

ENGLISH

IMPORTANT

Read this document thoroughly before installation and before use of the device and follow all recommendations; keep this document with the device for future consultation. Only use the device in the way described in this document; do not use the same as a safety device.

For further information consult the installation manual.



The device must be disposed of in compliance with local standards regarding the collection of electric and electronic equipment.

1 USER INTERFACE

1.1 Switching on/off the device

If ID parameter has value 0

1. Make sure the keyboard is not locked and no procedure is in progress.
2. Press and release the key.

If ID parameter has value 1

1. Make sure the keyboard is not locked and no procedure is in progress.
2. Press and release the key.
3. Press and release the "1... 6" interactive keys to set the user identification code.
4. Press and release the key.

The user identification code is valid 1 min, after which it is necessary to set it again; see also chapter "USER IDENTIFICATION".

1.2 The display

If the device is switched on, during the normal operation the display will show the magnitude set with AUX10 parameter. If the device is switched off, the display will show the date and the time.

1.3 Showing the temperature detected by the probes

1. Make sure the keyboard is not locked and no procedure is in progress.
2. Press and release the interactive key.
3. Press and release the interactive key.
4. Press and release the interactive key.

To exit the procedure:

5. Press and release the key or do not operate 60 s.

1.4 Activating the defrost in manual mode

1. Make sure the keyboard is not locked, no procedure is in progress and S01 parameter has a suitable value.
2. Press and release the interactive key.
3. Press and release the interactive key.
4. Press and release the interactive key.

If to the defrost activation the evaporator temperature is above that set with S02 parameter, the defrost will not be executed.

1.5 Switching on/off the room light in manual mode

1. Make sure no procedure is in progress.
2. Press and release the interactive key.

1.6 Executing the backup battery test

1. Make sure the keyboard is not locked and no procedure is in progress.
2. Press and release the interactive key.
3. Press and release the interactive key.
4. Press and release the interactive key.

The test takes 10 s; in this time the buzzer is activated.

If the test is successfully completed, the display will show "TEST OK"; if the test is not successfully completed, the device will be switched off.

1.7 Showing historical data

1. Make sure the keyboard is not locked and no procedure is in progress.
2. Press and release the interactive key.
3. Press and release the interactive key.
4. Press and release an interactive key to select:
 - graphic function "f:time-temperature"; also look at PR1 parameter
 - managing historical data; also look at chapter "MANAGING HISTORICAL DATA"
 - defrost historical data
 - alarms historical data
 - door switch input historical data
 - counters historical data.

To exit the procedure:

5. Press and release the key or do not operate 60 s.

1.8 Locking/Unlocking the keyboard (only if D08 parameter has value 1 or 2)

If D08 parameter has value 1

To lock/unlock the keyboard:

1. Make sure no procedure is in progress.
2. Press and release the key and then the key; the LED will switch on/off.

If D08 parameter has value 2

To lock the keyboard:

1. Make sure no procedure is in progress.
2. Press and release the key and then the key or do not operate the time set with D07 parameter; the LED will switch on.

To unlock the keyboard:

1. Make sure no procedure is in progress.
2. Press and release the key and then the key; the LED will switch off.

1.9 Silencing the alarm buzzer

1. Make sure no procedure is in progress.
2. Press and release a key; see also G01 parameter.

2 MANAGING HISTORICAL DATA

2.1 Selecting the data to record

1. Make sure the keyboard is not locked and no procedure is in progress.
2. Press and release the interactive key.
3. Press and release the interactive key.
4. Press and release the interactive key.
5. Press and release the or interactive key to select "SETUP RECORDINGS".
6. Press and release the key.
7. Press and release the or interactive key to select the data and then the key to confirm it.

To exit the procedure:

8. Press and release the key or do not operate 60 s.

2.2 Cancelling the recorded data

1. Make sure the keyboard is not locked and no procedure is in progress.
2. Press and release the interactive key.
3. Press and release the interactive key.
4. Press and release the interactive key.
5. Press and release the or interactive key to select "CANCEL RECORDINGS".
6. If ID parameter has value 1, press and release the "1... 6" interactive keys to set the user identification code.
7. Press and release the key.

To exit the procedure:

8. Press and release the key or do not operate 60 s.

2.3 Uploading/downloading data

1. Switch off the device.
2. Insert an USB flash drive in the USB port of the device: a frame will be shown.
3. Press and release the or interactive key to select:
 - "DOWNLOAD HISTORICAL"
 - "DOWNLOAD PARAMETERS"
 - "UPLOAD PARAMETERS".
4. Follow the instructions shown by the display.

To exit the procedure:

5. Press and release the key or do not operate 60 s.

3 SETTINGS

3.1 Setting the date and the time

1. Make sure the keyboard is not locked and no procedure is in progress.
2. Press and release the interactive key.
3. Press and release the interactive key.
4. Press and release the interactive key.
5. Press and release the or interactive key to select the date or the time, the or interactive key to set it and then the key to confirm it.

To exit the procedure:

6. Press and release the key or do not operate 60 s.

3.2 Setting the working setpoint

1. Make sure the keyboard is not locked and no procedure is in progress.
2. Press and release the interactive key.
3. Press and release the interactive key.
4. Press and release the or interactive key within 60 s; see also R08 and R09 parameters.
5. Press and release the key: the the device will exit the procedure.

3.3 Setting the configuration parameters

1. Make sure the keyboard is not locked and no procedure is in progress.
2. Press and release the interactive key.
3. Press and release the interactive key.
4. Press and release the interactive key.
5. Press and release the or interactive key to select the parameter, the or interactive key to set it and then the key to confirm it and move to the following one.

To exit the procedure:

6. Press and release the key or do not operate 60 s.

3.4 Calibrating the room probe and the auxiliary probe on 3 points

To calibrate the room probe:

1. Make sure the keyboard is not locked and no procedure is in progress.
2. Press and release the interactive key.
3. Press and release the interactive key.
4. Press and release the interactive key.
5. Press and release the interactive key.
6. Press and release the or interactive key to set the first calibrating setpoint.
7. Press and release the key.
8. Wait the temperature detected by the room probe is firmly the most possible equivalent to the first calibrating setpoint.
9. Press and release the or interactive key to calibrate the first point to the temperature detected by the calibrated external device.
10. Press and release the interactive key to confirm it and move to the second one.
11. Repeat steps 6 ... 9.
12. Press and release the interactive key to confirm it and move to the third one.
13. Repeat steps 6 ... 9.
14. Press and release the interactive key.

To calibrate the auxiliary probe:

15. Repeat steps 1 ... 4.
16. Press and release the interactive key.
17. Repeat steps 6 ... 14.

To exit the procedure:

18. Press and release the key or do not operate 60 s.

3.5 Setting the menu language

1. Make sure the keyboard is not locked and no procedure is in progress.
 2. Press and release the interactive key.
 3. Press and release the interactive key.
 4. Press and release the interactive key.
 5. Press and release the or interactive key to select:
 - "ITALIAN"
 - "ENGLISH"
 - "FRENCH"
 - "GERMAN"
 - "SPANISH".
 6. Press and release the key.
- To exit the procedure:
7. Press and release the key or do not operate 60 s.

4 USER IDENTIFICATION

4.1 Creating the user identification codes (only if ID parameter has value 1)

1. Make sure the keyboard is not locked and no procedure is in progress.
 2. Press and release the interactive key.
 3. Press and release the interactive key.
 4. Press and release the interactive key.
 5. If foreseen, press and release the "1... 6" interactive keys to set the user 1 identification code (according to factory's settings that's "111").
 6. Press and release the key.
 7. Press and release the or interactive key to select user number.
 8. Press and release the key.
 9. Press and release the "1... 6" interactive keys to set the user identification code and then the key to confirm it; press and release the to disable the user.
- To exit the procedure:
10. Press and release the key or do not operate 60 s.

5 SIGNALS

5.1 Signals

LED	Meaning
	compressor LED
	defrost LED
	evaporator fan LED

6 TECHNICAL DATA**6.1 Technical data****Purpose of control:** operating control device.**Construction of control:** incorporated electronic device.**Box:**

- user interface: open frame board on methacrylate
- control module: open frame board.

Heat and fire resistance category: D.**Dimensions:**

- user interface: 317.0 x 107.0 x 31.0 mm (12.480 x 4.212 x 1.220 in; W x H x D)
- control module: 166.0 x 116.0 x 44.0 mm (6.535 x 4.566 x 1.732 in; W x H x D).

Method of mounting control:

- user interface: by back-panel, with threaded studs
- control module: on plain surface, with spacers.

Degree of protection:

- user interface: IP65
- control module: IP00.

Connections:

- user interface: removable screw connection terminal blocks for conductors up to 1.5 mm² (0.0028 in²)
- control module: removable screw connection terminal blocks for conductors up to 2.5 mm² (0.0038 in²).

The maximum lengths allowed for the connecting cables are the following:

- user interface-control module: 10 m (32.808 ft)
- power supply: 10 m (32.808 ft)
- analog inputs: 10 m (32.808 ft)
- digital inputs: 10 m (32.808 ft)
- digital outputs: 10 m (32.808 ft)
- MODBUS RS-485 port: 1,000 m (3,280 ft); also look at *MODBUS specifications and implementation guides* manual available on www.modbus.org/specs.php.

Use cables having a section suitable to the current running through them.

Operating temperature: from 0 to 55 °C (from 32 to 131 °F).**Storage temperature:** from -10 to 70 °C (from 14 to 158 °F).**Operating humidity:** from 10 to 90 % of relative humidity not condensing.**Control pollution situation:** 2.**Environmental conformity:**

- RoHS 2011/65/CE
- WEEE 2012/19/EU
- REACH regulation (CE) n. 1907/2006.

EMC conformity:

- EN 60730-1
- IEC 60730-1.

Power supply:

- user interface: powered by the control module
- control module: 115... 230 VAC (+10 %, -15 %), 50... 60 Hz (± 3 Hz), 10 VA max.

Method of providing earthing of control: none.**Rated impulse voltage:** 4 KV.**Overvoltage category:** III.**Class and structure of software:** A.**Real time clock:** incorporated (with supercap battery).

Battery range in absence of power supply: 24 h.

Battery charging time: 2 min (the battery is charged by the power supply of the device).

Analog inputs: 4 inputs for 2 wires Pt 1000 probes (room temperature, evaporator temperature, condenser temperature and auxiliary temperature).Pt 1000 analog inputs (1 K Ω @ 0 °C, 32 °F)

Working range: from -99 to 150 °C (from -146 to 302 °F).

Resolution: 0.1 °C (1 °F).

Protection: none.

Digital inputs: 1 inputs which can be set via configuration parameter for normally open or normally closed contact (door switch).5 VDC, 2 mA digital inputs (free of voltage)

Power supply: none

Protection: none.

Digital outputs: 9 outputs:

- three 16 res. A @ 250 VAC SPST electromechanical relays (compressor, electronic door lock and backup battery test)
- five 8 res. A @ 250 VAC SPST electromechanical relays (defrost, evaporator fan, condenser fan, room light and door heater)
- one 8 res. A @ 250 VAC SPDT electromechanical relay (alarm).

The device ensures a reinforced insulation among each connector of the digital outputs and the remaining parts of the device.

Type 1 or type 2 actions: type 1.**Additional features of type 1 or type 2 action:** C.**Displays:** colour TFT graphic display.**Communication ports:** 2 ports:

- 1 MODBUS RS-485 port (with MODBUS slave communication protocol)
- 1 USB port.

Signal and alarm buzzer: incorporated.

7 CONFIGURATION PARAMETERS**7.1 Configuration parameters**

PARAM.	MIN.	MAX.	U.M.	DEF.	TEMPERATURE ALARMS (BUT AUXILIARY TEMPERATURE ALARMS)
A01	-50	0	°C/°F (1)	-3	room temperature below which the minimum room temperature alarm is activated ("working setpoint + A01"); see also A08
A02	0	50	°C/°F (1)	4	room temperature above which the maximum room temperature alarm is activated ("working setpoint + A02"); see also A09
A03	0	300	min	90	room temperature alarm delay after the device is switched on and after the defrost finishes
A04	0	900	s	0	room temperature alarm delay
A05	-50	0	°C/°F (1)	-20	evaporator temperature below which the evaporator temperature alarm is activated ("working setpoint + A05", on condition that the door switch input is not activated) (2)
A06	0	90	°C/°F (1)	60	condenser temperature above which the condenser temperature alarm is activated (3)
A07	0	60	°C/°F (1)	25	minimum difference between the minimum and the maximum condenser temperature when the compressor is switched on such as to provoke the dirty condenser alarm
A08	0	20	°C/°F (1)	2	A01 differential
A09	0	20	°C/°F (1)	2	A02 differential
PARAM.	MIN.	MAX.	U.M.	DEF.	ANALOG INPUTS AND DISPLAY
D01	0	1	- - -	0	unit of measurement for temperature (0 = °C; 1 = °F) (4)
D02	0	1	- - -	1	showing the splash when the device is switched on (1 = YES)
D03	0	1	- - -	1	kind of backlight (0 = switched on 60 s after the last operation on the keyboard; 1 = switched on)
D05	- - -	- - -	- - -	- - -	reserved
D06	0	1	- - -	1	locking of the room temperature showing during the defrost (1 = YES)
D07	1	300	min	5	time that must elapse in absence of operations on the keyboard in order that it is locked (only if D08 = 2)
D08	0	2	- - -	0	keyboard locking/unlocking mode (0 = absent; 1 = locking and unlocking in manual mode; 2 = locking in manual mode or by time and unlocking in manual mode); see also D07
D09	-10	10	°C/°F (1)	0	room temperature offset
D10	-10	10	°C/°F (1)	0	evaporator temperature offset
D11	-10	10	°C/°F (1)	0	condenser temperature offset
D12	-10	10	°C/°F (1)	0	auxiliary temperature offset
D13	5	240	s	30	power supply interruption alarm delay
PARAM.	MIN.	MAX.	U.M.	DEF.	DEFROST
S01	0	255	- - -	3	defrost activation mode (1 = in manual mode; 2 = by intervals, for time; 4 = by intervals, switching on the compressor; 8 = 1 h after the device is switched on; 128 = adaptive); see also S04 (5)
S02	-10	30	°C/°F (1)	6	evaporator temperature the defrost is finished; see also S03
S03	1	300	min	20	defrost maximum duration; see also S02
S04	1	48	h	8	defrost interval; see also S01
S05	0	2	- - -	1	defrost type (0 = switching off the compressor; 1 = electric; 2 = by hot gas)
S06	0	300	s	120	dripping duration
S07	0	300	s	0	delay in switching on the compressor when the defrost is activated (only if S05 = 2)
S08	1	48	h	5	minimum time the compressor is switched on such as to provoke the defrost activation (only if S01 = 128)
PARAM.	MIN.	MAX.	U.M.	DEF.	INPUTS/OUTPUTS CONFIGURATION
C01	0	2	- - -	0	effect provoked by the door switch input activation (0 = absent; 1 = the compressor and the evaporator fan will be switched off; 2 = the evaporator fan will be switched off); also look at C03
C02	0	1	- - -	0	type of door switch input contact (0 = normally open; 1 = normally closed)
C03	0	600	s	30	door switch input alarm signal delay; also maximum duration of the effect provoked by the door switch input activation on the evaporator fan (6)
C04	0	1	- - -	1	enabling the alarm buzzer (1 = YES)
C05	0	1	- - -	1	room light activation mode (0 = in manual mode and by digital input; 1 = in manual mode)
C07	0	1	- - -	1	enabling the evaporator probe (1 = YES)
C08	0	1	- - -	1	enabling the condenser probe (1 = YES)
C09	0	2	- - -	1	evaporator fan activity during the normal operation (0 = according to F03; 1 = according to the compressor; 2 = switched on)
C12	-25	20	°C/°F (1)	-7	room temperature below which the door heater is switched on (2)
C13	0	1	- - -	0	enabling the auxiliary probe (1 = YES)
PARAM.	MIN.	MAX.	U.M.	DEF.	MAIN REGULATOR
R01	0	20	°C/°F (1)	2	working setpoint differential
R02	0	30	min	1	minimum time between two consecutive times the compressor is switched on
R03	0	300	s	0	delay in switching on the compressor after the device is switched on
R04	0	300	s	10	minimum time the compressor is switched on
R05	0	300	min	0	time the compressor is switched on during the room temperature probe error; see also R06 and R07
R06	0	300	min	0	time the compressor is switched off during the room temperature probe error; see also R05 and R07
R07	0	100	%	100	daily percentage (24 h) above which the compressor is switched on/off according to R05 and R06
R08	-50	50	°C/°F (1)	15	maximum working setpoint
R09	-50	50	°C/°F (1)	2	minimum working setpoint
PARAM.	MIN.	MAX.	U.M.	DEF.	EVAPORATOR FAN AND CONDENSER FAN
F01	0	1	- - -	1	enabling the evaporator fan (1 = YES)
F02	0	1	- - -	0	enabling the condenser fan (1 = YES)
F03	5	50	°C/°F (1)	5	evaporator temperature above which the evaporator fan is switched off (only if C09 = 0) (7) (8)
F04	0	50	°C/°F (1)	15	condenser temperature above which the condenser fan is switched on (on condition that the compressor is switched on); also look at F08 (7) (9) (10)
F05	0	1	- - -	0	evaporator fan activity during the defrost (0 = switched off; 1 = switched on)
F06	0	2	- - -	0	condenser fan activity during the defrost (0 = switched off; 1 = switched on; 2 = according to F04)
F07	-40	50	°C/°F (1)	4	evaporator temperature below which the evaporator fan is switched on after the device is switched on and after the defrost finishes (8)
F08	0	300	s	0	delay in switching off the condenser fan after the compressor is switched off
PARAM.	MIN.	MAX.	U.M.	DEF.	ALARM BUZZER
G01	0	900	s	0	time that elapses between the alarm buzzer is silenced and it is activated again, if foreseen (0 = the alarm buzzer will never be activated)
PARAM.	MIN.	MAX.	U.M.	DEF.	ENERGY SAVING
ES1	0	24	h	24	time the "energy saving" function is activated; see also ES2 and ES3 (24 = absent)
ES2	0	24	h	24	time the "energy saving" function is deactivated; see also ES1 and ES3 (24 = absent)
ES3	0	20	°C/°F (1)	2	working setpoint increase during the "energy saving" function; see also ES1 and ES2
PARAM.	MIN.	MAX.	U.M.	DEF.	VARIOUS
PR1	1	60	min	1	room temperature and auxiliary temperature sampling interval for the graphic function "f:time-temperature"
PR2	0	1	- - -	0	enabling the USB port (0 = absent)
PARAM.	MIN.	MAX.	U.M.	DEF.	MODBUS RS-485
ADD	1	247	- - -	1	device address
MB1	0	2	- - -	2	baud rate (0 = 2,400 baud; 1 = 4,800 baud; 2 = 9,600 baud)
MB2	0	2	- - -	2	parity (0 = none; 1 = odd; 2 = even)
PARAM.	MIN.	MAX.	U.M.	DEF.	ALARM OUTPUT
RLA	0	1	- - -	0	alarm output activation mode (0 = deactivated if an alarm is in progress and activated otherwise; 1 = activated if an alarm is in progress and deactivated otherwise)
PARAM.	MIN.	MAX.	U.M.	DEF.	AUXILIARY TEMPERATURE ALARMS AND VARIOUS
AUX1	-50	0	°C/°F (1)	-3	auxiliary temperature below which the minimum auxiliary temperature alarm is activated ("working setpoint + AUX1"); see also AUX3
AUX2	0	50	°C/°F (1)	4	auxiliary temperature above which the maximum auxiliary temperature alarm is activated ("working setpoint + AUX2"); see also AUX4
AUX3	0	20	°C/°F (1)	2	AUX1 differential
AUX4	0	20	°C/°F (1)	2	AUX2 differential
AUX8	0	300	min	0	auxiliary temperature alarm delay

AUX9	0	300	min	90	auxiliary temperature alarm delay after the device is switched on
AUX10	0	1	- - -	0	magnitude displayed during the normal operation (0 = room temperature; 1 = auxiliary temperature)
I0	0	1	- - -	0	display orientation (0 = the device is installed at the top of the cabinet; 1 = the device is installed at the bottom of the cabinet)
ID	0	1	- - -	1	enabling the user identification (1 = YES)

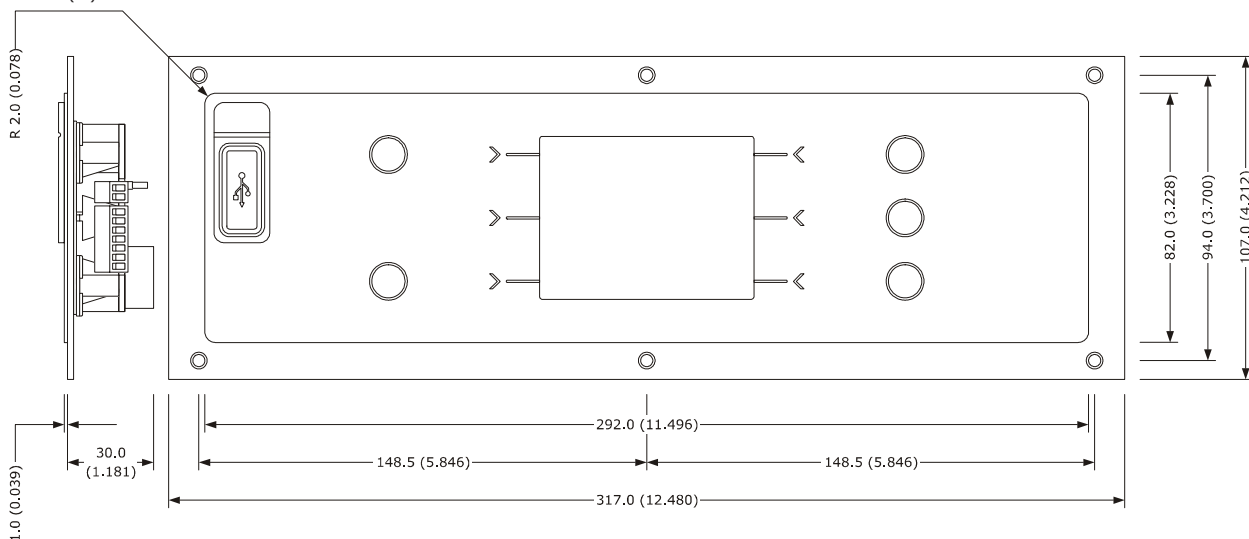
Notes:

- (1) the unit of measurement depends on D01 parameter
- (2) the differential of H05 parameter is 2 °C/4 °F
- (3) the differential of H06 parameter is 10 °C/18 °F
- (4) properly set the parameters relative to the regulators after setting D01 parameter
- (5) to set more activation modes, set S01 parameter to a value equivalent to the sum of the modes (for example if S01 parameter has value 3, the defrost activation mode will be in manual mode and by intervals, for time); a safety defrost will however be activated every 72 h (and in case of evaporator temperature alarm)
- (6) the evaporator fan will be switched on, if foreseen, after 10 s the door switch input is deactivated
- (7) the differential of F03 and F04 parameters is 5 °C/10 °F
- (8) if C09 parameter has value 0 (and in case of evaporator temperature probe error), the room temperature probe will work as evaporator temperature probe
- (9) if the compressor is switched off, the condenser fan will be switched off
- (10) in case of condenser temperature probe error, the condenser fan will work according to the compressor.

11 DIMENSIONS AND INSTALLATION

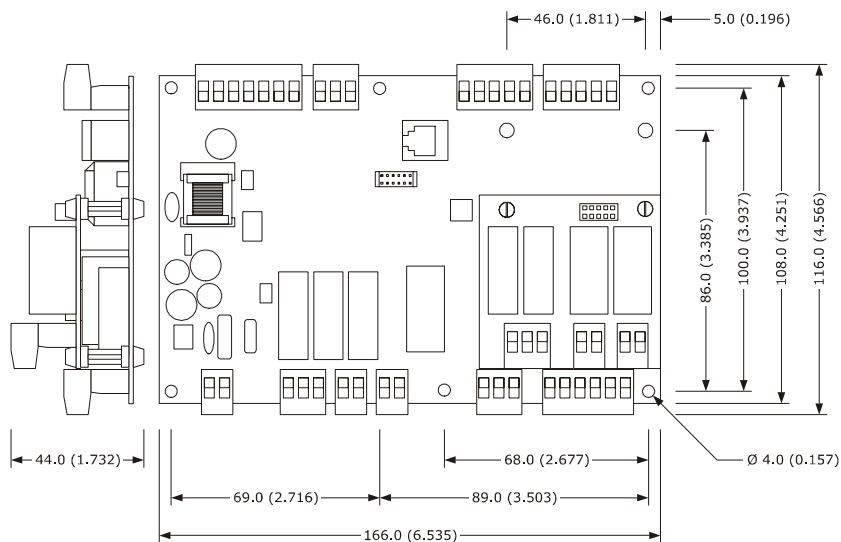
11.1 Dimensions user interface

Dimensions are in mm (in).



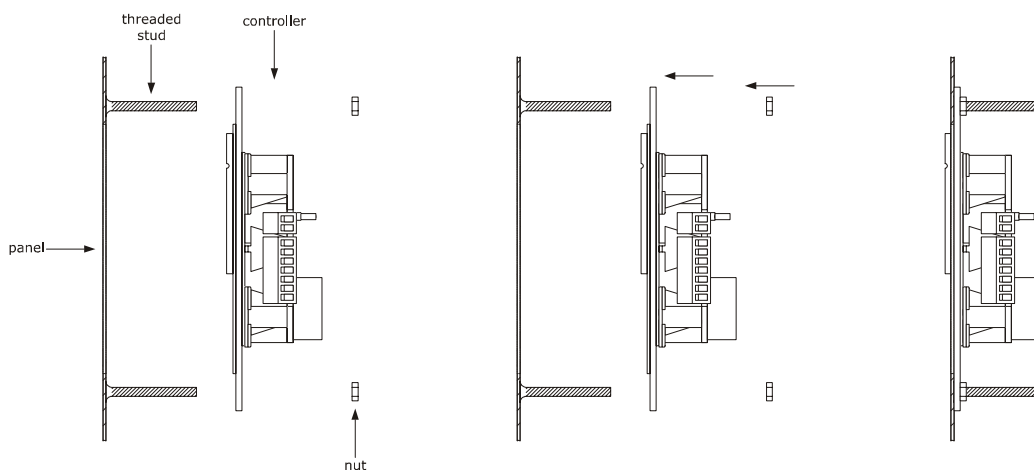
11.2 Dimensions control module

Dimensions are in mm (in).



11.3 Installation user interface

By back-panel, with threaded studs.



11.4 Installation control module

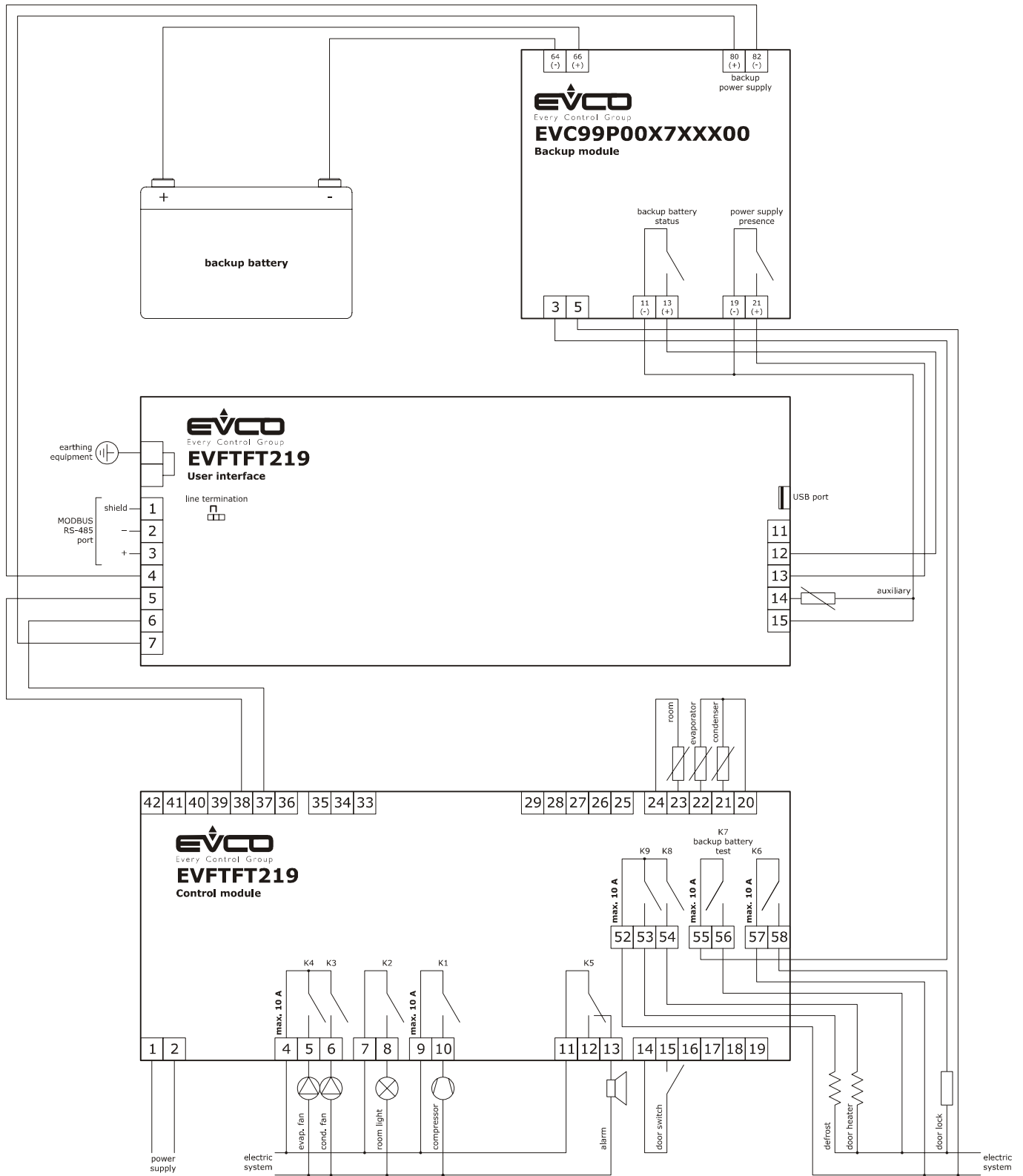
On plain surface, with spacers.

11.5 Additional information for the installation

- make sure the working conditions of the device (operating temperature, operating humidity, etc.) are in the limits indicated; see chapter TECHNICAL DATA
- do not install the device close to heating sources (heaters, hot air ducts, etc.), devices having big magnetos (big speakers, etc.), locations subject to direct sunlight, rain, humidity, dust, mechanical vibrations or bumps
- any metal parts in proximity of the control module must be at a distance such that they do not compromise the safety distances
- according to the safety legislation, the protection against possible contacts with the electrical parts must be ensured by a correct installation of the device; all the parts which ensure the protection must be fixed so that you can not remove them if not by using a tool.

12 ELECTRICAL CONNECTION

12.1 Electrical connection



12.2 Additional information for electrical connection

- do not operate on the terminal blocks of the device using electrical or pneumatic screwdrivers
- if the device has been moved from a cold location to a warm one, the humidity could condense on the inside; wait about an hour before supplying it
- make sure the power supply voltage, the electrical frequency and the electrical power of the device correspond to those of the local power supply; see chapter TECHNICAL DATA
- disconnect the power supply of the device before servicing it
- it is suggested to use a 12 V 12 Ah (or having higher capacity) sealed lead backup battery
- connect the device to a MODBUS RS-485 network using a twisted pair
- position the power cables as far away as possible from the signal cables
- for the repairs and for information about the device please contact the EVCO sales network.