

Remeha Rem 35-90 Auto Range

Commercial storage water heater
gas direct fired

Outputs: Rem 35 Auto 34 kW
Rem 50 Auto 49 kW
Rem 70 Auto 69 kW
Rem 90 Auto 88 kW



Broag Ltd.
Head Office
Remeha House
Molly Millars Lane
Wokingham
Berkshire RG41 2QP
Tel. 0118 978 3434
Fax 0118 978 6977
Email address:
boilers@broag-remeha.com
Website:
www.uk.remeha.com

The data published in this technical sales leaflet is based on the latest information (at date of publication) and may be subject to revisions. It should be read in conjunction with our full technical brochures (available on request).

We reserve the right to continuous development in both design and manufacture, therefore any changes to the technology employed may not be retrospective nor may we be obliged to adjust earlier supplies accordingly.



Introduction

The Broag Ltd. Rem Series is a range of fully automatic floor mounted hot water storage heaters with fully automatic ignition. They are designed exclusively for the preparation of hot water for commercial and industrial premises and fired by a number of atmospheric multi-gas stainless steel burner bars. They can be installed in single or multiple units.

The heaters are manufactured in four sizes, Rem 35, Rem 50, Rem 70 and Rem 90 Auto.

They are intended for use on Natural Gas only. For LPG a different model is required.

Contents

	page
Introduction	2
Description	2
Typical Water Heater Construction	3
Advantages at a Glance	4
Location	4
Technical Data	5
General Requirements	6
Gas Supply	6
Flue System	7
Air for Combustion and Ventilation	7
Water Pipework Installation	8
Gas Pipe Installation	9
Electrical Connection	9
Control System	10
Buffer Tank	12
Corrosion Protection	13
General Requirements	14
Unvented System	14
Auto Control Box	15

Description

The fully automatic control provides a safe light-up and shutdown programme for the burner, flame detection being based on the well known rectification principle. When the controlling thermostat calls for heat a high energy spark is produced at the spark electrode and the compact gas control valve is energised to establish a gas flame on the burner bars.

Failure to establish and detect flame during a start-up attempt results in lockout after the expiry of the nominal 5 seconds ignition safety time. Flame failure during a 'run' results in an immediate attempt to safely re-light the burner. Failure to establish and detect flame during a re-light attempt results in lockout after the expiry of the 5 seconds safety ignition time.

A false flame signal at the start point and during the 13 seconds waiting time prior to the introduction of the spark causes the control box to lockout.

The gas control valve and burner bars can be removed from the heater as a complete gas train assembly, being mounted above a tray and positioned beneath the combustion chamber at the base of the heater. The Rem range has been specifically designed to meet the exacting requirements of the DHSS Code of Practice for the prevention of Legionellae.

Flue gases from the combustion chamber enter the draught diverter via a number of vertical fire tubes which are individually retarded to ensure maximum heat transfer to water.

The draught diverter must be fitted to the heater in an unmodified condition and provides a horizontal flue outlet connection which is adjustable through 360° in the horizontal plane. The diverter locates on a flue damper which is located on the spigot on the heater flue connector dome and is secured with a stainless steel fixing clamp.

The interior vessel of the heater consists of a fully welded, convexed bottomed, pressure tested, storage vessel which is thermoglaed with a high quality glass lining on all waterside surfaces. This, together with one or two (depends on type) parasitic current CORREX anodes, provides the best possible protection against corrosion.

The current anode is also suitable for those regions of the United Kingdom where water conductivity is less than 200 micro-siemens per centimetre - see chapter "Corrosion Protection" page 13.

This vessel is fully insulated and is covered by sheet steel casing. The connections provided are cold water inlet, hot water outlet, re-circulation, drain cock and inspection/

cleaning outdoor. A 2" BSP socket is available for combined temperature/pressure relief valves required on unvented systems - see chapter "Unvented Systems" page 14.

All screw threads used in the Water Heater conform to the following:

ISO 7/1 or ISO 228/1 for pipe threads where applicable.

ISO 262 for all general screw threads.

Automatic water outlet temperature regulation is by means of a control thermostat which, for normal operation, should be set to a value not exceeding 60°C. Overheat protection is provided by a limit thermostat, with thermal reset.

This heater has been tested to comply with the gas appliances directive (90/396/EEC) Certification No.: 0085AP0195

Typical Water Heater Construction

Rem 35-90 Auto
Fully Automated Water Heater



Pic 1:

Flue Damper for Maximum Efficiency



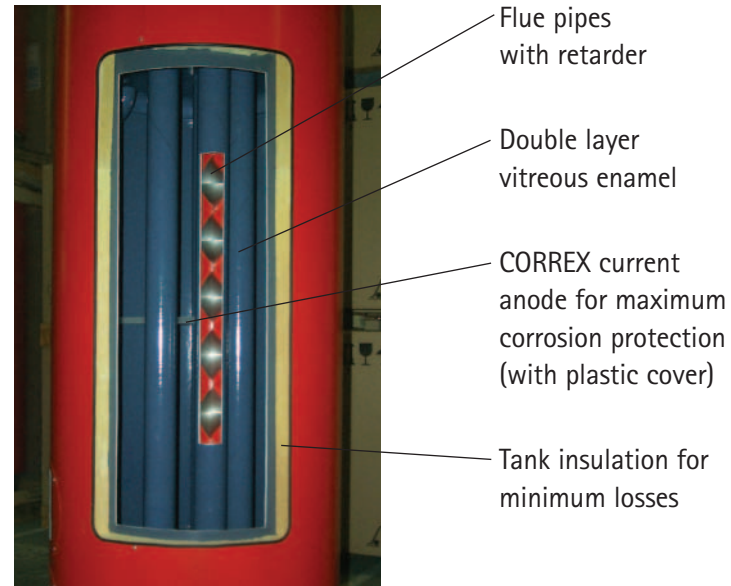
Pic 2:

- 1 Thermostat pocket (beneath cover)
- 2 Junction box (beneath cover)
- 3 Control panel with temperature controls (beneath cover)
- 4 Gas control valve with sequence controller (beneath cover)
- 5 Gas manifold
- 6 Flame probe/ignition electrode
- 7 Drain point

Advantages at a Glance

- Due to the different water qualities in the UK we can guarantee the best protection with this state-of-the-art CORREX titanium anodes
- Fully automatic controls
- Meets the requirements of the DHSS code of practice
- Fully insulated

Inside the Rem 35-90 Auto



Pic 3: Inside the water heater

Location

The heater location should be such that a satisfactory flue system can be connected. An adequate air supply must be provided for combustion and ventilation and sufficient space for servicing provided. The heater must be installed on a level concrete floor or plinth which is sufficient to support its weight when filled with water (reference Table 2).

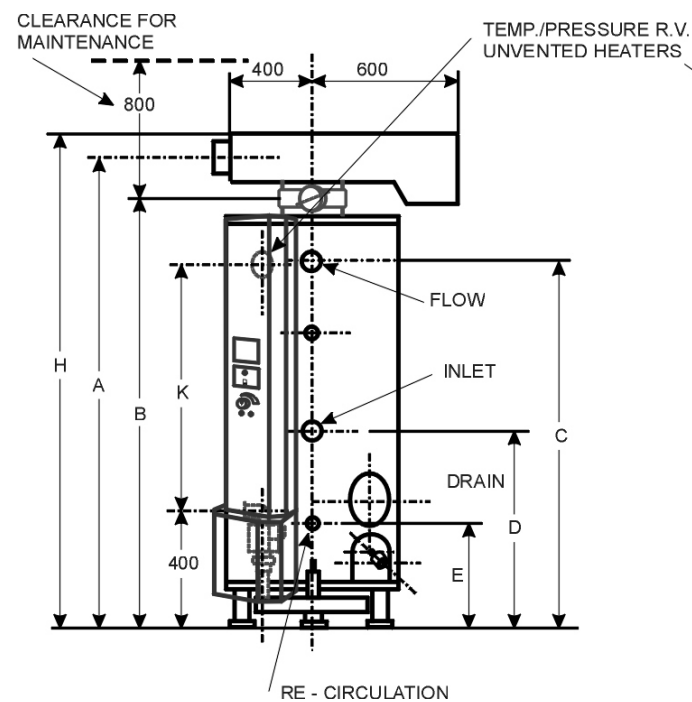


Fig. 1: Side view

Any combustible material adjacent to the heater and flue system must be so placed or shielded as to ensure that its temperature does not exceed 65°C (150° F).

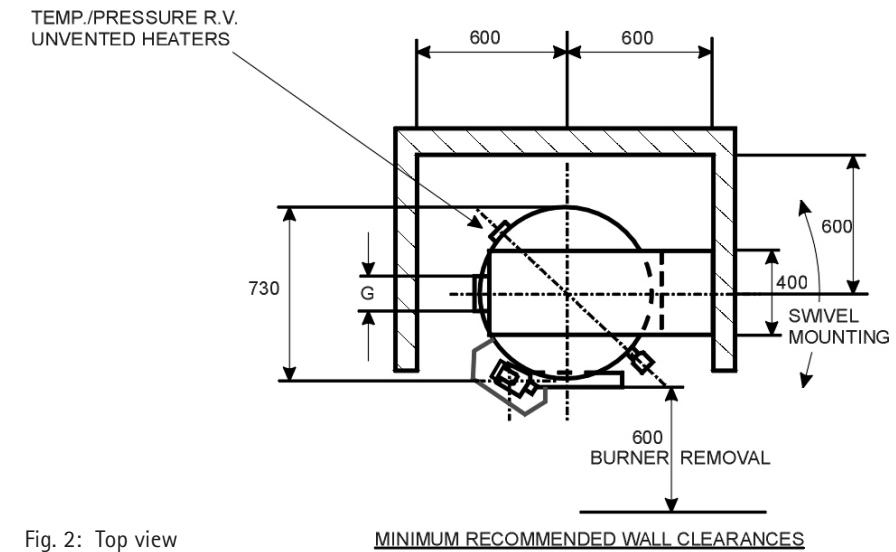


Fig. 2: Top view

(sizes in mm)	H	A	B	C	D	E	F	I.D.G	K
Rem 35 Auto	2060	1980	1740	1490	760	430	305	130	1070
Rem 50 Auto	2060	1965	1740	1490	760	430	305	155	1070
Rem 70 Auto	2130	2010	1740	1490	760	430	305	180	1070
Rem 90 Auto	2180	2045	1790	1540	760	430	305	230	1120

Table 1: Location measurements

Technical Data

MODEL	Rem 35 Auto	Rem 50 Auto	Rem 70 Auto	Rem 90 Auto
Input (gross)	43 kW	62 kW	87 kW	111 kW
Output	34 kW	49 kW	69 kW	88 kW
Weight (filled)	534 kg	539 kg	549 kg	570 kg
Maximum working head	53m	53m	53m	53 m
Nominal inlet gas pressure to the appliance	20 mbar	20 mbar	20 mbar	20 mbar
Propane gas inlet pressure	37mbar	37mbar	37mbar	37mbar
Butane gas inlet Pressure	28mbar	28mbar	28mbar	28mbar
Maximum gas inlet pressure	25 mbar	25 mbar	25 mbar	25 mbar
Gas burner operating pressure	12.3 mbar	12.7 mbar	12.3 mbar	13.2 mbar
Exhaust gas volume N.P.T (m3/h)	67	90	120	161
Net exhaust gas temp	190	245	214	200
Injector diameter	3.6 mm	3.5 mm	3.6 mm	3.6 mm
Injector marking	360	350	360	360
Number of burner bars	2	3	4	5
Nominal flue size (dia)	130 mm	150 mm	175 mm	225 mm
Capacity	325 litres	315 litres	300 litres	280 litres
Recovery rate raised through 44°C (80° F)	658 l/h	950 l/h	1336 l/h	1713 l/h

Table 2: Technical Data

General Requirements

Related Documents

Gas Safety Installations and Use Regulations 1994. It is Law that all gas appliances are installed by competent persons 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 this law is complied with.

The installation of the heater **MUST** be in accordance with the relevant requirements of the Gas Safety Regulations, Building Regulations, IEE Regulations and the byelaws of the local water undertaking. It should also be in accordance with the relevant requirements of the local gas region and local authority and the relevant recommendations of the following documents:

British Standard Codes of Practice

BS 6891 - Installation of low pressure gas pipework of up to 28 mm (R1) in domestic premises. For larger installations see **IM/2**, **IM/5** and **IM/16** below.

BS 6644 - Installation of gas fired hot water boilers -60 kW to 2 MW.

BS 6700 - Design, installation, testing and maintenance of services supplying water for domestic use.

BS 6880 - Part 1, 2 and 3 Code of Practice for low temperature hot water heating systems of output greater than 45 kW.

CP 342 - Centralised hot water supply, Part 2 -buildings other than individual dwellings.

BS 3456 - The testing and approval of domestic electrical appliances Part 1 Clause 27.3.

British Gas Publications

IM/2 - Purging procedures for non-domestic gas installations. **IM/5** - Soundness testing procedures for industrial and commercial gas installations.

IM/11 - Flues for commercial and industrial gas fired boilers and air heaters.

IM/16 - Guidance notes on the installation of gas pipework, excluding domestic installations of 25 mm and below.

Gas Supply

Service Pipes

The local gas region must 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 region.

Gas Supply Pipes

Supply pipes must be fitted in accordance with BS 6891. Pipework from the meter to the heater must be of adequate size and not smaller than the heater gas connection (3/4" BSP).

Boosted Supplies

Where it is necessary to employ a gas pressure booster, the controls must include a low pressure cut off switch at the booster inlet. The local gas region must be consulted before a gas pressure booster is fitted.

Flue System

Type of Flue System

The Broag Ltd. Rem Series of Hot Water Heaters are designed to be used with natural draught flues. Flue systems must be designed in accordance with the current regulations and with reference to the British Gas publication 'Flues for Commercial and Industrial Gas Fired Boilers and Air Heaters'. The following points should be noted:

Draught Diverter

The heater must have its correct draught diverter fitted in an unmodified condition before connection into the flue system.

Distance to Chimney

The heaters must be located as near to the flue or flue header (on multi-bank installations) as possible. The distance between the heaters and the chimney must not exceed 2 m (6 ft).

Flue Draft

The flue system must be designed to achieve a minimum draft of 0.05 mbar (0.02" wg) at the draught diverter outlet. 0.05 mbar (0.02" wg) is equivalent to 1.5 metres of vertical flue. The flue connection on the heater is intended for sheet metal flues.

In some instances mechanical assistance may be necessary, refer to British Gas publication 'Flues for Commercial and Industrial Gas Fired Boilers and Air Heaters'.

Material

The materials for the flue system must be noncombustible, mechanically robust and resistant to internal and external corrosion and be self supporting.

Waste Gas Volume and Temperatures

It is recommended that the volume and temperature of the exhaust gases used for the design of the flue system is as shown below:

Air for Combustion and Ventilation

Adequate air for combustion and ventilation must be provided by means of openings at high and low level within the boilerhouse. The air supply requirements specified in BS 6644 are summarized as follows:

Note: Aerosols in hairdressing salons or laundries give off vapours as do some industrial processes which can cause rapid corrosion of heater components. It is therefore essential that in these instances combustion air must be ducted from a space where vapours are not present.

Air Requirements

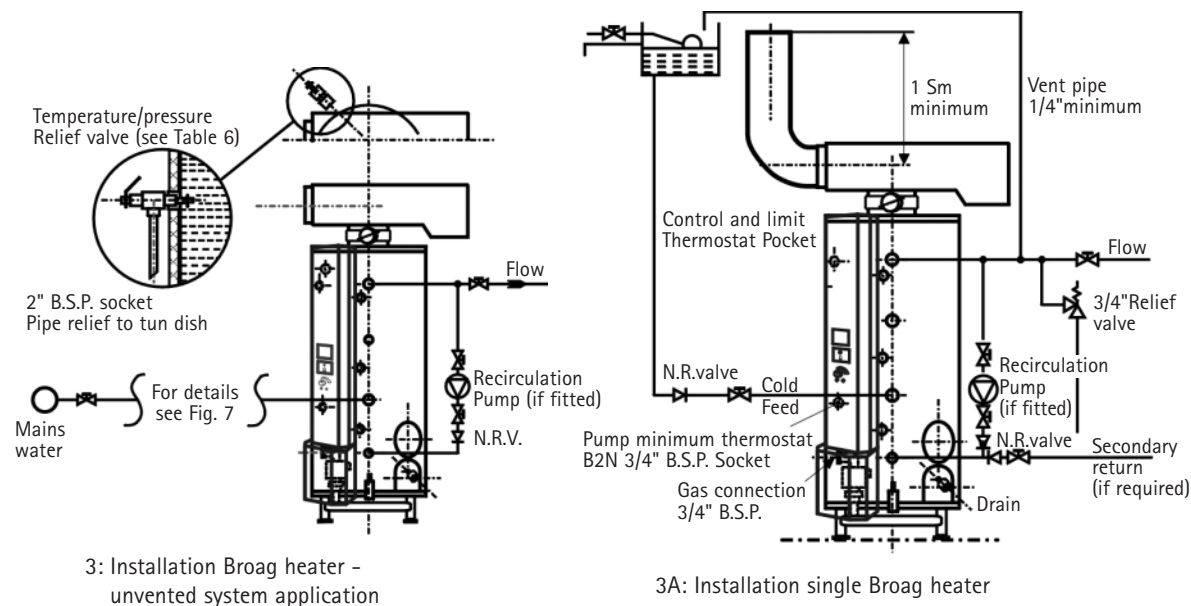
Low Level (Inlet)	540 cm ³ plus 4.5 cm ³ per kW in excess of 60 kW total rated input
High Level (Output)	270 cm ³ plus 2.5 cm ³ per kW in excess of 60 kW total rated output.

Table 3: Air requirements

Note: High level is considered to be as close to the roof as possible. Low level is considered to be 6" above floor level.

Water Pipework Installation

Typical Installations



The Rem unit is supplied as standard for pressurised (unvented) operation complete with unvented kit and expansion vessel. The unit can be supplied for open vented operation at time of ordering.

For details of a typical installation scheme of multi-Rem water heater refer to Figure 4.

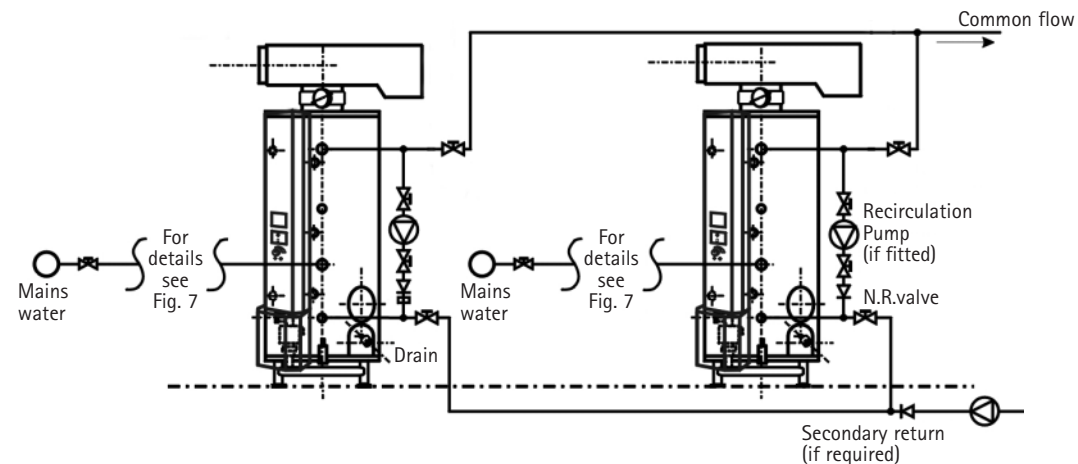


Fig. 4: Installation multiple Broag heaters with individual isolation

Water Connections

- Cold water feed – 1 1/2" BSP female socket.
- Hot water outlet – 1 1/2" BSP female socket.
- Secondary connection – 3/4" BSP female socket.

Flow Pipes

The hot water flow pipe each heater must be fitted with a relief valve 3/4" in diameter (20 mm) and an open vent 1 1/4" in diameter (32 mm). The vent should rise to discharge over the feed cistern. No isolating valves should be fitted between the water heater and the draw off point for relief valve and vent. For unvented systems see Figure 7. The maximum working head of the heater is 53 m (174 cu ft).

Dead Legs

Dead legs to water draw-off points should be as short as possible and in no case should they exceed the lengths laid down in the Water Byelaws. The Water Byelaws state that the maximum lengths of pipe supplying a hot water draw-off tap measured along the axis of the pipe from the heater, cylinder or tank or from a secondary circuit are as listed below:

- Pipes not greater than 19 mm ID – max dead leg length 12 m.
- Pipes in range 10–24 mm ID – max dead leg length 7.6 m.
- Pipes greater than 25 mm ID – max dead leg length 3 m.

Filling

After installation of the water system has been completed, open the main water supply valve, flush the system and fill the heater. Open the hot water taps and allow air to escape from the system. When the system is free of air close the hot water taps and check for leaks on all the water heater connections including the drain cock and control and limit thermostat pockets.

Gas Pipe Installation

Fit the 3/4" gas cock and nipple provided to the internal 3/4" BSP union connection at the inlet of the gas control valve.

Note: Do not run the gas pipework across the front of the heater since this will prevent removal of the gas train assembly for cleaning.

Electrical Connection – Heater

WARNING: THIS APPLIANCE MUST BE EARTHED.

Electrical supply required is 230 volts, 50 Hz, single phase fused at 5 amps. The method of connection to mains electrical supply should facilitate complete isolation for the heaters and should be provided in a readily accessible position. The wiring must be completed in heat resistant three core cable sized 1 sq mm CSA.

Note: If a Rem heater is to be used in conjunction with a storage tank, further wiring will be required to complete the circuitry for the storage tank thermostat and loading pumps.

Control System

Control Thermostat

The hot water outlet temperature is regulated by a single control thermostat (B1N) which senses, via a pocket, the heater water temperature and is located at the top front of the heater (see Fig. 1).

The control thermostat (B1N) on the Rem Auto heaters is connected in series with the main supply to the Satronic controller. On activation the thermostat interrupts the supply to the controller, flame is extinguished and the heater shuts down.

The control thermostat is graduated for a 35°C to 90°C operation but to comply with Broag Ltd. recommendations the outlet temperature should be regulated up to a maximum of 60°C. The thermostat is fitted with an internal stop, restricting the settings between 35°C and 60°C.

Limit Thermostat

A fixed 85°C manual reset limit thermostat (B1F) is prewired in series with the supply to the Satronic controller. In the event of the limit thermostat being activated, power to the controller is interrupted and the heater shuts down. The limit thermostat must then be reset by removing the plastic cap on the unit and pressing the green button exposed (see Fig 8). The heater will then automatically restart.

Note: In the event of the overheat limit thermostats being activated, the complete heater installation should be inspected to trace and isolate the cause of the problem before any further firing takes place.

Controller

The Satronic controller supervises the ignition and safety shutdown of the heater in the event of flame failure. Supply to the controller is via the thermostats previously described.

- 1 Inner tank
- 2 Fire tube
- 3 Hot water connection
- 4 Cold water connection
- 5 Cleaning door flange
- 6 Drain cock
- 7 Sheet steel casing
- 8 Insulation
- 9 Draught diverter
- 10 Gas control valve
- 11 Gas burner manifold and burner bars
- 12 Junction box
- 13 Control thermostat
- 14 Limit and lock-out thermostat
- 15 Correx up switchboard potentiostat
- 16 Alarm/reset automatic gas control
- 17 Burner and circ. pump control kit (option)
- 18 Rating lable
- 19 Suspended gas flow retarder
- 20 Recirculation connection
- 21 Damper
- 22 Control/limit thermostat pocket
- 23 Inspection door sealing gasket
- 24 Tray
- 25 Correx up electrodes
- 26 Pump min. thermostat pocket

Sectioned View

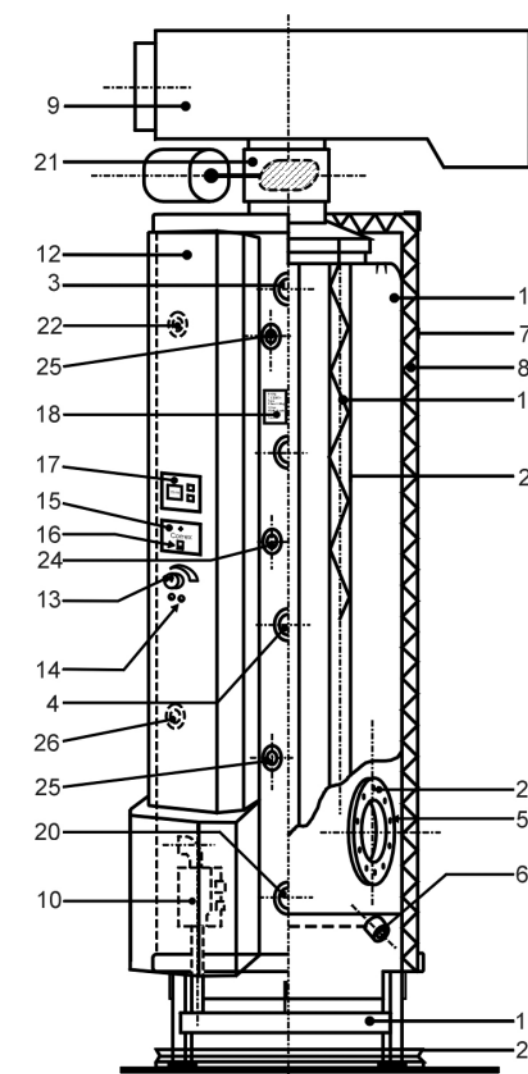


Fig. 5: Sectioned view

Buffer Tank

The BROAG range of Rem Water Heaters can be coupled to one or more buffer tanks on installations which require the use of large volumes of water over short periods.

The following sections detail a typical method of coupling the heater and tank together using a thermostatically controlled circulating pump (not Broag Ltd. supply) to transfer hot water from the heater to the storage tank, and additional thermostats (see Fig. 6).

Note: The installation of the storage tank must be made in accordance with the relevant British Standard Codes of Practice detailed in the paragraph on 'Related Documents', and be suitable for the system pressure.

Installation of Broag heater with one storage tank

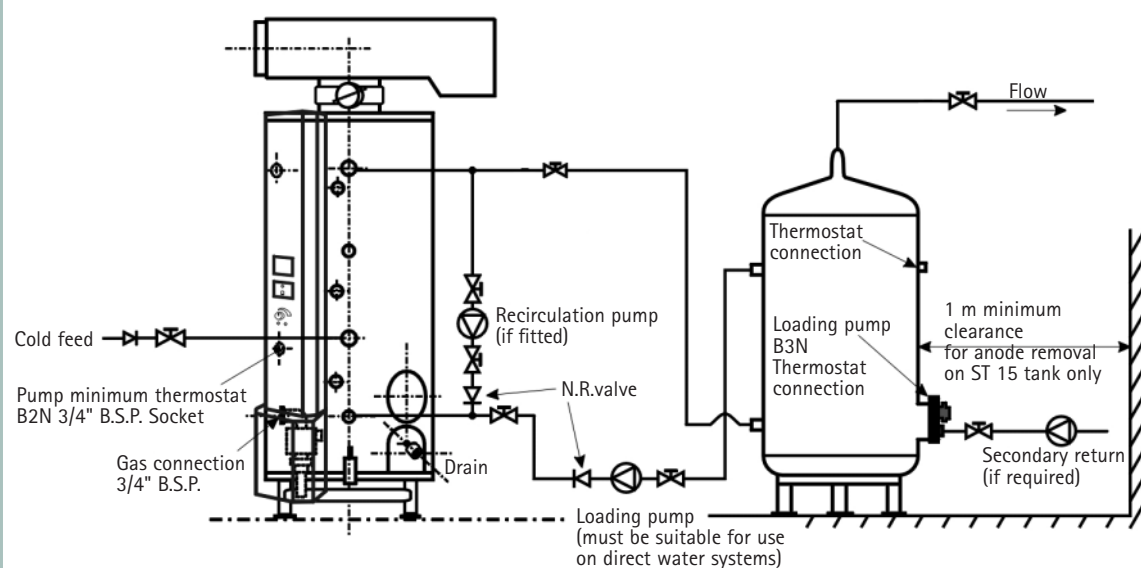


Fig. 6: Installation of Broag heater with one storage tank

Location

The storage tank must be installed on a level floor or plinth which is sufficient to support the weight when filled with water.

Corrosion Protection

The Rem range of hot water heaters consist of fully welded, pressure tested steel vessels, thermoglazed with a high quality enamel lining on all waterside surfaces. Enamel is a glasslike, electro-chemically neutral material which protects the steel vessel from the debilitating effects of corrosion. Whilst the 'integrity' of the glass lining is of a very high order typically 99.9% and better of the interior surface area, protection of that residual 0.1% is essential and parasitic current anodes are fitted as standard. Due to the different water qualities in the UK we can guarantee the best protection with this state-of-the-art CORREX titanium anodes.

Water electrical conductivity is an important parameter in sacrificial anode protection and normal waters range between 350-700 micro-siemens per centimetre at 20°C. In very low water conductivity areas of 100 micro-siemens and less, the water cannot operate as an efficient electrolyte and sacrificial anode protection becomes less and less effective. Such low conductivities are not unknown in the United Kingdom and water conductivities of 100 micro-siemens and less have been measured in many water catchment areas particularly from the peat moors of Scotland and Wales.

The CORREX UP impressed current, corrosion protection system has been specifically developed for such areas and its application is essential when the average electrical conductivity of the water supply is less than 200 micro-siemens per centimetre. The CORREX UP system applies an impressed current into the tank through one or more inert, titanium electrodes which unlike the magnesium anodes, do not require replacement.

As the platinized titanium electrodes, subject to reasonable treatment, will last the life of the heater, elimination of the restrictive magnesium anode withdrawal distances above the heater and the cost of periodic magnesium anode replacements are important advantages of the system.

The very small impressed current intensity is automatically adjusted by the potentiostat mounted in the heater junction box, to the 'potential' requirements of the vessel and power costs are extremely low and typically of the order of 60-70 pence per annum. As corrosion protection of the vessel is dependant on this minute continuous parasitic current, it is essential that the electrical power to the potentiostat should not be interrupted for any length of time (not switched off during weekends, holiday periods etc.).

The neon indicator lamp is connected by 3 wires to the potentiostat and shows green when the system is working. The lamp will flash red as a warning if there is a problem. This indicates that the protection is not effective and one of the following faults has occurred :

- There is no water in the heater
- There is a short circuit between the anode and the heater.
- The 2 core cable to the anode has been connected the wrong way round.

On rectification of the fault, the Correx unit and indicator lamp can be reset by interrupting the mains electrical supply to the unit for a brief period (30 seconds).

IT IS ALSO IMPORTANT THAT THE ELECTRICAL SUPPLY TO THE PARASITIC CURRENT SYSTEM IS NOT CONNECTED UNTIL THE HEATER IS FILLED WITH WATER.

General Requirements

The installation of the heater must be in accordance with the relevant requirements of the Gas Safety Regulations, Building Regulations, IEE Regulations and the Byelaws of the Local Water Undertaking. It should also be in accordance with the relevant recommendations of the publications referred to in the main installers guide together with the following additional documents:-

LPG Fuels

It is strongly recommended that, on LPG installations, gas detection equipment is fitted.

This equipment should be positioned near the heater and at low level.

It is also imperative that the boilerhouse is ventilated at high and low level and to this end our recommendations must be adhered to.

British Standards

BS 5482: Code of Practice for Domestic Butane and Propane Gas Burning Installations Part 1: Permanent Dwellings.

Installation

The heaters should be installed in the same manner as described in the main installers guide.

Unvented Systems

Following Revision of the model water byelaws in 1986, WRAS documents and the subsequent publication of part G3 of the Building Regulations, provisions were issued for the essential safety requirements necessary on unvented hot water storage systems. These initially covering storage systems of 45 kW were extended in 1990 to embrace hot water systems of any size.

It is important to note that above 45 kW, BBA Certification is not mandatory, the essential conditions being conformity with the general safety requirements for unvented systems as defined in section 2 of approved document G3. This document further states that the system should be designed by appropriate qualified engineers and installed by approved installers. Reference to Figure 7 will show that the safety system comprises of a number of essential controls preset to specific and very important pressure and temperature levels. To ensure that the controls are correctly sized for application, set to appropriate levels and assembled in the correct order. The Rem unit is supplied as standard with a factory fitted PTRV and an unvented kit.

HEATER MODEL	Rem 35 (UV)	Rem 50 (UV)	Rem 70 (UV)	Rem 90 (UV)
Unvented Kit Number	FL495	FL495	FL495	FL495
Assembly comprising: pressure limiting valve (set to 300 kPa) with strainer, pressure gauge, check valve, expansion relief valve (set to 6 bar), tundish and bush, 60 litre Flexcon expansion vessel (set to 2,6 bar)				
Pressure/Temperature relief valve Nabic fig 500T (Set to 600 kPa)				
Size	1"	1 1/4"	1 1/2"	1 1/2"

Table 4:

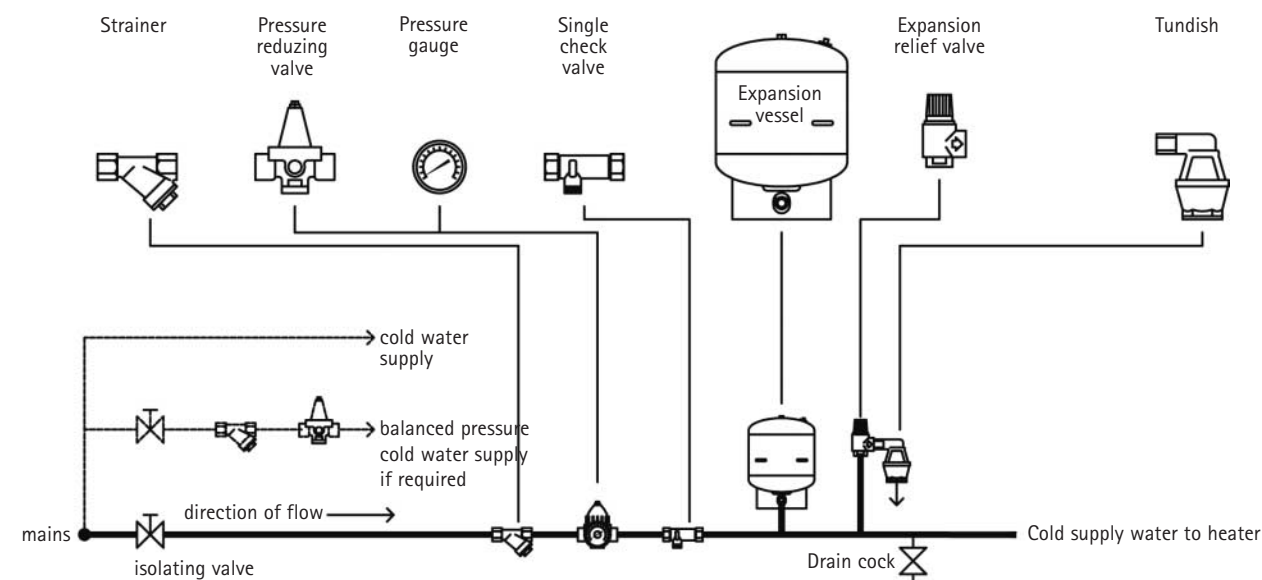
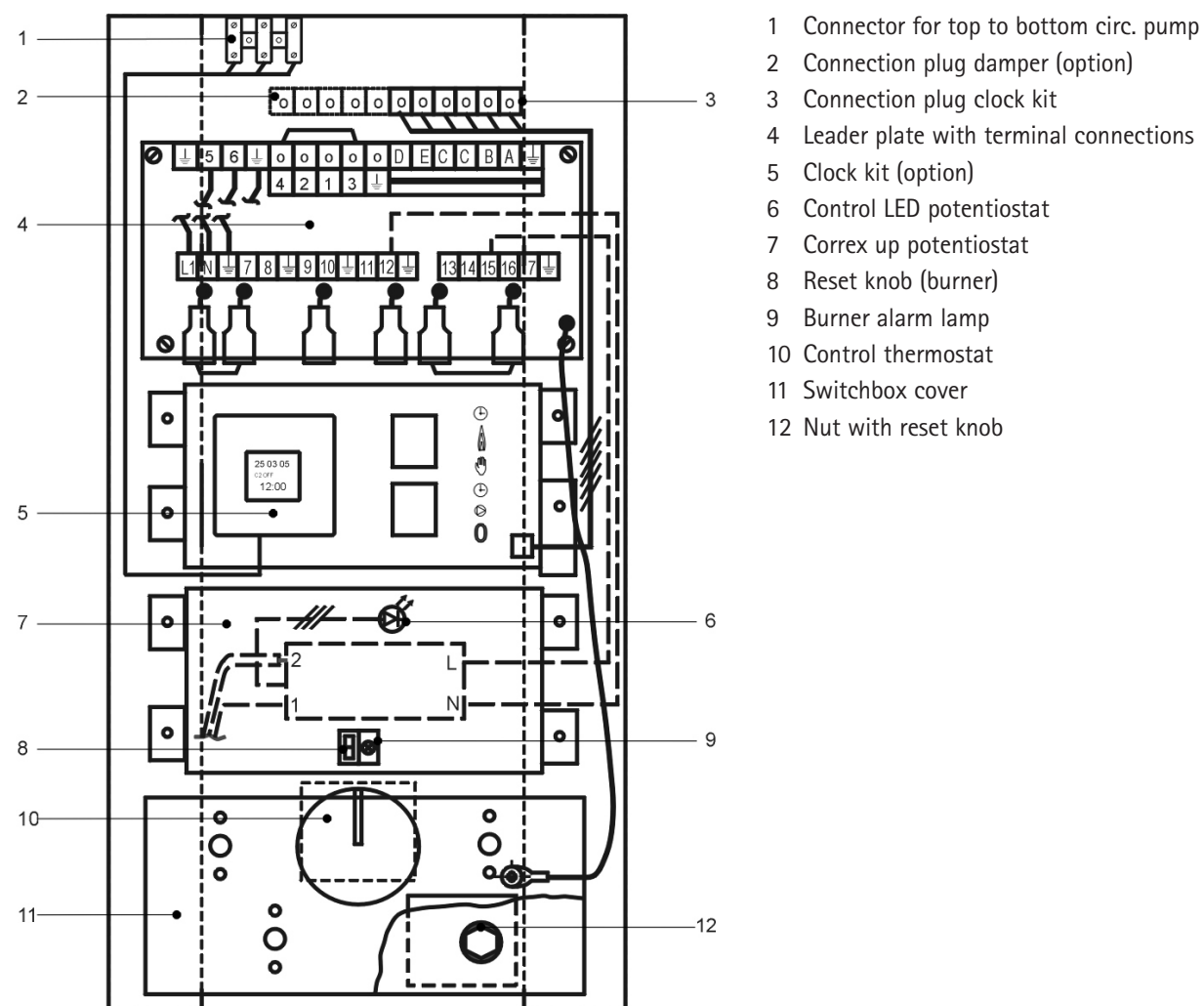


Fig. 7:

Auto Control Box



- 1 Connector for top to bottom circ. pump
- 2 Connection plug damper (option)
- 3 Connection plug clock kit
- 4 Leader plate with terminal connections
- 5 Clock kit (option)
- 6 Control LED potentiostat
- 7 Correx up potentiostat
- 8 Reset knob (burner)
- 9 Burner alarm lamp
- 10 Control thermostat
- 11 Switchbox cover
- 12 Nut with reset knob

Fig. 8: Auto control box