



Operator's Manual

BUS HVAC UNIT

Revision A

Introduction

This manual is published for informational purposes only. Thermo King® makes no representations warranties express or implied, with respect to the information recommendations and descriptions contained herein. Information provided should not be regarded as all-inclusive or covering all contingencies. If further information is required, Thermo King Corporation Service Department should be consulted.

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

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- 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

Machine Information Policy

Use of this product serves as acceptance of the Thermo King Machine Information Policy available at: www.europe.thermoking.com. This product includes a standard feature that collects and shares Machine Information with Thermo King. Separate terms may apply when a customer has entered into an agreement with Thermo King. Customers that would like to opt-out of sharing Machine Information with Thermo King should forward such inquiries to the email address Opt-Out@ThermoKing.com.

Software License

The product includes software that is licensed under a non-exclusive, non-sublicensable, terminable and limited license to use the software as installed on the product for its intended purpose. Any removal, reproduction, reverse engineering, or other unauthorized use of the software is strictly prohibited. Hacking the product or installing unapproved software may void the warranty. The owner or operator shall not reverse engineer, decompile, or disassemble the software, except and only to the extent that such activity is expressly permitted by applicable law notwithstanding this limitation. The product may include third party software separately licensed as specified in any documentation accompanying the product or in an about screen on a mobile application or website that interfaces with the product.

Emergency Assistance

Thermo Assistance is a multi-lingual communication tool designed to put you in direct contact with an authorized Thermo King dealer.

Thermo Assistance should only be contacted for breakdown and repair assistance.

To use this system, you need the following information before you call: (phone charges will apply)

- Contact Phone Number
- Type of TK Unit
- Thermostat Temperature Setting

Introduction

- Ambient temperature
- Probable Cause of Fault
- Warranty Details of the Unit
- Payment Details for the Repair

Leave your name and contact number and a Thermo Assistance Operator will call you back. At this point you can give details of the service required and the repair will be organized.

No payment at point of repair for customers with a ThermoKare service contract or with a guaranty of payment from their Thermo King home-dealer



Belgium	+32 270 01 735
Denmark	+45 38 48 76 94
France	+33 171 23 05 03
Germany	+49 695 00 70 740
Italy	+39 02 69 63 32 13
Spain	+34 914 53 34 65
The Netherlands	+31 202 01 51 09
United Kingdom	+44 845 85 01 101
Kazakhstan	+7 7273458096
Russia	+7 4992718539
Others	+32 270 01 735

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General Inquires and Unit Maintenance

For general inquiries please contact your local Thermo King dealer.

Go to www.europe.thermoking.com and select dealer locator for your local Thermo King dealer.

Or refer to the Thermo King Service Directory for contact information.

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 or type the web address https://tranetechnologies.iad1.qualtrics.com/jfe/form/SV_2octfSHoUJxsk6x?Q_CHL=qr&Q_JFE=qdg to complete the survey.



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Safety

Danger, Warning, Caution, and Notice

Thermo King® recommends that all service be performed by a Thermo King dealer and to be aware of several general safety practices.

Safety advisories appear throughout this manual as required (refer to examples below). Your personal safety and the proper operation of this unit depend upon the strict observance of these precautions.

▲ DANGER

Example!

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

▲ WARNING

Example!

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

▲ CAUTION

Example!

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

NOTICE

Example!

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

General Safety Practices



⚠ DANGER

Risk of Injury!

Keep hands and loose clothing clear of fans and belts at all times when the unit is operating with the doors open.

⚠ WARNING

Risk of Injury!

Do not apply heat to a closed cooling system. Before applying heat to a cooling system, drain it. Then flush it with water and drain the water. Antifreeze contains water and ethylene glycol. The ethylene glycol is flammable and can ignite if the antifreeze is heated enough to boil off the water.

⚠ WARNING

Risk of Injury!

Temperatures above 120 degrees F (50 degrees C) can cause serious burns. Use an infrared thermometer or other temperature measuring device before touching any potentially hot surfaces.

⚠ CAUTION

Sharp Edges!

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

Battery Removal

⚠ WARNING**Hazard of Explosion!**

When removing battery cables, ALWAYS disconnect the negative battery terminal first. Then remove the positive terminal. When reconnecting the battery terminals, connect the positive terminal (+) first, and connect the negative (-) terminal last.

This order is important because the frame is grounded to the negative battery terminal. If the negative terminal is still connected, a complete circuit exists from the positive terminal of the battery to the frame. Metal objects contacting the positive side and the frame simultaneously will cause sparks or arcing. If there are sufficient hydrogen gases emitted from the battery, an explosion might occur, causing equipment damage, serious injury, even death.

Refrigerant



Although fluorocarbon refrigerants are classified as safe, use caution when working with refrigerants or in areas where they are being used.

⚠ DANGER**Hazardous Gases!**

Refrigerant in the presence of an open flame, spark, or electrical short produces toxic gases that are severe respiratory irritants which can cause serious injury or possible death.

⚠ DANGER**Refrigerant Vapor Hazard!**

Do not inhale refrigerant. Use caution when working with refrigerant or a refrigeration system in any confined area with a limited air supply. Refrigerant displaces air and can cause oxygen depletion, resulting in suffocation and possible death.

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Refrigerant in a liquid state evaporates rapidly when exposed to the atmosphere, freezing anything it contacts. Wear butyl lined gloves and other clothing and eye wear when handling refrigerant to help prevent frostbite.

Refrigerant Oil



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

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Protect your eyes from contact with refrigerant oil. The oil can cause serious eye injuries. Protect skin and clothing from prolonged or repeated contact with refrigerant oil. To prevent irritation, wash your hands and clothing thoroughly after handling the oil. Rubber gloves are recommended.

***Important:** Please note that it is recommended to evacuate all passengers if a refrigerant leak is suspected. Please use your own specific company evacuation procedure.*

First Aid

REFRIGERANT

- **Eyes:** For contact with liquid, immediately flush eyes with large amounts of water and get prompt medical attention.
- **Skin:** Flush area with large amounts of warm water. Do not apply heat. Remove contaminated clothing and shoes. Wrap burns with dry, sterile, bulky dressing to protect from infection. Get prompt medical attention. Wash contaminated clothing before reuse.
- **Inhalation:** Move victim to fresh air and use Cardio Pulmonary Resuscitation (CPR) or mouth-to-mouth resuscitation to restore breathing, if necessary. Stay with victim until emergency personnel arrive.
- **Frost Bite:** In the event of frost bite, the objectives of First Aid are to protect the frozen area from further injury, warm the affected area rapidly, and to maintain respiration.

REFRIGERANT OIL

-
- **Eyes:** Immediately flush with large amounts of water for at least 15 minutes. Get prompt medical attention.
 - **Skin:** Remove contaminated clothing. Wash thoroughly with soap and water. Get medical attention if irritation persists.
 - **Inhalation:** Move victim to fresh air and use Cardio Pulmonary Resuscitation (CPR) or mouth-to-mouth resuscitation to restore breathing, if necessary. Stay with victim until emergency personnel arrive.
 - **Ingestion:** Do not induce vomiting. Immediately contact local poison control center or physician.

ENGINE COOLANT

- **Eyes:** Immediately flush with large amounts of water for at least 15 minutes. Get prompt medical attention.
- **Skin:** Remove contaminated clothing. Wash thoroughly with soap and water. Get medical attention if irritation persists.
- **Ingestion:** Do not induce vomiting. Immediately contact local poison control center or physician.

BATTERY ACID

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

ELECTRICAL SHOCK

Take IMMEDIATE action after a person has received an electrical shock. Get quick medical assistance, if possible.

The source of the shock must be quickly stopped, by either shutting off the power or removing the victim. If the power cannot be shut off, the wire should be cut with a non-conductive tool, such as a wood-handle axe or thickly insulated cable cutters. Rescuers should wear insulated gloves and safety glasses, and avoid looking at wires being cut. The ensuing flash can cause burns and blindness.

If the victim must be removed from a live circuit, pull the victim away with a non-conductive material. Use wood, rope, a belt or coat to pull or push the victim away from the current. DO NOT TOUCH the victim. You will receive a shock from current flowing through the victim's body. After separating the victim from power source, immediately check for signs of a pulse and respiration. If no pulse is present, start Cardio Pulmonary Resuscitation (CPR). If a pulse is present, respiration might be restored by using mouth-to-mouth resuscitation. Call for emergency medical assistance.

ASPHYXIATION

Safety

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.

General Description

General Features

Thermo King's Heating, Ventilation and Air Conditioning (HVAC) systems provide cooling, dehumidifying and heating of the air.

Units contain refrigeration circuit. The refrigeration medium is charged/transported by a compressor via installation pipes & hoses. Components are arranged for easy access and service through removable covers.

The units, compressor and other accessories are controlled by an Electrical control system. This Control system allows driver to control the operating conditions via Controller (also called driver panel) located on the bus' dashboard.

Different applications need different control solutions, and Thermo King's controllers have been developed to meet those needs.

Thermo King's range of bus HVAC controllers allows the operator to easily and accurately control the climate in his vehicle and ensure the comfort of his passengers, independent of outside conditions.

Easy to read displays present just enough information to monitor temperature set-point and system parameters. Touch buttons and analogue dials offer an intuitive interface for fine tuning of cooling, heating and ventilation.

Diagnostic features are built-in to reduce maintenance and repair costs.

Each bus is different in terms of structure, ambient conditions, operator and passenger needs. Thermo King not only has a wide portfolio of different driver panels but also the expertise to customize the software for most streamlined HVAC functionality in a bus fleet.

Serial Number Locations

Motors: Located on back of motor housing assembly.

Compressor: Stamped on plate attached to compressor body above clutch.

Unit: Nameplate is located on frame near fuse block (see chapter "Photos and Illustrations")

CANAIRE Controller



1.		<p>ON/OFF button. Two possibilities when driver panel is powered:</p> <ul style="list-style-type: none"> • Welcome screen with actual date and time and TK logo > driver panel is powered but out of operation > to start press ON/OFF button. • Standard operating screen.
2.		<p>Driver's area control Press red or blue button to set temperature^(a). Press ventilator buttons to set air flow.</p>
3.		<p>Driver's area control Automatic control of required temperature^(b).</p>
4.		<p>Air flow direction (Air distribution damper position) Press to change flow direction to windscreen or driver or to start defrost function.</p>
5.		<p>Preheater ON/OFF button.</p>

6.		Preheater setting button — see ???.										
7.		<p>Operating Mode selection button — press repeatedly to change the mode:</p> <table border="1" data-bbox="341 354 958 797"> <tr> <td data-bbox="341 354 444 423"></td> <td data-bbox="444 354 958 423">Ventilation</td> </tr> <tr> <td data-bbox="341 423 444 516"></td> <td data-bbox="444 423 958 516">Heating</td> </tr> <tr> <td data-bbox="341 516 444 623"></td> <td data-bbox="444 516 958 623">Cooling</td> </tr> <tr> <td data-bbox="341 623 444 711"></td> <td data-bbox="444 623 958 711">AUTO mode</td> </tr> <tr> <td data-bbox="341 711 444 797"></td> <td data-bbox="444 711 958 797">Reheat^(c) (TWO DROPS symbol – if available and configured)</td> </tr> </table>		Ventilation		Heating		Cooling		AUTO mode		Reheat ^(c) (TWO DROPS symbol – if available and configured)
	Ventilation											
	Heating											
	Cooling											
	AUTO mode											
	Reheat ^(c) (TWO DROPS symbol – if available and configured)											
8.		<p>SMOG button Press to close both HVAC unit and Feedback Fresh Air dampers. To cancel press SMOG button again. SMOG mode is terminated automatically after pre-set period.</p>										
9.		<p>Passenger's area control Press red or blue button to set temperature. Press ventilator buttons to set air flow.</p>										
10.		<p>Passenger's area control Automatic control of required temperature</p>										
11.		ECO button ^(d)										
12.		LCD graphic display — see ???.										

THERMO KING
CANAIRE Controller

- (a) The compressor is always controlled by HVAC unit. If the cooling function is required by Front Box only the compressor doesn't start.
- (b) The compressor is always controlled by HVAC unit. If the cooling function is required by Front Box only the compressor doesn't start.
- (c) Depends on system configuration.
- (d) Depends on system configuration.

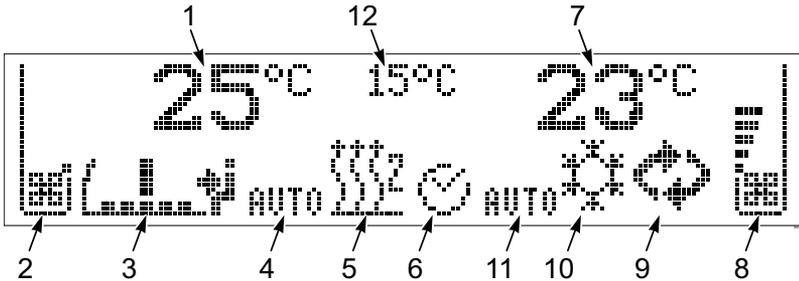
Note: Drivers Area Air Control - Left section => Frontbox control
 Passengers Area Air Control - Right Section => HVAC Unit

Setting Preheater Wake Up time

Step 1.		Press for 3 seconds to set Preheater Wake Up time.
Step 2.		Press repeatedly to set hours.
Step 3.		Press to go to minutes setting.
Step 4.		Press repeatedly to set minutes.
Step 5.		Press to go to weekdays setting.
Step 6.		Press repeatedly to set week days. Selected week day is underlined. Repeat steps 5 and 6 for each day.
Step 7.		Press shortly to finish.

LCD Graphic Display

Figure 1. LCD Graphic's display



1.	Driver's area temperature set point ^(a)	7.	Passenger's area temperature set point ^(b)
2.	Driver's area – air flow indicator (Front Box blower speed)	8.	Passenger's area – air flow indicator (HVAC unit blower speed)
3.	Air flow direction (air distribution damper position) indicator	9.	SMOG icon
4.	Automatic mode of Front Box icon	10.	HVAC unit operating mode icon
5.	Preheater icon	11.	Automatic mode of HVAC unit icon
6.	Preheater timer icon	12.	Ambient temperature ^(c)

(a) Depends on system configuration, driver panel or CANAIRE system setting.

(b) Depends on system configuration, driver panel or CANAIRE system setting.

(c) Depends on system configuration, driver panel or CANAIRE system setting.

Alarms Icons

	<p>Warning: "YELLOW Alarm" ► long beep ► HVAC unit is operating, probably with some restriction ► arrange repair as soon as possible.</p>
	<p>Alarm: "RED Alarm" ► long beep and then short beeps repeatedly ► HVAC unit is operating in VENTILATION Mode only ► arrange repair IMMEDIATELY.</p>

Setup

Start		Press the 3 buttons AUTO Driver and AUTO Passenger and SMOG for 3 seconds to enter Main Menu.
Menu		Press buttons with ventilator symbol on RIGHT SIDE repeatedly to scroll through function menu (UP and DOWN function).
Select		To select required item (folder, sub-menu) press F button (ENTER function).
Upper level		Press AUTO button to go back to upper menu level (ESCAPE function).
Change		To change value for selected (highlighted) item press upper or lower button with ventilator symbol on LEFT SIDE repeatedly.
Next		Select next item with upper or lower button with ventilator symbol on RIGHT SIDE. (LEFT and RIGHT function).
Finish		Press ON/OFF button shortly.

Full Menu Options

- Main Menu
- DP Setup
 - Units
 - Temp. on display

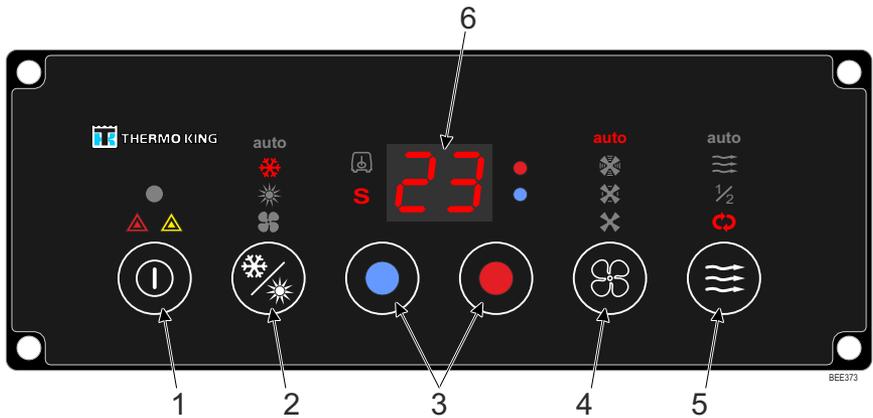
- Language
- Smog timer
- Preheater Tiner
- Time Setup
 - Date and Time Setup
 - Preheater Wake Up
 - Preheater Time On
- Front Box Setup
- Main Setup
- Relay Test
- Show Temperatures
- Alarm
 - Active Alarms
 - Alarm Read
 - Alarm Clear
- Hour meter
 - HVAC System ON
 - Driver Panel

Note: *Be careful with changing of parameters/ configuration. No warranties can be applied if nonapproved configuration is used. If you are not really experienced in following actions please call for help Thermo King Service Center otherwise there is risk of equipment damage or operation complications and Thermo King reserves the right to deny warranty.*

Specifications

APPLICATION	Control of HVAC unit
SETUP TEMPERATURE RANGE	17 °C (63 °F) to 27 °C (80 °F)
	Display in °C and °F as firmware option
OPERATING VOLTAGE RANGE	10 - 32 VDC
CURRENT CONSUMPTION	Max. 100 mA
OPERATING TEMPERATURE RANGE	-40 °C (-40°F) to 80 °C (176 °F)
CONNECTION	RS232 serial connection
	CAN bus - CAN0, CAN1
DIMENSIONS (WxHxD)	120 mm x 180 mm x 35 mm (without cover)
POWER SUPPLY	Ready 24 VDC
INPUTS	Analogue (AI) - 14
	Digital (DI) (4)
OUTPUTS	Analogue (AO) - 4
	Digital (DO) - 17
DIAGNOSTIC / PROGRAMMING	CANDiag software

ClimaAIRE I D Controller



1.		On/ OFF button.		<p>The Red Alarm (ALARM) symbol will shine in the following two conditions:</p> <ul style="list-style-type: none"> • high or low pressure switches are OFF longer than 10 minutes • high or low pressure switches are OFF 5 times per 10 minutes <p>In both cases, the unit will switch to the Ventilation Mode. If the Red Alarm appears, alarm code is shown on the display.</p>
				<p>The Yellow Alarm (WARNING) symbol will shine in case of temperature sensor failure.</p> <p>If the Yellow Alarm appears, alarm code flashes 5 times on the display. To restart the unit, press the ON/OFF button (1) twice to switch the unit OFF and ON. If the alarm comes up again, don't restart and see your nearest dealer for service.</p>

ClimaAIRE I D Controller

2.		Mode select button (MODE) (ESCAPE)	auto	Reheat/Auto mode. The unit will cool or heat the bus automatically (according to thermostat requirements).
				A/C mode. The unit will operate in cool mode.
				Heating mode. The unit will operate in heating mode.
				Ventilation mode Only the blowers are operating.
3.		Temperature button (UP)	Use to increase/ decrease temperature setpoint.	
		Temperature button (DOWN)		
4.		Blower speed button (SPEED) (ENTER)	auto	Automatic blower speed The blowers are controlled automatically depending on the thermostat setpoint and passenger compartment conditions.
				High blower speed
				Medium blower speed
				Low blower speed
5.		Fresh air select button (AIR MODE) (SMOG)	auto	Automatic mode – the fresh air damper is controlled automatically
				Fresh air damper open (100% FA)
				Half open – fresh air damper at 50% position (50% FA)
				Recirculated air – fresh air damper closed (0% FA)

6.		Display		Return air temperature icon
				Setpoint icon
				Red - Boost pump icon
				Blue - Compressor clutch icon

Operating Instructions

Turn the system ON by pressing button ON/OFF (1).

Use the buttons MODE, SPEED, AIR MODE and DOWN and UP to adjust the system. By pressing the selection button you select one of the options in the same group.

Use the DOWN button to set lower setpoint temperature (down to Lo = full cooling independent on real temperature). Use the UP button to set higher setpoint temperature (up to Hi = full heating independent on real temperature).

In Auto Mode all functions are controlled by the ClimaAIRE I D controller automatically according to the required setpoint.

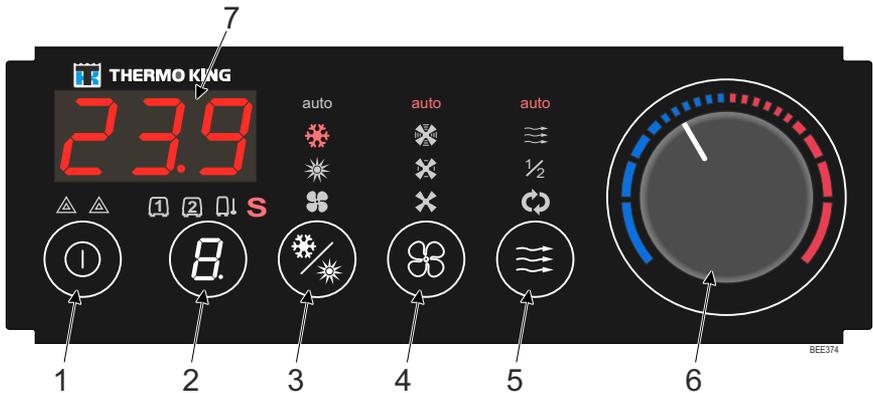
Turn the system OFF by pressing button ON/OFF (1).



Specifications

APPLICATION	Control of HVAC unit
SETUP TEMPERATURE RANGE	17 °C (63 °F) to 27 °C (80 °F)
	Display in °C and °F as firmware option
OPERATING VOLTAGE RANGE	10 - 32 VDC
CURRENT CONSUMPTION	Max. 100 mA
OPERATING TEMPERATURE RANGE	-30 °C (-22 °F) to 80 °C (176 °F)
CONNECTION	RS232 serial connection
	CAN bus - CAN0, CAN1
DIMENSION (WxHxD)	187 mm x 57 mm x 60 mm
POWER SUPPLY	Ready for 12 VDC and 24 VDC
INPUTS	Interior Temperature Sensor
	Freeze Temperature Sensor
	Ambient Temperature Sensor
	Heating Coil Temperature Sensor
	Floor Heating Temperature Sensor
	0 - 5 V DC Analog Input
	Coil Pressure Switch
	Pressure Switch (LPCO, HPCO)
OUTPUTS	(0.7 A Low Side Output - 1.0 A High Side Output)
	3 for Blower Speed - LSO - or PWM 20 kHz
	Alternator Excitation - LSO
	Compressor Clutch - LSO
	Boost Pump - LSO
	2 for Solenoid Heat Valve (PWM 0.1 Hz) - HSO
	2 for Fresh Air Damper (0 - 50 - 100% or PWM 1 Hz) - HSO
2 LSO free (2-speed floor blower)	
DIAGNOSTIC / PROGRAMMING	RS-232, CANdiag software

ClimaAIRE II Controller



1.		On/ OFF button.	<div data-bbox="561 862 618 911" style="text-align: center;">  </div> <p>The Red Alarm (ALARM) symbol will shine in the following two conditions:</p> <ul style="list-style-type: none"> • high or low pressure switches are OFF longer than 10 minutes • high or low pressure switches are OFF 5 times per 10 minutes <p>In both cases, the unit will switch to the Ventilation Mode. If the Red Alarm appears, alarm code is shown on the display.</p> <div data-bbox="561 1154 618 1203" style="text-align: center;">  </div> <p>The Yellow Alarm (WARNING) symbol will shine in case of temperature sensor failure. If the Yellow Alarm appears, alarm code flashes 5 times on the display. To restart the unit, press the ON/OFF button (1) twice to switch the unit OFF and ON. If the alarm comes up again, don't restart and see your nearest dealer for service.</p>
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ClimaAIRE II Controller

2.		Display selection button DISPLAY		The inside temperature in Zone 1 is displayed.
				The inside temperature in Zone 2 is displayed.
				The Ambient air temperature is displayed.
				Setpoint icon
3.		Mode select button (MODE) (ESCAPE)	auto	Reheat/Auto mode. The unit will cool or heat the bus automatically (according to thermostat requirements).
				A/C mode. The unit will operate in cool mode.
				Heating mode. The unit will operate in heating mode.
				Ventilation mode Only the blowers are operating.
4.		Blower speed button (SPEED) (ENTER)	auto	Automatic blower speed The blowers are controlled automatically depending on the thermostat setpoint and passenger compartment conditions.
				High blower speed
				Medium blower speed
				Low blower speed
5.		Fresh air select button (AIR MODE) (SMOG)	auto	Automatic mode – the fresh air damper is controlled automatically
				Fresh air damper open (100% FA)
			$\frac{1}{2}$	Half open – fresh air damper at 50% position (50% FA)
				Recirculated air – fresh air damper closed (0% FA)

6.		Thermostat knob		To cool the passenger compartment, turn the knob to the LEFT. To warm the passenger compartment, turn the knob to the RIGHT. Display will show adjusted setpoint. The inside temperature range is 17°C - 27°C (63°F - 80°F).
7.		Display		

Operating Instructions

Turn the system ON by pressing button ON/OFF (1).

Use the buttons MODE, SPEED and AIR MODE to adjust the system. By pressing the selection key you select one of the options in the same group.

Use the button DISPLAY to set the display mode.

In Auto Mode all functions are controlled by the ClimaAIRE II controller automatically according to the required setpoint.

Turn the system OFF by pressing key ON/OFF (1).



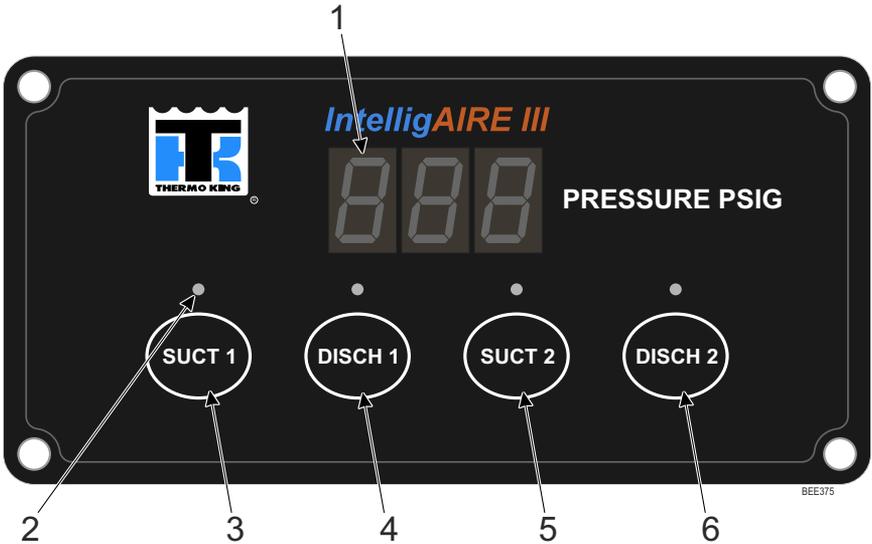
Specifications

APPLICATION	Control of HVAC unit
SETUP TEMPERATURE RANGE	17°C (63°F) to 27°C (80°F)
OPERATING VOLTAGE RANGE	10 - 32 VDC
CURRENT CONSUMPTION ^(a)	280 mA
CONNECTOR TYPE	Packard Metric-Pack
OPERATING TEMPERATURE RANGE	-40°C (-40°F) to 85°C (185°F)
COMMUNICATION	CAN J1939
DIMMENSIONS (WxHxD)	187 mm x 57 mm x 45 mm
POWER SUPPLY	Ready for 12 VDC and 24 VDC
DISPLAY MODULE DELUXE	
ANALOG INPUT	1 Feedback Sensor
BASE MODULE DELUXE	
ANALOG INPUTS	6 Temperature Sensors
	6 Feedback / Temperature Sensors
DIGITAL INPUTS	6 High Side (action at 12 - 24 V)
	2 Low Side (action at 0 V)
ANALOG OUTPUTS	4 x 0 - 5 V
DIGITAL OUTPUTS	1 x 10 A; 1 x 15 A; 10 x 1 A
	4 x H Bridge Output or 6 Digital outputs 250 mA
DIAGNOSTIC / PROGRAMMING	RS 232 PORT

^(a) Base Module Deluxe + Display Module Deluxe; outputs are switched off.

IntelligAIRE III Controller

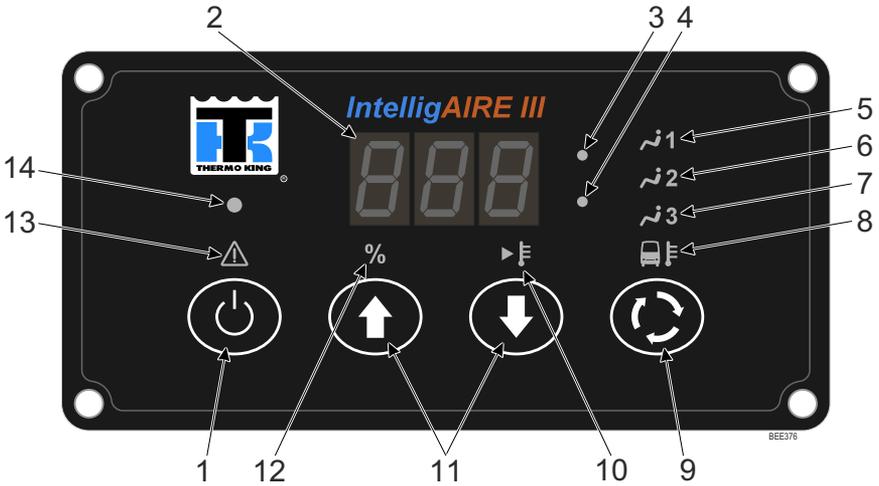
Figure 2. Pressure Display Module (PDM)



1.	3-Digit LED Display	4.	Discharge Pressure 1 button - compressor 1: Pressing the DISCH 1 button displays the discharge pressure for compressor 1.
2.	LED Indicators (above each button)	5.	Suction Pressure 2 button - compressor 2: Pressing the SUCT 2 button displays the suction pressure for compressor 2.
3.	Suction Pressure 1 button - compressor 1: Pressing the SUCT 1 button displays the suction pressure for compressor 1.	6.	Discharge Pressure 2 button - compressor 2: Pressing the DISCH 2 button displays the discharge pressure for compressor 2.

THERMO KING
IntelligAIRE III Controller

Figure 3. Drivers Display Module (DDM) (Optional)



1.	On/Off button
2.	3-Digit LED Display
3.	Red LED Indicator - HEAT Mode/
4.	Blue LED Indicator - COOL Mode: <ul style="list-style-type: none"> Blue LED indicator will shine whenever the compressor is running. Red LED indicator will shine whenever the boost pump and coolant valve are operating. Both LED's will shine when operating in Reheat Mode. Compressor clutch and coolant valve are energized as needed after setpoint is reached to maintain set point.
5.	Zone 1 Indicator
6.	Zone 2 Indicator
7.	Zone 3 Indicator
8.	Ambient Air Temperature Indicator: The ambient temperature sensor can provide data which may be used to help alert the driver of possible icing conditioning on some road surfaces.
9.	Zone Select button - Pressing the Zone Select button will cycle through each enabled zone as well as the outside ambient temperature.
10.	Setpoint Indicator
11.	Down Arrow button/Up Arrow button - After selecting the Zone Select button (9), the Up and Down Arrow buttons are used to increase or decrease the setpoint temperature for each zone.
12.	Percent Indicator

13.	Alarm Indicator - Red or Yellow
14.	Ambient Light Sensor

Alarms

When the system is turned ON, the warning indicator will flash as the system powers up.

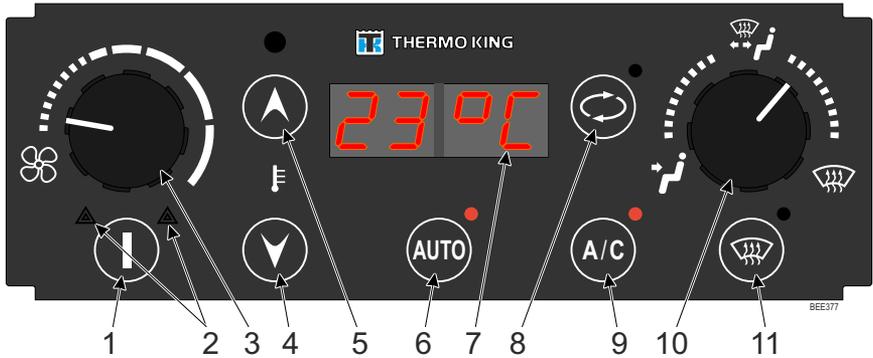
	If YELLOW warning indicator is displayed, the system is operable, but the warning should be investigated as soon as possible.
	If RED warning indicator comes ON during operation, the system will shut itself OFF. The system should be checked immediately, as this could indicate a major failure.

Note: Alarm codes can only be cleared using a laptop PC equipped with CAndiag. software. Log alarms should only be cleared after scheduled service has been completed.

**Specifications**

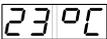
APPLICATION	Control of HVAC unit
SETUP TEMPERATURE RANGE	17°C (62°F) to 28°C (82°F)
	Display in °C and °F as firmware option
OPERATING VOLTAGE RANGE	10 - 32 VDC
CONTROL PANEL CONTACTORS	Size 3.7 kW (2 used) - 25 Amps
	Size 1.3 kW (2 used) - 6 Amps
OPERATING TEMPERATURE RANGE	-40°C (-40°F) to 80°C (176°F)
CONNECTION	RS232 serial connection
	CAN bus - CAN0, CAN1
DIMENSION (WxHxD)	120 mm x 180 mm x 35 mm (without cover)
POWER SUPPLY	Ready 24 VDC
INPUTS	Up to 8 - as required by application
OUTPUTS	Return Air Temperature
	Evaporator Coil Temperature
	Discharge Air Temperature
	Compressor Discharge Temperature
	Ambient Air Temperature
	Battery Cooler Coil Temperature
	Water Temperature
DIAGNOSTIC / PROGRAMMING	CANDiag software

FrontAIRE II Controller



1.		ON /OFF Button	Press the button to turn the unit ON. Press again to turn it OFF.
2.		Red Alarm Icon	The Red Alarm Symbol (LED) will be ON in the case of: <ul style="list-style-type: none"> • high or low pressure alarm • clutch or the harness failure In both cases, the unit will not work in Cool Mode.
		Yellow Alarm Icon	The Yellow Alarm Symbol (LED) will be ON in case of temperature sensors failure. In this case the unit will work with the wrong data from the sensor. To restart the unit, press twice the button ON/ OFF (1) to switch OFF and ON the unit. If the alarm comes up again, don't restart and see your nearest dealer for service.
3.		SPEED knob	The stepless control of the blower speed.
			To decrease the blower speed, turn the knob to the LEFT.

FrontAIRE II Controller

4.		Lower Value button	<p>Lower Value button: Press the button to decrease the desired setpoint. The minimum is 18 °C (64 °F). For permanent cooling set LO on the display and press A/C (9), LED A/C is ON. For permanent ventilation set LO on the display, LED A/C is OFF.</p>
5.		Higher Value button	<p>Higher Value button: Press the button to increase the desired setpoint. The maximum is 27 °C (80 °F). For permanent heating set HI on the display.</p> <p>Manual Mode: Press UP (5) and DOWN (4) simultaneously. Use UP (5) or DOWN (4) to set opening of the water valve (Hxxx%).</p>
6.		AUTO button	<p>Auto Mode: The unit will heat or ventilate the driver compartment automatically (according to the desired setpoint and compartment conditions), LED A/C is OFF.</p> <p>Reheat/Auto Mode: The unit will cool or heat the driver compartment automatically (according to the desired setpoint and compartment conditions), LED A/C is ON. The speed of the blower will set automatically (according to the desired setpoint and compartment conditions).</p>
7.		DISPLAY	<p>The display shows the real time when the system is OFF.</p> <p>The display shows the required setpoint when the system is ON.</p> <p>The brightness of the display and LED's is controlled automatically according to the external light condition.</p>
8.		SMOG button	<p>Recirculated Air: The fresh air damper is closed for 10 minutes (according to the parameter), LED is ON.</p>
9.		A/C button	<p>Air Condition Mode: The unit will operate in the cool or in the reheat mode, LED is ON.</p>

10.		AIR DISTRIBUTION knob	The stepless control of the air distribution damper.
			Turn the knob to the LEFT to distribute air to the driver.
			Turn the knob to the MIDDLE to distribute air to the driver and to the windshield.
			Turn the knob to the RIGHT to distribute air to the windshield.
11.		DEFROST button	Defrost / Demist Mode: The unit will defrost or demist the windshield, LED is ON.

Operating Instructions

Turn the system ON by pressing key ON/OFF (1) - the display shows temperature. The system is in Auto Mode - the LED AUTO is ON.

Use keys UP (5) or DOWN (4) to set the required setpoint.

Adjust the system by using keys AUTO (6), SMOG (8), A/C (9) and DEFROST (11), knobs SPEED (3) and AIR DISTRIBUTION (10).

To keep the constant temperature in the driver compartment press keys AUTO (6) and A/C (9) to ON state - both LED's are ON, and use keys UP (5) and DOWN (4) to set the required setpoint.

Turn the system OFF by pressing key ON/OFF (1) - the display shows the real time.

GENERAL FOR SETTING

In the working mode press and hold AUTO (6) for 5 sec. The display shows "TEST". Press UP (5) or DOWN (4) to show "TIME" on the display. Press ENTER (11) to show the real time. Press ENTER (11) again to show a blinking number. For the setting use UP (5) and DOWN (4), for the confirmation use ENTER (11). To go back to the working mode press ESC (6) three times.

TIME AND DATE SETTING

Real time / hours - left blinking numbers w/o dots (set hours).



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Real time / minutes - right blinking numbers w/o dots (set minutes).

Real date / day (set day).

Real date / month (set month).

Real date / year (set year).

PREHEATER TIME SETTING

Preheater start time / hours - left blinking numbers w/ dots.

Preheater start time / minutes - right blinking numbers w/ dots.

SPECIFICATIONS

APPLICATION	Control of HVAC front box unit
SETUP TEMPERATURE RANGE	18°C (64°F) to 27°C (80°F)
OPERATING VOLTAGE RANGE	22 - 30 VDC
CURRENT CONSUMPTION	Max. 60 mA
OPERATING TEMPERATURE RANGE	-30°C (-22°F) to 80°C (176°F)
CONNECTION	Molex 39-01-2140 and 39-01-2180
DIMENSION (WxHxD)	187 mm x 57 mm x 60 mm
INPUTS	Return Air Temperature Sensor
	Coil Temperature Sensor
	Ambient Temperature Sensor
	Floor Temperature Sensor
	Duct Temperature Sensor
	3 Analog Inputs (0 - 24 VDC)
	2 Digital Inputs (0 / 24 VDC)
OUTPUTS	6 Hi/Lo Side Universal Outputs (max. 0.5 A each)
	4 Servomotors Outputs: <ul style="list-style-type: none"> • Heat Valve • Floor Heat Valve • Fresh Air Damper • Windshield Damper
	Compressor Clutch Output (24 VDC / 2 A)
	PWM Blower Output (24 VDC, 20 kHz, 0 - 100%)
SOFTWARE FEATURES	Real-time clock
	Timer for Preheater
DIAGNOSTIC / PROGRAMMING	RS-232

Warranty

Please also refer to TK 61830-3-OP Thermo King Standard Warranty Terms & Conditions for Bus HVAC Air Conditioning Units available on <https://www.emea-user-manuals.thermoking.com/global/europe.html> or on request from your Thermo King Dealer.

Maintenance Inspection Schedule

A closely followed maintenance program will help to keep your Thermo King unit in top operating condition.

Coordinate the maintenance inspection schedule with the Bus Preventive Maintenance Schedule. Ask your Thermo King dealer representative for the Thermo King Bus A/C Preventive Maintenance forms for more information.

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

Note: *For further best practices, please go to www.europe.thermoking.com/best-practices.*

Off Season Operation Of Bus Air Conditioning System

Prior to operating the compressor during winter months, you must warm up the coach interior to normal operating temperature (15 to 21°C [60 to 76°F]). Unless this precaution is taken, liquid refrigerant might be forced into the compressor, causing severe damage.

Pre-trip Inspections

Performed daily and weekly **by the driver**.

- Check Driver panel for Alarm codes.
- Listen for unusual noises, vibrations, etc.
- Visually inspect unit for damaged, loose or broken parts (includes air ducts and bulkheads if so equipped).
- **Units with Power Pack only:** Check fuel supply.
- **Units with Power Pack only:** Visually inspect unit for fluid leaks. (fuel, coolant, oil and refrigerant).

Other Maintenance

Other maintenance on the unit should be performed **by your local Thermo King dealer or authorized service center**.

The following intervals are just a recommendation. The periods may vary - this depends on ambient conditions, pollution or local transportation laws. Please use common sense then judging replacement of filters and cleanliness based on first four months of service.

Maintenance Inspection Schedule

Examples are shown in the table below. Your Dealer will prepare a schedule to suit your specific needs.

Service Record: Each inspection and service performed should be recorded on your Dealer Service Record.

Interim Inspection	Complete PM	Full Service
A Service Monthly (M): after 10000 km (6,000 Miles) Quarterly (Q): after 30000 km (18,000 Miles) Semi-Annually (SA): regardless of mileage Annually (A): regardless of mileage	B Service Every 2 years (2Y): regardless of mileage	C Service Every 3 years (3Y): regardless of mileage

Recover Refrigerant

Note: *In the USA, EPA Section 609 Certification is required to work on motor vehicle air conditioning systems (MVAC).*

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.

When working on transport temperature control systems, a recovery process that prevents or minimizes refrigerant loss to the atmosphere is required by law. In addition, service personnel must be aware of the appropriate European Union, National, Federal, State, and/or Local regulations governing the use of refrigerants and certification of technicians. For additional information on regulations and technician programs, contact your local THERMO KING dealer.

Service Tools - Use the proper service tools. Gauge manifold sets should include appropriate shutoff valves or disconnects near the end of each service line.

Recovery Equipment - Recovery equipment must be used. Proper recovering, storing and recycling of refrigerants is an important part of all service work.

Service Procedures - Recommended procedures must be used to minimize refrigerant loss.

Components may be isolated by closing service valves and performing system pump-downs.

Components unable to be isolated for service must be repaired only after refrigerant is properly recovered.

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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