

# **Installation Instructions**



**FlowBox Solar Pump Station** 

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#### Subject to technical modifications without notice!

Due to continuous development, the drawings, installation steps and technical data detailed here may change.

#### Manufacturer address:

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Document no.: THUS 1101 V 1.3 Issue date: 04/13

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#### 1. About this Document

#### **1.1 Important Information**

The equipment must be installed in accordance with installation regulations required in the area where the installation is located. Local regulations must be carefully followed in all cases. Authorities having jurisdiction shall be consulted before installations are made.

#### 1.2 Purpose of this Document

This document is to provide you with information regarding the solar pump station Flow Box Solar. It contains information concerning:

• design and function • technical data • installation • commissioning • maintenance • repairs

#### 1.3 Target Group for this Document

These installation instructions are intended for installation engineers.

#### 1.4 Symbols used in this Document

The following terms are used throughout this manual to bring attention to the presence of hazards of various risk levels, or important information concerning product life.

Indicates an imminently hazardous situation, which, if not avoided, will result in death,

serious injury, or substantial property damage.

portant



Indicates a potentially hazardous situation, which, if not avoided, could result in death, serious injury, or substantial property damage.



Indicates a potentially hazardous situation, which, if not avoided, may result in moderate.



Indicates special instructions on installation, operation or maintenance, which are im-



but not related to personal injury hazards.

#### 1.5 Applicability

These installation instructions apply for Ritter's' pump station Flow Box Solar as of 06/01/2011.

#### 1.6 General Information

Carefully read through these installation instructions. Failure to follow these instructions will void any manufacturer's warranty or legal guarantee claims.

#### 1.7 Standards and Regulations

The equipment used in the installation must be in accordance with those regulations of local code authorities and utility companies in the area in which it is installed. All regulations must be carefully and thoroughly followed in every case. Local authorities should be consulted prior to the installation of any equipment.

## INTSALLATIONS OR SERVICE OF THE SOLAR FLOW BOX IS REQUIRED TO BE PREFORMED BY LI-CENSED PROFFESSIONALS, WHEN SOLAR, ELECTRICAL OR PLUMBING WORK IS REQUIRED!

The installer should read and follow all directions or instructions included with equipment.

All wiring must be in accordance with the latest edition of National Electric Code, ANSI/NFPA 70. In Canada use the latest edition of the Canadian Electric Code CSA C22.1.

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#### 2. General Notes

Please carefully read through these installation instructions and the accompanying guidance notes and diagrams for the Flow Box Solar prior to installation. Before commencing work, the installer must read, understand and observe this installation

manual.

Failure to follow these instructions will void commercial and legal guarantee claims.

#### 2.1 Working on the Flow Box Solar



Installation, initial setup, inspection, maintenance and repairs must be carried out by licensed professionals. Work must comply with the relevant safety standards. Before working on the Flow Box Solar the pump should be isolated from the main power sup-

ply (e.g. by unplugging it or switching off the circuit breaker) and steps should taken to prevent it being switched back on during service.

#### 2.2 Repair Work



Repairs to safety-critical components are not permitted. If components are replaced, original Ritter Group USA replacement parts must be used.

#### 2.2 Scalding Hazard



Solar thermal collectors can reach temperatures in excess of 400 °F during installation and operation. The solar thermal system is pressurized once in operation. There is a risk of scalding!

#### 3. Design and Function

#### 3.1 Design and Functioning of the Flow Box Solar

## NOTICE

The Flow Box Solar pump station is a preassembled, ready sealed unit for closed loop pressurized solar thermal systems in combination with water or propylene glycol mixtures for indoor use only. Any other mode of usage is inappropriate. Ritter Group USA,

Inc accepts no liability for damage caused by inappropriate use of the solar station. Rebuilding or making alterations is prohibited for safety reasons. The Flow Box Solar includes all fittings and safety equipment (expansion tank not included) for connecting a solar collector array to a hot water storage tank. The piping can be connected directly to the solar station using 3/4" copper piping. 3/4" compression ring fittings are preassembled to connect the tank and the collectors.

The insulation shell is made from water vapor expanded polypropylene (EPP). This material is environmentally friendly and 100 % recyclable.

## **Design and Function**

#### 3.2 Main Features Attractive Design

- State-of-the-art design
- Temperature gauges integrated stylishly into insulating shell
- Compact dimensions
- Optimized material usage for short energy amortization time
- · Precision-engineered multifunctional components
- · Low number of seals and joints
- Pressure relief valve solar-certified
- Extremely reliable connections using 3/4" compression ring fittings. Impressive efficiency and high performance
- Low heat losses with compact enclosed insulation shell made from water vapor expanded polypropylene (EPP)
- · High-performance high-head solar pump

#### Fast Installation

- · Intelligent time-saving wall bracket concept with only two securing screws
- Solar station is largely pre-assembled

#### **3.3 Delivery Contents**

#### Flow Box Solar Station, supplied pre-assembled with:

- · Front and rear EPP insulating shell with wall brackets
- Ball valves with immersion sleeve, temperature gauge and metal check valve with blue and red thermo grips
- UPS 15-58 U 130 solar pump
- Flow gauge and flow setter 0.5 gpm to 4 gpm
- Flow and return connection with 3/4" compression ring fitting
- Air elimination vent tube
- Flat seals at all connections

#### Separately in the Box:

- 2 x Phillips head screws with wall plugs and washers
- Safety assembly with pressure relief valve (87 psi), pressure gauge, filling valve and shut-off Ball valve with safety cap

#### 3.4 Technical data

External dimensions (h x w x d)	12" x 9 3/4" x 8 1/2"		
Weight	13 lbs		
Total content	0.02 gal		
Max. constant operating temperature	230 °F		
Max. operating pressure/ pressure relief valve	87 psi (6 bar)		
Min. ambient temperature	50°F		
Flow / return connections	3/4" compression ring fittings		
Pump	Grundfos 15-58U 130 110V, 60Hz; 0.04 HP		
Pump head height	19.4 ft @ 0 gpm		
Total length pump port-to-port	6 1/2"		
Pump connections	1 1/2" NPT threat		
Flow gauge / flow setter	0.5 – 4 gpm		
Pressure gauge	0 - 145 psi		
Indicating accuracy of flow gauge	+/- 10 % of the gauge reading		
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## **Design and Function**



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#### 4. Installing the Pump Station

#### 4.1 Tools List

- Pencil and level
- Percussion drill
- 10 mm diameter masonry drill bit
- 5 mm diameter wood drill bit
- Ratchet with extension (long) and 13 mm socket
- Adjustable wrench or open ended socket
- Phillips screwdriver
- Allen key 5/32"

#### 4.2 Wall Mounting

Determine location to install the solar station that is accessible for connecting pipes, reading outputs and adjusting valves. Note the space required for the pressure relief valve blow-off pipe to the right of the solar station. Determine location of solar controller and plan path of wires.



• Remove insulating shell from the solar station

• The solar station forms a unit with the wall bracket and the rear insulation cover, and is to be fastened from the front side, in the prescribed position, with wall plugs and screws suitable for the subsurface.

- Measure out the position (Fig. 2)
- Mark the positions of the drilled holes

 In stone or masonry walls, use a percussion drill with a 10 mm masonry drill bit

• In wood, predrill the holes for the screws us- ing a 5 mm wood drill bit

• Secure the complete station to the wall

Connect the safety assembly (Fig. 3) (supplied separately with the module) to the outlet of the return flow fitting above the pump using the 3/4" union nut. The package accompanying the module contains a suitable flat gasket.

#### **4.3 Pipe Connections**

The cold return from the storage tank is connected at the bottom of the solar station using the right compression ring fitting. The riser to the collector is then continued from the right connection at the top of the solar station. The hot supply from the collector is then fed to the left compression ring fitting on top of the solar station and then continues from the left bottom connection to the tank. (Fig. 3)



- Piping from the solar collectors or storage tank should terminate to 3/4" L-copper at least 1 foot from the Flow Box Solar pump station
- Cut off the copper pipe at the right length using a pipe cutter and deburr the edges of the pipe.
- First push the nut over the pipe, then the clamping ring.
- Insert the pipe with nut and clamping ring into the screw connection and push up to the stop.
- Tighten the clamping ring nut by hand.
- Then, upon first installation, screw tight with one revolution (360°). Each time the fitting has been loosened, it must be hand-tightened during reassembly, then further tightened using an open end wrench, turning only 1/8 to 1/4 of a rotation (45° to 90°).

NOTICE

When tightening the compression fitting, care is to be taken that counter-force is applied to the respective designated panes with an adjustable wrench.

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#### 4.4 Pressure Relief Valve

At pressures exceeding 87 psi the heat transfer fluid can exit from the pressure relief valve. A permanently installed blowoff pipe should be routed into an open collection container (Fig. 3) which is capable of holding the entire contents of the collector circuit (e.g. empty canister of the heat transfer fluid). This is required since glycol should not be allowed to drain onto the floor.

Do not seal off the pipe.

#### 4.5 Expansion Tank

The expansion tank is connected in accordance with its supplied installation instructions via a T-fitting in the return above the solar station using a 1 ft length copper pipe (not supplied). The size of the expansion tank must be checked in each individual case. The size of the expansion tank depends on the collector and pipe contents that are in the vapor zone when the system is not operating.

## 4.6 Flow adjustment

- Flow is set on the regulating valve using a 5/32" Allen key (Fig. 4)
- Set flow can be directly read on the gauge
- Upper edge of the red truncated cone shows the current flow (Fig. 4)
- Valve stroke is spread over several spindle revolutions, thereby permitting a high level of setting precision
- Targeted flow rate is determined by calculations or collector manufacturers' specifications





Water temperature over 125 degrees F can cause severe burns instantly, or death from scalds. Children, disabled, and elderly are at the highest risk of being scalded. See instruction manual before installation or repair work.



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#### 4.7 Filling and Flushing

	When filling and flushing the system, the blue check valve must be in the closed and		
NOTICE	the red check valve in the open position. It is opened by turning the ball valve to the		
	45° position. (Fig. 5) For normal operation of the system, the valve must be completely		
	open. The ball valve is completely closed in the 90° position (Fig. 5)		



Both the safety assembly and the flow gauge fitting are fitted with a mini ball-valve and a garden hose connection for filling, flushing and draining the system.

## NOTICE

The solar loop must be filled with an appropriate propylene glycol-water mixture depending on the geographical location if outdoor temperatures below 40°F are possible.

After the system has been filled and a complete seal-tightness check is performed, attach the front section of the heat insulation. (Fig. 1)

#### 4.8 Maintenance and Repair

Torque values when tightening the screw connections:

As the gasket may settle over time, it may be necessary to re-tighten the screw connections.

3/4" screw connection 26 pound force per foot

1" screw connection 40 pound force per foot

- 1 1/4" screw connection 66 pound force per foot
- 1 1/2" screw connection 96 pound force per foot

Removing the module from the wall bracket:

Use a screwdriver or similar tool to pull the clamping rings off towards you.



The Flow Box Solar module is now loose! Make sure that it does not slide forwards and out of the wall bracket!

## Appendix





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