USER'S MANUAL

Rev. 06/2025

CD86

PID temperature controller

001

M-CD86

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Important warnings for safety

This chapter contains important information for the safety. The not observance of these instructions may result in serious personal injury or death and can cause serious damages to the Thyristor unit and to the components system included.
The installation should be performed by qualified persons.
In the manual are used symbols to give more evidence at the notes of safety and operativity for the attention for the user:

	This icon is present in all the operational procedures where the Improper operation may result in serious personal injury or death by Electrical Shock Hazard Symbol (a lightning bolt in a triangle) precedes an electric shock hazard CAUTION or WARNING safety statement.
	Warning or Hazard that needs further explanation than the label on unit can provide. Consult User's Guide for further information.
	Unit is compliant with European Union directives. See Declaration of Conformity for further details on Directives and Standards used for Compliance.
	ESD Sensitive product, use proper grounding and handling techniques when installing or servicing product.
	Do not throw in trash, use proper recycling techniques or consult manufacturer for proper disposal.

A **"NOTE"** marks a short message to alert you to an important detail.

A **"CAUTION"** safety alert appears with information that is important for protecting your equipment and performance. Be especially careful to read and follow all cautions that apply to your application.

A **"WARNING"** safety alert appears with information that is important for protecting you, others and equipment from damage. Pay very close attention to all warnings that apply to your application.

Safety notes

WARNING! Risk of Fire and Electric Shock. This product is "Open Type Process Control Equipment". It must be mounted in an enclosure that does not allow fire to escape externally.

WARNING! If the output relays are used past their life expectancy, contact fusing or burning may occasionally occur. Always consider the application conditions and use the output relays within their rated load and electrical life expectancy. The life expectancy of output relays varies considerably with the output load and switching conditions.

WARNING! To avoid damage to property and equipment, injury and loss of life, adhere to applicable electrical codes and standard wiring practices when installing and operating this product. Failure to do so could result in damage, injury and death.

WARNING! All service including inspection, installation, wiring, maintenance, troubleshooting, fuse or other user serviceable component replacement must be performed only by properly qualified personnel. Service personnel must read this manual before proceeding with work. While service is being performed unqualified personnel should not work on the unit or be allowed in the immediate vicinity.

WARNING! Do not use in aerospace or nuclear applications.

WARNING! The device's protection rating is IP20 with all covers installed and closed. It must be installed in an enclosure that provides all the necessary additional protections appropriate for the environment and application.

CAUTION: Devices shall be supplied with limited energy according to UL 61010-1 3rd Ed, section 9.4 or LPS in conformance with UL 60950-1 or SELV in conformance with UL 60950-1 or Class 2 in compliance with UL 1310 or UL 1585.

CAUTION: A malfunction in the Digital Controller may occasionally make control operations impossible or prevent alarm outputs, resulting in property damage. To maintain safety in the event of malfunction of the Digital Controller, take appropriate safety measures, such as installing a monitoring device on a separate line.

CAUTION: To avoid compromising the insulation, do not bend wire or other components beyond their bend radius specifications.

CAUTION: Protect the device from high temperature, humidity and vibrations.

CAUTION: Install an appropriately sized RC filter across contactor coils, relays and other inductive loads.

NOTE: Provide a local disconnect to isolate the device for servicing.

Precautions for safe use

Be sure to observe the following precautions to prevent operation failure, malfunction, or adverse affects on the performance and functions of the product. Not doing so may occasionally result in unexpected events. Do not handle the Digital Controller in ways that exceed the ratings.

- The product is designed for indoor use only. Do not use or store the product outdoors or in any of the following places:
  - Places directly subject to heat radiated from heating equipment.
  - Places subject to splashing liquid or oil atmosphere.
  - Places subject to direct sunlight.
  - Places subject to dust or corrosive gas (in particular, sulfide gas and ammonia gas).
  - Places subject to intense temperature change.
  - Places subject to icing and condensation.
  - Places subject to vibration and large shocks.
- Installing two or more controllers in close proximity might lead to increased internal temperature and this might shorten the life cycle of electronic components. It is strongly recommended to install cooling fans or other air-conditioning devices inside the control cabinet.
- Always check the terminal names and polarity and be sure to wire properly. Do not wire the terminals that are not used.
- To avoid inductive noise, keep the controller wiring away from power cables that carry high voltages or large currents. Also, do not wire power lines together with or parallel to Digital Controller wiring. Using shielded cables and using separate conduits or ducts is recommended. Attach a surge suppressor or noise filter to peripheral devices that generate noise (in particular motors, transformers, solenoids, magnetic coils or other equipment that have an inductance component). When a noise filter is used at the power supply, first check the voltage or current, and attach the noise filter as close as possible to the Digital Controller. Allow as much space as possible between the Digital Controller and devices that generate powerful high frequencies (high-frequency welders, high-frequency sewing machines, etc.) or surge.
- A switch or circuit breaker must be provided close to device. The switch or circuit breaker must be within easy reach of the operator, and must be marked as a disconnecting means for the controller.
- The device must be protected by a fuse 1 A (cl. 9.6.2).
- Wipe off any dirt from the Digital Controller with a soft dry cloth. Never use thinners, benzine, alcohol, or any cleaners that contain these or other organic solvents. Deformation or discoloration may occur.
- The number of non-volatile memory write operations is limited. Therefore, use EEprom write mode when frequently overwriting data, e.g.: through communications.

Environmental policy / WEEE

Do not dispose electric tools together with household waste material.
According to European Directive 2012/19/EU on waste electrical and electronic equipment and its implementation in accordance with national law, electric tools that have reached the end of their life must be collected separately and returned to an environmentally compatible recycling facility.

Maintenance

Check periodically if the screw for the power cables and safety earth are tightened correctly
(See Connection Diagram)

Warranty condition

Producer gives a 12 months warranty to its products.

The warranty is limited to repairing and parts substitution in our factory and does exclude products not properly used and fuses.

Warranty does not include products with serial numbers deleted. The faulty product should be shipped to Producer at customer's cost and our Service will evaluate if product is under warranty terms.

Substituted parts remain of Producer property.

CE

General terms and conditions

Return Material Authorization (RMA)

Customers wishing to return any items, whether they are incorrectly supplied, faulty or damaged in transit, must first complete a Return Material Authorisation (RMA) form to obtain an RMA number from the Service Department.
A full repair service is available for customers. Prior to submitting the RMA form and returning products, customers are recommended to contact the technical support team to determine whether the issue can be resolved with telephone support.

How the RMA service works

The RMA form and details are available on our web sites:

https://www.cdautomation.com/rma-english-version/

When completing the RMA form, please be as specific as possible about the problem, including any pertinent application details. The more information given, the more quickly and more thoroughly the problem can be solved. The minimum information required is:

1. The Full Model Number

2. Quantity of units being returned

3. The units Serial Number(s)

4. A description of the problem ("faulty" or "unknown" is not sufficient)

Indice

1 Introduction

Thank you for choosing a CD Automation Temperature Controller.
The CD66 controller is a versatile, high-performance solution for industrial control.

1.1 Safety guidelines

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

Disconnect power supply before proceeding to hardware settings or electrical wirings to avoid risk of electric shock, fire, malfunction.

Do not install/operate the device in environments with flammable/explosive gases.

This device has been designed and conceived for industrial environments and applications that rely on proper safety conditions in accordance with national and international regulations on labour and personal safety. Any application that might lead to serious physical dama ge/ life risk or involve medical life support devices should be avoided.

Device is not conceived for applications related to nuclear power plants, weapon systems, flight control, mass transportation systems.

Only qualified personnel should be allowed to use device and/or service it and only in accordance to technical data listed in this manual.

Do not dismantle/modify/repair any internal component.

Device must be installed and can operate only within the allowed environmental conditions.

Overheating may lead to risk of fire and can shorten the lifecycle of electronic components.

1.2 Limitation in use

This product is a temperature controller which was developed, designed and manufactured on the premise that it would be used for general machinery.
In particular, if this product is to be used for applications that require the utmost safety as described below, please take into consideration of the safety of the entire system and the machine by adopting such means as a fail-safe design, a redundancy design as well as the conducting of periodical inspections.

- Safety devices for the purpose of protecting the human body.
- Direct control of transportation equipment.
- Airplanes.
- Space equipment.
- Atomic equipment, etc.

Please do not use this product for applications which directly involve human lives.

1.3 Over-Temperature Protection

Any control system design should take into account that any part of the system has the potential to fail.

For temperature control systems, continued heating should be considered the most dangerous conditions, and the machine should be designed to automatically stop heating if unregulated due to the failure of the control unit or for any other reason.

The following are the most likely causes of unwanted continued heating:

1) Controller failure with heating output constantly on

2) Disengagement of the temperature sensor from the system

3) A short circuit in the thermocouple wiring

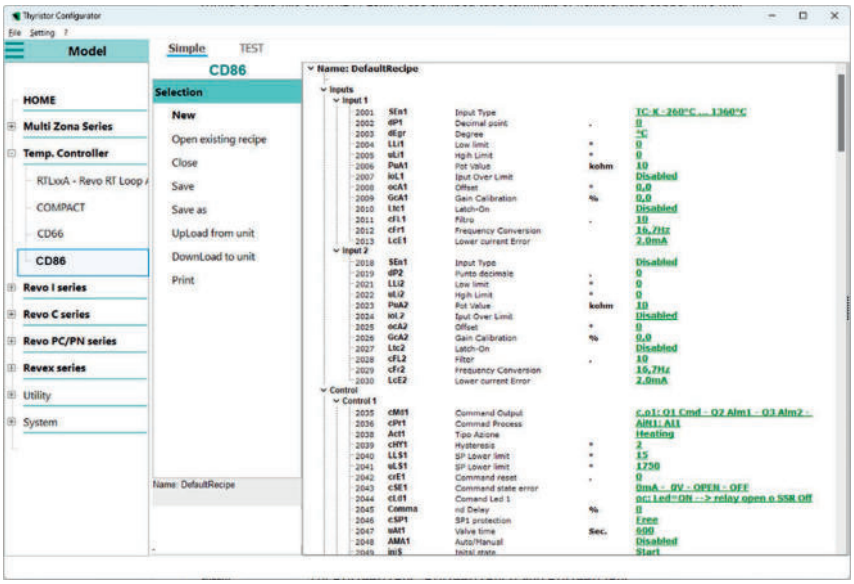
4) A valve or switch contact point outside the system is locked to kepp the heat switched on.

In any application where physical injury or destruction of equipment might occur, we recommend the installation of independent safety equipment, with a separate temperature sensor, to disable the heating circuit in case of overheating.

The controller alarm signal is not designed to function ad a protective measure in case of controller failure.

2 Configurator Software

The configurator software is free of charge and can be downloaded from our website.



Software Configurator download link:
https://www.cdautomation.com/wp-content/uploads/ThyristorConfigurator_ver6.zip

A standard Micro USB cable (our code is CCX) is required to connect CD66 to the computer.
The Windows driver for the USB connection is installed by the setup software installer.

3 Identification and Order Code

3.1 Identification of the unit

Caution: Before to install, make sure that the unit have not damages. If the product has a fault, please contact the dealer from which you purchased the product.

The identification label give all the information regarding the factory settings of the unit, this label is on the unit, like represented in figure.

Verify that the product is the same thing as ordered.

3.2 Order Code

	1	2	3	4		5	6	7		8	9	10		11	12	13		14	15		16
ORDER CODE	C	D	8	6	-	0	2	4	-	2	3	0	-	4	8	5	-	C	T	-	S

VERSION	3	4
Description	cod	
CD68 Regolatore PID 48x96 1AI, 1AO, 2DI, 2DO, 4 Relè	8	6

POWER SUPPLY	5	6	7	8	9	10
Description	cod					
24 Vac/dc e 115÷230 Vac	0	2	4	2	3	0

*External current sensor		
Description	Size	Cod.
Current transformer 38x48x20mm	25/0.05A	CT25
Current transformer 38x48x20mm	50/0.05A	CT50
Current transformer 38x48x20mm	100/0.05A	CT100
Current transformer 50x50x30mm	100/0.05A	CTB100

COMMUNICATION	11	12	13
Description	cod		
RS485	4	8	5

CURRENT TRANSFORMER	14	15
Description	cod	
ingresso TA 005	C	T

LOOP	16
Description	cod
Singolo Loop	S

4 Technical Specifications

4.1 General features

Displays:	4 digits 0,63" + 5 digits 0,39" + 5 digits 0,33" + bargraph
Operating temperature:	0-45° C - Humidity 35÷95 uR%
Sealing:	Front Panel IP65 (with gasket) - IP20 box and terminals (UL not evaluated)
Materiali:	PC UL94V2 self-extinguishing
Weight:	Approx. 245 g

4.2 Hardware features

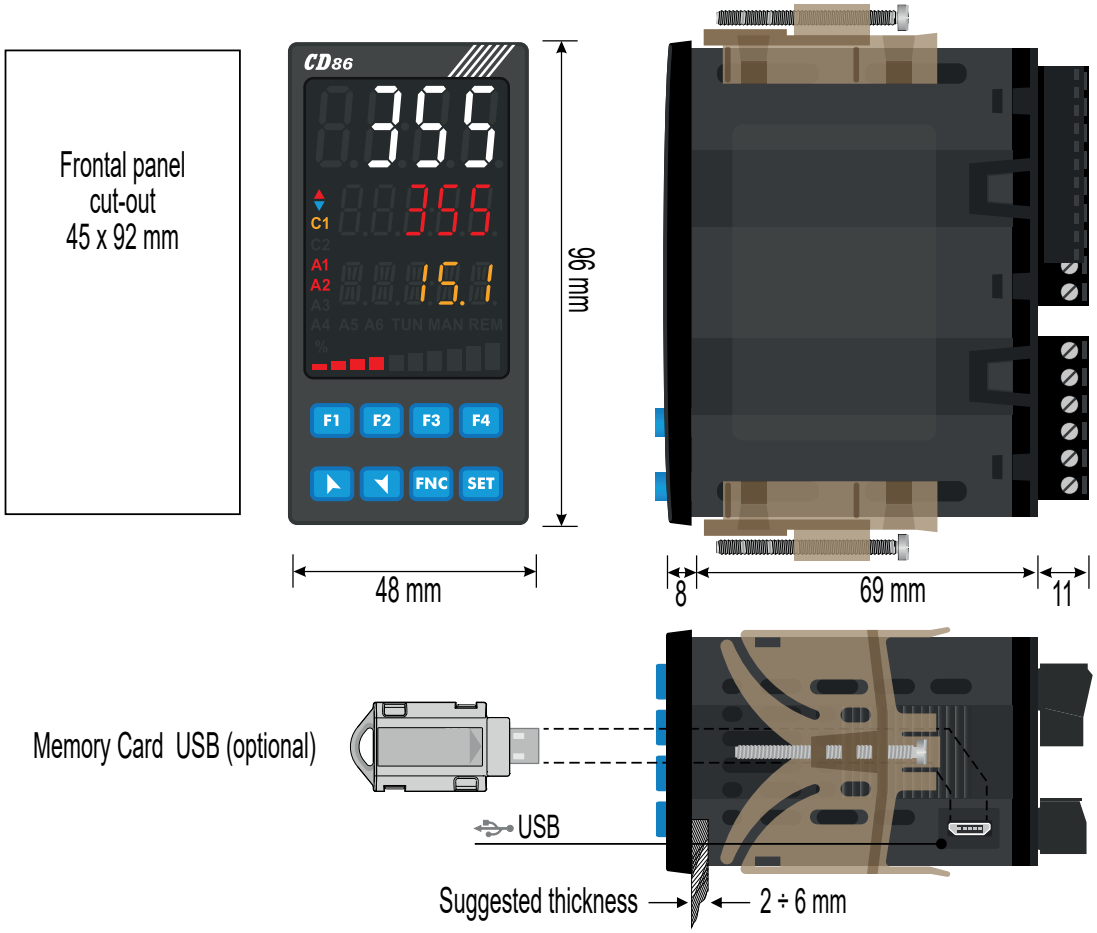
Analogue input AI1	Configurable via Software. **Thermocouple Input**: type K, S, R, J, T , E, N, B. Automatic compensation of cold junction from -25÷85° C. **Thermoresistances Input**: PT100, PT500, PT1000, Ni100, PTC 1K, NTC 10K (β 3435K) **Input V/mA**: 0-1V, 0-5V, 0-10V, 0-20mA, 4-20mA, 0-60mV. **Pot. Input**: 1÷150 KΩ. **Tolerance** (@25° C) ±0.2% ±1 digit (on F.s.) for thermocouple, thermoresistance and V/mA. Cold junction accuracy 0.1°C/°C. **Impedence**: 0-10V: Ri>110 KΩ 0-20mA: Ri<5 Ω 0-40mV: Ri>1 MΩ.
Current Transformer	50 mA. Max Scale Value 200A
Relay outputs	Configurable as command and alarm output. Contacts Q1, Q2, Q3: 5A-250Vac for resistive load. Contacts Q4: 5A-125Vac for resistive load (250Vac UL not evaluated).
SSR outputs	Configurable as command and alarm output. 12/24V, 25 mA.
Analogue outputs	Configurable as command, alarm, output or as retransmission of process/setpoints. Configurable: 0-10V with 40000 points ±0.2% (su F.s.) @25 °C; load >= 1 KΩ 4-20mA with 40000 points ±0.2% (su F.s.) @25 °C; load <= 250Ω
Power-supply	Extended power-supply 24÷220 Vac/Vdc ±10% 50/60 Hz
Consumption	6W

4.3 Software features

Controller algorithms	ON-OFF with hysteresis. - P, PI, PID, PD with proportional time
Proportional band	0÷9999°C or °F
Integral time	0,0÷999,9 sec (0 = disable function)
Derivative time	0,0÷999,9 sec (0 = disable function)
Controller functions	Manual or automatic Tuning type, selectable alarm Type, protection of command and alarm setpoints

5 Installation

5.1 Dimensions and installation



6 Wiring instructions

This controller has been designed and manufactured in compliance with the Low Voltage Directive 2006/95/EC, 2014/35/EU (LVD) and the EMC Directive 2004/108/EC, 2014/30/EU (EMC).

For installation in industrial environments, please adhere to the following safety guidelines:

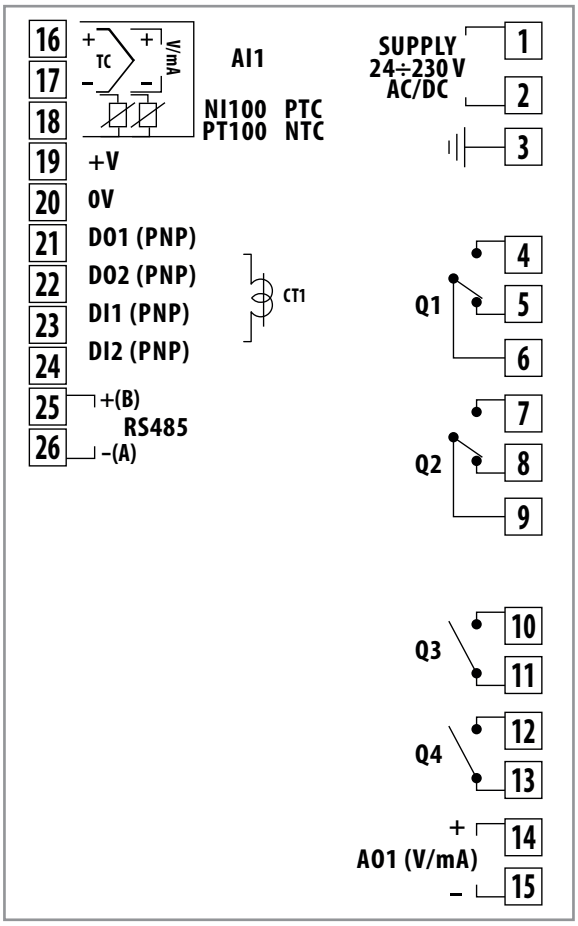
- Keep control lines separate from power cables.
- Avoid placing the controller near remote control switches, electromagnetic contactors, and powerful motors.
- Maintain distance from power units, especially those with phase control.
- It is strongly recommended to install an adequate mains filter on the power supply of the machine where the controller is installed, especially if supplied with 220Vac.

The controller is designed to be integrated into other machines, therefore, the CE marking on the controller does not exempt the machine manufacturer from the safety and conformity requirements applicable to the machine itself.

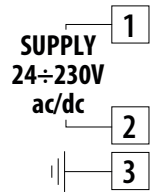
About the wiring of the pins, the following recommendations apply:

- Pins 1 to 15: use crimped tube terminals or flexible/rigid copper wire with diameter 0.2 and 2.5 mm² (min. AWG28, max. AWG12, operating temperature: min. 70°C). Cable stripping length: 7 to 8 mm. Tighten screws to tightening torque of 0,19 Nm.
- Pins 16 to 26: use crimped tube terminals or flexible/rigid copper wire with diameter 0.2 and 1.5 mm² (min. AWG28, max. AWG14, operating temperature: min. 70°C). Cable stripping length: 6 to 7 mm. Tighten screws to tightening torque of 0,51 Nm
- Use Copper or Copper-Clad Aluminum Conductors Only or AL-CU or CU-AL.

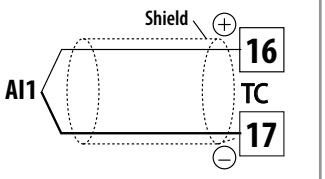
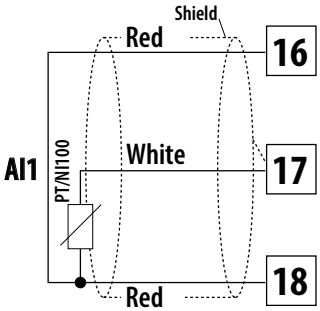
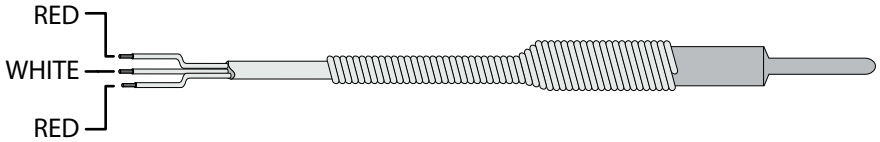
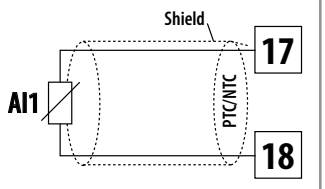
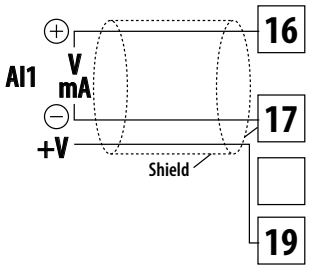
6.1 Wiring diagram



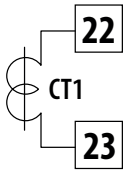
6.1.1 Power supply

	Extended range switching power supply 24÷230 Vac/dc ±10% 50/60 Hz. Galvanic insulation.

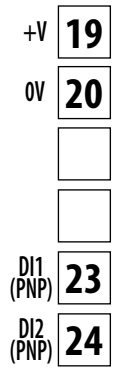
6.1.2 Analogue input 1

	**Thermocouples** • Type K, S, R, J, T, E, N, B. • Comply with polarity • For any extension, use compensated cable and terminals suitable for the thermocouples used (compensated). • When shielded cable is used, it should be grounded at one side only.
	**Termoresistances** Type PT100, Ni100 • With the three-wire connection use wires with the same section. • For the two-wire connection short-circuit terminals 16 and 18. • When shielded cable is used, it should be grounded at one side only. 
	**Thermoresistances** Type NTC, PTC, PT500, PT1000 and linear potentiometers. • When shielded cable is used, it should be grounded at one side only.
	**For linear signals in Volt and mA** Comply with polarity • When shielded cable is used, it should be grounded at one side only. • It's possible to select +V at 12Vdc or 24Vdc, by configuring parameter 334 *u.out* (GROUP G1 - *diSP.* - Display and interface).

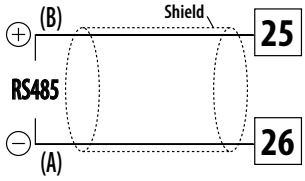
6.1.3 CT1 input

	**CT input** • To enable CT input, modify parameter 366 *ctIF*. • Input for 50 mA amperometric transformer. • Sampling time 100 ms. • Configurable by parameters.

6.1.4 Digital inputs

	**Digital inputs enabled by parameters** • Close pin "DIx" on pin "+V" to enable digital input. • It is possible to put in parallel the digital inputs of different devices joining together the 0V pins (20).

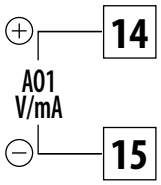
6.1.5 Serial input

	**Communication RS485 Modbus RTU Slave** with galvanic insulation. Note: It is recommended to use the twisted and shielded cable for communications.

6.1.6 Digital outputs

	**Digital output PNP** (including SSR) for command or alarm. Range 12 Vdc/25 mA or 24 Vdc/15mA selectable by parameter 334 *u.out* (GROUP G1 - *diSP.* - Display and interface). Wire the positive control (+) of the solid state relay to the pin DO(x). Wire the negative control (-) of the solid state relay to the pin 0V

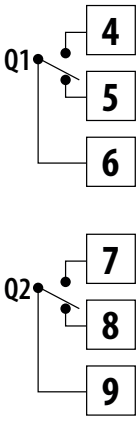
6.1.7 AO1 Analogue Output 1

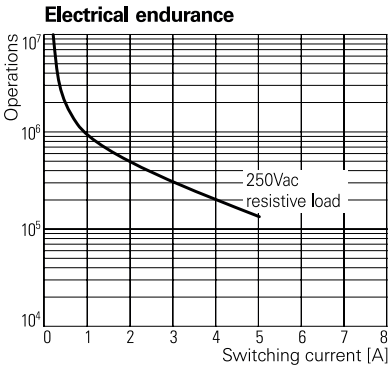


Linear output in mA or V
- Galvanically isolated
- Configurable as command, alarm or retransmission of process-setpoint.

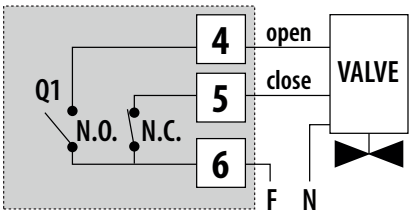
The mA or Volt output type is selected from the parameters in group A.O.1.

6.1.8 Relays output Q1 and Q2



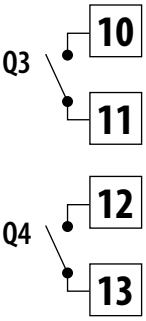


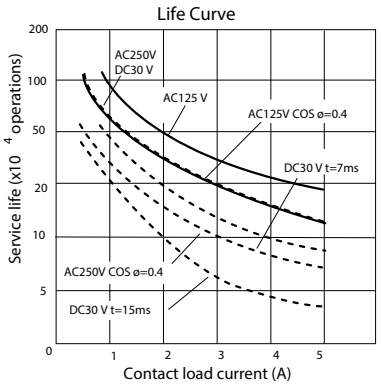
Capacity
5A/250Vac, resistive load 10^5 operations.
20/2 A, 250 Vac, cosϕ = 0.3, $1.2x10^5$ operations.



The output Q1 works through 2 indepedent relays, both contacts can be opened to manage the valves (see figure)

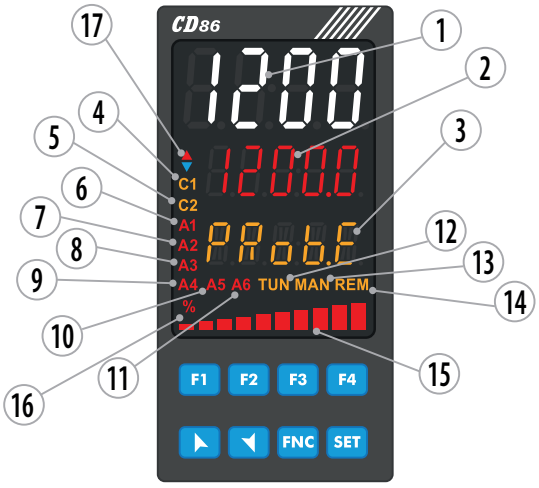
6.1.9 Relays output Q3 and Q4



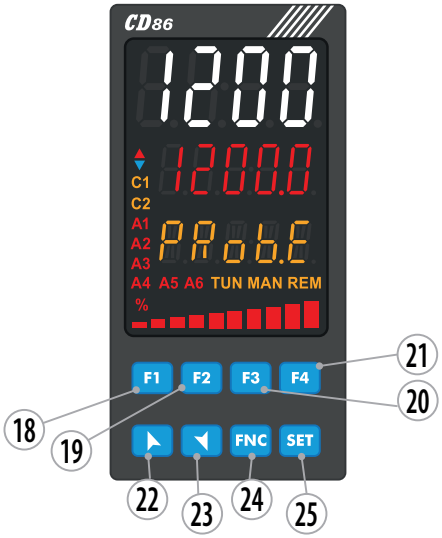


Capacity
5A, 250Vac, resistive load; min. $100x10^3$ operations.
1/8 HP 277Vac; min. $100x10^3$ operations.

7 Leds and key function



Leds	1	120.0	By default, it displays the process. During configuration, it displays the parameter group or the name of the parameter being entered.
	2	1200.0	Display the selected value on parameter 327 ud.d2. (default: setpoint) During configuration, displays the parameter group or the number of the parameter being entered.
	3	ProbE	Display the selected value on parameter 328 ud.d3. (default: state) During configuration, displays the value of the parameter being entered.
	4	C1	On when control output 1 is active. On when the valve is opening.
	5	C2	On when control output 2 is active. On when the valve is opening.
	6	A1	Alarm 1 state, On when active
	7	A2	Alarm 2 state, On when active
	8	A3	Alarm 3 state, On when active
	9	A4	Alarm 4 state, On when active
	10	A5	Alarm 5 state, On when active
	11	A6	Alarm 6 state, On when active
	12	TUN	Auto Tuning Status, On when active
	13	MAN	Manual Status, On when active
	14	REM	RS485 Serial Communication activity. Flashing when remote setpoint is enabled
	15		Configurable on par. 331 bAr.G. Normally indicates the percentage of control output 1
	16	%	On when the bar graph indicates the percentage of command output 1 or 2
	17	▲	On during the rising phase of the cycle
		▼	On during the falling phase of the cycle
		▲▼	Both ON during parameter modification, if it's not at default value



Keys	18		Increases the main setpoint During configuration allows to scroll the parameters or the groups of parameters Increases the setpoints
	19		Decreases the main setpoint During configuration allows to scroll the parameters or the groups of parameters Decreases the setpoints
	20	SET	Allows to visualize command and alarm setpoints During configuration allows to enter the parameter to be modified and confirms the variation
	21	FNC	Allows to enter the Tuning launch function, automatic/manual selection During configuration works as exit key (ESCAPE)
	22	F1	Configurable on parameter 342 - F1F.
	23	F2	Configurable on parameter 348 - F2F.
	24	F3	Configurable on parameter 354 - F3F.
	25	F4	Configurable on parameter 360 - F4F.

8 Controller functions

8.1 Modification of main and alarm setpoint value

Setpoint value can be modified from keyboard as follows:

	Key	Description	Function
1	▶ ◀	Value on display 2 changes	Increases or decreases the main setpoint value.
2	SET	Visualizes the other setpoints on display 2. Display 3 shows the setpoint type.	
3	▶ ◀	Value on display 2 changes	Increases or decreases the alarm setpoint value.

8.2 Automatic Tune

Automatic tuning procedure allows a precise regulation without delving into the PID regulation algorithm. Selecting *Auto* on parameter 83 *tun.1* (for regulation loop 1) the controller analyzes the proces oscillations and optimizes the PID parameters.
Led TUN flashes. If the PID parameters are not yet selected, at the device switch-on, it is automatically launched the manual Tuning procedure.

8.3 Manual Tune

Manual procedure allows the user greater flexibility to decide when to update PID algorithm parameters. During the manual tuning, the device generates a step to analyze the system inertia to be regulated and, according to the collected data, modifies PID parameters.
After selecting *MANu.* on parameter 83 *tun.1* the procedure can be activated in 4 ways:

- **Tuning activation by keyboard:**
  Press FNC until display 3 shows *tunE* with display 2 on "*diSAb*", then press SET: display 2 shows *ENAb*. Led TUN switches ON and the procedure starts.
- **Tuning activation from F1 - F4:**
  Select *tunE* on par. 342 *F1F.* (or on par. 348 *F2F.*, par. 354 *F3F.*, par. 360 *F4F.*). By pressing the button, the tuning activates/deactivates. Led TUN switches on when tuning is activated.
- **Tuning activation by digital input:**
  Select *tunE* on par. 275 *di.1.F.* (or on par. 284 *di.2.F.*, par. 293 *di.3.F.*, par. 302 *di.4.F.*). At first activation of digital input (commutation on front panel) led TUN switches on and at second activation switches off.
- **Tuning activation by serial input:**
  Write 1 on word modbus 1224 (command 1) or 1225 (command 2): led TUN switches ON and the procedure starts. Write 0 to stop the tuning.

To avoid an overshoot, the treshold where the controller calculates new PID parameters is determined by this operation:
Tune threshold = Setpoint - "Set Deviation Tune" (par. 84 *S.d.t.1* or par. 110 *S.d.t.2*)
Es.: if setpoint is 100.0∞C and the Par.84 *S.d.t.1* is 20.0∞C the threshold to calculate PID parameters is (100.0 - 20.0) = 80.0∞C.
For a greater accuracy in calculating PID parameters, it is ecommended to start the manual tuning procedure when the process deviates from the setpoint.

8.4 Tuning once

Set *oncE* on parameter 83 *tun.1*, or on parameter 109 *tun.2*. The autotuning procedure is executed only once when the device restart. If for any reason the procedure is not successful, it will be executed the next time the device restart.

8.5 Digital input functions

The controller integrates some features related to digital inputs, which can be enabled using the parameters 275 *d.i.1.F.*, 284 *d.i.2.F.*, 293 *d.i.3.F.* e 302 *d.i.4.F.*.

- *2t.SW.*: two-threshold setpoint change: with digital input active, the controller adjusts to SET 2, otherwise it adjusts to SET 1;
- *2t.SW.i.*: modification of 2 setpoints by digital input with impulse command;
- *3t.SW.i.*: modification of 3 setpoints by digital input with impulse command;
- *3t.SW.i.*: modification of 4 setpoints by digital input with impulse command;
- *SET.1.*: controller regulates on SET 1;
- *SET.2.*: controller regulates on SET 2;
- *SET.3.*: controller regulates on SET 3;
- *SET.4.*: controller regulates on SET 4;
- *StARt*: controller Start by digital input with impulse command;
- *StoP*: controller Stop by digital input with impulse command;
- *St./St.*: controller Start / Stop by digital input with impulse command
- *RUN.*: The regulation is enabled only with digital input active;
- *Ext.AL.*: External alarm. The controller goes into STOP mode and the alarms are deactivated. User intervention is required to return the controller to START mode;
- *HoLd*: With digital input active the conversion is locked and the process remains at the last measured value (the device continues to regulate);
- *tUNE*: Enables/disables the Tuning if par. 83 *tun.1* or par. 109 *tun.2* is set to *MANU*;
- *Au.MA.i.*: if par. 53 *A.MA.1.* or par. 76 *A.MA.2.* is set to *ENAb.* or *EN.Sto.*, with impulse command on digital input, the controller switches the related regulation loop, from automatic to manual and vice versa;
- *Au.MA.c.*: if par. 53 *A.MA.1.* or par. 76 *A.MA.2.* is set to *ENAb.* or *EN.Sto.* the controller switches to manual the related regulation loop, with digital input active, otherwise the regulation is automatic;
- *Act.tY.*: On the regulation loop selected for this function (par. 278 *d.i.1.r.* or 287 *d.i.2.r.* or 296 *d.i.3.r.*or 305 *d.i.4.r.*), The controller performs cooling-type regulation when the digital input is active; otherwise, it performs heating-type regulation;
- *PRGM*: Programmer. If par. 312 PrGM is set to *ENAb.*, the device works as programmator 1 cycle, if digital input is activated, otherwise it is a basic controller.
- *R.KWH*: Reset kWh. It resets the energy value consumed by the system (set the power rating of the load on par. 54 *L.P.r.1* or on par77 *L.P.r.2*).
- *R.i. 0*: Zero tare function: brings the related analogue input to 0. The analogue input is selected onpar. 277 *d.i.1.P.* or 286 *d.i.2.P.* or 295 *d.i.3.P.* or 304 *d.i.4.P.*.
- *M.RES.*: Allows the reset of the output if manual reset is active for the alarms and for the command outputs selected on par. 278 *d.i.1.r.* or 287 *d.i.2.r.* or 296 *d.i.3.r.* or 305 *d.i.4.r.*;
- *t.1.RUN*: If timer 1 is enabled (par. 420 *tMr.1* different from *diSAb.*), with digital input active, the timer is switched to RUN, otherwise is kept in STOP;
- *t.1.S.E.*: If timer 1 is enabled (par. 420 *tMr.1* different from *diSAb.*), by acting on the digital input, the timer status changes from STOP to RUN and vice versa;
- *t.1.StA.*: If timer 1 is enabled (par. 420 *tMr.1* different from *diSAb.*), by acting on the digital input, the timer is switched to RUN;
- *t.1.End.*: If timer 1 is enabled (par. 420 *tMr.1* different from *diSAb.*), by acting on the digital input, the timer is switched to STOP;
- *t.2.RUN*: If timer 2 is enabled (par. 423 *tMr.2* different from *diSAb.*), with digital input active, the timer is switched to RUN, otherwise is kept in STOP;
- *t.2.S.E.*: se il timer 2 è abilitato (par. 423 *tMr.2* different from *diSAb.*), by acting on the digital input, the timer status changes from STOP to RUN and vice versa;

- t.2.StR.: se il timer 2 è abilitato (par. 423 tMr.2 different from diSAb.), by acting on the digital input, the timer is switched to RUN;
- t.2.End.: se il timer 2 è abilitato (par. 423 tMr.2 different from diSAb.), by acting on the digital input, the timer is switched to STOP;
- Lo.cFG.: With digital input active, the access to setpoint configuration/modification is locked;
- uP.KEY: the digital input simulates the operation of key
- doWN.K: the digital input simulates the operation of key
- FNc. K.: the digital input simulates the operation of key FNC
- SEt. K.: the digital input simulates the operation of key SET
- REM.S.E.: if on par. 62 rEM.S. is set to ENAb. or En.SER.), with digital input active the remote setpoint is enabled, otherwise the setpoint is local. On par. 278 di.1.r. or 287 di.2.r. or 296 di.3.r. or 305 di.4.r. it is necessary to select the reference regulation loop.

8.6 Automatic / Manual regulation for % output control

This function allows to switch from automatic functioning to manual command of the output percentage. With parameter 53 A.MA.1. (for regulation loop 1) or parameter 76 A.MA.2. (for regulation loop 2) it is possible to select two modes.

1 **First selection** (ENAb.) allows to enable with FNC key the writing P.--- on display 2, while on display 3 is shown AutoM.
Press SET key to visualize MANu; it's now possible, during the process visualization, modify through the keys and the output percentage. To go back to automatic, with the same procedure, select AutoM. on display 3: immediately led MAN switches off and functioning backs to automatic.

2 **Second selection** (EN.Sto.) enables the same functioning but with two important variants:

- If there is a temporary power failure or after switch-off, the manual functioning as well as the previous output percentage value will be maintained at restarting.
- If the sensor breaks during automatic functioning, the controller switches to manual mode while maintaining the output percentage command unchanged as generated by the PID immediately before breakage. Ex: on an extruder the command in percentage of the resistance (load) is maintained also in case of input sensor failure.

8.7 Heater Break Alarm on CT (Current Transformer)

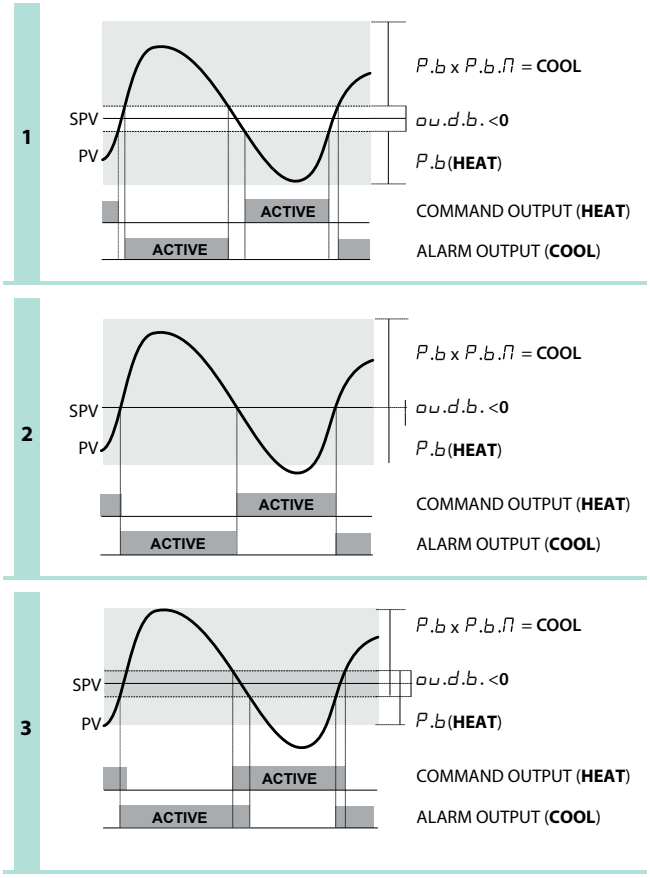
This function allows to measure load current to manage an alarm during a malfunctioning with power in short circuit, always open or partial break of the charge. To enable this function set 50HZ or 60HZ on parameter 366 ct.1.F. and the value of the connected transfomer, on parameter 367 ct.1.u..

- Set on parameter 368 H.b.1.r. the reference regulation loop for current measure and Heater Break Alarm intervention.
- Set on parameter 369 H.b.1.t. the Heater Break Alarm intervention threshold in Ampere.
- Set on parameter 370 oc.1.t. the intervention threshold in Ampere to control the overcurrent.
- Set on parameter 371 H.b.1.d. the delay time in seconds for the Heater Break Alarm intervention.
- It is possible to associate an alarm, selecting H.b.A. on parameter 135 AL.1.F. or par. 155 AL.2.F. or par. 175 AL.3.F. or par. 195 AL.4.F. or par. 215 AL.5.F. or par. 235 AL.6.F. or par. 255 AL.7.F..

It is possible to visualize on display 2 or 3 the average current, selecting AMP.1 on parameter 327 u1.d.2. or on parameter 328 u1.d.3..
Setting on parameter 369 H.b.1.t. value "0" it is possible to visualize the current consumption without generating an Heater Break Alarm.

8.8 Dual Action (heating-cooling)

The controller is suitable also for systems requiring a combined heating-cooling action.
The command output has to be configured as PID for Heating (Par. 40 *Ac.t.1* or Par. 63 *Ac.t.2* = Heat e *P.b. 1* or *P.b. 2* greater than 0), and one of the alarms (*AL.1.F.*, *AL.2.F.*, *AL.3.F.*, *AL.4.F.*, *AL.5.F.*, *AL.6.F.* or *AL.7.F.*) has to be configured as *cool*. The command output must be connected to the actuator responsible for heating, while the alarm will control cooling action.
Parameters to be configured for the heating PID are:
Ac.t.1 or *Ac.t.2* = *HEAt* Command output action type (Heating);
P.b. 1 or *P.b. 2*: Heating proportional band;
i.t. 1 or *i.t. 2*: Integral time of heating and cooling;
d.t. 1 or *d.t. 2*: Derivative time of heating and cooling;
c.t. 1 or *c.t. 2*: Heating time cycle.
Parameters to be configured for the cooling PID related to regulation loop 1 and alarm 1 are:
AL.1.F. = *cool*. Alarm 1 selection (Cooling);
P.b.M.1: Proportional band multiplier;
o.d.b.1: Overlapping / Dead band;
c.c.t.1: Cooling time cycle.
Parameter *P.b.M.1* (that ranges from 1.00 to 5.00) determines the proportional band of cooling action basing on the formula:
Proportional band for cooling action = *P.b. 1* x *P.b.M.1*.
This gives a proportional band for cooling which will be the same as heating band if *P.b.M.1* = 1.00, or 5 times greater if *P.b.M.1* = 5.00.
Integral and **Derivative Time** are the same for both actions.
Parameter *o.d.b.1* determines the percentage overlapping between the two actions. For systems in which the heating output and cooling output must never be simultaneously active a Dead Band (*o.d.b.1* ≤ 0), must be configured, vice versa you can configure an overlapping (*o.d.b.1* > 0).
The following figure shows an example of dual action PID (heating-cooling) with *i.t. 1* = 0 and *d.t. 1* = 0.



Parameter c.c.t.1 has the same meaning of cycle time for heating action c.t. 1.
Parameter co.F.1 (Cooling Fluid) re-selects the proportional band multiplier P.b.M.1 and the cooling PID cycle time c.c.t.1 according to cooling fluid type:

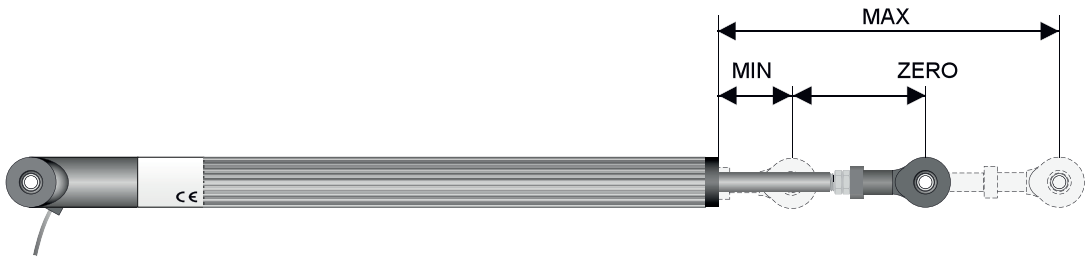
parameter co.F.1	**Cooling fluid type**	P.b.M.1	c.c.t.1
Air	Aria	1.00	10
oil	Olio	1.25	4
H2o	Acqua	2.50	2

Once parameter co.F.1 has been selected, the parameters P.b.M.1, o.d.b.1 and c.c.T.1 can be however modified.

8.9 LATCH ON function

For use with input Pot. and with linear input (0÷10V, 0÷40mV, 0/4÷20mA) it is possible to associate the start scale value (parameter 4 L.L.i.1 or parameter 22 L.L.i.2) to the minimum position of the sensor and the end of scale value (parameter 5 U.L.i.1 or parameter 23 U.L.i.2) to the maximum position of the sensor (parameter 11 Ltc.1 or parameter 29 Ltc.2 configured as StNdR).
It is also possible to fix the point in which the controller will display 0 (however keeping the scale range between L.L.i.1 / L.L.i.2 and U.L.i.1 / U.L.i.2) using the "virtual zero" option by setting u.0.Sto. or u.0.t.on. on parameter 11 Ltc.1 or 29 Ltc.2. Selecting u.0.t.on. the virtual zero must be reset at each switching on; selecting u.0.Sto. the virtual zero will remain fixed once calibrated. o use the LATCH ON function, configure the parameters Ltc.1 or Ltc.2.
The tuning procedure starts by exiting the configuration after changing the parameter.
Refer to the following table for the calibration procedure:

	Press	Display	To Do
1	FNC	Exit parameters configuration. Display 3 shows LAtcH.	Place the sensor on minimum operating value (corresponding to L.L.i.1 / L.L.i.2).
2	◀	Store value on minimum.. Display shows LoW.	Place sensor on maximum operating value (corresponding to U.L.i.1 / U.L.i.2).
3	▶	Store value on max. Display shows HiGH.	To exit standard proceeding press SET. For "virtual zero" setting, place the sensor to zero point.
4	SET	Set virtual zero. Display shows ZERo. If "Virtual zero at start"is selected, point 4 must be repeated at each starting.	Per uscire dalla procedura premere SET.

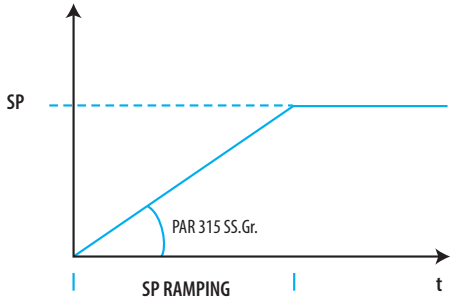


8.10 Soft-Start function

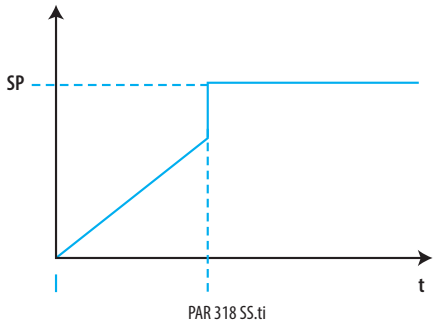
The soft-start function in the CD86 is useful to reduce the initial impact of the inrush current on the load when the system is started. This is important in order to protect the electrical components and the load and to increase their life span.
The instrument is provided with two types of soft-start selectable on parameter 313 "SS.tY." ("Soft start Type").

8.10.1 Gradient Soft-start "GrAd."

When switched on, the controller follows the rising gradient to reach the setpoint.

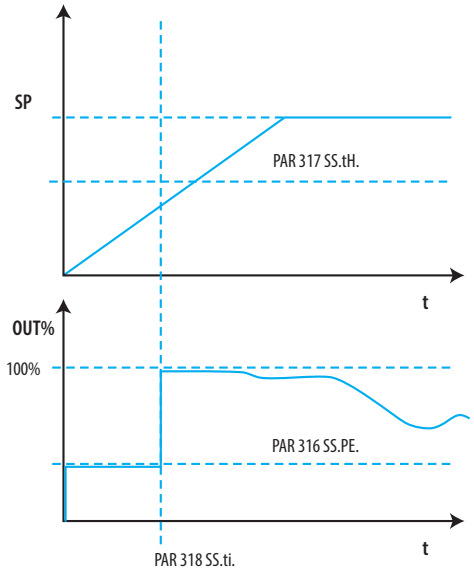


The gradient is set to parameter 315 "SS.Gr." ("Softstart Gradient") expressed in Units/hour (e.g. °C/h).
For example, if set to 100.0, the ramp will be 100°C/h



To ensure that you do not exceed a preset time, use parameter 318 "SS.ti." ("Softstart Time") soft-start time, which indicates the maximum time in which to run the ramp. If the ramp is longer than the maximum time, it will be truncated and brought to the final setpoint.
To disable this function, set the time to 0 ("SS.ti." = 0).

8.10.2 Soft-start with power output percentage limit "PErc."



Parameter 317 "SS.tH." sets the threshold below which the soft-start function starts at switch-on.
In parameter 316 "SS.PE." ('Softstart Percentage') you set an output percentage (0 to 100).
The controller will maintain the output percentage until the process exceeds the threshold set in parameter 317 "SS.tH." or until the time set in minutes in parameter 318 "SS.ti." expires. ("Softstart Time" word 2084).

NOTE: If the soft-start function is active the automatic/manual Tuning function cannot be activated.

8.12 Retransmission function on analogue output

If not used as command, the analogue output can be used to retransmit process/ setpoint/ current read by the C.T. input/ output percentage. Select on parameter 388 rtM.1 ("Retransmission 1") the value to be retransmitted, and on parameter 389 r.1.tY. ("Retransmission 1 Type") the output type. It is possible also to select on parameters 390 r1.L.L. and 391 r1.u.L. or 401 r.2.L.L. and 402 r.2.u.L. the input value rescale limits.

8.12 Timer functions

The controller integrates two timers that can be independent, sequential or looped together.
Timer 1 is enabled on parameter 420 tMr.1.; timer 2 on parameter 423 tMr.2.:

ENAb. the timer starts from the keyboard or digital input (user intervention is required)

EN.StA. the timer starts counting when the regulator is in RUN.

The timer time-base set in MM.SS or HH.MM by changing parameters 421 t.b.t.1 for timer 1 and 424 t.b.t.2 for timer 2.

In parameter 426 tMr.S. can be define whether the timers should be independent or related to each other.

SINGL. The timers work independently of each other.

SEQuE. When timer 1 ends, timer 2 starts. The sequence is active only by starting timer 1. When timer 2 expires, the sequence is interrupted.

LooP When a timer ends, another starts: the sequence repeats itself cyclically.

To change the duration of the counting time, follow the steps below:

	Press	Display	To Do
1	SET	Press until tiME1 or tiME 2 are visualized on display 3.	
2	▶ ◀	Digits on display 2 changes	Increase or decrease time value for the selected timer

To start the keyboard count follow the steps below:

	Press	Display
1	FNC	Press until tiME1 or tiME 2 are visualized on display 3. Display 2 shows StoP if timer is stopped, otherwise it shows the remaining time.
2	SET	IThe timer stops if active or starts counting if in StoP.

Start/Stop of Timer is possibile also by digital input (see parameters d1.1.F. ... d1.4.F.) or by key functions (see parameters F1F. ... F4F.).

The alarm outputs can be associated with the timers (parameters AL.1.F. ... AL.4.F.) and on parameters 422 A.tM.1 and 425 A.tM.2 is possible to select the activation mode. The proposed solutions are as follows:

StArt Alarm active during timer counting

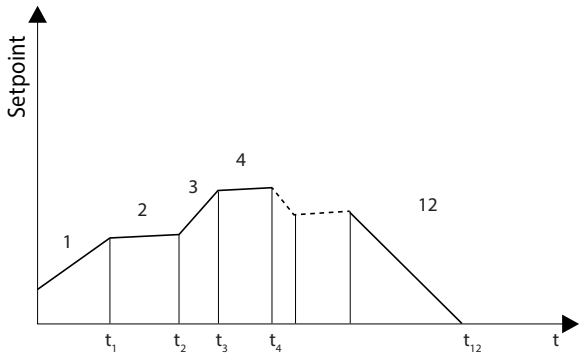
End Alarm active when the timer expiry

WARN. Alarm active 5 " before the timer expiry.

8.13 Programmer (1 cycle, 12 steps)

The controller integrates the programmer mode allowing process 1 to follow a cycle set by the user and consisting of maximum 12 steps. To enable this function select *EnAb.* on parameter 312 *PrGM* ("Programmer").
In this case, keys F1, F2, F3 and F4 are not programmable, but perform the following functions:

- F1: allows to enter the cycle modification management. When the device is in START, the cycle can only be displayed.
- F2: allows to ciclically display the setpoint, the running step and other cycle data.
- F3: resets the energy consumed value by command 1, if enabled on parameter 54 *L.P.r.1* ("Load Power Rating 1").
- F4: manages the regulation or cycle START/STOP.



Selecting *PrGM* on parameter 275 *d.i.1.F.* (or on par. 284 *d.i.2.F.*, or on par. 293 *d.i.3.F.* or on par. 302 *d.i.4.F.*.) it is possible to change mode from controller to programmer, by acting on digital inputs.

8.13.1 Programming (or modifying) cycle data

Follow the steps listed in the following table

	Press	Display	To Do
1	F1	Display 1 shows *01-t.* Display 2 shows the time of the step.	Press F1 to save and exit from programming cycle.
2	or	Scroll the different steps. The data on display 1 enables two information: The step number (first two digits) The type of data (time, temperature or status of the auxiliary output).	Es: *01-t* tempo della spezzata 1 *01-S* setpoint della spezzata 1 *01-A* ausiliario della spezzata 1. NB: the auxiliary setting is present only if enabled on at least one alarm parameter (selection *StEP.A.*).
3	SET to confirm	Enables the value modification. Display 2 flashes. This point is not allowed when the cycle is in START.	
4	or	The displayed value is increased or decreased	Insert the new data. • During time entry (hh:mm) set --.-- for infinite time or End for end of cycle ((if not all available steps are used) • During setpoint entry set the arrival temperature at the end of the step. • During auxiliary entry select *oN* for active auxiliary during step, otherwise set *oFF*.
5	SET to confirm	Confirm the new value.	
6	F1	Save and exit cycle programming.	

8.13.2 Cycle start

There are different options to start the cycle (START):
• Key F4: prss key for at least 1 second to START/STOP the controller.
• Through digital input if configured.
• Through serial port where present.

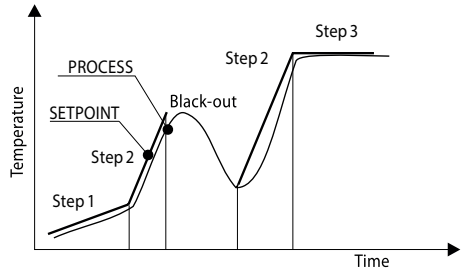
8.13.3 Recovery of interrupted cycle

Recovery function is particulary useful for kilns temperature regulation. In case of power failure, at restarting, the controller can resume the interrupted cycle, restarting it in an optimal manner. There are two cycle recovery modes, which are described below.

Recovery with automatic gradient

To enable cycle recovery with automatic gradient, set 1 on parameter 321 r.i.cY. This mode does not operate for cooling regulations. At restart, after a power failure, controller will operate like this:

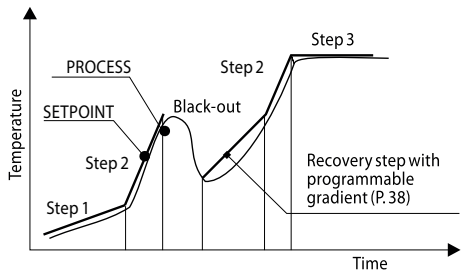
1. If a power failure occurs during a rising step, the gradient will be same as the operating step (setpoint temperature equal to the temperature read by the sensor).
2. If a power failure occurs during a holding step, two options are possible. If gap between process and setpoint is limited (not exceeding the value on parameter 320 M.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.

Recovery with recovery gradient

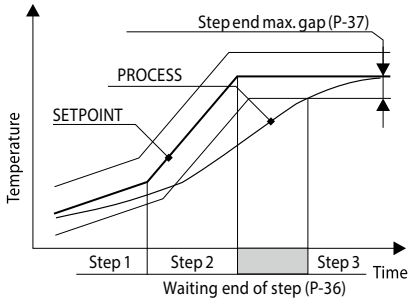
To enable cycle recovery with a recovery gradient, enter on parameter 321 r.i.cY. a value (degrees/hour if temperature) greater than 1. At restarting if the kiln temperature (process) is lower than the setpoint, the controller locks the working cycle executing a step with the rising gradient set on parameter 321 r.i.cY. to return to the setpoint value entered before the power failure and the cycle restarts form that point.
In recovery mode the display shows RECoVERY StEP 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.

Waiting step end (Auto Hold)

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 320 *n.G.S.E.* ("Max Gap Step End"), controller starts with the next step only after waiting for the time programmed on parameter 319 *U.t.S.E.* ("Waiting Time Step End"), or when this gap becomes lower than parameter 320 *n.G.S.E.*



To disable this function fix at 0 end step waiting time *U.t.S.E.* While waiting step end, instead of number of steps, the displays shows *WAIting StEP End*.

8.15 Configuration through memory card

The device can be configured through a memory card. This one is linked to the micro-USB connector on the bottom of the device.

8.14.1 Memory card creation/update

In order to save a parameter configuration in the memory card, connect it to micro-USB connector and power the device. If the memory card has never been configured, the device starts normally, but if its data are considered valid, it is possible to view on the display MEMo SKIP. Press SET in order to start the product without uploading any data from the memory card. Configure, set the parameters and exit configuration. Now, the device saves the configuration just created also in the memory card.

8.14.2 Configuration loading from memory card

In order to charge a configuration previously created and saved in the memory card, connect it to the micro-USB connector and power the instrument. Now, if the memory is detected and its data are considered valid, it is possible to view on the display MEMo SKIP. By pressing ▶ you see MEMo LoAd and with SET you confirm the uploading of parameters from the memory card to the controller. If, on the other hand, while viewing MEMo SKIP you press directly SET, the product starts without uploading any data from the memory card.

8.16 Loading default values

Questa procedura consente di ripristinare le impostazioni di fabbrica del dispositivo.

	Press	Display	To Do
1	FNC for 3 sec.	Display 1 shows "PASS", while display 2 shows "0000" with the 1st digit flashing	
2	◀ or ▶	Modify the flashing digit and move to the next one pressing SET.	Enter password "9999".
3	FNC to confirm	The device loads default settings and restarts.	

9 Serial communication

CD86 is equipped with RS485 and can receive/broadcast data via serial communication using MODBUS RTU protocol. The device can only be configured as a Slave. This function enables the control of multiple controllers connected to a supervisory system/SCADA.
Each controller responds to a Master query only if the query contains the same address as parameter 410 SL.Ad. ("Slave Address"). The addresses permitted are from 1 to 254 and there must not be controllers with the same address on the same line.
The address 255 can be used by the Master to communicate with all the connected equipment (broadcast mode), while with 0 all the devices receive the command, but no response is expected.

The baud rate is selected on parameter 411 bd.rt. ("Baud Rate").

Baud rate	Selectable on parameter 411 bd.rt.	
	1200bit/s	28800bit/s
	2400bit/s	38400bit/s
	4800bit/s	57600bit/s
	9600bit/s	115200bit/s
	19200bit/s	

The serial format is set on the parameter 412 S.P.P. (Serial Port Parameters).

Serial communication format	Selectable on parameter 412 S.P.P.	
	8N1	8N2
	8E1	8E2
	8O1	8O2

The controller can introduce a delay (in milliseconds) of the response to the master request. Tale ritardo deve essere impostato sul parametro 413 SE.dE. ("Serial Delay").

Supported functions	WORD READING (max 50 word) (0x03, 0x04)
	SINGLE WORD WRITING (0x06)
	MULTIPLE WORDS WRITING (max 50 word) (0x10)

NOTE: Each parameter modification is saved by the controller in the EEPROM memory (100000 writing cycles), while the setpoints are saved with a delay of 10 seconds after the last modification.

ATTENTION: Changes made to words that are different from those reported in the following table can lead to malfunction.

Below is a list of all available addresses and supported functions:

System parameters			
Modbus address	**Description**	**Read/Write**	**Reset value**
0	Device type	Read Only	55x
1	Software version	Read Only	Flash
2	Boot Version	Read Only	Flash
3	Slave Address	Read Only	Eepr/dip
6	Baud rate	Read Only	Eepr/dip
50	Slave address automatic learning	Write Only	-
51	System code comparison for slave address automatic learning	Write Only	-
500	Loading default values (write 9999)	Read/Write	0
501	Restart device (write 9999)	Read/Write	0
502	Setpoint storing delay time	Read/Write	10
503	Parameters storing delay time	Read/Write	1

Custom Message Area			
Modbus address	**Description**	**Read/Write**	**Reset value**
601	First character of the custom alarm message 1	Read/Write	"u"
...			
623	Last character of the custom alarm message 1	Read/Write	0
651	First character of the custom alarm message 2	Read/Write	"u"
...			
673l	Last character of the custom alarm message 2	Read/Write	0
701	First character of the custom alarm message 3	Read/Write	"u"
...			
723	Last character of the custom alarm message 3	Read/Write	0
751	First character of the custom alarm message 4	Read/Write	"u"
...			
773	Last character of the custom alarm message 4	Read/Write	0
801	First character of the custom alarm message 5	Read/Write	"u"
...			
823	Last character of the custom alarm message 5	Read/Write	0
851	First character of the custom alarm message 6	Read/Write	"u"
...			
873	Last character of the custom alarm message 6	Read/Write	0
901	First character of the custom alarm message 7	Read/Write	0
...			
923	Last character of the custom alarm message 7	Read/Write	"u"

Read Area			
Modbus address	**Description**	**Read/Write**	**Reset value**
1000	AI1 value (degrees with tenth)	Read Only	-
1001-1008	Not used		
1009	Real Setpoint (gradient) of the regulation loop 1	Read Only	0
1010	Not used		
1011	Alarms status (0=non active, 1=active) Bit0 = Alarm 1 Bit1 = Alarm 2 Bit2 = Alarm 3 Bit3 = Alarm 4 Bit4 = Alarm 5 Bit5 = Alarm 6	Read Only	0
1012	Error Flags 1 Bit0 = AI1 process error (sensor 1) Bit1 = Not used Bit2 = Cold junction error Bit3 = Safety error Bit4 = Generic error Bit5 = Hardware error Bit6 = Error H.B.A. (partial rupture of the load) Bit7 = Error H.B.A. (SSR in short circuit) Bit8 = Overcurrent error Bit9 = Parameters out of range error Bit10 = CPU eeprom writing error Bit11 = RFid eeprom writing error Bit12 = CPU eeprom reading error Bit13 = RFid eeprom reading error Bit14 = Eeprom calibrations bench corrupted Bit15 = Eeprom constants bench corrupted	Read Only	0
1013	Error Flags 2 Bit0 = Missing calibrations error Bit1 = Eeprom CPU bench parameters corrupted Bit2 = Eeprom CPU setpoint bench corrupted Bit3 = RFid memory not formatted Bit4 = Not used	Read Only	0
1014	Digital inputs status (0=not active, 1=active) Bit0 = Digital input 1 Bit1 = Digital input 2 Bit2 = Digital input 3 Bit3 = Digital input 4	Read Only	0
1015	Output status (0=off, 1=on) Bit0 = Q1 (NO) Bit1 = Q1 (NC) Bit2 = Q2 Bit3 = Q3 Bit4 = Q4 Bit5 = Q5 Bit6 = DO1 Bit7 = DO2	Read Only	0

1016	Led status (0=off, 1=on) Bit0 = Led arrow UP ▲ Bit1 = Led C1 Bit2 = Led C2 Bit3 = Led A1 Bit4 = Led A2 Bit5 = Led A3 Bit6 = Led A4 Bit7 = Led % Bit8 = Led A5 Bit9 = Led A6 Bit10 = Led TUN Bit11 = Led MAN Bit12 = Led REM Bit13 = Led point time 2 Bit14 = Led point time 3 Bit15 = Led arrow DOWN ▼	Read Only	0
1017	Keys status (0=releases, 1=pressed) Bit0 = key arrow UP Bit1 = key arrow DOWN Bit2 = key FNC Bit3 = key SET Bit4 = key F1 Bit5 = key F2 Bit6 = key F3 Bit7 = key F4	Read Only	0
1018	Cold junction 1 temperature (degrees with tenth)	Read Only	-
1019	Not used		
1020	Current CT1 istantaneous (Ampere with tenth)	Read Only	0
1021	Current CT1 average (Ampere with tenth)	Read Only	0
1022	Current CT1 ON (Ampere with tenth)	Read Only	0
1023	Current CT1 OFF (Ampere with tenth)	Read Only	0
1024-1027	Not used		
1028	Feedback valve position (0-100)	Read Only	-
1100	AI1 value with decimal point selection	Read Only	-
1101-1108	Not used		
1109	Real Setpoint (gradient) of the regulation loop 1 with decimal point selection	Read Only	0
1110	Real Setpoint (gradient) of the regulation loop 2 with decimal point selection	Read Only	0

Read/Write area			
Modbus address	**Description**	**Read/Write**	**Reset value**
1200	Setpoint 1 of regulation loop 1 (degrees with tenth)	Read/Write	EEPROM
1201	Setpoint 2 of regulation loop 1 (degrees with tenth)	Read/Write	EEPROM
1202	Setpoint 3 of regulation loop 1 (degrees with tenth)	Read/Write	EEPROM
1203	Setpoint 4 of regulation loop 1 (degrees with tenth)	Read/Write	EEPROM
1204	Setpoint 1 of regulation loop 2 (degrees with tenth)	Read/Write	EEPROM
1205	Setpoint 2 of regulation loop 2 (degrees with tenth)	Read/Write	EEPROM
1206	Setpoint 3 of regulation loop 2 (degrees with tenth)	Read/Write	EEPROM
1207	Setpoint 4 of regulation loop 2 (degrees with tenth)	Read/Write	EEPROM
1208	Alarm 1 Setpoint (degrees with tenth) Alarm 1 upper setpoint if Par. 135 *AL.1.F.* = *A.bAnd*	Read/Write	EEPROM
1209	Alarm 1 lower setpoint if Par. 135 *AL.1.F.* = *A.bAnd* (degrees with tenth)	Read/Write	EEPROM
1210	Alarm 2 Setpoint (degrees with tenth) Alarm 2 upper setpoint if Par. 155 *AL.2.F.* = *A.bAnd*	Read/Write	EEPROM
1211	Alarm 2 lower setpoint if Par. 155 *AL.2.F.* = *A.bAnd* (degrees with tenth)	Read/Write	EEPROM
1212	Alarm 3 Setpoint (degrees with tenth) Alarm 3 upper setpoint if Par. 175 *AL.3.F.* = *A.bAnd*	Read/Write	EEPROM
1213	Alarm 3 lower setpoint if Par. 175 *AL.3.F.* = *A.bAnd* (degrees with tenth)	Read/Write	EEPROM
1214	Alarm 4 Setpoint (degrees with tenth) Alarm 4 upper setpoint if Par. 195 *AL.4.F.* = *A.bAnd*	Read/Write	EEPROM
1215	Alarm 4 lower setpoint if Par. 195 *AL.4.F.* = *A.bAnd* (degrees with tenth)	Read/Write	EEPROM
1216	Alarm 5 Setpoint (degrees with tenth) Alarm 5 upper setpoint if Par. 215 *AL.5.F.* = *A.bAnd*	Read/Write	EEPROM
1217	Alarm 5 lower setpoint if Par. 215 *AL.5.F.* = *A.bAnd* (degrees with tenth)	Read/Write	EEPROM
1218	Alarm 6 Setpoint (degrees with tenth) Alarm 6 upper setpoint if Par. 235 *AL.6.F.* = *A.bAnd*	Read/Write	EEPROM
1219	Alarm 6 lower setpoint if Par. 235 *AL.6.F.* = *A.bAnd* (degrees with tenth)	Read/Write	EEPROM
1220	Alarm 7 Setpoint (degrees with tenth) Alarm 7 upper setpoint if Par. 255 *AL.7.F.* = *A.bAnd*	Read/Write	EEPROM
1221	Alarm 7 lower setpoint if Par. 255 *AL.7.F.* = *A.bAnd* (degrees with tenth)	Read/Write	EEPROM
1222	Start/Stop 0 = Controller in STOP 1 = Controller in START	Read/Write	0

1223	Hold conversion ON/OFF 0 = Hold conversion OFF 1 = Hold conversion ON	Read/Write	0
1224	Tune management for regulation loop 1		
	With automatic Tune (par. 83 tun.1 = Auto): 0 = autotuning function OFF 1 = autotuning ON	Read Only	0
	With manual Tune (par. 83 tun.1 = SYncH.): 0 = autotuning function OFF 1 = autotuning ON	Read/Write	0
	With synchronnized Tune (par. 83 tun.1 = MANu. o OncE): 0 = autotuning function OFF 1 = command output OFF (forces the cooling) 2 = command output ON (forces the heating) 3 = autotuning ON 4 = autotuning ended	Read/Write	0
1225	Tune management for regulation loop 2		
	With automatic Tune (par. 109 tun.2 = Auto): 0 = autotuning function OFF 1 = autotuning ON	Read Only	0
	With manual Tune (par. 109 tun.2 = SYncH.): 0 = autotuning function OFF 1 = autotuning ON	Read/Write	0
	With synchronized Tune (par. 109 tun.2 = MANu. o OncE): 0 = autotuning function OFF 1 = command output OFF (forces the cooling) 2 = command output ON (forces the heating) 3 = autotuning ON 4 = autotuning ended	Read/Write	0
1226	Automatic/manual selection for regulation loop 1 0 = Auto 1 = Manual	Read/Write	0
1227	Automatic/manual selection for regulation loop 2 0 = Auto 1 = Manual	Read/Write	0
1228	Command output percentage for regulation loop 1 (0-10000) Heating output percentage with regulation 1 in double loop (0-10000)	Read/Write	0
1229	Command output percentage for regulation loop 1 (0-1000) Heating output percentage with regulation 1 in double loop (0-1000)	Read/Write	0
1230	Command output percentage for regulation loop 1 (0-100) Heating output percentage with regulation 1 in double loop (0-100)	Read/Write	0

1231	Cooling output percentage with regulation 1 in double loop (0-10000)	Read Only	0
1232	Cooling output percentage with regulation 1 in double loop (0-1000)	Read Only	0
1233	Cooling output percentage with regulation 1 in double loop (0-100)	Read Only	0
1234	Command output percentage for regulation loop 2 (0-10000) Heating output percentage with regulation 2 in double loop (0-10000)	Read/Write	0
1235	Command output percentage for regulation loop 2 (0-1000) Heating output percentage with regulation 2 in double loop (0-1000)	Read/Write	0
1236	Command output percentage for regulation loop 2 (0-100) Heating output percentage with regulation 2 in double loop (0-100)	Read/Write	0
1237	Cooling output percentage with regulation 2 in double loop (0-10000)	Read Only	0
1238	Cooling output percentage with regulation 2 in double loop (0-1000)	Read Only	0
1239	Cooling output percentage with regulation 2 in double loop (0-100)	Read Only	0
1240	Command output manual reset for regulation loop 1: write 0 to reset the command output. In reading 0 = reset not allowed 1 = reset allowed	Read/Write	0
1241	Alarms manual reset: write 0 to reset all alarms In reading 0 = reset not allowed 1 = reset allowed Bit0 = Alarm 1 Bit1 = Alarm 2 Bit2 = Alarm 3 Bit3 = Alarm 4 Bit4 = Alarm 5 Bit5 = Alarm 6 Bit6 = Alarm 7	Read/Write	0
1242	Command output manual reset for regulation loop 2: write 0 to reset the command output. In reading 0 = reset not allowed 1 = reset allowed	Read/Write	0

1243	Alarm 1 remote status 0 = Absent 1 = Present	Read/Write	0
1244	Alarm 2 remote status 0 = Absent 1 = Present	Read/Write	0
1245	Alarm 3 remote status 0 = Absent 1 = Present	Read/Write	0
1246	Alarm 4 remote status 0 = Absent 1 = Present	Read/Write	0
1247	Alarm 5 remote status 0 = Absent 1 = Present	Read/Write	0
1248	Alarm 6 remote status 0 = Absent 1 = Present	Read/Write	0
1249	Alarm 7 remote status 0 = Absent 1 = Present	Read/Write	0
1250	Value AO1 from serial (Par. 388 rtn.1 = nd.bus)	Read/Write	0
1251	Value AO2 from serial (Par. 399 rtn.2 = nd.bus)	Read/Write	0
1252	Tare of zero AI1 1 = Tare 2 = Reset tare	Read/Write	0
1253-1258	Not used		
1259	Value of remote setpoint by command 1 serial	Read/Write	0
1260	Value of remote setpoint by command 2 serial	Read/Write	0
1300	Setpoint 1 of regulation loop 1, with decimal point selection	Read/Write	EEPROM
1301	Setpoint 2 of regulation loop 1, with decimal point selection	Read/Write	EEPROM
1302	Setpoint 3 of regulation loop 1, with decimal point selection	Read/Write	EEPROM
1303	Setpoint 4 of regulation loop 1, with decimal point selection	Read/Write	EEPROM
1304-1307	Not used		
1308	Alarm 1 Setpoint (degrees with tenth) Alarm 1 upper setpoint if Par. 135 AL.1.F. = A.bAnd	Read/Write	EEPROM
1309	Alarm 1 lower setpoint if Par. 135 AL.1.F. = A.bAnd (degrees with tenth)	Read/Write	EEPROM
1310	Alarm 2 setpoint (degrees with tenth) Alarm 2 upper setpoint if Par. 155 AL.2.F. = A.bAnd	Read/Write	EEPROM

1311	Alarm 2 lower setpoint if Par. 155 *AL.2.F.* = *A.bAnd* (degrees with tenth)	Read/Write	EEPROM
1312	Alarm 3 setpoint (degrees with tenth) Alarm 3 upper setpoint if Par. 175 *AL.3.F.* = *A.bAnd*	Read/Write	EEPROM
1313	Alarm 3 lower setpoint if Par. 175 *AL.3.F.* = *A.bAnd* (degrees with tenth)	Read/Write	EEPROM
1314	Alarm 4 setpoint (degrees with tenth) Alarm 4 upper setpoint if Par. 195 *AL.4.F.* = *A.bAnd*	Read/Write	EEPROM
1315	Alarm 4 lower setpoint if Par. 195 *AL.4.F.* = *A.bAnd* (degrees with tenth)	Read/Write	EEPROM
1316	Alarm 5 setpoint (degrees with tenth) Alarm 5 upper setpoint if Par. 215 *AL.5.F.* = *A.bAnd*	Read/Write	EEPROM
1317	Alarm 5 lower setpoint if Par. 215 *AL.5.F.* = *A.bAnd* (degrees with tenth)	Read/Write	EEPROM
1318	Alarm 6 setpoint (degrees with tenth) Alarm 6 upper setpoint if Par. 235 *AL.6.F.* = *A.bAnd*	Read/Write	EEPROM
1319	Alarm 6 lower setpoint if Par. 235 *AL.6.F.* = *A.bAnd* (degrees with tenth)	Read/Write	EEPROM
1320	Alarm 7 setpoint (degrees with tenth) Alarm 7 upper setpoint if Par. 255 *AL.7.F.* = *A.bAnd*	Read/Write	EEPROM
1321	Alarm 7 lower setpoint if Par. 255 *AL.7.F.* = *A.bAnd* (degrees with tenth)	Read/Write	EEPROM
1400	Remote process reset 1: by writing 1 the controller uses for the process the value measured in AI1 instead of the one written in the word 1402	Read/Write	0
1401	Remote process reset 2: by writing 1 the controller uses for the process the value measured in AI2 instead of the one written in the word 1403	Read/Write	0
1402	Remote process 1. The number written in this word will be the process value 1 that the device uses for setting and alarms (AD**C1** disabled)	Read/Write	-
1403	Remote process 2. The number written in this word will be the process value 2 that the device uses for setting and alarms (AD**C2** disabled)	Read/Write	-
2001	Parameter 1	Read/Write	EEPROM
2002	Parameter 2	Read/Write	EEPROM
...	Parameter ...	Read/Write	EEPROM
2503	Parameter 503	Read/Write	EEPROM

10 Configuration parameters

10.1 Access configuration

	Press	Display	To Do
1	FNC for 3 sec.	Display 1 shows "PASS", white display 2 shows "0000" with the 1st digit flashing	
2	◀ o ▶	Modify flashing digit and move to next digit with SET	Enter password "1234"
3	FNC to confirm	Display 1 shows the name of first parameters group, display 2 shows the description.	
4	◀ o ▶	Scroll parameters groups.	
5	SET to confirm	Display 1 shows the name of the group first parameter, display 2 shows the number of parameter and display 3 shows its value.	Press FNC to exit configuration
6	◀ o ▶	Scroll parameters.	
7	SET to confirm	Allows parameter modification (display 3 flashes)	
8	◀ o ▶	Increases or decreases visualized value ▲ ▼	Introduce new data
9	SET	Confirms and stores the new value. If the value is different from default values, the arrow keys light on ▲ ▼	
10	FNC	Backs to parameter groups selection (see point 3)	Press again FNC to exit configuration

10.2 Configuration parameters List

10.2.1 A.In.1 - Analogue input 1

1 SEn.1 Sensor AI1

Analogue input configuration / sensor AI1 selection

tc. K	Tc-K	-260°C÷1360°C **(Default)**
tc. S	Tc-S	-40°C÷1760°C
tc. r	Tc-R	-40°C÷1760°C
tc. J	Tc-J	-200°C÷1200°C
tc. T	Tc-T	-260°C÷400°C
tc. E	Tc-E	-260°C÷980°C
tc. N	Tc-N	-260°C÷1280°C
tc. b	Tc-B	100°C÷1820°C
Pt100	Pt100	-200°C÷600°C
Ni100	Ni100	-60°C÷180°C
Ni120	Ni120	-60°C÷240°C
ntc 1	NTC 10K β3435K	-40°C÷125°C
ntc 2	NTC 10K β3694K	-40°C÷150°C
ntc 3	NTC 2252 β3976K	-40°C÷150°C
Ptc	PTC 1K	-50°C÷150°C
Pt500	Pt500	-200°C÷600°C
Pt1K	Pt1000	-200°C÷600°C
RSVd.1	Reserved	
RSVd.2	Reserved	
0-1	0÷1 V	
0-5	0÷5 V	
0-10	0÷10 V	
0-20	0÷20 mA	
4-20	4÷20 mA	
0-60	0÷60 mV	
Pot.	Potentiometer (set the value on parameter 6)	

2 d.P. 1 Decimal Point 1

Select number of displayed decimal points for AI1

0	**Default**
0.0	1 decimal
0.00	2 decimals
0.000	3 decimals

3 dEGr. Degree

°C	Celsius (**Default**)
°F	Fahrenheit
K	Kelvin

4 L.Li.1 Lower Linear Input AI1

AI1 lower limit only for linear signals. Ex.: with input 4÷20 mA this parameter takes value associated to 4 mA. The value may be greater than the one entered on the next parameter.
-9999÷+30000 [digit] **Default:** 0.

5 u.Li.1 Upper Linear Input AI1

AI1 upper limit only for linear signals Ex: with input 4÷20 mA this parameter takes value associated to 20 mA.The value may be lower than the one entered on the previous parameter.
-9999÷+30000 [digit] **Default**: 1000

6 P.uA.1 **Potentiometer Value AI1**

Selects the value of the potentiometer connectedon AI1
1÷150 kohm. **Default**: 10kohm

7 i.o.L.1 **Linear Input over Limits AI1**

If AI1 is a linear input, allows to the process to overpass the limits (parameters 4 and 5).

d,SAb	Disabilitato (**Default**)
ENAb	Abilitato

8 L.c.E.1 **Lower Current Error 1**

If AI1 is a 4÷20 mA input, it determines the current value below the probe error E-05 is signaled5.

2.0 mA (**Default**)	2.0 mA	2.6 mA	2.6 mA	3.2 mA	3.2 mA
2.2 mA	2.2 mA	2.8 mA	2.8 mA	3.4 mA	3.4 mA
2.4 mA	2.4 mA	3.0 mA	3.0 mA	3.6 mA	3.6 mA
				3.8 mA	3.8 mA

9 o.cA.1 **Offset Calibration AI1**

AI1 Offset calibration. Value added/subtracted to the process value (ex: usually correcting the ambient temperature value)..
-9999÷+9999 [digit] (degrees.tenths for temperature sensors). **Default**: 0.

10 G.cA.1 **Gain Calibration AI1**

Value multiplied to the process value to calibrate the working point. Ex: to correct the range from 0÷1000°C showing 0÷1010°C, set the parameter to -1.0
-100.0%÷+100.0%, **Default:** 0.0.

11 LEc.1 **Latch-On AI1**

Automatic setting of limits for AI1 linear input

d,SAb	Disabled (**Default**)
Stnrd	Standard
V.0.Sto.	Virtual Zero Stored
V.0.t.oN.	Virtual Zero at start

12 c.FL.1 **Conversion Filter AI1**

ADC Filter: Number of sensor readings to calculate mean that defines process value.
NB: When readings increase, control loop speed slows down.
1÷15. (**Default**: 10)

13 c.Fr.1 **Conversion Frequency AI1**

Sampling frequency of digital / analogue converter for AI1.
Increasing the conversion speed will slow down reading stability (example: for fast transients, as the pressure, it is advisable to increase sampling frequency).

4.17HZ	4.17 Hz (Min. speed conversion)	33.2HZ	33.2 Hz
6.25HZ	6.25 Hz	39.0HZ	39.0 Hz
8.33HZ	8.33 Hz	50.0HZ	50.0 Hz
10.0HZ	10.0 Hz	62.0HZ	62.0 Hz
12.5HZ	12.5 Hz	123HZ	123 Hz
16.7HZ	16.7 Hz (**Default**) Ideal for noises filtering 50/60 Hz	242HZ	242 Hz
19.6HZ	19.6 Hz	470HZ	470 Hz (Max. speed conversion)

14÷18 **Reserved Parameters**

Reserved parameters

19÷36 **Unused parameters**

10.2.2 cMd.1 - Uscite e regolaz. Processo 1

37 c.ou.1 Command Output 1

Selects the command output related to the process1 and the outputs related to the alarms.

c. o3	Command on relay output Q3
c. o1	Command on relay output Q1 (**Default**)
c. SSR	Command on digital output
c. VAL.	Servo-valve command with open loop on Q1 (6-4 open; 6-5 close)
c.0-10	Command 0÷10 V on analogue output AO1
c.4-20	Command 4÷20 mA on analogue output AO1
0.10.S.R.	Command 0÷10 V on analogue output AO1 with split-range function: the analogue output sets the cooling action from 0 to 5V and heating action from 5 to 10V
4.20.S.R	Command 4÷20 mA on analogue output AO1 with split-range function: the analogue output sets the cooling action from 4 to 12mA and heating action from 12 to 20mA

	Command	AL.1	AL.2	AL.3	AL.4	AL.5	AL.6
c. o3	Q3	Q1	Q2	Q4	DO1	DO2	AO1
c. o1	Q1	Q2	Q3	Q4	DO1	DO2	AO1
c. SSR	DO1	Q1	Q2	Q3	Q4	DO2	AO1
c. VAL.	Q1	Q2	Q3	Q4	DO1	DO2	AO1
c.0-10 (0.10.S.R.)	AO1 (0÷10 V)	Q1	Q2	Q3	Q4	DO1	DO2
c.4-20 (4.20.S.R.)	AO1 (4÷20 mA)	Q1	Q2	Q3	Q4	DO1	DO2

NB: if an output is used for functions other than alarms (for example retransmission or command n° 2), this resource will no longer be available as an alarm and the related group will be hidden from the parameter list. The correspondence of the functions/outputs remains however that indicated in the tables above.

38 Unused parameter

39 rES Reserved

Reserved aprameter

40 Ac.t.1 Action type 1

Action type to control process 1.

HEAt	Heating (N.A.) (**Default**)
cooL	Cooling (N.C.)

41 c.HY.1 Command Hysteresis 1

Hysteresis to control process 1 in ON/OFF.
-9999÷+9999 [digit] (degrees.tenths for temperature sensors). **Default** 0.2.

42 L.L.S.1 Lower Limit Setpoint 1

Lower limit setpoint selectable for command setpoint 1.
-9999÷+30000 [digit] (degrees for temperature sensors). **Default** 0

43 u.L.S.1 Upper Limit Setpoint 1

Upper limit setpoint selectable for command setpoint 1.
-9999÷+30000 [digit] (degrees for temperature sensors). **Default** 1750

44 c.rE.1 Command Reset 1

Type of reset for command contact 1 (always automatic in PID functioning)

A. RES.	Automatic Reset (**Default**)
M. RES.	Manual Reset (by keyboard or by digital input)
M.RES.S.	Manual Reset Stored (keeps relay status also after an eventual power failure)
A.RES.t	Automatic reset with timed activation. The command remains active for the time set on the parameter 48 c.dE.1., even if the conditions generating it are missing. To be able to act again, the conditions for activating the command must disappear

45 c.S.E.1 Command State Error 1

State of contact for command 1 output in case of error.

If the command output 1 (Par. 37 c.ou.1) **is relay or valve:**

oPEn	Contact or valve open (**Default**)
cLoSE	Contact or valve closed

If the command output 1 is digital output (SSR):

oFF	Digital output OFF (**Default**)
on	Digital output ON

If the command output 1 is 0÷10V:

0 V	0 V (**Default**)
10 V	10 V

If the command output 1 is 4÷20 mA:

0 mA	0 mA (**Default**)
4 mA	4 mA
20 mA	20 mA
21.5mA	21.5 mA

46 c.S.S.1 Command State Stop 1

State of contact for command output 1 with controller in STOP

If the command output 1 (Par. 37 c.ou.1) **is relay or valve:**

oPEn	Contact or valve open (**Default**)
cLoSE	Contact or valve closed

If the command output 1 is digital output (SSR):

oFF	Digital output OFF (**Default**)
on	Digital output ON

If the command output 1 is 0÷10V:

0 V	0 V (**Default**)
10 V	10 V

If the command output 1 is 4÷20 mA:

0 mA	0 mA (**Default**)
4 mA	4 mA
20 mA	20 mA
21.5mA	21.5 mA

47 c.Ld.1 Command Led 1

Defines led C1 state corresponding to the relevant output. If the valve command is selected, this parameter is not managed

o.c.	ON with open contact or SSR switched off. If command AO1, ON with output 0%, OFF if 100% and flashing between 1% and 99%.
c.c.	ON with closed contact or SSR switched on. If command AO1 ON with output 100%, OFF if 0% and flashing between 1% and 99%. (**Default**)

48 c.dE.1 Command Delay 1

Command 1 delay (only in ON / OFF functioning).
-60:00÷60:00 mm:ss. **Default**: 00:00.
Negative value: delay when turning off output.
Positive value: delay when turning on output.

49 c.S.P.1 Command Setpoint Protection 1

Allows or not to modify command setpoint 1 value

FrEE	Modification allowed (**Default**)
LocK	Protetto

50	uA.t.1	**Valve Time 1**
	Valve time related to command 1 (declared by the manufacturer of the valve) 1÷300 secondi. **Default**: 60.	
51	**Unused parameter**	
52	S.u.S.1	**State Valve Saturation 1**
	Select the valve status when the output percentage is 100%	
	PERc	The valve opening relay is activated for a time equal to 5% of the valve time (**Default**)
	FIXEd	The valve opening relay is always active
53	A.MA.1	**State Valve Saturation 1**
	Enables the automatic/manual selection for command 1	
	dISAb.	Disabled (**Default**)
	EnAb.	Enabled
	En.Sto.	Enabled with memory
54	L.P.r.1	**Load Power Rating 1**
	Defines the power rating of the load (in kW) connected to the command output 1, to calculate the energy consumed by the system. 0.0÷000.0 kW. **Default**: 0.0 kW	
55	in1.S.	**Initial State**
	Choose the state of the controller when turning it on. This only works on the RS485 version or by enabling the Start/Stop from digital input or function button	
	StArt	Start (**Default**)
	StoP	Stop
	StorE.	Stored. State of Start/Stop prior to switching offo
56÷59	**Reserved Parameters**	
	Reserved parameters	
60÷82	**Unused parameters**	

10.2.3 rEG.1 - Autotuning e PID 1

83 tun.1 Tune 1

Selects autotuning type for command 1

diSAb.	Disabled. If proportional band and integral time paramters are to selected to zero, the regulation is ON/OFF type. (**Default**)
Auto	Automatic (Automatic PID parameters calculation)
MAnu.	Manual (launch by keyboards or by digital input)
ONcE	Once (PID parameters calculation only at first start)
SYNcH.	Synchronized (Autotuning managed by serial)

84 S.d.t.1 Setpoint Deviation Tune 1

Selects deviation from command setpoint 1 as threshold used by autotuning to calculate PID parameters 0-10000 [digit] (degrees.tenths for temperature sensors). **Default**: 30.0.

85 P.b. 1 Proportional Band 1

Proportional band or process 1 PID regulation (Process inertia).
0 ON/OFF if t.1. equal to 0 (**Default**)
1÷10000 [digit] (degrees.tenths for temperature sensors).

86 i.t. 1 Integral Time 1

Integral time for process 1 PID regulation (process inertia duration).
0.0÷2000.0 seconds (0.0 = integral disabled). **Default**: 0.0

87 d.t. 1 Derivative Time 1

Derivative time for process 1 PID regulation (Normally ¼ of integral time).
0.0÷1000.0 seconds (0.0 = derivative disabled), **Default**: 0

88 d.b. 1 Dead Band 1

Dead band of process 1 PID.
0÷10000 [digit] (degrees.tenths for temperature sensors) **Default**: 0

89 P.b.c.1 Proportional Band Centered 1

Defines if the proportional band 1 must be centered or not on the setpoint. In double loop functioning (heating/cooling), always disabled.

diSAb.	Disabled. Band under (heating) or over (cooling) (**Default**)
ENAb.	Centered band

90 o.o.S.1 Off Over Setpoint 1

In PID enables the command output 1 switching off, when a certain threshold is exceeded (setpoint + Par.91 o.d.t.1)

diSAb.	Disabled (**Default**)
ENAb.	Enabled

91 o.d.t.1 Off Deviation Threshold 1

Selects deviation from command setpoint 1, to calculate the intervention threshold of "Off Over Setpoint 1" function.
-9999÷+9999 [digit1 p. 190] (degrees.tenths for temperature sensors) (**Default**: 0)

92 c.t. 1 Cycle Time 1

Cycle time for PID regulation of process 1 (for PID on remote control switch 15 s; for PID on SSR 2s).
For valve refer to parameter 50 uA.t.1
1-300 seconds (**Default**: 15 seconds)

93 co.F.1 Cooling Fluid 1

Type of refrigerant fluid for heating / cooling PID for process 1. Enable the cooling output on parameter AL.1 .. AL.6.

AIR	Air (**Default**)
oIL	Oil
WAtER	Water

94 P.b.M.1 **Proportional Band Multiplier 1**

Proportional band multiplier for heating/cooling PID for process 1. Proportional band for cooling action is given by parameter *P.b.1* multiplied for this value.
1.00÷5.00. **Default**: 1.00

95 o.d.b.1 **Overlap / Dead Band 1**

Dead band combination for heating / cooling PID (double action) for process 1. Defines the dead band combination for heating and cooling action.
-20.0%÷50.0%

Negative:	Dead band.
Positive:	Overlap. **Default**: 0.0%

96 c.c.t.1 **Cooling Cycle Time 1**

Cycle time for cooling output in heating / cooling PID mode for process 1.
1-300 seconds (**Default**: 10 s)

97 L.L.P.1 **Lower Limit Output Percentage 1**

Selects min. value for command output 1 percentage.
0%÷100%, **Default**: 0%.

98 u.L.P.1 **Upper Limit Output Percentage 1**

Selects max. value for command output 1 percentage.
0%÷100%, **Default**: 100%.

99 M.G.t.1 **Max Gap Tune 1**

Selects the max. process-setpoint gap beyond which the automatic tune recalculates PID parameters of process 1.
8-10000 [digit] (degrees.tenths for temperature sensors). **Default**: 2.0

100 Mn.P.1 **Minimum Proportional Band 1**

Selects the min. proportional band 1 value selectable by the automatic tune for the PID regulation of process 1.
0-10000 [digit] (degrees.tenths for temperature sensors). **Default**: 3.0

101 MA.P.1 **Maximum Proportional Band 1**

Selects the max. proportional band 1 value selectable by the automatic tune for the PID regulation of process 1.
0-10000 [digit] (degrees.tenths for temperature sensors). **Default**: 100.0

102 Mn.I.1 **Minimum Integral Time 1**

Selects the min. integral time 1 value selectable by the automatic tune for the PID regulation of process 1.
0.0÷1000.0 seconds. **Default**: 30.0 seconds

103 d.cA.1 **Derivative Calculation 1**

Determines if, during autotuning, derivative time must be calculated or left at zero.

AutoM.	The derivative is forced to zero only if the command is of valve type; in all other cases it is calculated by autotuning. (**Default**)
ZERo	The derivative is always forced to zero.
cALc.	The derivative is always calculated by autotuning.

104 o.c.L.1 **Overshoot Control Level 1**

The overshoot control function prevents this event during device switching on or when the setpoint is modified.
Setting a too low value the overshoot may not be fully absorbed, while with high values the process could reach the setpoint more slowly

diSAb	LEV. 3	LEV. 6	LEV. 9
LEV. 1	LEV. 4	LEV. 7	LEV. 10
LEV. 2	LEV. 5 (**Default**)	LEV. 8	

105÷108 **Reserved parameters**

reserved parameters

109÷134 **Unused parameters**

10.2.4 AL. 1 - Alarm 1

135 AL.1.F. Alarm 1 Function

Alarm 1 selection.

diSAb.	Disabled (**Default**)
Ab.uP.A.	Absolute Upper Activation. Absolute referred to the process, active over
Ab.Lo.A.	Absolute Lower Activation. Absolute referred to the process, active under
bAnd	Band alarm (command setpoint ± alarm setpoint)
A.bAnd	Asymmetric band alarm (command setpoint + alarm setpoint 1 H and command setpoint - alarm setpoint 1 L)
uP.dEV.	Upper Deviation alarm
Lo.dEV.	Lower Deviation alarm
Ab.c.u.A.	Absolute Command Upper Activation. Absolute alarm referred to the command setpoint, active over
Ab.c.L.A.	Absolute Command Lower Activation. Absolute alarm referred to the command setpoint, active under
RUN	Status alarm (active in RUN/START)
cooL	Cold actuator auxiliary (Cold action in double loop)
c. AUX	Auxiliary for job distribution on the command output. cyclically replaces the command output for the time set on the parameter 147 A.1.dE.. If A.1.dE. = 0, it is activated parallel to the command output. It does not work in case of valve control and can only be activated on an alarm if A.1.dE. is different from 0.
StEP.A.	Step Auxiliary. Auxiliary output related to the step (ON/OFF at each step).
PRb.ER.	Probe error. Alarm active in case of sensor rupture.
H.b.A.	Heater Break Alarm and Overcurrent Alarm
tMR.1	Related to timer 1
tMR.2	Related to timer 2
tMR.1.2	Related to both timers
F1	Key F1. Alarm is activated / deactivated by pressing the F1 key
F2	key F2. Alarm is activated / deactivated by pressing the F2 key
F3	Key F3. Alarm is activated / deactivated by pressing the F3 key
F4	Key F4. Alarm is activated / deactivated by pressing the F4 key
d.I. 1	Digital Input 1. Active when digital input 1 is active
d.I. 2	Digital Input 2. Active when digital input 2 is active
d.I. 3	Digital Input 3. Active when digital input 3 is active
d.I. 4	Digital Input 4. Active when digital input 4 is active
REM.	Remote. The alarm is enabled by the word 1243

136, 137 Unused parameters

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

Alarm 1 output contact and intervention type.

N.o. St.	(N.O. Start) Normally open, active at start (**Default**)
N.c. St.	(N.C. Start) Normally closed, active at start
N.o. tH.	(N.O. Threshold) Normally open, active on reaching alarm
N.c. tH.	(N.C. Threshold) Normally closed, active on reaching alarm
N.o.tH.V.	(N.O. Threshold Variation) inibito dopo variazione set di comando
N.c.tH.V.	(N.C. Threshold Variation) inibito dopo variazione set di comando

139 rES. Reserved

Reserved parameter

140 A.1.HY. Alarm 1 Hysteresis

Alarm 1 hysteresis.
-9999÷+9999 [digit] (degrees.tenths for temperature sensors). **Default** 0.5.

141	*A.1.L.L.*	**Alarm 1 Lower Limit**
	Lower limit selectable for the alarm 1 setpoint. -9999÷+30000 [digit] (degrees for temperature sensors). **Default**: 0.	
142	*A.1.u.L.*	**Alarm 1 Upper Limit**
	Upper limit selectable for the alarm 1 setpoint. -9999÷+30000 [digit] (degrees for temperature sensors). **Default**: 1750.	
143	*A.1.rE.*	**Alarm 1 Reset**
	Alarm 1 contact reset type (always automatic *AL.1.F.* = *c. Au*).	
	A. RES.	Automatic reset (**Default**)
	M. RES.	Manual reset (manual reset by keyboard SET or by digital input)
	M.RES.S.	Stored manual reset (keeps the output status also after a power failure)
	A.RES.t.	Automatic reset with timed activation. The alarm remains active for the time set on the parameter 147 *A.1.dE.*, even if the conditions generating it are missing. To be able to act again, the alarm conditions must disappear.
144	*A.1.S.E.*	**Alarm 1 State Error**
	Alarm 1 output status in case of error.	
	oPEN	Open contact. **Default**
	CLoSE	Closed contact.
145	*A.1.S.S.*	**Alarm 1 State Stop**
	Alarm 1 output status with the controller in STOP.	
	ActV.A.	Alarm active. **Default**
	CLoSE	Closed contact.
	oPEN	Open contact.
146	*A.1.Ld.*	**Alarm 1 Led**
	Defines the status of the led A1 iin correspondence of the relevant output.	
	o.c.	ON with open contact or DO switched OFF.
	c.c.	ON with closed contact or DO switched ON. (**Default**)
147	*A.1.dE.*	**Alarm 1 Delay**
	Alarm 1 Delay. -60:00÷60:00 mm:ss (hh:mm if *AL.1.F.* = *c. Au*). **Default**: 00:00.	
	Negative	delay when exit alarm status.
	Positive	delay when enter alarm status.
148	*A.1.S.P.*	**Alarm 1 Setpoint Protection**
	Allows or not to change the alarm 1 setpoint.	
	FrEE	Editable by the user (**Default**)
	LocK	Protected
	HIdE	Protected and not visualized
149	*A.1.Lb.*	**Alarm 1 Label**
	Selects the message displayed in case of alarm 1 intervention.	
	diSAb	Disabled. (**Default**)
	Lb. 01	Message 1 (See table pag. 80)
	...	
	Lb. 20	Message 20 (See table pag. 80)
	uSER.L.	Custom message (modifiable by the user through the App or via modbus)
150÷154		**Reserved parameters**
	Reserved parameters	

10.2.5 AL. 2 - Alarm 2

135 AL.2.F. Alarm 2 Function

Alarm 2 selection.

diSAb.	Disabled (**Default**)
Ab.uP.A.	Absolute Upper Activation. Absolute referred to the process, active over
Ab.Lo.A.	Absolute Lower Activation. Absolute referred to the process, active under
bAnd	Band alarm (command setpoint ± alarm setpoint)
A.bAnd	Asymmetric band alarm (command setpoint + alarm setpoint 1 H and command setpoint - alarm setpoint 1 L)
uP.dEV.	Upper Deviation alarm
Lo.dEV.	Lower Deviation alarm
Ab.c.u.A.	Absolute Command Upper Activation. Absolute alarm referred to the command setpoint, active over
Ab.c.L.A.	Absolute Command Lower Activation. Absolute alarm referred to the command setpoint, active under
RUN	Status alarm (active in RUN/START)
cooL	Cold actuator auxiliary (Cold action in double loop)
c. AUX	Auxiliary for job distribution on the command output. cyclically replaces the command output for the time set on the parameter 167 A.2.dE.. If A.1.dE. = 0, it is activated parallel to the command output. It does not work in case of valve control and can only be activated on an alarm if A.2.dE. is different from 0.
StEP.A.	Step Auxiliary. Auxiliary output related to the step (ON/OFF at each step).
PRb.ER.	Probe error. Alarm active in case of sensor rupture.
H.b.A.	Heater Break Alarm and Overcurrent Alarm
tMR.1	Related to timer 1
tMR.2	Related to timer 2
tMR.1.2	Related to both timers
F1	Key F1. Alarm is activated / deactivated by pressing the F1 key
F2	key F2. Alarm is activated / deactivated by pressing the F2 key
F3	Key F3. Alarm is activated / deactivated by pressing the F3 key
F4	Key F4. Alarm is activated / deactivated by pressing the F4 key
d.I. 1	Digital Input 1. Active when digital input 1 is active
d.I. 2	Digital Input 2. Active when digital input 2 is active
REM.	Remote. The alarm is enabled by the word 1244

156, 157 Unused parameters

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

Alarm 2 output contact and intervention type.

N.o. St.	(N.O. Start) Normally open, active at start (**Default**)
N.c. St.	(N.C. Start) Normally closed, active at start
N.o. tH.	(N.O. Threshold) Normally open, active on reaching alarm
N.c. tH.	(N.C. Threshold) Normally closed, active on reaching alarm
N.o.tH.V.	(N.O. Threshold Variation) inibito dopo variazione set di comando
N.c.tH.V.	(N.C. Threshold Variation) inibito dopo variazione set di comando

159 rES. Reserved

Reserved parameter

160 A.2.HY. Alarm 2 Hysteresis

Alarm 2 hysteresis.
-9999÷+9999 [digit] (degrees.tenths for temperature sensors). **Default** 0.5.

161 A.2.L.L. Alarm 2 Lower Limit

Lower limit selectable for the alarm 2 setpoint.
-9999÷+30000 [digit] (degrees for temperature sensors). **Default**: 0.

162 A.2.u.L. Alarm 2 Upper Limit

Upper limit selectable for the alarm 2 setpoint.
-9999÷+30000 [digit] (degrees for temperature sensors). **Default**: 1750.

163	A.2.rE.	**Alarm 2 Reset**
	Alarm 2 contact reset type (always automatic if AL.2.F. = c. Au).	
	A. RES.	Automatic reset (**Default**)
	M. RES.	Manual reset (manual reset by keyboard SET or by digital input)
	M.RES.S.	Stored manual reset (keeps the output status also after a power failure)
	A.RES.t.	Automatic reset with timed activation. The alarm remains active for the time set on the parameter 167 A.2.dE., even if the conditions generating it are missing. To be able to act again, the alarm conditions must disappear.
164	A.2.S.E.	**Alarm 2 State Error**
	Alarm 2 output status in case of error.	
	If the alarm output is relay	
	oPEN	Contact or open valve. **Default**
	CLoSE	Contact or closed valve.
	If the alarm output is digital (SSR):	
	oFF	Digital output OFF. **Default**
	oN	Digital output ON.
165	A.2.S.S.	**Alarm 2 State Stop**
	Stato dell'uscita dell'allarme 2 con regolatore in STOP.	
	If the alarm output is relay	
	ActV.A.	Alarm active. **Default**
	oPEn	Contact or open valve.
	CLoSE	Contact or closed valve.
	If the alarm output is digital (SSR):	
	ActV.A.	Alarm active. **Default**
	oFF	Digital output OFF.
	oN	Digital output ON.
166	A.2.Ld.	**Alarm 2 Led**
	Defines the status of the led A2 in correspondence of the relevant output.	
	o.c.	ON with open contact or DO switched off.
	c.c.	ON with closed contact or DO switched on. (**Default**)
167	A.2.dE.	**Alarm 2 Delay**
	Alarm 2 Delay. -60:00÷60:00 mm:ss (hh:mm if AL.2.F. = c. Au). **Default**: 00:00.	
	Negative	delay when exit alarm status.
	Positive	delay when enter alarm status.
168	A.2.S.P.	**Alarm 2 Setpoint Protection**
	Allows or not to change the alarm 2 setpoint.	
	FrEE	Editable by the user (**Default**)
	LocK	Protected
	HIdE	Protected and not visualized
169	A.2.Lb.	**Alarm 2 Label**
	Selects the message displayed in case of alarm 2 intervention.	
	diSAb	Disabled. (**Default**)
	Lb. 01	Message 1 (See table pag. 80)
	...	
	Lb. 20	Message 20 (See table pag. 80)
	uSER.L.	Custom message (modifiable by the user through the App or via modbus)
170÷174		**Reserved parameters**
	Reserved parameters	

10.2.6 AL. 3 - Alarm 3

175 AL.3.F. Alarm 3 Function

Alarm 3 selection.

diSAb.	Disabled (**Default**)
Ab.uP.A.	Absolute Upper Activation. Absolute referred to the process, active over
Ab.Lo.A.	Absolute Lower Activation. Absolute referred to the process, active under
bAnd	Band alarm (command setpoint ± alarm setpoint)
A.bAnd	Asymmetric band alarm (command setpoint + alarm setpoint 1 H and command setpoint - alarm setpoint 1 L)
uP.dEV.	Upper Deviation alarm
Lo.dEV.	Lower Deviation alarm
Ab.c.u.A.	Absolute Command Upper Activation. Absolute alarm referred to the command setpoint, active over
Ab.c.L.A.	Absolute Command Lower Activation. Absolute alarm referred to the command setpoint, active under
RUN	Status alarm (active in RUN/START)
cooL	Cold actuator auxiliary (Cold action in double loop)
c. RuX	Auxiliary for job distribution on the command output. cyclically replaces the command output for the time set on the parameter 187 A.3.dE.. If A.3.dE. = 0 it is activated parallel to the command output. It does not work in case of valve control and can only be activated on an alarm if A.3.dE. is different from 0.
StEP.A.	Step Auxiliary. Auxiliary output related to the step (ON/OFF at each step).
PRb.ER.	Probe error. Alarm active in case of sensor rupture.
H.b.A.	Heater Break Alarm and Overcurrent Alarm
tMR.1	Related to timer 1
tMR.2	Related to timer 2
tMR.1.2	Related to both timers
F1	Key F1. Alarm is activated / deactivated by pressing the F1 key
F2	key F2. Alarm is activated / deactivated by pressing the F2 key
F3	Key F3. Alarm is activated / deactivated by pressing the F3 key
F4	Key F4. Alarm is activated / deactivated by pressing the F4 key
d.I. 1	Digital Input 1. Active when digital input 1 is active
d.I. 2	Digital Input 2. Active when digital input 2 is active
REM.	Remote. The alarm is enabled by the word 1245

176, 177 Unused parameters

178 A.3.S.o. Alarm 3 State Output

Alarm 3 output contact and intervention type.

N.o. St.	(N.O. Start) Normally open, active at start (**Default**)
N.c. St.	(N.C. Start) Normally closed, active at start
N.o. tH.	(N.O. Threshold) Normally open, active on reaching alarm
N.c. tH.	(N.C. Threshold) Normally closed, active on reaching alarm
N.o.tH.V.	(N.O. Threshold Variation) inibito dopo variazione set di comando
N.c.tH.V.	(N.C. Threshold Variation) inibito dopo variazione set di comando

179 rES. Reserved

Reserved parameter

180 A.3.HY. Alarm 3 Hysteresis

Alarm 3 hysteresis.
-9999÷+9999 [digit] (degrees.tenths for temperature sensors). **Default** 0.5.

181 A.3.L.L. Alarm 3 Lower Limit

Lower limit selectable for the alarm 3 setpoint.
-9999÷+30000 [digit] (degrees for temperature sensors). **Default**: 0.

182 A.3.u.L. Alarm 3 Upper Limit

Upper limit selectable for the alarm 3 setpoint.
-9999÷+30000 [digit] (degrees for temperature sensors). **Default**: 1750.

183	*A.3.rE.*	**Alarm 3 Reset**
	Alarm 3 contact reset type (always automatic if *AL.3.F.* = *c. Au*).	
	A. RES.	Automatic reset (**Default**)
	M. RES.	Manual reset (manual reset by keyboard SET or by digital input)
	M.RES.S.	Stored manual reset (keeps the output status also after a power failure)
	A.RES.t.	Automatic reset with timed activation. The alarm remains active for the time set on the parameter 187 *A.3.dE.*, even if the conditions generating it are missing. To be able to act again, the alarm conditions must disappear.
184	*A.3.S.E.*	**Alarm 3 State Error**
	Alarm 3 output status in case of error.	
	If the alarm output is relay	
	oPEN	Contact or open valve. **Default**
	CLoSE	Contact or closed valve.
	If the alarm output is digital (SSR):	
	oFF	Digital output OFF. **Default**
	oN	Digital output ON.
185	*A.3.S.S.*	**Alarm 3 State Stop**
	Alarm 3 output status with controller in STOP	
	If the alarm output is relay	
	ActV.A.	Alarm active. **Default**
	oPEn	Contact or open valve.
	CLoSE	Contact or closed valve.
	If the alarm output is digital (SSR):	
	ActV.A.	Alarm active. **Default**
	oFF	Digital output OFF.
	oN	Digital output ON.
186	*A.3.Ld.*	**Alarm 3 Led**
	Defines the status of the led A3 in correspondence of the relevant output.	
	o.c.	ON with open contact or DO switched off.
	c.c.	ON with closed contact or DO switched on. (**Default**)
187	*A.3.dE.*	**Alarm 3 Delay**
	Alarm 3 delay. -60:00÷60:00 mm:ss (hh:mm if *AL.3.F.* = *c. Au*). **Default**: 00:00.	
	Negative	delay when exit alarm status.
	Positive	delay when enter alarm status.
188	*A.3.S.P.*	**Alarm 3 Setpoint Protection**
	Allows or not to change the alarm 3 setpoint.	
	FrEE	Editable by the user (**Default**)
	LocK	Protected
	HIdE	Protected and not visualized
189	*A.3.Lb.*	**Alarm 3 Label**
	Selects the message displayed in case of alarm 3 intervention.	
	diSAb	Disabled. (**Default**)
	Lb. 01	Message 1 (See table pag. 80)
	...	
	Lb. 20	Message 20 (See table pag. 80)
	uSER.L.	Custom message (modifiable by the user through the App or via modbus)
190÷194		**Reserved parameters**
	Reserved parameters	

10.2.7 AL. 4 - Alarm 4

195 AL.4.F. Alarm 4 Function

Alarm 4 selection.

diSAb.	Disabled (**Default**)
Ab.uP.A.	Absolute Upper Activation. Absolute referred to the process, active over
Ab.Lo.A.	Absolute Lower Activation. Absolute referred to the process, active under
bAnd	Band alarm (command setpoint ± alarm setpoint)
A.bAnd	Asymmetric band alarm (command setpoint + alarm setpoint 1 H and command setpoint - alarm setpoint 1 L)
uP.dEV.	Upper Deviation alarm
Lo.dEV.	Lower Deviation alarm
Ab.c.u.A.	Absolute Command Upper Activation. Absolute alarm referred to the command setpoint, active over
Ab.c.L.A.	Absolute Command Lower Activation. Absolute alarm referred to the command setpoint, active under
RUN	Status alarm (active in RUN/START)
cooL	Cold actuator auxiliary (Cold action in double loop)
c. AUX	Auxiliary for job distribution on the command output. cyclically replaces the command output for the time set on the parameter 207 A.4.dE.. If A.4.dE. = 0 it is activated parallel to the command output. It does not work in case of valve control and can only be activated on an alarm if A.4.dE. is different from 0.
StEP.A.	Step Auxiliary. Auxiliary output related to the step (ON/OFF at each step).
PRb.ER.	Probe error. Alarm active in case of sensor rupture.
H.b.A.	Heater Break Alarm and Overcurrent Alarm
tMR.1	Related to timer 1
tMR.2	Related to timer 2
tMR.1.2	Related to both timers
F1	Key F1. Alarm is activated / deactivated by pressing the F1 key
F2	key F2. Alarm is activated / deactivated by pressing the F2 key
F3	Key F3. Alarm is activated / deactivated by pressing the F3 key
F4	Key F4. Alarm is activated / deactivated by pressing the F4 key
d.I. 1	Digital Input 1. Active when digital input 1 is active
d.I. 2	Digital Input 2. Active when digital input 2 is active
REM.	Remote. The alarm is enabled by the word 1246

196, 197 Unused parameters

198 A.4.S.o. Alarm 4 State Output

Alarm 4 output contact and intervention type.

N.o. St.	(N.O. Start) Normally open, active at start (**Default**)
N.c. St.	(N.C. Start) Normally closed, active at start
N.o. tH.	(N.O. Threshold) Normally open, active on reaching alarm
N.c. tH.	(N.C. Threshold) Normally closed, active on reaching alarm
N.o.tH.V.	(N.O. Threshold Variation) inibito dopo variazione set di comando
N.c.tH.V.	(N.C. Threshold Variation) inibito dopo variazione set di comando

199 A.4.o.t. Alarm 4 Output Type

Defines the output type if the alarm 4 is analogue

0.10 V	Output 0÷0 V. **Default**
4.20mA	Output 4÷20 mA.
10.0 V	Output 10÷0 V
20.4mA	Output 20÷4 mA

200 A.4.HY. **Alarm 4 Hysteresis**

Alarm 4 hysteresis.
-9999÷+9999 [digit] (degrees.tenths for temperature sensors). **Default** 0.5.

201 A.4.L.L. **Alarm 4 Lower Limit**

Lower limit selectable for the alarm 4 setpoint.
-9999÷+30000 [digit] (degrees for temperature sensors). **Default**: 0.

202 A.4.u.L. **Alarm 4 Upper Limit**

Upper limit selectable for the alarm 4 setpoint.
-9999÷+30000 [digit] (degrees for temperature sensors). **Default**: 1750.

203 A.4.rE. **Alarm 4 Reset**

Alarm 4 contact reset type (always automatic if AL.4.F. = c. Auх).

A. RES.	Automatic reset (**Default**)
M. RES.	Manual reset (manual reset by keyboard SET or by digital input)
M.RES.S.	Stored manual reset (keeps the output status also after a power failure)
A.RES.t.	Automatic reset with timed activation. The alarm remains active for the time set on the parameter 207 A.4.dE., even if the conditions generating it are missing. To be able to act again, the alarm conditions must disappear.

204 A.4.S.E. **Alarm 4 State Error**

Alarm 4 output status in case of error.

If the alarm output is relay	
oPEN	Contact or open valve. **Default**
CLoSE	Contact or closed valve.
If the alarm output is digital (SSR):	
oFF	Digital output OFF. **Default**
oN	Digital output ON.
If the alarm output is 0-10V:	
0 V	0 V. **Default**
10 V	10 V
If the alarm output is 0÷20 mA or 4÷20 mA:	
0 MA	0 mA. **Default**
4 MA	4 mA
20 MA	20 mA
21.5MA	21.5 mA

205	A.4.S.S.	**Alarm 4 State Stop**
	Alarm 4 output status with controller in STOP.	
	If the alarm output is relay	
	AcTV.A.	Alarm active. **Default**
	oPEn	Contact or open valve.
	CLoSE	Contact or closed valve.
	If the alarm output is digital (SSR):	
	AcTV.A.	Alarm active. **Default**
	oFF	Digital output OFF.
	oN	Digital output ON.
	If the alarm output is 0-10V:	
	AcTV.A.	Alarm active. **Default**
	0 V	0 V
	10 V	10 V
	If the alarm output is 0÷20 mA or 4÷20 mA:	
	AcTV.A.	Alarm atcive. **Default**
	0 mA	0 mA
	4 mA	4 mA
	20 mA	20 mA
	21.5mA	21.5 mA
206	A.4.Ld.	**Alarm 4 Led**
	Defines the status of the led **A4** in correspondence of the relevant output.	
	o.c.	ON with open contact or DO switched off.
	c.c.	ON with closed contact or DO switched on. (**Default**)
207	A.4.dE.	**Alarm 4 Delay**
	Alarm 4 Delay. -60:00÷.60:00 mm:ss (hh:mm se AL.4.F. = c. Au). **Default**: 00:00.	
	Negative	delay when exit alarm status.
	Positive	delay when enter alarm status.
208	A.4.S.P.	**Alarm 4 Setpoint Protection**
	Allows or not to change the alarm 4 setpoint.	
	FrEE	Editable by the user (**Default**)
	LocK	Protected
	HIdE	Protected and not visualized
209	A.4.Lb.	**Alarm 4 Label**
	Selects the message displayed in case of alarm 4 intervention.	
	diSAb	Disabled. (**Default**)
	Lb. 01	Message 1 (See table pag. 80)
	...	
	Lb. 20	Message 20 (See table pag. 80)
	uSER.L.	Custom message (modifiable by the user through the App or via modbus)
210÷214		**Reserved parameters**
	Reserved parameters	

10.2.8 AL. 5 - Alarm 5

215 AL.5.F. Alarm 5 Function

Alarm 5 selection.

diSAb.	Disabled (**Default**)
Ab.uP.A.	Absolute Upper Activation. Absolute referred to the process, active over
Ab.Lo.A.	Absolute Lower Activation. Absolute referred to the process, active under
bAnd	Band alarm (command setpoint ± alarm setpoint)
A.bAnd	Asymmetric band alarm (command setpoint + alarm setpoint 1 H and command setpoint - alarm setpoint 1 L)
uP.dEV.	Upper Deviation alarm
Lo.dEV.	Lower Deviation alarm
Ab.c.u.A.	Absolute Command Upper Activation. Absolute alarm referred to the command setpoint, active over
Ab.c.L.A.	Absolute Command Lower Activation. Absolute alarm referred to the command setpoint, active under
RUN	Status alarm (active in RUN/START)
cooL	Cold actuator auxiliary (Cold action in double loop)
c. AUX	Auxiliary for job distribution on the command output. cyclically replaces the command output for the time set on the parameter 227 A.5.dE.. If A.5.dE. = 0 it is activated parallel to the command output. It does not work in case of valve control and can only be activated on an alarm if A.5.dE. is different from 0.
StEP.A.	Step Auxiliary. Auxiliary output related to the step (ON/OFF at each step).
PRb.ER.	Probe error. Alarm active in case of sensor rupture.
H.b.A.	Heater Break Alarm and Overcurrent Alarm
tMR.1	Related to timer 1
tMR.2	Related to timer 2
tMR.1.2	Related to both timers
F1	Key F1. Alarm is activated / deactivated by pressing the F1 key
F2	key F2. Alarm is activated / deactivated by pressing the F2 key
F3	Key F3. Alarm is activated / deactivated by pressing the F3 key
F4	Key F4. Alarm is activated / deactivated by pressing the F4 key
d.I. 1	Digital Input 1. Active when digital input 1 is active
d.I. 2	Digital Input 2. Active when digital input 2 is active
REM.	Remote. The alarm is enabled by the word 1247

216, 217 Unused parameters

218 A.5.S.o. Alarm 5 State Output

Alarm 5 output contact and intervention type.

N.o. St.	(N.O. Start) Normally open, active at start (**Default**)
N.c. St.	(N.C. Start) Normally closed, active at start
N.o. tH.	(N.O. Threshold) Normally open, active on reaching alarm
N.c. tH.	(N.C. Threshold) Normally closed, active on reaching alarm
N.o.tH.V.	(N.O. Threshold Variation) inibito dopo variazione set di comando
N.c.tH.V.	(N.C. Threshold Variation) inibito dopo variazione set di comando

219 A.5.o.t. Alarm 5 Output Type

Defines the output type if the alarm 5 is analogue

0.10 V	Output 0÷0 V. **Default**
4.20mA	Output 4÷20 mA.
10.0 V	Output 10÷0 V
20.4mA	Output 20÷4 mA

220 A.5.HY. Alarm 5 Hysteresis

Alarm 5 hysteresis.
-9999÷+9999 [digit] (degrees.tenths for temperature sensors). **Default** 0.5.

221 A.S.L.L. **Alarm 5 Lower Limit**

Lower limit selectable for the alarm 5 setpoint.
-9999÷+30000 [digit] (degrees for temperature sensors). **Default**: 0.

222 A.S.u.L. **Alarm 5 Upper Limit**

Upper limit selectable for the alarm 5 setpoint.
-9999÷+30000 [digit] (degrees for temperature sensors). **Default**: 1750.

223 A.S.rE. **Alarm 5 Reset**

Alarm 5 contact reset type (always automaticif AL.S.F. = c. Au).

A. RES.	Automatic reset (**Default**)
M. RES.	Manual reset (manual reset by keyboard SET or by digital input)
M.RES.S.	Stored manual reset (keeps the output status also after a power failure)
A.RES.t.	Automatic reset with timed activation. The alarm remains active for the time set on the parameter 227 A.S.dE., even if the conditions generating it are missing. To be able to act again, the alarm conditions must disappear.

224 A.S.S.E. **Alarm 5 State Error**

Alarm 5 output status in case of error.

If the alarm output is relay	
oPEN	Contact or open valve. **Default**
CLoSE	Contact or closed valve.
If the alarm output is digital (SSR):	
oFF	Digital output OFF. **Default**
oN	Digital output ON.
If the alarm output is 0-10V:	
0 V	0 V. **Default**
10 V	10 V
If the alarm output is 0÷20 mA or 4÷20 mA:	
0 MA	0 mA. **Default**
4 MA	4 mA
20 MA	20 mA
21.5MA	21.5 mA

225 A.S.S.S. **Alarm 5 State Stop**

Alarm 5 output status with controller in STOP.

If the alarm output is relay	
AcTV.A.	Alarm active. **Default**
oPEn	Contact or open valve.
CLoSE	Contact or closed valve.
If the alarm output is digital (SSR):	
AcTV.A.	Alarm active. **Default**
oFF	Digital output OFF.
oN	Digital output ON.
If the alarm output is 0-10V	
AcTV.A.	Alarm active. **Default**
0 V	0 V
10 V	10 V
If the alarm output is 0÷20 mA or 4÷20 mA:	
AcTV.A.	Allarme attivo. **Default**
0 MA	0 mA
4 MA	4 mA
20 MA	20 mA
21.5MA	21.5 mA

226	A.5.Ld.	**Alarm 5 Led**
	Defines the status of the led **A5** in correspondence of the relevant output.	
	o.c.	ON with open contact or DO switched off.
	c.c.	ON with closed contact or DO switched on. (**Default**)
227	A.5.dE.	**Alarm 5 Delay**
	Alarm 5 delay. -60:00÷60:00 mm:ss (hh:mm se AL.5.F. = c. Au). **Default**: 00:00.	
	Negative	delay when exit alarm status.
	Positive	delay when enter alarm status.
228	A.5.5.P.	**Alarm 5 Setpoint Protection**
	Allows or not to change the alarm 5 setpoint.	
	FrEE	Editable by the user (**Default**)
	Lock	Protected
	HIdE	Protected and not visualized
229	A.5.Lb.	**Alarm 5 Label**
	Select the message displayed in case of alarm 5 intervention.	
	diSAb	Disabled. (**Default**)
	Lb. 01	Message 1 (See table pag. 80)
	...	
	Lb. 20	Message 20 (See table pag. 80)
	uSER.L.	Custom message (modifiable by the user through the App or via modbus)
230÷234		**Reserved parameters**
	Reserved parameters	

10.2.9 AL. 6 - Alarm 6

215 AL.6.F. Alarm 6 Function

Alarm 6 selection.

dISAb.	Disabled (**Default**)
Ab.uP.A.	Absolute Upper Activation. Absolute referred to the process, active over
Ab.Lo.A.	Absolute Lower Activation. Absolute referred to the process, active under
bAnd	Band alarm (command setpoint ± alarm setpoint)
A.bAnd	Asymmetric band alarm (command setpoint + alarm setpoint 1 H and command setpoint - alarm setpoint 1 L)
uP.dEV.	Upper Deviation alarm
Lo.dEV.	Lower Deviation alarm
Ab.c.u.A.	Absolute Command Upper Activation. Absolute alarm referred to the command setpoint, active over
Ab.c.L.A.	Absolute Command Lower Activation. Absolute alarm referred to the command setpoint, active under
RUN	Status alarm (active in RUN/START)
cooL	Cold actuator auxiliary (Cold action in double loop)
c. AUX	Auxiliary for job distribution on the command output. cyclically replaces the command output for the time set on the parameter 247 A.6.dE.. If A.6.dE. = 0 it is activated parallel to the command output. It does not work in case of valve control and can only be activated on an alarm if A.6.dE. is different from 0.
StEP.A.	Step Auxiliary. Auxiliary output related to the step (ON/OFF at each step).
PRb.ER.	Probe error. Alarm active in case of sensor rupture.
H.b.A.	Heater Break Alarm and Overcurrent Alarm
tMR.1	Related to timer 1
tMR.2	Related to timer 2
tMR.1.2	Related to both timers
F1	Key F1. Alarm is activated / deactivated by pressing the F1 key
F2	key F2. Alarm is activated / deactivated by pressing the F2 key
F3	Key F3. Alarm is activated / deactivated by pressing the F3 key
F4	Key F4. Alarm is activated / deactivated by pressing the F4 key
d.I. 1	Digital Input 1. Active when digital input 1 is active
d.I. 2	Digital Input 2. Active when digital input 2 is active
REM.	Remote. The alarm is enabled by the word 1248

236, 237 Unused parameters

238 A.6.S.o. Alarm 6 State Output

Alarm 6 output contact and intervention type.

N.o. St.	(N.O. Start) Normally open, active at start (**Default**)
N.c. St.	(N.C. Start) Normally closed, active at start
N.o. tH.	(N.O. Threshold) Normally open, active on reaching alarm
N.c. tH.	(N.C. Threshold) Normally closed, active on reaching alarm
N.o.tH.V.	(N.O. Threshold Variation) inibito dopo variazione set di comando
N.c.tH.V.	(N.C. Threshold Variation) inibito dopo variazione set di comando

239 A.6.o.t. Alarm 6 Output Type

Defines the output type if the alarm 6 is analogue.

0.10 V	Output 0÷0 V. **Default**
4.20mA	Output 4÷20 mA.
10.0 V	Output 10÷0 V
20.4mA	Output 20÷4 mA

240 A.6.HY. Alarm 6 Hysteresis

Alarm 6 hysteresis
-9999÷+9999 [digit] (degrees.tenths for temperature sensors). **Default** 0.5.

241 A.6.L.L. Alarm 6 Lower Limit

Lower limit selectable for the alarm 6 setpoint..
-9999÷+30000 [digit] (degrees for temperature sensors). **Default**: 0.

242 A.6.u.L. Alarm 6 Upper Limit

Upper limit selectable for the alarm 6 setpoint.
-9999÷+30000 [digit] (degrees for temperature sensors). **Default**: 1750.

243 A.6.rE. Alarm 6 Reset

Alarm 6 contact reset type (always automatic if AL.6.F. = c. Au).

A. RES.	Automatic reset (**Default**)
M. RES.	Manual reset (manual reset by keyboard SET or by digital input)
M.RES.S.	Stored manual reset (keeps the output status also after a power failure)
A.RES.t.	Automatic reset with timed activation. The alarm remains active for the time set on the parameter 247 A.6.dE., even if the conditions generating it are missing. To be able to act again, the alarm conditions must disappear.

244 A.6.S.E. Alarm 6 State Error

Alarm 6 output status in case of error.

If the alarm output is digital (SSR):	
oFF	Digital output OFF. **Default**
oN	Digital output ON.
If the alarm output is 0-10V:	
0 V	0 V. **Default**
10 V	10 V
If the alarm output is 0÷20 mA or 4÷20 mA:	
0 mA	0 mA. **Default**
4 mA	4 mA
20 mA	20 mA
21.5mA	21.5 mA

245 A.6.S.S. Alarm 6 State Stop

Alarm 6 output status with controller in STOP.

If the alarm output is digital (SSR):	
ActV.A.	Alarm active. **Default**
oFF	Digital output OFF.
oN	Digital output ON.
If the alarm output is 0-10V	
ActV.A.	Alarm active. **Default**
0 V	0 V
10 V	10 V
If the alarm output is 0÷20 mA or 4÷20 mA:	
ActV.A.	Allarme attivo. **Default**
0 mA	0 mA
4 mA	4 mA
20 mA	20 mA
21.5mA	21.5 mA

246 A.6.Ld. Alarm 6 Led

Defines the status of the led A6 in correspondence of the relevant output.

o.c.	ON with open contact or DO switched off.
c.c.	ON with closed contact or DO switched on. (**Default**)

247	A.6.dE.	**Alarm 6 Delay**
	Alarm 6 Delay. -60:00÷60:00 mm:ss (hh:mm se AL.6.F. = c. Au%). **Default**: 00:00.	
	Negative	delay when exit alarm status.
	Positive	delay when enter alarm status.
248	A.6.S.P.	**Alarm 6 Setpoint Protection**
	Allows or not to change the alarm 6 setpoint.	
	FrEE	Editable by the user (**Default**)
	LocK	Protected
	HIdE	Protected and not visualized
249	A.6.Lb.	**Alarm 5 Label**
	Selects the message displayed in case of alarm 6 intervention.	
	diSAb	Disabled. (**Default**)
	Lb. 01	Message 1 (See table pag. 80)
	...	
	Lb. 20	Message 20 (See table pag. 80)
	uSER.L.	Custom message (modifiable by the user through the App or via modbus)
250÷254		**Reserved parameters**
	Reserved parameters	
255÷274		**Unused parameters**

10.2.10 d.i. 1 - Digital input 1

275 d.i.1.F Digital Input 1 Function

Digital input 1 functioning..

diSAb.	Disabled (**Default**)
2t. SW.	2 Setpoints Switch
2t.SW.i.	2 Setpoints Switch Impulsive
3t.SW.i.	3 Setpoints Switch Impulsive
4t.SW.i.	4 Setpoints Switch Impulsive
SEt.1	Controller regulates on SET 1
SEt.2	Controller regulates on SET 2
SEt.3	Controller regulates on SET 3
SEt.4	Controller regulates on SET 4
StArt	Start (impulsive)
StoP	Stop (impulsive)
St./St.	Start / Stop (impulsive)
RUN	Run (controller in START with D.I. active, controller in STOP with D.I. disabled)
Ext.AL.	External alarm. The controller goes on STOP and the alarms will be disabled. The controller does not return to START automatically: for this operation, the user's intervention is required.
HoLd	Lock conversion (stop all conversions and display values)
tUNE	Manual Tune
Au.MA.i	Automatic / Manual Impulse (if enabled on parameter 53 or 76)
Au.MA.c.	Automatic / Manual Contact (if enabled on parameter 53 or 76)
Act.ty.	Action Type. Cooling regulation if D.I. is active, otherwise heating regulation
PRGM	Programmer. 1 cycle Programmer, with D.I. active (if enabled on parameter 312 PRGM), otherwise simple controller
R. KWH	Reset kWh. Resets the energy consumed by the system.
A.i. 0	Analogue Input 0. Set AI to zero
M. RES.	Manual reset. Reset the outputs if selected as manual reset
t.1.RUN	Timer 1 run. The timer 1 count with activated D.I.
t.1. S.E.	Timer 1 Start End. D.I. starts and stops the timer 1 (impulsive)
t.1.StR.	Timer 1 Start. D.I. starts the timer 1 (impulsive)
t.1.End	Timer 1 End. D.I. stops the timer 1 (impulsive)
t.2.RUN	Timer 2 run. The timer 2 count with activated D.I.
t.2. S.E.	Timer 2 Start End. D.I. starts and stops the timer 2 (impulsive)
t.2.StR.	Timer 2 Start. D.I. starts the timer 2 (impulsive)
t.2.End	Timer 2 End. D.I. stops the timer 2 (impulsive)
Lo.cFG	Lock configuration and setpoints
uP.KEY	Simulates the functioning of up key ▶.
doWN.K.	Simulates the functioning of down key ◀.
FNc. K.	Simulates the functioning of FNC key.
SEt. K.	Simulates the functioning of SET key.
REM.S.E.	Remote setpoint enabling. Enables Remote setpoint with activated D.I. Local setpoint with deactivated D.I. (remote setpoint must be enabled on parameter 62 REM.S.).

276 d.i.1.c Digital Input 1 Contact

Defines the resting contact of the digital input 1.

N.oPEN	Normally open (**Default**)
N.cLoS.	Normally closed

277,278 Unused parameters

279÷283 Reserved parameters

Reserved parameters

10.2.11 d.i. 2 - Digital input 2

284 d.i.2.F Digital Input 2 Function

Digital input 2 functioning.

diSAb.	Disabled (**Default**)
2t. SW.	2 Setpoints Switch
2t.SW.i.	2 Setpoints Switch Impulsive
3t.SW.i.	3 Setpoints Switch Impulsive
4t.SW.i.	4 Setpoints Switch Impulsive
SEt.1	Controller regulates on SET 1
SEt.2	Controller regulates on SET 2
SEt.3	Controller regulates on SET 3
SEt.4	Controller regulates on SET 4
StArt	Start (impulsive)
StoP	Stop (impulsive)
St./St.	Start / Stop (impulsive)
RUN	Run (controller in START with D.I. active, controller in STOP with D.I. disabled)
Ext.AL.	External alarm. The controller goes on STOP and the alarms will be disabled. The controller does not return to START automatically: for this operation, the user's intervention is required.
HoLd	Lock conversion (stop all conversions and display values)
tUNE	Manual Tune
Au.MA.i	Automatic / Manual Impulse (if enabled on parameter 53 or 76)
Au.MA.c.	Automatic / Manual Contact (if enabled on parameter 53 or 76)
Act.ty.	Action Type. Cooling regulation if D.I. is active, otherwise heating regulation
PRGM	Programmer. 1 cycle Programmer, with D.I. active (if enabled on parameter 312 PRGM), otherwise simple controller
R. KWH	Reset kWh. Resets the energy consumed by the system.
A.i. 0	Analogue Input 0. Set AI to zero
M. RES.	Manual reset. Reset the outputs if selected as manual reset
t.1.RUN	Timer 1 run. The timer 1 count with activated D.I.
t.1. S.E.	Timer 1 Start End. D.I. starts and stops the timer 1 (impulsive)
t.1.StA.	Timer 1 Start. D.I. starts the timer 1 (impulsive)
t.1.End	Timer 1 End. D.I. stops the timer 1 (impulsive)
t.2.RUN	Timer 2 run. The timer 2 count with activated D.I.
t.2. S.E.	Timer 2 Start End. D.I. starts and stops the timer 2 (impulsive)
t.2.StA.	Timer 2 Start. D.I. starts the timer 2 (impulsive)
t.2.End	Timer 2 End. D.I. stops the timer 2 (impulsive)
Lo.cFG	Lock configuration and setpoints
uP.KEY	Simulates the functioning of up key ▲.
doWN.K.	Simulates the functioning of down key ▼.
FNc. K.	Simulates the functioning of FNC key.
SEt. K.	Simulates the functioning of SET key.
REM.S.E.	Remote setpoint enabling. Enables Remote setpoint with activated D.I. Local setpoint with deactivated D.I. (remote setpoint must be enabled on parameter 62 REM.S.).

285 d.i.2.c Digital Input 2 Contact

Defines the resting contact of the digital input 2.

N.oPEN	Normally open (**Default**)
N.cLoS.	Normally closed

286, 287 Unused parameters

288÷292 Reserved parameters

Reserved parameters

293÷310	**Unused parameters**

10.2.12 SFt.S - Soft-start and mini cycle

311	dE.St.	**Delayed Start**
	To set the initial waiting time for the delayed start of the setting or cycle, even in case of a blackout. The elapsed time is saved every 10 minutes.	
	00:00	Initial waiting time disabled: the controller starts immediately (**Default**)
	00:01-24:00 hh:mm	Initial waiting time enabled
312	PrGM	**Programmer**
	Enables the programmer functioning (1 cycle, 12 steps).	
	diSAb.	Disabled (**Default**)
	EnAb.	Enabled ((all remote setpoint functions are inhibited)
313	SS.TY.	**Soft-Start Type**
	Enables and selects the soft-start type	
	diSAb.	Disabled (**Default**)
	GrAd.	Gradient
	PErc.	Percentage (only with pre-programmed cycle disabled)
314		**Unused parameter**
315	SS.Gr.	**Soft-Start Gradient**
	Rising/falling gradient for soft-start and pre-programmed cycle. 0÷20000 Digit/hour (degrees.tenth / hour if temperature). (**Default**: 100.0)	
316	SS.PE.	**Soft-Start Percentage**
	Output percentage during soft-start function. 0÷100%. (**Default**: 50%)	
317	SS.tH.	**Soft-Start Threshold**
	Threshold under which the soft-start percentage function is activated, at starting. -9999÷30000 [digit] (degrees.tenths for temperature sensors) (**Default**: 1000)	
318	SS.TY.	**Soft-Start Type**
	Max. Softstart duration: if the processs will not reach the threshold selected on par. SS.tH. within the selected time, the controller starts to regulate on setpoint.	
	00:00	Disabled
	00:01-24:00	hh:mm (**Default**: 00:15)
319	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)
320	M.G.S.E.	**Max. Gap Step End**
	Selects max. gap for step end waiting activation. When the difference between setpoint- process is lower than this parameter, controller switches to the next step also without waiting time programmed into parameter 319 U.t.S.E. 0÷10000 [digit] (degrees.tenth for temperature sensors) (**Default**: 5.0°C)	
321	r.i.cY.	**Recovery Interrupted Cycle**
	Enables interrupted cycle recovery function.	
	diSAb.	Cycle recovery disabled
	AutoM.	Cycle recovery enabled with automatic gradient (**Default**)
	2...20000	Digit/hour (degrees.tenth / hour if temperature). Select recovery gradient (rising.
322÷325		**Reserved parameters**
	Reserved parameters	

10.2.13 dISP. - Display and interface

326	u.FLt	**Visualization Filter**
	dISAb.	Disabled
	PtcHF	Pitchfork filter (**Default**)
	F1.oRd.	First Order
	F1.oR.P.	First Order with Pitchfork
	2 SA.M.	2 Samples Mean
	...	...n Samples Mean
	10.SA.M.	10 Samples Mean
327	u1.d.2	**Visualization Display 2**
	Select visualization on display 2 (second line).	
	Pro.d.1	(Process Display 1) Visualises which process the display 1 is visualising (Es. A.in.1)
	u.o.M.	(Unit Of Measure) Unit of measure set on the parameter 329 u.o.M.
	c.1.SPV	Command 1 setpoint (**Default**)
	ou.PE.1	Percentage of command output 1
	AMP. 1	Ampere from 1 current transformer
	d.S.P.c.1	Command process setpoint deviation 1
	VAL.c.1	Valve position for command 1
	KW	Power on loads (command 1 + command 2 if present)
	KWH	kWh cmd 1. Energy transferred to loads (command 1 + command 2 if present)
	A.IN.1	Value read on input AI1.
	c.2.SPV	Command 2 setpoint
	ou.PE.2	Percentage of command output 2
	AMP. 2	Ampere from current transformer 2
	d.S.P.c.2	Command process setpoint deviation 2
	VAL.c.2	Valve position for command 2
	KW c.1	Power on control load 1
	KWH.c.1	kWh cmd 1. Energy transferred to command load 1
	KW c.2	Power on control load 2
	KWH.c.2	kWh cmd 2. Energy transferred to command load 2
328	u1.d.3	**Visualization Display 3**
	Select visualization on display 3.	
	StAtE	Status controller. RUN, STOP, MANUAL, REMOTE, STEP1... STEP8 (**Default**)
	Pro.d.1	(Process Display 1) Visualises which process the display 1 is visualising (Es. A.in.1)
	u.o.M.	(Unit Of Measure) Unit of measure set on the parameter 329 u.o.M.
	c.1.SPV	Command 1 setpoint (**Default**)
	ou.PE.1	Percentage of command output 1
	AMP. 1	Ampere from 1 current transformer
	d.S.P.c.1	Command process setpoint deviation 1
	VAL.c.1	Valve position for command 1
	KW	Power on loads (command 1 + command 2 if present)
	KWH	kWh cmd 1. Energy transferred to loads (command 1 + command 2 if present)
	A.IN.1	Value read on input AI1.
	c.2.SPV	Command 2 setpoint
	ou.PE.2	Percentage of command output 2
	AMP. 2	Ampere from current transformer 2
	d.S.P.c.2	Command process setpoint deviation 2
	VAL.c.2	Valve position for command 2
	KW c.1	Power on control load 1
	KWH.c.1	kWh cmd 1. Energy transferred to command load 1

KW c.2	Power on control load 2
KWH.c.2	kWh cmd 2. Energy transferred to command load 2

329 u.o.M Unit Of Measure

Select the unit of measurement to show on the displays 2/3 if enabled in parameters 327 and 328.

°C **Default**	HPA	iN	M/H	KGP
°F	KPA	N	L/S	Ki P
K	MPA	KN	L/M	LbF
V	RtM	G	L/H	oZF
MV	MH2o	KG	RPM	PcS
A	MMHG	Q	RH	PERS
MA	MM	t	PH	
bAR	cM	oZ	L	
MbAR	dM	Lb	NM	
PSi	M	M/S	KNM	
PA	KM	M/M	KGF	

330 uSr.M. User Menu

Enables to modify parameter 315 **SS.Gr.** "Soft-Start Gradient" from the user menu. To modify the gradient, press SET.

diSAb.	Disabled (**Default**)
ENAb.	Enabled (the gradient can be changed from the user menu)

331 ScL.t. Scrolling Time

Select the duration for the visualization of the user menu data, before returning to the default page.

3 S	3 seconds
5 S	5 seconds (**Default**)
10 S	10 seconds
30 S	30 seconds
1 MiN	1 minute
5 MiN	5 minutes
10MiN	10 minutes
MAN.Sc.	Manual scroll

332 bAr.G. Bar Graph

Set the value indicated by the Bar Graph

diSAb.	Bar graph off
c.1.SPV	Command 1 setpoint
ou.PE.1	Command output percentage 1 (Par. L.L.b.G.and u.L.b.G. are ignoredi) (**Default**)
AMP. 1	Ampere from current transformer 1
d.S.P.c.1	Command process setpoint deviation 1
VA.P.c.1	Valve position for command 1 (Par. L.L.b.G. and u.L.b.G. are ignored)
KW	Power on loads (command 1 + command 2 if present)
Ai N.1	Value read on AI1 input1.
c.2.SPV	Command 2 setpoint
ou.PE.2	Percentage of command output 2 (Par. L.L.b.G. and u.L.b.G. are ignored)
AMP. 2	Ampere from current transformer 2
d.S.P.c.2	Command process setpoint deviation 2
VA.P.c.2	Valve position for command 2 (Par. L.L.b.G. and u.L.b.G. are ignored)

333	L.L.b.G.	**Lower Limit Bar Graph**
	Bar Graph lower limit -9999÷+30000 [digit] (degrees for temperature sensors). **Default** 0.	
334	u.L.b.G.	**Upper Limit Bar Graph**
	Bar Graph upper limit -9999÷+30000 [digit] (degrees for temperature sensors). **Default** 1000	
335	u.out	**Voltage Output**
	Select the voltage on the sensors power terminals and of the digital outputs (SSR).	
	12 V	12 volt (**Default**)
	24 V	24 volt
336		**Unused parameter**
337÷341		**Reserved parameters**
	Reserved parameters	

10.2.14 F.KEY. - Function keys

342 F1.F F1 Key

F1 key operation mode.

diSAb.	Disabled (**Default**)
2t.Sw.i.	2 Setpoints Switch Impulsive
3t.Sw.i.	3 Setpoints Switch Impulsive
4t.Sw.i.	4 Setpoints Switch Impulsive
SEt.1	Controller regulates on SET 1
SEt.2	Controller regulates on SET 2
SEt.3	Controller regulates on SET 3
SEt.4	Controller regulates on SET 4
StArt	Start (impulsive)
StoP	Stop (impulsive)
St./St.	Start / Stop (impulsive)
tunE	Performing manual tune
Au.MA.i.	Automatic / Manual Impulse (if enabled on parameter 53)
R. kWH	Reset kWh. Reset the value of energy consumed by the system.
A.i. 0	Analogue Input 0. Set AI to zero
M. RES.	Manual reset. Reset the outputs if selected as manual reset
t.1. S.E.	Timer 1 Start End. D.I. starts and stops the timer 1(impulsive)
t.1.StA.	Timer 1 Start. D.I. starts the timer 1 (impulsive)
t.1.End	Timer 1 End. D.I. stops the timer 1 (impulsive)
t.2. S.E.	Timer 2 Start End. D.I. starts and stops the timer 2 (impulsive)
t.2.StA.	Timer 2 Start. D.I. starts the timer 2 (impulsive)
t.2.End	Timer 2 End. D.I. stops the timer 2 (impulsive)
REM.S.E.	Local/Remote setpoint switch (remote setpoint must be enabled on par.62 REM.S.)

343 F1 c. F1 Contact

Defines the type of contact to be performed on F1 to activate the related function.

FSt.PR.	(Fast Press) Fast pressure (**Default**)
PR.HLd.	(Press & hold) Long pressure (1s).

344 Unused parameter

345 F1 r.c. F1 Reference Command

Defines the reference command for F1 functions.

cMd. 1	Command 1 (**Default**)
cMd. 2	Command 2
cMd.1.2	Command 1 and 2

346 rES Reserved

Reserved parameter

347 rES Reserved

Reserved parameter

348 F2.F F2 Key

F2 key operation mode.

diSAb.	Disabled (**Default**)
2t.Sw.i.	2 Setpoints Switch Impulsive
3t.Sw.i.	3 Setpoints Switch Impulsive
4t.Sw.i.	4 Setpoints Switch Impulsive
SEt.1	Controller regulates on SET 1

SEt.2	Controller regulates on SET 2
SEt.3	Controller regulates on SET 3
SEt.4	Controller regulates on SET 4
StArt	Start (impulsive)
StoP	Stop (impulsive)
St./St.	Start / Stop (impulsive)
tunE	Performing manual tune
Au.MA..	Automatic / Manual Impulse (if enabled on parameter 53)
R. KWH	Reset kWh. Reset the value of energy consumed by the system.
A.. 0	Analogue Input 0. Set AI to zero
M. RES.	Manual reset. Reset the outputs if selected as manual reset
t.1. S.E.	Timer 1 Start End. D.I. starts and stops the timer 1(impulsive)
t.1.StA.	Timer 1 Start. D.I. starts the timer 1 (impulsive)
t.1.End	Timer 1 End. D.I. stops the timer 1 (impulsive)
t.2. S.E.	Timer 2 Start End. D.I. starts and stops the timer 2 (impulsive)
t.2.StA.	Timer 2 Start. D.I. starts the timer 2 (impulsive)
t.2.End	Timer 2 End. D.I. stops the timer 2 (impulsive)
REM.S.E.	Local/Remote setpoint switch (remote setpoint must be enabled on par.62 REM.S.)

349 F2 c. F2 Contact

Defines the type of contact to be performed on F2 to activate the related function.

FSt.Pr.	(Fast Press) Fast pressure (**Default**)
PR.HLd.	(Press & hold) Long pressure (1s).

350 Parametro non utilizzato

351 F2 r.c. F2 Reference Command

Defines the reference command for F2 functions.

cMd. 1	Command 1 (**Default**)
cMd. 2	Command 2
cMd.1.2	Command 1 and 2

352 rES Reserved

Reserved parameter

353 rES Reserved

Reserved parameter

354 F3.F F3 Key

F3 key operation mode.

diSAb.	Disabled (**Default**)
2t.Sw..	2 Setpoints Switch Impulsive
3t.Sw..	3 Setpoints Switch Impulsive
4t.Sw..	4 Setpoints Switch Impulsive
SEt.1	Controller regulates on SET 1
SEt.2	Controller regulates on SET 2
SEt.3	Controller regulates on SET 3
SEt.4	Controller regulates on SET 4
StArt	Start (impulsive)
StoP	Stop (impulsive)
St./St.	Start / Stop (impulsive)
tunE	Performing manual tune
Au.MA..	Automatic / Manual Impulse (if enabled on parameter 53)
R. KWH	Reset kWh. Reset the value of energy consumed by the system.

A.i. 0	Analogue Input 0. Set AI to zero
M. RES.	Manual reset. Reset the outputs if selected as manual reset
t.1. S.E.	Timer 1 Start End. D.I. starts and stops the timer 1(impulsive)
t.1.StA.	Timer 1 Start. D.I. starts the timer 1 (impulsive)
t.1.End	Timer 1 End. D.I. stops the timer 1 (impulsive)
t.2. S.E.	Timer 2 Start End. D.I. starts and stops the timer 2 (impulsive)
t.2.StA.	Timer 2 Start. D.I. starts the timer 2 (impulsive)
t.2.End	Timer 2 End. D.I. stops the timer 2 (impulsive)
REM.S.E.	Local/Remote setpoint switch (remote setpoint must be enabled on par.62 REM.S.)

355 F3 c. F3 Contact

Defines the type of contact to be performed on F3 to activate the related function..

FSt.Pr.	(Fast Press) Fast pressure (**Default**)
PR.HLd.	(Press & hold) Long pressure (1s).

356 Parametro non utilizzato

357 F3 r.c. F3 Reference Command

Defines the reference command for F3 functions.

cMd. 1	Command 1 (**Default**)
cMd. 2	Command 2
cMd.1.2	Command 1 and 2

358 rES Reserved

Reserved parameter

359 rES Reserved

Reserved parameter

360 F4.F F4 Key

Funzionamento tasto F4.

diSAb.	Disabled (**Default**)
2t.Sw.i.	2 Setpoints Switch Impulsive
3t.Sw.i.	3 Setpoints Switch Impulsive
4t.Sw.i.	4 Setpoints Switch Impulsive
SEt.1	Controller regulates on SET 1
SEt.2	Controller regulates on SET 2
SEt.3	Controller regulates on SET 3
SEt.4	Controller regulates on SET 4
StArt	Start (impulsive)
StoP	Stop (impulsive)
St./St.	Start / Stop (impulsive)
tunE	Performing manual tune
Au.MA.i.	Automatic / Manual Impulse (if enabled on parameter 53)
R. kWH	Reset kWh. Reset the value of energy consumed by the system.
A.i. 0	Analogue Input 0. Set AI to zero
M. RES.	Manual reset. Reset the outputs if selected as manual reset
t.1. S.E.	Timer 1 Start End. D.I. starts and stops the timer 1(impulsive)
t.1.StA.	Timer 1 Start. D.I. starts the timer 1 (impulsive)
t.1.End	Timer 1 End. D.I. stops the timer 1 (impulsive)
t.2. S.E.	Timer 2 Start End. D.I. starts and stops the timer 2 (impulsive)
t.2.StA.	Timer 2 Start. D.I. starts the timer 2 (impulsive)
t.2.End	Timer 2 End. D.I. stops the timer 2 (impulsive)

	REM.S.E.	Local/Remote setpoint switch (remote setpoint must be enabled on par.62 REM.S.)
361	F4 c.	**F4 Contact**
	Defines the type of contact to be performed on F4 to activate the related function.	
	FSt.Pr.	(Fast Press) Fast pressure (**Default**)
	PR.HLd.	(Press & hold) Long pressure (1s).
362		**Parametro non utilizzato**
363	F4 r.c.	**F4 Reference Command**
	Defines the reference command for F4 functions.	
	cMd. 1	Command 1 (**Default**)
	cMd. 2	Command 2
	cMd.1.2	Command 1 and 2
364	rES	**Reserved**
	Reserved parameter	
365	rES	**Reserved**
	Reserved parameter	

10.2.15 Ct 1 - Current transformer 1

366	Ct.1.F	**Current Transformer 1 Function**
	Enables the CT1 input and select the net frequency	
	diSAb.	Disabled (**Default**)
	50 HZ	50 Hz
	60 HZ	60 Hz
	A.in.2	Electricity is the value converted by analogue input 2
367	Ct.1.u.	**Current Transformer 1 Value**
	Select the current transformer 1 full-scale 1÷300 Ampere (**Default**: 50)	
368	H.b.1.r.	**Heater Break Alarm 1 Reference Command**
	Defines the heater break Alarm reference command and the CT1 overcurrent.	
	cMd. 1	Command 1 (**Default**)
	cMd. 2	Command 2
369	H.b.1.t.	**Heater Break Alarm 1 Threshold**
	CT1 Heater Break Alarm 1 intervention threshold	
	0	Alarm disabled. (**Default**)
	0.1-300.0	Ampere.
370	oc.1.t.	**Overcurrent 1 Alarm Threshold**
	CT1 Overcurrent Alarm 1 threshold	
	0	Alarm disabled. (**Default**)
	0.1-300.0	Ampere.
371	H.b.1.d.	**Heater Break Alarm 1 Delay**
	CT1 Heater Break Alarm and overcurrent alarm activation delay. 00:00-60:00 mm:ss (**Default**: 01:00)	
372÷376		**Reserved parameters**
	Reserved parameters	

10.2.16 Ao. 1 - Retransmission 1

388 rtN.1 Retransmission 1

Retransmission for AO1. Parameters 390 and 391 define lower and upper limit of the operating scale.

diSAb.	Disabled (**Default**)
c.1.SPV	Command 1 setpoint
ou.PE.1	Percentage of command output 1
d.S.P.c.1	Command process setpoint deviation 1
AMP. 1	Ampere from current transformer 1
AL. 1	Alarm 1 setpoint
AL. 2	Alarm 2 setpoint
Md.buS	Retransmits the value written on word 1241
A.IN.1	Value read on input AI1
c.2.SPV	Command 2 setpoint
ou.PE.2	Percentage of command output 2
d.S.P.c.2	Command process setpoint deviation 2
AMP. 2	Ampere from current transformer 2

389 r.1.tY. Retransmission 1 Type

Select the retransmission type for AO1

0.10 V	Output 0÷10 V.
4.20MA	Output 4÷20 mA. **Default**

390 r.1. L.L. Retransmission 1 Lower Limit

Retransmission 1 lower limit range (value related to 0 V or 0/4 mA).
-9999÷+30000 [digit] (degrees for temperature sensors), **Default**: 0.

391 r.1. u.L. Retransmission 1 Upper Limit

Retransmission 1 upper limit range (value related to 10 V or 20 mA).
-9999÷+30000 [digit] (degrees for temperature sensors), **Default**: 1000.

392 r.1.S.E. Retransmission 1 State Error

Determines retransmission 1 value in case of error or anomaly

If the retransmission output is 0-10V:	
0 V	0 V. **Default**
10 V	10 V
Se l'uscita di ritrasmissione è 4-20 mA:	
0 MA	0 mA. **Default**
4 MA	4 mA
20 MA	20 mA
21.5MA	21.5 mA

393 r.1.S.S. Retransmission 1 State Stop

Determines retransmission 1 value with controller in STOP.

If the alarm output is 0-10V:	
ActV.R.	Alarm active
0 V	0 V. **Default**
10 V	10 V
If the alarm output is 0-20 mA or 4-20 mA:	
ActV.R.	Alarm active
0 MA	0 mA. **Default**
4 MA	4 mA
20 MA	20 mA
21.5MA	21.5 mA

394÷398	**Reserved parameters**
	Reserved parameters
399÷409	**Unused parameters**

10.2.17 SEr. - Serial

410 SL.Ad.	**Slave Address**
	Select slave address for serial communication. 1÷254. **Default**: 247.
411 bd.rt.	**Baud Rate**
	Select baudrate for serial communication.

1.2 K	1200 bit/s	28.8 K	28800 bit/s
2.4 K	2400 bit/s	38.4 K	38400 bit/s
4.8 K	4800 bit/s	57.6 K	57600 bit/s
9.6 K	9600 bit/s	115.2K	115200 bit/s
19.2 K	19200 bit/s (**Default**)		

412 S.P.P.	**Serial Port Parameters**
	Select the format for the modbus RTU serial communication.

8-N-1	8 bit, no parity, 1 stop bit (**Default**)
8-E-1	8 bit, even parity, 1 stop bit
8-o-1	8 bit, odd parity, 1 stop bit
8-N-2	8 bit, no parity, 2 stop bit
8-E-2	8 bit, even parity, 2 stop bit
8-o-2	8 bit, odd parity, 2 stop bit

413 SE.dE.	**Serial Delay**
	Select serial delay. 0÷100 ms. Default: 5 ms.
414 oFF.L.	**Off Line**
	Select the off-line tine. If there is no serial communication during the selected time, the controller switches-off the command output.

0	Offline disabilitato (**Default**)
0.1-600.0	tenths of second

415÷419	**Reserved parameters**
	Reserved parameters

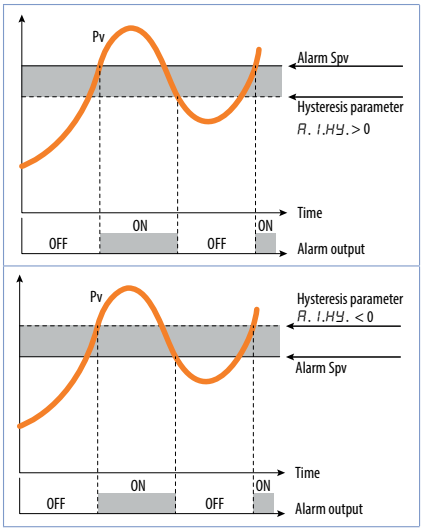
10.2.18 tIMr - Timer

420	tMr.1	**Timer 1**
	Enabling Timer 1.	
	diSAb.	Disabled (**Default**)
	EnAb.	Enabled
	En.StA.	Enabled and active at start
421	t.b.t.1	**Time Base Timer 1**
	Selects time base for timer 1.	
	MM.SS	minutes.seconds (**Default**)
	HH.MM	hours.minutes
422	A.tM.1	**Action Timer 1**
	Select the type of the action executed by the timer 1 to be related to an alarm.	
	StArt	Start. Active during timer counting(**Default**)
	End	End. Active at timer expiry
	WArn.	Warning. Active 5" before the timer expiry
423	tMr.2	**Timer 2**
	Enabling Timer 2.	
	diSAb.	Disabled (**Default**)
	EnAb.	Enabled
	En.StA.	Enabled and active at start
424	t.b.t.2	**Time Base Timer 2**
	Seleziona la base tempi per il timer 2.	
	MM.SS	minutes.seconds (**Default**)
	HH.MM	hours.minutes
425	A.tM.2	**Action Timer 2**
	Select the type of the action executed by the timer 2 to be related to an alarm.	
	StArt	Start. Active during timer counting(**Default**)
	End	End. Active at timer expiry
	WArn.	Warning. Active 5" before the timer expiry
426	tMr.S.	**Timers Sequence**
	Select the correlation between the two timers	
	SinGL.	Singles. Timers work independently (**Default**)
	SEQuE.	Sequential. When timer 1 ends, timer 2 starts.
	LooP	Loop. When a timer ends, another starts
427	MAi.r.	**Maintenance Request**
	View a maintenance request after elapsing of time given on par. 428 M.tiM..	
	diSAb.	Disabled (**Default**)
	EnAb.	Enabled
428	M.tiM.	
	Select the time in hours for the maintenance request. Range 1÷30000 (**default** 1000).	
429÷431		**Reserved parameters**
	Reserved parameters	

11 Alarm features

11.1 Alarm intervention modes

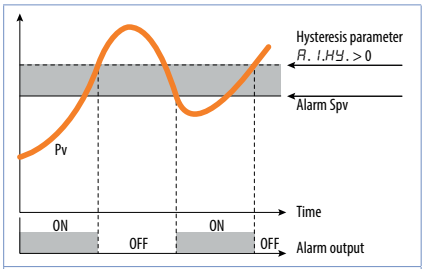
Absolute or threshold alarm active over (Parameter 135 AL.1.F. = Ab.uP.A.)



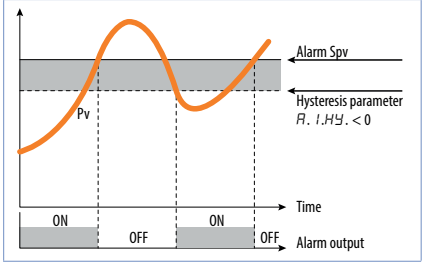
Absolute alarm active over.
Hysteresis value greater than 0 (Par. 140 A.1.HY >0).

Absolute alarm active over.
Hysteresis value lower than 0 (Par. 140 A.1.HY <0).

Absolute or threshold alarm active below (Parameter 135 AL.1F = Ab.uP.A.)

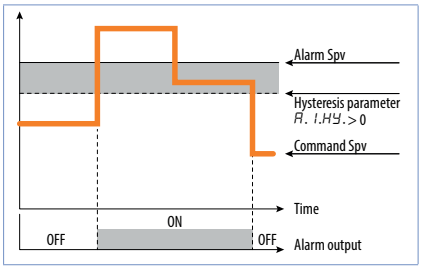


Absolute alarm active below.
Hysteresis value greater than 0 (Par. 140 A.1.HY >0).



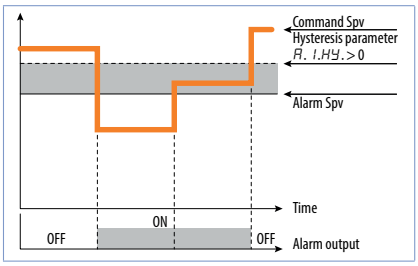
Absolute alarm active below.
Hysteresis value lower than 0 (Par. 140 A.1.HY <0)

Absolute or threshold alarm referred to command setpoint active over
(Parameter 135 AL.1F = Ab.c.u.A.)



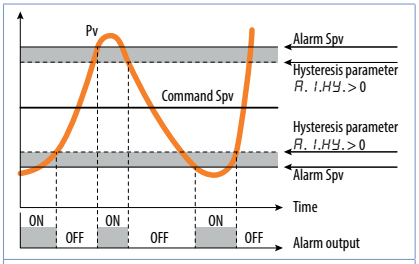
Absolute alarm referred to command setpoint active over
Hysteresis value greater than 0 (Par. 140 A. 1.HY >0).

Absolute or threshold alarm referred to command setpoint active below
(Parameter 135 AL.1F = Ab.c.L.A.)

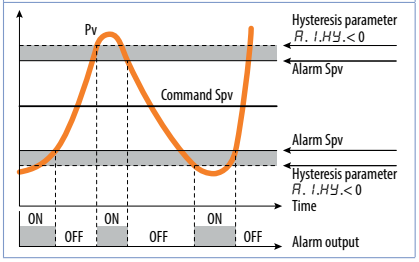


Absolute alarm referred to command setpoint active below.
Hysteresis value greater than 0 (Par. 140 A. 1.HY >0).

Band alarm (Parameter 135 AL.1F = bAnd)

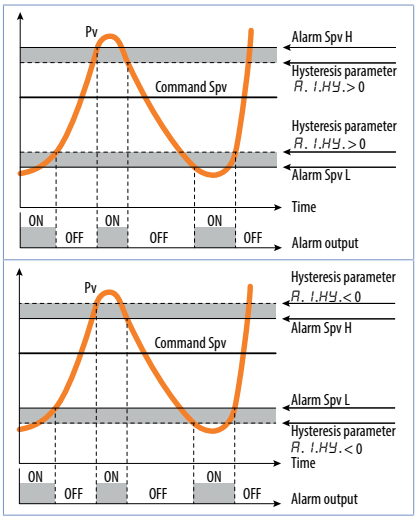


Band alarm hysteresis value greater than 0 (Par. 140 A. 1.HY >0).



Band alarm hysteresis value lower than 0 (Par. 140 A. 1.HY <0).

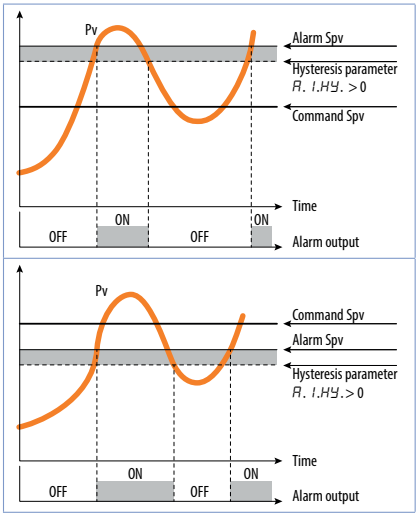
Asymmetric band alarm (Parameter 135 RL.1F = A.bAnd)



Asymmetric band alarm
with hysteresis value greater than 0 (Par. 140 A. 1.HY >0).

Asymmetric band alarm
with hysteresis value lower than 0 (Par. 140 A. 1.HY <0).

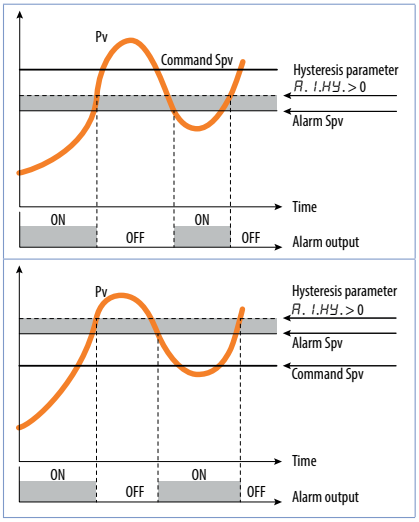
Upper deviation alarm (Parameter 135 RL.1F = uP.dEu.)



Upper deviation alarm value of alarm setpoint greater than 0 and hysteresis value greater than 0 (Par. 140 A. 1.HY >0).
NB: with hysteresis value less than 0 (A. 1.HY <0) the dotted line moves above the alarm setpoint.

Upper deviation alarm value of alarm setpoint less than 0 and hysteresis value greater than 0 (Par. 140 A. 1.HY >0).
NB: with hysteresis value less than 0 (A. 1.HY <0) the dotted line moves above the alarm setpoint..

Lower deviation alarm (Parametro 135 RL.1F = Lo.dEu.)



Lower deviation alarm value of alarm setpoint greater than 0 and hysteresis value greater than 0 (Par. 140 A. 1.HY >0).
NB: with hysteresis value less than 0 (A. 1.HY <0) lthe dotted line moves under the alarm setpoint.

Lower deviation alarm value of alarm setpoint less than 0 and hysteresis value greater than 0 (Par. 140 A. 1.HY >0).
NB: with hysteresis value less than 0 (A. 1.HY <0) the dotted line moves under the alarm setpoint.

11.2 Alarms label

By setting a value from 1 to 21 on the parameters 149 *A.1.Lb.*, 169 *A.2.Lb.*, 189 *A.3.Lb.*, 209 *A.4.Lb.*, 229 *A.5.Lb.*, 249 *A.6.Lb.* e 269 *A.7.Lb.* the display 3 will show one of the following messages in case of alarm:

Value	Message displayed in the alarm event
1	alarm 1
2	alarm 2
3	alarm 3
4	alarm 4
5	alarm 5
6	alarm 6
7	*not used*
8	open door
9	closed door
10	light on
11	light off
12	warning
13	waiting
14	high limit
15	low limit
16	external alarm
17	temperature alarm
18	pressure alarm
19	fan command
20	cooling
21	operating
22	Customized message

By setting 0, no message will be displayed. While setting 22, the user will have up to 23 characters available to customize his message by configurator software or by modbus.

12 Table of Anomaly Signals

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

Error code	Description	Cause	What to do
E-02	*SYSTEM Error*	Cold junction temperature sensor failure or environment temperature out of range	Call technical assistance
E-04	*EEProm Error*	Incorrect configuration data. Possible loss of instrument calibration	Verify that configuration parameters are correct.
E-05	*PRobE 1 Error*	Sensor connected to AI1 broken or temperature out of range	Control connection with probes and their integrity.
E-06	*PRobE 2 Error*	Sensor connected to AI2 broken or temperature out of range	Control connection with probes and their integrity.
E-08	*SYSTEM Error*	Missing calibration	Call technical assistance
E-10	*A.In.2 diSAbLEd*	Analogue input 2 disabled but used during configuration	Enable *A.In.2* or disable it during configuration
E-80	*rFid Error*	Tag rfid malfunctioning	Call technical assistance

13 Configuration parameter table

A.in.1 – Analogue input 1			pagina 42
1	SEn.1	Sensor AI1	
2	d.P. 1	Decimal Point 1	
3	dEGr.	Degree	
4	L.Li.1	Lower Linear Input AI1	
5	u.Li.1	Upper Linear Input AI1	
6	P.uA.1	Potentiometer Value AI1	
7	i.o.L.1	Linear Input over Limits AI1	
8	L.c.E.1	Lower Current Error 1	
9	o.cA.1	Offset Calibration AI1	
10	G.cA.1	Gain Calibration AI1	
11	Ltc.1	Latch-On AI1	
12	c.FL.1	Conversion Filter AI1	
13	c.Fr.1	Conversion Frequency AI1	
14÷18		Reserved Parameters	
19÷36		Unused parameters	
Cnd.1 – Outputs and regulation Process 1			pagina 44
37	c.ou.1	Command Output 1	
38	Unused parameter		
39	rES	Reserved	
40	Ac.t.1	Action type 1	
41	c.HY.1	Command Hysteresis 1	
42	L.L.S.1	Lower Limit Setpoint 1	
43	u.L.S.1	Upper Limit Setpoint 1	
44	c.rE.1	Command Reset 1	
45	c.S.E.1	Command State Error 1	
46	c.S.S.1	Command State Stop 1	
47	c.Ld.1	Command Led 1	
48	c.dE.1	Command Delay 1	
49	c.S.P.1	Command Setpoint Protection 1	
50	uA.t.1	Valve Time 1	
51	Unused parameter		
52	S.u.S.1	State Valve Saturation 1	
53	A.nA.1	State Valve Saturation 1	
54	L.P.r.1	Load Power Rating 1	
55	ini.S.	Initial State	
56÷59		Reserved Parameters	
60÷82		Unused parameters	

rEG.1 – **Autotuning and PID 1**		pagina 47
83	tun.1	Tune 1
84	S.d.t.1	Setpoint Deviation Tune 1
85	P.b. 1	Proportional Band 1
86	i.t. 1	Integral Time 1
87	d.t. 1	Derivative Time 1
88	d.b. 1	Dead Band 1
89	P.b.c.1	Proportional Band Centered 1
90	o.o.S.1	Off Over Setpoint 1
91	o.d.t.1	Off Deviation Threshold 1
92	c.t. 1	Cycle Time 1
93	co.F.1	Cooling Fluid 1
94	P.b.M.1	Proportional Band Multiplier 1
95	o.d.b.1	Overlap / Dead Band 1
96	c.c.t.1	Cooling Cycle Time 1
97	L.L.P.1	Lower Limit Output Percentage 1
98	u.L.P.1	Upper Limit Output Percentage 1
99	M.G.t.1	Max Gap Tune 1
100	Mn.P.1	Minimum Proportional Band 1
101	MA.P.1	Maximum Proportional Band 1
102	Mn.i.1	Minimum Integral Time 1
103	d.cA.1	Derivative Calculation 1
104	o.c.L.1	Overshoot Control Level 1
105÷108		Reserved parameters
109÷134		Unused parameters

AL.1 – **Alarm 1**		pagina 49
135	AL.1.F.	Alarm 1 Function
136, 137		Parametri non utilizzati
138	A.1.S.o.	Alarm 1 State Output
139	rES.	Reserved
140	A.1.HY.	Alarm 1 Hysteresis
141	A.1.L.L.	Alarm 1 Lower Limit
142	A.1.u.L.	Alarm 1 Upper Limit
143	A.1.rE.	Alarm 1 Reset
144	A.1.S.E.	Alarm 1 State Error
145	A.1.S.S.	Alarm 1 State Stop
146	A.1.Ld.	Alarm 1 Led
147	A.1.dE.	Alarm 1 Delay
148	A.1.S.P.	Alarm 1 Setpoint Protection
149	A.1.Lb.	Alarm 1 Label
150÷154		Reserved parameters

AL.2 – **Alarm 2**		pagina 51
135	AL.2.F.	Alarm 2 Function
156, 157		Unused parameters
158	A.2.S.o.	Alarm 2 State Output
159	rES.	Reserved
160	A.2.HY.	Alarm 2 Hysteresis
161	A.2.L.L.	Alarm 2 Lower Limit
162	A.2.u.L.	Alarm 2 Upper Limit
163	A.2.rE.	Alarm 2 Reset
164	A.2.S.E.	Alarm 2 State Error
165	A.2.S.S.	Alarm 2 State Stop
166	A.2.Ld.	Alarm 2 Led
167	A.2.dE.	Alarm 2 Delay
168	A.2.S.P.	Alarm 2 Setpoint Protection
169	A.2.Lb.	Alarm 2 Label
170÷174		Reserved parameters

AL.3 – **Alarm 3**		pagina 53
175	AL.3.F.	Alarm 3 Function
176, 177		Unused parameters
178	A.3.S.o.	Alarm 3 State Output
179	rES.	Reserved
180	A.3.HY.	Alarm 3 Hysteresis
181	A.3.L.L.	Alarm 3 Lower Limit
182	A.3.u.L.	Alarm 3 Upper Limit
183	A.3.rE.	Alarm 3 Reset
184	A.3.S.E.	Alarm 3 State Error
185	A.3.S.S.	Alarm 3 State Stop
186	A.3.Ld.	Alarm 3 Led
187	A.3.dE.	Alarm 3 Delay
188	A.3.S.P.	Alarm 3 Setpoint Protection
189	A.3.Lb.	Alarm 3 Label
190÷194		Reserved parameters

AL.4 – **Alarm 4**		pagina 55
195	AL.4.F.	Alarm 4 Function
196, 197		Unused parameters
198	A.4.S.o.	Alarm 4 State Output
199	A.4.o.t.	Alarm 4 Output Type
200	A.4.HY.	Alarm 4 Hysteresis
201	A.4.L.L.	Alarm 4 Lower Limit
202	A.4.u.L.	Alarm 4 Upper Limit
203	A.4.rE.	Alarm 4 Reset
204	A.4.S.E.	Alarm 4 State Error
205	A.4.S.S.	Alarm 4 State Stop

206	A.4.Ld.	Alarm 4 Led
207	A.4.dE.	Alarm 4 Delay
208	A.4.S.P.	Alarm 4 Setpoint Protection
209	A.4.Lb.	Alarm 4 Label
210÷214		Reserved parameters

AL.5 – **Alarm 5**		pagina 58
215	AL.5.F.	Alarm 5 Function
216, 217		Unused parameters
218	A.5.S.o.	Alarm 5 State Output
219	A.5.o.t.	Alarm 5 Output Type
220	A.5.HY.	Alarm 5 Hysteresis
221	A.5.L.L.	Alarm 5 Lower Limit
222	A.5.u.L.	Alarm 5 Upper Limit
223	A.5.rE.	Alarm 5 Reset
224	A.5.S.E.	Alarm 5 State Error
225	A.5.S.S.	Alarm 5 State Stop
226	A.5.Ld.	Alarm 5 Led
227	A.5.dE.	Alarm 5 Delay
228	A.5.S.P.	Alarm 5 Setpoint Protection
229	A.5.Lb.	Alarm 5 Label
230÷234		Reserved parameters

AL.6 – **Alarm 6**		pagina 61
215	AL.6.F.	Alarm 6 Function
236, 237		Parametri non utilizzati
238	A.6.S.o.	Alarm 6 State Output
239	A.6.o.t.	Alarm 6 Output Type
240	A.6.HY.	Alarm 6 Hysteresis
241	A.6.L.L.	Alarm 6 Lower Limit
242	A.6.u.L.	Alarm 6 Upper Limit
243	A.6.rE.	Alarm 6 Reset
244	A.6.S.E.	Alarm 6 State Error
245	A.6.S.S.	Alarm 6 State Stop
246	A.6.Ld.	Alarm 6 Led
247	A.6.dE.	Alarm 6 Delay
248	A.6.S.P.	Alarm 6 Setpoint Protection
249	A.6.Lb.	Alarm 5 Label
250÷254		Reserved parameters
255÷264		Unused parameters

di.1 – **Digital input 1**		pagina 64
275	d.i.1.F	Digital Input 1 Function
276	d.i.1.c	Digital Input 1 Contact
277,278		Unused parameters
279÷283		Reserved parameters

di.2 – **Digital Input 2**		pagina 65
284	di.i.2.F	Digital Input 2 Function
285	di.i.2.c	Digital Input 2 Contact
286, 287		Unused parameter
288÷292		Reserved parameters
293÷310		Unused parameters

SFt.S – **Soft-start and mini cycle**		pagina 66
311	dE.St.	Delayed Start
312	PrGM	Programmer
313	SS.Ty.	Soft-Start Type
314		Unused parameter
315	SS.Gr.	Soft-Start Gradient
316	SS.PE.	Soft-Start Percentage
317	SS.tH.	Soft-Start Threshold
318	SS.Ty.	Soft-Start Type
319	U.t.S.E.	Waiting Time Step End
320	M.G.S.E.	Max. Gap Step End
321	r.i.cy.	Recovery Interrupted Cycle
322÷325		Reserved parameters

diSP. – **Display and interface**		pagina 67
326	u.FLt	Visualization Filter
327	ui.d.2	Visualization Display 2
328	ui.d.3	Visualization Display 3
329	u.o.M	Unit Of Measure
330	uSr.M.	User Menu
331	ScL.t.	Scrolling Time
332	bAr.G.	Bar Graph
333	L.L.b.G.	Lower Limit Bar Graph
334	u.L.b.G.	Upper Limit Bar Graph
335	u.out	Voltage Output
336		Unused parameter
337÷341		Reserved parameters

F.tEY – **Function keys**		pagina 70
342	F1.t	F1 Key
343	F1 c.	F1 Contact
344		Unused parameter
345	F1 r.c.	F1 Reference Command
346	rES	Reserved
347	rES	Reserved
348	F2.t	F2 Key
349	F2 c.	F2 Contact
350		Unused parameter

351	F2 r.c.	F2 Reference Command
352	rES	Reserved
353	rES	Reserved
354	F3.F	F3 Key
355	F3 c.	F3 Contact
356		Unused parameter
357	F3 r.c.	F3 Reference Command
358	rES	Reserved
359	rES	Reserved
360	F4.F	F4 Key
361	F4 c.	F4 Contact
362		Unused parameter
363	F4 r.c.	F4 Reference Command
364	rES	Reserved
365	rES	Reserved

ct 1. – **Current transformer 1**		pagina 73
366	ct.1.F	Current Transformer 1 Function
367	ct.1.u.	Current Transformer 1 Value
368	H.b.1.r.	Heater Break Alarm 1 Reference Command
369	H.b.1.t.	Heater Break Alarm 1 Threshold
370	oc.1.t.	Overcurrent 1 Alarm Threshold
371	H.b.1.d.	Heater Break Alarm 1 Delay
372÷376		Reserved parameters

A.o. 2 – **Retransmission 2**		pagina 74
388	rtM.1	Retransmission 1
389	r.1.ty.	Retransmission 1 Type
390	r.1. L.L.	Retransmission 1 Lower Limit
391	r.1. u.L.	Retransmission 1 Upper Limit
392	r.1.S.E.	Retransmission 1 State Error
393	r.1.S.S.	Retransmission 1 State Stop
394÷398		Reserved parameters
399÷409		Unused parameters

SEr. – **Serial**		pagina 75
410	SL.Ad.	Slave Address
411	bd.rt.	Baud Rate
412	S.P.P.	Serial Port Parameters
413	SE.dE.	Serial Delay
414	oFF.L.	Off Line
415÷419		Reserved parameters

tMr – **Timer**		pagina 76
420	tMr.1	Timer 1
421	t.b.t.1	Time Base Timer 1
422	A.tM.1	Action Timer 1
423	tMr.2	Timer 2
424	t.b.t.2	Time Base Timer 2
425	A.tM.2	Action Timer 2
426	tMr.S.	Timers Sequence
427	MAi.r.	Maintenance Request
428	M.tiM.	Maintenance Time
429÷431		Reserved parameters

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