EV3B73/EV3B83

Controllers for refrigerated units, with compressor protection against mains voltage fluctuations

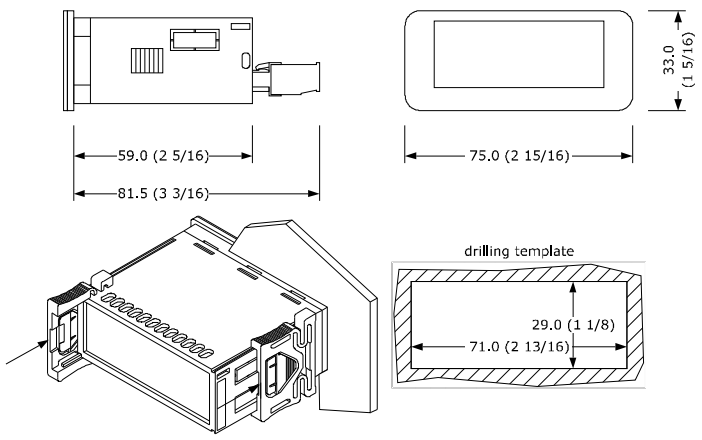
PLEASE READ CAREFULLY and save this document
CONSIDER THE ENVIRONMENT

E ENGLISH

- Controllers for low temperature units
- Power supply 115... 230 VAC
- Cabinet probe and auxiliary probe (PTC/NTC)
- Door switch/multi-purpose input
- Compressor relay rated 16 res. A @ 250 VAC (EV3B73) or 30 res. A @ 250 VAC (EV3B83)
- Compressor protection against mains voltage fluctuations
- Cooling or heating operation

1 MEASUREMENTS AND INSTALLATION

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

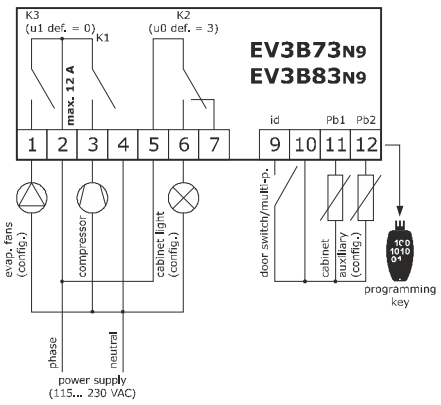


INSTALLATION PRECAUTIONS

- 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 *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, 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

N.B.
- Use cables of an adequate section for the current running through them
- To reduce any electromagnetic interference connect the power cables as far away as possible from the signal cables



PRECAUTIONS FOR ELECTRICAL CONNECTION

- If using an electrical or pneumatic screwdriver, adjust the tightening torque
- If the device has been 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 EVCO sales network

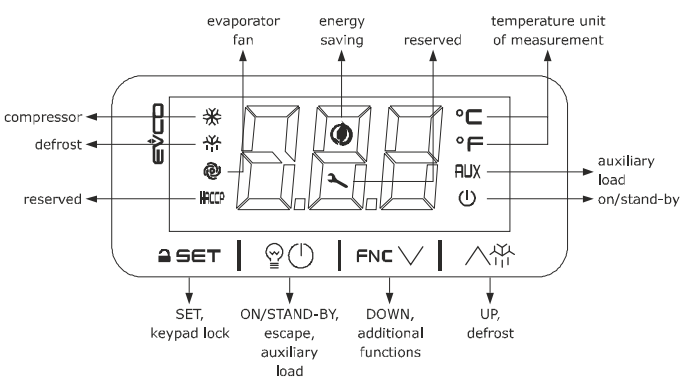
3 FIRST-TIME

1. Install following the instructions given in the section *MEASUREMENTS AND INSTALLATION*.
2. 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.
3. Configure the device as shown in the section *Setting configuration parameters*.
   Recommended configuration parameters for first-time use.

PAR.	DEF.	PARAMETER	MIN... MAX.
SP	**0.0**	setpoint	r1... r2
P0	**1**	probe type	0 = PTC 1 = NTC
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 *CONFIGURATION PARAMETERS*.
4. Disconnect the device from the mains.
5. Make the electrical connection as shown in the section *ELECTRICAL CONNECTION* without powering up the device.
6. Power up the device.

4 USER INTERFACE AND MAIN FUNCTIONS



4.1 Switching the device on/off

1.	ON/STAND-BY	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 active	-	- defrost delay active - dripping active
	evaporator fan on	evaporator fan off	evaporator fan stop active
HACCP	reserved	-	-
	energy saving active	-	-
	riservato	-	-
°C/°F	view temperature	-	-
AUX	cabinet light or button-operated load on	cabinet light or button-operated load off	- cabinet light on by digital input - auxiliary load delay active
	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.

4.2 Unlock keypad

Touch a 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.	FNC	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 and that overcooling is not active.

1.		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.

4.5 Cabinet light on/off (if u0 = 3, default or if u1 = 3)

1.	ON/STAND-BY	Touch the ON/STAND-BY key.

4.6 Button-operated load on/off (if u0 = 1)

Check that the keypad is not locked.

1.	ON/STAND-BY	Touch the ON/STAND-BY key (for 2 s if u1 = 3).

5 ADDITIONAL FUNCTIONS

5.1 View/delete compressor functioning hours

Check that the keypad is not locked.

1.	FNC	Touch the DOWN key for 4 s.
2.	FNC	Touch the UP or DOWN key within 15 s to select a label.

LAB.	DESCRIPTION
CH	view compressor functioning hours (hundreds)
rCH	delete compressor functioning hours

3.	SET	Touch the SET key.
4.	FNC	Touch the UP or DOWN key to set "**149**" (when label "**rCH**" is selected).
5.	SET	Touch the SET key.
6.	ON/STAND-BY	Touch the ON/STAND-BY key (or do not operate for 60 s) to exit the procedure.

5.2 View the temperature detected by the probes

Check that the keypad is not locked.

1.	FNC	Touch the DOWN key for 4 s.
2.	FNC	Touch the UP or DOWN key within 15 s to select a label.

LAB.	DESCRIPTION
Pb1	cabinet temperature
Pb2	auxiliary temperature

3.	SET	Touch the SET key.
4.	ON/STAND-BY	Touch the ON/STAND-BY key (or do not operate for 60 s) to exit the procedure.

5.3 View the mains voltage

Assicurarsi che la tastiera non sia bloccata.

1.	FNC	Touch the DOWN key for 4 s.
2.	FNC	Touch the UP or DOWN key within 15 s to select "**UOL**".
3.	SET	Touch the SET key.
4.	ON/STAND-BY	Touch the ON/STAND-BY key (or do not operate for 60 s) to exit the procedure.

6 SETTINGS

6.1 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.	FNC	Touch the UP or DOWN key within 15 s to set the PAS value (default "**-19**").
4.	SET	Touch the SET key (or do not operate for 15 s): the display will show the label "**SP**".
5.	FNC	Touch the UP or DOWN key to select a parameter.
6.	SET	Touch the SET key.
7.	FNC	Touch the UP or DOWN key within 15 s to set the value.
8.	SET	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

N.B.
- Check that the factory settings are appropriate; see the section *CONFIGURATION PARAMETERS*
- the storing of customized settings overwrites the default

1.	SET	Touch the SET key for 4 s: the display will show the label "**PA**".
2.	SET	Touch the SET key.
3.	FNC	Touch the UP or DOWN key within 15 s to set the value.

VAL.	DESCRIPTION
149	value to restore the factory settings (default)
161	value to store customized settings as default

4.	SET	Touch the SET key (or do not operate for 15 s): the display will show the label "**dEF**" (when value "**149**" is set) or the label "**MAP**" (when value "**161**" is set).
5.	SET	Touch the SET key.
6.	FNC	Touch the UP or DOWN key within 15 s to set "**4**".
7.	SET	Touch the SET key (or do not operate for 15 s): the display will show for 4 s "**- - -**" flashing, then the device will exit the procedure.
8.	Interrupt the power supply to the device.	
9.	SET	Touch the SET key 2 s before action 6. to exit the procedure beforehand.

7 CONFIGURATION PARAMETERS

N.	PAR.	DEF.	SETPOINT	MIN... MAX.
1	SP	**0.0**	setpoint	r1... r2

N.	PAR.	DEF.	ANALOGUE INPUTS	MIN... MAX.
2	CA1	**0.0**	cabinet probe offset	-25... 25 °C/°F
3	CA2	**0.0**	auxiliary probe offset	-25... 25 °C/°F
4	P0	**1**	probe type	0 = PTC 1 = NTC
5	P1	**1**	enable °C decimal point	0 = no 1 = yes
6	P2	**0**	temperature unit of measurement	0 = °C 1 = °F
7	P4	**1**	auxiliary probe function	0 = disabled 1 = evaporator probe (defrost + fan) 2 = condenser probe
8	P5	**0**	value displayed	0 = cabinet temperature 1 = setpoint 2 = auxiliary temperature
9	P8	**5**	display refresh time	0... 250 s : 10

N.	PAR.	DEF.	REGULATION	MIN... MAX.
10	r0	**2.0**	setpoint differential	1... 15 °C/°F
11	r1	**-40**	minimum setpoint	-99 °C/°F... r2
12	r2	**50.0**	maximum setpoint	r1... 199 °C/°F
13	r4	**0.0**	setpoint offset in energy saving	0... 99 °C/°F
14	r5	**0**	cooling or heating operation	0 = cooling 1 = heating
15	r12	**0**	position of the r0 differential	0 = asymmetric 1 = symmetric

N.	PAR.	DEF.	COMPRESSOR	MIN... MAX.
16	C0	**0**	compressor on delay after power-on	0... 199 min
17	C2	**3**	compressor off minimum time	0... 199 min 0 = protection against mains voltage fluctuations disabled
18	C3	**0**	compressor on minimum time	0... 199 s
19	C4	**0**	compressor off time during cabinet probe alarm	0... 240 min
20	C5	**10**	compressor on time during cabinet probe alarm	0... 240 min
21	C6	**80.0**	threshold for high condensation warning	0... 199 °C/°F differential = 2 °C/4 °F
22	C7	**90.0**	threshold for high condensation alarm	0... 199 °C/°F
23	C8	**1**	high condensation alarm delay	0... 15 min
24	C14	**190**	mains voltage threshold below which the compressor is not switched on	0... 300 V the device attempts to switch on every 30 s
25	C15	**180**	mains voltage threshold below which the compressor is switched off	0... 300 V if satisfied C17 time
26	C16	**260**	mains voltage threshold above which the compressor is not switched on or switched off	0... 300 V if satisfied C17 time the device attempts to switch on every 30 s
27	C17	**5**	consecutive duration of the permanence of the mains voltage outside the thresholds C15 and C16 due to the compressor being switched off	0... 60 s
28	C18	**5**	consecutive number of failed compressor starts due to the mains voltage outside the thresholds C14 and C16 such as to cause the forced start-up of the compressor	0... oo 0 = protection against mains voltage fluctuations disabled oo = the device never makes the forced start-up of the compressor the interruption of the power supply resets the count

N.	PAR.	DEF.	DEFROST (if r5 = 0)	MIN... MAX.
29	d0	**8**	automatic defrost interval	0... 99 h 0 = only manual if d8 = 3, maximum interval
30	d1	**0**	defrost type	0 = electric 1 = hot gas 2 = compressor stopped
31	d2	**2.0**	threshold for defrost end	-99... 99 °C/°F
32	d3	**30**	defrost duration	0... 99 min se P4 = 1, maximum duration
33	d4	**0**	enable defrost at power-on	0 = no 1 = yes
34	d5	**0**	defrost dealy after power-on	0... 199 min
35	d6	**2**	value displayed during defrost	0 = cabinet temperature 1 = display locked 2 = dEF label
36	d7	**2**	dripping time	0... 15 min
37	d8	**0**	defrost interval counting mode	0 = device on hours 1 = compressor on hours 2 = hours evaporator temperature < d9 3 = adaptive
38	d9	**0.0**	evaporation threshold for automatic defrost interval counting	-99... 99 °C/°F
39	d11	**0**	enable defrost timeout alarm	0 = no 1 = yes
40	d15	**0**	compressor on consecutive time for hot gas defrost	0... 99 min

41	d18	**40**	adaptive defrost interval	0... 999 min if compressor on + evaporator temperature < d22 0 = only manual
42	d19	**3.0**	threshold for adaptive defrost (relative to optimal evaporation temperature)	0... 40 °C/°F optimal evaporation temperature - d19
43	d20	**180**	compressor on consecutive time for defrost	0... 500 min 0 = disabled
44	d22	**0.0**	evaporation threshold for adaptive defrost interval counting (relative to optimal evaporation temperature)	-10... 10 °C/°F optimal evaporation temperature + d22
	N.	PAR.	DEF.	ALARMS	MIN... MAX.
45	A1	**10.0**	threshold for low temperature alarm (relative to setpoint)	0... 199 °C/°F 0 = disabled
46	A4	**10.0**	threshold for high temperature alarm (relative to setpoint)	0... 199 °C/°F 0 = disabled
47	A6	**12**	high temperature alarm delay after power-on	0... 99 min x 10
48	A7	**15**	high/low temperature alarms delay	0... 199 min
49	A8	**15**	high temperature alarm delay after defrost	0... 240 min
50	A9	**15**	high temperature alarm delay after door closing	0... 240 min
51	A11	**2.0**	high/low temperature alarms reset differential	1... 15 °C/°F
	N.	PAR.	DEF.	FANS	MIN... MAX.
52	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
53	F1	**-1.0**	threshold for evaporator fan operation	-99... 99 °C/°F differential = 2 °C/4 °F
54	F2	**0**	evaporator fan mode during defrost and dripping	0 = off 1 = on
55	F3	**2**	evaporator fan off maximum time	0... 15 min
56	F4	**0**	evaporator fan off time during energy saving	0... 199 s x 10
57	F5	**10**	evaporator fan on time during energy saving	0... 199 s x 10
58	F15	**0**	evaporator fan off time with compressor off	0... 240 s if F0 = 2
59	F16	**1**	evaporator fan on time with compressor off	0... 240 s if F0 = 2
	N.	PAR.	DEF.	DIGITAL INPUTS	MIN... MAX.
60	i0	**1**	door switch/multi-purpose input function	0 = disabled 1 = compressor + evaporator fan off + cabinet light on 2 = evaporator fan off + cabinet light on 3 = energy saving 4 = iA alarm (only display) 5 = iA alarm (compressor off)
61	i1	**0**	door switch/multi-purpose input activation	0 = with contact closed 1 = with contact open
62	i2	**30**	open door alarm delay	-1... 120 min -1 = disabled if i0 = 4, multi-purpose input alarm delay if i0 = 5, compressor on delay after alarm reset
63	i3	**15**	regulation inhibition maximum time with door open	-1... 120 min -1 = until the closing
64	i10	**0**	door closed consecutive time for energy saving	0... 999 min after regulation temperature < SP 0 = disabled
65	i13	**180**	number of door openings for defrost	0... 240 0 = disabled
66	i14	**32**	door open consecutive time for defrost	0... 240 min 0 = disabled
	N.	PAR.	DEF.	DIGITAL OUTPUTS	MIN... MAX.
67	u0	**3**	K2 output configuration	0 = defrost 1 = button operated load 2 = alarm 3 = cabinet light
68	u1	**0**	K3 output configuration	0 = evaporator fan 1 = defrost 2 = stand-by 3 = cabinet light
69	u2	**0**	enable cabinet light and button-operated load in stand-by	0 = no 1 = yes manual
70	u3	**0**	stand-by output off delay off after device off	0... 999 s
71	u4	**0**	enable alarm output off pressing a button	0 = no 1 = yes
72	u5	**0**	enable cabinet light in energy saving	0 = no 1 = yes manual
	N.	PAR.	DEF.	ENERGY SAVING (if r5 = 0)	MIN... MAX.
73	HE2	**0**	energy saving maximum duration	0... 999 min
74	HE3	**0**	consecutive time without operating on keys for low consumption	0... 240 min 0 = disabled
	N.	PAR.	DEF.	SAFETIES	MIN... MAX.
75	POF	**0**	enable ON/STAND-BY key	0 = no 1 = yes
76	PAS	**-19**	password	-99... 999

8 ALARMS

COD.	DESCRIPTION	RESET	REMEDIES
Pr1	cabinet probe alarm	automatic	- check P0 - check probe integrity - check electrical connection
Pr2	auxiliary probe alarm	automatic	
COn	forced compressor start alarm	manual	- touch a key - check C18
LU	compressor alarm not on or off due to low mains voltage	manual, automatic after 30 s	- touch a key - check C14 and C15
HU	compressor alarm not on or off due to high mains voltage	manual, automatic after 30 s	- touch a key - check C16
AL	low temperature alarm	automatic	check A1 and A7
AH	high temperature alarm	automatic	check A4 and A7
id	open door alarm	automatic	check i0 e i1
COH	high condensation warning	automatic	check C6
CSd	high condensation alarm	manual	- switch the device off and on - check C7
iA	multi-purpose input alarm	automatic	check i0 and i1
dFd	defrost timeout alarm	manual	- touch a key - check d2, d3 and d11

9 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 x 33.0 x 59.0 mm (2 15/16 x 1 5/16 x 2 5/16 in) with fixed screw terminal blocks			75.0 x 33.0 x 81.5 mm (2 15/16 x 1 5/16 x 3 3/16 in) with removable screw terminal blocks
Mounting methods for the control device			To be fitted to a panel, snap-in brackets provided
Degree of protection provided by the covering			IP65 (front)
Connection method			
Fixed screw terminal blocks for wires up to 2,5 mm²			Removable screw terminal blocks for wires up to 2,5 mm²; by request
Maximum permitted length for connection cables			
Power supply: 10 m (32.8 ft)			Analogue inputs: 10 m (32.8 ft)
Digital inputs: 10 m (32.8 ft)			Digital outputs: 10 m (32.8 ft)
Operating temperature			From 0 to 55 °C (from 32 to 131 °F)
Storage temperature			From -25 to 70 °C (from -13 to 158 °F)
Operating humidity			Relative humidity without condensate from 10 to 90%
Pollution status of the control device			2
Conformity			
RoHS 2011/65/CE	WEEE 2012/19/EU		REACH (EC) Regulation 1907/2006
EMC 2014/30/UE			LVD 2014/35/UE
Power supply			115... 230 VAC (+10 % -15%), 50/60 Hz (±3 Hz), max. 4 VA (EV3B73) or 4.9 VA (EV3B83) insulated
Earthing methods for the control device			None
Rated impulse-withstand voltage			2.5 KV
Over-voltage category			II
Software class and structure			A
Analogue inputs			2 for PTC or NTC probes (cabinet probe and auxiliary probe)
PTC probes	Sensor type		KTY 81-121 (990 Ω @ 25 °C, 77 °F)
	Measurement field		From -50 to 150 °C (from -58 to 302 °F)
	Resolution		0.1 °C (1 °F)
NTC probes	Sensor type		ß3435 (10 KΩ @ 25 °C, 77 °F)
	Measurement field		From -40 to 105 °C (from -40 to 221 °F)
	Resolution		0.1 °C (1 °F)
Digital inputs			1 dry contact (door switch/multi-purpose)
Dry contact	Contact type		5 VDC, 1.5 mA
	Power supply		None
	Protection		None
Digital outputs	3 electro-mechanical relays		
Relay K1			SPST, 16 A res. @ 250 VAC (EV3B73)
			SPST, 30 A res. @ 250 VAC (EV3B83)
Relay K2			SPDT, 8 A res. @ 250 VAC
Relay K3			SPST, 5 A res. @ 250 VAC
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

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

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