

ir33 smart - IR33C7HB0E electronic controller for normal and low temperature ventilated refrigeration units



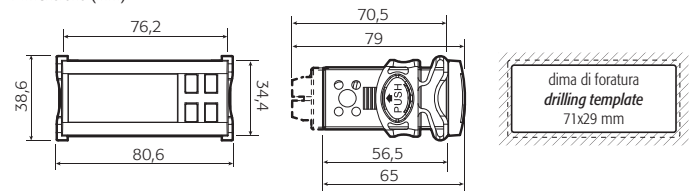
- Electronic controller for normal and low temperature ventilated refrigeration units
- 115/230 Vac switching power supply
- 16 A compressor relay
- Management of NTC (-50 to +90°C) and PTC (-50 to +150°C) sensors
- Simple and intuitive installation and configuration
- 6 pre-loaded configurations for the most common refrigeration applications
- HACCP reports
- Real time clock

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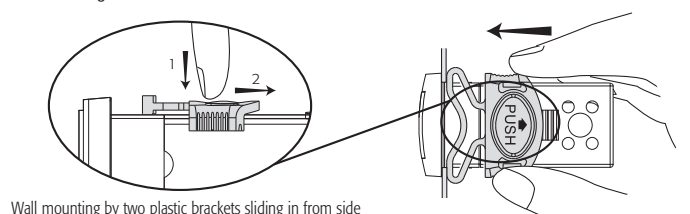
With reference to the label on the rear of the instrument and the required application

1. Check that power supply, probes and loads (compressor, heaters, etc.) are suitable for the instrument.
2. Fasten the instrument to the panel as shown in the following figure.
3. Make all the required electrical connections.
4. Power up the unit.
5. After around 2 seconds, if the instrument displays the temperature read by the probes connected to the device, go directly to point 7. If nothing is displayed or an alarm is signalled (alarm codes on the display), power down, check the connections and the power supply and go to point 6.
6. Power the unit up again. If the instrument now correctly displays the temperature, go to point 7. If, on the other hand, the problem described in point 5 is repeated, see the table "Alarms and signals: display, buzzer and relay" to identify the cause of the problem.
7. ir33 smart is now ready to be configured. For correct configuration based on the required application, see the section "How to select and load a configuration".

Dimensions (mm)

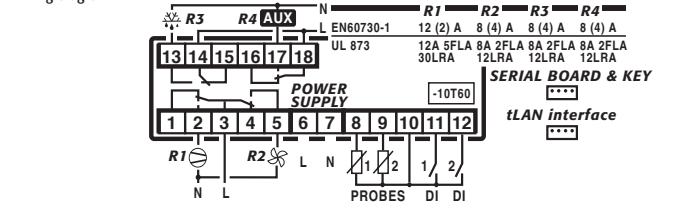


Wall mounting ir33

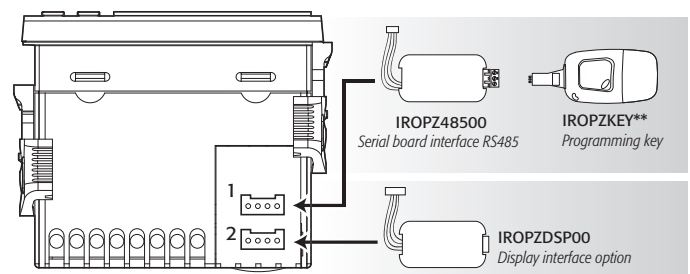


Wall mounting by two plastic brackets sliding in from side

Wiring diagram



Optional connections



IMPORTANT: separate the probe and digital input cables from the cables to inductive loads and power cables to avoid electromagnetic disturbance. Never run power cables (including electrical panel cables) and signal cables in the same conduits.

How to select and load a user configuration

Step	Action	Effect	Meaning
1	Switch the instrument on while holding Prq mute	After 2 seconds the display shows the message 'bn0'	'bn0' is the current configuration. (Standard CAREL when first switched on or other user configuration, if loaded)
2	Press ▲ or ▼ or aux	The display shows the messages 'bn1', 'bn2', 'bn3', 'bn4', 'bn5', 'bn6'	Select the required configuration (refer to the following table)
3	Press Set	The display shows 'Std' for 1 sec	The user configuration selected in point 2 will be loaded

This procedure can only be performed once: the most suitable configuration for the application, once loaded, will remain active the next time the instrument is started. When switching on the first time, bn0 corresponds to the Carel standard (default configuration). The procedure for loading one of the user configurations involves copying one of the sets of parameters (bn1,...,bn6) to bn0. bn0 therefore always corresponds to the last configuration loaded.

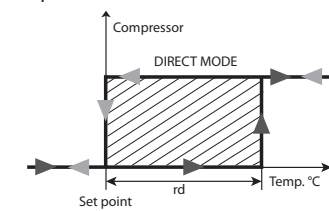
Configurations

ir33 SMART is loaded with 6 default configurations (sets of parameters). Each configuration identifies a specific refrigeration application, and can be identified simply by the index (bn*) when switching the instrument on.

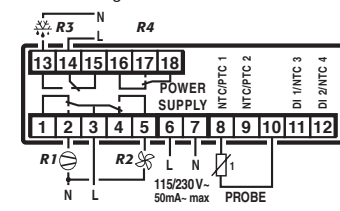
Index	Application	Op. T. range	Inputs	Relay outputs
bn1	Normal temperature ventilated refrigeration units with heater defrost (timed)	2T10°C	NTC room	Compressor Defrost Fans
bn2	Normal temperature ventilated refrigeration units with heater defrost (by temperature) and light control	2T10°C	NTC room NTC evaporator DI door switch	Compressor Defrost Fans Light
bn3	Normal or low temperature ventilated refrigeration units with heater defrost (by temperature) and light control	-20T-14°C 2T10 °C	NTC room NTC evaporator DI door switch	Compressor Defrost Fans Light
bn4	Normal temperature ventilated refrigeration units with heater defrost (with two evaporators, by temperature)	2T10°C	NTC room NTC evaporator 1 NTC evaporator 2	Compressor Defrost Evap fans 1 Evap fans 2
bn5	Normal or low temperature ventilated refrigeration units with heater defrost (with two evaporators, by temperature)	-20T-14°C 2T10 °C	NTC room NTC evaporator 1 NTC evaporator 2	Compressor Defrost Evap fans 1 Evap fans 2
bn6	Standard CAREL (default config.)	-50T90 °C	configurable	configurable

bn1: normal temperature (+2T10 °C) ventilated refrigeration units with heater defrost (timed) - Temperature range: 2T10 °C

Temperature control



Connection diagram



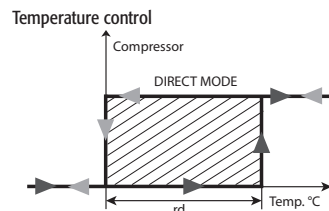
Inputs	Room probe	NTC 1
Compressor	R1: 16 A relay	
Defrost heater	R3: 8 A relay	
Evaporator fan	R2: 8 A relay	

Main parameters (type F)	Name	Type	Description	Default value
	St	ctl	Set point	4 °C
	rd	ctl	Control differential (hysteresis)	2 °C
	dl		Interval between defrosts	8 hours
	dP1	dEF	Maximum evap. defrost duration	30 min
	AL (*)		Minimum temperature alarm	-30 °C
	AH (*)	ALM	Maximum temperature alarm	30 °C
	Ad		Temperature alarm delay	30 min
	F0		Fan management	0
	Fd	FAn	Fans off after dripping	0 min

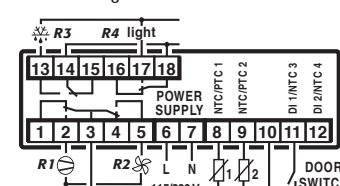
(*) alarm thresholds AL & AH absolute. Relay R4 is not used.

bn2: normal temperature (+2T10 °C) ventilated refrigeration units with heater defrost (by temperature) and light control

Temperature control



Connection diagram



*: short-circuit terminals 10 and 11 if the door switch is not used

Inputs	Room probe	NTC 1
Defrost probe	NTC 2	
Door switch	Digital input DI1	

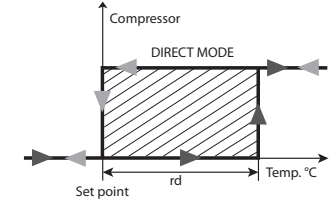
Outputs	Compressor	R1: 16 A relay
Defrost heater	R3: 8 A relay	
Evaporator fan	R2: 8 A relay	
Light	R4: 8 A relay	

Main parameters (type F)	Name	Type	Description	Default value
	St	ctl	Set point	2 °C
	rd	ctl	Control differential (hysteresis)	2 °C
	dl		Interval between defrosts	6 hours
	dt1	dEF	Evaporator end defrost temperature	4 °C
	dd		Dripping time	2 min
	d/1		Defrost probe 1 reading	-
	AL (*)		Minimum temperature alarm	-30 °C
	AH (*)	ALM	Maximum temperature alarm	30 °C
	Ad		Temperature alarm delay	30 min
	F0		Fan management	0
	F1	FAn	Fan on temperature	5 °C
	Fd		Fans off after dripping	2 min

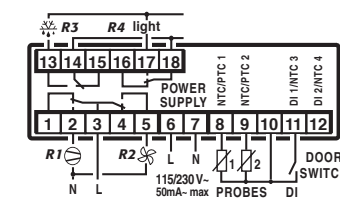
(*) absolute alarm thresholds

bn3: normal (+2T10 °C) or low temperature (-20T-14 °C) ventilated refrigeration units with heater defrost (by temperature) and light control

Temperature control



Connection diagram



*: short-circuit terminals 10 and 11 if the door switch is not used

Inputs	Room probe	NTC 1
Defrost probe	NTC 2	
Door switch	Digital input DI1	

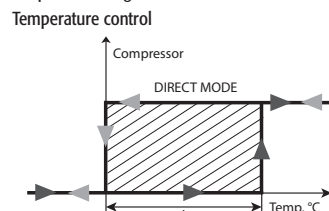
Outputs	Compressor	R1: 16 A relay
Defrost heater	R3: 8 A relay	
Evaporator fan	R2: 8 A relay	
Light	R4: 8 A relay	

Main parameters (type F)	Name	Type	Description	Default value
	St	ctl	Set point	-14 °C
	rd	ctl	Control differential (hysteresis)	2 °C
	dl		Interval between defrosts	6 hours
	dt1	dEF	Evaporator end defrost temperature	4 °C
	dd		Dripping time	2 min
	d/1		Defrost probe 1 reading	-
	AL (*)		Minimum temperature alarm	-50 °C
	AH (*)	ALM	Maximum temperature alarm	30 °C
	Ad		Temperature alarm delay	30 min
	F0		Fan management	0
	F1	FAn	Fan on temperature	5 °C
	Fd		Fans off after dripping	2 min

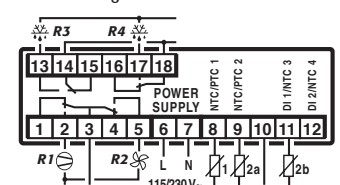
(*) absolute alarm thresholds

bn4: normal temperature ventilated refrigeration units (+2T10 °C) with heater defrost (by temperature) and two evaporators

Temperature control



Connection diagram



Inputs	Room probe	NTC 1
Defrost probe 2a	NTC 2	
Defrost probe 2b	NTC 3	

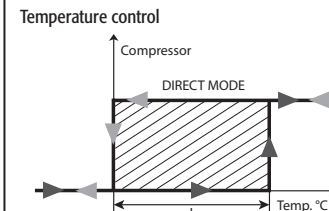
Outputs	Compressor	R1: 2 HP relay
Defrost heater 1	R3: 8 A relay	
Defrost heater 2	R4: 8 A relay	
Evaporator fan	R2: 8 A relay	

Main parameters (type F)	Name	Type	Description	Default value
	St	ctl	Set point	2 °C
	rd	ctl	Control delta	2 °C
	dl		Interval between defrosts	6 hours
	dt1	dEF	Evaporator end defrost temperature	4 °C
	dt2		AUX evap. end defrost temperature	4 °C
	dd		Dripping time	2 min
	d/1		Defrost probe 1 reading	-
	d/2		Defrost probe 2 reading	-
	AL (*)		Minimum temperature alarm	-30 °C
	AH (*)	ALM	Maximum temperature alarm	30 °C
	Ad		Temperature alarm delay	30 min
	F0		Fan management	0
	F1	FAn	Fan on temperature	5 °C
	Fd		Fans off after dripping	2 min

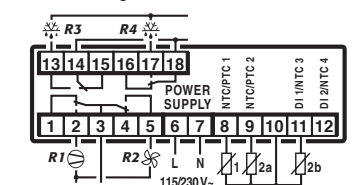
(*) absolute alarm thresholds

bn5: normal (+2T10 °C) or low temp. (-20T-14 °C) ventilated refrigeration units with heater defrost (by temperature) & two evaporators

Temperature control



Connection diagram



Inputs	Room probe	NTC 1
Defrost probe 2a	NTC 2	
Defrost probe 2b	NTC 3	

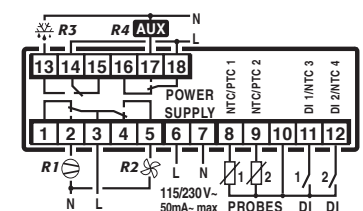
Outputs	Compressor	R1: 2 HP relay
Defrost heater 1	R3: 8 A relay	
Defrost heater 2	R4: 8 A relay	
Evaporator fan	R2: 8 A relay	

Main parameters (type F)	Name	Type	Description	Default value
	St	ctl	Set point	-14 °C
	rd	ctl	Control delta	2 °C
	dl		Interval between defrosts	6 hours
	dt1	dEF	Evaporator end defrost temperature	4 °C
	dt2		AUX evaporator end defrost temp.	4 °C
	dd		Dripping time	2 min
	d/1		Defrost probe 1 reading	-
	d/2		Defrost probe 2 reading	-
	AL (*)		Minimum temperature alarm	-50 °C
	AH (*)	ALM	Maximum temperature alarm	30 °C
	Ad		Temperature alarm delay	30 min
	F0		Fan management	0
	F1	FAn	Fan on temperature	5 °C
	Fd		Fans off after dripping	2 min

(*) absolute alarm thresholds

bn6: standard CAREL (default configuration)

Connection diagram



Main parameters (type F)	Name	Type	Description	Default value
	St	ctl	Set point	-14 °C
	rd	ctl	Control delta	2 °C
	rt	ctl	Temperature monitoring interval	-
	rH		Maximum temperature read	-
	rL		Minimum temperature read	-
	dl		Interval between defrosts	8 hours
	dt1	dEF	Evaporator end defrost temperature	4 °C
	dt2		AUX evaporator end defrost temp.	4 °C
	dP1		Maximum evaporator defrost duration	30 min
	dP2	dEF	Maximum evaporator defrost duration	30 min
	dd		Dripping time	2 min
	d8		Alarm bypass time after defrost and/or door open	1 hour
	d/1		Defrost probe 1 reading	-
	d/2		Defrost probe 2 reading	-
	AL		Minimum temperature alarm	0 °C
	AH	ALM	Maximum temperature alarm	0 °C
	Ad		Temperature alarm delay	120 min
	F1	FAn	Fan on temperature	5 °C
	Fd		Fans off after dripping	1 min

Indications on the display

When flashing, the signals on the display indicate a request that cannot be implemented until the delay timers have expired.

Icon	Function	Normal operation	Startup
COMPRESSOR	compressor on	compress. off	compress. call
FAN	fan on	fan off	fan call
DEFROST	defrost in progress	no defrost call	defrost call
AUX	AUX auxiliary output active	AUX auxiliary output not active	anti-sweat heater function active
ALARM	delayed external alarm (before the time "A7" has elapsed)	no alarm present	operation (e.g. high/low temp.) or immediate or delayed ext. alarm from digital input
CLOCK	if at least one timed defrost has been set	no timed defrost has been set	clock alarm
LIGHT	light auxiliary output active	light auxiliary output not active	anti-sweat heater function active
SERVICE		no malfunction	malfunction (e.g. EEPROM error or faulty probes)
HACCP	HACCP function enabled (HA and/or HF)	function not enabled	HACCP alarm saved
CONT. CYCLE	function activated	function not activated	function called

Buttons on the keypad

But.	Pressing the button alone	Pressing together with other buttons
Prq mute	if pressed for more than 5 s, accesses the menu for setting the type F parameters (frequent) in the event of alarms: mutes the audible alarm (buzzer) and deactivates the alarm relay	if pressed with SET for more than 5s, accesses the menu for setting type C parameters (configuration) or downloading the parameters if pressed together with UP/AUX for more than 5s resets any alarms with manual reset
▲ aux	if pressed for more than 1 s, activates/deactivates the auxiliary output	if pressed together with DOWN/DEF for more than 5s, activates/deactivates the continuous cycle if pressed with SET for more than 5s starts the report printing procedure (function available but to be implemented) if pressed with PRG/MUTE for more than 5s, resets any alarms with manual reset
def ▼	if pressed for more than 5 s, activates/deactivates a manual defrost	if pressed together with UP/AUX for more than 5s activates/deactivates the continuous cycle if pressed for more than 1 s with SEL, displays a submenu with the HACCP alarm parameters (HA, HAn, HF, HFn)
Set	if pressed for more than 1 s, displays and/or sets the set point	if pressed with PRG/MUTE for more than 5s, accesses the menu for setting type C parameters (configuration) or downloading the parameters if pressed for more than 1 s with DOWN/DEF, displays a submenu with the HACCP alarm parameters (HA, HAn, HF, HFn) if pressed with UP/AUX for more than 5s starts the report printing procedure (function available but to be implemented)

How to set the set point

Step	Action	Effect	Meaning
1	Press Set for 2 seconds	After 2 seconds the display will show the current set point	This the currently active control set point
2	Press ▲ or ▼ or aux	The value on the display will increase or decrease	Set the desired value
3	Press Set	The controller will show the temp.read by the probes again	The set point is modified and saved

Another way of changing the set point is to set parameter "St" (see the tables below)

How to access and set type "F" parameters (FREQUENT, not protected by password)

Step	Action	Effect	Meaning
1	Press Prq mute for 5 seconds	After 5 seconds the display will show the 1st parameter, "Sc" (set point)	Access to type "F" parameters is direct
2	Press ▲ aux or ▼ def	The display will scroll the list of type "F" parameters (FREQUENT) (depends on the configuration loaded)	Select the desired parameter
3	Press Set	The display will show the value of the selected parameter	This is the current value of the parameter
4	Press ▲ aux or ▼ def	The value on the display will increase or decrease	Set the desired value
5	Press Set	The display will show the parameter name again	IMPORTANT: parameters not yet saved
6	Repeat steps 2, 3, 4 & 5 for all parameters required		
7	Press for 5 seconds Prq mute	The controller will display the temperature read by the probes again	IMPORTANT: only now have all the parameters been updated

How to access and set type "C" parameters (CONFIGURATION, password protected)

Step	Action	Effect	Meaning
1	Press Prq mute & Set for 5 seconds	After 5 seconds the display shows "0"	Access to type "C" parameters requires the password
2	Press ▲ aux or ▼ def	The value on the display will increase or decrease	Enter the password "72"
3	Press Set	The display will show the first parameter in the list (depends on the configuration loaded)	The type "C" parameters also include type "F"
4	Press ▲ aux or ▼ def	The display will scroll the list of type "C" parameters (CONFIGURATION)	Select the desired parameter
5	Press Set	The display will show the value of the selected parameter	This is the current value of the parameter
6	Press ▲ aux or ▼ def	The value on the display will increase or decrease	Set the desired value
7	Press Set	The display will show the parameter name again	IMPORTANT: parameters not yet saved
8	Repeat steps 4, 5, 6 & 7 for all parameters required		
9	Press Prq mute for 5 seconds	The controller will display the temperature read by the probes again	IMPORTANT: only now have all the parameters been updated

For both types of access (type "F" and type "C") there is a timeout (no button on the keypad pressed for 1 min), the procedure is ended without saving the parameter.

Accessing the parameters divided by functional blocks (allows the user to scroll the list of parameters in blocks)

Once having accessed the type "F" or "C" parameters (see tables above)

Step	Action	Effect	Meaning
1	Press Prq mute	The display will show the name of the functional block that the parameter belongs to	Example 'CMP' for the compressor parameters, 'dEF' for the defrost parameters
2	Press ▲ aux or ▼ def	The display will show the name of the other functional blocks	Example 'Fan' for the fan parameters
3	Press Prq mute	The display will show the name of the first parameter in the functional block selected	Example "F0" for 'Fan'

Technical specifications

Power supply	Voltage	Power
Insulation guaranteed by the power supply	115-230 V~, 50/60 Hz	6 VA, 50 mA ~ max.
Inputs	insulation from very low voltage parts reinforced - 6 mm in air, 8 mm on surface, 3750 V insulation	basic 3 - mm in air, 4 mm on surface, 1250 V insulation
Type of probe	Std. CAREL NTC	10 kΩ at 25 °C, range -50/90 °C meas. error 1 °C in range -50/50 °C 3 °C in range 50/90 °C
	High temperature NTC	50 kΩ at 25 °C, range -40/150 °C meas. error 1.5 °C in range -20/115 °C 4 °C in range outside of -20/115 °C
	Std. CAREL PTC	985 Ω at 25 °C, range -50/150 °C meas. error 2 °C in range -50/50 °C 4 °C in range 50/150 °C
	Relay outputs	according to the model
Connections	The correct sizing of the power and connection cables between the instrument and the loads is the installer's responsibility. In max. load and max. operating temp. conditions, the cables used must be suitable for operation at least up to 105 °C.	
Assembly	smooth, hard and indeformable panel using side fastening brackets to press in fully drilling template	
Display	digits display operating status	
Keypad	available	
Infrared receiver	available	
Clock with backup battery	available	
Auxiliary alarm relay	available	
Buzzer	available	
Clock	error at 25°C error in the temperature range ageing discharge time charge time	
Operating conditions	-10/60 °C <90% rH non-condensing	
Storage conditions	-20/70 °C <90% rH non-condensing	
Front panel index of protection	IP65 gasket	
Environmental pollution	2 (normal situation)	
PII of insulating materials	printed circuits 250, plastic and insulating materials 175	
Period of electrical stress across the insulating parts	long	
Category of resistance to heat and fire	category D and category B (UL 94-V0)	
Class of protection against voltage surges	category II	
Type of action/disconnection	1B relay contacts (microswitching)	
Construction of the control device	built-in, electronic	
Classification according to protection against electric shock	Class 2 when appropriately integrated	
Device designed to be hand-held or integrated into equipment designed to be hand-held	no	
Software class and structure	class A	
Cleaning the front panel of the instrument	only use neutral detergents and water	
Serial interface for CAREL network	external	
Repeater display interface	external	
Maximum distance between interface and display	10 m	
Programming key	available	

The IR33 range fitted with the standard CAREL NTC sensor is compliant with standard EN 13485 on thermometers for measuring the air and product temperature for the transport, storage and distribution of chilled, frozen, deep-frozen/quick-frozen food and ice cream. Designation of the instrument: EN13485, air, S, A, 1, -50/90°C. The standard CAREL NTC sensor is identifiable by the printed laser code on "WP" models, or the code "103AT-11" on "HP" models, both visible on the sensor part.

Safety standards: compliant with the relevant European standards.

Installation warnings:

- the connection cables must guarantee insulation up to 90 °C; and, if necessary, up to 105 °C
- adequately secure the connection cables to the cupboard as to avoid contact with very low voltage components

Manual defrost

As well as automatic defrost, a manual defrost can be activated, if the temperature conditions are right, by pressing "DEF/DOWN" for 5 s.

HACCP functions

ir33 is compliant with the HACCP standards, as it monitors the temperature of the food stored. Alarm "HA" = max. threshold exceeded: up to three HA events are saved (HA, HA1, HA2), from the most recent (HA) to the oldest (HA2), with a signal HAn that displays the number of HA events saved. Alarm "HF" = power failure for more than 1 min. and max. threshold AH exceeded: up to three HF events are saved (HF, HF1, HF2), from the most recent (HF) to the oldest (HF2), with a signal HFn that displays the number of HF events saved. Setting the HA/HF alarm: parameter AH (high temp. threshold); Ad and Htd (Ad + Htd = HACCP alarm delay). Displaying the details: press "SET" to access parameters HA or HF and scroll using "UP/AUX" or "DEF/DOWN". Deleting the HACCP alarms: press "DEF/DOWN" and "SET" for 5 sec. inside the menu, "res" will be shown to indicate the alarm has been deleted. To delete the saved alarms, press "DEF/DOWN" + "SET" + "UP/AUX" together for 5 seconds.

Defrost event date and day (parameters td1 to td8)

0 = no event; 1 to 7 = Monday to Sunday; 8 = Monday to Friday; 9 = Monday to Saturday; 10 = Saturday and Sunday; 11 = every day.

Operating parameters

Complete list of parameters for each configuration

□ frequent parameters 'F' □ psw protected parameters 'P' ■ masked parameters (hidden)

Cd.	Parameter	Description	Configuration					
			bn1	bn2	bn3	bn4	bn5	bn6
/2	Measurement stability	1 to 15	4	4	4	4	4	4
/3	Probe display response	Temperature display refresh speed (0 to 15)	0	0	0	0	0	0
/4	Virtual probe	Weight % of temp. control probe 2 (0 to 100%)	0	0	0	0	0	0
/5	Select °C or °F	0: °C; 1: °F	0	0	0	0	0	0
/6	Decimal point	0: yes (-20 to 20 °C); 1: no	0	0	0	0	0	0
/I	Display on internal terminal	Probe reading displayed 1: virtual probe; 2: probe 1; 3: probe 2; 4: probe 3; 5: probe 4; 6: probe 5; 7: set point	2	2	2	2	2	1
/E	Display on external terminal	Probe displayed on remote term. 0: no remote term.; 1: virtual probe; 2: probe 1; 3: probe 2; 4: probe 3; 5: probe 4; 6: probe 5	0	0	0	0	0	0
/P	Select type of probe	0: NTC -50/90 °C; 1: NTC -40/150 °C; 2: PTC -50/150 °C	0	0	0	0	0	0
/A2	Probe 2 configuration	0: no probe; 1: product probe; 2: defrost probe; 3: condenser probe; 4: antifreeze probe	0	2	2	2	2	2
/A3	Probe 3 configuration	As for probe 2 (only if A4=0)	0	0	0	2	2	0
/A4	Probe 4 configuration	As for probe 2 (only if A5=0)	0	0	0	0	0	0
/c1	Probe 1 calibration or offset	Corr. to probe 1 reading (-20/20 °C)	0	0	0	0	0	0
/c2	Probe 2 calibration or offset	Corr. to probe 2 reading (-20/20 °C)	0	0	0	0	0	0
/c3	Probe 3 calibration or offset	Corr. to probe 3 reading (-20/20 °C)	0	0	0	0	0	0
/c4	Probe 4 calibration or offset	Corr. to probe 4 reading (-20/20 °C)	0	0	0	0	0	0
St	Set point	r1/r2 °C	4	2	-14	2	-14	0
rd	Control delta	Temp. control diff. or hysteresis (0.1/20 °C)	2	2	2	2	2	2
m	Dead zone	0.0/1.0 °C	4	4	4	4	4	4
rr	Reverse control differential	+0.1/20 °C	2	0	2	0	2	0
c1	Minimum set point	Min. value settable for the set point (-50/2 °C)	-30	-50	-50	-30	-50	-50
c2	Maximum set point	Max. value settable for the set point (r1/200 °C)	30	30	30	30	30	60
r3	Operating mode	0: direct thermostat with defrost control (cool) 1: direct them. (cool); 2: reverse them. (heat)	0	0	0	0	0	0
r4	Automatic set point variation in night-time	Value added to the set point in night-time operation (see A4, A5 and A9) (-20/20 °C)	3.0	3.0	3.0	3.0	3.0	3.0
r5	Enable temp. monitoring	0: disabled; 1: enabled	0	0	0	0	0	0
rr	Temp. monitoring interval	temp. recording hours. (0 to 999)	-	-	-	-	-	-
rH	Maximum temperature read	-	-	-	-	-	-	-
rL	Minimum temperature read	-	-	-	-	-	-	-
c0	Fan start delay (if relay fitted) on power-up	0 to 15 min	0	0	0	0	0	0
c1	Minimum time between consecutive starts of compressor	0 to 15 min	0	0	0	0	0	0
c2	Min. compressor off time	0 to 15 min	0	0	0	0	0	0
c3	Min. compressor on time	0 to 15 min	0	0	0	0	0	0
c4	Duty setting or safety relay	Comp. operating time for control probe fault (Fixed off time 15 min) (0 to 100 min)	15	15	15	15	15	15
cc	Continuous cycle duration	Compressor operating time even when the temp. is below the set point (0 to 15 hours)	0	0	0	0	0	0
c6	Alarm bypass after continuous cycle	0 to 250 hours	2	2	2	2	2	2
c7	Max pump down time	0 to 900 s	0	0	0	0	0	0
c9	Enable autostart with pump down operation	0 = Pump down cycle when closing the valve 1 = Pump down cycle whenever closing the valve and on each following request from low pressure switch (no cooling request)	0	0	0	0	0	0
c10	Select pump down by time or pressure	0 = End pump down by low press. switch activation; 1 = End when reaching low pressure or after maximum time C7	0	0	0	0	0	0
c11	Second compressor delay	Second compressor delay, after the first, start-up (H1=7 or H5=7) (0 to 250 sec)	4	4	4	4	4	4
d0	Type of defrost	0 = heater by temp.; 1 = hot gas by temp.; 2 = heater by time; 3 = hot gas by time; 4 = heater by time with temp. control	2	0	0	0	0	0
dl	Interval between defrosts	0 to 250 hours	8	6	6	6	6	8
d1	Evaporator end defrost temp.	-50/200 °C	4	4	4	4	4	4
d2	AUX evap. end defrost temp.	-50/200 °C	4	4	4	4	4	4
dP1	Maximum evaporator defrost duration	1 to 250 min	30	30	30	30	30	30
dP2	Maximum AUX evaporator defrost duration	1 to 250 min	30	30	30	30	30	30
d3	Defrost activation delay	Interval between defrost call and effective activation of the relay	0	0	0	0	0	0
d4	Defrost on start-up	0: disabled; 1: enabled	0	0	0	0	0	0
d5	Defrost delay on start-up or from multifunction input	0 to 250 min	0	0	0	0	0	0
d6	Display during defrost	0 = During defrost the display shows "dEF" and the actual temperature, alternating; 1 = During defrost the display shows the last temperature displayed before starting; 2 = During defrost the display shows "dEF" on steady	1	1	1	1	1	1
dd	Dripping time after defrost	Waiting time before reactivating compressor and fans at the end of a defrost (0 to 15 min)	0	2	2	2	2	2
d8	Alarm bypass time after defrost and/or door open	See a4, a5 and a9 (0 to 250 hours)	1	1	1	1	1	1
dbd	Door open alarm delay	See 'a4', 'a5' and 'a9' (0 to 250 hours)	0	0	0	0	0	0
d9	Defrost priority over compressor protectors	0 = protection times respected at start of defrost; 1 = protection times not respected; the defrost has higher priority	0	0	0	0	0	0
dP1	Display defrost probe 1	°C/°F	-	-	-	-	-	-
dP2	Display defrost probe 2	°C/°F	-	-	-	-	-	-
dC	Time base	0: 'dl' in hours; 'dP1' and 'dP2' in min.; 'dl' in minutes; 'dP1' and 'dP2' in seconds	0	0	0	0	0	0
d10	Compressor running time	Compressor operating time with evaporator temp. less than d11, after which a defrost is called (0 to 250 hours)	0	0	0	0	0	0
d11	Temp. threshold in running time	Evaporator temp. below which the compressor must continue operating for the time d10 to generate a defrost call (-20 to 20 °C)	1	1	1	1	1	1
d12	Advanced defrost	0 = Skip defrost and automatic variation in "dl" disabled; 1 = Skip defrost disabled, auto variation in "dl" enabled; 2 = Skip defrost enabled, auto variation in "dl" disabled; 3 = Skip defrost and automatic variation in "dl" enabled	0	0	0	0	0	0
dn	Nominal defrost duration	1 to 100%	65	65	65	65	65	65
dH	Prop. factor for variation in "dl"	0 to 100%	50	50	50	50	50	
A0	Alarm and fan differential	0.1/20 °C	2.0	2.0	2.0	2.0	2.0	
A1	Type of threshold AL and AH	0: relative; 1: absolute	1	1	1	1	1	
AL	Min. temperature alarm	-50/200 °C	-30	-30	-50	-30	-50	
AH	Max. temperature alarm	-50/200 °C	+30	+30	+50	+30	+50	
Ad	Temperature alarm delay	0 to 250 min	30	30	30	30	30	
A4	Digital 1 input configuration	0 = input not active; 1 = Immediate ext. alarm; 2 = delayed external alarm (time A7); 3 = Enable defrost; 4 = Start defrost from ext. contact; 5 = Door switch with comp. and fans OFF; 6 = remote ON/OFF; 7 = Curtain switch; 8 = Low press. switch input for pump down; 9 = Door switch with fans OFF; 10 = Direct / reverse operation; 11 = Light sensor; 12 = AUX output activation; 13 = Door switch with comp. and fans OFF (light not managed); 14 = Door switch with fans OFF (light not managed)	0	5	5	0	0	0
A5	Digital 2 input configuration	as for A4	0	0	0	0	0	
A6	Stop compressor from external alarm	Forced compressor operating time for external alarms (0 to 100 min)	0	0	0	0	0	
A7	External alarm delay	If A4=2, A5=2 or A9=2 (0 to 250 min)	0	0	0	0	0	
A8	Enable alarms Ed1 and Ed2	0 = signal "Ed1" and "Ed2" on display (end defrost due to maximum duration dP1/dP2) disabled; 1 = Sign. "Ed1" and "Ed2" enabled	0	0	0	0	0	
Ac	High condenser temp. alarm	0/200 °C	70	70	70	70	70	
AE	High condenser temperature alarm differential	Differential or hysteresis for activation/deactivation of high cond. temp. pre-alarm (0.1/20 °C)	10	10	10	10	10	
Ac0	High condenser temp. alarm delay.	0 to 250 min	0	0	0	0	0	
AF	Off time with light sensor	Light sensor management 0 = sensor in the door jamb (the inside light is switched on when the sensor detects light and off when it detects darkness) > 0 = sensor inside cold room or cabinet; the inside light is switched on when the sensor detects light. After the time AF in seconds the light is switched off for 3 sec to see if the door has been closed. In the event of darkness the inside light remains off, the inside light is switched on again after a minimum time of 3 sec and the cycle restarts (0 to 250)	0	0	0	0	0	
ALF	Antifreeze alarm threshold	Active if /A2, /A3, /A4 or /A5= 4 (-50/200 °C)	-5	-5	-5	-5	-5	
AdF	Antifreeze alarm delay	0 to 15 min	1	1	1	1	1	
F0	Fan management	0 = Fans always on 1 = Fans on based on difference between control probe and evaporator temp. 2 = Fans on based on evaporator temp.	0	0	0	0	0	
F1	Fan start temperature	F0 = 1 - F1 indicates the min. difference between room and evap. temp. to activate the fans F0 = 2 - F1 indicates the absolute fan activation temp. -50/200 °C	5	5	5	5	5	
F2	Fan off with compressor off	0 = Fans always active (F0=0) or upon request (F0=1,2) even when comp. off 1 = Fans off when compressor off	1	1	1	1	1	
F3	Fan in defrost	0 = Fans active during defrost 1 = Fans not active during defrost	0	0	1	0	1	
F4	Fans off after dripping	Fan off time after defrost and after dd (0 to 15 min)	0	2	2	2	2	
F4	Condenser fan stop temperature	-50/200 °C	40	40	40	40	40	
F5	Condenser fan start differential	Differential or hysteresis used for condenser fan control (0.1/20 °C)	5	5	5	5	5	

H0	Serial address	0 to 207	1	1	1	1	1	1
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