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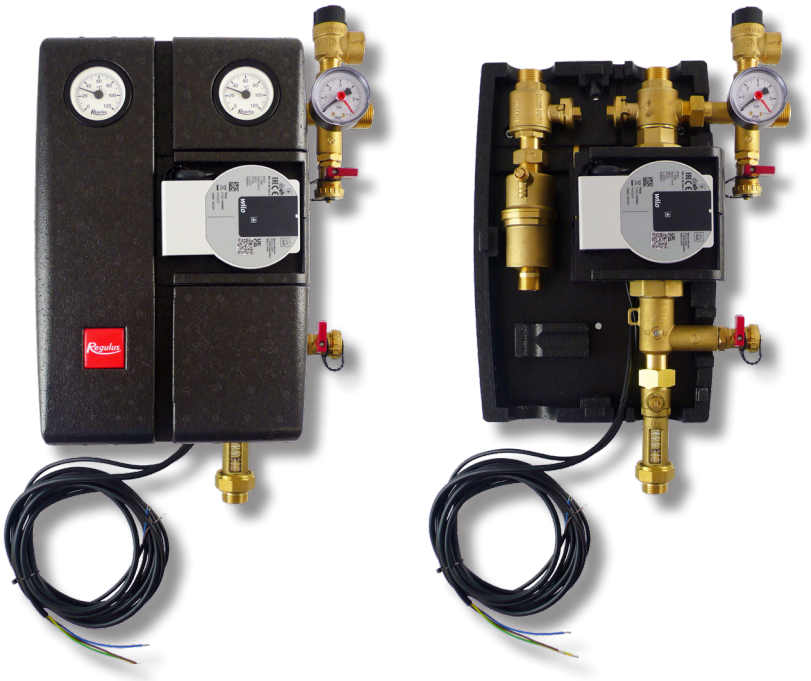


CSE2 SOL W P

Installation and Operation Manual

**CSE2 SOL W P SOLAR PUMP STATION**

**EN**

# CSE2 SOL W P

# 1. Introduction

Thanks to its design, CSE2 SOL W P solar pump station enables a simple and quick conenction into a solar circuit. It is fitted with a high-efficiency solar pump of the latest generation that permits continous flow control.
The pump station is designed for solar controllers with control by PWM signal (profile for solar thermal systems). The pump will not run without a PWM signal. iPWM signal can be read from the pump, for current flow rate measurements.

# 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 consist of a Para ST 25 / 7-50 / iPWM2 pump, check and safety valves, 3 ball valves, flow indicator, pressure gauge, air separator with air discharge, thermometer, installation kit and insulation.<br>The pump station further involves:<br>● connection point for an expansion vessel<br>● safety valve outlet<br>● ball valves for filling, draining and topping up a solar thermal system |
| 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 | Cu 22mm |
| Flow measurement range | 2-12 l/min | 8-28 l/min | 2-12 l/min |
| Code | 19985 | 19988 | 20549 |

# 3. Pump Station Data

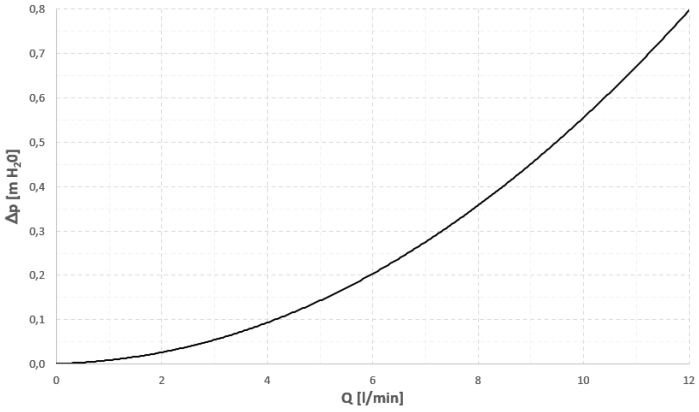
| Data for CSE2 SOL W P Pump Station | |
|---|---|
| Max. fluid working temperature | 110 °C |
| Max. working pressure | 6 bar |
| Min. system pressure | 1.3 bar with the pump stopped |
| Power supply | 230 V, 50 Hz |
| IP rating | IP20 |
| Ambient temperature | 5 - 40 °C |
| Max. relative humidity | 85 % at 25 °C |
| Insulation material | EPP RG 60 g/l |
| Overall dimensions (H x W x D) | 490 x 310 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<br>1.2 bar at 90 °C<br>1.8 bar at 110 °C |

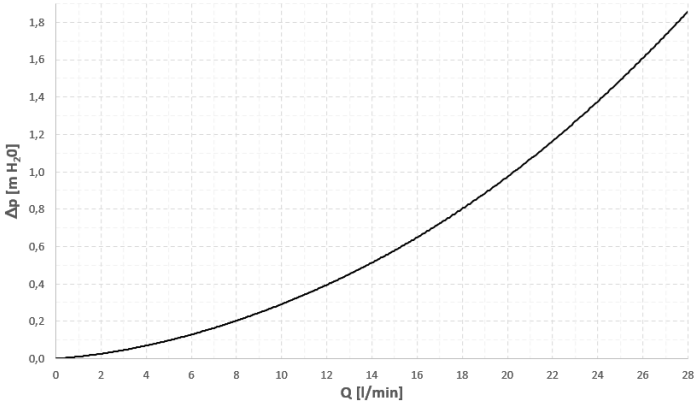
** this condition is met for current installations when the initial system pressure is set following the formula (see the Instructions for solar collectors): $p = 1,3 + 0,1 \cdot h$ [bar], where h… is the height from pressure gauge to the middle of collector array [m]

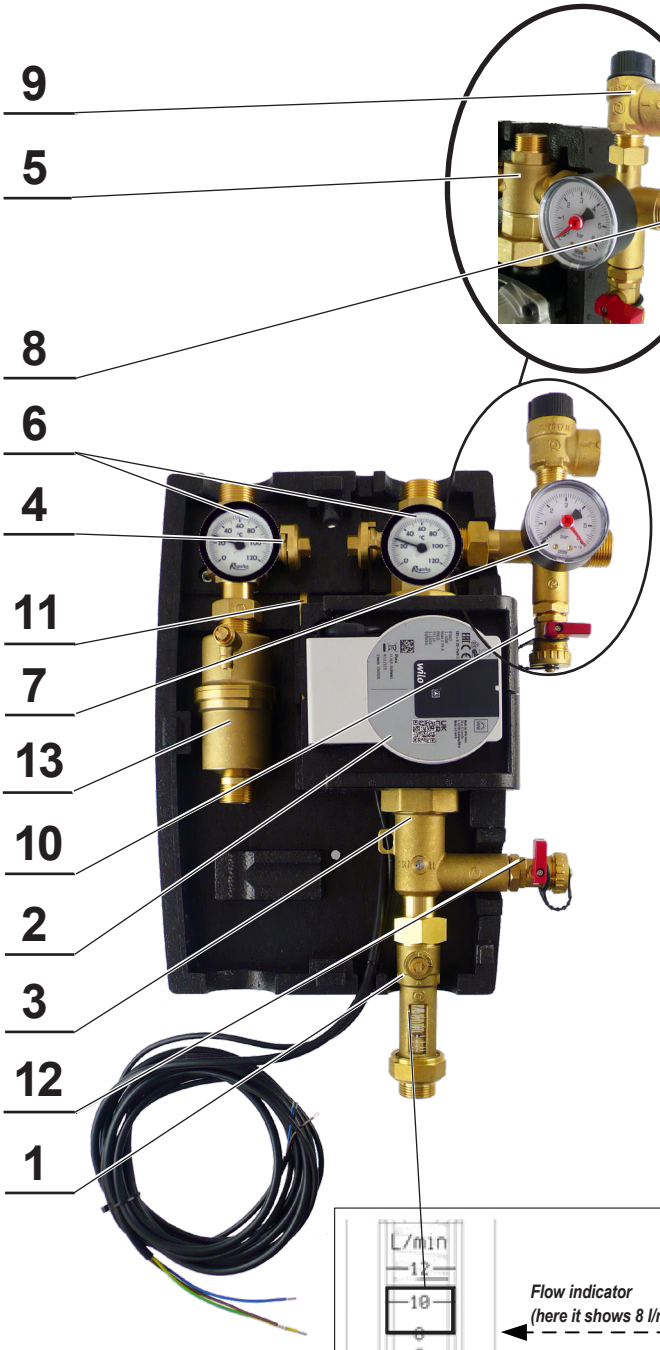
## 3.1 Pressure drop diagram

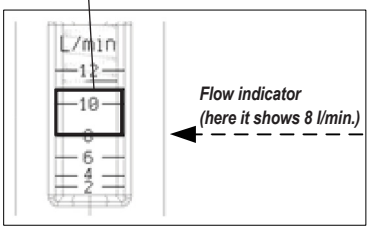
G 3/4“ M connection - code **19985** and Cu 22 mm connection - code **20549**




G 3/4“ M connection - code 19988

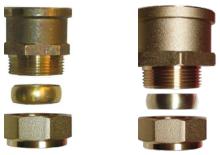



**Flow indicator:**
When reading the flow rate, the value at the lower edge of the sliding indicator applies.

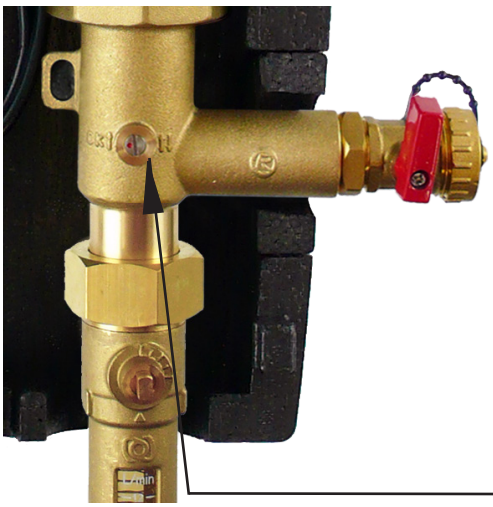
1 - FLOWRATE INDICATOR W. BALL VALVE
2 - CIRCULATION PUMP
3 - CHECK VALVE
4 - BALL VALVE ON THE INCOMING PIPE FROM SOLAR COLLECTORS
5 - BALL VALVE W. SIDE OUTLET FOR SAFETY GROUP
6 - THERMOMETER (IN THE UPPER PART OF INSULATION)
7 - PRESSURE GAUGE
8 - EXPANSION VESSEL CONNECTION POINT, 3/4“ M
9 - 6 BAR 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



Pump station 20549 includes fittings in the package for connecting the air separator and flow indicator to a 22mm diameter copper pipe. Ball valves 4 and 5 are fitted with a sleeve for connection to 22mm copper pipe.

## 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 between the ball valves and can therefore be removed and cleaned without having to drain the solar fluid from the entire circuit.



If the mark is on the left, the check valve is in the position for normal operation. If you need to open the valve (e.g. to drain fluid from the system), turn the control element of the check valve so that the red dot is on the right. Thus the check valve function will be disabled.

**It is imortant for normal operation of the pump station to have the check valve control always in the proper position, i.e. the mark on the left (see fig.).**

**The right position during operation**

## 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!

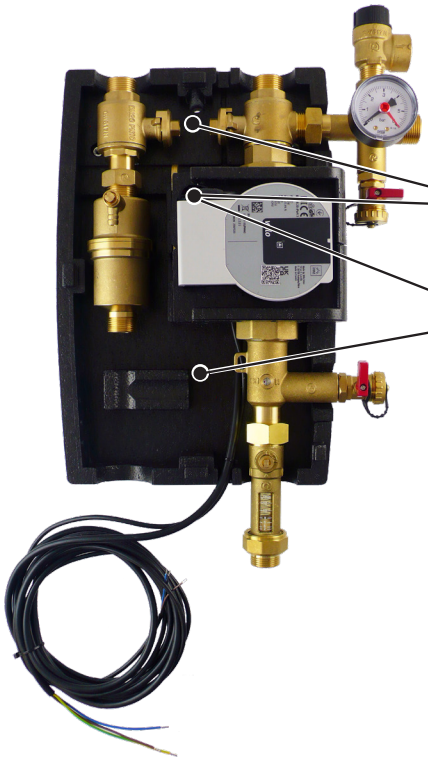
Never close the drain line of the safety valve, it must always be free for any liquid leaking from the safety valve!

## 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.

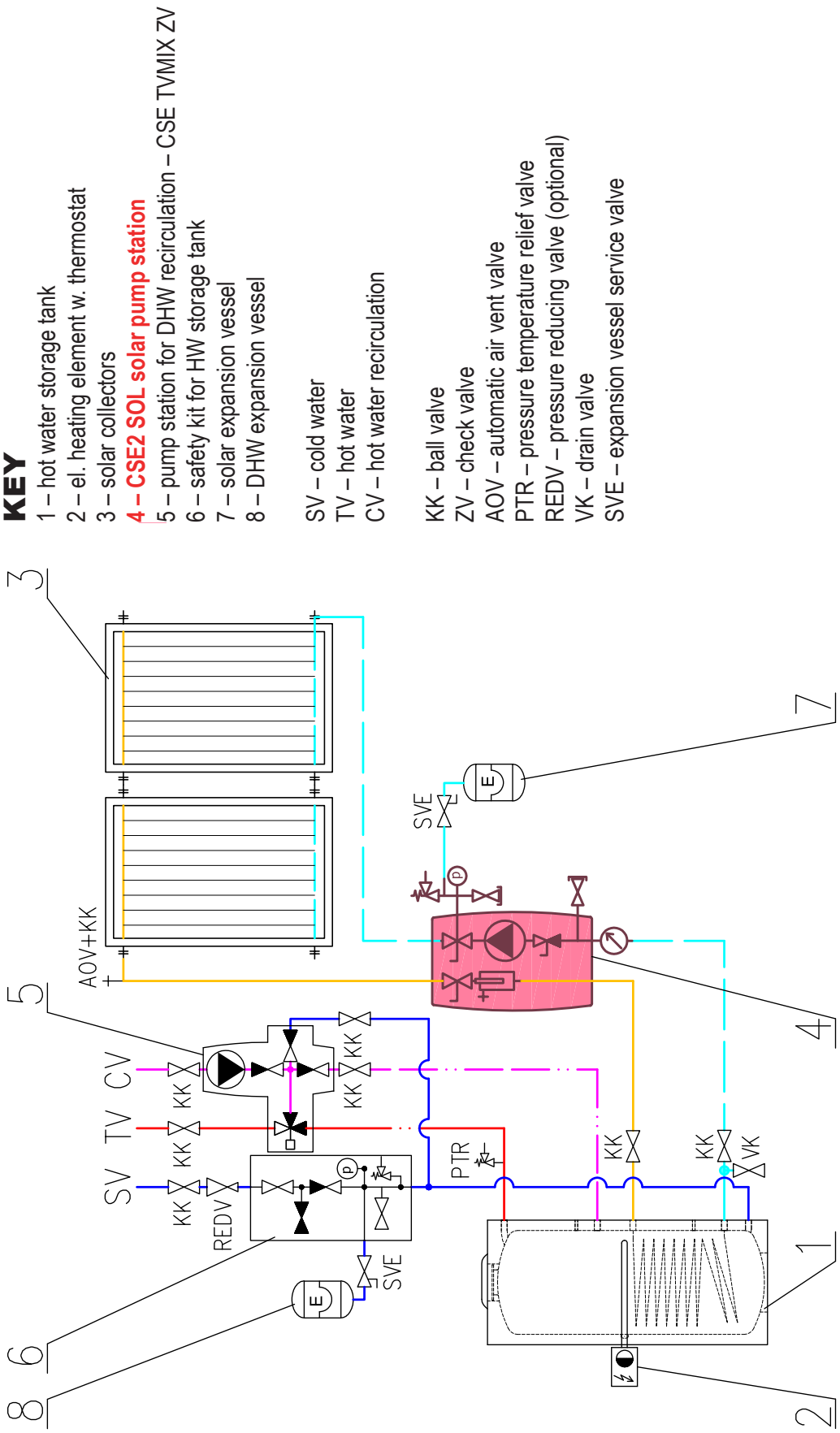



Contents of the mounting kit included in supply:

- 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

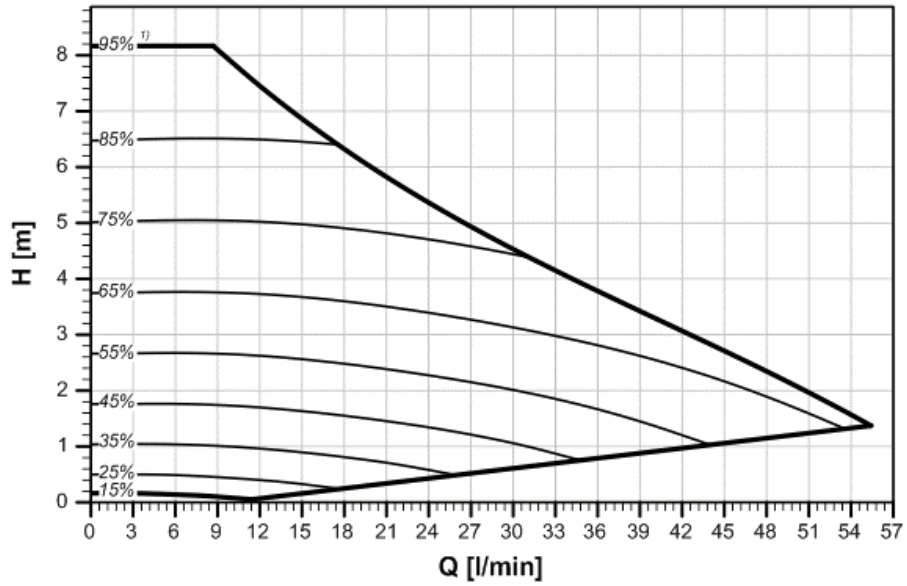
# 7. Pump Station Connection Diagram

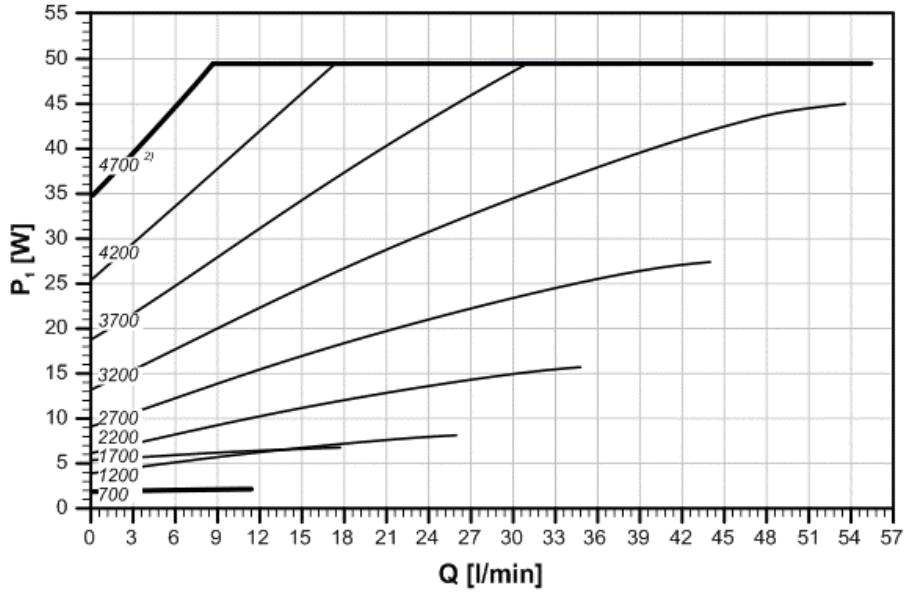


# 8. Wilo-Para iPWM2 Pump

The Wilo Para 25/7 iPWM2 is a wet running circulation pump. The pump speed is controlled by the PWM signal. When the PWM signal is disconnected, the pump stops running (PWM profile for solar thermal system pump). The operating status and possible faults of the pump are indicated by LEDs directly on the pump. The pump is able to send the current flowrate electronically to an external controller. The controller must be equipped with an iPWM read input and a flow calculation function.
The high efficiency circulation pumps of the PARA iPWM2 series are used exclusively for the circulation of liquids in solar thermal systems. Operating the pump in other systems or in systems containing too little water, air bubbles or not pressurized can lead to its rapid destruction.

## 8.1 Performance curves




***NOTE:***
*1) PWM signal value in %,*
*2) speed in 1/min*

## 8.2 Technical Data

| Wilo PARA 25/7 iPWM2 | |
|---|---|
| | |
| **Electric Data** | |
| Power supply | 1 ~ 230 V, 50 Hz |
| Power input (min./max.) | 1.8 / 50 W |
| Current (min./max.) | 0.02 / 0.43 A |
| Max. speed | 4700 rpm |
| Energy Efficiency Index | ≤ 0.20 by EN 16 297/3 |
| IP rating | IPX4D |
| Motor protection | integrated |
| | |
| **Operating Parameters** | |
| Fluid working temperature | -10 to 110 °C |
| Max. static pressure | 10 bar |

## 8.3 Visual indication of pump operation

**The LED light signals a defect. The pump will switch off (depending on the defect type) and try to restart.**

| LED Signals | | State Description and Possible Fault Reasons |
|---|---|---|
| | GREEN IS LIT | 1 - pump is running in trouble-free operation |
| | RED IS LIT | 1 - rotor is blocked |
| | | 2 - electric motor winding defect |
| | BLINKING RED | 1 - power supply lower/higher than 230 V |
| | | 2 - electric short circuit in pump |
| | | 3 - pump overheated |
| | BLINKING RED AND GREEN | 1 - unforced fluid circulation through the pump |
| | | 2 - pump speed lower than desired |
| | | 3 - air in pump |

**If the fault cannot be rectified, contact a qualified technician.**

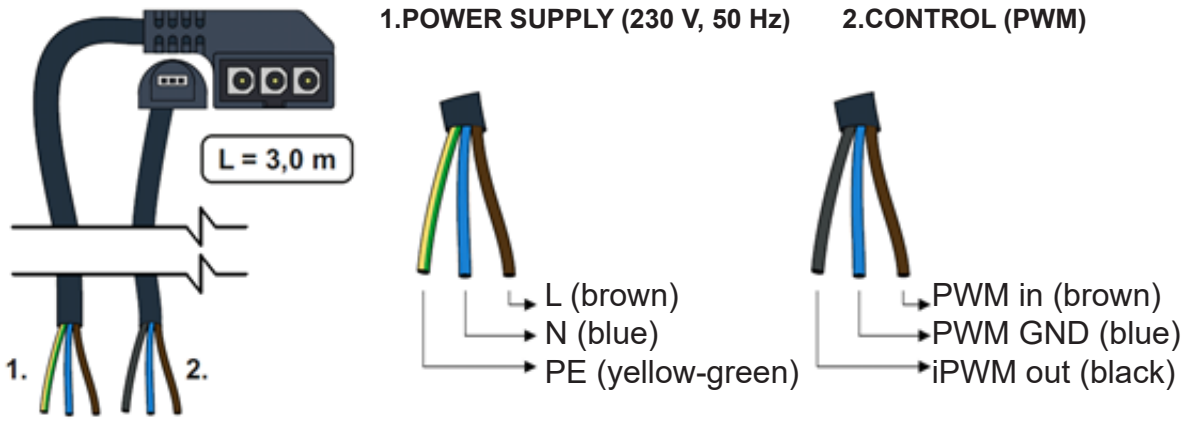
## WARNING! IMPORTANT!

For the pump to run, it is necessary to connect a controller that controls the pump speed through a PWM signal for solar pumps. The pump is switched on and off and it speed changes within the range set by its performance curves (see page 6) depending on the PWM signal value. The pump connects to a controller using the PWM signal cable, included in supply.

**OPERATION OF THE PUMP WITHOUT A PWM SIGNAL IS NOT POSSIBLE!**

## 8.4 Wilo PARA 25/7 iPWM2 Pump Wiring

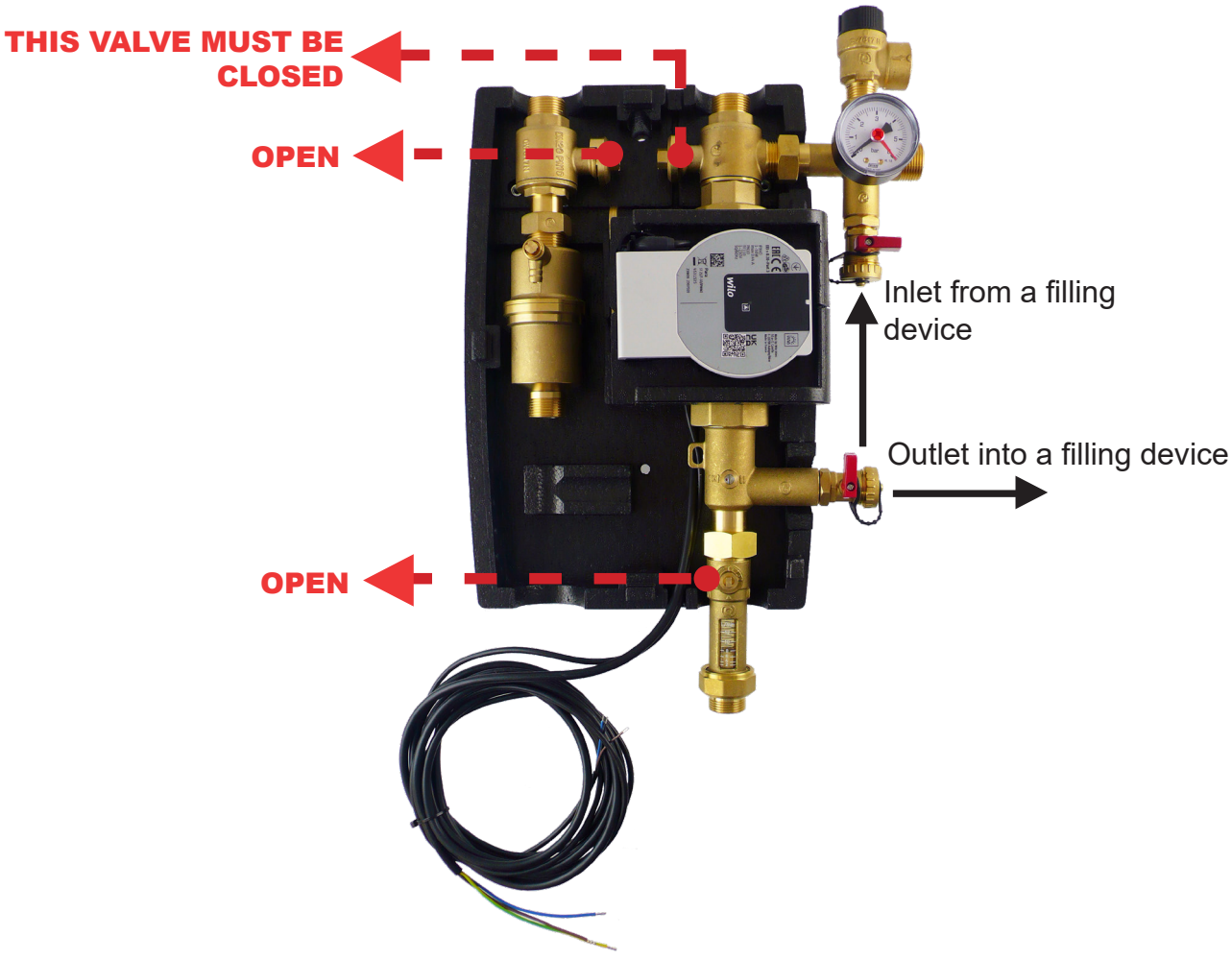
**The pump must be wired to / disconnected from power supply and a controller by a qualified person in compliance with EN 50110-1!**




## 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.

**Prior to commissioning the system, both the 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, turn the check valve control element so that the red dot is on the right (see Chap. 4.1), open the ball valve above the pump, do not disconnect the filling pump hoses!
- The pump shall be set to max. speed using the controller and by PWM signal setting to max. Vent the system by turning the pump on and off several times, 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, turn the check valve control element so that the red dot is on the left, close the fill and drain ball valves, adjust the system pressure to the required value, disconnect the hoses of the filling pump and reopen the ball valve above the pump!**

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