TC3224N9R Defrost Controller Installation Guide

For refrigerated cabinets, counters and islands, with energy-saving strategies.

PLEASE READ CAREFULLY and save this document

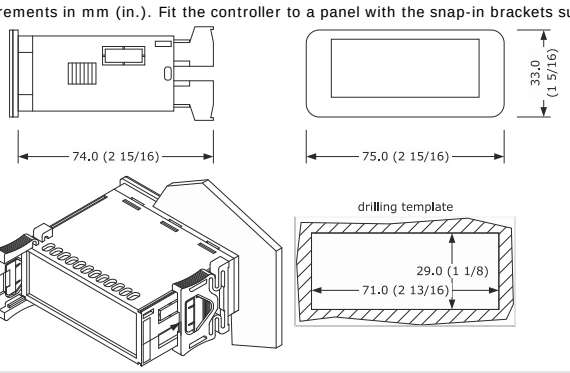
CONSIDER THE ENVIRONMENT

E ENGLISH

- Controller for low temperature units
- Universal power supply 115 VAC to 230 VAC
- Incorporated clock
- Cabinet probe and evaporator probe with a negative temperature coefficient (NTC), 10,000 ohm at 77°F
- Door switch input
- Alarm buzzer
- RS-485 MODBUS® subordinate port for Building Management System (BMS)
- Cooling or heating operation

1 MEASUREMENTS AND INSTALLATION

Measurements in mm (in.). Fit the controller to a panel with the snap-in brackets supplied.

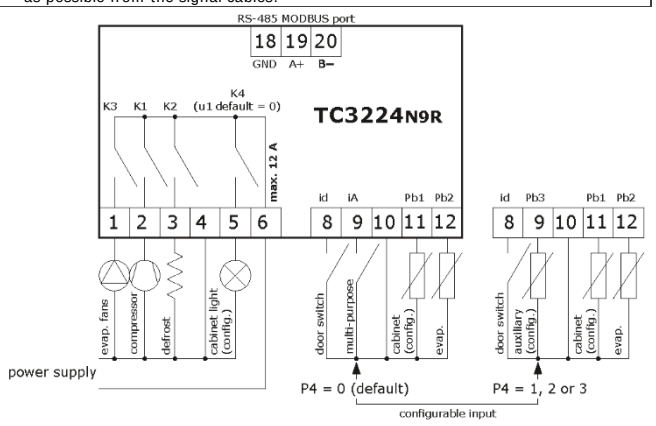


INSTALLATION PRECAUTIONS

- Ensure that the thickness of the panel is between 0.8 mm and 2.0 mm (1/32 in. and 1/16 in.)
- Ensure that the working conditions are within the limits stated in the *TECHNICAL SPECIFICATIONS* section.
- Do not install the device close to heat sources, equipment with a strong magnetic field, in places subject to direct sunlight, rain, damp, excessive dust, mechanical vibrations, or shocks.
- In compliance with safety regulations, install the device correctly to ensure adequate protection from contact with electrical parts. Fix all protective parts in such a way so as to need the aid of a tool to remove them.

2 ELECTRICAL CONNECTION

Important
- Use cables of an adequate wire gauge for the current running through them.
- To reduce any electromagnetic interference, connect the power cables as far away as possible from the signal cables.



- Power supply for TC3224N9R: 115 VAC to 230 VAC.

PRECAUTIONS FOR ELECTRICAL CONNECTION

- If you use an electrical or pneumatic screwdriver, adjust the torque to a maximum of 0.5 N•m (4 in. lb).
- If you move the device from a cold to a warm place, the humidity may cause condensation to form inside. Wait an hour before you switch on the power.
- Make sure that the supply voltage, electrical frequency, and power are within the set limits. See *TECHNICAL SPECIFICATIONS*.
- Disconnect the power supply before you do any type of maintenance.
- Do not use the device as safety device.
- For repairs and further information, contact the Penn sales network.

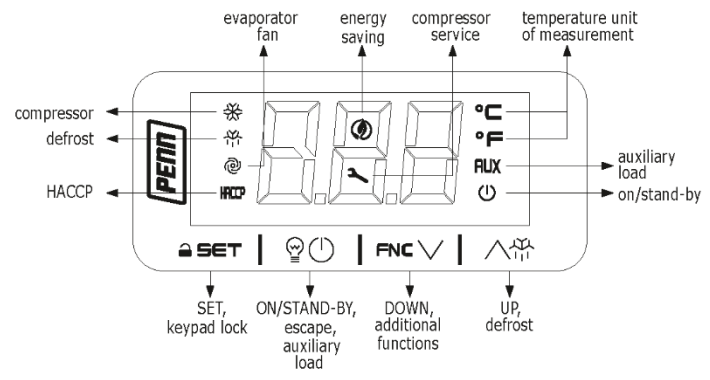
3 FIRST-TIME

1. Follow the instructions in MEASUREMENTS AND INSTALLATION to install the controller.
2. Power up the device as shown in *ELECTRICAL CONNECTION* and an internal test runs. The test normally takes a few seconds. When it finishes the display switches off.
3. Configure the device as shown in Table 6.1 in *SETTINGS*.
   For recommended configuration parameters for first-time use, see the following table.

PAR.	DEF.	PARAMETER	MIN. - MAX.
SP	**32**	Setpoint	r1 to r2
P2	**1**	Temperature unit of measurement	0 = °C 1 = °F
d1	**0**	Defrost type	0 = Electric 1 = Hot gas 2 = Compressor stopped

   Check that the remaining settings are appropriate; see *CONFIGURATION PARAMETERS*.
4. Disconnect the device from the mains.
5. Make the electrical connection as shown in *ELECTRICAL CONNECTION* without powering up the device.
6. Power up the device.

4 USER INTERFACE AND MAIN FUNCTIONS



4.1 Switching the device on or off

1. Tap the ON/STAND-BY key. — If POF = 1, tap the ON/STAND-BY key for 4 s.

If the device is switched on, the display shows the P5 value, cabinet temperature by default. If the display shows an alarm code, see ALARMS.

LED	ON	OFF	FLASHING
	Compressor on	Compressor off	- Compressor protection active - Setpoint setting active
	Defrost or pre-dripping active	-	- Defrost delay active - Dripping active
	Evaporator fan on	Evaporator fan off	Evaporator fan stop active
HACCP	Saved Hazard Analysis and Critical Control Point (HACCP) alarm	-	New HACCP alarm saved
	Energy saving active	-	-
	Request for compressor service	-	- Settings active - Access to additional functions active
°C/°F	View temperature	-	Overcooling or overheating active
AUX	Auxiliary load on	Auxiliary load off	- Auxiliary load on by digital input - Auxiliary load delay active
	Device off	Device on	Device on/off active

If 30 s elapse and you do not press the keys, the display shows the "**Loc**" label and the keypad locks automatically.

4.2 Unlocking the keypad

Tap any key for 1 s. The display shows the label "**UnL**".

4.3 Setting the setpoint

Check that the keypad is not locked.

1.	SET	Tap the SET key.
2.	FNC	Tap the UP or DOWN key within 15 s to set the value within the limits r1 and r2.
3.	SET	Tap the SET key (or do not operate for 15 s).

4.4 Activating manual defrost (if r5 = 0, default)

Check that the keypad is not locked and that overcooling is not active.

1. Tap the UP key for 2 s.

If P3 = 1 (default), the defrost activates if the evaporator temperature is lower than the d2 threshold.

4.5 Turning the cabinet light on or off (if u1 = 0, default)

1. Tap the ON/STAND-BY key.

- if u1 = 1, the **anti-fog** switches on for the u6 duration.
- if u1 = 2, r13 = 0, and the keypad is not locked, the **key-operated load** switches on or off.

4.6 Turning the key-operated load on or off (if u1 = 2 and r13 = 1)

1. Tap the UP key.

4.7 Silencing the buzzer (if A13 = 1)

Tap any key.
If u1 = 3 and u4 = 1, the alarm output switches off.

5 ADDITIONAL FUNCTIONS

5.1 Activating or deactivating the overcooling, overheating, and manual energy saving

Check that the keypad is not locked.

1. Tap the DOWN key.

FUNCTION	CONDITION	CONSEQUENCE
Overcooling	r5 = 0, r8 = 1 and defrost not active	The setpoint becomes "setpoint - r6", for the r7 duration
Overheating	r5 and r8 = 1	The setpoint becomes "setpoint + r6", for the r7 duration
Energy saving	r5 = 0 and r8 = 2	The setpoint becomes "setpoint + r4", at maximum for the HE2 duration

5.2 Navigating the additional functions menu

Before you begin, check that the keypad is not locked.

1.	FNC	To access the additional functions menu, tap the DOWN key for 4 s.
2.	FNC	To navigate to a label, tap the UP or DOWN key within 15 s.
3.	SET	To select a label, tap the SET key.
4.	FNC	If you cannot edit the parameter, the value displays. If you can edit the parameter, tap the UP or DOWN key to navigate to the value that you want.
5.	SET	To set the parameter value, tap the SET key.
6.		To exit the procedure, tap the ON/STAND-BY key, or do not operate the controller for 60 s.

5.3 Additional functions menu

Use the additional functions menu to cycle through the labels in the following table.

LABEL	VALUE	DESCRIPTION
LS		View HACCP alarm information
	AL	Low temperature alarm information
	AH	High temperature alarm information
	id	Door switch alarm information
	PF	Power failure alarm information
rLS		Delete HACCP alarm information
	149	Command to delete HACCP alarm information
CH		View compressor functioning hours in hundreds
rCH		Delete compressor functioning hours
	149	Command to delete compressor functioning hours
nS1		View compressor start-up number in thousands
Pb1		Cabinet temperature if P4 = 0, 1, or 2 Inlet air temperature if P4 = 3
Pb2		Evaporator temperature if P3 = 1 or 2
Pb3		Auxiliary temperature if P4 = 1, 2, or 3
Pb4		Calculated product temperature (CPT) if P4 = 3. See P7 in *CONFIGURATION PARAMETERS* for more information.
PrJ		View the project number
rEU		View the firmware revision

5.4 Alarm information example

The following table shows an example of information for a high temperature alarm.

LABEL	SAMPLE VALUE	DESCRIPTION
	8.0	The critical value was 8.0°F or 8.0°C. The critical value can be cabinet temperature or CPT.
Sta		The time at which the alarm signaled, for example: 26 March 2015 at 16:30
	y15	2015
	n03	March
	d26	26 March 2015
	h16	16:xx
	n30	16:30
dur		The alarm duration, for example 1 h 15 min
	h01	1 h
	n15	1 h 15 min

6 SETTINGS

6.1 Setting configuration parameters

1.	SET	Tap the SET key for 4 s. The display shows the label "**PA**".
2.	SET	Tap the SET key. The display shows the label "**PAS**".
3.	FNC	Tap the UP or DOWN key within 15 s to set the password.
4.	SET	Tap the SET key or do not operate for 15 s. The display shows the label "**SP**".
5.	FNC	Tap the UP or DOWN key to select a parameter.
6.	SET	Tap the SET key.
7.	FNC	Tap the UP or DOWN key within 15 s to set the value.
8.	SET	Tap the SET key or do not operate for 15 s.
9.	SET	Tap the SET key for 4 s or do not operate for 60 s to exit the procedure.

6.2 Setting the date, time, and day of the week

Important
Do not disconnect the device from the mains within 2 minutes of setting the time and day of the week.

Check that the keypad is not locked.

1.	FNC	Tap the DOWN key for 4 s.
2.	FNC	Tap the UP or DOWN key within 15 s to select the label "**rtc**".
3.	SET	Tap the SET key. The display shows the label "**yy**" followed by the last two figures of the year.
4.	FNC	Tap the UP or DOWN key within 15 s to set the year.
5.	Repeat actions 3. and 4. to set the next labels.	

LAB.	DESCRIPTION
n	Month (01 to 12)
d	Day (01 to 31)
h	Time (00 to 23)
n	Minute (00 to 59)

6.	SET	Tap the SET key. The display shows the label for the day of the week.
7.	FNC	Tap the UP or DOWN key within 15 s to set the day of the week.

LAB.	DESCRIPTION
Mon to Sun	Monday to Sunday

8.	SET	Tap the SET key. The device exits the procedure.
9.		Tap the ON/STAND-BY key to exit the procedure beforehand.

6.3 Restoring the default factory settings and storing customized settings as default

Important
- Check that the factory settings are appropriate; see *CONFIGURATION PARAMETERS*.
- When you store customized settings, you overwrite the default.

1.	SET	Tap the SET key for 4 s. The display shows the label "**PA**".
2.	SET	Tap the SET key.
3.	FNC	Tap the UP or DOWN key within 15 s to set the value.

VAL.	DESCRIPTION
149	Restores the default factory settings
161	Stores customized settings as default

4.	SET	Tap the SET key or do not operate for 15 s. The display shows the label "**dEF**" when you set the value "**149**" or the label "**MAP**" when you set the value "**161**".
5.	SET	Tap the SET key.
6.	FNC	Tap the UP or DOWN key within 15 s to set "**4**".
7.	SET	Tap the SET key or do not operate for 15 s. The display shows "**- - -**" flashing for 4 s, then the device exits the procedure.
8.	Interrupt the power supply to the device.	
9.	SET	Tap the SET key 2 s before step 6. to exit the procedure beforehand.

7 CONFIGURATION PARAMETERS

PAR.	DEF.	SETPOINT	MIN. - MAX.
SP	**32**	Setpoint	r1 to r2

PAR.	DEF.	ANALOG INPUTS	MIN. - MAX.
CA1	**0**	Cabinet probe offset	-25°F/°C to 25°F/°C If P4 = 3, air in probe offset
CA2	**0**	Evaporator probe offset	-25°F/°C to 25°F/°C
CA3	**0**	Auxiliary probe offset	-25°F/°C to 25°F/°C
P0	**1**	Probe type	0 = n/a 1 = NTC
P1	**1**	Enable °C decimal point	0 = No 1 = Yes
P2	**1**	Temperature unit of measurement	0 = °C 1 = °F
P3	**1**	Evaporator probe function	0 = Disabled 1 = Defrost + fan 2 = Fan
P4	**0**	Configurable input function	0 = Digital input 1 = Condenser probe 2 = Critical temperature probe 3 = Air out probe If P4 = 3, regulation temperature = CPT
P5	**0**	Value displayed	0 = Regulation temperature 1 = Setpoint 2 = Evaporator temperature 3 = Auxiliary temperature 4 = Air in temperature
P7	**5**	Inlet air weight for CPT	0% to 10% x 10 CPT = {[(P7 x (inlet air T)] + [(100 - P7) x (outlet air T)] : 100}
P8	**5**	Display refresh time	0 s to 250 s : 10

PAR.	DEF.	CONTROL	MIN. - MAX.
r0	**4**	Setpoint differential	1°F/°C to 15°F/°C
r1	**-50**	Minimum setpoint	-99°F/°C to r2
r2	**100**	Maximum setpoint	r1 to 199°F/°C
r4	**0**	Setpoint offset in energy saving	0°F/°C to 99°F/°C
r5	**0**	Cooling or heating operation	0 = Cooling 1 = Heating
r6	**0**	Setpoint offset in overcooling/overheating	0°F/°C to 99°F/°C
r7	**30**	Overcooling/overheating duration	0 min to 240 min

r8	**0**	DOWN key additional function	0 = Disabled 1 = Overcooling/overheating 2 = Energy saving
r12	**0**	Position of the r0 differential	0 = Asymmetric around setpoint 1 = Setpoint + r0 differential
r13	**0**	UP key additional function	0 = None 1 = Key-operated load
PAR.	DEF.	COMPRESSOR	MIN. - MAX.
C0	**0**	Compressor on delay after power-on	0 min to 240 min
C2	**3**	Compressor off minimum time	0 min to 240 min
C3	**0**	Compressor on minimum time	0 s to 240 s
C4	**10**	Compressor off time during cabinet probe alarm	0 min to 240 min
C5	**10**	Compressor on time during cabinet probe alarm	0 min to 240 min
C6	**176**	Threshold for high condenser temperature warning	0°F/°C to 199°F/°C Differential = 4°F/2°C
C7	**194**	Threshold for high condenser temperature alarm	0°F/°C to 199°F/°C
C8	**1**	High condenser temperature alarm delay	0 min to 15 min
C10	**0**	Compressor hours for service	0 h to 999 h x 100 0 = Disabled
C11	**0**	Second compressor switch-on delay	0 s to 240 s
C13	**0**	Number of start-ups for compressor rotation	0 to 10 0 = Disabled
PAR.	DEF.	DEFROST (if r5 = 0)	MIN. - MAX.
d0	**8**	Automatic defrost interval	0 h to 99 h 0 = Only manual If d8 = 3, maximum interval
d1	**0**	Defrost type	0 = Electric 1 = Hot gas 2 = Compressor stopped
d2	**46**	Threshold for defrost end	-99°F/°C to 99°F/°C
d3	**30**	Defrost duration	0 min to 99 min If P3 = 1, maximum duration
d4	**0**	Enable defrost at power-on	0 = no 1 = yes
d5	**0**	Defrost delay after power-on	0 min to 99 min
d6	**2**	Value displayed during defrost	0 = Regulation temperature 1 = Display locked 2 = dEF label
d7	**2**	Dripping time	0 min to 15 min
d8	**0**	Defrost interval counting mode	0 = Device on hours 1 = Compressor on hours 2 = Hours evaporator temperature < d9 3 = Adaptive 4 = Real time
d9	**32**	Evaporation threshold for automatic defrost interval counting	-99°F/°C to 99°F/°C
d11	**0**	Enable defrost timeout alarm	0 = No 1 = Yes
d15	**0**	Compressor on consecutive time for hot gas defrost	0 min to 99 min
d16	**0**	Pre-dripping time for hot gas defrost	0 min to 99 min
d18	**40**	Adaptive defrost interval	0 min to 999 min If compressor on and evaporator temperature < d22 0 = Only manual
d19	**6**	Threshold for adaptive defrost, relative to optimal evaporation temperature	0°F/°C to 40°F/°C Optimal evaporation temperature - d19
d20	**180**	Compressor on consecutive time for defrost	0 min to 999 min 0 = disabled
d21	**200**	Compressor on consecutive time for defrost after power-on and overcooling	0 min to 500 min If (regulation temperature - setpoint) > 20°F/10°C 0 = Disabled
d22	**-4**	Evaporation threshold for adaptive defrost interval counting, relative to optimal evaporation temperature	-10°F/°C to 10°F/°C Optimal evaporation temperature + d22
PAR.	DEF.	ALARMS	MIN. - MAX.
AA	**0**	Select sensor for high and low temperature alarms	0 = Regulation temperature 1 = Evaporator temperature 2 = Auxiliary temperature
A1	**-20**	Threshold for low temperature alarm	-99°F/°C to 99°F/°C
A2	**1**	Low temperature alarm type	0 = Disabled 1 = Relative to setpoint 2 = Absolute
A4	**20**	Threshold for high temperature alarm	-99°F/°C to 99°F/°C
A5	**1**	High temperature alarm type	0 = Disabled 1 = Relative to setpoint 2 = Absolute
A6	**12**	High temperature alarm delay after power-on	0 min to 99 min x 10
A7	**15**	High and low temperature alarms delay	0 min to 240 min
A8	**15**	High temperature alarm delay after defrost	0 min to 240 min
A9	**15**	High temperature alarm delay after door closing	0 min to 240 min
A10	**10**	Power failure duration for alarm recording	0 min to 240 min
A11	**4**	High and low temperature alarms reset differential	1°F/°C to 15°F/°C
A12	**2**	Power failure alarm notification type	0 = HACCP LED 1 = HACCP LED + PF label + buzzer 2 = HACCP LED + PF label + buzzer (if duration > A10)
A13	**0**	Enable alarm buzzer	0 = No 1 = Yes
PAR.	DEF.	FANS	MIN. - MAX.
F0	**3**	Evaporator fan mode during normal operation	0 = Off 1 = On 2 = According to F15 and F16 if compressor off, on if compressor on 3 = Thermoregulated (with F1) 4 = Thermoregulated (with F1) if compressor on
F1	**30**	Threshold for evaporator fan operation	-99°F/°C to 99°F/°C Differential = 2°F/1°C
F2	**0**	Evaporator fan mode during defrost and dripping	0 = Off 1 = On 2 = According to F0
F3	**2**	Evaporator fan stop maximum duration	0 min to 15 min
F4	**0**	Evaporator fan off time during energy saving	0 s to 240 s x 10
F5	**10**	Evaporator fan on time during energy saving	0 s to 240 s x 10
F7	**9**	Threshold for evaporator fan on after dripping (relative to setpoint)	-99°F/°C to 99°F/°C Setpoint + F7
F9	**0**	Evaporator fan off delay after compressor off	0 s to 240 s If F0 = 2
F11	**59**	Threshold for condenser fan on	0°F/°C to 99°F/°C Differential = 4°F/2°C
F12	**30**	Condenser fan off delay after compressor off	0 s to 240 s If P4 ≠ 1
F15	**0**	Evaporator fan off time with compressor off	0 s to 240 s If F0 = 2
F16	**1**	Evaporator fan on time with compressor off	0 s to 240 s If F0 = 2
PAR.	DEF.	DIGITAL INPUTS	MIN. - MAX.
i0	**5**	Door switch input function	0 = Disabled 1 = Compressor + evaporator fan off 2 = Evaporator fan off 3 = Cabinet light on 4 = Compressor + evaporator fan off, cabinet light on 5 = Evaporator fan off + cabinet light on 6 = n/a
i1	**0**	Door switch input activation	0 = With contact closed 1 = With contact open
i2	**30**	Open door alarm delay	-1 to 120 min -1 = Disabled
i3	**15**	Regulation inhibition maximum time with door open	-1 to 120 min -1 = Until the closing
i5	**2**	Multi-purpose input function	0 = Disabled 1 = Energy saving 2 = iA alarm 3 = Key-operated load on 4 = Device on or off 5 = Cth alarm 6 = th alarm
i6	**0**	Multi-purpose input activation	0 = With contact closed 1 = With contact open
i7	**0**	Multi-purpose input alarm delay	-1 to 120 min -1 = Disabled If i5 = 5 or 6, compressor on delay after alarm reset
i10	**0**	Door closed consecutive time for energy saving	0 min to 999 min After regulation temperature < SP 0 = Disabled
i13	**180**	Number of door openings for defrost	0 to 240 0 = Disabled
i14	**32**	Door open consecutive time for defrost	0 min to 240 min 0 = Disabled
PAR.	DEF.	DIGITAL OUTPUTS	MIN. - MAX.
u1	**0**	Auxiliary output configuration	0 = Cabinet light 1 = Anti-fog 2 = Key-operated load 3 = Alarm 4 = Door heaters 5 = Heater for neutral zone 6 = Condenser fan 7 = On/stand-by 8 = Second compressor 9 = Energy saving
u2	**0**	Enable cabinet light and key-operated load in stand-by	0 = No 1 = Yes manual
u4	**0**	Enable alarm output off silencing the buzzer	0 = No 1 = Yes
u5	**30**	Threshold for door heaters on	-99°F/°C to 99°F/°C Differential = 4°F/2°C
u6	**5**	Anti-fog output on duration	1 min to 120 min
u7	**-9**	Neutral zone threshold for heating (relative to setpoint)	-99°F/°C to 99°F/°C Differential = 4°F/2°C setpoint + u7
PAR.	DEF.	ENERGY SAVING (if r5 = 0)	MIN. - MAX.
HE2	**0**	Energy saving maximum duration	1 min to 999 min 0 = Until the door opening
PAR.	DEF.	REAL TIME ENERGY SAVING (if r5 = 0)	MIN. - MAX.
H01	**0**	Energy saving time	0 h to 23 h
H02	**0**	Energy saving duration	0 h to 24 h
HEd	**7**	Energy saving day	0 = Monday 1 = Tuesday 2 = Wednesday 3 = Thursday 4 = Friday 5 = Saturday 6 = Sunday 7 = None
PAR.	DEF.	REAL TIME DEFROST (if d8 = 4)	MIN. - MAX. (h- = disabled)
Hd1	**h-**	First daily defrost time	h-, 1 to 24
Hd2	**h-**	Second daily defrost time	h-, 1 to 24
Hd3	**h-**	Third daily defrost time	h-, 1 to 24
Hd4	**h-**	Fourth daily defrost time	h-, 1 to 24
Hd5	**h-**	Fifth daily defrost time	h-, 1 to 24
Hd6	**h-**	Sixth daily defrost time	h-, 1 to 24
PAR.	DEF.	SAFETIES	MIN. - MAX.
POF	**1**	Enable ON/STAND-BY key	0 = no 1 = yes
PAS	**0**	Password	-99 to 999 0 = Disabled
PAR.	DEF.	REAL TIME CLOCK	MIN. - MAX.
Hr0	**0**	Enable clock	0 = no 1 = yes
PAR.	DEF.	MODBUS	MIN. - MAX.
LA	**247**	MODBUS address	1 to 247
Lb	**2**	MODBUS baud rate	0 = 2,400 baud 1 = 4,800 baud 2 = 9,600 baud 3 = 19,200 baud Parity even

8 ALARMS

COD.	DESCRIPTION	RESET	REMEDIES
Pr1	Cabinet probe alarm	Automatic	- Check P0
Pr2	Evaporator probe alarm	Automatic	- Check probe integrity
Pr3	Auxiliary probe alarm	Automatic	- Check electrical connection
rtc	Clock alarm	Manual	Set date, time, and day of the week
AL	Low temperature alarm	Automatic	Check AA, A1, and A2
AH	High temperature alarm	Automatic	Check AA, A4, and A5
id	Open door alarm	Automatic	Check i0 and i1
PF	Power failure alarm	Manual	- Tap any key - Check electrical connection
COH	High condenser temperature warning	Automatic	Check C6
CSd	High condenser temperature alarm	Manual	- Switch the device off and on - Check C7
iA	Multi-purpose input alarm	Automatic	Check i5 and i6
Cth	Compressor thermal switch alarm	Automatic	Check i5 and i6
th	Global thermal switch alarm	Manual	- Switch the device off and on - Check i5 and i6
dFd	Defrost timeout alarm	Manual	- Tap any key - Check d2, d3, and d11

9 ELECTRICAL RATINGS

Output	Units	cULus (UL 60730)		CE (EN 60730)
	Applied voltage at 60 Hz	120 VAC	240 VAC	240 VAC
K1 compressor relay	Resistive amperes	12	12	12
	Inductive amperes	—	—	2
	Full load amperes	10	10	—
	Locked rotor amperes	60	60	—
K2 relay	Resistive amperes	8	8	5
	Inductive amperes	—	—	2
	Full load amperes	4.4	2.9	—
	Locked rotor amperes	26.4	17.4	—
K3 evaporator fan relay	Resistive amperes	5	5	5
	Inductive amperes	—	—	1
	Full load amperes	1.5	1.5	—
	Locked rotor amperes	9	9	—
K4 cabinet light or configurable relay	Resistive amperes	5	5	5
	Inductive amperes	—	—	1
	Full load amperes	1.5	1.5	—
	Locked rotor amperes	9	9	—

10 TECHNICAL SPECIFICATIONS

Purpose of the control device			Function controller
Construction of the control device			Built-in electronic device
Container			Black, self-extinguishing
Category of heat and fire resistance			D
Measurements			75.0 mm x 33.0 mm x 74.0 mm (2 15/16 in. x 1 5/16 in. x 2 15/16 in.)
Mounting methods for the control device			Fit the controller to a panel with the snap-in brackets supplied
Degree of protection provided by the covering			IP65 in front
Connection method			Removable screw terminal blocks for wires up to 2.5 mm²
Maximum permitted length for connection cables			
Power supply: 10 m (32.8 ft)			Analog inputs: 10 m (32.8 ft)
Digital inputs: 10 m (32.8 ft)			Digital outputs: 10 m (32.8 ft)
Operating temperature			From 32°F to 131°F (from 0°C to 55°C)
Storage temperature			From -13°F to 158°F (from -25°C to 70°C)
Operating humidity			Relative humidity without condensate from 10% to 90%
Pollution status of the control device			2
Compliance			
United States			cURus Recognized; File SA32187 CCN SDFY2; FCC Compliant to CFR47, Part 15, Subpart B, Class A limits
Canada			cURus Recognized; File SA32187 CCN SDFY8; Industry Canada (IC) compliant to Canadian ICES-003, Class A limits
Europe			CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive, Low Voltage Directive, and RoHS Directive
Power supply			115 VAC to 230 VAC (+10% -15%), 50/60 Hz (±3 Hz), max. 3.2 VA
Grounding methods for the control device			None
Rated impulse-withstand voltage			2,5 KV
Over-voltage category			II
Software class and structure			A
Clock			Incorporated secondary lithium battery
Clock drift			≤ 60 s/month at 77°F (25°C)
Clock battery autonomy in the absence of a power supply			> 24 h at 77°F (25°C)
Clock battery charging time			24 h (the battery is charged by the power supply of the device)
Analog inputs			2 for NTC probes (cabinet probe and evaporator probe)
NTC probes	Sensor type		ß3435 (10,000 ohm at 77°F, 25°C)
	Measurement field		-40°F to 221°F (-40°C to 105°C)
	Resolution		1°F (0.1°C)
Digital inputs			1 dry contact (door switch)
Dry contact	Contact type		5 VDC, 1.5 mA
	Power supply		None
	Protection		None
Other inputs			Input configurable for analog input (auxiliary probe) or digital input (multi-purpose input)
Digital outputs			4 electro-mechanical relays (compressor, defrost, evaporator fan, and auxiliary relay)
Type 1 or Type 2 actions			Type 1
Additional features of Type 1 or Type 2 actions			C
Displays			3 digits custom display with function icons
Alarm buzzer			Incorporated
Communication ports			1 RS-485 MODBUS subordinate port for BMS

11 PRODUCT WARRANTY

This product is covered by a limited warranty, details of which can be found at www.johnsoncontrols.com/buildingswarranty

12 SOFTWARE TERMS

Use of the software that is in (or constitutes) this product, or access to the cloud, or hosted services applicable to this product, if any, is subject to applicable end-user license, open-source software information, and other terms set forth at www.johnsoncontrols.com/techterms. Your use of this product constitutes an agreement to such terms.

13 SINGLE POINT OF CONTACT

APAC	Europe	NA/SA
JOHNSON CONTROLS C/O CONTROLS PRODUCT MANAGEMENT NO. 32 CHANGJIANG RD NEW DISTRICT WUXI JIANGSU PROVINCE 214028 CHINA	JOHNSON CONTROLS WESTENDHOF 3 45143 ESSEN GERMANY	JOHNSON CONTROLS 507 E MICHIGAN ST MILWAUKEE WI 53202 USA

14 CONTACT INFORMATION

Contact your local branch office:
www.johnsoncontrols.com/locations
Contact Johnson Controls:
www.johnsoncontrols.com/contact-us

Important
The device must be disposed of according to local regulations governing the collection of electrical and electronic waste.

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