LABEL	MIN.	MAX.	U.M.	DEF.	
/2	0	6	—	3	probe reading speed (0 = fast, … , 6 = slow)
/8	0	1	—	1	temperature unit of measure (0 = Fahrenheit degree, 1 = Celsius degree)

LABEL	MIN.	MAX.	U.M.	DEF.	REGULATOR
r1	0	r2	°C/°F [6]	0	minimum value you can assign to the working setpoint
r2	r1	999	°C/°F [6]	700	maximum value you can assign to the working setpoint

LABEL	MIN.	MAX.	U.M.	DEF.	PID
P0	-99	99	°C/°F [6]	0	proportional band offset
P1	0	999	s	100	integral action time (0 = it will never be activated)
P2	0	1	—	1	authorization to activate the auto-tuning function (1 = YES)
Pb	1	250	°C/°F [6]	30	proportional band (it is relative to the working setpoint)
Pc	1	120	s	30	cycle time for temperature regulation [7]
Pd	0	250	s	35	derivative action time (0 = it will never be activated)

LABEL	MIN.	MAX.	U.M.	DEF.	ALARM
A0	1	99	°C/°F [6]	1	hysteresis (differential, it is relative to A1, it is important if A4 ≠ 1)
A1	-99	999	°C/°F [6]	0	temperature alarm threshold (it is important if A4 ≠ 1); look at A4 as well
A3	0	999	min	0	temperature alarm exclusion time since you turn the instrument ON (it is important if A4 ≠ 1)
A4	1	7	—	1	kind of temperature alarm (1 = it will never be activated, 2 = absolute lower temperature alarm, 3 = absolute upper temperature alarm, 4 = lower temperature alarm relative to the working setpoint, 5 = upper temperature alarm relative to the working setpoint, 6 = lower temperature alarm relative to the working setpoint with automatic calculation and enabling, 7 = upper temperature alarm relative to the working setpoint with automatic calculation and enabling)

LABEL	MIN.	MAX.	U.M.	DEF.	SERIAL NETWORK (EVCOBUS)
L1	1	15	—	1	instrument address
L2	0	7	—	0	instrument group
L3	2	250	s	7	time-out link
L4	0	3	—	1	baud rate (0 = 1,200 baud, 1 = 2,400 baud, 2 = 4,800 baud, 3 = 9,600 baud)

[6] the unit of measure depends on the parameter /8

[7] the length of the contribution of the output during the cycle time depends on an algorithm of the instrument.

FK 450A

PID single output digital thermoregulator

smart guide
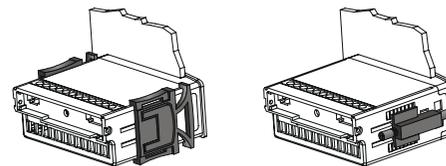
ENGLISH

1   PREPARATIONS

1.1   How to install the instrument

Panel mounting, panel cut out 71 x 29 mm (2.79 x 1.14 in), with click brackets (they are supplied by the builder) or screw brackets (by request).
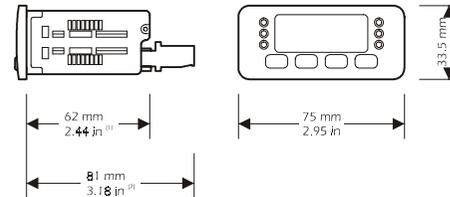
(1)   maximum depth with screw terminal blocks (by request)
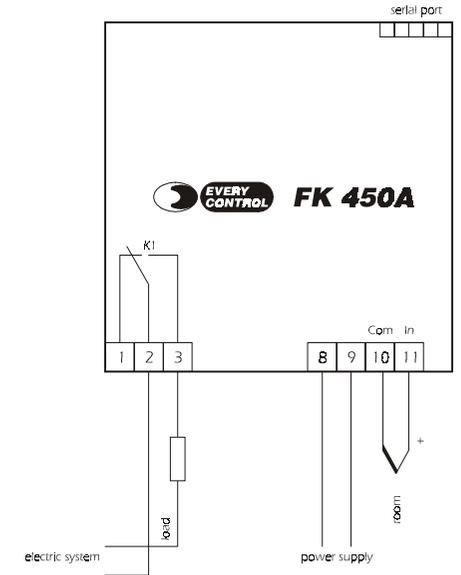
(2)   maximum depth with extractable terminal blocks (standard model).

installation with click brackets (on the left-hand side, they are supplied by the builder)

and screw brackets (on the right-hand side, by request); if you are using screw brackets, you have to moderate the clamping torque, in order not to damage the box and screw brackets.

1.2   Electrical connection

Provide the probe with a protection able to protect it against contacts with metal parts or use insulated probes.

2   OPERATION

2.1   Preliminary information

During the normal operation the instrument shows the room temperature.

2.2   How to silence the buzzer

If you have to silence the buzzer:

▪ press

2.3   How to activate the auto-tuning function

If you have to activate the auto-tuning function:

▪ press   for 4 s : the instrument will show tun alternated with the room temperature [3] [4].

The auto-tuning function allows to calculate the optimal value of parameters P1, Pb and Pd automatically.

(3)   if the parameter P2 has value 0, the function will not be available

(4) at the moment of the activation of the auto-tuning function, room temperature has to be sufficiently below the working setpoint.

2.4 How to stop the auto-tuning function

If you have to stop the auto-tuning function:

- press ⬆ for 4 s

3 WORKING SETPOINT

3.1 How to set the working setpoint

If you have to modify the working setpoint value:

- press set
- press ⬆ or ⬇ within 4 s [5]
- press set

(5) you can set the working setpoint between the limits you have set with the parameters r1 and r2.

4 CONFIGURATION PARAMETERS

4.1 How to set the configuration parameters

Configuration parameters are arranged on two levels.

If you have to gain access the first level:

- press ⬆ and ⬇ for 4 s: the instrument will show $P\,A$

If you have to select a parameter:

- press ⬆ or ⬇

If you have to modify the value of the parameter:

- press set and ⬆ or ⬇

If you have to gain access the second level:

- gain access the first level
- press ⬆ or ⬇ for selecting $P\,A$
- press set and ⬆ or ⬇ for setting " **-19** "
- press ⬆ and ⬇ for 4 s: the instrument will show $\sqcup\ 0$

If you have to quit the procedure:

- press ⬆ and ⬇ for 4 s or do not operate for about 60 s.

5 SIGNALS

5.1 Signals

LED	MEANING
out	Load LED
	if it is lighted, the load will be ON

°F	Fahrenheit degree LED
	if it is lighted, the unit of measure of the temperature showed by the instrument is Fahrenheit degree
°C	Celsius degree LED
	if it is lighted, the unit of measure of the temperature showed by the instrument is Celsius degree

6 ALARMS

6.1 Alarms

CODE	REASONS	REMEDIES	EFFECTS
$E\,2$ corrupted memory data	there is the corruption of the configuration data of the memory of the instrument	switch off the power supply of the instrument: unless the alarm disappears, you will have to change the instrument	• you can not gain access the setting procedures • the load will be forced OFF
$E\,0$ room probe alarm	• the kind of room probe you have connected is not right • the room probe plays up • the connection instrument-room probe is wrong • the room temperature is outside the limits allowed by the working range of the instrument	• look at the parameter /0 • test the integrity of the probe • test the instrument-probe connection • test the temperature close to the probe (it has to be between the limits allowed by the working range)	the load will be forced OFF
$E\,0\,C$ cold joint alarm	there will be a defect in the cold joint compensation circuit	switch off the power supply of the instrument: unless the alarm disappears, you will have to change the instrument	the load will be forced OFF
$A\,L\,1$ temperature alarm	the room temperature is outside the limit you have set with the parameter A1	test the temperature close to the probe (look at the parameters A0, A1 and A4)	no effects

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| - - - auto-tuning alarm | the instrument has not been able to calculate the optimal value of parameters P1, Pb and Pd | press ⬆ for 4 s | the load will be forced OFF (after you have pressed ⬆ for 4 s) the instrument will work with the previous settings |

The instrument shows the indications above alternated with the room temperature, except the indications "**E2**", "**E0**", "**E0C**" and "**- - -**" (they flash) and the buzzer utters an intermittent beep.

7 TECHNICAL DATA

7.1 Technical data

Box: self-extinguishing grey.

Size: 75 x 33.5 x 81 mm (2.95 x 1.31 x 3.18 in) the model with extractable terminal blocks (standard model), 75 x 33.5 x 62 mm (2.95 x 1.31 x 2.44 in) the model with screw terminal blocks (by request).

Installation: panel mounting, panel cut out 71 x 29 mm (2.79 x 1.14 in), with click brackets (they are supplied by the builder) or screw brackets (by request).

Frontal protection: IP 65.

Connections: extractable terminal blocks with pitch 5 mm (0.19 in, standard model) for cables up to 2.5 mm² (0.38 sq in, power supply, input and output) or screw terminal blocks with pitch 5 mm (0.19 in, by request) for cables up to 2.5 mm² (0.38 sq in, power supply, input and output), 5 poles single line male connector with pitch 2.5 mm (0.09 in, serial port).

Ambient temperature: from 0 to 55 °C (32 to 131 °F, 10 ... 90% of relative humidity without condensate).

Power supply: 12-24 Vac/dc, 50/60 Hz, 1.5 VA (standard model) or 12 Vac/dc, 50/60 Hz, 1.5 VA (by request).

Alarm buzzer: included.

Measure inputs: 1 (room probe) for "J" or "K" thermocouples.

Working range: from 0 to 700 °C (32 to 999 °F) for "J" thermocouple, from 0 to 999 °C (32 to 999 °F) for "K" thermocouple.

Setpoint range: from 0 to 999 °C (0 to 999 °F).

Resolution: 1 °F with unit of measure in Fahrenheit, 1 °C with unit of measure in Celsius.

Display: one red LED 3-digit display 13.2 mm (0.51 in) high, output status indicator, temperature unit of measure indicators.

Outputs: one 10 A @ 250 Vac relay (change-over contact).

Serial port: TTL with EVCOBUS communication protocol (for the configurer/cloner system CLONE and supervision system RICS).

8 WORKING SETPOINT AND CONFIGURATION PARAMETERS

8.1 Working setpoint

LABEL	MIN.	MAX.	U.M.	DEF.	WORKING SETPOINT
	r1	r2	°C/°F [6]	0	working setpoint

8.2 First level parameters

LABEL	MIN.	MAX.	U.M.	DEF.	PASSWORD
PA	-99	99	—	0	password

LABEL	MIN.	MAX.	U.M.	DEF.	MEASURE INPUTS
/1	-10	10	°C/°F [6]	0	room probe calibration

8.3 Second level parameters

LABEL	MIN.	MAX.	U.M.	DEF.	MEASURE INPUTS
/0	10	11	—	10	kind of probe (10 = "J" Tc, 11 = "K" Tc)
/1	-10	10	°C/°F [6]	0	room probe calibration