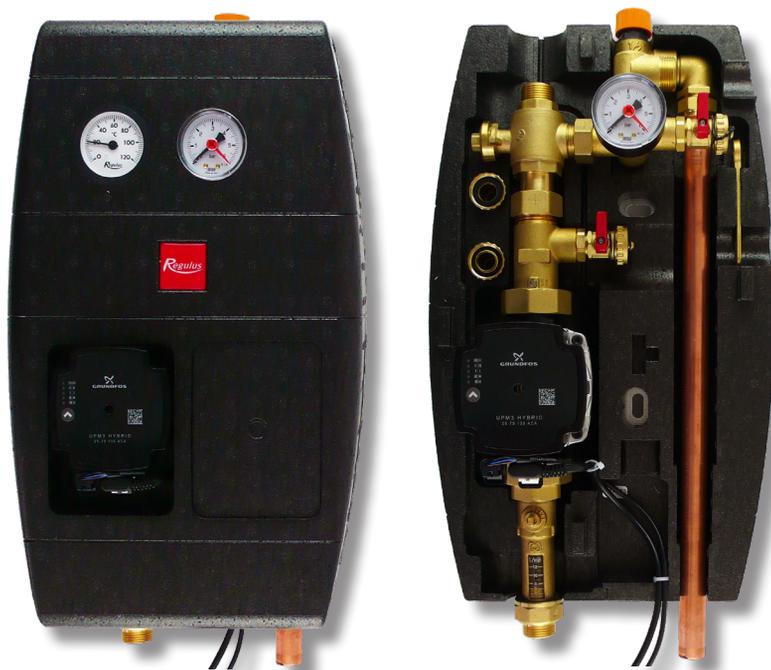


# Regulus

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



CSE SOL G P

Installation and Operation Manual  
CSE SOL G P SOLAR PUMP STATION

EN

CSE SOL G P

## 1. Introduction

CSE SOL G P Solar pump station allows a simple and fast connection to a solar thermal circuit thanks to its design. It is equipped with a high-efficiency solar pump of the latest generation that permits continuous flow control.

The pump station is intended for controllers with PWM control or 230V switching (on/off).

## 2. Pump Station Description

| Main Features |   |
|---------------|---|
| Application   | This solar pump station involves all necessary components, except for a controller, needed for everyday efficient operation of a solar thermal system.  |
| Description   | It consists of a UPM3 Hybrid 25-70 pump, check and safety valves, 2 ball valves, flow rate indicator, pressure gauge, thermometer, installation kits and insulation.<br>The pump station further involves: <ul style="list-style-type: none"> <li>• outlet for expansion vessel connection</li> <li>• outlet from safety valve, incl. extension piping led below the pump station for an easy connection</li> <li>• solar system filling, draining and topping-up valves</li> </ul> |
| Installation  | on a tank or wall   |
| Working fluid | water-glycol mixture (max. 1:1)   |

| Code corresponding to connection size |              |              |
|---------------------------------------|--------------|--------------|
| Connections                           | G 3/4" M     | G 1" M       |
| Flow rate measurement range           | 2-12 l/min   | 8-28 l/min   |
| Code                                  | <b>18958</b> | <b>18957</b> |

## 3. Pump Station Data

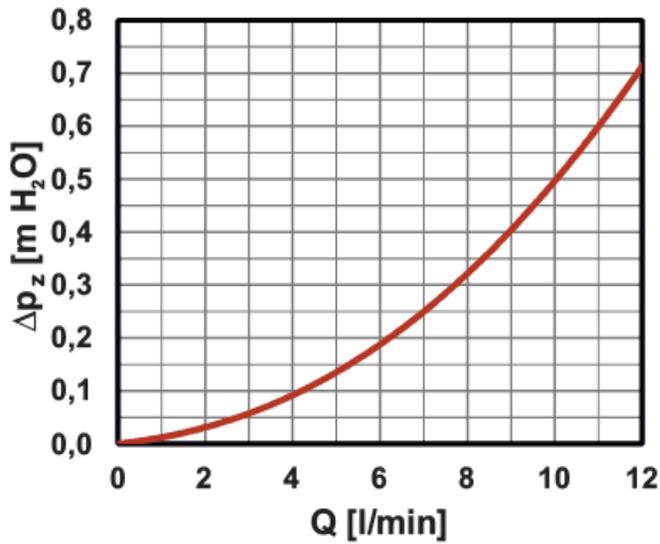
| Data for CSE SOL G P Pump Station |                               |
|-----------------------------------|-------------------------------|
| Max. fluid working temperature    | 110 °C                        |
| Max. working pressure             | 6 bar                         |
| Min. system pressure              | 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                 |
| Overall dimensions                | 470 x 265 x 120 mm            |
| Total weight                      | 6,6 kg                        |

| Min. working pressure values**  |   |
|---|---|
| Min. working pressure values at the suction port depending on temperature | 0,8 bar at 50 °C<br>1,2 bar at 90 °C<br>1,8 bar at 110 °C |

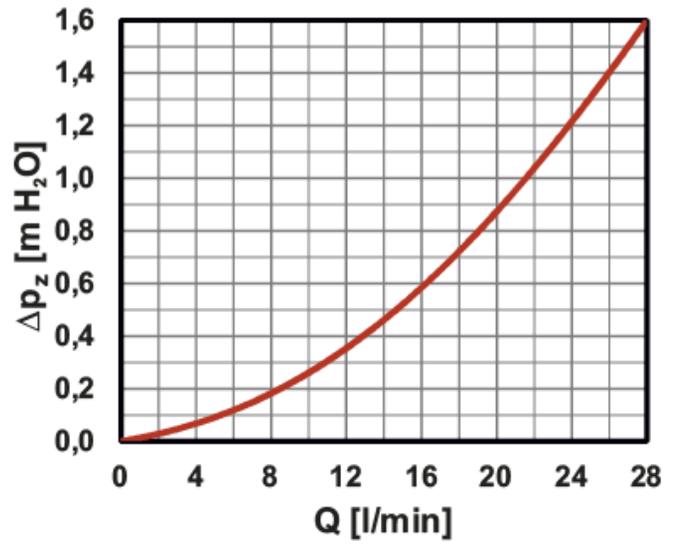
\*\* for standard installations this condition is met when the initial system pressure is set following the formula (see the collector guide):  
 $p = 1,3 + 0,1 \cdot h$  [bar], where h ... height from the pressure gauge to the middle of the collector array [m]

### 3.1 Pump Station Pressure Drop Graph

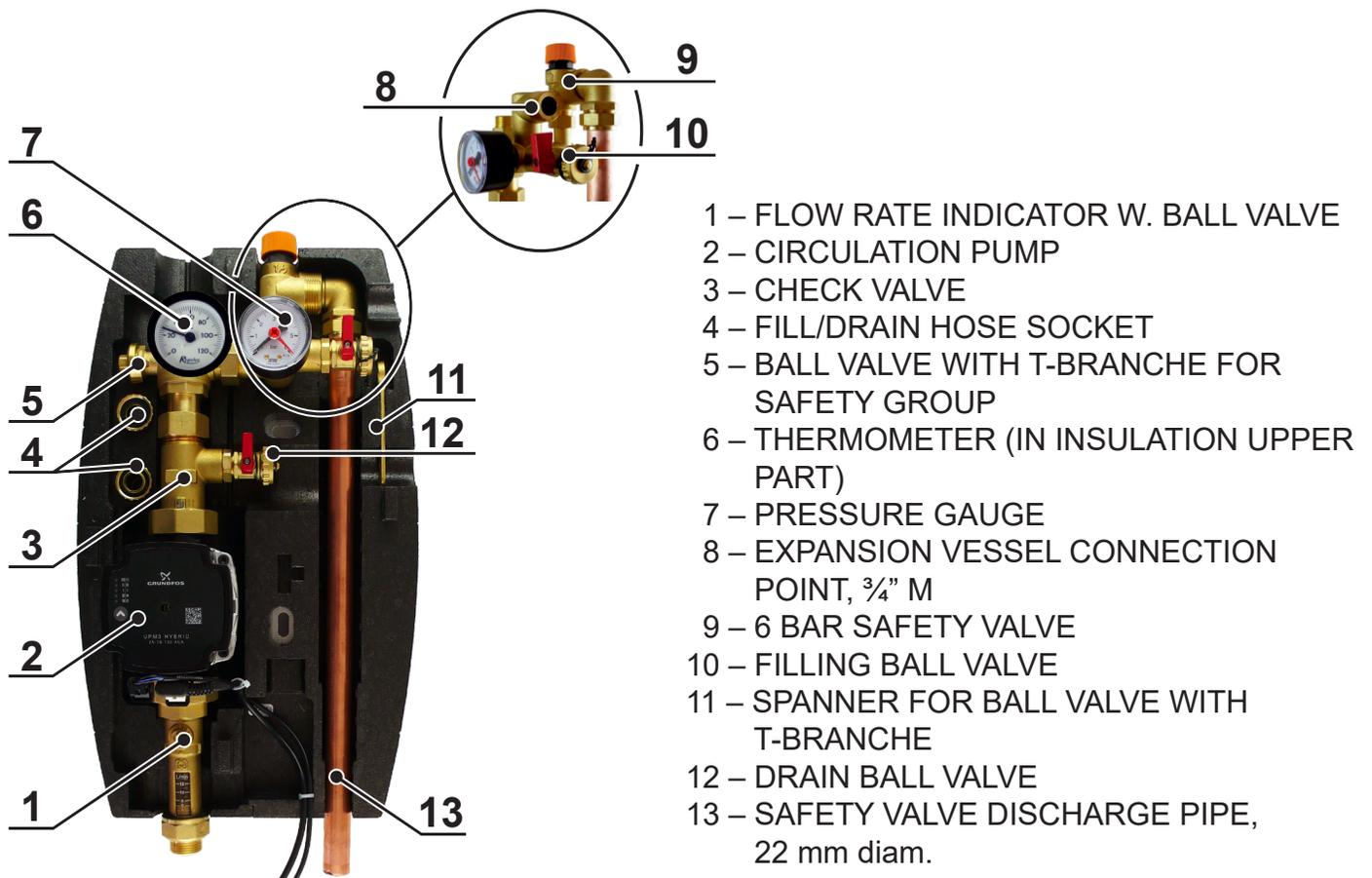
Flowmeter 2-12 l/min



Flowmeter 8-28 l/min

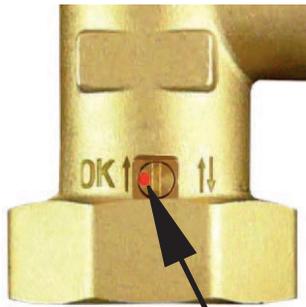


### 4. Pump Station Components



## 4.1 Check Valve

The check valve prevents the tank from being cooled down by gravity circulation during periods of no sunshine. It is located between the ball valves so it can be removed and cleaned without the need to drain solar fluid from the entire solar circuit.



When the mark is on the left-hand side, the check valve is set to normal operation position. If you need to open the valve (e.g. to drain the system), rotate its control so that the red dot is on the right-hand side. The check valve function is thus out of operation.

! It is important for proper operation of the pump station under normal use to have the check valve control always in the right position, i.e. the red mark on the left-hand side (see fig.).

**The right position during operation.**

## 4.2 Ball Valves

Ball valves are intended to isolate the pump station from a solar circuit. Then it is not necessary to drain the solar circuit for servicing (incl. cleaning the non-return valve). In order to have a more solid hydraulic section of the pump station, the upper ball valve is fixed to the rear mounting plate.

The upper ball valve is controlled by a lever that is not present on the valve during operation. To control the lower ball valve that is a part of the flow rate indicator a spanner or pliers are needed. The valve is closed by turning the lever (or spanner/pliers) clockwise by 90°. It is opened by turning the lever anti-clockwise. Prior to turning the lever, the upper part of the insulation needs to be removed. Thanks to that, shutting off the solar circuit is reserved to installers and servicing staff. The user cannot simply shut off the solar circuit, bringing about stagnation and subsequent solar fluid degradation.

The ball valves are fitted with a gland with two O-rings (8.7x1.8 mm) that can be easily replaced after the control element with stops is removed and the gland nut released using a #21 spanner.

## WARNING! IMPORTANT!

The safety relief valve, expansion vessel and upper filling valve always remain connected with the solar thermal system, even when the ball valves are shut off! Never try to isolate them from a filled solar thermal system as there is a risk of serious injury and damage to the system!

Never close the safety valve discharge piping, it shall remain free for fluid eventually discharged by the safety valve!

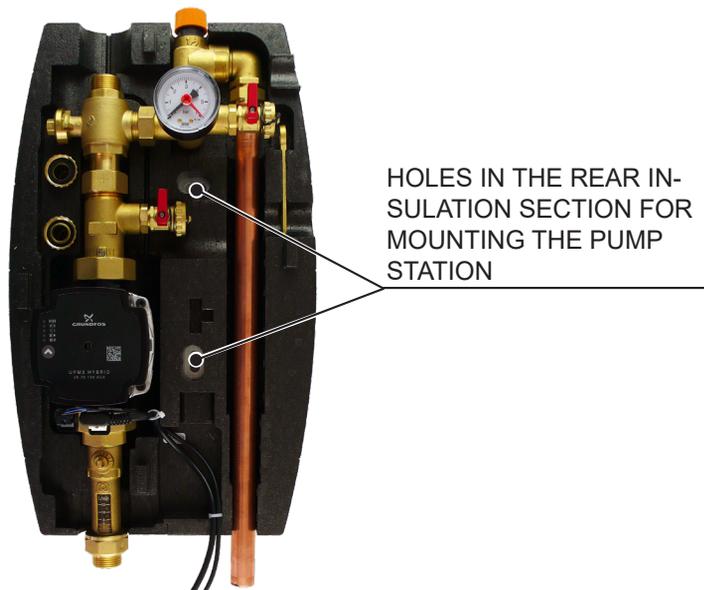
## 5. Accessories

| Accessories (not included in supply)    | Code  |
|---|-------|
| Straight Pipe Fitting, Cu 22 x Cu 22    | 7629  |
| Straight Pipe Fitting, Cu 22 x G 3/4" M | 13695 |

These accessories are not included in supply.

## 6. Installation Options

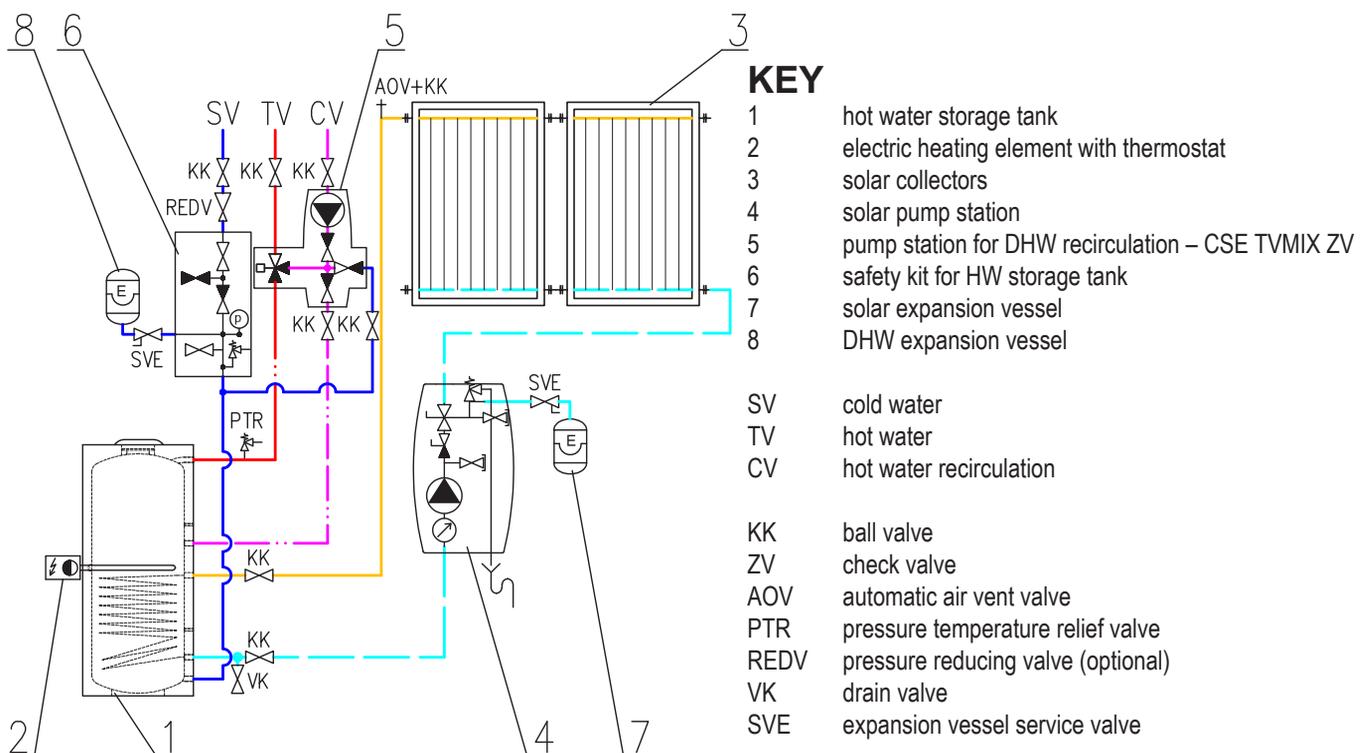
The solar pump station is designed to be mounted on a wall or a tank. In the rear section of the insulation there are two mounting holes. The lower hole is accessible only when the electronic controller and wiring box are removed from the insulation rear section (see the fig. below).



The package includes a mounting kit that is used to fix the pump station to the intended place.



## 7. Pump Station Connection Diagram



## 8. UPM3 HYBRID 25-70 Pump

### Pump Control

The circulation pump can be controlled:

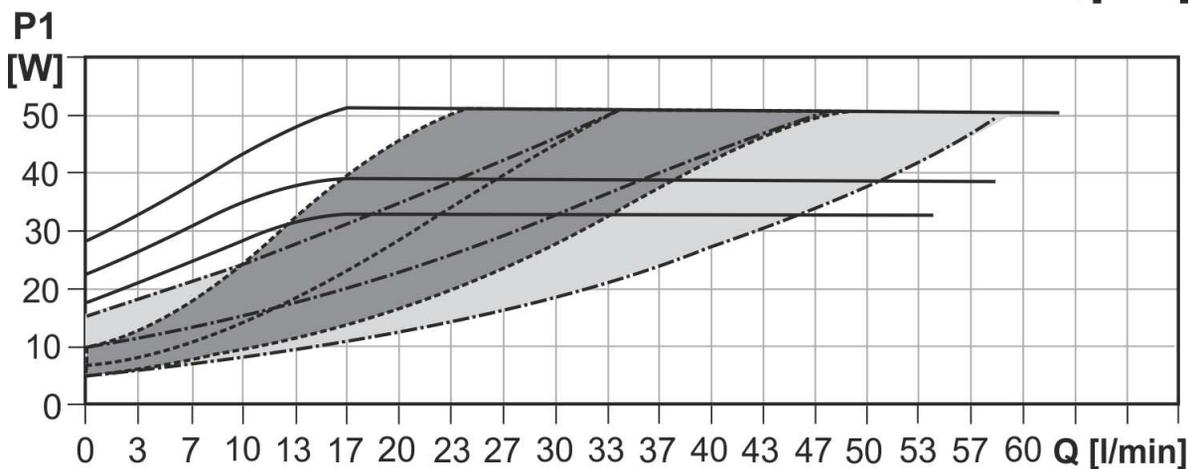
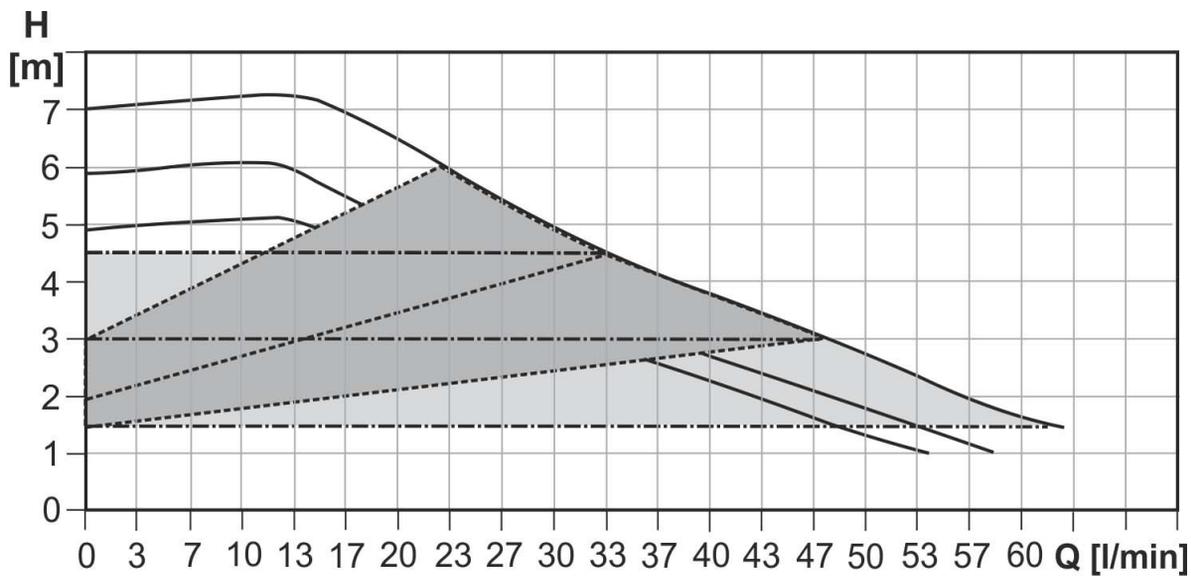
- internally without a PWM signal by selecting a suitable mode and pump performance curve
- by an external PWM C control signal (profile for use in solar thermal systems)

#### WARNING – IMPORTANT

The pump permits also control by a PWM A control signal (profile for use in heating systems).

This mode must not be used for solar thermal systems.  
Using the PWM A mode would cause system damage.

### 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.



| CONTROL MODE          |                       | DESCRIPTION  |
|-----------------------|-----------------------|--|
| 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 a constant speed.
- Pump operating point: moves up or down on the selected constant 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                               |
|                | II                  | 6 m                               |
|                | III                 | 7 m                               |

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

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

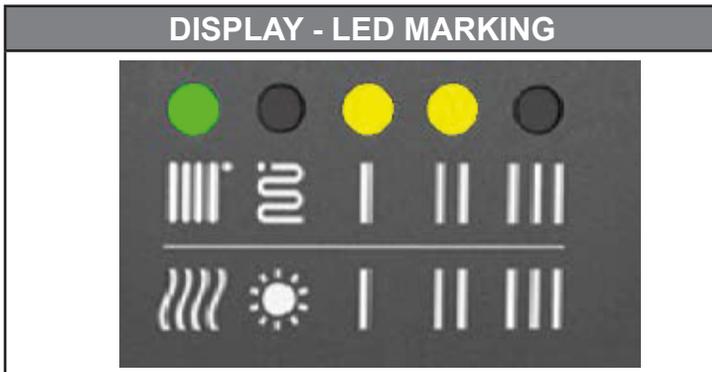


### e) EXTERNAL CONTROL - PWM A (heating)

#### WARNING – USING PWM A MODES IS PROHIBITED

Using PWM A modes (I, II, III) in a solar pump station would lead to system damage.

## Settings Display



The LED marking is further omitted for better clarity.

|    | 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  |
| 14 |                           |                 | II   |
| 15 |                           |                 | III  |
|    |                           |                 | <b>WARNING – USING THESE MODES IS PROHIBITED</b> |

| GREEN LEDS FLASHING FREQUENCY | CONTROL  | PWM SIGNAL RECEPTION |
|-------------------------------|----------|----------------------|
| 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.

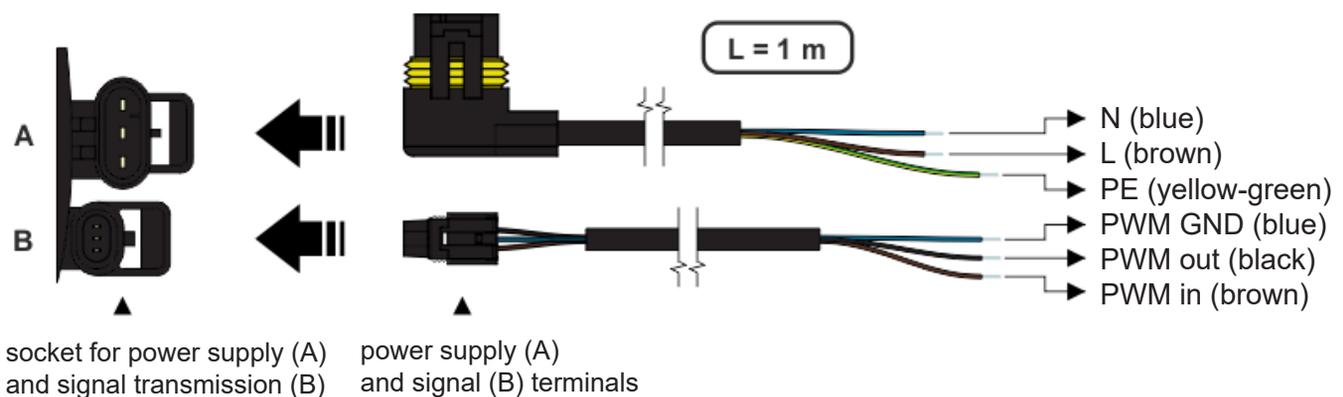
## Setting selection

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 open. The ball valve above the pump is 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. After filling the solar thermal system, close the fill and drain ball valves, disconnect the hoses and re-open the ball valve above the pump.

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

