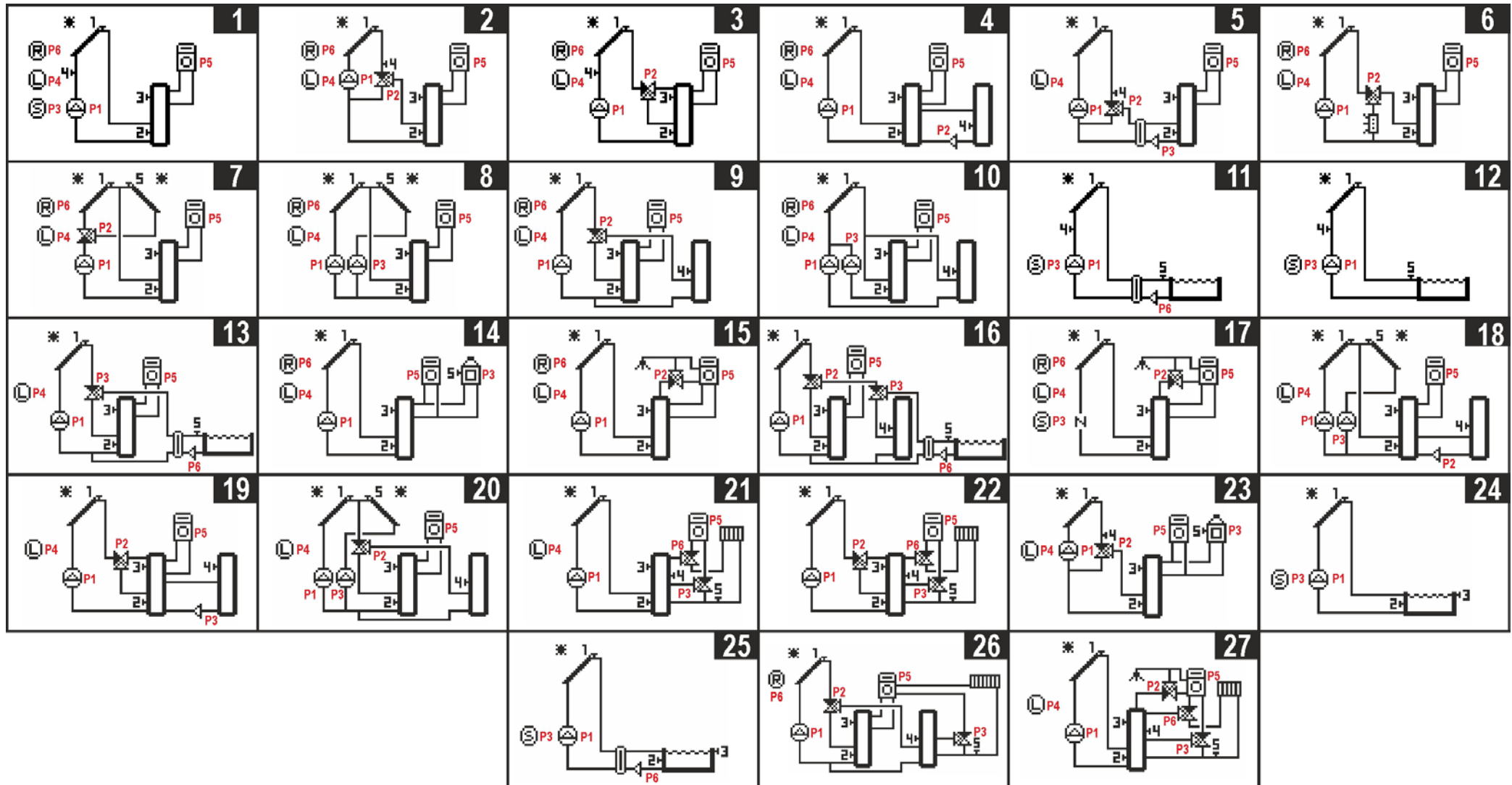




TSol600

**System controller for
thermal solar systems**

Plant overview



1 Introduction

Generally:

The **TSol600** Control system is a tool for the management of natural and forced circulation solar systems. In general, the system consists of solar collectors, buffer storage/pool, integration of additional heat generators and various protection and cooling functions.

General safety instructions

Read the safety instructions carefully to avoid damage and danger to people and property. Before working on the controller, please follow the following instructions:

- Accident prevention regulations and environmental protection regulations.
- Regarding the regulations of national authorities and work accident insurance companies.
- To the recognized safety standards.
- These instructions for use are intended only for technically trained personnel.
- Electrical work may only be carried out by qualified electricians.
- The initial commissioning of the system must be carried out by qualified personnel or by the manufacturer or a technician commissioned by him.

Declaration of conformity:

Applied standards:

EN 60730-1 50081-1 EN 60730-1 A1 50081-2

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Development, production and trade

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Product composition: 1x

TSol600

Technical data:

Mains voltage: 230 Vac 50 Hz Power consumption: 2 VA Relay output power: 5A 250 Vac Internal fuse: 3.15 A

Protection class: IP40

Measuring range: -40 ÷ 300 °C

Installation conditions and use: Ambient temp. during controller operation: 0°C-40°C ambient temp. during transport/storage: 0°C-60°C humidity: 85% @25°C

Mechanical properties: Housing design: ABS plastic Installation options: surface or flush-mounted display Display: BackLight 128 x 64 dots

2 installation

2.1 Box with cable relief

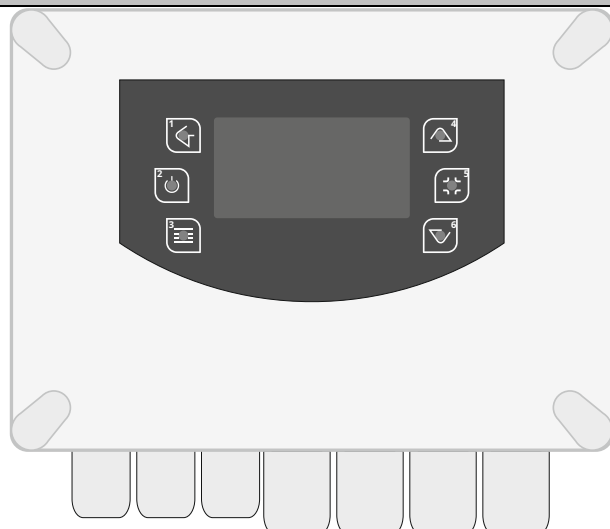


Fig. 1 Dimensions: 180 x 132 x 60mm

. 2 flush-mounted box version

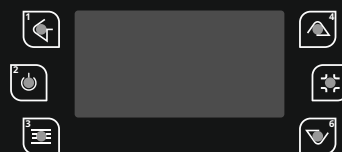
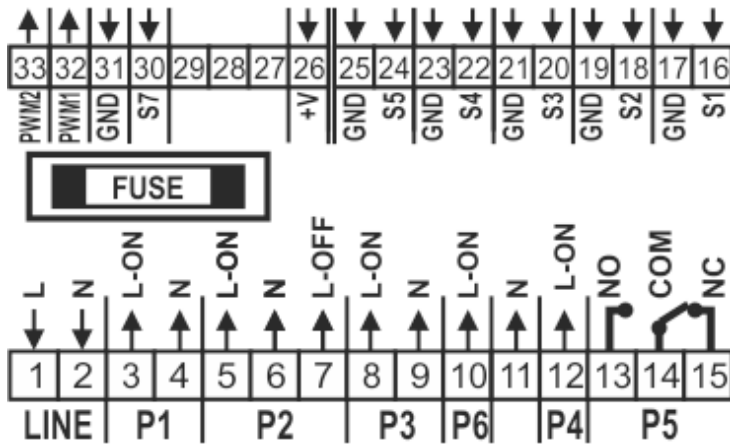


Fig. 2 Dimensions: 200 x 90 x 55mm

. 3 Electrical connections



Before working on the device, switch off the power supply and secure it against being switched on again! Check that there is no voltage! The electrical connection may only be carried out by a specialist taking into account the applicable regulations. The controller must not be put into operation if there is visible damage to the housing, such as cracks. Cables carrying low voltage, such as temperature sensor cables, must be laid separately from cables carrying mains voltage.



S1	S2	S3	S4	S5	Temperature sensor PT1000
S7	Flow sensor				
P1	P2	P3	P4	P6	Relay outputs 230 Vac
P5	Alternating potential-free contact				
GND	0-10Vdc, frequency 1kHz, duty cycle 0-100%				
PWM1					
PWM2					

Fig. 3Electrical connections.

3 Installation of the temperature sensors

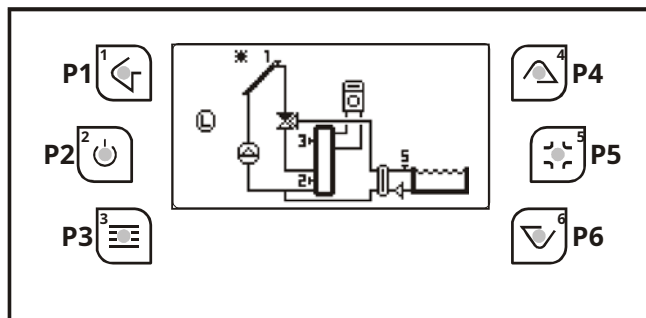
The controller works with a temperature sensor, with a range from -40 °C to 300 °C (+/- 1 °C).

If there is a short circuit in the sensor, "Short" appears in the display. If the sensor is interrupted or not connected, "Open" appears in the display. Which measured values are displayed depends on the selected program, the connected sensors and the respective device version.

Ganzheitliche Energiekonzepte GmbH & Co. KG assumes no responsibility for damage to sensors if they were not used in the range area or were damaged by incorrect cable extensions.

- The temperature sensor cables must be laid separately from mains voltage cables.
- If necessary, the sensor cables can be extended to a maximum of 30m with a cable of at least 1mm². Make sure that no contact resistance occurs!
- Place the sensors exactly in the area to be measured!
- Only use the submersible, pipe-mounted or flat-mounted sensor that is suitable for the respective area of application and has the corresponding permissible temperature range.

4 Control panel: usage and functions



Functions of the buttons:

P4/P6= Browse through the menu - value increase or decrease

P3= Entrance in the menu

Save in menu

P1= Exit the menu

P2= ON/OFF

P5= Date-time / temperature sensor display

Temperatur probe

Fig. 4 LCD display

4.1 Display

	Pump: ON when flashing		Mixer: flow direction
	Collector protection: ON when flashing		Boiler integration: ON when flashing
	Holiday: Active when displayed		Wood boiler: ON when flashing
	Circulation pump: ON when flashing		Cooler circuit
	Anti-legionella pump: ON se Lampeggia		Plate heat exchanger
	Flow sensor activated		Active error messages
	pool		

Touch **P5** to scroll between the measured temperatures.

With **P4** go to the menu "**monitor**". The measured temperatures are displayed.

Sys 1 =wt. System diagram for sensor temperature Sensor bridged, contact closed Buhler break or not connected Current flow energy per hour	monitor Sys 1 T1 = 70 T2 = Short T3 = Open FL kWh	
---	--	--

Fig. 4. Monitor menu

Over **P4** you get to the display "**Statistics**". Active error messages are displayed.

Sys 1 =Number of system diagram error messages Error code Operating hours P1 energy during the day Total energy	Statistics Sys 1 A02 Time P1 = 00012 kWh day kWh dead	
---	--	--

Fig. 5 Statistics menu

4.2 Error messages

DESCRIPTION	DISPLAY
Overtemperature of the collector: Temperature on S1 or S5 higher than thermostat THS103	A01
Boiler overtemperature: Temperature on S2 higher than thermostat THS203	A02
Antifrost collector: Temperature on S1 or S5 smaller than thermostat THS101	A03
Sensor anomaly: possible sensor break: it seems that the sensor is not connected	A04
Sensor anomaly: possible sensor break: the sensor causes a short circuit	A05

5 default functions

5.1 Boiler management¹

The following table shows the thermostats and hysteresis in connection with the buckling charge 1

DESCRIPTION	code
Boiler 1 operating thermostat on S3	THS300
Hysteresis thermostat THS300	HYS300
Differential thermostat (S1-S2) for loading boiler1 using collector1/collector2	THD120
Hysteresis differential thermostat THD120	HYD120
Minimum thermostat on S1o. S5 below this value the solar charging pump is switched off	THS102
Hysteresis thermostat THS102	HYS102
Maximum thermostat on S2 above this value, the boiler cooling1 function is activated (by cooler or solar system)	THS202
Hysteresis thermostat THS202	HYS202
Max. thermostat on S2 which Boiler1 can reach	THS203
Hysteresis thermostat THS203	HYS203

5.2 Boiler management²

The following table shows the thermostats and hysteresis in connection with the buckling charge 2

DESCRIPTION	code
Boiler2 operating thermostat on S4	THS401
Hysteresis thermostat THS401	HYS401
Differential thermostat (S1-S4) for loading using collector1/collector2	THD140
Hysteresis thermostat differentials THD140	HYD140
Minimum temperature at S1o S5 below this value, the solar charging pump is switched off	THS102
Hysteresis thermostat THS102	HYS102

5.3 Pool management

The following table shows the thermostats and hysteresis related to pool loading

DESCRIPTION	code
Operating thermostat pool on S5	THS502
Hysteresis thermostat THS502	HYS502
Differential thermostat (S1-S5) for loading the pool	THD150
Hysteresis differential thermostat THD150	HYD150
Minimum thermostat on S1 below this value the solar pump is deactivated	THS102
Hysteresis on thermostat THS102	HYS102

5.4 Boiler/boiler requirement integration

The table below shows the thermostats and hysteresis related to the boiler requirement

DESCRIPTION	code
Thermostat on S3 below which the output for inclusion of a boiler is activated	THS302
Hysteresis Thermosta THS302	HYS302
Configuration of collector protection/boiler request2: ENA014=1 boiler request2 activated	ENA014

5.5 Heat exchanger

The following table shows the thermostats and hysteresis in connection with the function (heat exchange) loading Boiler2 using Boiler1

DESCRIPTION	code
If the thermostat is on S3 above this value, the heat exchange is activated	THS304
Hysteresis thermostat THS304	HYS304
Differential thermostat (S3-S4) for activating heat exchange	THD340
Hysteresis parameters THD340	HYD340
Boiler2 operating thermostat on S4	THS401
Hysteresis thermostat THS401	HYS401

5.6 Cooling solar circuit

The following table shows the thermostats and hysteresis in connection with the cooling of the solar circuit due to overtemperature.

DESCRIPTION	code
Thermostat on S1 or S5 - the heat transfer fluid is cooled above this value	THS104
Hysteresis thermostat THS104	HYS104
Thermostat on S1 and S5 - above this value the solar pump charges the boiler until the maximum thermostats are reached	THS100
Hysteresis thermostat THS100	HYS100
Max. thermostat on S3 of the boiler1	THS303
Hysteresis thermostat THS303	HYS303
Max. thermostat on S4 of the boiler2	THS405
Hysteresis thermostat THS405	HYS405
Max thermostat on S5 of the pool	THS500
Hysteresis thermostat THS500	HYS500
Thermostat on S1 and S5 also stops the solar pump.	THS103
Hysteresis thermostat THS103	HYS103

5.7 Domestic water temperature increase

Parameters for controlling the mixer for loading the BW boiler1/boiler

DESCRIPTION	code
Thermostat on S3 - above this value the hot water mixer is moved to the hot water	THS305
Hysteresis thermostat THS305	HYS305

5.8 Collector protection

The following table shows the thermostats and their hysteresis for the respective selected system scheme. In addition, the protective functions are activated or deactivated.

DESCRIPTION	code
Thermostat on S1, via which the protective function of the collector is activated (e.g. sun protection)	THS103
Hysteresis thermostat THS103	HYS103
Configuration of the protection function / boiler request 2. Boiler: ENA014=0 Collector protection activated	ENA014

5.9 Heating return flow increase

The following table shows the thermostats and their hysteresis in relation to raising the return of the heating towards the boiler in order to raise the temperature.

DESCRIPTION	code
Differential thermostat (S4-S5) on which the return temperature is raised.	THD450
Hysteresis thermostat THD450	HYD450

5.10 Double collector field using a valve

The following table shows the thermostats and their hysteresis in relation to the valve logic.

DESCRIPTION	code
Differential thermostat for selecting the collector area 2	THD510
Hysteresis differential thermostat THD510	HYD510

5.11 Double collector field pump logic

The management of the second collector field is automatic. controlled by the parameters of collector f.1:

5.12 Bypass

Thermostats and their hysteresis in the context of managing the bypass function.

DESCRIPTION	code
Thermostat on S4 under which the solar fluid is returned to the solar collector.	THS400
Hysteresis parameters THS400	HYS400

6 Menu

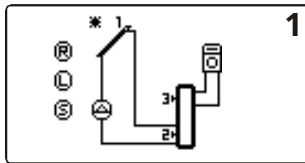
Il menu is divided into:

- **specialist menu**, in which all parameters of the **TSol500** are available.
- **user menu**, (End-user parameters) only certain functions are available.

6.1 Initial commissioning

When you switch it on for the first time it shows **TSol600** The investment schemes available:

Browse between the investment schemes
with the buttons **P4/P6**
Confirm the selected setting
With the button **P3**



The same function selection is in the specialist menu under the name **initialization** selectable.

6.2 ON/OFF system

The Accensione/Spegnimento of the system is effective with the pressure prolungata del pulsante P2. The status of SPENTO is segnalato nel display with the scritta 'OFF', durante tale stato gli ingressi sono controllati e le uscite sono disabilitate, qualora venga rilevata una condition di alarme il sistema si riporta nello stato di accensione.

6.3 Expert menu

Settings			Here you will find all thermostats, hysteresis and parameters. (Adjustable by a specialist).
Thermostats			Here you will find all thermostats and hysteresis that are included in the system scheme.
parameter			Here you will find all the parameters that correspond to the investment scheme.
Features	Intelligent loading/temperature increase		Here you will find all the functions that can be used in the selected investment scheme.
	Holiday		
	Recirculation	Modality	
		Programming	
		Parametric	
	Anti-Legionella		
	Antifrost		
	Layering		
	Alternating loading		
	Wood boiler		
	Antiblock pump		
statistics			Menu for displaying and resetting statistical data (pump working hours, error messages)
Test outputs			Here you can test the individual outputs.
Date / time			This allows you to set the date and time.
Language			Choice of language
initialization			Re-initialization of the system
Change Password			You can change the password here
Consumer menu			Back to the consumer menu.
Menu control element			Menu for setting the LCD display.

6.4 Accessing the installation menu

Main menu	PASSWORD?	• With P3 the first number is selected	0 - - -
Menu Expert		• With P4 u. P6 the value is chosen	1 - - -
	- - - -	• With P3 confirm the value	1 0 - -
		• Repeat until the 4th number	1 2 3 4
		• PASSWORD with button P3 confirm	
		• With P1 the set numbers are deleted	
If you do not press any key in the expert menu for a long time, this will lead you System automatically switches to the end user menu.			

6.5 Settings

Includes thermostats, hysteresis, parameters required for the selected system scheme.

6.6 Thermostats

All thermostats and hysteresis are displayed in this level.

6.7 Parameters

All parameters for the selected investment scheme are displayed on this level.

6.8 Features

All functions are displayed in this level.

6.8.1 Intelligent loading/temperature increase

The purpose of this function is to increase the temperature of the collector when there is low solar radiation. In the event that there is a temperature difference between S1 and S2, but the temperatures S1 and S3 are lower than the thermostat THS301, the solar charging pump will operate according to the times TIM001 (pause) and TIM002 (operation) to facilitate raising the temperature until THS301 is reached. The pause / operation cycle is repeated for as long as in COU000; then the function is deactivated for a time equal to TIM000. At the end of this time, the function will resume its work if the conditions are met.

In the system diagrams in which the stratification function was selected, this function is deactivated.

DESCRIPTION	code
Thermostat on sensor S3 to activate the intelligent loading function	THS301
Hysteresis thermostat THS301	HYS301
Time to deactivate the Intellect function. Loading according to COU00; Pump is stopped.	TIM000
Pause time of the charging pump during function	TIM001
Working time of the pump during function	TIM002
Max. number of pauses of the pump during function	COU000
Activation of the function	ENA000

6.8.2 Holiday

With the function **HOLIDAY** System operation will stop if there is prolonged inactivity. When the feature is enabled, the system does the following:

- Boiler1 is being cooled
- Integration of the gas, oil or pellet boiler is deactivated.
- Integration of the wood boiler is deactivated.
- The storage is cooled by the collectors.
- Ornamentation is deactivated.

DESCRIPTION	code
thermostat on sensor S2; In addition, the system starts the intelligent discharge of the memory when there is a negative differential between S1-S2.	THS201
Hysteresis THS201	HYS201
Activation of the Holiday function	ENA002

6.8.3 Recirculation of process water

This function enables the activation of a circulation pump for the domestic hot water circuit. This function can be deactivated or controlled using a timer under the "Daily, Weekly, Weekend" function (24 hours).

6.8.3.1. Recirculation: modality

Allows you to select one of the 4 operating modes of the circulation function.

6.8.3.2. Recirculation: programming

Recirculation	program	<ul style="list-style-type: none"> Edit the setting with P3(the cursor flashes) Choose with P4and P6out of Confirm with P3 With P1leave
modality	Daily	
program	Wöchentliche	
parameter	Week end	

- Daily:**3 time windows are displayed for each individual day of the week.

program	Monday	Monday
Day	Tuesday	ON
Week	Wednesday	09:30
weekend	Thursday	OFF
	Friday	11:15
		V
		00:00
		00:00

- Weekly:**3 time slots are displayed for the entire week.

program	Mon-Sun
Day	ON
Week	08:30
weekend	00:00
	00:00
	1:15 p.m
	V

- Weekend:**Three time slots are displayed from Monday to Friday and from Saturday to Sunday.

program	Mon-Fri	Mon-Fri
Day	Sat-Sun	ON
Week		06:30
weekend		12:00
		08:00
		2:00 p.m
		6:00 p.m
		10:00 p.m

PROGRAMMING CLOCK PROGRAM		Tasti
After selecting the desired program:		
Select the programmed time		P4OP6
Set the time (selected time flashes)		P3
Change time		P4OP6
Save time		P3
Activate time window (a "V" is displayed) or deactivate time window (no "V" is displayed)		P5
Finish		P1
PROGRAMMING CHRONO OVER MIDNIGHT		
The time for the time window of a weekday OFF on 23:59 place		
The time for the time slot of the next weekday ON on 00:00 place		
All three program types remain stored independently: if e.g. For example, if the TAG setting is changed, the others remain unchanged. If clock program deactivated = permanent night mode.		

6.8.3.3. Ricircolo: Parametric

DESCRIPTION	code
Tempo di Pause della Pompa durante ricircolo function	TIM003
Tempo di Lavoro della Pompa durante la functionzione Ricircolo	TIM004

6.8.4 Anti Legionella

This function prevents the formation of Legionella via "thermal shock". If the temperature on S2 remains below the thermostat value THS200 for the time of TIM007, the Anti-Legionella function is active. Integration and recirculation (if available), values work according to parameter TIM005.

DESCRIPTION	code
Thermostat on S2 which must be exceeded to prevent legionella formation.	THS200
Hysteresis for thermostat THS200	HYS200
Start time of the anti-Legionella function.	TIM005
Timer (in minutes) for maintaining the temperature above the THS200 thermostat on S2	TIM006
Timer for the checking time (in hours) for the temperature (on S2) of the hot water tank to fall below the thermostat value THS200 for activating the function at time (TIM005)	TIM007
Qualification of the anti-Legionella function	ENA006

6.8.5 Atntifrost

If the temperature (on S1 or S5) is below the thermostat THS101, the solar pump is activated in pause/operation mode.

DESCRIPTION	code
Temperature value S1 for activating the anti-frost function	THS101
Hysteresis thermostat THS101	HYS101
Operating time (sec) of the pump during function	TIM012
Minimum time (min) of breaks during the function	TIM013
Qualification of the anti-frost function	ENA007

6.8.6 Layering

If there is a differential between S1-S3, the upper part of the boiler is loaded first until the thermostat THS306 is reached. The lower part of the boliser is then loaded until the thermostat THS300 has been met. If there is no differential between S1-S3 but the differential between S1-S2 is present, the lower part of the boiler is loaded (pause/run mode). After a certain number of cycles (COU001), the function is deactivated for a certain time (TIM017).

In selected investment schemes in which stratification is provided but intelligent loading has been selected, the "stratification" function is automatically deactivated (and vice versa).

DESCRIPTION	code
Stratification thermostat	THS306
Hysteresis thermostat THS306	HYS306
Minimum differential between sensor S1 and sensor S3	THD130
Maximum number of solar pump stops	COU001
Pause duration of the solar pump during function	TIM010
Operating time of the solar pumps during operation	TIM011
Deactivation time of the stratification function	TIM017
Qualification of the stratification function	ENA008

6.8.7 Alternating loading between boiler 1 and boiler 2

This paragraph contains the thermostats, hysteresis and parameters related to the alternating loading function. With this function you can load the second/third boiler if the main storage can no longer be loaded. For example, if Boiler1 is not yet fulfilled and there is no differential between S1-S2 but the differential is present between S1-S4 (Boiler 2), Boiler2 will be loaded.

DESCRIPTION	code
Pump pause time during operation	TIM008
Pump lasts the function	TIM009
Enabling the Commuter Charge function	ENA009

6.8.8 Wood boiler

Management of burner requirements with wood boiler priority over, for example, the gas boiler. The ENA012 parameter activates the wood boiler priority over the gas boiler.

DESCRIPTION	code
Differential thermostat between S5-S3 for activating the loading of the boiler using a wood boiler.	THD531
Hysteresis for thermostat THD531	HYD531
Thermostat on S5, in addition the priority of the wood boiler over the gas boiler is enforced regardless of the differential S5-S3	THS504
Hysteresis related to the TH504 thermostat	HYS504
Minimum thermostat on S5. Below this, the integration of the wood boiler is deactivated regardless of the S5-S3 differential	THS505
Hysteresis related to the TH505 thermostat	HYS505
Qualification of the integration function of the wood boiler	ENA010
Qualification of the wood boiler priority over the gas boiler	ENA012

6.8.9 Antiblock pump

Menu for setting thermostats, hysteresis and parameters related to antiblock pump.

DESCRIPTION	code
Pump waiting time (in days)	TIM019
Pump running time (in minutes)	TIM020
Activation of output P1	P1
Activation of output P2	P2
Activation of output P3	P3
Activation of output P4	P4
Activation of output P5	P5
Activation of output P6	P6

6.8.10 Flow sensor management

With the parameter **ENA015** It is possible to activate a flow sensor from the Huba Control series, type 200 DN15, which monitors the flow of the primary circuit (**FL**) recorded. Based on the temperature difference between the collector sensor (S1) and that of the return circuit (S4), the energy generated by the main solar panel is calculated, specifically the energy generated in one hour (**kWh**), in one day (**kWh day**) and the total energy after the last **Reset(kWh dead)**.

DESCRIPTION	code
Flow sensor activation	ENA015

6.8.11 Pump management with PWM control

With the parameters **PAR001** and **PAR002** It is possible to activate and select the operating mode of the PWM1 and PWM2 signals for the management of the solar pumps provided in the hydraulic systems:

- PWM1: **PAR001**= 0 → Disabled; **PAR001**= 1 → Manual; **PAR001**=2 → Auto (solar pump P1)
- PWM2: **PAR002**= 0 → Disabled; **PAR002**= 1 → Manual; **PAR002**=2 → Auto (solar pump 2 P3)

PWM Disabled:

The pumps are controlled exclusively via the 230V output. **PWM**

manual:

The duty cycle of the PWM signal, which determines the speed of the pumps, is set using the following parameters:

- **PWM101** if PWM1 with solar profile (Solar pump 1)
- **PWM201** if PWM2 with solar profile (solar pump 2)

PWM car:

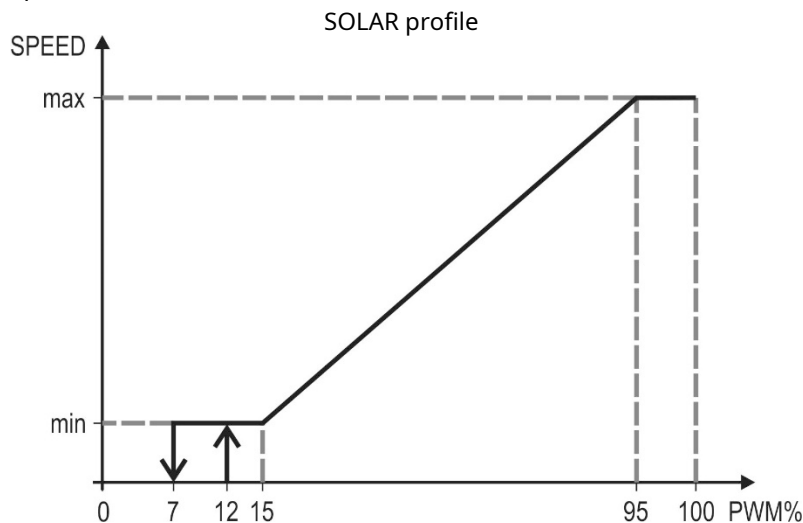
Depending on the pump type, the PWM signal is calculated based on the temperature of the solar panel probe and can vary in the following ranges:

- between **PWM102** and **PWM103** if PWM1 with solar profile (E.g. 15÷95%) (E.g. 15÷95%)
- between **PWM202** and **PWM203** if PWM2 with solar profile

Changing the speed of the solar collector pump is possible in this temperature range:

- Between **THS106** u. **THS106+THS107** (if $THS106=45^{\circ}\text{C}$, $THS107=20^{\circ}\text{C}$ then Range: $45 \div 65^{\circ}\text{C}$)
- Between **THS506** and **THS506+THS507**

The PWM solar signal profile is automatically selected based on the pump being managed. The profiles of the pumps on the market are listed below:



Based on this profile, it is advisable to set the PWM duty cycle parameters as follows:

PWM2

Vmin: PWM202 $\geq 15\%$

Vmax: PWM203 $\leq 95\%$

When the PWM manages the solar pump, it can manage the antifreeze, security and anti-lock functions. Here you can set the associated parameters:

- **FROST PROTECTION:** PWM104 o PWM204
- **SECURITY:** PWM105 o PWM205
- **ANTI-BLOCK:** PWM106 o PWM206

DESCRIPTION	code
Management PWM1	PAR001
Management PWM2	PAR002
Duty cycle percentage PWM1 in Manual mode in SOLAR PROFILE	PWM101
Duty cycle percentage PWM1 in min. speed in SOLAR PROFILE	PWM102
Duty Cycle Percentage PWM1 in Max. Speed in SOLAR PROFILE	PWM103
Duty cycle percentage PWM1 in antifrost in SOLAR PROFILE	PWM104
Duty cycle percentage PWM1 in safety in SOLAR PROFILE	PWM105
Duty cycle percentage PWM1 in antiblock in SOLAR PROFILE	PWM106
Duty cycle percentage PWM2 in Modalit Manual in SOLAR PROFILE	PWM201
Duty cycle percentage PWM2 in min. speed in SOLAR PROFILE	PWM202
Duty Cycle Percentage PWM2 in Max. Speed in SOLAR PROFILE	PWM203
Duty cycle percentage PWM2 in antifrost in SOLAR PROFILE	PWM204
Duty cycle percentage PWM2 in safety in SOLAR PROFILE	PWM205
Duty cycle percentage PWM2 in antiblock in SOLAR PROFILE	PWM206
Thermostat activation PWM1 solar pump	THS106
Hysteresis for thermostat THS106	HYS106
Delta temperature for automanagement of the PWM1 signal	THS107
Thermostat activation PWM2 solar pump	THS506
Hysteresis for thermostat THS506	HYS506
Delta temperature for automanagement of the PWM2 signal	THS507

6.9 Statistics

Allows you to view the history of managed alarms.

All counters and alarms can be reset using the Reset menu item.

6.10 Test outputs

This can be used to check the function of the outputs. By selecting one of the outputs it is possible to switch it to ON (1). When you exit the menu, the system status is automatically restored.

6.11 Date and time

With this function you can set the date and time.

6.12 Language

This feature allows you to select the language.

6.13 Initialization

System re-initialization menu. This again allows the selection of a new investment scheme.

6.14 Change password

Password change menu (professional). This changes the password for the protected level.

6.15 End user menu

This function allows you to return to the consumer menu.

6.16 LCD control element

This function allows you to adjust the LCD display.

6.16.1 Adjust contrast

Adjust contrast

+



15

-

- Adjust with **P4/P6**
- Confirm with **P3**
- End with **P1**

6.16.2 Min. light setting

Minimal
Light setting

+



15

-

- Adjust with **P4/P6**
- Confirm with **P3**
- End with **P1**.

7 List of thermostats and parameters

code	Description	function	range			U
			Min	set	Max	
THD120	Differential thermostat between (S1-S2) for activating the loading of the boiler1	Loading boiler1	1	6	30	°C
HYD120	Hysteresis to the differential THD120		1	2	5	°C
THD130	Differential thermostat between (S1-S3 or S5-S3) for activating the stratification function	Layering	1	3	30	°C
THD140	Differential thermostat between (S1-S4) for activating the loading of the boiler2	loading Boiler2	1	6	30	°C
HYD140	Hysteresis to the differential THD140		1	2	5	°C
THD150	Differential thermostat between (S1-S5) for activation of loading (swimming pool)	loading Swimming pool	1	6	30	°C
HYD150	Hysteresis to the differential THD150		1	2	5	°C
THD340	Differential thermostat between (S3-S4) for activating the loading of the boiler2 by means Boiler1	loading Boiler2	1	5	30	°C
HYD340	Hysteresis to the differential THD340		1	2	5	°C
THD450	Differential thermostat between (S4-S5) for increasing the return flow of the heating circuit	return lifting ung heating circuit	1	5	30	°C
HYD450	Hysteresis to the differential THD450		1	2	5	°C
THD510	Differential thermostat between (S5-S1) for the selection of collector area2	Double collector area	1	5	30	°C
HYD510	Hysteresis to the differential THD610		1	2	5	°C
THD531	Differential thermostat between (S5-S3) for activating loading through a wood boiler.	Wooden kettle	1	5	30	°C
HYD531	Hysteresis to the differential THD531		1	2	5	°C
THD540	Differential thermostat between (S5-S4) for activating the loading of boiler2 from collector2	Loading boiler2	1	6	30	°C
HYD540	Hysteresis to the differential THD540		1	2	5	°C
THS100	Thermostat on S1 and S5 above that, the solar pump, the available boiler up to Max. temperature loaded.	Collector protection	80	95	200	°C
HYS100	Hysteresis for thermostat THS100		0	2	25	°C
THS101	Thermostat on S1 or S5 under which the anti-frost function is activated.	Anti-frost	- 20	5	30	°C
HYS101	Hysteresis for thermostat THS101		0	2	25	°C
THS102	Thermostat on S1o. S5 under which the solar pump is deactivated.	Collector protection	0	30	40	°C
HYS102	Hysteresis for thermostat THS102		0	2	25	°C
THS103	Thermostat on S1o. S5 above which the Solar pump is blocked.	Collector protection	80	100	298	°C
HYS103	Hysteresis for thermostat THS103		0	2	25	°C
THS104	Thermostat on S1 above which the solar fluid is conveyed to the cooler.	cooler	70	100	200	°C
HYS104	Hysteresis for thermostat THS104		0	20	30	°C
THS106	Thermostat activation PWM1 solar pump	PWM1	1	20	50	°C
HYS106	Hysteresis for thermostat THS106		0	2	20	°C
THS107	Delta temperature for the automatic Management of the PWM1 signal		1	20	50	°C
THS200	Thermostat on S2 to prevent legionella	Anti-Legionella	20	60	85	°C

HYS200	Hysteresis for thermostat THS200		0	2	25	°C
THS201	Thermostat on S2, above which the boiler1 via Differential S1-S2 is cooled.	Holiday	20	60	85	°C
HYS201	Hysteresis for thermostat THS201		0	2	25	°C
THS202	Thermostat on S2, above which the cooling function, activated by the collector for Boiler1.	Boiler protection1	20	85	100	°C
HYS202	Hysteresis for thermostat THS202		0	2	25	°C
THS203	Max. thermostat on S2 which Boiler1 is allowed to reach.	Boiler protection1	20	80	298	°C
HYS203	Hysteresis to thermostat THS203		0	2	25	°C
THS300	Operating thermostat on S3 of boiler1	loading Boiler1	10	70	85	°C
HYS300	Hysteresis for thermostat THS300		0	2	25	°C
THS301	Thermostat on S1 and S3 under which the function Temperature increase is activated.	Temperature-raising	20	45	85	°C
HYS301	Hysteresis for thermostat THS301		0	2	25	°C
THS302	Thermostat on S3 below which the burner request is activated.	loading Boiler1	20	50	85	°C
HYS302	Hysteresis for thermostat THS302		0	2	25	°C
THS303	Max. thermostat on S3 which Boiler1 is allowed to reach	Boiler protection1	20	90	298	°C
HYS303	Hysteresis for thermostat THS303		0	2	25	°C
THS304	Thermostat on S3 above which the loading of the Boiler2 is activated via Boiler1.	loading Boiler2	20	55	85	°C
HYS304	Hysteresis for thermostat THS304		0	2	25	°C
THS305	Thermostat on S3 above which the domestic hot water valve points towards the domestic hot water output is directed.	domestic hot water Temperature-Uphold	20	50	85	°C
HYS305	Hysteresis for thermostat THS305		0	2	25	°C
THS306	Thermostat on S3 during the stratification function is used, under which the loading of the boiler activated above.	stratification function	20	60	THS300 - HYS300	°C
HYS306	Hysteresis for thermostat THS306		0	2	25	°C
THS400	Thermostat on S4 under which the solar fluid directed towards the solar field.	bypass	15	35	40	°C
HYS400	Hysteresis for thermostat THS400		0	2	25	°C
THS401	Operating thermostat on S4 of the boiler2	loading Boiler2	20	70	85	°C
HYS401	Hysteresis for thermostat THS401		0	2	25	°C
THS405	Max. thermostat on S4 which Boiler2 is allowed to reach	Boiler protection2	20	90	100	°C
HYS405	Hysteresis for thermostat THS405		0	2	25	°C
THS500	Max. thermostat on S5 of the swimming pool	Swimming pool- Protection	20	35	100	°C
HYS500	Hysteresis for thermostat THS500		0	2	25	°C
THS502	Operating thermostat on S5 - swimming pool	loading Swimming pool	15	28	85	°C
HYS502	Hysteresis for thermostat THS502		0	1	25	°C
THS504	Max. thermostat on S5 above which the boiler requirement of the wood boiler is activated, independent of the differential S5-S3	Wood boiler	20	80	100	°C
HYS504	Hysteresis for thermostat THS504		0	2	25	°C
THS505	Minimum thermostat on S5 under which the integration of the wood boiler is deactivated.	Wood boiler	20	55	85	°C
HYS505	Hysteresis for thermostat THS505		0	2	25	°C

THS506	Activation thermostat PWM2 solar pump	PWM2	1	20	50	°C
HYS506	Hysteresis for thermostat THS506		0	2	20	°C
THS507	Delta temperature for the automatic Management of the PWM2 signal		1	20	50	°C
TIM000	Deactivation duration of the collector temperature function Increase.	Temperature increase hung of collector field	1	30	480	minutes
TIM001	Duration of pause for the pump during function Collector temperature increase	Temperature increase hung of collector field	1	5	60	minutes
TIM002	Pump operating time during the collector temperature increase function	Temperature increase hung of collector field	1	5	60	minutes
TIM003	Duration of pause for the pump during function Recirculation (time period)	Recirculation	1	3	60	minutes
TIM004	Pump operating time during the recirculation function (time period)	Recirculation	1	3	60	minutes
TIM005	Start time of the anti-Legionella function	Anti-Legionella	0	15	24	hh:mm
TIM006	Remaining time of the boiler temperature above Thermostat THS200 in anti-Legionella function.	Anti-Legionella	1	5	60	minutes
TIM007	Observation time of the boiler temperature below of the THS200 thermostat to include the anti-Activate legionella.	Anti-Legionella	1	72	480	Hours
TIM008	Pump pause time during the alternating loading function	alternating load ung	1	10	60	minutes
TIM009	Operating time of the pump during the alternating loading function	alternating load ung	1	10	60	minutes
TIM010	Pump pause time during function stratification	Layering	1	5	60	minutes
TIM011	Tempo di Lavoro della Pompa throughout the function of stratification	Layering	1	5	60	minutes
TIM012	Working time of the solar pump during the anti-frost function	Anti-frost	1	5	480	seconds
TIM013	Pause time for the solar pump during the anti-frost function	Anti-frost	0	5	60	minutes
TIM017	Deactivation time of the stratification function	Layering	1	3	480	Hours
TIM019	Waiting time in anti-block pump	Antiblock pump	1	7	30	days
TIM020	Pump working time in anti-block function	Antiblock pump	1	1	30	minutes
COU000	Max. number of STOPS of the solar pump during the Collector field temperature increase function	Temperature-raising collector field	1	5	20	
COU001	Max. number of STOPS of the solar pump during the Function stratification	Layering	1	5	20	
PAR001	Management PWM1	PWM1	0	0	2	
PWM101	Duty cycle percentage PWM1 in manual mode SOLAR PROFILE		0	50	100	
PWM102	Duty cycle percentage PWM1 in min. speed SOLAR PROFILE		0	15	100	
PWM103	Duty Cycle Percentage PWM1 Max Speed SOLAR PROFILE		0	95	100	
PWM104	Duty cycle percentage PWM1 in antifrost SOLAR PROFILE		0	100	100	
PWM105	Duty cycle percentage PWM1 in safety SOLAR PROFILE		0	100	100	
PWM106	Duty cycle percentage PWM1 in antiblock SOLAR PROFILE		0	100	100	
PAR002	Management PWM2	PWM2	0	0	2	
PWM201	Duty cycle percentage PWM2 in manual modality SOLAR PROFILE		0	50	100	
PWM202	Duty cycle percentage PWM2 in min. speed SOLAR PROFILE		0	15	100	

PWM203	Duty Cycle Percentage PWM2 in Max Speed SOLAR PROFILE		0	95	100	
PWM204	Duty cycle percentage PWM2 in antifrost SOLAR PROFILE		0	100	100	
PWM205	Duty cycle percentage PWM2 in safety SOLAR PROFILE		0	100	100	
PWM206	Duty cycle percentage PWM2 in antiblock SOLAR PROFILE		0	100	100	
ENA000	Qualification of the temperature increase function collector field	Temperature- raising collector field	0	0	1	
ENA002	Qualification of the Holiday function	Holiday	0	0	1	
ENA006	Qualification of the anti-Legionella function	Anti-Legionella	0	0	1	
ENA007	Qualification of the anti-frost function	Anti-frost	0	0	1	
ENA008	Qualification of the stratification function	Layering	0	1	1	
ENA009	Qualification of the alternating loading function	alternating load ung	0	0	1	
ENA010	Qualification of the boiler request function using the Wood boiler	Wood boiler	0	0	1	
ENA012	Qualification priority of integration wood boilers gas boiler	Wood boiler	0	0	1	
ENA014	Output configuration 0=collector protection/ 1=integration2 boiler	loading Boiler1 Collector protection	0	0	1	
ENA015	Flow sensor activation 0=Disabled 1=Enabled	flow sensor	0	0	1	
P1	Qualification output P1 check Antiblock pump	Antiblock pump	0	0	1	
P2	Qualification output P2 check Antiblock pump	Antiblock pump	0	0	1	
P3	Qualification output P3 check Antiblock pump	Antiblock pump	0	0	1	
P4	Qualification output P4 check Antiblock pump	Antiblock pump	0	0	1	
P5	Qualification output P5 check Antiblock pump	Antiblock pump	0	0	1	
P6	Qualification output P6 check Antiblock pump	Antiblocco Pompe	0	0	1	

8th Managed facilities

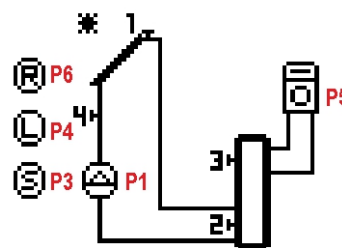
Function	1	2	3	4	5	6	7	8th	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Boiler integration	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X			X	X
Antifrost	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
Anti-Legionella	X	X	X	X	X	X	X	X	X	X			X	X	X		X	X	X	X	X		X				X
bypass		X			X																		X				
Wood boiler														X									X				
Loading boiler1	X	X	X	X	X	X	X	X	X	X			X	X	X	X		X	X	X	X	X	X			X	X
Loading boiler2									X	X						X			X	X						X	
Loading pool											X	X	X			X								X	X		
Intelligent loading	X	X	X	X	X	X	X	X	X	X			X	X	X	X		X	X	X	X	X	X			X	X
Alternating loading B1 and B2									X	X			X			X			X	X						X	
Double collector fields							X	X										X		X							
Holiday	X	X	X	X	X	X	X	X	X	X			X	X	X	X		X	X	X	X	X	X			X	X
increase in heating return																					X	X				X	X
increase in service water return															X		X										X
Collector protection	X										X	X					X							X	X		
Domestic water circulation	X	X	X	X		X	X	X	X	X				X	X		X									X	
Statistics	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
Stratification/layering			X						X													X					
Heat exchanger				X														X	X								
Flow sensor	X		X								X	X													X	X	
PWM1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
PWM2								X										X		X							

9 List of system diagrams

1

boiler1, boiler/burner demand integration, collector protection, service water circulation, anti- Legionella, flow sensor, PWM1

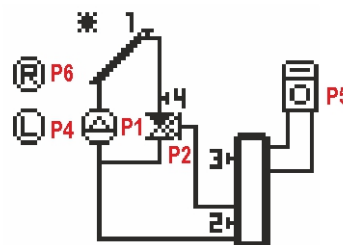
P6	10-11	Pump circulation
P5	13NO. 15NC 14Com	Boiler integration
P4	11-12	Anti-legionella pump
P3	8-9	Collector protection Integration2 boilers
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S2	18-19	Sensor buffer below
S3	20-21	Sensor buffer at top
S4	22-23	return sensor
S7	30	Flow sensor



2

Boiler1, bypass, boiler integration, hot water circulation, anti-Legionella, PWM1

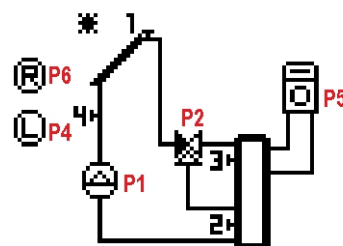
P6	10-11	Pump ornamentation
P5	13NO. 15NC 14Com	Boiler integration
P4	3-4	Anti-legionella pump
P2	5-6-7	Bypass valve
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S2	18-19	Sensor buffer below
S3	20-21	Sensor buffer at top
S4	22-23	Solar flow sensor



3

boiler1, integration boiler, stratification, service water circulation, anti-Legionella, Dflow sensor, PWM1

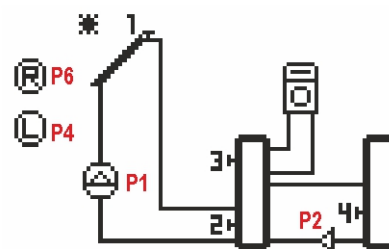
P6	10-11	Pump ornamentation
P5	13NO. 15NC 14Com	Boiler integration
P4	11-12	Anti-legionella pump
P2	5-6-7	Valve stratification
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S2	18-19	Sensor buffer below
S3	20-21	Sensor buffer at top
S4	22-23	return sensor
S7	30	Flow sensor



4

Boiler1, boiler integration, heat exchange, hot water circulation, anti-Legionella, PWM1

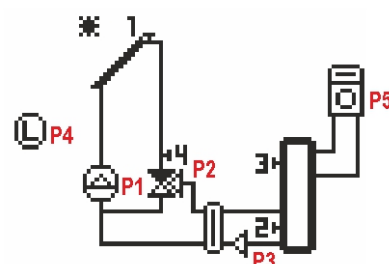
P6	10-11	Pump circulation
P5	13NO. 15NC 14Com	Boiler integration
P4	11-12	Anti-legionella pump
P2	5-6	Pump heat exchange
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S2	18-19	Sensor buffer 1 below
S3	20-21	Sensor buffer 1 at the top
S4	22-23	Sensor buffer 2



5

Boiler1 with heat exchanger, bypass, boiler integration, anti-Legionella, PWM1

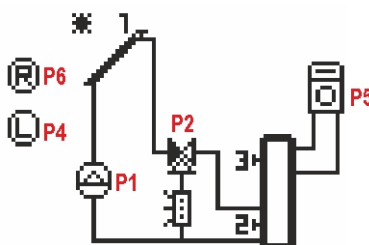
P5	13NO. 15NC 14Com	Boiler integration
P4	11-12	Anti-legionella pump
P3	8-9	Pump boiler
P2	5-6-7	Valve bypass
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S2	18-19	Sensor buffer below
S3	20-21	Sensor buffer at top
S4	22-23	Solar flow sensor



6

Boiler1, integration boiler, cooler, hot water circulation, anti-Legionella, PWM1

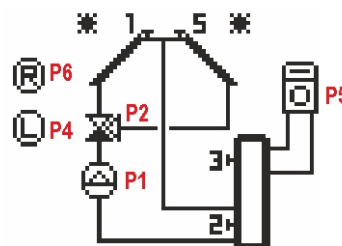
P6	10-11	Pump circulation
P5	13NO. 15NC 14Com	Boiler integration
P4	11-12	Anti-legionella pump
P2	5-6-7	Valve cooler
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S2	18-19	Sensor buffer below
S3	20-21	Sensor buffer at top



7

Dcoupled collector field valve logic, boiler1, boiler integration, hot water circulation, anti-Legionella, PWM1

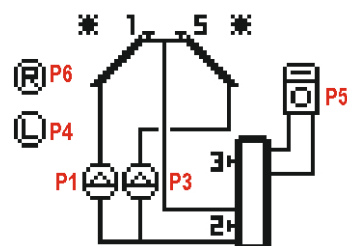
P6	10-11	Pump circulation
P5	13NO. 15NC 14Com	Boiler integration
P4	11-12	Anti-legionella pump
P2	5-6-7	Collector field valve 2
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor 1
S2	18-19	Sensor buffer below
S3	20-21	Sensor buffer at top
S5	24-25	Collector sensor 2



8th

Dcoupled collector field pump logic, boiler1, boiler integration, hot water circulation, LAntiegeionella, PWM1, PWM2

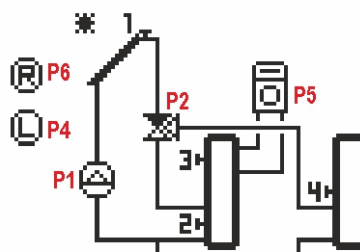
P6	10-11	Pump circulation
P5	13NO. 15NC 14Com	Boiler integration
P4	11-12	Anti-legionella pump
P3	8-9	Solar pump 2
P1	3-4	Solar pump 1
PWM1	32	PWM1 pump P1
PWM2	33	PWM2 pump P3
S1	16-17	Collector sensor 1
S2	18-19	Sensor buffer below
S3	20-21	Sensor buffer at top
S5	24-25	Collector sensor 2



9

Boiler1, Boiler2 valve logic, boiler integration, hot water circulation, anti-Legionella, PWM1

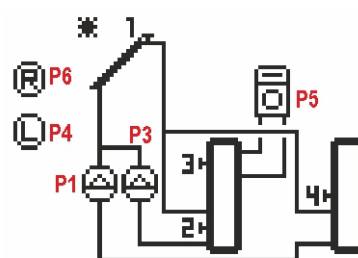
P6	10-11	Pump circulation
P5	13NO. 15NC 14Com	Boiler integration
P4	11-12	Anti-legionella pump
P2	5-6-7	Valve boiler2
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S2	18-19	Sensor buffer 1 below
S3	20-21	Sensor buffer 1 at the top
S4	22-23	Sensor buffer 2



10

boiler1, Boiler2 pump logic, boiler integration, hot water circulation, anti-Legionella, WM1 P

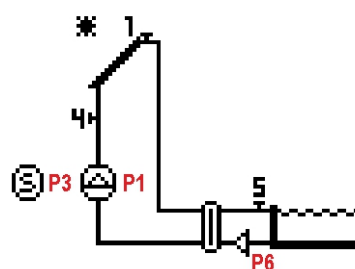
P6	10-11	Pump circulation
P5	13NO. 15NC 14Com	Boiler integration
P4	11-12	Anti-legionella pump
P3	8-9	Solar oil pump boiler2
P1	3-4	Solar pump boiler1
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S2	18-19	Sensor buffer 1 below
S3	20-21	Sensor buffer 1 at the top
S4	22-23	Sensor buffer 2



11

Pool with heat exchanger, collector protection, flow sensor, PWM1

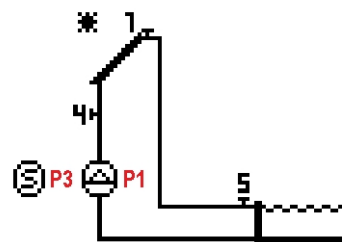
P6	10-11	Pump pool
P3	8-9	Collector protection
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S4	22-23	Sensor return
S5	24-25	Sensor pool
S7	30	Flow sensor



12

Pool, collector protection, flow sensor, PWM1

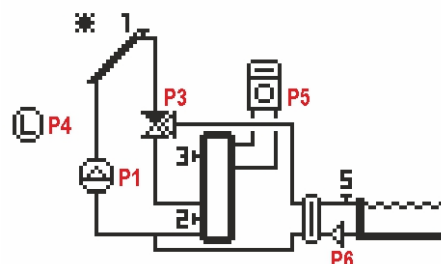
P3	8-9	Collector protection
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S4	22-23	Sensor return
S5	22-23	Sensor pool
S7	30	Flow sensor



13

Boiler1, pool with heat exchanger, boiler integration, anti-legionella, PWM1

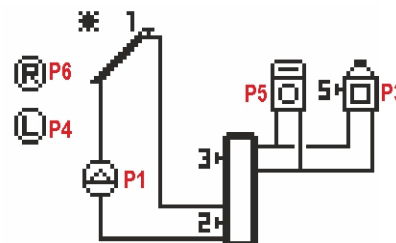
P6	10-11	Pump pool
P5	13NO. 15NC 14Com	Boiler integration
P4	11-12	Anti-legionella pump
P3	8-9	Valve pump
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S2	18-19	Sensor buffer below
S3	20-21	Sensor buffer at top
S5	24-25	Sensor pool



14

boiler1, integration boiler, integration wood boiler, circulation service water, anti-Legionella, WM1 P

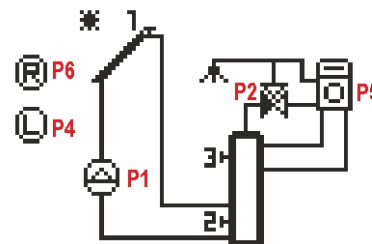
P6	10-11	Pump circulation
P5	13NO. 15NC 14Com	Boiler integration
P4	11-12	Anti-legionella pump
P3	8-9	Wood boiler
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S2	18-19	Sensor buffer below
S3	20-21	Sensor buffer at top
S5	24-25	Sensor wood boiler



15

boiler1, boiler integration, service water temperature increase, anti-legionella, hot water bdecoration, PWM1

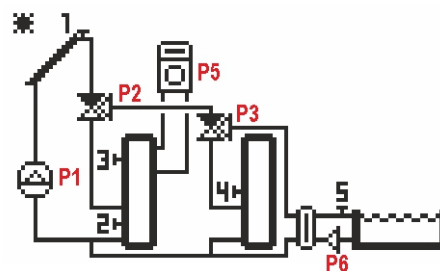
P6	10-11	Pump circulation
P5	13NO. 15NC 14Com	Boiler integration
P4	11-12	Anti-legionella pump
P2	5-6-7	Domestic water valve
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S2	18-19	Sensor buffer below
S3	20-21	Sensor buffer at top



16

Boiler1, Boiler2, pool with heat exchanger, boiler integration, PWM1

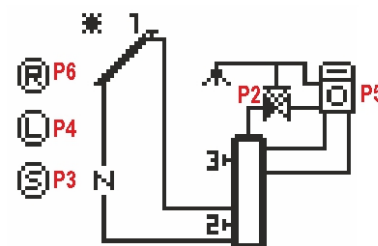
P6	10-11	Pump pool
P5	13NO. 15NC 14Com	Boiler integration
P3	8-9	Valve pool
P2	5-6-7	Valve buffer 2
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S2	18-19	Sensor buffer 1 below
S3	20-21	Sensor buffer 1 at the top
S4	22-23	Sensor buffer 2
S5	24-25	Sensor pool



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boiler1 with natural circulation, collector protection, temperature increase service water, Integration boiler, anti-legionella, ornamental process water

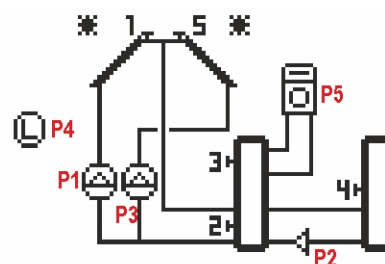
P6	10-11	Pump circulation
P5	13NO. 15NC 14Com	Integration 1 boiler
P4	11-12	Anti-legionella pump
P3	8-9	Collector protection Integration of 2 boilers
P2	5-6-7	Domestic water valve
S1	16-17	Collector sensor
S2	18-19	Sensor buffer below
S3	20-21	Sensor buffer at top



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Double collector field pump logic, boiler1, boiler integration, thermal exchange, anti-legionella, PWM1, PWM2

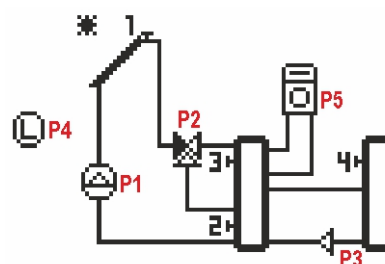
P5	13NO. 15NC 14Com	Boiler integration
P4	11-12	Anti-legionella pump
P3	8-9	Solar pump 2
P2	5-6-7	Pump replacement
P1	3-4	Solar pump 1
PWM1	32	PWM1 pump P1
PWM2	33	PWM2 pump P3
S1	16-17	Collector sensor 1
S2	18-19	Sensor buffer 1 below
S3	20-21	Sensor buffer 1 at the top
S4	22-23	Sensor buffer 2
S5	24-25	Collector sensor 2



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Boiler1, stratification, boiler integration, thermal exchange, anti-Legionella, PWM1

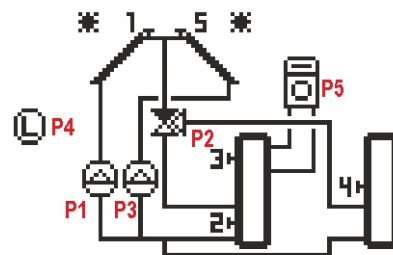
P5	13NO. 15NC 14Com	Boiler integration
P4	11-12	Anti-legionella pump
P3	8-9	Pump replacement
P2	5-6-7	Valve stratification
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S2	18-19	Sensor buffer 1 below
S3	20-21	Sensor buffer 1 at the top
S4	22-23	Sensor buffer 2



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Dcoupled collector field pump logic, boiler1, boiler2, boiler integration, anti-legionella, PWM1, PWM2

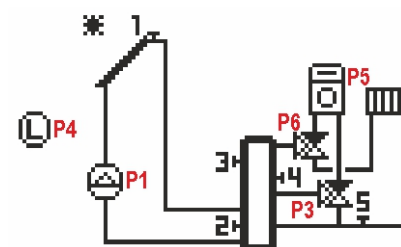
P5	13NO.	15NC	14Com	Boiler integration
P4	11-12			Anti-legionella pump
P3	8-9			Solar pump 2
P2	5-6-7			Valve buffer2
P1	3-4			Solar pump 1
PWM1	32			PWM1 pump P1
PWM2	33			PWM2 pump P3
S1	16-17			Collector sensor 1
S2	18-19			Sensor buffer 1 below
S3	20-21			Sensor buffer 1 at the top
S4	22-23			Sensor buffer 2
S5	24-25			Collector sensor 2



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Boiler1, boiler integration, heating return temperature increase, anti-Legionella, PWM1

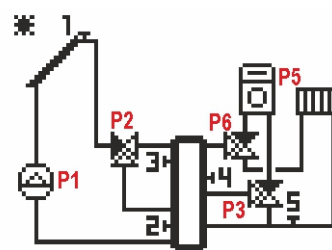
P6	10-11			Valve integration
P5	13NO.	15NC	14Com	Boiler integration
P4	11-12			Anti-legionella pump
P3	8-9			Valve heating
P1	3-4			Solar pump
PWM1	32			PWM1 pump P1
S1	16-17			Collector sensor
S2	18-19			Sensor buffer below
S3	20-21			Sensor buffer at top
S4	22-23			Sensor buffer center
S5	24-25			Heating sensor



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Boiler1, stratification, boiler integration, heating return temperature increase, PWM1

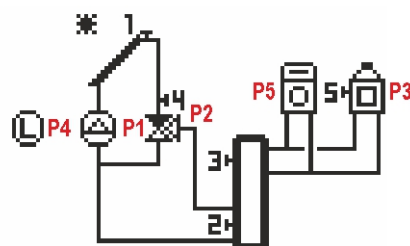
P6	10-11			Valve integration
P5	13NO.	15NC	14Com	Boiler integration
P3	8-9			Valve stratification
P2	5-6-7			Valve heating
P1	3-4			Solar pump
PWM1	32			PWM1 pump P1
S1	16-17			Collector sensor
S2	18-19			Sensor buffer below
S3	20-21			Sensor buffer at top
S4	22-23			Sensor buffer center
S5	24-25			Heating sensor



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Boiler1, integration boiler, integration wood boiler, bypass, anti-Legionella, PWM1

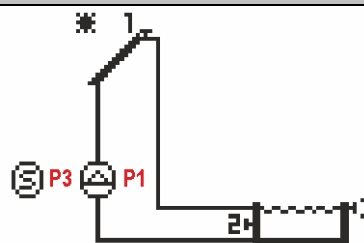
P5	13NO.	15NC	14Com	Boiler integration
P4	11-12			Anti-legionella pump
P3	8-9			Wood boiler
P2	5-6-7			Valve bypass
P1	3-4			Solar pump
PWM1	32			PWM1 pump P1
S1	16-17			Collector sensor
S2	18-19			Sensor buffer below
S3	20-21			Sensor buffer at top
S4	22-23			Solar start sensor
S5	24-25			Sensor wood boiler



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l, collector protection, flow sensor, PWM1

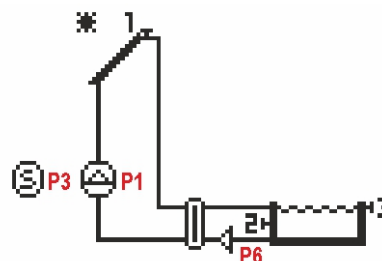
P3	8-9	Collector protection
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S2	18-19	Sensor pool below
S3	20-21	Sensor pool above
S4	22-23	return sensor
S7	30	Flow sensor



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Pool with heat exchanger, collector protection, flow sensor, PWM1

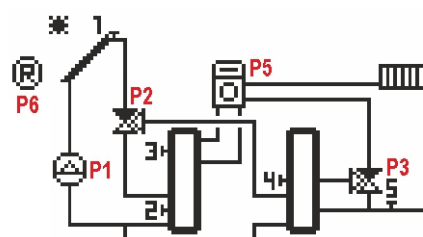
P6	10-11	Pump pool
P3	8-9	Collector protection
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S2	16-17	Sensor pool below
S3	20-21	Sensor pool above
S4	22-23	return sensor
S7	30	Flow sensor



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Boiler1, Boiler2, boiler integration, heating return temperature increase, PWM1

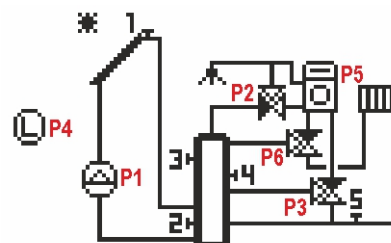
P6	10-11	Pump circulation
P5	13NO. 15NC 14Com	Boiler integration
P3	8-9	Valve heating
P2	5-6-7	Valve boiler2
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S2	18-19	Sensor buffer 1 below
S3	20-21	Sensor buffer 1 at the top
S4	22-23	Sensor buffer 2 center
S5	24-25	Heating sensor



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boiler1, boiler integration, heating return temperature increase, anti-legionella, hot bwater temperature increase, PWM1

P6	10-11	Valve integration
P5	13NO. 15NC 14Com	Boiler integration
P4	11-12	Anti-legionella pump
P3	8-9	Valve heating
P2	5-6-7	Domestic water valve
P1	3-4	Solar pump
PWM1	32	PWM1 pump P1
S1	16-17	Collector sensor
S2	18-19	Sensor buffer below
S3	20-21	Sensor buffer at top
S4	22-23	Sensor buffer center
S5	24-25	Heating sensor



System diagram: _____

Posted on: _____

Employed by: _____

Remark:



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