THERMO KING

Operator's Manual

BUS HVAC UNIT

Revision B

December 2020

TK 53050-3-OP-EN

TRANE TECHNOLOGIES

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

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. You are obliged to complete the declaration for “THERMO KING EQUIPMENT SOFTWARE LICENSE AGREEMENT” before you put your unit in operation. This is located in your language at the following location : https://www.emea-user-manuals.thermoking.com

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
- 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

THERMO KING
ThermoAssistance
00800 80 85 85 85

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

BEA261

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 Technical Publications EMEA Feedback

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Safety

Danger, Warning, Caution, and Notice

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

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this unit depend upon the strict observance of these precautions. The four types of advisories are defined as follows:

⚠ DANGER

Hazard!

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

⚠ WARNING

Hazard!

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

⚠ CAUTION

Hazard!

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

NOTICE

Hazard!

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

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

Personal Protective Equipment (PPE) Required!

A battery can be dangerous. Lithium Ion batteries are potentially hazardous. The combustion gas from these batteries is toxic and can present a serious FIRE HAZARD if damaged, defective or improperly used. A battery stores enough electricity to burn you if it discharges quickly. Always wear goggles or safety glasses and personal protective equipment when working with a battery. Do not replace the battery with any type other than the one approved by Thermo King for this unit.

⚠ 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.

⚠ WARNING

Risk of Injury!

This unit operates with 48 volts dc. While this voltage is not considered dangerous, the large amount of amperage available can cause severe burns if shorted or grounded. Do not wear jewelry, watches, or rings when working in on this unit because they increase the risk of shorting out electrical circuits, damaging equipment, or causing severe burns.

⚠ CAUTION

Sharp Edges!

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

Battery Removal

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Overcharging or over-discharging of an AGM Battery. There is a very real possibility of inducing enough heat into an AGM battery to initiate thermal runaway if the battery is charged at too high a voltage. This could cause your AGM battery to get very hot. Always wear personal protective equipment when working with a battery.

⚠ 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.

Note: *These hazard statements refer to servicing of the unit.*

⚠ DANGER

Hazardous Gases - Personal Protective Equipment (PPE) Required!

Refrigerant in the presence of an open flame, spark, or electrical short produces toxic gases that are severe respiratory irritants which can cause serious injury or possible death. When working with or around hazardous chemicals, ALWAYS refer to appropriate Material Data Safety Sheets (MSDS) and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection, and handling instructions.

⚠ DANGER

Refrigerant Vapor Hazard!

Do not inhale refrigerant. Use caution when working with refrigerant or a refrigeration system in any confined area with a limited air supply. Refrigerant displaces air and can cause oxygen depletion, resulting in suffocation and possible death. When working with or around hazardous chemicals, ALWAYS refer to appropriate Material Data Safety Sheets (MSDS) and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection, and handling instructions.

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Refrigerant in a liquid state evaporates rapidly when exposed to the atmosphere, freezing anything it contacts. Wear butyl lined gloves and other clothing and eye wear when handling refrigerant to help prevent frostbite. When working with or around hazardous chemicals, ALWAYS refer to appropriate Material Data Safety Sheets (MSDS) and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection, and handling instructions.

Refrigerant Oil

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

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Protect your eyes from contact with refrigerant oil. The oil can cause serious eye injuries. Protect skin and clothing from prolonged or repeated contact with refrigerant oil. To prevent irritation, wash your hands and clothing thoroughly after handling the oil. Rubber gloves are recommended. When working with or around hazardous chemicals, ALWAYS refer to appropriate 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.

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

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.
- **INHALATION:** Provide fresh air. Rinse mouth and nose with water. Seek immediate medical assistance.
- **SKIN CONTACT:** 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.
- **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.

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.

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

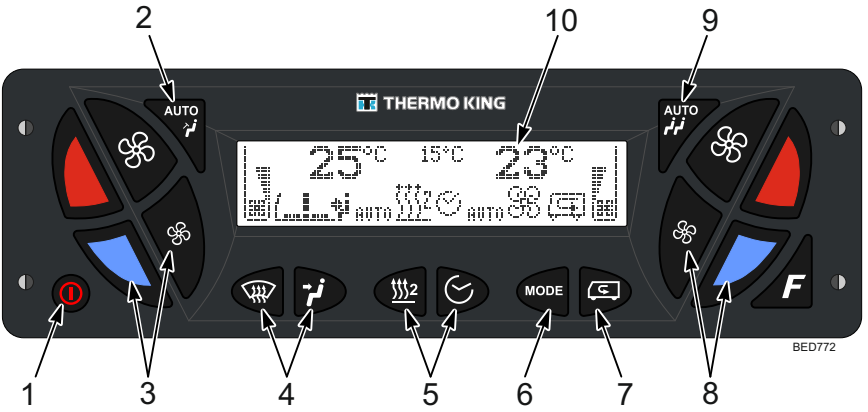
Motors: Located on back of motor housing assembly.

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

Description

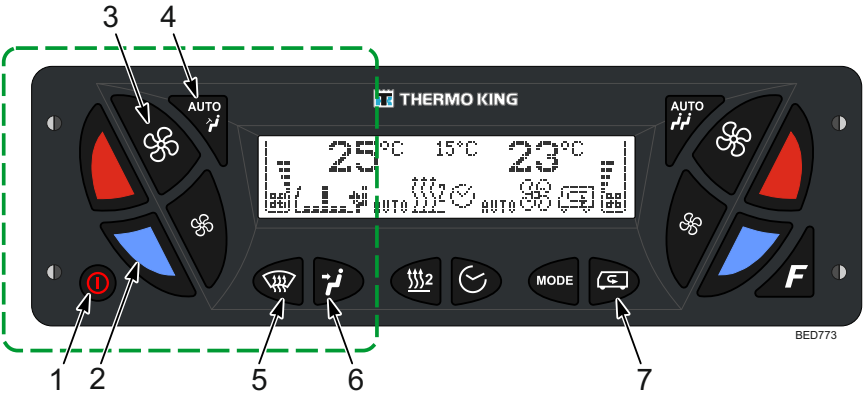


1.		ON/OFF button Two possibilities when driver panel is powered: • Welcome screen with actual date and time and TK logo. Driver panel is powered but out of operation. Press ON/OFF button to start. • Standard operating screen.
2.		**Driver area** – automatic control of blower speed
3.		**Driver area** – temperature and air flow setting Press RED and BLUE buttons to set the temperature. Press big and small fan buttons to set the amount of airflow.
4.		Air flow direction (air distribution damper position) Press to change air flow direction between windscreen and driver or to start defrost function.
5.		PREHEATER control buttons See "Preheater Control," p. 23.
6.		HVAC operating mode button Press repeatedly to change HVAC unit operating mode.

7.		SMOG mode button[a] Press to turn ON or OFF one of the SMOG modes. See "Driver Area Climate Control," p. 19, point 7 for details.
8.		**Passenger area** – temperature and air flow setting. Press RED and BLUE buttons to set the temperature. Press big and small fan buttons to set the amount of airflow.
9.		**Passenger area** – automatic control of blower speed
10.		LCD graphic display. See "Display Icons," p. 24.

(a) Depends on system configuration.

Driver Area Climate Control

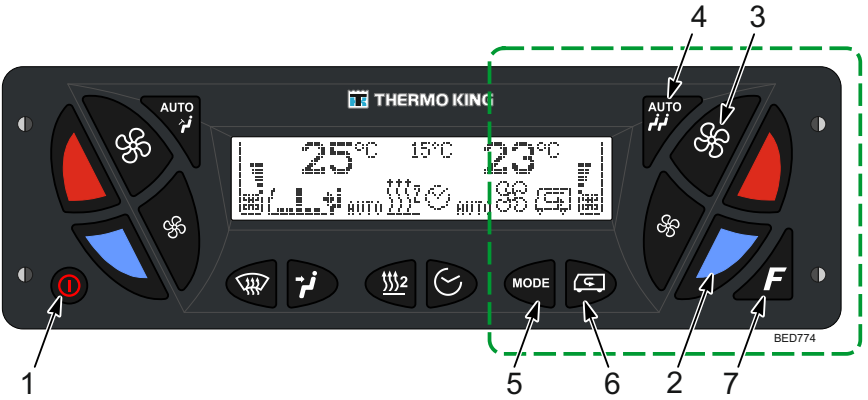


1.		ON/OFF button
2.		Temperature setting ***Note:*** *Long press (more than 3 seconds) will set maximum or minimum setpoints. Another long press will turn ON the Hi or Lo modes. Short press will exit this mode.*
3.		Manual control of blower speed
4.		Automatic control of blower speed
5.		Air flow direction setting (air distribution damper position) Short press – air to windscreen Long press – DEFROST/DEMIST function
6.		Air flow direction setting (air distribution damper position) Short press — air to driver seat
7.		SMOG mode button**(a)** Turns ON or OFF one of the SMOG modes. Press repeatedly to scroll through individual modes. Each mode determines what part of the vehicle is closed or opened to outside air. SMOG mode is terminated automatically after pre-set period of time.

		Corresponding display icons:			
			Vehicle air flow closed		Driver area air flow opened
			Vehicle air flow opened		Passenger area air flow closed
			Driver area air flow closed		Passenger area air flow opened

(a) Depends on system configuration.

Passenger Area Climate Control



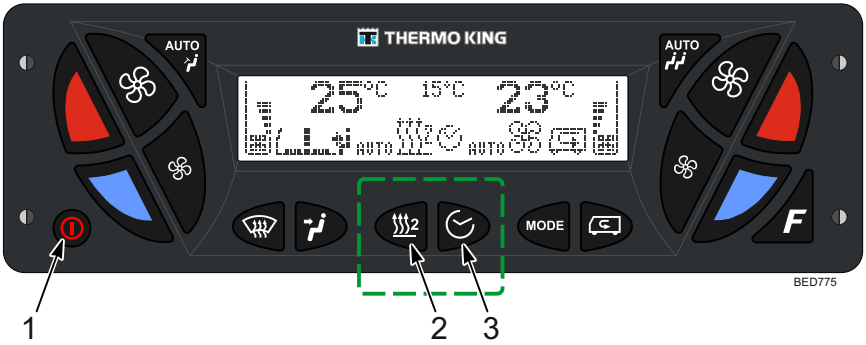
1.		ON/OFF button			
2.		Temperature setting ***Note:*** *Long press (more than 3 seconds) will set maximum or minimum setpoints. Another long press will turn ON the Hi or Lo modes. Short press will exit this mode.*			
3.		Manual control of blowers speed			
4.		Automatic control of blowers speed			
5.		HVAC unit operating mode button			
		Corresponding display icons:			
			Ventilation		AUTO mode[a]
			Heating[a]		Reheat[a]

			Cooling[a]		
6.		SMOG mode button[a] Turns ON or OFF one of the SMOG modes. See "Driver Area Climate Control," p. 19, point 7 for details.			
7.		The F button[b]			

(a) Depends on system configuration.

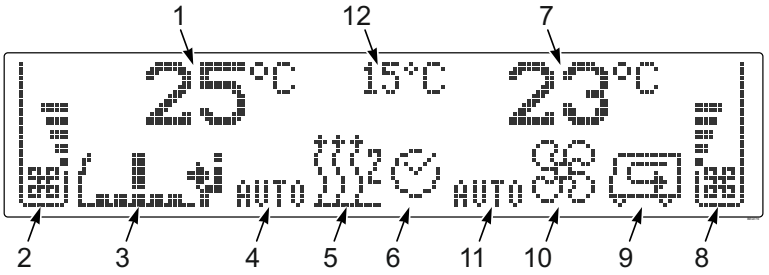
(b) Depends on display mode.

Preheater Control



1.		ON/OFF button		
2.		PREHEATER ON/OFF button Press for immediate start of preheater. Press again to stop preheater operation.		
3.		PREHEATER TIMER button Press shortly to activate the timer. Press long (more than 3 seconds) to enter Preheater Wake Up time setting.		
		Preheater Wake Up time setting:		
		Step 1		Press repeatedly to scroll between days, hours or minutes.
		Step 2		Press repeatedly to set number of days, hours or minutes.
		Step 3		Repeat steps 1 and 2
		Step 4		Press shortly to finish.

Display Icons



1.	Driver area – temperature set point **(a)**	7.	Passenger area – temperature set point**(a)**
2.	Driver area – blower speed indicator	8.	Passenger area – blowers speed indicator
3.	Air flow direction indicator (air distribution damper position)	9.	SMOG icon
4.	Driver area – automatic mode of blower speed	10.	Operating mode icon
5.	Preheater icon	11.	Passenger area – automatic mode of blower speed
6.	Preheater timer icon	12.	Ambient temperature**(a)**

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

Alarms

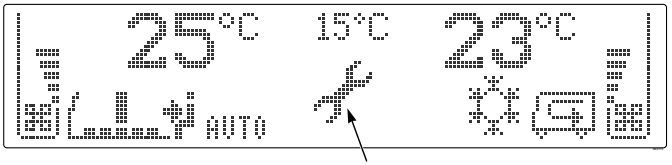
The CANAIRE control system uses dual alarm system with two levels of signals:

- ALARM (“RED” alarm)
- WARNING (“YELLOW” alarm)

RED Alarm

When any RED alarm appears in system:

- Alarm icon SERVICE WRENCH shows on display.
- Alarm acoustic signal sounds – long beep and then short beeps repeatedly.



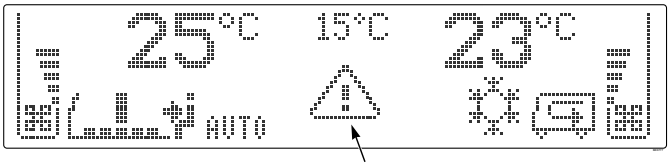
Arrange repairs IMMEDIATELY.

Note: *Any RED alarm will disable the compressor. This means that cooling (and A/C heating in case of Heat Pump units) will stop working.*

YELLOW Alarm

When any YELLOW alarm appears in system:

- Warning TRIANGLE shows on display.
- Warning acoustic signal sounds (one long beep).



Arrange repairs AS SOON AS POSSIBLE.

Alarm codes are stored in the memory to identify possible fault conditions. The alarm records can be displayed on the driver panel by long press of **F** button (3 s).

Alarm symbols can be removed by restart of control system (use the ON/OFF button to switch OFF, wait for 2 seconds, and then switch ON). After restart,

the alarm symbol can appear again, if the reason for alarm still exists. If the alarm comes up again, don't restart the unit repeatedly, this will be of no benefit. Contact the service department or Thermo King representative immediately.

For more information see “Alarm Codes,” p. 28.

Setup

Start		Press the 3 buttons AUTO Driver and AUTO Passenger and SMOG for 3 seconds to enter Main Menu.
Menu		Press RED and BLUE buttons 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 RED and BLUE buttons on LEFT SIDE repeatedly.
Next		Select next item with RED and BLUE buttons on RIGHT SIDE. (**LEFT** and **RIGHT** function).
Finish		Press ON/OFF button shortly to leave the Main Menu.

In Setup mode operator can escape Setup menu every time by pressing ON/OFF key. When any function is selected and any value is changed the change is saved to the memory in the same time.

When the ignition is switched OFF, display shows date and time for next 12 seconds. If preheater timer is ON, timer icon will be visible all the time.

If driver panel is ON and time reaches the Preheater set time, no action is executed, preheater will not start, because the driver is present.

Alarm Codes

Table 1. Color Code Definitions

O	Y	R
Occurrence – No alarm	Yellow check alarm	Red shutdown alarm
OK TO RUN	CHECK AS SPECIFIED	TAKE IMMEDIATE ACTION

Main Module Alarms – Default

Note: *Some of the alarm codes listed are reserved for special applications only.*

Table 2. Alarm prefix for module identification of articulated or special application systems

MM ID	MM position	Final indicated Alarm number value
ID00	Front or Single unit	Alarm No = value from column A
ID01	Rear or Middle unit	Alarm No = value from column A + 100
ID02	Rear unit or special app	Alarm No = value from column A + 200

Example:
Alarm 001: Clutch on MM0
Alarm 101: Clutch on MM1
Alarm 201: Clutch on MM2

Alarm No	Severity	Description
1	R	Clutch 1 output open circuit
2	R	Clutch 1 output short circuit or overcurrent
3	Y	Low pressure cut-out compressor 1
4	R	High pressure cut-out compressor 1
5	R	Low pressure cut-out compressor1 cycled 13 times in 10 min.
6	R	Low pressure cut-out compressor 1 longer than 10 min.
7	Y	Return air temperature sensor failure - low value
8	Y	Return air temperature sensor failure - high value
9	Y	Evaporator coil temperature sensor CTS1 failure - low value
10	Y	Evaporator coil temperature sensor CTS1 failure - high value

Alarm No	Severity	Description
11	Y	Ambient temperature Sensor failure - low value
12	Y	Ambient temperature Sensor failure - high value
13	Y	Temperature Sensor CTS2 failure - low value.
14	Y	Temperature Sensor CTS2 failure - high value
15	Y	Duct air temperature sensor failure (DTS1) - low value
16	Y	Duct air temperature sensor failure (DTS1) - high value
17	Y	Temperature sensor failure (DTS2) - low value
18	Y	Temperature sensor failure (DTS2) - high value
19	Y	Screw Compressor discharge temp. sensor failure - low value
20	R	Screw Compressor discharge temp. sensor failure -high value
21	R	Clutch 2 output open circuit
22	R	Clutch 2 output short circuit or overcurrent
23	Y	Low pressure cut-out compressor 2
24	R	High pressure cut-out compressor 2
25	R	Low pressure cut-out compressor 2 cycled 13 times in 10 min.
26	R	Low pressure cut-out compressor 2 longer than 10 min.
27	R	Clutch 1 cycling
28	R	Clutch 2 cycling
29	O	Evaporator coil 1 frozen
30	O	Evaporator coil 2 frozen
31	Y	Compressor discharge temperature warning
32	R	Compressor discharge temperature shutdown
33	Y	Fresh air servo 1 failed during initialization
34	Y	Fresh air servo 1 failure
35	Y	Fresh air servo 2 failed during initialization
36	Y	Fresh air servo 2 failure
37	Y	Heater valve servo 1 failed during initialization
38	Y	Heater valve servo 1 failure
39	Y	Heater valve servo 2 failed during initialization

Alarm No	Severity	Description
40	Y	Heater valve servo 2 failure
41	Y	SM1 output failure
42	Y	SM2 output failure
43	Y	SM3 output failure
44	Y	SM4 output failure
45	Y	SM5 output failure
46	Y	SM6 output failure
47	Y	EEPROM error
48	Y	Configuration check sum error
49	Y	Heater valve servo 3 failed during initialization
50	Y	Evaporator fan low speed output open circuit or underload
51	Y	Evaporator fan low speed output short circuit or overload
52	Y	Evaporator fan med.speed output open circuit or underload
53	Y	Evaporator fan med. speed output short circuit or overload
54	Y	Evaporator fan high speed output open circuit or underload
55	Y	Evaporator fan high speed output short circuit or overload
56	Y	Condenser fan low speed output open circuit or underload
57	Y	Condenser fan low speed output short circuit or overload
58	Y	Condenser fan high speed output open circuit or underload
59	Y	Condenser fan high speed output short circuit or overload
60	Y	LSB (liquid solenoid Bottom)output open circuit or underload
61	Y	LSB (liquid solenoid Bottom) output short circuit or overload
62	Y	LST (liquid solenoid Top) output open circuit or underload
63	Y	LST (liquid solenoid Top) output short circuit or overload
64	Y	Boost pump relay output open circuit or underload
65	Y	Boost pump relay output short circuit or overload
66	Y	OTP1 output open circuit or underload

Alarm No	Severity	Description
67	Y	OTP1 short circuit or underload
68	Y	OTP2 output open circuit or underload
69	Y	OTP2 short circuit or underload
70	Y	Missing CAN message from FH second zone / second deck / Stroco preheater
71	Y	Evaporator blower fault
72	Y	Condenser fan fault
73	R	Discharge pressure transducer 1 out of range - low
74	R	Discharge pressure transducer 1 out of range - high
75	R	Discharge pressure transducer 2 out of range - low
76	R	Discharge pressure transducer 2 out of range - high
77	Y	Suction pressure transducer 1 out of range - low
78	Y	Suction pressure transducer 1 out of range - high
79	Y	Suction pressure transducer 2 out of range - low
80	Y	Suction pressure transducer 2 out of range - high
81	Y	Preheater Valeo/Webasto: F01 – no start after two attempts
		Preheater Eberspaecher: 50/52 – Safety time exceed
		Preheater Stroco: 1 – Safety time exceed
82	Y	Preheater Valeo/Webasto: F02 – flame out (at least 5-times)
		Preheater Eberspaecher: 54 – Flame cutout
		Preheater Stroco: N/A (not defined)
83	Y	Preheater Valeo/Webasto: F03 – low voltage or excess voltage
		Preheater Eberspaecher: 11 – Undervoltage cut-off
		Preheater Stroco: 4 – Undervoltage
84	Y	Preheater Valeo/Webasto: F04 – foreign light detected
		Preheater Eberspaecher: 16/51/58 – Flame monitor
		Preheater Stroco: N/A (not defined)
85	Y	Preheater Valeo/Webasto: F05 – flame sensor defective
		Preheater Eberspaecher: Connection Error (many internal alarms)

Alarm No	Severity	Description
		Preheater Stroco: 3 – Photodetector defective
86	Y	Preheater Valeo/Webasto: F06 – temperature sensor defective
		Preheater Eberspaecher: 14/60/61/71/72 – Temperature sensor
		Preheater Stroco: 8 – Sensor defective
87	Y	Preheater Valeo/Webasto: F07 – Solenoid Valve defective
		Preheater Eberspaecher: 10 – Overvoltage cut-off
		Preheater Stroco: 7 – Solenoid Valve defective
88	Y	Preheater Valeo/Webasto: F08 – Fan Motor Defective
		Preheater Eberspaecher: 32/33 – Burner Motor
		Preheater Stroco: 6 – Fan defective
89	Y	Preheater Valeo/Webasto: F09 – Circulation Pump Defective
		Preheater Eberspaecher: N/A (not defined)
		Preheater Stroco: N/A (not defined)
90	Y	Preheater Valeo/Webasto: F10 – Temperature Limiter Defective
		Preheater Eberspaecher: 12/15 – Overheating
		Preheater Stroco: 10 – Overtemperature alarm
91	Y	Preheater Valeo/Webasto: F11 – Igniter Box Defective
		Preheater Eberspaecher: Diagnostic Output Failure
		Preheater Stroco: 2 – Ignition Electrode Defective
92	Y	Preheater Valeo/Webasto: F12 – Error lockout, repeated malfunction / repeated flame out
		Preheater Eberspaecher: 90-97 – Control Box
		Preheater Stroco: 9 – Too many start attempts
93	Y	Missing voltage for main module power 24 V-3
94	Y	Missing CAN message from second unit (articulated systems)
95	Y	Missing CAN message from FH first zone/first deck
96	Y	Missing CAN message from DP
97	R	Hydraulic Pressure High Value

Alarm No	Severity	Description
98	Y	Clutch 1 fuse failure
99	Y	Clutch 2 fuse failure
100	Y	Vehicle CAN1 message(s) missing / not valid
701	Y	Preheater Valeo/Webasto: F13 – Electrical Pressure Regulator defective (CNG only)
		Preheater Eberspaecher: N/A (not defined)
		Preheater Stroco: 5 – Overvoltage
703	Y	Expansion water tank LOW (HV vehicle battery water circuit)
704	Y	Expansion water tank CRITICAL (HV vehicle battery water circuit)
705	Y	Expansion water tank HW error (HV vehicle battery water circuit)
706	Y	Electrostatic filter clogged
707	Y	Electrostatic filter faulty
709	Y	High voltage relay 1 damaged (HV DC electric preheater section 1)
710	Y	High voltage relay 2 damaged (HV DC electric preheater section 2)
711	Y	High voltage relay 3 damaged (HV DC electric preheater section 3)
712	Y	High voltage relay 4 damaged (HV DC electric preheater section 4)

Main Module Alarms – Special

Note: *Some of the alarm codes listed are reserved for special applications only.*

Table 3. Alarm 6xx are dedicated for TK built-in air cooled inverter TYPE 1

Inverter No	Inverter position	Dedicated alarm scope
1	Front or Single unit	Alarm scope 600 to 649
2	Rear unit	Alarm scope 650 to 699

Alarm No	Severity	Description
600	Y	FRONT-TK INV1 alarm 1: Undervoltage 24 V application
601	Y	FRONT-TK INV1 alarm 2: Overvoltage 24 V application
602	Y	FRONT-TK INV1 alarm 6: Customer PLC version error
603	Y	FRONT-TK INV1 alarm 8: Communication application<>power
604	Y	FRONT-TK INV1 alarm 10: Parameter distributor
605	Y	FRONT-TK INV1 alarm 11: Power time out
606	Y	FRONT-TK INV1 alarm 13: Cable break at analogue in 1
607	Y	FRONT-TK INV1 alarm 14: Cable break at analogue in 2
608	Y	FRONT-TK INV1 alarm 15: Blocking detection
609	Y	FRONT-TK INV1 alarm 16: PID dry run
610	Y	FRONT-TK INV1 alarm 17: Start-up error
611	Y	FRONT-TK INV1 alarm 18: Excess temperature for frequency converter application
612	Y	FRONT-TK INV1 alarm 21: Bus time-out
613	Y	FRONT-TK INV1 alarm 22: Acknowledgement error
614	Y	FRONT-TK INV1 alarm 23: External fault 1
615	Y	FRONT-TK INV1 alarm 24: External fault 2
616	Y	FRONT-TK INV1 alarm 25: Motor detection
617	Y	FRONT-TK INV1 alarm 26: STO inputs plausibility
618	Y	FRONT-TK INV1 alarm 32: Trip IGBT
619	Y	FRONT-TK INV1 alarm 33: Overvoltage of intermediate circuit

Alarm No	Severity	Description
620	Y	FRONT-TK INV1 alarm 34: Undervoltage of intermediate circuit
621	Y	FRONT-TK INV1 alarm 35: Excess motor temperature
622	Y	FRONT-TK INV1 alarm 36: Power failure
623	Y	FRONT-TK INV1 alarm 38: Excess IGBT module temperature
624	Y	FRONT-TK INV1 alarm 39: Overcurrent
625	Y	FRONT-TK INV1 alarm 40: Excess frequency converter temperature
626	Y	FRONT-TK INV1 alarm 42: I2T motor protection shut-off
627	Y	FRONT-TK INV1 alarm 43: Ground leak
628	Y	FRONT-TK INV1 alarm 45: Motor connection disrupted
629	Y	FRONT-TK INV1 alarm 46: Motor parameters
630	Y	FRONT-TK INV1 alarm 47: Drive controller parameters
631	Y	FRONT-TK INV1 alarm 48: Type plate data
632	Y	FRONT-TK INV1 alarm 49: Power class restriction
633	Y	FRONT-TK INV1 alarm 53: Motor tipped
634	Y	FRONT-TK INV1 status word bit 2: Inverter blocked by internal conditions
635	Y	FRONT-TK INV1: Inverter CAN bus operational mode timeout (> 8 seconds)
647	Y	Exception - Driver panel alarm (see driver panel alarm list)
650	Y	REAR-TK INV1 alarm 1: Undervoltage 24 V application
651	Y	REAR-TK INV1 alarm 2: Overvoltage 24 V application
652	Y	REAR-TK INV1 alarm 6: Customer PLC version error
653	Y	REAR-TK INV1 alarm 8: Communication application<>power
654	Y	REAR-TK INV1 alarm 10: Parameter distributor
655	Y	REAR-TK INV1 alarm 11: Power time out
656	Y	REAR-TK INV1 alarm 13: Cable break at analogue in 1
657	Y	REAR-TK INV1 alarm 14: Cable break at analogue in 2

Alarm No	Severity	Description
658	Y	REAR-TK INV1 alarm 15: Blocking detection
659	Y	REAR-TK INV1 alarm 16: PID dry run
660	Y	REAR-TK INV1 alarm 17: Start-up error
661	Y	REAR-TK INV1 alarm 18: Excess temperature for frequency converter application
662	Y	REAR-TK INV1 alarm 21: Bus time-out
663	Y	REAR-TK INV1 alarm 22: Acknowledgement error
664	Y	REAR-TK INV1 alarm 23: External fault 1
665	Y	REAR-TK INV1 alarm 24: External fault 2
666	Y	REAR-TK INV1 alarm 25: Motor detection
667	Y	REAR-TK INV1 alarm 26: STO inputs plausibility
668	Y	REAR-TK INV1 alarm 32: Trip IGBT
669	Y	REAR-TK INV1 alarm 33: Overvoltage of intermediate circuit
670	Y	REAR-TK INV1 alarm 34: Undervoltage of intermediate circuit
671	Y	REAR-TK INV1 alarm 35: Excess motor temperature
672	Y	REAR-TK INV1 alarm 36: Power failure
673	Y	REAR-TK INV1 alarm 38: Excess IGBT module temperature
674	Y	REAR-TK INV1 alarm 39: Overcurrent
675	Y	REAR-TK INV1 alarm 40: Excess frequency converter temperature
676	Y	REAR-TK INV1 alarm 42: I2T motor protection shut-off
677	Y	REAR-TK INV1 alarm 43: Ground leak
678	Y	REAR-TK INV1 alarm 45: Motor connection disrupted
679	Y	REAR-TK INV1 alarm 46: Motor parameters
680	Y	REAR-TK INV1 alarm 47: Drive controller parameters
681	Y	REAR-TK INV1 alarm 48: Type plate data
682	Y	REAR-TK INV1 alarm 49: Power class restriction
683	Y	REAR-TK INV1 alarm 53: Motor tipped

Alarm No	Severity	Description
684	Y	REAR-TK INV1 status word bit 2: Inverter blocked by internal conditions
685	Y	REAR-TK INV1: Inverter CAN bus operational mode timeout (> 8 seconds)

Floor Module Alarms

Note: *Some of the alarm codes listed are reserved for special applications only.*

Table 4. Floor Module ID00 (single/front floor section, or upper deck floor section in double deck)

Alarm No	Severity	Description
401	Y	FTS Low (Floor Temperature - air)
402	Y	FTS High (Floor Temperature - air)
403	Y	HTS Low (Hot Water Temperature)
404	Y	HTS High (Hot Water Temperature)
405	Y	Servo failed during init
406	Y	Servo failed
407	Y	Output PHBP failed
408	Y	Output PHOUT failed
409	Y	Output FBR failed
410	Y	Output FBRH failed

Table 5. Floor Module ID03 (second floor section in single vehicle, or lower deck floor section in double deck, or Stroco preheater control)

Alarm No	Severity	Description
411	Y	FTS Low (Floor Temperature - air)
412	Y	FTS High (Floor Temperature - air)
413	Y	HTS Low (Hot Water Temperature)
414	Y	HTS High (Hot Water Temperature)
415	Y	Servo failed during init
416	Y	Servo failed
417	Y	Output PHBP failed
418	Y	Output PHOUT failed
419	Y	Output FBR failed
420	Y	Output FBRH failed

Table 6. Floor Module ID01 (rear floor section in articulated vehicle)

Alarm No	Severity	Description
501	Y	FTS Low (Floor Temperature - air)
502	Y	FTS High (Floor Temperature - air)
503	Y	HTS Low (Hot Water Temperature)
504	Y	HTS High (Hot Water Temperature)
505	Y	Servo failed during init
506	Y	Servo failed
507	Y	Output PHBP failed
508	Y	Output PHOUT failed
509	Y	Output FBR failed
510	Y	Output FBRH failed

Driver Panel Alarms

Note: *Some of the alarm codes listed are reserved for special applications only.*

Alarm No	Severity	Description
350	Y	No CAN message from MM0
351	Y	No CAN message from MM1
352	Y	No CAN message from MM2
353	Y	No CAN message from FB module
647	Y	EEPROM error / parameter inconsistency

Front Box Alarms

Note: *Some of the alarm codes listed are reserved for special applications only.*

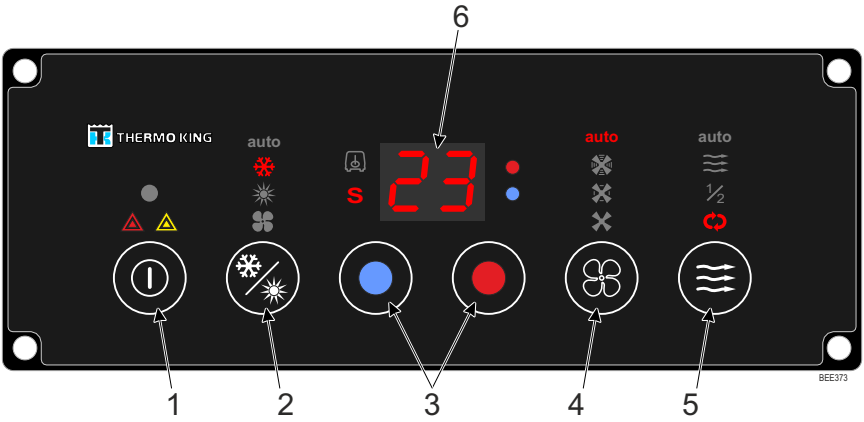
Alarm No	Severity	Description
301	Y	Internal power supply failure
302	Y	Internal underload failure
303	Y	Internal overload failure
304	Y	Internal overtemperature failure
307	Y	RTS Low
308	Y	RTS High
309	Y	CTS Low
310	Y	CTS High
311	Y	ATS Low
312	Y	ATS High
313	Y	DTS Low
314	Y	DTS High
315	Y	Servo TOP failure during init
316	Y	Servo TOP failure
317	Y	Servo FA failure during init
318	Y	Servo FA failure
319	Y	Servo HEAT failure during init

Alarm No	Severity	Description
320	Y	Servo HEAT failure
321	Y	Output OUT5 failure
322	Y	Output OUT6 failure

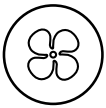
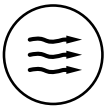
Specifications

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.		The Red Alarm (ALARM) symbol will shine in the following two conditions: • high or low pressure switches are OFF longer than 10 minutes • high or low pressure switches are OFF 5 times per 10 minutes In both cases, the unit will switch to the Ventilation Mode. If the Red Alarm appears, alarm code is shown on the display.
				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.
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).

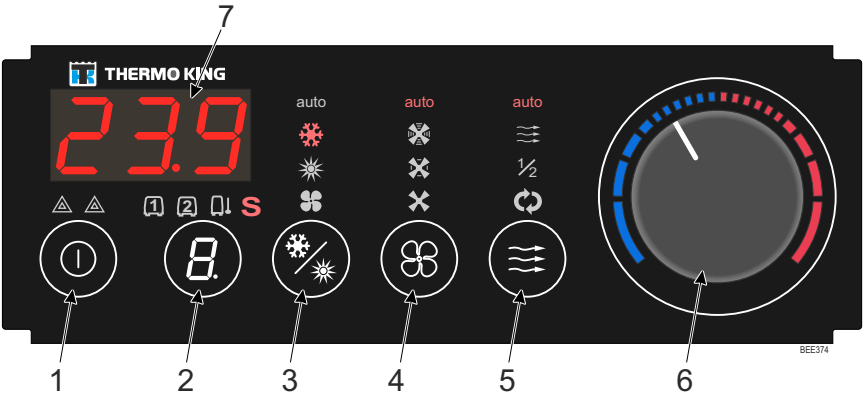
In Auto Mode all functions are controlled by the ClimaAIRE I D controller automatically according to the required setpoint.

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

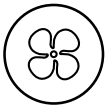
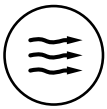
Specifications

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
DIAGNOSTIC / PROGRAMMING	RS-232, CANDiag software

ClimaAIRE II Controller



1.		On/ OFF button.		The Red Alarm (ALARM) symbol will shine in the following two conditions: • high or low pressure switches are OFF longer than 10 minutes • high or low pressure switches are OFF 5 times per 10 minutes In both cases, the unit will switch to the Ventilation Mode. If the Red Alarm appears, alarm code is shown on the display.
				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.
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.
			S	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)
			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).

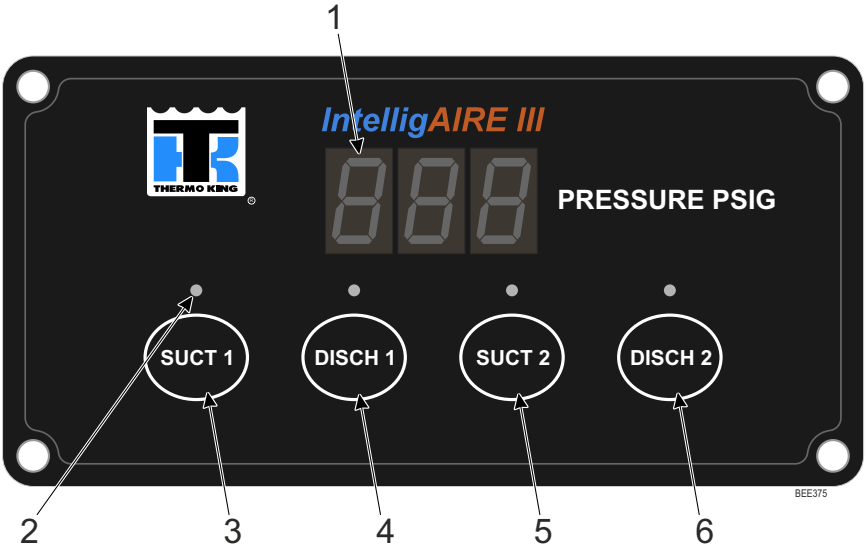
Specifications

APPLICATION	Control of HVAC unit
SETUP TEMPERATURE RANGE	17ºC (63ºF) to 27ºC (80ºF)
OPERATING VOLTAGE RANGE	10 - 32 VDC
CURRENT CONSUMPTION[a]	280 mA
CONNECTOR TYPE	Packard Metric-Pack
OPERATING TEMPERATURE RANGE	-40ºC (-40ºF) to 85ºC (185ºF)
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.

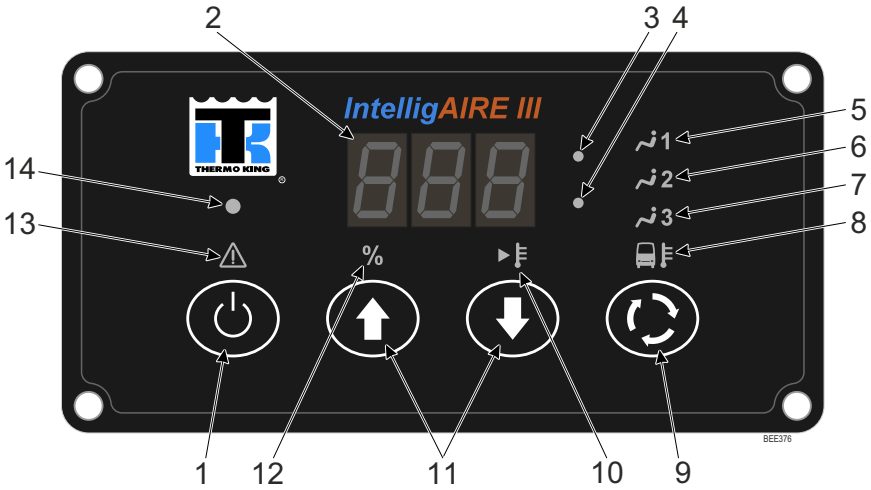
IntelligAIRE III Controller

Figure 1. 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.

Figure 2. 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: • 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.

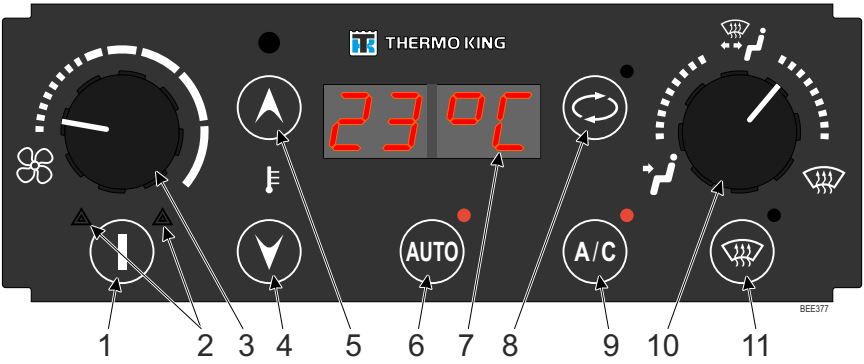
Note: *Alarm codes can only be cleared using a laptop PC equipped with CANDiag. software. Log alarms should only be cleared after scheduled service has been completed.*

Specifications

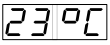
APPLICATION	Control of HVAC unit
SETUP TEMPERATURE RANGE	17°C (62°F) to 28°C (82°F)
	Display in °C and °F as firmware option
OPERATING VOLTAGE RANGE	10 - 32 VDC
CONTROL PANEL CONTACTORS	Size 3.7 kW (2 used) - 25 Amps
	Size 1.3 kW (2 used) - 6 Amps
OPERATING TEMPERATURE RANGE	-40°C (-40°F) to 80°C (176°F)
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: • 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.

4.		Lower Value button	**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. **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. **Manual Mode:** Press UP (5) and DOWN (4) simultaneously. Use UP (5) or DOWN (4) to set opening of the water valve (Hxxx%).
5.		Higher Value button	
6.		AUTO button	**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. **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).
7.		DISPLAY	The display shows the real time when the system is OFF. The display shows the required setpoint when the system is ON. The brightness of the display and LED's is controlled automatically according to the external light condition.
8.		SMOG button	**Recirculated Air:** The fresh air damper is closed for 10 minutes (according to the parameter), LED is ON.
9.		A/C button	**Air Condition Mode:** The unit will operate in the cool or in the reheat mode, LED is ON.
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 SETTINGS

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).

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: • 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 contact your nearest Thermo King dealer for terms of the Thermo King North American Trailer Unit Limited Warranty.

Please also refer to TK 61508-2-WA Thermo King EMEA Trailer Unit Limited Warranty for SLXi Units.

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.

Please also refer to TK 61654-18-WA Thermo King EMEA Unit Limited Warranty for Vehicle Powered Truck Units.

Please contact your nearest Thermo King dealer for terms of the Thermo King North American Trailer Unit Limited Warranty. Refer to TK 56445-9-CH.

Terms of the Thermo King Trailer Unit warranty are available on request from your local Thermo King dealer.

Terms of the Thermo King Self Powered Truck Unit Warranty are available on request from your Thermo King Dealer.
Also refer to TK 61598-2-WA Thermo King EMEA Limited Warranty for Self Powered Truck Units.

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, Thermo King Warranty may be voided and the compressor may be damaged.

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 general recommendations. 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.

Examples are shown in the table below. Your local Thermo King dealer will prepare a schedule to suit your specific needs.

Service Record: Each inspection and service performed should be recorded on 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 608 Certification is required to work on refrigeration systems. In the EU, local F-gas Regulations must be observed when working on refrigeration systems.*

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.

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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