PIXSYS
elettronica

ATR 401

- **Regolatore**
- **Controller**

Manuale Installatore
User manual

Summary	Page

Look!

Pay attention at the section marked with this symbol

Presta attenzione alla sezione contrassegnata da questo simbolo

Sommario

Sommaire

1 Introduction

Thanks for choosing a Pixsys controller.
With ATR401 model, Pixsys integrates in a single device all options for sensors reading and actuators control, beside an useful supply with extended range 24…230 Vac/Vdc. Thanks to dual universal analogue input outputs configurable as relay or SSR, the user or the retailer can reduce stock needs.
The series includes also a model with serial communication RS485 Modbus Rtu and linear output 0-10 V, 0/4-20 mA. The possibility to repeat parameterization is simplified by the Memory Cards with internal battery that do not require power supply for the controller.

2 Model Identification

ATR401 series includes four versions.
Looking at the following table it is possible to find the required model.

Power supply 24…230 Vac/Vdc +/-15% 50/60 Hz – 5,5 VA	
ATR401-22ABC	2 Analogue inputs + 2 Relays 8 A + 1 SSR
ATR401-23ABC	2 Analogue inputs + 3 Relays 8 A + 1 SSR
ATR401-24ABC	2 Analogue inputs + 4 Relays 8 A + 1 SSR
ATR401-22ABC-T	2 Analogue inputs + 2 Relays 8 A + 1 SSR 1 Output V / mA + RS485

3 Technical data

3.1 General data

Indicators	4 display 0,40 inches 4 display 0,30 inches
Operating temperature	Temperature 0-45 °C Humidity 35..95 uR%
Sealing	IP54 front panel, box IP30 and terminal block IP20
Material	Box: Noryl UL94V1 self-exstinguish Front panel: PC ABS UL94V0 self-exstinguish
Weight	Approx 350 g

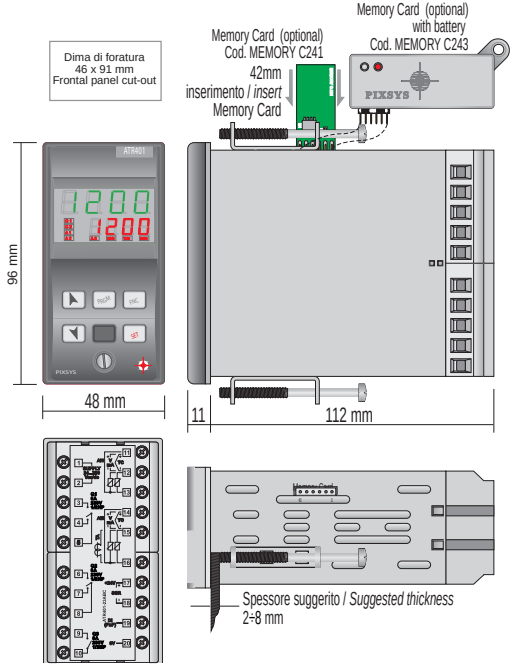
3.2 Hardware data

Analogue input	**AI1 – AI2:** Configurable via software. **Input:** Thermocouple type K, S, R, J. Automatic compensation of cold junction from 0 … 50°C. **Thermoresistances:** PT100, PT500, PT1000, Ni100, PTC1K, NTC10K (β 3435K) **Linear input:** 0-10 V, 0-20 o 4-20 mA, 0-40 mV. **Input Potentiometer:** 6 K□, 150 K□. • **ONLY AI2 input T.A.:** 50 mA.	Tolerance (25 °C) +/-0.2% ±1 digit for thermocouple, thermoresistance and V / mA. Cold junction accuracy 0.1 °C/°C. **Impedance:** **0-10 V:** Ri>110 K□ **0-20 mA:** Ri<5 □ **4-20 mA:** Ri<5 □ **0-40 mV:** Ri>1 M□
Relay outputs	Configurable as control and alarm output.	Contacts: 8 A - 250 V~ for resistive charges.
SSR output	Configurable as control and alarm output.	24 V; 25 mA.
Analogue output	Configurable as control output, alarm, retransmission of process or setpoint.	Configurable: **0-10 V** (9500 points); **0-20 mA** (7500 points); **4-20 mA** (6000 points).
Power supply	Extended range 24…230 Vac/ Vdc ±15% 50/60 Hz.	Consumption: 5.5 VA.

3.3 Software data

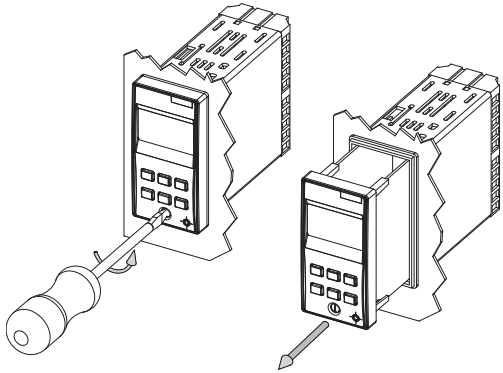
Regulation algorithms	ON - OFF with hysteresis. P, P.I., P.I.D., P.D. proportional time.
Proportional band	0...9999 °C o °F
Integral time	0,0...999,9 sec. (0 excludes integral function)
Derivative time	0,0...999,9 sec. (0 excludes derivative function)
Controller functions	Manual or automatic tuning, selectable alarms, protection of control and alarm setpoints.

4 Dimensions and Installation



4.1 Electronics Removal

To configure internal Jumper, remove the electronics by twist off the screw on instrument frontal side.



WARNING

Disconnect the device from the mains before starting to configurate or service it.

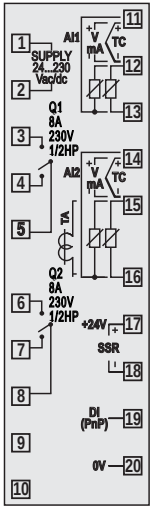
5 Electrical wirings

WARNING

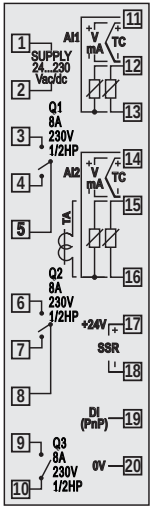
Although this controller has been designed to resist noises in an industrial environments, please notice the following safety guidelines:

- Separate control lines from the power wires.
- Avoid the proximity of remote control switches, electromagnetic meters, powerful engines.
- Avoid the proximity of power groups, especially those with phase control.

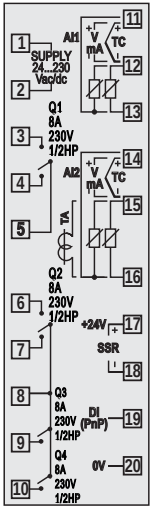
5.1 Wiring diagram



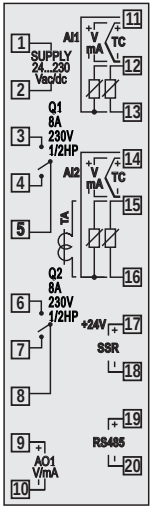
ATR401-22ABC



ATR401-23ABC



ATR401-24ABC



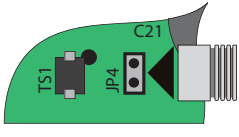
ATR401-22ABC-T

Power

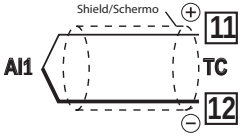
Switching power supply with extended range 2 selections:

- 24 Vac/dc ±15% with Jumper insertion JP4;
- 115…230 Vac/dc ±15% without Jumper JP4;

50/60 Hz – 5,5 VA (with galvanic isolation).

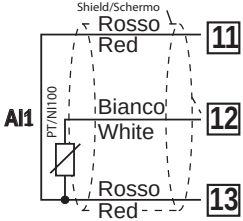


Analogue Input AI1



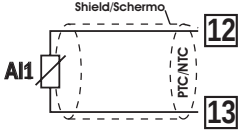
For thermocouples K, S, R, J.

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



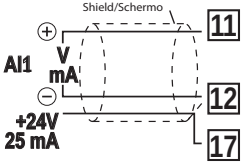
For thermoresistances PT100, NI100.

- For a three-wires connection use cables with the same diameter.
- For a two-wires connection short-circuit terminals 16 and 18.
- When shielded cable is used, it should be grounded at one side only.



For thermoresistances NTC, PTC, PT500, PT1000 and linear potentiometers.

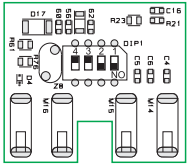
- When shielded cable is used, it should be grounded at one side only.



For linear signals Volt / mA.

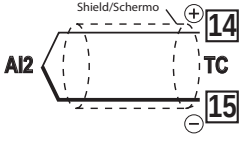
- Comply with polarity.
- When shielded cable is used, it should be grounded at one side only.

Analogue Input AI2



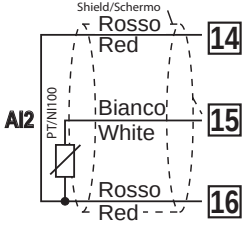
To enable the second analogue input, set the dip switches as indicated in the figure.

In this configuration input T.A. **is not** available.



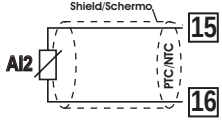
For thermocouples K, S, R, J.

- Comply with polarity.
- When extending thermocouples be sure to use the correct extension/compensating cable.
- When shielded cable is used, it should be grounded at one side only.



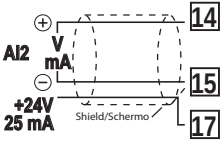
For thermoresistances PT100, NI100.

- For a three-wires connection use cables with the same diameter.
- For a two-wires connection short-circuit terminals 16 and 18.
- 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.



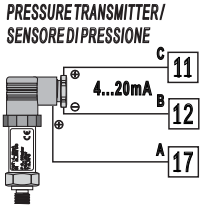
For linear signals in Volt / mA.

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

Examples of connection for linear input AI1

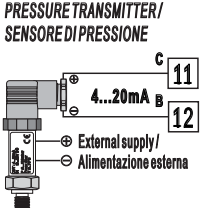
For linear signals 0….10 V.

Comply with polarity.



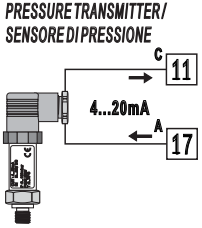
For linear signals 0/4….20 mA with **three-wires sensors.**

Comply with polarity:
C= Sensor output
B= Sensor ground
A= Sensor supply (24 Vdc / 25 mA)



For linear signals 0/4..20 mA
with **external power supply for sensor.**

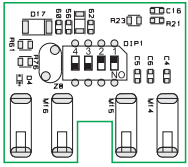
Comply with polarity:
C= Sensor output
B= Sensor ground



For linear signals 0/4..20 mA
with **two-wires sensors.**

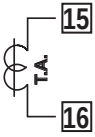
Comply with polarity:
C= Sensor output
A= Sensor supply (24 Vdc / 25 mA)

T.A. Input



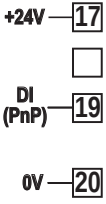
To enable T.A. input, set the dip switches as indicated in the figure.

In this configuration it is possible to set tA on parameter 11 SEn2.



- Input for 50 mA amperometric transformer.
- Sampling time 100 ms.
- Configurable by parameters.

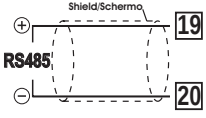
Digital input (not available on ATR401-22ABC-T)



Digital input (parameter dGt. i).

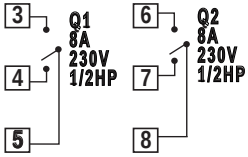
- Close pin “DI” (19) on pin “+24 V” (17) to enable digital input.

Serial input (only on ATR401-22ABC-T)



Communication RS485 Modbus RTU with galvanic isolation.

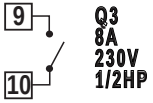
Relay outputs Q1, Q2



Contacts capacity:
- 8 A, 250 Vac, resistive charge 10^5 operations.
- 30/3 A, 250 Vac, cosφ = 0.3, 10^5 operations.

N.B.: See graphic.

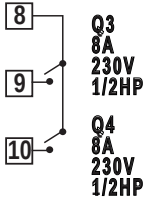
Relay output Q3 (ATR401-23ABC)



Contacts capacity:
- 8 A, 250 Vac, resistive charge 10^5 operations.
- 30/3 A, 250 Vac, cosφ = 0.3, 10^5 operations.

N.B.: See graphic.

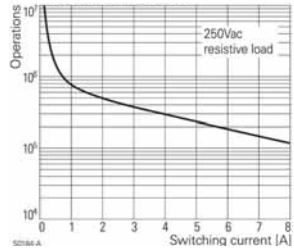
Relay outputs Q3, Q4 (ATR401-24ABC)



Contacts capacity:
- 8 A, 250 Vac, resistive charge 10^5 operations.
- 30/3 A, 250 Vac, cosφ = 0.3, 10^5 operations.

N.B.: See graphic.

N.B.:



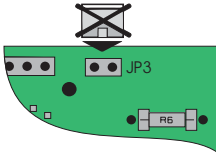
Electrical endurance
Q1 / Q2 / Q3 / Q4:
- 8 A, 250 Vac, resistive charge 10^5 operations.
- 30/3 A, 250 Vac, cosφ = 0.3, 10^5 operations.

SSR output

SSR Command output capacity 24 V / 25 mA.

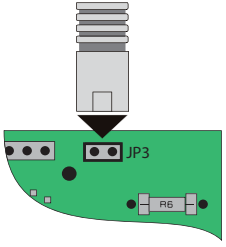
Output mA or Volt (ATR401-22ABC-T)

Linear output in **mA** configurable using parameters as command (parameter c.out) or retransmission of process-setpoint (parameter rETr.).



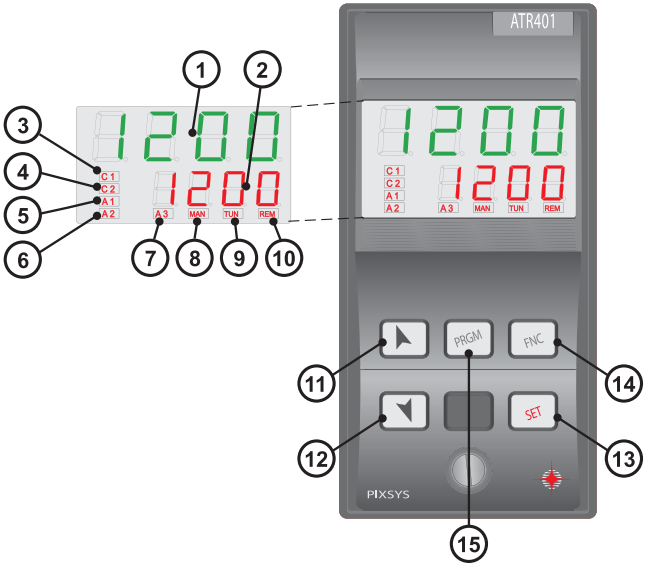
To use analogue output in mA do not place JP3.

Linear output in **Volt** configurable using parameters as command (parameter c.out) or retransmission of process-setpoint (parameter rETr.).



To use analogue output in Volt enter JP3 as indicated in the figure.

6 Display and Key Functions



6.1 Numeric Indicators (Display)

1	1234	Normally visualizes process. In configuration mode visualizes parameter that is being entered.
2	1234	Normally visualizes setpoints. In configuration mode visualizes value of parameter that is being entered.

6.2 Meaning of Status Lights (Led)

3	C1	On when command output is active. For open / close logic: on during valve opening.
4	C2	For open / close logic: on during valve closing.
5	A1	On when alarm 1 is active.

6	A2	On when alarm 2 is active.
7	A3	On when alarm 3 is active.
8	MAN	On when “Manual” function is active.
9	TUN	On when controller is executing an auto-tuning cycle.
10	REM	On when controller communicates in serial way.

6.3 Keys

11		• Increases main setpoint. • In configuration mode allows to scroll and modify parameters. • Press after SET key increases alarm setpoint.
12		• Decreases main setpoint. • In configuration mode allows to scroll and modify parameters. • Press after SET key decreases alarm setpoints.
13		• Allows to visualize command and alarm setpoints. • In configuration mode allows to access the parameter to change and confirm its modification.
14		• Allows to enter Tuning launch, selection automatic / manual. • In configuration mode operates as exit key (ESCAPE).
15		• If pressed allows to enter configuration password. • In configuration mode assigns at selected parameter a mnemonic code or a number.

7 Dual input mode

Each ATR401 model has the possibility to use two analogue inputs:
it is possible to do easy methematic operations between measured process values, correlating obtained result to the command or alarm outputs, or use a process as remote setpoint.

7.1 Selection of process value related to the command output and to the alarms

When second input is enabled (par.11 SEn2 other than diS) it is possible to choose the process value to be related to command output, to alarms and to retransmission.
Following options are available:

- Pro1 : Value read by input AI1;
- Pro2 : Value read by input AI2;
- MEAn : Mean between inputs AI1 and AI2;
- diFF. : Difference between inputs: AI1-AI2;
- AbSd. : Difference between inputs as absolute value: AI1-AI2;
- SuM : Addition between inputs: AI1+AI2.
- Process related to command output must be set on parameter 19 cPro.
- Process related to alarms must be set on par. 38 A1Pr. for alarm 1, on par. 47 A2Pr. for alarm 2, on par. 56 A3Pr. for alarm 3 and on par. 65 A4Pr. for alarm 4.
- Value to retransmit must be set on par. 88 rEtr.

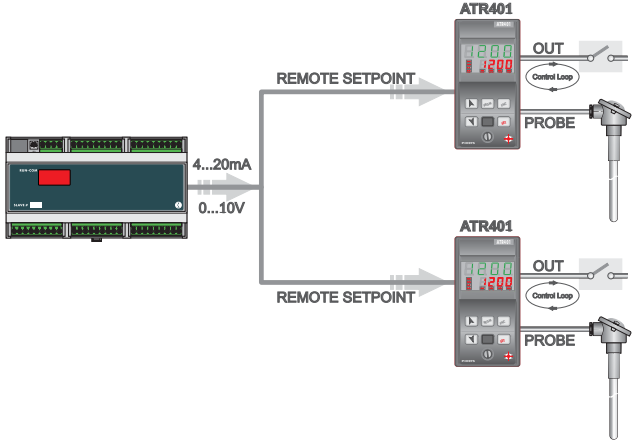
It is possible to choose the visualization for display 2 on parameter 86 u d2.

WARNING

Mean, difference and addition are available only if both inputs are configured for temperature sensors or for linear signals V / mA.

7.2 Remote setpoint

It is possible to enable remote setpoint function setting En on par. 20 rEnS.



In this configuration command setpoint corresponds to the second process value read:

- if parameter 19 cPrA is set as Pr1, AI1 becomes the main process (command) and AI2 becomes the setpoint value.
- If parameter 19 cPrA is set as Pr2, AI2 becomes the main process (command) and AI1 becomes the setpoint value.

Remote setpoint function works only with one of these two settings of parameter. 19 cPrA .

WARNING

Decimal point setting parameter for remote setpoint input is locked and it is automatically changed when command input decimal point variates.

8 Controller Functions

8.1 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.
2	[SET]	Visualize alarm setpoint on display 1.	
3	[▶] or [▼]	Value on display 2 changes.	Increases or decreases the alarm setpoint value.

8.2 Auto-Tuning

Tuning procedure to calculate regulation parameters can be manual or automatic and according to selection on parameter 28 tunE.

8.3 Manual Tuning

Manual procedure allows user more flexibility on deciding when to update regulation parameters of P.I.D. algorithm.
Press key [FNC] until display 1 visualizes writing tunE and display 2 visualizes oFF. Pressing [▶], display 2 visualizes on.
Led **TUN** switches on and procedure starts.

8.4 Automatic Tuning

Automatic tuning starts when the controller is switched-on or when setpoint value has been modified over 35%.
To avoid overshooting, the threshold where controller calculates new P.I.D. parameters is determinated by setpoint value minus “Set Deviation Tune” value (see parameter 29 SdtU).

To interrupt Tuning keeping the P.I.D. values unchanged, press key [FNC] until display 1 visualizes writing [tunE] and display 2 visualizes [on]. Pressing [▼], display 2 visualizes [oFF], led **TUN** switch off and procedure ends.
Setting [oncE] on parameter 28 [tunE] autotuning procedure starts only once when instrument is switched on: after calculating P.I.D. parameters parameter 28 [tunE] returns to [d.S.].

8.5 Automatic / Manual Regulation for % Output Control

This function allows to switch from automatic functioning to manual control of output porcentage.
With parameter 83 [AuMA], it is possible to select two modes.

1 **First selection** ([En]). Pressing key [FNC] display 1 visualizes writing [P.---] on display 1, while display 2 visualizes [Auto]. Press key [▶] to select manual mode [MAn]. Whit [▶] and [▼] change output percentage. To return to automatic mode with the same procedure select [Auto] on display 2: led **MAN** switches on and operation returns to automatic mode.
2 **Second selection** ([EnSt]). Enable the same functioning, but with two important variants:

- In case of power failure or after a switch-off, at restart both the manual functioning and the previously fixed output percentage value will be maintained.
- If during automatic functioning there is a sensor failure, controller will automatically switch to manual mode while maintaining command output percentage unchanged as generated by P.I.D. immediately before failure.

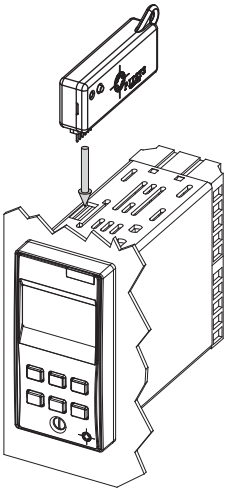
8.6 Soft-Start

At switch-on the controller follows a rising gradient expressed in units (ex. Degree / Hour) to reach the setpoint.
The chosen rising gradient in Unit / Hour must be set on parameter 85 [r.Gr.]; at **next switch-on** the controller will execute Soft-Start function.
Automatic and manual Tuning function cannot be enabled if Soft-Start function is active.

8.7 Memory Card (optional)

Look!

Parameters and setpoint values can be easily copied from one controller to others using the MEMORY CARD.
Two modes are available:



- **With the controller connected to the power supply:**

Insert Memory card when the **controller is off**.
At switch-on display 1 visualizes nEn0 and display 2 visualizes ---- **(only if correct values are stored on Memory).**
Pressing ▶ display 2 visualizes LoAd.
Confirm with FNC.
Controller loads news values and restarts.

- **With the controller not connected to power supply:**

The memory card is equipped with an internal battery with an autonomy of about 1000 uses (button battery, replaceable).
Insert the memory card and press the programming button.
When writing the parameters, led turns red and on completing the procedure it turns to green. It is possible to repeat the procedure without any particular attention.

WARNING

Updating Memory Card

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

[1] If on activation the controller does not display nEn0 it means no data have been saved on the memory card, but it is possible to update values.

8.8 Loading default values

This procedure allows to restore factory settings of the instrument.

	Press	Display	Do
1	PRGM for 3 second	Display 1 visualizes 0000 with 1st digit blinking, while display 2 shows PASS.	
2	▶ or ◀	Change blinking digit and move to the next one with SET.	Enter password: 9999.
3	PRGM to confirm	Device loads default settings.	Switch the instrument off and on.

8.9 LATCH ON Functions (only AI1)

For use with input Pot. 1 (potentiometer 6 KΩ) and Pot.2 (potentiometer 150 KΩ) and with linear input (0…10 V, 0...40 mV, 0/4…20 mA), you can associate start value of the scale (parameter 6 LoL.) to the minimum position of the sensor and value of the scale end (parameter 7 uPL.) 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 LoL. and uPL.) using the "virtual zero" option by setting uOSt. or uO in. in parameter 8 LAtc.

If you set uO in. the virtual zero will reset after each activation of the tool; if you set uOSt. the virtual zero remains fixed once tuned.

To use the LATCH ON function configure as you wish 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	Display	Do
1	FNC	Exit parameters configuration. Display 2 visualizes writing LAtc.	Place the sensor on minimum operating value(corresponding to LL. ı !).
2	◀	Store value on minimum. Display shows LoU.	Place sensor on maximum operating value (corresponding to uL. ı !).
3	▶	Store value on max. Display shows H ıGH.	To exit standard proceeding press FNC. For “virtual zero” setting, place the sensor to zero point.
4	SET	Set the virtual zero. Display shows u ırt. **N.B.:** if u ırt. is selected, the procedure must be executed at each start.	To exit procedure press FNC.

8.10 Heating-Cooling P.I.D.

ATR401 is suitable also for applications requiring a combined heating-cooling P.I.D. action.

Command output must be configured as Heating P.I.D.

(Actt = HEAt and Pb greater than 0 and one of alarms (AL. 1, AL. 2, AL. 3 or AL. 4) has to be configured as cooL.

Command output must be connected to actuator responsible for heating action, while alarm will control the cooling action.

Parameters to configure for Heating P.I.D. are:

Actt = HEAt Command output action type (Heating);

Pb : Proportional band Heating;

t. i : Integral time Heating and cooling;

td : Derivative time Heating and cooling;

tc. : Cycle time Heating.

Configuration parameters for Cooling P.I.D. are (example: action associated to alarm 1):

AL. 1 = cooL Alarm 1 selection (Cooling);

PbM : Proportional band multiplier;

oudb : Overlapping / Dead band;

cotc. : Cycle time Cooling.

Parameter PbM (that ranges from 1.00 to 5.00) sets the proportional band for cooling action, according to the formula here below:

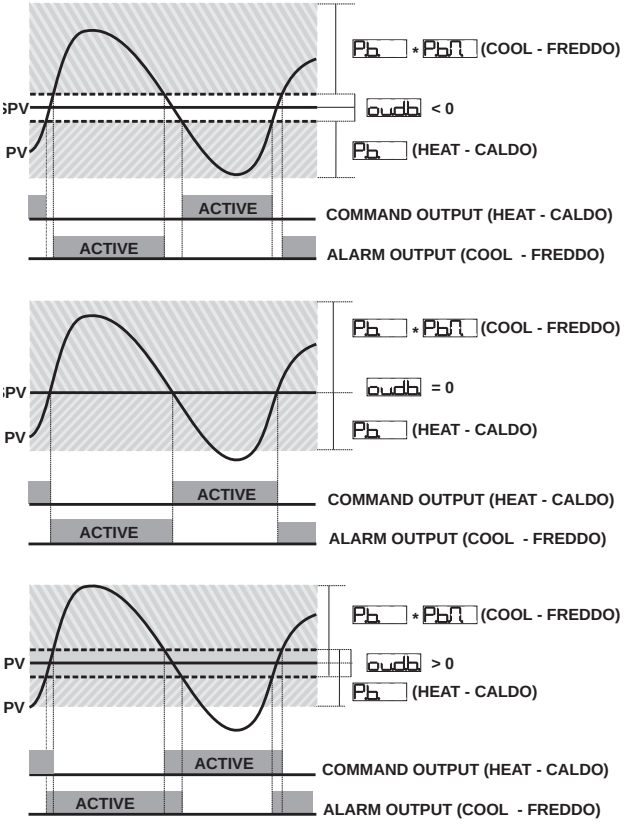
Proportional band cooling action = Pb **x** PbM **.**

In this way it is possible to have a proportional band for cooling action that will be equal to heating proportional band if PbM = 1.00, or 5 times greater if PbM = 5.00.

Integral time and **derivative time** are the same for both actions

Parameter oudb sets the percentage overlapping between the two actions. For installations where heating and cooling output cannot be activated at the same time, a dead band will be configured (oudb ≤ 0), vice versa an overlapping will be configured (oudb > 0).

Figure here below shows an example of double action P.I.D. (heating-cooling) with t.i = 0 and td = 0.



Parameter cAtc. has the same meaning of cycle time for heating action tc. .
Parameter cooF. (Cooling Fluid) pre-selects the proportional band multiplier Pbn and the cooling P.I.D. cycle time cAtc. according to cooling fluid type:

cooF.	Cooling fluid type	Pbn	cAtc.
Air	Air	1.00	10
oil	Oil	1.25	4
H2o	Water	2.50	2

Once parameter cooF. has been selected, the parameters Pbn , oudb and cAtc. can be however modified.

9 Serial Communication

ATR401-22ABC-T is provided with RS485 and can receive / broadcast data via MODBUS-RTU protocol. Device can be configured only as Slave.
This function allows to control multiple controllers connected to a supervisory system. Each instrument will answer to a Master query only if contains same address as on parameter 93 SLAd.
Allowed addresses are 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 connected equipments (broadcast mode), while with 0 all devices receive command, but no answer is expected.
ATR401 can introduce an answer delay (in milliseconds) to Master request.This delay has to be set on parameter 94 SEdE.
At each parameters modification, instrument stores values in EEPROM memory (100000 writing cycles), while setpoints are stored with a delay of 10 seconds after last modification.

N.B.: Modifications made to Words different from those described in the following table can lead to instrument malfunction.

Modbus RTU protocol features	
Boud-rate	Selectable on parameter 92 bdrt. : 4800 4 4800 bit/sec. 9600 9600 bit/sec. 19200 19200 bit/sec. 28800 28800 bit/sec. 38400 38400 bit/sec. 57600 57600 bit/sec. 115200 115200 bit/sec.
Format	8, N, 1 (8 bit, no parity, 1 stop)
Supported functions	WORD READING (max 20 word) (0x03, 0x04) SINGLE WORD WRITING (0x06) MULTIPLE WORDS WRITING (max 20 word) (0x10)

Looking at the table here below it is possible to find all available addresses and functions:

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	Installation 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 baud-rate **9996** Restore all values except for slave address	R/W	0
900	Process AI1 (degrees with tenths of degree for temperature sensors; digits for linear sensors)	RO	?
901	Process AI2 (degrees with tenths of degree for temperature sensors; digits for linear sensors)	RO	?
902	Average AI1-AI2 (degrees with tenths of degree for temperature sensors; digits for linear sensors)	RO	?

903	Difference AI1-AI2 (degrees with tenths of degree for temperature sensors; digits for linear sensors)	RO	?
905	Modul difference AI1-AI2 (degrees with tenths of degree for temperature sensors; digits for linear sensors)	RO	?
905	Addition AI1-AI2 (degrees with tenths of degree for temperature sensors; digits for linear sensors)	RO	?
1000	Command process (degrees with tenths of degree for temperature sensors; digits for linear sensors)	RO	?
1001	Setpoint 1	R/W	EEPROM
1002	Setpoint 2	R/W	EEPROM
1003	Setpoint 3	R/W	EEPROM
1004	Setpoint 4	R/W	EEPROM
1005	Alarm 1	R/W	EEPROM
1006	Alarm 2	R/W	EEPROM
1007	Alarm 3	R/W	EEPROM
1008	Alarm 4	R/W	EEPROM
1009	Real setpoint (it is based on gradient)	RO	EEPROM
1010	Relay status (0 = Off, 1 = On) Bit 0 = Relay **Q4** Bit 3 = Relay **Q2** Bit 1 = Relay **Q3** Bit 4 = Relay **Q1 N.O.** Bit 2 = Relay **Q1 N.O.** Bit 5 = **SSR**	RO	0
1011	Percentage heating output (0-10000)	RO	0
1012	Percentage cooling output (0-10000)	RO	0
1013	Alarms status (0 = None, 1 = Active) Bit 0 = Alarm 1 Bit 2 = Alarm 3 Bit 1 = Alarm 2 Bit 3 = Alarm 4	RO	0
1014	Manual reset: write 0 to reset all alarms. In reading (0 = Not resettable, 1 = Resettable) Bit 0 = Alarm 1 Bit 2 = Alarm 3 Bit 1 = Alarm 2 Bit 3 = Alarm 4	WO	0
1015	Error flags Bit 0 = Eeprom writing error Bit 1 = Eeprom reading error Bit 2 = Cold juntion error Bit 3 = Error AI1 (sensor 1) Bit 4 = Error AI2 (sensor 2) Bit 5 = Generic error Bit 6 = Hardware error Bit 7 = Missing calibration error Bit 8 = Incongruous control parameters Bit 9 = Incongruous alarm parameters Bit 10 = Incongruous retransmission parameters Bit 11 = Incongruous visualization parameters Bit 12 = L.B.A. – Low corrent Bit 13 = L.B.A. – Short circuit	RO	0

1016	Cold junction temperature (with decimal point)	RO	?
1017	Start / Stop 0 = Controller in STOP 1 = Controller in START	R/W	0
1018	Lock conversion ON / OFF 0 = Lock conversion off 1 = Lock conversion on	R/W	0
1019	Tuning ON / OFF 0 = Tuning off 1 = Tuning on	R/W	0
1020	Automatic / Manual selection 0 = Automatic 1 = Manual	R/W	0
1021	OFF LINE[3] time (milliseconds)	R/W	?
1022	Digital input status 0 = Input OFF 1 = Input ON	RO	?
1023	Instantaneous current value (tenth of ampere)	RO	0
1024	Current ON value (tenth of ampere)	RO	0
1025	Current OFF value (tenth of ampere)	RO	0
1100	Process with decimal point selection	RO	?
1101	Setpoint 1 with decimal point selection	R/W	EEPROM
1102	Setpoint 2 with decimal point selection	R/W	EEPROM
1103	Setpoint 3 with decimal point selection	R/W	EEPROM
1104	Setpoint 4 with decimal point selection	R/W	EEPROM
1105	Alarm 1 with decimal point selection	R/W	EEPROM
1106	Alarm 2 with decimal point selection	R/W	EEPROM
1107	Alarm 3 with decimal point selection	R/W	EEPROM
1108	Alarm 4 with decimal point selection	R/W	EEPROM
1109	Real setpoint (gradient) with decimal point selection	RO	EEPROM
1110	Percentage heating output (0-1000)	R/W	0
1111	Percentage heating output (0-100)	R/W	0
1112	Percentage cooling output (0-1000)	RO	0
1113	Percentage cooling output (0-100)	RO	0
2001	Parameter 1	R/W	EEPROM
….	….	R/W	EEPROM
2100	Parameter 100	R/W	EEPROM
4001	Parameter 1[4]	R/W	EEPROM
….	….	R/W	EEPROM
4100	Parameter 100	R/W	EEPROM

[3] If it is 0, control is desabled. If it is different from 0, it is “maximum time that can elapse between two pollings before the controller goes off-line”.
If it goes Off-line, the controller goes.

[4] Parameters changed using serial address from 4001 to 4100 are saved in eeprom only after 10’’ after the last writing of parameters.

10 Configuration

10.1 Modify configuration parameters

For configuration parameters see next paragraph.

	Press	Display	Do
1	PRGM for 3 second	Display 1 shows 0000 with the 1st digit flashing, while display 2 shows PASS.	
2	▲ or ▼	Modify flashing digit and move to next digit with SET.	Enter password: 1234.
3	PRGM to confirm	Display 1 shows first parameter and second display shows its value.	
4	▲ or ▼	Scroll parameters.	
5	PRGM	Allows to pass from mnemonic parameter code to the numeric one and viceversa.	
6	SET	Allows parameter modification (display 2 flashes).	
7	▲ or ▼	Increases or decreases visualized value.	Introduce new data.
8	SET	Confirms data entering (display 2 stops flashing).	To change another parameter return to point 4.
9	FNC	End of parameters modification Controller exits the programming mode.	

11 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 data.

1  **Command Output:** Command output type selection

Default (necessary for using process and setpoint retransmission function with Volt / mA output)

ATR401-22ABC

	COMMAND	*ALARM 1*	*ALARM 2*
	Q1	Q2	SSR
	Q1 3-4 (open) / 4-5 (close)	Q2	SSR
	SSR	Q1	Q2

ATR401-23ABC

	COMMAND	*ALARM 1*	*ALARM 2*	*ALARM 3*
	Q1	Q2	Q3	SSR
	Q1 3-4 (open) / 4-5 (close)	Q2	Q3	SSR
	SSR	Q1	Q2	Q3

ATR401-24ABC

	COMMAND	*ALARM 1*	*ALARM 2*	*ALARM 3*	*ALARM 4*
	Q1	Q2	Q3	Q4	SSR
	Q1 3-4 (open) / 4-5 (close)	Q2	Q3	Q4	SSR
	SSR	Q1	Q2	Q3	Q4

ATR401-22ABC-T

	COMMAND	*ALARM 1*	*ALARM 2*	*ALARM 3*
	Q1	Q2	SSR	AO1(V)
	Q1 3-4 (open) / 4-5 (close)	Q2	SSR	AO1(V)
	SSR	Q1	Q2	AO1(V)
	4...20 mA	Q1	Q2	SSR
	0...20 mA	Q1	Q2	SSR
	0...10 V	Q1	Q2	SSR

2 SEn.1 **Sensor:** Analog input configuration / sensor selection (AI1)

Look!

d.S.	Disabled	
tc.H	Tc-K **(Default)**	-260…1360 °C
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
n.1	NI100	-60…180 °C
ntc	NTC10K	-40…125 °C
Ptc	PTC1K	-50…150 °C
Pt5	PT500	-100…600 °C
Pt.1H	PT1000	-100…600 °C
0-10	0…10 Volt	
0-20	0…20 mA	
4-20	4…20 mA	
0.40	0…40 mVolt	
Pot.1	Potentiometer max 6 Kohm	
Pot.2	Potentiometer max 150 Kohm	

3 dP. **Decimal Point:** Select type of visualized decimal point for Analogic Input 1

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

4 LL.1 **Lower Linear Input 1:** AI1 lower range limit only for linear signals. Example: with input 4...20 mA this parameter takes value associated to 4 mA **-999…+9999** digit*, **Default: 0.**

Look!

* The display of the decimal point depends on the setting of parameter SEn and the parameter dP.

5 **Upper Linear Input 1:** AI1 upper range limit only for linear signals. Example: with input 4...20 mA this parameter takes value associated to 20 mA

Look!

-999…+9999 digit*, **Default: 1000.**

6 **Offset Calibration 1:** Offset AI1 calibration. Number added to visualized process value (normally correcting ambient temperature value)

-999…+1000 digit* for linear sensors and potentiometers.
-99.9…+100.0 tenths for temperature sensors, **Default: 0.0.**

7 **Gain Calibration 1:** AI1 gain calibration. % Value multiplied with displayed value to calibrate process value

-99.9%…+100.0%, Default: 0.0.

8 **Latch-On 1:** Automatic setting of limits for linear input

- dis — Disabled **(Default)**
- Std — Standard
- uOSt — Virtual Zero Stored (see paragraph 8.9)
- uOin — Virtual Zero Initialized (see paragraph 8.9)

9 **Lower Limit Setpoint 1:** AI1 lower limit setpoint

Look!

-999…+9999 digit* (degrees if temperature), **Default: 0.**

10 **Upper Limit Setpoint 1:** AI1 upper limit setpoint

Look!

-999…+9999 digit* (degrees if temperature), **Default: 1750.**

11 **Sensor 2:** Analogue input 2 configuration / sensor selection AI2

dis	Disabled **(Default)**	
tc.H	Tc-K	-260…1360 °C
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
Pt1	PT100	-200…140 °C
ni	NI100	-60…180 °C
ntc	NTC10K	-40…125 °C
Ptc	PTC1K	-50…150 °C

* The display of the decimal point depends on the setting of parameter SEn and the parameter dP.

PtS	PT500	-100…600 °C
Pt 1K	PT1000	-100…600 °C
0-10	0…10 Volt	
0-20	0…20 mA	
4-20	4…20 mA	
040	0…40 mVolt	
Pot.1	Potenc. max 6 Kohm (full scale)	
Pot.2	Potenc. max 150 Kohm (full scale)	
tA	Current measured by amperometric transformer	

12 dP. 2 **Decimal Point 2:** Select decimal type visualized for analogue input 2

- 0 **Default**
- 0.0 1 Decimal
- 0.00 2 Decimal
- 0.000 3 Decimal

13 LL. i2 **Lower Linear Input 2:** AI2 lower range limit only for linear signals. Example: with input 4...20 mA this parameter takes value associated to 4 mA

-999…+9999 digit*, **Default: 0.**

14 uL. i2 **Upper Linear Input 2:** AI2 upper range limit only for linear signals. Example: with input 4...20 mA this parameter takes value associated to 20 mA

-999…+9999 digit*, **Default: 1000.**

15 oCA2 **Offset Calibration 2:** AI2 offset calibration.
Number added to visualized process value
(normally correcting ambient temperature value)

-999…+1000 digit* for linear sensors and potentiometers.
-99.9…+100.0 tenths for temperature sensors, **Default: 0.0.**

16 GCA2 **Gain Calibration 2:** AI2 Gain calibration.
% Value multiplied with displayed value to calibrate process value

-99.9%…+100.0%, **Default: 0.0.**

17 LLS2 **Lower Limit Setpoint 2:** AI2 lower limit setpoint

-999…+9999 digit* (degrees if temperature), **Default: 0.**

---

* The display of the decimal point depends on the setting of parameter SEn and the parameter dP.

18 **Upper Limit Setpoint 2:** AI2 upper limit setpoint

Look!

-999…+9999 digit* (degrees if temperature), **Default: 1750.**

19 **Command Process:** Selects process value related to command output and visualized on display 1. This determinates which is the primary process

- Pro1 Process 1 **(Default)**
- Pro2 Process 2
- MEAn Processes mean
- diFF Processes difference
- AbSd Processes difference as absolute value
- Sum AI1+AI2 Input addition

20 **Remote Setpoint:** Enables remote setpoint. Command setpoint is the secondary process. It works if Pro1 or Pro2 is selected on parameter cPro

- dis Disabled **(Default)**
- En Enabled

21 **Command Action Type:** Regulation type for command output

- HEAt Heating (N.O.) **(Default)**
- cooL Cooling (N.C.)
- HooS Lock command above SPV. Example: command output disabled when reaching setpoint, also with P.I.D. value different from 0

22 **Command Hysteresis:** Hysteresis in ON / OFF or dead band in P.I.D.

0.0-999.9 digit* (tenth of degree if temperature), **Default: 0.**

23 **Command Rearmament:** Type of reset for contact of command output (always automatic in P.I.D. functioning)

- ArE. Automatic Reset **(Default)**
- MrE. Manual Reset by keyboard
- MrES Manual reset stored (keeps relay status also after an eventual power failure)

---

* The display of the decimal point depends on the setting of parameter SEn and the parameter dP.

24	c. SE.	**Command State Error:** Contact state for command output in case of error
	co	Open contact **(Default)**
	cc.	Closed contact
25	c. Ld	**Command Led:** Defines led C1 state corresponding to relevant contact
	co	ON with open contact
	cc.	ON with closed contact **(Default)**
26	c. dE.	**Command Delay:** Command delay (only in ON / OFF functioning). (In case of servo valve it works also in P.I.D. and represents delay between opening and closure of two contacts)
		-600…+600 seconds (tenth of second in case of servo valve). Negative: delay when turning off. Positive: delay when turning on. **Default: 0.**
27	c. SP.	**Command Setpoint Protection:** Allows or not to change command setpoint value by keyboard
	FrEE	Modification allowed **(Default)**
	Loch	Protected
28	tunE	**Tune:** Autotuning type selection
	d iS	Disabled **(Default)**
	Auto	Automatic (P.I.D. parameters calculation at each activation and / or each change)
	MAn	Manual (launch by keyboards or by digital input)
	onCE	Once (P.I.D. parameters calculation only at first start)
29	Sdtu	**Setpoint Deviation Tune:** Selects deviation from command setpoint as threshold used by autotuning to calculate P.I.D. parameters
		0…5000 digit* (tenth of degree if temperature), **Default: 10.0.**
30	Pb.	**Proportional Band:** Process inertia in units (example: °C if temperature)
		0 ON / OFF if also t. i is equal to 0 **(Default).** **1…9999** digit* (tenth of degree if temperature).

* The display of the decimal point depends on the setting of parameter SEn and the parameter dP.

31 t.i **Integral Time:** Process inertia in seconds
0.0…999.9 seconds. 0 integral disabled, **Default: 0.0.**

32 t.d **Derivative Time:** Normally ¼ of integral time
0.0…999.9 seconds. 0 derivative disabled, **Default: 0.0.**

33 t.c **Cycle Time:** Cycle time (for P.I.D. on remote control switch 10 / 15 sec., for P.I.D. on SSR 1 sec.) or servo time (value declared by servo-motor manufacturer)
0.1…300.0 seconds, **Default: 10.0.**

34 LLoP **Lower Limit Output Percentage:** Select minimum value for command output percentage
0…100%, **Default: 0%.**
Example: with cout selected as 0...10 V and LLoP set at 10%, command output can change from a min. of 1 V to a max. of 10 V.

35 uLoP **Upper Limit Output Percentage:** Selects maximum value for command output percentage
0…100%, **Default: 100%.**

36 dEGr. **Degree:** Select degree type
- °c Centigrade **(Default)**
- °F Fahrenheit

37 AL.1 **Alarm 1:** Alarm 1 selection.
Alarm intervention is correlated to AL1

Look!

- d.iS. Disabled **(Default)**
- A.AL. Absolute alarm, referring to process
- b.AL. Band alarm
- HdAL. Upper deviation alarm
- LdAL. Lower deviation alarm
- AcAL. Absolute alarm, referring to command setpoint
- StAL. Status alarm (active in Run / Start)
- cool Cooling action
- LbA Status alarm “load control” (Loop Break Alarm)
  Example: status of contactors / SSR or heating elements

---

* The display of the decimal point depends on the setting of parameter SEn and the parameter dP.

38 A1Pr **Alarm 1 Hysteresis:** Select value correlated to alarm 1

- Pro1 Process 1 **(Default)**
- Pro2 Process 2
- MEAn Processes mean
- diFF Processes difference
- AbSd Processes difference as absolute value
- SuM AI1+AI2 Input addition

39 A1So **Alarm 1 State Output:** Alarm 1 output contact and intervention type

- no. S (N.O. start) Normally open, active at start
- nc. S (N.C. start) Normally closed, active at start
- no. t. (N.O. threshold) Normally open, active on reaching alarm[5]
- nc. t. (N.C. threshold) Normally closed, active on reaching alarm[5]

40 A1HY **Alarm 1 Hysteresis**
-999…+999 digit* (tenths of degree if temperature), **Default: 0.0.**

41 A1rE **Alarm 1 Rearmament:** Type of reset for contact of alarm 1

- AuE. Automatic Reset **(Default)**
- MnE. Manual Reset by keyboard
- MnES Manual reset stored
  (keeps relay status also after an eventual power failure)

42 A1SE **Alarm 1 State Error:** Contact status for alarm 1 output in case of error

- oP. Open contact **(Default)**
- cc. Closed contact

43 A1Ld **Alarm 1 Led:** Defines led A1 status corresponding to relevant contact

- oP. ON with open contact
- cc. ON with closed contact **(Default)**

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

* The display of the decimal point depends on the setting of parameter SEn and the parameter dP.

44 A. dE. **Alarm 1 Delay**

-600…+600 seconds.
Negative: delay at exit from alarm.
Positive: delay at starting of alarm.
Default: 0.

45 A. SP. **Alarm 1 Setpoint Protection:** Alarm 1 set protection.
Does not allow the user to change setpoint

- FrEE Modification allowed **(Default)**
- Loc Protected
- H dE Protected and not visualized

46 AL. 2 **Alarm 2:** Alarm 2 selection.
Alarm intervention is associated to AL2

- d .S. Disabled **(Default)**
- A. AL. Absolute alarm, referring to process
- b. AL. Band alarm
- HdAL. Upper deviation alarm
- LdAL. Lower deviation alarm
- AcAL. Absolute alarm, referring to command setpoint
- StAL. Status alarm (active in Run / Start)
- cool Cooling action
- LbA. Status alarm “load control” (Loop Break Alarm)
  Example: status of contactors / SSR or heating elements

47 A2Pr. **Alarm 2 Process:** Selects value related to alarm 2

- Pro.1 Process 1 **(Default)**
- Pro.2 Process 2
- MEAn Processes mean
- d iFF. Processes difference
- AbSd. Processes difference as absolute value
- SuM AI1+AI2 Input addition

48 A2Sa **Alarm 2 State Output:** Alarm 2 output contact and intervention type

- no. S (N.O. start) Normally open, active at start
- nc. S (N.C. start) Normally closed, active at start

---

* The display of the decimal point depends on the setting of parameter SEn and the parameter dP. .

	no t.	(N.O. threshold) Normally open, active on reaching alarm[6]
	nc. t.	(N.C. threshold) Normally closed, active on reaching alarm[6]
49	A2HY	**Alarm 2 Hysteresis** **-999…+999** digit* (tenth of degree if temperature), **Default: 0.0.**
50	A2rE.	**Alarm 2 Rearmament:** Type of reset for alarm 2 contact
	AutE.	Automatic Reset **(Default)**
	MAn.	Manual Reset by keyboard
	MAnS.	Manual reset stored (keeps relay status also after an eventual power failure)
51	A2SE.	**Alarm 2 State Error:** Contact status for alarm 2 output in case of error
	co.	Open contact **(Default)**
	cc.	Closed contact
52	A2Ld	**Alarm 2 Led:** Defines led A2 status corresponding to relevant contact
	co.	ON with open contact
	cc.	ON with closed contact (**Default)**
53	A2dE.	**Alarm 2 Delay** **-600…+600** seconds. Negative: delay at exit from alarm. Positive: delay at starting of alarm. **Default: 0.**
54	A2SP.	**Alarm 2 Setpoint Protection:** Alarm 2 set protection. Does not allow the user to change set value
	FrEE	Modification allowed **(Default)**
	Loch	Protected
	H idE	Protected and not visualized

[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.

* The display of the decimal point depends on the setting of parameter SEn and the parameter dP.

55 AL. 3 **Alarm 3:** Alarm 3 selection.
Alarm intervention is associated to AL3

- dIS. Disabled **(Default)**
- R. AL. Absolute alarm, referring to process
- b. AL. Band alarm
- HdAL. Upper deviation alarm
- LdAL. Lower deviation alarm
- AcAL. Absolute alarm, referring to command setpoint
- StAL. Status alarm (active in Run / Start)
- cooL Cooling action
- LbA. Status alarm “load control” (Loop Break Alarm)
  Example: status of contactors / SSR or heating elements

56 A3Pr. **Alarm 3 Process:** Selects value correlated to alarm 3

- Pro1 Process 1 **(Default)**
- Pro2 Process 2
- MEAn Processes mean
- diFF. Processes difference
- AbSd. Processes difference as absolute value
- Sum AI1+AI2 Input addition

57 A3Sa **Alarm 3 State Output:** Alarm 3 output contact and intervention type

- no. S (N.O. start) Normally open, active at start
- nc. S (N.C. start) Normally closed, active at start
- no. t. (N.O. threshold) Normally open, active on reaching alarm[7]
- nc. t. (N.C. threshold) Normally closed, active on reaching alarm[7]

58 A3HY **Alarm 3 Hysteresis**
-999…+999 digit* (tenths of degree if temperature), **Default: 0.0.**

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

* The display of the decimal point depends on the setting of parameter SEn and the parameter dP.

59 A3rE **Alarm 3 Rearmament:** Type of reset for alarm 3 contact

- ArE. Automatic Reset **(Default)**
- MrE. Manual Reset by keyboard
- MrES. Manual reset stored (keeps relay status also after an eventual power failure)

60 A3SE. **Alarm 3 State Error:** Contact status for alarm 3 output in case of error

- oo. Open contact **(Default)**
- cc. Closed contact

61 A3Ld. **Alarm 3 Led:** Defines led A3 status corresponding to relevant contact

- oo. ON with open contact
- cc. ON with closed contact **(Default)**

62 A3dE. **Alarm 3 Delay**

-600…+600 seconds.
Negative: delay at exit from alarm.
Positive: delay at starting of alarm.
Default: 0.

63 A3SP. **Alarm 3 Setpoint Protection:** Alarm 3 set protection. Does not allow the user to change set value

- FrEE Modification allowed **(Default)**
- Loch Protected
- H idE Protected and not visualized

64 AL. 4 **Alarm 4:** Alarm 4 selection. Alarm intervention is associated to AL4

- d iS. Disabled **(Default)**
- A. AL. Absolute alarm, referring to process
- b. AL. Band alarm
- HdAL. Upper deviation alarm
- LdAL. Lower deviation alarm
- AcAL. Absolute alarm, referring to command setpoint
- StAL. Status alarm (active in Run / Start)
- cooL Cooling action
- LbA Status alarm “load control” (Loop Break Alarm) Example: status of contactors / SSR or heating elements

65	A4Pr	**Alarm 4 Process:** Selects value correlated to alarm 4
	Pro1	Process 1 **(Default)**
	Pro2	Process 2
	MEAn	Processes mean
	diFF	Processes difference
	AbSd	Processes difference as absolute value
	SuM	AI1+AI2 Input addition
66	A4So	**Alarm 4 State Output:** Alarm 4 output contact and intervention type
	no S	(N.O. start) Normally open, active at start
	nc S	(N.C. start) Normally closed, active at start
	no t	(N.O. threshold) Normally open, active on reaching alarm[8]
	nc t	(N.C. threshold) Normally closed, active on reaching alarm[8]
67	A4HY	**Alarm 4 Hysteresis** **-999…+999** digit* (tenths of degree if temperature), **Default: 0.0.**
68	A4rE	**Alarm 4 Rearmament:** Type of reset for alarm 4 contact
	AtE	Automatic Reset **(Default)**
	MtE	Manual Reset by keyboard
	MtES	Manual reset stored (keeps relay status also after an eventual power failure)
69	A4SE	**Alarm 4 State Error:** Contact status for alarm 4 output in case of error
	oA	Open contact **(Default)**
	cC	Closed contact
70	A4Ld	**Alarm 4 Led:** Defines led A4 status corresponding to relevant contact
	oA	ON with open contact
	cC	ON with closed contact **(Default)**

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

* The display of the decimal point depends on the setting of parameter SEn and the parameter dP.

71 A4dE **Alarm 4 Delay**

-600…+600 seconds.
Negative: delay at exit from alarm.
Positive: delay at starting of alarm.
Default: 0.

72 A4SP **Alarm 4 Setpoint Protection:** Alarm 4 set protection. Does not allow the user to change set value

FrEE Modification allowed **(Default)**

LocK Protected

H idE Protected and not visualized

73 tA **Amperometric Transformer:** Activation and range for amperometric transformer

0 Desabled **(Default)**
1…200 Ampere

74 LbAt **Loop Break Alarm Threshold:** Loop Break Alarm intervention threshold

0.0 Disabled alarm
0.1...200.0 Ampere
Default: 50.0

75 LbAd **Loop Break Alarm Delay:** Loop Break Alarm intervention delay

00.00…60.00 mm.ss
Default: 01.00

76 CooF **Cooling Fluid:** Type of refrigerant fluid for heating / cooling P.I.D.

A ir Air **(Default)**

o iL Oil

H2o Water

77 Pbn **Proportional Band Multiplier:** Proportional band for cooling action is given by parameter 30 multiplied for this parameter

1.00…5.00
Default: 1.00

78 odb **Overlap / Dead Band:** Dead band combination for heating / cooling P.I.D.

-20.0…50.0%.
Negative: Dead band.
Positive: overlap.
Default: 0.0.

79 Cot.C. **Cooling Cycle Time:** Cycle Time for Cooling output

1…300 seconds
Default: 10

80 CFLt. **Conversion Filter:** ADC Filter: Number of sensor readings to calculate mean that defines process value.
N.B.: When readings increase, control loop speed slows down

- d .S. Disabled
- 2. SM 2 Samples Mean
- 3. SM 3 Samples Mean
- 4. SM 4 Samples Mean
- 5. SM 5 Samples Mean
- 6. SM 6 Samples Mean
- 7. SM 7 Samples Mean
- 8. SM 8 Samples Mean
- 9. SM 9 Samples Mean
- 10.SM 10 Samples Mean
- 11.SM 11 Samples Mean
- 12.SM 12 Samples Mean
- 13.SM 13 Samples Mean
- 14.SM 14 Samples Mean
- 15.SM 15 Samples Mean

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

- 242H 242 Hz (Maximum speed conversion)
- 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)** Ideal for filtering noises 50 / 60 Hz
	12.5H	12.5 Hz
	10 H	10 Hz
	8.33H	8.33 Hz
	6.25H	6.25 Hz
	4.17H	4.17 Hz (Minimum speed conversion)
82	uFLt.	**Visualization Filter:** Slow down the update of process value visualized on display, to simplify reading
	d iS.	Disabled with pitchfork (maximum speed of display update)
	F ior.	First order filter with pitchfork
	2. SM	2 Samples Mean
	3. SM	3 Samples Mean
	4. SM	4 Samples Mean
	5. SM	5 Samples Mean
	6. SM	6 Samples Mean
	7. SM	7 Samples Mean
	8. SM	8 Samples Mean
	9. SM	9 Samples Mean
	10SM	10 Samples Mean (Maximum slow down of display update)
	nuLL	Disabled without pitchfork
	Fo 2	First order filter
83	AuMA	**Automatic / Manual:** Enables automatic / manual selection
	d iS.	Disabled **(Default)**
	En	Enabled
	EnSt.	Enabled with memory
84	dGt. i	**Digital Input**
	d iS.	Disabled **(Default: 0)**
	2tS.	2 Setpoints Switch
	2tS. i	2 Setpoints Switch Impulsive
	3tS. i	3 Setpoints Switch Impulsive
	4tS. i	4 Setpoints Switch Impulsive

	St.St.	Start / Stop
	rnno	Run N.O. (enables regulation with N.O. contact)
	rnnc.	Run N.C. (enables regulation with N.C. contact)
	Lcno	Lock conversion N.O. (stop conversion and display value with N.O.)
	Lcnc.	Lock conversion N.C. (stop conversion and display value with N.C.)
	tunE	Manual Tune (by digital input)
	AMA.i	Automatic / Manual Impulse (if enabled on parameter 83)
	AMAc.	Automatic / Manual Contact (if enabled on parameter 83)
	Actt.	Action Type. Heating regulation with open D.I. Cooling regulation with closed D.I
85	r Gr.	**Rising Gradient:** Rising gradient for Soft-Start **0** Disabled. **1…9999** digit/hour* (degrees/hour with decimal visualization if temperature), **Default: 0.**
86	u d2	**Visualization Display 2:** Set visualization on display 2
	outP.	Output Percentage
	AMP.	Ampere
	c.SPu	Command Setpoint **(Default)**
	Pro.1	Process 1
	Pro2	Process 2
	MEAn	Processes mean
	diFF.	Processes difference
	AbSd.	Processes difference as absolute value
	Sum	AI1+AI2 Input addition
87	u tY	**Visualization Type:** Set visualization type on display
	Std.	Display 1 process + Display 2 as u d2 **(Default)**
	d2H i	Display 1 process + Display 2 as u d2 hidden after 3 sec.
	SUAP	Display 1 as u d2 + Display 2 process
	Sd2H	Display 1 as u d2 + Display 2 process hidden after 3 sec.
88	rEtr.	**Retransmission:** Retransmission for output 0…10 V or 0/4…20 mA. Parameters 90 and 91 defines upper/lower limit of scale
	dis.	Disabled **(Default)**
	c.SPu	Command Setpoint

***** The display of the decimal point depends on the setting of parameter SEn and the parameter dP.

88 rEtr. **Retransmission:** Retransmission for output 0…10 V or 0/4…20 mA. Parameters 90 and 91 defines upper/lower limit of scale

- Pro.1 Process 1
- Pro2 Process 2
- MEAn Processes Mean
- diFF. Processes Difference
- AbSd Processes Difference as absolute value
- SuM AI1+AI2 Input addition

89 rEtY **Retransmission Type:** Select retransmission type

- 0-10 0…10 Volt **(Default)**
- 0-20 0…20 mA
- 4-20 4…20 mA

90 LoLr. **Lower Limit Retransmission:** Lower limit analogue output range
-999…9999 digit* (degrees if temperature), **Default: 0.**

91 uPLr. **Upper Limit Retransmission:** Upper limit analogue output range
-999…9999 digit* (degrees if temperature), **Default: 1000.**

92 bdrt. **Baud Rate:** Selects baudrate for serial communication

- 48 h 4800 bit/s
- 96 h 9600 bit/s
- 192h 19200 bit/s **(Default)**
- 288h 28800 bit/s
- 384h 39400 bit/s
- 576h 57600 bit/s
- 115.2 115200 bit/s

93 SLAd **Slave Address:** Selects slave address for serial communication
1 – 254
Default: 254

94 SEdE. **Serial Delay:** Selects serial delay
0 – 100 miliseconds
Default: 20

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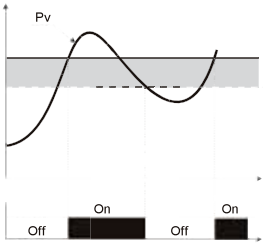
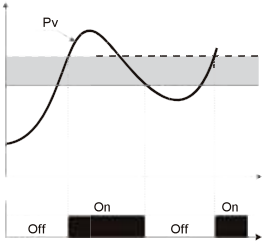
* The display of the decimal point depends on the setting of parameter SEn and the parameter dP.

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



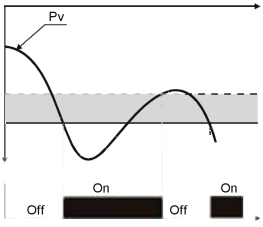
Absolute alarm with controller in heating functioning (par. 21 ACTT. selected HEAT) and hysteresis value greater than "0" (par. 40 A. HY > 0).

N.B.



Absolute alarm with controller in heating functioning (par. 21 ACTT. selected HEAT) and hysteresis value less than "0" (par. 40 A. HY < 0).

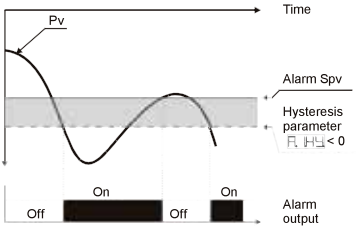
N.B.



Absolute alarm with controller in cooling functioning (par. 21 ACTT. selected COOL) and hysteresis value than "0" (par. 40 A. HY > 0).

N.B.

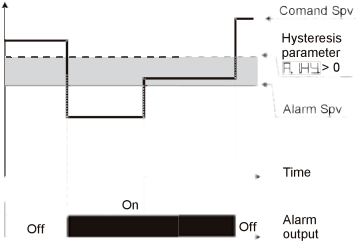
N.B.: The example is related to alarm 1; function can be enabled also for alarms 2, 3 and 4 on models that include them.



Absolute alarm with controller in cooling functioning
(par. 21 AcTt selected cooL) hysteresis value minor than “0”
(par. 40 A. HY < 0).

N.B.

Absolute Alarm or Threshold Alarm Referring to Setpoint Command (selection AcAL)

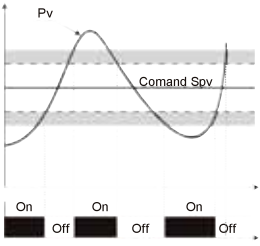


Absolute alarm refers to the command set, with the controller in heating functioning
(par. 21 AcTt selected HEAt) hysteresis value greater than “0.
(par. 40 A. HY > 0).
Command set can be changed by pressing the arrow keys on front panel.

N.B.

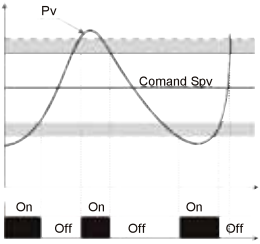
N.B.: The example is related to alarm 1; function can be enabled also for alarms 2, 3 and 4 on models that include them.

Band Alarm (selection b. AL.)



Band alarm with hysteresis value greater than “0”.
(par. 40 A. HY > 0).

N.B.

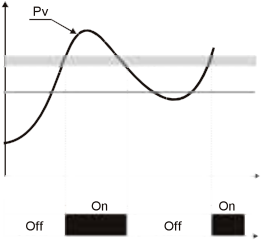


Band alarm with hysteresis value minor than “0”.
(par. 40 A. HY < 0).

N.B.

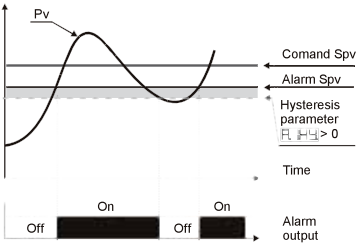
N.B.: The example is related to alarm 1; function can be enabled also for alarms 2, 3 and 4 on models that include them.

Upper Deviation Alarm (selection HdAL.)



Upper deviation alarm value of alarm setpoint greater than “0” and hysteresis value greater than“0”
(par. 40 A. HY > 0).

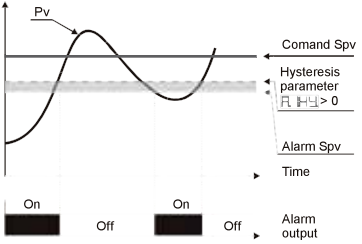
N.B.[2]



Upper deviation alarm value of alarm setpoint minor than “0” and hysteresis value greater than “0”
(par. 40 A. HY > 0).

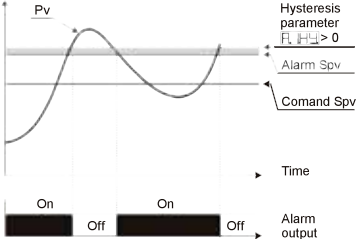
N.B.²

Lower Deviation Alarm (selection HdAL.)



Lower deviation alarm value of alarm setpoint greater than “0” and hysteresis value greater than “0”
(par. 40 A. HY > 0).

N.B.²



Lower deviation alarm value of alarm setpoint minor than “0” and hysteresis value greater than “0”
(par. 40 A. HY > 0).

N.B.²

N.B.²: a) The example is related to alarm 1; function can be enabled also for alarms 2, 3 and 4 on models that include them.
b) With hysteresis minor than “0” (A. HY < 0) dotted line moves below alarm setpoint.

13 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) flashing on display.
For other signals see table below.

#	Cause	What to do
E-01 SYSE	EEPROM programming error.	Call Assistance.
E-02 SYSE	Cold junction temperature sensor failure or environment temperature out of range.	Call Assistance.
E-04 SYSE	Incorrect configuration data. Possible loss of instrument calibration.	Verify that configuration parameters are correct.
E-05 Pro.1	Sensor connected to AI1 broken or temperature out of range.	Control connection with probes and their integrity.
E-06 Pro2	Sensor connected to AI2 broken or temperature out of range.	Control connection with probes and their integrity.
E-08 SYSE	Missing calibration.	Call Assistance.
E-10 cPAr	Incorrect control parameters.	Verify control parameters.
E-11 APAr	Incorrect alarms parameters.	Verify alarm parameters.
E-12 rPAr	Incorrect retransmission parameters.	Verify retransmission parameters.
E-13 uPAr	Incorrect visualization parameters.	Verify visualization parameters.
E-14 SPAr	Incorrect remote setpoint parameters.	Verify remote setpoint parameters.

14 Configuration EASY-UP

Look!

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 one 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 the setpoint”).

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

15 Summary of Configuration parameters

Date:	**Model ATR401:**
Installer:	**System:**
Notes:	

cout	Select type of command output
SEn.1	Analogue input 1 configuration
dP. 1	Select type of decimal visualized by sensor 1
LL.r1	AI1 range lower limit only for linear
uL.r1	AI1 range upper limit only for linear
acA1	AI1 Offset calibration
GcA1	AI1 Gain calibration
Ltc.1	Limits automatic setting for linear inputs
LL.S1	AI1 setpoint lower limit
uL.S1	AI1 setpoint upper limit
SEn2	Analogue input 2 configuration
dP. 2	Select type of decimal visualized by sensor 2
LL.r2	AI2 range lower limit only for linear
uL.r2	AI2 range upper limit only for linear
acA2	AI2 offset calibration
GcA2	AI2 gain calibration
LL.S2	AI2 setpoint lower limit
uL.S2	AI2 setpoint upper limit
cPro	Select process value related to command output
rEnS	Enable remote setpoint
Actt	Regulation type for command output
c. HY	Hysteresis in ON / OFF or dead band in P.I.D.
c. rE	Command contact reset type
c. SE	Contact status for command output in case of error
c. Ld	C1 led status in correspondence of relevant contact
c. dE	Command delay
c. SP	Command setpoint protection
tunE	Autotuning type selection
Sdtu	Deviation from command setpoint for autotuning
Pb	Proportional band

t.i	Integral time	
t.d	Derivative time	
t.c.	Cycle time	
LLoP.	Minimum value for command output percentage	
uLoP.	Maximum value for command output porcentage	
dEGr.	Degrees type	
AL. 1	Alarm 1 selection	
A1Pr.	Select process value related to alarm 1	
A1Sa.	Alarm 1 output contact and intervention type	
A1HY.	Alarm 1 hysteresis	
A1rE.	Alarm 1 contact reset type	
A1SE.	Alarm 1 output contact status in case of error	
A1Ld.	Led A1 status in correspondance of relevant contact	
A1dE.	Alarm 1 delay	
A1SP.	Alarm 1 set protection	
AL. 2	Alarm 2 selection	
A2Pr.	Select process value related to alarm 2	
A2Sa.	Alarm 2 output contact and intervention type	
A2HY.	Alarm 2 hysteresis	
A2rE.	Alarm 2 contact reset type	
A2SE.	Alarm 2 output contact status in case of error	
A2Ld.	Led A2 status in correspondance of relevant contact	
A2dE.	Alarm 2 delay	
A2SP.	Alarm 2 set protection	
AL. 3	Alarm 3 selection	
A3Pr.	Select value related to alarm 3	
A3Sa.	Alarm 3 output contact and intervention type	
A3HY.	Alarm 3 hysteresis	
A3rE.	Alarm 3 contact reset type	
A3SE.	Alarm 3 output contact status in case of error	
A3Ld.	Led A3 status in correspondance of relevant contact	
A3dE.	Alarm 3 delay	
A3SP.	Alarm 3 set protection	
AL. 4	Alarm 4 selection	
A4Pr.	Select value related to alarm 4	

	Alarm 4 output contact and intervention type
	Alarm 4 hysteresis
	Alarm 4 contact reset type
	Alarm 4 output contact status in case of error
	Led A4 status in correspondance of relevant contact
	Alarm 4 delay
	Alarm 4 set protection
	Activation and scale range of amperometric transformer
	Loop Break Alarm intervention threshold
	Delay for Loop Break Alarm intervention
	Cooling fluid type
	Proportional band multiplier
	Overlap / Dead band
	Cooling output cycle time
	Adc filter
	Sampling frequency
	Filter in visualization
	Enable automatic / manual selection
	Digital input functioning
	Rising gradient
	Set visualization on display 2
	Set visualization type on displays
	Retransmission for output 0-10 V o 4…20 mA
	Select retransmission type
	Lower limit analogue output range
	Upper limit analogue output range
	Select baud rate for serial communication
	Select slave address
	Select serial delay

Notes / Updates