

# *User's Instructions*

## **Alpha SolarSmart 90 and 150**

**Pre-Heat Drain Back Solar System and Wall Mounted  
Unvented Hot Water Solar Cylinder  
for use with an Alpha Combination Boiler**

For Technical help or for Service call ...  
**ALPHA HELPLINE Tel: 0844 8718764**  
website: [www.alpha-innovation.co.uk](http://www.alpha-innovation.co.uk)

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**Building Regulations Approved  
Certificate No. ETC11206**



**SOLAR Key Mark Certified**



**THE NATIONAL FEDERATION OF  
ROOFING CONTRACTORS LIMITED**

**Leave these instructions with the User**

## 1 DESCRIPTION

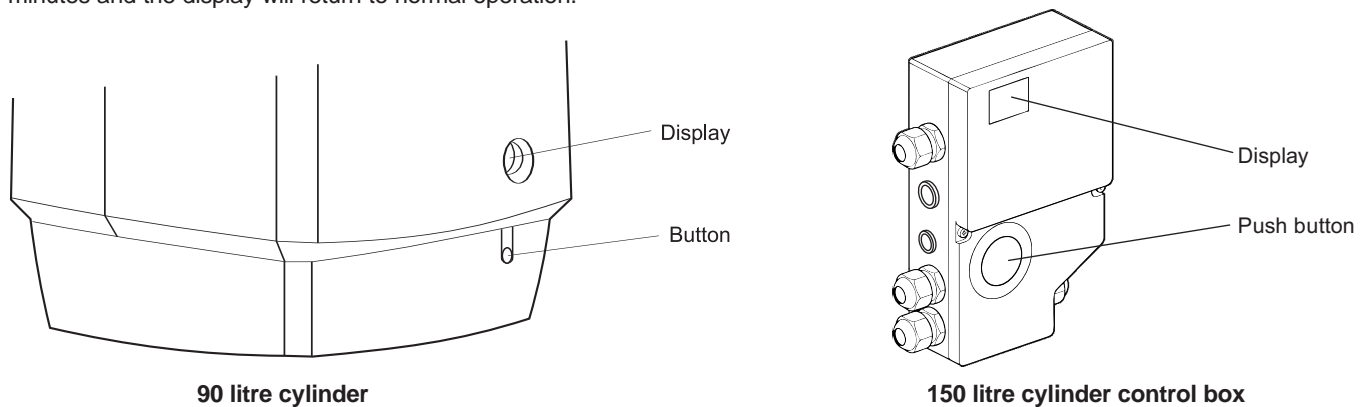
The Alpha SolarSmart system is a pre-heat drain back solar collector system which includes an unvented cylinder to store water heated by the solar collector (either a 90 litre wall mounted or 150 litre floor standing cylinder). The system **must be** used in conjunction with an Alpha combination boiler fitted with the Alpha Solar valve which is supplied with the system.

The SolarSmart system consists of an unvented cylinder (90 or 150 litre), a 2.5 m<sup>2</sup> flat plate drain back solar collector, drain back unit, unvented kit and solar valve. The cylinder is fitted with a pump and temperature sensors - a control box if fitted within the 90 litre cylinder casing and is supplied loose for remote fitting with the 150 litre cylinder. The drain back unit is fitted with a heat exchanger and pump.

The unvented kit **must be** fitted in the mains water supply to the cylinder. The kit includes a pressure reducing valve, expansion vessel, expansion relief valve, check valve and a tundish. The solar valve **must be** fitted directly to the mains water inlet of the Alpha combination boiler.

## 2 USER CONTROLS

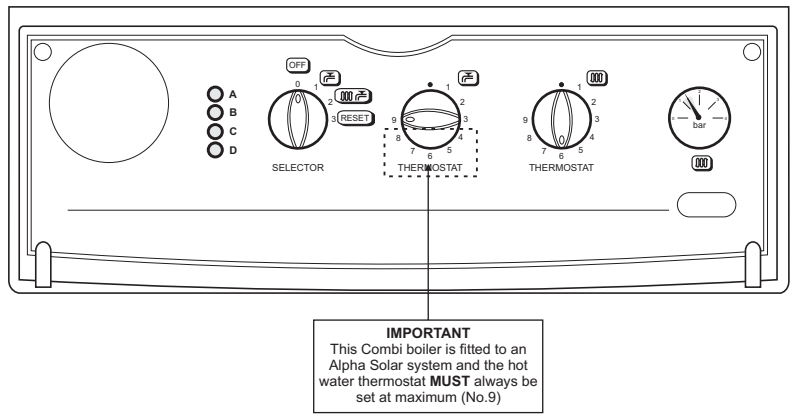
The controls of the solar cylinder are able to indicate working modes on the display. The push button provides the means to operate the cylinder. During normal operation the system can be turned on and off using the button. When the button is held in for 5 seconds the diagnostic mode will be entered. If this has been done, push the button in for 5 seconds or do not touch it for 10 minutes and the display will return to normal operation.



**Fig. 1 - Solar cylinder controls**

Display shown	Display explained
	This indicates the operating mode of the solar system, on or off (oN or oF). <b>Note:</b> It is recommended the system is always left 'ON'.
	If oF is shown the solar system is not operating, press the button to change from off to on. <b>Note:</b> It is recommended the system is always left 'ON'.
	This is the temperature of the domestic hot water (°C) in the solar cylinder. <b>Note:</b> The Solar cylinder temperature can be between 10°C and approximately 70°C max. When the system is on and working, the display will alternate between the domestic hot water temperature (for 4 seconds) and the operating mode (oN or oF for 2 seconds).
	This is the temperature of the domestic hot water in the solar cylinder. The flashing dot in the right hand corner of the display shows that the drain back unit pump and cylinder pump are running.
	This is the temperature of the domestic hot water in the solar cylinder. The flashing dot in the middle of the display shows that only the cylinder pump is running.
	If flashing fault codes (71 to 84). Contact your Installer or Alpha Helpline, Tel: 0870 3001964

The boiler domestic hot water thermostat **must** always be set to the maximum setting. A label has been supplied which should have been positioned over the domestic hot water thermostat knob, as shown below, to ensure the maximum setting is maintained.



**Fig. 2 - Alpha combination boiler controls**

### 3 POSITIONING OF THE COLLECTOR

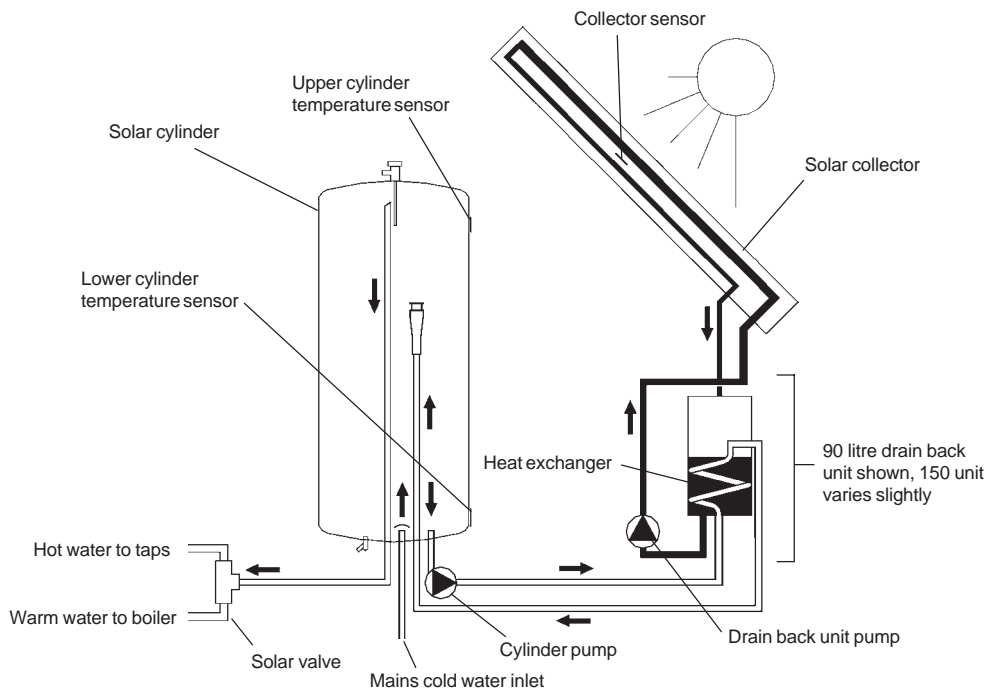
The solar energy supplied by a system varies with the orientation and tilt of the collector, which will usually be determined by the existing roof. However, the predicted variation is slight. For a collector facing anywhere between SE and SW and tilted from the horizontal by upto 60°, the annual solar energy supplied will be at least 90% of that obtained at the optimum collector position. It should be remembered that shading from trees, buildings etc., can produce a significant decrease in system performance, and collectors should be positioned to minimise shading from the sun in the middle of the day.

### 4 SYSTEM OPERATION

**WORKING PRINCIPAL - Fig. 3**

The solar collector uses the energy of the natural light to heat the water being circulated around the collector. When the heated water enters the drain back unit, heat is transferred into the stored water via a heat exchanger. Stored domestic hot water is pumped from the bottom of the solar cylinder through the drain back unit heat exchanger where it is heated and returned to the cylinder.

When a hot water tap is turned on mains water flows into the bottom of the solar cylinder and hot water flows out of the top towards the solar valve at the boiler. If the water from the cylinder is above 60°C the solar valve diverts the flow directly to the tap, if the temperature is less than 60°C the valve diverts the flow through the combination boiler. When the flow is via the combination boiler the water temperature is maintained by the boiler. As the temperature of the water entering the boiler is higher than the normal incoming mains water, less gas is required to heat the water to the set temperature of above 60°C thereby saving energy costs.



**Fig. 3**

### OPERATION OF THE SOLARSMART SYSTEM - Fig. 3

When the controls detect a collector sensor temperature that is at least 10°C higher than the lower cylinder sensor and the solar cylinder temperature is less than 65°C, the drain back unit pump will start. The pump will run at full speed for 250 seconds and then modulate between 30 and 50% full speed to circulate water around the collector. The speed of the pump is dependent upon the difference in the temperature between the collector sensor and the lower cylinder sensor.

At the same time that the drain back unit pump starts the cylinder pump will start at 10% full speed to circulate the cylinder water through the drain back unit heat exchanger. The drain back unit pump will stop when the temperature difference between the collector sensor and the lower cylinder sensor falls to 3.5°C or the cylinder temperature reaches 70°C. The cylinder pump will continue to run for 120 seconds to collect any excess heat from the drain back unit then it will also stop.

When both pumps are operating, a flashing dot will be visible in the right hand corner of the display (Fig. 1). If only the cylinder pump is running, a flashing dot will be visible in the middle of the display.

If a fault occurs, a fault code will be visible in the display.

## 5 ELECTRICAL SUPPLY

The SolarSmart requires a 230/240 V ~ 50 Hz supply, fused at 3 A if a 13 A 3-pin plug is used or a 5 A fuse if any other type of plug is used.

### To connect a plug:-

The colour of the wires in the mains lead of the boiler may not correspond with the coloured markings identifying the terminals in your plug. In this case proceed as follows:-

The wire coloured green and yellow must be connected to the terminal in the plug that is marked with the letter **E**, or by the earth symbol  $\perp$ , or coloured green or green and yellow.

The blue wire must be connected to the terminal which is marked with either the letter **N** or coloured black.

The brown wire must be connected to the terminal which is marked with the letter **L** or coloured red.

**THE APPLIANCE MUST BE EARTHED.**

## 5 IMPORTANT NOTES

**1. Solar Cylinder Location** - Always ensure the following clearances are available around the cylinder:-

**Solar 90** - Top: 100 mm, Bottom: 300 mm, Sides: 10 mm, Front: 450 mm.

**Solar 150** - Top: 100 mm, L/H side : 100 mm, R/H sides: 300 mm, Front: 450 mm.

**2. Mains Failure** - In the event of an electrical supply failure the system will not operate. When the supply is restored, the system will return to normal operation. If the mains water supply fails, there will be no hot water from the taps.

**3. Pressure Relief Valves** - If the hot water system overheats and steam or water is discharged from the pipe connected to the tundish, turn the Solar system off and contact your Installer. Your Installer should have told you where these pipes terminate.

**4. Hot Water** - To prevent very high temperatures at the hot water taps, the Installer should have fitted a thermostatically controlled mixing valve after the combination boiler.

**5. Hot Piping** - The temperatures of pipework from the collector panel, drain back unit and solar cylinder can be very high. Therefore all Solar system pipework should have been insulated to not only reduce heat loss, but more importantly to prevent injury from burns. Ensure your Installer has done this!

**6. Frost** - Always ensure the room/area where the various parts of the Solar system have been installed are protected from frost.

**7. Holidays** - The SolarSmart system uses a very small amount of energy for its operation and during normal vacations (1-2 weeks) we recommend that the system is left switched ON.

If hot water is not used for an extended period of time or the property is vacant then we recommend the system is switched off and the cylinder is drained at the drain point provided. Further details of this procedure can be found in the Installation and Servicing Instructions alternatively contact your installer or engineer.

**8. Servicing** - To maintain efficient and safe operation of the SolarSmart system, it is recommended regular inspection and checks are carried out.

If you contact the Alpha Helpline (Tel: 0844 8718764) for advice, you will be asked for the serial number of your solar cylinder. The serial number of the cylinder is located on top of the front housing underneath the top cover.

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*These instructions have been carefully prepared but we reserve the right to alter the specification at any time in the interest of product improvement.  
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