maximum** of 63.5 mm (2.50 in.) beyond the surface of the front wall.

Mounting Bolt Specifications

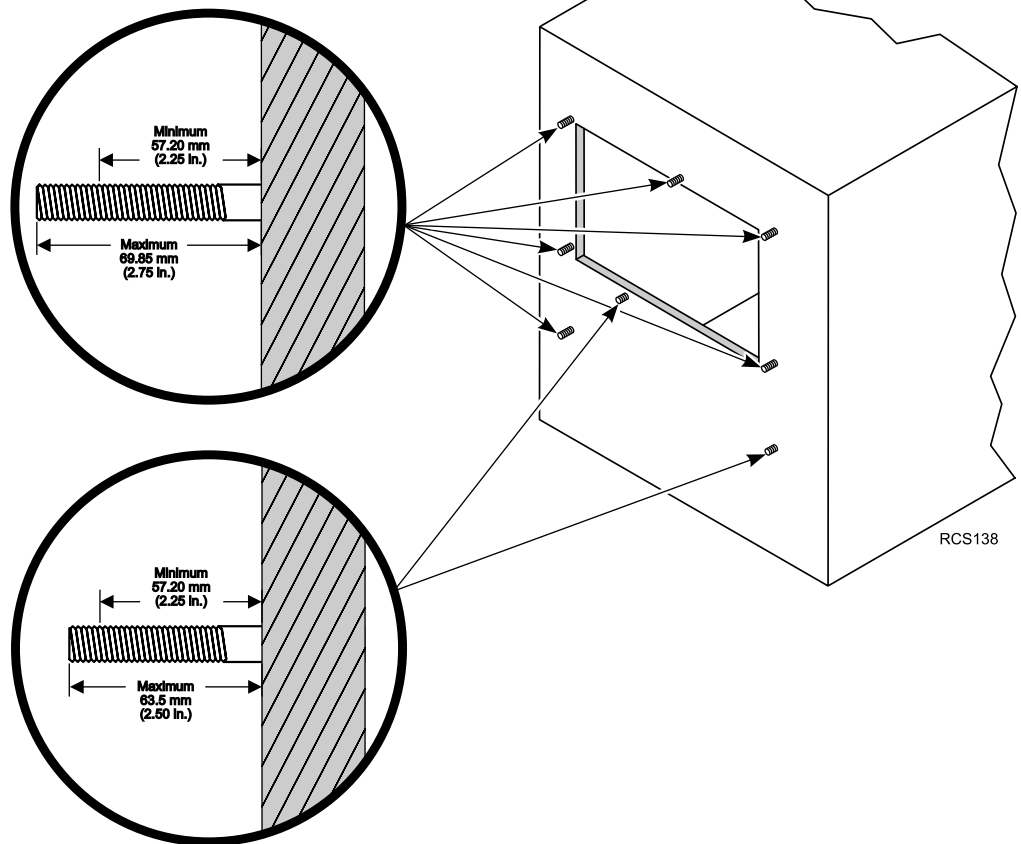
⚠ DANGER

Risk of Injury!

The use of mounting bolts other than those specified could result in severe damage to equipment, void the warranty, or cause personal injury or death.

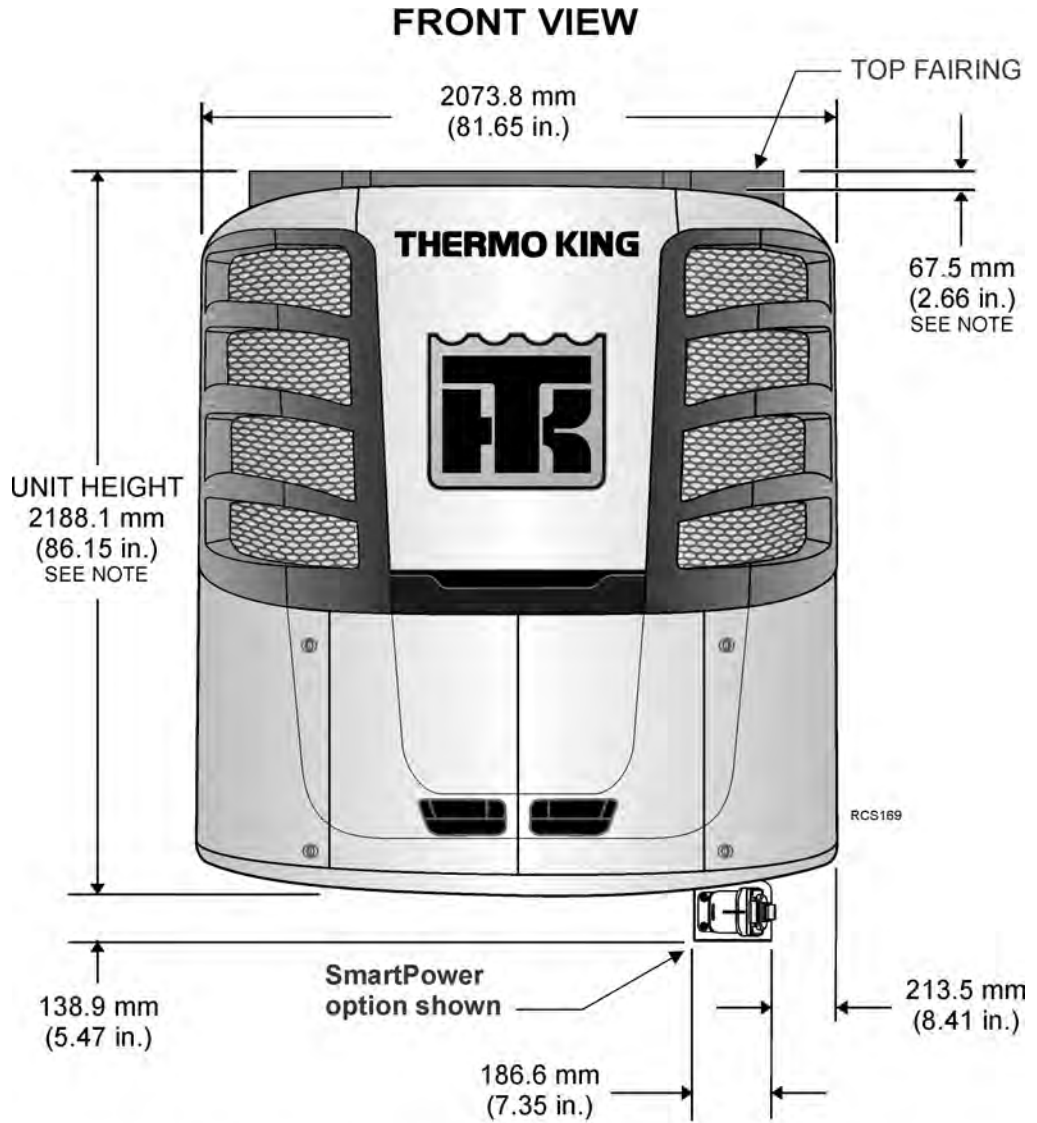
Use 1/2 in.-13 UNC - 28 Rolled thread grade 5, medium carbon steel bolts and locking nuts. All hardware must be zinc plated with dichromate finish.

These six unit mounting bolts should be trimmed to extend a **minimum** 57.2 mm (2.25 in.) and a **maximum** of 69.8 mm (2.75 in.) beyond the surface of the front wall.



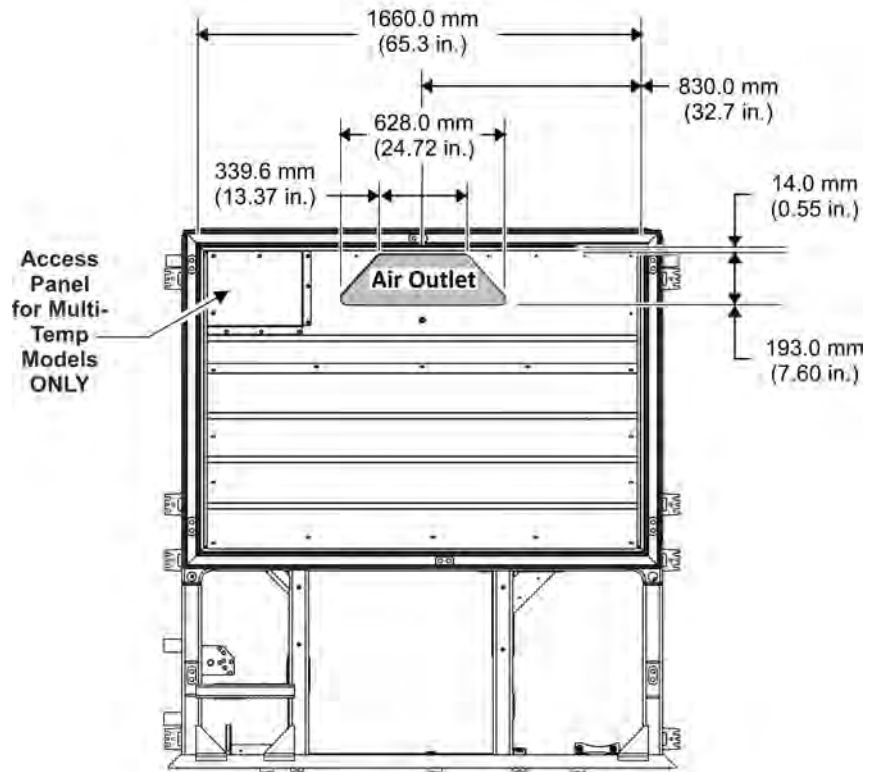
These two unit mounting bolts should be trimmed to extend a **minimum** 57.2 mm (2.25 in.) and a **maximum** of 63.5 mm (2.50 in.) beyond the surface of the front wall.

Unit Dimensions

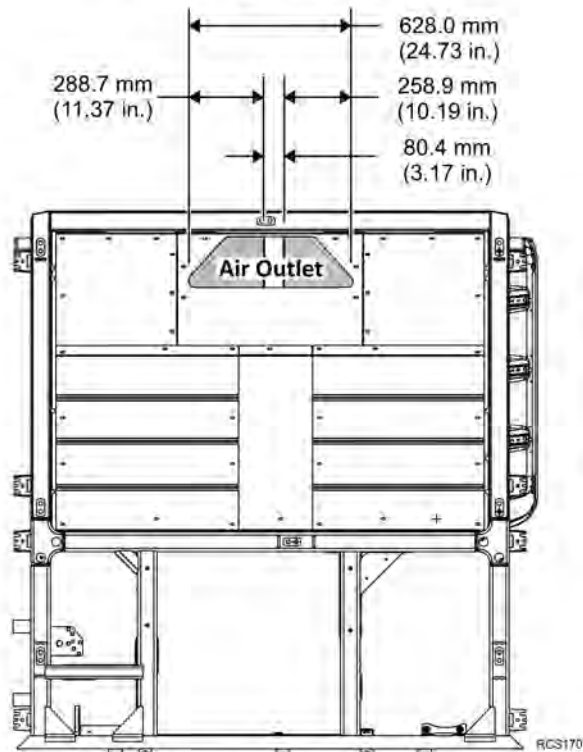


NOTE: The unit height shown includes the top fairing. Some applications such as Domestic Refrigerated Containers (DRC) and Trailer On Flat Car (TOFC) with an intermodal guard will not have a top fairing. The unit height for these applications would be 67.5 mm (2.66 in.) less.

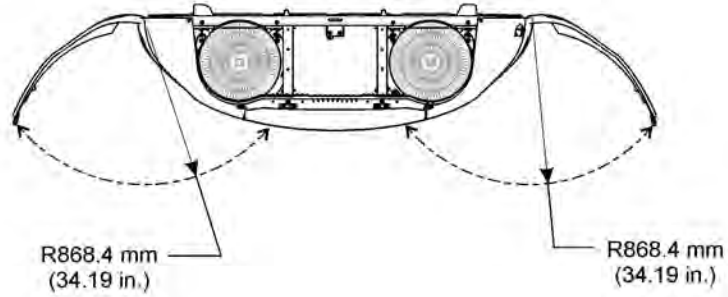
REAR VIEW



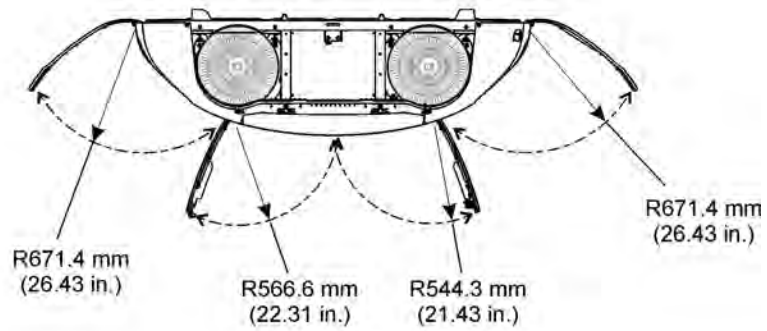
REAR VIEW DE



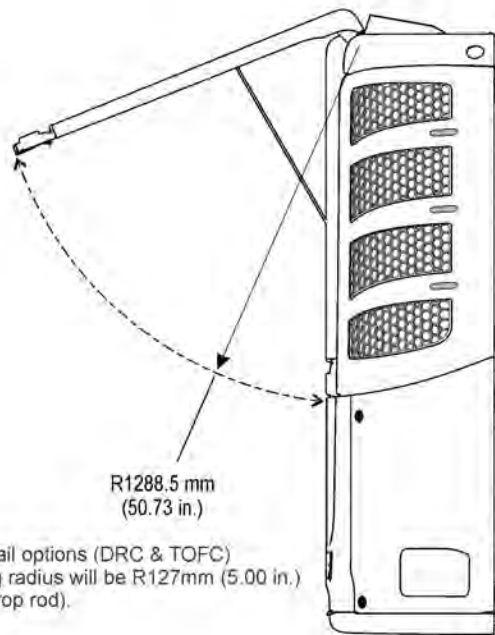
TOP VIEW
UPPER GRILLE RADII



TOP VIEW
LOWER DOOR & PANEL RADII

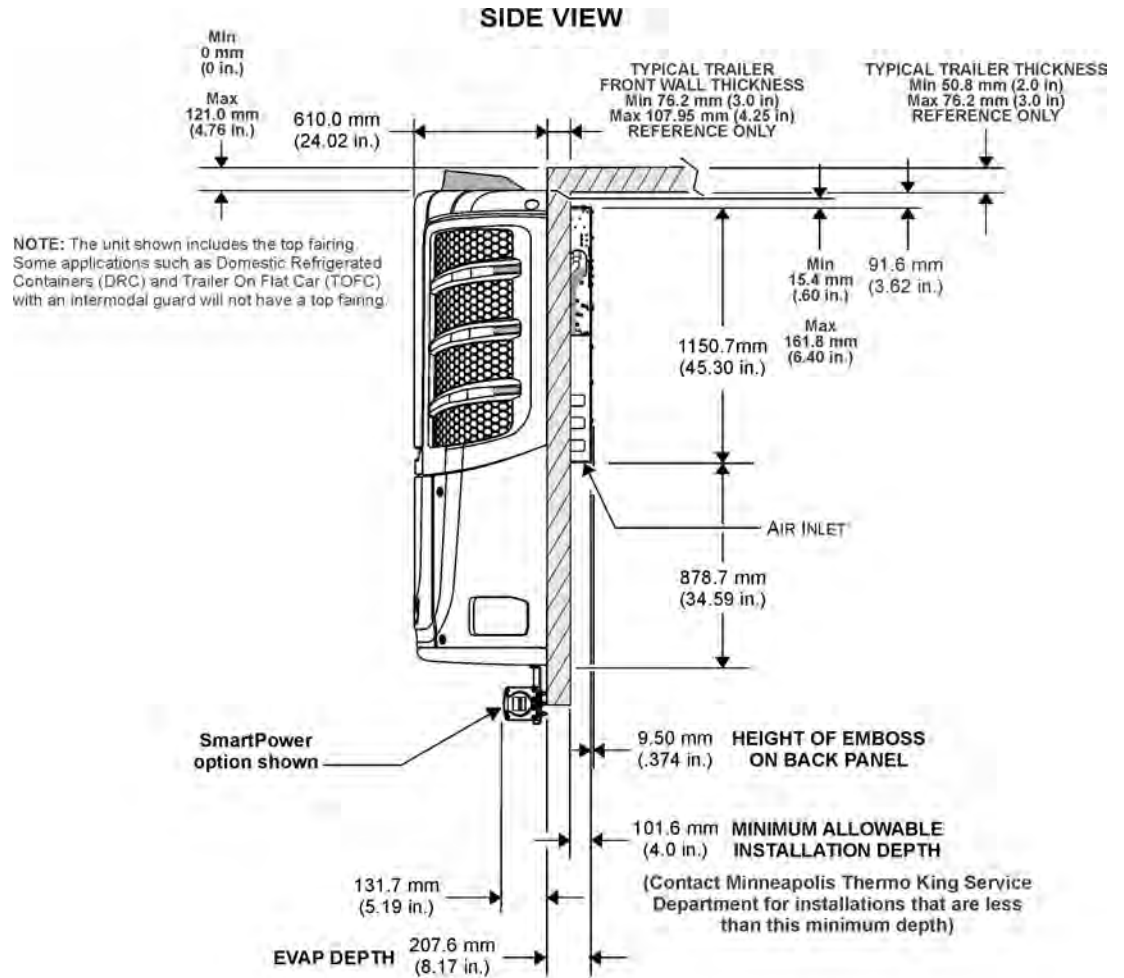


SIDE VIEW
TOP DOOR RADIUS



NOTE: For rail options (DRC & TOFC) door opening radius will be R127mm (5.00 in.) (with short prop rod).

ABA770



ABA635

Battery Selection Guide

NOTICE

Equipment Damage!

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

***Important:** The specified battery, electrical wiring and electronic controls were designed to operate and maintain only the Thermo King refrigeration system and factory authorized Thermo King options.*

Trailer units are designed for one, Group C31, 12 volt battery supplied by the installer.

The battery must be suitable for deep cycling, heavy duty and rated with a minimum of 95 amp/hr.

***Note:** See the following table for Thermo King approved batteries.*

BATTERY APPLICATION TABLE	
925 CCA Wet Cell Thermo King ReliaMax 925N P/N 203-733 Threaded Stud P/N 203-732 SAE Post	1150 CCA Dry Cell (AGM) Thermo King EON P/N 203-550 Threaded Stud P/N 203-551 SAE Post
<ul style="list-style-type: none"> Wet Cell Technology Recommended for both warm and cold climates High cranking power at low ambient temperatures 18-24 month expected life *see note below 	<ul style="list-style-type: none"> Dry Cell (AGM) Technology Recommended for extreme climates and for Rail Ready (RR), Domestic Refrigerated Container (DRC), and Trailer on Flat Car (TOFC) applications. High cranking power at lower ambient temperatures Suited for extreme temperatures Best for high cycling applications (Cycle-Sentry use) 5-7 year expected life
<p><small>* NOTE: Wet cell battery life and maintenance requirements are determined by the operating environment and the charge/discharge rate (cycles) while the battery is in service. Higher ambient temperatures and frequent discharges will shorten a wet cell battery's overall life expectancy and increase maintenance requirement. If the unit is not going to be used for an extended period of time, turn the Microprocessor On/Off Power Switch to the OFF position to maximize battery life.</small></p>	

Lifting Bar Dimensions

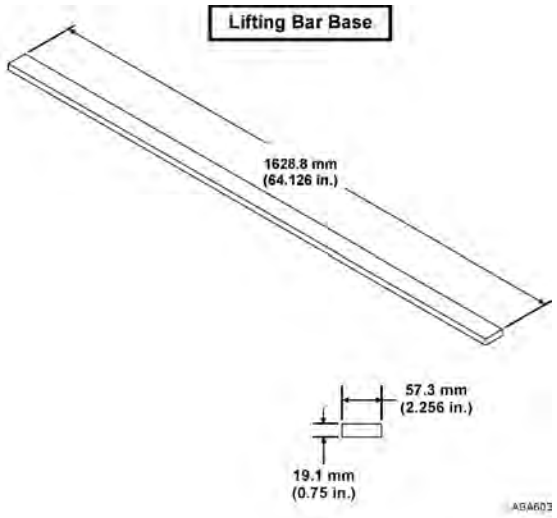
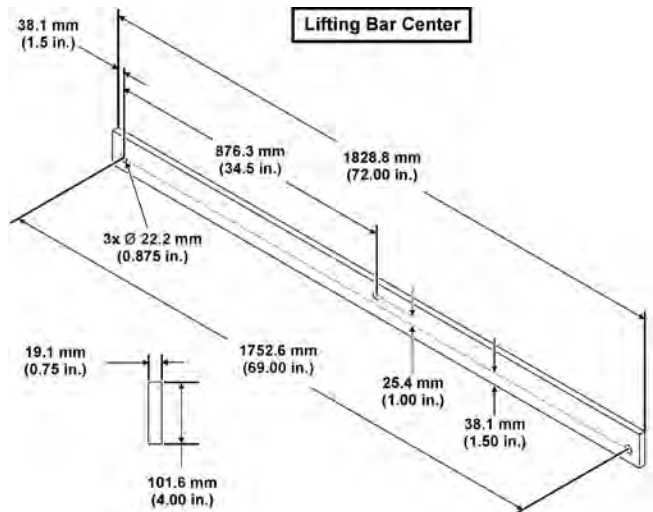
⚠ WARNING

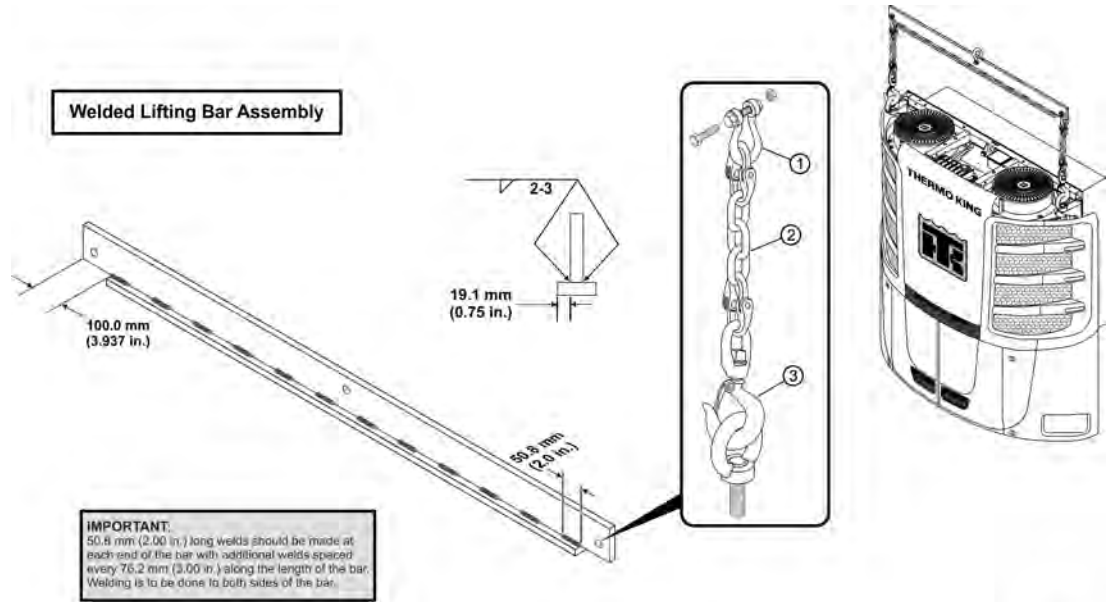
Risk of Injury!
 Thermo King requires a 2 point lifting bar to safely lift and install units. A lifting bar can be made from the drawings provided using ASTM A514 Grade B Steel Plate (UNS K11630).

⚠ WARNING

Risk of Injury!
 The lifting bar and lifting device combined must be able to support minimum weight of 1360.8 kilos (1 1/2 tons).

Important: Use forged clevis and pins, forged chain links and forged locking hooks with strength equal to total lift capacity of hoist mechanism and that meet all safety standards.





ABA630

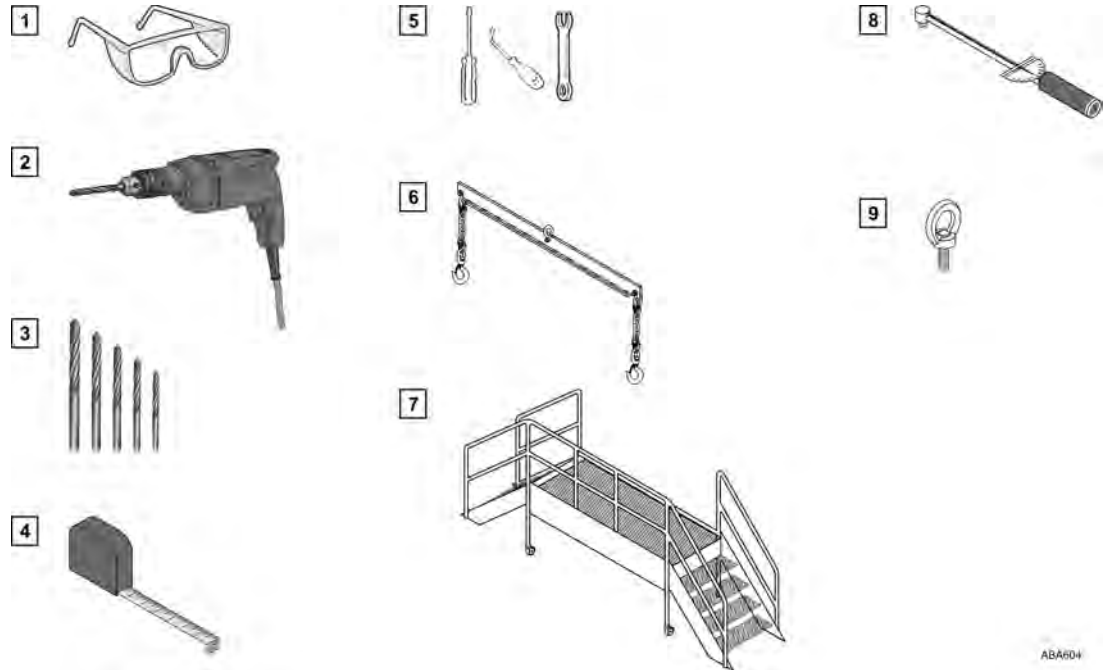
1.	Forged Clevis Pin
2.	Forged Chain Links
3.	Forged Locking Hooks

Note: These instructions are provided for fabricating the lifting bar used to install Precedent units. Thermo King is not the manufacturer of the lifting bar and is not responsible for material used or failure of this lifting device.

Required Tools for Installation

1. Safety Glasses
2. Drill
3. Drill Bits
4. Tape Measure
5. Mechanics Tools
6. Lifting Bar
7. Work Platform (Recommended)
8. Torque Wrench
9. Forged Eyebolts (5/8–11)

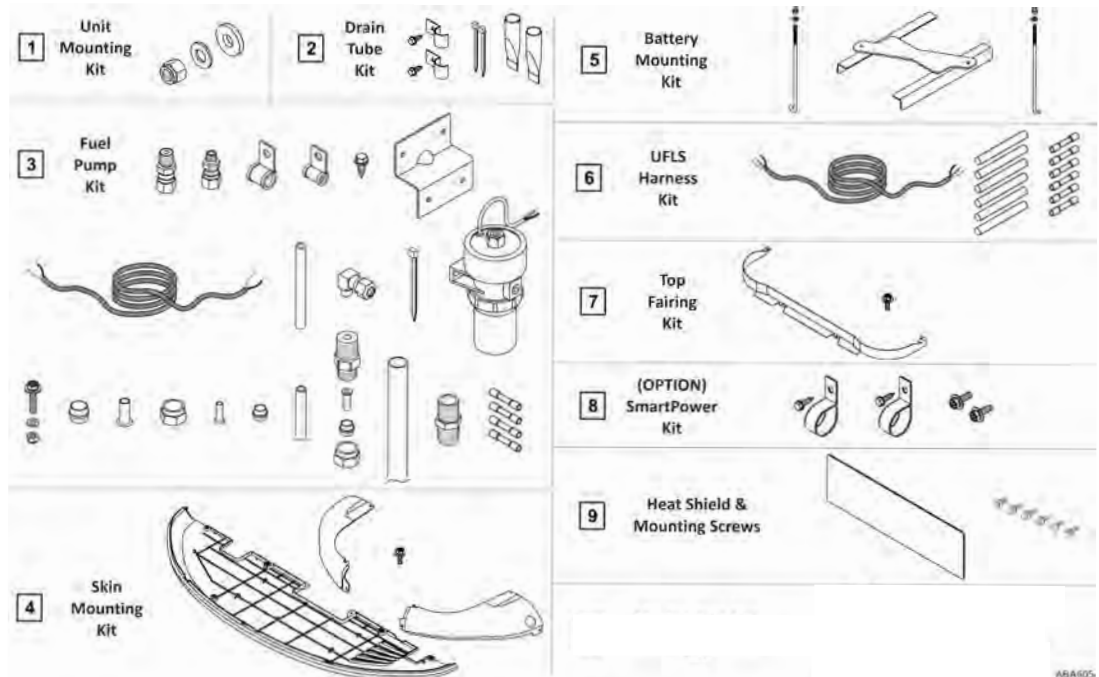
Note: Equipment such as scales, gauges, refrigerant leak detectors, and torque wrenches should be in good working condition and routinely calibrated to assure accurate readings.



ABA604

Installation Components

1. Unit Mounting Kit
2. Drain Tube Kit
3. Fuel Pump Kit
4. Skin Mounting Kit
5. Battery Mounting Kit
6. UFLS Harness Kit
7. Top Fairing Kit (Option on some models)
8. SmartPower Kit (Option)
9. Heat Shield and Mounting Screws (C-600M, S-610M and S-610DE Only)



ABA605

Unpacking the Unit

⚠ WARNING

Risk of Injury!

Thermo King requires a 2 point lifting bar to safely lift and install units. A lifting bar can be made from the drawings provided using ASTM A514 Grade B Steel Plate (UNS K11630).

⚠ WARNING

Risk of Injury!

Use only locking hooks to safely lift the unit. Failure to use locking hooks could result in severe damage to the equipment, void the warranty, or cause personal injury or death.

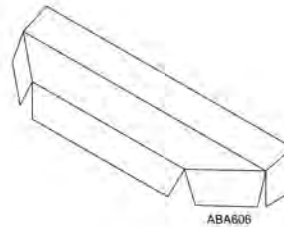
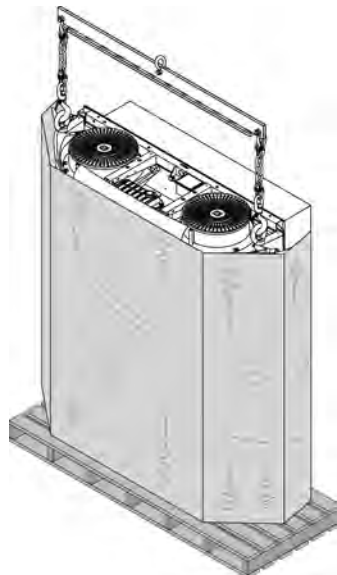
Note: A lifting bar can be made from the drawings shown ("Lifting Bar Dimensions," p. 24) using ASTM A514 Grade B Steel Plate (UNS K11630).

Units are shipped attached to disposable wooden pallet and wrapped with protective cardboard and plastic stretch wrap.

Note: To avoid unnecessary damage to your unit, place the crated unit near the trailer prior to its removal.

Important: DO NOT use a sharp knife to remove the stretch wrap or cardboard wrap as damage to the exterior of the unit will result.

1. Carefully remove plastic stretch wrap from unit.
2. Carefully remove the top cardboard cover.
3. Carefully remove the outer cardboard wrap.
4. Remove installation kit boxes, bottom panel, and any other loose components from rear of unit.
5. Install two forged eyebolts into the top corners of the unit and attach the 2 point lifting bar with locking hooks to the eyebolts. Raise unit only enough to remove slack from lifting bar chains.
6. Remove hardware holding unit to wooden pallet.
7. Unit is now ready for installation.



Installing the Heat Shield (C-600M, S-610M and S-610DE Only)

Installation Procedures

Note: Heat shield and screws can be found loosely attached to the rear of the unit with band wraps.

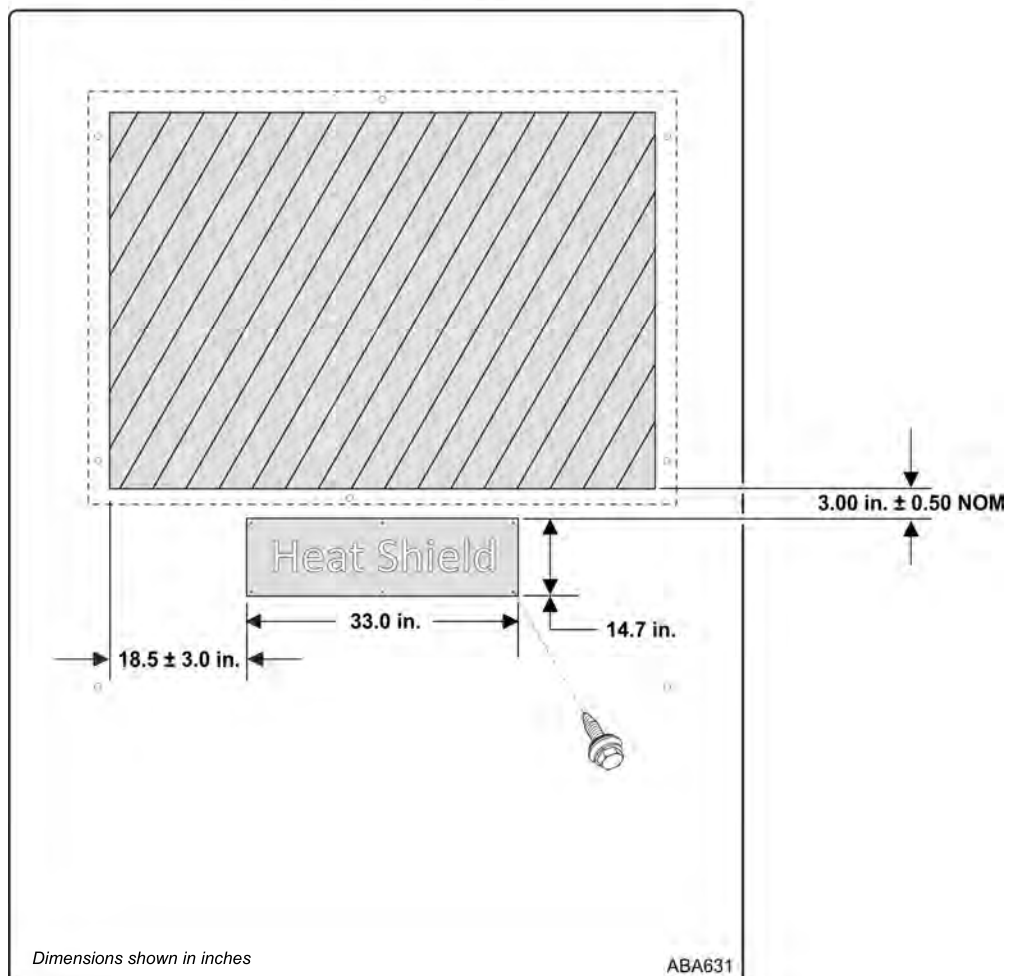
The supplied heat shield must be installed onto the front outside wall of the trailer prior to unit installation. The shield should be positioned approximately 76.2 mm (3.00 in.) down from the cutout and centered horizontally as shown.

1. Thoroughly clean the area shown with isopropyl alcohol to remove dirt, grease, wax, etc.
2. Starting at the top of the shield, peel approximately 25.4 mm (1.00 in.) of the backing liner from the shield, place shield onto trailer wall and progressively remove liner downward while applying pressure to the foil.
3. Once shield is installed, apply pressure to the remove wrinkles.

Note: Any remaining wrinkles have no effect on performance.

4. Install provided sealing screws at each corner and top and bottom center of the shield.
5. The unit is now ready to be installed.

FRONT VIEW



Installing the Unit

⚠ WARNING

Equipment Damage and Risk of Injury!

Do not use a forklift to install the unit. This could result in severe damage to equipment, void the warranty, or cause personal injury or death.

⚠ WARNING

Risk of Injury!

Thermo King requires a 2 point lifting bar to safely lift and install units. A lifting bar can be made from the drawings provided using ASTM A514 Grade B Steel Plate (UNS K11630).

⚠ WARNING

Risk of Injury!

Use only locking hooks to safely lift the unit. Failure to use locking hooks could result in severe damage to the equipment, void the warranty, or cause personal injury or death.

Note: A lifting bar can be made from the drawings shown ("Lifting Bar Dimensions," p. 24) using ASTM A514 Grade B Steel Plate (UNS K11630).

Unit Installation

Note: Ref. (Figure 1, p. 31, Detail I).

1. Raise unit up to the trailer opening and position onto the mounting bolts. To access mounting bolts, see (Figure 1, p. 31, Detail II).
2. Attach thick washer, standard washer, and elastic stop nuts provided in the installation kit. Torque to 82 N•m (60 ft. lbs.).

S-600M and S-600DE ONLY

Note: Third party installers (i.e. trailer OEM's)

- Mount unit on front wall of trailer and secure by installing hardware supplied in installation kit.
- DO NOT install center mounting nut located behind engine.
- Install hardware at the other 7 locations – 3 on each vertical side frame members and 1 at center top frame member. Torque to 82 N•m (60 ft. lbs.).
- Trailer with installed Multi-Temp unit is to be driven to an authorized Thermo King dealership via PAVED ROADS ONLY. Distance between third party installer and Thermo King dealership is not to exceed 100 miles (160 km).
- The center mounting hardware (attached to the unit with a bandwrap) is to be installed and torqued to spec by the Thermo King commissioning dealer.

Access to Mounting Bolts

Note: Ref. (Figure 1, p. 31, Detail II).

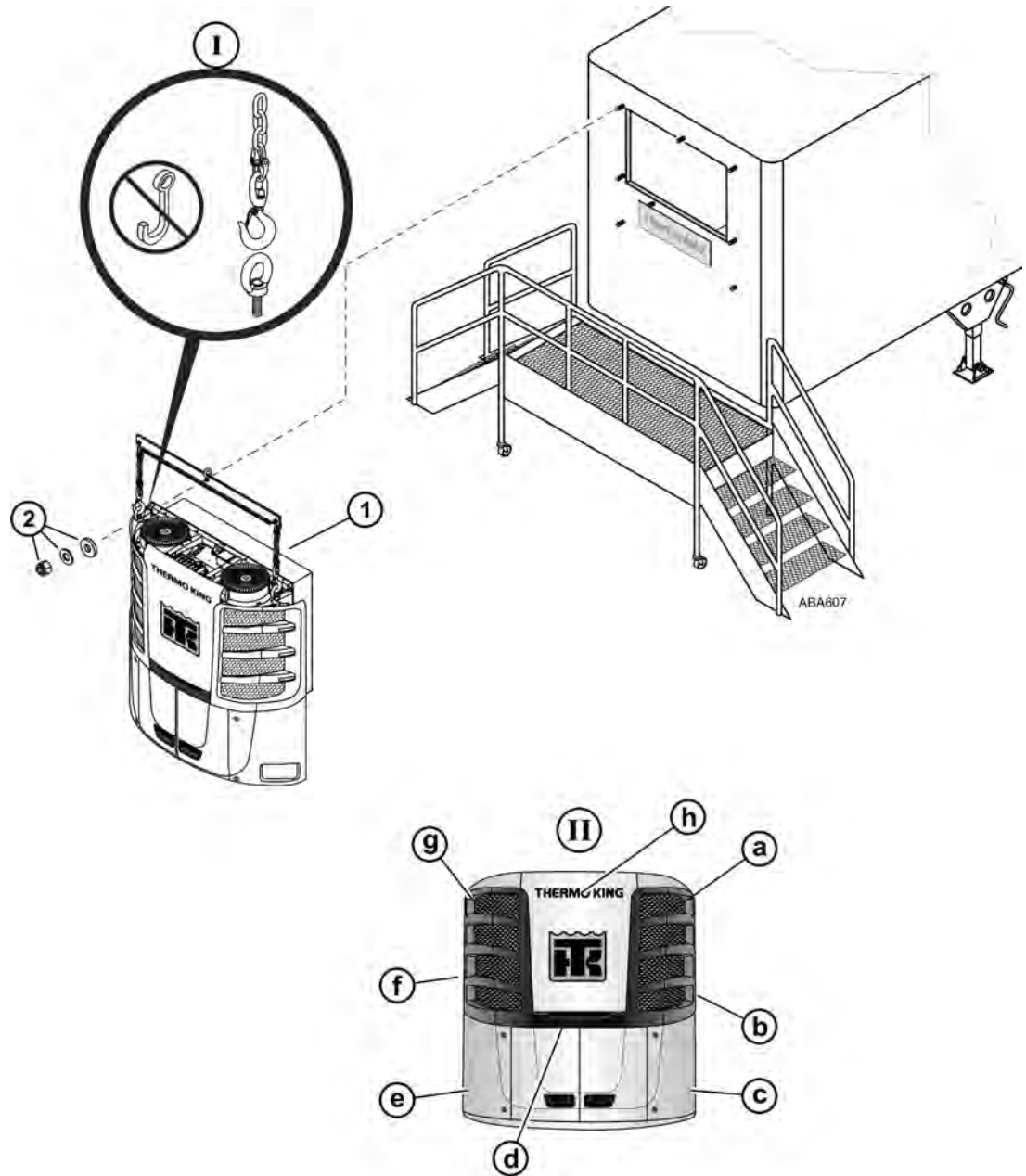
- a. Top side mounting hole through the hinged roadside grille.
- b. Center side mounting hole through hinged roadside grille.
- c. Lower side mounting hole through hinged roadside panel, behind hinged control box.
- d. Center side mounting hole through hinged lower curbside door.

Note: S-600M and S-600DE ONLY – The center mounting hardware (attached to the unit with a bandwrap) is only to be installed by the Thermo King commissioning dealer.

- e. Lower side mounting hole through hinged curbside panel.

- f. Center side mounting hole through hinged curbside grille.
- g. Top side mounting hole through hinged curbside grille.
- h. Top center mounting hole from top of the unit.

Figure 1. Unit Installation



Engine Component Removal (S-600M and S-600DE Only)

Note: This procedure is to be completed by a Thermo King commissioning dealer after initial unit install by third party. Refer to Figure 2, p. 33.

The following engine components must be removed to gain access to the center mounting bolt located directly behind the engine:

1. Open the lower roadside and curbside doors along with the center door.

Air Cleaner Removal

2. Remove the bandwrap securing the curbside doors along with the center door.

Note: A new bandwrap will be needed when reinstalling the air intake tube to the intake.

3. Loosen the hose clamp securing the rubber intake hose to the Mass Air Flow (MAF) adapter assembly.
4. Remove the two 13mm bolts securing the air cleaner assembly.
 - Remove the air cleaner assembly from the unit with the upper and lower hose still attached.

Intercooler Outlet and Turbo Outlet Hose Removal

Note: Be sure the hose adapter grommet assembly stays in place when removing the hoses.

5. Remove the spring clamp securing the **intercooler** outlet hose to the intercooler and move hose out of the way.
6. Remove the spring clamp securing the **turbo** outlet hose to the intercooler and move the hose out inlet.

MAF and Inlet Elbow Removal

Important: Do not lose or damage the o-ring when removing the air intake assembly from the turbo. See important note below.

7. Disconnect the electrical connectors from:
 - MAF Sensor
 - Blowby Gas Heater (located on the air intake assembly)
8. Rotate the MAF adapter counterclockwise and remove it from the air intake assembly.
9. Remove the two 8mm bolts and carefully remove the air intake assembly from the turbo.

Center Side Bolt Mounting Hardware

10. Attach thick washer, standard washer and elastic stop nut (attached to the unit with a bandwrap) onto the unit's center mounting bolt. Torque to 82 N•m (60 ft. lbs.).

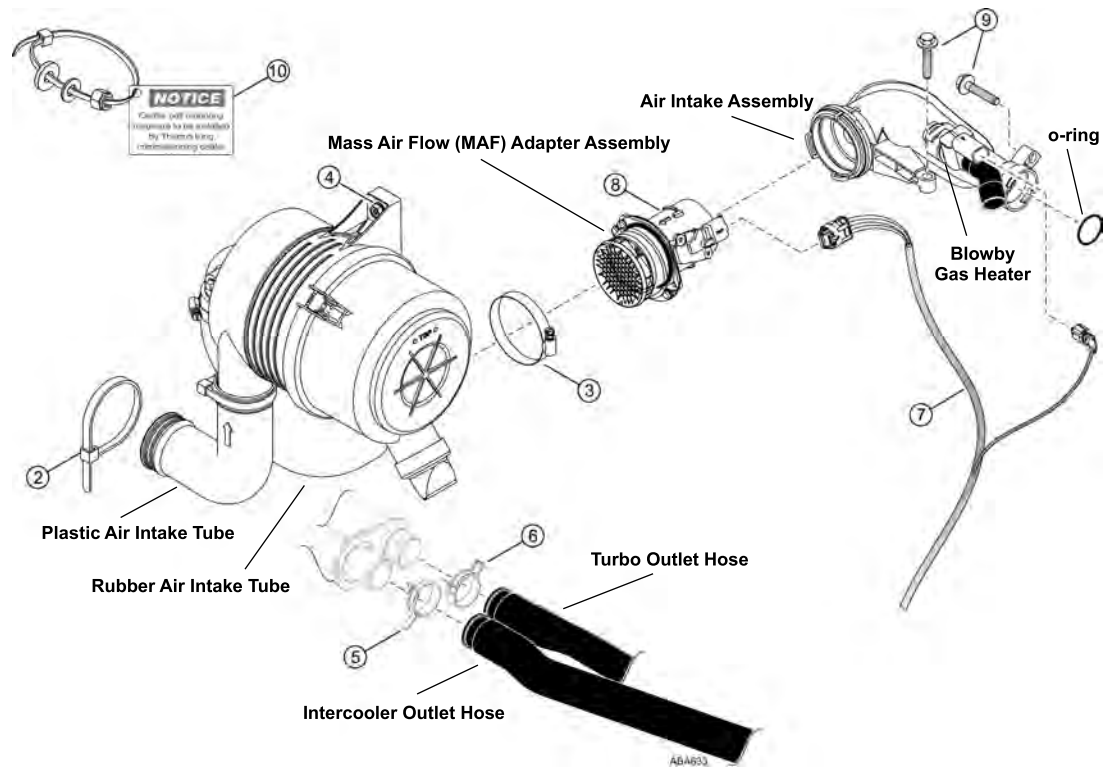
Reinstalling Engine Components

Important: The o-ring must be in place in the air intake assembly to properly seal the intake to the turbo. If the o-ring is damaged or lost, a new o-ring must be installed. Lightly lubricate the o-ring with engine oil and make sure it is held in place with the tangs inside the elbow.

11. Reinstall engine components in reverse order they were removed.

Note: Be sure to rotate the MAF adapter clockwise to lock it in place on the air intake assembly before reattaching the air intake hose.

Figure 2. Engine Component Removal S-600M and S-600DE Only



Installing the Drain Hoses and Coolant Overflow Hose – Trailer Applications

Evaporator Drain Hose Installation

Note: Ref. (Figure 3, p. 34, Detail A).

1. Evaporator drain hoses should run straight down the trailer wall from each side of the unit with no kinks or bends.
2. Cut off excess hose and attach check valves with supplied band wraps.
3. Secure each hose to trailer wall with two clamps and screws as shown.

Important: Upper clamp location varies by individual application while lower clamps should be installed 127 mm (5.00 in.) up from the bottom of the drain valves and not be so tight as to restrict water drainage.

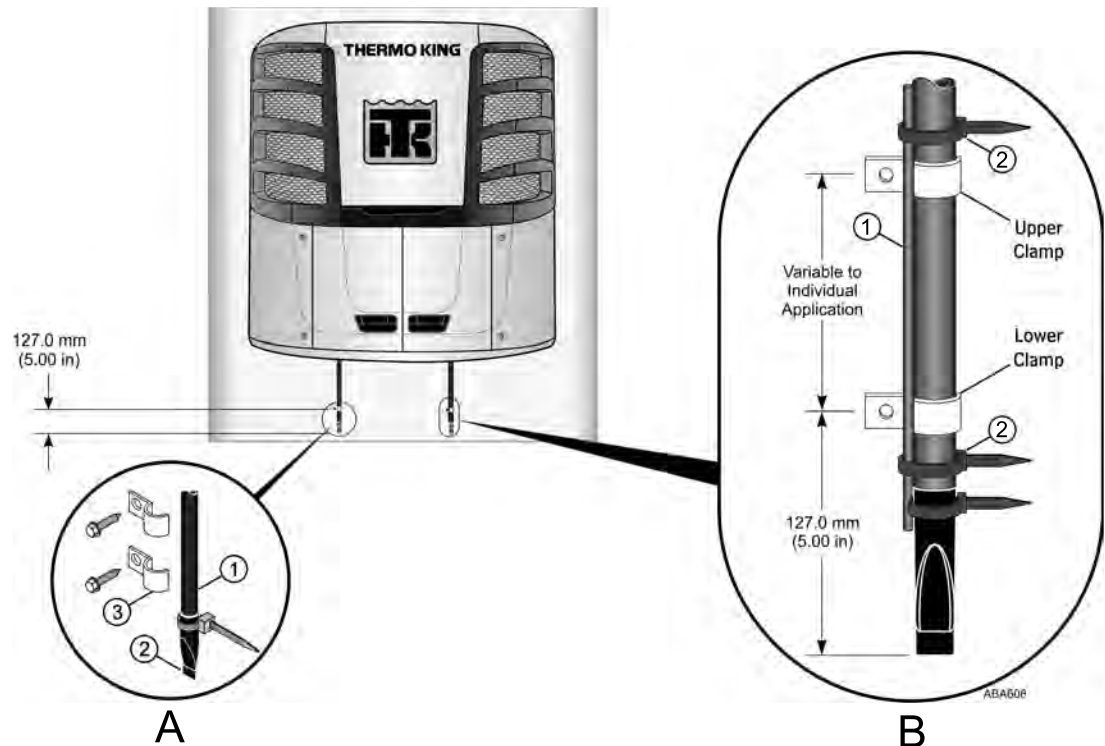
Coolant Overflow Hose Installation

Note: Ref. (Figure 3, p. 34, Detail B).

1. The coolant overflow hose should run straight down the trailer wall with no kinks or bends.
2. Secure the overflow hose to the roadside evaporator drain hose with supplied band wraps as shown

Important: Bandwraps must not be so tight as to restrict water drainage.

Figure 3. Drain Hose and Coolant Hose Installation



Installing the Fuel Pump and Harness

Fuel Pump Installation

Important: Two different electric fuel pumps are used depending on model and diesel engine configuration. Always install the correct fuel pump included in the installation kit for your specific model unit.

Precedent Model	Correct Fuel Pump
C-600M	41-7059 (high pressure pump)
S-600M, S-600DE, S-610M and S-610DE	42-0351 (low pressure pump)

Note: The fuel pump must be installed in a location above the fuel tank in an area that protects it from road debris and allows for routine filter removal.

Note: Ref. (Figure 4, p. 37).

1. Install the fuel pump bracket to the pre-drilled holes in the trailer's cross member directly above the fuel tank.
 - Use the M6 x 1.00" bolts, washers, and locking nuts supplied in the fuel pump mounting kit.
 - Securely tighten hardware.
2. Install the fuel pump to the bracket.
 - Use the M6 x 1.00", bolts, washers and locking nuts supplied in the fuel pump mounting kit.
 - Securely tighten hardware.

Fuel Pump Harness Installation

⚠ DANGER

Fire Hazard!

Do not route electrical harness together with fuel lines as this could cause a fire resulting in death or serious injury.

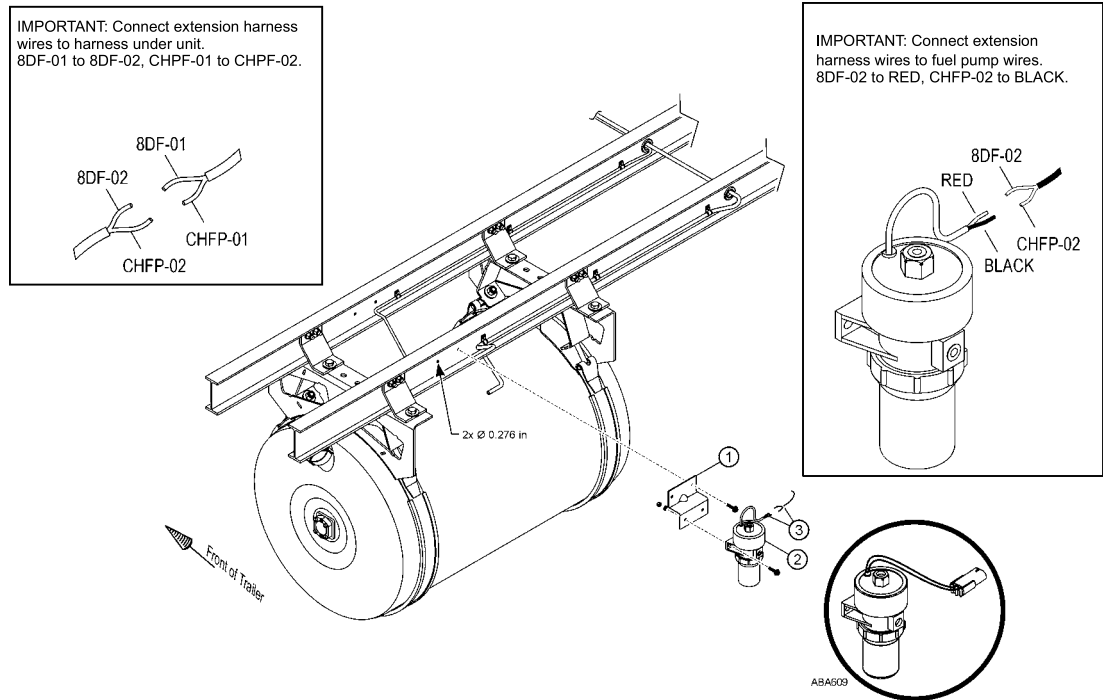
Important: The electric fuel pump is polarity sensitive and must be wired properly. Failure to do so will cause failure of the electric fuel pump.

Note: Thermo King recommends a conduit or chase with 1.00 in (25.4 mm) I.D. to accommodate the fuel pump harness.

Note: Ref. (Figure 4, p. 37).

1. Attach the supplied fuel pump harness (**8DF-02, CHFP-02**) to the fuel pump wires as follows:
 - **C-600M Only** - Cut the 2-pin connector off the fuel pump harness.
 - **8DF-02** is 12 volt positive and needs to be connected to the **RED** wire at the pump.
 - **CHFP-02** is ground and needs to be connected to the **BLACK** wire at the pump.
 - Splice the wires from the harness to the wires from the pump with supplied butt splice connectors and heat shrink.
 - Route the harness to the unit through the conduit or chase.
 - Locate the two fuel pump wires (**8DF-01, CHFP-01**) secured to the bottom of the frame.
 - Match up wires (**8DF-01** to **8DF-02**) and (**CHFP-01** to **CHFP-02**).
 - Splice the harness from the pump to the wires under the unit with supplied butt splice connectors and heat shrink.
 - Secure harness with clamps.

Figure 4. Fuel Pump and Harness Installation



Installing the Fuel Lines – Trailer Applications

Important Installation Requirements

⚠ DANGER

Fire Hazard!

Leaking fuel lines could cause a fire resulting in death or serious injury. All fuel line fittings must be tight and leak free.

⚠ DANGER

Fire Hazard!

Do not route fuel lines with battery cables or electrical wires, as this could cause a fire.

DETAIL I - Fuel lines should be routed in a protective housing with no kinks or sharp bends and rubber grommets must be used when routing fuel lines through holes in metal.

DETAIL II - Secure all fuel lines with provided clamps.

DETAIL III - Fuel line should be 25.4 (1.00 in.) from bottom of tank and end cut at 45 degree angle.

Note: For Detail information, Ref. (Figure 5, p. 39).

Fuel System Fittings

Important: Using the wrong fuel system fittings may void your engine warranty! All Thermo King supplied fuel line fittings (except fuel line connector) are nickel plated brass for Precedent units.

DO NOT use fuel fittings (main body) made of brass, copper, zinc, zinc plated or galvanized steel where it would make direct contact with flowing diesel fuel. Diesel fuel flowing through these types of fittings allows those metals to leach into the fuel forming deposits on the injector tips which fouls them prematurely.

Fuel fitting nuts, compression sleeves, and fuel line connectors made of brass are acceptable because diesel fuel does not flow across their surfaces.

Do not use PTFE (Polytetrafluoroethylene) thread sealing tape on the fuel fittings in a Precedent unit. PTFE tape may allow strands into the fuel system that could plug up the tight clearance fuel injectors causing failures.

Fuel Line Installation

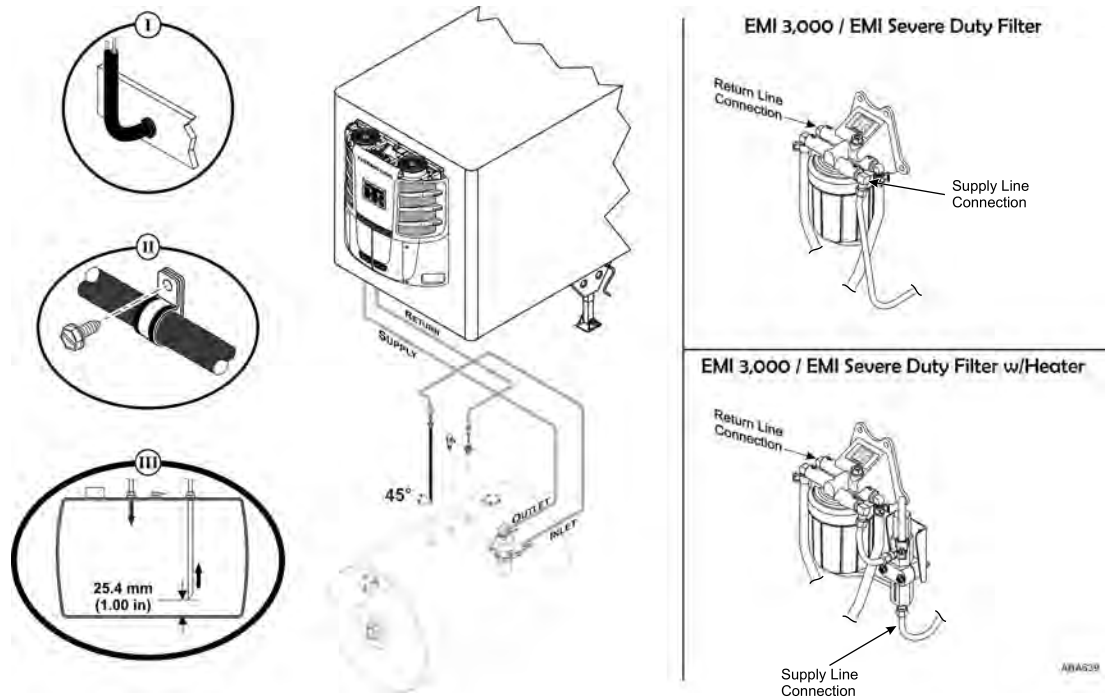
Important: Use two wrenches (where applicable) when tightening fuel line fittings to help prevent stripping threads.

1. Route a fuel supply line from the fuel pump's INLET fitting to the fuel pickup fitting on the fuel tank.
 - a. Install fuel line connector, cut the end of fuel line at a 45 degree angle and insert into fuel pickup tube until it is 25.4 mm (1.00 in.) from bottom of tank (Detail III). Tighten fittings securely.
2. Attach a second fuel supply line onto the fuel pump's OUTLET fitting.
3. Install the fuel return line to the fuel tank return fitting. Tighten fittings securely.
4. Remove plastic cap from the fuel vent and point the outlet to the rear of the trailer.
 - **IMPORTANT:** The factory installed fuel tank air vent must be in place and functional for the Thermo King unit's fuel system to operate correctly and for the fuel tank to remain in compliance with Federal Motor Carrier Safety Administration specifications (title 49, paragraph 393.67). A plugged or restricted fuel tank air vent can result in premature damage to the fuel pump and could also cause severe damage to the fuel tank. **NEVER** remove or install any other component in place of the fuel tank air vent.

5. Route both the fuel supply and fuel return to the unit.
 - a. Open the top access door.
 - b. Route both fuel lines into the conduit located under the curbside of the unit until they come out by the fuel filter.
 - c. Fuel Filter Only - connect supply and return lines as shown. Tighten fittings securely.
 - d. Fuel Filter with Fuel Heater - connect supply and return lines as shown. Tighten fittings securely.

Note: It is important not to allow the unit to run out of fuel during the engine break-in period. Add a sufficient amount of fuel (approximately 20 gallons) to allow the unit to run for 8 to 12 hours during engine break-in and pre-delivery procedures.

Figure 5. Fuel Line Installation



Installing the UFLS Harness – Trailer Applications

“Solid State” Ultrasonic Fuel Level Sensor (UFLS)

Important: All electrical connections of the UFLS harness must be made with the supplied crimp and solder style connectors with separate heat shrink tubing. **DO NOT** burn the heat shrink. If the heat shrink is burnt, charred, or has bubbles from overheating, the wire connections must be removed and redone correctly.

Interconnect Harness Installation and Routing

⚠ DANGER

Fire Hazard!
Do not route electrical harness together with fuel lines as this could cause a fire resulting in death or serious injury.

1. Attach the interconnect harness to the fuel sensor wires located inside the control box (Figure 6, p. 41, Item 1).

Connections inside Control Box
BLACK to FUELN-01
WHITE to FUEL-01
GREEN to 8F-01

- a. Slide supplied heat shrink tubing onto each wire and position them away from joint.
 - b. Connect each wire with wire connector and crimp securely.
 - c. Solder wires to wire connectors with a soldering gun.
 - d. Slide heat shrink tubing over each wire connector and applying heat with a heat gun.
 - e. Secure harness inside the control box with tie bands.
2. Route the harness to the fuel tank using the trailer’s harness conduit or chase to avoid interference with fifth wheel plate area (Figure 6, p. 41, Item 2).

UFLS Harness Connections

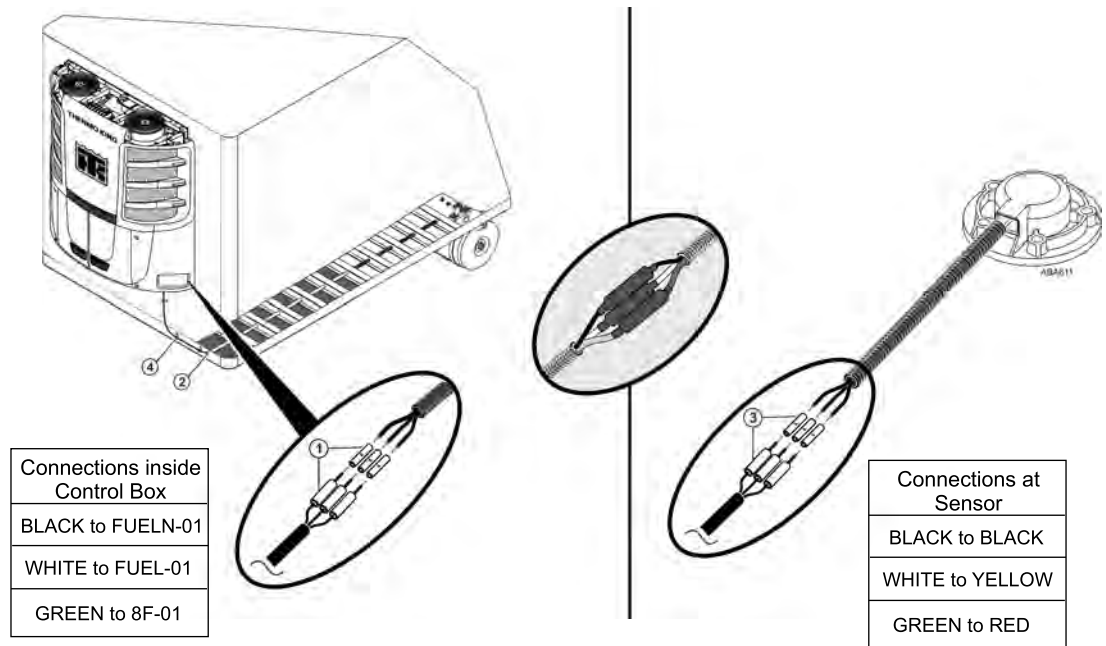
1. Cut the interconnect harness to length and splice wires to the fuel sensor’s leads (Figure 6, p. 41, Item 3).

Connections at Sensor
BLACK to BLACK
WHITE to YELLOW
GREEN to RED

- a. Slide supplied heat shrink tubing onto each wire and position them away from joint.
 - b. Connect each wire with wire connector and crimp securely.
 - c. Solder wires to wire connectors with a soldering gun.
 - d. Slide heat shrink tubing over each wire connector and applying heat with a heat gun.
2. Secure any exposed harness with clamps (Figure 6, p. 41, Item 4).

Important: This is a “Solid State” fuel level sensor and the SR-4 Controller must be programmed accordingly to enable the fuel level feature.

Figure 6. "Solid State" Ultrasonic Fuel Level Sensor (UFLS) Installation

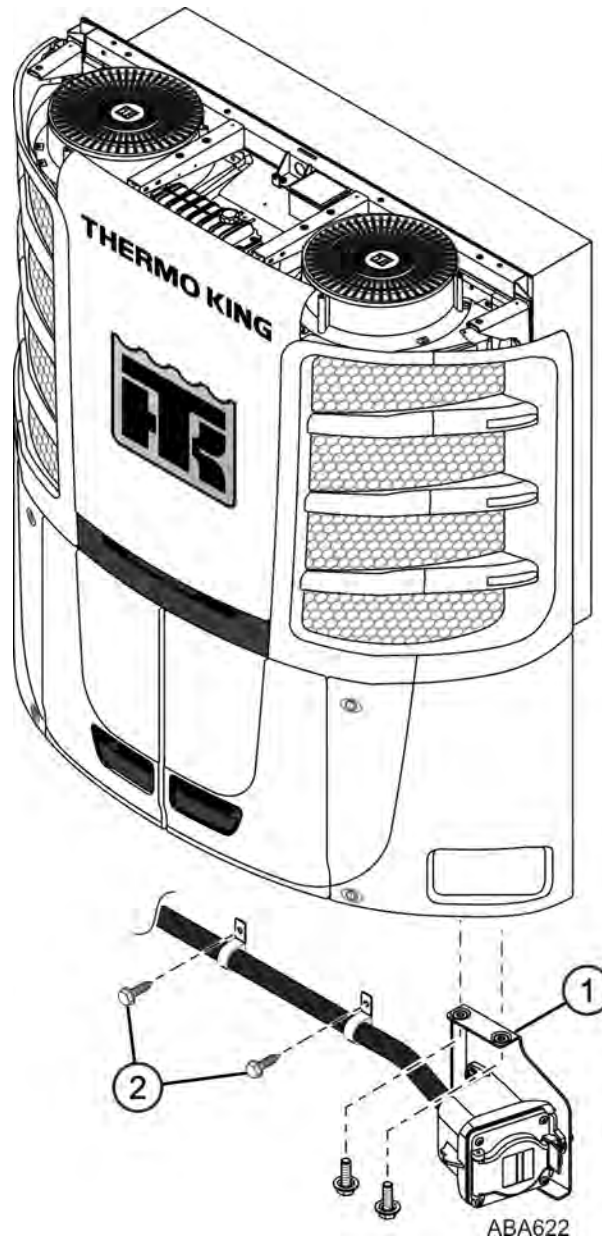


Installing the Power Receptacle (Option) – Trailer Applications

Power Receptacle Installation

Note: *Optional SmartPower units have the power receptacle and cable factory wired and secured inside the unit with tie bands for shipment.*

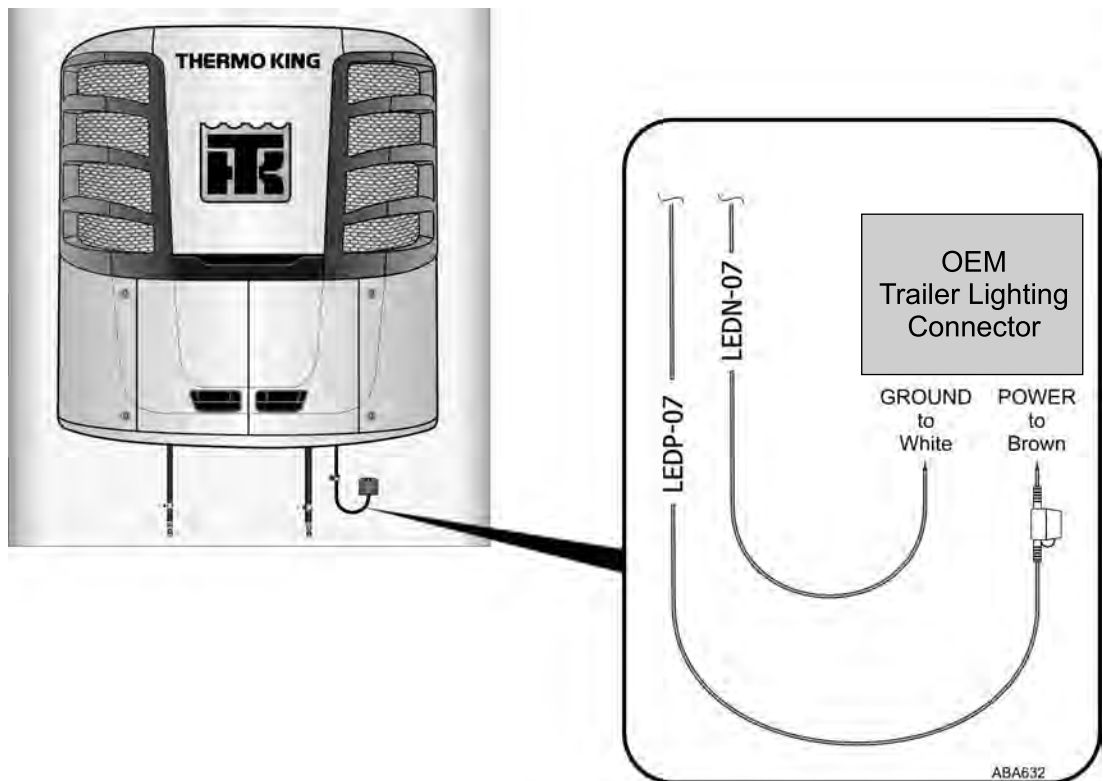
1. Remove tie bands securing receptacle to unit.
 - Attach receptacle bracket under the roadside of the unit with the two supplied screws.
 - Securely tighten hardware.
2. Secure cable under the unit to the trailer wall with supplied cable clamps and screws.



Installing the LED Clearance Lighting (Option) – Trailer Applications

Installation

1. Locate the following:
 - LED extension harness bundled and secured under the unit.
 - Fuse holder and butt splice connector shipped with the unit.
2. Route the LED extension harness to the trailer's OEM lighting connector.
3. Allow enough wire to provide a drip loop and cut LED extension harness to proper length.
4. **POWER WIRE** - Install the fuse holder to the power wire (**LEDP-07**) with the butt splice connector.
 - Connect the power wire with the fuse holder to the **BROWN** wire on the trailer's OEM lighting connector.
5. **GROUND WIRE** - Connect the ground wire (**LEDN-07**) to the **WHITE** wire on the trailer's OEM lighting connector.
6. Provide a drip loop and secure wires with a clamp.



Installing the Battery

Important Battery Information

Important: See "Battery Installation and Cable Routing" ("Safety Precautions," p. 5) for additional information.

⚠ WARNING

Hazard of Explosion!

An improperly installed battery could result in a fire, explosion, or injury. A Thermo King approved battery must be installed and properly secured to the battery tray.

⚠ WARNING

Hazard of Explosion!

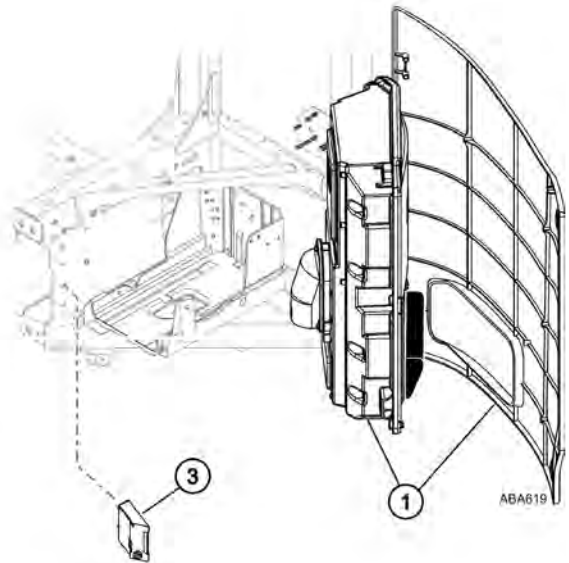
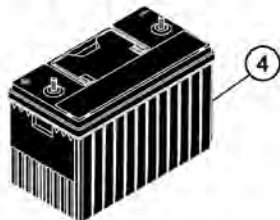
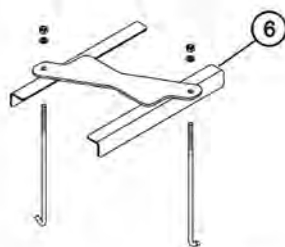
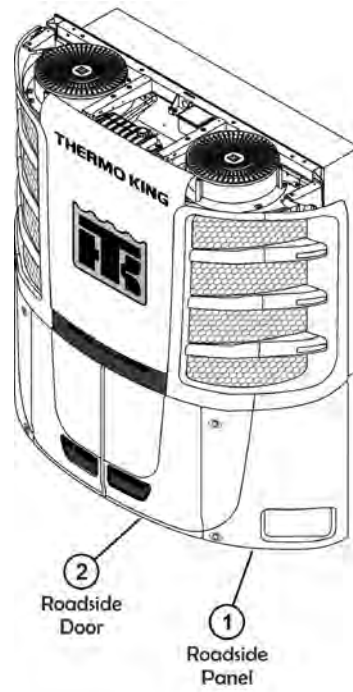
Improperly installed battery cables could result in a fire, explosion, or injury. Battery cables must be installed, routed, and secured properly to prevent them from rubbing, chaffing, or making contact with hot, sharp, or rotating components.

Note: Thermo King units are designed for one 12 volt, group 31 battery. The battery must be suitable for deep cycling, heavy duty, and rated with a minimum of 95 amp/hr.

Battery Installation

Important: Care should be taken to prevent direct metal contact to the battery's positive post when installing the battery.

1. Open the roadside panel to access the control box.
 - a. Loosen the two bolts securing the control box in place.
 - b. Swing the control box away to gain access to the battery tray area.
2. Open the roadside door.
 - a. Pull the hinge pins and remove the door assembly from unit.
3. Locate the lower bracket directly in front of the battery tray.
 - a. Remove the two bolts and bracket from the frame.
4. Install the battery into the plastic liner.
5. Attach the **positive (+)** battery cable on the positive battery post and securely tighten.
6. Install the battery hold down rods and bracket.
 - a. Tighten the two battery hold down rods to 2.25 N•m (20 in -lbs.). **DO NOT over tighten as this may crack or distort the battery.**
7. Attach the **negative (-)** battery cable on the negative battery post and securely tighten.
8. Reinstall the bracket removed in Step 3 and securely tighten hardware.
9. Swing the control box assembly back into place and securely tighten the two screws.
10. Reinstall the roadside door back onto the hinges and securely close.



Installing the Top Covers and Bottom Pan – Trailer Applications

Important Fairing Information

Note: The top fairing increase the height of the unit by approximately 76 mm (3.00 in.). Tractor trailer height restrictions differ from state to state. The total height of the unit installed onto your particular trailer should not exceed these height restrictions. Remove the top fairing if it causes the unit to exceed these height restrictions.

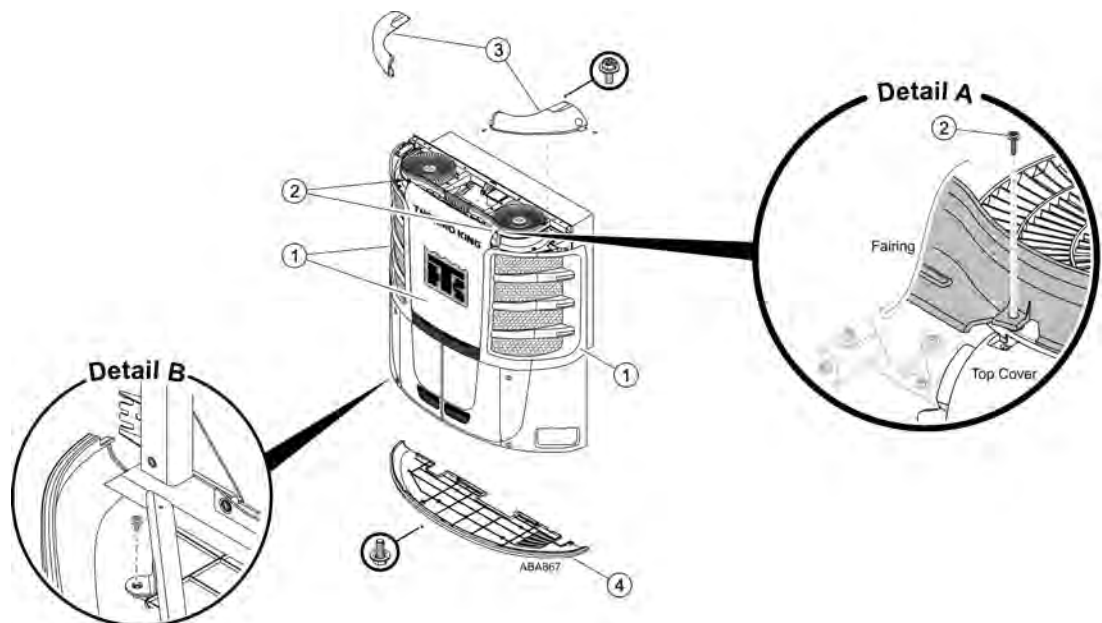
Top Covers

Important: Top covers must be positioned between condenser fan grille and fairing as shown in Detail A.

1. Open top door along with curbside and roadside grilles.
2. Remove the two M6 screws that secure the fairing to each condenser fan grille as shown in illustration.
3. Place top covers onto unit.
 - Lift fairing up just enough so the top cover mounting holes are positioned under the fairing mounting tab.
 - Loosely reinstall M6 screws back down through fairing, top cover and into condenser fan grille.
 - Install remaining M6 screws supplied in kit to secure top covers to threaded inserts on frame.
 - Use a T-30 Torx drive and tighten screws to 69 kg-cm (60 in-lbs.)

Bottom Pan

4. Position bottom pan under unit and align mounting holes with threaded inserts on frame.
 - From under unit, loosely install the M6 screws supplied in installation kit to attach bottom pan to frame.
 - Open roadside door and loosely install a M6 screw down through frame tab and into bottom pan insert (**Detail B**).
 - Use a T-30 Torx drive and tighten screws to 69 kg-cm (60 in-lbs.)
5. Close and secure curbside and roadside grilles and top door.



Important Information – Completing The Installation

S-600M, S-610M, S-610DE (3 Zone) and C-600M Units

NOTICE

Equipment Damage!

Severe compressor damage will result from operating the Precedent Multi-Temperature host unit before completing the entire installation which includes: installing all components, releasing/recovering holding charges, connecting the refrigeration lines, leak testing, evacuation, clean-up, and charging the system with the proper amount and type of refrigerant. Refer to the S-2 and S-3 Remote Evaporator Systems Installation Manual (TK 55774) to complete the installation.

S-600DE and S-610DE (2 Zone) Units

To complete the installation, refer to the S-2 and S-3 Remote Evaporator Systems Installation Manual (TK 55774) for information regarding installing the Center Wall Divider, Unit Run-In and Checkout Procedures.



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