

Technical information

Remeha Gas 550/550 Duo

Remeha Gas 550/550 Duo

- Atmospheric gas boiler
- 278 - 1058 kW



TABLE OF CONTENT

Preface	3	8 Gas supply	13
1 Boiler description	3	8.1 General	13
2 Construction details	3	8.2 Gas pressure	13
2.1 General	3	8.3 Injectors	13
2.2 Burners	3	9 Electrical supply	14
2.3 Assembly	3	9.1 General	14
3 dimensions and Technical data	4	9.2 Instrument panel	14
3.1 Dimensions Remeha Gas 550	4	9.3 Control panel	14
3.2 Dimensions Remeha Gas 550 Duo	6	9.4 Electrical connections	14
4 Application information	7	9.5 Electrical information	14
4.1 L.P.H.W. system	7	9.6 Water level control	14
4.1.1 Water temperature	7	9.7 Wiring diagrams	15
4.1.2 Water pressure	7	10 Commissioning	16
4.1.3 Water flow	7	10.1 Switching off the boiler	18
4.1.4 Water treatment	7	11 Maintenance	18
4.1.5 Noise level	8	12 Trouble shooting	19
4.2 Chimneys	8	12.1 Fault causes	19
4.3 Installation standards	8		
5 Typical boiler installations	9		
5.1 Installation 1	9		
5.2 Installation 2	10		
6 Control and safety equipment	11		
6.1 General	11		
6.2 Instrument panel	11		
6.3 Standard electronic gas train High/Low	11		
6.3.1 Schematic	11		
6.3.2 Control panel on gas train	11		
6.3.3 Specification control box	11		
6.3.4 Specification Ignition transformer	12		
6.4 Functions	12		
6.4.1 Flame control (lock out)	12		
6.4.2 Thermostats (shutdown / lock out)	12		
6.4.3 Water level control (lock out)	12		
6.4.4 Valve leakage control - optional (lock out)	12		
6.4.5 Gas pressure switch LD - optional (shut down)	12		
6.4.6 Gas pressure switch HD - optional (lock out)	12		
6.4.7 Down draft thermostat; (optional, shut down)	12		
7 Assembly and installation guidelines	13		
7.1 General	13		
7.2 Boiler assembly	13		
7.3 Water connections	13		
7.4 Pocket for the thermostat capillaries	13		
7.5 Water pressure	13		

PREFACE

These technical instructions contain useful and important information for the correct operation and maintenance of the Remeha boiler, model Gas 550 and Gas 550 Duo.

Read these instructions carefully before putting the boiler into operation, familiarise yourself with its control functions and operation, strictly observing the instructions given. Failure to do so may invalidate warranty or prevent the boiler from operating.

The installation and commissioning of the boiler must be carried out by a competent Engineer, with the relevant certification i.e.: CORGI, ACOPS, IEE regs. etc. On completion a copy of the boiler log / commissioning sheet should be returned to Broag Ltd for record purposes.

If you have any questions, or if you need more information about specific subjects relating to this boiler, or its installation please do not hesitate to contact us.

The data published in these technical instructions is based on the latest information (at date of publication) and may be subject to revisions.

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.

1 BOILER DESCRIPTION

The Remeha Gas 550 series boiler is a cast iron sectional boiler, with a powder coated enamel steel casing complete with glass fibre insulation. It has high / low atmospheric gas burners, suitable for natural gas, cat. I_{2H} - 20 mbar. It is supplied in sections for delivery and on site assembly.

The boiler meets the requirements of the CE regulations at the following directives:

- Gas appliance directive no. 90/396/EEC;
- Efficiency directive no. 92/42/EEC;
- E.M.C. directive no. 89/336/EEC.

And is correspondent with:

- Electrical low voltage directive no. 73/23/EEC.

Remeha Gas 550 (Duo)-reference number: 0063AP6520

Classification type for evacuation of the combustion products, according: EN-656: B11, B11BS.

For further advice or information contact Broag Ltd.

2 CONSTRUCTION DETAILS

2.1 General

The Remeha Gas 550 / 550 Duo is a floor standing boiler complete with temperature and safety controls. The cast iron sectional heat exchanger is assembled using conical nipples and jointing compound. The boiler has a built in draft diverter. It has water connections at the side within the casing dimensions and a gas train to one side.

Note: Both water and gas connections can be handed on site during assembly. But the instrument panel, mounted in the front casing should always be fitted on the same side as the flow connection.

The casings can be fitted after the flue and pipework to the boiler have been installed and connected.

2.2 Burners

The burners are stainless steel, atmospheric type with a heat reflecting floor plate providing the correct ventilation distribution. Front and top access is required for service work to be carried out.

Note: The Gas 550 Duo has two complete boiler units within one casing using a common flue connection.

2.3 Assembly

The boiler cannot be supplied pre-assembled and must be assembled on site.

3 DIMENSIONS AND TECHNICAL DATA

3.1 Dimensions Remeha Gas 550

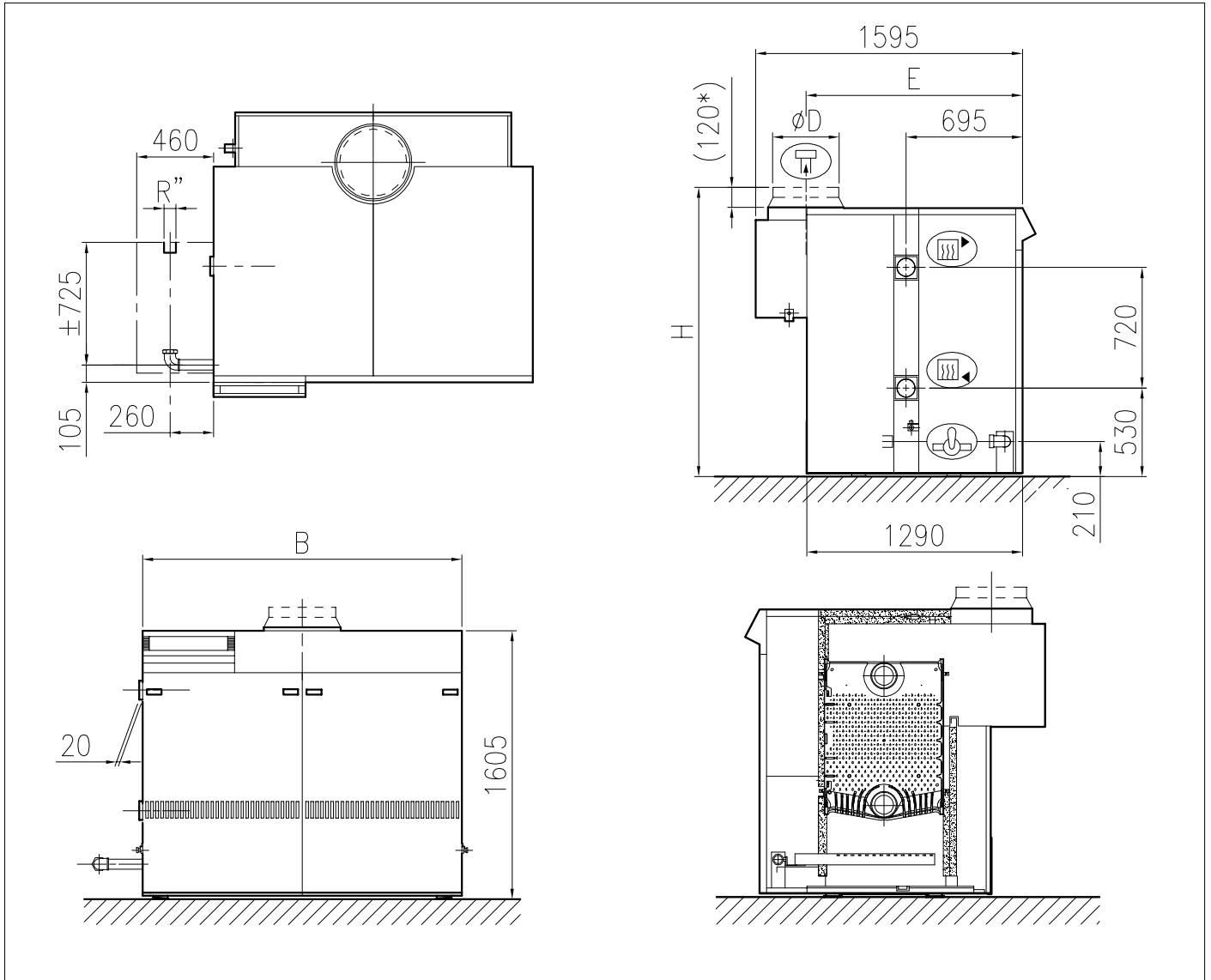






Fig. 01 Dimensions Remeha Gas 550

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-  Flow $\varnothing 107$ int.
-  Return $\varnothing 107$ int.
-  Gas 2"
-  Flue gas \varnothing

Number of sections			10	12	14	16	18	20	22
Nominal heat output		kW	139-278	170-340	202-403	233-466	265-529	296-592	328-656
Nominal heat input	Hi / NCV	kW	160-309	195-378	232-448	266-518	301-588	337-657	372-728
	Hs / GCV	kW	177-343	217-420	256-498	296-576	335-653	374-730	414-809
Gas consumption		m ³ /h	33	40	47	55	62	70	77
Dimensions	B	mm	1240	1460	1680	1900	2120	2340	2560
	Ø D	mm	300*	350*	400*	450	450*	500	500*
	E	mm	1295	1295	1295	1295	1295	1295	1245
	H	mm	1730	1730	1730	1610	1730	1610	1730
Flue temperature		°C	154	152	146	138	138	142	142
Water resistance	Δt = 10°C	mbar	64	72	80	128	160	180	196
	Δt = 20°C	mbar	16	18	20	32	40	45	49
Water contents		litre	291	349	407	465	523	581	639
Boiler weight (dry)		kg	1450	1695	1940	2185	2430	2675	2920
Flue gas flow rate		kg/h	692	847	1033	1239	1376	1560	1678

Table 01 Technical data Remeha Gas 550

* Supplied with a flue gas pipe adapter

Remeha Gas 550/550 Duo

3.2 Dimensions Remeha Gas 550 Duo

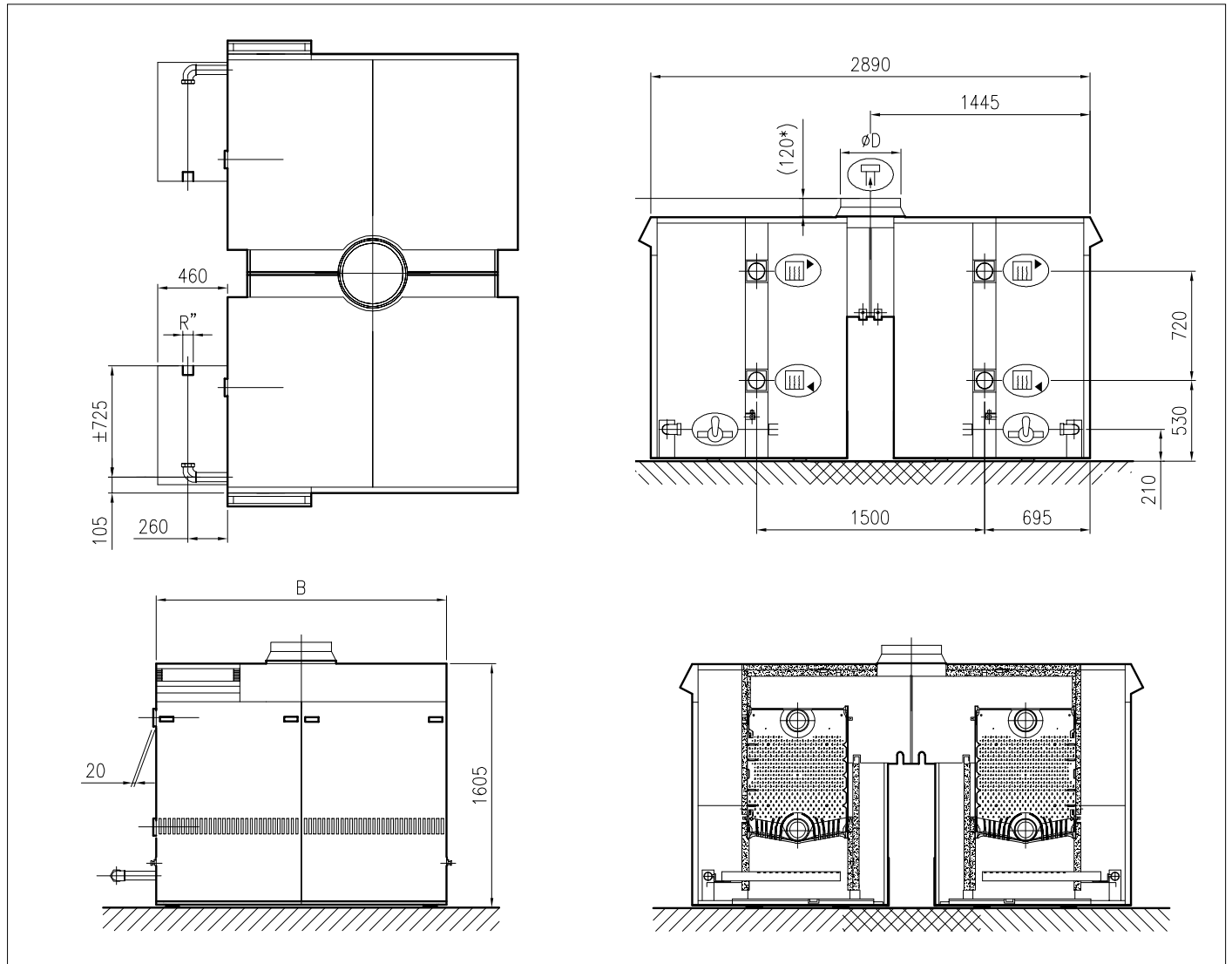






Fig. 02 Dimensions Remeha Gas 550 Duo

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-  Flow $\text{Ø}107$ int.
-  Return $\text{Ø}107$ int.
-  Gas 2"
-  Flue gas Ø

Number of sections			2 x 10	2 x 12	2 x 14	2 x 16	2 x 18
Nominal heat output		kW	139-556	170-680	202-806	233-932	265-1058
Nominal heat input	Hi / NCV	kW	160-618	195-756	232-896	266-1036	301-1176
	Hs / GCV	kW	177-686	217-840	256-996	296-1152	335-1306
Gas consumption		m ³ /h	66	80	94	110	124
Dimensions	B	mm	1240	1460	1680	1900	2120
	Ø D	mm	450*	500*	600*	650	650*
Water contents		litre	582	698	814	930	1046
Boiler weight (dry)		kg	2900	3390	3880	4370	4620
Flue gas flow rate		kg/h	1385	1694	2066	2478	2752

Table 02 Technical data Remeha Gas 550 Duo

* Supplied with a flue gas pipe adapter

4 APPLICATION INFORMATION

4.1 L.P.H.W. system

4.1.1 Water temperature

Maximum water temperature is 110°C (high limit thermostat).

Highest boiler water temperature is 95°C (control thermostat).

Minimum return water temperature is 20°C at a flow rate related to a Δt of 20°C (flow/return temp).

4.1.2 Water pressure

Boiler sections are factory pressure tested at 10 bar.

Maximum pressure test boiler block is 7,8 bar.

Maximum working pressure is 6 bar

Minimum working pressure is 0,8 bar at a maximum working temperature of 110°C or 0,3 bar at a maximum working temperature of 95°C.

4.1.3 Water flow

The minimum water flow through the boiler on shut down is:

$$\frac{\text{Output boiler in kW}}{93} = \text{m}^3/\text{h}$$

This minimum flow must be maintained for approximately 5 minutes after the burner stops firing to avoid high temperature shut down due to residual heat gain.

Due to the design and manufacture of the boiler no

specific minimum water flow requirements exist other than for overheating protection.

4.1.4 Water treatment

The system should be filled with mains cold water (for the UK this will usually have a pH of between 7 and 8).

Pressurised installations with a boiler/system content ratio of 1:10 or less should not require water treatment, provided that the following conditions apply:

1. The system is flushed thoroughly to remove all fluxes and debris and then filled completely once.
2. Make up water is limited to 5 % per annum.
3. The hardness of the water does not exceed 360 ppm (20°D).

All scale deposits will reduce the efficiency of the boiler and should be prevented. However provided the above is complied with any scale produced will not be too detrimental to the boiler efficiency and will not reduce the anticipated life expectancy of the boiler.

Note: Scale deposits in excess of 3 to 5 mm will reduce boiler efficiency and greatly increase the risk of premature casting failure.

As most systems contain a variety of metals which can react with each other to cause corrosion. It is considered good practice to provide some form of water treatment (especially in open vented systems) in order to prevent or reduce the following:

- Metallic corrosion;
- Formation of scale and sludge;
- Microbiological contamination;
- Chemical changes in the untreated system water.

Suitable chemicals and their use should be discussed with a specialist water treatment company prior to carrying out any work. The specification of the system and manufacturers recommendations must be taken into account, along with the age and condition of the system. New systems should be flushed thoroughly to remove all traces of flux, debris, grease and metal swarf generated during installation. Care to be taken with old systems to ensure any black metallic iron oxide sludge and other corrosive residues are removed, again by thoroughly flushing, ensuring that the system is drained completely from all low points.

Note: Please ensure that the new boiler plant is not in circuit when the flushing takes place, especially if cleansing chemicals are used to assist the process.

Under no circumstances is the boiler to be operated with cleaning chemicals in the system.

To Summarise:

- Minimise water loss;
 - Prevent pumping over in open vented systems;
 - Provide adequate air venting at all high points;
 - Keep pH level between 7 - 9 when using additives;
 - Maximum chlorine content of 200 mg/l;
- Take advice on the suitability of inhibitors.

4.1.5 Noise level

The noise level measured around the boiler depending on boiler room construction is about 50-55 dBA. Noise levels taken at 1 meter from the boiler.

4.2 Chimneys

The average flue gas temperature is so low that the chimney must be made in accordance with the guidelines of British Gas (BS 6644).

4.3 Installation standards

The following instructions must be adhered to when the Remeha Gas 550/550 Duo is installed:

Gas Safety (installation and use) Regulations 1984 (as amended).

In addition to the above regulations, this boiler must be installed in compliance with:

- Current I.E.E. Regulations for electrical installations
- Local building regulations
- The Building Standards (Scotland)
- (Consolidation) Regulations
- By-laws of the local water undertaking
- 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. BS 5440 Pt 1 and 2, BS 5449, BS 5546, BS 6798, BS 6891 and BG.DM2.

Lawfully all gas appliances must be installed by competent persons (e.g. Corgi, ACOPS).

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.

Important:

The Remeha Gas 550/550 Duo is a certified appliance and must not be modified or installed in any way contrary to these 'Installation and Servicing Instructions'. Manufacturer instructions must NOT be taken in any way as when overriding statutory obligations.

5 TYPICAL BOILER INSTALLATIONS

5.1 Installation 1

Recommended layout for boiler installation, measurements in mm.

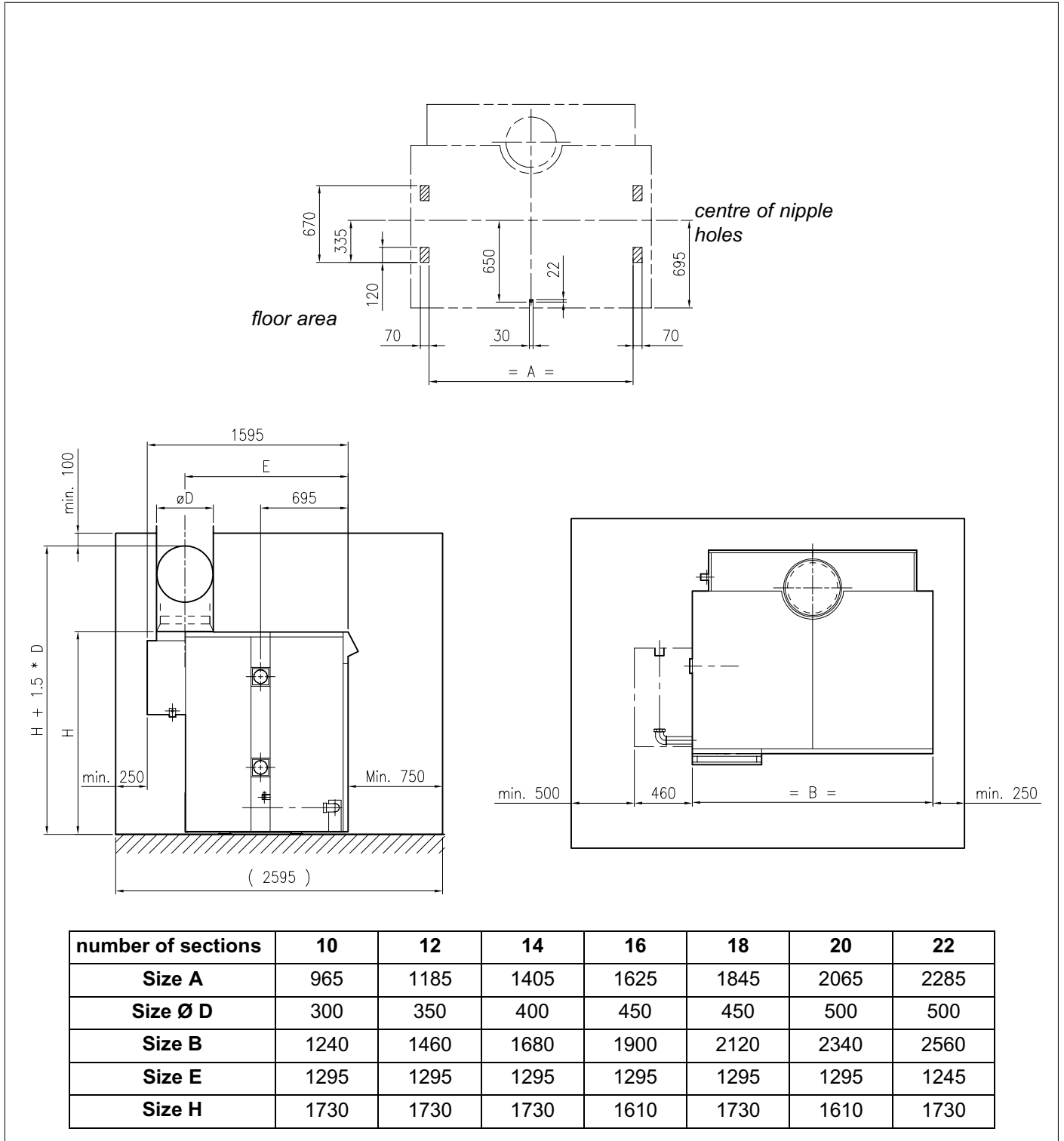


Fig. 03 Remeha Gas 550

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5.2 Installation 2

Recommended layout for boiler installation, measurements in mm.

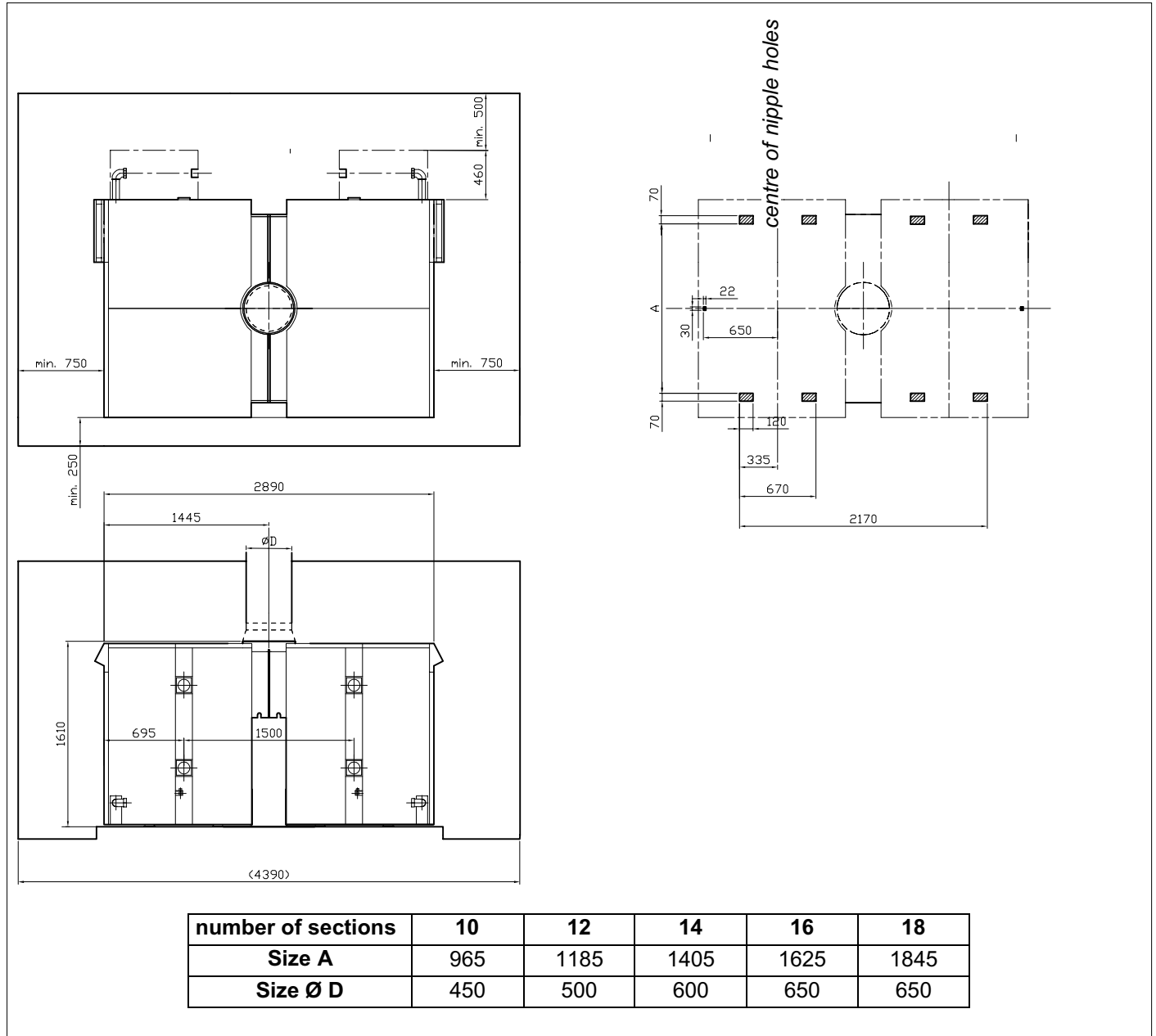


Fig. 04 Remeha Gas 550 Duo

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6 CONTROL AND SAFETY EQUIPMENT

6.1 General

The Remeha Gas 550 is supplied with electronic control and safety equipment with ionisation flame detection.

6.2 Instrument panel

The Remeha Gas 550 is supplied with an instrument panel mounted in the front of the boiler, either left or right. All connections are pre-wired and fitted with plugs. The capillaries from the instrument panel should be fitted in the thermostat pocket of the boiler flow connection, which is fitted in the top front of the end section.

The instrument panel and the flow connection with thermostat pocket should always be fitted on the same side of the boiler, either left or right.

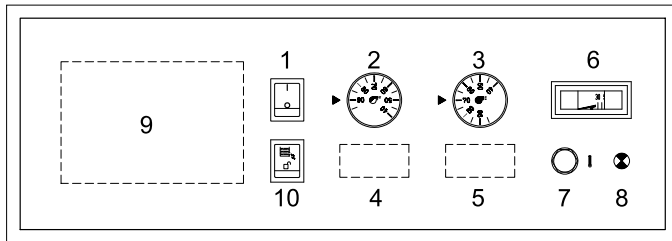


Fig. 05 Instrument panel

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The instrument panel contains:

1. Operating switch (On/Off);
2. Control thermostat On/Off, range 35°C-95°C;
3. Control thermostat High-Low, range 35°C-95°C;
4. Hour run meter total running hours (option);
5. Hour run meter full load hours (option);
6. Analogue thermometer for flow temperature;
7. High – limit thermostat preset to 110°C;
8. Lock out warning lamp;
9. Option for **rematic**® weather compensator;
10. Reset for water level control.

The Instrument panel mounted in the front casing also contains circuit boards for:

- Water level control (see §9.6);
- Common alarm and operating signal.

6.3 Standard electronic gas train High/Low

6.3.1 Schematic

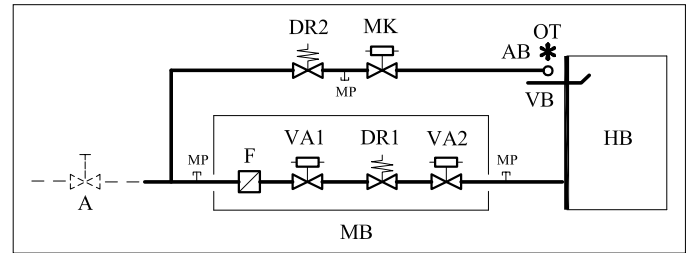


Fig. 06 Schematic layout gas train

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Legend

- A Gas cock
- AB Pilot burner
- DR Gas pressure regulator
- F Gas filter
- HB Burners
- MK Pilot gas valve
- MP Measuring point
- VA Safety shut off valve
- OT Ignition transformer
- VB Ionisation probe
- MB Gas multibloc valve
- - - Not supplied as standard

6.3.2 Control panel on gas train

The instrument panel is linked to the control panel on gas train by means of a cable and connector. If required the control panel (and gas train) can be fitted on the opposite side of the boiler by using extension cables (option).

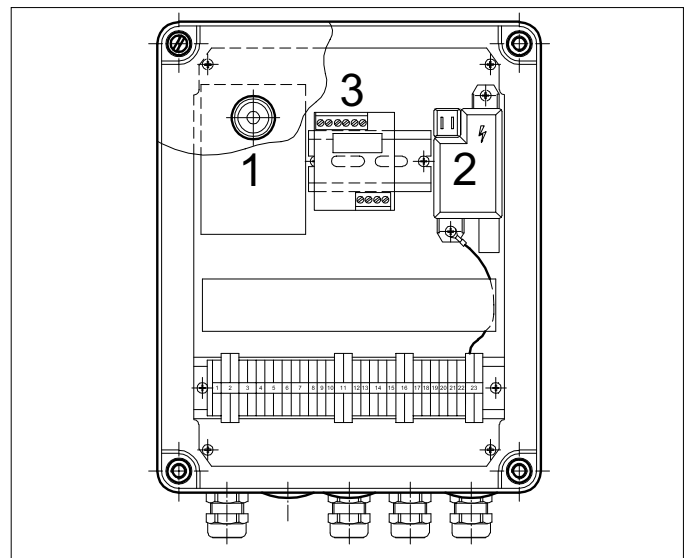


Fig. 07 Front of Control panel

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1. Control box Satronic MMI 816;
2. Ignition transformer Satronic ZT 870;
3. Operation report circuit board.

6.3.3 Specification control box

Control box	: Satronic MMI 816
Main supply	: 230 V – 50 Hz
Minimum ionisation current	: min 3 μ A (DC)
Reaction time flame protection	: 1 sec.
Safety time	: \leq 10 sec.
Maximum ambient temperature	: 60 °C

Injector size pilot burner	: \varnothing 1.0 mm
Injector size main burner	: \varnothing 5.4 mm
Burner pressure full load (high calorific gas)	: 8.4 mbar (100%)
Burner pressure part load (high calorific gas)	: 2.2 mbar (50%)
Burner pressure pilot burner (high calorific gas)	: 13 mbar

Warning: control box is phase neutral sensitive.

6.3.4 Specification Ignition transformer

Ignition transformer	: Satronic ZT 870
Ignition voltage	: 16 kV
Distance electrodes	: 3,5 \pm 1 mm.

6.4 Functions

General

The following functions (standard and optional) will, when activated, either lock out or shut down the boiler. For all options full fitting instructions are included in the option pack.

6.4.1 Flame control (lock out)

The flame is monitored using ionisation flame detection. In the event of a flame failure the boiler will lock out. Manual intervention is required to reset the boiler (on the control panel) once the cause of the problem has been rectified.

Note: The Gas 550 Duo has two sets.

6.4.2 Thermostats (shutdown / lock out)

- **Control thermostat On/Off:** shutdown (35°C-95°C);
The boiler will automatically resume operation when the flow temperature falls below the set point.
- **Control thermostat High/Low:** shutdown (35°C-95°C);
The boiler will automatically resume operation when the flow temperature falls below the set point.
- **High Limit thermostat:** lock out at 110°C.
The boiler will lock out. Manual intervention is required to reset the boiler (on the instrument panel) once the cause of the problem has been rectified.

Note: The Gas 550 Duo has two sets.

6.4.3 Water level control (lock out)

The boiler is equipped with a water level sensor to prevent boiler from operating without water. The boiler will lock out. Manual intervention is required to reset the boiler (on the instrument panel) once the cause of the problem has been rectified.

Note: The Gas 550 Duo has two sets.

6.4.4 Valve leakage control - optional (lock out)

The gas train can be combined with a valve leakage control, which checks for gas leakage between the valves at every start. The boiler will lock out. Manual intervention is required to reset the boiler (on the valve leakage control) once the cause of the problem has been rectified.

Type: Dungs VPS 504.

Note: The Gas 550 Duo requires two sets.

6.4.5 Gas pressure switch LD - optional (shut down)

If the supply gas pressure drops below the set value (12mbar; for natural gas, cat. I_{2H} only), the boiler will shut down. When the supply gas pressure returns above this set value the boiler will resume operation again.

Type: Dungs GW50 A5.

Note: The Gas 550 Duo requires two.

6.4.6 Gas pressure switch HD - optional (lock out)

If the gas arrival pressure rises above the set value (10mbar; for natural gas, cat. I_{2H} only), the boiler will lock out. Manual intervention is required to reset the boiler (on the gas pressure switch) once the cause of the problem has been rectified.

Type: Dungs UB 50 A2.

Note: The Gas 550 Duo requires two.

6.4.7 Down draught thermostat; (optional, shut down)

If the temperature in the draft diverter rises above the down **draught** thermostat set point, the boiler will shut down. It automatically resets after 3 minutes, provided that the temperature also falls.

Type: Honeywell L6068A; fixed setpoint is 70°C.

Note: The Gas 550 Duo requires two.

7 ASSEMBLY AND INSTALLATION GUIDELINES

7.1 General

The boiler is suitable for operating at a maximum working pressure of 6 bar. It can be installed in open vented or sealed systems with a minimum pressure of 0.8 bar sealed and 0.3 bar open vented.

7.2 Boiler assembly

The boiler is supplied with full assembly instructions. On request special assembly tools can be hired from Broag on a daily basis.

However, Broag (or a Broag approved boiler erection engineer) can provide boiler assembly services and / or building supervision.

7.3 Water connections

The boiler flow and return connections can be fitted on either side of the boiler (left or right hand side) dependant on design or site conditions.

The boiler comes with four flanges, 2 x blank and 2 x Ø 107 mm (int.) weld neck.

The end sections have a 3/4 " BSP tapping to accept the supplied drain cock.

Note: The Gas 550 Duo has two sets.

7.4 Pocket for the thermostat capillaries

The multi pocket for the thermostat capillaries should be fitted in the top front-end section of the boiler and on the same side of the boiler as the instrument panel. The water level control electrode should be fitted in the 1" tapping of the other end section.

Note: The Gas 550 Duo has two sets.

7.5 Water pressure

Each section is hydraulically tested at 10 bar. Maximum test pressure for the assembled boiler block is 7.8 bar. Minimum working pressure is 0.8 bar at a maximum working temperature of 110°C or 0.3 bar at a maximum working temperature of 95°C. Maximum working pressure is 6 bar.

8 GAS SUPPLY

8.1 General

The instrument panel (mounted in the front casing) must be mounted on the same side of the boiler as the flow connection, either left or right (choice on assembly). As standard the gas train must also be on the same side as the flow connection. However an extension cable can be supplied (option) to allow the gas train to be mounted on the opposite side to the instrument panel.

The local Gas authority should be consulted to ensure that an adequate pressure and supply is available at the boilers maximum output. To minimise risk of sediment or foreign particles entering the control valves, an approved filter can be fitted into the pipe system downstream.

The gas supply should be conforming to the British Gas safety regulations.

Note: The Gas 550 Duo requires two gas supplies.

8.2 Gas pressure

Natural gas, cat. I_{2H} (20mbar)

Maximum gas pressure at inlet 100 mbar.

Main burner pressure settings :

- full load : 8.4 mbar

- part load : 2.2 mbar

Pilot burner pressure settings : 13 mbar

Gas inlet pressure : 17 - 25 mbar

8.3 Injectors

Injector size main burner : 5.4 mm

Injector size ignition burner : 1.0 mm

Note: The Gas 550 Duo has two sets.

9 ELECTRICAL SUPPLY

9.1 General

The electrical installation must conform to the IEE regulations and also to local authority requirements.

9.2 Instrument panel

The Gas 550 is supplied with an instrument panel that is fitted in the front of the boiler, either left or right (dependant on flow and gas connection).

Note: The Gas 550 Duo has two instrument panels and requires two sets of power supplies.

9.3 Control panel

A control panel is fitted on the gas train.

Note: The Gas 550 Duo has two control panels and requires two sets of operating controls and has two sets of function indication.

9.4 Electrical connections

The boiler is pre-wired. Only the main supply should be wired to the instrument panel.

9.5 Electrical information

Main supply : 230 V-50 Hz (L/N)
Running current : 150 VA
Maximum fuse : 6 A (slow acting)

Note: The Gas 550 Duo requires two sets of power supplies.

9.6 Water level control

Water level control : Dungs DWEB 53E
Main supply : 230 V – 50 Hz
Running current : 5 W
Electrode voltage : 42 V (AC)
Working area : 100 – 10.000 mA (AC)
Electrode resistance : max. 20 kOhm; min. 1 kOhm
Electrode : Dungs FLE ½”

Must be fitted in one of the end sections (see 7.4).

Note: The Gas 550 Duo has two sets.

9.7 Wiring diagrams

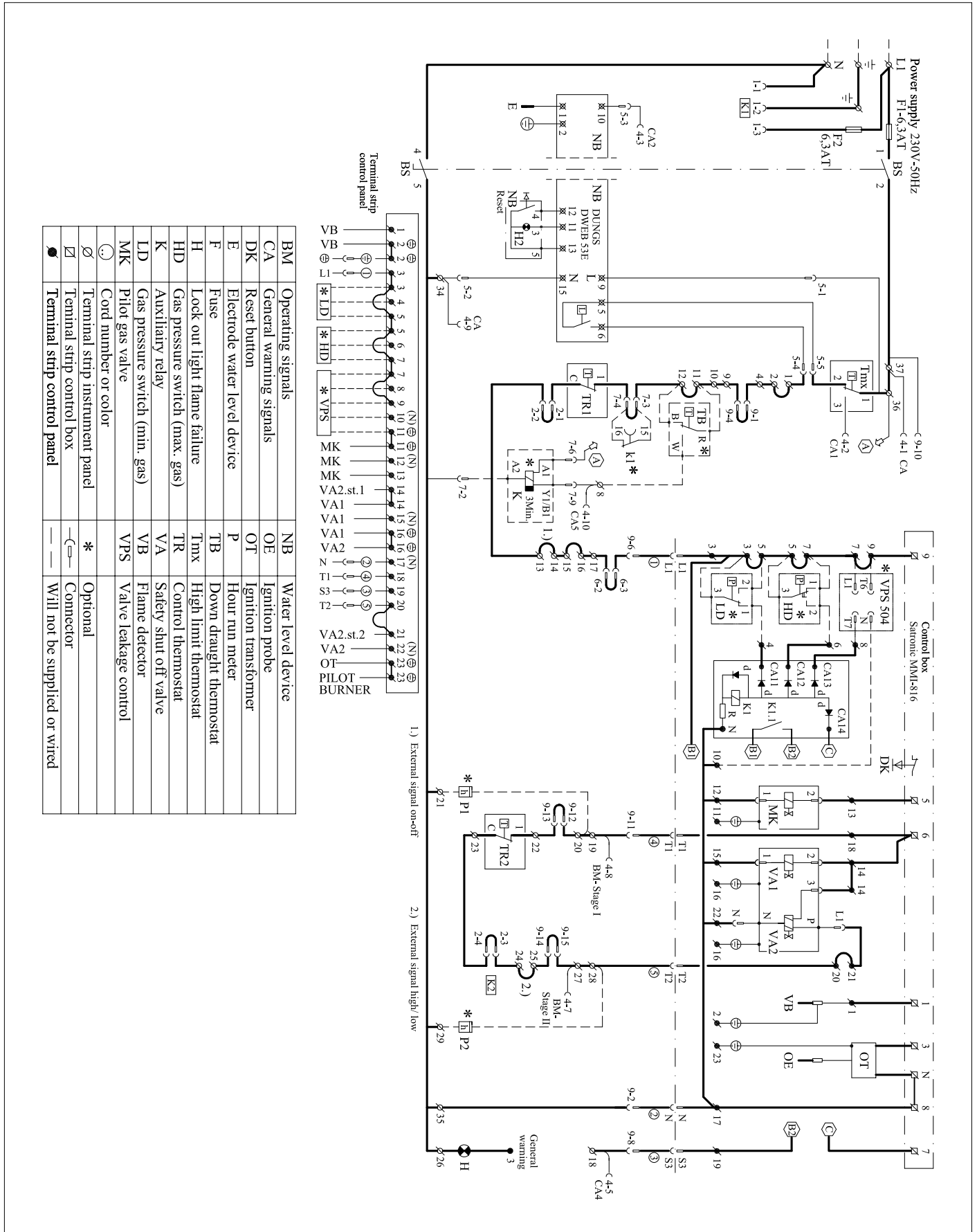


Fig. 08 Electrical principle diagram

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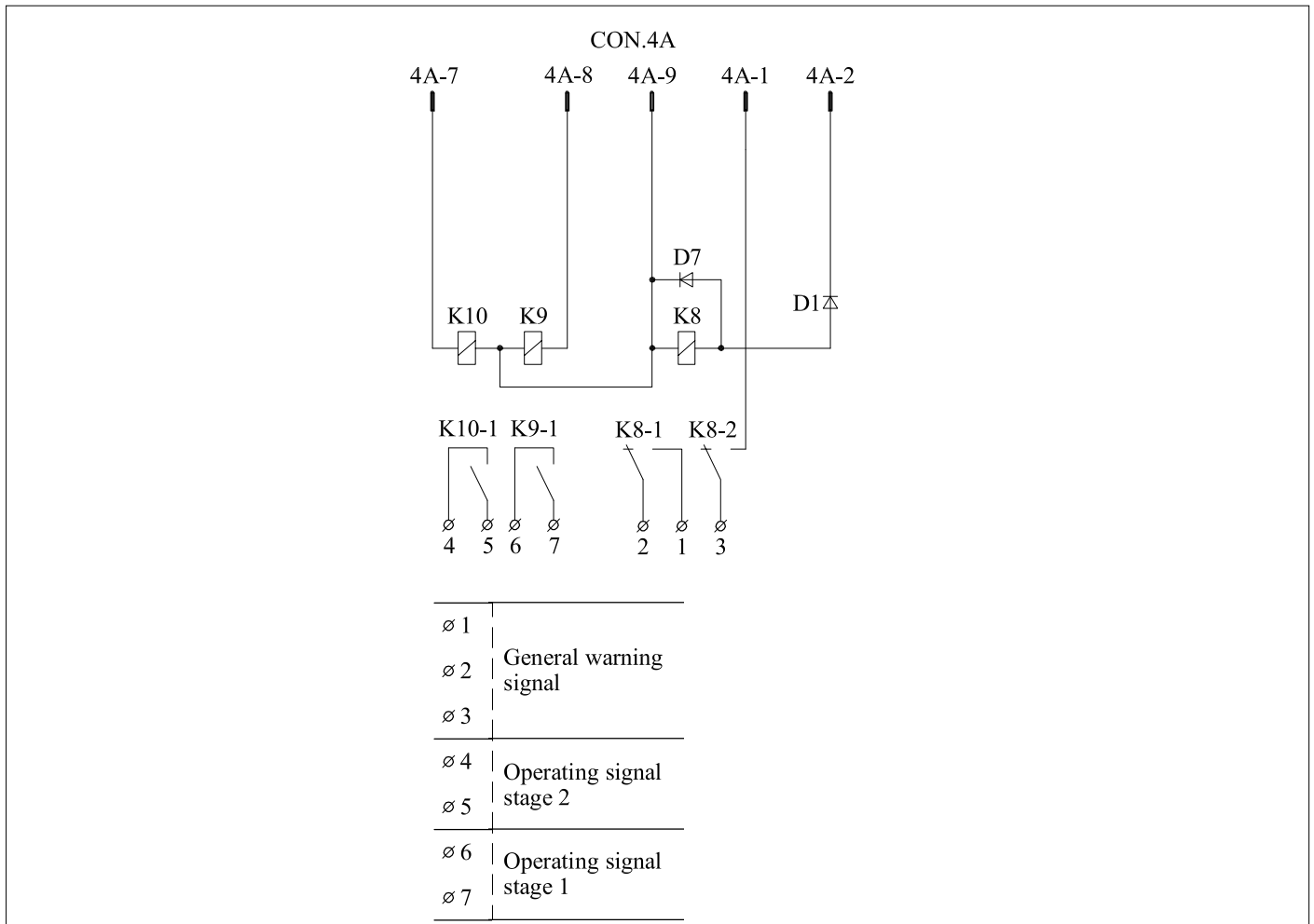


Fig. 09 Electric connection central alarm

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10 COMMISSIONING

Note: Commissioning must only be carried out by a qualified engineer with the relevant training and certification i.e. Acops - Corgi. A commissioning data sheet / boiler logbook must be completed on site for issue to owner.

1. Check the gas connections.
2. Check the electrical supply (L/N and earth).
3. Check the water connections and whether the installation is full and under system pressure.
4. Switch on the circulation pump and check the rotation direction.
5. Open the main gas cock (purge gas pipeline).
6. Switch on the electrical supply.
7. Set both the thermostats to about 85°C.
8. If a control system is built in, put the selector switch on manual operation.
9. Switch on the boiler.
 - If a **valve leakage control** is installed the following will take place:
A membrane pump will create overpressure between safety valves VA1 & VA2, which are inside the multibloc gas valve. When, within 27 sec, an overpressure of 30 mbar (compared to the inlet pressure) is reached, the electric supply is released to the control box.
10. After a waiting time of about 13 seconds the ignition starts. The magnetic valve MK opens and ignition burner lights. At a minimum ionisation current of 3 µA the ignition stops. After 5 seconds the main gas valves VA1 en VA2 will open. The boiler runs.
11. Let the boiler run for a couple of minutes on high fire to clear any air still in the gas pipe.

12. Set the correct **full load burner pressure** by means of the pressure regulator on the gas multibloc gas valve (see Fig. 10, pos. 1).

Warning: When the required burner pressure cannot be reached because of low inlet pressure, ensure that the pressure regulator remains within its operating range.

Now do the following:

- Set the burner pressure to the highest possible value (but not over the required full load burner pressure).
- Turn the pressure regulator anticlockwise until the burner pressure is affected.
- The burner pressure is now limited, this will prevent the boiler from being over gassed should the inlet gas pressure increase.

13. Set the correct **part load burner pressure:**

- Turn the high/low thermostat to its minimum setting (35°C). When the flow temperature is over 35°C, the boiler will burn at part load.
- Set the part load burner pressure by turning the adjustment ring (Fig. 10, pos. 2).
- To check the high fire setting: Turn the high/low thermostat to 85°C and check the full load burner pressure (if necessary re-adjust). The speed of opening of the main gas valve can also be adjusted to ensure a smooth light up. Setting the hydraulic brake on the main gas valve as follows:
 - Remove the setting cap (Fig. 10, pos.3) and turn it upside down on the hydraulic brake.
 - Turn it clockwise to slow down, anticlockwise to speed up.
 - Check both burner pressures again and if necessary re-adjust.

14. Adjustment of the **gas pressure switch LD** (optional):

- Switch the boiler to full load.
- Connect a pressure gauge to measuring point LD.
- Turn the adjustment disc of the pressure switch to its minimum setting.
- Now close the main gas cock slowly until the inlet pressure drops to the value detailed in the documentation supplied with the gas pressure switch.
- Slowly turn the adjustment disc of the pressure switch until the pressure control operates.
- The control box shuts down the gas supply and will restart.

15. Adjustment of the **gas pressure switch HD** (optional):

- Switch the boiler to full load.
- Connect a pressure gauge to manifold.
- Set the pressure switch to the value detailed in the documentation supplied with the gas pressure switch.
- Check whether the gas pressure switch HD comes to action at the set value by increasing (Fig. 10, pos.1) the full load burner pressure to that value. The boiler will lock out.
- Reset by pressing the reset button on the gas

pressure switch HD. The boiler will resume operation.

- Set the correct full load burner pressure again according to §10.2.12.

16. **Valve leakage control** (optional)

- Remove plug Pa during boiler start up (see §10.2.9). The plug Pa is located opposite the valve leakage control on the multibloc. The boiler will lock out.
- Reset by pressing the reset button on the valve leakage control. The boiler will resume normal operation.

17. Check the **thermostats** for the correct operation setting.

18. Check the **flame control on the control box**

- Start the boiler with disconnected ionisation probe, after the ignition phase the pilot gas valve must close. The boiler will lock out.
- Reset by pressing the reset button on the control box.
- Then disconnect the ionisation probe during operation, the pilot gas valve must close immediately. The boiler will lock out.
- Reset by pressing the reset button on the control box.

19. **Water level control:**

- Check the water level.
- Check the operation of the water level control by disconnecting the electrode. The boiler should go to lock out
- Create a shortcut between the electrode and earth. The boiler should go to lock out
- Reset by pressing the reset button on the instrument panel. The boiler will resume operation

20. Check the **down draft thermostat** by pressing the bimetallic strip on the thermostat. The boiler will shut down for 3 minutes. After that the boiler will resume operation.

21. Send the initial commissioning report CE to Broag.

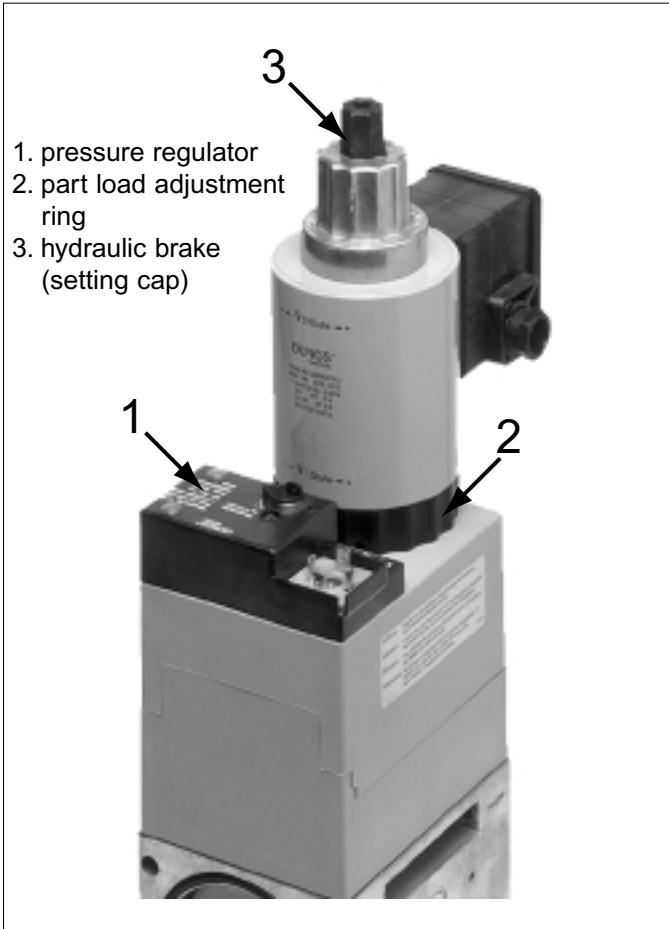


Fig. 10 Dungs MB-ZRDLE 415 / 420 S22.

10.1 Switching off the boiler

1. Switch off the electric supply.
2. Shut off the gas cock.

Warning: When switched off and full of water the boiler could be damaged if the temperature falls below freezing point.

Note: Commissioning must only be carried out by a qualified engineer with the relevant product training and certification i.e. Acops - Corgi. A commissioning data sheet / logbook must be completed on site for issue to owner.

11 MAINTENANCE

To maintain maximum efficiency it is essential to service the boiler, check safety parameters and re-set combustion once a year.

Normal Service Maintenance

- Isolate power, controls and gas supply.
 - Remove front, top casings and flue hood covers.
 - Remove gas manifold.
 - Remove the burners and floor plates.
 - Clean the internal flue ways of the boiler.
 - Clean the floor underneath the boiler and boiler room.
 - Clean the burners internally and externally using a soft brush.
 - Clean the gas train, ignition, pilot burner, thermostats and wiring.
 - Check and re-set/re-place ignition electrode and ionisation probe as found necessary.
 - Re-assemble boiler.
 - Check ignition and ionisation cables for connections and continuity.
 - Restore power, controls and gas supply.
 - Check start program, ignition time and safety times.
 - Check flame protection and thermostats.
 - Check boiler input at 100% (full load) and 50% (part load) load.
- Carryout a combustion efficiency test.
 - Check the boiler and immediate installation connections for water leaks (seals).
 - Check gas train and gas pipe for gas leaks.
 - Check flue connections.
 - Clean boiler casings.
 - Complete a commissioning report.

12 TROUBLE SHOOTING

Switch diagram		↻ Start						
		blue	orange	yellow	red	yellow	green	white
Normal start	Waiting time control box	[Bar]						
	Ignition			[Bar]	[Bar]			
	MK			[Bar]	[Bar]	[Bar]		
	VB			[Bar]	[Bar]	[Bar]	[Bar]	
	VA1			[Bar]	[Bar]	[Bar]	[Bar]	
	VA2 stage low			[Bar]	[Bar]	[Bar]	[Bar]	
	VA2 stage high			[Bar]	[Bar]	[Bar]	[Bar]	
	seconds	13	3	10	5	10	35	4
	Disturbances	Early flame			[Bar]	[Bar]	[Bar]	[Bar]
No ionisation VB				[Bar]	[Bar]	[Bar]	[Bar]	

Fig. 11 Switch diagram

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Switch diagram		↻ Start						
		blue	orange	yellow	red	yellow	green	white
Normal start	Waiting time control box		[Bar]					
	Ignition			[Bar]	[Bar]			
	Waiting time valve leakage proof system	[Bar]						
	MK			[Bar]	[Bar]	[Bar]		
	VB			[Bar]	[Bar]	[Bar]	[Bar]	
	VA1			[Bar]	[Bar]	[Bar]	[Bar]	
	VA2 stage low			[Bar]	[Bar]	[Bar]	[Bar]	
	VA2 stage high			[Bar]	[Bar]	[Bar]	[Bar]	
	seconds	27	13	3	10	5	10	35
Disturbances	Valve leakage		[Bar]	[Bar]	[Bar]	[Bar]	[Bar]	
	Early flame			[Bar]	[Bar]	[Bar]	[Bar]	
	No ionisation VB			[Bar]	[Bar]	[Bar]	[Bar]	

Fig. 12 Switch diagram with valve leakage control (optional)

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12.1 Fault causes

In case of all disturbances the gas supply is interrupted and the color disc stops rotating.

Check the position of the color disc for a indication of the cause. The color disc is situated at the side of the control box.

Indication mark at:	Possible cause:
end of green zone; (no rotation of color disc)	- no tension - no heat demand
end of yellow zone; begin of red zone	- no flame (signal) of pilot burner - no spark
red zone	failing or unstable flame of pilot burner
end of yellow zone; begin of green zone	no flame (signal) of main burner
Green zone; end of green zone	failing or unstable flame of main burner

Table 03 Trouble shooting



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