



touch system

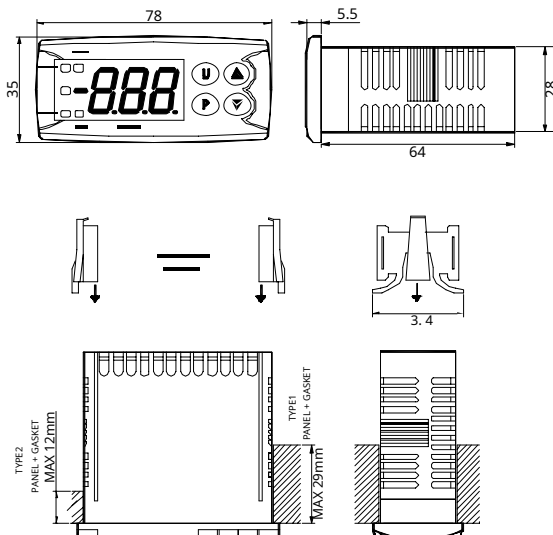
## DIGITAL REGULATORS BASIC CONTROL(ON-OFF / PID)



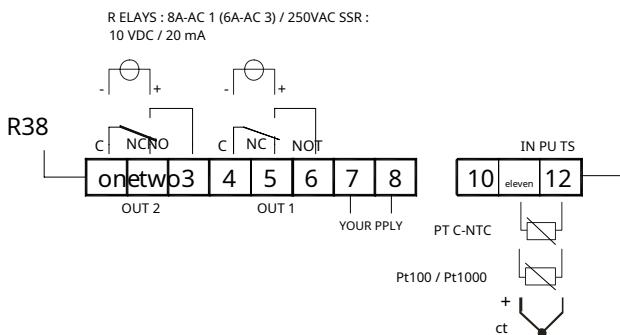
Manual

### K1/ K2 & TS K1/ TS K2

#### 1. MECHANICAL DIMENSIONS (mm)



#### 2. WIRING DIAGRAM



#### 2.1 - REQUIREMENTS FOR ASSEMBLY

This instrument only protects for a permanent installation, for use in an indoor environment and for mounting in an electrical panel that protects the back of the instrument, the terminal block and the electrical connections.

Mount the instrument on an electrical panel that has the following characteristics:

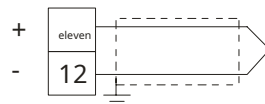
- 1) It must be easily accessible
- 2) It must not be subjected to vibration or impact.
- 3) There should be no presence of corrosive gas.
- 4) There should be no presence of water or other fluids (condensate).
- 5) The room temperature must be between 0 and 50 °C.
- 6) Relative humidity must remain within the field of use (from 20% to 85% RH).

The instrument can be mounted on a panel with a maximum thickness of 15mm. To obtain maximum safety against (IP65), it is necessary to mount the sealing rubber (optional accessory).

#### 2.2 - NOTES ON THE ELECTRICAL CONNECTION

- 1) Do not connect signal cables with power cables.
- 2) Outside component (such as zener barriers) may cause measurement errors due to excessive or unbalanced line resistance or may lead to leakage currents.
- 3) When shielded cable is used, the shield must be connected on one side only.

#### 2.3 - CONNECTION FOR THERMOCOUPLE INPUT



**external resistor:** 100 Ω max, maximum error 0.5% of the field width.

**cold junction:** automatic compensation from 0 to 50 °C.

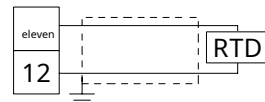
**cold junction precision:** 0.1°C/°C after heating for 20 minutes.

**input impedance:** > 1MΩ. **Calibration**

: according to EN 60584-1.

**Note:** For the CT input use shielded cable preferably plywood.

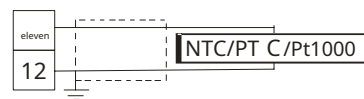
#### 2.4 - PT100 INPUT CONNECTION



**input circuit:** current injection (135 μA). **line**

**resistance:** not compensated **Calibration:** according to EN 60751/A2.

#### 2.5 - CONNECTION FOR PTC / NTC / PT1000 INPUT



**input circuit:** current injection (25 μA). **line**

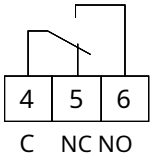
**resistance:** not compensated.

## 2.6 - SAFETY NOTES

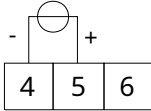
- 1) To avoid electric shock, connect power after making all other connections
- 2) For power connection use #16 AWG wire or larger and suitable for a temperature of at least 75 °C

### a) Output Out 1

Relay



SSR



### Out 1 contacts capacity:

8 A /250 V  $\cos\varphi = 1$  3

A /250 V  $\cos\varphi = 0.4$

**Operation:** 1x10<sup>5</sup>

**Logic level 0:**  $V_{out} <$

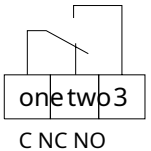
0.5 V DC. **Logic level**

**1:** 12V  $\pm$  20% @ 1mA

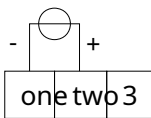
10V  $\pm$  20% @ 20mA.

### b) Output Out 2

Relay



SSR



### Out 2 contacts capacity:

8 A /250 V  $\cos\varphi = 1$  3

A /250 V  $\cos\varphi = 0.4$

**Operation:** 1x10<sup>5</sup>

**Logic level 0:**

$V_{out} < 0.5$  V DC

**logical level 1:** 12V  $\pm$

20% @ 1mA 10V  $\pm$

20% @ 20mA

## 2.7- POWER SUPPLY

**Consumption:** 5VA maximum



### Supply voltage:

From 100 V to 240 V AC/DC ( $\pm$  10%)

12V DC ( $-15\%$  to  $+10\%$ )

24 V AC/DC (From  $-15\%$  to  $+10\%$ )

- 1) Before connecting the instrument to the mains, make sure that the line voltage is as used on the identification label of the instrument.
- 2) To avoid the risk of electric shock, connect the power only after all other connections.
- 3) To connect to the network, use a cable No. 16 AWG or more cables suitable for a temperature of at least 75 °C.
- 4) Use only copper conductors.
- 5) Do not lay signal cables parallel to or close to power cables or noise sources.
- 6) Power input **NOT** It is protected by fuse. It is necessary to prevent externally a fuse type T 1A, 250V.
- 7) For the power supply, it is in direct current, that in alternating, the polarity is not significant.

## 3. TECHNICAL CHARACTERISTICS

**Cash register:** UL94 V0 plastic case

**Front protection:** IP 65 (with optional gasket) for indoor use according to EN 60070-1

**Terminal Protection:** IP 20 according to EN

60070-1 **Facility:** Front panel mount

**Terminal:** 11 screw terminals (M3 thread, for cables from  $\varphi$  0.25 to  $\varphi$  2.5 mm<sup>2</sup> or from AWG 22 to AWG 14).

**Dimensions:** 75 x 33mm, depth 75.5mm **Drilling:** 71

(-0 to +0.6mm) x 29 (-0 to +0.5mm) **Weight:** Approx

180g **Insulation voltage:** 2300 Vrms according to EN

61010-1

**Screen:** 12 mm h red 3-digit display **Screen**

**update time:** 500ms **Sample time:** 500ms

**Resolution:** 20000

**Overall Accuracy:**  $\pm 0.5\%$  FSV  $\pm 1$  digit @ 25°C temperature environment

**Electromagnetic compatibility and safety requirements:**

Compatibility: EMC directive 2004/108/CE (EN 61326), directives BT 2006/95/EC (EN 61010-1)

**Installation Category:** II

**Pollution degree:** two

**Temperature drift:** included in full precision **Work**

**temperature:** 0...50°C (32...122°F). **Storage temperature:**

-30...+70°C (-22...158°F) **Humidity:** 20%...85% RH, non-

condensing

## 4. EQUIPMENT CONFIGURATION

### 4.1 - BEHAVIOR OF THE INSTRUMENT ON

When turning on the instrument, it will start in the following ways, depending on the specific configuration.

#### Automatic mode

- The display will show the measured value.

- The instrument is carrying out normal regulation.

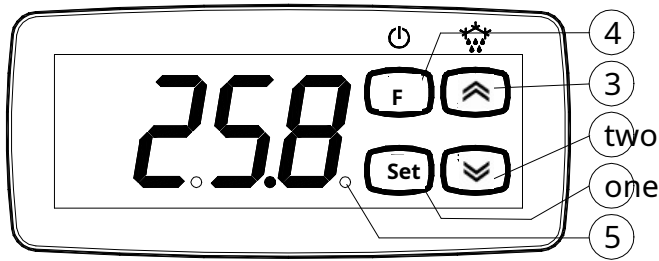
#### Standby mode (St.bY)

- The display alternately shows the measured value and the message <<St.b>> or <<od>>.

- The instrument is not carrying out any type of regulation (the regulation of the products is turned off).

- The instrument acts as an indicator.

## 4.2 - DESCRIPTION OF THE FRONT PANEL



### 1 - Button

- Pressed for 5 seconds. Allows access to programming mode parameters.
- In programming mode it is used to access the modification of the parameters and to confirm the values.
- In programming mode it can be used with the UP button to change the access level (operator level or configuration level) of the selected parameter.
- During normal operation (not programming), pressed, together with the UP button for 5 seconds, allows you to lock and unlock the keyboard.
- During normal operation (not programming), press the U button for 5 seconds. Allows you to reset or silence the alarm.

### 2 - Button

- In programming mode it is used to decrease the values to be set and the selection of parameters.
- During normal operation (not programming) press quickly, it allows to view and modify the value of the set point.

### 3 - Button

- In programming mode it is used to increase the values to be set and the selection of parameters.
- Keep pressed for 3 seconds. In programming mode, it can be used to exit and return to normal operation.
- Always in programming mode can also be used, together with the P key to change the access level (in operation or configuration) of the selected parameter.
- Press the P key for 5 seconds. When the keyboard is locked, it allows keyboard release.
- During normal operation (not programming), press quickly, it allows the visualization of the output power.

### 4 - Button

- If programmed with the parameter. "Ub.F", press for 1 second. The normal mode of operation allows power on / off (standby) or performs one of the possible functions (start of an Auto tuning cycle, etc.).
- During normal operation (not programming), press together with the P key for 5 seconds. Allows you to reset or silence the alarm.

### 5 - Led SET

- In programming mode it is used to indicate the level of the programming parameters.
- If Ub.F = sb.o, when the instrument is placed in standby mode, it remains the link light only.

- In normal operating mode it flashes when a button is pressed to indicate the fact of the same pressure.

### 6 - Led Out1

- Indicates the status of the Out1 output (compressor or temperature control device) activated (on), deactivated (off) or inhibited (flashing).

### 7 - Led Out2

- Indicates the status of output 2.

### 8 - Led Tun

- Indicates the automatic adjustment in progress.

## 4.3 - HOW TO ACCESS THE CONFIGURATION PARAMETERS

Press the P button and keep it pressed.

**Condition 1:** The instrument displays the writing "Ln" (Lock ON).

The keyboard is locked.

Maintain pressure on the P key and also press the UP button. The Led SET starts flashing.

Keep pressing the two buttons until the display shows the message "LF" (Lock OFF).

Release the keys. The keyboard is now unlocked.

**Note:** If you do not press any button for longer than the value assigned to the parameter, the keyboard lock is automatically reinserted.

**Condition 2:** The instrument does not display any message.

In this situation we can have 2 different cases: **Case 1:**

Parameter protection (password) **not** activated.

Push the button **P** and keep it pressed for about 5 seconds.

The screen will show the code that identifies the first configuration parameter

Using the UP and DOWN buttons to select the parameter you want to edit.

**case 2:** Parameter (password) protection is **active**.

Push the button **P** and keep it pressed for about 5 seconds. The screen will display the code that identifies the first parameter promoted to the operator level.

Press the UP button. The display will show "**rP**". Press the P button again. The display will show "0".

Using the UP and DOWN buttons to set the programmed password and confirm by pressing the P button.

**NOTE: the factory password is 10.**

2.A) If the password is **correct**, the instrument will display the code that identifies the first parameter of setting.

2.B) If the password **NOT** is correct, the instrument will display "rP" again.

- Once inside the configuration parameters, select the parameter you wish to modify with the UP and DOWN keys.
- Press the P key. The instrument will alternately display the parameter code and its focus.
- Modify the value of the parameter through the UP and DOWN buttons.
- Press the P button to memorize the new value. The screen will return to showing only the code of the selected parameter.

e) Acting on the UP and DOWN keys, so that you can select another parameter and modify it as described in sections a, b, c, d.

**Note:** The instrument will display only the parameter consistent with the hardware present and with the parameter value previously set (for example, if an output "is not used" is set, the instrument does not display the parameters of this proposal).

To exit programming do not act on any button for about 30 seconds, or press the UP key for about 5 seconds until you exit programming mode.

#### 4.4 - PARAMETER PROTECTION THROUGH PASSWORD

The instrument has a parameter protection function by means of a personalized password through the parameter. "PP".

If you want to have this protection, set the "PP" parameter, the number of passwords you want and exit the programming parameters.

When the protection is active, to access the parameters, press the P button for about 5 seconds, after which, the screen will show "rP" and press the P key again, the screen will show "0"

At this point set by the UP and DOWN buttons, the number of programmed passwords and press the P button.

If the password is correct, the screen will show the code that identifies the first parameter and it will be possible to program the parameters in the same way as described in the previous paragraph.

Password protection is disabled by setting the parameter. "PP" = 0F.

**Note:** If the password is forgotten, turn off the power to the instrument, press the P key, and restore the power to the instrument by holding down the key for another 5 seconds. We are going to access the protection parameters, and then you can try and also change the "PP" parameter.

#### 4.5 - PERSONALIZED PARAMETER PROGRAMMING (PARAMETER PROGRAMMING LEVELS)

The factory setting provides password protection to act on all parameters except setpoint.

If you want, after enabling the password using the "PP" parameter, modifying some parameters, maintaining protection on the other, you should follow the procedure below.

- a) Access to programming via password.
- b) Select the parameter you want to make programmable without a password.
- c.1) The led SET is flashing.
  - the parameter is password protected
- c.2) The led SET is fixed
  - The parameter is NOT password protected

To modify the access level of the parameter (in other words, make sure it is password protected or not) press the P key and, keeping it pressed, also briefly press the UP key.

The SET LED will change state indicating the new accessibility level of the parameters (on = no flashing protection = password protected)



If the password is enabled and some of the parameters have been configured as "unprotected", when accessing the programming

of the instrument, it will show first all the parameters that are configured as "no protection" and the last parameter "rP" through which "protection" parameters can be accessed.

#### 4.6 - FACTORY RESET - RESTORES THE FACTORY PROGRAMMING

The instrument parameters to return to the values set by the factory (default).

To restore the default values you need:

- Press the P button for more than 7 seconds. If the display will indicate "rP".
- Release the P button and press again. The screen will indicate "0" - through the keys  and  set the value -48.

Then confirm the password with P key, the screen displays for about 2 seconds. "--" Then the instrument resets the instrument as it was turned on and restores all the default parameters to the values programmed at the factory.

**Note:** the complete list of the default parameter is shown in the Appendix A

#### 4.7 - ON / STAND-BY FUNCTION

The instrument, once powered, can take 2 different conditions:

- ON: means that the regulator implements the planned control functions.
- STAND-BY: it means that the regulator does not carry out any supervision function and regulation of the products are forced to zero (the display is on or off depending on the configuration made using the ub.F parameter)

The instrument starts in the same way as before closing.

The ON / STAND-BY state can be selected by means of the U key, pressing for 1 sec.

ON stand-by transition is not one or soft-start (or DO) or autose, but alarm masking is reactivated.

When the instrument is in standby with the display on, the display alternately shows the "St.b" measurement.

When the instrument is in standby with the display off, the display is completely off, except for the LSD decimal point (LED Set (5)).

When the instrument is in standby mode (both displays) it is still possible to access the programming parameters.

#### 4.8 - ALL CONFIGURATION PARAMETERS

All instrument parameters are described on the following pages. However, the instrument only displays the parameters for the available hardware options and according to the setting made for the previous parameters (for example, set O2F [alarm] equal to <<no>> [not used], all parameters related to the alarm is ignored).

##### [1] SPL : Lower limit of Set Point 1

**Range:** -99.9...SPH

##### [2] SPH : Upper limit of the Set Point

**Range:** SPL....999

##### [3] SP1 : Set Point 1: value to adjust in relay 1

**Range:** SPL...SPH

**[4] SP2 : Set Point 2: value to adjust on relay 2**

**Note:**When 2 solution outputs are set with ON/OFF action, the instrument uses SP1 to control output OUT1 and SP2 (see next parameter) to control output OUT2. **Visible:** Solution output only if output was set to 2.

**Range:** SPL...SPH

**[5] AL: Alarm threshold**

**Visible:** only if output 2 is set as alarm output.**Range:** -99.9...999

**[6] tun = Visible auto tuning:**

only if o1.F = PID

ALL = E auto tune runs all parameters on power up and the Pb, Ti and Td parameters are masked.

OnE = l'Autotuning comes just after successive access.

ub = Manual output through the U key (the parameters Pb, Ti and Td are visible)

**NOTE:** When soft start, or power on delay autotuning was expected and the instrument runs before soft start (with whatever parameters it has) or delay, and then autotunes

**[7] Pb = Visible proportional band:**

if o1F=PID**and** tun = ub **Range:** 1...

200 engineering units.

**[8] ti = Integral time**

**Visible:** it is only o1F=PID and tun = ub

**Range:** 1...999 seconds and OFF (excluded).

**[9] td = Visible derivative time:**

only if o1F=PID and tun = ub **Range:**

0 = (OFF)... 200 seconds.

**[10] SEn = Sensors**

Model	Selection	Sensor	Measurement field
°F	J.C.	CT J	- 40 to 999 °C
	Ca.C	CT K	- 40 to 999 °C
	J.F.	CT J	- 40 to 999°F
	Ca.F	CT K	- 40 to 999°F
A	Pt.C	PT100	- 50.0 to 850 °C (automatic regulation)
	Pt.F	PT100	- 58.0 to 999 °F (automatic regulation)
T	nC.C	NTC	- 50.0 to 109 °C (automatic regulation)
	PC.C	PTC	- 50.0 to 150 °C (automatic regulation)
	nC.F	NTC	- 58.0 to 228 °F (automatic regulation)
	PC.F	PTC	- 58.0 to 302 °F (automatic regulation)

P1.C	Pt1000	- 50.0 to 850 °C (automatic regulation)
P1.F	Pt1000	- 58.0 to 999 °F (automatic regulation)

**[11] dP = Decimal point**

**Range:** YES = Automatic regulation display nO = display always without decimal

**[12] AC = measurement offset Range:**

-300...300 engineering units

**[13] Ft = filter on analog input**

**Range:** 0...20 seconds.

**[14] o1F = Relay Out 1 operating mode**

**Range:** H.rE = PID control with heating action (reverse) C.rE = PID control with cooling action (direct) on.H = ON/OFF control with heating action (reverse) on.C = ON control /OFF with cooling action (direct)

**[15] tr1 = Output cycle time Out 1 Range:**

1...250 seconds.

**[16] o2F = Relay Out 2 operating mode**

**Range:**

If o1F is equal to H.rE or C.rE

not = not used

HAL = Absolute maximum alarm

LAL = Absolute minimum alarm

b.AL = Band alarm (symmetrical with respect to the set

point) dHA = Upward deviation alarm

dLA = Deviation Down Alarm If o1F =

on.H or on.C

not = not used

HAL = Absolute maximum alarm

LAL = Absolute minimum alarm

b.AL = Band alarm (symmetrical with respect to the set

point) dHA = Upward deviation alarm

dLA = Deviation Down Alarm

SP.C = SP2 ON/OFF control with cooling action. SP.H = SP2

ON/OFF control with heating action

nr = ON/OFF to neutral zone (o2F that the opposite action to that expected for o1F, while the hysteresis [parameter D1] becomes the neutral zone).

**NOTE:** Neutral Zone operation is used for control of places that have an element that causes a positive increase (for example, heating, humidification, etc.) and an element that causes a negative increase (for example, refrigerants, desiccants, etc.)

Consequently, the element causing a positive increase will be connected to the output configured as a heater, while the element connected to the negative increase output configured as cooling.

Table of possible combinations

O1F	O2F	Displayed parameters
H.rg	H.AL, L.AL, b.AL, dHA, dLA	SP1, AL
c.rg	H.AL, L.AL, b.AL, dHA, dLA	SP1, AL
On.H	H.AL, L.AL, b.AL, dHA, dLA	SP1, AL
	SP.C, SP.H	SP1, SP2
	No.	Sp1 only
On.C	H.AL, L.AL, b.AL, dHA, dLA	SP1, AL
	SP.C, SP.H	SP1, SP2
	No.	SP1 only

**[17] d1 = Output 1 hysteresis or neutral zone Visible:**

if Out 1 is equal to on.H or on.C. **Range:** 1...999 engineering units.

**[18] d2 = Output 2 hysteresis Visible:**

if o2F is different from nr. **Range:** 1...999 engineering units

**[19] AL.F = Alarm Function**

**Visible:** if o2F is set as alarm output **Range:** AL = Automatic reset alarm AL.n = Stored alarm

AL.A = Silenceable alarm AL = Alarm with automatic reset AL.n = Memorized alarm AL.A = Silenceable alarm

**[20] AL.t = Alarm inhibition time from a set point change**

**Range:** 0 = OFF...9.59 HH.mm

**Note :** When the measurement reaches the alert threshold, the masking instrument deactivates the alarm.

**[21] Pct = Compressor protection times**

Avoid closing after a "cooldown" of the same activity that occurs before the expiration of the term established with this parameter.

In other words, it defines the minimum time interval between the closing of an "outlet cooldown" and the subsequent reactivation.

**Visible:** if at least one 'out is set as the cooling out.

**Range:** 0=OFF...9.59 HH.mm

**Note:** this parameter is applied to ALL cooling outputs.

**[22] SSt = Soft start times Range:**

0=OFF... 9.59 HH.mm

**[23] SSP = Power during soft start Visible:** if SSt is different from 0. **Range:** 0...100%.

**[24] Ub.F = Function key U**

**Range:** no = Does not work Tun = Activates manual adjustment Sb = Standby mode Sb.o = Standby mode with screen off.

**[25] PP = Password for access to standard parameters**

**Range:** 1...999.

**[26] Lo = Keypad autolock time**

It is possible to set a time after which the instrument locks the keyboard automatically. The time counter will start after any key is pressed.

**Range:** OFF... 30 minutes.

**OSAKA WARRANTY**

This equipment has a guarantee in the form of repair or replacement of 12 months from the date of delivery.

Improper use or manipulation automatically cancels said guarantee.

In the event of a defective product, it is necessary to contact the after-sales service to make the appropriate limits.