

**REGENCY GBS RANGE
ATMOSPHERIC GAS FIRED
CENTRAL HEATING BOILERS**

INSTALLATION AND SERVICING INSTRUCTIONS



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L249

INDEX

Section	Classification	Page No.
1	GENERAL NOTES	5
2	TECHNICAL DATA AND DIMENSIONS	5
3	SITING REQUIREMENTS	6
4	GAS SUPPLY, FLUE SYSTEM, VENTILATION AND AIR SUPPLY	6
5	CONNECTIONS	8
6	BOILER INSTALLATION	10
7	WATER CIRCULATION SYSTEM	10
8	CONTROLS	11
9	COMMISSIONING PROCEDURES	11
10	INITIAL LIGHTING	13
11	ADJUSTMENT AND SAFETY CHECKS	14
12	BOILER SERVICING	15
13	FAULT FINDING	16
14	REPLACEMENT OF COMPONENTS	17
15	DIAGRAMMATIC ASSEMBLY DRAWINGS	20
16	SPARE PARTS LISTS	22

INSTALLATION AND SERVICING INSTRUCTIONS

1. GENERAL NOTES

These instructions are designed to assist the installation and servicing engineer in the fitting and maintenance of G.B.S. Series 2 Central Heating Boilers.

These Atmospheric Gas Fired Boilers are floor standing and suitable for heating large dwellings, commercial or industrial buildings.

They are designed for use in conjunction with calorifiers or indirect cylinders for hot water production.

The G.B.S. Series 2 Boilers are natural draught, open flued central heating appliances with outputs ranging from 42 kW to 100 kW (144000 Btu/h to 341000 Btu/h).

All boilers in this range are suitable for working pressures up to 5 bar (167 ft head).

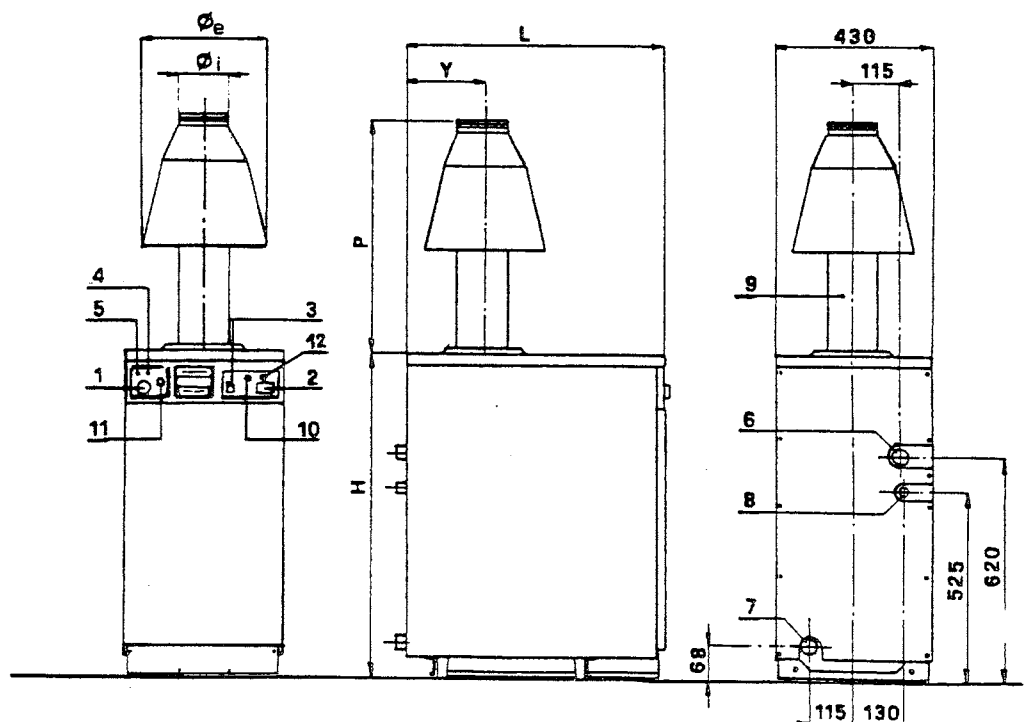
2. TECHNICAL DATA

Boiler Model		147-34 GBS	184-43 GBS	221-52 GBS	260-60 GBS	295-70 GBS	332-80 GBS
Heat Output	kW Btu / h	42 143500	54 184200	67 227500	75 254600	87 292900	100 341300
Heat Input	kW Btu / h	53 180800	68 232000	84 286600	94 320700	110 375300	126 429900
Main injector Diameter	mm in.	3.45 0.136	3.90 0.153	4.30 0.169	4.60 0.181	4.90 0.193	5.25 0.207
Pilot injector Diameter	mm in.	0.56 0.022	0.56 0.022	0.56 0.022	0.56 0.022	0.56 0.022	0.56 0.022
Gas Flow Rates	m ³ h cu. ft / h	4.98 175.8	6.34 223.9	7.71 272.2	9.08 320.6	10.44 368.6	11.8 416.1
Net Weight	kg 1 lbs	159 350	186 410	213 469	240 529	267 588	294 648
Burner Pressure	m bar in. w. g.	10.9 4.4	11.5 4.6	12.0 4.8	11.9 4.8	12.0 4.8	12.0 4.8
No. of Sections		5	6	7	8	9	10

Maximum Static Head 50m (167ft) [5 bar]
 Electric supply 240v 50 Hz Fuse 3 amp
 All boilers have 3 injectors
 Permanent pilot heat input - 0.27 kW (900 Btu/h)

Dimensions

- 1) Boiler Thermostat
- 2) Thermometer
- 3) On-Off Switch
- 4) Burner Control Lamp
- 5) Pump Control Lamp
- 6) Flow Flange RP 1 1/4"
- 7) Return Flange RP 1 1/4"
- 8) Gas Supply Pipe
- 9) Down Draught Diverter
- 10) Limit thermostat reset button
- 11) Piezo ignitor button
- 12) Red light for limit thermostat "tripped" indication



Model	L	H	Y	Ø I	P	Ø e	Water Litres	Content Gall
47 - 34 GBS	mm 711 inches 27 ⁶³ / ₆₄ "	890 35 ³ / ₆₄ "	215 8 ¹⁵ / ₃₂ "	150 6"	640 25 ¹ / ₂ "	335 13 ¹ / ₄ "	18	3.96
184 - 43 GBS	mm 807 inches 31 ⁴⁹ / ₆₄ "	890 35 ³ / ₆₄ "	215 8 ¹⁵ / ₃₂ "	180 7"	730 28 ³ / ₄ "	380 15"	21.6	4.75
221 - 52 GBS	mm 903 inches 35 ³⁵ / ₆₄ "	890 35 ³ / ₆₄ "	215 8 ¹⁵ / ₃₂ "	180 7"	730 28 ³ / ₄ "	380 15"	2.52	5.54
260 - 60 GBS	mm 999 inches 39 ²¹ / ₆₄ "	960 37 ⁵ / ₆₄ "	432 17 ¹ / ₆₄ "	225 9"	800 31 ¹ / ₂ "	450 17 ³ / ₄ "	28.8	6.33
295 - 70 GBS	mm 1095 inches 43 ⁷ / ₆₄ "	960 37 ⁵ / ₆₄ "	480 18 ²⁹ / ₃₂ "	225 9"	800 31 ¹ / ₂ "	450 17 ³ / ₄ "	32.4	7.12
332 - 80 GBS	mm 1191 inches 46 ⁵⁷ / ₆₄ "	960 37 ⁵ / ₆₄ "	528 20 ²⁵ / ₃₂ "	225 9"	800 31 ¹ / ₂ "	450 17 ³ / ₄ "	36	7.91

3. SITING REQUIREMENTS

The installation of the boiler must be in accordance with relevant requirements of the Gas Safety (Installation and Use) Regulations 1984, Health and Safety at work etc. Act, Building and I.E.E. Regulations, Local Authority, Local Gas Undertaking, Local Water Authority, Fire Authority Regulations and Insurance Company requirements. The following British Standards Codes of Practice are applicable:

- CP331 Installation of pipes and meters for towns gas, Part 3 Low pressure installation pipes.
- BS.6644 Installation of gas-fired hot water boilers of rated inputs between 60kW and 2MW (2nd and 3rd family gases) - formerly CP.332:Part 3.
- CP341-300-307 Central Heating by Low Pressure hot water.
- CP342 Centralised hot water supply:
Part 1: Individual dwellings
Part 2: Buildings other than individual dwellings.

British Gas Publications

Flue for Commercial and Industrial gas fired boilers and air heaters - IM/11.

b) Gas Safety (Installations and Use) Regulations

It is the law that all gas appliances are installed by competent persons, i.e. 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.

c) Location

The location chosen for the boiler must permit the provision of a satisfactory flue and an adequate space for servicing and air circulation around the boiler. The boiler room, whether specifically constructed or a modification of an existing space, should be designed in accordance with BS.6644.

Clean boilerhouse free from lagging/fiberglass dust.

4. GAS SUPPLY, FLUE SYSTEM, VENTILATION AND AIR SUPPLY

a) Gas supply

The availability of an adequate gas supply or the suitability of an existing supply and metering equipment, should be established by reference to the local Gas Undertaking before installation.

Gas supply pipework should be fitted in accordance with CP.331:3. Do not use pipes of a smaller size than the boiler gas connection.

b) Flue system

Detailed recommendations for the flue are detailed in BS.6644 and IM/11. The following notes are intended for your guidance.

The area of the flue serving the boiler must be not less than the area of the boiler flue outlet.

Nominal Flue Pipe diameters between the boiler and chimney should be in accordance with the following table:

147-34 GBS	-	150 mm	(6")
184-43 GBS	-	175 mm	(7")
221-52 GBS	-	175 mm	(7")
260-60 GBS	-	225 mm	(9")
295-70 GBS	-	225 mm	(9")
332-80 GBS	-	225 mm	(9") ²

Flue pipes and fittings should be constructed from aluminium, stainless steel or acid resistant vitreous enamel lined cast iron. Any double walled flue pipe, must be acceptable to British Gas.

Chimneys should be lined with non-porous acid resistant material in accordance with BS.5854, such as stainless steel flexible flue liner or similar British Gas approved material. The internal diameter of the liner must not be less than the recommended flue pipe and the number of joints should be kept to a minimum. Any joints between the flexible liner and the flue pipe from the boiler should be effected by means of a purpose built adaptor plate. Existing flues should be thoroughly swept before use and any register plates, restrictor plates or dampers should be removed.

The flue should be fitted with a British Gas approved terminal on boiler sizes 34, 43 and 52. On boiler sizes 60, 70 and 80 the flue outlet should be fitted with a wire mesh to protect against blockage. The terminal should not be sited adjacent to any opening window, air vent, or other ventilation opening and should be situated at least 1 m above the roof surface. All should be in accordance with BS.6644.

c) Air supply

Detailed recommendations for air supply are given in BS. 6644. The following notes are given as guidance.

d) Air supply by Natural Ventilation

The purpose provided space housing the boiler(s) must have permanent air vents communicating directly with the outside air, at high level and at low level. Where communications with the outside air is possible only by means of high level air vents, ducting down to floor level for the lower vent(s) should be used. For an exposed boilerhouse, air vents should be fitted, preferably on all four sides but at least on two sides. Air vents should have negligible resistance and must not be sited in any position where they are likely to be easily blocked or flooded or in any position adjacent to an extraction system which is carrying inflammable vapour. Grilles or louvres should be so designed that high velocity air streams do not occur within the space housing the boiler(s).

The air supply requirements stated below are related to the maximum rated heat INPUT of the boiler(s) and are equivalent to those specified in BS.6644.

e) The total minimum free area requirements of the air vents are as follows:

Total input rating of boiler installations	Position of Air vent(s)	Air Vent areas (Air direct from outside)
UP TO 2 MW (6,824,000 Btu / h)	High level (outlet)	270 cm ² plus 2.25 cm ² per kilowatt in excess of 60 kW total rated input
	Low level (inlet)	540 cm ² plus 4.5 cm ² per kilowatt in excess of 60 kW total rated input

f) The actual minimum effective areas of the air vents required are as follows:

BOILER MODEL	POSITION OF AIR VENT	AREA OF VENT (Air Direct from Outside)
147 - 34 GBS	High Level	270 cm ² per boiler (42 in ² per boiler)
	Low Level	540 cm ² per boiler (84 in ² per boiler)
184 - 43 GBS	High Level	307 cm ² per boiler (48 in ² per boiler)
	Low Level	614 cm ² per boiler (96 in ² per boiler)
221 - 52 GBS	High Level	385 cm ² per boiler (60 in ² per boiler)
	Low Level	770 cm ² per boiler (120 in ² per boiler)
260 - 60 GBS	High Level	442 cm ² per boiler (68 in ² per boiler)
	Low Level	884 cm ² per boiler (136 in ² per boiler)
295 - 70 GBS	High Level	518 cm ² per boiler (80 in ² per boiler)
	Low Level	1036 cm ² per boiler (160 in ² per boiler)
332 - 80 GBS	High Level	419 cm ² per boiler (65 in ² per boiler)
	Low Level	837 cm ² per boiler (130 in ² per boiler)

g) Air supply by Mechanical Ventilation

Mechanical ventilation systems serving the area containing the boiler should be designed with an extraction air rate of 0.45 m³/sec per 1000 kW total rated input, and an inlet air rate of 1.1 m³/sec per 1000 kW total rated heat input.

Systems employing an extract fan only must not be used, whereas the use of a single inlet fan, or an inlet together with an extract fan, is acceptable.

All air inlet and extract fans should be electrically interlocked to cause safety shut-down or lock-out of the boiler in the event of malfunction of either fan.

The requirements of mechanical ventilation schemes is fully outlined in BS.6644.

The following table gives the minimum mechanical ventilation rates for the GBS Series 2 range of boilers:

	INLET AIR (Combustion, ventilation)	EXTRACT AIR (Ventilation)
147-34 GBS	0.059 m ³ /S (125ft ³ /min)	0.024 m ³ /S (51ft ³ /min)
184-43 GBS	0.09 m ³ /S (185ft ³ /min)	
221-52 GBS	0.10 m ³ /S (222ft ³ /min)	
260-60 GBS	0.12 m ³ /S (260ft ³ /min)	
295-70 GBS	0.14 m ³ /S (296ft ³ /min)	
332-80 GBS	0.139 m ³ /S (295ft ³ /min)	

5. CONNECTIONS

a) Gas Connection

The gas inlet connection at the rear of the boiler terminates with a R³/₂" (½ BSP Male Tapered) thread. A gas cock complete with union (supplied separately in plastic bag) should be fitted between this point and the gas supply in an easily accessible position to facilitate servicing.

b) Water Connection

All Regency GBS Boilers are provided with Flow and Return connections at the rear of the back section. Mating flanges tapped RP 1-1/4" (1-1/4" BSP) are supplied complete with bolts to facilitate easy disconnection.

c) Electrical supply

The boiler requires a 200/250 volts to 50 Hz Acedrical supply. Fuse rating is 3 amps. The method of connection to the mains electrical isolation of the boiler, preferably by means of un-switched shuttered socket outlet in conjunction with a fused three pin plug, both complying with the requirements of BS.1363. Alternatively, a fused double pole switch or fused spur box connection to the mains should be readily accessible and adjacent to the boiler. All wiring external to the boiler must be installed in accordance with the latest and current I.E.E. and Local Authority regulations.

d) Electrical Connection

The boiler is supplied prewired with heat resistant cables (H05 VK) tested to a maximum temperature of 160°C and suitable for working temperatures not exceeding 70°C.

There are three cables terminating in connection plugs located at the rear of the left hand side panel. Each plug is marked with a label.

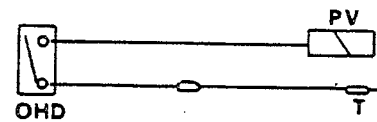
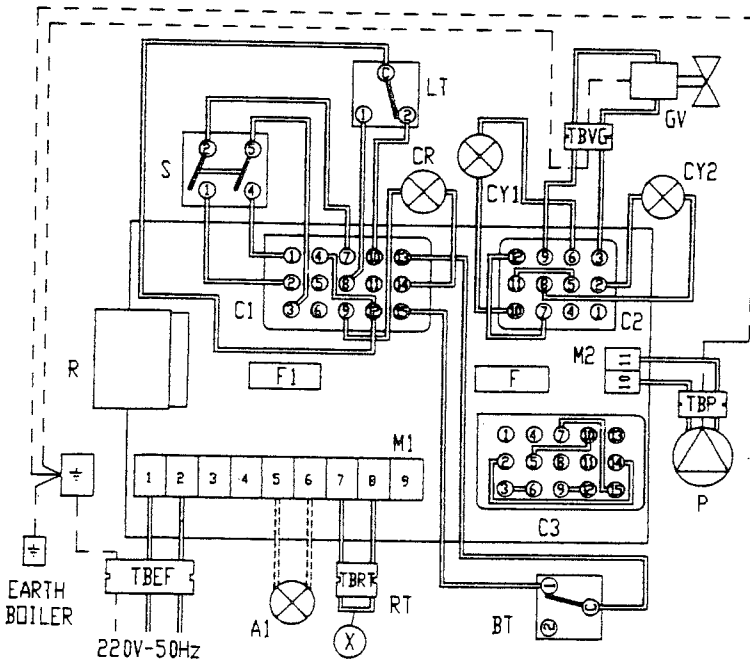
The incoming electrical supply should be connected to the plug marked "240V 50Hz".

The boiler shunt pump (if fitted) should be connected to the plug marked "⊗".

The external controls e.g. Room Thermostat, Time Clock, Sequencer etc, should be connected to the plug marked "Switch Wires".

e) Room Thermostat

See (d) above. Remove the link "x" from the plug marked "Switch Wires", and extend a pair of wires to a suitable volt free switch control device.

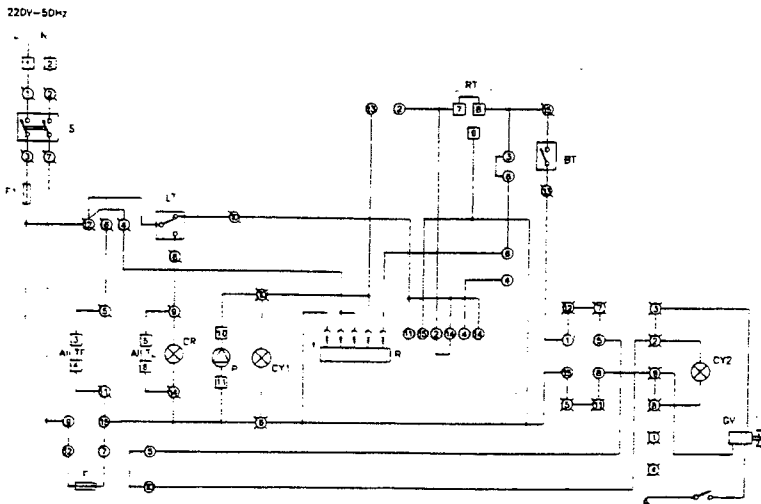


WIRING DIAGRAM

- A1 - REMOTE HIGH LIMIT TRIP INDICATOR
- CY2 - YELLOW CONTROL LAMP (BURNER)
- BT - BOILER THERMOSTAT
- GV - GAS VALVE
- P - PUMP
- S - SWITCH
- CR - RED CONTROL LAMP (ALARM)
- CY1 - YELLOW CONTROL LAMP (PUMP)
- RT - ROOM THERMOSTAT
- E - EARTH
- R - PUMP OVER-RUN RELAY
- F/F1 - FUSE
- LT - LIMIT THERMOSTAT
- TBVG - TERMINAL BOARD GAS VALVE
- PV - PILOT VALVE
- T - THERMOCOUPLE
- OHD - OVER HEAT CUT-OFF DEVICE
- M1/M2 - TERMINAL BLOCKS
- TBEF - TERMINAL BOARD ELECTRICAL FEEDING
- TBP - TERMINAL BOARD PUMP
- TBRT - TERMINAL BOARD ROOM THERMOSTAT
- C1/C2/C3 - CONNECTORS

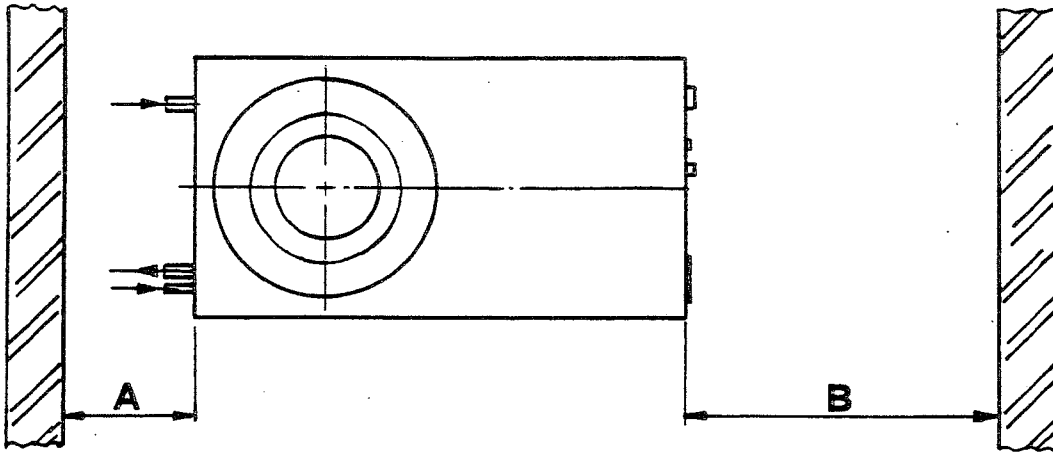
- CONNECTOR C1
- CONNECTOR C2
- CONNECTOR C3
- TERMINAL BLOCKS (M1/M2)

- NOTE:**
- a) Remove the "x" link to insert RT in the electrical circuit.
 - b) To connect remote high limit trip alarm, terminal "5" provides 240V live signal e terminal "6" provides neutral.



6. BOILER INSTALLATION

- a) Siting of the boiler should be such that adequate space is provided at the front of the unit to facilitate the withdrawal of the burner bars during servicing. Sufficient headroom over the boiler should be allowed to facilitate servicing with a minimum requirement of 1000 mm.



Allow minimum of 50 mm at sides of boiler for assembly

34 GBS	175 mm	500 mm
43 GBS	175 mm	600 mm
52 GBS	175 mm	700 mm
60 GBS	175 mm	800 mm
70 GBS	175 mm	900 mm
80 GBS	175 mm	1000 mm

The boiler is delivered in a wooden crate and polythene envelope. In addition, all painted surfaces are protected by a vacuum applied polythene film which should only be removed when the installation is complete. The boiler is supplied complete with a draught diverter which must be fitted. The opening around this draught diverter must not be restricted in any way (i.e. boxing in boiler in alcove, etc.).

The draught diverter should be fitted into the flue outlet and sealed with suitable sealant material or fire cement. The boiler should be mounted on a level base of non-combustible material. A split collar should be fitted immediately above the draught diverter to allow servicing of the heat exchanger.

7. WATER CIRCULATION SYSTEM

- a) Recommendations for the water circulation system are given in BS.6644, CP.341 and 342. The boiler is designed for open or sealed vented system, therefore hot water storage vessels must be of the INDIRECT or CALORIFIER type. Any pipework or cisterns exposed to the freezing conditions (i.e. under-ventilated floor spaces or in roof spaces) should be suitably insulated. Drain taps conforming to BS.2879 should be fitted in accessible positions facilitating the emptying of the whole system, and hot water primary circuit.

b) Pipework

The system should be designed to operate at a temperature drop of not less than 11.2°C (20°F) and not more than 16.7°C (30°F). In calculating the total frictional resistance, the following chart indicating losses through the boiler will assist.

MODEL	Water flow rate to give 11°C temperature rise across boiler		Pressure drop across heat exchanger at stated flow rates	
	m ³ / h	Galls / min	M.H ₂ O. gauge	inches w.g.
147-34 GBS	3.36	12.3	0.25	9.8
184-43 GBS	4.22	15.5	0.31	12.1
221-52 GBS	5.08	18.6	0.39	15.2
260-60 GBS	5.96	21.9	0.50	19.5
295-70 GBS	6.76	24.8	0.61	23.8
332-80 GBS	7.62	27.9	0.72	28.1

c) Pumps

The circulating pumps should be provided with two isolating valves to facilitate removal and should be in an accessible position. Should the pump be installed on the flow circuit these valves should not be capable of obstruction between the boiler and open vent pipe, which should be open to atmosphere under all conditions. Similar constraints apply to boiler isolating valves if fitted.

d) **Vent Pipe**

An open vent pipe sized in accordance with the recommendations contained in BS.6644 should be provided directly from the flow pipe adjacent to the boiler to terminate over the feed and expansion tank. A cold feed pipe from the tank should be introduced into the system return pipework and provided with an isolating valve.

e) **Pressure Relief Valve**

It is essential that a pressure relief valve of approved manufacture and size in accordance with the boiler rating should be fitted on the boiler flow pipe between the boiler and the open vent connection. The blowoff pressure will be set relative to the system static head. The discharge pipe should be run to a point at low level to avoid injury to personnel should emission occur. See BS.6644 for guidance on these points.

f) **Pressure Gauge**

The installer may feel that it is good practice to fit a Pressure Gauge on the flow pipe with a scale to indicate the pressure of the installation in metres of water or bars.

g) **Thermometer**

The boiler control panel contains a drum type revolving thermometer as standard.

h) **Draining Taps**

A draining tap is supplied with the boiler and located near the base of the front section to facilitate complete drainage of the boiler. Any other low points within the system which will not drain through this point should be similarly equipped.

i) **System Water Treatment**

In almost all heating and indirect hot water systems there is a need to treat the circulating water, particularly where the system type is open vented. The fill water will almost always produce a scale deposit on the water ways of the boiler. This deposit will reduce the heat transfer capability of the boiler by insulating the metal of the heat exchanger from the system water. Water loss from the system is inevitable even when there is no obvious leakage. This is caused by surface evaporation from the feed tank. Over a heating season water replenishment can be considerable. Make up water will, naturally, contribute to scale formation in the boiler. The rise and fall of water levels through expansion and contraction of the water on heating and cooling, allows dissolved oxygen to be drawn continuously into the system promoting corrosion. Corrosion debris can be carried into and laid down in the boiler increasing the potential for fouling which will severely reduce boiler efficiency and can lead to premature boiler failure.

It is for these reasons that Modular Heating Sales Ltd., strongly recommends correct treatment of the system fill water after proper initial system cleansing and flushing.

For specific guidance on water treatment direct contact is advised with:

Grace Dearborn Limited
Widnes
Cheshire
WA8 8UD
Telephone: 051-495 1861

8. CONTROLS

- a) Each boiler is supplied pre-wired with boiler thermostat, overheat cut-off device (thermocouple interrupter), illuminated ON-OFF switch, burner run indicator lamp (YELLOW), pump running indicator lamp (YELLOW), pump or diverter valve time delay relay, piezo ignition, limit thermostat and fuse.

Whilst the following devices are not supplied, the boiler is designed to be compatible for use with the following external controls which should be BSI approved:

- | | |
|--------------------------------|---------------------------|
| 1. Time Clock/Programmer | 4. Sequence control panel |
| 2. Room thermostat | 5. Compensating equipment |
| 3. Frost protection thermostat | |

b) **Lamps**

The boiler control panel contains YELLOW control lamps which remain alight when respectively the pump and the burner are working.

9. COMMISSIONING PROCEDURES

a) **Electrical Installation**

Ensure the electrical supply installation has been checked for earth continuity and adequate fuse protection by a qualified engineer.

b) **Gas Installation**

The whole of the gas installations, including the meter should be inspected and tested for soundness and purged in accordance with the recommendations of CP.331:3:1974.

c) **Water Circulation System**

The whole of the system should be thoroughly flushed out with cold water, without the pump in position. Ensure that all valves are open.

With the pump fitted the system should be filled and air locks cleared. Vent all heat emitters and check for water soundness.

d) **Flues**

Make a general check of the flue system ensuring that draught is negative and stable, the flue is clear and all joints are correctly sealed. Ensure also that the flue terminal is correctly positioned.

e) **Boiler**

Remove the cling film protective layer from control panel and casing.

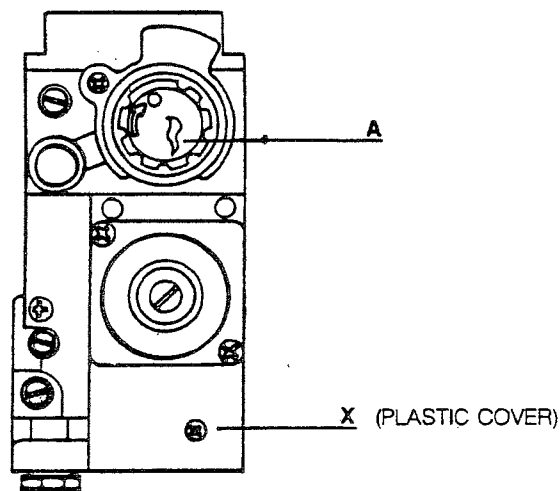
Check the boiler components are in position and correctly fitted.

Check boiler internal wiring is undamaged and connected.

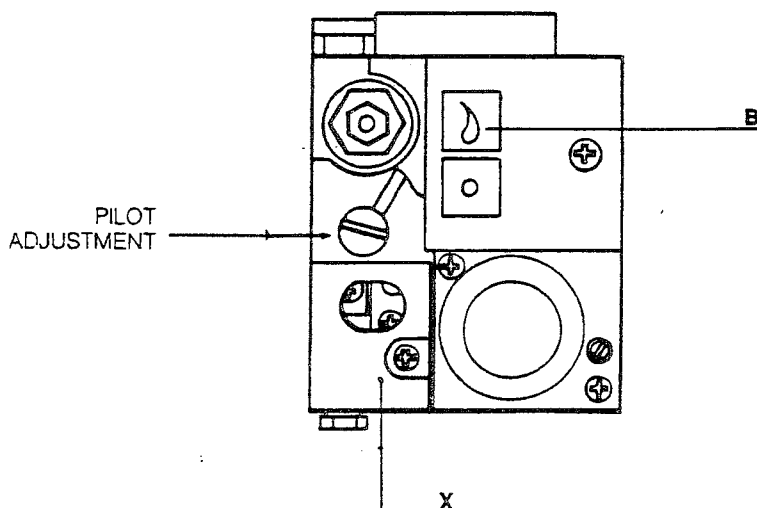
Light the boiler as detailed in "LIGHTING INSTRUCTIONS" on page 13.

f) **Multifunction Gas valve**

The 147-37 and 184-43 GBS boilers are fitted with a Honeywell V4600 C single button multifunction gas valve as illustrated. The single button is referred to as knob A in the initial lighting instructions on page 13.




The 221-52, 260-60, 295-70 and 332-80 GBS boilers are fitted with a Honeywell V4400 C 1211 two button multifunction gas valve as illustrated. The white button with the flame symbol is referred to as 'B' and the red button marked with the symbol (o) is easily identifiable.



10. INITIAL LIGHTING

The initial lighting should be carried out by a competent engineer.

WARNING: If the pilot light is extinguished either intentionally or unintentionally NO attempt should be made to relight the gas until at least three minutes have elapsed.

- Ensure electrical supply to the boiler and switch 'F' on the control panel are OFF.
- Ensure gas and water supplies are turned ON. Check gas soundness of safety valve as follows: Open and close service cock and check with pressure gauge at inlet pressure test point, that pressure is stable for 3 min.
- Push in fully and hold in knob A on the single button gas control valve (Models 34 and 43 GBS) and at the same time press in and release the piezo ignitor button C two or three times in quick succession. For boilers fitted with the two button gas control valve (Models GBS 52, 60, 70 and 80) push and hold in firmly the white button B marked 
- When the pilot light is seen through the viewing port D to be alight, continue to keep the knob A (or button B) fully pushed in for at least 20 seconds before releasing. If the pilot flame goes out, turn knob A clockwise to limit of travel – about 1/4 turn and release. For boilers with the two button control, push in and release the red button (marked 0). Now wait three minutes and repeat from step (c).
- Switch electricity supply ON.
- With the pilot flame established, adjust the boiler thermostat knob E to the required temperature and ensure that all external controls, i.e. clock programmer room thermostat, etc. are at the required settings.
- Switch on the switch F on the control panel and the boiler will light.
- After a short period the main burner(s) should ignite. If not, turn the boiler thermostat E to a higher temperature. Reset the boiler thermostat to the required temperature.

TO TURN OFF THE BOILER

i) For Short Periods


Switch OFF burner switch F.

This will leave the pilot burner alight and it will obviate the necessity of using the complete lighting procedure when the boiler is again required.

To relight, switch ON burner switch F.

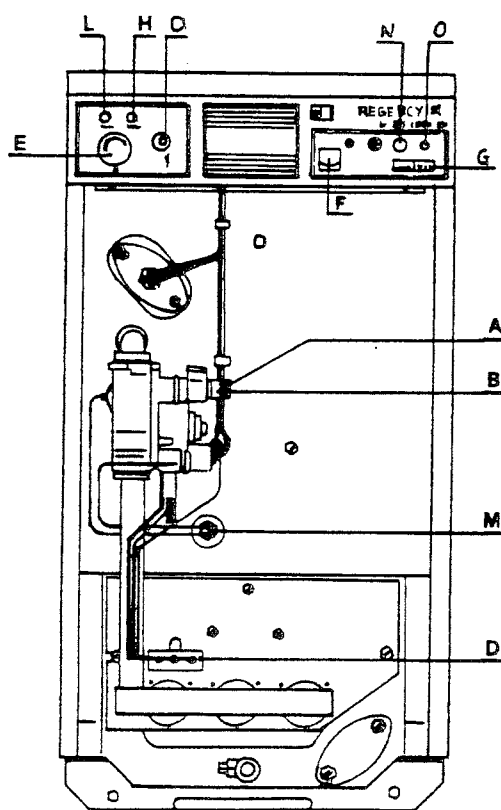
j) For Long Periods

Switch OFF burner switch F.



Turn Knob A on the gas control valve clockwise to the limit of travel, about 1/4 turn and release (for boilers with a two button gas control valve, push in and release the red button marked ).


Switch OFF electricity supply to the boiler, after waiting ten minutes for pump over-run relay to cut out pump. Turn off gas supply.

NOTE: For re-lighting, follow full lighting procedure.



- A - GAS CONTROL VALVE
- B - GAS CONTROL VALVE
- C - PIEZO IGNITOR BUTTON
- D - PILOT VIEWING PORT
- E - BOILER THERMOSTAT
- F - ON-OFF SWITCH BUTTON
- G - WATER TEMPERATURE INDICATOR
- H - BURNER CONTROL LAMP (YELLOW)
- L - PUMP CONTROL LAMP (YELLOW)
- M - OVER HEAT CUT-OFF DEVICE
- N - LIMIT THERMOSTAT RESET BUTTON
- O - RED LAMP FOR LIMIT THERMOSTAT "TRIPPED" INDICATION

- B**
- | | | |
|-------------------------------------------------------------------------------------|------------|---------------------------------------------|
|  | ON (white) | } Two button gas control valve arrangement. |
|  | OFF (red) | |

- A**
-  SINGLE KNOB GAS CONTROL VALVE ARRANGEMENT

11. ADJUSTMENT AND SAFETY CHECKS

FINAL COMMISSIONING CHECKS AND SETTINGS

After gas has been established at the main burner(s) the following tests and checks must be made:

- a) Tests for gas soundness around boiler gas components, e.g. using leak detection fluid.
- b) Check pilot flame to ensure stability, envelopment of thermocouple probe and smooth cross lighting of the main gas burners.
Adjust pilot flame if necessary by the adjusting screw incorporated in the gas valve.
- c) The gas pressure regulator is incorporated in the gas valve. Should adjustment be necessary, remove the protection screw and with a screw-driver adjust the inner screw. By turning the screw clockwise, pressure is increased, anti-clockwise pressure will reduce. Before adjusting, make sure that pressure upstream of the valve exceeds that required at burner and is at least 17.5 mbar.

Measure pressure at burner at the test point situated on burner manifold (loosen internal sealing screw) - see technical data table on page 1. Bear in mind that measuring of the pressure should be carried out with the burner lit. Ensure that all gas pressure measurements are made when burner has been on at least 5 minutes.

- d) When main burner pressure is correctly set:
Switch OFF burner switch F.
Disconnect rubber hose and pressure gauge.
Replace test point screw and tighten.
Switch ON burner switch F.
Test for gas soundness around test point screw.
- e) Should there be any doubt of the correct setting of the gas rate on main burner, the rate may be measured directly, by accurately timing with a stop watch, one or more complete revolutions of the gas meter test dial pointer, ensuring that no other appliance supplied through the same meter is in operation.
- f) Check that there is no spillage of products of combustion from the boiler draught diverter by carrying out a spillage test as detailed in BS.5400:1:1978, Appendix B.
- g) Allow the water system to warm up and check the correct temperature difference of 11°C (21°F) between the flow and return pipes. There should be no undue noise in the system and no pumping over of system water at the vent pipe.

Check operation of the flame failure device on the boiler to ensure that the device will shut off the gas to the main burner(s) within 60 seconds.

To test the flame failure device, turn off gas service cock whilst the boiler is in operation, timing the period until an audible click is heard from the multifunctional valve(s).

To re-light the boiler use the full "Lighting Instructions" contained on page 13.

- i) Check that the boiler thermostat and all automatic controls that are fitted, operate satisfactorily.
- j) Allow the water system to reach maximum working temperature and examine for water soundness. The system should then be turned off and rapidly drained while still hot. The water system should again be filled and cleared of air locks. Re-adjust controls to appropriate settings. Examine for water soundness.
- k) Hand the "USERS INSTRUCTIONS" to the user or purchaser for retention and instruct in the efficient and safe operation of the boiler, controls (if fitted) and the heating/hot water system.
- l) Advise the user of the precautions necessary to prevent frost damage.
- m) Finally, advise the user, that for continued efficient and safe operation of the boiler it is important that adequate servicing is carried out at regular intervals recommended by the local Gas region.

12. BOILER SERVICING

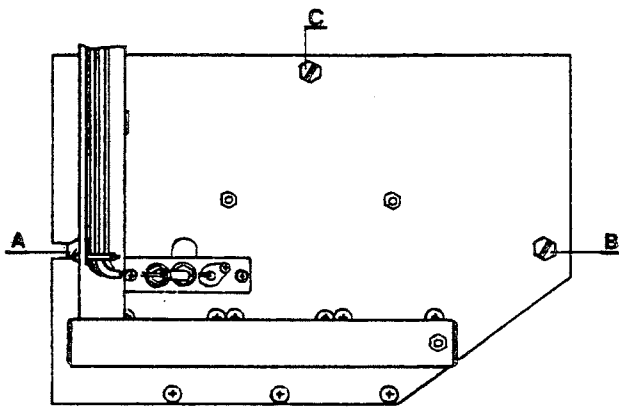
WARNING: Make sure that gas supply is always turned OFF at inlet gas cock and that the electricity supply is switched OFF and disconnected before attempting to service appliance. Check for gas soundness after servicing gas carrying components.

Servicing must be carried out by a qualified Gas Service Engineer and, where applicable, a qualified Electrician. Servicing must be on a regular basis with periods not exceeding 12 months.

- a) Switch off the electricity to the boiler at the isolating switch and at the ON/OFF switch on the boiler control panel and turn off at the gas control.
- b) Turn off gas supply at the gas service cock.
- c) Remove cover on multifunction gas valve cable entry (secured by cross headed screw) and disconnect wires. These connections are push on and ring terminals.

Disconnect terminals from overheat cut-off device situated in front of boiler.

Remove set screws from multifunctional gas valve flange to release gas connection and piezo ignitor (GBS 34 & 43) or H.T. lead (GBS 52 to GBS 80).



Remove two set screws (marked A and B in diagram above) securing burner front plate.

Withdraw burner tray until pilot assembly is exposed.

Complete withdrawal of burner assembly.

Clean burner bars by careful brushing or vacuum method.

Remove three screws retaining each burner flange to front plate to disconnect burners for access to venturis. Ensure all lint or dust is removed.

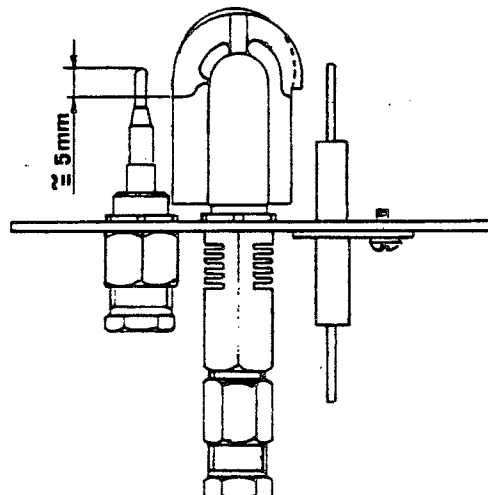
Inspect injectors for cleanliness. If necessary, remove injectors using a 12 mm spanner. Retain washers. In the event of blockage, do not attempt to penetrate the hole in the injector. Fit new injector after ascertaining correct size (see Technical Data on page 5). Ensure that washers are re-fitted.

With burner assembly still withdrawn, remove split collar above draught diverter. Remove draught diverter, boiler top panel (by lifting upwards) and insulation (using protective gloves). Using a screw-driver remove cover plate and baffles between heat exchanger sections.

A flue brush is provided with the boiler and this should be used to remove all deposits in the flueways.

Remove all deposits from combustion chamber by brushing or vacuum cleaner. Replace baffles, heat exchanger cover plate, insulation, boiler top panel and draught diverter with split collar.

Before replacing burner assembly, check pilot burner, electrode and thermocouple for damage. Check spark gap and pilot burner to thermocouple alignment. See sketch below for correct assembly.



Replace burner assembly as described for removal in reverse order.

- d) Inspect all field wiring for damage or loose contacts. Check for gas soundness.
- e) Inspect all capillaries for damage and ensure that thermometer and thermostat bulbs are correctly located in pockets.
- f) Examine flow and return connections for water soundness.
- g) Recommission boiler fully as described on page 14.

13. FAULT FINDING

WARNING: disconnect from electrical supply before servicing.

Note: The following checks should only be carried out by a competent service engineer.

FAULT	POSSIBLE CAUSE OF FAILURE	SUGGESTED REMEDIAL ACTION	
Pilot will not light	Gas supply closed	Check gas cocks at meter and adjacent to boiler are open	
	Air in gas line	Purge gas supply pipeworks	
	Pilot injector blocked	Clean or replace pilot injector as necessary	
	Incorrect pilot injector fitted	Ascertain correct injector from Data label on boiler door and replace	
	No ignition spark at Piezo electrode	Check H.T. lead insulation throughout its length. Check good contact at electrode and piezo unit	
	Electrode insulation broken	Replace electrode	
	Spark gap incorrectly set	Check spark gap (See page 15)	
Pilot flame fails when pilot button is released	Insufficient time allowed for thermocouple to heat up	Hold pilot button in for at least 20 secs See lighting instructions on boiler door	
	Flame impingement on thermocouple incorrect	Flame should envelope 12 mm (1/2") of thermocouple tip (see diagram page 15)	
	Poor contact between thermocouple and gas valve	Disconnect thermocouple lead at multifunction gas valve, clean contact surface and replace fingertight plus 1/2 turn	
	Faulty thermocouple	Test output using millivolt testing device. Output should be within range 10-15 mV (closed current). If faulty replace	
	Faulty power unit in multifunction gas valve	Replace multifunction gas valve	
Main Burner fails to light	Faulty overheat cut-off device	Replace	
	Main Burner fails to light	Electric supply switched off	Switch on electric supply of isolator and ON/OFF switch on boiler panel
		Fuse blown in electric supply	Test any fuses in electric supply for continuity and replace as necessary
Main Burner fails to light	Boiler water temperature higher than boiler thermostat setting	Turn boiler thermostat clockwise to 80°C	
	External controls isolating electric supply	Examine time clocks, programmers, room thermostats, etc. and ensure all are calling for heat	
	Boiler thermostat defective	Test for continuity across thermostat terminals. Replace if necessary	
	Faulty contact on wiring connection to multifunction gas valve	Remove cover on cable entry to multifunction gas valve, remove connections. Clean surface and re-connect	

FAULT	POSSIBLE CAUSE OF FAILURE	SUGGESTED REMEDIAL ACTION
Incomplete combustion production of smoke, heat exchanger soots up	Insufficient combustion	Examine ventilation grilles (for minimum size see page 7 & 8). Ensure these are not obscured
	Insufficient primary air supply	Ensure space around base of boiler is not restricted. Clean burner bars externally and internally
	Flue size incorrect or partially blocked	Establish unobstructed flue of correct size is available for elimination of combustion gases
Boiler continually goes to lockout on boiler overheat cut-off device	Insufficient water circulation	Ensure pump is operating. Examine valves on water circuit for restriction
	Boiler thermostat setting too high	Boiler thermostat should not be set higher than 80°C
	Faulty boiler thermostat	Replace
	Faulty Thermocouple interruptor safety thermostat	Replace
	Faulty pump	Check pump and over-run relay
Heat Output below stated rating	Faulty pump over-run relay	Replace
	Insufficient gas pressure	Check pressure at burner against Data label attached to boiler door and if necessary adjust the governor
	Blocked or restricted injectors	Clean or replace as necessary
	Incorrect injectors fitted	Ascertain correct size from Data label on boiler door and replace

NOTE: The above checks should only be carried out by a competent service engineer.

14. REPLACEMENT OF COMPONENTS

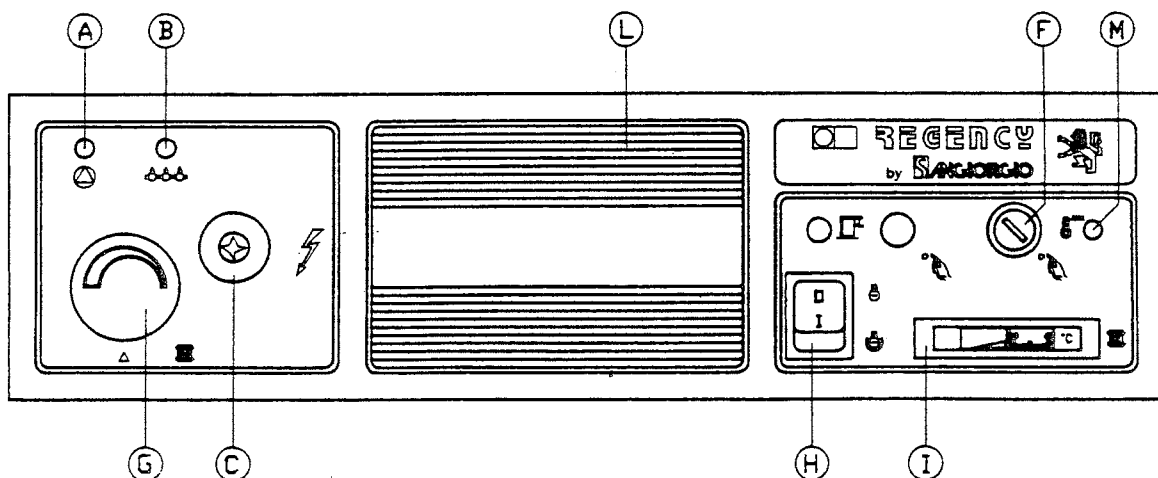
WARNING: Before removing or replacing any boiler components make sure the gas supply is turned OFF and the electricity supply is isolated.

Any items suspected of being faulty should be replaced with the identically corresponding part.

WARNING: INADVERTENT SUBSTITUTION OR REPLACEMENT OF SIMILAR COMPONENTS COULD CAUSE A HAZARD.

Work on replacement of components must only be carried out by a competent engineer.

Check for gas soundness after replacing gas carrying components



Control Panel

A - YELLOW LAMP FOR PUMP OPERATING INDICATION
 B - YELLOW LAMP FOR BURNER "ON" INDICATION
 C - PIEZO SPARK IGNITOR
 F - LIMIT THERMOSTAT RESET BUTTON

G - BOILER THERMOSTAT
 H - ON/OFF SWITCH
 I - BOILER THERMOMETER
 L - KNOCKOUT FOR OPTIONAL CLIMATIC CONTROLLER
 M - RED LAMP FOR LIMIT THERMOSTAT "TRIPPED" INDICATION

a) **Boiler thermostat**

Remove casing top panel.

Disconnect electrical connections to thermostat, after noting terminations to ensure correct replacement (spade type connectors).

Pull off thermostat knob.

Undo two screws (92) securing thermostat mechanism to control fascia panel (77).

Remove thermostat capillary and phial (90) from triple pocket (30).

Remove thermostat, capillary and phial complete.

Fit new thermostat in reverse order ensuring that capillary lead is not crimped or trapped and that the phial is fully inserted in triple pocket. Note that the electrical connections are remade in correct positions as mentioned above.

b) **Overheat Cut-out Device**

Remove thermocouple interrupter leads from overheat cut-off device.

Unscrew device using a 17 mm spanner.

Remove overheat cut-off device.

Fit new overheat cut-off device and re-assemble in reverse order.

c) **Thermocouple interrupter leads**

Pull spade connectors from overheat cut-off device.

Unscrew thermocouple union nut on Gas Valve and remove one interrupter lead by sliding plastic end of lead away from Gas Valve.

To do this on model 34 and 43 boilers, first release plastic cover over terminals of gas valve, secured by cross headed screw.

Unscrew union nut connecting other interrupter lead to Gas Valve and remove lead.

Fit new interrupter leads and re-assemble in reverse order making sure that the thermocouple is making a good contact with the end of the interrupter lead.

d) **Pump Over-run Relay**

The boiler is equipped with a pump overrun relay to allow the boiler circulation pump to overrun after the boiler has been asked to stop firing by the room thermostat, timer or sequencer. It is factory set for 3 minutes delay. However the relay is time adjustable and may be set for either 1, 2, 3, 4, 8, 16 or 32 minutes according to the system requirements. See Table below for adjustment method and result.



POSITION	SELECTOR						DELAY TIME
	1	2	3	4	5	6	
ON		●	●	●	●	●	1 min.
OFF	●						
ON	●		●	●	●	●	2 min.
OFF		●					
ON			●	●	●	●	3 min.
OFF	●	●					
ON	●	●		●	●	●	4 min.
OFF			●				
ON	●	●	●		●	●	8 min.
OFF				●			
ON	●	●	●	●	●	●	16 min.
OFF					●		
ON	●	●	●	●	●		32 min.
OFF						●	

e) **Thermometer**

Remove top panel by lifting upwards.

Remove screw (81) securing control box cover and remove cover (80).

Remove thermometer phial from triple pocket (30).

Squeeze plastic spring clips on each side of thermometer assembly (88) and remove by pushing unit through control fascia panel (77) from back to front.

Fit new thermometer in reverse order ensuring that the phial is fully inserted into pocket (30).

f) **Gas Valve**

Remove complete burner assembly as detailed in Section 12 (c) - BOILER SERVICING.

Disconnect gas pilot pipe and thermocouple connections to multifunctional valve by unscrewing union nuts.

Remove four screws securing the outlet connection flange to the multifunctional valve.

Remove gas valve.

Fit new gas valve ensuring that new gaskets (43) are correctly located.

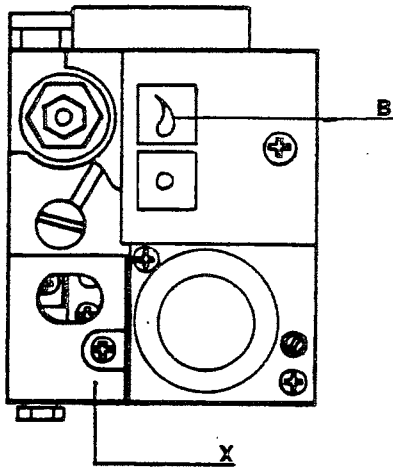
Re-assemble to complete burner assembly and replace in reverse order to the method of removal.

Re-connect electrical connections to gas valve and replace plastic protective cover.

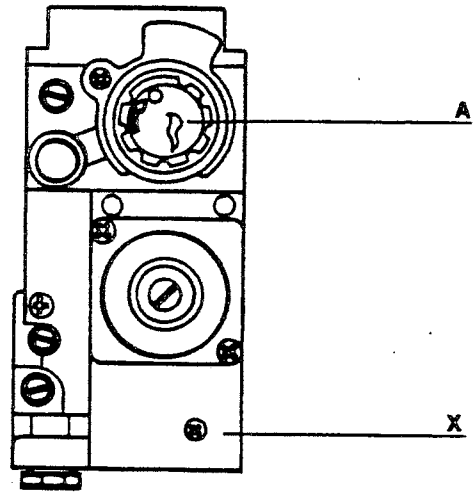
Re-connect pilot pipe and thermocouple to gas valve.

Check for gas soundness (see item b) page 13) first with burner OFF, second with pilot only operating and thirdly with main gas burner operating.

Turn on gas at inlet gas cock, light the pilot and check for gas soundness at the valve inlet. Switch off electrical supply, light the main burner and check for gas soundness at the valve outlet. (See commissioning procedure on page 14 and carry out instructions a to f and h).



**Control for
52,60,70 and 80
GBS Boilers**



**Control for
34 and 43
GBS Boilers**

g) Piezo Unit

- Disconnect ignitor lead from piezo unit (50).
- Undo nut (68) securing piezo unit to bracket (51).
- Remove piezo unit (50).
- Fit new piezo unit in reverse order and re-connect lead.

h) Thermocouple

- Release Sleeve nut securing thermocouple to pilot burner.
- Release sleeve nut securing thermocouple lead to gas valve.
- Remove thermocouple lead.
- Replace new thermocouple in reverse order, taking care to check that the thermocouple interrupter wire is properly fitted on gas valve. Re-commission as item 11 (h) page 14.

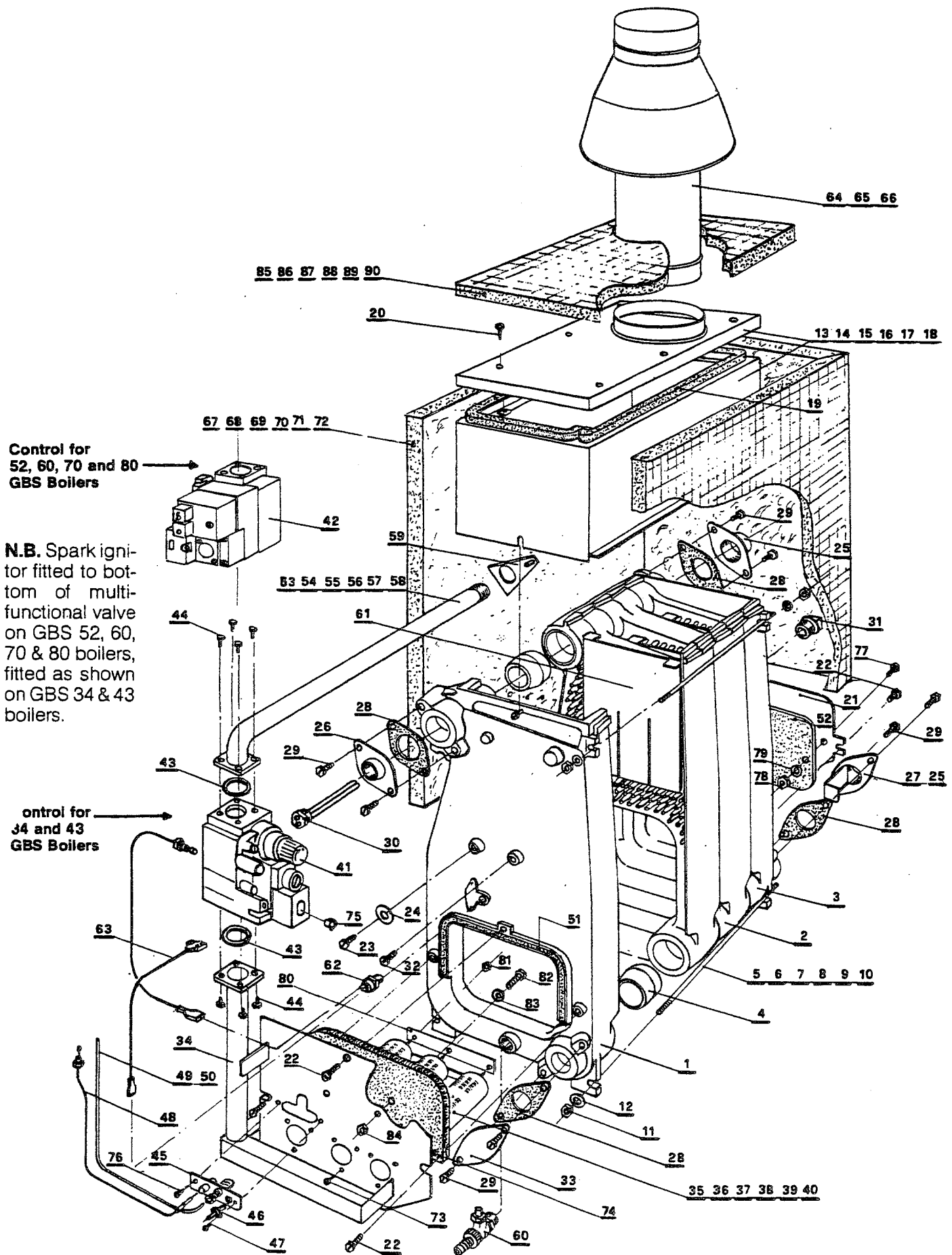
i) Ignition Electrode/Pilot Assembly

- Disconnect thermocouple and pilot gas connection from gas valve unscrew locating/retaining nut holding thermocouple into pilot assembly and withdraw thermocouple probe. Unscrew union nut connecting pilot gas pipe to pilot assembly and withdraw thermocouple probe. Unscrew union nut connecting pilot gas pipe to pilot assembly and withdraw pipe sufficiently to clear coupling.
- Remove igniter lead from electrode (push-on terminal).
- Release two screws retaining pilot burner bracket to front plate and withdraw pilot assembly (76).
- Remove screw (47) securing electrode to pilot burner bracket.
- Remove electrode and fit new component replacing securing screw.
- Check spark gap (sketch on page 15).
- Refit pilot burner bracket. Re-connect thermocouple and pilot gas connection ensuring the pilot burner injector is still in position.
- Reconnect igniter lead to electrode.
- Test boiler operation.

j) Main Burners/Main Burner Injectors

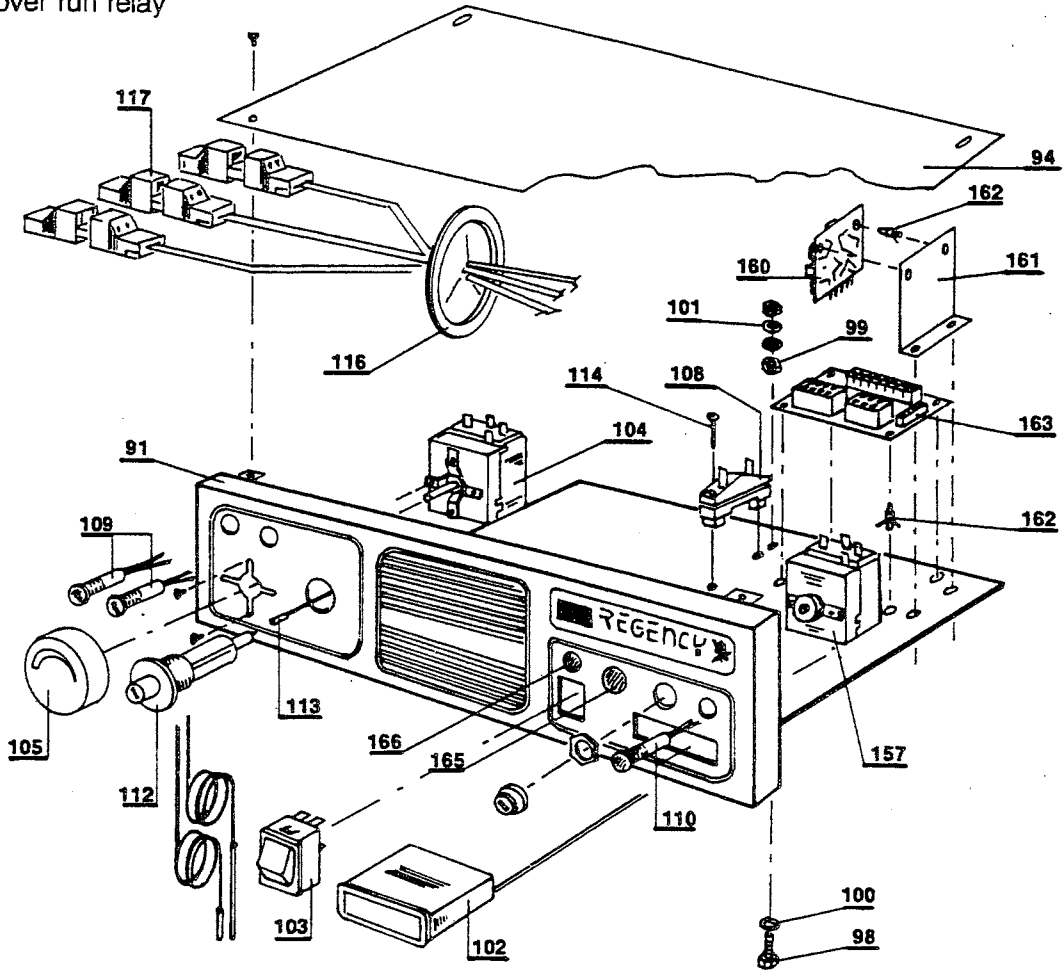
- Remove main burner assembly as detailed in Section 12 (c) (BOILER SERVICING).
- Remove three screws retaining burner flange to front plate and the nut locking burner to rear spacer bar.
- Unscrew injector using a 12 mm spanner, fit new injector after ascertaining the correct size (Technical Data on page 5) ensuring that the washer is re-fitted between the injector and burner manifold.
- Replace burner ensuring the stud at the end of burner locates through hole in rear spacer bar. Screw on nut and tighten locate burner flange against front plate and tighten screws.
- Replace burner assembly and test boiler operation.

15. DIAGRAMMATIC ASSEMBLY DRAWINGS

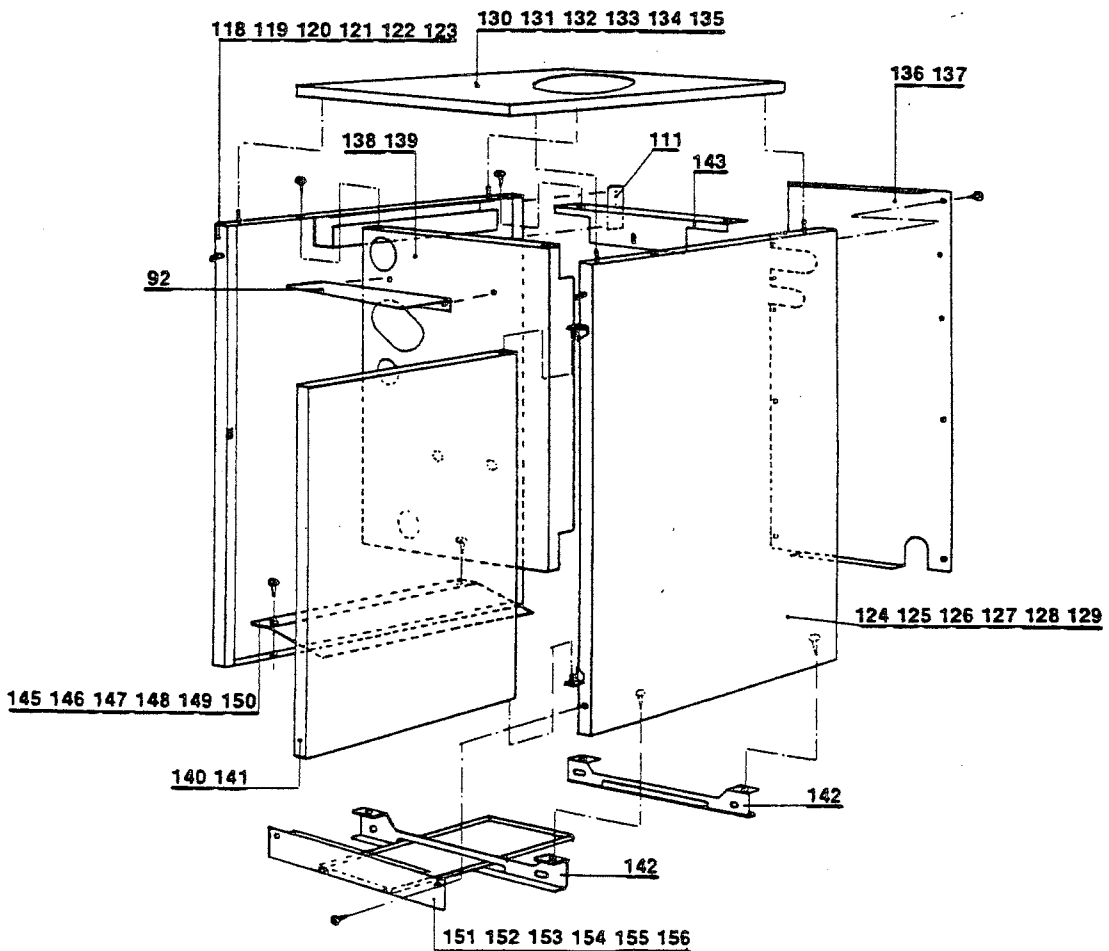


CONTROL PANEL

With pump over run relay



CASING



GBS SERIES 2 BOILER LIST OF COMPONENT PARTS

KEY NO.	MAKERS PART NO.	DESCRIPTION
1	059081011	Front section
2	059181012	Intermediate section
3	059081014	Rear section
4	073098551	Nipple
5	075088135	Tie rod for 5 sections boiler 34 GBS
6	075088136	Tie rod for 6 sections boiler 43 GBS
7	075088137	Tie rod for 7 sections boiler 52 GBS
8	075088138	Tie rod for 8 sections boiler 60 GBS
9	075088139	Tie rod for 9 sections boiler 70 GBS
10	075088140	Tie rod for 10 sections boiler 80 GBS
11	073098168	8 mm nut
12	073098763	Washer 8,4 mm dia
13	075066165	Collector hood and cleaning cover for 5 sections boiler 34 GBS
14	075066166	Collector hood and cleaning cover for 6 sections boiler 43 GBS
15	075066167	Collector hood and cleaning cover for 7 sections boiler 52 GBS
16	075066168	Collector hood and cleaning cover for 8 sections boiler 60 GBS
17	075066169	Collector hood and cleaning cover for 9 sections boiler 70 GBS
18	075066170	Collector hood and cleaning cover for 10 sections boiler 80 GBS
19	—	Component of Pos. 13 to 18
20	074098280	Screws for cleaning cover
21	078088023	Rear access plate
22	075083148	Set screw 8 x 15 mm
23	075083128	Brass screw 8 x 10 mm
24	075083150	Brass washer 8,4 mm dia
25	075083015	Flange with coupling Rp 1¼"
26	077081053	Flange with drilled hole Rp ½"
27	075083016	Flange with coupling and deflector only for 5, 6, 7, 8 sections boilers
28	074098451	Gasket for Key 25-26-27
29	075083335	Set screw 8 x 20 mm for key 25-26-27
30	075075196	Triple thermostat pocket
31	074098861	Plug 3/4 BSP
32	075083138	Screw 8 x 10 mm
33	077081052	Blind flange
34	075066500	Front burner door
35	075083515	Burner bars for 5 sections boiler 34 GBS
36	075083516	Burner bars for 6 sections boiler 43 GBS
37	075083517	Burner bars for 7 sections boiler 52 GBS
38	075083518	Burner bars for 8 sections boiler 60 GBS
39	075083519	Burner bars for 9 sections boiler 70 GBS
40	075083520	Burner bars for 10 sections boiler 80 GBS
41	075073030	Gas valve v 4600 c - 34 & 43 GBS
42	075098011	Gas valve v 4400 c - 1112 - 52, 60, 70, & 80 GBS
43	075093176	Gasket for key 41 & 42
44	075078018	Set screw 5 x 12 mm for Key 41 & 42
45	075083506	Pilot burner
46	075066506	Ignition electrode

**GBS SERIES BOILER
LIST OF COMPONENT PARTS**

KEY NO.	MAKERS PART NO.	DESCRIPTION
47	075099253	Screw M3 x 6
48	075083507	Thermocouple
49	075083508	Tube 6/4 mm dia for gas valve V 4600 C
50	075083509	Tube 6/4 mm dia for gas valve V 4400 C
51	074098010	Insulating cord for key 1
52	075086169	Insulating slab for key 21
53	075083155	Gas feed pipe for 5 sections boiler 34 GBS
54	075083156	Gas feed pipe for 6 sections boiler 43 GBS
55	075083157	Gas feed pipe for 7 sections boiler 52 GBS
56	075083158	Gas feed pipe for 8 sections boiler 60 GBS
57	075083159	Gas feed pipe for 9 sections boiler 70 GBS
58	075083160	Gas feed pipe for 10 sections boiler 80 GBS
59	075081021	Bracket for gas feed pipe
60	075076413	Draining cock
61	077081114	Baffle
62	075098205	Over heat cut-off device
63	075081024	Thermocouple interrupter leads
64	075087085	Down draught diverter for 5 sections
65	075088088	Down draught diverter for 6-7 sections
66	075088287	Down draught diverter for 8-9-10 sections
67	075083785	Insulating slab for 5 sections boiler 34 GBS
68	075083786	Insulating slab for 6 sections boiler 43 GBS
69	075083787	Insulating slab for 7 sections boiler 52 GBS
70	075083788	Insulating slab for 8 sections boiler 60 GBS
71	075083789	Insulating slab for 9 sections boiler 70 GBS
72	075083790	Insulating slab for 10 sections boiler 80 GBS
73	075099251	Set screw 4,8 x 9,5 mm for key 35-36-37-38-39 & 40
74	075098173	Insulating slab for key 34
75	075098845	Clamping screen for key 41-42
76	075099252	Screw 4 & 8
77	075099169	Fastening screw pos. 52 M6x20
78	075088053	Fastening nut M6
79	075086171	Washer Ø 6,6x24x2
80	075066502	Fastening brackets for ramps
81	074098840	Nuts for key 80
82	075099169	Fastening screw pos. 74
83	074086171	Washer pos. 82
84	074088053	Nut pos. 82
85	074083795	Upper insulating slab for 5 sections boiler 34 GBS
86	074083796	Upper insulating slab for 6 sections boiler 43 GBS
87	074083797	Upper insulating slab for 7 sections boiler 52 GBS
88	075083798	Upper insulating slab for 8 sections boiler 60 GBS
89	074083799	Upper insulating slab for 9 sections boiler 70 GBS
90	075083800	Upper insulating slab for 10 sections boiler 80 GBS
91	075098301	Control-panel
92	075191421	Fixing bracket for Key 91

**GBS SERIES BOILER
LIST OF COMPONENT PARTS**

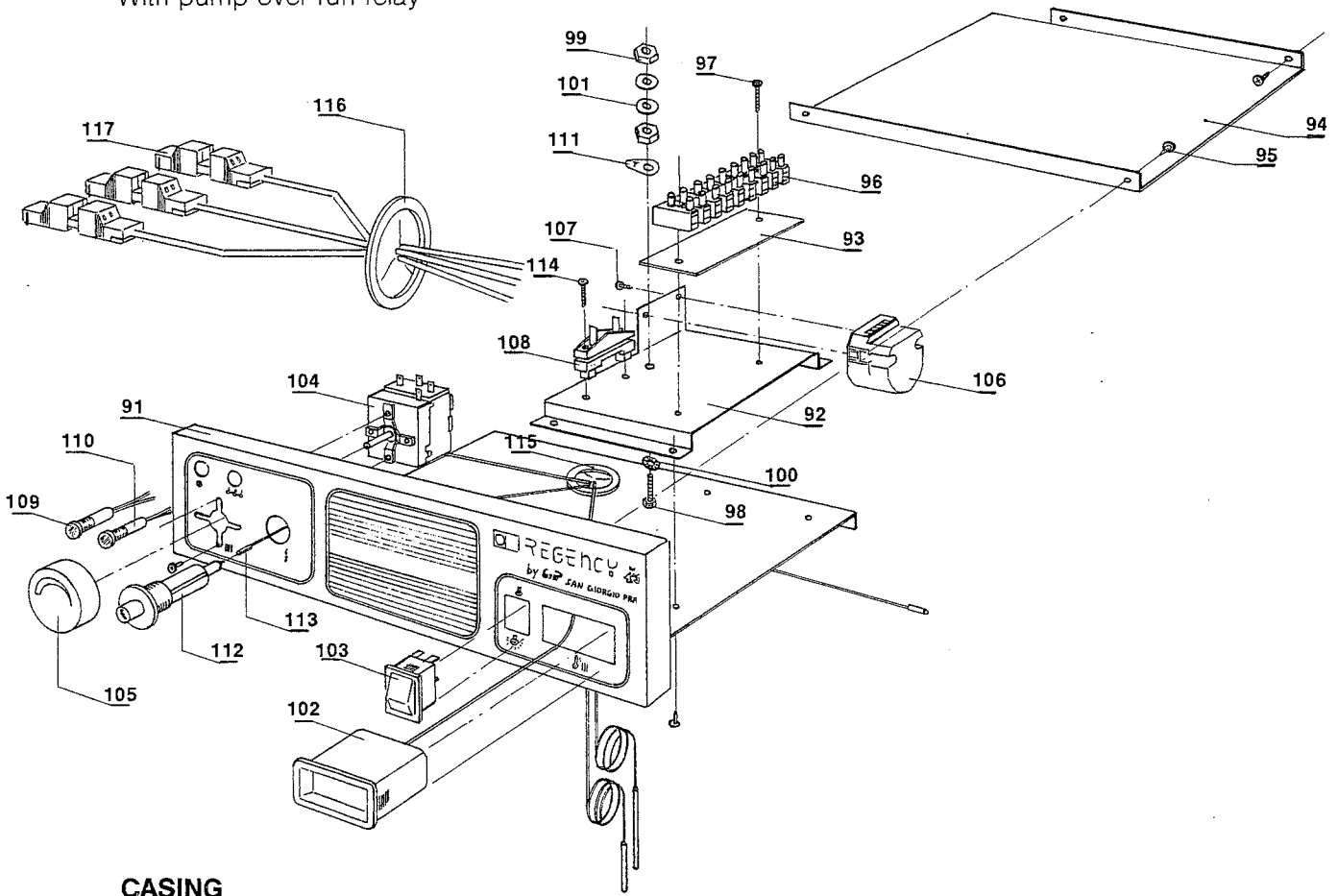
KEY NO.	MAKERS PART NO.	DESCRIPTION
93	-	-
94	075AOB201	Upper access cover of the control panel
95	074099256	Screw for key 91-94
96	-	-
97	-	-
98	074027251	Earth screw
99	074027253	Nut 4 mm
100	074027252	Spring washer 4 mm dia
101	074027254	Washer 4,3 mm dia
102	075098909	Thermometer
103	075098189	Switch (Off-On)
104	075083102	Boiler thermostat
105	074098006	Thermostat knob
106	075063253	Pump over - run relay
107	075093479	Screw for key 106
108	075083407	Clamping screw
109	075063252	Yellow pump and burner control lamps
110	075063251	Red limit thermostat lamp
111	075G1G113	Fixing bracket for key 117
112	075088204	Piezoelectric ignitor
113	075088213	Cable for key 112
114	075099250	Screw for key 108
115	074098575	Cable grommet Ø 28
116	074098576	Cable grommet Ø 68
117	075098254	Connecting assembly
118	075083705	Left side panel for 5 sections boiler 34 GBS
119	075083706	Left side panel for 6 sections boiler 43 GBS
120	075083707	Left side panel for 7 sections boiler 52 GBS
121	075083708	Left side panel for 8 sections boiler 60 GBS
122	075083709	Left side panel for 9 sections boiler 70 GBS
123	075083710	Left side panel for 10 sections boiler 80 GBS
124	075083715	Right side panel for 5 sections boiler 34 GBS
125	075083716	Right side panel for 6 sections boiler 43 GBS
126	075083717	Right side panel for 7 sections boiler 52 GBS
127	075083718	Right side panel for 8 sections boiler 60 GBS
128	075083719	Right side panel for 9 sections boiler 70 GBS
129	075083720	Right side panel for 10 sections boiler 80 GBS
130	075083725	Upper panel for 5 sections boiler 34 GBS
131	075083726	Upper panel for 6 sections boiler 43 GBS
132	075083727	Upper panel for 7 sections boiler 52 GBS
133	075083728	Upper panel for 8 sections boiler 60 GBS
134	075083729	Upper panel for 9 sections boiler 70 GBS
135	075083730	Upper panel for 10 sections boiler 80 GBS
136	075083702	Rear panel for 5-4-7 sections boiler 34-43 & 52 GBS
137	075083703	Rear panel for 8-9-10 sections boiler 60-70 & 80 GBS

GBS SERIES BOILER
LIST OF COMPONENT PARTS

KEY NO.	MAKERS PART NO.	DESCRIPTION
138	075083469	Internal panel for 5-6-7 sections boiler 34-43 & 52 GBS
139	075083470	Internal panel for 8-9-10 sections boiler 60-70 & 80 GBS
140	075083700	Door for 5-6-7 sections boiler 34-43 & 52 GBS
141	075083701	Door for 8-9-10 sections boiler 60-70 & 80 GBS
142	075083475	Fixing bracket for lower panels
143	075083704	Fixing bracket for rear upper panels
144	075099256	self-tapping screws
145	075083745	Spoiler for 5 sections boiler 34 GBS
146	075083746	Spoiler for 6 sections boiler 43 GBS
147	074083747	Spoiler for 7 sections boiler 52 GBS
148	074083748	Spoiler for 8 sections boiler 60 GBS
149	075083749	Spoiler for 9 sections boiler 70 GBS
150	075083750	Spoiler for 10 sections boiler 80 GBS
151	075083735	Water tray for 5 sections 34 GBS
152	075083736	Water tray for 6 sections 43 GBS
153	075083737	Water tray for 7 sections 52 GBS
154	075083738	Water tray for 8 sections 60 GBS
155	075083739	Water tray for 9 sections 70 GBS
156	075083740	Water tray for 10 sections 80 GBS
157	074098069	Limit thermostat
158	-	-
159	-	-
160	075099098	Pump over-run relay
161	075099097	Fixing bracket for key 160
162	073098050	Plastic fixing for key 160-163
163	075099099	Printing card
164	073098054	Fuse
165	075098044	Plastic cover for hole Ø 11 mm
166	075098043	Plastic cover for hole Ø 6,2 mm

CONTROL PANEL

With pump over run relay



CASING

