Zelio Control
Temperature controller
Quick start

04/2009
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CHAPTER 1 INTRODUCTION

Functioning:

The temperature control relays are equipped with a sensor input that permits to use multiple types of sensors (PT100 probe, thermocouple, current or voltage sensors depending the model), one or two process outputs (relay, solid state relay interface or analog) for heating, cooling or heating and cooling regulation based on PID algorithm.

The measured temperature and the setpoint can be displayed in °Celsius or °Fahrenheit.

Advanced functions are embedded: Ramps (up to 16), hysteresis, fuzzy logic, auto tuning, soft start, alarms.

The temperature controllers can be setup using the front face interface or through a common software by a communication port and the integrated Modbus.

This communication port provides intergartion capability in an itelligente architecture supervised by Magelis terminal or controled by PLCs(Twido, M340 or Premium) to exchange setpoints, process values and alarms.

Application examples:

The temperature controllers Zélio control REG provide a solution for temperature control in the following applications:
- Ovens and furnaces,
- Extrusion lines,
- Plastic and rubber presses,
- thermo-forming,
- Production of synthetic fibres an polymerisation,
- Food and drink processing lines,
- Moulding presses,
- Environmental chambers, overhead furnaces and test benches,
- UV &laser technologies,
- Cabin of painting,
- Cold rooms,
- Horticultural and livestock farms,
- Maintening the temperature of a colour bath...
Identification and functionnalities:

The product part number allows identification of the embedded functions:

### 24 controllers:

<table>
<thead>
<tr>
<th>REG</th>
<th>24</th>
<th>P</th>
<th>TP</th>
<th>1</th>
<th>A</th>
<th>R</th>
<th>HU</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>UJ</td>
<td>L</td>
<td>L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Regulator  Size    PID  Input  Output  Without  Output  Power
              type  number  modbus   type   supply

\( P = \text{PID} \)

Input type:
\( \text{TP} = \text{Thermocouples and PT100} \)
\( \text{UJ} = \text{Analog signal} \)

Modbus function:
\( A = \text{no modbus available} \)

Output type:
\( R = \text{relay} \)
\( L = \text{solid state relay interface} \)
\( J = \text{analog (4/20mA)} \)

Power supply:
\( \text{HU} = 110/220 \text{ VAC} \)
\( \text{LU} = 24 \text{ V AC/DC} \)

### 48/96 controllers:

<table>
<thead>
<tr>
<th>REG</th>
<th>48</th>
<th>P</th>
<th>UN</th>
<th>1</th>
<th>L</th>
<th>R</th>
<th>HU</th>
</tr>
</thead>
<tbody>
<tr>
<td>96</td>
<td>2</td>
<td>L</td>
<td>L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Regulator  Size    PID  Input  Output  Without  Output  Power
              type  number  modbus   type   supply

\( P = \text{PID} \)

Input type:
\( \text{UN} = \text{universal input} \)
\( \text{thermocouple / PT100 / analog} \)

Output type:
\( R = \text{relay} \)
\( L = \text{solid state relay interface} \)
\( J = \text{analog (4/20mA)} \)

Modbus function:
\( L = \text{no modbus available} \)

Power supply:
\( \text{HU} = 110/220 \text{ VAC} \)
\( \text{LU} = 24 \text{ V AC/DC} \)

**Note**: When 2 outputs possible combination between 1 relay and 1 solid state relay interface or 1 solid state relay and one current (for detail see doc 24480-EN page 6)
CHAPTER 2: TERMINOLOGY

**PID : Proportionnel Intégral Dérivé:**

The principle of the PID algorithm consists on 3 actions that are dependant to the difference between the setpoint (SV) and the measured process value (PV).

- A proportional action, the error is multiplied by a gain \( GR \)
- A complete action, the error is integrated on an interval of time \( TI \)
- Derivated action, the error is derivated according to time \( TD \)

**PID principle schematic**

The parameters of the PID influence the answer of the system in the following way:

- When the proportional gain \( GR \) increases, the time of rise is shorter but there is a more important overshoot of the setpoint. The time of stabilization varies little and the static error is improved.
- When \( 1 / TI \) increase, the time of rise is shorter, but there is a more important overtaking of the setpoint. The time of stabilization stretches out but we assure a static no error.
- When \( TD \) increases, the time of rise changes little, but the overshoot decreases. The time of stabilization is better and there is no influence on the static error.

The use of 24/48/96 controllers is going to allow through a parameter setting of variables to appeal to automatic functions or manual regulations.

These variables are going to allow:

- To choose the type of sensor used (probe thermocouple or PT100, analogical sensor),
- To choose the type of output used according to the actuator(s) (relay, solid state relay, analogical),
- To choose the function of regulation (heating or cooling or heating and cooling),
- To reduce the time of establishment (the value of measure reaches as quickly as possible the setpoint),
- Avoid overshoot (fuzzy logic and PID2),
- To maintain the temperature very close to the setpoint (réduction of the hysteresis and the dead band),
- Avoid influence of perturbation,
- To activate alarms (high, low, delayed...),
- Setup ramps (up to 16 depending the model) to chain cycles of regulations,
- To have information of defects (overflowing measures, defect sensors),
- To lock or authorize the modification of the parameters from the front face of the product.
Chapter 2 Terminology

The outputs:

- **Relay**: Output type mostly used
- **Solid state relay interface**: Used to control actuator with no noise or frequent switching.
- **Courant**: Used to drive analog actuator such as speed drives

**On and OFF control**: Most simple algorithm, no anticipation of the setpoint, not precized, we notice a lot of oscillations.

**Proportional control**: The process output is proportional to the derivation from the. The proportional band allows overshoots anticipation.

![Proportional control diagram](image-url)
Regulation principle:

Chapter 2 Terminology

Proportional

P too low = oscillations

P too high = slow rise and important gap

P correct = correct rise and minor gap

Intégrale

Offset

The integral allows catching up the setpoint when there is an offset with the process value. In combination with the proportional, the intégrale function reaches the setpoint.

Derivative

Proportional + derivative

Proportional only

External perturbation

The derived control allows countering any distance created by an external perturbation.

PID

The combination of proportional, derivative and intégrale optimized the regulation
Visualization of PID structure:

Chapter 2 Terminology

- **Hysteresis**
- **Overshoot**
- **Perturbation**
- **PV (measure)**
- **Dead band**

**Values**

- **SP** (setpoint)
- **PV** (measure)
- **Response time**

**Visualization of PID structure**

**Time**

**Reverse operation (heat control)**

- ON: PV < SV
- OFF: PV > SV
- Output state

**Normal operation (cooling control)**

- ON: PV > SV
- OFF: PV < SV
- Output state

**Choice of regulation type**
CHAPTER 3: EXAMPLES OF INTEGRATED FUNCTIONS INTO THE CONTROLLERS

Auto tuning:
This function calculates automatically the proportional, derivative and integrative factors of the PID function. This calculation is done during 2 regulation cycles.

Fuzzy logic:
The fuzzy logic manages the command of the process in a range of 0 to 100% of the measure scale. This logic applies a command to the process to optimize the switching between heating and cooling outputs depending the setpoint and avoid overshoot.

Remark: This command will generate temporarily a perturbation of the regulation close to the setpoint value. Some applications might be sensitive to this function.

Self control:
This function restarts the calculation of the PID parameters at each setpoint change or after a power on.
**Ramps:**

This function allows a sequence of setpoints (up to 16 ramps for REG48 and REG96) during a certain period of time. For each setpoint, a response time and the duration of the level can be setup. These times can be defined in hour and minutes or in minutes and seconds.

**Example:**

![Diagram of ramps]

**Ramp 1**
**Ramp 2**
**Ramp 3**
**Ramp 4**

**Pid 2:**
Choice of a PID that avoid overshoot during the regulation phase.

**Soft start:**
Moderate starting up, the time of establishment (the process value reaches the setpoint) is adjustable. This function can be used in the case of machines sensitive to the abrupt variations of temperature.

**Alarms:**
One to 3 alarms are available depending the models. Each alarm is based on an output relay (1 to 3A depending the model). Two more alarms are available through Modbus on REG96 and one on the REG48 models. The alarms can be configured for a low or high level and can also be delayed.
CHAPTER 4 : WIRING AND SCHEMATICS :

REG 24 (12 models) :

- Modbus
- Power supply 24 V (AC/DC) or 100/240 V AC Depending model
- Output 1 actuator for heating or cooling: relay / solid state relay, analog depending model
- Contact alarm output 1 A
- Input temperature probe 2 or 3 wires or voltage / current sensor depending model

REG 48 (14 models) :

- Modbus
- Output 1 actuator for heating: relay / solid state relay / analog depending the model
- Input temperature probe 2 / 3 or 4 wires or voltage current sensor
- Contacts for 2 alarm outputs 3 A
- Power supply 24 V (AC/DC) or 100/240 V AC Depending model
- Output 2 actuator for cooling: relay / solid state relay / analog depending the model
REG 96 (14 models):

Chapter 4 wiring and schematics

Note:
The alarms D4 and D5 are only available through Modbus.
The output(s) type depends on the product (see page 6 of the document).

Remark:
The wiring of the solid state relays or analog actuators and input probe must follow the wiring schematics, especially the polarity..

For the modbus connection availability check carefully the part number and the table described page 6.

The modbus connection is connected to the screw terminals:
- 14/15 for REG 24
- 7/8 for REG 48
- 1/2 for REG 96
CHAPTER 5: IMPLEMENTATION

Selection guide:

To choose the most adapted controller the characteristics that must be take into account are (functional analysis):

- The sensor type connected to the input (PT100, thermocouple, analog, current or voltage);
- The number and type of the outputs: need to manage one or 2 actuators for heating, cooling or heating and cooling regulation (relay or solid state relay interface or analog (proportional valve, speed drive));
- The number of alarms;
- The number of ramps;
- Operation mode (automatic or automatic and manual);
- Modbus communication available (need of multiple controllers, communication with a Magelis, a PLC such as TWIDO, M340 or Premium);

Advanced function easy to use and to setup embedded on controllers:
- hysteresis
- auto tuning
- fuzzy logic (see page 8)
- soft start (on REG48 and REG96)

<table>
<thead>
<tr>
<th></th>
<th>REG 24</th>
<th>REG 48</th>
<th>REG 96</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input type</strong></td>
<td>-PT100</td>
<td>-PT100</td>
<td>-PT100</td>
</tr>
<tr>
<td></td>
<td>-Thermocouple</td>
<td>-Thermocouple</td>
<td>-Thermocouple</td>
</tr>
<tr>
<td></td>
<td>-Voltage</td>
<td>-Voltage</td>
<td>-Voltage</td>
</tr>
<tr>
<td></td>
<td>1….5V</td>
<td>0….5V,1….5V,0….10V,</td>
<td>0….5V,1….5V,0….10V,</td>
</tr>
<tr>
<td></td>
<td>-Current</td>
<td>2…10V,</td>
<td>2…10V,</td>
</tr>
<tr>
<td></td>
<td>4….20mA</td>
<td>-Current</td>
<td>-Current</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0….20mA, 4….20mA</td>
<td>0…20mA, 4….20mA</td>
</tr>
<tr>
<td><strong>Process output type</strong></td>
<td>-SPDT Relay 220VAC, 30VAC/DC 3A</td>
<td>-SPST Relay 220VAC, 30VAC/DC 3A</td>
<td>-Solid state interface 24VDC, 20 mA, 850Ω</td>
</tr>
<tr>
<td></td>
<td>-Solid state interface 24VDC, 20 mA, 850Ω</td>
<td>- analog 4….20mA (600Ω maxi)</td>
<td>- analog 4….20mA (600Ω maxi)</td>
</tr>
<tr>
<td>Number of process outputs</td>
<td>1 relay</td>
<td>1 relay</td>
<td>1 relay</td>
</tr>
<tr>
<td></td>
<td>ou 1 solid state relay interface</td>
<td>ou 2 relays</td>
<td>ou 1 solid state relay interface</td>
</tr>
<tr>
<td></td>
<td>ou 1 analog current</td>
<td>ou 1 solid state relay interface</td>
<td>ou 1 solid state relay interface</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ou 1 relay + 1 solid state relay interface</td>
<td>ou 1 analog current</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ou 1 solid state relay interface + 1 analog current</td>
</tr>
<tr>
<td><strong>Alarms</strong></td>
<td>1 physical or 1Modbus</td>
<td>2 + 1Modbus</td>
<td>3 + 2 Modbus</td>
</tr>
<tr>
<td><strong>Sampling time</strong></td>
<td>500ms</td>
<td>200ms</td>
<td>200ms</td>
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<tr>
<td><strong>Precision</strong></td>
<td>0,5% FS</td>
<td>0,3% FS</td>
<td>0,3% FS</td>
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<tr>
<td><strong>Number of ramps</strong></td>
<td>8</td>
<td>16</td>
<td>16</td>
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<tr>
<td><strong>Hysteresis</strong></td>
<td>OUI</td>
<td>OUI</td>
<td>OUI</td>
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<tr>
<td><strong>PID</strong></td>
<td>OUI</td>
<td>OUI</td>
<td>OUI</td>
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<tr>
<td><strong>PID2</strong></td>
<td>NON</td>
<td>OUI</td>
<td>OUI</td>
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<tr>
<td><strong>Auto tuning</strong></td>
<td>OUI</td>
<td>OUI</td>
<td>OUI</td>
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<tr>
<td><strong>Fuzzy logic</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td><strong>Soft start</strong></td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
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<tr>
<td><strong>Operating mode</strong></td>
<td>AUTOMATIC</td>
<td>AUTOMATIC and MANUAL</td>
<td>AUTOMATIC and MANUAL</td>
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<tr>
<td><strong>Modbus communication</strong></td>
<td>NO if A letter in the part number</td>
<td>NO if L letter in the part number befor the number of output</td>
<td>NO if L letter in the part number befor the number of output</td>
</tr>
</tbody>
</table>
Front face description:

**REG 24**

1. **C1**: indicator showing output 1 ON
2. **SV**: set-point value indicator; on = SV, off = PV present value indicator, if parameter entry
3. **SEL**: selector button
4. Display of parameter value entered, 4 red digits, 10 mm high
5. **UP** (increment) arrow.
6. **DOWN** (decrement) arrow
7. **AL1**: relay output alarm on REG24PTP1A•HU only.
8. **AL2**: Modbus alarm.

**REG 48**

1. **C1**: set-point value indicator.
2. **PV**: process value indicator
3. **C1**: indicator showing output 1 ON.
4. **C2**: indicator showing output 2 ON.
5. **D01**: Alarm 1 output ON
6. **D02**: Alarm 2 output ON
7. Display of process value, 4 red digits, 12 mm high
8. Display of parameter value entered, 4 green digits, 10 mm high
9. **UP** (increment) arrow
10. **DOWN** (decrement) arrow.
11. **SEL**: selector button.
12. **A/M**: automatic / manual mode or configuration key.

**REG 96**

1. **SV**: set-point value indicator
2. **PV**: process value indicator
3. **C1**: indicator showing output 1 ON
4. **C2**: indicator showing output 2 ON
5. **D01**: alarm 1 output ON
6. **D02**: alarm 2 output ON
7. **D03**: alarm 3 output ON
8. Display of process value, 4 red digits, 12 mm high
9. Display of parameter value entered, 4 green digits, 10 mm high
10. **UP** (increment) arrow
11. **DOWN** (decrement) arrow.
12. **SEL**: selector button.
13. **A/M**: automatic / manual mode or configuration key.
CHAPTER 6: EXAMPLE OF IMPLEMENTATION

The function to be done is the piloting of a system of heating. The actuator is managed by a relay and the temperature probe is a PT100, range from 0 to 400 °Celsius. The temperature setpoint is 28°C. It can be adjusted by the operator from 24 to 30°C. One alarm must turn on when the temperature reaches 32°C and a second alarm when the temperature reaches 36°C. The controller power supply is 220VAC.

At first no particular function is needed, just a regulation closer of to the setpoint.

1st step : Controller selection

The demand of two alarms imposes at least a regulator of type 48, Modbus communication to use the software ZelioControl soft. The selected model is:

REG 48 PUN 1 R HU: 1 universal input, 1 relay output, 220VAC power supply, Modbus communication to allow parameter setting using the software

2nd step : The cabling

![Cable diagram with connections for Ph, N, Process output 1, Alarms 1 and 2, and Probe PT100.]}
3 Rd step: Front face programming

Power on the controller,

Probe type setting (PT100)

From the main screen push on the key until this screen appears

Ch 1 functions, for detail see the user guide

Push on the key until this screen appears

Ch 6 functions, for detail see the user guide

Push on key until this screen appears

PvT choice of the probe type

Push on key, the green figure is blinking

PvT = 1 (PT100 probe)

Impulsion sur jusqu’à l’apparition du chiffre 1

Choice validation by pushing the key
Chapter 6 Example of implementation

Setting of the PT100 probe range (0 to 400°C)

Push on key to get this screen

Setting of the minimum value for the PT100 probe \( P_{vb} = 0°C \)

Push on the key, the green figure is blinking

Push on the key to get 0

Choice validation by pushing the key

Setting of the maximum value for the PT100 probe \( P_{vf} = 400°C \)

Push on key until this screen appears

Push on key, the green figure is blinking

Push on key to reach 400

Choice validation by pushing the key

Push on key to get this screen
Chapter 6 Example of implementation

Setting of the choosen decimal value (Pvd) (to display the tenth)

Push the key, the green figure is blinking

Push the key to get the figure 1

Choice validation by pushing the key

Back to the main screen by pushing

Push the key until this screen appears

Push the key until this screen appears

Ch 2 functions, for details see the user guide

Push the key until this screen appears

Push the key until this screen appears
Chapter 6 Example of implementation

Regulation mode selection = heating on channel 1 (rEv)
see details of the choices page 8

Push the key, the line no-- is blinking

One push on ▼ to get rv --

Choice validation by the key

Back to the main screen by pushing

Alarms 1 and 2 parameters setting

Push the key key until this screen appears

Push the key until this screen appears

Push the key key until this screen appears
**Alarm 1 parameters setting at 32°C**

Push the key the green figure is blinking

Push the key until 32.0 value displayed

Choice validation by pushing the key 

One push on to adjust alarm 2

**Alarm 2 setting at 38°C**

Same operation as for alarm 1, adjust at 38.0°C

Validation of the choice by pushing the key  

Back to the main screen by pushing

**Parameter setting of the alarms on high overtaking (do1T)**

Push the key the green figure is blinking

1 push on the key to display the number 1

Validation using the key 

Back to the main screen by pushing
Chapter 6 Example of implementation

4 Th step: Functional test

The controller has been configured as for the example. Real tests can be made.
(Status of the alarm 1 and 2 compare to the temperature displayed on the front face….)
Following the same method it’s possible to modify through the front face the other parameters
(Auto Tuning, PID2, etc…)

Use of the ZelioControl SOFT software

1 St step: install the software ZelioControl Soft (compatible with Windows XP and Vista)

2 Nd step: installation of the TSXCUSB485 driver

3 Rd step: connect the TSXUSB485 to your PC and the controller

Check the rotary swith is positionned to OTHER MULTI
4 Th step : check the communication port parameters of the TSXCUSB485 driver

Open the Windows configuration panel (1), then “System”, then “Hardware” (2) and “peripheral management” (3):

5 Th step: Discover the software ZelioControl Soft

After the installation of ZelioControl Soft done, start ZelioControl Soft:

Select the controllers 48/96
Chapter 6 Example of implementation

6th step: check the communication parameters of the TSXCUSB485 driver

Select the same communication port than for step 4

Chapter 6 Example of implementation

7th step: Communication parameters setting:

Baudrate, parity, station number:

These parameters must be the same than the controller’s one. You can check this value using the controller front face interface and the screen CH9:

In this example: baudrate 9600, parity odd, station number 5

Communication setting using ZelioControl Soft
(Communication default values are : 19200 bauds, parity Even, station n°248)

Baudrate 9600 bds Parity odd Station n°5
Chapter 6 Setup example

8 Th step: Connection to the régulator and application Upload

![Image of ZelioControl Soft interface]

1. Upload choice
2. Confirmation

Important:
Before exit of ZelioControl Soft, don’t forget to save your application. The software closes without an automatic save of the file. (see page 36)

9 Th step: Application display

ZelioControl Soft principal screen

![Image of ZelioControl Soft principal screen]

1. Controller identification
   - SV (setpoint) = 25.0
2. Visible parameter on the product
   - No display through ZelioControl Soft
3. Hidden parameter on the product
   - (Settable through the software)
4. Hidden parameters
   - for details see user guide

Important:
Before exit of ZelioControl Soft, don’t forget to save your application. The software closes without an automatic save of the file. (see page 36)
**Operations:**

1. **Man** switches to manual mode
2. **Stby** Control RUN/STANDBY
3. **NOT USED**
4. **PrG** Ramp soak operation command (Off/Run/hold)
5. **AT** Auto Tuning Command (Off/ON/Low)
6. **LACh** Output alarm retain
7. **Svn** Preselection setpoint (0:Sv0 default value)
8. **PLn1** Preselection PID (0:pid0 default value)
9. **AL1 AL1L** Alarm 1 low limit *(example: 32°C)*
   a. **AL1h** Alarm 1 high limit
   b. **AL2 AL2L** Alarm 2 low limit *(example: 36°C)*
      AL2h Alarm 2 high limit
   c. **AL3 AL3L** Alarm 3 low limit
      AL3h Alarm 3 high limit
   d. **AL4 AL4L** Alarm 4 low limit
      AL4h Alarm 4 high limit
   e. **AL5 AL5L** Alarm 5 low limit
      AL5h Alarm 5 high limit
   f. **LoC** Front face keys locked

**Note:** The REG48 includes 2 alarms, the REG96 3 alarms. The alarms 4 and 5 are accessible through Modbus only.

**Note:** if auto tuning then the setting of P/I/D/hys/bal/ar is automatic
ZelioControl SOFT screen PID CH2

PID parameters:
1. Sv0 Setpoint
2. P Proportional factor
3. I Integrale factor
4. d Derivation factor
5. hyS Hysteresis (0 to 50% FS)
6. CoL Cooling proportional band
7. db Dead band
8. bAL Output convergence value
9. Ar Anti reset windup – ovoid overshoot if PID inactive
a. rEv Normal/reverse – selection type (example: rEv – see page 8)
b. SvL SV low limit - (example: 0°C)
c. SvH SV high limit - (example: 400°C)
d. TC1 OUT 1 proportional cycle (if solid state interface type: max frequency switching)
e. TC2 OUT 1 proportional cycle (if solid state interface type: max frequency switching)
f. PLC1 OUT 1 lower limit - (if analog)
g. PhC1 OUT 1 upper limit - (if analog)
h. PLC2 OUT 2 lower limit - (if analog)
i. PhC2 OUT 2 upper limit - (if analog)
j. PCUT Select output limiter type - (PLC1/2 – PhC1/2)
k. NOT USED

Remind: if auto tuning then the setting of P/I/D/hys/bal/ar is automatic
Setpoints and PID settings:

1. **Sv1** setpoint 1
   - P1 Proportional 1
   - I1 Integrale 1
   - D1 Derivative 1
   - hyS1 hysteresis 1
   - CoL1 Cooling proportional band 1
   - db1 dead band 1
   - bAL1 output convergence 1
   - Ar1 anti reset windup 1
   - rEv1 Normal/reverse function selection

2. Same for PID 2
3. Same for PID 3
4. Same for PID 4
5. Same for PID 5
6. Same for PID 6
7. Same for PID 7
8. **SvMX** Selectable Sv numbers
9. **PL1M** Currently select PID
### Ramp parameters:

1. **PTn** ramp soak pattern – ramp number selection
2. **TIMU** ramp soak time unit (hhmm or mmss)
3. **Sv1** setpoint ramp 1
   - **TM1r** ramp soak 1 ramp time
   - **TM1s** ramp soak 1 seg soak
4. Same for ramp 2
5. Same for ramp 3
6. Same for ramp 4
7. Same for ramp 5
8. Same for ramp 6
9. Same for ramp 7
10. **a** Same for ramp 8
11. **b** Same for ramp 9
12. **c** Same for ramp 10
13. **d** Same for ramp 11
14. **e** Same for ramp 12
15. **f** Same for ramp 13
16. **g** Same for ramp 14
17. **h** Same for ramp 15
18. **i** Same for ramp 16
19. **j** Mod ramp soak mod (0 to 15)
20. **k GsoK** guaranty soak (ON/OFF)
21. **l GS-L** guaranty soak lower limit
22. **m GS-h** guaranty soak upper limit
23. **n PvST** Consideration of the global nature of the programmed curve (OFF)
   - Consideration of the real value measured for starting up (ON)
24. **o ConT** 3 choices rES/CON/INI
25. **p PTnM** sets the max pattern selection
26. **q Pmin** sets the min pattern selection
**Monitoring functions:**
1. **STAT**: ramp soaks progress
2. **Mv1**: output 1
3. **Mv2**: output 2
4. **PFb**: PFB input value display
5. **rSv**: RSV input value display
6. **NOT USED**
7. **TM1**: remaining time on timer 1
8. **TM2**: remaining time on timer 2
9. **TM3**: remaining time on timer 3
a. **TM4**: remaining time on timer 4
b. **TM5**: remaining time on timer 5
c. **FALT**: Fault status error source display
d. **Plno**: PID in progress
e. **Ptno**: ramp in progress

**Note:** Data used only with the Software. Updated only after the upload.
Setup:
1 **PV T** Sensor type selection (example: 1 PT100)
2 **Pvb** Pv input lower limit - (example: 0.0°C)
3 **PV F** Pv input upper limit - (example: 400.0°C)
4 **Pvd** decimal position - (example: 1)
5 **PV U** unit selection ° Celsius or ° Fahrenheit (example: °C)
6 **CUT**
7 **PvoF** PV input shift offset
8 **SvoF** SV shift offset
9 **TF** PV input filter
a **AdJO** user zero adjustement
b **AdJS** user span adjustment
c **rCJ** Compensation weld for thermocouple probe
d **NOT USED**
f **C1r** OUT1 range (if OUT 1 is analog)
g **C2r** OUT2 range (if OUT 2 is analog)
h **Flo1** OUTPUT 1 set value during fault
i **Flo2** OUTPUT 2 set value during fault
j **SFO1** Soft start OUT 1 set value (if Output 1 digital -3% =0 , 103% =1)
k **SFO2** Soft start OUT 2 set value (if Output 2 digital -3% =0 , 103% =1)
l **SFTM** Soft start set time
m **Sbo1** during standby OUT 1 set value
n **Sbo2** during standby OUT 2 set value
o **SbMD** standby mode setting – alarms output state in standby mode
p **AoT** type off output retransmission (Modbus only)
q **AoL** AO lower limit scaling (Modbus only)
r **Aoh** AO upper limit scaling (Modbus only)
System parameters:
1 UkEy  User key assignment setting
2 NOT USED
3 do1T  DO1 output event setting - alarm 1 type configuration
4 doP1  DO1 option function setting - hold alarm 1
5 do2T  DO2 output event setting - alarm 1 type configuration
6 doP2  DO2 option function setting - hold alarm 2
7 do3T  DO3 output event setting - alarm 1 type configuration
8 doP3  DO3 option function setting - hold alarm 3
9 do4T  DO4 output event setting - alarm 1 type configuration
a doP4  DO4 option function setting - hold alarm 4
b do5T  DO5 output event setting - alarm 1 type configuration
c doP5  DO5 option function setting - hold alarm 5
d rMP  ramp use on setpoint change
e rMPL ramp SV decline
f rMPh ramp SV incline
g rMPh ramp SV slope time unit
h SvT ramp SV-SV display mode selection
i CTrL select PID/FUZZY/SELF function
j NOT USED
k onoF hysteresis mode setting
l SLFb pv stable range
m STMd start mode selection
ZelioControl Soft screen – ALM Ch8

Alarms setting:
1. A1hy alarm 1 hysteresis (0 to 50% FS)
2. dLy1 alarm 1 delay – alarm 1 depending the selected unit
3. dL1U alarm 1 time unit – alarm time unit (0=second – 1=minute)
4. A2hy alarm 2 hysteresis
5. dLy2 alarm 2 delay délai - alarm 2 depending the selected unit
6. dL2U alarm 2 time unit - alarm time unit (0=second – 1=minute)
7. A3hy alarm 3 hysteresis
8. dLy3 alarm 3 delay - alarm 3 depending the selected unit
9. dL3U alarm 3 time unit - alarm time unit (0=second – 1=minute)
a. A4hy alarm 4 hysteresis
b. dLy4 alarm 4 delay - alarm 4 depending the selected unit
c. dL4U alarm 4 time unit - alarm time unit (0=second – 1=minute)
d. A5hy alarm 5 hysteresis
e. dLy5 alarm 5 delay - alarm 5 depending the selected unit
f. dL5U alarm 5 time unit - alarm time unit (0=second – 1=minute)
g. NOT USED
h. NOT USED
i. NOT USED
ZelioControl Soft screen - CoM CH9

Modbus communication parameters display:
1. Stno: station number (5 in the example)
2. CoM: baudrate and parity (96 = 9600 bauds, odd parity as for the example)
3. PcoL: Communication type (Modbus fixed value)
4. SCC: read/write possible (up load/down load (fixed value))

Note: For communication parameters setting see page 23

ZelioControl Soft screen - PFb CH10

Feedback position:
1 NOT USED
ZelioControl Soft screen - PAS CH11

Passwords setting:
1 PAS1 Password 1 (default value = 0000)
2 PAS2 Password 2 (default value = 0000)
3 PAS3 Password 3 (default value = 0000)
Environment parameters configuration:
1 ToUT Time delay to principal screen return after key action
2 NOT USED
3 SoFK Blinking or fix state of front face alarm leds
4 ALMF Ramps execution order modification
5 bCon NOT USED
6 PTnT
7 NOT USED
8 L-C1 Led function selection
9 L-C2
a Ldo1
b Ldo2
c Ldo3
d L-Sv
e L-Mv
f LMA
gLSTB
h LrEM
i L-AT
j rST controller reset
Application file saving under ZelioControl SOFT

Application file saving:

1. File selection
2. Save As and then indicates the path for the file

Other functions:

- Report function: all parameters display (printing possibility)
- Download (Application transfer from PC to controller using Modbus)
- Upload (Application transfer from controller to PC using Modbus)