

# DIS96V-DUO

## Controlador de proceso



**Remberg®**



vertical 48x96



**3 INDICACIONES  
SIMULTÁNEAS**

**FRONTAL  
IP65**

**2 ENTRADAS  
ANALÓGICAS  
UNIVERSALES**

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

**4 ENTRADAS  
DIGITALES**

**2 TRAFOS  
INTENSIDAD  
X/50mA**

**NFC**

**2 TEMPORIZADORES**

**2 RELÉS  
de SALIDA**

**2 SALIDAS de  
TRANSISTOR**

PNP / SSR

**1 SALIDA  
ANALÓGICA  
0/10V, 4/20mA**

opcional

DIS96V-DUO -T

v/i 1 v/i 2

RS485

**ALIMENTACIÓN  
24.. 230VAC/DC**

**OPERACIONES ARITMÉTICAS**

A+B / 2 MEDIA

A+B SUMA

A-B DIFERENCIA

REDUNDANTE

A > B LA MAYOR

A < B LA MENOR



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# 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   |
|---------------------|---|
| <b>Danger!</b>      | Disregarding these safety guidelines and notices can be life-threatening.                                       |
| <b>Warning!</b>     | Disregarding these safety guidelines and notices can result in severe injury or substantial damage to property. |
| <b>Information!</b> | This information is important for preventing errors.  |

## 1.2 Safety Precautions

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

## 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<br>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  | <p><b>A11</b> <i>opcional DUO</i> – A12:<br/>Configurable via software.<br/><b>Input:</b> Thermocouple type K, S, R, J,T,E,N,B.<br/>Automatic compensation of cold junction from -25...85°C.<br/><b>Thermoresistances:</b> PT100, PT500, PT1000, Ni100, PTC1K, NTC10K (<math>\beta</math> 3435K)<br/><b>V/mA input:</b> 0-1 V, 0-5 V, 0-10 V, 0-20 o 4-20 mA, 0-60 mV.<br/><b>Pot. input:</b> 1..150 K<math>\Omega</math>.<br/><b>CT (Current transformer):</b> x/50 mA</p> | <p>Tolerance (@25° C)<br/><math>\pm 0.2\% \pm 1</math> digit (on F.s.) for thermocouple, thermoresistance and V/mA.<br/>Cold junction accuracy 0.1° C/°C.</p> <p><b>Impedence:</b><br/><b>0-10 V:</b> Ri&gt;110 K<math>\Omega</math><br/><b>0-20 mA:</b> Ri&lt;5 <math>\Omega</math><br/><b>0-60 mV:</b> Ri&gt;1 M<math>\Omega</math></p> |
| 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:<br><b>0-10 V</b> with 40000 points +/-0.2% (on F.s.) @25 °C; load $\geq 1$ K $\Omega$<br><b>4-20 mA</b> with 40000 points +/-0.2% (on F.s.) @25 °C; load $\leq 250\Omega$   |
| Power-supply     | Extended power-supply 24..230 VAC/VDC $\pm 15\%$ 50/60 Hz   | <b>Consumption:</b><br>DIS96V plus 8W<br>DIS96V plus -T 10W<br>DIS96V plus -5 12W<br>DIS96V-DUO 10W<br>DIS96V-DUO-T 12W   |
|                  |   |   |

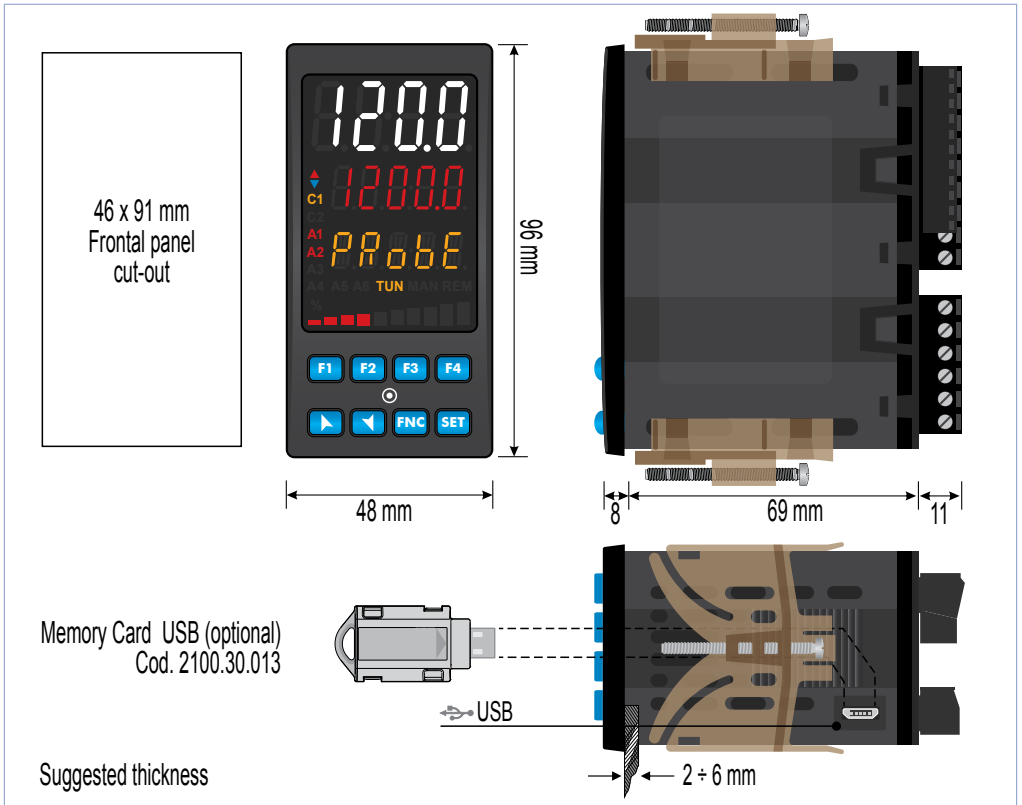
## 3.3 Software Features

|                       |  |
|-----------------------|--|
| 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: <a href="http://www.remberg.es">www.remberg.es</a>   |
| App PROGRAMADOR NFC PLUS | ..through download the App PROGRAMADOR NFC plus on Google Play Store®, see paragraph 11<br>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. <b>The device does not intentionally emit radio waves.</b> |

## 4 Dimensions and Installation

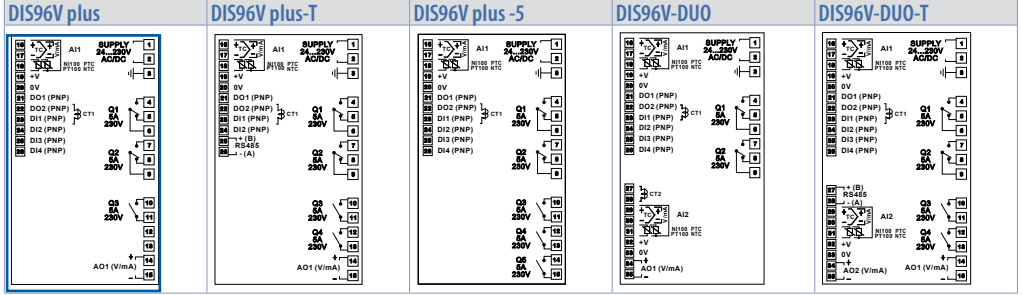


## 5 Electrical wirings

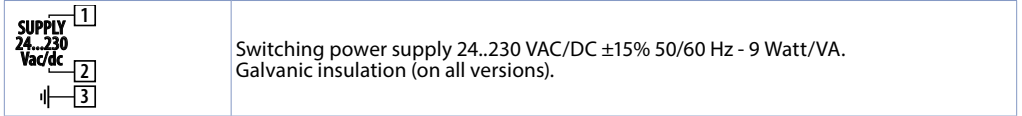
This controller has been designed and manufactured in conformity to Low Voltage Directive 2006/95/EC, 2014/35/EU (LVD) and EMC Directive 2004/108/EC, 2014/30/EU (EMC). For installation in industrial environments please observe following safety guidelines:

- 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<sup>2</sup> (min. AWG28, max. AWG12; Minimum temp. rating of the cable to be connected to the field wiring terminals, 70°C). Cable stripping length 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<sup>2</sup> (min. AWG28, max. AWG14; Minimum temp. rating of the cable to be connected to the field wiring terminals, 70°C). Cable stripping length 6 to 7 mm. Tighten screws to tightening torque of 0,51 Nm.
- Use Copper or Copper-Clad Aluminum Conductors Only or AL-CU or CU-AL.

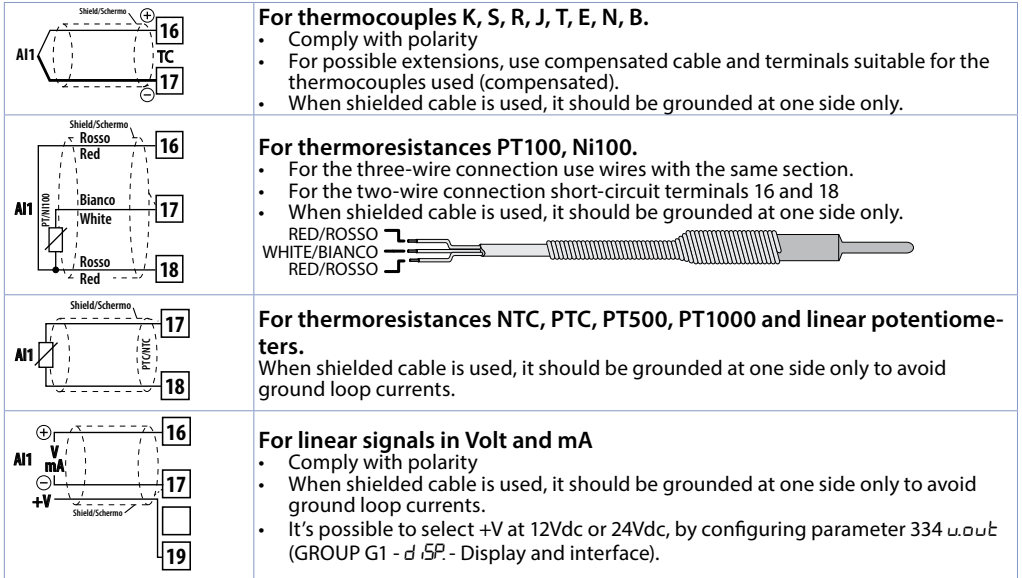
# 5.1 Wiring diagram



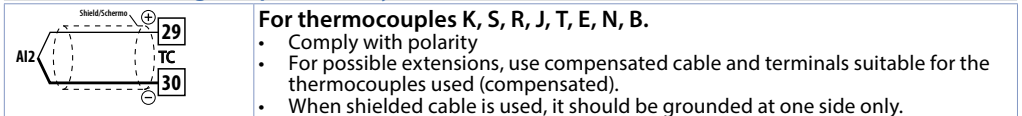
## 5.1.a Power Supply



## 5.1.b Analogue Input AI1



## 5.1.c Analogue Input AI2 (only DIS96V-DUO, DIS96V-DUO-T)





|  |  |
|--|--|
|  | <p><b>For thermoresistances PT100, Ni100.</b></p> <ul style="list-style-type: none"> <li>For the three-wire connection use wires with the same section.</li> <li>For the two-wire connection short-circuit terminals 29 and 31.</li> <li>When shielded cable is used, it should be grounded at one side only.</li> </ul>   |
|  | <p><b>For thermoresistances NTC, PTC, PT500, PT1000 and linear potentiometers.</b></p> <p>When shielded cable is used, it should be grounded at one side only to avoid ground loop currents.</p>   |
|  | <p><b>For linear signals in Volt and mA</b></p> <ul style="list-style-type: none"> <li>Comply with polarity</li> <li>When shielded cable is used, it should be grounded at one side only to avoid ground loop currents.</li> <li>To power the sensor connected to AI2 through +V (terminal 32), short-circuit 0 V (terminal 33) with AI2 ground input (terminal 30).</li> <li>+ V at 12Vdc or 24Vdc can be selected by configuring parameter 334 <math>\mu</math>OUT (GROUP G1 - d 5P - Display and interface).</li> </ul> |

### 5.1.d CT1 input

|  |   |
|--|---|
|  | <p><b>To enable CT1 input, modify parameter 366 <math>c_t F</math>.</b></p> <ul style="list-style-type: none"> <li>Input for 50 mA amperometric transformer.</li> <li>Sampling time 100 ms.</li> <li>Configurable by parameters.</li> </ul> |
|--|---|

### 5.1.e CT2 input (only DIS96V-DUO)

|  |  |
|--|--|
|  | <p><b>To enable CT2 input, modify parameter 377 <math>c_t 2F</math>.</b></p> <ul style="list-style-type: none"> <li>Input for 50 mA amperometric transformer.</li> <li>Sampling time 100 ms.</li> <li>Configurable by parameters.</li> </ul> |
|--|--|

### 5.1.f Digital inputs

|  |  |
|--|--|
|  | <p>Digital inputs can be enabled by parameters.</p> <p>Close pin "DIx" on pin "+V" to enable digital input.</p> <p>It is possible to put in parallel the digital inputs of different devices joining together the 0V pins (20).</p> <p>In the version DIS96V plus-T only DI1 and DI2 are available</p> |
|--|--|

### 5.1.g Serial input (only DIS96V-xxxxx-T)

|                             |  |
|-----------------------------|--|
| <p><b>DIS96V plus-T</b></p> | <p>Modbus RS485 communication.<br/>RTU Slave with galvanic insulation.</p>         |
| <p><b>DIS96V-DUO-T</b></p>  | <p>It is recommended to use the twisted and shielded cable for communications.</p> |

## 5.1.h Digital outputs

|           |    |   |  |
|-----------|----|---|--|
| OV        | 20 | ⊖ | Digital output PNP (including SSR) for command or alarm.<br>Range 12 VDC/25 mA or 24 VDC/15mA selectable by parameter 334 u.o.u.t. (GROUP G1 - d SP - Display and interface) |
| DO1 (PNP) | 21 | ⊕ |  |
| DO2 (PNP) | 22 | ⊕ |  |
|           |    |   | Wire the positive control (+) of the solid state relay to the pin DO(x).<br>Wire the negative control (-) of the solid state relay to the pin OV.                            |

## 5.1.i AO1 Analogue output

|                     |    |  |
|---------------------|----|--|
| <b>DIS96V XXX-T</b> |    | Linear output in <b>mA</b> or <b>V</b> (galvanically isolated) configurable as command, alarm or retransmission of process-setpoint. |
| ⊕                   | 14 |  |
| A01 V/mA            | 15 |  |
| ⊖                   |    |  |
| <b>DIS96V-DUO</b>   |    | The selection mA or Volt for the linear output depends on the parameters configuration.  |
| ⊕                   | 34 |  |
| A01 V/mA            | 35 |  |
| ⊖                   |    |  |

## 5.1.j AO2 Analogue output (only DIS96-DUO-T)

|          |    |  |
|----------|----|--|
| ⊕        | 34 | Linear output in <b>mA</b> or <b>V</b> (galvanically isolated) configurable as command, alarm or retransmission of process-setpoint. |
| A02 V/mA | 35 |  |
| ⊖        |    | The selection mA or Volt for the linear output depends on the parameters configuration.  |

## 5.1.k Relays output Q1 and Q2

|  |                                    |   |
|--|------------------------------------|---|
|  | <p><b>Electrical endurance</b></p> | Capacity:<br>2 A, 250 VAC, resistive loads, 10 <sup>5</sup> operations.<br>20/2 A, 250 VAC, cosφ = 0.3, 10 <sup>5</sup> operations.<br>See chart below. |
|  |                                    | The output Q1 works through 2 independent relays and both contacts can be opened to manage the valves (see figure).                                     |

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

|  |                          |  |
|--|--------------------------|--|
|  | <p><b>Life Curve</b></p> | Capacity <ul style="list-style-type: none"> <li>5 A, 250 Vac, resistive loads; min.100x10<sup>3</sup> operations.</li> <li>1/8 HP 277 Vac; min. 100x10<sup>3</sup> operations.</li> </ul> See chart below. |
|  |                          | <b>NB:</b> relays 3, 4 and 5 are not present in all DIS96V versions  |

## 6 Numeric Indicators (Display)

|  |  |   |
|--|--|---|
|  |  | <p>Normally it displays the process.</p> <p>During the configuration phase, it displays the name of parameter being inserted.</p>   |
|  |  | <p>Displays the selected value on the parameter 327 <i>u.i.d.2</i> (factory settings: setpoint)</p> <p>During the configuration phase it displays the parameters group or the number of the parameter being inserted. I</p> |
|  |  | <p>Displays the selected value on the parameter 328 <i>u.i.d.3</i> (factory settings: state)</p> <p>During the configuration phase it displays the parameter value being inserted.</p>                                      |

### 6.1 Meaning of Status Lights (Led)

|            |  |
|------------|--|
| <b>C1</b>  | 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. |
| <b>C2</b>  | 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. |
| <b>A1</b>  | ON when alarm 1 is active.   |
| <b>A2</b>  | ON when alarm 2 is active.   |
| <b>A3</b>  | ON when alarm 3 is active.   |
| <b>A4</b>  | ON when alarm 4 is active.   |
| <b>A5</b>  | ON when alarm 5 is active.   |
| <b>A6</b>  | ON when alarm 6 is active.   |
| <b>TUN</b> | ON when the controller is executing an auto-tuning cycle.  |
| <b>MAN</b> | ON when "Manual" function is active.   |
| <b>REM</b> | ON when the controller communicates through serial. Flashes when the remote setpoint is enabled.   |
|            | Configurable on par. 331 <i>bar.g</i> . 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

|            |  |
|------------|--|
|            | <ul style="list-style-type: none"> <li>Increases the main setpoint.</li> <li>During the configuration phase it allows to scroll the groups of parameters and to scroll/modify the parameters.</li> <li>Increases the setpoints.</li> </ul> |
|            | <ul style="list-style-type: none"> <li>Decreases the main setpoint.</li> <li>During the configuration phase it allows to scroll the groups of parameters and to scroll/modify the parameters.</li> <li>Decreases the setpoints.</li> </ul> |
| <b>FNC</b> | <ul style="list-style-type: none"> <li>Allows to enter the Tuning launch function, automatic/manual selection.</li> <li>During configuration works as exit key (ESC).</li> </ul>   |
| <b>SET</b> | <ul style="list-style-type: none"> <li>Allows to visualize command and alarm setpoints.</li> <li>During configuration allows to enter the parameter to be modified and confirms the variation.</li> </ul>                                  |
| <b>F1</b>  | <ul style="list-style-type: none"> <li>Configurable on the parameter 342 - <i>F1 t</i>.</li> </ul>   |
| <b>F2</b>  | <ul style="list-style-type: none"> <li>Configurable on the parameter 348 - <i>F2 t</i>.</li> </ul>   |
| <b>F3</b>  | <ul style="list-style-type: none"> <li>Configurable on the parameter 354 - <i>F3 t</i>.</li> </ul>   |
| <b>F4</b>  | <ul style="list-style-type: none"> <li>Configurable on the parameter 360 - <i>F4 t</i>.</li> </ul>   |

## 7 Dual input mode

Each DIS96V-DUO model is provided with two analogue inputs: it is possible to do mathematic operations between 2 measured process values, correlating obtained result to the command or alarm outputs, or to give a process value as remote setpoint. It is also possible to use the controller for 2 independent control loops.

### 7.1 Selection of process value related to the command output and to the alarms

When second analogue input is enabled (par. 19 *SEn.2* other than *d.SAb.*) it is possible to choose the process value to be related to command output, to alarms and to retransmission.

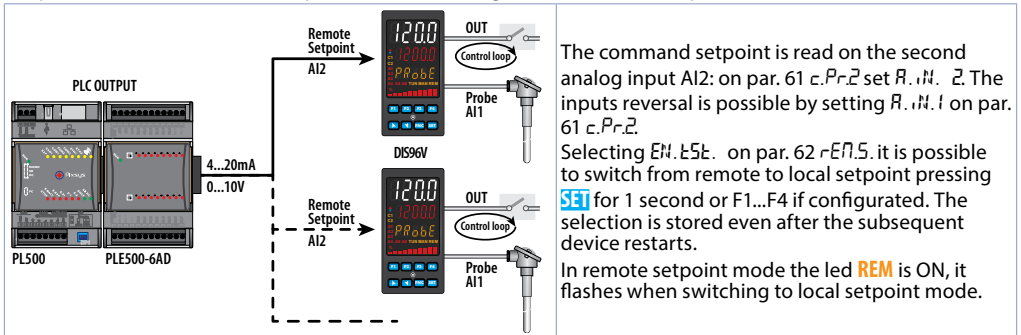
Following options are available:

- *R.N.1.*: Value read by input AI1
- *R.N.2.*: Value read by input AI2;
- *MEAN*: Mean between inputs AI1 and AI2;
- *d.FF.*: Difference between inputs: AI1-AI2;
- *Ab.d.F.*: Difference between inputs as absolute value: AI1-AI2;
- *Sum*: Sum of inputs: AI1+AI2.
- *HIGH*: Greater value between AI1 and AI2.
- *LOW*: Lower value between AI1 and AI2.
- *REDUN*: The value read on AI1. If AI1 signs error (E-05), it goes automatically to the value read on AI2.
- Command 1 process must be selected on parameter 38 *c.Pr.1*
- Command 2 process must be selected on parameter 61 *c.Pr.2*
- The process related to the alarms must be selected on par. 136 *R.1.Pr.* for the alarm 1, on par. 156 *R.2.Pr.* for the alarm 2, on par. 176 *R.3.Pr.* for the alarm 3, and on par. 196 *R.4.Pr.* for the alarm 4, on par. 216 *R.5.Pr.* for the alarm 5, on par. 236 *R.6.Pr.* for the alarm 6 and on par. 256 *R.7.Pr.* for the alarm 7.
- The value to be retransmitted must be selected on par. 299 *rEn.1* and/or on par. 308 *rEn.2*.

It is possible to choose what to visualize on display 2 selecting par. 327 *u.d.2.* and on display 3 by selecting the parameter 328 *u.d.3.*

### 7.2 Remote setpoint by analogue input

It is possible to enable remote setpoint function setting *ENAb.* or *En.tSt.* on par. 62 *rEn.5.*



The command setpoint is read on the second analog input AI2: on par. 61 *c.Pr.2* set *R.N. 2*. The inputs reversal is possible by setting *R.N.1* on par. 61 *c.Pr.2*.

Selecting *EN.tSt.* on par. 62 *rEn.5.* it is possible to switch from remote to local setpoint pressing **SET** for 1 second or F1...F4 if configured. The selection is stored even after the subsequent device restarts.

In remote setpoint mode the led **REM** is ON, it flashes when switching to local setpoint mode.

The decimal point setting parameter for the image input (or remote setpoint) is locked and modifies automatically when the command input decimal point is changed.

### 7.3 Remote setpoint by serial input

It is possible to enable remote setpoint function selecting *EN.SEP.* or *EN.SEt.* on par. 62 *rEn.5.* 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 setpoint 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).

## 8 Controller Functions

### 8.1 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 |  | Visualizes the other setpoints on display 2.<br>Display 3 shows the setpoint type. |  |
| 3 |  | Value on display 2 changes.  | Increases or decreases the alarm setpoint value. |

### 8.2 Automatic Tune

Automatic tuning procedure allows a precise regulation without delving into the PID regulation algorithm. Selecting **Auto** on par. 83  $\epsilon_{un.1}$  (for the regulation loop 1), or on par. 109  $\epsilon_{un.2}$  (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.

### 8.3 Manual Tune

Manual procedure allows the user greater flexibility to decide when to update PID algorithm parameters. During the manual tuning, the device generates a step to analyze the system inertia to be regulated and, according to the collected data, modifies PID parameters.

After selecting **MANU.** on par. 83  $\epsilon_{un.1}$ , or on par. 109  $\epsilon_{un.2}$ , the procedure can be activated in 4 ways:

- **Running Tuning by keyboard:**

Press **FNC** until display 3 shows  $\epsilon_{ME}$  with display 2 on  $d.5Rb.$  and then press **SET**: display 2 shows  $E#Rb.$  Led **TUN** switches ON and the procedure starts.

- **Running Tuning from F1... F4:**

Select  $\epsilon_{ME}$  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  $\epsilon_{ME}$  on par. 275  $d.1.F.$  (or on par. 284  $d.1.F.$ , par. 293  $d.1.F.$ , par. 302  $d.1.F.$ ). 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 treshhold where the controller calculates new PID parameters is determined by this operation:

Tune threshold = Setpoint - "Set Deviation Tune" (par. 84  $5.d.t.1$  or par. 110  $5.d.t.2$ )

Ex.: if the sepoint is  $100.0^{\circ}C$  and the Par. 84  $5.d.t.1$  is  $20.0^{\circ}C$  the threshold to calculate PID parameters is  $(100.0 - 20.0) = 80.0^{\circ}C$ .

For a greater precision on PID parameters calculation it is suggested to start the manual tuning procedure when the process deviates from the setpoint.

### 8.4 Tuning once

Set  $ONE$  on parameter 83  $\epsilon_{un.1}$ , or on parameter 109  $\epsilon_{un.2}$ .

Autotuning procedure is executed only once at next device restart. If the procedure doesn't work, it will be executed at next restart.

### 8.5 Synchronized tuning

Set  $SYNCH.$  on parameter 83  $\epsilon_{un.1}$  or on parameter 109  $\epsilon_{un.2}$ .

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) or 1225 (for regulation loop 2) 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.

## 8.6 Digital input functions

The DIS96V functions related to digital inputs, can be enabled by parameters 275 d. 1.1F., 284 d. 1.2F., 293 d. 1.3F. and 302 d. 1.4F..

- 2E.5M.: Two threshold setpoint modification: with digital input active the controller regulates on SET2, otherwise regulates on SET1;
- 2E.5M.1.: Modification of 2 setpoints by digital input with impulse command;
- 3E.5M.1.: Modification of 3 setpoints by digital input with impulse command,
- 4E.5M.1.: Modification of 4 setpoints by digital input with impulse command,
- 5E.E.1.: Controller regulates on SET1;
- 5E.E.2.: Controller regulates on SET2;
- 5E.E.3.: Controller regulates on SET3;
- 5E.E.4.: Controller regulates on SET4;
- 5E.RP.E: Start of the regulator by digital input with impulse command;
- 5E.OP: Stop of the regulator by digital input with impulse command;
- 5E.1.5E.: 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);
- Enable: Enables/disables the Tuning if par. 83 EUN.1 or par. 109 EUN.2 is selected as PARNU;
- RUN.MAN.1.: If par. 53 MAN.1 or par. 76 MAN.2 is selected as ENAB. or EN.5Ea., with impulse command on digital input, the controller switches the related regulation loop, from automatic to manual and vice versa.
- RUN.MAN.2.: If par. 53 MAN.1 or par. 76 MAN.2 is selected as ENAB. or EN.5Ea. the controller switches to manual the related regulation loop, with digital input active, otherwise the regulation is automatic.
- REL.1.4.: On the regulation loop selected for this function (par. 278 d. 1.1r. or 287 d. 1.2r. or 296 d. 1.3r. or 305 d. 1.4r.), the controller execute a cooling type regulation with digital input active, otherwise the regulation is of heating type;
- PROGRAM: Programmer. If par. 312 PROGRAM is set on ENAB., the device works as programmer 1 cycle, if digital input is activated, otherwise it is a basic controller.
- RESET: Reset kWh. It resets the energy value consumed by the system (set the power rating of the load on par. 54 LPR.1 or on par 77 LPR.2).
- R.1.0: Zero tare function: brings the related analogue input to 0. The analogue input is selected on par. 277 d. 1.1P. or 286 d. 1.2P. or 295 d. 1.3P. or 304 d. 1.4P.
- 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. 1.1r. or 287 d. 1.2r. or 296 d. 1.3r. or 305 d. 1.4r.;
- E.1.RUN: If timer 1 is enabled (par. 420 ENR.1 different from d.5RB.), with digital input active, the timer is switched to RUN, otherwise is kept in STOP;
- E.1.5.E.: If timer 1 is enabled (par. 420 ENR.1 different from d.5RB.), acting on the digital input, the status of the timer switches from STOP to RUN and vice versa;
- E.1.5ER.: If timer 1 is enabled (par. 420 ENR.1 different from d.5RB.), acting on the digital input, the timer is switched to RUN;
- E.1.ENd.: If timer 1 is enabled (par. 420 ENR.1 different from d.5RB.), acting on the digital input, the timer is switched to STOP;
- E.2.RUN: If timer 2 is enabled (par. 423 ENR.2 different from d.5RB.), with digital input active, the timer is switched to RUN, otherwise is kept in STOP;
- E.2.5.E.: If timer 2 is enabled (par. 423 ENR.2 different from d.5RB.), acting on the digital input, the status of the timer switches from STOP to RUN and vice versa;
- E.2.5ER.: If timer 2 is enabled (par. 423 ENR.2 different from d.5RB.), acting on the digital input, the timer is

switched to RUN;

- $t_2.EMd$ : If timer 2 is enabled (par. 423  $tPr2$  different from  $dSRb$ ), 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;
- $uP.HES$ : the digital input simulates the operation of **▲**;
- $dM.H.K$ : 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  $rEN.S$  it is selected  $ENRb$  or  $EN.SEP$ ), with digital input active the remote setpoint is enabled, otherwise the setpoint is local. On par. 278  $d.i.r$  or 287  $d.i.r$  or 296  $d.i.r$  or 305  $d.i.r$  it is necessary to select the reference regulation loop.

## 8.7 Automatic / Manual regulation for % output control

This function allows to switch from automatic functioning to manual command of the output percentage.

With par. 53  $R.P.R.l$  (for regulation loop 1) or par. 76  $R.P.R.2$  (for regulation loop 2) it is possible to select two modes.

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

Press **SET** to visualize  $MPMu$ ; 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  $RuLoM$  on display 3: immediately led **MAN** switches off and functioning backs to automatic.

- 2 **Second selection** ( $EN.SLo$ ) enables the same functioning with two important variants:

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

## 8.8 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  $SD.HZ$  or  $BD.HZ$  on par. 287  $cE.l.F$  and the value of the connected transformer, on par. 288  $cE.l.u$ .

- Select on par. 368  $H.b.l.P$  the regulation loop referred to the current measure and the Heater Break Alarm intervention.
- Select on par. 369  $H.b.l.E$  the Heater Break Alarm intervention threshold in Ampere.
- Select on par. 370  $a.c.l.E$  the intervention threshold in Ampere to control the overcurrent.
- Select on par. 371  $H.b.l.d$  the delay time in seconds for the Heater Break Alarm intervention.
- It is possible to associate an alarm, selecting  $H.b.R$  on par. 215  $RL.S.F$  on par. 155  $RL.2.F$  or par. 175  $RL.3.F$  or par. 195  $RL.4.F$  or par. 215  $RL.5.F$  or par. 235  $RL.6.F$  or par. 255  $RL.7.F$ .

It is possible to visualize on display 2 or 3 the average current, selecting  $MP.P.l$  on par. 327  $V.i.d.2$  or on par. 328  $V.i.d.3$ .

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

In the version DIS96V-DUO 2 CT inputs are available: for the second CT configuration refer to "Group I2 -  $cE2$  Current Transformer 2".

## 8.9 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  $Rc.E.l$  or Par. 63  $Rc.E.2 = HERe$  and  $P.b. 1$  or  $P.b. 2$  greater than 0), and one of the alarms ( $RL.1.F$ ,  $RL.2.F$ ,  $RL.3.F$ ,  $RL.4.F$ ,  $RL.5.F$ ,  $RL.6.F$  or  $RL.7.F$ ) has to be configured as  $CoAL$ . 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:

$Rc.E.l$  or  $Rc.E.2 = HERe$  Command output action type (Heating);

$P.b. 1$  or  $P.b. 2$ : Heating proportional band;

$i.E. 1$  or  $i.E. 2$ : Integral time of heating and cooling;

$d.E. 1$  or  $d.E. 2$ : Derivative time of heating and cooling;

$c.E. 1$  or  $c.E. 2$ : Heating time cycle.

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

$RL.l.F = CoAL$ . Alarm 1 selection (Cooling);

$P.b.\eta.l$ : Proportional band multiplier;

$\sigma.d.b.l$ : Overlapping / Dead band;

$c.c.t.l$ : Cooling time cycle.

Par.  $P.b.\eta.l$  (that ranges from 1.00 to 5.00) determines the proportional band of cooling action basing on the formula:

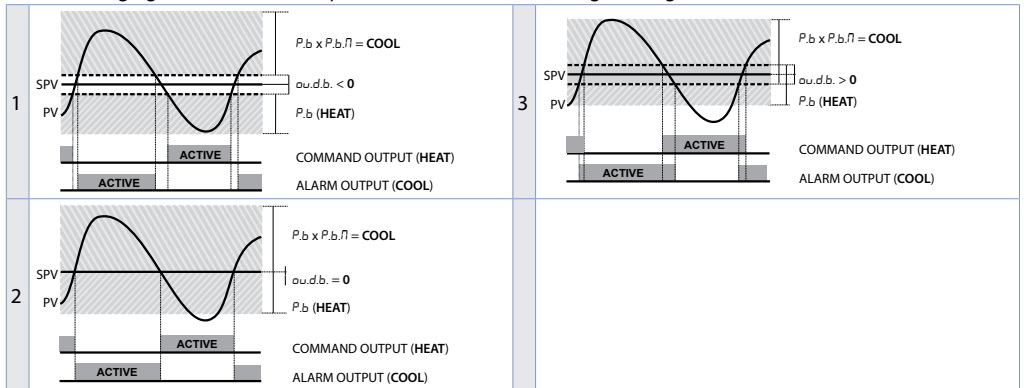
**Proportional band for cooling action** =  $P.b. \cdot l \times P.b.\eta.l$

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

**Integral and derivative time are the same for both actions.**

Par.  $\sigma.d.b.l$  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 ( $\sigma.d.b.l \leq 0$ ), must be configured, vice versa you can configure an overlapping ( $\sigma.d.b.l > 0$ ).

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



Parameter  $c.c.t.l$  has the same meaning of cycle time for heating action  $c.t. \cdot l$

Parameter  $c.o.f.l$  (Cooling Fluid) pre-selects the proportional band multiplier  $P.b.\eta.l$  and the cooling PID cycle time  $c.c.t.l$  according to cooling fluid type:

| $c.o.f.l$     | Cooling fluid type | $P.b.\eta.l$ | $c.c.t.l$ |
|---------------|--------------------|--------------|-----------|
| $A_{ir}$      | Air                | 1.00         | 10        |
| $\sigma_{il}$ | Oil                | 1.25         | 4         |
| $H_2O$        | Water              | 2.50         | 2         |

Once parameter  $c.o.f.l$  has been selected, the parameters  $P.b.\eta.l$ ,  $\sigma.d.b.l$  and  $c.c.t.l$  can be however modified.

## 8.10 LATCH ON Function

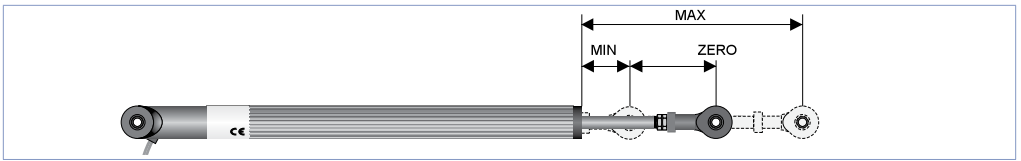
For use with input  $P.o.t.$  and with linear input (0..10 V, 0..40 mV, 0/4..20 mA) it is possible to associate start value of the scale (par. 4  $L.L. \cdot 1$  or par. 22  $L.L. \cdot 2$ ) to the minimum position of the sensor and value of the scale end (par. 5  $U.L. \cdot 1$  or par. 23  $U.L. \cdot 2$ ) to the maximum position of the sensor (par. 11  $L.t.c. \cdot 1$  or par. 29  $L.t.c. \cdot 2$  configured as  $S.t.M.P.$ ). It is also possible to fix the point in which the controller will display 0 (however keeping the scale range between  $L.L. \cdot 1/L.L. \cdot 2$  and  $U.L. \cdot 1/U.L. \cdot 2$ ) using the "virtual zero" option by selecting  $u.d.t.o.$  or  $u.d.t.o.n.$  on par. 11  $L.t.c. \cdot 1$  or 29  $L.t.c. \cdot 2$ . Selecting  $u.d.t.o.n.$  the virtual zero must be reset at each switching on; selecting  $u.d.t.o.$  the virtual zero will remain fixed once calibrated. To use the LATCH ON function, configure the par.  $L.t.c. \cdot 1$  or  $L.t.c. \cdot 2$ .

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 | <b>FNC</b> | Exit parameters configuration. Display 3 visualizes writing $L.R.t.H.$   | Place the sensor on minimum operating value (corresponding to $L.L. \cdot 1/L.L. \cdot 2$ )                   |
| 2 | <b>✓</b>   | Store value on minimum. Display shows $L.o.H.$   | Place sensor on maximum operating value (corresponding to $U.L. \cdot 1/U.L. \cdot 2$ ).                      |
| 3 | <b>▲</b>   | Store value on max. Display shows $H.i.G.H.$   | To exit standard proceeding press <b>SET</b> .<br>For "virtual zero" setting, place the sensor to zero point. |
| 4 | <b>FNC</b> | Set virtual zero. Display shows $Z.E.P.o.$ .<br>If "Virtual zero at start" is selected, point 4 must be repeated at each starting. | To exit procedure press <b>SET</b> .  |





## 8.11 Soft-Start Function

The controller is provided with two types of softstart selectable on parameter 313  $55.5\text{H}$  ("Softstart Type").

- 1 First selection ( $GRD$ ) enables gradient softstart. AAt starting the controller reaches setpoint basing on the rising gradient set on parameter 315  $55.GR$  ("Softstart Gradient") in Unit/hour (ex. °C/h). If parameter 318  $55.t_i$  ("Softstart Time") is different to 0, at starting when the time selected on par.  $55.t_i$  is elapsed, the controller stops to follow the gradient and reaches setpoint with the maximum power.
  - 2 Second selection ( $PER$ ) abilita enables output percentage softstart. On par. 317  $55.tH$  it is possible to set the threshold under which starts the softstart ("Softstart Threshold"). On par. 316  $55.PE$  ("Softstart Percentage") an output percentage is selectable (from 0 to 100), which controller keeps until the process exceeds the threshold set on par.  $55.tH$  or until the time in minutes set on par. 318  $55.t_i$  ("Softstart Time" word 2084).
- If the Sof-Start function is active the automatic/manual Tuning function cannot be activated.

## 8.12 Retransmission function on analogue output

If not used as command, the analogue output can be used to retransmit process/ setpoint/ current read by the C.T. input/ output percentage.

Select on parameter 388  $r.t1$  ("Retransmission 1") or on parameter 399  $r.t2$  ("Retransmission 2") the value to be retransmitted and on parameter 389  $r.t.t1$  ("Retransmission 1 Type") or on parameter 400  $r.t.t2$  ("Retransmission 2 Type") the output type. It is possible also to select on parameters 390  $r.l.l.l$  and 391  $r.l.u.l$  or 401  $r.r.l.l$  and 402  $r.r.u.l$  the input value rescale limits.

## 8.13 Timer functions

The controller integrates two timers that can be independent, sequential or looped together.

Timer 1 is enabled on parameter 420  $t.r.1$ ; timer 2 on parameter 423  $t.r.2$ :

$ENRb$  the timer starts from the keyboard or digital input (user intervention is required)

$EN.5ER$  the timer starts counting when the regulator is in RUN.

The timer time-base set in  $MM.55$  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  $t.r.s$  can be define whether the timers should be independent or related to each other.

$SINGL$  The timers work independently of each other.

$SEQU.E$  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 | <b>SET</b> | Press until $t.i.ME 1$ or $t.i.ME 2$ visualized on display 1. |   |
| 2 | <b>▲▼</b>  | 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 | <b>FNC</b> | Press until $t.i.ME 1$ or $t.i.ME 2$ visualized on display 3. Display 2 shows STOP if the timer is stopped, otherwise it shows the remaining time. |    |
| 2 | <b>SET</b> | The timer stops if active or starts counting if in $STOP$ .  |    |

Start/Stop of Timer is possible also by digital input (see parameters  $d.i.IF \dots d.i.HF$ ) or by key functions (see parameters  $F1 F \dots F4 F$ ).

The alarm outputs can be associated with the timers (parameters  $AL.IF \dots AL.HF$ ). On parameters 425  $R.t.1$  and 333  $R.t.2$  is possible to select the activation mode. The proposed solutions are as follows:

$5LRRt$  Alarm active during timer counting

|             |  |
|-------------|--|
| <i>END</i>  | Alarm active when the timer expiry       |
| <i>WRPN</i> | Alarm active 5 " before the timer expiry |

## 9 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 *ENRB* 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 cyclically display the setpoint, the running step and other cycle data.
- F3: resets the energy consumed value by command 1, if enabled on parameter 54 *LP.r.1* ("Load Power Rating 1").
- F4: manages the regulation or cycle START/STOP.

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

### 9.1 Programming (or modifying) cycle data

Follow the steps listed in the following table:

|   | Press   | Display   | Do  |
|---|---|---|---|
| 1 | F1  | Display 1 shows <i>01-t</i> .<br>Display 2 shows the time of the step.  | Press F1 to save and exit from programming cycle.   |
| 2 |  or  | Scroll the different steps.<br>The data on display 1 enables two information: <ul style="list-style-type: none"> <li>• The step number (first two digits)</li> <li>• The type of data (time, temperature or status of the auxiliary output).</li> </ul> | Ex: <i>01-t</i> step 1 time<br><i>01-S</i> step 1 setpoint<br><i>01-R</i> step 1 auxiliary<br><b>NB:</b> the auxiliary setting is present only if enabled on at least one alarm parameter (selection <i>5tEP.R</i> ).   |
| 3 | <b>SET</b> to confirm   | Enables the value modification.<br>Display 2 flashes.<br>This point is not allowed when the cycle is in START.  |   |
| 4 |  or  | The displayed value is increased or decreased   | Insert the new data. <ul style="list-style-type: none"> <li>• During time entry (hh:mm) set --.-- for infinite time or End for end of cycle (if not all available steps are used)</li> <li>• During setpoint entry set the arrival temperature at the end of the step</li> <li>• During auxiliary entry select <i>a#</i> for active auxiliary during step, otherwise set <i>aFF</i>.</li> </ul> |
| 5 | <b>SET</b> to confirm   | Confirm the new value.  |   |
| 6 | F1  | Save and exit cycle programming.  |   |

### 9.2 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.

### 9.3 Recovery of interrupted cycle

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

#### 9.3.1 Recovery with automatic gradient

To enable cycle recovery with automatic gradient, set 1 on parameter 321 as *r.1.G*. 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 *PLSE*) 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.

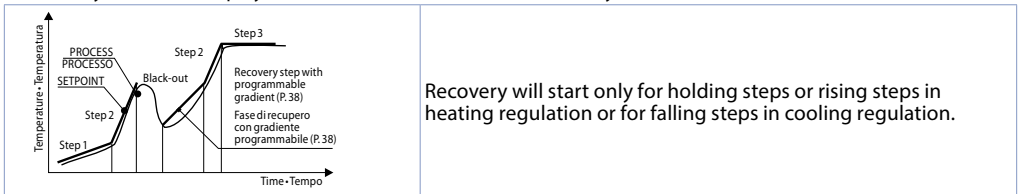
3. If a power failure occurs during a cooling step or a holding step (dwell) after that a cooling step has already been completed, the setpoint will match the the temperature read by the sensor, without including any rising and even skipping to next step if necessary (this a safety tip particularly for glass working).



### 9.3.2 Recovery with recovery gradient

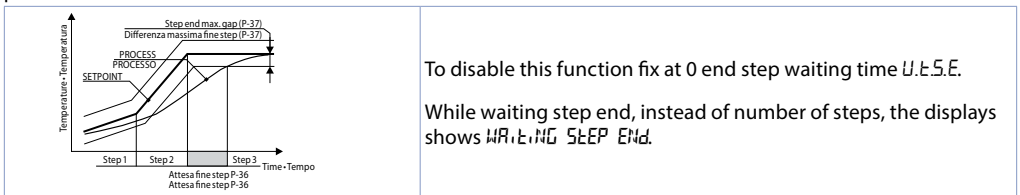
To enable cycle recovery with a recovery gradient, enter on parameter 321 *r. i. c. d.* a value (degrees/hour if temperature) greater than 1. At restarting if the kiln temperature (process) is lower than the setpoint, DIS96V locks the working cycle executing a step with the rising gradient set on parameter 321 *r. i. c. d.* to return to the setpoint value entered before the power failure and the cycle restarts from that point.

In recovery mode the display shows *RECUPERO STEP* instead of the cycle number.



## 9.4 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 *M.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 *M.G.S.E.*



## 10 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 *S.L.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 baud 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 <i>bd.rE.</i><br>1200bit/s                    28800bit/s<br>2400bit/s                    38400bit/s<br>4800bit/s                    57600bit/s<br>9600bit/s                    115200bit/s<br>19200bit/s |
| Formato             | Selectable on parameter 412 <i>S.P.P.</i><br>8N1            8N2<br>8E1            8E2<br>8O1            8O2  |
| Funzioni supportate | WORD READING (max 50 word) (0x03, 0x04)<br>SINGLE WORD WRITING (0x06)<br>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           |
| 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         | -           |
| 1001           | AI2 value (degrees with tenth)  | RO         | -           |
| 1002           | Average between AI1 and AI2 [(AI1 + AI2) /2] (degrees with tenth)               | RO         | 0           |
| 1003           | Difference between AI1 and AI2 (AI1 - AI2) (degrees with tenth)                 | RO         | 0           |
| 1004           | Module of the difference between AI1 and AI2 ( AI1 - AI2 ) (degrees with tenth) | RO         | 0           |
| 1005           | Sum of AI1 and AI2 (AI1 + AI2) (degrees with tenth)                             | RO         | 0           |

| Modbus address | Description   | Read Write | Reset value |
|----------------|---|------------|-------------|
| 1006           | Greater value between AI1 and AI2 (degrees with tenth)  | RO         | 0           |
| 1007           | Lower value between AI1 and AI2 (degrees with tenth)  | RO         | 0           |
| 1008           | AI1 value. AI2 value if AI1 signs error (E-05) (degrees with tenth)   | RO         | 0           |
| 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)<br>Bit0 = Alarm 1      Bit4 = Alarm 5<br>Bit1 = Alarm 2      Bit5 = Alarm 6<br>Bit2 = Alarm 3      Bit6 = Alarm 7<br>Bit3 = Alarm 4   | RO         | 0           |
| 1012           | Error flags 1<br>Bit0 = AI1 process error (sensor 1)<br>Bit1 = AI2 process error (sensor 2)<br>Bit2 = Cold junction error<br>Bit3 = Safety error<br>Bit4 = Generic error<br>Bit5 = Hardware error<br>Bit6 = Error H.B.A. (partial rupture of the load)<br>Bit7 = Error H.B.A. (SSR in short circuit)<br>Bit8 = Overcurrent error<br>Bit9 = Parameters out of range error<br>Bit10 = CPU eeprom writing error<br>Bit11 = RFid eeprom writing error<br>Bit12 = CPU eeprom reading error<br>Bit13 = RFid eeprom reading error<br>Bit14 = Eeprom calibrations bench corrupted<br>Bit15 = Eeprom constants bench corrupted | RO         | 0           |
| 1013           | Error flags 2<br>Bit0 = Missing calibrations error<br>Bit1 = Eeprom CPU bench parameters corrupted<br>Bit2 = Eeprom CPU setpoint bench corrupted<br>Bit3 = RFid memory not formatted<br>Bit4 = AI2 error disabled   | RO         | 0           |
| 1014           | Digital inputs status (0 = not active, 1 = active)<br>Bit0 = Ingresso dig. 1 Bit2 = Ingresso dig. 3<br>Bit1 = Ingresso dig. 2 Bit3 = Ingresso dig. 4  | RO         | 0           |
| 1015           | Outputs status (0 = OFF, 1 = ON)<br>Bit 0 = Q1 (NO)      Bit 4 = Q4<br>Bit 1 = Q1 (NC)      Bit 5 = Q5<br>Bit 2 = Q2 Bit 6 = DO1<br>Bit 3 = Q3 Bit 7 = DO2  | RO         | 0           |
| 1016           | Stato led (0 = OFF, 1 = ON)<br>Bit 0 = Led UP arrow      Bit 8 = Led A5<br>Bit 1 = Led C1      Bit 9 = Led A6<br>Bit 2 = Led <b>C2</b> Bit 10 = Led <b>TUN</b><br>Bit 3 = Led <b>A1</b> Bit 11 = Led <b>MAN</b><br>Bit 4 = Led <b>A2</b> Bit 12 = Led <b>REM</b><br>Bit 5 = Led <b>A3</b> Bit 13 = Led point time 2<br>Bit 6 = Led A4      Bit 14 = Led point time 3<br>Bit 7 = Led %      Bit 15 = Led DOWN arrow  | RO         | 0           |
| 1017           | Key status (0 = released, 1 = pressed)<br>Bit 0 = Key UP arrow      Bit 4 = Key F4<br>Bit 1 = Key DOWN arrow      Bit 5 = Key F3<br>Bit 2 = Key <b>FNC</b> Bit 6 = Key F2<br>Bit 3 = Key <b>SET</b> Bit 7 = Key F1  | RO         | 0           |
| 1018           | Cold junction 1 temperature (degrees with tenth)  | RO         | -           |
| 1019           | Cold junction 2 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           |

| Modbus address | Description  | Read Write | Reset value |
|----------------|--|------------|-------------|
| 1023           | Current CT1 OFF (Ampere with tenth)  | RO         | 0           |
| 1024           | Current CT2 instantaneous (Ampere with tenth)  | RO         | -           |
| 1025           | Current CT2 average (Ampere with tenth)  | RO         | -           |
| 1026           | Current CT2 ON (Ampere with tenth)   | RO         | -           |
| 1027           | Current CT2 OFF (Ampere with tenth)  | RO         | -           |
| 1028           | Feedback valve position (0-100)  | RO         | -           |
| 1100           | AI1 value with decimal point selection   | RO         | -           |
| 1101           | AI2 value with decimal point selection   | RO         | -           |
| 1102           | Average between AI1 and AI2 [(AI1 + AI2) /2] with decimal point selection                    | RO         | 0           |
| 1103           | Difference between AI1 and AI2 (AI1 - AI2) with decimal point selection                      | RO         | 0           |
| 1104           | Module of the difference between AI1 and AI2 ( AI1 - AI2 ) with decimal point selection      | RO         | 0           |
| 1105           | Sum of AI1 and AI2 (AI1 + AI2) with decimal point selection                                  | RO         | 0           |
| 1106           | Greater value between AI1 and AI2 with decimal point selection                               | RO         | -           |
| 1107           | Lower value between AI1 and AI2 with decimal point selection                                 | RO         | -           |
| 1108           | AI1 Value. AI2 value if AI1 signs error (E-05) 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      |
| 1204           | Setpoint 1 del loop di regolazione 2 (gradi con decimo)                                      | R/W        | EEPROM      |
| 1205           | Setpoint 2 del loop di regolazione 2 (gradi con decimo)                                      | R/W        | EEPROM      |
| 1206           | Setpoint 3 del loop di regolazione 2 (gradi con decimo)                                      | R/W        | EEPROM      |
| 1207           | Setpoint 4 del loop di regolazione 2 (gradi con decimo)                                      | R/W        | EEPROM      |
| 1208           | Alarm 1 setpoint (degrees with tenth)<br>Alarm 1 upper setpoint if Par. 135 RL.1.F. = R.bRNd | R/W        | EEPROM      |
| 1209           | Alarm 1 lower setpoint if Par. 135 RL.1.F. = R.bRNd (degrees with tenth)                     | R/W        | EEPROM      |
| 1210           | Alarm 2 setpoint (degrees with tenth)<br>Alarm 2 upper setpoint if Par. 155 RL.2.F. = R.bRNd | R/W        | EEPROM      |
| 1211           | Alarm 2 lower setpoint if Par. 155 RL.2.F. = R.bRNd (degrees with tenth)                     | R/W        | EEPROM      |
| 1212           | Alarm 3 setpoint (degrees with tenth)<br>Alarm 3 upper setpoint if Par. 175 RL.3.F. = R.bRNd | R/W        | EEPROM      |
| 1213           | Alarm 3 lower setpoint if Par. 175 RL.3.F. = R.bRNd (degrees with tenth)                     | R/W        | EEPROM      |
| 1214           | Alarm 4 setpoint (degrees with tenth)<br>Alarm 4 upper setpoint if Par. 195 RL.4.F. = R.bRNd | R/W        | EEPROM      |
| 1215           | Alarm 4 lower setpoint if Par. 195 RL.4.F. = R.bRNd (degrees with tenth)                     | R/W        | EEPROM      |
| 1216           | Alarm 5 setpoint (degrees with tenth)<br>Alarm 5 upper setpoint if Par. 215 RL.5.F. = R.bRNd | R/W        | EEPROM      |
| 1217           | Alarm 5 lower setpoint if Par. 215 RL.5.F. = R.bRNd (degrees with tenth)                     | R/W        | EEPROM      |
| 1218           | Alarm 6 setpoint (degrees with tenth)<br>Alarm 6 upper setpoint if Par. 235 RL.6.F. = R.bRNd | R/W        | EEPROM      |
| 1219           | Alarm 6 lower setpoint if Par. 235 RL.6.F. = R.bRNd (degrees with tenth)                     | R/W        | EEPROM      |
| 1220           | Alarm 7 setpoint (degrees with tenth)<br>Alarm 7 upper setpoint if Par. 255 RL.7.F. = R.bRNd | R/W        | EEPROM      |
| 1221           | Alarm 7 lower setpoint if Par. 255 RL.7.F. = R.bRNd (degrees with tenth)                     | R/W        | EEPROM      |
| 1222           | Start/Stop<br>0=controller in STOP<br>1=controller in START                                  | R/W        | 0           |
| 1223           | Hold conversion ON/OFF<br>0=Hold conversion OFF<br>1=Hold conversion ON                      | R/W        | 0           |

| Modbus address | Description  | Read Write | Reset value |
|----------------|--|------------|-------------|
| 1224           | Tune management for regulation loop 1<br>With automatic Tune (par. 83 $t_{un,1} = R_{u\tau\alpha}$ ):<br>0 = autotuning function OFF<br>1 = autotuning ON  | RO         | 0           |
|                | With manual Tune (par. 83 $t_{un,1} = \overline{R}R_{nu,0} \overline{D}nc\overline{E}$ ):<br>0 = autotuning function OFF<br>1 = autotuning ON  | R/W        | 0           |
|                | With synchronized Tune (par. 83 $t_{un,1} = S_{ynch}$ ):<br>0 = autotuning function OFF<br>1 = command output OFF (forces the cooling)<br>2 = command output ON (forces the heating)<br>3 = autotuning ON<br>4 = autotuning ended            | R/W        | 0           |
| 1225           | Tune management for regulation loop 2<br>With automatic Tune (par. 109 $t_{un,2} = R_{u\tau\alpha}$ ):<br>0 = autotuning function OFF<br>1 = autotuning ON   | RO         | 0           |
|                | With manual Tune (par. 109 $t_{un,2} = \overline{R}R_{nu,0} \overline{D}nc\overline{E}$ ):<br>0 = autotuning function OFF<br>1 = autotuning ON   | R/W        | 0           |
|                | With synchronized Tune (par. 109 $t_{un,2} = S_{ynch}$ ):<br>0 = autotuning function OFF<br>1 = command output OFF (forces the cooling)<br>2 = command output ON (forces the heating)<br>3 = autotuning ON<br>4 = autotuning ended           | R/W        | 0           |
| 1226           | Automatic/manual selection for regulation loop 1<br>0 = automatic; 1 = manual  | R/W        | 0           |
| 1227           | Automatic/manual selection for regulation loop 2<br>0 = automatic; 1 = manual  | R/W        | 0           |
| 1228           | Command output percentage for regulation loop 1 (0-10000)<br>Heating output percentage with regulation 1 in double loop (0-10000)  | R/W        | 0           |
| 1229           | Command output percentage for regulation loop 1 (0-1000)<br>Heating output percentage with regulation 1 in double loop (0-1000)  | R/W        | 0           |
| 1230           | Command output percentage for regulation loop 1 (0-100)<br>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           |
| 1234           | Command output percentage for regulation loop 2 (0-10000)<br>Heating output percentage with regulation 2 in double loop (0-10000)  | R/W        | 0           |
| 1235           | Command output percentage for regulation loop 2 (0-1000)<br>Heating output percentage with regulation 2 in double loop (0-1000)  | R/W        | 0           |
| 1236           | Command output percentage for regulation loop 2 (0-100)<br>Heating output percentage with regulation 2 in double loop (0-100)  | R/W        | 0           |
| 1237           | Cooling output percentage with regulation 2 in double loop (0-10000)   | RO         | 0           |
| 1238           | Cooling output percentage with regulation 2 in double loop (0-1000)  | RO         | 0           |
| 1239           | Cooling output percentage with regulation 2 in double loop (0-100)   | RO         | 0           |
| 1240           | Command output manual reset for regulation loop 1: write 0 to reset the command output.<br>In reading 0 = reset not allowed, 1 = reset allowed   | R/W        | 0           |
| 1241           | Alarms manual reset: write 0 to reset all alarms.<br>In reading 0 = reset not allowed, 1 = reset allowed<br>Bit0 = Alarm 1      Bit4 = Alarm 5<br>Bit1 = Alarm 2      Bit5 = Alarm 6<br>Bit2 = Alarm 3      Bit6 = Alarm 7<br>Bit3 = Alarm 4 | R/W        | 0           |
| 1242           | Command output manual reset for regulation loop 2: write 0 to reset the command output.<br>In reading 0 = reset not allowed, 1 = reset allowed   | R/W        | 0           |

| Modbus address | Description  | Read Write | Reset value |
|----------------|--|------------|-------------|
| 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 $rL1.i = Pd.bu5$ )   | R/W        | 0           |
| 1251           | Value AO2 by serial (Par. 399 $rL2.i = Pd.bu5$ )   | R/W        | 0           |
| 1252           | Tare of zero AI1 (1 = tare; 2=reset tare)  | R/W        | 0           |
| 1253           | Tare of zero AI2 (1 = tare; 2=reset tare)  | R/W        | 0           |
| 1254           | Tare of zero average between AI1 and AI2 $[(AI1 + AI2) / 2]$<br>(1 = tare; 2 = reset tare)   | R/W        | 0           |
| 1255           | Tare of zero difference between AI1 and AI2 (AI1 - AI2)<br>(1 = tare; 2 = reset tare)  | R/W        | 0           |
| 1256           | Tare of zero module of the difference between AI1 and AI2 $( AI1 - AI2 )$ (1 = tare; 2 = reset tare)   | R/W        | 0           |
| 1257           | Tare of zero sum of AI1 and AI2 (AI1 + AI2)<br>(1 = tare; 2 = reset tare)  | R/W        | 0           |
| 1258           | Zero tare AI1 and AI2 simultaneously (1=tare; 2= tare reset)   | 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)<br>Alarm 1 upper setpoint if Par. 135 $RL.1.F. = R.bRNd$   | R/W        | EEPROM      |
| 1309           | Alarm 1 lower setpoint if Par. 135 $RL.1.F. = R.bRNd$ (degrees with tenth)   | R/W        | EEPROM      |
| 1310           | Alarm 2 setpoint (degrees with tenth)<br>Alarm 2 upper setpoint if Par. 155 $RL.2.F. = R.bRNd$   | R/W        | EEPROM      |
| 1311           | Alarm 2 lower setpoint if Par. 155 $RL.2.F. = R.bRNd$ (degrees with tenth)   | R/W        | EEPROM      |
| 1312           | Alarm 3 setpoint (degrees with tenth)<br>Alarm 3 upper setpoint if Par. 175 $RL.3.F. = R.bRNd$   | R/W        | EEPROM      |
| 1313           | Alarm 3 lower setpoint if Par. 175 $RL.3.F. = R.bRNd$ (degrees with tenth)   | R/W        | EEPROM      |
| 1314           | Alarm 4 setpoint (degrees with tenth)<br>Alarm 4 upper setpoint if Par. 195 $RL.4.F. = R.bRNd$   | R/W        | EEPROM      |
| 1315           | Alarm 4 lower setpoint if Par. 195 $RL.4.F. = R.bRNd$ (degrees with tenth)   | R/W        | EEPROM      |
| 1316           | Alarm 5 setpoint (degrees with tenth)<br>Alarm 5 upper setpoint if Par. 215 $RL.5.F. = R.bRNd$   | R/W        | EEPROM      |
| 1317           | Alarm 5 lower setpoint if Par. 215 $RL.5.F. = R.bRNd$ (degrees with tenth)   | R/W        | EEPROM      |
| 1318           | Alarm 6 setpoint (degrees with tenth)<br>Alarm 6 upper setpoint if Par. 235 $RL.6.F. = R.bRNd$   | R/W        | EEPROM      |
| 1319           | Alarm 6 lower setpoint if Par. 235 $RL.6.F. = R.bRNd$ (degrees with tenth)   | R/W        | EEPROM      |
| 1320           | Alarm 7 setpoint (degrees with tenth)<br>Alarm 7 upper setpoint if Par. 255 $RL.7.F. = R.bRNd$   | R/W        | EEPROM      |
| 1321           | Alarm 7 lower setpoint if Par. 255 $RL.7.F. = R.bRNd$ (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           |
| 1401           | Remote process reset 2: by writing 1 the controller uses for the process the value measured in AI2 instead of the one written in the word 1403 | R/W        | 0           |



| Modbus address | Description   | Read Write | Reset value |
|----------------|---|------------|-------------|
| 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        | -           |
| 1403           | Remote process 2. The number written in this word will be the process value 2 that the device uses for setting and alarms (ADC2 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      |

## 10.1 Serial compatibility with DIS401

In existing plants where it is necessary to replace an DIS401, it is possible to install a new DIS96V-T or 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)   |            |             |
| 901            | AI2 value (degrees with tenth)   |            |             |
| 902            | Average between AI1 and AI2 $[(AI1 + AI2) / 2]$ (degrees with tenth)   |            |             |
| 903            | Difference between AI1 and AI2 $(AI1 - AI2)$ (degrees with tenth)  |            |             |
| 904            | Module of the difference between AI1 and AI2 $( AI1 - AI2 )$ (degrees with tenth)  |            |             |
| 905            | Sum of AI1 and AI2 $(AI1 + AI2)$ (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)<br>Bit 0 = Q1 (NO)      Bit 4 = Q4<br>Bit 1 = Q1 (NC)      Bit 5 = Q5<br>Bit 2 = Q2    Bit 6 = DO1<br>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)<br>Bit0 = Alarm 1      Bit4 = Alarm 5<br>Bit1 = Alarm 2      Bit5 = Alarm 6<br>Bit2 = Alarm 3      Bit6 = Alarm 7<br>Bit3 = Alarm 4 | RO         | 0           |

|      |   |     |        |
|------|---|-----|--------|
| 1014 | Manual reset: write 0 to reset all alarms.<br>In reading (0 = Not resettable, 1 = Resettable)<br>Bit0 = Alarm 1            Bit4 = Alarm 5<br>Bit1 = Alarm 2            Bit5 = Alarm 6<br>Bit2 = Alarm 3            Bit6 = Alarm 7<br>Bit3 = Alarm 4   | R/W | 0      |
| 1015 | Error flags:<br>Bit 0 = Eeprom writing error<br>Bit 1 = Eeprom reading error<br>Bit 2 = Cold junction error<br>Bit 3 = A11 error (probe 1)<br>Bit 4 = A12 error (probe 2)<br>Bit 5 = Generic error<br>Bit 6 = Hardware error<br>Bit 7 = Missing calibration data error<br>Bit 8 = Parameters out of range error | RO  | 0      |
| 1016 | Cold junction temperature (degrees.tenths)  | RO  | -      |
| 1017 | Start / Stop<br>0 = Controller in STOP            1 = Controller in START   | R/W | 0      |
| 1018 | Lock conversion ON / OFF<br>0 = Lock conversion OFF            1 = Lock conversion ON   | R/W | 0      |
| 1019 | Tune management for regulation loop 1<br>With automatic Tune (par. 83 $E_{UN}.I = Auto$ ):<br>0 = autotuning function OFF            1 = autotuning ON  | RO  | 0      |
|      | With manual Tune (par. 83 $E_{UN}.I = MANU. o ONCE$ ):<br>0 = autotuning function OFF            1 = autotuning ON  | R/W | 0      |
|      | With synchronized Tune (par. 83 $E_{UN}.I = SYNCH.$ ):<br>0 = autotuning function OFF<br>1 = command output OFF (forces the cooling)<br>2 = command output ON (forces the heating)<br>3 = autotuning ON<br>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)<br>Bit0 = Ingresso dig. 1 Bit2 = Ingresso dig. 3<br>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.

## 11 Reading and configuration through NFC



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.

### 11.1 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.

## 11.2 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.

## 11.3 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.

## 12 Loading default values

This procedure allows to restore factory settings of the device.

|   | Press                 | Display  | Do                           |
|---|-----------------------|--|------------------------------|
| 1 | <b>FNC</b> for 3 sec  | Display 1 shows <b>PRESS.</b> , while display 2 shows <b>0000</b> with the 1st digit flashing. |                              |
| 2 | <b>▲</b> or <b>▼</b>  | Modify the flashing digit and move to the next one pressing <b>SET</b> .                       | Enter password <b>9999</b> . |
| 3 | <b>FNC</b> to confirm | The device loads default settings and restarts.  |                              |

## 13 Access configuration

|   | Press                 | Display   | Do                                      |
|---|-----------------------|---|---|
| 1 | <b>FNC</b> for 3 sec. | Display 1 shows <b>PRESS.</b> , while display 2 shows <b>0000</b> with the 1st digit flashing.                                |   |
| 2 | <b>▲</b> or <b>▼</b>  | Modify flashing digit and move to next digit with <b>SET</b> .  | Enter password <b>1234</b> .            |
| 3 | <b>FNC</b> to confirm | Display 1 shows the name of first parameters group, display 2 shows the description.  |   |
| 4 | <b>▲</b> or <b>▼</b>  | Scroll parameters groups.   |   |
| 5 | <b>SET</b> 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 <b>FNC</b> to exit configuration. |
| 6 | <b>▲</b> or <b>▼</b>  | Scroll parameters.  |   |
| 7 | <b>SET</b> to confirm | Allows parameter modification (display 3 flashes)   |   |
| 8 | <b>▲</b> or <b>▼</b>  | Increases or decreases visualized value <b>▲▼</b>   | Introduce new data                      |

|    | Press      | Display  | Do   |
|----|------------|--|--|
| 9  | <b>SET</b> | Confirms and stores the new value. If the value is different from default values, the arrow keys light on. |  |
| 10 | <b>FNC</b> | Backs to parameter groups selection (see point 3).   | Press again <b>FNC</b> to exit configuration |

## 13.1 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 vice versa. Ex. The first parameter can be displayed as *SEn.1* (mnemonic visualization) or as *PO01* (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.

## 14 Table of configuration parameters

### GROUP A1 - *R<sub>1</sub> in.1* - Analogue input 1

#### 1 *SEn.1* **Sensor A11**

Analogue input configuration / sensor A11 selection

|               |  |                                      |
|---------------|--|--------------------------------------|
| <i>tc. K</i>  | Tc-K   | -260° C..1360° C. ( <b>Default</b> ) |
| <i>tc. S</i>  | Tc-S   | -40° C..1760° C                      |
| <i>tc. R</i>  | Tc-R   | -40° C..1760° C                      |
| <i>tc. J</i>  | Tc-J   | -200° C..1200° C                     |
| <i>tc. t</i>  | Tc-T   | -260° C..400° C                      |
| <i>tc. E</i>  | Tc-E   | -260° C..980° C                      |
| <i>tc. N</i>  | Tc-N   | -260° C..1280° C                     |
| <i>tc. b</i>  | Tc-B   | 100° C..1820° C                      |
| <i>Pt100</i>  | Pt100  | -200° C..600° C                      |
| <i>Ni100</i>  | Ni100  | -60° C..180° C                       |
| <i>Ni120</i>  | Ni120  | -60° C..240° C                       |
| <i>Ntc 1</i>  | NTC 10K $\beta$ 3435K                        | -40° C..125° C                       |
| <i>Ntc 2</i>  | NTC 10K $\beta$ 3694K                        | -40° C..150° C                       |
| <i>Ntc 3</i>  | NTC 2252 $\beta$ 3976K                       | -40° C..150° C                       |
| <i>Ptc</i>    | PTC 1K                                       | -50° C..150° C                       |
| <i>Pt500</i>  | Pt500  | -200° C..600° C                      |
| <i>Pt1000</i> | Pt1000                                       | -200° C..600° C                      |
| <i>RSvd.1</i> | Reserved                                     |                                      |
| <i>RSvd.2</i> | Reserved                                     |                                      |
| <i>0-1</i>    | 0..1 V                                       |                                      |
| <i>0-5</i>    | 0..5 V                                       |                                      |
| <i>0-10</i>   | 0..10 V                                      |                                      |
| <i>0-20</i>   | 0..20 mA                                     |                                      |
| <i>4-20</i>   | 4..20 mA                                     |                                      |
| <i>0-60</i>   | 0..60 mV                                     |                                      |
| <i>Pot.</i>   | Potentiometer (set the value on parameter 6) |                                      |

#### 2 *dP.1* **Decimal Point 1**

Select number of displayed decimal points for A11

|                |           |      |            |                  |
|----------------|-----------|------|------------|------------------|
| <b>Default</b> |           |      |            |                  |
| <i>0.0</i>     | 1 decimal | 0.00 | 2 decimals | 0.000 3 decimals |

#### 3 *dEGr.* **Degree**

|              |                            |   |        |
|--------------|----------------------------|---|--------|
| $^{\circ}$ C | Celsius ( <b>Default</b> ) |   |        |
| $^{\circ}$ F | Fahrenheit                 | K | Kelvin |

- 4** **LL.L1 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<sup>1 p. 79</sup>] **Default: 0.**
- 5** **UL.L1 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<sup>1 p. 79</sup>] **Default:1000**
- 6** **PUR1 Potentiometer Value AI1**  
Selects the value of the potentiometer connected on AI1  
**1..150 kohm. Default: 10kohm**
- 7** **LO.L1 Linear Input over Limits AI1**  
If AI1 is a linear input, allows to the process to overpass the limits (parameters 4 and 5)  
d.SRb. Disabled (**Default**)  
ENRb. Enabled
- 8** **LC.E1 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.  
**(Default)** 2.0 mA 2.5 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** **OC.R1 Offset Calibration AI1**  
AI1 Offset calibration. Value added/subtracted to the process value (ex: usually correcting the ambient temperature value).  
**-9999..+9999** [digit<sup>1 p. 79</sup>] (degrees.tenths for temperature sensors). **Default 0.**
- 10** **GC.R1 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** **LE.C1 Latch-On AI1**  
Automatic setting of limits for AI1 linear input  
d.SRb. Disabled (**Default**)  
SENRd Standard  
V.0.5to. Virtual Zero Stored  
V.0.0to. Virtual Zero at start
- 12** **CF.L1 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** **CF.F1 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) 39.0HZ 39.0 Hz  
6.25HZ 6.25 Hz 50.0HZ 50.0 Hz  
8.33HZ 8.33 Hz 62.0HZ 62.0 Hz  
10.0HZ 10.0 Hz 123HZ 123 Hz  
12.5HZ 12.5 Hz 242HZ 242 Hz  
16.7HZ 16.7 Hz (**Default**) Ideal for noises 470HZ 470 Hz (Max. speed conversion)  
filtering 50 / 60 Hz  
19.6HZ 19.6 Hz  
33.2HZ 33.2 Hz

## 14÷18 Reserved Parameters - Group A1

Reserved parameters - Group **A1**

## GROUP A2 - $\overline{A1}, \overline{IN2}$ - Analogue input 2 (only on ATR444-2xABC-X)

### 19 $\overline{SEN2}$ Sensor AI2

Analogue input configuration / sensor AI2 selection

|                     |   |                            |
|---------------------|---|----------------------------|
| $\overline{d15Rb.}$ | Disabled                                      | Disabled. <b>(Default)</b> |
| $\overline{tc. K}$  | Tc-K  | -260° C..1360° C           |
| $\overline{tc. S}$  | Tc-S  | -40° C..1760° C            |
| $\overline{tc. R}$  | Tc-R  | -40° C..1760° C            |
| $\overline{tc. J}$  | Tc-J  | -200° C..1200° C           |
| $\overline{tc. T}$  | Tc-T  | -260° C..400° C            |
| $\overline{tc. E}$  | Tc-E  | -260° C..980° C            |
| $\overline{tc. N}$  | Tc-N  | -260° C..1280° C           |
| $\overline{tc. B}$  | Tc-B  | 100° C..1820° C            |
| $\overline{Pt100}$  | Pt100   | -200° C..600° C            |
| $\overline{Ni100}$  | Ni100   | -60° C..180° C             |
| $\overline{Ni120}$  | Ni120   | -60° C..240° C             |
| $\overline{Ntc 1}$  | NTC 10K $\beta$ 3435K                         | -40° C..125° C             |
| $\overline{Ntc 2}$  | NTC 10K $\beta$ 3694K                         | -40° C..150° C             |
| $\overline{Ntc 3}$  | NTC 2252 $\beta$ 3976K                        | -40° C..150° C             |
| $\overline{Ptc}$    | PTC 1K  | -50° C..150° C             |
| $\overline{Pt500}$  | Pt500   | -200° C..600° C            |
| $\overline{Pt1k}$   | Pt1000  | -200° C..600° C            |
| $\overline{P5vd.1}$ | Reserved                                      |                            |
| $\overline{P5vd.2}$ | Reserved                                      |                            |
| $\overline{0.1}$    | 0..1 V  |                            |
| $\overline{0.5}$    | 0..5 V  |                            |
| $\overline{0.10}$   | 0..10 V                                       |                            |
| $\overline{0.20}$   | 0..20 mA                                      |                            |
| $\overline{4.20}$   | 4..20 mA                                      |                            |
| $\overline{0.60}$   | 0..60 mV                                      |                            |
| $\overline{Pot.}$   | Potentiometer (set the value on parameter 24) |                            |

### 20 $\overline{dP.2}$ Decimal Point 2

Select number of displayed decimal points for AI 2

|                  |                |                    |            |
|------------------|----------------|--------------------|------------|
| $\overline{0}$   | <b>Default</b> |                    |            |
| $\overline{0.0}$ | 1 decimal      | $\overline{0.00}$  | 2 decimals |
|                  |                | $\overline{0.000}$ | 3 decimals |

### 21 $\overline{rES.}$ Reserved

Reserved parameter

### 22 $\overline{LL.12}$ Lower Linear Input AI2

AI2 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<sup>1 p. 79</sup>] **Default:** 0.

### 23 $\overline{UL.12}$ Upper Linear Input AI2

AI2 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<sup>1 p. 79</sup>] **Default:** 1000

### 24 $\overline{P.0R2}$ Potentiometer Value AI2

Selects the value of the potentiometer connected on AI2

**1..150 kohm. Default:** 10kohm

### 25 $\overline{1.0L2}$ Linear Input over Limits AI2

If AI2 is a linear input, allows to the process to overpass the limits (parameters 22 and 23)

|                     |                           |
|---------------------|---------------------------|
| $\overline{d15Rb.}$ | Disabled <b>(Default)</b> |
| $\overline{ENRb.}$  | Enabled                   |

## 26 *L.c.E.P* Lower Current Error 2

If AI2 is a 4-20 mA input, it determines the current value below the probe error E-06 is signaled.

|               |                  |               |               |               |
|---------------|------------------|---------------|---------------|---------------|
| <i>2.0 mA</i> | <b>(Default)</b> | <i>2.6 mA</i> | <i>3.2 mA</i> | <i>3.8 mA</i> |
| <i>2.2 mA</i> |                  | <i>2.8 mA</i> | <i>3.4 mA</i> |               |
| <i>2.4 mA</i> |                  | <i>3.0 mA</i> | <i>3.6 mA</i> |               |

## 27 *a.c.A.P* Offset Calibration AI2

AI2 Offset calibration. Value added/subtracted to the process value (ex: usually correcting the ambient temperature value).

-9999..+9999 [digit'<sup>p. 29</sup>] (degrees.tenths for temperature sensors). **Default** 0.

## 28 *G.c.A.P* Gain Calibration AI2

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.

## 29 *L.E.C.P* Latch-On AI2

Automatic setting of limits for AI2 linear input

*d.5Rb.* Disabled (**Default**)

*5ENPb* Standard

*V.0.5Eb.* Virtual Zero Stored

*V.0.E.aN* Virtual Zero at start

## 30 *c.F.L.P* Conversion Filter AI2

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)

## 31 *c.Fr.P* Conversion Frequency AI2

Sampling frequency of digital / analogue converter for AI2.

Increasing the conversion speed will slow down reading stability

(example: for fast transients, as the pressure, it is advisable to increase sampling frequency).

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

## 32÷36 Reserved Parameters - Group A2

Reserved parameters - Group **A2**

## GROUP B1 - *c.Pd.I* - Outputs and regulation Process 1

### 37 *c.o.u.I* Command Output 1

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

*c. a3* Command on relay output Q3.

*c. a1* Command on relay output Q1. (**Default**)

*c. 55P* Command on digital output

*c. VRL.* 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.

*D. 10.5.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.

*4.20.5.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. 03                | Q3             | Q1    | Q2    | DO1   | DO2   | AO1   |
| c. 01                | Q1             | Q2    | Q3    | DO1   | DO2   | AO1   |
| c. 55P               | DO1            | Q1    | Q2    | Q3    | DO2   | AO1   |
| c. VRL               | Q1             | Q2    | Q3    | DO1   | DO2   | AO1   |
| c. 0-10 (0..10.V)    | 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. 03                | Q3             | Q1    | Q2    | Q4    | DO1   | DO2   | AO1   |
| c. 01                | Q1             | Q2    | Q3    | Q4    | DO1   | DO2   | AO1   |
| c. 55P               | DO1            | Q1    | Q2    | Q3    | Q4    | DO2   | AO1   |
| c. VRL               | Q1             | Q2    | Q3    | Q4    | DO1   | DO2   | AO1   |
| c. 0-10 (0..10.V)    | 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. 03         | Q3      | Q1    | Q2    | Q4    | Q5    | DO1   | DO2   |
| c. 01         | Q1      | Q2    | Q3    | Q4    | Q5    | DO1   | DO2   |
| c. 55P        | DO1     | Q1    | Q2    | Q3    | Q4    | Q5    | DO2   |
| c. VRL        | Q1      | Q2    | Q3    | Q4    | Q5    | DO1   | DO2   |

| DIS96V duo           |                |       |       |       |       |
|----------------------|----------------|-------|-------|-------|-------|
|                      | Command        | AL. 1 | AL. 2 | AL. 3 | AL. 4 |
| c. 01                | Q1             | Q2    | DO1   | DO2   | AO1   |
| c. 55P               | DO1            | Q1    | Q2    | DO2   | AO1   |
| c. VRL               | Q1             | Q2    | DO1   | DO2   | AO1   |
| c. 0-10 (0..10.V)    | AO1 (0..10 V)  | Q1    | Q2    | DO1   | DO2   |
| c. 4-20 (4..20.S.P.) | AO1 (4..20 mA) | Q1    | Q2    | DO1   | DO2   |

| DIS96V duo-T         |                |       |       |       |       |       |       |       |
|----------------------|----------------|-------|-------|-------|-------|-------|-------|-------|
|                      | Command        | AL. 1 | AL. 2 | AL. 3 | AL. 4 | AL. 5 | AL. 6 | AL. 7 |
| c. 03                | Q3             | Q1    | Q2    | Q4    | DO1   | DO2   | AO1   | AO2   |
| c. 01                | Q1             | Q2    | Q3    | Q4    | DO1   | DO2   | AO1   | AO2   |
| c. 55P               | DO1            | Q1    | Q2    | Q3    | Q4    | DO2   | AO1   | AO2   |
| c. VRL               | Q1             | Q2    | Q3    | Q4    | DO1   | DO2   | AO1   | AO2   |
| c. 0-10 (0..10.V)    | AO1 (0..10 V)  | Q1    | Q2    | Q3    | Q4    | DO1   | DO2   | AO2   |
| c. 4-20 (4..20.S.P.) | AO1 (4..20 mA) | Q1    | Q2    | Q3    | Q4    | DO1   | DO2   | AO2   |

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

### 38 c.Pr.1 Command Process 1 (only on DIS96V DUO-X)

Selects process value related to process 1 and to command output 1.

R.N.1 Value read on input AI1. **(Default)**

R.N.2 Value read on input AI2.

MERN Arithmetic average of the value read on inputs AI1 and AI2  $((AI1-AI2)/2)$ .

d.FF. Difference of the values read on inputs AI1 and AI2  $(AI1-AI2)$ .

Rb.d.F. 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  $(AI1+AI2)$ .

H.GH. Greater value between AI1 and AI2

LOWEP Lower value between AI1 and AI2

REDUM. Value read on AI1 or value read on AI2 if AI1 is in error (E-05)

- 39** *rES.* **Reserved**  
Reserved parameter
- 40** *Ac.L.1* **Action type 1**  
Action type to control process 1.  
*HErE* Heating (N.A.) (**Default**)  
*cooL* Cooling (N.C.)
- 41** *cHY.1* **Command Hysteresis 1**  
Hysteresis to control process 1 in ON/OFF  
-9999..+9999 [digit<sup>1 p.79</sup>] (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<sup>1 p.79</sup>] (degrees for temperature sensors). **Default** 0.
- 43** *ULS.1* **Upper Limit Setpoint 1**  
Upper limit setpoint selectable for command setpoint 1  
-9999..+30000 [digit<sup>1 p.79</sup>] (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)  
*R. 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)  
*R.RES.E.* Automatic reset with timed activation. The command remains active for the time set on the parameter 48 *c.dE.t.*, even if the conditions generating it are missing. To be able to act again, the conditions for activating the command must disappear.
- 45** *cSE.1* **Command State Error 1**  
State of contact for command 1 output in case of error.  
If the command output 1 (Par. 37 *c.o.u.1*) is relay or valve:  
*aPEN* Contact or valve open. **Default**  
*cLoSE* Contact or valve closed.  
If the command output 1 is digital output (SSR):  
*aFF* Digital output OFF. **Default**  
*aM* 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** *cSS.1* **Command State Stop 1**  
State of contact for command output 1 with controller in STOP  
If the command output 1 (Par. 37 *c.o.u.1*) is relay or valve:  
*aPEN* Contact or valve open. **Default**  
*cLoSE* Contact or valve closed.  
If the command output 1 is digital output (SSR):  
*aFF* Digital output OFF. **Default**  
*aM* 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.   |
| 21.5 mA | 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.

- a.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 **v.R.t.1** **Valve Time 1**

Valve time related to command 1 (declared by the manufacturer of the valve)

1...300 seconds. **Default:** 60.

#### 51 **v.FE.P.** **Valve Feedback Potentiometer** *(only on DIS96V DUO-X)*

Enables the reading of feedback potentiometer for motorized valves on input AI2

By setting **Po.cRL.**, when exit configuration, valve will be open and then completely closed to allow the controller to store feedback potentiometer limits.

**d.SRb.** Disabled **(Default)**

**ENRb.** Enabled

**Po.cRL.** (Potentiometer Calibration). Back to **ENRb.** when the procedure ends.

#### 52 **S.v.S.1** **State Valve Saturation 1**

Select the valve status when the output percentage is 100%

**PERc.** The valve opening relay is activated for a time equal to 5% of the valve time

**FixEd** The valve opening relay is always active

#### 53 **A.M.A.1** **Automatic / Manual 1**

Enables the automatic/manual selection for command 1

**d.SRb.** Disabled **(Default)**

**ENRb.** Enabled

**EM.Sto.** Enabled with memory

#### 54 **L.P.r.1** **Load Power Rating 1**

Defines the power rating of the load (in kW) connected to the command output 1, to calculate the energy consumed by the system.

0.0..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.

**StARRt** Start **(Default)**

**StoP** Stop

**StoPE.** Stored. State of Start/Stop prior to switching off.

#### 56÷59 **Reserved Parameters - Group B1**

Reserved parameters - Group B1

## GROUP B2 - $c_{nd}2$ - Outputs and regul. Process 2 (only on DIS96V DUO-X)

### 60 $c_{ou}2$ Command Output 2

Selects the command output related to the process 2

**NB:** refer to the function/output table of parameter 37  $c_{ou}1$  to check which resources will remain available after changing this parameter (eg: setting  $c_{ou}2$  as  $c_{55P}$ , it will no longer be possible to enable the alarm associated with the DO2 output).

$d_{5Rb}$ . Command disabled. **(Default)**

$c_{o4}$  Command on relay output Q4

$c_{o2}$  Command on relay output Q2

$c_{55P}$  Command on digital output DO2

$c_{VRL}$ . Servo-valve command with open loop

$c_{0-10}$  Command 0-10 V on analogue output AO2

$c_{4-20}$  Command 4-20 mA on analogue output AO2

$0.10.5.P.$  Command 0-10 V on analogue output AO2 with split-range function: the analogue output sets the cooling action from 0 to 5V and heating action from 5 to 10V.

$4.20.5.P.$  Command 4-20 mA on analogue output AO2 with split-range function: the analogue output sets the cooling action from 4 to 12mA and heating action from 12 to 20mA.

| ATR444-22ABC | Command              |
|--------------|----------------------|
| $d_{5Rb}$    | -                    |
| -            | -                    |
| $c_{o2}$     | Q2                   |
| $c_{55P}$    | DO2                  |
| $c_{VRL}$ .  | DO1(open)-DO2(close) |

| ATR444-24ABC-T             | Command            |
|----------------------------|--------------------|
| $d_{5Rb}$                  | -                  |
| $c_{o4}$                   | Q4                 |
| $c_{o2}$                   | Q2                 |
| $c_{55P}$                  | DO2                |
| $c_{VRL}$ .                | Q2(open)-Q4(close) |
| $c_{0-10}$ ( $0.10.5.P.$ ) | AO2 (0..10 V)      |
| $c_{4-20}$ ( $4.20.5.P.$ ) | AO2 (4..20 mA)     |

### 61 $c_{Pr}2$ Command Process 2

Selects process value related to process 2 and to command output 2.

$R_{iN.1}$  Value read on input AI1. **(Default)**

$R_{iN.2}$  Value read on input AI2.

$MEAN$  Arithmetic average of the value read on inputs AI1 and AI2  $((AI1-AI2)/2)$ .

$d_{iFF}$ . Difference of the values read on inputs AI1 and AI2  $(AI1-AI2)$ .

$Rb.d.F.$  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

$PEdN$ . Value read on AI1 or value read on AI2 if AI1 is in error (E-05)

### 62 $rENS$ Remote Setpoint

Enables remote setpoint. The control setpoint is sent by another device and is received by a second analogue input (it is necessary to select on parameter  $c_{Pr}2$  the selections  $R_{iN.1}$  or  $R_{iN.2}$ ) or through serial.

$d_{5Rb}$ . Disabled. **(Default)**

$ENRb$ . Enables remote setpoint by process 2. Remote/local selection can be done by digital input.

$ENLSL$ . Remote setpoint by process 2, Remote/local selection only by keyboard (not allowed by digital input)

$ENSER$ . Enables remote setpoint by serial input. Remote/local selection can be done by digital input.

$ENSEL$ . Remote setpoint by serial, Remote/local selection only by keyboard (not allowed by digital input).

$c_{nd.1}$  The reference setpoint of command 2 is the same of command 1.

### 63 $A_{ct}2$ Action type 2

Action type to control process 2.

$HEAT$  Heating (N.A.) **(Default)**

$COOL$  Cooling (N.C.)

- 64** *c.H2* **Command Hysteresis 2**  
Hysteresis to control process 2 in ON/OFF.  
-9999..+9999 [digit<sup>1 p.79</sup>] (degrees.tenths for temperature sensors). **Default** 0.2.
- 65** *LLS2* **Lower Limit Setpoint 2**  
Lower limit setpoint selectable for command setpoint 2.  
-9999..+30000 [digit<sup>1 p.79</sup>] (degrees for temperature sensors). **Default** 0.
- 66** *ULS2* **Upper Limit Setpoint 2**  
Upper limit setpoint selectable for command setpoint 2.  
-9999..+30000 [digit<sup>1 p.79</sup>] (degrees for temperature sensors). **Default** 1750.
- 67** *c.rE2* **Command Reset 2**  
Type of reset for command contact 2 (always automatic in PID functioning)  
*R.PES.* Automatic Reset (**Default**)  
*M.PES.* Manual Reset (by keyboard or by digital input)  
*M.PES.S.* Manual Reset Stored (keeps relay status also after an eventual power failure)  
*R.PES.E.* Automatic reset with timed activation. The command remains active for the time set on the parameter 71 *c.dE.2.*, even if the conditions generating it are missing. To be able to act again, the conditions for activating the command must disappear.
- 68** *c.S.E2* **Command State Error 2**  
State of contact for command 2output in case of error.  
**If the command output 2 (Par. 60 *c.Ou.2*) is relay or valve:**  
*aPEN* Contact or valve open. **Default**  
*cLoSE* Contact or valve closed.  
**If the command output 2 is digital output (SSR):**  
*aFF* Digital output OFF. **Default**  
*aM* Digital output ON.  
**If the command output 2 is 0-10V:**  
*0 V* 0 V. **Default**  
*10 V* 10 V.  
**If the command output 2 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.
- 69** *c.SS2* **Command State Stop 2**  
State of contact for command output 2 with controller in STOP  
**If the command output 2 (Par. 60 *c.Ou.2*) is relay or valve:**  
*aPEN* Contact or valve open. **Default**  
*cLoSE* Contact or valve closed.  
**If the command output 2 is digital output (SSR):**  
*aFF* Digital output OFF. **Default**  
*aM* Digital output ON.  
**If the command output 2 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.
- 70** *c.Ld2* **Command Led 2**  
Defines led **O2** state corresponding to the relevant output. If the valve command is selected, this parameter is not managed.  
*a.c.* ON with open contact or SSR switched off. If command AO2, 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 AO2 ON with output 100%, OFF if 0% and flashing between 1% and 99%. **(Default)**

#### 71 c.dE2 **Command Delay 2**

Command 2 delay (only in ON / OFF functioning).  
-60:00..60:00 mm:ss. **Default:** 00:00.  
Negative: delay when turning off output.  
Positive: delay when turning on output.

#### 72 c.S.P2 **Command Setpoint Protection 2**

Allows or not to modify command setpoint 2 value  
FREE Modification allowed **(Default)**  
LOCK Protected

#### 73 vA.t.2 **Valve Time 2**

Valve time related to command 2 (declared by the manufacturer of the valve)  
1..300 seconds. **Default:** 60.

#### 74 rES. **Reserved**

Reserved parameter

#### 75 S.v.S2 **State Valve Saturation 2**

Select the valve 2 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

#### 76 A.M.R.2 **Automatic / Manual 2**

Enables the automatic/manual selection for command 2  
d.SRb. Disabled **(Default)**  
EMRb. Enabled  
EM.SEm. Enabled with memory

#### 77 L.P.r.2 **Load Power Rating 2**

Defines the power rating of the load (in kW) connected to the command output 2, to calculate the energy consumed by the system  
0.0..1000.0 kW. **Default:** 0.0 kW

#### 78÷82 **Reserved Parameters - Group B2**

Reserved parameters - Group B2

### GROUP C1 - rEE.1 - Autotuning and PID 1

#### 83 t.un.1 **Tune 1**

Selects autotuning type for command 1  
d.SRb. Disabled. If proportional band and integral time parameters 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)  
oMCE 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<sup>1 p. 79</sup>] (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<sup>1 p. 79</sup>] (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<sup>1 p.79</sup>] (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.  
*d.5Rb.* Disabled. Band under (heating) or over (cooling)(**Default**)  
*ENRb.* 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*)  
*d.5Rb.* Disabled (**Default**)  
*ENRb.* Enabled
- 91** *o.d.t.1* **Off Deviation Threshold 1**  
Selects deviation from command setpoint 1, to calculate the intervention threshold of "Off Over Setpoint 1" function.  
-9999..+9999 [digit<sup>1 p.79</sup>] (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 *u.R.t.1*  
1-300 seconds (**Default:**15 s)
- 93** *co.F.1* **Cooling Fluid 1**  
Type of refrigerant fluid for heating / cooling PID for process 1. Enable the cooling output on parameter AL.1 ... AL.6.  
*RiP* Air (**Default**)  
*o.L* Oil  
*WRLEP* 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** *LL.P.1* **Lower Limit Output Percentage 1**  
Selects min. value for command output 1 percentage.  
0%...100%, **Default:** 0%.

- 98** *uL.P.1* **Upper Limit Output Percentage 1**  
 Selects max. value for command output 1 percentage.  
 0%...100%, **Default:** 100%.
- 99** *Π.G.E.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<sup>1 p. 79</sup>] (degrees.tenths for temperature sensors). **Default:** 2.0
- 100** *Π.n.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<sup>1 p. 79</sup>] (degrees.tenths for temperature sensors). **Default:** 3.0
- 101** *Π.Π.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<sup>1 p. 79</sup>] (degrees.tenths for temperature sensors). **Default:** 100.0
- 102** *Π.n.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.c.R.1* **Derivative Calculation 1**  
 Determines if, during autotuning, derivative time must be calculated or left at zero.  
*Ρ.υ.ε.ο.Μ.* The derivative is forced to zero only if the command is of valve type; in all other cases it is calculated by autotuning. **(Default)**  
*∫ΕΡ.ο* The derivative is always forced to zero.  
*ε.Ρ.Λ.ε.* The derivative is always calculated by autotuning
- 104** *ο.ε.Λ.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.
- |                   |                         |               |                |
|-------------------|-------------------------|---------------|----------------|
| <i>d.i.S.P.b.</i> | <i>LEV. 3</i>           | <i>LEV. 6</i> | <i>LEV. 9</i>  |
| <i>LEV. 1</i>     | <i>LEV. 4</i>           | <i>LEV. 7</i> | <i>LEV. 10</i> |
| <i>LEV. 2</i>     | <i>LEV. 5 [Default]</i> | <i>LEV. 8</i> |                |
- 105÷108** **Reserved Parameters - Group C1** Reserved parameters - Group C1

## GROUP C2 - *r.E.G.2* - Autotuning and PID 2 (only on DIS96V DUO-X)

- 109** *t.u.n.2* **Tune 2**  
 Selects autotuning type for command 2  
*d.i.S.P.b.* Disabled. If proportional band and integral time paramters are to selected to zero, the regulation is ON/OFF type. **(Default)**  
*Ρ.υ.ε.ο* Automatic (Automatic PID parameters calculation)  
*Μ.Ρ.Μ.υ.* Manual (launch by keyboards or by digital input)  
*ο.Μ.ε.Ε* Once (PID parameters calculation only at first start)  
*Σ.Υ.ν.ε.Η.* Synchronized (Autotuning managed by serial)
- 110** *Σ.d.ε.2* **Setpoint Deviation Tune 2**  
 Selects deviation from command setpoint 2 as threshold used by autotuning to calculate PID parameters.  
 0-10000 [digit<sup>1 p. 79</sup>] (degrees.tenths for temperature sensors). **Default:** 30.0.
- 111** *P.b. 2* **Proportional Band 2**  
 Proportional band or process 2 PID regulation (Process inertia).  
 0 ON / OFF if *ε. i.* equal to 0 **(Default)**  
 1..10000 [digit<sup>1 p. 79</sup>] (degrees.tenths for temperature sensors).



- 112** *i.t. 2* **Integral Time 2**  
Integral time for process 2 PID regulation (process inertia duration).  
0.0...2000.0 seconds (0.0 = integral disabled), **Default** 0.0
- 113** *d.t. 2* **Derivative Time 2**  
Derivative time for process 2 PID regulation (Normally ¼ of integral time).  
0.0...1000.0 seconds (0.0 = derivative disabled), **Default** 0
- 114** *d.b. 2* **Dead Band 2**  
Dead band of process 2 PID  
0..10000 [digit<sup>1 p.79</sup>] (degrees.tenths for temperature sensors) (**Default:** 0)
- 115** *P.b.c.2* **Proportional Band Centered 2**  
Defines if the proportional band 2 must be centered or not on the setpoint. In double loop functioning (heating/cooling), always disabled.  
*d.5Rb.* Disabled. Band under (heating) or over (cooling) (**Default**)  
*ENRb.* Centered band
- 116** *o.o.5.2* **Off Over Setpoint 2**  
In PID enables the command output 2 switching off, when a certain threshold is exceeded (setpoint + Par. 117 *o.d.t. 2*)  
*d.5Rb.* Disabled (**Default**)  
*ENRb.* Enabled
- 117** *o.d.t.2* **Off Deviation Threshold 2**  
Selects deviation from command setpoint 2, to calculate the intervention threshold of "Off Over Setpoint 2" function.  
-9999..+9999 [digit<sup>1 p.79</sup>] (degrees.tenths for temperature sensors) (**Default:** 0)
- 118** *c.t. 2* **Cycle Time 2**  
Cycle time for PID regulation of process 2 (for PID on remote control switch 15 s; for PID on SSR 2s). For valve refer to parameter 73 *i.R.t. 2*  
1-300 seconds (**Default:**15 s)
- 119** *co.F.2* **Cooling Fluid 2**  
Type of refrigerant fluid for heating / cooling PID for process 2. Enable the cooling output on parameter AL.1... AL.6.  
*RiR* Air (**Default**)  
*o.L* Oil *WRLEP* Water
- 120** *Pb.M.2* **Proportional Band Multiplier 2**  
Proportional band multiplier for heating/cooling PID for process 2. Proportional band for cooling action is given by parameter *Pb. 2* multiplied for this value.  
1.00..5.00. **Default:** 1.00
- 121** *o.d.b.2* **Overlap / Dead Band 2**  
Dead band combination for heating / cooling PID (double action) for process 2. -20.0..50.0%  
Negative: Dead band  
Positive: overlap. **Default:** 0.0%
- 122** *c.c.t.2* **Cooling Cycle Time 2**  
Cycle time for cooling output in heating / cooling PID mode for process 2.  
1-300 seconds (**Default:**10 s)
- 123** *LLP2* **Lower Limit Output Percentage 2**  
Selects min. value for command output 2 percentage.  
0%...100%, **Default:** 0%.
- 124** *u.L.P.2* **Upper Limit Output Percentage 2**  
Selects max. value for command output 2 percentage.  
0%...100%, **Default:** 100%.

## 125 $\Delta G_{T2}$ Max Gap Tune 2

Selects the max. process-setpoint gap beyond which the automatic tune recalculates PID parameters of process 2.

8-10000 [digit<sup>1/0.79</sup>] (degrees.tenths for temperature sensors). **Default: 2.0**

## 126 $\Delta n_{P2}$ Minimum Proportional Band 2

Selects the min. proportional band value selectable by the automatic tune for the PID regulation of process 2.

0-10000 [digit<sup>1/0.79</sup>] (degrees.tenths for temperature sensors). **Default: 3.0**

## 127 $\Delta n_{P2}$ Maximum Proportional Band 2

Selects the max. proportional band 2 value selectable by the automatic tune for the PID regulation of process 2.

0-10000 [digit<sup>1/0.79</sup>] (degrees.tenths for temperature sensors). **Default: 100.0**

## 128 $\Delta n_{i2}$ Minimum Integral Time 2

Selects the min. integral time 2 value selectable by the automatic tune for the PID regulation of process 2.

0.0...1000.0 sec. **Default: 30.0 sec.**

## 129 $d_{cR2}$ Derivative Calculation 2

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

$R_{\Delta t M}$ . The derivative is forced to zero only if the command is of valve type; in all other cases it is calculated by autotuning. **(Default)**

$\overline{I}ER_0$ . The derivative is always forced to zero.

$cRLc$ . The derivative is always calculated by autotuning

## 130 $\Delta_{cL2}$ Overshoot Control Level 2

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.

|             |                  |        |         |
|-------------|------------------|--------|---------|
| $d_{SRb}$ . | LEV: 3           | LEV: 6 | LEV: 9  |
| LEV: 1      | LEV: 4           | LEV: 7 | LEV: 10 |
| LEV: 2      | LEV: 5 [Default] | LEV: 8 |         |

## 131÷134 Reserved Parameters - Group C2

Reserved parameters - Group **C2**

## GROUP D1 - $RL_1$ - Alarm 1

### 135 $RL_1F$ Alarm 1 Function

Alarm 1 selection.

$d_{SRb}$ . Disabled **(Default)**

$Rb_{uP.R}$ . Absolute Upper Activation. Absolute referred to the process, active over

$Rb_{Lo.R}$ . Absolute Lower Activation. Absolute referred to the process, active under

$bRNd$ . Band alarm (command setpoint  $\pm$  alarm setpoint)

$R.bRNd$ . 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

$Rb_{c.u.R}$ . Absolute Command Upper Activation. Absolute alarm referred to the command setpoint, active over

$Rb_{c.L.R}$ . Absolute Command Lower Activation. Absolute alarm referred to the command setpoint, active under

$R_{uN}$ . Status alarm (active in RUN/START)

$c_{oOL}$ . Cold actuator auxiliary (Cold action in double loop)

$c.R_{u\%}$ . Auxiliary for job distribution on the command output. It cyclically replaces the command output for the time set on the parameter 147  $R_{i.dE}$ . If  $R_{i.dE} = 0$ , 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  $R_{i.dE}$  is different from 0.

$S_{tEP.R}$ . Step Auxiliary. Auxiliary output related to the step (ON/OFF at each step).

|                 |  |
|-----------------|--|
| <i>PRb.ER.</i>  | Probe error. Alarm active in case of sensor rupture.                               |
| <i>H.b.R.</i>   | Heater Break Alarm and Overcurrent Alarm   |
| <i>EMR.1</i>    | Related to timer 1   |
| <i>EMR.2</i>    | Related to timer 2   |
| <i>EMR.1..2</i> | Related to both timers   |
| <i>F1</i>       | Key F1. Alarm is activated / deactivated by pressing the F1 key <sup>4 p. 79</sup> |
| <i>F2</i>       | Key F2. Alarm is activated / deactivated by pressing the F2 key <sup>4 p. 79</sup> |
| <i>F3</i>       | Key F3. Alarm is activated / deactivated by pressing the F3 key <sup>4 p. 79</sup> |
| <i>F4</i>       | Key F4. Alarm is activated / deactivated by pressing the F4 key <sup>4 p. 79</sup> |
| <i>d.i. 1</i>   | Digital Input 1. Active when digital input 1 is active.                            |
| <i>d.i. 2</i>   | Digital Input 2. Active when digital input 2 is active.                            |
| <i>d.i. 3</i>   | Digital Input 3. Active when digital input 3 is active.                            |
| <i>d.i. 4</i>   | Digital Input 4. Active when digital input 4 is active.                            |
| <i>REM.</i>     | Remote. The alarm is enabled by the word 1243                                      |

### 136 *AlP.* **Alarm 1 Process** (only on DIS96V DUO-X)

Selects the size related to alarm 1.

|                |  |
|----------------|--|
| <i>R.in.1</i>  | Value read on input AI1. <b>(Default)</b>                                      |
| <i>R.in.2</i>  | Value read on input AI2.   |
| <i>MERh</i>    | Arithmetic average of the value read on inputs AI1 and AI2 [(AI1+AI2)/2].      |
| <i>dIFF.</i>   | Difference of the values read on inputs AI1 and AI2 (AI1-AI2).                 |
| <i>Ab.d.F.</i> | Module of the difference of the values read on inputs AI1 and AI2 ( AI1-AI2 ). |
| <i>Sum</i>     | Sum of values read on inputs AI1 and AI2 (AI1+AI2).                            |
| <i>HiGH.</i>   | Greater value between AI1 and AI2  |
| <i>LoWER</i>   | Lower value between AI1 and AI2  |
| <i>REDuN.</i>  | The value read on AI1 or value read on AI2 if AI1 is in error (E-05)           |

### 137 *Al.r.c.* **Alarm 1 Reference Command** (only on DIS96V DUO-X)

Selects alarm 1 reference command

|               |   |
|---------------|---|
| <i>cMd. 1</i> | Alarm referred to command 1. <b>(Default)</b> |
| <i>cMd. 2</i> | Alarm referred to command 2.                  |

### 138 *Al.S.o.* **Alarm 1 State Output**

Alarm 1 output contact and intervention type.

|                   |  |
|-------------------|--|
| <i>N.o. St.</i>   | (N.O. Start) Normally open, active at start <b>(Default)</b>                           |
| <i>N.c. St.</i>   | (N.C. Start) Normally closed, active at start  |
| <i>N.o. Th.</i>   | (N.O. Threshold) Normally open, active on reaching alarm <sup>2 p. 79</sup>            |
| <i>N.c. Th.</i>   | (N.C. Threshold) Normally closed, active on reaching alarm <sup>2 p. 79</sup>          |
| <i>N.o. Th.V.</i> | (N.O. Threshold Variation) disabled after changing control setpoint <sup>3 p. 79</sup> |
| <i>N.c. Th.V.</i> | (N.C. Threshold Variation) disabled after changing control setpoint <sup>3 p. 79</sup> |

### 139 *rES.* **Reserved**

Reserved parameter

### 140 *Al.HY.* **Alarm 1 Hysteresis**

Alarm 1 hysteresis

-9999..+9999 [digit<sup>1 p. 79</sup>] (degrees.tenths for temperature sensors). **Default** 0.5.

### 141 *Al.LL.* **Alarm 1 Lower Limit**

Lower limit selectable for the alarm 1 setpoint.

-9999..+30000 [digit<sup>1 p. 79</sup>] (degrees for temperature sensors). **Default** 0.

### 142 *Al.U.L.* **Alarm 1 Upper Limit**

Upper limit selectable for the alarm 1 setpoint.

-9999..+30000 [digit<sup>1 p. 79</sup>] (degrees for temperature sensors). **Default** 1750.

### 143 *Al.rE.* **Alarm 1 Reset**

Alarm 1 contact reset type (always automatic if *RL.i.F.* = *c.* *RuA*).

*R. 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)
- R. RES.t.* Automatic reset with timed activation. The alarm remains active for the time set on the parameter 147 *R.t.dE.*, even if the conditions generating it are missing. To be able to act again, the alarm conditions must disappear.

#### 144 *R.tSE.* Alarm 1 State Error

Alarm 1 output status in case of error.

- aPEN* Open contact. **Default**
- cLoSE* Closed contact.

#### 145 *R.tSS.* Alarm 1 State Stop

Alarm 1 output status with the controller in STOP.

- R.cL.V.R.* Alarm active. **Default**
- aPEN* Open contact.
- cLoSE* Closed contact.

#### 146 *R.tLd.* Alarm 1 Led

Defines the status of the led **A1** in correspondence of the relevant output

- a.c.* ON with open contact or DO switched OFF.
- c.c.* ON with closed contact or DO switched ON. (**Default**)

#### 147 *R.tdE.* Alarm 1 Delay

Alarm 1 Delay.

-60:00..60:00 mm:ss (hh:mm if *R.L.t.F.* = *c. R.w.*). **Default:** 00:00.

Negative value: delay when exit alarm status.

Positive value: delay when enter alarm status.

#### 148 *R.tSP.* Alarm 1 Setpoint Protection

Allows or not to change the alarm 1 setpoint

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

#### 149 *R.tLb.* Alarm 1 Label

Selects the message displayed in case of alarm 1 intervention.

- d.tSRb.* 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)

### 150÷154 **Reserved Parameters - Group D1** Reserved parameters - Group D1

## GROUP D2 - *R.L. 2* - Alarm 2

#### 155 *R.L.2.F.* Alarm 2 Function

Alarm 2 selection.

- d.tSRb.* Disabled (**Default**)
- Rb. uP.R.* Absolute Upper Activation. Absolute referred to the process, active over
- Rb. Lo.R.* Absolute Lower Activation. Absolute referred to the process, active under
- bAND* Band alarm (command setpoint ± alarm setpoint)
- R.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
- Rb.c.u.R.* Absolute Command Upper Activation. Absolute alarm referred to the command setpoint, active over
- Rb.c.L.R.* Absolute Command Lower Activation. Absolute alarm referred to the command setpoint, active under

|          |  |
|----------|--|
| RUN      | Status alarm (active in RUN/START)   |
| cool     | Cold actuator auxiliary (Cold action in double loop)   |
| c. RUX   | Auxiliary for job distribution on the command output. It cyclically replaces the command output for the time set on the parameter 167 R.2.dE.. If R.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 R.2.dE. is different from 0. |
| STEP.R.  | Step Auxiliary. Auxiliary output related to the step (ON/OFF at each step).  |
| PRb.ER.  | Probe error. Alarm active in case of sensor rupture.   |
| H.b.R.   | Heater Break Alarm and Overcurrent Alarm   |
| EMR.1    | Related to timer 1   |
| EMR.2    | Related to timer 2   |
| EMR.1..2 | Related to both timers   |
| F1       | Key F1. Alarm is activated / deactivated by pressing the F1 key <sup>4 p. 79</sup>   |
| F2       | Key F2. Alarm is activated / deactivated by pressing the F2 key <sup>4 p. 79</sup>   |
| F3       | Key F3. Alarm is activated / deactivated by pressing the F3 key <sup>4 p. 79</sup>   |
| F4       | Key F4. Alarm is activated / deactivated by pressing the F4 key <sup>4 p. 79</sup>   |
| 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  |

### 156 R2Pr. Alarm 2 Process (only on DIS96V DUO-X)

Select the size related to alarm 2.

|         |  |
|---------|--|
| R.iN.1  | Value read on input AI1. (Default)   |
| R.iN.2  | Value read on input AI2.   |
| MEAN    | Arithmetic average of the value read on inputs AI1 and AI2 ((AI1+AI2)/2).      |
| d.FF.   | Difference of the values read on inputs AI1 and AI2 (AI1-AI2).                 |
| Ab.d.F. | Module of the difference of the values read on inputs AI1 and AI2 ( AI1-AI2 ). |
| SUM     | Sum of values read on inputs AI1 and AI (AI1+AI2).                             |
| HiGH.   | Greater value between AI1 and AI2  |
| LoWER   | Lower value between AI1 and AI2  |
| REduM.  | The value read on AI1 or value read on AI2 if AI1 is in error (E-05)           |

### 157 R2r.c. Alarm 2 Reference Command (DIS96V DUO-X)

Selects alarm 2 reference command

|        |  |
|--------|--|
| cMd. 1 | Alarm referred to command 1. (Default) |
| cMd. 2 | Alarm referred to command 2.           |

### 158 R2S.o. Alarm 2 State Output

Alarm 2 output contact and intervention type.

|            |  |
|------------|--|
| N.o. SE.   | (N.O. Start) Normally open, active at start (Default)                                  |
| N.c. SE.   | (N.C. Start) Normally closed, active at start  |
| N.o. EH.   | (N.O. Threshold) Normally open, active on reaching alarm <sup>2 p. 79</sup>            |
| N.c. EH.   | (N.C. Threshold) Normally closed, active on reaching alarm <sup>2 p. 79</sup>          |
| N.o. EH.V. | (N.O. Threshold Variation) disabled after changing control setpoint <sup>3 p. 79</sup> |
| N.c. EH.V. | (N.C. Threshold Variation) disabled after changing control setpoint <sup>3 p. 79</sup> |

### 159 rES. Reserved

Reserved parameter.

### 160 R2HY. Alarm 2 Hysteresis

Alarm 2 hysteresis

-9999..+9999 [digit<sup>1 p. 79</sup>] (degrees.tenths for temperature sensors). **Default** 0.5.

### 161 R2LL. Alarm 2 Lower Limit

Lower limit selectable for the alarm 2 setpoint

-9999..+30000 [digit<sup>1 p. 79</sup>] (degrees for temperature sensors). **Default** 0.

### 162 *R2.U.L.* Alarm 2 Upper Limit

Upper limit selectable for the alarm 2 setpoint  
-9999..+30000 [digit<sup>p.79</sup>] (degrees for temperature sensors). **Default** 1750.

### 163 *R2.R.E.* Alarm 2 Reset

Alarm 2 contact reset type (always automatic if *R.L.Z.F.* = *c. R.u.*).

*R. 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)

*R. RES.t.* Automatic reset with timed activation. The alarm remains active for the time set on the parameter 167 *R.z.dE.*, even if the conditions generating it are missing. To be able to act again, the alarm conditions must disappear.

### 164 *R2.S.E.* Alarm 2 State Error

Alarm 2 output status in case of error

If the alarm output is relay

*aPEN* Contact or open valve. **Default**

*cLoSE* Contact or closed valve.

If the alarm output is digital (SSR):

*aFF* Digital output OFF. **Default**

*aM* Digital output ON.

### 165 *R2.S.S.* Alarm 2 State Stop

Alarm 2 output status with controller in STOP

If the alarm output is relay

*RcEtV.R.* Alarm active. **Default**

*aPEN* Contact or open valve

*cLoSE* Contact or closed valve

If the alarm output is digital (SSR):

*RcEtV.R.* Alarm active. **Default**

*aFF* Digital output OFF

*aM* Digital output ON

### 166 *R2.L.d.* Alarm 2 Led

Defines the status of the led **A2** in correspondence of the relevant output.

*a.c.* ON with open contact or DO switched off.

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

### 167 *R2.dE.* Alarm 2 Delay

Alarm 2 Delay. -60:00..60:00 mm:ss (hh:mm if *R.L.Z.F.* = *c. R.u.*); **Default**: 00:00.

Negative value: delay when exit alarm status.

Positive value: delay when enter alarm status

### 168 *R2.S.P.* Alarm 2 Setpoint Protection

Allows or not to change the alarm 2 setpoint

*FPEE* Editable by the user (**Default**)

*Lock* Protected

*HidE* Protected and not visualized

### 169 *R2.Lb.* Alarm 2 Label

Selects the message displayed in case of alarm 2 intervention.

*dSRb.* Disabled. (**Default**)

*Lb. 01* Message 1 (see table paragraph 15.1)

...

*Lb. 20* Message 20 (see table paragraph 15.1)

*uSEP.L.* Custom message (modifiable by the user through the App or via modbus)

### 170÷174 Reserved Parameters - Group D2

Reserved parameters - Group D2.

## GROUP D3 - *AL 3* - Alarm 3

### 175 *AL3.F.* Alarm 3 Function

Alarm 3 selection.

*d.SAb.* Disabled (**Default**)

*Rb. uP.R.* Absolute Upper Activation. Absolute referred to the process, active over

*Rb. Lo.R.* Absolute Lower Activation. Absolute referred to the process, active under

*bANd* Band alarm (command setpoint ± alarm setpoint)

*R.b.bANd* Asymmetric band alarm (command setpoint + alarm setpoint 3 H and command setpoint - alarm setpoint 3 L)

*uP.dEV.* Upper Deviation. Upper Deviation alarm

*Lo.dEV.* Lower Deviation. Lower Deviation alarm

*Rb.c.u.R.* Absolute Command Upper Activation. Absolute alarm referred to the command setpoint, active over

*Rb.c.L.R.* 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. Ru\** Auxiliary for job distribution on the command output. It cyclically replaces the command output for the time set on the parameter 187 *R.3.dE..* If *R.3.dE.* = 0, it is activated parallel to the command output. It does not work in case of valve control and can only be activated on an alarm if *R.3.dE.* is different from 0.

*StEP.R.* 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.R.* Heater Break Alarm and Overcurrent Alarm

*tMP.1* Related to timer 1

*tMP.2* Related to timer 2

*tMP.1.2* Related to both timers

*F1* Key F1. Alarm is activated / deactivated by pressing the F1 key <sup>4 p. 79</sup>

*F2* Key F2. Alarm is activated / deactivated by pressing the F2 key <sup>4 p. 79</sup>

*F3* Key F3. Alarm is activated / deactivated by pressing the F3 key <sup>4 p. 79</sup>

*F4* Key F4. Alarm is activated / deactivated by pressing the F4 key <sup>4 p. 79</sup>

*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 1245

### 176 *R3P.* Alarm 3 Process (only on DIS96V DUO-X)

Select the size related to alarm 3.

*R.i.N.1* Value read on input AI1. (**Default**)

*R.i.N.2* Value read on input AI2.

*MERh* Arithmetic average of the value read on inputs AI1 and AI2  $[(AI1+AI2)/2]$ .

*d.FF.* Difference of the values read on inputs AI1 and AI2  $(AI1-AI2)$ .

*Rb.d.F.* 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)

### 177 *R3.c.c.* Alarm 3 Reference Command (DIS96V DUO-X)

Select alarm 3 reference command

*cMd. 1* Alarm referred to command 1. (**Default**)

*cMd. 2* Alarm referred to command 2.

### 178 *R3.s.o.* Alarm 3 State Output

Alarm 3 output contact and intervention type.

*N.o. St.* (N.O. Start) Normally open, active at start (**Default**)

*N.c. St.* (N.C. Start) Normally closed, active at start

- N. a. tH.* (N.O. Threshold) Normally open, active on reaching alarm <sup>2 p. 79</sup>
- N. c. tH.* (N.C. Threshold) Normally closed, active on reaching alarm <sup>2 p. 79</sup>
- N. a. tH. V.* (N.O. Threshold Variation) disabled after changing control setpoint <sup>3 p. 79</sup>
- N. c. tH. V.* (N.C. Threshold Variation) disabled after changing control setpoint <sup>3 p. 79</sup>

**179** *rES.* **Reserved**  
Reserved parameter

**180** *R3HY.* **Alarm 3 Hysteresis**  
Alarm 3 hysteresis.  
-9999..+9999 [digit<sup>1 p. 79</sup>] (degrees.tenths for temperature sensors). **Default** 0.5.

**181** *R3LL* **Alarm 3 Lower Limit**  
Lower limit selectable for the alarm 3 setpoint.  
-9999..+30000 [digit<sup>1 p. 79</sup>] (degrees for temperature sensors). **Default** 0.

**182** *R3UL.* **Alarm 3 Upper Limit**  
Upper limit selectable for the alarm 3 setpoint.  
-9999..+30000 [digit<sup>1 p. 79</sup>] (degrees for temperature sensors). **Default** 1750.

**183** *R3rE.* **Alarm 3 Reset**  
Alarm 3 contact reset type (always automatic if *RL.3.F. = c. Ru\**).  
*R. 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)  
*R. RES.t.* Automatic reset with timed activation. The alarm remains active for the time set on the parameter *187 R.3.dE.*, even if the conditions generating it are missing. To be able to act again, the alarm conditions must disappear.

**184** *R3SE.* **Alarm 3 State Error**  
Alarm 3 output status in case of error  
If the alarm output is relay  
*aPEN* Contact or open valve. **Default**  
*cLoSE* Contact or closed valve.  
If the alarm output is digital (SSR):  
*aFF* Digital output OFF. **Default**  
*aM* Digital output ON.

**185** *R3SS.* **Alarm 3 State Stop**  
Alarm 3 output status with controller in STOP  
If the alarm output is relay  
*RcEtV.R.* Alarm active. **Default**  
*aPEN* Contact or open valve  
*cLoSE* Contact or closed valve  
If the alarm output is digital (SSR):  
*RcEtV.R.* Alarm active. **Default**  
*aFF* Digital output OFF  
*aM* Digital output ON

**186** *R3Ld.* **Alarm 3 Led**  
Defines the status of the led **A3** in correspondence of the relevant output.  
*a. c.* ON with open contact, DO switched off or AO deactivated.  
*c. c.* ON with closed contact, DO switched on or AO activated. (**Default**)

**187** *R3dE.* **Alarm 3 Delay**  
Alarm 3 Delay.  
-60:00..60:00 mm:ss (hh:mm if *RL.3.F. = c. Ru\**). **Default**: 00:00.  
Negative value: delay when exit alarm status.  
Positive value: delay when enter alarm status



**188** *RS.P.* **Alarm 3 Setpoint Protection**  
 Allows or not to change the alarm 3 setpoint.  
*FREE* Editable by the user (**Default**)  
*Lock* Protected HidE Protected and not visualized

**189** *RLb.* **Alarm 3 Label**  
 Selects the message displayed in case of alarm 3 intervention.  
*dSRb.* 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)

**190÷194** **Reserved Parameters - Group D3** Reserved parameters - Group D3

## GROUP D4 - *RL. 4* - Alarm 4

**195** *RL4.F.* **Alarm 4 Function**  
 Alarm 4 selection.  
*dSRb.* Disabled (**Default**)  
*Rb.uP.R.* Absolute Upper Activation. Absolute referred to the process, active over  
*Rb.Lo.R.* Absolute Lower Activation. Absolute referred to the process, active under  
*bRNd* Band alarm (command setpoint ± alarm setpoint)  
*R.bRNd* Asymmetric band alarm (command setpoint + alarm setpoint 4 H and command setpoint - alarm setpoint 4 L)  
*uP.dEV.* Upper Deviation. Upper Deviation alarm  
*Lo.dEV.* Lower Deviation. Lower Deviation alarm  
*Rb.c.u.R.* Absolute Command Upper Activation. Absolute alarm referred to the command setpoint, active over  
*Rb.c.L.R.* 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. Ru\** Auxiliary for job distribution on the command output. It cyclically replaces the command output for the time set on the parameter 207 *R.4.dE.*. If *R.4.dE.* = 0, it is activated parallel to the command output. It does not work in case of valve control and can only be activated on an alarm if *R.4.dE.* is different from 0.  
*SEPR.* Step Auxiliary. Auxiliary output related to the step (ON/OFF at each step).  
*PRb.ER.* Probe error. Alarm active in case of sensor rupture.  
*H.b.R.* Heater Break Alarm and Overcurrent Alarm  
*EMR.1* Related to timer 1  
*EMR.2* Related to timer 2  
*EMR.1.2* Related to both timers  
*F1* Key F1. Alarm is activated / deactivated by pressing the F1 key <sup>4 p. 79</sup>  
*F2* Key F2. Alarm is activated / deactivated by pressing the F2 key <sup>4 p. 79</sup>  
*F3* Key F3. Alarm is activated / deactivated by pressing the F3 key <sup>4 p. 79</sup>  
*F4* Key F4. Alarm is activated / deactivated by pressing the F4 key <sup>4 p. 79</sup>  
*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 1246

**196** *RL4.P.* **Alarm 4 Process (only on DIS96V DUO-X)**  
 Selects the size related to alarm 4.  
*R.iN.1* Value read on input AI1. (**Default**)  
*R.iN.2* Value read on input AI2.  
*MERi* 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).

|                |  |
|----------------|--|
| <b>Ab.d.F.</b> | Module of the difference of the values read on inputs AI1 and AI2 ( AI1-AI2 ). |
| <b>Sum</b>     | Sum of values read on inputs AI1 and AI2 (AI1+AI2).                            |
| <b>HiGH.</b>   | Greater value between AI1 and AI2  |
| <b>LoWEr</b>   | Lower value between AI1 and AI2  |
| <b>REduN.</b>  | The value read on AI1 or value read on AI2 if AI1 is in error (E-05)           |

### 197 **ALr.c.** Alarm 4 Reference Command (only on DIS96V DUO-X)

Select alarm 4 reference command

- cMd. 1** Alarm referred to command 1. **(Default)**
- cMd. 2** Alarm referred to command 2.

### 198 **AS.o.** Alarm 4 State Output

Alarm 4 output contact and intervention type.

- N.o. 5E.** (N.O. Start) Normally open, active at start **(Default)**
- N.c. 5E.** (N.C. Start) Normally closed, active at start
- N.o. 5H.** (N.O. Threshold) Normally open, active on reaching alarm <sup>2 p. 79</sup>
- N.c. 5H.** (N.C. Threshold) Normally closed, active on reaching alarm <sup>2 p. 79</sup>
- N.o. 5H.V.** (N.O. Threshold Variation) disabled after changing control setpoint <sup>3 p. 79</sup>
- N.c. 5H.V.** (N.C. Threshold Variation) disabled after changing control setpoint <sup>3 p. 79</sup>

### 199 **AO.t.** Alarm 4 Output Type

Defines the output type if the alarm 4 is analogue.

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

### 200 **AHY.** Alarm 4 Hysteresis

Alarm 4 hysteresis.

-9999..+9999 [digit<sup>1 p. 79</sup>] (degrees.tenths for temperature sensors). **Default 0.5.**

### 201 **ALL** Alarm 4 Lower Limit

Lower limit selectable for the alarm 4 setpoint.

-9999..+30000 [digit<sup>1 p. 79</sup>] (degrees for temperature sensors). **Default 0.**

### 202 **AUL.** Alarm 4 Upper Limit

Upper limit selectable for the alarm 4 setpoint.

-9999..+30000 [digit<sup>1 p. 79</sup>] (degrees for temperature sensors). **Default 1750.**

### 203 **ARE.** Alarm 4 Reset

Alarm 4 contact reset type (always automatic if **RL.Y.F. = c. Ru**).

- R. 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)
- R. RES.t.** Automatic reset with timed activation. The alarm remains active for the time set on the parameter 207 **R.Y.dE.**, even if the conditions generating it are missing. To be able to act again, the alarm conditions must disappear.

### 204 **ASE.** Alarm 4 State Error

Alarm 4 output status in case of error

If the alarm output is relay

**aPEN** Contact or open valve. **Default**

**cLoSE** Contact or closed valve.

If the alarm output is digital (SSR):

**aFF** Digital output OFF. **Default**

**aN** Digital output ON.

If the alarm output is 0-10V:

**0 V** **Default**

**10 V** 10 V.

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

|         |                      |
|---------|----------------------|
| 0 mA    | 0 mA. <b>Default</b> |
| 4 mA    | 4 mA.                |
| 20 mA   | 20 mA.               |
| 21.5 mA | 21.5 mA.             |

#### 205 **AL4SS.** Alarm 4 State Stop

Alarm 4 output status with controller in STOP.

If the alarm output is relay

|         |                              |
|---------|------------------------------|
| AL4V.R. | Alarm active. <b>Default</b> |
| oPEN    | Contact or open valve        |
| cLoSE   | Contact or closed valve      |

If the alarm output is digital (SSR):

|         |                              |
|---------|------------------------------|
| AL4V.R. | Alarm active. <b>Default</b> |
| oFF     | Digital output OFF           |
| oN      | Digital output ON            |

If the alarm output is 0-10V:

|         |                              |
|---------|------------------------------|
| AL4V.R. | Alarm active. <b>Default</b> |
| 0 V     | 0 V.                         |
| 10 V    | 10 V.                        |

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

|         |                              |
|---------|------------------------------|
| AL4V.R. | Alarm active. <b>Default</b> |
| 0 mA    | 0 mA                         |
| 4 mA    | 4 mA                         |
| 20 mA   | 20 mA                        |
| 21.5 mA | 21.5 mA                      |

#### 206 **AL4Ld.** Alarm 4 Led

Defines the status of the led A4 in correspondence of the relevant output.

|      |  |
|------|--|
| o.c. | ON with open contact, DO switched off or AO deactivated.                   |
| c.c. | ON with closed contact, DO switched on or AO activated. ( <b>Default</b> ) |

#### 207 **AL4dE.** Alarm 4 Delay

Alarm 4 Delay.

-60:00..60:00 mm:ss (hh:mm if  $AL4.F. = c.$   $AL4.$ ). **Default:** 00:00.

Negative value: delay when exit alarm status.

Positive value: delay when enter alarm status

#### 208 **AL4S.P.** Alarm 4 Setpoint Protection

Allows or not to change the alarm 4 setpoint.

|      |   |
|------|---|
| FREE | Editable by the user ( <b>Default</b> ) |
| LoCK | Protected                               |
| HiDE | Protected and not visualized            |

#### 209 **AL4Lb.** Alarm 4 Label

Selects the message displayed in case of alarm 4 intervention.

|         |   |
|---------|---|
| dISAb.  | Disabled. ( <b>Default</b> )  |
| 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) |

#### 210÷214 **Reserved Parameters - Group D4** Reserved parameters - Group D4.

### GROUP D5 - **AL 5** - Alarm 5 (not available on DIS96V DUO)

#### 215 **AL5.F.** Alarm 5 Function

Alarm 5 selection.

|          |  |
|----------|--|
| dISAb.   | Disabled ( <b>Default</b> )  |
| Ab.uP.R. | Absolute Upper Activation. Absolute referred to the process, active over |

|                          |  |
|--------------------------|--|
| <i>Rb. Lo.R.</i>         | Absolute Lower Activation. Absolute referred to the process, active under  |
| <i>bRNd</i>              | Band alarm (command setpoint ± alarm setpoint)   |
| <i>R. bRNd</i>           | Asymmetric band alarm (command setpoint + alarm setpoint 5 H and command setpoint - alarm setpoint 5 L)  |
| <i>uP. dEV.</i>          | Upper Deviation. Upper Deviation alarm   |
| <i>Lo. dEV.</i>          | Lower Deviation. Lower Deviation alarm   |
| <i>Rb. c. u. R.</i>      | Absolute Command Upper Activation. Absolute alarm referred to the command setpoint, active over  |
| <i>Rb. c. l. R.</i>      | Absolute Command Lower Activation. Absolute alarm referred to the command setpoint, active under   |
| <i>RuN</i>               | Status alarm (active in RUN/START)   |
| <i>cool</i>              | Cold actuator auxiliary (Cold action in double loop)   |
| <i>c. Ru<sup>x</sup></i> | Auxiliary for job distribution on the command output. It cyclically replaces the command output for the time set on the parameter 227 <i>R.5. dE..</i> . Se <i>R.5. dE.</i> = 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 <i>R.5. dE.</i> is different from 0. |
| <i>SEpP.R.</i>           | Step Auxiliary. Auxiliary output related to the step (ON/OFF at each step).  |
| <i>PRb. ER.</i>          | Probe error. Alarm active in case of sensor rupture.   |
| <i>H. b. R.</i>          | Heater Break Alarm and Overcurrent Alarm   |
| <i>tMR. 1</i>            | Related to timer 1   |
| <i>tMR. 2</i>            | Related to timer 2   |
| <i>tMR. 1. 2</i>         | Related to both timers   |
| <i>F1</i>                | Key F1. Alarm is activated / deactivated by pressing the F1 key <sup>4 p. 79</sup>   |
| <i>F2</i>                | Key F2. Alarm is activated / deactivated by pressing the F2 key <sup>4 p. 79</sup>   |
| <i>F3</i>                | Key F3. Alarm is activated / deactivated by pressing the F3 key <sup>4 p. 79</sup>   |
| <i>F4</i>                | Key F4. Alarm is activated / deactivated by pressing the F4 key <sup>4 p. 79</sup>   |
| <i>d. i. 1</i>           | Digital Input 1. Active when digital input 1 is active.  |
| <i>d. i. 2</i>           | Digital Input 2. Active when digital input 2 is active.  |
| <i>d. i. 3</i>           | Digital Input 3. Active when digital input 3 is active.  |
| <i>d. i. 4</i>           | Digital Input 4. Active when digital input 4 is active.  |
| <i>REM.</i>              | Remote. The alarm is enabled by the word 1247  |

## 216 *ASPr.* Alarm 5 Process (only on DIS96V DUO-T)

Select the size related to alarm 5.

|                   |   |
|-------------------|---|
| <i>R. iN. 1</i>   | Value read on input AI1. <b>(Default)</b>   |
| <i>R. iN. 2</i>   | Value read on input AI2.  |
| <i>MEAN</i>       | Arithmetic average of the value read on inputs AI1 and AI2 $[(AI1+AI2)/2]$ .      |
| <i>d. iFF.</i>    | Difference of the values read on inputs AI1 and AI2 $(AI1-AI2)$ .                 |
| <i>Rb. d. iF.</i> | Module of the difference of the values read on inputs AI1 and AI2 $( AI1-AI2 )$ . |
| <i>Sum</i>        | Sum of values read on inputs AI1 and AI2 $(AI1+AI2)$ .                            |
| <i>HiGH.</i>      | Greater value between AI1 and AI2   |
| <i>LOWER</i>      | Lower value between AI1 and AI2   |
| <i>REduM.</i>     | The value read on AI1 or value read on AI2 if AI1 is in error (E-05)              |

## 217 *ASr.c.* Alarm 5 Reference Command (only on DIS96V DUO-T)

Select alarm 5 reference command

|               |   |
|---------------|---|
| <i>cMd. 1</i> | Alarm referred to command 1. <b>(Default)</b> |
| <i>cMd. 2</i> | Alarm referred to command 2.                  |

## 218 *ASSo.* Alarm 5 State Output

Alarm 5 output contact and intervention type.

|                     |  |
|---------------------|--|
| <i>N. o. SE.</i>    | (N.O. Start) Normally open, active at start <b>(Default)</b>                           |
| <i>N. c. SE.</i>    | (N.C. Start) Normally closed, active at start  |
| <i>N. o. tH.</i>    | (N.O. Threshold) Normally open, active on reaching alarm <sup>2 p. 79</sup>            |
| <i>N. c. tH.</i>    | (N.C. Threshold) Normally closed, active on reaching alarm <sup>2 p. 79</sup>          |
| <i>N. o. tH. V.</i> | (N.O. Threshold Variation) disabled after changing control setpoint <sup>3 p. 79</sup> |
| <i>N. c. tH. V.</i> | (N.C. Threshold Variation) disabled after changing control setpoint <sup>3 p. 79</sup> |

- 219** *AS.o.t.* **Alarm 5 Output Type**  
 Defines the output type if the alarm 5 is analogue.
- 0.10 V* Output 0...10 V. **Default**
  - 4.20mA* Output 4...20 mA.
  - 10.0 V* Output 10..0 V
  - 20.4mA* Output 20..4 mA
- 220** *ASHY.* **Alarm 5 Hysteresis**  
 Alarm 5 hysteresis.  
 -9999..+9999 [digit<sup>1 p.79</sup>] (degrees.tenths for temperature sensors). **Default** 0.5.
- 221** *ASLL.* **Alarm 5 Lower Limit**  
 Lower limit selectable for the alarm 5 setpoint.  
 -9999..+30000 [digit<sup>1 p.79</sup>] (degrees for temperature sensors). **Default** 0.
- 222** *ASUL.* **Alarm 5 Upper Limit**  
 Upper limit selectable for the alarm 5 setpoint.  
 -9999..+30000 [digit<sup>1 p.79</sup>] (degrees for temperature sensors). **Default** 1750.
- 223** *AS.rE.* **Alarm 5 Reset**  
 Alarm 5 contact reset type (always automatic if *RL.S.F. = c. R.u.*).
- R. 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)
  - R. RES.t.* Automatic reset with timed activation. The alarm remains active for the time set on the parameter 227 *R.S.dE.*, even if the conditions generating it are missing. To be able to act again, the alarm conditions must disappear.
- 224** *ASSE.* **Alarm 5 State Error**  
 Alarm 5 output status in case of error  
 If the alarm output is relay
- aPEN* Contact or open valve. **Default**
  - cLoSE* Contact or closed valve.
- If the alarm output is digital (SSR):
- aFF* Digital output OFF. **Default**
  - aM* Digital output ON.
- If the alarm output is 0-10V:
- 0 V* 0 V. **Default**
  - 10 V* 10 V.
- If the alarm output is 0-20 mA or 4-20 mA:
- 0 mA* 0 mA. **Default**
  - 4 mA* 4 mA
  - 20 mA* 20 mA
  - 21.5mA* 21.5 mA
- 225** *ASSS.* **Alarm 5 State Stop**  
 Alarm 5 output status with controller in STOP.  
 If the alarm output is relay
- RcEtV.R.* Alarm active. **Default**
  - aPEN* Contact or open valve
  - cLoSE* Contact or closed valve
- If the alarm output is digital (SSR):
- RcEtV.R.* Alarm active. **Default**
  - aFF* Digital output OFF
  - aM* Digital output ON
- If the alarm output is 0-10V:
- RcEtV.R.* Alarm active. **Default**
  - 0 V* 0 V
  - 10 V* 10 V

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

|                 |                              |
|-----------------|------------------------------|
| <i>RcL.V.R.</i> | Alarm active. <b>Default</b> |
| <i>0 mA</i>     | 0 mA                         |
| <i>4 mA</i>     | 4 mA                         |
| <i>20 mA</i>    | 20 mA                        |
| <i>21.5mA</i>   | 21.5 mA                      |

## 226 *ASLd.* Alarm 5 Led

Defines the status of the led A5 in correspondence of the relevant output.

|             |  |
|-------------|--|
| <i>o.c.</i> | ON with open contact, DO switched off or AO deactivated.                 |
| <i>c.c.</i> | ON with closed contact, DO switched on or AO activated. <b>(Default)</b> |

## 227 *AS.dE.* Alarm 5 Delay

Alarm 5 Delay.

-60:00..60:00 mm:ss (hh:mm if *RL.S.F.* = *c.* *RU\**). **Default:** 00:00.

Negative value: delay when exit alarm status.

Positive value: delay when enter alarm status

## 228 *ASS.P.* Alarm 5 Setpoint Protection

Allows or not to change the alarm 5 setpoint.

|             |                                       |
|-------------|---------------------------------------|
| <i>FREE</i> | Editable by the user <b>(Default)</b> |
| <i>Lock</i> | Protected                             |
| <i>Hide</i> | Protected and not visualized          |

## 229 *ASLb.* Alarm 5 Label

Select the message displayed in case of alarm 5 intervention.

*d.SRb.* Disabled. **(Default)**

*Lb. 01* Message 1 (see table paragraph 15.1)

...

*Lb. 20* Message 20 (see table paragraph 15.1)

*uSEP.L.* Custom message (modifiable by the user through the App or via modbus)

## 230÷234 Reserved Parameters - Group D5      Reserved parameters - Group D5.

## GROUP D6 - *RL. 5* - Alarm 6 (only on DIS96V PLUS-T, DIS96V PLUS-5, and DIS96V DUO-T)

### 235 *RL.5.F.* Alarm 6 Function

Alarm 6 selection.

*d.SRb.* Disabled **(Default)**

*Rb.uP.R.* Absolute Upper Activation. Absolute referred to the process, active over

*Rb.Lo.R.* Absolute Lower Activation. Absolute referred to the process, active under

*bRNd* Band alarm (command setpoint ± alarm setpoint)

*R.bRNd* Asymmetric band alarm (command setpoint + alarm setpoint 6 H and command setpoint - alarm setpoint 6 L)

*uP.dEV.* Upper Deviation. Upper Deviation alarm

*Lo.dEV.* Lower Deviation. Lower Deviation alarm

*Rb.c.u.R.* Absolute Command Upper Activation. Absolute alarm referred to the command setpoint, active over

*Rb.c.L.R.* 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. RU\** Auxiliary for job distribution on the command output. It cyclically replaces the command output for the time set on the parameter 247 *R.5.dE.* Se *R.5.dE.* = 0, it is activated parallel to the command output. It does not work in case of valve control and can only be activated on an alarm if *R.5.dE.* is different from 0.

*STEP.R.* 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.R.* Heater Break Alarm and Overcurrent Alarm

|         |  |
|---------|--|
| EMR.1   | Related to timer 1   |
| EMR.2   | Related to timer 2   |
| EMR.1.2 | Related to both timers   |
| F1      | Key F1. Alarm is activated / deactivated by pressing the F1 key <sup>4 p. 79</sup> |
| F2      | Key F2. Alarm is activated / deactivated by pressing the F2 key <sup>4 p. 79</sup> |
| F3      | Key F3. Alarm is activated / deactivated by pressing the F3 key <sup>4 p. 79</sup> |
| F4      | Key F4. Alarm is activated / deactivated by pressing the F4 key <sup>4 p. 79</sup> |
| 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 1248                                      |

### 236 **ABP.** Alarm 6 Process (only on DIS96V DUO-T)

Selects the size related to alarm 6.

|         |   |
|---------|---|
| R.IN.1  | Value read on input AI1. (Default)  |
| R.IN.2  | Value read on input AI2.  |
| MERH    | Arithmetic average of the value read on inputs AI1 and AI2 $((AI1+AI2)/2)$ .      |
| d.FF.   | Difference of the values read on inputs AI1 and AI2 $(AI1-AI2)$ .                 |
| Ab.d.F. | 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   |
| PEdUn.  | The value read on AI1 or value read on AI2 if AI1 is in error (E-05)              |

### 237 **ABr.c.** Alarm 5 Reference Command (only on DIS96V DUO-T)

Select alarm 6 reference command

|        |  |
|--------|--|
| cMd. 1 | Alarm referred to command 1. (Default) |
| cMd. 2 | Alarm referred to command 2.           |

### 238 **ABS.o.** Alarm 6 State Output

Alarm 6 output contact and intervention type.

|            |  |
|------------|--|
| N.o. 5E.   | (N.O. Start) Normally open, active at start (Default)                                  |
| N.c. 5E.   | (N.C. Start) Normally closed, active at start  |
| N.o. 5H.   | (N.O. Threshold) Normally open, active on reaching alarm <sup>2 p. 79</sup>            |
| N.c. 5H.   | (N.C. Threshold) Normally closed, active on reaching alarm <sup>2 p. 79</sup>          |
| N.o. 5H.V. | (N.O. Threshold Variation) disabled after changing control setpoint <sup>3 p. 79</sup> |
| N.c. 5H.V. | (N.C. Threshold Variation) disabled after changing control setpoint <sup>3 p. 79</sup> |

### 239 **AB.o.t.** Alarm 6 Output Type

Defines the output type if the alarm 6 is analogue.

|        |                                 |
|--------|---------------------------------|
| 0.10 V | Output 0...10 V. <b>Default</b> |
| 4.20mA | Output 4...20 mA.               |
| 10.0 V | Output 10...0 V                 |
| 20.4mA | Output 20...4 mA                |

### 240 **ABHy.** Alarm 6 Hysteresis

Alarm 6 hysteresis

-9999..+9999 [digit<sup>1 p. 79</sup>] (degrees.tenths for temperature sensors). **Default** 0.5.

### 241 **ABL.L.** Alarm 6 Lower Limit

Lower limit selectable for the alarm 6 setpoint.

-9999..+30000 [digit<sup>1 p. 79</sup>] (degrees for temperature sensors). **Default** 0.

### 242 **ABU.L.** Alarm 6 Upper Limit

Upper limit selectable for the alarm 6 setpoint.

-9999..+30000 [digit<sup>1 p. 79</sup>] (degrees for temperature sensors). **Default** 1750.

### 243 *RL.E*. Alarm 6 Reset

Alarm 6 contact reset type (always automatic if *RL.E.F.* = *c*. *RL*).

*R*. *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)

*R.RES.t*. Automatic reset with timed activation. The alarm remains active for the time set on the parameter *247 R.t.dE.*, even if the conditions generating it are missing. To be able to act again, the alarm conditions must disappear.

### 244 *RES.E*. Alarm 6 State Error

Alarm 6 output status in case of error

If the alarm output is digital (SSR):

*oFF* Digital output OFF. **Default**

*oN* Digital output ON.

If the alarm output is 0-10V:

*0 V* 0 V. **Default**

*10 V* 10 V.

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

*0 mA* 0 mA. **Default**

*4 mA* 4 mA.

*20 mA* 20 mA.

*21.5mA* 21.5 mA.

### 245 *RES.S*. Alarm 6 State Stop

Alarm 6 output status with controller in STOP.

If the alarm output is digital (SSR):

*RcLV.R*. Alarm active. **Default**

*oFF* Digital output OFF

*oN* Digital output ON

If the alarm output is 0-10V:

*RcLV.R*. Alarm active. **Default**

*0 V* 0 V

*10 V* 10 V

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

*RcLV.R*. Alarm active. **Default**

*0 mA* 0 mA

*4 mA* 4 mA

*20 mA* 20 mA

*21.5mA* 21.5 mA

### 246 *RL.d*. Alarm 6 Led

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

*o.c.* ON with open contact, DO switched off or AO deactivated.

*c.c.* ON with closed contact, DO switched on or AO activated. (**Default**)

### 247 *R.t.dE*. Alarm 6 Delay

Alarm 6 Delay.

-60:00..60:00 mm:ss (hh:mm if *RL.E.F.* = *c*. *RL*). **Default:** 00:00.

Negative value: delay when exit alarm status

Positive value: delay when enter alarm status

### 248 *RES.P*. Alarm 6 Setpoint Protection

Allows or not to change the alarm 6 setpoint.

*FREE* Editable by the user (**Default**)

*LoCk* Protected

*HiDE* Protected and not visualized

### 249 *RL.b*. Alarm 6 Label

Selects the message displayed in case of alarm 6 intervention.



|         |   |
|---------|---|
| d.5Rb.  | Disabled. <b>(Default)</b>  |
| 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) |

## 250÷254 Reserved Parameters - Group D6

Reserved parameters - Group D6.

## GROUP D7 - AL. 7 - Alarm 7 (only on DIS96V DUO-T)

### 255 AL.7.F. Alarm 7 Function

Alarm 7 selection.

|              |  |
|--------------|--|
| d.5Rb.       | Disabled <b>(Default)</b>  |
| Rb. u.P.R.   | Absolute Upper Activation. Absolute referred to the process, active over   |
| Rb. L.o.R.   | Absolute Lower Activation. Absolute referred to the process, active under  |
| bRNd         | Band alarm (command setpoint ± alarm setpoint)   |
| R. bRNd      | Asymmetric band alarm (command setpoint + alarm setpoint 7 H and command setpoint - alarm setpoint 7 L)  |
| uP.dEV.      | Upper Deviation. Upper Deviation alarm   |
| L.o.dEV.     | Lower Deviation. Lower Deviation alarm   |
| Rb. c. u. R. | Absolute Command Upper Activation. Absolute alarm referred to the command setpoint, active over  |
| Rb. c. L. R. | 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. Ru*       | Auxiliary for job distribution on the command output. It cyclically replaces the command output for the time set on the parameter 267 R.7.dE.. Se R.7.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 R.7.dE. is different from 0. |
| 5tEP.R.      | Step Auxiliary. Auxiliary output related to the step (ON/OFF at each step).  |
| PPb. EP.     | Probe error. Alarm active in case of sensor rupture.   |
| H. b. R.     | 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 <sup>4 p. 79</sup>   |
| F2           | Key F2. Alarm is activated / deactivated by pressing the F2 key <sup>4 p. 79</sup>   |
| F3           | Key F3. Alarm is activated / deactivated by pressing the F3 key <sup>4 p. 79</sup>   |
| F4           | Key F4. Alarm is activated / deactivated by pressing the F4 key <sup>4 p. 79</sup>   |
| 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 1249  |

### 256 AL.7.P. Alarm 7 Process

Selects the size related to alarm 7.

|             |   |
|-------------|---|
| R. iN. 1    | Value read on input AI1. <b>(Default)</b>   |
| R. iN. 2    | Value read on input AI2.  |
| MERH        | Arithmetic average of the value read on inputs AI1 and AI2 $[(AI1+AI2)/2]$ .      |
| d. FF.      | Difference of the values read on inputs AI1 and AI2 $(AI1-AI2)$ .                 |
| Rb. d. F.   | 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 $(AI1+AI2)$ .                            |
| H. GH.      | Greater value between AI1 and AI2   |
| L. o. M. EP | Lower value between AI1 and AI2   |
| REduN.      | The value read on AI1 or value read on AI2 if AI1 is in error (E-05)              |

- 257** *AL7.R.C.*    **Alarm 7 Reference Command**  
 Selects alarm 7 reference command  
*cMd. 1*    Alarm referred to command 1. **(Default)**  
*cMd. 2*    Alarm referred to command 2.
- 258** *AL7.S.O.*    **Alarm 7 State Output**  
 Alarm 7 output contact and intervention type.  
*N.O. 5E.*    (N.O. Start) Normally open, active at start **(Default)**  
*N.C. 5E.*    (N.C. Start) Normally closed, active at start  
*N.O. 5H.*    (N.O. Threshold) Normally open, active on reaching alarm <sup>2 p. 79</sup>  
*N.C. 5H.*    (N.C. Threshold) Normally closed, active on reaching alarm <sup>2 p. 79</sup>  
*N.O. 5H.V.*    (N.O. Threshold Variation) disabled after changing control setpoint <sup>3 p. 79</sup>  
*N.C. 5H.V.*    (N.C. Threshold Variation) disabled after changing control setpoint <sup>3 p. 79</sup>
- 259** *AL7.O.T.*    **Alarm 7 Output Type**  
 Defines the output type if the alarm 7 is analogue.  
*0. 10 V*    Output 0...10 V. **Default**  
*4. 20 mA*    Output 4...20 mA.  
*10. 0 V*    Output 10..0 V  
*20. 4 mA*    Output 20..4 mA
- 260** *AL7.HY.*    **Alarm 7 Hysteresis**  
 Alarm 7 hysteresis  
 -9999..+9999 [digit<sup>1 p. 79</sup>] (degrees.tenths for temperature sensors). **Default 0.5.**
- 261** *AL7.LL.*    **Alarm 7 Lower Limit**  
 Lower limit selectable for the alarm 7 setpoint.  
 -9999..+30000 [digit<sup>1 p. 79</sup>] (degrees for temperature sensors). **Default 0.**
- 262** *AL7.U.L.*    **Alarm 7 Upper Limit**  
 Upper limit selectable for the alarm 7 setpoint.  
 -9999..+30000 [digit<sup>1 p. 79</sup>] (degrees for temperature sensors). **Default 1750.**
- 263** *AL7.R.E.*    **Alarm 7 Reset**  
 Alarm 7 contact reset type (always automatic if *RL.7.F. = c. R<sub>U</sub>*).  
*R. RES.*    Automatic reset **(Default)**  
*M. RES.*    Manual reset (manual reset by keyboard or by digital input)  
*M.RES.5.*    Stored manual reset (keeps the output status also after a power failure)  
*R. RES. t.*    Automatic reset with timed activation. The alarm remains active for the time set on the parameter 267 *R.7.dE.*, even if the conditions generating it are missing. To be able to act again, the alarm conditions must disappear.
- 264** *AL7.S.E.*    **Alarm 7 State Error**  
 Alarm 7 output status in case of error  
 If the alarm output is 0-10V:  
*0 V*    0 V. **Default**  
*10 V*    10 V.  
 If the alarm output is 0-20 mA or 4-20 mA:  
*0 mA*    0 mA. **Default**  
*4 mA*    4 mA  
*20 mA*    20 mA  
*21.5 mA*    21.5 mA
- 265** *AL7.SS.*    **Alarm 7 State Stop**  
 Alarm 7 output status with controller in STOP.  
 If the alarm output is 0-10V:  
*RcE.V.R.*    Alarm active. **Default**  
*0 V*    0 V  
*10 V*    10 V

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

*RcL.F.* Alarm active. **Default**

*0 mA* 0 mA

*4 mA* 4 mA

*20 mA* 20 mA

*21.5 mA* 21.5 mA

## 266 *rES.* **Reserved**

Reserved parameter

## 267 *ALdE.* **Alarm 7 Delay**

Alarm 7 Delay.

-60:00..60:00 mm:ss (hh:mm if *RL.T.F.* = c. *Ru*). **Default:** 00:00.

Negative value: delay when exit alarm status

Positive value: delay when enter alarm status

## 268 *ALSP.* **Alarm 7 Setpoint Protection**

Allows or not to change the alarm 7 setpoint.

*FREE* Editable by the user (**Default**)

*Lock* Protected

*Hide* Protected and not visualized

## 269 *ALLb.* **Alarm 7 Label**

Select the message displayed in case of alarm 7 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)

## 270÷274 **Reserved Parameters - Group D7**

Reserved parameters - Group D7.

## GROUP E1 - *d.i. 1* - Digital input 1

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

Digital input 1 functioning.

*disAb.* Disabled (**Default**)

*2E. SM.* 2 Setpoints Switch

*2E. SM. i.* 2 Setpoints Switch Impulsive

*3E. SM. i.* 3 Setpoints Switch Impulsive

*4E. SM. i.* 4 Setpoints Switch Impulsive

*SEE. 1* Controller regulates on **SET1**

*SEE. 2* Controller regulates on **SET2**

*SEE. 3* Controller regulates on **SET3**

*SEE. 4* Controller regulates on **SET4**

*SEAP* Start (impulsive)

*SEoP* Stop (impulsive)

*SE./SE.* 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

*Auto.MA. i.* Automatic / Manual Impulse (if enabled on parameter 53 or 76)

*Auto.MA. c.* Automatic / Manual Contact (if enabled on parameter 53 or 76)

*RcL.EY.* 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

|                  |   |
|------------------|---|
| <i>R.i. 0</i>    | Analogue Input 0. Set AI to zero  |
| <i>M.RES.</i>    | Manual reset. Reset the outputs if selected as manual reset.  |
| <i>t.1.RUN</i>   | Timer 1 run. The timer 1 count with activated D.I.  |
| <i>t.1.S.E.</i>  | Timer 1 Start End. D.I. starts and stops the timer 1 (impulsive)  |
| <i>t.1.SEtR.</i> | Timer 1 Start. D.I. starts the timer 1 (impulsive)  |
| <i>t.1.Emd</i>   | Timer 1 End. D.I. stops the timer 1 (impulsive)   |
| <i>t.2.RUN</i>   | Timer 2 run. The timer 2 count with activated D.I.  |
| <i>t.2.S.E.</i>  | Timer 2 Start End. D.I. starts and stops the timer 2 (impulsive)  |
| <i>t.2.SEtR.</i> | Timer 2 Start. D.I. starts the timer 2 (impulsive)  |
| <i>t.2.Emd</i>   | Timer 2 End. D.I. stops the timer 2 (impulsive)   |
| <i>Lo.cFG.</i>   | Lock configuration and setpoints.   |
| <i>uP.KEY</i>    | Simulates the functioning of up key.  |
| <i>dOWN.K.</i>   | Simulates the functioning of down key.  |
| <i>FNC.K.</i>    | Simulates the functioning of <b>FNC</b> key.  |
| <i>SEt.K.</i>    | Simulates the functioning of <b>SET</b> key.  |
| <i>REM.S.E.</i>  | Remote setpoint enabling. Enables Remote setpoint with activated D.I. Local setpoint with deactivated D.I. (remote setpoint must be enabled on parameter 62 <i>REt.S.</i> ) |

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

|   |                                  |
|---|----------------------------------|
| Defines the resting contact of the digital input 1. |                                  |
| <i>N.oPEN</i>                                       | Normally open ( <b>Default</b> ) |
| <i>N.cLoS.</i>                                      | Normally closed                  |

## 277 *d.i.1.P.* Digital Input 1 Process (only on DIS96V DUO-X)

Select the size related to the digital input 1 if parameter 275 *d.i.1.F.* = *R.i. 0*.

|                  |   |
|------------------|---|
| <i>R.i.N.1</i>   | Value read on input AI1. ( <b>Default</b> )                                       |
| <i>R.i.N.2</i>   | Value read on input AI2.  |
| <i>MERit</i>     | Arithmetic average of the value read on inputs AI1 and AI2 $((AI1-AI2)/2)$ .      |
| <i>d.i.FF.</i>   | Difference of the values read on inputs AI1 and AI2 $(AI1-AI2)$ .                 |
| <i>Ab.d.F.</i>   | Module of the difference of the values read on inputs AI1 and AI2 $( AI1-AI2 )$ . |
| <i>SuM</i>       | Sum of values read on inputs AI1 and AI2 $(AI1+AI2)$ .                            |
| <i>R.i.N.1.2</i> | The value read on AI1 and AI2   |

## 278 *d.i.1.r.* Digital Input 1 Reference Command (only on DIS96V DUO-X)

Defines the reference command for the digital input 1 functions.

|                 |                              |
|-----------------|------------------------------|
| <i>cMd. 1</i>   | Command 1 ( <b>Default</b> ) |
| <i>cMd. 2</i>   | Command 2                    |
| <i>cMd. 1.2</i> | Command 1 and 2              |

## 279÷283 Reserved Parameters - Group E1

Reserved parameters - Group E1.

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

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

Digital input 2 functioning.

|                  |   |
|------------------|---|
| <i>d.i.SAb.</i>  | Disabled ( <b>Default</b> )   |
| <i>2Et.SW.</i>   | 2 Setpoints Switch  |
| <i>2Et.SW.i.</i> | 2 Setpoints Switch Impulsive  |
| <i>3Et.SW.i.</i> | 3 Setpoints Switch Impulsive  |
| <i>4Et.SW.i.</i> | 4 Setpoints Switch Impulsive  |
| <i>SEt.1</i>     | Controller regulates on <b>SET1</b>   |
| <i>SEt.2</i>     | Controller regulates on <b>SET2</b>   |
| <i>SEt.3</i>     | Controller regulates on <b>SET3</b>   |
| <i>SEt.4</i>     | Controller regulates on <b>SET4</b>   |
| <i>StARtE</i>    | Start (impulsive)   |
| <i>StoP</i>      | Stop (impulsive)  |
| <i>St./St.</i>   | Start / Stop (impulsive)  |
| <i>RuN</i>       | Run (controller in START with D.I. active, controller in STOP with D.I. disabled) |

|                   |  |
|-------------------|--|
| <b>EAL</b>        | 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. |
| <b>MoLd</b>       | Lock conversion (stop all conversions and display values)  |
| <b>EME</b>        | Performing manual tune   |
| <b>Auto.MA.i.</b> | Automatic / Manual Impulse (if enabled on parameter 53 or 76)  |
| <b>Auto.MA.c.</b> | Automatic / Manual Contact (if enabled on parameter 53 or 76)  |
| <b>Act.E.</b>     | Action Type. Cooling regulation if D.I. is active, otherwise heating regulation.   |
| <b>PRGM</b>       | Programmer. 1 cycle Programmer, with D.I. active (if enabled on parameter 312 <i>PRGM</i> ), otherwise simple controller,  |
| <b>R. kWh</b>     | Reset kWh. It resets the energy consumed by the system   |
| <b>R.i. 0</b>     | Analogue Input 0. Set AI to zero   |
| <b>M. RES.</b>    | Manual reset. Reset the outputs if selected as manual reset.   |
| <b>E.1.RUN</b>    | Timer 1 run. The timer 1 count with activated D.I.   |
| <b>E.1.S.E.</b>   | Timer 1 Start End. D.I. starts and stops the timer 1 (impulsive)   |
| <b>E.1.S.E.R.</b> | Timer 1 Start. D.I. starts the timer 1 (impulsive)   |
| <b>E.1.E.Nd</b>   | Timer 1 End. D.I. stops the timer 1 (impulsive)  |
| <b>E.2.RUN</b>    | Timer 2 run. The timer 2 count with activated D.I.   |
| <b>E.2.S.E.</b>   | Timer 2 Start End. D.I. starts and stops the timer 2 (impulsive)   |
| <b>E.2.S.E.R.</b> | Timer 2 Start. D.I. starts the timer 2 (impulsive)   |
| <b>E.2.E.Nd</b>   | Timer 2 End. D.I. stops the timer 2 (impulsive)  |
| <b>Lo.cFG.</b>    | Lock configuration and setpoints.  |
| <b>uP.KEY</b>     | Simulates the functioning of up key.   |
| <b>dOWN.K.</b>    | Simulates the functioning of down key.   |
| <b>Fnc. K.</b>    | Simulates the functioning of <b>FNC</b> key.   |
| <b>SEt. K.</b>    | Simulates the functioning of <b>SET</b> key.   |
| <b>REM.S.E.</b>   | Remote setpoint enabling. Enables Remote setpoint with activated D.I. Local setpoint with deactivated D.I. (remote setpoint must be enabled on parameter 62 <i>REM.S.</i> )                  |

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

- 286** **d.i.2.P.** **Digital Input 2 Process** (*only on DIS96V DUO-X*)  
 Select the size related to the digital input 2.  
**R.i.N.1** Value read on input AI1. (**Default**)  
**R.i.N.2** Value read on input AI2.  
**MERh** Arithmetic average of the value read on inputs AI1 and AI2  $((AI1-AI2)/2)$ .  
**d.FF.** Difference of the values read on inputs AI1 and AI2  $(AI1-AI2)$ .  
**Ab.d.F.** 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  $(AI1+AI2)$ .  
**R.i.N.1.2** The value read on AI1 and AI2

- 287** **d.i.2.r.** **Digital Input 2 Reference Command** (*only on DIS96V DUO-X*)  
 Defines the reference command for the digital input 2 functions.  
**cMd. 1** Command 1 (**Default**)  
**cMd. 2** Command 2  
**cMd. 1.2** Command 1 and 2

**288÷292** **Reserved Parameters - Group E2**  
 Reserved parameters - Group E2.

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

- 293** **d.i.3.F.** **Digital Input 3 Function**  
 Digital input 3 functioning.  
**d.SAb.** Disabled (**Default**)  
**2E. SM.** 2 Setpoints Switch  
**2E. SM.i.** 2 Setpoints Switch Impulsive

|            |  |
|------------|--|
| 3E.SM.1.   | 3 Setpoints Switch Impulsive   |
| 4E.SM.1.   | 4 Setpoints Switch Impulsive   |
| 5EE.1      | Controller regulates on <b>SET1</b>  |
| 5EE.2      | Controller regulates on <b>SET2</b>  |
| 5EE.3      | Controller regulates on <b>SET3</b>  |
| 5EE.4      | Controller regulates on <b>SET4</b>  |
| 5EARR      | Start (impulsive)  |
| 5EoP       | Stop (impulsive)   |
| 5E./5E.    | 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. |
| MoLd       | Lock conversion (stop all conversions and display values)  |
| tUNE       | Performing manual tune   |
| Auto.MR.1. | Automatic / Manual Impulse (if enabled on parameter 53 or 76)  |
| Auto.MR.2. | Automatic / Manual Contact (if enabled on parameter 53 or 76)  |
| Act.Type   | 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 <i>PRGM</i> ), otherwise simple controller   |
| R.kWH      | Reset kWh. It resets the energy consumed by the system.  |
| R.I. 0     | Analogue Input 0. Set AI to zero   |
| M. RES.    | Manual reset. Reset the outputs if selected as manual reset.   |
| t.1.RUN    | Timer 1 run. The timer 1 count with activated D.I.   |
| t.1. S.E.  | Timer 1 Start End. D.I. starts and stops the timer 1 (impulsive)   |
| t.1. StA.  | Timer 1 Start. D.I. starts the timer 1 (impulsive)   |
| t.1. End   | Timer 1 End. D.I. stops the timer 1 (impulsive)  |
| t.2.RUN    | Timer 2 run. The timer 2 count with activated D.I.   |
| t.2. S.E.  | Timer 2 Start End. D.I. starts and stops the timer 2 (impulsive)   |
| t.2. StA.  | Timer 2 Start. D.I. starts the timer 2 (impulsive)   |
| t.2. End   | Timer 2 End. D.I. stops the timer 2 (impulsive)  |
| Lo.cFG.    | Lock configuration and setpoints.  |
| uP.KEY     | Simulates the functioning of up key.   |
| doWn.K.    | Simulates the functioning of down key.   |
| Fnc. K.    | Simulates the functioning of <b>FNC</b> key.   |
| 5EE. K.    | Simulates the functioning of <b>SET</b> 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 <i>REN.S.</i> )                  |

**294 d.13.c. Digital Input 3 Contact**  
 Defines the resting contact of the digital input 3.

|         |                                  |
|---------|----------------------------------|
| N.oPEN  | Normally open ( <b>Default</b> ) |
| N.cLoS. | Normally closed                  |

**295 d.13.P. Digital Input 3 Process (only on DIS96V DUO-X)**

Select the size related to the digital input 3.

|         |   |
|---------|---|
| R.N.1   | Value read on input AI1. ( <b>Default</b> )                                       |
| R.N.2   | Value read on input AI2.  |
| MEAN    | Arithmetic average of the value read on inputs AI1 and AI2 $((AI1-AI2)/2)$ .      |
| d.FF.   | Difference of the values read on inputs AI1 and AI2 $(AI1-AI2)$ .                 |
| Ab.d.F. | 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 $(AI1+AI2)$ .                            |
| R.N.1.2 | The value read on AI1 and AI2   |

**296 d.13.r. Digital Input 3 Reference Command (only on DIS96V DUO-X)**

Defines the reference command for the digital input 3 functions.

|          |                              |
|----------|------------------------------|
| cMd. 1   | Command 1 ( <b>Default</b> ) |
| cMd. 2   | Command 2                    |
| cMd. 1.2 | Command 1 and 2              |

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

### 302 d. i. 4.F. **Digital Input 4 Function**

Digital input 4 functioning.

d.SRb. Disabled (**Default**)

2E.SW. 2 Setpoints Switch

2E.SW.i. 2 Setpoints Switch Impulsive

3E.SW.i. 3 Setpoints Switch Impulsive

4E.SW.i. 4 Setpoints Switch Impulsive

SEE.1 Controller regulates on **SET1**

SEE.2 Controller regulates on **SET2**

SEE.3 Controller regulates on **SET3**

SEE.4 Controller regulates on **SET4**

SEARPE Start (impulsive)

SEoP Stop (impulsive)

SE./SE. 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

Ru.MR.i. Automatic / Manual Impulse (if enabled on parameter 53 or 76)

Ru.MR.c. Automatic / Manual Contact (if enabled on parameter 53 or 76)

RcE.tS. 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 *PrGn*), otherwise simple controller.

R. kWh Reset kWh. Resets the energy consumed by the system

R.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.S.E.R. 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.S.E.R. 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.

SEE. 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 *rEn.5*)

### 303 d. i. 4.c. **Digital Input 4 Contact**

Defines the resting contact of the digital input 4.

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

N.cLoS. Normally closed

### 304 d. i. 4.P. **Digital Input 4 Process**

Select the size related to the digital input 4.

R.i.N.1 Value read on input AI1. (**Default**)

R.i.N.2 Value read on input AI2.

MEAN Arithmetic average of the value read on inputs AI1 and AI2 [(AI1-AI2)/2].

|                 |  |
|-----------------|--|
| <i>d.FF.</i>    | Difference of the values read on inputs AI1 and AI2 (AI1-AI2).                 |
| <i>Ab.d.F.</i>  | Module of the difference of the values read on inputs AI1 and AI2 ( AI1-AI2 ). |
| <i>Sum</i>      | Sum of values read on inputs AI1 and AI2 (AI1+AI2).                            |
| <i>R.in.1.2</i> | The value read on AI1 and AI2  |

- 305** *d.I.Fr.* **Digital Input 4 Reference Command**  
 Defines the reference command for the digital input 4 functions.
- |                 |                              |
|-----------------|------------------------------|
| <i>cMd. 1</i>   | Command 1 ( <b>Default</b> ) |
| <i>cMd. 2</i>   | Command 2                    |
| <i>cMd. 1.2</i> | Command 1 and 2              |

**306÷310** **Reserved Parameters - Group E4** Reserved parameters - Group E4

## GROUP F1 - *5F.E.5* - Soft-start and mini cycle

- 311** *d.E.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.
- |                          |   |
|--------------------------|---|
| <i>0</i>                 | Initial waiting time disabled: the controller starts immediately ( <b>Default</b> ) |
| <i>00:01-24:00 HH.MM</i> | Initial waiting time enabled.   |

- 312** *P.r.Gn* **Programmer**  
 Enables the programmer functioning (1 cycle, 12 steps).
- |               |   |
|---------------|---|
| <i>d.SRb.</i> | Disabled ( <b>Default</b> )                           |
| <i>ENRb.</i>  | Enabled (all remote setpoint functions are inhibited) |

- 313** *SS.tY.* **Soft-Start Type**  
 Enables and selects the soft-start type
- |               |  |
|---------------|--|
| <i>d.SRb.</i> | Disabled ( <b>Default</b> )                          |
| <i>GPRd.</i>  | Gradient   |
| <i>PERc.</i>  | Percentage (only with pre-programmed cycle disabled) |

- 314** *SS.r.c.* **Soft-Start Reference Command** (*only on DIS96V DUO-X*)  
 Defines the reference command for the Soft-Start and the pre-programmed cycle.
- |                 |                              |
|-----------------|------------------------------|
| <i>cMd. 1</i>   | Command 1 ( <b>Default</b> ) |
| <i>cMd. 2</i>   | Command 2                    |
| <i>cMd. 1.2</i> | Command 1 and 2              |

- 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<sup>1 p.79</sup>] (degrees.tenths for temperature sensors) (**Default:** 1000)

- 318** *SS.t.t.* **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.
- |                    |                                |
|--------------------|--------------------------------|
| <i>00:00</i>       | Disabled                       |
| <i>00:01-24:00</i> | hh:mm ( <b>Default:</b> 00:15) |

- 319** *U.t.S.E.* **Waiting Time Step End**  
 Selects time for step end waiting in hh:mm
- |                    |                                |
|--------------------|--------------------------------|
| <i>00:00</i>       | Step end waiting excluded      |
| <i>00:01-24:00</i> | hh:mm ( <b>Default:</b> 01:00) |



### 320 *AGSE* 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.L.S.E.*  
0..10000 [digit<sup>[p.79]</sup>] (degrees.tenth for temperature sensors) (**Default:** 5.0°C)

### 321 *r.r.c.y.* Recovery Interrupted Cycle

Enables interrupted cycle recovery function

*d.SRB.* Cycle recovery disabled

*R.u.t.M.* Cycle recovery enabled with automatic gradient (**Default**)

2...20000 Digit/hour (degrees.tenth / hour if temperature). Select recovery gradient (rising).

### 322÷325 Reserved Parameters - Group F1

Reserved parameters - Group F1

## GROUP G1 - *d.SP.* - Display and interface

### 326 *u.F.L.t.* Visualization Filter

*d.SRB.* Disabled

*P.t.c.HF* Pitchfork filter (**Default**)

*F1.oPd.* First Order

*F1.oP.P.* First Order with Pitchfork

*2.SR.M.* 2 Samples Mean

...  
...n Samples Mean

*10.SR.M.* 10 Samples Mean

### 327 *u.i.d.2* Visualization Display 2

Select visualization on display 2 (second line).

*PRo.d.1* (Process Display 1) Visualises which process the display 1 is visualising (Es. *R.i.N.1*)  
*u.o.M.* (Unit Of Measure) Unit of measure set on the parameter 329 *u.o.M.*

*c.1.SP.V.* Command 1 setpoint (**Default**)

*o.u.PE.1* Percentage of command output 1

*RMP.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)

*R.i.N.1* Value read on input AI1.

*R.i.N.2* Value read on input AI2.

*MEAN* Arithmetic average of the value read on inputs AI1 and AI2 [(AI1-AI2)/2].

*d.FF.* Difference of the values read on inputs AI1 and AI2 (AI1-AI2).

*Ab.d.F.* 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

*c.2.SP.V.* Command 2 setpoint

*o.u.PE.2* Percentage of command output 2

*RMP.2* Ampere from current transformer 2

*d.S.P.c.2* Command process setpoint deviation 2

*VAL.c.2* Valve position for command 2

*kW c.1* Power on control load 1

*kWh c.1* kWh cmd 1. Energy transferred to command load 1

*kW c.2* Power on control load 2

*kWh c.2* kWh cmd 2. Energy transferred to command load 2

### 328 *u.i.d.3* Visualization Display 3

Select visualization on display 3.

*StRE* Status controller. RUN, STOP, **MANUAL**, **REMOTE**, STEP1... STEP8 (**Default**)

*PRo.d.1* (Process Display 1) Visualizza quale processo sta visualizzando il display 1 (Es. *R.i.N.1*)

|                  |  |
|------------------|--|
| <i>u.o.m.</i>    | (Unit Of Measure) Unit of measure set on the parameter 329 <i>u.o.m.</i>       |
| <i>c.1.SP.V</i>  | Command 1 setpoint   |
| <i>o.u.PE.1</i>  | Percentage of command output 1   |
| <i>AMP.1</i>     | Ampere from 1 current transformer  |
| <i>d.S.P.c.1</i> | Command process setpoint deviation 1   |
| <i>VAL.c.1</i>   | Valve position for command 1   |
| <i>kW</i>        | Power on loads (command 1 + command 2 if present)                              |
| <i>kWh</i>       | kWh cmd 1. Energy transferred to loads (command 1 + command 2 if present)      |
| <i>R.in.1</i>    | Value read on input AI1.   |
| <i>R.in.2</i>    | Value read on input AI2.   |
| <i>MEAN</i>      | Arithmetic average of the value read on inputs AI1 and AI2 [(AI1-AI2)/2].      |
| <i>dIFF.</i>     | Difference of the values read on inputs AI1 and AI2 (AI1-AI2).                 |
| <i>Ab.d.F.</i>   | Module of the difference of the values read on inputs AI1 and AI2 ( AI1-AI2 ). |
| <i>Sum</i>       | Sum of values read on inputs AI1 and AI2 (AI1+AI2).                            |
| <i>HIGH.</i>     | Greater value between AI1 and AI2  |
| <i>LOWER</i>     | Lower value between AI1 and AI2  |
| <i>c.2.SP.V</i>  | Command 2 setpoint   |
| <i>o.u.PE.2</i>  | Percentage of command output 2   |
| <i>AMP.2</i>     | Ampere from current transformer 2  |
| <i>d.S.P.c.2</i> | Command process setpoint deviation 2   |
| <i>VAL.c.2</i>   | Valve position for command 2   |
| <i>kW c.1</i>    | Power on command load 1  |
| <i>kWh.c.1</i>   | kWh cmd 1. Energy transferred to command load 1                                |
| <i>kW c.2</i>    | Power on command load 2  |
| <i>kWh.c.2</i>   | kWh cmd 2. Energy transferred to command load 2                                |

### 329 *u.o.m.* Unit Of Measure

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

|                   |             |            |            |              |
|-------------------|-------------|------------|------------|--------------|
| <b>°C Default</b> | <i>KPA</i>  | <i>IN</i>  | <i>M/H</i> | <i>KGP</i>   |
| <i>°F</i>         | <i>KPA</i>  | <i>N</i>   | <i>L/S</i> | <i>KIP</i>   |
| <i>K</i>          | <i>MPA</i>  | <i>KN</i>  | <i>L/M</i> | <i>LB/F</i>  |
| <i>V</i>          | <i>RE/M</i> | <i>G</i>   | <i>L/H</i> | <i>oZF</i>   |
| <i>MV</i>         | <i>MHzo</i> | <i>KG</i>  | <i>RPM</i> | <i>PCS</i>   |
| <i>R</i>          | <i>MMHG</i> | <i>Q</i>   | <i>PH</i>  | <i>PERS.</i> |
| <i>MPA</i>        | <i>MM</i>   | <i>t</i>   | <i>PH</i>  | (by App)     |
| <i>bRR</i>        | <i>cm</i>   | <i>oZ</i>  | <i>L</i>   |              |
| <i>MbRR</i>       | <i>dm</i>   | <i>Lb</i>  | <i>MM</i>  |              |
| <i>PSI</i>        | <i>M</i>    | <i>M/S</i> | <i>KNM</i> |              |
| <i>PR</i>         | <i>MM</i>   | <i>M/M</i> | <i>KGF</i> |              |

### 330 *u.s.r.m.* User Menu

Enables to modify parameter 315 SS.Gr. "Soft-Start Gradient" from the user menu. To modify the gradient, press [SET](#).

|                |  |
|----------------|--|
| <i>d.S.Rb.</i> | Disabled ( <b>Default</b> )                              |
| <i>EMRb.</i>   | 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.

|                |                              |
|----------------|------------------------------|
| <i>3 S</i>     | 3 seconds                    |
| <i>5 S</i>     | 5 seconds ( <b>Default</b> ) |
| <i>10 S</i>    | 10 seconds                   |
| <i>30 S</i>    | 30 seconds                   |
| <i>1 M.N</i>   | 1 minutes                    |
| <i>5 M.N</i>   | 5 minutes                    |
| <i>10 M.N</i>  | 10 minutes                   |
| <i>MAN.Sc.</i> | Manual scroll                |

- 332** *bAr.G.* **Bar Graph**  
Set the value indicated by the Bar Graph
- d.SRb* Bar graph off
  - c.1.SP.V* Command 1 setpoint
  - ou.PE.1* Command output percentage 1 (Par. *LL.b.G.* and *u.L.b.G.* are ignored) **(Default)**
  - AMP.1* Ampere from current transformer 1
  - d.S.P.c.1* Command process setpoint deviation 1
  - VR.P.c.1* Valve position for command 1 (Par. *LL.b.G.* and *u.L.b.G.* are ignored)
  - W* Power on loads (command 1 + command 2 if present)
  - R.in.1* Value read on AI1 input.
  - R.in.2* Value read on AI2 input.
  - MERN* Arithmetic average of the values read on inputs AI1 e AI2  $[(AI1+AI2)/2]$ .
  - d.FF.* Difference of the values read on the inputs AI1 and AI2  $(AI1-AI2)$ .
  - Ab.d.F.* Module of the difference in the values read on the inputs AI1 and AI2  $(|AI1-AI2|)$ .
  - Sum* Sum of the values read on the inputs AI1 and AI2  $(AI1+AI2)$ .
  - H.G.H.* Greater value between AI1 and AI2
  - LoWER* Lower value between AI1 and AI2
  - ReduM.* The value read on AI1 or value read on AI2 if AI1 is in error (E-05)
  - c.2.SP.V* Command 2 setpoint
  - ou.PE.2* Percentage of command output 2 (Par. *LL.b.G.* and *u.L.b.G.* are ignored)
  - AMP.2* Ampere from current transformer 2
  - d.S.P.c.2* Command process setpoint deviation 2
  - VR.P.c.2* Valve position for command 2 (Par. *LL.b.G.* and *u.L.b.G.* are ignored)

- 333** *LL.b.G.* **Lower Limit Bar Graph**  
Bar Graph lower limit  
-9999..+30000 [digit<sup>1 p.79</sup>] (degrees for temperature sensors). **Default** 0.

- 334** *u.L.b.G.* **Upper Limit Bar Graph**  
Bar Graph upper limit  
-9999..+30000 [digit<sup>1 p.79</sup>] (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** *nF.c.L.* **NFC Lock**
- d.SRb.* NFC lock disabled: NFC accessible.
  - ENRb.* NFC lock enabled: NFC not accessible.

- 337÷341** **Reserved Parameters - Group G1**  
Reserved parameters - Group G1

## GROUP H1 - *F.F.E.Y.* - Function Keys

- 342** *F1.F.* **F1 Key**  
F1 key operation mode.
- d.SRb.* Disabled **(Default)**
  - 2E.SM.i.* 2 Setpoints Switch Impulsive
  - 3E.SM.i.* 3 Setpoints Switch Impulsive
  - 4E.SM.i.* 4 Setpoints Switch Impulsive
  - 5EE.1* Controller regulates on **SET1**
  - 5EE.2* Controller regulates on **SET2**
  - 5EE.3* Controller regulates on **SET3**
  - 5EE.4* Controller regulates on **SET4**
  - 5EAPt* Start (impulsive)
  - 5EoP* Stop (impulsive)
  - 5E./5E.* Start / Stop (impulsive)

**ΕΜΝΕ** Performing manual tune  
**Αυ.ΜΡ.ι.** Automatic / Manual Impulse (if enabled on parameter 53 or 76)  
**Ρ.ΚΩΗ** Reset kWh. Reset the value of energy consumed by the system.  
**Α.ι.0** Analogue Input 0. Set AI to zero  
**Μ.ΡΕΣ.** Manual reset. Reset the outputs if selected as manual reset.  
**Ε.1.Σ.Ε.** Timer 1 Start End. D.I. starts and stops the timer 1(impulsive)  
**Ε.1.Σ.Ε.Ρ.** Timer 1 Start. D.I. starts the timer 1(impulsive)  
**Ε.1.Ε.Μ.Δ** Timer 1 End. D.I. stops the timer 1(impulsive)  
**Ε.2.Σ.Ε.** Timer 2 Start End. D.I. starts and stops the timer 2(impulsive)  
**Ε.2.Σ.Ε.Ρ.** Timer 2 Start. D.I. starts the timer 2(impulsive)  
**Ε.2.Ε.Μ.Δ** Timer 2 End. D.I. stops the timer 2(impulsive)  
**ΡΕΜ.Σ.Ε.** Local/Remote setpoint switch (remote setpoint must be enabled on par. 62 *ρΕΠ.5.*)

### 343 **F1.c.** **F1 Contact**

Defines the type of contact to be performed on F1 to activate the related function  
**FS.ΡΡ.** (Fast Press) Fast pressure (**Default**)  
**ΡΡ.Η.Δ.** (Press & hold) Long pressure (1s).

### 344 **F1.P.** **F1 Process (only on DIS96V DUO-X)**

Selects the value to be brought to 0 when function **Α.ι.0** is selected for F1  
**Α.ι.Ν.1** Value read on input AI1. (**Default**)  
**Α.ι.Ν.2** Value read on input AI2  
**ΜΕΡΗ** Arithmetic average of the value read on inputs AI1 and AI2  $[(AI1+AI2)/2]$   
**Δ.Δ.ΡΡ.** Difference of the values read on inputs AI1 and AI2  $(AI1-AI2)$   
**Α.β.Δ.ΡΡ.** Module of the difference of the values read on inputs AI1 and AI2  $(|AI1-AI2|)$   
**Σ.Α.Μ** Sum of values read on inputs AI1 and AI2  $(AI1+AI2)$   
**Α.ι.Ν.1.2** The value read on AI1 and AI2

### 345 **F1.ρ.α.** **F1 Reference Command**

Defines the reference command for F1 functions  
**α.Μ.Δ. 1** Command 1 (**Default**)  
**α.Μ.Δ. 2** Command 2  
**α.Μ.Δ. 1.2** Command 1 and 2

### 346 **ρΕΣ.** **Reserved**

Reserved parameter

### 347 **ρΕΣ.** **Reserved**

Reserved parameter

### 348 **F2.F.** **F2 Key**

F2 key operation mode.  
**Δ.Σ.Α.β.** Disabled (**Default**)  
**2.Ε.Σ.Μ.ι.** 2 Setpoints Switch Impulsive  
**3.Ε.Σ.Μ.ι.** 3 Setpoints Switch Impulsive  
**4.Ε.Σ.Μ.ι.** 4 Setpoints Switch Impulsive  
**ΣΕΕ.1** Controller regulates on **SET1**  
**ΣΕΕ.2** Controller regulates on **SET2**  
**ΣΕΕ.3** Controller regulates on **SET3**  
**ΣΕΕ.4** Controller regulates on **SET4**  
**ΣΕΑΡΕ** Start (impulsive)  
**ΣΕΟΡ** Stop (impulsive)  
**ΣΕ.Ρ/ΣΕ.** Start / Stop (impulsive)  
**ΕΜΝΕ** Performing manual tune  
**Αυ.ΜΡ.ι.** Automatic / Manual Impulse (if enabled on parameter 53 or 76)  
**Ρ.ΚΩΗ** Reset kWh. Reset the value of energy consumed by the system.  
**Α.ι.0** Analogue Input 0. Set AI to zero  
**Μ.ΡΕΣ.** Manual reset. Reset the outputs if selected as manual reset.

- £.1.5.E. Timer 1 Start End. D.I. starts and stops the timer 1(impulsive)
- £.1.5£R. Timer 1 Start. D.I. starts the timer 1(impulsive)
- £.1.£Nd. Timer 1 End. D.I. stops the timer 1(impulsive)
- £.2.5.E. Timer 2 Start End. D.I. starts and stops the timer 2(impulsive)
- £.2.5£R. Timer 2 Start. D.I. starts the timer 2(impulsive)
- £.2.£Nd. Timer 2 End. D.I. stops the timer 2(impulsive)
- ££M.5.E. Local/Remote setpoint switch (remote setpoint must be enabled on par. 62 r££.5.)

### 349 F2 £. F2 Contact

- Defines the type of contact to be performed on F2 to activate the related function
- F5£.PR. (Fast Press) Fast pressure (**Default**)
  - PR.HLd. (Press & hold) Long pressure (1s).

### 350 F2 P. F2 Process (only on DIS96V DUO-X)

- Selects the value to be brought to 0 when function R. r. £. is selected for F2
- R. r.N.1 Value read on input AI1. (**Default**)
  - R. r.N.2 Value read on input AI2
  - M£RR. Arithmetic average of the value read on inputs AI1 and AI2  $((AI1+AI2)/2)$
  - d.£FF. Difference of the values read on inputs AI1 and AI2  $(AI1-AI2)$
  - Rb. d.£F. 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  $(AI1+AI2)$
  - R. r.N.1.2 The value read on AI1 and AI2

### 351 F2 r.£. F2 Reference Command

Defines the reference command for F2 functions.

- £Md. 1 Command 1 (**Default**)
- £Md. 2 Command 2
- £Md.1.2 Command 1 and 2

### 352 r££. Reserved

Reserved parameter

### 353 r££. Reserved

Reserved parameter

### 354 F3 £. F3 Key

F3 key operation mode.

- d.5Rb. Disabled (**Default**)
- 2£.5M. r. 2 Setpoints Switch Impulsive
- 3£.5M. r. 3 Setpoints Switch Impulsive
- 4£.5M. r. 4 Setpoints Switch Impulsive
- 5££.1 Controller regulates on SET1
- 5££.2 Controller regulates on SET2
- 5££.3 Controller regulates on SET3
- 5££.4 Controller regulates on SET4
- 5£R£ Start (impulsive)
- 5££P Stop (impulsive)
- 5£. /5£. Start / Stop (impulsive)
- £uNE Performing manual tune
- Ru.MR. r. Automatic / Manual Impulse (if enabled on parameter 53 or 76)
- R. £WH Reset kWh. Reset the value of energy consumed by the system.
- R. r. 0 Analogue Input 0. Set AI to zero
- M. R£S. Manual reset. Reset the outputs if selected as manual reset.
- £.1.5.E. Timer 1 Start End. D.I. starts and stops the timer 1(impulsive)
- £.1.5£R. Timer 1 Start. D.I. starts the timer 1(impulsive)
- £.1.£Nd. Timer 1 End. D.I. stops the timer 1(impulsive)
- £.2.5.E. Timer 2 Start End. D.I. starts and stops the timer 2(impulsive)
- £.2.5£R. 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 *rEN.5*)

### 355 *F3 c.* **F3 Contact**

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

*FSE.PR.* (Fast Press) Fast pressure (**Default**)

*PR.HLD.* (Press & hold) Long pressure (1s).

### 356 *F3 P.* **F3 Process (only on DIS96V DUO-X)**

Selects the value to be brought to 0 when function *R.i. 0.* is selected for F3.

*R.in.1* Value read on input A11. (**Default**)

*R.in.2* Value read on input A12

*MERN* Arithmetic average of the value read on inputs A11 and A12 [(A11+A12)/2]

*diff.* Difference of the values read on inputs A11 and A12 (A11-A12)

*Ab.diff.* Module of the difference of the values read on inputs A11 and A12 (|A11-A12|)

*Sum* Sum of values read on inputs A11 and A12 (A11+A12)

*R.in.1.2* The value read on A11 and A12

### 357 *F3 r.c.* **F3 Reference Command**

Defines the reference command for F3 functions.

*cmd. 1* Command 1 (**Default**)

*cmd. 2* Command 2

*cmd.1.2* Command 1 and 2

### 358 *rES.* **Reserved** Reserved parameter

### 359 *rES.* **Reserved** Reserved parameter

### 360 *F4 t.* **F4 Key**

F4 key operation mode.

*disRb.* 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**

*StARRt* Start (impulsive)

*StoP* Stop (impulsive)

*St./St.* Start / Stop (impulsive)

*tunE* Performing manual tune

*Aut.MR.i.* Automatic / Manual Impulse (if enabled on parameter 53 or 76)

*R. kWh* Reset kWh. Reset the value of energy consumed by the system.

*R.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. StAR.* 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. StAR.* 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 *rEN.5*)

### 361 *F4 c.* **F4 Contact**

Defines the type of contact to be performed on F4 to activate the related function.

*FSE.PR.* (Fast Press) Fast Pressure (**Default**)

*PR.HLD.* (Press & hold) Long pressure (1s).

- 362** *F4.P.* **F4 Process (only on A DIS96V DUO-X)**  
 Selects the value to be brought to 0 when function *R.i.*  is selected for F4
- R.i.N.1* Value read on input AI1. **(Default)**
  - R.i.N.2* Value read on input AI2
  - MERN* Arithmetic average of the value read on inputs AI1 and AI2 ((AI1+AI2)/2)
  - d.FF.* Difference of the values read on inputs AI1 and AI2 (AI1-AI2)
  - Rb.d.F.* 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)
  - R.i.N.1.2* The value read on AI1 and AI2

- 363** *F4.r.c.* **F4 Reference Command**  
 Defines the reference command for F4 functions.
- cMd. 1* Command 1 **(Default)**
  - cMd. 2* Command 2
  - cMd. 1.2* Command 1 and 2

**364** *rES.* **Reserved** Reserved parameter

**365** *rES.* **Reserved** Reserved parameter

## GROUP I1 - *ct 1* - Current Transformer 1

- 366** *ct.1.F.* **Current Transformer 1 Function**  
 Enables the CT1 input and select the net frequency
- d.5Rb.* Disabled **(Default)**
  - 50 HZ* 50 Hz
  - 60 HZ* 60 Hz
  - R.i.N.2* Electricity is the value converted by analogue input 2

- 367** *ct.1.v.* **Current Transformer 1 Value**  
 Select the current transformer 1 full-scale
- 1..300* Ampere **(Default: 50)**

- 368** *H.b.1.r.* **Heater Break Alarm 1 Reference Command**  
 Defines the heater break Alarm reference command and the CT1 overcurrent.
- cMd. 1* Command 1 **(Default)**
  - cMd. 2* Command 2

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

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

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

**372÷376** **Reserved Parameters - Group I1** Reserved parameters - Group I1

## GROUP I2 - *ct 2* - Current Transformer 2

- 377** *ct.2.F.* **Current Transformer 2 Function**  
 Enables the CT2 input and select the net frequency
- d.5Rb.* Disabled **(Default)**
  - 50 HZ* 50 Hz

60 HZ 60 Hz  
R.in.2 Electricity is the value converted by analog input 2

### 378 **ct2.v.** **Current Transformer 2 Value**

Select the current transformer 2 full-scale  
1..300 Ampere (**Default:** 50)

### 379 **Hb2r.** **Heater Break Alarm 2 Reference Command**

Defines the heater break Alarm reference command and the CT2 overcurrent.  
cmd. 1 Command 1 (**Default**)  
cmd. 2 Command 2

### 380 **Hb2t.** **Heater Break Alarm 2 Threshold**

CT2 Overcurrent Alarm 1 threshold  
0 Alarm disabled. (**Default**)  
0.1-300.0 Ampere

### 381 **oc2t.** **Overcurrent 2 Alarm Threshold**

CT2 Overcurrent Alarm 1 threshold  
0 Alarm disabled. (**Default**)  
0.1-300.0 Ampere

### 382 **Hb2d.** **Heater Break Alarm 2 Delay**

CT2 Heater Break Alarm and overcurrent alarm activation delay.  
00:00-60:00 mm:ss (**Default:** 01:00)

### 383÷387 **Reserved Parameters - Group I2**

Reserved parameters - Group I2

## **GROUP J1 - R.d. 1 - Retransmission 1**

### 388 **rt1.** **Retransmission 1**

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

d.SRb. 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  
RMP. 1 Ampere from current transformer 1  
RL. 1 Alarm 1 setpoint  
RL. 2 Alarm 2 setpoint  
Md.bu5 Retransmits the value written on word 1241  
R.in.1 Value read on input AI1  
R.in.2 Value read on input AI2  
MEAN Arithmetic average of the value read on inputs AI1 and AI2  $((AI1+AI2)/2)$   
d.FF. Difference of the values read on inputs AI1 and AI2  $(AI1-AI2)$   
Ab.d.F. Module of the difference of the values read on inputs AI1 and AI2  $(|AI1-AI2|)$   
Sum Greater value between AI1 and AI2  $(AI1+AI2)$   
HiGH. Greater value between AI1 and AI2  
LoWER Lower value between AI1 and AI2  
REdM. Value read on AI2 if AI1 is in error (E-05)  
c.2.SPv Command 2 setpoint  
ou.PE.2 Percentage of command output 2  
d.S.P.c.2 Command process setpoint deviation 2  
RMP. 2 Ampere from current transformer 2

### 389 **r.ty.** **Retransmission 1 Type**

Select the retransmission type for AO1  
0.10 V Output 0...10 V.  
4.20mA Output 4...20 mA. **Default**



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

Retransmission 1 lower limit range (value related to 0 V or 0/4 mA).  
-9999..+30000 [digit<sup>1 p.29</sup>] (degrees for temperature sensors), **Default:** 0.

### 391 *r.L.U.L.* Retransmission 1 Upper Limit

Retransmission 1 upper limit range (value related to 10 V or 20 mA).  
-9999..+30000 [digit<sup>1 p.29</sup>] (degrees for temperature sensors), **Default:** 1000.

### 392 *r.I.S.E.* Retransmission 1 State Error

Determines retransmission 1 value in case of error or anomaly

If the retransmission output is 0-10V:

0 V 0 V. **Default**

10 V 10 V.

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.

21.5 mA 21.5 mA.

### 393 *r.I.S.S.* Retransmission 1 State Stop

Determines retransmission 1 value with controller in STOP.

If the alarm output is 0-10V:

Alarm active

0 V 0 V. **Default**

10 V 10 V.

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

Alarm active

0 mA 0 mA. **Default**

4 mA 4 mA.

20 mA 20 mA.

21.5 mA 21.5 mA.

## 394÷398 Reserved Parameters - Group J1 Reserved parameters - Group J1

## GROUP J2 - *R.O. 2* - Retransmission 2 (only on DIS96V DUO-T)

### 399 *r.E.R.2* Retransmission 2

Retransmission for AO1. Par. 401 and 402 define lower and upper limit of the operating scale.

*d.S.R.b.* Disabled (**Default**)

*c.1.SP.V* Command 1 setpoint

*ou.PE.1* Percentage of command output 1

*d.S.P.c.1* Command process setpoint deviation 1

*RMP. 1* Ampere from current transformer 1

*RL. 1* Alarm 1 setpoint

*RL. 2* Alarm 2 setpoint

*rd.bu5* Retransmits the value written on word 1241

*R.in.1* Value read on input AI1

*R.in.2* Value read on input AI2

*MER.N* Arithmetic average of the value read on inputs AI1 and AI2 [(AI1+AI2)/2]

*d.FF.* Difference of the values read on inputs AI1 and AI2 (AI1-AI2)

*Rb.d.F.* 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)

*H.G.H.* Greater value between AI1 and AI2

*Lo.WEP* Lower value between AI1 and AI2

*PEd.w.N.* Value read on AI2 if AI1 is in error (E-05)

*c.2.SP.V* Command 2 setpoint

*ou.PE.2* Percentage of command output 2

*d.S.P.c.2* Command process setpoint deviation 2

*RMP. 2* Ampere from current transformer 2

#### 400 *r2t4*. **Retransmission 2 Type**

Select the retransmission type for AO2

*0.10 V* Output 0...10 V.

*4.20mA* Output 4...20 mA. **Default**

#### 401 *r2LL*. **Retransmission 2 Lower Limit**

Retransmission 2 lower limit range (value related to 0 V or 0/4 mA).

-9999..+30000 [digit<sup>1 p.79</sup>] (degrees for temperature sensors), **Default: 0**.

#### 402 *r2UL*. **Retransmission 2 Upper Limit**

Retransmission 2 upper limit range 2 (value related to 10 V or 20 mA).

-9999..+30000 [digit<sup>1 p.79</sup>] (degrees for temperature sensors), **Default: 1000**.

#### 403 *r2SE*. **Retransmission 2 State Error**

Determines retransmission 2 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.

#### 404 *r2SS*. **Retransmission 2 State Stop**

Determines retransmission 2 value with controller in STOP.

If the alarm output is 0-10V:

*Alarm R.* Alarm active

*0 V* 0 V. **Default**

*10 V* 10 V.

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

*Alarm R.* Alarm active

*0 mA* 0 mA. **Default**

*4 mA* 4 mA.

*20 mA* 20 mA.

*21.5mA* 21.5 mA.

#### 405÷409 **Reserved Parameters - Group J2** Reserved parameters - Group J2

### GROUP K1 - *5Er* - Serial (only on DIS96V-XXXX-T)

#### 410 *SLAd*. **Slave Address**

Select slave address for serial communication.

1..254. **Default: 247**.

#### 411 *bd.rte*. **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 *SP.P*. **Serial Port Parameters**

Select the format for the modbus RTU serial communication.

*B-N-1* 8 bit, no parity, 1 stop bit (**Default**)

*B-E-1* 8 bit, even parity, 1 stop bit

*B-O-1* 8 bit, odd parity, 1 stop bit

*B-N-2* 8 bit, no parity, 2 stop bit

*B-E-2* 8 bit, even parity, 2 stop bit

*B-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 time. 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.

**415÷419** **Reserved Parameters - Group K1**

Reserved parameters - Group K1

**GROUP L1 - *t i n r* - Timer**

**420** *t n r.1* **Timer 1**

Enabling Timer 1

*d i S R b.* Disabled (**Default**)

*E n R b.* Enabled

*E n. S t A.* 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. t n. 1* **Action Timer 1**

Select the type of the action executed by the timer 1 to be related to an alarm..

*S t A R R t* Start. Active during timer counting (**Default**)

*E n d* End. Active at timer expiry

*W A R N.* Warning. Active 5" before the timer expiry

**423** *t n r.2* **Timer 2**

Enabling Timer 2

*d i S R b.* Disabled (**Default**)

*E n R b.* Enabled

*E n. S t A.* 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. t n. 2* **Action Timer 2**

Select the type of the action executed by the timer 2 to be related to an alarm.

*S t A R R t* Start. Active during timer counting (**Default**)

*E n d* End. Active at timer expiry.

*W A R N.* Warning. Active 5" before the timer expiry.

**426** *t n r. S.* **Timers Sequence**

Select the correlation between the two timers.

*S i n g l.* Singles. Timers work independently (**Default**)

*S e q u e.* Sequential. When timer 1 ends, timer 2 starts.

*L o o p* Loop. When a timer ends, another starts.

**427** *M A. r.* **Maintenance Request**

View a maintenance request after elapsing of time given on par. 428 *n. t. n.*

*d i S R b.* Disabled (**Default**)

*E n R b.* Enabled

## 428 $\overline{A.L.}$ Maintenance Time

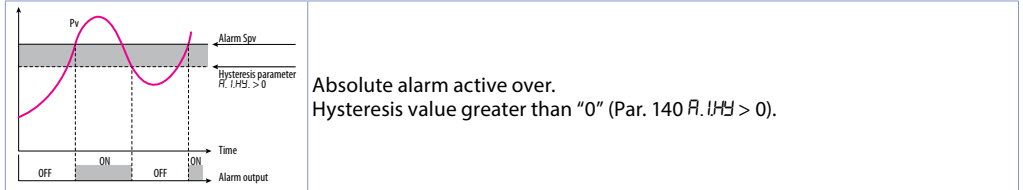
Select the time in hours for the maintenance request.

Range 1...30000 (Default: 1000).

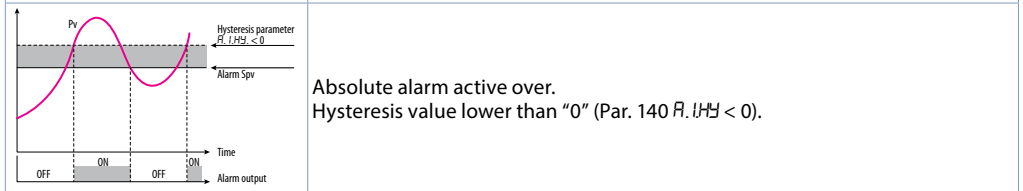
## 429÷431 Reserved Parameters - Group L1 Reserved parameters - Group L1

# 15 Alarm intervention modes

### 15.a Absolute or threshold alarm active over (par. 135 $R.L.I.F. = Ab.u.PA$ )

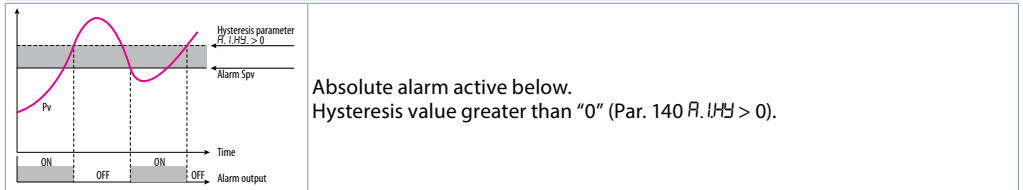


Absolute alarm active over.  
Hysteresis value greater than "0" (Par. 140  $R.I.H.Y > 0$ ).

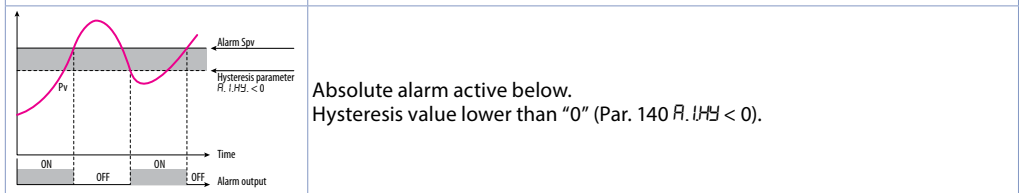


Absolute alarm active over.  
Hysteresis value lower than "0" (Par. 140  $R.I.H.Y < 0$ ).

### 15.b Absolute or threshold alarm active below (par. 135 $R.L.I.F. = Ab.u.PA$ )

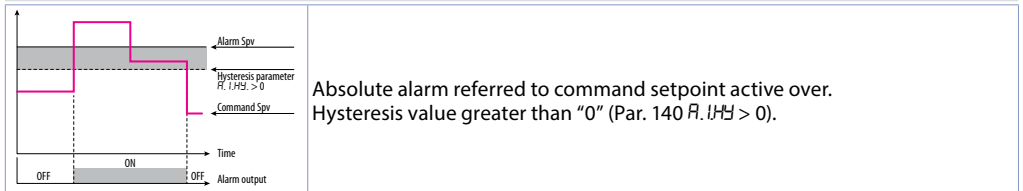


Absolute alarm active below.  
Hysteresis value greater than "0" (Par. 140  $R.I.H.Y > 0$ ).



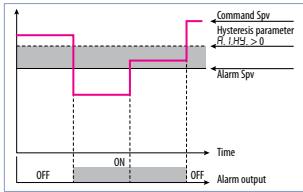
Absolute alarm active below.  
Hysteresis value lower than "0" (Par. 140  $R.I.H.Y < 0$ ).

### 15.c Absolute or threshold alarm referred to command setpoint active over (par. 135 $R.L.I.F. = Ab.c.u.PA$ )



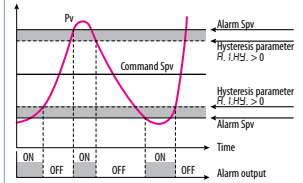
Absolute alarm referred to command setpoint active over.  
Hysteresis value greater than "0" (Par. 140  $R.I.H.Y > 0$ ).

**15.d Absolute or threshold alarm referred to command setpoint active below (par. 135  $ALIF = Ab.c.LA$ )**

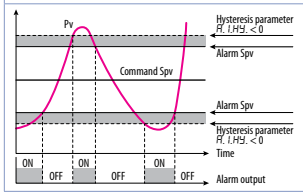


Absolute alarm referred to command setpoint active below. Hysteresis value greater than "0" (Par. 140  $R.I.HY > 0$ ).

**15.e Band alarm (par. 135  $ALIF = bAnd$ )**

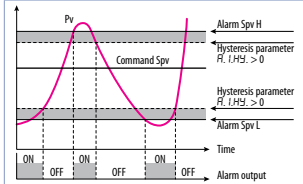


Band alarm hysteresis value greater than "0" (Par.  $R.I.HY > 0$ ).

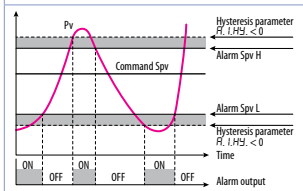


Band alarm hysteresis value lower than "0" (Par. 140  $R.I.HY < 0$ ).

**15.f Asymmetric band alarm (par. 135  $ALIF = Ab.bAnd$ )**

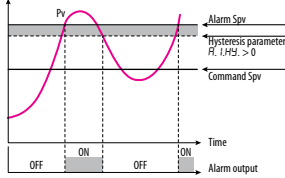


Asymmetric band alarm with hysteresis value greater than "0" (Par. 140  $R.I.HY > 0$ ).



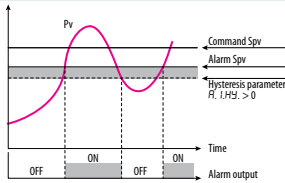
Asymmetric band alarm with hysteresis value lower than "0" (Par. 140  $R.I.HY < 0$ ).

## 15.g Upper deviation alarm (par. 135 R.L.I.F. = $uP.dE_u$ )



Upper deviation alarm value of alarm setpoint greater than "0" and hysteresis value greater than "0" (Par. 140 R.I.H.Y. > 0).

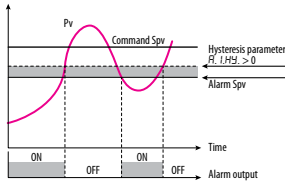
**NB:** with hysteresis value less than "0" (R.I.H.Y. < 0) the dotted line moves under the alarm setpoint.



Upper deviation alarm value of alarm setpoint less than "0" and hysteresis value greater than "0" (Par. 140 R.I.H.Y. > 0).

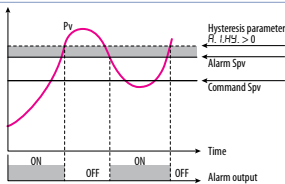
**NB:** with hysteresis value less than "0" (R.I.H.Y. < 0) the dotted line moves under the alarm setpoint.

## 15.h Lower deviation alarm (par. 135 R.L.I.F. = $L_o.dE_u$ )



Lower deviation alarm value of alarm setpoint greater than "0" and hysteresis value greater than "0" (Par. 140 R.I.H.Y. > 0).

**NB:** with hysteresis value less than "0" (R.I.H.Y. < 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 R.I.H.Y. > 0).

**NB:** with hysteresis value less than "0" (R.I.H.Y. < 0) the dotted line moves under the alarm setpoint.

## 15.1 Alarms label

By setting a value from 1 to 21 on the parameters 149 R.1.Lb., 169 R.2.Lb., 189 R.3.Lb., 209 R.4.Lb., 229 R.5.Lb., 249 R.6.Lb. and 269 R.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                           |

| Selection | Message displayed in the alarm event |
|-----------|--------------------------------------|
| 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.

## 16 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<br>SYSTEM<br>Error       | Cold junction temperature sensor failure or environment temperature out of range | Call assistance                                       |
| E-04<br>EEPROM<br>Error       | Incorrect configuration data.<br>Possible loss of instrument calibration         | Verify that configuration parameters are correct.     |
| E-05<br>Probe 1<br>Error      | Sensor connected to AI1 broken or temperature out of range                       | Control connection with probes and their integrity.   |
| E-06<br>Probe 2<br>Error      | Sensor connected to AI2 broken or temperature out of range                       | Control connection with probes and their integrity.   |
| E-08<br>SYSTEM<br>Error       | Missing calibration  | Call assistance                                       |
| E-10<br>An. In. 2<br>disabled | Analogue input 2 disabled but used during configuration.                         | Enable $P_{in.2}$ or disable it during configuration. |
| E-80<br>rFid<br>Error         | Tag rfid malfunctioning  | Call assistance                                       |

## Notes / Updates

- 1 Display of decimal point depends on setting of parameter  $SEn.1$  and  $d.P.1$  or  $SEn.2$  and  $d.P.2$ .
- 2 On activation, the output is inhibited if the controller is in alarm mode. Activates only if alarm condition reappears, 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  $P.x.dE$ , if different from 0.

# Table of configuration parameters

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| 29    | <i>Lt.c.2</i>  | Latch-On AI2                   | 40 |
| 30    | <i>c.FL.2</i>  | Conversion Filter AI2          | 40 |
| 31    | <i>c.Fr.2</i>  | Conversion Frequency AI2       | 40 |
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| 86   | <i>i.t. 1</i>  | Integral Time 1                 | 48 |
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| 123     | <i>l.l.P.2</i> | Lower Limit Output Percentage 2 | 51 |
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| 160 | <i>AL.2.H.Y.</i> | Alarm 2 Hysteresis                                       | 56 |
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| 164 | <i>AL.2.S.E.</i> | Alarm 2 State Error                                      | 57 |
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|--|----------------|--|----|
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| 177  | <i>A3.r.c.</i> | Alarm 3 Reference Command (only on <b>DIS96V DUO-X</b> ) | 58 |
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| 197  | <i>A4.r.c.</i> | Alarm 4 Reference Command (only on <b>DIS96V DUO-X</b> ) | 61 |
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| 203  | <i>A4.rE.</i>  | Alarm 4 Reset  | 62 |
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|         |                |                                |    |
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| 244     | <i>AL6.S.E.</i> | Alarm 6 State Error                                       | 68 |
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| 257     | <i>AL7.r.c.</i> | Alarm 7 Reference Command      | 70 |
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| 259     | <i>AL7.o.t.</i> | Alarm 7 Output Type            | 71 |
| 260     | <i>AL7.HY.</i>  | Alarm 7 Hysteresis             | 71 |
| 261     | <i>AL7.L.L.</i> | Alarm 7 Lower Limit            | 71 |
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| 263     | <i>AL7.rE.</i>  | Alarm 7 Reset                  | 71 |
| 264     | <i>AL7.S.E.</i> | Alarm 7 State Error            | 71 |
| 265     | <i>AL7.S.S.</i> | Alarm 7 State Stop             | 72 |
| 266     | <i>rES.</i>     | Reserved                       | 72 |
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| 276     | <i>d.i.1.c.</i> | Digital Input 1 Contact  | 73 |
| 277     | <i>d.i.1.P.</i> | Digital Input 1 Process (only on <b>DIS96V DUO-X</b> )           | 74 |
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| 304 d.i.4.P. | Digital Input 4 Process           | 78 |
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| 319 U.t.S.E. | Waiting Time Step End                               | 79 |
| 320 M.G.S.E. | Max. Gap Step End                                   | 79 |
| 321 r.i.c.   | Recovery Interrupted Cycle                          | 79 |
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| 327 u.i.d.2  | Visualization Display 2        | 79 |
| 328 u.i.d.3  | Visualization Display 3        | 80 |
| 329 u.o.m.   | Unit Of Measure                | 80 |
| 330 u.S.r.m. | User Menu                      | 81 |
| 331 Sc.L.t.  | Scrolling Time                 | 81 |
| 332 b.A.r.G. | Bar Graph                      | 81 |
| 333 L.L.b.G. | Lower Limit Bar Graph          | 81 |
| 334 U.L.b.G. | Upper Limit Bar Graph          | 81 |
| 335 u.out    | Voltage Output                 | 81 |
| 336 n.F.c.L. | NFC Lock                       | 82 |
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**GROUP H1 - F.F.E.Y. - Function Keys**

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| 343 F1 c.   | F1 Contact                        | 82 |
| 344 F1 P.   | F1 Process (only on DIS96V DUO-X) | 82 |
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| 346 r.E.S.  | Reserved                          | 83 |
| 347 r.E.S.  | Reserved                          | 83 |
| 348 F2 k.   | F2 Key                            | 83 |
| 349 F2 c.   | F2 Contact                        | 83 |
| 350 F2 P.   | F2 Process (only on DIS96V DUO-X) | 83 |
| 351 F2 r.c. | F2 Reference Command              | 83 |
| 352 r.E.S.  | Reserved                          | 83 |

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|-----|----------------|---|----|
| 353 | <i>rES.</i>    | Reserved                                  | 84 |
| 354 | <i>F3 k.</i>   | F3 Key                                    | 84 |
| 355 | <i>F3 c.</i>   | F3 Contact                                | 84 |
| 356 | <i>F3 P.</i>   | F3 Process (only on <b>DIS96V DUO-X</b> ) | 84 |
| 357 | <i>F3 r.c.</i> | F3 Reference Command                      | 84 |
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| 359 | <i>rES.</i>    | Reserved                                  | 84 |
| 360 | <i>F4 k.</i>   | F4 Key                                    | 85 |
| 361 | <i>F4 c.</i>   | F4 Contact                                | 85 |
| 362 | <i>F4 P.</i>   | F4 Process (only on <b>DIS96V DUO-X</b> ) | 85 |
| 363 | <i>F4 r.c.</i> | F4 Reference Command                      | 85 |
| 364 | <i>rES.</i>    | Reserved                                  | 85 |
| 365 | <i>rES.</i>    | Reserved                                  | 85 |

#### **GROUP I1 - *ct 1* - Current Transformer 1**

|         |                |  |    |
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| 367     | <i>ct.1v.</i>  | Current Transformer 1 Value            | 86 |
| 368     | <i>H.b.1r.</i> | Heater Break Alarm 1 Reference Command | 86 |
| 369     | <i>H.b.1t.</i> | Heater Break Alarm 1 Threshold         | 86 |
| 370     | <i>oc.1t.</i>  | Overcurrent 1 Alarm Threshold          | 86 |
| 371     | <i>H.b.1d.</i> | Heater Break Alarm 1 Delay             | 86 |
| 372÷376 |                | Reserved Parameters - Group I1         | 86 |

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| 377     | <i>ct.2f.</i>  | Current Transformer 2 Function         | 86 |
| 378     | <i>ct.2v.</i>  | Current Transformer 2 Value            | 86 |
| 379     | <i>H.b.2r.</i> | Heater Break Alarm 2 Reference Command | 86 |
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| 381     | <i>oc.2t.</i>  | Overcurrent 2 Alarm Threshold          | 87 |
| 382     | <i>H.b.2d.</i> | Heater Break Alarm 2 Delay             | 87 |
| 383÷387 |                | Reserved Parameters - Group I2         | 87 |

#### **GROUP J1 - *R.o. 1* - Retransmission 1**

|         |                 |                                |    |
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| 389     | <i>r.1tY.</i>   | Retransmission 1 Type          | 87 |
| 390     | <i>r.1.L.L.</i> | Retransmission 1 Lower Limit   | 87 |
| 391     | <i>r.1.U.L.</i> | Retransmission 1 Upper Limit   | 87 |
| 392     | <i>r.1S.E.</i>  | Retransmission 1 State Error   | 88 |
| 393     | <i>r.1S.S.</i>  | Retransmission 1 State Stop    | 88 |
| 394÷398 |                 | Reserved Parameters - Group J1 | 88 |

#### **GROUP J2 - *R.o. 2* - Retransmission 2 (only on **DIS96V DUO-T**)**

|         |                 |                                |    |
|---------|-----------------|--------------------------------|----|
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| 400     | <i>r.2tY.</i>   | Retransmission 2 Type          | 88 |
| 401     | <i>r.2.L.L.</i> | Retransmission 2 Lower Limit   | 89 |
| 402     | <i>r.2.U.L.</i> | Retransmission 2 Upper Limit   | 89 |
| 403     | <i>r.2S.E.</i>  | Retransmission 2 State Error   | 89 |
| 404     | <i>r.2S.S.</i>  | Retransmission 2 State Stop    | 89 |
| 405÷409 |                 | Reserved Parameters - Group J2 | 89 |

#### **GROUP K1 - *5Er.* - Serial (only on **DIS96V plus-T** and **DIS96V DUO-T**)**

|     |                |                        |    |
|-----|----------------|------------------------|----|
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| 411 | <i>bd.r.t.</i> | Baud Rate              | 89 |
| 412 | <i>S.P.P.</i>  | Serial Port Parameters | 89 |

|                                      |                |                                |    |
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| 413                                  | <i>SE.dE.</i>  | Serial Delay                   | 90 |
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| 421                                  | <i>t.b.t.1</i> | Time Base Timer 1              | 90 |
| 422                                  | <i>A.tA.1</i>  | Action Timer 1                 | 90 |
| 423                                  | <i>tMr.2</i>   | Timer 2                        | 90 |
| 424                                  | <i>t.b.t.2</i> | Time Base Timer 2              | 90 |
| 425                                  | <i>A.tA.2</i>  | Action Timer 2                 | 90 |
| 426                                  | <i>tMr.S.</i>  | Timers Sequence                | 90 |
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Antes de usar el dispositivo leer con atención las informaciones de seguridad y configuración contenidas en este manual.



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