



AG Series Vacuum Tube Solar Water Heater

User Manual

Please read the manual carefully before use and retain for later reference

Contents:

- Description
- Applications
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- Service

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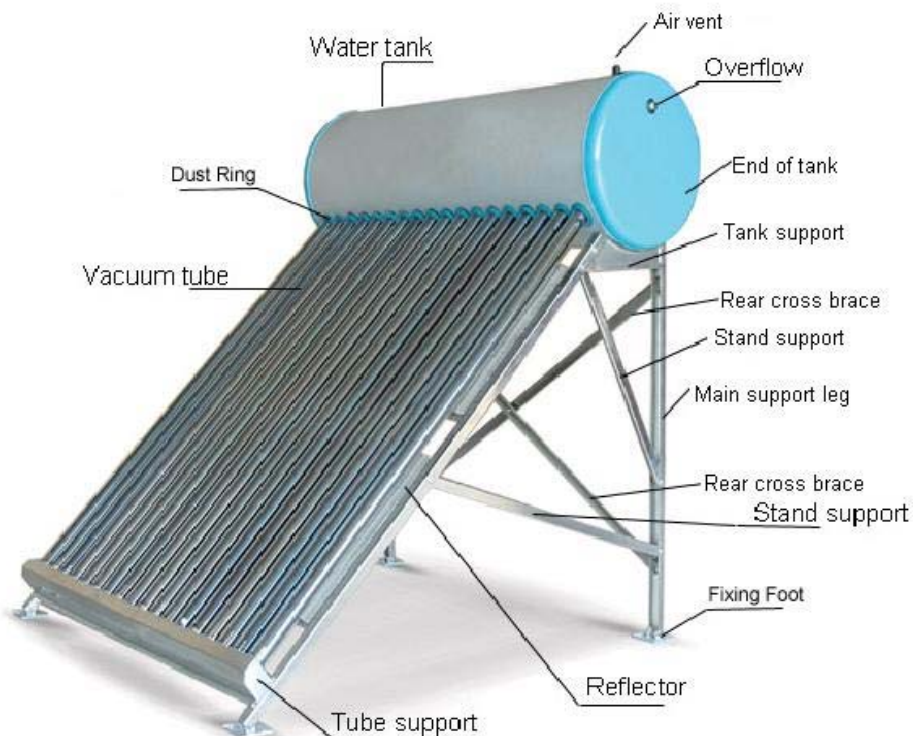
Description

This solar hot water series consist of a horizontal hot water cylinder made of 304 stainless steel with an external stainless steel casing which insulated with polyurethane foam. The inner cylinder has apertures formed to allow glass vacuum tubes to penetrate the cylinder and has triple edged silicone seals to prevent water leakage. The hot water cylinder is mounted on a frame which also holds the lower ends of the tubes at the correct spacing.

The tubes feature the AL-N/AL heat absorption coating which has high absorption efficiency and low reflectivity.

Two forms of the tubes are available, the standard version heats the solar hot water directly with the option to upgrade to the super heat tube version which gives increased efficiency and greater resistance to frost.

Please note! This series of solar hot water systems are designed for low pressure only. High pressure hot water can be delivered by using an optional high pressure hot water kit.



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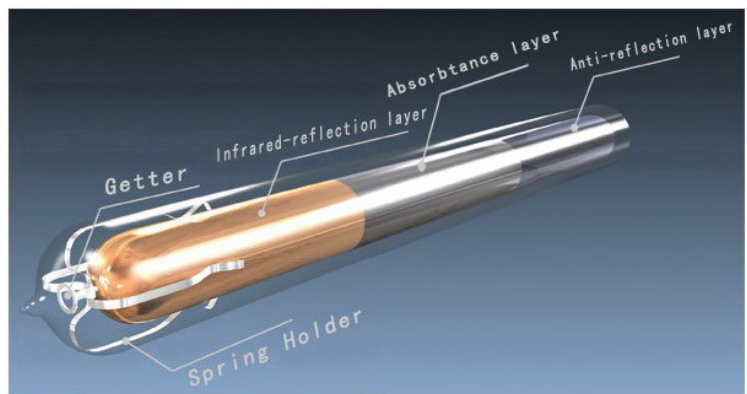
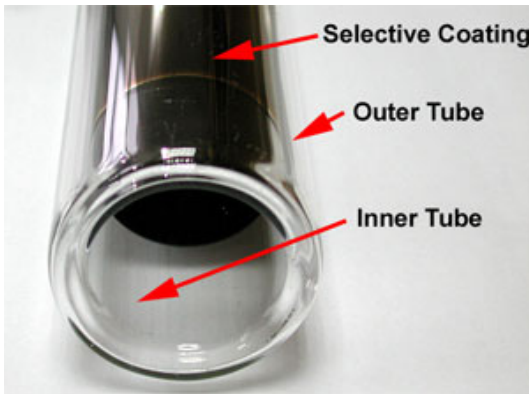
Applications

- Domestic hot water – low pressure
- Domestic hot water – high pressure (with optional high pressure kit)
- Interface to wood/coal fire wetbacks
- Commercial/industrial hot water
- Horticultural hot water
- Cowshed washdown water pre heat
- Swimming / spa pools (with external heat exchange)

Optional extras:

- Electric element
- Wet back adaptor

3). Evacuated Glass Technology and specifications



Model type	Glass Type 58mm	Super Heat Pipe 58mm
Length	1800	1800
Outer tube diameter	58mm	58mm
Inner tube diameter	47mm	47mm
Glass thickness	1.5mm	1.5mm
Glass material	Borosilicate Glass 3.3	Borosilicate Glass 3.3
Absorptive Coating	AL/N/AL	AL/N/AL
Absorption coefficient	>90%	>92%
Emission coefficient	<10%	<8%
Vacuum	$P < 5 \times 10^{-2}$ Pa	$P < 5 \times 10^{-2}$ Pa
Stagnation Temperature	>200°C	>220°C
Net Weight	2.23kg	2.77kg

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Installation

The AG series of solar hot water heaters is supplied as a kitset consisting of the following items

- Box containing the hot water cylinder;
- Box containing the frame parts;
- Boxes containing glass vacuum tubes;
- Additional parts as ordered.

Note! If the solar hot water heater is to be mounted on a flat roof or pitched roof you may have to obtain an engineers report to ensure your roof will withstand the weight of the assembly. The weight of the AG310 series full of water is approximately 370 kg, filled with water. You may also have to obtain consent from your local Council. Full engineering calculations are available from head office. Ground mounted systems may not need consent.

Unpack all components carefully and inspect for damage. If damage is found, report immediately.

Inspect the hot water cylinder for foreign matter inside. If there is some present flush out with clean water. Also check the silicone seals for insulation material that may be sticking to the sealing surface. This must be removed before proceeding further with the installation.



Thoroughly clean the silicon seals with a wet soapy rag

If an electric element or wet back adaptor is to be fitted, rotate cylinder so that the hole is at the top, apply silicone grease to seal and component and fit component. Set aside cylinder and allow seal to grip component.

Decide your location for the frame and choose the orientation so that the panel faces north with limits of no more than 10° east of north and 30° west of north. There must be no obstruction to sunlight all day especially in winter. Measure the pitch of the roof. The frame is designed for a flat roof or ground mounting. If mounting on a pitched roof, the rear legs of the frame will need shortening so that the installed angle of the tubes is about 45°. If your roof

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angle is 45° the rear leg should be discarded and the mounting foot attached to the stainless steel bracket that secures the cylinder to the frame. If your roof angle is greater than 45° do not attempt to mount the cylinder assembly on your roof.

Assemble the frame and attach the cylinder to the frame. Ensure that the holes for the glass tubes line up with the tube support at the base of the frame. Failure to do this may result in the tubes becoming broken in service. Depending on the configuration you have chosen, attach fittings to the cylinder connections using hemp and “Boss White” or similar. Do not use plain hemp as this will rot in time and cause leaks. Depending on the configuration, the jointing compound may have to be compatible with drinking water. Check before use.

Secure the cylinder and frame assembly to the roof or ground mounting. The use of “Multistrut” or “Unistrut” rails will make the installation easier and spread the load over a larger area of roof.

Fit the vacuum tubes to the cylinder. Take a black sealing ring and slip over the open end of a tube to about 200 mm from the open end. Apply silicone grease to the inside of the silicone seal and the open end of the tube. Insert the tube into the silicone seal and slide the tube into the cylinder just far enough so that the closed end can line up with the lower tube retainer. Slide the tube downward so that it is fully engaged with the retainer. Slide the black sealing ring up the tube until it is flush with the outside of the cylinder casing. Repeat the operation for the rest of the tubes. Note! The tubes are glass and need to be handled carefully. It is strongly recommended that gloves are used for this operation.

Attach the reflectors to the tubes and this part of the installation is complete.



AG210 with reflectors attached between tubes. Not advised for high wind areas.

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Installation Pictures



AG310 view from behind, showing frame assembly



Leg Detail



Tube detail

Plumbing

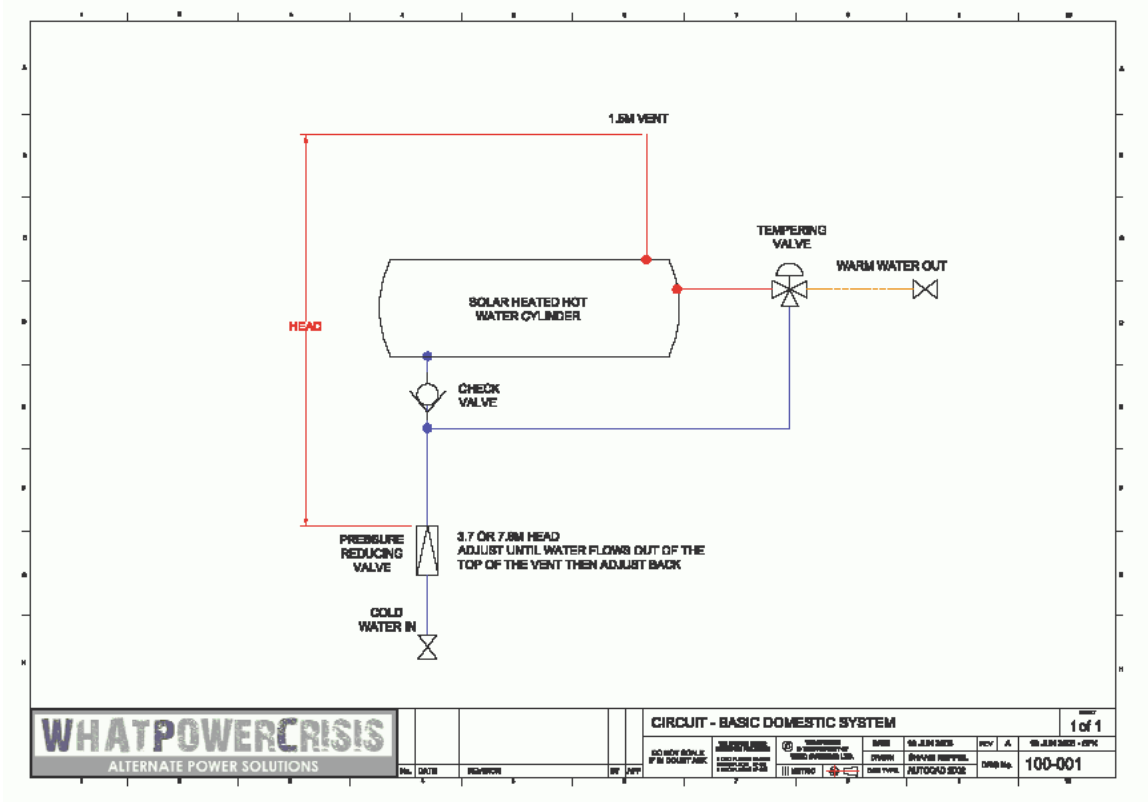
There are various methods for connecting the solar hot water to the inlet and outlet connections. The basic method of direct heating is shown here.

When ordering your solar hot water heater your application should be discussed and the appropriate diagram supplied.

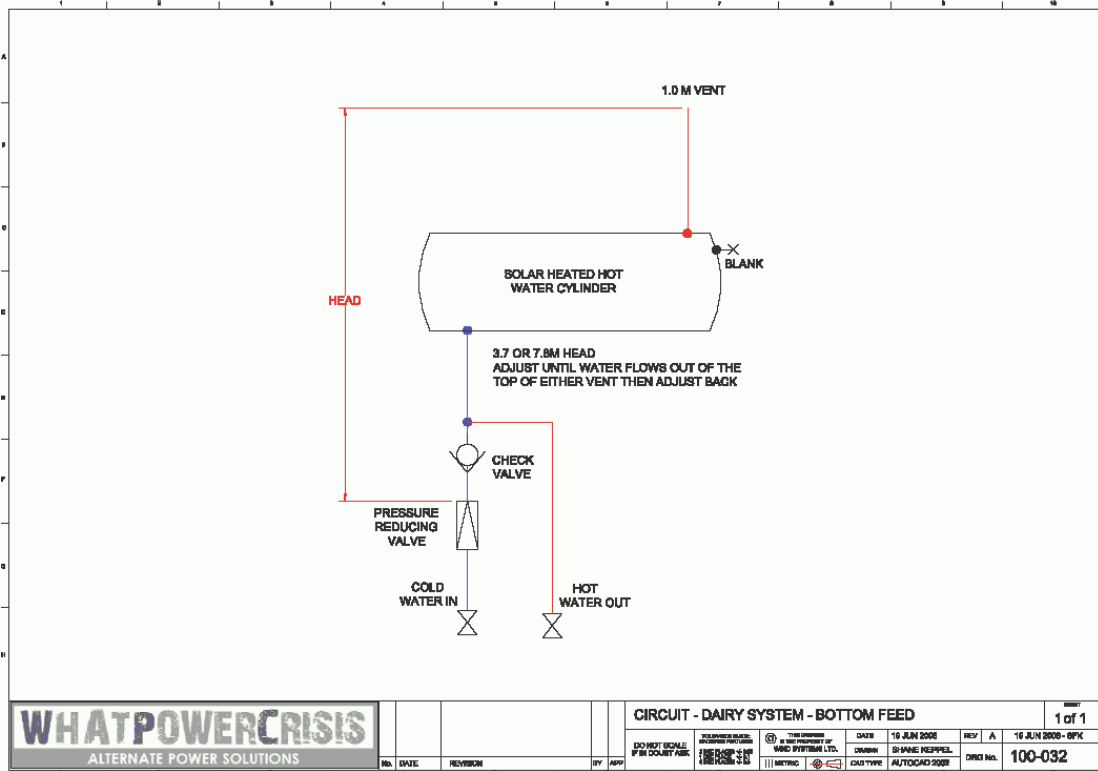
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Basic Plumbing Diagram



Cow Shed Plumbing Diagram



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Connections to potable water supply should be done by a registered plumber.

The maximum length of vent pipe is 1.5 metres. The pipe must be supported at the top with stay wires. In frost prone areas this pipe must be lagged.

In general, if the system is designed to use hot water directly, cold water can flow in at the base of the cylinder and flow out of the connection at the end of the cylinder. If this method is used, then the hot water will be gradually diluted with cold water. This is the full flow method and is automatic. The other method is the batch method and requires the tank to be filled manually or through a solenoid valve and timer and the hot water flows out of the base of the cylinder at the same point where the cold water fills the tank. This method allows the hot water to be used without being diluted by incoming cold water.

Tempering Valve

If the hot water is to be used for personal hygiene the water must be tempered to give no more than 55°C. Be sure to use a tempering valve that will accept water at 100°C. A Caleffi Solar tempering valve is a good example. Note! Most tempering valves will only accept 85°C.

Water Hardness

If your water is hard or aggressive it may be worth considering an indirect system that uses the same water in the solar collector and transferring the heat through a heat exchanger. This will increase the life of your solar heater.

Important note!

Please ensure that all pipework is properly supported. Do not rely on the cylinder to carry the weight of the plumbing.

Commissioning

Once the plumbing is complete for the installation, slowly open the valve that feeds the pressure reducing valve. Inspect the joints on the cylinder and the connections around the entry points of the glass tubes and the electric immersion heater if fitted. If any leaks are found, stop filling immediately and drain water down. If leaks are found in the joints for the glass tubes, put on gloves and carefully rotate the tube upward into the cylinder. Once clear of the base support, remove the tube from the cylinder with a rotating motion. Inspect the silicone seal and ensure that there is no debris on the sealing face to the glass and also that the seal fits perfectly onto the stainless steel cylinder. Once you are satisfied that the seal is correct. Apply silicone grease to the seal and the tube and refit the tube. Note! Do not be too sparing of the silicone grease.

Continue to fill the cylinder with cold water until water comes out of the top of the vent pipe. When this happens back off the adjustment screw on the pressure regulating valve until no water comes out of the vent pipe. If no water comes out of the vent pipe, the pressure may be set too low. Slowly increase the pressure by screwing in the adjusting screw and wait until water comes out of the vent pipe. Back off the pressure until no water flows out of the vent pipe.

If a tempering valve is fitted, adjust this to 55°C. Check the setting once the sun has heated the water in the cylinder.

Service

As there are no moving parts, very little service is required. It is important that the pressure regulator valve is adjusted correctly. If water is seen coming out of the vent pipe, the pressure regulator should be backed off by turning the adjustment screw anticlockwise in quarter turn increments. If the pressure cannot be adjusted down, then the valve pad in the pressure regulator should be replaced.

It is important to keep the solar collecting surfaces of the tubes and reflectors clean. To keep dust build up to a minimum spray the tubes with clean water every three months. If the unit has a tendency to build up moss or lichen, spray the tubes and cylinder with a propriety moss killer in the Autumn in order to maximize the winter performance.

Check the solar collector for cracked or broken tubes. Replacement tubes can be obtained from the importer

For replacement parts or service advice please telephone 09 974 3386.