K__V

INDICATORS WITH INDEPENDENT TIMER

Engineering Manual

19/06 - Code: ISTR_Q_K-Vseries_E_03_--

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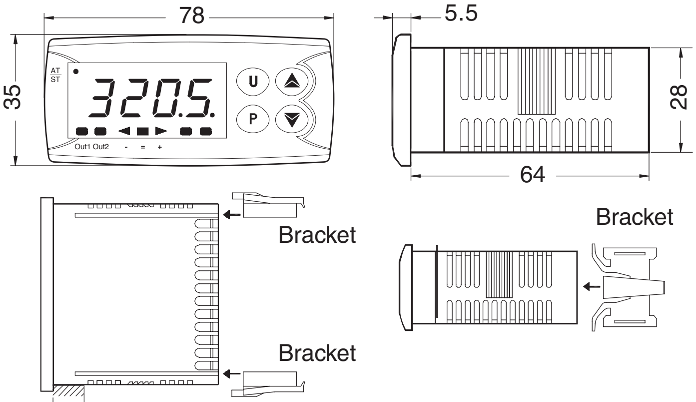
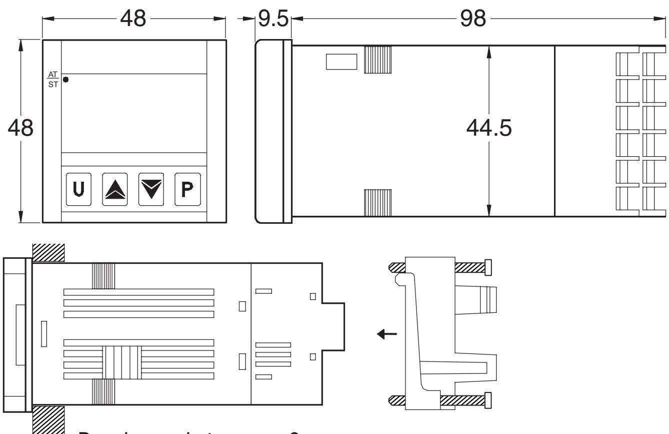
1. OUTLINE DIMENSIONS (MM)

1.1 3xV Series



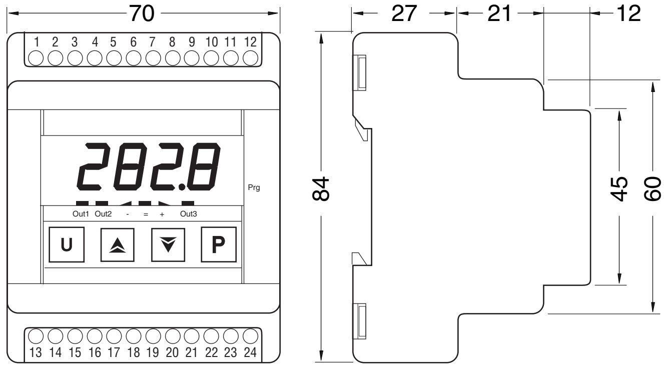
Panel + Gasket = 12 mm max.

1.2 K48 V Series



Panel + gasket = max. 9 mm

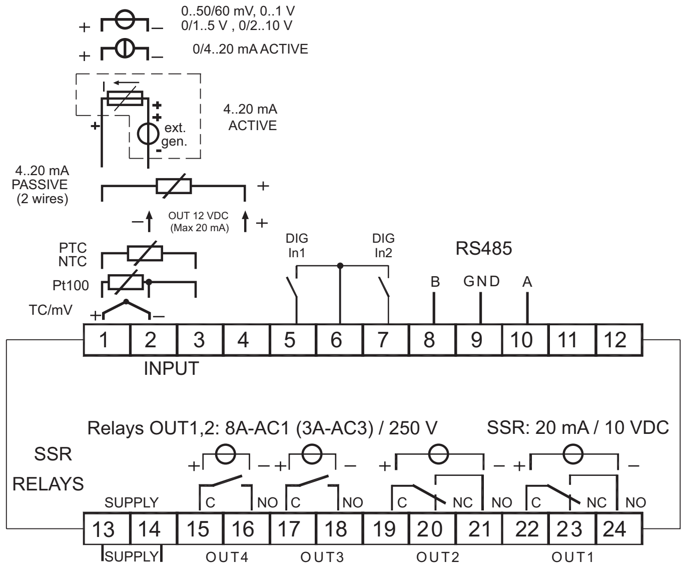
1.3 K85 V Series



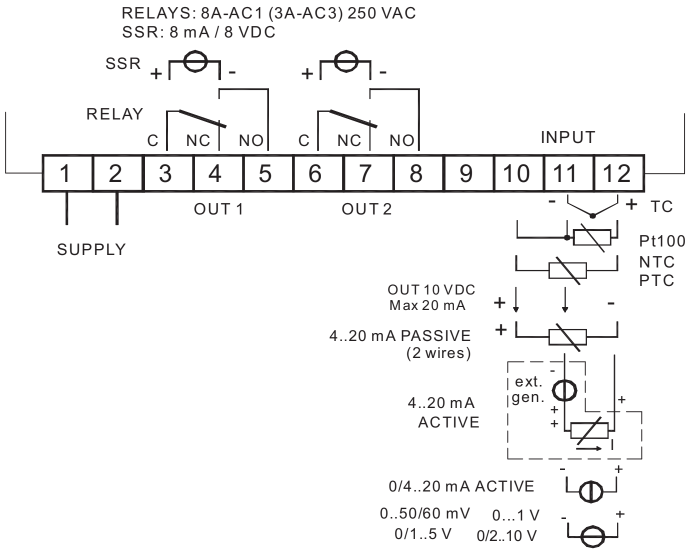
2. CONNECTIONS

2.1 Connection Diagrams

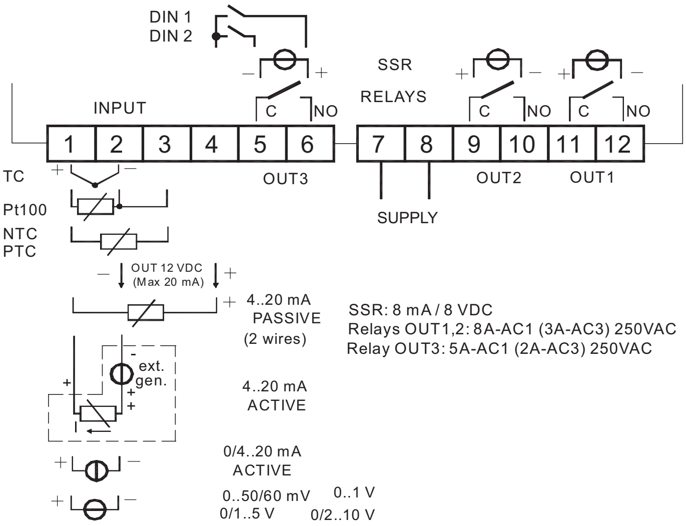
2.1.1 K31 V Series



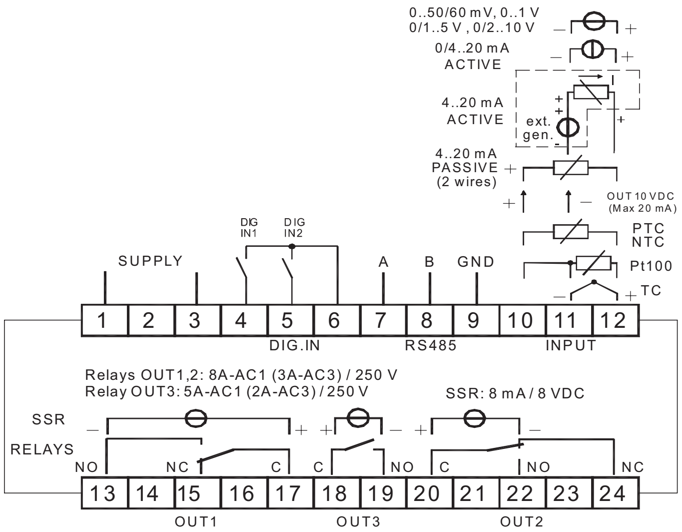
2.1.2 K38 V Series



2.1.3 K48V Series



2.1.4 K85V Series



3. MOUNTING REQUIREMENTS

This instrument is intended for permanent installation, for indoor use only, in an electrical panel which encloses the rear housing, exposed terminals and wiring on the back.

Select a mounting location having the following characteristics:

1. It should be easily accessible;
2. There is minimum vibrations and no impact;
3. There are no corrosive gases;
4. There are no water or other fluid (i.e. condensation);
5. The ambient temperature is in accordance with the operative temperature (0... 50°C);
6. The relative humidity is in accordance with the instrument specifications (20% to 85 %).

Lo strumento può essere montato su un pannello con uno spessore massimo di 15 mm.

Per ottenere la massima protezione frontale (IP65), è necessario montare la guarnizione opzionale.

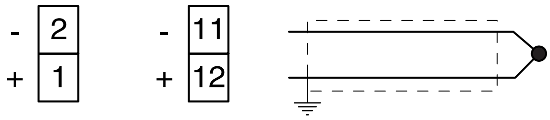
3.1 General Notes about Input Wiring

1. Do not run input wires together with power cables;
2. External components (like zener barriers, etc.) connected between sensor and input terminals may cause errors in measurement due to excessive and/or not balanced line resistance or possible leakage currents;
3. When a shielded cable is used, it should be connected at one point only;
4. Pay attention to the line resistance; a high line resistance may cause measurement errors.

3.2 Inputs wiring

3.2.1 Ingresso da termocoppia

K31-K48 K38-K85



External resistance: 100 Ω max., maximum error 0.5% of span.

Cold junction: automatic compensation from 0 to 50°C.

Cold junction accuracy: 0.1°C/°C after a warm-up of 20 minutes.

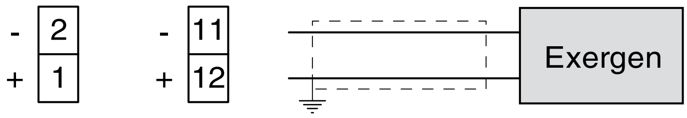
Input impedance: > 1 MΩ.

Calibration: according to EN 60584-1.

Note: For TC wiring use proper compensating cable preferable shielded.

3.2.2 Infrared Sensors Input

K31-K48 K38-K85



External resistance: Do not care condition.

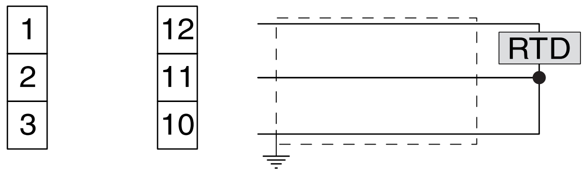
Cold junction: Automatic compensation from 0 to 50°C.

Cold junction accuracy: 0.1°C/°C.

Input impedance: > 1 MΩ.

3.2.3 RTD (PT100) Input

K31-K48 K38-K85



Input circuit: Current injection (135 µA).

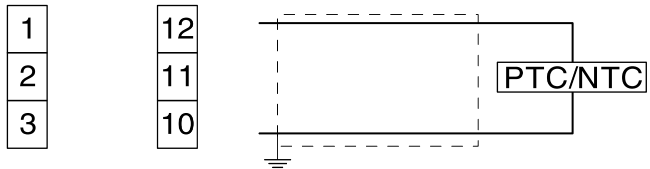
Line resistance: Automatic compensation up to 20Ω/wire with maximum error ±0.1% of the input span.

Calibration: According to EN 60751/A2.

Note: The resistance of the 3 wires must be the same.

3.2.4 Thermistors Input

K31-K48 K38-K85

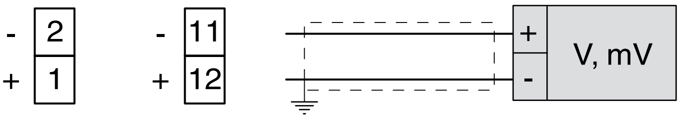


Line resistance: Not compensated.

Pt 1000 Input circuit: Current injection (25 µA).

3.2.5 V and mV Input

K31-K48 K38-K85



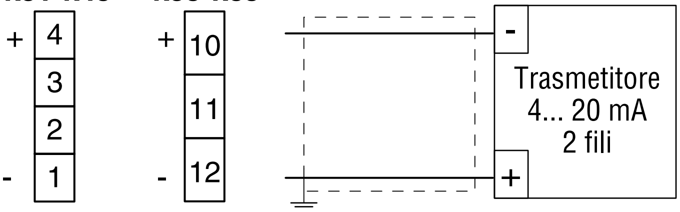
Input impedance: > 1 MΩ

Accuracy: ±0.5 % of Span ±1 digit @ 25 °C.

3.2.6 Current Input (mA)

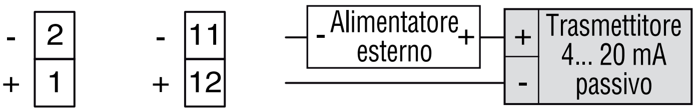
0/4... 20 mA input wiring for passive transmitter using auxiliary pws

K31-K48 K38-K85



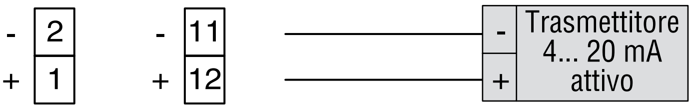
0/4... 20 mA input wiring for passive transmitter using an external pws

K31-K48 K38-K85



0/4... 20 mA input wiring for active transmitter

K31-K48 K38-K85



Input impedance: < 51Ω.

Accuracy: 0.5% of Span ±1 dgt @ 25 °C.

Protection: NOT protected from short circuit.

Internal auxiliary PWS: 10 VDC (±10%), 20 mA max..

3.3 Output

Safety notes:

– To avoid electrical shock, connect power line at last.

– For supply connections use No. 16 AWG or larger wires rated for at last 75°C;

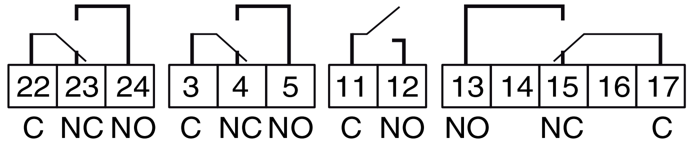
– Use copper conductors only.

– SSR outputs are not isolated. A double or reinforced isolation must be assured by the external solid state relays.

3.3.1 Output 1 (OP1)

Relay Output

K31 K38 K48 K85

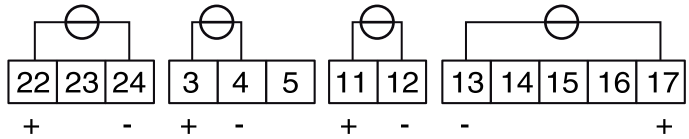


Out 1 contact rating: • 8 A /250 V cosφ =1;
• 3 A /250 V cosφ =0.4.

Operation: 1 x 10^5.

Uscita SSR

K31 K38 K48 K85



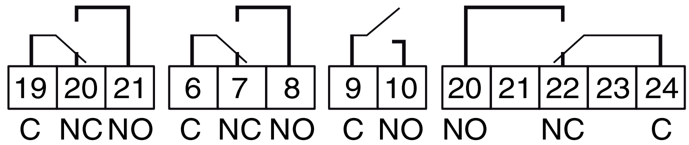
Logic level 0: Vout < 0.5 VDC;

Logic level 1: 12 V ±20% @ 1 mA;
10 V ±20% @ 20 mA.

3.3.2 Output 2 (OP2)

Relay Output

K31 K38 K48 K85

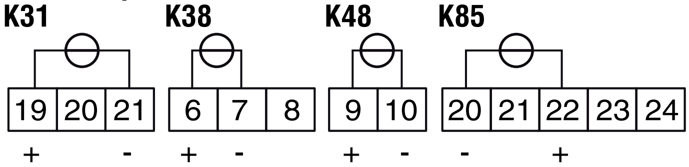


Out 2 contact rating: • 8 A /250 V cosφ =1;
• 3 A /250 V cosφ =0.4.

Operation: 1 x 10^5.

SSR Output

K31 K38 K48 K85



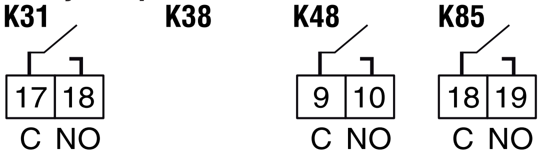
Logic level 0: Vout < 0.5 VDC;

Logic level 1: 12 V ±20% @ 1 mA;
10 V ±20% @ 20 mA.

3.3.3 Output 3 (OP3)

Relay Output

K31 K38 K48 K85



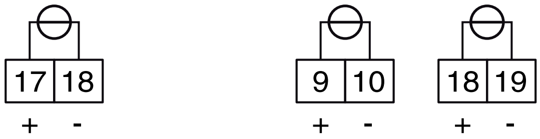
Out 3 contact rating: • 8 A /250 V cosj =1;

• 3 A /250 V cosj =0.4.

Operation: 1 x 105.

SSR Output

K31 K38 K48 K85



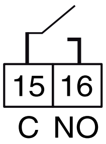
Logic level 0: Vout < 0.5 VDC;

Logic level 1: 12 V ± 20% @ 1 mA;
10 V ± 20% @ 20 mA.

3.3.4 Output 4 (OP4)

Relay Output

K31

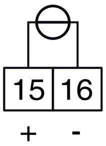


Out 1 contact rating: • 8 A /250 V cosφ =1;
• 3 A /250 V cosφ =0.4.

Operation: 1 x 10^5.

SSR Output

K31



Logic level 0: Vout < 0.5 VDC;

Logic level 1: 12 V ± 20% @ 1 mA;
10 V ± 20% @ 20 mA.

3.4 Logic Inputs

Safety notes:

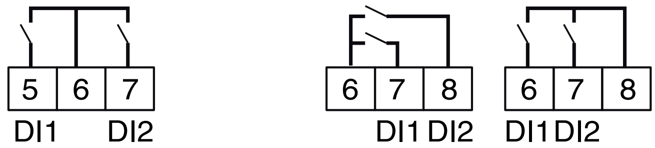
– Do not run logic input wiring together with power cables.

– Use an external dry contact capable to switch 0.5 mA, 5 VDC.

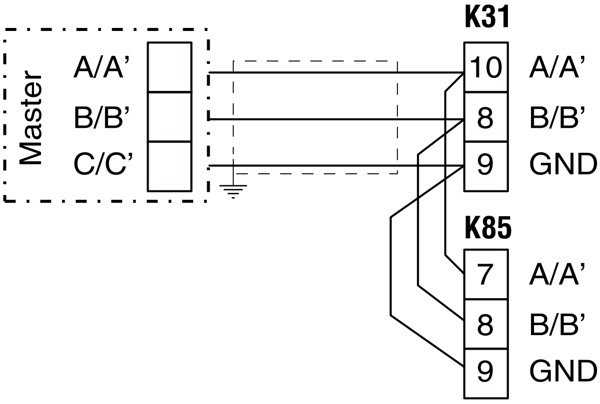
– The instrument needs 150 ms to recognize a contact status variation.

– The logic inputs are **NOT** isolated by the measuring input. A double or reinforced isolation between logic inputs and power line must be assured by the external element.

K31 K38 K48 K85



3.5 Serial Interface



Interface type: - Isolated (50 V) RS-485;
- TTL not isolated;

Voltage levels: According to EIA standard;

Protocol type: MODBUS RTU;

Byte format: 8 bit without parity;

Stop bit: One;

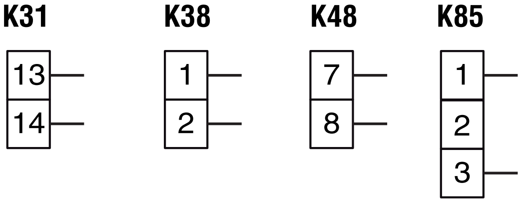
Baud rate: Programmable: 1200... 38400 baud;

Address: Programmable: 1... 255.

Notes: **1.** RS-485 interface allows to connect up to 30 devices with one remote master unit.

2. The cable length must not exceed 1.5 km at 9600 baud.

3.6 Power Supply



Supply voltage:
- 12 VAC/DC (±10%)
- 24 VAC/DC (±10%);
- 100... 240 VAC (±10%).

Power Consumption: 5 VA max.

Notes:
1. Before connecting the instrument to the power line, make sure that line voltage is equal to the voltage shown on the identification label;
2. To avoid electrical shock, connect power line at the end of the wiring procedure.
3. For supply connections use No 16 AWG or larger wires rated for at last 75 °C.
4. Use copper conductors only.
5. For power supply the polarity is a do not care condition.
6. The power supply input is NOT fuse protected.
7. Please, provide a T type 1A, 250 V external fuse.

4. TECHNICAL CHARACTERISTICS

4.1 Technical Specifications

Case: Plastic, self-extinguishing degree: V-0 according to UL 94;

Front protection: IP 65 (when the optional panel gasket is mounted) for indoor locations according to EN 60070-1.

Rear terminals protection: IP 20 according to EN 60070-1.

Terminal block: Screw terminals (screw M3, for cables of 0.25... 2.5 mm^2 or from AWG 22 to AWG 14) with connection diagrams.

Dimensions:
K3xV: 78 x 35 x 64 mm (3.07 x 1.38 x 2.52")
K4xV: 48 x 48 x 98 mm (1.77 x 1.77 x 3.86")
K85V: 70 x 84 x 60 mm (2.76 x 3.31 x 2.37");

Mount cut-out:
K3xV: 71(+0.6) x 29(+0.6) mm [2.8(+0.023) x 1.78(+0.023) in.];
K4xV: 45(+0.6) x 45(+0.6) mm [1.78(+0.023) x 1.78(+0.023) in.];
K85V: DIN rail mounting.

Weight: About 180 g;

Power Supply:
– 12 VAC/DC (±10% of the nominal voltage);
– 24 VAC/DC (±10% of the nominal voltage);
– 100... 240 VAC (-15... +10% of the nominal voltage);

Power consumption: 5 VA max.;

Insulation voltage: 2300 V rms according to EN 61010-1;

Display: One 4 digits red display h 12 mm + 3 LED Bargraph;

Display updating time: 500 ms;

Sampling time: 130 ms;

Resolution: 30000 counts;

Total Accuracy: ±0.5% F.S.V. ±1 digit @ 25°C of room temperature;

Common mode rejection: 120 dB at 50/60 Hz;

Normal mode rejection: 60 dB at 50/60 Hz;

Electromagnetic compatibility and safety requirements

Compliance: - directive EMC 2004/108/CE (EN 61326-1),
- directive LV 2006/95/CE (EN 61010-1);

Installation category: II;

Pollution category: 2;

Temperature drift: It is part of the global accuracy;

Operating temperature: 0... 50°C (32... 122°F);

Storage temperature: -30... +70°C (-22... 158°F);

Humidity: 20... 85% RH, non condensing;

Protections: WATCH DOG (hardware/software) for the automatic restart.

5. HOW TO ORDER

5.1 K31V

Model
K31V - = Front panel mounting Indicator 78 x 35 mm

Power Supply
F = 12 VAC/DC
L = 24 VAC/DC
H = 100... 240 VAC

Input
C = TC, PT100, mV
E = TC, PTC, NTC, mV
I = 0/4... 20mA
V = 0... 1V, 0/1... 5V, 0/2... 10V

Output 1
R = Relay SPDT 8A-AC1 (resistive load)
O = VDC for SSR
M = Mosfet Output

Output 2
- = Not available
R = Relay SPDT 8A-AC1 (resistive load)
O = VDC for SSR

Output 3
- = Not available
R = Relay SPST-NO 5A-AC1 (resistive load)
O = VDC for SSR

Output 4
- = Not available
R = Relay SPST-NO 5A-AC1 (resistive load)
O = VDC for SSR

Serial communications
- = TTL Modbus
S = RS485 Modbus

5.2 K38V

Model
K38V - = Front panel mounting Indicator 78 x 35 mm

Power Supply
F = 12 VAC/DC
L = 24 VAC/DC
H = 100... 240 VAC

Input
C = TC, PT100, mV
E = TC, PTC, NTC, mV
I = 0/4… 20mA
V = 0… 1V, 0/1… 5V, 0/2… 10V

Output 1
R = Relay SPDT 8A-AC1 (resistive load)
O = VDC for SSR

Output 2
- = Not available
R = Relay SPDT 8A-AC1 (resistive load)
O = VDC for SSR

5.3 K48V

Model
K48V - = Front panel mounting Indicator 48 x 48 mm

Power Supply
L = 24 VAC/DC
H = 100... 240 VAC

Input
C = TC, PT100, mV
E = TC, PTC, NTC, mV
I = 0/4… 20mA
V = 0… 1V, 0/1… 5V, 0/2… 10V

Output 1
R = Relay SPDT 8A-AC1 (resistive load)
O = VDC for SSR

Output 2
- = Not available
R = Relay SPDT 8A-AC1 (resistive load)
O = VDC for SSR

Output 3
- = Not available
D = Double Digital Input
R = Relay SPDT 8A-AC1 (resistive load)
O = VDC for SSR

5.4 K85V

Model
K85V - = DIN rail mounting Indicator

Power Supply
L = 24 VAC/DC
H = 100... 240 VAC

Input
C = TC, PT100, mV
E = TC, PTC, NTC, mV
I = 0/4… 20mA
V = 0… 1V, 0/1… 5V, 0/2… 10V

Output 1
R = Relay SPDT 8A-AC1 (resistive load)
O = VDC for SSR

Output 2
- = Not available
R = Relay SPDT 8A-AC1 (resistive load)
O = VDC for SSR

Output 3
- = Not available
R = Relay SPDT 8A-AC1 (resistive load)
O = VDC for SSR

Digital Inputs
- = Not available
D = 2 Digital Inputs

Serial Communications
- = TTL Modbus
S = RS485 Modbus

6. CONFIGURATION PROCEDURE

6.1 Introduction

When the instrument is powered ON, it starts immediately working according to the parameters values loaded in its memory.

The instrument behaviour and its performances are governed by the value of the stored parameters.

At first start up the instrument uses the "*default*" parameter set (factory parameter set); this set is a generic one (e.g. a TC J input is programmed).

We recommend that you modify the parameter set to suit your application (e.g. set the right input type, define the alarms, etc.)

To change these parameters you will need to enter the "*Configuration procedure*".

6.1.1 Access levels to the parameter modifications and their password

The instrument have a complete parameter set. We call this set "configuration parameter set" (or "configuration parameters").

The access to the configuration parameters is protected by a programmable password (password level 3).

The configuration parameters are collected in various groups. Each group defines all parameters related with a specific function (E.g. alarms, output functions, serial link).

Note: The instrument shows only the parameters consistent with the specific hardware and in accordance with the value assigned to the previous parameters (e.g. if you set an output as "not used" the instrument will mask all other parameters related with this output).

6.2 Instrument Behaviour at Power UP

At power ON the instrument can show one of the following information:

– The measured value;
– An one alarm threshold;
– The programmed time of the timer.

In all cases:

– The programmed alarm are enabled;
– The serial link is immediately operative.

We define the above conditions as "Standard Display".

6.3 How to enter the Configuration Mode

1. Push the [P] button for more than 3 seconds. The display starts showing 0 and PASS alternately.
2. Using [▲] and/or [▼] buttons set the programmed password.

Notes: 1. The factory default password for configuration parameters is 30.

2. All parameter changes are protected by a time out. If no button is pressed for more than 10 seconds the instrument automatically returns to the Standard display, the new value of the last selected parameter is lost and the parameter modification procedure is closed.
When you want to remove the time out (e.g. for the first configuration of an instrument) you can use a password equal to 1000 plus the programmed password (e.g. 1000 + 30 [default] = 1030). It is always possible to end manually the parameter configuration procedure (see the next paragraph).

3. During parameter changes the instrument continues to perform the control. In certain conditions, when a configuration change can produce a heavy bump to the process, it is advisable to temporarily stop the controller from controlling during the programming procedure (its control output will be OFF).
A password equal to 2000 + the programmed value (e.g. 2000 + 30 = 2030).
The control will restart automatically when the configuration procedure will be manually closed.

3. Push the [P] button. If the password is correct the display shows the acronym of the first parameter group preceded by the symbol].
In other words the display shows:] inP
The instrument is in configuration mode.

6.4 How to exit the Configuration Mode

Push the [U] button for more than 5 seconds. The instrument returns to the "standard display"

6.5 Keyboard functions during the parameter modification

[U] A short press allows to exit from the current parameter group and select a new parameter group.
A long press allows you to close the configuration parameter procedure (the instrument will come back to the "standard display").

[P] When the upper display is showing a group and the lower display is blank, this key allows to enter in the selected group.
When the upper display is showing a parameter and the lower display its value, this key allows to store the selected value for the current parameter and access the next parameter within the same group.

[▲] Allows to increase the value of the selected parameter.

[▼] Allows to decrease the value of the selected parameter.

Note: The group selection is cyclic as well as the selection of the parameters in a group.

6.6 Factory Reset - Default Parameters Loading Procedure

Sometime, e.g. when you reconfigure an instrument previously used for other works or from other people or when you have made too many errors during configuration and you decided to reconfigure the instrument, it is possible to restore the factory configuration. This action allows you to put the instruent in a defined con-dition (in the same condition it was at the first power ON).

The default data are the typical values loaded in the instrument prior to shipment from factory.

To load the factory default parameter set, proceed as follows:

1. Press the [P] button for more than 5 seconds. The upper display shows PASS, the lower 0;
2. Press [▲]/[▼] to set the -481 value;
3. Press the [P] ;
4. The instrument turns OFF all LEDs for a few seconds, the upper display shows dFLt (default) then all LEDs are turned ON for 2 seconds. At this point the instrument restarts as for the first power ON.

The procedure is complete.

Note: The complete list of the default parameters is available in Appendix A.

6.7 Configuring all the Parameters

In the following pages we will describe all the parameters of the instrument. However, the instrument will only show the parameters applicable to its hardware options in accordance with the specific instrument configuration (i.e. setting AL1t [Alarm 1 type] to nonE [not used], all parameters related to alarm 1 will be skipped).

inP Group - Main and auxiliary input configuration

[2] SEnS - Input Type

Available: Always.

Range: • When the code of the input type is equal to C (see Ordering Code at page 29).

J	TC J	(0... 1000°C/32... 1832°F)
crAL	TC K	(0... 1370°C/32... 2498°F)
S	TC S	(0... 1760°C/32... 3200°F)
r	TC R	(0... 1760°C/32... 3200°F)
t	TC T	(0... 400°C/32... 752°F)
ir.J	Exergen IRS J	(0... 1000°C/32... 832°F)
ir.cA	Exergen IRS K	(0... 1370°C/32... 2498°F)
Pt1	RTD Pt 100	(-200... 850°C/-328... 1562°F)
0.50	0... 50 mV linear	
0.60	0... 60 mV linear	
12.60	12... 60 mV linear	

• When the code of the input type is equal to E.

J	TC J	(0... 1000°C/32... 1832°F)
crAL	TC K	(0... 1370°C/32... 2498°F)
S	TC S	(0... 1760°C/32... 3200°F)
r	TC R	(0... 1760°C/32... 3200°F)
t	TC T	(0... 400°C/32... 752°F)
ir.J	Exergen IRS J	(0... 1000°C/32... 1832°F)
ir.cA	Exergen IRS K	(0... 1370°C/32... 2498°F)
Ptc	PTC KTY81-121	(-55... 150°C/-67... 302°F)
0.50	0... 50 mV linear	
0.60	0... 60 mV linear	
12.60	12... 60 mV linear	

• When the code of the input type is equal to I I.

0.20	0... 20 mA linear
4.20	4... 20 mA linear

• When the code of the input type is equal to V.

0.1	0... 1 V linear
0.5	0... 5 V linear
1.5	1... 5 V linear
0.10	0... 10 V linear
2.10	2... 10 V linear

Notes: **1.** When a TC input is selected and a decimal figure is programmed (see the next parameter) the max. displayed value become 999.9°C or 999.9°F

2. Every change of the SEnS parameter setting will force the following change:
[3] dP = 0
[4] SSc = -1999
[5] FSC = 9999

[3] dP - Decimal point position

Available: Always.

Range: When [2] SenS = Linear input: 0 to 3.
When [2] SenS different from linear input: 0 or 1

Note: Every change of the dP parameter setting will produce a change of the parameters related with it (e.g. Alarm thresholds, Peak hi and peak low memory, etc.).

[4] SSc – Initial scale read-out for linear inputs

Available: When a linear input is selected by [2] SenS.

Range: -1999 to 9999

Notes: **1.** Defines the value shown by the instrument when it measures the the minimum electrical value of the scale selected by [2] SenS parameter

2. Allows the scaling of the analogue input to set the minimum displayed/measured value
The instrument will show a measured value up to 5% less then SSc value and than it will show an underrange error.

3. It is possible to set a initial scale read-out higher then the full scale read-out in order to obtain a reverse read-out scaling. E.g. :
0 mA = 0 mBar and 20 mA = - 1000 mBar (vacuum).

[5] FSc - Full scale read-out for linear input

Available: When a linear input is selected by [2] SenS.

Range: -1999... +9999.

Notes: **1.** Defines the value shown by the instrument when it measures the the maximum electrical value of the scale selected by [2] SenS parameter

2. Allows the scaling of the analogue input to set the maximum displayed/measured value
The instrument will show a measured value up to 5% higher than [5] FSc value and then it will show an overrange error.

3. It is possible to set a full scale read-out lower than the initial scale read-out in order to obtain a reverse read-out scaling. E.g. :
0 mA = 0 mBar and 20 mA = - 1000 mBar (vacuum).

[6] 0.Pot - Offset value used to shift the readout zero

Available: When a linear input is selected by [2] SenS.

Range: SSC... FSC (E.U.).

[7] unit - Engineering unit

Available: When a temperature sensor is selected by [2] SenS.

Range: °c Centigrade
°F Fahrenheit

[8] FiL - Digital filter on the measured value

Available: Always.

Range: oFF (No filter) 0.1 to 20.0 s.

Note: This is a first order digital filter applied on the measured value. For this reason it will affect both the measured value but also the control action and the alarms behaviour.

[9] diF1 - Digital input 1 function

Available: When the instrument is equipped with digital inputs.

Range:

oFF	No function
AAC	Alarm Reset [status]
ASi	Alarm acknowledge (ACK) [status]
HoLd	Hold of the measured value [status]
r.Pic	Peaks reset [transition]
0.Pot	start of the 0.Pot procedure. [transition]
r.PoP	Start of the 0.Pot procedure and Peaks reset [transition]
t.rHr	Timer Run/Hold/Reset [transition]
t.run	Timer Run [transition] a short closure allows to start timer execution
t.rES	Timer rese [transition] a short closure allows to reset timer count
t.rH	Timer run/hold [Status]

- Contact closure = timer RUN
- contact opend = timer Hold

uP.du Digital input 1 works in parallel with ▲ button while digital input 2 with ▼.

[10] diF2 - Digital input 2 function

Available: When the instrument is equipped with digital inputs.

Range:
- oFF No function
- AAC Alarm Reset [status]
- ASi Alarm acknowledge (ACK) [status].
- HoLd Hold of the measured value [status].
- r.Pic Peaks reset [transition]
- 0.Pot start of the 0.Pot procedure. [transition]
- r.PoP Start of the 0.Pot procedure and Peaks reset [transition]
- t.rHr Timer Run/Hold/Reset [transition]
- t.run Timer Run [transition] a short closure allows to start timer execution.
- t.rES Timer rese [transition] a short closure allows to reset timer count.
- t.rH Timer run/hold [Status]
  - Contact closure = timer RUN
  - contact opend = timer Hold
- uP.du Digital input 1 works in parallel with ▲ button while digital input 2 with ▼.

Note: When d iF 1 is equal to uP.du, d iF2 setting is forced to uP.du and d iF2 value and cannot perform another additional function.

out group - Output parameters

[11] o1F - Out 1 function

Available: Always.

Range:
- nonE Output not used. With this setting the status of the this output can be driven directly from serial link
- AL Alarm output
- t.out Timer output
- t.HoF Timer out - OFF in Hold
- or.bo Out-of-range or burn out indicator
- P.FAL Power failure indicator
- bo.PF Out-of-range, burn out, Power failure indicator
- diF.1 The output repeats the digital input 1 status
- diF.2 The output repeats the digital input 2 status.

Notes: **1.** When 2 or more outputs are programmed in the same way, these outputs will be driven in parallel.
2. The power failure indicator will be reset when the instrument detect an alarm reset command by U key, digital input or serial link.

[12] o1.AL - Alarms linked up with the out 1

Available: When [11] o1F = AL

Range: 0... 15 with the following rule:
- +1 Alarm 1
- +2 Alarm 2
- +4 Alarm 3
- +8 Alarm 4
- + 16 = Sensor break (burn out)

Example 1: Setting 3 (2+1) the output will be driven by the alarm 1 and 2 (OR condition).

Example 2: Setting 13 (8+4+1) the output will be driven by alarm 1 + alarm 3 + alarm 4.

[13] o1Ac - Output 1 action

Available: When [11] o1F is different from nonE.

Range:
- dir Direct action
- rEU Reverse action
- dir.r Direct action with revers LED indication
- rEU.r Reverse action with reverse LED indication.

Notes: **1.** Direct action: the output repeats the status of the driven element.
Example: the output is an alarm output with direct action. When the alarm is ON, the relay will be energized (logic output 1).
2. Reverse action: the output status is the opposite of the status of the driven element.
Example: the output is an alarm output with reverse action. When the alarm is OFF, the relay will be energized (logic output 1). This setting is usually named "fail-safe" and it is generally used in dangerous process in order to generate an alarm when the instrument power supply goes OFF or the internal watchdog starts.

[14] o2F - Out 2 function

Available: When the instrument has out 2 option.

Range:
- nonE Output not used. With this setting the status of the this output can be driven directly from serial link.
- AL Alarm output
- t.out Timer output
- t.HoF Timer out - OFF in Hold
- or.bo Out-of-range or burn out indicator
- P.FAL Power failure indicator
- bo.PF Out-of-range, burn out, Power failure indicator
- diF.1 The output repeates the digital input 1 status
- diF.2 The output repeates the digital input 2 status.

Note: For other details see [11] O1F parameter

[15] o2.AL – Alarms linked up with Out 2

Available: When [14] o2F = AL

Range: 0... 15 with the following rule:
- +1 Alarm 1
- +2 Alarm 2
- +4 Alarm 3
- +8 Alarm 4
- +16 Sensor break (burn out).

Note: For more details see [13] o1.AL parameter

[16] o2Ac -Output 2 action

Available: When [14] o2F is different from nonE.

Range:
- dir Direct action
- rEU Reverse action
- dir.r Direct action with revers LED indication
- rEU.r Reverse action with reverse LED indication.

Note: For more details see [13] o1.Ac parameter.

[17] o3F - Out 3 function

Available: When the instrument has out 3 option

Range:
- nonE Output not used. With this setting the status of the this output can be driven directly from serial link
- AL Alarm output
- t.out Timer output
- t.HoF Timer out - OFF in Hold
- or.bo Out-of-range or burn out indicator
- P.FAL Power failure indicator

bo.PF Out-of-range, burn out, Power failure indicator
diF.1 The output repeates the digital input 1 status
diF.2 The output repeates the digital input 2 status.

Note: For other details see [11] O1F parameter

[18] o3.AL - Alarms linked up with Out 3

Available: When [17] o3F = AL

Range: 0... 15 with the following rule:
+1 Alarm 1
+2 Alarm 2
+4 Alarm 3
+8 Alarm 4
+16 Sensor break (burn out).

Note: For more details see [13] o1.AL parameter.

[19] o3Ac -Output 3 action

Available: When [17] o3F is different from nonE.

Range: dir Direct action
rEU Reverse action
dir.r Direct action with revers LED indication
rEU.r Reverse action with reverse LED indication.

Note: For more details see [13] o1.Ac parameter.

[20] o4F - Out 4 function

Available: When the instrument has out 4 option

Range: nonE Output not used. With this setting the status of the this output can be driven directly from serial link.
AL Alarm output
t.out Timer output
t.HoF Timer out - OFF in Hold
or.bo Out-of-range or burn out indicator
P.FAL Power failure indicator
bo.PF Out-of-range, burn out, Power failure indicator
diF.1 The output repeates the digital input 1 status
diF.2 The output repeates the digital input 2 status.

Note: For other details see [11] O1F parameter.

[21] o4.AL - Alarms linked up with Out 4

Available: When [20] o4F = AL

Range: 0... 15 with the following rule:
+1 Alarm 1
+2 Alarm 2
+4 Alarm 3
+8 Alarm 4
+16 Sensor break (burn out).

Note: For more details see [13] o1.AL parameter

[22] o4Ac -Output 4 action

Available: When [20] o4F is different from nonE.

Range: dir Direct action
rEU Reverse action
dir.r Direct action with revers LED indication
rEU.r Reverse action with reverse LED indication.

Note: For more details see [13] o1.Ac parameter.

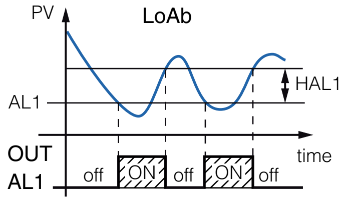
AL1 Group - Alarm 1 parameters

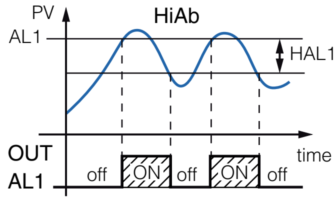
[23] AL1t - Alarm 1 type

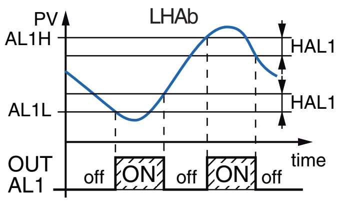
Available: Always.

Range: nonE Alarm not used
LoAb Absolute low alarm
HiAb Absolute high alarm
LHAb Absolute band alarm
SE.br Sensor break

Note: The (SE.br) sensor break alarm will be ON when the display shows - - - - indication.







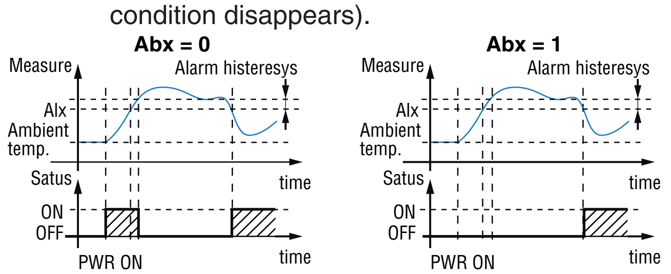
[24] Ab1 - Alarm 1 function

Available: AWhen [24] AL1t is different from nonE.

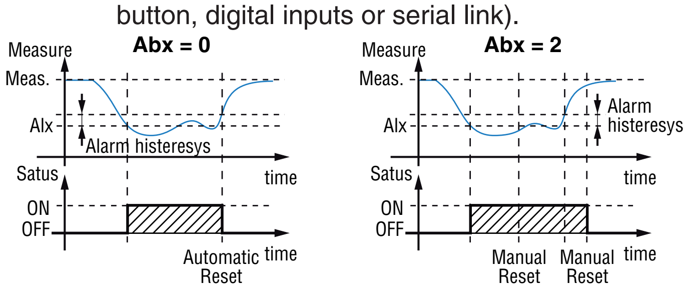
Range: 0... 15 with the following rule:
+1 Not active at power up.
+2 Latched alarm (manual reset)
+4 Acknowledgeable alarm

Example: setting Ab1 equal to 5 (1+4) the alarm 1 will be *Not active at power up* and *Acknowledgeable*.

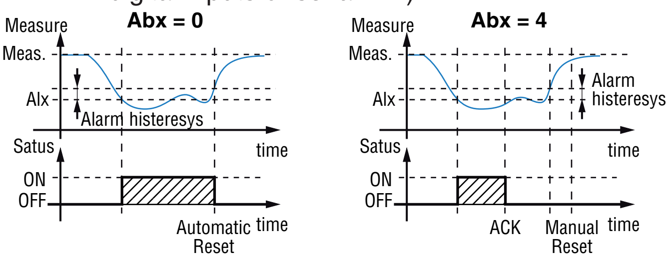
Notes: 1. The *Not active at power up* selection allows you to inhibit the alarm function at instrument power up. The alarm will be automatically enabled when the measured value reaches, for the first time, the alarm threshold plus or minus the hysteresis (in other words, when the initial alarm condition disappears).



2. A *Latched alarm* (manual reset) is an alarm that will remain active even if the conditions that generated the alarm no longer persist. Alarm reset can be done only by an external command (U button, digital inputs or serial link).



3. An *Acknowledgeable* alarm is an alarm that can be reset even if the conditions that generated the alarm are still present. Alarm acknowledge can be done only by an external command (U button, digital inputs or serial link).



4. - The instrument does not memorize in EEPROM the alarm status. For this reason, the alarm status will be lost if a power down occurs.

[25] AL1L - For High and low alarms, it is the low limit of the AL1 threshold - For band alarm, it is the low alarm threshold

Available: When [23] AL1t is different from nonE or [23] AL1t is different from SE.br.

Range: From - 1999 to [26] AL1H (E.U.).

[26] AL1H - For High and low alarms, it is the high limit of the AL1 threshold - For band alarm, it is the high alarm threshold

Available: when [23] AL1t is different from nonE or [23] AL1t is different from SE.br.

Range: from [25] AL1L to 9999 (E.U.).

[27] AL1- Alarm 1 threshold

Available: When:
- [23] AL1t = LoAb Absolute low alarm
- [23] AL1t = HiAb Absolute high alarm
- [23] AL1t = LodE Deviation low alarm (relative)
- [23] AL1t = LidE Deviation high alarm (relative)

Range: From [25] AL1L to [26] AL1H (E.U.).

[28] HAL1 - Alarm 1 hysteresis

Available: When [23] AL1t is different from nonE or [23] AL1t is different from SE.br.

Range: From 1 to 9999 (E.U.)

Note: The hysteresis value is the difference between the Alarm threshold value and the point where the Alarm automatically resets.

[29] AL1d - Alarm 1 delay

Available: When [23] AL1t different form “nonE”

Range: From oFF (0) to 9999 seconds

Note: The alarm goes ON only when the alarm condition persists for a time longer than [29] AL1d time but the reset is immediate.

[30] AL1o - Alarm 1 enabling during out of range indications

Available: when [24] AL1t different from nonE.

Range: No Alarm NOT running when out-of-range conditions are detected.
YES Alarm enabled when out-of-range conditions are detected.

AL2 Group - Alarm 2 parameters

[31] AL2t - Alarm 2 type

Available: Aways

Range:
nonE Alarm not used
LoAb Absolute low alarm
HiAb Absolute high alarm
LHAb Absolute band alarm
SE.br Sensor break

[32] Ab2 - Alarm 2 function

Available: when [31] AL2t is different from nonE.

Range: 0 to 15 with the following rule:
+1 = Not active at power up.
+2 = Latched alarm (manual reset)
+4 = Acknowledgeable alarm

Example: setting Ad2 equal to 5 (1+4) the alarm 2 will be “not active at power up” and “Acknowledgeable”.

Note: For other details see [24] Ab1 parameter.

[33] AL2L - For High and low alarms, it is the low limit of the AL2 threshold - For band alarm, it is is the low alarm threshold

Available: When [31] AL2t is different from nonE or [31] AL2t is different from SE.br.

Range: From - 1999 to [34] AL2H (E.U.).

[34] AL2H - For High and low alarms, it is the high limit of the AL2 threshold - For band alarm, it is the high alarm threshold

Available: When [31] AL2t is different from nonE or [31] AL2t is different from SE.br.

Range: From [33] AL2L to 9999 (E.U.).

[35] AL2 - Alarm 2 threshold

Available: When:
- [31] AL2t = LoAb Absolute low alarm
- [31] AL2t = HiAb Absolute high alarm
- [31] AL2t = LodE Deviation low alarm (relative)
- [31] AL2t = LidE Deviation high alarm (relative)

Range: From [33] AL2L to [34] AL2H (E.U.).

[36] HAL2 - Alarm 2 hysteresis

Available: When [31] AL2t is different from nonE or [31] AL2t is different from SE.br.

Range: From 1 to 9999 (E.U.).

Note: For other details see [28] HAL1 parameter

[37] AL2d - Alarm 2 delay

Available: When [31] AL2t different form “nonE”

Range: From oFF (0) to 9999 seconds

Note: The alarm goes ON only when the alarm condition persist for a time longer than [37] AL2d time but the reset is immediate.

[38] AL2o - Alarm 2 enabling during Stand-by mode and out of range indications

Available: When [31] AL2t different from nonE

Range: No Alarm NOT running when out-of-range conditions are detected.
YES Alarm enabled when out-of-range conditions are detected.

⌐AL3 Group - Alarm 3 parameters

[39] AL3t - Alarm 3 type

Available: Always.

Range: nonE Alarm not used
LoAb Absolute low alarm
HiAb Absolute high alarm
LHAb Absolute band alarm
SE.br Sensor break

[40] Ab3 – Alarm 3 function

Available: When [39] AL3t is different from nonE.

Range: 0... 15 with the following rule:
+1 Not active at power up
+2 Latched alarm (manual reset)
+4 Acknowledgeable alarm

Example: setting Ad3 equal to 5 (1+4) the alarm 3 will be "not active at power up" and "Acknowledgeable".

Note: Notes: For other details see [24] Ab1 parameter.

[41] AL3L - For High and low alarms, it is the low limit of the AL3 threshold - For band alarm, it is the low alarm threshold

Available: When [39] AL3t is different from nonE or [39] AL3t is different from SE.br.

Range: From - 1999 to [42] AL3H (E.U.).

[42] AL3H - For High and low alarms, it is the high limit of the AL3 threshold - For band alarm, it is the high alarm threshold

Available: When [30] AL3t is different from nonE or [39] AL3t is different from SE.br.

Range: From [41] AL3L to 9999 (E.U.).

[43] AL3 - Alarm 3 threshold

Available: When
- [39] AL3t = LoAb Absolute low alarm
- [39] AL3t = HiAb Absolute high alarm
- [39] AL3t = LodE Deviation low alarm (relative)
- [39] AL3t = LidE Deviation high alarm (relative)

Range: from [41] AL3L to [42] AL3H (E.U.).

[44] HAL3 - Alarm 3 hysteresis

Available: When [39] AL3t is different to "nonE"

Range: From 1 to 9999 (E.U.)

Note: Notes: for other details see [28] HAL1 parameter

[45] AL3d – Alarm 3 delay

Available: When [39] AL3t different form "nonE"

Range: From oFF (0) to 9999 seconds

Note: The alarm goes ON only when the alarm condition persist for a time longer than [45] AL3d time but the reset is immediate.

[46] AL3o - Alarm 3 enabling during Stand-by mode and out of range indications

Available: when [39] AL3t different from nonE.

Range: No Alarm NOT running when out-of-range conditions are detected.
YES Alarm enabled when out-of-range conditions are detected.

⌐AL4 Group - Alarm 4 parameters

[47] AL4t - Alarm 4 type

Available: Always.

Range: nonE Alarm not used
LoAb Absolute low alarm
HiAb Absolute high alarm
LHAb Absolute band alarm
SE.br Sensor break

[48] Ab4 - Alarm 4 function

Available: When [47] AL3t is different from nonE.

Range: 0 to 15 with the following rule:
+1 Not active at power up.
+2 Latched alarm (manual reset)
+4 Acknowledgeable alarm

Example: setting Ad3 equal to 5 (1+4) the alarm 3 will be "not active at power up" and "Acknowledgeable".

Note: For other details see [24] Ab1 parameter.

[49] AL4L - For High and low alarms, it is the low limit of the AL4 threshold - For band alarm, it is the low alarm threshold

Available: when [47] AL4t is different from nonE or [47] AL4t is different from SE.br.

Range: from - 1999 to [50] AL4H (E.U.).

[50] AL4H - For High and low alarms, it is the high limit of the AL4 threshold - For band alarm, it is the high alarm threshold

Available: when [47] AL4t is different from nonE or [47] AL4t is different from SE.br.

Range: from [49] AL4L to 9999 (E.U.).

[51] AL4 - Alarm 4 threshold

Available: When:
- [47] AL4t = LoAb Absolute low alarm
- [47] AL4t = HiAb Absolute high alarm
- [47] AL4t = LodE Deviation low alarm (relative)
- [47] AL4t = LidE Deviation high alarm (relative)

Range: From [49] AL4L to [50] AL4H (E.U.).

[52] HAL4 - Alarm 4 hysteresis

Available: When [47] AL3t is different to "nonE"

Range: From 1 to 9999 (E.U.)

Note: For other details see [28] HAL1 parameter

[53] AL4d - Alarm 4 delay

Available: When [47] AL4t different form "nonE"

Range: From oFF (0) to 9999 seconds

Note: The alarm goes ON only when the alarm condition persist for a time longer than [53] AL4d time but the reset is immediate.

[54] AL4o - Alarm 4 enabling during Stand-by mode and out of range indications

Available: when [47] AL4t different from nonE.

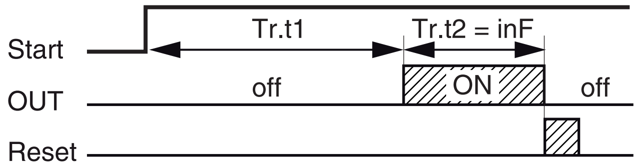
Range: No Alarm NOT running when out-of-range conditions are detected.
YES Alarm enabled when out-of-range conditions are detected.

tin Group - Timer function parameters

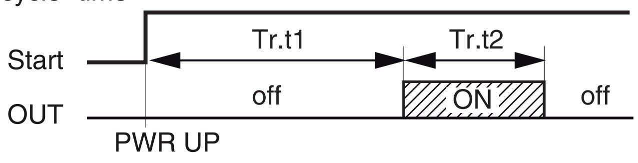
Five timer types are available:

1. Delayed start with a delay time and a "end of cycle" time

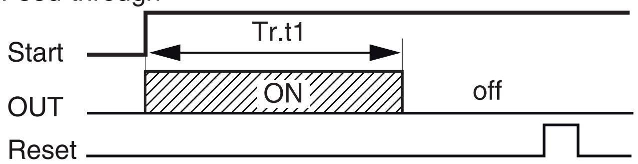
– Setting tr.t2 = Inf the timer out remains in ON condition until a reset command is detected.



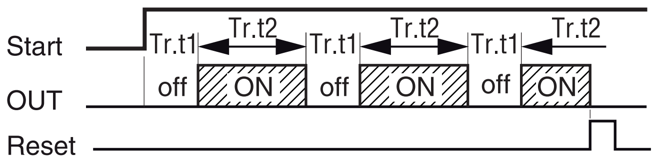
2. Delayed start at power up with a delay time and a "end of cycle" time



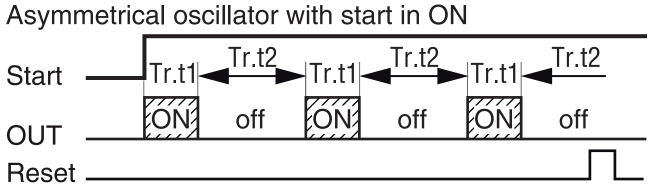
3. Feed-through



4. Asymmetrical oscillator with start in OFF



5. Asymmetrical oscillator with start in ON



Notes: **1.** The instrument can receive the start, hold and reset commands by U button, by logic inputs and/or by serial link

2. An HOLD command can suspend the time count.

[55] tr.F - Independent timer function

Available: Always.

Range: nonE Timer not used
i.d.A Delayed start timer
i.uP.d Delayed start at power up
i.d.d Feed-through timer
i.P.L Asymmetrical oscillator with start in OFF
i.L.P Asymmetrical oscillator with start in ON

[56] tr.u - Engineering unit of the time

Available: When [55] tr.F is different form nonE

Range: hh.nn Hours and minutes
nn.SS Minutes and seconds
SSS.d Seconds and tenth of seconds

Note: When the timer is running, you can see the value of this parameter but you can NOT modify it.

[57] tr.t1 - Time 1

Available: When [55] tr.F is different form nonE

Range:
- when [56] tr.u = hh.nn from 00.01 to 99.59
- when [56] tr.u = nn.SS from 00.01 to 99.59
- when [56] tr.u = SSS.d from 000.1 to 995.9

[58] tr.t2 - Time 2

Available: When [55] tr.F is different form nonE

Range:
- when [56] tr.u = hh.nn from 00.01 to 99.59 + inF
- when [56] tr.u = nn.SS from 00.01 to 99.59 + inF
- when [56] tr.u = SSS.d from 000.1 to 995.9 + inF

Note: Setting [58] tr.t2 = inF, the second time can be stopped by a reset command only.

[59] tr.St – Timer status

Available: When [55] tr.F is different form nonE

Range: run Timer Run
HoLd Timer Hold
rES Timer reset

Note: This parameter allows to manage timer execution by a parameter (without digital inputs or U button).

PAn group - Operator HMI

[60] PAS2 - Level 2 password: Limited access level

Available: Always.

Range: oFF Level 2 not protected by password (as level 1 = Operator level).
1... 999.

[61] PAS3 - Level 3 password : configuration level

Available: Always.

Range: From 3 to 999.

Note: Setting [60] PAS2 equal to [61] PAS3, the level 2 will be masked.

[62] uSrb - U button function during RUN TIME

Available: Always.

Range: nonE No function
AAc Alarm reset
ASi Alarm acknowledge
HoLd Hold of the measured value
d.Pic The display will shows the peacks.
r.Pic Peachs reset
0.Pot Start the 0.Pot routine
r.Pot 0.Pot routine + Peacks reset
t.Pot Input calibration with self-learning procedure
Str.t Timer run/hold/reset (see note below).

Note: When *Timer run/hold/reset* is selected, a short press starts/stops(hold) timer count while a long press (longer than 10 second) resets the timer.

Where:

nonE: No function

Aac: Pushing U for 1 s at least, it is possible to acknowledge the alarm (see par. 4.3).

ASi: Pushing U for 1 s at least, it is possible to acknowledge an active alarm (see par. 4.3).

HoLd: Pushing U the measurement taken at that moment is blocked (N.B.: not the reading on the display, therefore the indication may stabilise itself with a delay that is proportional to the measuring filter). With the hold function turned on, the instrument carries out control according to the memorised measurement. Releasing the key, the instrument starts normal measurement acquisition once more.

d.Pic: Pressing [U], the maximum variation of the measurement recorded since the instrument was switched on is visualized on the display (highest/lowest peak).

r.Pic: Pressing [U], the highest and lowest peak values are re-set.

0.Pot: For the instruments with normalized signals input, it is possible to set the *zero* value with this function. Pressing [U] for at least 1 s, the display shows the writing 0.Pot for approx. 1 s and then 0, assuming the value measured in that instant as **0**. In practice, this function allows to allign the zero of the readout scaling (defined by [4] SSc and [5] FSc parameters) with the current measured value.
An example will help us to show the result.
Input type: 0... 50 mV
[4] SSc = 0
[5] FSc = 100
[65] uSrb = O.Pot
Now, the current position is equal to 30 and I push the [P] button. The display will show zero and the new readout range becomes -30... +70°.

r.P0P: For the instruments with normalized signals input, it is possible to set the "zero" value and contemporarily re-set the highest and lowest peak values with this function. Pressing [U] for at least 1 s, the display will show the writing r.P0P for approx. 1 s, and then 0, assuming the value measured in that instant as 0 and re-setting the stored peak values.

t.Pot: For the instruments with normalized signals input, with this function it is possible to set the points of measurement by means of auto-ranging procedure through which the parameters "SSC", "FSC" and "0.Pot." are automatically re-calculated.
Pressing [U] for at least 1 s, the display shows P1 alternated to the value of the first point of setting. Now, give to the input the first point value of setting and program the value desired for that point using the [▲] and [▼] keys. Once the value has been set, press the [P] key: the instrument will memorize the value and the display shows P2 alternated to the value of the second point of setting. Give to the input the second point value of setting and program the value desired for that point using the [▲] and [▼] keys. Pressing the [P] key, the second value is also acquired and the instrument will automatically exit from the self-learning mode, re-calculating the measuring range.

[63] diSP – Display management

Available: Always.

Range:
- nonE Standard display
- AL1 Alarm 1 threshold
- AL2 Alarm 2 threshold
- AL3 Alarm 3 threshold
- AL4 Alarm 4 threshold
- ti.uP When the timer is running, the display will show the timer counting up. At counting end, the instrument shows t.End alternated with the measured value.
- ti.du When the timer is running, the display will show the timer counting down. At counting end, the instrument shows t.End alternated with the measured value.

[64] Edit - Alarm editing enabling

Available: Always.

Range:
- AE Alarm thresholds can be modified
- AnE Alarm threshold can NOT be modified

Ser group - Serial link parameter

[65] Add - Instrument address

Available: Always.

Range:
- oFF Serial interface not used
- 1... 254.

[66] bAud - Baud rate

Available: When [65] Add different from oFF

Range:
- 1200 1200 baud
- 2400 2400 baud
- 9600 9600 baud
- 19.2 19200 baud
- 38.4 38400 baud

COn Group - worked time count

[67] Co.tY – Measurement type

Available: Always.

Range:
- oFF Not used
- dAY Total worked days with threshold. It is the number of hours that the instrument is turned ON divided for 24.
- Hour Total worked hours with threshold. It is the number of hours that the instrument is turned ON.

Note: It is an internal counter for machine service inspection intervals. It works every time the instrument is turned ON.
When the count reaches the programmed threshold, the display shows alternately the standard display and the message "r. iSP" (requested Inspection). The count reset can be done only by changing the threshold value.

[68] h.Job – Threshold of the working period

Available: When [67] Co.tY = tot.d or [67] Co.tY = tot.H

Range: oFF = threshold not used
from 1 to 999 days or
from 1 to 999 hours.

CAL group - user calibration group

This function allows to calibrate the complete measuring chain and to compensate the errors due to:
- Sensor location;
- Sensor class (sensor errors);
- Instrument accuracy.

[69] AL.P – Adjust Low Point

Available: Always.

Range: from -1999 to (AH.P - 10) (E.U.)

Note: The minimum differance between AL.P and AH.P is equal to 10 Engineering Units.

[70] ALo – Adjust Low Offset

Available: Always.

Range: From -300 to 300 (E.U.).

[71] AH.P – Adjust High Point

Available: Always.

Range: From (AL.P + 10) to 9999 (E.U.)

Note: the minimum differance between AL.P and AH.P is equal to 10 Engineering Units.

[72] AL.o – Adjust Low Offset

Available: Always.

Range: From -300 to 300 (E.U.).

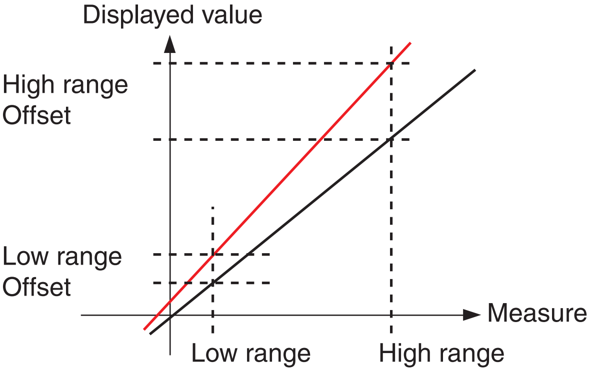
Example: Environmental chamber with an operative range from 10 to + 100 °C.

1. Insert in the chamber a reference sensor connected with a reference instrument (usually a calibrator).
2. Start the control of the instrument, and set a set point equal to the minimum value of the operative range (e.g. 10°C).

   When the temperature in the chamber is steady, take note of the themperature measured by the reference system (e.g. 9°C).
3. Set [130] AL.P = 10 (low working point) and [131] ALo = -1 (it is the difference between the reading of the instrument and the reading of the reference system).

   Note that after this set the measured value of the instrument is equal to the measured value of the reference system.
4. Set a set point equal to the maximum value of the operative range (e.g. 100 °C). When the temperature in the chamber is steady, take note of the themperature measured by the reference system (e.g. 98 °C).
5. Set [132] AH.P = 100 (low working point) and [133] ALo = +2 (it is the difference between the reading of the instruent and the reading of the reference system).

   Note that after this set the measured value of the instrument is equal to the measured value of the reference system.



The most important step of the configuration procedure is completed.

In order to exit from configuration parameter procedure, proceed as follows:

– Push [U] button.

– Push [U] button for more than 10 seconds.

– The instrument will come back to the “standard display”.

7. PARAMETERS PROMOTION

Another important step of the instrument configuration is due to the possibility to create a custom HMI (interface) in order to make the instrument easy to use for the operator and comfortable for the assistance.

By a special procedure, named promotion, the OEM can create two parameter subsets.

The first one is the “limited access” level.

This subset is protected by the password programmed by [60] PAS2 parameter.

The last subset is the “Operator” set (Level1).

This level si NOT password protected.

Notes: 1. The “limited access” parameter are collected in a list.

2. The sequence of the “limited access” parameters is programmable and can be made according to your needs.
3. The parameter sequence of the operator level is the same programmed for “limited access” level but only specified parameters can be displayed and modified. This set must be create according to your requirements.

7.1 Parameters Promotion Procedure

The limited access parameter set is a list, so that, before to start promotion procedure, we suggest to operate as follows:

1. Prepare the exact parameter list you want to make accessible for limited access.
2. Number the desired parameters in the same sequence you want to have in the limited access.
3. Define which of the selected parameter will be available in Operator level also.

Example: I would like to obtain the following limited access list:

– AL1 - Alarm 1 threshold;

– AL3 - Alarm 2 threshold;

– HAL4 -Histeresys of the alarm 4.

But I want that the operator to be able to change AL3 threshold only. In this case the promotion will be the following:

Parameter	Promotion	Limited Access	Operator
- AL1 -	A 5	AL1	
- AL3 -	o 6	AL2	AL2
- Pb -	A 7	HAL4	

Now, proceed as follows:

1. Push the [P] button for more than 3 seconds.
2. The display will show alternately “PASS” and “0”.
3. By [▲] and [▼] button set a password equal to -81.
4. Push [P] button.

   The instrument will show the acronym of the first configuration parameter group “]inP”.
5. By [U] button select the group of the first parameter of your list.
6. By [P] button select the first parameter of your list.

   The instrument will show alternately the acronym of the parameter and his current promotion level. The promotion level is defined by a letter followed by a number.

The letter can be:

c	Shows that this parameter is NOT promoted and it is present only in configuration. In this case the number is forced to zero
A	Shows that this parameter has been promoted to the limited access level. The number will show the position in the limited access list.
o	Shows that the parameter has been promoted to the Operator level. The number will show the position in the limited access list

7. By $\boxed{\blacktriangle}$ and $\boxed{\blacktriangledown}$ button assign to this parameter the desired position.

Note: Setting a value different from 0 the letter "c" will change automatically to "A" and the parameter is automatically promoted to the limited access level.

8. In order to modify the level from limited access to operator and vice versa, push $\boxed{U}$ button and, maintaining the pressure, push $\boxed{\blacktriangle}$ button.
The letter will change from "A" to "o" and vice versa.

9. Select the second parameter that you want to add to the "limited access" level and repeat step 6, 7 and 8.

10. Repeat step 6, 7, 8 until the list has been completed.

11. When you need to exit from promotion procedure, push $\boxed{U}$ button and maintain the pressure for more than 10 s. The instrument will show the "standard display".

Note: When you set the some number to two parameter, the instrument will use only the last programmed parameter.

Example: In the previous example we assigned the A3 promotion level to parameter SP2. Assigning the promotion level 03 to parameter SP3 the "Limited acces" and the "Operator" list will be:

Parameter	Promotion	Limited Access	Operator
- OPEr -	o 1	OPEr	OPEr
- SP1 -	o 2	SP1	SP1
- SP3 -	o 3	SP3	SP3
- SPAt -	A 4	SPAt	
- AL1 -	o 5	AL1	AL1

8. OPERATIVE MODES

As we said at paragraph 4.1, when the instrument is powered, it starts immediately to work according to the stored parameter value.

8.1 How to enter the "Operator Level"

The instrument is showing the "standard display".

1. Press the $\boxed{P}$ button

2. The instrument will show alternately the acronym of the first parameter promoted to this level and its value.

3. By $\boxed{\blacktriangle}$ and $\boxed{\blacktriangledown}$ buttons assign to this parameter the desired value.

4. Press the $\boxed{P}$ button in order to memorize the new value and go to the next parameter.

5. When you want to come back to the "standard display" push the $\boxed{U}$ button for more than 5 seconds.

Note: The parameter modification of the Operator level is subject to a time out. If no button is pressed for more than 10 seconds, the instrument goes back to the "standard display" and the new value of the last selected parameter will be lost.

8.2 How to enter the "Limited Access Level"

The instrument is showing the "standard display".

1. Press the $\boxed{P}$ button for more than 5 seconds;

2. The display will show alternately "PASS" and "0";

3. By $\boxed{\blacktriangle}$ and $\boxed{\blacktriangledown}$ buttons set the value assigned to [114] PAS2 (Level 2 password).

Notes: **1.** The factory default password for configuration parameters is equal to 20.

2. All parameter modification are protected by a time out. If no button is pressed for more than 10 second the instrument comes automatically back to the Standard display, the new value of the last selected parameter is lost and the parameter modification procedure is closed.

When you desire to remove the time out (e.g. for the first configuration of an instrument) you can use a password equal to 1000 plus the programmed password (e.g. 1000 + 20 [default] = 1020).

It is always possible to manually End the parameter configuration procedure (see below).

4. Push $\boxed{P}$ button.

5. The instrument will show alternately the acronym of the first parameter promoted to this level and its value.

6. By $\boxed{\blacktriangle}$ and $\boxed{\blacktriangledown}$ buttons assign to this parameter the desired value.

7. Press the $\boxed{P}$ button in order to memorize the new value and go to the next parameter.

8. When you want to come back to the "standard display" push the $\boxed{U}$ button for more than 5 seconds.

8.3 How to see but not modify the "Limited Access Parameters"

Sometime it is necessary to give to the operator the possibility to see the value assigned to the parameter promoted in the Limited Access level but it is important that all changes are made by autorized personnel only.

In this cases, proceed as follows:

1. Press the P button for more than 5 seconds
2. The display will show alternately "PASS" and "0".
3. By ▲ and ▼ buttons set the value -181.
4. Push P button.
5. The instrument will show alternately the acronym of the first parameter promoted to the level 2 and its value.
6. Using P button it is possible to see the value assigned to all parameter present in level 2 but it will not be possible to modify it.
7. It is possible to come back to the "standard display" by pushing the U button for more than 3 seconds or by pushing no pushbutton for more than 10 seconds.

8.3.1 Keyboard function when the instrument is in display mode

U	Runs the action programmed by [116] uSrb (U button function during RUN TIME) parameter.
P	Allows entry into parameter modification procedures.
▲	Allows you to start the "Direct set point modification" function (see below).
▼	Allows you to display the "additional informations" (see below).

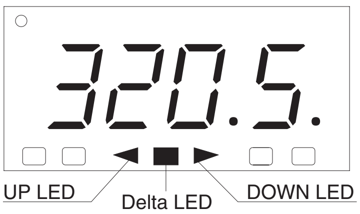
8.3.2 Additional informations

This instrument is able to show you some additional informations that can help you to manage your system.

The additional information is related to how the instrument is programmed, hence in many cases, only part of this information is available.

1. When the instrument is showing the "standard display" push ▲ button.

   The display will show the maximum measured value and turn ON the "UP" LED



2. Push ▲ button again. The display will show the minimum measured value and turn ON the "down" LED
3. Push ▲ button again. The display will show the differences between the maximum and the minimum measured value and turn ON the "delta" LED.
4. Push ▲ button again. The display will show:
   - "h" followd by the worked hours or
   - "d" followed by the worked days

   according to the [67] co.tY parameter setting.

9. ERROR MESSAGES

9.1 Out of Range Signals

The display shows the OVER-RANGE and UNDER-RANGE conditions with the following indications:

Over-range	Under-range
oooo	u.u.u.u.

The sensor break will be signalled as an out of range:

- - - -

Note: When an over-range or an under-range is detected, the alarms operate as in presence of the maximum or the minimum measurable value respectively.

To check the out of span Error condition, proceed as follows:

1. Check the input signal source and the connecting line.
2. Make sure that the input signal is in accordance with the instrument configuration.

   Otherwise, modify the input configuration (see section 4).
3. If no error is detected, send the instrument to your supplier to be checked.

9.2 List of Possible Errors

ErEP Possible problem of the instrument memory. The messages desappears automatically. If the error continues, send the instrument to your supplier.

10. GENERAL NOTES

10.1 Proper use

Every possible use not described in this manual must be consider as a improper use.

This instrument is compliant to EN 61010-1 “Safety requirements for electrical equipment for measurement, control and laboratory use”; for this reason it cannot be used as a safety device.

Ascon Tecnologic S.r.l. and its legal representatives do not assume any responsibility for any damage to people, things or animals deriving from violation, wrong or improper use or in any case not in compliance with the instrument’s features.

⚠ Whenever a failure or a malfunction of the control device may cause dangerous situations for persons, thing or animals, please remember that the plant has to be equipped with additional safety devices.

10.2 Warranty and Repairs

This product is under warranty against manufacturing defects or faulty materials that are found within 18 months from delivery date. The warranty is limited to repairs or to the replacement of the instrument.

The tampering of the instrument or an improper use of the product will bring about the immediate withdrawal of the warranty effects.

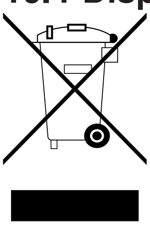
In the event of a faulty instrument, either within the period of warrantee, or further to its expiry, please contact our sales department to obtain authorisation for sending the instrument to our company. The faulty product must be shipped to Ascon Tecnologic with a detailed description of the faults found, without any fees or charge for Ascon Tecnologic, except in the event of alternative agreements.

10.3 Maintenance

This instrument does not requires periodical recalibration and it have no consumable parts so that no particular maintenance is required. Some times, a cleaning action is suggestable.

1. **SWITCH OFF THE EQUIPMENT** (power supply, relay out, etc.).
2. Take the instrument out of its case.
3. Using a vacuum cleaner or a compressed air jet (max. 3 kg/cm^2) remove all deposits of dust and dirt which may be present on the louvers and on the internal circuits being careful not to damage the electronic components.
4. To clean external plastic or rubber parts use only a cloth moistened with:
   - Ethyl Alcohol (pure or denatured) [C_2H_5OH] or
   - Isopropyl Alcohol (pure or denatured) [$(CH_3)_2CHOH$] or
   - Water (H_2O).
5. Make sure that there are no loose terminals.
6. Before putting the instrument back in its case, make sure that it is perfectly dry.
7. Put the instrument back and turn it ON.

10.4 Disposal



The appliance (or the product) must be disposed of separately in compliance with the local standards in force on waste disposal.

11. ACCESSORIES

The instrument has a lateral socket into which a special tool can be inserted. This tool, named **A03**, allows:

– To store a complete instrument configuration and to use it for other instruments.

– To transfer a complete instrument configuration to a PC or from a PC to an instrument

– To transfer from a PC to an instrument a complete instrument configuration

– To transfer a configuration from an A03 to another one.

– To test serial interface of the instruments and to help the OEM during machine start up.

Appendix A

⁻inp Group - Main and Auxiliary Input Configuration

no.	Param.	Description	Dec. Point	Values	Default	Vis. promo
	HcFG	Parameter available by serial link shows the current hardware	0	TC/RTD TC/PTC Current Voltage	According to HW	Not displayed
	SEnS	Sensor selection (according to the hw				A4
		nTC, Pt100 input	0	J, crAL, S, r, t, ir.J, ir.cA, Pt1, 0... 50 (mV), 0... 60 (mV), 12... 60 (mV)	J	
		TC, PTC, NTC input		J, crAL, S, r, t, Ir.J, Ir.cA, Ptc, ntc, 0... 50 (mV), 0... 60 (mV), 12... 60 (mV)	Ptc	
		I input		0... 20 (mA), 4... 20 (mA)	4... 20	
		V input		0... 5 (V), 1... 5 (V), 0... 10 (V), 2... 10 (V), 0... 1 (V)	0... 10	
	dP	Decimal figures	0	0... 3	0	
	SSc	Initial scale readout	dP	-1999... FSC (E.U.)	-1999	
	FSc	Final scale readout	dP	SSc... 9999 (E.U.)	9999	
	0.Pot	Offset value (to shift the zero readout)	1	SSc... FSc (E.U.)	9999	
	unit	Engineering unit	0	°C o °F	0 = °C	
	FiL	Digital filter on the measured value	1	0 (oFF)... 20.0 (s)	1.0	

	diF1	Digital input 1 function	0	oFF = No function;
				AAC = Alarm Reset;
				ASi = Alarm acknowledge (ACK);
				HoLd = Hold of the measured value;
				r.Pic = Peaks reset;
				0.Pot = Start of the 0.Pot procedure;
				r.PoP = Start of the 0.Pot procedure and Peaks reset;
				t.rHr = Timer Run/Hold/Reset [transition];
				t.run = Timer Run [transition];
				t.rES = Timer reset [transition];
				t.rH = Timer run/hold [Status];
				uP.du = Digital inputs in parallel to the ▲ and ▼ keys
					OFF	A-13

	diF2	Digital input 2 function	0			A-14

⁻Out Group - Output Configuration

no.	Param.	Description	Dec. Point	Values	Default	Vis. promo
1	o1F	Out 1 function	0	nonE = Output not used. AL = Alarm output t.out = Timer output t.HoF = Tiemer out - OFF in Hold or.bo = Out-of-range or burn out indicator P.FAL = Power failure indicator bo.PF = Out-of-range, burn out and Power failure indicator diF.1 = The output repeates the digital input 1 status diF.2 = The output repeates the digital input 2 status	H.reg	A-16
2	o1AL	Alarms linked up with out	0	from 0 to 15 +1 = Alarm 1 +2 = Alarm 2 +4 = Alarm 3 +8 = Alarm 4 +16 = Sensor break (burn out)	AL1	A-17
3	o1Ac	Out 1 action	0	dir = Direct action rEU = Reverse action dir.r = Direct with reversed LED ReU.r = Reverse with reversed LED	dir	C-0
4	o2F	Out 2 function	0	nonE = Output not used. AL = Alarm output t.out = Timer output t.HoF = Tiemer out - OFF in Hold or.bo = Out-of-range or burn out indicator P.FAL = Power failure indicator bo.PF = Out-of-range, burn out and Power failure indicator diF.1 = The output repeates the digital input 1 status diF.2 = The output repeates the digital input 2 status	AL	A-19

no.	Param.	Description	Dec. Point	Values	Default	Vis. promo
5	o2AL	Alarms linked up with the out 2	0	from 0 to 15 + = Alarm 1 +2 = Alarm 2 +4 = Alarm 3 +8 = Alarm 4 +16 = Sensor break (burn out)	AL1	A-20
6	o2Ac	Out 2 action	0	dir = Direct action rEU = Reverse action dir.r = Direct with reversed LED ReU.r = Reverse with reversed LED	dir	C-0
7	o3F	Out 3 function	0	nonE = Output not used. AL = Alarm output t.out = Timer output t.HoF = Tiemer out - OFF in Hold or.bo = Out-of-range or burn out indicator P.FAL = Power failure indicator bo.PF = Out-of-range, burn out and Power failure indicator diF.1 = The output repeates the digital input 1 status diF.2 = The output repeates the digital input 2 status	AL	A-22
8	o3AL	Alarms linked up with the out 3	0	from 0 to 15 +1 = Alarm 1 +2 = Alarm 2 +4 = Alarm 3 +8 = Alarm 4 +16 = Sensor break (burn out)	AL2	A-23
9	o3Ac	Out 3 action	0	dir = Direct action rEU = Reverse action dir.r = Direct with reversed LED ReU.r = Reverse with reversed LED	dir	C-0
10	o4F	Out 4 function	0	nonE = Output not used. AL = Alarm output t.out = Timer output t.HoF = Tiemer out - OFF in Hold or.bo = Out-of-range or burn out indicator P.FAL = Power failure indicator bo.PF = Out-of-range, burn out and Power failure indicator diF.1 = The output repeates the digital input 1 status diF.2 = The output repeates the digital input 2 status	AL	A-24
11	o4AL	Alarms linked up with the out 4	0	from 0 to 15 +1 = Alarm 1 +2 = Alarm 2 +4 = Alarm 3 +8 = Alarm 4 +16 = Sensor break (burn out)	AL2	A-25
12	o4Ac	Out 4 action	0	dir = Direct action rEU = Reverse action dir.r = Direct with reversed LED ReU.r = Reverse with reversed LED	dir	C-0

AL1 Group - Alarm 1 (AL1) Configuration

no.	Param.	Description	Dec. Point	Values	Default	Vis. promo
13	AL1t	Alarm 1 type	0	nonE = Alarm not used LoAb = Absolute low alarm HiAb = Absolute high alarm LHAb = Absolute band alarm SE.br = Sensor break	LoAb	A-47
14	Ab1	Alarm 1 function	0	From 0 to 15 +1 = Not active at power up +2 = Latched alarm (manual reset) +4 = Acknowledgeable alarm	0	C-0
15	AL1L	For High and low alarms, is the low limit of the AL1 threshold For band alarm, it is low alarm threshold	dP	-1999... AL1H (E.U.)	-1999	A-48
16	AL1H	For High and low alarms, is the high limit of the AL1 threshold For band alarm, it is high alarm threshold	dP	AL1L... 9999 (E.U.)	9999	A-49
17	AL1	AL1 threshold	dP	AL1L... AL1H (E.U.)	0	A-50
18	HAL1	AL1 hysteresis	dP	1... 9999 (E.U.)	1	A-51
19	AL1d	AL1 delay	dP	0 (OFF)...9999 (s)	oFF	C-0
20	AL1o	Alarm 1 enable at out of range indication	0	No = Alarm NOT running when out-of-range YES = Alarm enabled when out-of-range	no	C-0

AL2 Group - Alarm 2 (AL2) configuration

no.	Param.	Description	Dec. Point	Values	Default	Vis. promo
21	AL2t	Alarm 2 type	0	nonE = Alarm not used LoAb = Absolute low alarm HiAb = Absolute high alarm LHAb = Absolute band alarm SE.br = Sensor break	HiAb	A-54
22	Ab2	Alarm 2 function	0	From 0 to 15 +1 = Not active at power up +2 = Latched alarm (manual reset) +4 = Acknowledgeable alarm	0	C-0
23	AL2L	For High and low alarms, it is the low limit of the AL2 threshold For band alarm, it is low alarm threshold	dP	-1999... AL1H (E.U.)	-1999	A-56
24	AL2H	For High and low alarms, it is the high limit of the AL2 threshold For band alarm, it is high alarm threshold	dP	AL2L... 9999 (E.U.)	9999	A-57
25	AL2	AL2 threshold	dP	AL2L... AL2H (E.U.)	0	A-58
26	HAL2	AL2 hysteresis	dP	1... 9999 (E.U.)	1	A-59
27	AL2d	AL2 delay	dP	0 (OFF)...9999 (s)	oFF	C-0
28	AL2o	Alarm 2 enable at out of range indication	0	No = Alarm NOT running when out-of-range YES = Alarm enabled when out-of-range	no	C-0

AL3 Group - Alarm 3 (AL3) configuration

no.	Param.	Description	Dec. Point	Values	Default	Vis. promo
29	AL3t	Alarm 2 type	0	nonE = Alarm not used LoAb = Absolute low alarm HiAb = Absolute high alarm LHAb = Absolute band alarm SE.br = Sensor break	nonE	C-0
30	Ab3	Alarm 2 function	0	From 0 to 15 +1 = Not active at power up +2 = Latched alarm (manual reset) +4 = Acknowledgeable alarm	0	C-0
31	AL3L	For High and low alarms, is the low limit of the AL3 threshold For band alarm, it is low alarm threshold	dP	-1999... AL3H (E.U.)	-1999	C-0
32	AL3H	For High and low alarms, is the high limit of the AL3 threshold For band alarm, it is high alarm threshold	dP	AL3L... 9999 (E.U.)	9999	C-0
33	AL3	AL3 threshold	dP	AL3L... AL3H (E.U.)	0	C-0
34	HAL3	AL3 hysteresis	dP	1... 9999 (E.U.)	1	C-0
35	AL3d	AL3 delay	dP	0 (OFF)...9999 (s)	oFF	C-0
36	AL3o	Alarm 3 enable at out of range indication	0	No = Alarm NOT running when out-of-range YES = Alarm enabled when out-of-range	no	C-0

AL4 Group - Alarm 4 (AL4) Configuration

no.	Param.	Description	Dec. Point	Values	Default	Vis. promo
37	AL4t	Alarm 4 type	0	nonE = Alarm not used LoAb = Absolute low alarm HiAb = Absolute high alarm LHAb = Absolute band alarm SE.br = Sensor break	nonE	C-0
38	Ab4	Alarm 4 function	0	From 0 to 15 +1 = Not active at power up +2 = Latched alarm (manual reset) +4 = Acknowledgeable alarm	0	C-0
39	AL4L	For High and low alarms, it is the low limit of the AL4 threshold For band alarm, it is low alarm threshold	dP	-1999... AL4H (E.U.)	-1999	C-0
40	AL4H	For High and low alarms, it is the high limit of the AL4 threshold For band alarm, it is high alarm threshold	dP	AL4L... 9999 (E.U.)	9999	C-0
41	AL4	AL4 threshold	dP	AL4L... AL4H (E.U.)	0	C-0
42	HAL4	AL4 hysteresis	dP	1... 9999 (E.U.)	1	C-0
43	AL4d	AL4 delay	dP	0 (OFF)...9999 (s)	oFF	C-0
44	AL4o	Alarm 4 enable at out of range indication	0	No = Alarm NOT running when out-of-range YES = Alarm enabled when out-of-range	no	C-0

TIN Group - Timer Configuration

no.	Param.	Description	Dec. Point	Values	Default	Vis. promo
45	tr.F	Independent timer function	0	NonE = Timer not used i.d.A = Delayed start timer i.uP.d = Delayed start at power up i.d.d = Feed-through timer i.P.L = Asymmetrical oscillator with start in OFF i.L.P = Asymmetrical oscillator with start in ON	nonE	A-62
46	tr.u	Timer unit	0	hh.nn = Hours and minutes nn.SS = Minutes and seconds SSS.d = Second and tenth of seconds	nn.SS	A-63
47	tr.t1	Time 1	2	When tr.u = hh.nn from 00.01 to 99.59 When tr.u = nn.SS from 00.01 to 99.59 When tr.u = SSS.d from 000.1 to 995.9	1.00	A-64
48	tr.t2	Time 2	2	When tr.u = hh.nn from 00.01 to 99.59 + inF When tr.u = nn.SS from 00.01 to 99.59 + inF When tr.u = SSS.d from 000.1 to 995.9 + inF	1.00	A-65
49	tr.St	Timer status	0	HoLd = timer hold; run = timer run; rES = timer reset	rES	C-0

⌐PAn Group - Operator Interface Configuration

no.	Param.	Description	Dec. Point	Values	Default	Vis. promo
50	PAS2	Password level 2	0	From 0 (oFF) to 999 (oFF = Level 2 not protected by psw)	20	A-93
51	PAS3	Password level 3	0	From 3 to 999	30	C-0
52	uSrb	U button function during run time	0	nonE = No function AAc = Alarm reset ASi = Alarm acknowledge HoLd = Hold of the measured value d.Pic = The display will shows the peaks r.Pic = Peaks reset 0.Pot = Start the 0.Pot routine r.Pot = 0.Pot routine + Peaks reset t.Pot = Input calibration with self-learning procedure Str.t = Timer run/hold/reset	nonE	A-94
53	diSP	Display management	0	nonE = Standard display AL1 = Alarm 1 threshold AL2 = Alarm 2 threshold AL3 = Alarm 3 threshold ti.uP = Timer time up ti.du = Timer time down	nonE	A-95
54	Edit	Alarm editing enable	0	AE = Alarm thresholds can be modified AnE = Alarm threshold can NOT be modified	ANe	

⌐Ser Group - Serial Communications Interface Configuration

no.	Param.	Description	Dec. Point	Values	Default	Vis. promo
55	Add	Address	0	0 (oFF)... 254	1	C-0
56	bAud	Baud rate	0	1200 (bit/s); 2400 (bit/s); 9600 (bit/s); 9.2 (kbit/s); 38.4 (kbit/s)	9600	C-0

COn Group - Consumption Parameters Configuration

no.	Param.	Description	Dec. Point	Values	Default	Vis. promo
57	co.ty	Measurement type	0	oFF = Not used dAY = Total worked days Hour = Total worked hours	nonE	A-97
58	h.Job	Threshold of the worked hours/days	0	From 0 (oFF) to 9999 (days/hours)	oFF	A-100

CAL Group - User Calibration Parameters Configuration

no.	Param.	Description	Dec. Point	Values	Default	Vis. promo
59	A.L.P	Adjust low Point	dP	From -1999 to AH.P-10 (E.U.)	0	A-9
60	A.L.o	Adjust low Offset	dP	From -300 to 300 (E.U.)	0	A-10
61	A.H.P	Adjust High Point	dP	From A.L.P +10 to 9999 (E.U.)	9999	A-11
62	A.H.o	Adjust High Offset	dP	From -300 to 300 (E.U.)	0	A-12