DIS48-2R+

Process controller

48x48

CUSTOMIZABLE ALARM MESSAGES

⇦⇦⇦ "OVEN ALARM" ⇦⇦⇦

FRONTAL
IP65

1 ANALOG UNIVERSAL INPUT

0/10V, 4/20mA
Pt100, Tc
mV, ntc10K, ptc1K

+

1 DIGITAL INPUT

2 OUTPUT RELAYS

+

1 TRANSISTOR OUTPUT

PNP / SSR

NFC

FNC

POWER SUPPLY
24.. 230VAC/DC

Rmberg®

PROGRAMMABLE ALSO
VIA SMARTPHONE

GENERATE/PRINT
DETAILED REPORT
EQUIPMENT CONFIGURATION

Table of contents

Introduction

The controllers ATR224 stands out for the bright display which ensures optimal visibility and increased level of information for the operator beside a scrolling Help function.
These controllers relies on Pixsys flagship programming mode by NFC/RFID technology with dedicated App MyPixsys for Android devices (same already used for Pixsys signal converters and ATR indicators) not requiring wirings and power supply, allowing quick set-up/updates on site.
The outputs can be selected as command/multiple alarm modes. Useful power supply with extended range 24 to 230VAC / VDC with galvanic insulation of the net.

1 Safety guidelines

Read carefully the safety guidelines and programming instructions contained in this manual before connecting/using the device.
Disconnect power supply before proceeding to hardware settings or electrical wirings to avoid risk of electric shock, fire, malfunction.
Do not install/operate the device in environments with flammable/explosive gases.
This device has been designed and conceived for industrial environments and applications that rely on proper safety conditions in accordance with national and international regulations on labour and personal safety. Any application that might lead to serious physical dama ge/ life risk or involve medical life support devices should be avoided.
Device is not conceived for applications related to nuclear power plants, weapon systems, flight control, mass transportation systems.
Only qualified personnel should be allowed to use device and/or service it and only in accordance to technical data listed in this manual.
Do not dismantle/modify/repair any internal component.
Device must be installed and can operate only within the allowed environmental conditions. Overheating may lead to risk of fire and can shorten the lifecycle of electronic components.

1.1 Organization of safety notices

Safety notices in this manual are organized as follows:

Safety notice	Description
Danger!	Disregarding these safety guidelines and notices can be life-threatening.
Warning!	Disregarding these safety guidelines and notices can result in severe injury or substantial damage to property.
Information!	This information is important for preventing errors.

1.2 Safety Precautions

This product is UL listed as open type process control equipment.	**Danger!**
If the output relays are used past their life expectancy, contact fusing or burning may occasionally occur. Always consider the application conditions and use the output relays within their rated load and electrical life expectancy. The life expectancy of output relays varies considerably with the output load and switching conditions.	**Danger!**
Loose screws may occasionally result in fire. For screw terminals of relays and of power supply, tighten screws to tightening torque of 0,51 Nm. For other terminals, tightening torque is 0,19 Nm	**Warning!**
A malfunction in the Digital Controller may occasionally make control operations impossible or prevent alarm outputs, resulting in property damage. To maintain safety in the event of malfunction of the Digital Controller, take appropriate safety measures, such as installing a monitoring device on a separate line.	**Warning!**

1.3 Precautions for safe use

Be sure to observe the following precautions to prevent operation failure, malfunction, or adverse affects on the performance and functions of the product. Not doing so may occasionally result in unexpected events. Do not handle the Digital Controller in ways that exceed the ratings.

- The product is designed for indoor use only. Do not use or store the product outdoors or in any of the following places.
  - Places directly subject to heat radiated from heating equipment.
  - Places subject to splashing liquid or oil atmosphere.
  - Places subject to direct sunlight.
  - Places subject to dust or corrosive gas (in particular, sulfide gas and ammonia gas).
  - Places subject to intense temperature change.
  - Places subject to icing and condensation.
  - Places subject to vibration and large shocks.
- Installing two or more controllers in close proximity might lead to increased internal temperature and this might shorten the life cycle of electronic components. It is strongly recommended to install cooling fans or other air-conditioning devices inside the control cabinet.
- Always check the terminal names and polarity and be sure to wire properly. Do not wire the terminals that are not used.
- To avoid inductive noise, keep the controller wiring away from power cables that carry high voltages or large currents. Also, do not wire power lines together with or parallel to Digital Controller wiring. Using shielded cables and using separate conduits or ducts is recommended. Attach a surge suppressor or noise filter to peripheral devices that generate noise (in particular motors, transformers, solenoids, magnetic coils or other equipment that have an inductance component). When a noise filter is used at the power supply, first check the voltage or current, and attach the noise filter as close as possible to the Digital Controller. Allow as much space as possible between the Digital Controller and devices that generate powerful high frequencies (high-frequency welders, high-frequency sewing machines, etc.) or surge.
- A switch or circuit breaker must be provided close to device. The switch or circuit breaker must be within easy reach of the operator, and must be marked as a disconnecting means for the controller.
- The device must be protected by a fuse 1A (cl. 9.6.2).
- Wipe off any dirt from the Digital Controller with a soft dry cloth. Never use thinners, benzine, alcohol, or any cleaners that contain these or other organic solvents. Deformation or discoloration may occur.
- The number of non-volatile memory write operations is limited. Therefore, use EEprom write mode when frequently overwriting data, e.g.: through communications.
- Chemicals/solvents, cleaning agents and other liquids must not be used.
- Non-respect of these instructions may reduce performances and safety of the devices and cause danger for people and property.

1.4 Environmental policy / WEEE

Do not dispose electric tools together with household waste material.
According to European Directive 2012/19/EU on waste electrical and electronic equipment and its implementation in accordance with national law, electric tools that have reached the end of their life must be collected separately and returned to an environmentally compatible recycling facility.

2 Model Identification

Panel-mount model with power supply 24..230 VAC/VDC 50/60 Hz – 6 Watt/VA	
DIS48-2R+	1 A.I. + 2 relays 2 A + 1 SSR + 1 D.I.

3 Technical Data

3.1 General Features

Displays	4 digits 0,52'', 5 digits 0,30''
Operating conditions	Temperature: 0-45° C -Humidity 35..95 uR% - Max. altitude: 2000m
Sealing	Front panel mounting NEMA type 1 - IP65 front panel (with gasket) - IP20 box and terminals (UL not evaluated)
Material	Box and front panel PC UL94V2
Weight	Approx. 185 g

3.2 Hardware Features

Analogue input	**AI1** Configurable via software. **Input**: Thermocouple type K, S, R, J,T,E,N,B. Automatic compensation of cold junction from -25...85° C. **Thermoresistances**: PT100, PT500, PT1000, Ni100, PTC 1K, NTC 10K (β 3435K) **Input V/mA**: 0-1 V, 0-5 V, 0-10 V, 0-20 o 4-20 mA, 0-60 mV. **Pot. Input**: 1...150 KΩ.	Tolerance (@25° C) ± 0.2% ±1 digit (on F.s.) for thermo-couple, thermoresistance and V/mA. Cold junction accuracy 0.1° C/°C. **Impedence**: **0-10 V**: Ri>110 KΩ **0-20 mA**: Ri<5 Ω **0-40 mV**: Ri>1 MΩ
Relay outputs	Config. as command and alarm output	Contacts: 2A - 250 VAC for resistive load.
SSR output	Config. as command and alarm output	12/24 V, 25 mA.
Power-supply	Extended power-supply 24..230 VAC/VDC ±15% 50/60 Hz	**Consumption**: 6 Watt/VA

3.3 Software Features

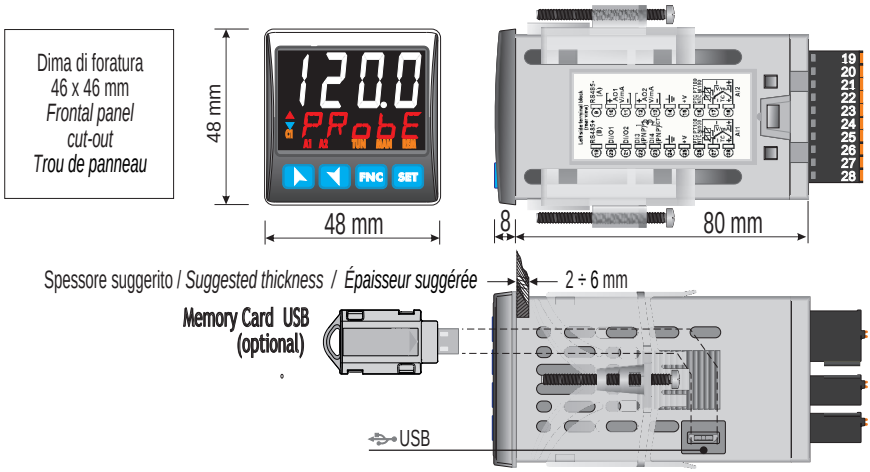
Regulation algorithms	ON-OFF with hysteresis. - P, PI, PID, PD with proportional time
Proportional band	0..9999°C o °F
Integral time	0,0..999,9 sec (0 excludes)
Derivative time	0,0..999,9 sec (0 excludes)
Controller functions	Manual or automatic Tuning, selectable alarm, protection of command and alarm setpoints.

3.4 Programming mode

by keyboard	..see paragraph *12*
software LabSoftview	..on *"Download section"* of official pixsys site: www.pixsys.net
App MyPixsys	..through download the App on Google Play Store®, see paragraph *10* When activated by a reader/interrogator supporting NFC-V protocol, the controllers are to be considered a VICC (Vicinity Inductively Coupled Card) according to ISO/IEC 15693 and it operates at a frequency of 13.56 MHz. **The device does not intentionally emit radio waves**.

4 Dimensions and Installation

ATR224-12ABC



5 Electrical wirings

This controller has been designed and manufactured in conformity to Low Voltage Directive 2006/95/EC, 2014/35/EU (LVD) and EMC Directive 2004/108/EC, 2014/30/EU (EMC). For installation in industrial environments please observe following safety guidelines:

- Separate control line from power wires.
- Avoid proximity of remote control switches, electromagnetic contactors, powerful engines.
- Avoid proximity of power groups, especially those with phase control.
- It is strongly recommended to install adequate mains filter on power supply of the machine where the controller is installed, particularly if supplied 230Vac.

The controller is designed and conceived to be incorporated into other machines, therefore CE marking on the controller does not exempt the manufacturer of machines from safety and conformity requirements applying to the machine itself.

- Wiring of pins 1...8 on use crimped tube terminals or flexible/rigid copper wire with diameter 0.2 to 2.5 mm^2 (min. AWG28, max. AWG12; Minimum temp. rating of the cable to be connected to the field wiring terminals, 70°C). Cable stripping lenght 7 to 8 mm. Tighten screws to tightening torque of 0,19 Nm.
- Wiring of pins 9...19 on use crimped tube terminals or flexible/rigid copper wire with diameter 0.2 to 1.5 mm^2 (min. AWG28, max. AWG14; Minimum temp. rating of the cable to be connected to the field wiring terminals, 70°C). Cable stripping lenght 6 to 7 mm. Tighten screws to tightening torque of 0,51 Nm.
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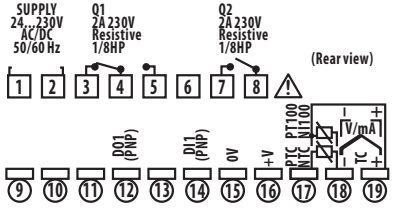
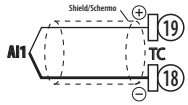
5.1 Wiring diagram



5.1.a Power Supply

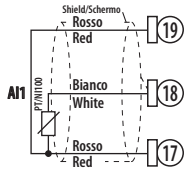
Switching power supply 24..230 VAC/VDC ±15% 50/60 Hz - and 9 Watt/VA .
Galvanic insulation.

5.1.b Analogue Input AI1



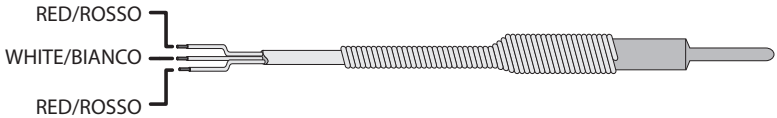
For thermocouples K, S, R, J, T, E, N, B.

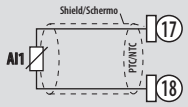
- Comply with polarity
- For possible extensions, use compensated cable and terminals suitable for the thermocouples used (compensated).
- When shielded cable is used, it should be grounded at one side only.



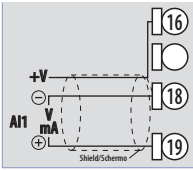
For thermoresistances PT100, Ni100.

- For the **three-wire** connection use wires with the same section.
- For the **two-wire** connection short-circuit terminals 17 and 19
  When shielded cable is used, it should be grounded at one side only.





For thermoresistances NTC, PTC, PT500, PT1000 and linear potentiometers.
When shielded cable is used, it should be grounded at one side only to avoid ground loop currents.



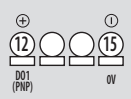
For linear signals in Volt and mA

- Comply with polarity
- When shielded cable is used, it should be grounded at one side only to avoid ground loop currents.
- It's possible to select +V at 12Vdc or 24Vdc, by configuring parameter 282 u.out (GROUP R - diSP. - Display and interface).

5.1.c Digital input

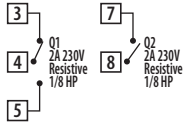
Digital input can be enabled by parameters.
Close pin "DI1" on pin "+V" to enable digital input.
It is possible to put in parallel the digital inputs of different devices joining together the pins (0V).

5.1.d Digital output

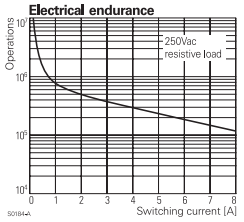


Digital output PNP (including SSR) for command or alarm.
Range 12 VDC/25 mA or 24 VDC/15mA selectable by parameter 282 u.out.
Wire the positive control (+) of the solid state relay to the pin DO(x).
Wire the negative control (-) of the solid state relay to the pin 0V.

5.1.e Relay output Q1 - Q2



Capacity 2 A / 250 VAC for resistive loads.
See chart below.



Electrical endurance Q1 - Q2:
2 A, 250 VAC, resistive loads, 10^5 operations.
20/2 A, 250 VAC, cosφ = 0.3, 10^5 operations.

6 Display and Key Functions

1	129.4	Normally displays the process. During the configuration phase, it displays the parameter being inserted.
2	ProbE	Normally displays the setpoint. During the configuration phase, it displays the parameter value being inserted.

6.1 Meaning of Status Lights (Led)

3	C1	ON when the command output 1 is active.
5	A1	ON when alarm 1 is active.
6	A2	ON when alarm 2 is active.
8	TUN	ON when the controller is executing an auto-tuning cycle.
9	MAN	ON when "Manual" function is active.
10	REM	ON when the controller communicates through serial. Flashes when the remote setpoint is enabled.

6.2 Keys

11	■	• Increases the main setpoint. • During configuration allows to scroll the parameters or the groups of parameters. • Increases the setpoints.
12	■	• Decreases the main setpoint. • During configuration allows to scroll the parameters or the groups of parameters. • Decreases the setpoints.
13	SET	• Allows to visualize command and alarm setpoints. • During configuration allows to enter the parameter to be modified and confirms the variation.
14	FNC	• Allows to enter the Tuning launch function, automatic/manual selection. • During configuration works as exit key (ESCAPE).
15	▲▼	• Both ON during parameter modification, when this is not a default value.

7 Controller Functions

7.1 Modification of main and alarm setpoint value

Setpoint value can be modified from keyboard as follows:

	Press	Display	Do
1	▲ or ▼	Value on display 2 changes.	Increases or decreases the main setpoint value.
2	SET	Visualizes the other setpoints on display 1. Display 2 shows the setpoint type.	
3	▲ or ▼	Value on display 1 changes.	Increases or decreases the alarm setpoint value.

7.2 Automatic Tune

Automatic tuning procedure allows a precise regulation without delving into the PID regulation algorithm. Selecting Auto on par. 73 tun.1 (for the regulation loop 1), the controller analyzes the proces oscillations and optimizes the PID parameters.
Led TUN flashes.
If the PID parameters are not yet selected, at the device switch-on, it is automatically launched the manual Tuning procedure described into the next paragraph.

7.3 Manual Tune

Manual procedure allows the user greater flexibility to decide when to update
PID algorithm parameters. During the manual tuning, the device generates a step to analyze the system inertia to be regulated and, according to the collected data, modifies PID parameters.
After selecting MAnu. on par. 73 tun.1, the procedure can be activated as follows:

- **Running Tuning by keyboard:**
  Press FNC until display 2 shows tunE with display 1 on dis. and then press SET: display 1 shows Enab. Led TUN switches ON and the procedure starts.
- **Running Tuning by digital input:**
  Select tunE on par. 231 d.i.1F.. At first activation of digital input (commutation on front panel) led TUN led switches on and at second activation switches off.

To avoid an overshoot, the treshold where the controller calculates new PID parameters is determined by this operation:
Tune threshold = Setpoint - *"Set Deviation Tune"* (par. 74 S.d.t.1)
Ex.: if the sepoint is 100.0∞C and the Par.32 S.d.t.1 is 20.0∞C the threshold to calculate PID parameters is (100.0 - 20.0) = 80.0∞C.
For a greater precision on PID parameters calculation it is suggested to start the manual tuning procedure when the process deviates from the setpoint.

7.4 Tuning once

Set onCE on parameter 73 tun.1.
Autotuning procedure is executed only once at next device restart. If the procedure doesn't work, will be executed at next restart.

7.5 Digital input functions

The ATR224 functions related to digital inputs, can be enabled by parameter 231 d.i.1F..

- 2tSU.: Two threshold setpoint modification: with digital input active the device regulates on SET2, otherwise reulates on SET1;
- run.: The regulation is enabled only with digital input active,
- tunE: Enables/disables the Tuning if par. 73 tun.1 is selected as MAnu.;
- Au.MA.i.: If par. 48 A.MA.1. is selected as EnAb. or En.Sto., with impulse command on digital input, the device switches the related regulation loop, from automatic to manual and vice versa.

- Au.MA.c.: If par. 48 A.MA.1 is selected as EnAb. or En.Sto. the devices switches to manual the related regulation loop, with digital input active, otherwise the regulation is automatic.
- Act.tY.: the device execute a cooling type regulation with digital input active, otherwise the regulation is of heating type;
- M.rES.: Allows the reset of the output if manual reset is active for the alarms and for the command outputs.

7.6 Automatic / Manual regulation for % output control

This function allows to switch from automatic functioning to manual command of the output percentage.
With par. 48 A.MA.1 (for regulation loop 1) it is possible to select two modes.

1 **First selection** (EnAb.) allows to enable with FNC the writing P.--- on display 1, while on display 2 is showed AutoM.
Press SET to visualize MAnu; it's now possible, during the process visualization, modify through the keys ▲ and ▼ the output percentage. To back to automatic, with the same procedure, select AutoM. on display 2: immediately led MAN switches off and functioning backs to automatic.

2 **Second selection** (En.Sto.) enables the same functioning but with two important variants:

- If there is a temporary power failure or after switch-off, the manual functioning as well as the previous output percentage value will be maintained at restarting.
- If the sensor breaks during automatic functioning, the controller switches to manual mode while maintaining the output percentage command unchanged as generated by the PID immediately before breakage.
  Ex: on an extruder the command in percentage of the resistance (load) is maintained also in case of input sensor failure.

7.7 LATCH ON Function

For use with input Pot. and with linear input (0..10 V, 0..40 mV, 0/4..20 mA) it is possible to associate start value of the scale (par. 4 LL.1.1) to the minimum position of the sensor and value of the scale end (par. 5 uL.1.1) to the maximum position of the sensor (par. 10 Ltc.1 configured as Stndr).
It is also possible to fix the point in which the controller will display 0 (however keeping the scale range between LL.1.1 and uL.1. 1) using the *"virtual zero"* option by selectin u.0.Sto. on par. 10 Ltc.1. Selecting u.0.t.on. the virtual zero must be reset at each switching on; selecting u.0.Sto. the virtual zero will remain fixed once calibrated. To use the LATCH ON function, configure the par. Ltc.1[1]
Then refer to the following table for the calibration procedure:

	Press	Display	Do
1	FNC	Exit parameters configuration. Display 2 visualizes writing LAtc.	Place the sensor on minimum operating value (corresponding to LL.1.1)
2	■	Store value on minimum. Display shows LoU.	Place sensor on maximum operating value (corresponding to uL.1.1).
3	■	Store value on max. Display shows HiGh.	To exit standard proceeding press SET. For *"virtual zero"* setting, place the sensor to zero point.
4	FNC	Set virtual zero. Display shows 2Ero. If *"Virtual zero at start"* is selected, point 4 must be repeated at each starting.	To exit procedure press SET.

1 *The tuning procedure starts by exiting the configuration after changing the parameter.*

7.8 Soft-Start Function

The devices is provided with two types of softstart selectable on parameter 264 SS.tY. (*"Softstart Type"*).

1 First selection (GrAd.) enables gradient softstart. AAt starting the controller reaches setpoint basing on the rising gradient set on parameter 266 SS.Gr. (*"Softstart Gradient"*) in Unit/hour (ex. °C/h). If parameter 269 SS.t1. (*"Softstart Time"*) is different to 0, at starting when the time selected on par. 269 is elapsed, the controller stops to follow the gradient and reaches setpoint with the maximum power.

2 Second selection (PErc.) abilita enables output percentage softstart. On par. 268 SS.tH. it is possible to set the threshold under which starts the softstart (*"Softstart Threshold"*). On par. 267 SS.PE. (*"Softstart Percentage"*) an output percentage is selectable (from 0 to 100), which controller keeps until the process exceeds the threshold set on par. 268 or until the time in minutes set on par. 269 SS.t1. (*"Softstart Time"* word 2084).

If the Sof-Start function is active the automatic/manual Tuning function cannot be activated.

8 Reading and configuration through NFC

Programmable
via RFID /NFC.
No wiring required!

The controller is supported by the App: using an ANDROID smartphone with NFC connection it is possible to program the device without using a dedicated equipment. The App allows to read, set and backup all parameters which are stored into the internal memory of Pixsys devices.

Procedure:

- Identify the position of the NFC antenna on the smartphone (usually central, behind the back cover) or to one of the sides in case of metal chassis. The antenna is placed on the frontal panel: between ▼ and FNC keys for the ATR224 • Make sure that the NFC sensor of the phone is enabled or that there are no metal materials between the phone and the device (ex. aluminium cover or with magnetic stand)
- It is useful to enable the system sounds on the smartphone, as the notification sound confirms that the device has correctly been detected.

The App interface is provided with four tabs: SCAN, DATA, WRITE, EXTRA.

Select the first tab *"SCAN"* to read data stored into the internal memory of the device; place the smartphone in contact with the controller frontal panel, making sure that the phone's antenna matched with that of the controller.

Once detected the device, the App emits a notification sounds and proceeds with the model identification and the reading of the parameters.

The graphic interface shows the advancement and switches to the second tab *"DATA"*. It is now possible to move the smartphone away from the controller to make the required modifications more easily.

The device parameters are divided into collapsible groups and are displayed with name, current value and reference index to the manual. Click on a row to open the setting screen of the related parameter with the detailed view of available options (in case of multiple choice parameters) or of the minimum/maximum/decimals limits (for numeric parameters), included the text description (as per section n. 11 of the user manual). Once selected the chosen value, the related row will be updated and underlined into the tab *"DATA"* (hold down the line to cancel modifications).

To download the new configuration on your device, select the third tab *"WRITE"*, place again the

smartphone in contact with the controller and wait for the notification.
The devices will show a restart request, necessary to update the configuration with the new written modifications; if it does not restart, the controller will continue to work with the previous configuration.
In addition to the classic operation of parameters reading->modification->writing, MyPixsys is provided with additional functions which can be accessed by the tab *"EXTRA"*, as save parameters / e-mail loaded values/ restore default values.

8.1 Configuration through memory card

The device can be configured through a memory card (2100.30.013). This one is linked to the micro-USB connector on the bottom of the device.

8.2 Memory card creation/update

	In order to save a parameter configuration in the memory card, connect it to micro-USB connector and power the instrument. If the memory has never been configured, the device starts normally, but if its data are considered valid, it is possible to view on the display *MEMo SKiP*. Press **SET** in order to start the product without uploading any data from the memory card. Configure, set the parameters and exit configuration. Now, the device saves the configuration just created also in the memory.

8.3 Configuration loading from memory card

	In order to charge a configuration previously created and saved in the memory card, connect it to the micro-USB connector and power the instrument. Now, if the memory is detected and its data are considered valid, it is possible to view on the display *MEMo SKiP*. By pressing ▲ you see *MEMo LoAd* and with **SET** you confirm the uploading of parameters from the memory card to the controller. If, on the other hand, you press directly **SET**, when viewing *MEMo SKiP*, the product starts without uploading any data from the memory card.

9 Loading default values

This procedure allows to restore factory settings of the device.

	Press	Display	Do
1	**FNC** for 3 sec	Display 1 shows *PASS.*, while display 2 shows *0000* with the 1st digit flashing.	
2	▲ or ▼	Modify the flashing digit and move to the next one pressing **SET**.	Enter password *9999*.
3	**FNC** to confirm	The device loads default settings and restarts.	

10 Access configuration

	Press	Display	Do
1	**FNC** for 3 sec.	Display 1 shows *PASS.*, while display 2 shows *0000* with the 1st digit flashing.	
2	■	Modify flashing digit and move to next digit with **SET**.	Enter password *1234*.
3	**FNC** to confirm	Display 1 shows the first parameters group, display 2 shows the description.	
4	▲ or ■	Scroll parameters groups.	

	Press	Display	Do
5	SET to confirm	Display 1 shows the first parameter of the group and display 2 shows its value.	Press FNC to exit configuration.
6	▲ or ■	Scroll parameters.	
7	SET to confirm	Allows parameter modification (display 2 flashes)	
8	▲ or ■	Increases or decreases visualized value ▲▼	Introduce new data
9	SET	Confirms and stores the new value. If the value is different from default values, the arrow keys light on.	
10	FNC	Backs to parameter groups selection (see point 3).	Press again FNC to exit configuration

10.1 Parameters list functioning

The controller integrates many features that make the configuration parameters list very long. To make it more functional, the parameters list is dynamics and it changes as the user enables / disables the functions. Practically, using a specific function that occupies a given input (or output), the parameters referred to other functions of that resource are hidden to the user making the parameters list more concise.

To simplify the reading/interpretation of the parameters, pressing SET it is possible to visualize a brief description of the selected parameter.

Finally, keeping pressed FNC, it is possible to move from the mnemonic visualization of the parameter to the numeric one, and vice versa. Ex. The first parameter can be displayed as SEn.1 (mnemonic visualization) or as P.001 (numeric visualization).

Set the product parameters so that they are suitable for the system to be controlled. If they are not suitable, unexpected operations may occasionally cause materials damage or accidents.

11 Table of configuration parameters

GROUP A - A.in.1 - Analogue input 1

1 SEn.1 Sensor AI1

Analogue input configuration / sensor AI1 selection

tc. K	Tc-K	-260° C..1360° C. (**Default**)
tc. S	Tc-S	-40° C..1760° C
tc. r	Tc-R	-40° C..1760° C
tc. J	Tc-J	-200° C..1200° C
tc. t	Tc-T	-260° C..400° C
tc. E	Tc-E	-260° C..980° C
tc. n	Tc-N	-260° C..1280° C
tc. b	Tc-B	100° C..1820° C
Pt100	Pt100	-200° C..600° C
Ni100	Ni100	-60° C..180° C
ntc 1	NTC 10K β3435K	-40° C..125° C
Ptc	PTC 1K	-50° C..150° C
Pt500	Pt500	-200° C..600° C
Pt1K	Pt1000	-200° C..600° C
0-1	0..1 V	
0-5	0..5 V	
0-10	0..10 V	
0-20	0..20 mA	
4-20	4..20 mA	
0-60	0..60 mV	
Pot.	Potentiometer (set the value on parameter 6)	
Ni120	Ni120	-60 °C..240 °C
ntc 2	NTC 10K β3694K	-40 °C..150 °C
ntc 3	NTC 2252 β3976K	-40 °C..150 °C

2 dP. 1 Decimal Point 1

Select number of displayed decimal points for AI1

0	**Default**
0.0	1 decimal
0.00	2 decimals
0.000	3 decimals

3 dEGr. Degree

°c	Celsius (**Default**)
°F	Fahrenheit
K	Kelvin

4 LL.1 Lower Linear Input AI1

AI1 lower limit only for linear signals. Ex.: with input 4..20 mA this parameter takes value associated to 4 mA. The value may be greater than the one entered on the next parameter.
-9999..+30000 [digit[p. 28]] **Default**: 0.

5 uL.1 Upper Linear Input AI1

AI1 upper limit only for linear signals Ex: with input 4..20 mA this parameter takes value associated to 20 mA.The value may be lower than the one entered on the previous parameter.
-9999..+30000 [digit[p. 28]] **Default**:1000

6 Pot.1 Potentiometer Value AI1

Selects the value of the potentiometer connected on AI1
1..150 kohm. **Default**: 10kohm

7 i.oL.1 Linear Input over Limits AI1

If AI1 is a linear input, allows to the process to overpass the limits (parameters 4 and 5).

d.SAb. Disabled (**Default**)
ENAb. Enabled

8 o.cA.1 Offset Calibration AI1

AI1 Offset calibration. Value added/subtracted to the process value (ex: usually correcting the ambient temperature value).
-9999..+9999 [digit1 p. 28] (degrees.tenths for temperature sensors). **Default** 0.

9 G.cA.1 Gain Calibration AI1

Value multiplied to the process value to calibrate the working point. Ex: to correct the range from 0..1000°C showing 0..1010°C, set the parameter to -1.0
-100.0%...+100.0%, **Default**: 0.0.

10 LEc.1 Latch-On AI1

Automatic setting of limits for AI1 linear input

d.SAb. Disabled (**Default**)
STNRd Standard
V.0.Sto. Virtual Zero Stored
V.0.t.oN. Virtual Zero at start

11 cFL.1 Conversion Filter AI1

ADC Filter: Number of sensor readings to calculate mean that defines process value. **NB**: When readings increase, control loop speed slows down. 1...15. (**Default**: 10)

12 cFr.1 Conversion Frequency AI1

Sampling frequency of digital / analogue converter for AI1. Increasing the conversion speed will slow down reading stability
(example: for fast transients, as the pressure, it is advisable to increase sampling frequency).

4.17.HZ 4.17 Hz (Min. conversion speed)
6.25HZ 6.25 Hz
8.33HZ 8.33 Hz
10.0HZ 10.0 Hz
12.5HZ 12.5 Hz
16.7HZ 16.7 Hz (**Default**) Ideal for noises filtering 50 / 60 Hz
19.6HZ 19.6 Hz
33.2HZ 33.2 Hz
39.0HZ 39.0 Hz
50.0HZ 50.0 Hz
62.0HZ 62.0 Hz
123HZ 123 Hz
242HZ 242 Hz
470HZ 470 Hz (Max. speed conversion)

13 LcE.1 Lower Current Error 1

If AI1 is a 4-20 mA input, it determines the current value below the probe error E-05 is signaled.

2.0 MA (**Default**)
2.2 MA
2.4 MA
2.6 MA
2.8 MA
3.0 MA
3.2 MA
3.4 MA
3.6 MA
3.8 MA

GROUP C - cMd.1 - Outputs and regulation Process 1

35 c.ou.1 Command Output 1

Selects the command output related to the process1 and the outputs related to the alarms.

c. o2 Command on relay output Q2.
c. o1 Command on relay output Q1. (**Default**)
c. SSR Command on digital output

	Command	AL. 1	AL. 2
c. o2	Q2	Q1	DO1
c. o1	Q1	Q2	DO1
c. SSR	DO1	Q1	Q2

38 Ac.t.1 Action type 1

Action type to control process 1.

HERt Heating (N.A.) (**Default**)

cooL Cooling (N.C.)

39 c.HY.1 Command Hysteresis 1

Hysteresis to control process 1 in ON/OFF.

-9999..+9999 [digit[1 p. 28]] (degrees.tenths for temperature sensors). **Default** 0.2.

40 L.L.S.1 Lower Limit Setpoint 1

Lower limit setpoint selectable for command setpoint 1.

-9999..+30000 [digit[1 p. 28]] (degrees.tenths for temperature sensors). **Default** 0.

41 u.L.S.1 Upper Limit Setpoint 1

Upper limit setpoint selectable for command setpoint 1.

-9999..+30000 [digit[1 p. 28]] (degrees for temperature sensors). **Default** 1750.

42 c.rE.1 Command Reset 1

Type of reset for command contact 1 (always automatic in P.I.D. functioning)

A. rES. Automatic Reset (**Default**)

M. rES. Manual Reset (by keyboard or by digital input)

M.rES.S. Manual Reset Stored (keeps relay status also after an eventual power failure)

A.rES.t. Automatic reset with timed activation. The command remains active for the time set on the parameter 45 c.dE.1., even if the conditions generating it are missing. To be able to act again, the conditions for activating the command must disappear.

43 c.S.E.1 Command State Error 1

State of contact for command 1 output in case of error.

If the command output 1 (Par. 35 c.ou.1) **is relay or valve:**

oPEN Contact or valve open. **Default**

cLoSE Contact or valve closed.

If the command output 1 is digital output (SSR):

oFF Digital output OFF. **Default**

on Digital output ON.

44 c.Ld.1 Command Led 1

Defines led C1 state corresponding to the relevant output.

o.c. ON with open contact or SSR switched off.

c.c. ON with closed contact or SSR switched on. (**Default**)

45 c.dE.1 Command Delay 1

Command 1 delay (only in ON / OFF functioning).

-60:00..60:00 mm:ss. **Default**: 00:00.

Negative: delay when turning off output.

Positive: delay when turning on output.

46 c.S.P.1 Command Setpoint Protection 1

Allows or not to modify command setpoint 1 value

FREE Modification allowed (**Default**)

Loc[Protected

FR.in. Free Initialized. At start, setpoint 1 of command 1 is initialized to the value set on parameter 51 in.SP.1 (Initial Value Setpoint 1).

48 A.MA.1 Automatic / Manual 1

Enables the automatic/manual selection for command 1

dISAb. Disabled (**Default**)
ENAb. Enabled
EN.Sto. Enabled with memory

49 inI.S. Initial State

Choose the state of the controller when turning it on. This only works on the RS485 version or by enabling the Start/Stop from digital input or SET button.
StArt Start (**Default**)
StoP Stop
StorE. Stored. State of Start/Stop prior to switching off.

51 I.SP.1 Initial Value Setpoint 1

Determines the initial value (at start) of setpoint 1 of command 1 when FR.IN. is selected on parameter 46 C.S.P.1 (Command Setpoint Protection 1)
-9999..+30000 [digit[1p. 28]] (degrees for temperature sensors). **Default** 0.

GROUP E - rEG.1 - Autotuning and PID 1

73 tun.1 Tune 1

Selects autotuning type for command 1
dISAb. Disabled. If proportional band and integral time paramters are to selected to zero, the regulation is ON/OFF type.. (**Default**)
Auto Automatic (Automatic P.I.D. parameters calculation)
MANu. Manual (launch by keyboards or by digital input)
oNcE Once (P.I.D. parameters calculation only at first start)

74 S.d.t.1 Setpoint Deviation Tune 1

Selects deviation from command setpoint 1 as threshold used by autotuning to calculate P.I.D. parameters
0-10000 [digit[1p. 28]] (degrees.tenths for temp. sensors). **Default**: 30.0.

75 P.b. 1 Proportional Band 1

Proportional band or process 1 P.I.D. regulation (Process inertia).
0 ON / OFF if t. I. equal to 0 (**Default**)
1...10000 [digit[1p. 28]] (degrees.tenths for temp. sensors).

76 I.t. 1 Integral Time 1

Integral time for process 1 P.I.D. regulation (process inertia duration).
0.0...2000.0 sec. (0.0 = integral disabled), **Default** 0.0

77 d.t. 1 Derivative Time 1

Derivative time for process 1 P.I.D. regulation (Normally ¼ of integral time).
0.0...1000.0 sec. (0.0 = derivative disabled, **Default** 0

78 d.b. 1 Dead Band 1

Dead band of process 1 P.I.D..
0...10000 [digit[1p. 28]] (degrees.tenths for temp. sensors) (**Default**: 0)

79 P.b.c.1 Proportional Band Centered 1

Defines if the proportional band 1 must be centered or not on the setpoint. In double loop functioning (heating/cooling), always disabled.
dISAb. Disabled. Band under (heating) or over (cooling)(**Default**)
ENAb. Centered band

80 o.o.S.1 Off Over Setpoint 1

In P.I.D. enables the command output 1 switching off, when a certain threshold is exceeded

(setpoint + Par.81)
dISAb. Disabled (**Default**)
ENAb. Enabled

81 o.d.E.1 Off Deviation Threshold 1
Selects deviation from command setpoint 1, to calculate the intervention threshold of "Off Over Setpoint 1" function.
-9999...+9999 [digit[1p.28]] (degrees.tenths for temp. sensors) (**Default**: 0)

82 c.t. 1 Cycle Time 1
Cycle time for P.I.D. regulation of process 1 (for P.I.D. on remote control switch 15 s; for PID on SSR 2s). For valve refer to parameter 47 uA.t.1
1-300 seconds (**Default**:15 s)

87 LLP.1 Lower Limit Output Percentage 1
Selects min. value for command output 1 percentage.
0%...100%, **Default**: 0%.

88 uLP.1 Upper Limit Output Percentage 1
Selects max. value for command output 1 percentage.
0%...100%, **Default**: 100%.

89 MG.t.1 Max Gap Tune 1
Selects the max. process-setpoint gap beyond which the automatic tune recalculates PID parameters of process 1.
0-10000 [digit[1p.28]] (degrees.tenths for temp. sensors). **Default**: 2.0

90 Mn.P.1 Minimum Proportional Band 1
Selects the min. proportional band 1 value selectable by the automatic tune for the P.I.D. regulation of process 1.
0-10000 [digit[1p.28]] (degrees.tenths for temp. sensors). **Default**: 3.0

91 MA.P.1 Maximum Proportional Band 1
Selects the max. proportional band 1 value selectable by the automatic tune for the P.I.D. regulation of process 1.
0-10000 [digit[1p.28]] (degrees.tenths for temp. sensors). **Default**: 80.0

92 Mn.i.1 Minimum Integral Time 1
Selects the min. integral time 1 value selectable by the automatic tune for the P.I.D. regulation of process 1.
0.0...1000.0 seconds. **Default**: 30.0 s.

93 o.cL.1 Overshoot Control Level 1
The overshoot control function prevents this event during device switching on or when the setpoint is modified.
Setting a too low value the overshoot may not be fully absorbed, while with high values the process could reach the setpoint more slowly.

Disab.	Lev. 3	Lev. 6	Lev. 9
Lev. 1	Lev. 4	Lev. 7	Lev. 10
Lev. 2	Lev. 5 (**Default**)	Lev. 8	

GROUP G - AL. 1 - Alarm 1

123 AL.1.F. Alarm 1 Function
Alarm 1 selection.

d.SAb.	Disabled (**Default**)
Ab.uP.A.	Absolute Upper Activation. Absolute referred to the process, active over
Ab.Lo.A.	Absolute Lower Activation. Absolute referred to the process, active under
bAnd	Band alarm (command setpoint ± alarm setpoint)
uP.dEv.	Upper Deviation alarm
Lo.dEv.	Lower Deviation alarm

126 A1S.o. Alarm 1 State Output

Alarm 1 output contact and intervention type.

N.o. St.	(N.O. Start) Normally open, active at start (**Default**)
N.c. St.	(N.C. Start) Normally closed, active at start
N.o. tH.	(N.O. Threshold) Normally open, active on reaching alarm[2 p. 28]
N.c. tH.	(N.C. Threshold) Normally closed, active on reaching alarm[2 p. 28]
N.o.tH.V.	(N.O. Threshold Variation) disabled after changing control setpoint[3 p. 28]
N.c.tH.V.	(N.C. Threshold Variation) disabled after changing control setpoint[3 p. 28]

128 A.1HY. Alarm 1 Hysteresis

Alarm 1 hysteresis
-9999..+9999 [digit[1 p. 28]] (degrees for temp. sensors). **Default** 0.5.

129 A.1LL. Alarm 1 Lower Limit

Lower limit selectable for the alarm 1 setpoint.
-9999..+30000 [digit[1 p. 28]] (degrees for temp. sensors). **Default** 0.

130 A.1uL. Alarm 1 Upper Limit

Upper limit selectable for the alarm 1 setpoint
-9999..+30000 [digit[1 p. 28]] (degrees for temp. sensors). **Default** 1750.

131 A.1rE. Alarm 1 Reset

Alarm 1 contact reset type (always automatic if AL.1.F. = c. Auy).

A. rES.	Automatic reset (**Default**)
M. rES.	Manual reset (manual reset by keyboard or by digital input)
M.rES.S.	Stored manual reset (keeps the output status also after a power failure)
A. rES.t.	Automatic reset with timed activation. The alarm remains active for the time set on the parameter 134 A.1.dE., even if the conditions generating it are missing. To be able to act again, the alarm conditions must disappear.

132 A.1S.E. Alarm 1 State Error

Alarm 1 output status in case of error.

oPEn	Open contact. **Default**
cLoSE	Closed contact.

133 A.1Ld. Alarm 1 Led

Defines the status of the led **A1** in correspondence of the relevant output

o.c.	ON with open contact or DO switched off.
c.c.	ON with closed contact or DO switched on. (**Default**)

134 A.1dE. Alarm 1 Delay

Alarm 1 Delay.
-60:00..60:00 mm:ss (hh:mm if AL.1.F. = c. Auy). **Default**: 00:00.
Negative value: delay when exit alarm status.
Positive value: delay when enter alarm status.

135 A.1S.P. Alarm 1 Setpoint Protection

Allows or not to change the alarm 1 setpoint

FREE	Editable by the user (**Default**)

LocK Protected
HidE Protected and not visualized

136 A.LLb. Alarm 1 Label

Selects the message displayed in case of alarm 1 intervention.
diSAb. Disabled. (**Default)** 0.
Lb. 01 Message 1 (see table on paragraph *14.1*)
..
Lb. 16 Message 16 (see table on paragraph *14.1*)
uSEr.L. Custom message (modifiable by the user through the App or via modbus)

GROUP H - AL. 2 - Alarm 2

141 AL2.F. Alarm 2 Function

Alarm 2 selection.
diSAb. Disabled (**Default**)
Ab.uP.A. Absolute Upper Activation. Absolute referred to the process, active over
Ab.Lo.A. Absolute Lower Activation. Absolute referred to the process, active under
bAnd Band alarm (command setpoint ± alarm setpoint)
uP.dEv. Upper Deviation alarm
Lo.dEv. Lower Deviation alarm

144 A.2S.o. Alarm 2 State Output

Alarm 2 output contact and intervention type.
N.o. St. (N.O. Start) Normally open, active at start (**Default**)
N.c. St. (N.C. Start) Normally closed, active at start
N.o. tH. (N.O. Threshold) Normally open, active on reaching alarm[2 p. 28]
N.c. tH. (N.C. Threshold) Normally closed, active on reaching alarm[2 p. 28]
N.o.tH.V. (N.O. Threshold Variation) disabled after changing control setpoint[3 p. 28]
N.c.tH.V. (N.C. Threshold Variation) disabled after changing control setpoint[3 p. 28]

146 A.2HY. Alarm 2 Hysteresis

Alarm 2 hysteresis
-9999..+9999 [digit[1 p. 28]] (degrees for temp. sensors). **Default** 0.5.

147 A.2L.L. Alarm 2 Lower Limit

Lower limit selectable for the alarm 2 setpoint.
-9999..+30000 [digit[1 p. 28]] (degrees for temp. sensors). **Default** 0.

148 A.2.u.L. Alarm 2 Upper Limit

Upper limit selectable for the alarm 2 setpoint
-9999..+30000 [digit[1 p. 28]] (degrees for temp. sensors). **Default** 1750.

149 A.2.rE. Alarm 2 Reset

Alarm 2 contact reset type (always automatic if AL.2.F. = c. Au).
A. rES. Automatic reset (**Default**)
M. rES. Manual reset (manual reset by keyboard or by digital input)
M.rES.S. Stored manual reset (keeps the output status also after a power failure)
A. rES.t. Automatic reset with timed activation. The alarm remains active for the time set on the parameter 152 A.2.dE., even if the conditions generating it are missing. To be able to act again, the alarm conditions must disappear.

150 A.2S.E. Alarm 2 State Error

Alarm 2 output status in case of error
If the alarm output is relay
oPEN Contact or open valve. **Default**

cLoSE Contact or closed valve.

If the alarm output is digital (SSR):

oFF Digital output OFF. **Default**

oN Digital output ON.

151 A2Ld. Alarm 2 Led

Defines the status of the led **A2** in correspondence of the relevant output.

o.c. ON with open contact or DO switched off.

c.c. ON with closed contact or DO switched on. (**Default**)

152 A2dE. Alarm 2 Delay

Alarm 2 Delay. -60:00..60:00 mm:ss (hh:mm if AL.2.F. = c. Au). **Default**: 00:00.

Negative value: delay when exit alarm status.

Positive value: delay when enter alarm status

153 A2SP. Alarm 2 Setpoint Protection

Allows or not to change the alarm 2 setpoint

FREE Editable by the user (**Default**)

Loc Protected

HidE Protected and not visualized

154 A2Lb. Alarm 2 Label

Selects the message displayed in case of alarm 2 intervention.

diSAb. Disabled. (**Default)** 0.

Lb. 01 Message 1 (see table on paragraph *14.1*)

..

Lb. 20 Message 20 (see table on paragraph *14.1*)

uSER.L. Custom message (modifiable by the user through the App or via modbus)

GROUP M - d.i. 1 - Digital input 1

231 d.i.1F. Digital Input 1 Function

Digital input 1 functioning.

diSAb. Disabled (**Default**)

2t. SW. 2 Setpoints Switch

Run Run

tuNE Performing manual tune

Au.MA.i. Automatic / Manual Impulse (if enabled on parameter 48 or 67)

Au.MA.c. Automatic / Manual Contact (if enabled on parameter 48 or 67)

Act.tY. Action Type. Cooling regulat. if D.I. is active, otherwise heating reg.

M. RES. Manual reset. Reset the outputs if selected as manual reset.

232 d.i.1c. Digital Input 1 Contact

Defines the resting contact of the digital input 1.

N.oPEN Normally open (**Default**)

N.cLoS. Normally closed

GROUP Q - SFt.S - Soft-start and mini cycle

264 SS.tY. Soft-Start Type

Enables and selects the soft-start type

diSAb. Disabled (**Default**)

GRAd. Gradient

PERc. Percentage (only with pre-programmed cycle disabled)

266 SS.Gr. Soft-Start Gradient

Rising/falling gradient for soft-start and pre-programmed cycle.

0..20000 Digit/hour[!p.28] (degrees.tenths/hour if temperature). (**Default**: 100.0)

267 SS.PE. **Soft-Start Percentage**

Output percentage during soft-start function.
0..100%. (**Default**: 50%)

268 SS.tH. **Soft-Start Threshold**

Threshold under which the soft-start percentage function is activated, at starting.
-9999...30000 [digit[1 p. 28]] (degrees.tenths for temp. sensors) (**Default**: 1000)

269 SS.t i. **Soft-Start Time**

Max. Softstart duration: if the processs will not reach the threshold selected on par. SS.tH. within the selected time, the controller starts to regulate on setpoint.

00:00	Disabled
00:01-24:00	hh:mm (**Default**: 00:15)

GROUP R - diSP. - Display and interface

277 u.FLt **Visualization Filter**

diSAb.	Disabled
PtcHF	Pitchfork filter (**Default**)
Fi.oRd.	First Order
Fi.oR.P.	First Order with Pitchfork
2 SA.M.	2 Samples Mean
....	...n Samples Mean
10.SA.M.	10 Samples Mean

278 u i.d.2 **Visualization Display 2**

Selects visualization on display 2.

c.1.SPi	Command 1 setpoint (**Default**)
ou.PE.1	Percentage of command output 1

279 tMo.d. **Timeout Display**

Determines the display timeout

diSAb.	Disabled. Display always ON (**Default**)	5 Mi.N	5 minutes
		10Mi.N	10 minutes
15 S	15 seconds	30Mi.N	30 minutes
1 Mi.N	1 minute	1 H	1 hour

280 tMoS. **Timeout Selection**

Selects which display is switched off when Display Timout expires

diSP.1	Display 1
diSP.2	Display 2 (**Default**)
dSP.1.2	Display 1 and 2
d.1.2.Ld.	Display 1, 2 and led

282 u.out **Voltage Output**

Selects the voltage on the sensors power terminals and of the digital outputs (SSR).

12 V	12 volt (**Default**)
24 V	24 volt

283 ScL.t. **Scrolling Time**

Select the duration for the visualization of the user menu data, before returning to the default page.

3 S	3 seconds	1 MIN	1 minutes
5 S	5 seconds (**Default**)	5 MIN	5 minutes
10 S	10 seconds	10MIN	10 minutes
30 S	30 seconds	MAN.Sc.	Manual scroll

284 dSPF. Display Special Functions

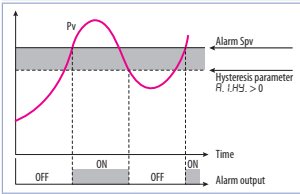
diSAb.	Special functions disabled
SWAP	Shows the setpoint on display 1 and the process on display 2 (only if Par. 278 u1.d2 set on c.ISPu)

285 nFc.L. NFC Lock

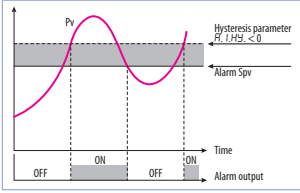
diSAb.	NFC lock disabled: NFC accessible.
ENAb.	NFC lock enabled: NFC not accessible.

12 Alarm Intervention Modes

12.a Absolute or threshold alarm active over (par. 123 AL.1F. = Ab.uPA)

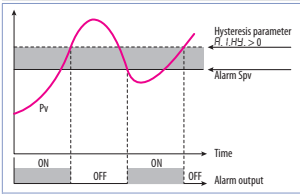


Absolute alarm active over.
Hysteresis value greater than "0" (Par. 128 A.1HY > 0).

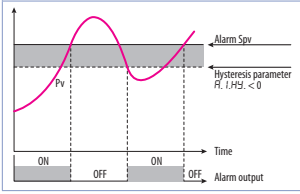


Absolute alarm active over.
Hysteresis value lower than "0" (Par. 128 A.1HY < 0).

12.b Absolute or threshold alarm active below (par. 123 AL.1F. = Ab.uPA)

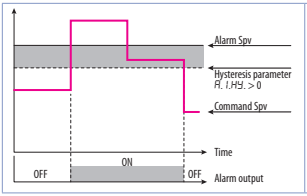


Absolute alarm active below.
Hysteresis value greater than "0" (Par. 128 A.1HY > 0).

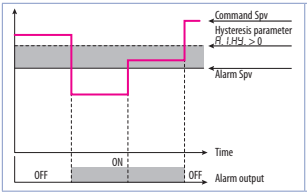


Absolute alarm active below.
Hysteresis value lower than "0" (Par. 128 A.1HY < 0).

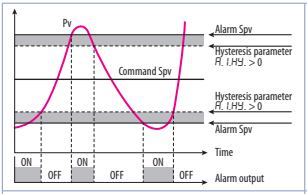
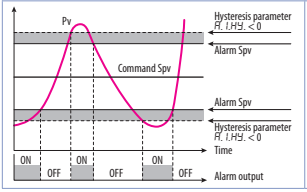
12.c Absolute or threshold alarm referred to command setpoint active over (par. 123 AL.1F. = Ab.c.u.A)

	Absolute alarm referred to command setpoint active over. Hysteresis value greater than “0” (Par. 128 A.1.HY > 0).

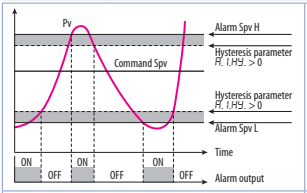
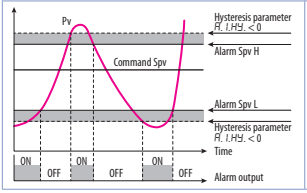
12.d Absolute or threshold alarm referred to command setpoint active below (par. 123 AL.1.F. = Ab.c.L.A.)

	Absolute alarm referred to command setpoint active below. Hysteresis value greater than “0” (Par. 128 A.1.HY > 0).

Band alarm (par. 123 AL.1.F. = bAnd)

	Band alarm hysteresis value greater than “0” (Par. 128 A.1.HY > 0).
	Band alarm hysteresis value lower than “0” (Par. 128 A.1.HY < 0).

12.e Asymmetric band alarm (par. 123 AL.1.F. = A.bAnd)

	Asymmetric band alarm with hysteresis value greater than “0” (Par. 128 A.1.HY > 0).
	Asymmetric band alarm with hysteresis value lower than “0” (Par. 128 A.1.HY < 0).

12.f Upper deviation alarm (par. 123 AL.1.F. = uP.dEu.)

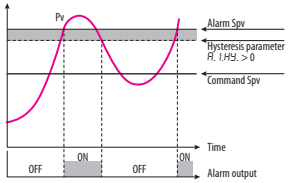
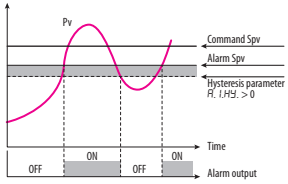
	Upper deviation alarm value of alarm setpoint greater than “0” and hysteresis value greater than “0” (Par.128 A1.HY. > 0). **NB**: with hysteresis value less than “0” (A1.HY. < 0) the dotted line moves under the alarm setpoint.
	Upper deviation alarm value of alarm setpoint less than “0” and hysteresis value greater than “0” (Par.128 A1.HY. > 0). **NB**: with hysteresis value less than “0” (A1.HY. < 0) the dotted line moves under the alarm setpoint.

Table of configuration parameters

GROUP A - A.in.1 - Analogue input 1			
1	SEn.1	Sensor AI1	19
2	d.P. 1	Decimal Point 1	19
3	dEGr.	Degree	19
4	LL.i.1	Lower Linear Input AI1	19
5	uL.i.1	Upper Linear Input AI1	19
6	P.uA.1	Potentiometer Value AI1	19
7	i.oL.1	Linear Input over Limits AI1	20
8	o.cA.1	Offset Calibration AI1	20
9	G.cA.1	Gain Calibration AI1	20
10	Ltc.1	Latch-On AI1	20
11	c.FL.1	Conversion Filter AI1	20
12	c.Fr.1	Conversion Frequency AI1	20
13	L.cE.1	Lower Current Error 1	20
14÷17		Reserved Parameters - Group A	20
GROUP C - cMd.1 - Outputs and regulation Process 1			
35	c.ou.1	Command Output 1	21
37	rES.	Reserved	21
38	Ac.t.1	Action type 1	21
39	c.HY.1	Command Hysteresis 1	21
40	LLS.1	Lower Limit Setpoint 1	21
41	uLS.1	Upper Limit Setpoint 1	21
42	c.rE.1	Command Reset 1	21
43	cS.E.1	Command State Error 1	21
44	c.Ld.1	Command Led 1	21
45	c.dE.1	Command Delay 1	22
46	cS.P.1	Command Setpoint Protection 1	22
48	A.MA.1	Automatic / Manual 1	22
49	in.S.	Initial State	22
51	iSP.1	Initial Value Setpoint 1	22
52÷53		Reserved Parameters - Group C	22
GROUP E - rEG.1 - Autotuning and PID 1			
73	tun.1	Tune 1	23
74	S.d.t.1	Setpoint Deviation Tune 1	23
75	P.b. 1	Proportional Band 1	23
76	i.t. 1	Integral Time 1	23
77	d.t. 1	Derivative Time 1	23
78	d.b. 1	Dead Band 1	23
79	P.b.c.1	Proportional Band Centered 1	23
80	o.oS.1	Off Over Setpoint 1	23
81	o.d.t.1	Off Deviation Threshold 1	23
82	c.t. 1	Cycle Time 1	23
87	LLP.1	Lower Limit Output Percentage 1	24
88	uLP.1	Upper Limit Output Percentage 1	24
89	M.G.t.1	Max Gap Tune 1	24
90	Mn.P.1	Minimum Proportional Band 1	24
91	MA.P.1	Maximum Proportional Band 1	24
92	Mn.i.1	Minimum Integral Time 1	24
93	o.cL.1	Overshoot Control Level 1	24