

# FK 902A FK 902B

**ON-OFF digital controller for ventilated refrigerating units with compressor working hours counter**

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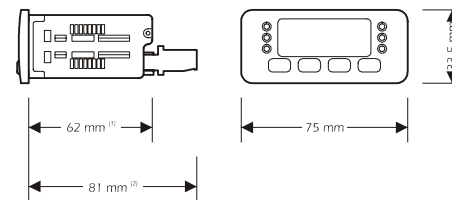
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**ENGLISH**

## 1 PREPARATIONS

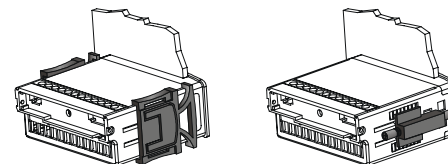
### 1.1 How to install the instrument

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 (standard model)

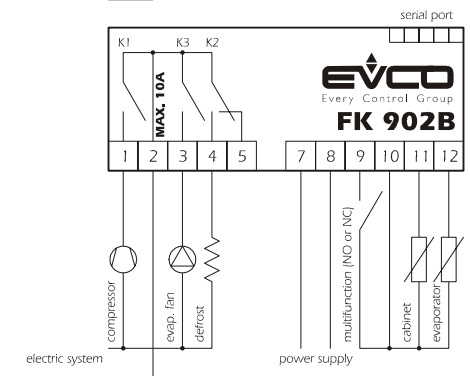
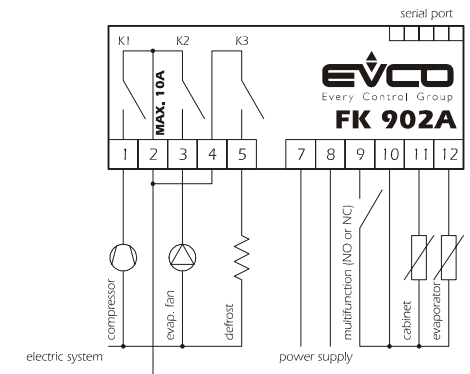
(2) maximum depth with extractable terminal blocks (by request).



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



## 2 OPERATION

### 2.1 Preliminary information

During the normal operation the instrument shows the cabinet temperature.

### 2.2 How to silence the buzzer

If you have to silence the buzzer:

- press

### 2.3 How to activate the defrost by hand

If you have to activate the defrost by hand:

- press for 4 s

Unless the evaporator temperature is below the defrost end temperature you have set with the parameter d2, the defrost will not be activated.

### 3 WORKING SETPOINT

#### 3.1 How to set the working setpoint

If you have to modify the working setpoint value:

- press and or <sup>(3)</sup>

(3) 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 **PR**

If you have to select a parameter:

- press or

If you have to modify the value of the parameter:

- press and or

If you have to gain access the second level:

- gain access the first level
- press or for selecting **PR**
- press and or for setting “-19”
- press and for 4 s : the instrument will show **PD**

If you have to quit the procedure:

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

### 5 ADDITIONAL FUNCTIONS

#### 5.1 Compressor working hours counter

The instrument stores the compressor working hours <sup>(4)</sup> <sup>(5)</sup> <sup>(6)</sup>.

If you have to show the compressor working hours the instrument has stored:

- gain access the first level of configuration parameters
- press or for selecting **EL**
- press

If you have to show the thousands of compressor working hours the instrument has stored:

- gain access the first level of configuration parameters
- press or for selecting **EH**
- press

If you have to erase both the compressor working hours and the thousands of compressor working hours the instrument has stored:

- gain access the second level of configuration parameters
- press or for selecting **EL** or **EH**
- press and for 4 s : the instrument will show **0**

- (4) the instrument stores the compressor working time every 30 min
- (5) every time a lack of power supply takes place, the first compressor working time storage takes place after 15 min the power supply has recovered, in order to count however the compressor working time even if the lacks of power supply take place over and over again
- (6) the instrument can store up to 65,535 compressor working hours.

### 6 SIGNALS

#### 6.1 Signals

LED	MEANING
	Compressor LED if it is lighted, the compressor will be ON if it flashes, a compressor delay will be running (look at the parameters C0, C1, C2 and C4)
	Defrost LED if it is lighted, the defrost output will be activated if it flashes: <ul style="list-style-type: none"> <li>a defrost delay will be running (look at the parameters C0, C1, C2 and C4)</li> <li>the dripping will be running (look at the parameter d7)</li> <li>the freezing fluid heating will be running (look at the parameter dP)</li> </ul>
	Evaporator fan LED if it is lighted, the evaporator fan will be ON if it flashes, the after dripping evaporator fan delay will be running (look at the parameter F5)

### 7 ALARMS

#### 7.1 Alarms

CODE	REASONS	REMEDIES	EFFECTS
<b>E2</b> 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	<ul style="list-style-type: none"> <li>you can not gain access the setting procedures</li> <li>all outputs will be forced OFF</li> </ul>

- (13) if at the moment of the defrost activation the cabinet temperature is below the value “working setpoint + r0”, the instrument will not show temperatures above that value; if at the moment of the defrost activation the cabinet temperature is above the value “working setpoint + r0”, the instrument will not show the increases of the temperature (if the increase takes place below the value “working setpoint + r0”, look at the previous case); the instrument restores the normal operation once the after dripping evaporator fan delay ends and the cabinet temperature falls below the freeze temperature
- (14) if at the moment of the defrost activation the compressor is ON since a time lower than the one you have set with the parameter, the compressor will be forced ON for a time such as to finish the time you have set with the parameter
- (15) if the temperature alarm does not disappear at the end of the time you have set with the parameter A3, it will further be excluded for the time you have set with the parameter A6; if the temperature alarm takes place during the defrost and does not disappear at the end of the time you have set with the parameter A7, it will further be excluded for the time you have set with the parameter A6
- (16) the evaporator fan stop temperature is “cabinet temperature - F1”; you always have to consider the parameter F1 with positive sign.

LABEL	MIN.	MAX.	U.M.	DEF.	EVAPORATOR FAN
F1	-55	99	°C/°F <sup>(7)</sup>	-1	evaporator fan stop temperature (evaporator temperature, it is important if /A = 1 and F7 = 3 or 4); look at F6 as well
F2	1	15	°C/°F <sup>(7)</sup>	2	hysteresis (differential, it is relative to F1, it is important if /A = 1 and F7 = 3 or 4)
F4	0	2	—	0	evaporator fan action during the defrost and dripping (0 = it will be forced OFF, 1 = it will be forced ON, 2 = it will work in accordance with F7)
F5	0	15	min	2	after dripping evaporator fan delay
F6	0	1	—	0	kind of evaporator fan stop temperature (it is important if /A = 1 and F7 = 3 or 4; 0 = absolute evaporator fan stop temperature, 1 = evaporator fan stop temperature relative to the cabinet temperature) <sup>(14)</sup>
F7	0	4	—	4	evaporator fan action during the normal operation (0 = it will be forced OFF, 1 = it will be forced ON, 2 = it will work in accordance with the compressor, 3 = it will work in accordance with F1 and F2, 4 = if the compressor is ON, it will work in accordance with F1 and F2, if the compressor is OFF, it will be forced OFF)

LABEL	MIN.	MAX.	U.M.	DEF.	DIGITAL INPUTS
i0	0	5	—	4	action given by the multifunction input activation (0 = inactive, 1 = once d5 has passed, the defrost will be activated <sup>(12)</sup> , 2 = reserved, 3 = the compressor will be forced ON, 4 = the compressor and the evaporator fan will be forced OFF, 5 = the evaporator fan will be forced OFF)
i1	0	1	—	0	kind of contact of the multifunction input (it is important if i0 ≠ 0; 0 = NO, 1 = NC)

LABEL	MIN.	MAX.	U.M.	DEF.	SERIAL NETWORK (EVCOBUS)
L1	1	15	—	1	instrument address
L2	0	7	—	6	instrument group
L4	0	3	—	1	baud rate (0 = 1,200 baud, 1 = 2,400 baud, 2 = 4,800 baud, 3 = 9,600 baud)

LABEL	MIN.	MAX.	U.M.	DEF.	COMPRESSOR WORKING HOURS COUNTER
CL	—	—	h	—	compressor working hours showing
CH	—	—	kh <sup>(8)</sup>	—	thousands of compressor working hours showing

(7) the unit of measure depends on the parameter /B

(8) kh = 1,000 hours

(9) once you have modified the value of the parameter, you will have to switch off the power supply of the instrument

(10) if the parameter has value 0, the defrost will end by time (parameter d3); if the parameter F7 has value 3 or 4, the evaporator fan will work in accordance with the compressor, except what you have set with the parameters F4 and F5

(11) if you have to clear the delay between you turn the instrument ON and the first compressor activation, press  for 4 s 

(12) unless the evaporator temperature is below the defrost end temperature you have set with the parameter d2, the defrost will not be activated

<b>ED</b>	cabinet	the kind of cabinet probe	look at the parameter /D	the compressor will work in accordance with the parameters C5 and C6
	alarm	the cabinet probe plays up	test the integrity of the probe	if the defrost is running, it will immediately end
<b>EI</b>	evaporator probe	the connection instrument-cabinet probe is wrong	test the instrument-probe connection	the defrost will never be activated
	alarm	the cabinet temperature is outside the limits allowed by the working range of the instrument	test the temperature close to the probe (it has to be between the limits allowed by the working range)	if the parameter F7 has value 3 or 4, the evaporator fan will work in accordance with the compressor, except what you have set with the parameters F4 and F5
<b>ALn</b>	for 1 s	the multifunction input is active	deactivate the input (look at the parameters i0 and i1)	you will get the action you have chosen with the parameter i0
	every 4	the evaporator probe plays up	test the instrument-probe connection	the defrost will end by time (parameter d3)
<b>ALn</b>	cabinet	the cabinet temperature is outside the limit	test the temperature close to the probe	no effects
	temperature	you have set with the parameter A1 or A2	look at the parameters A0, A1 and A2	
<b>ALn</b>	lower or upper	the evaporator temperature alarm		

The instrument shows the indications above flashing, except the indication "Ain" (it is alternated with the cabinet temperature) and the buzzer utters an intermittent beep.

## 8 TECHNICAL DATA

### 8.1 Technical data

**Box:** self-extinguishing grey.

**Size:** 75 x 33.5 x 62 mm (2.95 x 1.31 x 2.44 in) the model with screw terminal blocks, 75 x 33.5 x 81 mm (2.95 x 1.31 x 3.18 in) the model with extractable 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:** screw terminal blocks with pitch 5 mm (0.19 in) for cables up to 2.5 mm<sup>2</sup> (0.38 sq in, power supply, inputs and outputs) or extractable terminal blocks with pitch 5 mm (0.19 in) for cables up to 2.5 mm<sup>2</sup> (0.38 sq in, power supply, inputs 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.

**Alarm buzzer:** by request.

**Measure inputs:** 2 (cabinet and evaporator probe) for PTC or NTC probes.

**Digital inputs:** 1 multifunction input (NO or NC contact) free of voltage.

**Working range:** from -50 to 99 °C (-58 to 210 °F) for PTC probe, from -40 to 99 °C (-40 to 210 °F) for NTC probe.

**Setpoint range:** from -55 to 99 °C (-55 to 99 °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 indicators.

**Outputs FK 902A:** 3 relays: one 10 A @ 250 Vac relay for one ½ HP @ 230 Vac compressor control (NO contact), one 8 A @ 250 Vac relay for evaporator fan control (NO contact) and one 8 A @ 250 Vac relay for defrost system control (NO contact).

**Outputs FK 902B:** 3 relays: one 10 A @ 250 Vac relay for one ½ HP @ 230 Vac compressor control (NO contact), one 8 A @ 250 Vac relay for evaporator fan control (NO contact) and one 8 A @ 250 Vac relay for defrost system control (change-over contact).

**Kind of defrost:** electric and hot gas defrost.

**Defrost control:** defrost interval, defrost end temperature and defrost maximum length (automatic, by hand and remote).

**Serial port:** TTL with EVCOBUS communication protocol.

## 9 WORKING SETPOINT AND CONFIGURATION PARAMETERS

### 9.1 Working setpoint

LABEL	MIN.	MAX.	U.M.	DEF.	WORKING SETPOINT
r1	r2		°C/°F <sup>(7)</sup>	0	working setpoint

### 9.2 First level parameters

LABEL	MIN.	MAX.	U.M.	DEF.	PASSWORD
PA	-55	99	—	0	password

LABEL	MIN.	MAX.	U.M.	DEF.	MEASURE INPUTS
/1	-55	99	°C/°F <sup>(7)</sup>	0	cabinet probe calibration (you have to set eight points for adjusting one degree)
/6	-55	99	°C/°F <sup>(7)</sup>	0	evaporator probe calibration (it is important if /A = 1, you have to set eight points for adjusting one degree)

LABEL	MIN.	MAX.	U.M.	DEF.	REGULATOR
r0	1	15	°C/°F <sup>(7)</sup>	2	hysteresis (differential, it is relative to the working setpoint)

LABEL	MIN.	MAX.	U.M.	DEF.	DEFROST
dA	—	—	°C/°F <sup>(7)</sup>	—	evaporator temperature showing (it is important if /A = 1)

LABEL	MIN.	MAX.	U.M.	DEF.	COMPRESSOR WORKING HOURS COUNTER
CL	—	—	h	—	compressor working hours showing
CH	—	—	kh <sup>(8)</sup>	—	thousands of compressor working hours showing

### 9.3 Second level parameters

LABEL	MIN.	MAX.	U.M.	DEF.	MEASURE INPUTS
/0	1	4	—	3	kind of probe (1 = PTC, 2 = reserved, 3 = NTC, 4 = reserved)
/1	-55	99	°C/°F <sup>(7)</sup>	0	cabinet probe calibration (you have to set eight points for adjusting one degree)
/6	-55	99	°C/°F <sup>(7)</sup>	0	evaporator probe calibration (it is important if /A = 1, you have to set eight points for adjusting one degree)
/8	0	1	—	1	temperature unit of measure (0 = Fahrenheit degree, 1 = Celsius degree)
/A	0	1	—	1	evaporator probe presence (and its functions; 1 = YES) <sup>(9) (10)</sup>

LABEL	MIN.	MAX.	U.M.	DEF.	REGULATOR
r0	1	15	°C/°F <sup>(7)</sup>	2	hysteresis (differential, it is relative to the working setpoint)
r1	-55	r2	°C/°F <sup>(7)</sup>	-50	minimum value you can assign to the working setpoint
r2	r1	99	°C/°F <sup>(7)</sup>	50	maximum value you can assign to the working setpoint

LABEL	MIN.	MAX.	U.M.	DEF.	COMPRESSOR PROTECTION
C1	0	240	min	5	minimum delay between two compressor activation in succession
C2	0	240	min	3	minimum delay between the compressor gets OFF and the following activation (it sets the minimum delay between you turn the instrument ON and the first compressor activation as well) <sup>(11)</sup>
C4	0	1	—	0	fixed delay since the compressor gets ON and OFF (1 = YES, for 3 s)
C5	1	240	min	10	cycle time for the compressor activation during the cabinet probe alarm
C6	0	100	%	50	percentage of C5 the compressor is ON during the cabinet probe failure

LABEL	MIN.	MAX.	U.M.	DEF.	DEFROST
d0	0	99	h	8	defrost interval <sup>(12)</sup> (0 = the defrost will never automatically be activated)
d1	0	1	—	0	kind of defrost (0 = electric defrost, 1 = hot gas defrost)
d2	-55	99	°C/°F <sup>(7)</sup>	2	defrost end temperature (evaporator temperature, it is important if /A = 1)
d3	0	240	min	30	defrost maximum length (0 = the defrost will never be activated)
d4	0	1	—	0	defrost activation every time you turn the instrument ON (1 = YES) <sup>(12)</sup>
d5	0	99	min	0	delay between you turn the instrument ON and the defrost activation (it is important if d4 = 1)
d6	0	1	—	1	freeze of the temperature showed by the instrument during the defrost (1 = YES) <sup>(13)</sup>
d7	0	15	min	2	dripping time
d9	0	1	—	0	compressor protections cleaning at the moment of the defrost activation (it is important if d1 = 1; 1 = YES)
dA	—	—	°C/°F <sup>(7)</sup>	—	evaporator temperature showing (it is important if /A = 1)
dP	0	99	min	0	minimum time the compressor must have been ON at the moment of the defrost activation in order that the defrost can be activated (it is important if d1 = 1) <sup>(14)</sup>

LABEL	MIN.	MAX.	U.M.	DEF.	ALARMS
A0	1	15	°C/°F <sup>(7)</sup>	2	hysteresis (differential, it is relative to A1 and A2, it is important if A1 and/or A2 ≠ 0)
A1	-55	0	°C/°F <sup>(7)</sup>	-10	lower temperature alarm threshold (it is relative to the working setpoint, 0 = it will never be activated)
A2	0	99	°C/°F <sup>(7)</sup>	10	upper temperature alarm threshold (0 = it will never be activated; the upper temperature alarm threshold is "working setpoint + r0 + A2")
A3	0	240	min	120	temperature alarm exclusion time since you turn the instrument ON (it is important if A1 and/or A2 ≠ 0)
A5	-1	120	min	30	buzzer exclusion time since the multifunction input activation (it is important if i0 ≠ 0; -1 = the buzzer will never be activated)
A6	0	240	min	5	temperature alarm exclusion time (it is important if A1 and/or A2 ≠ 0) <sup>(15)</sup>
A7	0	240	min	15	temperature alarm exclusion time since the end of the after dripping evaporator fan delay (since the end of F5, it is important if A1 and/or A2 ≠ 0)