



# Operator's Manual

## TriPac® 3 Auxiliary Power Unit (APU)

Revision B

# Introduction

This manual is published for informational purposes only and the information furnished herein should not be considered as all-inclusive or meant to cover all contingencies. If more information is required, consult your Thermo King Service Directory for the location and telephone number of the local dealer.

**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.***

There is nothing complicated about operating and maintaining your Thermo King unit, but a few minutes studying this manual will be time well spent.

Performing pre-trip checks and enroute inspections on a regular basis will minimize operating problems. A regular maintenance program will also help to keep your unit in top operating condition. If factory recommended procedures are followed, you will find that you have purchased the most efficient and dependable temperature control system available.

All service requirements, major and minor, should be handled by a Thermo King dealer for four very important reasons:

- They are equipped with the factory recommended tools to perform all service functions.
- They have factory trained and certified technicians.
- They have genuine Thermo King replacement parts.
- The warranty on your new unit is valid only when the repair and replacement of component parts is performed by an authorized Thermo King dealer.

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# Safety

## 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 operation of this unit depend upon the strict observance of these precautions. The four types of advisories are defined as follows:

### **Danger**

#### **Hazard!**

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

### **Warning**

#### **Hazard!**

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

### **Caution**

#### **Hazard!**

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

### **Notice**

#### **Hazard!**

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

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## Safety Precautions

Thermo King recommends all services be performed by a Thermo King dealer. However, there are several general safety practices you should be aware of:

### **▲ Danger**

#### **Fire Hazard!**

Always turn the TriPac system OFF at the HMI Control Panel On/Off button while the truck is being refueled. Fuel vapors could ignite if they come in contact with TriPac electrical or heater components.

### **▲ Danger**

#### **Risk of Injury!**

Keep your hands, clothing, and tools clear of moving parts when the unit is operating or vehicle's engine is running. Loose clothing can become entangled in moving parts, causing serious injury or possible death.

### **▲ Warning**

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

Always wear goggles or safety glasses when working with or around the refrigeration system or battery. Refrigerant or battery acid can cause permanent damage if it comes in contact with your eyes.

### **▲ 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!**

Turn the unit HMI Controller Off before opening the Battery Box or inspecting any part of the unit.

**⚠ Caution**

**Sharp Edges!**

Exposed coil fins can cause lacerations. Service work on the evaporator or condenser coils should only be accomplished by a certified Thermo King technician.

**Telematics Precautions**

**⚠ Warning**

**Risk of Injury!**

Thermo King units equipped with two-way communications can be turned on and off from remote locations at any time via satellite or cellular phone. Once turned on, the units can start and run automatically at any time.

**Refrigerant Oil Hazards**

Observe the following when working with or around refrigerant oil.

**⚠ 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. When working with or around hazardous chemicals, ALWAYS refer to the applicable Material Data Safety Sheets (MSDS) and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection, and handling instructions.

**Refrigerant Hazards**

Although fluorocarbon refrigerants (R-404A/R-452A and R-134a) are classified as safe, observe caution when working with refrigerants or around areas where they are being used in the servicing of your unit.

**▲ Danger****Hazardous Gases - Personal Protective Equipment (PPE) Required!**

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. When working with or around hazardous chemicals, ALWAYS refer to the applicable Material Data Safety Sheets (MSDS) and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection, and handling instructions.

**▲ 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. When working with or around hazardous chemicals, ALWAYS refer to the applicable Material Data Safety Sheets (MSDS) and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection, and handling instructions.

**▲ 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. When working with or around hazardous chemicals, ALWAYS refer to the applicable Material Data Safety Sheets (MSDS) and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection, and handling instructions.

## 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 Cardio Pulmonary Resuscitation (CPR) 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 Cardio Pulmonary Resuscitation (CPR) 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.

### BATTERY ACID

- **Eyes:** Immediately flush with large amounts of water for at least 15 minutes. Get prompt medical attention. Wash skin with soap and water.

## Safety

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- **Skin:** Immediately remove contaminated clothing. Wash skin with large volumes of water, for at least 15 minutes. Wash skin with soap and water. Do not apply fatty compounds. Seek immediate medical assistance.
- **Inhalation:** Provide fresh air. Rinse mouth and nose with water. Seek immediate medical assistance.
- **Ingestion:** If the injured person is fully conscious: make the person drink extensive amounts of milk. Do not induce vomiting. Take the injured person immediately to a hospital.

### 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 Cardio Pulmonary Resuscitation (CPR). If a pulse is present, respiration might be restored by using mouth-to-mouth resuscitation. Call for emergency medical assistance.

### ASPHYXIATION

Move victim to fresh air and use Cardio Pulmonary Resuscitation (CPR) or mouth-to-mouth resuscitation to restore breathing, if necessary. Stay with victim until emergency personnel arrive.

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## Electrical Hazards

### Low Voltage

#### **⚠ Warning**

##### **Live Electrical Components!**

Control circuits used in the Auxiliary Power Unit are low voltage (12 to 28 volts dc). This voltage potential is not considered dangerous, but the large amount of amperage available can cause severe burns if shorted or grounded. Do not wear jewelry, watches, or rings because they increase the risk of shorting out electrical circuits and damaging equipment or causing severe burns.

#### **⚠ Caution**

##### **Risk of Injury!**

Always disconnect power at the battery before removing or repairing electrical components. Failure to do so may result in personal injury or damage to the 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 the unit from starting unexpectedly and causing personal injury.

**📄 Notice****Equipment Damage!**

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

**Safety Decals****Figure 1. Danger Nameplate**

**Figure 2. Warning Nameplate**



**Figure 3. Caution Nameplate**



## Unit Description

The TriPac 3 APU provides auxiliary heating, cooling temperature management that allows drivers to reduce unnecessary truck engine idling, which helps lower fuel consumption. The simple to use digital controller provides drivers greater control over their comfort and APU operations with large cabin temperature readings, function icons, and toggling menus.

The available Telematics option provides the data needed to have a clear line of sight to the unit's run hours, cabin temperatures, and fuel tax reporting. Real-time software updates, alarms, and maintenance reminders help ensure the APU runs smoothly.

**Figure 4. TriPac 3 APU Shown.**



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## Standard Features

- Easy to use interactive digital HMI controller
- Automatic start/stop operation for maximum fuel efficiency
- Truck engine preheating for easy starts in cold climates
- Truck battery charging with automatic low voltage sensing
- 9.0 hp 2 cylinder diesel engine - EPA Tier 4
- Thermo King TK 15 compressor for air conditioning
- Diesel fuel-fired sleeper compartment air heater
- 120 amp alternator
- Noise-dampening construction for quiet operation

## Optional Features

- TracKing V5 (TKV5) Telematics
- Inverter 2000W
- Arctic Package
- Closed Loop Cooling
- High Capacity Heater
- Truck Integration
- Air Tower Kit
- Appearance Package
- Hour Meter Kit (Single and Dual)
- Stainless Steel Condenser Frame
- Stainless Steel Exhaust Pipe Extension
- Solar Panel Kits (40W and 110W)
- Exhaust Aftertreatment Device (ATD) System (if equipped)

## System Components

- APU (with engine on/off switch inside)
- A/C Condenser
- A/C Evaporator
- MAC (Main Application Controller)
- Digital HMI Controller
- Heater (if equipped)

### APU

The TriPac 3 APU is mounted onto the side of the tractor's frame rails and contains the diesel engine, air conditioning compressor, alternator, control box with fuses, and a engine On/Off switch.

**Figure 5. TriPac 3 APU Shown.**



## Engine On/Off Switch

### ⚠ Warning

#### Risk of Injury!

The unit may start automatically without warning if the Engine On/Off Switch is in the On position.

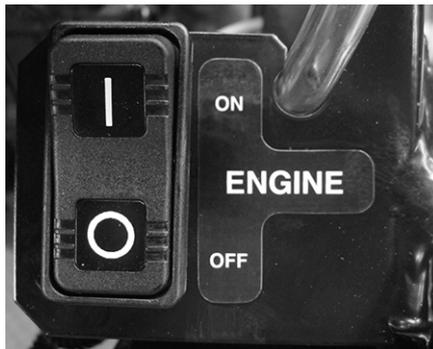
### ⚠ Warning

#### Risk of Injury!

Immediately stand clear when the preheat buzzer sounds. This indicates that the engine is preheating. If the engine is hot, preheat time will only be a few seconds.

The APU Engine On/Off Switch is located inside the TriPac 3 APU housing on the lower right side of the frame. The Engine On/Off Switch functions as a service switch to allow maintenance personnel to prevent the APU engine from starting when working on the unit. The switch is normally in the ON position to allow the TriPac system to operate. When the Engine On/Off Switch is placed in the Off position, it will not only prevent the engine from starting, but disable ALL outputs in the system (fans, AC clutch, etc.) from powering on.

**Figure 6. APU Engine On/Off Switch Shown.**



## A/C Condenser

The air conditioning condenser is typically mounted on the back of the truck cab.

**Figure 7. A/C Condenser Shown.**



## A/C Evaporator

The air conditioning evaporator is typically installed under the bunk in the truck cab sleeper compartment. Air ducts from the evaporator carry conditioned air to the sleeper compartment. The evaporator has a air filter that can easily removed for cleaning.

**Note:** Depending on the installation, the MAC (Main Application Controller) may also be attached to the top of the evaporator as shown.

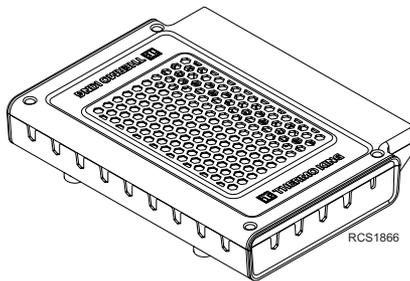
**Figure 8. A/C Evaporator (with MAC) Shown.**



## MAC

The MAC (Main Application Controller) is typically installed on top of the evaporator or it can be mounted separately under the bunk area. The MAC receives input from the HMI to operate the TriPac. Fuses for the system components are located at one end of the MAC.

**Figure 9. MAC Shown.**



**Important:** The top area of the MAC should be kept open to allow for air flow and heat dissipation.

## HMI Controller

The digital HMI (Human Machine Interface) controller is typically installed on a wall in the sleeper compartment. The HMI communicates with the MAC to operate the TriPac.

**Figure 10. TriPac 3 HMI Controller.**



## Heater

**Note:** *Some TriPac 3 installation may have the heater delete option. These installation will not have a heater.*

The stand alone diesel fired heater is typically installed in the cargo compartment or under the truck cab sleeper compartment. The heater uses fuel from the truck's diesel fuel tank and is controlled by the HMI. The heater's output vent is typically located near floor level in the truck cab sleeper compartment. The air return inlet vent is typically located at floor level. The heater is turned On and Off and the temperature setpoint is set using the HMI Controller. The inlet tube pulls air into the heater and the outlet tube provides heated air into the cab through a vent. The heater has its own internal fan and does not use the evaporator fan. The standard heater output is 7,500 BTUs and the optional high output heater is 13,600 BTUs.

**Important:** *It is important that both of these vents to be unblocked for the heater to operate efficiently.*

**Figure 11. Diesel Fired Heater Shown.**



## ConnectedSuite™ Telematics (Option)

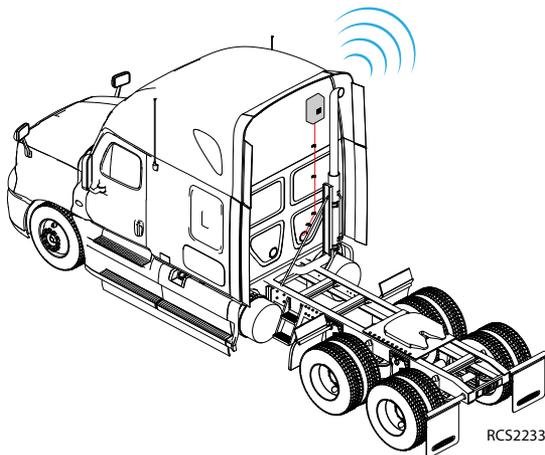
Thermo Kings ConnectedSuite a wireless communication platform that offers fleet owners the ability to monitor their TriPac 3 units. 4G cellular capabilities are used to communicate with Thermo King's web-based TracKing® application. Bluetooth® and Cellular options are available when using the TK Connect App to monitor assets using the telematics TKV5 module. A third party interface with the TKV5 module offers a gateway for telematics providers to communicate with the Thermo King unit.

Tractors equipped with this option will typically have the TKV5 module attached to the outside rear of the tractor cab protected by a cover.

TKV5 communicates with the unit controller through the CAN connector on the controller. The TKV5 has an internal antenna system through which it communicates with the telematics system or locally via Bluetooth using the TK Connect App for supported devices. It also has an internal battery that is used to provide backup power if the main battery power is lost or interrupted. The TKV5 contains an intelligent battery charger that keeps the TKV5 battery charged during normal unit operation. No maintenance is required by the operator.

Contact your Thermo King dealer for more information.

**Figure 12. Typical Telematics Location on Rear of Sleeper/Cab Shown.**



## **Power Inverter (Option)**

A 12 Vdc to 120 Vac inverter is available as an option for TriPac. The inverter is normally connected directly to the truck batteries.

Inverter features will vary, depending upon the brand and model used. Typically, when the inverter detects an AC load, it automatically turns on and converts DC to AC power for onboard 120 Vac devices. If the TriPac is enabled and the inverter draws truck battery voltage down below the voltage limit established for the installation, the TriPac will start and attempt to recharge the truck batteries back to the level specified. If the TriPac is not enabled, the inverter could drain the truck batteries below the level required to start the truck or the TriPac.

Manufacturer's instructions for the optional inverter are provided separately. It is important to read and follow those instructions for proper use of the inverter.

## **Inverter Operation Hazards**

### **⚠ Danger**

#### **Risk of Injury!**

Do not use the Thermo King Power Inverter in life support or health care applications where a malfunction or failure of the inverter could cause failure of a life support device or medical equipment or significantly alter the performance of that equipment.

### **⚠ Danger**

#### **Hazardous Voltage!**

Potentially lethal voltages exist within the power inverter as long as the battery supply is connected. During any service work, the battery supply should be disconnected.

### **⚠ Danger**

#### **Risk of Injury!**

Do not connect or disconnect batteries while the power inverter is operating from the battery supply. Dangerous arcing may result.

**⚠ Caution**

**Risk of Injury!**

Protect against possible electrical shock hazards. If the inverter is operated in wet or damp conditions a user-supplied, portable GFCI (ground fault circuit interrupter) must be connected between each inverter receptacle and the equipment it powers.

**📌 Notice**

**Equipment Damage!**

You may experience uneven performance results if you connect a surge suppressor, line conditioner or UPS system to the output of the inverter.

## Closed Loop Cooling (Option)

The Closed Loop Cooling option is typically for trucks operating in warmer climates where the standard TriPac 3 Truck Coolant Integration is not needed. This option separates the TriPac Evolution cooling system from the truck engine cooling system. The APU engine is equipped with a coolant tank and the pre-cooler coil becomes the radiator for the APU engine. Coolant level should be checked routinely.

## Arctic Package (Option)

This option monitors engine coolant temperature during low ambient conditions and automatically starts the TriPac 3 engine to heat the truck engine coolant. This keeps the truck's engine warm allowing for easier sub-zero cold starts. Arctic Package is only available for installation onto trucks with the standard Truck Coolant Integration.

## Remote Hour Meter (Option)

Single or dual hour meters (Engine Hours and/or Heater Hours) are available as an option. Typically they are located inside the truck tool box area so they are visible through the access door.

# How to Maximize APU Operational Efficiency

The following suggestion will help maximize the operation and efficiency of your TriPac 3 APU.

## **A/C System**

- When possible, pre-cool the cab/sleeper with the truck's OEM air conditioning system before switching over to the APU's air conditioning.
- Minimize heat generated from sunlight through windows by closing curtains, blinds, etc.
- Keep evaporator air inlet grille free from obstructions.
- Keep evaporator air inlet filter clean. Replace when dirty.
- When air ducts are low on wall or near the floor, adjust air flow up and away from evaporator inlet grille to minimize re-circulation.
- Confirm evaporator air discharge hoses are not damaged, disconnected, or have any kinks or tight bends.

## **Heating System (if equipped)**

- When possible, pre-heat the cab/sleeper with the truck's OEM heating system before switching over to the APU's heater.
- Minimize loss of heated air by closing curtains, blinds, etc.
- Keep heater air inlet grille and outlet vent free from obstructions.
- Confirm heater air intake or discharge hoses are not damaged, disconnected, or have any kinks or tight bends.
- Confirm heater is not covered with blankets, pillows, etc.

# Manual Pre-Trip Inspection

Pre-trip inspections are an important part of a preventative maintenance program designed to minimize operating problems and breakdowns. Perform this pre-trip inspection before every trip.

**Important:** *Contact your nearest Thermo King Dealer immediately if problems are found.*

**Note:** *Pretrip inspections are not intended to take the place of regular maintenance inspections.*

## Before Starting the TriPac Unit

**Engine:** Check engine oil level. Check coolant level if equipped with optional closed loop cooling. Coolant should be visible in coolant tank sight glass.

**Belts:** Verify the TriPac APU belts are in good condition and adjusted to the proper tension.

**Electrical:** Check the electrical connections to verify they are securely fastened. Wires and terminals should be free of corrosion, cracks, and moisture.

**Structural:** Visually inspect the unit for leaks, loose or broken parts, and other damage.

**Coils:** Verify the condenser, evaporator, and pre-cooler coils are clean and free of debris.

**Heater:** Check exhaust pipe and intake tube.

**General:** Listen for unusual noises and vibrations or fluid leaks.

# Operating Instructions

## HMI Control Panel

**⚠ Danger**

**Fire Hazard!**

Always turn the TriPac system OFF at the HMI Control Panel On/Off button while the truck is being refueled. Fuel vapors could ignite if they come in contact with TriPac electrical or heater components.

The Human Machine Interface (HMI) Control Panel is used to operate the APU and display information. The HMI consists of a display, four buttons with dedicated functions, and four multi-function soft keys. The display is capable of showing both text and graphics. Please take a few minutes to familiarize yourself with the HMI functions and features.

**Note:** *The TriPac 3 APU is designed to operate only when the truck is stationary to reduce unnecessary truck engine idling.*

**Figure 13. TriPac 3 HMI Shown.**



1.	On/Off Button	6.	Time
2.	Mode Icon (Cool Shown)	7.	Fan Speed Icon (AUTO Shown)
3.	Alarm Notification Icon	8.	Up/Down Buttons
4.	Temperature Set Point	9.	Multi-Function Soft Keys (1-4)
5.	Maintenance Reminder Icon	10.	Menu Button

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## Buttons

There are four buttons with dedicated functions.



**On/Off:** Used to turn the unit on/off. A short press will turn the unit on. A short press will also toggle the screen on/off. A long press of five seconds will open the Mode Selection screen to shut down the unit.



**Menu:** Used to access the menus and return to Standard Display.



**Up/Down:** Used for temperature setpoint change.

## Operating Instructions

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### Multi-Function Soft Keys

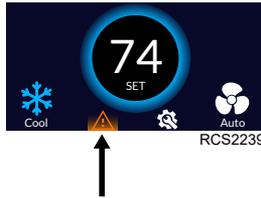
There are four multi-function soft keys. The function of the soft keys change depending on the operation being performed. If a soft key is active, its function will be shown in the display directly above the key.



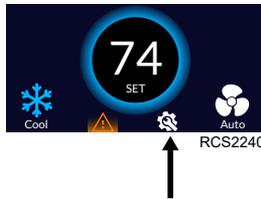
**1st Button — HVAC Mode Selection:** For selecting one of the four operating modes:



**2nd Button — Alarm Notification:** For viewing alarm notifications (if present).



**3rd Button — Maintenance Status:** For viewing maintenance schedule.



**4th Button — Fan Speed Selection:** For selecting one of the four fan speeds or off:



## OFF Mode

The **OFF Mode** selection turns off the HVAC system while leaving the unit powered up. This allows the APU to automatically start for truck battery charging, and for truck coolant heating when equipped with optional Arctic Package.

1. Press ON/OFF button to turn system ON.
2. Press multi-function button #1 and select **OFF Mode**.

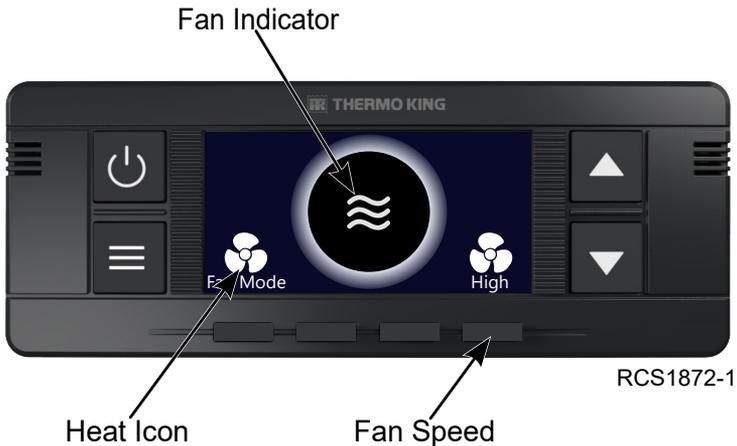
## Fan Mode

The **Fan Mode** selection allows the evaporator fan to operate to provide air circulation with no A/C.

1. Press **ON/OFF** button to turn system **ON**.
2. Press multi-function button #1 and select **Fan Mode**.
3. Press multi-function button #4 and set fan to desired speed.

**Note:** In the Fan Mode with no A/C, fan speeds available are Low, Medium, High or Off. AUTO is not available in FAN mode.

**Figure 14. Fan Mode Shown.**



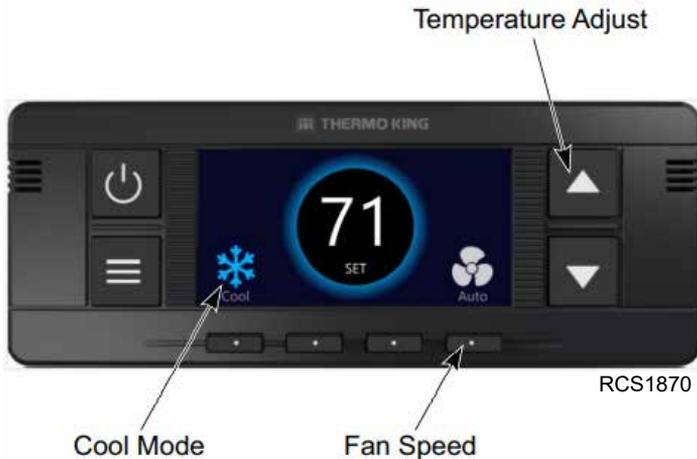
## Cool Mode

The **Cool Mode** selection provides air conditioning (A/C) for the sleeper compartment. The A/C will shut off (along with the APU) when sleeper compartment temperature reaches the set point selected by the operator. If the sleeper compartment temperature rises several degrees above the set point, the APU will restart along with the A/C system.

1. Press **ON/OFF** button to turn system **ON**.
2. Press the multi-function button #1 and select **Cool Mode**.\*
3. Press the up/down buttons to raise or lower temperature set point.
4. To change the fan speed, press multi-function button #4 and select desired fan speed.\*

**Note:** \*The fan operates automatically in the **AUTO** speed setting when in **Cool Mode**. There is no fan off setting while the A/C is operating.\*

**Figure 15. Cool Mode Shown.**

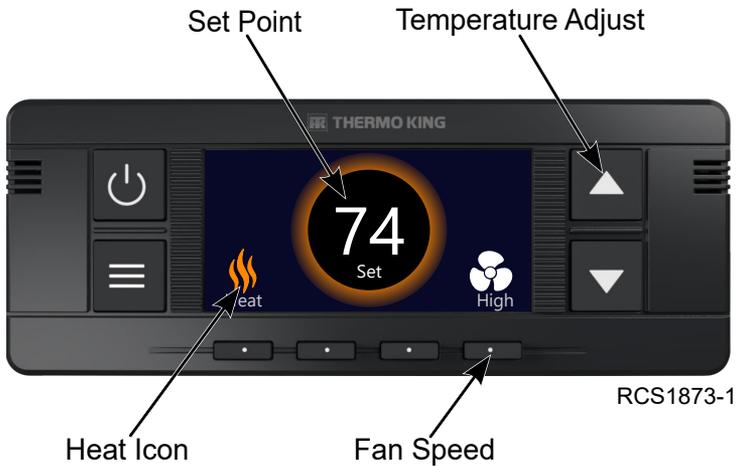


## Heat Mode

1. Press **ON/OFF** button to turn system **ON**.
2. Press multi-function button #1 and select **Heat Mode**.
3. Press the up/down scroll buttons to raise or lower temperature set point.
4. When in **Heat Mode**, heated air is provided by the heater's internal fan which is not adjustable.

**Note:** *The evaporator fan can also be used to provide additional air circulation by adjust the fan speed (Low, Medium, High or Off) on the HMI. AUTO is not available in HEAT mode.*

**Figure 16. Heat Mode Shown.**



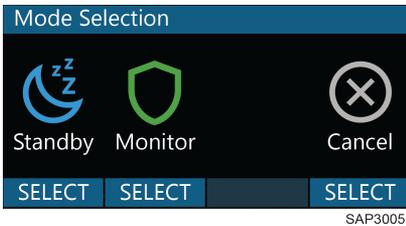
## Standby Mode

Standby mode is used to disable operation of the APU, usually while the truck engine is running or during periods where the APU operation should be paused, such as refueling.

Standby mode can be controlled externally using a switched input, either from a truck ignition switch or separate auxiliary switch in the truck cab.

Standby mode can also be activated as shown below using the Mode Selection screen, by choosing the left-most choice labeled "Standby". When either (or both) of these conditions occur, the system will enter Standby mode

When the truck ignition switch is in the run position, a voltage signal is sent to the MAC and the TriPac system will enter Standby mode.



The following occurs when the TriPac system is in Standby mode:

- Air conditioning, fan, or heat operation will terminate.
- The APU engine will stop.

The MAC remains on but will not respond to any operation requests, such as low battery voltage, low coolant temperature, or changes in cab temperature.

### Standby Truck Integration

An optional wire harness connects the truck ignition switch to a SBY circuit input connection on the MAC. The MAC monitors voltage on this circuit. The following conditions occur:

- **The Truck ignition switch is in the Off or Acc position.** If the TriPac system is turned on the unit operates normally.
- **The Truck ignition switch is in the Start or On position.** The TriPac unit is forced to Standby mode.

### Truck Integration Standby Switch

The Standby Switch is located on the truck instrument panel. It is connected to the MAC.

When the Standby Switch is in the Normal (On) position, the APU operates as previously stated. The system will respond to the truck ignition as with the Standby Truck Integration option.

When the Standby Switch is in the Standby (Off) position, power is routed from the TRUCK\_IGN\_2 circuit to the MAC SBY circuit input connection. When this occurs, the APU is forced to Standby mode and operation stops. The unit will remain in Standby mode until the Standby Switch is placed in the Normal position. The truck ignition switch will have no effect. This allows the operator to disable the TriPac system without accessing the HMI Control Panel in the sleeper.

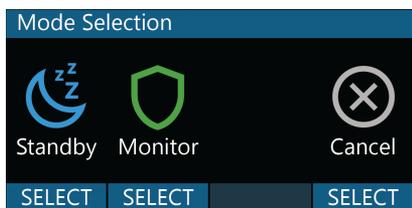
## Monitor Mode

When long pressing the power button (five seconds), Standby, Monitor, and Shut Down are options. If the Monitor only option is enabled, the Shut Down option will not be available.

Monitor mode is intended to function similarly to HVAC Off mode. In Monitor mode, HVAC functions will be disabled, but the truck protection features of battery voltage and coolant temperature (if applicable) will be active.

Monitor mode can be entered by long pressing the power button for five seconds which brings up the Mode Selection screen. Monitor mode will appear in the second position. If the Monitor only option is enabled, the Shut Down option will not be available leaving Monitor as the only option verifying that a typical user cannot shut off the APU, and allows the APU to remain active to keep truck batteries charged and tractor coolant warmed. The APU can still be shut down from the Advanced Menu.

**Important:** *Battery and engine temperature monitoring are disabled if the TriPac system is turned off at the HMI.*



SAP3005



SAP3004

## Operating Instructions

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### Operation

While Monitor mode is active, the APU will continue to start and stop as necessary to maintain battery voltage and engine coolant temperature (if the Arctic Option is installed). While in Monitor mode, the system will not react to changes in cab temperature. TriPac Cool, Heat, and Fan modes will remain off.

Battery voltage sensing is enabled. When battery voltage falls to the level set by Battery Voltage Restart Value (default 12.2 Vdc), the APU engine will start to charge the batteries. The engine will continue to run until the Charge Current Shutoff Value setting has been reached (default 20 amps).

If the Arctic Option is installed and enabled, the truck engine coolant temperature is monitored. If returning coolant temperature rises above 140° F, the PCF circuit will be energized and the pre-cooler fan will run. When coolant temperature falls below 115°F, the PCF circuit will be de-energized and the pre-cooler fan will stop.

### Main Menu

The Main Menu contains several additional submenus that allow the user to view information and modify unit operation.

The following selections are available:

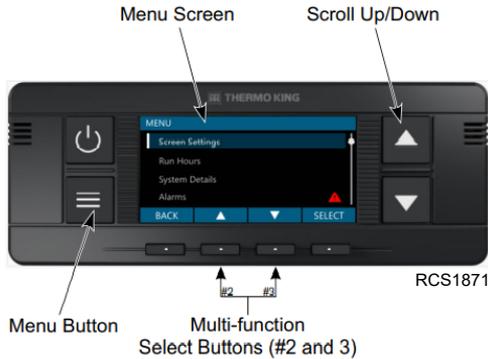
- **Screen Settings:** Programmable settings for screen/button colors, time out, language, and temperature readings.
- **Run Hours:** Displays hour meter readings for engine, cooling, heating, battery charge, and fan recirculation.
- **System Details:** Displays system information, dates, serial number, and firmware information.
- **Alarms:** Displays current and historical alarm data.
- **Maintenance:** Displays unit maintenance trackers and settings.
- **Fuel Meter:** Displays lifetime fuel consumption of unit.
- **Aftertreatment (if equipped):** Display status of ATD system.
- **Advanced Menu:** Dealer only access to system settings.

To access the **Main Menu**:

1. Press **ON/OFF** button to turn system **ON**.
2. Press **Menu** button and scroll through menu options using up/down scroll buttons, or by using multi-function up/down buttons **#2** and **#3**.

- Use multi-function select buttons **#4** and **#1** as needed to select menu options.

**Figure 17. Main Menu Screen Shown.**



## Screen Settings

The Screen Settings submenu can be accessed by pressing the Menu button and scrolling to Screen Settings using the soft keys below the Up/Down arrows. Press the soft key below SELECT when Screen Settings is highlighted.



The following settings can be individually adjusted:

- Screen Brightness (Active): 20% to 100%
- Screen Brightness (Idle): 20% to 100%
- Button Brightness (Active): 100%
- Button Brightness (Idle): 100%
- Button Color: Blue

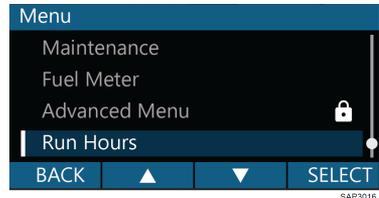
## Operating Instructions

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- Idle Timeout: 30, 60, 90, or 120 Seconds
- Temperature Scale: Fahrenheit or Celsius
- Language: English

## Run Hours

The Run Hours submenu can be accessed by pressing the Menu button and scrolling to Run Hours using the soft keys below the Up/Down arrows. Press the soft key below SELECT when Run Hours is highlighted. Run Hours allows the user to view the unit hourmeters. If the view feature for a particular hourmeter is not enabled, that hourmeter will continue to accumulate time but cannot be viewed from the Run Hours menu.



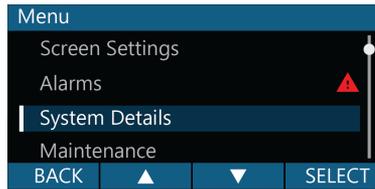
The following Run Hours may be displayed:

- APU Engine: Number of run hours the APU engine has accumulated in its lifetime.
- APU Engine Starts: Number of engine starts the APU engine has accumulated in its lifetime.
- Heater: Number of run hours the heater has accumulated in its lifetime.
- Fan: Number of run hours the evaporator fan has accumulated in its lifetime.
- Compressor: Number of run hours the compressor has accumulated in its lifetime.
- Compressor Cycles: Number of compressor starts the compressor has accumulated in its lifetime.
- Battery Charge: Number of run hours the alternator has accumulated in its lifetime.
- Alternator Cycles: Number of alternator starts the alternator has accumulated in its lifetime.

- Regen Cycles: The number of complete regeneration cycles performed by the Aftertreatment Device (ATD) in its lifetime.
- Protection: Number of hours the controller has spent performing, or ready to perform, its primary functions of temperature control, battery charging, and tractor warming (if configured for Arctic operation).
- Heating: Number of hours the controller has spent in HEAT HVAC mode.
- Cooling: Number of hours the controller has spent in COOL HVAC mode.
- Fan Only: Number of hours the controller has spent in FAN ONLY HVAC mode.
- Standby: Number of hours the controller has spent in STANDBY mode.
- Tractor Warm: Number of hours the controller has spent warming the engine (Arctic configuration only).
- Controller ON: Number of hours the controller has been powered ON, regardless of operating mode.

## System Details

The System Details submenu can be accessed by pressing the Menu button and scrolling to System Details using the soft keys below the Up/Down arrows. Press the soft key below SELECT when System Details is highlighted.



The following System Details may be available:

- Model Number
- Manufactured Date
- In-Service Date
- Serial Number
- Unit ID
- MAC, RIO, and HMI Firmware

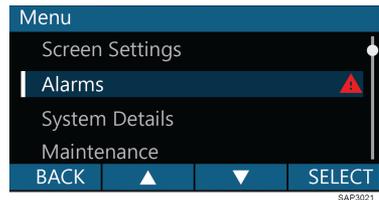
## Operating Instructions

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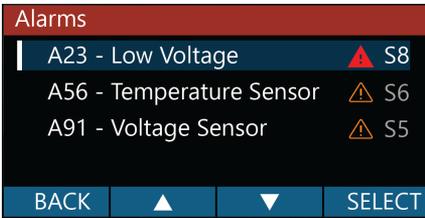
- Engine Cooling
- Aftertreatment
- Cabin Heater
- Telematics
- Telematics Connection
- Telematics Firmware
- Telematics Serial Number

## Alarms

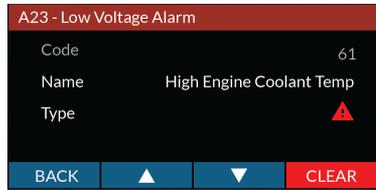
Alarms are displayed and cleared using the Alarms submenu. This submenu can be accessed by pressing the Menu button and scrolling to Alarms using the soft keys below the Up/Down arrows or by pressing the soft key under the alarm icon, if present.



The Alarms list will appear displaying all active Shutdown (Red), Check (Amber), and Log (Yellow) alarms. The HMI Alarm screen displays up to 32 active alarms in priority order to assist in troubleshooting. Select an alarm for specific details. The option to Clear an alarm may or may not be available depending on the alarm type.



SAP3022

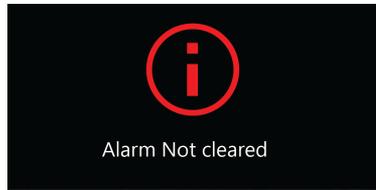


SAP3023

To clear an alarm, highlight the Alarm using the soft keys below the Up/Down arrows. Press the soft key below CLEAR. A Confirmation screen will be displayed.



SAP3024



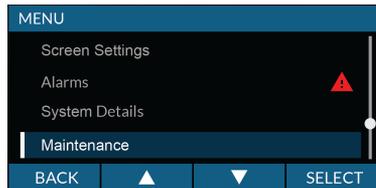
SAP3025

## Maintenance Menu

The Maintenance submenu can be accessed by pressing the Menu button and scrolling to Maintenance using the soft keys below the Up/Down arrows. Press the soft key below SELECT when Maintenance is highlighted.



SAP3028



SAP3026

The following Maintenance related items are displayed:

- Remaining Hours: Defined as Recommended Service Interval minus Engine Run Hours elapsed since last Maintenance Tracker Reset.

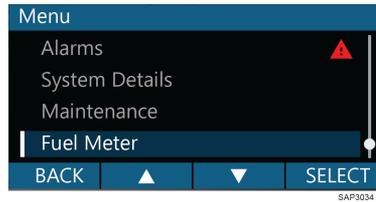
## Operating Instructions

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- Reset Maintenance Tracker: Can be reset at any time by any user.
- Maintenance Reminders: Yes or No
- Services Required: Information Icon

## Fuel Meter

The Fuel Meter submenu can be accessed by pressing the Menu button and scrolling to Fuel Meter using the soft keys below the Up/Down arrows. Press the soft key below SELECT when Fuel Meter is highlighted. Fuel Meter is used to record the lifetime fuel consumption of the unit.



## Aftertreatment

The Aftertreatment submenu can be accessed by pressing the Menu button and scrolling to Aftertreatment using the soft keys below the Up/Down arrows. Press the soft key below SELECT when Aftertreatment is highlighted. This submenu is only visible if the APU is configured with an Aftertreatment Device.



The following Aftertreatment related items are displayed:

- Initiate ATD Regen: Select to initiate ATD Regen process.
- Status: Time since last successful ATD Regen.

# Specifications

## Engine

Engine	TK270F (Tier 4)
Fuel Type	No. 2 Diesel fuel under normal conditions No. 1 Diesel fuel is acceptable cold weather fuel
<div style="background-color: #4F81BD; color: white; padding: 5px; display: inline-block;"><b>Notice</b></div>	
<p><b>Equipment Damage!</b></p> <p>Use fuel suitable for the climate you operate in (see truck engine manufacturer's recommendations). Blending used engine oil with diesel fuel is not permitted in the TriPac APU system. It will plug the filters and will not allow the air heater to run properly. Thermo King reserves the right to void all warranty on the unit.</p>	
Oil Capacity: Crankcase & Oil Filter	6.5 quarts (6.15 liters) maximum
Oil Type	API Type CK-4 multigrade oil. API Synthetic Type CK-4 multigrade oil is required for units equipped with the optional DPF (Diesel Particulate Filter) FA-4 (10w-30 only)
<p><b>Important:</b> <i>The port on top of the engine should not be used to add engine oil. Always add oil through the lower port on the timing gear cover to prevent engine lock-up and/or serious internal damage. Approximately 1.5 quarts (1.4 liters) is required to move the oil level from the lower line (5.1 quarts [4.8 liters]) to the upper line (6.5 quarts [6.2 liters]) on the dipstick.</i></p>	
Oil Viscosity	5 to 104 F (-15 to 40 C): SAE 15W-40 -4 to 86 F (-20 to 30 C): SAE 10W-30
Coolant System Capacity (TriPac engine only)	0.6 quarts (0.6 liters) 2.75 quarts (2.60 liters) with Closed Loop Cooling
Engine Thermostat	160 F (71 C)

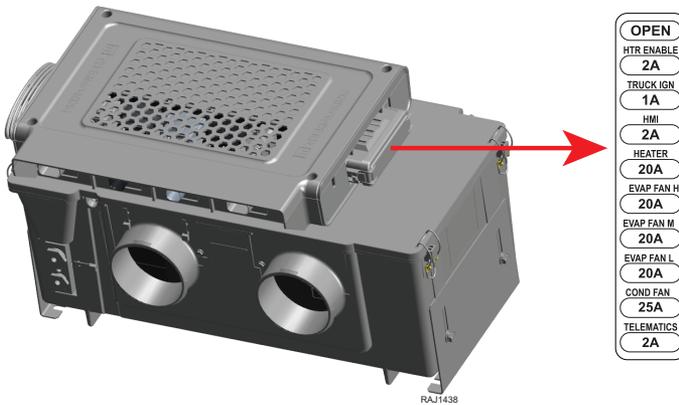
## Fuses

The electrical system of the TriPac 3 is protected by a number of fuses. Fuse locations are as follows:

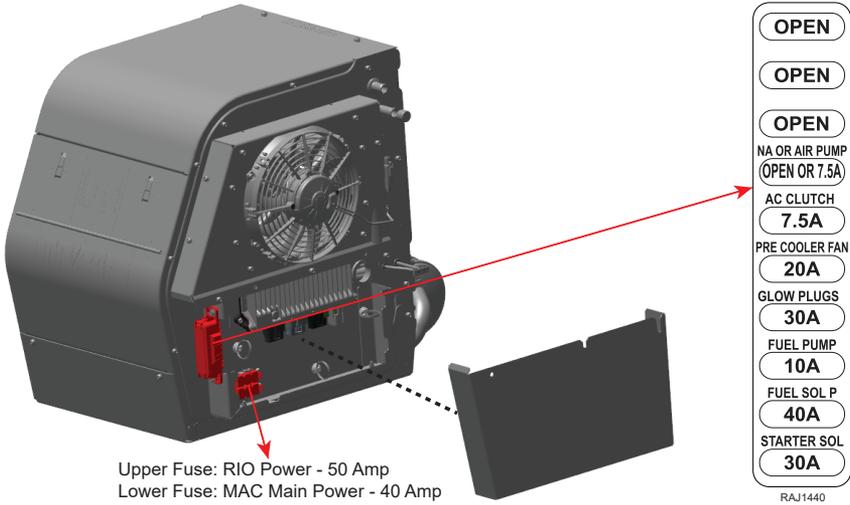
- Fuse block on the MAC inside the truck cab
- Fuse block inside RIO compartment on APU
- Inside APU
- Inside battery box of truck

**Important:** Replacement fuses must be the correct amp rating. Replacing fuses without diagnosing the problem is not recommended. Thermo King recommends all electrical maintenance and service procedures be performed by an authorized Thermo King dealer.

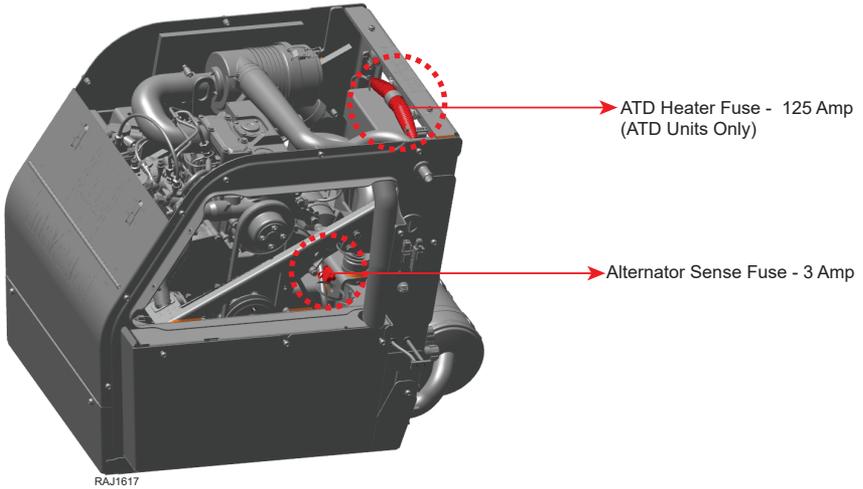
**Figure 18. Fuse Block on the MAC Shown.**



**Figure 19. Fuse Block Inside RIO Compartment Shown.**



**Figure 20. Fuses Inside APU Shown.**



# Maintenance and Service

Thermo King recommends all maintenance and service procedures be performed by an authorized Thermo King dealer.

**Note:** *Thermo King reserves the right to deny warranty coverage on claims due to lack of maintenance or neglect. Claims in question must be supported by maintenance records.*

## ⚠ Warning

### Risk of Injury!

Take precautions to ensure the unit will not accidentally start while you are servicing the system. Always turn off the APU Engine On/Off Switch when inspecting or servicing any components in the APU enclosure.

## Engine

Pre-trip	500 Hrs	Annual 2,000 Hrs	Check condition of or service the following:	Completed
•	•	•	Check engine oil level.	
•	•	•	Check engine coolant level on units with optional closed loop cooling system.	
•	•	•	Inspect belts for condition and proper tension.	
•	•	•	Listen for unusual noises, vibrations, etc.	
	•	•	Check air cleaner hose for damage.	
	•	•	Inspect air cleaner. Change as needed or annually.	
	•	•	Inspect fuel pre-filter screen. Clean as required or annually.	
		•	Change fuel filter. Thermo King brand filter is required.	
		•	Drain water from fuel tank and check vent.	
	•	•	Check and adjust engine speed.	
	•	•	Check condition of engine mounts.	

## Maintenance and Service

Pre-trip	500 Hrs	Annual 2,000 Hrs	Check condition of or service the following:	Completed
		•	Maintain year-round anti-freeze protection at -30° F (-34° C). Change coolant every two years, or with truck coolant. For units equipped with optional closed loop cooling system and ELC (red) engine coolant, change ELC coolant every 5 years or 12,000 hours.	
		—	Adjust engine valves (1,500 hours).	
		—	Test fuel injection nozzles at least every 3,000 hours. *	
		—	Replace fuel return lines between fuel injection nozzles every 10,000 hours or sooner, as required.	
* Based on EPA 40 CFR Part 89.				

## Engine Oil Change Intervals

### Change oil and filters hot

Pre-trip	500 Hrs	Annual 2,000 Hrs	Check condition of or service the following:	Completed
		•	<b>2,000 Hour Interval</b> -Oil change interval is every 2,000 hours of operation <u>only when using a Thermo King brand oil filter and CK-4 or better oil.</u> Units with optional ATD exhaust system require CK-4 or better oil. FA-4 is not approved.	
	•		<b>500 Hour Interval</b> -Oil change interval is every 500 hours of operation when using any other brand oil filter and CI-4 or better oil. Units with optional ATD exhaust system require CK-4 or better oil.	
<p><b>Important:</b> The fill port on top of the engine <b>should not be used</b> to add engine oil. To prevent engine lock-up and/or serious internal damage after TriPac engine oil is added or changed always add oil through the lower port on the timing gear cover.</p> <p><b>Important:</b> DO NOT overfill oil, this can damage the Engine and ATD exhaust system (if equipped).</p>				

## Electrical

Thermo King recommends all electrical maintenance and service procedures be performed by an authorized Thermo King dealer.

## Structural

Pre-trip	500 Hrs	Annual 2,000 Hrs	Check condition of or service the following:	Completed
•	•	•	Visually inspect unit for fluid leaks (coolant, oil, refrigerant).	
•	•	•	Visually inspect unit for damaged, loose or broken parts.	
	•	•	Inspect, clean and (if necessary) replace evaporator air filter. It may be necessary to check or replace it more often if conditions require.	
	•	•	Inspect evaporator drain valves (kazoos) to ensure that they are in place, in good condition and are sealing.	
		•	Steam clean condenser and APU pre-cooler coil. Do not bend coil fins.	
		•	Blow out evaporator coil and evaporator water drains with air. Do not bend coil fins.	
		•	Check APU mounting bolts and brackets for cracks, damage and poor alignment. Verify tightness and torque to 100 ft-lbs (135.6 N•m) for the claw mount, or 200 ft-lbs (271.2 N•m) for the direct frame mount.	

## A/C System

Thermo King recommends all air conditioning maintenance and service procedures be performed by an authorized Thermo King dealer.

## Heater

Thermo King recommends all heater maintenance and service procedures be performed by an authorized Thermo King dealer.

## **Exhaust Aftertreatment Device (ATD) System (if equipped)**

Thermo King recommends all exhaust aftertreatment device maintenance and service procedures be performed by an authorized Thermo King dealer.

# TriPac Warranty

Terms of the Thermo King Warranty are available on request. Please reference document TK 53051 for the Thermo King TriPac 3 Warranty.

# **EPA and ARB Supplemental Emissions Warranty Statement**

Your Thermo King unit is covered by the diesel engine manufacturer's EPA and ARB Supplemental Emissions Warranty. Complete details of this emission warranty can be found at [www.thermoking.com](http://www.thermoking.com).

## Serial Number Locations

**APU:** Unit nameplate is located on front right edge of APU frame near the Engine Switch (APU service access door must be opened to view the nameplate).

**Engine:** Nameplate located on the top of the engine. The engine is mounted in the APU housing.

**Compressor:** Nameplate located on compressor body. The engine driven compressor is located in the APU housing.

**Heater:** Sticker located on the side of the heater (Fabrik No.).

## Emergency Cold Line

If you can't get your unit operating and need assistance, you can locate a Thermo King Dealer anywhere in the United States by going to [thermoking.com](http://thermoking.com) or by using the Thermo King North American Service Directory (available from any Thermo King dealer). If you are unable to reach a dealer, then call the Toll Free Emergency Cold Line Number (888) 887-2202. The answering service will assist you in reaching a dealer to get the help you need. The Cold Line is answered 24 hours a day by personnel who will do their best to get you quick service at an authorized Thermo King Dealer



# Recover Refrigerant

At Thermo King®, we recognize the need to preserve the environment and limit the potential harm to the ozone layer that can result from allowing refrigerant to escape into the atmosphere.

We strictly adhere to a policy that promotes the recovery and limits the loss of refrigerant into the atmosphere.

In addition, service personnel must be aware of Federal regulations concerning the use of refrigerants and the certification of technicians. For additional information on regulations and technician certification programs, contact your local THERMO KING dealer.

# CALIFORNIA Proposition 65 Warning



RCS1032







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

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