Centrometal

HEATING TECHNIQUE

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CE

TECHNICAL INSTRUCTIONS

For installation, setup and control of

the solar control unit **Cm-SOL**

WiFi READY

Cm-SOL

TU-SOL-09/2018-v2.00-ENG

Thank you for purchasing the product of Centrometal d.o.o.

Please read these technical manuals carefully so that you can use and adjust this control unit as easily as possible.
Once you have read the manuals, place them in an appropriate place where you can easily find them if you need further information on the operation and use of control unit.
Please make sure that the contol unit is discontinued after the end of use to reduce the pollution of the environment.

CONTENT

INTRODUCTION

Solar control unit is intended for heating the DHW tank, accumulation tank (with or without built-in DHW tank) or swimming pool through solar collectors and / or boilers and / or el. heaters.

The control unit can lead heating up to 4 different tanks / swimming pools that can be heated up to 2 separate hot water solar collector fields and up to 2 types of conventional source (boiler) or el. heaters.

In addition to the temperature sensor, also on the control unirt it is possible to connect the flow meter and the pressure limiter in the solar system.

With standard tank heating control over temperature difference, control unit has protective functions such as collector cooling (over tank), collector freezing options, tank coolers (over collector or recirculation), legionella protection (disinfection function) and protection of outlets (pumps and valves) of blocking due to long-term non using time.

Also, it is possible to include the functions of examinations of the priority tank filling, pumps pulse start, as well as annual vacation functions (all protective functions are switched on at once), one-time heating of the tank, one-time extension of tank heating or tank disinfection (legionella protection).

For the functions like heating of the tank with conventional source (boiler) or el. heater, recirculation, impulse start of the solar collector and disinfection of the tank It is possible to set switching times (two tables, for each day of the week, up to 3 times)

All functions are controlled through a touch screen color screen that simplifies the use of control.

As an additional equipment, a Cm WiFi-box can be connected via which it is possible to connect control unit to the local WiFi network, and remote control and monitoring of the system.

TECHNICAL CHARACTERISTICS

Technical characteristics CM-SOL	
Input	10x multifunctional inputs (each of which can be PT1000 or NTC5K or flow meter or pressure limiter)
	1x input for measuring of the insolation (inactive)
	1x power supply +5V
Output	8x semi-conductor (triac)
	2x PWM, 8.8 kHz (inactive)
	2x analog 1-10V (inactive)
	1x non-wired relay with NO and NC
	2x 12V alarm output (inactive)
Output power	Triacs (8x) 1A/240V
	Relay (1x) 5A/30VDC/250VAC
Power supply	195-265V/50Hz
Max. Power	6,3A/240VAC
Electricity consumption	3W
Cross section conductor	1-2,5 mm2
IP protection	IP20 po EN
Environment temperature	-10 do 40°C
Display	touchscreen display
Control unit mass	715 g
Housing material	Flame resistant ABS (UL94V-0)
Control unit dimensions	(WxHxD) 200x40x200
Sensor technical characteristics	
Sensor type	Pt1000, NTc5k
Min. conductor cross section	0,5-2,5 mm2
Max. conductor length	50 m

EC izjava o sukladnosti

Proizvod odgovara zahtjevima trenutno važećih pravilnika te je označen oznakom CE.

EC izjava o sukladnosti je dostupna na zahtjev, kontaktirajte proizvođača.

CE

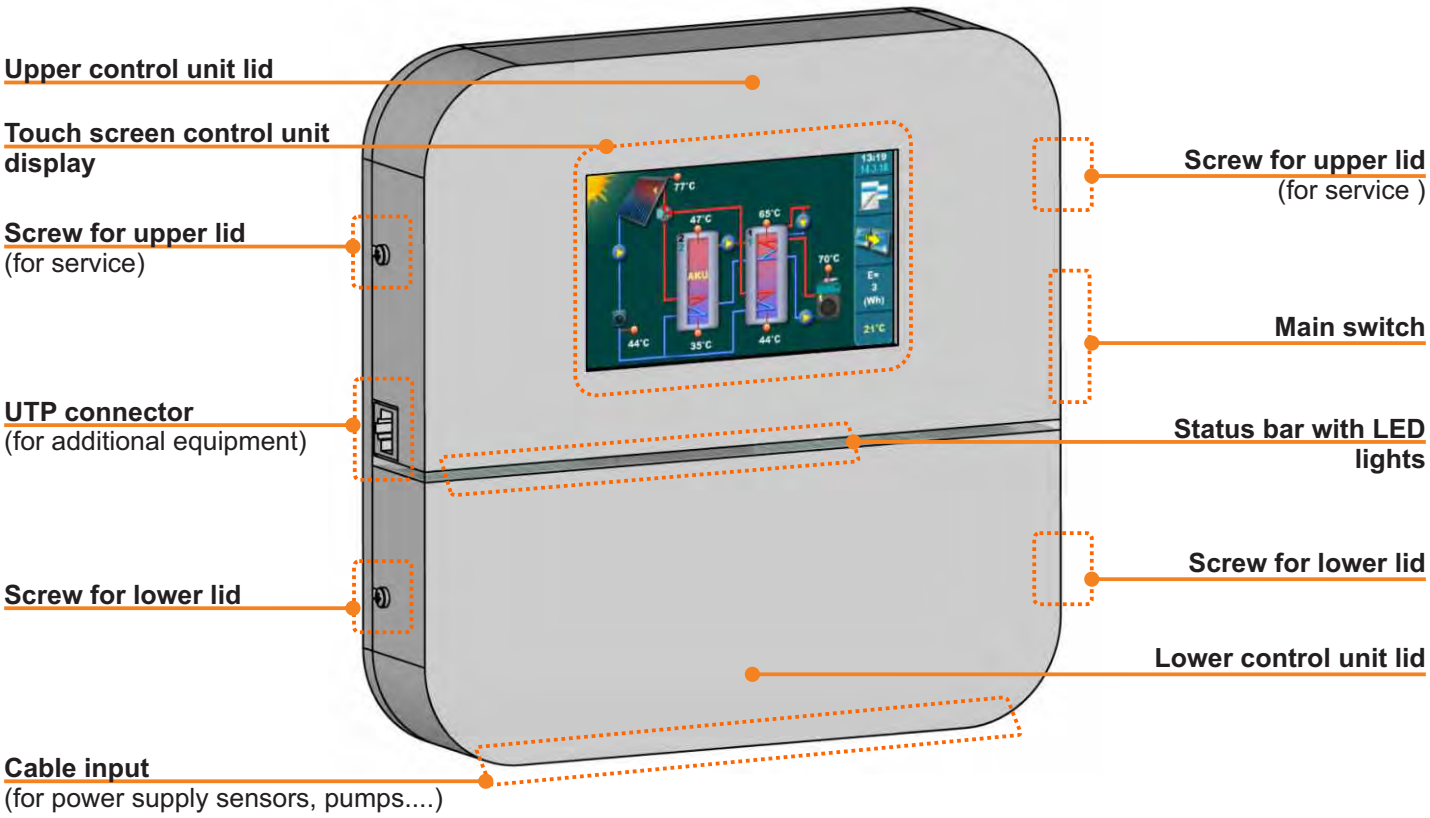
BASIC PARTS

INPUT:
- 10x multifunctional inputs for sensors (PT1000 or NTC5k sensor of the tank,boilers,soalr collector and outer sensor, flow meter or pressure limiter)
- 1x CS-10 (solar radiation sensor - inactive)
- 1x +5V power supply

OUTPUT:
- 8x standardni (230V)
- 2x PWM (for modulation pump - inactive)
- 2x 0-10V analog (for modulation pump - inactive)
- 1x relay output (with quiet or operational contact)
- 2x CAL (for alarm module - inactive)

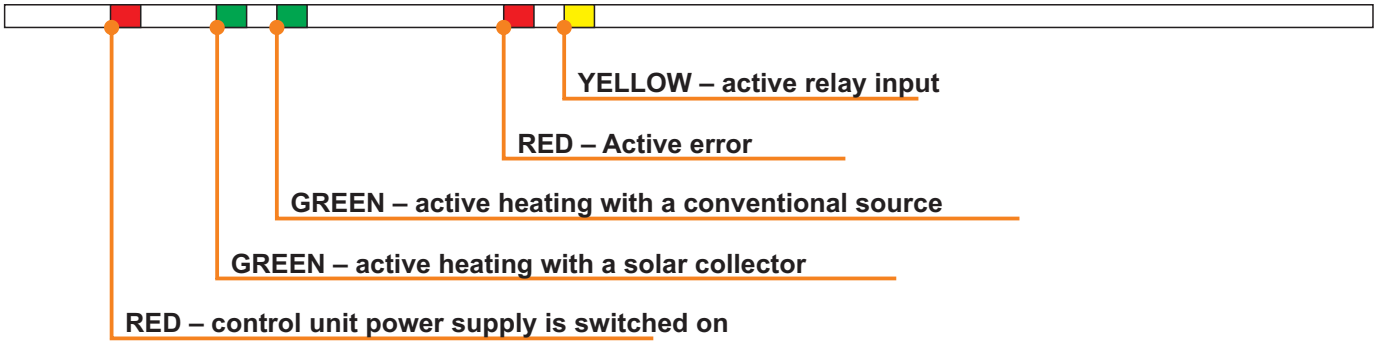
- 1x USB connector for software loading
- 1x UTP connector for connection of the additional equipment (WiFi box...)
- 1x Main switch

DELIVERY in the cardboard box:
1x solar control unit
1x Pt1000 (silicone cable for solar collector)
4x Pt1000 (2x tank, 1x boiler, 1x return) 3x dowel+screw
1x technical manual

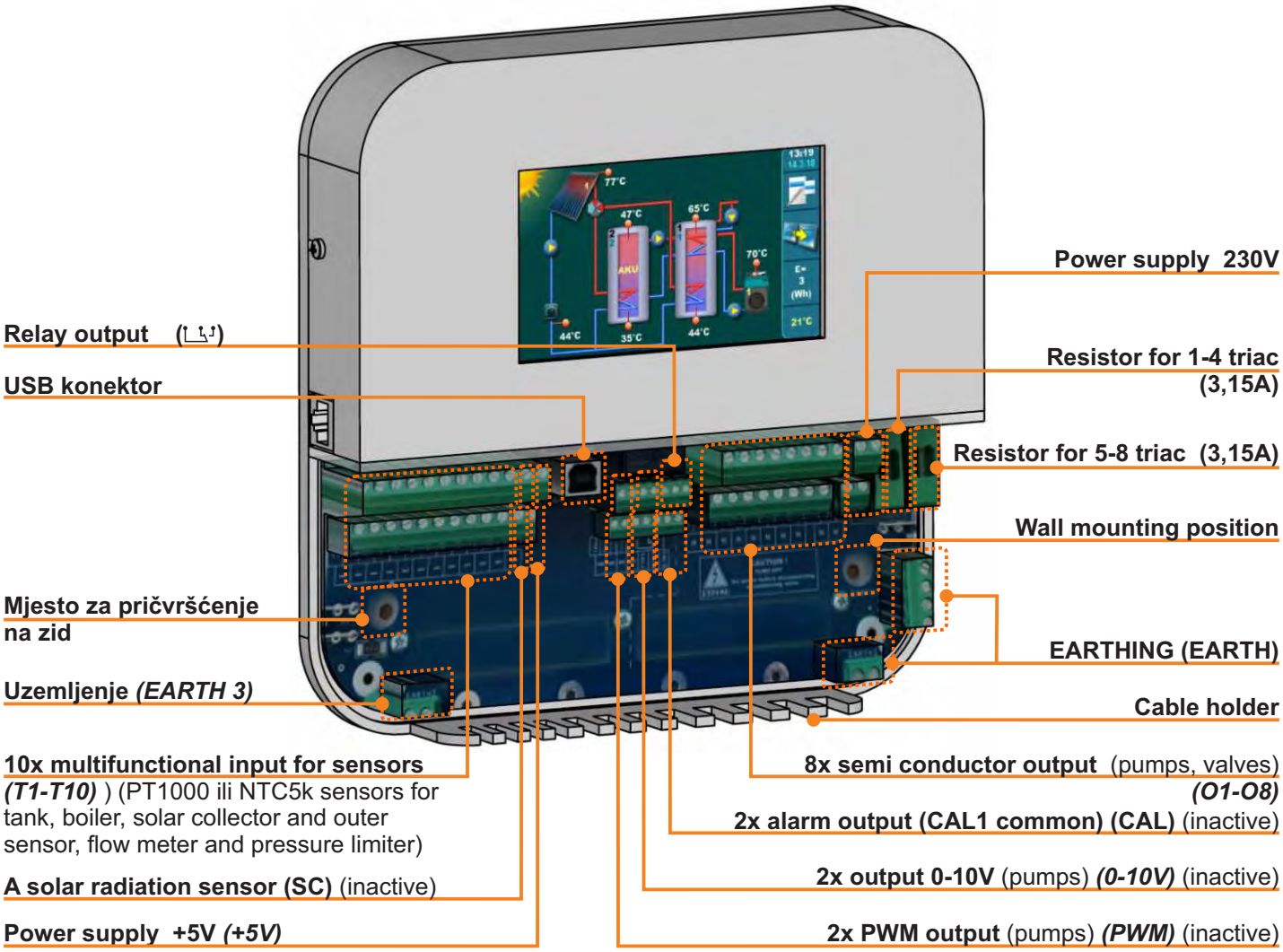


BASIC PARTS

STATUS BAR - LED diodes mark



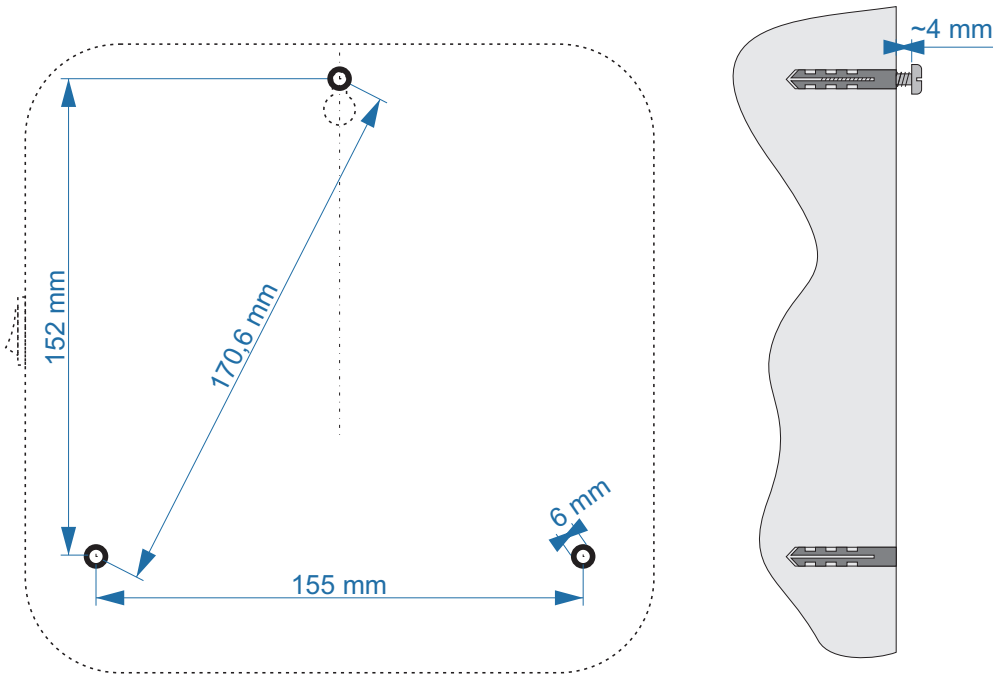
Control unit INPUT / OUTPUT



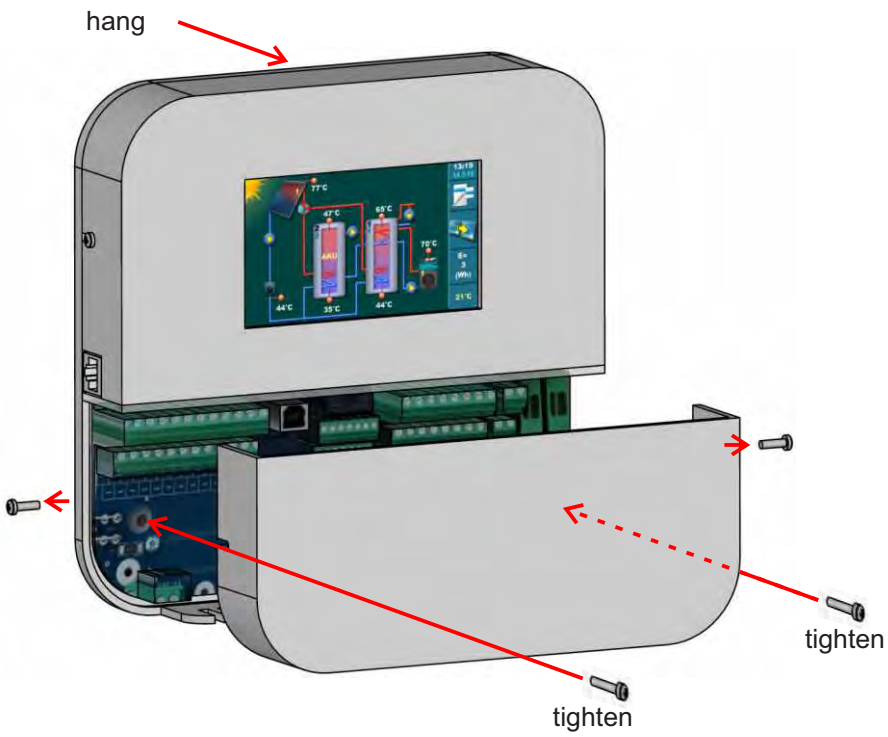
CONTROL UNIT INSTALLATION

Solar control is installed on a wall or flat hard surface in a closed dry area.

First, 3 holes in diameter 6mm x 35 - 40mm should be drilled at the mounting site according to the bottom sketch. Three dowels are inserted into the holes and in the upper dowel need to be screwed the screw with a distance of approx. 4mm



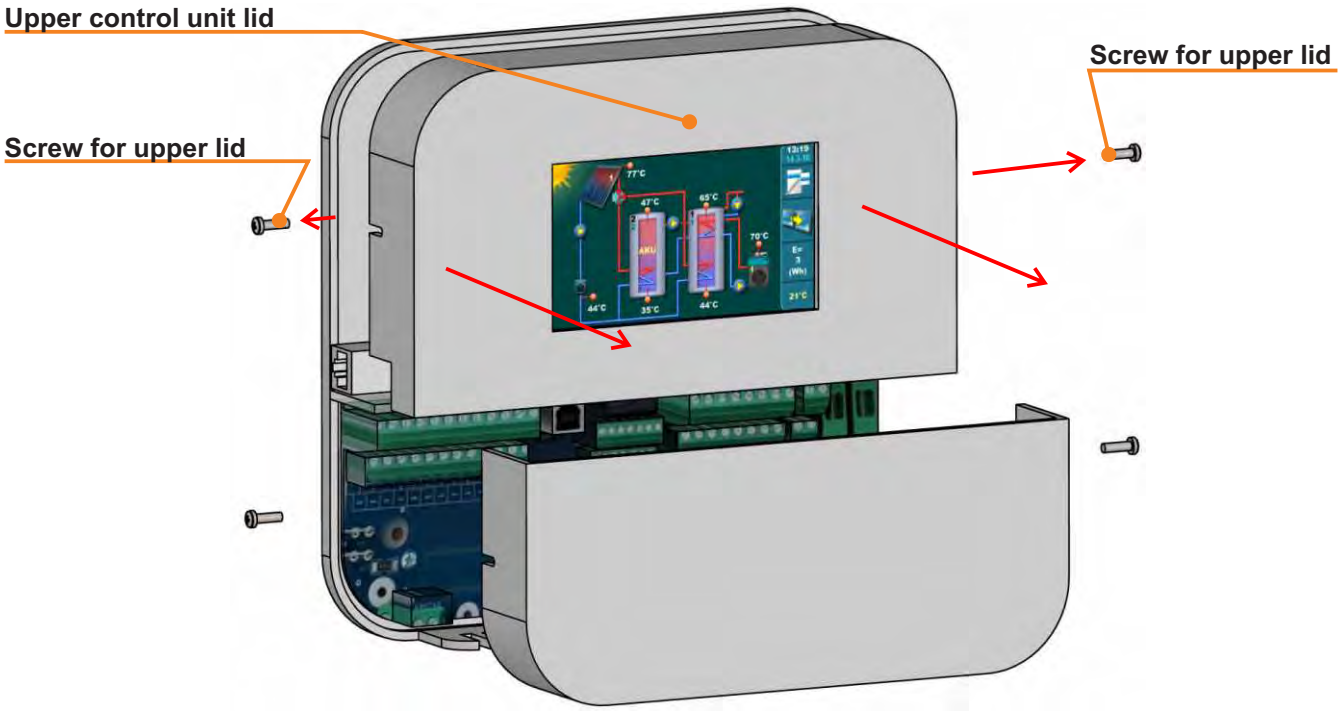
From the control unit remove the lower lid, hang the control unit on the upper screw, insert the screws at the mounting positions of the control unit and tighten the screws in the wall dowels.



BATTERY REPLACEMENT

If it is necessary to replace the battery in the solar control unit, remove the upper control unit lid (on which the display is located).

After releasing the two side screws for the upper lid (each side of the control for one), slowly pull the upper lid of the control towards you and completely remove it.



On the back of the display, in the corner of the PCB board, there is placed a battery CR 1220.

After replacing the battery, the upper lid with the display must be carefully restored to the control unit(pay attention to the connector of the PCB board and motherboard) and tighten the side screws.

POSSIBILITIES OF THE CONTROL UNIT

CmSOL control unit can lead to solar heating up to 4 separate tanks with 1 or 2 solar collector fields and heating the first tank using conventional sources - an el. heater and up to two boilers.

Contol unit have 10 inputs and 8 outputs.

Types of soalr collectors can be chosen between flat plate and vaccum tube solar collectors.

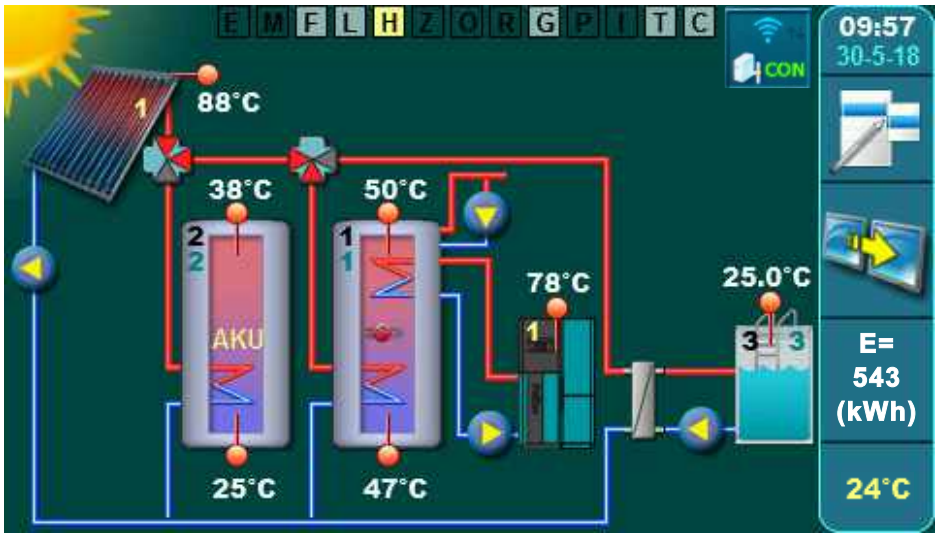
Types of tanks can be selected between DHW tank, accumulation tank, accumulation tank with built-in DHW tank and swimming pool.

The hydraulic connector for the multiple tanks can be selected via pumps, 3-way valve zone and 2-way valve zone.
It is possible to lead the pump of reheating the first tank to another tank(heating the DHW tank with the accumulation tank).

The first tank can be heated by an el. heater (via contactor) and with up to 2 conventional heat sources (it is possible to choose between wood boilers, pellets, oil / gas, el. boiler or heat pumps).

The control unit can lead the recirculation pump to impulse operation at the set switching time.

By entering the correct flow through the solar collectors and by installing the solar collector backflow sensor, it collects the total energy from the solar collector. If the flow meter is installed, the calculation of the energy will be more accurate.



In addition to the upper mentioned, the control unit also has protective functions: solar collector cooling function (via tank), tank cooling function (over solar collector or recirculation), disinfection function (legionella protection) and function pump protection and function of the blocking valve protection.

The control unit can determine the priority of solar heating of a single tank, include a tank heating up priority test, switch on and off certain tank from the heating, include one-time heating of conventional tank sources, include a party option for a one-time extension of conventional tank and switch on the holiday options with whom automatically swith on all protective control unit functions to allow the overheating / freezing of the collector to be minimized.

To monitor the operation of the solar system, it is possible to install a WiFi box through the web portal and monitor the individual temperatures and operation of individual pumps and valves. Through the web portal it is also possible to change the set temperature of the tank and solar collector.

CONTROL UNIT ACTUATION

After the main switch is switched on, the menu for selecting the desired language and the software version will appear. Different languages can be selected. To select the language you need to press on the display the flag of the preferred language.

Online operation monitoring and regulation control (additional equipment: Cm WiFi-box)

Software version

Page listing

Language selection

If in the main menu under "EKRAN (DISPLAY)", option "ODABIR JEZIKA(LANGUAGE SELECTION)" set under "ISKLJUČENO(SWITCH OFF)" an initial message will appear (see the image below) and it will be displayed as long as it is set in the menu "VRIJEME POČETNE PORUKE(TIME OF INITIAL MESSAGE" or until the key "OK" is pressed.

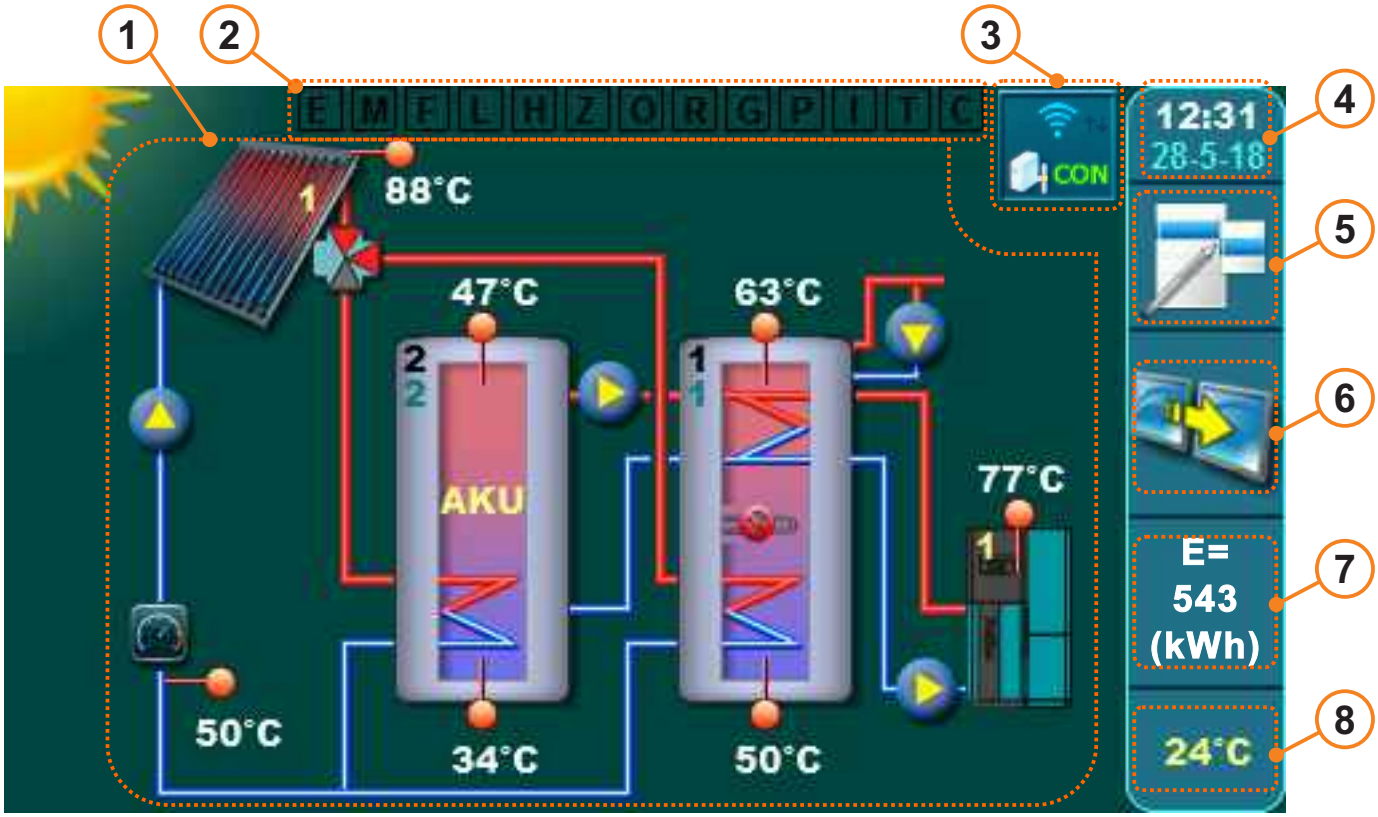
Software version

Key ”OK”

Countdown of the initial message duration

When switching on the main switch the display must not be pressed (finger ...). If the display switches on when the main switch is pressed (Firmware update is displayed on the screen), the control unit enters the software insertion mode, which can only be used by authorized service persons. If this occurs, switch off the main switch and turn it back on again without any pressure on the display to make the control unit ready for operation.

MAIN DISPLAY / SYMBOLS

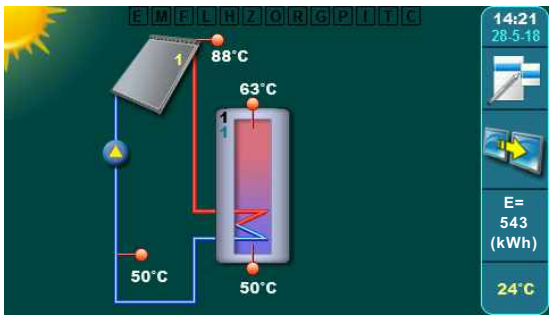


1 coll. field / vacuum tube coll. / 1 tank DHW / 1 ACCU tank / 3 –way zone valve / el. heater / boiler1 / mixing/reheating / flow meter / backflow sensor / outer temperature sensor / recirculation / internet control

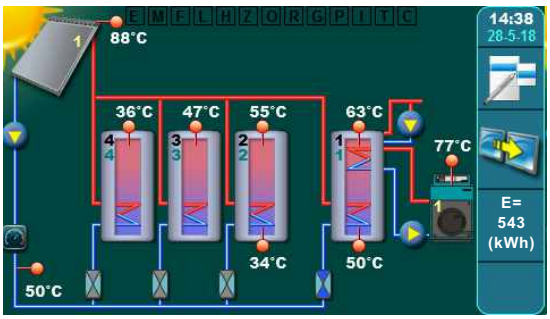
Main display symbols

1 - Display of the selected configuration
2 - Display of the system functions (switch off/on/active)
3 - WiFi Connection Status Display (additional equipment)
4 - Display of the current clock and date
5 - Key 'main menu'
6 - Key ''shortcuts''
7 - Display the total amount of solar energy collected
8 - Display of outer temp (additional equipment)

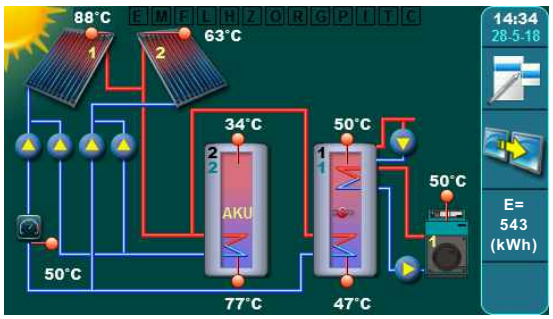
Several examples of the main display with selected configurations of the solar



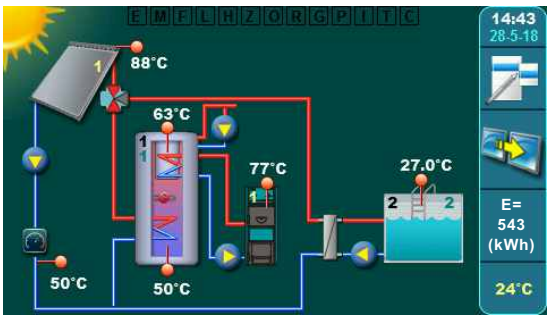
1coll.field / flat plate coll. / 1 tank. DHW / backflow sensor / outer temperature sensor



1coll.field / flat plate coll. / 4 tank. DHW / hydr. connection /2 –way zone / reheating boiler oil/gas / recirculation DHW / flow meter / backflow sensor

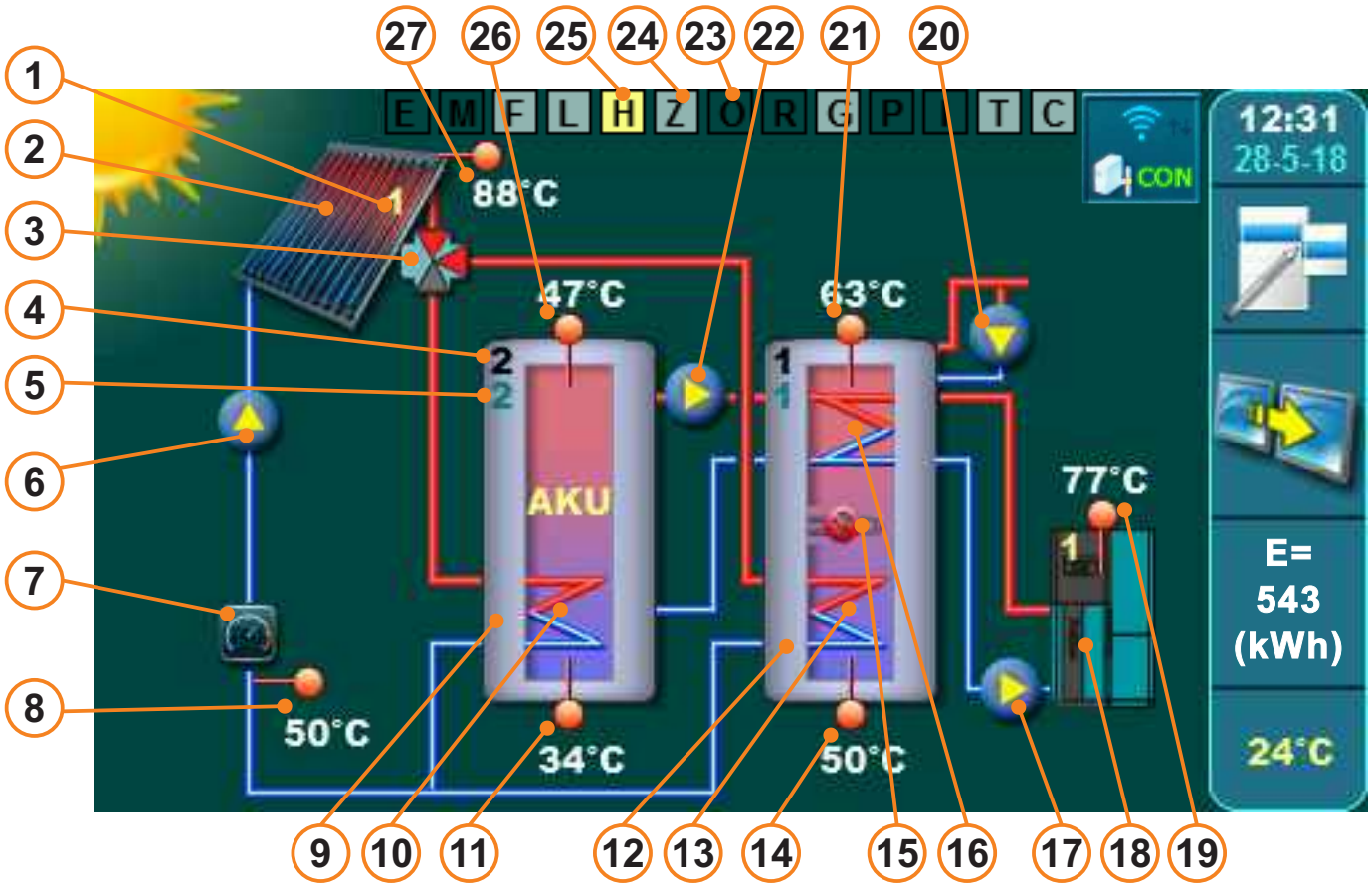


2 coll. fields / vaccum tube coll. / 1 tank. DHW / 1 accu tank / pump hydr.connection / reheating boiler oil/gas / recirculation DHW / flow meter / backflow sensor



1 coll. fields / flat plate coll. / 1 accu with DHW / swimming pool / hydr.connection 3 –way zone / reheating wood boiler / recir. DHW / flow meter / backflow sensor / outer temp. sensor

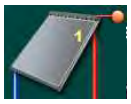
SYMBOLS



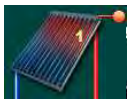
Main display symbols

1 - Mark of the collector field according to the configuration (1(1/2))
2 - Collector field 1 (vaccum tube coll.. (vaccum tube/flat plate))
3 - Tank hydraulic connection (zone 3-way (pump/ zone 2-way/zone 3-way))
4 - Mark of the tank according to the configuration (2 (1/2/3/4))
5 - Mark of the tank priority (2 (1/2/3/4))
6 - Collector pump (collector field 1)
7 - flow meter (additional equipment)
8 - Collector backflow sensor
9 - Accu tank (second)
10 - Lower heat exchanger of the accumulation tank
11 - Lower temperature of the accumulation tank
12 - DHW tank (first)
13 - Lower heatexchanger of the DHW tank
14 - Lower temp of the DHW tank
15 - El. Heater (additional equipment)
16 - upper heat exchanger of the DHW tank
17 - Boiler pump
18 - Boiler (Pellets (Pellets/wood/gas-oil/El. boiler/DT))
19 - Boiler temperature
20 - Recirculation
21 - upper temperature of the DHW tank
22 - mixing pump /reheating of the DHW tank
23 - system function - inactive (darkgreen)
24 - system function – switch on , at this moment inactive (lightgreen)
25 - system function – at this moment active (yellow)
26 - Upper temperature of the accu. tank
27 - Collectors field 1 temperature

Solar collectors



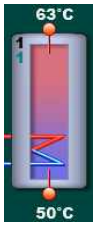
1 collector field flat plate solar collector



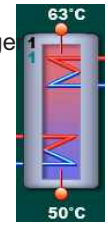
1 collector field vacuum tube solar collector

2 collector field vacuum tube solar collector

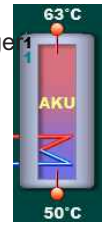
Tanks



Tank DHW
1 Haet exchange
2 temperatures

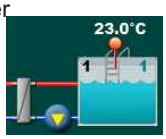


Tank DHW
2 heat exchange
2 temperatures



Accumulation tank heat exchanger
2 temperature

Accumulation tank with DHW tank
1 heat exchanger
2 temperatures



Swimming pool

Hydraulic connection of the tank

Hydraulic connection of the tank: Pumps

Hydraulic connection of the tank: 3-way zone valve

Hydraulic connection of the tank: 2-way zone valve

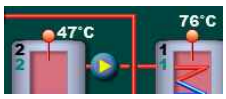

3-way zone valve: Open in L


3-way zone valve: Open in I


2-way zone valve: Open


2-way zone valve: Closed

Mixing / reheating



Mixing / reheating
Reheating – Pump between the accumulation tank and DHW tank for reheating of the DHW tank

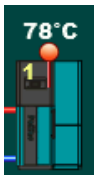
Mixing / reheating

REMARK: El. Heater and boiler/boilers can be configured only to 1. tank in the configuration!


El. heater (in 1. tank) installed – switch off

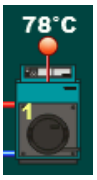

El. heater (in 1. tank) installed – switch on
- out of order


El. heater (in 1. tank) installed – switch on
- operational



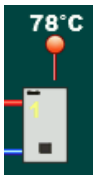
Boiler: Pellets/chiped wood

Boiler: wood

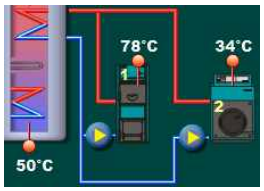


Boiler: gas/oil

Boiler: Heat pump



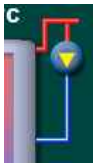
Boiler: El . boiler



Tank reheating:
example 1 wood boiler and 1 oil/gas boiler
- control unit steeres only with the boiler pumps, do not switch off/on the boielrs kotlove!

Recirculation

REMARK: Recirculation can be configured only to 1. tank in the configuration!


DHW recirculation

Energy meter / backflow sensor

REMARK: energy meter is the additional equipment

Energy meter (upper symbol)
Backflow meter (lower meter)

WiFi supervision

REMARK: additional equipment


Cm Wifi-box
Is not connector to a router/server

Cm Wifi-box
Is connector to a router/server

MARKING OF THE SYSTEM FUNCTION

Marking of the system function on the main display

C - Cooling of the collector (2.2.Collector cooling)

T - Cooling of the tank (1.7.Tank cooling)

I - Pulse start of the collector/swimming pool (2.1.2.Pump pulse start)

P - Priority test (1.6.priority test)

G - Protection of the pumps/valves (3.8. Protection of the pumps/valves)

R - recirculation (3.6.Recirculation)

O - One-time heating of the DHW (3.2.DHW one-time)

Z - party function (3.4.Party function)

H - Holiday options (3.5.GO options)

L - tank desinfection (3.7.Legionella protection)

F - Collector frost protection kolektora (2.3.frost protection)

M - Manual test (3.9.Manual test)

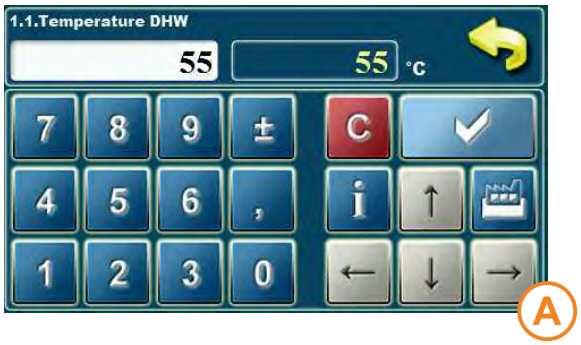
E - Reheating delay (3.3.Reheating delay)

1 - When none of the functions are included, the letter boxes on the main display are dark green.

2 - When a single function of the system is on, but not active, the letter box of that function on the main display is light green.

3 - When a single function of the system is on, and active, the letter box of that function on the main display is yellow.

PARAMETERS SETTING



A

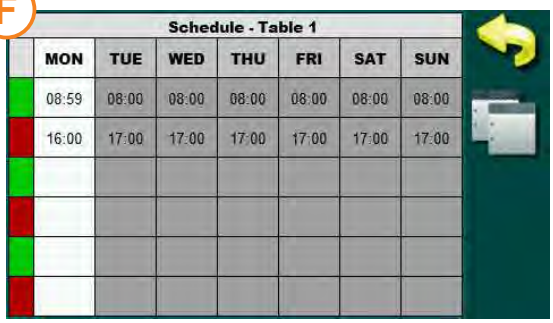
B

C

D

E

F



There are several parameter menus for setting parameters:

A- The menu is used to set parameters that have numeric values (°C, time...)
example: setting of the DHW tank temperature

B - the menu is used to set the parameters which need to to be selected (marked) to be switched on, multiple elements can be tagged simultaneously
REMARK: some of the included elements exclude others (may not be included at the same time)
example:switch on the tank...

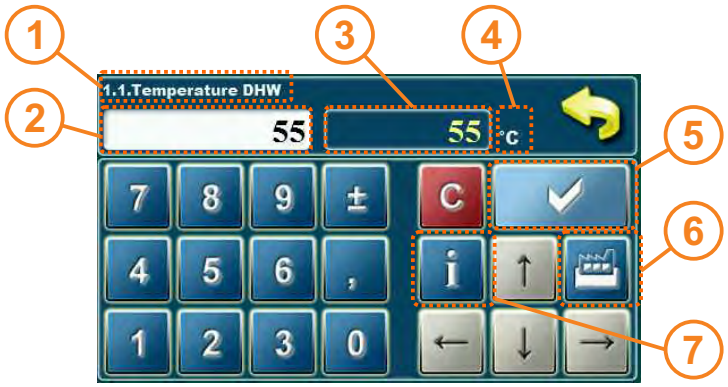
C - the menu is used to set the parameters which need to be selected (marked) but only one parameter can be selected (marked) example:: test priority switched off...

D - the menu is used for settings the parameters which have more then one setting parameters (adjusting with the arrows) example: setting of the time and date

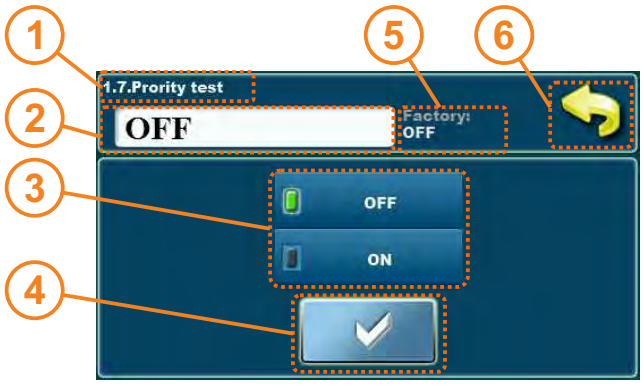
E - The menu is used when entering file names, usernames and passwords (letters and characters)
example: entering the name of the user file during the recording...

F - the menu is used when setting the switching times (timers)
example: setting the switching times of the pulse pump start

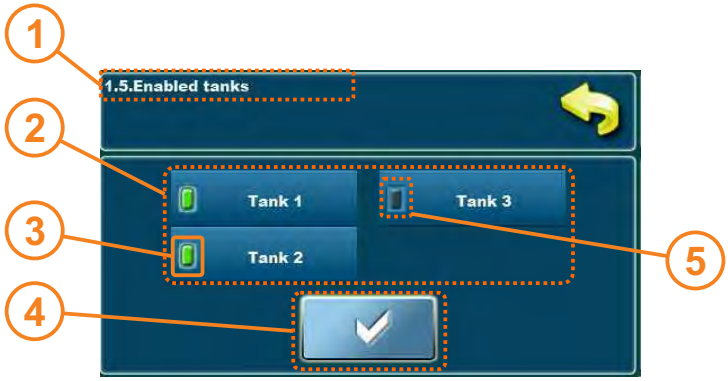
TYPES OF PARAMETERS SETTING (EXAMPLES)



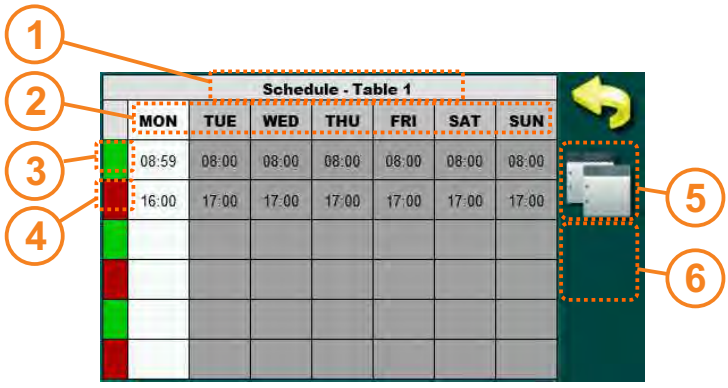
1 - setting parameters
2 -the window value you set
3 - set value
4 - value unit
5 - button for the entered value
6 - resets the current value to the factory value
7- key info (shows the factory, min. and max. value)



1 - setting parameters
2 - the window value you set
3 - set value (only one can be set)
4 - Confirmation key
5 - information on the factory value
6 - BACK button to return to the previous screen



1 - setting parameters
2 - elements that can be switched on / off
3 - marked (switched on) element
4 - confirmation key
5 - Unmarked (switch off) element



1 - setting table
2 - the day of the week for which the switching time is valid
3 - start time of switching time (green)
4 - end of switching time (red)
5 - If it is marked all day by pressing the name day it is possible to copy all the switching times of that day.
6 - marking the name of the day can be pasted before copie day

IMPORTANT: Press the key after changing parameter values**"CONFIRMATION"** to save a new value. If you do not want to save a new value, press the key **"BACK".**

MAIN MENU

The main menu is used to select the desired menus. To select a particular menu, press the appropriate icon on the display. To switch between "Main Menu" and "Home screen", use the "MAIN MENU" key.

Time
Date
Main menu:
Main menu / Home display
Shortcust: inactive
Total Collected Energy from Solar Collectors
Outer temperature (if outer sensor is installed, additional equipment)

KEYS

Key "**MAIN MENU**"
options: main menu / home display

Key "**SHORTCUTS**"
options: home screen / set shortcuts

Key "**LOAD**"

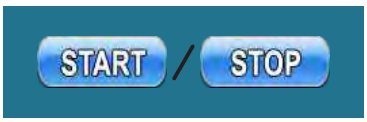
Key "**BACK**"

Key "**BACK SCREEN**"

Key "**NEXT SCREEN**"

Key "**COPIE**"

Key "**OK**"



Key "**START**"/"**STOP**"

Navigation Keys:
"**LIJEVO**", "**DESNO**", "**DOLJE**", "**GORE**"

Key "**BRISANJE**"

Key "**TVORNIČKE POSTAVKE**"

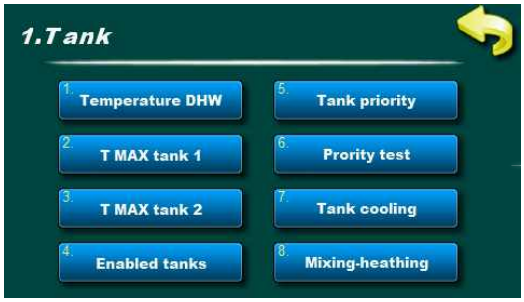
Key "**INFORMACIJE**"

Key "**ZALIJEPI**"

THE NUMBERS OF MENU AND MENU ARE CHANGING ACCORDING TO THE SELECTED CONFIGURATION (some menus in certain configurations will not be displayed in the same place as in this manual).

USER MENU (MAIN MENU)

1. TANK



primjer: konfigurirana 2 spremnika, funkcija miješanje-dogrijavanje

The menu 1. Tank contains menus associated with configured tanks. Depending on the configuration, here are displayed menus for 1 to max 4 tanks.

1.1. DHW temperature

Set the desired DHW temperature (domestic hot water). Conventional energy sources (el. heater, boiler1 and boiler2) heat the DHW tank to the desired DHW temperature.

REMARK: DHW temperature applies only to the conventional sources. Solar collectors heat tank up to tank to tank temperature Tmax tank.

Factory settings		*min./max.*	*unit*
DHW temperature	55	10 / 85	°C

1.2. T MAX tank 1

Set maximum tank temperature 1.
Solar Collectors Heat Tank 1 to Temp. [T MAX tank 1]
after which the heating of the tank 1 stops and the heat is transferred to the next tank by priority (if available).
If the collector cooling function is activated, the temperature in the tank can increase to max. 90 ° C (or 95°C if the TMAX Tank 1 is set at 90°C).

1.3. T MAX tank 2

Set maximum tank temperature 2.
Solar Collectors Heat Tank 2 to Temp. [T MAX Tank 2] after which the the heating of the tank 2 stops and the heat transfer to the next container by priority (if available). If the active cooling function of the collector is also activated, the temperature in the tank can increase to max. 90°C (or 95°C if the TMAX tank is set to 90 ° C.

Factory settings		*min./max.*	*unit*
T MAX tank 1	70	30 / 90	°C
T MAX tank 2	70	30 / 90	°C
T MAX tank3	70	30 / 90	°C
T MAX tank 4	70	30 / 90	°C

If the swimming pool is selected as the last tank, the max. swimming pool temperature can be adjusted in the following range:

Factory settings		*min./max.*	*unit*
T MAX tank X	28	15 / 40	°C

Example:configuration 2 tanks

1.4. Enabled tanks

In this menu, you can switch on/off the individual tank in operation of the system.

SWITCH ON - the tank is included in the system.
SWITCH OFF - the tank is switched off from the system (no pump or valve is used, nor does it heat up).

REMARK: If all tanks are switched off on the control unit a warning will appear!(solar collectors do not fill any of the tank fast boiling of the collector).

Factory settings		*selection*
Tank 1	Switch on	ON/OFF
Tank 2	Switch on	ON/OFF
Tank 3	Switch on	ON/OFF
Tank 4	Switch on	ON/OFF

Example:configuration 3 tanks

1.5. Tank priority

Selection of the priority for solar tank filling. Tank 1 must always be the first priority, the other tanks can rotate at the priority of the charge. The priority of eachtank is indicated in the upper left corner of the tank (number of green), below the row number of the tank (black number).

Factory settings		*selection*
2 tank	12	12
3 tank	123	123 / 132
4 tank	1234	1234/1243/1324/1342/1423/1432

P P P

1.6. Priority test

If there are more than one tank in the configuration, the tank priority test may be switch on to periodically examine whether the collector temperature is high enough to refill the priority tank.

After the priority tank (or [T MAX tank1] or [Tcoll <Ttank1 + TDcoll-ready] is filled, solar heating is switched to the first next tank by priority. By switching to the Priority Option, the next priority tank by option will be filled for a certain time (set under Priority filling) and then tank filling will be stopped for a specified time (set under Priority Stand by) to make sure the collectors can begin filling the priority tank or continue filling the same tank. If the increase in temp. the collector in the set idle time is greater than or equal to [3 ° C / min.] the idle time is extended as long as the temperature rises. the collector is larger, ie when the priority tank can be refilled. If the increase in temp. the collector in the set idle time less than [3°C / min] continues filling the same tank. By using the Test Priority option in the 1. Tank, appears the menus Priority filling and Priority stand by.

Factory settings		*selection*
Test priority	OFF	OFF/ON

1.7. Filling priority

Priority test -> Switch on
Continuous filling time of the next tank in order (non-priority tank).

Factory settings		*min./max.*	*unit*
Filling priority	15	0 / 720	min

1.8. PRIORITY OF STAND BY

Test priority -> Switch on

The collector pump stand by time during which the temperature rise of the collector is tested in order to return collector heating to the priority tank. If the temperature increase in the set stand by time is greater than or equal to [3°C / x min], the stand by time is extended for the next interval, which again looks at the increase in the temperature of the collector and the possibility of filling the priority tank. If the temperature rise in the set stand by time is less than [3°C / x min], filling the current tank continues

Factory settings		*min./max.*	*unit*
The priority of stand by	3	0 / 60	min

1.7. Tank cooling

Cooling the tank, ie lowering the water temperature in tanks to prepare the tank for accepting the new solar energy the next day, can be done over the collector or through recirculation (if it is installed in the system and connected to the control).

REMARK: Cooling of the tank always start from the lowest priority to the tank with the highest priority.

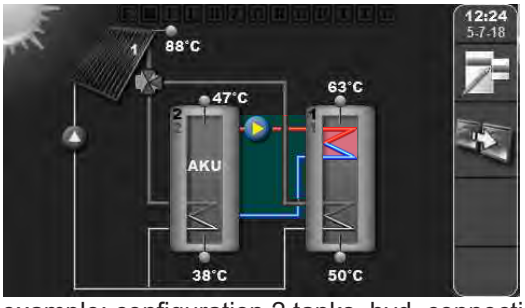
Collectors - Cooling the tank via the collector (and pipes to the collector).

REMARK: It is recommended to cool the tank with **flat plate collectors** (not vaccum tube) for less insulation on flat plate collectors.

Cooling takes place when the temperature in the collectors is lower than the temperature in the tank. down [Tcoll. + dTcoll. / ready. <T MAX size.X]. The tank cools only when all the tanks are filled to the [T MAX tank] and move from the minimum priority tank. The cooling of the tank stops when the temperature of the upper sensor drops below the diference collector / tank [Ttank_upper <TMAX ready - dTcoll / tank].

Recirculation - cooling the first tank through recirculation (only the first priority tank is cooled only if the recirculation is connected). Cooling of the tank starts only when all the tanks are filled to [T MAX] and when [Ttank.1_upper> T MAX is ready.1] (only runs on the first tank). Cooling of the first tank stops when the temperature of the upper sensor drops to 5 ° C of [T MAX 1].
[Ttank.1_upper < TMAX tank.1 - 5°C].

Factory settings		
Tank cooling.	OFF	Isključeno/Kolektorsko/Recirkulacijsko



example: configuration 2 tanks, hyd. connection - Zones 3-Way, Mixing / Reheating

1.8. Mixing-reheating

If in the the mixing-heating configuration of the tank is switch on on in the installation menu, in this menu, the mixing-reheating function of the first tank, ie the mixing-reheating pump can be switched on or off. If the function is switched on, when the temperature of the first tank (upper sensor) is lower for the differential setting than the second tank (upper sensor), the mixing / reheatingl pump is switched on to fill the first tank (this function is usually used when the first tank is DHW tank and the second ACCU , when the excess energy is stored in the ACCU during the day, and in the evening, after the consumption, the DHW tank may additionally be heated).

REMARK: need to be switch on in the Installation menu.

Factory settings		*selection*
Mixing-reheating.	OFF	ON/OFF

2. COLLECTOR

example: configurated 2 collector fields

In Menu 2.Collectors, there are menus associated with configured collector fields. Depending on the configuration, menus for 1 to max. 2 collector fields. are displayed here

2.1. Collector 1

In Menu 2.1, Collector 1 contains menus for setting the parameters for the 1st Collector field.

2.1.1. T MAX COLLECTOR1

Set maximum collector temperature 1. The solar collector field 1 pump runs to the temperature in the collectors [T MAX collector 1] after which it goes off (to protect the armature from excessive temperature due to steam in the collectors and the inability to operate the pump until the temperature in the collectors drops below the set max. collector). When the temperature in the collectors drops below [T MAX Collector1 - 4°C], the Collector Field 1 pump again starts working if other conditions are met

REMARK: [T MAX collector] it is necessary to adjust the point of solar fluid boilin in the solar system and always be lower than the boiling point.

Factory settings		*min./max.*	*unit*
T MAX collector 1	140	30 / 150	°C

2.1.2.Pulse collector start

In the menu 2.1.2. The pulse start pump contains the menus for adjusting the parameters for the pulse start pump (kick) of the collector field 1.

If the collector sensor is not mounted in the collector (rather than somewhere on the flow pipe) or has more than one collector in the same field, it is recommended to switch on the impulse start pump which, if the pump collector pauses, occasionally populate the collector pump at a specified time to obtain a more accurate current temperature solar fluid on the collector sensor.

REMARK: excessive and long-lasting pump operation can be tank unnecessarily cooled down! Pump time and breakdown depends on the size and location of the collector field and the collector sensor.

2.1.2.1. Pulse collector start

In this menu, the pulse start function can switch the collector on or off. All pre-set times as well as switching times remain.

Factory settings		selection
Pulse coll. start	OFF	ON/OFF.

2.1.2.2.Pump work time

Set the operation pump time at pulse start.

REMARK: Time has to be adapted to the size and location of the collector field and collector sensor to obtain the correct collector temperature and ASAP the tank start to heat.

Factory settings		min./max.	unit
Operation pump time	10	0 / 3600	sec

2.1.2.3.Pump pause time

Set the stand time (pause) of the pump in the pulse start.

REMARK: Time has to be adapted to the size and location of the collector field and collector sensor to obtain the correct collector temperature and ASAP the tank start to heat.

Factory settings		min./max.	unit
Pump pause time	15	0 / 1440	min

2.1.2.4.Switching time

In this menu there are menus related to adjusting the switching times for the pulse start of the pump (kick) of the collector field 1.

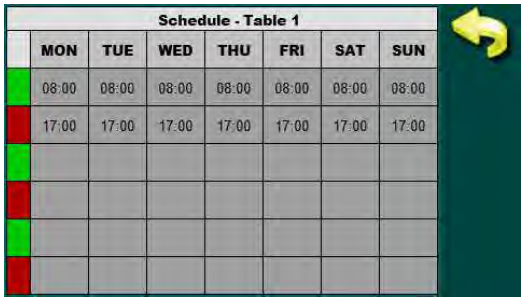
The switching time can be switched off or one of two tables can be set with the set intervals of the active and inactive function

2.1.2.4.1.Switching time

In this menu, you can switch on / off the switching time and select one of the two tables that will operate on the pulse start pumps.

REMARK: If the pulse start pump is switched on, and the switch-off time is off, the pulse start will run non-stop (24/7) at run / break times. In such a case, the pulse start **will also work overnight** and there is a possibility of cooling the tank over the collector.

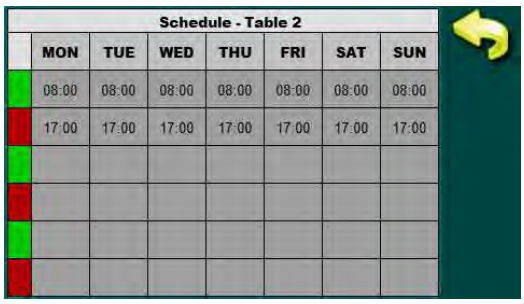
Factory settings		selection
Switching time	Table1	OFF/Table1/Table2



2.1.2.4.2.Table 1

In this menu, you can set 3 time intervals (3 start and 3 stop) for each day of the week in which the pump will operate according to the set pulse start.Factory setting: Pulse start pump is active from 08:00 to 17:00 every day of the week. From 17:00 h the first day until 08:00 h the next day the impulse start does not operate.

Factory settings		selection
Table 1	08:00-17:00	mon/tue/wed/thu/fri/sat/sun



2.1.2.4.3.Table 2

In this menu, you can set 3 time intervals (3 start and 3 stop) for each day of the week in which the pump will operate according to the set pulse start. Factory setting: Pulse start pump is active from 08:00 to 17:00 every day of the week. From 17.00 h the first day till 08.00 h next day. Pulse start is not operational.

Factory settings		*selection*
Table 2	08:00-17:00	mon/tue/wed/thu/fri/sat/sun

2.2. Collector 2

In Menu 2.2, Column 2 contains menus for setting parameters for the 2nd Column Field. The menus are identical to that of Collector 1 (for details, see descriptions for 2.1.collector 1).

C C C

2.3.Collector cooling

In this menu, the collector cooling function (over the tank) can be switched on or off. The cooling function of the collector wishes to delay the solenoid heating of the solids in the collectors by raising the temperature in the tanks to the maximum temperature [T MAX tank= 90°C].
The collector cools down if the temperature in the collectors reaches [T MAX collector - d Cooling_colorator] and if all tanks are full, to [T MAX tank(set)]. [Tkole. > T MAX col. - dThlađ.kol.] Collector cooling stops if the coil collector crosses [T MAX collector] or when the temperature drops in the collectors below [Tkol <T MAX ch. - dThlađ.kol. - 2 ° C]
or when all tanks are filled up to the maximum of [T MAX Tank = 90°C]. If [T MAX Tank = 90°C] is selected then the maximum in the collector cooling tank automatically rises to 95°C.The cooling differential [dTh.col.] Can be adjusted by PIN
REMARK: [T MAX collector] must be adjusted to the point of boiling of solar fluid in the solar system and must always be lower than the boiling point.

Factory settings		*selection*
Collector cooling	OFF	ON/OFF

F F F

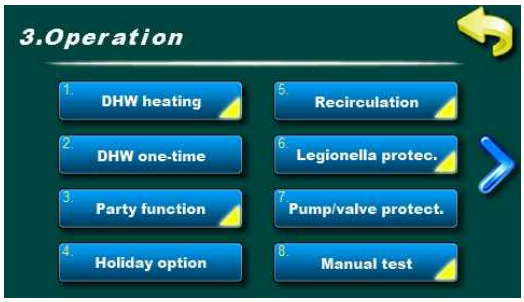
2.4. Frost protection

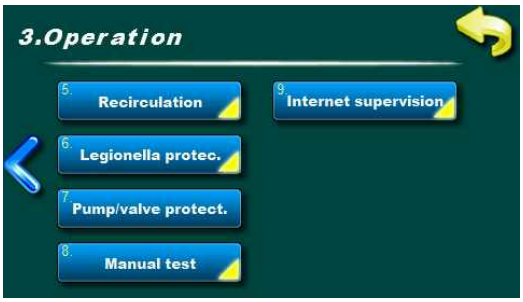
In this menu, you can switch the collector freezing function on or off. Use this function when in the solar water system and if the outer temperatures do not drop below zero. In the solar system it is always recommended to use a mixture of glycol and water (solar antifreeze and water). The freezing collector protection function caused the circulation of water through the collectors to prevent the freezing of the tank from preventing the freezing of water in the collectors. The frost protection drops when the temperature in the collectors falls to the set temperature under [Supports] PIN (factory setting + 4°C). The freezing protection stops when the drip in the collectors rises by + 2°C of the set temperature [Supports] and when the temperature in the tank drops down to + 3°C (to prevent freezing of the tank). Frost protection moves from the least priority tank to a tank of higher priority.

REMARK: Only use this function when only water is in the collectors. It is never recommended to fill the solar system with water only (without glycol)! By switching on the frost protection function, it is possible to coll the tanks.

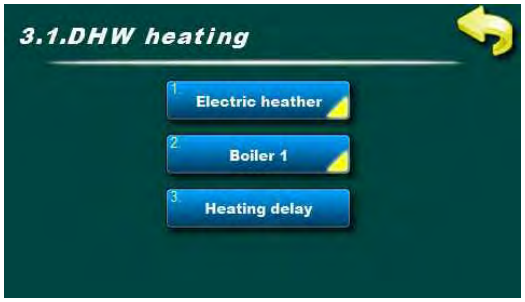
Factory settings		*selection*
Collector cooling	OFF	ON/OFF

3. OPERATION





In the menu 3 you can finde the menus connected with the solar system functions , manual test and if present the internet supervision.



Example: configuration of 1 electric heater and 1 conventional source

3.1. DHW heating

In this menu you can find the menus connected with the parameter setting of the configurated DHW heating (tank).
Under the PIN for the DHW heating it is possible to configurate one electric heater and until maximum 2 conventional sources (under PIN it is possible to select for screen display following:
wood boiler, pellet boiler, oil/gas boiler, heat pump and electric boiler).
It is possible to switch on/off (needs to be configurated in the installation menu) the reheating prorogation.

3.1.1. Electric heater

In this menu you can find the menus connected with the electric heater parameter settings in the first tank.
REMARK: needs to be switched on in the installation menu.The electric heater is connected on the controller's exit always through a contactor.

3.1.1.1.Electric heater

In this menu it is possible to switch on/off the electric heater operation for the reheating of the tank.
In case the electric heater is switched off, the symbol of the electric heater in the tank is crossed.
In case the the electric heater is switched on, and not active, the symbol of the electric heater has a grey colour.
In case the electric heater is switched on, and active, the symbol of the electric heater in the tankhas a red colour and blinks.

Factory settings		*selection*
Electric heater	OFF	ON/OFF

3.1.1.2 Schedule

In this menu you can find the menus connected with the schedule (switching time) for theelectric heater operation.

The schedule can be switched on or one or two tables can be selected with the set time intervalsof the active and inactive function.

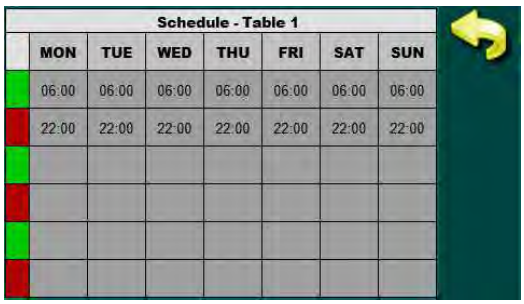
REMARK: Considering that the electric heater for the tank reheating consumpts an expensive energy source – electricity – it is necessary after the electric heater switches on, to define the schedule, with which we define the time of the desired tank reheating by the electric heater.

3.1.1.2.1.Schedule

In this menu it is possible to switch on/off the switching time and to select one or two tables according to which the electric heater will be switched on and active when needed (for example . first table can be used for the everyday use of the electric heater , the other over holidays).

REMARK: If the electric heater is switched on and the Schedule (switching time) turned off , the electric heater **will NOT operate**.For the electric heater operation it is obligatory to select one of the two tables and set the switching time (in some countries night/second electricity tariff is much cheaper than the daily one).

Factory settings		*selection*
Schedule	OFF	OFF/ Table 1/ Table 2



3.1.1.2.2.Tablica 1

In this menu it is possible to set 3 time intervals (3 start (green field) and 3 stop (red field)) for each day in the week in which the reheating by the conventional source will be able to operate according to the set temperatures.
Factory setting: the conventional source is enabled from 06:00 until 22:00 each day in the week.
From 22:00 first day until 06:00 next day the reheating by the conventional source cannot operate.

Factory settings		*selection*
Table 1	06:00-22:00	mon/tue/wed/thu/fri/sat/sun

3.1.1.2.3.Tablica 2

In this menu it is possible to set 3 time intervals (3 start (green field) i 3 stop (red field)) for each day in the week on which the electric heater will be able to operate according to the set temperatures.
Factory setting: the electric heater is enabled for operation from 06.00 to 22.00 hours each day in the week. From 22.00 hours first day until 06.00 hours next day the electric heater cannot operate.

Factory settings		*selection*
Table 1	06:00-22:00	mon/tue/wed/thu/fri/sat/sun

3.1.2. Boiler 1

In this menu you can find the menus connected with the parameter settings for the reheating by a conventional source 1 of the first tank.

REMARK: it is necessary to switch it on in the installation menu.

3.1.2.1. Boiler 1

In this menu the reheating of the conventional source 1 can be switched on or off (ie the operation of the pump between the conventional source 1 and tank 1).

Factory settings		*selection*
Boiler 1	OFF	ON/OFF

3.1.2.2.Schedule

In this menu you can find the menus connected for the schedule setting for the reheating operation through the conventional source 1.

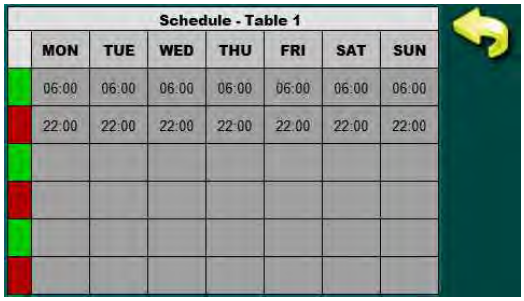
REMARK: In case the schedule is not switched on when we would like the reheating by help of the conventional source to operate and when not , the conventional source pump will operate according to the set temperatures the entire time, 24/7.The recommendation is to switch on and set the schedule in order to optimize the energy consumption according to the real needs for DHW.

3.1.2.2.1.Schedule

In this menu it is possible to switch on/ off the schedule and to select one or two tables according to
which the tank reheating by the conventional source 1 will operate.

REMARK: If the conventional source iz switched on, and the schedule is switched off, the reheating of the tank by the conventional source will be done according to the set temperature the entire time, 24/7.

Factory settings		*selection*
Schedule	OFF	OFF/Table1/Table2



3.1.2.2.2.Table 1

In this menu it is possible to set 3 time intervals (3 start (green field) and 3 stop (red field)) for each day in the week in which the reheating by the conventional source will be able to operate according to the set temperatures. Factory setting: the conventional source is enabled from 06:00 until 22:00 each day in the week.
From 22:00 first day until 06:00 next day the reheating by the conventional source cannot operate.

Factory settings		*selection*
Table1	06:00-22:00	mon/tue/wed/thu/fri/sat/sun

3.1.2.2.3.Tablica 2

In this menu it is possible to set 3 time intervals (3 start (green field) and 3 stop (red field)) for each day in the week in which the reheating by the conventional source will be able to operate according to the set temperatures. Factory setting: the conventional source is enabled from 06:00 to 22:00 hours each day in the week.
From 22:00 first day until 06:00 next day the reheating by the conventional source cannot operate.

Factory settings		*selection*
Table 1	06:00-22:00	mon/tue/wed/thu/fri/sat/sun

3.1.3. Boiler 2

The menus for the setting of the conventional source 2. All menus are the same as for the conventional source 1 and will not be separately described.

E E E

8.4.4. Heating delay

For the appearance of this menu the reheating with at least one of the conventional sources must be defined and in the installation menu the heating delay must be switched on and configurated.
If the function is switched on and the solar collector pump is active (it means that the tank is reheated by solar energy) this function decreases the actuation temperature of the reheatingby the conventional source (it delays the start of the reheating by the conventional source) for the value set under PIN in the menu Temperature decrease.
If the solar collector pump is active, the delay of the reheating start:
(Ttank_up1 <=TDHW-dTboiler_tank-Ttemp. decrease)

If the solar collector pump is not active and needs to reheat the tank, the delay of the reheating is not taken into consideration:
[Ttank_up1 <=TDHW – dTboiler_tank)]

REMARK: It is needed to swith it on in the installation menu.

Factory settings		*selection*
Heating delay	OFF	ON/OFF

In the installation menu:

		min./max.	*jed.*
Temp. decrease	0	0 / 90	°C

Example: configurated 1 electric heater and 1 conventional source

O O O

3.2. DHW one – time

By selecting the conventional source from this menu (one or more of them together if existing) the DHW is reheated one-time until the set temeperature (either in the set time or outside of it).
After the reheating completion the option DHW one – time is automatically switched off
.
REMARK: It is needed to switch on the conventional sources (in its menus) by which the DHW reheating would like to be done.

Factory settings		*selection*
DHW one – time	OFF	Electric heater/boiler 1/boiler 2

Z Z Z

3.3. Party function

Party function enables the DHW heating by switched on conventional sources a certain selected time (independent on the set time).
After completion of the selected time Party function, the options switches off automatically.

3.3.1. Party function

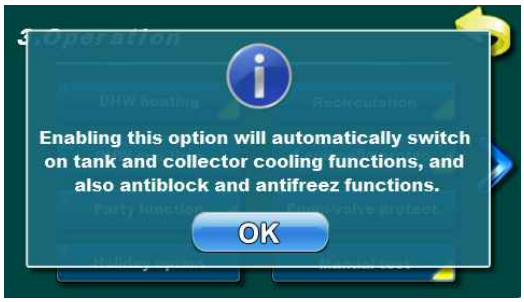
By switching on of this option the DHW is reheated until the set DHW tank temperature by switching on the conventional sources a certain time , which is selected in the menu Duration.
After the expiration of the selected time the Party function automatically switches off.

Factory settings		*selection*
Party function	OFF	ON/OFF

3.3.2. Duration

In this menu is defined how long from the moment of the Party function actuation the DHW reheating will last according to the set temperature. After the expiry of the selected time the Party function automatically switches off.

Factory settings		selection	unit.
Duration	1	1 / 3 / 6 / 12	h



H H H

3.4. Holiday option

The holiday option includes system safety functions to postpone as long as possible the appearance of steam in the solar collectors and to prevent the pump and valves blockage due to very little or none water consumption. By the actuation of the Holiday option the tank and collector cooling function is activated aswell the pump/valve safety function and frost protection of the water in the collectors. If it is not wished to activate all aforementioned functions at once, the Holiday option must be switched off and the individual wished safety functions need to be activated manualy.

Factory settings		unit.
Party opcija	OFF	ON/OFF

3.5. Recirculation

In the menu you can find the menus connected with the setting of the DHW recirculation operation parameters.

In this menus you can set the time of operation and inaction of the recirculation pump and define the time interval in which the operation and inactivity time of the pump will be active.

REMARK: It is necessary to switch it on in the installation menu.

R R R

3.5.1. Recirculation

In this menu the recirculation function can be switched on or off.
All preset time aswell the switching time remain as adjusted.

Factory settings		unit.
Recirculation	OFF	ON/OFF

3.5.2.Pump operation time

Adjusting the pump operation time when the recirculation is inactive.
REMARK: The time must be adjusted to the recirculation system.
The recommendation is to set the pump recirculation operation as short as possible in order to undercool the DHW tank as less as possible.

Factory settings		min./max.	jed.
Pump operation time	5	1 / 1440	min

3.5.3. Pump inactivity time

Adjusting the pump inactivity time when the recirculation is active.
REMARK: Time must adjust itself to the recirculation system.
The recommendation is to set the pump recirculation activity as long as possible in order to undercool the DHW tank.

Factory settings		min./max.	jed.
Pump inactivity time	15	0 / 1440	min

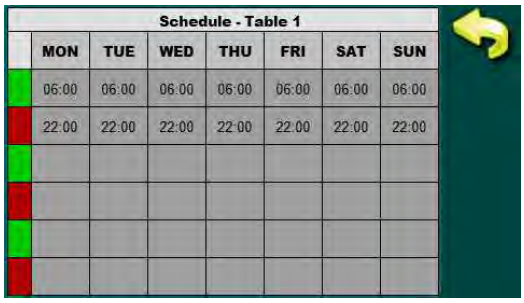
3.5.4. Schedule

In this menu you can find the menus connected with the schedule setting for the recirculation.
The schedule time can be switched off or one or two tables selected with the set time intervals of the active and inactive function.

3.5.4.1. Schedule

In this menu it is possible to switch on/off the schedule and select one or two tables according to which the DHW recirculation will operate.
REMARK: If the recirculation is switched on, and the switching time is switched off ,the recirculation will operate according to the set time non – stop (24/7), ie the recirculation pump will operate also in the time when it is not needed and will unnecessarily undercool the DHW tank.

Factory settings		*selection*
Schedule	ON	OFF/Table1/Table2



3.5.4.2. Table 1

In this menu it is possible to set 3 time interval (3 start (green field) and 3 stop (red field)) for each day in the week in which the pump will operate according to the set time of operation/inactivity.
Factory settings: the recirculation is enabled from 06:00 until 22:00 hours each day in the week. From 22:00 hours first day until 06:00 hours next day the recirculation does not operate.

Factory settings		*selection*
Table 1	06:00-22:00	mon/tue/wed/thu/fri/sat/sun

3.5.4.3. Table 2

In this menu it is possible to set 3 time interval (3 start (green field) and 3 stop (red field)) for each day in the week in which the pump will operate according to the set time of operation/inactivity.
Factory settings: the recirculation is enabled from 06:00 until 22:00 hours each day in the week. From 22:00 hours first day until 06:00 hours next day the recirculation does not operate.

Factory settings		*selection*
Table 2	06:00-22:00	mon/tue/wed/thu/fri/sat/sun

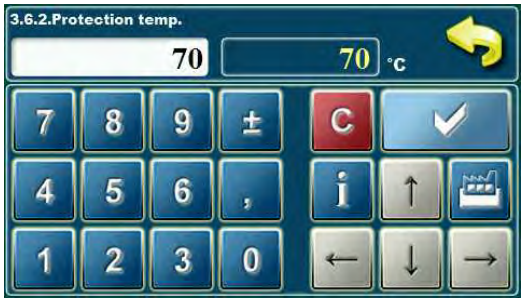
3.6. Legionella protection

In this menu you can find the menus connected with the tank disinfection functions settings ie the legionella protection.

3.6.1. Legionella protection

In this menu the legionella protection function can be switch on or off.
All preset time aswell the switching time and temperatures remain as adjusted.

Factory settings		selection
Legionella protection	OFF	ON./OFF.



3.6.2. Protection temperature

The Legionella bacteria /bacterium lives and develops itself in the areas with weak or none circulation at the temperature between 20°C and 55 °C. On higher temperatures the bacteria dies slowly, while above 70°C the bacteria instantly dies.
In order to have an efficient bacteria appearance protection, the tanks and piping must be kept a certain time above 65°C to have an efficient disinfection.

Factory settings		min./max.	jed.
Protection temp.	70	60 / 90	°C

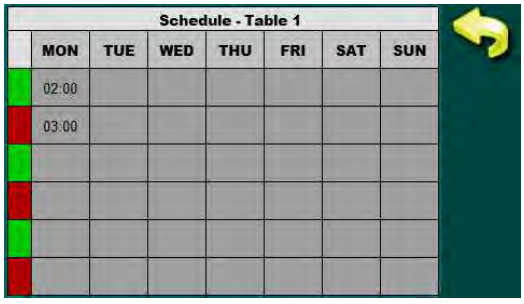
3.6.3. Schedule

In this menu you can find the menus connected with the setting of the switching time for the legionella protection.
The switching time can be switched off or one or two tables can be selected with the preset time intervals of the active and inactive function.

3.6.3.1. Schedule

In this menu it is possible to switch on/off the switching time and to select one or two tables according to which the legionella protection will be switched on.
REMARK: If the switching time (schedule) is switched off the legionella protection will not operate until one of the tables with the set time is selected.

Factory settings		selection
Schedule	Table 1	OFF/Table1/Table2



3.6.3.2. Table 1

In this menu it is possible to set 3 time intervals (3 start (green field) and 3 stop (red field)) for each day in the week on which the legionella protection will be switched on.
Factory settings: Legionella protection is active one day in the in the week (on Monday) from 02:00 until 03:00 hours.

Factory settings		selection
Table 1	02:00-03:00	pon

3.6.3.3. Table 2

In this menu it is possible to set 3 time intervals (3 start (green field) and 3 stop (red field)) for each day in the week in which the legionella protection will be switched on.
Factory settings: Legionella protection is active one day in the in the week (on Monday) from 02:00 until 03:00 hours.

Factory settings		selection
Table 1	02:00-03:00	pon

primjer: konfigurirano 3 konvencionalna izvora

3.6.4. Choose source (source selection)

In this menu it is possible to select the conventional source with which we would like to disinfect the tank according to the switching time and set temperature.The selected source must be able to reach the set temperature at the choosen time (in the menu only the configurated conventional sources are listed).

Factory settings		*selection*
Choose source	Electric heater	Electric heater/Boiler1/Boiler 2

3.6.5. Omission of term

In this menu it is possible to switch on or off the omission of term function for the Legionella protection.
If the function is switched on, and in the time interval between two activation terms of the tank protection, the set temperature and the desinfection time duration is reached, when the next activation term for the protection arrives , the controller skips it and waits for the next term.

		selection
Omission of term	OFF	ON/OFF

3.6.6. Desinfection duration

Setting of time in which the water temperature on the upper sensor in the tank must beabove the set protection temperature in order to consider that the desinfection was successfully performed.

Factory settings		*min./max.*	*jed.*
Desinfection duration	15	1 / 1440	min

3.6.7. Legionella recirculation

In this menu it is possible to switch on and off the recirculation operation when the Legionella protection is active in order to disinfect the piping (the condition is that the recirculation is configurated in the system).
When the conventional source starts up, also the recirculation pump switches on, and operates for as long as the disinfection time is set.

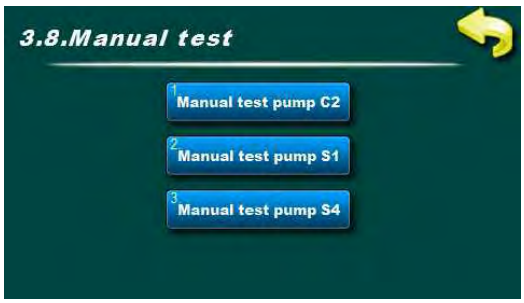
REMARK: The recirculation must exist and it is needed to switch it on in the installation menu.

Factory settings		*selection*
Omission of term	OFF	ON./OFF

3.7. Pump/valve protection

The pump/valve protection follows the activity of the individual exit (pump or valve) as due to a long – term inactivity the pump/valve would not block. By setting the inaction time (in the installation menu) it is possible to determine the maximum inaction time of the exit, after which the controller activates the exit for 60 seconds.

Factory settings		*selection*
Pump/valve protection	OFF	ON/OFF



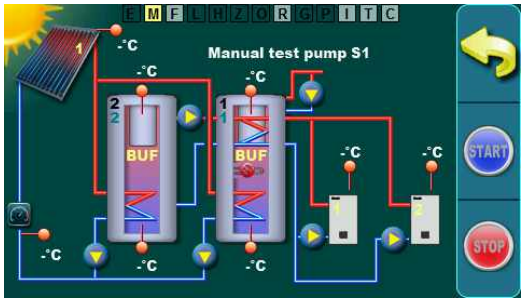
Example: configurated 2 tanks with pumps 1 conventional source, 1 electric heater, recirculation pump and mixing pump

M M M

3.8. Ručni test

Depending on the configurated system components and its exits , during the manual test it is possible to test all turned on exits.

REMARK: Number and type of menu depends on the turned on exits in the installation menu.

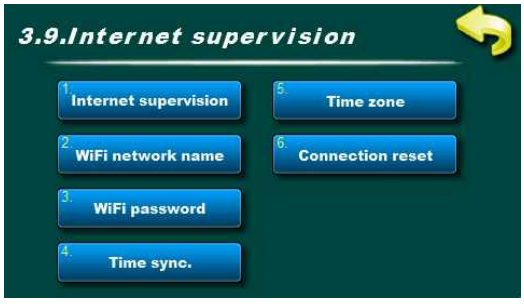


1 solar flat collector field / vacuum tube collector / 1 DHW tank / 1 buffer tank / pumps / electric heater / boiler 1 / mixing/reheating / flow meter / return sensor / outer temperature sensor / recirculation / Internet supervision

3.8.1. Manual test pump S1

By pressing the key START the exit is turned on (in this case the tank 1 pumps) and by pressing the key STOP the exit is turned off (in this case the tank 1 pumps). With the key RETURN it returns the previous screen. When the Manual test is switched on , the marking of the Manual test (M) function lights yellow.

Depending on the selected exit, with the keys START and STOP the individual exits are manualy switched on or off.



3.9. Internet supervision

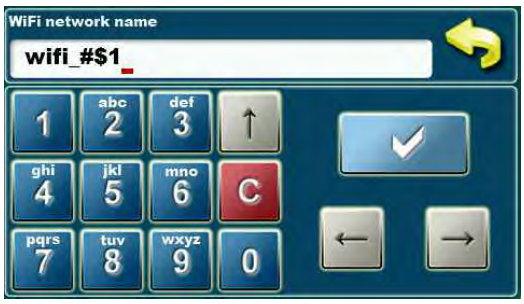
If the CM – WiFi BOX is embedded, the controller automatically recognizes the device and under the user and PIN the menu Internet supervision appears.

In this menu it is possible to switch on/off the supervision or the supervision and control via the WiFi network, inscribe the name of the WiFi network and the password, make the time synchronization , select the time zone and do the connection manual test.
The user can adjust and commission the WiFi Box by him/herself.

3.9.1. Internet supervision

In this menu it is possible to switch on and off the Internet supervision and to choose only Supervision (it is not possible to change the parameters) or Supervision and control (possible to change the parameters).

Factory settings		*selection*
Internet supervision	Sup.+control.	OFF/Supervision/Sup.+control



3.9.2. Name of the WiFi network

In this menu the name of the WiFi network is inscribed with which the WiFi Box is connected.
It is possible to inscribe 31 signs, with big/small letters, numbers and signs.

REMARK : It is obligatory to inscribe the correct network name by respecting the big and small letters and other signs.

3.9.2. WiFi password

In this menu WiFi password to which Cm WiFi-box will connect must be entered. Possible is to enter 31 characters, with upper and lower case, numbers and symbols.

NOTE: Insert correct network password paying attention to the upper and lower case, numbers and symbols.

3.9.4. Time synchronization

In this menu the controller time synchronization is enabled with the server.

Factory settings		*selection*
Time synchr.	ON	ON/OFF

3.9.5. Time zone

In this menu it is possible to change the time zone where the boiler is installed.

Factory settings		*min./max.*	*jed.*
Time Zone	1h	-12 / 14	h

3.9.6. Connection reset

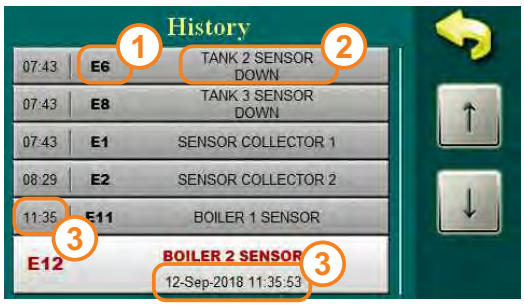
In this menu it is possible to manualy reset the Internet connection.If the sending of data to the web server is blocked, it is possible to reset the connecting manualy.

Cm WiFi – box requires an active DHCP access point server (for instance router, access point) as the the manual adjusting of the network parameters is not possible.For additional information please contact the local network administrator.

For detailed adjustment of the Cm WiFi – box please look into the technical manual for the Cm WiFi – box delivered together with the device.

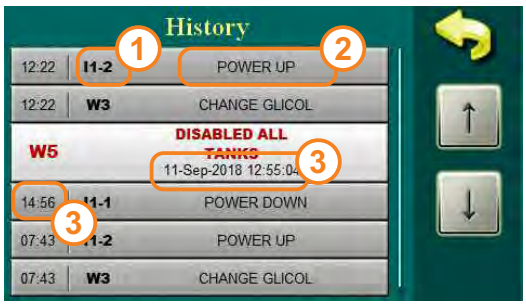
4. HISTORY

4. History
In the menu 4. History you can find information about the error history , warnings and information. After the 50th written item the oldest one will be erased when a new one appears.
The error history/warning/information cannot be erased.



4.1. Errors
In this menu it is possible to view/browse the earlier arosed errors (E) in the system – time of emergence, code and the name of the emerged error.
1 - error code
2 - error name
3 - error date and time of emergence

You can find the list of all codes and error names at the end of this instructions.



4.2. Warnings
In this menu it is possible to browse the warnings (W) and information (IW) in the system – time of emergence, code and name of warning/information.
1 -warning/information code
2 - warning/information name
3 - warning/information date and time of emergence

You can find the list of all codes and warning/information names at the end of this instructions.

By pressing the error/warning/information it is possible to read the cause and the possibility how to remove the error or warning.

5. DISPLAY

5. Display
In the menu 5. Display it is possible to set the functions connected with the screensaver, language selection , initial message time , date and time and the volume and type of sound

5.1. Screensaver
Time after which the screensaver appears to avoid a screen damage due to a long – time presence of the same image.By pressing the screen/display or by appearance of an „Error „ or „ Warning „ the screen saver switches off until the end of the next recorded time or until the error/warning is confirmed.

Factory settings		*min./max.*	*unit*
Screensaver	600	10 / 43200	sec

5.2. Language selection

In this menu it is allowed or disabled to display the initial screen with the language selection when pressing the main switch.In case you select „ Switched off „ , after pressing the main switch the controller/regulation will turn on with the previous set language and after a certain time „ initial message time „ the main screen will appear.

REMARK: It is obligatory after the language selection to switch off the „ Language selection „to enable the controller to start up automatically after the arrival of electricity. If the „Language selection„ is not switched off, after the electricity arrival the controller/regulation will wait for someone to select the desired language in order that the main screen and possible errors appear.

Factory settings		*selection*
Language selection	Switched on	ON/OFF

5.3. Initial message time

Initial message duration settings after switching on the main switch.
Time is running only if the „ Language selection „ is set on „ Switched off „.

Factory settings		*min./max.*	*unit*
Language selection	5	0 / 20	sec

5.4. Date and time:

Current date and time settings.

REMARK: If the date and time is not correct , the switching time will not operate upright. If the clock starts to be late or it resets on 00:00 and the date on 01.01.2000 it is necessary to replace the battery in the controller display (CR1220) (see chapter battery replacement).

5.5. Sound volume:

Setting one out of 3 sound volumes by pressing the display or a complete volume switch off.

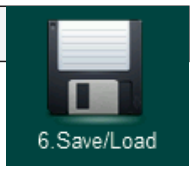
Factory settings		*selection*
Sound volume	2	OFF/1...3

5.6. Sound type:

Selecting on out of 10 possible sound types which are heard when pressing the display.

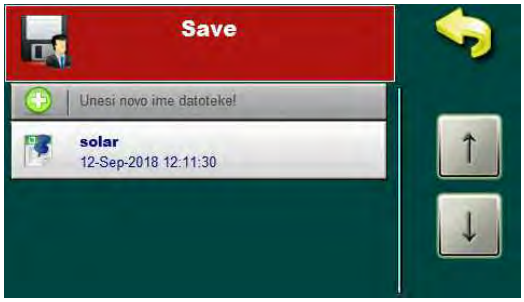
Factory settings		*selection*
Sound type	Type 3	Type 1...Type 10

6. SAVE/ LOAD



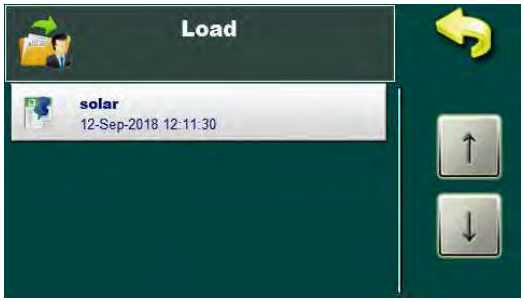
6. Save/Load

In this menu you can find the menus connected with the saving and loading of changed settings.



6.1. Save

Saving of current user's files (settings). It is possible to save it under a new name or under the existing one.
The file names can contain big and small letters, numbers and signs until the max. length of 24 signs.The selection of big/small letters/signs is done by pressing the key with the arrow (on the keyboard the upper right corner).

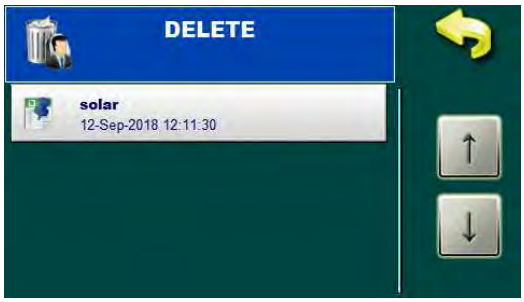


6.2. Load

Loading of saved user's files (settings).

6.3. Load service

Loading of files saved under PIN (serviceman files).



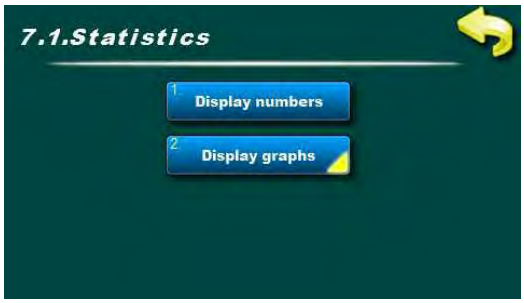
6.4. Delete

Deletion of previous saved files.
The serviceman files is possible to delete only under PIN.

7. INFO

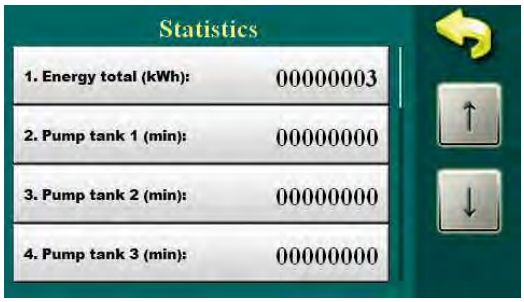
7. Info

In this menu you can find the menus connected with the system info and software.



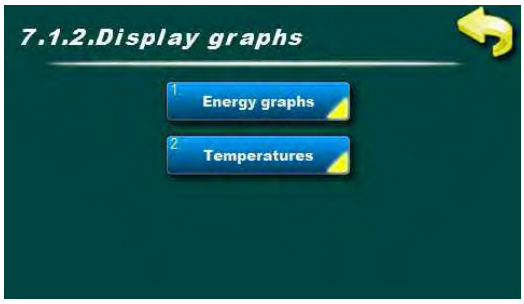
7.1. Statistics

In this menu you can find the menus connected for the display of the solar system statistical data.



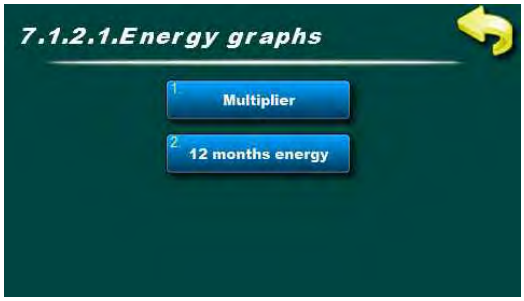
7.1.1. Numerical display

Here the operation statistics of the individual exits (in minutes of operation) and the total collected energy (in kWh/MWh) are shown.



7.1.2. Display graphs

The menus connected with the graphical display of statistical data : Graphs connected with the collected energy (in 12 months) and the temeperature diagrams (24 h and 48 h).

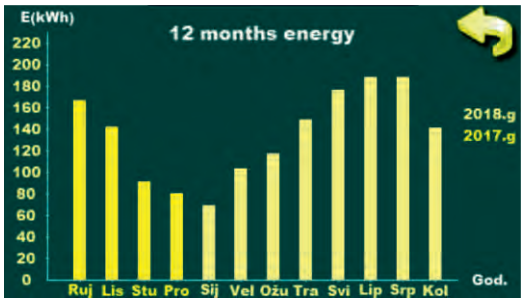


7.1.2.1. Energy graphs

Menus connected with the graphical display of the collected energy.If the columns do not fit into the visible chart surface/area , by help of the multiplier it is possible to reduce or increase the chart surface.The collected energy can be viewed per month within a year.

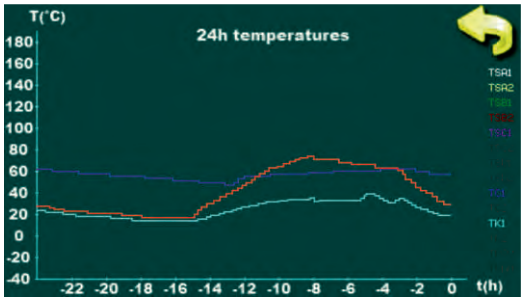
7.1.2.1.1. Multiplier

If the columns of the collected energy do not fit into the visible chart surface, by help of the multiplier it is possible to reduce or increase the chart area (x1,x2,x3,x5,x10) (multiplication of the axes with the energy).



7.1.2.1.2. 12 months energy

As the solar energy is collected the chart is drawn automatically in the month in which we are currently present. On the display it is always possible to see the collected solar energy in the interval of one year in periods of one month.



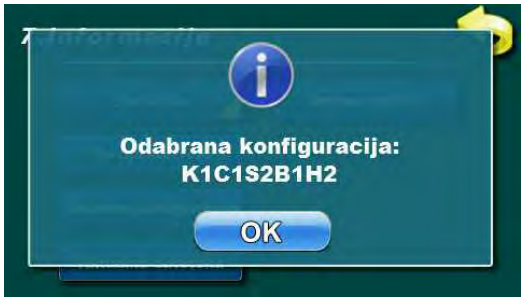
7.1.2.2. Temperatures
Menus connected with the graphical display of the obtained temperatures from the configurated sensors.

7.1.2.2.1. 24h temperatures
The temperature diagram from the configurated sensors in a time span of 24 hours.

7.1.2.2.2. 48h temperatures
The temperature diagram from the configurated sensors in a time span of 48 hours.

7.2. Software version
Software version and WiFi box identification number:

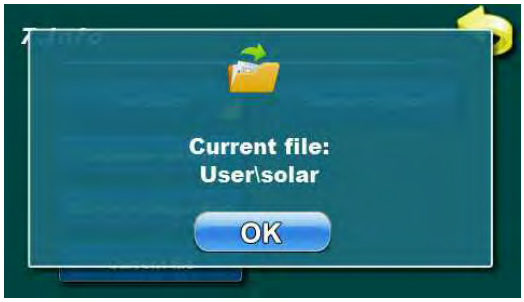
- current software version loaded in the controller
- if connected, WiFi ID (identification number)



Example: configurated: 1 boiler, 1 collector circuit, 2 tanks, 1 swimming pool, hydraulic connection – 2 way zone valve

7.3. Current configuration
Selected system configuration.

1. K x - number of boilers (0, 1, 2)
2. C x - number of collector fields (1, 2)
3. S x - number of tanks (1, 2, 3, 4)
4. B x - number of swimming pools (0, 1)
5. H x - hydraulic connection (1(pump), 2 (2 way zone valve), 3 (3 way zone valve))



7.4. Current file
Current selected file under which the controller is operating.It is possible to select the file which is saved under the basic menu (user) or a file saved under PIN (serviceman).

8.9.5. Last change of glycol
Depending on the solar system operation and the recommendation of the glycol manufacturer, the glycol in the solar system must be regularly replaced (due to often glycol overheating (steam in the collectors) glycol ages faster and thickens which lowers the solar collector efficiency and finaly can lead to solar colletor stoppage).**The recommendation is to replace glycol every 2 years.**
After the glycol replacement in the solar installation you need to reset the counter in the menu 8.12.2.Undo the glycol counter, by help of which a new time counting of 2 years will start and after which a warning appears for the replacement of glycol in the solar system.
REMARK: The warning for the glycol replacement appears after the expiry of 2 years from the last reset of the glycol counter.After the appearance of the warning the solar system continous normaly with the operation, only the warning is active that long until the counter is annulled.
The annulment of the counter warning for the glycol replacment can be found in the installation menu -> 8.12.2 Undo the glycol counter.

SETTING OF PARAMETERS UNDER PIN (SYSTEM CONFIGURATION)

MENUS FOR THE SYSTEM CONFIGURATION

8. INSTALLATION

By pressing the key 8. Installation you enter the menus designed for the solar system configuration. To enter the menu it is needed to write the PIN (0000) (which cannot be changed), to prevent the entering into this menu accidently.

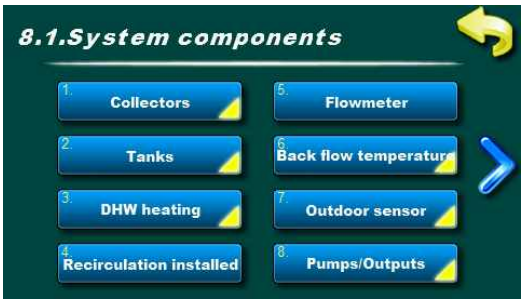
In the menu 8. Installation the individual system components are set (it is not intended for everyday use).

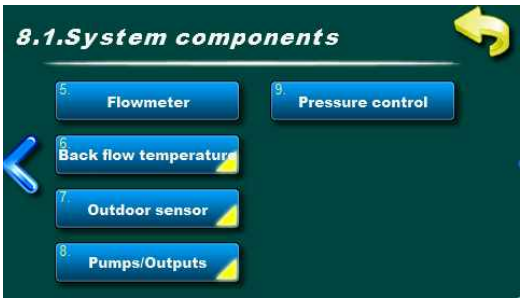
Menus:

1. System components - selection of existing components in the system and exit configuration
2. Solar collector - parameter setting of selected solar collector fields
3. Tank – parameter setting of selected tanks
4. Tank reheating - parameter setting of selected conventional sources for the tank reheating
5. Recirculation - recirculation parameter setting in case of its existence
6. Legionella protection - parameter settings for the tank disinfection ie legionella protection
7. Energy measuring - parameter setting connected with the solar fluid and the flow through the solar collectors
8. Manual test - testing of the operation of every individual component connected with the controller
9. Save/Load - saving/deleting/loading the controller settings and returning the controller to factory settings
10. Information - Browsing the error history , software version and the records of the enterings into the installation menu
11. Internet supervision - WiFi network parameter settings for the controller connection with the Internet
12. Counter annulment - the return of the energy and glycol counter to zero (0)

THE MENU NUMBERS AND THE MENUS ARE CHANGING IN DEPENDENCE OF THE SELECTED CONFIGURATION (some menus for some individual configurations will not appear on the same place as in this instructions).

8.1. SYSTEM COMPONENTS

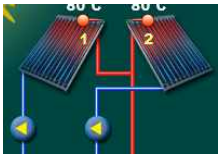




8.1. System components
In the menu 8.1. System components you can find the menus connected with the selection of the existing components in the system and the configuration of the individual controller exit.

8.1.1. Collectors (Solar collectors)
In this menu you can find the menus connected with the selection of the number of the solar collector fields and the type of the installed solar collectors.

jedno polje



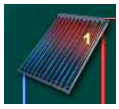
dva polja

8.1.1.1. Solar collector fields
In this menu it is necessary to select the number of the solar collector fields (the solar collector field is a set of collectors connected in one system with one solar collector pump).Two solar collector fields are usually installed as one on the east part and one on the west part of the roof and each field is separately connected with the tank with its solar collector pump.

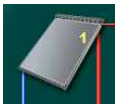
Factory settings		*selection*
Collector fields	One field	One field / Two fields

8.1.1.2. Field type
In this menu it is necessary to select the type of used collectors in the solar collector field.
It is always possible to select only one type of collectors, whether one or two solar collector fields were selected.
The selection of the solar collectors only serves for the graphical display of the solar collectors on the screen.

Factory settings		*selection*
Field type	Vacuum tube	Vacuum tube/Flat



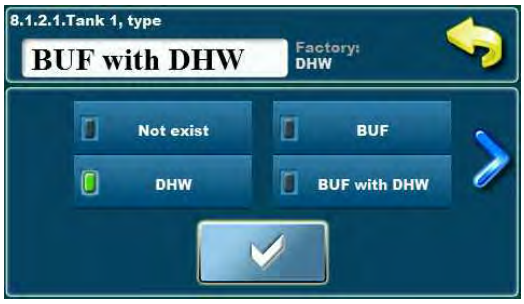
Vacuum tube collector

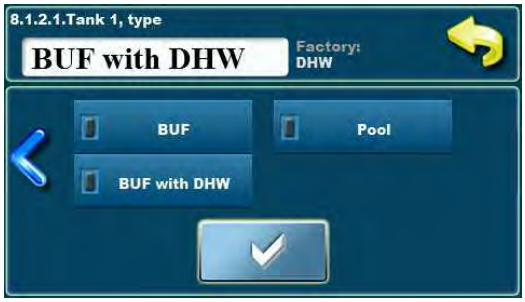


flat plate collector

8.1.2. Tanks

In this menu you can find the menus connected with the selection of the number and type of installed tanks and the selection of their connection (with collectors and mutually).
It is possible to configurate up to 4 tanks.
It is possible to select one of three hydraulic connection.
It is possible to select mutual reheating of the first 2 tanks (reheating of the DHW tank with the buffer tank).



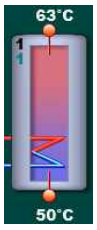


8.1.2.1. Tank 1 , type

In this menu it is necessary to select the type of the installed tank (1 – 4). Tank 1 must always exist.The types of tanks can be DHW tank, buffer tank (BUF), buffer tank with DHW tank (BUF with DHW) or pool (Pool).

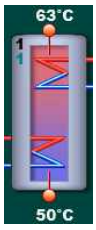
Only with the Tank 1 it is possible to configurate reheating with conventional sources and the recirculation of DHW.

If conventional sources are configurated (boiler 1,2 or electric heater), the installation of the upper sensor in the Tank 1 is obligatory. If the upper sensor in the Tank 1 is not installed, the conventional sources cannot be included into the tank reheating.
The solar collector pump operates according to the temperature difference of the lower tank sensor and the solar collector sensor.
If the pool is configurated as a tank, the pool sensor is configurated as the upper tank sensor and the solar collector pump operates according to the temeperature difference between the upper tank sensor (pool) and solar collector sensor. The pool must always be configurated only as the last tank (it is not possible to choose between two tanks), as the tank 1, 2 or 3.
The controller can manage each tank with two sensors – upper and lower (except the pool where only the upper sensor is used) or only with one, lower sensor,but in this case some of the controller functions are disabled.
The upper sensor serves for the tank safety and protection functions (maximum temperature), for the tank mixing/reheating function and for the tank reheating with conventional sources.
The lower sensor serves for the solar collector tank reheating.
Donji osjetnik služi za kolektorsko dogrijavanje spremnika.
Each configurated tank has on itself in the upper left corner the ordinaly number marking (black number) and below the tank ordinaly number the priority marking of the tank in the configuration
(green number).



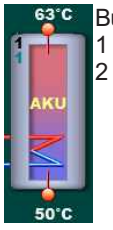
DHW tank
1 heat exchanger
2 temperatures

DHW



DHW tank
2 heat exchangers
2 temperatures

DHW

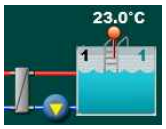


Buffer tank
1 heat exchanger
2 temperatures

BUF

Buffer tank with
embedded DHW tank
1 heat exchanger
2 temperatures

BUF with DHW



POOL
1 temperature

Pool

Factory settings		*selection*
Tank 1, type	DHW	Doesn't exist/DHW/BUF/BUF with DHW/Pool
Tank 2, type	doesn't exist	Doesn't exist/DHW/BUF/BUF with DHW/Pool
Tank 2, type	doesn't exist	Doesn't exist/DHW/BUF/BUF with DHW/Pool
Tank 2, type	doesn't exist	Doesn't exist/DHW/BUF/BUF with DHW/Pool

8.1.2.2. Tank type 2

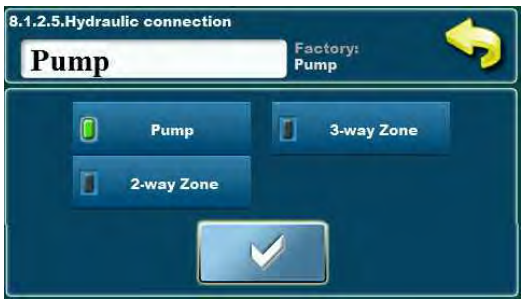
In this menu it is necessary to select the installed tank type 2.For details please see description Tank type 1.

8.1.2.3. Tank type 3

In this menu it is necessary to select the installed tank type 3.For details please see description Tank type 1.

8.1.2.4. Tank type 4

In this menu it is necessary to select the installed tank type 4.For details please see description Tank type 1.

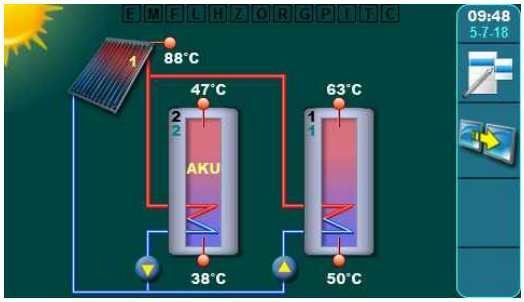


8.1.2.5. Hydraulic tank connection

In this menu it is necessary to select the hydraulic connection mode of the tanks with the solar collectors.
In all schemes the tanks are connected serial with DHW – the tanks are always loaded (filled)
according to the selected loading priority (first the first one, subsequently the second …).
Depending on the installed configuration it is necessary to select one or three offered connection modes:
Pump: each configurated tank has its solar collector pump.

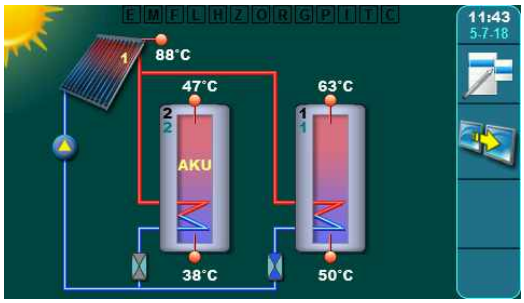
2 way zone: each configurated tank has its 2 way valve (valve with spring !) + common solar collector pump.

3 way zone: the solar collector flow overlaps the 3 way zone valve (valve with spring !) depending on the given priority (2 tanks 1 valve, 3 tanks 2 valves , 4 tanks 3 valves). The 3 way zone valve must always be installed with the zero position towards the primary tank (when the valve gets contact it overlaps onto the secondary tank, when the contact stops the spring returns).

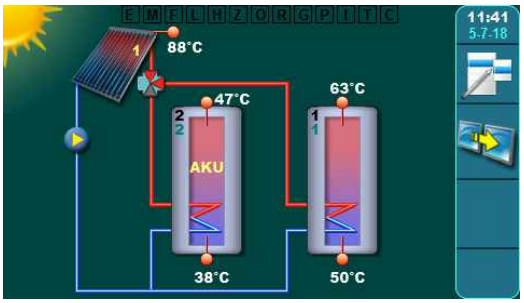


Example: configurated 2 tanks, hydraulic connection: - pump

Factory settings		selection
Hydr. tank connection.	Pump	Pump/3 way zone valve/2 way zone valve



Example: configurated 2 tanks, hydraulic connection: 2 way zone valve

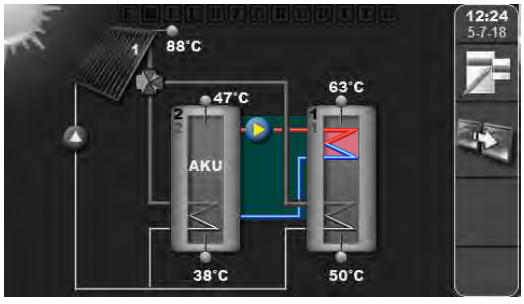


Example: configurated 2 tanks, hydraulic connection: 3 way zone valve

8.1.2.6. Mixing – reheating

If there is a need for the reheating of for example the primary DHW tank with the secondary buffer tank (when both tanks are reheated by solar energy, and the DHW is cooled down, it is possible to reheat the DHW tank by help of the buffer tank (if energy exists in the tank), the controller can manage the pump between the buffer tank and the upper heat exchanger in the DHW tank on the basis of the difference between the upper buffer tank temperature and the upper DHW tank temperature and the set difference.

Factory settings		selection
Mixing–reheating	Not exist	Not exist/Exist



Example: configurated 2 tanks, hydraulic connection:
- 3 way zone valve, mixing /reheating

8.1.3. DHW heating

In this menu you can find the menus connected with the selection of the installed conventional source for the reheating/heating of the primary Tank 1. It is possible to reheat only the Tank 1 with the installed upper temperature sensor.
Electric heater switching on is possible only over an additional contactor.
The controller optionally (and in current conditions) switches on/off the pump between the tank 1 and the boiler.
(In order to switch off the conventional source it is obligatory to install the upper Tank 1 sensor. After the configuration, the conventional source must be set in the menu 8.4. Tank reheating/heating).

8.1.3.1. Installed electric heater

If the electric heater is installed in the Tank 1, in this menu it must be marked in order to be existing in the configuration.
When the electric heater is configurated, it is possible to switch it on/off from the operation and it is needed to select the Switching time during which the electric heater operation is permitted.
REMARK: the connection of the electric heater with the controller only over a contactor !

Factory settings		*selection*
Installed el. heater	Not exist	Not exist/Exist

8.1.3.2. Boiler type 1

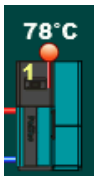
If a conventional source exists connected with Tank 1, in this menu you need to select the type of the conventional source to be used for the reheating/heating of the Tank 1.
The selection of the Boiler 1 type serves only for the graphical display of the first conventional source on the screen.

Factory settings		*selection*
Boiler type 1	Not exist	Not exist/Wood/Pellets_Wood chip/ Gas_oil/Heat pump/Electric boiler

8.1.3.3. Boiler type 2

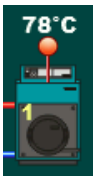
If a second conventional source exists connected with the Tank 1 in this menu it is necessary to select the type of the second conventional source to be used for the reheating/heating of the Tank 1.
The selection of the Boiler 2 type serves only for the graphical display of the second conventional source on the screen.

Factory settings		*selection*
Boiler type 2	Not exist	Not exist/Wood/Pellets_Wood chip/Gas_oil/ Heat pump/Electric boiler



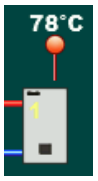
Boiler type: Pellets/Wood chip

Boiler type: Wood



Boiler type: Gas/Oil

Boiler type: Heat pump



Boiler type: Electric boiler

8.1.4. Recirculation installed

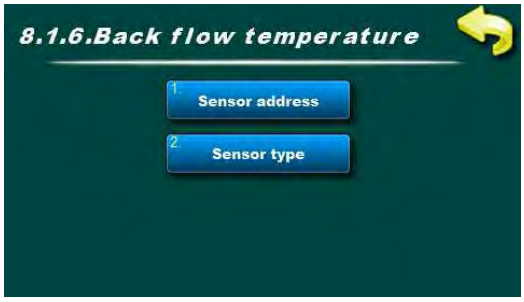
If the system has a recirculation installed into the Tank 1, in this menu it needs to be marked in the configuration.
When the recirculation is configurated, it is possible to switch it on/off, it is needed to select the operation interval of the pump start/stop and it is possible to select the Switching time during which the recirculation operation is permitted.

Factory settings		*selection*
Recirculation installed.	Not exist	Not exist./Exist

8.1.5. Flowmeter

If a flowmeter is installed in the system in this menu it needs to be marked to be existing in the configuration.
If the flowmeter is switched on, it is needed to inscribe its characteristics in the following menus (the constant and volume per pulse and the sensor address).

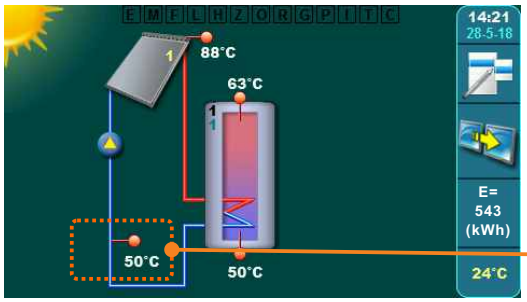
Factory settings		*selection*
Flowmeter	Not exist	Not exist/Exist



8.1.6. Back flow temperature (Return sensor)

If the return sensor is installed in the system in this menu it is necessaray to select the address and sensor type.
The sensor of the return (back flow) serves for a more accurate measuring of the collected energy from the solar collectors (along the solar collector sensor also a correct inscribed or measured fluid flow through the collectors).
If the return sensor is not installed, the controller takes as the return temperature the lower tank temperature.

REMARK: The measuring of energy is done over the temperature in the solar collector sensor, the temperature in the return sensor (or lower tank sensor) and inscribed flow (or flow value from the installed flowmeter). The calculation of the collected energy from the solar collectors depends very much on the accuracy of the measured temperatures and the inscribed/measured fluid flow through the solar collectors. In case of 2 solar collector fields the return/back flow sensor is installed on the return of the first field while for the measuring of energy of the second field the lower tank temperature is taken into consideration.



ugrađen i konfiguriran
osjetnik povratnog voda

Example: configurated 1 tank, 1 flat plate collector, return/back flow sensor, outdoor/outer temperature sensor

8.1.6.1. Sensor address

It is needed to mark on which entry address the return sensor is connected (it is possible to connect on one free out of 10 addresses).

Factory settings		*selection*
Sensor address	Isključeno	OFF./T1/.../T10

...

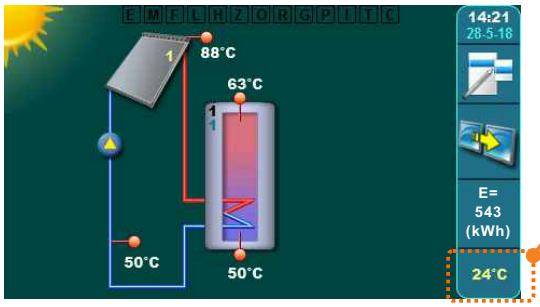
8.1.6.2. Sensor type

If the sensor type NTC is installed here it is necessary to change the sensor type from PT1000 to NTC.

Factory settings		*selection*
Sensor type	PT1000	PT1000/NTC

8.1.7. Outdoor sensor

If the outdoor sensor is installed in the system in this menu it is needed to select the address and sensor type.
The outdoor sensor shows the information on the main screen about the current outer temperature (additional equipment).



Installed and configurated outdoor/outer temperature sensor

Example: configurated 1 tank, 1 flat collector, back flow/return sensor, outdoor temperature sensor

8.1.7.1. Sensor address

It is needed to mark on which entry address the outdoor temperature sensor is connected (it is possible to connect on one free out of 10 addresses).

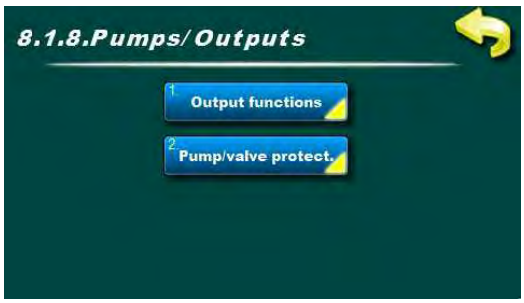
Factory settings		*selection*
Sensor address	OFF	OFF./T1/.../T10

...

8.1.7.2. Sensor type

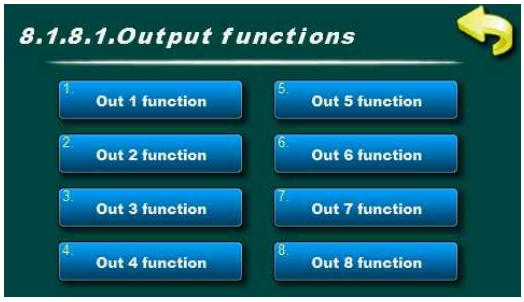
If the sensor type NTC is installed here it is necessary to change the sensor type from PT1000 to NTC.

Factory settings		*selection*
Sensor type	PT1000	PT1000/NTC



8.1.8. Pumps / Outputs

In this menu function of the output that is used must be defined (max. 8 outputs) and output standby time can be defined after which function of pump and valve protection is activated due to longterm inactivity.



8.1.8.1. Output functions

In this menu function of the output that is used must be defined (max. 8 outputs).

8.1.8.1.1. Output function 1

In this menu function of the output that is used must be defined (one of the 22 functions - pump collector, tank, boiler, recirculation, pool, mixing/additional heating, exchanger, MRh, electric heater, valve, zone 2 way or zone 3 way valve).

8.1.8.1.2. Output function 2

See 8.1.8.1.1. Output function 1.

8.1.8.1.3. Output function 3

See 8.1.8.1.1. Output function 1.

8.1.8.1.4. Output function 4

See 8.1.8.1.1. Output function 1.

8.1.8.1.5. Output function 5

See 8.1.8.1.1. Output function 1.

8.1.8.1.6. Output function 6

See 8.1.8.1.1. Output function 1.

8.1.8.1.7. Output function 7

See 8.1.8.1.1. Output function 1.

8.1.8.1.8. Output function 8

See 8.1.8.1.1. Output function 1.

Factory settings		*selection*
Output function 1 *Output function 2* *Output function 3* *Output function 4* *Output function 5* *Output function 6* *Output function 7* *Output function 8*	Disabled	Disabled/Pump collector1/Pump collector2/ Pump tank1/Pump tank2/Pump tank3/ Pump tank4/Pump boiler1/Pump boiler2/ Electric heater/Recirculation pump/Pool pump/ Exchanger pump/Pump MRh/ 3 way valve1/3 way valve2/3 way valve3/3 way valve4/ Valve1/Valve2/Valve3/Valve4

8.1.8.2. Pumps/Valves protection

In this menu pump/valve protection can be enabled. Also, standby time can be set after which pump/valve protection will be activated to prevent blocking due to the longterm inactivity.

8.1.8.2.1. Pumps/Valves protection

Pumps/valves protection function monitors activity of each output (pump or valve) to prevent blocking of the pump or valve due to longterm inactivity.

Factory settings		*selection*
Pump/valve protect.	OFF	ON/OFF

8.1.8.2.2. Off time

By setting the Off time, maximum inactivity time of each output is set after which regulation activates output for 60 second.

Factory settings		*min./max.*	
Off time	48	1 / 720	h

8.1.9. Pressure control

In case of installation of the pressure sensor it must be enabled in this menu.

When this pressure sensor is connected and enabled, position (address) where is connected must be set (Address of the sensor T under Collector).

When the pressure in the solar system is to low, when pressure sensor gives signal to the regulation (system pressure on which pressure sensor gives signal depends on the type and setting of the pressure sensor) and low system pressure warning is displayed on the regulation screen.

Factory settings		*selection*
Pressure control	Not exist	Not exist/Exist

8.2. COLLECTOR

8.2. Collector

In this menu are settins for the working of the collector (one and another fileld (if they exist)) and it's protection functions.

example: configurated 2 collector fields.
pressure control

8.2.1. Collector 1

In this menu settings for working of the collector 1 are set (maximum allowed collector temperature, enabling temperature of the collector 1 for start of the collector pump, puls start of the collector 1 pump na collector sensor address).

8.2.1.1. T MAX collector 1

Setting of the maximum temperature of the collector 1.
Pump of the solar collector field 1 works to the temperature in collectors [T MAX collector 1] after which stops (to protect the armature from to high temperature, steam occurance in the collectors and pump not working until temperature in the collectors is below set max. temp. of the collectors.
When temperature in the collectors falls below [T MAX collector 1 - 4°C] pump of collector field 1 starts to work again if other conditions are met.
NOTE: [T MAX collector] must be set according to the boiling point of the solar fluid in the solar system and always must be lower than the boiling point.

Factory settings		*min./max.*	*unit*
T MAX collector 1	140	30 / 150	°C

8.2.1.2. T enable coll.1

Setting of the minimum temperature of the collector 1 at which circulation trough collector 1 starts (working of the collector pump).

Factory settings		*min./max.*	*unit*
T enable coll.1	10	0 / 90	°C

8.2.1.3.Pulse collector start

In this menu are additional menus for setting the parameters for the pulse start of the pump (kick) of the collector field 1
If collector sensor isn't installed into collector (somewhere on the flow tube) or there are more collectors in the same field, it's recommended to enable pulse start which in case of the inactivity of the collector pump, periodically starts it for some time to have better temperature reading of the solar fluid on the collector sensor.
NOTE: to offten and to long pump working is possible to unnecessary cool down the tank! Work time and stop time of the pump depends of the size and location of the collector field and collector sensor.

8.2.1.3.1. Pulse start coll.1

In this menu impulse start collector can be enabled and disabled. All preset times and also timers are valid.

Factory settings		selection
Pulse start coll.1	OFF	ON/OFF

8.2.1.3.2.Pump work time

Setting of the pump working time in pulse start.
NOTE: Working time must be adjusted according size and location of the collector field and collector sensor to have accurate reading from the collector sensor to start heating the tank asap.

Factory settings		min./max.	unit
Pump working time	10	0 / 3600	sec

8.2.1.3.3.Pump pause time

Setting of the pump pause time (not working) in pulse start.
NOTE: Pause time must be adjusted according size and location of the collector field and collector sensor to have accurate reading from the collector sensor to start heating the tank asap.

Factory settings		min./max.	unit
Pump pause time	15	0 / 1440	min

8.2.1.3.4.Schedule

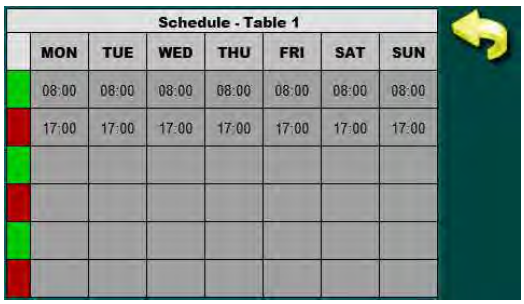
In this menu are additonal menus for setting the schedule for working of the impuls start of the pump (kick) for the collector field 1.

Schedule can be disabled or selected one of two tables with set schedules with enabled and disabled function.

8.2.1.3.4.1.Schedule

In this menu schedule can be enabled/disabled and one of the two tables can be selected according to which Impuls start of the pump will work.
NOTE: If the Impuls start of the pump is enabled and Schedule is set to Off, Impuls start of the pump will work always (24/7) according to the set work/pause time. In this case Impulst start of the pump will work during the night and there is possibility to cool the tank trough the collector.

Factory settings		selection
Schedule	Table 1	OFF/Table1/Table2



8.2.1.3.4.2.Table 1

In this menu 3 schedules can be set (3 start (green part) and 3 stop (red part) for each day of the week in which pump will work according the set Impulse start.
Factory setting: Impulse start of the pump is active from 08:00 to the 17:00 every day of the week. From 17:00 of the first day to 08:00 next day impuls start of the pump is not working.

Factory settings		selection
Table 1	08:00-17:00	mon/tue/wed/thu/fri/sat/sun

8.2.1.3.4.3.Table 2

In this menu 3 schedules can be set (3 start (green part) and 3 stop (red part) for each day of the week in which pump will work according the set Impulse start.

Factory setting: Impulse start of the pump is active from 08:00 to the 17:00 every day of the week. From 17:00 of the first day to 08:00 next day impuls start of the pump is not working.

Factory settings		*selection*
Table 2	08:00-17:00	mon/tue/wed/thu/fri/sat/sun

8.2.1.4. Coll.1 sensor address

Neccesary it to set (choose) address (input) of the connected collector sensor (possible to connect to one of the 10 addresses, regulation recommends input T1)

Factory settings		*selection*
Coll.1 sensor address	Not exist	Not exist./T1/.../T10

8.2.2. Collector 2

In this menu settings for working of the collector 2 are set (maximum allowed collector temperature, enabling temperature of the collector 2 for start of the collector pump, puls start of the collector 2 pump na collector sensor address).

Menus are equivalent to the menus for Collector 1 - for details see description 8.2.1. Collector 1.

8.2.3.Collector cooling

In this menu collector cooling can be enabled or disabled (through the tank) and set the difference for collector cooling start.

With the collector cooling function, boiling of the solar fluid in the collector wants to be delayed by increasing tanks temperature to the maximum temperature [T MAX tank = 90°C].

Collector cooling starts if the temperature in the collectors reaches to the [TMAX collector -dTcooling (collector) and if all tanks are full to the [TMAX tank (set)].

[Tkol.>TMAX coll. -dTcooling (collector)]

Collector cooling stops if Tcollector exceedes [TMAX collector] or temperature in the collectors falls below

[Tcoll.<TMAX coll.- -dTcooling (collector) -2°C]

or if all tanks are full to the maximum from [TMAX tank = 90°C]. If [TMAX tank=90°C] is set, maximum for the collector cooling is automatically raised to the 95°C.

NOTE: [TMAX collector] must be set according to the solar fluid boiling point and allways must be below than boiler point.

C C C

8.2.3.1.Collector cooling

In this menu coolector cooling can be enabled or disabled (through the tank).

Factory settings		selection
Collector cooling	OFF	OFF/ON

8.2.3.2. Cooling difference

Setting of the difference when collector cooling starts [TMAX collector - dTcooling (collector)] (factory 140-10=130°C)

Factory settings		min./max.	unit
Cooling difference	10	1 / 50	°C

F F F

8.2.4. Antifreeze protection

In this menu collector antifreeze function can be set and temperature (of the collector) for start of this function can be set.

This function is used when in solar system is water and if outside temperature don't fall below 0°C. **In solar system always is recommendation to use mixing of the glicole and water** (solar antifreeze and water).
With this function enabled, circulation in the collector is started to try to prevent freezing of the collector with the heat of the tank.
Antifreeze protection starts when temperature in the collectors falls to the set temperature [Tstart] (factory +4°C).
Antifreeze function stops when temperature in collectors is raised for +2°C from set temperature [Tstart] and when lower temperature in the tank fals to the +3°C (to prevent freezing of the tank).
Freezing protection start from tank with lowest priority to the tank with highest priority.

NOTE: filling the solar system only with water is NOT RECOMMENDED (without glicole). By enabling the antifreeze protection tanks are geting cooled! There is possibility to considerably spend the conventional heating resource to heat the tanks due to the 'heating' of the collectors.

8.2.4.1. Antifreeze protection

In this menu collector antifreeze protection can be enabled or disabled.

Factory settings		selection
Antifreeze protection	OFF	OFF/ON

8.2.3.2. T start

Setting of the temperature to start the antifreeze protection.

Factory settings		min./max.	unit
T start	4	0 / 10	°C

8.2.5. Pressure sensor

In case there is pressure sensor installed, here must be set the connecting address (input) to which this sensor is is connected (possible to connect to one of 10 addresses (inputs)).

Factory settings		selection
Sensor address T	Not exist	Not exist./T1/.../T10

8.3. TANK

exapmle: configurated 3 tanks (DHW, BUF, Pool), priotrity test, mixing/heating function

8.3. Tank

In this menu are additonal menus for setting the parammeters for the tanks (depending of the set configuration and tank type, from 1 to maximum 4 tanks).

8.3.1. Temperature DHW

Setting the desired DHW temperature (domestic hot water), tank on top sensor.
Conventional heating sources (el. heater, boiler1, boiler2) heats the tank to the set DHW temperature.

NOTE: DHW temperature is related only to the conventional heating sources. Solar collectors are heating tanks to the temperature TMAX tank.

Factory settings		*min./max.*	*unit*
Temperature DHW	55	10 / 85	°C

8.3.2. T MAX tank 1

Setting the max temperature of the tank1.
Solar collectors are heating tank 1 to the temperature [T MAX tank 1] after which solar heating of the tank 1 stops and switches to the next tank according the priority (if exists).
If the collector cooling function is enabled and activated, tank temperature can rise up to max. 90°C (or 95°C if TMAX tank is set to 90°C)

Factory settings		*min./max.*	*unit*
T MAX tank 1	70	30 / 90	°C

If the pool is set as the last tank in the configuration, max. temperature of the pool can be set in following range:

T MAX tank X	28	15 / 40	°C

8.3.2.2. TDcoll-tank (difference)

Setting the desired difference between temperature of the collector and temperature of the tank (lower sensor) for start and stop of the collector pump.
START pump coll. -> [Tcollector > **TDcoll-tank** + THcoll-tank].
STOP pump coll. -> [Tcollector < **TDcoll-tank**].

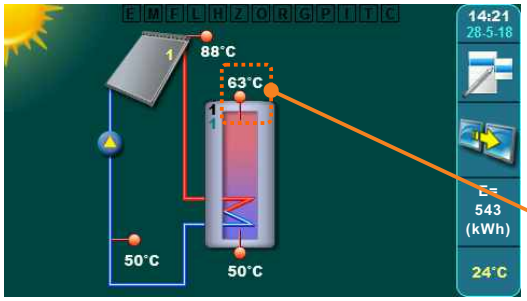
Factory settings		*min./max.*	*unit*
TDcoll-tank	4	1 / 10	°C

8.3.2.3. THcoll-tank (histeresys)

Setting the desired histeresys of the temperature between collector and tank (lower sensor) for start of the collector pump.

START pump coll. -> [Tcollector > TDcoll-tank + **THcoll-tank**].
STOP pump coll. -> [Tcollector < TDcoll-tank].

Factory settings		*min./max.*	
THcoll-tank	2	1 / 10	°C



example: configurated 1 tank (with 2 sensors), 1 flat collector, return flow sensor, outdoor sensor

8.3.2.4. Sensor tank 1 up

Sensor tank 1 is used:
- stop of the collector pump when set maximum temperature in the tank is reached,
- protection function of tank cooling through the collector,
- for additional heating of the tank with the conventional heating sources (boilers and el. heater),
- One time DHW function
- Party function
- Mixing/heating function
- Holiday function
- Legionella function

In this menu sensor address and type must be set.

installed and set sensor tank 1 up

8.3.2.4.1. Sensor upper

Set the address of the input on which sensor tank 1 upper is connected (possibility to connect to any of the free 10 addresses, regulation automaticaly suggest input T2).

Factory settings		*selection*
Sensor upper	Not exist	Not exist/T1/.../T10

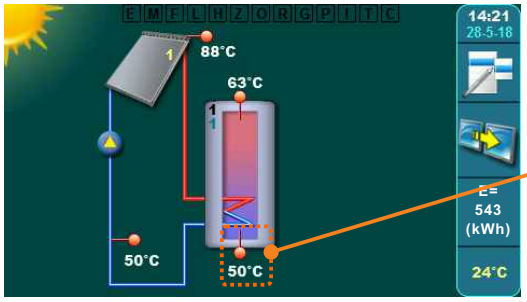
8.3.2.4.2. Sensor type

If NTC sensor is installed, here must be changed from PT1000 to the NTC.

Factory settings		*selection*
Sensor type	PT1000	PT1000/NTC

8.3.2.5. Sensor tank 1 down

Sensor tank 1 down is used:
- work of the collector pump.
- in case that return flow sensor isn't installed, for energy meassurement (meassurement is less precise than with return flow sensor).
- in case that sensor tank 1 up isn't installed, it take over it's functions except additonal heating function with conventional heating sources.
- at function of Collector cooling through tank,
- at Collector antifreeze function,
- at Holiday function.



example: configurated 1 tank (with 2 sensors), 1 flat collector, return flow sensor, outdoor sensor

In this menu sensor address and type must be set.

installed and set sensor tank 1 down

8.3.2.5.1. Sensor lower

Set the address of the input on which sensor tank 1 lower is connected (possibility to connect to any of the free 10 addresses, regulation automaticaly suggest input T3).

Factory settings		*selection*
Sensor lower	Not exist	Not exist/T1/.../T10

8.3.2.5.2. Sensor type

If NTC sensor is installed, here must be changed from PT1000 to the NTC.

Factory settings		*selection*
Sensor type	PT1000	PT1000/NTC

8.3.3. T MAX tank 2

Setting the max temperature of the tank2.
Solar collectors are heating tank 2 to the temperature [T MAX tank 2] after which solar heating of the tank 2 stops and switches to the next tank according the priority (if exists).
If the collector cooling function is enabled and activated, tank temperature can rise up to max. 90°C (or 95°C if TMAX tank is set to 90°C)

Facotry settings		*min./max.*	*unit*
T MAX tank 2	70	30 / 90	°C

If the pool is set as the last tank in the configuration, max. temperature of the pool can be set in following range:

T MAX tank X	28	15 / 40	°C

8.3.3.2. TDcoll-tank (difference)

Setting the desired difference between temperature of the collector and temperature of the tank (lower sensor) for start and stop of the collector pump.
START pump coll. -> [Tcollector > **TDcoll-tank** + THcoll-tank].
STOP pump coll. -> [Tcollector < **TDcoll-tank**].

Factory settings		*min./max.*	*unit*
TDcoll-tank	4	1 / 10	°C

8.3.2.3. THcoll-tank (histeresys)

Setting the desired histeresys of the temperature between collector and tank (lower sensor) for start of the collector pump.

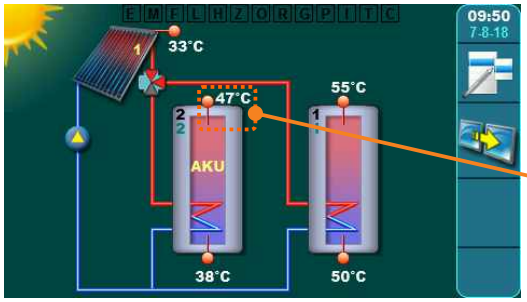
START pump coll. -> [Tcollector > TDcoll-tank + **THcoll-tank**].
STOP pump coll. -> [Tcollector < TDcoll-tank].

Factory settings		*min./max.*	*unit*
THcoll-tank	2	1 / 10	°C

8.3.3.4. Sensor tank 2 up

Sensor tank 2 is used:
- stop of the collector pump when set maximum temperature in the tank is reached,
- protection function of tank cooling through the collector,
- Mixing/heating function,
- Holiday function,

In this menu sensor address and type must be set.



example: configurated 2 tank (both with 2 sensors), 1 pipe collector, zone 3-way valve

Installed and set sensor tank 2 up

8.3.3.4.1. Sensor upper

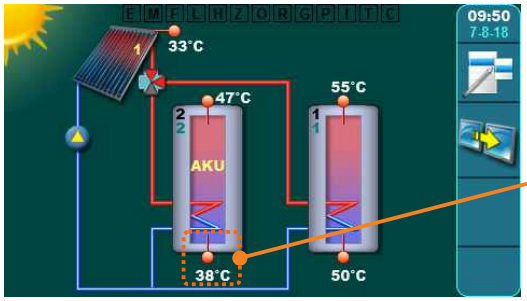
Set the address of the input on which sensor tank 1 upper is connected (possibility to connect to any of the free 10 addresses, regulation automaticaly suggest input T4).

Factory settings		*selection*
Sensor upper	Not exist	Not exist/T1/.../T10

8.3.3.4.2. Sensor type

If NTC sensor is installed, here must be changed from PT1000 to the NTC.

Factory settings		*selection*
Sensor type	PT1000	PT1000/NTC



example: configurate 2 tank (both with 2 sensors), 1 pipe collector, zone 3-way valve

installed and set sensor tank 2 down

8.3.3.5. Sensor tank 2 down

Sensor tank 2 down is used:
- work of the collector pump.
- in case that return flow sensor isn't installed, for energy meassurement (meassurement is less precise than with return flow sensor).
- in case that sensor tank 2 up isn't installed, it takes over it's functions
- at function of Collector cooling through tank,
- at Collector antifreeze function,
- at Holiday function.

In this menu sensor address and type must be set.

8.3.3.5.1. Sensor lower

Set the address of the input on which sensor tank 1 lower is connected (possibility to connect to any of the free 10 addresses, regulation automaticaly suggest input T5).

Factory settings		*selection*
Sensor lower	Not exist	Not exist/T1/.../T10

8.3.3.5.2. Sensor type

If NTC sensor is installed, here must be changed from PT1000 to the NTC.

Factory settings		*selection*
Sensor type	PT1000	PT1000/NTC

8.3.4. Tank 3

In case Tank 3 is set as DHW or BUF or BUF with DHW, menus must be set the same like for Tank 2 - see menus under 8.3.2. Tank 2.

8.3.5. Spremnik 4

In case Tank 4 is set as DHW or BUF or BUF with DHW, menus must be set the same like for Tank 2 - see menus under 8.3.2. Tank 2.

If Tank 1, 2 or 3 is set as **POOL**, menus must be set the same like for Tank 3 in the description below.
(example: Pool set as tank 3).
IMPORTANT: in the pool only Sensor tank upper must be installed and set!

NOTE: pool sensor **ALWAYS** must be **NTC5K** because of the much better precision in temperature reading (reading to 1 decimal place) than PT1000.

8.3.4. T MAX tank 3

Setting the maximum temperature of the tank 3.
Solar collectors heats tank 3 to the temp. [T MAX tank 3] after which stops heating of this tank.
If the collector cooling function is enabled and active, temperature in the tank can reach up to max. 90°C

NOTE: Pool must be always set as the LAST tank!

Factory settings		*min./max.*	*unit*
T MAX tank 3	28	15 / 40	°C

8.3.4.2. TDcoll-tank (diferenca)

Setting the desired difference between temperature of the collector and temperature of the tank (pool - upper sensor) for start of the collector pump.

START coll. pump -> [Tcollector > **TDcoll-tank** + THcoll-tank]
STOP coll. pump -> [Tcollector < **TDcoll-tank**].

Factory settings		*min./max.*	*unit*
TDcoll-tank	4	1 / 10	°C

8.3.4.3. THcoll-tank (hysteresis)

Setting the desired hysteresis temperature between collectors and the tank (pool - upper sensor) for start of the collector pump.

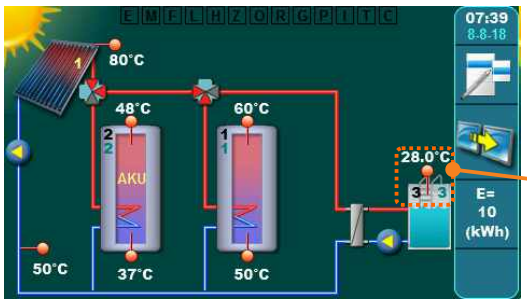
START coll pump -> [Tcollector > TDcoll-tank + **THcoll-tank**]
STOP coll. pump -> [Tcollector < TDcoll-tank].

Factory settings		*min./max.*	*unit*
THcoll-tank	2	1 / 10	°C

8.3.4.4. Senssor tank 3 up

Sensor tank 3 up (pool) is used:
- work of the collector pump including the stop of the collector pump when in the tank (pool) set maximum temp. is reached,
- in case that return flow sensor isn't installed, for energy meassurement (meassurement is less precise than with return flow sensor).
- at function of Collector cooling through tank,
- at Collector antifreeze function,
- in protection function of the tank cooling through the collector
- at Holiday function.

In this menu sensor address and type must be set.



example: configurated 3 tank (2 with 2 sensors, 3. tank = pool), 1 pipe collector, return flow sensor, zone 3-way valve

installed and set sensor tank 3 up

8.3.4.4.1. Sensor upper

Set the address of the input on which sensor tank 3 upper (pool sensor) is connected (possibility to connect to any of the free 10 addresses, regulation automaticaly suggest input T6).

Factory settings		*selection*
Sensor upper	Not exist	Not exist/T1/.../T10

8.3.4.4.2. Sensor type

Because of the much better precision in temperature reading (reading to 1 decimal place) pool sensor **ALWAYS** must be **NTC5K** (not in the delivery).
If NTC sensor is installed, here must be changed from PT1000 to the NTC.

Factory settings		*selection*
Sensor type	PT1000	PT1000/NTC

example: set 3 tanks

8.3.5. Enabled tanks

In this menu tanks can be enabled/disabled in the working system.

ENABLED - tank is enabled (included) in working of the system
DISABLED - tank is disabled (removed) from the working of the system (to this tank pumps, valves and additional heating doesn't work).

Factory settings		*selection*
Tank 1	Enabled	Enabled/Disabled
Tank 2	Enabled	Enabled/Disabled
Tank 3	Enabled	Enabled/Disabled
Tank 4	Enabled	Enabled/Disabled

example: set 3 tanks

8.3.6. Tank priority

Setting the priority for the solar filling of the tanks. Tank 1 always must be first in priority, other can be rotated according the filling priority. Priority of each tank is marked on the upper left corner of the tank (green number), below tank order number (black number).

Factory settings		*selection*
2 tanks	12	12
3 tanks	123	123 / 132
4 tanks	1234	1234/1243/1324/1342/1423/1432

8.3.7. Priority test

If there is more than 1 tank in the configuration, priority test can be enabled to periodicaly test the collector temperature if it has enough high temperature to start filling the prioritiy tank again.

After priority tank is filled (or [T MAX tank1] or [Tcoll. < Ttank1 + TDcoll-tank]), solar heating is switched to the next tank according the priority. By enabling Prioritiy test function, next tank by priority will be filled for some time (set under Priority filling) after which it will stop for some time (set under Priority pause) to check if the collectors can fill priority tank or they will continue to fill current tank. If the collector temperature rise in the set pause time is higher or equall [3°C/x min.] pause time is extended until rise of the collector temp. is higher ie. until is possible to fill priority tank again. If the rise of the collector temp. in set time is lower than [3°C/x min.] filling the current tank continues.
By enabling Priority test function in menu 1. Tank, options Priority filling and Priority pause is shown.

Factory settings		***selection***
Priority test	OFF	OFF/ON

8.3.8. Priority filling

Priority test -> ON
Time for continuous filling of the next tank (not priority tank).

Factory settings		***min./max.***	***unit.***
Filling priority	15	0 / 720	min

8.3.9. Priority pause

Priority test -> ON
Pause time for the collector pump in which is tested rise of the collector temperature to switch back to heat priority tank.
If the temperature rise in the set pause time is higher or equal [3°C/x min.], time of the pause is extended for next interval, in which rise of the collector temperature is tested and possibility to start to heat priority tank. If the temperature rise in set pause time is less than [3°C/x min], current tank continues to be filled.

Factory settings		***min./max.***	***unit.***
Priority pause	3	0 / 60	min

8.3.10. Tank cooling

Tank cooling ie. lower the water temperature in the tanks to prepare them to accept new solar energy next day can be done through collectors or through recirculation (if it's installed into the system and connected to the regulation).
NOTE: tank cooling always starts from the tank with the lowest priority to the tank with highest priority.

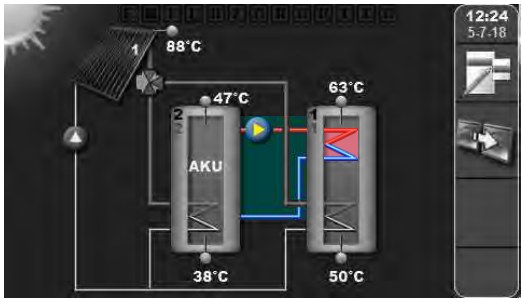
Through collector - cooling the tank through the collector (and pipes to the collector)

NOTE: it's recommended that cooling is done **through flat collectors** (not pipe collectors) due to lower insulation of the flat collectors.

Tank cooling is done when collector temperature is lower than temperature in tank lower [Tcoll + dTcoll/tank < T MAX tank X].
Tank cooling start only when all tanks are filled to the [T MAX tank] and start from lowes priotiry tank.
Tank coolin stops when temperature of the upper tank sensor is lower than difference collector/tank
[Ttank_up < TMAX tank -dTcoll/tank].

Through recirculation - cooling of the first tank through recirculation (cooling only first, priority tank, only if recirculation is connected).
Tank cooling starts only when all tanks are filled to the [T MAX tank] and when [Ttank 1_up > T MAX tank 1] (only in first tank).
First tank cooling stops when temperature of the upper sensor falls for 5°C from [T MAX tank 1].
[Ttank 1_up < T MAX tank 1 - 5°C].

Factory settings		*selection*
Tank cooling	Disabled	Disabled/Through coll./Recirculation



example: configurated 2 tanks,
hid. connection: - Zone 3-way valve,
Mixing/heating

8.3.11. Mixing-heating

When temperature of the first (priority) tank (upper sensor) is lower for min. set difference than second tank (upper sensor) mixing-heating pump starts to heat first tank. this function is mostlly used when first tank is DHW and second is BUF, when excest of energy (solar) is stored in the BUF tank during the day so in the evening, after spending the DHW can additional heat DHW tank with energy from BUF, without using conventional heating source.

In this menu is possible to enable/disable function of additional heating of the first tank with the second tank and set the difference between first two tanks.

8.3.11.1. Mixing-heating

In this menu mixing-heating function can be enabled and disabled.

Factory settings		*selection*
Mixing-heating	OFF	OFF/ON

8.3.11.2. TDif Tank2->Tank1 (difference)

Setting the temperature difference between second and first tank (upper sensors) for start and stop of the mixing/heating pump.

Factory settings		min./max.	unit.
Tdif Tank2->Tank1	4	1 / 10	°C

8.3.12. Puls start pool

This menu is shown only if pool is set in the configuration.
In this menu are additional menus for setting the pulse start of the pool pump (kick).
If pool sensor can't be installed into place where it can read correct temperature, it's recommended to enable pulse start of the pump (when pump is still) which occasionaly starts the pump for set time, to read correct tempearature of the pool sensor.

NOTE: to offten and to long work of the pool pump power supply consumption can be increrased and pool can be cooled! Work and pause time of the pool pump depends of the location of the pool sensor.

8.3.12.1. Puls start pool

In this menu puls start pool can be enabled or disabled. All set times and schedule are valid.

Factory settings		setting
Pulse start pool	OFF	OFF/ON

8.3.12.2. Pump pause time

Setting the pause time of the pool pump in pulse start.
NOTE: Time must be set according to the position of the pool sensor to have correct pool temperature and start with the pool heating asap.

Factory settings		min./max.	unit.
Pump pause time	15	0 / 1440	min

8.3.12.3. Pump working time

Setting the working time of the pump in pulse start.
NOTE: Time must be set according to the position of the pool sensor to have correct pool temperature and start with the pool heating asap.

Factory settings		min./max.	unit.
Pump working time	60	0 / 3600	sec

8.3.12.4.Schedule

In this menu are additional menus for setting the schedule for pulse start (kick) of the pool pump.

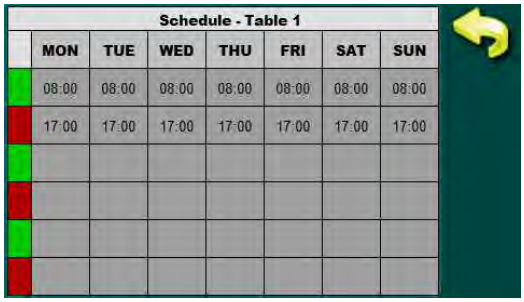
Schedule can be switch off or one of two tables with adjusted on/off intervals can be set.

8.3.12.4.1.Schedule

In this menu Schedule can be enabled/disabled and set one of two tables according to which pool pump Pulse start will work.

NOTE: If Pulse start is on ad Schedule is off, pulse start will work always (24/7) according the work/pause time. In this case, power supply consumption can be increased (pool pump) and pool cooling can occur.

Factory settings		*selection*
Schedule	Table 1	OFF/Table 1/Table 2



8.3.12.4.2.Table 1

In this menu 3 time intervals (3 starts (green fields) and 3 stops (red fields)) can be set for each day of the week according to which pool pump will work in pulse start.

Factory setting: pulse start is active from 08:00 h to 17:00 h every day of the week. From 17:00 h of the first day to 08:00 h next day pulse start doesn't work.

Factory settings		*selection*
Table 1	08:00-17:00	mon/tue/wed/thu/fri/sat/sun

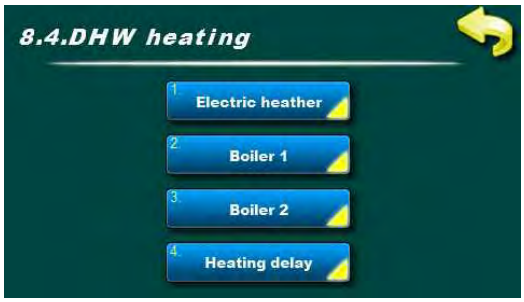
8.3.12.4.3.Table 2

In this menu 3 time intervals (3 starts (green fields) and 3 stops (red fields)) can be set for each day of the week according to which pool pump will work in pulse start.

Factory setting: pulse start is active from 08:00 h to 17:00 h every day of the week. From 17:00 h of the first day to 08:00 h next day pulse start doesn't work.

Factory settings		*selection*
Table 2	08:00-17:00	mon/tue/wed/thu/fri/sat/sun

8.4. DHW heating



example: configurated 1 electric heater and 2 conventional heating sources

8.4. DHW heating

In this menu are additional menus for setting the heating with the conventional heating sources connected to tank 1.

8.4.1. Electric heater

In this menu are additional menus for setting the heating with the electric heater.

8.4.1.1. Electric heater

In this menu electric heater can be switch ON or OFF

Factory settings		*selection*
Electric heater	OFF	OFF/ON

8.4.2. Boiler 1

In this menu are addtional settings for heating with conventional source 1.

8.4.2.1. Boiler 1

In this menu for heating with conventional heating source 1 can be enabled or disabled (ie. pump working between conventional heat source and tank 1).

Factory settings		*selection*
Boiler 1	OFF	OFF/ON

8.4.2.2. T MAX Boiler 1

Setting of the maximum temperature of the conventional heating source 1. If the temperature in conventional heating source is higher than set, pump to the tank will not start.

Factory settings		*min./max.*	*unit*
T MAX Boiler 1	90	30 / 90	°C

8.4.2.3. TD boiler1-tank1 (difference)

Setting of the temperature difference between conventional heating source 1 and first tank (upper sensor) for start and stop of the pump between boiler 1 and tank 2. Some of the conditions:

pump start: [Tboiler1=>Ttank1+**TDboiler1-tank+5**]
pump stop: [Tboiler1=<Ttank1+**TDboiler1-tank**]

Factory settings		*min./max.*	*unit*
TD boiler1-tank	10	3 / 20	°C

8.4.2.4. TH boiler1-tank1 (hysteresis)

Setting the temperature hysteresis between conventional heating source 1 and fist tank (upper sensor) for start of the pump between boiler 1 and tank 1. Some of the conditions:

pump start: [Ttank1upper<TDHW-**THboiler1-tank**-TXXXXXXX]

Factory settings		*min./max.*	*unit*
TH boiler1-tank	10	3 / 20	°C

8.4.2.5. T enable boiler 1

Setting the minimum temperature of the conventional heating source for starting the pump between conventional heating source 1 and tank 1 (normaly needed when condensation of the boiler needs to be prevented.)

Factory setting		min./max.	Val.
T enable boiler 1	60	0 / 90	°C

8.4.2.6.Schedule

In this menu are additional menus for setting the schedule for working of the conventional heating source 1.

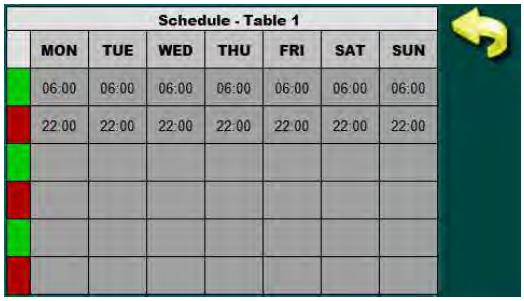
NOTE: In case schedule is not set, convetional heating source pump will work according set temperatures always, 24/7. Recommendation is to set schedule according to the real need for DHW to optimize fuel consumption.

8.4.2.6.1.Schedule

In this menu schedule can be enabled/disabled and one of two tables can be selected according to which heating with convetional heating source will work.

NOTE: If the convetional heating source is enabled and schedule is disabled, tank heating with convetional heating source will be active always, 24/7, according the set temperatures.

Factory setting		setting
Schedule	OFF	OFF/Table 1/ Table 2



8.4.2.6.2.Table 1

In this menu 3 time intervals can be set (3 starts ((green fields) and 3 stops (red fields) for each day of the week in which heating with coventional heating source will work according the set temperatures.
Factory setting: conventioanl heating source is enabled from 06:00 h to 22:00 h every day of the week. From 22:00 h of the first day to 06:00 h next day heating with conventional heating source is disabled.

Factory setting		setting
Table 1	06:00-22:00	mon/tue/wed/thu/fri/sat/sun

8.4.2.6.3.Table 2

In this menu 3 time intervals can be set (3 starts ((green fields) and 3 stops (red fields) for each day of the week in which heating with coventional heating source will work according the set temperatures.
Factory setting: conventioanl heating source is enabled from 06:00 h to 22:00 h every day of the week. From 22:00 h of the first day to 06:00 h next day heating with conventional heating source is disabled.

Factory setting		setting
Table 2	06:00-22:00	mon/tue/wed/thu/fri/sat/sun

8.4.2.7. Sensor address

It's necessary to select address of the connected sensor of the convetional heating source 1 (possible to connect to one od 10 free address, regulation autmatically recommends input according the set configuration).

Factory setting		setting
Sensor address	Not exist	Not exist/T1/.../T10

8.4.2.8. Sensor type
If NTC sensor is installed, here it must be changed from PT1000 to NTC type.

Factory settings		selection
Sensor type	PT1000	PT1000/NTC

8.4.3. Boiler 2
Menus for conventional heating source 2 settings. All menus are similar to menus for conventional heating source 1 and will not be separately explained here (for details, see 8.4.2. Boiler 1).

E E E

8.4.4. Heating delay
For this menu to appear, minimun one of the conventional heating source must be set.
If the function is enabled and collector pump is active (tank is filled with solar energy) this function lowers the temperature of activation of the conventional heating source function (delays start of the conventional heating source function) by value that is set under Lower temperature menu.
If collector pump is active, delay start of the heating:
[Ttank_upper1 <= TDHW -dTboiler_tank - **Tlowering temperature**].

If collector pump isn't active a tank needs to be heated, delay isn't considered:
[Ttank_upper1 <= TDHW -dTboiler_tank].

8.4.4.1. Heating delay
In this menu heating delay can be enabed and disabled.

Factory settings		selection
Heating delay	OFF	OFF/ON

8.4.4.2. Lowering temperature
Setting the temperature for which start of the heating with convenctional heating source will be delayed when collector pump is working.

Factory settings		min./max.	unit.
Lowering temperature	0	0 / 90	°C

8.5. RECIRCULATION

R R R

8.5. Recirculation
In this menu are additional menus for setting the recirculation of DHW.

In this menus work and pause time of the DHW recirculation pump can be set and set the time interval when work and pause will be active.

8.5.1. Recirculation
In this menu recirculation function can be enabled and disabled. All set times and schedule remains valid.

Factory settings		unit.
Recirculation	OFF	OFF/ON

8.5.2.Pump working time

Setting the recirculation pump working time when recirculation is active.
NOTE: Time must be set according the recirculation system. Recommendation is to set the working time as short as possible to cool down the tank as low as possible.

Factory settings		min./max.	unit
Pump working time	5	1 / 1440	min

8.5.3. Pump pause time

Setting the recirculation pump pause time when circulation is active.
NOTE: Time must be set according the recirculation system. Recommendation is to set the pause time as long as possible to cool down the tank as low as possible.

Factory settings		min./max.	unit
Pump pause time	15	0 / 1440	min

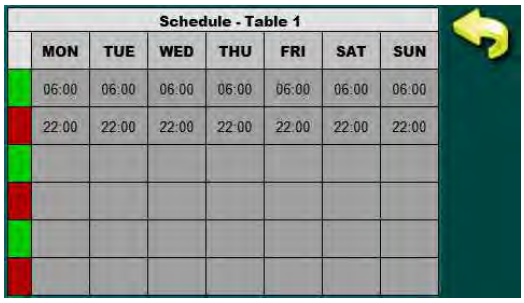
8.5.4. Schedule

In this menu are additional menus for set the recirculation schedule.
Schedule can be enabled/disabled or select one of the two tables with set time intervals for enabled and disabled function.

8.5.4.1. Schedule

In this menu schedule can be enabled/disabled and selected one of two tables according to which DHW recirculation will work.
NOTE: In case recirculation is enabled and shedule is disabled, recirculation will always work according set times, 24/7, ie. recirculation pump will work when not needed and will cool down DHW tank and increase fuel comsumption of the conventional heating source.

Factory settings		selection
Schedule	OFF	OFF/Table 1/Table 2



8.5.4.2. Table 1

In this menu 3 time intervals can be set (3 start (green fields) and 3 stop (red fields)) for each day of the week in which recirculation pump will work according the set work/pause times.
Factory setting: recirculation is enabled from 06:00 h to 22:00 h every day of the week. From 22:00 h of the first day to the 06:00 next day recirculation is disabled.

Factory settings		selection
Table 1	06:00-22:00	mon/tue/wed/thu/fri/sat/sun

8.5.4.3. Table 2

In this menu 3 time intervals can be set (3 start (green fields) and 3 stop (red fields)) for each day of the week in which recirculation pump will work according the set work/pause times.
Factory setting: recirculation is enabled from 06:00 h to 22:00 h every day of the week. From 22:00 h of the first day to the 06:00 next day recirculation is disabled.

Factory settings		selection
Table 2	06:00-22:00	mon/tue/wed/thu/fri/sat/sun

8.6. LEGIONELLA PROTECTION

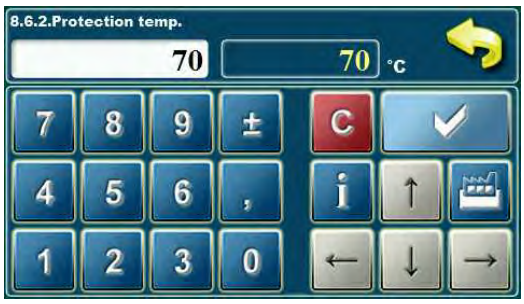
8.6. Legionella protection

In this menu are additional menus for setting the tank disinfection ie. legionella protection.

8.6.1. Legionella protection

In this menu legionella protection function can be enabled or disabled.
All set times, schedule and temperatures are remaining as they were set.

Facotry settings		*selection*
Legionella protection	OFF	OFF/ON



8.6.2. Protection temperature

Legionella bacteria lives and develops in places with poor or without circulation in water temperature between 20°C and 55°C. In higher temperature bacteria is slowly dying and over 70°C dies instantly.
For protection from the bacteria to be efficient, tanks and pipelines have must be for some time over 65°C for efficient disinfection.
Set protection temperature is followed by upper tank 1 sensor.

Factory settings		*min./max.*	*unit.*
Protection temp.	70	60 / 90	°C

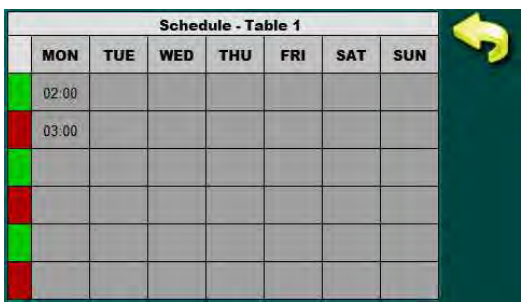
8.6.3. Schedule

in this menu are additional menus for setting the schedule for legionella protection.
Schedule can be disabled or select one of the two tables with set time intervals for enabled and disabled function.

8.6.3.1. Schedule

In this menu schedule can be enabled/disabled and select one of two tables according to which Legionella protection will work.
NOTE: in case Schedule is disabled Legionella protection will not wotk until one of two tables with set time intervals is selected.
If DHW tank has larger volume or conventional heating source is weak, depending of the tank heating speed, it's necessary to adjust legionella protection time.

Factory settings		*selection*
Schedule	Table 1	OFF/Table 1/Table 2



8.6.3.2. Table 1

In this menu 3 time intervals can be set (3 starts (green fields) and 3 stops (3 red fields)) for each day of the week when Legionella protection will work.
Factory setting: Legionella protection is active one day of the week (Monday) from 02:00 to 03:00 h.

Factory settings		*selection*
Table 1	02:00-03:00	mon

8.6.3.3. Table 2

In this menu 3 time intervals can be set (3 starts (green fields) and 3 stops (3 red fields)) for each day of the week when Legionella protection will work.
Factory setting: Legionella protection is active one day of the week (Monday) from 02:00 to 03:00 h.

Factory settings		selection
Table 2	02:00-03:00	mon

example: configurated 3 conventional sources

8.6.4. Choose source

In this menu conventional heating source for tank disinfection according the schedule and temperature can be set. Selected heating source must be able to achieve set temperature in set schedule time (in menu displayed are only set convencional heating sources).

Facotry settings		selection
Choose source	El. heater	El. heater/Boiler 1/Boiler 2

8.6.5. Skip legionella time

In this menu Skip legionella time function can be enabled or disabled.
In case function is enabled and in time interval between two legionella protection activation, temperature and time of the protection function is reached, next interval for protection is skipped and next time interval is scheduled.

Factory settings		selection
Skip legionella time	OFF	OFF/ON

8.6.6. Disinfection time

Setting the duration of water temperature that must be above set Protection temp. to have succesfull disinfection.

Factory settings		min./max.	unit.
Disinfection duration	15	1 / 1440	min

8.6.7. Recirculation legionella

In this menu DHW recirculation can be enabled/disabled when Legionella protection function is active to disinfect pipeline (circulation must be set in the system).
When conventional heating source is started, recirculation pump is also started and works until disinfection is finished.

NOTE: recirculation must be set and enabled in the installation menu.

Factory settings		selection
Recirculation leg.	OFF	OFF/ON

8.7. ENERGY MEASURING

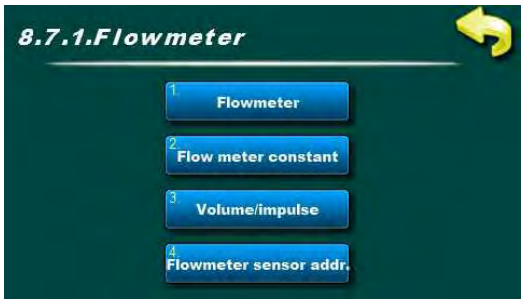
example: configurated 2 collector fields, flowmeter

8.7. Energy measuring

In this menu are additional menus for setting the energy measuring functions.
Energy is calculated according temperatures from collector sensor, return flow sensor and written or measured current flow of glicol in the solar system.
If return flow temperature sensor isn't installed, for energy calculation is done with temperature of lower sensor of the currently active tank.

NOTE: energy measurement without return flow sensor installed and without flowmeter will be less accurate than with them.

NOTE: input of received solar energy is on the redulation screen is done by intevals of 1 kWh! Interval of drawing received solar energy in the graphical view of the statistic depend of the amount installed collectors ie. flow through collectors.



8.7.1. Flowmeter

In this menu are additional menus for setting the characteristic of the flowmeter.

NOTE: energy measuring with installed flowmeter is more accurate than manual input of the flow because always is used correct flow for the calculation (important with modulating pumps).

8.7.1.1. Flow meter

In this menu flowmeter can be enabled or disabled.
All set values remain like were set before.

Factory settings		*selection*
Flowmeter	OFF	OFF/ON

8.7.1.2. Flowmeter constant

Setting of the measuring unit of flowmeter.

Factory settings		*selection*
Flowmeter constant	ml/impuls	ml/imp. / l/imp.

8.7.1.3. Volume/impuls

Input of the measured volume by flowmeter impuls.

Factory settings		*min./max.*	*unit.*
Volume by impuls	1	1 / 65000	-

8.7.1.4. Flowmeter sensor address

Setting the address of input where flowmeter is connected (one free address of 10 possible).

Factory settings		*selection*
Flowmeter sen. add.	Not exist	Not exist/T1/.../T10

8.7.2. Collector 1 flow

In case flowmeter isn't installed, precise flow through collector field 1 must be entered.

NOTE: Solar pump must work at 100% power on set flow (flow regulator) and flow must be precisely read from the flowmeter (on pump group) and entered into regulation.
In case that flow isn't correct, regulation will wrongly measure received solar energy!

Factory settings		*min./max.*	*unit*
Collector 1 flow	1.00	0.01/60.00	l/min

8.7.3. Collector 2 flow

In case flowmeter isn't installed, precise flow through collector field 2 must be entered.

NOTE: Solar pump must work at 100% power on set flow (flow regulator) and flow must be precisely read from the flowmeter (on pump group) and entered into regulation.
In case that flow isn't correct, regulation will wrongly measure received solar energy!

Factory settings		*min./max.*	*unit*
Collector 2 flow	1.00	0.01/60.00	l/min

8.7.4. Glycol type

In this menu used glycole type must be set for correct calculation of received solar energy.

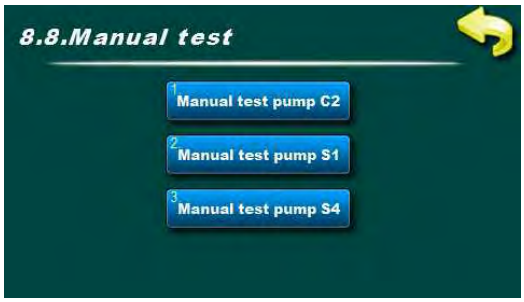
Factory settings		*setting*
Glycol type	Propylene gly.	Ethylene gly./Propylene gly.

8.7.5. Mixing

In this menu percetange of glycol in mixing of water and glycol in solar system must be precisely set for best calculation of received solar energy.

Factory settings		*min./max.*	*unit*
Mixing	40	10 / 70	%

8.8. MANUAL TEST

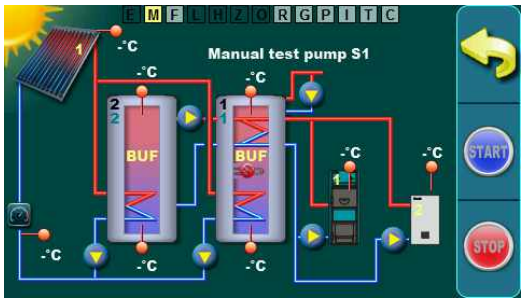


example: configurated 2 tank with pumps,
1 conventional heating source,
1 electric heater, recirculation pump
and mixing pump

8.8. Manual test

Depending of set components and their outputs, in manual test all enabled outputs can be tested.

NOTE: number and type of menus depends of enabled outputs in installation menu.



1 kol.polje / cijevni kol. / 1 sprem. PTV / 1 AKU spremnik / pumpe / električni grijač / kotao1 / miješanje/dogrijavanje / mjerač protoka / osjetnik povratnog voda / recirkulacija

8.8.1. Manual test pump S1

Pressing the START button output is enabled (in this case tank 1 pump), and by pressing the STOP button, output is disabled (in this case tank 1 pump). With button BACK previous screen is displayed.
When Manual test is on, mark for the Manual test function (M) is yellow.

Depending of the selected output, with buttons START and STOP outputs are manually enabled or disabled.

8.9. SAVE/LOAD

8.9. Save/Load

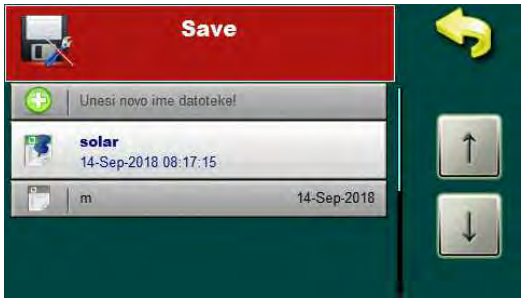
In this menu are additional menus for saving and loading changed parameters and reseting to the factory setting.

8.9.1. Factory setting

Reset all parameters to the factory setting. After reset to factory setting previously saved files remains (user and advanced) and they can be loaded after reset. Also, statistic remains as before reset to factory setting.

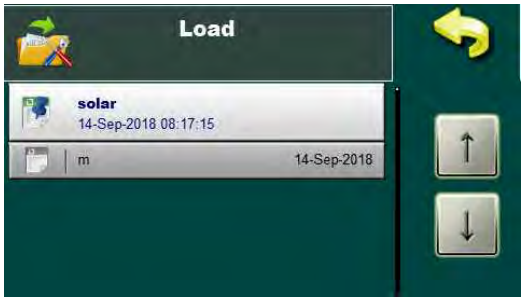
After pressing the facotry setting, current setting can (but don't have to) be saved in new or already saved file (saving is done into service save file).
After this, loading of factory setting must be confirmed by entering PIN 0000 two times (same PIN for installation menu). If done correctly, message that factory setting is loaded appears.
After factory setting is loaded, regulation must be switched off and back on on the main switch.

Factory set scheme: 1 collector field of pipe collectors, 1 DHW tank with upper and lower sensor.



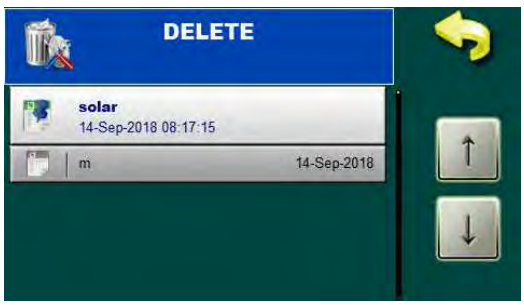
8.9.2. Save

Saving current service files (settings).
File can be saved to new or existing name.
File names can have upper or lower case, numbers and signs up to max. lenght of 24 characters. Pressing the button with arrow, upper/lower/signs input type can be switched (upper right corner).



8.9.3. Load

Load previously saved service files (settings).



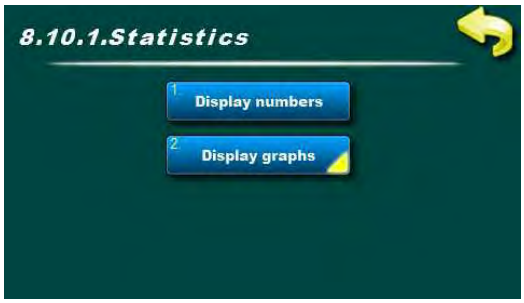
8.9.4. DELETE

Delete previously saved files. Currently active files can't be deleted (files that have PIN symbol on the icon).
Service files can be deleted only in installation menu (under PIN).

8.10. INFORMATION

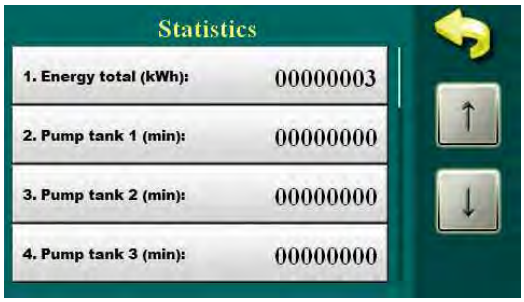
8.10. Information

In this menu are additonal menus for informations regarding system and software.



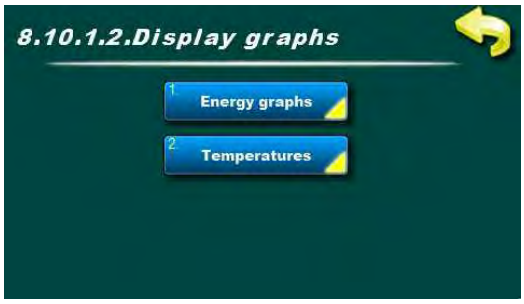
8.10.1. Statistics

In this menu are additional menus regarding statistics data of solar system.



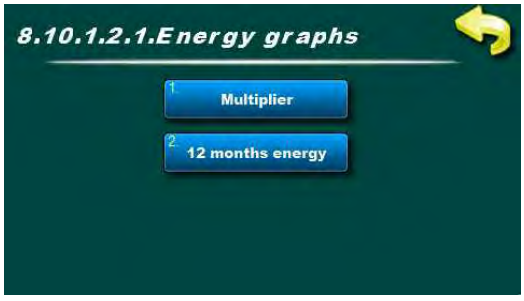
8.10.1.1. Display numbers

View of the statistics for working of each individual output (in minutes of working) and totaly energy received (in kWh/MWh).



8.10.1.2. Display graphs

In this menu are additional menus for graphical view of the statistic data: received energy graphs and temperatures graph (24 and 48 h).

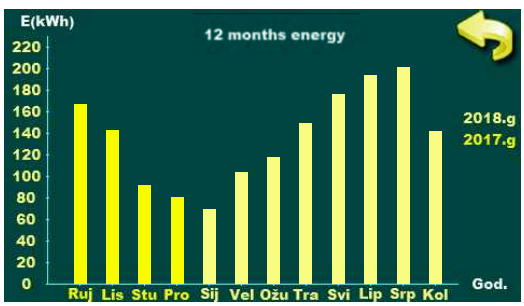


8.10.1.2.1.Energy graphs

In this menu are additional menus for graphical view of received energy. If columns doesn't fit in the graph screen, with multiplier, graph area can be increased or decreased. Received energy can be viewed by months in period of one year.

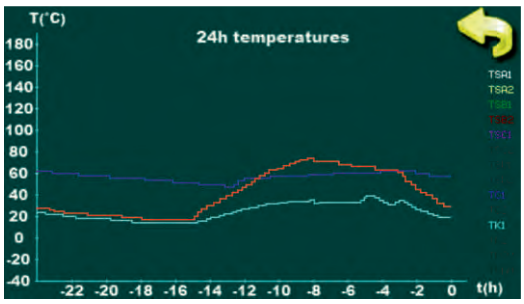
8.10.1.2.1.1. Multiplier

If columns of received energy doesn't fit to the graph screen, with the multiplier, graph area can be increased or decreased (x1, x2, x3, x5, x10) (multiplication of axis by energy).



8.10.1.2.1.2. 12 month energy

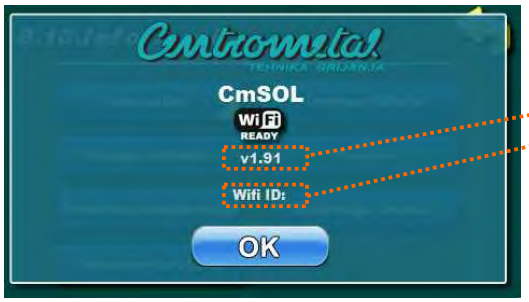
As solar energy is received, a current month graph it's automaticaly drawn. On this view is always possible to see received energy for period of one year by intervals of one month.



8.10.1.2.2. Temperatures
In this menu are additional menus for graphical view of the received temperatures from set sensors.

8.10.1.2.2.1. 24h temperatures
Diagram of temperatures of configurated sensors in 24 h.

8.10.1.2.2.2. 48h temperatures
Diagram of temperatures from configurated sensors in 48 h.

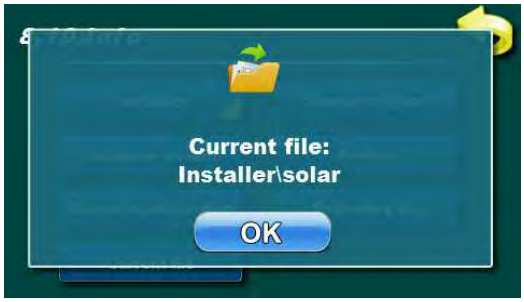


8.10.2. Software version
In this menu are software version and WiFi ID of the Cm WiFi-box:
- current software version of the regulation
- if connected, WiFi ID of the Cm WiFi-box

example: configurated: 1 boiler, 1 collector field, 2 tanks, 1 pool, hydraulic connection zone 3-way valve

8.10.3. Current configuration
In this menu current system configuration is displayed.

1. K x - number of boilers (0, 1, 2)
2. C x - number of collector fields (1, 2)
3. S x - number of tanks (1, 2, 3, 4)
4. B x - number of pools (0, 1)
5. H x - hydraulic connection (1 (Pump), 2 (Zone valve 2-way), 3 (Zone valve 3-way))



8.10.4. Current file
In this menu current selected file is displayed. Regulation is working according this file. Select and active can be or configuration set by serviceman (under PIN) or configuration set by user.

8.10.5. Change of glycol

Depending of the solar system working and glycol producer recommendation, glycol in the solar system must be replaced regulary (offten overheating of the glycol (steam in the collectors) results with faster glycol aging and it's geting thicker, which results with lower collector efficiency and in the end it can result with clogging of the collector). **Recommendation is to replace the glycol every 2 years.**
After glycol replacing in the solar system, counter in the menu -> 8.12.2. Reset glycol counter must be reset, which restarts time interval of 2 years, after which warning for glycol replacement is displayed.

NOTE: Warning for glycol replacement appears after 2 years from last counter reset. When warning appears solay system works normally, only warning is active until reset of the counter.

Glycole counter reset menu is under installation menu -> 8.12.2. Reset glycole counter

8.10.6. History

In this menu are informations regarding history of errors, warnings and informations in chronological order of occurrence (in user menu errors are separated from warnings).

With mark of error/warning/information displayed is it's full name, date and time of occurence and error code.

By pressing the error/warning/information area detailed description is displayed with possible correction solution.

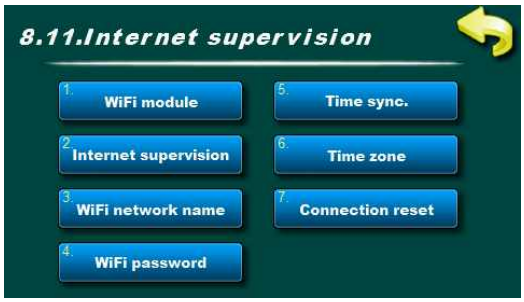
After 50. input, oldest input is deleted when new occurs.

History of the errors/warnings/informations can't be deleted.

8.10.7. Enterance log

In this menu log of entry to the installation menu (under PIN) is displayed (date and time).

8.11. INTERNET SUPERVISION



8.11. Internet supervision

Regulation automaticaly recognizes when Cm WiFi-box module is connected and in user and installation menus (under PIN) is displayed new menu for Internet supervision.

In this menu internet supervision or supervision+control through WiFi network can be enabled/disabled, WiFi network name and password can be entered, time syncronisation can be enabled/disabled, time zone can be set and manual connection reset can be done.
User can install and set Cm WiFi-box by itself.

8.11.1. WiFi module

In this menu Cm WiFi-box module can be enabled or disabled.

Factory settings		*selection*
WiFi module	OFF	OFF/ON

8.11.2. Internet supervision

In this menu internet supervision can be enabled/disabled and select Internet supervision (without possibility to change parameters) or select Internet supervision+control (parameters can be changed).

Factory settings		*selection*
Internet supervision	Sup.+control	OFF/Sup./Sup.+control

8.11.3. WiFi network name

In this menu WiFi network name to which Cm WiFi-box will connect must be entered. Possible is to enter 31 character, with upper and lower case, numbers and symbols.

NOTE: Insert correct network name paying attention to the upper and lower case, numbers and symbols.

8.11.4. WiFi password

In this menu WiFi password to which Cm WiFi-box will connect must be entered. Possible is to enter 31 characters, with upper and lower case, numbers and symbols.

NOTE: Insert correct network password paying attention to the upper and lower case, numbers and symbols.

8.11.5. Time syncronisation

In this menu regulation time syncronisation with server time can be enabled/disabled.

Factory settings		*selection*
Time sync.	ON	OFF/ON

8.11.6. Time zone

In this menu time zone can be set according the boiler installation location.

Factory settings		*min./max.*	*unit.*
Time zone	1h	-12 / 14	h

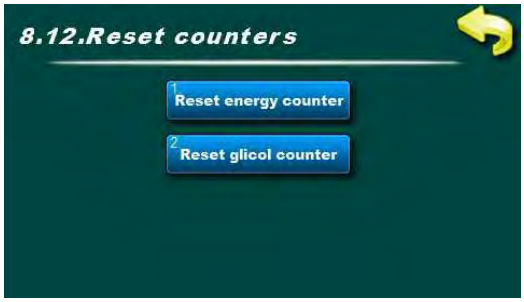
8.11.7. Connection reset

In this menu internet connection can be manually reset. In case of data sending to web server is blocked, connection can be manually reset.

CM WiFi-box requires active DHCP server of Access Point (e.g. router) because manual setting of network parameters is not possible. For more informations contact administrator of your home network.

For detailed setting of the Cm WiFi-box see technical instructions for Cm WiFi-box received with module.

8.12. PONIŠTI BROJAČE



8.12. Reset counters

In this menu are additional menus for received solar energy counters reset and reset of the glycol counter (glycol replacement).

8.12.1. Reset energy counter

In this menu counter of total received solar energy from collectors can be reset to 0.

8.12.2. Reset glycol counter

In this menu counter of the solar system glycol replacement interval can be reset to 0.
After reset, counter start to count time of 2 years after which warning (reminder) for glycole replacement is active again.

Counter can be reset without warning appearing on the screen.

When glycole replacement warning appears on the screen, glycole in the solar system must be replaced with new one and reset the counter so after 2 years warning will appear again.

ERRORS LIST

ERROR	NAME	DESCRIPTION
E1	COLLECTOR 1 SENSOR	**Possible cause:** interruption in el. wires between sensor and controller, contact on the regulation, cold connection or damaged sensor, set wrong sensor type at configuration. **Controller status:** Collector/tank pump doesn't work. **Troubleshooting:** Check sensor installation position, check damage / function of the sensor and (silicone) cable, check connection contacts, check sensor type (PT1000 or NTC), if there is availible free input set it for this sensor and connect sensor.
E2	COLLECTOR 2 SENSOR	**Possible cause:** interruption in el. wires between sensor and controller, contact on the regulation, cold connection or damaged sensor, set wrong sensor type at configuration. **Controller status:** Collector/tank pump doesn't work. **Troubleshooting:** Check sensor installation position, check damage / function of the sensor and (silicone) cable, check connection contacts, check sensor type (PT1000 or NTC), if there is availible free input set it for this sensor and connect sensor.
E3	TANK 1 UPPER SENSOR	**Possible cause:** interruption in el. wires between sensor and controller, contact on the regulation, cold connection or damaged sensor, set wrong sensor type at configuration. **Controller status:** Regulation works without tank that has sensor error, electric heater/pump of conventional heating source (boiler) doesn't work. **Troubleshooting:** Check sensor installation position, check damage / function of the sensor and cable, check connection contacts, check sensor type (PT1000 or NTC), if there is availible free input set it for this sensor and connect sensor.
E4	TANK 1 LOWER SENSOR	**Possible cause:** interruption in el. wires between sensor and controller, contact on the controller, cold connection or damaged sensor, set wrong sensor type at configuration. **Controller status:** Controller works without tank that has sensor error. **Troubleshooting:** Check sensor installation position, check damage / function of the sensor and cable, check connection contacts, check sensor type (PT1000 or NTC), if there is availible free input set it for this sensor and connect sensor.
E5	TANK 2 UPPER SENSOR	**Possible cause:** interruption in el. wires between sensor and controller, contact on the controller, cold connection or damaged sensor, set wrong sensor type at configuration. **Controller status:** Controller works without tank that has sensor error. **Troubleshooting:** Check sensor installation position, check damage / function of the sensor and cable, check connection contacts, check sensor type (PT1000 or NTC), if there is availible free input set it for this sensor and connect sensor.
E6	TANK 2 LOWER SENSOR	**Possible cause:** interruption in el. wires between sensor and controller, contact on the controller, cold connection or damaged sensor, set wrong sensor type at configuration. **Controller status:** Controller works without tank that has sensor error. **Troubleshooting:** Check sensor installation position, check damage / function of the sensor and cable, check connection contacts, check sensor type (PT1000 or NTC), if there is availible free input set it for this sensor and connect sensor.

E7	TANK 3 UPPER SENSOR	**Possible cause:** interruption in el. wires between sensor and controller, contact on the controller, cold connection or damaged sensor, set wrong sensor type at configuration. **Controller status:** Controller works without tank that has sensor error. **Troubleshooting:** Check sensor installation position, check damage / function of the sensor and cable, check connection contacts, check sensor type (PT1000 or NTC), if there is availible free input set it for this sensor and connect sensor.
E8	TANK 3 LOWER SENSOR	**Possible cause:** interruption in el. wires between sensor and controller, contact on the controller, cold connection or damaged sensor, set wrong sensor type at configuration. **Controller status:** Controller works without tank that has sensor error. **Troubleshooting:** Check sensor installation position, check damage / function of the sensor and cable, check connection contacts, check sensor type (PT1000 or NTC), if there is availible free input set it for this sensor and connect sensor.
E9	TANK 4 UPPER SENSOR	**Possible cause:** interruption in el. wires between sensor and controller, contact on the controller, cold connection or damaged sensor, set wrong sensor type at configuration. **Controller status:** Controller works without tank that has sensor error. **Troubleshooting:** Check sensor installation position, check damage / function of the sensor and cable, check connection contacts, check sensor type (PT1000 or NTC), if there is availible free input set it for this sensor and connect sensor.
E10	TANK 4 LOWER SENSOR	**Possible cause:** interruption in el. wires between sensor and controller, contact on the controller, cold connection or damaged sensor, set wrong sensor type at configuration. **Controller status:** Controller works without tank that has sensor error. **Troubleshooting:** Check sensor installation position, check damage / function of the sensor and cable, check connection contacts, check sensor type (PT1000 or NTC), if there is availible free input set it for this sensor and connect sensor.
E11	BOILER 1 SENSOR	**Possible cause:** interruption in el. wires between sensor and controller, contact on the controller, cold connection or damaged sensor, set wrong sensor type at configuration. **Controller status:** Conventional heating source pump doesn't work. **Troubleshooting:** Check sensor installation position, check damage / function of the sensor and cable, check connection contacts, check sensor type (PT1000 or NTC), if there is availible free input set it for this sensor and connect sensor.
E12	BOILER 2 SENSOR	**Possible cause:** interruption in el. wires between sensor and controller, contact on the controller, cold connection or damaged sensor, set wrong sensor type at configuration. **Controller status:** Conventional heating source pump doesn't work. **Troubleshooting:** Check sensor installation position, check damage / function of the sensor and cable, check connection contacts, check sensor type (PT1000 or NTC), if there is availible free input set it for this sensor and connect sensor.

E13	BACK FLOW SENSOR	**Possible cause:** interruption in el. wires between sensor and controller, contact on the controller, cold connection or damaged sensor, set wrong sensor type at configuration. **Controller status:** Controller works normally, for energy measuring uses tank lower sensor (less accurate calculation of received energy). **Troubleshooting:** Check sensor installation position, check damage / function of the sensor and cable, check connection contacts, check sensor type (PT1000 or NTC), if there is availible free input set it for this sensor and connect sensor.
E14	OUTDOOR SENSOR	**Possible cause:** interruption in el. wires between sensor and controller, contact on the controller, cold connection or damaged sensor, set wrong sensor type at configuration. **Controller status:** Controller works normally, outside temperature isn't displayed on screen. **Troubleshooting:** Check sensor installation position, check damage / function of the sensor and cable, check connection contacts, check sensor type (PT1000 or NTC), if there is availible free input set it for this sensor and connect sensor.
E15	NOT ACTIVE	
E100	COMMUNICATION ERROR WITH WIFI	**Possible cause:** Damaged UTP cable or connections on mainboard of controller or WIFI-box. **Controller status:** Controller works normally, there isn't connection to the web portal. **Troubleshooting:** Replace UTP cable, call authorized serviceman.

WARNING LIST

WARNING	NAME	DESCRIPTION
W1	FACTORY SETTINGS LOADED	**Possible cause:** Displayed when regulation automatically loads facotry settings because values in database are not correct. In normal circumstances this warning appears after first turning on after firmware change. **Controller status:** System configuration is set to factory setting, regulation doesn't work properly. **Note:** Find the cause of the factory reset, configure the regulation again, call authorized serviceman.
W2	DATE AND TIME ARE NOT SET	**Possible cause:** Clock is reset to 00:00 and date is reset to 01.01.2000. after controller switching off or power supply failure. **Controller status:** Controller works normaly but all functions that use schedule doesn't work properly. **Troubleshooting:** Replace the battery (CR1220) in the display, set date and time.
W3	REPLACE THE GLYCOL	**Possible cause:** Period of 2 years has passed from last glycol counter reset. **Controller status:** Controller works normally. **Note:** Reset glycol counter after replacing the glycol in solar system.
W4	LOW SYSTEM PRESSURE	**Possible cause:** Airvent valve on collectors isn't open, fluid is leaking on connections, solar system isn't filled enough. **Regulation status:** Controller works normally. **Note:** Refill the solar system with solar fluid and airvent the system.
W5	ALL TANKS ARE DISABLED	**Possible cause:** All tanks in the solar system are disabled. **Controller status:** Regulation works normaly. **Note:** Enable at least one tank for normal working of the solar system. If all tanks are disabled, collector pump doesn't work and boiling will start in the collectors.

INFORMATION LIST

INFO.	NAME	DESCRIPTION
I1-1	POWER SUPPLY FAILURE	**Description:** Power supply failure or switching off the controller on main switch (0/1). **Controller status:** Information is entered into History without displaying on the screen. Time of entry is time of power failure/time of swithing off main switch. **Troubleshooting:** Check if the main switch is on 1, if there is power supply to the controller, if fuse is not damaged, call athorized serviceman.
I1-2	POWER SUPPLY RETURN	**Description:** Power supply returns or swithing on the controller on main switch (0/1). **Controller status:** Information is entered into History without displaying on the screen. Time of entry is time of power return/time of swithing on main switch. **Troubleshooting:** -
I2	MAXIMUM COLLECTOR TEMPERATURE	**Description:** When temperature in collectors is above maximum set collector temperature, collector pump stops to protect armature and ability to circulate because of steam. All tanks are full with energy, air in the collectors, to low flow through collectors, to many collectors, to low pressure in the solar system. **Controller status:** Controller works normaly, collector pump doesn't work **Note:** If this information occures regulary, check for air in the solar system (collectors), pressure in the solar system, recommended flow through collectors, set temperatures in the tanks/maximum temperature of collectors. It's recommended to enable collector cooling function and/or tank cooling function.
I3	FREEZE PROTECTION	**Description:** Information of active antifreeze protection function - low outdoor temperature. **Controller status:** Controller works normaly. **Note:** Check freezing point of the solar fluid in the system to prevent possibility of solar system damage and offten solar tank cooling.
I4	TANK DISINFECTION	**Description:** Information of active legionella protection function (Tank disinfection). **Controller status:** Controller works normaly. **Note:** Check if the legionella protection function was done.

ELECTRIC CONNECTION

Solar radiation sensor ***(SC)*** (not active)

Power supply +5V ***(+5V)***

10x multifunction inputs for sensors ***(T1-T10)*** (PT1000 ili NTC5k sensors tanks, boilers, collectors outdoor sensor, flow sensor and pressure sensor)

Power supply 230V

8x semiconductor outputs (pumps, valves) ***(O1-O8)***

Relay outputs (⌐ ⌐)

2x alarm outputs (CAL1 common) ***(CAL)*** (not active)

2x output 0-10V (pumps) ***(0-10V)*** (not active)

2x PWM output (pumps) ***(PWM)*** (not active)

RESISTANCE LIST NTC **PT1000** SENSOR
(measuring field -30 - +400 °C)

Temperature (°C)	**Resis. (Ω)**	**Temperature (°C)**	**Resis. (Ω)**
-30	885	225	1.866
-25	904	230	1.886
-20	923	235	1.905
-15	942	240	1.924
-10	962	245	1.943
-5	981	250	1.963
0	1.000	255	1.982
5	1.019	260	2.001
10	1.039	265	2.020
15	1.058	270	2.040
20	1.077	275	2.059
25	1.096	280	2.078
30	1.116	285	2.097
35	1.135	290	2.117
40	1.154	295	2.136
45	1.173	300	2.155
50	1.193	305	2.174
55	1.212	310	2.194
60	1.231	315	2.213
65	1.250	320	2.232
70	1.270	325	2.251
75	1.289	330	2.271
80	1.308	335	2.290
85	1.327	340	2.309
90	1.347	345	2.328
95	1.366	350	2.348
100	1.385	355	2.367
105	1.404	360	2.386
110	1.424	365	2.405
115	1.443	370	2.425
120	1.462	375	2.444
125	1.481	380	2.463
130	1.501	385	2.482
135	1.520	390	2.502
140	1.539	395	2.521
145	1.558	400	2.540
150	1.578		
155	1.597		
160	1.616		
165	1.635		
170	1.655		
175	1.674		
180	1.693		
185	1.712		
190	1.732		
195	1.751		
200	1.770		
205	1.789		
210	1.809		
215	1.828		
220	1.847		

RESISTANCE LIST **NTC 5k/25°C** SENSOR
(measuring field from -20 - +130 °C)

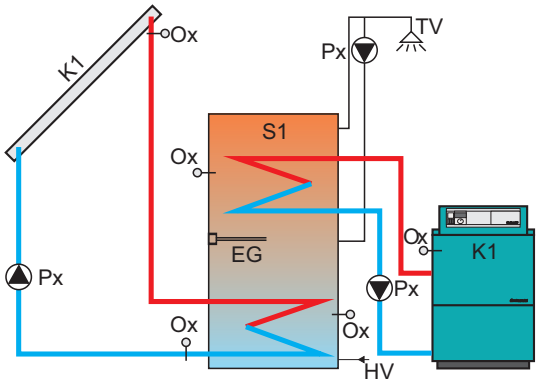
Temperature (°C)	**Resistance (Ω)**
-20	48.534
-15	36.465
-10	27.665
-5	21.158
0	16.325
5	12.694
10	9.950
15	7.854
20	6.245
25	5.000
30	4.028
34	3.266
40	2.663
45	2.184
50	1.801
55	1.493
60	1,244
65	1.041
70	876
75	740,7
80	629,0
85	536,2
90	458,8
95	394,3
100	340,0
105	294,3
110	255,6
115	222,7
120	190,7
125	170,8
130	150,5

EXAMPLES OF SELECTING THE SOLAR SYSTEM COMPONENTS

Examples of selecting the solar system components

1. example:
1 flat collector field + 1 DHW tank + recirculation + electric heater + 1 oil boiler + back flow sensor

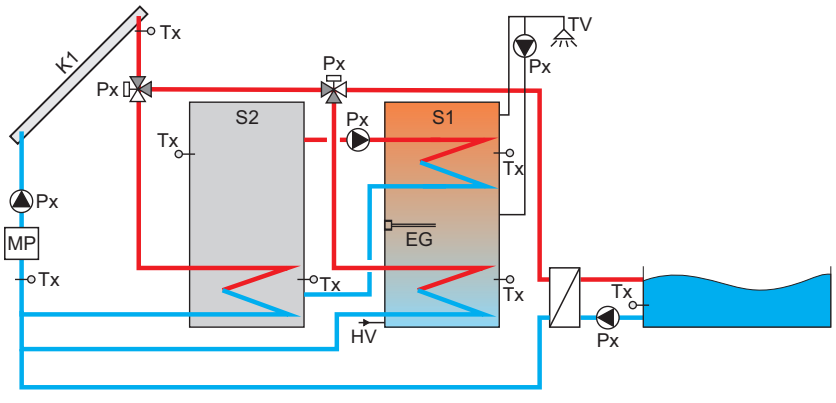
Examples of selecting the solar system components



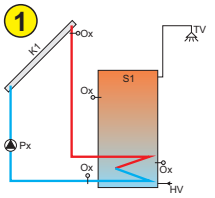
collectors	collector fields	X	one filed
			two fields
	field type		pipe
		X	flat
tanks	tank 1 type		not exist
		X	DHW
			BUF
			BUF with DHW
			pool
	tank 2 type	X	not exist
			DHW
			BUF
			BUF with DHW
			pool
	tank 3 type	X	not exist
			DHW
			BUF
			BUF with DHW
			pool
hydraulic conn.		X	pump
			zone 2-way
			zone 3-way
mixing/heating		X	not exist
			exist
heating	el. Heater installed		not exist
		X	exist
	boiler 1 type		not exist
			wood
			pellet/wood chips
		X	gas/oil
			heat pump
			electric boiler
recirculation			not exist
		X	exist
flowmeter		X	not exist
			exist
back flow sen.	sensor address		not exist
			T1...
		X	T10

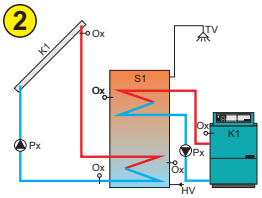
collectors	collector fields	X	one field
			two fields
	field type	X	pipe
			flat
tanks	tank 1 type		not exist
		X	DHW
			BUF
			BUF with DHW
			pool
	tank 2 type		not exist
			DHW
		X	BUF
			BUF with DHW
			pool
	tank 3 type		not exist
			DHW
			BUF
			BUF with DHW
		X	pool
hydraulic conn.			pump
			zone 2-way
		X	zone 3-way
mixing/heating			not exist
		X	exist
heating	el. Heater installed		not exist
		X	exist
	boiler 1 type	X	not exist
			wood
			pellet/wood chips
			gas/oil
			heat pump
			electric boiler
recirculation			not exist
		X	exist
flowmeter			not exist
		X	exist
back flow sen.	sensor address		not exist
			T1...
		X	T10

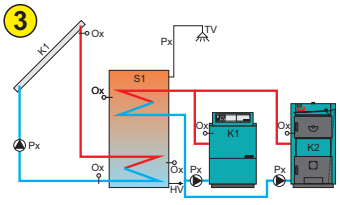
2. example:
1 pipe collector field + 1 DHW tank + recirulation + electric heater + 1 accumulation tank + heating BUF/DHW + pool + back flow sensor + flowmeter

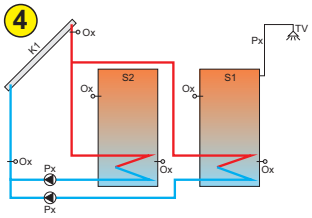


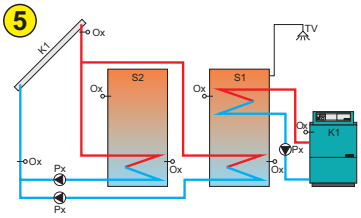
In next pages are some of possible connecting schemes which solar regulation supports. Every tank be **DHW tank** (shown in majority of schemes) or **accumulation tank** or **accumulation tank with build in DHW tank** or on first 3 places **pool**. On schemes options for electric heater, recirculation, heating pump, flowmeter... are **NOT displayed**. They can be enabled for every scheme according the description in technical manual.

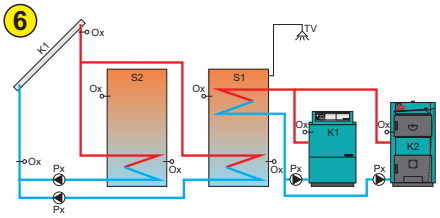


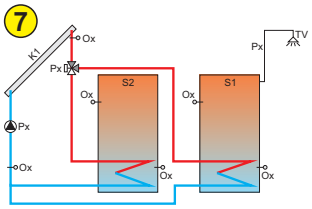


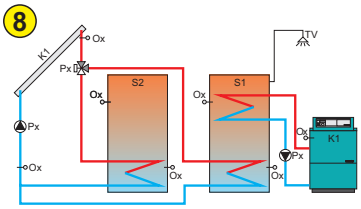


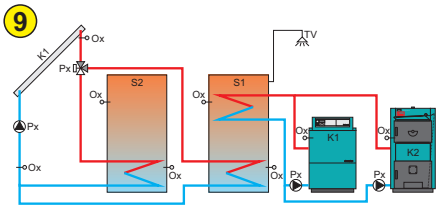


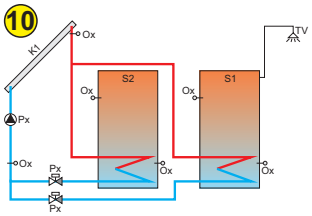


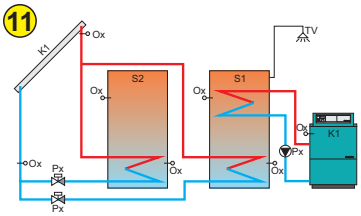


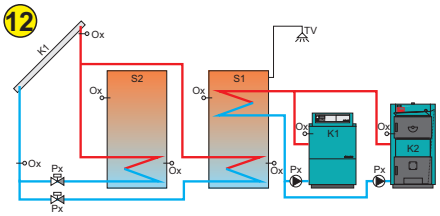


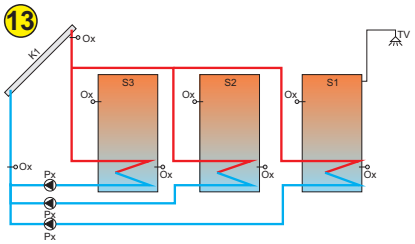


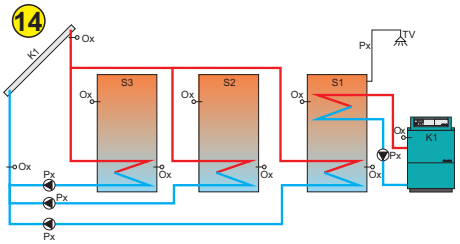


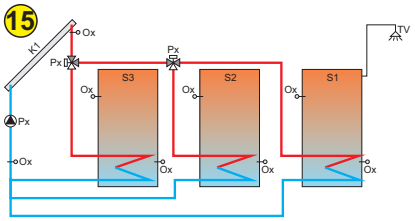


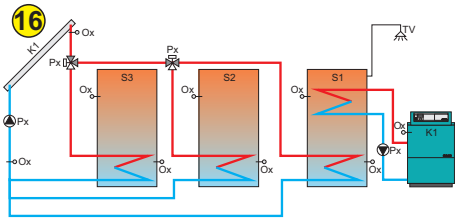


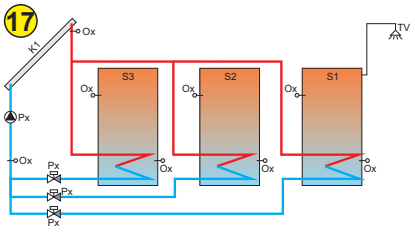


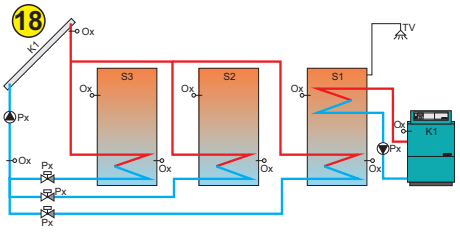








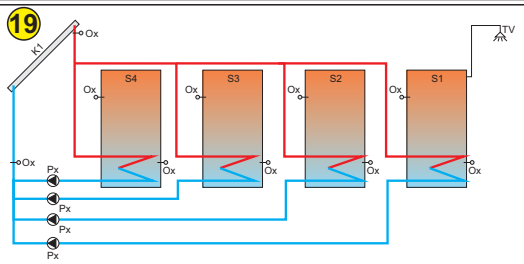


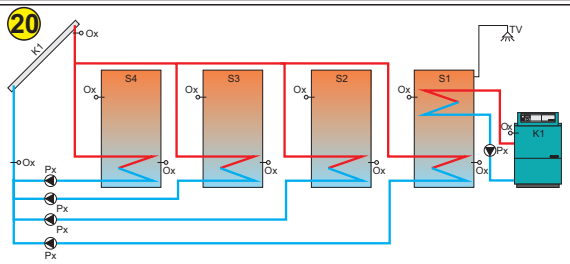


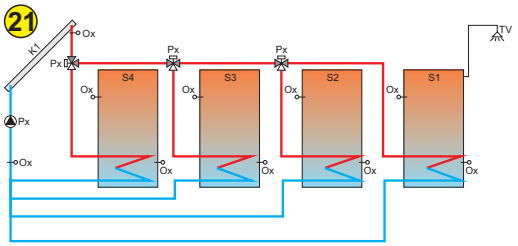
1. 1 collector+1 tank+pump
2. 1 collector+1 tank+pump+1 boiler
3. 1 collector+1 tank+pump+2 boilers

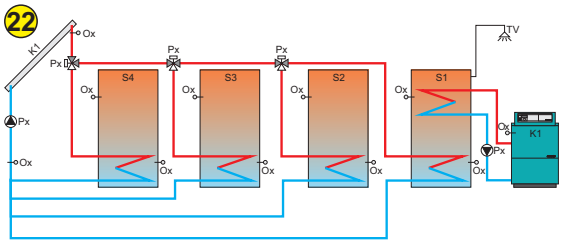
4. 1 collector+2 tanks+pumps
5. 1 collector+2 tanks+pumps+1 boiler
6. 1 collector+2 tanks+pumps+2 boilers
7. 1 collector+2 tanks+3-way valve
8. 1 collector+2 tanks+3-way valves+1 boiler
9. 1 collector+2 tanks+3-way valves+2 boiler
10. 1 collector+2 tanks+2-way valves
11. 1 collector+2 tanks+2-way valves+1 boiler
12. 1 collector+2 tanks+2-way valves+2 boilers

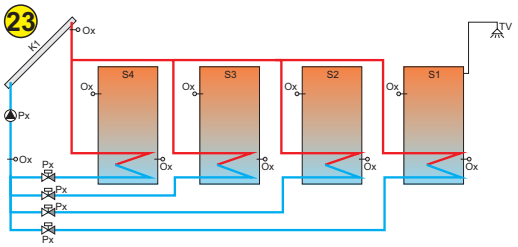
13. 1 collector+3 tanks+pumps
14. 1 collector+3 tanks+pumps+1 boiler
15. 1 collector+3 tanks+3-way valve
16. 1 collector+3 tanks+3-way valves+1 boiler
17. 1 collector+3 tanks+2-way valves
18. 1 collector+3 tanks+2-way valves+1 boiler

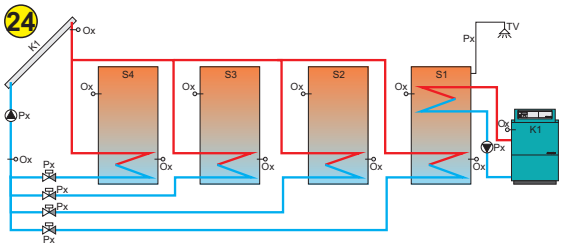


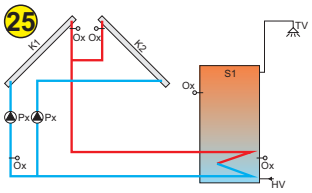


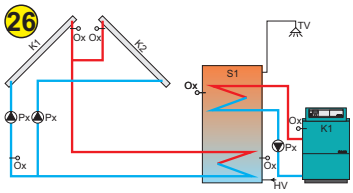


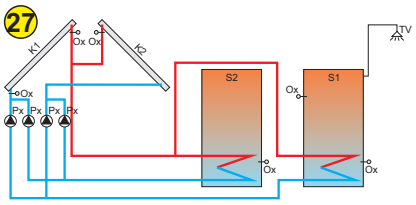


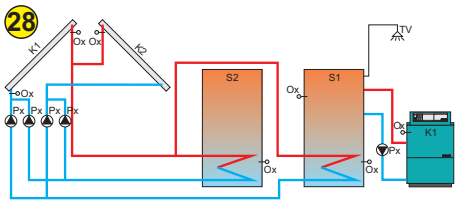


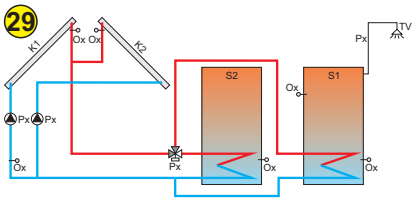


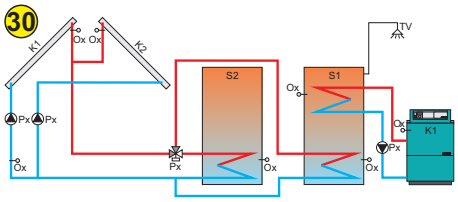




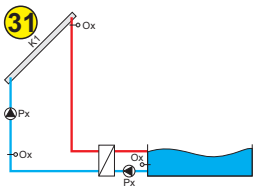


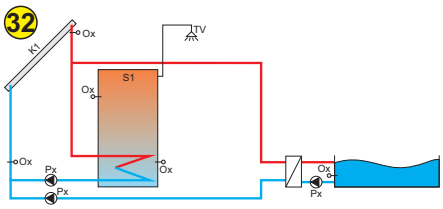


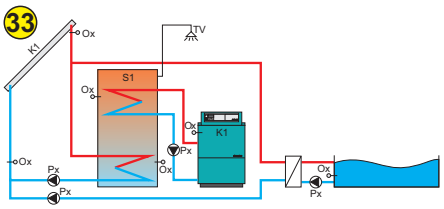


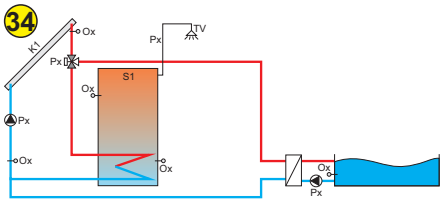


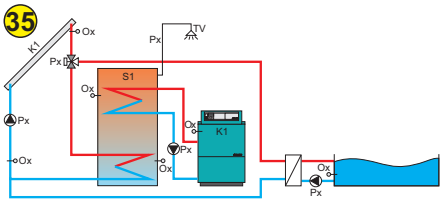
19. 1 collector+4 tanks+pumps
20. 1 collector+4 tanks+pumps+1 boiler
21. 1 collector+4 tanks+3-way valves
22. 1 collector+4 tanks+3-way valves+1 boiler
23. 1 collector+4 tanks+2-way valves
24. 1 collector+4 tanks+2-way valves+1 boiler
25. 2 collectors+1 tank+pumps
26. 2 collectors+1 tank+pumps+1 boiler
27. 2 collectors+2 tanks+pumps
28. 2 collectors+2 tanks+pumps+1 boiler
29. 2 collectors+2 tanks+3-way valve
30. 2 collectors+2 tanks+3way valve+1 boiler

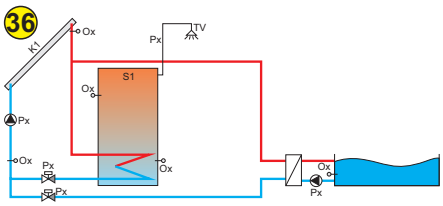


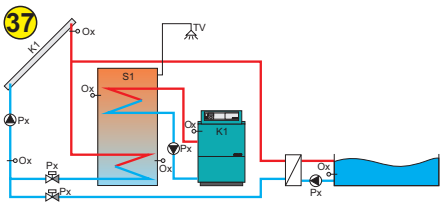


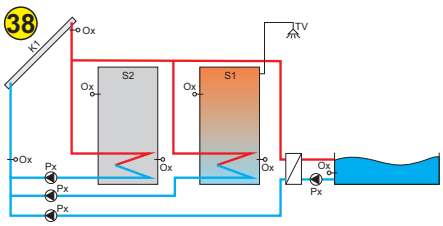


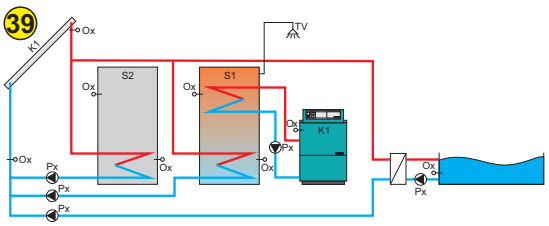


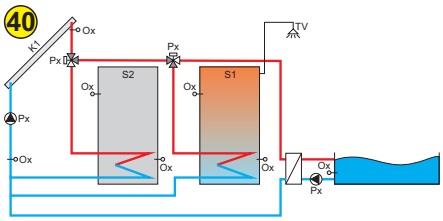


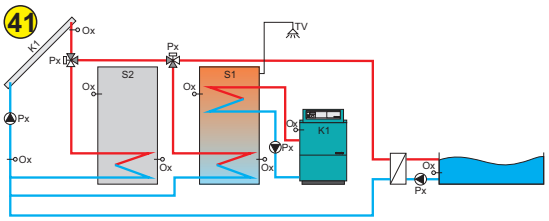


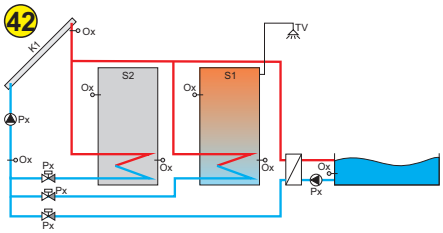


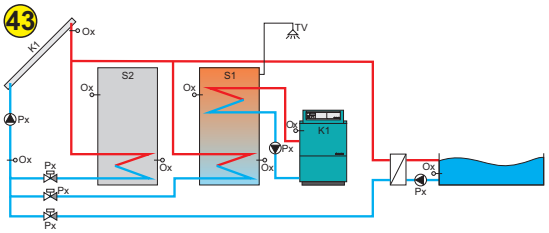




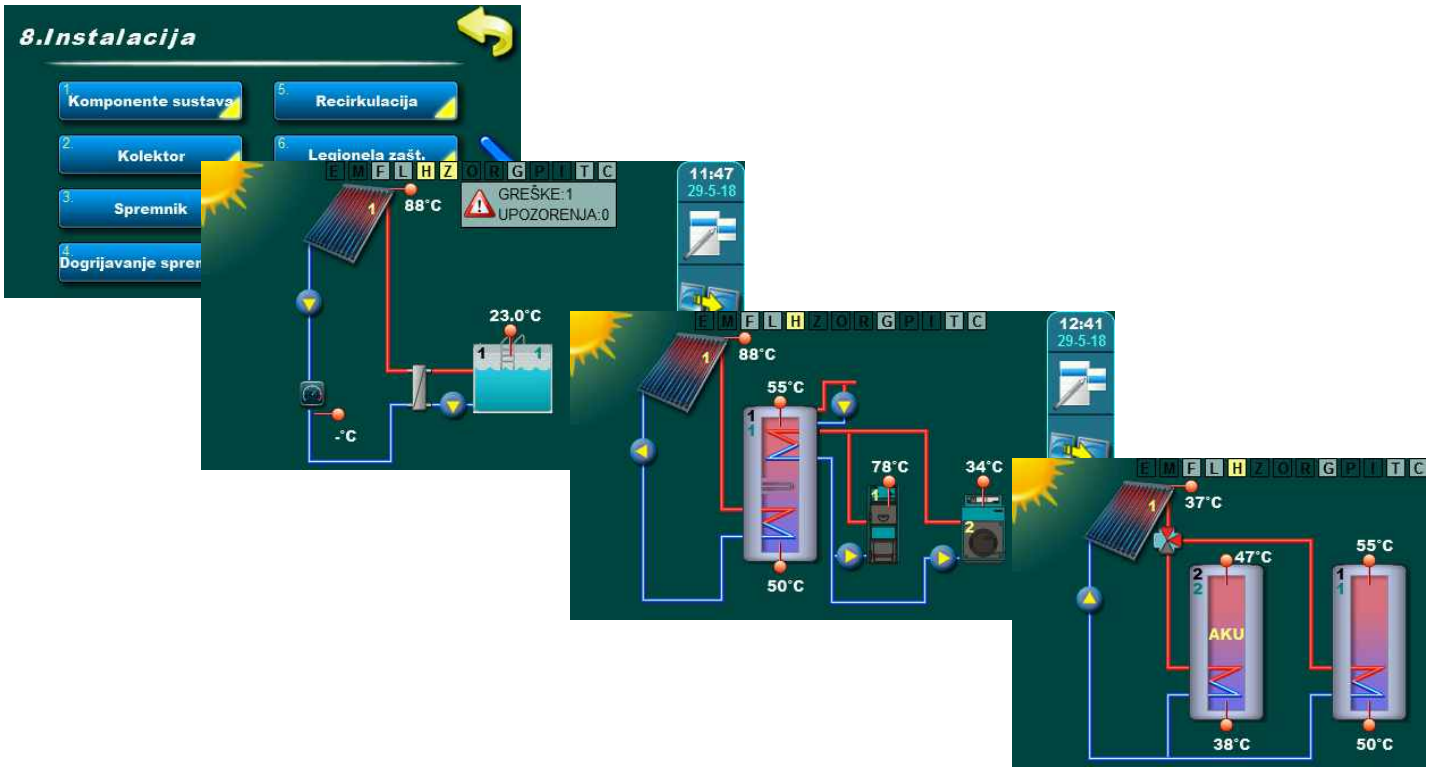








31. 1 collector+pool
32. 1 collector+1 tank+pool+pumps
33. 1 collector+1 tank+pool+pumps+1 boiler
34. 1 collector+1 tank+pool+3-way valve
35. 1 collector+1 tank+pool+3-way valve+1 boiler
36. 1 collector+1 tank+pool+2-way valve
37. 1 collector+1 tank+pool+2-way valve+1 boiler
38. 1 collector+2 tanks+pool+pumps
39. 1 collector+2 tanks+pool+pumps+1 boiler
40. 1 collector+2 tanks+pool+3-way valve
41. 1 collector+2 tanks+pool+1 boiler+3-way valve
42. 1 collector+2 tanks+pool+2-way valve
43. 1 collector+2 tanks+pool+1 boiler+2-way valve



SOLAR REGULATION COMMISSIONING LIST

Cm-SOL regulation commissioning list

Basic information

1. Regulation serial number: ☐☐☐☐☐.
2. User name and surname:_____
3. Address / Phone:_____

4. Commissioned by:_____
5. Commissioning date: ☐☐.☐☐.☐☐☐☐.

Installation

6. According to the technical instructions drill 3 holes on the regulation installation place, insert fasteners, screw upper screw (to 4 mm). Remove lower regulation cover, hang regulation on to upper screw and with 2 lower screws fasten the regulation. ……..☐YES
7. Connect sensors, flowmeter, pressure sensor to the connecting clamps (inputs T1 -T10..☐YES
8. Connect pumps, valves to the connecting clamps (outputs O1-O8)……..☐YES
9. Connect power supply to the connecting clamps (F, N)……..☐YES
10. Install wire holder and close regulation lower cover……..☐YES
11. Connect additional equipment to the UTC connector on the left regulation side .☐YES ☐NO

Regulation setting

12. Turn on the regulation on the main switch and select language. ……..☐YES

IMPORTANT!!!

Menus are active (dynamic) and are changed according to set configuration (menu numbers don't have to match Your current installation)!

Configuration of the solar system components

13. Configuration is done in the menu 8. Installation
*->8.Installation->0000->**Enter file name**->…*

		enter X or value
8.1.1. Collectors	8.1.1.1. Collector fields	☐ one field
		☐ two fields
	8.1.1.2. Field type	☐ pipe
		☐ flat

8.1.2. Tanks	8.1.2.1. Tank 1 type		not exist
			DHW
			BUF
			BUF with DHW
			pool
	8.1.2.2. Tank 2 type		not exist
			DHW
			BUF
			BUF with DHW
			pool
	8.1.2.3. Tank 3 type		not exist
			DHW
			BUF
			BUF with DHW
			pool
	8.1.2.4. Tank 4 type		not exist
			DHW
			BUF
			BUF with DHW
			pool
	8.1.2.5. Hydraulic connection		pump
			zone 2-way
			zone 3-way
	8.1.2.6. Mixing/Heating		not exist
			exist
8.1.3. Heating	8.1.3.1. El. heater installed		not exist
			exist
	8.1.3.2. Boiler 1 type		not exist
			wood
			pellet/wood chips
			gas/oil
			heat pump
			electric boiler
	8.1.3.3. Boiler 2 type		not exist
			wood
			pellet/wood chips
			gas/oil
			heat pump
			electric boiler
8.1.4. Recirculation			not exist
			wood
8.1.5. Flowmeter			not exist
			wood

8.1.6. Back flow sensor	8.1.6.1. Sensor address		not exist
			= T
	8.1.6.2. Sensor type		PT1000
			NTC
8.1.7.Outdoor sensor	8.1.7.1. Sensor address		not exist
			= T
	8.1.7.2. Sensor type		PT1000
			NTC
8.1.8. Pumps/Outputs	8.1.8.1. Outputs function	enter output number	
			= pump collector 1
			= pump collector 2
			= pump tank 1
			= pump tank 2
			= pump tank 3
			= pump tank 4
			= pump boiler 1
			= pump boiler 2
			= electric heater
			= pump recirculation
			= pump pool
			= pump exchanger
			= pump mixing/heating
			= zone 3-way 1
			= zone 3-way 2
			= zone 3-way 3
			= zone 3-way 4
			= zone 2-way 1
			= zone 2-way 2
			= zone 2-way 3
			= zone 2-way 4
8.1.9. Pressure control			not exist
			exist
8.2. Collectors	8.2.1.4. Collector 1 sensor address		not exist
			= T
	8.2.2.4. Collector 2 sensor address		not exist
			= T
8.3. Spremnik	8.3.2.4.1.Tank 1 upper sensor address		not exist
			= T
	8.3.2.5.1.Tank 1 lower sensor address		not exist
			= T
	8.3.3.4.1.Tank 2 upper sensor address		not exist
			= T
	8.3.3.5.1.Tank 2 lower sensor address		not exist
			= T

	8.3.4.4.1.Tank 3 upper sensor address	☐	not exist
		☐	= T
	8.3.4.5.1.Tank 3 lower sensor address	☐	not exist
		☐	= T
	8.3.5.4.1.Tank 4 upper sensor address	☐	not exist
		☐	= T
	8.3.5.5.1.Tank 4 lower sensor address	☐	not exist
		☐	= T
8.4. Tank heating.	8.4.2.8. Boiler 1 sensor address	☐	not exist
		☐	= T
	8.4.3.8. Boiler 2 sensor address	☐	not exist
		☐	= T
8.7. Energy measuring	8.7.1. Flowmeter	☐	not exist
		☐	disabled
		☐	enabled
		☐	ml/impuls
		☐	l/impuls
		☐	= volume/impuls
		☐	= T (flowmeter address)
	8.7.2. Collector 1 flow	☐	lit/min.
	8.7.3. Collector 2 flow	☐	lit/min.
	8.7.4. Glycol type	☐	propylene glycol
		☐	ethylene glycol
	8.7.5. Mixing %	☐	%

14. With Manual test function test all connected components. ..... ☐ YES
    ->8.8. Manual test
15. Write down software version from regulation : Software version: ☐.
    ->8.10.2.Software version
16. Enter correct date and time..... ☐ YES
    ->5.4..Date and time
17. Disable language selection at start..... ☐ YES
    ->5.2.Language selection->OFF
18. Reset glycol counter (after filling the solar system with new glycol) ..... ☐ YES
    ->8.12.2. Reset glycol counter

Next points enable and configure according the set system and customer demands

19. Enable and set Puls start collector……. ☐ YES ☐ NO
    ->8.2.1.3. Puls collector start
20. Enable and set Collector cooling……. ☐ YES ☐ NO
    ->8.2.2. Collector cooling
21. Enable and set Antifreeze protection of the collector… ……. ☐ YES ☐ NO
    ->8.2.3. Antifreeze protection
22. If there are more tanks, enable and set Priority test……. ☐ YES ☐ NO
    ->8.3.6. Priority test
23. Enable and set Tank cooling……. ☐ YES ☐ NO
    ->8.3.7. Tank cooling
24. Enable and set DHW heating……. ☐ YES ☐ NO
    ->8.4. DHW heating
25. Enable and set Recirculation……. ☐ YES ☐ NO
    ->8.5. Recirculation
26. Enable and set Legionella protection……. ☐ YES ☐ NO
    ->8.6. Legionella protection
27. If Cm WiFi-box (additional equipment) is installed, enter local WiFi network name and password to which it will be connected……. ☐ YES ☐ NO
    ->8.11. Internet supervision
28. Save made changes in 'Service parameters'
    ->8.Installation->PIN->0000->8.9.Save/Load->8.9.2.Save ……. ☐ YES
29. According to customer's demands set the: temperatures, differences, schedules ☐ YES ☐ NO
30. Save made changes to user file:
    ->6.Save/Load->6.1.Save ……. ☐ YES
31. Inform the user with regulation technical instructions……. ☐ YES
32. Notes regarding the commissioning:

    _____

    _____

    _____

    _____

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Centrometal
HEATING TECHNIQUE