EV3271/EV3281

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

EPoCA compatible

PLEASE READ CAREFULLY and save this document

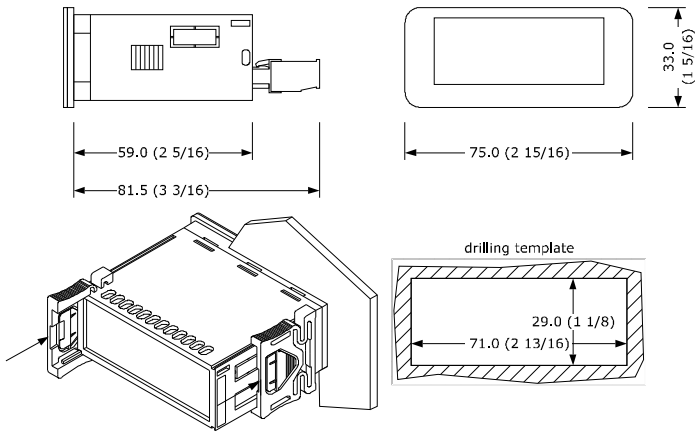
CONSIDER THE ENVIRONMENT

E ENGLISH

- Controllers for normal temperature units
- Power supply 115... 230 VAC
- Cabinet probe (PTC/NTC)
- Door switch/multi-purpose input
- Compressor relay rated 16 res. A @ 250 VAC (EV3271) or 30 res. A @ 250 VAC (EV3281)
- Compressor protection against mains voltage fluctuations
- Alarm buzzer
- TTL MODBUS slave port for EVconnect app, EPoCA remote monitoring system or for BMS
- Cooling or heating operation

1 MEASUREMENTS AND INSTALLATION

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

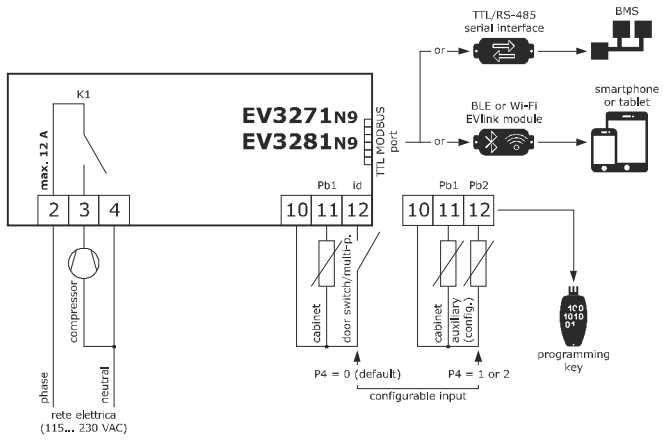


INSTALLATION PRECAUTIONS

- 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

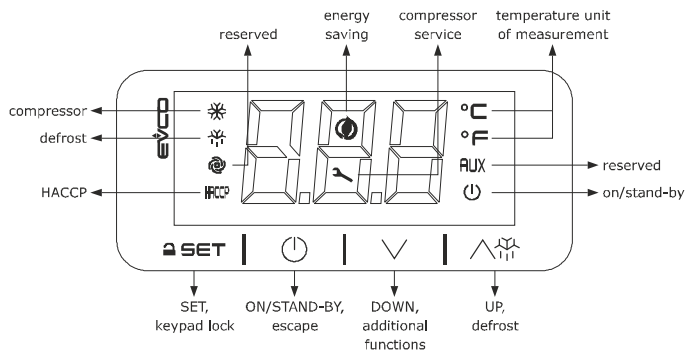
3 FIRST-TIME

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. For the connection in an RS-485 network, connect the EVIF22TSX or EVIF23TSX interface. To activate real time functions, connect the EVIF23TSX module. To use the device with the app EVconnect, connect the EVIF25TBX interface. To use the device with the EPoCA remote monitoring system, connect the EVIF25TWX module. **If the EVIF22TSX or EVIF23TSX interface is used, set parameter bLE to 0**.
7. 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	-	dripping active
HACCP	saved HACCP alarm in EVlink	-	-
	energy saving active	-	-
	request for compressor service	-	- settings active - access to additional functions active - operation with EVconnect APP active
°C/°F	view temperature	-	overcooling or overheating 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. | UP/DOWN | Touch the UP or DOWN key within 15 s to set the value within the limits r1 and r2 (default "-50... 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. | UP | 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 Silence buzzer

Touch a key.

5 ADDITIONAL FUNCTIONS

5.1 Activate/deactivate overcooling, overheating and manual energy saving

Check that the keypad is not locked.

1. | DOWN | Touch 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 HE2 duration

5.2 View/delete compressor functioning hours and view compressor start-up number

Check that the keypad is not locked.

1. | DOWN | Touch the DOWN key for 4 s.
2. | UP/DOWN | 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
nS1	compressor start-up number (thousands)

3. | SET | Touch the SET key.
4. | UP/DOWN | 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.

5.3 View the temperature detected by the probes

Check that the keypad is not locked.

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

LAB.	DESCRIPTION
Pb1	cabinet temperature
Pb2	auxiliary temperature (if P4 = 1 or 2)

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.

5.4 View the project number and the firmware revision

Check that the keypad is not locked.

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

LAB.	DESCRIPTION
PrJ	view the project number
rEU	view the firmware revison

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.

5.4 View the mains voltage

Assicurarsi che la tastiera non sia bloccata.

1. | DOWN | Touch the DOWN key for 4 s.
2. | UP/DOWN | 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. | UP/DOWN | 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. | UP/DOWN | Touch the UP or DOWN key to select a parameter.
6. | SET | Touch the SET key.
7. | UP/DOWN | 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 Set the date, time and day of the week (available if EVIF23TSX, EVIF25TBX or EVIF25TWX module is connected)

N.B.
- Do not disconnect the device from the mains within two minutes since the setting of the time and day of the week
- if the device communicates with the EVconnect app, the date, time and day of the week will be automatically set by the smartphone or tablet

Check that the keypad is not locked.

1. | DOWN | Touch the DOWN key for 4 s.
2. | UP/DOWN | Touch the UP or DOWN key within 15 s to select the label "**rtc**".
3. | SET | Touch the SET key: the display will show the label "**yy**" followed by the last two figures of the year.
4. | UP/DOWN | Touch 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 OF THE NUMBERS FOLLOWING THE LABEL
n	month (01... 12)
d	day (01... 31)
h	time (00... 23)
n	minute (00... 59)

6. | SET | Touch the SET key: the display will show the label for the day of the week.
7. | UP/DOWN | Touch the UP or DOWN key within 15 s to set the day of the week.

LAB.	DESCRIPTION
Mon	Monday
tuE	Tuesday
UEd	Wednesday
thu	Thursday
Fri	Friday
Sat	Saturday
Sun	Sunday

8. | SET | Touch the SET key: the device will exit the procedure.
9. | ON/STAND-BY | Touch the ON/STAND-BY key to exit the procedure beforehand.

6.3 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. | UP/DOWN | 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. | UP/DOWN | 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**	configurable input function	0 = door switch/multi-purpose input 1 = evaporator probe 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	**-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	r6	**0.0**	setpoint offset in overcooling/overheating	0... 99 °C/°F
16	r7	**30**	overcooling/overheating duration	0... 240 min
17	r8	**0**	DOWN key additional function	0 = disabled 1 = overcooling/overheating 2 = energy saving
18	r12	**0**	position of the r0 differential	0 = asymmetric 1 = symmetric
N.	PAR.	DEF.	COMPRESSOR	MIN... MAX.
19	C0	**0**	compressor on delay after power-on	0... 240 min
20	C2	**3**	compressor off minimum time	0... 240 min 0 = protection against mains voltage fluctuations disabled
21	C3	**0**	compressor on minimum time	0... 240 s
22	C4	**10**	compressor off time during cabinet probe alarm	0... 240 min
23	C5	**10**	compressor on time during cabinet probe alarm	0... 240 min
24	C6	**80.0**	threshold for high condensation warning	0... 199 °C/°F differential = 2 °C/4 °F
25	C7	**90.0**	threshold for high condensation alarm	0... 199 °C/°F
26	C8	**1**	high condensation alarm delay	0... 15 min
27	C10	**0**	compressor hours for service	0... 999 h x 100 0 = disabled
28	C14	**190**	mains voltage threshold below which the compressor is not switched on	95... 260 V the device attempts to switch on every 30 s
29	C15	**180**	mains voltage threshold below which the compressor is switched off	95... 260 V if satisfied C17 time
30	C16	**260**	mains voltage threshold above which the compressor is not switched on or switched off	95... 260 V if satisfied C17 time the device attempts to switch on every 30 s
31	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
32	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.
33	d0	**8**	automatic defrost interval	0... 99 h 0 = only manual if d8 = 3, maximum interval
34	d2	**8.0**	threshold for defrost end	-99... 99 °C/°F
35	d3	**30**	defrost duration	0... 99 min se P4 = 1, maximum duration
36	d4	**0**	enable defrost at power-on	0 = no 1 = yes
37	d5	**0**	defrost dealy after power-on	0... 99 min
38	d6	**2**	value displayed during defrost	0 = cabinet temperature 1 = display locked 2 = dEF label
39	d7	**2**	dripping time	0... 15 min
40	d8	**0**	defrost interval counting mode	0 = device on hours 1 = compressor on hours 2 = hours evaporator temperature < d9 3 = adaptive 4 = real time
41	d9	**0.0**	evaporation threshold for automatic defrost interval counting	-99... 99 °C/°F
42	d11	**0**	enable defrost timeout alarm	0 = no 1 = yes
43	d18	**40**	adaptive defrost interval	0... 999 min if compressor on + evaporator temperature < d22 0 = only manual
44	d19	**3.0**	threshold for adaptive defrost (relative to optimal evaporation temperature)	0... 40 °C/°F optimal evaporation temperature - d19
45	d20	**180**	compressor on consecutive time for defrost	0... 999 min 0 = disabled
46	d21	**200**	compressor on consecutive time for defrost after power-on and overcooling	0... 500 min if (cabinet temperature - setpoint) > 10°C/20 °F 0 = disabled
47	d22	**-2.0**	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.
48	AA	**0**	select value for high/low temperature alarms	0 = cabinet temperature 1 = auxiliary temperature
49	A1	**-10.0**	threshold for low temperature alarm	-99... 99 °C/°F
50	A2	**1**	low temperature alarm type	0 = disabled 1 = relative to setpoint 2 = absolute
51	A4	**10.0**	threshold for high temperature alarm	-99... 99 °C/°F
52	A5	**1**	high temperature alarm type	0 = disabled 1 = relative to setpoint 2 = absolute
53	A6	**12**	high temperature alarm delay after power-on	0... 99 min x 10
54	A7	**15**	high/low temperature alarms delay	0... 240 min
55	A8	**15**	high temperature alarm delay after defrost	0... 240 min
56	A9	**15**	high temperature alarm delay after door closing	0... 240 min
57	A10	**10**	power failure duration for alarm recording	0... 240 min
58	A11	**2.0**	high/low temperature alarms reset differential	1... 15 °C/°F
59	A13	**0**	enable alarm buzzer	0 = no 1 = yes
N.	PAR.	DEF.	DIGITAL INPUTS	MIN... MAX.
60	i0	**5**	door switch/multi-purpose input function	0 = disabled 1 = compressor 2 = reserved 3 = reserved 4 = reserved 5 = reserved 6 = reserved 7 = energy saving 8 = iA alarm 9 = device on/off 10 = Cth alarm 11 = th alarm
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
63	i3	**15**	regulation inhibition maximum time with door open	-1... 120 min -1 = until the closing
64	i7	**0**	multi-purpose input alarm delay	-1... 120 min -1 = disabled if i0 = 10 or 11, compressor on delay after alarm reset
65	i10	**0**	door closed consecutive time for energy saving	0... 999 min after regulation temperature < SP 0 = disabled
66	i13	**180**	number of door openings for defrost	0... 240 0 = disabled
67	i14	**32**	door open consecutive time for defrost	0... 240 min 0 = disabled
N.	PAR.	DEF.	ENERGY SAVING (if r5 = 0)	MIN... MAX.
68	HE2	**0**	energy saving maximum duration	0... 999 min
N.	PAR.	DEF.	REAL TIME ENERGY SAVING (if r5 = 0)	MIN... MAX.
69	H01	**0**	energy saving time	0... 23 h
70	H02	**0**	energy saving duration	0... 24 h
71	HEd	**7**	energy saving day	0 = Monday 1 = Tuesday 2 = Wednesday 3 = Thursday 4 = Friday 5 = Saturday 6 = Sunday 7 = none
N.	PAR.	DEF.	REAL TIME DEFROST (if d8 = 4)	MIN... MAX.
72	Hd1	**h-**	1st daily defrost time	h- = disabled
73	Hd2	**h-**	2nd daily defrost time	h- = disabled
74	Hd3	**h-**	3rd daily defrost time	h- = disabled
75	Hd4	**h-**	4th daily defrost time	h- = disabled
76	Hd5	**h-**	5th daily defrost time	h- = disabled
77	Hd6	**h-**	6th daily defrost time	h- = disabled
N.	PAR.	DEF.	SAFETIES	MIN... MAX.
78	POF	**0**	enable ON/STAND-BY key	0 = no 1 = yes
79	PAS	**-19**	password	-99... 999
80	PA1	**426**	level 1 password	-99... 999
81	PA2	**824**	level 2 password	-99... 999
N.	PAR.	DEF.	REAL TIME CLOCK	MIN... MAX.
82	Hr0	**0**	enable clock	0 = no 1 = yes
N.	PAR.	DEF.	DATA-LOGGING EVLINK	MIN... MAX.
83	bLE	**1**	serial port configuration for connectivity	0 = free 1 = forced for EVconnect or EPoCA 2-99 = EPoCA local network address
84	rE0	**15**	data-logger sampling interval	0... 240 min
85	rE1	**3**	recorded temperature	0 = none 1 = cabinet 2 = auxiliary 3 = all
N.	PAR.	DEF.	MODBUS	MIN... MAX.
86	LA	**247**	MODBUS address	1... 247
87	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	auxiliary probe alarm	automatic	- check probe integrity - check electrical connection
rtc	clock alarm	manual	set date, time and day of the week
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 AA, A1 and A2
AH	high temperature alarm	automatic	check AA, A4 and A5
id	open door alarm	automatic	check i0 e i1
PF	power failure alarm	manual	- touch a key - check electrical connection
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
Cth	compressor thermal switch alarm	automatic	check i0 and i1
th	global thermal switch alarm	manual	- switch the device off and on - 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	Micro-MaTch connector
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 (EV3271) or 4.9 VA (EV3281) 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		1 for PTC or NTC probes (cabinet 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)
Other inputs		Input configurable for analogue input (auxiliary probe) or digital input (door switch/multi-purpose, dry contact)
Dry contact	Contact type	5 VDC, 1.5 mA
	Power supply	None
	Protection	None
Digital outputs	1 electro-mechanical relay	
Compressor relay (K1)		SPST, 16 A res. @ 250 VAC (EV3271)
		SPST, 30 A res. @ 250 VAC (EV3281)
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 TTL MODBUS slave port for EVconnect app, EPoCA remote monitoring system or for BMS

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

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