EV3C23 & EV3C33

Controllers for refrigerated cabinets, counters and islands, with configurable outputs

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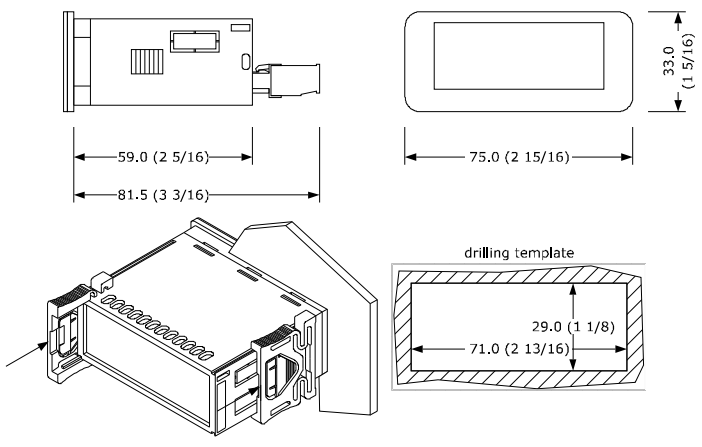
CONSIDER THE ENVIRONMENT

E ENGLISH

- Controllers for low or medium temperature units, static or ventilated, with light.
- Interval time defrost with configurable evaporator probe
- Configurable outputs
- Power supply 230 VAC or 115 VAC (according to the model).
- Cabinet probe and auxiliary probe (PTC/NTC).
- Door switch/multi-purpose input.
- Compressor relay 16A res. @250 VAC or 30A res. @250 VAC (according to the model).
- Cooling or heating operation.

1 MEASUREMENTS AND INSTALLATION

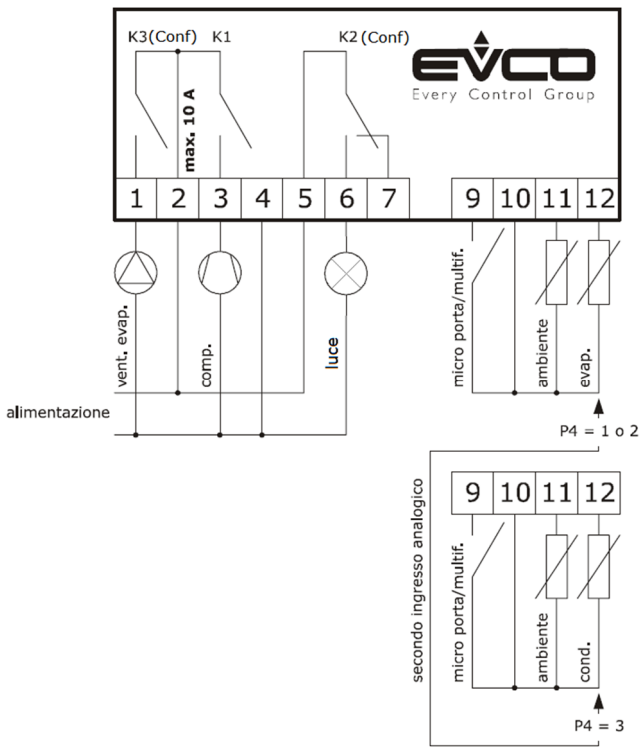
Measurements in mm (inches). To be fitted to a panel, snap-in brackets provided.



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.

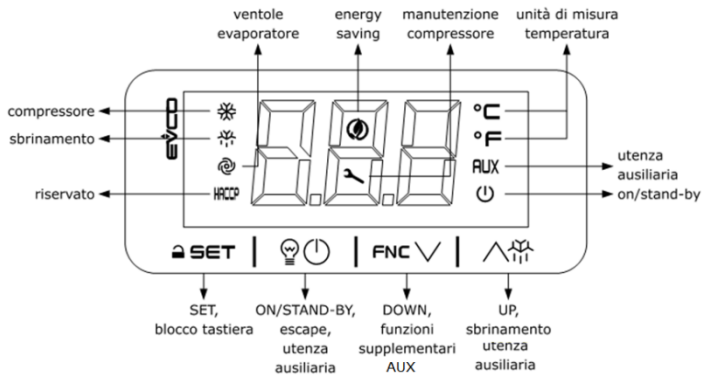
3 FIRST-TIME

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.
7. Power up the device.

4 USER INTERFACE AND MAIN FUNCTIONS



4.1 Switching the device on/off

1. 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
HACCP	saved 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
	device off	device on	device on/off active
AUX	Light on Aux on		Light on due to door open

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. 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 "-50... 50")
3. 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 manual on/off switch mode

1. Touch the light key. Function always unlocked.

- Light manual command if u0 = 3 or u1= 3.
- Auxiliary manual command if u0=1 and u1<>3 if the keyboard is unlocked.

4.6 Cabinet LIGHT or AUXILIARY manual on/off switch mode

1. Touch the light key. Function always unlocked.
2. Touch FNC key for auxiliary load with keyboard unlocked.

- Load configuration u0 = 1(aux) and u1=3(light)

5 ADDITIONA FUNCTIONS

5.1 View/delete compressor functioning hours

Check that the keypad is not locked.

1. Touch the DOWN key for 4 s.
2. 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. Touch the SET key.
4. Touch the UP or DOWN key to set "**149**" (when label "**rCH**" is selected).
5. Touch the SET key.
6. 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. Touch the DOWN key for 4 s.
2. Touch the UP or DOWN key within 15 s to select a label.

LAB.	DESCRIPTION
Pb1	cabinet temperature
Pb2	auxiliary temperature

3. Touch the SET key.
4. 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. 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 PAS value (default "**-19**").
4. 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. Touch the SET key.
7. Touch the UP or DOWN key within 15 s to set the value.
8. Touch the SET key (or do not operate for 15 s).
9. 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. 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.

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

4. 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. Touch the SET key.
6. Touch the UP or DOWN key within 15 s to set "**4**".
7. 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. 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 = evaporator probe (fan) 3 = condenser probe
8	P5	**0**	value displayed	0 = cabinet temperature 1 = setpoint 2 = auxiliary temperature
9	P8	**5**	display refresh time	0... 250 s
N.	**PAR.**	**DEF.**	**REGULATION**	**MIN... MAX.**
10	r0	**2.0**	setpoint differential	1... 15 °C/°F
11	r1	**-50**	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... 240 min
17	C2	**3**	compressor off minimum time	0... 240 min
18	C3	**0**	compressor on minimum time	0... 240 s
19	C4	**10**	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
N.	**PAR.**	**DEF.**	**DEFROST (if r5 = 0)**	**MIN... MAX.**
24	d0	**8**	automatic defrost interval	0... 99 h 0 = only manual if d8 = 3, maximum interval
25	d1	**0**	defrost type	0 = electric 1 = hot gas 2 = compressor stopped
26	d2	**8.0**	threshold for defrost end	-99... 99 °C/°F
27	d3	**30**	defrost duration	0... 99 min se P3 = 1, maximum duration 0= no defrost available
28	d4	**0**	enable defrost at power-on	0 = no 1 = yes
29	d5	**0**	defrost dealy after power-on	0... 99 min
30	d6	**2**	value displayed during defrost	0 = cabinet temperature 1 = display locked 2 = dEF label
31	d7	**2**	dripping time	0... 15 min
32	d8	**0**	defrost interval counting mode	0 = device on hours 1 = compressor on hours 2 = hours evaporator temperature < d9 3 = adaptive
33	d9	**0.0**	evaporation threshold for automatic defrost interval counting if d8=2	-99... 99 °C/°F
34	d11	**0**	enable defrost timeout alarm dFd	0 = no 1 = yes
35	d15	**0**	compressor on consecutive time for hot gas defrost	0... 99 min
36	d18	**40**	adaptive defrost interval if d8 = 3	0... 999 min if compressor on + evaporator temperature < d22 0 = only manual
37	d19	**3.0**	threshold for adaptive defrost (relative to optimal evaporation temperature)	0... 40 °C/°F optimal evaporation temperature - d19
38	d20	**180**	compressor on consecutive time for defrost	0... 999 min 0 = disabled
39	d22	**2,0**	if d8 = 3 adaptive upper relative threshold to stand-by the defrost interval counting "evaporator temperatures average + d22");	0..19.9C/F

N.	PAR.	DEF.	ALARMS	MIN... MAX.
40	A1	**10.0**	threshold for low temperature alarm LA	0... 99 °C/°F 0=disabled
41	A4	**10.0**	threshold for high temperature alarm HA	... 99 °C/°F
42	A6	**12**	high temperature alarm delay after power-on	0... 99 min x 10 0=disabled
43	A7	**15**	high/low temperature alarms delay	0... 240 min
44	A8	**15**	high temperature alarm delay after defrost	0... 240 min
45	A9	**15**	high temperature alarm delay after door closing	0... 240 min
46	A11	**2.0**	high/low temperature alarms reset differential	1... 15 °C/°F

N.	PAR.	DEF.	FANS	MIN... MAX.
47	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 = thermo regulated (with F1) 4 = thermo regulated (with F1) if compressor on
48	F1	**-1.0**	threshold to stop evaporator fan. Fan restarts at |F1-2°|C/F	-99... 99 °C/°F differential = 2 °C/°F
49	F2	**0**	evaporator fan mode during defrost and dripping	0 = off 1 = on 2 = according to F0
50	F3	**2**	evaporator fan off maximum time after dripping	0... 15 min
51	F4	**0**	evaporator fan off time during energy saving	0... 240 s x 10
52	F5	**10**	evaporator fan on time during energy saving	0... 240 s x 10

N.	PAR.	DEF.	DIGITAL INPUTS	MIN... MAX.
53	i0	**5**	door switch/multi-purpose input function	0 = disabled 1 = compressor + evaporator fan off + light ON 2 = evaporator fan off + Light ON 3 = energy saving 4 = "iA" alarm (only display) 5 = "iA" pressure switch
54	i1	**0**	door switch/multi-purpose input activation	0 = with contact closed 1 = with contact open
55	i2	**30**	open door alarm delay; alarm delay "iA" (i0=4); compressor restart delay for pressure alarm "iA" (i0=5);	-1... 120 min -1 = disabled
56	i3	**15**	regulation inhibition maximum time with door open	-1... 120 min -1 = until the closing
57	i10	**0**	door closed consecutive time for energy saving	0... 999 min after regulation temperature < SP 0 = disabled
58	i13	**180**	number of door openings for defrost	0... 240 0 = disabled
59	i14	**32**	door open consecutive time for defrost	0... 240 min 0 = disabled
60	u0	**3**	K2 output configuration	0= defrost 1=auxiliary(light key, if u1=3 "V" key) 2= alarm 3= light (default)
61	u1	**0**	K3 output configuration	0 = evaporator fan (default) 1 = defrost 2 = stand-by (with delay u3) 3 = light
62	u2	**1**	Light key enabled in stand-by. Also suitable for Aux function.	0=no 1 =yes
63	u3	**0**	Standby output delay (u1=2) after setting the unit in standby. Be aware that the stand by relay is on for the time set in u3 after. ! Disconnect the power supply before doing any type of maintenance.	0..999 seconds 0= disabled
64	u4	**1**	Alarm output silencing u0=2	0=no 1 =yes

N.	PAR.	DEF.	ENERGY SAVING (if r5 = 0)	MIN... MAX.
65	HE2	**0**	energy saving maximum duration	0... 999 min -1 = until the door opening
66	HE2	**0**	low power consumption function (switch off the display)	0... 240 min 0= disabled

N.	PAR.	DEF.	SAFETIES	MIN... MAX.
67	POF	**0**	enable ON/STAND-BY key function	0 = no 1 = yes
68	PAS	**-19**	password	-99... 999

8 ALARMS

COD.	DESCRIPTION	RESET	REMEDIES
Pr1	cabinet probe alarm	automatic	- check P0
Pr2	auxiliary probe alarm	automatic	- check probe integrity - check electrical connection
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
iA	pressure switch input alarm	automatic	i2 delay
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 73.0 mm (2 15/16 x 1 5/16 x 2 7/8 in)		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; 75.0 x 33.0 x 83.0 mm (2 15/16 x 1 5/16 x 3 1/4 in)
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	TTL or seriale RS485 not available
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); from 0 to 50 °C (from 32 a 122 °F) in EV3... N3
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
- EN 60730-1		- IEC 60730-1.
Power supply		
230 VAC (+10% -15%), 50/60 Hz (±3 Hz), max. 2 VA insulated in EV3... N7		
115 VAC (+10% -15%), 50/60 Hz (±3 Hz), max. 2 VA insulated in EV3... N5		
Earthing methods for the control device		None
Rated impulse-withstand voltage		4 KV (2.5 KV in EV3C33N9)
Over-voltage category		III (II in EV3C33N9)
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 K□Ω @ 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 (compressor, defrost and evaporator fan)
Compressor relay (K1)	EV3C23	SPST, 16 A res. @ 250 VAC
	EV3C33	SPST, 30 A res. @ 250 VAC
Light/configurable relay (K2)		SPDT, 8 A res. @ 250 VAC
Evaporator fan / configurable relay (K3)		SPST, 5 A res. @ 250 VAC; (30,000 cycles)
Classificazione del dispositivo di comando secondo la protezione contro la scossa elettrica		CLASS II EMC EN 60730-1 §2.7.5.
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		Not available
Communication ports		
TTL port not available		RS-485 MODBUS port not available

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

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