AEL
HEATING SOLUTIONS
Telephone: 01928 579 068 for Technical Assistance

2019 / 20

CONTROLLER MODEL TSRE010 MD V17

INSTRUCTIONS FOR PROGRAMMING AND OPERATION

AELTHERM

WALL MOUNTED SUB STATION

The product has made according to the PED 2014/68/UE.

All rights in this document are reserved under law; no part hereof may be reproduced.

AEL/TS reserves the right to modify, without notice obligation, technical and constructive features of every product mentioned in this work.

CONTENTS

TECHNICAL FEATURES

PRINCIPAL COMPONENTS

- Power supply: 230 V AC. Low-voltage section power requirement: max 8 VA (the transformer and the 24 V AC and 230 V AC power supplies are protected by fuses)
- Microprocessor control
- LCD graphic display: 128 x 64, backlighted
- 10-key programming keyboard
- Buzzer for acoustic alarms/signals
- Clock/calendar with Ultracap for maintaining the date/time settings without mains power supply (for 3 months ca.)
- 4 Inputs for PT1000 sensors: Range -50 / +250 °C, Resolution 0.1 °C
- 1 Input for Ni 1000 sensor: Range -40 / +140 °C, Resolution 0.1 °C
- 1 Input for Limit Thermostat for Heating: 230 V AC
- 1 Input for Limit Thermostat for DHW: 230 V AC
- 1 Input for Limit Thermostat for Heating: 24 V AC
- 1 Input for Limit Thermostat for DHW: 24 V AC
- 1 Input for external switch
- 1 Input flow switch: on/off or turbine type
- 1 Input for impulses from Heat Meter
- 2 Inputs for minimum and maximum pressure switches
- 2 Inputs Aux, configurable, for future use for voltage- or potentiometer readings
- 1 Output: 230 V AC, max 10 A
- 1 Output: 24 V AC, max 4 VA
- 1 Output 230 V to relay: max 10 A, for pump
- 1 Output 230 V to relay: max 5 A Open/Close, for per Heating Servomotor
- 1 Output 230 V to relay: max 5 A Open/Close, for DHW Servomotor
- 1 Output 230 V to relay max 5 A Open/Close, for domestic hot water On/Off Valve Servomotor
- 1 Output to relay: max 5 A, potential-free contact, NC COM NA for “Boiler Crisis” signaling
- 1 Output 0..10 V, max 20 mA, with supply for Heating Servomotor, 24 V AC, max 2 VA
- 1 Output 0..10 V max 20 mA, with supply for DHW Servomotor, 24 V AC, max 2 VA
- Connector with dual RS232 port for MODBUS
- BDM connector for microprocessor reprogramming.

SAFETY STANDARDS

They comply with the following regulations:

- EN 61000-6-3:2007 +/A1:2011 +/A2:2012
- EN 61000-3-2:2014
- EN 61000-3-3:2013 +/A1:2018
- EN 61000-6-1:2007
- EN 60335-1:2012 +/A1:2018

CE

and meet the essential requirements required by the Directives

- EMC 2014/30/UE
- Low voltage 2014/35/UE
- RoHS 2011/65/UE
- PED 2014/68/UE Art.4 par.3

- Working temperature of the electronic cards +10 / +40 (room temperature)
- The cables used for wiring the unit are insulated to withstand temperatures in excess of 90 °C.
- The control devices powered at 24 V AC are supplied through a safety transformer.
- A safety fuse is installed in series with the transformer primary.

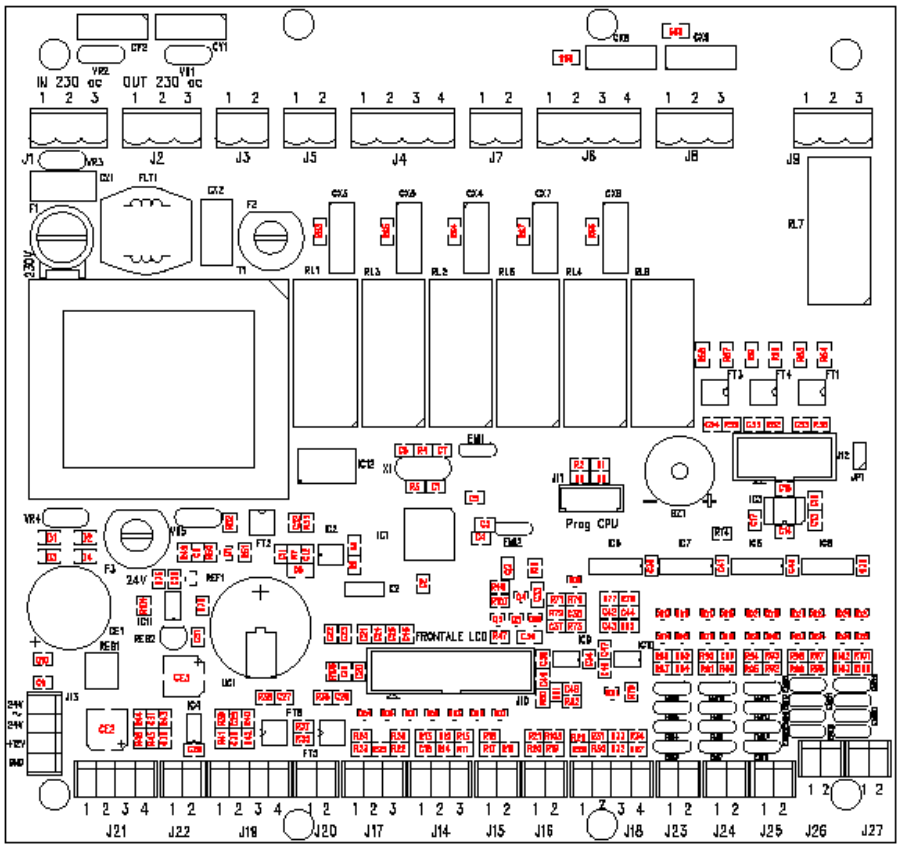
NOTE: The controller is designed for equipment control in normal operating conditions. In cases in which a breakdown or malfunction could lead to an anomalous operating condition such as to cause injury to persons or damage to the equipment itself or other property, it will be necessary to incorporate additional devices (limiters or safety commands) and/or systems (alarm or supervisory systems) dedicated to signaling or providing protection in case of breakdown or malfunction; these devices/systems must be incorporated as integral parts of the control system.

WARNING:
During installation, electrical connection, and maintenance of the system, ensure that:

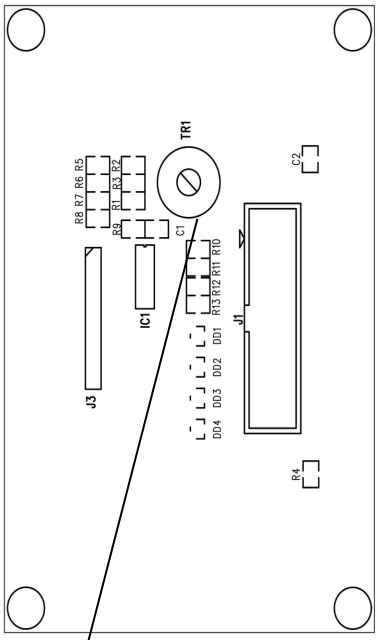
- *Power to the system is cut via the two-pole cutout switch in order to prevent any possible injury to persons and/or damage to the equipment and/or electrical shocks. Do not touch or disconnect any electrical components if the power supply is connected.*
- *The controller is not installed in a polluted environment or an environment in direct contact with explosive and/or inflammable gases.*
- *The controller is not directly exposed to jets of water, to magnetic interference and/or to strong radio interference (transmitting antennas).*

COMPONENTS LAYOUT

Main Circuit Board



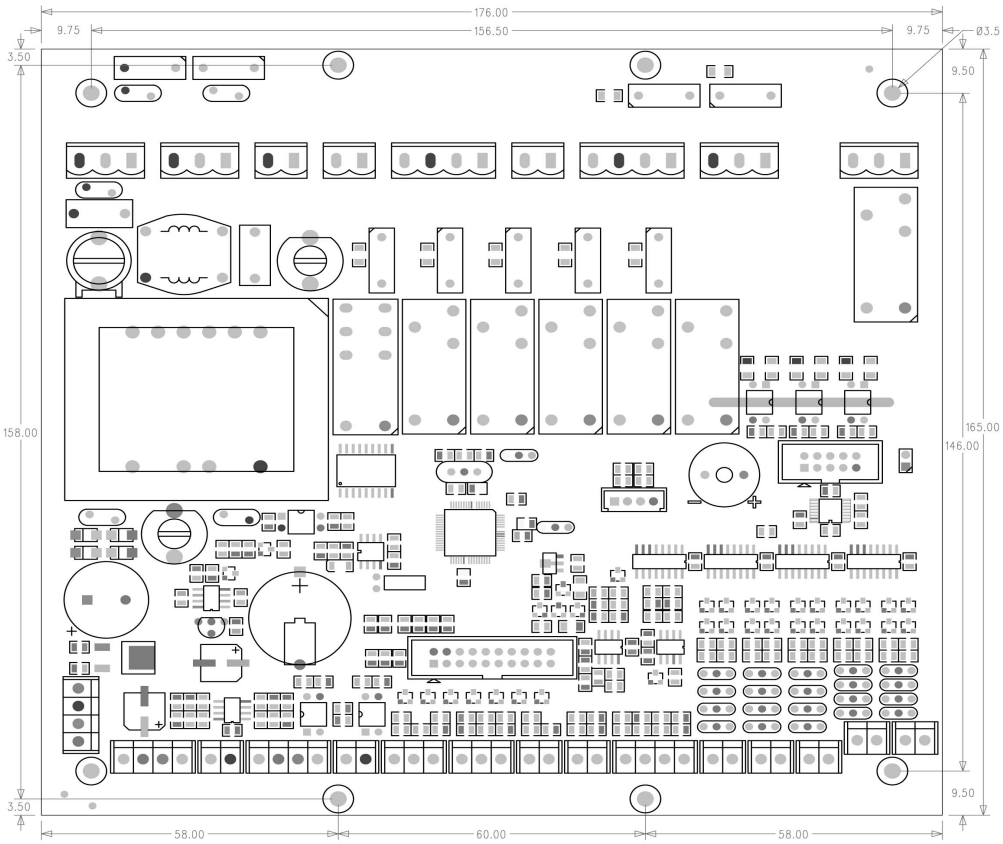
LCD Card



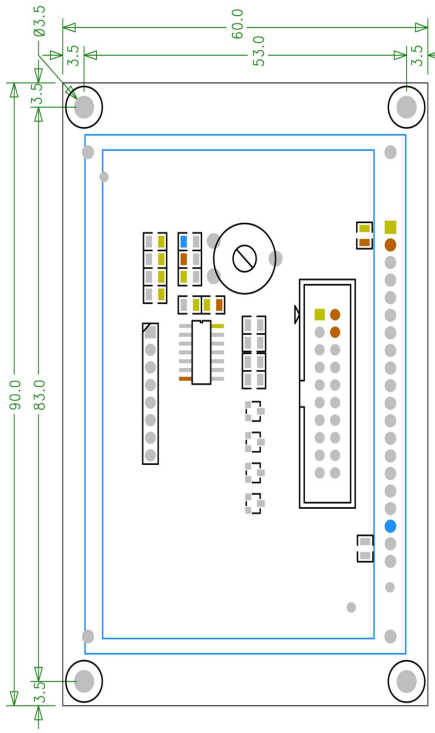
Trimmer TR1 adjusts LCD display contrast

CIRCUIT BOARD DIMENSIONS

Main Circuit Board

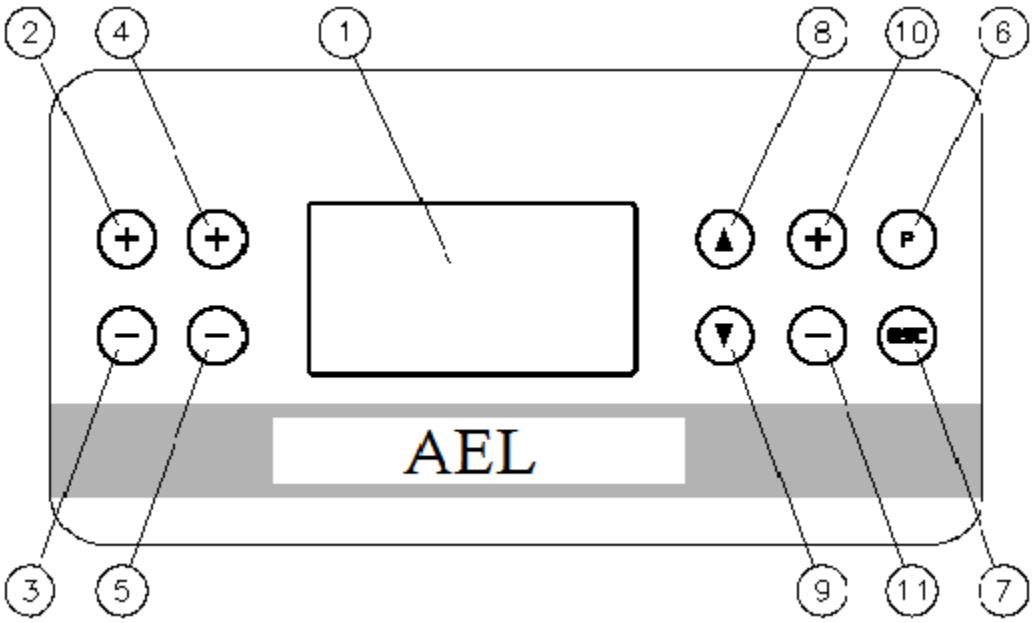


LCD Card



F1 : Fuse: 6.3 A (in some case 10 A) on 230 V AC outputs.
This fuse cuts power to the 230 V components but not to the circuit board.
F2 : Fuse: 315 mA on 8 VA transformer primary.
This fuse cuts power to the logic circuits (all the relays open).
F3 : Fuse: 1 A on 24 V AC outputs.
This fuse cuts power to the 24 V AC servomotors but not to the 0..10 V outputs.

CONTROL PANEL



KEYBOARD: LIST OF KEYS AND FUNCTIONS

1	Backlighted LCD graphic display (the LCD display light remains on for 4 minutes ca.)
2 & 3	Not enabled on this model
4 & 5	Directly regulate the Sec temperature from the main menu.
6	For calling up the “parameters programming” function to select programmable parameters; if held down for more than 3 seconds, accesses the Password menu.
7	For exiting the “parameters programming” function, for exiting the various submenus and, if held down for more than 3 seconds, for resetting any alarms (if pressed in the main page, resets the password).
8 & 9	For moving forward and back through the various menus and for moving the cursor to a parameter. for programming.
10 & 11	For modifying the programmable parameters.

MENU MANAGEMENT

The controller features various menus at different access levels: User, Installer, and Manufacturer.
Press ▲▼ to scroll the menus.
Press the P button to access the programming mode. If there are no programmable parameters, the controller is not active; if there are programmable parameters, a cursor flashes on the selected parameter. Press P again or press ▲▼ (10 and 11) to move to the next programmable parameter (if applicable). Use the +− buttons to modify the selected parameter **WARNING: all modifications are memorized immediately; there is no need to press any other buttons.**
Press ESC to exit the programming mode (press ESC again to return to the main menu).

The Installer and Manufacturer menus are password-protected. To access, in the Password menu:

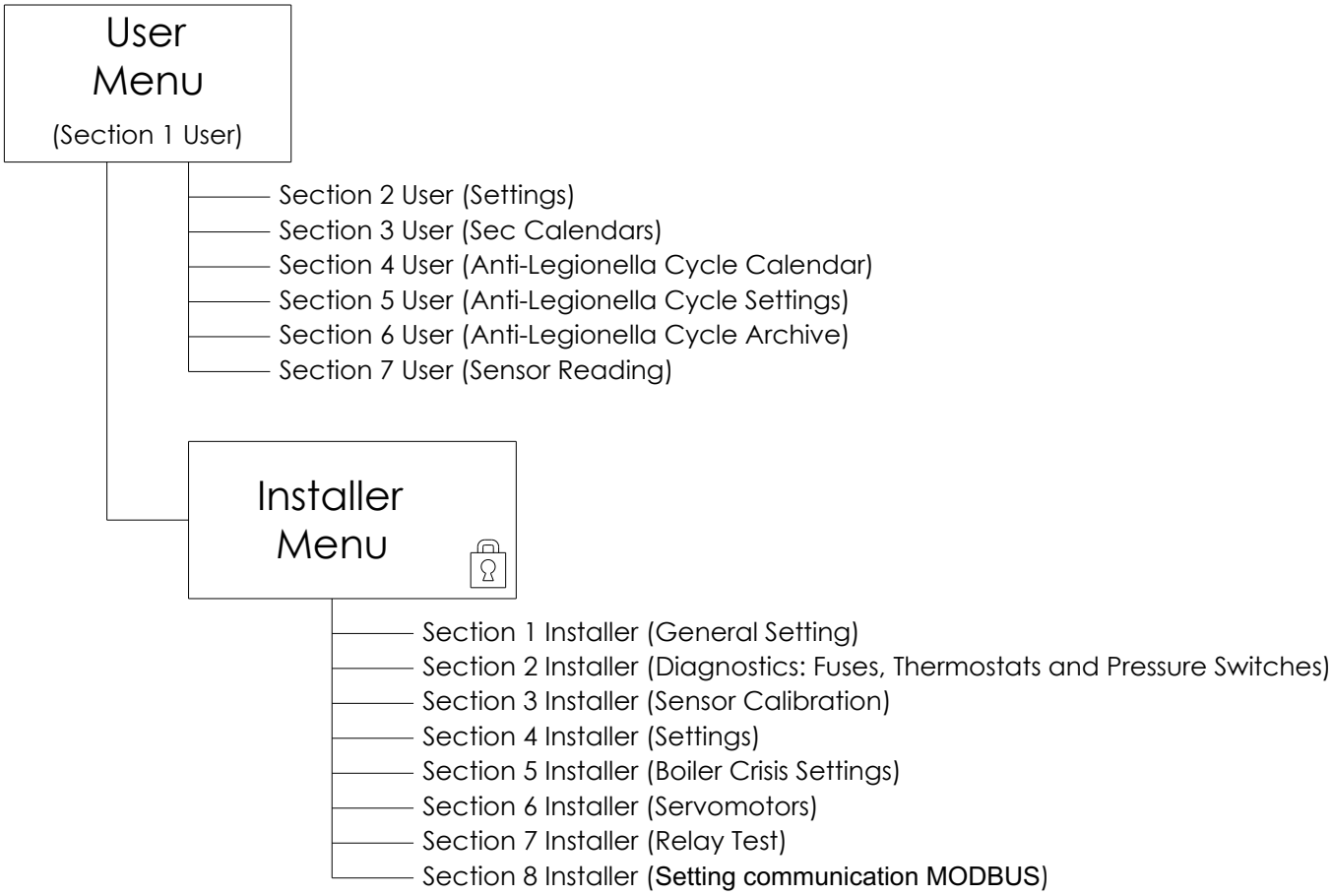
- press P and hold down for at least 3 seconds to display a screen with the password code request.
- type in the Installer code (factory default value = 1111) or the Manufacturer code (this value is communicated by AEL/TS only in case of necessity) and then press ESC to access the selected level.

The Installer code accesses only the Installer menus, while the Manufacturer code permits access to both the Installer and the Manufacturer menus. After entering the level, press ▼ to access the nest Installer or Manufacturer menus; with a menu selected, press P to access the relative submenus.

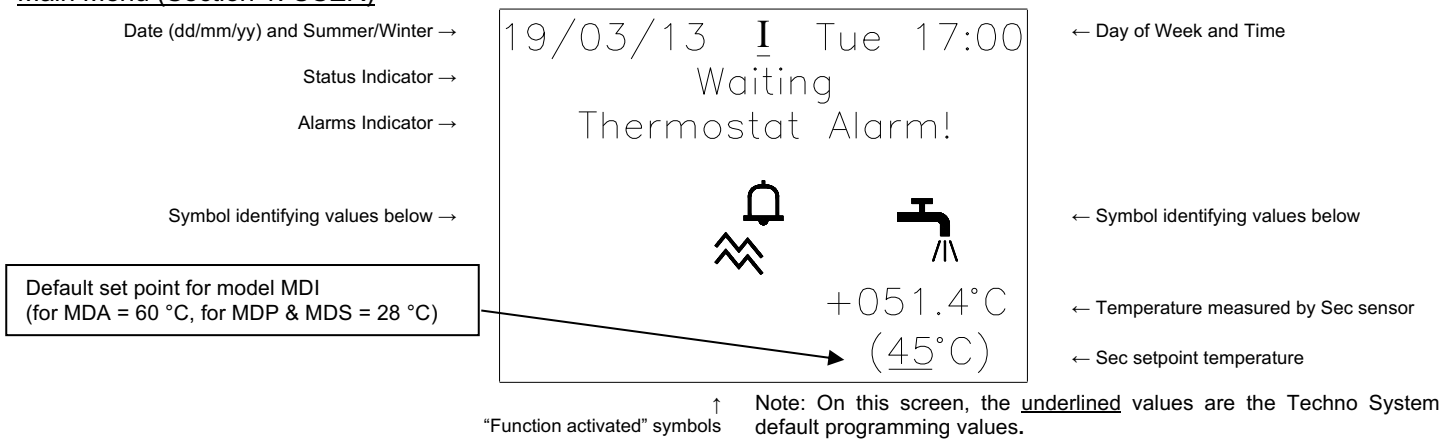
The procedures illustrated above for the User menu also apply when making modifications in the Installer and/or Manufacturer menus.
To exit either of these menus, press ESC to return to the previous menu (press ESC again to return to the main menu).

After 30 minutes of inactivity (no buttons pressed), the system will automatically return to the main User menu and the password will be reset.

MENU STRUCTURE



Main Menu (Section 1: USER)



Note: On this screen, the underlined values are the Techno System default programming values.

After the date is set, the clock/calendar **automatically sets the day of the week** and automatically switches between **standard and daylight saving time**.

The circuit board **status indicator** displays the current controller activity.
The messages that may be displayed are shown below:

- **Waiting**
- **Production**
- **Anti-Legionella**

The **alarms indicator** shows the type of problem/s diagnosed by the controller (in order of alarm priority).
The messages that may be displayed are those explained below:

- **Fuse Break !** (check fuses F1 and F3. If fuse F2 is blown, the circuit board will be off.)
  This alarm resets when the damaged fuse/s is/are replaced.
- **Thermostat Alarm !** (one or more thermostats, if installed, have tripped).
  This alarm resets when the thermostat/s return to the rest state.
- **Sensor Failure !** (check the active sensors for breakdowns or connection problems).
  This alarm resets when the damaged sensor/s is/are replaced and or reconnected.
- **Anti-Legionella Alarm** (the anti-Legionella cycle has not run for the minimum programmed time).
  This alarm resets when ESC is held down for 3 seconds; the alarm is memorized in the "anti-Legionella cycle archive."
- **Low Pressure** (the low pressure switch on the Heating side – if installed – has tripped)
  This alarm resets when the pressure switch returns to the rest state.
- **High Pressure** (the high pressure switch on the Heating side – of installed – has tripped).
  This alarm resets when the pressure switch returns to the rest state.

Note: the temperature sensors supported by this controller are the PT1000 type (if different sensors are installed, the controller will not operate and the "Sensor Breakdown" alarm will be given.

All the information relative to the secondary circuit is reported on the lower right.
The symbol, the measured temperature, and the set point will vary according to the operating status of the Modulo TS.
These are:

- **Production** (no symbol)
- **Anti-Legionella cycle** (symbol:)

Secondary Set Temperature indicates the value desired in the secondary circuit (this set temperature is given by the various settings and is based on unit status). If the unit is in **Production** status, use buttons 4 and 5 on the control panel to directly modify the value.

The bottom center area of the screen reports all the information relative to the active functions. .
The screen may display:

When the acoustic signaling function is active.

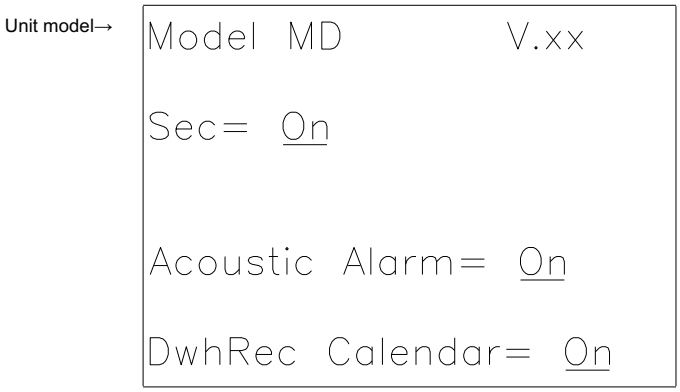
When the periodic anti-Legionella cycle function is active

Settable values:

Date → used to set the date
Time → used to set the time
Sec Set Temperature → See explanation above.

To modify a value, press P and scroll with the ▲▼ buttons to the desired parameter; press +− to modify the value; use ▲▼ to scroll to other values.
When all modifications are completed, press ESC.
Press ▲▼ to scroll the submenu pages.

Section 2 USER (Settings)



Note: On this screen, the underlined values are the Techno System default programming values.

Settable values:

Sec → Sec may be enabled or disabled (Sec is disabled only in special cases).

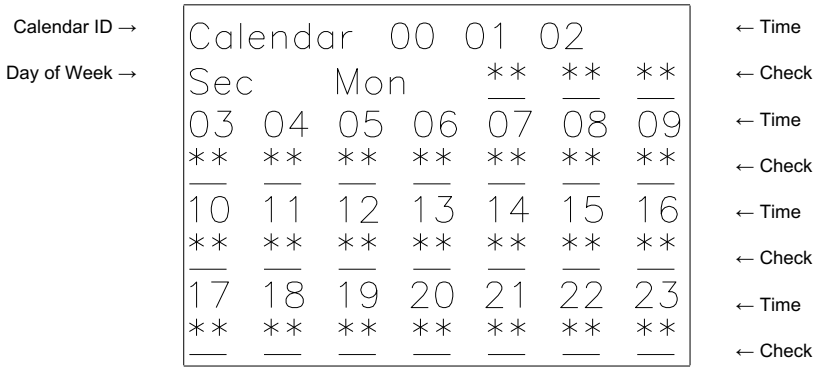
Acoustic Alarm → The acoustic alarm may be enabled or disabled .

Dwh Rec Calendar → The controller is equipped with an onboard weekly calendar for Sec management; the on/off function may be set by half-hour intervals (see following pages):

- **On** activates Sec production
- **Off** deactivates Sec production.

To modify a value, press (P) and scroll with the (▲)(▼) buttons to the desired parameter; press (+)(−) to modify the value; use (▲)(▼) to scroll to other values.
When all modifications are completed, press (ESC).
Press (▲)(▼) to scroll the submenu pages.

Sections 3 USER (Sec Monday to Sunday Calendars)



Note: On this screen, the underlined values are the Techno System default programming values.

Settable values:

Check → To enable Sec and Recirculation during the desired hours of the day, with 30-minute interval offset:

- ***** indicates the half hour on the active calendar.
- A **blank space** indicates that the calendar is not active in that half hour.

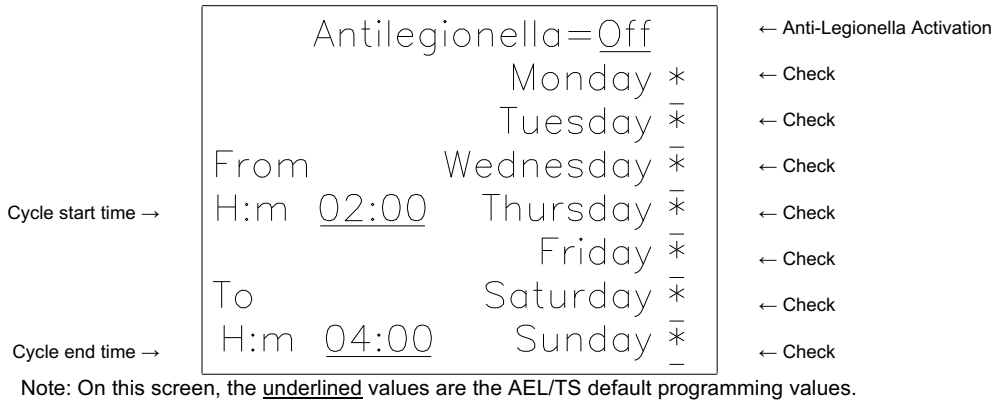
Day of Week → Selecting **Day** displays the calendar in question. Use (▲)(▼) to scroll to the desired day (1 submenu page for the 7 days of the week).

NOTE: To set uninterrupted Sec and Recirculation, set the Sec calendar to Off in the Section 2 User menu.

To modify a value, press (P) and scroll with the (▲)(▼) buttons to the desired parameter; press (+)(−) to modify the value; use (▲)(▼) to scroll to other values.
When all modifications are completed, press (ESC).
Press (▲)(▼) to scroll the submenu pages.

Section 4 USER (Anti-Legionella Cycle Calendar)

This screen is not necessary for all the models.



Note: On this screen, the underlined values are the AEL/TS default programming values.

Settable values:

Anti-Legionella Activation → the user may enable or disable the anti-Legionella cycles:
- Select Off to deactivate the cycle (even if the check is on *).
- Select On to activate the cycle (the cycle will be run on the days marked with the asterisk *).

Check → The user may enable or disable the anti-Legionella cycles for different days of the week:
- * indicates that the anti-Legionella is active on the corresponding day.
- A **blank space** indicates that the anti-Legionella is not activated.

Cycle Start Time → Used to set the starting time for the anti-Legionella cycle: the time from which the controller counts the minutes during which the cycle achieves the Set parameters(refer to next section for anti-Legionella cycle settings).

Cycle End Time → Used to set the end time for the anti-Legionella cycle: the time at which the controller stops counting the minutes during which the cycle achieves the Set parameters(refer to next section for anti-Legionella cycle settings).

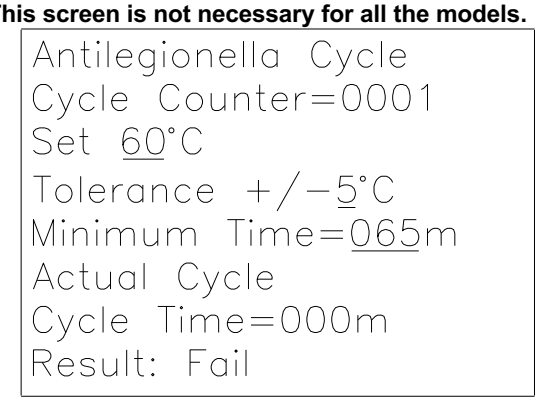
NOTE: For 24-hour use, set 00:00 as Start Time and 23:59 as the End Time.

WARNING
*Failure to meet the acceptability criteria for the Anti-Legionella cycle (preset temperature within the preset tolerance, for the preset time) triggers the **"Anti-Legionella Alarm"** in the Main Menu. The alarm is accompanied by an acoustic signal (if the acoustic signaling function is activated).*

To modify a value, press (P) and scroll with the (▲)(▼) buttons to the desired parameter; press (+)(−) to modify the value; use (▲)(▼) to scroll to other values.
When all modifications are completed, press (SET).
Press (▲)(▼) to scroll the submenu pages.

Section 5 USER (Anti-Legionella Cycle Settings)

This screen is not necessary for all the models.



Cycle Temperature Setpoint →

Cycle tolerance range →

Minimum cycle time →

← Current cycle time

← Current cycle result

Note: On this screen, the underlined values are the Techno System default programming values.

The **Cycle Counter** displays the number of cycles run (maximum permissible number of cycles: 65535).
Current Cycle can be used to display the last cycle run (or underway), followed by the **Time** (maximum cycle time during which the temperature remained within range) and the **Result** (**OK** indicates that the time measured is within the preset minimum time limit; **Fail** indicates that the maximum time measured is less than the preset minimum time).

Settable values:

Set → For setting the temperature for the anti-Legionella cycle.

Tolerance → For setting the admissible range of variation from the preset temperature for validation of the Anti-Legionella cycle.

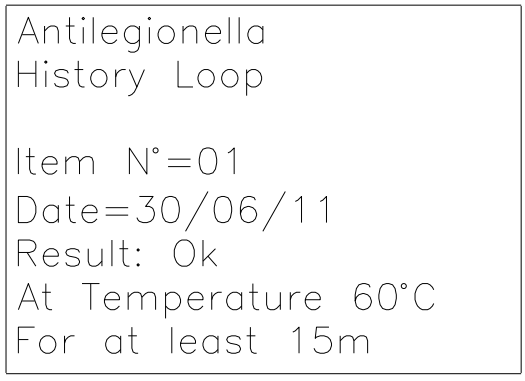
Minimum Time → For setting the minimum time for validation of the anti-Legionella cycle.

WARNING
The temperature and the corresponding disinfection times must be selected on the basis of system type and relative intended use. In accordance with current laws and regulations, the following are indicative of the criteria that may be adopted:
Temperature 70 °C for 35 minutes
Temperature 65 °C for 50 minutes
Temperature 60 °C for 65 minutes.

To modify a value, press (P) and scroll with the (▲)(▼) buttons to the desired parameter; press (+)(−) to modify the value; use (▲)(▼) to scroll to other values.
When all modifications are completed, press (ESC).
Press (▲)(▼) to scroll the submenu pages.

Section 6 USER (Anti-Legionella Cycle Archive)

This screen is not necessary for the model MDA, MDP, and MDS units



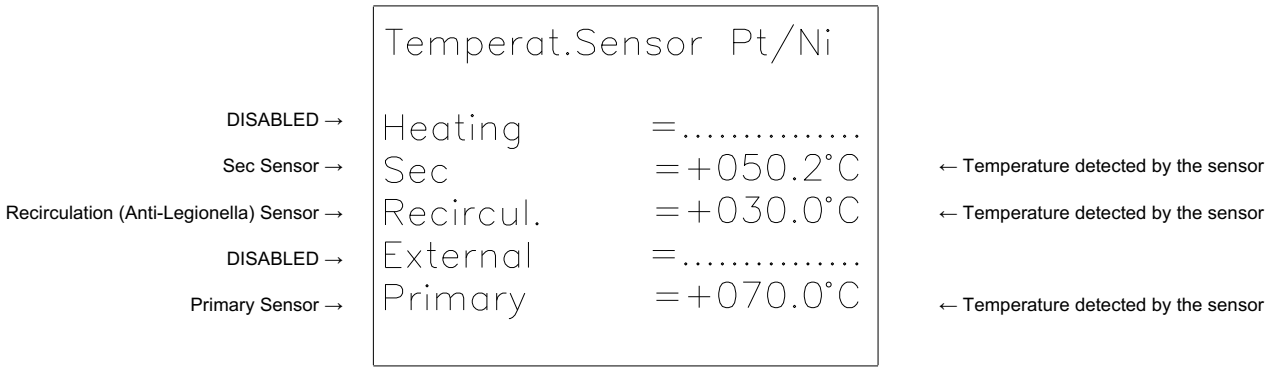
This page provides the user with an overview of the Results of past Anti-Legionella cycles. Select a **Record No.** to display the date on which the cycle was run (**Date…** line), whether or not it was successful (**Result…** line: **OK** if the measured time was within the minimum limit, **Fail** if the measured time was less than the preset minimum), the preset temperature for the cycle (**at Temperature…** line), and the maximum time at temperature (on the **for at least…** line).

Settable values:

Record No. → Number of the record of the cycle in the anti-Legionella Archive. Change this number to display the results for any previous cycle (the data for the last 64 cycles run are memorized). Selecting “01” will display the data for the last cycle; “02,” the data for the next-to-last cycle; etc.

To modify a value, press (P) and scroll with the (▲)(▼) buttons to the desired parameter; press (+)(−) to modify the value; use (▲)(▼) to scroll to other values.
When all modifications are completed, press (ESC).
Press (▲)(▼) to scroll the submenu pages.

Section 7 USER (Sensor Reading)



This page allows the user to check the temperatures measured by the sensors.

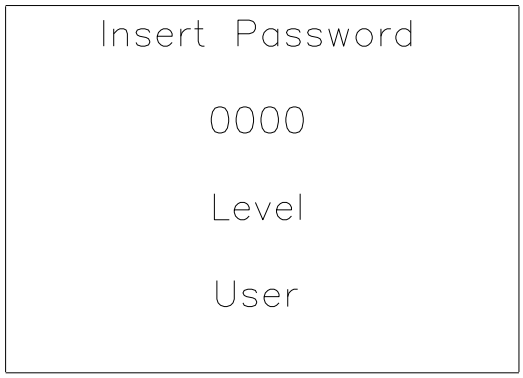
NOTE: A dotted line is displayed if a sensor is not connected or is short-circuited.

WARNING
*If a sensor is not connected or is short-circuited, the Main Menu **"Sensor Breakdown"** alarm trips and an acoustic signal is given (if the acoustic signaling function is activated).*

INSTALLER Menu Heading

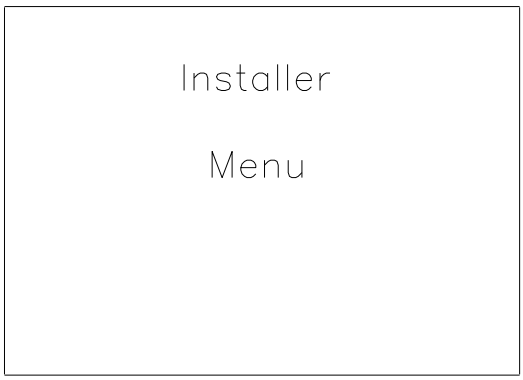
Press and hold down P to enter the Password menu.

Code →



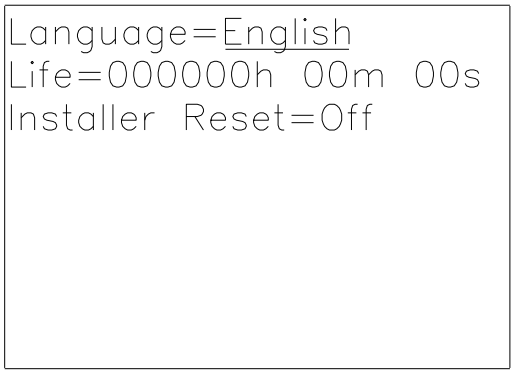
Press P. The **Code** digits will begin flashing.
Use the ▲▼ and P buttons to insert the code "1111."
Press ESC to access the Installer main page.

WARNING
After 30 minutes of inactivity (no buttons pressed), the system will automatically return to the main User menu and the password will be reset.
The password is reset every time the user returns to the main menu.



Press P to enter the Installer menu.

Section 1 INSTALLER (General Settings)



Note: On this screen, the underlined values are the Techno System default programming values.

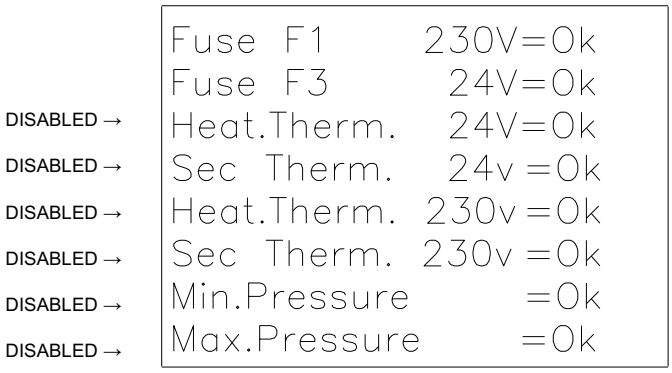
Life reports the time (hours, minutes, seconds) elapsed since the circuit board was first powered.

Settable values:

Language → For selecting the display language.
Installer Reset → If activated, all the User, Installer, and Controller settings are reset to factory defaults.

To modify a value, press P and scroll with the ▲▼ buttons to the desired parameter; press +− to modify the value; use ▲▼ to scroll to other values.
When all modifications are completed, press ESC.
Press ▲▼ to scroll the submenu pages.

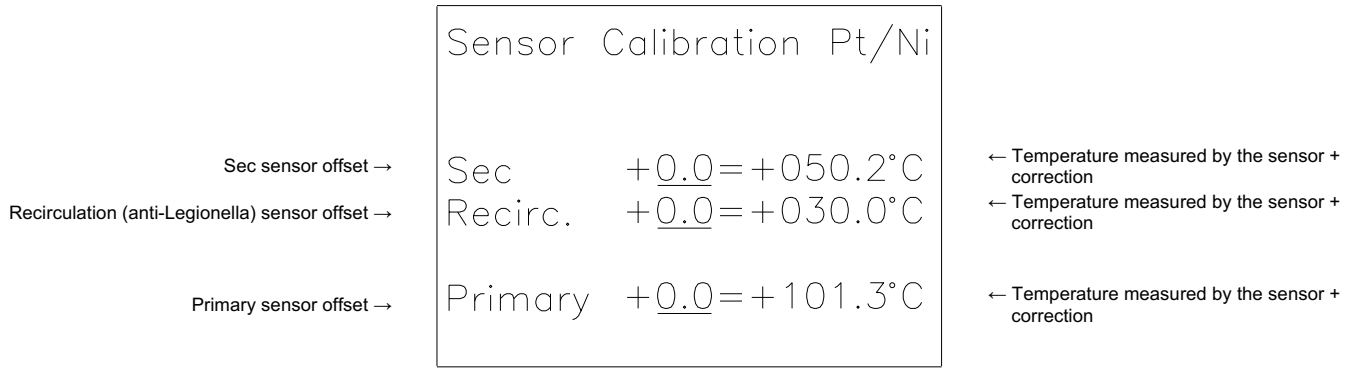
Section 2 INSTALLER (Diagnostics: Fuses, Thermostats and Pressure Switches)



NOTE: Fuse F2 is not shown since the circuit card will not be powered if this fuse is blown (this fuse cuts power to the logic section and all the relays open).

WARNING
*Blowing of one or more fuses triggers the "**Blown Fuse !**" alarm in the main menu and sounds an acoustic alarm (if the acoustic signaling function is active).*

Section 3 INSTALLER (Sensor Calibration)



Note: On this screen, the underlined values are the Techno System default programming values.

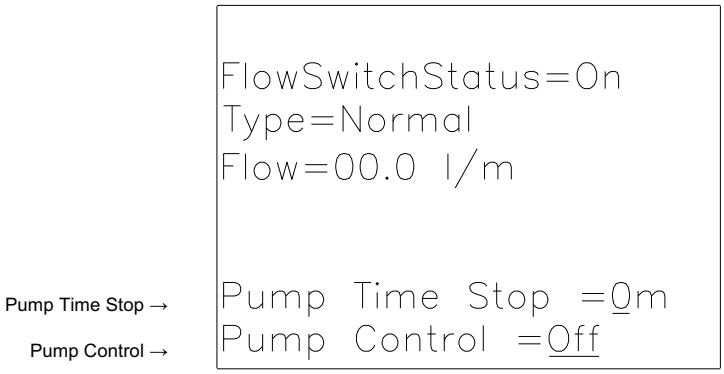
This page permits verifying the temperatures detected by the sensors and adjusting the offsets.

Settable values:
Sensor Offset → permits correcting the reading by +/- 9.9 °C, by modifying the offset value (in the example, +0.0).

NOTE: A dotted line is displayed if a sensor is not connected or is short-circuited.

WARNING
*If a sensor is not connected or is short-circuited, the Main Menu **"Sensor Breakdown"** alarm trips and an acoustic signal is given (if the acoustic signaling function is activated).*

To modify a value, press (P) and scroll with the (▲)(▼) buttons to the desired parameter; press (+)(−) to modify the value; use (▲)(▼) to scroll to other values.
When all modifications are completed, press (ESC).
Press (▲)(▼) to scroll the submenu pages.



Note: On this screen, the underlined values are the Techno System default programming values.

Flow Switch Status Indicates whether or not the flow switch is activated (**On**) or deactivated (**Off**).
Type Indicates the type of flow switch used (**Normal** or **Turbine**).
Flow Rate Indicates the flow rate read by the flow switch in l/m (in case of a turbine type flow switch).

Settable values:

Pump Time Stop → it's possible to set a delayed shutdown of the pump (from 0 to 5 minutes) when the probe detects that the temperature on the secondary circuit has reached the set value fixed on the main menu (with 0 value the pump will stop immediately reached the set)

Pump Control → it's possible to enable or disable the delayed switching off of the pump:

- with Off option selected the function is not active (the pump works continuously)
- with on option selected the function is active (The pump stops after the time indicated on the "time stop pump" row

Warning: In case of the control pump on secondary side this option must be always "ON".

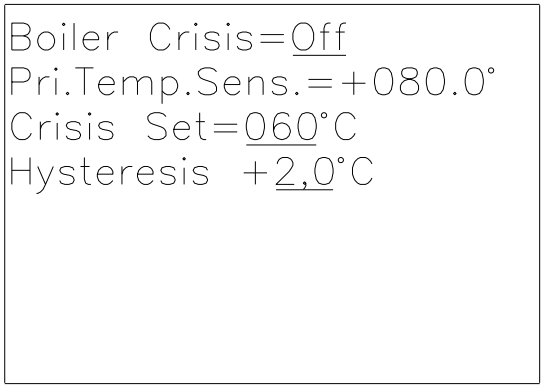
NOTE: in MDI version is not advisable to set a sudden stop of the pump because a continuous switching on and off can create problems

NOTE: In case of twin pump with MASTER / SLAVE logic, it is advised never to activate the pump control, so as to allow an adequate management of the operation without interruptions (any interruption would resume the automatic management parameters making always work the usual impeller).

WARNING
Before setting up the control pump function, check if the boiler or any other instrument of the primary circuit are subject to damage caused by thermal shock(even the stop of the pump can cause this thermal shock)

To modify a value, press (P) and scroll with the (▲)(▼) buttons to the desired parameter; press (+)(−) to modify the value; use (▲)(▼) to scroll to other values.
When all modifications are completed, press (ESC).
Press (▲)(▼) to scroll the submenu pages.

Section 5 INSTALLER (Boiler Crisis Settings)



Note: On this screen, the underlined values are the Techno System default programming values.

Primary Sensor reports the value detected by the sensor on the primary side.

Settable values:

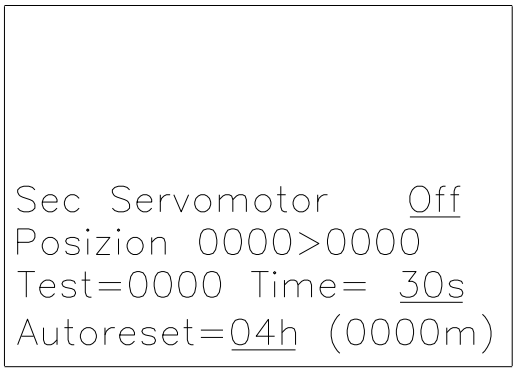
Boiler Crisis → the Boiler Crisis function on the primary side return may be enabled or disabled:
- Off: the function is not active.
- On: the function is activated.

Crisis Set → Maximum temperature setting for Boiler Crisis cut-in.

Hysteresis → Boiler Crisis function cut-in range with respect to preset crisis set temperature value, in °C.

NOTE: When the temperature detected by the sensor on the primary side falls below the Crisis Set value, the Boiler Crisis function is activated; when the temperature is in excess of the Crisis Set + Hysteresis value, the Boiler Crisis function is deactivated.

Section 6 INSTALLER (Servomotors)



Note: On this screen, the underlined values are the Techno System default programming values.

Position indicates the current position and the position the servomotor must reach.

Settable values:

Enable relè → it's possible to choose if enable or disable relès according to servo-motor used:
- if there is a 230V servo-motor should be activated (switch on)
- if there is a 24V servo-motor should not be activated (switch off)

Test → For testing whether the servomotor (at both 24 V and 220 V) interacts correctly with the controller, by setting a percentage value.

Time → For setting servomotor time

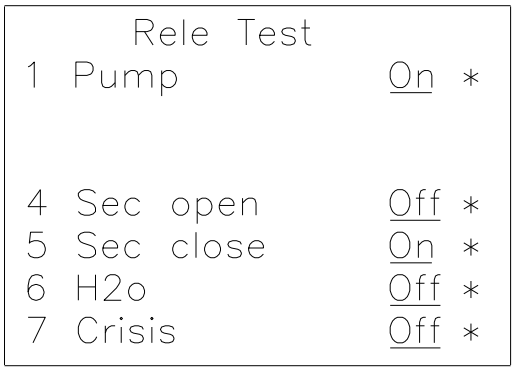
Autoreset → For setting the servomotor automatic reset time (to eliminate the risk that the servomotor lose track of its the real position after a period of operation). The function is deactivated if 0 is set.

Counter → for displaying autoreset time advance.

WARNING
With autoreset activated, the servomotor will close the valve all the way at settable intervals, after which it will return to performing regulation in the normal mode. With the autoreset function deactivated, this momentary inconvenience is eliminated but, in the case valve regulation continues uninterruptedly for long periods, there is the risk that the servomotor may lose its positioning reference.

To modify a value, press (P) and scroll with the (▲)(▼) buttons to the desired parameter; press (+)(−) to modify the value; use (▲)(▼) to scroll to other values.
When all modifications are completed, press (ESC).
Press (▲)(▼) to scroll the submenu pages.

Section 7 INSTALLER (Relay Test)



Note: On this screen, the underlined values are the Techno System default programming values.

Settable values:

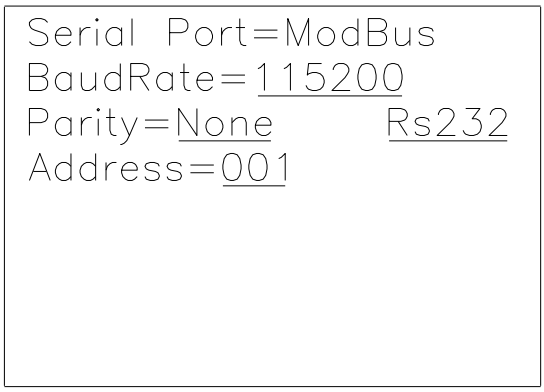
Check → relay status may be inverted:

- ***** indicates that the relay is inverted
- **-** indicates that the relay is in the default position.

Note: Returning to the User menu automatically returns all inverted relays to the default positions.

To modify a value, press (P) and scroll with the (▲)(▼) buttons to the desired parameter; press (+)(−) to modify the value; use (▲)(▼) to scroll to other values.
When all modifications are completed, press (ESC).
Press (▲)(▼) to scroll the submenu pages.

Section 7 INSTALLER (Setting communication MODBUS)



Note: On this screen, the underlined values are the Techno System default programming values.

Settable values:

BaudRate → For setting the baud rate of the serial port
Parity → For setting the baud rate of the parity
Address → For setting the baud rate of the MODBUS address of the device

To modify a value, press (P) and scroll with the (▲)(▼) buttons to the desired parameter; press (+)(−) to modify the value; use (▲)(▼) to scroll to other values.
When all modifications are completed, press (ESC).
Press (▲)(▼) to scroll the submenu pages.