FK 401A

ON-OFF two outputs digital thermoregulator

smart guide

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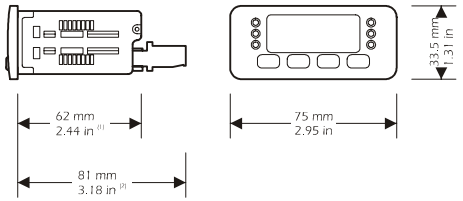
ENGLISH

1 PREPARATIONS

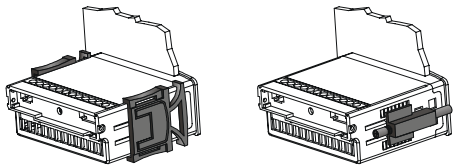
1.1 How to install the instrument

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

(2) maximum depth with extractable terminal blocks.



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.

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 (optional):

▪ press (↓)

3 WORKING SETPOINT

3.1 How to set the working setpoint

If you have to modify the first working setpoint value:

▪ press (set)

▪ press (↑) or (↓) within 2 s (3) (4)

▪ do not operate for 2 s

If you have to modify the second working setpoint value:

▪ press (set) during the first working setpoint modification

▪ press (↑) or (↓) within 2 s (5) (6) (7)

▪ press (set)

(3) you can set the first working setpoint between the limits you have set with the parameters rA1 and rA2

(4) unless the parameter rA5 has value 0, you can not modify the first working setpoint

(5) if the parameter -/0 has value 3, the second working setpoint will not be showed

(6) you can set the second working setpoint between the limits you have set with the parameters rb1 and rb2

(7) unless the parameter rb5 has value 0, you can not modify the second working setpoint.

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 PA

If you have to select a parameter:

▪ press (↑) or (↓)

If you have to modify the value of the parameter:

▪ press (set)

- press ↑ or ↓ within 2 s
- press set

If you have to gain access the second level:

- gain access the first level
- press ↑ or ↓ for selecting PA
- press set
- press ↑ or ↓ within 2 s for setting "**-19** "
- press set
- press ↑ and ↓ for 4 s: the instrument will show – r0

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 1	Load 1 LED if it is lighted, the load 1 will be ON if it flashes, a load 1 delay will be running (look at the parameters CA0, CA1, CA2 and CA4)
out 2	Load 2 LED if it is lighted, the load 2 will be ON if it flashes, a load 2 delay will be running (look at the parameters Cb0, Cb1, Cb2 and Cb4)
°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

INDICAT.	MEANING
---	you can not modify the working setpoint (look at the parameters rA5 and/or rb5)

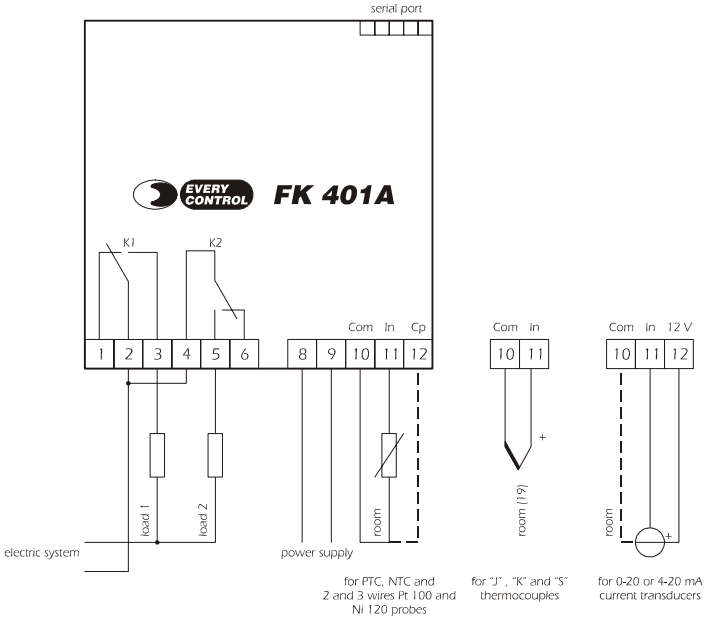
6 ALARMS

6.1 Alarms

CODE	REASONS	REMEDIES	EFFECTS
E2 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 ▪ all outputs will be forced OFF
E0 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 1 will be forced to the status you have set with the parameter CA3 ▪ the load 2 will be forced to the status you have set with the parameter Cb3
E0C cold joint/ third wire alarm	▪ if the instrument has been preset for working with "J" , "K" or "S" thermocouples, there will be a defect in the cold joint compensation circuit ▪ if the instrument has been preset for working with 2 or 3 wires Pt 100 or Ni 120 probes, the third wire of the probe will not be connected	▪ in the first case, switch off the power supply of the instrument: unless the alarm disappears, you will have to change the instrument ▪ in the second case, test the instrument-probe connection	▪ the load 1 will be forced to the status you have set with the parameter CA3 ▪ the load 2 will be forced to the status you have set with the parameter Cb3

9 ELECTRICAL CONNECTION

9.1 Electrical connection



(19) provide the probe with a protection able to protect it against contacts with metal parts or use insulated probes.

LABEL	MIN.	MAX.	U.M.	DEF.	SECOND ALARM
Ab0	0.1	999	°C/°F (8)	0.1	hysteresis (differential, it is relative to Ab1, it is important if Ab4 ≠ 1)
Ab1	-99	999	°C/°F (8)	0.0	second temperature alarm threshold (it is important if Ab4 ≠ 1); look at Ab4 as well
Ab3	0	999	min	0	second temperature alarm exclusion time since you turn the instrument ON (it is important if Ab4 ≠ 1)
Ab4	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 first working setpoint, 5 = upper temperature alarm relative to the first working setpoint, 6 = lower temperature alarm relative to the first working setpoint with automatic calculation and enabling, 7 = upper temperature alarm relative to the first 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
L4	0	3	—	1	baud rate (0 = 1,200 baud, 1 = 2,400 baud, 2 = 4,800 baud, 3 = 9,600 baud)

(8) the unit of measure depends on the parameter /8

(9) if the parameter -/0 has value 3, the parameter will not be showed

(10) if the parameter rA3 has value 0, you have to set the parameter rA0 with positive sign; if the parameter rA3 has value 1, you have to set the parameter rA0 with negative sign

(11) if the parameter -/0 has value 3, the parameter will set the neutral zone value

(12) if the parameter rb3 has value 0, you have to set the parameter rb0 with positive sign; if the parameter rb3 has value 1, you have to set the parameter rb0 with negative sign

(13) if the parameter has value 3, the load 1 will be ON when the room temperature will rise above the value "first working setpoint + rA0" and the load 2 will be ON when the room temperature will fall below the value "first working setpoint - rA0" (the loads will be ON as long as the room temperature will get the first working setpoint)

(14) the value depends on the kind of measure input the instrument has been preset

(15) if the instrument has been preset for working with "J" , "K" or "S" thermocouples, the parameter will not be showed

(16) unless the parameter /8 has value 1, the parameter will not be showed

(17) unless the instrument has been preset for working with 0-20 or 4-20 mA current transducers, the parameter will not be showed

(18) if the instrument has been preset for working with 0-20 or 4-20 mA current transducers, the parameter will not be important.

AL 1 first temperature alarm	the room temperature is outside the limit you have set with the parameter AA1	test the temperature close to the probe (look at the parameters AA0, AA1 and AA4)	no effect
AL 2 second temperature alarm	the room temperature is outside the limit you have set with the parameter Ab1	test the temperature close to the probe (look at the parameters Ab0, Ab1 and Ab4)	no effect

The instrument shows the indications above alternated with the room temperature, except the indications "**E2**" , "**E0**" and "**E0C**" (they flash) and the buzzer (optional) 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, 75 x 33.5 x 62 mm (2.95 x 1.31 x 2.44 in) the model with screw terminal blocks.

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) for cables up to 2.5 mm² (0.38 sq in, power supply, input and outputs) or screw terminal blocks with pitch 5 mm (0.19 in) for cables up to 2.5 mm² (0.38 sq in, power supply, input and outputs), 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: optional.

Measure inputs: 1 (room probe), depending on the model, for PTC or NTC probes, "J" , "K" or "S" thermocouples, 2 or 3 wires Pt 100 or Ni 120 probes, 0-20 or 4-20 mA current transducers.

At terminal 12 there are 12 V you can use in order to supply the transducer.

Working range: from -50 to 150 °C (-58 to 302 °F) for PTC probe, from -40 to 110 °C (-40 to 230 °F) for NTC probe, from 0 to 700 °C (32 to 999 °F) for "J" thermocouple, from 0 to 999 °C (32 to 999 °F) for "K" thermocouple, from 0 to 999 °C (32 to 999 °F) for "S" thermocouple, from -50 to 600 °C (-58 to 999 °F) for 2 or 3 wires Pt 100 probe, from -80 to 260 °C (-99 to 500 °F) for 2 or 3 wires Ni 120 probe.

Setpoint range: from -99 to 999 °C (-99 to 999 °F).

Resolution: 1 °F with unit of measure in Fahrenheit, 0.1 °C (except the instruments preset for working with "J" , "K" or "S" thermocouples) or 1 °C with unit of measure in Celsius.

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

Outputs: 2 relays: one 10 A @ 250 Vac relay for load 1 control (change-over contact) and one 8 A @ 250 Vac relay for load 2 control (change-over contact).

Serial port: TTL with EVCOBUS communication protocol.

8 WORKING SETPOINT AND CONFIGURATION PARAMETERS

8.1 Working setpoint

LABEL	MIN.	MAX.	U.M.	DEF.	WORKING SETPOINT
	rA1	rA2	°C/°F [8]	0.0	first working setpoint
	rb1	rb2	°C/°F [8]	0.0	second working setpoint [9]

8.2 First level parameters

LABEL	MIN.	MAX.	U.M.	DEF.	PASSWORD
PA	-90	100	—	0	password

LABEL	MIN.	MAX.	U.M.	DEF.	MEASURE INPUTS
/1	-25	25.0	°C/°F [8]	0.0	room probe calibration

LABEL	MIN.	MAX.	U.M.	DEF.	FIRST REGULATOR
rA0	-99	99.9	°C/°F [8]	-0.2	hysteresis (differential, it is relative to the first working setpoint); look at rA4 as well [10] [11]

LABEL	MIN.	MAX.	U.M.	DEF.	SECOND REGULATOR
rb0	-99	99.9	°C/°F [8]	-0.2	hysteresis (differential, it is relative to the second working setpoint); look at rb4 as well [9] [12]

8.3 Second level parameters

LABEL	MIN.	MAX.	U.M.	DEF.	KIND OF REGULATOR
-/0	1	3	---	2	kind of regulator (1 = the first working setpoint is absolute, the second one is relative to the first, 2 = two absolute working setpoint, 3 = neutral zone) [13]

LABEL	MIN.	MAX.	U.M.	DEF.	MEASURE INPUTS
/0	01	41	—	[14]	kind of probe (01 = PTC, 03 = NTC, 10 = "J" Tc, 11 = "K" Tc, 12 = "S" Tc, 20 = 3 wires Pt 100, 21 = 2 wires Pt 100, 30 = 4-20 mA, 31 = 0-20 mA, 40 = 3 wires Ni 120, 41 = 2 wires Ni 120)
/1	-25	25.0	°C/°F [8]	0.0	room probe calibration
/5	0	1	—	1	temperature resolution (0 = 1 degree, 1 = 0.1 degrees) [15] [16]
/6	-99	999	points	-20	minimum value of the range of the transducer [17]
/7	-99	999	points	80	maximum value of the range of the transducer [17]
/8	0	1	—	1	temperature unit of measure (0 = Fahrenheit degree, 1 = Celsius degree) [18]

LABEL	MIN.	MAX.	U.M.	DEF.	FIRST REGULATOR
rA0	-99	99.9	°C/°F [8]	-0.2	hysteresis (differential, it is relative to the first working setpoint); look at rA4 as well [10] [11]
rA1	-99	rA2	°C/°F [8]	[14]	minimum value you can assign to the first working setpoint
rA2	rA1	999	°C/°F [8]	[14]	maximum value you can assign to the first working setpoint
rA3	0	1	—	1	cooling or heating action (0 = cooling action) [9]
rA4	0	1	—	0	kind of hysteresis (0 = asymmetrical, 1 = symmetrical)
rA5	0	1	—	0	first working setpoint modification lock-out (1 = YES)

LABEL	MIN.	MAX.	U.M.	DEF.	SECOND REGULATOR
rb0	-99	99.9	°C/°F [8]	-0.2	hysteresis (differential, it is relative to the second working setpoint); look at rb4 as well [9] [12]
rb1	-99	rb2	°C/°F [8]	[14]	minimum value you can assign to the second working setpoint [9]
rb2	rb1	999	°C/°F [8]	[14]	maximum value you can assign to the second working setpoint [9]
rb3	0	1	—	1	cooling or heating action (0 = cooling action) [9]
rb4	0	1	—	0	kind of hysteresis (0 = asymmetrical, 1 = symmetrical) [9]
rb5	0	1	—	0	second working setpoint modification lock-out (1 = YES) [9]

LABEL	MIN.	MAX.	U.M.	DEF.	LOAD 1 PROTECTION
CA0	0	999	s	0	minimum delay between you turn the instrument ON and the first load 1 activation
CA1	0	999	s	0	minimum delay between two load 1 activation in succession
CA2	0	999	s	0	minimum delay between the load 1 gets OFF and the following activation
CA3	0	1	—	0	load 1 status during the room probe alarm (0 = it will be forced OFF, 1 = it will be forced ON)
CA4	0	1	—	0	fixed delay since the load 1 gets ON and OFF (1 = YES, for 3 s)

LABEL	MIN.	MAX.	U.M.	DEF.	LOAD 2 PROTECTION
Cb0	0	999	s	0	minimum delay between you turn the instrument ON and the first load 2 activation
Cb1	0	999	s	0	minimum delay between two load 2 activation in succession
Cb2	0	999	s	0	minimum delay between the load 2 gets OFF and the following activation
Cb3	0	1	—	0	load 2 status during the room probe alarm (0 = it will be forced OFF, 1 = it will be forced ON)
Cb4	0	1	—	0	fixed delay since the load 2 gets ON and OFF (1 = YES, for 3 s)

LABEL	MIN.	MAX.	U.M.	DEF.	FIRST ALARM
AA0	0.1	999	°C/°F [8]	0.1	hysteresis (differential, it is relative to AA1, it is important if AA4 ≠ 1)
AA1	-99	999	°C/°F [8]	0.0	first temperature alarm threshold (it is important if AA4 ≠ 1); look at AA4 as well
AA3	0	999	min	0	first temperature alarm exclusion time since you turn the instrument ON (it is important if AA4 ≠ 1)
AA4	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 first working setpoint, 5 = upper temperature alarm relative to the first working setpoint, 6 = lower temperature alarm relative to the first working setpoint with automatic calculation and enabling, 7 = upper temperature alarm relative to the first working setpoint with automatic calculation and enabling)