

Operator's Manual

Advancer Simulator

Multi-Temperature

August 2024

TK 62318-11-OP-EN



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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.

Copies of the approved Thermo King documentation can be found on the Thermo King iService Portal: http://iservice.thermoking.com/esa.

Customer Satisfaction Survey

Let your voice be heard!

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

Scan the Quick Response (QR) code or click Technical Publications EMEA Feedback to complete the survey.



Safety Information

Danger, Warning, Caution, and Notice

Thermo King®/ FRIGOBLOCK recommends that all service be performed by a Thermo King/FRIGOBLOCK 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.

A Warning

Hazard!

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

A 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.

IFFERMO KING Safety Information

General Practices

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:

Important: Thermo King will not be held liable for claims for damage resulting from the following:

- Misuse, improper installation, abnormal service, storage of hazardous chemicals, use of corrosive substances, transit damage, recharging of cooling system, accident, fire, improper repair, tampering or abuse.
- Incorrect voltages or faults with regard to power supply which falls outside of the operating parameters.

A Danger

Risk of Injury!

Improper servicing can lead to fire, electrocution, or explosion. Never service, repair, or troubleshoot a system unless you are a professional service person.

A Warning

Personal Protective Equipment (PPE) Required!

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

Notice

Children!

Do not let children to tamper with the unit. The unit is not intended for use by young children unless they have been adequately supervised by a responsible person to ensure they can use it safely.

Notice

Equipment Damage!

Do not operate the unit if it is visibly damaged.

Electrical Hazards

🔺 Danger

Hazardous Voltage!

Risk of fatal injury from electric shocks! Do not touch exposed cables with your bare hands. This especially applies when operating the ColdCube[™] Connect from an AC power supply.

A Warning

Hazardous Voltage!

Treat all wires and connections as if they were high voltage until a meter and wiring diagram indicate otherwise. Only use tools with insulated handles. Never hold uninsulated metal tools near exposed, energized conductors. If there is a risk of energized electrical contact, arc, or flash, technicians MUST put on all PPE in accordance with OSHA, NFPA 70E, or other local, state, or country-specific requirements for arc flash protection PRIOR to servicing the unit. NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASHING CLOTHING. ELECTRICAL METERS AND EQUIPMENT MUST BE PROPERLY RATED FOR INTENDED VOLTAGE.

A Warning

Live Electrical Components!

Control circuits used in your equipment are low voltage (12 or 24 VDC). The voltage is not dangerous but the large amount of electric current (amperage) from alternator and battery can cause severe burns if accidentally shorted to ground with metal objects, such as tools. Do not wear jewelry, watches, or rings because they increase the risk of shorting out electrical circuits and damaging the equipment or causing severe burns.

A Warning

Risk of Injury!

The unit power plug must be clean and dry before connecting it to a power source.

Safety Information

A Warning

Hazardous Voltage!

Never work alone on high voltage circuits in the refrigeration unit. Another person should be nearby to shut off the unit and provide aid in the event of an accident. If there is a risk of energized electrical contact, arc, or flash, technicians MUST put on all PPE in accordance with OSHA, NFPA 70E, or other local, state, or country-specific requirements for arc flash protection PRIOR to servicing the unit. NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASHING CLOTHING. ELECTRICAL METERS AND EQUIPMENT MUST BE PROPERLY RATED FOR INTENDED VOLTAGE.

A Warning

Hazardous Voltage!

Danger of electrocution! Disconnect the connection cable before you replace the ColdCube[™] Connect fuse.

A Warning

Personal Protective Equipment (PPE) Required!

In the event of an electrical accident, all required PPE should be near the work area in accordance with OSHA, NFPE 70E, or other local, state, or country-specific requirements for a Category 3 risk.

A Warning

Risk of Injury!

Do not make rapid moves when working on high voltage circuits in the refrigeration unit. Do not grab for falling tools because you might accidentally touch a high voltage source.

Notice

Equipment Damage!

Disconnect your equipment and all other electric devices from the battery before you connect the battery to a quick charging device. Over-voltage can damage the electronics of your equipment.

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.

BATTERY ACID

Under normal usage, the Ni-MH batteries are hermetically sealed. In case of accident, perform the following instructions:

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

THERMO KING Safety Information

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.

Unit Description



The Thermo King "Advancer Simulator" is designed to experience operating an actual Thermo King transportation refrigeration equipment which is controlled by the "A-Series controller". It is a stand-alone piece of equipment which needs only to be connected to utility power to operate.

The "Advancer Simulator" has the functionality of a typical multitemperature Advancer unit. It has the ability to mimic operation under both diesel and electric power. Easy to operate switches allow the user to simulate real world conditions and observe the corresponding reactions which would be typical of an actual refrigeration unit.

The different operational modes can be observed by changing set-point, initiating defrost cycles, opening and closing the door switch, etc. Using the "Advancer Simulator", an operator can quickly become well versed in how to use an actual "Human Machine Interface" (HMI) controlled refrigeration unit. Refer to the "A-Series Multi-Temperatures Diagnostic Manual" (TK 62005–2–OD), for unit features and a detailed explanation of the HMI operation.

Description

Components Description

The different components of the Advancer Simulator is described as follows:



Item	Description	
1	A-Series Controller HMI: The main controller for the simulator (Refer the later session for more details on the HMI operations).	
2	Controller USB PORT: This port is used to insert a USB Type A Storage Device (Pen Drive). The USB device will connect to the HMI Controller and allow for flashload the software or download.	
3	RS232 Port: This allows to connect the simulator main PCB to laptop for external communication. This can be used for diagnostic and external control of the simulator without operation using switches.	
4	BlueBox USB PORT: This port is used to connect the BlueBox service cable (Part number 423001). This allows the USB communication with the BlueBox.	
5	12V Power ON/OFF Switch: This switch is used to ON/OFF the 12V power to the module. (The 12V LED should illuminate once the simulator is ON).	

THERMO KING Description

Item	Description	
6	Adjustment Switches: Switches used to adjust parameters used by the HMI to simulate the Advancer unit operation. (Individual switch functions and LED indication are detailed in later.)	
7	Triple Combo Display: The Triple Combo Display, shows the current fuel level by lighting up the bar on the right, shows the current Return Air Temp, and lights up the amber when an alarm occurs.	

HMI



Item	Description	
1	Soft Keys: From the Left, Soft Key 1, Soft Key 2, and Soft Key 3. The function of soft keys change depending on the operation being performed. If a soft key is active, it's function is shown in the display directly above the key.	
2	HMI ON: This button is used to turn ON the HMI controller. While turning the HMI ON, wait for the program running LED (Orange) to light up before pressing the button.	
3	HMI OFF: This button is used to turn OFF the HMI.	
4	Center Buttons: The Navigation keys are used to navigate the menus, while the center key is used as and ACCEPT/ENTER key.	
5	Cycle-Sentry Key: This Key is used to select Cycle Sentry Mode or Continuous Mode operation.	

THERMO KING Description

Item	Description
6	Defrost Key: Once pressed, the key will initiate a Manual Defrost cycle.
7	Display: The LCD Display, displays the output of the HMI on the screen. Powered ON when the HMI ON key is pressed.

Note: For more information on HMI control panel, refer to A-Series operator's manual (TK 61738-2).

Adjustment Switches

Note: Most of these parameters will only be visible in the Main Menu $+ \rightarrow$ System \rightarrow Refrigeration section.



Item	Description	
1	SELECT button: This button can be pressed to select the parameter which has to be changed (Zone specific or System specific). The selected parameters will be identified by the LED indication. If there is no operation for 10 second the selection will be deactivated.	
2	UP button: This button can be pressed to increase the value of the selected parameter (LED ON).Single press will increase the value by 0.5. Long press (PRESS and HOLD) will increase the value faster.	
3	DOWN button: This button can be pressed to decrease the value of the selected parameter (LED ON). Single press will decrease the value by 0.5. Long press (PRESS and HOLD) will decrease the value faster.	
4	Return Air Temp: Adjust the Return Air Temperature up or down by $0.5^{\circ}C/0.9^{\circ}$ F (by default).	

THERMO KING Description

Item	Description	
5	Discharge Air Temp: Adjust the Discharge Air Temperature up or down by 0.5° C/0.9°F (by default).	
6	Evap Coil Temp: Adjust the Evaporator Coil Temperature up or down by 0.5°C/ 0.9°F (by default).	
7	Ambient Air Temp: Adjust the Ambient Air Temperature up or down by 0.5°C/ 0.9°F (by default).	
8	Coolant Temp: Adjust the Coolant Temperature up or down by 0.5°C/0.9°F (by default).	
9	Compliance Log Sensor: Once pressed, allows for pdf file to be loaded to a USB pen drive plugged into the "USB CONTROLLER" port.	
10	Suction Pressure: Adjust the Suction Pressure up/down by 0.25 PSI / 0.02 BAR G.	
11	Discharge Pressure: Adjust the Discharge Pressure up/down by $0.25 \text{ PSI} / 0.02 \text{ BAR G}$.	
12	Fuel Level: Allows the user to set the fuel level from 0% (Empty) to 100% (Full).	
13	PRG Running: Program running LED, indicates that the unit is powered on and the software program is running.	
14	ZONE SELECT: This button is used to select the Zone 2 or Zone 3 parameters. The selected zone will be indicated by LED on. If both the zone select LEDs (Z2/ Z3 parameters) are OFF means it is in ZONE 1 parameters (by Default is ZONE 1). Once Z2/Z3 parameters are selected, then only zone-specific parameters can be changed. If no operation for 10 seconds, the zone selection will be deactivated and goes to default Zone 1.	
15	Z2 Parameters: Indicate Zone 2 is selected and zone specific parameters change will affect the zone 2 values.	
16	Z3 Parameters: Indicate Zone 3 is selected and zone specific parameters change will affect the zone 3 values.	

Note: If the HMI software version is for a Single temperature, then the ZONE select function will not be functional.

Door Open Switches

Door Open switches allows for switching the door status to OPEN or CLOSED. By default, it is CLOSED, and the LED backlight for the switches is OFF. When pressed, the LED backlight will turn ON and the door status changes to OPEN. Press again to change to CLOSED.

- 1. DOOR1 : Door OPEN / CLOSED for Zone 1
- 2. DOOR2 : Door OPEN / CLOSED for Zone 2
- 3. DOOR3 : Door OPEN / CLOSED for Zone 3



Electric Mode Switch

This switch allows to select the mode of operation between ELECTRIC and DIESEL. By default, it is DIESEL, and the LED backlight is OFF. Press the button to switch to ELECTRIC mode, and the LED backlight will turn ON.



Alarms Switches

These switches allow for generating the below alarms. By default, the alarm is off, and by pressing the switch, the alarm is activated and the LED backlight turns ON. Press again to turn OFF the alarm.



HPCO Switch

The High Pressure Cut Out switch allows to switch between HIGH and NORMAL pressure levels. On HIGH position, generate a RED alarm in HMI.



Other Ports

Figure 1. iBox Connector



The iBox port uses a Deutsch 6-Pin (DT04-6P-CE03) connector. The connector is located on the right-hand side of the simulator. This connector can be used to establish connection with a third party telematic device.

Figure 2. TouchLog connector



The TouchLog port uses a Deutsch 8-Pin (DT04-68SB-CE05) connector. The connector is located on the right-hand side of the simulator. It can be used to connect a TouchLog Device for the serial communication.

Operation Instructions

Method of Operation

- 1. Plug in the mains power into the simulator.
- 2. Turn ON the "Main Power Switch" part of the main power plug of the simulator.
- Wait for the "PRG RUNNING" LED to light up before pressing the HMI ON button.
- 4. Once the program initializes, the Advancer Simulator should be setup and ready for simulation.
- **Note:** If the Door Status switch does not work, check the Guarded Access settings to see if it is configured. Also, if the Fuel Level Sensor does not work, confirm that it is properly configured in Guarded Access.

Electronic Module Diagnostic using the Simulator

The different electronics modules used in the Advancer unit, like the HMI, HPM, LPM, and BlueBox2, can be replaced with the modules to be tested in the simulator and checked for normal operation. To allow this, the simulator enclosure can be easily opened to access the internal electronics modules.



Item	Description
1	НМІ
2	НРМ
3	LPM
4	BlueBox2

Specification

Power Source:

The "Advancer Simulator" is intended to be operated indoors from the following power source:

AC Input Power: 85 ~ 264 VAC and 47 ~ 63 Hz.

Simulated Parameters:

The "Advancer Simulator" will simulate the necessary parameters for the "A-Series Controller" system to act normally. These parameters will constantly vary as with an actual refrigeration unit. The Simulated Parameters are:

- 1. Temperatures:
 - Return Air Temperature
 - Discharge Air Temperature
 - Ambient Air Temperature
 - Evaporator Coil Temperature

2. Pressures:

- Discharge Pressure
- Suction Pressure

3. Engine Parameters:

- Engine Coolant Temperature
- Engine Oil Pressure
- Engine R.P.M.
- Battery Amperage
- Fuel Tank Condition
- 4. Other:
 - AC Power (for simulating ELECTRIC mode)
 - Trailer Door Condition (OPEN/CLOSED)

Telematics

The Telematics connections available with the "Advancer Simulator" are the iBOX and the TouchLog connections.

Note: The Touchlog connection is available through using the 424725 Touchlog Serial Port Harness.

iBox Connector



Pin Code Description RX-02 RS232 Receive line 1 2 TX-02 RS232 Transmit Line Wake Up signal 3 DI1-02 4 3P_P-02 3rd Party AUX Power Out (12 V, 3 A) 5 3PN-01 Power Ground 6 8XP-02 Unit ON signal

TouchLog Connector





Pin	Code	Description
1	TX2-01	RS232 Receive line
2	RX2-01	RS232 Transmit 2 Line
3	COM2-01	Signal 2 Ground
4	RX-01	RS232 Receive 1 line
5	TX-01	RS232 Transmit 1 Line
6	GND-05	Signal 1 Ground

THERMO KING Notes

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.

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