Pixsys®
ELECTRONICS

ATR 142

Controller

User manual

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Introduction

Thank you for choosing a Pixsys controller.
With the ATR142 model Pixsys makes available in a single device multiple options related to sensor input and actuators command in addition to the extended power range 24…230 Vac/Vdc. With 17 sensors to select and outputs configurable as relay or SSR command, the user or retailer can reduce stock by rationalising investment and device availability. The series includes a version equipped with serial communication RS485 Modbus. The configuration is further simplified by the Memory cards which are provided with internal battery and therefore do not require cabling to power the controller.

1 Safety standards

Carefully read the instructions and safety measures in this manual before using the device. Disconnect power before performing any interventions on the electrical connections or hardware settings. Only qualified personnel may use/perform maintenance in full respect of the technical data and declared environmental conditions.
Do not dispose of electrical appliances together with household waste. In compliance with the European Directive 2002/96/EC, waste electrical equipment must be collected separately for eco-compatible reuse or recycling.

2 Model Identification

Refer to the table below to easily select preferred model.

All versions available with power 24…230 Vac/Vdc +/-15% 50/60Hz – 4,6VA	
ATR142-ABC	2 relays (8A+5A) + 1 SSR
ATR142-ABC-T	1 relays 8A + 1 Ssr + RS485

3 Technical Data

3.1 General Features

Display	4 0.40 inch displays + 4 0.30 displays
Operating temperature	1 relays 8A + 1 Ssr + RS485
Sealing	IP65 front panel (with gasket) IP30 box, IP20 terminals
Material	Polycarbonate UL94V2 self-extinguishing
Weight	100 g

3.2 Hardware Features

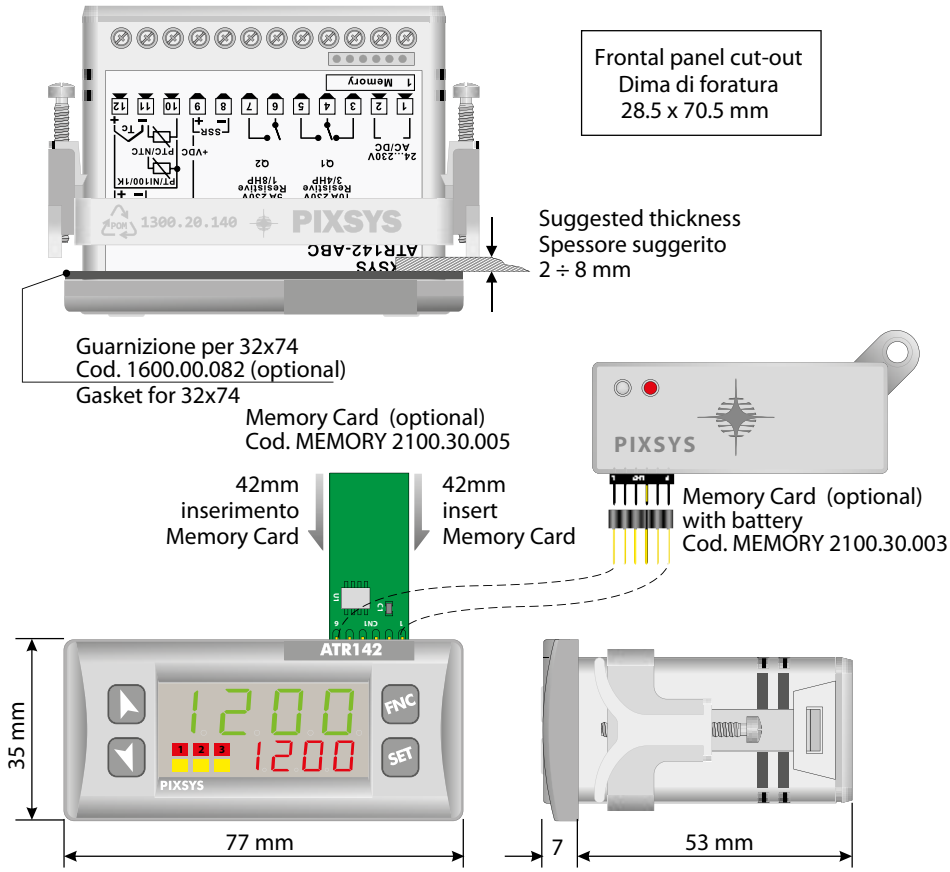
Analogue input	**AN1**. Configurable via software. **Thermocouple type**: K, S, R, J. Automatic compensation of cold junction from 0°C to 50°C. **Thermoresistance**: PT100, PT500, PT1000, Ni100, PTC1K, NTC10K (β 3435K). **Linear**: 0-10V, 0-20 or 4-20mA, 0-40mV **Potentiometers**: 6KΩ, 150KΩ,	Tolerance (25°C) +/-0.2 % ± 1 digit (full scale) for thermocouple input, thermo-resistance and V/mA. Cold junction accuracy 0.1°C/°C **Impedance**: **0-10V**: Ri>110KΩ **0-20mA**: Ri<5Ω **4-20mA**: Ri<5Ω **0-40mV**: Ri>1MΩ
Relay output	**2** relays (ATR142-ABC) **1** relay (ATR142-ABC-T) Configurable as command and/or alarm output	Contacts: **Q1**: 8A-250V~ for resistive loads **Q2**: 5A-250V~ for resistive loads
SSR output	1 SSR Configurable as command output and/ or alarm output.	12Vdc/30mA

Supply	Power supply 24..230 Vac/Vdc +/-15% 50/60Hz	Power consumption 4.6VA

3.3 Software Features

Regulation algorithms	ON-OFF with hysteresis. P, PI, PID, PD with proportional time
Proportional band	0...9999°C or °F
Integral time	0,0...999,9 sec (0 excluded)
Derivative time	0,0...999,9 sec (0 excluded)
Controller functions	Manual or automatic Tuning, configurable alarms, protection of command and alarm setpoints, activation of functions via digital input, preset cycle with Start/Stop.

4 Dimensions and Installation

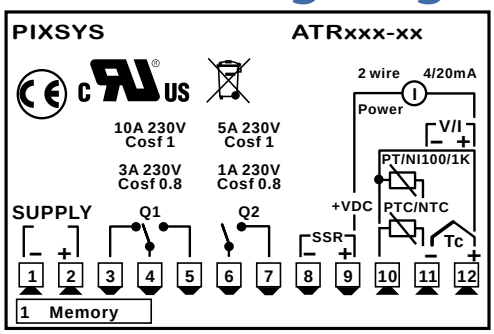


5 Electrical wirings

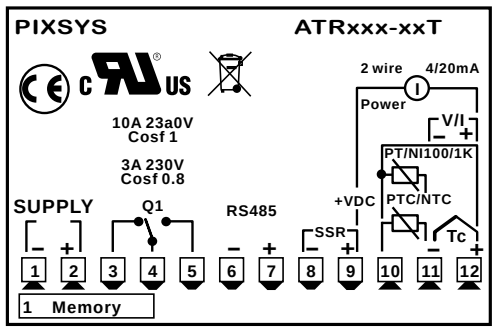
Although this controller was designed to resist electromagnetic interferences in industrial environments, please observe following safety guidelines:

- Separate the control line from the power wires.
- Avoid proximity of remote control switches, electromagnetic contactors, powerful engines and in all instances use specific filters.
- Avoid proximity of power groups, especially those with phase control

5.1 Wiring diagram

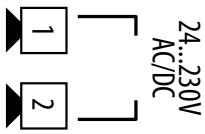


ATR142-ABC



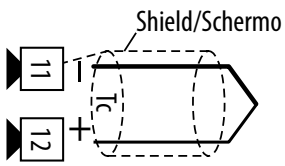
ATR142-ABC-T

5.1.a Power Supply



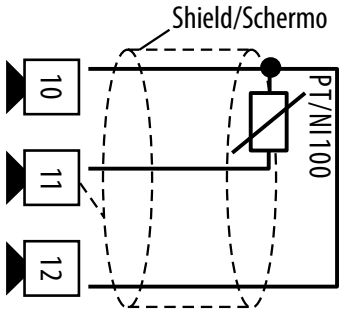
Switching power supply with extended range 24..230 Vac/dc ±15% 50/60Hz – 5,5VA.

5.1.b AN1 Analogue Input



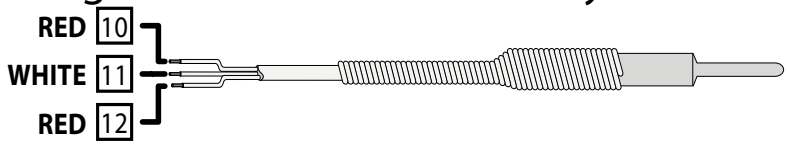
For thermocouples K, S, R, J.

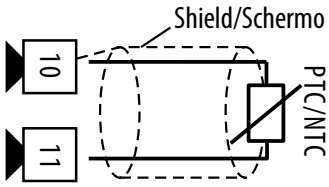
- Comply with polarity
- For possible extensions, use compensated cable and terminals suitable for the thermocouples used(compensated)
- When shielded cable is used, it should be grounded at one side only



For thermoresistances PT100, NI100

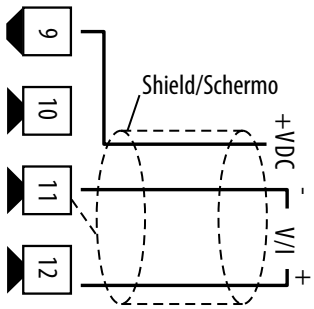
- For the three-wire connection use wires with the same section
- For the two-wire connection short-circuit terminals 10 and 12
- When shielded cable is used, it should be grounded at one side only





For thermoresistances NTC, PTC, PT500, PT1000 e potentiometers

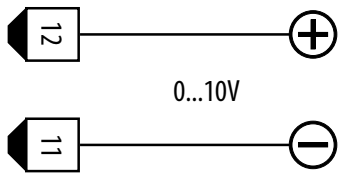
- When shielded cable is used, it should be grounded at one side only to avoid ground loop currents



For linear signals V/mA

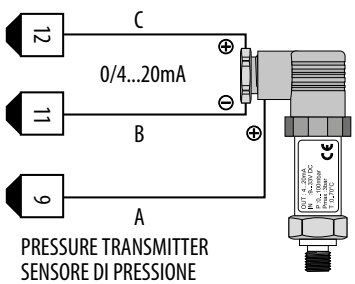
- Comply with polarity
- When shielded cable is used, it should be grounded at one side only

5.1.c Examples of Connection for linear input



For signals 0..10V

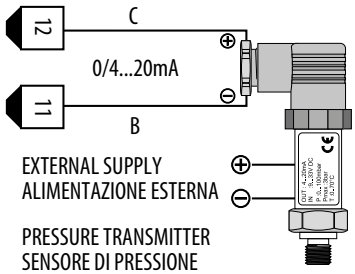
- Comply with polarity



For signals 0/4..20mA with **three-wire sensor**

- Comply with polarity

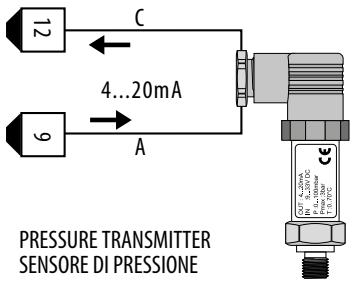
C = Sensor output
B = Sensor ground
A = Sensor power supply (12V/30mA)



For signals 0/4..20mA with **external power of sensor**

- Comply with polarity

C = Sensor output
B = Sensor ground

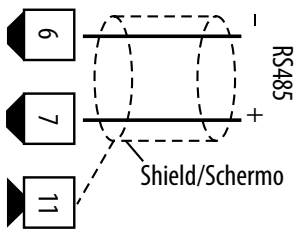


For signals 0/4..20mA with **two-wire sensor**

- Comply with polarity

C = Sensor output
A = Sensor power supply (12V/30mA)

5.1.d Serial input

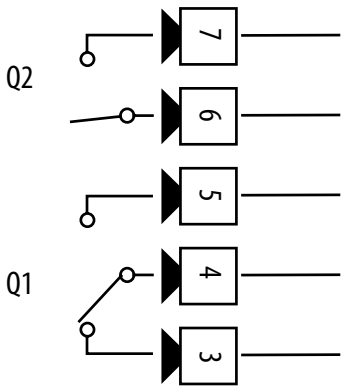


RS485 Modbus RTU communication

Do not use LT (line termination) resistors

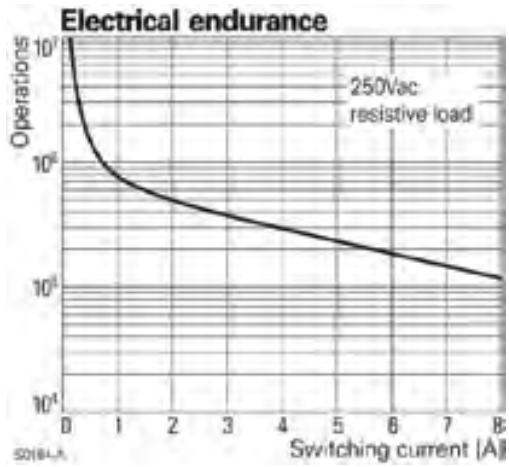
- For networks with more than five instruments supply in low voltage

5.1.e Relay Q1 Output

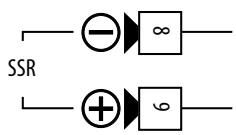


Capacity:

- **Q1**: 8A, 250Vac,resistive loads,10^5 operations. 30/3A, 250Vac, cosφ=0.3, 10^5 operations.
- **Q2**: 5A, 250Vac, resistive loads, 105 operations. 20/2A, 250Vac, cosφ=0.3, 10^5 operations.

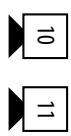


5.1.f SSR output



SSR command output 12V/30mA

5.1.g Digital Input



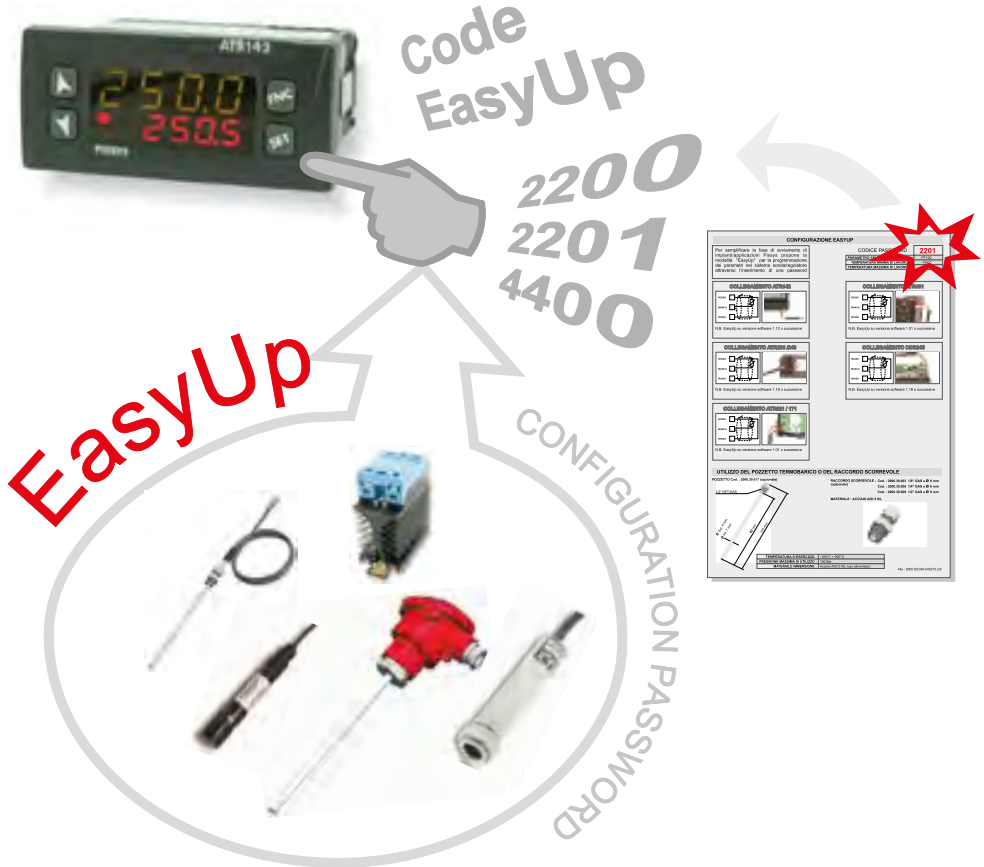
Digital input according to parameter *dGt. 1*.
The use of digital input in this version is possible only with TC sensors or 0..10V, 0/4..20mA and 0...40mV signals

6 Configuration EASYUP

To simplify the setting of parameters and the integration of the different components involved in the control system, Pixsys introduces the EASY-UP coding which allows to set sensors and/or command outputs in a single step.

By means of the code listed in the data sheet enclosed to the sensor or actuator (SSR, motorized valve etc..) the EASY-UP coding will set the relevant main parameters on the controllers (ex. selection of PT100 on parameter "Sensor" and the corresponding measuring range on parameters "Lower and Upper limits of setpoint").

Different codes may be entered on the controllers in sequence to configure inputs, control output or retransmission of signal.



7 Display and keys functions

7.1 Numeric indicators (Display)

1	1234	Normally displays the process. During the configuration phase, it displays the parameter being inserted.
2	1234	Normally displays the setpoint. During the configuration phase, it displays the parameter value being inserted.

7.2 Meaning of status lights (Led)

3	1	ON when the output command is on. For motorised valve command, led is ON when valve is opening and blinks when closing.
4	2	ON when alarm 1 is on.
5	3	ON when alarm 2 is on.
6	M	ON when the "Manual" function is on.
7	T	ON when the controller is running an "Autotuning" cycle.
8	R	ON when the controller communicates via serial port.

7.3 Keys

9	"﹀"	• Allows to decrease main setpoint. • During configuration phase, allows to slide through parameters. Together with **SET** key it modifies them. • Pressed after **SET** key it allows to decrease alarm setpoint.
10	"﹀"	• Allows to increase main setpoint. • During configuration phase, allows to slide through parameters. Together with **SET** key it modifies them. • Pressed after **SET** key it allows to increase alarm setpoint.
11	**SET**	• Allows to display alarm setpoint and runs the autotuning function. • Allows to modify configuration parameters.
12	**FNC**	• Allows to run the autotuning function and to select Manual/automatic operation. • Allows to enter/exit for configurator procedure.

8 Controller functions

8.1 Modifying main setpoint and alarm setpoint values

Setpoint value can be changed by keyboard as follows:

	Press	Effect	Do
9	"﹀" or "﹀"	Value on display 2 changes	Increase or decrease main setpoint
10	**SET**	Visualize alarm setpoint on display 1	
11	"﹀" or "﹀"	Value on display 2 changes	Increase or decrease the alarm set point value

8.2 Auto-Tune

Tuning procedure calculates the controller parameters and can be manual or automatic according to selection on parameter 46 tunE.

8.3 Manual tuning

Manual procedure allows the user greater flexibility to decide when to update PID algorithm parameters. The procedure can be activated in two ways.

- **Running Tuning by keyboard**:
  Press **FNC** key until display 1 shows the writing tunE with display 2 showing oFF, press "^", display 2 shows on. The T led switches on and the procedure begins.
- **Running Tuning by digital input**:
  Select tunE on parameter 50 dGt. i.. At first activation of digital input (commutation on front panel) T led switches ON and at second activation switches off.

8.4 Automatic tuning

Automatic tuning activates whenever the controller is switched on or when the setpoint is modified to a value over 35%.
To avoid an overshoot, the threshold where the controller calculates new PID parameters is determined by the setpoint value minus the "Set Deviation Tune" (Parameter 47 S.d.tu.).
To exit Tuning and keep PID values unchanged, just press the **FNC** key until display 1 shows the writing tunE with the display showing on, press "v", display 2 shows oFF.
The T led switches off and the procedure finishes.

8.5 Soft start

To reach the setpoint the controller can follow a gradient expressed in units (e.g. degree/hour).
Enter this gradient on parameter 51 GrAd. with the chosen units/hour; only **on subsequent activation** the controller uses soft start function.

Automatic/manual tuning cannot be enabled if the Soft start is active.

8.6 Automatic / manual regulation for % output control

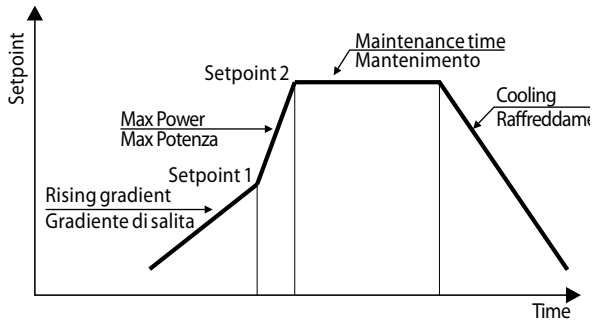
This function allows to select automatic functioning or manual command of the output percentage.
Parameter 49 Au.MA., can select two methods.

- First selection En.: pressing the **FNC** key display 1 shows P.---, while display 2 shows Auto.
  Press the "^" key to select MAn. mode; it is now possible, to change the output percentage using the keys "^" and "v". To return to automatic mode, using the same procedure, select Auto on display 2: M led switches off and functioning returns to automatic mode.
- Second selection En.St.: same functioning, but with two important variants:

- If there is a temporary power failure or after switch-off, manual functioning as well as the previous output percentage value will be maintained at restarting.
- If the sensor breaks during automatic functioning, controller moves to manual mode while maintaining the output percentage command unchanged as generated by the PID immediately before breakage.

8.7 Pre-Programmed cycle

Pre-programmed cycle function activates by setting Pr.cY. on parameter 48 oP.No.
Controller reaches setpoint1 basing on the gradient set on parameter 51 GrAd., then it reaches max. power up to setpoint2. When the process reaches max. power, this setpoint is maintained for the time set on parameter 52 MA.t.1. At expiry, process will reach ambient temperature according to gradient entered on parameter 64 FA.Gr., then command output will be disabled and display will visualize StoP.



Cycle starts at each activation of the controller, or via digital input if it is enabled for this type of functioning (parameter 50 dGt. i.).

8.8 Memory card (optional)

Parameters and setpoint values can be duplicated from one controller to another using the Memory card.
There are two methods:

- **With the controller connected to the power supply**
  Insert the memory card **when the controller is off**.
  On activation display 1 shows MEMo and display 2 show ---- (**Only if the correct values are saved in the memory card**). By pressing the "^" key display 2 shows LoAd, then confirm using the **FNC** key. The controller loads the new data and starts again.
- **With the controller not connected to power supply**.
  The memory card is equipped with an internal battery with an autonomy of about 1000 operations.
  Insert the memory card and press the programming button.

When writing the parameters, the led turns to red and on completing the procedure it turns to green. It is possible to repeat the procedure without any particular attention.

Updating Memory Card

To update the memory card values, follow the procedure described for the first method, setting display 2 to ---- so as not to load the parameters on controller[1].
Enter configuration level and change at least one parameter. Exit configuration. Changes are saved automatically.

[1] *If on activation the controller does not display MEMo it means no data have been saved on the memory card, but it is possible to update values.*

8.9 Loading default values

This procedure allows to restore factory settings of the device

	Press	Effect	Do
1	**FNC** for 3s.	Display 1 shows 0000 with the 1st digit flashing, while display 2 shows PASS	
2	"^" and "v"	Change the flashing digit and move to the next one using the **SET** key.	Enter password 9999
3	**SET** to confirm	Instrument loads default settings	Turn off and restart the instrument

8.10 LATCH ON functions

For use with input Pot.1 (potentiometer 6KΩ) and Pot.2 (potentiometer 150KΩ) and with linear input (0…10V, 0...40mV, 0/4…20mA), it is possible to associate start value of the scale (parameter 6 Lo.L.1) to the minimum position of the sensor and value of the scale end (parameter 7 uP.L.1) to the maximum position of the sensor (parameter 8 LAtc. configured as Std.). It is also possible to fix the point in which the controller will display 0 (however keeping the scale range between Lo.L.1. and uP.L.1.) using the "virtual zero" option by setting u.0St. or u.0in. in parameter 8 LAtc. If you set u.0in. the virtual zero will reset after each activation of the device; if you set u.0St. the virtual zero remains fixed once tuned.
To use the LATCH ON function, configure according to required operation the parameter LAtc.[2]

[2] *The tuning procedure starts by exiting the configuration after changing the parameter.*

For the calibration procedure refer to the following table:

	Press	Effect	Do
1	**FNC**	Exit parameters configuration. Display 2 shows the writing LAtc.	Place the sensor on the minimum operating position (associated with Lo.L. 1.)
2	"﹀"	Set the value to minimum. The display shows LoU	Place the sensor on the maximum operating position (associated with uP.L. 1.)
3	"﹀"	Set the value to maximum. The display shows HiGt	To exit standard procedure press **FNC**. For "virtual zero" settings place the sensor on zero point.
4	**SET**	Set the virtual zero value. The display shows uirt. **NB**: for selection of u.0in. the procedure on point 4 should be followed at each re-activation.	To exit the procedure press **FNC**.

8.11 Digital input functions

On ATR142 model, digital input can be enabled by using parameters 48 oP.No. and 50 dGt. 1.

- **Parameter 48** oP.No.
  conf.: Operating as controller.
  NB: When using this settings, parameter 50 dGt. 1. is ignored.

2t.S.: Switch two thresholds setpoint: with open contact ATR142 regulates on **SET**1; with closed contact regulates on **SET**2;
2t.S. i.: Switch two thresholds setpoint: setpoint selection is done by an impulse on digital input;
3t.S. i.: Switch three thresholds setpoint by an impulse on digital input;
4t.S. i: Switch four thresholds setpoint by an impulse on digital input;
P.r.c.Y.: Pre-programmed cycle (parameter 7.7).
Setpoints values can be modified any time pressing **SET** key.

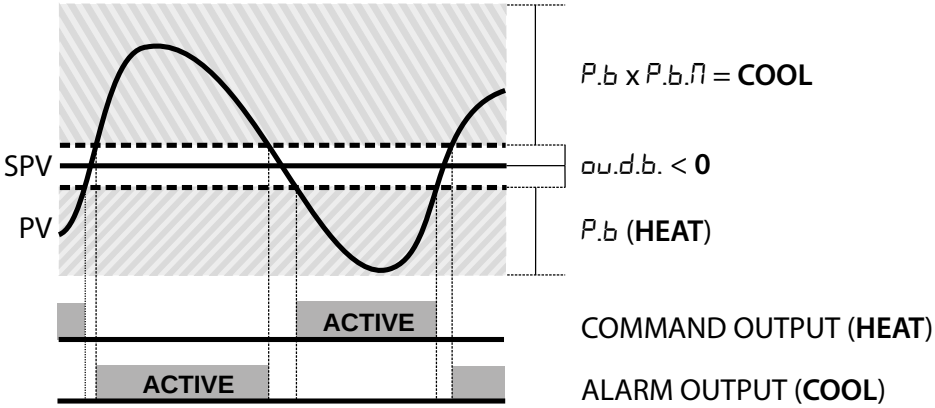
- **Parameter 50** dGt. i.
  NB: Settings on this parameter are available only if cont. or Pr.cY. are selected on parameter 48 oP.no.
  St.St.: Start / Stop; operating on digital input the controller switches alternatively from start to stop;
  rn.n.o.: Run N.O. Controller is in start only with closed input;
  rn.n.c.: Run N.C. Controller is in start only with open input;
  L.c.n.o.: With closed input allows to lock the reading of sensors;
  Lc.n.c.: With open input allows to lock the reading of sensors;
  tunE: Enables/disables Tuning function if parameter 46 tunE is selected as MAn.;
  A.MA. i.: If parameter 49 Au.MA. is selected as En. or En.St. controller switch from automatic to manual functioning;
  A.MA.c.: If parameter 49 Au.MA. is selected as En. or En.St. ATR142 works in automatic mode if input is open or in manual mode if input is closed.
  t.1.S.S.: timer 1 Start/Stop, (parameter 8.)

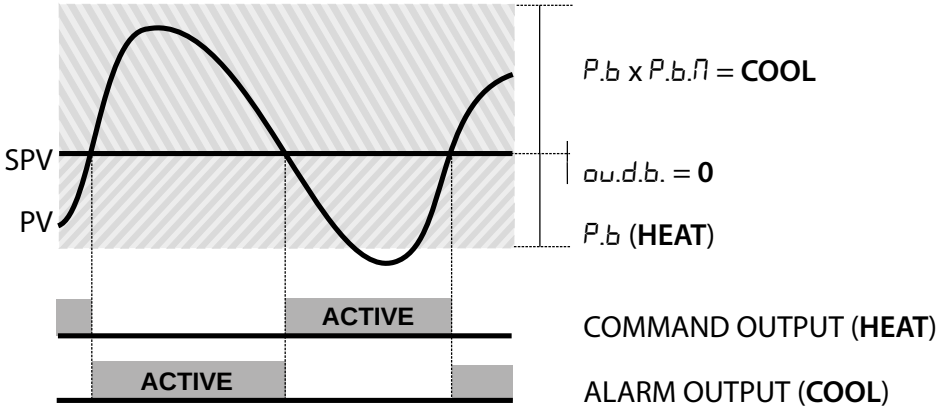
NB: digital input functions **are not** available with sensors PT100, NI100, NTC, PTC, PT500, PT1000 and potentiometers.

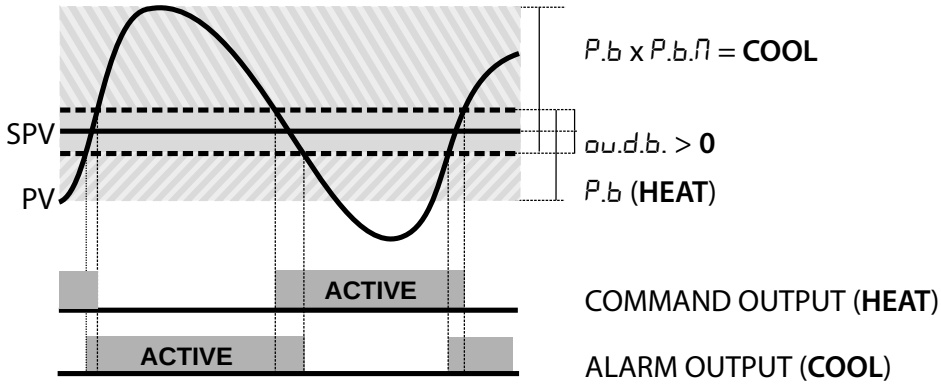
8.12 Dual action heating-cooling

ATR142 is suitable also for systems requiring a combined heating-cooling action.
Main command output must be configured foe hearting PID (*Act.t.* = *HEAt* and *P.b.* must be greater than 0), and one of the alarms (*AL.1* or *AL. 2*) must be configured as *cooL*. Command output must be connected to the actuator responsible for heat, while the alarm output will control cooling action.
Parameters to configure for the Heating PID are:
Act.t. = *HEAt* Command output type (Heating)
P.b.: Heating proportional band
t. i.: Integral time of heating and cooling
t.d.: Derivative time of heating and cooling
t.c.: Heating time cycle
The parameters to configure for the Cooling PID are the following (example: action associated to alarm1):
AL. 1 = *cooL* Alarm1 selection (cooling)
P.b.M.: Proportional band multiplier
ou.d.b.: Overlapping/Dead band
co.t.c.: Cooling time cycle
Parameter *P.b.M.* (that ranges from 1.00 to 5.00) determines the proportional band of cooling basing on the formula:
Cooling proportional band = *P.b.* * *P.b.M.*
This gives a proportional band for cooling which will be the same as heating band if *P.b.M.* = 1.00, or 5 times greater if *P.b.M.* = 5.00. The **integral time and derivative time** are the same for both actions.
Parameter *ou.d.b.* determines the overlapping percentage between the two actions. For systems in which the heating and cooling output must never be simultaneously active a dead band (*ou.d.b.* ≤ 0) can be configured, and viceversa an overlapping (*ou.d.b.* > 0).

The following diagram shows an example of dual PID action (heating-cooling) with *t. i.* = 0 and *t.d.* = 0.







Parameter co.t.c. has the same meaning of the cycle time t.c. for heating.
Parameter coo.F. (cooling fluid) pre-selects the proportional band multiplier P.b.M. and the cooling PID cycle time co.t.c. basing on the type of cooling fluid:

coo.F.	Cooling fluid type	P.b.M.	co.t.c.
Air	Air	1.00	10
oil	Oil	1.25	4
H2o	Water	2.50	2

9 Timer operation

Timer operation is enabled by parameter 63 tMr.F. To modify duration of counting time, follow the steps below:

	Press	Effect	Do
1	SET	Press until t.1n. 1 or t.1n. 2 visualized on display 1.	
2	"^" and "v"	Digits on display 2 changes.	Increase or decrease time value for the selected timer.

Below a description of available options for Timer operation.

9.1 Single timer

This option enables one single Timer and the time is selectable by the operator.

To achieve this operation set parameter 63 tMr.F. as follows:

- S.tM.S. (Single Timer Seconds) time-basis in seconds (mm.ss)
- S.tM.M. (Single Timer Minutes) time-basis in minutes (hh.mm)

To start/stop the Timer, press **FNC** for 1s.

During the counting, Led R is On and display2 shows decrementing time. At elapsing of Timer, led R switches off and display 2 flashes, visualising the programmed time until any key is pressed.

Start/Stop of Timer is possibile also by digital input, selecting t.I.S.S. on parameter 50 dGt. i..

9.2 Dual timer

This option enables two Timers and the time is selectable by the operator: timers **cannot be started at same time**.

To achieve this operation set parameter 63 as follows:

- d.tM.S. (Double Timer Seconds) time-basis in seconds (mm.ss)
- d.tM.M. (Double Timer Minutes) time-basis in minutes (hh.mm)

Check the table below for the Start procedure:

	Press	Effect	Do
1	**FNC**	Press until t.m. 1 or t.m. 2 visualized on display 1.	
2	"^"	Start the Timer. Display 2 shows decrementing time and Led R switches on (fixed for timer 1, flashing for timer 2).	Back to point 1, after selection of running Timer press "^" to stop counting. Led R switches off.

At elapsing of Timer the led R switches off and display 2 flashes, showing the programmed time until any key is pressed. Start/Stop of Timer by digital input **is NOT available** for dual timer mode.

9.3 Dual sequential timer

This option enables two Timers and the time is selectable by the operator. At elapsing of Timer 1, counting of Timer 2 will automatically start . At elapsing of Timer 2, counting will stop. To achieve operation of dual sequential Timer set the parameter 63 tmr.F. as follows:

- d.S.t.S. (Double Sequential Timer Seconds) time-basis in seconds (mm.ss)
- d.S.t.m. (Double Sequential Timer Minutes) time-basis in minutes (hh.mm)

To start/stop the Timer, press key **FNC** for 1s. During the counting, Led R is On (fixed for Timer 1, flashing for Timer 2) and display2 shows decrementing time. Start is always made on Timer 1. At elapsing of Timer, led R is switched off and display 2 shows setpoint value. Start/Stop of Timer is possibile also by digital input, selecting t.I.S.S. on parameter 50 dGt. 1.

9.4 Dual timer loop

This option enables 2 Timers and the time value is selectable by the operator. At elapsing of one Timer, the other one will automatically start and this sequence is repeated cycling.
To achieve operation of dual timer loop set the parameter 63 tMr.F. as follows:

- d.t.L.S. (Double Timer Loop Seconds) time-basis in seconds (mm.ss)
- d.t.L.M. (Double Timer Loop Minutes) time-basis in minutes (hh.mm)

To start/stop the Timer, press **FNC** for 1s.
During the counting, Led R is On (fixed for Timer1, flashing for Timer 2) and display 2 shows decrementing time. Start is always made on Timer 1.
Start/Stop of Timer is possibile also by digital input, selecting t.1.S.S. on parameter 50 dGt. i.

9.5 Relating timers to alarms

It is possible to associate the alarms (relay or SSR outputs) to the timers by parameters 23 AL. 1 and 31 AL. 2. The table below is showing the combined operation of alarms and Timers.

Selection par. 23 or 31	Description
t.1.S.A. Timer 1 Start Alarm	Alarm active as long as Timer 1 is in Start mode (Timer active)
t.1.E.A. Timer 1 End Alarm	Alarm active at elapsing of Timer1 until any key is pressed. Option not available for Dual sequential Timer and Dual Timer Loop.
t.1.W.A. Timer 1 Warning Expiring	Alarm active for the last 5” of Timer1
t.2.S.A. Timer 2 Start Alarm	Alarm active as long as Timer 2 is in Start mode (Timer active)

t.2.E.A. Timer 2 End Alarm	Alarm active at elapsing of Timer2 until any key is pressed. Option not available for Dual sequential Timer and Dual Timer Loop.
t.2.U.E. Timer 2 Warning Expiring	Alarm active for the last 5" of Timer2
t.1.2.S. Timer 1-2 Start Alarm	Alarm active as long as Timers 1 and 2 are in Start mode (Timers active)
t.1.2.E. Timer 1-2 End Alarm	Alarm active at elapsing of Timers 1 and 2 until any key is pressed. Option not available for Dual sequential Timer and Dual Timer Loop.
t.1.2.U. Timer 1-2 Warning expiring	Alarm active for the last 5" of Timers 1 and 2.

10 Serial Communication

10.1 Slave

ATR142-ABC-T is equipped with RS485, it can receive and broadcast data via serial communication using MODBUS RTU protocol. The device operates as slave if parameter 59 MASt. is set as d.S. This function enables the control of multiple devices connected to a supervisory system (SCADA).

Each controller will answer to a master query only if the query contains same address as on parameter SL.Ad. The permitted addresses range from 1 to 254 and there should not be controllers with the same address on the same line.

Address 255 can be used by the master to communicate with all the connected equipment (broadcast mode), while with 0 all the devices receive the command, but no answer is expected.

ATR142 can introduce an answer delay (in milliseconds) to master request. This delay has to be set on parameter 58 SE.dE..

At each parameter configuration, the device stores changed values in the EEPROM memory (100000 writing cycles), while setpoints are stored with a delay of 10 seconds after last modification. **NB**: modifications made to words different from those described in the following table can lead to instrument malfunction.

Modbus RTU protocol features	
Baud-rate	Selectable on parameter 56 4.8 ŀ 4800bit/sec 9.6 ŀ 9600bit/sec 19.2ŀ 19200bit/sec 28.8ŀ 28800bit/sec 38.4ŀ 38400bit/sec 57.6ŀ 57600bit/sec
Format	8, N, 1 (8bit, no parity, 1 stop)
Supported functions	WORD READING (max 20 word) (0x03, 0x04) SINGLE WORD WRITING (0x06) MULTIPLE WORDS WRITING (max 20 word) (0x10)

The list below includes all available addresses:

RO = Read Only R/W = Read/Write WO = Write Only

Modbus address	Description	Read Write	Reset value
0	Device type	RO	EEPROM
1	Software version	RO	EEPROM
5	Slave Address	R/W	EEPROM
6	Boot version	RO	EEPROM
50	Automatic addressing	WO	-
51	System code comparison	WO	-

500	Loading default values: 9999 restore all values 9998 restore all values except for baud-rate and slave address 9997 restore all values except for slave address 9996 restore all values except for baud-rate	WO	0
1000	Process (with tenths of degree for temperature sensors; digits for linear sensors)	RO	-
1001	Setpoint1	R/W	EEPROM
1002	Setpoint2	R/W	EEPROM
1003	Setpoint3	R/W	EEPROM
1004	Setpoint4	R/W	EEPROM
1005	Alarm1	R/W	EEPROM
1006	Alarm2	R/W	EEPROM
1007	Setpoint gradient	RO	EEPROM
1008	Outputs status (0=off, 1=on) Bit 0 = Q1 relay Bit 1 = Q2 relay Bit 2 = SSR	RO	0
1009	Heating output percentage (0-10000)	RO	0
1010	Cooling output percentage (0-10000)	RO	0
1011	Alarms status (0=none, 1=active) Bit0 = Alarm 1 Bit1 = Alarm 2	RO	0
1012	Manual reset: write 0 to reset all the alarms. In reading (0=not resettable, 1=resettable): Bit0 = Alarm 1 Bit1 = Alarm 2	WO	0

1013	Error flags Bit0 = Eeprom writing error Bit1 = Eeprom reading error Bit2 = Cold junction error Bit3 = Process error (sensor) Bit4 = Generic error Bit5 = Hardware error Bit6 = Master off-line Bit7 = Missing calibration data	RO	0
1014	Cold junction temperature (tenths of degree)	RO	-
1015	Start/Stop 0=controller in STOP 1=controller in START	R/W	0
1016	Lock conversion ON/OFF 0=Lock conversion off 1=Lock conversion on	R/W	0
1017	Tuning ON/OFF 0=Tuning off 1=Tuning on	R/W	0
1018	Automatic/manual selection 0=automatic 1=manual	R/W	0
1019	OFF LINE* time (milliseconds)	R/W	0
1100	Process visualized (decimal as display)	RO	-
1101	Visualized Setpoint 1 (decimal as display)	R/W	EEPROM
1102	Visualized Setpoint 2 (decimal as display)	R/W	EEPROM
1103	Visualized Setpoint 3 (decimal as display)	R/W	EEPROM
1104	Visualized Setpoint 4 (decimal as display)	R/W	EEPROM
1105	Visualized Alarm 1 (decimal as display)	R/W	EEPROM

1106	Visualized Alarm 2 (decimal as display)	R/W	EEPROM
1107	Setpoint gradient (decimal as display)	RO	EEPROM
1108	Heating output percentage (0-1000)	RO	0
1109	Heating output percentage (0-100)	RO	0
1110	Cooling output percentage (0-1000)	RO	0
1111	Cooling output percentage (0-100)	RO	0
2001	Parameter 1	R/W	EEPROM
...	...	...	...
2064	Parameter 64	R/W	EEPROM
3000	Disabling serial control of machine**	WO	0
3001	First word display1 (ASCII)	R/W	0
...	…..	R/W	0
3008	Eighth word display1 (ASCII)	R/W	0
3009	First word display2 (ASCII)	R/W	0
...	…..	R/W	0
3016	Eighth word display2 (ASCII)	R/W	0
3017	Word LED Bit 0 = LED 1 Bit 1 = LED 2 Bit 2 = LED 3 Bit 3 = LED **MAN** Bit 4 = LED **TUN** Bit 5 = LED **REM**	R/W	0
3018	Word keys (write 1 to command keys) Bit 0 = “❯” Bit 1 = “❮” Bit 2 = **SET** Bit 3 = **FNC**	R/W	0

3019	Word serial outputs Bit 0 = Q1 relay Bit 1 = Q2 relay Bit 2 = SSR	R/W	0
3020	Word serial outputs state if off-line Bit 0 = Q1 relay Bit 1 = Q2 relay Bit 2 = SSR	R/W	0
3021	Word serial process	R/W	0

* *If value is 0, the control is disabled. If different from 0, it is the max. time which can elapse between two pollings before the controller goes off-line. If it goes off-line, the controller returns to Stop mode, the control output is disabled but the alarms are active.*

** *By writing 1 on this word, the effects of the writing are cancelled on all the Modbus addresses from 3001 to 3022. Control therefore returns to the controller.*

10.2 Master

The device works as master if value selected on parameter 59 MASt. is other than diS.

10.2.1 Master mode in retransmission

Selecting this mode, the device will write the value to be retransmitted to the address selected on parameter 60 Add.r on the slave devices having same ID as value selected on parameter 57 SL.Ad.

Regarding retransmission of setpoint values, after writing the value on slaves, ATR142 starts reading the corresponding word, so that any modification of value on the slave will be automatically updated also on the Master. Two successive pollings will be delayed for the time selected on parameter 57 SE.dE.

The following table includes the options allowing the Master mode in retransmission and the relevant retransmitted value.

MASt.	Description
U.Pro. Write Process	Write process value
r.U.co. Read/Write Command Setpoint	Write and read command setpoint value
U.ou.P. Write Output Percentage	Write output percentage rated by P.I.D. function (Range 0-10000)
r.U.A.1 Read/Write Alarm 1	Write and read alarm 1 setpoint value

The read/written value might be rescaled according to the proportion described in the following table:

MASt.	Value limits input Min	Value limits input Max	Limits of rescaled value Min	Limits of rescaled value Max
U.Pro. Write Process	Lo.L.1. Lower Limit Input	uP.L.1. Upper Limit Input	Lo.L.r. Lower Limit Re-transmis-sion	uP.L.r. Upper Limit Re-transmis-sion
r.U.co. Read/Write Command Setpoint	Lo.L.S. Lower Limit Setpoint	uP.L.S. Upper Limit Setpoint	Lo.L.r. Lower Limit Re-transmis-sion	uP.L.r. Upper Limit Re-transmis-sion
U.ou.P. Write Output Percentage	0	10000	Lo.L.r. Lower Limit Re-transmis-sion	uP.L.r. Upper Limit Re-transmis-sion
r.U.A.1 Read/Write Alarm 1	Lo.L.S. Lower Limit Setpoint	uP.L.S. Upper Limit Setpoint	Lo.L.r. Lower Limit Re-transmis-sion	uP.L.r. Upper Limit Re-transmis-sion

The input value (included between minimum and max limit) is linearly converted into the retransmitted value which is included between min and max output value. Rescaling is not executed if parameters Lo.L.r. and uP.L.r. have the same value.

10.2.2 Master Mode Remote process

To enable this function it is necessary to select r.Pro. on parameter 59 MASt. In this mode the process value on ATR142 is a value read via serial communication. The ID of the slave must be same as value selected on parameter 57 SL.Ad. and the word to read is selected on parameter 60 Add.r. Two successive pollings will be delayed for the time selected on parameter 57 SE.dE. The read value might be rescaled according to the proportion described in the following table:

MASt.	Limits of read value Min	Limits of read value Max	Limits of rescaled value Min	Limits of rescaled value Max
r.Pro. Read Process	Lo.L.r. Lower Limit Re-transmis-sion	uP.L.r. Upper Limit Re-transmis-sion	Lo.L.i. Lower Limit Input	uP.L.i. Upper Limit Input

11 Configuration

11.1 Modify Configuration Parameter

For configuration parameters (parameter 11.)

	Press	Effect	Do
1	**FNC** for 3s	Display 1 shows 0000 with the 1st digit flashing, while display 2 shows pass.	
2	"n" and "m"	Change the flashing digit and move to the next one using the **SET** key.	Enter password 1234

3	**SET** to confirm	Display 1 shows the first parameter and display 2 shows the value.	
4	"^" and "v"	Slide up/down through parameters	
5	**SET** + "^" and "v"	Increase or decrease the value displayed by pressing firstly **SET** and then an arrow key.	Enter the new data which will be saved on releasing the keys. To change another parameter return to point 4.
6	**FNC**	End of configuration parameter change. The controller exits from programming.	

12 Table of configuration parameters

The following table includes all parameters. Some of them will not be visible on the models which are not provided with relevant hardware features.

1 c.out Command Output

select command output type.

c.o2

c.o1 > **Default** (Factory setting)

c.SSr

c.uAL.

ATR142-ABC			
	Command	Alarm 1	Alarm 2
c.o1	Q1	Q2	SSR
c.o2	Q2	Q1	SSR
c.SSr	SSr	Q1	Q2
c.uAL.	Q1(opens) Q2(closes)	SSR	-

ATR142-ABC-T		
	Command	Alarm 1
c.o1	Q1	SSR
c.SSr	SSR	Q1
c.uAL.	Q1(opens) SSR(closes)	-

2 SEn. Sensor

analogue input configuration.

tc. K	Tc-K -260…1360°C > **Default**
tc. S	Tc-S -40…1760°C
tc. r	Tc-R -40…1760°C
tc. J	Tc-J -200…1200°C
Pt	PT100 -200…600°C
Pt 1	PT100 -200…140°C
ni	NI100 -60…180°C
ntc	NTC10K -40…125°C
Ptc	PTC1K -50…150°C
PtS	PT500 -100…600°C
Pt1K	PT1000 -100…600°C
0.10	0…10Volt
0.20	0…20mA
4.20	4…20mA
0.40	0…40mVolt
Pot.1	Potenz. Max 6KΩ F.S.
Pot.2	Potenz. Max 150KΩ F.S.

3 d.P. Decimal Point

select number of displayed decimal points.

0	> **Default**
0.0	1 Decimal
0.00	2 Decimals
0.000	3 Decimals

4 Lo.L.S. Lower Limit Setpoint

lower limit setpoint.

-999…+9999 [digit^{3}] (degrees.tenths for temperature sensors) **Default**: 0.

5 uP.L.S. Upper Limit Setpoint

upper limit setpoint.

-999…+9999 [digit^{3}] (degrees.tenths for temperature sensors) **Default**: 1750.

6 Lo.L.i. Lower Linear Input

lower range limit AN1 only for linear input.

-999…+9999 [digit^{3}] **Default**: 0.

7 uP.L.i. Upper Linear Input

upper range limit AN1 only for linear input.

-999…+9999 [digit^{3}] **Default**: 1000.

8 LAtc. Latch On Function

automatic setting of limits for Linear input.

dis.	Disabled > **Default**
Std.	Standard
u.0.St.	Virtual Zero Stored (parameter 8.10)
u.0.in.	Virtual Zero Initialized (parameter 8.10)

9 o.cAL. Offset Calibration

number added/subtracted to process value visualized on display (usually correcting the ambient temperature value).

-999…+1000 [digit[3]] for linear sensors and potentiometers.

-99.9…+100.0 (degrees.tenths for temperature sensors).

> **Default**: 0.0.

10 G.cAL. Gain Calibration

this % is multiplied with displayed value to calibrate the process value. **-99.9%…+100.0**% > **Default**: 0.0

11 Act.t. Action type

regulation type

hEAt	Heating (N.A.) > **Default**
cooL.	Cooling (N.C.)
H.o.o.S.	If process is above setpoint, output is disabled (Heating).

12 c. rE. Command Reset

type of reset for state of command contact (always automatic in PID functioning).

A.rE.	Automatic Reset > **Default**
M.rE.	Manual Reset
M.rE.S.	Manual Reset Stored

13 c. S.E. Command State Error

state of contact for command output in case of error.

c.o.	> **Default**
c.c.	

14 c. Ld. Command Led

state of OUT1 led corresponding to the relevant contact.

c.o.	
c.c.	> **Default**

15 c. HY. Command Hysteresis

hysteresis in ON/OFF or dead band in P.I.D.

-999…+999 [digit[3]], (degrees.tenths for temperature sensors) > **Default**: 0.0

16 c. dE. Command Delay

(only in ON/OFF functioning).(In case of servo valve it also functions in PID and represents the delay between the opening and closure of the two contacts).

-180…+180 seconds, tenths of second in case of servo valve.

Negative: delay in switching off phase.

Positive: delay in activation phase.

Default: 0.

17 c. S.P. Command Setpoint Protection

allow/deny modifications of command setpoint by frontal keyboard.

FrEE > **Default**

Loch. Locked

18 P.b. Proportional Band

process inertia in units (°C if temperature).

0 on/off if t. i. equal to **0**. > **Default**

1-9999 [digit[3]], (degrees for temperature sensors).

19 t. i. Integral Time

process inertia in seconds

0.0-999.9 sec. (0 excludes integral) > **Default**: 0.

20 t.d. Derivative Time

normally ¼ of integral time.

0.0-999.9 sec. (0 excludes derivative) > **Default**: 0.

---

[3] *The display of decimal point depends on the setting of parameter* SEn. *and the parameter* d.P.

21 t.c. Cycle Time

Cycle time for time-proportioning output (10/15sec for PID contactors, 1 sec for PID on SSR or value declared by manufacturer for motorised valves)
0.1-300.0 sec. > **Default**: 10.0.
For motorised valve min. time is 1.0 sec

22 o.Po.L. Output Power Limit

limit of output power %.
10-100 % > **Default**: 100

23 AL. 1 Alarm

operating mode for Alarm 1. Intervention of the alarm is associated to AL1.

d.S.	Disabled > **Default**
A. AL.	Absolute Alarm (parameter 12)
b. AL.	Band Alarm (parameter 12)
H.d.AL.	High Deviation Alarm (parameter 12)
L.d.AL.	Low Deviation Alarm (parameter 12)
A.c.AL.	Absolute Command setpoint Alarm
St.AL.	Start Alarm, Active in Run
cooL.	Cooling
t.1.S.A.	Timer 1 Start Alarm
t.1.E.A.	Timer 1 End Alarm
t.1.U.E.	Timer 1 Warning Expiring
t.2.S.A.	Timer 2 Start Alarm
t.2.E.A.	Timer 2 End Alarm
t.2.U.E.	Timer 2 Warning Expiring
t.1.2.S.	Timer 1-2 Start Alarm
t.1.2.E.	Timer 1-2 End Alarm
t.1.2.U.	Timer 1-2 Warning Expiring

24 A.1.S.o. Alarm 1 State Output

alarm 1 output contact and intervention type

- n.o. S. (n.o. start) Normally open, active at start > **Default**
- n.c. S. (n.c. start) Normally closed, active at start.
- n.o. t. (n.o. threshold) Normally open, active on reaching alarm[4].
- n.c. t. (n.c. threshold) Normally closed on reaching alarm[4].

25 A.1.rE. Alarm 1 Reset

type of Reset for contact of alarm 1.

- A.rE. Automatic Reset > **Default**
- M.rE. Manual Reset
- M.rE.S. Manual Reset Stored

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

state of contact for alarm 1 output in case of error.

- c.o. > **Default**
- c.c.

27 A.1.Ld. Alarm 1 Led

state of OUT2 led corresponding to the relative contact.

- c.o.
- c.c. > **Default**

28 A.1.HY. Alarm 1 Hysteresis

-999…+999 [digit[5]], (degrees.tenths for temperature sensors).

---

[4] *On activation the output is inhibited if the controller is in alarm mode. Activates only if alarm condition reappers after that it was restored.*

[5] *The display of decimal point depends on the setting of parameter SEn. and the parameter d.P.*

29 A.1.dE. Alarm 1 Delay

-180…+180 Sec. > **Default**: 0.
Negative: delay at exit from alarm
Positive: delay at starting of alarm

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

does not allow the user to modify setpoint.

FrEE	> **Default**
Loch.	Locked
HidE	Locked and hidden

31 AL. 2 Alarm 2

Alarm 2 selection. Alarm intervention is associated to AL2.

d.S.	Disabled > **Default**
A. AL.	Absolute Alarm
b. AL.	Band Alarm
H.d.AL.	High Deviation Alarm
L.d.AL.	Low Deviation Alarm
A.c.AL.	Absolute Command setpoint Alarm
St.AL.	Start Alarm, Attivo in Run
CooL	Cooling
t.1.S.A.	Timer 1 Start Alarm
t.1.E.A.	Timer 1 End Alarm
t.1.U.E.	Timer 1 Warning Expiring
t.2.S.A.	Timer 2 Start Alarm
t.2.E.A.	Timer 2 End Alarm
t.2.U.E.	Timer 2 Warning Expiring
t.1.2.S.	Timer 1-2 Start Alarm
t.1.2.E.	Timer 1-2 End Alarm
t.1.2.U.	Timer 1-2 Warning Expiring

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

alarm 2 output contact and intervention type.

- n.o. S. (n.o. start) Normally open, active at start. > **Default**
- n.c. S. (n.c. start) Normally closed, active at start.
- n.o. t. (n.o. threshold) Normally open, active on reaching alarm[6]
- n.c. t. (n.c. threshold) Normally closed, active on reaching alarm[6]

33 A.2.rE. Alarm 2 Reset

type of Reset for contact of alarm 2.

- A.rE. Automatic Reset > **Default**
- M.rE. Manual Reset
- M.rE.S. Manual Reset Stored

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

state of contact for alarm 2 output in case of error.

- c.o. > **Default**
- c.c.

35 A.2.Ld. Alarm 2 Led

state of OUT2 led corresponding to relative contact.

- n.o.
- n.c. > **Default**

36 A.2.HY. Alarm 2 Hysteresis

-999…+999 [digit[7]], (degrees.tenths for temperature sensors). > **Default**: 0.

37 A.2.dE. Alarm 2 Delay

-180…+180 Sec. > **Default**: 0.
Negative: delay in alarm output phase.
Positive: delay in alarm entry phase.

---

[6] *On activation the output is inhibited if the controller is in alarm mode. Activates only if alarm condition reappers, after that it was restored.*

38 A.2.S.P. Alarm 2 Setpoint Protection

Alarm 2 set protection.
Does not allow operator to change setpoint value.

FrEE	> **Default**
Loch.	Locked
HidE	Locked and hidden

39 coo.F. Cooling Fluid

select type of cooling fluid for Heating/Cooling PID (parameter 7.12)

Air	Air > **Default**
oiL	Oil
H2o	Water

40 P.b.M. Proportional Band Multiplier

1.00-5.00 > **Default**: 1.00. (parameter 7.12)

41 ou.d.b. Overlap/Dead Band

overlapping/Dead band (parameter 7.12)
-20.0-50.0% > **Default**: 0.

42 co.t.c. Cooling Cycle Time

cycle time for cooling output.
1-300 sec. > **Default**: 10.

43 c.FLt. Conversion Filter

ADC filter, number of means on analogue-digital conversions.

dis.	Disabled
2. S.M.	2 Samples Mean
3. S.M.	3 Samples Mean
4. S.M.	4 Samples Mean
5. S.M.	5 Samples Mean
6. S.M.	6 Samples Mean
7. S.M.	7 Samples Mean
8. S.M.	8 Samples Mean

9. 5.M. 9 Samples Mean
10.5.M. 10 Samples Mean > **Default**
11.5.M. 11 Samples Mean
12.5.M. 12 Samples Mean
13.5.M. 13 Samples Mean
14.5.M. 14 Samples Mean
15.5.M. 15 Samples Mean

44 c.Frn. Conversion Frequency

Frequency of sampling for analogue-digital converter.

242H. 242 Hz Max ADC conversion frequency
123H. 123 Hz
62 H. 62 Hz
50 H. 50 Hz
39 H. 39 Hz
33.2H. 33.2 Hz
19.6H. 19.6 Hz
16.7H. 16.7 Hz > **Default**
12.5H. 12.5 Hz
10 H. 10 Hz
8.33H. 8.33 Hz
6.25H. 6.25 Hz
4.17H. 4.17 Hz Min. ADC conversion frequency

45 u.FLt. Visualization Filter

slow down the refresh of display in order to simplify the reading (keeping unchanged the ADC conversion frequency)

diS. Disabled
PtcH Pitchfork filter > **Default**
F.or. First Order
F.or.P. First Order with Pitchfork
2. 5.M. 2 Samples Mean
3. 5.M. 3 Samples Mean
4. 5.M. 4 Samples Mean
5. 5.M. 5 Samples Mean
6. 5.M. 6 Samples Mean

7. S.M. 7 Samples Mean
8. S.M. 8 Samples Mean
9. S.M. 9 Samples Mean
10.S.M. 10 Samples Mean

46 tunE Tune

tuning type selection

dIS. Disabled > **Default**
Auto Automatic. PID parameters are calculated at each activation and/or change of setpoint.
MAn. Manual. Launch by keyboard or by digital input.
oncE Once (P.I.D. parameters calculation only at first start)

47 S.d.tu. Setpoint Deviation Tune

select the deviation from the command setpoint as threshold used by Autotuning to calculate PID parameters.

0-5000 [digit$^{/}$], (degrees.tenths for temperature sensors) > **Default**: 10.

48 oP.Mo. Operating Mode

select operating mode (parameter 7.11)

cont. Controller > **Default**
Pr.cY. Programmed Cycle
2t.S. 2 Thresholds Switch
2t.S.I. 2 Thresholds Switch Impulsive
3t.S.I. 3 Thresholds Switch Impulsive
4t.S.I. 4 Thresholds Switch Impulsive

49 Au.MA. Automatic/Manual

enable automatic/manual selection. (parameter 7.6)

dIS. Disabled > **Default**
En. Enabled
En.St. Enabled Stored

50 dGt.i. Digital Input

Digital input functioning. (parameter 7.11)
Parameter 48 selection must be cont. or Pr.cY.

- dis. Disabled > **Default**
- St.St. Start/Stop
- rn.n.o. Run n.o.
- rn.n.c. Run n.c.
- L.c.n.o. Lock Conversion n.o. (Lock visualisation on display with N.O. contact)
- L.c.n.c. Lock Conversion n.c. (Lock visualisation on display with N.C. contact)
- tunE Tune > Manual
- A.MA.i. Automatic Manual impulse
- A.MA.c. Automatic Manual Contact
- t.1.S.S. Timer 1 Start Stop

51 GrAd. Gradient

Rising gradient for soft start or pre-programmed cycle
0 Disabled > **Default**: 0.
1-9999 Digit/time[7] (degrees/hours with display of tenths if temperature)

52 MA.ti. Maintenance Time

maintenance time for pre-programmed cycle
00.00-24.00 hh.mm > **Default**: 00.00

[7] *The display of decimal point depends on the setting of parameter* SEn. *and the parameter* d.P.

53 u.M.c.P. User Menu Cycle Programmed

Allows the rising/falling gradient and the maintenance time to be changed from the user menu in pre-programmed cycle functioning. (parameter 7.7)

- d.S. Disabled > **Default**
- r.Gr. Rising Gradient (modify gradient)
- MA.t.r. Maintenance Time (modify time)
- r.G.M.t. Rising Gradient and Maintenance Time (modify both)
- FA.Gr. Falling Gradient (modify cooling gradient)
- r.F.Gr. Rising and Falling Gradient (modify rising and cooling gradient)
- F.G.M.t. Falling Gradient and Maintenance Time
- ALL. All (modify all parameters for pre-programmed cyle)

54 u.tY. Visualization Type

select visualization for display 1 and 2

- 1.P.2.S. 1 Process, 2 Setpoint > **Default**
- 1.P.2.H. 1 Process, 2 Hide after 3 sec.
- 1.S.2.P. 1 Setpoint, 2 Process.
- 1.S.2.H. 1 Setpoint, 2 Hide after 3 sec.

55 dEGr. Degree

select degree type

- °C Celsius > **Default**
- °F Fahrenheit

56 bd.rt. Baud Rate

select baud rate for serial communication

- 4.8 r
- 9.6 r
- 19.2r > **Default**
- 28.8r
- 38.4r
- 57.6r

57 SL.Ad. Slave Address

select slave address for serial communication
0 – 255 > **Default**: 254.

58 SE.dE. Serial Delay

select serial delay
0 – 100 milliseconds > **Default**: 20.

59 MASt. Master

select master mode. (parameter 9.2)

diS.	Disable > **Default**
U.Pro	Write Process
r.U.co.	Read Write Command Setpoint
U.ou.P.	Write Output Percentage
r.U.A.1	Read Write Alarm 1 Setpoint
r.Pro.	Read Process

60 Add.r. Address Retransmission

select address for retransmission.
0x0000 – 0xFFFF hexadecimal > **Default**: 0x03E9.

61 Lo.L.r. Lower Limit Retransmission

lower limit retransmission range.
-999 - 9999 [digit[8]], (degrees for temperature sensors) > **Default**: 0.

62 uP.L.r. Upper Limit Retransmission

upper limit retransmission range[9].
-999 – 9999 [digit[8]], (degrees for temperature sensors) > **Default**: 0.

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[8] *The display of decimal point depends on the setting of parameter* SEn. *and the parameter* d.P.

[9] *If parameter 61* Lo.L.r. *and 62* uP.L.r. *have the same value, retransmitted value is not rescaled.*

63 tMr.F. Timer Function

enable 1 or 2 Timers which may be set from user menu and which can be related to alarms. (parameter 8)

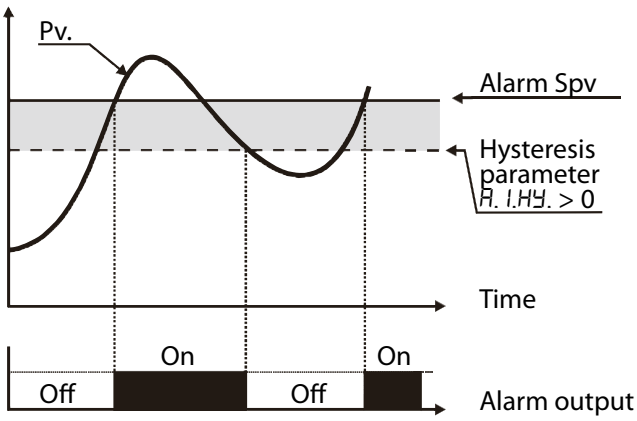
- dis. Disable > **Default**
- S.tM.S. Single Timer Seconds
- d.tM.S. Double Timer Seconds
- d.S.t.S. Double Sequential Timer Seconds
- d.t.L.S. Double Timer Loop Seconds
- S.tM.M. Single Timer Minutes
- d.tM.M. Double Timer Minutes
- d.S.t.M. Double Sequential Timer Minutes
- d.t.L.M. Double Timer Loop Minutes

64 FA.Gr. Falling Gradient

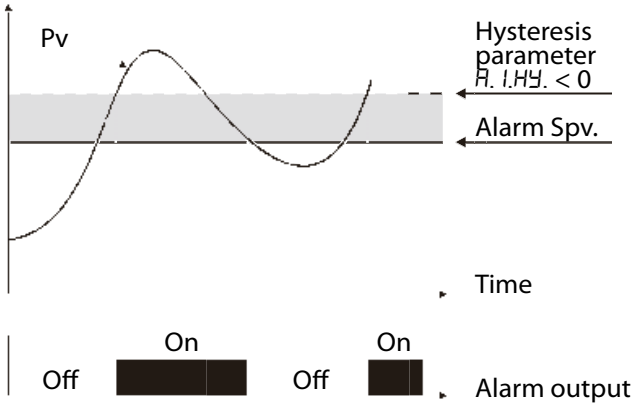
cooling gradient for pre-programmed cycle
0 desabled (uncontrolled cooling) > **Default**: 0.
1-9999 degrees/hour, with display of tenths

13 Alarm Intervention Modes

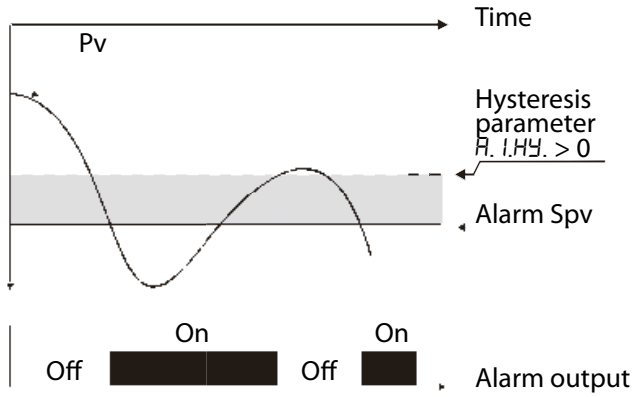
13.a Absolute Alarm or Threshold Alarm (A. AL. selection)



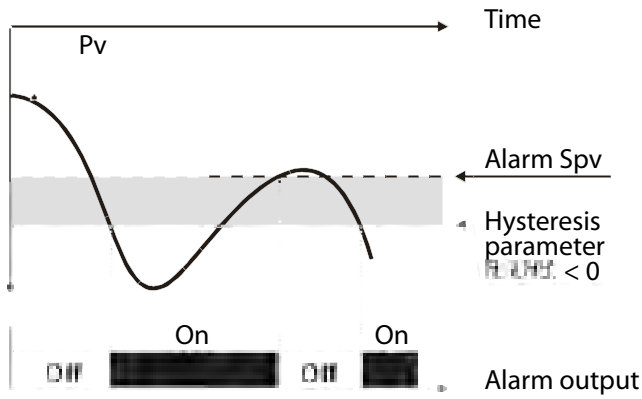
Absolute alarm with controller in heating functioning (Parameter 11 Act.t. selected HEAt) and hysteresis value greater than "0" (Parameter 28 A. I.HY. > 0). *



Absolute alarm with controller in heating functioning (Parameter 11 Act.t. selected HEAt) and hysteresis value less than "0" (Parameter 28 A.I.HY. < 0). *

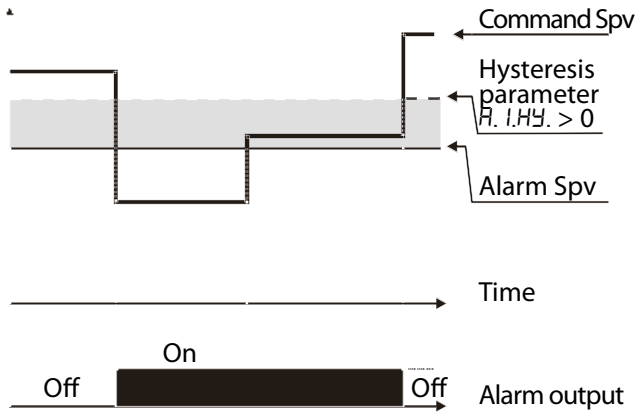


Absolute alarm with controller in cooling functioning (Parameter 11 Act.t. selected cooL) and hysteresis value greater than "0" (Parameter 28 A.I.HY. > 0). *



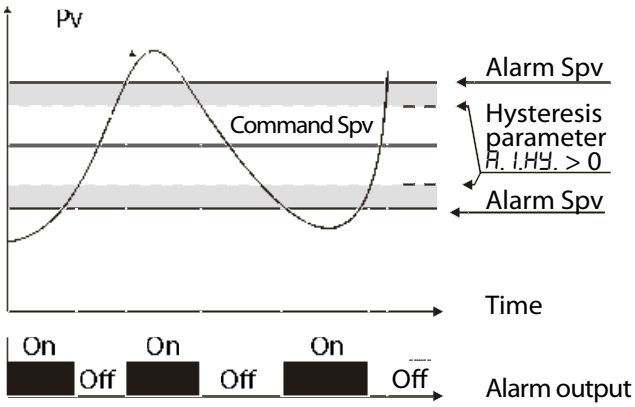
Absolute alarm with controller in cooling functioning (Parameter 11 Act.t. selected cooL) and hysteresis value less than "0" (Parameter 28 A.I.HY. > 0). *

13.b Absolute alarm or threshold alarm referring to setpoint command (A.c.AL. selection)

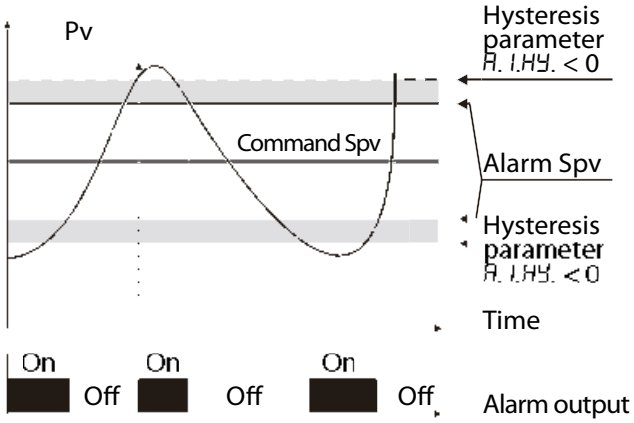


Absolute alarm refers to the command set, with the controller in heating functioning (Parameter 11 Act.t. selected HEAt) and hysteresis value greater than "0" (Parameter 28 A. I.HY. > 0).
The command set can be changed by pressing the arrow keys on front panel or using serial port RS485 commands. *

13.c Band Alarm (b. AL. selection)

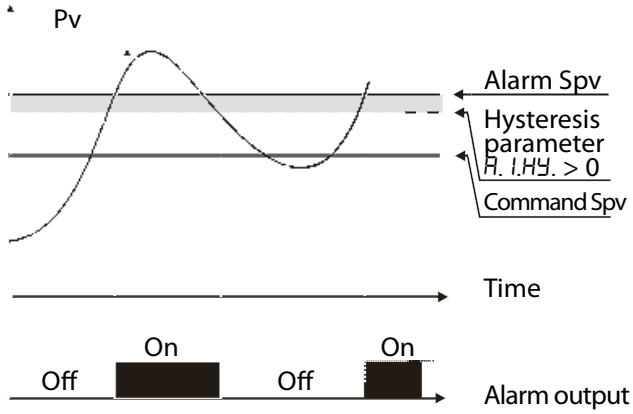


Band alarm hysteresis value greater than "0" (Parameter 28 A. I.HY. > 0). *

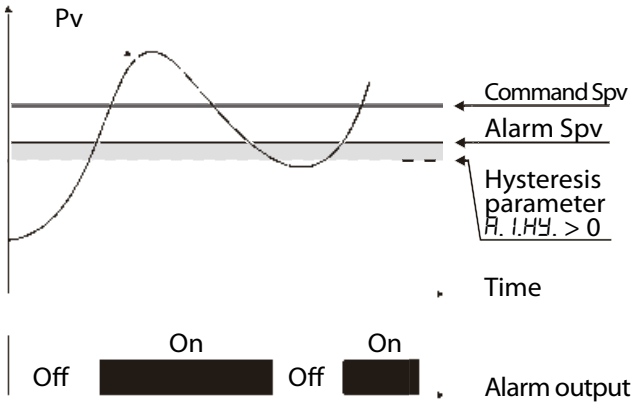


Band alarm hysteresis value less than "0" (Parameter 28 A. I.HY. < 0). *

13.d Upper Deviation Alarm (H.d.AL. selection)

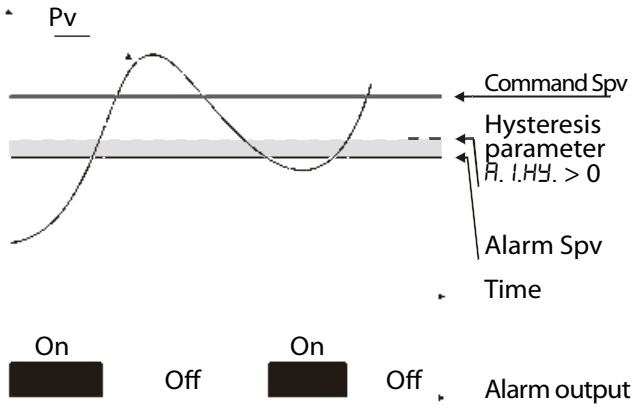


Upper deviation alarm value of alarm setpoint greater than "0" and hysteresis value greater than "0" (Parameter 28 A.I.HY. > 0). **

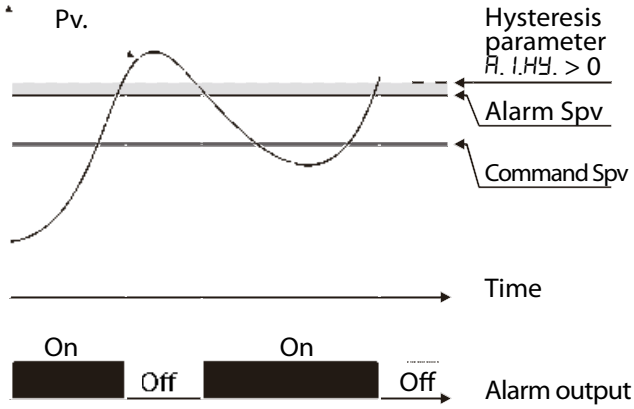


Upper deviation alarm value of alarm setpoint less than "0" and hysteresis value greater than "0" (Parameter 28 A.I.HY. > 0). **

13.e Lower Deviation Alarm (L.d.AL. selection)



Lower deviation alarm value of alarm setpoint greater than "0" and hysteresis value greater than "0" (Parameter 28 A.I.HY. > 0). **



Lower deviation alarm value of alarm setpoint less than “0” and hysteresis value greater than “0” (Parameter 28 A.I.HY. > 0). **

* *The example refers to alarm 1; the function can also be enabled for alarm 2 on model that include it.*

** *a) The example refers to alarm 1; the function can also be enabled for alarm 2 on model that include it. b) With hysteresis less than “0” (A.I.HY. < 0) the segmented line moves above the alarm setpoint.*

14 Table of Anomaly Signals

If installation malfunctions, controller will switch off regulation output and will report the anomaly. For example, controller will report failure of a connected thermocouple visualizing E-05 flashing on display for other signals, see table below.

	Cause	What to do
E-01 SYS.E.	Error in E^2PROM cell programming	Call Assistance
E-02 SYS.E.	Cold junction sensor fault or room temperature outside of allowed limits.	Call Assistance
E-04 SYS.E.	Incorrect configuration data. Possible loss of calibration values.	Check if the configu-ration parameters are correct.
E-05 Prb.	Thermocouple open or temperature outside of limits.	Check the connection with the sensors and their integrity.

E-06 SEr.E.	Off-line in master mode remote process	Check the serial connection, baud-rate and device ID.
E-08 SYS.E.	Missing calibration data	Call Assistance

Notes

Table of configuration parameters

Read carefully the safety guidelines and programming instructions contained in this manual before using/connecting the device.

Prima di utilizzare il dispositivo leggere con attenzione le informazioni di sicurezza e settaggio contenute in questo manuale.

RoHS Compliant

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