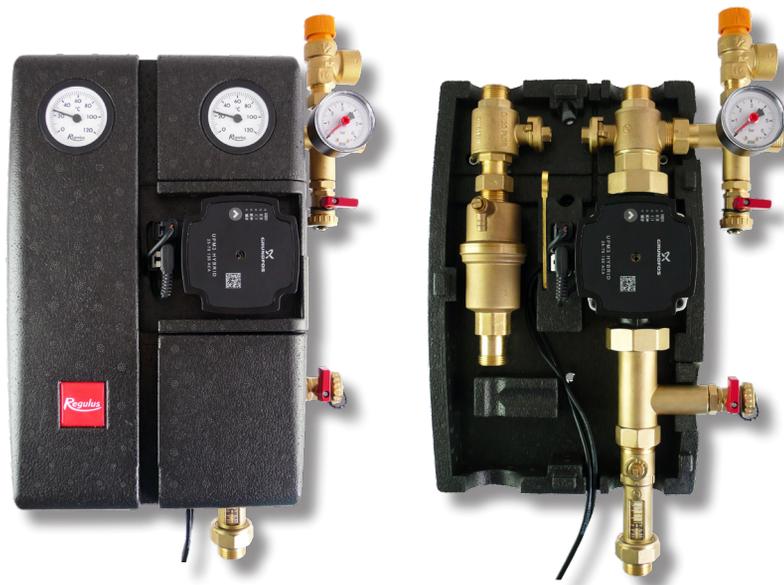


# Regulus

[www.regulus.eu](http://www.regulus.eu)



CSE2 SOL G P

Installation and Operation Manual  
**CSE2 SOL G P SOLAR PUMP STATION**

**EN**

**CSE2 SOL G P**

## 1. Introduction

Thanks to its design, CSE2 SOL G P solar pump station enables a simple and quick connection into a solar circuit. It is fitted with a high-efficiency solar pump of the latest generation that permits continuous flow control.

This pump station is intended for controllers with PWM control or with 230 V switching (ON/OFF).

## 2. Pump Station Description

Main Features	
Application	This twin-line solar pump station contains all components (except for a controller) necessary for current and efficient operation.
Description	The pump station consists of a UPM3 Hybrid 25-70 pump, check and safety valves, 3 ball valves, flow indicator, pressure gauge, air separator with air discharge, thermometer, installation kit and insulation. The pump station further involves: <ul style="list-style-type: none"> <li>• connection point for an expansion vessel</li> <li>• safety valve outlet</li> <li>• ball valves for filling, draining and topping up a solar thermal system</li> </ul>
Installation	on a tank or wall
Working fluid	water-glycol mixture (max. 1:1)

Codes corresponding to connection sizes		
Connection	G 3/4" M	G 1" M
Flow measurement range	2-12 l/min	8-28 l/min
Code	19990	19983

## 3. Pump Station Data

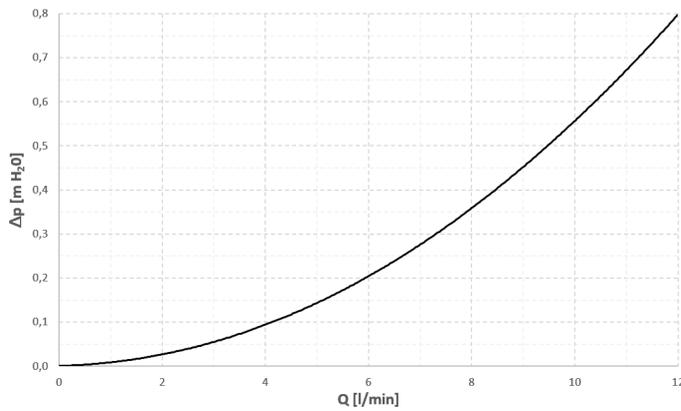
Data for CSE2 SOL G P Pump Station	
Max. fluid working temperature	110 °C
Max. working pressure	6 bar
Min. system pressure	1.3 bar with the pump stopped
Power supply	230 V, 50 Hz
IP rating	IP20
Ambient temperature	5 - 40 °C
Max. relative humidity	85 % at 25 °C
Insulation material	EPP RG 60 g/l
Overall dimensions (W x H x D)	310 x 490 x 155 mm
Total weight	5.9 kg

Min. values of working pressure**	
Values of min. working pressure at the pump suction port depending on temperature	0,8 bar at 50 °C 1,2 bar at 90 °C 1,8 bar at 110 °C

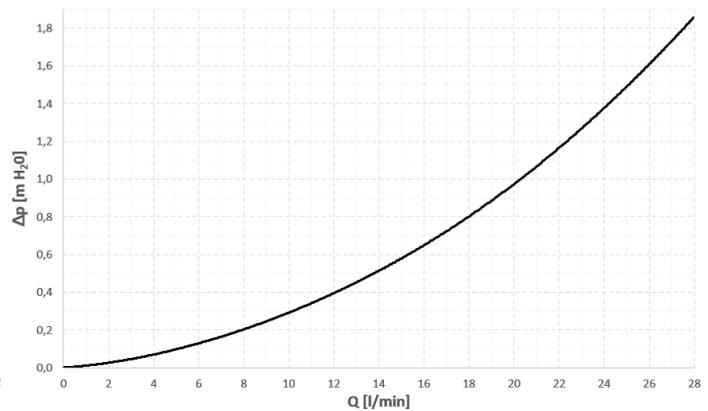
\*\* this condition is met for current installations when the initial system pressure is set following the formula (see the Instructions for solar collectors):  $p = 1,3 + 0,1 \cdot h$  [bar], where h... is the height from pressure gauge to the middle of collector array [m]

### 3.1 Pressure drop diagram

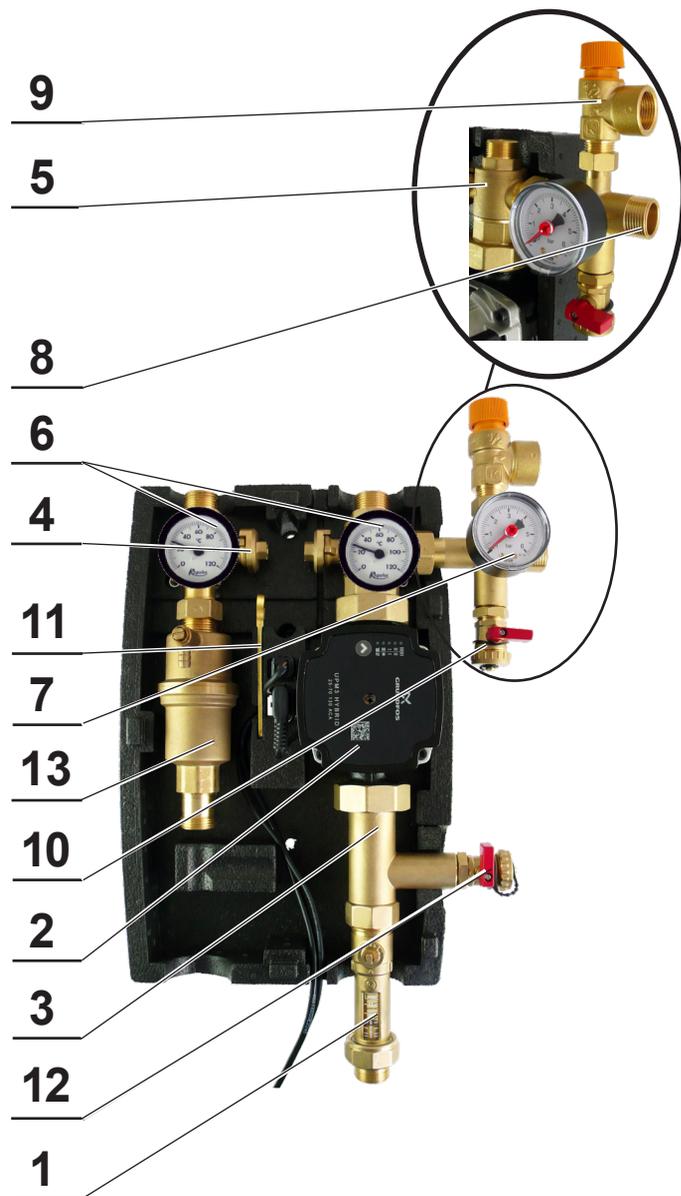
G 3/4" M connection - code 19990



G 3/4" M connection - code 19983



### 4. Pump Station Components



- 1 - FLOWRATE INDICATOR W. BALL VALVE
- 2 - CIRCULATION PUMP
- 3 - CHECK VALVE
- 4 - BALL VALVE ON THE INCOMING PIPE FROM SOLAR COLLECTORS
- 5 - BALL VALVE W. SIDE OUTLET FOR SAFETY GROUP
- 6 - THERMOMETER (IN THE UPPER PART OF INSULATION)
- 7 - PRESSURE GAUGE
- 8 - EXPANSION VESSEL CONNECTION POINT, 3/4" M
- 9 - 6 BAR SAFETY VALVE
- 10 - 3/4" M FILL/DRAIN BALL VALVE
- 11 - SPANNER FOR CONTROL OF BALL VALVE W. SIDE OUTLET AND BALL VALVE OF THE INCOMING PIPE
- 12 - 3/4" M FILL/DRAIN BALL VALVE
- 13 - AIR SEPARATOR W. AIR VENT VALVE

## 4.1 Check valve

The check valve prevents the tank from cooling down due to gravity circulation when the sun is not shining. It is located below the ball valves and can therefore be removed and cleaned without having to drain the solar fluid from the entire circuit.

## 4.2 Ball valves

Ball valves are used to separate the pump station from the solar circuit. During servicing (including cleaning of the check valve) there is no need to drain the fluid from the solar system. For greater rigidity of the hydraulic part of the pump station, the upper ball valve is attached to the fixing back plate.

The upper ball valves are operated by a lever which is not located on the valve during operation. A wrench or pliers must be used to operate the lower ball valve, which is part of the flow indicator. Turning the lever or the key or pliers a quarter turn to the right closes the ball valve. It opens when the lever is turned to the left. Before closing / opening the ball valve, it is necessary to remove the top part of the insulation. As a result, closing the system is reserved for installation or service technicians only. Thus, the user cannot simply close the solar circuit and cause stagnation and subsequent degradation of the solar fluid.

The ball valves are equipped with a spindle packing with two O-rings with dimensions of 8.7x1.8 mm that can be easily replaced by removing the control element with stop ends and loosening the packing nut with a # 21 spanner.

### **WARNING! IMPORTANT!**

The safety valve, expansion vessel and upper fill/drain ball valve always remain connected to the solar thermal system, even if the ball valves are closed! For this reason, never try to separate them from the filled solar system, as there is a risk of serious injury and damage to the solar system!

Never close the drain line of the safety valve, it must always be free for any liquid leaking from the safety valve!

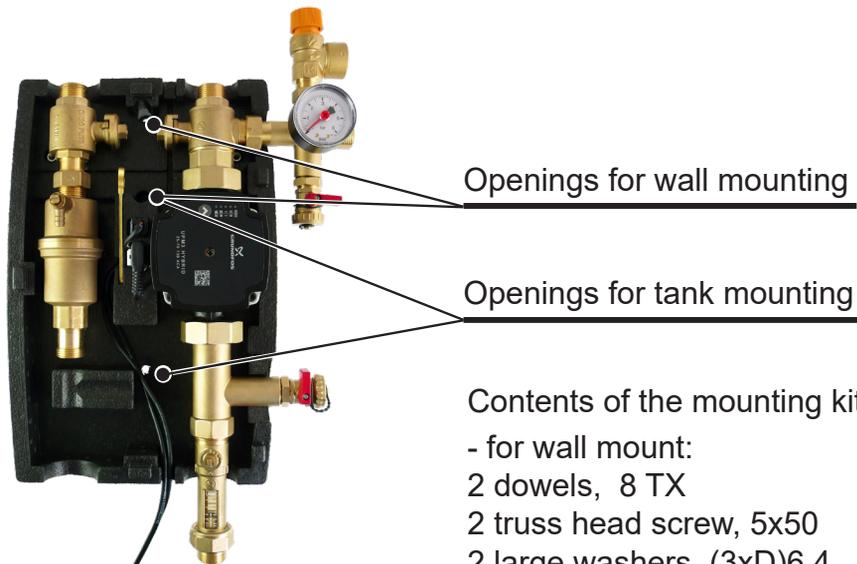
## 5. Air Separator with Air Vent Valve



In order to remove air from the circuit perfectly, the pump station is equipped with a so-called air separator with an air vent valve. After filling or topping up the fluid in the circuit and during the pre-season check, it is always recommended to release the air using the air vent valve.

## 6. Installation Options

The solar pump station is designed to be mounted on a wall or a tank. In the rear section of the insulation there are three mounting holes. The two upper holes are intended for installation on a wall using the mounting kit included in supply. The two lower holes are intended for installation on a tank (160 mm pitch) using the mounting kit included in supply. When mounting the pump station on a tank, use large washers between the tank and pump station for both the holes; the third washer shall be used for the lowest hole between the bolt head (M6x25) and the pump station. The washers are included in supply.



Contents of the mounting kit included in supply::

- for wall mount:

2 dowels, 8 TX

2 truss head screw, 5x50

2 large washers, (3xD)6.4

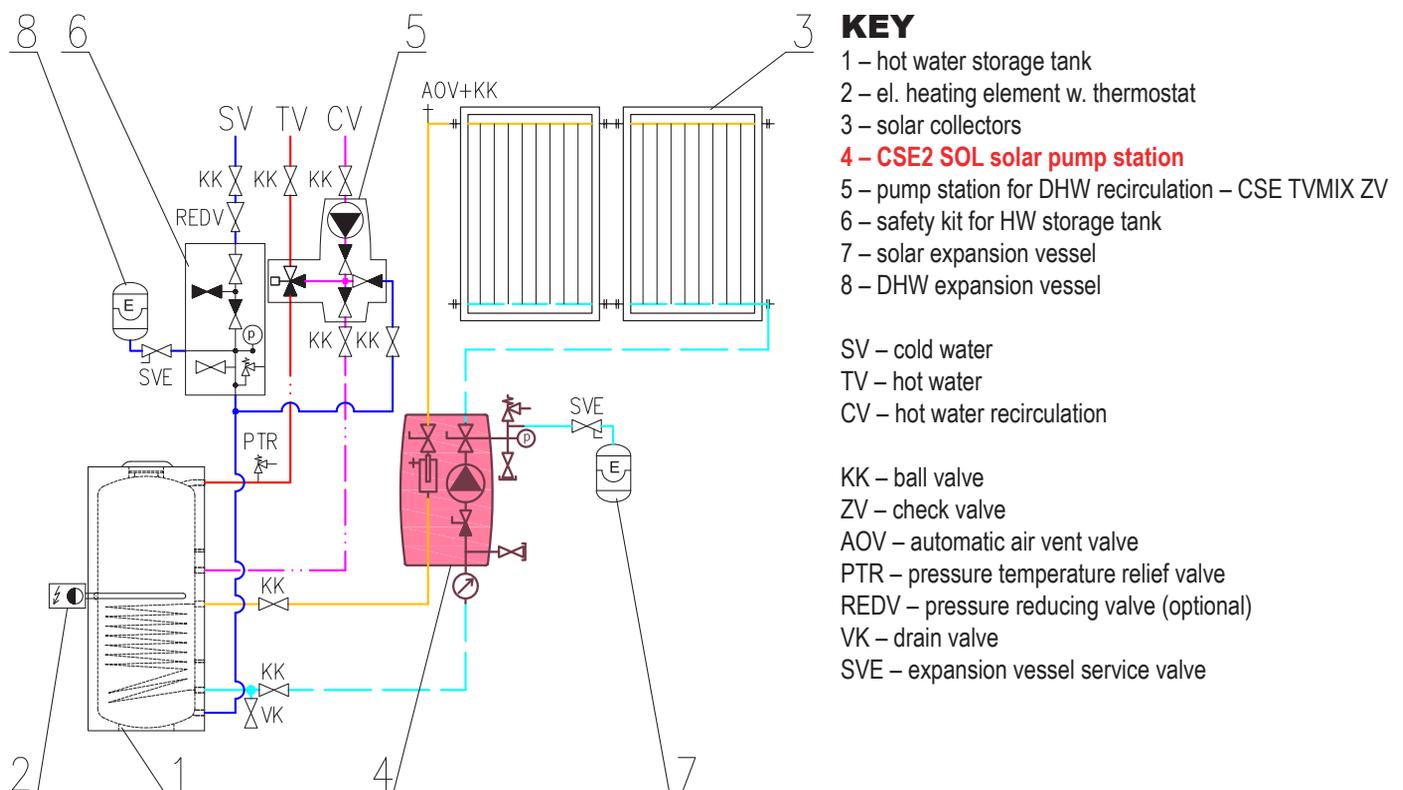
- for tank mount:

1 socket hex pan-head screw, M6x16 (middle hole)

1 socket hex pan-head screw, M6x25 (lower hole)

3 large washers, (3xD)6.4

## 7. Pump Station Connection Diagram



## 8. UPM3 HYBRID 25-70 Pump

### Pump control

The circulation pump can be controlled:

- internally without PWM signal by selecting a constant pressure or constant speed mode and a desired pump curve.
- externally by PWM C control signal (profile for solar systems)

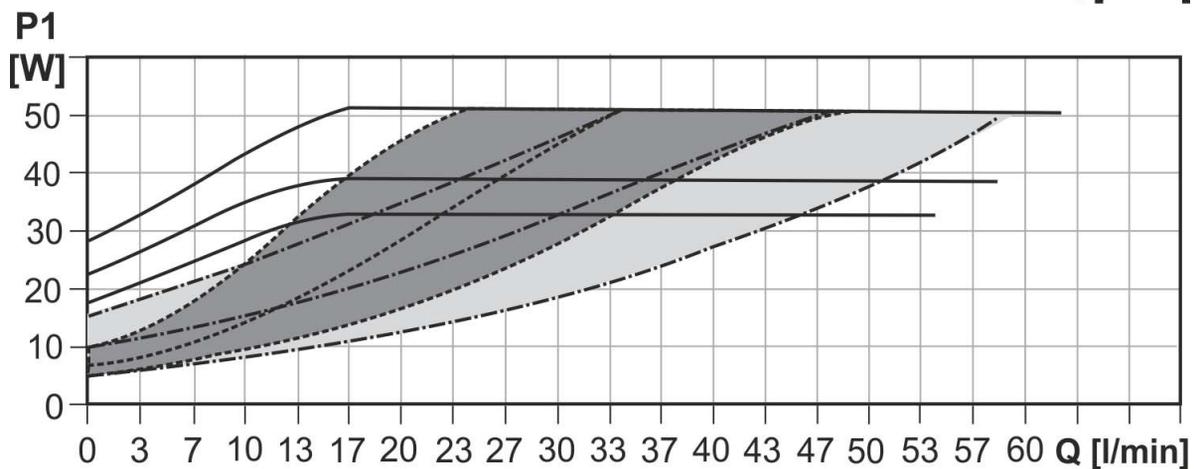
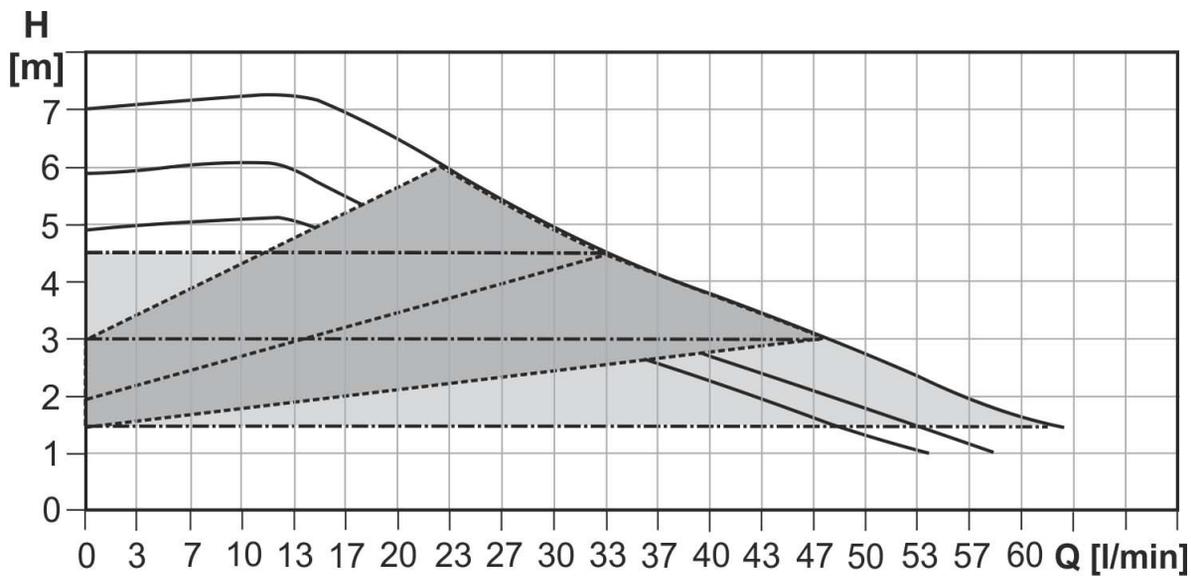
#### WARNING – IMPORTANT

The pump permits to be controlled also by PWM A signal (profile for use in heating systems). This mode must not be used for solar thermal systems.

Using the PWM A pump profile would cause system damage.

Using the proportional pressure mode in the internal pump control is also not advisable.

### Performance curves



Line type	Description
—	Constant speed
- - -	Proportional pressure
- · - · -	Constant pressure

## Description of Pump Profiles

### a) INTERNAL CONTROL - Proportional pressure

- Head (pressure): reduced with growing system pressure drop and increased with sinking system pressure drop.
- Pump operating point: moves up or down on the selected proportional pressure curve depending on the current system pressure drop.
- Using the proportional pressure mode for solar thermal systems is not advisable.



CONTROL MODE		CONTROL MODE
Proportional pressure	I	The lowest curve of proportional pressure
	II	The middle curve of proportional pressure
	III	The highest curve of proportional pressure
	AUTO <sub>ADAPT</sub>	Automatically controls performance in the range from the highest to the lowest proportional pressure curve. AUTO <sub>ADAPT</sub> mode mode is not used for solar thermal systems.

### b) INTERNAL CONTROL - Constant pressure

- Head (pressure): kept constant, disregarded of the system pressure drop.
- Pump operating point: moves on the selected constant pressure curve depending on the current system pressure drop.



CONTROL MODE		DESCRIPTION
Constant pressure	I	The lowest curve of constant pressure
	II	The middle curve of constant pressure
	III	The highest curve of constant pressure
	AUTO <sub>ADAPT</sub>	Automatically controls performance in the range from the highest to the lowest constant pressure curve. AUTO <sub>ADAPT</sub> mode mode is not used for solar thermal systems.

### c) INTERNAL CONTROL - Constant speed

- The pump runs at constant speed.
- Pump operating point: moves up or down on the selected curve depending on the current system pressure drop.



CONTROL MODE		Max. H (upper graph)	Max. P <sub>1</sub> (lower graph)
Constant speed	I	5 m	33 W
	II	6 m	39 W
	III	7 m	52 W

### d) EXTERNAL CONTROL - PWM C (solar)

- The pump runs up to the max. head following the constant speed curve set depending on the current PWM value.
- The speed will increase when the PWM value increases. If PWM equals 0, the pump will stop.

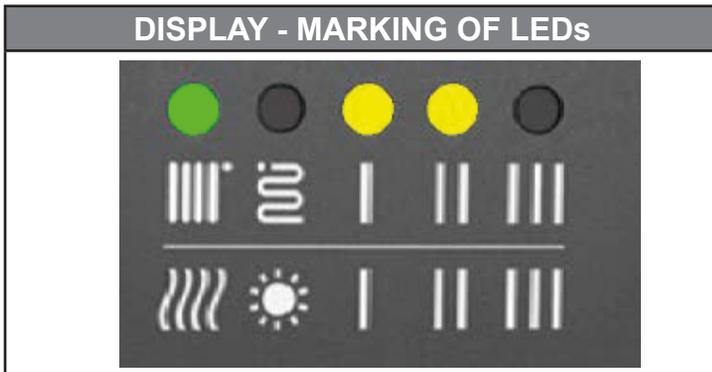


### e) EXTERNAL CONTROL - PWM A (heating)

#### WARNING – IT IS PROHIBITED TO USE PWM A PUMP PROFILES

Using the PWM A (I, II, III) pump profiles in a solar pump station would cause system damage.

## Settings Display



For clarity, the marking of the LEDs is further omitted.

	DISPLAY	CONTROL MODE		
	<b>green LED NOT FLASHING</b>	<b>INTERNAL</b>		
1		Proportional pressure AUTO <sub>ADAPT</sub> - not used for solar thermal systems		
2		Constant pressure AUTO <sub>ADAPT</sub> - not used for solar thermal systems		
3		Proportional pressure - not used for solar thermal systems	I	
4			II	
5			III	
6		Constant pressure	I	
7			II	
8			III	
9		Constant speed	I	
10			II	
11			III	

	DISPLAY	CONTROL MODE		
	<b>green LED FLASHING</b>	<b>EXTERNAL</b>		
12		PWM C		
13		PWM A	I	<b>WARNING - DO NOT USE THESE MODES</b>
14			II	
15			III	

FLASHING FREQUENCY OF GREEN LEDS	CONTROL	RECEIVING PWM SIGNAL
Not flashing	Internal	-
1 flash per second	External	NO
12 flashes per second	External	YES

**WARNING:** LEDs may be turned by 90° or 180°, or mirrored, depending on the specific pump type. When switched on, the pump runs at factory settings or the last setting. The display shows the current pump performance.

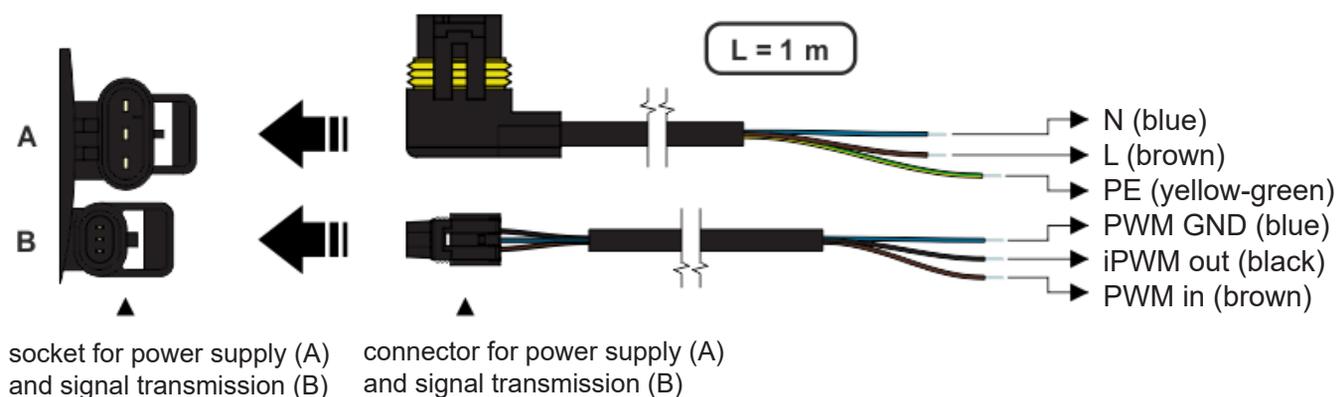
## Setting selection

To select your desired setting, press the button repeatedly until you find the setting you need (see the table above). If you pass the desired setting, you have to go one more round until it appears again. The order of modes corresponds to the table.

## Error Display

DISPLAY	CONTROL MODE
	Seized pump
	Too low power supply voltage
	Electric fault

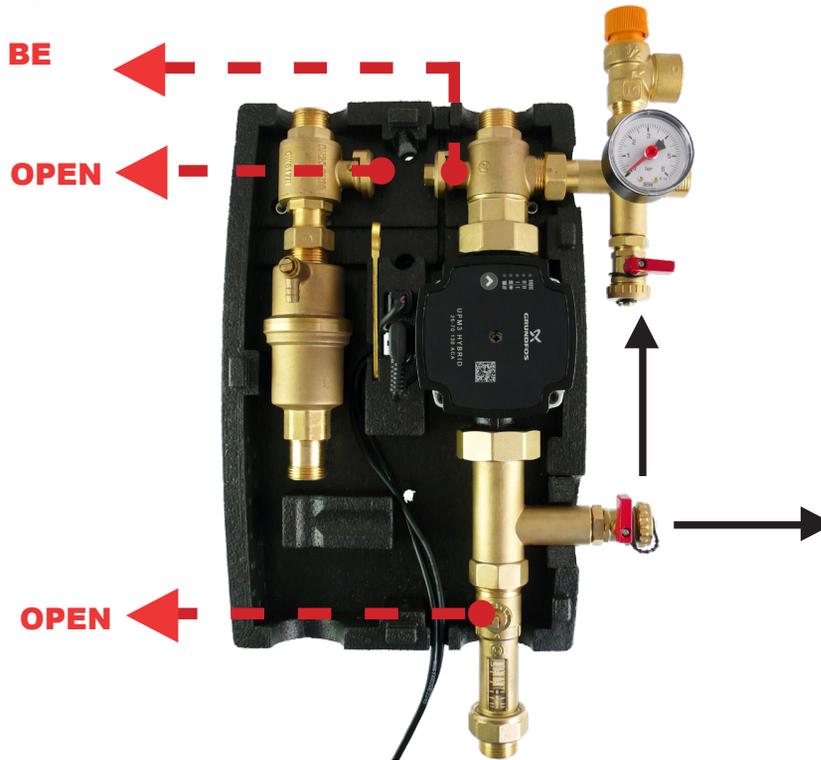
## Pump Wiring



## 9. Filling a Solar Thermal System

For filling a solar thermal system, the ball valve above the pump must be closed and the ball valve below the pump and on the incoming pipe from solar collectors open. The ball valves above the pump are operated by means of the enclosed spanner. Connect the filling pump to the fill and drain ball valves using hoses – see Chap. 4, and open these valves.

**Prior to commissioning the system, all the three ball valves must be open!**



## 10. Solar System Air Venting

- During operation of the filling pump, close the lower drain valve and increase the pressure to about 5 bar;
- close the upper filling valve and turn off the filling pump, open the ball valve above the pump, do not disconnect the filling pump hoses!
- Set the circulation pump to the highest level in the constant speed mode and, by turning it on and off several times, vent the system using the air vent valve of the air separator and other automatic air vent valves, especially on the solar collectors and others, if they are installed in the system (the de-aerated pump works almost silently);
- continuously monitor the system pressure and if it drops, increase it to 5 bar by turning on the filling pump and opening the filling valve;
- repeat the venting until the float of the flow indicator takes a stable position during pump operation, shows a measurable flow and no bubbles appear in the sight glass. Then let the circulation pump run for at least 5 minutes;
- close the air vent valve of the air separator after air discharge is complete, and if an automatic venting valve(s) is (are) anywhere in the solar circuit, also close this valve after venting.

After filling and air venting the solar thermal system, close the fill/drain ball valve, adjust the system pressure to the required value, disconnect the hoses of the filling pump and re-open the ball valve above the pump.