TC3B23

Basic controller for refrigerated cabinets, with energy-saving strategies



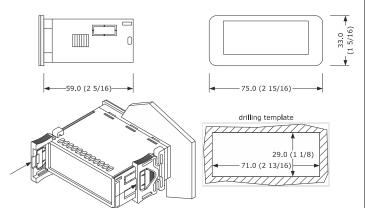




- Controller for low temperature units.
- Power supply for TC3B23N5V: 115 VAC
- Power supply for TC3B23N7V: 230 VAC Cabinet probe and auxiliary probe (NTC).
- Door switch/multi-purpose input.
- Cooling or heating operation.

1 MEASUREMENTS AND INSTALLATION

Measurements in mm (inches). To be fitted to a panel, snap-in brackets provided.

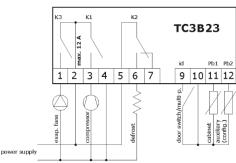


INSTALLATION PRECAUTIONS

- The thickness of the panel must be between 0.8 and 2.0 mm (1/32 and 1/16 in) Ensure that the working conditions are within the limits stated in the $\emph{TECHNICAL}$ 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
- In compliance with safety regulations, the device must be installed properly to ensure adequate protection from contact with electrical parts. All protective parts must be fixed in such a way as to need the aid of a tool to remove them.

2 ELECTRICAL CONNECTION

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 TC3B23N5V: 115 VAC
- Power supply for TC3B23N7V: 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 the device was moved from a cold to a warm place, the humidity may have caused condensation to form inside. Wait about an hour before switching on the power.
- Make sure that the supply voltage, electrical frequency and power are within the set limits. See the section TECHNICAL SPECIFICATIONS.
- Disconnect the power supply before doing any type of maintenance.
- Do not use the device as safety device.
- For repairs and for further information, contact the PENN sales network.

Install following the instructions given in the section MEASUREMENTS AND INSTALLA-TION.

- Power up the device as shown in the section ELECTRICAL CONNECTION and an internal
- test will be run.
- The test normally takes a few seconds, when it is finished the display will switch off. Configure the device as shown in Table 6.1 in the section SETTINGS.

Recommended configuration parameters for first-time use.			
PAR.	DEF.	PARAMETER	MIN MAX.
SP	0.0	setpoint	r1 r2
P2	0	temperature unit of measurement	0 = °C 1 = °F
d1	0	defrost type	0 = electric 1 = hot gas
			2 = compressor stopped

Then check that the remaining settings are appropriate; see the section CONFIGURA-

- Disconnect the device from the mains.
- Make the electrical connection as shown in the section ELECTRICAL CONNECTION with-
- out powering up the device. Power up the device.

4 USER	4 USER INTERFACE AND MAIN FUNCTIONS						
compressor defrost		eva	fan s	nergy aving	n/a o	mperature unit f measurement n/a	
n/a	→ ↓	HRC07			<u> </u>	► on/stand-by	
		 ≙ SET	I ()	I v	1 ^	<u></u>	
		SET, keypad lock	ON/STAND-B' escape	Y, DOWN, additiona functions	UF defr	· },	

Switching the device on/off

 \bigcirc If POF = 1, touch the ON/STAND-BY key for 4 s.

If the device is switched on, the display will show the P5 value ("cabinet temperature" default); if the display shows an alarm code, see the section 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
(2)	 if device on, energy saving active if device off, low consumption active 	-	-
°C/°F	view temperature	-	-
(1)	device off	device on	device on/off active

If 30 s have elapsed without the keys being pressed, the display will show the "Loc" label and the keypad will lock automatically

Unlock keypad

Touch any key for 1 s: the display will show the label "UnL".

4.3 Set the setpoint

Check that the keypad is not locked.

1.	≙SET	Touch the SET key.
2.		Touch the UP or DOWN key within 15 s to set the value within the limits r1 and r2 (default "-40 50")
3.	≙ SET	Touch the SET key (or do not operate for 15 s).

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

Check that the keypad is not locked.

△₩ Touch the UP key for 2 s.

If P4 = 1 (default), defrost is activated provided that the evaporator temperature is lower than the d2 threshold.

5	ADDITIONAL FUNCTIONS						
5.1	View/delete compressor functioning hours						
Check t	heck that the keypad is not locked.						
1.	`	✓ 	Touch the DOWN key for 4 s.				
2.	√ ^# b		Touch the UP or DOWN key within 15 s to select a label.				
	LAB.	DESCRIPTION	ON				
	СН	view compr	essor functioning hours (hundreds)				
	rCH delete comp		pressor functioning hours				
3.	= 9	SET	Touch the SET key.				
4.	√		Touch the UP or DOWN key to set "149" (when label "rCH" is selected).				
5.	≙SET		Touch the SET key.				
6.		1	Touch the ON/STAND-BY key (or do not operate for 60 s) to exit the procedure. $ \label{eq:condition} % \begin{subarray}{ll} \end{subarray} % \beg$				

5.2 View the temperature detected by the probes

Check that the keypad is not locked.

1.	$ I \vee I $		Touch the DOWN key for 4 s.	
2.	√		Touch the UP or DOWN key within 15 s to select a label.	
	LAB. DESCRIPTION		ON	
	Pb1 cabinet tem		perature	
	Pb2 auxiliary ter		mperature	
3.	≙SET		Touch the SET key.	
4.	4.		Touch the ON/STAND-BY key (or do not operate for 60 s) to exit the procedure.	

6	SETTINGS					
6.1	1 Setting configuration parameters					
1.	≙ SET	Touch the SET key for 4 s: the display will show the label "PA".				
2.	≙SET	Touch the SET key.				
3.	√	Touch the UP or DOWN key within 15 s to set the PAS value (default "-19").				
4.	aset	Touch the SET key (or do not operate for 15 s): the display will show the label "SP".				
5.	√	Touch the UP or DOWN key to select a parameter.				
6.	aset	Touch the SET key.				
7.	√	Touch the UP or DOWN key within 15 s to set the value.				
8.	1 aset	Touch the SET key (or do not operate for 15 s).				
9.	_ SET	Touch the SET key for 4 s (or do not operate for 60 s) to exit the procedure.				

6.2 Restore the factory settings (default) and store customized settings as default

	П	mportant	ı
Ö.	-	Check that the factory settings are appropriate; see the section CONFIGURATION	١
O		PARAMETERS.	ı
			н

	~ ⇔	PARAMETERS.				
ı		- Whe	en you store	customized settings, you overwrite the default.		
	1.	SET		Touch the SET key for 4 s: the display will show the label "PA".		
	2.			Touch the SET key.		
	3.			Touch the UP or DOWN key within 15 s to set the value.		
I		VAL.	DESCRIPTION	N		
		149 value to re		store the factory settings (default)		
I		161 value to sto		ore customized settings as default		
				Touch the SET key (or do not operate for 15 s): the display will		
I	4.	4. aset		show the label "dEF" (when value "149" is set) or the label		
I				"MAP" (when value "161" is set).		
	5.	4	∋ET	Touch the SET key.		
	6.	√ <u>^</u>		Touch the UP or DOWN key within 15 s to set "4".		
l				Touch the SET key (or do not operate for 15 s): the display will		
l	7.	_ = 9	SET	show for 4 s "" flashing, then the device will exit the proce-		
1				dure.		
۱	8.	Interrupt the power supply to the device.				

≙ SET

Touch the SET key 2 s before action 6. to exit the procedure be-

Frost = Fam						
1 SP 0.0 Seption! C1 2	7	CON	FIGUR/	ATION	PARAMETERS	
	Ŭ≣					
3 CA2 0.0 0.0 subling probe offeet 225 - 25 F/F/C			PAR.			
			 	_	·	
Post				1	probe type	0 = n/a 1 = NTC
7			 			· ·
	\bigcirc	7	P4	1		0 = disabled
9 88 5 display refresh time 0250 s. 10	O,	8	P5	0		2 = evaporator probe (fan) 3 = condenser probe 0 = cabinet temperature 1 = setpoint
10		9	P8	5	display refresh time	
12						
13		_	 	_		
14 15	12		 	_		
15	4.			_		0 = cooling
10 CO 0 compressor on delay after powe en		15	r12	1	position of the r0 differential	0 = asymmetric
1						
18					er-on	
19			 			
20 CS 10 compressor on time during cable net probe alarm enterpose alarm temperature warning 22 C 7 9.0.0 threshold for high condenser temperature temperature warning 22 C 7 9.0.0 threshold for high condenser temperature alarm elary 1 high condenser temperature alarm alarm delay 2 C 7 9.0.0 threshold for high condenser temperature alarm 1 high condenser temperature alarm 2 C 9 c 9 min 1 high condenser temperature 2 C 9 c 9 min 1 high condenser temperature 2 C 9 c 9 min 1 high condenser temperature 3 C 9 c 9 min 1 high condenser temperature 3 C 9 c 9 min 1 high condenser temperature 3 C 9 c 9 min 1 high condenser temperature 3 C 9 c 9 min 1 high condenser temperature 3 C 9 c 9 min 1 high condenser temperature 3 C 9 c 9 min 1 high condenser temperature 3 C 9 c 9 min 1 high condenser temperature 3 C 9 c 9 min 1 high condenser temperature 4 c 9 c 9 min 1 high condenser temperature 4 c 9 c 9 min 1 high condenser temperature 4 c 9 c 9 min 1 high condenser temperature 4 c 9 c 9 min 1 high condenser temperature 4 c 9 c 9 min 1 high condenser temperature 4 c 9 c 9 min 1 high condenser temperature 4 c 9 c 9 min 1 high condenser temperature 4 c 9 c 9 min 1 high condenser temperature 4 c 9 c 9 min 1 high condenser 2 high condenser 1 high condenser 2 high condenser 2 high condenser 2 high condenser 2 high			 		compressor off time during cabi-	
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		21	C6	80.0	net probe alarm	0 199 °F/°C
23 C8 1 high condenser temperature alarm of the process of the pr					temperature warning	differential = 4 °F/2 °C
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N. PAR. DEF. DEFNOST ((if r5 = 0) Min MAX.		23	C8	1	high condenser temperature	0 15 min
24 d0 8 automatic defrost interval						
						0 99 h
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49 F2 0 evaporator fan mode during de- 0 = off 1 = on frost and dripping 2 = according to F0 50 F3 2 evaporator fan off maximum 0 15 min time 51 F4 30 evaporator fan off time during 0 240 s x 10 energy saving 52 F5 30 evaporator fan on time during 0 240 s x 10		48	F1	-1.0	· ·	
50 F3 2 evaporator fan off maximum 0 15 min time 51 F4 30 evaporator fan off time during 0 240 s x 10 energy saving 52 F5 30 evaporator fan on time during 0 240 s x 10		49	F2	0	evaporator fan mode during de-	0 = off 1 = on
time 51 F4 30 evaporator fan off time during 0 240 s x 10 energy saving 52 F5 30 evaporator fan on time during 0 240 s x 10		50	F3	2		
energy saving 52 F5 30 evaporator fan on time during 0 240 s x 10					time	
		57	r4	30		
		52	F5	30	,	0 240 s x 10
		1				

	N.	PAR.	DEF.	DIGITAL INPUTS	MIN MAX.
	53	iO	1	door switch/multi-purpose input	0 = disabled
				function	1 = compressor + evapora-
					tor fan off
					2 = evaporator fan off
					3 = energy saving
					4 = iA alarm
					5 = iA alarm + compressor
					off
	54	i1	0	door switch/multi-purpose input	0 = with contact closed
				activation	1 = with contact open
	55	i2	30	open door alarm delay	-1 120 min
.1					if i0 = 3, multi-purpose input
€ \$					alarm delay
					if i0 = 4, compressor on de-
					lay after alarm reset
					-1 = disabled
	56	i3	15	regulation inhibition maximum	-1 120 min
				time with door open	-1 = until the closing
	57	i10	0	door closed consecutive time for	0 999 min
				energy saving	after regulation temperature
					< SP 0 = disabled
	58	i13	180	number of door openings for de-	0 240
	56	113	180	frost	0 = disabled
	59	i14	32	door open consecutive time for	0 240 min
	0,		"-	defrost	0 = disabled
	N.	PAR.	DEF.	ENERGY SAVING (if r5 = 0)	MIN MAX.
	60	HE2	0	energy saving maximum duration	0 999 min
20.					0 = until the door opening
77	61	HE3	2	no operation on the keyboard	0 240 min
				consecutive time for low con-	0 = disabled
				sumption	
_	N.	PAR.	DEF.	SAFETIES	MIN MAX.
$\langle \rangle$	62	POF	0	enable ON/STAND-BY key	0 = no 1 = yes
•	63	PAS	-19	password	-99 999

8	ALARMS								
COD.	DESCRIPTION	RESET	REMEDIES						
Pr1	cabinet probe alarm	automatic	- check PO						
Pr2	auxiliary probe alarm	automatic	- check probe integrity						
			- check electrical connection						
AL	low temperature alarm	automatic	check A1						
AH	high temperature alarm	automatic	check A4						
id	open door alarm	automatic	check i0 e i1						
СОН	high condenser temperature	automatic	check C6						
СОН	warning	automatic							
CSd	high condenser temperature	manual	- switch the device off and on						
	alarm		- check C7						
iA	multi-purpose input alarm	automatic	check i0 and i1						
dFd	defrost timeout alarm	manual	- touch 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	10					
	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	_					

40 TEOLINI	0.11 ODE01510	A.T.I.O.N.O.			
10 TECHNI	CAL SPECIFICA	ATIONS			
Purpose of the	control device		Function controller		
•	the control devi	ice	Built-in electronic device		
Container	the control and	cc	Black, self-extinguishing		
Category of heat and fire resistance			D D		
Measurements		31100	75.0 x 33.0 x 59.0 mm (2 15/16 x 1 5/16 x		
			2 5/16 in)		
Mounting methods for the control device			To be fitted to a panel, snap-in brackets pro-		
			vided		
Degree of prot ing	ection provided	by the cover-	IP65 (front)		
Connection met	thod		Fixed screw terminal blocks for wires up to		
			2,5 mm²		
Maximum perm	nitted length for	connection cable	es		
Power supply: 10 m (32.8 ft)			Analog inputs: 10 m (32.8 ft)		
Digital inputs: 1	10 m (32.8 ft)		Digital outputs: 10 m (32.8 ft)		
Operating temp	perature		From 32 to 131 °F (from 0 to 55 °C)		
Storage temperature			From -13 to 158 °F (from -25 to 70 °C)		
Operating humidity		Relative humidity without condensate from			
			10 to 90%		
Pollution status of the control device			2		
Compliance					
Europe	JCI declares product compliance meets requirements of EMC, LVD, and RoHS Directives.			ments of EMC, LVD, and RoHS	
USA	UL Recognized Component, SDFY2.SA516; FCC Part 15 Subpart B Class A			Part 15 Subpart B Class A	
Canada	UL Recognized	Component, SD	FY8.SA516; ICE	S-003 Class A	
Power supply	TC3B23N5V				
	TC3B23N7V		0% -15%), 50/60 Hz (+/- 3Hz), max. 2 VA		
	hods for the con		None		
•	withstand voltag	e	4 KV		
Over-voltage ca			III		
Software class	and structure		A		
Analog inputs			2 for NTC probes (cabinet probe and auxiliary		
			probe)		
NTC probes	Sensor type		β3435 (10 KΩ @ 77 °F, 25 °C)		
	Measurement field		From -40 to 221 °F (from -40 to 105 °C)		
Resolution		1 °F (0.1 °C)			
Digital inputs			1 dry contact (door switch/multi-purpose)	
Dry contact Contact type Power supply			5 VDC, 1.5 mA		
			None		
Protection			None		
			(compressor, defrost and evaporator fan)		
Type 1 or Type 2 Actions			Type 1		
Additional features of Type 1 or Type 2 actions			С		
Displays			3 digits custom	display, with function icons	
5.5pic.Jo					

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 terms set forth at $% \left(1\right) =\left(1\right) \left(1\right)$ $\underline{www.johnsoncontrols.com/techterms}. \ Your \ use \ of \ this \ product \ constitutes \ an \ agreement \ to$ such terms.

13 SINGLE POINT OF CONTACT

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Important

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

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