

Installation and operating instructions

S230 Digital differential thermoregulator for controlling solar heating systems.

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1. GENERAL WARNINGS

1.1 Read this section before using the manual

- This manual must be stored in a place near to the instrument for ease of consultation.
- The regulator must not be used with functions other than those described below. Specifically it must not be used as a safety device.

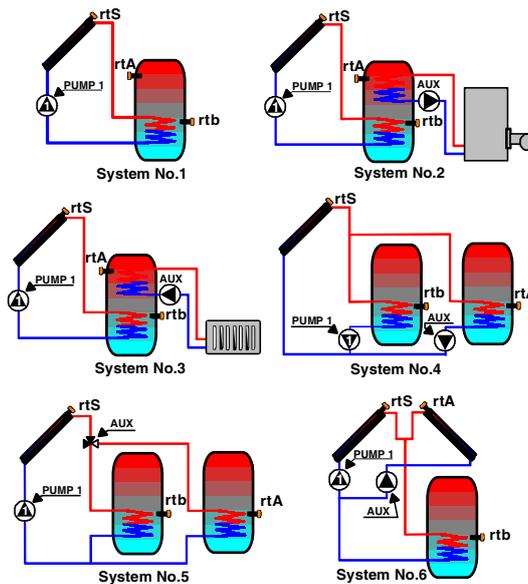
1.2 Safety precautions

- Before connecting the instrument check the label to ensure that the power supply voltage is correct.
- Use the instrument within the specified operating limits, avoiding sudden temperature changes in the presence of high atmospheric humidity levels to prevent the formation of condensation.
- Always disconnect the electrical power supply before carrying out maintenance.
- Take note of the maximum current that can be applied to each relay and the total maximum current (refer to the technical data and the instrument's label).
- In the case of applications in particularly critical environments, it may prove helpful to install a mains filter in parallel with the inductive loads.

2. GENERAL DESCRIPTION

S230 Digital differential regulator for controlling solar heating systems. Three temperature probes, a relay output for controlling the pump, a second output (AUX) which can be configured according to the type of system to be controlled (OFF, boiler integration, heat exchange with an external element, control of a second tank with pump logic or valve logic, control of 2 solar panels) and, according to the model, a third relay and/or buzzer is available for signalling any alarms in progress. The instrument has special functions: solar panel cooling, system shutdown, holiday program, etc.

3. SYSTEM



4. CONTROL

4.1 Pump 1 Output

During normal operation, pump 1 is activated when the difference in temperature between the solar panel probe (rtS) and the boiler 1 probe (rtb) is equal to or higher than the starting **SEt** point value set on the 1st programming level and only if the temperature of the probe rtS is higher than the value set in parameter SAS and the temperature of probe rtb is less than the value set in parameter SAB, unless special functions are enabled.

4.2 Auxiliary Output

The operation of the auxiliary output varies according to the setting of parameter Ofn. Its setting depends on the system to be controlled (see systems on page 1), while parameters OSC and OSt define its working set point.

To simplify the programming of the auxiliary output there is a special parameter (OSL) that automatically converts the setup parameters to the most commonly used values. When parameter OSL is set to the number of the system to be controlled (see systems on page 1), the parameters(OSC, OSt, OFn) are converted automatically to the most commonly used values.

5. INSTALLATION AND ASSEMBLY

4 DIN model The instrument is attached to DIN rails by means of the specific fixing clips located on the rear. Instrument protection rating IP20.

Its DIN module design makes the instrument more versatile in that it can be installed in the most critical environments, using an installation box readily available on the market with the IP protection best suited to the installation site (IP20...IP65).

Panel mounting model: The instrument is designed for mounting on a vertical panel with minimum gauge of 0.5 mm, in a 28.5x71 mm opening, secured simply by means of a press-fit system. Instrument protection rating IP20; front panel protection rating IP54 (for panel-mounting version), to maintain IP54 protection rating on the front panel of the installed instrument, interpose a 50mm \varnothing soft rubber O-ring, with 1.5 mm cord and Shore hardness 40¹.

Alternatively, apply silicone sealant between panel and instrument¹.

Refer to the technical characteristics for operating temperature and relative humidity; install the device in normal pollution conditions. Avoid places subject to pronounced vibration and the presence of corrosive gas. Maintain sufficient clearance around the instrument to ensure adequate ventilation, with a distance between ventilation openings and adjacent surfaces of at least 5 mm.

For both models, once the instrument is installed only the front panel (display and buttons) must be accessible.

6. ELECTRICAL CONNECTIONS

Make sure the power supply voltage is suitable for the instrument (refer to the label on the instrument).The instrument is equipped with screw terminals for connection of power conductors having a minimum cross section of 1.5 mm². Use heat resistant, flexible conductors of suitable cross section in relation to the load. Do not exceed the maximum permissible current on each relay and the maximum total current (see technical data or label affixed to the instrument); in the presence of higher load values install an appropriately rated contactor. Keep the probe cables, the instrument power cable and the load power cables segregated and sufficiently far apart, without crossing and without forming loops.

For the connection wiring diagram refer to the label affixed to the instrument.

7. MAIN FUNCTIONS

7.1 SET-point and parameters programming

Programming procedures are divided into three levels:

1st level: working SET-point (starting differential) can be viewed and changed if required.

2nd level: frequent operating parameters can be viewed and changed if required.

3rd level: all parameters can be viewed and edited; the parameters accessible at the 2nd programming level can be chosen.

Refer to the Programming heading.

7.2 Solar Panel Cooling (FCC)

The FCC function (collector cooling), is controlled by parameters FtC, FtB and FFn.

When the function is enabled (FCC=On), if the temperature of the solar panels reaches the value set in parameter FtC, the temperature to be reached by the boiler(s) is reduced from the value set in parameter(s) SAb/OSt to the value set in parameter FtB for as long as the temperature of the solar panels remains higher than FtC.

¹The constructor declines every responsibility in case of inadequate isolation.

This enables the heat exchange to be increased, thus reducing the temperature of the solar panels.

Parameter FFn can be used to define, once the temperature differential between the solar panels and the boilers has become negative, whether heat exchange is to be activated to increase the temperature of the boiler to the value of SAb/OSt. When the FCC function is active, the message "FCC" alternates with the normal view on the display.

7.3 System shutdown (FbL)

The FbL function (system shutdown) defines a temperature value which, when reached by the solar panels, brings the system to a halt.

This is used to avoid starting the heat exchange if the maximum working temperature of components downstream of the system is exceeded.

When the FbL function is active, the message "FbL" alternates with the normal view on the display.

7.4 Holiday function (FHO)

The FHO function (holiday), which is enabled/disabled manually by holding the ◀MAN (DEF on panel mounting version)+ ▲ALM buttons down for about 3 seconds if FHO=On, is used to prevent the solar panels from overheating when, for example, you are away on your summer holidays and the water in the boiler is not being used.

Control is normally activated when the difference in temperature between the solar panels and the boiler(s) is equal to or less than -10°C (at night, with a hysteresis of 4°C), the heat exchange is started to cool the boiler(s) to 35°C, so that the next day, when the solar panel warms up again, as the boiler is not at the right temperature, the heat exchange is started to prevent the solar panels from overheating.

If the AUX output is set for external integration (OFn= Ht), the latter is disabled when the FHO function is enabled.

It is important to remember to disable the function when you need to start using the boiler water again.

When the FHO function is active, the message "FHO" alternates with the normal view on the display.

7.5 Anti-Freeze Function (FFS)

When the FFS anti-freeze function (solar frost) is enabled (FFS=On), the heat exchange is started if the temperature of the solar panels drops below 4°C to prevent them from freezing, by heating them through the boiler(s).

This function is to be used only with small-sized solar panels, in places with a mild climate and when no anti-freeze fluid has been put into the system.

While the FFS function is active, the message "FFS" alternates with the normal view on the display.

7.6 Cyclic Pump Activation (FOP)

The FOP function is used when the solar panel temperature probe (rtS) cannot be positioned at the hottest point. By activating the pump cyclically for 30 seconds every 30 minutes, the temperature of the probe is increased to that of the highest point.

A difference may also be set for cyclic pump activation so that it is only executed when the differential temperature is close to the starting one (for example, to avoid cyclic activation during the night) and if the boiler(s) has(have) not yet reached the temperature set.

When the FOP function is active, the message "FOP" alternates with the normal view on the display.

7.7 Manual Activation (SMA)

When the ◀MAN (DEF on the panel mounting version) button is pressed for about 4 seconds, the pump(s) is(are) turned on/off manually, but manual operation terminates when the time set in parameter SMA has elapsed or the temperature of the boiler(s) has reached 85°C.

During manual operation, the message "SMA" alternates with the normal view on the display.

7.8 System Analysis

The system analysis menu (CHC) includes some read-only parameters in which the lowest and highest temperatures reached by the three probes during the system's operation are saved permanently. This provides an indication of its operation during system maintenance.

The values saved can be deleted using the parameter Clr.

The instrument also has an alarm memory in which any alarms triggered are saved permanently (see alarms paragraph).

7.9 Alarms

The instrument signals the latest alarm tripped on the display and by means of the alarm outputs (buzzer and/or relay depending on the model) if present; all alarms (up to 12) are saved permanently in the memory in the chronological order in which they occurred; when a new alarm is saved the (LED) LED flashes. Deleting alarms once they have been displayed simplifies the checking of future alarms.

7.10 Setting Up the AUX Output

To make it easier to program the auxiliary output, there is a special parameter (OSL) which automatically converts the setup parameters to the most commonly used values. When the number of the system to be controlled is set in parameter

OSL (see systems on page. 1), the parameters (OSC, OST, OFn) are converted automatically.

7.11 Display

Using parameter rPr, you can establish which temperature is to be displayed during normal operation: solar panel probe (rtS), boiler 1 probe (rtb), AUX probe (rtA), rtS – rtb differential (rd1), rtS – rtA differential (rd2), rtA – rtb differential (rd3).

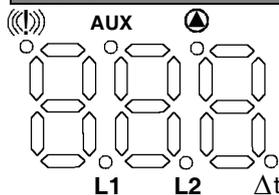
7.12 Keypad lock

To lock or unlock the keypad hold down **▲ALM + ▼PRG** for approximately 3 seconds; with the keypad locked the value of the SET-point can be displayed but not altered; when a key is pressed on the locked keypad the message "LOC" is displayed.

7.13 Restoring default values

Powering on the instrument while holding down the **▲ALM + ▼PRG** keys serves to restore the factory default settings, with the ALd alarm notification. This operation results in the loss of all the user's changes to the instrument's default parameters and must therefore be used with caution.

8. DISPLAY



Led	Mode	Meaning
	On	In programming: 1st level programming active
	Flashing	New alarm saved
AUX	On	AUX output active / In programming: 2nd level programming active
AUX	Flashing	AUX output in stand-by / In programming 3rd level: with parameter present on 2nd level
	On	Pump 1 output active / 3rd level programming active
	Flashing	Pump 1 output in stand-by
Δt	Off	Starting differential (1st level programming) not reached.
Δt	Flashing	Starting differential reached / fast flashing, starting differential reached with respect to both boilers (system nos. 4 and 5).
L1 L2 Δt	Alternating	3rd level programming active, a menu code is being displayed

9. KEY FUNCTIONS

SET▶: displays the SET-point (starting differential); during programming provides the facility to open the submenu and edit values (see "programming") or quit a value setting procedure, saving the relative value; when held down for 4 seconds serves to delete saved alarms from the alarm memory.

◀MAN (DEF on panel mounting version) : when pressed for 4 seconds serves to start a manual operation if enabled by the parameter SMA; in programming mode if pressed for 1 second serves to exit and return to the previous level (see "programming") or quit a value setting procedure without saving the value (the previous value will be left unchanged).

▲ALM: press this key to acquire an alarm in progress and hold it down for 4 seconds to enter the alarm memory; in programming mode this key is used to scroll through the parameter codes or menus, increase values; press the key within 60 seconds from instrument power-on in order to inhibit temperature alarms for the time set in parameter Ado.

▼PRG: press this key for 4 seconds to enter 2nd level programming mode; in programming mode this key is used to scroll through the parameter codes or menus, decreasing the relative values.

Key combinations:

▲ALM + ▼PRG: to lock/unlock the keypad.

◀MAN (DEF on panel mounting version) + **▲ALM**: to start the holiday program if enabled by parameter FHO.

▲ALM + ▼PRG: powering on the instrument, to restore the default factory settings - all user parameter settings are lost.

▼PRG + SET▶: from 2nd level programming mode (frequently used parameters) serves to enter 3rd level programming (parameters protected by a password if enabled by parameter rPS). From 3rd level programming, displaying a parameter code, makes it possible to include or exclude the parameter in question in 2nd level programming.

10. ALARMS AND SIGNALS

10.1 Temperature alarms

The instrument signals and saves any temperature alarms (AHS, AHb, AHA). All alarms are saved to the alarm memory (maximum of 12 alarms) in the order in which they occurred.

10.2 Alarm memory

All alarms are saved to the alarm memory (maximum of 12 alarms) in the order in which they occurred; when the alarm memory is full the next alarm is saved by overwriting the oldest alarm in the memory. When a new alarm is saved the **LED** flashes; to display the alarms saved to the memory hold down **▲ALM** for approximately 4 seconds: this will cause the display of the latest alarm code saved to the memory. Use the **▲ALM** and **▼PRG** keys to scroll through the alarms in the memory; if the memory is empty or when the start or end of the list of alarms is reached, the display will show "- - -". To delete all the saved alarms hold down the **SET▶** key for approximately 4 seconds.

Deleting alarms once they have been displayed simplifies the checking of future alarms.

10.3 Alarm and signals description

Code	Description	Outputs	Reset
AHS	Probe rtS (solar p.) high temperature alarm (par. AHS)	Unchanged	Automatic ¹
AHb	Probe rtb (boiler 1) high temperature alarm, (par. AHb)	Unchanged	Automatic ¹
AHA	Probe rtA (AUX) high temperature alarm, (par. AHA)	Unchanged	Automatic ¹
APS	Probe rtS faulty or off-range alarm	With positive off-range, control continues, otherwise pump 1 is turned off.	Automatic ²
APb	Probe rtb faulty or off-range alarm	Output of pump 1 always off.	Automatic ²
APA	Probe rtA faulty or off-range alarm	On system 6, with positive off-range control continues, otherwise it is turned off.	Automatic ²
Adr	Data carry-over alarm, changing of par. LLS or LHS has resulted in the "SEt" point being carried over to the nearest value.	Unchanged	Manual
ALd	Data loss alarm, the default values are restored.	The default values are restored	Manual
FCC	Displayed while the solar panel cooling function is active	As specified in FCC program	Automatic
FbL	System shutdown	As specified in FbL program	Automatic
FHO	Holiday function	As specified in FHO program	Automatic
FFS	Anti-freeze function	As specified in FFS program	Automatic
FOP	Cyclic pump activation	As specified in FOP program	Automatic
SMA	Manual activation	As specified by SMA program	Automatic
Loc	Locked keypad indication.	Unchanged	- - -

¹ The alarms can also be reset manually by pressing key ALM; however, if the cause persists, once the associated time delay has elapsed the relative alarm will trip again and be saved in the memory.

² The alarms can also be reset manually by pressing key ALM;

11. PROGRAMMING

The instrument is already programmed by default with the values most commonly used for controlling system No.2. To control any other kind of system, the setup parameters can be converted automatically by entering the No. of the system to be controlled in parameter OSL (see systems on page 1 and parameter table on page 10) Each individual parameter may however be changed manually.

Instrument programming is divided into 3 levels:

1st level: to display and edit the SET-point (starting differential). Press **SET** to display the message "SEt" alternating with the current value; press **SET** to edit the value (value flashes); now use **▲ALM** and **▼PRG** to change the value as required, press **SET** to save the new value to the memory, **◀MAN** (DEF on panel mounting version) to quit without saving the new value, or hold down **◀MAN** (DEF on panel mounting version) for 1 second to quit the display of an alarm code and return to normal operation. Programming mode is deactivated automatically after 10 seconds if no keys are pressed in this interval. In 1st level programming mode LED  illuminates to signal the programming level.

2nd level: this level is accessed by holding down the **▼PRG** key for approximately 4 seconds; the 2nd programming level contains frequently used parameters. From the higher programming level (3rd) it is possible to choose which parameters to include in the 2nd access level. On accessing 2nd level programming the code of the first parameter available in this level is displayed (parameters table column B) alternated with the set value. Use **▲ALM** and **▼PRG** to scroll through the parameter codes, **SET** to enter value editing mode (value flashes), **SET** to exit and save the new value, or **◀MAN** (DEF on panel mounting version) to quit without saving the new value, or hold down **◀MAN** (DEF on panel mounting version) for 1 second from the parameter code display to return to normal operation. Programming mode is deactivated automatically after 60 seconds if no keys are pressed in this interval. In 2nd level programming mode LED **AUX** illuminates to signal the programming level.

3rd level: 3rd level programming can be accessed from 2nd level programming by holding down the **▼PRG + SET** keys for approximately 4 seconds; this will result in the display of code PSd (password, if enabled by parameter "rSd") if the password is active; at this point in order to access 3rd level programming enter the value **33**, otherwise access will be denied. The 3rd programming level contains all parameters and, to facilitate programming procedures, the parameters are divided into menus (parameters table column A); the menu is recognised by alternate flashing of the three lower LEDs (L1, L2, Δt). Use **▲ALM** or **▼PRG** to scroll through the menus, **SET** to open the menu displayed, **▲ALM** or **▼PRG** to scroll through the parameter codes in the menu in question (parameters table column B), **SET** to enter value editing mode (value flashes), **SET** to exit and save the new value, or **◀MAN** (DEF on panel mounting version) to quit without saving the new value, **◀MAN** (DEF on panel mounting version) from the parameter display in order to return to the menu, or hold down **◀MAN** (DEF on panel mounting version) for 1 second from the menu display to return to normal operation. Programming mode is also deactivated automatically after 60 seconds if no keys are pressed in this interval. In 3rd level programming LED  remains illuminated to indicate the currently active programming level, while flashing of LED **AUX** indicates that the parameter code currently displayed is available also on the 2nd level. When displaying a parameter code it can be activated or deactivated in 2nd level programming by holding down **▼PRG + SET** for 1 second.

12. PARAMETERS DESCRIPTION

LI menu (limitation):

LLS and LHS: these parameters establish the minimum and maximum values at which the Set-point (starting differential) can be programmed (1st level programming).

LOd: when the instrument is powered on the control outputs are inhibited the time set in this parameter; the alarm signalling outputs are disabled.

SOr menu (pump 1 output):

SAS: defines the minimum temperature of the solar panel probe at which control is to be activated.

SAb: defines the temperature of the boiler 1 probe (rtb) and, once it is reached or exceeded, control is not activated unless special functions have been set.

SOF, SOn: define the minimum time for which, after being enabled or disabled, the pump 1 output is to remain in this status: the OFF and ON times, respectively.

Sdi: is the control hysteresis of the pump 1 output.

SPS: defines whether the probes rtb and rtA used are 50K or 10K.

SCS: used to calibrate solar panel 1 probe rtS.

SCb: used to calibrate boiler 1 probe rtb.

SMA: enables manual operation and defines its duration.

OAU menu (auxiliary output):

OSC: defines whether the working set point (OSt) for the AUX output is an absolute value or is relative to parameter SAb.

If rE (relative) is set, the working set-point of the AUX output is equal to SAb + Ost (max 90°C limited automatically), so when the value SAb (boiler 1) is changed, the set point of the AUX output also changes.

OSt: is the working set point for the AUX output, which also depends on the OSC parameter.

OSL: when the number of the system to be controlled is set in this parameter (see system No. on page 1), the setup parameters are converted automatically to the most commonly used values.

OFn: defines the operation of the AUX output. **OFF=** AUX output disabled, temperature probe rTA is not handled (system n°1). **Pr3=** AUX output disabled, temperature probe rTA only present for display (system no.1); **Ht=** AUX output used for integration (heating of boiler 1), according to the temperature probe rTA (system no.2); **CL=** AUX output used for external element heating (cooling of boiler 1), according to the temperature probe rTA (system no.3); **LPU=** AUX output used to heat boiler 2 from the solar panels 1, with pump logic, according to the temperature probe rTA (system no.4); **LUA=** AUX output used to heat boiler 2 from the solar panels 1, with valve logic, according to the temperature probe rTA (system no.5); **2SP=** AUX output used to heat boiler 1 from the solar panels 2, according to the temperature probe rTA (system no.6).

OPr: on systems with 2 boilers (OFn= LPU or LUA), defines the priority, that is, which boiler is to have priority in being brought to and kept at the temperature, **St0=** no priority, if OFn= LUA (valve logic) as the 2 boilers cannot be heated at the same time, priority is given to boiler 1, **St1=** priority to boiler 1, **St2=** priority to boiler 2.

OFF and OOn: define the minimum time for which, when enabled or disabled, the AUX output is to remain in that status: the OFF and ON times, respectively.

Odi: is the control hysteresis of the AUX output.

OCA: is used to calibrate the AUX output of probe rTA..

ALL menu (alarms):

AHS: probe rTS (solar panels 1) high temperature alarm.

AHB: probe rTB (boiler 1) high temperature alarm.

AHA: probe rTA (AUX) high temperature alarm.

ALD: a temperature alarm whose duration is less than the set time is not signalled or saved to the alarm memory; in the presence of an alarm it can be manually reset by means of the ▲ALM key. If the cause of the alarm persists, once the associated time delay has elapsed the relative alarm will trip again and be saved in the memory.

AnF: enables/disables the outputs for signalling any alarms present (buzzer and alarm output).

rPr: serves to select the temperature value to be displayed during normal operation: **rtS=** temperature of the solar panels 1 probe (rTS), **rtb=** temperature of the boiler 1 probe (rtb), **rtA=** temperature of auxiliary probe (rTA), **rd1=** rTS – rtb temperature differential, **rd2=** rTS – rTA temperature differential, **rd3=** rTA – rtb temperature differential.

rd1: read-only parameter, shows the rTS – rtb temperature differential.

rd2: read-only parameter, shows the rTS – rTA temperature differential.

rd3: read-only parameter, shows the rTA – rtb temperature differential.

rEL: display-only parameter; shows the software release.

rTL: display-only parameter; identifies the factory set parameters map.

rPS: password request for access to 3rd level programming.

OFF= access to 3rd level without password; **On=** password required (fixed value password = 33); on quitting 3rd level programming mode the password request is withheld for 10 minutes to facilitate parameters set-up without having to enter the password each time a parameter must be edited.

FCS menu (special functions):

FCC: solar panel cooling function **OFF=** function disabled, **On=** function enabled.

FtC: the temperature that, when reached by the solar panels, starts the solar panel cooling function.

Ftb: the maximum temperature that may be reached by the boiler(s) during the solar panel cooling function.

FFn: defines the operation of the solar panel cooling function, **On1=** the function ends when the temperature of the solar panels drops below the value of FtC; **On2=** the function ends when the temperature of the solar panels drops below the value of FtC, but if the temperature differential between the solar panels and the boiler becomes negative (-10 °C), the heat exchange is activated to cool the boiler so as to bring the temperature to the correct value (SAb/OSt).

FbL: safe system shutdown, if the temperature of the solar panels reaches the value set, the control is locked until the temperature drops below the value set.

FHO: holiday function, **OFF=** function disabled, **On=** function enabled.

If the function is enabled, it may be activated manually by pressing the ◀MAN (DEF on the panel mounting version) + ▲ALM buttons.

The activation of the function when you are to be away for a long period (e.g. summary holidays) -and hot water is therefore not needed- prevents the solar panels from overheating. See also paragraph 7.4.

FFS: anti-freeze function, **OFF=** function disabled, **On=** function enabled.

If the temperature of the solar panel is equal to or less than 4°C, the pump is started (hysteresis of 2°C), so th at the solar panel is heated from the boiler. Function only to be used with a limited area of solar panels installed in places with a mild climate and when no anti-freeze fluid has been put in the system.

FOP: cyclic pump activation, **OFF=** function disabled; **On1=** function enabled, the pump output(s) is(are) activated for 30 seconds every 30 minutes irrespective of the temperature of the boiler(s); **On2=** function enabled, the pump output(s) is(are) activated for 30 seconds every 30 minutes only if the temperature of the boiler(s) is below its set point (SAb, OSt).

FdE: difference for cyclic pump activation **OFF=** function disabled; **value=** the cyclic pump is only activated if the temperature differential between the solar panels and the boiler is equal to or higher than the SET – the value set in this parameter, so that cyclic activation is not executed when the temperature differential is too far from the value set as the starting differential to reach it even if the pump were activated, for example, at night, etc.

CHC menu (check):

CLS: read-only parameter, indicates the lowest temperature reached by the probe rtS.

CHS: read-only parameter, indicates the highest temperature reached by the probe rtS.

CLb: read-only parameter, indicates the lowest temperature reached by the probe rtb.

CHb: read-only parameter, indicates the highest temperature reached by the probe rtb.

CLA: read-only parameter, indicates the lowest temperature reached by the probe rtA.

CHA: read-only parameter, indicates the highest temperature reached by the probe rtA.

Clr: clear parameter, when the setting is changed from OFF to On, the values saved in the parameters of the CHC menu (CLS, CHS, CLb, CHb, CLA, CHA) are deleted.

See also paragraph 7.8.

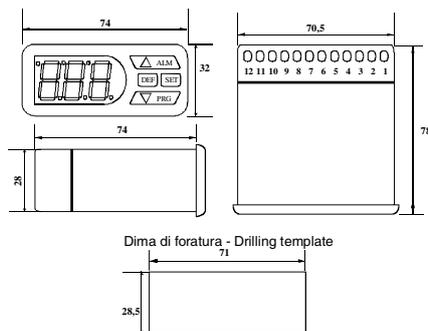
13. TECHNICAL DATA

Plastic enclosure in class V0 self-extinguishing material; power supply depending on model: 230Vac ±10% 50/60 Hz; 115Vac ±10% 50/60 Hz; 12Vac/dc ±10%; 24Vac/dc ±10%; max. power input 3VA; display: three digits, red LEDs, height 14,2 mm; inputs: Three precision NTC probes; measurement range: ntc 50K -40 ÷ 155°C, ntc 10K -50 ÷ 105°C; according to the model, up to three 8(3)A 250Vac or 16(9)A¹ 250Vac outputs end buzzer, see the label on the instrument; instrument precision ±0.7°C, ±1 digit; device utilisable for operating duty and not as a safety system; retention of data in non-volatile memory (EEPROM); Flush-mounted electronic thermoregulators; classification in accordance with automatic operation characteristics 1B; degree of protection: II; rated impulse voltage 2,5 KV; contact opening: micro-disconnection; tracking index PTI 175V; situation of pollution of the device: normal; electrical connection to be executed with resistant conductors up to 108°C; software class A; heat and fire resistance category D; operating temperature range 0 ÷ 60°C with non-condensing humidity 0 ÷ 90%; storage temperature -20 ÷ 70°C.

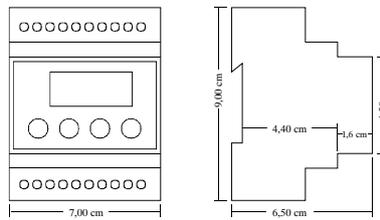
¹Duration: 16A resistive cosφ=1 30,000 cycles, 10A resistive cosφ =1 100,000 cycles, 9A inductive cosφ=0.4 120,000 cycles; 100,000 cycles when not specified.

14. DIMENSIONS

Contenitore ad incasso - Panel mounting box



Scatola 4 DIN - Box 4 DIN



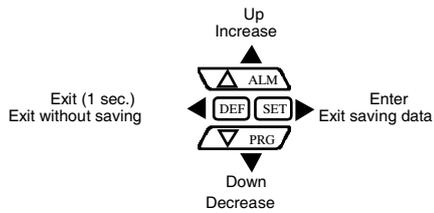
It is essential to observe all the technical operating characteristics of the instrument; in particular, incorrectly executed operations or maintenance and/or incorrect electrical wiring or mechanical installation can lead to impaired operation of the unit or potentially hazardous situations.

The Manufacturer reserves the right to withdraw the product from production or make technical modifications whenever it deems necessary and with no obligation to provide notice.

Although all due care has been applied in the preparation of this documentation, Termoregolatori Campini-Corel declines all liability connected with its use.

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15. Parameters table



	A	B	Default ¹	
	Menu code 3 rd level programming	Parameter code	\$230	
Description	Range			
LIMITATION	LI			
Programmable initial minimum differential		LLS	4	0 ÷ LHS °C
Programmable initial maximum differential		LHS	12	LLS ÷ 20 °C
Time for activation of outputs at power-on		LdO	0	0 ÷ 255 min.
PUMP 1 OUTPUT CONTROLS	SO _r			
Minimum temperature of solar panel probe (rtS) to activate control		SAS	10	0 ÷ 50 °C
Temperature to be reached by boiler 1, probe (rtb)		SAb	60	0 ÷ 90 °C
Minimum off time for pump 1 output		SOF	4	0 ÷ 255 sec.
Minimum on time for pump 1 output		SO _n	4	0 ÷ 255 sec.
Control hysteresis for pump 1 output		Sdi	2	0 ÷ 10 °C
Probes rtb and rtA used NTC 10K (ntL), NTC 50K (ntH)		SPS	ntH	ntL / ntH
Solar panel probe rtS calibration		SCS	0	-15 ÷ 15 °C
Boiler 1 probe rtb calibration		SCb	0	-15 ÷ 15 °C
Activation and duration of manual operation		SMA	10	OFF ÷ 255 min.
AUX OUTPUT CONTROLS	OAU			
Defines whether the working set point OST is an absolute value or is relative to SAb.		OSC	Ab	Ab / rE
Working set point for AUX output, probe rtA		OST	40	0 ÷ 90 °C
Selection of system to be controlled (automatic conversion of parameters)		OSL	2	1 ÷ 6
Operating logic for AUX (auxiliary) output		OF _n	Ht	OFF/ PR3/ H/ CL/ LPU/ LUA/ 2SP
Boiler priority (when parameter OF _n = LPU/ LUA)		OP _r	St1	St0 / St1 / St2
Minimum off time for AUX (auxiliary) output		OOF	3	0 ÷ 255 sec.
Minimum on time for AUX (auxiliary) output		OOn	3	0 ÷ 255 sec.
Control hysteresis for AUX (auxiliary) output		Odi	2	1 ÷ 10 °C
rtA (auxiliary) probe calibration		OCA	0	-15 ÷ 15 °C
ALARMS	ALL			
Solar panel probe high temperature alarm (rtS)		AHS	155	-50 ÷ 155 °C
Boiler 1 probe high temperature alarm (rtb)		AHB	90	-50 ÷ 155 °C
Auxiliary probe high temperature alarm (rtA)		AHA	155	-50 ÷ 155 °C
Temperature alarm signalling time		ALd	5	0 ÷ 255 min.
Buzzer and/or alarm output OFF / On		AnF	OFF	OFF / On
DISPLAYS	rEA			
Temperature normally displayed		rPr	rd1	rtS / rtb / rtA / rd1 / rd2 / rd3
Solar panel probe temperature display (rtS)		rtS	-	-
Boiler 1 probe temperature display (rtb)		rtb	-	-
Auxiliary probe temperature display (rtA)		rtA	-	-
rtS – rtb temperature differential display (rd1)		rd1	-	-
rtS – rtA temperature differential display (rd2)		rd2	-	-
rtA – rtb temperature differential display (rd3)		rd3	-	-
Software release		rEL	-	-
Parameter table		rtL	-	-
Password prompt for access to the 3rd programming level		rPS	OFF	OFF / On
SPECIAL FUNCTIONS	FCS			
Activation of solar panel cooling function (FCC)		FCC	On	OFF / On
Solar panel temperature (rtS) to start cooling (FCC)		FtC	100°C	OFF ÷ 155 °C
Maximum boiler temperature during solar panel cooling (FCC)		Ftb	80	0 ÷ 90 °C
Type of solar panel cooling operation (FCC)		FF _n	On2	On1 / On2
Activation, temperature of solar panels (rtS) for system shutdown (FbL)		FbL	OFF	OFF ÷ 155 °C
Activation of holiday function (FHO)		FHO	On	OFF / On
Activation of solar panel anti-freeze program (rtS/rtA)		FFS	OFF	OFF / On
Activation, type of cyclic pump activation (FOP)		FOP	OFF	OFF / On1 / On2
Temperature difference to start cyclic pump		FdE	5	OFF ÷ 50 °C
SYSTEM ANALYSIS check	CHC			
Minimum temperature read by the solar panel probe (rtS)		CLS	-	-
Maximum temperature read by the solar panel probe (rtS)		CHS	-	-
Minimum temperature read by the boiler 1 probe (rtb)		CLb	-	-
Maximum temperature read by the boiler 1 probe (rtb)		CHb	-	-
Minimum temperature read by the auxiliary probe (rtA)		CLA	-	-
Maximum temperature read by the auxiliary probe (rtA)		CHA	-	-
Deletes the data saved in the parameters of the CHC menu, when set to On		Clr	OFF	OFF / On
Parameters present by default on the 2nd programming level				
Starting differential, programmed on the 1st programming level				
	SEt	6		LLS ÷ LHS °C

¹If this instruction booklet is accompanied by an additional sheet entitled "PERSONALIZED PROGRAMMING", this means that the unit has been subjected to personalised programming in the factory so the values of the product in question will be those shown on the supplementary sheet.