

Technical Service Bulletin:

# Draining, Flushing, Filling, & Pressurizing Solar Thermal Systems

For Bosch and Buderus Solar Thermal Systems



# BOSCH

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## Before you begin:

Bosch and Buderus solar thermal pump stations have BSP hose threads, which are slightly different from US NPT hose threads. US hoses do connect but require 3 or more flat gaskets to make a water tight fit.

Hoses must be glycol, pressure (100 psi) and temperature (200°F / 95°C) proof.

The Bosch and Buderus solar filling station (part number 8718530474) comes with both NPT and BSP hoses.

This work can only be performed when the collectors are cool, and not heated from solar irradiation. If possible, schedule for an early morning, late afternoon, or cloudy day. Otherwise the collectors must be covered with cardboard or dense cloth to prevent damage from thermal shock.

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## Required tools:

- ▶ Bosch Buderus Solar Filling Station (part number 8718530474) or Transfer Pump with minimum ½ HP motor, 2 hoses min. 6' (2 m) long
- ▶ Several flat gaskets for hose thread if using NPT hoses
- ▶ Hose long enough to reach a fresh water spigot
- ▶ Fresh solar fluid in sufficient quantity
  - For residential OG300 systems use Tyfocor L"G" (part number 8718571374)
  - For all other systems use Tyfocor L (part number 8718660945)
- ▶ Clean pail
- ▶ 4 mm Allen wrench
- ▶ Radiator key

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## Sequence of work procedure

- (1) Drain all spent solar fluid from the system
- (2) Fill with fresh water
- (3) Pump fresh water around
- (4) Drain all water to remove residue
- (5) Fill with fresh solar fluid
- (6) Pressurize the system
- (7) Bleed air from system and repressurize

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## Drain all spent solar fluid from the system:



**Only start the work if the collectors are not going to be exposed to high solar irradiation for several hours. If heating up of the collectors cannot be avoided, the collectors must be covered.**



**Ensure all hoses, pails, and pumps are exceptionally clean as filling the system with contaminated solar fluid may affect life expectancy of vital components.**



**Check with local authorities before dumping the old solar fluid into a public sewer system or septic system.**

1. Solar controller: Turn power OFF. See controller instruction manual for details.
2. Solar pump station on the wall: remove foam insulation.
3. Locate upper hose connection on right side with a shutoff valve with a blue handle. Connect a hose. Ensure tight connection under pressure.



**Threads are BSP; insert 3 or more flat gaskets when using hoses with NPT thread.**

4. Locate drain at low point of solar thermal piping. If no low drain was installed use the second valve on solar pump station. Connect second hose.



**If the system is not equipped with a drain valve at the low point(s), consider fitting one for future servicing while the system is off line.**

5. Insert other end of the hoses in a floor drain and open both valves.
6. If an air vent is installed on the roof, remove air vent and open valve.
7. Ensure on the pump station that the red and blue valves with thermometers are in the 45 degree position (check valve open).
8. If the system consists of several tanks, pump stations, or diverter valves, drain fluid from all sections. You may have to operate diverter valves to drain trapped fluid.



**Caution:**  
**Do not run pumps dry.**

9. Open the air vent on the left pipe of the pump station using a radiator key.
10. Wait until fluid has drained from the system.
11. Close all drain valves, air vent on pump station, and air vent valve on roof.

### Fill with fresh water

1. Connect a hose from a fresh water spigot to the upper hose connection on the pump station.
2. Open lower drain valve.
3. Open the spigot and start filling the system with fresh water.
4. Ensure on the pump station that the red and blue valves with thermometers are in the 45 degree position (check valve open).
5. If the system consists of several tanks, heat exchangers, pump stations, or diverter valves, ensure water is entering all sections. You may have to operate diverter valves to open passage ways.



**Caution:**  
**Do not run pumps dry.**

6. Let fluid drain from lower drain for a couple of minutes.
7. Close lower drain valve and watch pressure rise to 30 psi (2 bar), then close fill valve and close spigot.

### Pump fresh water around

1. Solar controller: Turn solar pump ON. See controller instruction manual for details.
2. If the system consists of several tanks, heat exchangers, pump stations, or diverter valves, ensure water is entering all sections. You may have to operate diverter valves to open passage ways.
3. Pump the water around for minimum 15 minutes.
4. Solar controller: Turn power OFF. See controller instruction manual for details.

### Drain all water to remove residue



**It is important to drain as much of the water out as possible, because leftover water will dilute the solar fluid and reduce the frost protection.**

1. Locate upper hose connection on right side with a shutoff valve with a blue handle. Connect a hose.
2. Locate drain at low point of solar thermal piping. If no low drain was installed use the second valve on solar pump station. Connect second hose.
3. Insert other end of the hoses in a floor drain and open both valves.
4. If an air vent is installed on the roof, remove air vent and open valve.
5. Ensure on the pump station that the red and blue valves with thermometers are in the 45 degree position (check valve open).
6. If the system consists of several tanks, pump stations, or diverter valves, drain water from all sections. You may have to operate diverter valves to drain trapped water.



**Caution:**  
**Do not run pumps dry.**

7. Open the air vent on the left pipe of the pump station using a radiator key.
8. Wait until water has drained from the system.
9. Close all drain valves, air vent on pump station, and air vent valve on roof.
10. Rinse and drain the filling station or pump, the hoses, and clean or replace the filter.



**With the system depressurized, now would be a good time to check the precharge pressure of the expansion vessel and verify it meets the system requirements. See the installation instructions for details.**

### Fill the system with fresh solar fluid

1. When using the Bosch solar filling station, ensure the valves are closed, the reservoir and hoses are exceptionally clean, and the filter is new or has been cleaned. For filling station operation see the instruction manual.
2. When using a generic transfer pump, ensure an exceptionally clean pail is used, and the pump and hoses are clean as well.



**Contaminated solar fluid will need replacing again soon and may affect life expectancy of vital components.**

3. Connect the hoses to the filling station or pump.
4. Connect the supply hose to the upper connection on the pump station or the pressure port on the pump.
5. Connect the return hose to the lower hose connections on the pump station or the pail ensuring that it is firmly attached.
6. Open both blue ball valves on the pump station.
7. On the pump station ensure that the red and blue valves with thermometers are in the 45 degree position (check valve open).
8. Fill filling station reservoir or pail with fresh solar fluid to about 9/10.
9. Operate the pump.
10. As the fluid level in the reservoir goes down, add solar fluid.
11. Continue adding fluid until fluid starts coming back and the level no longer goes down.
12. If the system consists of several tanks, pump stations, or diverter valves, fill all sections. You may have to operate diverter valves to open passage ways.
13. Manually operate the solar pump on occasion.
14. Repeatedly manually open and close ball valves to release trapped air.
15. Repeatedly release trapped air from air vent on pump station and on roof.
16. You will observe that in the tank there will be lesser and lesser fine bubbles and the fluid will become clear and no longer look milky.
17. Pump fluid around for a minimum of 30 minutes depending on system size.

### Pressurize the system

1. Continue running the filling pump.
2. Once ready to pressurize the system close the ball valve on the return hose back to the filling pump.
3. Watch the pressure rise to 30 psi (2 bar) or the relevant system target pressure.
4. Shut off the blue ball valve on the supply hose.
5. Immediately shut off the pump.
6. The system pressure should hold steady. If the pressure drops, a leak is present and must be fixed.
7. Turn on the solar pump and observe the flow meter on the pump station. If the indicator pulses noticeably, there is still a significant amount of air in the system that needs to be removed.
8. Dial in the system flow rate to match the number of collectors. See the pump station installation instructions for details.

### Bleed air from system and repressurize

1. Bleed any air from the air vent on the pump station and the air vent on the roof.
2. Once satisfied that all air has been bled, ensure all drain and bleeder valves are closed all the way. Close shutoff valve on roof air vent.
3. Remove the hoses. Install protective caps.
4. Drain any remaining fluid into containers.
5. Rinse and drain the filling station and hoses, clean or replace the filter.
6. Set the solar controller to AUTOMATIC OPERATION. See controller instruction manual for details.
7. Ensure all pumps and diverter valves are operational.
8. Remove covering from solar collectors.
9. It is recommended to return to the job site after 4 weeks to bleed any remaining air from the system that accumulated in the mean time and ensure proper operation.

Please contact Bosch Thermotechnology Technical Support at 1-800-283-3787 if you have further questions.



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