



**KIT TOP MOUNTED PACKAGES REFRIGERATION SYSTEMS
FOR INDOOR AND OUTDOOR APPLICATIONS**

KITI & KITO MODELS

TECHNICAL GUIDE



Kool-Air reserve the right to change product design & specifications without notice.

For more information on Kool-Air products:

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www.kool-air-inc.com

NOMENCLATURE

K	I	T	I / O	O40	M	4	2	S
Product Line		Design Orientation	Application Location	Nominal capacity	Temperature Range	Refrigerant Type	Unit Voltage	Motor Type
K= Kool-Air	Install - Ready	Top mount	I= Indoor	XXX= Btu/H X 100	H= High	4= R404A	1= 115/1/60	S= STD Motor
			O= Outdoor		M= Medium		2= 230/1/60	E= ECM Motor
					L= Low		5= 208-230/3/60	

AVAILABLE MODELS

HIGH TEMP

KITI/O-026-H4
 KITI/O-031-H4
 KITI/O-042-H4
 KITI/O-050-H4
 KITI/O-067-H4
 KITI/O-076-H4
 KITI/O-104-H4
 KITI/O-133-H4

MEDIUM TEMP

KITI/O-029-M4
 KITI/O-047-M4
 KITI/O-063-M4
 KITI/O-072-M4
 KITI/O-099-M4
 KITI/O-128-M4

LOW TEMP

KITI/O-021-L4
 KITI/O-031-L4
 KITI/O-044-L4
 KITI/O-052-L4
 KITI/O-069-L4

FEATURES & BENEFITS

- The KIT units are self-contained fully packaged evaporator & condensing unit with reduced refrigerant charge, small footprint & economical.
- No additional equipment or controls are required.
- Designed for walk-in coolers & freezers ideal for small & medium restaurant & convenience store application.
- Units are charged with refrigerant, factory tested and factory wired for ease of installation and peace of mind.

KITI/O TOP MOUNT PERFORMANCE, CAPACITIES AND SPECIFICATIONS

HIGH TEMPERATURE R404A								
KITI/O	CAPACITY BTU/H							
	AMBIENT TEMPERATURE °F							
	90°F		95°F		100°F		110°F	
	BOX TEMPERATURE (°F)							
	38°F	42°F	38°F	42°F	38°F	42°F	38°F	42°F
KITI/O-026-H4-1 COMPRESSOR ASE20C4E-IAA	2860	3130	2740	3010	2600	2870	2340	2600
KITI/O-031-H4-1 COMPRESSOR ASE26C4E-IAA	3450	3720	3300	3570	3140	3410	2800	3050
KITI/O-042-H4-1 COMPRESSOR ASE35C4E-IAA	4700	4970	4550	4820	4400	4670	4250	4520
KITI/O-050-H4-1 COMPRESSOR RST45C1E-IAA	5610	5880	5460	5610	5310	5340	5160	5070
KITI/O-050-H4-2 COMPRESSOR RST45C1E-CAV	5610	5880	5460	5610	5310	5340	5160	5070
KITI/O-067-H4-2 COMPRESSOR RST61C1E-CAV	7500	8080	7100	7500	6700	7100	6300	6800
KITI/O-076-H4-2 COMPRESSOR RST64C1E-CAV	8200	8780	7800	8200	7400	7800	7000	7500
KITI/O-104-H4-2 COMPRESSOR CS10K6E-PFV	12000	12580	11600	12000	11200	11600	10800	11300
KITI/O-104-H4-5 COMPRESSOR CS10K6E-TF5	12000	12580	11600	12000	11200	11600	10800	11300
KITI/O-133-H4-2 COMPRESSOR CS12K6E-PFV	13530	14260	12 790	13 500	12 040	12 750	10 740	11 310
KITI/O-133-H4-5 COMPRESSOR CS12K6E-TF5	13530	14260	12 790	13 500	12 040	12 750	10 740	11 310

NOTE: OTHER UNITS ARE AVAILABLE UPON REQUEST

KITI/O TOP MOUNT PERFORMANCE, CAPACITIES AND SPECIFICATIONS

MEDIUM TEMPERATURE R404A, ELECTRIC DEFROST								
KITI/O	CAPACITY BTU/H							
	AMBIENT TEMPERATURE °F							
	90°F		95°F		100°F		110°F	
	BOX TEMPERATURE (°F)							
	35°F	38°F	35°F	38°F	35°F	38°F	35°F	38°F
KITI/O-029-M4-1 COMPRESSOR ASE26C4E-IAA	3 300	3 450	3 160	3 310	2 980	3 140	2 390	2 820
KITI/O-047-M4-1 COMPRESSOR RST45C1E-IAA	5 350	5 600	5 120	5 370	4 830	5 080	4 360	4 570
KITI/O-047-M4-2 COMPRESSOR RST45C1E-CAV	5 350	5 600	5 120	5 370	4 830	5 080	4 360	4 570
KITI/O-063-M4-2 COMPRESSOR RST61C1E-CAV	7 180	7 500	6 860	7 190	6 470	6 810	5 850	6 130
KITI/O-072-M4-2 COMPRESSOR RST64C1E-CAV	7 890	8 260	7 500	7 840	7 100	7 420	6 270	6 540
KITI/O-099-M4-2 COMPRESSOR CS10K6E-PFV	11 800	12 170	11 190	11 560	10 550	10 920	9 260	9 630
KITI/O-099-M4-5 COMPRESSOR CS10K6E-TF5	11 800	12 170	11 190	11 560	10 550	10 920	9 260	9 630
KITI/O-128-M4-2 COMPRESSOR CS12K6E-PFV	13 530	13 900	12 790	13 160	12 040	12 410	10 740	11 110
KITI/O-128-M4-5 COMPRESSOR CS12K6E-TF5	13 530	13 900	12 790	13 160	12 040	12 410	10 740	11 110

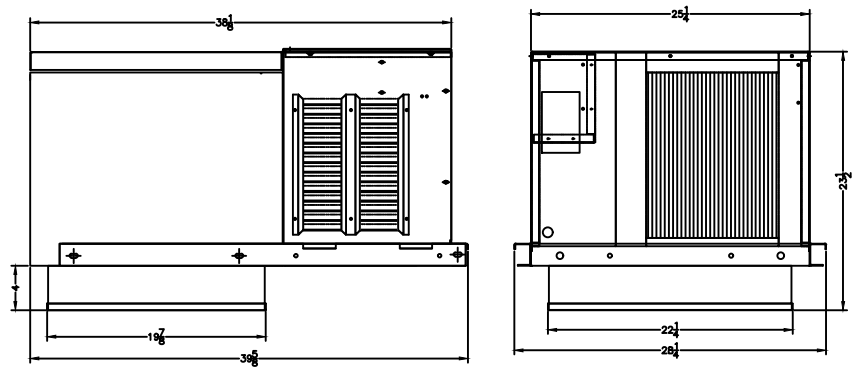
LOW TEMPERATURE R404A								
KITI/O	CAPACITY BTU/H							
	AMBIENT TEMPERATURE °F							
	90°F		95°F		100°F		110°F	
	BOX TEMPERATURE (°F)							
	0°F	-10°F	0°F	-10°F	0°F	-10°F	0°F	-10°F
KITI/O-021-L4-1 COMPRESSOR RFT26C1E-IAV	2860	2300	2680	2160	2470	1990	2080	1672
KITI/O-021-L4-2 COMPRESSOR RFT26C1E-CAV	2860	2300	2680	2160	2470	1990	2080	1672
KITI/O-031-L4-2 COMPRESSOR CF04K6E-PFV	4500	3400	4220	3190	3880	2940	3260	2470
KITI/O-044-L4-2 COMPRESSOR CF06K6E-PFV	6260	4830	5870	4530	5400	4170	4540	3500
KITI/O-052-L4-2 COMPRESSOR CF06K6E-PFV	7470	5720	7000	5360	6440	4930	5410	4140
KITI/O-052-L4-5 COMPRESSOR CF06K6E-TF5	7470	5720	7000	5360	6440	4930	5410	4140
KITI/O-069-L4-2 COMPRESSOR CF09K6E-PFV	9500	7800	9000	7100	8300	6500	7000	5500
KITI/O-069-L4-5 COMPRESSOR CF09K6E-TF5	9500	7800	9000	7100	8300	6500	7000	5500

HIGH TEMPERATURE R404A						
MODEL	P/N	VOLTAGE	MCA	FUSE	CABINET	SHIPPING WEIGHT (lbs)
KITI-026-H4-1	KOOL 101	115/1/60	9.9A	15A	A	125 lbs
KITI-031-H4-1	KOOL 102	115/1/60	12.4A	20A	A	125 lbs
KITI-042-H4-1	KOOL 103	115/1/60	17.5A	30A	A	125 lbs
KITI-050-H4-1	KOOL 104	115/1/60	17.8A	30A	B	220 lbs
KITI-050-H4-2	KOOL 105	230/1/60	8.8A	15A	B	220 lbs
KITI-067-H4-2	KOOL 106	230/1/60	11A	20A	C	280 lbs
KITI-076-H4-2	KOOL 107	230/1/60	14.1A	25A	C	280 lbs
KITI-104-H4-2	KOOL 108	230/1/60	17.9A	30A	C	280 lbs
KITI-104-H4-5	KOOL 109	230/3/60	13A	20A	C	280 lbs
KITI-133-H4-2	KOOL 110	230/1/60	16.3A	25A	C	280 lbs
KITI-133-H4-5	KOOL 111	230/3/60	13.6A	25A	C	280 lbs
KITO-026-H4-1	KOOL 401	115/1/60	9.9A	15A	A	135 lbs
KITO-031-H4-1	KOOL 402	115/1/60	12.4A	20A	A	135 lbs
KITO-042-H4-1	KOOL 403	115/1/60	17.5A	30A	A	135 lbs
KITO-050-H4-1	KOOL 404	115/1/60	17.8A	30A	B	230 lbs
KITO-050-H4-2	KOOL 405	230/1/60	8.8A	15A	B	230 lbs
KITO-067-H4-2	KOOL 406	230/1/60	11A	20A	C	290 lbs
KITO-076-H4-2	KOOL 407	230/1/60	14.1A	25A	C	290 lbs
KITO-104-H4-2	KOOL 408	230/1/60	17.9A	30A	C	290 lbs
KITO-104-H4-5	KOOL 409	230/3/60	13A	20A	C	290 lbs
KITO-133-H4-2	KOOL 410	230/1/60	16.3A	25A	C	290 lbs
KITO-133-H4-5	KOOL 411	230/3/60	13.6A	25A	C	290 lbs

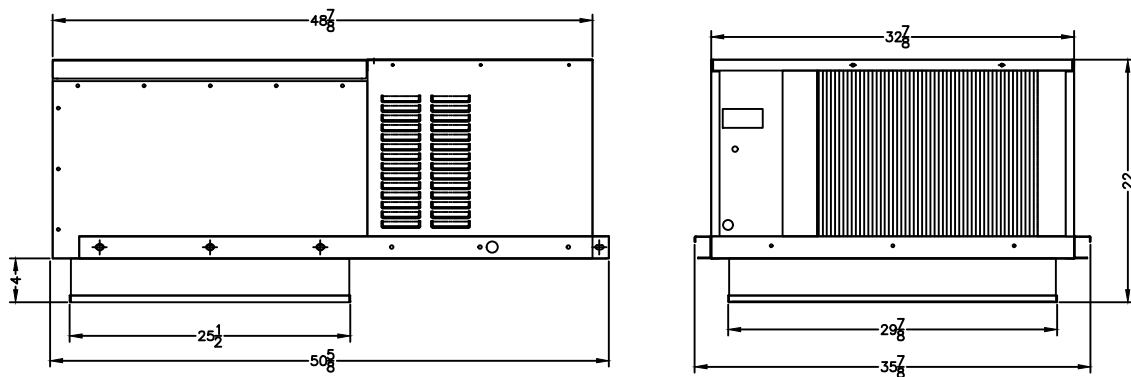
MEDIUM TEMPERATURE R404A, ELECTRIC DEFROST						
MODEL	P/N	VOLTAGE	MCA	FUSE	CABINET	SHIPPING WEIGHT (lbs)
KITI-029-M4-1	KOOL 201	115/1/60	12.4A	20A	A	125 lbs
KITI-047-M4-1	KOOL 202	115/1/60	19.8A	30A	B	220 lbs
KITI-047-M4-2	KOOL 203	230/1/60	9.8A	15A	B	220 lbs
KITI-063-M4-2	KOOL 204	230/1/60	10.0A	20A	B	220 lbs
KITI-072-M4-2	KOOL 205	230/1/60	13.1A	20A	B	220 lbs
KITI-099-M4-2	KOOL 206	230/1/60	16.3A	25A	C	280 lbs
KITI-099-M4-5	KOOL 207	230/3/60	13.0A	20A	C	280 lbs
KITI-128-M4-2	KOOL 208	230/1/60	16.3A	25A	C	280 lbs
KITI-128-M4-5	KOOL 209	230/3/60	13.6A	20A	C	280 lbs
KITO-029-M4-1	KOOL 501	115/1/60	12.4A	20A	A	135 lbs
KITO-047-M4-1	KOOL 502	115/1/60	19.8A	30A	B	230 lbs
KITO-047-M4-2	KOOL 503	230/1/60	9.8A	15A	B	230 lbs
KITO-063-M4-2	KOOL 504	230/1/60	10.0A	20A	B	230 lbs
KITO-072-M4-2	KOOL 505	230/1/60	13.1A	20A	B	230 lbs
KITO-099-M4-2	KOOL 506	230/1/60	16.3A	25A	C	290 lbs
KITO-099-M4-5	KOOL 507	230/3/60	13.0A	20A	C	290 lbs
KITO-128-M4-2	KOOL 508	230/1/60	16.3A	25A	C	290 lbs
KITO-128-M4-5	KOOL 509	230/3/60	13.6A	20A	C	290 lbs

LOW TEMPERATURE R404A						
MODEL	P/N	VOLTAGE	MCA	FUSE	CABINET	SHIPPING WEIGHT (lbs)
KITI-021-L4-1	KOOL 301	115/1/60	15.3A	25A	B	220 lbs
KITI-021-L4-2	KOOL 302	230/1/60	10.4A	20A	B	220 lbs
KITI-031-L4-2	KOOL 303	230/1/60	13.9A	25A	B	220 lbs
KITI-044-L4-2	KOOL 304	230/1/60	17A	30A	C	280 lbs
KITI-052-L4-2	KOOL 305	230/1/60	17A	30A	C	280 lbs
KITI-052-L4-5	KOOL 306	230/3/60	12A	20A	C	280 lbs
KITI-069-L4-2	KOOL 307	230/1/60	22.9A	40A	C	280 lbs
KITI-069-L4-5	KOOL 308	230/3/60	15.7A	25A	C	280 lbs
KITO-021-L4-1	KOOL 601	115/1/60	15.3A	25A	B	230 lbs
KITO-021-L4-2	KOOL 602	230/1/60	10.4A	20A	B	230 lbs
KITO-031-L4-2	KOOL 603	230/1/60	13.9A	25A	B	230 lbs
KITO-044-L4-2	KOOL 604	230/1/60	17A	30A	C	290 lbs
KITO-052-L4-2	KOOL 605	230/1/60	17A	30A	C	290 lbs
KITO-052-L4-5	KOOL 606	230/3/60	12A	20A	C	290 lbs
KITO-069-L4-2	KOOL 607	230/1/60	22.9A	40A	C	290 lbs
KITO-069-L4-5	KOOL 608	230/3/60	15.7A	25A	C	290 lbs

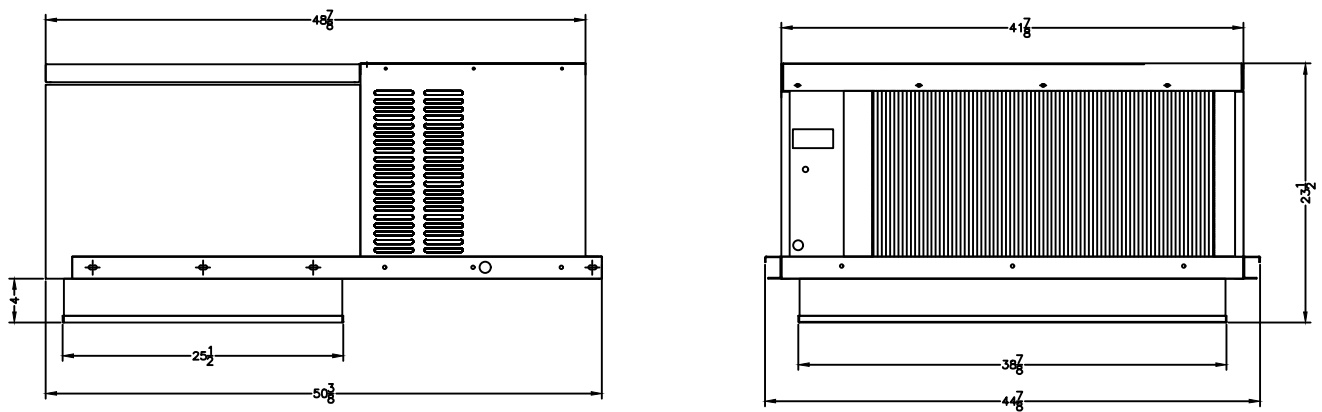
KITI INDOOR CABINET A



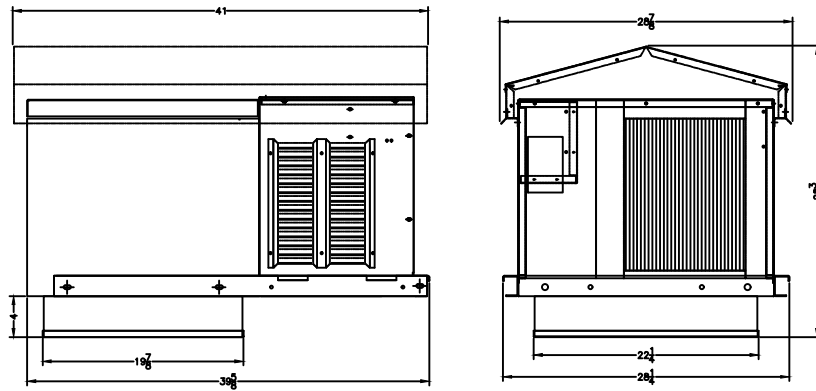
KITI INDOOR CABINET B



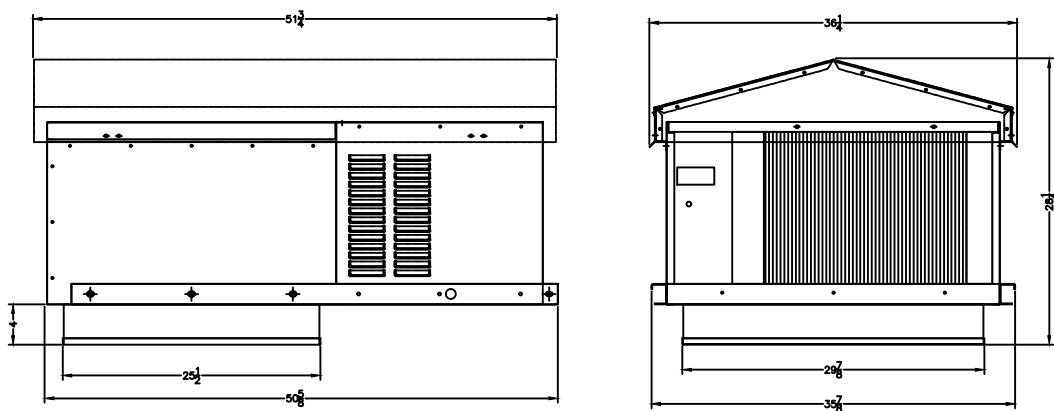
KITI INDOOR CABINET C



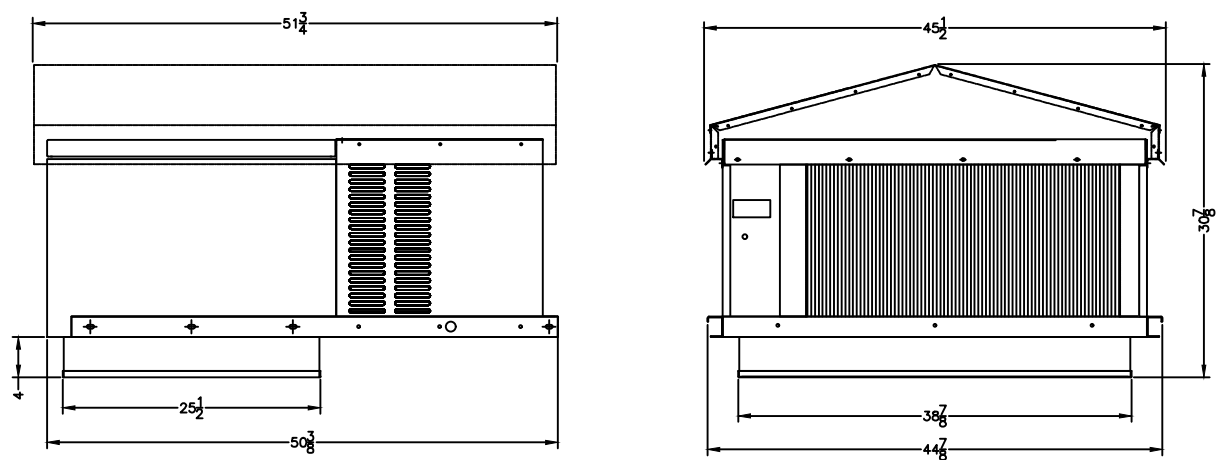
KITO OUTDOOR CABINET A



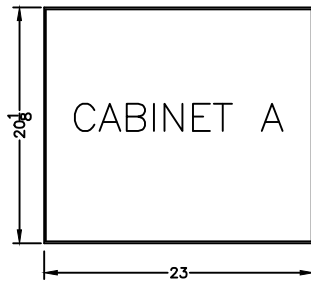
KITO OUTDOOR CABINET B



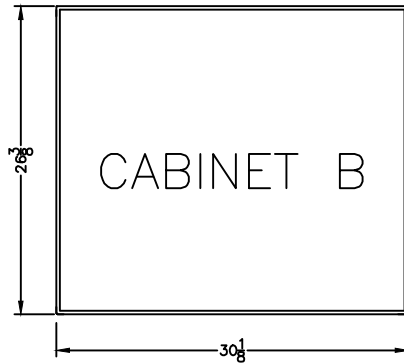
KITO OUTDOOR CABINET C



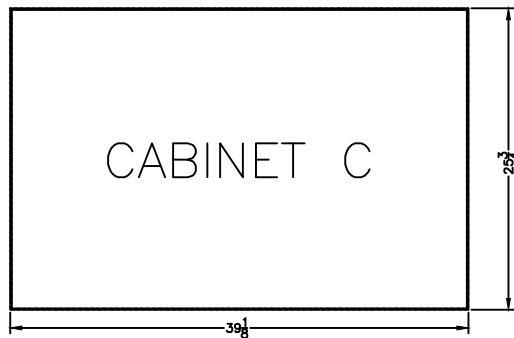
COLD ROOM
ROOFTOP OPENING
23'' x 20-1/8''



COLD ROOM
ROOFTOP OPENING
30-1/8'' x 26-3/8''



COLD ROOM
ROOFTOP OPENING
39-1/8'' x 25-3/4''



CASING

- The entire casing are acoustically and thermally insulated with 2" high density fiberglass insulation, mechanically fastened to the panels.
- Drain pan is constructed of stainless steel, double insulated to eliminate sweating.

COILS

- All coils are made of die formed, collared, self-spacing standard aluminium plate fins (optional copper fins) and standard copper tubes staggered in the direction of airflow and mechanically bonded to give metal to metal contact for maximum heat transfer.
- After welding, each coil shall be factory leak pressure tested at 400 PSIG.

CONTROLS

Sporlan microprocessor controller PSK

ENERGY EFFICIENCY

PSC motor or optional EC motor

RELIABLE & DURABILITY

Two years compressor warranty and one year parts warranty

ENVIRONMENT FRIENDLY

- Reduced refrigerant charge
- Refrigerant R404A

OPTIONS

- Copper fins
- Epoxy coated fins
- Heresite coating

RECEIVING, INSPECTION & INSTALLATION

- Congratulations and thank you for choosing Kool-Air products.
- All KIT condensing units are factory inspected & tested prior shipping. Prior reception & unpacking, ensure that the unit model on the serial tag correspond to the packing slip.
- A thorough inspection of the unit and all components parts should be made upon reception of the latter.
- Any damages in transit or any missing parts must be reported immediately to the carrier and to your Kool-Air local representative.
- In case of damages, hand over a claim form to the carrier and send a copy to your Kool-Air local representative.

LOCATION

- KIT unit can be installed indoor or outdoor and on rooftop of a cold room.
- Check the loading capacity of the rooftop before installation.
- When selecting a location for the new KIT unit, ensure that there is sufficient space for air circulation and preventing air recirculation.
- Units must be easily accessible and safe for maintenance and repairs. Location must also comply with the local building codes.
- If the unit is installed near a wall, the recommended distance between the wall and the unit must be at least the width of the unit.
- If two units are installed next to each other, the recommended distance between both must be at least twice the width of the KIT unit.
- If two units are installed in front of each other, the recommended distance between both must be at least the width of the KIT unit.
- Units are usually placed on an aluminium frame on the rooftop. They must be firmly bolted down using all the holes provided on the unit. Make sure to insulate between the opening and the unit.
- The frame must be straight and level for proper operation of the unit.

WIRING

- All wiring must be done in accordance with local and national codes. Check the nameplate with the current characteristics to be used for powering up the unit. Internal wiring connections of the fan motors, optional controls and contactors have been completed at the factory.
- A certified qualified staff must do the installation. The unit has been factory tested and the wiring diagram supplied. The unit must be grounded. Disconnect switch for the unit must be provided. The electrical contractor must supply the main fuse switch or breaker.

CABLE PLUG FOR KITI MODEL ONLY

L515P, 125V, 15A, Twist-lock

L520P, 125V, 20A, Twist-lock

L530P, 125V, 30A, Twist-lock

L615P, 250V, 15A, Twist-lock

L620P, 250V, 20A, Twist-lock

L630P, 250V, 30A, Twist-lock

L1520P, 250V, 20A, 3Ph, Twist-lock

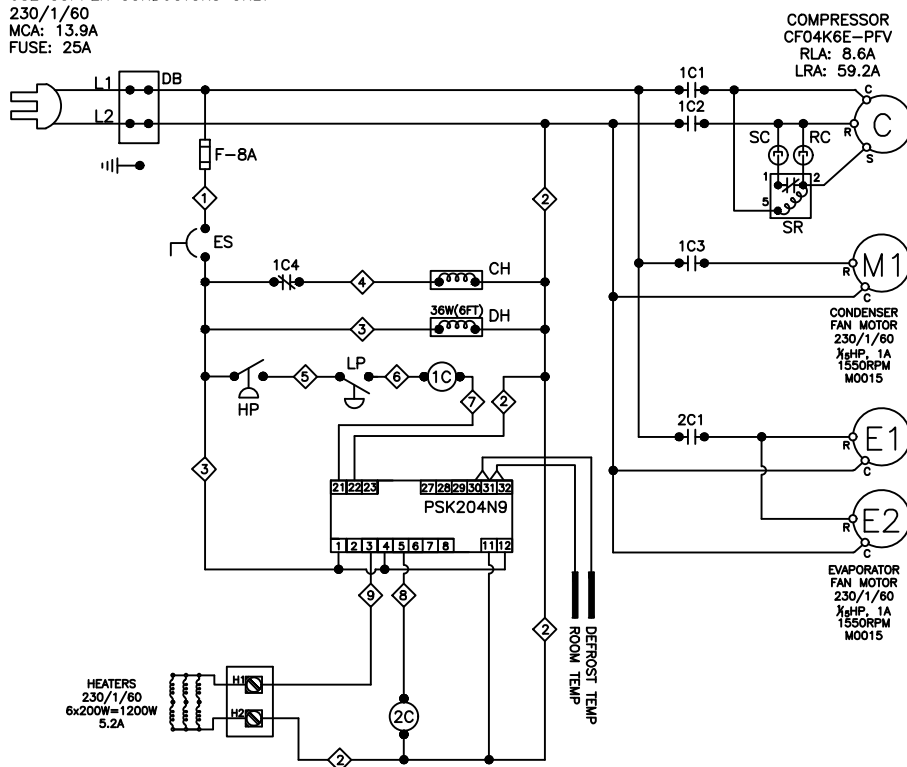
L1530P, 250V, 30A, 3Ph, Twist-lock



Remarks: A 2m power supply cable with cable plug is supplied with the KITI indoor unit only. The model of the cable plug depends on the voltage and amperage of the unit. For KITO outdoor model, the 2m power supply cable from the unit will end up with no cable plug. It will be the responsibility of the electrical contractor to ensure a weatherproof connection.

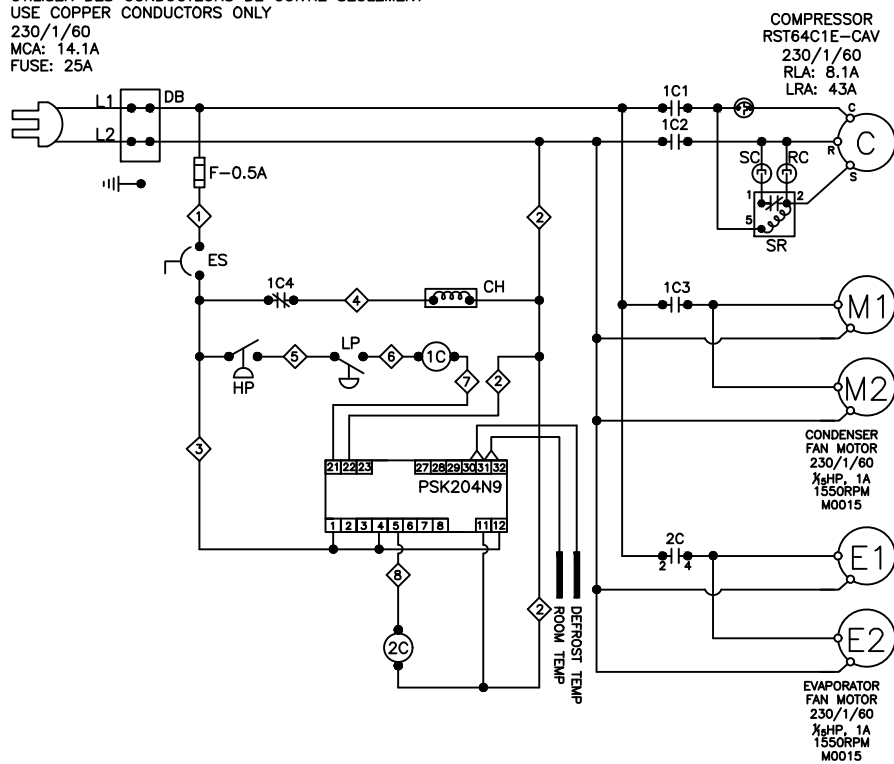
KITI-KITO LOW TEMP ELECTRICAL DIAGRAM

UTILISER DES CONDUCTEURS DE CUIVRE SEULEMENT
USE COPPER CONDUCTORS ONLY
230/1/60
MCA: 13.9A
FUSE: 25A



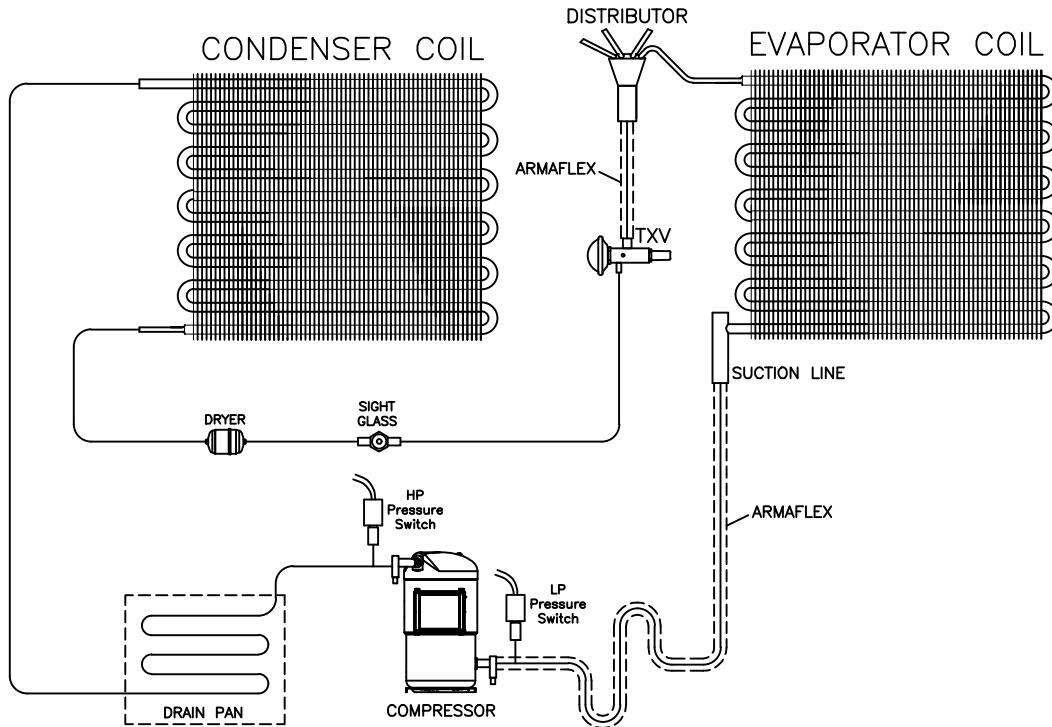
KITI-KITO HIGH TEMP ELECTRICAL DIAGRAM

UTILISER DES CONDUCTEURS DE CUIVRE SEULEMENT
USE COPPER CONDUCTORS ONLY
230/1/60
MCA: 14.1A
FUSE: 25A

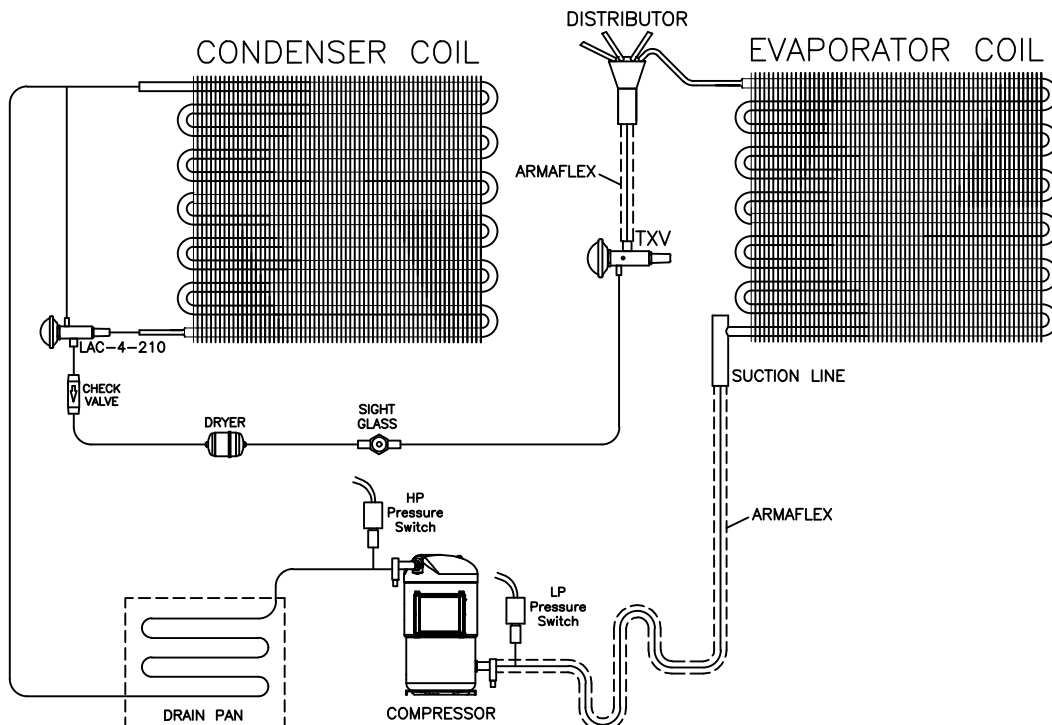


KITI/O PIPING DIAGRAM

KITI INDOOR MODEL



KITO OUTDOOR MODEL





PSK204

Digital Thermostats for Low Temperature Refrigerating Units

INSTALLATION AND OPERATING INSTRUCTIONS

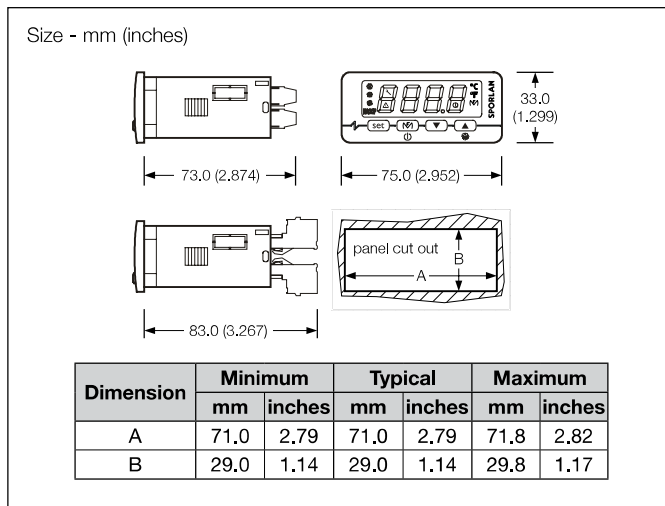


1 GETTING STARTED

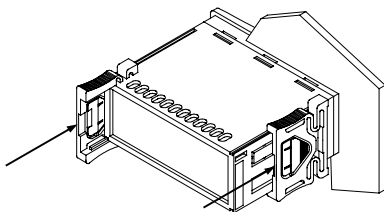
1.1 Important

Read these instructions carefully before installing and operating this controller and follow all additional information for installation and electrical connection. Keep this guide for future reference.

1.2 Installing the controller



Installation - Panel mounting, with click brackets (supplied by the builder).

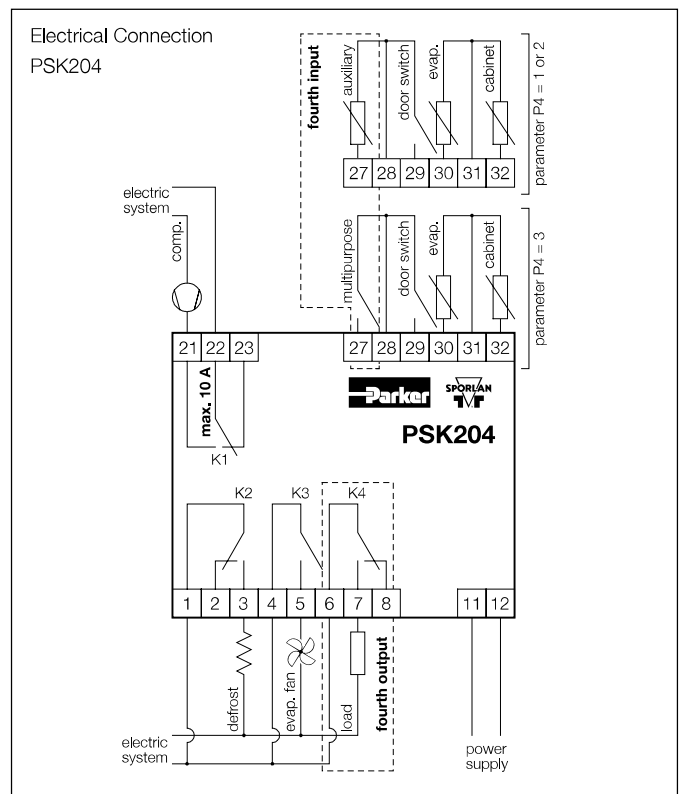


Additional information for installation:

- 73.0 mm (2.874 inches) is the maximum depth with screw terminal blocks
- the panel thickness must not be greater than 8.0 mm (0.314 inches)
- working conditions (working temperature, humidity, etc.) must be between the limits indicated in the technical data
- do not install the controller close to heat sources (heaters, hot air ducts, etc.), devices containing large magnets, locations subject to direct sunlight, moisture, humidity, dust, mechanical vibrations or shocks
- according to safety regulations, protection against access to electrical parts must be ensured by a correct installation of the controller;

the parts that ensure this protection must be installed so that they can not be removed without the use of a tool.

1.3 Wiring diagram



With reference to the electrical circuit diagram:

- the service controlled by the fourth input depends on param. P4
- the service controlled by the fourth output depends on param. u1

Additional information for electrical connection:

- do not operate on the terminal blocks with electrical screwdrivers/wrenches
- if the controller has been moved from a cold location to a warm one, condensation may occur on the inside of the unit; wait at least one hour before attempting to power up and use the controller
- make sure that the supply voltage and frequency are correct for the power supply of the controller
- always disconnect power from the unit before servicing it
- this controller is not intended to be used as a safety control device
- please contact your Parker Sporlan Sales Engineer prior to any servicing of this controller.

2 USER INTERFACE

2.1 Introductory comments

The device has the following operational states:

- “on” (power is connected and the controller is on: the regulators may be switched on)
- “stand-by” (power is connected but software sets the controller to o : the regulators are switched o ; the option of manually switching on/off the cabinet light or the auxiliary output depends on parameter u2).

The term “turning on” is understood to mean switching from the stand-by state to on; the term “turning off” is understood to mean switching from the on state to the stand-by state.

When the controller is turned on, it restores the state it was in when power was interrupted.

2.2 Manual switching on/off of the controller

- make sure the keyboard is not locked and no procedure is running
- press and hold (M) for 4 seconds.

It is also possible to turn the controller on/off using the multifunction input.

2.3 The display

If the controller is turned on, during normal operation the display will show the quantity you have set with parameter P5.

While in stand-by mode the display is turned o .

2.4 Showing the temperature read by the probes

- make sure the keyboard is not locked and no procedure is running
- press and hold (V) for 2 seconds: the display will show the first available label
- press (A) or (V) to select “Pb1” (cabinet probe), “Pb2” (evaporator probe), or “Pb3” (auxiliary probe)
- press (set)

To quit the procedure:

- press (set) or do not press any other buttons for 60 seconds
- press (A) or (V) as long as the display shows the quantity you have set with parameter P5 or do not press any other buttons for 60 seconds.

Alternatively:

- press (M)

If there is no evaporator probe (parameter P3 = 0), label “Pb2” will not be shown.

If the function of the fourth input is not for an auxiliary probe (parameter P4 = 0 or 3), then label “Pb3” will not be shown.

2.5 Manually activating defrost

- make sure the keyboard is not locked and no procedure is running
- press and hold (A) for 4 seconds.

If the function of the evaporator probe is set for a defrost probe (parameter P3 = 1) and the evaporator temperature is above that established by parameter d2, then defrost will not be activated.

2.6 Manually turning on/off the cabinet light (only if parameter u1 is set to 0)

- make sure no procedures are running
- press (M)

It is also possible to turn the cabinet light on/off remotely using the microport and multifunction inputs; see also parameter u2.

2.7 Manually turning on the anti-sweat heater (only if parameter u1 is set to 1)

- make sure the controller is turned on and no procedures are running
- press (M) for 2 seconds: the anti-sweat heater will be turned on for the period of time established by parameter u6.

Manually turning o of the anti-sweat heater is not permitted.

2.8 Manually turning on/off the auxiliary output (only if parameter u1 is set to 2)

- make sure the keyboard is not locked and no procedure is running
- press (M)

It is also possible to turn the auxiliary output on/off using the multifunction input.

The auxiliary output can be turned off manually by the same process in section 2.8, only if it was turned on manually (the same applies for remotely turning on the auxiliary output); see also parameter u2.

2.9 Locking/unlocking the keyboard

To lock the keyboard:

- make sure no procedures are running
- press and hold (set) and (V) for 2 seconds: the display will show “Loc” for 1 second.

If the keyboard is locked, it will not be possible to:

- manually turn the device on/off
- show the temperature read by the cabinet probe, evaporator probe, or auxiliary probe (using the procedure indicated in paragraph 2.4)
- manually activate defrost
- manually turn the auxiliary output on/off
- view information pertaining to the HACCP alarms
- delete the HACCP alarm list
- change the operational setpoint using the procedure indicated in paragraph 3.1
- display the total hours of compressor operation
- delete the total hours of compressor operation.

These operations will cause the label “Loc” to be displayed for 1 second.

To unlock the keyboard:

- press and hold (set) and (V) for 2 seconds: the display will show “UnL” for 1 second.

3 SETTINGS

3.1 Setting the working setpoint

- make sure the keyboard is not locked and no procedure is running
- press (set): LED ✱ will ash
- press (A) or (V) within 15 seconds; also see parameters r1, r2 and r3
- press (set) or do not press any other button for 15 seconds.

You also can modify the working setpoint through parameter SP.

3.2 Setting the configuration parameters

To gain access to the procedure:

- make sure no procedures are running
- press and hold (A) and (V) for 4 seconds: the display will show “PA”
- press (set)
- press (A) or (V) within 15 seconds to set the display to “-19”
- press (set) or do not press any other button for 15 seconds

- press and hold **▲** and **▼** for 4 seconds: the display will show “SP”

To select a parameter:

- press **▲** or **▼**

To modify a parameter:

- press **set**
- press **▲** or **▼** within 15 seconds
- press **set** or do not press any other buttons for 15 seconds.

To quit the procedure:

- press and hold **▲** and **▼** for 4 seconds or do not press any other buttons for 60 seconds.

Turn off/on the power supply of the controller after the modification of the parameters.

3.3 Restoring the default value of configuration parameters

- make sure no procedure is running
- press and hold **▲** and **▼** for 4 seconds: the display will show “PA”
- press **set**
- press **▲** or **▼** within 15 seconds to set the display to “743”
- press **set** or do not press any other buttons for 15 seconds
- press and hold **▲** and **▼** for 4 seconds: the display will show “dEF”
- press **set**
- press **▲** or **▼** within 15 seconds to set the display to “149”
- press **set** or do not press any other buttons for 15 seconds: the display will flash “dEF” for 4 seconds, after which the controller will quit the procedure
- turn the controller off then back on after these procedures then confirm that the default values have been reset.

Make sure the default value of the parameters is correct, in particular note if the probes are PTC probes.

4 HACCP

4.1 Introductory comments

The controller is capable of storing up to 3 HACCP alarms, and can display the following information:

- the critical value
- the alarm duration (from 1 minute to 99 hours and 59 minutes)

CODE ALARM TYPE (AND CRITICAL VALUE)

AL	Low temperature alarm (the minimum temperature of the cabinet or the minimum temperature detected by the auxiliary probe during an any alarm state of this type)
AH	High temperature alarm (the maximum temperature of the cabinet or the maximum temperature detected by the auxiliary probe during an any alarm state of this type)
id	Microport input alarm (the maximum temperature of the cabinet during an any alarm state of this type); see also parameter i4

Warnings:

- the device records low temperature alarms and high temperature alarms providing the temperature associated with the alarm is the cabinet temperature (parameters A0 and A3 = 0) or the temperature measured by the auxiliary probe, providing its function is that of display probe (parameter P4 = 1 and parameters A0 = 2 and A3 = 1)
- the instrument updates the information on the alarms on condition that the critical value is more critical than the one the instrument has stored or on condition that the information has already been displayed
- no alarms will be recorded if the device is in stand-by mode.

When the cause of the alarm is resolved, the display returns to normal.

The HACCP LED indicates the status of the HACCP alarm memory; please refer to paragraph 6.1 for details.

4.2 Viewing HACCP alarm information

To access the procedure:

- make sure the keyboard is not locked and no procedure is running
- press and hold **▼** for 2 seconds: the display will show the first available label
- press **▲** or **▼** to select “LS”
- press **set**: display will show one of the codes reported in the table in paragraph 4.1.

To select an alarm:

- press **▲** or **▼** (to select “AH” for example).

To display the information relating to the alarm:

- press **set**: HACCP LED will stop flashing and remain on and the display will show the following information in succession (for example):

INFO	EXPLANATION
8.0	the critical value is 8.0°C/8°F
dur	the display is about to show the alarm duration
h01	the alarm lasted for 1 hour (continued ...)
n15	the alarm lasted for 1 hour and 15 minutes
AH	the selected alarm

The display shows each piece of information for 1 second.

To quit the information series:

- press **set**: display will show the selected alarm.

To quit the procedure:

- quit the information series
- press **▲** or **▼** as long as the display shows the quantity you have set with parameter P5 or do not press any other buttons for 60 seconds.

Alternatively:

- quit the information series
- press **set**

If the instrument has stored no alarm, the label “LS” will not be shown.

4.3 Deleting the HACCP alarm list

- make sure the keyboard is not locked and no procedure is running
- press and hold **▼** for 2 seconds: the display will show the first available label
- press **▲** or **▼** to select “rLS”
- press **set**
- press **▲** or **▼** within 15 seconds to set the display to “149”
- press **set** or do not press any other buttons for 15 seconds: the display will flash “- - -” for 4 seconds and the HACCP LED will be turned off, after which the controller will quit the procedure.

If the instrument has no alarm stored, the label “rLS” will not be shown.

5 COMPRESSOR OPERATION TIME COUNTER

5.1 Introductory comments

The device is capable of recording up to 9,999 hours of compressor function, after which the number “9999” flashes.

5.2 Displaying the compressor operation time

- make sure the keyboard is not locked and no procedure is running
- press and hold **▼** for 2 seconds: the display will show the first available label

9 TECHNICAL DATA

9.1 Technical data

Frontal bezel protection: IP 65.

Connections (use copper conductors only): screw terminal blocks (power supply, inputs and outputs)

Working temperature: from 0 to 55°C (32 to 131°F, 10 to 90% of relative humidity without condensate).

Power supply: 115/230 VAC, 50/60 Hz, 5 VA (approximate).

If the instrument is supplied at 115 ... 230 VAC, protect the power supply with a fuse rated 250 V, 1.25 A, 6.7 I2t.

Insulation class: 2.

Measure inputs: 2 (cabinet probe and evaporator probe) for PTC/NTC probes.

Digital inputs: 1 (microport) for NO/NC contact (clean contact, 5 V, 1 mA); fourth input can be configured as sensor input (display probe or condenser probe, for PTC/NTC probes) or digital input (multifunction, clean contact, 5V, 1 mA).

Working range: from -50 to 150°C (-50 to 300°F) for PTC probe, from -40 to 105°C (-40 to 220°F) for NTC probe.

Resolution: 0.1°C/1°C/1°F.

Digital outputs - 4 relays:

- compressor relay: 16 A res. @ 250 VAC, 5 FLA, 30 LRA (exchange contacts)
- defrost relay: 8 A res. @ 250 VAC, 2 FLA, 12 LRA (exchange contacts)
- evaporator fan relay: 8 A res. @ 250 VAC, 2 FLA, 12 LRA (NO contact)
- fourth output: 8 A res. @ 250 VAC, 2 FLA, 12 LRA (exchange contacts).

The maximum current allowed on the load is 10 A.



10 WORKING SET POINT and CONFIGURATION PARAMETERS

10.1 Configuration setpoint

Parameters	Minimum	Maximum	U.M.	DEF.	Working Setpoint
SP	r1	r2	°C/°F	0	working setpoint
Parameters	Minimum	Maximum	U.M.	DEF.	Temperature Inputs
CA1	-25	25	°C/°F	0	cabinet probe offset
CA2	-25	25	°C/°F	0	evaporator probe offset
CA3	-25	25	°C/°F	0	auxiliary probe offset (only if P4 = 1 or 2)
P0	0	1	—	1	kind of probe 0 = PTC 1 = NTC
P1	0	1	—	1	display decimal point value during normal operation (Celsius mode only) 1 = YES
P2	0	1	—	0	unit of measure, temperature 0 = °C 1 = °F
P3	0	2	—	1	evaporator probe function 0 = probe not enabled 1 = defrost probe and thermostat probe for the evaporator fan 2 = thermostat probe for the evaporator fan
P4	0	3	—	3	fourth input function 0 = input not enabled 1 = measure input (display probe) 2 = measure input (condenser probe) 3 = digital input (multipurpose/door switch input)
P5	0	4	—	0	quantity to show during the normal operation 0 = cabinet temperature 1 = working setpoint 2 = evaporator temperature 3 = cabinet temperature - evaporator temperature 4 = temperature read by the auxiliary probe (only if P4 = 1 or 2)
P6	0	4	—	0	quantity to show by the remote indicator 0 = cabinet temperature 1 = working setpoint 2 = evaporator temperature 3 = cabinet temperature - evaporator temperature 4 = temperature read by the auxiliary probe (only if P4 = 1 or 2)
Parameters	Minimum	Maximum	U.M.	DEF.	Setpoints
r0	0.1	15	°C/°F	2	working setpoint differential
r1	-99	r2	°C/°F	-50	minimum working setpoint
r2	r1	99	°C/°F	50	maximum working setpoint
r3	0	1	—	0	lock the working setpoint (with the procedure related in paragraph 3.1) 1 = YES
r4	0	99	°C/°F	0	temperature increase during Energy Saving function (only if P4 = 3 and i5 = 2 or 3)
Parameters	Minimum	Maximum	U.M.	DEF.	Compressor Protections
C0	0	240	min	0	compressor delay after turning on the controller
C1	0	240	min	5	minimum time between two activations in succession of the compressor; also compressor delay from the end of the cabinet probe error
C2	0	240	min	3	minimum time the compressor remains turned off

Parameters	Minimum	Maximum	U.M.	DEF.	Compressor Protections (continued)
C3	0	240	s	0	minimum time the compressor remains turned on
C4	0	240	min	10	time the compressor remains turned off during the cabinet probe error; also look at C5
C5	0	240	min	10	time the compressor remains turned on during the cabinet probe error; also look at C4
C6	0	200	°C/°F	80	condenser temperature above which the overheated condenser alarm is activated (only if P4 = 2)
C7	0	200	°C/°F	90	condenser temperature above which the compressor locked alarm is activated (only if P4 = 2)
C8	0	15	min	1	compressor locked alarm delay (only if P4 = 2)
C9	0	120	s	5	compressor 2 delay from power up of compressor 1 (only if u1 = 3)
C10	0	9999	h	1000	number of hours of compressor operation above which the LED maintenance indicator is turned on 0 = no function
Parameters	Minimum	Maximum	U.M.	DEF.	Defrost
d0	0	99	h	8	defrost interval (also see d8) 0 = the defrost at intervals will never be activated
d1	0	1	—	0	kind of defrost 0 = electric defrost 1 = hot gas defrost
d2	-99	99	°C/°F	2	defrost termination temperature (only if P3 = 1)
d3	0	99	min	30	defrost duration if P3 = 0 or 2; maximum defrost duration if P3 = 1 0 = the defrost will never be activated
d4	0	1	—	0	defrost when you turn on the controller 1 = YES
d5	0	99	min	0	defrost delay when you turn on the controller (only if d4 = 1); also see i5
d6	0	1	—	1	temperature shown during the defrost 0 = cabinet temperature 1 = if, upon the activation of defrost, the cabinet temperature is below “working setpoint + r0”, at most “working setpoint + r0”; if, upon the activation of defrost, the cabinet temperature is above “working setpoint + r0”, at most the current cabinet temperature
d7	0	15	min	2	drip delay
d8	0	2	—	0	kind of defrost interval 0 = the defrost will be activated when the controller has remained turned on for time d0 1 = the defrost will be activated when the compressor has remained turned on for time d0 2 = the defrost will be activated when the evaporator temperature has remained below temperature d9 for time d0
d9	-99.0	99.0	°C/°F	0.0	evaporator temperature above which the count of the defrost interval is suspended (only if d8 = 2)
dA	0	99	min	0	minimum time the compressor must remain turned on before defrost can be activated (only if d1 = 1)
Parameters	Minimum	Maximum	U.M.	DEF.	Temperature Alarms
A0	0	2	—	0	measured input used for the low temperature alarm 0 = cabinet temperature 1 = evaporator temperature 2 = temperature read by the auxiliary probe (only if P4 = 1 or 2)
A1	-99.0	99.0	°C/°F	-10.0	temperature below which the low temperature alarm is activated; also look at A0 and A2
A2	0	2	—	1	kind of lower temperature alarm 0 = alarm not enabled 1 = relative to the working setpoint (or “working setpoint - A1”; consider A1 without sign) 2 = absolute (or A1)
A3	0	1	—	0	measured input used for high temperature alarm 0 = cabinet temperature 1 = temperature read by the auxiliary probe (only if P4 = 1 or 2)
A4	-99.0	99.0	°C/°F	10.0	temperature above which the high temperature alarm is activated; also look at A3 and A5
A5	0	2	—	1	kind of upper temperature alarm 0 = alarm not enabled 1 = relative to the working setpoint (or “working setpoint + A4”; consider A4 without sign) 2 = absolute (or A4)
A6	0	240	min	120	high temperature alarm delay after turning on the controller (only if A3 = 0 if P4 = 1 and A3 = 1)
A7	0	240	min	15	temperature alarm delay

Parameters	Minimum	Maximum	U.M.	DEF.	Temperature Alarms (continued)
A8	0	240	min	15	high temperature alarm delay after the end of the defrost (only if A3 = 0 or if P4 = 1 and A3 = 1)
A9	0	240	min	15	high temperature alarm delay after the deactivation of the door switch input (only if A3 = 3 and i0 = 3)
Parameters	Minimum	Maximum	U.M.	DEF.	Evaporator Fan
F0	0	4	—	1	evaporator fan activity during normal operation 0 = off 1 = on 2 = in parallel with compressor 3 = dependent on F1 4 = off if the compressor is off, dependent on F1 if the compressor is on
F1	-99	99	°C/°F	-1	evaporator temperature above which the evaporator fan is turned off (only if F0 = 3 or 4)
F2	0	2	—	0	evaporator fan activity during defrost and drip delay 0 = off 1 = on 2 = dependent on F0
F3	0	15	min	2	fan delay after evaporator drip completes
Parameters	Minimum	Maximum	U.M.	DEF.	Digital Inputs
i0	0	5	—	1	effect caused by activation of microport input; see also i4 0 = no effect 1 = the cabinet light will be switched on (only if u1 = 0, until the input is deactivated) 2 = the evaporator fan will be switched off (for up to the length of time set by i3 or until the input is deactivated) 3 = the compressor and evaporator fan will be switched off (for up to the length of time set by i3 or until the input is deactivated) 4 = the evaporator fan will be switched off (for up to the length of time set by i3 or until the input is deactivated) and the cabinet light will be switched on (only if u1 = 0, until the input is deactivated) 5 = the compressor and evaporator fan will be switched off (for up to the length of time set by i3 or until the input is deactivated) and the cabinet light will be switched on (only if u1 = 0, until the input is deactivated)
i1	0	1	—	0	microport input contact type 0 = NO (the input will be active if you close the contact) 1 = NC (the input will be active if you open the contact)
i2	-1	120	min	30	microport input alarm signal delay -1 = the alarm will not be reported
i3	-1	120	min	15	maximum duration of the effect caused by activation of the microport input on the compressor and on the evaporator fan -1 = the effect will last until the input will be disabled
i4	0	1	—	0	recording of microport input alarm 1 = YES
i5	0	7	—	4	effect caused by activation of the multifunction input (only if P4 = 3) 0 = no effect 1 = SYNCHRONIZING DEFROSTS - after time d5, defrost will be activated 2 = ACTIVATING ENERGY SAVING - Energy Saving function will be activated (until the input is deactivated); also look at r4 3 = ACTIVATION OF NIGHT AWNING - the cabinet light will be turned off (only if u1 = 0 and only if switched on manually) and the Energy Saving function will be activated (until the input is deactivated); see also r4 4 = ACTIVATING THE EXTERNAL ALARM - after time i7, the display will flash the code "iA" and the buzzer will be activated (until the input is deactivated) 5 = ACTIVATING COMPRESSOR LOCKOUT - the compressor will be turned off, the display will flash the code "iA" and the buzzer will be activated (until the input is deactivated); also look at i7, i8 and i9 6 = TURNING ON THE AUXILIARY OUTPUT - the auxiliary output will be turned on (only if u1 = 2, until the input is deactivated) 7 = SWITCHING OFF THE DEVICE - the device will switch to stand-by mode (until the input is deactivated)
i6	0	1	—	0	type of multifunction input contact (only if P4 = 3) 0 = NO (input active with contact closed) 1 = NC (input active with contact open)
i7	0	120	min	0	if i5 = 4, delayed multifunction input alarm notification (only if P4 = 3) if i5 = 5, delayed multifunction input deactivation compressor delay (only if P4 = 3)
i8	0	15	—	0	number of multifunction input alarms such as to cause controller locked alarm (only if P4 = 3 and i5 = 5) 0 = alarm not enabled
i9	1	999	min	240	time without multipurpose input alarms such as to provoke the alarm counter to be cleared (only if P4 = 3 and i5 = 5)

Parameters	Minimum	Maximum	U.M.	DEF.	Digital Outputs
u1	0	7	—	0	<p>service controlled by the fourth output</p> <p>0 = CABINET LIGHT - in this case, the important factors are: the key (M), parameters i0, i5 and u2</p> <p>1 = ANTI-SWEAT HEATER - in this case, the important factors are: the key (M) and parameter u6</p> <p>2 = AUXILIARY OUTPUT - in this case, the important factors are: the key (M), parameters i5 and u2</p> <p>3 = COMPRESSOR 2 - in this case, the important factor is parameter C9</p> <p>4 = ALARM OUTPUT - the output is activated during an alarm and during an error; in this case the important factors are parameters u3 and u4</p> <p>5 = DOOR ELEMENT - in this case the important factor is parameter u5</p> <p>6 = EVAPORATOR VALVE - in this case the important factors are parameters u7 and u8</p> <p>7 = SYNCHRONIZING DEFROSTS - the output works in parallel with the defrost output; in this case the fourth output terminals must be connected to the auxiliary input of one or more PSK devices, with each having parameter i5 = 1.</p>
u2	0	1	—	0	<p>enables manual switching on/off of the cabinet light or auxiliary output while in stand-by mode (only if u1 = 0 or 2)</p> <p>1 = YES</p>
u3	0	1	—	0	<p>alarm output polarity (only if u1 = 4)</p> <p>0 = disabled during normal operation (the contact between terminals 6 and 7 will be open) and activated during an alarm or error (the contact between terminals 6 and 7 will be closed)</p> <p>1 = activated during normal operation (the contact between terminals 6 and 7 will be closed) and disabled during an alarm or error (the contact between terminals 6 and 7 will be open)</p>
u4	0	1	—	0	<p>during an active alarm, deactivate the alarm output by pressing any button on the controller (only if u1 = 4)</p> <p>1 = YES</p>
u5	-99	99	°C/°F	-1	cabinet temperature above which the door element is switched off (only if u1 = 5)
u6	1	120	min	5	anti-sweat heater duration (only if u1 = 1)
u7	0	99	°C/°F	2	cabinet temperature below which the evaporator valve is deactivated (in relation to the operational setpoint, i.e. the "operational setpoint + u7") (only if u1 = 6)
u8	0	1	—	0	<p>evaporator valve contact type (only if u1 = 6)</p> <p>0 = NO (valve active with contact closed)</p> <p>1 = NC (valve active with contact open)</p>
Parameters	Minimum	Maximum	U.M.	DEF.	Serial Network
LA	1	247	—	247	controller address
Lb	0	3	—	2	<p>baud rate</p> <p>0 = 2,400 baud</p> <p>1 = 4,800 baud</p> <p>2 = 9,600 baud</p> <p>3 = 19,200 baud</p>
LP	0	2	—	2	<p>parity</p> <p>0 = none</p> <p>1 = odd</p> <p>2 = even</p>
Parameters	Minimum	Maximum	U.M.	DEF.	Reserved
E9	0	1	—	0	reserved

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