# ATR 621
Controller

User manual

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# Sommario

## Introduction

Thanks for choosing a Pixsys controller.

With ATR621 model Pixsys integrates in a single device all options for sensors reading and actuators control, beside an useful supply with extended range 24..230 Vac/Vdc. With the analogue universal input and the output configurable as relay or SSR, the user or the retailer can reduce stock needs. The series includes also a model with serial communication RS485 Modbus Rtu and linear output 0-10V, 0/4-20mA. The possibility to repeat parameterization is simplified by the Memory Cards with internal battery that do not require power supply for the controller.

## 1    Safety standards

Carefully read the instructions and safety measures in this manual before using the device. Disconnect power before performing any interventions on the electrical connections or hardware settings.

Only qualified personnel may use/perform maintenance in full respect of the technical data and declared environmental conditions.

Do not dispose of electrical appliances together with household waste.

In compliance with the European Directive 2002/96/EC, waste electrical equipment must be collected separately for eco-compatible reuse or recycling.

## 2    Model identification

ATR621 includes 3 versions. Looking at the following table it is possible to find the required model.

| Power supply 24..230 Vac/Vdc ±15% 50/60Hz – 5,5VA | |
|---|---|
| **ATR621-12ABC** | 1 Analogue input + 2 relays 8A + 1 SSR + D.I. |
| **ATR621-14ABC** | 1 Analogue input + 3 relays 8A + 1 Relays 5A (30V) + D.I. |
| **ATR621-13ABC-T** | 1 Analogue input + 3 relays 8A + 1 Output V/mA/SSR + RS485 |

## 3    Technical data
### 3.1    Main features

| | |
|---|---|
| Displays | 4 digits display 0,50 inches + 4 digits display 0,30 inches |
| Operating Temperature | Temperature 0-45°C - Humidity 35..95uR% |
| Sealing | Front panel IP54, box IP30, terminal blocks IP20 |
| Material | Box: Noryl UL94V1 self-exstinguish<br>Front panel: PC ABS UL94V0 self-exstinguish |
| Weight | Approx. 250 g |

## 3.2    Hardware features

| | | |
|---|---|---|
| Analogue inputs | **AI1** - Configurable via software **Thermocouples**: type K,S,R,J,E,N. Automatic compensation of cold junction from 0..50 °C. **Thermoresistances**: PT100, **Input V/mA**: 0-10V, 0-20mA, 4-20mA. | Tolerance (25°C) +/-0.2 % ± 1 digit for thermocouple, thermoresistance and V/mA. Cold junction accuracy 0.1°C/°C **Impedance**: **0-10V**: Ri>110KΩ **0-20mA**: Ri<5Ω **4-20mA**: Ri<5Ω |
| Relay outputs | Configurable as control and alarm output. | Contacts: - Q1, Q2, Q3: 8A-250V~ for resistive charges - Q4: 5A-30V for resistive charges |
| Output SSR/ V/ mA | 1 SSR /V/mA Selectable as command output, alarm or process/ setpoin retransmission. | Configurable: SSR 12V 30mA 0-10V (9500 points) 0-20mA (7500 points) 4-20mA (6000 points) |
| Supply | Extended range 24..230Vac/ Vdc ±15% 50/60Hz | Consumption: 5.5VA |
| UL specifications | Over Voltage Category: II Type 1 Enclosure Pollution Degree: 2 or better Software Class: A | |

## 3.3    Software features

| | |
|---|---|
| Control algorithms | ON-OFF with hysteresis. P, PI, PID, PD time proportioned. |
| Proportional band | 0...9999°C o °F |
| Integral time | 0,0...999,9 sec (0 excludes) |
| Derivative time | 0,0...999,9 sec (0 excludes) |
| Controller functions | Manual or automatic tuning, selectable alarms and functions selection by digital input. |

# 4    Size and installation

Memory Card (optional)
with battery
Cod. 2100.30.007

Memory Card (optional)
Cod. 2100.30.006

42mm
inserimento
Memory Card
*42mm
insert
Memory Card*

72 mm

72 mm

66 mm

DIMA DI FORATURA
66,5 x 66,5 mm
*Frontal panel cut-out*

Spessore suggerito
2÷8 mm
*Suggested thickness*

5    89 mm    10
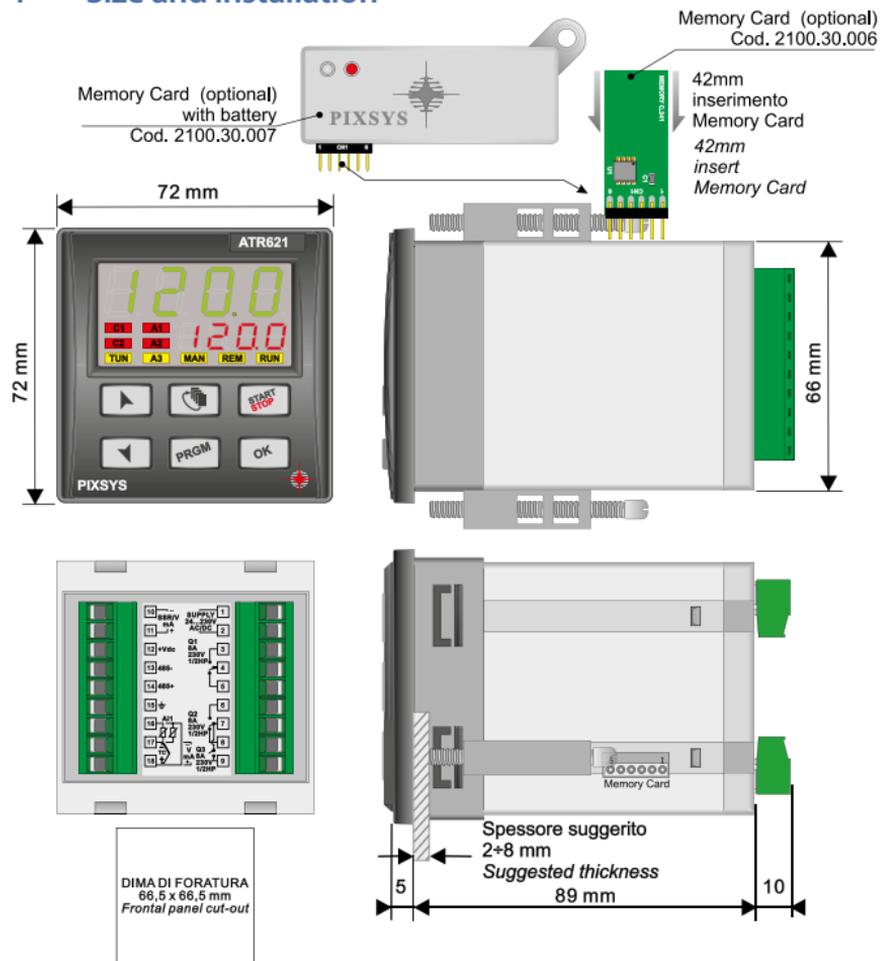
# 5    Electrical wirings

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

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

# 5.1 Wiring diagram



**ATR621-12ABC**

| | |
|---|---|
| 10 SSR | 1 |
| 11 ⌐+ | SUPPLY 24...230V AC/DC 2 |
| 12 +Vdc ∎ DI | 3 |
| 13 | Q1 8A 230V 1/2HP 4 |
| 14 | 5 |
| 15 ⏚ | 6 |
| 16 AI1 | Q2 8A 230V 1/2HP 7 |
| 17 TC ⎓ V/mA | 8 |
| 18 ± | 9 |

**ATR621-13ABC-T**

| | |
|---|---|
| 10 SSR/V mA | 1 |
| 11 ⌐+ | SUPPLY 24...230V AC/DC 2 |
| 12 +Vdc | Q1 8A 230V 1/2HP 3 |
| 13 485- | 4 |
| 14 485+ | 5 |
| 15 ⏚ | 6 |
| 16 AI1 | Q2 8A 230V 1/2HP 7 |
| 17 TC ⎓ V mA | 8 Q3 8A 230V 1/2HP |
| 18 ± | 9 |

**ATR621-14ABC**

| | |
|---|---|
| 10 Q4 5A 30V 1/8HP | 1 |
| 11 | SUPPLY 24...230V AC/DC 2 |
| 12 +Vdc ∎ DI | 3 |
| 13 | Q1 8A 230V 1/2HP 4 |
| 14 | 5 |
| 15 ⏚ | 6 |
| 16 AI1 | Q2 8A 230V 1/2HP 7 |
| 17 TC ⎓ V mA | 8 Q3 8A 230V 1/2HP |
| 18 ± | 9 |

## 5.1.a Power supply



1 SUPPLY · ALIMENTAZIONE 24...230 Vac/dc 2

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

## 5.1.b Analogue input AI1



AI1 — Shield/Schermo
17
TC
18 +
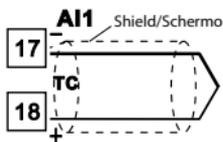
**For thermocouples K, S, R, J, E, N.**
- Comply with polarity
- For extensions make sure to use the correct extension/compensating cable
- When shielded cable is used, it should be grounded at one side only.



AI1 — Shield/Schermo
16
17 PT/NI100
18
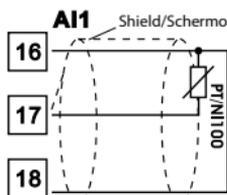
**For thermoresistances PT100**
- For a three-wires connection use cables with the same diameter.
- For a two-wires connection short-circuit terminals 16 and 18.
- When shielded cable is used, it should be grounded at one side only.

RED/ROSSO 16
WHITE/BIANCO 17
RED/ROSSO 18
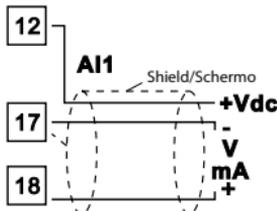
**For linear signals Volt/mA**
- Comply with plarity
- When shielded cable is used, it should be grounded at one side only.

## 5.1.c  Examples of connection for linear input AI1



For linear signals 0..10V
- Comply with polarity
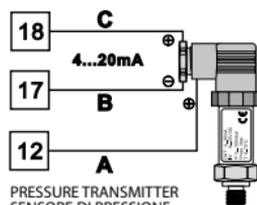


For linear signals 0/4..20mA with **three-wires sensors**
- Comply with polarity
C = Sensor output
B = Sensor ground
A = Sensor supply (12Vdc/25mA)
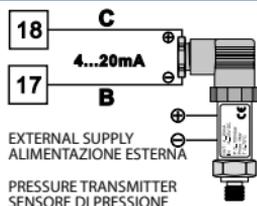


For linear signals 0/4..20mA with **external power supply for sensor**
- Comply with polarity
C = Sensor output
B = Sensor ground
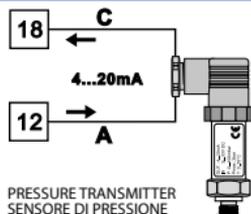


For linear signals 0/4..20mA with **two-wires sensors**
- Comply with polarity
C = Sensor output
A = Sensor supply (12Vdc/25mA)

## 5.1.d  Digital input (ATR621-12ABC and 14ABC)
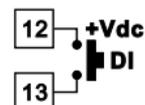


Digital input (parameter dﻻﻉ.ﻱ).

| 10 | - |
|----|---|
| | **SSR** |
| 11 | + |
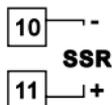
Command output SSR: 12V, 30mA max, SELV, Limited Energy circuit < 15 W

### 5.1.f  Relay outputs Q1, Q2, Q3

| 3 | |
|---|---|
| | **Q1 8A 230V 1/2HP** |
| 4 | |
| 5 | |
| 6 | |
| | **Q2 8A 230V 1/2HP** |
| 7 | |
| 8 | |
| | **Q3 8A 230V 1/2HP** |
| 9 | |
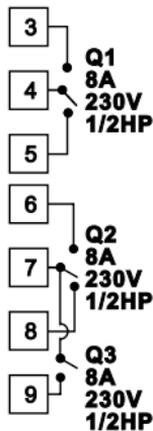
Contacts capacity:
- 8A, 250Vac, resistive charge $10^5$ operations.
- 30/3A, 250Vac, cosφ=0.3, $10^5$ operations.

**Electrical endurance**
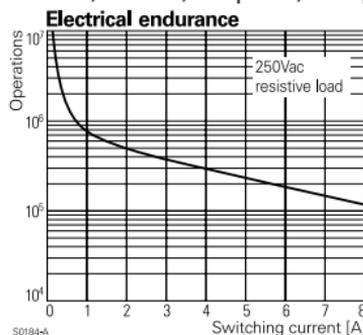


### 5.1.g  Relay outputs Q4 (ATR621-14ABC)
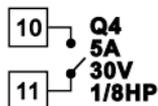
Contacts capacity:
- 5A, 250Vac, resistive charge $18 \times 10^4$ operations.
- Class 2 source

Life Curve



| 10 | **Q4 5A 30V 1/8HP** |
|----|---------------------|
| 11 | |
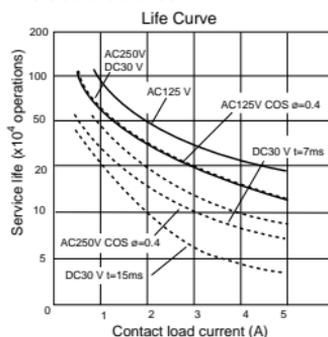
### 5.1.h  Output mA / Volt (ATR621-13ABC-T)
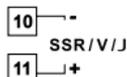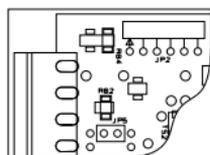
Analogue output in **mA** configurable as command (Parameter c.out) or retransmission of process-setpoint (Parameter rEtr).
**To use analogue output in mA, JP5 has not to be entered.**

10   -
SSR / V / J
11   +
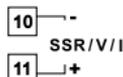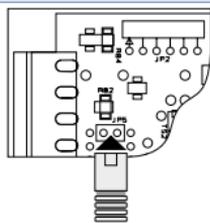
Analogue output in Volt configurable as command (Parameter c.out) or retransmission of process-setpoint (Parameter rEtr).
**To use analogue output in Volt, enter JP5 as indicated in the figure.**

10   -
SSR / V / I
11   +

### 5.1.i  Serial input (ATR621-13ABC-T)

Shield/Schermo

13   -
RS485
14   +

15
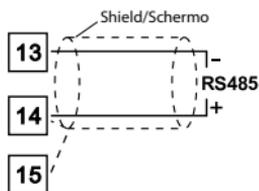
Communication RS485 Modbus RTU.

# 6    Display and keys functions
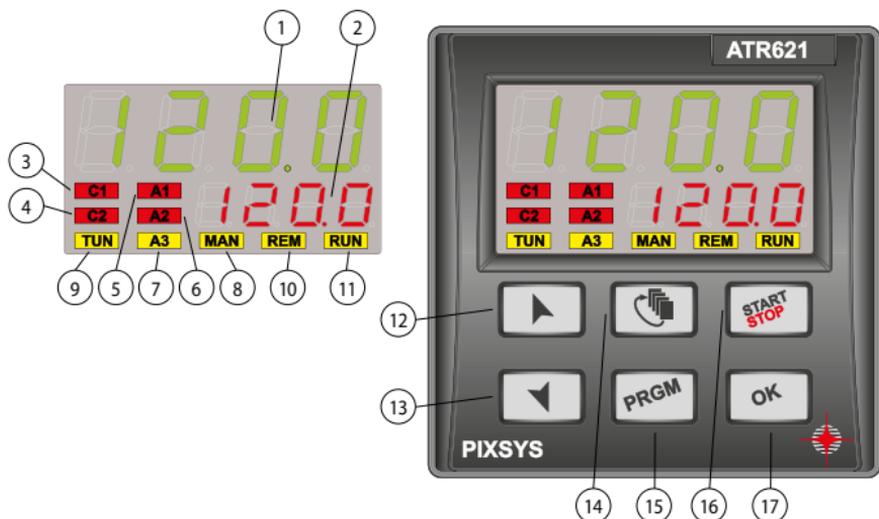


## 6.1    Numeric indicators (display)

| 1 | 123.4 | Usually visualizes process value, it may visualize also setpoint value, time elapsed from cycle start, number of operating step or the percentage value of the command output. During configuration it visualizes the value of entering parameter. |
|---|-------|---|
| 2 | 123.4 | Visualization can be customized with setpoint, time elapsed from cycle start or number of operating step. During configuration it visualizes the value of entering parameter. |

## 6.2    Meaning of Status Lights (led)

| 3 | C1 | On when command output is active. For open /close logic: on during valve opening. |
|---|----|---|
| 4 | C2 | For open/ close logic: on during valve closing. |
| 5 | A1 | On when alarm 1 is active. |
| 6 | A2 | On when alarm 2 is active. |
| 7 | A3 | On when alarm 3 is active. |
| 8 | MAN | On when Manual function is active |
| 9 | TUN | On when controller is executing an auto-tuning cycle. |
| 10 | REM | On when serial communication is in progress. |
| 11 | RUN | On when controller is operating a cycle or is thermocontrolling. |

## 6.3   Keys

| | |
|---|---|
| 12 "⌃" | • In configuration allows to scroll and modify parameters.<br>• Scroll cycles to be started or modified.<br>• In cycle programming allows to modify time and setpoint parameters.<br>• Modifies setpoint in *tHEr.* function.<br>• Modifies command output percentage in *MAn.* function.<br>• Allows a quick advancement of the cycle when it is in "START". |
| 13 "⌄" | • In configuration allows to scroll and modify parameters.<br>• Scroll cycles to be started or modified.<br>• In cycle programming allows to modify time and setpoint parameters.<br>• Modifies setpoint in *tHEr.* function.<br>• Modifies command output percentage in *MAn.* function.<br>• Allows a quick retrograde of the cycle when it is in "START". |
| 14 "⌦" | • Whit controller in **STOP** it visualize the duration of the last cycle.<br>• In configuration it assigns a mnemonic code or a number to the selected parameter.<br>• During a cycle it allows to visulize cycling the setpoint and the other data. |
| 15 "PRGM" | • Whit controller in **STOP** allows to enter cycle modification and configuration.<br>• During a cycle, if pressed for 1 second, it allows to activate/deactivate HOLD function. |
| 16 "START" "STOP" | • Start/Stop a cycle.<br>• In parameter configuration and cycle data modification, it is used as exit key (ESCAPE). |
| 17 "OK" | • Value or selected function confirmation. |

## 7   Programming and configuration

There are two programming levels:

1. **Cycles programming** (for operator/user) means entering time/setpoint values for each step of cycle.
2. **Configuration** (for manufacturer/installer of plant), to enter main par meters (sensor type, output type, auxiliary output intervention type ext.).

## 7.1   Programming (or modifying) cycle data

**With or without starting setpoint and timed auxiliary outputs.**

The above specifications underline the possibility given to the installer (plant's manufacturer) to choose the sequence of operations required for the programming of a firing cycle.

This paragraph includes all available options. In case that the installer decides to choose a simplified programming with less options, it is highly recommended to prepare additional instructions specifying only the choosen sequence.

Set the controller in 5ᴛₒP and follow the points below:

| | Press | Display | Do |
|---|---|---|---|
| 1 | "PRGM" | Red display shows c4.01 | |
| 2 | "∧" "∨" | | Decrease or increase to visualize c4.01 (for cycle no.1), c4.02 (for cycle no.2) up to c4.15 (for cycle no.15). |

## 7.1.1 Programming of starting setpoint (if enabled)

This is useful for example when the kiln is still hot and cycle has to start from a lower temperature.

| | Press | Display | Do |
|---|---|---|---|
| 3 | "OK" | Red display shows 00-5.* Green display shows "starting setpoint". Otherwise pass to point 5. | At any time press "START STOP" to exit programming with storing modified data. |
| 4 | "∧" "∨" | Increase or decrease value on green display. | Enter starting setpoint (starting temperature) |

*  The two first digits indicate the number of the step which is being modified. Last digit visualizes ᴛ if a step duration time is being entered, 5 if a setpoint value is being entered (ex: temperature to reach into selected time) and ᴀ if the status of the auxiliary output is being entered.

## 7.1.2 Programming of the step

| | Press | Display | Do |
|---|---|---|---|
| 5 | "OK" | Red display shows 01-ᴛ. Green display shows step time. | |
| 6 | "∧" "∨" | Increase or decrease value on green display. **NB**: Each cycle is composed of max. 45 programmable steps, after those it skips automatically to point 12. | Enter step **duration** in hour: minutes. **NB**: Set for endless time or --.-- for cycle end (if not all steps are used) and skip to point 11. |
| 7 | "OK" | Red display shows 01-5. Green display shows the step setpoint (temperature that has to be reached within given time). | With keys "∧" or "∨" enter setpoint (temperature reached at step end). |

### 7.1.3 Programming of the auxiliary output (if configured)

| | Press | Display | Do |
|---|---|---|---|
| 8 | "OK" | Red display shows *O1-A*. Green display shows *A1.oF* o *A1.on*. | If *AL.1* is not programmed as auxiliary time (*A.o.r.5*) skip to point 10. |
| 9 | "∧" "∨" | | Set auxiliary output status during the step: *A1.on* for active output and *A1.oF* for not active output. |
| 10 | "OK" | If *AL.2, AL.3* are programmed as time auxiliary   go back to point 9. Green display will visualize the number and the status of the selected auxiliary (*A2.oF/ A2.on, A3.oF/ A3.on*). Once selected all auxiliary **go back to point 5**. |

### 7.1.4 End programming

| | Press | Display | Do |
|---|---|---|---|
| 11 | "OK" | Controller returns in STOP mode saving the cycle. Red display shows *StoP*. | If *AL.1, AL.2, AL.3* are selected as auxiliary (*A.o.r.5*) repeat the procedure of points 9 and 10 for the output status at cycle end. |

## 8    Cycle start
### 8.1    Start of a cycle and setting of delayed start
Red display shows *StoP*.

| | Press | Display | Do |
|---|---|---|---|
| 1 | "START" "STOP" | Red display shows cycle selection. | |
| 2 | "∧" "∨" | | Decrease or Increase until choosen cycle is visualized *cy.01* (for cycle no.1), *cy.02* (for cycle no.2), |
| 3 | "OK" or "START" "STOP" | **Cycle starts**. Buzzer sounds for a second. Green display shows the process while red display shows the setpoint introduced on parameter 29 *u.i.d.2*. | |

If function "Delayed start" is enabled (see parameter 30 *dE.St.*) follow the points below:

| | Press | Display | Do |
|---|---|---|---|
| 4 | "OK" or "START" "STOP" | Red display shows *UA it* while green display shows the programmed waiting time flashing. | |
| 5 | "∧" "∨" | Increase or decrease time for delayed start (hours:minutes). | |
| 6 | "OK" | Start of waiting time. At elapsing of programmed time, cycle will start. | Press "∧" or "∨" to modify the time. |

## 8.2 Fast advancement during the cycle
During functioning or after a restart it can be useful to scroll onwards or backwards the cycle in progress, to reach chosen setpoint value.

| | Press | Display | Do |
|---|---|---|---|
| 1 | "∧" "∨" | Forwards or backwards (each beep of internal buzzer means one minute). | To stop the cycle and set the controller in , before cycle end press "START STOP" for a second. |

## 8.3 Simple controller function **
*StoP* controller.

| | Press | Display | Do |
|---|---|---|---|
| 1 | "START" "STOP" | Red display shows selected cycle. | |
| 2 | "∧" | | Increase until visualize *tHEr*. |
| 3 | "OK" or "START" "STOP" | Red display shows *SPu* while green display shows the setpoint. | |
| 4 | "∧" "∨" | Increase or decrease setpoint value. | Enter chosen setpoint value. |
| 5 | "OK" | Controller modulates the command output to keep the programmed temperature. | |
| 6 | "⟳" | Visualize controller values cycling. | To modify setpoint *SPu* press "⟳" and/or arrow keys. To exit, press "START STOP" for a second. |

## 8.4    Output manual control **

This function allows to modify manually the command output, excluding the process control. Output will activate in percentage from 0 to 100% according to time base set on parameter 23 *t.c.* (cycle time) or on parameter 43 *uAL.t.* if parameter 1 *c.out* is set on *c.uAL. StoP* controller and follow the table below.

| | Press | Display | Do |
|---|---|---|---|
| 1 | "START" "STOP" | Red display shows cycle selection. | |
| 2 | "⌃" | | Increase until visualize *MAn.* |
| 3 | "OK" | Green display shows the process. Red display shows *P.---*, where the output percentage value is visualized . Controller starts to modulate the command output. | To modify percentage pres "⌃" or "⌄". To esc press "START STOP" for a second. |

*** Access to this function have to be enabled on parameter 32 SP.Fu.*

# 9    Programmer functions
## 9.1    Hold function

This function allows to interrupt the cycle: red display visualizes *Hold* and cycle advancement is stopped. By pressing "⌃" or "⌄" it is also possible to modify the setpoint.
There are two possibilities to start this function:
- By keyboard: set *En.* on parameter 33 *HLd.F.*
  Press "PRGM" for a second: function will be started or stopped.
- By digital input: select *Hold* on parameter 27 *dGt.i.* (only for ATR621-12ABC e 14ABC).

**NB**: It is not possible to enable Hold function by parameter 33 *HLd.F* if parameter 27 *dGt.i.* has already been set on *Hold*.

## 9.2    Automatic tuning

Automatic tuning procedure has been conceived to give user the possibility to have a clear regulation also without knowledge of PID regulation algorithm. Setting *Auto* on parameter 11 *tunE*, the controller will check process oscillations and will modify PID parameters if the difference between process and setpoint values is greater than value on P-13 *n.G.tu*. **Parameters 13 *n.G.tu*, 14 *n.n.P.b.*, 15 *nA.P.b.* and 16 *nn.i.t.* can be modified entering the dedicated  password 5678.**

## 9.3    Manual tuning

Manual tuning procedure allows user a greater flexibilty on deciding to update PID parameters. To enable this function set *nAn.* on parameter 11 *tunE*.
To start manual tuning procedure, follow the table below:

| Press | Display |
|---|---|
| 1 "⏻" | Press until red display shows $tunE$. |
| 2 "∽" | Green display shows $on$, led **TUN** turns on and procedure starts. |

Controller activates output increasing (or decreasing - if cooling regulation) the process value entered on parameter 12 $5.d.tu$. Than it turns off the output and calculates the new PID parameters depending on overshoot/undershoot oscillations. It is possible to end manual tuning procedure any time, following the points below:

| Press | Display |
|---|---|
| 1 "⏻" | Press until red display shows $tunE$. |
| 2 "∽" | Green display shows $oFF$, led **TUN** turns off and procedure ends. PID parameters will not be modified. |

## 9.4 Recovery of interrupted cycle

Recovery function is particulary useful for kilns temperature regulation. After a power failure, at restarting ATR621 can resume the interrupted cycle. There are two recovery modes.

### 9.4.1 Recovery with automatic gradient

To enable cycle recovery with automatic gradient, set 1 on parameter 38 as $r.i.cY$. This mode does not operate for cooling regulations. At restart, after a power failure, controller will operate like this:
1. If a power failure occurs during a rising step, the gradient will be same as the operating step (setpoint temperature equal to the temperature read by the sensor).
2. If a power failure occurs during a holding step, two options are possible. If gap between process and setpoint is limited (not exceeding the value on parameter 37 $n.G.S.E.$) cycle will resume from the point of interruption; if the gap is bigger but controller has not yet executed a cooling step, the cycle will go back to the closest rising step and will repeat the procedure as explained on point 1.
3. If a power failure occurs during a cooling step or a holding step (dwell) after that a cooling step has already been completed, the setpoint will match the the temperature read by the sensor, without including any rising and even skipping to next step if necessary (this a safety tip particularly for glass working).
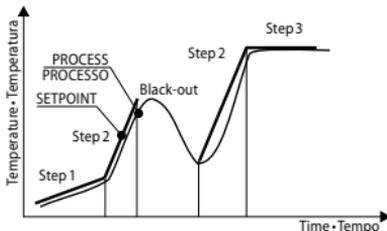


**NB**: After a power-off the chronometer will restart from 00:00.

## 9.4.2 Recovery with recovery gradient

To enable cycle recovery with a recovery gradient, enter on parameter 38 r.ı.cУ. a value (degrees/hour if temperature) greater than 1. At restarting if the kiln temperature (process) is lower than the setpoint, ATR621 locks the working cycle executing a step with the rising gradient set on parameter 38 r.ı.cУ. to return to the setpoint value entered before the power failure and the cycle restarts form that point.

In recovery mode the point on the right of the red display flashes and display shows rEc. instead of the cycle number.
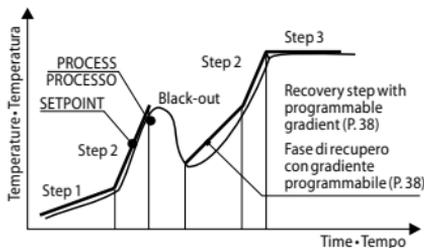


- Recovery will start only for holding steps or rising steps in heating regulation or for falling steps in cooling regulation.
- To exit manually from recovery mode press "∧" or "∨".

## 9.5 Waiting step end

This function has been conceived to control kilns working cycles, whenever the kiln cannot follow gradients programmed by the user. If at step end the difference between process and setpoint values is greater than the value on parameter 37, controller starts with the next step only after waiting for the time programmed on parameter 36 U.t.5.E., or when this gap becomes lower than parameter 37 Π.G.5.E..
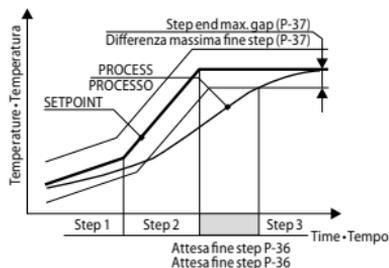


- To exit manually from step end waiting function press "∧".
- To disable this function fix at 0 end step waiting time U.t.5.E.
- During end step waiting red display shows UAıt.

## 9.6 Heating / Cooling PID

ATR621 is suitable also for applications requiring a combined heating-cooling P.I.D. action.

Command output has to be configured as heating PID ($Act.t. = HEAt$ and $P.b.$ greater than 0), and one of alarms ($AL.1$, $AL.2$, $AL.3$) has to be configured as $cooL$. Command output must be connected to actuator responsible for heating action, while alarm will control the cooling action.

Parameters to configure for heating PID are:

$Act.t. = HEAt$ Command output action type (Heating)
$P.b.$ : Proportional band heating
$t.i.$ : Integral time Heating and cooling
$t.d.$ : Derivative time Heating and cooling
$t.c.$ : Cycle time Heating

Parameters to configure for cooling PID are (example: action associated to alarm 1):

$AL.1 = cooL$ Alarm1 selection (Cooling)
$P.b.M.$ : Proportional band multiplier
$ou.d.b.$ : Overlapping / Dead band
$co.c.t.$ : Cycle time Cooling

Parameter $P.b.M.$ (that ranges from 1.00 to 5.00) determinates the proportional band for cooling action, according to the formula:

- **Proportional band for cooling action:** = $P.b. * P.b.M.$
  In this way it is possible to have a proportional band for cooling action that will be equal to heating proportional band if $P.b.M. = 1.00$, or 5 times greater if $P.b.M. = 5.00$.

- **Integral and Derivative time** are the same for both actions.
  Parameter $ou.d.b.$ establishes the overlapping (in percentage) between the two actions. For installations where heating and cooling outputs cannot be activated at the same time, a Dead band will be configured ($ou.d.b. \leq 0$), viceversa an overlapping will be configured ($ou.d.b. > 0$).
  Figure below shows an example of double action PID (heating-cooling) with $t.i. = 0$ and $t.d. = 0$.
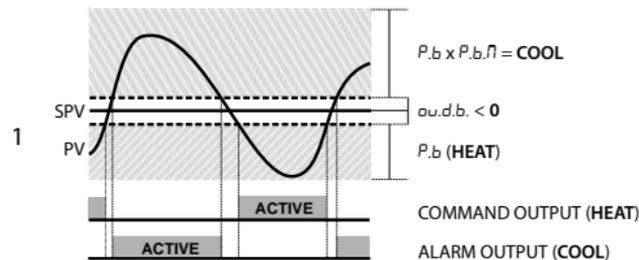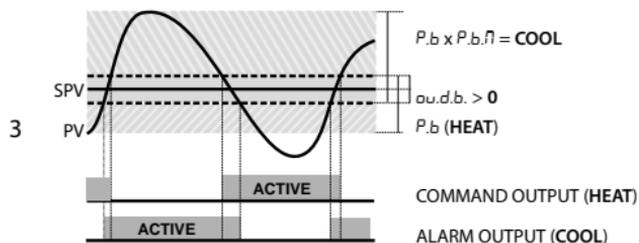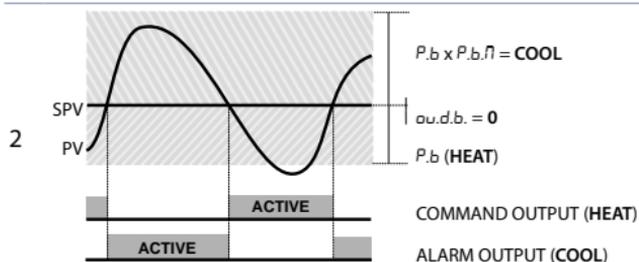
Parameter $co.c.t.$ has the same meaning of cycle time for heating action $t.c.$
Parameter $coo.F.$ (Cooling Fluid) pre-selects the proportional band multiplier and the cooling P.I.D. cycle time $P.b.\Pi.$, according to cooling fluid type.

| $coo.F.$ | Cooling fluid type | $P.b.\Pi.$ | $co.c.t.$ |
|---|---|---|---|
| $A_ir$ | Air | 1.00 | 10 |
| $o_iL$ | Oil | 1.25 | 4 |
| $H2o$ | Water | 2.50 | 2 |

Once parameter $coo.F.$ has been selected, parameters $P.b.\Pi.$ / $ou.d.b.$ and $co.c.t.$ can be however modified.

## 9.7 Memory Card (optional)

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

- **With the controller connected to the power supply**:
  Insert Memory card **when the controller is off**.
  At switch-on green display shows $\Pi E\Pi o$ and red display shows `----` (**only if correct values are stored on Memory**). Pressing "$\frown$" red display visualizes $LoAd$. Confirm with "OK". Controller loads news values and restarts.
- **With the controller not connected to the power supply:**
  The memory card is equipped with an internal battery with an autonomy of about 1000 uses.Insert the memory card and press the programming button. When writing the parameters, led turns red and on completing the procedure it turns to green. It is possible to repeat the procedure without any particular attention.

**Updating Memory Card**

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

# 10 Serial communication

ATR621-13ABC-T is provided with isolated RS485 serial and can receive/transmit data via MODBUS RTU protocol. Device can be configured as master or slave.

| Modbus RTU protocol features | | |
|---|---|---|
| Baud-rate | Selectable by parameter 78 bd.rt. | |
| | 4.8 ⊦ 4800 bit/sec | 9.6 ⊦ 9600bit/sec |
| | 19.2⊦ 19200bit/sec | 28.8⊦ 28800bit/sec |
| | 57.6⊦ 57600bit/sec | 115.2 115200bit/sec |
| Format | Selectable by parameter 79 SE.P.S. | |
| | 8.n.1 | 8 data bits, no parity, 1 stop bit. |
| | 8.o.1 | 8 data bits, odd parity, 1 stop bit. |
| | 8.E.1 | 8 data bits, even parity, 1 stop bit. |
| Supported functions | WORD READING (max 20 word) (0x03, 0x04) | |
| | SINGLE WORD WRITING (0x06) | |
| | MULTIPLE WORDS WRITING (max 20 word) (0x10) | |

## 10.1 Slave

ATR621-13ABC-T can operate as slave unit setting d iS. on parameter 77 rEN.S.: this function allows to control multiple controllers connected to a supervisory system. Each instrument will answer to a Master query only if it contains same address as on parameter 80 SL.Ad. Allowed addresses are 1 to 254 and there should not be controllers with the same address on the same line. Address 255 can be used by the Master to communicate with all connected devices without knowing their addresses (broadcast mode), while with address 0 all devices receive command, but no answer is expected. ATR621 can introduce an answer delay (in milliseconds) to Master request. This delay has to be set on parameter 81 SE.dE. At each parameters modifi cation, instrument stores values in EEPROM memory (100000 writing cycles).
**NB**: Modifications made to Words different from those described in the following table can lead to instrument malfunction.
Here below list of available addresses

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

---

[1] *If at starting controller shows ΠΕΠ₀ it means that no data are stored into the Memory Card, however values can be update.*

| Modbus address | Description | Read Write | Reset value |
|---|---|---|---|
| 0 | Device type | RO | 220 |
| 1 | Software version | RO | FLASH |
| 5 | Slave address | R/W | EEPROM |
| 6 | Boot version | RO | FLASH |
| 50 | Automatic addressing | WO | - |
| 51 | Installation code comparison | WO | - |
| 500 | Loading Default values:<br>9999 restore all values except for cycles<br>9989 restore all values, cycles included | RW | 0 |
| 900 | AI1 process (degrees with tenths of degree for temperature sensors; digits for linear sensors). | RO | - |
| 901 | AI2 process (feedback potentiometer-Ohm/10) | RO | - |
| 902 | Valve position – 0..100. | RO | - |
| 1000 | Process (degrees with tenths of degree for temperature sensors; digits for linear sensors). | RO | - |
| 1001 | Process with decimal point selection. | RO | - |
| 1002 | Setpoint (with gradient) | RO | 0 |
| 1003 | Setpoint with process decimal point selection | RO | 0 |
| 1004 | Digital input status<br>**0** = input OFF          **1** = input ON | RO | 0 |
| 1005 | Relay status (0=off, 1=on)<br>Bit 0 = relay **Q4/SSR**     Bit 1 = relay **Q1**<br>Bit 2 = relay **Q2**          Bit 3 = relay **Q3** | RO | 0 |
| 1006 | Heating output percentage (0-10000) | RO | 0 |
| 1007 | Cooling output percentage (0-10000) | RO | 0 |
| 1008 | Heating output percentage (0-1000) | RO | 0 |
| 1009 | Cooling output percentage (0-1000) | RO | 0 |
| 1010 | Heating output percentage (0-100) | | 0 |
| 1011 | Cooling output percentage (0-100) | RO | 0 |
| 1012 | Alarms status (0=none, 1=active)<br>Bit0 = Alarm 1     Bit1 = Alarm 2          Bit2 = Alarm 3 | RO | 0 |
| 1013 | Error flags<br>Bit0 = Eeprom writing error<br>Bit1 = Eeprom reading error<br>Bit2 = Cold junction error<br>Bit3 = Error AI1 (sensor 1)<br>Bit5 = Generic error<br>Bit6 = Hardware error<br>Bit7 = Missing calibration error<br>Bit8 = Eeprom cycle reading error | RO | 0 |
| 1014 | Cold junction temperature (degrees with tenth) | RO | - |

| Modbus address | Description | | Read Write | Reset value |
|---|---|---|---|---|
| 1200 | Cycle selection for remote start<br>**1** = cycle1 (...) **16** = controller<br>**15** = cycle15 **17** = output manual control | | R/W | 1 |
| 1201 | Remote Start/Stop (0 = STOP, 1 = START) | | R/W | 0 |
| 1202 | Remote setpoint for controller (degrees with tenths of degree for temperature sensors; digits for linear sensors). | | R/W | 0 |
| 1203 | Remote setpoint for controller with process decimal point selection. | | R/W | 0 |
| 1204 | Remote manual control output percentage (0-100) | | R/W | 0 |
| 1205 | Remote manual control output percentage (0-1000) | | R/W | 0 |
| 1206 | Remote manual control output percentage (0-10000) | | R/W | 0 |
| 1207 | Manual tuning ON/OFF<br>**0** = Tuning off **1** = Tuning on | | R/W | 0 |
| 1210 | OFF LINE time* (milliseconds) | | R/W | 0 |
| 2001 | Parameter 1 | | R/W | EEPROM |
| ... | ... | | R/W | EEPROM |
| 2100 | Parameter 100 | | R/W | EEPROM |
| 4001 | Parameter 1** | | R/W | EEPROM |
| ... | ... | | R/W | EEPROM |
| 4100 | Parameter 100 | | R/W | EEPROM |

\* If it is 0, control is desabled. If it is different from 0, it is "maximum time that can elapse between two pollings before the controller goes off-line". If it goes Off-line, the controller goes to Stop mode.

\*\* Parameters changed using serial address from 4001 to 4100 are saved in eeprom only after 10'' after the last writing of parameters.

## 10.2 Master and remote setpoint

ATR621-13ABC-T includes a simplified Master mode allowing operation with other programmers ATR621-13ABC-T or with controllers ATR401-22ABC-T.
Setting ∏5⊱r on parameter 77 r∈∏.5. controller transmits in broadcast (address 0) its status (start/stop) and the control setpoint.
Following table shows all data:

| Modbus Address | Description |
|---|---|
| 5000 | Controllers status:<br>**0** = Controller in stop<br>**1** = Controller during initial waiting<br>**2** = Controller in start |
| 5001 | Remote Setpoint |

Setting 5LuE on parameter 77 r∈∏.5. controller is normally in stop mode; it goes in start when the master device on the serial line starts a cycle.

# 11 Loading default values / Reset

This procedure allows to restore all default settings.

| | Press | Display | Do |
|---|---|---|---|
| 1 | "PRGM" | Red display shows cycle selection. | |
| 2 | "⌃" | | Increase until _conF_ is visualized. |
| 3 | "OK" | Green display shows _0000_ with 1st digit flashing, whil red display shows _PASS_. | |
| 4 | "⌃" "⌄" + "⟳" | Flashing digit on green display changes. | Enter password _9999_. |
| 5 | "OK" | Device loads default settings. | |

Entering password 9999 all default parameters will be loaded. If it is necessary to cancel and reset also the cycles, enter password 9989.

## 11.1 Configuration for installer

To accede configuration parameters it is necessary to _StoP_ the controller.

| | Press | Display | Do |
|---|---|---|---|
| 1 | "PRGM" | Red display shows cycle selection. | |
| 2 | "⌃" | | Increase until visualize _conF_. |
| 3 | "OK" | On green display appears _0000_ with 1st digit flashing, while red display shows _PASS_. | |
| 4 | "⌃" "⌄" + "⟳" | Flashing digit of green display changes. | Enter password _1234_. |
| 5 | "OK" | Green display shows the first parameter while red display shows the value. | |
| 6 | "⟳" | Allows to switch from mnemonic to numeric parameter visualization (and vice versa). | |
| 7 | "⌃" "⌄" | Scroll parameters. | Viualize parameter to be modify. |
| 8 | "OK" | Allows parameter modification: on red display the chosen parameter value starts flashing. | |
| 9 | "⌃" "⌄" | Increase or decrease visualized value. | Enter new data. |
| 10 | "OK" | Confirms data entering (red display stops flashing). | To modify a new parameter back to point 7. |

| Press | Display | Do |
|---|---|---|
| 11 "START" "STOP" | Configuration ends. Controller is in 5ŁoP. **NB**: If a memory card is introduced, in a few minutes it will be updated according to the modifications done. | |

## 12 Table of configuration parameters

**1** c.ouŁ **Command Output**

Command output type selection.

c. o l > **Default** (Default parameter).
c.uRL.
c.55r
c.4.20
c.0.20
c.0.10

| ATR621 - 12ABC | | |
|---|---|---|
| | **Command** | **Alarm 1** | **Alarm 2** |
| c. o l | Q1 | Q2 | SSR |
| c.uRL. | Q1 (open) - Q2 (close) | SSR | - |
| c.55r | SSR | Q1 | Q2 |

| ATR621 - 14ABC | | | |
|---|---|---|---|
| | **Command** | **Alarm 1** | **Alarm 2** | **Alarm 3** |
| c. o l | Q1 | Q2 | Q3 | Q4 |
| c.uRL. | Q2 (open) - Q3 (close) | Q1 | Q4 | - |

| ATR621 - 13ABC-T | | | |
|---|---|---|---|
| | **Command** | **Alarm 1** | **Alarm 2** | **Alarm 3** |
| c. o l | Q1 | Q2 | Q3 | SSR |
| c.uRL. | Q2 (open) - Q3 (close) | Q1 | SSR | - |
| c.55r | SSR | Q1 | Q2 | Q3 |
| c.4.20 | 4...20mA | Q1 | Q2 | Q3 |
| c.0.20 | 0...20mA | Q1 | Q2 | Q3 |
| c.0.10 | 0...10V | Q1 | Q2 | Q3 |

**2** 5En. **Sensor**

Analogue input 1 configuration.

tc. ⊦ Tc-K: -260..1360°C >**Default**
tc. 5 Tc-S: -40..1760°C
tc. r Tc-R: -40..1760°C
tc. J Tc-J: -200..980°C
tc. E Tc-E: -260..740°C
tc. n Tc-N: -260..1280°C
PŁ PT100: -200..600°C
0-10 0..10Volt

| 0-20 | 0..20mA |
|------|---------|
| 4-20 | 4..20mA |
| 5Pᵤ | Setpoint (setpoint value is visualized as process) |

**3 d.P. Decimal Point**
Selects type of visualized decimal point.
| 0 | > **Default** |
|---|---------------|
| 0.0 | |
| 0.00 | |
| 0.000 | |

**4 LoL.ı. Lower Linear Input**
AI1 lower limit range, only for linear.
**-999..+9999** [digit²]. **Default**: 0.

**5 uP.L.ı. Upper Linear Input**
AI1 upper limit range, only for linear.
**-999..+9999** [digit²]. **Default**: 1000.

**6 o.cAL. Offset Calibration**
Offset calibration. Number added to visualized process (normally it corrects ambient temperature value).
**-999..+1000** [digit²]. **Default**: 0.0.

**7 G.cAL. Gain Calibration**
Gain calibration. Number multiplied with process value to calibrate working point.
**-99.9%..+100.0**%. **Default**: 0.0.

**8 Lo.L.5. Lower Limit Setpoint**
Setpoint lower limit.
**-999..+9999** [digit²] (degrees.tenths for temperature sensors). **Default**: 0.

**9 uP.L.5. Upper Limit Setpoint**
Setpoint upper limit.
**-999..+9999** [digit²] (degrees.tenths for temperature sensors). **Default**: 1750.

**10 dEGr. Degree**
Select degree type.
| °c | Centigrade. > **Default**. |
|----|---------------------------|
| °F | Fahrenheit. |

**11** $tunE$ **Tune**

Select autotuning type.
- $d\,iS.$     Disabled. > **Default**.
- $Auto$    Automatic. Controller checks constantly the process value and modifies P.I.D. values (if necessary).
- $nAn.$    Manual. Started by keys or digital input.

**12** $5.d.tu.$ **Setpoint Deviation Tune**

Selects deviation from command setpoint as threshold used by manual tuning to calculate P.I.D. parameters.
**0..5000** [digit$^2$] (degrees.tenths for temperature sensors). > **Default**: 5.0.

**13** $n.G.tu.$ **Max Gap Tune (password 5678)**

Selects the max. process-setpoint gap, beyond which the automatic tune recalculates P.I.D. parameters.
**1..500** [digit$^4$] (degrees.tenths for temperature sensors). > **Default**: 1.0.

**14** $nn.P.b.$ **Minimum Proportional Band (password 5678)**

Selects proportional band min. value selectable by automatic tune.
**0..9999** [digit$^2$] (degrees.tenths for temperature sensors). > **Default**: 5.0.

**15** $nA.P.b.$ **Maximum Proportional Band (password 5678)**

Selects proportional band max. value selectable by automatic tune.
**0..9999** [digit$^4$] (degrees.tenths for temperature sensors). > **Default**: 50.0.

**16** $nn.i.t.$ **Minimum Integral Time (password 5678)**

Selects integral time min. value selectable by automatic tune.
**0..999.9** seconds. > **Default**: 10.0.

**18** $Act.t.$ **Command Action Type**

Command output regulation type.
- $HEAt$   (Heat). Heating regulation (n.o.). > **Default**
- $cooL$   (Cool). Cooling regulation (n.c.).

**19** $c.\,HY.$ **Command Hysteresis**

Hysteresis in ON/OFF or dead band in P.I.D. for command output.
**-999..+999** [digit$^2$] (degrees.tenths for temperature sensors). >**Default**: 1.0

**20** $P.b.$ **Proportional Band**

Process inertia in units (Ex: if temperature in °C)
**0** ON/OFF if also $t.i.$ equal to 0. > **Default**.
**1..9999** [digit$^2$] (degrees.tenths for temperature sensors ).

**21** $t.i.$ **Integral Time**

Integral time. Process inertia in seconds.
**0.0..999.9** seconds. 0 disabled integral. > **Default**: 0.0.

**22** $t.d.$ **Derivative Time**

Derivative time. Normally ¼ of integral time.
**0.0..999.9** seconds. 0 disabled integral. > **Default**: 0.0.

**23** $t.c.$ **Cycle Time**

Cycle time (for P.I.D. on contactor 10"/15", for P.I.D. on SSR 1"). For time-proportioned valves see Parameter 43.
**1..300** seconds. > **Default**: 10.

**24** $L.L.o.P.$ **Lower Limit Output Percentage**

Selects min. value for command output percentage.
**0..100**% > **Default**: 0%.

**25** $u.Lo.P.$ **Upper Limit Output Percentage**

Selects max. value for command output percentage.
**0..100**% > **Default**: 100%.

**26** $c. S.E.$ **Command State Error**

Contact status for command output in case of error.
$o.c.$  (Open Contact) > **Default**
$c.c.$  (Contact closed).

**27** $dGt.i.$ **Digital Input**

Digital input functioning.
$d iS.$  (Disabled). > **Default**.
$oPEn$  Temporary regulation lock input (holding cycle, $oPEn$ on display and command output switching off).
$EПrG.$  (Emergency) Emergency input: device stops. It visualizes $EПrG.$ with active buzzer until pressing OK.
$Hold$  Cycle pause with sepoint modifiable by keyboard.
$r.cY.1$  (Run Cycle 1) active **RUN** input:cycle 1 starts
$r.cY.2$  (Run Cycle 2) active **RUN** input:cycle 2 starts
$r.cY.3$  (Run Cycle 3) active **RUN** input:cycle 3 starts
$r.cY.4$  (Run Cycle 4) active **RUN** input:cycle 4 starts
$r.cY.5$  (Run Cycle 5) active **RUN** input:cycle 5 starts
$r.L.cY$  (Run Last Cycle) active **RUN** input:starts the last cycle done
$r.tHE.$  (Run Thermoregulator) active **RUN** input: thermoregulator function starts
$r.ПАn.$  (Run Manual) active **RUN** input: manual mode starts
$tunE$  Input for manual autotuning function
$StEP$  Pulse input, one step progress with cycle in START
$nE.cY.$  Pulse input, skip to the next cycle

## 28 d.i.c.t. **Digital Input Contact Type:**
   o.c.     (Open Contact)
   c.c.     (Contact closed) > **Default**

## 29 u.i.d.2 **Visualization Display 2**
Set visualization on display 2 during a cycle.
   E.St.S.  (End Step Setpoint) Operating step end temperature
   r.SPu   (Real Setpoint) Updated according to the selected gradient
   cY.nu.  (Cycle Number) Number of operating cycle. > **Default**.
   St.nu.  (Step Number) Number of operating step
   t.iNE   Time elaplsed from cycle start
   out.P.  (Output Percentage)

## 30 dE.St. **Delaied Start**
Enables initial waiting for delayed start of cycle.
   dis.    (Disabled) Initial waiting disabled. > **Default**.
   En.    (Enabled) Initial waiting selectable by the user.

## 31 S.SPu **Starting Setpoint**
Enables cycle starting setpoint to guarantee the programmed gradient for the first step.
   dis.    (Disabled) Cycle starting setpoint disabled. > **Default**.
   En.    (Enabled) Cycle starting setpoint selectable by the user.
   En.A.t.  (Enabled Ambient Temperature) Fixed cycle starting setpoint (25°C for temperature sensors and 0 for linear sensors).

## 32 SP.Fu. **Special Functions**
Enables simple thermoregulator function and manual setting of output percentage.
   dis.    (Disabled) No function available. > **Default**.
   tHEr.  (Thermoregulator) Enables simple thermoregulator function.
   NAn.   (Manual) Enables manual mode.
   tH.NA.  (Thermoregulator and Manual) Enables both simple thermoregulator and manual function.

## 33 HLd.F. **Hold Function**
Enables "Hold" function; allows to hold the cycle and modify setpoint by keyboard. The same function **NOT** have to be enabled on Parameter 27 dGt.i.
   dis.    (Disabled) "Hold" function disabled. > **Default**.
   En.    (Enabled) "Hold" function enabled.

## 34 cY.Au. **Cycles Available**
Selects number of available cycles.
**1..15** cycles. > **Default**: 15.

**35** b.Pr.c. **Block Programming Cycles**
Selects number of cycles that the user cannot modify, to avoid wrong progamming. Ex.: selecting 3 the programming of first 3 cycles is locked.
**0..15** locked cycles. > **Default**: 0.

**36** U.t.S.E. **Waiting Time Step End**
Selects time for step end waiting in hh.mm.
**00.00** Step end waiting excluded
**00.01..24.00** hh.mm. > **Default**: 01.00.

**37** N.G.S.E. **Max. Gap Step End**
Selects max. gap for step end waiting activation. When the difference between setpoint and process is lower than this parameter, controller switch to the next step (also without waiting time programmed into parameter 36 U.t.S.E.
**0..200** [digit²] (degrees.tenths for temperature sensors). > **Default**: 5.

**38** r.i.cY. **Recovery Interrupted Cycle**
Enables interrupted cycle recovery function.
**0** Cycle recovery disabled
**1** Cycle recovery enabled with automatic gradient > **Default**.
**2..9999** [digit²]. Select recovery gradient (rising).

**43** uAL.t. **Valve Time**
Time for open/close servo-valve (value declared by servo-valve manufacturer). Not allowed for feedback valves (potentiometer).
**0..300** seconds. > **Default**: 60.

**45** AL.1 **Alarm 1**
Alarm 1 selection.
| | |
|---|---|
| d.S | (Disabled). > **Default**. |
| A. AL. | (Absolute Alarm). Absolute Alarm, referring to the process. |
| b. AL. | (Band Alarm). Command sepoint ± band. |
| H.d.AL. | (High Deviation Alarm). Command setpoint + deviation. |
| L.d.AL. | (Low Deviation Alarm). Command setpoint - deviation. |
| A.c.S.A. | (Absolute Command Setpoint Alarm). Refferring to the sepoint. |
| St.AL. | (Start Alarm). Active in **RUN**. |
| End.A. | (End Alarm). Active at cycle end. |
| A.o.r.S. | (Auxiliary Output Related to the Step). ON/OFF at each step. |
| A.o.r.N. | (Auxiliary Output Rising Maintenance). Auxiliary output active for rising and holding steps. |
| A.o.FA. | (Auxiliary Output Falling). Auxiliary output active for falling steps. |
| cooL | (Cooling). Actuator output for cooling during double loop functioning. |
| A.AL.r. | (Absolute Alarm active in **RUN**). |
| S.A.oP. | (Start Alarm Open). Works as the alarm active in start (St.AL.), but it opens in case of open door (digital input selected as oPEn). |

**46** *A.1.S.o.* **Alarm 1 State Output**

Selects contact type for alarm 1 output.
- *n.o.* (Normally Open). > **Default**.
- *n.c.* (Normally Closed).

**47** *A.1.tH.* **Alarm 1 Threshold**

Selects setpoint value for alarm 1.
**-999..+9999** [digit$^2$]. > **Default**: 0

**48** *A.1.HY* **Alarm 1 Hysteresis**

Selects hysteresis for alarm 1.
**-999..+999** [digit$^2$] (degrees.tenths for temperature sensors). > **Default**: 1.0

**49** *A.1.S.E.* **Alarm 1 State Error**

Contact satus for alarm 1 output in case of error.
- *o.c.* (Open Contact) > **Default**
- *c.c.* (Contact closed)

**50** *A.1.Ld.* **Alarm 1 Led**

Defines led **A1** status corresponding to relevant contact.
- *o.c.* (Open Contact)
- *c.c.* (Contact closed) > **Default**

**51** *A.1.A.t.* **Alarm 1 Action Type**

Type: Defines alarm 1 action type on operating cycle.
- *no.Ac.* (No Action). Changes only output related to the alarm > **Default**.
- *E.cY.S.* (End Cycle Signal). Cycle ends (STOP) with acoustic and visual signalling. Changes output related to the alarm, buzzer sounds and on display flashes *AL.1*, until pressing OK.
- *Au.S1.* (Audible Signal). Only acoustic signalling: buzzer sounds.

**52** *AL. 2* **Alarm 2**

Alarm 2 selection.
- *d1S.* (Disabled). > **Default**.
- *A. AL.* (Absolute Alarm). Referring to the process.
- *b. AL.* (Band Alarm). Command sepoint ± band.
- *H.d.AL.* (High Deviation Alarm). Command setpoint + deviation
- *L.d.AL.* (Low Deviation Alarm). Command setpoint - deviation
- *A.c.S.A.* (Absolute Command Setpoint Alarm). Refferring to the sepoint.
- *St.AL.* (Start Alarm). Active in **RUN**.
- *End.A.* (End Alarm). Active at cycle end.
- *A.o.r.S.* (Auxiliary Output Related to the Step). ON/OFF at each step.
- *A.o.r.M.* (Auxiliary Output Rising Maintenance). Auxiliary output active for rising and holding steps.

A.o.FA.   (Auxiliary Output Falling). Auxiliary output active for falling.
cool    (Cooling). Actuator output for cooling during double loop functioning.
A.AL.r.   (Absolute Alarm active in **RUN**).
S.A.oP.   (Start Alarm Open). Works as the alarm active in start (St.AL.), but it opens in case of open door (digital input selected as oPEn).

## 53 A.2S.o.  Alarm 2 State Output

Selects contact type for alarm 2 output.
n.o.    (Normally Open). > **Default**.
n.c.    (Normally Closed).

## 54 A.2.tH.  Alarm 2 Threshold

Selects setpoint value for alarm 2.
**-999..+9999** [digit²] (degrees for temperature sensors). > **Default**: 0.

## 55 A.2.HY.  Alarm 2 Hysteresis

Selects hysteresis for alarm 2.
**-999..+999** [digit²] (degrees.tenths for temperature sensors). > **Default**: 1.0.

## 56 A.2S.E.  Alarm 2 State Error

Contact satus for alarm 2 output in case of error.
o.c.    (Open Contact) > **Default**
c.c.    (Contact closed)

## 57 A.2Ld.  Alarm 2 Led

Defines led **A2** status corresponding to relevant contact.
o.c.    (Open Contact)
c.c.    (Contact closed) > **Default**

## 58 A.2.A.t.  Alarm 2 Action Type

Defines alarm 2 action type on operating cycle.
no.Ac.   (No Action). Changes only output related to the alarm. > **Default**.
E.cY.S.   (End Cycle Signal). Cycle ends (STOP) with acoustic and visual signalling. Changes output related to the alarm, buzzer sounds and on display flashes AL. 2 until pressing OK.
Au.Si.   (Audible Signal). Only acoustic signalling: buzzer sounds.

**59** $AL.\ 3$ **Alarm 3**

Alarm 3 selection
- $d\ iS.$ (Disabled). > **Default**.
- $A.\ AL.$ (Absolute Alarm). Referring to the process.
- $b.\ AL.$ (Band Alarm). Command sepoint ± band.
- $H.d.AL.$ (High Deviation Alarm). Command setpoint + deviation.
- $L.d.AL.$ (Low Deviation Alarm). Command setpoint - deviation.
- $A.c.S.A.$ (Absolute Command Setpoint Alarm). Refferring to the sepoint.
- $St.AL.$ (Start Alarm). Active in **RUN**.
- $End.A.$ (End Alarm). Active at cycle end.
- $A.o.r.S.$ Auxiliary Output Related to the Step). ON/OFF at each step.
- $A.o.r.A.$ (Auxiliary Output Rising Maintenance). Auxiliary output active for rising and holding steps
- $A.o.FA.$ (Auxiliary Output Falling). Auxiliary output active for falling steps.
- $cooL$ (Cooling). Actuator output for cooling during double loop functioning.
- $A.AL.r.$ (Absolute Alarm active in **RUN**).
- $S.A.oP.$ (Start Alarm Open). Works as the alarm active in start ($St.AL.$), but it opens in case of open door (digital input selected as $oPEn$).

**60** $A.3.S.o.$ **Alarm 3 State Output**

Selects contact type for alarm 3 output.
- $n.o.$ (Normally Open). > **Default**.
- $n.c.$ (Normally Closed).

**61** $A.3.tH.$ **Alarm 3 Threshold**

Selects setpoint value for alarm 3.
**-999..+9999** [digit$^2$] (degrees for temperature sensors). > **Default**: 0.

**62** $A.3.HY.$ **Alarm 3 Hysteresis**

Selects hysteresis for alarm 3.
**-999..+999** [digit$^2$] (degrees.tenths for temperature sensors). > **Default**: 1.0.

**63** $A.3.S.E.$ **Alarm 3 State Error**

Contact satus for alarm 3 output in case of error.
- $o.c.$ (Open Contact) > **Default**
- $c.c.$ (Contact closed)

**64** $A.3.Ld.$ **Alarm 3 Led**

Defines led **A3** status corresponding to relevant contact.
- $o.c.$ (Open Contact)
- $c.c.$ (Contact closed) > **Default**

**65 A.3.A.t. Alarm 3 Action Type**

Defines alarm 3 action type on operating cycle.

no.Ac. (No Action). Changes only output related to the alarm. > **Default**.

E.cY.S. (End Cycle Signal). Cycle ends (STOP) with acoustic and visual signalling. Changes output related to the alarm, buzzer sounds and on display flashes AL. 3, until pressing OK.

Au.S i. (Audible Signal). Only acoustic signalling: buzzer sounds.

**73 coo.F. Cooling Fluid**

Defines cooling fluid type.

A ir > **Default**

o iL

H2o

**74 P.b.∏. Proportional Band Multiplier**

**1.00..5.00**. > **Default**: 1.00.

**75 ou.d.b. Overlap/Dead Band**

**-20.0%..50.0%**. > **Default**: 0.0%.

**76 co.c.t. Cooling Cycle Time**

**1..300** seconds. > **Default**: 10s.

**77 rE∏.S. Remote Setpoint**

Selects remote setpoint mode, through serial communication.

d iS. (Disabled). Controller operates autonomously. > **Default**.

SLuE (Slave). Controller is a slave normally in STOP: goes in **RUN** when, on master device connected to the serial, a cycle is started.

∏Str (Master). Controller transmits the setpoint to all controllers connected to the serial and set as slave.

**78 bd.rt. Baud Rate**

Selects baud rate for serial communication.

| | | | |
|---|---|---|---|
| 4.8 ⊦ | 4800 bit/s | | |
| 9.6 ⊦ | 9600 bit/s | 38.4⊦ | 38400 bit/s |
| 19.2⊦ | 19200 bit/s > **Default** | 57.6⊦ | 57600 bit/s |
| 28.8⊦ | 28800 bit/s | 115.2 | 115200 bit/s |

**79 SE.P.S. Serial Parameters Setting**

Selects data format for serial communication.

8.n.1 8 data bits, no parity, 1 stop bit. > **Default**.

8.o.1 8 data bits, odd parity, 1 stop bit.

8.E.1 8 data bits, even parity, 1 stop bit.

**80** 5L.Ad.   **Slave Address**
Selects slave address for serial communication.
**1..254** Address for slave functioning. > **Default**: 254.

**81** 5E.dE.   **Serial Delay**
Select serial delay.
**0..100** ms. > **Default**: 20ms.

**82** c.FLt.   **Conversion Filter**
Adc filter: number of means on analogue-digital conversion.
**1..15** samplings > **Default**: 10.

**83** u.FLt.   **Visualization Filter**
   d i5.   (Disabled)
   PtcH   (Pitchfork filter) > **Default**.
   F i.or.   (First Order)
   F.or.P.   (First Order with Pitchfork)
   2. 5.Π.   (2 Samples Mean)
   3. 5.Π.   (3 Samples Mean)
   4. 5.Π.   (4 Samples Mean)
   5. 5.Π.   (5 Samples Mean)
   6. 5.Π.   (6 Samples Mean)
   7. 5.Π.   (7 Samples Mean)
   8. 5.Π.   (8 Samples Mean)
   9. 5.Π.   (9 Samples Mean)
   10.5.Π.   (10 Samples Mean)

**84** rEtr.   **Retransmission**
Retransmission for analogue output. Parameters 86 and 87 define upper/lower limit of scale
   d i5.   (Disabled). > **Default**.
   c.5Pu.   (Command Setpoint) Retransmit the command setpoint.
   Pro.   (Process) Retransmit the process.

**85** rE.tY.   **Retransmission Type**
Select retransmission signal type.
   0-10   (0..10V)
   0-20   (0..20mA)
   4-20   (4..20mA) > **Default**.

**86** Lo.L.r.   **Lower Limit Retransmission**
Lower limit analogue output range.
**-999..+9999** [digit²] (degrees.tenths for temperature sensors). > **Default**: 0.

**87** $uP.L.r.$ **Upper Limit Retransmission**

Upper limit analogue output range.

**-999..+9999** [digit[2]] (degrees.tenths for temperature sensors).

> **Default**: 1000.

**88** $PUr.$ **Power**

This parameter defines the power of the heating element managed by the controller. If the selected value is different from 0.0, pressing "⟳" at the end of the cycle, it is possible to visualize the employed energy expressed in kWh. It does not work with valve control.

**0.0..+999.9** kWh

> **Default**: 0.0

# 13 Alarm intervention modes

ATR621 has the possibility to program up to 3 alarms.
Into the following table all intervention modes are showed.

## 13.a Absolute alarm
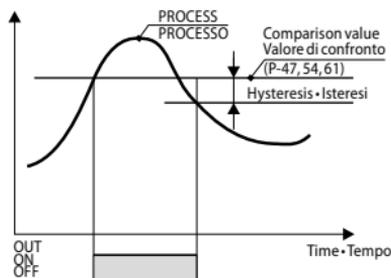


Alarm can be:
• Active over
• Active under
In the figure it is active over.

## 13.b Band alarm (setpoint-process)
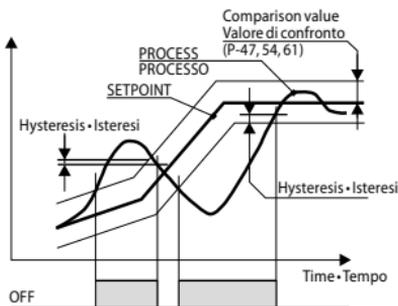


Alarm can be:
• Active outside
• Active inside
In the figure it is active outside.

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[2] *The display of the decimal point depends on the setting of parameters* $SEn.$ *and* $d.P.$

## 13.c    Deviation alarms
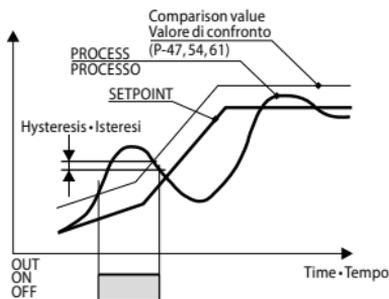


Alarm can be:
- Upper deviation
- Lower deviation

In the figure it is upper deviation.

## 13.d    Independent alarm refferring to the setpoint
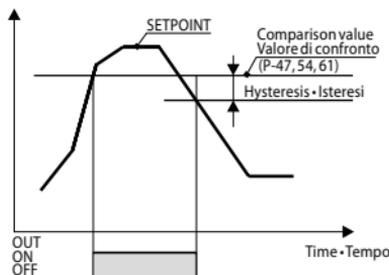


Alarm can be:
- Active over
- Active under

In the figure it is active on.

Each intervention can be related to a cycle lock and/or to an acoustic signalling.

## 13.f    Auxiliary output related to the step
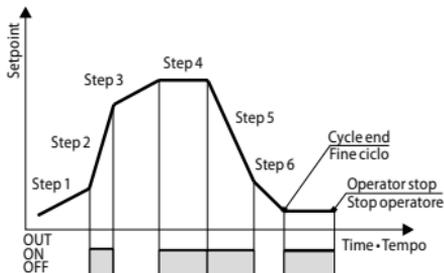


ON/OFF status of the auxiliary output is selectable for each step of each cycle. The status can be selected also at cycle end.

## 14    Table of Anomaly Signals

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

| | Couse | How to do |
|---|---|---|
| E-01 SYS.E. | Error in EEPROM cell programming. | Call Assistance |
| E-03 EEP.E. | Incorrect cycle data | Call Assistance |
| E-04 SYS.E. | Incorrect configuration data. Possible loss instrument calibration. | Verify that configuration parameters are correct. |
| E-05 Prb.1 | Sensor connected to AI1 broken or temperature out of range. | Control connection with probes and their integrity. |
| E-06 Prb.2 | Sensor connected to AI2 broken or temperature out of range. | Control connection with potentiometer and its integrity. |
| E-08 SYS.E. | Missing calibration. | Call Assistance |
| E-11 SYS.E. | Cold junction sensor failure or room temperature outside of allowed limits. | Call Assistance |
| E-16 Po.cA. | Feedback potentiometer for motorized valve not calibrated. | Start valve calibration procedure. |

## Notes / Updates

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## Table of configuration parameters

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

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

CE   RoHS Compliant   🗑

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