

# Controller - Indicator with Limit Switch function

$1/32$  DIN - 48 x 24



**ASCON spa**

**ISO 9001**  
**Certified**

## **C1 line**

User manual • M.I.U.C1L-1/03.10 • Cod. J30-478-1AC1L IE



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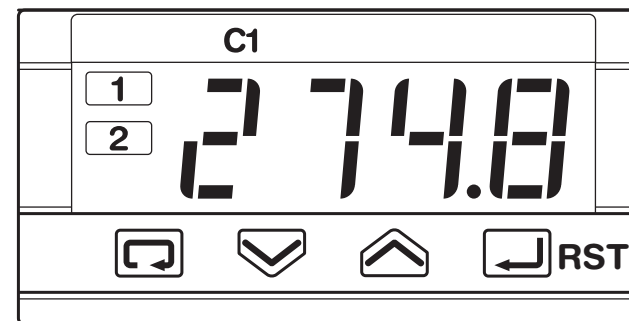


# Controller - Indicator with Limit Switch function

$1/32$  DIN - 48 x 24

**C1 line**

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## NOTES

### ON ELECTRIC SAFETY AND ELECTROMAGNETIC COMPATIBILITY

**Please, read carefully these instructions before proceeding with the installation of the controller.**

**Class II instrument, for indoor use only.**

This controller has been designed with compliance to:

**Regulations on electrical apparatus** (appliance, systems and installations) according to the European Community directive 73/23/EEC amended by the European Community directive 93/68/EEC and the Regulations on the essential protection requirements in electrical apparatus EN61010-1 : 93 + A2 : 95.

**Regulations on Electromagnetic Compatibility** according to the European Community directive n° 89/336/EEC, amended by the European Community directive n° 92/31/EEC, 93/68/EEC, 98/13/EEC and the following regulations:

- *Regulations on RF emissions:*

EN61000-6-3: 2001 residential environments

EN61000-6-4: 2001 industrial environments

- *Regulation on RF immunity:*

EN61000-6-2: 2001 industrial equipment and system

**It is important to understand that it's responsibility of the installer to ensure the compliance of the regulations on safety requirements and EMC.**

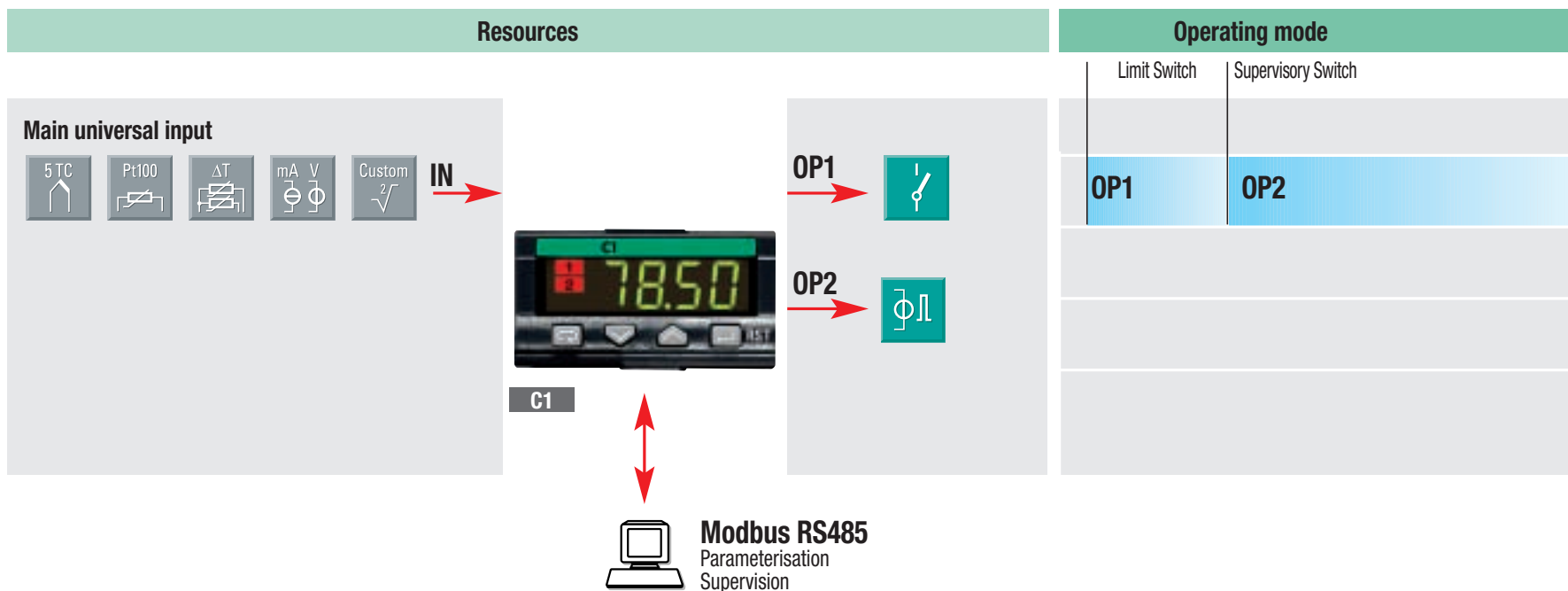
Repairs: this device has no user serviceable parts and requires special equipment and specialised engineers. Therefore, a repair can be hardly carried on directly by the user. For this purpose, the manufacturer provides technical assistance and the repair service for its Customers.

Please, contact your nearest Agent for further information.

**All the information and warnings about safety and electromagnetic compatibility are marked with the  sign, at the side of the note.**


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# 1 ■ INSTALLATION

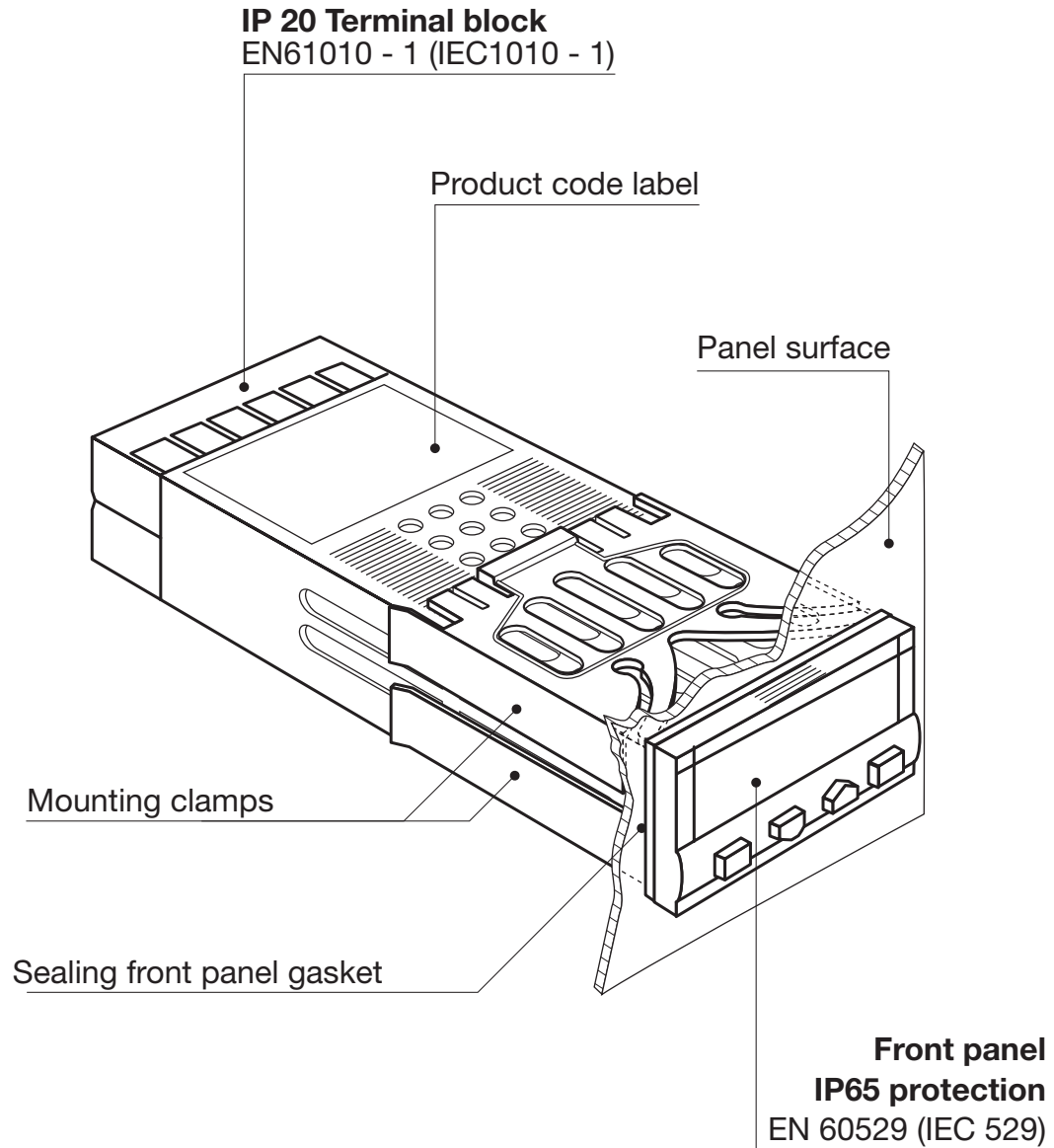
**Installation must only be carried out by qualified personnel.**

Before proceeding with the installation of this controller, follow the instructions illustrated in this manual and, in particular, the installation precautions marked with the  symbol, related to the European Community directive on electrical protection and electromagnetic compatibility.



To prevent hands or metal touching parts that may be electrically live, the controllers must be installed in an enclosure and/or in a cubicle.

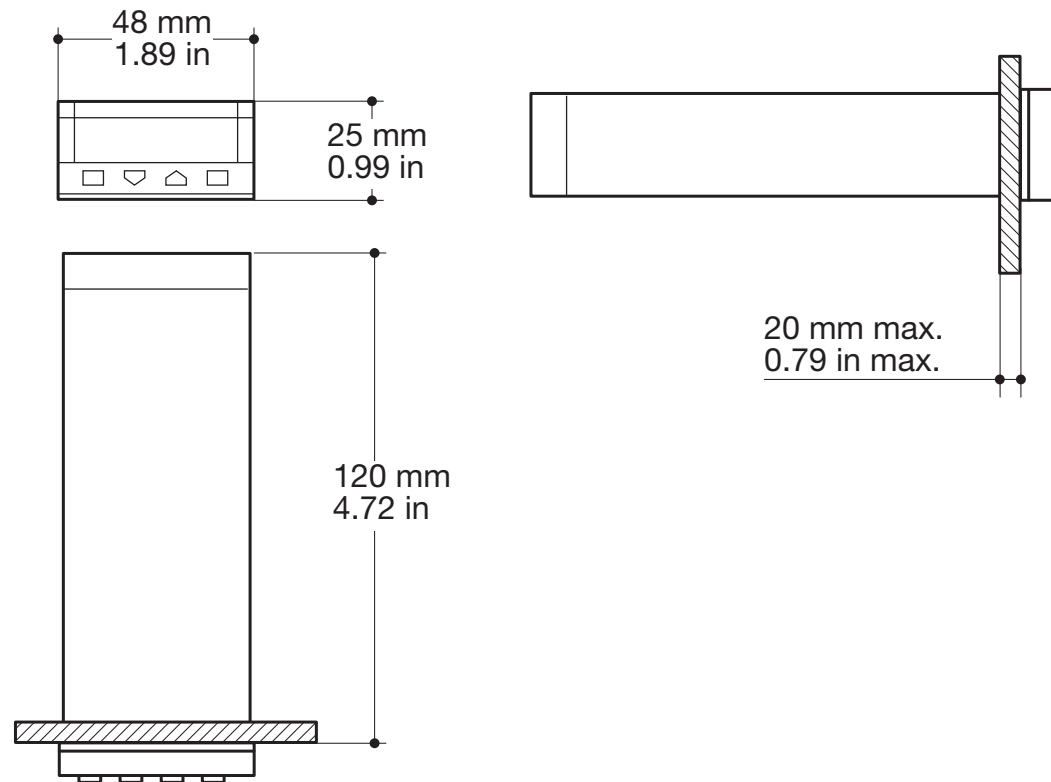
## 1.1 GENERAL DESCRIPTION



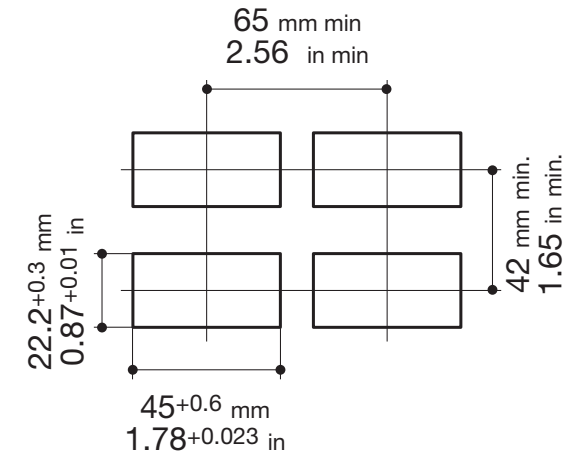
## 1.2 DIMENSIONAL DETAILS

### 1.2.1 Panel Mounting Models

#### Instrument dimensions

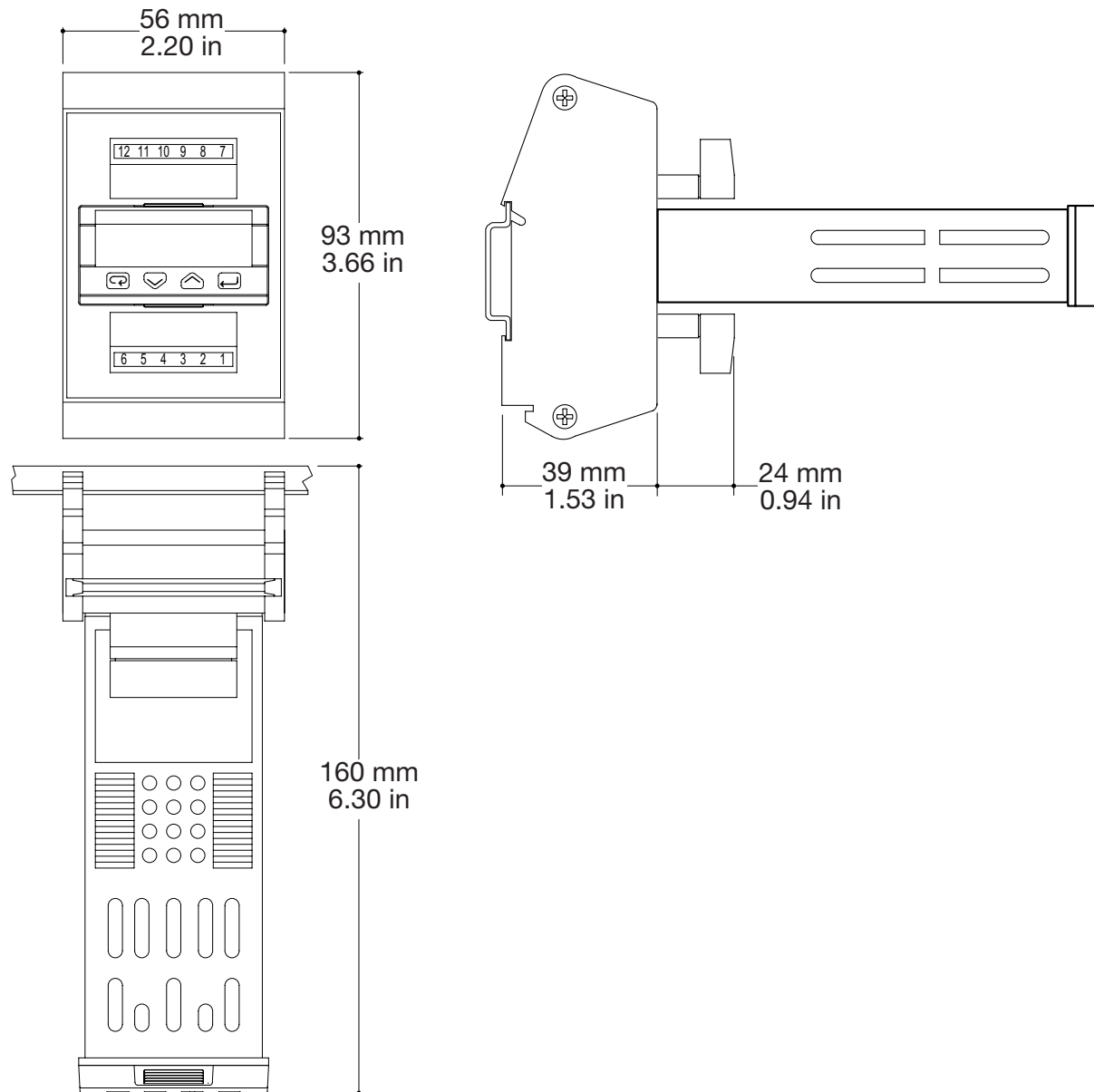


#### Panel cut-out



## 1.2.2 DIN Rail Mounting Models

### Instrument dimensions



## 1.3 ENVIRONMENTAL RATINGS




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**Operating conditions**


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Altitude up to 2000 m



Temperature 0...55°C

%Rh

Relative humidity 5... 95 % non-condensing

---

**Special conditions**
**Suggestions**

Altitude &gt; 2000 m

Use 24V $\sim$  supply version

Temperature &gt;55°C

Use forced air ventilation

%Rh

Humidity &gt; 95 %

Warm up



Conducting atmosphere

Use filters

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**Forbidden Conditions**


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Corrosive atmosphere



Explosive atmosphere

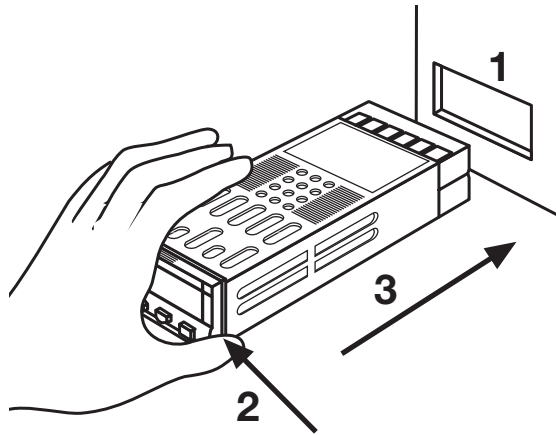


## 1.4 INSTRUMENT MOUNTING

### 1.4.1 Panel Mounting Models

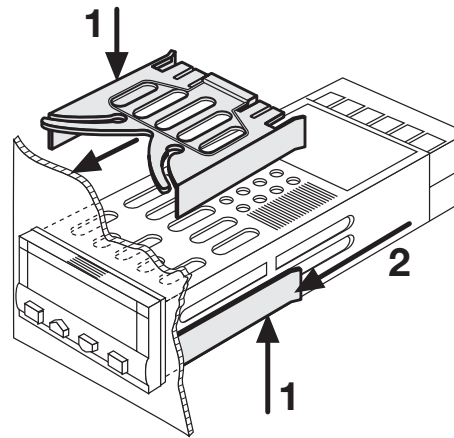
#### Instrument insertion

- 1 Prepare panel cut-out;
- 2 Check front panel gasket position;
- 3 Insert the instrument through the cut-out.



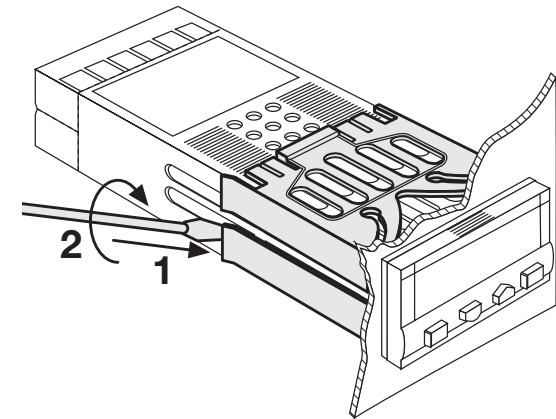
#### Installing the locking clamps

- 1 Fit the mounting clamps;
- 2 Push the mounting clamps towards the panel surface to secure the instrument.



#### Clamps removing

- 1 Insert the screwdriver in the clips of the clamps;
- 2 Rotate the screwdriver.



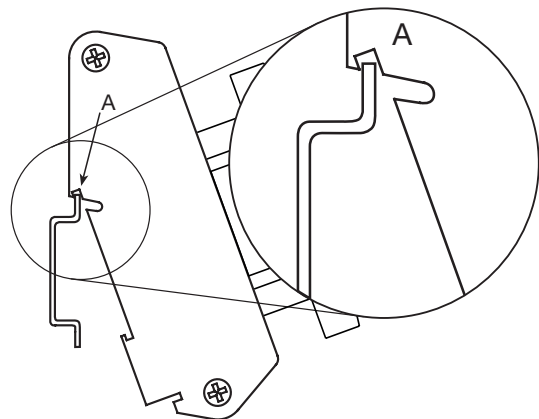
#### UL note

[1] For Use on a Flat Surface of a Type 2 and Type 3 'raintight' Enclosure.

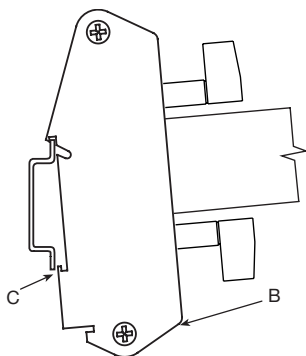
## 1.4.2 DIN Rail Mounting Models

### Instrument installation

- 1 Hook the “A” portion of the instrument socket to the DIN rail.

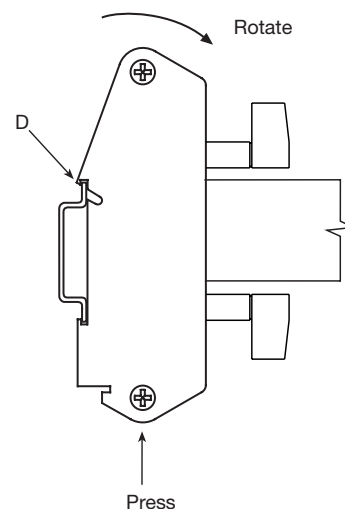


- 2 Press the lower part of the socket in direction “B”. As part “C” is locked to the DIN rail, the instrument is correctly fitted.



### Instrument removal

- 1 Press the lower part of the DIN rail socket; when “D” part of the socket frees from the rail, the instrument can be removed rotating the higher part as indicated.

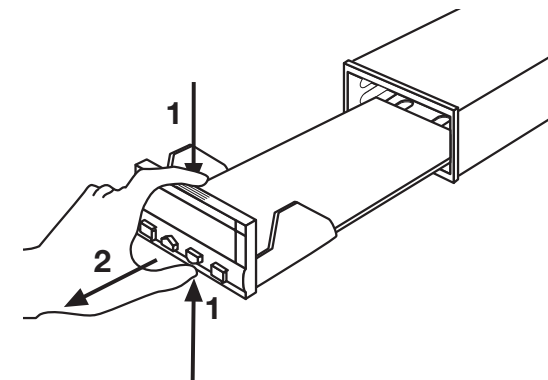


## 1.4.3 INSTRUMENT UNPLUGGING



The instructions that follow are valid for both the panel and DIN rail mounting models.

- 1 Push and
- 2 pull to remove the instrument

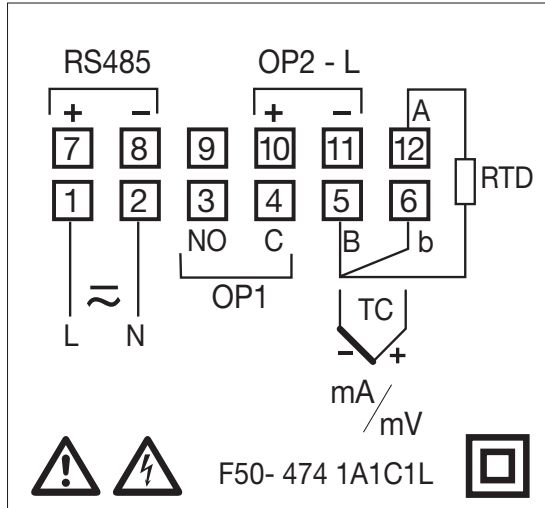


Electrostatic discharges can damage the instrument

Before removing the instrument the operator must discharge himself to ground



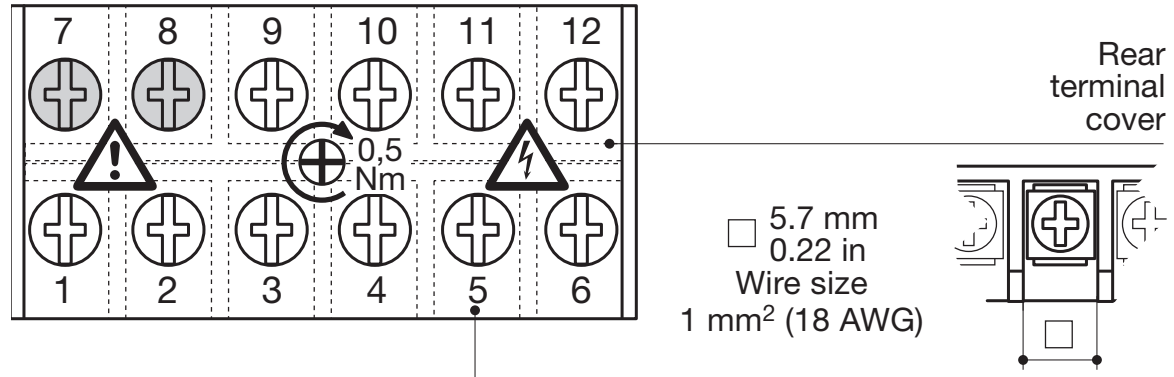
## 2 ELECTRICAL CONNECTIONS



### UL note

[1] Use 60/70 °C copper (Cu) conductor only.

### 2.1 TERMINAL BLOCK [1]



12 screw terminals



Option terminals



Tightening torque 0.5 Nm

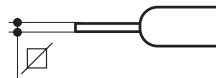


Positive screw driver PH1



Negative screw driver 0.8 x 4 mm

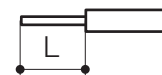
### Recommended wire terminal leads



Pin connector  $\varnothing$  1.4 mm - 0.055 in max.



Fork-shape AMP 165004  $\varnothing$  5.5 mm - 0.21 in



Stripped wire L 5.5 mm - 0.21 in

**PRECAUTIONS**

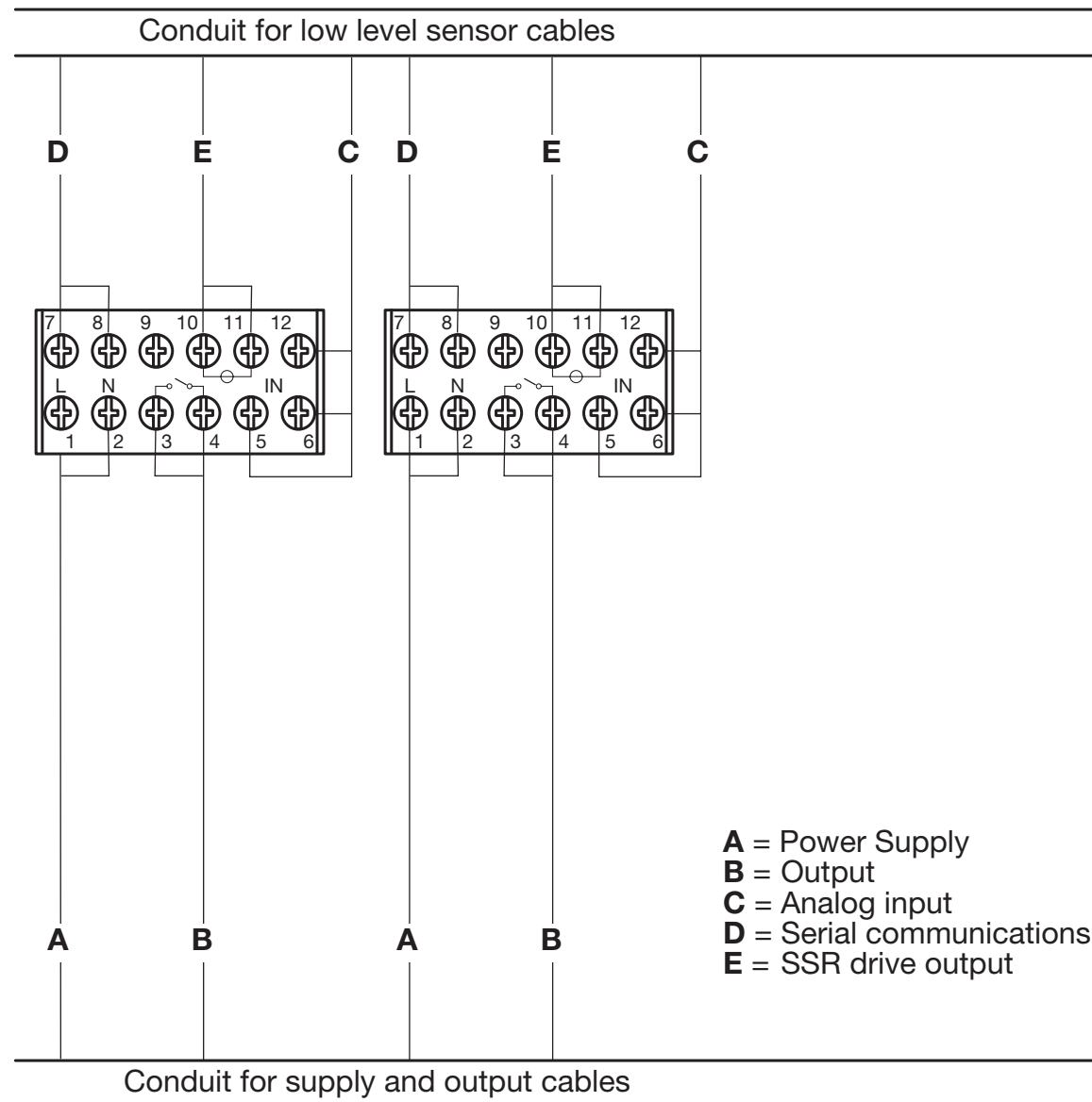
Despite the fact that the instrument has been designed to work in an harsh and noisy environmental (level IV of the industrial standard IEC 801-4), it is strongly recommended to follow the following suggestions.



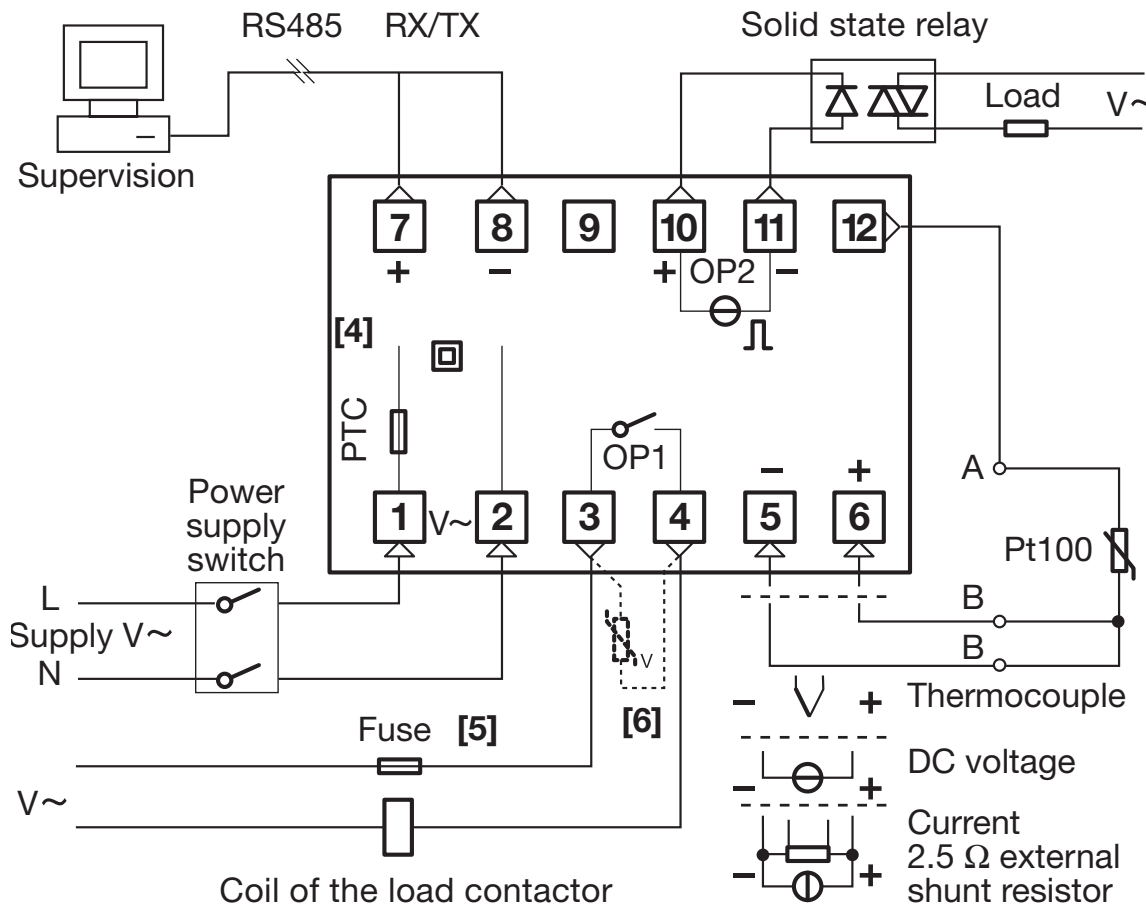
All the wiring must comply with the local regulations.

The supply wiring should be routed away from the power cables. Avoid to use electromagnetic contactors, power relays and high power motors nearby. Avoid power units nearby, especially if controlled in phase angle

Keep the low level sensor input wires away from the power lines and the output cables. If this is not achievable, use shielded cables on the sensor input, with the shield connected to earth.

**2.2 SUGGESTED WIRES ROUTING**

### 2.3 TYPICAL INSTRUMENT WIRING



#### Notes:

- 1] Make sure that the power supply voltage is the same indicated on the instrument.
- 2] Switch ON the power supply only after that all the electrical connections have been completed.
- 3] In accordance with the safety regulations, the power supply switch shall bring the identification of the relevant instrument. The power supply switch shall be easily accessible from the operator.
- 4] The instrument is PTC protected. In case of failure it is suggested to return the instrument to the manufacturer for repair.
- 5] To protect the contacts of the relay output (OP1) use a 2 A~ T (250 V~) or a 4 A~ T (120 V~) fuse.
- 6] Relay contacts are already protected with varistors.

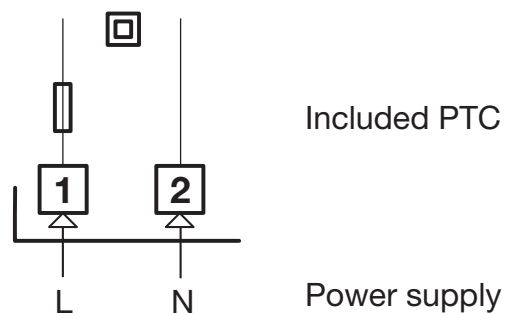
**Only in case of 24 V~ inductive loads, use model A51-065-30D7 varistors (on request)**

### 2.3.1 POWER SUPPLY



Switching power supply with multiple isolation and internal PTC.

- Standard version:  
nominal voltage:  
100... 240V $\sim$  (-15... +10%),  
frequency: 50/60Hz;
- Low Voltage version:  
nominal voltage:  
24V $\sim$  (-25... +12%),  
frequency 50/60Hz  
or  
24V- (-15... +25%);
- Power consumption 1.6W max..

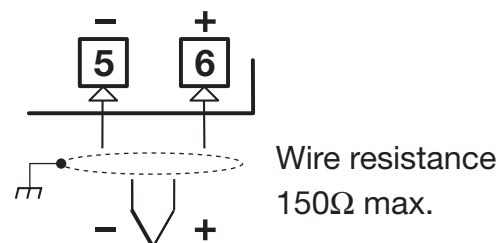


### 2.3.2 INPUT

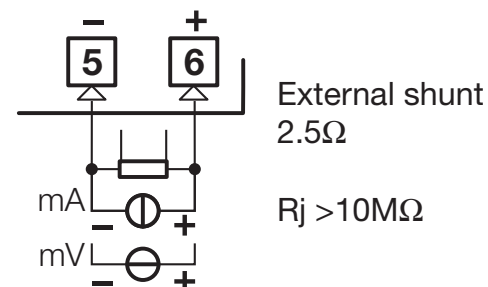


- Connect the wires with the polarity as shown;
- Use always compensation cable of the correct type for the thermocouple used;
- The shield, if present, must be connected to a proper earth.

For L J K S T thermocouple type



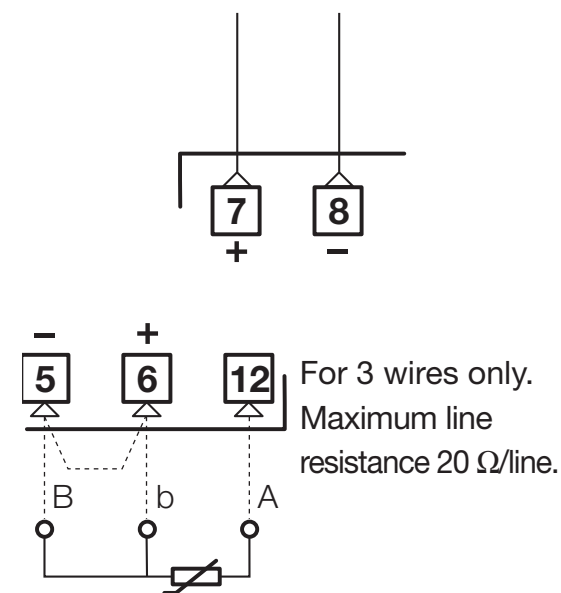
For mA, mV and V



- If a 3 wires system is used, use always cables of the same size (1mm<sup>2</sup> min.) (line 20 Ω/lead maximum resistance).
- When using a 2 wires system, use always cables of the same size (1,5mm<sup>2</sup> min.) and put a jumper between terminals 5 and 6.

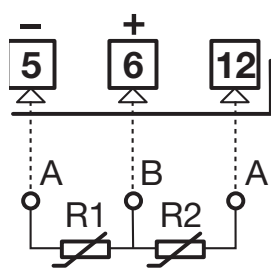
**⚠** When the distance between the controller and the sensor is 15 m, using a cable of 1.5 mm<sup>2</sup> size, produces an error on the measure of 1°C.

For PT100 resistance thermometer



## 2 - Electrical connections

### For $\Delta T$ (2 x RTD Pt100) Special



Use wires of the same length and 1.5 mm<sup>2</sup> size.

Maximum line resistance 20  $\Omega$ /line.

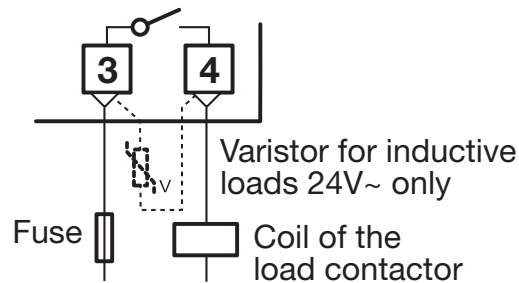
**R1 + R2 must be < 320 $\Omega$ .**

### 2.3.3 LIMIT SWITCH RELAY OUTPUT (OP1)



#### Single relay output

- NO contact for resistive load of up to 2A/250V $\sim$  max. or 4 A $\sim$  T at 120 V $\sim$ ;
- Fuse: 2A $\sim$  T at 250 V $\sim$  or 4 A $\sim$  T at 120 V $\sim$  (IEC 127).

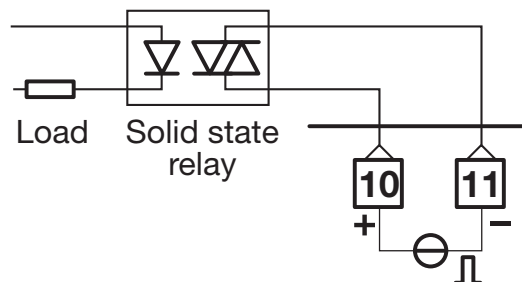


### 2.3.4 SUPERVISORY SWITCH LOGIC OUTPUT (OP2)



#### Logic output not isolated

- SSR drive output, not isolated 0... 5V $-$ ,  $\pm 20\%$ , 30mA max..



### 2.3.5 SERIAL COMMUNICATIONS

(option)

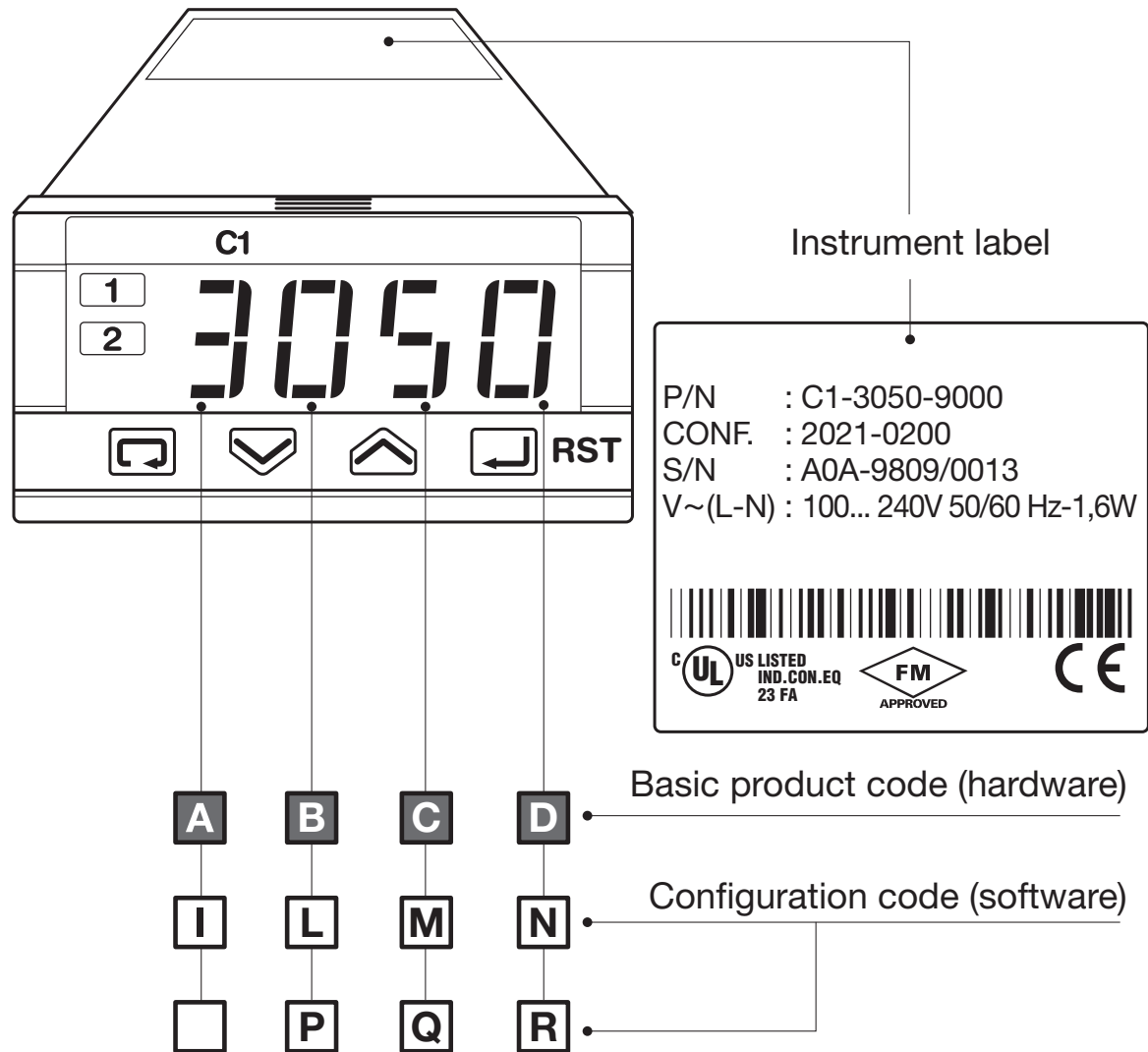


- Galvanic isolation 500V $\sim$ /1 min.;
- Compliance to the EIA RS485 standard for Modbus/Jbus.

**!** Please, read the user manual: **“C1 serial communications and configuration software”**

# 3 PRODUCT CODING

The complete code is shown on the instrument label. The informations about product coding are accessible from the front panel by means of a particular procedure described at section 4.2.2 page 22.





### 3.1 LIMIT SWITCH MODEL CODE

The product code indicates the specific hardware configuration of the instrument, that can be modified by specialized engineers only.

**Model:** **Line** **Basic** **Accessories**  
**C 1** **A 0 C 0** - **9 F G H**

<b>Line</b>		<b>C</b>	<b>1</b>
<b>Power supply</b>		<b>A</b>	
100... 240V~ (-15... +10%)		<b>3</b>	
24V~ (-25... 12%) or 24V- (-15... +25%)		<b>5</b>	
<b>Serial Communications</b>		<b>C</b>	
Not fitted		<b>0</b>	
RS485 Modbus/Jbus protocol		<b>5</b>	
<b>User manual</b>		<b>F</b>	
Italian/English		<b>0</b>	
French/English		<b>1</b>	
German/English		<b>2</b>	
Spanish/English		<b>3</b>	
<b>Front bezel colour</b>		<b>0/4... 20 mA Input shunt resistor [1]</b>	
Dark grey (std)	Standard resistor	<b>0</b>	
Beige	Standard resistor	<b>1</b>	
Dark grey (std)	High accuracy resistor	<b>2</b>	
Beige	High accuracy resistor	<b>3</b>	
<b>Mounting</b>		<b>H</b>	
Panel mounting (standard)		<b>0</b>	
DIN rail mounting with display		<b>1</b>	

**Note:**

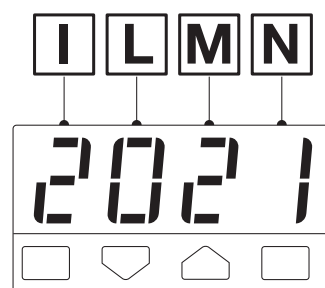
- 1]** Standard shunt resistor without field calibration will provide: 1.10% input accuracy for 0/4... 20mA input.  
 High accuracy shunt resistor without field calibration will provide: 0.20% input accuracy for 0/4... 20mA input.  
 Both shunt resistors with field calibration will provide 0.10% input accuracy for 0/4... 20mA input.

## 3.2 CONFIGURATION CODING

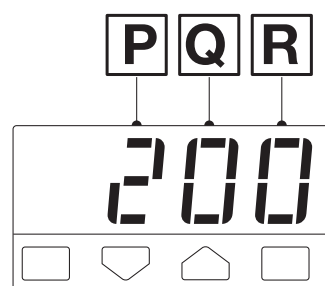
The configuration code consists of 7 digits that identify the operating characteristic of the controller, as chosen by the user.

Section 4.5 at pag. 28 reports the instructions how to set a new configuration code.

### 1<sup>st</sup> part of configuration code



### 2<sup>nd</sup> part of configuration code



The configuration code can be displayed on the front panel, following the instructions at page 20 section 4.2.2.

Input type and range			I
TR Pt100 IEC751	-99.9... +300.0°C	-99.9... +572.9°F	0
TR Pt100 IEC751	-200... +600°C	-328... +1112°F	1
TC L Fe-Const DIN43710	0... +600°C	32... 1112°F	2
TC J Fe-Cu45% Ni IEC584	0... +600°C	32... 1112°F	3
TC T Cu-CuNi	-200... +400°C	-328... +752°F	4
TC K Chromel-Alumel IEC584	0... 1200°C	32... 2192°F	5
TC S Pt10%Rh-Pt IEC584	0... 1600°C	32... 2912°F	6
DC input 0... 50 mV, linear	engineering units		7
DC input 10... 50 mV, linear	engineering units		8
Custom input and range			9

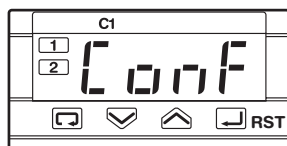
Value shown on the display in operator mode		L
Input variable		0
Limit switch alarm (AL1) threshold		1
Supervisory switch alarm (AL2) threshold		2

Alarm_1 (AL1) Limiter Power-ON condition		M
Automatic reset		0
Manual reset		1
Status retention		2

AL1 Function		N
High limiter		0
Low limiter		1



If, when the controller is powered up for the first time, the display shows the following message:



it means that the controller has not been configured yet.

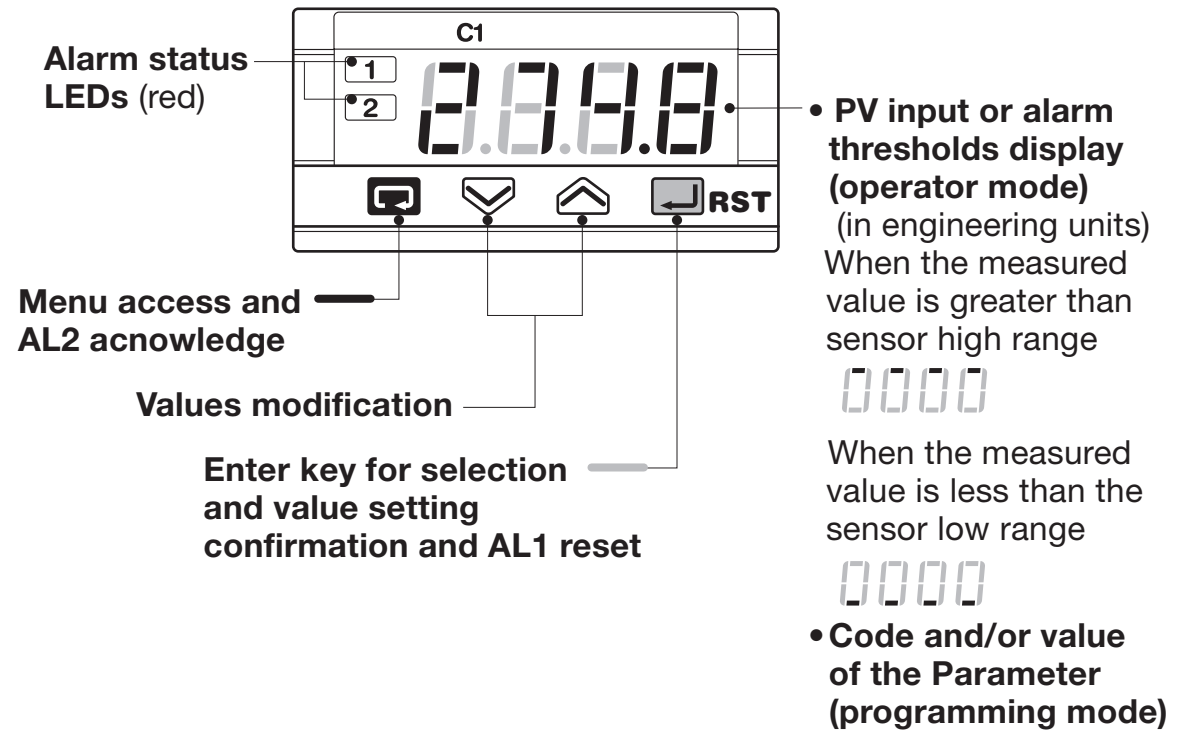
The controller remains in stand-by until the configuration code is set correctly (see chapter 4.5 page 28).

<b>Alarm_2 (AL2) type and function</b>		<b>P</b>
Not active		0
Sensor break alarm		1
Absolute	Active high	2
	Active low	3
Deviation	Active high	4
	Active low	5
Band	Active out	6
	Active in	7
<b>AL2 action</b>		<b>Q</b>
Direct		0
Reverse		1
<b>AL2 reset</b>		<b>R</b>
Auto		0
Manual		1

## 4

## OPERATIONS

## 4.1 KEYPAD COMMANDS AND DISPLAY




The display indicates the Input Value (IN) or the current setting for limiter threshold (AL1) or AL2 threshold (all in engineering units).



If the limiter is configured to indicate the IN (configuration code L=0), during normal operation, the display shows the IN value. Pressing the UP or DOWN keys the AL1 threshold will be displayed for 5 s.


### 4.1.3 OPERATOR INTERFACE






The limiter can be configured to show, on the display, the Input Value (IN) or AL1 or AL2 threshold (configuration code L=0 or L=1 or L=2). If the limiter is configured to show, during normal operation, the AL1 (or AL2) threshold value, pressing the UP or DOWN keys the Input Value will be displayed for 5 s.

Pressing the Reset key () in normal operating conditions has no effect.

After an alarm event has stopped and the temperature is within the normal operating range, pressing the reset key will energize the OP1 limiter output relay (contact will close).

Any operator intervention other than limiter AL1 acknowledgement (by pressing the Reset key ) , or auxiliary AL2 acknowledgement (by pressing the  key when AL2 is configured), is protected by password access (except the reading of engineering units, hardware and software code etc.).

By pressing the menu access key  and entering the correct password value, the operator can enter the menu mode in order to set the parameters and configure the instrument.

When the instrument is in menu mode, the UP () and DOWN () keys modify the displayed value (: increases the value, : decreases the value), and pressing the Enter/Reset key () confirms the value during data entry and this sets the operating parameters and configuration codes.

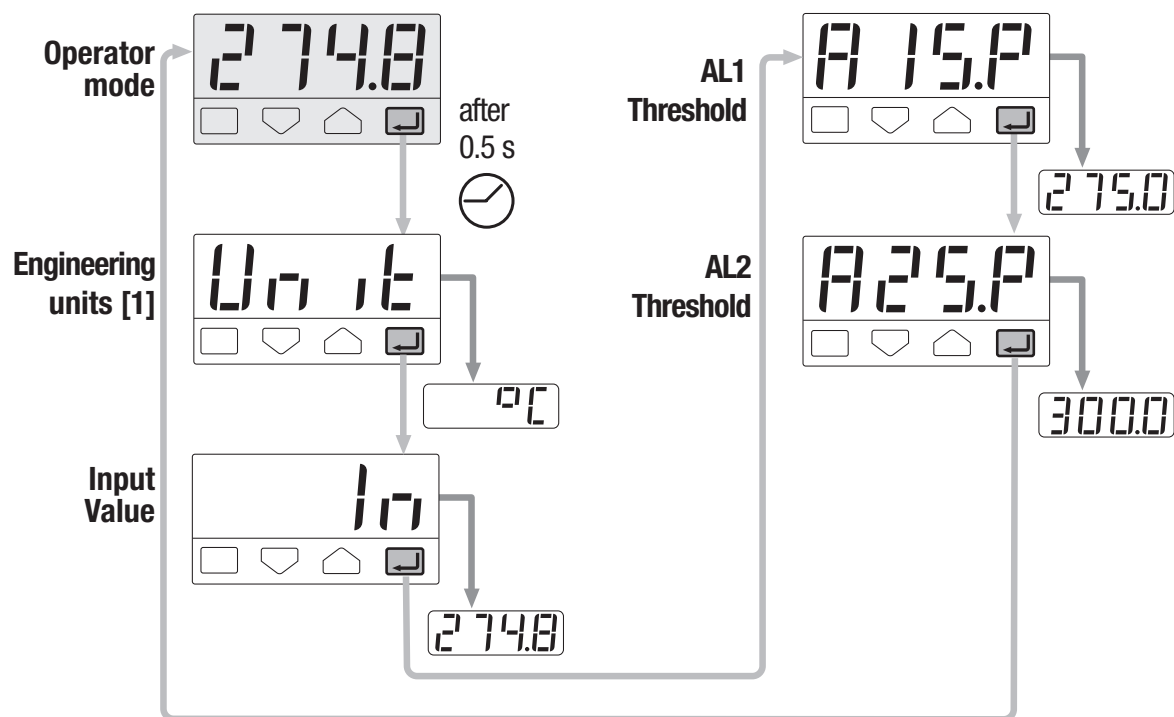
## 4.2 DISPLAY

When the display operation is selected, the controller presents automatically all the most important parameters and configuration information.

**During the operation, the parameters values cannot be modified by the user**

After 2 seconds from the end of the operation, the controller returns to the normal operating conditions.

### 4.2.1 PROCESS DATA DISPLAY

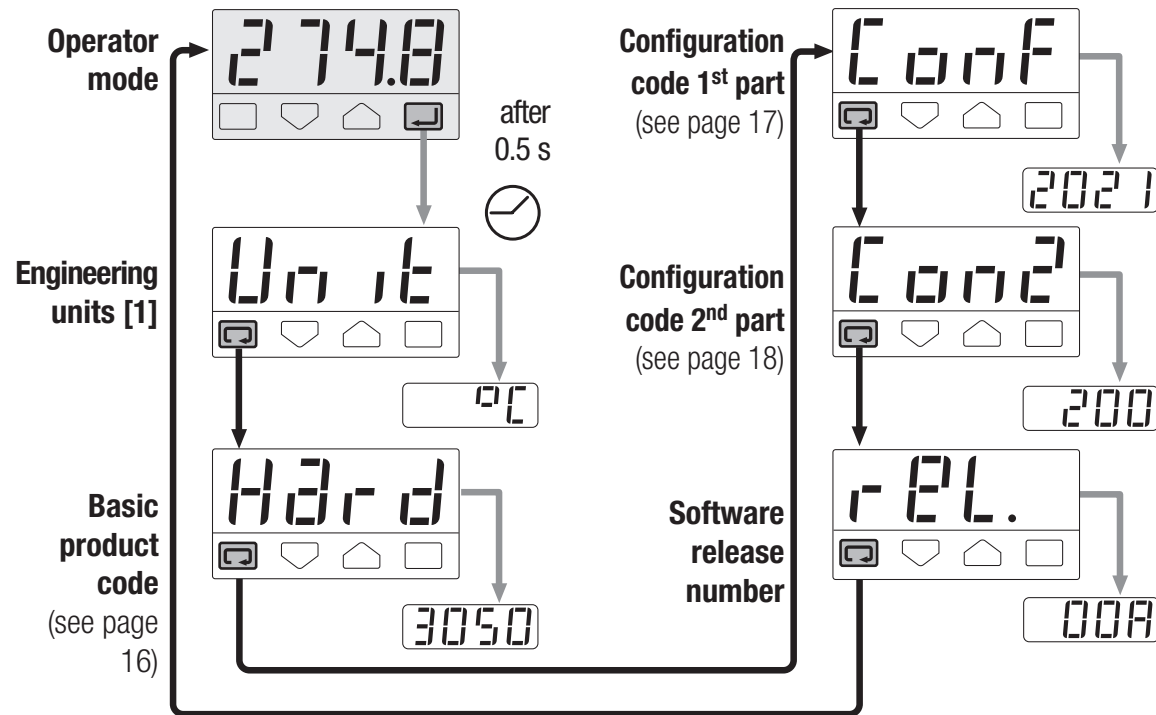


**Note:**

[1] See table page 27

### 4.2.2 CONFIGURATION CODES DISPLAY

When necessary, the operator can view the instrument main data (no changes are possible with the present procedure).

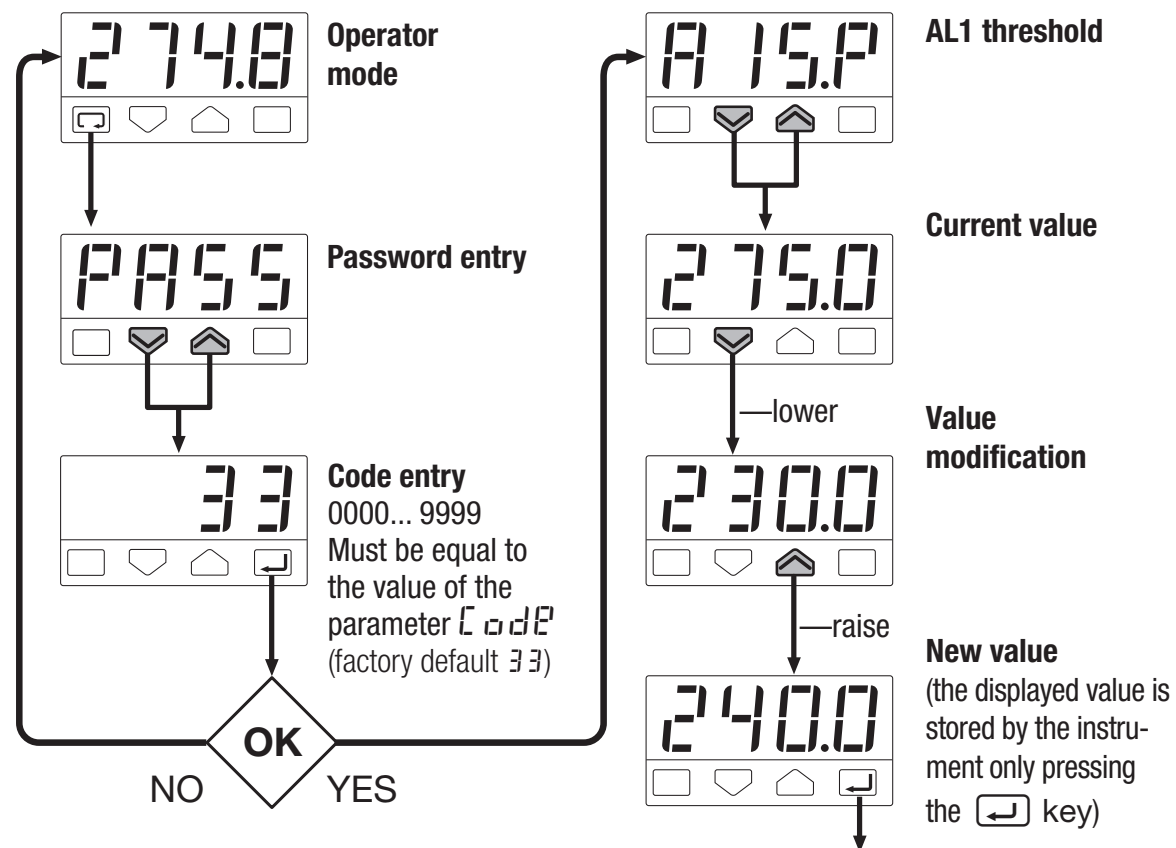


Example: C1 - 3050 - 2021 - 200 / Release 00A

## 4.3 PARAMETER SETTING

### 4.3.1 NUMERIC ENTRY

(e.g. the modification of the AL1 threshold from 275.0 to 240.0)



Press or momentarily to change the value of 1 unit each time the key is pressed.



Pressing the or key for a longer time changes the value, at rate that doubles every second. Releasing the button the rate of change decreases.



In any case the change of the value stops when it has reached the max./min. limit set for the parameter.




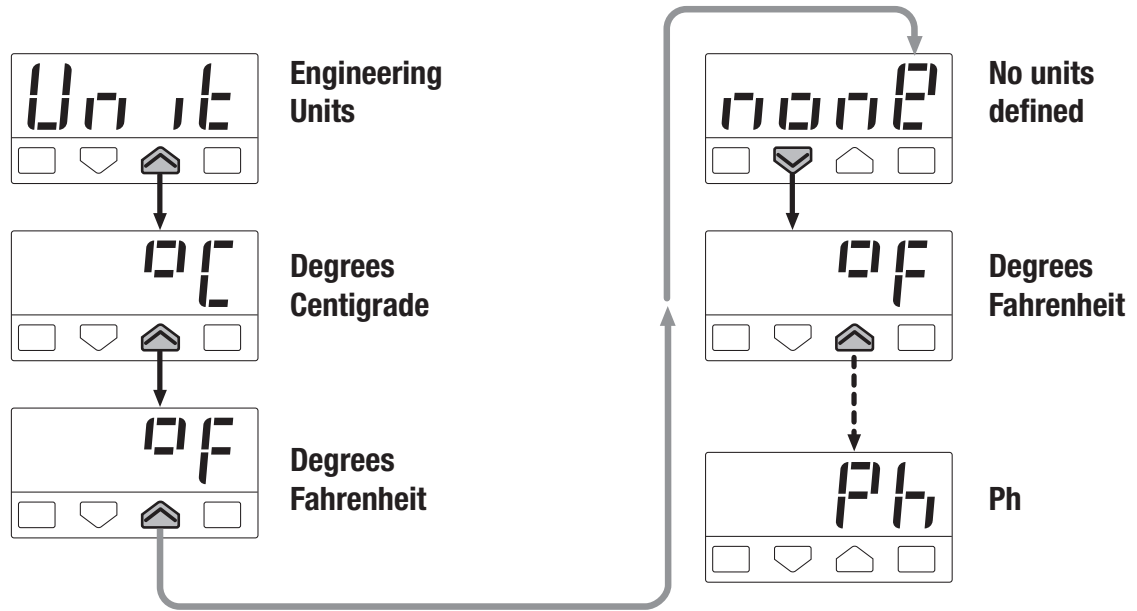
### 4.3.2 MNEMONIC CODES SETTING

(e.g. configuration see pages 28, 29)

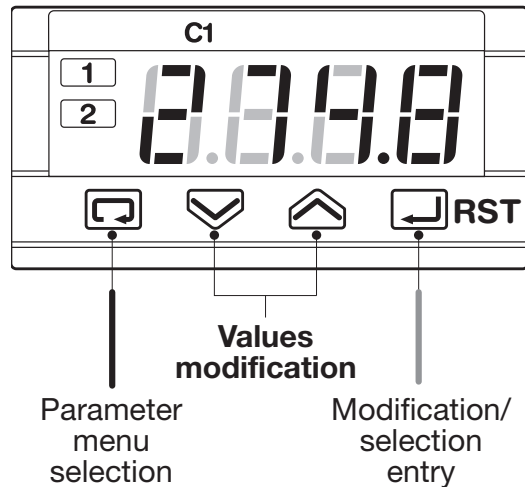
Press the  or  to display the next or previous mnemonic for the selected parameter.

Continued pressing of  or  will display further mnemonics at a rate of one mnemonic every 0.5 s.

The mnemonic code displayed at the time the next parameter is selected pressing the  key, is the one stored in the parameter.



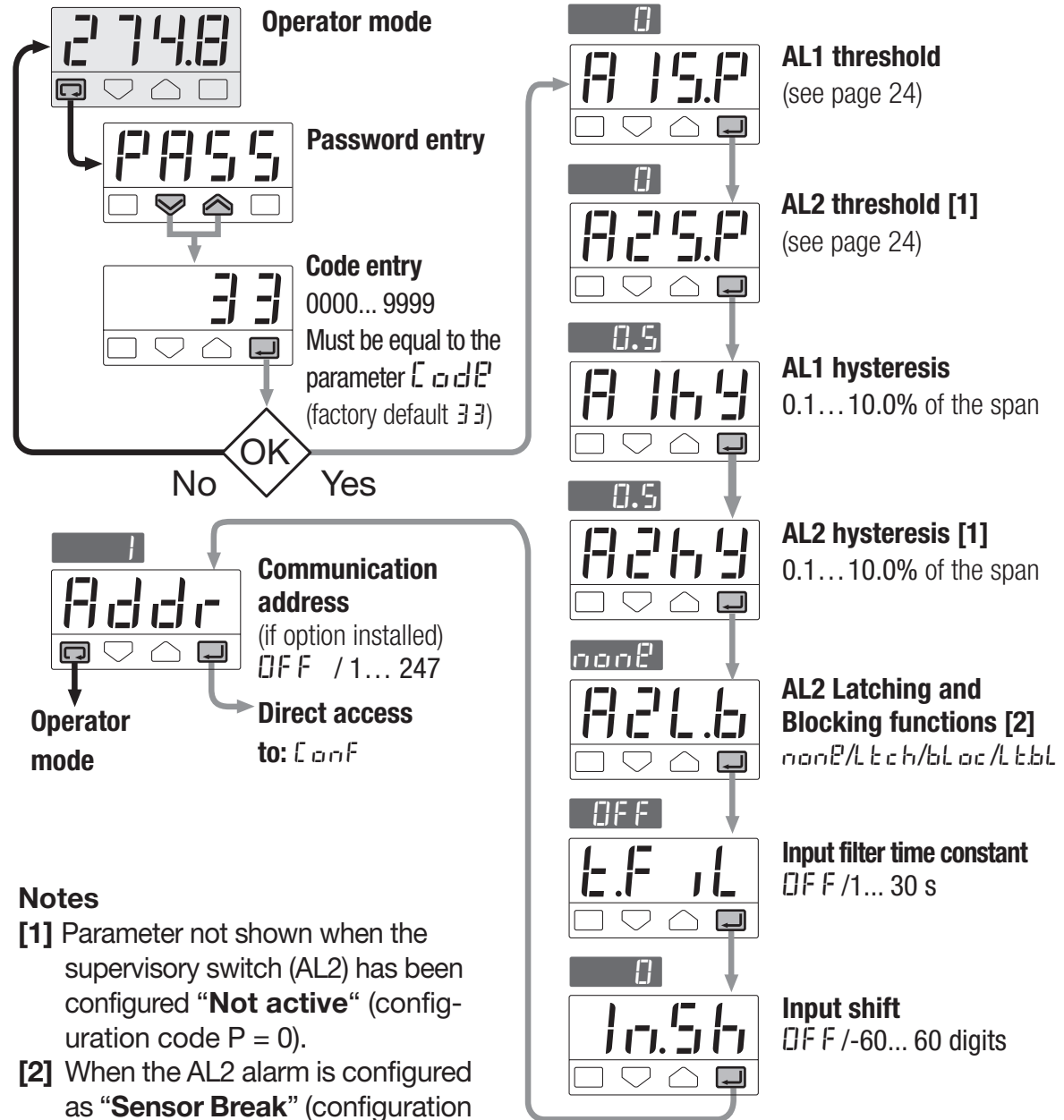
### 4.4 PARAMETER SETTING



**!**  
The parameter setting procedure has a timeout. If no keys are pressed for, at least, 30 seconds, the controller switches back, automatically, to the operator mode.

After having selected the parameter or the code, press or to display or modify the value (see page 23) The value is entered when the next parameter is selected pressing the key.

Pressing the key, at any time, the controller switches back to the operator mode.



**Notes**

- [1] Parameter not shown when the supervisory switch (AL2) has been configured “**Not active**” (configuration code P = 0).
- [2] When the AL2 alarm is configured as “**Sensor Break**” (configuration code P = 1) the only choices available are: None and Latching.

Configuration instructions (pages 28 ... 29)

### 4.5 PARAMETERS



#### AL1 Limit switch threshold

Threshold value that triggers the Limit Switch output (OP1).

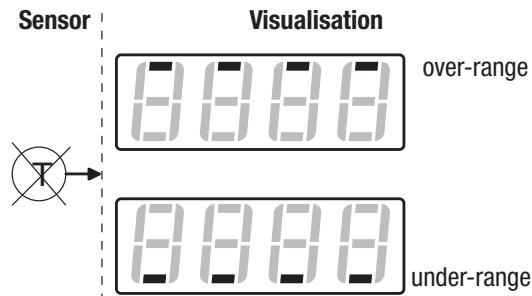
In engineering units. The Limit Switch operates as described at page 30.



#### AL2 Supervisory switch threshold

The alarm occurrences handle the OP2 output in different ways, according to the configured types of alarms, as illustrated.

#### Sensor failure (break, disconnection etc.)

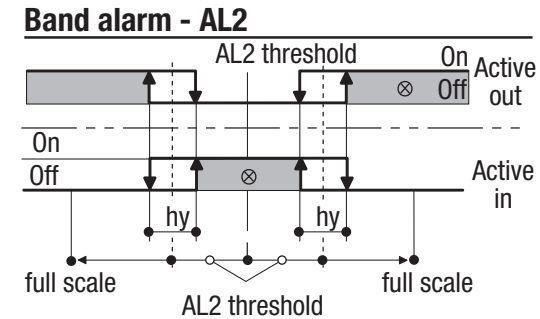
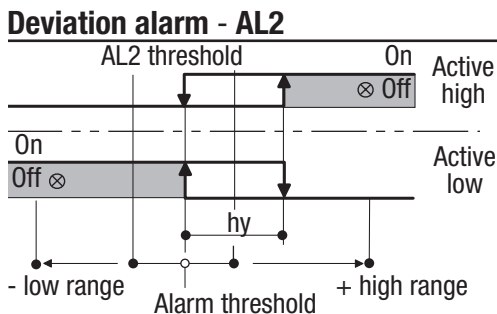
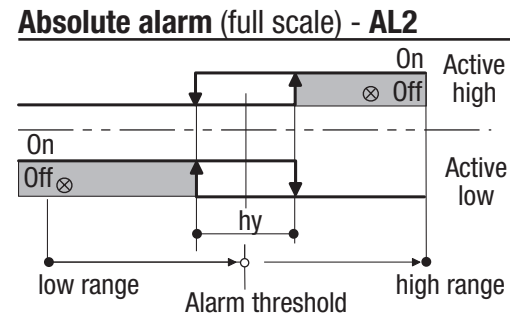


If a sensor failure occurs, the instrument detects and displays an over-range or under-range input condition as specified in the following table.

PT100	
Wire <b>A</b> open	Over-range
All other conditions	Under-range
Wires <b>A</b> and <b>B</b> in short circuit, wire <b>b</b> open	Over-range for a while, then under-range

Thermocouple	
All conditions	Over-range

Analog input	
Short circuit between the wires	Under-range
All other conditions	Over-range



Absolute alarm is referred to AL2 threshold, while deviation and band alarms are referred to AL1 threshold. If **Direct action** is selected for AL2 (configuration code **Q=0**), OP2 SSR output will be activated during AL2 condition; if **Reverse action** is selected (configuration code **Q=1**), OP2 SSR output will be released during AL2 condition. Only OP2 action can be configured, limiter function on OP1 operates only in fail safe mode.

AL2 reset function is only effective if latching has been selected for AL2 output.

If **Auto** is selected (configuration code **R=0**), AL2 reset will be performed after acknowledgement and exiting from the alarm condition. If **Man** is selected (configuration code **R=1**), acknowledgement will reset AL2 regardless to the alarm condition.

**A 169** AL1 hysteresis

**A269** AL2 hysteresis

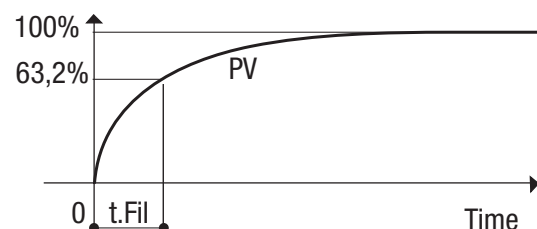
Hysteresis of the threshold of both the alarms, that activate OP1 and OP2 control output. It is specified as a % of the full scale.

**t.F 1L** Input filter time constant

Time constant, in seconds, of the RC input filter applied to the IN value.

When this parameter is set to **FFF** the filter is bypassed.

#### Filter response



**A2L.b** AL2, latching and blocking functions

For AL2 alarm it is possible to select the following functions:

**none** none


**latch** latching

**block** blocking

**latch** both latching and blocking

**latch** AL2 ACKNOWLEDGE FUNCTION

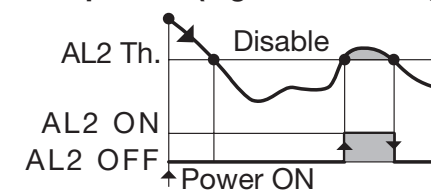
The alarm, once occurred, is presented on the display until to the time of acknowledge.

The acknowledge operation consists in pressing the  key.

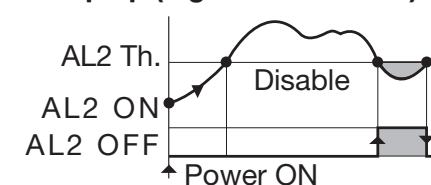
**After this operation, the alarm leaves the alarm state only when the alarm condition is no longer present.**

**block** AL2 START-UP DISABLING

Ramp down (e.g.: AL2 Abs. high)



Ramp up (e.g.: AL2 Abs. low)



**1n.5h** Input shift

This value is added to the measured Input Value. Its effect is to shift the whole Input scale of up to  $\pm 60$  digits.

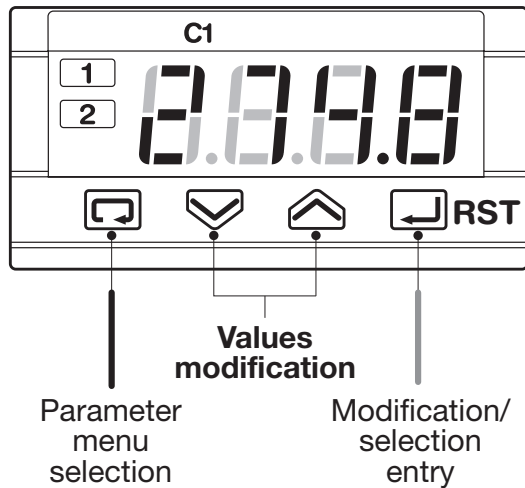
**Addr** Controller address

The address range is from 1 to 247 and must be unique for each controller on the communication bus to the supervisor.

When set to **FFF** the controller is not communicating

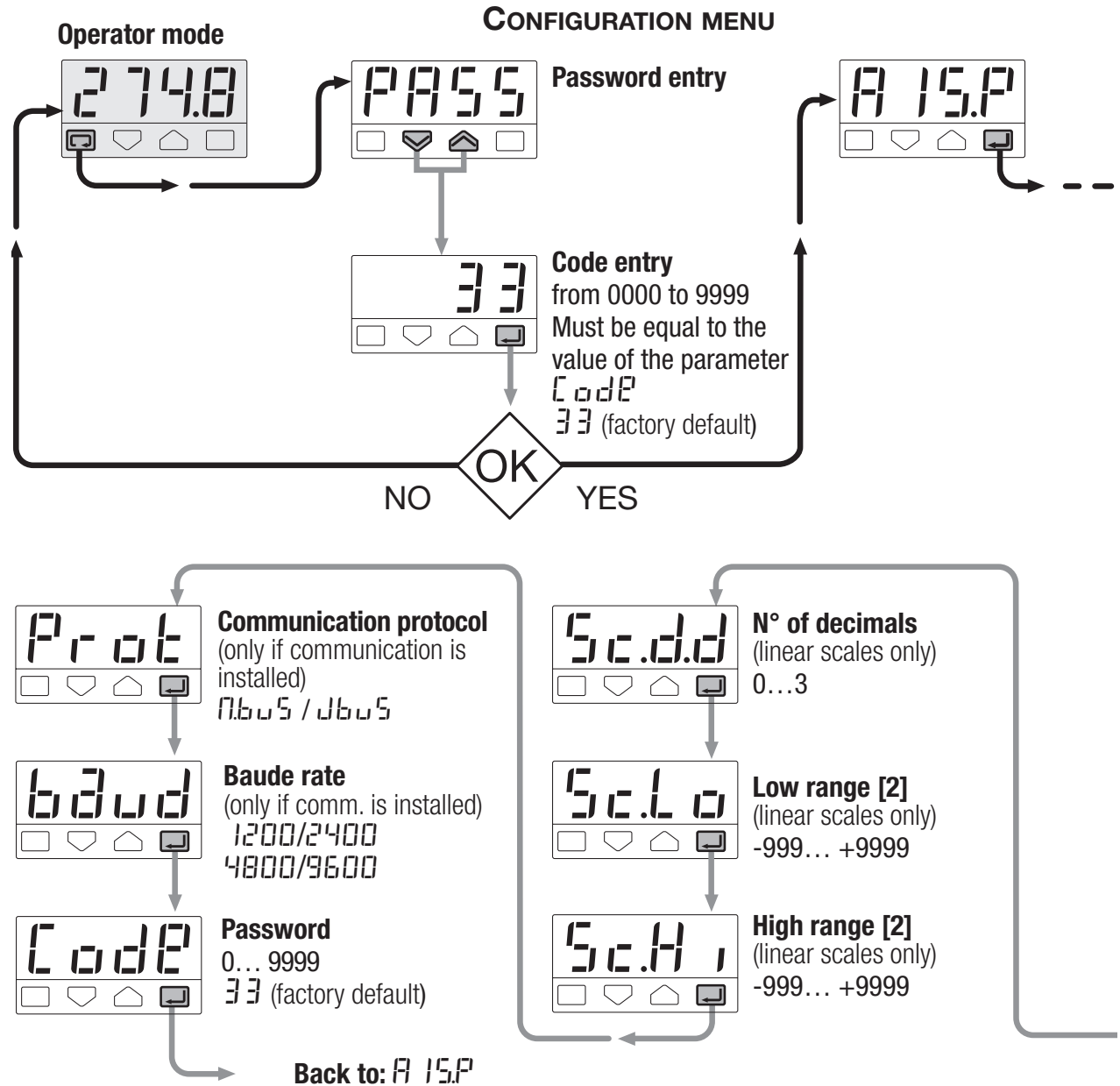
### 4.5 CONFIGURATION

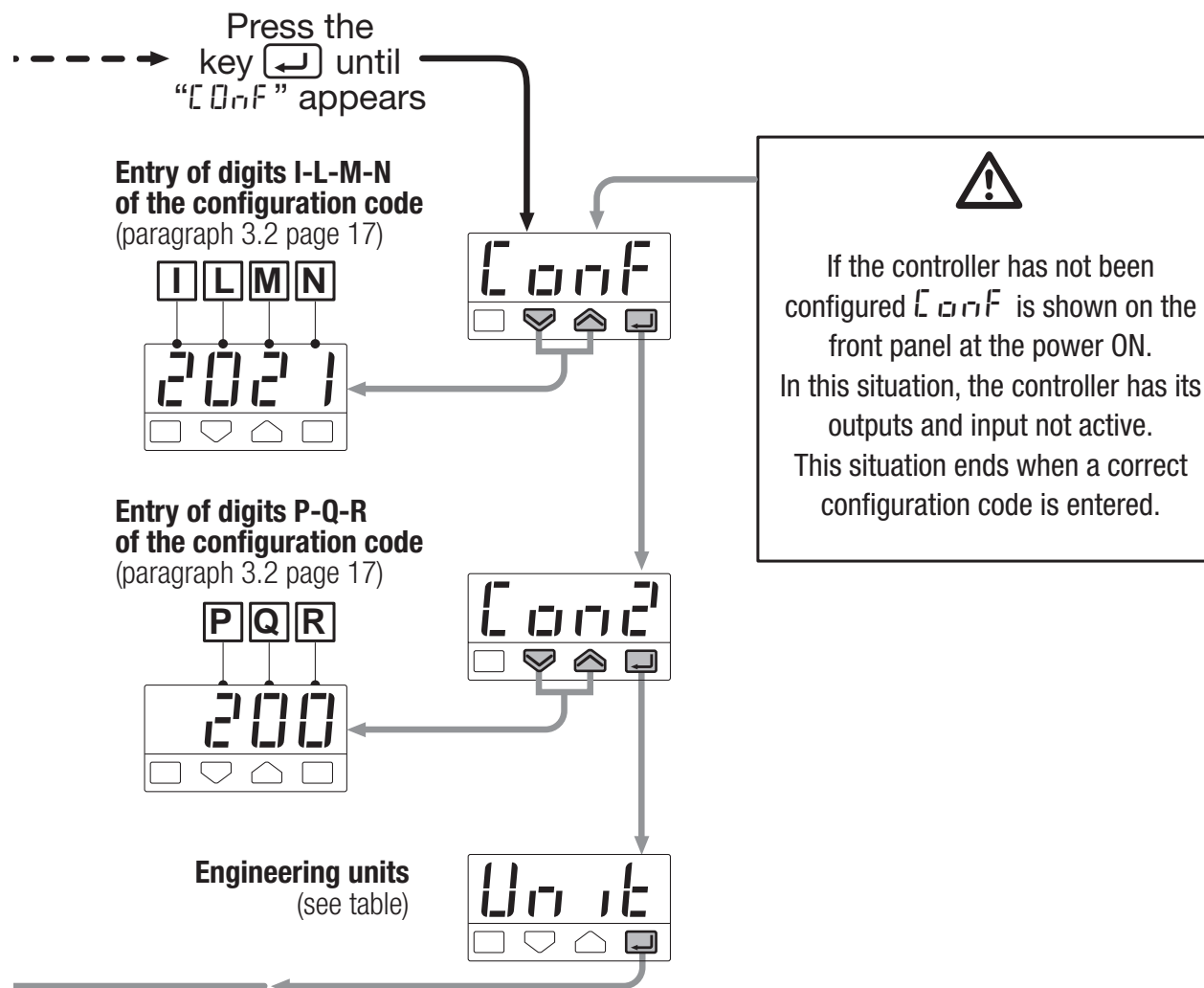
The configuration of the controller is specified through a 7 digit code that defines the type of input and the alarms (paragraph 3.2, page17) Other parameters specify the type of auxiliary functions.



Press or to display the next parameter or the next code and to change its value.

The new value entered is stored into the controller when the next parameter is selected pressing .





**[1]** Table of the supported Engineering Units.

Centigrade degrees *	°C
Fahrenheit degrees *	°F
none	none
mV	mV
Volt	V
mA	mA
Ampere	A
Bar	bar
PSI	PSI
Rh	rh
pH	pH

\* For inputs from thermocouple or resistance thermometer, the choice is between °C and °F only.

**[2]** Range of min 100 digits.

**[3]** To return to the operator mode press, from any position, the key.

## 5 LIMIT SWITCH FUNCTION

In order to have the limit switch function the product code digit **E** must be 9 (see page 16)  
For example: C1- 3050-9000

### 5.1 LIMIT SWITCH (AL1)

The limiter can operate as a high limiter or low limiter. Only output relay OP1 can be used as limit switch.

The limiter output relay OP1 is energized (contact closed) during normal operation and is de-energized (contact open) when the alarm is activated or when a power failure occurs (fail safe mode).

If “**High limiter**” is selected (configuration code N=0), the limiter will go in alarm condition when the input exceeds the alarm threshold or when a failure of the input occurs.

If “**Low limiter**” is selected (configuration code N=1), the limiter will go in alarm condition when the input drops below the alarm threshold or when a failure of the input occurs.

Then, after an alarm occurred, when the input returns to a normal value (i.e. drops below the AL1 threshold for high limit, or rises above AL1 threshold for low

limit), the OP1 relay will remain de-energized with the contact open until the operator manually acknowledges the alarm by pressing the “**Enter key**” (↵ RST) on the front panel of the limiter (reset).

LED1 will:

- Flash when a new non-acknowledged alarm occurs;
- Remain steady ON when AL1 is acknowledged but still exists.

The complete operation mode is detailed in the table that follows:

<b>Limiters status</b>	<b>OP1 contact</b>	<b>Led 1</b>	<b>Limiters can change status by:</b>	
<b>Non alarm status</b>	Energized (contact closed)	OFF	<b>Input condition</b>	
			Non alarm condition	AL1 condition
			Remains in non alarm status	Transition to non-acknowledged status
<b>Non-acknowledged status</b>	De-energized (contact open)	Flashing	<b>Reset</b>	
			Ack	Non-Ack
			Transition to acknowledged status	Remains in non-acknowledged status
<b>Acknowledged status</b>	De-energized (contact open)	Steady ON	<b>Input condition</b>	
			Non alarm condition	AL1 condition
			Returns to non alarm status	Remains in acknowledged status



## 5 - Limit Switch function

The limiter has a Status Retention capability, it only applies to the Limiter AL1 and OP1 output status. If the limiter is configured for the Status Retention and the power is switched ON, the limiter will operate as detailed in the table that follows:

Limiter Status at previous power OFF	Input AL1 condition at new power ON	Limiter Status at new power ON	OP1 Relay contact	LED 1
Non alarm status (normal operation)	Normal operation	Non Alarm status	Close	Steady OFF
	Alarm condition true	Non Acknowledged alarm	Open	Flashing
Non Acknowledged alarm	Normal operation	Acknowledge alarm	Open	Flashing
	Alarm condition true			
Acknowledge alarm	Normal operation	Non Alarm status	Close	Steady OFF
	Alarm condition true	Acknowledge alarm	Open	Steady ON

If “**Automatic Reset**” is selected (configuration code M=0), at power ON, the limiter status will depend on the input value (i.e.: if at power ON the input value is in the safe operating range, the limiter automatically will enter in non-alarm status).

If “**Manual reset**” is selected (configuration code M=1), at power ON, the limiter status will be forced to Non-acknowledge Alarm.

If “**Status retention**” is selected (configuration code M=2), at power ON, the limiter status will be forced to the status of the limiter at previous power down time, as described in table above.

Status retention does not apply to any condition regarding AL2 (AL2 operation at power ON depends on input value).

## 5.2 SUPERVISORY SWITCH (AL2)

The OP2 relay output contact is used as a normal auxiliary alarm (AL2). AL2 operation is configurable and independent from the operation of the limiter output OP1. Configuration allows the operator to choose the alarm type, OP2 action, automatic reset/latching. LED 2 indicates Alarm 2 status. For OP2 no status retention mode is available (status data storing).

**AL2 Reset = Auto**   **AL2L.b = Latching or Latching + Blocking**

Status		OP2 contact	AL2 LED	State transition			
#	Description			Input		Operator acknowledgment	
				Non alarm condition	Alarm condition	No	Yes
0	Non alarm	OFF	OFF	No transition	Transition to 1		
1	Non-acknowledged alarm	ON	Flashing			No transition	Transition to 2
2	Acknowledged alarm	ON	ON	Transition to 0	No transition		

**AL2 Reset = Man**   **AL2L.b = Latching or Latching + Blocking**

Status		OP2 contact	AL2 LED	State transition			
#	Description			Input		Operator acknowledgment	
				Non alarm condition	Alarm condition	No	Yes
0	Non alarm	OFF	OFF	No transition	Transition to 1		
1	Alarm	ON	ON			No transition	Transition to 2
2	Silence	OFF	OFF	Transition to 0	No transition		

5 - Limit Switch function

**AL2 Reset = Man**    **AL2L.b = None or Blocking**

Status		OP2 contact	AL2 LED	State transition			
#	Description			Input		Operator acknowledgment	
				Non alarm condition	Alarm condition	No	Yes
0	Non alarm	OFF	OFF	No transition	Transition to 1		
1	Alarm	ON	ON	Transition to 0	No transition	No transition	Transition to 2
2	Silence	OFF	OFF	Transition to 0	No transition		

**AL2 Reset = Auto**    **AL2L.b = None or Blocking**

Status		OP2 contact	AL2 LED	State transition			
#	Description			Input		Operator acknowledgment	
				Non alarm condition	Alarm condition	No	Yes
0	Non alarm	OFF	OFF	No transition	Transition to 1		
1	Alarm	ON	ON	Transition to 0	No transition		
2							

## 6 TECHNICAL SPECIFICATIONS

Features (at 25°C environmental temp.)	Description			
<b>Input</b> (input ranges are listed at page 17)	Common characteristics	A/D converter resolution: 50,000 points Update measurement time: 0.2 s Sampling time: 0.5 s Input bias: $\pm 60$ digit Input filter with enable/disable: 1...30 s (0 = OFF)		
	Accuracy	0.25% $\pm 1$ digit for temperature sensors 0.1% $\pm 1$ digits for mV 0.1% $\pm 1$ digits +the accuracy of the external shunt resistor for mA Between 100...240V $\sim$ the error is minimal		
	Resistance thermometer (for $\Delta T$ : R1+R2 must be $< 320\Omega$ )	Pt: 100 $\Omega$ at 0°C (IEC 751) °C/°F selectable	2 or 3 wires connection	Max. wire Res.: 20 $\Omega$ max. (3 wires) Input drift: 0.35°C/10°C T <sub>Env.</sub> <0.35°C /10 $\Omega$ Wire Res.
	Thermocouple	L, J, T, K, S (IEC 584) °C/°F selectable	Internal cold junction compensation in °C/°F	Max. wire Res.: 150 $\Omega$ max.: Input drift: <2 $\mu$ V/°C T <sub>env.</sub> <5 $\mu$ V/10 $\Omega$ Wire Resistance
	DC input (current)	4... 20mA, 0... 20mA with external shunt 2.5 $\Omega$ R <sub>j</sub> >10M $\Omega$	Engineering units Conf. decimal point position Init. Sc. -999...9999	Input drift: <0.1%/20°C environmental temperature
	DC input (voltage)	10... 50mV, 0... 50mV R <sub>j</sub> >10M $\Omega$	Full Sc. -999...9999 (min. range of 100 digits)	

## 6 - Technical specifications

Features (at 25°C environmental temp.)	Description	
<b>OP1 output</b>	SPST Relay N.O.: 2 A/250 V $\sim$ for resistive load; 4 A/120 V $\sim$ for resistive load	
<b>OP2 output</b>	SSR drive, not isolated: 5V $-$ , $\pm$ 10%, 30 mA max.	
<b>Serial comm.</b> (option)	RS485 isolated, Modbus/Jbus protocol, 1200, 2400, 4800, 9600 bit/s, two wires	
<b>Operational safety</b>	Measure input	Detection of out of range, short circuit or sensor break with automatic activation of the safety strategies and alerts on display
	Parameters	Parameter and configuration data are stored in a non volatile memory for an unlimited time
	Access protection	A password protects the instrument configuration access
<b>General characteristics</b>	Power supply (PTC protected)	100... 240V $\sim$ (-15... +10%) 50/60 Hz or 24V $\sim$ (-25... +12%), 50/60 Hz and 24V $-$ (-15... +25%) Power consumption 1,6 W max.
	Electric Safety	Compliance to EN61010-1 (IEC 1010-1), installation class 2 (2500V) pollution class 2, <b>class II instrument</b>
	Electromagnetic compatibility	Compliance to the CE standards for industrial system and equipment (see page 2)
	Protection	IP65 front panel EN60529 (IEC 529)
	Approvals	UL, cUL, file N° 176452; Factory Mutual Class 3545 Note: The UL label on the limit switch is for regulatory use only.
	Dimensions	1 $\frac{1}{32}$ DIN - 48 x 24, depth 120 mm, weight 100 g approx.

## ■ **WARRANTY**

We warrant that the products will be free from defects in material and workmanship for 3 years from the date of delivery.

The warranty above shall not apply for any failure caused by the use of the product not in line with the instructions reported on this manual.

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