



Installation and commissioning instructions

255 series and 256 series



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1 General information

1.1 About these instructions

These instructions describe the installation, commissioning, function and operation of the solar stations. For other components of the solar thermal system such as collectors, storage tanks and controllers please follow the instructions of the respective manufacturer.

1.2 About this product

The solar station is a preinstalled and leak-tested group of fittings for transferring heat from the collector to the storage tank. It contains important fittings and safety devices for the operation of the solar thermal system:

- Ball valves in flow and return in combination with check valves to prevent gravity circulation
- Flushing and filling unit for flushing, filling and emptying the solar thermal system
- Air vent for manual bleeding of the solar thermal system
- Flow meter for displaying the flow rate
- Thermometer in flow and return for displaying flow and return temperature
- Gauge for displaying the system pressure
- Safety relief valve to prevent overpressure

1.3 Appropriate usage

The solar station may only be used in the collector circuit of solar thermal systems in compliance with the technical data specified in these instructions.

Improper use excludes all liability claims.

2 Safety instructions

The installation and commissioning of the solar station as well as the connection of electrical components requires technical knowledge matching with a recognized vocational qualification as a pipe fitter for plumbing, heating and air conditioning technology, or a profession requiring a comparable level of knowledge. The following must be observed during installation and commissioning:

- the relevant state and national regulations
- the accident prevention regulations of the trade association
- the technical and safety instructions of these instructions

Attention: Risk of scalding

There is a danger of steam emission with safety valves. Therefore a discharge pipe must be connected to the $\frac{3}{4}$ " internal thread of the safety assembly. Please observe the enclosed instructions regarding the safety valve when doing this.

Attention: Damage to property

The group of fittings must be installed with sufficient spacing to the collectors because temperatures in the vicinity of the collectors can be very high. An intermediate vessel may be necessary for installation in the attic.

Attention: Damage to property

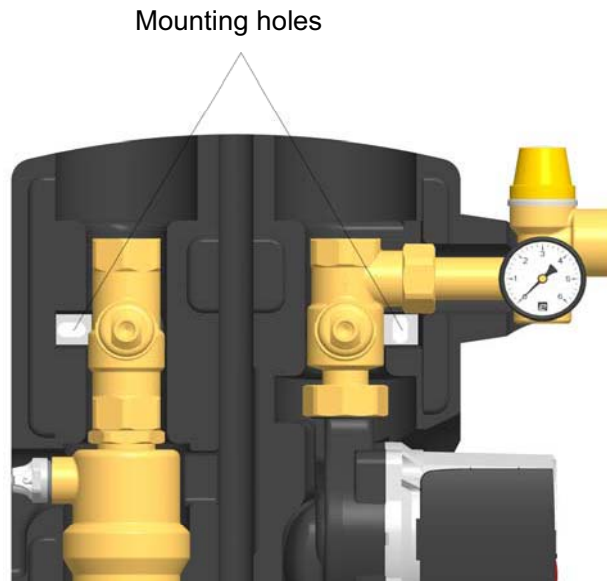
It is imperative that you make sure the EPDM sealing elements of the solar station do not come into contact with substances containing mineral oil. Mineral oil products cause lasting damage to the material, whereby its sealant properties are lost.

If necessary, ask the manufacturer whether the solar fluid, contains fats or installation aids contain mineral oils.

We do not assume liability nor provide warranty for damage to property resulting from seals damaged in this way.

3 Mounting and installing the solar station

1. Remove the front half of the insulation.
2. Hold the solar station against the wall and mark the fastening holes (see figure).
3. Fasten the solar station to the wall with the enclosed anchors and screws.
4. Connect the solar station to the solar thermal system.
5. Check the inlet pressure of the expansion tank and, if necessary, adjust it to the local conditions (inlet pressure = 15 psi + difference in height between the collector and solar station/10).
6. Connect the electrical components of the solar station: Attach the storage tank and collector sensor and connect these to the controller. Plug the controller into a socket.
In the case of solar stations without controllers connect the controller and the pump in accordance with the manufacturer's instructions.
7. Tighten all union nuts and screw connections.



4 Commissioning

4.1 Flushing and filling the solar thermal system

Observe the following safety instructions for commissioning the solar thermal system:

Attention: Risk of scalding

To prevent the solar fluid boiling in the collectors, the system should not be flushed or filled during periods of strong sunshine.

Attention: Risk of freezing

Solar thermal systems cannot be completely emptied after flushing. There is a danger of freeze damage if water is used for flushing. Only use solar fluid to flush and fill the solar thermal system.

Use a water-propylene glycol mixture as a solar fluid (maximum 50% propylene glycol).

The solar thermal system is flushed, filled and emptied via a flushing and filling unit.

Instructions for initial commissioning

If the flushing and filling unit is integrated in the solar station (see fig. 1) and if you are commissioning the storage tank for the first time, we recommend an additional fill and drain ball valve in the return at the lowest point of the solar thermal system, to flush possible scale out of the storage tank. The flushing and filling station must have a filter that prevents the flushed-out scale from re-entering the solar circuit. This flushing process is described in “5.2 Flushing the storage tank for initial commissioning”. Then continue as described in “5.3 Flushing and filling the solar thermal system”.

If the flushing and filling unit is not integrated in the solar station, and external flushing and filling unit is required, see fig. 2.

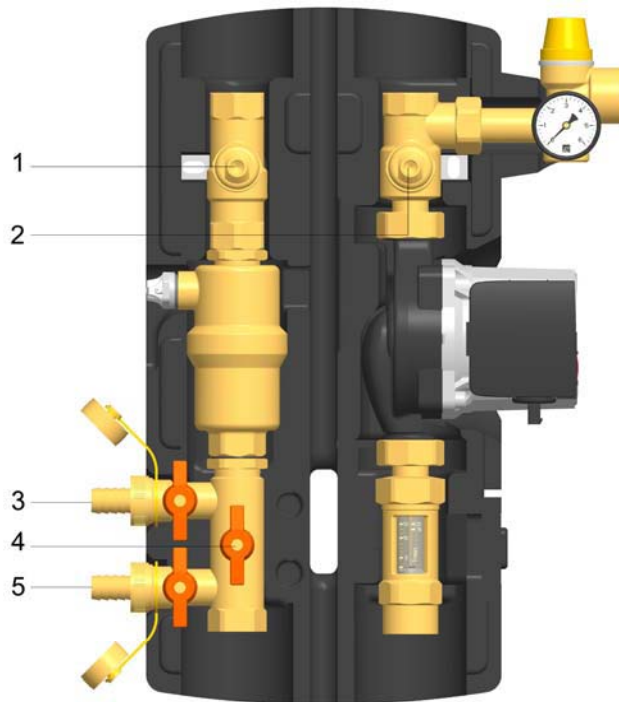


Fig. 1: Integrated flushing and filling unit

- 1 – Ball / check valve, flow (red)
- 2 – Ball / check valve, return (blue)
- 3 – Drain ball valve
- 4 – Ball valve
- 5 – Fill ball valve

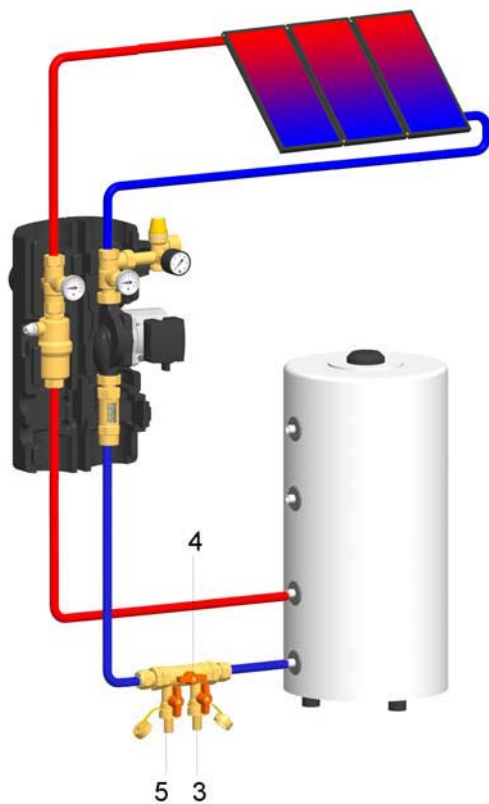


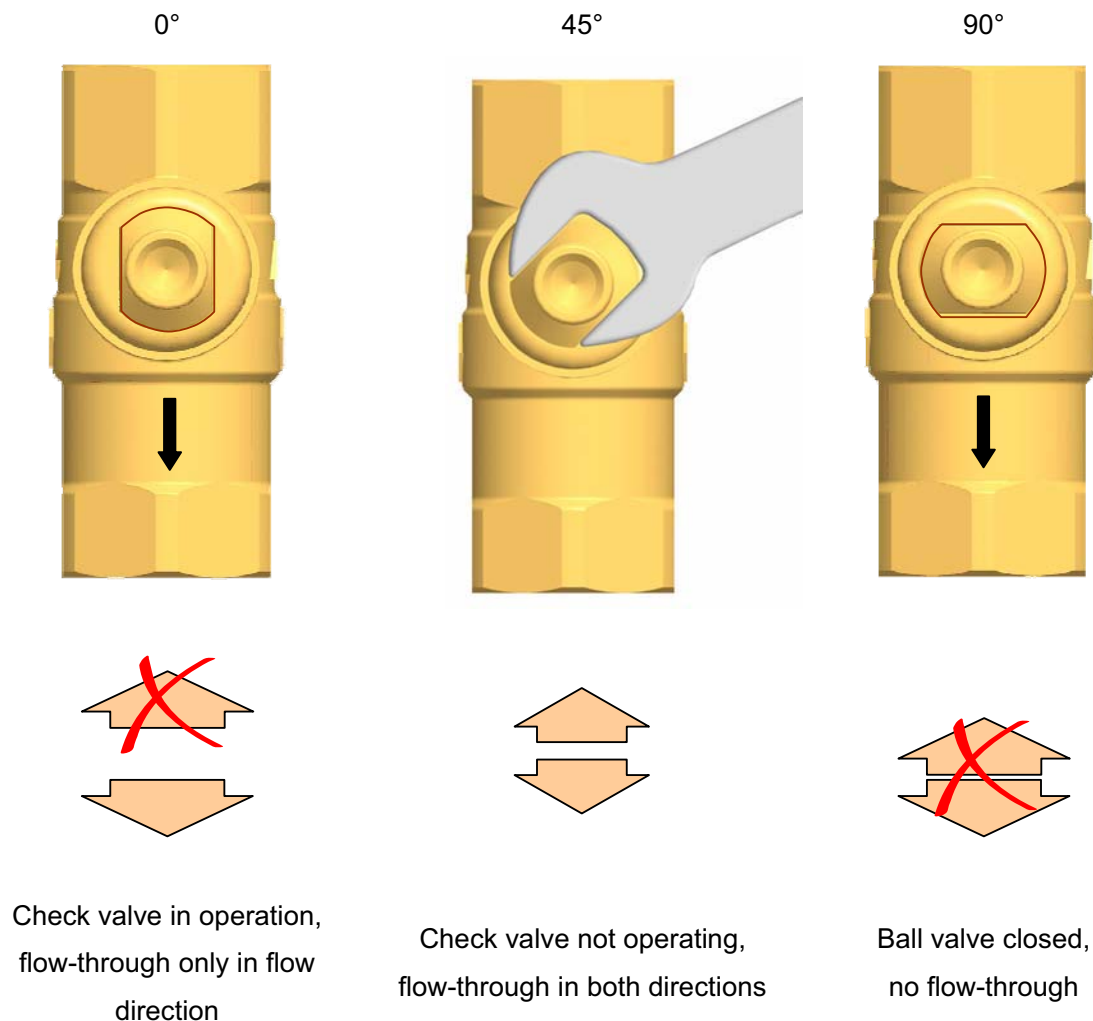
Fig. 2: External flushing and filling unit

4.2 Flushing the storage tank for initial commissioning

1. Connect the pressure hose of a flushing and filling station to the fill ball valve (5).
2. Connect the flushing hose of a flushing and filling station to the fill and drain ball valve at the lowest point of the solar thermal system.
3. Close the ball valve (4).
4. Open the fill ball valve (5) and the fill and drain ball valve at the lowest point of the solar thermal system.
5. Flush the solar thermal system by means of the flushing and filling station until the discharged solar fluid is free of dirt particles.
6. Switch off the filling pump.
7. Close the fill and drain ball valve at the lowest point of the solar thermal system.
8. Remove the flushing hose from the fill and drain ball valve.
9. Close the fill ball valve (5).
10. Connect the flushing hose to the drain ball valve (3).

4.3 Flushing and filling the solar thermal system

1. Disconnect the expansion vessel from the solar thermal system.
2. Connect the pressure hose of a flushing and filling station to the fill ball valve of the flushing and filling unit (5, see figures 1 and 2).
3. Connect the flushing hose of a flushing and filling station to the drain ball valve of the flushing and filling unit (3).
4. Close the ball valve in the center of the flushing and filling unit (4).
5. Turn the ball valves (1 and 2) in flow and in return with an open-ended spanner (wrench width 14) to a 45° position. The check valves in the ball valves are now open.



6. Open the fill and drain ball valves (3 and 5).
7. Flush the solar thermal system using the flushing and filling station for at least 15 minutes to remove all air from the system.
8. During flushing, bleed the solar thermal system several times at the Air vent (6) until the discharged solar fluid is free of air bubbles.
9. Close the drain ball valve (3) of the flushing and filling unit with the filling pump running and increase the system pressure to approx. 70 psi (5 bars). The system pressure can be read from the gauge.
10. Close the fill ball valve (5) and switch off the pump of the flushing and filling station.
11. Check the gauge to see whether the system pressure reduces and eliminate leaks where necessary.

12. Reconnect the expansion vessel to the other components of the solar thermal system.
13. Set the operating pressure of the solar thermal system by means of the flushing and filling station 5 to 7 psi (0.3 to 0.5 bars) higher than the inlet pressure of the expansion tank.
14. If you have put the flushing and filling station into operation to set the operating pressure, switch off the filling pump.
15. Close the fill and drain ball valves (3 and 5) and open the ball valve (4).
16. Put the check valves in flow and return in operating position by turning the ball valves (1 and 2) to a 0° position with an open-ended 14 mm wrench.
17. Manually put the solar thermal pump in operation at the highest RPM level (see controller manual) and let it circulate for at least 15 minutes.
18. During flushing, bleed the solar thermal system several times at the air vent (6), until the discharged solar fluid is free of air bubbles and increase, if required, the system pressure to the operating pressure.
19. Remove the hoses of the flushing and filling station and screw the caps onto the fill and drain ball valves.

Setting the solar thermal system:

20. Set the required RPM level of the solar thermal pump in relation to the required flow rate.
The flow rate should be set in accordance with the collector manufacturer's data.
21. It is possible to reduce the maximum flow rate by switching down the pump at the control switch. It should be checked whether the starting torque is sufficient with low pump speed. Another way of limiting the flow rate is to partially close the ball valve (4) (higher pressure drop – lower flow rate).
22. Attach the front insulation cover to the solar station.
23. Insert the red thermometer in the flow (left) and the blue thermometer in the return (right).
24. Set the pump automatic operation on the controller (see controller manual).

4.4 Emptying the solar thermal system

1. Open the check valves in the ball valves in flow and return (1 and 2, see. fig. 1) by turning the ball valves to a 45° position with an open-ended 14mm wrench.
2. Place a temperature-resistant collection container under the drain ball valve at the lowest point of the solar thermal system.

Danger:

The discharged fluid can have very high temperatures. Place the collection container so that people standing nearby are not endangered when the solar thermal system is being emptied.

3. Open the drain ball valve at the lowest point of the solar thermal system.
4. Open the bleeding devices at the highest point of the solar thermal system, where available.
5. Dispose of the solar fluid in observance of local regulations.

5 Flow meter

The Flow meter is for measurement and display of the flow rate of .25 to 5 gpm (1-20 l/min). In order to guarantee the flawless function of the measuring device the system must be flushed and free from foreign substances.

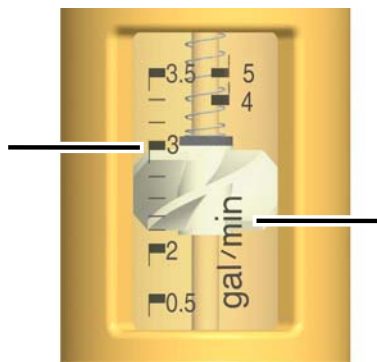
0.5 – 3.5 gpm (1-13 l/min)



4 - 5 gpm (15-20 l/min)

Left scale:

Upper edge of the propeller



Right scale:

Lower edge of the propeller

Example display = approx. 3 gal/min

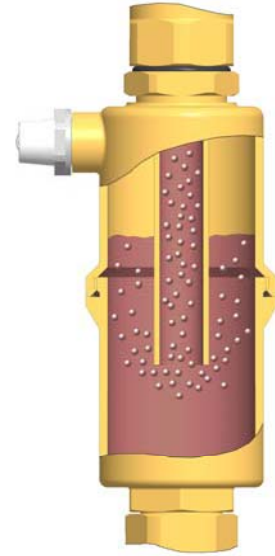
6 Air vent

The Air vent (manual bleed valve) is for bleeding the solar fluid in the solar thermal system. The air precipitated from the solar fluid gathers in the upper area of the manual bleed valve (see diagram) and can, if required, be discharged at the bleeding valve. To guarantee faultless bleeding of the collector circuit the flow rate in the flow must be at least 1 f/s (0.3 m/s).

Check the system pressure after bleeding and if necessary increase it to the specified operating pressure.

Danger:

During bleeding the escaping air and solar fluid can reach temperatures of over 212°F (100°C).



Bleeding the solar thermal system directly after commissioning:

At first you should bleed the solar thermal system daily and then weekly or monthly, depending on the volume of discharged air.

Information for operators of solar thermal systems:

Bleed the solar thermal system twice a year with the manual bleed valve to achieve optimal efficiency.

7 Dismantling the solar station

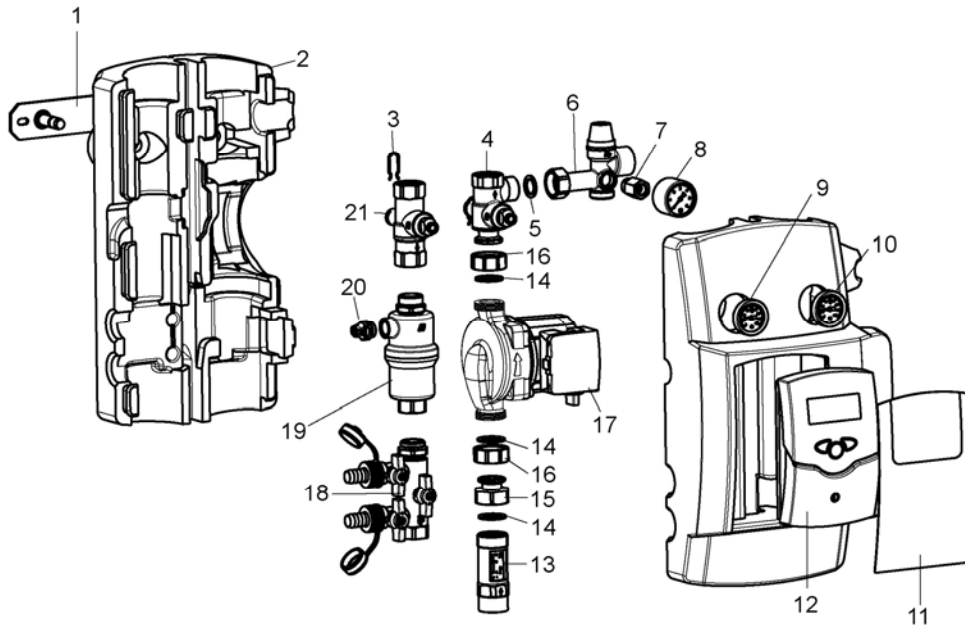
To detach the solar station from the wall bracket, remove the clips with a screwdriver and pull the solar station from the wall brackets.



8 Technical data

Dimensions:	Height (with insulation):	15-7/8" (402 mm)
	Width (with insulation)	8" (205 mm)
	Depth (with insulation):	6-7/8" (174 mm)
	Distance between flow - return:	4" (100 mm)
	Pipe connections:	1" external thread flat sealing
	Connection for membrane expansion vessel:	¾" external thread, flat sealing
	Outlet safety valve:	¾" internal thread
Technical data:	Max. permitted pressure	90 psi (6 bars)
	Max. operating temperature:	250°F (120°C)
	Max. stagnation temperature:	300°F (150°C)
	Max. propylene glycol content in water-propylene glycol-mixture	50%
Features:	Safety relief valve:	90 psi (6 bars)
	Pressure gauge:	0-90 psi (0-6 bars)
	Check valves:	Opening pressure 1 psi
	Dial thermometer:	32 – 320°F (0-160°C)
	Flow meter	.25 – 5 gpm (1-20 l/min).
Material:	Fittings:	Body: Brass
	Seals:	EPDM
	Insulation:	EPP, $\lambda = R-4$ (0.041 W/(m*K))

9 Replacement parts



When ordering replacement parts please state the item no. of the solar station!

Pos.	Designation	Pos.	Designation
1	Wall bracket	11	Controller cover
2	Insulation	12	Controller
3	Clip	13	Flow meter
4	Return ball valve with check valve	14	Sealing washer 1"
5	Sealing washer 3/4"	15	Flange sleeve
6	Safety group	16	Union nut
7	Valve for gauge	17	Solar thermal pump
8	Gauge	18	Flushing and filling unit
9	Red thermometer	19	Air vent
10	Blue thermometer	20	Bleed valve
		21	Flow ball valve with check valve

Caleffi North America, Inc
3883 W. Milwaukee Rd / Milwaukee, WI 53208
Tel: 414.238.2360 / Fax: 414.238.2366
sales@caleffi.com / www.caleffi.us