



Operator's Manual

Truck Edition

UT-1280

October 2016

TK-56373-1-OP

Revision 0

TRANE
TECHNOLOGIES

UT-1280

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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.

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Introduction

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 on-the-road 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.

IMPORTANT: 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.

Safety Precautions

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



WARNING: 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: Keep hands and loose clothing clear of fans and belts at all times when the unit is operating or when opening or closing compressor service valves.



WARNING: Exposed coil fins can cause painful lacerations. Service work on the evaporator or condenser coils is best left to a certified Thermo King technician.



CAUTION: Use extreme caution when drilling holes in the unit. Drilling into electrical wiring or refrigerant lines could cause a fire. Never drill into structural components.

Automatic Start/Stop Operation

This unit is capable of automatic operation and may start at any time without prior warning.



WARNING: The unit may start at any time when the controller is turned on. The controller display lights up when the controller is turned on.



WARNING: Units equipped with electric standby may start at any time when the unit is connected to live electric power and the controller is turned on.



WARNING: *Be sure to press the OFF key to turn the controller off before opening doors or inspecting any part of the unit.*

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.*

Safety Precautions



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.

Electrical Hazard



CAUTION: Be sure to turn off the high voltage power supply, and disconnect the electric cable before working on the unit. Units with electric standby present a potential electrical hazard.

Refrigerant

Although fluorocarbon refrigerants 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: Fluorocarbon refrigerants may produce toxic gases. In the presence of an open flame or electrical short, these gases are severe respiratory irritants **CAPABLE OF CAUSING DEATH.**



DANGER: Fluorocarbon refrigerants tend to displace air and can cause oxygen depletion which could result in **DEATH BY SUFFOCATION.** Provide adequate ventilation in enclosed or confined areas.



WARNING: Fluorocarbon refrigerants evaporate rapidly, freezing anything they contact if accidentally released into the atmosphere from the liquid state.

Refrigerant Oil

Observe the following precautions when working with or around refrigerant oil:



WARNING: Always wear goggles or safety glasses to protect eyes from refrigerant oil contact.



WARNING: Protect skin and clothing from prolonged or repeated contact with refrigerant oil. Rubber gloves are recommended.



WARNING: Wash thoroughly immediately after handling refrigerant oil to prevent irritation.

First Aid

First Aid–Refrigerant

Eyes: For contact with liquid, immediately flush eyes with large amounts of water. Get prompt medical attention.

Skin: Flush areas with large amounts of warm water. Do not apply heat. Wrap burns with dry, sterile, bulky dressing to protect from infection or injury. Get prompt medical attention.

Inhalation: Move victim to fresh air and restore breathing if necessary. Stay with victim until arrival of emergency medical personnel.

First Aid–Refrigerant Oil

Eyes: Immediately flush eyes with large amounts of water for at least 15 minutes while holding the eyelids open. 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 restore breathing if necessary. Stay with victim until arrival of emergency personnel.

Ingestion: Do not induce vomiting. Immediately contact local poison control center or physician.

Safety Decals and Locations



**Figure 1: Antifreeze Caution
(Attached near Expansion Tank fill cap)**

Safety Precautions

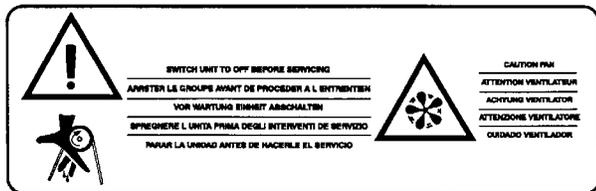


Figure 2: Belt Caution (Locations vary depending on model. Decals are located near areas that contain belts and fans which can cause severe injuries if hands or clothing become tangled.)



Figure 3: Automatic Start Caution (Locations vary depending on model. Decals are located near areas that contain moving parts which can cause severe injuries if hands or clothing become tangled when the unit automatically starts.)

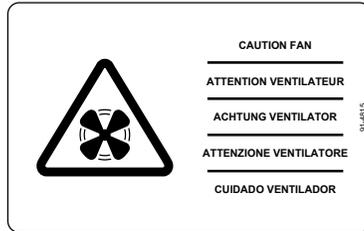


Figure 4: Fan Caution (Locations vary depending on model. Decals are located near areas that contain fans which can cause severe injuries if hands or clothing become tangled.)

Model 50 Units (Electric Standby)

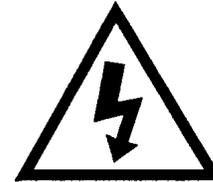
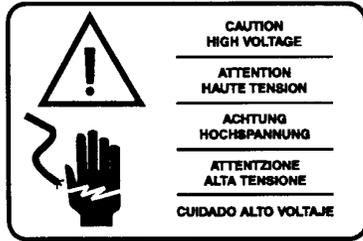


Figure 5: Electrical Hazard (Locations vary depending on model. Typically located near power receptacle, high voltage tray cover and interface board.)

Safety Precautions



**Figure 6: High Voltage Caution
(Located near high voltage box.)**

Emission Control

In compliance with the California ULG (Utility, Lawn and Garden) Rules, the following information is provided:

1. Selection Of Fuel Oil: Use diesel fuel only.

2-1. Modification To Any Engine Component:

Modifications to any engine component which many cause engine exhaust emission output changes are not allowed.

Any engine modification not in compliance with regulation will be the responsibility of the engine manufacturer, dealer or customer who made the modification.

2-2. Air Induction System: Air induction system must remain intact and receive regular prescribed maintenance.

Example: Air cleaner element replacement at required operation hour interval.

2-3. Exhaust System: Exhaust system must remain intact and cannot be modified in any manner that will further restrict exhaust flow.

2-4. Fuel Oil System: Fuel oil system must remain intact and receive regular prescribed maintenance. *Example:* Fuel filter replacement at required operation hour interval.

3. Engine Identification: Engines must be identified in a manner that will determine when they were built and what regulations they comply with. The engine must be labeled with an emission control label and the engine family name, both described below.

Emission Control

- a. Emission control label: a new label, shown in Figure 7, contains important engine information.

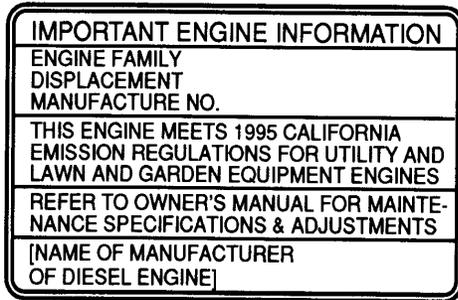


Figure 7: Emission Control Label

- b. Engine Family Name, as assigned by the California Air Resources Board, identifies engine family group, by largest displacement, within an engine family, and is shown in Figure 8.

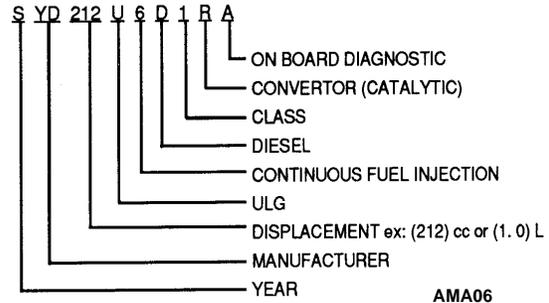


Figure 8: Engine Family Name

3-1 Emission Control Labels: Emission control labels are a requirement of the California ULG Rules. In the event the emission control label provided on the engine is inaccessible, there will be a supplemental label containing the same information, provided by the equipment manufacturer, located in a readily accessible location, shown in Figure 9:

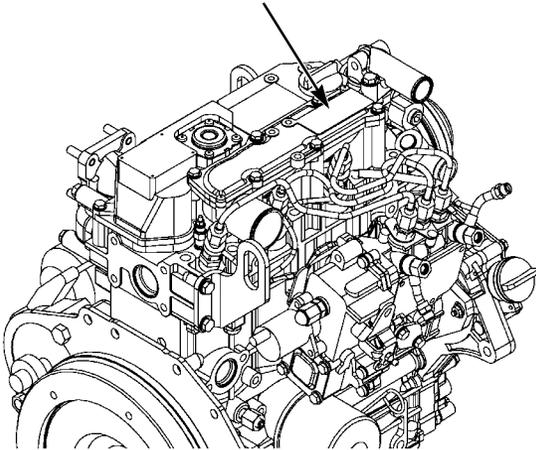


Figure 9: Emission Control Label Location

All engine labels and supplementary labels will contain the following information:

- Engine Family Name
- Displacement
- Manufacturer

The above information, along with the engine serial number, will be required to obtain proper service information and correct service repair parts. Figure 10 identifies the engine model.

Engine Model
TK380U (Tier 4)
Note: Design parameters to bring engine family into compliance were utilized; no after treatment measures incorporated.

Figure 10: Engine Model

Emission Control

4. Emission Control Related Parts: The California ULG Rules require a manufacturing defect warranty on all emission control parts, including:

- Fuel Injection Pump
- Fuel Injection Nozzle
- High Pressure Oil Line
- Air Cleaner Element¹
- Fuel Filter Element¹
- Air Cleaner Gasket
- Air Intake Pipe (Manifold) Gasket
- Muffler Gasket

The warranty period is two years and complete details are included in the section of this manual titled “*California Emission Control System Warranty Statement, Your Warranty Rights And Obligations.*”

¹Any warranted part which is scheduled for replacement as required maintenance shall be warranted for the period of time up to the first scheduled replacement point for that part.

5. Maintenance Schedule: To maintain optimum engine performance and compliance with the California ULG Rules, the maintenance schedule must be adhered to.

Regular scheduled maintenance is the major key to engine service life and emission regulation compliance. Scheduled maintenance requirements must be performed regularly. See the Maintenance Schedule provided in this Operator’s Manual.

California Emission Control System Warranty Statement

Your Warranty Rights And Obligations

The California Air Resources Board and Thermo King are pleased to explain the California emission control system warranty on your 1996 and later utility equipment (ULG) engine. In California, new utility equipment (ULG) engines must be designed, built, and equipped to meet the state’s stringent anti-smog standards. Thermo King must warrant the California emission control system on your utility equipment

(ULG) engine for the time listed below, provided there has been no abuse, neglect or improper maintenance of your utility equipment (ULG) engine.

Your California emission control system includes parts such as the fuel injection pump, the fuel injection nozzle, and the high-pressure fuel line. Also included are the air filter element and the fuel filter element which are covered under this California emission control system warranty only up to the first scheduled maintenance replacement.

Where a warrantable condition exists, Thermo King will repair your utility equipment (ULG) engine with California emission control system parts or components at no cost to you, including diagnosis, parts and labor.

Manufacturer's Warranty Coverage

1996 and later utility equipment (ULG) engines: California emission control system parts and components are warranted for the period of two years (24 months). If any California emission control system part or component on your utility equipment (ULG) engine is defective, the part or component will be repaired or replaced by Thermo King.

Owner's Warranty Responsibilities

As the utility equipment (ULG) engine owner, you are responsible for the performance of the required maintenance listed in this Operator's Manual. Thermo King recommends that you retain all receipts covering maintenance on your utility equipment (ULG) engine, but Thermo King cannot deny warranty solely for the lack of receipts or your failure to ensure the performance of all scheduled maintenance.

As the utility equipment (ULG) engine owner, you should be aware that Thermo King may deny you warranty coverage if your utility equipment (ULG) engine, or a part or component, has failed due to abuse, neglect, improper maintenance, or unapproved modifications.

You are responsible for presenting your utility equipment (ULG) engine to an authorized Thermo King dealer as soon as a problem exists. The emission control system parts or component repairs should be completed in a reasonable amount of time not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, contact a Thermo King service representative at 952-887-2337.

Emission Control

Manufacturer Explanation Of Emission Control System Warranty Coverage

A. Warranty Commencement Date

The California emission control system warranty period begins on the date the engine or equipment is delivered to the original retail purchaser.

B. Length Of Coverage

Thermo King warrants to the original purchaser, and each subsequent purchaser, that the engine emission control system is free from defects in material and workmanship that cause the failure of the warranted California emission control system part or component for a period of two years (24 months) beginning on the day the utility equipment (ULG) engine is delivered to the original purchaser.

C. What Is Covered

1. **Repair or Replacement of Parts:** Repair or replacement of any California emission control system warranted part or component will be performed at no charge to the owner

at a Thermo King authorized service dealer. To obtain the phone number of your nearest Thermo King authorized service dealer, call the Cold Line at: 952-887-2202.

2. **Warranty Period:** Any warranted California emission control system part or component that is not scheduled for replacement as required maintenance, or that is scheduled only for regular inspection to the effect of repair or replacement as necessary, shall be warranted for the warranty period. Any warranted part that is scheduled for replacement as required maintenance shall be warranted for the period of time up to the first scheduled replacement point for that part or component.
3. **Diagnosis:** The owner shall not be charged for diagnostic labor which leads to the determination that a California emission control system warranted part or component is defective, if the diagnostic work is performed at a Thermo King authorized service dealer.
4. **Consequential Damages:** Thermo King is liable for damages to other engine parts or components caused by the failure of an emission control system part or component within the above stated California emission control system warranty period.

D. What is Not Covered

1. Failures caused by abuse, neglect, or improper maintenance.
2. Add-On or Modified Parts. The use of add-on or modified parts can be grounds for disallowing a warranty claim. Thermo King is not liable for failures of emission control system parts or components caused by the use of add-on or modified parts.
3. Use of fuel other than the California Title 13, CCR Section 2282 (g)(3), low sulfur, low aromatic, with a cetane number of 48 minimum, will nullify this warranty.

E. How to File a Claim

Warranty claims for California emission control system parts or components are to be filed by the Thermo King authorized servicing dealer on behalf of the engine owner.

F. Where to Get Warranty Service

Warranty service or repairs shall be provided at all Thermo King authorized service dealers. You can generally find dealers in the Yellow Pages of your regional telephone directory, or

call the customer service representative at 888-887-2202 for the location of the nearest Thermo King authorized service dealer.

G. Maintenance, Replacement and Repair of Emission Control System Related Parts

Any Thermo King approved replacement part can be used in the performance of any warranty maintenance or repairs on emission control system parts or components, and must be provided without charge to the owner if the part is still under the California emission control system warranty.

H. Emission Control System Warranty Parts List

- Part Name
- Fuel Injection Pump
- Fuel injection Nozzle
- High Pressure Fuel Oil Line
- Air Cleaner Element
- Fuel Filter Element
- Air Cleaner Gasket
- Air Intake Pipe (Manifold)

Emission Control

- Gasket Muffler Gasket

I. Maintenance Statements

The owner is responsible for the performance of the required maintenance as defined by Thermo King within this Operator's Manual.

EPA Emission Control System Warranty Statement

Thermo King warrants to the initial owner and each subsequent owner that the certified non-road diesel engine in your unit is:

1. Designed, built and equipped so as to conform, at the time of sale, with all applicable regulations adopted by the United States Environmental Protection Agency (EPA).
2. Free from defects in materials and workmanship in specific, emission-related parts for a period of five years or 3,000 hours of operation, whichever comes first, after date of delivery to the initial owner.

If an emission-related part or component fails during the warranty period, it will be repaired or replaced. Any such part or component repaired or replaced under warranty is warranted for the warranty period.

During the term of this warranty, Thermo King will provide, through a Thermo King authorized service dealer or other establishment authorized by Thermo King, repair or replacement of any warranted part at no charge to the non-road engine owner.

In an emergency, repairs can be performed at any service establishment, or by the owner, using any replacement part. Thermo King will reimburse the owner for their expenses, including diagnostic charges, for such emergency repair. These expenses shall not exceed Thermo King's suggested retail price for all warranted parts replaced, and labor charges based on Thermo King's recommended time allowance for the warranty repair and the geographically appropriate hourly labor rate.

Any replacement part can be used for maintenance or repairs. The owner should ensure that such parts are equivalent in design and durability to genuine Thermo King parts. However, Thermo King is not liable for parts which are not genuine Thermo King parts.

A part not being available within 30 days or repair not being completed within 30 days constitutes an emergency.

As a condition of reimbursement, replaced parts and received invoices must be presented at a place of business of a Thermo King authorized service dealer or other establishment authorized by Thermo King.

This warranty covers the following emission-related parts and components:

- Fuel Injection System
- Intake Manifold
- Exhaust Manifold
- Miscellaneous hoses, clamps, connectors and sealing devices used in the above systems.

If failure of one of these parts or components results in failure of another part or component, both will be covered by this warranty.

Responsibilities

This warranty is subject to the following:

Thermo King Corporation Responsibilities

During the emission warranty period, if a defect in material or workmanship of a warranted part or component is found, Thermo King will provide:

- New, remanufactured, or repaired parts or components required to correct the defect.

NOTE: Items replaced under this warranty become the property of Thermo King.

- Labor, during normal working hours, required to make the warranty repair. This includes diagnosis and labor to remove and install the engine, if necessary.

Owner Responsibilities

During the emission warranty period, the owner is responsible for:

- The performance of all required maintenance. A warranty claim will not be denied because the scheduled maintenance was not performed. However, if the lack of required maintenance was the reason for the repair, then the claim will be denied.

Emission Control

- Premium of overtime cost.
- Cost to investigate complaints that are not caused by defect in Thermo King material or workmanship.
- Providing timely notice of a warrantable failure and promptly making the product available for repair.

Remedies under this warranty are limited to the provision of material and services as specified herein. Thermo King is not responsible for incidental or consequential damages such as downtime or loss of engine-powered equipment.

Limitations

Thermo King is not responsible for resultant damages to an emission-related part or component resulting from:

- Any application or installation Thermo King deems improper as explained in this Operator's Manual, or any other manuals provided with the unit.
- Attachments, accessory items, or parts not authorized for use by Thermo King.
- Improper off-road engine maintenance, repair, or abuse.
- Owner's unreasonable delay in making the product available after being notified of a potential product problem.

This warranty is in addition to Thermo King's standard warranty applicable to the off-road engine product involved.

Unit Description

General Description

The UT-1280 is a microprocessor based transport temperature control system, which utilizes the SR-3 Truck HMI microcontroller to manage system functions.

The unit is a two-piece under-mount refrigeration unit designed for truck applications. The condenser unit mounts underneath the truck and the evaporator mounts inside the truck body. Two different evaporators are used: the UTSE, and the Spectrum S-3.

Engine power for the UT-1280 is provided by the TK380U, a three cylinder, special clean and silent diesel engine rated at 19.6 continuous horsepower (14.6 kW) at 2425 RPM. A belt drive system transfers energy to the compressor, unit fans and alternator. A centrifugal clutch on the diesel engine isolates the engine during electric standby operation.

Design Features

- Microprocessor Controller, SR-3 Truck
- Alarm Code Display
- Battery Voltage Display
- Continuous System Monitoring
- Coolant Temperature Display
- CYCLE-SENTRY™ Start/Stop Controls
- Engine and Electric (Model 50) Hour Display
- In-Cab Remote
- Smart Defrost
- Symbolic Controller Interface
- Unit Self Check-Pretrip
- Air Cleaner, Dry Type
- Alternator, 120 Amp

Unit Description

- Automatic Phase Correction
- Bypass Oil Filter
- Coolant Expansion Tank
- Corrosion Resistant Protection
- Diesel/Electric Autoswitching
- Economy Mode
- Fahrenheit and Celsius Scales
- Fuel Filter, Spin On
- Oil Filter, Full Flow
- R-404A Chlorine-free Refrigerant
- Scroll Compressor
- ETV (Electronic Throttling Valve)
- Stainless Steel Condenser and Evaporator Hardware
- TK380U Diesel Engine

Unit Options

- TouchPrint Datalogger
- Door Switch
- Scissors Field Installation Kit
- Battery Box Kit
- Remote Body-Mount Box Kit
- Premium HMI Control Panel
- Telematics

Standard HMI Control Panel

The Standard HMI Control Panel (Human/Machine Interface) is used to operate the unit and display unit information. The Control Panel is typically located in the vehicle driver's compartment and communicates with the base controller using a connection on the interface board.



Figure 11: Standard HMI Control Panel

Premium HMI Control Panel (Optional)

The Premium HMI Control Panel is available as an option that replaces the Standard HMI Control Panel. It is used operate the unit and display unit information. It also provides access to all the controller functions and menus.

CYCLE-SENTRY™ Start/Stop System

The CYCLE-SENTRY Start/Stop fuel saving system provides optimum operating economy.



WARNING: Turn the unit off by pressing the OFF key before opening doors or inspecting any part of the unit. The unit can start at any time without warning if it has been turned on by pressing the ON key.

The CYCLE-SENTRY system automatically starts the unit on microprocessor demand and shuts down the unit when all demands are satisfied.

The system monitors and maintains the compartment temperature, the engine block temperature, and battery charge levels at a point where quick, easy starts are possible.

Unit Protection Devices

Battery Fuse: The battery fuse is a 60 amp fuse that protects the 2 circuit. It is located in a fuse holder in the 2 wire near the battery.

Fuses: A number of fuses are used. Sizes and functions are described in the Specifications section of this manual.

Unit Description

High Pressure Cutout Switch (HPCO): This normally closed switch monitors the discharge pressure at the compressor. It opens on high discharge pressure to shut the unit down to prevent damage.

Low Oil Level Sensor: The low oil level sensor detects if the oil drops below a certain level. If it stays below that level for a specified time, the microprocessor will shut the unit down and record alarm code 66 (normal code when changing oil).

Compressor Temperature Sensor: This sensor provides a compressor temperature input to the microprocessor. If the compressor temperature is too high, the controller stops the unit and records an alarm.

Coolant Temperature Sensor: This sensor provides an engine coolant temperature input to the microprocessor. If the engine coolant temperature is too high, the controller stops the unit and records an alarm.

Engine Oil Pressure Switch/Sensor: This switch provides an engine oil pressure input to the microprocessor. If the oil pressure falls below 10 ± 2 psig (69 ± 14 kPa), engine shutdown will occur.

Preheat Buzzer: The preheat buzzer sounds when the CYCLE-SENTRY™ system energizes the glow plugs. This should warn anyone near the unit that the CYCLE-SENTRY™ system is about to start the diesel engine.

Electric Motor Overload Relay: The overload relay protects the electric standby motor. The overload relay opens the circuit from the contactor to the electric motor if the motor overloads for any reason and an alarm will occur. The relay resets when the alarm code is cleared.

Unit Component Identification

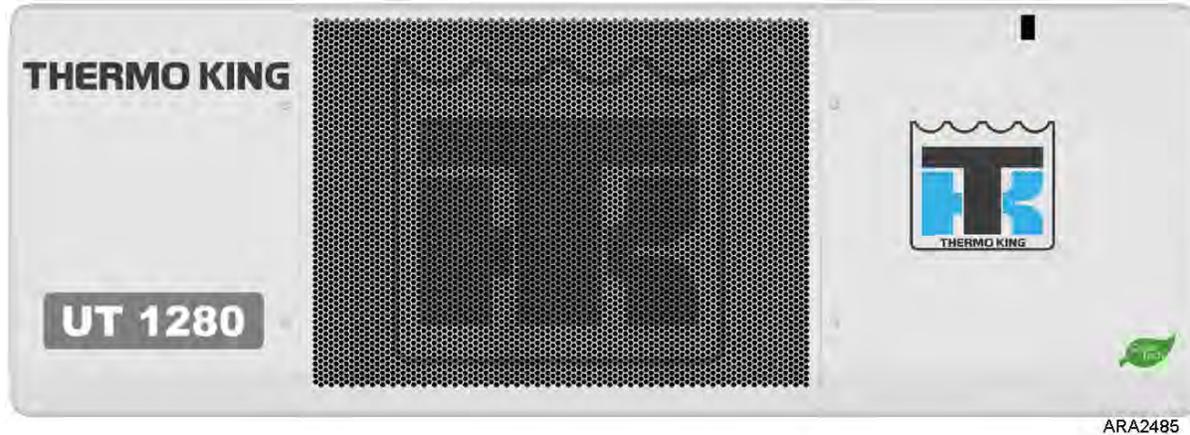
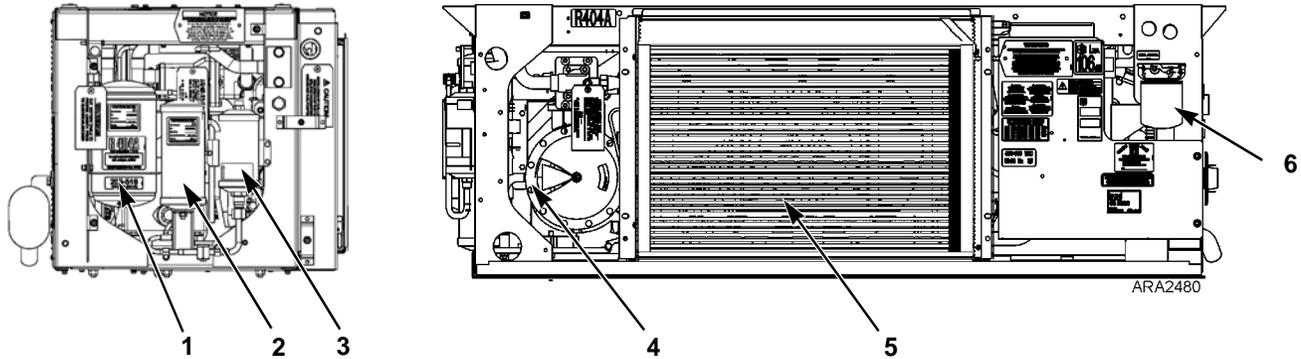


Figure 12: UT-1280 Front View

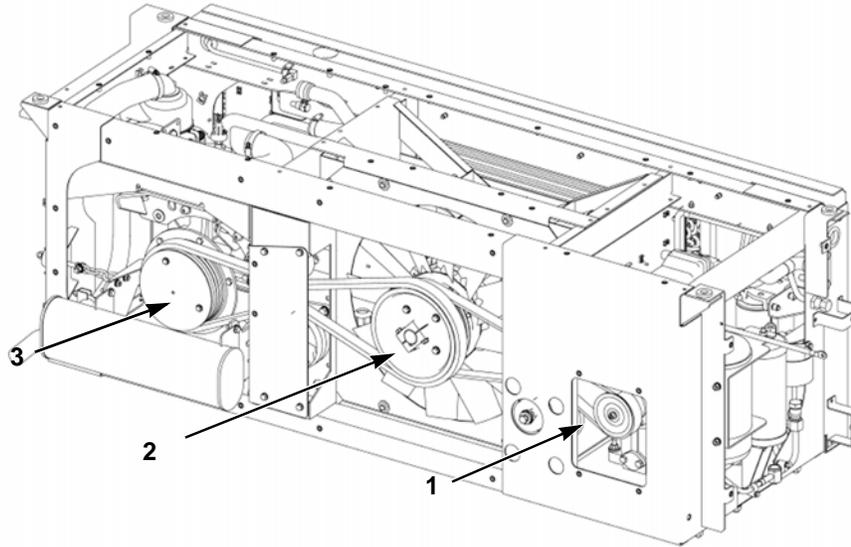
Unit Description



1.	Accumulator	4.	Compressor
2.	Receiver Tank	5.	Condenser/Radiator Coil
3.	Filter/Drier	6.	Fuel Filter/Water Separator

Figure 13: UT-1280 Components, Front and Side Views (Panels Removed)

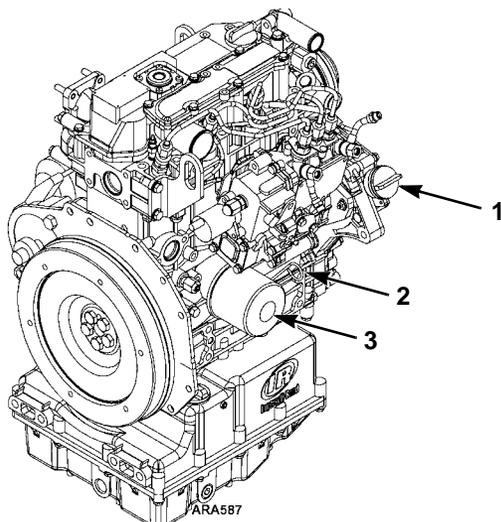
Unit Description



1.	Compressor Pulley	3.	Engine Clutch
2.	Electric Motor Pulley		

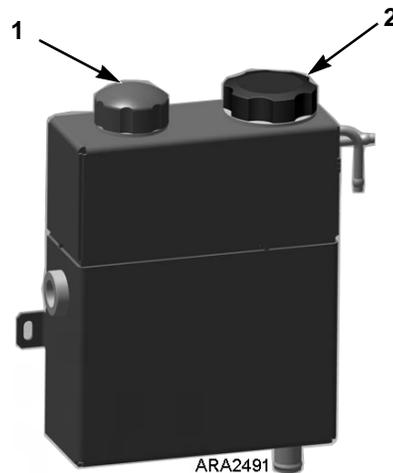
UT-1280 Components, Rear View (Panels Removed)

Unit Description



1.	Oil Fill Location
2.	Oil Level Dipstick
3.	Oil Filter

Figure 14: Engine Oil Service Locations



1.	Overflow Tank Cap
2.	Expansion Tank Cap

Figure 15: Expansion Tank Service Locations

Unit Operation

SR-3 Truck HMI Controller

The SR-3 Standard Truck HMI (Human/Machine Interface) Control Panel is supplied as standard equipment on SR-3 Single Temperature Truck applications. It is used to operate the unit and display some unit information. The SR-3 Standard Truck HMI Control Panel communicates with the base controller via the CAN (Controller Area Network) bus. The SR-3 Standard Truck HMI Control Panel is typically located in the vehicle driver's compartment. It may be located in the truck dashboard using a DIN mount or under the dashboard using an under dash mounting kit.



Figure 16: SR-3 Truck HMI Controller

- The SR-3 Standard Truck HMI Control Panel consists of a display and nine touch-sensitive keys.
- The display is capable of showing numbers and lighting several icons. It does not display text, thereby making it suitable for use with any language.
- Amber indicator LED's are located next to each of the four function keys below the display. The LED will light when that function is active.
- A red indicator LED is located between the ON Key and OFF Key. This indicator will glow if Alarm Code 91 Check Electric Ready Input occurs. It will also glow if a 15 pin Thermo King data cable is connected to the serial port on the back of the controller (DPD).

Controller Features

- Displays Box Temperature and Setpoint in Fahrenheit or Celsius
- Displays Engine Running and Motor Running Hourmeters

Unit Operation

- Changes Setpoint
- Selects and Indicates CYCLE-SENTRY or Continuous Mode Operation
- Selects and Indicates High Speed Lock-Out Operation
- Initiates and Indicates a Defrost Cycle
- Indicates an Alarm Condition Exists, Displays and Clears Alarms
- Initiates and Indicates a Pretrip Test
- Sends a Start of Trip to the ServiceWatch data logger.
- Changes Display Brightness
- Shows HMI Control Panel Serial Number and Software Revision.

Display

The display presents information to the operator. This information includes setpoint and box temperature, hourmeter readings, alarms and several icons as shown below. All display segments and icons are shown in Figure 17.

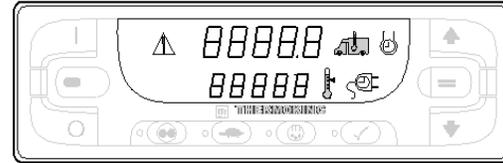


Figure 17: Display

The upper row of numbers can display the Box Temperature, Engine Run Time Hourmeter or Alarm Code(s).

The lower row of numbers can display the Setpoint, Electric Run Time Hourmeter or Total Number of Alarms.

The meaning of the display icons are shown in the following page.



When this icon is present the upper display is showing the actual box temperature inside the truck box.



When this icon is present the lower display is showing the current setpoint.



When this icon is present the upper display is showing the diesel engine run time.



When this icon is present the lower display is showing the electric motor run time (if the unit equipped with optional ELECTRIC STANDBY).



When this Alarm Icon is present one or more alarm conditions have occurred. If the display is not flashing any alarms are Check Alarms. If the display is flashing on and off a shutdown alarm has occurred and the unit has been shut down. Immediate action must be taken.

Keys and LED Indicators

There are nine touch sensitive keys. Some of these keys have more than one function as shown in Figure 18.

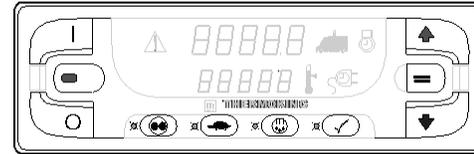


Figure 18: Keys and LED Indicators

There are amber indicator LED's located next to each of the four function keys below the display. The LED will glow amber when that function is active.

Unit Operation

A red indicator LED is located between the ON Key and OFF Key at the left side of the display. This indicator will glow if Alarm Code 91 Check Electric Ready Input occurs. It will also light if a 15 pin Thermo King data cable is connected to the serial port on the back of the controller (DPD).

The primary and secondary key uses are shown in the table below. If the key has more than one use the primary use is shown first.

ON Key

Pressing the ON Key will turn the unit on.



Secondary Use - When the unit is on, pressing this key and the PRETRIP Key at the same time will display any alarm codes that are present.

Secondary Use - When the unit is on, pressing and holding this key allows the UP ARROW Key and DOWN ARROW Key to increase or decrease the display brightness.

Secondary Use - When the unit is on, pressing this key will return to the Standard Display of box temperature and setpoint.

POWER OFF Key

Pressing the OFF Key will turn the unit off.



UP ARROW Key



When the unit is turned on and the Standard Display is shown, pressing the UP ARROW Key will increase the setpoint.

Secondary Use - When alarms are being displayed, pressing this key will scroll thru the alarms (if more than one alarm is present).

Secondary Use - While holding ON Key down with the unit turned on, pressing this key will increase the display brightness (Low, Medium, High).

DOWN ARROW Key



When the unit is turned on and the Standard Display is shown, pressing the DOWN ARROW Key will decrease the setpoint.

Secondary Use - While holding ON Key down with the unit turned on, pressing this key will decrease the display brightness (High, Medium, Low).

ENTER Key



If the setpoint has been changed using the UP ARROW Key and/or DOWN ARROW Key, pressing the ENTER Key enters the setpoint into the base controllers memory.

Secondary Use - When alarms are being displayed, pressing this key will clear the alarm shown on the display.

Secondary Use - When the unit is turned on, press and hold this key for 5 seconds to send a Start of Trip (SOT) to the data logger.

Unit Operation



CYCLE-SENTRY/Continuous Key

If the unit is turned on and is in Continuous Mode, pressing the CYCLE-SENTRY/CONTINUOUS Key will switch operation to CYCLE-SENTRY Mode and the amber LED indicator will glow. If the unit is running in CYCLE-SENTRY Mode, pressing this key will switch operation to Continuous Mode and the amber LED will turn off.



HIGH SPEED LOCK-OUT Key

If the unit is turned on, pressing the HIGH SPEED LOCK-OUT Key will activate High Speed Lock-Out. The unit will switch to low speed operation and the amber LED indicator will glow. No further high speed operation is allowed until this feature is turned off. Unit may automatically return to high speed operation after a programmed time limit if timer feature is enabled. This feature is typically used in noise sensitive areas to reduce unit noise.

NOTE: The HIGH SPEED LOCK-OUT Key is only used when the unit is operating in Diesel Mode. The HIGH SPEED LOCK-OUT Key does not have any effect in Electric Mode operation.



DEFROST Key

If the unit is turned on, pressing the DEFROST Key will initiate a manual defrost cycle if conditions allow. If the evaporator coil temperature less than 45 F (7 C) the unit will enter a defrost cycle. The amber LED will flash while the defrost cycle is initialized and will glow during the defrost cycle. The defrost cycle will terminate automatically and the amber LED will turn off when the evaporator coil temperature is greater than 52 F (11 C). To manually terminate a defrost cycle turn the unit off and back on.



PRETRIP TEST Key

Pressing and holding the PRETRIP TEST Key for 5 seconds will initiate either a Full Pretrip Test or Engine Running Pretrip Test so long as no alarm conditions exist. If the Alarm Icon is glowing, record and clear the alarms before starting the Pretrip Test.

Press and hold the PRETRIP TEST Key for 5 seconds. If the unit is not running when the PRETRIP TEST Key is pressed the unit will perform a Full Pretrip that includes circuit amps and running system checks. If the unit is running when the PRETRIP TEST Key is pressed the unit will perform the running system checks only. The amber LED may flash while the Pretrip Test is initialized and will glow steady while the Pretrip Test is running. When the Pretrip Test is complete the amber LED will turn off.

- If there are no alarm codes set when the Pretrip Test is complete, the unit passed.
- If there are alarm codes set when the Pretrip Test is complete, the unit failed. Check and correct the alarm conditions and repeat the test.
- If a shutdown alarm occurred, Alarm Code 28 Pretrip Abort will be set and the unit will be shut down. Check and correct the alarm conditions and repeat the test.

Secondary Use - When the unit is turned off press and hold this key for 5 seconds to show the HMI Control Panel Serial Number (in the upper display) and the HMI Control Panel Software Revision (in the lower display).

Unit Operation

Turning the Unit On and Off

IMPORTANT: Verify the Base Controller On/Off Switch is turned on before turning on the HMI Control Panel. The Base Controller On/Off switch is located on the outside of the control box side of the unit.

If the Standard Truck HMI Control Panel is turned on and the Base Controller On/Off Switch is turned off, the HMI display screen will flash on and off.

The unit is turned on by pressing the ON Key and off by pressing the OFF Key. When the ON Key is pressed the display briefly shows dashes as the display initializes.

IMPORTANT: If the display flashes on and off continuously when the ON Key is pressed, check to make sure the Base Controller On/Off switch is in the ON position.

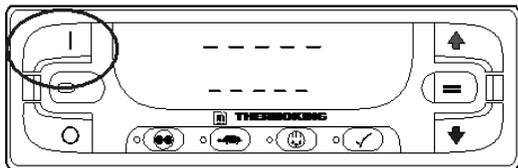


Figure 19: Keys and LED Indicators

Then the unit running time hourmeters are shown for 30 seconds. The diesel engine run time hours and Diesel Icon are shown in the upper display. If the optional Electric Standby Feature is installed, the electric motor run time hours and Electric Icon appear in the lower display as shown in Figure 20.

A Full Pretrip Test is initiated from this display by pressing and holding the Pretrip Key as shown later in this section.

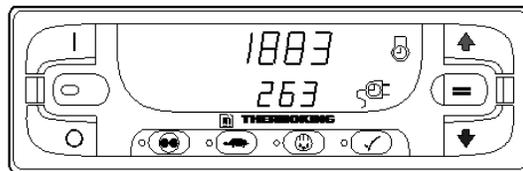


Figure 20: Electric Motor Run Time Hours and Electric Icon

When the unit is ready to run the Standard Display of box temperature and setpoint appears. The box temperature and Box Temp Icon are shown in the upper display. The setpoint and Setpoint Icon are shown in the lower display. The box temperature shown in Figure 21 is 35.8 F (2.1 C) with a 35 F (1.6 C) setpoint.

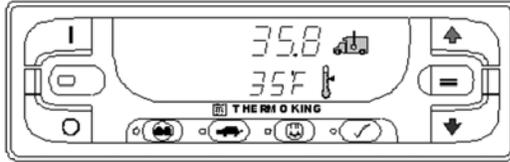


Figure 21: Standard Display of Box temperature and Setpoint

Pressing the OFF Key stops unit operation. The unit shuts down immediately and the display goes blank. To start the unit again, press the ON Key, shown in Figure 22.

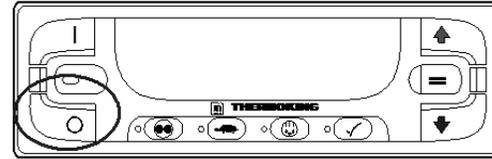


Figure 22: ON Key

The Standard Display

The Standard Display is the default display that appears if no other display function is selected. The Standard Display shows the box temperature and setpoint. The box temperature is that measured by the return air sensor. The box temperature and Box Temperature Icon are shown in the upper display. The setpoint and Setpoint Icon are shown in the lower display. The box temperature in Figure 23 is 35.8 F (2.1 C) with a 35 F (1.6 C) setpoint.

Unit Operation

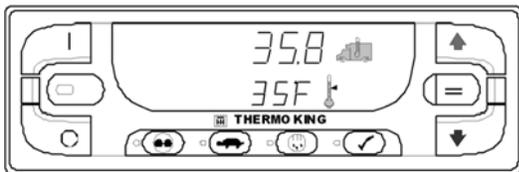


Figure 23: Standard Display

Changing the Setpoint

From the Standard Display, press the UP ARROW Key and/or DOWN ARROW Key until the desired setpoint is shown. In Figure 24 the setpoint has been increased to 40 F (4.4 C) using the UP ARROW Key.



Figure 24: UP ARROW Key

When the desired setpoint has been selected using the UP ARROW Key or DOWN ARROW Key, the ENTER Key must be pressed to confirm and load the new setpoint.

- If the setpoint is changed using the UP ARROW Key and DOWN ARROW Key, the setpoint display will begin to flash 10 seconds after the last press of the UP ARROW or DOWN ARROW key as a reminder to press the ENTER Key.
- The setpoint display will flash for 10 additional seconds. If at the end of this time the ENTER Key still has not been pressed to complete the setpoint change, the setpoint will return to the old setpoint and Alarm Code 127 Setpoint Not Entered will be set. The Alarm Icon will appear in the display.



Figure 25: ENTER Key

The new setpoint of 40 F (4.4 C) will remain on the display after the ENTER Key has been pressed.

Failure to confirm the new setpoint by pressing the ENTER Key within 20 seconds of changing the setpoint will result in no setpoint change. In addition, Alarm Code 127 Setpoint Not Entered is set, to indicate that the setpoint change was started but was not completed.

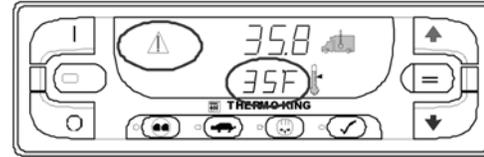


Figure 26: Alarm Icon and Setpoint

Notice that the setpoint has returned to the old setpoint of 35 F (1.6 C) and the Alarm Icon has lighted indicating that Alarm Code 127 Setpoint Not Entered is set.

IMPORTANT: If the setpoint is changed using the UP ARROW Key or DOWN ARROW Key, the change must be confirmed by pressing the ENTER Key within 20 seconds of changing the setpoint.

- If the ENTER Key is pressed, the setpoint change made with the UP ARROW Key and/or DOWN ARROW Key is accepted, the setpoint is changed, and the display returns to the Standard Display showing the new setpoint.

Unit Operation

- If the ENTER Key is not pressed within 20seconds of making a change with the UP ARROW Key and/or DOWN ARROW Key, the setpoint is not changed and the display returns to the Setpoint Display showing the old setpoint. Alarm Code 127 Setpoint Not Entered is set and the Alarm Icon will appear on the display, to indicate that the setpoint change was started but not completed.

Starting the Diesel Engine

Diesel engine preheats and starts are automatic in both Continuous Mode and CYCLE-SENTRY Mode. The engine will preheat and start as required when the unit is turned on. The engine pre-heat and start sequence will be delayed in Cycle Sentry mode if there is no current need for the engine to run.

NOTE: *If the unit is equipped with optional Electric Standby there may be some additional prompts before the engine will start. See STARTING THE ELECTRIC MOTOR on the following pages for details.*

CAUTION: *The engine may start automatically any time the unit is turned on.*

WARNING: *Never use starting fluid.*

When the engine is preparing to start, the SR-3 Standard Truck HMI Control Panel will continue to display the Standard Display as shown in Figure 27. The preheat buzzer at the unit (located on the unit Interface Board) sounds during the engine pre-heat and crank sequence.

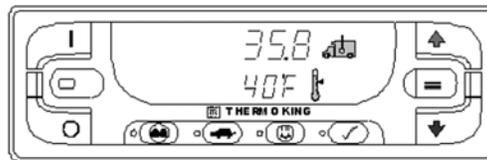


Figure 27: Standard Display

Starting the Electric Motor

Units equipped with the Electric Standby option only

Electric motor starting is automatic in both Continuous Mode and CYCLE-SENTRY Mode. The motor will start as required when the unit is turned on in Standby Mode and standby power is connected.

CAUTION: *The motor may start automatically any time the unit is turned on.*

When the motor is preparing to start, the SR-3 Standard Truck HMI Control Panel will continue to show the Standard Display as shown in Figure 28. The preheat buzzer at the unit (located on the unit Interface Board) sounds for 20 seconds before the electric motor starts.

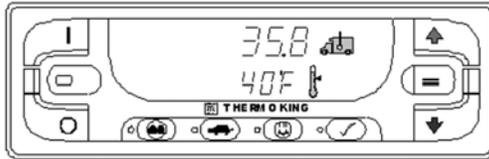


Figure 28: Standard Display

Switching from Diesel to Electric

IMPORTANT: *Applies to units with the Electric Standby Option only. The operation of this feature can be changed using the Guarded Access Menu. See the Guarded Access / Unit Configuration Menu / Diesel to Electric Auto Switch Enabled feature in Section 3 of the Diagnostic Manual for details. The Diesel to Electric Auto Switch Enabled feature should be set YES on units equipped with the Standard Truck HMI Control panel.*

Diesel to Electric Auto Switch Enabled set YES

(Default): If this feature is set YES, the unit will switch automatically from Diesel Mode to Electric Mode when standby power is connected and present.

Diesel to Electric Auto Switch Enabled set NO: The Diesel to Electric Auto Switch Enabled feature should not be set NO on units equipped with the Standard Truck HMI Control panel.

Unit Operation

Switching from Electric to Diesel

IMPORTANT: Applies to units with the Electric Standby Option only. The operation of this feature can be changed using the Guarded Access Menu. See the Guarded Access / Unit Configuration Menu / Electric to Diesel Auto Switch Enabled feature in the Diagnostic Manual.

Electric to Diesel Auto Switch Enabled feature set

YES: If this feature is set YES, the unit will switch automatically from Electric Mode to Diesel Mode when standby power is removed or fails.

Electric to Diesel Auto Switch Enabled feature set NO

(Default) : If the unit is operating in Electric Mode and standby power is disconnected or fails, the unit will not automatically switch to Diesel mode. This is primarily designed to prevent unauthorized diesel engine starts when the truck is indoors or on a ferry where engine operation is strictly prohibited.

If the unit is operating in Electric Mode and standby power is disconnected or fails, Alarm Code 91 Check Electric Ready Input will be set. The red LED between the ON key and OFF

Key will glow, the Alarm Icon will glow and the box temperature and setpoint displays will disappear as shown in Figure 29.

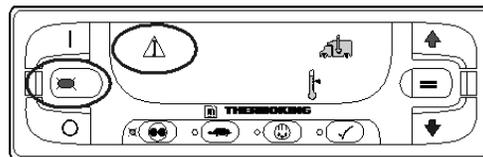


Figure 29: Alarm Icon

Alarm Code 91 Check Electric Ready Input will be cleared and the unit will restart automatically if power is restored.

Pressing the ON Key will clear Alarm Code 91 Check Electric Ready Input and turn the unit back on in Diesel Mode. If unit operation is required, the diesel engine will start as shown previously in STARTING THE DIESEL ENGINE.



Figure 30: Press ON Key

Preferred Method for Manually Switching from Electric Mode to Diesel Mode

1. Press the Standard Truck HMI Control Panel OFF Key to turn the unit off.
2. Turn off the standby power and disconnect the cord.
3. Press the Standard Truck HMI Control Panel ON Key to turn the unit on. The Hourmeters display will briefly appear and then the screen will appear as shown in Figure 31.

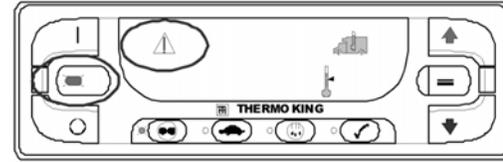


Figure 31: Display, Preferred Method for Manually Switching from Electric Mode to Diesel Mode

4. Press the Standard Truck HMI Control Panel ON Key again to clear Alarm Code 91 Check Electric Ready Input and turn the unit back on in Diesel Mode.

IMPORTANT: When the display shown in Figure 31 is present, do not press the Standard Truck HMI Control Panel OFF Key to turn the unit off. Press the Standard Truck HMI Control Panel ON Key again to clear Alarm Code 91 Check Electric Ready Input and turn the unit back on in Diesel Mode.

If the Standard Truck HMI Control Panel OFF Key is pressed when the display shown in Figure 31 is present, the unit will turn off and the display will be blank.

Unit Operation

To restart the unit in Diesel Mode, proceed as follows:

- Press the Standard Truck HMI Control Panel ON Key. The Hourmeters display and a blinking Alarm Icon will appear.
- When the Hourmeters display and a blinking Alarm Icon is shown, press the Standard Truck HMI Control Panel ON Key again. The display will go blank but the blinking Alarm Icon will remain on and blinking.
- When the display goes blank and the blinking Alarm Icon is shown, press the Standard Truck HMI Control Panel ON Key again. The box temperature and setpoint will appear, the blinking Alarm Icon will disappear and the unit will start in Diesel Mode.

Selecting CYCLE-SENTRY or Continuous Mode

When CYCLE-SENTRY mode is selected the unit will start and stop automatically to maintain setpoint, keep the engine warm and the battery charged. When Continuous Mode is selected, the unit starts automatically and runs continuously to maintain setpoint and to provide constant airflow throughout the truck box.

CYCLE-SENTRY Mode or Continuous Mode is selected by pressing the CYCLE-SENTRY/CONTINUOUS Key when the unit is turned on. If the unit is running in Continuous Mode, pressing this key will switch operation to CYCLE-SENTRY Mode and the amber LED indicator will glow. If the unit is running in CYCLE-SENTRY Mode, pressing this key will switch operation to Continuous Mode and the amber LED will turn off.

The unit shown in Figure 32 is running in CYCLE-SENTRY Mode.

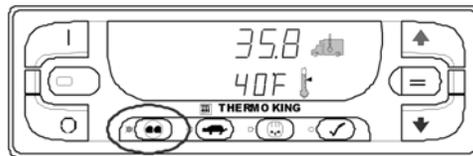


Figure 32: CYCLE-SENTRY/Continuous Key

CAUTION: *The engine may start automatically any time the unit is turned on.*

CAUTION: *If the unit is in CYCLE-SENTRY null and the mode is switched to Continuous Mode, the unit will start automatically.*

Selecting the High Speed Lock-Out Feature

If the High Speed Lock-Out feature is enabled and turned on, the unit will run only in low speed until the High Speed Lock-Out feature is turned off or the High Speed Lockout Timer is exceeded. This feature is typically used in noise sensitive areas to reduce unit engine noise.

High Speed Lock-Out is turned on or off by pressing the HIGH SPEED LOCKOUT Key when the unit is turned on. Pressing this key will turn High Speed Lock-Out on, pressing it again will turn High Speed Lockout off. If High Speed Lockout is turned on, unit will switch to low speed operation and the amber LED indicator will glow. No further high speed operation is allowed until this feature is turned off or the High Speed Lockout Timer is exceeded.

IMPORTANT: HIGH SPEED LOCKOUT TIMER: *If High Speed Lockout Mode is selected, the High Speed Inhibit Timeout feature may be enabled to return the unit to normal operation after a set time period has expired. This prevents unintended extended operation with high speed operation locked out. The time period may be set from 15 minutes to 2 hours. If a time period is set and exceeded, the unit will return to normal operation with high speed operation allowed and the amber LED indicator will turn off. If necessary to return to High Speed Lockout Mode, press the HIGH SPEED LOCKOUT Key again.*

The unit shown in Figure 33 has High Speed Lockout turned on.

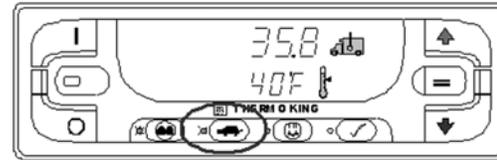


Figure 33: HIGH SPEED LOCKOUT Key

Unit Operation

Initiating a Manual Defrost Cycle

Defrost cycles are usually initiated automatically based on time or demand. Manual defrost may also be available. Defrost is only available if the unit is running and the evaporator coil temperature is less than 45 F (7 C). Other features such as door switch settings may not allow manual defrost under some conditions.

To initiate a manual defrost cycle, press the DEFROST Key as shown in Figure 34. If conditions allow, the unit will enter a defrost cycle and the amber LED next to the DEFROST Key will glow.

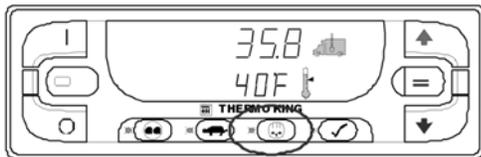


Figure 34: DEFROST Key

IMPORTANT: During the defrost cycle, the box temperature will rise toward 50 F (10 C). This is normal and is caused by the defrost cycle warming the evaporator coil. Since the damper door is closed during the defrost cycle, this warm air is not allowed to pass into the truck box.

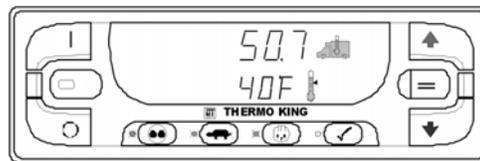


Figure 35: Box temperature will rise toward 50 F (10 C)

Terminating a Defrost Cycle

The defrost cycle terminates automatically when the coil temperature is greater than or equal to 52 F (11 C) or the maximum defrost timer expires. Alarm code 14, Defrost Terminated by Time, will generate if the maximum defrost

time is exceeded. When the defrost cycle is completed the amber LED next to the DEFROST Key will turn off. Defrost can also be terminated by turning the unit off and back on.

Alarms

Alarm Code Notification

If an alarm condition occurs, the Alarm Icon will appear on the display. If the alarm is a Check Alarm, the Alarm Icon will turn on but the unit will continue to run. If the alarm is a Shutdown Alarm, the Alarm Icon and the display will flash on and off and the unit will shut down.

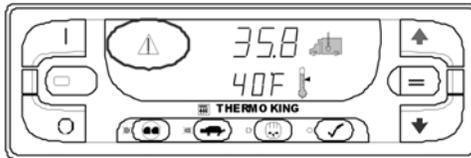


Figure 36: Alarm Icon

Displaying Alarm Codes

Alarms are displayed by simultaneously pressing and holding the ON Key and PRETRIP TEST Key. The alarm display will appear as shown below. The upper display shown in Figure 37 indicates that Alarm Code 127 Setpoint Not Entered has been set. The lower display indicates that only one alarm code exists.

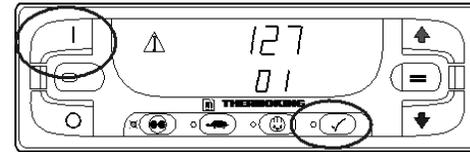


Figure 37: ON and PRETRIP TEST Keys

If more than one alarm code has been set, they are displayed with the most recent alarm shown first. Use the UP ARROW Key to scroll through the alarms.

Unit Operation

Clearing Alarm Codes

After the alarm situation is resolved, press the ENTER Key to clear the alarm code currently being shown. When all alarms have been cleared the display will show all zeros to indicate that no alarm codes exist.

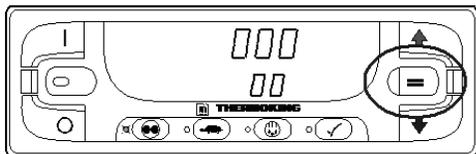


Figure 38: ENTER Key

The display will return to the Standard Display about 30 seconds after all alarms have been cleared.

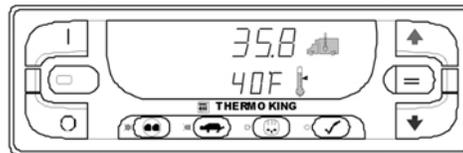


Figure 39: Standard Display

Important Alarm Notes

- All alarms must be viewed before any of the alarms can be cleared.
- If an alarm will not clear, it may still exist. If the alarm is not corrected, it will not clear or may be immediately set again.
- Some alarms cannot be cleared using the Standard Truck HMI Control Panel. These alarms must be cleared by maintenance personnel from the Maintenance or Guarded Access Menus.

- Alarm Code 91 Check Electric Ready Input is cleared by turning the unit off and back on. See SWITCHING FROM ELECTRIC TO DIESEL in this section.

Sending a ServiceWatch Data Logger Start of Trip

When the unit is turned on, press and hold the ENTER Key for 5 seconds to send a Start of Trip (SOT) marker to the unit ServiceWatch Data Logger and the optional DAS Data Logger (if equipped).



Figure 40: ENTER Key

Pretrip Test

A Pretrip Test verifies unit operation. The PRETRIP Key allows either a Full Pretrip Test or an Engine Running Pretrip Test to be initiated by the operator.

Pretrip Test Conditions

- The current unit settings are saved and restored at the end of the Pretrip Test or if the unit is turned off and back on.
- The Pretrip Test can be run in either Diesel or Electric Mode.
- The unit will auto switch from Diesel Mode to Electric Mode or from Electric Mode to Diesel Mode during a Pretrip Test if these features are enabled and the auto switch conditions occur.

Conditions where Pretrip Tests are not allowed

- Pretrip Tests are not allowed if any shutdown alarms are present.

Unit Operation

- Pretrip tests are allowed with some Check and Log alarms present.

Pretrip Test Sequence

Pretrip tests proceed in the order shown below.

Full Pretrip Test

Full Pretrip Tests include all of the tests shown below.

- Amp Checks - Each electrical control component is energized and the current drawn is confirmed as within specification.
- Engine Start - The Engine will start automatically.
- Defrost - If the coil temperature is below 45 F (7 C), a defrost cycle is initiated.
- RPM Check - The engine RPM in high and low speed is checked during the Cool Check.
- Cool Check - The ability of the unit to cool in low speed is checked.
- Heat Check - The ability of the unit to heat in low speed is checked.

- Report Test Results - The test results are reported when the Pretrip Test is completed. If the Pretrip Test fails, alarm codes will exist to direct the technician to the source of the problem.

Engine Running Pretrip Test

Engine Running Pretrip Tests include all of the tests shown below. They do not include the Amps Check or the Engine Start tests.

- Defrost - If the coil temperature is below 45 F (7 C), a defrost cycle is initiated.
- RPM Check - The engine RPM in high and low speed is checked during the Cool Check.
- Cool Check - The ability of the unit to cool in low speed is checked.
- Heat Check - The ability of the unit to heat in low speed is checked.
- Report Test Results - The test results are reported when the Pretrip Test is completed. If the Pretrip Test fails, alarm codes will exist to direct the technician to the source of the problem.

Pretrip Test Considerations

When performing a Pretrip Test, the following issues should be considered.

- Whenever possible, run the Pretrip Test with an empty truck box.
- If running a Pretrip Test on a truck loaded with dry cargo, insure that proper airflow can occur around the load. If the load restricts airflow, false test results may occur. Also, units have high refrigeration capacity which results in rapid temperature change. Sensitive dry cargo may be damaged as a result.
- If running a Pretrip Test on a truck that has just been washed down, the extremely high humidity inside the truck box may result in false test results.
- If running a Pretrip Test on a truck loaded with sensitive cargo, monitor the load temperature during the test as normal temperature control is suspended during pre-trip operation.
- Always perform Pretrip Tests with the cargo doors closed to prevent false test results.

Performing a Pretrip Test

Starting a Pretrip Test

The Full Pretrip Test must be started with the unit not running. Turn the unit on and clear all alarm codes. Turn the unit off.

Turn the unit on and wait for the unit running time hourmeters to be shown on the display. When the unit running time hourmeters are shown on the display, press and hold the PRETRIP Key for 5 seconds.

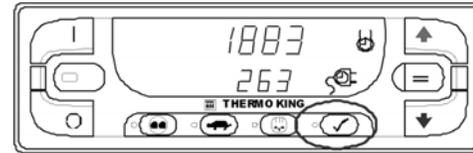


Figure 41: Pretrip Test

- A flashing Pretrip LED indicates that the Pretrip Test is being initialized. When the Pretrip Test starts, the Pretrip LED will glow steady amber. The display will show the Standard Display.

Unit Operation

- The Amps Check Test will be performed and then the unit will start automatically. The balance of the tests will be completed.
- The Pretrip Test will take about 20 - 30 minutes, depending on conditions.

IMPORTANT: The box temperature will vary during the Pretrip Test. This is normal operation.

- When the Pretrip Test is complete or if a Shutdown Alarm occurs, the amber Pretrip LED will turn off.
- Stopping a Pretrip Test: To stop a Pretrip Test at any time, press the POWER OFF Key to turn the unit off. This will generate Alarm Code 28 Pretrip Abort. Other alarm codes may also be generated. This is normal when the Pretrip Test is halted before completion.

Starting a Engine Running Pretrip Test

The Engine Running Pretrip Test must be started with the unit running. Turn the unit on and clear all alarm codes. Allow the unit to start.

With the unit running, press and hold the PRETRIP Key for 5 seconds.

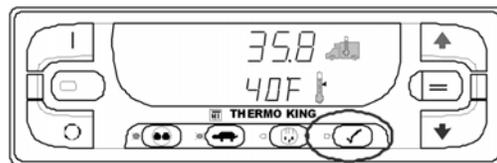


Figure 42: PRETRIP Key

- A flashing Pretrip LED indicates that the Pretrip Test is being initialized. When the Pretrip Test starts, the Pretrip LED will glow steady amber to indicate the test is in progress. The display will show the Standard Display.
- The Pretrip Test will take about 20 - 25 minutes, depending on conditions.

IMPORTANT: The box temperature will vary during the Pretrip Test. This is normal operation.

When the Pretrip Test is complete or if a Shutdown Alarm occurs, the amber Pretrip LED will turn off.

Stopping a Pretrip Test: To stop a Pretrip Test at any time, press the POWER OFF Key to turn the unit off. This will generate Alarm Code 28 Pretrip Abort. Other alarm codes may also be generated. This is normal when the Pretrip Test is halted before completion.

Pretrip Test Results

Pass Pretrip Test

- If the unit passes the Pretrip Test, the amber Pretrip Test LED will turn off at the completion of the test and the unit will continue to run as required. This signifies that the unit passed the Pretrip Test.

Fail Pretrip Test with Check Alarms

- If the unit fails the Pretrip Test with Check alarms, the Alarm Icon will appear when the alarm condition occurs. The Pretrip Test will continue to run unless a Shutdown Alarm occurs.

- The amber Pretrip Test LED will turn off at the completion of the test, but the Alarm Icon will remain lit. This indicates that one or more Check Alarm conditions occurred during the Pretrip Test. More than one alarm may be present.
- View and record the alarm(s), correct as necessary, clear the alarm(s) and repeat the Pretrip Test.

Fail Pretrip Test with Shutdown Alarms

- If the unit fails the Pretrip Test with a Shutdown alarm, the Alarm Icon will appear when the alarm condition occurs, the unit will immediately shut down and the amber Pretrip Test LED will turn off.
- The Pretrip Test will be aborted.
- Alarm Code 28 Pretrip Abort will be set along with the Shutdown Alarm that was detected. This signifies that a Shutdown Alarm occurred during the Pretrip Test and that the test was aborted. Other alarms may also be present.
- View and record the alarm(s), correct as necessary, clear the alarm(s) and repeat the Pretrip Test.

Unit Operation

Display Brightness

The brightness of the SR-3 Standard Truck HMI Control Panel display can be adjusted to allow for changing ambient light conditions. The choices available to the operator are HIGH, MEDIUM and LOW.

To change the display brightness press and hold the ON key then press the UP ARROW Key to increase display brightness and the DOWN ARROW Key to decrease display brightness.

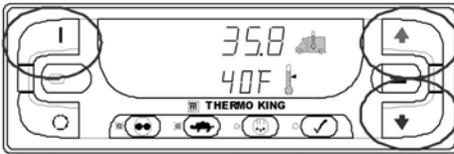


Figure 43: ON Key, UP/DOWN Arrow Keys

Electric Standby Operation

Model 50 units are equipped with Electric Standby. This feature allows the unit to operate on electric power as well as be powered by the standard diesel engine.

During Electric Standby operation, power to the unit is supplied by an electric motor connected to a high voltage power source. Check the unit for proper power source ratings.



WARNING: Units equipped with electric standby can start at any time when the unit is connected to live electric power and the controller is turned on.



CAUTION: Always turn the electric power supply off when handling, connecting, or disconnecting high voltage power cords.

NOTE: The Model 50 control system automatically determines if diesel or electric power is desired.

See “Starting the Electric Motor” in the Unit Operation chapter of this manual

Electric Power Receptacle

The electric power receptacle is used to connect the unit to an appropriate electric power source for electric standby operation. Turn the unit OFF before connecting or disconnecting the power cord.



Figure 44: Model 50 Power Receptacle Box

Loading and Enroute Inspections

Thermo King refrigeration units are designed to maintain the required temperature for the product being carried during its time in transit. Because of the unit's unique design, special care is required during loading to prevent cargo spoilage.

Pre-Loading Inspection

1. Inspect all door seals, including vent doors, for condition and a tight seal with no air leakage.
2. Inspect the cargo compartment inside and out for damaged or loose skin and insulation.
3. Inspect the inside of the cargo compartment for damaged walls, air ducts, floor channels or "T" flooring, clogged defrost drain tubes, and clogged or damaged floor channels which could block the air return, creating isolated areas in the load that are warmer than the desired temperature.
4. Pre-cool the cargo compartment. Adjust the setpoint to the desired cargo temperature and allow the unit to run a minimum of 30 to 60 minutes (longer if possible) before loading. Check to be certain the setpoint temperature is correct for the cargo.

Pre-cooling before loading will remove residual heat and moisture from the cargo compartment and prepare it to receive the refrigerated load. Pre-cooling also provides a good test of the refrigeration system.
5. Make sure products are pre-cooled to the proper temperature before loading. Any variance should be noted on the manifest.
6. Supervise product loading to make sure that there is sufficient air space around and through the load so air flow is not restricted.

Inspecting the Load

Never assume that the product has been loaded properly. Watch for and perform the following tasks. It takes only a few minutes and could save you or your employer considerable time and money later on.

1. Make sure the unit is off before opening the cargo compartment doors. During operation, the unit blows out refrigerated air, and draws in outside air.

NOTE: The unit can be run with the doors open if the truck is backed into a refrigerated warehouse with tight door seals.

2. Perform a final check of the load temperature. If the load is too hot or too cold, make a final notation on the manifest.



CAUTION: Make sure cargo is pre-cooled to the proper temperature before loading. The unit is designed to maintain temperature, not cool an above-temperature load.

3. While inspecting to see that the cargo is loaded properly, make sure the evaporator inlets and outlets are not blocked.
4. Close or supervise the closing of the cargo compartment doors. Make sure they are securely locked.
5. Check to make sure the unit setpoint is set at the desired temperature as listed on the manifest.
6. If the unit was stopped, restart using the appropriate starting procedure outlined in this manual.
7. Repeat the after-start inspection.
8. Defrost the unit 30 minutes after loading by starting a manual defrost cycle.

Loading and Enroute Inspections

Enroute Inspections

NOTE: *Enroute inspections are recommended every four hours for the prevention of damage to the cargo.*

1. Note the setpoint to make certain no one has altered the setting since picking up the load.
2. Note the return air temperature reading. It should be within the desired temperature range. If the return air temperature reading is not within the desired temperature range, it indicates one of the following:
 - a. The unit has not had sufficient time to pull down the temperature. Refer to log, if possible, for history of load (for example, above temperature load, properly pre-cooled cargo compartment, length of time on road).
 - b. The unit is in defrost or has just completed defrost.

NOTE: *You can cancel defrost by turning the unit off, then restarting the unit.*

- c. The evaporator is plugged with frost. Initiate a manual defrost cycle. The defrost cycle will be automatically terminated.
- d. Improper air circulation within the cargo compartment. Inspect the cargo compartment (if possible) to determine if the evaporator fans are working and properly circulating the air. Poor air circulation can be due to improper loading of the cargo or shifting of the load.



WARNING: *The unit may START automatically AT ANY TIME while it is turned ON. Make sure to turn the unit OFF before opening unit doors or inspecting any part of the unit.*

- e. The unit did not start automatically. If the unit cranked without starting, determine and correct the cause for not starting.

Loading and Enroute Inspections

- f. The unit may have a low refrigerant charge. If liquid is not showing in the unit receiver tank sight glass, the refrigerant charge may be low. Adding refrigerant or repairing the refrigeration system requires a competent mechanic. Refer such problems to the nearest Thermo King dealer or authorized Service Center, or call the Thermo King Cold Line telephone number shown on the inside back cover of this manual for referral.

NOTE: If the temperature in the compartment is not within the desired temperature range, repeat the Enroute Inspection every 30 minutes until the compartment temperature comes within the desired temperature range.



CAUTION: Stop the unit if the compartment temperature remains outside the desired temperature range from the setpoint on two consecutive 30 minute inspections. Contact the nearest Thermo King Service Center or your company office immediately. Take all necessary steps to protect and maintain proper load temperature.

3. Initiate a Manual Defrost cycle after each Enroute Inspection.

Specifications

Engine

Model	TK380U (Tier 4)
Fuel Type	Diesel Fuel must conform to EN 590 No. 2 Diesel fuel under normal conditions No. 1 Diesel fuel is acceptable cold weather fuel
Oil Capacity:	Crankcase & Oil Filter w/Bypass Oil Filter
	10.2 quarts (9.7 liters) 11.5 quarts (10.9 liters) Fill to full mark on dipstick
Oil Type	API Classification CI-4 or better (ACEA Rating E3 or better for Europe)
Oil Viscosity	14 F to 122 F (-10 C to 50 C): SAE 15W-40 (Synthetic) 5 to 104 F (-15 to 40 C): SAE 15W-40 5 to 104 F (-15 to 40 C): SAE 10W-30 (Synthetic or Synthetic Blend) -13 to 104 F (-25 to 40 C): SAE 10W-40 -13 to 86 F (-25 to 30 C): SAE 10W-30 -22 to 122 F (-30 to 50 C): SAE 5W-40 (Synthetic) Below -22 F (-30 C): SAE 0W-30 (Synthetic)

Engine (Continued)

Engine Thermostat	160 F (71 C)
Engine Coolant Type	<p>ELC (Extended Life Coolant), which is “RED” Use a 50/50 concentration of any of the following equivalents: Chevron Dex-Cool Texaco ELC Havoline Dex-Cool® Havoline XLC for Europe Shell Dexcool® Shell Rotella Saturn/General Motors Dex-Cool® Caterpillar ELC Detroit Diesel POWERCOOL® Plus</p>
<p><i>CAUTION: Do not add “GREEN” or “BLUE-GREEN” conventional coolant to cooling systems using “RED” Extended Life Coolant, except in an emergency. If conventional coolant is added to Extended Life Coolant, the coolant must be changed after 2 years instead of 5 years.</i></p>	
Coolant System Capacity	5.5 quarts (5.2 liters) with overflow tank
Coolant Expansion Tank Cap Pressure	15 psig (103 kPa)

Specifications

Belt Tension

NOTE: Use belt tension gauge TK P/N 204-427 or Frequency Gauge TK P/N 204-1903 whenever possible to check belt tension. New belts should be tensioned cold and tensioned cold again after 10 hours of unit operation.

Belt	Tension No. on TK Gauge P/N 204-427
Engine/Electric Motor	75 ± 5
Compressor/Electric Motor	75 ± 5
Electric Motor/Alternator	55 ± 5
Water Pump/Engine	40

Refrigeration System

Compressor Model	TK06 Scroll 6 HP
Refrigerant Charge	Approximately 9.9 lb (4.5 kg) R-404A

Electrical Control System

Control System Voltage	12.5 Vdc (nominal)
Battery	12 Volt, AHr Rating - 75 AHrs, 640 Cold Cranking Amps at 0 F (-18 C) (ENCCA)
Battery Charging System	12 volt, 120 amp, brush type, Thermo King alternator

Fuses

Fuse	Size	Function
F2	15A	Power to On/Off Switch
F3	40A	Fuel Sol Pull-In/Starter Circuit
F4	None 2A	No Fuse - All Bosch and Thermo King Alternators 2A Fuse - All Prestolite Alternators
F5	40A	Preheat Circuit
F6	15A	High Speed Circuit
F7	2A	8XP Circuit - Controller On Feedback to HMI

Specifications

Fuses (Continued)

Fuse	Size	Function
F8	5A	2A Power to CAN Connector J12
F9	5A	2A Power to CAN Connector J14
F10	10A	8X Power (Install fuse in right position)
F12	5A	2A Power to CAN Connector J13
F13	2A	8FC Circuit (Remote Status Light/Optional Power)
F20	2A	Alternator Sense
F21	60A	Main Fuse (2 Circuit)
F25	7.5A	HPCO Switch Circuit
F26	5A	Power to CAN Connector J98
F4 Remove fuse F4 for units with Australian Bosch or Thermo King Alternators. Install fuse F4 for units with Prestolite Alternator.		
F10 When fuse F10 is installed in the right position the On/Off keys on the HMI turn the unit on and off. When fuse F10 is installed in the left position the unit will start and run without the HMI control panel.		

Electric Motor and Overload Relay

Voltage/Phase/Frequency	Horsepower	Kilowatts	rpm	Full Load (amps)	Overload Relay Setting (amps)
208/3/60	12	8.9	1735	31.4	32
230/3/60	12	8.9	1750	28.8	32
460/3/60	12	8.9	1750	14.4	16

Standby Power Requirements

Supply Circuit Breaker:	200-230/3/50-60 380-460/3/50-60	50 amps 20 amps
Extension Cord Size:		Up to 25 ft (7.6 m)—10 gauge 50 to 75 ft (15.2 to 22.9 m)—8 gauge

Maintenance Inspection Schedule

A closely followed maintenance program will help to keep your Thermo King unit in top operating condition. The following general schedule is provided to assist in monitoring that maintenance.

For more specific detail, see the maintenance manual for your unit and to the PreTrip Inspection chapter in this manual.

After first week of operation:

- Check belt tension.
- Tighten unit mounting bolts.
- Check coolant level.
- Check refrigerant oil level.
- Check refrigerant level.

Pretrip	750 Hours	Annual 2,000 Hours	Inspect/Service These Items
			Microprocessor
•			Run pretrip test (see “Pretrip Test” in Operating Instructions Chapter).
			TK380U Engine
•			Check fuel supply.
•			Check engine oil level.

Maintenance Inspection Schedule

Pretrip	750 Hours	Annual 2,000 Hours	Inspect/Service These Items
•	•	•	<p>Check engine coolant level.</p> <p> (CAUTION: Do not remove radiator cap while coolant is hot.)</p>
•	•	•	Inspect belts for condition and proper tension.
•	•	•	Check engine oil pressure hot, on high speed.
•	•	•	Listen for unusual noises, vibrations, etc.
		•	Change engine oil (hot). (2000 hrs with bypass filter or synthetic oil).
		•	Change oil filters.
		•	Clean and service crankcase breather.
		•	Drain water from fuel tank and check vent.
		•	Replace fuel filter
		•	Replace dry type air cleaner element.
		•	Inspect/clean electric fuel pump filter.
		•	Check air cleaner hose for damage.

Maintenance Inspection Schedule

Pretrip	750 Hours	Annual 2,000 Hours	Inspect/Service These Items
		<ul style="list-style-type: none"> — — • • • — — — 	<p>Check that engine coolant antifreeze protection is at -30 F (-34 C) every 1,000 hours or 6 months year (whichever occurs first).</p> <p>Adjust engine valve clearance every 1,000 hours.</p> <ul style="list-style-type: none"> • Check and adjust engine speeds. • Check condition of engine mounts. • Check restraining mount (snubber) pre-load adjustment. <p>Clean and test fuel injection nozzles every 3,000 hours.</p> <p>Replace fuel return lines between fuel injection nozzles every 10,000 hours or sooner, as required.</p> <p>Change ELC (red) engine coolant every 5 years or 12,000 hours.</p>

Maintenance Inspection Schedule

Pretrip	750 Hours	Annual 2,000 Hours	Inspect/Service These Items
			Refrigeration
• •	• •	• • • • • •	Check refrigerant level and compressor oil condition. Check for proper suction pressure. Check throttling valve regulating pressure on defrost. Check compressor oil level. Check compressor efficiency and pump down refrigeration system. Replace dehydrator and check discharge and suction pressure. *Replace compressor oil filter when refrigeration system work is performed.

Maintenance Inspection Schedule

Pretrip	750 Hours	Annual 2,000 Hours	Inspect/Service These Items
<ul style="list-style-type: none"> • • • 	<ul style="list-style-type: none"> • • 	<ul style="list-style-type: none"> • • • • 	<p>Electrical</p> <ul style="list-style-type: none"> Check controller for alarms. Run pretrip test Check battery voltage. Inspect/clean battery terminals and check electrolyte level. Inspect wire harness for damaged wires or connections. Check DC (battery charging) alternator bearings and brushes.* Inspect electric motor bearings.*

Maintenance Inspection Schedule

Pretrip	750 Hours	Annual 2,000 Hours	Inspect/Service These Items
			Structural
• •	• • • • •	• • • • •	Check for oil, fuel, coolant and refrigerant leaks. Visually inspect unit for damaged, loose or broken parts (includes air ducts and bulkheads). Inspect tapered roller bearing idlers for leakage and bearing wear (noise). Check and clean evaporator and condenser coils. Clean defrost drains. Check all unit and fuel tank mounting bolts, brackets, lines, hoses, etc.
		•	Inspect clutch.*
*NOTE: With belt removed, spin bearings by hand. Listen for noise (bearings roll freely).			

Serial Number Locations

Write the unit model and unit serial number in the spaces provided in the following Emergency Cold Line chapter. This information is needed to service the unit.

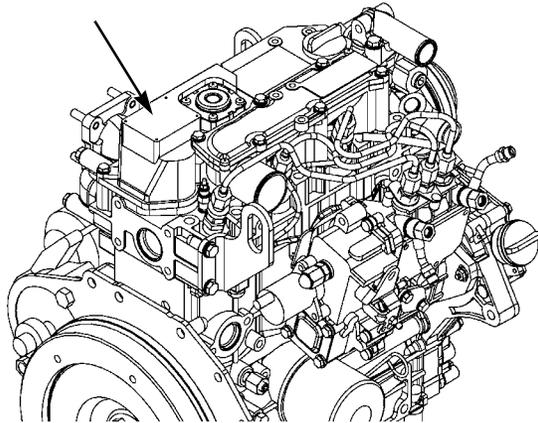


Figure 45: Engine Serial Number Location

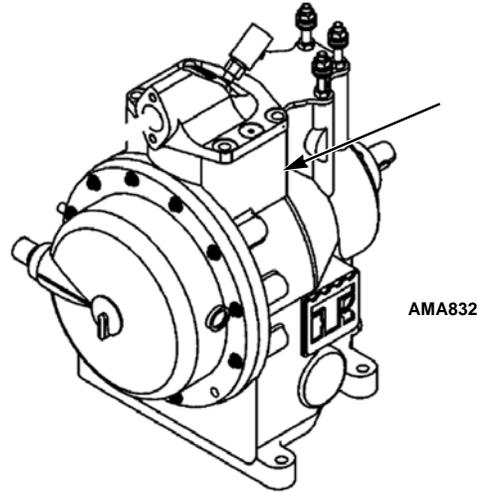


Figure 46: Compressor Serial Number Location

Serial Number Locations

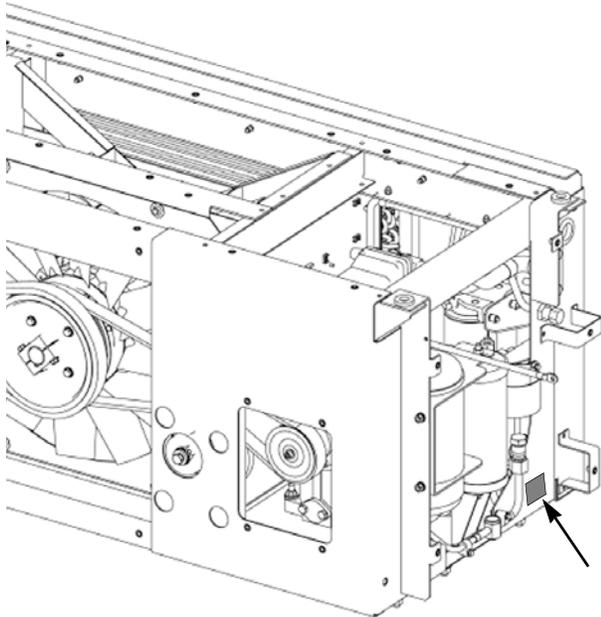
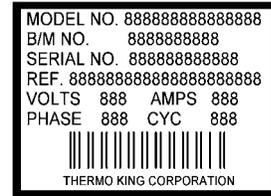


Figure 47: Unit Serial Number Plate Location



AQA011

Figure 48: Laminated Unit Serial Number Plate



Figure 49: Refrigerant Type Label

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.

Emergency Cold Line



AMA1585

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.

If you can't get your rig rolling, and you have tried the Thermo King North American Service Directory (available from any Thermo King dealer) to reach a dealer without success, *then* call the Toll Free Emergency Cold Line Number (888) 887-2202.

California Proposition 65 Warning

**Diesel exhaust is a chemical known to
the State of California to cause cancer.**

Warranty

Terms of the Thermo King Warranty are available on request.
Please reference document TK 50047 for the Thermo King
Self-Powered Truck Unit Warranty.

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 or www.tranetechnologies.com

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

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