



INSTRUCTIONS

FOR INSTALLING AND USING

Solavert solar conversion heat exchanger

January 2010

inta^{ECO}

Installation information

When fitted to an existing DHWS copper cylinder, the Solarvert can be used with a solar system. It's fitted into the top entry connection point for the Immersion Heater.

Key features:

- 0.5 sq metre stainless steel heat exchanger coil
- 304 grade stainless steel coil
- DZR brass header
- 15mm compression connections
- 1¼" access plug
- Optional Immersion Heater
- Versions for 36" (900mm) and 42" (1050mm) high vertical cylinders

Important information

For systems without a permanent dedicated solar volume, the following should be carefully considered when designing the system and before commencing any installation.

It is important to ensure that the system to which the solarvert is being fitted meets the following requirements in full.

Good control of the auxiliary heating

The auxiliary heating must be programmed to come on soon after sunset only. Any further heating must be manual over-ride boost only.

Education for the householder

Make sure the householder understands the importance of controlling the auxiliary heating correctly & leave clear instruction labels near the solar & heating control panels.

Check the cylinder

Make sure the existing cylinder is fit for purpose.

There must be no obvious signs of leaks or corrosion, & the tank must be well insulated. For tanks without the BS1566:1-2002 sticker, an additional insulating jacket made to BS5615:1985 must be fitted.



solarvert viewed from above

Technical data and detailed drawings

Technical data

- For vertically mounted immersion cylinders
- Models available for tanks 900mm, 1050mm & 1200mm high
- Suitable for any panels up to 2.5sq
- Cost effective & easy retrofit solution
- Immersion: 2KW & 420mm long with thermostat & high temp. cut out, to comply with UK regs.
- 1¼" BSP threaded connection
- Surface area of heat exchanger 0.5sqm.
- Connections : 15mm copper
- Max pressure: 6 bar
- Liquid volume: 750ml
- Weight: 2.8kg + 500gm for immersion
- CE certified
- Patent, BEAB, MCS & WRAS pending

Schematic drawing

IF IN DOUBT ASK

THIRD ANGLE PROJECTION

DO NOT SCALE

GENERAL ASSEMBLY OF ITEMS ① & ⑤

SOLDER AFTER ASSY.

SECTIONAL DETAIL 1:1

SCALE 2:1

SCALE 1:1

SCALE 1:1

SCALE 1:1

NOTE: ITEM ⑥ NOT SHOWN

ITEM	QTY	PART N°	DESCRIPTION	REMARKS	ITEM	QTY	PART N°	DESCRIPTION	REMARKS
16	1		GASKET - 79.38mm O/D x 66mm I/D x 15mm	WRAS 0502517	8	1	SP-09	1/4" BSPP PLUG	
15	1		O' RING - ID60 x C/S 2.0	WRAS 0609516	7	2	SP-08	1/2" BSPP x 3/8" BSPT NIPPLE	
14	1		O' RING - ID19 x C/S 2.0	WRAS 0609516	6	1	SP-07	8mm x 1/8" COMPRESSION FITTING	(OPTIONAL) - REPLACES ITEM 9
13	1		O' RING - ID10 x C/S 2.0	WRAS 0609516	5	2	SP-13	12mm x 3/8" SOLDERED PIPE FITTING	
12	1		O' RING - ID39 x C/S 3.0	WRAS 0609516	4	1	SP-05	IMMERSION HEATER	TH 600 - 240V / 1 ~ / 2KW
11	8		M5 x 12LG SKT CAP HD	GRADE 12.9	3	1	SP-04	2 1/4" FLANGE	
10	1	SP-11	1/8" BSPT PLUG		2	1	SP-03	TANK ADAPTOR	
9	1	SP-10	1/8" BSPP PLUG		1	1	SP-02	- HEAT EXCHANGER	

TOLERANCES U.O.S.		MATERIAL		TITLE	
FINISH		FINISH		GENERAL ASSEMBLY	
1 FRACTION ± 1/64"	UNFINISHED ± 0.50mm	WEIGHT		DRAWN ASW	
2 DEC.PLACE ± 0.010"	1 DEC.PLACE ± 0.25mm	4.2 Kg		CHECKED	
3 DEC.PLACE ± 0.005"	2 DEC.PLACE ± 0.13mm			APPROVED	
				DATE 6.09	
				SCALE 1:2	

REVISION DESCRIPTION

CHK'D APP'D DATE

7.09

6.09

solarvert

REMOVE ALL BURRS AND SHARP EDGES

DRG.N° SP-01

SIZE A2

CAD FILE 054001-1

Fitting and installation advice

Fitting instructions

The Solavert is a heat exchanger which is fitted inside a hot water cylinder, via the immersion heater threaded boss. It is intended for attaching solar collectors for heating the hot water cylinder.

Suitability of the Solavert

The Solarvert facilitates the fitting of solar heating to an existing hot water system by enabling the existing tank to be retained. The Solarvert is not intended to be used in new houses or where existing plumbing is to be refurbished, or if hot water demand is much greater than 0.56 x tank volume.

Sizing

Start with the tank:

The copper cylinder HW tank must have a top entry Immersion Heater installation connection. 2¼" bsp as the UK standard.

The existing tank must be in good condition with no signs of leaks or corrosion.

If the tank has a label claiming compliance with BS1566:1-2002, it will already be well insulated.

If the tank appears in good condition, but does not have BS1566:1-2002 labels on it, fit a hot water jacket made to BS5615:1985, following the manufacturer's instructions carefully.

The insulating performance of a jacket made to BS5615:1985 is almost the same as the insulating performance required in BS1566:1-2002, so a tank which already has some foam insulation will surpass the insulation requirements if a jacket is added.

Hot water usage

Consider the number of full time occupants of the property.

If the occupants have showers rather than baths & if the washing machine & dishwasher are fed from cold only (most are).

Typical usage of hot water @ 45°C is 30 litres per person per day.

Tank volume required for solar hot water heating

The tank volume must be at least 1.8 X (daily hot water demand).

Therefore for a house with 2 full time occupants usually showering rather than bathing, using about 30 litres of hot water per day, the tank must be at least 1.8 x 60 litres = 108 litres.

Unless water usage is unusually low, we would not recommend fitting a Solarvert to a hot water cylinder of less than 120litres.

Diameter mm	Height mm	Volume (litres)
400	1050	120
400	1200	135
400	1500	172
450	900	117
450	1050	144
450	1200	168
450	1500	216
500	1200	195

Size of collectors

In order to prevent frequent overheating in summer it is normal to limit the aperture area to allow at least 50 litres of tank volume per square meter of aperture area. Note that for flat plate collectors, absorber, aperture & gross areas are usually very similar.

For vacuum tube collectors, it pays to check the manufacturer's technical data.

Allowances can be made for collectors facing significantly away from due south.

A 120 litre tank fitted with a Solarvert should have a maximum collector area of about 2.4sqm.

Heat exchanger

Heat exchanger area for Solarvert is 0.5sqm

Guidelines recommend at least 0.2sqm per sqm of collector net absorber area. Therefore a 120 litre tank with 2.5sqm of absorber area should have a heat exchanger area of at least 0.5sqm

Pipework & Connections

15mm copper tube can be connected to the compression fittings

Size of pipes

Flow rates through solar systems should be about 40 litres per hour per square meter of collector. The speed of flow of coolant through a solar circuit should be less than 1m/sec (to curb noise). 10mm copper is sufficient for collector areas up to 4sq m. Most installers prefer to use larger pipe to reduce the electric power consumed by the circulating pump, so use 15mm pipe or DN16 throughout.

Insulation of pipes

In practice, this must be at least 13mm thick.

Pipes near the collector must be insulated with material capable of withstanding high temperatures.

All pipes connecting to the tank must be insulated to at least 1m from the tank or up to any bulkhead.

Fitting and installation advice

Control of the solar system

The lower temperature sensor on the tank should be located half way up the height of the Solarvert heat exchanger.

Poor thermal contacts between sensors & the tank or collector are common faults in solar systems. If the existing tank is used (probably without a sensor pocket in the right position), the sensor probe must be pushed through the insulating foam & against the metal outer surface of the cylinder. Thermal contact can be improved with thermal contact paste. You should use the sachet included in the pack.

Cut a square of insulation out, clean the cylinder surface right back to the copper, apply the thermal paste, and position the probe flat against the clean surface.

Use the supplied poly-square to reseal the entry point, and fix with the strap supplied.

Additional spare paste packs can be ordered using Part Number IM-000381 A.

The wire from the sensor must be strapped to the cylinder to ensure that the sensor is secure & cannot be loosened or removed by someone who might not understand its purpose.

Control of backup heating

It is essential that regular backup water heating is programmed to come on at the end of the day only. (A manual boost is available if required).

The water & central heating of boiler must be programmed separately.

The exact time of day will depend on the orientation of the collector.

Instructions & training

The home owner or occupier must be instructed on the importance of the timing of the backup heating, clear instructions must be left in the manual & on labels beside the solar controller & boiler controller.

Scalding

Either a mixer valve, or high temperature cut out feature in the controller should be used reduce the risk of scalding.

The Solavert is not designed or intended for use with other heat sources such as back boilers or heat pumps.

Installation

1. If an existing Immersion Heater is fitted, turn off and disconnect electric supplies. This should be done in accordance with regulations and by a qualified electrician. Turn off and isolate any other related heat sources

2. Turn off water supplies to the HW system, and drain down.

3. Remove the immersion heater, or immersion heater plug. Use an Immersion Heater Box Spanner. Take care not to use excessive force which could tear the copper of the cylinder.

4. Screw in the Solarvert brass collar and use the gasket to seal. Only used approved jointing pastes or PTFE tape.

5. Before fitting the Solarvert, mark the connections for later reference as Flow and Return. The return connection fitting (15mm compression) is to connect to the pipework which connects to the solar circulating pump. This is identified on the Solarvert coil as the port which connects to the central tube which runs directly to the base of the coil. The flow connection is to the spiral coil.

6. Place the smaller washer on the flange on the Solarvert, and insert carefully into the cylinder, and locate so that the plug on the Solarvert (where the optional Solarvert immersion heater can be fitted) is closest to the pipe connection on the top of the cylinder. The Solarvert coil should not touch any part of the cylinder walls or indirect heating coil.

7. Locate the set screw holes into position, and then use the M5 screws provided to secure and seal the Solarvert in its position. The objective is to make a water tight seal.

8. **OPTIONAL Immersion Heater.** If chosen as an option, remove the brass plug on the Solavert (1¼" bsp connection), and make in the Solarvert 2Kw Immersion Heater, using the provided gasket as a seal. Electrical connections should be to current regulations, and by a qualified installer

9. Connect the solar circuit pipework, using 15mm pipe, onto the 15mm compression couplings.

10. Flush well, and check for any leaks before filling by pressurizing to 3 bar with water. When all connections are proven, drain, and fill with an approved solar anti-freeze pre mix.

11. Re-fill the DHWS

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