EVK404 Four outputs universal digital controller

Ⓘ ENGLISH

MAIN INDEX

1 IMPORTANT

1.1 Important

Please read these instructions carefully prior to installation and use and follow the precautions for installation and electric connection; keep these instructions with the device for future consultation.
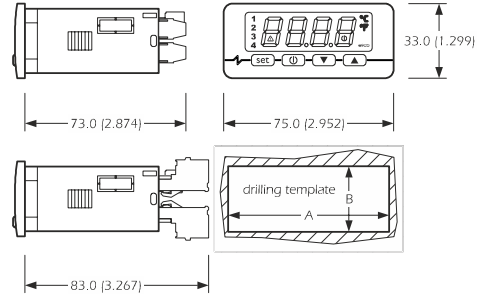
The device must be disposed of in compliance with local Standards regarding the collection of electric and electronic equipment.
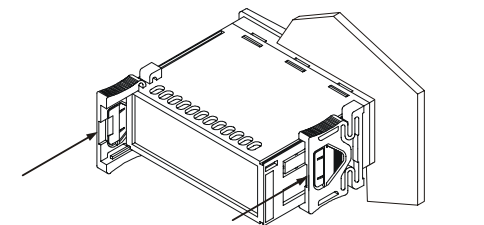
2 DIMENSIONS AND INSTALLATION

2.1 Dimensions

The dimensions are expressed in mm (in).

33.0 (1.299)

73.0 (2.874)   75.0 (2.952)

drilling template
A
B

83.0 (3.267)

DIMENS.	MINIMUM	TYPICAL	MAXIMUM
A	71.0 (2.795)	71.0 (2.795)	71.8 (2.826)
B	29.0 (1.141)	29.0 (1.141)	29.8 (1.173)

2.2 Installation

Per panel using the snap-on brackets supplied.

2.3 Installation warnings

▪ the thickness of the panel must not exceed 8.0 mm (0.314 in)
▪ make sure the work conditions (temperature of use, humidity, etc.) lie within the limits indicated in the technical data.
▪ do not install the device near to any heat sources (heating elements, hot air ducts etc.), equipment containing powerful magnets (large diffusers, etc), areas affected by direct sunlight, rain, humidity, excessive dust, mechanical vibrations or shocks.
▪ in compliance with Safety Standards, the device must be installed correctly and in a way to protect against any contact with electric parts; all parts that ensure protection must be fixed in a way that they cannot be removed without the use of tools.
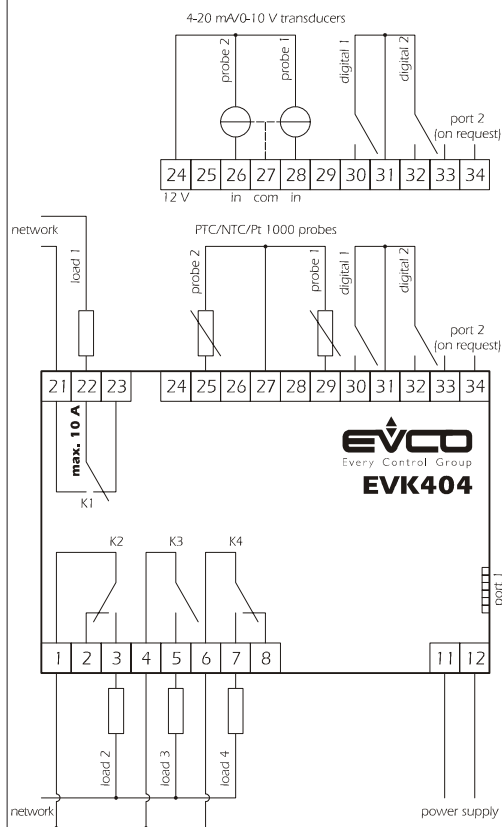
3 ELECTRIC CONNECTION

3.1 Foreword

With reference to the wiring diagram:
▪ port 1 (on request) is the TTL serial port for communication with the EVKEY programming key, with the Parameters Manager set-up software (via a serial interface, with MODBUS communication protocol) or for for that for monitoring or supervision of RICS plants (via a serial interface, with MODBUS communication protocol); the port must be used for one purpose at a time.
▪ port 2 (on request) is the port for communication with the EVT100 remote indicator; the indicator displays the magnitude established with parameter P6.

3.2 Electric connection

4-20 mA/0-10 V transducers

| 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 |
12 V   in com in

PTC/NTC/Pt 1000 probes

| 21 | 22 | 23 | | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 |

max. 10 A

EVCO
Every Control Group
EVK404

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 11 | 12 |

network   power supply

3.3 Warnings for the electric connection

▪ do not use electric or pneumatic screwdrivers on the terminal board
▪ if the device has been taken from a cold to hot place, the humidity could condense inside; wait about 1 hour before powering it
▪ make sure that the power supply voltage, the frequency and the operational electric power of the device, correspond with those of the local power supply
▪ disconnect the power supply before proceeding with any type of maintenance
▪ do not use the device as a safety device
▪ for repairs and information regarding the device, contact the EVCO sales network.

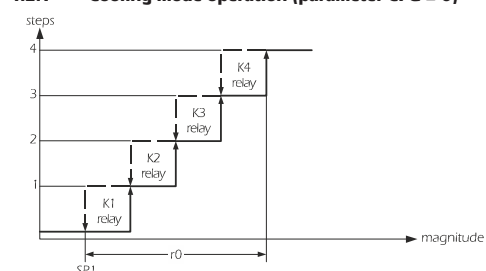## 4 OPERATION

4.1 Foreword

Operation depends mainly on the parameter CFG; paragraphs 4.2.1 ... 4.2.10 illustrate operation according to the value of this parameter.

The magnitude associated with the regulation is that detected by probe 1, unless the CFG parameter is set at 8, if and when operation is with two independent neutral areas.

In the diagrams shown in paragraphs 4.2.1 ... 4.2.10 the switch-on and switch-off sequence of the relays is fixed; it can be modified via parameter C13.

Using the Soft switch-on function (see paragraph 4.3) it is also possible to increase or decrease the work set-point gradually on device switch-on.

Via parameter P9 it is finally possible to subject device operation to the value of the magnitude detected by probe 2 (see paragraph 4.4).

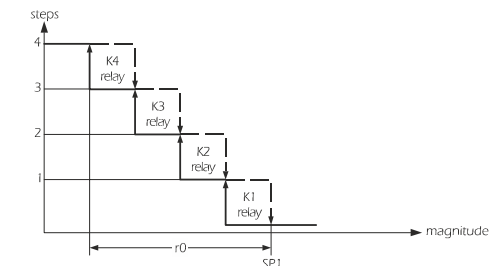See paragraph 6.3 to set the configuration parameters.

4.2.1 Cooling mode operation (parameter CFG = 0)

steps

CODE	MEANING
SP1	work set-point
r0	work set-point differential

If the magnitude is below SP1, all relays will remain off.

If the magnitude is within r0, the relays will be on (and off) in succession; switch-ons (and switch-offs) will be distributed proportionally to the number of relays used for the regulation (four).

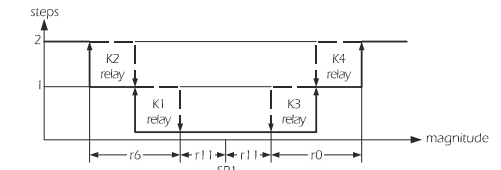If the magnitude exceeds "SP1 + r0", all relays will remain on.

4.2.2 Heating mode operation (CFG parameter = 1); factory setting

steps

CODE	MEANING
SP1	work set-point
r0	work set-point differential

If the magnitude exceeds SP1, all relays will remain off.

If the magnitude is within r0, the relays will be on (and off) in succession; switch-ons (and switch-offs) will be distributed proportionally to the number of relays used for the regulation (four).

If the magnitude is below "SP1 - r0", all relays will remain on.
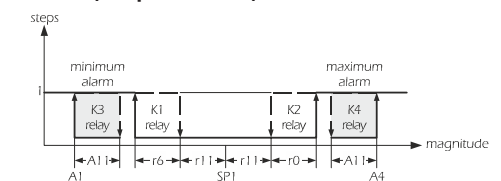
4.2.3 Neutral area operation (parameter CFG = 2)

steps

CODE	MEANING
SP1	work set-point
r0	relay differential with cooling mode operation (relays K3 and K4)
r6	relay differential with heating mode operation (relays K1 and K2)
r11	neutral area value

If the magnitude is within r11, all relays will remain off.

If the magnitude is within r6, the relays with heating mode operation will be on (and off) in succession; switch-ons (and switch-offs) will be distributed proportionally to the number of relays used for the regulation (two).

If the magnitude is below "SP1 - r11 - r6", the relays with heating mode operation will remain on.

If the magnitude is within r0, the relays with cooling mode operation will be on (and off) in succession; switch-ons (and switch-offs) will be distributed proportionally to the number of relays used for the regulation (two).

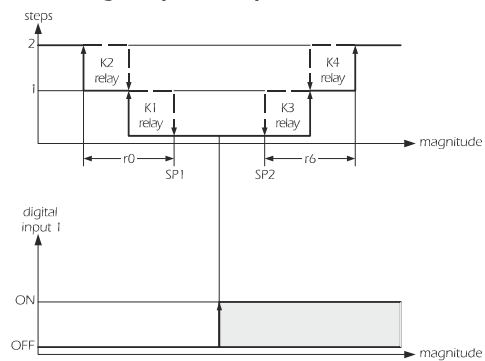If the magnitude exceeds "SP1 + r11 + r0", the relays with cooling mode operation will remain on.

4.2.4 Neutral area operation with alarm relay (CFG parameter = 3)

steps

minimum alarm   maximum alarm

CODE	MEANING
SP1	work set-point
r0	relay differential with cooling mode operation (relay K2)
r6	relay differential with heating mode operation (relay K1)
r11	neutral area value
A1	magnitude value below which the minimum alarm is activated (code "AL")
A4	magnitude value over which the minimum alarm is activated (code "AH")
A11	parameters A1 and A4 differential

If the magnitude is within r11, all relays will remain off.

If the magnitude drops below "SP1 - r11 - r6", the relay with heating mode operation will be on (it will be off over "SP1 - r11").

If the magnitude rises above "SP1 + r11 + r0", the relay with cooling mode operation will be on (it will be off below "SP1 + r11").

If the magnitude drops below A1, the minimum alarm signal relay will be on (it will be off over "A1 + A11").

If the magnitude rises above A4, the maximum alarm signal relay will be on (it will be off over "A4 + A11").

4.2.5 Operation in cooling or heating mode from digital input 1 (CFG parameter = 4)
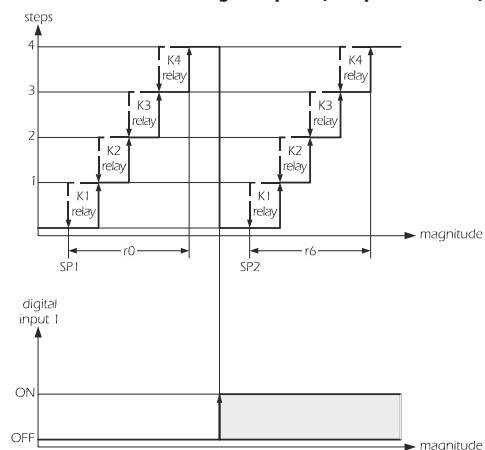
CODE	MEANING
SP1	work set-point with heating mode operation
SP2	work set-point with cooling mode operation
r0	work set-point differential with heating mode operation (SP1)
r6	work set-point differential with cooling mode operation (SP2)

If the digital input 1 is not active, the device will operate with heating mode (see paragraph 4.2.2); the set-point associated with the regulation will be SP1.

If the digital input 1 is active, the device will operate with cooling mode (see paragraph 4.2.1); the set-point associated with the regulation will be SP2.

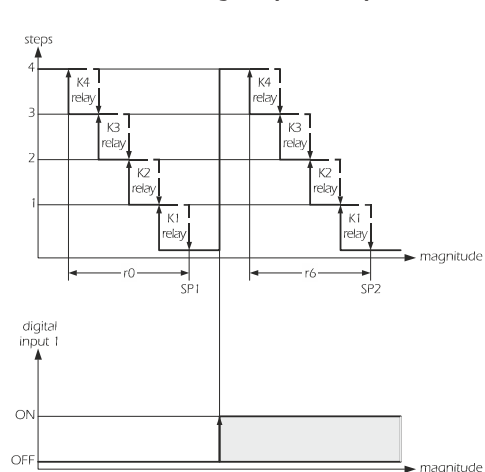### 4.2.6 Operation in cooling mode with Energy Saving function from digital input 1 (CFG parameter = 5)

CODE	MEANING
SP1	work set-point with digital input 1 not active
SP2	work set-point with digital input 1 active
r0	work set-point differential with digital input 1 not active (SP1)
r6	work set-point differential with digital input 1 active (SP2)

The device will operate with cooling mode operation (see paragraph 4.2.1).

If digital input 1 is not active, the set-point associated to the regulation will be SP1; if the digital input 1 is active, the set-point associated to the regulation will be SP2.

4.2.7 Operation in heating mode with Energy Saving function from digital input 1 (CFG parameter = 6)

CODE	MEANING
SP1	work set-point with digital input 1 not active
SP2	work set-point with digital input 1 active
r0	work set-point differential with digital input 1 not active (SP1)
r6	work set-point differential with digital input 1 active (SP2)

The device will operate with heating mode (see paragraph 4.2.2).

If digital input 1 is not active, the set-point associated to the regulation will be SP1; if the digital input 1 is active, the set-point associated to the regulation will be SP2.
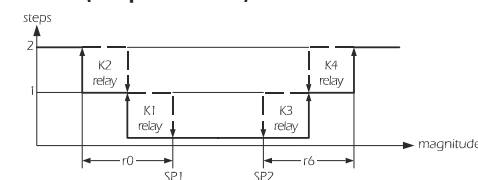
4.2.8 Operation for cooling and heating mode with two independent work set-points (CFG parameter = 7)

CODE	MEANING
SP1	work set-point with heating mode operation
SP2	work set-point with cooling mode operation
r0	work set-point differential with heating mode operation (SP1)
r6	work set-point differential with cooling mode operation (SP2)

If the magnitude exceeds SP1, the relays K1 and K2 will remain off.

If the magnitude is within r0, the relays K1 and K2 will be on (and off) in succession; switch-ons (and switch-offs) will be distributed proportionally to the number of relays used for the regulation (two).
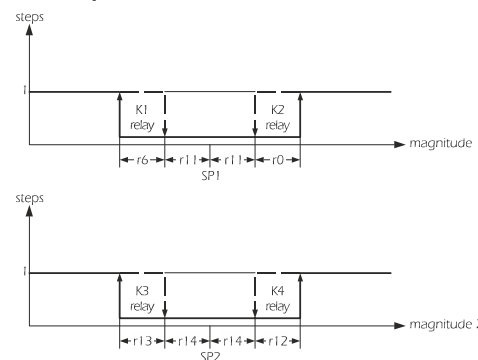
If the magnitude is below "SP1 - r0", the relays K1 and K2 will remain on.

If the magnitude exceeds SP2, the relays K3 and K4 will remain off.

If the magnitude is within r6, the relays K3 and K4 will be on (and off) in succession; switch-ons (and switch-offs) will be distributed proportionally to the number of relays used for the regulation (two).

If the magnitude exceeds "SP2 + r6", the relays K3 and K4 will remain on.

4.2.9 Operation with two independent neutral areas (parameter CFG =8)

CODE	MEANING
SP1	work set-point SP1 (the magnitude associated to the adjustment is that detected by probe 1)
r0	differential (of the work set-point SP1) of the relay with cooling mode operation (relay K2)
r6	differential (of the work set-point SP1) of the relay with heating mode operation (relay K1)
r11	neutral area value (of the work set-point SP1)
SP2	work set-point SP2 (the magnitude associated to the adjustment is that detected by probe 2)
r12	differential (of the work set-point SP2) of the direct operation relay (for example, to dehumidify; relay K4)
r13	differential (of the work set-point SP2) of the heating mode operation relay (for example, to humidify; relay K3)
r14	neutral area value (of the work set-point SP2)

If the magnitude detected by probe 1 is within r11, the K1 and K2 relays will remain off.

If the magnitude detected by probe 1 drops below "SP1 - r11 - r6", relay K1 will be switched on (it will be switched off over "SP1 - r11").
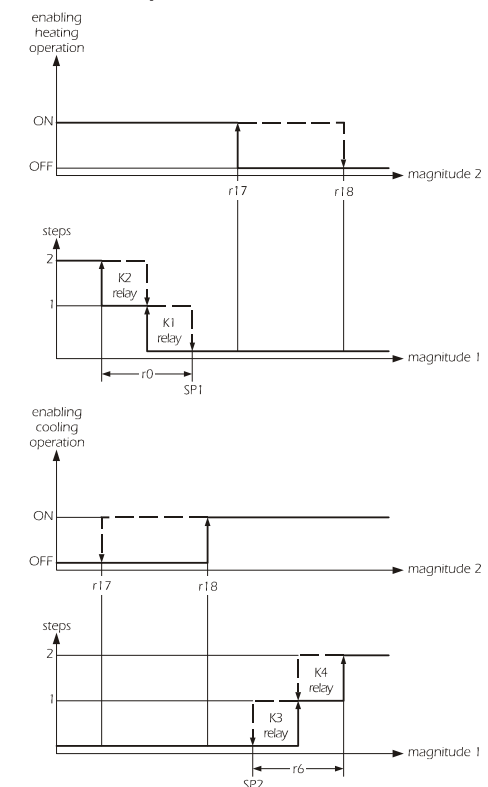
If the magnitude detected by probe 1 rises above "SP1 + r11 + r0", relay K2 will be switched on (it will be switched off below "SP1 + r11").

If the magnitude detected by probe 2 is within r14, the K3 and K4 relays will remain off.

If the magnitude detected by probe 2 drops below "SP2 - r14 - r13", relay K3 will be switched on (it will be switched off over "SP2 - r14").

If the magnitude detected by probe 2 rises above "SP2 + r14 + r12", relay K4 will be switched on (it will be switched off below "SP2 + r14").

4.2.10 Operation in cooling or heating mode from probe 2 (CFG parameter = 9)

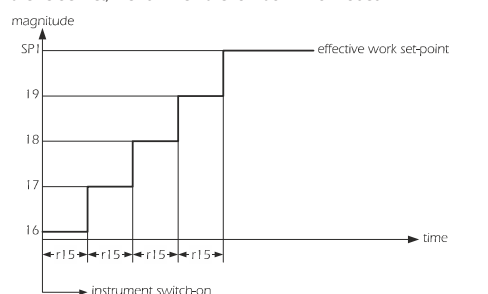| CODE	MEANING
SP1	work set-point with heating mode operation
SP2	work set-point with cooling mode operation
r0	work set-point differential with heating mode operation (SP1)
r6	work set-point differential with cooling mode operation (SP2)
r17	magnitude value detected by probe 2 below which the heating mode operation is enabled
r18	magnitude value detected by probe 2 over which the cooling mode operation is enabled

The device will operate with cooling or heating mode (see paragraph 4.2.8).

For the cooling mode operation (or heating mode) to be enabled, the magnitude detected by probe 2 must have remained in continuous mode above that established with parameter r18 (or below that established below r17) for the time established with parameter r21.

4.3 Soft switch-on function

The Soft switch-on allows to increase (heating mode operation) or decrease (cooling mode operation) the work set-points gradually on device switch-on.

On expiry of the time established with parameter r15, the set-points are increased or decreased by one unit (temporary set-points) starting from the value of the magnitude to device switch-on until reaching the values set, if and when the function is concluded.

In the example:
- the operation is for heating mode
- the magnitude value on device switch-on is 16
- the work set-point SP1 is set at 20.

4.4 Device operation in the presence of probe 2

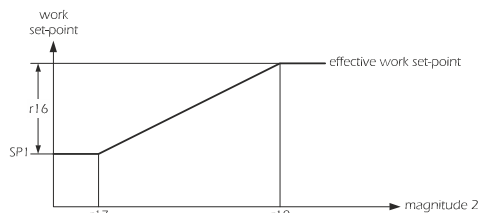In the presence of probe 2, device operation depends mainly on parameter P9.

No probe (parameter P9 = 0)
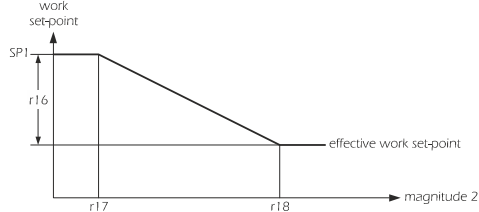Factory settings.

Differential operation (parameter P9 = 1); only if CFG = 0, 1, 2 or 3
The magnitude associated to the regulation will be "magnitude detected by probe 1 - magnitude detected by probe 2".

Operation with summer compensation of the work set-point SP1 (parameter P9 = 2); only is CFG = 0, 1, 2 or 3

Example 1: parameter r16 is set at a positive value.

Example 2: parameter r16 is set at a negative value.

CODE	MEANING
SP1	work set-point SP1
r16	maximum value of the summer compensation of the work set-point SP1
r17	value of the magnitude detected by probe 2 over which summer compensation of the work set-point SP1 is started
r18	value of the magnitude detected by probe 2 over which summer compensation of the work set-point SP1 is concluded

The value of the work set-point SP 1 is however subject to the values established with parameters r1 and r2.

Operation with winter compensation of the work set-point SP1 (parameter P9 = 3); only is CFG = 0, 1, 2 or 3
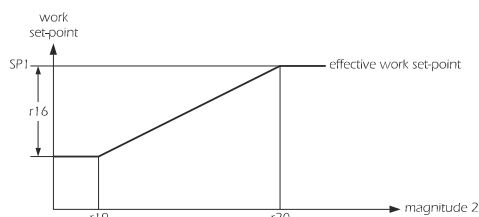

Example 1: parameter r16 is set at a positive value.

Example 2: parameter r16 is set at a negative value.

CODE	MEANING
SP1	work set-point SP1
r16	maximum value of the winter compensation of the work set-point SP1
r19	value of the magnitude detected by probe 2 below which summer compensation of the work set-point SP1 is concluded
r20	value of the magnitude detected by probe 2 below which winter compensation of the work set-point SP1 is started

The value of the work set-point SP 1 is however subject to the values established with parameters r1 and r2.

Operation with combined compensation of the work set-point SP1 (parameter P9 = 4); only is CFG = 0, 1, 2 or 3

Example 1: parameter r16 is set at a positive value.

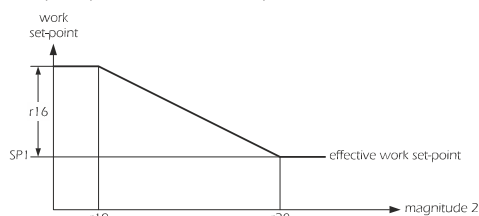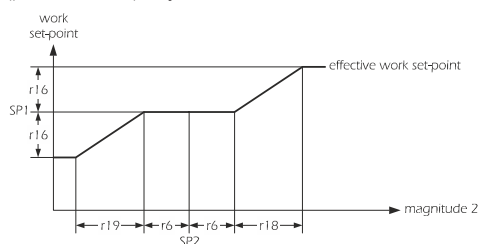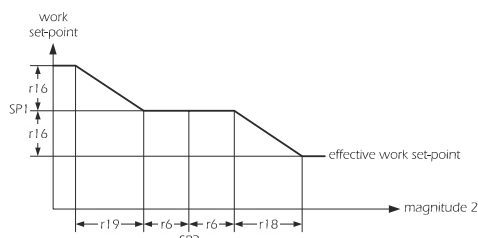Example 2: parameter r16 is set at a negative value.

CODE	MEANING
SP1	work set-point SP1
SP2	work set-point SP2
r6	neutral area value with combined compensation operation of the work set-point SP1
r18	value of the magnitude detected by probe 2 over which combined compensation of the work set-point SP1 is concluded (relative to "SP2 + r6")
r19	value of the magnitude detected by probe 2 below which combined compensation of the work set-point SP1 is concluded (relative to "SP2 - r6")

The value of the work set-point SP 1 is however subject to the values established with parameters r1 and r2.

4.5 Work program function

The Work Program function allows to reach and maintain five magnitudes (with different values) during five respective time intervals (hereon called phases).

On conclusion of a phase, the device passes automatically to the next one; on conclusion of the fifth phase the device restores normal operation and the function is concluded.

If the magnitude has not reached the respective value at the conclusion of a phase, the device will still pass to the next phase.

If the duration of the first ... fourth phase is set at a nil value, on reaching the respective value, the device will pass to the next phase. If the duration of the fifth phase is set at a nil value, the phase will continue until the function is interrupted in manual mode.

If a power cut occurs during operation, this will be concluded.

To activate/deactivate the function:

The activation/deactivation mode of the function depends on parameter r23.

▪ if parameter r23 is set at 0, the function will be absent
▪ if parameter r2 is set at 1, the ▲ key must be pressed for 4 s, on condition that the keyboard is not blocked
▪ if parameter r23 is set at 2, it will be necessary to activate the digital input 1 (or digital input 2), on condition that the parameter i0 (or the parameter i5) is set at 4.

When the function is interrupted, the display will show the "**StOP**" indication flashing for 4 s.

During the function:

During the function, the display shows the "**Ph**" indication followed by the number of the phase (for example "**Ph2**") for ½ s every 4 s.

On conclusion of the function:

On conclusion of the function, the display shows the "**EndP**" indication flashing ½ s every 4 s; press a key to delete the "**EndP**" indication.

CODE	MEANING
r24	duration of the first phase of the work program
r25	magnitude detected by probe 1 to be reached and maintained during the first phase of the work program
r27	duration of the second phase of the work program
r28	magnitude detected by probe 1 to be reached and maintained during the second phase of the work program
r30	duration of the third phase of the work program
r31	magnitude detected by probe 1 to be reached and maintained during the third phase of the work program
r33	duration of the fourth phase of the work program
r34	magnitude detected by probe 1 to be reached and maintained during the fourth phase of the work program
r36	duration of the fifth phase of the work program
r37	magnitude detected by probe 1 to be reached and maintained during the fifth phase of the work program

If CFG parameter is set at 8, the function will allow to reach and maintain five magnitudes detected by probe 1 and five magnitudes detected by probe 2.

5 USER INTERFACE
5.1 Foreword

The user interface is composed of a custom 4 digit display (with decimal point and function icons) and by 4 keys (SET, UP, DOWN and ON/STAND-BY).

The following operating states exist:

▪ "on" state (the device is powered and is on: the relays can be switched on)
▪ the "stand-by" state (the device is powered but is off via software: the relays are off)
▪ the "off" state (the device is not powered).

Hereon, the term "switch on" means the passage from the stand-by state to the on state. The term "switch off" means passage from the on state to the stand-by state.

When powered, the device will be in the same state as when the power supply was cut-off.

5.2 Device switch-on/off in manual mode

▪ make sure that the keyboard is not blocked and that no procedure is in progress
▪ make sure that the device has not switched off in remote mode (parameter i0 = 3 and digital input 1 active and/or parameter i5 = 3 and digital input 2 active)
▪ press ⏻ for 1 s: the on/stand-by LED will switch off/on.

Using the digital inputs 1 and 2 it is also possible to switch the device on/off in remote mode.

5.3 The display

If the device is on, during normal operation the display will show the magnitude established with parameter P5:

▪ if P5 = 0, the display will show the magnitude detected by probe 1
▪ if P5 = 1, the display will show the magnitude detected by probe 2.

If the device is off (stand-by state), the display will be off.

5.4 Display of the magnitude detected by probe 1 and the magnitude detected by probe 2

▪ make sure that the keyboard is not blocked and that no procedure is in progress
▪ press ▼ for 1 s: the display will show the first label available
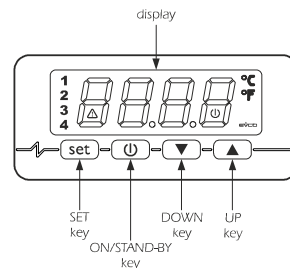▪ press ▲ or ▼ to select "**Pb1**" or "**Pb2**"
▪ press set

To exit the procedure:

▪ press set or do not operate for 60 s
▪ press ▲ or ▼ until the display shows the magnitude established with parameter P5 or do not operate for 60 s.

Alternatively:

▪ press ⏻

If probe 2 is absent (parameter P9 = 0 or parameter CFG = 4, 5, 6 or 7), the "**Pb2**" label will not be displayed.

5.5 Display of the state of the digital input 1 and the state of the digital input 2

▪ make sure that the keyboard is not blocked and that no procedure is in progress
▪ press ▼ for 1 s: the display will show the first label available
▪ press ▲ or ▼ to select "**id1**" or "**id2**"
▪ press set : the display will show "**on**" (active input) or "**oFF**" (non-active input).

To exit the procedure:

▪ press set or do not operate for 60 s
▪ press ▲ or ▼ until the display shows the magnitude established with parameter P5 or do not operate for 60 s.

Alternatively:

▪ press ⏻

If the activation of the digital input 1 does not have any effect (parameter i0 = 0), the "**id1**" label will not be displayed.

If the activation of the digital input 2 does not have any effect (parameter i5 = 0), the "**id2**" label will not be displayed.

5.6 Learning the type of operation in progress

▪ make sure that the keyboard is not blocked and that no procedure is in progress
▪ press ▼ for 1 s: the display will show the first label available
▪ press ▲ or ▼ to select "**CFG**"
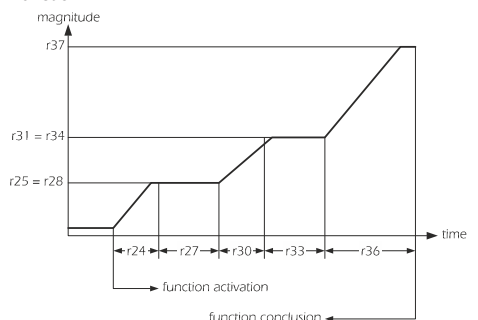▪ press set

To exit the procedure:

▪ press set or do not operate for 60 s
▪ press ▲ or ▼ until the display shows the magnitude established with parameter P5 or do not operate for 60 s.

Alternatively:

▪ press ⏻

5.7 Block/release of the keyboard

To block the keyboard:
- make sure no procedures are in progress
- press [set] and [▼] for 1 s: the display will show "**Loc**" for 1 s.

The following will not be allowed if the keyboard is blocked:
- to switch the device on/off in manual mode
- display the magnitude detected by probe 1 and the magnitude detected by 2 (with the procedure indicated in paragraph 5.4)
- display the state of the digital input 1 an the state of the digital input 2 (with the procedure indicated in paragraph 5.5)
- learning the type of operation in progress (with the procedure indicated in paragraph 5.6)
- to activate the Program function in manual mode
- to modify the work set-point SP1 (with the procedure indicated in paragraph 6.1)
- to modify the work set-point SP1 (with the procedure indicated in paragraph 6.2)
- to restore the factory settings
- to display the list of alarms and errors
- to delete the list of alarms and errors.

These operations cause the "**Loc**" label to be displayed for 1 s.
To release the keyboard:
- press [set] and [▼] for 1 s: the display will show "**UnL**" for 1 s.

5.8 Silencing the buzzer
- make sure no procedures are in progress
- press a key (pressing the key does not cause the associated effect).

If parameter u4 is set at 1, pressing the key will also cause the deactivation of any relays for signalling the alarms and errors (CFG = 3).
If parameter u9 is set to 0, the buzzer will not be enabled.

6 SETTINGS

6.1 Setting the work set-point SP1
- make sure that the keyboard is not blocked and that no procedure is in progress
- press [set] : the display will show "**SP1**" for 1 s, after which the value will be displayed
- press [▲] or [▼] within 15 s; see also parameters r1, r2 and r3
- press [set] twice or do not operate for 15 s: the device will exit the procedure.

It is also possible to set this work set-point via parameter SP1.

6.2 Setting the work set-point SP2
- press [set] twice: the display will show "**SP2**" for 1 s, after which the value will be displayed
- press [▲] or [▼] within 15 s; see also parameters r7, r8 and r9
- press [set] or do not operate for 15 s: the device will exit the procedure.

It is also possible to set this work set-point via parameter SP2.

6.3 Setting the configuration parameters

To access the procedure:
- make sure no procedures are in progress
- press [▲] and [▼] for 4 s: the display will show "**PA**"
- press [set]
- press [▲] or [▼] within 15 s to set "**-19**"
- press [set] or do not operate for 15 s
- press [▲] and [▼] for 4 s: the display will show "**SP1**".

To select a parameter:
- press [▲] or [▼]

To modify a parameter:
- press [set]
- press [▲] or [▼] within 15 s
- press [set] or do not operate for 15 s.

To exit the procedure:
- press [▲] and [▼] for 4 s or do not operate for 60 s.

Cut the device power supply off after modification of the parameters.

6.4 Restoring the factory settings

To access the procedure:
- make sure that the keyboard is not blocked and that no procedure is in progress
- press [▼] for 1 s: the display will show the first label available
- press [▲] or [▼] to select "**dEF**"
- press [set]
- press [▲] or [▼] within 15 s to set "**149**"
- press [set] or do not operate for 15 s: the display will show "**dEF**" flashing for 4 s after which the device will exit the procedure
- cut the device power supply off.

To exit the procedure in advance:
- press [⏻] during the procedure (i.e. before setting "**149**"), after which do not operate for 60 s: restore will not take place.

Make sure that the factory settings are appropriate (see chapter 12).

7 STORING ALARMS AND ERRORS

7.1 Foreword

The device can store the alarms and errors (hereon called events; see chapters 9 and 10).
The device supplies the following information:
- the critical value (if available)
- the duration of the event (from 1 min to 99 h and 59 min, partial if the event is in progress)

CODE	TYPE OF EVENT (AND CRITICAL VALUE)
AL	minimum alarm (the minimum magnitude detected by probe 1 during any alarm of this type)
AH	maximum alarm (the maximum magnitude detected by probe 1 during any alarm of this type)
id1	external alarm with automatic restore from digital input 1 (the critical value is not available)
id2	external alarm with automatic restore from digital input 2 (the critical value is not available)
iSd1	external alarm with manual restore from digital input 1 (the critical value is not available)
iSd2	external alarm with manual restore from digital input 2 (the critical value is not available)
Pr1	probe 1 error (he critical value is not available)
Pr2	probe 2 error (he critical value is not available)

Warnings:
- **the device updates the information regarding the event also if the critical value of the new event is less critical than that in the memory or on condition that the information have been already displayed**
- **if the device is off (stand-by state), no event will be stored.**

When the cause of the event disappears, the display restores normal operation.

7.2 Display of information regarding the alarms and errors

To access the procedure:
- make sure that the keyboard is not blocked and that no procedure is in progress
- press [▼] for 1 s: the display show the first label available
- press [▲] or [▼] to select "**LS**"
- press [set] : the display will show one of the codes stated in the table in paragraph 7.1.

To select an event:
- press [▲] or [▼] to select "**AH**" (for example).

To display the information regarding the event:
- press [set] : the display will show the following information in succession (for example):

INFOR.	MEANING
8.0	the critical value is 8.0 °C/8.0 °F
dur	the display is about to show the duration of the event
h01	the event had duration of 1 h (continue …)
n15	the event had duration of 1 h and 15 minutes
AH	the event selected

the displays each piece of information for 1 s.

To exit the succession of information:
- press [⏻] : the display will show the event selected.

To exit the procedure:
- exit the succession of information
- press [▲] or [▼] until the display shows the magnitude established with parameter P5 or do not operate for 60 s.

Alternatively:
- exit the succession of information
- press [⏻]

If the device has no event in the memory, the "**LS**" label will not be displayed.

7.3 Deleting the list of alarms and errors
- make sure that the keyboard is not blocked and that no procedure is in progress
- press [▼] for 1 s: the display will show the first label available
- press [▲] or [▼] to select "**rLS**"
- press [set]
- press [▲] or [▼] within 15 s to set "**149**"
- press [set] or do not operate for 15 s: the display will show "**- - - -**" flashing for 4 s after which the device will exit the procedure.

To exit the procedure in advance:
- press [▲] or [▼] during the procedure i.e. before setting "**149**") until the display shows the magnitude established with parameter P5 or do not operate for 60 s: deletion will not be performed.

If the device has no event in the memory, the "**rLS**" label will not be displayed.

8 SIGNALS AND INDICATIONS

8.1 Signals

LED	MEANING
1	Relay 1 LED
	if it is on, relay 1 will be on
	if flashing:
	▪ a relay 1 protection will be in progress:
	- parameters C0, C1, C2, C11 and C12
2	Relay 2 LED
	if it is on, relay 2 will be on
	if flashing:
	▪ a relay 2 protection will be in progress:
	- parameters C0, C1, C2, C11 and C12
3	Relay 3 LED
	if it is on, relay 3 will be on
	if flashing:
	▪ a relay 3 protection will be in progress:
	- parameters C0, C1, C2, C11 and C12
4	Relay 4 LED
	if it is on, relay 4 will be on
	if flashing:
	▪ a relay 4 protection will be in progress:
	- parameters C0, C1, C2, C11 and C12
⚠	alarm LED
	if it is on, an alarm or error is in progress
°C	Degree Celsius LED
	if it is on, the unit of measurement of the temperature will be the degree Celsius:
	- parameters P21 and P22
°F	Degree Fahrenheit LED
	if it is on, the unit of measurement of the temperature will be the degree Fahrenheit:
	- parameters P21 and P22
⏻	On/stand-by LED
	if it is on, the device will be in the stand-by state

8.2 Indications

CODE	MEANING
Ph?	the work Program function is in progress - see paragraph 4.5
EndP	the work Program function has been cut-off - see paragraph 4.5
StOP	the work Program function has ended - see paragraph 4.5
- - - -	the magnitude displayed during normal operation is probe 2 but the probe is absent: - parameters P5 and P9
Loc	the keyboard is blocked: - see paragraph 5.7 the work set-points are blocked: - parameter r3 and/or r9

9 ALARMS

9.1 Alarms

CODE	MEANING
AL	Minimum alarm
	Solutions:
	▪ check the magnitude detected by probe 1
	▪ see:
	- parameters A1 and A2
	Main consequences:
	▪ if the parameter CFG is set at 3, the relay K3 will be on
AH	Maximum alarm
	Solutions:
	▪ check the magnitude detected by probe 1
	▪ see:
	- parameters A4 and A5
	Main consequences:
	▪ if the parameter CFG is set at 3, the relay K4 will be on
id1	External alarm with automatic restore from digital input 1
	Solutions:
	▪ check the causes of input activation
	▪ see parameters i0 and i1
	Main consequences:
	▪ the relays used for regulation will be forced to the state established with parameter i11
	▪ if parameter CFG is set at 3, the relays signalling the alarms and errors will be switched on
iSd1	External alarm with manual restore from digital input 1
	Solutions:
	▪ check the causes of input activation
	▪ see parameters i0 and i1
	▪ wait for the cause of the alarm to disappear and then press the [set] and [▲] keys for 1 s
	Main consequences:
	▪ the relays used for regulation will be forced to the state established with parameter i11
	▪ if parameter CFG is set at 3, the relays signalling the alarms and errors will be switched on
id2	External alarm with automatic restore from digital input 2
	Solutions:
	▪ check the causes of input activation
	▪ see parameters i5 and i6
	Main consequences:
	▪ the relays used for regulation will be forced to the state established with parameter i11
	▪ if parameter CFG is set at 3, the relays signalling the alarms and errors will be switched on

iSd2	External alarm with manual restore from digital input 2

Solutions:
- check the causes of input activation
- see parameters i5 and i6
- wait for the cause of the alarm to disappear and then press the `set` and `▲` keys for 1 s

Main consequences:
- the relays used for regulation will be forced to the state established with parameter i11
- if parameter CFG is set at 3, the relays signalling the alarms and errors will be switched on

When the cause of the alarm disappears, the device restores normal operation, except for the following alarms:
- the external alarm with manual restore from digital input 1 (code "**iSd1**")
- the external alarm with manual restore from digital input 2 (code "**iSd2**")

which require the cause of the alarm to disappear and successively the keys `⏻` and `▼` to be pressed for 1 s.

10 ERRORS

10.1 Errors

CODE	MEANING
Pr1	Probe 1 error

Solutions:
- see parameter P01
- check the integrity of the probe
- check the device-probe connection
- check the magnitude detected by the probe

Main consequences:
- the work Program function cannot be activated
- the work program will be interrupted if it is in progress
- the relays used for regulation will be forced to the state established with parameter C4
- if parameter CFG is set at 3, the relays signalling the alarms and errors will be switched on

Pr2	Probe 2 error

Solutions:
- see parameter P02
- check the integrity of the probe
- check the device-probe connection
- check the magnitude detected by the probe

Main consequences:
- if parameter P9 is set at values different to 0 (or if the CFG parameter is set at 8 or 9), the device will function as if the parameter is set at 0
- if parameter CFG is set at 3, the relays signalling the alarms and errors will be switched on
- If the CFG parameter is set at 8, the relays used for adjustment will be forced to the state established with parameter C5

When the cause of the alarm disappears, the device restores normal operation.

11 TECHNICAL DATA

11.1 Technical data

Container: grey self-extinguishing.

Front panel protection rating: IP 65.

Connections: screw terminal boards (power supply and outputs), removable terminal board (inputs), 6-pole connector (serial port on request), removable terminal board (at the remote indictor, on request); removable spring terminal board (power supply and outputs) on request.

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

Power supply: 12 VAC/DC (or 12-24 VAC/DC), 50/60 Hz, 3.5 VA (approximate) or 115 ... 230 VAC, 50/60 Hz, 5 VA (approximate).

Alarm buzzer: on request.

Measure input: 2 (probe 1 and probe 2) for PTC/NTC probes, Pt 1000 2 wires, 4-20 mA and 0-10 V transducers (universal measure input).

Digital inputs: 2 (digital input 1 and digital input 2) for NO/NC contact (potential-free contact, 5 V 1 mA).

Field of measurement: from -50 to 150 °C (from -50 to 300 °F) for PTC probe, from -40 to 105 °C (from -40 to 220 °F) for NTC probe, from -100 to 150 °C (from -145 to 300 °F) for Pt 1000 probe.

Resolution: 0,1 °C/1 °C/0,1 °F/1 °F.

Digital outputs: 4 relays:
- **relay K1:** 16 A res. @ 250 VCA (changeover switch)
- **relay K2:** 8 A res. @ 250 VCA (changeover switch)
- **relay K3:** 8 A res. @ 250 VCA (NO contact)
- **relay K4:** 8 A res. @ 250 VCA (changeover switch).

The maximum current accepted on relay 1 is 10 A.

Communication ports: 2 ports:
- TTL serial port for communication with the EVKEY programming key, with the Parameters Manager set-up software (via a serial interface, with MODBUS communication protocol) or for that for monitoring or supervision of RICS plants (via a serial interface, with MODBUS communication protocol); on request
- communication port with EVT100 remote indicator, on request.

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## 12 WORK SET-POINT AND CONFIGURATION PARAMETERS

12.1 Work set-point

	MIN.	MAX.	U. M.	CFG = 0	CFG = 1	CFG = 2	CFG = 3	CFG = 4	CFG = 5	CFG = 6	CFG = 7	CFG = 8	CFG = 9	WORK SET-POINT
	r1	r2	°C/°F (1)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	work set-point SP1
	r7	r8	°C/°F (1)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	work set-point SP2 (2)

12.2 Configuration parameters

PAR.	MIN.	MAX.	U. M.	CFG = 0	CFG = 1	CFG = 2	CFG = 3	CFG = 4	CFG = 5	CFG = 6	CFG = 7	CFG = 8	CFG = 9	WORK SET-POINT
SP1	r1	r2	°C/°F (1)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	work set-point SP1
SP2	r7	r8	°C/°F (1)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	work set-point SP2 (2)
PAR.	**MIN.**	**MAX.**	**U. M.**	**CFG = 0**	**CFG = 1**	**CFG = 2**	**CFG = 3**	**CFG = 4**	**CFG = 5**	**CFG = 6**	**CFG = 7**	**CFG = 8**	**CFG = 9**	**MEASURE INPUTS**
CA1	-25.0	25.0	°C/°F (1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	probe 1 offset
CA2	-25.0	25.0	°C/°F (3)	0.0	0.0	0.0	0.0	not avail.	not avail.	not avail.	not avail.	0.0	0.0	probe 2 offset
P01	0	4	----	1	1	1	1	1	1	1	1	1	1	probe 1 type 0 = PTC 1 = NTC 2 = Pt 1000 3 = 4-20 mA; see also P3 and P4 4 = 0-10 V; see also P3 and P4
P02	0	4	----	1	1	1	1	not avail.	not avail.	not avail.	not avail.	3	3	probe 2 type 0 = PTC 1 = NTC 2 = Pt 1000 3 = 4-20 mA; see also P10 and P11 4 = 0-10 V; see also P10 and P11
P1	0	1	----	1	1	1	1	1	1	1	1	1	1	if P01 and/or P02 = 0, 1 or 2, decimal point (for the magnitude displayed during normal operation) 1 = YES if P01 and/or P02 = 3 or 4, position of the decimal point 0 = no decimal point 1 = on the tens character
P21	0	2	----	0	0	0	0	0	0	0	0	0	0	temperature unit of measurement of probe 1 (affecting only degree Celsius LED and degree Fahrenheit LED if P01 =3 or 4) (4) (5) 0 = °C 1 = °F 2 = the degree Celsius LED and the degree Fahrenheit LED remain off
P22	0	2	----	0	0	0	0	not avail.	not avail.	not avail.	not avail.	0	0	temperature unit of measurement of probe 2 (affecting only degree Celsius LED and degree Fahrenheit LED if P02 =3 or 4) (4) (6) 0 = °C 1 = °F 2 = the degree Celsius LED and the degree Fahrenheit LED remain off
P3	-199.0	9990	points	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	probe 1 transducer minimum calibration value (only if P01 = 3 or 4)
P4	-199.0	9990	points	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	probe 1 transducer maximum calibration value (only if P01 = 3 or 4)
P5	0	1	----	0	0	0	0	not avail.	not avail.	not avail.	not avail.	0	0	magnitude displayed during normal operation 0 = magnitude detected by probe 1 1 = magnitude detected by probe 2
P6	0	1	----	0	0	0	0	not avail.	not avail.	not avail.	not avail.	1	1	magnitude displayed by the EVT100 remote indicator 0 = magnitude detected by probe 1 1 = magnitude detected by probe 2
P8	0	250	ds	5	5	5	5	5	5	5	5	5	5	delay displaying magnitude variation detected by the probes

PAR.	MIN.	MAX.	U. M.	CFG = 0	CFG = 1	CFG = 2	CFG = 3	CFG = 4	CFG = 5	CFG = 6	CFG = 7	CFG = 8	CFG = 9	
P9	0	4	----	0	0	0	0	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	device operation in presence of probe 2 (see paragraph 4.4) 0 = no probe 1 = differential operation (only if P01 = P02) (7) 2 = operation with summer compensation of the work set-point SP1 3 = operation with winter compensation of the work set-point SP1 4 = operation with combined compensation of the work set-point SP1
P10	-199.0	9990	points	0.0	0.0	0.0	0.0	not avail.	not avail.	not avail.	not.avail.	0.0	0.0	probe 2 transducer minimum calibration value (only if P02 = 3 or 4)
P11	-199.0	9990	points	100.0	100.0	100.0	100.0	not avail.	not avail.	not avail.	not.avail.	100.0	100.0	probe 2 transducer maximum calibration value (only if P02 = 3 or 4)
PAR.	**MIN.**	**MAX.**	**U. M.**	**CFG = 0**	**CFG = 1**	**CFG = 2**	**CFG = 3**	**CFG = 4**	**CFG = 5**	**CFG = 6**	**CFG = 7**	**CFG = 8**	**CFG = 9**	**REGULATORS**
r0	0.1	99.0	°C/°F (1)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	if CFG = 0, 1, 4, 5, 6, 7 or 8, work set-point SP1 differential if CFG = 2, 3 or 8, differential (of the work set-point SP1) of the relays with operation in cooling mode
r1	-199.0	r2	°C/°F (1)	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	minimum work set-point SP1
r2	r1	9990	°C/°F (1)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	maximum work set-point SP1
r3	0	1	----	0	0	0	0	0	0	0	0	0	0	work set-point SP1 modification block (with the procedure indicated in paragraph 6.1)
r6	0.1	99.0	°C/°F (1)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	if CFG = 2, 3 or 8, differential (of the work set-point SP1) of the relays with operation in heating mode if CFG = 4, 5, 6, 7 and 9 work set-point SP2 differential if CFG = 0, 1, 2 or 3 and P9 = 4, value of the neutral area with combined compensation operation of the work set-point SP1
r7	-199.0	r8	°C/°F (1)	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	minimum work set-point SP2
r8	r7	9990	°C/°F (1)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	maximum work set-point SP2
r9	0	1	----	0	0	0	0	0	0	0	0	0	0	work set-point SP2 modification block (with the procedure indicated in paragraph 6.2)
r11	0.0	99.0	°C/°F (1)	not avail.	not avail.	2.0	2.0	not avail.	not avail.	not avail.	not avail.	2.0	not avail.	neutral area value (of the work set-point SP1)
r12	0.1	99.0	°C/°F (3)	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	2.0	not avail.	differential (of the work set-point SP2) of the relays operating in direct mode
r13	0.1	99.0	°C/°F (3)	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	2.0	not avail.	differential (of the work set-point SP2) of the relays operating in inverse mode
r14	0.0	99.0	°C/°F (3)	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	2.0	not avail.	neutral area value (of the work set-point SP2)
r15	0	99	min	0	0	0	0	0	0	0	not avail.	0	not avail.	duration of the temporary set-point during soft switch on function (see paragraph 4.3) 0 = no function
r16	-99.0	99.0	°C/°F (1)	0.0	0.0	0.0	0.0	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	se P9 = 2, maximum value of the summer compensation of the work set-point SP1 se P9 = 3, maximum value of the winter compensation of the work set-point SP1
r17	-199.0	r18	°C/°F (3)	50.0	50.0	50.0	50.0	not avail.	not avail.	not avail.	not avail.	not avail.	50.0	if CFG = 0, 1, 2 or 3 and P9 = 2, value of the magnitude detected by probe 2 above which summer compensation of the work set-point SP1 is started (only if P9 = 2) if CFG = 9, magnitude value detected by probe 2 below which the heating mode operation is enabled
r18	r17	9990	°C/°F (3)	55.0	55.0	55.0	55.0	not avail.	not avail.	not avail.	not avail.	not avail.	-55.0	if CFG = 0, 1, 2 or 3 and P9 = 2, value of the magnitude detected by probe 2 above which summer compensation of the work set-point SP1 is concluded if CFG = 0, 1, 2 or 3 and P9 = 4, value of the magnitude detected by probe 2 above which combined compensation of the work set-point SP1 is concluded (relative to "SP2 + r6" i.e. "SP2 + r6 + r18"; consider r18 without sign) if CFG = 9, magnitude value detected by probe 2 over which the cooling mode operation is enabled
r19	-199.0	r20	°C/°F (3)	-55.0	-55.0	-55.0	-55.0	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	if CFG = 0, 1, 2 or 3 and P9 = 3, value of the magnitude detected by probe 2 below which summer compensation of the work set-point SP1 is concluded if CFG = 0, 1, 2 or 3 and P9 = 4, value of the magnitude detected by probe 2 below which combined compensation of the work set-point SP1 is concluded (relative to "SP2 + r6" i.e. "SP2 + r6 + r19"; consider r19 without sign)
r20	r19	9990	°C/°F (3)	-50.0	-50.0	-50.0	-50.0	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	value of the magnitude detected by probe 2 below which winter compensation of the work set-point SP1 is started (only if P9 = 3)
r21	0	99	h	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	24	continuous duration of the permanence of the magnitude detected by probe 2 below that established with parameter r17 (or above that established with parameter r18) for heating mode operation (or cooling mode) to be enabled
r23	0	2	----	0	0	0	0	not avail.	not avail.	not avail.	not avail.	0	not avail.	Work Program activation/deactivation mode 0 = no function 1 = pressing the key ▲ for 4 s 2 = activation of digital input 1 (only if i0 = 4) or digital input 2 (only if i5 = 4)
r24	0	240	min	0	0	0	0	not avail.	not avail.	not avail.	not avail.	0	not avail.	duration of the first phase of the work program 0 = on reaching the r25 value, the device will pass to the next phase
r25	-199.0	9990	°C/°F (1)	0.0	0.0	0.0	0.0	not avail.	not avail.	not avail.	not avail.	0.0	not avail.	magnitude detected by probe 1 to be reached and maintained during the first phase of the work program
r26	-199.0	9990	°C/°F (3)	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	0.0	not avail.	magnitude detected by probe 2 to be reached and maintained during the first phase of the work program
r27	0	240	min	0	0	0	0	not avail.	not avail.	not avail.	not avail.	0	not avail.	duration of the second phase of the work program 0 = on reaching the r27 value, the device will pass to the next phase
r28	-199.0	9990	°C/°F (1)	0.0	0.0	0.0	0.0	not avail.	not avail.	not avail.	not avail.	0.0	not avail.	magnitude detected by probe 1 to be reached and maintained during the second phase of the work program
r29	-199.0	9990	°C/°F (3)	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	0.0	not avail.	magnitude detected by probe 2 to be reached and maintained during the second phase of the work program
r30	0	240	min	0	0	0	0	not avail.	not avail.	not avail.	not avail.	0	not avail.	duration of the third phase of the work program 0 = on reaching the r29 value, the device will pass to the next phase
r31	-199.0	9990	°C/°F (1)	0.0	0.0	0.0	0.0	not avail.	not avail.	not avail.	not avail.	0.0	not avail.	magnitude detected by probe 1 to be reached and maintained during the third phase of the work program
r32	-199.0	9990	°C/°F (3)	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	0.0	not avail.	magnitude detected by probe 2 to be reached and maintained during the third phase of the work program
r33	0	240	min	0	0	0	0	not avail.	not avail.	not avail.	not avail.	0	not avail.	duration of the fourth phase of the work program 0 = on reaching the r31 value, the device will pass to the next phase
r34	-199.0	9990	°C/°F (1)	0.0	0.0	0.0	0.0	not avail.	not avail.	not avail.	not avail.	0.0	not avail.	magnitude detected by probe 1 to be reached and maintained during the fourth phase of the work program
r35	-199.0	9990	°C/°F (3)	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	0.0	not avail.	magnitude detected by probe 2 to be reached and maintained during the fourth phase of the work program
r36	0	240	min	0	0	0	0	not avail.	not avail.	not avail.	not avail.	0	not avail.	duration of the fifth phase of the work program 0 = the phase will continue until the function is interrupted in manual mode
r37	-199.0	9990	°C/°F (1)	0.0	0.0	0.0	0.0	not avail.	not avail.	not avail.	not avail.	0.0	not avail.	magnitude detected by probe 1 to be reached and maintained during the fifth phase of the work program
r38	-199.0	9990	°C/°F (3)	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	0.0	not avail.	magnitude detected by probe 2 to be reached and maintained during the fifth phase of the work program
PAR.	**MIN.**	**MAX.**	**U. M.**	**CFG = 0**	**CFG = 1**	**CFG = 2**	**CFG = 3**	**CFG = 4**	**CFG = 5**	**CFG = 6**	**CFG = 7**	**CFG = 8**	**CFG = 9**	**PROTECTIONS OF THE RELAYS USED FOR REGULATION**
C0	0	240	min	0	0	0	0	0	0	0	0	0	0	switch-on delay of the device switch-on relays (8)

PAR.	MIN.	MAX.	U. M.	CFG = 0	CFG = 1	CFG = 2	CFG = 3	CFG = 4	CFG = 5	CFG = 6	CFG = 7	CFG = 8	CFG = 9	
C1	0	240	min	0	0	0	0	0	0	0	0	0	0	minimum time between two consecutive switch-ons of the same relay (9)
C2	0	240	min	0	0	0	0	0	0	0	0	0	0	minimum switch off time of the same relay (9)
C3	0	240	s	0	0	0	0	0	0	0	0	0	0	minimum switch on time of the same relay
C4	0	3	----	0	0	0	0	0	0	0	0	0	0	state of the relays used for regulation during probe 1 error (code "**Pr1**") 0 = the relays will be off 1 = the relays will be switched on (10) 2 = the cooling mode operation relays will be on and the heating mode operation relays will be off (10) 3 = the heating mode operation relays will be on and the cooling mode operation relays will be off (10)
C5	0	3	----	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	0	0	state of the relays used for regulation during probe 2 error (code "**Pr2**") 0 = the relays will be off 1 = the relays will be switched on (10) 2 = the direct operation relays will be switched on and the inverse operation relays will be switched off (10) 3 = the heating mode operation relays will be on and the cooling mode operation relays will be off (10)
C11	0	240	s	5	5	5	5	5	5	5	5	5	5	minimum time between two consecutive switch-ons of two different relays (9)
C12	0	240	s	0	0	0	0	0	0	0	0	0	0	minimum time between two consecutive switch-offs of two different relays
C13	0	6	----	0	0	0	not avail.	0	0	0	0	not avail.	not avail.	type of relays switch-on and switch-off sequence 0 = fixed sequence (the relays will be on and off as indicated in the drawings in chapter 4, Last In First Out) 1 = the first relay that will be switched on will be that off for the longest period of time and the first to be switched off will be that on for the longest period of time (First In First Out) 2 = this sequence has been studied for the management of split compressors with valve activated with relay on. In this case the utilities managed by the relays must be the following: relay K1 = compressor 1 relay K2 = compressor 1 valve relay K3 = compressor 2 relay K4 = compressor 2 valve the switch-on sequence will be the same in the case C13 = 1 but relative to relays 1 and 3 (11) 3 = the same as the previous case but relevant to the valves activated with relay off (12) 4 = the same as case C13 = 1 but relative to relays 3 and 4 5 = the same as case C13 = 1 but relative to relays 1 and 2 6 = the same as case C13 =1 but relative to relays 1 and 2 (with each other) and to relays 3 and 4 (with each other)
PAR.	MIN.	MAX.	U. M.	CFG = 0	CFG = 1	CFG = 2	CFG = 3	CFG = 4	CFG = 5	CFG = 6	CFG = 7	CFG = 8	CFG = 9	MINIMUM ALARM AND MAXIMUM ALARM (13)
A1	-199.0	9990	°C/°F (1)	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	magnitude value below which the minimum alarm is activated (code "**AL**"); see also A2 and A11
A2	0	2	----	2	2	2	2	2	2	2	2	2	2	minimum alarm type (code "**AL**") 0 = no alarm 1 = relative to the work set-point (i.e. "work set-point SP1 - A1" or "work set-point SP2 - A1"; consider A1 without sign) (14) 2 = absolute (i.e. A1)
A4	-199.0	9990	°C/°F (1)	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	magnitude value above which the maximum alarm is activated (code "**AH**"); see also A5 and A11
A5	0	2	----	2	2	2	2	2	2	2	2	2	2	maximum alarm type (code "**AH**") 0 = no alarm 1 = relative to the work set-point (i.e. "work set-point SP1 - A4" or "work set-point SP2 - A4"; consider A4 without sign) (15) 2 = absolute (i.e. A4)
A6	0	240	min	120	120	120	120	120	120	120	120	120	120	minimum alarm delay (code "**AL**") and maximum alarm (code "**AH**") from device switch-on (8)
A7	0	240	min	15	15	15	15	15	15	15	15	15	15	minimum alarm delay (code "**AL**") and maximum alarm (code "**AH**")
A11	0.1	99.0	°C/°F (1)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	parameters A1 and A4 differential
PAR.	MIN.	MAX.	U. M.	CFG = 0	CFG = 1	CFG = 2	CFG = 3	CFG = 4	CFG = 5	CFG = 6	CFG = 7	CFG = 8	CFG = 9	DIGITAL INPUTS
i0	0	4	----	0	0	0	0	not avail.	not avail.	not avail.	0	0	0	effect caused by the activation of digital input 1 0 = no effect 1 = <u>ACTIVATION OF AUTOMATIC RESTORE EXTERNAL ALARM</u> - on expiry of time i2 the relays used for regulation will be forced into the state established with parameter C5. Any relays for signalling alarms and errors (CFG = 3) will be on, the display will show the "**id1**" code flashing and the buzzer will be activated. When the cause f the alarm disappears, the device restores normal operation 2 = <u>ACTIVATION OF MANUAL RESTORE EXTERNAL ALARM</u> - on expiry of time i2 the relays used for regulation will be forced into the state established with parameter C5. Any relays for signalling alarms and errors (CFG = 3) will be on, the display will show the "**iSd1**" code flashing and the buzzer will be activated. The cause of the alarm must disappear and then the ⏻ and ▼ keys must be pressed for 1 s in order for the device to restore normal operation 3 = <u>DEVICE SWITCH-ON/OFF</u> - on expiry of time C3, the device will be off (stand-by state) and the display will show the magnitude established with parameter P5 for ½ s every 4 s (while the input remains active) 4 = <u>ACTIVATION OF THE WORK PROGRAM FUNCTION</u> - if r23 = 2, the Work Program function is activated (see paragraph 4.5)
i1	0	1	----	0	0	0	0	0	0	0	0	0	0	type of digital input 1 contact 0 = normally open (input active with closed contact) 1 = normally closed (input active with open contact)
i2	-1	120	min	120	120	120	120	120	120	120	120	120	120	external alarm delay from digital input 1 (codes "**id1**" and "**iSd1**") and external alarm from digital input 2 (codes "**id2**" and "**iSd2**") -1= the alarm will not be signalled
i5	0	4	----	0	0	0	0	0	0	0	0	0	0	effect caused by the activation of digital input 2 0 = no effect 1 = <u>ACTIVATION OF AUTOMATIC RESTORE EXTERNAL ALARM</u> - on expiry of time i2 the relays used for regulation will be forced into the state established with parameter C5. Any relays for signalling alarms and errors (CFG = 3) will be on, the display will show the "**id2**" code flashing and the buzzer will be activated. When the cause f the alarm disappears, the device restores normal operation

														2 = <u>ACTIVATION OF MANUAL RESTORE EXTERNAL ALARM</u> - on expiry of time i2 the relays used for regulation will be forced into the state established with parameter C5. Any relays for signalling alarms and errors (CFG = 3) will be on, the display will show the "**iSd2**" code flashing and the buzzer will be activated. The cause of the alarm must disappear and then the [⏻] and [▼] keys must be pressed for 1 s in order for the device to restore normal operation 3 = <u>DEVICE SWITCH-ON/OFF</u> - on expiry of time C3, the device will be off (stand-by state) and the display will show the magnitude established with parameter P5 for ½ s every 4 s (while the input remains active) 4 = <u>ACTIVATION OF THE WORK PROGRAM FUNCTION</u> - if r23 = 2, the Work Program function is activated (see paragraph 4.5)
i6	0	1	- - - -	0	0	0	0	0	0	0	0	0	0	type of digital input 2 contact 0 = normally open (input active with closed contact) 1 = normally closed (input active with open contact)
i11	0	3	- - - -	0	0	0	0	0	0	0	0	0	0	state of he relays used for regulation during the external alarm delay from digital input 1 (codes "**id1**" and "**iSd1**") and external alarm from digital input 2 (codes "**id2**" and "**iSd2**") 0 = the relays will be off 1 = the relays will be switched on (10) 2 = the heating mode operation relays will be off 3 = the cooling mode operation relays will be off
PAR.	MIN.	MAX.	U. M.	CFG = 0	CFG = 1	CFG = 2	CFG = 3	CFG = 4	CFG = 5	CFG = 6	CFG = 7	CFG = 8	CFG = 9	**DIGITAL OUTPUTS**
u3	0	1	- - - -	not avail.	not avail.	not avail.	0	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	polarity of the relays for signalling alarms and errors 0 = off during normal operation and on during an alarm and an error 1 = on during normal operation and off during an alarm and an error
u4	0	1	- - - -	not avail.	not avail.	not avail.	0	not avail.	not avail.	not avail.	not avail.	not avail.	not avail.	enabling of switch-of of the relays for signalling the alarms and the errors with silencing of buzzer 1 = YES
u9	0	1	- - - -	1	1	1	1	1	1	1	1	1	1	enabling the buzzer 1 = YES
PAR.	MIN.	MAX.	U. M.	CFG = 0	CFG = 1	CFG = 2	CFG = 3	CFG = 4	CFG = 5	CFG = 6	CFG = 7	CFG = 8	CFG = 9	**SERIAL NETWORK (MODBUS)**
LA	1	247	- - - -	247	247	247	247	247	247	247	247	247	247	device address
Lb	0	3	- - - -	2	2	2	2	2	2	2	2	2	2	baud rate 0 = 2.400 baud 1 = 4.800 baud 2 = 9.600 baud 3 = 19.200 baud
LP	0	2	- - - -	2	2	2	2	2	2	2	2	2	2	parity 0 = no parity (none) 1 = odd 2 = even
PAR.	MIN.	MAX.	U. M.	CFG = 0	CFG = 1	CFG = 2	CFG = 3	CFG = 4	CFG = 5	CFG = 6	CFG = 7	CFG = 8	CFG = 9	**RESERVED**
E9	0	1	- - - -	1	1	1	1	1	1	1	1	1	1	reserved
PAR.	MIN.	MAX.	U. M.	DEFAULT										**OPERATION**
CFG	0	9	- - - -	1										operation 0 = cooling mode operation (see paragraph 4.2.1) 1 = heating mode operation (see paragraph 4.2.2) 2 = neutral area operation (see paragraph 4.2.3) 3 = neutral area operation with alarm relay (see paragraph 4.2.4) 4 = operating in cooling or heating mode from digital input 1 (see paragraph 4.2.5) 5 = operating in cooling mode with Energy Saving function from digital input 1 (see paragraph 4.2.6) 6 = operating in heating mode with Energy Saving function from digital input 1 (see paragraph 4.2.7) 7 = operation for cooling and heating mode with two independent work set-points (see paragraph 4.2.8) 8 = operation with two independent neutral areas (see paragraph 4.2.9) 9 = operating in cooling or heating mode from probe 2 (see paragraph 4.2.10)

(1) the unit of measurement depends on parameter P21

(2) if parameter P9 is set at 4 and the CFG parameter is set at 0, 1, 2 or 3 (or if the CFG parameter is set at 8), the unit of measurement will depend on parameter P22

(3) the unit of measurement depends on parameter P22

(4) set the parameters relative to the regulators appropriately after modification of parameters P21 and/or P22

(5) if the parameter P01 is set at 0, 1 or 2 and the parameter P21 is set at 2, the device will operate as if parameter P21 is set at 0

(6) if the parameter P02 is set at 0, 1 or 2 and the parameter P22 is set at 2, the device will operate as if parameter P22 is set at 0

(7) if the parameter P01 is not set at the same value as parameter P02, the instrument will operate as if the parameter P9 is set at 0

(8) the parameter also has effect after a power cut, which occurs when the device is on

(9) the time established with the parameter is counted also when the device is off (stand-by state)

(10) the protections are respected at switch-on (parameters C0, C1 and C11)

(11) a switch-on sequence could be the following:
  K1 off - K2 off - K3 off - K4 off
  K1 on - K2 off - K3 off - K4 off
  K1 on - K2 on - K3 off - K4 off
  K1 on - K2 off - K3 on - K4 off
  K1 on - K2 on - K3 on - K4 on

(12) a switch-on sequence could be the following:
  K1 off - K2 off - K3 off - K4 off
  K1 on - K2 on - K3 off - K4 off
  K1 on - K2 off - K3 off - K4 off
  K1 on - K2 off - K3 on - K4 on
  K1 on - K2 on - K3 on - K4 on

(13) the magnitude associated to the minimum and maximum alarms is that detected by probe 1

(14) if the CFG parameter is set at 7 and the parameter A2 is set at 1, the minimum alarm will be relative to the work set-point SP1

(15) if the CFG parameter is set at 7 and the parameter A5 is set at 1, the maximum alarm will be relative to the work set-point SP2.