DIS96V Plus

Controlador de proceso

1 CICLO
12 PASOS
RAMPAS

vertical 48x96

VÚMETER GRÁFICO

Remberg®

FRONTAL IP65

2 TEMPORIZADORES

1 ENTRADA ANALÓGICA UNIVERSAL

0/10V, 4/20mA
Pt100, Termopar
mV, ntc10K, ptc1K

** opcional 2 entradas*
DIS96V-DUO

\+

4 ENTRADAS DIGITALES

TRAFO INTENSIDAD X/50mA

3 RELÉS de SALIDA

\+

2 SALIDAS de TRANSISTOR
PNP / SSR

\+

1 SALIDA ANALÓGICA
0/10V, 4/20mA

NFC

ALIMENTACIÓN
24.. 230VAC/DC

opcionales

DIS96V Plus -T
RS485

DIS96V Plus -5

Table of contents

Introduction

Controller DIS96V (48x96mm – 1/8DIN) is available in several versions featuring a variable numbers of analogue-digital I/Os. The wide range of software functions are detailed in the relevant sections below.
Programming options include App PROGRAMADOR-NFC-plus, relying on NFC communication and not requiring any wiring/power supply, and software tool Labsoftview via Micro-USB port.
Available also with Cycle programming function.

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 damage/ 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.

1.1 Organization of safety notices

Safety notices in this manual are organized as follows:

Safety notice	Description
Danger!	Disregarding these safety guidelines and notices can be life-threatening.
Warning!	Disregarding these safety guidelines and notices can result in severe injury or substantial damage to property.
Information!	This information is important for preventing errors.

1.2 Safety Precautions

This product is UL listed as open type process control equipment.	**Danger!**
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.	**Danger!**
Loose screws may occasionally result in fire. For screw terminals of relays and of power supply, tighten screws to tightening torque of 0,51 Nm. For other terminals, tightening torque is 0,19 Nm	**Warning!**
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.	**Warning!**

1.3 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 1A (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.
- Chemicals/solvents, cleaning agents and other liquids must not be used.
- Non-respect of these instructions may reduce performances and safety of the devices and cause danger for people and property.

For CT (Current Transformer) input:

- **Warning**: To reduce risk of electric shock, always open or disconnect circuit from power-distribution system (or service) of building before installing or servicing current transformers
- For use with Listed Energy-Monitoring Current Transformers
- The current transformers may not be installed in equipment where they exceed 75 percent of the wiring space of any cross-sectional area within the equipment
- Restrict installation of current transformer in an area where it would block ventilation openings
- Restrict installation of current transformer in an area of breaker arc venting
- Not suitable for Class 2 wiring methods
- Not intended for connection to Class 2 equipment
- Secure current transformer and route conductors so that the conductors do not directly contact live terminals or bus.

1.4 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.

2 Model Identification

Power supply 24..230 VAC/VDC ±15% 50/60 Hz – 6 Watt/VA	
DIS96V Plus	1 A.I. + 3 relays 5 A + 2 SSR + 4 D.I. + 1 A.O. V/mA + 1 CT
DIS96V Plus-T	1 A.I. + 4 relays 5 A + 2 SSR + 2 D.I. + 1 A.O. V/mA + 1 CT + RS485
DIS96V Plus-5	1 A.I. + 5 relays 5 A + 2 SSR + 4 D.I. + 1 CT
DIS96V-DUO	2 A.I. + 2 relays 5 A + 2 SSR + 4 D.I. + 1 A.O. V/mA + 2 CT
DIS96V-DUO-T	2 A.I. + 4 relays 5 A + 2 SSR + 4 D.I. + 2 A.O. V/mA + 1 CT + RS485

3 Technical Data

3.1 General Features

Displays	4 digits 0,63''(16mm) + 5 digits 0,39''(10mm) + 5 digits 0,33'' + bar graph
Operating temperature	Temperature: 0-45° C -Humidity 35..95 uR%
Sealing	Front panel mounting NEMA type 1 IP65 front panel (with gasket) - IP20 box and terminals (UL not evaluated)
Material	Box and front panel PC UL94V2
Weight	Approx. 245 g

3.2 Hardware Features

Analogue inputs	**AI1** *opcional* **DUO** *– AI2:* Configurable via software. **Input**: Thermocouple type K, S, R, J,T,E,N,B. Automatic compensation of cold junction from -25...85°C. **Thermoresistances**: PT100, PT500, PT1000, Ni100, PTC1K, NTC10K (β 3435K) **V/mA input**: 0-1 V, 0-5 V, 0-10 V, 0-20 o 4-20 mA, 0-60 mV. **Pot. input**: 1..150 KΩ. **CT (Current transformer)**: x/50 mA	Tolerance (@25° C) ± 0.2% ±1 digit (on F.s.) for thermocouple, thermoresistance and V/mA. Cold junction accuracy 0.1° C/°C. **Impedence**: **0-10 V**: Ri>110 KΩ **0-20 mA**: Ri<5 Ω **0-60 mV**: Ri>1 MΩ
Relay outputs	Config. as command and alarm output	Contacts: 5A - 250 VAC for resistive load
SSR output	Config. as command and alarm output	12/24 V, 25 mA
Analogue outputs	Configurable as command, alarm output or as retransmission of process / setpoints	Configurable: **0-10 V** with 40000 points +/-0.2% (on F.s.) @25 °C; load >= 1 KΩ **4-20 mA** with 40000 points +/-0.2% (on F.s.) @25 °C; load <= 250Ω
Power-supply	Extended power-supply 24..230 VAC/VDC ±15% 50/60 Hz	**Consumption:** **DIS96V plus 8W** **DIS96V plus -T 10W** **DIS96V plus -5 12W** DIS96V-DUO 10W DIS96V-DUO-T 12W

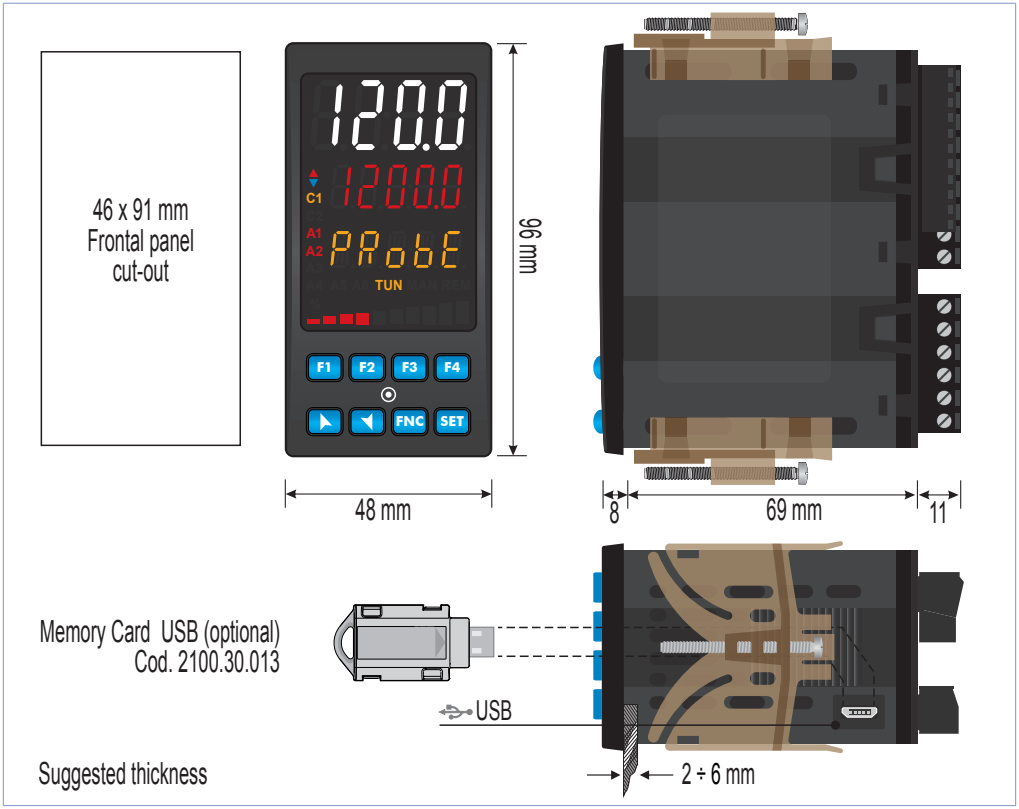
3.3 Software Features

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

3.4 Programming mode

by keyboard	..see paragraph *13*
software LabSoftview	..on *"Download section"* of official remberg site: www.remberg.es
App PROGRAMADOR NFC PLUS	..through download the App PROGRAMADOR NFC plus on Google Play Store®, see paragraph *11* When activated by a reader/interrogator supporting NFC-V protocol, controller is to be considered a VICC (Vicinity Inductively Coupled Card) according to ISO/IEC 15693 and it operates at a frequency of 13.56 MHz. **The device does not intentionally emit radio waves**.

4 Dimensions and Installation



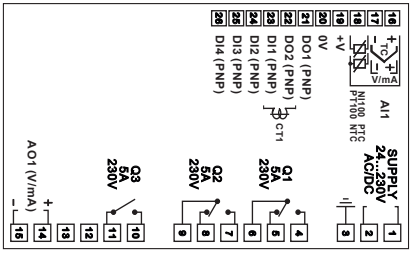
5 Electrical wirings

This controller has been designed and manufactured in conformity to Low Voltage Directive 2006/95/EC, 2014/35/EU (LVD) and EMC Directive 2004/108/EC, 2014/30/EU (EMC). For installation in industrial environments please observe following safety guidelines:

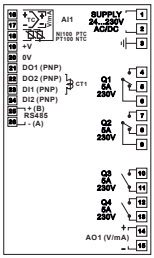
- Separate control line from power wires.
- Avoid proximity of remote control switches, electromagnetic contactors, powerful engines.
- Avoid proximity of power groups, especially those with phase control.
- It is strongly recommended to install adequate mains filter on power supply of the machine where the controller is installed, particularly if supplied 230Vac. The controller is designed and conceived to be incorporated into other machines, therefore CE marking on the controller does not exempt the manufacturer of machines from safety and conformity requirements applying to the machine itself.
- Wiring of pins 1...15, use crimped tube terminals or flexible/rigid copper wire with diameter 0.2 and 2.5 mm^2 (min. AWG28, max. AWG12; Minimum temp. rating of the cable to be connected to the field wiring terminals, 70°C). Cable stripping lenght 7 to 8 mm. Tighten screws to tightening torque of 0,19 Nm.
- Wiring of pins 16...35, use crimped tube terminals or flexible/rigid copper wire with diameter 0.2 and 1.5 mm^2 (min. AWG28, max. AWG14; Minimum temp. rating of the cable to be connected to the field wiring terminals, 70°C). Cable stripping lenght 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.

5.1 Wiring diagram

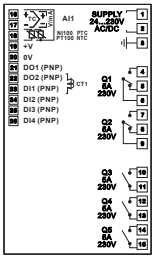
DIS96V plus



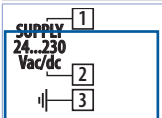
DIS96V plus-T



DIS96V plus -5

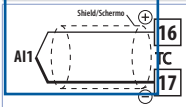


5.1.a Power Supply

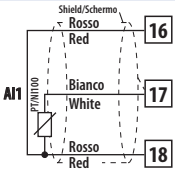


Switching power supply 24..230 VAC/DC ±15% 50/60 Hz - 9 Watt/VA.
Galvanic insulation (on all versions).

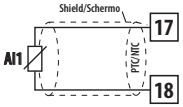
5.1.b Analogue Input AI1



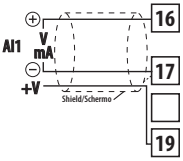
For thermocouples K, S, R, J, T, E, N, B.
- Comply with polarity
- For possible extensions, use compensated cable and terminals suitable for the thermocouples used (compensated).
- When shielded cable is used, it should be grounded at one side only.



For thermoresistances PT100, Ni100.
- For 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.

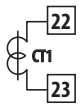


For thermoresistances NTC, PTC, PT500, PT1000 and linear potentiometers.
When shielded cable is used, it should be grounded at one side only to avoid ground loop currents.



For linear signals in Volt and mA
- Comply with polarity
- When shielded cable is used, it should be grounded at one side only to avoid ground loop currents.
- It's possible to select +V at 12Vdc or 24Vdc, by configuring parameter 334 `u.out` (GROUP G1 - `d iSP` - Display and interface).

5.1.c CT1 input



To enable CT1 input, modify parameter 366 `ct F`.
- Input for 50 mA amperometric transformer.
- Sampling time 100 ms.
- Configurable by parameters.

5.1.d Digital inputs

Digital inputs can be enabled by parameters.

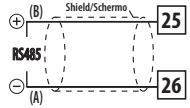
Close pin *"DIx"* on pin *"+V"* to enable digital input.

It is possible to put in parallel the digital inputs of different devices joining together the 0V pins (20).

In the version DIS96V plus-T only DI1 and DI2 are available

5.1.e Serial input (only DIS96V-T)

DIS96V plus-T



Modbus RS485 communication.
RTU Slave with galvanic insulation.

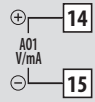
It is recommended to use the twisted and shielded cable for communications.

5.1.f 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.

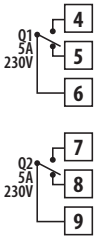
5.1.g AO1 Analogue output

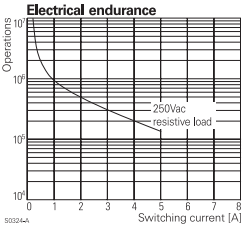


Linear output in **mA** or **V** (galvanically isolated) configurable as command, alarm or retransmission of process-setpoint.

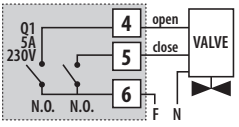
The selection mA or Volt for the linear output depends on the parameters configuration.

5.1.h Relays output Q1 and Q2





Capacity:
2 A, 250 VAC, resistive loads, 10^5 operations.
20/2 A, 250 VAC, cosφ = 0.3, 10^5 operations.
See chart below.

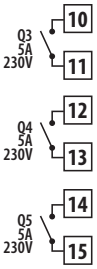


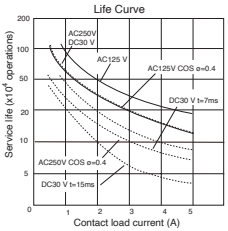
3 States:

OPEN	6-4 on
CLOSE	6-5 on
REPOSE	4 off ; 6-5 off

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

5.1.i Relays output Q3, Q4 and Q5 (where required)





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

See chart below.

NB: relays 3, 4 and 5 are not present in all DIS96V versions

6 Numeric Indicators (Display)

120.0	Normally it displays the process. During the configuration phase, it displays the name of parameter being inserted.
1200.0	Displays the selected value on the parameter 327 uid2 (factory settings: setpoint) During the configuration phase it displays the parameters group or the number of the parameter being inserted. I
ProbE	Displays the selected value on the parameter 328 uid3 (factory settings: state) During the configuration phase it displays the parameter value being inserted.

6.1 Meaning of Status Lights (Led)

C1	ON when the command output 1 is active. In versions with single analog input, it is ON when the valve is opening. In the versions with two analog inputs, in case of command 1 on the motorized valve, it is permanently ON when the valve is opening and flashing during the closing phase.
C2	ON when the command output 2 is active. In versions with single analog input, it is ON when the valve is opening. In the versions with two analog inputs, in case of command 2 on the motorized valve, it is permanently ON when the valve is opening and flashing during the closing phase.
A1	ON when alarm 1 is active.
A2	ON when alarm 2 is active.
A3	ON when alarm 3 is active.
A4	ON when alarm 4 is active.
A5	ON when alarm 5 is active.
A6	ON when alarm 6 is active.
TUN	ON when the controller is executing an auto-tuning cycle.
MAN	ON when *"Manual"* function is active.
REM	ON when the controller communicates through serial. Flashes when the remote setpoint is enabled.
▬▬	Configurable on par. 331 bAr.G. Normally it indicates the percentage of the command output 1
%	Access when the bar graph indicates the percentage of the command output 1 or 2 q
▲	ON during the rising phase of the cycle
▼	ON during the falling phase of the cycle
▲▼	Both ON during parameter modification, when this is not a default value.

6.2 Keys

▲	• Increases the main setpoint. • During the configuration phase it allows to scroll the groups of parameters and to scroll/modify the parameters. • Increases the setpoints.
▼	• Decreases the main setpoint. • During the configuration phase it allows to scroll the groups of parameters and to scroll/modify the parameters. • Decreases the setpoints.
FNC	• Allows to enter the Tuning launch function, automatic/manual selection. • During configuration works as exit key (ESC).
SET	• Allows to visualize command and alarm setpoints. • During configuration allows to enter the parameter to be modified and confirms the variation.
F1	• Configurable on the parameter 342 - F1 F.
F2	• Configurable on the parameter 348 - F2 F.
F3	• Configurable on the parameter 354 - F3 F.
F4	• Configurable on the parameter 360 - F4 F.

6.3 Remote setpoint by serial input

It is possible to enable remote setpoint function selecting EN.SER. or EN.SE.E. on par. 62 rEM.S. The remote setpoint must be written on the word modbus 1259 for the command 1 and 1260 for the command 2 (with tenth of degree if the command process is a temperature sensor).

It is possible to switch from remote to local sepoint pressing SET for 1 second or F1...F4 if configured. In remote setpoint mode the led REM is ON (if there is serial communication), it flashes when switching to local setpoint mode.

At restarting the controller keeps set in remote setpoint mode (the setpoint value is initialized to 0).

7 Controller Functions

7.1 Modification of main and alarm setpoint value

Setpoint value can be modified from keyboard as follows:

	Press	Display	Do
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.

7.2 Automatic Tune

Automatic tuning procedure allows a precise regulation without delving into the PID regulation algorithm. Selecting AuTo on par. 83 tun.1 (for the regulation loop 1), or on par. 109 tun.2 (for the regulation loop 2), 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 described into the next paragraph.

7.3 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 MAN. on par. 83 tun.1, or on par. 109 tun.2, the procedure can be activated in 4 ways:

- **Running Tuning by keyboard:**
  Press FNC until display 3 shows tuNE with display 2 on diSAb. and then press SET: display 2 shows ENAb. Led TUN switches ON and the procedure starts.
- **Running Tuning from F1... F4:**
  Select tuNE on par. 342 F1 F. (or on par. 348 F2 F., par. 354 F3 F., par. 360 F4 F.). By pressing the button, the tuning activates/deactivates. Led TUN switches on when tuning is activated.
- **Running Tuning by digital input:**

Select tunE on par. 275 d.in.1F., par. 293 d.in3F., par. 302 d.in4F). At first activation of digital input (commutation on front panel) led **TUN** led switches on and at second activation switches off.

- **Running Tuning 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 SdEt.1 or par. 110 SdEt.2)
Ex.: if the sepoint is 100.0∞C and the Par. 84 SdEt.1 is 20.0∞C the threshold to calculate PID parameters is (100.0 - 20.0) = 80.0∞C.
For a greater precision on PID parameters calculation it is suggested to start the manual tuning procedure when the process deviates from the setpoint.

7.4 Tuning once

Set oNcE on parameter 83 tun.1.
Autotuning procedure is executed only once at next device restart. If the procedure doesn't work, it will be executed at next restart.

7.5 Synchronized tuning

Set SYNcH. on parameter 83 tun.1.
This procedure has been conceived to calculate correct PID values on multi-zone systems, where each temperature is influenced by the adjacent zones.
Writing on word modbus 1224 (for regulation loop 1) the controller works as follows:

Word value	Action
0	Tune off
1	Command output OFF
2	Command output ON
3	Tune active
4	Tune completed: command output OFF (read only)
5	Tune not available: softstart function enabled (only reading)

Here below the functioning for regulation loop 1: the master switches-off or turns-on all zones (value 1 or 2 on word 1224) for a time long enough to create inertia on the system.
At this point the autotuning is launched (value 3 on word 1224). The controller executes the procedure for the calculation of the new PID values. When the procedure ends, the controller switches off the command output and selects the value 4 on word 1224. The master, who will always read the word 1224, will control the various zones and when all will have finished, will bring to 0 the value of word 1224: the various devices will regulate the temperature independently, with the new calculated values.
The master must read the word 1224 at least every 10 seconds or the controller will automatically exit the autotuning procedure.

7.6 Digital input functions

The DIS96V functions related to digital inputs, can be enabled by parameters 275 d.in.1F., 284 d.in2F., 293 d.in3F. and 302 d.in4F..

- 2t.SW.: Two threshold setpoint modification: with digital input active the controller regulates on **SET**2, otherwise reulates on **SET**1;
- 2t.SW.in.: Modification of 2 setpoints by digital input with impulse command;
- 3t.SW.in.: Modification of 3 setpoints by digital input with impulse command,
- 4t.SW.in.: 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: Start of the regulator by digital input with impulse command;
- StoP: Stop of the regulator by digital input with impulse command;
- St./St.: Start / Stop of the controller by digital input with impulse command,
- run.: The regulation is enabled only with digital input active,
- HoLd: With digital input active the conversion is locked (visualization maintenance function);
- tunE: Enables/disables the Tuning if par. 83 tun.1 is selected as MAnu.;
- Au.MA.in.: If par. 53 A.MA.1. is selected as 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.MR.c.*: If par. 53 *A.MA.1.* is selected as *ENAb.* or *EN.Stb.* 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.1.1.r.* or 287 *d.1.2.r.* or 296 *d.1.3.r.* or 305 *d.1.4.r.*), the controller execute a cooling type regulation with digital input active, otherwise the regulation is of heating type;
- *PRGM*: Programmer. If par. 312 *PRGM* is set on *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*).
- *R.1. 0*: Zero tare function: brings the related analogue input to 0. The analogue input is selected on par. 277 *d.1.1.P.* or 286 *d.1.2.P.* or 295 *d.1.3.P.* or 304 *d.1.4.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.1.1.r.* or 287 *d.1.2.r.* or 296 *d.1.3.r.* or 305 *d.1.4.r.*;
- *t.1.RUN*: If timer 1 is enabled (par. 420 *tMr.1* different from *d.SAb.*), 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 *d.SAb.*), acting on the digital input, the status of the timer switches from STOP to RUN and vice versa;
- *t.1.StR.*: If il timer 1 is enabled (par. 420 *tMr.1* differnet from *d.SAb.*), acting on the digital input, the timer is switched to RUN;
- *t.1.End.*: If il timer 1 is enabled (par. 420 *tMr.1* differnet from *d.SAb.*), 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 *d.SAb.*), with digital input active, the timer is switched to RUN, otherwise is kept in STOP;
- *t.2.S.E.*: If timer 2 is enabled (par. 423 *tMr.2* different from *d.SAb.*), acting on the digital input, the status of the timer switches from STOP to RUN and vice versa;
- *t.2.StR.*: If timer 2 is enabled (par. 423 *tMr.2* different from *d.SAb.*), acting on the digital input, the timer is switched to RUN;
- *t.2.End.*: If timer 2 is enabled (par. 423 *tMr.2* different from *d.SAb.*), 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 ▲
- *doWN.K.*: the digital input simulates the operation of ▼
- *FNc. K.*: the digital input simulates the operation of **FNC**
- *SEt. K.*: the digital input simulates the operation of **SET**
- *REM.S.E.*: If on par. 62 *rEM.S.* it is selected *ENAb.* or *EN.SER.*), with digital input active the remote setpoint is enabled, otherwise the setpoint is local. On par. 278 *d.1.1.r.* or 287 *d.1.2.r.* or 296 *d.1.3.r.* or 305 *d.1.4.r.* it is necessary to select the reference regulation loop.

7.7 Automatic / Manual regulation for % output control

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

1 **First selection** (*ENAb.*) allows to enable with **FNC** the writing *P.---* on display 2, while on display 3 is showed *AutoM*.

Press **SET** to visualize *MANu.*; it's now possible, during the process visualization, modify through the keys ▲ and ▼ the output percentage. To 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.Stb.*) 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.

7.8 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 50 HZ or 60 HZ on par. 287 CT.1.F. and the value of the connected transfomer, on par. 288 CT.1.U..

- Seletct on par. 368 H.b.1.P. the regulation loop referred to the current measure and the Heater Break Alarm intervention.
- Select on par. 369 H.b.1.t. the Heater Break Alarm intervention threshold in Ampere.
- Select on par. 370 oc.1.t. the intervention threshold in Ampere to control the overcurrent.
- Select on par. 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 par. 215 AL5.F. on par. 155 AL2F. or par. 175 AL3.F. or par. 195 AL4.F. or par. 215 AL5.F. or par. 235 AL6.F. or par. 255 AL7.F.

It is possible to visualize on display 2 or 3 the average current, selecting AMP.1 on par. 327 Vi.d.2. or on par. 328 Vi.d.3.

Selecting 0 on par. 369 H.b.1.t. it is possible to visualize the current consumption without generating an Heater Break Alarm.

7.9 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 = HEAt and P.b. 1 greater than 0), and one of the alarms (AL.1.F., AL.2.F., AL.3.F., AL.4.F., AL.5.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 = HEAt Command output action type (Heating);

P.b. 1: Heating proportional band;

i.t. 1: Integral time of heating and cooling;

d.t. 1: Derivative time of heating and cooling;

c.t. t: Heating time cycle.

Parameters to be configured for the cooling PID related to regulation loop 1 and alarm 1 are:

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

P.b.M.t: Proportional band multiplier;

o.d.b.t: Overlapping / Dead band;

c.c.t.t: Cooling time cycle.

Par. 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.

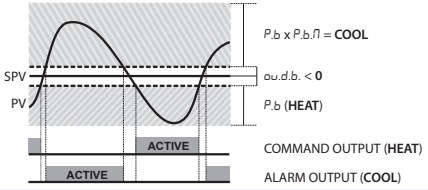
This gives a proportional band for cooling which will be the same as heating band if P.b.M.1 = 1.00, or 5 times greater if P.b.M.1 = 5.00.

Integral and derivative time are the same for both actions.

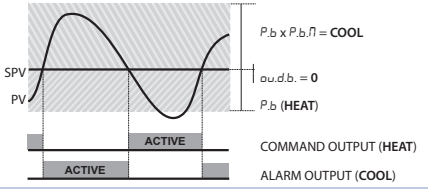
Par. o.d.b.1 determines the percentage overlapping between the two actions. For systems in which the heating output and cooling output must never be simultaneously active a Dead Band (o.d.b.1 ≤ 0), must be configured, vice versa you can configure an overlapping (o.d.b.1 > 0).

The following figure shows an example of dual action PID (heating-cooling) with i.t. 1 = 0 and d.t. 1 = 0.

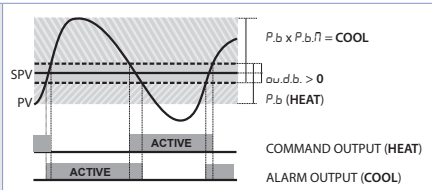
1



2



3



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

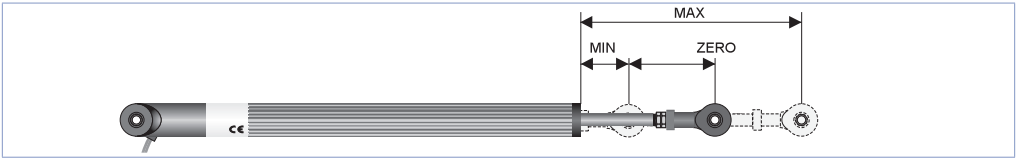
co.F.1	Cooling fluid type	P.b.M.1	c.c.t.1
Air	Air	1.00	10
oil	Oil	1.25	4
H2o	Water	2.50	2

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.

7.10 LATCH ON Function

For use with input Pot. and with linear input (0..10 V, 0..40 mV, 0/4..20 mA) it is possible to associate start value of the scale (par. 4 L.L. 1.1) to the minimum position of the sensor and value of the scale end (par. 5 u.L. 1.1) to the maximum position of the sensor (par. 11 Ltc.1 configured as StNdP).
It is also possible to fix the point in which the controller will display 0 (however keeping the scale range between L.L. 1.1 and u.L. 1.1) using the *"virtual zero"* option by selectin u.0.Sto. or u.0.t.on. on par. 11 Ltc.1. 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. To use the LATCH ON function, configure the par. Ltc.1.
The tuning procedure starts by exiting the configuration after changing the parameter.
Then refer to the following table for the calibration procedure:

	Press	Display	Do
1	FNC	Exit parameters configuration. Display 3 visualizes writing LAtcH.	Place the sensor on minimum operating value (corresponding to L.L. 1.1)
2	▼	Store value on minimum. Display shows LoW.	Place sensor on maximum operating value (corresponding to u.L. 1.1).
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	FNC	Set virtual zero. Display shows ZERo. If *"Virtual zero at start"* is selected, point 4 must be repeated at each starting.	To exit procedure press SET.



7.11 Soft-Start Function

The controller is provided with two types of softstart selectable on parameter 313 SS.tY. (*"Softstart Type"*).

1 First selection (GrAd.) enables gradient softstart. AAt starting the controller reaches setpoint basing on the rising gradient set on parameter 315 SS.Gr. (*"Softstart Gradient"*) in Unit/hour (ex. °C/h). If parameter 318 SS.t 1. (*"Softstart Time"*) is different to 0, at starting when the time selected on par. SS.t1. is elapsed, the controller stops to follow the gradient and reaches setpoint with the maximum power.
2 Second selection (PErc.) abilita enables output percentage softstart. On par. 317 SS.tH. it is possible to set the threshold under which starts the softstart (*"Softstart Threshold"*). On par. 316 SS.PE. (*"Softstart Percentage"*) an output percentage is selectable (from 0 to 100), which controller keeps until the process exceeds the threshold set on par. SS.tH. or until the time in minutes set on par. 318 SS.t 1. (*"Softstart Time"* word 2084).

If the Sof-Start function is active the automatic/manual Tuning function cannot be activated.

7.12 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.1tY. ("Retransmission 1 Type") the output type. It is possible also to select on parameters 390 r.1LL. and 391 r.1uL. the input value rescale limits.

7.13 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.StR. 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	Do
1	SET	Press until tiME 1 or tiME 2 visualized on display 1.	
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	Do
1	FNC	Press until tiME 1 or tiME 2 visualized on display 3. Display 2 shows STOP if the timer is stopped, otherwise it shows the remaining time.	
2	SET	The timer stops if active or starts counting if in StoP.	

Start/Stop of Timer is possibile also by digital input (see parameters d.i.1F ... d.i.4F.) or by key functions (see parameters F1 F. ... F4 F.).
The alarm outputs can be associated with the timers (parameters AL.1F .... AL.6F.). On parameters 425 A.tM.1 and 333 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 Programmer (1 cycle, 12 steps)

DIS96V 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 F1, F2, F3 and F4 are not programmable, but perform the following functions:

- F1: allows to enter the cycle modification management. When 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.1F. (or on 284 d.i.2F., or on 293 d.i.3F. or on 302 d.i.4F.) it is possible to change mode from controller to programmer, by acting on digital inputs.

8.1 Programming (or modifying) cycle data

Follow the steps listed in the following table:

	Press	Display	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).	Ex: 01-t step 1 time 01-S step 1 setpoint 01-A step 1 auxiliary **NB**: the auxiliary setting is present only if enabled on at least one alarm parameter (selection StEP.A.).

	Press	Display	Do
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 cyle (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.	

8.2 Cycle start

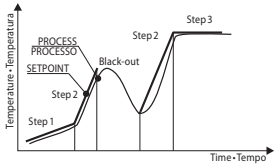
There are different options to start the cycle (START):
- Press key 4 for at least 1 second to START / STOP the controller.
- Through digital input if configured.
- Through serial port where present.

8.3 Recovery of interrupted cycle

Recovery function is particulary useful for kilns temperature regulation. After a power failure, at restarting DIS96V can resume the interrupted cycle. There are two recovery modes.

8.3.1 Recovery with automatic gradient

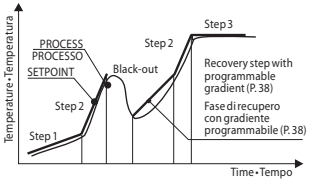
To enable cycle recovery with automatic gradient, set 1 on parameter 321 as r.i.cY. This mode does not operate for cooling regulations. At restart, after a power failure, controller will operate like this:
1. If a power failure occurs during a rising step, the gradient will be same as the operating step (setpoint temperature equal to the temperature read by the sensor).
2. If a power failure occurs during a holding step, two options are possible. If gap between process and setpoint is limited (not exceeding the value on parameter 320 MG.SE) 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.

8.3.2 Recovery with recovery gradient

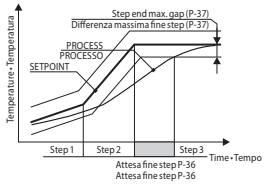
To enable cycle recovery with a recovery gradient, enter on parameter 321 r.i.cY. a value (degrees/hour if temperature) greater than 1. At restarting if the kiln temperature (process) is lower than the setpoint, DIS96V locks the working cycle executing a step with the rising gradient set on parameter 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.

8.4 Waiting step end

This function has been conceived to control kilns working cycles, whenever the kiln cannot follow gradients programmed by the user. If at step end the difference between process and setpoint values is greater than the value on parameter 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 WAIt.NG StEP End.

9 Serial communication

DIS96V-XXX-T 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 range from 1 to 254 and there must not be controllers with the same address on the same line.

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"*). The baude rate is selected on parameter 412 S.P.P. (Serial Port Parameters).

The controller can introduce a delay (in milliseconds) of the response to the master request. This delay must be set on parameter 413 SE.dE. (*"Serial Delay"*).

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.

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

Modbus RTU protocol features	
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
Formato	Selectable on parameter 412 S.P.P. 8N1 8N2 8E1 8E2 8O1 8O2
Funzioni supportate	WORD READING (max 50 word) (0x03, 0x04) SINGLE WORD WRITING (0x06) MULTIPLE WORDS WRITING (max 50 word) (0x10)

Here below a list of all available addresses and supported functions:

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

Modbus address	Description	Read Write	Reset value
0	Device type	RO	55x
1	Software version	RO	Flash
2	Boot version	RO	Flash
3	Slave Address	RO	Eepr/dip
6	Baud rate	RO	Eepr/dip
50	Slave address automatic learning	WO	-
51	System code comparison for slave address automatic learning	WO	-
500	Loading default values (write 9999)	RW	0
501	Restart DIS96V (write 9999)	RW	0

Modbus address	Description	Read Write	Reset value
502	Setpoint storing delay time	RW	10
503	Parameters storing delay time	RW	1
601	First character of the custom alarm message 1	RW	"u"
...			
623	Last character of the custom alarm message 1	RW	0
651	First character of the custom alarm message 2	RW	"u"
...			
673	Last character of the custom alarm message 2	RW	0
701	First character of the custom alarm message 3	RW	"u"
...			
723	Last character of the custom alarm message 3	RW	0
751	First character of the custom alarm message 4	RW	"u"
...			
773	Last character of the custom alarm message 4	RW	0
801	First character of the custom alarm message 5	RW	"u"
...			
823	Last character of the custom alarm message 5	RW	0
851	First character of the custom alarm message 6	RW	"u"
...			
873	Last character of the custom alarm message 6	RW	0
901	First character of the custom alarm message 7	RW	0
...			
923	Last character of the custom alarm message 7	RW	"u"
1000	AI1 value (degrees with tenth)	RO	-
1009	Real setpoint (gradient) of the regulation loop 1	RO	0
1010	Real setpoint (gradient) of the regulation loop 2	RO	0
1011	Alarms status (0 = absent, 1 = present) Bit0 = Alarm 1 Bit2 = Alarm 3 Bit4 = Alarm 5 Bit6 = Alarm 7 Bit1 = Alarm 2 Bit3 = Alarm 4 Bit5 = Alarm 6	RO	0
1012	Error flags 1 Bit0 = AI1 process error (sensor 1) Bit1 = AI2 process error (sensor 2) 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	RO	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 = AI2 error disabled	RO	0
1014	Digital inputs status (0 = not active, 1 = active) Bit0 = Ingresso dig. 1 Bit2 = Ingresso dig. 3 Bit1 = Ingresso dig. 2 Bit3 = Ingresso dig. 4	RO	0
1015	Outputs status (0 = OFF, 1 = ON) Bit 0 = Q1 (NO) Bit 4 = Q4 Bit 1 = Q1 (NC) Bit 5 = Q5 Bit 2 = Q2 Bit 6 = DO1 Bit 3 = Q3 Bit 7 = DO2	RO	0

Modbus address	Description	Read Write	Reset value
1016	Stato led (0 = OFF, 1 = ON) Bit 0 = Led UP arrow Bit 8 = Led A5 Bit 1 = Led C1 Bit 9 = Led A6 Bit 2 = Led **C2** Bit 10 = Led **TUN** Bit 3 = Led **A1** Bit 11 = Led **MAN** Bit 4 = Led **A2** Bit 12 = Led **REM** Bit 5 = Led **A3** Bit 13 = Led point time 2 Bit 6 = Led A4 Bit 14 = Led point time 3 Bit 7 = Led % Bit 15 = Led DOWN arrow	RO	0
1017	Key status (0 = released, 1 = pressed) Bit 0 = Key UP arrow Bit 4 = Key F4 Bit 1 = Key DOWN arrow Bit 5 = Key F3 Bit 2 = Key **FNC** Bit 6 = Key F2 Bit 3 = Key **SET** Bit 7 = Key F1	RO	0
1018	Cold junction 1 temperature (degrees with tenth)	RO	-
1020	Current CT1 instantaneous (Ampere with tenth)	RO	0
1021	Current CT1 average (Ampere with tenth)	RO	0
1022	Current CT1 ON (Ampere with tenth)	RO	0
1023	Current CT1 OFF (Ampere with tenth)	RO	0
1028	Feedback valve position (0-100)	RO	-
1100	AI1 value with decimal point selection	RO	-
1109	Real setpoint (gradient) of the regulation loop 1 with decimal point selection	RO	0
1110	Real setpoint (gradient) of the regulation loop 2 with decimal point selection	RO	0
1200	Setpoint 1 of regulation loop 1 (degrees with tenth)	R/W	EEPROM
1201	Setpoint 2 of regulation loop 1 (degrees with tenth)	R/W	EEPROM
1202	Setpoint 3 of regulation loop 1 (degrees with tenth)	R/W	EEPROM
1203	Setpoint 4 of regulation loop 1 (degrees with tenth)	R/W	EEPROM
1208	Alarm 1 setpoint (degrees with tenth) Alarm 1 upper setpoint if Par. 135 *AL.1.F. = A.bAnd*	R/W	EEPROM
1209	Alarm 1 lower setpoint if Par. 135 *AL.1.F. = A.bAnd* (degrees with tenth)	R/W	EEPROM
1210	Alarm 2 setpoint (degrees with tenth) Alarm 2 upper setpoint if Par. 155 *AL.2.F. = A.bAnd*	R/W	EEPROM
1211	Alarm 2 lower setpoint if Par. 155 *AL.2.F. = A.bAnd* (degrees with tenth)	R/W	EEPROM
1212	Alarm 3 setpoint (degrees with tenth) Alarm 3 upper setpoint if Par. 175 *AL.3.F. = A.bAnd*	R/W	EEPROM
1213	Alarm 3 lower setpoint if Par. 175 *AL.3.F. = A.bAnd* (degrees with tenth)	R/W	EEPROM
1214	Alarm 4 setpoint (degrees with tenth) Alarm 4 upper setpoint if Par. 195 *AL.4.F. = A.bAnd*	R/W	EEPROM
1215	Alarm 4 lower setpoint if Par. 195 *AL.4.F. = A.bAnd* (degrees with tenth)	R/W	EEPROM
1216	Alarm 5 setpoint (degrees with tenth) Alarm 5 upper setpoint if Par. 215 *AL.5.F. = A.bAnd*	R/W	EEPROM
1217	Alarm 5 lower setpoint if Par. 215 *AL.5.F. = A.bAnd* (degrees with tenth)	R/W	EEPROM
1218	Alarm 6 setpoint (degrees with tenth) Alarm 6 upper setpoint if Par. 235 *AL.6.F. = A.bAnd*	R/W	EEPROM
1219	Alarm 6 lower setpoint if Par. 235 *AL.6.F. = A.bAnd* (degrees with tenth)	R/W	EEPROM
1220	Alarm 7 setpoint (degrees with tenth) Alarm 7 upper setpoint if Par. 255 *AL.7.F. = A.bAnd*	R/W	EEPROM
1221	Alarm 7 lower setpoint if Par. 255 *AL.7.F. = A.bAnd* (degrees with tenth)	R/W	EEPROM
1222	Start/Stop 0=controller in STOP 1=controller in START	R/W	0
1223	Hold conversion ON/OFF 0=Hold conversion OFF 1=Hold conversion ON	R/W	0

Modbus address	Description	Read Write	Reset value
1224	Tune management for regulation loop 1		
	With automatic Tune (par. 83 tun.1 = AutO): 0 = autotunig function OFF 1 = autotuning ON	RO	0
	With manual Tune (par. 83 tun.1 = MAnu. or OnCE): 0 = autotunig function OFF 1 = autotuning ON	R/W	0
	With synchronized Tune (par. 83 tun.1 = SYncH): 0 = autotunig function OFF 1 = command output OFF (forces the cooling) 2 = command output ON (forces the heating) 3 = autotuning ON 4 = autotuning ended	R/W	0
1226	Automatic/manual selection for regulation loop 1 0 = automatic; 1 = manual	R/W	0
1228	Command output percentage for regulation loop 1 (0-10000) Heating output percentage with regulation 1 in double loop (0-10000)	R/W	0
1229	Command output percentage for regulation loop 1 (0-1000) Heating output percentage with regulation 1 in double loop (0-1000)	R/W	0
1230	Command output percentage for regulation loop 1 (0-100) Heating output percentage with regulation 1 in double loop (0-100)	R/W	0
1231	Cooling output percentage with regulation 1 in double loop (0-10000)	RO	0
1232	Cooling output percentage with regulation 1 in double loop (0-1000)	RO	0
1233	Cooling output percentage with regulation 1 in double loop (0-100)	RO	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	R/W	0
1241	Alarms manual reset: write 0 to reset all alarms. In reading 0 = reset not allowed, 1 = reset allowed Bit0 = Alarm 1 Bit2 = Alarm 3 Bit4 = Alarm 5 Bit6 = Alarm 7 Bit1 = Alarm 2 Bit3 = Alarm 4 Bit5 = Alarm 6	R/W	0
1243	Alarm 1 remote status (0 = absent, 1 = present)	R/W	0
1244	Alarm 2 remote status (0 = absent, 1 = present)	R/W	0
1245	Alarm 3 remote status (0 = absent, 1 = present)	R/W	0
1246	Alarm 4 remote status (0 = absent, 1 = present)	R/W	0
1247	Alarm 5 remote status (0 = absent, 1 = present)	R/W	0
1248	Alarm 6 remote status (0 = absent, 1 = present)	R/W	0
1249	Alarm 7 remote status (0 = absent, 1 = present)	R/W	0
1250	Value AO1 by serial (Par. 388 rEt.1 = Md.buS)	R/W	0
1252	Tare of zero AI1 (1 = tare; 2=reset tare)	R/W	0
1259	Value of remote setpoint by command 1 serial	R/W	0
1260	Value of remote setpoint by command 2 serial	R/W	0
1300	Setpoint 1 of regulation loop 1, with decimal point selection	R/W	EEPROM
1301	Setpoint 2 of regulation loop 1, with decimal point selection	R/W	EEPROM
1302	Setpoint 3 of regulation loop 1, with decimal point selection	R/W	EEPROM
1303	Setpoint 4 of regulation loop 1, with decimal point selection	R/W	EEPROM
1304	Setpoint 1 of regulation loop 2, with decimal point selection	R/W	EEPROM
1305	Setpoint 2 of regulation loop 2, with decimal point selection	R/W	EEPROM
1306	Setpoint 3 of regulation loop 2, with decimal point selection	R/W	EEPROM
1307	Setpoint 4 of regulation loop 2, with decimal point selection	R/W	EEPROM
1308	Alarm 1 setpoint (degrees with tenth) Alarm 1 upper setpoint if Par. 135 AL.1.F. = A.bAnd	R/W	EEPROM
1309	Alarm 1 lower setpoint if Par. 135 AL.1.F. = A.bAnd (degrees with tenth)	R/W	EEPROM
1310	Alarm 2 setpoint (degrees with tenth) Alarm 2 upper setpoint if Par. 155 AL.2.F. = A.bAnd	R/W	EEPROM
1311	Alarm 2 lower setpoint if Par. 155 AL.2.F. = A.bAnd (degrees with tenth)	R/W	EEPROM
1312	Alarm 3 setpoint (degrees with tenth) Alarm 3 upper setpoint if Par. 175 AL.3.F. = A.bAnd	R/W	EEPROM
1313	Alarm 3 lower setpoint if Par. 175 AL.3.F. = A.bAnd (degrees with tenth)	R/W	EEPROM

Modbus address	Description	Read Write	Reset value
1314	Alarm 4 setpoint (degrees with tenth) Alarm 4 upper setpoint if Par. 195 AL.4.F. = A.bAnd	R/W	EEPROM
1315	Alarm 4 lower setpoint if Par. 195 AL.4.F. = A.bAnd (degrees with tenth)	R/W	EEPROM
1316	Alarm 5 setpoint (degrees with tenth) Alarm 5 upper setpoint if Par. 215 AL.5.F. = A.bAnd	R/W	EEPROM
1317	Alarm 5 lower setpoint if Par. 215 AL.5.F. = A.bAnd (degrees with tenth)	R/W	EEPROM
1318	Alarm 6 setpoint (degrees with tenth) Alarm 6 upper setpoint if Par. 235 AL.6.F. = A.bAnd	R/W	EEPROM
1319	Alarm 6 lower setpoint if Par. 235 AL.6.F. = A.bAnd (degrees with tenth)	R/W	EEPROM
1320	Alarm 7 setpoint (degrees with tenth) Alarm 7 upper setpoint if Par. 255 AL.7.F. = A.bAnd	R/W	EEPROM
1321	Alarm 7 lower setpoint if Par. 255 AL.7.F. = A.bAnd (degrees with tenth)	R/W	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	R/W	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 (ADC1 disabled)	R/W	-
2001	Parameter 1	R/W	EEPROM
2002	Parameter 2	R/W	EEPROM
...	Parameter ...	R/W	EEPROM
2503	Parameter 503	R/W	EEPROM

9.1 Serial compatibility with DIS401

In existing plants where it is necessary to replace an DIS401, it is possible to install a new DIS96V-T o DIS96-DUO-T enabling the Modbus register's compatibility.
To enable the Modbus register's compatibility with the DIS401, simply enter the password 0401.
To return again to the DIS96V Modbus mapping, enter the password 0444.
The new register map is the following:

Modbus address	Description of compatibility registers	Read Write	Reset value
0	Device type	RO	EEPROM
1	Software version	RO	EEPROM
5	Address slave	RO	EEPROM
6	Boot version	RO	EEPROM
50	Automatic addressing	WO	-
51	System code comparison	WO	-
500	Loading default values (write 9999)	R/W	0
900	AI1 value (degrees with tenth)		
1000	AI1 value (degrees with tenths for temperature sensors; digits for linear sensors)	RO	-
1001	Setpoint 1	R/W	EEPROM
1002	Setpoint 2	R/W	EEPROM
1003	Setpoint 3	R/W	EEPROM
1004	Setpoint 4	R/W	EEPROM
1005	Alarm 1	R/W	EEPROM
1006	Alarm 2	R/W	EEPROM
1007	Alarm 3	R/W	EEPROM
1008	Alarm 4	R/W	EEPROM
1009	Setpoint gradient	RO	EEPROM
1010	Relay status (0=OFF, 1=ON) Bit 0 = Q1 (NO) Bit 4 = Q4 Bit 1 = Q1 (NC) Bit 5 = Q5 Bit 2 = Q2 Bit 6 = DO1 Bit 3 = Q3 Bit 7 = DO2	RO	0
1011	Heating output percentage (0-10000)	R/W	0
1012	Cooling output percentage (0-10000)	RO	0

1013	Alarms status (0=None, 1=Active) Bit0 = Alarm 1 Bit4 = Alarm 5 Bit1 = Alarm 2 Bit5 = Alarm 6 Bit2 = Alarm 3 Bit6 = Alarm 7 Bit3 = Alarm 4	RO	0
1014	Manual reset: write 0 to reset all alarms. In reading (0 = Not resettable, 1 = Resettable) Bit0 = Alarm 1 Bit4 = Alarm 5 Bit1 = Alarm 2 Bit5 = Alarm 6 Bit2 = Alarm 3 Bit6 = Alarm 7 Bit3 = Alarm 4	R/W	0
1015	Error flags: Bit 0 = Eeprom writing error Bit 1 = Eeprom reading error Bit 2 = Cold junction error Bit 3 = AI1 error (probe 1) Bit 5 = Generic error Bit 6 = Hardware error Bit 7 = Missing calibration data error Bit 8 = Parameters out of range error	RO	0
1016	Cold junction temperature (degrees.tenths)	RO	-
1017	Start / Stop 0 = Controller in STOP 1 = Controller in START	R/W	0
1018	Lock conversion ON / OFF 0 = Lock conversion OFF 1 = Lock conversion ON	R/W	0
1019	Tune management for regulation loop 1		
	With automatic Tune (par. 83 tUN.t = Auto): 0 = autotunig function OFF 1 = autotuning ON	RO	0
	With manual Tune (par. 83 tUN.t = MANU. o oNcE): 0 = autotunig function OFF 1 = autotuning ON	R/W	0
	With synchronized Tune (par. 83 tUN.t = SYNcH.): 0 = autotunig function OFF 1 = command output OFF (forces the cooling) 2 = command output ON (forces the heating) 3 = autotuning ON 4 = autotuning ended	R/W	0
1020	Automatic/manual selection 0 = automatic	R/W	0
1021	OFF LINE* time (milliseconds)	R/W	0
1022	Digital inputs status (0 = not active, 1 = active) Bit0 = Ingresso dig. 1 Bit2 = Ingresso dig. 3 Bit1 = Ingresso dig. 2 Bit3 = Ingresso dig. 4	RO	0
1023	Current CT instantaneous (Ampere with tenth)	RO	0
1024	Current CT ON (Ampere with tenth)	RO	0
1025	Current CT OFF (Ampere with tenth)	RO	0
1100	Process with decimal point selection	RO	0
1101	Setpoint 1 with decimal point selection	R/W	EEPROM
1102	Setpoint 2 with decimal point selection	R/W	EEPROM
1103	Setpoint 3 with decimal point selection	R/W	EEPROM
1104	Setpoint 4 with decimal point selection	R/W	EEPROM
1105	Alarm 1 with decimal point selection	R/W	EEPROM
1106	Alarm 2 with decimal point selection	R/W	EEPROM
1107	Alarm 3 with decimal point selection	R/W	EEPROM
1108	Alarm 4 with decimal point selection	R/W	EEPROM
1109	Gradient Setpoint with decimal point selection	RO	EEPROM
1110	Percentage heating output (0-1000)	R/W	0
1111	Percentage heating output (0-100)	R/W	0
1112	Percentage cooling output (0-1000)	RO	0
1113	Percentage cooling output (0-100)	RO	0
5000	Start/Stop	WO	-
5001	Value of remote setpoint by command 1 serial	R/W	0

* *If value is 0, the control is disabled. If different from 0, it is the max. time which can elapse between two pollings before the controller goes off-line. If it goes off-line, the controller returns to Stop mode, the control output is disabled but the alarms are active.*

10 Reading and configuration through NFC

Programmable
via RFID /NFC.
No wiring required!

Scan the Qr-Code
to download the App
on Google Play Store®

The controller is supported by the App PROGRAMADOR NFC Plus: using an ANDROID smartphone with NFC connection it is possible to program the device without using a dedicated equipment. The App allows to read, set and backup all parameters which are stored into the internal memory of this devices.
Procedure:

- Identify the position of the NFC antenna on the smartphone (usually central, behind the back cover) or to one of the sides in case of metal chassis. The controller's antenna is placed on the frontal panel, under the function keys.
- Make sure that the NFC sensor of the phone is enabled or that there are no metal materials between the phone and the device (ex. aluminium cover or with magnetic stand)
- It is useful to enable the system sounds on the smartphone, as the notification sound confirms that the device has correctly been detected.

The App interface is provided with four tabs: SCAN, DATA, WRITE, EXTRA.

Select the first tab *"SCAN"* to read data stored into the internal memory of the device; place the smartphone in contact with the controller frontal panel, making sure that the phone's antenna matched with that of the controller. Once detected the device, the App emits a notification sounds and proceeds with the model identification and the reading of the parameters.

The graphic interface shows the advancement and switches to the second tab *"DATA"*. It is now possible to move the smartphone away from the controller to make the required modifications more easily.
The device parameters are divided into collapsible groups and are displayed with name, current value and reference index to the manual. Click on a row to open the setting screen of the related parameter with the detailed view of available options (in case of multiple choice parameters) or of the minimum/maximum/decimals limits (for numeric parameters), included the text description (as per section n. 11 of the user manual). Once selected the chosen value, the related row will be updated and underlined into the tab *"DATA"* (hold down the line to cancel modifications).

To download the new configuration on your device, select the third tab *"WRITE"*, place again the smartphone in contact with the controller and wait for the notification.
The DIS96V will show a restart request, necessary to update the configuration with the new written modifications; if it does not restart, the controller will continue to work with the previous configuration.
In addition to the classic operation of parameters reading->modification->writing, APP is provided with additional functions which can be accessed by the tab *"EXTRA"*, as save parameters / e-mail loaded values/ restore default values.

10.1 Configuration through memory card

The device can be configured through a memory card (2100.30.013). This one is linked to the micro-USB connector on the bottom of the device.

10.2 Memory card creation/update

In order to save a parameter configuration in the memory card, connect it to micro-USB connector and power the instrument. If the memory 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.

10.3 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, you press directly **SET**, when viewing MEMo SKiP, the product starts without uploading any data from the memory card.

11 Loading default values

This procedure allows to restore factory settings of the device.

	Press	Display	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.	

12 Access configuration

	Press	Display	Do
1	**FNC** for 3 sec.	Display 1 shows PASS., while display 2 shows 0000 with the 1st digit flashing.	
2	▲ ▼	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	▲ or ▼	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	▲ or ▼	Scroll parameters.	
7	**SET** to confirm	Allows parameter modification (display 3 flashes)	
8	▲ or ▼	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

12.1 Parameters list functioning

The controller integrates many features that make the configuration parameters list very long. To make it more functional, the parameters list is dynamics and it changes as the user enables / disables the functions. Practically, using a specific function that occupies a given input (or output), the parameters referred to other functions of that resource are hidden to the user making the parameters list more concise.

To simplify the reading/interpretation of the parameters, pressing **SET** it is possible to visualize a brief description of the selected parameter.

Finally, keeping pressed **FNC**, it is possible to move from the mnemonic visualization of the parameter to the numeric one, and viceversa. Ex. The first parameter can be displayed as SEn.1 (mnemonic visualization) or as P.001 (numeric visualization).

Set the product parameters so that they are suitable for the system to be controlled. If they are not suitable, unexpected operations may occasionally cause materials damage or accidents.

13 Table of configuration parameters

GROUP A1 - 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 dP. 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 LL.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[1 p. 47]] **Default**: 0.

5 uL.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[1 p. 47]] **Default**:1000

6 P.uA.1 **Potentiometer Value AI1**
Selects the value of the potentiometer connected on AI1
1..150 kohm. **Default**: 10kohm

7 i.oL.1 **Linear Input over Limits AI1**
If AI1 is a linear input, allows to the process to overpass the limits (parameters 4 and 5)
dISAb. Disabled (**Default**) Enab. Enabled

8 L.cE.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 signaled.
2.0 mA (**Default**) 2.6 mA 3.2 mA 3.8 mA
2.2 mA 2.8 mA 3.4 mA
2.4 mA 3.0 mA 3.6 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[1 p. 47]] (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 LAtc.1 **Latch-On AI1**
Automatic setting of limits for AI1 linear input
dISAb. Disabled (**Default**)
StNRd Standard V.0.Sto. Virtual Zero Stored V.0.t.oN. Virtual Zero at start

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

GROUP B1 - cnd.1 - Outputs and regulation Process 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.P. 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.P. 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.

DIS96V plus

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

DIS96V plus-T

	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.P.)	AO1 (0..10 V)	Q1	Q2	Q3	Q4	DO1	DO2
c.4-20 (4.20.S.P.)	AO1 (4..20 mA)	Q1	Q2	Q3	Q4	DO1	DO2

DIS96V plus-5

	Command	AL. 1	AL. 2	AL. 3	AL. 4	AL. 5	AL. 6
c. o3	Q3	Q1	Q2	Q4	Q5	DO1	DO2
c. o1	Q1	Q2	Q3	Q4	Q5	DO1	DO2
c. SSR	DO1	Q1	Q2	Q3	Q4	Q5	DO2
c. VAL.	Q1	Q2	Q3	Q4	Q5	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.

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! p. 47] (degrees.tenths for temperature sensors). **Default** 0.2.

42 LLS.1 Lower Limit Setpoint 1

Lower limit setpoint selectable for command setpoint 1

-9999..+30000 [digit! p. 47] (degrees for temperature sensors). **Default** 0.

43 uLS.1 Upper Limit Setpoint 1

Upper limit setpoint selectable for command setpoint 1

-9999..+30000 [digit! p. 47] (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 0-20 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 0-20 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 Protected

50 uA.t.1 **Valve Time 1**

Valve time related to command 1 (declared by the manufacturer of the valve)
1...300 seconds. **Default**: 60.

52 S.uS.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
FixEd The valve opening relay is always active

53 A.MA.1 **Automatic / Manual 1**
Enables the automatic/manual selection for command 1
diSAb. Disabled (**Default**)
ENAb. Enabled
EN.Sto. Enabled with memory

54 LPr.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..1000.0 kW. **Default**: 0.0 kW

55 in.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 off.

GROUP C1 - rEG.1 - Autotuning and 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[1 p. 47]] (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. i. equal to 0 (**Default**)
1..10000 [digit[1 p. 47]] (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 sec. (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 sec. (0.0 = derivative disabled), **Default** 0

88 d.b. 1 **Dead Band 1**
Dead band of process 1 PID
0..10000 [digit[1 p. 47]] (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.E.1 **Off Deviation Threshold 1**
Selects deviation from command setpoint 1, to calculate the intervention threshold of "Off Over Setpoint 1" function.
-9999..+9999 [digit[1 p. 47]] (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 s)

93 coF.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 Pb.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 Pb. 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.
-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 LLP.1 **Lower Limit Output Percentage 1**
Selects min. value for command output 1 percentage.
0%...100%, **Default**: 0%.

98 uLP.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[1 p. 47]] (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[1 p. 47]] (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[1 p. 47]] (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 s.

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.

d.SAb.	LEV. 3	LEV. 6	LEV. 9
LEV. 1	LEV. 4	LEV. 7	LEV. 10
LEV. 2	LEV. 5 [**Default**]	LEV. 8	

GROUP D1 - AL. 1 - Alarm 1

135 AL.1.F. Alarm 1 Function

Alarm 1 selection.

- d.SAb. 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. Upper Deviation alarm
- Lo.dEV. Lower Deviation. 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. It 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).
- PAb.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 4 p. 47
- F2 Key F2. Alarm is activated / deactivated by pressing the F2 key 4 p. 47
- F3 Key F3. Alarm is activated / deactivated by pressing the F3 key 4 p. 47
- F4 Key F4. Alarm is activated / deactivated by pressing the F4 key 4 p. 47
- 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 A.1.Pr. Alarm 1 Process *(only on DIS96V DUO-X)*

Selects the size related to alarm 1.

- A.in.1 Value read on input AI1. (**Default**)
- A.in.2 Value read on input AI2.
- MEAN Arithmetic average of the value read on inputs AI1 and AI2 [(AI1+AI2)/2].

dIFF. Difference of the values read on inputs AI1 and AI2 (AI1-AI2).
Ab.dIF. Module of the difference of the values read on inputs AI1 and AI2(|AI1-AI2|).
SUM Sum of values read on inputs AI1 and AI2 (AI1+AI2).
HIGH. Greater value between AI1 and AI2
LOWER Lower value between AI1 and AI2
REdUN. The value read on AI1 or value read on AI2 if AI1 is in error (E-05)

137 AI.rc. Alarm 1 Reference Command *(only on DIS96V DUO-X)*

Selects alarm 1 reference command
cMd. 1 Alarm referred to command 1. (**Default**)
cMd. 2 Alarm referred to command 2.

138 AI 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 2 p. 47
N.c. tH. (N.C. Threshold) Normally closed, active on reaching alarm 2 p. 47
N.o.tH.V. (N.O. Threshold Variation) disabled after changing control setpoint 3 p. 47
N.c.tH.V. (N.C. Threshold Variation) disabled after changing control setpoint 3 p. 47

140 A.IHY. Alarm 1 Hysteresis

Alarm 1 hysteresis
-9999..+9999 [digit1 p. 47] (degrees.tenths for temperature sensors). **Default** 0.5.

141 A.IL.L. Alarm 1 Lower Limit

Lower limit selectable for the alarm 1 setpoint.
-9999..+30000 [digit1 p. 47] (degrees for temperature sensors). **Default** 0.

142 A.I.uL. Alarm 1 Upper Limit

Upper limit selectable for the alarm 1 setpoint.
-9999..+30000 [digit1 p. 47] (degrees for temperature sensors). **Default** 1750.

143 A.I.rE. Alarm 1 Reset

Alarm 1 contact reset type (always automatic if AL.1.F. = c. Au).
A. RES. Automatic reset (**Default**)
M. RES. Manual reset (manual reset by keyboard 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.IS.E. Alarm 1 State Error

Alarm 1 output status in case of error.
oPEN Open contact. **Default** CLose Closed contact.

145 A.ISS. Alarm 1 State Stop

Alarm 1 output status with the controller in STOP.
ActV.A. Alarm active. **Default**
oPEN Open contact. CLose Closed contact.

146 A.ILd. Alarm 1 Led

Defines the status of the led **A1** 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**)

147 A.1dE. Alarm 1 Delay

Alarm 1 Delay.
-60:00..60:00 mm:ss (hh:mm if AL.1.F. = c. Au*). **Default**: 00:00.
Negative value: delay when exit alarm status.
Positive value: delay when enter alarm status.

148 A.1S.P. Alarm 1 Setpoint Protection

Allows or not to change the alarm 1 setpoint

- FREE Editable by the user (**Default**)
- Loc* Protected
- HidE Protected and not visualized

149 A.1Lb. Alarm 1 Label

Selects the message displayed in case of alarm 1 intervention.

- diSAb. Disabled. (**Default**)
- Lb. 01 Message 1 (see table paragraph *15.1*)
- ...
- Lb. 20 Message 20 (see table paragraph *15.1*)
- uSER.L. Custom message (modifiable by the user through the App or via modbus)

GROUP D2 - AL. 2 - Alarm 2

155 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 2 H and command setpoint - alarm setpoint 2 L).
- uP.dEv. Upper Deviation. Upper Deviation alarm
- Lo.dEv. Lower Deviation. 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. Au* Auxiliary for job distribution on the command output. It cyclically replaces the command output for the time set on the parameter 167 A.2.dE.. If A.2.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).
- PPb.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 4 p. 47
- F2 Key F2. Alarm is activated / deactivated by pressing the F2 key 4 p. 47
- F3 Key F3. Alarm is activated / deactivated by pressing the F3 key 4 p. 47
- F4 Key F4. Alarm is activated / deactivated by pressing the F4 key 4 p. 47
- 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 1244

158 A2S.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 2 p. 47
- n.c. tH. (N.C. Threshold) Normally closed, active on reaching alarm 2 p. 47
- n.o.tH.V. (N.O. Threshold Variation) disabled after changing control setpoint 3 p. 47
- n.c.tH.V. (N.C. Threshold Variation) disabled after changing control setpoint 3 p. 47

160 A2HY. **Alarm 2 Hysteresis**

Alarm 2 hysteresis

-9999..+9999 [digit1 p. 47] (degrees.tenths for temperature sensors). **Default** 0.5.

161 A2LL. **Alarm 2 Lower Limit**

Lower limit selectable for the alarm 2 setpoint

-9999..+30000 [digit1 p. 47] (degrees for temperature sensors). **Default** 0.

162 A2uL. **Alarm 2 Upper Limit**

Upper limit selectable for the alarm 2 setpoint

-9999..+30000 [digit1 p. 47] (degrees for temperature sensors). **Default** 1750.

163 A2rE. **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 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 A2S.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 A2SS. **Alarm 2 State Stop**

Alarm 2 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

166 A2Ld. **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 value: delay when exit alarm status.

Positive value: delay when enter alarm status

168 A2S.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 A2Lb. **Alarm 2 Label**
Selects the message displayed in case of alarm 2 intervention.
- diSAb. Disabled. (**Default**)
- Lb. 01 Message 1 (see table paragraph *15.1*)
- ...
- Lb. 20 Message 20 (see table paragraph *15.1*)
- uSER.L. Custom message (modifiable by the user through the App or via modbus)

GROUP D3 - AL. 3 - Alarm 3
GROUP D4 - AL. 4 - Alarm 4
GROUP D5 - AL. 5 - Alarm 5

GROUP E1 - d.i. 1 - Digital input 1
275 d.i.1F. **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 SET1
- SEt.2 Controller regulates on SET2
- SEt.3 Controller regulates on SET3
- SEt.4 Controller regulates on SET4
- 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 Performing 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.I.c. **Digital Input 1 Contact**
Defines the resting contact of the digital input 1.
N.oPEN Normally open (**Default**) n.cLos. Normally closed

GROUP E2 - d.i. 2 - Digital input 2

284 d.i2F. **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 SET1
SEt.2 Controller regulates on SET2
SEt.3 Controller regulates on SET3
SEt.4 Controller regulates on SET4
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 Performing 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. It 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.)

285 d.i2c. **Digital Input 2 Contact**
Defines the resting contact of the digital input 2.
N.oPEN Normally open (**Default**) N.cLoS. Normally closed

GROUP E3 - d.i.3 - Digital input 3 *(not available on DIS96V plus-T)*
GROUP E4 - d.i.4 - Digital input 4 *(not available on DIS96V plus-T)*

GROUP F1 - 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.
0 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)

315 SS.Gr. **Soft-Start Gradient**
Rising/falling gradient for soft-start and pre-programmed cycle.
0..20000 Digit/ora (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[1 p. 47]] (degrees.tenths for temperature sensors) (**Default**: 1000)

318 SS.t i. **Soft-Start Time**
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[1 p. 47]] (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).

GROUP G1 - 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.d2 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. A1.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)
- A1.IN.1 Value read on input AI1.
- kW c.1 Power on control load 1
- kWH.c.1 kWh cmd 1. Energy transferred to command load 1

328 u1.d3 Visualization Display 3

Select visualization on display 3.

- StAtE Status controller. RUN, STOP, **MAN**UAL, **REM**OTE, STEP1... STEP8 (**Default**)
- PRo.d.1 (Process Display 1) Visualizza quale processo sta visualizzando il display 1 (Es. A1.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
- 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)
- A1.IN.1 Value read on input AI1.
- kW c.1 Power on command load 1
- kWH.c.1 kWh cmd 1. Energy transferred to command load 1

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	K1P
K	MPA	KN	L/M	LbF
V	RtM	G	L/H	oZF
mV	MH2o	KG	RPM	PcS
A	MMHG	Q	RH	PERS. (by App)
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 minutes
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. LLbG. and uLbG. are ignored) (**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. LLbG. and uLbG. are ignored)
- kW Power on loads (command 1 + command 2 if present)
- AIN.1 Value read on AI1 input.
- PEduN. The value read on AI1 or value read on AI2 if AI1 is in error (E-05)

333 LLbG. **Lower Limit Bar Graph**
Bar Graph lower limit
-9999..+30000 [digit[1 p. 47]] (degrees for temperature sensors). **Default** 0.

334 uLbG. **Upper Limit Bar Graph**
Bar Graph upper limit
-9999..+30000 [digit[1 p. 47]] (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 nFcL. **NFC Lock**
- diSAb. NFC lock disabled: NFC accessible.
- ENAb. NFC lock enabled: NFC not accessible.

GROUP H1 - FnEY. - 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 SET1
- SEt.2 Controller regulates on SET2
- SEt.3 Controller regulates on SET3
- SEt.4 Controller regulates on SET4
- 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 or 76)
- R. kWH Reset kWh. Reset the value of energy consumed by the system.
- AI. 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.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. 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)
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).

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 SET1
SEt.2 Controller regulates on SET2
SEt.3 Controller regulates on SET3
SEt.4 Controller regulates on SET4
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 or 76)
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.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. 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)
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).

354 F3 F. **F3 Key**

F3 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 SET1
SEt.2 Controller regulates on SET2
SEt.3 Controller regulates on SET3
SEt.4 Controller regulates on SET4
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 or 76)
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.StR. Timer 1 Start. D.I. starts the timer 1(impulsive)
t.1.End Timer 1 End. D.I. stops the timer 1(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).

360 F4 F. F4 Key

F4 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 SET1
SEt.2 Controller regulates on SET2
SEt.3 Controller regulates on SET3
SEt.4 Controller regulates on SET4
StARt Start (impulsive)
StoP Stop (impulsive)
St./St. Start / Stop (impulsive)
toNE Performing manual tune
Au.MA.i. Automatic / Manual Impulse (if enabled on parameter 53 or 76)
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.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. 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)
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).

GROUP I1 - Ct 1 - Current Transformer 1

366 Ct.1F. 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.1u. Current Transformer 1 Value

Select the current transformer 1 full-scale
1..300 Ampere (**Default**: 50)

368 H.b.l.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.l.t. **Heater Break Alarm 1 Threshold**
CT1 Heater Break Alarm 1 intervention threshold
0 Alarm disabled. (**Default**:)
0.1-200.0 Ampere.

370 oc.l.t. **Overcurrent 1 Alarm Threshold**
CT1 Overcurrent Alarm 1 threshold
0 Alarm disabled. (**Default**)
0.1-300.0 Ampere

371 H.b.l.d. **Heater Break Alarm 1 Delay**
CT1 Heater Break Alarm and overcurrent alarm activation delay.
00:00-60:00 mm:ss (**Default**: 01:00)

GROUP J1 - A.o. 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

389 r.ltY. **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.l.LL. **Retransmission 1 Lower Limit**
Retransmission 1 lower limit range (value related to 0 V or 0/4 mA).
-9999..+30000 [digit[1 p. 47]] (degrees for temperature sensors), **Default**: 0.

391 r.l.uL. **Retransmission 1 Upper Limit**
Retransmission 1 upper limit range (value related to 10 V or 20 mA).
-9999..+30000 [digit[1 p. 47]] (degrees for temperature sensors), **Default**: 1000.

392 r.lS.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.
If the retransmission 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.

393 r.lSS. **Retransmission 1 State Stop**
Determines retransmission 1 value with controller in STOP.
If the alarm output is 0-10V:
ActV.A. Alarm active
0 V 0 V. **Default** 10 V 10 V.

If the alarm output is 0-20 mA or 4-20 mA:

AcEv.A.	Alarm active				
0 mA	0 mA. **Default**				
4 mA	4 mA.	20 ma	20 mA.	21.5ma	21.5 mA.

GROUP K1 - SEr. - Serial *(only on DIS96V -XXXX-T)*

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 oFFL. 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 disabled (**Default**)
0.1-600.0	tenths of second.

GROUP L1 - tiMr - Timer

420 tMr.1 Timer 1

Enabling Timer 1

diSAb.	Disabled (**Default**)
ENAb.	Enabled
EN.StR.	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.StR.	Enabled and active at start

424 t.b.t.2 Time Base Timer 2
Selects time base for 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.

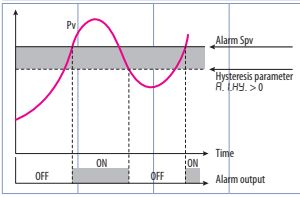
426 tMr.S. Timers Sequence
Select the correlation between the two timers.
SinGL. Singles. Timers work independently (**Default**)
SEQuE. Sequential. When timer 1 ends, timer 2 starts.
LooP Loop. When a timer ends, another starts.

427 MAin. Maintenance Request
View a maintenance request after elapsing of time given on par. 428 M.t in..
diSAb. Disabled (**Default**)
ENAb. Enabled

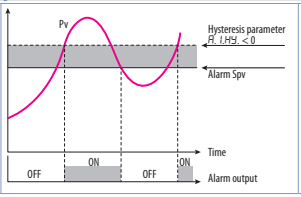
428 M.t in. Maintenance Time
Select the time in hours for the maintenance request.
Range 1....30000 (**Default**: 1000).

14 Alarm intervention modes

14.a Absolute or threshold alarm active over (par. 135 AL.1F. = Ab.uPA)

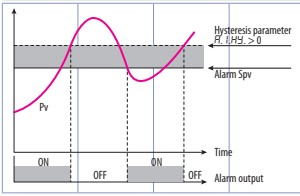


Absolute alarm active over.
Hysteresis value greater than "0" (Par. 140 A.1HY > 0).

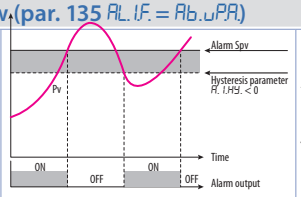


Absolute alarm active over.
Hysteresis value lower than "0"
(Par. 140 A.1HY < 0).

14.b Absolute or threshold alarm active below (par. 135 AL.1F. = Ab.uPA)

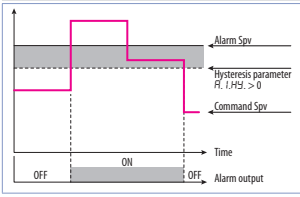


Absolute alarm active below.
Hysteresis value greater than "0" (Par. 140 A.1HY > 0).



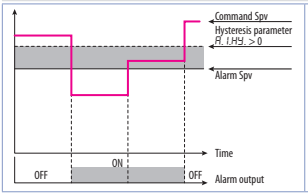
Absolute alarm active below.
Hysteresis value lower than "0"
(Par. 140 A.1HY < 0).

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



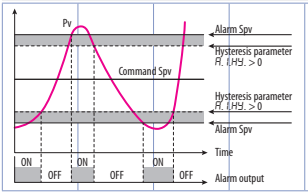
Absolute alarm referred to command setpoint active over.
Hysteresis value greater than "0" (Par. 140 A.1HY > 0).

14.d Absolute or threshold alarm referred to command setpoint active below (par. 135 AL.1F. = Ab.cL.A.)

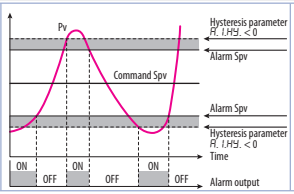


Absolute alarm referred to command setpoint active below. Hysteresis value greater than "0" (Par. 140 A.1.HY > 0).

14.e Band alarm (par. 135 AL.1F. = bAnd)

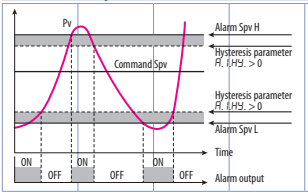


Band alarm hysteresis value greater than "0" (Par. A.1.HY > 0).

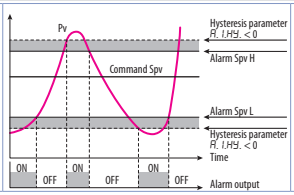


Band alarm hysteresis value lower than "0" (Par. 140 A.1.HY < 0).

14.f Asymmetric band alarm (par. 135 AL.1F. = A.bAnd)

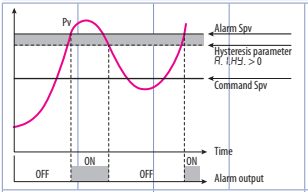


Asymmetric band alarm with hysteresis value greater than "0" (Par. 140 A.1.HY > 0).

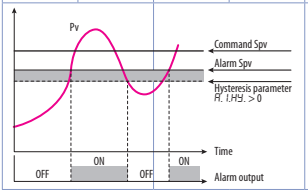


Asymmetric band alarm with hysteresis value lower than "0" (Par. 140 A.1.HY < 0).

14.g Upper deviation alarm (par. 135 AL.1F. = uP.dEu.)

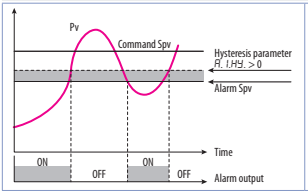


Upper deviation alarm value of alarm setpoint greater than "0" and hysteresis value greater than "0" (Par. 140 A.1.HY > 0).
NB: with hysteresis value less than "0" (A.1.HY. < 0) the dotted line moves under the alarm setpoint.

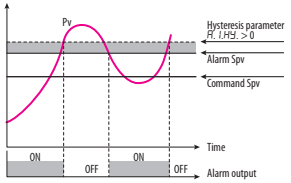


Upper deviation alarm value of alarm setpoint less than "0" and hysteresis value greater than "0" (Par. 140 A.1.HY > 0).
NB: with hysteresis value less than "0" (A.1.HY. < 0) the dotted line moves under the alarm setpoint.

14.h Lower deviation alarm (par. 135 AL.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) the 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.

14.1 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. and 269 A.7.Lb., the display 3 will show one of the following messages in case of alarm:

Selection	Message displayed in the alarm event
1 ... 7	alarm 1 ... 7
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

By setting 0, no message will be displayed. While setting 22, the user will have up to 23 characters available to customize his message via the "PROGRAMADOR-NFC-PLUS" App or via modbus.

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

	Cause	What to do
E-02 SYSTEM Error	Cold junction temperature sensor failure or environment temperature out of range	Call 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-08 SYSTEM Error	Missing calibration	Call assistance
E-80 rFid Error	Tag rfid malfunctioning	Call assistance

Notes / Updates

1 *Display of decimal point depends on setting of parameter SEn. I and d.P.*

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

3 *Changing the control setpoint, the alarm will be disabled. It will stay disabled as long as the parameters that created it are active. It only works with deviation alarms, band alarms and absolute alarms (referring to the control setpoint).*

4 *The alarm remains active for the time set on the parameter A.x.dE, if different from 0.*

Table of configuration parameters

GROUP A1 - AIn.1 - Analogue input 1

1	SEn.1	Sensor AI1	26
2	d.P. 1	Decimal Point 1	26
3	dEGr.	Degree	26
4	LL.i.1	Lower Linear Input AI1	26
5	uL.i.1	Upper Linear Input AI1	26
6	P.uA.1	Potentiometer Value AI1	26
7	i.oL.1	Linear Input over Limits AI1	26
8	L.cE.1	Lower Current Error 1	26
9	o.cA.1	Offset Calibration AI1	26
10	G.cA.1	Gain Calibration AI1	26
11	Ltc.1	Latch-On AI1	26
12	cFL.1	Conversion Filter AI1	26
13	cFr.1	Conversion Frequency AI1	27

GROUP B1 - cMd.1 - Outputs and regulation Process 1

37	c.ou.1	Command Output 1	27
40	Ac.t.1	Action type 1	27
41	cHY.1	Command Hysteresis 1	27
42	LLS.1	Lower Limit Setpoint 1	27
43	uLS.1	Upper Limit Setpoint 1	28
44	c.rE.1	Command Reset 1	28
45	cSE.1	Command State Error 1	28
46	cSS.1	Command State Stop 1	28
47	c.Ld.1	Command Led 1	28
48	c.dE.1	Command Delay 1	28
49	cS.P.1	Command Setpoint Protection 1	28
50	uA.t.1	Valve Time 1	29
52	S.uS.1	State Valve Saturation 1	29
53	A.MA.1	Automatic / Manual 1	29
54	LP.r.1	Load Power Rating 1	29
55	in.S.	Initial State	29

GROUP C1 - rEG.1 - Autotuning and PID 1

83	tun.1	Tune 1	29
84	S.d.t.1	Setpoint Deviation Tune 1	29
85	P.b. 1	Proportional Band 1	29
86	i.t. 1	Integral Time 1	29
87	d.t. 1	Derivative Time 1	29
88	d.b. 1	Dead Band 1	29
89	P.b.c.1	Proportional Band Centered 1	29
90	o.o.S.1	Off Over Setpoint 1	30
91	o.d.t.1	Off Deviation Threshold 1	30
92	c.t. 1	Cycle Time 1	30
93	co.F.1	Cooling Fluid 1	30
94	P.bM.1	Proportional Band Multiplier 1	30
95	o.d.b.1	Overlap / Dead Band 1	30
96	c.c.t.1	Cooling Cycle Time 1	30
97	LLP.1	Lower Limit Output Percentage 1	30
98	uL.P.1	Upper Limit Output Percentage 1	30

GROUP K1 - SEr. - Serial *(only on DIS96V plus-T and DIS96V DUO-T)*

GROUP L1 - tiMr - Timer

Antes de usar el dispositivo leer con atención las informaciones de seguridad y configuración contenidas en este manual.

CE

RoHS Compliant

www.remberg.es