

# ***Installation and Servicing Instructions***

## **Alpha FlowSmart 25 and 50**

**Hot Water System incorporating a Flue Gas Heat  
Recovery Device, Primary Store and an Alpha CD  
Condensing Combination Boiler**

For Technical help or for Service call ...

**ALPHA HELPLINE**

**Tel: 0870 3001964**

***Alpha***  
HEATING INNOVATION

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Building Regulations Approved  
Certificate No. ETC12908



Zenex SuperFlow Technology  
Patent Protected No. 2420174  
Other Patents Pending

**Leave these instructions with the User**

# CONTENTS

1	Introduction .....	2	5	Commissioning .....	10
2	Technical data .....	3	6	Routine inspection .....	11
3	General information .....	5	7	Short parts list .....	11
4	Installation .....	8	8	Inspection history .....	12

## 1 INTRODUCTION

The Alpha FlowSmart system is a domestic hot water system designed to provide a high level of performance more efficiently.

The combination boiler will provide both central heating and domestic hot water at mains pressure.

The complete FlowSmart package consists of an Alpha CD35C condensing combination boiler, GasSaver, primary storage cylinder (25 or 50 litre), expansion vessel and fittings kit. A cylinder thermostat and a 'Y' or 'S' plan control system kit will also be required for the installation (not supplied).

### IMPORTANT

The Alpha FlowSmart system must be installed as detailed in these instructions. The boiler and GasSaver must be installed in accordance with the installation instructions supplied with them. Failure to do so will negate the warranty supplied with this unit.

The FlowSmart system has been approved to the relevant requirements of the Building Regulations for primary hot water storage systems and to the UK Water Regulations.

It is the law that all gas appliances are installed by a competent person, ie CORGI registered personnel, in accordance with the following recommendations:-

Current Gas Safety (Installation and Use) Regulations

All current Building Regulations issued by the Department of the Environment, i.e. Approved Document L1.

Building Standards (Scotland) (Consolidation) Regulations issued by the Scottish Development Department

UK Water Regulations/Byelaws (Scotland)

Health & Safety Document No. 635 (The Electricity At Work Regulations 1989)

The installation should also be in accordance with the following British Standard Codes of Practice:-

BS 5440:1:2000	Flues
BS 5449:1990	Forced circulation hot water systems
BS 5546:2000	Installation of hot water supplies for domestic purposes
BS 6700:1997	Design, installation, testing and maintenance of services supplying water
BS 6798:2000	Installation of gas fired hot water boilers
BS 6891:1998	Gas installation
BS 7593:1992	Code of Practice for treatment of water in heating systems
BS 7671:2001	Requirements for electrical installations, IEE Wiring Regulations

Failure to install any part of the FlowSmart system correctly could lead to prosecution. It is in your own interest and that of safety to ensure that the law is complied with.

Manufacturer's instructions must **NOT** be taken in anyway as over-riding statutory obligations.

- Notes:**
1. Alpha CD condensing flue components **must** be used when the GasSaver is used with an Alpha CD boiler.
  2. It is essential that the primary system is thoroughly cleaned and flushed when fitting the FlowSmart system. All cleaning agent must be removed and inhibitor added to the system - failure to do so will invalidate the warranty.

## 2 Alpha FlowSmart 25 and 50 - Contents/Introduction

## 2 TECHNICAL DATA

### 2.1 GENERAL

Cylinder External Dimensions	25 L	345 mm Dia. x H530 mm
	50 L	470 mm Dia. x H650 mm
Outer Case	Steel - White paint	
Cylinder Insulation Material	PUR foam	
Cylinder Insulation Thickness	50 mm	
Standing Energy Loss of Cylinder	25 L	0.6 kW/24hr (0.8 Watts/litre)
	50 L	1.1 kW/24hr (0.8 Watts/litre)

### 2.2 DHW SYSTEM

Maximum Inlet Water Pressure	*5 bar
Minimum Inlet Water Pressure	0.2 bar
Maximum Water Flow Rate	18 l/min
Minimum Water Flow rate	2.5 l/min
Outlet Water Temperature (approx. max.)	62°C

\* **Note:** If inlet water pressure is above 5 bar a pressure reducing valve **must** be fitted

#### FlowSmart Cylinder

Mains Water Inlet Pipe Connection	3/4" BSP to 15 mm (fitting supplied)	
Mains Water Outlet Pipe Connection	3/4" BSP to 15 mm (fitting supplied)	
Coil Material	Copper	
DHW Coil Water Capacity	25 L	2 L
	50L	3.5 L
Secondary Circulation Connections	50L only	3/4" BSP
Secondary Circulation Coil Capacity	50L only	0.28 L

### 2.3 PRIMARY SYSTEM

Maximum Working Pressure	2.5 bar
Minimum System Pressure	0.5 bar
Maximum System Temperature (approx.)	82°C
Boiler Pressure relief Valve Setting	3 bar
Boiler Exp. Vessel (pre-charge press.)	8 L at 0.8 bar
Recommended System Pressure (cold)	1.0 bar

#### FlowSmart Cylinder

Flow and Return Connections	3/4" BSP to 22 mm (fittings supplied)	
Cylinder Material	Mild Steel	
Cylinder Capacity	25 L	24 L
	50 L	50 L
Plugged Connection (immersion heater if required)	1 1/4" BSP	

### 2.4 COMPONENTS

Blending Valve Setting (boiler inlet) - <b>Required temperature setting</b>	30°C	
Blending Valve Connections	15 mm	
Additional Primary System Expansion Vessel	Capacity	5 L
	Connection	1/2" BSP
	Pre-Charge Pressure	1 bar

## 2.5 INSTALLATION

Minimum Clearances for Servicing (Refer to Fig. 1)	Top	* 150 mm
	Drain Point Side only	100 mm
Lifting Weight (empty)	25 L	16 kg
	50 L	29 kg
Weight (full) including DHW and Primary Circuit	25 L	42 kg
	50 L	82 kg

**\* Note:** If an immersion heater is fitted, sufficient top clearance **must be** allowed to enable the immersion heater to be replaced

## 2.6 FLOWSMART CYLINDER LOCATION and CONNECTIONS

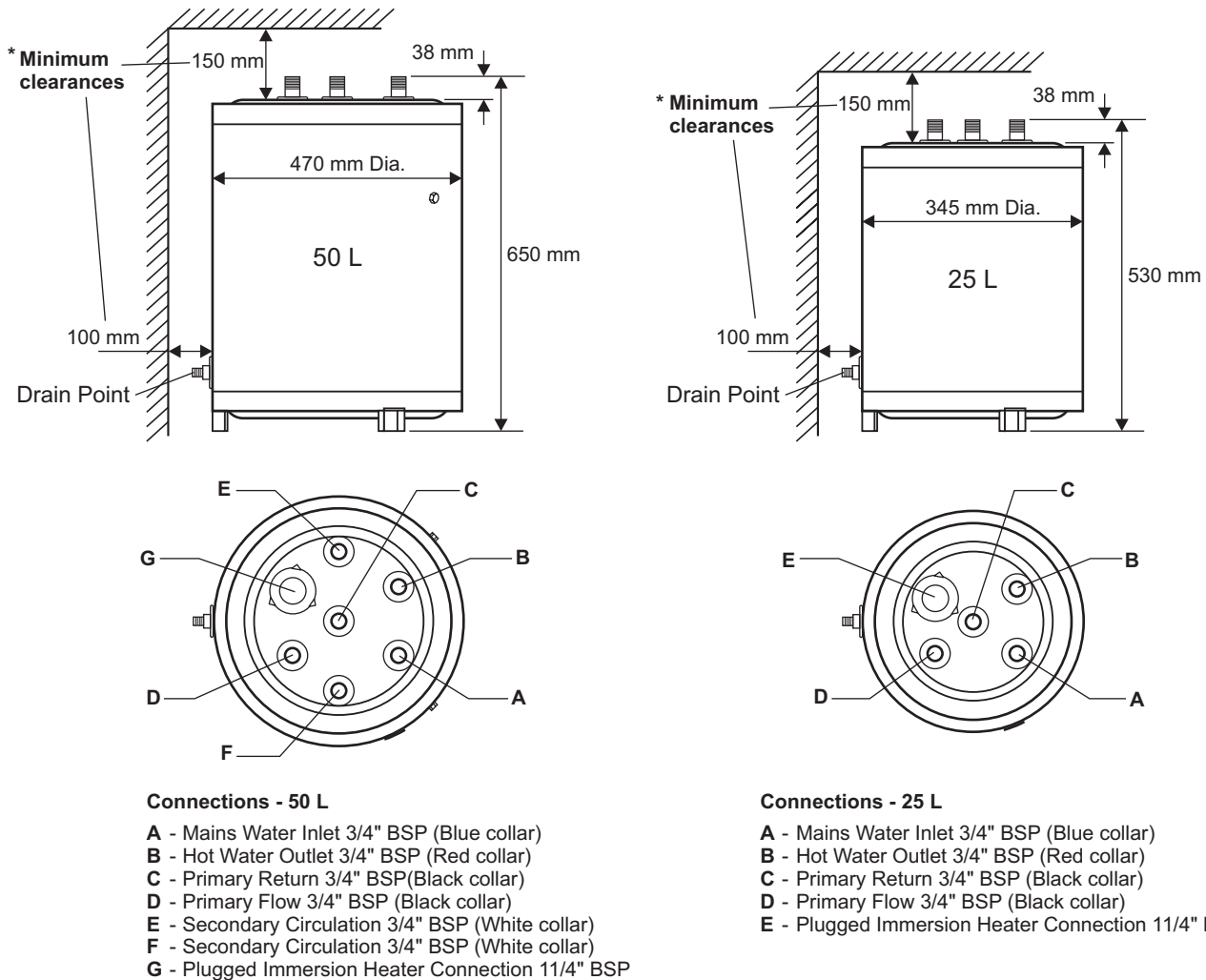


Fig. 1

## 2.7 ELECTRICAL CONNECTIONS

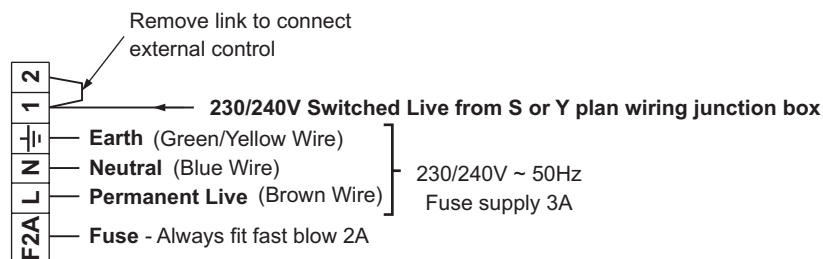


Fig. 2 - Boiler terminal block

## 4 Alpha FlowSmart 25 and 50 - Technical Data

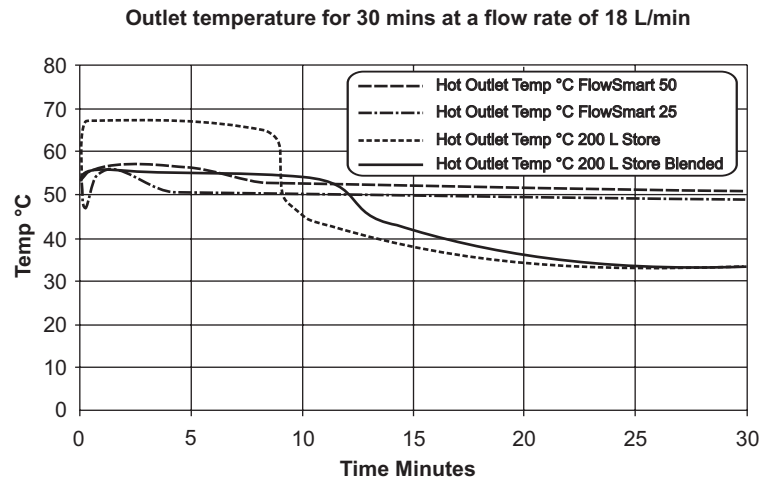
### 3 GENERAL INFORMATION

#### 3.1 HOW DOES THE FLOWSMART SYSTEM WORK

The Alpha FlowSmart system has been designed to deliver domestic hot water at a high level of performance more efficiently, for example 18 l/min for temperatures of 50°C and above for long periods of demand using less energy than a typical hot water storage system utilising a large cylinder.

The cold water supply first passes through the GasSaver where the reclaimed heat from the hot flue gasses is used to pre-heat the cold water supply. This pre-heated water then passes through the coil in the primary store where it is heated to a higher temperature. This hot water then passes to the blending valve where it is mixed with cold water direct from the supply and enters the cold inlet of the combination boiler at a temperature of approximately 30°C. The boiler then heats the water to the required temperature. See the performance graph Fig. 3.

When the flow of hot water is stopped, the FlowSmart store is reheated and then the system is ready to provide the same performance again.

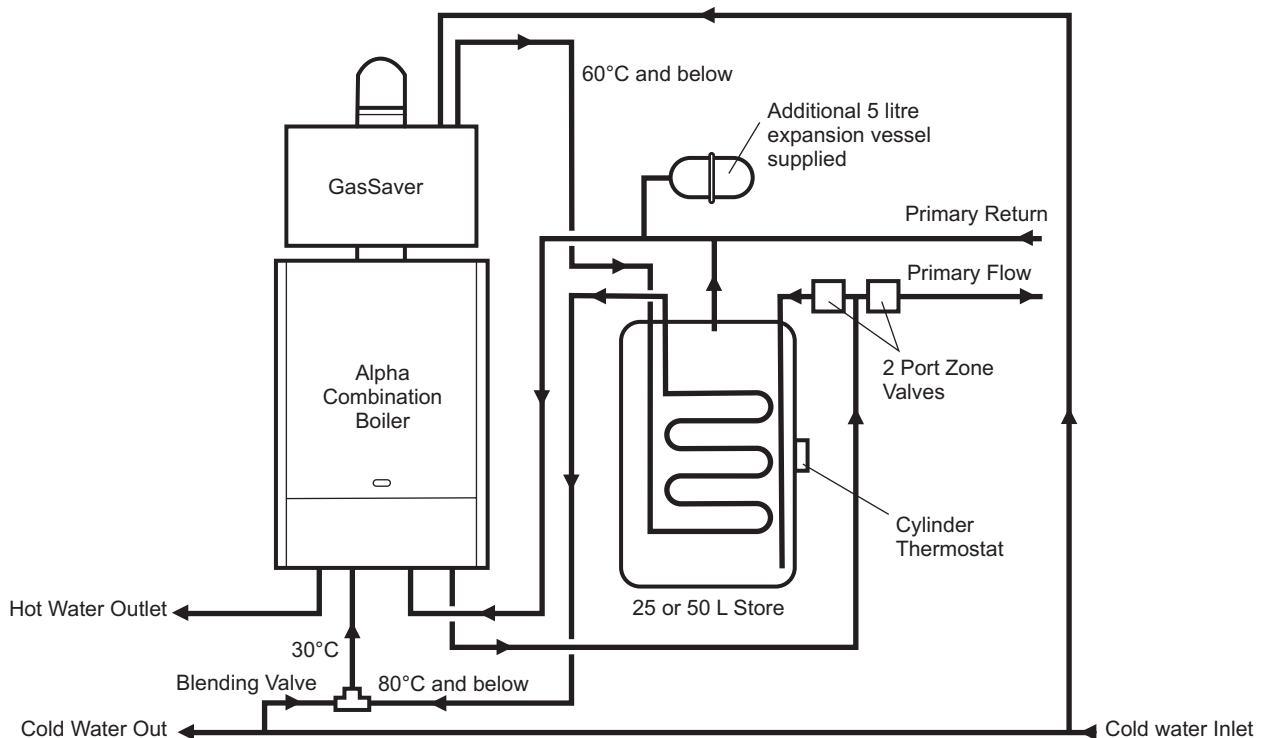


**Fig. 3 - FlowSmart vs 200 L store performance**

#### 3.2 TYPES OF INSTALLATION

Depending on the type of control system used the FlowSmart should be installed as shown in one of the following schematics. The primary store should be positioned as close as possible to the boiler with the primary flow and return pipework to the store no more than 1½ m in length. This pipework must be insulated.

##### Using the 'S' plan control system



**Fig. 4**

## Using the 'Y' plan control system

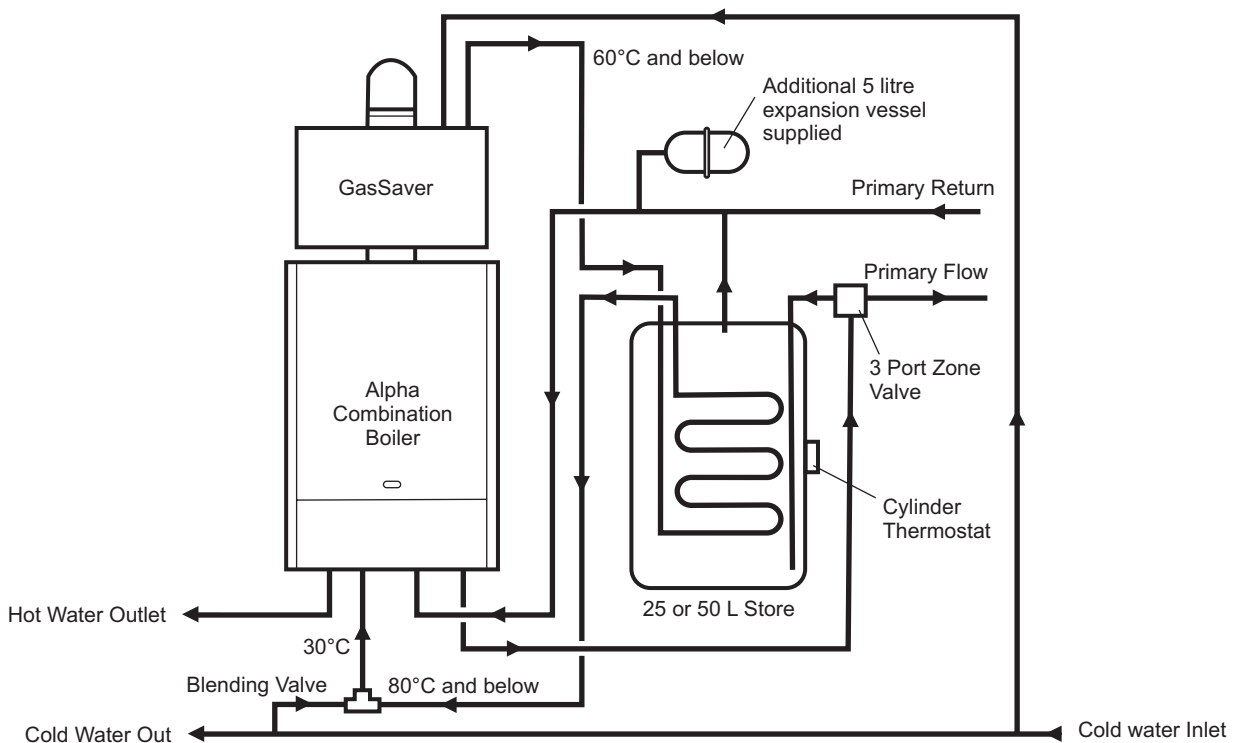


Fig. 5

### 3.3 DOMESTIC HOT WATER SYSTEM

**Note:** Before installation, check that the incoming mains water supply is adequate to provide the required flow rates.

The minimum flow rate needed for the flow switch and burner to operate is 2.5 litres/min.

The incoming mains water pressure should be between 0.2 and 5 bar to ensure efficient operation. If the pressure is above 5 bar a pressure reducing valve must be fitted.

To ensure economic use, the pipe runs should, where possible, be in 15 mm copper pipe and be as short as possible, also where possible the pipework should be insulated to reduce heat loss.

All taps and mixing valves used with the hot water system must be suitable for operating at a mains pressure of up to 8 bar.

**Showers** - A shower may be used with the boiler if required.

If a loose or flexible head type shower is used it may require the fitting of a double check valve, to comply with Water Bye Law 17.

**Bidets** - No anti-syphonage arrangements are necessary, provided the outlets are shrouded and it is not possible to attach a temporary hand held spray. A supply of direct mains fed hot and cold water is permitted provided the appliance is of the over-rim flushing type.

Before the mains water supply pipe is connected to the boiler, it should be thoroughly flushed out to avoid the danger of dirt or foreign matter entering the boiler.

### 3.4 FLUSHING THE HEATING SYSTEM

It is essential that the primary system is thoroughly cleaned and flushed when fitting the FlowSmart system. If a cleaning agent is used, it must be flushed out before inhibitor is added to the primary system. Cleaning agent and inhibitor must be applied in accordance with the manufacturers instructions. Only Fernox and Sentinel are acceptable for use. Further information can be obtained from Fernox (Tel: 0179 9521133) or Sentinel (Tel: 0800 3894670).

All cleaning agent **must** be removed and inhibitor added to the system, failure to do so will invalidate the warranty.

The system should be flushed in accordance with BS 7593 and BS 5449. The following procedures are recommended:

1. Installing onto a new system:-
  - a. Fill the system, vent at high points, at pump and radiators.
  - b. Check for leaks.
  - c. Rapidly drain the system.
  - d. If required, chemically clean the system as instructed by the recommended cleaner manufacturer.  
**Note:** Ensure that the system is flushed to remove any remains of the cleaner.
  - e. If chemical cleaner is not used to clean the system:-
    - i) Refill the system.
    - ii) Switch on the boiler and allow the system to heat up to the normal operating temperature.
    - iii) Rapidly drain the system while the water is still hot.
    - iv) Refill the system.
  - f. As required, add the recommended inhibitor to the system as instructed by the inhibitor manufacturer.
  - g. Recheck for leaks.
2. Installing onto an existing system, clean the system before fitting the new boiler:-
  - a. If the old boiler is still working:-
    - i) Switch on the boiler and allow the system to heat up to the normal operating temperature.
    - ii) Rapidly drain the system while the water is still hot.
    - iii) Refill and chemically clean the system as instructed by the recommended cleaner manufacturer.
    - iv) Ensure the system is flushed to remove any remains of the cleaner.
    - v) Fit the new boiler.
  - b. If the old boiler is not working:-
    - i) Rapidly drain the system.
    - ii) Remove the old boiler.
    - iii) Flush the system through.
    - iv) Fit the new boiler.
    - v) Refill and chemically clean the system as instructed by the recommended cleaner manufacturer.
    - vi) Ensure the system is flushed to remove any remains of the cleaner.
  - c. As required, add the recommended inhibitor to the system as instructed by the inhibitor manufacturer.
  - d. Check for leaks.

### 3.5 CENTRAL HEATING SYSTEM

Refer to the instructions supplied with the boiler for full information. However the FlowSmart has been supplied with a 5 litre expansion vessel for fitting to the primary return pipework between the FlowSmart primary store and the boiler (See Figs. 4 and 5). This is to allow for the additional expansion required when fitting the FlowSmart primary store. The pre-charge of the expansion vessel should be 1 bar.

### 3.6 IMMERSION HEATER

If an immersion heater is fitted, it must incorporate a thermostat and thermal cut-out.

**Note:** Immersion heaters without thermal cut-outs must not be fitted.

The immersion heater must be installed in accordance to current electrical requirements for installation BS 7671 and must be fused as stated on the heater. A label will be supplied with the immersion heater detailing the watts, voltage, type, length and the BS or equivalent it complies with. This label must be fitted to the FlowSmart store.

### 3.7 ALPHA FLOWSMART 50 - SECONDARY CIRCULATION - See Fig. 6

1. If a DHW secondary circulation circuit is required, you must use the FlowSmart 50 because it incorporates a secondary circulation coil in the store.
2. A DHW expansion vessel the correct size must always be fitted to the secondary circulation system, eg. 5 litre expansion vessel is suitable for capacities of the secondary circulation system upto 50 litres. This expansion vessel should be charged to 3.5 bar.
3. The secondary circulation pump should be controlled by a timer, and correspond with the timer settings for the FlowSmart system, i.e. do not operate the pump when the store is not heated.
4. Ensure the setting of the secondary circulation thermostat setting does not exceed the FlowSmart store temperature setting, i.e. cylinder thermostat setting.
5. Ensure there are no dead areas or areas where there is no circulation within the pipework of the secondary circulation system.

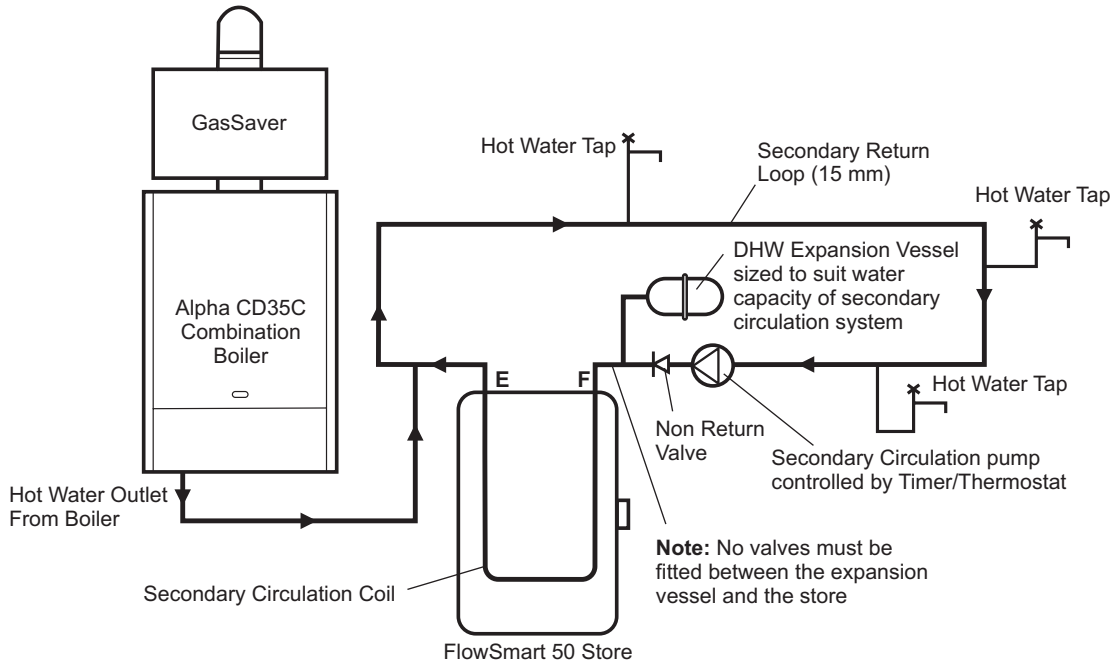


Fig. 6

## 4 INSTALLATION

### 4.1 UNPACKING

**Note:** When delivered on site do not unpack until ready for installation and ensure to store in a dry area.

1. The following items are supplied in the FlowSmart package:
  - a. An Alpha CD35C condensing combination boiler
  - b. An Alpha GasSaver GS-1 complete
  - c. A FlowSmart 25 or 50 primary store
  - e. A FlowSmart expansion vessel and fittings kit (Part No. 3.019505) which contains the items shown in Fig. 7

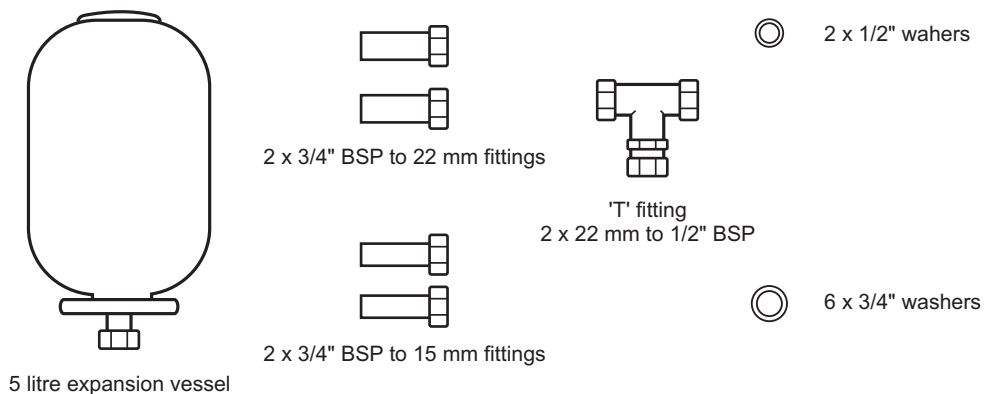


Fig. 7 - Expansion vessel kit contents



2. The following items are required in addition to the above.
  - a. The required flue terminal assembly for the boiler
  - b. A cylinder thermostat
  - c. An 'S' or 'Y' plan control system kit, including programmer and room thermostat.

#### 4.2 FIT THE BOILER AND GASSAVER

The boiler, flue and GasSaver **must be** fitted as described in the instructions supplied with the boiler and the GasSaver.

#### 4.3 FIT THE FLOWSMART PRIMARY STORE

1. Locate the primary store as close to the boiler as possible ensuring there are the minimum clearances available as given in Section 2.5 and shown in Fig. 1.

Ensure the floor on which the store is mounted is capable of withstanding the weight of the store, i.e. 42 kg for 25 litre model or 82 kg 50 litre model.

**Note:** If an immersion heater is fitted, sufficient top clearance **must be** allowed to enable the immersion heater to be replaced.

2. Connect the pipework - Refer to Figs. 1 and 4 or 5.
  - a. Fit the 3/4" BSP to 22 mm fittings and 3/4" BSP to 15 mm fittings supplied, to the primary store connections using the washers supplied as follows:-  
The 3/4" BSP to 22 mm fittings to the primary flow and return connections (with the black collar) and the 3/4" BSP to 15 mm fittings to the cold inlet (with the blue collar) and hot water outlet connections (with the red collar).  
**Note: 50 L only** - If a DHW secondary circulation circuit is used, the connections with the white collar (E and F) must be connected to the circuit. Refer to Section 3.7 and Fig. 6.
  - b. Thoroughly flush out all water pipework. Refer to Section 3.4.
  - c. Connect all primary system pipework referring to Fig. 4 or 5. Ensure that the following are connected:-  
Connect the 5 litre expansion vessel using the 'T' connection supplied, to the primary return pipework from the store.  
Connect the 'S' or 'Y' plan valves as shown in Fig. 4 or 5.
  - d. Connect all cold mains and hot water pipework as shown in Fig. 4 or 5. Ensure that the blending valve is connected to the hot water outlet pipework from the store also shown in Fig. 4 or 5.

#### 4.4 FIT THE CYLINDER THERMOSTAT

1. Remove the six screws securing the 80 x 160 mm cover located on the side of the primary store, just above the drain tap and remove the cover.
2. Cut away the insulation around the 80 x 160 mm hole until the metal side of the store is exposed.
3. The cylinder thermostat can then be located within the hole and secured as detailed in the instructions supplied with the thermostat.

#### 4.5 ADJUST THE SEASONALITY VALVE - See Fig. 8

Adjust the seasonality valve on the combination boiler by turning the adjusting screw fully clockwise, as shown in Fig. 8. This will allow the maximum flow rate through the boiler.

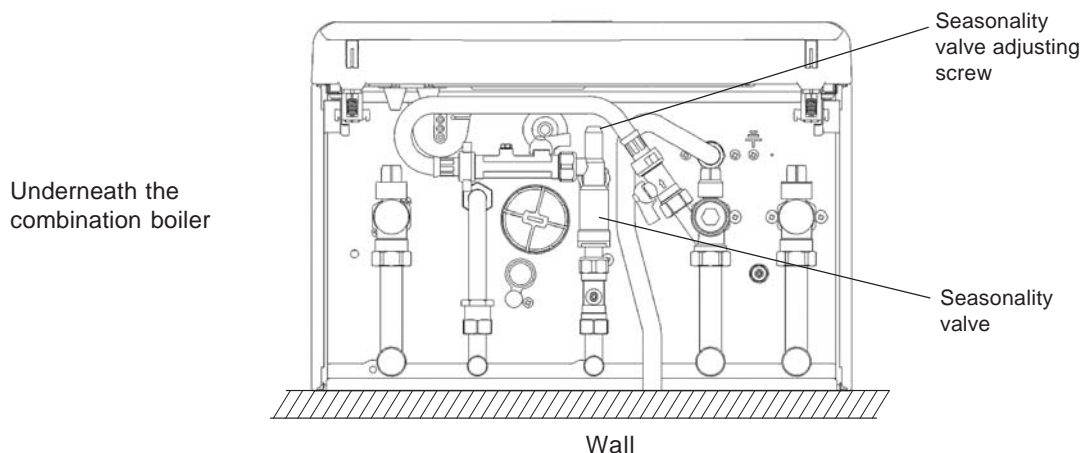


Fig. 8 - Location of seasonality valve

#### 4.6 ELECTRICALLY CONNECT ALL CONTROLS

**Note:** All electrical wiring must be carried out by a competent person to BS 7671 - Requirements for Electrical Installations, IEE Wiring Regulations.

1. Connect the mains supply to the boiler terminal block as described in the instructions supplied with the boiler.  
The boiler electrical connections are shown in Fig. 2 of these instructions.

**Note: An internal clock should not be fitted to the boiler when a FlowSmart system is connected. An external 2-channel clock must be used instead.**

2. Connect the cylinder thermostat, 2-channel programmer, room thermostat and zone valves as described in the instructions supplied with the 'S' or 'Y' plan control system kits.

## 5 COMMISSIONING

1. Fill all the systems, i.e. primary and secondary circuits and check for leaks. Refer to the boiler instructions.
2. Refer to Section 3.4 in these instructions and ensure the primary system has been flushed and cleaned and inhibitor added to the primary system.  
**Note:** All cleaning agent **must be** removed and inhibitor added to the primary system, failure to do so will invalidate the warranty.
3. Commission the boiler and GasSaver as described in the boiler and GasSaver installation instructions.
4. Ensure that the boiler hot water thermostat is set to position 9 (maximum) and the boiler central heating thermostat is set to a position above 7 to max. as shown in Fig. 9.

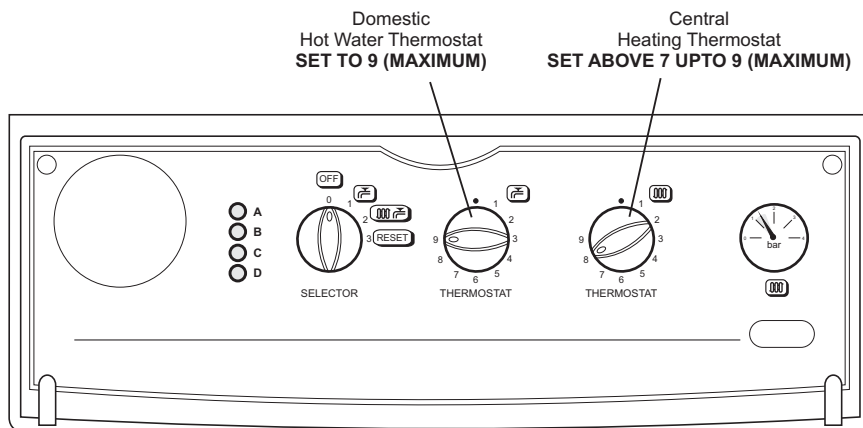


Fig. 9

5. Ensure that the blending valve positioned between the FlowSmart store and the boiler water inlet is set to approximately 30°C, i.e. about the minimum setting.
6. Ensure that the cylinder thermostat is set at or below the boiler central heating thermostat temperature setting.

## 6 ROUTINE INSPECTION

It is recommended that the FlowSmart cylinder should be subject to a general condition inspection at each boiler maintenance interval.

If the system pressure exceeds 2.5 bar when operating at maximum temperature, the additional 5 litre expansion vessel (refer to Fig. 4 or 5) as well as the boiler expansion vessel should be checked and re-pressurised, if necessary.

**Notes:** 1. Check the expansion vessel charge only when the system pressure is zero.  
2. The expansion vessel pressure should be charged to 1 bar.

## 7 SHORT PARTS LIST

Item	Qty.	Part No.
5 litre expansion vessel	1	1.026991
Drain tap	1	6.2003030
Connector 3/4" BSP to 15 mm	2	3.019591
Connector 3/4" BSP to 22 mm	2	3.019592
'T' connector 22 mm to 1/2" BSP	1	3.019539
Plug 1 1/4" BSP	1	6.0001140
'O' ring for 1 1/4" BSP plug	1	6.2003040
Box spanner for 1 1/4" connection	1	6.2003045

# 8 INSPECTION RECORD

It is recommended that the FlowSmart is inspected regularly and that you complete the appropriate Inspection Record below.

**Service Provider:** Before completing the appropriate Inspection Record below, please ensure you have carried out the boiler service as described in the boiler instruction manual.

**INSPECTION 1:** Date .....  
Engineers Name .....  
Company Name .....  
Telephone No. ....  
CORGI ID card serial No. ....  
Comments .....  
Signature .....

**INSPECTION 2:** Date .....  
Engineers Name .....  
Company Name .....  
Telephone No. ....  
CORGI ID card serial No. ....  
Comments .....  
Signature .....

**INSPECTION 3:** Date .....  
Engineers Name .....  
Company Name .....  
Telephone No. ....  
CORGI ID card serial No. ....  
Comments .....  
Signature .....

**INSPECTION 4:** Date .....  
Engineers Name .....  
Company Name .....  
Telephone No. ....  
CORGI ID card serial No. ....  
Comments .....  
Signature .....

**INSPECTION 5:** Date .....  
Engineers Name .....  
Company Name .....  
Telephone No. ....  
CORGI ID card serial No. ....  
Comments .....  
Signature .....

**INSPECTION 6:** Date .....  
Engineers Name .....  
Company Name .....  
Telephone No. ....  
CORGI ID card serial No. ....  
Comments .....  
Signature .....

**INSPECTION 7:** Date .....  
Engineers Name .....  
Company Name .....  
Telephone No. ....  
CORGI ID card serial No. ....  
Comments .....  
Signature .....

**INSPECTION 8:** Date .....  
Engineers Name .....  
Company Name .....  
Telephone No. ....  
CORGI ID card serial No. ....  
Comments .....  
Signature .....

# Alpha

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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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