THERMO KING

Installation Manual

Trailer Edition

Precedent S-600 and S-700 Single Temperature Systems

TK 55496-2-IM (Rev. 1, 11/12)

Ingersoll Rand

Installation Manual

Trailer Edition
Precedent™ S-600 and S-700
Single Temperature Systems

TK 55496-2-IM (Rev. 1, 11/12)

Release History

Released   (11/12)

Rev. 1   (11/12) Pages 60-61 - Changed bulkhead mounting screw lengths.

Introduction

This manual was written to assist with the installation of the **Thermo King Precedent S-600 and S-700 Single Temperature** refrigeration systems onto trailers specifically designed and built for refrigerated applications.

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.

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.

Installation summary for Precedent S-600 and S-700 Systems

The Precedent installs the same as the current SB with the following exceptions:

1. Evaporator opening and mounting bolt locations on front wall of trailer did not change. However, depending on your particular installation, two of the mounting bolts lengths may need to be trimmed to 57.20 mm (2.25 in.) long or they may interfere with the back of the control box and engine. *See "Mounting Hardware Requirements" on page 12.*

2. The Precedent unit is approximately 6.00 inches wider than a SB which may interfere with trailer mounted fresh air exchange doors.Thermo King fresh air exchange option 070026 is also available. *See "Evaporator Opening Requirements" on page 10.*

3. A new two point lifting bar is required to safely lift the unit during installation. *See "Lifting Bar Dimensions" on page 20.*

4. A new fuel pump and bracket (TK supplied) will need to be installed onto the trailer cross member directly above the fuel tank. All fuel line fittings (TK supplied) are now nickel plated brass for S-600 and S-700 units. Any additional fittings required for these units must also be nickel plated brass or stainless steel. *See "Installing the Fuel Pump and Harness" on page 40.*

5. Fuel supply and fuel return lines will need to be routed to the bottom of the unit and fed up inside through the provided chase. The lines will need to be cut to length and connected to the fuel filter or optional fuel heater with the (TK supplied) nickel plated brass fittings for S-600 and S-700 units. *See "Installing the Fuel Lines" on page 42.*

6. It is recommended the installer provide a separate conduit or chase under the trailer with a minimum inside diameter of 25.4 mm (1.00 in.) to accommodate both the standard fuel pump harness and the ultrasonic fuel sensor harness. *See "Installing the UFLS Harness" on page 44.*

7. The fuel pump harness (TK supplied) will need to be routed through a conduit or chase (see #6) from the fuel pump to the bottom of unit. The harness needs to be attached to wires provided under the unit and also to the fuel pump using the (TK supplied) butt splice connectors and heat shrink. Four connections total. *See"Installing the Fuel Pump and Harness" on page 40.*

8. The Ultrasonic Fuel Level Sensor harness (TK Supplied) will need to be routed from the fuel tank to the bottom of the unit through the same conduit or chase (see #6) as the fuel pump harness. The harness needs to be attached to wires provided inside the control box and to the sensor at the tank using the (TK supplied) butt splice connectors and heat shrink. Six connections total. *See "Installing the UFLS Harness" on page 44.*

9. SmartPower™ units will come pre-wired with the power cable and receptacle secured inside the unit with tie bands for shipment. The installer will need to secure the receptacle under the roadside of the unit with (TK supplied) hardware. The cable needs to be secured to the trailer wall with the (TK supplied) cable clamps and screws. *See "Installing the Power Receptacle (Option)" on page 62.*

10. Battery installation requires the removal of the roadside door and a bracket to gain access the battery tray and cables. *See "Installing the Battery" on page 64.*

11. The bottom panel, two top covers and top fairing are shipped in separate cardboard boxes and will need to be installed with (TK supplied) hardware. The top fairing should not be installed if it interferes with maximum trailer height restrictions. *See "Installing the Top Covers, Top Fairing and Bottom Pan" on page 66.*

12. It may take a few attempts to start a newly installed unit for the first time as the fuel pump primes itself, fills the fuel lines and filter, and automatically bleeds air from the system. The fuel pump can also be primed separately by using the SR-4 controller's Interface Bard Test Mode - Run Relay Function. This function operates only the fuel pump and primes the fuel system without cranking the engine. *See "Priming the Fuel Pump and Programming the Controller" on page 70.*

13. All status light options now require the harness be routed into the control box and connected directly to the controller board. *See "Installing the Status Light (Option)" on page 46.*

Table of Contents

Safety Precautions

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

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

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

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

⚠ **DANGER: High voltage is present whenever the unit is operating on either diesel or electric standby power. Take precautions when servicing the unit as this high voltage can cause death or serious injury.**

⚠ **DANGER: Never operate the unit with the discharge valve closed because it could cause the compressor to explode, causing death or serious injury.**

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

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

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

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

⚠ **WARNING: Keep your hands away from fans and belts when the unit is running. This should also be considered when opening and closing the compressor service valves.**

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

⚠ **WARNING: Never drill holes in the unit unless absolutely necessary. Holes drilled into the unit may weaken structural components. Holes drilled into electrical wiring can cause fire or explosion.**

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

Safety Precautions (continued)

Battery Installation and Cable Routing

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

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

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

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

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

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

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

Refrigerant

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

First Aid

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

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

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

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

Refrigeration Oil

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

First Aid

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

Trailer Requirements

Approximate Weight of Precedent transport temperature control units:

S-600 and S-700 = 842 kg (1857 lbs.)

with SmartPower 12 HP/230V = 946 kg (2086 lbs.)

with SmartPower 12 HP/460V = 962 kg (2121 lbs.)

with SmartPower 19 HP/460V = 962 kg (2121 lbs.)

Front Wall Requirements

⚠️ *DANGER: 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" on pages 10-11.

Unit Mounting Hardware

⚠️ *DANGER: 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" on pages 12-13.

Unit Dimensions

IMPORTANT: Adequate clearance must be provided to allow for routine service and maintenance of the Thermo King unit. See "Unit Dimensions" on page 14.

Fuel Tank Mounting

⚠️ *DANGER: 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

⚠️ *CAUTION: The minimum distance from the king pin to the front of the trailer must be at least 1025 mm (40.35 in.) or severe damage to the equipment will result. VERIFY THIS DIMENSION BEFORE INSTALLING UNIT! See see "Swing Radius and King Pin Requirements" on page 9.*

Swing Radius Clearance

⚠️ *CAUTION: The minimum clearance required for the swing radius must be 1664.2 mm (65.52 in.) or severe damage to the equipment will result. VERIFY THIS DIMENSION BEFORE INSTALLING UNIT! see "Swing Radius and King Pin Requirements" on page 9.*

Swing Radius and King Pin Requirements

E 1850.4 mm (72.85 in.)
D 1704.3 mm (67.10 in.)
C 1555.8 mm (61.25 in.)
B 1429.3 mm (56.27 in.)
A 1306.3 mm (51.43 in.)

C/L

Swing Radius

King Pin Location

A 609.6 mm (24 in.)
B 762.0 mm (30 in.)
C 914.4 mm (36 in.)
D 1066.8 mm (42 in.)
E 1219.2 mm (48 in.)

THERMO KING

A B C D E

C/L

ABA601
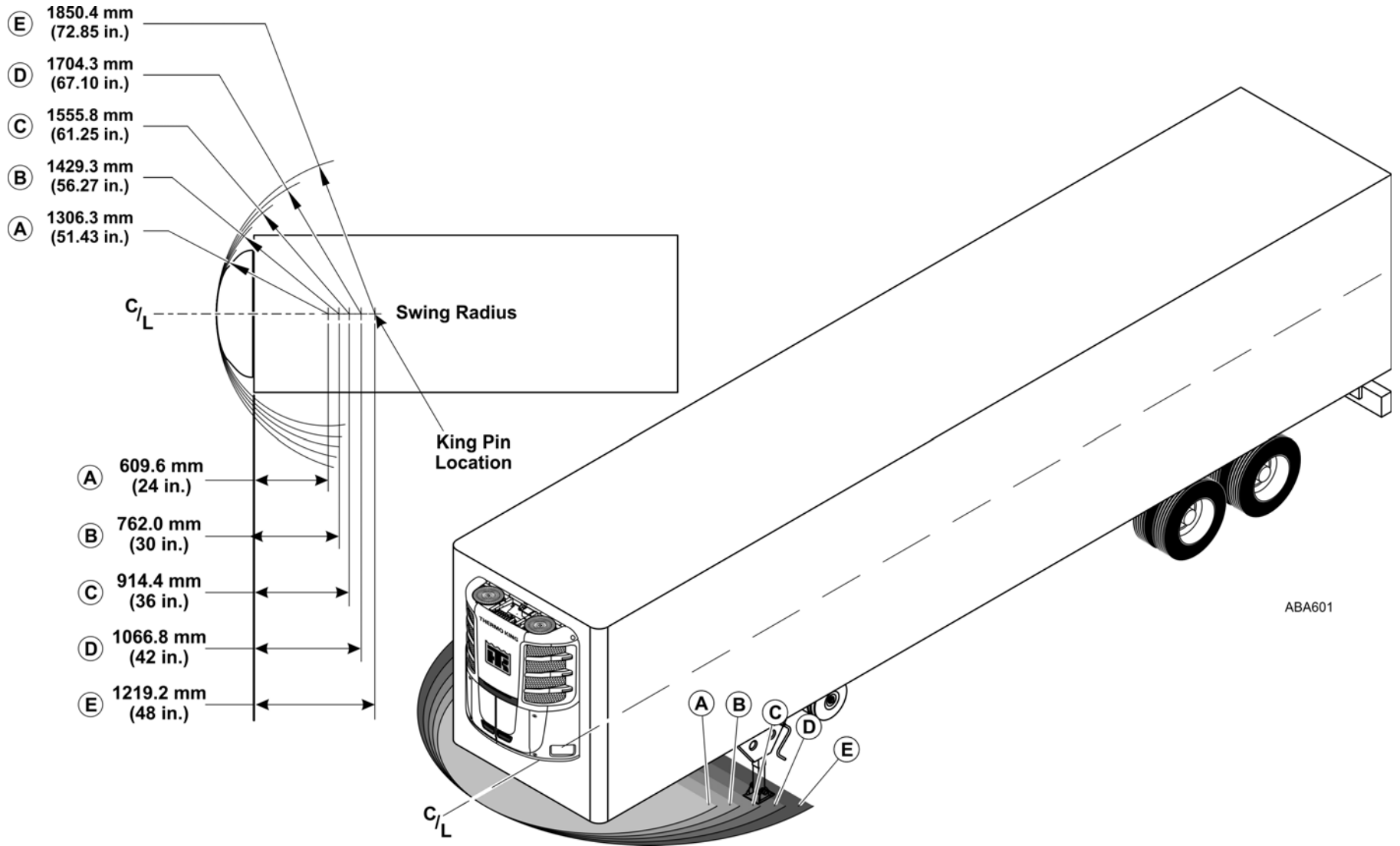
Evaporator Opening Requirements

Evaporator Opening

⚠️ *DANGER: The front trailer wall 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 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 (0.05 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.

Evaporator Opening Requirements

FRONT VIEW
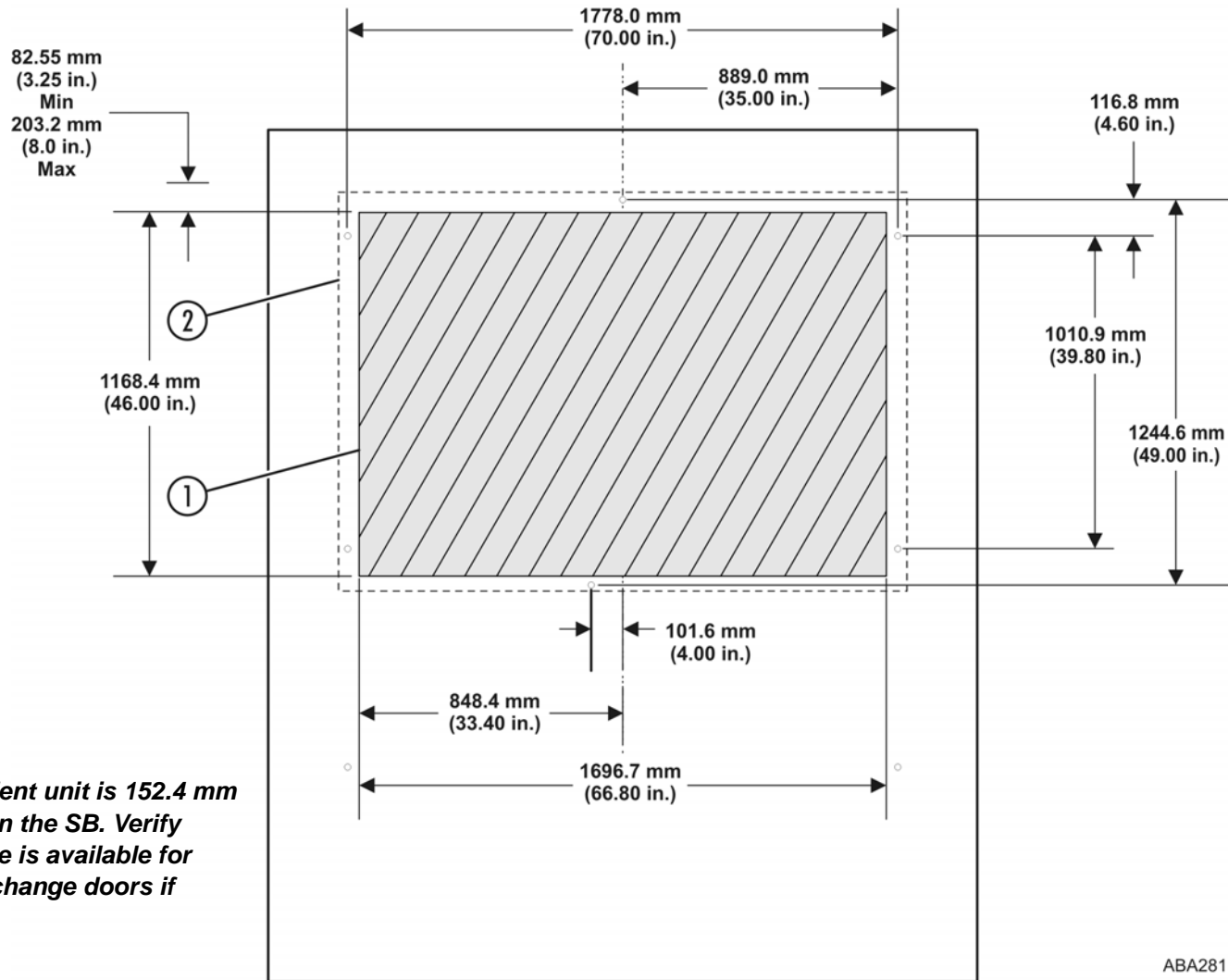
82.55 mm (3.25 in.) Min
203.2 mm (8.0 in.) Max

1778.0 mm (70.00 in.)

889.0 mm (35.00 in.)

116.8 mm (4.60 in.)

1168.4 mm (46.00 in.)

1010.9 mm (39.80 in.)

1244.6 mm (49.00 in.)

101.6 mm (4.00 in.)

848.4 mm (33.40 in.)

1696.7 mm (66.80 in.)

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

ABA281

Mounting Hardware Requirements

Mounting Bolts

⚠️ **DANGER: 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 the illustration on page 13 regarding the following mounting bolt details:

* Surface of all mounting bolts are to be flat within 2.50 mm (0.10 in.).

* The unit mounting bolts are to extend a **minimum** 57.20 mm (2.25 in.) and a **maximum** of 69.85 mm (2.75 in.) beyond the front wall.

NOTE: Depending on your particular installation, two of the mounting bolts lengths may need to be trimmed to 57.20 mm (2.25 in.) long or they may interfere with the back of the control box and engine.

Mounting Bolt Specifications

⚠️ **DANGER: 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.

Mounting Hardware Requirements

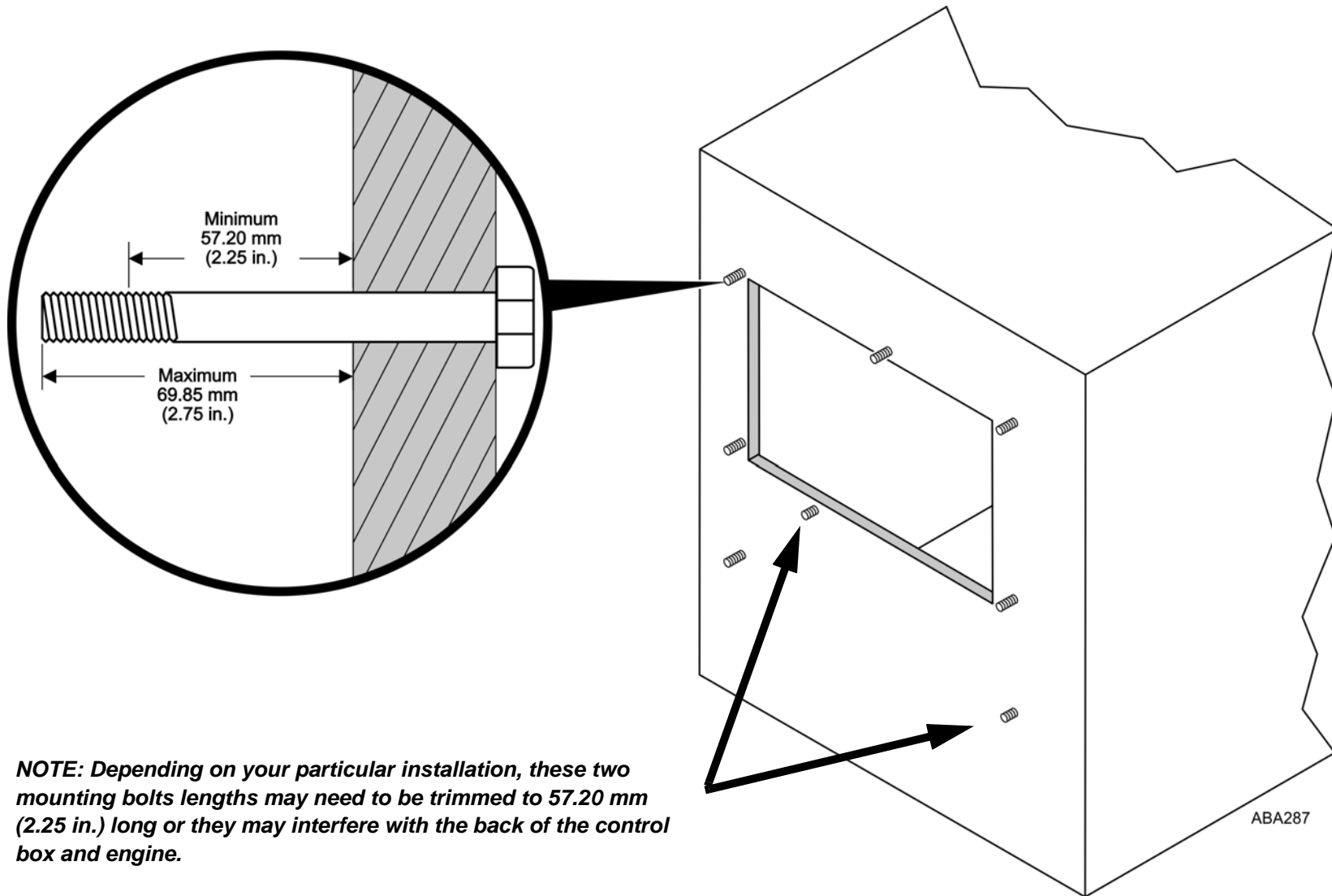Minimum
57.20 mm
(2.25 in.)

Maximum
69.85 mm
(2.75 in.)

NOTE: Depending on your particular installation, these two mounting bolts lengths may need to be trimmed to 57.20 mm (2.25 in.) long or they may interfere with the back of the control box and engine.

ABA287

Unit Dimensions

FRONT VIEW

2073.82 mm
(81.64 in.)

THERMO KING

2191.54 mm
(86.28 in.)

TOP VIEW

1659.8 mm
(65.35 in.)

829.9 mm
(32.67 in.)

R669.2 mm
(R26.35 in.)

R669.2 mm
(R26.35 in.)

R543.7 mm
(R21.41 in.)

SIDE VIEW

610.0 mm
(24.02 in.)

86.4 mm
(3.40 in.)

1150.7 mm
(45.30 in.)

R1288.9 mm
(R50.74 in.)

AIR INLET

205.5 mm
(8.09 in.)

101.6mm
(4.00 in.)

MIN. CLEARANCE
FOR AIR RETURN

REAR VIEW

829.72 mm
(32.67 in.)

339.6 mm
(13.37 in.)

628.0 mm
(24.72 in.)

14.04 mm
(0.55 in.)

Air Outlet

193.0 mm
(7.60 in.)

ABA602

14
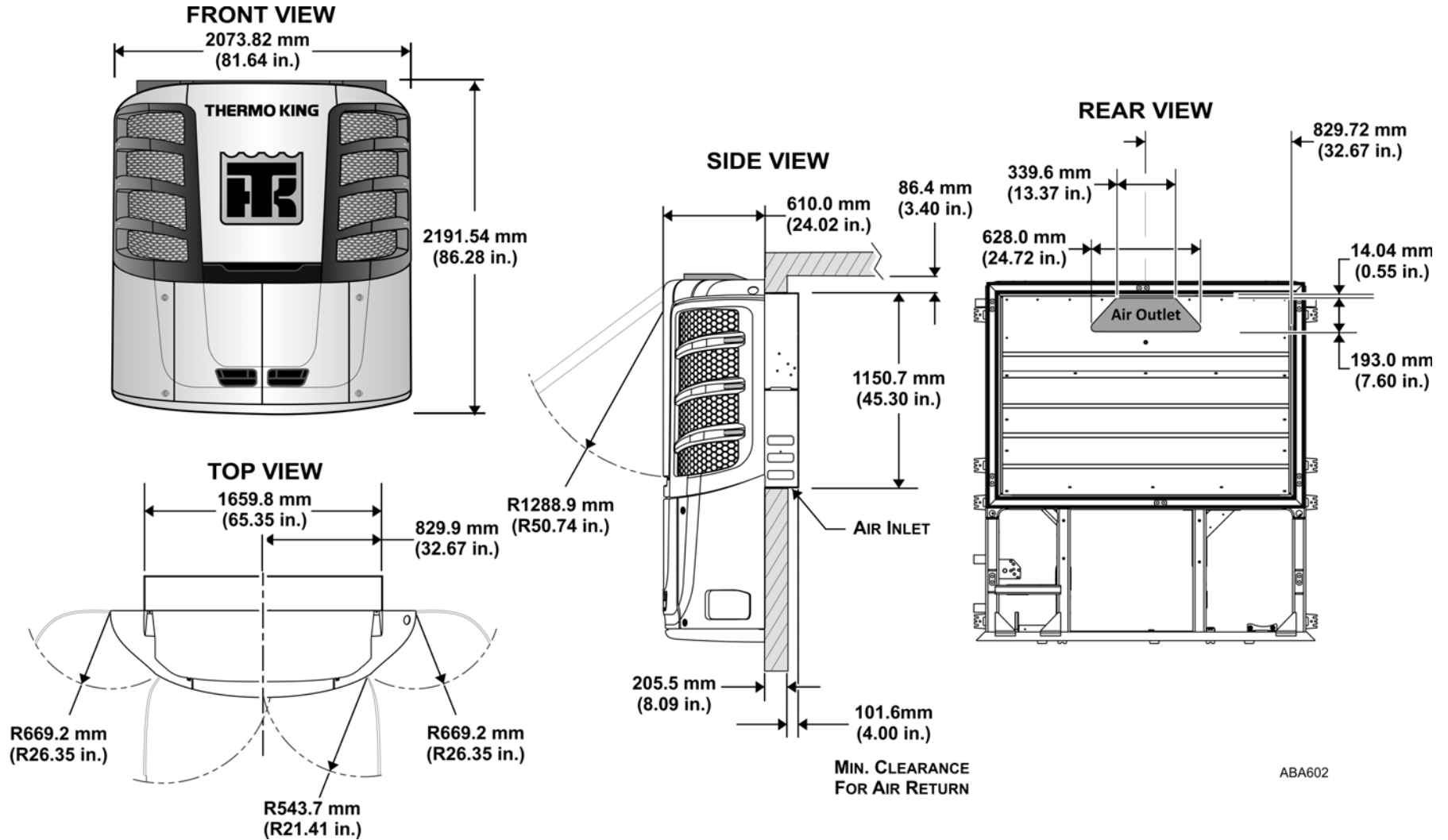
BLANK PAGE

Bulkhead Dimensions (Option)

THERMO KING RECOMMENDS USING A BULKHEAD

Contact your Thermo King Dealer for specific part number

Bulkhead Function

A bulkhead is used to keep the return airflow from being restricted if the load shifts. The bulkhead also prevents the load from shifting into the return airflow passageway on the front wall of the trailer.

Return Airflow

Restrictions of the return airflow adversely affects the performance of the unit. The area directly behind the evaporator return air inlet must not be restricted.

NOTE: Typical Bulkhead Shown (dimensions are approximate).

Bulkhead Dimensions (Option)

1948.2 mm
(76.70 in.)

133.4 mm
(5.25 in.)

1790.6 mm
(70.50 in.)

PrimAir

ABA626
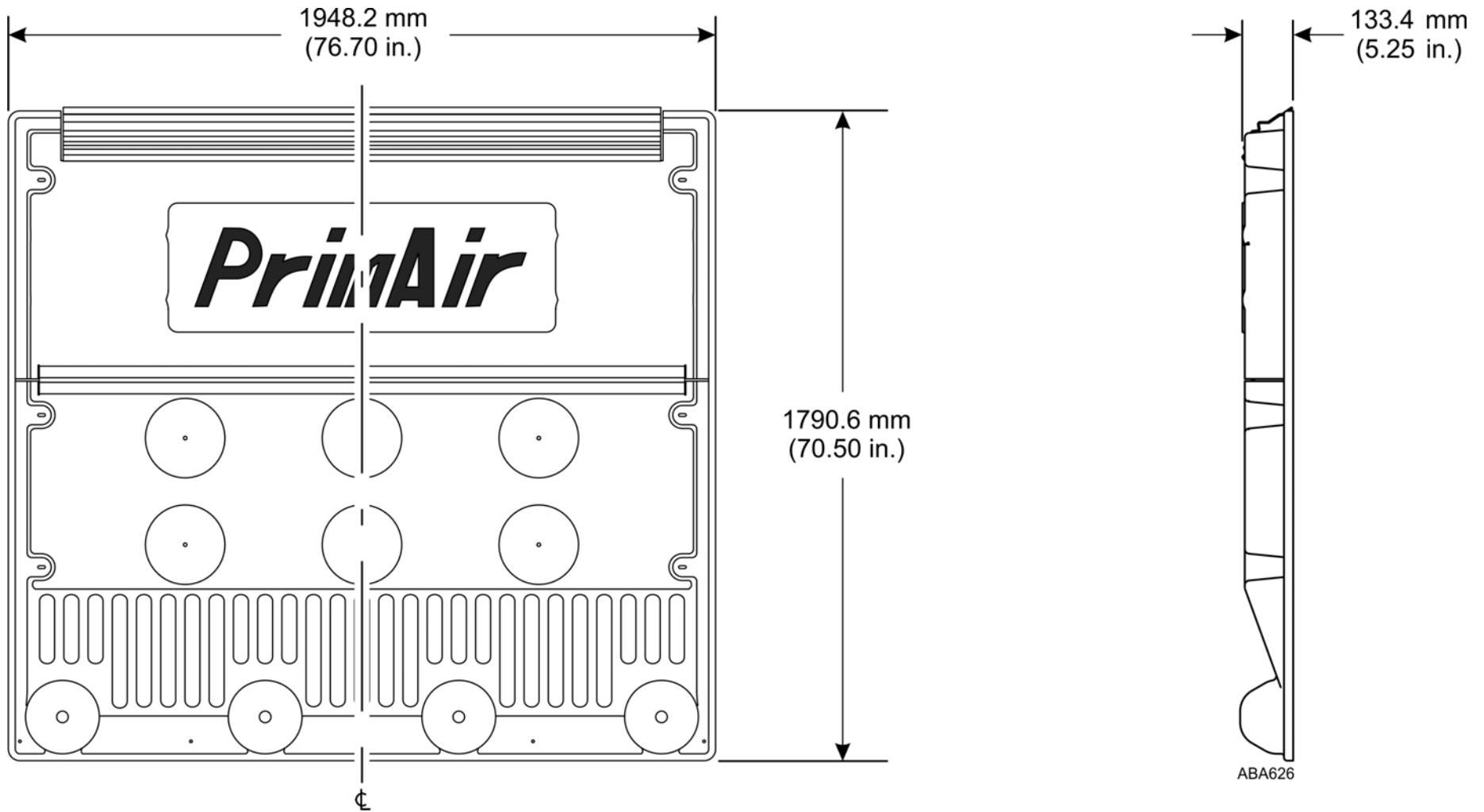
Battery Selection Guide

Refer to Service Bulletin T&T 446 for more information regarding Battery Selection and Maintenance

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

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.
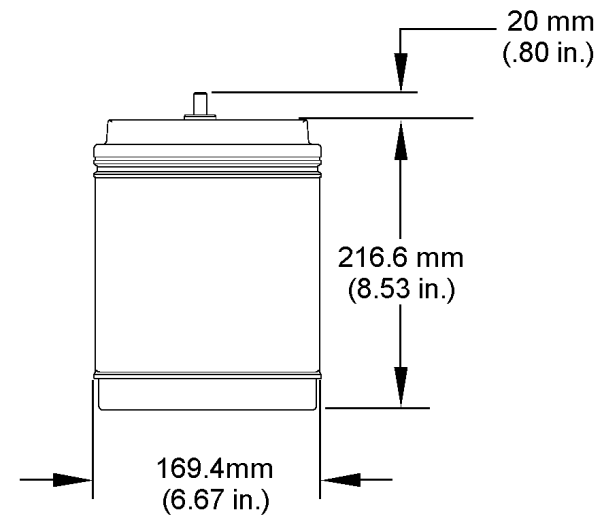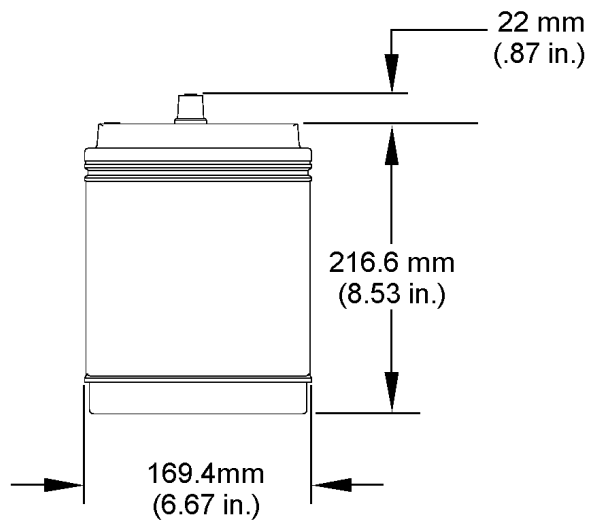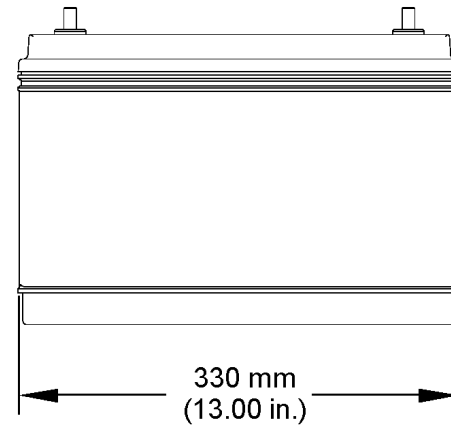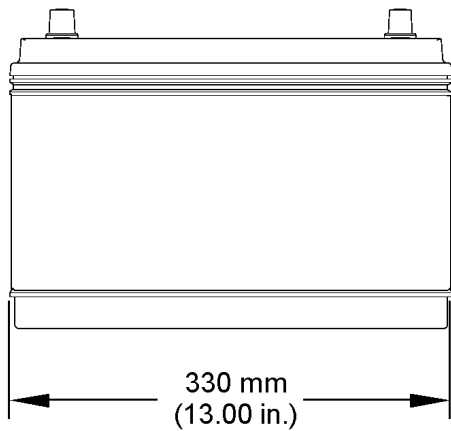
Trailer units are designed for one 12 volt, Group 31 battery supplied by the installer.

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

NOTE: See 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
• Wet Cell Technology • Better suited for colder climates • High cranking power at low ambient temperatures • 18-24 month expected life *see note below	• Dry Cell (AGM) Technology • Better suited for all 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
* 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	

Group 31 Battery Dimensions

330 mm
(13.00 in.)

330 mm
(13.00 in.)

22 mm
(.87 in.)

20 mm
(.80 in.)

216.6 mm
(8.53 in.)

216.6 mm
(8.53 in.)

169.4mm
(6.67 in.)

169.4mm
(6.67 in.)

AAA403

Lifting Bar Dimensions

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

WARNING: Thermo King requires a 2 point lifting bar to safely lift and install units. A lifting bar can be made from the drawing provided using ASTM A514 Grade B Steel Plate (UNS K11630).
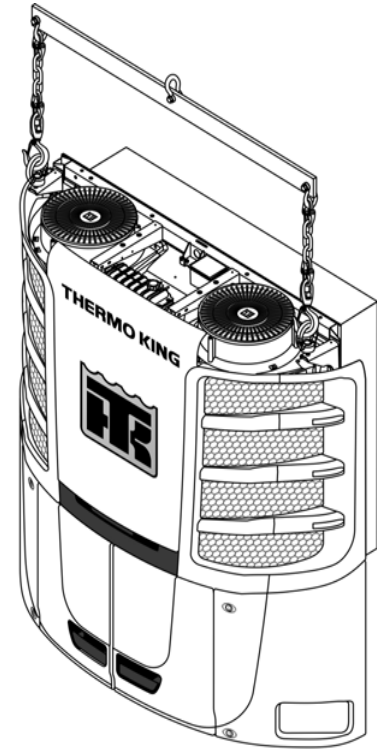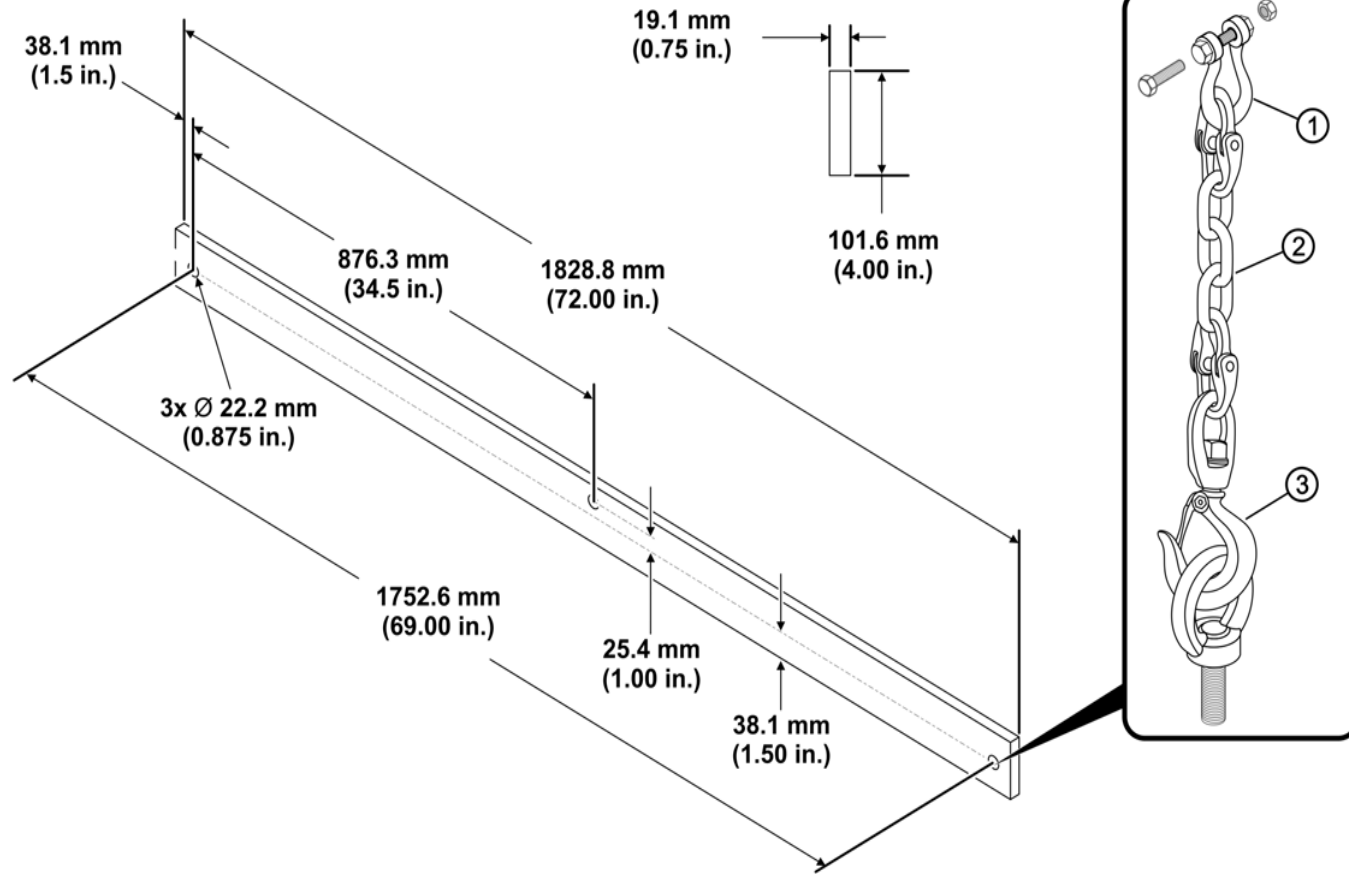
WARNING: The lifting bar and lifting device combined must be able to support minimum weight of 1360.8 kilos (1 1/2 tons).

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.

1. Forged Clevis Pin

2. Forged Chain Links

3. Forged Locking Hook
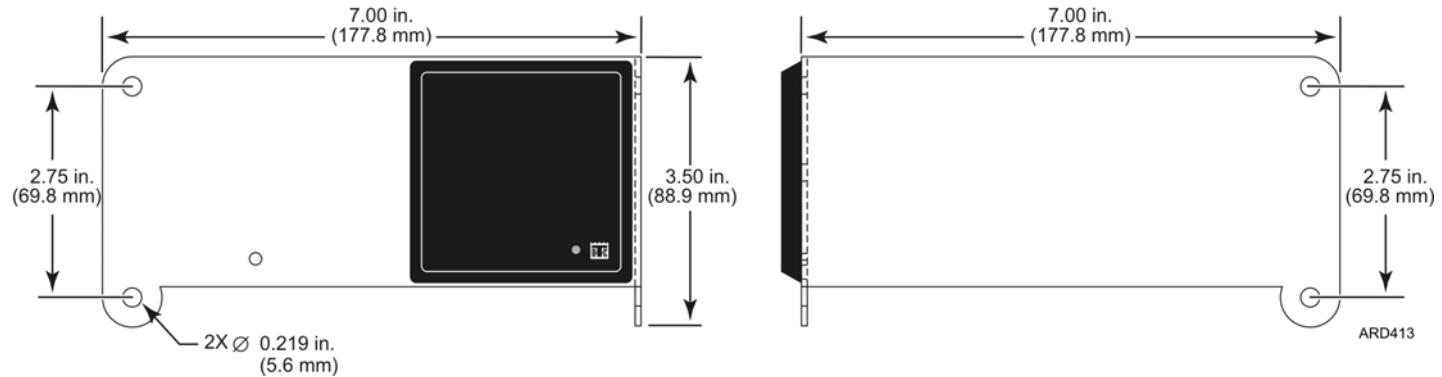
Lifting Bar Dimensions

38.1 mm
(1.5 in.)

19.1 mm
(0.75 in.)

101.6 mm
(4.00 in.)

876.3 mm
(34.5 in.)

1828.8 mm
(72.00 in.)

3x Ø 22.2 mm
(0.875 in.)

1752.6 mm
(69.00 in.)

25.4 mm
(1.00 in.)

38.1 mm
(1.50 in.)

THERMO KING

① ② ③

ABA603

Surface Mounted Status Light Dimensions (Option)

Contact your Thermo King Dealer for specific part numbers

Standard Display and Fuel Combo Display
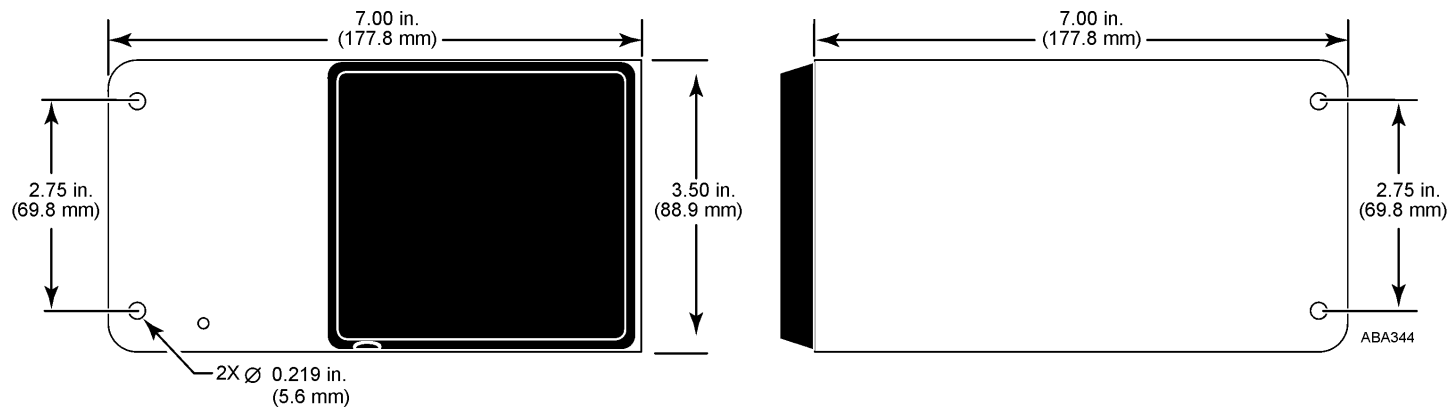
7.00 in.
(177.8 mm)

2.75 in.
(69.8 mm)

3.50 in.
(88.9 mm)

2X ⌀ 0.219 in.
(5.6 mm)

7.00 in.
(177.8 mm)

2.75 in.
(69.8 mm)

ARD413

Triple Combo Display

7.00 in.
(177.8 mm)

2.75 in.
(69.8 mm)

3.50 in.
(88.9 mm)

2X ⌀ 0.219 in.
(5.6 mm)

7.00 in.
(177.8 mm)

2.75 in.
(69.8 mm)

ABA344
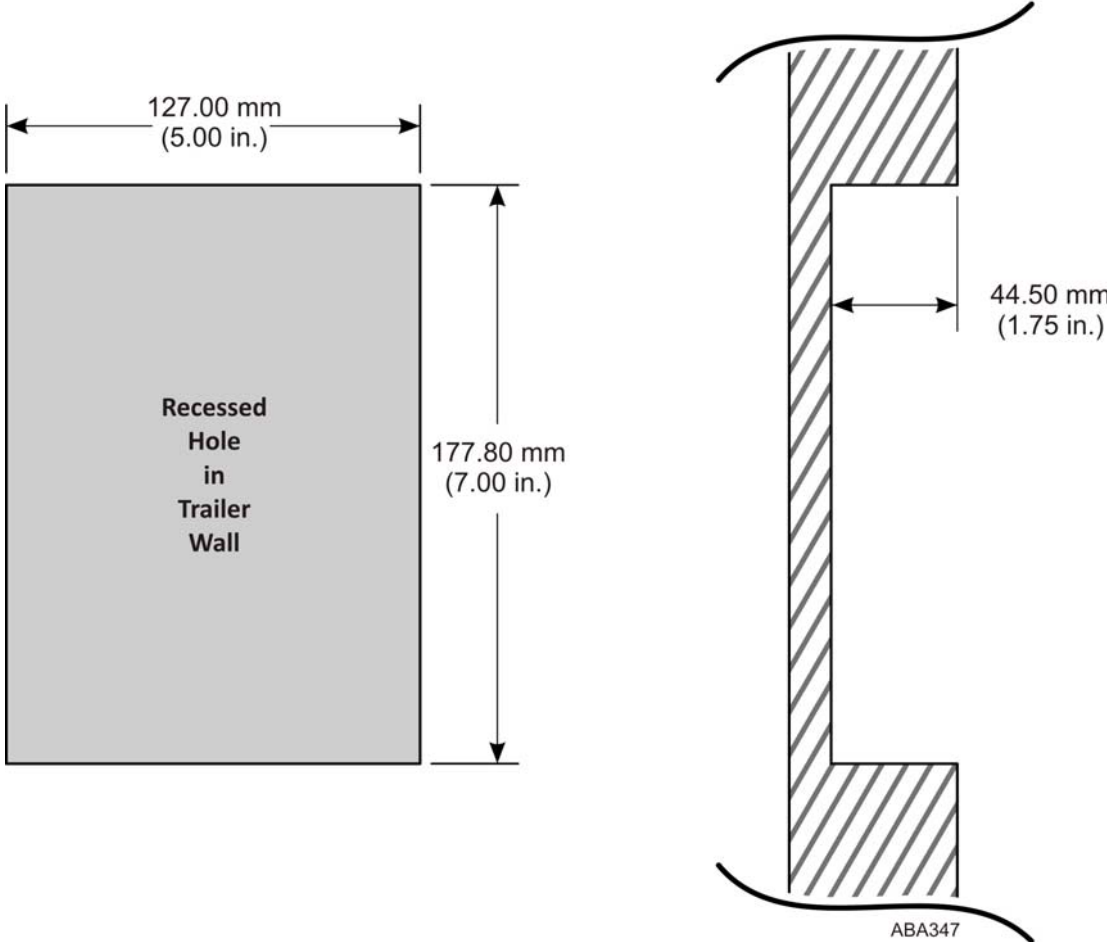
Flush Mounted Status Light Opening Dimensions (Option)

Contact your Thermo King Dealer for specific part numbers

127.00 mm
(5.00 in.)

Recessed
Hole
in
Trailer
Wall
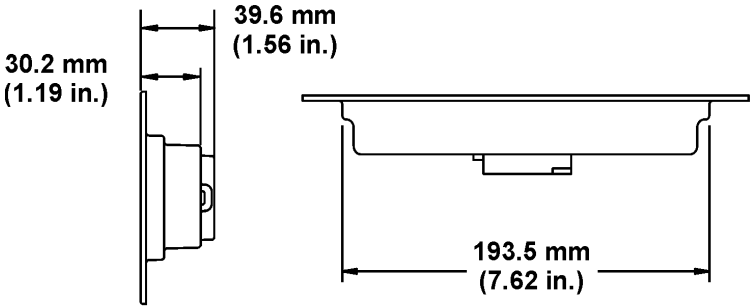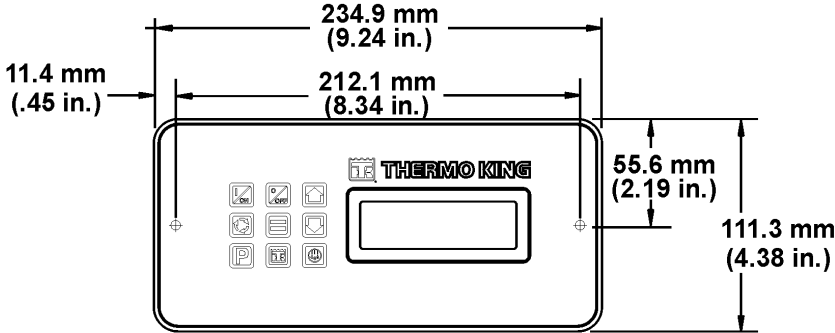
177.80 mm
(7.00 in.)

44.50 mm
(1.75 in.)

ABA347

NOTE: Dimensions shown will accommodate the flush mounted Standard Display, Standard and Fuel Combo Display and Triple Combo Display.

Rear Remote Controller Dimensions (Option)

Contact your Thermo King Dealer for specific part numbers

CONTROLLER

234.9 mm
(9.24 in.)

11.4 mm
(.45 in.)

212.1 mm
(8.34 in.)

55.6 mm
(2.19 in.)

111.3 mm
(4.38 in.)

THERMO KING

30.2 mm
(1.19 in.)

39.6 mm
(1.56 in.)

193.5 mm
(7.62 in.)

CONTROLLER BOX

212.1 mm
(8.35 in.)

149 mm
(5.88 in.)

39 mm
(1.57 in.)

83 mm
(3.27 in.)

7 mm
(.28 in.)

39 mm
(1.42 in.)

69 mm
(2.72 in.)

30.48 mm
(1.2 in.)

260.4 mm
(10.25 in.)

ABA327
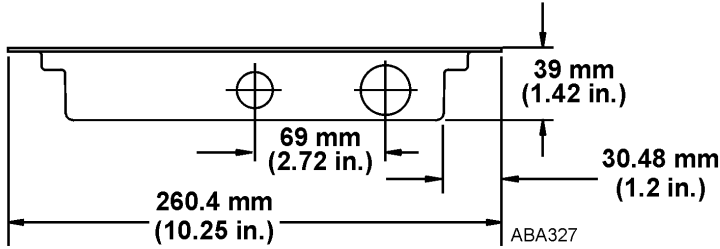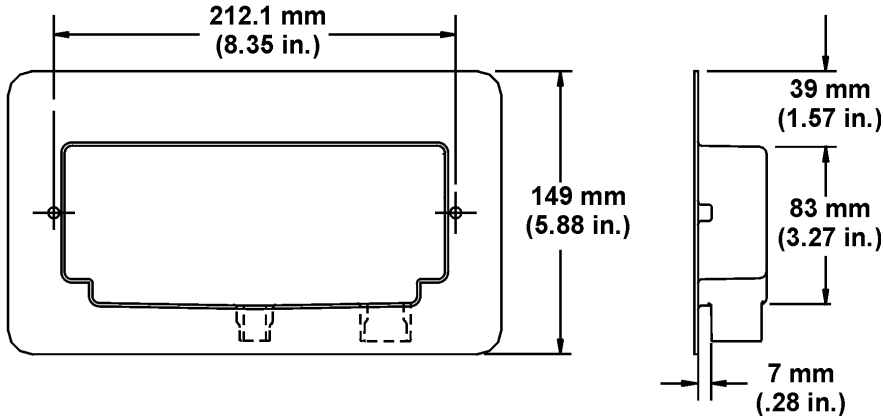
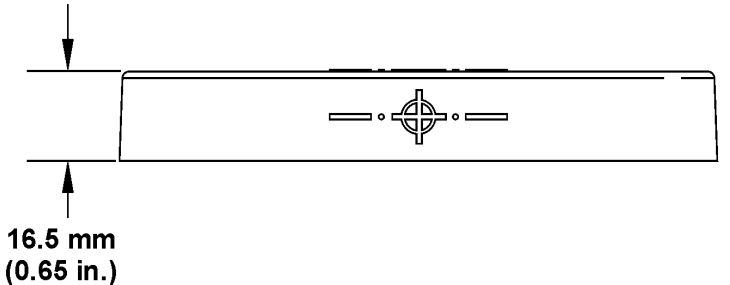# Door Switch Dimensions (Option)

Contact your authorized Thermo King Dealer for specific part numbers

MAGNET

SWITCH

110 mm
(4.35 in.)

70 mm
(2.75 in.)

38 mm
(1.50 in.)

19.1 mm
(0.75 in.)

91.4 mm
(3.60 in.)

110 mm
(4.33 in.)

THERMO KING

16.5 mm
(0.65 in.)

10 mm
(0.40 in.)

THERMO KING

ABA328
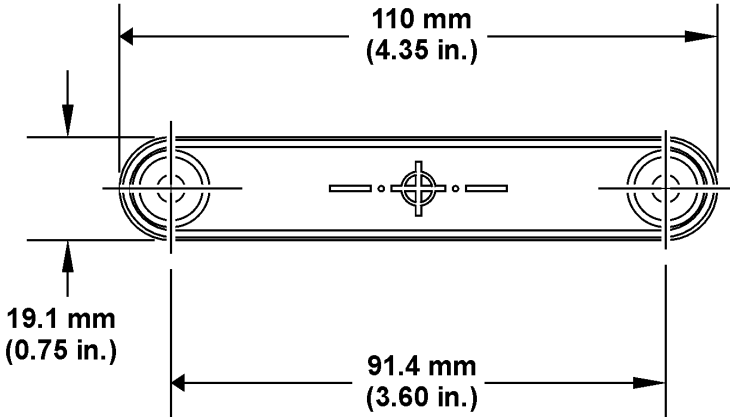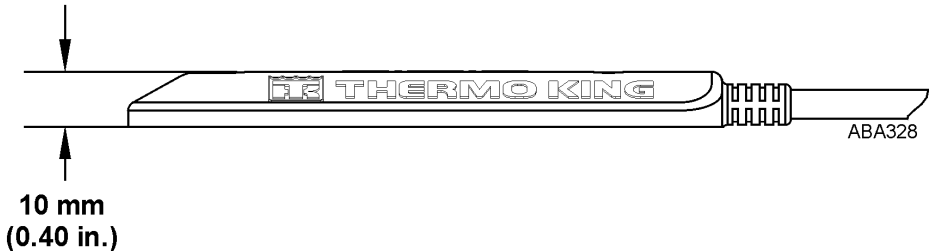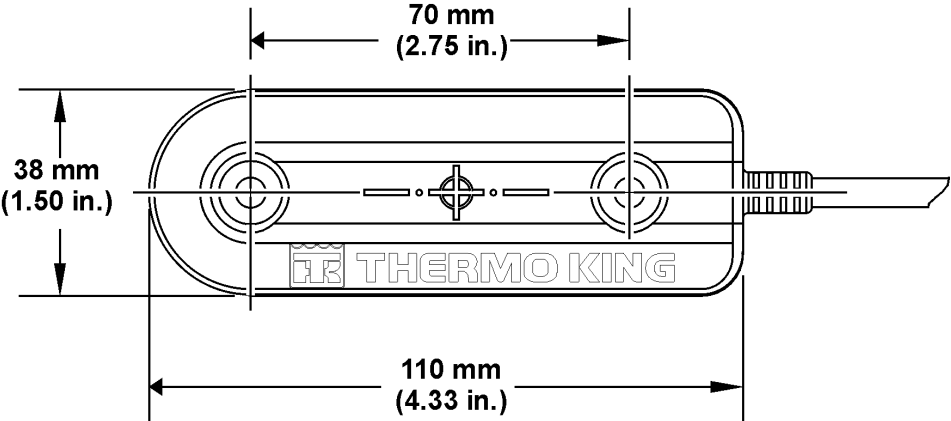
Required Tools for Installation

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.

Required Tools for Installation

1

2

3

4

5

6

7

8

ABA604

9
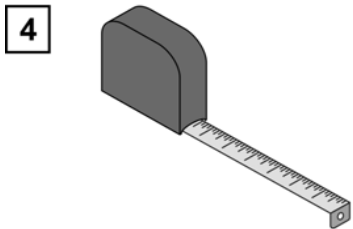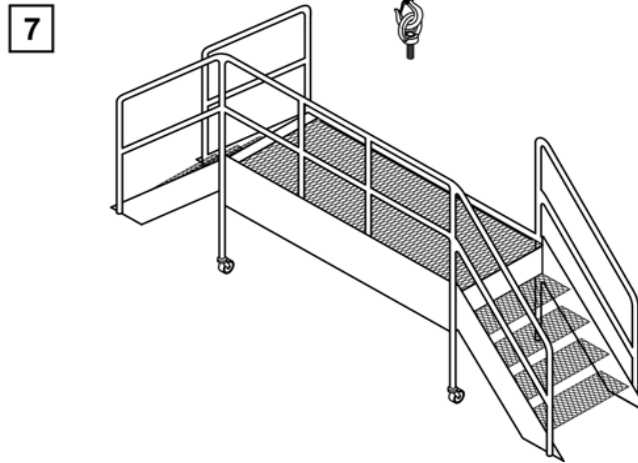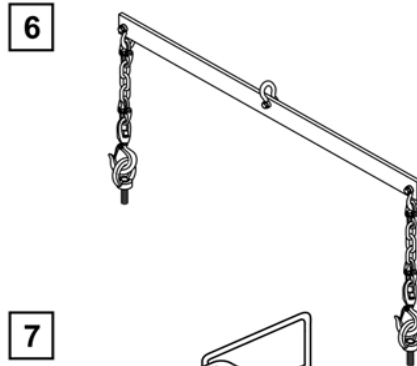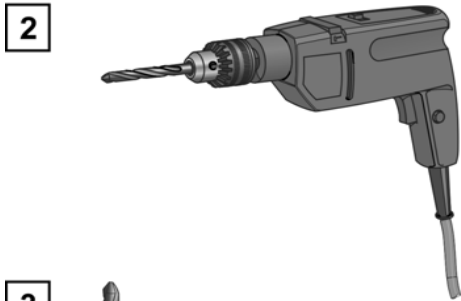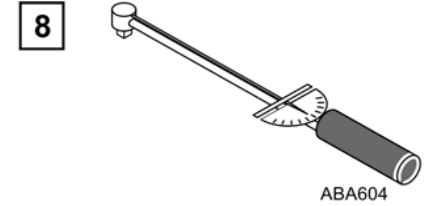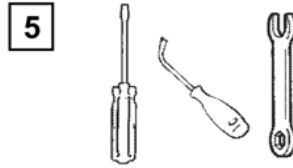
Installation Components

1. Unit Mounting Kit

2. Defrost Drain Tube Kit

3. Fuel Pump Kit

4. Top Covers and Bottom Pan Kit

5. Battery Mounting Kit

6. UFLS Harness Kit

7. Top Fairing Kit

8. (OPTION) SmartPower Kit

Installation Components
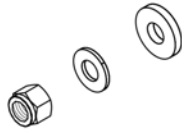
1 Unit Mounting Kit

2 Drain Tube Kit

3 Fuel Pump Kit
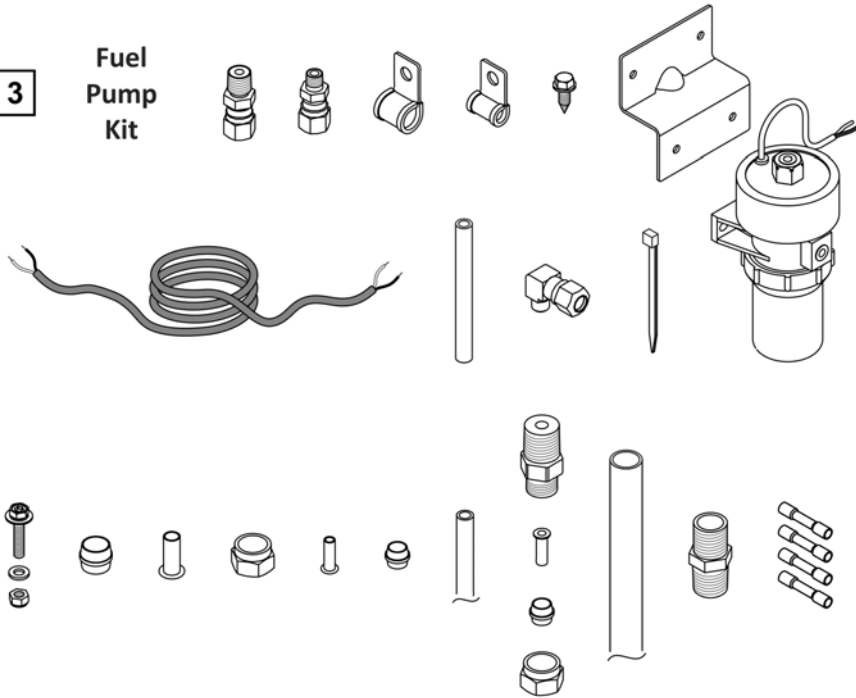
4 Skin Mounting Kit
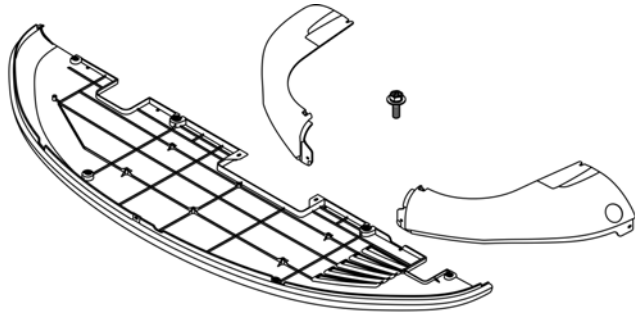
5 Battery Mounting Kit
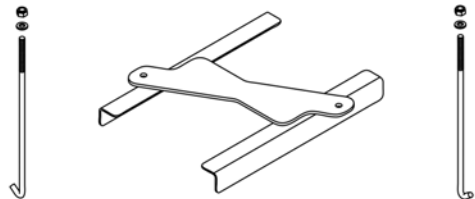
6 UFLS Harness Kit
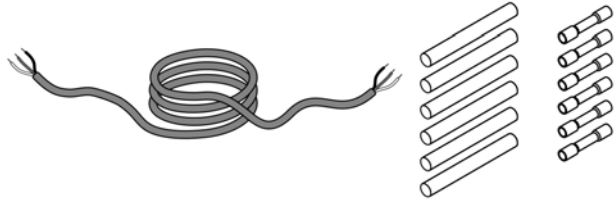
7 Top Fairing Kit
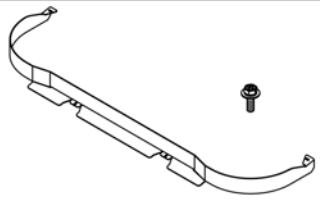
8 (OPTION) SmartPower Kit

ABA605

Unpacking the Unit

⚠ ***WARNING: Thermo King requires a 2 point lifting bar to safely lift and install the unit. See "Lifting Bar Dimensions" on page 20.***

⚠ ***WARNING: 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!.***

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!

Unpacking the Unit

- Carefully remove plastic stretch wrap from unit.

- Carefully remove the top cardboard cover.

- Carefully remove the outer cardboard wrap.

- Remove installation kit boxes, bottom panel, and any other loose components from rear of unit.

- 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.

- Remove hardware holding unit to wooden pallet.

- Unit is now ready for installation.

Unpacking the Unit
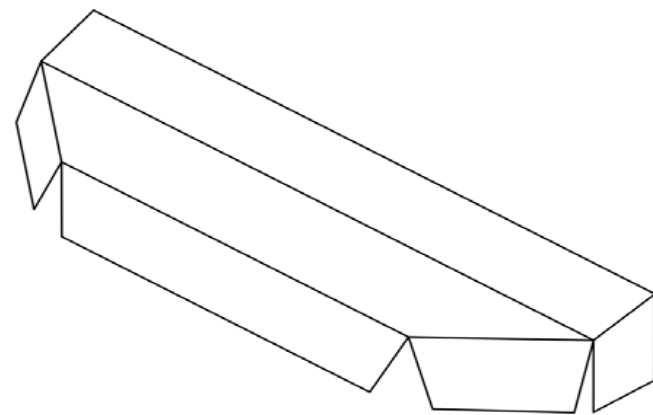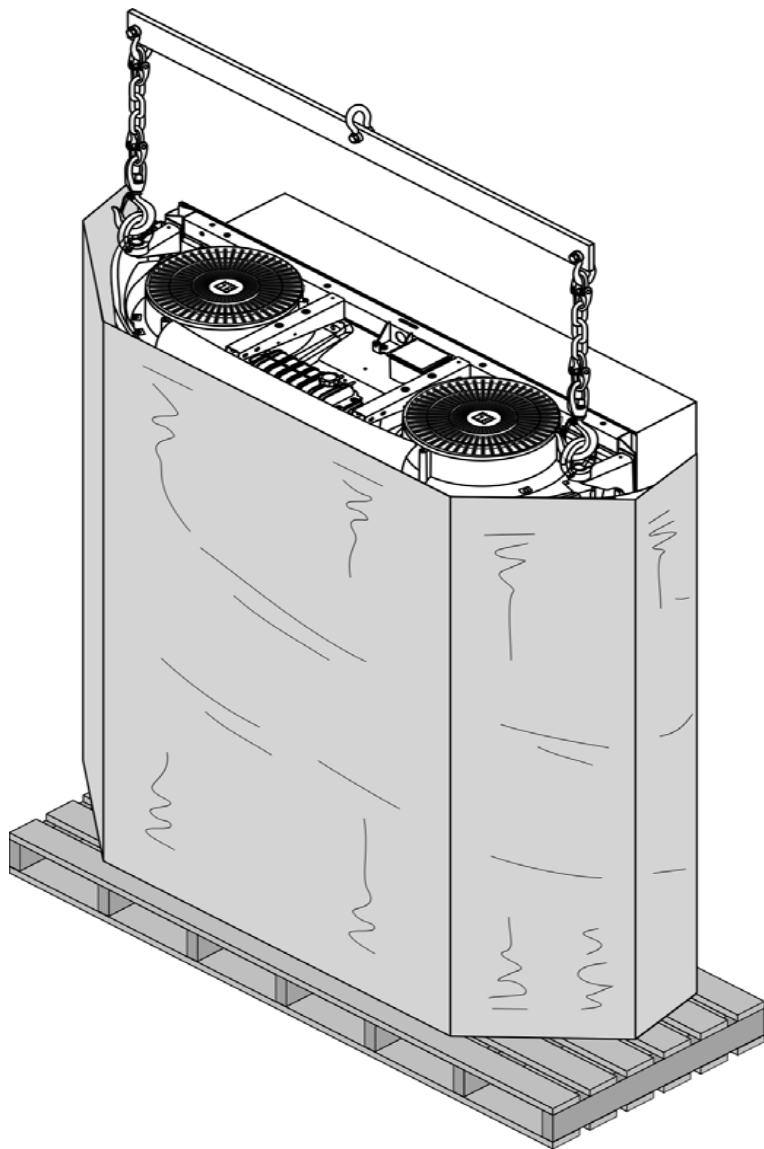
ABA606

Installing the Unit

⚠️ **WARNING: 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: Thermo King requires a 2 point lifting bar to safely lift and install the unit. See "Lifting Bar Dimensions" on page 20.**

⚠️ **WARNING: 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! (Detail I).**

Unit Installation

1. Raise unit up to the trailer opening and position onto the mounting bolts. To access mounting bolts, see 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.).

NOTE: All nuts that hold the unit to the trailer should be elastic stop nuts (Nylock Type) provided in the installation kit.

Access to Mounting Bolts (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.

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.

ABA607
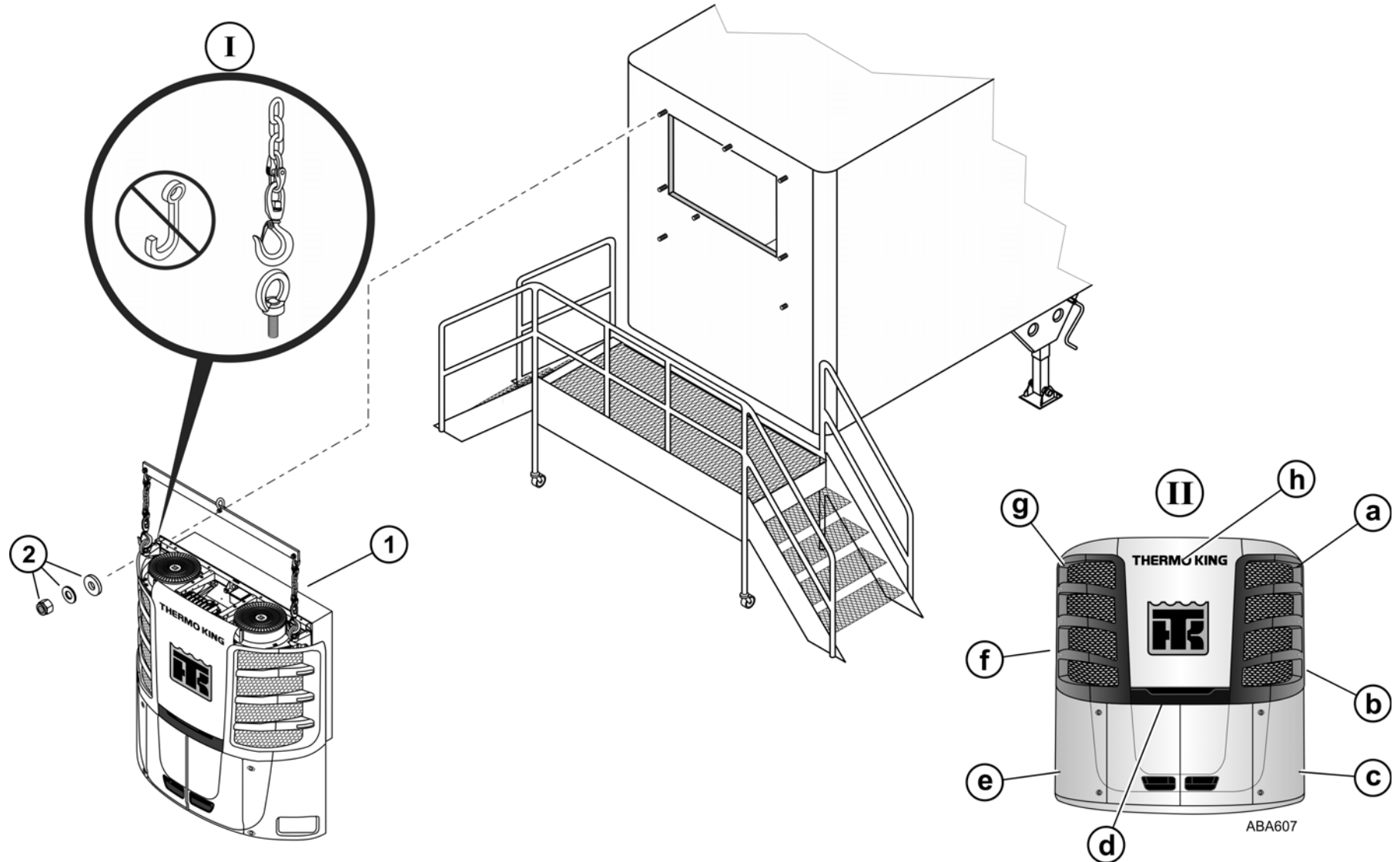
Installing the Drain Hoses

Installation

1. Drain hoses should run straight down the trailer wall from each side of the unit with no kinks or bends.

2. Secure with screws and clamps provided in installation kit.

3. Cut off excess hose and attach drain hose check valves provided in installation kit.

Installing the Drain Hoses
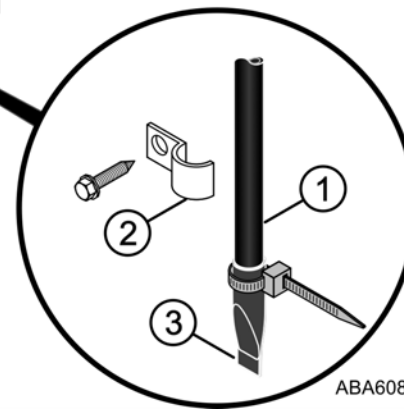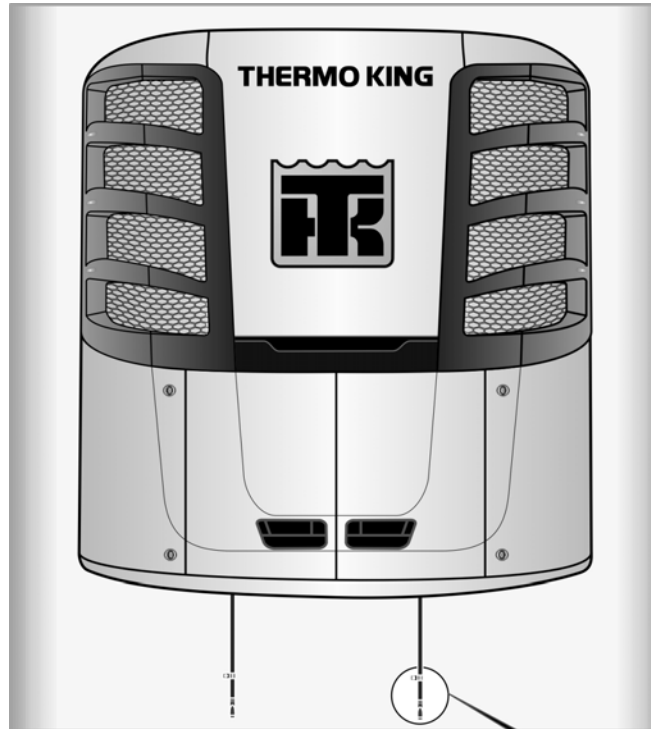
ABA608

Installing the Fuel Tank - 50 Gallon, 22" Dia., Aluminum (Option)

OPEN STYLE TANK MOUNTING BRACKET

IMPORTANT FUEL TANK INSTALLATION INFORMATION

⚠ *DANGER: 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.*

⚠ *CAUTION: The trailers crossmembers must be strong enough to safely support the combined weight of the mounting hardware, fuel tank and fuel.*

Fuel Tank Capacity	Combined Total Weight
50 Gallon Diesel	214 KG (471 lbs.)

Open Style Tank Mounting Bracket - New fuel tank mounting kits were released November 1, 2008. Factory Kit 701635 and Aftermarket Kit 90-398 contain a new open style fuel tank mounting bracket. This new mounting bracket can be used to install either a 30 or 50 gallon, 22" diameter fuel tanks onto a typical trailer with standard crossmember spacing of 6", 8", 10" or 12".

- Trailers with non-standard crossmember spacing of 9", 15" and 16" will require the additional components found in Kit 701658 (90-399) to complete the installation.

- These new kits **can not** be used to install a 75, 90, 110 or 120 gallon, 22" diameter fuel tanks. Those tanks require Kit 710278 (90-121).

- **DO NOT** substitute any components from Kits 701635 (90-398) and 701658 (90-399) with any previously supplied fuel tank mounting kits as they are not interchangeable.

- Kits 701635 (90-398) and 701658 (90-399) are specifically designed to install a 30 or 50 gallon fuel tank in a hanging position under a trailer attached to the floor crossmembers. *Substitutions are not acceptable!*

A. Fuel Tank Position

- Thermo King recommends the fuel tank be mounted 203.2 mm (8.00 in.) under the trailer as shown. Otherwise, the OEM or installer is responsible to ensure the fuel tank position meets or exceeds DOT or Federal Highway regulations, when applicable.

B. Tank Strap Position

- 50 Gallon Tanks - Fuel tank straps must be positioned 673 mm (26.50 in.) apart as shown.

C. Rubber Strips and Pads

- Rubber strips must be properly installed on both the mounting bands and the rubber pads must be installed onto the underside of the hanger assemblies to prevent metal to aluminum contact.

D. Mounting Hardware

- Grade 5 mounting hardware is supplied. *Substitutions are not acceptable!*

- All mounting hardware must be properly installed and torqued to the specifications listed.

Hardware Size	Torque Specifications
3/8-16 Grade 5	42 N•m (31 ft-lb)
1/2 -13 Grade 5	81 to 88 N•m (60-65 ft-lb)
1/2" T-bolts	48 N•m (35 ft-lb.)

Installing the Fuel Tank - 50 Gallon, 22" Dia., Aluminum (Option)

OPEN STYLE TANK MOUNTING BRACKET

Standard crossmember spacing shown. For other crossmember spacing, refer to TK-54238-2-IM.
Non-standard crossmember spacing of 9", 15" and 16" also requires Kit 701658 (90-399)
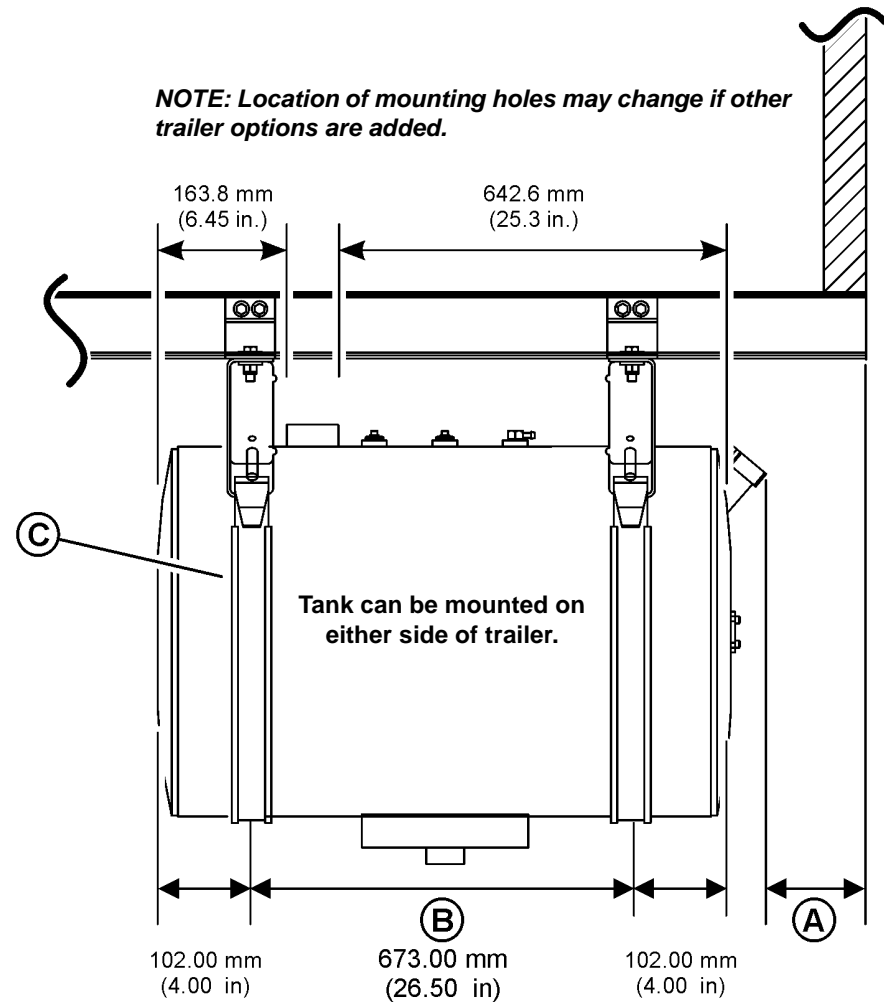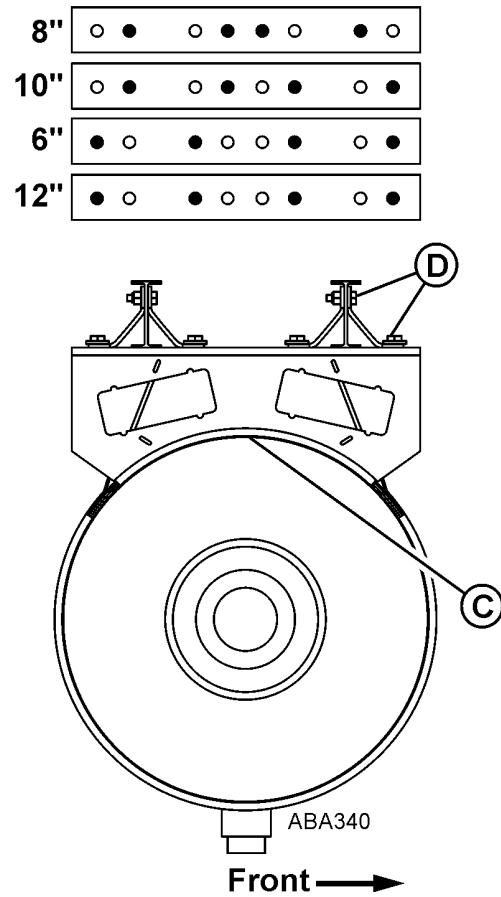
8"

10"

6"

12"

D

C

ABA340

Front ⟶

NOTE: Location of mounting holes may change if other trailer options are added.

163.8 mm
(6.45 in.)

642.6 mm
(25.3 in.)

C

Tank can be mounted on either side of trailer.

102.00 mm
(4.00 in)

673.00 mm
(26.50 in)

102.00 mm
(4.00 in)

B

A

Installing the Fuel Tank - 50 Gallon, 22" Dia., Aluminum (Option)

OPEN STYLE TANK MOUNTING BRACKET

Fuel Tank Installation

NOTE: Location of mounting holes may change if other trailer options are added.

1. Locate the existing sets of 10.3 mm (.406" dia.) pre-punched holes in the crossmembers. ***See note above.***

2. Align the two holes of each hanger bracket with the holes in the crossmember and secure with two, 3/8-16 screws, washers and locking nuts. Torque the hardware to 42 N•m (31 ft-lb).

3. Install each hanger assembly (facing each other as shown) onto the hanger brackets with 1/2-13 screws, washers and locking nuts. Torque the hardware to 81 to 88 N•m (60-65 ft-lb).

4. Install a self-adhesive rubber pad to the underside of each hanger assembly.

5. Loosely install the tank straps t-bolts onto the hanger assemblies with 1/2" washers and locking nuts. Verify the rubber strips are properly installed on the mounting bands.

6. Install the fuel tank into the straps with the tank filler positioned straight up and down and tighten the tank straps to 48 N•m (35 ft-lb).

IMPORTANT: The fuel tank filler must be positioned straight up and down +/- 5 degrees for the Ultrasonic Fuel Level Sensor (UFLS) to read fuel level accurately.

Installing the Fuel Tank - 50 Gallon, 22" Dia., Aluminum (Option)

OPEN STYLE TANK MOUNTING BRACKET

NOTE: Location of mounting holes may change if other trailer options are added.

IMPORTANT: The fuel tank filler must be positioned straight up and down +/- 5 degrees for the Ultrasonic Fuel Level Sensor (UFLS) to read fuel level accurately.

+/- 5°

Open Style Bracket

①

②

③

④

⑤

Front

ABA341

Installing the Fuel Pump and Harness

Fuel Pump Installation

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.

1. Install the fuel pump bracket to the pre-drilled holes in the trailer's cross member directly above the fuel tank.

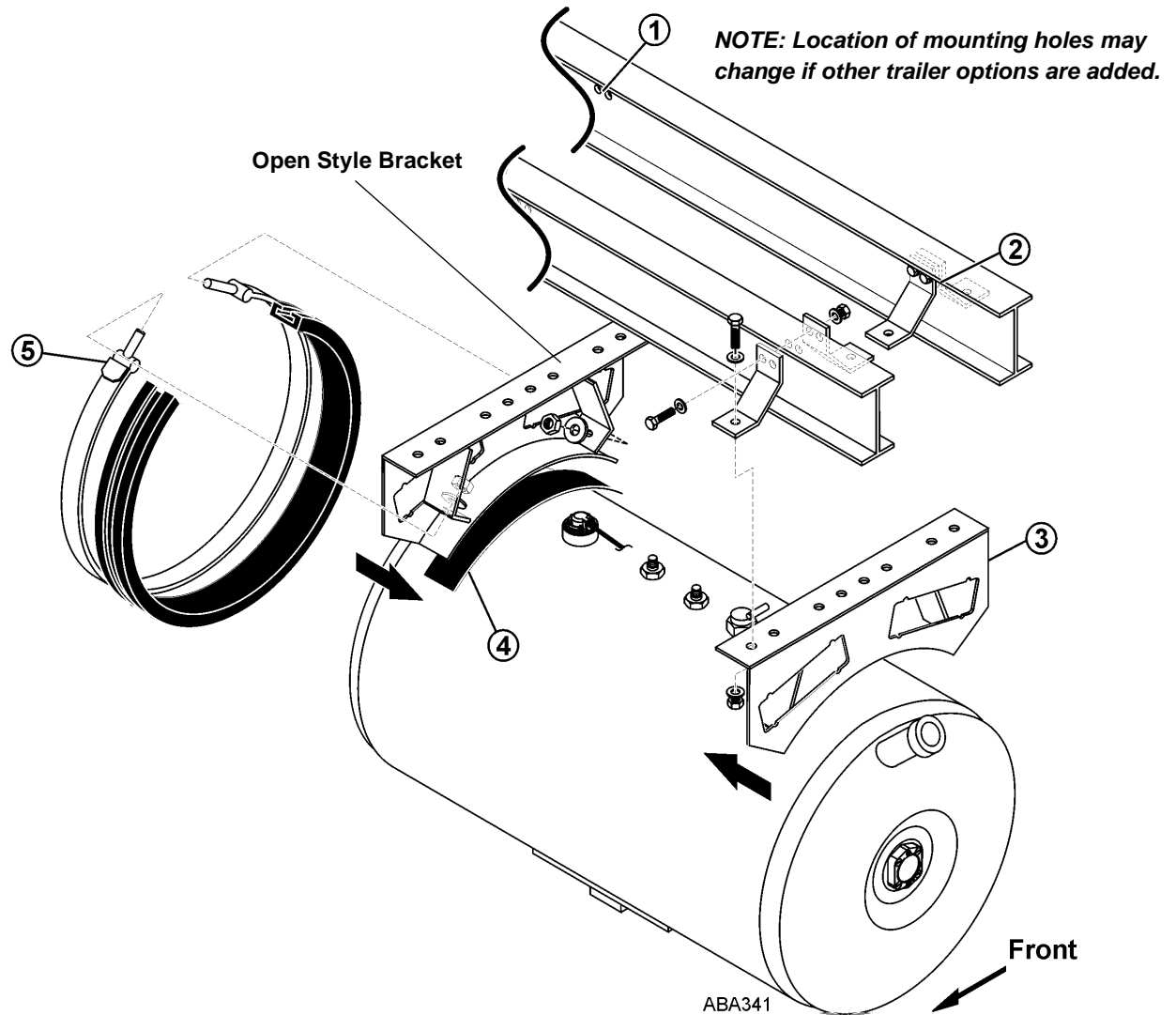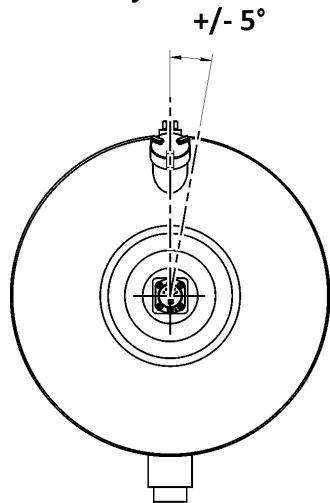   - Use the M6 x 1.00", bolts, washers and locking nuts supplied in the fuel pump mounting kit.

    - Tighten hardware to securely.

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.

    - Tighten hardware securely.

Fuel Pump Harness Installation

⚠ *DANGER: Do not route electrical wires with fuel lines as this could cause a fire!*

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

3. Attach the supplied fuel pump harness to the fuel pump wires.

    - Splice the wires form 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-02, CHFP-02)** secured to the bottom of the frame.

    - Splice the harness from the pump to the wires under the unit with supplied butt splice connectors and heat shrink.

    - Secure harness with clamps.

Installing the Fuel Pump and Harness
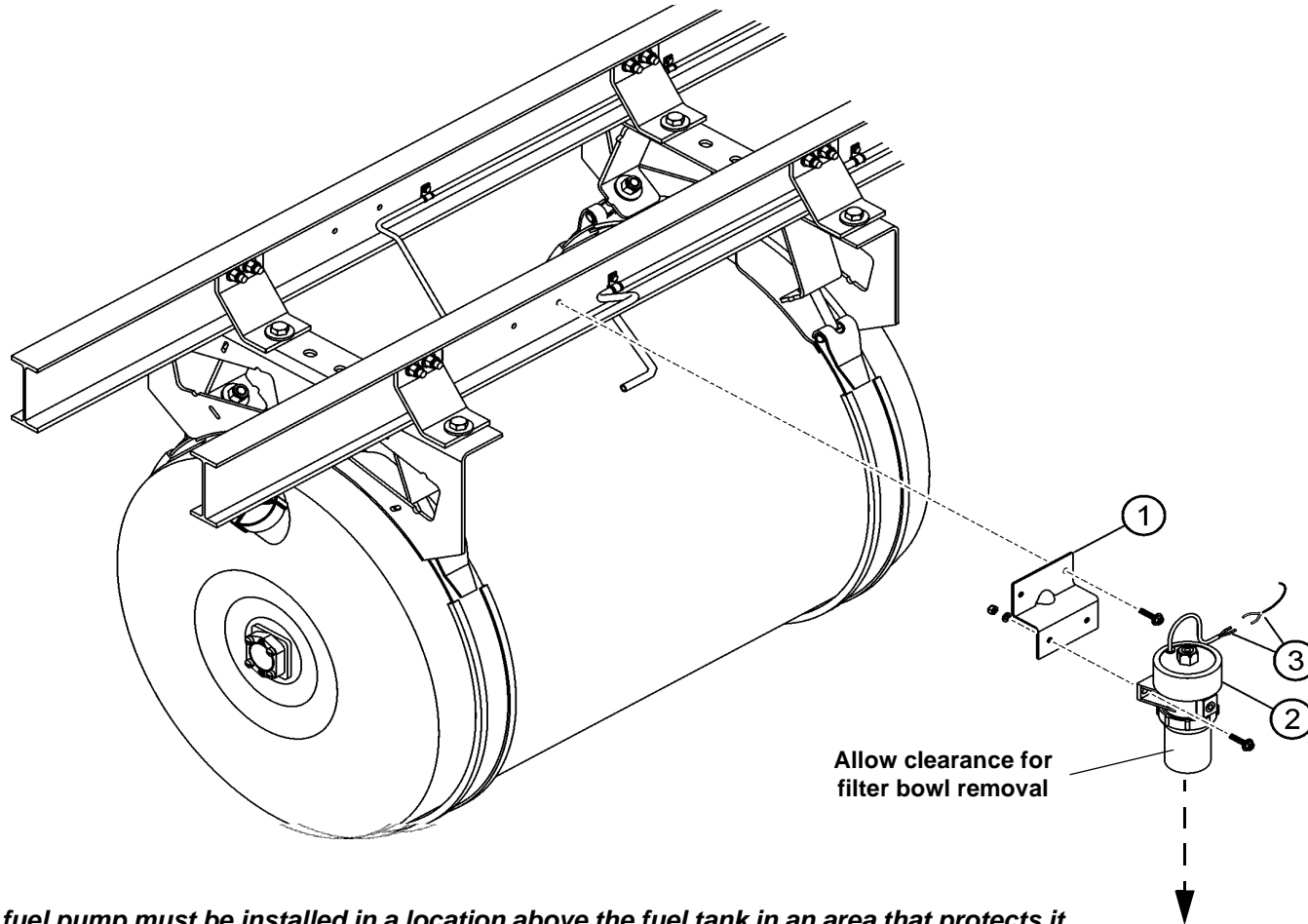
Allow clearance for filter bowl removal

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 bowl removal.

Installing the Fuel Lines

Important Installation Requirements

⚠️ *DANGER: Leaking fuel lines could cause a fire resulting in death or serious injury! All fuel line fittings must be tight and leak free!*

⚠️ *DANGER: Do not route fuel lines with battery cables or electrical wires, as this could cause a fire!*

NOTE: 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 I).

NOTE: Secure all fuel lines with provided clamps (Detail II).

All fuel line fittings (TK supplied) are now nickel plated brass for S-600 and S-700 units. Any additional fittings required for these units must also be nickel plated brass or stainless steel.

Fuel Line Installation

1. Route a **fuel supply** line from the fuel pump's **INLET** fitting to the fuel pickup fitting on the fuel tank.

   • 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.

5. Route both the **fuel supply** and **fuel return** to the unit.

   • Open the top access door.

   • Route both fuel lines into the conduit located under the curbside of the unit until they come out by the fuel filter.

   Fuel Filter Only - connect supply and return lines as shown. Tighten fittings securely.

   Fuel Filter with Fuel Heater - connect supply and return lines as shown. Tighten fittings securely.

NOTE: Add a sufficient amount of fuel (1/4 tank) to allow the unit to run for 8 to 12 hours during engine break-in and pre-delivery procedures.

Installing the Fuel Lines

I

2

3

II

4

III

25.4 mm
(1.00 in)

5

Fuel Filter

Return Line
Connection

RETURN

SUPPLY

Fuel Filter w/Heater

Return Line
Connection

RETURN
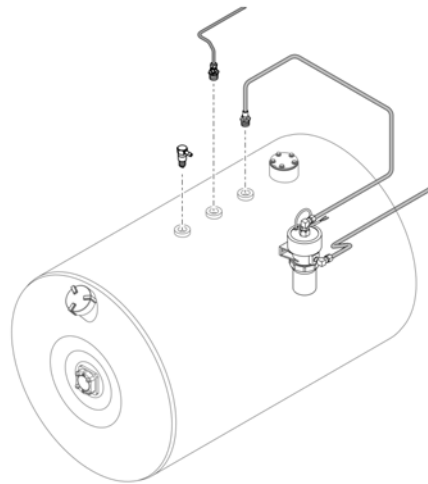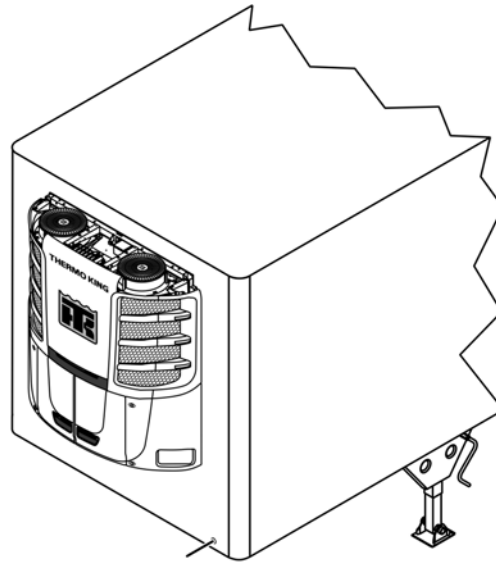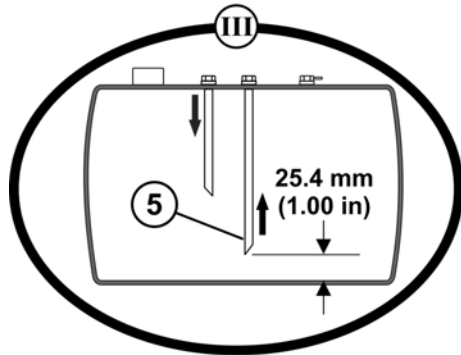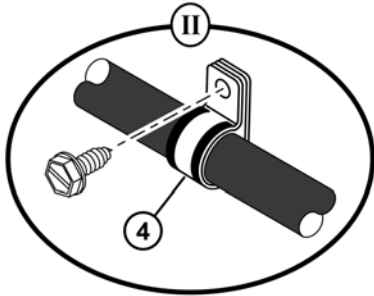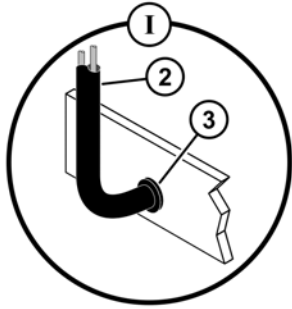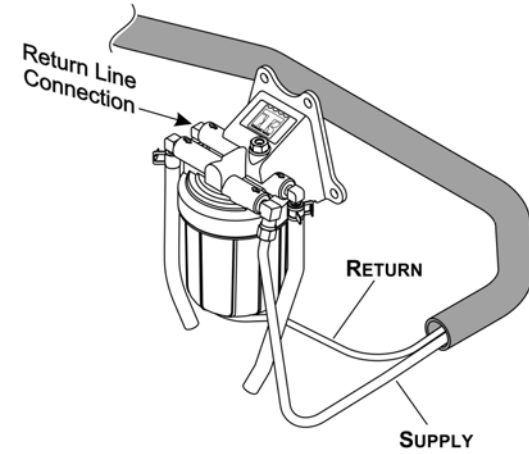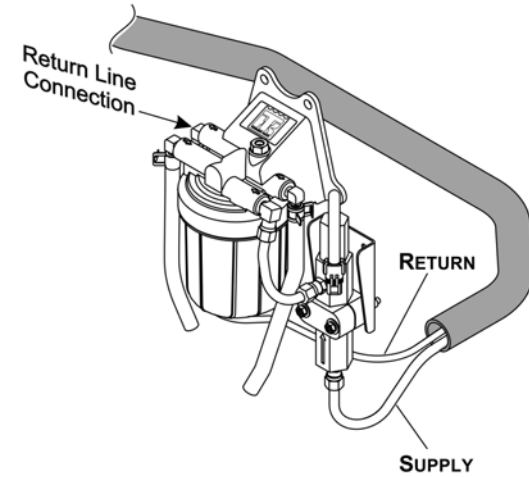
SUPPLY

ABA610

Installing the UFLS Harness

"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: Do not route electrical wires with fuel lines as this could cause a fire!*

1. Attach the interconnect harness to the fuel sensor wires located inside the control box.

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

- Slide supplied heat shrink tubing onto each wire and position them away from joint:
- Connect each wire with wire connector and crimp securely.
- Solder wires to wire connectors with a soldering gun.
- Slide heat shrink tubing over each wire connector and applying heat with a heat gun.
- 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.

UFLS Harness Connections

3. Cut the interconnect harness to length and splice wires to the fuel sensor's leads.

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

- Slide supplied heat shrink tubing onto each wire and position them away from joint:
- Connect each wire with wire connector and crimp securely.
- Solder wires to wire connectors with a soldering gun.
- Slide heat shrink tubing over each wire connector and applying heat with a heat gun.

4. Secure any exposed harness with clamps.

IMPORTANT: This is a "Solid State" fuel level sensor and the SR-4 Controller must be programmed accordingly to enable the fuel level feature. See "Programming the SR-4 Controller for Fuel Level" on page 70.

Installing the UFLS Harness

"Solid State" Ultrasonic Fuel Level Sensor (UFLS)

ABA611
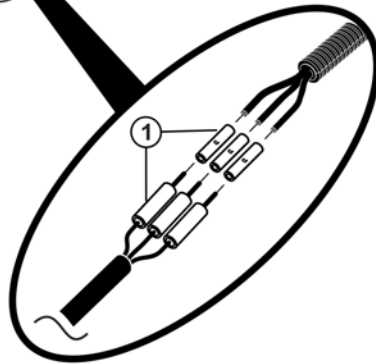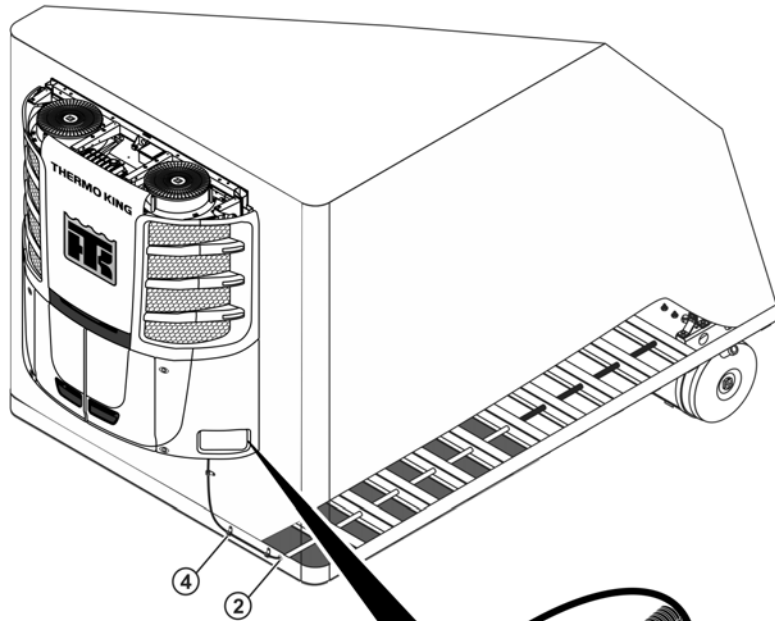
Connections inside Control Box
BLACK to **FUELN-01**
WHITE to **FUEL-01**
GREEN to **8F-01**
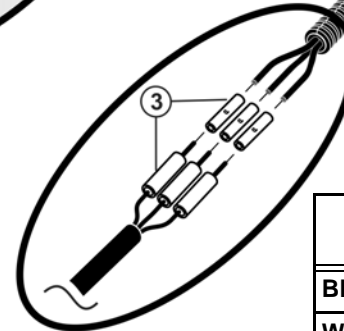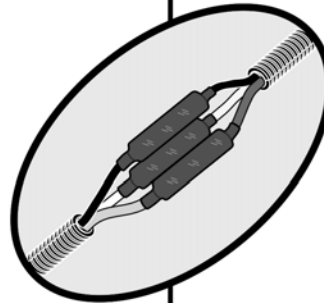
Connections at Sensor
BLACK to **BLACK**
WHITE to **YELLOW**
GREEN to **RED**
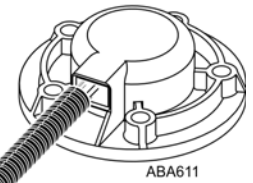
Installing the Status Light (Option)

Installation

NOTE: Surface mounted status light installation shown. Flush mounted light installs into recessed opening (see "Flush Mounted Status Light Opening Dimensions (Option)" on page 23), electrical connections are made the same.

1. Mount the status light in a location so that is visible in the tractor mirror to the driver.

   - Mark and drill the four mounting holes using a 3/16" drill.

   - Mount the status light in position with the supplied rivets.

2. Route harness as shown allowing a "drip-loop" to prevent water from migrating into the Status Light.

3. Secure harness to the bracket and trailer using the supplied clamps and rivets.

4. Connecting the status light harness:

   STANDARD DISPLAY - Route the harness through the harness grommet and into the control box.

   - Connect the 4-pin connector to the matching 4-pin connector (**J8**) located on the circuit board.

   FUEL COMBO and TRIPLE COMBO DISPLAYS - Route the harness through the harness grommet and into the control box.

   - Connect the 4-pin connector to the matching 4-pin connector (**J8**) located on the circuit board.

   - Connect the 8-pin connector to CAN1 (**J12**).
     *NOTE: If this position is occupied use CAN2 (**J13**).*

NOTE: If all CAN ports are occupied use the CAN extender Harness available from your Thermo King Dealer.

- Be sure the connectors are locked securely in place on the circuit board.

- Secure any excess harness with tie bands to the main harness behind the battery tray.

IMPORTANT: DO NOT secure excess harness to battery cables or refrigeration lines.

Installing the Status Light (Option)

Fuel Combo
& Triple Combo
Displays

Standard
Display
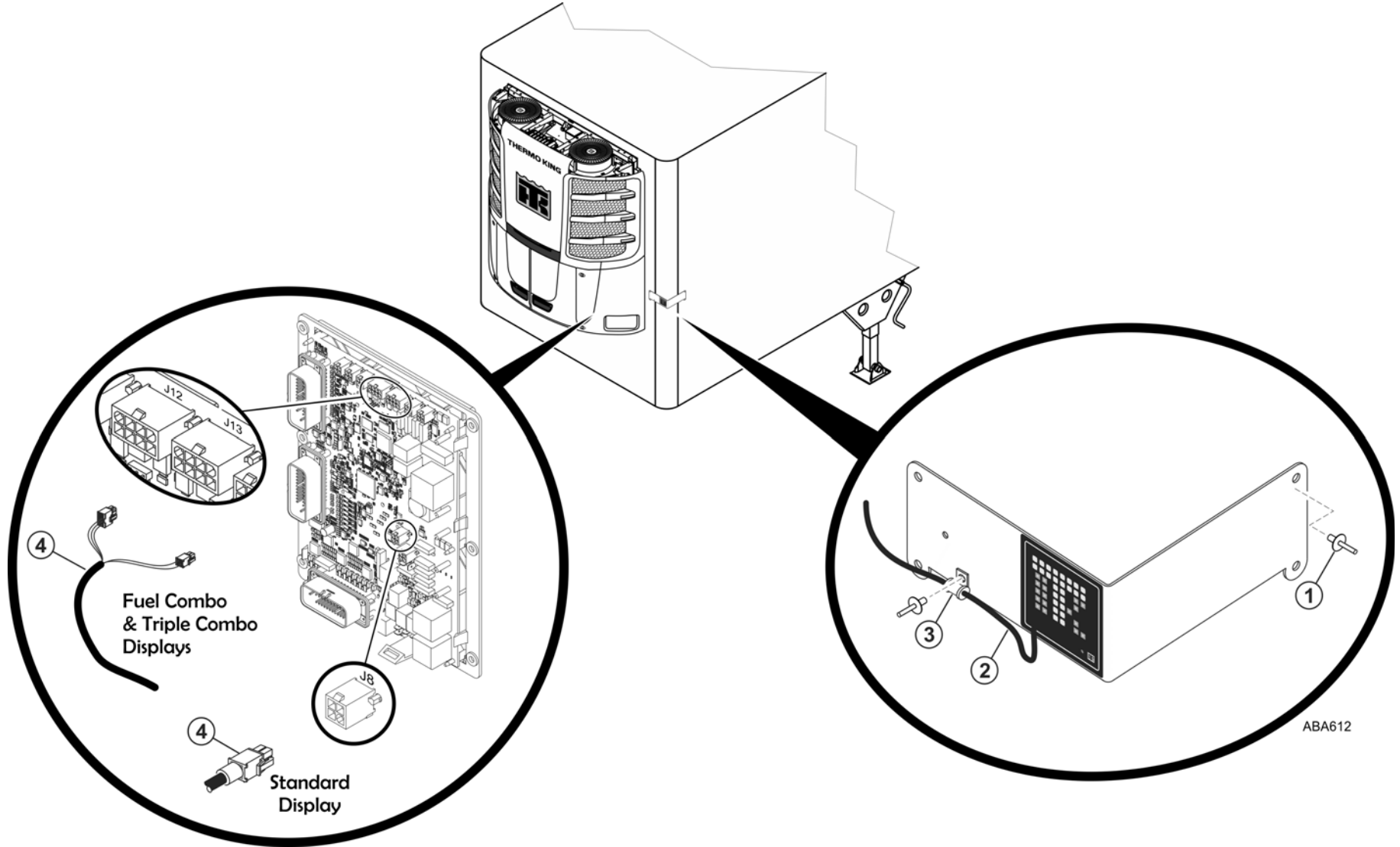
ABA612

Installing the Rear Remote Controller (Option)

Foamed-In-Place Installation

NOTE: Verify mounting location and all dimensions before installing the remote controller.

   A = 69.8 mm (2.75 in.)

   B = 196.8 mm (7.75 in.)

⚠️ ***DANGER: Do not route electrical harness together with fuel lines as this could cause a fire resulting in death or serious injury!***

⚠️ ***CAUTION: Do not drill holes into refrigeration, electrical or mechanical components or severe damage to the equipment will result!***

Preferred Wire Routing (Steps 1,2, 6-10)

NOTE: The preferred routing of the electrical harness chase and interface harness is from the <u>bottom</u> of the controller box.

1. Connect the harness chase to the bottom of controller while providing a drip loop.
2. Install and route a 1/2 in. CPVC drain hose from the bottom of the controller box out of trailer floor.

Alternative Wire Routing (Steps 3-10)

NOTE: The alternative routing of the electrical harness chase and interface harness is from the <u>side</u> of the controller box.

3. Drill an appropriate size hole in the controller box for the harness chase coupling.
4. Install harness chase coupling.

NOTE: Coupling should not protrude more than 6.4 mm (0.25 in.) inside the controller box.

5. Install cap in bottom of controller box *before* foaming trailer wall.
6. Apply chalking to controller box and install securely into trailer wall.

Harness Connections

7. Apply Superlube (or equivalent) to Remote Controller Harness connector and attach securely to back of controller. Route harness through chase. Secure controller to controller box with screws.
8. Route chase and Remote Controller Harness from controller to host unit. Secure with clamps.
9. Cut off excess harness and strip wire ends.
   - Attach the Remote Controller Harness wires to the splice connectors on the Interface Harness.

Remote Controller Harness (with flat 8-pin connector)	Code	Interface Harness (with 8-pin connector and splice ends)	Code
Pin 1	BLU	Pin 3	BLU
Pin 2	GRN	Pin 5	GRN
Pin 3	No Connection	Pin 7	No Connection
Pin 4	ORN	Pin 6	ORN
Pin 5	YEL	Pin 4	YEL
Pin 6	BRN	Pin 8	BRN
Pin 7	BLK	Pin 1	BLK
Pin 8	RED	Pin 2	RED

10. Apply Superlube (or equivalent) and securely connect the Interface Harness 8-pin connector to the mating 8-pin Remote Controller connector located on the side of the evaporator housing.

Installing the Rear Remote Controller (Option)

39 mm
(1.57 in.)

20 mm
(0.80 in.)

17 mm
(0.70 in.)

6.4 mm
(.25 in.)

ABA613
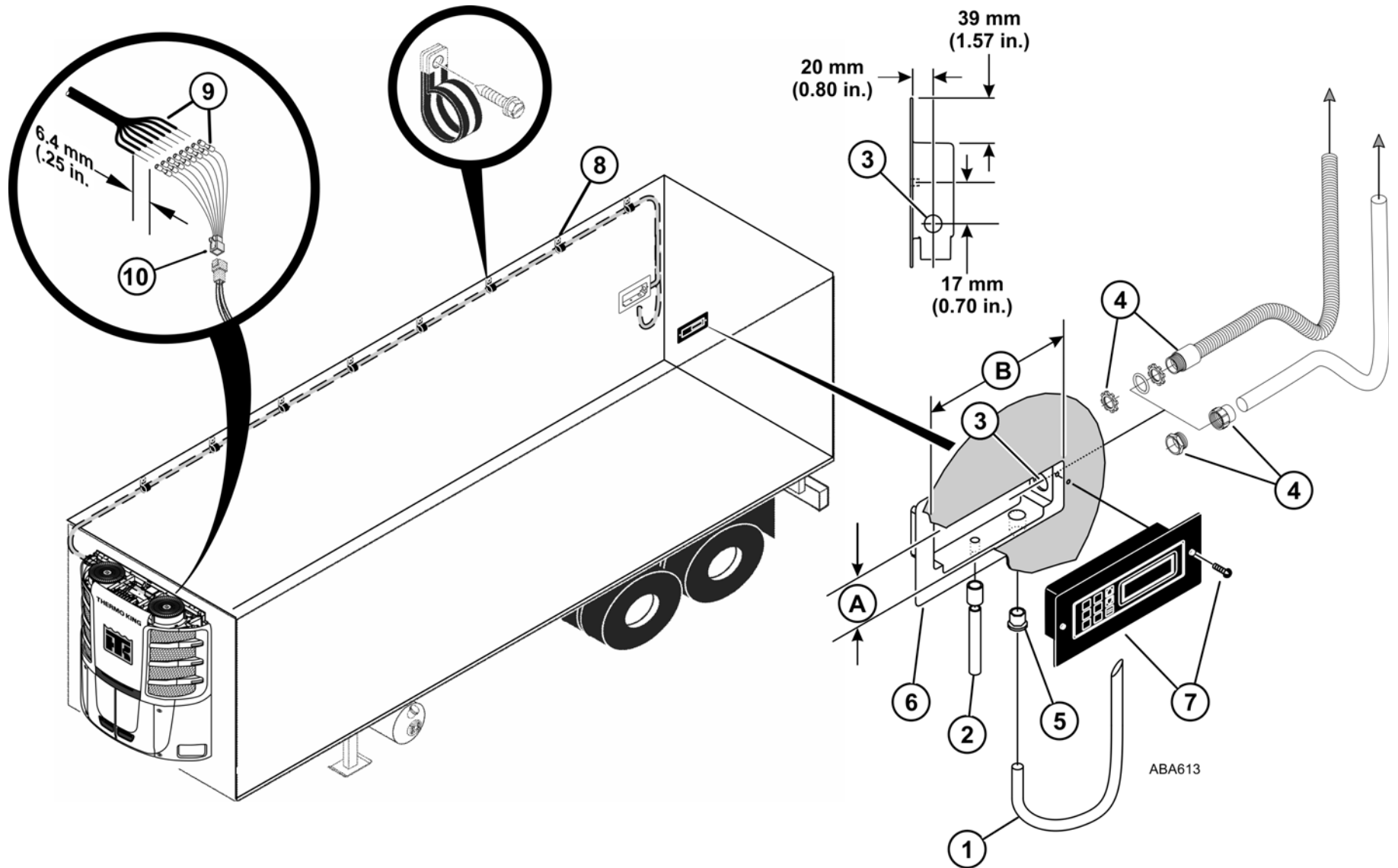
Installing the Rear Remote Controller (Option)

Retro-Fit Installation

NOTE: Verify mounting location and all dimensions before installing the remote controller.

⚠️ *DANGER: Do not route electrical harness together with fuel lines as this could cause a fire resulting in death or serious injury!*

⚠️ *CAUTION: Do not drill holes into refrigeration, electrical or mechanical components or severe damage to the equipment will result!*

⚠️ *CAUTION: Rubber grommets must be used when routing electrical harnesses through metal holes!*

1. Cut opening in trailer wall per dimensions shown.

   A = 203 mm (8.0 in.)

   B = 107.9 mm (4.25 in.)

   C = 38 x 12.7 mm (1.5 x.5 in.)

2. Install and route a 1/2 in. CPVC drain hose and 0.88 O.D. harness chase from the bottom of the controller box out of the trailer.

3. Apply caulking to controller box and install securely in trailer wall.

*NOTE: Make sure the drain hose and harness chase are connected properly.*

Harness Connections

4. Apply Superlube (or equivalent) to Remote Controller Harness connector and attach securely to back of controller. Route harness through chase. Secure controller to controller box with screws.

5. Route harness under trailer through chase in floor or I-beam crossmembers towards the unit.

6. From inside the trailer, measure and drill an appropriate size hole and route the harness up into the trailer towards the unit.

7. Secure harness to the backside of the unit with clamps.

8. Measure the length of harness required for the harness to connect to the 8-pin Remote Controller connector that is factory installed on the side of the evaporator housing. Cut off excess harness and strip wire ends. Crimp into existing splice and use heat shrink covering**.**

Remote Controller Harness (with flat 8-pin connector)	Code	Interface Harness (with 8-pin connector and splice ends)	Code
Pin 1	BLU	Pin 3	BLU
Pin 2	GRN	Pin 5	GRN
Pin 3	No Connection	Pin 7	No Connection
Pin 4	ORN	Pin 6	ORN
Pin 5	YEL	Pin 4	YEL
Pin 6	BRN	Pin 8	BRN
Pin 7	BLK	Pin 1	BLK
Pin 8	RED	Pin 2	RED

9. Apply Superlube (or equivalent) and securely connect the Interface Harness 8-pin connector to the mating 8-pin Remote Controller connector factory installed on the unit.

Installing the Rear Remote Controller (Option)

ABA614
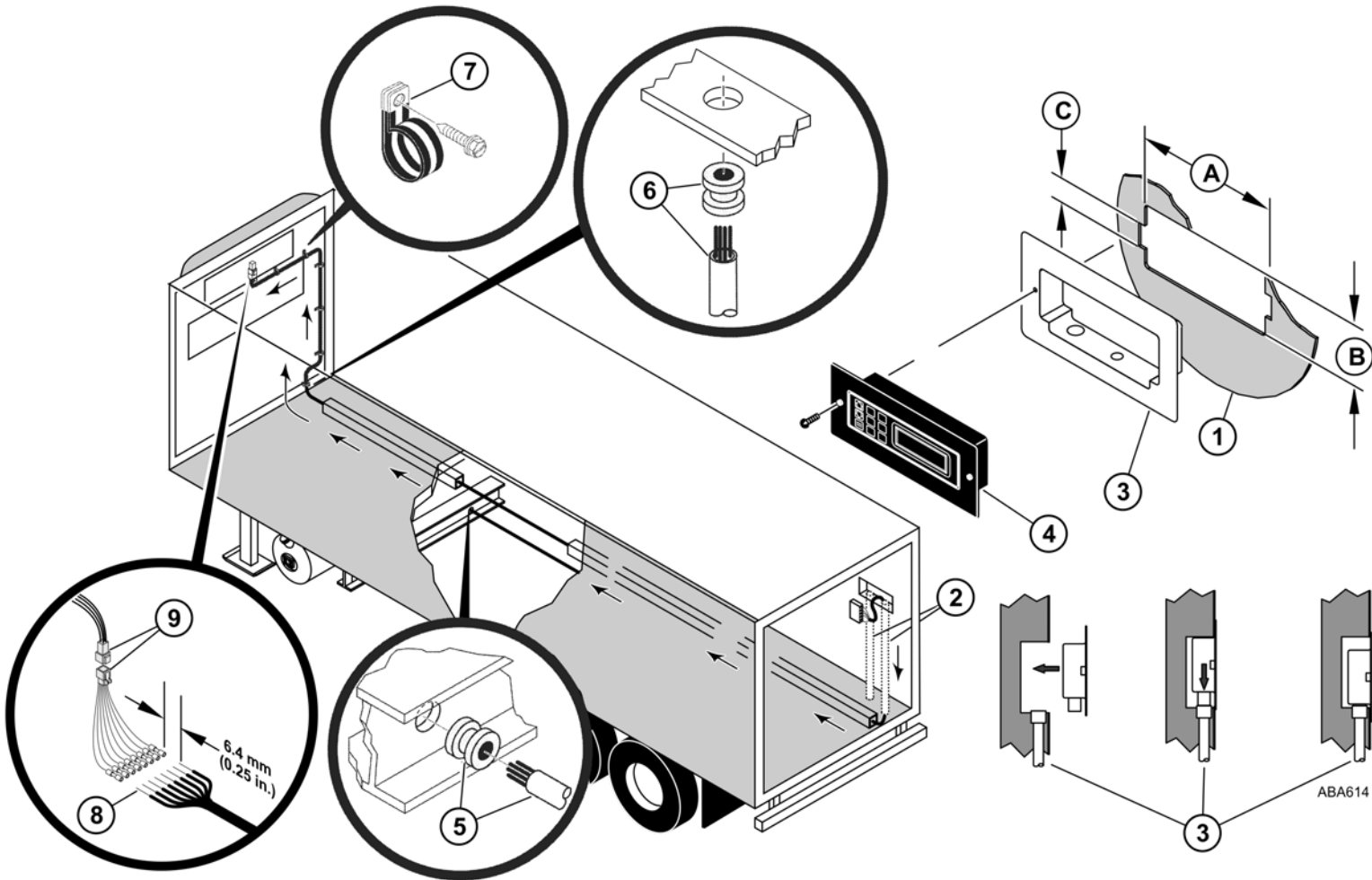
Installing the Door Switch (Option)

When installing CargoLink <u>wireless</u> door switches, see TK 55151 CargoLink Installation Manual

NOTE: These instructions (pages 52-55) are intended as reference guide only to assist with a typical <u>hard</u> <u>wired</u> door switch installation. Your installation may be different depending on the trailer, the amount and types of doors and the customers particular requirements.

Door Switch Components

The door switch consists of a magnet, a switch, non-magnetic mounting hardware and a interface harness to connect to the host unit.

• The *magnet* is always mounted on the door.

• The *switch* (with harness) is always mounted to a stationary location.

• Two short *interface harnesses* are available depending on your particular kit. One allows a single door switch in a single zone to activate a unit shutdown. The other allows two door switches in the same zone to each activate a unit shutdown.

Non-magnetic mounting hardware is included to install the switches. If alternate hardware is used it must also be non-magnetic or the door switch will not operate properly.

Installer is to supply and fabricate the harness connecting the interface harness to the door switch per the table below. The harness should be 18 AWG or better, 3 wires, color coded RED, BLACK and WHITE.

Interface Harness Wiring	Door Switch Wiring
RED = (12 Vdc) POWER	RED = (12 Vdc) POWER
BLACK = (CH) GROUND	BLACK = (CH) GROUND
WHITE = (DS) OUTPUT	WHITE = (DS) OUTPUT

Mounting Locations

The door switch can be mounted on the inside or outside of either swing out or roll-up doors and can be mounted in various positions to accommodate particular applications.

IMPORTANT INSTALLATION NOTES:

• The door switch must be installed away from traffic (i.e. forklifts) or protected from it.

• The door switch and magnet must be installed parallel to each other, not perpendicular. Long cross hair aligns to long cross hair.

• It is important that a maximum gap of 12.7 mm (0.50 in.) is maintained between the door switch and the magnet. Shims may be required and must be a non-magnetic material (aluminum, wood, plastic, etc.) or the door switch will not operate properly.

(Detail A) Ceiling Mounted

1. Mount the **magnet** flush with the top edge of the door and secure with supplied hardware.

2. Close the door and mount the **switch** to the door sill parallel with the magnet, being sure the "cross hairs" are aligned and that the maximum gap of 12.7 mm (0.50 in.) is maintained.

(Detail B) Floor Mounted

1. Mount the **magnet** flush with the bottom edge of the door and secure with supplied hardware.

2. Close the door and mount the **switch** to the floor parallel with the magnet, being sure the "cross hairs" are aligned and that the maximum gap of 12.7 mm (0.50 in.) is maintained.

(Detail C) Outside Door Installation

1. Mount the **magnet** flush with the top edge of the door and secure with supplied hardware.

2. Close the door and mount the **switch** to the door sill parallel with the magnet, being sure the "cross hairs" are aligned and that the maximum gap of 12.7 mm (0.50 in.) is maintained.

Installing the Door Switch (Option)

Red = (12Vdc) Power
Black = (CH) Ground
White = (DS) Output

Ⓐ

12.7 mm
(0.50 in.) MAX

Right Angle Mounting

Red = (12Vdc) Power
Black = (CH) Ground
White = (DS) Output

Ⓑ

12.7 mm
(0.50 in.) MAX

Top x Top Mounting

Red = (12Vdc) Power
Black = (CH) Ground
White = (DS) Output

Ⓒ

12.7 mm
(0.50 in.) MAX

Side x Side Mounting

AAB102
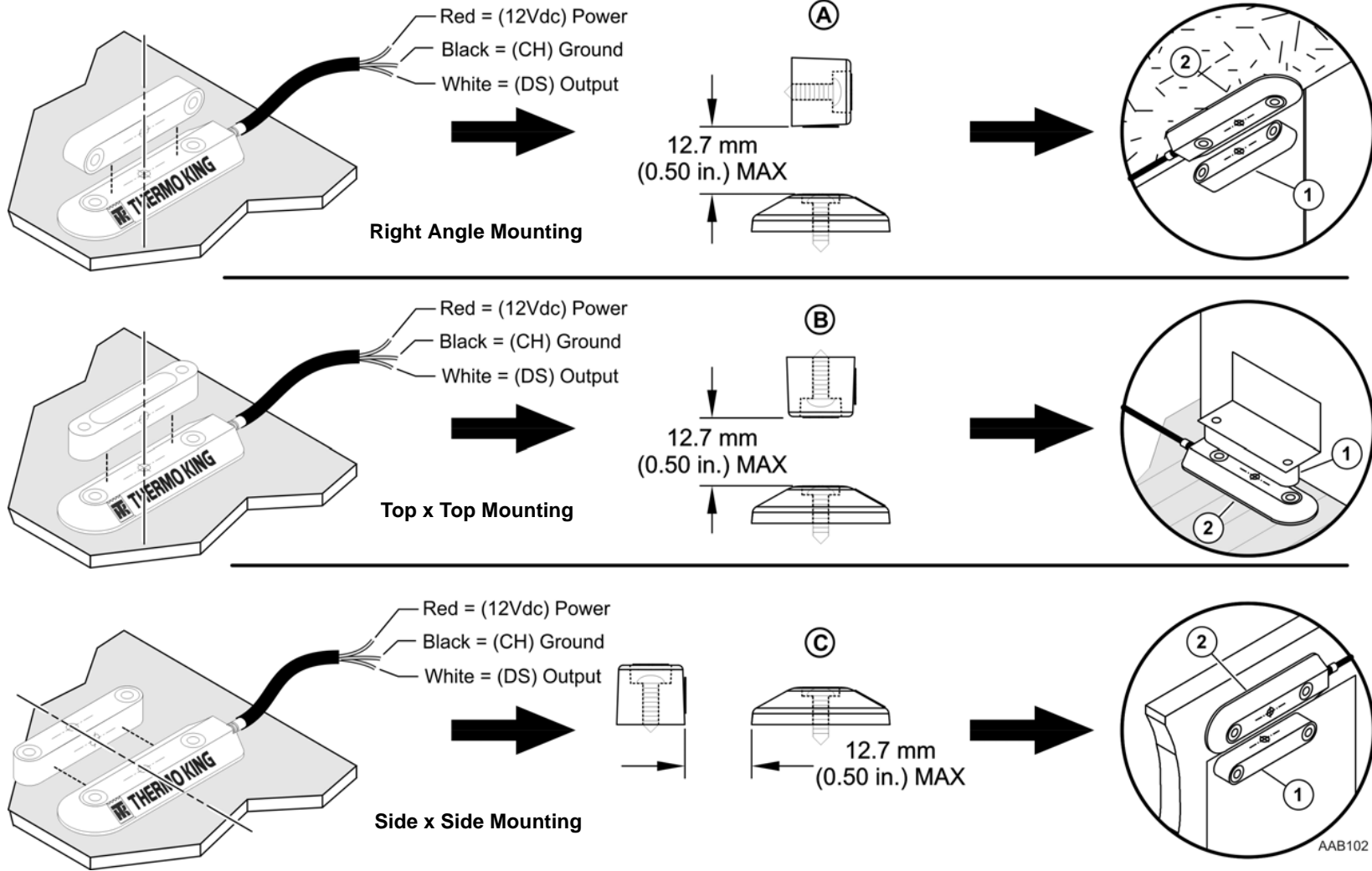
Installing the Door Switch (Option)

Contact your Thermo King Dealer for specific part numbers

NOTE: The Door Switch Harness Connectors are located at the rear of the unit (See DETAIL C).

Single Door Switch Activation / Single Zone (Detail A)

1. Attach the interface harness to the door switch connector located at the rear of the unit.

2. Route a 3 wire harness **(Installer Supplied)** from the interface harness to a **single** door switch. Connect matching wires per the table below **(RED/RED, WHITE/WHITE, BLACK/BLACK)** to each door switch using splice connectors. Crimp splice connectors securely and apply heat with a heat gun.

Interface Harness Wiring	Door Switch Wiring
RED = (12 Vdc) POWER	RED = (12 Vdc) POWER
BLACK = (CH) GROUND	BLACK = (CH) GROUND
WHITE = (DS) OUTPUT	WHITE = (DS) OUTPUT

3. All harnesses should be installed, routed and properly secured to protect from damage.

Multiple Door Switch Activation / Single Zone (Detail B)

4. Attach the interface harness to the door switch connector at the rear of the unit.

5. Route a 3 wire harness **(Installer Supplied)** from the interface harness to **each** door switch - **Maximum Two Doors.** Connect matching wires per the table below **(RED/RED, WHITE/WHITE, BLACK/BLACK)** to each door switch using splice connectors. Crimp splice connectors securely and apply heat with a heat gun.

Interface Harness Wiring	Door Switch Wiring
RED = (12 Vdc) POWER	RED = (12 Vdc) POWER
BLACK = (CH) GROUND	BLACK = (CH) GROUND
WHITE = (DS) OUTPUT	WHITE = (DS) OUTPUT

6. All harnesses should be installed, routed and properly secured to protect from damage.

7. Operate unit and verify door switch operation.

Installing the Door Switch (Option)

Interface Harness Wiring	Door Switch Wiring
RED = (12 Vdc) POWER	RED = (12 Vdc) POWER
BLACK = (CH) GROUND	BLACK = (CH) GROUND
WHITE = (DS) OUTPUT	WHITE = (DS) OUTPUT
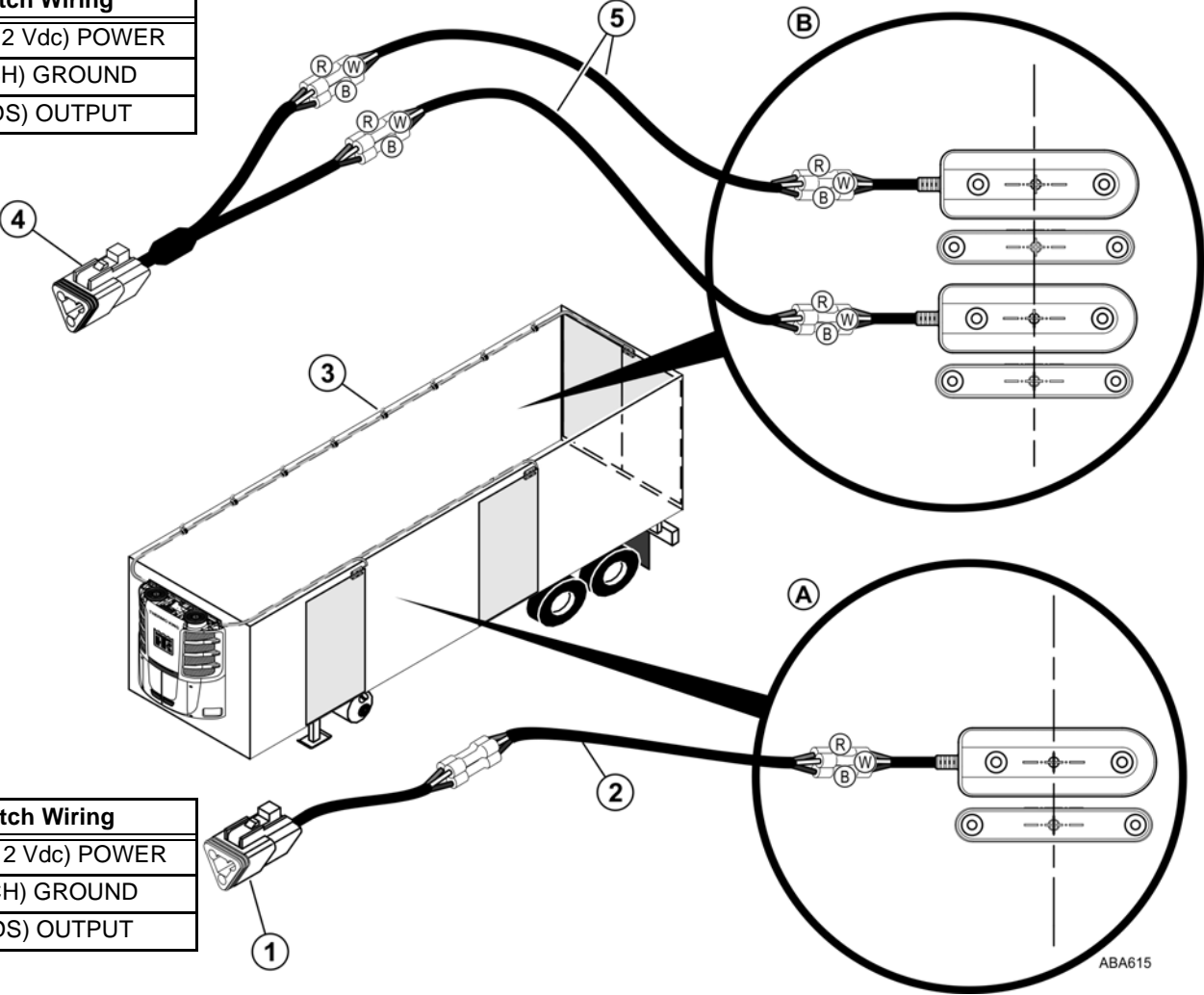
Interface Harness Wiring	Door Switch Wiring
RED = (12 Vdc) POWER	RED = (12 Vdc) POWER
BLACK = (CH) GROUND	BLACK = (CH) GROUND
WHITE = (DS) OUTPUT	WHITE = (DS) OUTPUT

ABA615

CargoWatch™ Sensor Locations (Option)

Sensor locations for Domestic Applications as required by customer

1. Sensor #1 is located in the evaporator side return opening near unit return air sensor (factory installed).

2. Sensor #2 location as required by customer.

CargoWatch™ Sensor Locations (Option)

ABA616

Connecting the CargoWatch™ Sensors (Option)

NOTE: ONLY CargoWatch Sensors Can Be Used

CONNECTING SENSORS

NOTE: The sensor are not polarity sensitive.

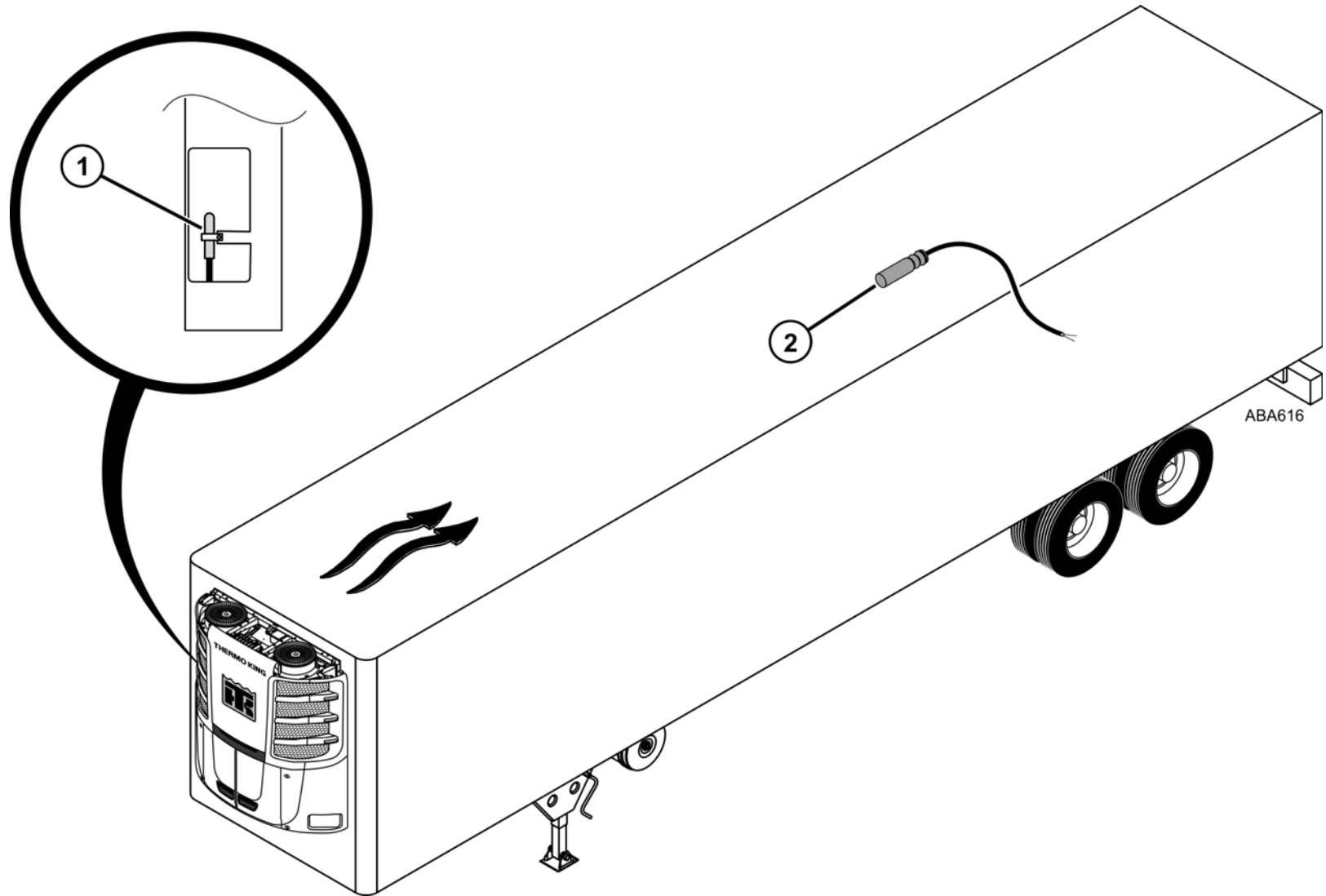1. Locate the CargoWatch **Sensor Harness** behind the evaporator access panel.

2. Unplug the connector from the harness.

3. Removes orange end from connector.

4. Remove only the plugs from the connector holes for the sensors you are connecting. Unused holes must remain plugged.

SENSOR	PLUGS
1	#1 and #12
2	#2 and #11
3	#3 and #10
4	#4 and #9
5	#5 and #8
6	#6 and #7

5. Insert **WHITE** pin connector and wire into correct connection until it locks into position (**Detail I**). The wire side of the connector is shown.

SENSOR	PLUGS
1	White into #1
2	White into #2
3	White into #3
4	White into #4
5	White into #5
6	White into #6

6. Insert **BLACK** pin connector and wire into correct connection until it locks into position (**Detail I**). The wire side of the connector is shown.

SENSOR	PLUGS
1	Black into #12
2	Black into #11
3	Black into #10
4	Black into #9
5	Black into #8
6	Black into #7

Reinstall orange end (**3**) back onto connector (**2**), apply a light coating of Superlube to electrical connections and plug sensor back into mating connector on the Sensor Harness (**1**).

7. Connect the CargoWatch Sensor Harness to the sensor using the splice connectors. Crimp splice connectors securely and apply heat with a heat gun. *NOTE: The CargoWatch Sensor wires are not polarity sensitive.*

8. Secure sensor with appropriate clamps.

Connecting the CargoWatch™ Sensors (Option)

Sensor #1	12	1
Sensor #2	11	2
Sensor #3	10	3
Sensor #4	9	4
Sensor #5	8	5
Sensor #6	7	6

ABA617
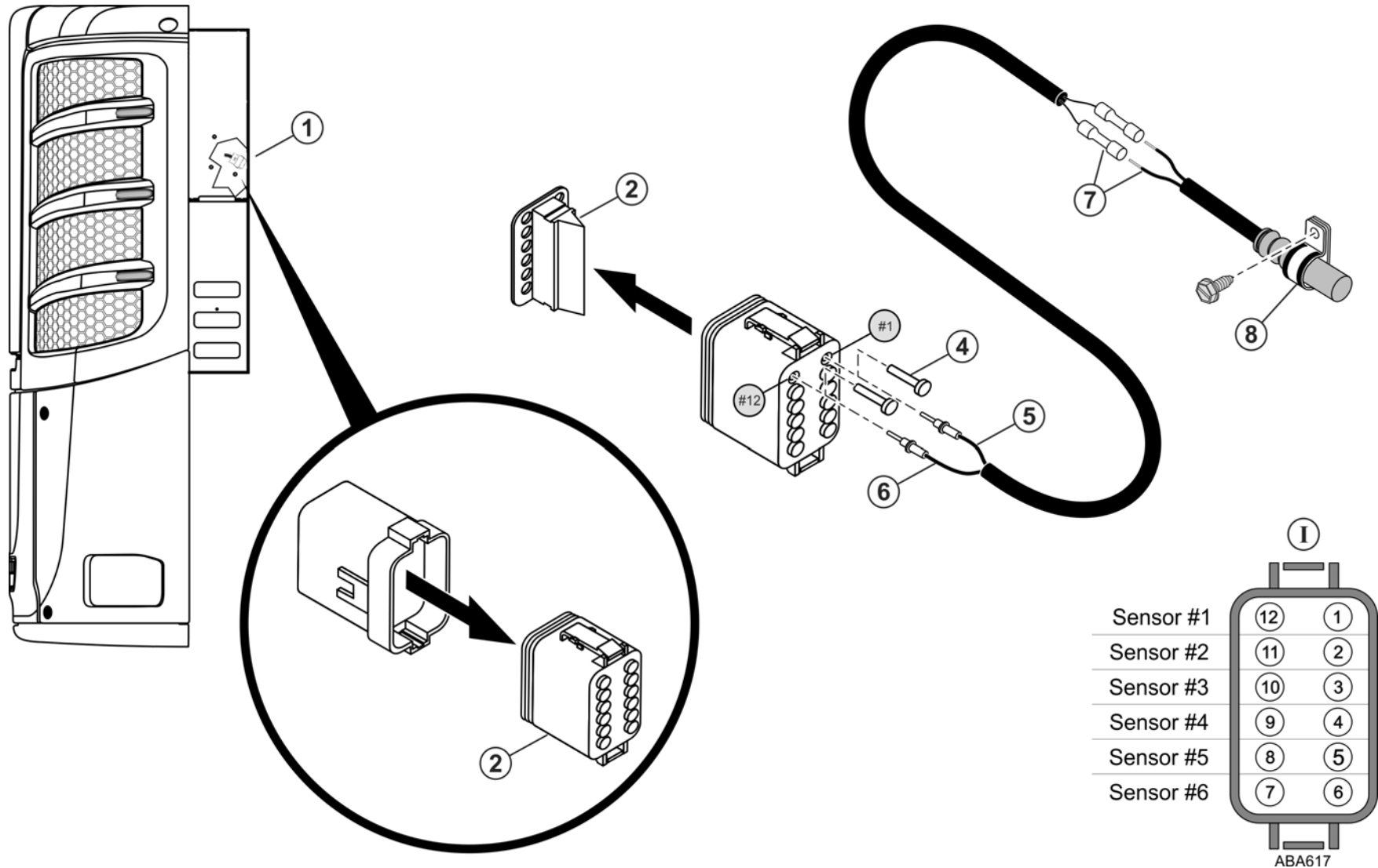
Installing the Precedent Bulkhead (Option)

THERMO KING RECOMMENDS USING A BULKHEAD

Contact your Thermo King Dealer for specific part numbers of bulkhead and mounting hardware.

Installation

⚠️ *CAUTION: Do not drill holes into refrigeration, electrical or mechanical components or severe damage to the equipment will result!*

1. Locate and mark the front trailer wall support posts. The bulkhead side mounting holes should align with the trailer wall posts.

2. Set the bottom of the bulkhead on the trailer floor and fit it over the evaporator. DO NOT cut the top of the bulkhead.

3. Secure the sides of bulkhead to the wall support posts using six (3 each side) 1/4" x 3.00" long sheet metal screws and washers (installer supplied).

4. Secure the bottom of the bulkhead using five 1/4" x 1.25" long sheet metal screws and washers (installer supplied.

5. Cut the side flanges to activate the hinge feature.

NOTE: For evaporator service, remove the screws on each side securing the top portion of the bulkhead and fold down.

Installing the Precedent Bulkhead (Option)

Typical trailer wall support posts.

Three long mounting screws on each side. ③

Five short mounting screws along bottom. ④

ABA627

Cut the side flanges to activate the hinge feature. For evaporator service, remove the screws on each side securing the top portion of the bulkhead and fold down.
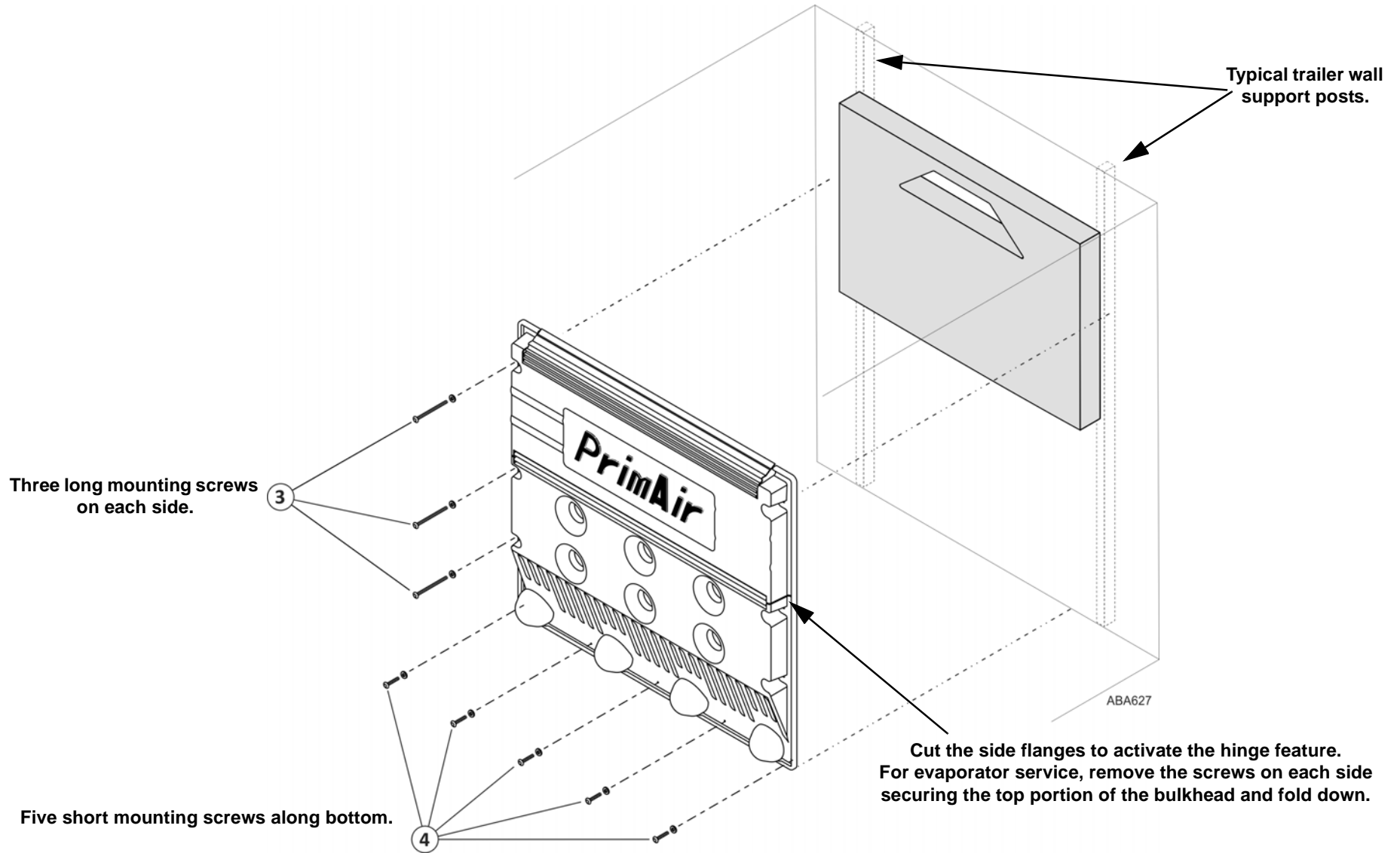
Installing the Power Receptacle (Option)

Power Receptacle Installation

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.

   • Tighten hardware securely.

2. Secure cable under the unit to the trailer wall with supplied cable clamps and screws.

Installing the Power Receptacle (Option)

ABA622
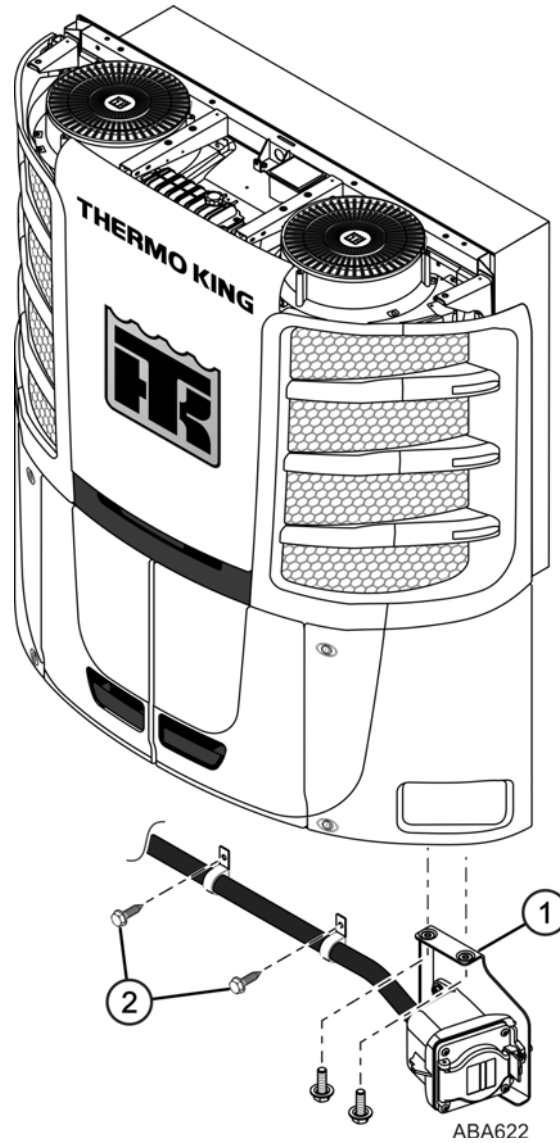
Installing the Battery

Important Battery Information

IMPORTANT: See Safety Precautions - "Battery Installation and Cable Routing" on page 7 for additional information.

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

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

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.

   - Loosen the two bolts securing the control box in place.

   - Swing the control box away to gain access to the battery tray area.

2. Open the roadside door.

   - Pull the hinge pins and remove the door assembly from unit.

3. Locate the lower bracket directly in front of the battery tray.

   - Remove the two bolts and bracket from the frame.

4. Install the battery into the plastic liner.

5. Attach the **negative (-)** battery cable onto negative battery post and tighten securely.

6. Install the battery hold down rods and bracket.

   - 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. Install **positive (+)** battery cable on the positive battery post and tighten securely.

8. Reinstall the bracket removed in Step 3 and tighten hardware securely.

9. Swing the control box assembly back into place and tighten the two screws securely.

10. Reinstall the roadside door back onto the hinges and close securely.

Installing the Battery

Roadside Door

Roadside Panel

ABA619
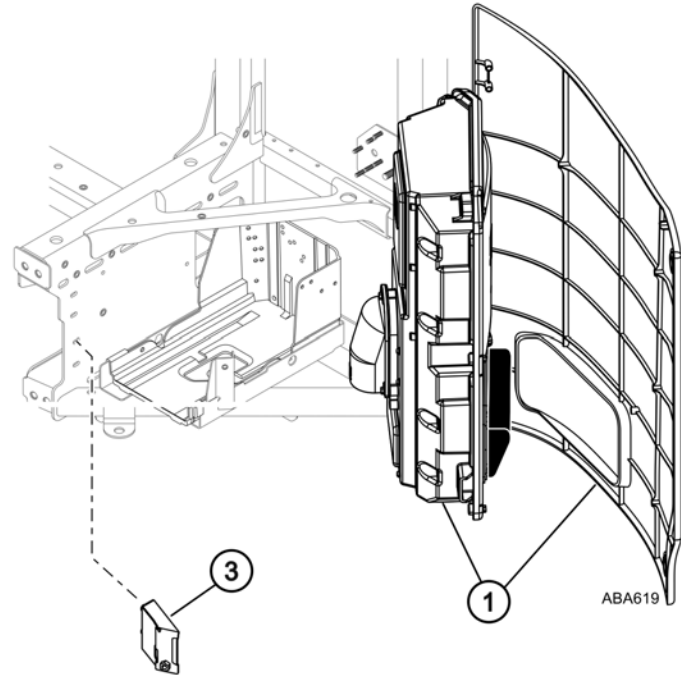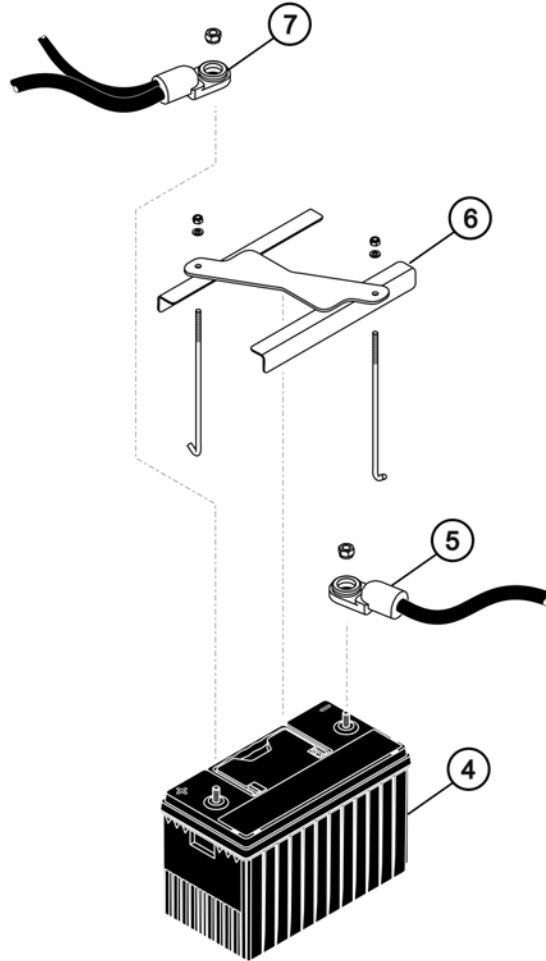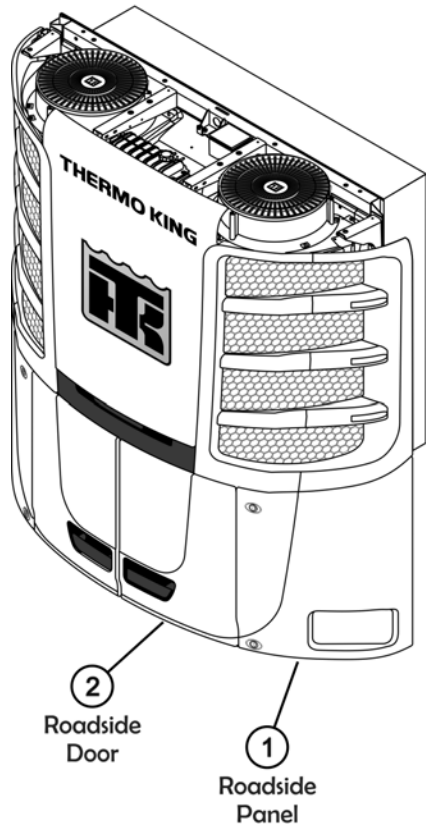
Installing the Top Covers, Top Fairing and Bottom Pan

Top Covers

1. Position the Roadside and Curbside covers onto the top of the unit and align the mounting holes with the holes in the frame.

   • Install the M6 screws supplied in the installation kit to secure the covers to the unit.

   • Use a T-30 Torx drive and tighten the screws securely.

Top Fairing

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. According to the U.S. Department of Transportation, state regulations vary from 13 feet 6 inches to 14 feet 6 inches. The total height of the unit installed onto your particular trailer should not exceed these height restrictions. Do not install the Top Fairing if it causes the unit to exceed these height restrictions.

2. Place the fairing on top of the unit. The outer mounting holes will be secured to the condenser fan grilles using the existing screws from the grille. Remove the two screws from the fan grilles using a T-30 Torx drive.

   • Align the outer mounting holes on top of the condenser fan grille mounting holes and loosely reinstall the screws.

   • Install the M6 screws supplied in the installation kit to secure the fairing's two center mounting holes to the frame mounted inserts.

   • Use a T-30 Torx drive and tighten the screws to 89 kg-cm (77 lb-in.)

Bottom Pan

3. Position the bottom pan under the unit and align the four holes in the rear of the bottom pan with the four holes in the rear of the frame.

   • Install the M6 screws supplied in the installation kit to secure the bottom pan to the unit.

   • Use a T-30 Torx drive and tighten the screws securely.

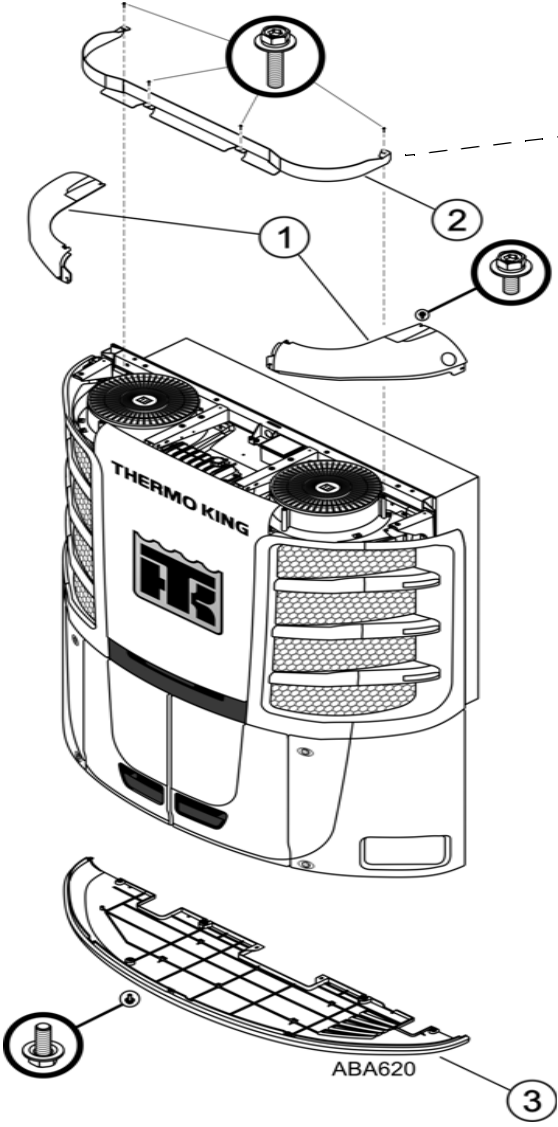# Installing the Top Covers, Top Fairing and Bottom Pan

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. According to the U.S. Department of Transportation, state regulations vary from 13 feet 6 inches to 14 feet 6 inches. The total height of the unit installed onto your particular trailer should not exceed these height restrictions. Do not install the Top Fairing if it causes the unit to exceed these height restrictions.

ABA620

STOP
Only trained and qualified individuals should operate the unit.
Refer to Precedent Operators Manual TK 55538-2-OP

High Voltage Safety Precautions

⚠️ *DANGER: High voltage is present whenever the unit is operating on either diesel or electric standby power. Take precautions when servicing the unit as this high voltage can cause death or serious injury.*

High Voltage Components

Various components on the Precedent unit operate using 220/3/60 or 460/3/60 high voltage and are identified by warning nameplates.
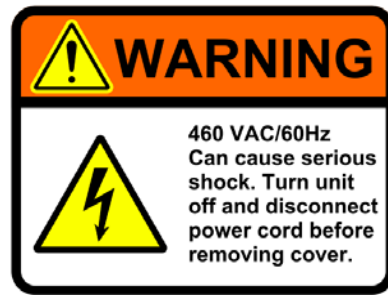

High Voltage Warning Nameplates

Additionally, all high voltage wiring is identified by **ORANGE** conduiting. Be aware of the locations of these components and understand that only certified and trained technicians should service them.

See the following page for locations of high voltage components.

Unit Fan Operation Safety Precautions

⚠️ *DANGER: The unit's Condenser fans and Evaporator fans may start automatically anytime the unit switch is "ON" and can cause serious injury. Switch unit to "off" before servicing.*

Condenser and Evaporator Fans

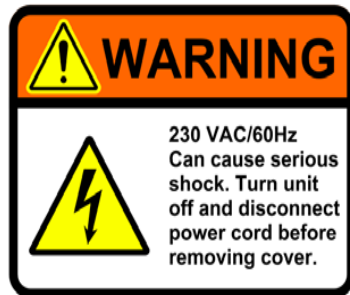Be aware of the warning nameplates near the condenser fans and evaporator fans.

Fan Warning Nameplates

STOP
Only trained and qualified individuals should operate the unit.
Refer to Precedent Operators Manual TK 55538-2-OP

Condenser Motors

Evaporator Motor

High Voltage Distribution Box

High Voltage Control Box

Electric Standby Motor and Power Receptacle (SmartPower Option)

AC Generator

Evaporator Motor

High Voltage Heater Strips (across coil)

High Voltage Junction Box

All high voltage wiring is identified by ORANGE conduiting

Priming the Fuel Pump and Programming the Controller

Priming the Fuel Pump

The Precedent unit is equipped with a remote fuel pump near the fuel tank. This fuel pump needs to be primed and the fuel system bled of air before the diesel engine can be started for the first time.

There are two ways this can be done:

Recommended Procedure: The fuel pump can be primed and fuel system bled of air (without starting the engine) by using the SR-4 controller to operate only the fuel pump relay.

1. Access **Maintenance Menu**.

2. Access **Output Test**.

3. Access **Run Relay** and PRESS Lock Key.

4. The fuel pump will begin to operate. Allow the pump to run for 5 minutes.

   - The diesel engine can now be started using the normal SR-4 controller functions.

Alternative Procedure: The fuel pump can be primed and fuel system bled of air by using the normal SR-4 controller functions to start and run the unit.

1. Use the SR-4 controller to start the unit.

   - It may take a few attempts to start the diesel engine as the fuel pump primes itself, fills the fuel lines and filter, and automatically bleeds air from the system.

   - Once the unit starts, Alarm Code 20 (Engine Failed to Start) may be present and should be cleared.

Programming the SR-4 Controller for Fuel Level

NOTE: These procedures can also be done through OptiSet™

Programming Procedures

NOTE: The Guarded Access Menu is not available if the engine is running.

1. Turn off the engine.

2. Go to the Guarded Access Menu.

3. Scroll down to and select the Unit Configuration.

4. Scroll down to and select Fuel Level Sensor.

   The choices are: NONE, SOLID STATE or FLOAT.

   - **USFLS STYLE** - scroll to SOLID STATE by pressing + key then YES key.

   - **FLOAT STYLE** - scroll to FLOAT by pressing + key then YES key.

   - Fuel Level Percent will now be in the gauge menu.

5. The unit is now programed, press the exit key.

UNIT CHECK LIST

UNIT CHECK LIST

☐ Visually inspect the unit for transit and handling damage. File claim with delivery carrier.

☐ Install the unit, fuel tank, fuel pump and lines as outlined in the Thermo King Installation Manual.

☐ Add 15 gallons of fuel to the tank.

BEFORE STARTING THE UNIT

☐ Check battery and battery cable installation.

☐ Inspect fuel line routing checking for rubbing, chaffing or laying on hot surfaces.

☐ Visually inspect the unit for the following: Loose or improperly fitting bolts, brackets, hardware, hose connections and hose routing.

☐ Inspect all wiring connections and routing.

☐ Check defrost drain hoses and kazoos.

☐ Check unit mounting hardware for tightness.

☐ Check compressor and engine mounts.

☐ Install refrigeration gauge manifold. (Multi-Temp units only)

☐ Check engine oil level.

☐ Check condenser and evaporator section for cleanliness and signs of refrigerant leaks.

☐ Check front bulkhead and air chute if equipped.

MULTI-TEMP UNITS (REMOTE EVAPORATORS)

☐ Check evaporator(s) sections for cleanliness.

☐ Leak test interconnecting tubing.

☐ Check for damage, loose or missing bolts and hardware on remote evaporator(s).

☐ Check for proper installation of drain tubes, drain kazoos and drain tube heater wires.

☐ Check for properly routed refrigerant lines wiring harnesses for remote evaporator(s). Check for properly routed harnesses for remote controller.

☐ Check for proper installation of remote evaporator guards if equipped.

☐ Check remote harness wiring plugs in the host evaporator.

☐ Check wiring, connections, and terminals in the remote evaporator(s).

☐ Check compartment bulk head(s) for proper fit if equipped.

UNIT CHECK LIST

START AND RUN UNIT
(On Multi-temp units start only the host unit)

☐ Check for proper oil pressure, coolant temperature, oil, fuel, or coolant leaks.

☐ Check alternator charge.

☐ Cycle the unit and ensure the unit functions in the correct modes and the mode indicators are working.

☐ Confirm engine speeds at normal engine running temperature. High Speed and Low Speed per maintenance manual. Check @70° F (21 C) box temperature and 70° F (21 C) ambient.

☐ Set for continuous run with thermostat set point at 32 F (0 C) and run the unit to 32 F (0 C).

☐ Observe and record refrigerant operating pressures in relation to ambient and box temperatures.

☐ Verify the readings above are correct for the conditions.

☐ When box reaches 32 F (0 C) check calibration of thermostat, thermometer and data logger.

☐ Run unit for 30 minutes at 32 F (0 C). During this period check for correct cycling.

☐ Reset thermostat to 50 F (10 C).

☐ Check throttling valve while in the heat cycle.

☐ Check operation of Modulation system if equipped.

☐ For Single Temp units perform a controlled check of the refrigerant level. For Multi-temps check the charge per multi-temp unit procedures.

MULTI-TEMP UNITS

☐ Install the compartment bulk head(s) if equipped.

☐ Check for correct rotation of remote evaporator fans.

☐ Check for correct cycling and operation of remote evaporator fans.

ALL UNITS

☐ Initiate and check defrost operation and termination.Check operation and adjustment of damper door and remote fans. Each zone on multi-temps must be checked for proper operation.

☐ Set the unit for Cycle Sentry Operation.

☐ Check for proper operation of all door switches.

☐ Remove the compartment bulk head(s) if equipped.

☐ Set the unit for continuous run. Continue to run the unit with the back doors open, alternating between high speed cool and heat until at

least 6 hours (10 hours preferred) are shown on the engine run time hour meter to ensure complete break in of the engine, time for the belts and other moving parts to take out the initial tension and adjustment.

☐ Run Pre-trip.

UNIT CHECK LIST

ELECTRIC STANDBY OPERATIONAL CHECKS

- ☐ Test AC electrical contacts and connections by connecting to AC power and running.
- ☐ Check for correct electric motor rotation.
- ☐ Check compressor clutch operation.
- ☐ Cycle thermostat and check for correct modes of operation.
- ☐ Power source not available to test AC.

STOP UNIT

- ☐ On Multi-temp units leak test interconnecting tubing.
- ☐ Check and readjust all belt tensions using TK belt gauge 204-427.
- ☐ Check for oil, fuel, coolant, refrigerant and exhaust leaks.
- ☐ Check engine oil and coolant level.
- ☐ Check entire unit for loosened hardware and fittings.
- ☐ Check and adjust all skin, door and panels for correct alignment and operation.
- ☐ Complete the commissioning registration process.
- ☐ Release unit.

Ingersoll Rand

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

www.thermoking.com   www.hussmann.com   www.ingersollrand.com