Temperature Controller
$^{1}/_{16}$ DIN - 48 x 48

S E R I E S

ASCON spa

ISO 9001
Certified

M1 line

User manual • M.I.U.M1-3/03.01 • Cod. J30-478-1AM1 IE

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Temperature Controller
$^{1}/_{16}$ DIN - 48 x 48

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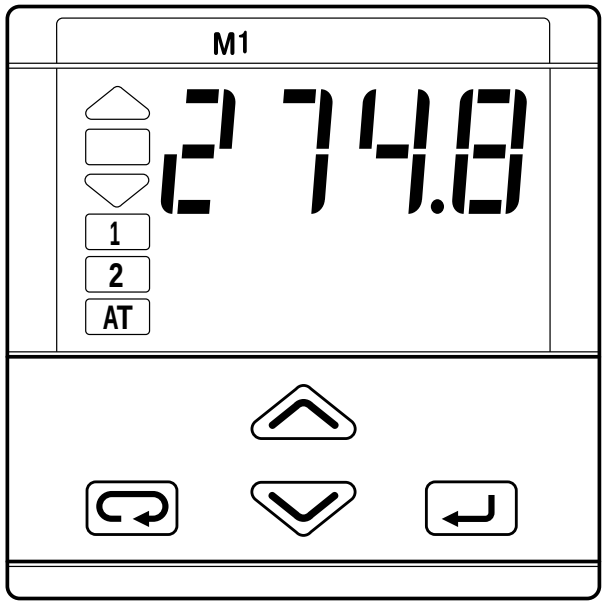

CE

NOTES ON ELECTRIC SAFETY AND ELECTROMAGNETIC COMPATIBILITY.

Please, read carefully these instructions before proceeding with the installation of the controller.
Class II instrument, real panel mounting.

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 Comunity 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 n089/336/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.
The 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 ⚠CE sign, at the side of the note.

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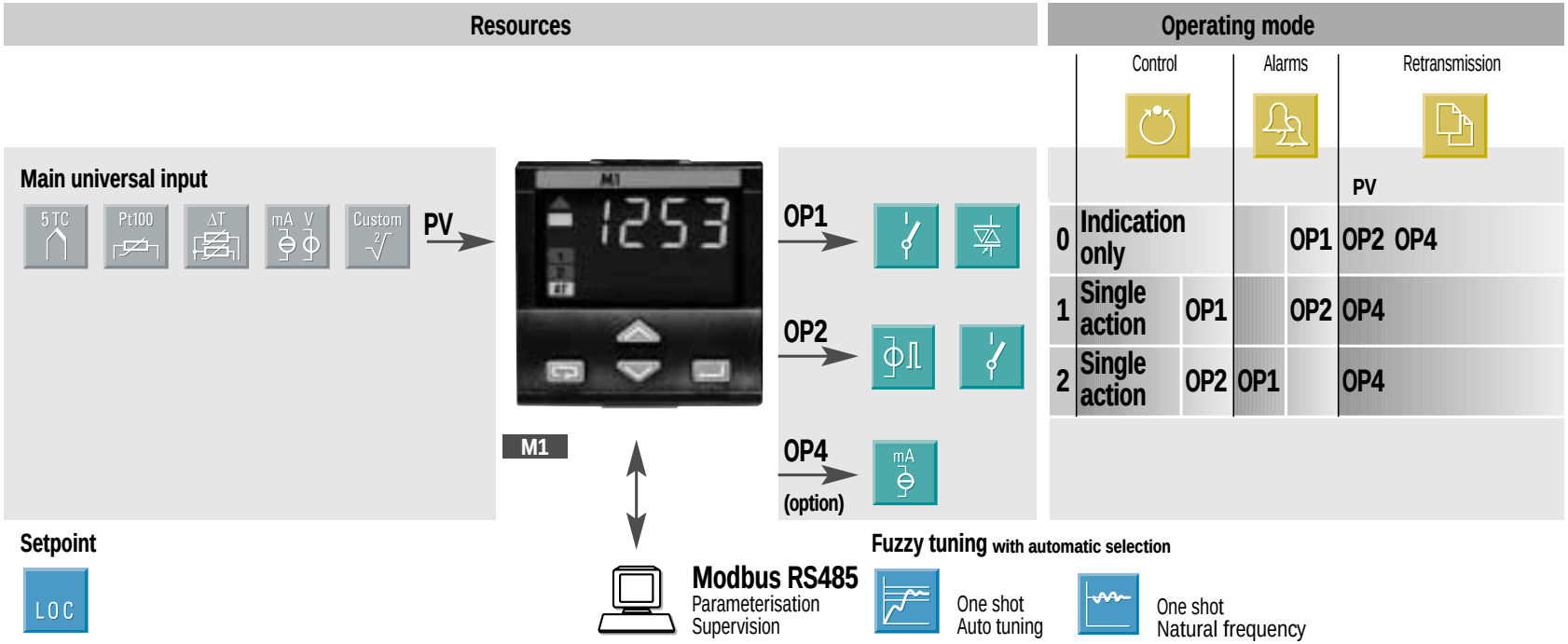


1 INSTALLATION

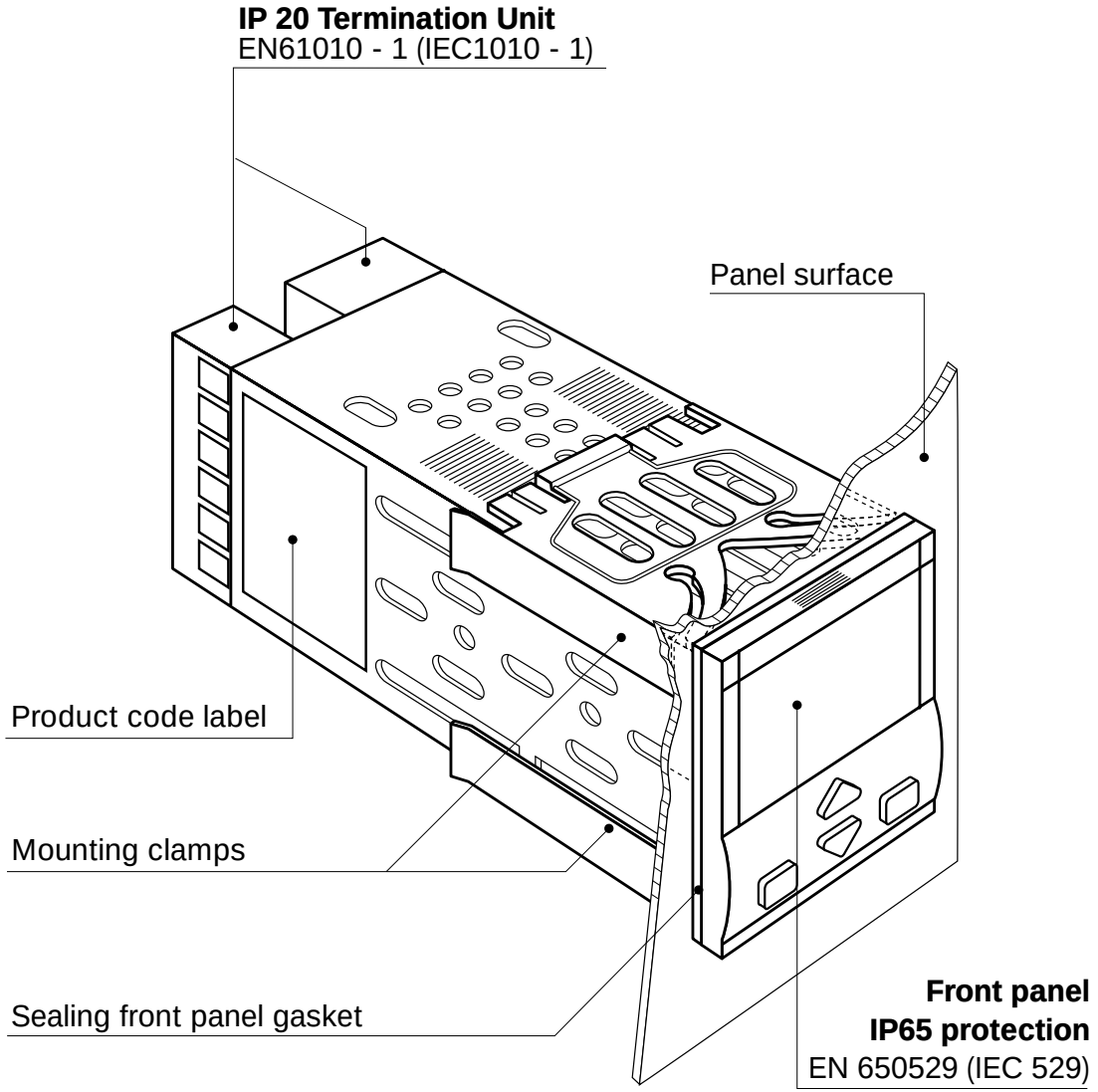
1.1 GENERAL DESCRIPTION

Installation must only be carried out by qualified personnel.

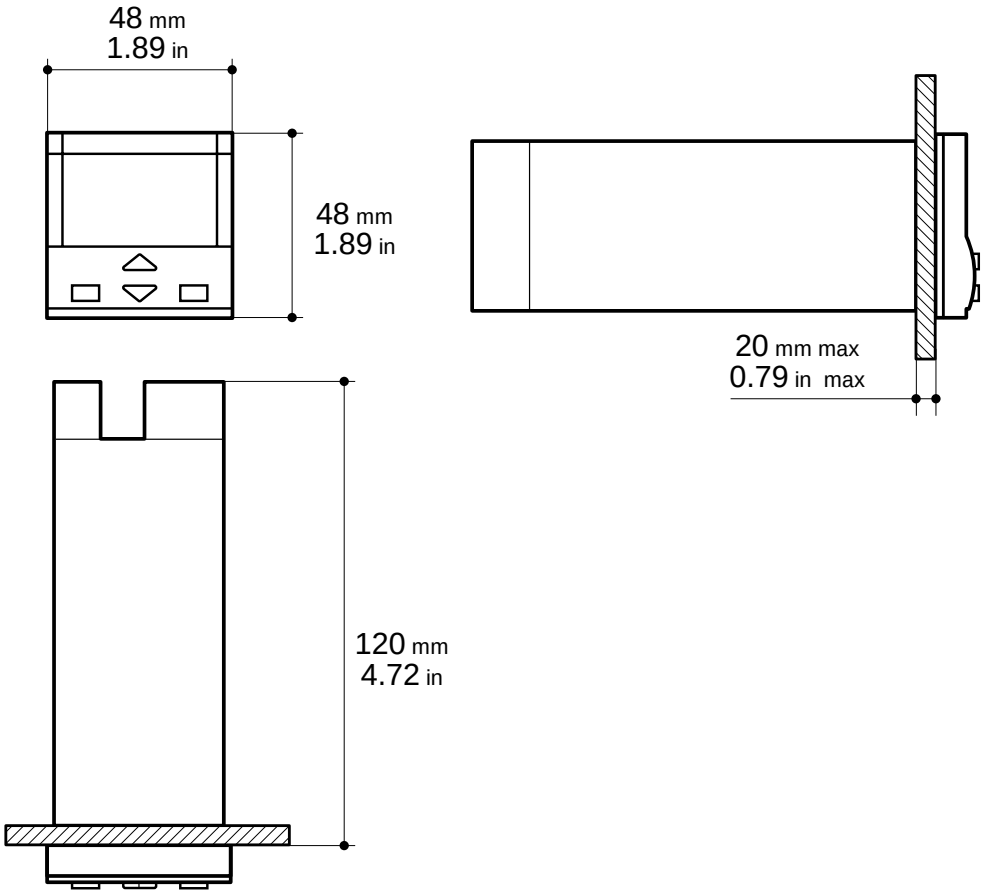
Before proceeding with the installation of this controller, follow the instructions illustrated in this manual and, particularly the installation precautions marked with the ⚠CE symbol, related to the European Community directive on electrical protection and electromagnetic compatibility.

⚠CE

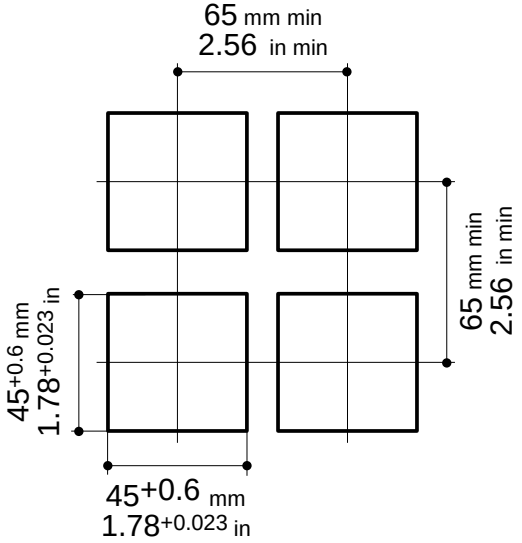
To prevent hands or metal touching parts that may be electrically live, the controllers must be installed in an enclosure and/or in a cubicle.



1.2 DIMENSIONAL DETAILS



1.3 PANEL CUT-OUT



1.4 ENVIRONMENTAL RATINGS

Operating conditions	
2000	Altitude up to 2000 m
°C	Temperature 0…50°C
%Rh	Relative humidity 5…95 % non-condensing

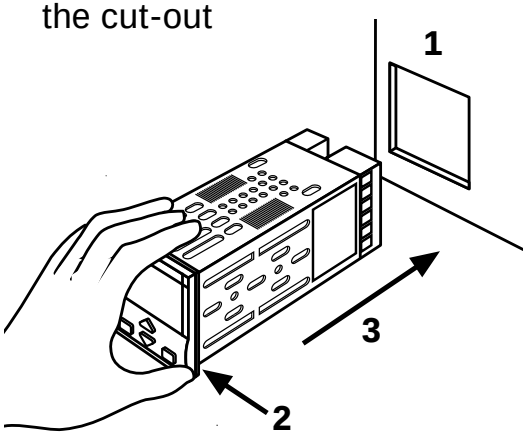
Special conditions		Suggestions
2000	Altitude > 2000 m	Use 24V~ supply version
°C	Temperature >50°C	Use forced air ventilation
%Rh	Humidity > 95 %	Warm up
	Conducting atmosphere	Use filter

Forbidden Conditions	
	Corrosive atmosphere
	Explosive atmosphere

1.5 PANEL MOUNTING [1]

1.5.1 INSERT THE INSTRUMENT

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

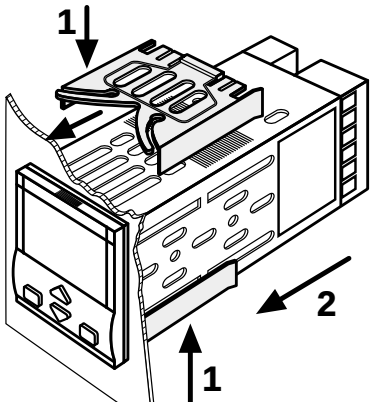


UL note

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

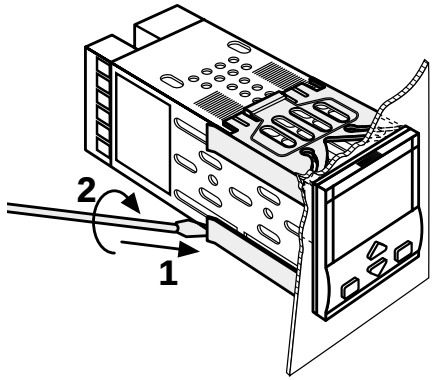
1.5.2 INSTALLATION SECURING

1 Position the mounting clamps
2 Push the mounting clamps towards the panel surface to secure the instrument



1.5.3 CLAMPS REMOVING

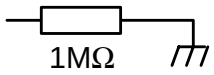
1 Insert the screwdriver in the clips of the clamps
2 Rotate the screwdriver

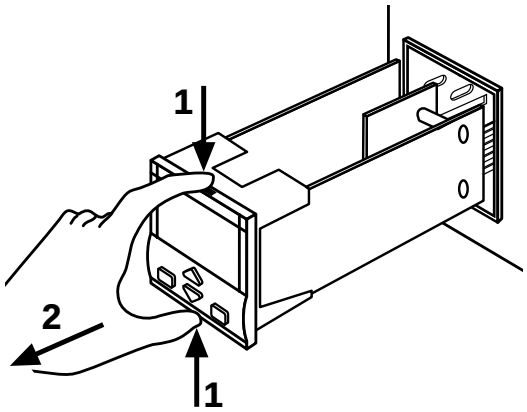


1.5.4 INSTRUMENT UNPLUGGING

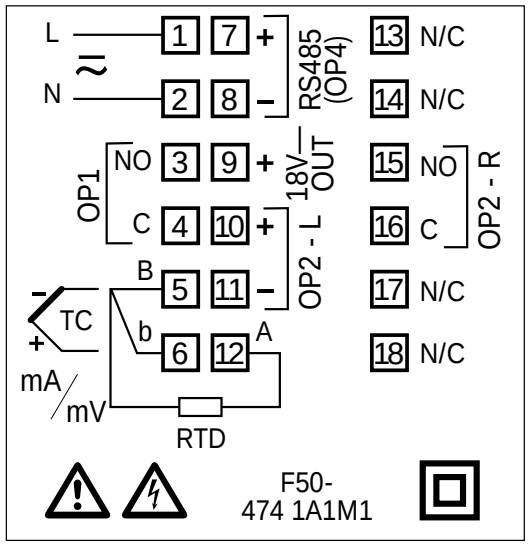
1 Push and
2 pull to remove the instrument

Electrostatic discharges can damage the instrument
Before removing the instrument the operator must discharge himself to ground

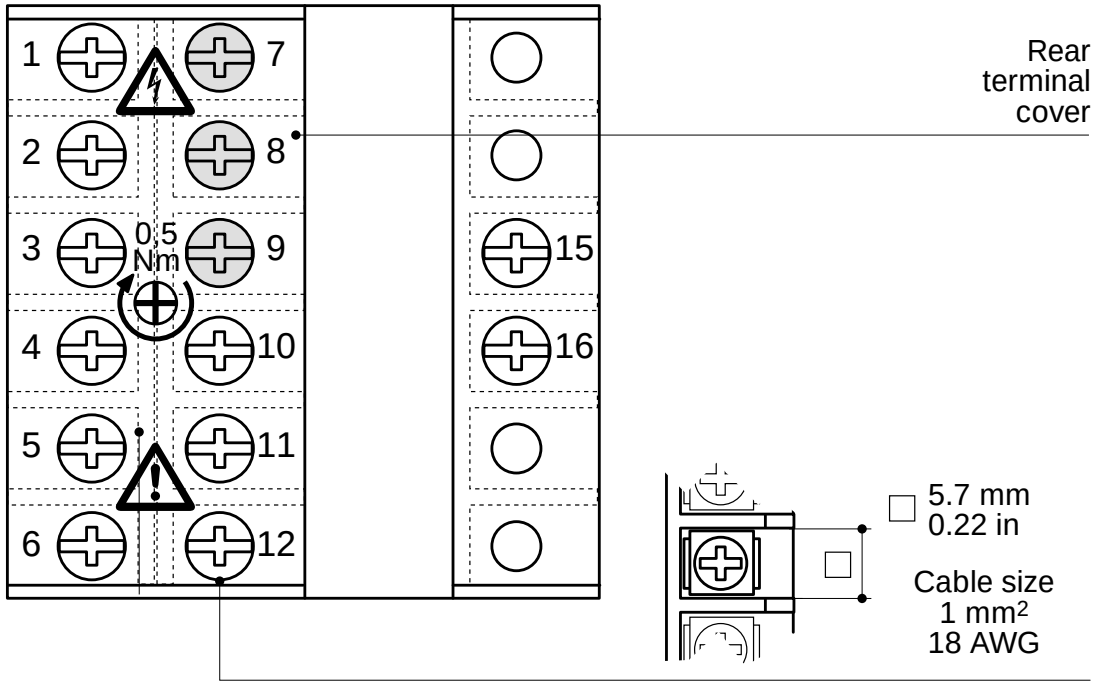




2 ELECTRICAL CONNECTIONS



2.1 TERMINATION UNIT [1]



	14 screw terminals
	Option terminals
	Holding screw 0.5 Nm
+	Positive screw driver PH1
–	Negative screw driver 0,8 x 4 mm

Terminals

	Pin connector ⌀ 1.4 mm 0.055 in max
⌀	Fork-shape AMP 165004 Ø 5.5 mm - 0.21 in
L	Stripped wire L 5.5 mm - 0.21 in

UL note

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

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.

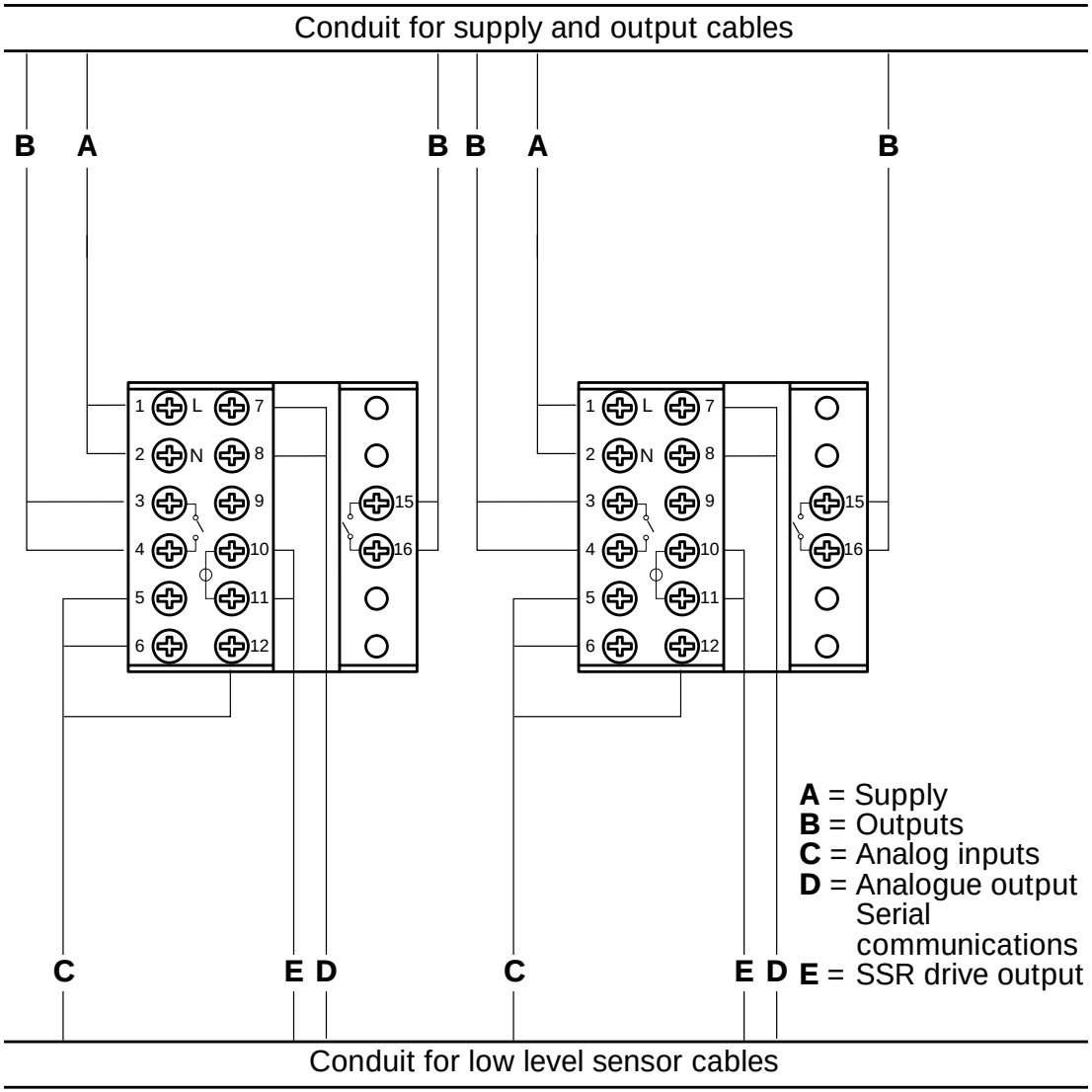
⚠

All the wiring must comply with the local regulations.

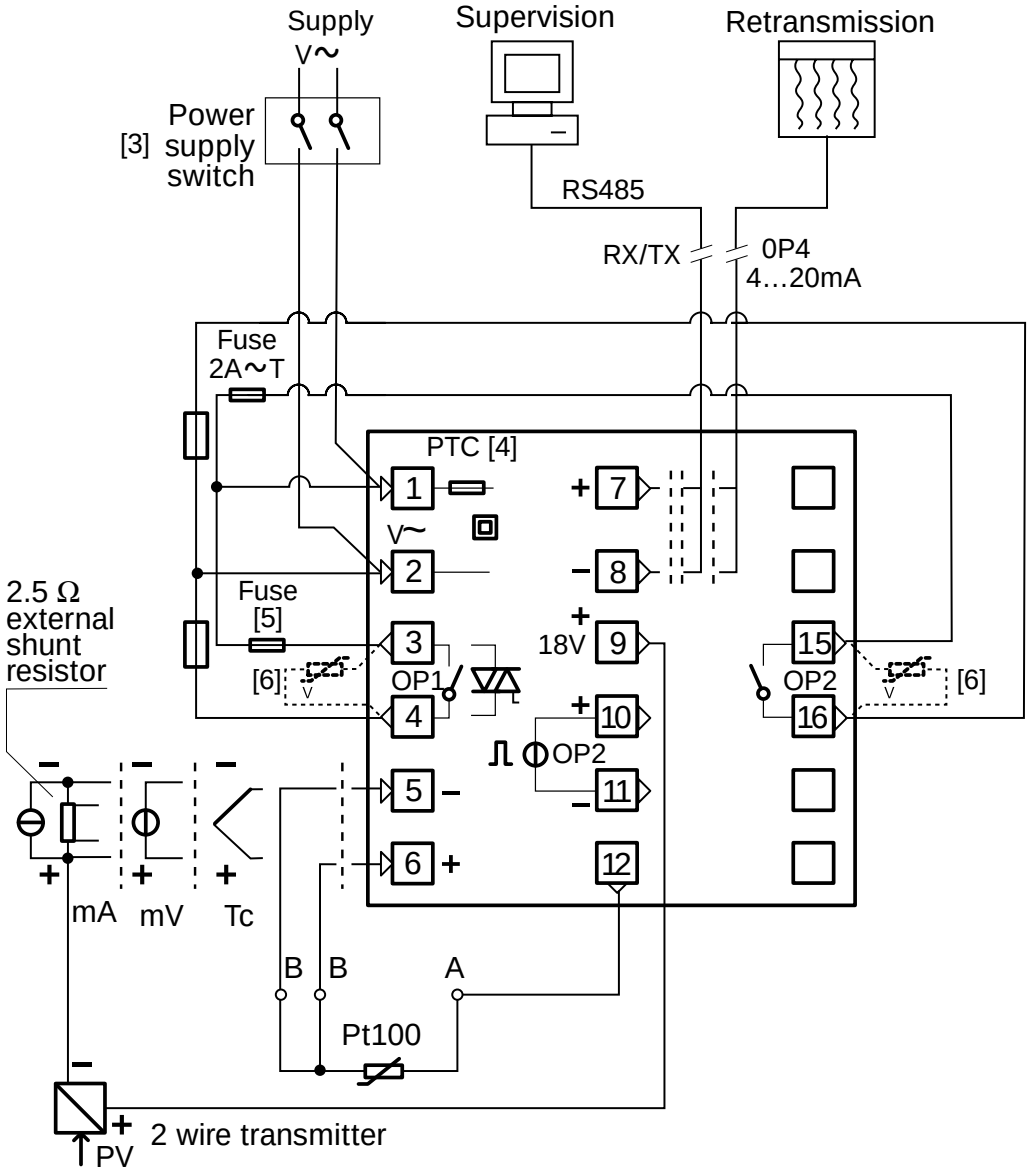
The supply wiring should be routed away from the power cables.
Avoid to use electromagnetic contactors, power relays and high power motors nearby.
Avoid power units nearby, especially if controlled in phase angle

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 PRECAUTIONS AND ADVISED CONDUCTOR COURSE



2.3 EXAMPLE OF WIRING DIAGRAM



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 is PTC protected. In case of failure it is suggested to return the instrument to the manufacturer for repair.

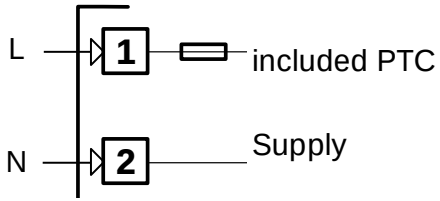
5] To protect the instrument internal circuits use:
- 2 A~ T fuses for Relay outputs
- 1 A~ T fuses for Triac outputs

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

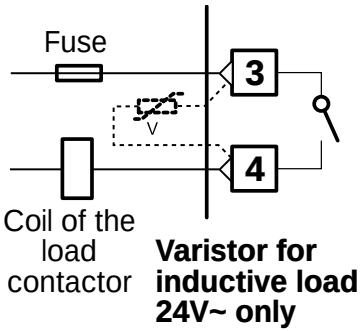
- Standard version:
  nominal voltage:
  100 - 240V~ (- 15% + 10%)
  Frequency 50/60Hz
- Low Voltage version:
  Nominal voltage:
  24V~ (- 25% + 12%)
  Frequency 50/60Hz
  or 24V– (- 15% + 25%)
- Power consumption 2.6W max



2.3.2 OP1 OUTPUT

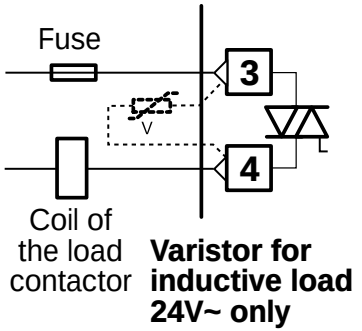
A] **Single relay output**

- NO contact for resistive load of up to 2A / 250V~ max.
- Fuse 2A~ T (IEC 127)



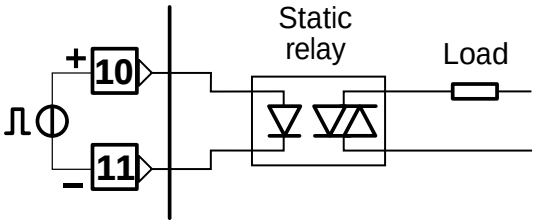
B] **Triac Output**

- NO contact for resistive load of up to 1A / 250V~ max.
- Fuse 1A~ T (IEC 127)



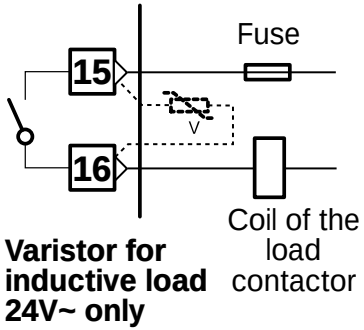
2.3.3 0P2 OUTPUT

A] **SSR drive output**, not isolated
0...5V–, ±20%, 30mA max



B] **Single relay output**

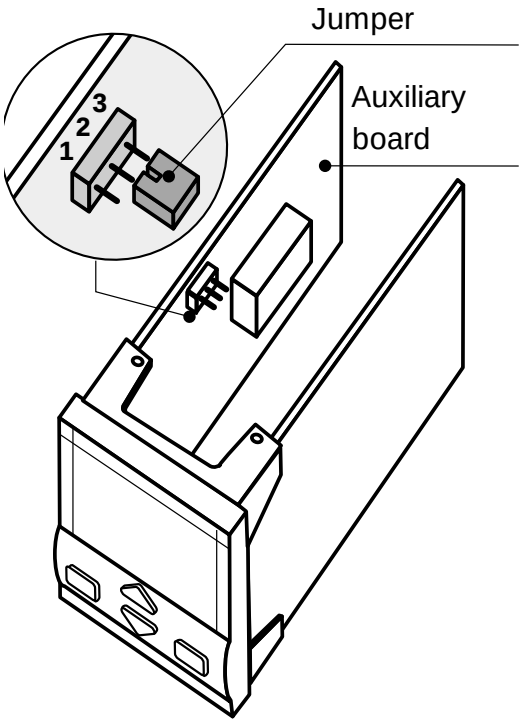
- NO contact for resistive load of up to 2A / 250V~ max.
- Fuse 2A~ T (IEC 127)



OP2 OUTPUT

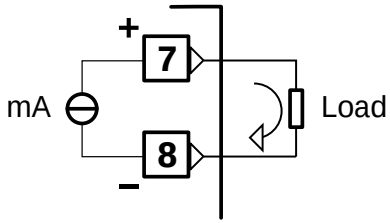
OP2 output can be Relay (Std) or SSR drive.
The “jumper” on the auxiliary board selects the output type:

Link Pins 1-2 for OP2-Relay
Link Pins 2-3 for OP2-SSR drive



2.3.4 OP4 OUTPUT (option)

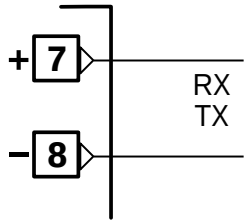
PV retransmission
- Galvanic isolation 500V~/1 min.
- 0/4...20mA (750Ω or 15V– max)



2.3.5 SERIAL COMMUNICATIONS (option)

- Galvanic isolation 500V~/1 min
- Compliance to the EIA RS485 standard for Modbus/Jbus

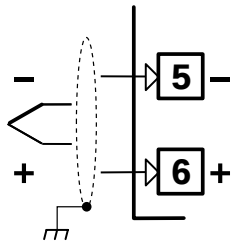
⚠ Please, read:
gamma**due**® and delta**due**® controller series serial communication and configuration



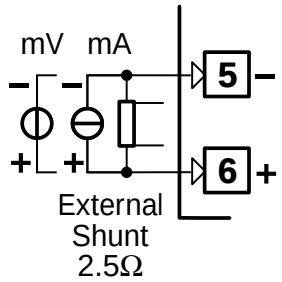
2.3.6 PV CONTROL INPUT

- 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

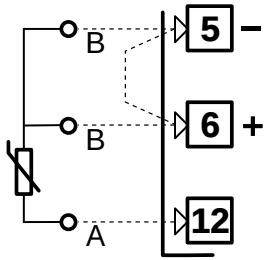


Rj >10MΩ

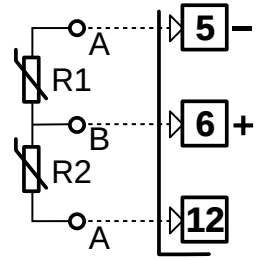
- If a 3 wires system is used, use always cables of the same diameter (1mm² min.)
  (line 20 Ω/lead maximum resistance)
- When using a 2 wires system, use always cables of the same diameter (1,5mm² min.) and put a jumper between terminals 5 and 6

⚠ When the distance between the controller and the sensor is 15 mt. using a cable of 1.5 mm² diameter, produces an error on the measure of 1°C.

For PT100 resistance thermometer

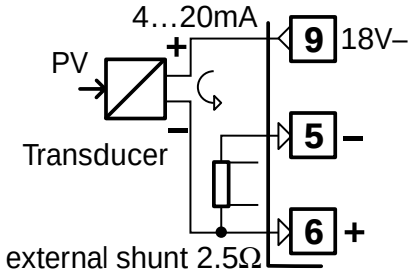


For ΔT (2 x RTD Pt100) Special

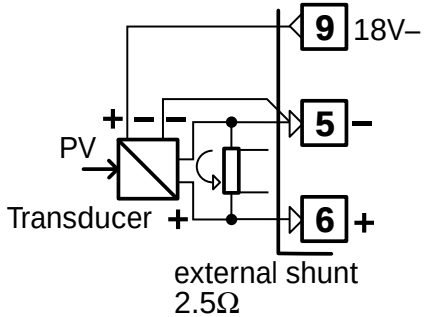


R1 + R2 must be < 320Ω

With 2 wire transducer

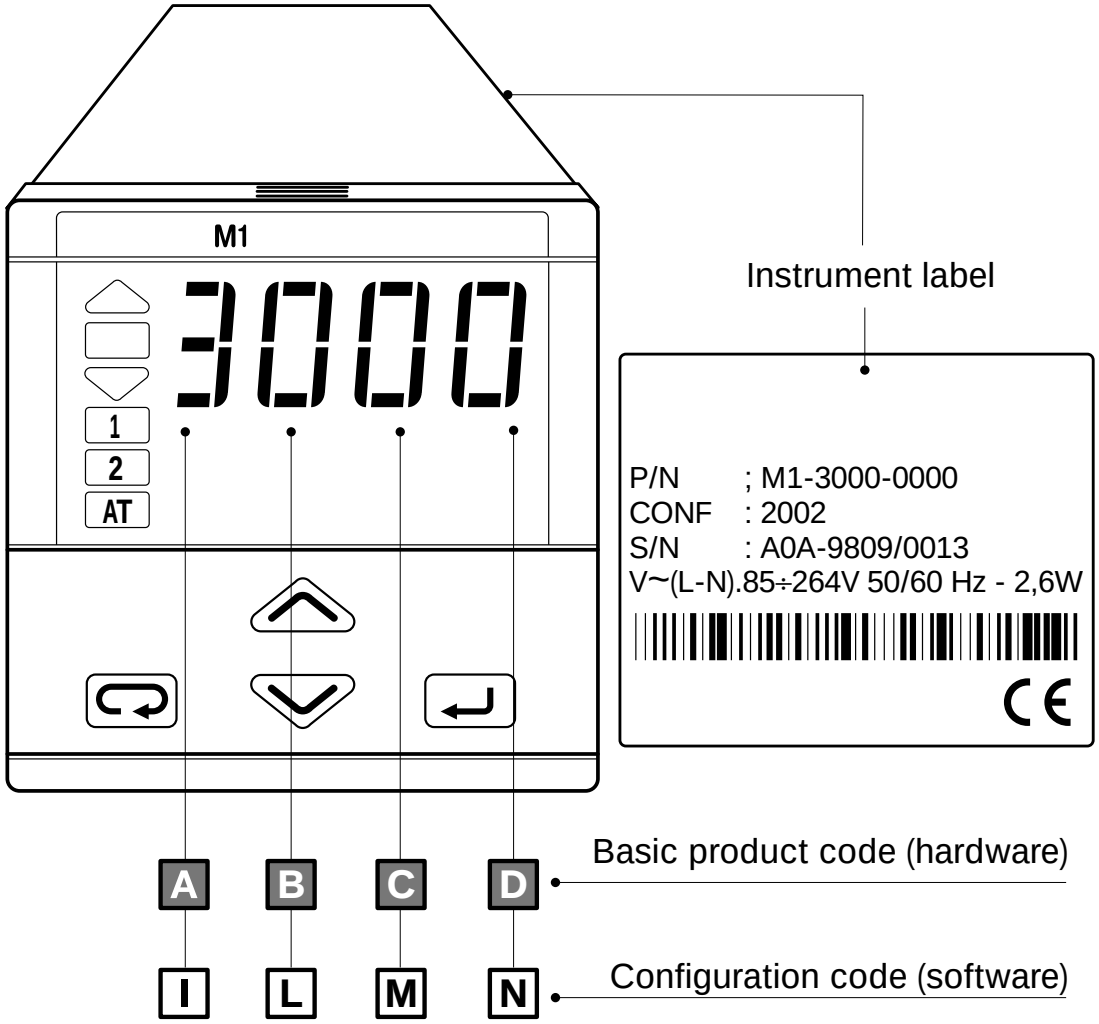


With 3 wire transducer



3 PRODUCT CODING

The complete code is shown on the instrument label. The informations about product coding are accessible from the front panel by mean of a particular procedure described at section 4.2.2 page 19



3.1 MODEL CODE

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

	Line	Basic					Accessories					Configur.			
Model:	**M**	**1**	**A**	**B**	**C**	**D**	**-**	**0**	**F**	**G**	**0**	**/**	**I**	**L**	**M**	**N**

Line	**M**	**1**

Power supply	**A**
100 - 240V~ (- 15% + 10%)	**3**
24V~ (- 25% + 12%) or 24V– (- 15% + 25%)	**5**

OP1 Output	**B**
Relay	**0**
Triac	**3**

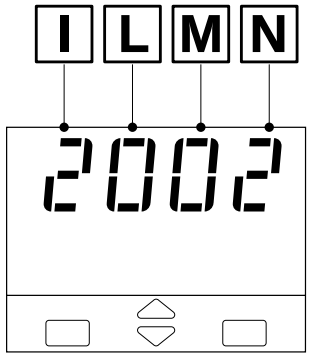
Serial Communications	**Options**	**C**	**D**
Not fitted	None	**0**	**0**
	Transmitter Power Supply (P.S.)	**0**	**6**
	Transmitter P.S. + Retransmission	**0**	**7**
RS485	None	**5**	**0**
Modbus/Jbus protocol	Transmitter Power Supply	**5**	**6**

User manual	**F**
Italian/English (std)	**0**
French/English	**1**
German/English	**2**
Spanish/English	**3**

Front panel colour	**G**
Dark (std)	**0**
Beige	**1**

3.2 CONFIGURATION CODING

The configuration code consists of 4 digits that identify the operating characteristic of the controller, as chosen by the user.
Section 4.5 at pag. 26 reports the instructions how to set a new configuration code.



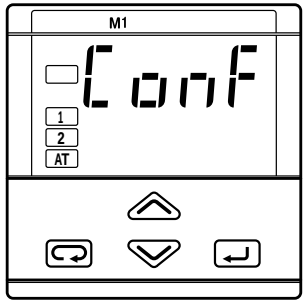
The configuration code can be displayed on the front panel, following the instructions at pag 19 section 4.2.2.

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 Cromel -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**

Control mode	**Output configuration**	**L**
P.I.D.	Control OP1 / alarm AL2 on OP2	**0**
	Control OP2 / alarm AL2 on OP1	**1**
On - Off	Control OP1 / alarm AL2 on OP2	**2**
	Control OP2 / alarm AL2 on OP1	**3**
2 alarms indicator	Alarm AL1 on OP1/ alarm AL2 on OP2	**4**
	Alarm AL1 on OP2/ alarm AL2 on OP1	**5**

Type of control and safety		**M**
Reverse (AL1 active low)	Safety 0%	**0**
Direct (AL1 active high)	Safety 0%	**1**
Reverse (AL1 active low)	Safety 100%	**2**
Direct (AL1 active high)	Safety 100%	**3**

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 4.6 pag 26).

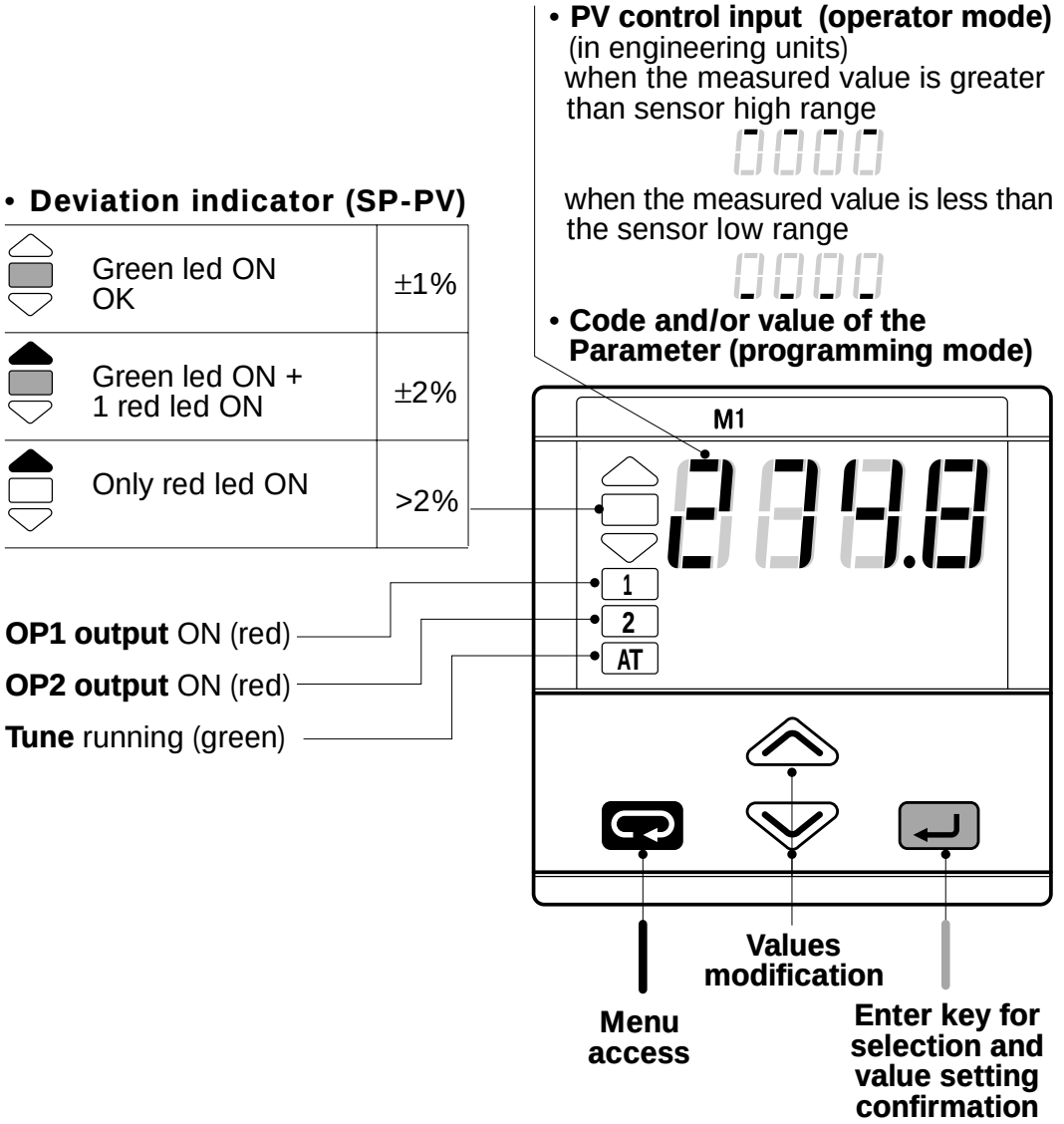
Alarm 2 type and function		**N**
Not active		**0**
Sensor break alarm		**1**
Absolute	active high	**2**
	active low	**3**
Deviation **[1]**	active high	**4**
	active low	**5**
Deviation band **[1]**	active out (of the band)	**6**
	active in (the band)	**7**

Note

[1] Choice not available when the controller has been configured as 2 alarms indicator (L digit assigned to 4 or 5)

4 OPERATIONS

4.1 KEYPAD COMMANDS AND DISPLAY



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

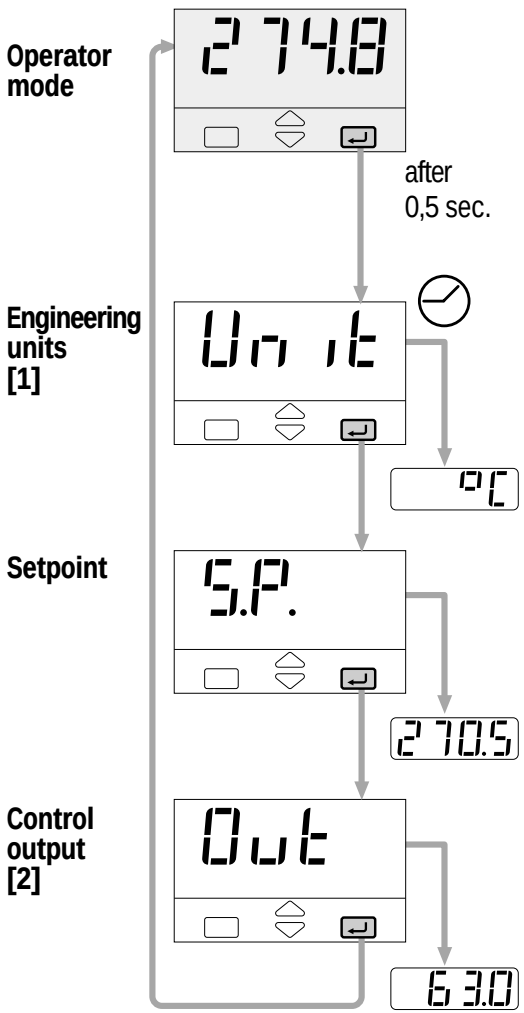
After 2 sec from the end of the operation, the controller flashes the display and returns to the normal operating conditions.

Note

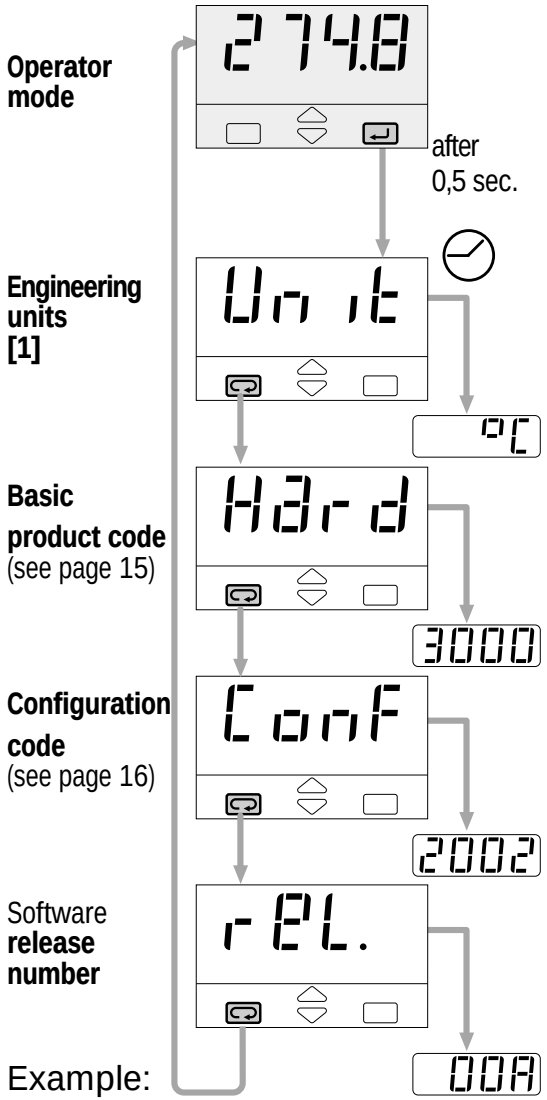
[1] See page 27

[2] This display is not presented if the instrument has been configured as an On - Off controller

4.2.1 OF THE PROCESS VARIABLES



4.2.2 OF THE CONFIGURATION CODES



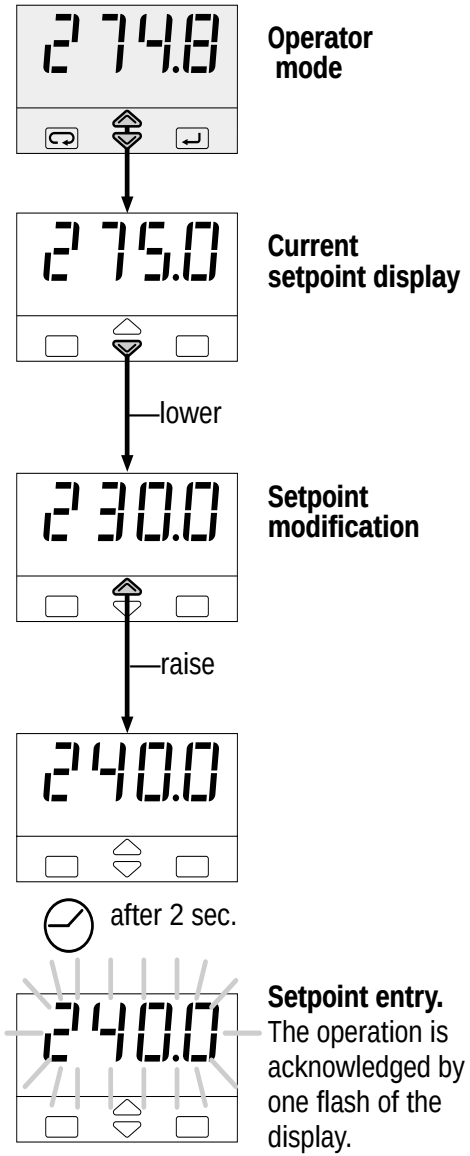
Example:
M1 - 3000 - 2002 / Release 00A

4.3 PARAMETER SETTING

4.3.1 NUMERIC ENTRY

(i.e. the modification of the value of a stored Setpoint from 275.0 to 240.0)

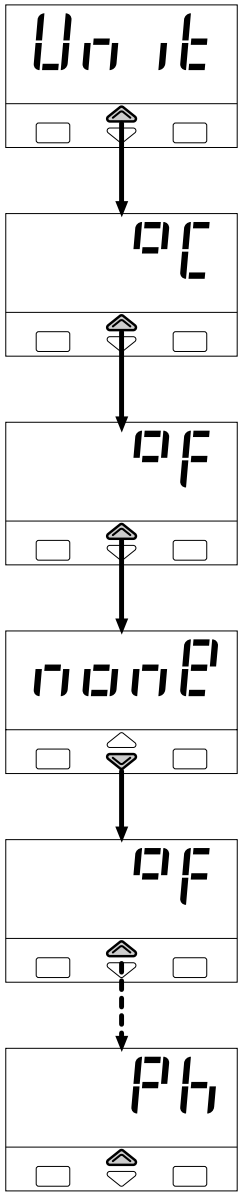
Press ⌃ or ⌄ momentarily to change the value of 1 unit every push
Continued pressing of ⌃ or ⌄ changes the value, at rate that doubles every second. Releasing the button the rate of change decreases.
In any case the change of the value stops when it has reached the max/min limit set for the parameter.



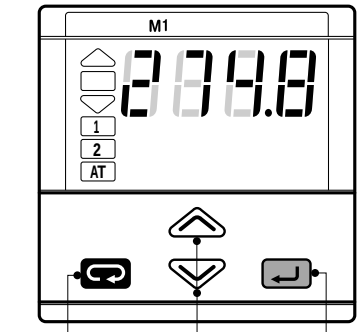
4.3.2 MNEMONIC CODES SETTING

(e.g. configuration see pages 26, 27)

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 sec. The mnemonic displayed at the time the next parameter is selected, is the one stored in the parameter.



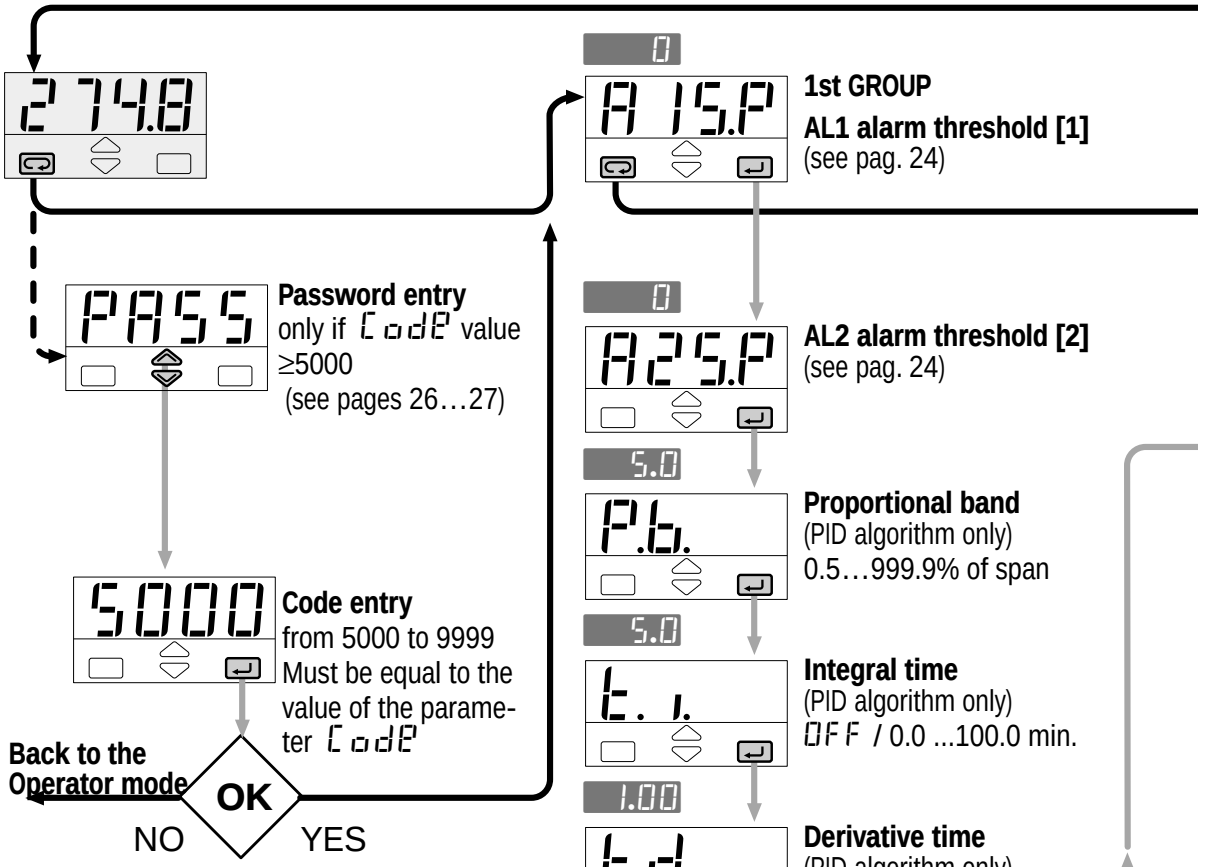
4.4 PARAMETERIZATION



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 ∧ and ∨ to display or modify the value (see pag. 20) The value is entered when the next parameter is selected, by pressing the ↵ key.

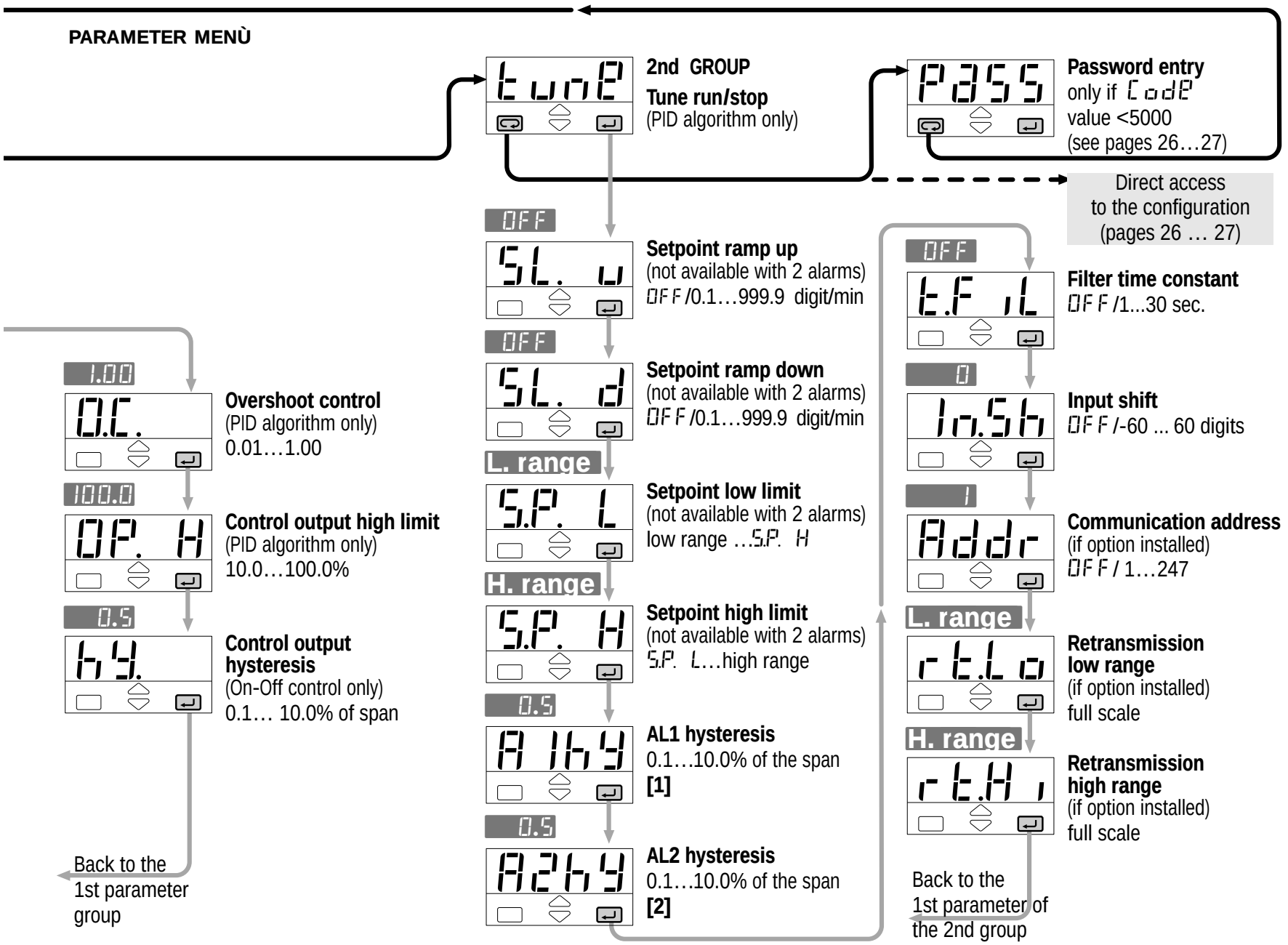
Pressing the ↻ key, the next group of parameters is presented on the display.



Note

[1] It is presented only if the controller has been configured with 2 alarms. Digit L of the configuration code is assigned to 4 or 5

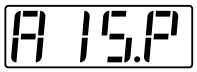
[2] It is not presented if the controller has been configured with alarm n° 2 not active or of sensor break type. Digit N of the configuration code is assigned to 0 or 1.


PARAMETER MENÙ
tunE
2nd GROUP
Tune run/stop
(PID algorithm only)
PASS
Password entry
only if CodE
value <5000
(see pages 26…27)
Direct access
to the configuration
(pages 26 … 27)
OFF
SL. u
Setpoint ramp up
(not available with 2 alarms)
OFF /0.1…999.9 digit/min
OFF
SL. d
Setpoint ramp down
(not available with 2 alarms)
OFF /0.1…999.9 digit/min
L. range
S.P. L
Setpoint low limit
(not available with 2 alarms)
low range …S.P. H
H. range
S.P. H
Setpoint high limit
(not available with 2 alarms)
S.P. L…high range
0.5
A1hy
AL1 hysteresis
0.1…10.0% of the span
[1]
0.5
A2hy
AL2 hysteresis
0.1…10.0% of the span
[2]
1.00
OC.
Overshoot control
(PID algorithm only)
0.01…1.00
100.0
OP. H
Control output high limit
(PID algorithm only)
10.0…100.0%
0.5
hy.
Control output
hysteresis
(On-Off control only)
0.1… 10.0% of span
Back to the
1st parameter
group
OFF
t.F iL
Filter time constant
OFF /1...30 sec.
0
In.Sh
Input shift
OFF /-60 ... 60 digits
1
Addr
Communication address
(if option installed)
OFF / 1…247
L. range
rt.Lo
Retransmission
low range
(if option installed)
full scale
H. range
rt.H i
Retransmission
high range
(if option installed)
full scale
Back to the
1st parameter of
the 2nd group

4.5 PARAMETER

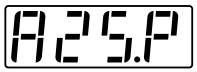
1st GROUP

The controller parameters have been organized in group, according to their functionality area.



AL1 alarm threshold

The threshold is presented only if the controller have been configured with 2 alarms. (Digit L of the configuration code assigned to 4 or 5)

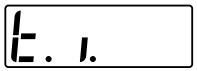


AL2 alarm threshold

The alarm occurrences handle the OP1 and OP2 outputs, in different ways, according to the configured types of alarms, as illustrated.

Proportional band

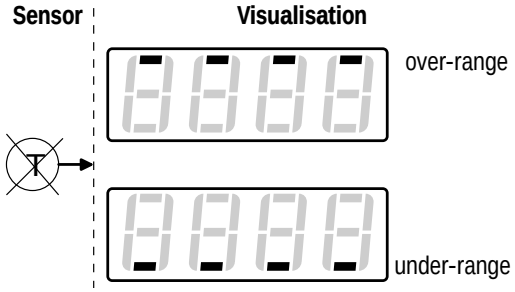
This parameter specifies the proportional band coefficient that multiplies the error (SP - PV)



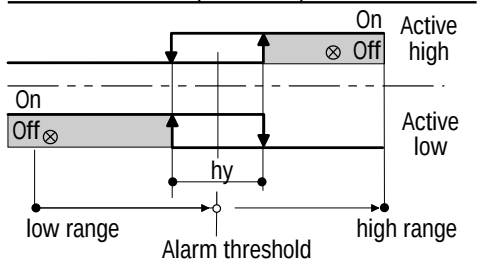
Integral time

It is the integral time value, that

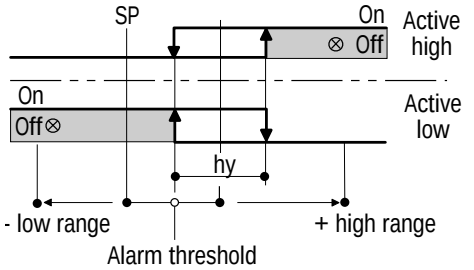
Sensor break or input disconnection



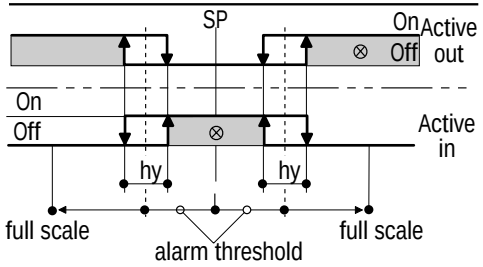
Absolute alarm (full scale)



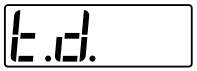
Deviation alarm



Band alarm

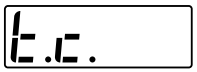


specifies the time required by the integral term to generate an output equivalent to the proportional term. When OFF the integral term is not included in the control algorithm.



Derivative time

It is the derivative term coefficient that specifies the time required by the proportional term P to reach the level of D. When OFF the derivative term is not included in the control algorithm.



Control output cycle time

It's the cycle time of the time proportioning control output. The PID control output is provided through the pulse width modulation of the digital waveform.

Overshoot control

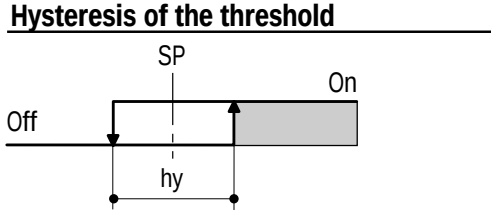
This parameter specifies the span of action of the overshoot control. Setting lower values (0.99 —> 0.01) the overshoot generated by a Setpoint change is reduced. The overshoot control doesn't affect the

effectiveness of the PID algorithm. Setting 1, the overshoot control is disabled.

OP. H **Control output high limit**

It specifies the maximum value the control output can be set

HY. **Control output hysteresis**



Control output hysteresis span, set in % of the full scale.

2nd GROUP

SL. U **Setpoint ramp up**

SL. d **Setpoint ramp down**

This parameter specifies the maximum rate of change of the Setpoint in digit/min. When the parameter is OFF, this function is disabled.

SP. L **Setpoint low limit**

Low limit of the setpoint value. When the parameter is OFF, this function is disabled.

SP. H **Setpoint high limit**

High limit of the setpoint value. When the parameter is OFF, this function is disabled.

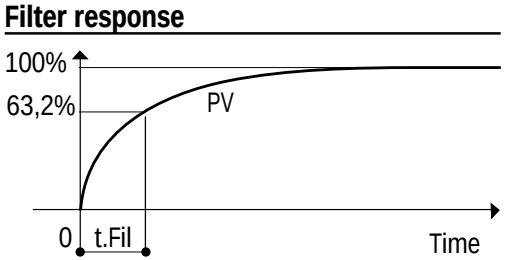
AL1HY **AL1 alarm hysteresis**

AL2HY **AL2 alarm 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.

tF iL **Input filter time constant**

Time constant, in seconds, of the RC input filter applied to the PV input. When this parameter is set to OFF the filter is bypassed.



InSh **Input shift**

This value is added to the measured PV input value. Its effect is to shift the whole PV scale of up to ± 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 OFF the controller is not communicating

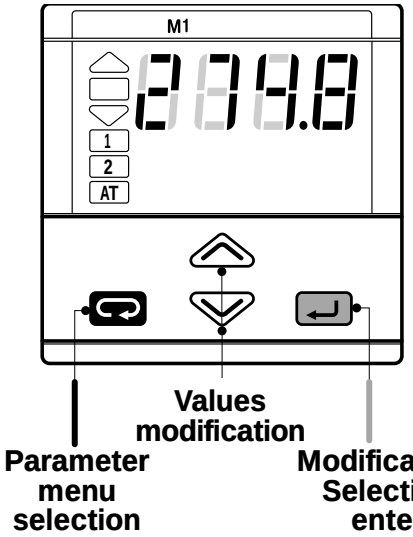
rtLo **Retransmission low range**

rtHi **Retransmission high range**

These parameters define the range of the OP4 retransmission output. Example: 4..20 mA output corresponding to 20…120°C.

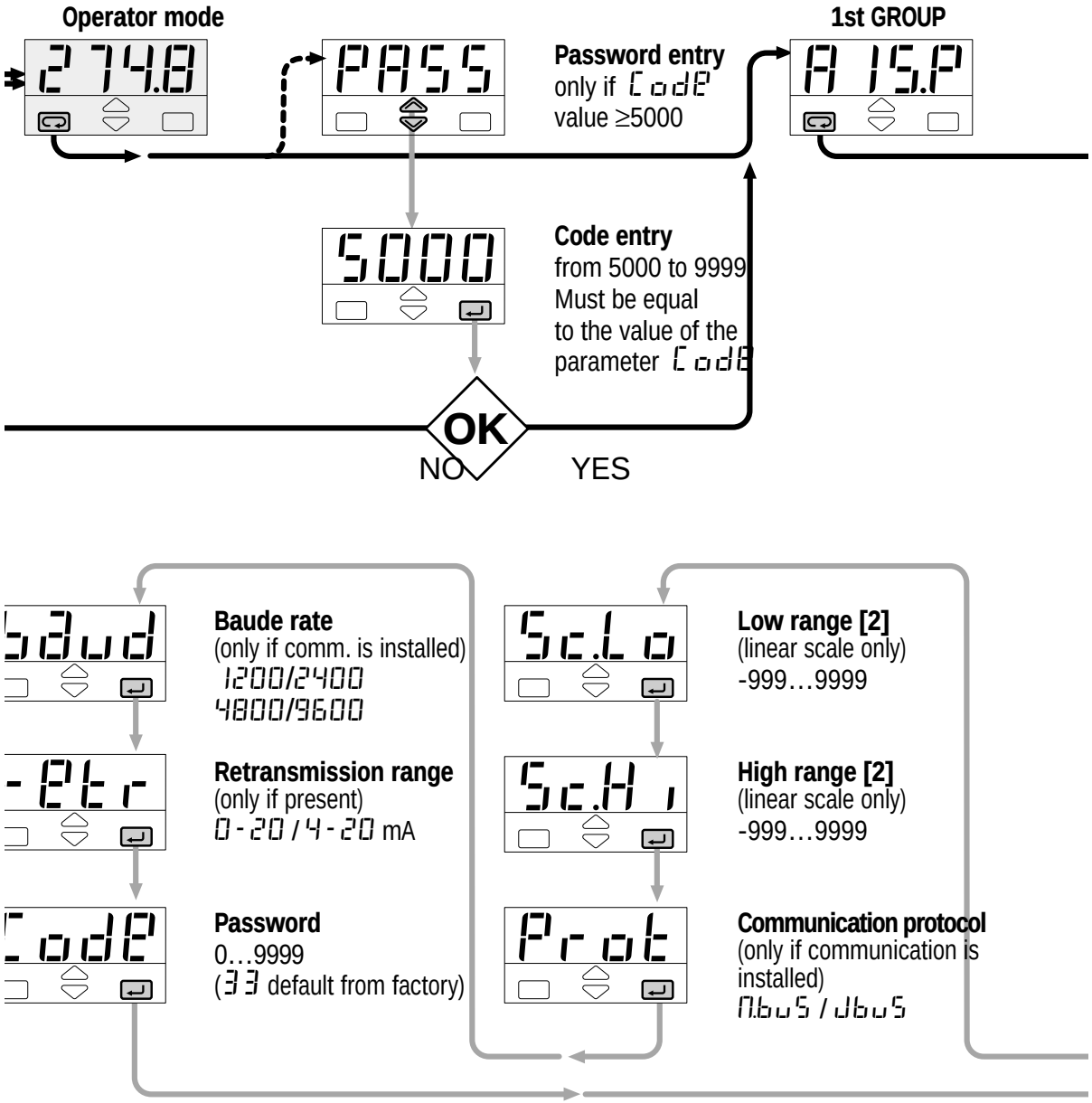
4.6 CONFIGURATION

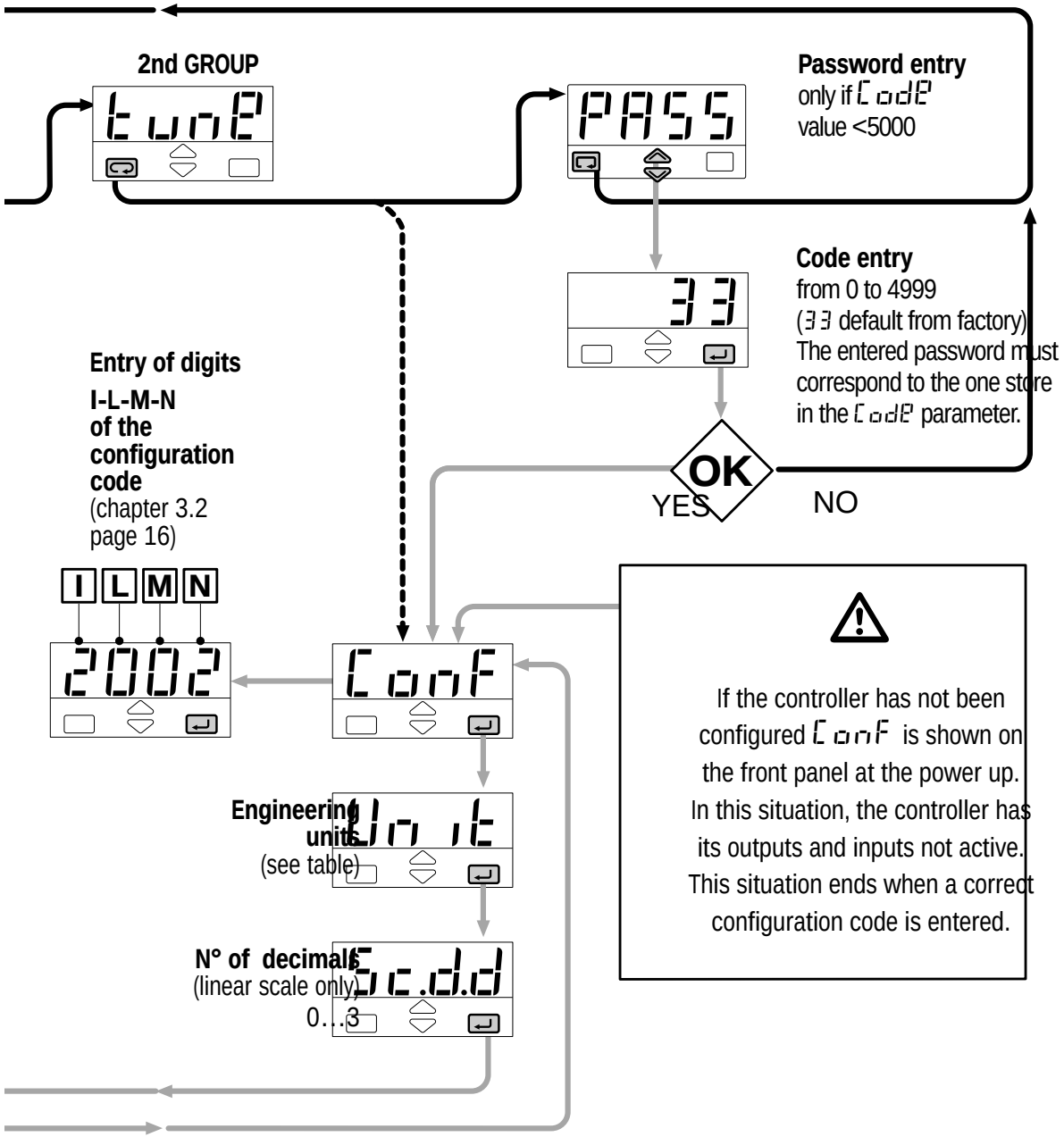
The configuration of the controller is specified through a 4 digit code that defines the type of input, of control output and of the alarms. (sect. 3.2 pag16)
Other parameters specifie the type of auxiliary functions.



Press ⌃ or ⌄ to display the next parameter or the next code and change its value.
The new value entered is stored into the controller when the next parameter is selected by pressing ↵.

CONFIGURATION MENU





Note
Pressing the ⟲ the next group of parameters is displayed.

[1] Table of the supported Engineering Units.

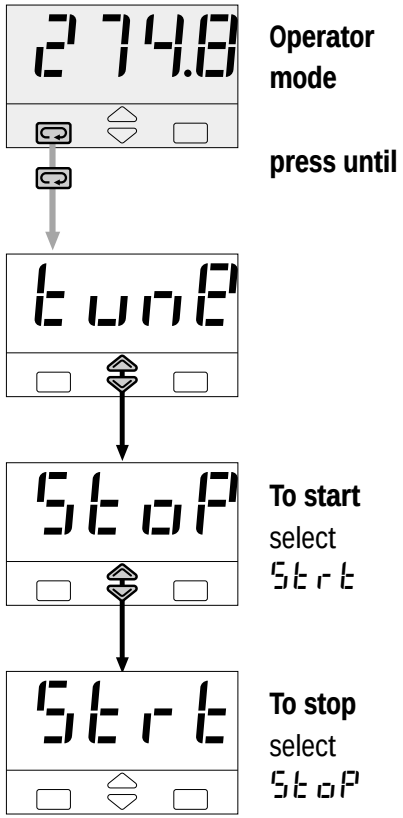
Centigrade degrees *	°C
Fahrenheit degrees *	°F
none	none
mV	mU
Volt	U
mA	mA
Ampere	A
Bar	bAr
PSI	PSI
Rh	rh
pH	Ph

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

[2] Range of min 100 digits.

5 AUTOMATIC TUNE

Start/stop of the Fuzzy Tuning
The Tuning operation can be started or stopped any time.



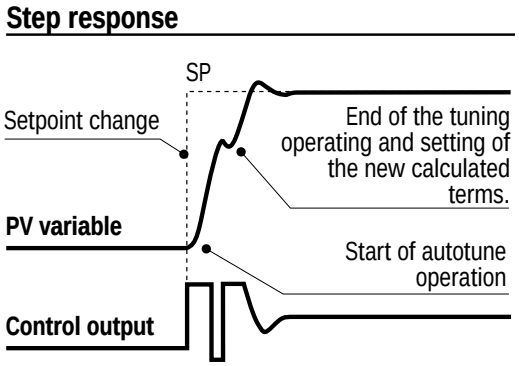
The green led AT goes on when the Fuzzy Tuning is in progress. At the end of this operation, the calculated PID terms parameter are stored and used by the control algorithm and the controller goes back to the operator mode. The green led AT becomes off.
This function allows the calculation of the optimal PID terms parameters, monitoring the response of the process to disturbances.
The controller provides 2 types of "one shot" tuning algorithm, that are selected automatically according to the process condition when the operation is started.

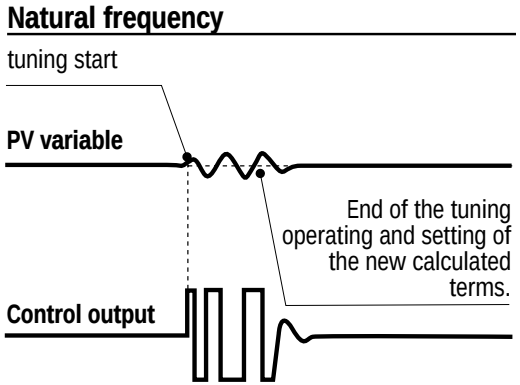
Step response

This type is selected when, at the start of the autotune operation, the PV is far from the Setpoint of more than 5% of the span.
This method has the big advantage of fast calculation, with a reasonable accuracy in the term calculation.

Natural frequency

This type is selected when the PV is close to the SP setpoint.
This method has the advantage of a better accuracy in the term calculation with a reasonable speed calculation.
The Fuzzy Tuning determines automatically the best method to use to calculate the PID term, according the process conditions.





6 TECHNICAL SPECIFICATIONS

Features (at 25°C enviromental temp.)	**Description**			
Total configurability see par. 3.2 pag. 16 par. 4.6 pag. 26	From keypad or serial communication the user selects: the type of input - the associated functions and the corresponding outputs - the type of control algorithm - the type of output and the safe conditions - the type and functionality of the alarms - the values of all the control parameters.			
PV Input (see pag.13 and pag. 16)	Common characteristics	A/D converter with resolution of 50.000 points Update measurement time: 0.2 seconds Sampling time: 0.5 seconds Input bias: - 60…+ 60 digit Input filter with enable/disable: 1…30 seconds		
	Accuracy	0.25% ± 1 digits for temperature sensors 0.1% ± 1 digits (for mV and mA)		Between 100…240V~ the error is minimal
	Resistance thermometer	Pt100Ω at 0°C (IEC 751) °C/°Fselectable	2 or 3 wires connection	Max. wire Res: 20Ω max (3 wires) Sensitivity: 0.35°C/10° Env. Temp. <0.35°C / 10Ω Wire Res.
	Thermocouple	L,J,T,K,S (IEC 584) °C/°F selectable	Internal cold junction compensation in °C/°F	Max. wire Res.: 150Ω max Sensitivity: <2µV/°C Env. Temp. <5µV / 10Ω Wire Res.
	DC input (current)	4…20mA,0-20mA with external shunt 2.5Ω Rj >10MΩ	Engineering units Conf. decimal point position Init. Sc. -999…9999 Full Sc. -999…9999 (min. range of 100 digits)	Input drift: <0.1% / 20°C Env. Temp.
	DC input (voltage)	10…50mV, 0-50mV Rj >10MΩ		
Error indicator	By led with green led when error <1% (see page 18)			

Features (at 25°C enviromental temp.)	**Description**					
Operating mode and Outputs	Indicator with 2 alarms	**AL1 alarm**		**AL2 alarm**		
		OP1 - Relay or Triac		OP2 - SSR drive or Relay		
		OP2 - SSR drive or Relay		OP1 - Relay or Triac		
	1 PID loop or 1 ON-OFF loop with 1 Alarm	**Control output**		**AL2 alarm**		
		OP1 - Relay or Triac		OP2 - SSR drive or Relay		
		OP2 - SSR drive or Relay		OP1 - Relay or Triac		
Control mode	Algorithm	PID with overshoot control or ON OFF				
	Proportional band (P)	0.5…999.9%			PID algorithm	
	Integral time (I)	0.1…100.0 min	OFF = O			
	Derivative time (D)	0.01…10.00 min				
	Cycle time	1…200 sec				
	Overshoot control	0.01…1.00				
	High limit	100.0…10.0%				
	Hysteresis	0.1…10.0%			ON-OFF algorithm	
OP1 output	SPST Relay N.O., 2A/250V~ for resistive load Triac, 1A/250V~ for resistive load					
OP2 output	SSR drive, not isolated: 5V–, ± 10%, 30mA max SPST Relay N.O., 2A/250V~ for resistive load					
AL1 alarm (indicator with 2 alarms)	Hysteresis 0.1…10,0% full scale					
	Active high	Absolute threshold: full scale				
	Active low					
AL2 alarm	Hysteresis 0.1…10,0% c.s.					
	Action	Active high	Action type	Deviation threshold	±range	
		Active low		band threshold	0…range	
				Absolute threshold	whole range	
		Special function	Sensor break			

Features (at 25°C enviromental temp.)	**Description**	
Setpoint	Ramp up and down. User inhibited	0.1…999.9 digit/min (OFF = 0)
	Low limit	From low range to the high limit
	High limit	From low limit to the high range
OP4 PV retransmission (option)	Galvanic isolation: 500 V~/1 min Resolution 12bit (0.025%) Accuracy: 0.1 %	Current output: 0/4…20mA 750Ω/15V max
One shot Fuzzy-Tuning with automatic selection	The controller selects automatically the best method according to the process conditions	Step method
		Natural frequency method
Serial comm. (option)	RS485 isolated, Modbus/Jbus protocol, 1200, 2400, 4800, 9600 bit/sec 2 wires	
Auxiliary Supply	+18V– ±20%, 30mA max for an external transmitter supply	
Operational safety	Measure input	Detection of out of range, short circuit or sensor break with automatic activation of the safety strategies and alerts on display
	Control output	Safety value: 0…+100%. (user enabled/disabled)
	Parameters	parameter and configuration data are stored in a non volatile memory for an unlimited time
	Access protection	Password to access the configuration and parameters data
General characteristics	Power supply	100 - 240V~ (- 15% + 10%) 50/60Hz or 24V~ (- 25% + 12%) 50/60Hz and 24V– (- 15% + 25%) Power consumption 2.6W max
	Electric safety	Compliance to EN61010, installation class 2 (2500V) pollution class 2
	Electromagnetic compatibility	Compliance to the CE standards for industrial system and equipment
	UL and cUL Omologation	File 176452
	Protection EN650529	IP20 termination unit IP65 front panel
	Dimensions	1/16 DIN - 48 x 48, depth 120 mm, weight 130 gr. apx.

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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