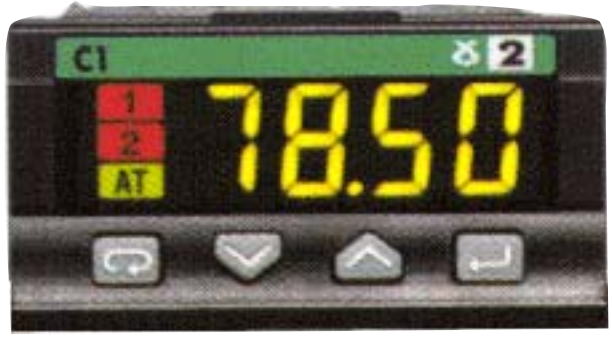
Hays Cleveland
Division of UniControl Inc.

Controller
Indicator
Transmitter
1/32 DIN - 48 x 24

Customer Service
1111 Brookpark Rd.
Cleveland OH 44109
Tel: 216.398.44`4
Fax: 216.398.8558

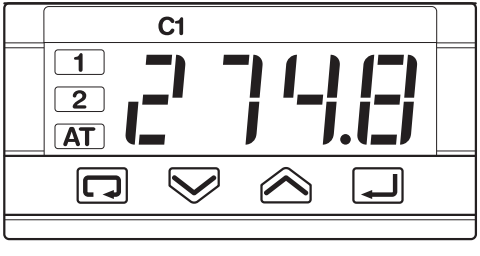
Sales Office
1903 S. Congress Avenue
Boynton Beach FL 33426
Tel: 561.734.9400
Fax: 561.734.8060



Series C1
Instruction Manual C1.01

Controller
Indicator
Transmitter
$^{1}/_{32}$ DIN - 48 x 24

C1 line



CE

NOTES ON ELECTRIC SAFETY AND ELECTROMAGNETIC COMPATIBILITY.

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

This controller has been designed in compliance with:
Regulations on electrical apparatus (appliance, systems and installations) according to the European Community directive 73/23 CEE amended by the European Comunity directive 93/68 CEE and the Regulations on the essential protection requirements in electrical apparatus EN 61010-1 (IEC 1010 - 1) : 90 +A1:92 + A2:95.

Regulations on Electromagnetic Compatibility according to the European Community directive n089/336/CEE, amended by the European Community directive n° 92/31/CEE and the following regulations:
Regulations on RF emissions
EN50081 - 1 residential environments
EN50081 - 2 for industrial environments
Regulation on RF immunity
EN500082-2 for industrial equipment and system

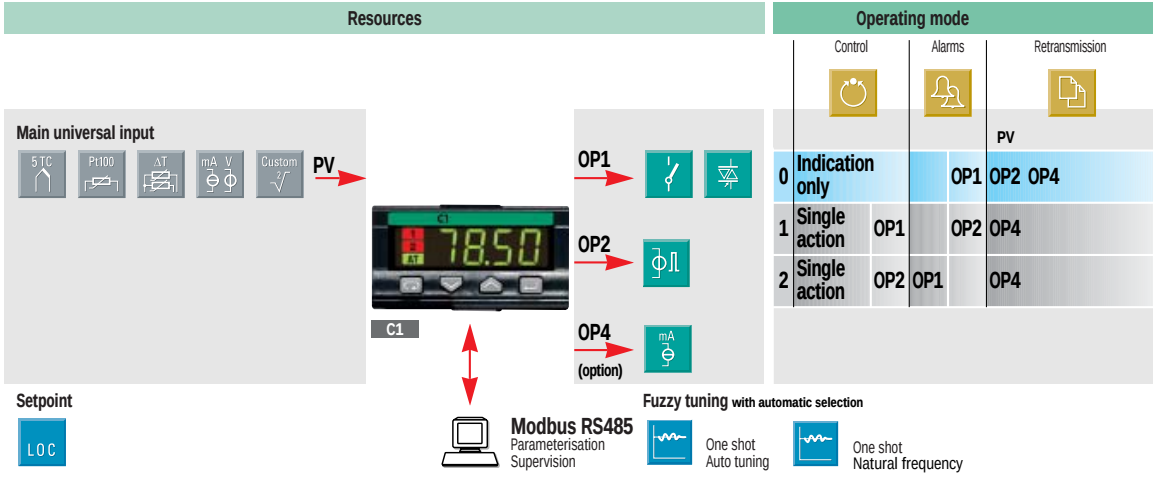
It is the responsibility of the installer to ensure compliance with all local regulations and safety requirements.

This control has no user serviceable parts.

Should repair be necessary, contact the Hays Cleveland sales office from which the unit was purchased for instructions on returning it to the factory. Or call Hays Cleveland Customer Service at 216.398.4414,

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

TABLE OF CONTENTS



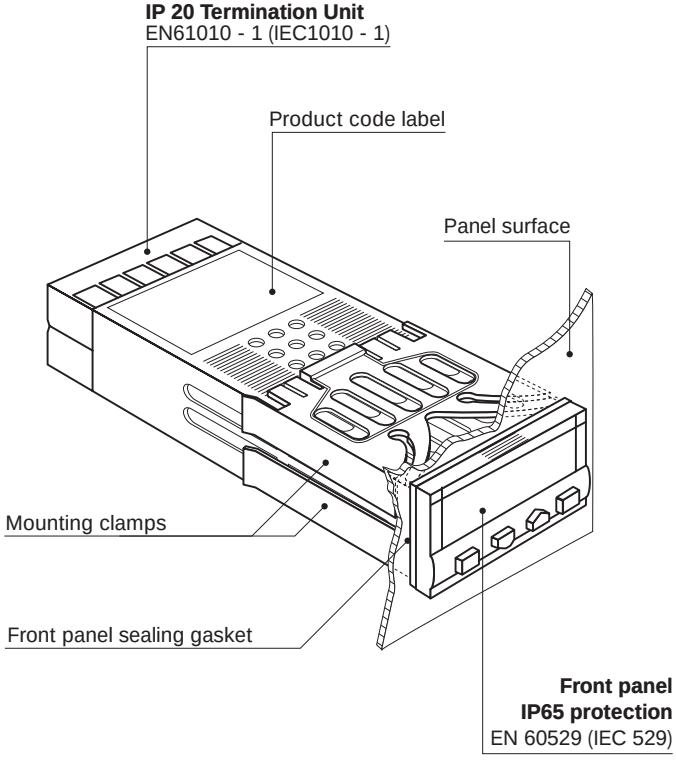
1 INSTALLATION

1.1 GENERAL DESCRIPTION

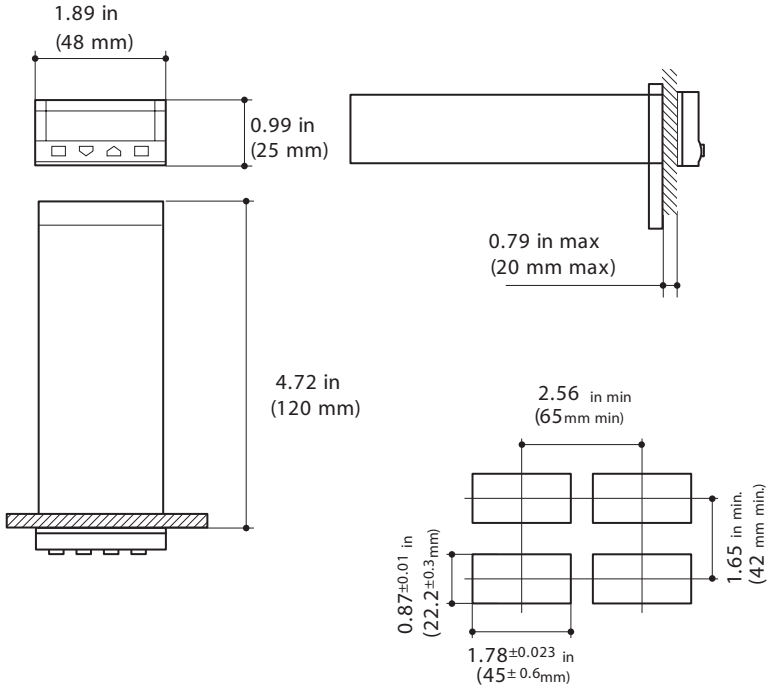
Installation must only be carried out by qualified personnel.

Before proceeding with the installation of this controller, follow the instructions illustrated in this manual, 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, this control must be installed in an enclosure and/or in a cubicle.



1.2 C1 DIMENSIONS



1.4 ENVIRONMENTAL RATINGS

Operating conditions	
2000	Altitude up to 6500 ft. (2000 m)
°c	Temperature 32-106 F (0-50 C)
%Rh	Relative humidity 5-95 %, non-condensing

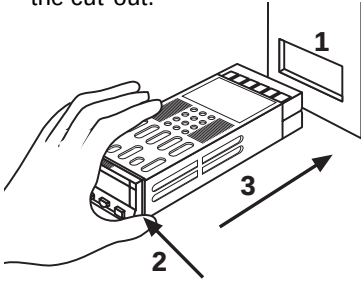
Special conditions		Suggestions
2000	Altitude > 6500 ft. (2000 m)	Use 24VAC supply version
°c	Temperature >106F (50C)	Use forced air ventilation
%Rh	Humidity > 95%	Warm up
	Conducting atmosphere	Use filter

Forbidden Conditions	
	Corrosive atmosphere
	Explosive atmosphere

1.5 PANEL MOUNTING

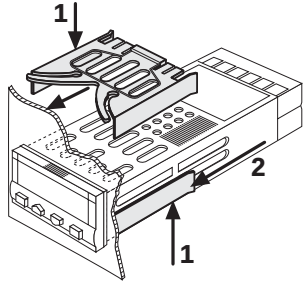
1.5.1 INSERT THE INSTRUMENT

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



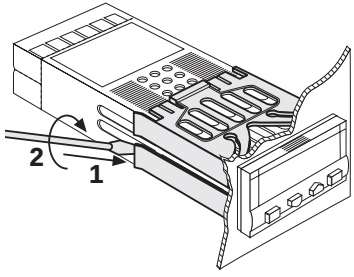
1.5.2 SECURING CLAMPS

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



1.5.3 REMOVING CLAMPS

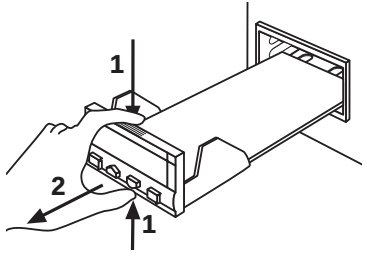
1 Insert a screwdriver into the clips of the clamps.
2 Rotate the screwdriver.



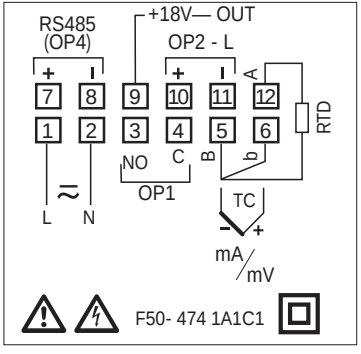
1.5.4 UNPLUGGING INSTRUMENT

1 Push and then
2 pull to remove the instrument.

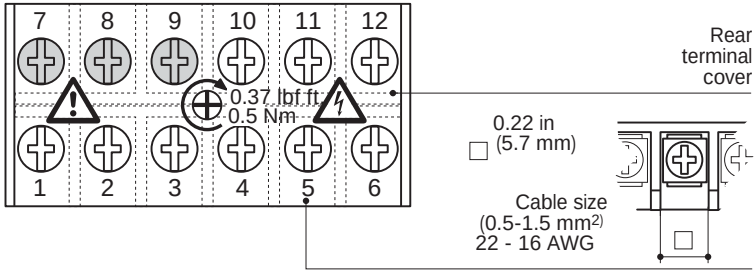
Electrostatic discharges can damage the instrument.
Before removing the instrument the operator must discharge himself to ground.



2 ELECTRICAL CONNECTIONS



2.1 TERMINATION UNIT



	12 screw terminals
	Option terminals
	Holding screw 0.5 Nm
	Positive screw driver PH1
	Negative screw driver 0.8 x 4 mm

Recommended wire terminal leads

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

PRECAUTIONS

Although this instrument has been designed to work in a harsh,noisy industrial environment, (level IV of the industrial standard IEC 801-4), the following suggestions are strongly recommended.

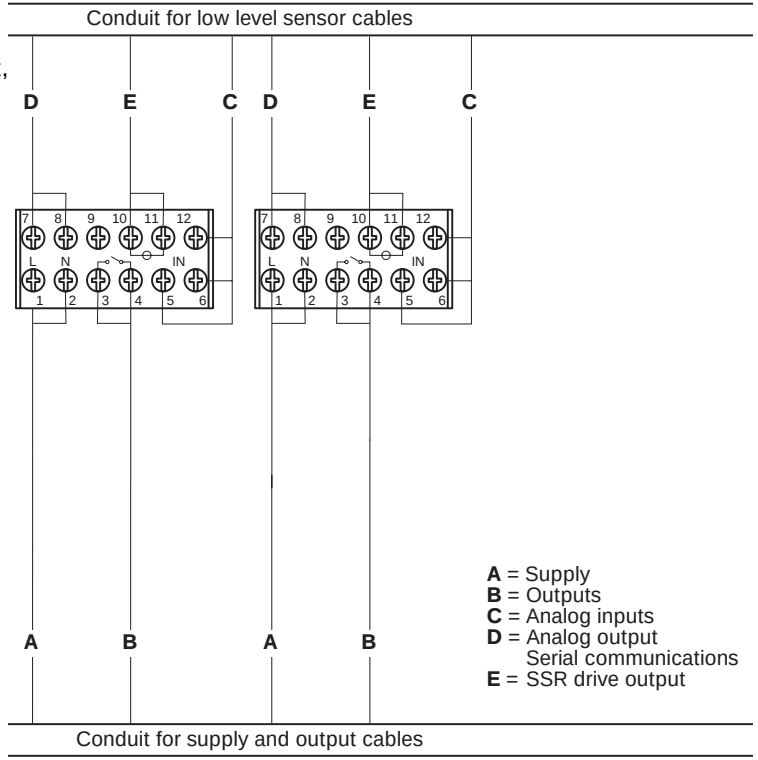
⚠

All wiring must comply with local regulations!

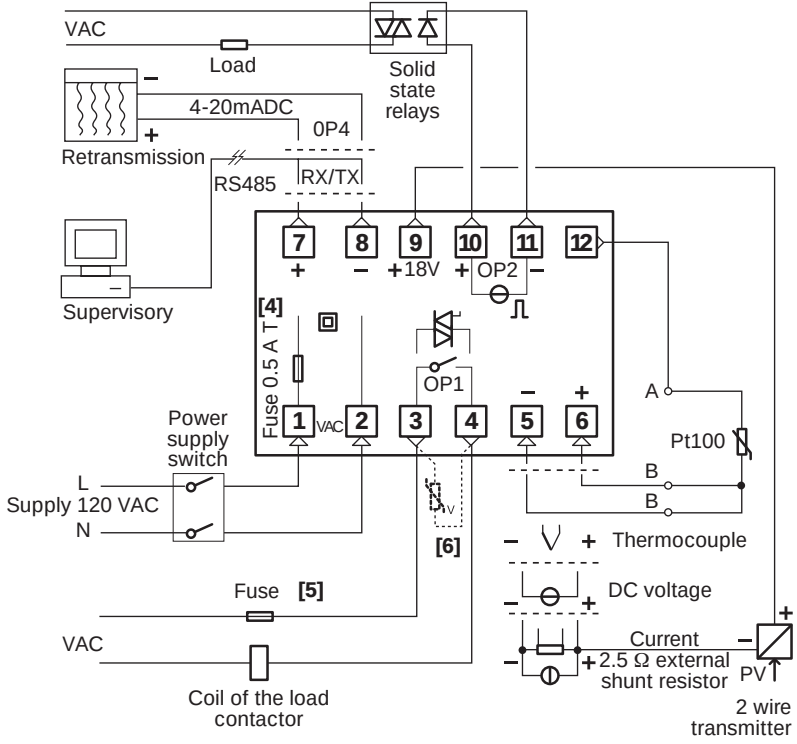
The supply wiring should be routed away from the power cables.
Avoid using electromagnetic contactors, power relays and high power motors nearby.
Avoid power units nearby, especially if controlled in phase angle.

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

2.2 RECOMMENDED ROUTING OF WIRES



2.3 TYPICAL INSTRUMENT WIRING



Notes:

1] Make sure the power supply voltage is the same as indicated on the instrument.

2] Switch on the power supply only after that all the electrical connections have been completed.

3] In accordance with safety regulations, the power supply switch carries the identification of the relevant instrument. The power supply switch is easily accessible from the operator.

4] The instrument is protected with a 0.5 AC time lag fuse. In case of failure, return the unit to the Hays Cleveland Customer Service office for repair.

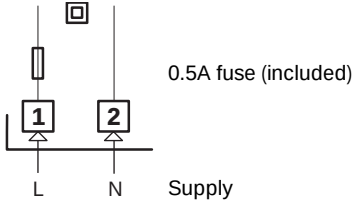
5] To protect the instrument internal circuits use:
- 2 A AC time lag fuses for Relay outputs
- 1 A AC time lag fuses for Triac outputs

6] Relay contacts are already protected with varistors.
Only in case of 24 V AC inductive loads, use model A51-065-30D7 varistors (on request).

2.3.1 POWER SUPPLY

Switching power supply with multiple isolation and internal fuse:

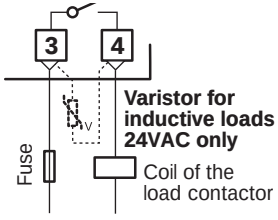
- Standard version:
  nominal voltage:
  100 - 240VAC (- 15% + 10%)
  Frequency 50/60Hz.
- Low Voltage version:
  Nominal voltage:
  24VAC (- 25% + 12%)
  Frequency 50/60Hz.
  or 24V. (- 15% + 25%)
- Power consumption 1.6W max.



2.3.2 OP1 OUTPUT

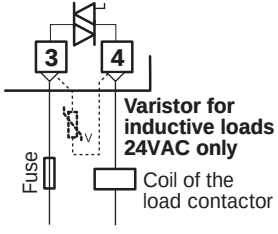
A] **Single relay output**

- NO contact for resistive load of up to 2A / 250 VAC max.
- 2A. AC Time lag Fuse (IEC 127)



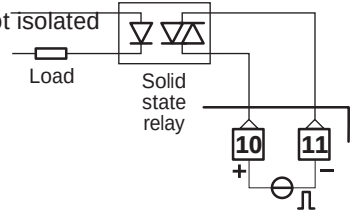
B] **Triac Output**

- NO contact for resistive load of up to 1A / 250 VAC max.
- 1A. AC Time lag Fuse (IEC 127)



2.3.3 OP2 OUTPUT

SSR (solid state relay) drive output, not isolated
0-5V., ±20%, 30mA, max.

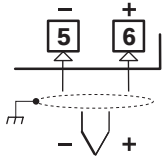


2.3.4 PV CONTROL INPUT

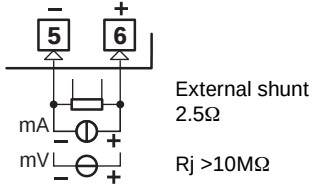
B

- 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 ground.

For type L J K S or T thermocouples:

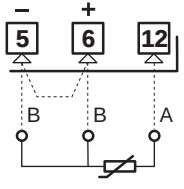


For mA, mV and V

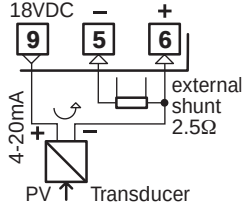


- For a 3-wire system, always use cables of the same diameter (1mm² minimum.) (line 20 Ω/lead maximum resistance)
- For a 2-wire system, always use cables of the same diameter (1.5mm² min.) and put a jumper between terminals and 6.

For PT100 resistance thermometer:

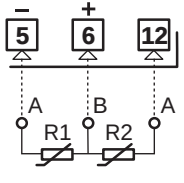


With 2-wire transducer



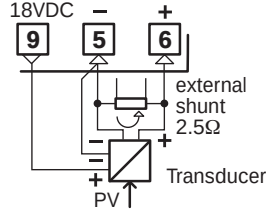
- When the distance between the controller and the sensor is 50 ft. (15 mt.), using cable of 1.5 mm² diameter, an error of approx. 2° F (1° C) is produced.

For ΔT (2 x RTD Pt100) Special



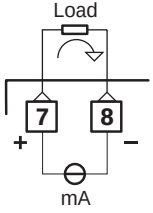
R1 + R2 must be < 320Ω

With 3-wire transducer



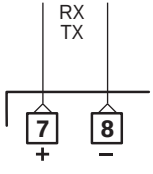
2.3.5 **OP4 OUTPUT** (option)

Process Variable (PV) retransmission:
- Galvanic isolation 500VAC/1 min.
- 0/4-20mA, 750Ω/ 15V. max.



2.3.6 **SERIAL COMMUNICATIONS** (option)

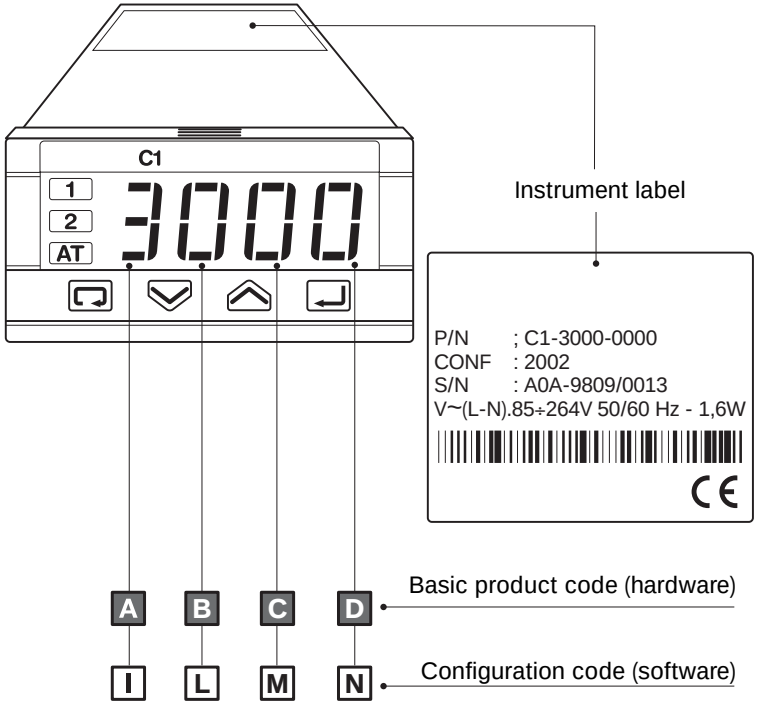
- Galvanic isolation 500VAC/1 min
- Compliance to the EIA RS485 standard for Modbus/Jbus



⚠ **Please, read the user instructions on the "C1 controller MODBUS/JBUS protocol."**

3 Nomenclature

The complete code is shown on the instrument label.
This information is accessible from the front panel by means of the procedure described in section 4.2.2, page 19.



3.1 MODEL CODE

The product code indicates the specific hardware configuration of the instrument. It cannot be modified in the field.

Model: C 1 A B C D - 0 F G 0 / I L M N

Line	C 1

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

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

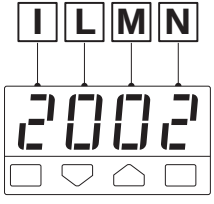
Serial Communications	Options	C	D
Not supplied	None	**0**	**0**
	Transmitter Power Supply (P.S.)	**0**	**6**
	Transmitter P.S. + Retransmission	**0**	**7**
RS485 Modbus/Jbus protocol	None	**5**	**0**
	Transmitter Power Supply	**5**	**6**

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 CODE

The configuration code consists of 4 digits that identify the operating characteristics of the unit, selected by the user.
See Section 4.5 on page 26 for instructions on how to set a new configuration code.



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

Input type and range	C	F	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 page 26).

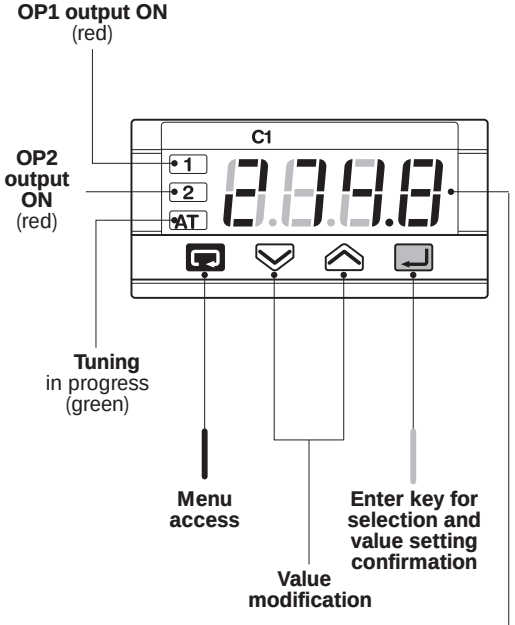
Alarm 2 type and function		**N**
Not active		**0**
Sensor break alarm		**1**
Absolute	active high	**2**
	active low	**3**
Deviation **[1]**	active high	**4**
	active low	**5**
Deviation band **[1]**	active out (of the band)	**6**
	active in (the band)	**7**

Note:

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

4 OPERATIONS

4.1 KEYPAD COMMANDS AND DISPLAY



- **PV control input (operator mode)** (in engineering units) when the measured value is greater than sensor high range:

  OVER

  when the measured value is less than the sensor low range:

  UNDER

- **Code and/or value of the Parameter (programming mode)**

4.2 DISPLAY MODE

When the display mode is selected, the unit automatically displays the most important parameters and configuration information.

In display mode, the parameter values cannot be modified by the user.

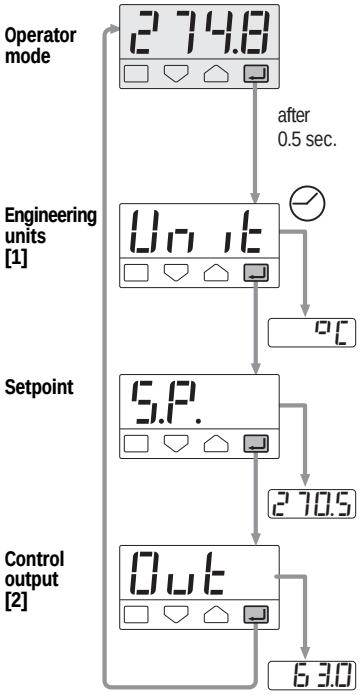
After2 seconds in display mode, the display flashes and the unit returns to normal operating mode.

Note

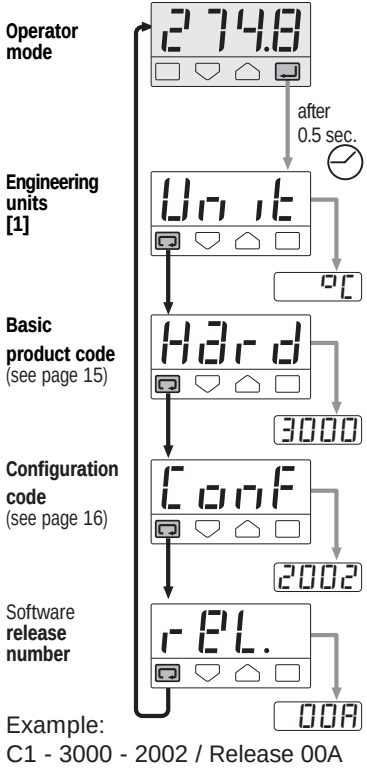
[1] See table page 27

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

4.2.1 DISPLAY OF THE PROCESS VARIABLES



4.2.2 DISPLAY OF THE CONFIGURATION CODES



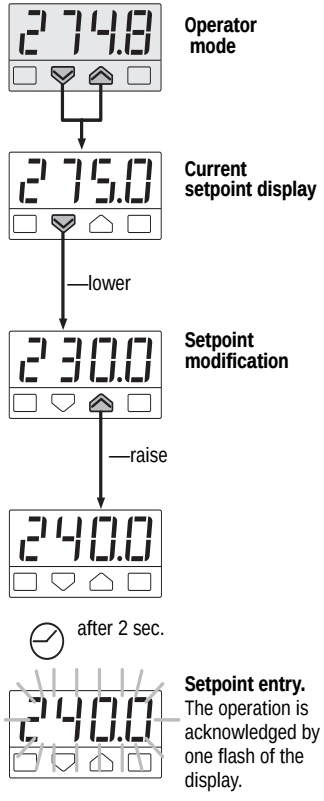
Example:
C1 - 3000 - 2002 / Release 00A

4.3 SETTING PARAMETERS

4.3.1 NUMERIC ENTRY

(Ex: change the value of a stored Setpoint from 275.0 to 240.0)

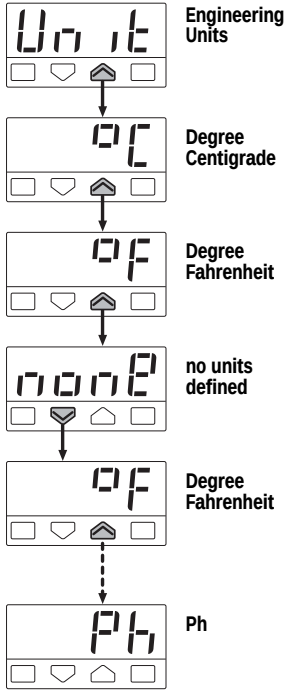
Press ⌃ or ⌄ momentarily to change the value by 1 unit every push.
Continued pressing of ⌃ or ⌄ changes the value at rate that doubles every second. Releasing the button decreases the rate of change.
In any case, the change of the value stops when it has reached the max/min limit set for the parameter.



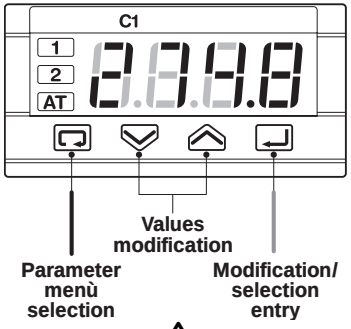
4.3.2 SETTING MNEMONIC CODES

(see Configuration, 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.



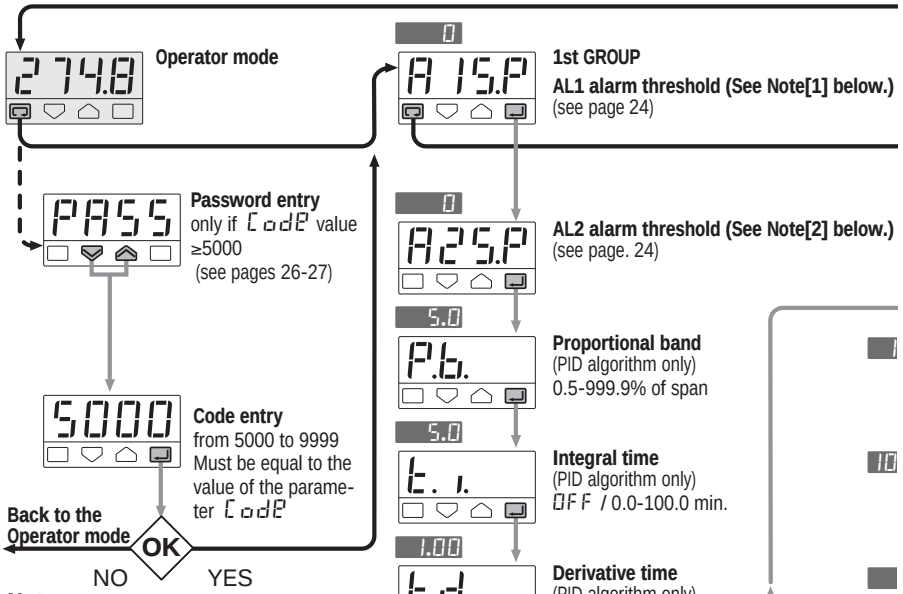
4.4 SETTING PARAMETERS



The parameter setting procedure has a timeout. If no keys are pressed for 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 page 20). The value is entered when the next parameter is selected, by pressing the ↵ key.

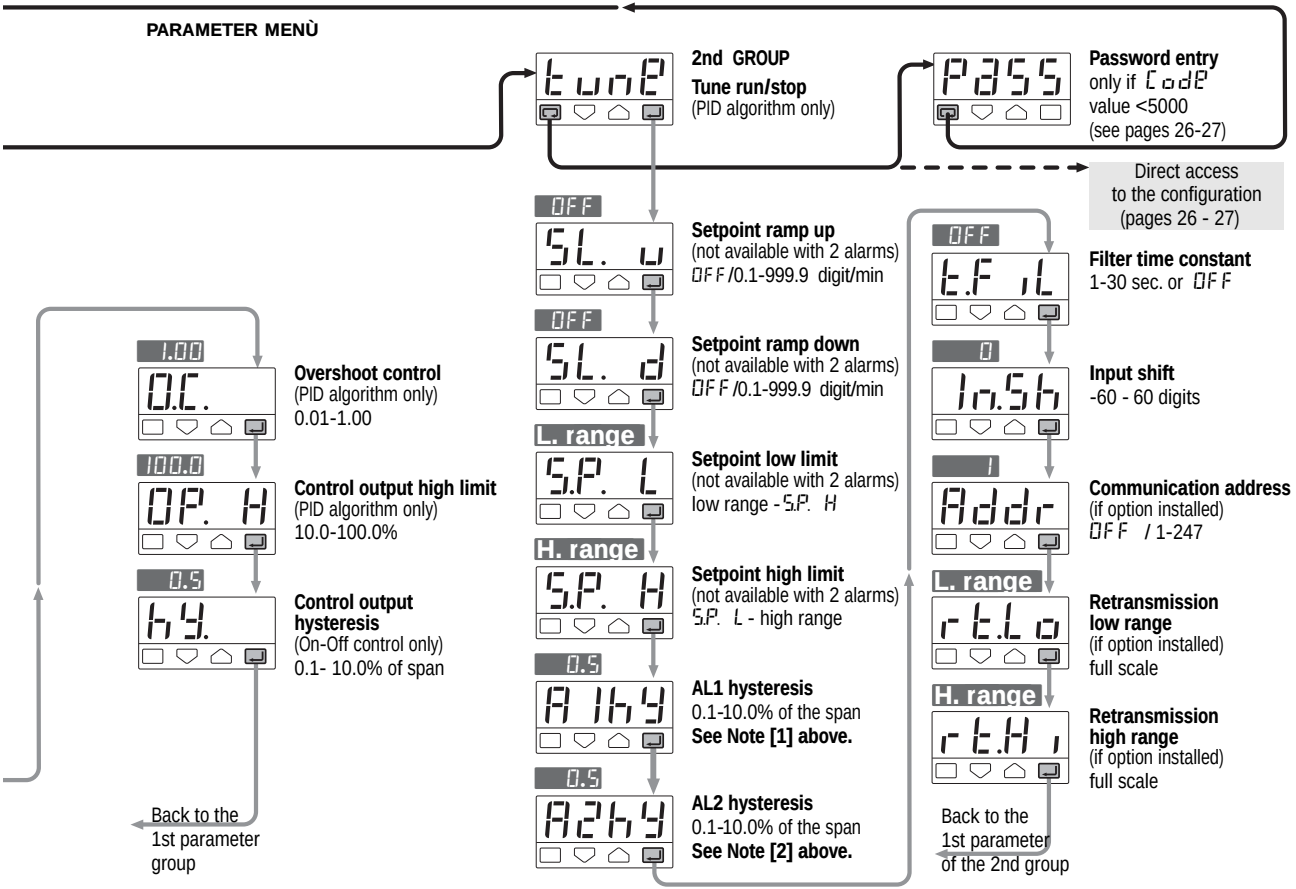
Pressing the ↻ key, the next group of parameters is presented on the display.



Notes:

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

[2] Displayed if the controller has been configured with alarm #2 not active (or of sensor failure 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
See Note [1] above.
0.5
A2hy
AL2 hysteresis
0.1-10.0% of the span
See Note [2] above.
OFF
t.F iL
Filter time constant
1-30 sec. or OFF
0
In.Sh
Input shift
-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
1.00
O.C.
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

4.5 PARAMETER

1st GROUP

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

AL1 alarm set point

This set point is displayed only if the controller has been configured with 2 alarms. (Digit L of the configuration code assigned to 4 or 5)

AL2 alarm set point

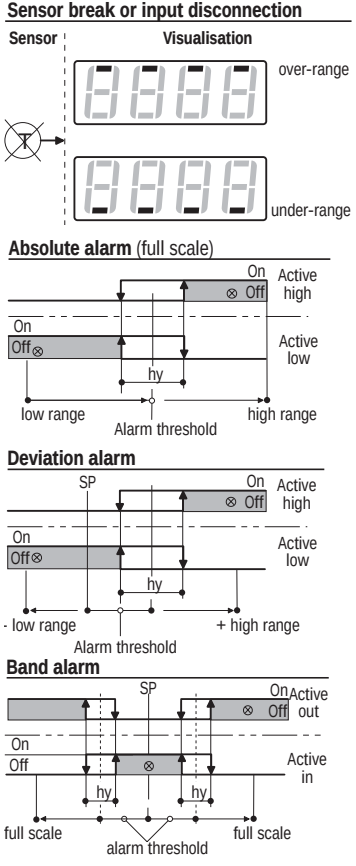
The alarm occurrences handle the OP1 and OP2 outputs, in different ways, according to the configured types of alarms, as illustrated.

Proportional band

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

Integral time

The integral time value 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

The derivative term coefficient 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

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

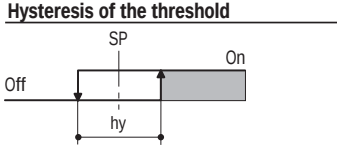
This parameter specifies the span of action of the overshoot control. Setting lower values (0.99 —> 0.01) reduces the overshoot resulting from a set point change. The overshoot control does not affect the

effectiveness of the PID algorithm.
Set 1 to disable the overshoot control.

OP. H **Control output high limit**

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 set point in digit/min. When the parameter is OFF, this function is disabled.

SP. L **Set point low limit**

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

SP. H **Set point high limit**

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

AL1HY **AL1 alarm hysteresis**

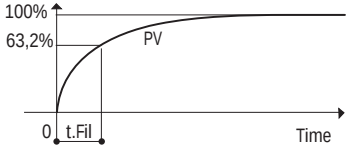
AL2HY **AL2 alarm hysteresis**

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

t.FiL **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.

Filter response



in.SH **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

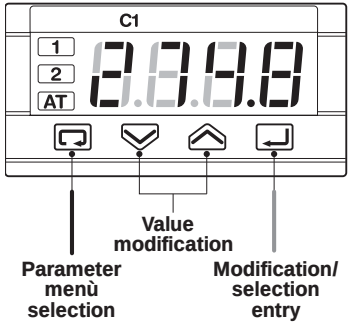
rtLo **Retransmission low range**

rtHi **Retransmission high range**

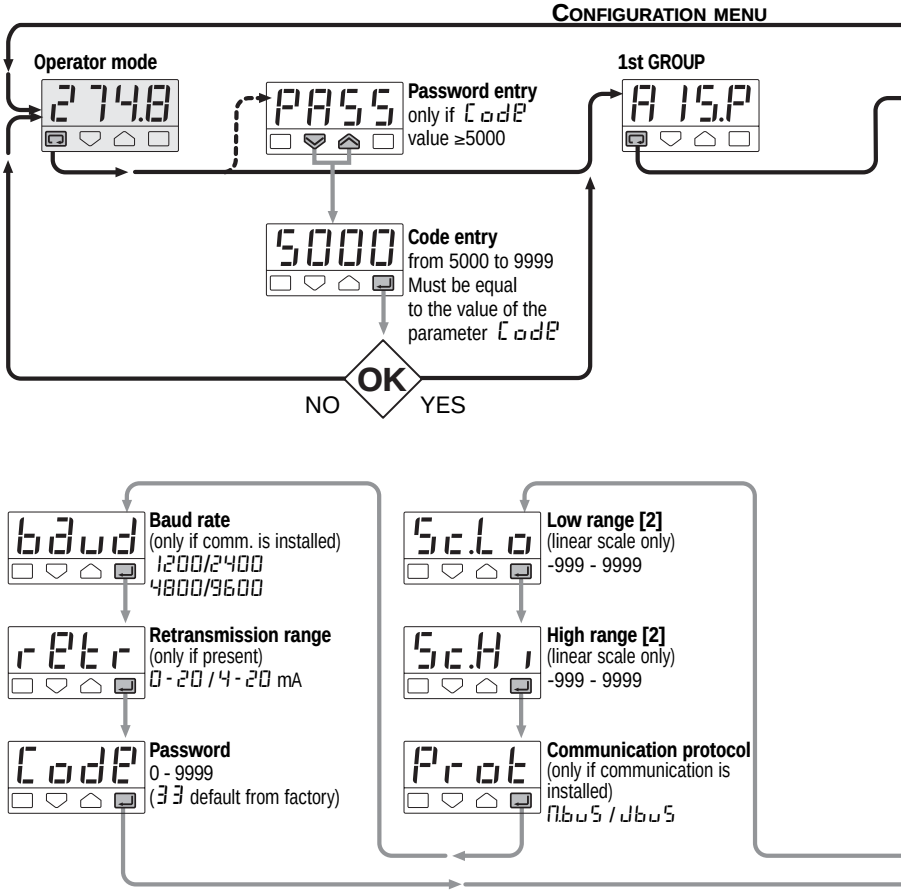
These parameters define the range of the OP4 retransmission output. Example: 4-20 mA output corresponding to 20-120 C.

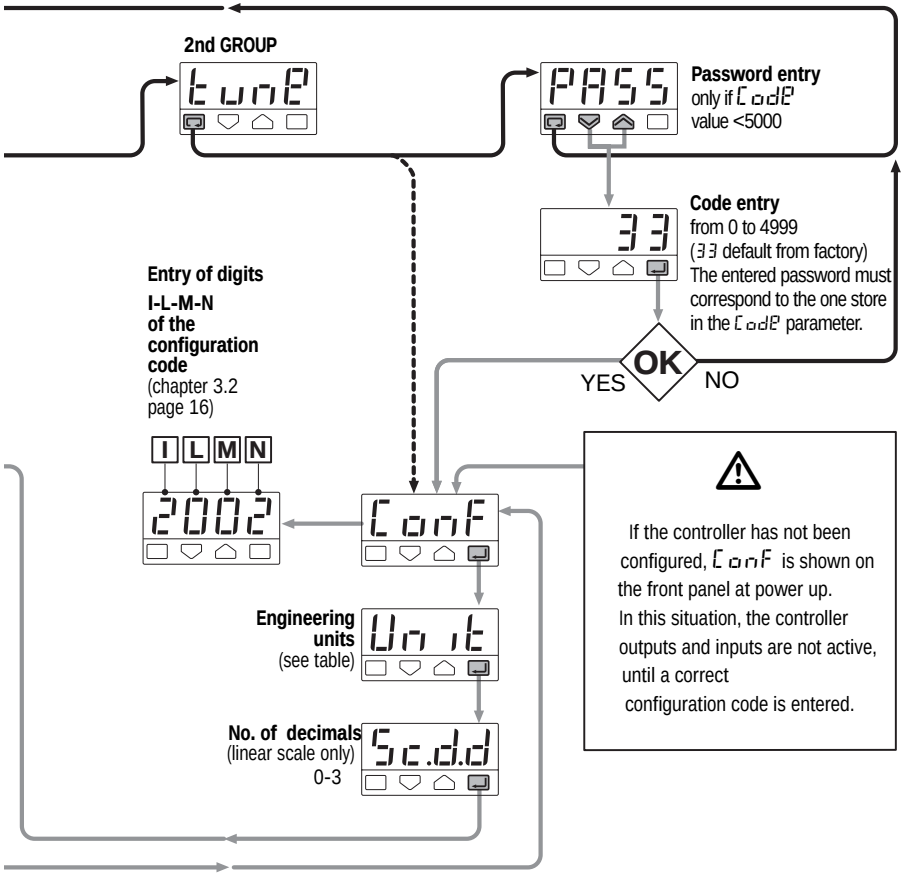
4.6 CONFIGURATION

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 page 16)
Other parameters specify the type of auxiliary functions.



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





Note
Pressing the ⮌ displays the next group of parameters.

[1] Table of supported Engineering Units.

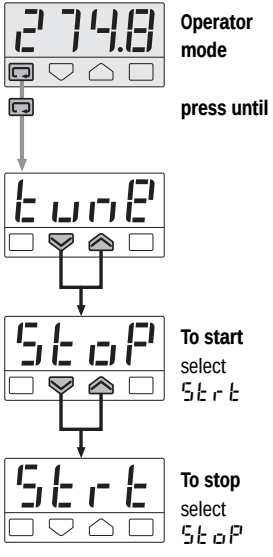
Celsius degrees *	°C
Fahrenheit degrees *	°F
none	none
mV	mU
Volt	U
mA	mA
Ampere	A
Bar	bAr
PSI	PSI
Rh	rh
pH	Ph

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

[2] Range of min 100 digits.

5 AUTOMATIC TUNING

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



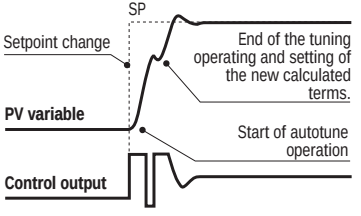
The green led AT comes on when Fuzzy Tuning is in progress. At the end of this operation, the calculated PID parameters are stored and used by the control algorithm, and the controller returns to the operator mode. The green led AT goes off.
This function allows the calculation of the optimal PID parameters to monitor 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 tuning:
This type is selected when, at the start of the autotune operation, the process variable (PV) is more than 5%of the span away from set point (SP). The big advantage of this method is fast calculation, with reasonably accurate results.

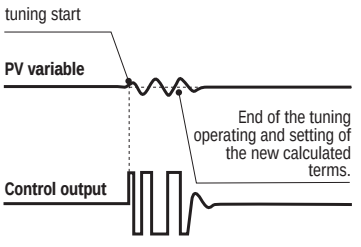
Natural frequency tuning:
This type is selected when PV is close (within 5% of the span) to SP.

The advantage of this method is better accuracy in the term calculated and a reasonable speed of calculation.
Fuzzy Tuning automatically determines the best method to use to calculate the PID terms, according to process conditions.

Step response



Natural frequency



6 TECHNICAL SPECIFICATIONS

Features (at 77F (25C) ambient temp.)	**Description**			
Total configurability see: par. 3.2, page 16. par. 4.6, page 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 pages 12 and16.	Common characteristics	A/D converter with resolution of 50.000 points. Update measurement time: 0.2 second. Sampling time: 0.5 second. Input bias: -60 to +60 digits Input filter with enable/disable: 1 to 30 seconds.		
	Accuracy	0.25% ± 1 digit for temperature sensors. 0.1% ± 1 digit (for mV and mA).		Between 100-240 VAC the error is minimal.
	Resistance thermometer	Pt100Ω at 0°C (IEC 751). °C/°F selectable.	2 or 3 wire connection.	Max. wire resistance: 20Ω max (3 wires) Sensitivity: 0.1°C/10°C Env. Temp. (0.18°F/18°F <0.1°C (0.18°F)/ 10Ω Wire Res.
	Thermocouple	Type L,J,T,K,S (IEC 584). °C/°F selectable.	Internal cold junction compensation in °C/°F.	Max. wire resistance: 150Ω max Sensitivity: <2µV/°C Env. Temp. <0.5µV / 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 to 9999 Full Sc. -999 to 9999 (min. range of 100 digits)	Input drift: <0.1% / 20°C (36°F) ambient temp.
	DC input (voltage)	10-50mV, 0-50mV Rj >10MΩ		

Features (at 77F (25C) ambient temp.)	**Description**				
Operating mode and Outputs	Indicator with 2 alarms	**AL1 alarm**		**AL2 alarm**	
		OP1 - Relay or Triac		OP2 - SSR drive	
		OP2 - SSR drive		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	
		OP2 - SSR drive		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 = 0		
	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/250VAC for resistive load. Triac, 1A/250VAC for resistive load.				
OP2 output	SSR drive, not isolated: 5VDC, ± 10%, 30mA max.				
AL1 alarm (indicator with 2 alarms)	Hysteresis 0.1-10,0% full scale.				
	Active high	Absolute threshold, whole range.			
	Active low				
AL2 alarm	Hysteresis 0.1-10,0% c.s.				
	Action: Activate high	Action type: Deviation threshold	± range		
	Action: Activate low	Action type: Band threshold	0 - range		
		Action type: Absolute threshold	whole range		
	Action: Special function	Sensor failure			

Features (at 77F (25C) ambient temp.)	**Description**		
Setpoint	Ramp up and down		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 VAC /1 min. Resolution 12 bit (0.025%). Accuracy: 0.1 %.		Current output: 4-20mA 750Ω/15V max.
One shot Fuzzy-Tuning with automatic selection	The controller automatically selects the best method according to the process conditions.		Step response. Natural frequency.
Serial comm. (option)	RS485 isolated, Modbus/Jbus protocol, 1200, 2400, 4800, 9600 bit/sec, 2-wire.		
Auxiliary Supply	+18VDC ±20%, 30mA max for an external transmitter supply.		
Operational safety	Measure input	Detection of "out of range", short circuit, or sensor failure with automatic activation of the safety strategies and alerts on display.	
	Control output	Safety value: 0 to +100%. (user enabled/disabled).	
	Parameters	parameter and configuration data are stored in nonvolatile memory for an unlimited time.	
	Access protection	Password to access the configuration and parameter data.	
General characteristics	Power supply	100 - 240VAC (- 15% + 10%) 50/60Hz. or 24VAC (- 25% + 12%) 50/60Hz and 24V– (- 15% + 25%). Power consumption: 1.6W 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.	
	Protection EN650529	IP20 termination unit. IP65 front panel.	
	Dimensions	19" x .95", depth 4.72" (1/32 D IN - 48 x 24, depth 120 mm); 0.25 lbs. (100 gr.) approx.	