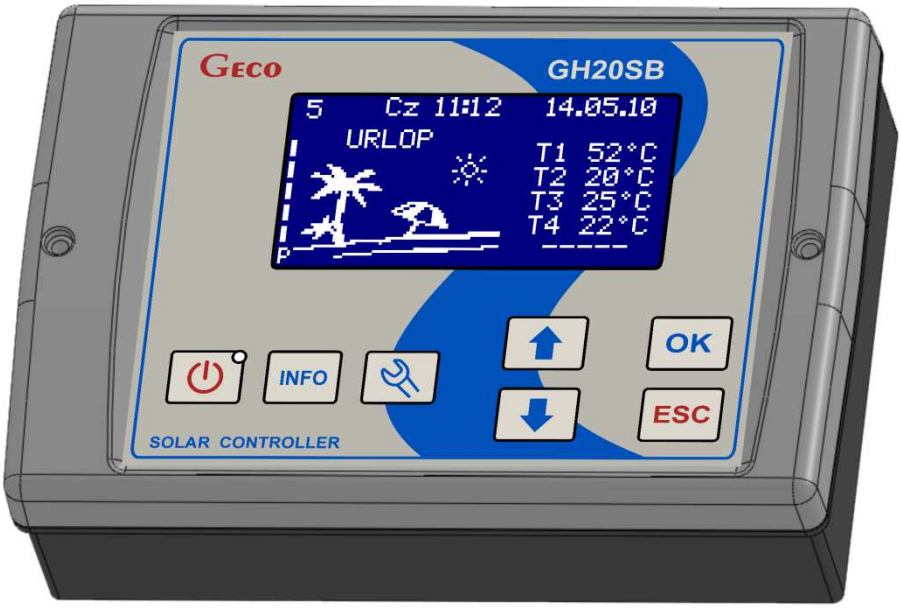
P.P.U.H. „Geco” spółka z o. o.
32-060 Liszki, Cholerzyn 376
tel. 012 6369811, 6361290
fax. 012 6362002



USER MANUAL
FOR SOLAR COLLECTOR
SYSTEM CONTROLLER

GH20SB

Software release 02A

CONTENTS

1. Controller Description

The GH20SB Controller is a device designed and manufactured to support systems with solar collectors. The product was base on a reliable state-of-the-art microprocessor technology. The Controller is modern in its design and very easy to use as it is equipped with a user panel with a transparent keyboard and an LCD graphic display.

Its advantage is an extensive package of basic options greatly enhancing its functionality. These are:

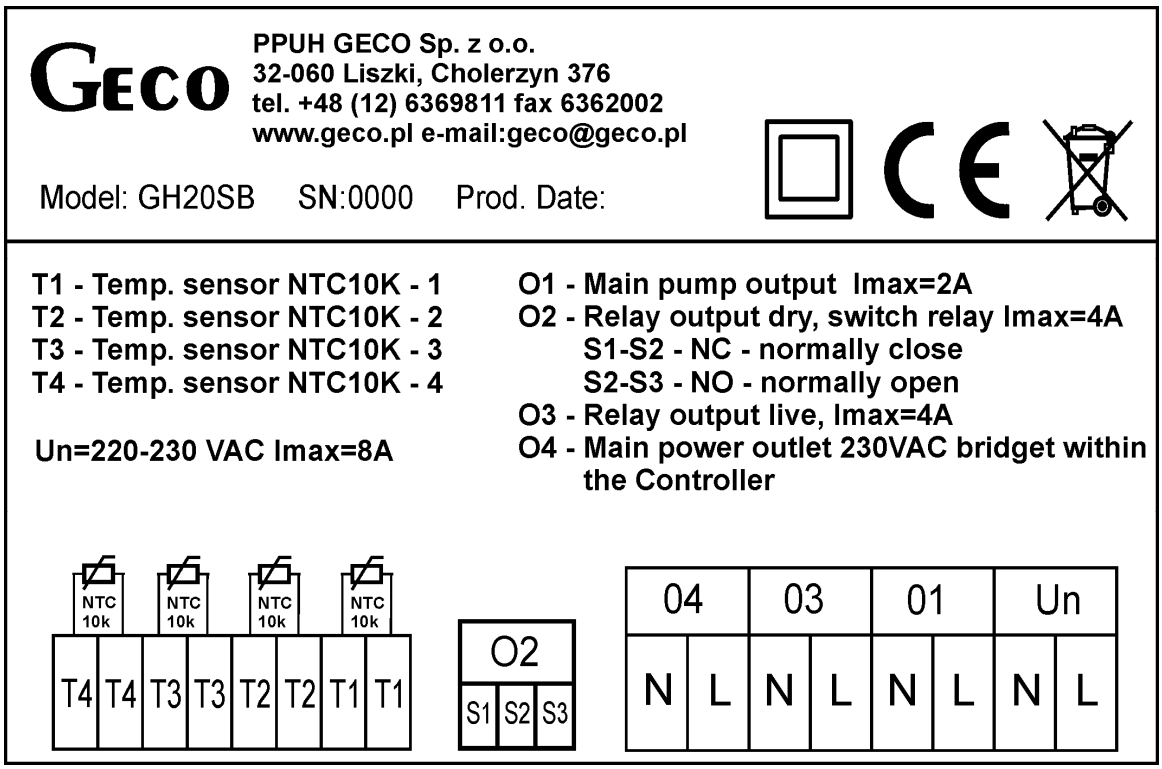
- A selection of 17 various system configurations,
- System scheme display,
- Device operation animation in the system scheme,
- Collector pump rotation speed adjustment,
- External device manual control option,
- Calculation of collector instantaneous power,
- Inbuilt real-time clock,
- Controller status memory after disconnecting power supply,
- Extensive average collector power statistics menu,
- Extensive energy counters menu,
- Holiday function,
- Anti-legionella function,
- Collector overheating prevention function,
- Anti-freeze function,
- Collector type selection function (flat plate / tube).

Additionally the Controller has been equipped with a number of features facilitating its use:

- Transparent menu,
- Graphic presentation of time intervals,
- Selection of many language versions,
- Easy and quick control settings configuration.

2. Connecting External Devices

The GH20SB Controller is equipped with 4 inputs enabling connection of NTC10K temperature sensors and three outputs enabling connection of external devices, pumps or three-way valves, depending on the system scheme chosen. A drawing contains a graphic presentation of the input and output marking. The description of the Controller inputs and outputs is provided in the table.



Marking of Controller inputs and outputs

Input/Output	Description
Un	Mains connection (230VAC~/ 50Hz)
O1	Main pump output Maximum current rating: 3.15A
O2	Relay output – dry, switch relay Maximum current rating: 8A - S1-S2 – NC (normally closed), - S2-S3 – NO (normally open).
O3	Relay output – live, 230VAC~ Maximum current rating: 8A
O4	Mains power outlet 230VAC~ bridged within the Controller. This output may be bridged outside with the switch relay output, thus providing switching power supply for controlling e.g. a three-way valve.
T1,T2,T3,T4	Temperature sensor inputs – NTC10k

Description of Controller inputs and outputs

When connecting devices to the Controller outputs it must be remembered that outputs marked as O1 and O3 are live outputs to which an external device may be connected directly. The O2 output is dry and to be placed in series between the power source and the external device.

3. Controller Usage

The GH20SB controller can't be connection with electronic flow meter. Before you start using controller make sure that "Measurmem" parameter is adjust to "Rotameter". (pkt. 3.3.4.5.)

3.1. Enabling the Controller

After connecting the Controller to the power supply, controller for about 5 second make touch-pad keyboard calibration, and inform user about this fact by inscription on the display: "**Keyboard calibration, Do not touch sensors**"

After connecting the Controller to power supply the Collector will be activated in the standby mode (if before deactivation it was in the standby mode) or in the operation mode (if before deactivation it was in the operation mode).

If touch sensors display doesn't work correct please make calibration process again. Before you start next calibration Please turn of the controller from the power supply for a moment.

3.2. Standby Mode.

In this mode the LCD display is slightly backlit and the Controller name and the current software release are shown on the screen.

In the standby mode all outputs remain disabled and the alarm sounds are inactive.

Press ⏻ to cause the Controller to exit the standby mode and switch to the operation mode.

3.3. Operation.

3.3.1. Main Screen.

In the upper line of the LCD display, on the left, the number of the currently supported system scheme is shown. In the middle and on the right the time and date are shown. Below the time and date line, on the left, the system scheme and the collector pump control level are displayed. The digits in the scheme represent the numbering of the temperature sensors. You need to ensure that the sensors are properly installed, as described in the scheme. Sensor substitution may result in control system malfunction.

On the right of the system scheme the temperatures measured by sensors are shown. T1 corresponds to the temperature measured by sensor 1, T2 corresponds to the temperature measured

by sensor 2 etc. The Controller is designed to ensure that it is not necessary to install all four temperature sensors. You need to install only those sensors which are necessary for control. If a sensor necessary for control is not installed or damaged, next to the sensor symbol on the screen the word ”Err” will appear, indicating that there is no sensor or it is damaged. In this case all external devices will be deactivated and the Controller will raise alarm indicated by an intermittent audio signal. If a sensor not required for control is not connected to the controller or is damaged, the Controller will not raise alarm, and on the screen the temperature will be replaced with the symbol “-----”.

Below the displayed temperatures, in the lower right-hand corner of the screen, the collectors’ instantaneous power is displayed as calculated by the Controller. When the collector pump is deactivated or the sensor on the collector return (as a rule it is sensor T3) is disconnected, the power indication is replaced with the symbol “-----”. For systems numbered 6, 10, 12, 14, 15 and 16 the power calculation option is not available.

Depending on the control status, additional symbols may appear on the screen, such as:

- “L” – active anti-legionella function.
- Holiday symbol – active holiday function.
- Cooling symbol – active cooling function.

Press  to cause the Controller to switch to the standby mode.

Press  to cause the Controller to switch to the main menu screen.

3.3.2. Main Menu Screen

On the main menu screen you can choose the following Controller functions:

- Scheme selection,
- Settings configuration,
- Controller settings configuration,
- Manual control,
- Cooling settings configuration,
- Energy counters view,
- Holiday function.

Press  and  to switch between options.

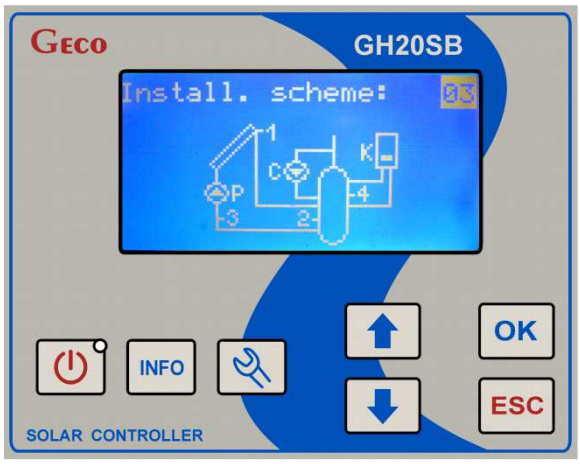
To confirm the selection of an option press  .

Press  to return to the main screen.

Press  to cause the Controller to switch to the standby mode.

3.3.3. System Scheme Selection

The Controller allows controlling 17 different configurations of solar collector systems. To choose the desired configuration of the collector system, choose “Scheme Selection” on the main menu screen.



When you go to the system scheme selection screen, on the display screen a figure appears representing the system scheme and accompanied by its number.

Press ↓ and ↑ to change the system scheme.

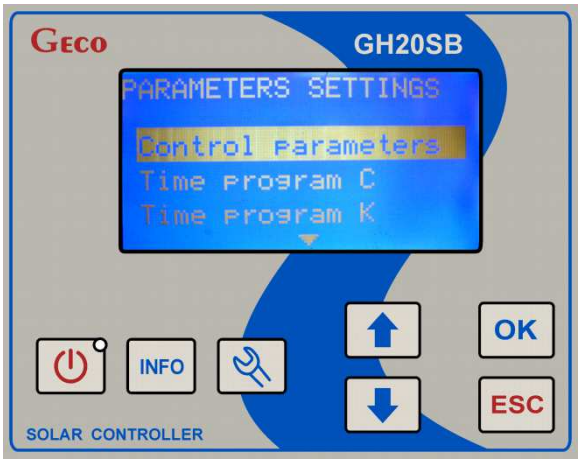
Press OK to save changes and return to the main menu screen.

Press ESC to cancel changes and return to the main menu screen.

Press ⏻ to cancel changes and cause the Controller to switch to the standby mode.

3.3.4. Settings Configuration Menu Screen

To go to the settings configuration menu choose “Parameters settings” on the main menu screen.



In the settings configuration menu you can:

- Choose control settings edition option,
- Choose circulation pump C time programme editing option,
- Choose boiler/heater K time programme editing option,
- Choose heating medium freezing point editing option,
- Choose rated and minimum flow editing option,
- Choose maximum and minimum collector pump rotation speed editing option,
- Enter factory values of control settings.

Depending on the currently selected system scheme some of the above options may be hidden (they will not appear in the menu).

Press ↓ and ↑ to switch between options.

To confirm the selection of an option press OK.

Press ESC to return to the main menu screen.

Press ⏻ to cause the Controller to switch to the standby mode.

3.3.4.1. Control Settings Editing

To edit control settings choose “Control parameters” on the main menu screen and then “Parameters settings” on the settings configuration menu screen.

On this screen you can change the configuration of the following settings:

- Solar collector type (Flat /Tube) ,
- T1, T2 temperatures difference for deactivating collector pump (2…15ºC),
- Temperatures difference for activating additional pump, valve (2…15ºC),
- Max. temp. T2 OFF collectors pump (10…85ºC)
- Min. temp. T3 ON boiler pump (10…85ºC
- Min. temp. T4 ON circulation pump (10…85ºC)
- Max. temp. T4 OFF source of heat (10…85ºC)
- Max. temp. of water heated in boiler C (10…85ºC)),
- Regulation of collectors pump (No / Yes)),
- Circulation pump mode (Discon / Continuous)),
- Coll. Power OFF boiler heater, heat source (100…3000W)),
- Overheat protection of collectors ON (No / Yes)),
- MaxTemp. T2 overheat protection OFF (60…85ºC)),
- Freezing protection of collectors ON (No / Yes)),
- Selection of heating priority (A / B)),
- Protection against Legionella (No / Yes)),
- Disabling boiler K operation by activating boiler C (No / Yes).

Depending on the currently selected system scheme some of the above settings may be hidden.

Press ↓ and ↑ to switch between settings.

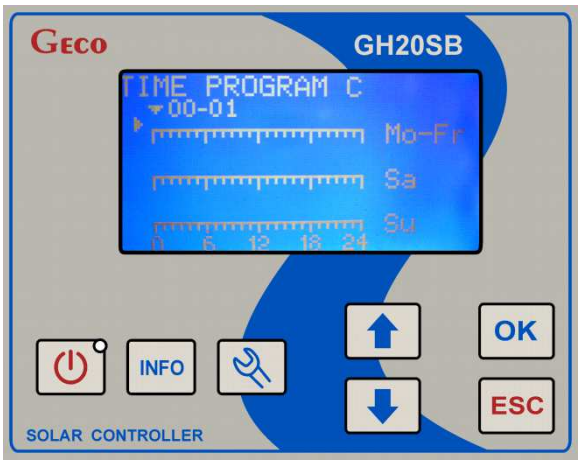
Press OK to edit the current setting. During edition the setting value flashes. Press ↓ and ↑ to define a new value. Press OK to save the new value and exit the setting edition option. Press ESC to cancel the change and exit the setting edition option.

Press ESC (when setting edition is not active) to return to the settings configuration menu screen.

Press ⏻ to cause the Controller to switch to the standby mode.

3.3.4.2. Editing Circulation Pump C Time Programme

To edit the circulation pump C time programme choose “Parameters settings” on the main menu screen and then “Time program C” on the settings configuration menu screen.



The external devices operating hours setting mode allows setting time separately for week days (Monday-Friday) and for Saturday and Sunday. The horizontal arrow shown above the scale at the top of the screen indicates the hour range active for edition.

The edition of the time programme begins with defining the device operation on weekdays (Monday-Friday). To change the hour displayed use ↓ and ↑. After setting the last hour in this range the Controller will switch to editing the time programme for Saturday, and after setting the last hour for Sunday it will switch to editing the time programme for Sunday.

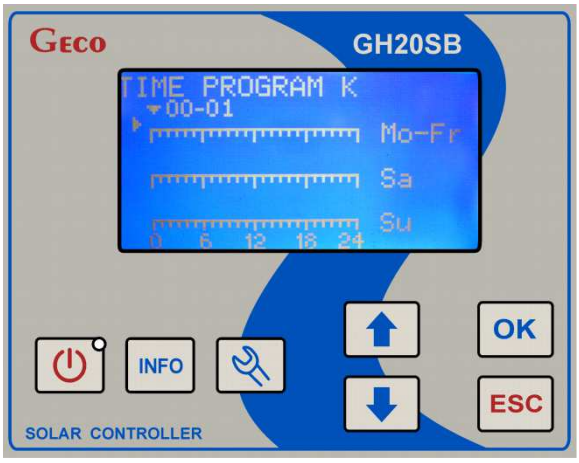
To activate or deactivate an external device at a selected hour, press OK. If the device is set to operate during the selected hour, it will be indicated by a white field on the hour scale. To deactivate the device for the selected hour, use the OK key to put out the white field above the hour scale.

Press ESC to save new settings and return to the settings configuration menu screen.

Press ESC to cancel changes and cause the Controller to switch to the standby mode.

3.3.4.3. Editing Boiler/Heater K Time Programme

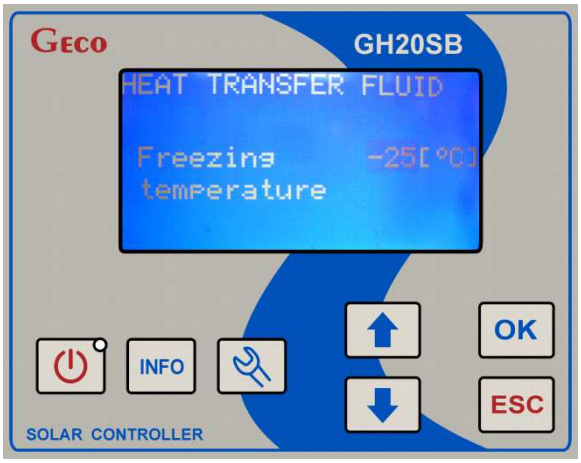
To edit the boiler / heater K time programme choose “Parameters settings” on the main menu screen and then “Time program K” on the settings configuration menu screen.



To set the time zones for the device marked with “K” on the scheme follow the same procedure as when selecting working hours for circulation pump C.

3.3.4.4. Editing Heating Medium Freezing Point

To edit heating medium freezing point choose “Parameters settings” on the main menu screen and then “Heat transfer fluid” on the settings configuration menu screen.



When you go to this screen the setting value flashes. Press  and  to define a new heating medium freezing point temperature in the range from -35 to 0ºC.

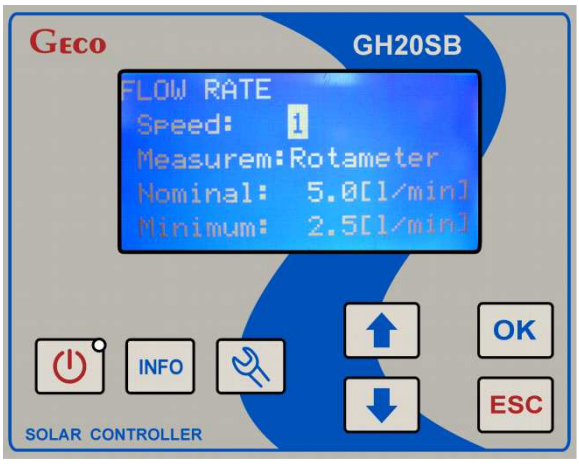
Press  to save the new value and return to the settings configuration menu.

Press  to cancel changes and return to the settings configuration menu.

Press  to cancel changes and cause the Controller to switch to the standby mode.

3.3.4.5. Editing Rated and Minimum Flow

To edit rated and minimum flow choose “Parameters settings” on the main menu screen and then “Flow rate” on the settings configuration menu screen.



On this screen you can edit:

- Speed (1...3)
- Measurem: (Rotameter/Electr.916)
- The nominal flow (0.5…30.0l/min),
- the minimum flow (0…rated flow–0.5l/min).

The GH20SB controller can't be connection with electronic flow meter. Before you start using controller make sure that "Measurmem" parameter is adjust to "Rotameter". (pkt. 3.3.4.5.)

If the "Regulation of collectors pump" is set to "No" the minimum flow will be hidden (it cannot be edited).
If the "Regulation of collectors pump" is set to "Yes" the minimum flow will be hidden (it can be edited).

Press ↓ and ↑ to switch between these settings and press OK to edit the highlighted setting.

During active edition the setting value flashes. Use ↓ and ↑ to set a new value. Press OK to save the new value and exit the setting edition option. Press ESC to cancel the change and exit the setting edition option.

Press ESC (when setting edition is not active) to return to the settings configuration menu screen.

Press ⏻ to cause the Controller to switch to the standby mode.

3.3.4.6. Factory Control Settings

To restore factory control settings choose "Ustaw. parametrów" (Settings Config.) on the main menu screen and then "Nastawy fabryczne" (Factory Settings) on the settings configuration menu screen.

When you choose this option the Controller will ask for confirmation of factory settings restoration. Press OK to restore factory control settings and return to the settings configuration menu screen. Press ESC to return to the settings configuration menu, the control settings will remain unchanged.

The values of the factory control settings depend on the currently set system scheme

Setting	System scheme number																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Typ kolektora słonecznego (Solar collector type)	Płaski (Flat plate)	Płaski (Flat plate)	Płaski (Flat plate)	Płaski (Flat plate)	Płaski (Flat plate)	Płaski (Flat plate)	Płaski (Flat plate)	Płaski (Flat plate)	Płaski (Flat plate)	Płaski (Flat plate)	Płaski (Flat plate)	Płaski (Flat plate)	Płaski (Flat plate)	Płaski (Flat plate)	Płaski (Flat plate)	Płaski (Flat plate)	Płaski (Flat plate)
Różnica temp. T1,T2 włącz. Pompy kolektorów (T1, T2 temperatures differences for activating collector pump)	6ºC	6ºC	6ºC	6ºC	6ºC	6ºC	6ºC	6ºC	6ºC	6ºC	6ºC	6ºC	6ºC	6ºC	6ºC	6ºC	6ºC
Różnica temp. włączenia dod. pompy, zaworu (Temperatures differences for activating additional pump, valve)	-	-	-	-	-	5ºC	5ºC	5ºC	5ºC	5ºC	5ºC	5ºC	5ºC	5ºC	-	-	-
Max. temp. T2 wyłączenia pompy kolektorów (Max. T2 temperature for deactivating collector pump)	65ºC	65ºC	65ºC	65ºC	65ºC	65ºC	65ºC	65ºC	65ºC	65ºC	65ºC	65ºC	65ºC	65ºC	65ºC	65ºC	65ºC
Min. temp. T3 uruchomienia pompy kotła (Min. T3 temperature for activating boiler pump)	-	-	-	-	-	41ºC	-	-	-	-	-	-	-	41ºC	-	-	-
Min. temp. T4 włączenia pompy cyrkulacyjnej (Min. T4 temperature for activating circulation pump)	-	35ºC	35ºC	35ºC	35ºC	35ºC	35ºC	-	-	-	35ºC	35ºC	-	-	35ºC	-	35ºC
Max. temp. T4 wyłączenia źródła ciepła (Max. T4 temperature for deactivating heat source)	-	-	50ºC	50ºC	50ºC	50ºC	50ºC	-	30ºC	30ºC	65ºC	65ºC	-	50ºC	-	65ºC	80ºC
Max. temp. wody grzana z kotła C (Max. temperature of water heated in boiler C)	-	-	-	-	-	-	-	-	-	-	-	-	-	65ºC	-	-	-
Regulacja obrotów pompy kolektorów (Collector pump rotation speed adjustment)	Tak (Yes)	Tak (Yes)	Tak (Yes)	Tak (Yes)	Tak (Yes)	-	Tak (Yes)	Tak (Yes)	Tak (Yes)	-	Tak (Yes)	-	Tak (Yes)	-	-	-	Tak (Yes)

Tryb pracy pompy cyrkulacyjnej (Circulation pump operation mode)	-	Przer. (Interm.)	Przer. (Interm.)	Przer. (Interm.)	Przer. (Interm.)	Przer. (Interm.)	Przer. (Interm.)	Przer. (Interm.)	-	-	Przer. (Interm.)	Przer. (Interm.)	-	Przer. (Interm.)	Przer. (Interm.)	-	Przer. (Interm.)
Moc kolekt. wyłącz. kotła, grzałki, pompy ciepła (Collector power for deactivated boiler, heater, heat pump)	-	-	1500W	1500W	1500W	-	-	-	-	-	-	-	-	-	-	-	-
Ochrona przed przegrzaniem kolektorów (Collector overheating prevention)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)
Max. temp. T2 wył. ochrony przegrz. kolektorów (Max. T2 temperature for deactivating collector overheating prevention)	80ºC	80ºC	80ºC	80ºC	80ºC	80ºC	80ºC	80ºC	80ºC	80ºC	80ºC	80ºC	80ºC	80ºC	80ºC	80ºC	80ºC
Ochrona przed zamrożeniem kolektorów (Collector freezing prevention)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)	Nie (No)
Wybór priorytetu grzania (Heating priority selection)	-	-	-	-	-	-	-	-	B	B	B	B	-	-	-	B	-
Ochrona przed bakteriami Legionella (Protection from Legionella)	-	-	Nie (No)	Nie (No)	-	-	-	-	-	-	-	-	-	Nie (No)	-	-	-
Blokada pracy kotła K uruchomieniem kotła C (Blocking boiler K operation by activating boiler C)	-	-	-	-	-	-	-	-	-	-	-	-	-	Nie (No)	-	-	-

Factory control settings

3.3.5.Controller Configuration Menu Screen

To go to the Controller configuration menu choose “Controller settings” on the main menu screen.

In the Controller configuration menu you can:

- Choose date and time edition option,
- Choose display settings edition option,
- Choose sound edition option,
- Choose language selection option.

Press ↓ and ↑ to switch between options.

To confirm the selection of an option press OK.

Press ESC to return to the main menu screen.

Press ⏻ to cause the Controller to switch to the standby mode.

3.3.5.1. Editing Date and Time

To go to date and time edition screen choose “Controller settings” on the main menu screen and then “Date and Time” on the Controller configuration menu screen.

Press [↓] and [↑] to change to flashing (edited) value.

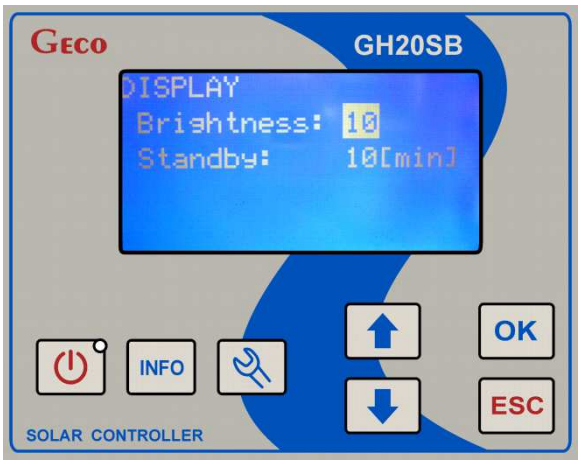
Press [OK] to edit the next value. If you press it when editing the year then the new time and date will be saved and you will return to the Controller configuration menu screen.

Press [ESC] to cancel changes and return to the Controller configuration menu.

Press [⏻] to cancel changes and cause the Controller to switch to the standby mode.

3.3.5.2. Display Settings Editing

To edit display settings choose “Controller settings” on the main menu screen and then “Display” on the Controller configuration menu screen.



On this screen you can edit:

- Display backlight intensity (1…10),
- Inactivity time after which the backlight will be automatically turned off (1…10min).

Press [↓] and [↑] to switch between these settings and press [OK] to edit the currently highlighted setting.

During active edition the setting value flashes. Use [↓] and [↑] to set a new value. Press [OK] to save the new value and exit the setting edition option. Press [ESC] to cancel the change and exit the setting edition option.

Press [ESC] (when setting edition is not active) to return to the Controller configuration menu screen.

Press [⏻] to cause the Controller to switch to the standby mode.

3.3.5.3. Sound Settings Editing

To edit sound settings choose “Controller settings” on the main menu screen and then “Sound settings” on the Controller configuration menu screen.

On this screen you can edit:

- Alarm sounds (Yes / No),
- Keys (Yes / No).

Press ↓ and ↑ to switch between these settings and press OK to edit the currently highlighted setting.

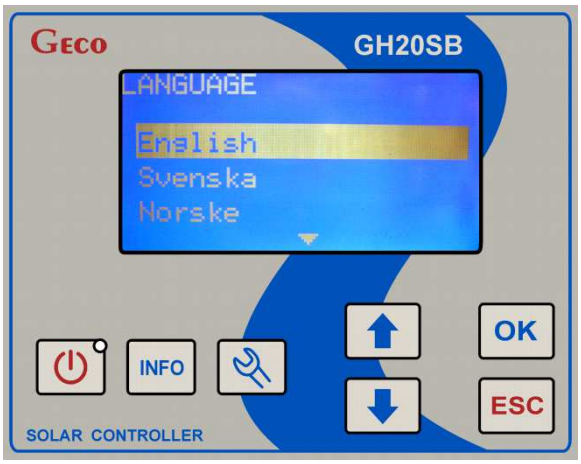
During active edition the setting value flashes. Use ↓ and ↑ to set a new value. Press OK to save the new value and exit the setting edition option. Press ESC to cancel the change and exit the setting edition option.

Press ESC (when setting edition is not active) to return to the Controller configuration menu screen.

Press ⏻ to cause the Controller to switch to the standby mode.

3.3.5.4. Language Selection

To go to the language selection screen choose “Controller settings” on the main menu screen and then “Language” on the Controller configuration menu screen.



Use [↓] and [↑] to select the desired language.

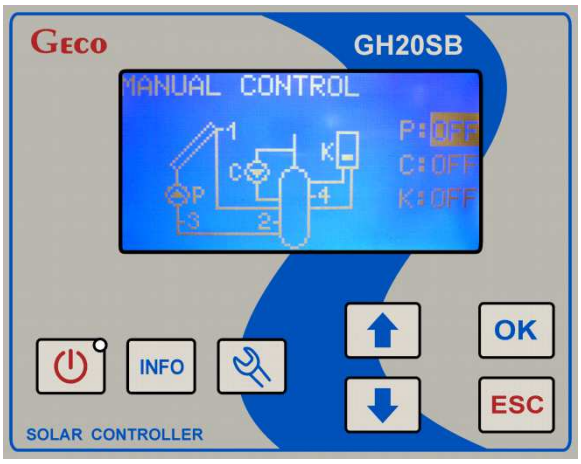
Press [OK] to save the new language settings and return to the Controller configuration menu screen.

Press [ESC] to cancel changes and return to the Controller configuration menu screen.

Press [⏻] to cancel changes and cause the Controller to switch to the standby mode.

3.3.6. Manual Control

To go to the manual control screen choose “Manual control” on the main menu screen.



» The LCD display will show the system scheme screen and (on the right side of the screen) letters will appear that correspond to the devices in the scheme together with a description of the external device status (ON / OFF).

NOTE!!!
After switching to manual operation the control algorithm is wholly suspended and the user has full control over the status of the outputs (external devices).

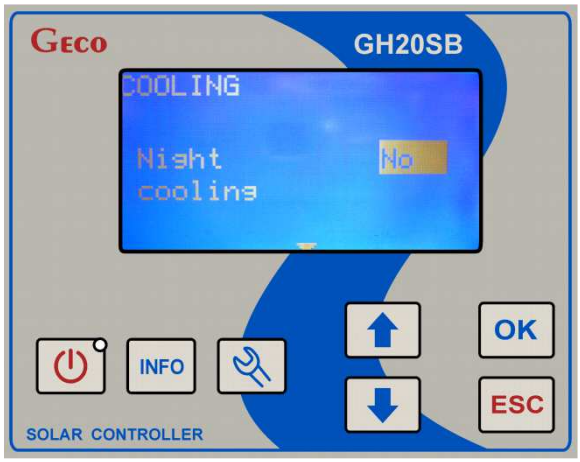
Depending on the selected system configuration, the Controller can operate from 1 to 3 external devices. Each device can be separately activated and deactivated, and its current status is always shown in the system scheme and on the right side of the display, next to the letter describing the device. To switch between devices use [↓] and [↑] Press [OK] to unlock the possibility of changing the status of the currently highlighted output, which is indicated by the flashing of the output status symbol (ON / OFF). Press [↓] and [↑] to change the device status and then press [OK] to lock the current output status.

Press [ESC] to restore control and return to the main menu screen.

Press [⏻] to cause the Controller to switch to the standby mode.

3.3.7. Cooling

To choose the cooling settings editing option choose “Cooling” on the main menu screen.



On this screen you can activate cooling and set the temperature of cooling activation and deactivation.

Press ↓ and ↑ to switch between settings.

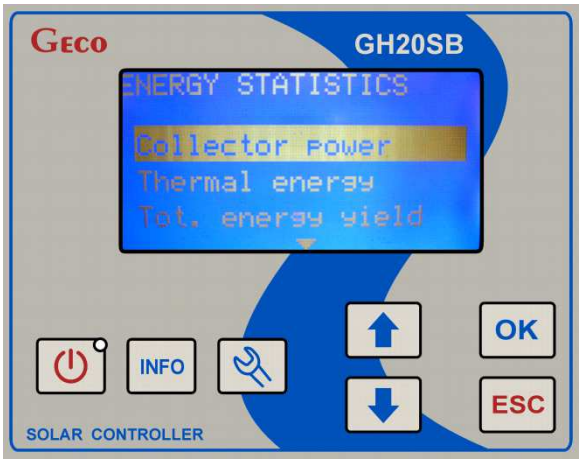
Press OK to choose current setting editing option. During edition the setting value flashes. Press ↓ and ↑ to set a new value. Press OK to save the new value and exit the setting edition option. Press ESC to cancel the change and exit the setting edition option.

Press ESC (when setting edition is not active) to return to the main menu screen.

Press ⏻ to cause the Controller to switch to the standby mode.

3.3.8. Energy and Collector Power Counters

The energy and collector power counters function is not available for schemes 6, 10, 12, 14, 15, 16.



The Controller has an inbuilt module for recording average collector power and the energy generated by the collectors. The Controller enables recording and readout of power and energy statistics for the following time intervals:

- Last 60 recorded days,
- Last 20 recorded weeks,
- Last 12 recorded months,
- Last 10 recorded years,

Additionally, for days, weeks, months and years statistics there is possibility to present the time intervals graphically, by means of bar charts:

- For daily statistics it is possible to graphically present the hourly distribution of the average collector power and energy,
- For weekly statistics it is possible to graphically present the distribution of average power and energy for individual days in the interval from Monday to Sunday,
- For monthly statistics it is possible to graphically present the distribution of the average power and energy for individual days, The interval depends on the number of days in the month viewed,
- For annual statistics it is possible to graphically present the distribution of average power and energy for individual months in the year in intervals from January to December.

When the graphical presentation in the form of bar charts is displayed, in the left upper-corner of the screen the highest value in the given interval appears, to which the height of each bar is scaled. Additionally, in the right-hand upper corner the series recording date appears.

The energy counters menu includes also the total energy counter. This counter counts, on a continuous basis, the energy generated since the Controller activation.

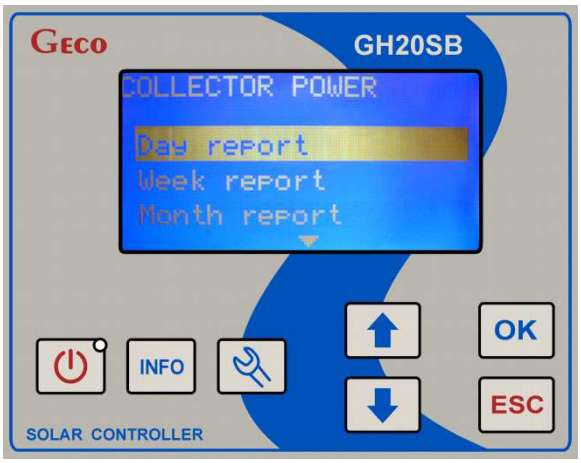
The statistics and the total counter may be reset anytime. The reset options are to be found in the energy counters menu and available separately for the total counter and for the statistics.

A change of date may disturb the sequence of the recorder data.

To view the energy counters or reset the counters, choose “Energy statistics” on the main menu screen.

3.3.8.1. Average Collector Power Counters

To view average collector power counters choose “Energy statistic” on the main menu screen and then “Collector Power” on the energy counters menu screen.



Report type selection option will appear on the screen:

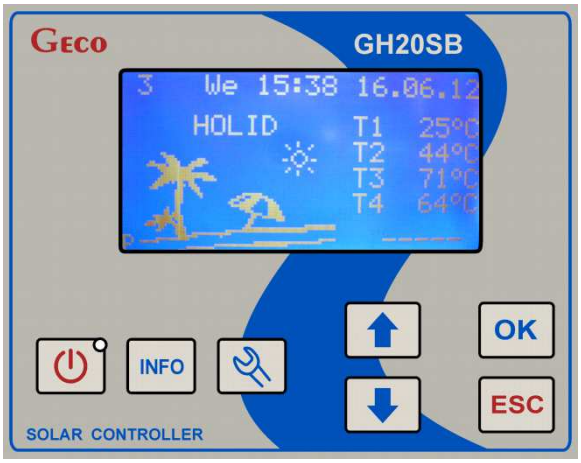
- Day Report,
- Week Report,
- Month Report,
- Year Report,

When you select the desired report a list including the date and the average power value for a given time interval (day, week, month, year) will appear on the screen.

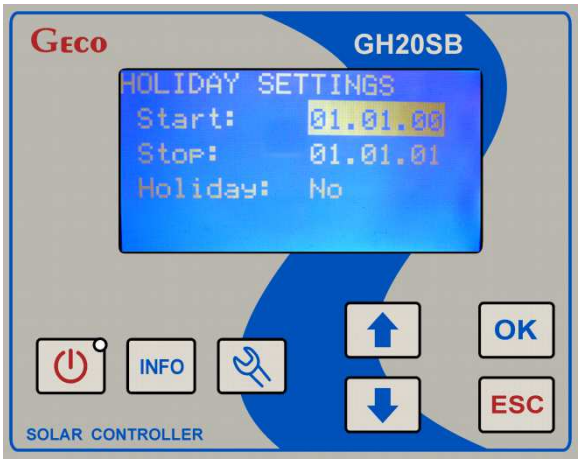
To edit power distribution in a given time interval use ↓ or ↑ to select the desired time interval and press OK.

Press ESC to go back to the previous menu.

3.3.9. Holiday function



To use the holiday function editing option choose “Holiday settings” on the main menu screen.



On this screen you can change the status of the holiday function and define holiday start and end date.

Press ↓ and ↑ to switch between settings and press OK to edit the currently highlighted setting.

During holiday start or end date the value being edited (day, month or year) flashes. Using ↓ and ↑ change the flashing (edited) value and press OK to edit the next value. When editing the year value press this button to save the new date and exit holiday start and end date edition. Press ESC to cancel the changes and exit the holiday start or end date edition option. If the holiday function status is set to “Yes” , a change of the holiday start or end date will automatically change the status to “No”.

When editing the holiday function status use  and  to set a new value and press  to save the new value and exit the holiday function status edition. Press  to cancel the change and exit the holiday status edition option.

Press  (when setting edition is not active) to return to the main menu screen.

Press  to cause the Controller to switch to the standby mode.

4. Settings

4.1. Control Settings

Setting	Symbol	Description	Range
Typ kolektora słonecznego (Solar collector type)		This setting applies to all system schemes and enables collector type selection.	Flat plate / Tube
Różnica temp. T1,T2 włącz. pompy kolektorów (T1, T2 temperatures differences for activating collector pump)	DT1	The main control delta **(temperature difference).** This setting specifies the condition for activating and deactivating the collector pump. When the sum of the Δ1 setting and the tank temperature T2 exceeds the temperature measured by the collector sensor T1, the collector pump deactivates. If the sum is lower than the T1 value, the collector pump is active. Additionally, to ensure stable operation of the heating system, a control hysteresis of 3°C is applied.	2…15ºC
Różnica temp. włączenia dod. Pompy, zaworu (Temperatures differences for activating additional pump, valve)	DT2	The auxiliary control delta **(temperature difference).** The setting is applied to controlling more extensive systems.	2…15.ºC
Max. temp. T2 wyłączenia pompy kolektorów (Max. T2 temperature for deactivating collector pump)	$T2_{max}$	Setting associated with temperature sensor T2 located inside the tank. This setting specifies the maximum allowable temperature measured by the sensor T2 which, when exceeded, causes the collector pump to stop.	10…85ºC
Min. temp. T3 uruchomienia pompy kotła (Min. T3 temperature for activating boiler pump)	$T3_{min}$	Setting applied in schemes 6 and 14. It defines the minimum boiler pump K activation temperature.	10…85ºC
Min. temp. T4 włączenia pompy cyrkulacyjnej (Min. T4 temperature for activating circulation pump)	$T4_{mincyrk}$	Setting associated with the circulation pump and the T4 sensor. It defines the minimum circulation pump activation temperature (T4).	10…85ºC
Max. temp. T4 wyłączenia źródła ciepła (Max. T4 temperature for deactivating heat source)	$T4_{max}$	Setting applied in more extensive schemes.	10…85ºC
Max. temp. wody grzana z kotła C (Max. temperature of water heated in boiler C)	$T4_{maxC}$	Setting applied only in scheme 14. Defines the maximum value measured by the T4 sensor for boiler pump control.	10…85ºC

Setting	Symbol	Description	Range
Regulacja obrotów pompy kolektorów (Collector pump rotation speed adjustment)	RegFaz	Main pump (collector pump) adjustment. If the collector pump adjustment is selected in the Controller settings, the Controller will adjust the collector pump rotation speed. If the collector pump speed adjustment option is disabled, the Controller will only control the pump in the on/off operation mode. In schemes 6, 10, 12, 14, 15 and 16 the collector pump rotation speed adjustment is never active.	No / Yes
Tryb pracy pompy cyrkulacyjnej (Circulation pump operation mode)		When it is set to “Ciągły” (Continuous), the circulation pump is activated in the hours set in the “Program czasowy” (Time Programme) menu. If it is set to “Przerywana” (Intermittent), the circulation pump will additionally operate in the hours set in the “Program czasowy” (Time Programme) menu, however, it will operate on a cyclical basis, activating for 10 minutes, then after 10 minutes deactivating for another 10 minutes after it will again activate for 10 minutes.	Interm. / Contin.
Moc kolekt. wyłącz. kotła, grzałki, pompy ciepła (Collector power for deactivated boiler, heater, heat pump)		Setting applied in schemes 3, 4, 5 and 14. The Controller calculates the collector power and deactivates the boiler or the heater if the calculated power exceeds the power defined in the control setting. When the collector power value is lower than the value defined in the settings, the boiler, heater and pump outputs are controlled in accordance with their control algorithm.	100…3000W
Ochrona przed przegrzaniem kolektorów (Collector overheating prevention)	ZabPrzeg	Setting defines enabling or disabling the boiler overheating prevention function.	No / Yes
Max. temp. T2 wyłącz. ochrony przegrz. kolektorów (Max. T2 temperature for deactivating collector overheating prevention)	$T_{maxprzeg}$	Setting defines the maximum temperature within the tank when the collector overheating function is enabled. This setting has priority over the $T2_{max}$.setting.	60…85ºC
Ochrona przed zamrożeniem kolektorów (Collector freezing prevention)	Przeciw.Zam	Setting enables/disables the collector freezing prevention function.	No / Yes
Wybór priorytetu grzania (Heating priority selection)	PriorytAB	Setting associated with schemes 9, 10, 11, 12 and 16. Defines the priority of the tank / pool heating.	A / B
Ochrona przed bakteriami Legionella (Protection from Legionella)		Setting associated with schemes 3, 4, and 14. Defines whether the anti-legionella function is enabled or disabled.	No / Yes

Setting	Symbol	Description	Range
Blokada pracy kotła K uruchomieniem kotła C (Blocking boiler K operation by activating boiler C)		Setting associated only with scheme 14. Allows blocking gas boiler K activity during solid fuel boiler C operation.	No / Yes

4.2. Controller Settings

Setting	Description	Range
Poziom jasności wyświetlacza (Display backlight intensity)	Setting defines display backlight intensity.	***1…10***
Czas wygaszenia wyświetlacza (Display sleep time)	Setting defines time without any button pressed after which the display becomes inactive for reasons of energy savings.	1…10min
Dźwięki alarmów (Alarm sounds)	Setting enabling or disabling alarm sounds when temperature sensors are disconnected or damaged.	No / Yes
Dźwięki klawiszy (Key sounds)	Setting enabling or disabling key sounds.	No / Yes

5. Additional Functions

5.1. Collector Freezing Prevention Function

When this function is enabled, the collector pump will activate if the temperature at the T1 sensor is lower than or equal to the freezing point defined in the Heat transfer fluid setting and the T2 temperature is higher than 7°C. The pump will deactivate if the T2 temperature falls below 5°C or the (T1 – 2) temperature is higher than the freezing point defined in the Heat transfer fluid setting.

Additionally, in schemes 15 and 16, where a second collector is used, when this function is enabled, pump K will activate if the temperature at the T3 sensor is lower than or equal to the freezing point defined in the Heat transfer fluid setting and the T2 temperature is higher than 7°C. The pump will deactivate if the T2 temperature falls below 5°C or the (T3 – 2) temperature is higher than the freezing point defined in the Heat transfer fluid setting.

5.2. Anti-Legionella Function

The anti-legionella function applies only in schemes 3, 4 and 14. It is always activated once a week, in the night from Sunday to Monday, at 12 midnight. When the anti-legionella function is activated, the collector pump is deactivated and the boiler and, additionally, the circulation pump, are turned on. When the temperature measured by the T4 sensor exceeds 70°C, the circulation pump and the boiler turn off and the anti-legionella function deactivates. Next time it will be activated in a week, in the night from Sunday to Monday.

The anti-legionella function does not work during holidays.

5.3. Holiday Function

The holiday function consists in totally disabling the control of the heater, the gas boiler, the heat pump, the boiler pump etc. Additionally, when the holiday function is active, the collector cooling function (regardless of whether it is enabled) and the collector overheating prevention function (regardless of the value in the “ZabPrzeg” setting) are also active. When the Controller finishes the application of the holiday function, the function is automatically deactivated so as not to activate next year. This function should be set manually before any planned holidays.

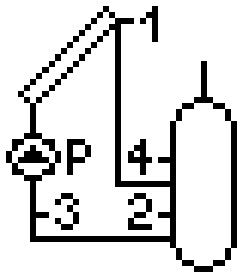
5.4. Manual Cooling Function

The manual cooling function is available in the main menu. When the cooling option is enabled or the holiday function is active and the temperature in the tank measured by the T2 sensor is higher than the cooling activation temperature, the collector pump activates and remains active until the temperature in the tank measured by the T2 sensor falls below cooling deactivation temperature. The pump activation is always linked with the freezing prevention function.

The manual cooling function is time-based and is active between 12 midnight and the cooling end hour defined in the settings. During the collector cooling, only the main collector pump P operates, while all other devices are inactive. The only exception here is the dump valve in scheme 17, i.e. it will be active if the T4 temperature is higher than the $T4_{max}$ temperature and it will be inactive if the T4 temperature is lower than the ($T4_{max}$ – 1) temperature.

6. Controller Operation Scheme

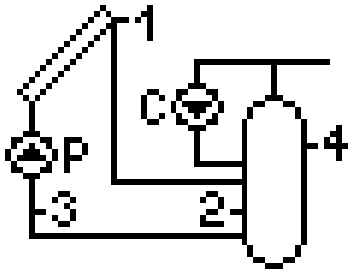
6.1. Scheme 1 – the basic scheme.



Output	Device connected
O1	Collector pump P
O2	-
O3	-

Sensor	Description
T1	Collector sensor (Required)
T2	Tank sensor (Required)
T3	Sensor for calculating power/energy (Optional)
T4	Tank sensor (Optional)

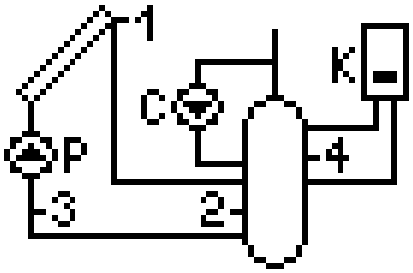
6.2. Scheme 2 – the basic scheme with a circulation pump.



Output	Device connected
O1	Collector pump P
O2	-
O3	Circulation pump C

Sensor	Description
T1	Collector sensor (Required)
T2	Tank sensor (Required)
T3	Sensor for calculating power/energy (Optional)
T4	Tank sensor (Required)

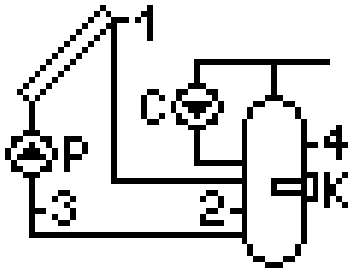
6.3. Scheme 3 – the basic scheme with a circulation pump and a gas boiler.



Output	Device connected
O1	Collector pump P
O2	Boiler K
O3	Circulation pump C

Sensor	Description
T1	Collector sensor (Required)
T2	Tank sensor (Required)
T3	Sensor for calculating power/energy (Optional)
T4	Tank sensor (Required)

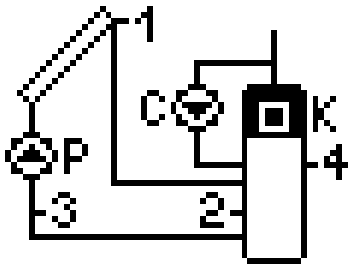
6.4. Scheme 4 – the basic scheme with a circulation pump and an electric heater.



Output	Device connected
O1	Collector pump P
O2	Heater K
O3	Circulation pump C

Sensor	Description
T1	Collector sensor (Required)
T2	Tank sensor (Required)
T3	Sensor for calculating power/energy (Optional)
T4	Tank sensor (Required)

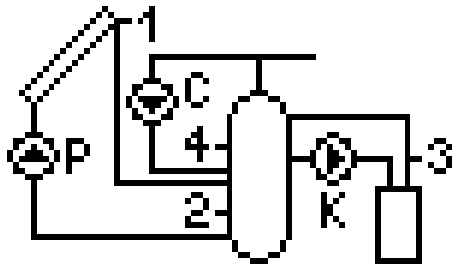
6.5. Scheme 5 – the basic scheme with a circulation pump and a heat pump.



Output	Device connected
O1	Collector pump P
O2	Heat pump K
O3	Circulation pump C

Sensor	Description
T1	Collector sensor (Required)
T2	Tank sensor (Required)
T3	Sensor for calculating power/energy (Optional)
T4	Tank sensor (Required)

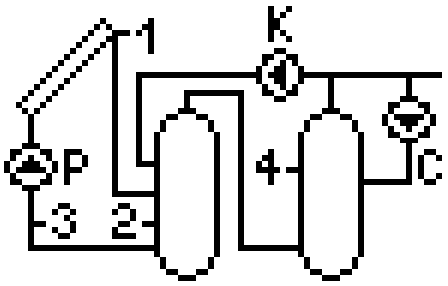
6.6. Scheme 6 – the basic scheme with a circulation pump, activating domestic hot water heating after the boiler achieves the required temperature.



Output	Device connected
O1	Collector pump P
O2	Boiler pump K
O3	Circulation pump C

Sensor	Description
T1	Collector sensor (Required)
T2	Tank sensor (Required)
T3	Sensor for calculating power/energy (Optional)
T4	Tank sensor (Required)

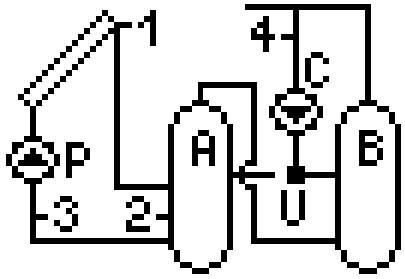
6.7. Scheme 7 – a system of two heaters allows additional heating of the boiler heater with solar energy.



Output	Device connected
O1	Collector pump P
O2	Pump K
O3	Circulation pump C

Sensor	Description
T1	Collector sensor (Required)
T2	Tank sensor (Required)
T3	Sensor for calculating power/energy (Optional)
T4	Tank sensor (Required)

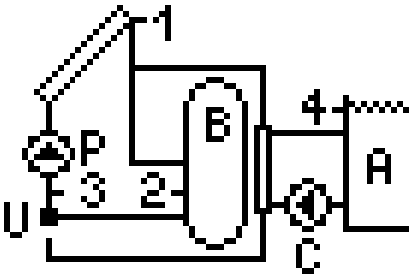
6.8. Scheme 8 – a system of two heaters allows additional heating of the circulation return with solar energy.



Output	Device connected
O1	Collector pump P
O2	Valve U
O3	Circulation pump C

Sensor	Description
T1	Collector sensor (Required)
T2	Tank sensor (Required)
T3	Sensor for calculating power/energy (Optional)
T4	Circulation return sensor (Required)

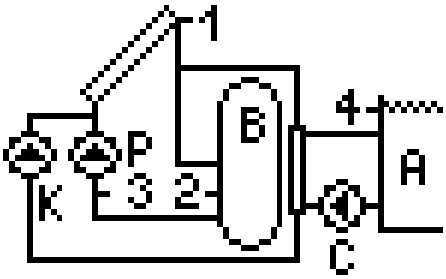
6.9. Scheme 9 – a system with a three-way valve for domestic hot water heating and pool water heating. Additional control of the pool water filtering system pump.



Output	Device connected
O1	Collector pump P
O2	Valve U
O3	Pool pump C

Sensor	Description
T1	Collector sensor (Required)
T2	Tank sensor (Required)
T3	Sensor for calculating power/energy (Optional)
T4	Pool sensor (Required)

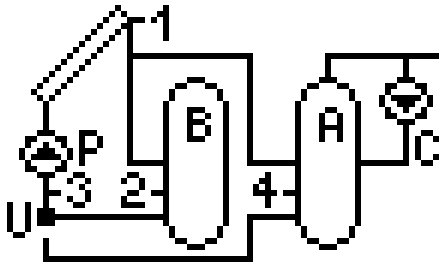
6.10. Scheme 10 – a system with two collector pumps for domestic hot water heating and pool water heating. Additional control of the pool water filtering system pump.



Output	Device connected
O1	Collector pump P
O2	Collector pump K
O3	Pool pump C

Sensor	Description
T1	Collector sensor (Required)
T2	Tank sensor (Required)
T3	Sensor for calculating power/energy (Optional)
T4	Pool sensor (Required)

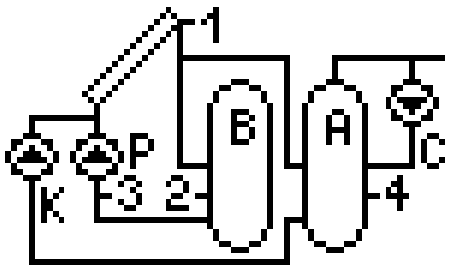
6.11. Scheme 11 – a system with a three-way valve for domestic hot water heating in two solar heaters with additional control of a circulation pump.



Output	Device connected
O1	Collector pump P
O2	Valve U
O3	Circulation pump C

Sensor	Description
T1	Collector sensor (Required)
T2	Tank sensor (Required)
T3	Sensor for calculating power/energy (Optional)
T4	Tank sensor (Required)

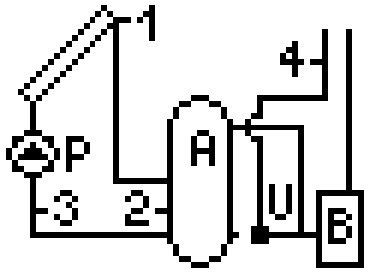
6.12. Scheme 12 – a system with two collector pumps for domestic hot water heating in two solar heaters with additional control of a circulation pump.



Output	Device connected
O1	Collector pump P
O2	Collector pump K
O3	Circulation pump C

Sensor	Description
T1	Collector sensor (Required)
T2	Tank sensor (Required)
T3	Sensor for calculating power/energy (Optional)
T4	Tank sensor (Required)

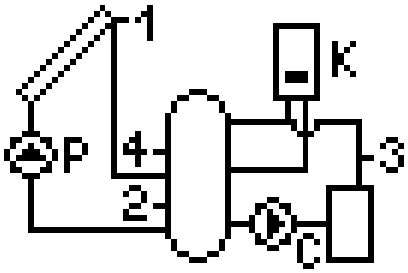
6.13. Scheme 13 – a system allowing the cooperation of collectors with the buffer container used for cooperation with the SH.



Output	Device connected
O1	Collector pump P
O2	-
O3	Valve U

Sensor	Description
T1	Collector sensor (Required)
T2	Tank sensor (Required)
T3	Sensor for calculating power/energy (Optional)
T4	SH return sensor (Required)

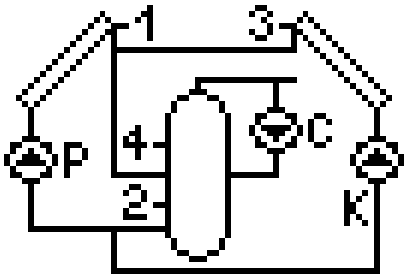
6.14. Scheme 14 – a domestic hot water heating system with solar collectors. Additionally the system controls a gas boiler and activates domestic hot water heating after the boiler achieves the required temperature.



Output	Device connected
O1	Collector pump P
O2	Boiler K
O3	Boiler pump C

Sensor	Description
T1	Collector sensor (Required)
T2	Tank sensor (Required)
T3	Sensor for calculating power/energy (Optional)
T4	Tank sensor (Required)

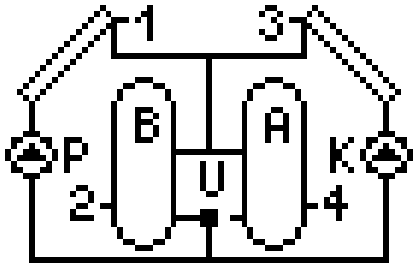
6.15. Scheme 15 – a system allowing control of pumps cooperating with collector batteries placed in various directions; additionally the system controls a circulation pump.



Output	Device connected
O1	Collector pump P
O2	Collector pump K
O3	Circulation pump C

Sensor	Description
T1	Collector sensor (Required)
T2	Tank sensor (Required)
T3	Collector sensor (Required)
T4	Tank sensor (Required)

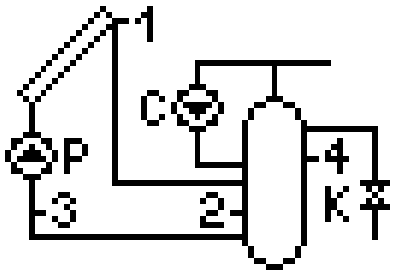
6.16. Scheme 16 – a system allowing control of pumps cooperating with collector batteries placed in various directions. The system allows domestic hot water heating in two heaters.



Output	Device connected
O1	Collector pump P
O2	Valve U
O3	Collector pump K

Sensor	Description
T1	Collector sensor (Required)
T2	Tank sensor (Required)
T3	Collector sensor (Required)
T4	Tank sensor (Required)

6.17. Scheme 17 – the basic scheme with a circulation pump, allowing emergency water dump from the heater.



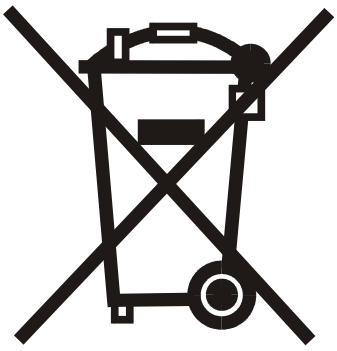
Output	Device connected
O1	Collector pump P
O2	Dump valve K
O3	Circulation pump C

Sensor	Description
T1	Collector sensor (Required)
T2	Tank sensor (Required)
T3	Sensor for calculating power/energy (Optional)
T4	Tank sensor (Required)

7. Sensor Error Alarm

The Controller checks the temperature sensors for proper connection. If a sensor is damaged, a cable is broken or a sensor is disconnected, the Controller raises alarm for that sensor (in the event of sensor short-circuit the Controller will nor raise alarm but indicate a temperature of 125ºC). In the alarm condition all outputs are disconnected; additionally, when the Controller displays the main screen, alarm is indicated by audio signal. In the alarm mode, you can browse the menu system, configure settings, and manually control the external devices. The information which sensor is in alarm condition is available in the main screen. The display shows “Err” instead of the temperature next to the sensor marking. When the Controller raised sensor alarm, check the system for proper connection and installation of the sensors.

8. Information on Marking and Collection of Waste Electric and Electronic Equipment



NOTE!

The symbol placed on a product or on its packaging indicates that it is subject to selective collection of waste electric and electronic equipment. This means that the product should not be discarded with other household waste. Appropriate removal of old and waste electric and electronic equipment will prevent potentially harmful effects on the environment and human health.

The obligation of selective equipment collection rests on the user who should deliver the equipment to a collection point.

P.P.U.H. „Geco” Spółka z o. o.
32-060 Liszki, Cholerzyn 376
tel. +48 12 6369811, +48 12 6361290
fax.+48 12 6362002
http://www.geco.pl