

P I X S Y S
electronica

CONTROLLER
and PROGRAMMER

ATR-900
ATR-901

User Manual

Contents list

Introduction	3
1.0 Ordering code ATR900	3
1.1 Ordering code ATR901	3
2. Electrical wirings	4
2.1 Pin Assignment	4
3. Displays and keys	5
3.2 Leds.....	6
4. Programming and configuration.....	7
4.1 Entering or modifying a firing curve.....	7
4.2 Entering or modifying a firing cycle - Version 2.x.....	9
5. Cycle start and special functions	11
5.1 Program start.....	11
5.2 Changing the setpoint value during a firing.....	11
5.3 Jump to the next segment during the cycle	11
5.4 Function HOLD.....	12
5.5 Visualize Power consumption	12
5.6 Funtion WAITING	13
5.7 RECOVERY	13
5.8 Function SIMPLE CONTROLLER.....	14
5.9 Auto-tune	14
6. Configuration.....	16
6.1 To change values	16
6.2 Setting of configuration parameters	16
7. Configuration parameters	17
8. Alarm A1	19
9. Fault displays	20
10. Technical data.....	21
10.1 General features.....	21
10.2 Hardware.....	21
10.3 Software	21
Notes.....	22

Introduction

The plug-in controller ATR900 or 901 is specially dedicated to applications in the glass and pottery industry. This controller provides high accuracy of the programmed firing cycle and reliable monitoring of the firing. It can store up to 4 completely configurable programs, each consisting of max. 15 segments. Delayed start is also available as well as other software functions. All parameters are protected by a password to avoid unauthorized access.

1.0 Ordering code ATR900

ATR900-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Digital input	1				No digital input
Relay output					
	2				Relay 10A
Power supply	A				24V AC $\pm 15\%$ 50/60Hz
	B				230V AC $\pm 15\%$ 50/60Hz
	C				110V AC $\pm 15\%$ 50/60Hz
Connector					Standard 7 poles

1.1 Ordering code ATR901

ATR901-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Digital input	1				No digital input
Relay output					
	2				Relay 10A
Power supply	A				24V AC $\pm 15\%$ 50/60Hz
	B				230V AC $\pm 15\%$ 50/60Hz
	C				110V AC $\pm 15\%$ 50/60Hz
Connector					Standard 7 poles

2. Electrical wirings

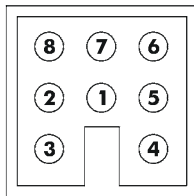


Although this controller has been conceived to resist the worst noises in an industrial environment, please notice the following safety guidelines:

- 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

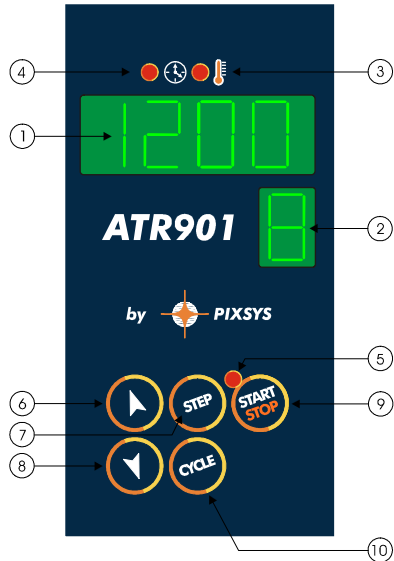
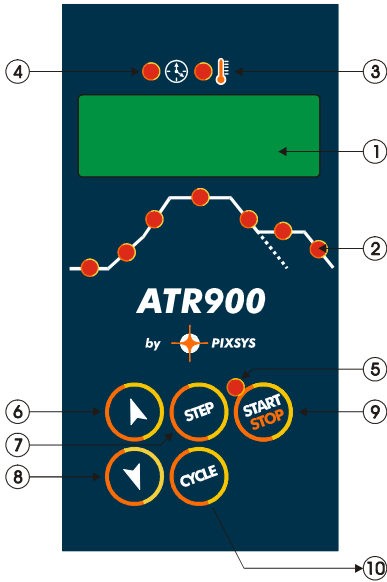
2.1 Pin Assignment



**Front view
8 poles connector**












- 1) Neutral
- 2) Neutral
- 3) Thermocouple +
- 4) Thermocouple -
- 5) Power supply (phase)
- 6) Control output (phase)
- 7) Aux output (phase)
- 8) Not connected

3. Displays and keys




3.1 Displays		
1		Main display normally displays the actual kiln temperature. During configuration or programming it will display setpoint value, number of segments or other values (temperature, rate, dwell etc.).
2		Secondary display shows the number of segment in progress or the number of segment which is being programmed.-



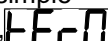
3.2 Leds		
2		Leds shows the segment number of the firing cycle. All leds are flashing when a delayed start has been programmed. When the cycle foresees more than 7 segments, the 7th led stays ON also for the additional segments.
3		Led is ON when the operator is entering a temperature or if the function “simple controller” is running.
4		Led is ON when the operator is entering a time value for each segment of a program.
5		Led flashes when the control output is on during a firing cycle or when the function “simple controller” is running.












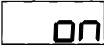





3.3 Keys		
6		Increases the displayed value: <ul style="list-style-type: none"> Parameter value during configuration Setpoint value if operating as “simple controller” (see 5.3) Time or temperature value if entering a firing cycle.
7		<ul style="list-style-type: none"> Scroll through the parameters during configuration. Scroll through the segments within the selected program
8		Decreases the displayed value: <ul style="list-style-type: none"> Setpoint value if operating as “simple controller” (see 5.3) Time or temperature value if entering a firing cycle Parameter value during configuration
9		START / STOP key <ul style="list-style-type: none"> ESCAPE –key if programming parameters or cycles.
10		Scrolls through the cycles to select or start one <ul style="list-style-type: none"> Keep pressing it for about 5 sec. to enter configuration mode..

4. Programming and configuration

4.1 Entering or modifying a firing curve



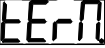
The controller must be in STOP-mode. Press  and follows the points below.









	Key	Display	Do
1	Press 	Main display displays 	Press the key to scroll through the available programs and finally the function “simple controller”  , until the chosen program is displayed.

	Key	Display	Do
2	Press 	Displays the 1 st segment of the selected program. The number of segments (1-9, A,B,C,D,E,F,) is displayed on the 2 nd display. Press  to scroll through and enter time and temperature values (and auxiliary relay if available) for each segment.	To program the delayed start of firing cycle, enter the time value (0:00-09:59) for step 0. Otherwise skip to step no. 1
3	  	Increase or decrease the displayed value.	Enter duration of segment (hours:minutes) To set the maximum rise speed, press  until  is displayed. Led  is On. Enter the setpoint value (required temperature). Led  is On To finish the firing cycle, enter  (keep pressing  until 'END' is displayed). If auxiliary output is enabled, select  to close the relay or  to close it.
4	 	Press  to end programming and press it again to start the firing cycle.	Press  to skip to the 1 st segment of the next program.

4.2 Entering or modifying a firing cycle - Version 2.x

Press START/STOP and follow the points below:

	Key	Display	Do
1	Press 	Main display displays 	Press the key to scroll through the available programs and the function "simple controller"  , until the chosen program is displayed.






<p>2</p>		<p>Press this key to enter the first step of the cycle and scroll all the relevant data (temperature, time, dwell, state of relay if available) To modify them, check point 4.3</p>	
<p>3</p>	  	<p>Increase or decrease the value on display</p> <p>Press  to scroll data about the cycle.</p>	<ul style="list-style-type: none"> • Enter setpoint value.¹ Set <input type="text" value="End"/> to finish the cycle. Led  is ON. • Set the duration of heating up ramp or cooling ramp (hours: minutes) Enter <input type="text" value="UNP"/> for heating up with maximum power Led  is ON • Enter the value for dwell (hours: minutes) Set <input type="text" value="UNP"/> if dwell is not required. Led  is flashing. • If the auxiliary relay is enabled, select <input type="text" value="on"/> to close the relay or <input type="text" value="off"/> to open it.

^{1 1} N.B. If the temperature value is the same as in previous step, the dwell is entered with a single time value.



5. Cycle start and special functions

5.1 Program start

Press START/STOP and follow the points below.


	Key	Display	Do
1	Press 	Display displays 	Keep pressing the key until the chosen program is displayed
2		Program starts and buzzer sounds briefly. From now on, display shows the actual temperature of the kiln. Led START is On.	 To stop or pause the firing cycle, press  .

5.2 Changing the setpoint value during a firing.

	Key	Display	Do
1	 	Only possible if this function has been enabled (see parameter 14). Press the key once to display the setpoint value. Then press once more to change this value. After a few seconds, the display will revert to the actual temperature. The new setpoint value is automatically stored.	Enter new setpoint value.




5.3 Jump to the next segment during the cycle

Follow the points below:

	Press	Display	Do
1	 Press the key for a few seconds	The controller jumps to the next segment of the running cycle	


5.4 Function HOLD

Follow the points below:

	Press	Display	Do
1	 Press the key for a few seconds.	The controller holds the temperature which is currently visualized on display until the key CYCLE is pressed by the operator again. The display visualizes alternating the temperature value and the writing 	The function can be interrupted by pressing the  key again for a few seconds.

5.5 Visualize Power consumption

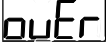
Press START/STOP and follow the points below.

	Key	Display	Do
1		Press the key to visualize the power consumption during last cycle. Enter the plant power on P-15 to rate power consumption	

5.6 Funtion WAITING

During rising segments , the controller usually jumps to the next segment of cycle only when the kiln reaches the programmed setpoint value. In case that the kiln is not able to reach setpoint within the given time (due for example to excessive load), the controller would hold the running segment until the process reaches the setpoint.

The function WAITING allows to set a fixed waiting time on parameter P-16 : in this case the controller waits only for the fixed time before jumping to the next segment.

When this function is working and the controller jumps to the next segment as result, the display will visualize  . The writing may be stopped by pressing the key STEP or START.











P-16 set to zero means that the function is disabled. The function does anyway not work during holding and cooling ramps as well as during rising steps if time is set to zero.

5.7 RECOVERY

The function allows the recovery of an interrupted cycle and the firing prosecution in case of black-out. It may be activated by setting parameter P-17 to 1. If the function has been previously activated, the cycle will restart from the point of interruption. The controller stores both the running cycle and the interrupted segment.

5.8 Function SIMPLE CONTROLLER

ATR901 may also be used as a “simple controller” to fire a set temperature. Press START/STOP and follow the sections below.



	Key	Display	Do
1	Press 		Keep pressing  until display shows  .
3	Press  or 	Display the temperature setting and to increase or decrease it. After a few seconds  is displayed again.	
4	Press 	The actual temperature of the kiln is shown. Led STARTS to flash. Control output is active.	To modify the temperature setting, see following section no. 5
5	Press  or 	Display shows temperature setting . Increase or decrease the value.	To exit the function “simple controller”, press  .



5.9 Auto-tune

The Auto-tuning process may be launched when the function “simple controller” is running, if it has been previously enabled by parameter P-12.

**The process value (temperature measured by sensor) must be at least 35% lower than setpoint value to avoid overflow.



Access to this function may be disabled (see parameter P-12).


	Key	Display	Do
1	Press 	Display shows  flashing.	

<p>2</p>	<p>Press</p> 	<p>Display alternates between tunE and temperature of kiln. Led STARTS to flash. The controller starts the self-tuning process .</p>	<p>Wait until display shows the kiln temperature again, after the process has been completed. To interrupt the process, press  .</p>
-----------------	--	---	---


6. Configuration








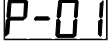




6.1 To change values

To increase or decrease the displayed value, just press  or .

Press  to skip to next parameter.

6.2 Setting of configuration parameters

To enter or change the configuration parameters the controller must be in STOP-mode. Press  and follow the points below.

	Key	Display	Do
1	Press  for about 5 sec.	Display visualizes  and the 1 st number on the left flashes.	
2	 		Enter password  . Press  to skip to next number and then to display the 1 st parameter.
3		Display  flashing.	
4		Press this key to scroll through all the parameters.	When the display reaches the required parameter, wait for a few seconds for it to change to the value.
5	 	Increase or decrease the value	Enter the new value.
6		End of configuration. The controller is set as STOP-mode	

7. Configuration parameters

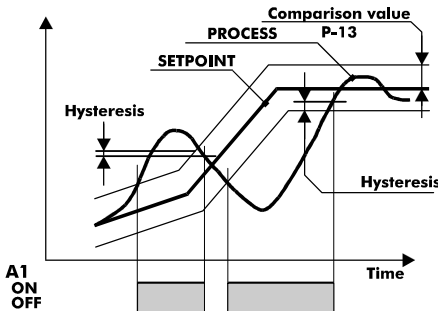
P-01	Analogic input AN1 <i>Type of thermocouple</i>																														
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%; text-align: center;">0</td> <td>Type K (-50/1300°C)</td> </tr> <tr> <td style="text-align: center;">1</td> <td>Type J (-50/1200°C)</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Type S (-50/1800°C)</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Type R (-50/1800°C)</td> </tr> </table>	0	Type K (-50/1300°C)	1	Type J (-50/1200°C)	2	Type S (-50/1800°C)	3	Type R (-50/1800°C)																						
0	Type K (-50/1300°C)																														
1	Type J (-50/1200°C)																														
2	Type S (-50/1800°C)																														
3	Type R (-50/1800°C)																														
P-02	Limits of the scale (0/3200 °C or °F) <i>This parameter defines the maximum temperature of the kiln. All parameters which are expressed as percentage values (ON/OFF hysteresis, proportional band) also refer to this scale</i>																														
P-03	Auxiliary output A1 <i>Operating of second relay</i>																														
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%; text-align: center;">0</td> <td>Disabled</td> </tr> <tr> <td style="text-align: center;">1</td> <td>Set the status of the relay at end of cycle</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Set the status of relay for each segment of the cycle</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Same operating of both relays for maximum power</td> </tr> <tr> <td style="text-align: center;">4</td> <td>General alarm (relay N.O.)</td> </tr> <tr> <td style="text-align: center;">5</td> <td>Band alarm (relay N.O.)</td> </tr> <tr> <td style="text-align: center;">6</td> <td>Upper deviation alarm (relay N.O.)</td> </tr> <tr> <td style="text-align: center;">7</td> <td>Lower deviation alarm (relay N.O.)</td> </tr> <tr> <td style="text-align: center;">8</td> <td>Set the status of relay during the cycle (N.O. at Start and Stop, Closed during the cycle)</td> </tr> <tr> <td style="text-align: center;">9</td> <td>General alarm (relay N.C.)</td> </tr> <tr> <td style="text-align: center;">10</td> <td>Band alarm (relay N.C.)</td> </tr> <tr> <td style="text-align: center;">11</td> <td>Upper deviation alarm (N.C.)</td> </tr> <tr> <td style="text-align: center;">12</td> <td>Lower deviation alarm (N.C.)</td> </tr> <tr> <td style="text-align: center;">13</td> <td>Set the status of relay during the cycle (N.C. at Start and Stop, Open during the cycle)</td> </tr> <tr> <td style="text-align: center;">14</td> <td>Control of safety contactor</td> </tr> </table>	0	Disabled	1	Set the status of the relay at end of cycle	2	Set the status of relay for each segment of the cycle	3	Same operating of both relays for maximum power	4	General alarm (relay N.O.)	5	Band alarm (relay N.O.)	6	Upper deviation alarm (relay N.O.)	7	Lower deviation alarm (relay N.O.)	8	Set the status of relay during the cycle (N.O. at Start and Stop, Closed during the cycle)	9	General alarm (relay N.C.)	10	Band alarm (relay N.C.)	11	Upper deviation alarm (N.C.)	12	Lower deviation alarm (N.C.)	13	Set the status of relay during the cycle (N.C. at Start and Stop, Open during the cycle)	14	Control of safety contactor
0	Disabled																														
1	Set the status of the relay at end of cycle																														
2	Set the status of relay for each segment of the cycle																														
3	Same operating of both relays for maximum power																														
4	General alarm (relay N.O.)																														
5	Band alarm (relay N.O.)																														
6	Upper deviation alarm (relay N.O.)																														
7	Lower deviation alarm (relay N.O.)																														
8	Set the status of relay during the cycle (N.O. at Start and Stop, Closed during the cycle)																														
9	General alarm (relay N.C.)																														
10	Band alarm (relay N.C.)																														
11	Upper deviation alarm (N.C.)																														
12	Lower deviation alarm (N.C.)																														
13	Set the status of relay during the cycle (N.C. at Start and Stop, Open during the cycle)																														
14	Control of safety contactor																														
P-05	Offset correction for sensor input (-150/150 °C or °F)																														
P-06	Gain calibration for sensor input (-5.0%...+5.0%) <i>These parameters act to adjust eventual mistakes caused by damages or errors on thermocouple wiring and to set the precision of thermocouple on a well definite point of the scale.</i>																														

Pixsys S.n.c.

P-07	Proportional band (0-1800 °C or °F).
P-08	Integral time (0/9999 sec). (Zero excludes integral)
P-09	Derivative time (0.0/999.9 sec). (Zero excludes derivative)
P-10	Cycle time for output with proportional time (1/120 sec).
	<i>These parameters set the values for P.I.D. control mode. In case of ON/OFF modulation (proportional band set to 0), parameter P-10 acts as hysteresis</i>
P-11	Measure units
	<i>Units of temperature measurement</i>
	0 °C.
	1 °F.
P-12	Delayed start
	<i>Programming of delayed start (entering step 0) and Autotuning function</i>
	0 Step 0 enabled Auto-tune disabled
	1 Step 0 disabled Auto-tune enabled
	2 Step 0 enabled Auto-tune enabled
	3 Step 0 disabled Auto-tune disabled
P-13	Threshold for alarm (0/3200 °C or °F)
	<i>This parameter defines the threshold for intervention of alarm.</i>
P-14	Change of setpoint value during a firing curve
	<i>This parameter allows the setpoint values to be modified during a firing.</i>
	0 Setpoint change disabled
	1 Setpoint change enabled
P-15	Power consumption of the kiln (0.0/999.9 – Kwatt/h)
	<i>This parameter defines the power of the plant. If the value has been entered, press the key STEP after cycle end to visualize the power consumption Kwatt/h for the last cycle. The value gets lost when the controller is switched off.</i>
P-16	Function WAITING (0/9999 minutes)
	<i>This parameter allows to set a fixed waiting time in case that setpoint value is not reached. If parameter is set to zero, the function is disabled.</i>
P-17	Function RECOVERY
	<i>Recovery of interrupted cycle and firing prosecution after a black-out.</i>
	0 Recovery excluded
	1 Recovery enabled

8. Alarm A1

Band alarm (setpoint-process)



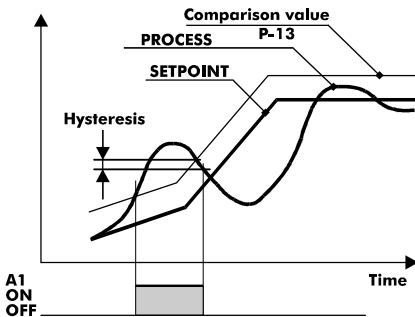
The alarm can be:

- working outside
- working inside

Example: Outside

N.B. Alarm threshold is set on P-13
Hysteresis is fixed as 1°C/°F.

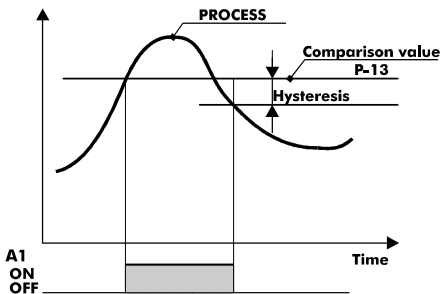
Deviation alarm (setpoint-process)



- Upper deviation
 - Lower deviation
- Example: Upper deviation

N.B. Hysteresis is fixed as 1°C/°F.

General alarm (process)



The alarm can be:

- working over
- working under

Example: working over

N.B. Hysteresis is fixed as 1°C/°F.

9. Fault displays

In case the plant does not work properly, the controller stops the program running and shows a fault condition, activating the internal buzzer. To stop the buzzer press any key. See table below for description of fault messages.

Error	Cause	Do
E-01	Mistake in programming E ² PROM	Contact technical service
E-02	Cold link failed or room temperature out of limits	-
E-03	Wrong cycle data	Program a new cycle
E-04	Parameter error.	Check and/or reconfigure the parameters
E-05	Thermocouple circuit defect	Check sensors wiring
E-06	ADC conversion out of range	-
E-07	Second relay is programmed to control the safety contactor.	Check the operation of the relay and/or of contactor

10. Technical data

10.1 General features

Display	4 digits (+ 1 digit)
Operating temperature	0-45°C, humidity 35..95uR%
Sealing	IP54
Material	Shock-resistant polystyrene
Weight	550 g
Sizes	120x65x65

10.2 Hardware

Analogic input	AN1, Configurable via software Input no.1 Thermocouple type K,J,S,R	Accuracy (25°C) 0.2 % ± 1 digit
	Relay output	OUT1, A1 Control output and safety relay (alarm or auxiliary)
		Contacts 8A-250V~

10.3 Software

Algorithm	ON/OFF with hysteresis 1°C/°F P,PI,PID,PD with Proportional time
Proportional band	0...1800°C / °F
Integral time	0...9999 sec (0 excludes integral)
Derivative time	0,0...999,9 sec (0 excludes derivative)
Programmable cycles	4 (max 15 steps each) + function "simple controller" with programmable setpoint

Notes

Date :	Model ATR
Installator :	Plant :

Notes:

P-01	Analogic input AN1	
P-02	Maximum limit of scale (0/3200 digit)	
P-03	Output A1 (Alarm/Auxiliary relay)	
P-05	Offset correction for sensor input (-150/150 °C or °F)	
P-06	Gain calibration for sensor input (-5.0%...+5.0%)	
P-07	Proportional band (0-1800°C or °F).	
P-08	Integral time (0/9999 sec). (0 excludes integral)	
P-09	Derivative time (0.0/999.9 sec). (0 excludes derivative)	
P-10	Cycle time for output with proportional time (1/120 sec).	
P-11	Measure unit	
P-12	Delayed start / Autotuning	
P-13	Treshold for alarm operation	
P-14	Change of setpoint value during a firing curve	
P-15	Power consumption (0.0/999.9 kW)	
P-16	Waiting	
P-17	Recovery	

Pixsys S.n.c.

Pixsys S.n.c.

PIXSYS

Via Tagliamento, 18

30030 Mellaredo di Pianiga (VE)

www.pixsys.net

e-mail: sales@pixsys.net - support@pixsys.net

Software Rev. 1.12

2300.10.041-RevB 130104

*** 2300.10.041-B ***