

Solutions 2000 - S-HR

Fully Modulating & Condensing Gas Boiler Installation Manual



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12 Technical specifications

appliance type		S-HR 15	S-HR 24	S-HR 24T	S-HR 35	S-HR 35T	S-HR 51	S-HR 51T	S-HR 60	
input (Hs)	kW	15,0	24,0	24,0	35,0	35,0	51,0	51,0	60,0	
input (Hi)	kW	13,5	21,6	21,6	31,5	31,5	45,9	45,9	54,0	
modulation range (capacity 80/60°C)	kW	3,5-13,3	3,5-21,2	3,5-21,2	4,9-30,9	4,9-30,9	8,8-44,9	8,8-44,9	8,8-52,9	
modulation range (capacity 50/30°C)	kW	3,9-14,4	3,9-23,0	3,9-23,0	5,3-33,6	5,3-33,6	9,5-48,7	9,5-48,7	9,5-57,2	
efficiency (80/60°C at full load)	%	98	98	98	98	98	98	98	98	
efficiency (50/30°C at full load)	%	107	107	107	107	107	106	106	106	
efficiency in accordance with EN677	%	109	109	109	109	109	109	109	109	
yearly emission of NOx	ppm	12	12	12	12	12	12	12	12	
yearly emission of CO	ppm	11	11	11	11	11	11	11	11	
CO ₂	%	9	9	9	9	9	9,5	9,5	9,5	
flue gas temperature (at 80/60°C at full load)	°C	65	65	65	67	67	68	68	68	
flue gas temperature (at 50/30°C at low load)	°C	31	31	31	31	31	31	31	31	
burner control		stepless modulation								
gas consumption (at 1013 mbar/0°C) G20	m³/h	1,32	2,10	2,10	3,07	3,07	4,47	4,47	5,26	
burner type		ceramic					foam ceramic			
current type	V/Hz	230/50	230/50	230/50	230/50	230/50	230/50	230/50	230/50	
maximum electric power recorded	W	122	122	122	145	145	190	190	190	
standby electric power recorded	W	5	5	5	5	5	5	5	5	
degree of protection according to EN60529		IP 40	IP 40	IP 40	IP 40	IP 40	IP 40	IP 40	IP 40	
weight (net)	kg	50	50	73	53	76	63	86	63	
water capacity CH-based	l	3,5	3,5	3,5	5	5	7	7	7	
water capacity DHW-based	l			14		14		13		
pump overrun time CH	min	15	15	15	15	15	15	15	15	
pump overrun time DHW	min			1		1		1		
minimum water pressure	bar	1	1	1	1	1	1	1	1	
maximum water pressure	bar	3	3	3	3	3	3	3	3	
maximum flow water temperature	°C	90	90	90	90	90	90	90	90	
DHW flow rate at 60°C	l/min			6		8,5		12,5		
DHW flow rate at 45°C	l/min			8,5		12,5		17,5		
pump type	Wilo	ARS 25/70	ARS 25/70	ARS 25/70	ARS 25/70	ARS 25/70	ARS 25/75	ARS 25/75	ARS 25/75	
available pump head	kPa	35	25	25	20	20	20	20	12	
expansion vessel content	l			12		12				
expansion vessel pre-pressure	bar			1		1				

boiler specifications

table 12

1 General description

The Beeston S-HR is a room sealed, fully modulating, condensing central heating boiler with optional built-in domestic hot water facility. The appliances are suitable for NATURAL GAS only.

The built-in fan draws the combustion air from outside and provides full premixing of gas and air. The gas mixture passes through the ceramic burner which is fitted above the heat exchanger. The small flame height enables a compact construction and low standby losses. The condensate is discharged through an internal siphon.

The unit has been tested to European Standards and has a CE certificate.

The operating efficiency of the unit is more than 98% (nett cv). Emission of CO and NO_x are well below the maximum EU requirements for this class of appliance. The unit is vented automatically during filling or topping up the system. The control system checks the water pressure in the system and will indicate low pressure on a display provided on the boiler control panel.

The boiler anticipates the heat requirement of both the central heating installation and the hot water supply (if fitted). As a result the unit will adjust its output to match installation requirements. Load matching ensures optimum comfort and efficiency.

In order to reduce noise in normal operation initial ignition is at low output. Once ignition is established the controls provide a uniform increase in input, instead of igniting at full rate. When the installation does require full input the control will adjust as required. This ensures that a uniform increase in water temperature is effected. If an outside sensor is fitted, the control will be weather compensated. This means that the control sensors monitor the outside temperature and the boiler flow temperature. This data enables the control system to provide the correct water flow temperature at the heat emitters.

A boiler supplied with the optional built in domestic hot water facility has a small domestic hot water storage vessel fitted at the right hand side of the boiler. Hot water from the vessel passes through an adjustable thermostatic mixing valve which is factory pre-set and provides a constant hot water temperature of 60°C.

Gas Safety (Installation and Use) Regulations 1996.

All gas appliances must, by law, be installed by competent persons, e.g. Members of CORGI in accordance with the above regulations. Failure to install appliances correctly could lead to prosecution.

It is in your own interest and that of safety to ensure that the law is complied with.

In addition to the above regulations, this appliance must be installed in compliance with the current IEE Regulations for electrical installation, local Building Regulations, the Building Standards (Scotland) (Consolidation) Regulations, bye laws of the local water undertaking and Health and Safety Document No.635 'The Electricity at Work Regulations 1989'. It should also be in accordance with the relevant recommendations in the current editions of the following British Standards and Codes of Practice, viz BS5440Pt 1 and 2, BS 5449, BS 5546, BS6789, BS6891 and BG DM2.

Important: The Beeston S-HR is a Certified appliance and must not be modified or installed in any way contrary to this "Installation Manual". Manufacturers instructions must NOT be taken in any way as overriding statutory obligations.

2 Scope of the delivery

The unit is supplied ready for installation. The following components are supplied:

- Boiler with casing
- Automatic vent (inside the boiler)
- Pressure relief valve (inside the boiler)
- Inlet combination and dosing valve (only with SHR T units)
- Mounting bracket
- Filling and draining valve with T-piece
- Hardware pack containing plugs and screws
- Template
- Installation instructions
- User's Instructions

3 Installing the boiler

The unit can be easily mounted on an external wall using the mounting bracket and fittings supplied. The wall must be flat and of sufficient strength to be able to carry the weight of the boiler when it is full.

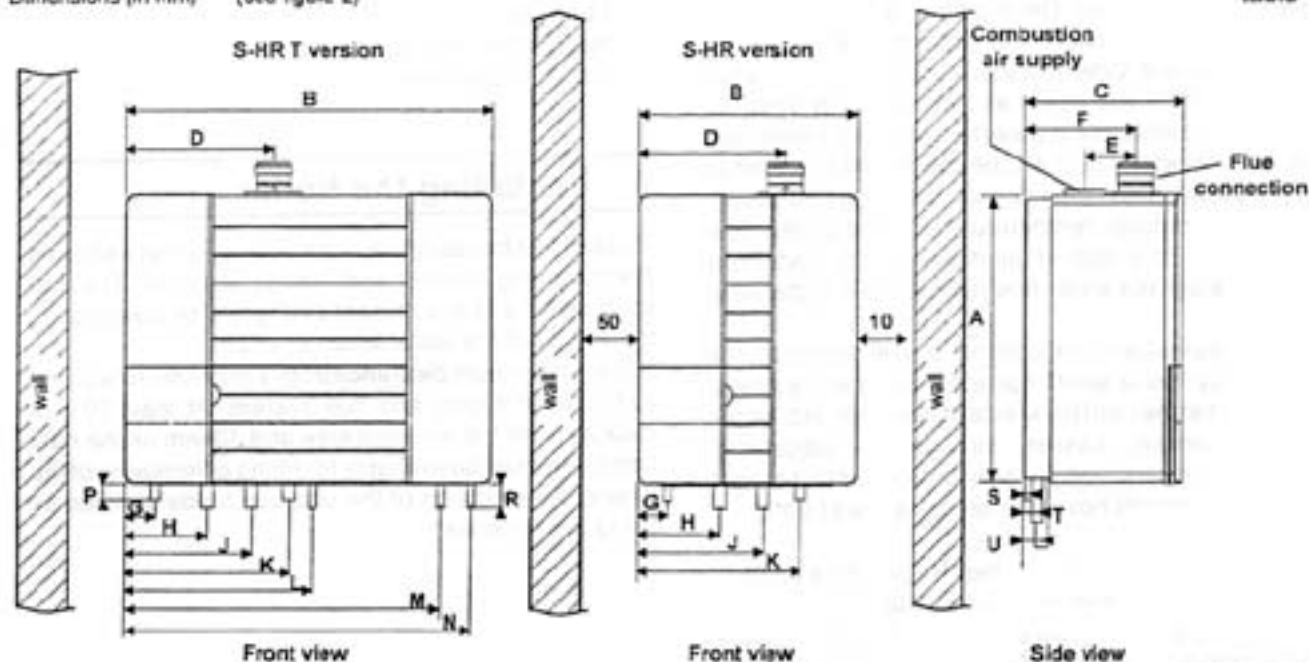
250 mm minimum clearance above the boiler is required to fit the air supply and flue system. At least 50 mm clearance on the left hand side and 10 mm on the right hand side must be available for fitting or removing of the casing. The location of the unit can be determined by using the template.

3.1 Dimensions

type of unit		S-HR	S-HR	S-HR	S-HR	S-HR	S-HR	S-HR	S-HR
		15	24	24T	35	35T	51	51T	60
				Combi		Combi		Combi	
A height	mm	680	680	680	680	680	680	680	680
B width	mm	500	500	840	500	840	660	1000	660
C depth	mm	370	370	370	370	370	370	370	370
D left side / flue gas exhaust	mm	335	335	335	335	335	495	495	495
E centre to centre / flue gas exhaust and supply	mm	120	120	120	120	120	120	120	120
F back / flue gas exhaust	mm	270	270	270	270	270	270	270	270
G left side / gas pipe	mm	65	65	65	65	65	65	65	65
H left side / flow pipe	mm	185	185	185	185	185	185	185	185
J left side / return pipe	mm	285	285	285	285	285	445	445	445
K left side / condensation pipe	mm	370	370	370	370 <td 370	370	530	530	530
L left side / expansion tank pipe	mm			430		430		590	
M left side / cold water pipe	mm			725		725		885	
N left side / hot water pipe	mm			795		795		955	
P pipe length of g*	mm	18	18	18	18	18	18	18	18
Q pipe length of c and k*	mm	40	40	40	40	40	40	40	40
R pipe length of a; r; e and w*	mm	60	60	60	60	60	60	60	60
S back / centre of pipe a*	mm	25	25	25	25	25	25	25	25
T back / centre of pipe g*	mm	40	40	40	40	40	40	40	40
U back / centre of pipe a; r; e; k; w*	mm	50	50	50	50	50	50	50	50

Dimensions (in mm) (see figure 2)

table 1



Dimensions (in mm)

figure 1

3.2 Performance data, dimensions, and service connections

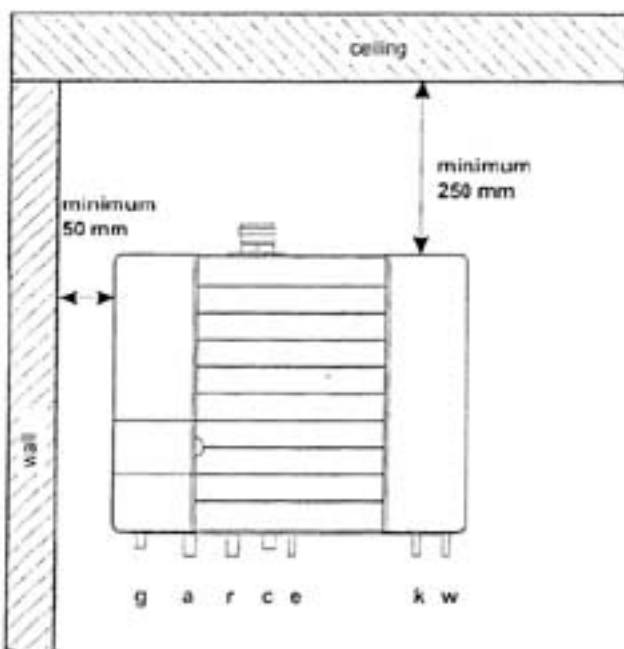
The unit has the following pipework connection arrangements: The standard gas pipe connection at the boiler is $\frac{1}{2}$ " BSP female. This is increased to $\frac{3}{4}$ " BSP female by the fitting of a suitable reducing bush on S-HR51T and S-HR60 units.

The condensate discharge pipe consist of an oval 24 mm plastic pipe. The outflow pipe can be connected to this by means of an open connection to drain. If the outflow to drain terminates in a remote location, then the pipe can be lengthened by means of a 32 mm PVC sleeve. **Run the discharge pipe to avoid air-locks. Protect the pipe from freezing and blockage.**

type of unit		S-HR 15	S-HR 24	S-HR 24T	S-HR 35	S-HR 36T	S-HR 51	S-HR 61T	S-HR 90
				Combi		Combi		Combi	
combustion air supply	mm	80	80	80	80	80	80	80	80
flue gas exhaust	mm	80	80	80	80	80	80	80	80
gas pipe - G		½" inside	½" inside	½" inside	½" inside	½" inside	¾" inside	¾" inside	¾" inside
central heating flow pipe - A	mm	28	28	28	28	28	35	35	35
central heating return pipe - R	mm	28	28	28	28	28	35	35	35
condensation discharge pipe - C	mm	24	24	24	24	24	24	24	24
expansion vessel pipe - E	mm			22		22		22	
cold water pipe - K	mm			15		15		15	
hot water pipe - W	mm			15		15		15	

connection diameters

table 2



unit pipes bottom

figure 2

The flue gas exhaust system and air supply system consist of 2 x 80 mm connections.

The boiler flow and return pipes can be connected to the installation by means of compression fittings.

One T-piece compression fitting for the return pipe and fitting the fill and drain valve is supplied.

⚠ When removing the plastic sealing caps from the pipes, contaminated testing water may be released.

⚠ Fitting isolating valves to all connections to the boiler is recommended.

3.3 Ventilation and combustion air requirements

Detailed recommendations for air supply are given in BS 5440:2 which MUST be consulted before proceeding.

Contamination of the air supply from any external source must be avoided, with particular reference to dust, insulation debris and flue products. In addition, the contamination of air supply with fluorides and/or chlorides must be avoided as they will cause deterioration of the heat exchangers.

- The boilerhouse or room in which the appliance is installed does not require a purpose made air vent to cool the appliance. However, due account must be taken of any other heat gained from ancillary equipment. The manufacturers of the equipment should be consulted and if necessary specialist advice obtained.
- If the appliance is installed in a cupboard or compartment, permanent air vents are required in the cupboard or compartment, one at high level, and one at low level. Both high and low level air vents must communicate with the same internal room / space or must both be on the same wall to outside air. The minimum effective areas required are given in table 3.

THE OPENINGS MUST NOT BECOME BLOCKED.

The user must be instructed not to store items which may block ventilation openings in the compartment.

⚠ Multiple boiler installations (two or more) designed to take combustion air from **INSIDE** the boilerhouse **MUST** comply with the requirements of BS 6644:1991

Position of air vents	Air from rooms	Air direct from outside
High level	540 cm ² 84 in ²	270 cm ² 42 in ²
Low level	540 cm ² 84 in ²	270 cm ² 42 in ²

cooling air requirements

table 3

4 Central heating system

The central heating system adjusts automatically the flow rate from the boiler's internal circulation pump. As the load fluctuates it will maintain a more or less constant boiler temperature difference of 20K. The relationship between available pump flow rate and permissible system resistance at full load is shown in Table 4.

If the system resistance is higher than the maximum value the pump will rotate at maximum speed and the load will be adjusted until an acceptable temperature difference between flow and return water has been achieved. If this is not achievable and the temperature difference remains too high then the unit will switch itself off and wait until an acceptable temperature can be achieved.

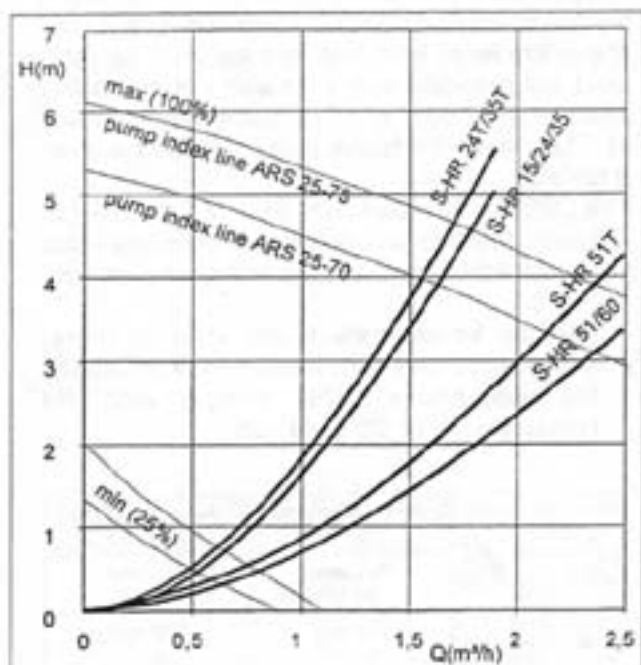
type of unit	water flow rate ΔT 20°C		permissible installation resistance	
	l/min	l/h	kPa	mbar
S-HR 16	9,9	600	35	350
S-HR 24/24T	15,1	980	25	250
S-HR 35/35T	22,1	1324	20	200
S-HR 51/51T	32,1	1929	20	200
S-HR 60	37,9	2271	12	120

available water flow at full load

table 4

If an unacceptably high temperature is detected, then the control will try repeatedly to ensure that this is not caused by inadequate water flow, and if the fault persists the unit will lock out.

Note that, under this method of control, all units other than the S-HR to have a maximum system resistance of 2.04m (6-7 ft) head. The S-HR 60 is limited to 1.22m (4.0 ft) head.



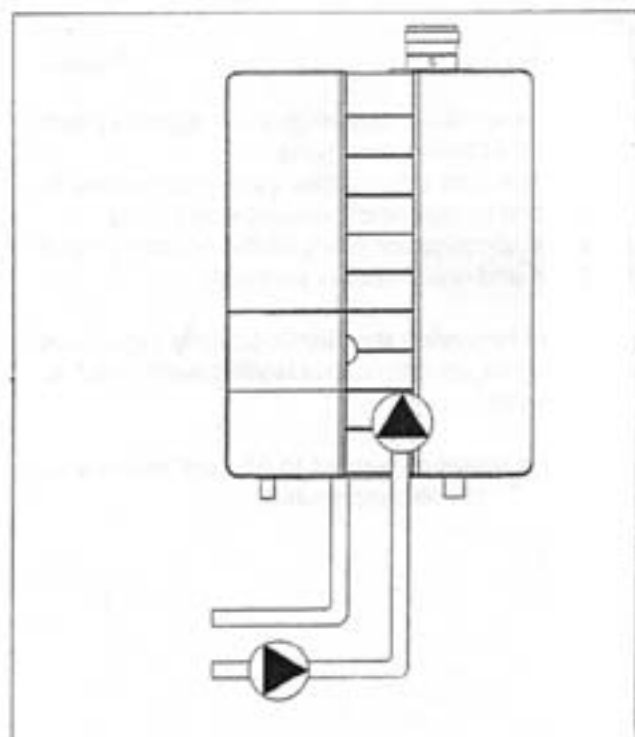
pump index lines

graph 1

If the capacity of the boiler pump is insufficient, an additional system pump can be installed in series with the unit. The systems pump's electrical supply connections are made directly into the control box, which ensures the pump is switched at the same time as the boiler pump.

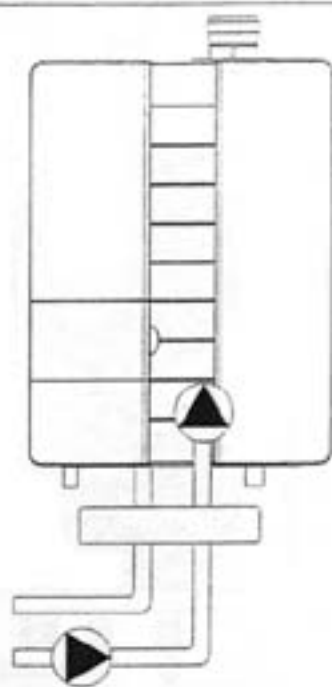
The maximum absorbed current consumption of the system pump should not exceed 1amp. - i.e. a suitable pump would be supplied at 230V and consume 220W nominally.

Installation using a mixing header is acceptable. However, in this case an independent system pump must be fitted. Note that if the system pump flow rate exceeds the boiler pump flow rate, the system flow temperature will be depressed below that of the boiler. This can be partly compensated for by raising the boiler flow control temperature (max 90°C).



external system pump

figure 3



external system pump with a mixing header

figure 4

The boiler return pipe has a filter fitted as standard. The boiler is also provided with a safety valve pre-set at 3 bar (43.5psi). The valve must be connected to a discharge pipe suitably protected against freezing and blockage, and routed safely to a suitable drain.

If all, or a large part of the radiators are provided with thermostatic radiator valves, it is advisable to use a bypass with pressure regulator valve in order to prevent excessive reduction in system user flow.

⚠ The unit is not suitable for open vented installations.

⚠ Additives in the installation water are only permitted in consultation with Beeston Heating.

When using more than one unit in an installation please refer to the cascade installation instructions.

4.1 Expansion vessel

The Beeston S-HR 24T and 35T only are provided with an expansion vessel on top of the cylinder. This expansion vessel is connected between the three way valve and the circulation pump inlet. This means that the expansion vessel will not be cut off from the hot water heat exchanger circuit when any thermostatic radiator valves are fully closed. A second expansion vessel may be fitted if required.

⚠ For correct operation of the S-HR 51T, it is essential that the external expansion vessel is connected to the pipe provided.

The Beeston S-HR heating only boilers are not equipped with an expansion vessel connection pipe. If a heating only boiler is combined with a Beeston Comfort cylinder, the expansion vessel connection is included in the internal piping of the Comfort boiler, to which the expansion vessel can be connected. If a different boiler is used then the expansion vessel should be connected between the three way valve and the boiler circulation pump.

⚠ For correct operation of the boiler, it is essential that the external expansion vessel is connected to the pipe provided.

The expansion vessel used must take account of the water content of the installation. The pre-pressure of the vessel depends on the installation height above it, as shown in table 5. Consult BS5449 and BS6798 for further guidance on expansion vessel application.

Installation height above the expansion vessel	pre-pressure of the expansion vessel
5 m	0.5 bar
10 m	1.0 bar
15 m	1.5 bar

choice of expansion tank

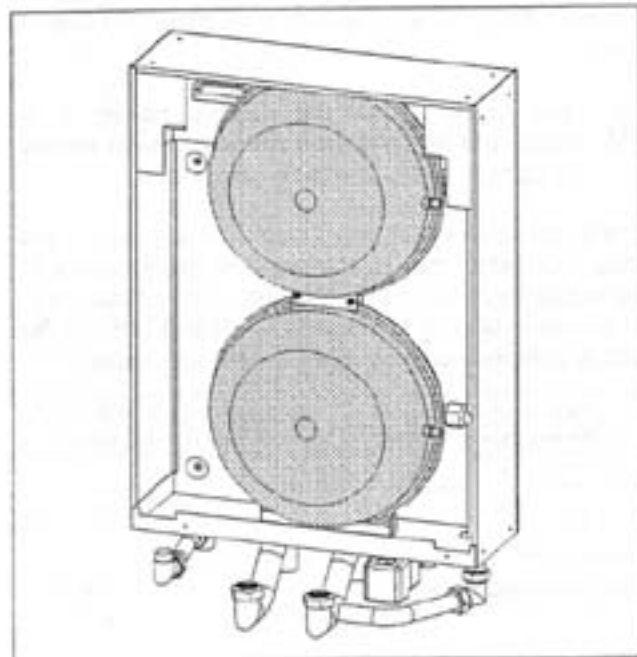
table 5

The Expansion vessel module can be supplied with the Beeston S-HR24 and S-HR35 heating boilers only as an option. This avoids the need for a system mounted vessel. The module is placed out of the way behind the boiler. If the boiler is used with a Beeston Comfort boiler the overall depth will be the same. The content of the two expansion vessels is 20 liters. The vessel's pre-pressure is 1 bar.



If the system volume requires an expansion vessel more than 20 liters then an external vessel must be used.

The expansion vessel module can be supplied with the necessary pipes for easy connection. The connecting pipes for the vessel installation correspond with those of the boiler, each having the same centre to centre distance to the wall face. When removing the expansion vessel the connections are accessible from the left and right hand sides as well as the top. It is not necessary to dismantle the boiler in order to remove the vessel.

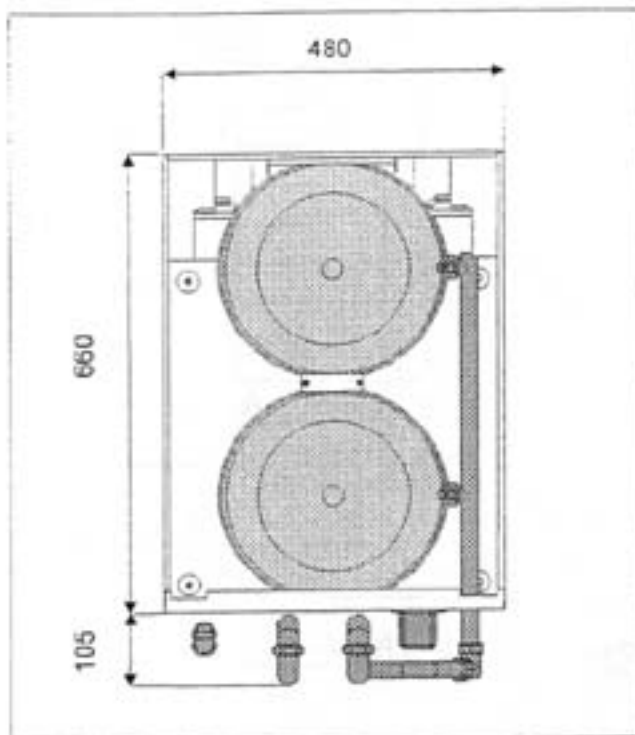


expansion vessel module (S-HR24 and 35 only) figure 5

The expansion vessel module and boiler are the same size. The template and mounting bracket provided for the boiler can be used for the expansion tank module. The boiler is fitted after the expansion vessel module has been mounted. The necessary mounting bracket for the boiler is provided with the module.

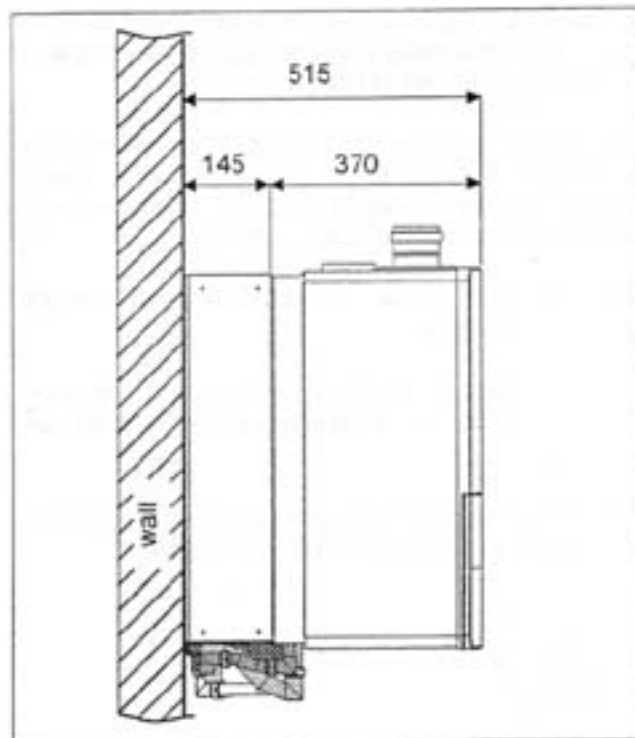
Article numbers:

- the expansion tank module without pipe connections AEMO209U
- pipe connections for expansion vessel module ALE0004U



front view of the expansion vessel module
(dimensions in mm)

figure 6



side view of the module + boiler
(dimensions in mm)

figure 7

4.2 Underfloor heating systems

When connecting or using an underfloor heating system fitted with plastic pipes one has to take into account that the plastic pipes used meet the DIN 4726/4729 standard. It is stated in this standard that the pipes may not have a higher oxygen transmittance than $0.1 \text{ g/m}^2 \cdot \text{d}$ at 40°C . If the system does not meet this DIN standard, then the underfloor heating section will have to be separated from the central heating unit by means of a plate heat exchanger.

⚠ In case of non-compliance with the regulations concerning plastic underfloor heating pipes, no claims can be made against the guarantee conditions.

4.3 Gas supply

The local gas supplier should be consulted at the installation planning stage in order to establish the availability of an adequate supply of gas. An existing service pipe must NOT be used without prior consultation with the local gas supplier.

A gas meter can only be connected by a contractor approved by the gas supplier.

Static inlet pressure should not exceed 50 mbar. Minimum inlet gas pressure whilst the boilers running 17.5 mBar.

An existing meter should be checked, preferably by the gas supplier, to ensure that the meter is adequate to deal with the rate of gas supply required.

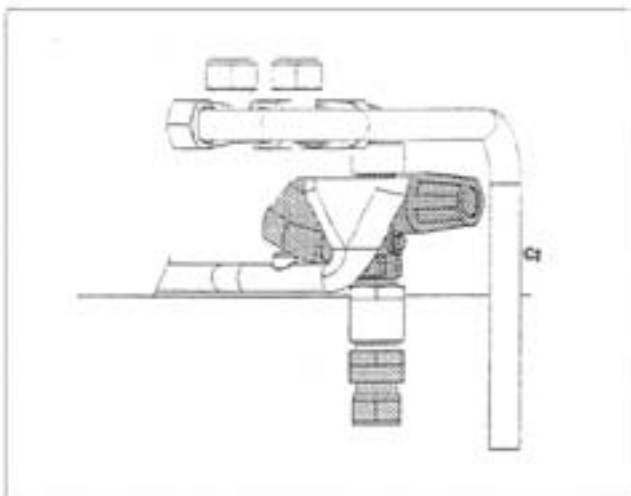
Installation pipes MUST be fitted in accordance with BS 6891. Pipework from the meter to the boiler MUST be of an adequate size. DO NOT use pipes of smaller size than the boiler inlet gas connection.

The complete installation MUST be tested for soundness and purged as described in the above Standard. In addition, publications IM2, IM5 and IM16 should be consulted where applicable.

4.4 Hot water supply (S-HR-T)

The units pipes can be connected to the installation by means of the adapter supplied.

The unit is provided with an inlet mounted safety valve set at 8 bar. The condensate discharge and the discharge of the central heating safety valve (3 bar) may be routed through a single pipe to drain.



inlet combination and mixing valve (S-HR-T only)

figure 8

A mixing valve is fitted in the cold water pipe inlet. The mixing valve ensures that a quantity of water is supplied which has a guaranteed temperature of 60°C (assuming a cold water temperature of 10°C). The quantity of water is virtually unaffected by the water pressure. If a water pressure is lower than 1.5 bar it is advisable to remove the inside mechanism of the mixing valve.

4.5 Combination discharge pipe

A combination discharge pipe should be routed to a suitable drain by means of acid condensate impervious pipe i.e. PVC-C or polypropylene. The pipe should have a minimum internal diameter of 25mm and should be protected from freezing, mechanical damage or blockage.

The following components may be connected to the combination discharge pipe:

- Condensate discharge;
- Central heating safety valve discharge;
- Cold water inlet safety valve (S-HR-T) discharge;

⚠ If individual discharge pipes are fitted a minimum internal diameter of 13 mm should be used for EACH PIPE.

⚠ The discharging of condensate to the external rain guttering is not permitted in view of the danger of freezing.

⚠ Before putting the boiler into operation fill the siphon with 300 ml of water.

4.6 Flue gas exhaust and air supply systems

Independent 80 mm diameter socket connections are provided for flue gas discharge and air supply ducts which can be fitted with or without bends.

The maximum usable pipe length is stated in table 6.

It is advisable to use stainless steel duct for the flue gas discharge. However the air supply duct may be plastic e.g. ABS. By using the Beeston ice free roof terminal assembly the risk of ice forming is reduced. If a plastic duct system for flue gas is installed the unit must be fitted with a flue gas thermostat. The thermostat is available from Beeston Heating - Part No. 44339500.

The complete flue gas and air supply system includes the flue gas discharge duct; the air supply duct and the roof terminal or wall terminal.

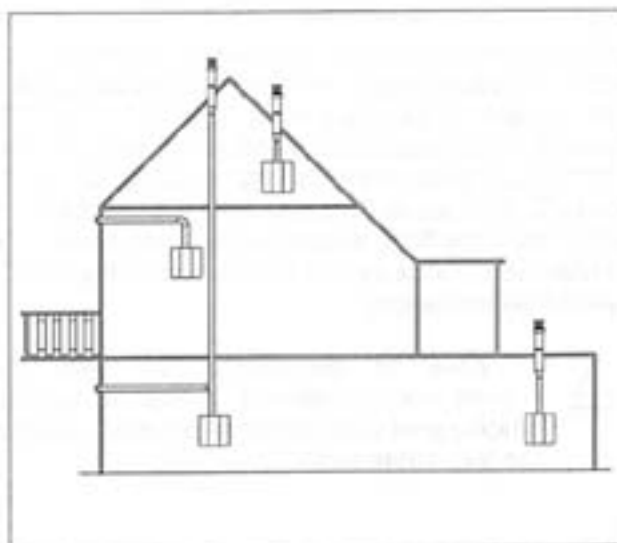
The maximum stated pipe length in metres for both the air supply and flue gas discharge ducts is the distance between the boiler connections and the roof or wall terminal.

The maximum stated pipe length in metres is for both the supply as well as the exhaust system and is the distance between the unit and the roof or wall terminal.		
type of unit	maximum pipe length in metres with a diameter of 80 mm	maximum pipe length in metres with a diameter of 90 mm
S-HR 15	30	40
S-HR 24/24T	25	40
S-HR 35/35T	18	36
S-HR 51/51T	10	20
S-HR 60	0	13
When using bends in the supply or exhaust system, the equivalent length stated below, must be added to the linear pipe lengths. Example: S-HR 24 with 10 metres exhaust duct ϕ 80 mm and 2 x 90° bends. This means: 10 metres + 2 x 1,25 metre = 12,5 metre.		
bend 90°	1,25	1,5
bend 45°	1	1,25

length supply and exhaust system

table 6

For further information on the full range of flue and air supply systems refer to the Beeston flue systems range brochure.



air supply and flue gas system

figure 9

! Flue systems must comply with the requirements of BS 5440.1

! It is **ESSENTIAL** that in practice, products of combustion discharging from the terminal cannot re-enter the building or any other adjacent building through ventilators, windows, doors, other sources of natural air infiltration, or forced ventilation/air conditioning systems. If this should occur, the appliance **MUST** be turned **OFF IMMEDIATELY** and the local gas supplier consulted.

Horizontal sections of the flue system should always be installed sloping towards the boiler, in order to avoid condensate lying in the flue system. The minimum gradient is 30mm/m. With condensate running back to the boiler the risk of ice forming at the terminal is reduced.

When a wall terminal is used and the fresh air supply system is horizontal, then it should be installed sloping to the outside in order to prevent rain entering the duct.

It is not necessary to install an extra condensate drainage point. In operation, the unit produces a white condensation plume. The plume is harmless but the terminal should be positioned to avoid any nuisance. For this reason it is advisable to ensure full compliance with BS 5440:1.

The boiler is a room sealed appliance. This means that the combustion air must be brought from outside. However, multiple boiler installations may take air from within a boilerhouse. In this event the installation **MUST** comply with the requirements of BS 6644:1991. Refer also to the S-HR Cascade installation instructions.

5 Additional hot water cylinder

A number of additional hot water cylinders can be connected to a heating only boiler, depending on requirements. All boilers are equipped as standard with an internal hot water cylinder control. The Beeston hot water cylinder thermostat is connected to a socket in the control box by means of the relevant plug. The Beeston Comfort and the Solar Energy Comfort hot water cylinders are provided with an internal three way valve.

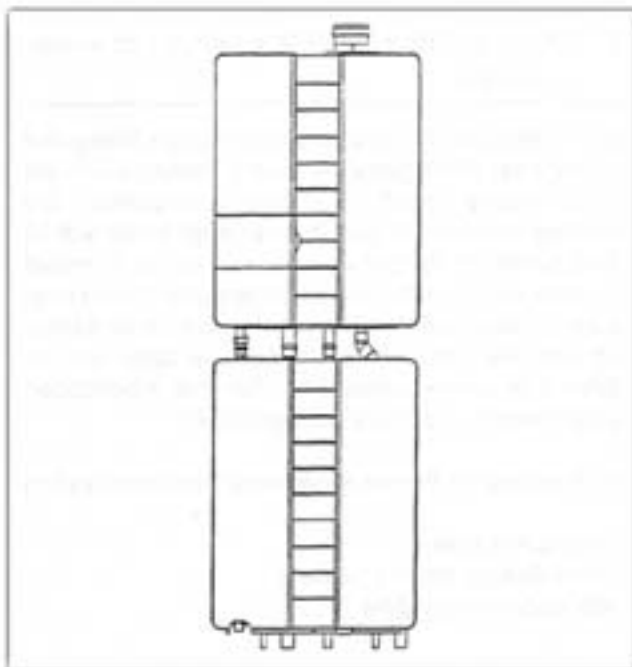
type hot water cylinder	suitable for boiler type
CBV60	S-HR15 S-HR24 S-HR35
CBH60	S-HR15 S-HR24 S-HR35
CBV110	S-HR15 S-HR24 S-HR35
CBH110	S-HR15 S-HR24 S-HR35

Hot water cylinder combination possibilities

table 7

5.1 Beeston Comfort hot water cylinder

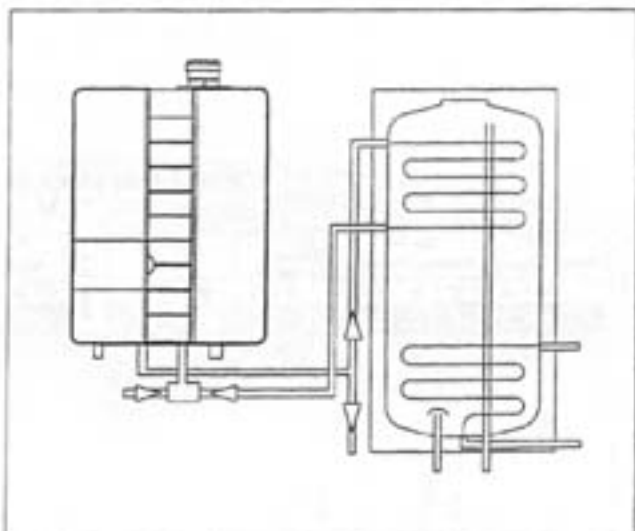
The Beeston Comfort hot water cylinder is recommended because it is specifically designed for use with the Beeston S-HR range. The hot water cylinder is equipped with a Beeston hot water cylinder sensor which together with the three way valve motor can be connected using the plug provided and the relevant socket in the control box.



S-HR with Comfort hot water cylinder (S-HR24V60) figure 10

5.2 Beeston Solar Energy Comfort hot water cylinder

The Beeston Solar Energy Comfort hot water cylinder is recommended for use with a Solar Energy installation because it is specifically designed for use with the Beeston S-HR range. The hot water cylinder is equipped with a Beeston hot water cylinder sensor which, together with the three way valve motor can be connected using the plug provided into the relevant socket in the control box. The Solar Energy Comfort hot water cylinder is equipped with an additional heating coil in the central heating circuit which, if required, will boost the domestic hot water to the correct temperature.



Solo unit with Solar Energy hot water cylinder

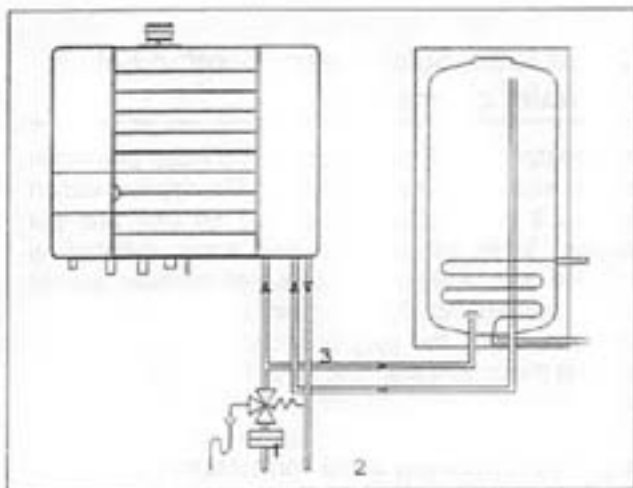
figure 11

5.3 Other additional solar energy hot water cylinders

It is possible to use a Compact unit on a Solar Energy hot water cylinder which does not have a heating coil in the central heating circuit. With this arrangement the preheated water from the Solar Energy boiler will be heated further by the hot water supply of the Compact unit which will operate only when required. In order to ensure correct operation, the thermostatic mixing valve used with the Compact unit should be fitted with an additional pipework connection. For this modification Beeston Heating supply a conversion kit.

Fig. 16 shows the three connections after modification i.e.

- 1 Cold water pipe
- 2 Solar Energy boiler pipework
- 3 Hot water supply pipe



Compact boiler with Solar Energy hot water cylinder figure 12

6 Electrical connection

The boiler complies with the EC Machinery Directive guidelines 89/392/JEEC, the EC Low Voltage Directive 72/23/EEC, and the EC EMC Directive 89/336/EEC

A 230V-50Hz mains electrical supply is required fused externally at 5 A.

Wiring external to the appliance **MUST** be in accordance with the I.E.E. (BS7671) Wiring Regulations and any local regulations which apply.

⚠ No modifications may be made to the wiring of the boiler.

All connections must be made to the connection block provided.

The Beeston room thermostat and controls must be connected to the connections provided. All other types or makes of room thermostat or external switching controls used must have Volt free contacts.

When using an external thermostat or control, it is possible that an anticipating resistance will be included in the control specification to prevent excessive temperature fluctuations.

Provision for wiring an anticipating resistance is made in the control box connection block. Use connections 23 and 27. The anticipating resistance in the control should be set at 0.11A.

Contact the control manufacturer directly for specific information.

The connections of the Beeston thermostat and the wiring of the three port valve with the boiler sensor apply only to the control box.

Connection block in the Control Tower

230 V- Power Supply			230 V- External Pump			230 V- External Controller			230 V-		80333324	Calorifier connection three-way valve					Outside sensor		Brain		Room therm. On / Off		External safety contact		24 V- 100 mA		
⬇	N	L	⬇	N	L	⬇	N	L	⬇	N		L	CH	DHW	N	DHW sensor	18	19	A	B	22	23	24	25	26	27	
1	2	3	4	5	6	7	8	9	10	11			12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

mains power supply

230 Volts for
external pump
1 A max.

230 Volts for
external control

230 Volts

internal or external
three-way valve motor
and calorifier sensor

BEESTON outside
sensor

Brain
clock thermostat

On/off thermostat or
control


External safety
contact




24 Volts
maximum 100 mA

7 Boiler controls

The boiler is provided with a fully automatic microprocessor control. This control simplifies operation by undertaking all major control functions. Initially when power to the unit is switched on it will remain on standby. The control panel display will show the relevant state. The various parameters can be called up in two ways:

(a) The  state.

In this state the display will show  during all normal operating functions of the appliance. Should a fault develop this will be shown on the display.





(b) Start from the  state by pressing the Step key for 5 seconds. Returning from this to the  display is done in the same way. From the  state a more extensive read out can be obtained e.g. the boiler flow temperature and the water pressure in the central heating system.

When the system has been filled the automatic venting programme can be selected and started. The programme takes 15 minutes and stops automatically. After this the unit will function normally.




On a call for heating or hot water the control system will select the required water control temperature. This water temperature is called the T set value. On a call for central heating the boiler ignites first at low input. The input is then changed slowly to match the load required. The boiler operates in this way to avoid excessive water noises and temperature overshoot. On a call for hot water supply the T set value of central heating return water temperature is monitored. Depending on the amount of sanitary water which is withdrawn from the boiler, the central heating return water temperature, from which the input is adjusted, will vary.

7.1 Explanation of the function keys

Key functions from the initial control panel displays (8a, b) are:

-  Central Heating programme key, see chapter 10.1.
-  Hot Water programme key, see chapter 10.2.
-  PC programme key, adjusts the pump to continuous water circulation in the central heating system, or according to the overrun times on the relevant programmes.
- **Mode** key, after pressing briefly a selection of the data available can be retrieved. After pressing for 5 seconds it is possible to enter the code as described in chapter 10.3;
- **Step** key, after pressing briefly, the water pressure can be checked and continuous data retrieved. After pressing for 5 seconds it switches from  indication to information retrieval and the other way round.
- **Reset** key for:
 - unlocking errors or;
 - ending the access code or;
 - ending the automatic venting programme, only when the access code is entered and the reset key is pressed briefly.
 After pressing for 5 seconds a stop is made, for example, to activate the automatic venting programme.

Other key functions from the other indications are:

-  The Central Heating key then has the '+' function;
-  The Hot Water key then has the '-' function;
-  The PC key then has the store function. This key is used to confirm a change in stored information.
- **Step** key for scrolling in data.

8 Filling and venting the boiler and installation

Filling of the system is carried out in the normal way. In order to read out the central heating water pressure the electrical supply must be turned on.

The circulation pump will not begin to operate whilst the operating lamps are off. The control display will show a **FILL** indication, which means that the control is signalling insufficient water pressure. As the installation is filled and the pressure rises the the water pressure will be shown with an alternating **FILL** display. When the water pressure rises to above 1.5 bar then after showing a short "stop", **Good** will be displayed, meaning the water pressure is sufficient and the unit is ready for operation.

To read water pressure constantly the Step key should be pressed. To change this to a constant **Good** display press the Step key again.

If the water pressure in the unit becomes too high (>3.5 bar) a **HIGH** display appears, and the burner will lock out. If the system is drained partly and pressure reduced below 3 bar the **HIGH** display will revert back to **Good** and the burner refire.

In order to go from a **Good** readout to a date retrieval readout i.e. [0 - 19] the Step key should be pressed for 5 seconds. This readout can be selected if the user requires to check operating parameters. To return to the **Good** readout the Step key must be pressed again for 5 seconds.

8.1 Central heating system

To fill the central heating system use the filling and draining valve provided.


Fill the system as follows:

- Turn on the electrical supply and leave the operating lamps off.
- Connect a filling hose to a suitable mains water supply or cistern and let it fill with water.




If a direct mains supply is used a water line, between the hose and the filling and draining valve fitted to the boiler, MUST include an anti-vacuum valve and non-return valve.

- Connect the hose to the water line serving the filling and draining valve and open this valve;
- Open the cold water tap and fill the installation slowly;

- The unit has an automatic vent which removes any air present;
- Start venting the radiators and pipes at the lowest point;
- Bring the installation to pressure (1.5 to 2 bar) after all radiators and pipes have been vented;
- Close the cold water tap and the filling and draining valve;
- Activate the automatic venting programme by pressing the pump  key. The pump run light will illuminate. Allow the control to finish its venting programme. The pump will circulate water a number of times around the boiler as well as the central heating installation. During the programme, the three way valve, if fitted, will be actuated between the boiler and central heating installation a number of times. The pump will stop from time to time in order to allow any air present to escape.

The display shows **A 20**: "A" means "Automatic venting program activ". The number behind is the actual flow temperature.

- Check the water pressure and if required top up. The working pressure in the installation should be between 1.5 and 2 bar in cold state.
- After finishing the automatic venting programme, the  key can be switched off.



It can take a while before all air has disappeared from a filled installation. Especially during the first week noises will be heard which indicate the presence of air.

The automatic air vent in the unit will eventually remove this air. The water pressure may reduce during this period so the system should be topped up as required.

8.2 Hot water supply

Open the main cold water supply valve and the combination cold water inlet valve at the appliance. Vent the boiler and the hot water installation by opening a hot water tap. Leave the tap open for as long as required until all air has disappeared from the boiler and the pipes and only water is flowing from the tap. All other hot water discharge points should be checked individually and all air removed in the same manner.



Our Promise

Customers will find that:

- They get value for money
- They can communicate with us easily
- We are reliable and do what we say we will do
- Our products are reliable and do what we claim for them
- We deliver the right product on time, every time
- We aim to have zero defects in our products, services, systems, information and advice
- It is easy to be our customer

Quality for Beeston means that we aim to meet and exceed our customers' expectations of both product and service all the time, every time and in every way - at a competitive price.

Beeston Heating maintain a policy of continuous research and development, and reserve the right to alter specifications when necessary.

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