Pixsys
ELECTRONICS

ATR 313
Controller

User manual

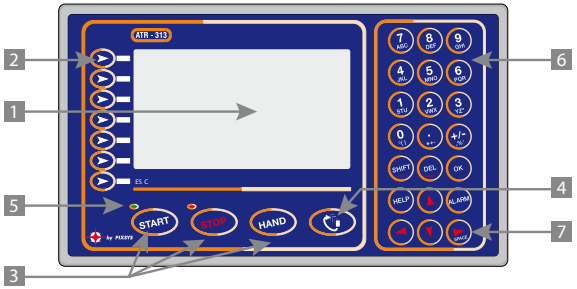

Pixsys
ELECTRONICS

Contents list

1 Process controller ATR 313

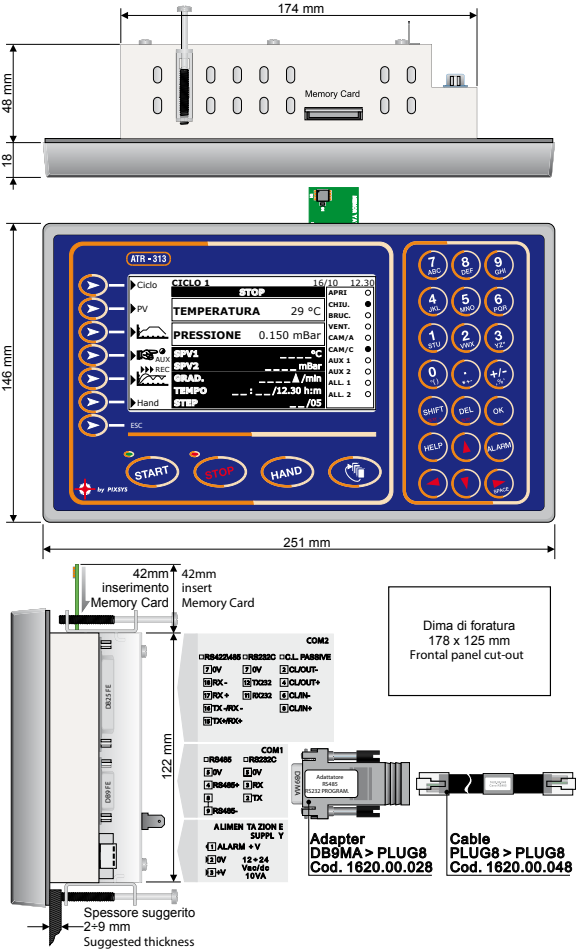
Graphic Terminal, LCD 251x146mm, Multi-loop. Combined with a variable number of data acquisition modules Pixsys PL300 , it offers a complete and flexible control system for the management of thermal processes on industrial kilns, dryers, environmental chambers.
On the frontal panel there are 32 keys, including alphanumeric keyboard, function keys to select menus and to activate special functions.
The LCD graphic display (240x128 pixel) allows to visualize both graphs and alphanumeric data.
Two leds inform the operator about the status of Terminal.

1.1 Keys and LCD display



Ref.	Description
1	LCD Display 240x128, backlightened, "reverse" function. Screen-saver management with programmable switching of lamp are configurable via software.
2	Function keys to select menus on display.
3	Select main functions of the terminal.
4	Key to enter configuration menu. It is used also as Esc key.
5	Led Start / stop. Meaning of leds varies according to software version loaded on terminal.
6	Alphanumeric keyboard to enter numbers or alphanumeric strings.
7	Arrow keys to place cursor and enter blank space during the writing.

1.2 Sizes and installation



1.3 Electrical wirings

WARNING

Although this controller has been conceived to resist the worst noises in an industrial environment, please notice the following safety guidelines:

- Separate control wires from power wires
- Avoid mounting close to remote control switching systems, electromagnetic relays, powerful engines
- Avoid proximity of power systems, especially those with phase control.

Terminals block		
1	ALARM +V	Alarm signal. In case the internal buzzer is activated (any general alarm), an external siren may be supplied by this pin (and pin 0V) with the same tension of power supply (max. 5 A).
2	0V	Power supply 12÷24V AC\DC 10VA. To improve noises immunity, it is highly recommended to use a transformer with dedicated secondary.
3	+V	

Terminal block features			
Contacts	Extractable	Insulation	600 V
Material	PA V2	Current	8 A
Cables	AWG 28-16		

1.4 Serial communication port

Connection DB9 FE COM1	
RS485 0V (pin 5) RS+ (pin 4) RS- (pin 9)	Connection to COM1 of PL300 by means of cable DB9M – Plug-8M, which is supplied with the terminal.

Connection DB25 FE COM2	
RS232	Connection to PC for software upgrade, reading and writing of data, configuration parameters and cycles stored on terminal via serial cable.
RS485 0V (pin 14) RS+ (pin 15) RS- (pin 16)	Connection to PC for reading and writing of data, configuration parameters and cycles stored on Terminal by MODBUS protocol. Connection of a Pixsys PL250 for gas/air modulating valves (optional).

Connection DB25 FE COM2	
RS422 0V (pin 14) TX+ (pin 15) TX- (pin 16) RX+ (pin 17) RX- (pin 18)	Connection to PC for reading and writing of data, configuration parameters and cycles stored on Terminal by MODBUS protocol.

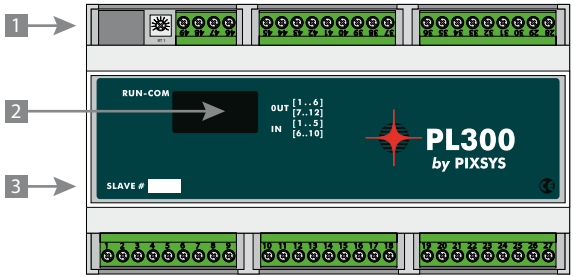
2 Data acquisition module PL300

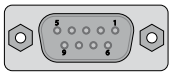
Module PL300 joined to the Terminal ATR313 is data acquisition/activation module to control thermal processes or other physical values. This dedicated configuration does not involve the typical operating as PLC and it is focused on the management of analog inputs and control outputs for Open/Close function and alarm configurations which are usually required for control loops on industrial applications.

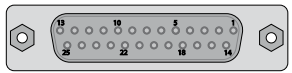
Hardware features include 4 analog inputs for TC/RTD/ linear signals, 6 digital inputs, 12 relay outputs (two change-over relays 8A), programmable alalogue outputs.

The module communicates with Terminal ATR313 via serial comunication RS485 and Pixsys protocol.

2.1 Frontal panel and Terminals block

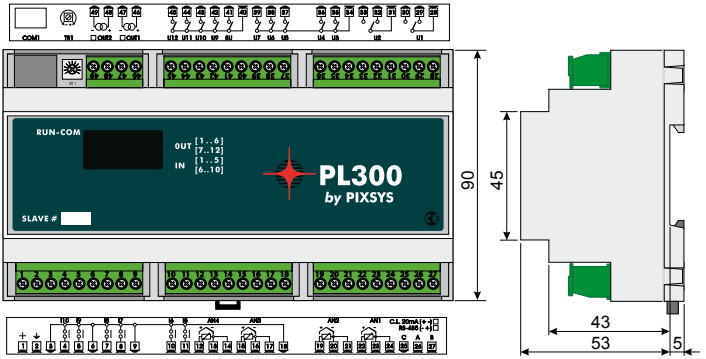


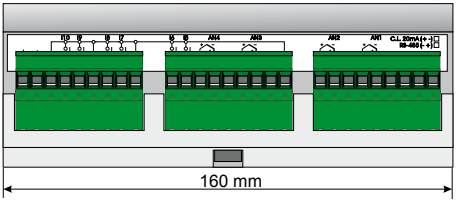

DB9 FE COM1


DB25 FE COM2

Ref.	Description
1	Plug connector – Connection to terminal ATR313
2	Status leds: Green led RUN >ON when PL300 is working. Yellow led COM > ON if comunication in progress. Red leds OUT 1..12 > ON if output is active. Green leds IN 1..10 > ON if digital input is active.
3	Slave number of module PL300.

2.2 Sizes and installation





Attacco a guida DIN EN50022
Din rail mounting guide EN5002 2

2.3 Electrical wirings

N°	Name	Description	
1	+	Supply 12÷24V AC\DC 10VA. To improve noises immunity, the employ of the secondary of a dedicated transformer is highly recommended.	
2			
25	C	Reference signal of serial comunication port	Use these pins to expand serial connection to ATR313 on plants requiring more modules PL300. In case of comunication via RS485, connect all pins C of various PL300 as well as pins A and B.
26	A	RS485-	
27	B	RS485+	
22	AN1+	Positive signal for analog input AN1 (+Tc).	
23	AN1-	Reference signal analog input AN1 (-Tc).	
24	AN1C	Compensation PT100. For 3-wire PT100 connect compensation wire to this pin.	
19	AN2+	Positive signal for analog input AN2 (+Tc).	
20	AN2-	Reference signal for analog input AN2 (-Tc).	
21	AN2C	Compensation PT100. For 3-wire PT100 connect compensation wire to this terminal.	
15	AN3+	Positive signal for analog input AN3 (+Tc).	
16	AN3-	Reference signal for analog input AN3 (-Tc).	
17	AN3C	Compensation PT100. For 3-wire PT100 connect compensation wire to this pin.	
12	AN4+	Positive signal for analog input AN4 (+Tc).	
13	AN4-	Reference signal for analog input AN4 (-Tc).	
14	AN4C	Compensation PT100. For 3-wire PT100 connect compensation wire to this terminal.	
3	COM INPUT	Common positive signal for digital inputs. Connect this signal to one of the digital inputs (I5÷I10) or to terminal "+" of analog inputs (AN1÷AN4 if configured via software as digital input), to activate the input (the relevant led switches on).	
6			
9			
18			

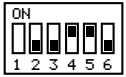
N°	Name	Description	
11	I5	Digital input.	To activate digital inputs, short-circuit signal COM INPUT on the pin of input. Inputs Leds ON mean that input is active.
10	I6	Digital input.	
8	I7	Digital input.	
7	I8	Digital input.	
5	I9	Digital input.	
4	I10	Digital input.	
28	U1 Com	Common contact relay U1.	8A ÷ 230Volt resistive
29	U1 n.c.	Contact relay U1 N.C.	
30	U1 n.a.	Contact relay U1 N.O.	
31	U2 Com	Common contact relay U2.	
32	U2 n.c.	Contact relay U2 N.C.	
33	U2 n.a.	Contact relay U2 N.O.	
34	U3÷U7 Com	Common contact relays U3÷U7.	5A ÷ 230Volt resistive
35	U3 n.a.	Contact relay U3 N.O.	
36	U4 n.a.	Contact relay U4 N.O.	
37	U5 n.a.	Contact relay U5 N.O.	
38	U6 n.a.	Contact relay U6 N.O.	
39	U7 n.a.	Contact relay U7 N.O.	
40	U8÷U12Com	Common contact relays U8÷U12.	
41	U8 n.a.	Contact relay U8 N.O.	
42	U9 n.a.	Contact relay U9 N.O.	
43	U10 n.a.	Contact relay U10 N.O.	
44	U11 n.a.	Contact relay U11 N.O.	
45	U12 n.a.	Contact relay U12 N.O.	
46	OUT1+	Positive signal linear output OUT1.	0..10 Volt 4..20 mA Logic 0-15 Volt PWM 3 A
47	OUT1-	Reference linear output OUT1.	
48	OUT2+	Reference linear output OUT1.	
49	OUT2-	Reference linear output OUT2.	

Connect COM1	
RS485	Connection to ATR313 by means of cable DB09 – Plug-8M supplied with the terminal.

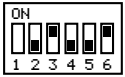
2.4 Select type of linear output

PL300 is provided with 2 linear outputs (OUT1, OUT2) which must be configured via software and manually by selection of 2 dip-switches on board:

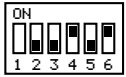
- Disconnect power supply PL300.
- Use a screwdriver to remove the upper cover of PL300
- Set dip SW1 (for OUT1) and SW2 (for OUT2) as shown here below to configure the output[1].



Logica 15V



4-20 mA



0-10 Volt

- Replace the upper cover and restart PL300.

2.5 Selection of communication address

PL300 is provided with 2 dip-switches to set the address of module for the communication with ATR313. Up to four combinations are possible, therefore if it is necessary to connect more than 4 modules on the same line, the parameter of address offset must be changed. The address of each module is exactly defined as follows:

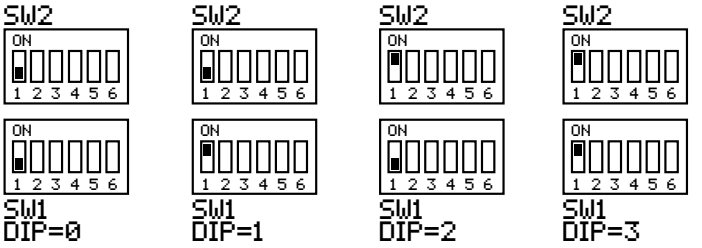
ADDRESS OF MODULE = OFFSET OF ADDRESS + COMBINATION OF DIP

The offset of address, which a value stored on memory of PL300 (default value is "0"), may be modified writing on Modbus word 5.

To set the address , please proceed as follows:

- Disconnect power supply of PL300.
- Remove upper panel of PL300 with a screwdriver
- Set dip-switches SW1-1 and SW2-1 as shown below to get the value which must be added to offset value in order to obtain the address value.

[1] *Dip SW1-1 and SW2-1 are not used for selection of linear output, but for selection of address (see following paragraph).*



Replace the upper panel and restart PL300.
Terminal ATR313 may communicate with max. 5 modules PL300 which must have the following addresses: 1, 2, 3, 4, 5. Many applications require one single PL300: in this case there's no need to make selections on the module because the default address is 1 (OFFSET of ADDRESS=0, DIP COMBINATION=1).

2.6 Hardware data PL300

ATR313 and module PL300 allows the management of up to 20 different control loops. Each control loop includes one input and one output, whose positions are fixed hardware data of PL300. Therefore during the configuration of the system please avoid to overlap other programmable outputs to the outputs alredy fixed for control loops.

2.6.1 Inputs for processes PROC. 1÷20

Process	PL300 SLAVE#	Imput
1	1	AN1
2	1	AN2
3	1	AN3
4	1	AN4
5	2	AN1
6	2	AN2
7	2	AN3
8	2	AN4
9	3	AN1
10	3	AN2
11	3	AN3

Process	PL300 SLAVE#	Imput
12	3	AN4
13	4	AN1
14	4	AN2
15	4	AN3
16	4	AN4
17	5	AN1
18	5	AN2
19	5	AN3
20	5	AN4

2.6.2 Outputs for control-loops

The following table summarizes the outputs which are used by control loops referring to parameter "**Type of output**" (menu "PROCESS CONFIGURATION"). Outputs which are not used for control-loops can be configured for other functions with the menu "CONFIGURATION OUTPUTS PL300".

Output Proc.	PL300 SLAVE#	USED OUTPUT					
		No out	On / Off Time Proport	Servo AC	OUT1 LOGIC 4..20mA 0..10V	OUT2 LOGIC 4..20mA 0..10V	SSR PROP T. SSR ON/OFF
1	1	-	U1	U1,U2	OUT1	OUT2	SSR1
2	1	-	U3	U3,U4	OUT1	OUT2	SSR2
3	1	-	U5	U5,U6	OUT1	OUT2	SSR3
4	1	-	U7	U7,U8	OUT1	OUT2	SSR4
5	2	-	U1	U1,U2	OUT1	OUT2	SSR1
6	2	-	U3	U3,U4	OUT1	OUT2	SSR2
7	2	-	U5	U5,U6	OUT1	OUT2	SSR3
8	2	-	U7	U7,U8	OUT1	OUT2	SSR4
9	3	-	U1	U1,U2	OUT1	OUT2	SSR1
10	3	-	U3	U3,U4	OUT1	OUT2	SSR2
11	3	-	U5	U5,U6	OUT1	OUT2	SSR3
12	3	-	U7	U7,U8	OUT1	OUT2	SSR4
13	4	-	U1	U1,U2	OUT1	OUT2	SSR1
14	4	-	U3	U3,U4	OUT1	OUT2	SSR2

Output Proc.	PL300 SLAVE#	USED OUTPUT					
		No out	On / Off Time Proport	Servo AC	OUT1 LOGIC 4..20mA 0..10V	OUT2 LOGIC 4..20mA 0..10V	SSR PROP T. SSR ON/OFF
15	4	-	U5	U5,U6	OUT1	OUT2	SSR3
16	4	-	U7	U7,U8	OUT1	OUT2	SSR4
17	5	-	U1	U1,U2	OUT1	OUT2	SSR1
18	5	-	U3	U3,U4	OUT1	OUT2	SSR2
19	5	-	U5	U5,U6	OUT1	OUT2	SSR3
20	5	-	U7	U7,U8	OUT1	OUT2	SSR4

2.7 Modify parameters on ATR313

Independently from loaded software version (Alfa, Beta, Gamma), to modify parameters it is necessary to refer to the following table.

Type	Example	Example of parameters change
Numeric	1200	1. Use the arrow keys to place the cursor on the data you want to modify. 2. Enter the choosen numeric value by means of the alphanumeric keyboard. (Press DEL to cancel one digit at a time) 3. Press OK to confirm the data. The cursor will automatically move to the next changeable data in the same page.
Mnemonic	On	1. Use the arrow keys to place the cursor on data to modify. 2. Press "SHIFT" to scroll all the settings available for this parameter ("DEL" allows to search backwards). 3. Press OK to confirm the data. The cursor will automatically move to the next changeable data in the same page.

Type	Example	Example of parameters change
Text	Temperature	1. Use the arrow keys to place the cursor on data to modify. 2. Cursor does not blink because the function Modify is not yet enabled. 3. Press "OK" to enable function Modify (cursor starts blinking). 4. Use the alphanumeric keyboard, the arrow keys and "DEL" to enter the text. 5. Press OK to confirm the data. The cursor will automatically move to the next changeable data in the same page.

3 "Alfa" software version for firing cycles with multiple steps on gas and electric kilns.

3.1 General features

This software is specially conceived for the management of gas and electrical kilns, requiring the programming of cycles with a certain number of steps and programmable setpoints. Main features include:

- 2 independent setpoints.
- Up to 20 independent control loops with PID algorithm.
- 20 cycles with 30 steps each , repetition of cycle
- Manual control of setpoints and outputs AUX1..AUX4
- Function "Waiting"
- Function "Recovery"
- Inputs and outputs free configurable.
- Programming of up to 30 alarms.
- Visualize the graph of cycle with advancement indicator.
- Record and visualize historical archiv of 6 traces for max. 75 hours.
- Rate of power consumption
- Serial communication via Modbus protocol; connection to PC and software data logger "Datalogger_ATR313".

3.2 Standard configuration for inputs/outputs

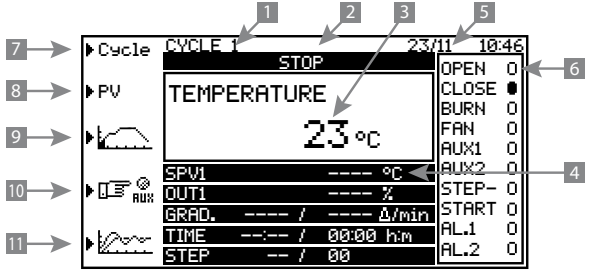
Terminal ATR313 is supplied with a standard configuration which is described in the following pages. This basic configuration allows the operating with a single module PL300 (Slave #1) to control a gas kiln with a thermocouple type K. These standard settings require the following electrical wirings.

Function and description	IN / OUT	Pins
TEMPERATURE termocouple K	AN1	22(+), 23(-)
OPEN (servovalve control)	U1 n.o.	28, 30
CLOSE (servovalve control)	U2 n.o.	31, 33
BURNERS	U3 n.o.	34, 35
FANS	U4 n.o.	34, 36
AUX1	U5 n.o.	34, 37
AUX2	U6 n.o.	34, 38
STEP-	U7 n.o.	34, 39
START	U8 n.o.	40, 41
ALL.1	U9 n.o.	40, 42
ALL.2	U10 n.o.	40, 43
STEP+ & STEP=	U11 n.o.	40, 44
STOP	U12 n.o.	40, 45
GAS PREASSURE SWITCH (stop cycle)	I5 n.o.	9, 11
START (start cycle)	I6 n.o.	9, 10
STOP (stop cycle)	I7 n.o.	6, 8

Below a description of all functions currently supported by "Alfa" software.

3.3 Main stop window (for operator)

When cycle is not running the main window is visualized as follows:

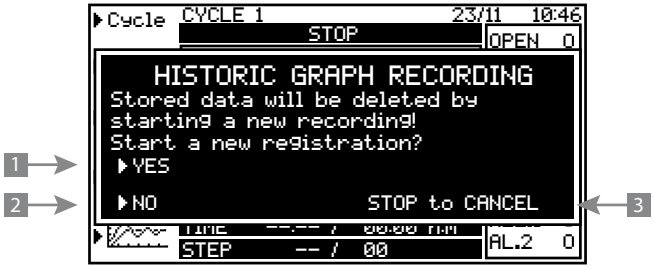


Ref.	Description
1	Name of selected cycle
2	Status of cycle
3	Name/s and value/s visualized process/es (up to max. 4 processes which can be selected from menu DISPLAY CONFIGURATION (parameters "Source 1÷4 process field").
4	Cycle values (setpoint SPV1, setpoint SPV2, selected output value, real and programmed gradient, elapsed time and total cycle time, number of step in progress and total number of steps for the selected cycle).
5	Date and time
6	Brief overview about state of outputs and digital inputs
7	Cycle functions (menu for cycle configuration)
8	Visualize data about all processes
9	Graph of selected cycle
10	Modify auxiliary output AUX5..AUX8
11	Historical graph

Within this page in addition to menu selection keys, the following keys are also active: "START" to start selected cycle, "HAND" to enable manual control and to enter main menu window.

3.4 Start historical recording (for operator)

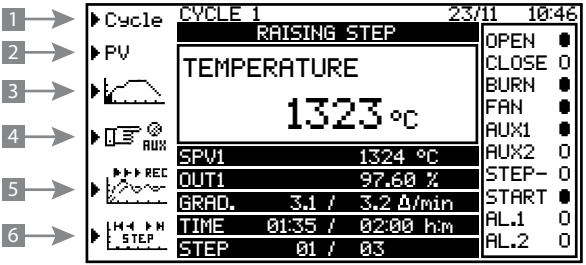
At cycle start the controller visualizes a dialogue box asking the operator if a new recording must be started or if data of previous registration must be stored. Starting a new recording, the stored data will be deleted. Historical recording shall be automatically interrupted at cycle stop or after elapsing of fixed time.



Ref.	Description
1	Start a new historical recording.
2	Keep previous recording, do not start a new one.
3	Cancel operation, keep STOP condition of terminal.

3.5 Main window during cycle execution (for operator)

When cycle is in progress, main status window will be like this:

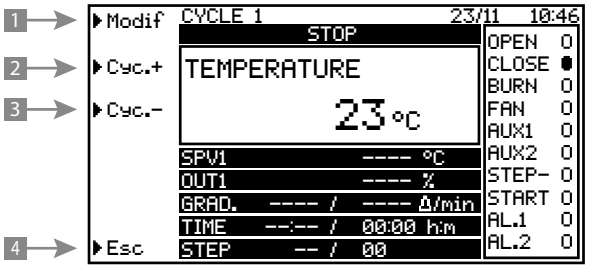


Ref.	Description
1	Menu to enter current cycle data visualization.
2	Visualize values of processes, control setpoint, % control output.
3	Cycle graph and advancement indicator
4	Modify auxiliary output AUX5..AUX8
5	Historical graph and recording indicator "**>>> REC**".
6	Menu to enter cycle manual advancement function.

Within this page in addition to menu selection keys, the following keys are also active: "START" to start selected cycle, "HAND" to enable manual control and to enter main menu window.

3.6 Menu cycle window (for operator)

When cycle is not running, enter the menu "**>Cycle**" from main window to visualize the following window:



Ref.	Description
1	Menu "Modify selected cycle".
2	Load next cycle.
3	Load previous cycle.
4	Back to main window.

3.7 Cycle programming - Modify/visualize cycle data - (for operator)

This window can be entered both with cycle in stop and in start, but the data modification is allowed only in stop condition. During the cycle this window only visualizes cycle data. The programming of selected cycle starts by entering the name of cycle, how many times the cycle will be executed , the steps (time - SPV values) and the status of 4 auxiliary outputs AUX1÷AUX4.

Cycle modification/ visualization window:

```
     **************  PROGRAMMING CYCLE 1  **************
Cycle name: < CYCLE 1 >

Execute cycle for 1 times
At cycle stop go to CYCLE  --

St  hh:mm  SPV1      SPV2      A1      A2      A3      A4
    --:--    0       0.00     OFF     OFF     OFF     OFF
1   01:00  1000      1.00     OFF     OFF     OFF     OFF
2   00:00    0       0.00     OFF     OFF     OFF     OFF
......
27  00:00    0       0.00     OFF     OFF     OFF     OFF
28  00:00    0       0.00     OFF     OFF     OFF     OFF
    00:00 ------    ------     OFF     OFF     OFF     OFF
-> ESC
```

4 auxiliary outputs of the following cycle can be used to obtain 8 programmable outputs connected to the steps of the cycle. These outputs will be named as AUX1B÷AUX4B (A1B÷A4B). They will be used only in case that the duration of first step in the next cycle (following the cycle in progress) will be entered as 00:00.

1. To enter cycle name, follow the procedure to modify text-type parameters (see par. 2.7).
2. Program the number of times the cycle will be executed. Cycle will be automatically repeated for the given number of times.
   Setting this parameter to 99, cycle will be repeated endless.
3. Select the cycle to be executed at the end of current cycle (set "CYCLE --" for no additional cycles).

4. Program the two initial setpoints from which the first cycle step will start: the cursor is automatically positioned on SPV1 and subsequently on SPV2. Set the status of 4 auxiliary outputs A1÷4 on the first line to define the status of 4 outputs with cycle in stop.
5. Proceed introducing the cycle steps (column "St" indicates the number of step), entering the time/duration of the step and the setpoint values SPV1÷2 (values which the system reaches when the programmed time expires).
6. To end programming without using all available steps, confirm the value 00.00 into the column hh:mm. Entered values will be saved pressing OK. Set the 4 auxiliary A1÷4 status of the programmed last line to define the status of 4 outputs at cycle end. Press one of function key on display right side to back to main window.

3.8 Process status (for operator)

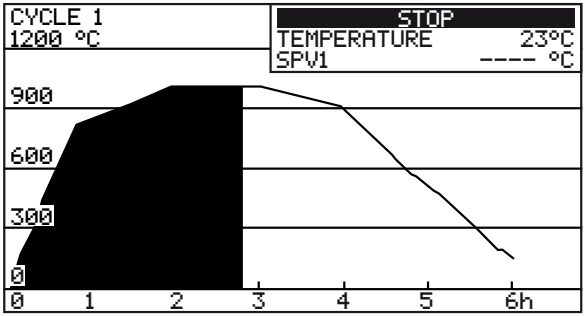
This mask gives a survey over all processes, relevant setpoints, measure units and percentage of control output. Values of processes not connected will be kept at zero. Single control zones can be eventually enabled or disabled in this mask. Desabled zones will not be included in the calculation of averages and their output will be set at 0%.

```
        **************  PROCESS STATE   **************
NAME                VALUE               SPV                    OUT%
TEMPERATURE          23                 0 °C                   0 ON
PROCESS 2            0                   0                     0 ON
PROCESS 3            0                   0                     0 ON
.....
.....
PROCESS 19           0                   0                     0 ON
PROCESS 20           0                   0                     0 ON

-> ESC
```

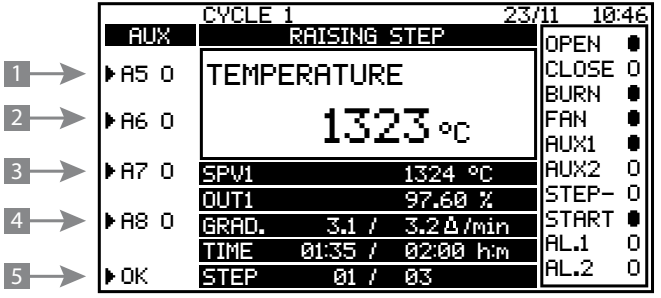
3.9 Cycle graph window (for operator)

Visualize graph of selected cycle regerring to main setpoint SPV1. The full-filled zone visualizes the cycle part alredy completed. Press one of the function keys besides the display to go back to previous mask.



3.10 Modify auxiliary outputs AUX5..AUX8 (for operator)

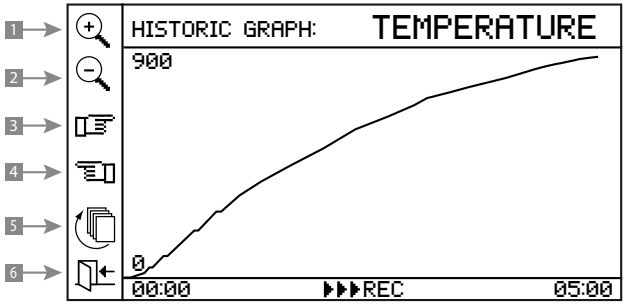
These outputs can be used to control directly the output relays of module PL300, allowing to simplify electrical wirings. State of outputs is stores and saved also in case that the Terminal is switched off. The round cycle beside the output means the state of outputs (empty circle = output is not active, full circle = output is active).



Ref.	Description
1	Press to reverse the state of output AUX5. (A5)
2	Press to reverse the state of output AUX6. (A6)
3	Press to reverse the state of output AUX7. (A7)
4	Press to reverse the state of output AUX8. (A8)
5	Esc

3.11 Historical graph of cycle (for operator)

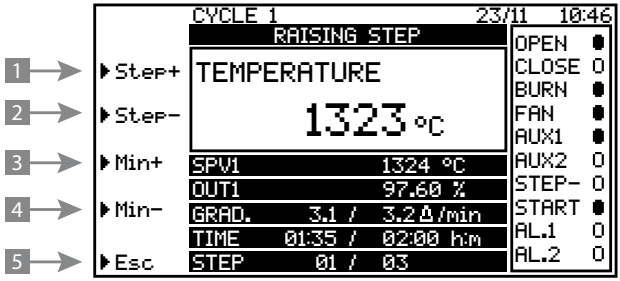
This graph visualizes the tracks recorded during the cycle (max 6). Display automatically rates the suitable scale, but details may be visualized using Zoom function.



Ref.	Description
1	Zoom / enlargement of visualized area.
2	Zoom /reduction of visualized area.
3	Visualize next section of graph.
4	Visualize previous section .
5	Cycling selection and visualization of historical tracks .
6	Back to previous window.

3.12 Manual advancement of cycle (for operator)

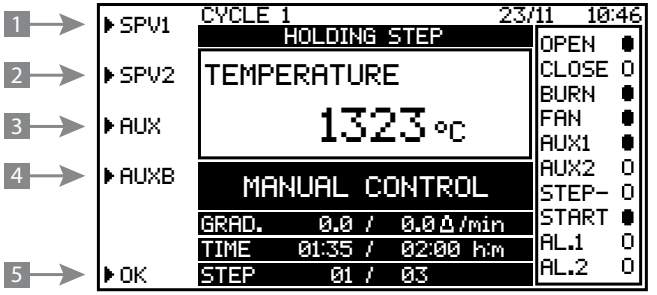
The functions of this menu allow to sroll the cycle values onwards or backwards to skip or repeat part of the program. Look at the table below for a brief description of functions.



Ref.	Description
1	Go to next step.
2	Back to previous step.
3	One minute forwards.
4	One minute backwards.
5	Back to main menu.

3.13 Manual control window (for operator)

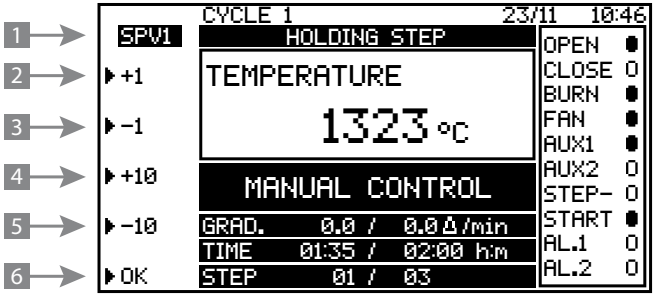
Press the key "**HAND**" to enter this menu and to enable or to stop manual control of setpoints SPV1, SPV2, AUX1..AUX4 and AUX1B..AUX4B. When the manual control mode is selected, the controller stops any eventual cycle in progress and it starts a holding stage of process according to the entered values. Press "**HAND**" again to stop manual control mode.



Ref.	Description
1	Select menu modify for SPV1.
2	Select menu modify for SPV2
3	Select menu modify for AUX1..AUX4
4	Select menu modify for AUX1B..AUX4B
5	Quit this menu and go back to main window. On main window select menu "**>Hand**" to go back to menu of manual modify.

3.14 Manual control SPV1 and SPV2 (for operator)

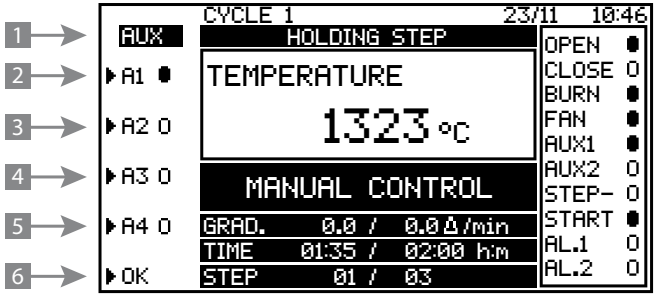
To enter this menu press function keys "**>SPV1**" or "**>SPV2**" on the menu "manual control" described at previous point. Function keys allow to enter setpoint value for setpoint SPV1 and SPV2 as long as manual control is enabled.



Ref.	Description
1	Visualize which setpoint is being modified.
2	Increase of 1 unit the value of selected setpoint.
3	Decrease of 1 unit the value of selected setpoint.
4	Increase of 10 units the value of selected setpoint.
5	Dicrease of 10 units the value of selected setpoint.
6	Esc and go back to menu "Manual control".

3.15 Manual control auxiliary outputs AUX1..AUX4 (for operator)

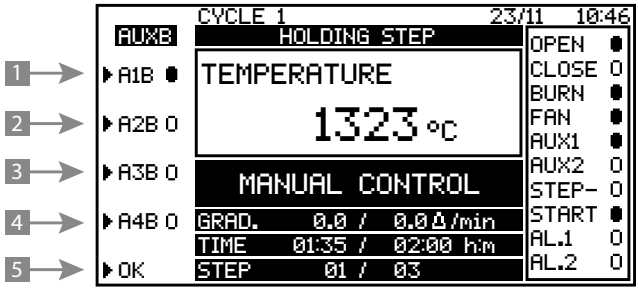
Press function key ">AUX" on the menu described at 3.13 . Function keys on this window allow to enter the state of auxiliary outputs AUX1..AUX4 (A1..A4) as long as manual control is enabled.



Ref.	Description
1	Reverse the state of output AUX1.
2	Reverse the state of output AUX2.
3	Reverse the state of output AUX3.
4	Reverse the state of output AUX4.
5	Esc and go back to mein menu "Manual control".

3.16 Manual control AUX1B..AUX4B (for operator)

Press function key ">AUXB" on the menu described at 3.13. Function keys allows to select the state of auxiliary outputs AUX1B..AUX4B (A1B..A4B) for manual control.



Ref.	Description
1	Reverse the state of output AUX1B.
2	Reverse the state of output AUX2B.
3	Reverse the state of output AUX3B.
4	Reverse the state of output AUX4B.
5	Esc and go back to main menu "Manual control".

3.17 Main menu window (for operator)

Enter this main menu by pressing from main window only if cycle is not in progress and controller is visualizing status window. Otherwise the access to configuration is denied during the cycle.

```
-> CONFIGURATION
-> EVENTS LIST
-> TIMERS VISUALIZATION
-> DISPLAY SETTING
-> CLOCK SETTING
-> GAS/AIR SERVO CALIBRATION
-> ESC
```

Pressing function key in correspondence of chosen option, it is possible to enter sub-menus or configuration pages. To go back to the previous page, press the key.

3.18 Events list window (for operator)

This window visualizes the latest 300 events recorded by the terminal and stored on internal memory with relevant date and time.
Look at the example below. Use the arrow keys to scroll the list.

```
          ************** EVENTS LIST **************
DATE      TIME      EVENT
27/11     09:02     Restart
27/11     12:58     Switch off
27/11     13:30     Restart
27/11     14:01     Cycle start
27/11     14:30     Cycle stop
27/11     15:04     Cycle start
27/11     15:45     Cycle stop
29/11     15:46     Advance cycle minutes
29/11     16:06     Start manual control
29/11     17:00     End manual control
30/11     09:02     Restart

-> ESC
```

La tabella seguente presenta la lista completa degli eventi memorizzabili.

COMPLETE LIST OF RECORDABLE EVENTS	
Wrong configuration parameters	Wrong user's settings
Wrong status data	Wrong process data
Wrong alarms data	Wrong cycle data
Process no.xx out of range	End process value out of range
Hardware failure Eeprom	Hardware failure clock
PL300 no. 1 Off-line	End PL300 no.1 off-line
PL300 no. 2 Off-line	End PL300 no.2 off-line
PL300 no. 3 Off-line	End PL300 no.3 off-line
PL300 no. 4 Off-line	End PL300 no.4 off-line
PL300 no. 5 Off-line	End PL300 no.5 off-line
Switch-on	Switch-off
Cycle start by keyboard	Cycle stop
Cycle end	Start cycle recovery
End of cycle recovery	Cycle start from input
Cycle stop from input	Cycle wait from input
End cycle wait from input	Cycle stop by failure
Start manual control	End manual control
Advance cycle step	Advance cycle minutes
Cycle stop by alarm	Stop null duration cycle
Maintenance request	Wrong historical graph data

COMPLETE LIST OF RECORDABLE EVENTS	
Cycle start from serial	Cycle stop from serial
Lock keyboard	Unlock keyboard
PL250 off-line	End of off-line PL250
Failure air/gas servo	End of failure air/gas servo
Recovery of code from flash memory	Recovery failed!
Modify date/time clock	New clock setting
Anomaly of clock data	Anomaly clock advancement
Anomaly stopped clock	WDT / Stack overflow
Load default settings	Load from Memory Card

3.19 Timers window (for operator)

This window allows to visualize total operating time of controller, total time of cycle running and for fas kilns total time of burners lighting. Time to next maintenance is also visualized.
Further listed data include: the number of serial frames that did not receive a PL300 answer, the number of serial data errors intercepted by ATR313/PL300 and the number of startings for PL300. These data can confirm correct serial communication between ATR313 and PL300.

```
            ************** TIMERS **************
                                                        hh:mm

Total operating time                        :             0:00
Real operating time in cycle                :             0:00
Burners working time                        :             0:00
Next maintenance in                         :          1000:00
Serial frame lost                           :               1

-> ESC
```

3.20 Display setting window (for operator)

This window includes all parameters which regulates LCD display functioning.

```
        ************** DISPLAY SETTING **************
LCD display brightness %                :              50
Reverse                                 :              NO
*** BACKLIGHTING ***
Switch on at                            :            8:30
Switch off at                           :           18:30
Min. time (min)                         :               0
-> ESC
```

The following table summarizes meaning of each parameter.

Parameter	Description	Range
LCD display Brightness %	Set display brightness	0÷100
Reverse	Reverse dark or light screen	NO, SI
Switch on at	This parameter is relevant only if the controller is in START mode. If time of internal clock is between time given in this parameter and time given in parameter **Switch off at** , lamp is always ON. Outside this time interval, lamp can be switched on pressing any key, and it remains ON for the **Minimum time**.	0:00 ÷ 23:59
Switch off at	This parameter and the previous one select the time for automatical switch-off of the lamp when the controller is in START mode.	0:00 ÷ 23:59
Minimum time	Lighting time of LCD lamp after last pressing of any key (in START or STOP mode) outside the programmed lighting time.	0÷99 minuti (0 lampada sempre accesa)

3.21 Clock setting window (for operator)

Setting of internal clock.

```
        ************** CLOCK SETTING **************
Date:                   24/11/04
Time:                   16:15:38
-> ESC
```

3.22 Gas/air servo calibration (for operator)

Calibration and management of gas/air servo no.1 and no.2.

```
-> GAS/AIR SERVO N°1 CALIBRATION
-> GAS/AIR SERVO N°2 CALIBRATION
```

Press Scroll key to go back to previus menu.

3.23 Air/gas servo calibration menu n° 1 (for operator)

Setting of all parameters for the management of servo output air/gas for Process 1. ATR313-1AD can **control modulation of air/gas valves only for process 1 and 2 by means of PL250-10AD**. A potentiometer checks their positions.

Press Scroll key to go back to previus menu.

```
 ************* GAS/AIR SERVO N°1 CALIBRATION  *************
% GAS min. servo                          :               0
% GAS max. servo                          :             100
Max. gas servo % cooling                  :             100
% servo tolerance warning                 :               2
Reduction mode                            :     PROPORTIONAL
Gas Servo % in reduction                  :               0
Air Servo % in reduction                  :               0
Min. gas servo % reduction                :               0
Max. gas servo % reduction                :             100
  GAS SERVO              AIR SERVO             REDUCTION A4
      0%                     0%                    0%
     10%                    10%                    0%
     20%                    20%                    0%
     30%                    30%                    0%
     40%                    40%                    0%
     50%                    50%                    0%
     60%                    60%                    0%
     70%                    70%                    0%
     80%                    80%                    0%
     90%                    90%                    0%
    100%                   100%                    0%
Servo calibration mode                    :          DISAB.
% gas servo calibration value             :               0
```

```
% gas servo current/teoric value          :             0/ 0
% air servo current/teoric value          :             0/ 0
```

The following table summarizes meaning of each parameter.

Parameter	Description	Range
% GAS min. servo heating	Min. % opening of gas valve. During the cycle, the gas valve will not be closed below this %. In Stop mode the % will always be 0, regardless of value.	0÷100
% GAS max. servo heating	Max. % opening of gas valve. During the cycle, the gas valve will not be opened above this %.	0÷100
Max. gas servo % cooling	Max. % opening of gas valve. During the cycle, the gas valve will not be opened above this %. Set the max. opening percentage of the air servo-command into the cooling steps.	0÷100
% servo tolerance warning	Max. tolerance between theoretic % and current position of valve for the management of positioning failure. This control is active only for rising and holding steps.	0÷100
Reduction mode	Selection of reduction mode. Available options: PROPORTIONAL means the percentage of opening of the air servo is reduced for the % given on the following table (activating A4) FIXED means that percentage of both gas and air servo is a fixed value which is set by the two following parameters.	**PROPORTIONAL FIXED**
Gas servo % reduction fixed	This parameter selects the opening % for gas servo when the reduction mode is selected as FIXED.	0÷100
Air servo % reduction fixed	This parameter selects the opening % for air servo when the reduction mode is selected as FIXED.	0÷100
Min.servo gas % reduction PROPORTIONAL	Select minimum opening % of gas valve when reduction mode is selected as PROPORTIONAL.	0÷100
Max.servo gas % reduction PROPORTIONAL	Max. opening % of gas servo when the reduction mode is selected as PROPORTIONAL .	0÷100
Servo calibration mode	Enable or desable calibration mode of air/gas valve. It is enabled only if cycle is in progress (Run mode). When calibration is enabled, opening % of gas valve will be the value set in the following parameter (% gas servo calibration value), while opening % of air valve will be rated by the table air/gas.	**DISAB.** **ENAB.**

Parameter	Description	Range
% gas servo calibration value	Opening % for gas valve if calibration is enabled. When calibration is desabled, this value is constantly updated with value of gas valve.	0÷100
%gas servo current/ teoric value	Visualization of current position (read by the feedback potentiometer) and theoric position rated by the controller. If gas servo is working correctly, both % should have same value.	0÷100/0÷100
%air servo current/ teoric value	Visualization of current position (read by the feedback potentiometer) and theoric position rated by the controller. If air servo is working correctly, both % should have same value.	0÷100/0÷100

3.24 Gas/air servo calibration no. 2 (for operator)

Setting of all parameters for the management of servo output air/gas for Process 2. ATR313-1AD can control modulation of air/gas valves only for process 1 and 2 by means of PL250-10AD. A potentiometer checks their positions.
Press to go back to previous menu.

Refer to previous paragraph for the meaning of parameters.

3.25 Configuration menu

Enter configuration password "1234" to visualize this general menu:

```
-> GENERAL CONFIGURATION
-> PROCESS CONFIGURATION
-> CONFIGURATION INPUTS PL300
-> CONFIGURATION OUTPUTS PL300
-> ALARMS CONFIGURATION
-> LOAD/SAVE CONFIGURATION
```

3.26 General configuration

Press the function keys besides the display to enter the main menus:

```
-> CONFIGURATION SPV1
-> CONFIGURATION SPV2
-> DISPLAY CONFIGURATION
-> SPECIAL CONFIGURATIONS
-> CONFIGURATION ATR313 / PL300
-> ESC
```

3.27 Configuration SPV1 and SPV2

Into this window all parameters of first setpoint SPV1 are selected.

```
  ************ VALUES RELATED TO SETPOINT SPV1 ************

Measure unit SPV1                          :              °C
Sensor type SPV1                           :           TC K
Number of decimals SPV                     :              0
Lower limit scale SPV1                     :              0
Upper limit scale SPV1                     :           1000
Min. settable value SPV1                   :              0
Max. settable value SPV1                   :           1200
Control action on SPV1                     :     PID S. INV
Dead band SPV1                             :              0
Proportional band SPV1                     :             50
Centered proportional band SPV1            :             NO
Integral time SPV1 (sec)                   :            150
Derivative time SPV1 (sec)                 :            0.0
Dead band double action                    :              0
Proportional band d.action                 :             50
Integral time d.action (sec)               :            150
Derivat. time d.action (sec)               :            0.0
Separate double action outputs             :             NO
Hysteresis  ON/OFF                         :              5
-> ESCI
```

Into this window all parameters of second setpoint SPV2 are selected.

```
************ VALUES RELATED TO SETPOINT SPV2 ************

Measure unit SPV2                          :            mmca
Sensor type SPV2                           :         4..20mA
Number of decimals SPV2                    :               1
Lower limit scale SPV2                     :             -50
Upper limit scale SPV2                     :              50
Min. settable value SPV2                   :             -50
Max. settable value SPV2                   :              50
Control action on SPV2                     :      PID S. DIR
Dead band SPV2                             :               0
Proportional band SPV2                     :              20
Centered proportional band SPV2            :              NO
Integral time SPV1 (sec)                   :              60
Derivative time SPV1 (sec)                 :             0.0
Dead band double action                    :               0
Proportional band d.action                 :              20
Integral time d.action (sec)               :              60
Derivat. time d.action (sec)               :             0.0
Separate double action outputs             :              NO
Hysteresis  ON/OFF                         :               5
-> ESC
```

Look at the table below for a brief description of the parameters.

Parameter	Description	Options / Range
Measure unit	Measure unit for SPV and processes.	°C °F mBar Bar RH% PH mmca
Sensor type	Select sensor connected to the analog inputs related to this setpoint. **Selection 4...20mAover**: visualization is stopped at the value which is enterd for upper limit of scale, even if sensor gives more than 20mA as output.	------, TC K,TC S, TC T, TC R, TC B, TC J, TC E,PT100, NI100, 0..1V,0..10V, 0..20mA, 4..20mA, 0..50mV,PT500, 4..20mAover

Parameter	Description	Options / Range
Number of decimals	Number of visualized decimal points for setpoint and related values. NB: Conversion accuracy of PL300 for TC/RTD is 0.1°C. Do not set more than one decimal point for these sensors to avoid wrong visualization of value.	0÷3
Lower limit scale	Only for inputs 0..10V, 0..20mA , 4..20mA. It defines the value assumed by process for minumum value of input signal.	-30000÷30000 units
Upper limit scale	Only for inputs 0..10V, 0..20mA , 4..20mA. It defines the value assumed by process for max. value of input signal.	-30000÷30000 units
Min. settable value SPV	This value must be set as units. Do not consider number of selected decimals. (example -3,000=-3000units)	-30000÷30000 units
Max. settable value SPV	This value must be set as units. Do not consider number of selected decimals. (example -3,000=-3000units)	-30000÷30000 units
Control action on SPV	ON/OFF mode means that control is achieved opening and closing the output. **PID S**-ingle action rates a percentage of output between 0.00÷100.00. **PID D**-ouble action rates 2 opposite percentages of output between 0.00÷100.00 , allowing combined control over 2 opposite actions (ex.: heat/cool). Reverse PID ("**PID REV**") increases output percentage when process value is lower than setpoint (ex.: heating control). Direct PID ("**PID DIR**") increases output percentage when process value is over setpoint value (ex.: cooling).	ON/OFF, PID S. DIR, PID S. INV, PID D. DIR, PID D. INV
Deadband	Enter value for dead band. Only for PID control	0÷20000 units
Proportional band	Enter value for proportional band. Only for PID control.	0÷20000 units
Centered proportional band SPV	Only for PID control. Choose if proportional band is "centered" on setpoint or if it is below setpoint.	NO, YES
Integral time	Enter value for integral time. Only for PID control	0÷10000 sec
Derivative time	This parameter is used only in PID regulation. It defines the derivative time of PID regulation algorithm.	0.0÷1000.0 sec

Parameter	Description	Options / Range
Dead band double action	This parameter is used only in PID regulation with double action. It defines the dead band for the second PID regulation algorithm.	**0÷20000 units**
Proportional band d.action	Only for PID- double action. Proportional band for second PID algorithm	**0÷20000 units**
Integral time d.action (sec)	Only for PID- double action. Integral time for second PID algorithm.	**0÷10000 sec**
Derivat. time d.action (sec)	Only for PID- double action. Derivative time for second PID algorithm.	**0.0÷1000.0 sec**
Separate double action outputs	This parameter it is used only in PID regulation with double action. It defines if the two PID algorithms regulation actions can be active contemporarily or only one at a time.	**NO, YES**
Hysteresis ON/OFF	Only for ON/OFF, to avoid dangerous oscillations of output when PV is approching SPV.	**-10000÷10000 units**

3.28 Configuration of visualization

Setting of parameters which define the processes to be visualized on the main window, the inputs and outputs whose status will be visualized and the values which will be recorded for the historical graph.

```
 *************** LANGUAGE & LOGO SELECTION ***************
Message language                          :          ENGLISH
Client logo number                        :                0

    ***************** VISUALIZED VALUES *****************
Source 1°process field                    :          PROC. 1
Source 2°process field                    :          -------
Source 3°process field                    :          -------
Source 4°process field                    :          -------
Source SPV2 field                         :             OUT1
Source field gradient                     :         GRADIENT
Source gradient calculation               :           PROC.1

Name average AV1                          :   <AVERAGE 1   >
Name average AV2                          :   <AVERAGE 2   >

            SELECT VISUALIZED INPUT/OUTPUT FIELDS
 FIELD         PL300        IN/OUT              NAME
 LED 1           1          U1 n.a.          < OPEN >
 LED 2           1          U2 n.a.         < CLOSE >
 LED 3           1          U3 n.a.          < BURN >
 LED 4           1          U4 n.a.           < FAN >
 LED 5           1          U5 n.a.          < AUX1 >
 LED 6           1          U6 n.a.          < AUX2 >
 LED 7           1          U7 n.a.          < STEP->
 LED 8           1          U8 n.a.         < START >
 LED 9           1          U9 n.a.           <AL.1>
 LED 10          1         U10 n.a.           <AL.2>

SELECT HISTORICAL GRAPH RECORDING TRACKS
Source historical track no.1              :          PROC. 1
Source historical track no.2              :             SPV1
Source historical track no.3              :             OUT1
Source historical track no.4              :          -------
Source historical track no.5              :          -------
Source historical track no.6              :          -------

Historical recording duration (h)         :               20
Sample interval (sec)                     :              3.7
-> ESC
```

Look at the table below for a brief description of the parameters.

Parameter	Description	Range
Message language	Select language of visualization for display.	ITALIAN, ENGLISH, GERMAN
Client logo number	Select the logo visualized at starting. Customer requiring customized logo will get a reserved code to activate visualization.	0 = PIXSYS logo
Source 1° process field	Select which process or average of processes shall be visualized in the 1st field of visualization on the main window.	PROC. 1, ... PROC.20, AVERAGE 1, AVERAGE 2
Source 2° process field	Select which process or average of processes shall be visualized in the 2nd field of visualization on the main window. Select "-------" to exclude visualization in the 2nd field, thus allowing more space for visualization of 1st field.	-------, PROC. 1, ... PROC.20, AVERAGE 1, AVERAGE 2
Source 3° process field	Select which process or average of processes shall be visualized in the 3rd field of visualization on the main window. Select "-------" to exclude visualization in the 3rd field, thus allowing more space for visualization of previous fields.	-------, PROC. 1, ... PROC.20, AVERAGE 1, AVERAGE 2
Source 4° process field	Select which process or average of processes shall be visualized in the 4th field of visualization on the main window. Select "-------" to exclude visualization in the 4th field, thus allowing more space for visualization of previous fields.	-------, PROC. 1, ... PROC.20, AVERAGE 1, AVERAGE 2
Source SPV2 field	Select the visualization on the main window of setpoint SPV2 or the percentage value of one control output.	SPV2, OUT1, ... OUT20, AIR/GAS1, AIR/GAS2
Source gradient field	Select to visualize on main mask real and theorical gradient or actual and total consumption of cycle.	GRADIENT, CONSUMPTION, AIR/GAS1, AIR/GAS2
Source gradient calculation	Select the value whose theoretical and real gradient shall be visualized on the main window.	PROC. 1, ... PROC.20, AVERAGE 1, AVERAGE 2

Parameter	Description	Range
Name average AV1	Enter the name for average AV1 (max 11 characters).	Any alphanumeric string
Name average AV2	Enter the name for visualization of average AV2 (max 11 characters)	Any alphanumeric string
Select visualized input/ output fields -PL300 -IN/OUT -NAME	These parameters select the outputs which will be visualized on the main window. (see box on the right side of display – symbols: !,#). For each visualized field inputs/outputs (max.10) select the following features: number of relevant PL300, number of relay or digital input and relevant state (n.o.=normally open or n.c.=normally closed), choose a name to simplify the reading (max 5 characters).	--------, U1 n.o., U1 n.c., ..., U12 n.o., U12 n.c., OUT1 ON, OUT1 OFF, OUT2 ON, OUT2 OFF, I5 n.o., I5 n.c, ..., I10 n.o., I10 n.c.
Source historical track 1ª÷6ª	The terminal ATR313 can record and store up to 6 different tracks. For each track it is possible to select the signal to record. List of signals available for selection: all processes, two averages, two setpoints, or no selection. The setting of these parameters define also the sequence of visualization for the historical graph.	-------,PROC. 1, ...,PROC.20, MED.1,MED.2, SPV1,SPV2, OUT 1, ..., OUT 20, OUT GAS 1,.., OUT AIR 2, LED1,.,LED10, U1na,.,U12nc, I5na,.,I10nc
Historical recording duration	Recording is interrupted at cycle stop or after elapsing of fixed time. Sampling interval is automatically rated .	1÷75 hours
Sample interval	Visualize sampling interval.	Seconds

3.29 Special functions

```
******************** SPECIAL FUNCTIONS ********************
Value cycle control SPV1                :          PROC. 1
AVER1 average calculation mode          :          AVERAGE
AVER2 average calculation mode          :          AVERAGE
Waiting step end SPV1 (min)             :              120
Max. gap step end                       :                5
Cycle recovery mode                     :          CERAMIC
Min. gap for recovery                   :               10
Recovery gradient (digit/h)             :               10
Gas mode                                :           ENABL.
Washing time (sec)                      :               60
Fan follows burners                     :               NO
End ON/OFF burners                      :              300
Hysteresis ON/OFF                       :                5
Treshold switch off burners             :               30
Treshold switch off fans                :               30
Total operating time                    :             0:00
Real operating time in cycle            :             0:00
Burners working time                    :             0:00
Next maintenance in                     :          1000:00
Report maintenance request              :              YES
Consumption analog input                :          -------
Consumption sensor type                 :          -------
Lower limit consumption scale           :                0
Upper limit consumption scale           :             1000
Consumption measure unit                :               mc
Consumtion number of decimals           :                1
Execute start test gas pipeline         :               NO
Test gas pipeline time (sec)            :               20
-> ESC
```

Look at the table below for a brief description of the parameters.

Parameter	Description	Range
Value cycle control SPV1	Select the process or the average which shall control the cycle and any relevant special option beside the main setpoint SPV1.	**PROC. 1, ..., PROC.20, MED.1, MED.2**
AVER1 average calculation mode	Defines value AVER1 calculation mode. It is possible to calculate the arithmetic average (AVERAGE), select the max. value (MAX VAL) or the min. value (MIN VAL) between process of AVERAGE1 group.	**AVERAGE, MAX VAL, MIN VAL**

Parameter	Description	Range
AVER2 average calculation mode	Defines value AVER2 calculation mode. It is possible to calculate the arithmetic average (AVERAGE), select the max. value (MAX VAL) or the min. value (MIN VAL) between process of AVERAGE2 group.	AVERAGE, MAX VAL, MIN VAL
Waiting step end SPV1*	Max. waiting time for step end (reference: SPV1)	0÷1000 minutes
Max. step end*	Max. gap from step end for the start of Waiting function.	-10000÷10000 units
Cycle recovery mode**	Select the mode for cycle recovery in case of power failure (see SPECIAL FUNCTIONS - Recovery)*.	NO CERAMIC, CERAM-D
Min. gap for recovery	Min. required gap between SPV1 and control value of cycle for start of recovery mode. Until the gap between these two values is lower than this value, the cycle restarts from the point at which it was interrupted.	0÷20000 units
Recovery gradient	Only for recovery mode **GRADIENT**: select the rise gradient units/hour .	0÷20000 units/h
Gas mode	Enable or exclude the management of gas burners on SPV1. GID function switches burners on at minimum (ON/OFF) during cooling steps. GID-S function allows to modulate the gas by the servo also during cooling steps.	DESAB., ENABLE, GID, GID-S.
Washing time	Time between fans switching on and burners switching off.	0÷999 seconds
Fan follows burners	Enable parallel switching off of fans and burners during ON/OFF control.	NO, YES
End ON/OFF burners	Treshold for end of ON/OFF control of burners.	0÷2000 units
Hysteresis ON/OFF	Hysteresis for the calculation of burners output intervention thresholds when the controller is below the threshold of ON/OFF modulation end. Useful to avoid output oscillations when the process is approching the setpoint.	0÷2000 units
Treshold switch off burners	Treshold for burners switching off (PID mode) during rising and holding steps.	0÷2000 units

* See par. **3.43.2** (pg. 64)
** See par. **3.43.1** (pg. 63)

Parameter	Description	Range
Treshold switch off fans	Defines threshold below setpoint SPV1 under which the fans are switched off during falling steps (to avoid the temperature getting down under SPV1 value - threshold for fans switch-of). In GID function, at this threshold burners are switched on. Burners switch-off will occur when the temperature reaches the SPV1.	0÷2000 units
Total operating time	Total operating time of the controller (hhhh:mm)	0:00÷9999:59
Real operating time in cycle	Real operating time of controller as cycle mode (hours:minutes).	0:00÷9999:59
Burners working time	Total operating time of burners (hours:minutes)	0:00÷9999:59
Next maintenance in	Select the interval for maintenance of the plant. Value is automatically decreased by the controller when cycle is in progress. When timer is set to 0:00, the controller visualizes the request for maintenance (if relevant parameter is enabled).	0:00÷9999:59
Report maintenance request	Enable request for maintenance after elapsing of fixed time	NO, YES
Consumption analog input	Select the process to calculate the consumption. Sensor for the calculation of consumption must be connected to the analogical input of PL300 which is related to the selected process.	-------, PROC. 1, ..., PROC.20
Consumption sensor type	Select type of sensor for consumption rate	-------, 0..1V,0..10V, 0..20mA, 4..20mA, 0..50mV
Lower lim. consumption scale	Lower limit of scale for consumption sensor. It defines the min. consumption as units/h read by the sensor. Consider number of decimals, ex. 100.0 mc/h = 1000 units/h).	-30000÷30000 units/h
Upper lim. Consumption scale	Upper limit of scale for consumption sensor. It defines the max consumption as units/h read by the sensor. Consider number of decimals, ex. 100.0 mc/h = 1000 units/h)	-30000÷30000 units/h

Parameter	Description	Range
Consumption measure unit*	Select consumption measure unit for the visualization on main mask of actual and total consumption for the cycle. These data are visualized only if the visualization has been enabled by parameter Source gradient field within the mask which defines the configuration of visualization.	mc, m3, kWh, Ah, Kg, L, ----
Consumption Number of decimals	Set the number of decimals to visualize for consumption value.	1÷3
Execute test gas pipeline	Execute test at cycle start.	NO, YES
Test gas pipeline time	Enter duration for test of gas pipeline.	20÷60 seconds

3.30 Configuration ATR313 / PL300

```
 ************** CONFIGURATION ATR313 / PL300 **************
Number of connected PL300(1 – 5)          :              1
Software filter (1-20)                    :             50
Number of enabled gas/air servo           :             10
Number of enabled servo gas/air           :              0
Management COM2(RS485) off-line           :             NO
Management COM2(RS232) off-line           :             NO
ATR313 modbus protocol address            :              1
Answering delay COM2 (mS)                 :              5
Timeout save configuration (s)            :            1.5
-> ESC
```

Look at the table below for a brief description of the parameters.

Parameter	Description	Range
Number of connected PL300	Number of PL300 connected to ATR313. Serial connected PL300 must have different and progressive "slave" numbers starting from 1.	1÷5
Number of off-line errors	Defines the number of consecutive errors/timeout noticed by the serial communication ATR313-PL300 after which a communication error message is generated.	10÷500

* See par. **3.43.3** (pg. 64)

Parameter	Description	Range
Software filter	Software filter on the reading of sensors connected to analogical inputs of PL300. Increase filter value to increase reading stability, decrease filter value to speed variation of reading.	**1÷20**
Number of enabled gas/air servo	Enter number of air/gas servo to be managed by the terminal. Entering 1 or 2, Terminal starts communication with PL250 for the management of the valves.	**0÷2**
Management COM2 RS485) off-line	Selecting YES: enable the management of off-line in serial port COM2 (RS485) only when it is not used for the connection to PL250 (configuration for air-gas servovalves) and it is instead used for reading/writing of data via Modbus protocol by a Master device. In case of off-line (which means no data for 5 seconds), an error message is visualised and the running cycle is interrupted.	**NO, YES**
Management COM2 RS232) off-line	Selecting YES: enable the management of off-line in serial port COM2 (RS232) only when it is not used for the connection to PL250 (configuration for air-gas servovalves) and it is instead used for reading/writing of data via Modbus protocol by a Master device. In case of off-line (which means no data for 5 seconds), an error message is visualised and the running cycle is interrupted.	**NO, YES**
ATR313 modbus protocol address	Slave address of ATR313 in MODBUS protocol on COM2.	**1÷250**
Answering delay COM2 (mS)	Set the minimum delay between and of serial reception of data from master and start of answer transmission from ATR313.	**0÷1000**
Save configuration timeout (s)	Time elapsed between latest modification of parameters and their saving on internal eeprom memory according to relevant procedure.	**1.5÷30.0**
Save configuration timeout	After elapsing of this time value (expressed in seconds) since last writing of parameters/cycles, data are stored on memory	**1.5÷30.0**

3.31 Configuration of processes

```
    *************** PROCESS CONFIGURATION ***************
Select process                              :          PROC.1
Name: <TEMPERATURE>
Sensor offset correction                    :              0
Correction % sensor gain                    :            0.0
Control setpoint                            :           SPV1
Output type                                 :      VALVE A-C
Valve or cycle time (sec)                   :             60
Average                                     :     NO AVERAGE
-> SOURCE SETPOINT VALUE
-> ESC
```

Look at the table below for a brief description of the parameters.

Parameter	Description	Range
Select process	Tramite i tasti "SHIFT" E "DEL" è possibile selezionare il processo desiderato.	**PROC. 1, ..., PROC.20**
Name	Enter name for selected process (max 11 characters).	**Any alphanumeric string**
Sensor offset correction	Allows to introduce a correction on sensor reading. Entered value is in tenths of degree for thermocouples and thermoresistances, in units for sensor in V and mA. Ex.: Visualized value = Measured value + offset correction	**-999÷9999**
Correction % sensor gain	Add to reading of sensor a percentage correction rated on value of reading Ex.: Visualized value = Measured value + (Measured value x % correction) / 100.0.	**-99.9÷999.9%**
Control setpoint	Select SPV1 or SPV2 for selected process.	**NO SPV, SPV1, SPV2**

Parameter	Description	Range
Output type	Define the output type.	**NO SPV, ON/OFF, SERVO O-C, TIME PROPORT, OUT1 LOGIC, OUT1 4..20, OUT1 0..10, OUT2 LOGIC, OUT2 4..20, OUT2 0..10, SSR T.PROP, SSR ON/OFF**
Valve or cycle time	For output **VALVE O-C** this value defines the time between total opening and closing of valve. For **TIME PROP.** this value sets the time between single activations of output when it is lower 100.00%.	**1÷999 secondi**
Average	Select if process must be considered to define the value of average values.	**NO AVERAGE, AVERAGE 1, AVERAGE 2**

3.31.1 Source of setpoint value

Into this window, which can be entered from process configuration page, the sources of setpoint values for each process are defined.

```
   *************** SOURCE OF SETPOINT VALUE ***************
NO. PROCESS                                  ->  SETPOINT VALUE
PROCESS 1                                    ->     SPV1 / SPV2
PROCESS 2                                    ->     SPV1 / SPV2
PROCESS 3                                    ->     SPV1 / SPV2
PROCESS 4                                    ->     SPV1 / SPV2
PROCESS 5                                    ->     SPV1 / SPV2
PROCESS 6                                    ->     SPV1 / SPV2
PROCESS 7                                    ->     SPV1 / SPV2
PROCESS 8                                    ->     SPV1 / SPV2
PROCESS 9                                    ->     SPV1 / SPV2
..
..
PROCESS 19                                   ->     SPV1 / SPV2
PROCESS 20                                   ->     SPV1 / SPV2
```

Look at the table below for a brief description of the parameters.

Parameter	Description	Range
SETPOINT VALUE	By means of keys "**SHIFT**" and "**DEL**" it is possible to select the source of setpoint value for each process. Keeping default setting (**SPV1 / SPV2**), setpoint value for each process will be the value selected on Menu "Process configuration" (field "control setpoint"). Selecting one of the other process values, the setpoint will constantly change according to the value of selected process.	**SPV1 / SPV2, PROCESS 1, PROCESS 2, ..., PROCESS 20**

3.32 Configuration of digital inputs PL300

```
     ********** CONFIGURATION DIGITAL INPUTS ***********
                      -- PL300 no. 1 --
IMPUT            ACTION                  DESCRIPTION
 I5 n.a.       STOP-ALAR          <       GAS LACK       >
 I6 n.a.         START            <         START        >
 I7 n.a.          STOP            <          STOP        >
--------        MESSAGE           <        IMPUT 4       >
--------        MESSAGE           <        IMPUT 5       >
--------        MESSAGE           <        IMPUT 6       >
-> ESC
```

The following table summarizes the meaning of each parameter that can be set for each of the 6 programmable digital inputs of PL300 slave no. 1.

Parameter	Description	Range
IMPUT	Select programmable input from list and define relevant state n.o.=normally open or n.c.=normally closed.	**--------, I5 n.a., I5 n.c., ..., I10 n.a., I10 n.c.**
ACTION	Select one of the available actions: • **MESSAGE**: when input is active, visualize the message set on field DESCRIPTION • **START**: when input is active, start the cycle and historical recording and visualize the message set on field DESCRIPTION • **STOP**: when input is active, stop the cycle in progress and visualize the message set in the field DESCRIPTION • **STOP-ALL**: when input is active, stop the cycle in progress, start the buzzer and visualize the message set in the field DESCRIPTION • **PAUSE**: when input is active, stop the cycle in progress, keep unchanged the setpoint values and the control outputs, visualizing the message set in the filed DESCRIPTION • **PAUSE-REC** (not available) • **TEST PIPELINE** complete the test and visualize the message set in the field DESCRIPTION • **STOP R&H** :during rising or holding step, when input is active, stop the cycle in progress, start the buzzer and visualize the message set in the field DESCRIPTION • **KEYB.ON**: keyboard is active only if this input is active, to prevent unauthorized access by operator. If input (and consequently keyboard) is not active, a message is visualized on display.	**MESSAGE, START, STOP, STOP-ALAR, PAUSE, PAUSE-REC TEST-PIPE, STOP R&H KEYB.ON**
DESCRIPTION	Enter the message to visualize when input is active (max 18 characters).	**Any alphanumeric string**

3.33 Configuration of outputs PL300

Configuration of outputs, except for outputs used for control-loops (see paragraph "OUTPUTS for control loops", see par. **2.6.2** - pg. 14).

```
      ********** CONFIGURATION OUTPUTS PL300 ***********
PL300          OUTPUT                  TYPE OF OUTPUT
  1           U3 n.o.                      BURNER
  1           U4 n.o.                        FAN
  1           U5 n.o.                       AUX1
  1           U6 n.o.                       AUX2
  1           U7 n.o.                      STEP-
  1           U8 n.o.                      START
  1           U9 n.o.                       AL1
  1          U10 n.o.                       AL2
  1          U11 n.o.                  STEP+ & STEP=
  1          U12 n.o.                      STOP
  1         ----------              ------------------
.....
  1         ----------              ------------------
  1         ----------              ------------------
-> ESC
```

The following table summarizes the meaning of each parameter that can be set for each programmable output.

Parameter	Description	Range
PL300	"slave" number of PL300 for programming of output.	1÷5
OUTPUT	Select a free output of the selected PL300 and choose the function which will be linked to the output It is possible to associate more logic functions to the same output, simply setting more lines repeating the same output.	---------, U1 n.a., U1 n.c., ..., U12 n.a., U12 n.c., OUT1 LOGIC, OUT1 4-20, OUT1 0-10, OUT2 LOGIC, OUT2 4-20, OUT2 0-10

Parameter	Description	Range
OUTPUT TYPE	Select function to match with the hardware output selected in the relevant field OUTPUT. • ------ Output disabled • **BURNER** Burners control • **FAN** Fans control • **STEP+&STEP=** output active during rising and descending steps • **STEP-** output active during descending steps • **START** output active with cycle in progress • **STOP** output active with cycle not in progress • **AUX1-4** auxiliary outputs programmed for the cycle • **RETRANS.SPV1** value of SPV1 is retransmitted by selected linear output, using its scale limits. • **RETRANS.SPV2** value of SPV2 is retransmitted by selected linear output, using its scale limits • **ALL1-30** output is active when the relevant alarm is active • **STEP=** output active during holding steps • **AUX5÷8** auxiliary outputs A5÷8 controlled manually by the operator • **AUX1B-AUX4B** auxiliary outputs A1B-A4B programmed for next cycle • **RUN** output active with cycle in progress but not in END CYCLE • **RETRANSMISSION PROC. 1÷20**: retransmission of process value by the selected linear output, basing on the limits entered for the setpoint • **STEP+** output active during rising steps	----------, BURNER, FAN, STEP+&STEP=, STEP-, START, STOP, AUX1, ..., AUX4, RETRAS. SPV1, RETRAS. SPV2, ALL1, ..., ALL30, STEP=, AUX5, ..., AUX8, AUX1B, …, AUX4B, RUN, RETRAS. PROC.1, …., RETRAS. PROCESS 20, STEP+

3.34 Alarms configuration

```
          ********** ALARMS CONFIGURATION ***********
Select alarm: AL. 1

Type of alarm                                :      ----------
Alarm source                                 :          PROC. 1
Alarm treshold                               :                0
Alarm hysteresis                             :                0
Alarm validity                               :         ANYTIME
Alarm action                                 :        NO ALARM
Messaggio allarme                            :      < ALARM 1 >
-> ESC
```

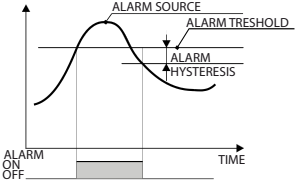
Look at the table below for a brief description of the parameters.

Parameter	Description	Range
Select alarm	Press "SHIFT" and "DEL" to select the choosen alarm.	**AL. 1, ..., AL.30**
Type of alarm	Type of control on alarm source. See following table "ALARMS OPERATING".	**----------, ABSOLUTE TOP, ABSOLUTE BOTTOM, DEVIATION TOP, DEVIATION BOTTOM, INSIDE BAND, OUT OF BAND, DELAY ABSOLUTE TOP, DELAY ABSOLUTE BOTTOM**
Alarm source	Select the source value which defines the alarm condition.	**PROC. 1, ..., PROC.20, AVERAGE 1, AVERAGE 2**
Alarm treshold	Treshold for independent alarms or deviation for deviation/band alarms.	**-30000÷30000 units**
Alarm hysteresis/ Delay (s)	Hysteresis for the calculation of tresholds. Useful to avoid oscillations (start/stop alarms). Delay of signal expressed in seconds for delaied alarms	**0÷10000 units/ seconds**

Parameter	Description	Range
ALARM VALIDITY	• Cycle zones for alarm validity: • **ANYTIME** alarm is active independently from controller's state • **ONLY START** active only during cycle • **ONLY STOP** active only if cycle is in stop mode • **ONLY STEP+/=** only during rising or holding steps • **ONLY STEP-** only during descending steps • **ONLY RUN** only during cycle run (excluded END CYCLE) • **ONLY STEP+** only during rising steps • **ONLY STEP=** only during holding steps • **ONLY RECOVERY** only in Recovery mode • **AL.N ACTIVE** only IF Alarm N is active • **AL.N & START** only during cycle execution and IF alarm N is active • **AL.N & STOP** only in Stop mode and IF alarm N is active • **AL.N & STEP+/=** only during rising or holding steps and IF alarm N is active • **ALL.n & STEP-** only during descending steps and IF alarm N is active. • **ALL.n & RUN** only during cycle run (excluded END CYCLE) and IF alarm N is active • **ALL.n & STEP+** only during rising steps and IF alarm N is active • **ALL.n & STEP=** only during holding steps and IF alarm N is active • **ALL.n & RECOVERY** only in Recovery mode and IF alarm N is active	**EVERYTIME, ONLY START, ONLY STOP, ONLY STEP+/=, ONLY STEP-, ONLY RUN, ONLY STEP+, ONLY STEP=, ONLY RECUPERO AL.no ATTIVO, AL.no & START, AL.no & STOP, AL.no & STEP+/=, AL.no & STEP-, AL.no & RUN, AL.no & STEP+, AL.no & STEP=, AL.no & RECOVERY**
Alarm action	Type of action in case of alarm (see also CONFIGURATION OFOUTPUTS PL300) • **No action** in case of alarm • **MESSAGE ONLY** visualize the message set in the field **ALARM MESSAGE**. • **CYCLE STOP** stop the cycle in progress at alarm starting • **CYCLE PAUSE**	**NO ALARM, MESSAGE ONLY, CYCLE STOP CYCLE PAUSE**
Alarm message	Allows to set the message to visualize in case of alarm (max 18 digits).	**Any alphanumeric string**

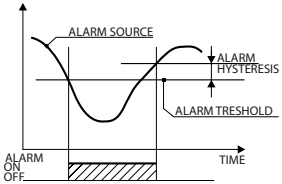
ALARMS OPERATING

INDIPENDENT OVER



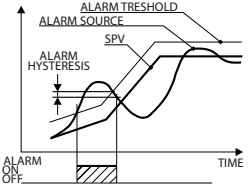
Max. treshold for the alarm source (ex. process or average).

INDIPENDENT UNDER



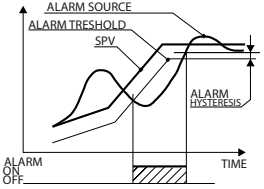
Min. treshold for the alarm source (ex. process or average).

UPPER DEVIATION



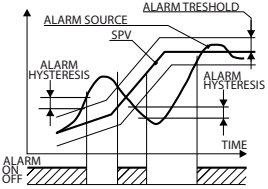
Max. upper deviation with reference to set values of alarm source.

LOWER DEVIATION



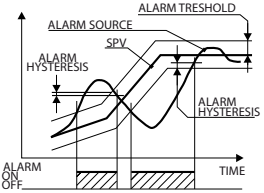
Max. lower deviation with reference to set values of the alarm source

BAND ALARM (INSIDE)



Max. value of deviation band with reference to set values (INSIDE)

BAND ALARM (OUTSIDE)



Max. value of deviation band with reference to set values (OUTSIDE)

3.35 Load / Save configuration

```
-> LOAD STANDARD CONFIGURATION

-> LOAD CONFIGURATION FROM MEMORY CARD

-> SAVE CONFIGURATION ON MEMORY CARD
```

3.36 Load standard configuration

```
     ********** LOAD STANDARD CONFIGURATION ***********

-> GAS KILN 1 ZONE TC-K

->SAVE CONFIGURATION ON MEMORY-CARD
```

Use relevant function key to select and load the choosen configuration (parameters and cycles data). **NB: Current configuration and cycle data will be lost!**

3.37 Load configuration from Memory Card

```
  ********** LOAD CONFIGURATION AND CYCLES DATA ***********
          ****       FROM MEMORY-CARD       *****

-> LOAD
```

Selecting **-> Load**, the configuration and cycles data stored on memory Card will be saved as new configuration of Terminal. **NB: Current configuration and cycle data will be lost!**

3.38 Save configuration on Memory-card

```
  ********** SAVE CONFIGURATION AND CYCLES DATA ***********
           ****       ON MEMORY-CARD       *****

-> SAVE
```

Selecting **-> Save**, the configuration and cycles data will be stored on Memory Card (inserted on relevant connector). This way it is possible to create a back-up of the whole configuration.

NB: Current configuration and cycle data on Memory will be lost!

3.39 Loading in progress

```
LOADING IN PROGRESS...
WAIT...
```

This window appears when modifying configuration parameters or cycle data. Terminal saves modified data and loads them for the next operations. Do not switch-off the terminal.

3.40 Failure and anomaly messages windows

Below all windows that appears in case of anomaly or failure of ATR313-PL300 (-PL250) system components. Into this section, messages have been divided into categories with a brief description.

3.40.1 Configuration parameters/data lost

In this section all messages visualized in case of cycle data or configuration parameters loss. In case of data loss the terminal will load a default configuration. In case of configuration/process/alarm/user data loss the terminal cannot work correctly; it is necessary the installer intervention for a new parameters configuration. In case of data loss, Terminal will load a default configuration. By parameters loss, the installer will have to restore them since terminal will not function correctly. Cycle data can be easily reprogrammed. In case that status data are lost, Terminal can operate correctly, but it will not be able to start recovery function, therefore it will automatically switch to Stop mode.

```
************************************************************
*              Wrong configuration parameters              *
************************************************************
```

```
************************************************************
*                   Wrong user settings                    *
************************************************************
```

```
************************************************************
*             Wrong process configuration data             *
************************************************************
```

```
************************************************************
*              Wrong alarms configuration data             *
************************************************************
```

```
************************************************************
*                       Wrong cycle data                   *
************************************************************
```

```
************************************************************
*                       Wrong state data                   *
************************************************************
```

3.40.2 Communication errors

In this section all messages visualized in case of communication errors with the devices connected to the terminal (caused by disconnected connectors or screw terminals not correctly fixed). Once solve the problem, this type of anomaly will not affect correct operating of the system.

```
************************************************************
*                     PL300 no.1 off-line                  *
************************************************************
```

```
************************************************************
*                     PL300 no.2 off-line                  *
************************************************************
```

```
************************************************************
*                     PL300 no.3 off-line                  *
************************************************************
```

```
************************************************************
*                     PL300 no.4 off-line                  *
************************************************************
```

```
**********************************************************
*                    PL300 no.5 off-line                 *
**********************************************************
```

```
**********************************************************
*                     PL250 off-line                     *
**********************************************************
```

```
**********************************************************
*                   Device no. 1 off-line                *
**********************************************************
```

```
**********************************************************
*                   Device no. 2 off-line                *
**********************************************************
```

3.40.3 Sensors failure

Below the message visualized in case of failure of the sensor connected to the PL300 analogue inputs or if its value is not included into the allowed range. Consequently process value out of range will be locked at 32767 (if the read value is too high) or -32768 (if the read value is too low).

```
**********************************************************
*            One or more processes out of range          *
**********************************************************
```

3.40.4 Hardware failure

In this section all messages visualized in case of eeprom memory failure where all parameter/cycle/internal clock data are saved. These error messages involve repairing/test of the terminal.

```
**********************************************************
*              Hardware failure serial eeprom            *
**********************************************************
```

```
**********************************************************
*                Hardware failure serial ram             *
**********************************************************
```

3.40.5 Failure of Air/gas servo

This message, visualized only in case of gas/air servo valves management by PL250, indicates that a servo positioning error has been noticed; this means that the installation cannot correctly manage the gas/air regulation and consequently the running cycle is locked.

```
**********************************************************
*                  Air/gas servo failure                 *
**********************************************************
```

3.40.6 Failure or error in memory-card management

This message is visualized only in case of memory-card management error, indicates an error in memory-card data or the memory card is not present (or has been removed).

```
**********************************************************
*            Memory-card failed or not present           *
**********************************************************
```

```
**********************************************************
*                Wrong data on Memory-card               *
**********************************************************
```

3.41 Wiring test PL300

********** WIRING TEST PL300 **********

PL300	n°1	n°2	n°3	n°4	n°5
U1	OFF	OFF	OFF	OFF	OFF
U2	OFF	OFF	OFF	OFF	OFF
U3	OFF	OFF	OFF	OFF	OFF
U4	OFF	OFF	OFF	OFF	OFF
U5	OFF	OFF	OFF	OFF	OFF
U6	OFF	OFF	OFF	OFF	OFF
U7	OFF	OFF	OFF	OFF	OFF
U8	OFF	OFF	OFF	OFF	OFF
U9	OFF	OFF	OFF	OFF	OFF
U10	OFF	OFF	OFF	OFF	OFF
U11	OFF	OFF	OFF	OFF	OFF
U12	OFF	OFF	OFF	OFF	OFF
OUT1%	0	0	0	0	0
OUT2%	0	0	0	0	0
Tamb	23.5	0.0	0.0	0.0	0.0
AN1	23.5	0.0	0.0	0.0	0.0
AN2	0.0	0.0	0.0	0.0	0.0
AN3	0.0	0.0	0.0	0.0	0.0
AN4	0.0	0.0	0.0	0.0	0.0
I5	OFF	OFF	OFF	OFF	OFF
I6	OFF	OFF	OFF	OFF	OFF
I7	OFF	OFF	OFF	OFF	OFF
I8	OFF	OFF	OFF	OFF	OFF
I9	OFF	OFF	OFF	OFF	OFF
I10	OFF	OFF	OFF	OFF	OFF

->ESC

This window can be entered by pressing the first function key at the top left of the display. Access is allowed only during the starting stage when display visualizes logo and software release. Password 1234 is also required to enter this window.

This function enables following actions: activate all relay outputs, choose the percentage for linear outputs and activate them, check the state of all analogical and digital inputs, thus allowing to verify electrical wirings and any eventual mistake. After quitting this page, the program starts as after any restarting.

3.42 Enable/Desable functions

To enter this Menu, press "HELP" and enter password "0892".
Desabled functions will not be available by keyboard, to avoid unauthorized access /changes.

```
    ************* ENABLE/DESABLE FUNCTIONS ***************

START KEY                          :                  ENABLED
STOP KEY                           :                  ENABLED
HAND KEY                           :                  ENABLED
CYCLE MENU                         :                  ENABLED
CYCLE MODIFY                       :                  ENABLED
CYCLE VISUALIZE                    :                  ENABLED
SELECT CYCLE                       :                  ENABLED
VISUALIZE PROCESS PV               :                  ENABLED
CYCLE GRAPH                        :                  ENABLED
MODIFY AUX5..8                     :                  ENABLED
HISTORICAL GRAPH                   :                  ENABLED
MENU GO TO STEP                    :                  ENABLED
GENERAL MENU                       :                  ENABLED
CONFIGURATION MENU                 :                  ENABLED
EVENTS LIST                        :                  ENABLED
TIMERS VISUALIZATION               :                  ENABLED
DISPLAY SETTING                    :                  ENABLED
CLOCK SETTING                      :                  ENABLED
GAS/AIR SERVO CALIBRATION          :                  ENABLED
```

3.43 Special functions

3.43.1 Working cycle recovery interrupted for power failure

Recovery mode	Recovery mode description
EXCLUDED	At restarting the cycle is interrupted and the controller is set to STOP.
CERAMIC	This recovery mode can be activated only if the gap between process and setpoint is bigger than value set on parameter "Min. gap for recovery ", otherwise the cycle starts from the point at which it was interrupted. According to the type of step that the controller was executing, there are different recovery modes: • **RISING OR HOLDING STEP**: At restarting the controller scrolls the cycle backwards to reach the setpoint value lower or equal to the process value. From that point, the controller restarts cycle, repeating rising steps and omitting the holding steps which had alredy been completed. When the cycle reaches the point at which it had been interrupted, the recovery functions stops and the cycle continues regularly. • **COOLING STEP**: At restarting , the controller scrolls the cycle values onwards to reach the setpoint value lower or equal to process value. From this point, the cycle continues regularly according to programmed values.
CER-RIT	Similar to recovery mode Ceramic, but it starts after initialization of servo-valves to avoid that during this stage the difference between setpoint and process may increase (consequently the valves would open too much at the starting of control action).

3.43.2 Waiting

This function is particularly useful for firing cycles on industrial kilns in case that the plant is unable to reach the programmed temperature in the given time.

If the gap between process and setpoint value is bigger than value set on parameter "**Max. gap step end**", the next step shall start only after elapsing of time programmed on parameter "**Waiting step end SPV1**", or when this gap is included in the max. programmed value. To exclude this function, set Waiting time to zero.

3.43.3 Rate of power consumption

This function rates both istantaneous and total consumption from cycle start, reading the sensor connected to an analog input of one connected PL300. The

input can be configured selecting type of sensor, measure unit, scale of sensor, number of decimal points to visualize. At cycle start the controller will start the power consumption rate which can be expressed as gas m^3, kWh for electrical kilns, Kg or l of fuel for other types of kilns.

3.43.4 Gas/air modulation by module PL250

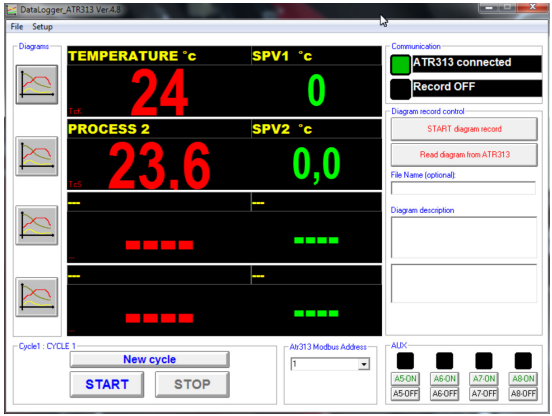
An additional module PL250-10AD allows to manage up to two loops with independent control for air/gas modulation by feed-back potentiometer. The Menu "Gas/air servo calibration" allows to calibrate each modulating valve, setting the correct opening percentage of air valve with reference to percentage of gas. The purpose is to assure optimal combustion.
This function requires the addition of a module PL250-10AD to the basic system with ATR313-1AD + PL300.

3.44 Kit ATR313-UP

This complete package enables the upgrading of software version on ATR313 and it allows also to load and download parameters and cycles from PC.
It includes:

1. CDRom with latest software version DataLogger_ATR313
2. Serial cable with connector plug8-plug8 marked as "CAVO RS232 PROGRAMMAZIONE" (Cod.: 1620.00.047).
3. Connector DB9F – plug8 marked as "Adattatore PC RS232 PROGRAM." (Cod.: 1620.00.040).
4. Connector DB9M – plug8 marked as "Adattatore RS485 RS232 PROGRAM." (Cod.: 1620.00.028).

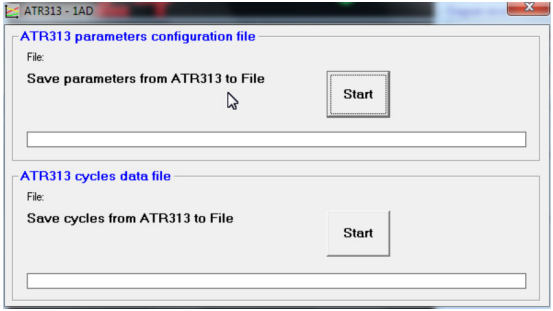
To install the program on PC, insert CDRom and double-click on file "setup.exe", then follow the guided instructions. As soon as the installation will have been successfully completed, select and start the program in the Programs directory ("DataLogger_ATR313").



"**Setup**" menu allows to select serial port (COM) for the communication cable of ATR313 and to select also language.

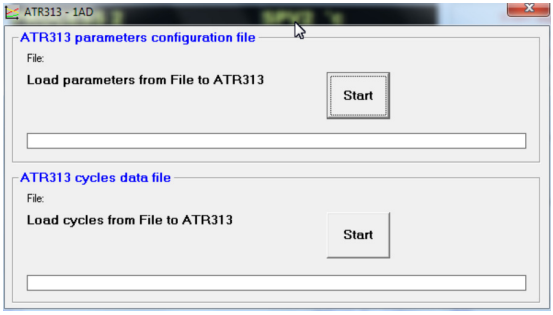
File menu gives access to following functions:

1. **Backup of data for ATR313** to store on PC parameters and cycle data currently stored on ATR313



START keys allows to visualize a mask for the entering of path and name of file.

2. **Restore data ATR313** to download a configuration (parameters and cycles) previously stored on PC.



START keys allows to visualize a mask for the entering of path and name of file.

3. **Upgrade firmware ATR313**.

Select choosen option (upgrade firmware or create memory card). **START** keys allows to visualize a mask for the entering of path and name of upgrade file.

3.45 Communication protocol Modbus-RTU

ATR313 may communicate with a Master device via MODBUS-RTU protocol.
Format is 19200 baud, no parity, 8 bit data, 1 bit stop.
Slave address may be entered on Menu può essere impostato nella finestra "CONFIGURATION ATR313 / PL300", as well as the answer delay expressed in millisecond. Terminal can be connected to RS485/422 or to RS232 port (See par. **1.4** pg. 6).

The following table contains all words with relevant description.

Modbus Address	Name	Description
611	Process 1 Visualized	Visualized Value of process 1
612	Process 2 Visualized	Visualized Value of process 2
613	Process 3 Visualized	Visualized Value of process 3
614	Process 4 Visualized	Visualized Value of process 4
615	Process 5 Visualized	Visualized Value of process 5
616	Process 6 Visualized	Visualized Value of process 6
617	Process 7 Visualized	Visualized Value of process 7
618	Process 8 Visualized	Visualized Value of process 8
619	Process 9 Visualized	Visualized Value of process 9
620	Process 10 Visualized	Visualized Value of process 10
621	Process 11 Visualized	Visualized Value of process 11
622	Process 12 Visualized	Visualized Value of process 12
623	Process 13 Visualized	Visualized Value of process 13
624	Process 14 Visualized	Visualized Value of process 14
625	Process 15 Visualized	Visualized Value of process 15
626	Process 16 Visualized	Visualized Value of process 16
627	Process 17 Visualized	Visualized Value of process 17
628	Process 18 Visualized	Visualized Value of process 18
629	Process 19 Visualized	Visualized Value of process 19
630	Process 20 Visualized	Visualized Value of process 20
531	Process 1	Value of process 1
532	Process 2	Value of process 2
533	Process 3	Value of process 3
534	Process 4	Value of process 4
535	Process 5	Value of process 5
536	Process 6	Value of process 6
537	Process 7	Value of process 7
538	Process 8	Value of process 8
539	Process 9	Value of process 9
540	Process 10	Value of process 10
541	Process 11	Value of process 11
542	Process 12	Value of process 12

Modbus Address	Name	Description
543	Process 13	Value of process 13
544	Process 14	Value of process 14
545	Process 15	Value of process 15
546	Process 16	Value of process 16
547	Process 17	Value of process 17
548	Process 18	Value of process 18
549	Process 19	Value of process 19
550	Process 20	Value of process 20
551	Setpoint Process 1	Setpoint value selected for process 1
552	Setpoint Process 2	Setpoint value selected for process 2
553	Setpoint Process 3	Setpoint value selected for process 3
554	Setpoint Process 4	Setpoint value selected for process 4
555	Setpoint Process 5	Setpoint value selected for process 5
556	Setpoint Process 6	Setpoint value selected for process 6
557	Setpoint Process 7	Setpoint value selected for process 7
558	Setpoint Process 8	Setpoint value selected for process 8
559	Setpoint Process 9	Setpoint value selected for process 9
560	Setpoint Process 10	Setpoint value selected for process 10
561	Setpoint Process 11	Setpoint value selected for process 11
562	Setpoint Process 12	Setpoint value selected for process 12
563	Setpoint Process 13	Setpoint value selected for process 13
564	Setpoint Process 14	Setpoint value selected for process 14
565	Setpoint Process 15	Setpoint value selected for process 15
566	Setpoint Process 16	Setpoint value selected for process 16
567	Setpoint Process 17	Setpoint value selected for process 17
568	Setpoint Process 18	Setpoint value selected for process 18
569	Setpoint Process 19	Setpoint value selected for process 19
570	Setpoint Process 20	Setpoint value selected for process 20
571	Out Process 1	Output value for control of process 1
572	Out Process 2	Output value for control of process 2
573	Out Process 3	Output value for control of process 3
574	Out Process 4	Output value for control of process 4
575	Out Process 5	Output value for control of process 5

Modbus Address	Name	Description
576	Out Process 6	Output value for control of process 6
577	Out Process 7	Output value for control of process 7
578	Out Process 8	Output value for control of process 8
579	Out Process 9	Output value for control of process 9
580	Out Process 10	Output value for control of process 10
581	Out Process 11	Output value for control of process 11
582	Out Process 12	Output value for control of process 12
583	Out Process 13	Output value for control of process 13
584	Out Process 14	Output value for control of process 14
585	Out Process 15	Output value for control of process 15
586	Out Process 16	Output value for control of process 16
587	Out Process 17	Output value for control of process 17
588	Out Process 18	Output value for control of process 18
589	Out Process 19	Output value for control of process 19
590	Out Process 20	Output value for control of process 20
647	Setpoint SPV1	Value of setpoint 1
648	Setpoint SPV2	Value of setpoint 2
308	Selected cycle	Use this word to read the selected cycle. To change the cycle, follow the steps below: • Enter the number of cycle (0÷19) on word 308 • Enter the numer of cycle (0÷19) on word 3354 • Wait for 2 seconds without sending any instructions reading/writing on serial line.
401	State of cycle	Use this word to give start/stop of cycle by serial line: • Write 1 on word 401 to START the selected cycle. • Write 0 on word 401 to STOP the selected cycle.
404	Current Step	Number of current step

Modbus Address	Name	Description
643	Step advancement	Advancement of the cycle in progress. To move one step forwards: • Enter value 1 on word 643. Cycle will move to the beginning of the next step. If the current step is the last step of the cycle, this will be stopped. To move one step backwards, proceed as follows: • Enter value –1 on word 643. Cycle will move to the previous step
674	Digital inputs PL300 no.1	State of digital inputs for all connected PL300 modules. For each word, bit0 will indicate state of input I1, bit1 the state of input I2 and so on. (0 = input not active, 1 = active input).
675	Digital inputs PL300 no.2	
676	Digital inputs PL300 no.3	
677	Digital inputs PL300 no.4	
678	Digital inputs PL300 no.5	
798	State of relays PL300no.1	State of relay outputs for all connected PL300. For each word, bit0 will indicate state of relay U1, bit1 the state of relay U2 and so on. (0 = relay not active, 1 = active relay).
799	State of relays PL300no.2	
800	State of relays PL300no.3	
801	State of relays PL300no.4	
802	State of relays PL300no.5	
797	State of LEDs	State of the 10 LEDs which represent the inputs/outputs on the main window of ATR313. Bit0 will indicate state of led no. 1 (at the top), bit1 will indicate state of led no.2 and so on. (0 = led OFF or empty circle, 1 = led ON or full circle)
422	Manual mode (HAND)	• To start manual mode write value "1" on word 422 • To stop manual function write value "0" on word 422. The controller returns to previous status (if executing a cycle, it goes back to point of interruption, if in Stop mode it goes back to Stop).
424	Setpoint SPV1 Manual	Value of setpoint 1 in manual control Write the choosen setpoint value
425	Setpoint SPV2 Manual	Value of setpoint 2 in manual control Write the choosen setpoint value

Modbus Address	Name	Description
437	Status AUX1 manual	Status of auxiliary in manual mode Write 1 on relevant word. To activate it or 0 to de-activate it
438	Status AUX2 manual	
439	Status AUX3 manual	
440	Status AUX4 manual	
445	Status AUX1B manual	
446	Status AUX2B manual	
447	Status AUX3B manual	
448	Status AUX1B manual	
405	Minutes elapsed from start of the current step	Time elapsed from cycle start. Time is expressed in minutes and seconds, which may be entered by 2 separate words.
406	Seconds elapsed from start of the current step	
407	Hours of total duration for cycle	Total programmed time (excluding waiting or pauses during the cycle). Time is expressed in hours and minutes, which may be entered by 2 separate words.
408	Minutes of total duration for cycle	
409	Hours elepsed from start of the running cycle	Total time elapsed from start of the running cycle (excluding waiting or pauses during the cycle). Time is expressed in hours and minutes, which may be entered by 2 separate words.
410	Minutes elepsed from start of the running cycle	
404	Number of current step	This word identifies the number of the step which is being executed.
633	Total number of steps	Total number of programmed steps.

Modbus Address	Name	Description
3355	Start data for cycle no. 1	The words referring to cycles data are all consequent and follow the sequence below: (+X means offset from cycle start): • +0 Cycle index (do not modify!!!) • +1 How many times cycle must be executed • +2 Not used (do not modify!!!) • +3 SPV1 starting setpoint of the cycle • +4 SPV2 starting setpoint of the cycle • +5 Status A1 (0=OFF, 1=ON) at cycle start • +6 Status A2 (0=OFF, 1=ON) at cycle start • +7 Status A3 (0=OFF, 1=ON) at cycle start • +8 Status A4 (0=OFF, 1=ON) at cycle start • +9 Hours / duration step 1 • +10 Minutes / duration step 1 • +11 Final SPV1 step 1 • +12 Final SPV2 step 1 • +13 Status A1 (0=OFF, 1=ON) at end of step 1 • +14 Status A2 (0=OFF, 1=ON) at end of step 1 • +15 Status A3 (0=OFF, 1=ON) at end of step 1 • +16 Status A4 (0=OFF, 1=ON) at end of step 1 • +17 Hours / duration step 2 • +18 Minutes / duration step 2 • +19 Final SPV1 step 2 • +20 Final SPV2 step 2 • +21 Status A1 (0=OFF, 1=ON) at end of step 2 • +22 Status A2 (0=OFF, 1=ON) at end of step 2 • +23 Status A3 (0=OFF, 1=ON) at end of step 2 • +24 Status A4 (0=OFF, 1=ON) at end of step 2
3596	Start data for cycle no. 2	
3837	Start data for cycle no. 3	
4078	Start data for cycle no. 4	
4319	Start data for cycle no. 5	
4560	Start data for cycle no. 6	
4801	Start data for cycle no. 7	
5042	Start data for cycle no. 8	
5283	Start data for cycle no. 9	
5524	Start data for cycle no. 10	
5765	Start data for cycle no. 11	
6006	Start data for cycle no. 12	
6247	Start data for cycle no. 13	
6488	Start data for cycle no. 14	

Modbus Address	Name	Description
6729	Start data for cycle no. 15	….. …... • +225 Hours / duration step 28 • +226 Minutes / duration 28 • +227 Final SPV1 step 28 • +228 Final SPV2 step 28 • +229 Status A1 (0=OFF, 1=ON) at end of step 28 • +230 Status A2 (0=OFF, 1=ON) at end of step 28 • +231 Status A3 (0=OFF, 1=ON) at end of step 28 • +232 Status A4 (0=OFF, 1=ON) at end of step 28 • +233 Not used (do not modify!!!) • +234 Not used (do not modify!!!) • +235 Not used (do not modify!!!) • +236 Not used (do not modify!!!) • +237 Status A1 (0=OFF, 1=ON) at cycle end • +238 Status A2 (0=OFF, 1=ON) at cycle end • +239 Status A3 (0=OFF, 1=ON) at cycle end • +240 Status A4 (0=OFF, 1=ON) at cycle end
6970	Start data for cycle no. 16	
7211	Start data for cycle no. 17	
7452	Start data for cycle no. 18	
7693	Start data for cycle no. 19	
7934	Start data for cycle no. 20	
3143	Start data for alarm no. 1	Data are all consequent and they follow the sequence below (+X means offset from beginning of data for relevant alarm): • +0 Type of alarm 0 ->---------- 1 ->INDEPENDENT OVER 2 -> INDEPENDENT BELOW 3 ->DEVIATION HIGH 4 ->DEVIATION LOW 5 ->INSIDE BAND 6 ->OUTSIDE BAND • +1 Source of alarm 1 ->PROCESS 1 2 ->PROCESS 2 3 ->PROCESS 3 4 ->PROCESS 4
3150	Start data for alarm no. 2	
3157	Start data for alarm no. 3	
3164	Start data for alarm no. 4	
3171	Start data for alarm no. 5	
3178	Start data for alarm no. 6	
3185	Start data for alarm no. 7	
3192	Start data for alarm no. 8	
3199	Start data for alarm no. 9	
3206	Start data for alarm no. 10	
3213	Start data for alarm no. 11	
3220	Start data for alarm no. 12	
3227	Start data for alarm no. 13	

Modbus Address	Name	Description
3234	Start data for alarm no. 14	5 -> PROCESSO 5 5 -> PROCESS 5 6 -> PROCESS 6 7 -> PROCESS 7 8 -> PROCESS 8 9 -> PROCESS 9 10 -> PROCESS 10 11 -> PROCESS 11 12 -> PROCESS 12 13 -> PROCESS 13 14 -> PROCESS 14 15 -> PROCESS 15 16 -> PROCESS 16 17 -> PROCESS 17 18 -> PROCESS 18 19 -> PROCESS 19 20 -> PROCESS 10 21 -> AVERAGE 1 22 -> AVERAGE 2 • +2 Alarm treshold (numeric value) • +3 Alarm hysteresis (numeric value) • +4 Alarm validity 0 -> ALWAYS 1 -> ONLY START 2 -> ONLY STOP 3 -> ONLY STEP 4 -> ONLY STEP- 5 -> ONLY RUN • +5 Type of alarm action 0 -> NO ACTION 1 -> MESSAGE ONLY 2 -> CYCLE STOP 3 -> CYCLE PAUSE • +6 Index of alarm message (do not modify!!!)
3241	Start data for alarm no. 15	
3248	Start data for alarm no. 16	
3255	Start data for alarm no. 17	
3262	Start data for alarm no. 18	
3269	Start data for alarm no. 19	
3276	Start data for alarm no. 20	
3283	Start data for alarm no. 21	
3290	Start data for alarm no. 22	
3297	Start data for alarm no. 23	
3304	Start data for alarm no. 24	
3311	Start data for alarm no. 25	
3318	Start data for alarm no. 26	
3325	Start data for alarm no. 27	
3332	Start data for alarm no. 28	
3339	Start data for alarm no. 29	
3346	Start data for alarm no. 30	

Modbus Address	Name	Description
3001	Start data for process no. 1	The words referring to data of processes are all consequent and they follow the sequence below (+X means offset from start of configuration data for each single process): • +0 Index of cycle (do not modify!!!) • +1 Offset correction of sensor • +2 Gain correction of sensor • +3 Control setpoint 0 -> NO SETPOINT 1 -> SPV1 2 -> SPV2 • +4 Type of output 0 -> NO OUTPUT 1 -> ON/OFF 2 -> SERVO OPEN/CLOSE 3 -> TIME PROPORTIONING 4 -> OUT1 LOGIC 5 -> OUT1 4..20 6 -> OUT1 0..10 7 -> OUT2 LOGIC 8 -> OUT2 4..20 9 -> OUT2 0..10 10 -> SSR Time proportioning 11 -> SSR 0N/OFF • +5 Servo time or cycle time (sec) • +6 Average 0 -> No average 1 -> AVERAGE.1 2 -> AVERAGE 2
3008	Start data for process no. 2	
3015	Start data for process no. 3	
3022	Start data for process no. 4	
3029	Start data for process no. 5	
3036	Start data for process no. 6	
3043	Start data for process no. 7	
3050	Start data for process no. 8	
3057	Start data for process no. 9	
3064	Start data for process no. 10	
3071	Start data for process no. 11	
3078	Start data for process no. 12	
3085	Start data for process no. 13	
3092	Start data for process no. 14	
3099	Start data for process no. 15	
3106	Start data for process no. 16	
3113	Start data for process no. 17	
3120	Start data for process no. 18	
3127	Start data for process no. 19	
3134	Start data for process no. 20	

The following table contains the formats for the names of stored cycles. Access to Modbus words allows to read two characters at same time. To divide the different strings the terminators (0x00) may be used. The table describes the structure for the first five cycles. The remaining ones are stored with same structure. The first line of each table is the Modbus address.

1001		1002		1003		1004		1005		1006	
0x1E	"C"	"I"	"C"	"L"	"O"	" "	"1"	" "	" "	" "	" "
	1	2	3	4	5	6	7	8	9	10	11
	NAME CYCLE NO. 1										

1007		1008		1009		1010		1011		1012	
" "	" "	" "	" "	" "	" "	" "	" "	" "	0x00	"C"	"I"
12	13	14	15	16	17	18	19	20		1	2
NAME CYCLE NO. 1											

1013		1014		1015		1016		1017		1018	
"C"	"L"	"O"	" "	"2"	" "	" "	" "	" "	" "	" "	" "
3	4	5	6	7	8	9	10	11	12	13	14
NAME CYCLE NO. 2											

1019		1020		1021		1022		1023		1024	
" "	" "	" "	" "	" "	" "	0x00	"C"	"I"	"C"	"L"	"O"
15	16	17	18	19	20		1	2	3	4	5
NAME CYCLE NO. 2							NAME CYCLE NO. 3				

1025		1026		1027		1028		1029		1030	
" "	"3"	" "	" "	" "	" "	" "	" "	" "	" "	" "	" "
6	7	8	9	10	11	12	13	14	15	16	17
NAME CYCLE NO. 3											

1031		1032		1033		1034		1035		1036	
" "	" "	" "	0x00	"C"	"I"	"C"	"L"	"O"	" "	"4"	" "
18	19	20		1	2	3	4	5	6	7	8
NAME CYCLE NO. 3				NAME CYCLE NO. 4							

1037		1038		1039		1040		1041		1042	
" "	" "	" "	" "	" "	" "	" "	" "	" "	" "	" "	" "
9	10	11	12	13	14	15	16	17	18	19	20
NAME CYCLE NO. 4											

1043		1044		1045		1046		1047		1048	
0x00	"C"	"I"	"C"	"L"	"O"	" "	"5"	" "	" "	" "	" "
	1	2	3	4	5	6	7	8		10	11
	NAME CYCLE NO. 5										

1049		1050		1051		1052		1053		1054	
" "	" "	" "	" "	" "	" "	" "	" "	" "	0x00	"C"	"I"
12	13	14	15	16	17	18	19	20		1	2
NAME CYCLE NO. 5											

Notes / Updates


Pixsys
ELECTRONICS

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

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