

# DrainSet

Installation and operating instructions





**Read carefully before installation, commissioning and operation**


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## Safety Instructions

 The operation without antifreeze is only permissible with clearance from the manufacturer of the collectors and a careful and expert fitting and installation! The manufacturer does not warrant against frost damage! Operate the installation with glycol.

 In case of operation without antifreeze fluid, a corrosion inhibitor shall be provided which permanently protects the system against corrosion.  
Alternatively, purified water can be used.  
Please refer to the manufacturer's specifications and recommendations for the individual components.

 For the operation of the drain set only, **self-emptying collectors** may be used!  
For detailed information on compatibility of installed collectors, please contact the manufacturer of the collectors.

 Care must be taken to ensure that the collectors can drain completely and that the entire piping to the drain set is laid at a slope.

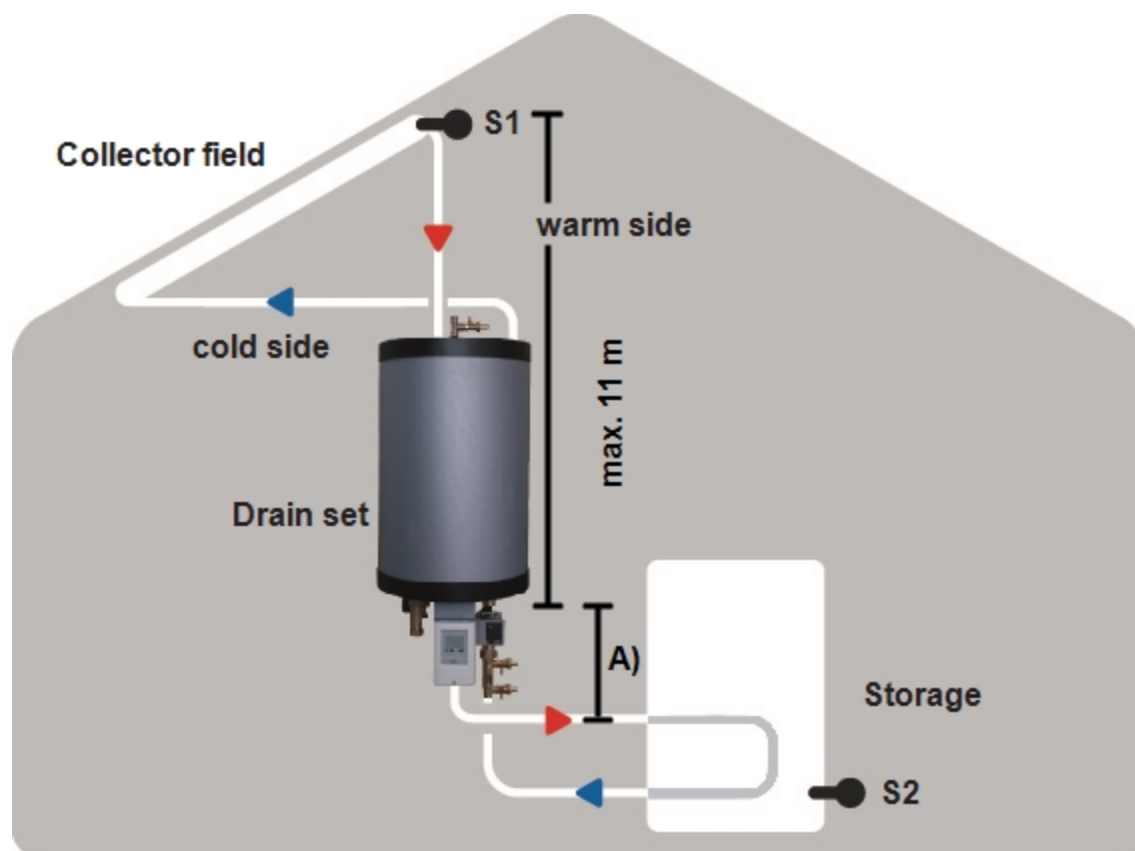
## Specifications

Size of collector field	up to 35m <sup>2</sup> ; depending on type of collector
Controlling	MTDC / LTDC
High efficiency pump	For delivery heads of up to 11 m, optionally upgradeable to 22 m, in compliance with EU standard 2015
Solar station	consisting of flushing and filling unit DN20 and safety valve
Pressure gauge	Max. operating pressure 6 bar
Weight	ca. 23 kg (without fluid) / ca. 65 kg (with fluid)
Content	ca. 40 l
Insulation	50 mm insulation according to DIN-EN13501-1 standard.
Material	Steel container, untreated / not suitable for drinking water
Overall dimensions	H 1100 mm x B 425 mm x T 425 mm

### Electrical specifications of controller:

Mains voltage	110 - 230 VAC +/- 10%
Mains frequency	50 ... 60 Hz
Power consumption	0,5 W - 2,3 W

## Installation Diagram



Please note that during the installation of the drain set, the distance of measurement A - lower edge of drain set vessel / connection port of uppermost solar heat exchanger has to be between 100 mm and 1,000 mm.

## Quick Start



This quick start is only for the professional installer who knows the setup and operation of drain back systems.

The following instructions describe a fast and simple way to commission the installation.

### 1. Wall Installation and installation

Install the Installation and all pipes see " Installation " on page 4.

### 2. Determine drain volume

Calculate or determine the drain volume see " Drain volume " on page 5.

### 3. Filling and venting

Completely fill and vent the installation vial the filling unit see " Commissioning of the installation " on page 6.

### 4. Drain drain volume

Drain the calculated or determined drain volume from the installation see " Drain volume " on page 5.

### 5. Check pressure on installation

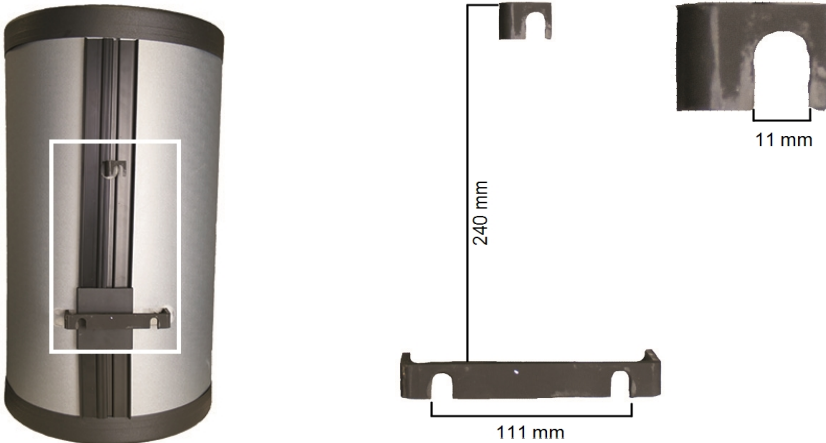
Check pressure on installation. If you have filled installation in warm condition, negative pressure is going to set in after the cooling of the solar circuit. In order to equalize the negative pressure, open the ball valve of the air venting unit (3) for a short time and compensate the accrued negative pressure.

## Installation



Total weight of drain sets 65 kg. The load-bearing capacity of the ground has to be tested before installation. The dimensioning and kind of fixation have to be tailored toward that and have to be provided on site.

1. The installation is done on the three-point suspension on the back side.  
After the placing of the fixings, the drain set is hung on the fastening points and fixated.

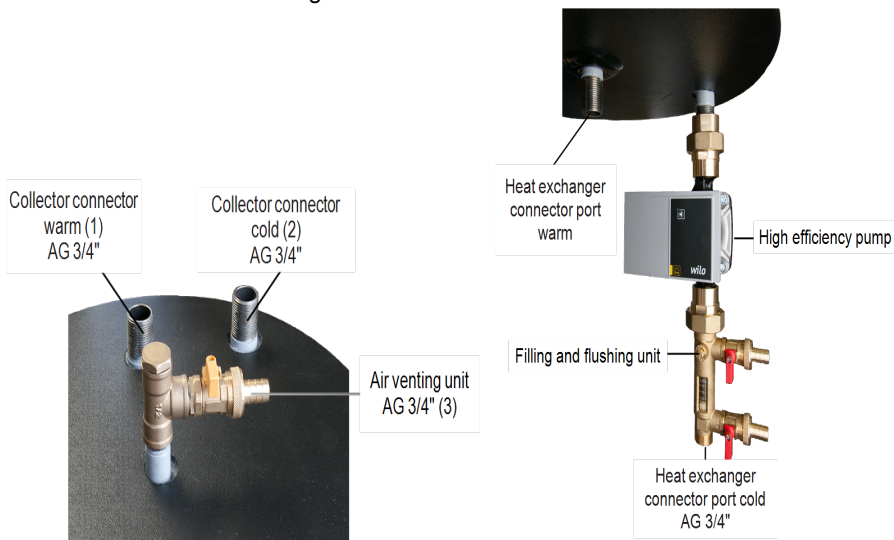


2. Now, install the connection pipes to the collector!



Please note, the entire piping from the collector to the drain set has to be layed on a slope!

3. Next, connect the drain set with the connectors of the heat exchanger of the storage or the external heat exchanger.



Please note, the piping from the drain set to the heat exchanger has to be layed on a slope!

4. Affix the storage sensor to the storage. Should a different installation diagram other than the pre-set one be used, follow the installation instructions of the supplied controller.
5. Install all other sensors and wire them up with the controller. See installation instructions of supplied controller.

## Filling quantity

### Calculation and determination of the filling quantity of the installation



The filling quantity depends on the components used in the installation. The respective values for collector content, heat exchanger content and content of the installed piping is provided in the technical documentation of the individual components.

The filling quantity is the total content of the installation when it is completely filled and the air is drained.

**The filling quantity of the installation is determined as follows:**

**Filling quantity = content of collectors + content of all pipes + content of heat exchanger + content of drain set**

The collector content according to the technical datasheet of the installed collectors.

Content of pipes according to installed length of pipes and cross section see "Fluid contents / Volumes" on page 8.

The content of the heat exchanger (external/internal) is provided in the technical documentation of the heat exchanger or respectively the storage.

The content of the **drain set is 40 liters**.

Should additional system components that influence the filling quantity of the installation be installed, they have to be taken into account for calculation and determination of the filling quantity.



Be sure that during the filling of the installation, the mix of glycol and water is filled at room temperature (15 °C - 25 °C).

## Expansion volume

### Determine the the expansion volume of the installation

The expansion volume of the solar fluid with temperature increase has to be taken into account.

Depending on the total volume of the photovoltaic system, an expansion volume has to be drained. The respective value can be found in the table see "Expansion Volume" on page 8.

## Drain volume

### Calculation and determination of the drain volume of the installation



The drain volume depends on the components used in the installation. The respective values for collector content, heat exchanger content and content of the installed piping is provided in the technical documentation of the individual components.

**The drain value of the installation is determined as follows:**

**drain value = collector content + content of all collection and connection pipes + expansion volume**

The collector content according to the technical datasheet of the installed collectors

Depending on the collector field installation, collection and connection pipes are installed. The content of these pipes is provided in the technical documentation of the manufacturer of the collectors.

## Installation content

### Calculate the installation content of the installation



In order to avoid negative pressure in the installation, it is advised to run the system with a pressure of ca. 0.5 bar (above installation pressure due to static height).

If you want to adjust the pressure increase of the installation via the filling station, determine the installation content as follows:

**installation content = filling quantity - drain volume**

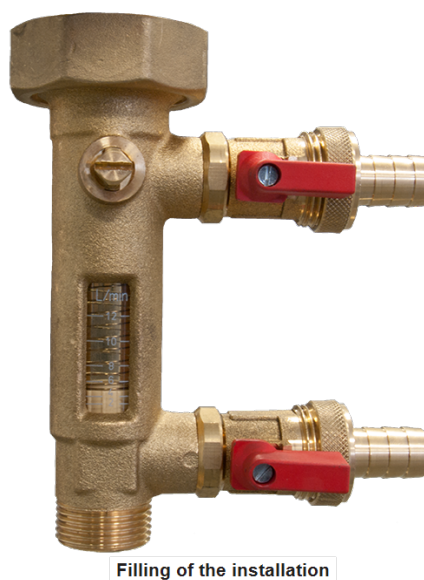
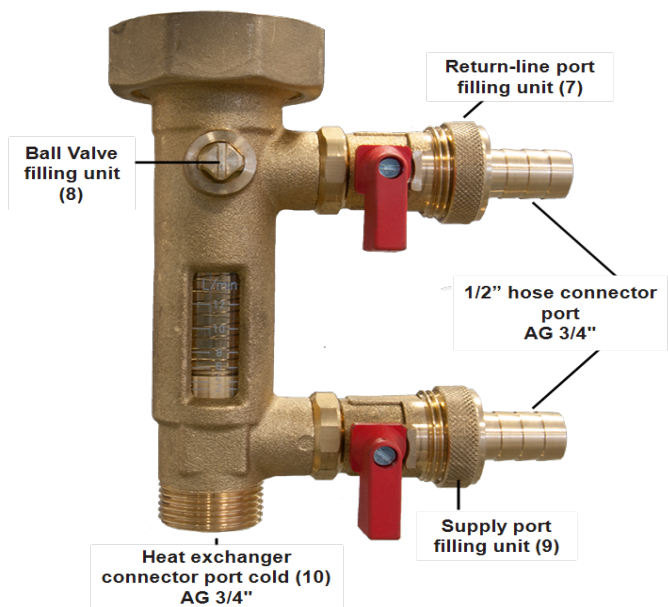
## Commissioning of the installation

### Filling of the installation

2. Connect the pressure hose of filling station to connection port (9). The ball valve on connection port (9) is opened.
3. The ball valve (8) is closed.
4. Connect the return hose of filling station to connection port (7). The ball valve on connection port (7) is opened.
5. Pump the mix of glycol and water into the installation with the filling station until fluid leaks out at connection port (7). Shut off filling station and close ball valve on connection ports (7) and (9).
6. Open ball valve (8) and run installation manually for ca. 15 min - see installation instructions for controller-, in order to bind entrapped air from the system in the drain set.
7. Afterwards, connect the return hose to the air venting unit (3). The ball valve on the air venting unit is opened.
8. Connect the pressure hose of the filling station to connection port (7). The ball valve on connection port (7) is opened. The ball valve (8) is closed.
9. Again, pump mix of glycol and water into the installation with the filling station until fluid leaks out at the air venting unit. The installation is now completely filled and vented.

### Drain installation

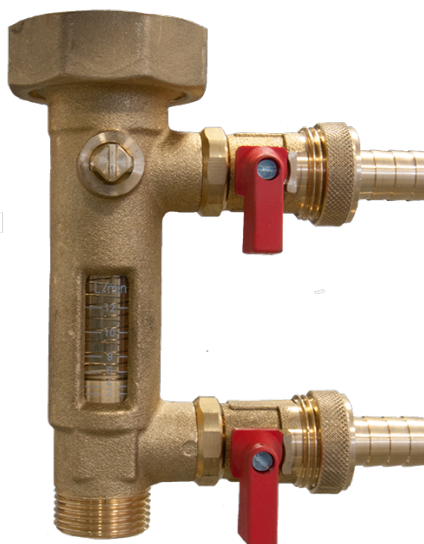
10. In order to maintain the necessary air volume in the installation, a part of the installation has to be drained. In order to do that, the necessary drain volume has to be determined see "Drain volume" on page 5 and drained.
11. In order to do that, connect a hose, that leads to a collecting vessel, to the air venting unit (3). The ball valve on the air venting unit is opened.
12. Further, connect a hose that also leads to the collecting vessel, to the filling unit (7). The ball valve (7) is opened. Ball valves (8) and (9) remain closed.
13. Now, drain the exact volume according to prior determination from the system!
14. After the drain volume was drained, the ball valves on the air venting unit (3) and the filling unit (7) are closed.



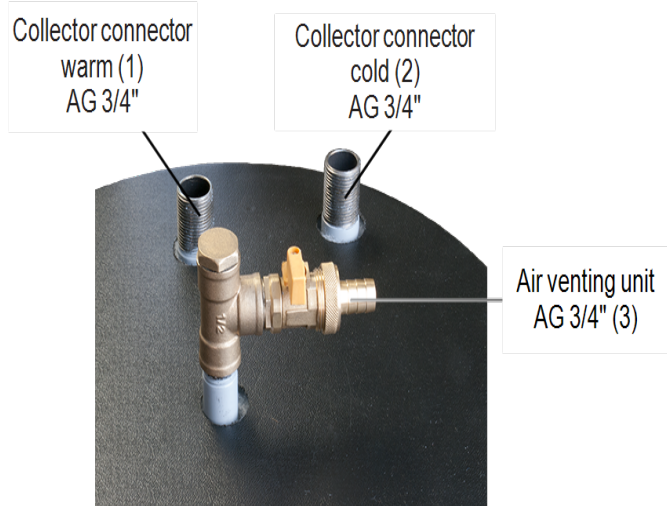
Filling of the installation



Ball valve operational state



Operation of installation



## Adjust installation pressure

### Variant 1: pressure increase with filling station

Depending on the content of the installation, a defined volume is now drained from the installation see " Discharge Volume for Pressure Increase " on page 8.

1. In order to do that, connect a hose to the air venting unit (3). The hose leads back into the vessel of the filling station. The ball valve of the air venting unit (3) is opened.
2. Further, connect a hose that also leads to the vessel to the filling unit (7). The ball valve (7) is opened. The ball valves (8) and (9) remain closed. Now, drain the exact volume according to prior determination from the system!
3. After the drain volume has been drained, the ball valve is connected to the the air venting unit.
4. Now, pump the drained fluid back into the installation via the connection port (7) on the filling unit with the help of the filling station. Connect the ball valve to the filling unit (7).

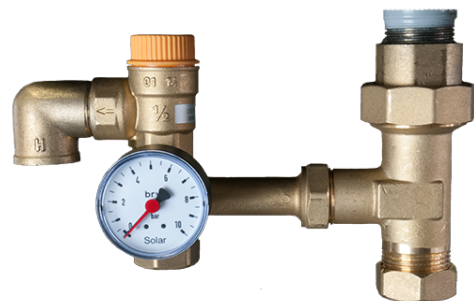
## Adjust installation pressure

### Variant 2: pressure increase with compressor

1. In order to do that, connect a compressor to the filling unit 9 and open the ball valve.
2. Close ball valve (7) and (8) and increase the pressure by 0.5 bar at a system temperature of 15 - 25°C (can be read on the pressure gauge of the safety system).



Be sure that the system pressure in the compressor is above the pressure in the installation. Otherwise solar fluid can flow into the compressor.



Safety system



**Important:** Please note that the fluid in the installation has to circulate freely into every direction. No automatic blocking systems may be installed in the entire photovoltaic system.

## Fluid contents / Volumes



Information regarding the determination of the content of the installed collector surface including all collector connectors are provided in the technical data of the collector manufacturer.



Information regarding the determination of the content of the installed pipes are provided in the tables on pipe volumes taking into account the installed pipe dimension and pipe length.



Information regarding the determination of the content of the installed heat exchanger is provided in the technical data of the heat exchanger or the installed storage.

### Expansion Volume

Filling Quantity	Expansion Volume	Comment
50 l	3 l	The <b>filling quantity</b> = amount of solar fluid that is needed to fill the entire system.
51 l - 100 l	6 l	
101 l - 150 l	9 l	
151 l - 200 l	12 l	

### Discharge Volume for Pressure Increase

Installation Content	Discharge Volume	Comment
20 l	10 l	The <b>installation content</b> = amount of solar fluid that is in the installation during operation (installation content = filling quantity - drain volume)
21 l - 40 l	20 l	
41 l - 60 l	30 l	
61 l - 80 l	40 l	
81 l - 100 l	50 l	

### Pipe Volume

#### Copper Pipe

Abmessung	Volume (l/m)
15 x 1	0,13
18 x 1	0,20
22 x 1	0,31
28 x 1	0,53
35 x 1,5	0,80
42 x 1,5	1,19
54 x 2	1,96

#### Stainless Steel corrugated Pipe

Abmessung	Volume (l/m)
DN 16	0,24
DN 18	0,27
DN 20	0,37
DN 25	0,66
DN 32	1,00
DN 40	1,42
DN 50	2,33



The volume l/m for the stainless steel corrugated pipe can vary. Please observe the manufacturer's information.

## Example calculation

- The installation encompasses 6 collectors with pipe length of 12 meters copper piping with a diameter of 18 mm. The collector content is 2 litres per collector.
- The collection and connection pipes have a content of 2 litres.
- The internal heat exchanger has a content of 6.5 litres.
- The drain set has a content of 40 litres.

Filling quantity of installation:

Collector content:	6 collectors x 2 l	12 l
Content of pipes	12 m x 0,2 l	2,4 l
Content of collection and connection pipes		2 l
Content of heat exchanger		6,5
Content of drain set		40 l
<b>Filling quantity</b>		<b>63 l (rounded up)</b>

<b>Expansion volume vor 63 l filling quantity</b>	<b>51 l - 100 l</b>	<b>6 l</b>
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Drain volume of installation

Collector content		12 l
Content of all collection and connection pipes		4,4 l
Expansion volume		6 l
<b>Drain volume of installation</b>		<b>23 l (rounded up)</b>

<b>Installation content</b>		<b>40 l</b>
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<b>Drain volume for pressure increase</b>	<b>21 l - 40 l</b>	<b>20 l</b>
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## Commissioning/ Commissioning protocol

After the device components have been installed, the system has been filled with fluid, vented and the device pressure has been set, the installation is ready for its commissioning.



For the commissioning, please use the solar controller that has been preset by the factory. Please refer to the enclosed instructions for the controller for further information regarding the commissioning.

Building Owner	
Collector Type	
Number of Collectors	
Collector Surface	
Storage Type	
Storage Volume	
Primary Heating Source	
Heat Transfer Medium	
Frost Protection	
Height of Installation	
Installation content	
Pipe length VL+RL	
Pipe Dimension	
Commissioning	
Implementing Company	



## **Final declaration**

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Although these instruction have been created with the greatest possible care, the possibility of incorrect or incomplete information cannot be excluded. Subject as a basic principle to errors and technical changes.

**Date and time of installation:**

**Name of installation company:**

**Space for notes:**

Your specialist dealer:

Manufacturer:

SOREL GmbH Mikroelektronik  
Reme-Str. 12  
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