



OR broag - remeha

Advanced boiler technology

Technical information
Remeha P 200

R e m e h a P 2 0 0

- Pressurized boiler
- Heat output: 59 - 256 kW



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PREFACE

These technical instructions contain useful and important information for the correct operation and maintenance of the Remeha boiler, model P200

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 DESCRIPTION OF THE UNIT

1.1 General

High efficiency pressurized boiler, suitable for use with natural gas and light oil, by means of a pressure jet burner. Also available with a condensing unit (ECO) (for natural gas only).

Up to 141 kW (7 sections) the Remeha P 200 can be delivered assembled (except for casing and instrument panel).

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

- Gas appliance directive no. 90/396/EEC
- Electrical low voltage directive no. 73/23/EEC
- E.M.C. directive no. 89/336/EEC
- Efficiency directive no. 92/42/EEC.

Classification type for evacuation of the combustion products: B23.

1.2 Burners

In principle all CE-approved pressure jet burners are suitable, subject to prior adjustment to the boiler capacity and boiler construction. The individual boiler satisfies inspection requirement for central heating boilers.

2 CONSTRUCTION DATA

2.1 General

The boiler block consists of cast iron sections which are assembled by means of tapered nipples. The boiler is a three pass design. The boiler block is insulated with a 80 mm thick layer of glass wool.

2.2 Sections

The sections are made of pearlitic cast iron.

Weights and measures of the sections:

- Front section: 59 kg H x W = 630 x 540 mm
- Intermediate section: 58 kg H x W = 630 x 540 mm
- Rear section: 61 kg H x W = 630 x 540 mm

2.3 Casing

Steel casing, finished with a high-quality insulation. The front door is suitable for left or right opening as desired.

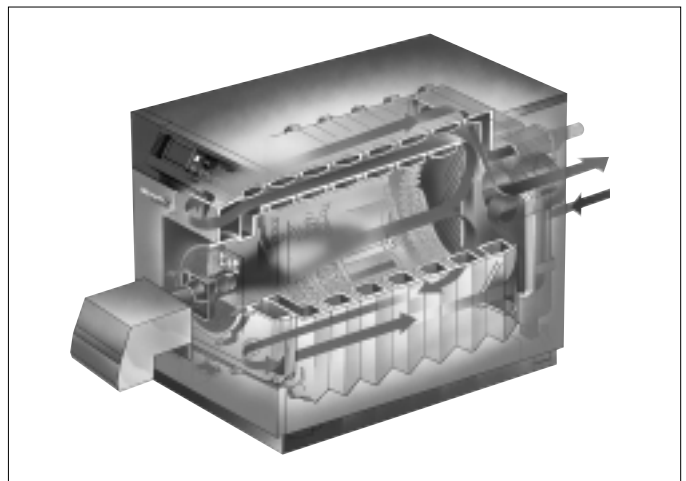


Fig. 01 Remeha P200

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3 TECHNICAL DATA AND DIMENSIONS

3.1 Dimensions

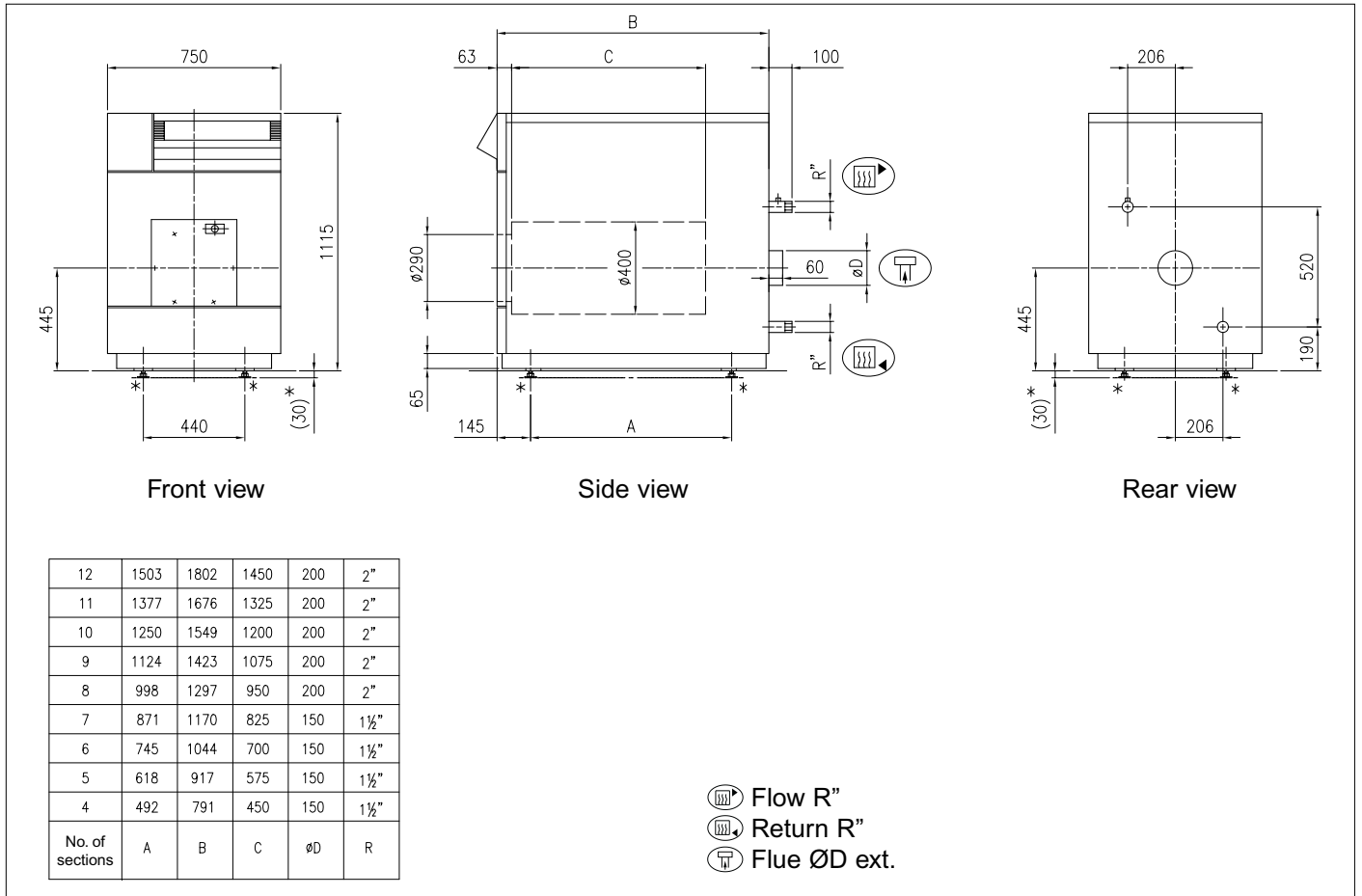


Fig. 02 Dimensions

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* If the boiler is delivered with adjustable feet (standard for assembled delivery 4 to 7 sections) the boiler will be approximately 30 mm higher.

3.2 Technical data

Number of sections			4	5	6	7	8	9	10	11	12
Nominal heat output		kW	34 - 59	40 - 93	46 -117	52 -141	58 -165	65 -184	71 -206	77 -229	83-256
Nominal heat input	Hi / NCV	kW	66	103	129	155	181	202	225	250	278
	Hs / GCV	kW	73	114	143	172	201	224	250	278	309

Dimensions	A	mm	492	618	745	871	998	1124	1250	1377	1503
	B	mm	791	917	1044	1170	1297	1423	1549	1676	1802
	C	mm	450	575	700	825	950	1075	1200	1325	1450
	ØD	mm	150	150	150	150	200	200	200	200	200
	R	"	1½"	1½"	1½"	1½"	2"	2"	2"	2"	2"
Water resistance	Δ t = 10°C	mbar	9	22	34	48	67	84	103	127	158
	Δ t = 20°C	mbar	2	5	8	12	17	21	26	32	39
Water contents		litre	24	29	34	39	44	49	54	59	64
Boiler weight (dry)		kg	365	425	485	545	605	665	725	775	835
Combustion chamber resistance¹⁾		mbar	0.1	0.3	0.6	1.0	1.2	1.6	1.4	1.8	2.1
Combustion gas side content		m ³	0.08	0.11	0.13	0.16	0.18	0.21	0.23	0.26	0.28
Flue gas flow rate		kg/h	103	161	201	242	282	315	351	390	434

Table 01 Technical data

¹⁾ Determined with 20 % excess air.

3.3 Quotation specifications

- Heat exchanger manufactured from corrosion resistant "pearlite" cast iron
- Maximum operating pressure of 6 bar
- Maximum operating temperature of 95°C
- Sectional design with three passes for max efficiency (gross 83%) and a generously sized combustion chamber for minimising NOx production
- Water cooled base and rear sections
- Large insulated door (hinged left or right) allowing easy access for service operations
- Supplied in broken down form for ease of delivery and site access
- Powder coated enamel steel casing
- 80 - 100 mm thick glass wool insulation
- Suitable for use with a Natural gas, and/or 35 sec oil fired pressure jet burner (matched with most popular burner manufacturers)
- Supplied as standard with on/off switch, temperature indication, control and high limit thermostats
- Efficiency 83% (Hs - GCV)
- Manufactured to ISO 9001
- CE approved.

4 OUTPUT DATA

4.1 Boiler efficiency

Up to 91.7 % at Hi (82.6 % at Hs) at full load and up to 93.2 % at Hi (84.0 % at Hs) at part load.
Average water temperature 70°C (80/60°C).

4.2 Combustion efficiency

Up to 93.0 % at Hi (83.8 % at Hs) at full load and up to 95.5 % at Hi (86.0 % at Hs) at part load.

Note: Hi = NCV ; Hs = GCV

5 APPLICATION DATA

5.1 L.P.H.W. version

5.1.1 Water temperature

Maximum water temperature is 110°C.

The minimum acceptable return water temperature is, for gas fired boilers 45°C and for oil fired boilers 40°C, at a flow rate corresponding to a Δt of 20°C at nominal heat output.

5.1.2 Water pressure

Maximum pressure 6 bar.

The boiler is suitable for open and sealed systems up to a maximum pressure of 6 bar and a minimum pressure of 0.8 bar. The boiler is suitable for installation in basement or rooftop boiler houses.

5.1.3 Flow rate

The minimum flow rate through the boiler is obtained from the following formula:

$$\frac{\text{nominal heat output (kW)}}{70} = \text{m}^3/\text{h}$$

This minimum flow must be maintained for 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 requirement exists other than for over-temperature protection.

5.1.4 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.

5.2 Economisers

ECO's can be delivered upon request (for natural gas only).

5.3 Flue gas discharge

For the discharge of the flue gases, chimney draught is not required.

Tests have shown that very good combustion results are obtained with zero draught at the boiler outlet.

5.4 Noise production

The noise level taken at a distance of 1 m around the boiler is approximately 70 to 85 dBA. The noise level at the chimney outlet will, depending on load, type of burner and chimney situation, vary from 70 to 90 dBA, measured at a distance of 1 m from the outlet. If this noise production gives rise to problems in the immediate vicinity, then noise reducing or absorbing measures should be taken.

The values that have been measured are averages obtained from various measurements carried out at a distance of approximately 1 m around the boiler and at a height of approximately 1 m.

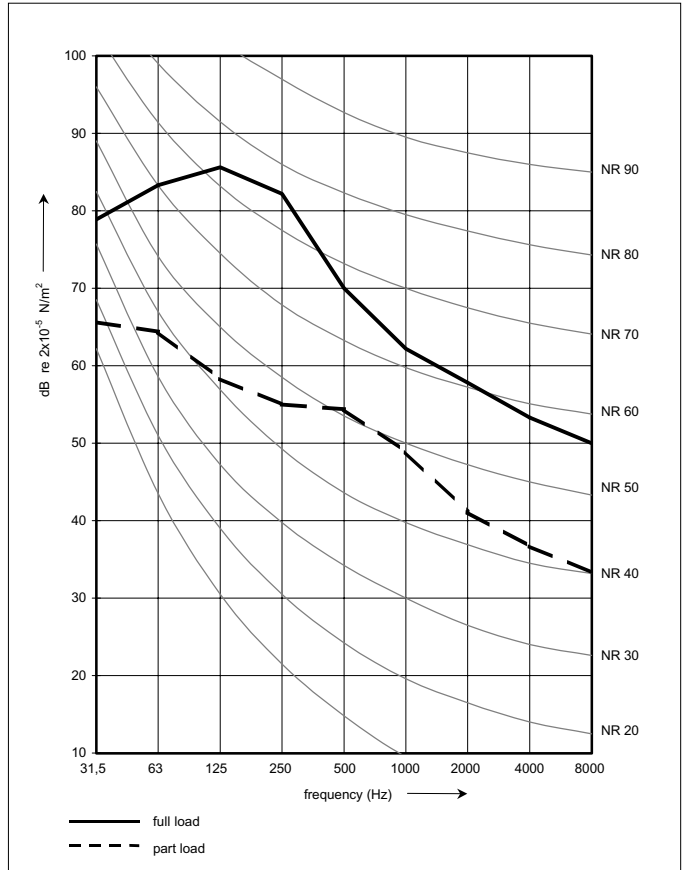


Fig. 03 Noise level readings without burner silencer

6 INSTALLATION REQUIREMENTS

6.1 Installation recommendations in the boiler house

The necessary minimum installation space of the boiler can be seen from Fig. 04

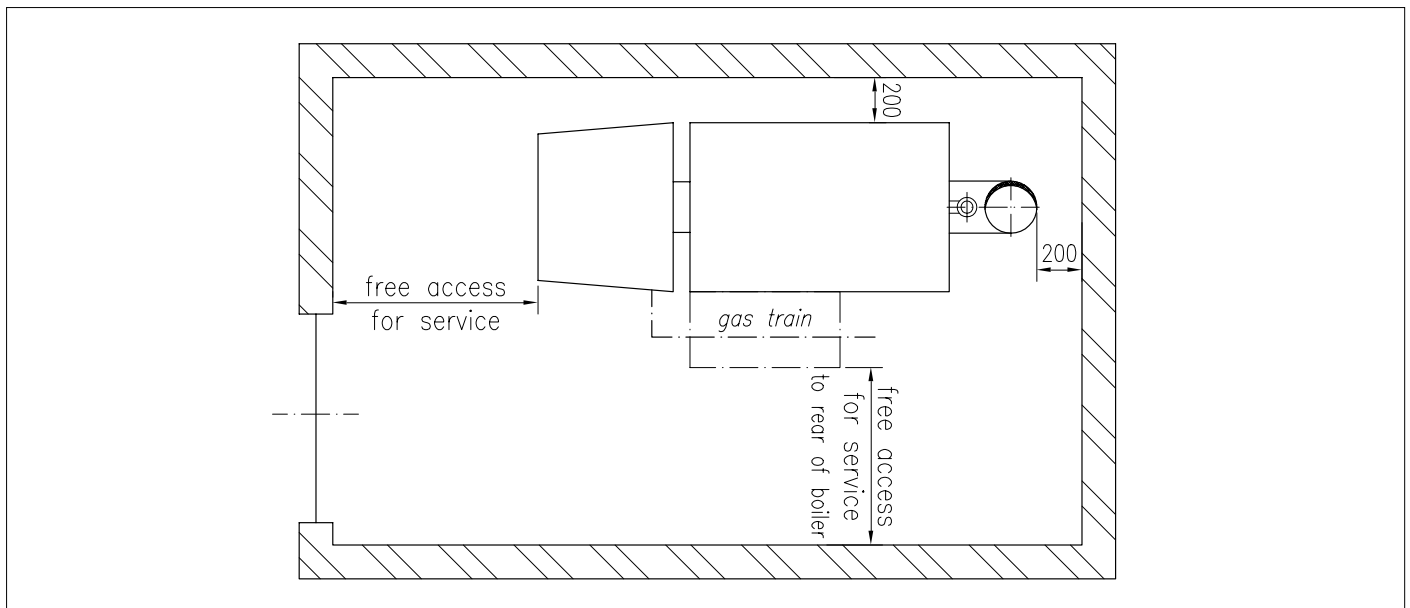


Fig. 04 Installation recommendations in the boiler house

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7 ASSEMBLY GUIDELINES AND INSTALLATION REQUIREMENTS

7.1 General

The Remeha boilers P 200 - 4 to 7 sections can be delivered in individual parts or assembled.

The Remeha boilers P 200 - 8 to 12 sections are delivered in individual parts.

7.2 Water connections

The water connections are at the rear of the boiler. The flow and return connections consist of threaded male connections:

- 4 - 7 sections 1 ½" BSP
- 8 - 12 sections 2" BSP

Flange connections in accordance with DIN 2633 can be delivered on request (Ø 70 mm ID). The return connection is provided with a G ¾" threaded hole in which a drain off cock is fitted.

At the front of the boiler a flange is provided with 3 x G ½" threaded holes for the fitting of the thermostat pockets.

7.3 Delivery in individual parts

7.3.1 General

The sizes of the boiler parts are such that they all can enter the boiler house through a normal entrance. The casing and equipment parts are delivered in packaged units. If necessary, the boiler can be put into operation without casing. The casing can be added at a later stage without dismantling the water connections. On request the boiler can be delivered with adjustable boiler feet (standard for assembled delivery 4 to 7 sections).

7.3.2 Boiler assembly

Assembly and installation of a boiler delivered in individual parts should only be undertaken by a recognized and approved engineer and in accordance with the assembly manual. Local regulations laid down by the relevant authorities must be adhered to.

7.4 Delivery assembled (4 to 7 sections only)

The boiler is delivered completely assembled in a crate and on a pallet. Just the casings and the instrument panel are delivered separate in package units in the crate. The boiler is delivered with adjustable boiler feet (Fig. 05). By unscrewing the boiler feet, the boiler lifts itself up from the pallet. The pallet can now be dismantled and taken away (Fig. 06). Now the boiler level can be adjusted horizontally and in the right height (Fig. 07). After the installation of the boiler, the casings and the instrument panel can be fitted (figure 08).

If necessary, the boiler can be put into operation without casing. The casing can be added at a later stage without disconnecting the water connections.

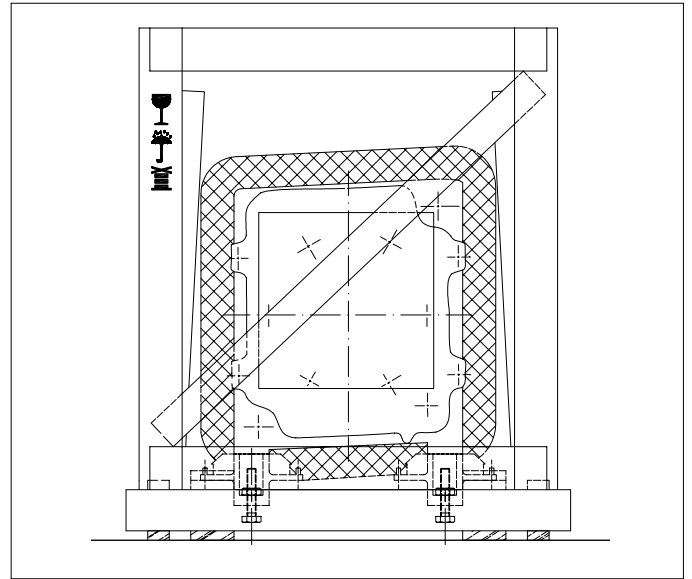


Fig. 05 The boiler completely assembled in a crate and on a pallet.

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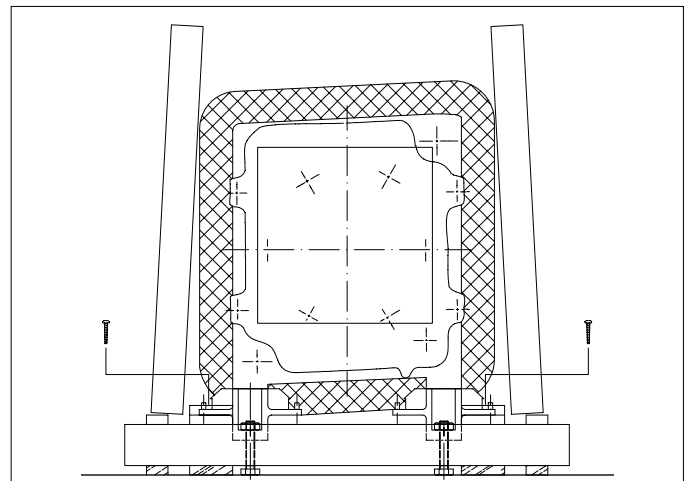


Fig. 06 The pallet dismantled and taken away

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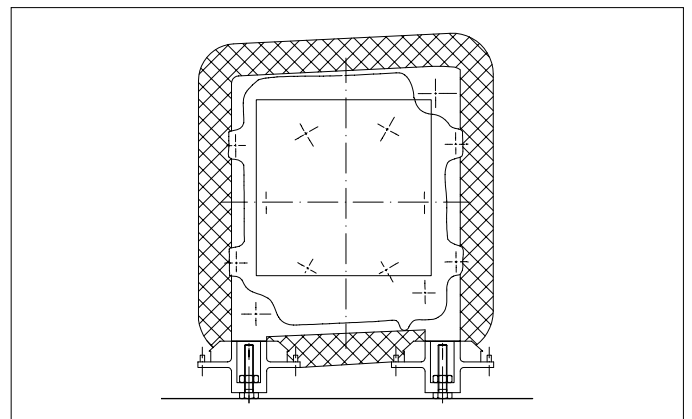


Fig. 07 The boiler adjusted horizontal and at the right height

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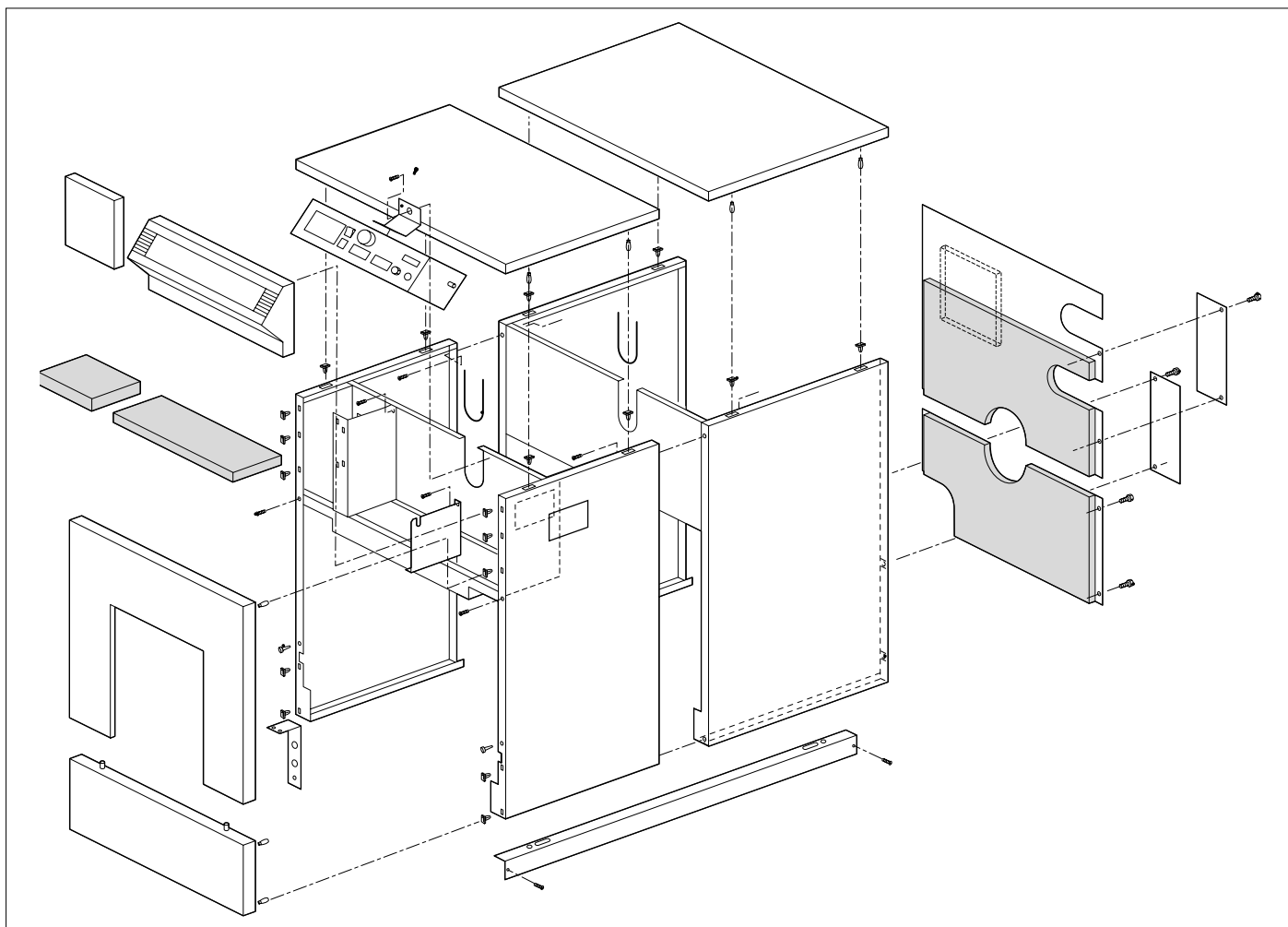


Fig. 08 Mounting casings and the instrument panel.

8 INSTRUMENT PANELS

8.1 Equipment contents

The panels contain all the necessary control and measuring instruments required to control the boiler. The connections have to be made on a terminal strip. The capillaries and sensor wires, which come from the control panel, are placed in the instrument pockets that are fitted at the front of the boiler.

See par. 8.2 for an instrument panel High/Low with hours run meters. Several extra options can be built into the panels.

Ask our technical department.

8.2 Instrument panel High/Low with hours run meters

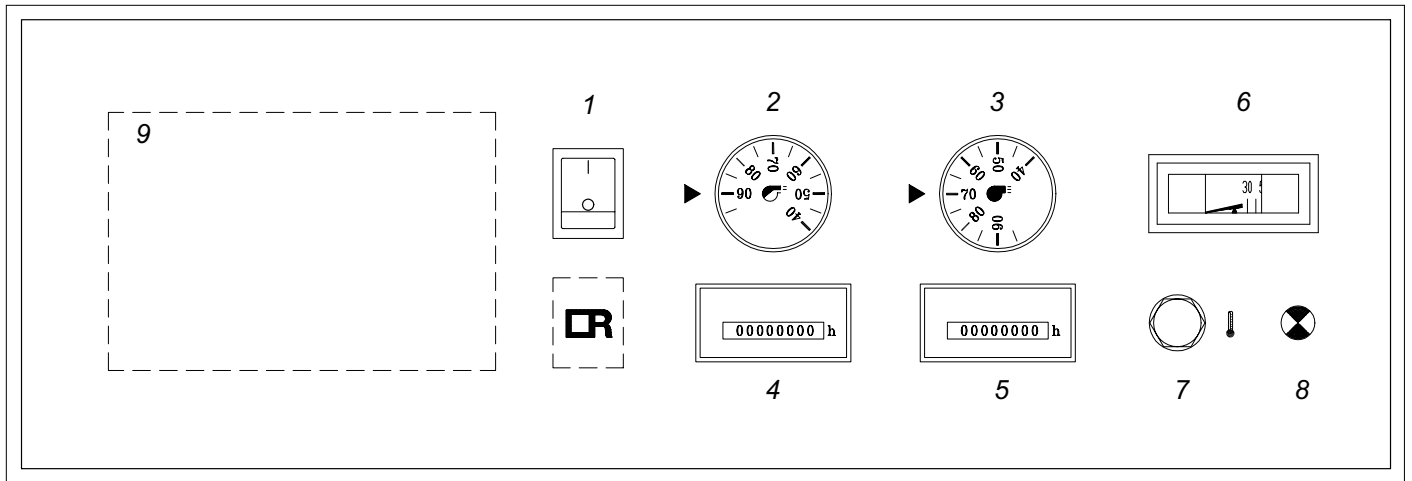
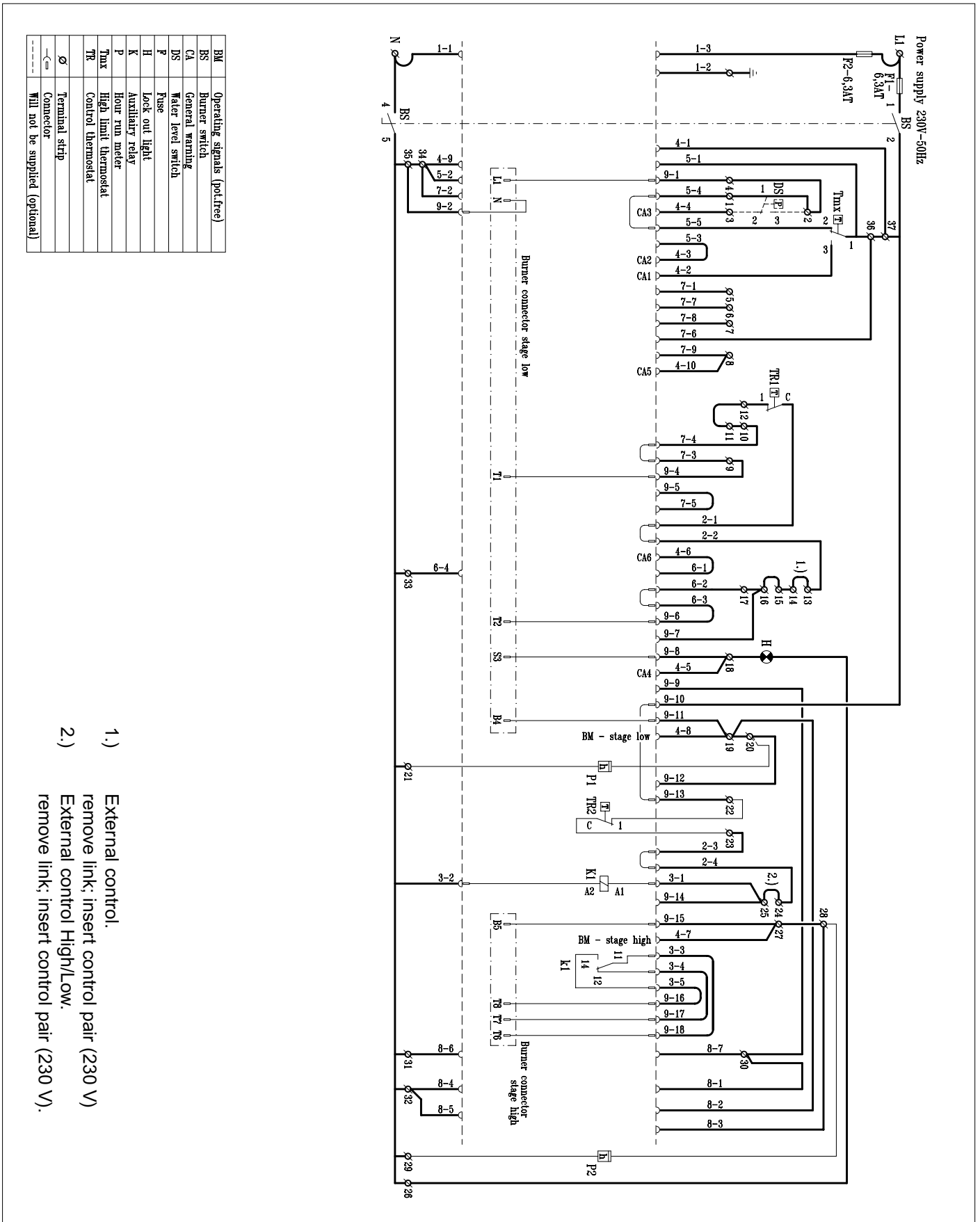


Fig. 09 Layout of the instrument panel High/Low with hours run meters

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1. Operating switch (On/Off)
2. Control thermostat; setting between 35°C - 95°C
3. High/Low thermostat; setting between 35°C - 95°C
4. Hours run meter total running hours
5. Hours run meter full load running hours
6. Analogue thermometer water temperature
7. High limit thermostat 110°C (lock out)
8. Lock out warning lamp
9. Option for **rematic**[®] weather compensator

8.3 Wiring diagram instrument panel High/Low with hours run meters



- 1.) External control.
remove link; insert control pair (230 V)
- 2.) External control High/Low.
remove link; insert control pair (230 V).

Fig. 10 Wiring diagram instrument panel High/Low with hours run meters

9 COMMISSIONING

Note:

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

9.1 Pressurized boiler with gas burner

9.1.1 Commissioning procedure

If the boiler is to be put into operation again following a period of non-use, then the following procedure must be carried out :

- Open the main gas cock.
- Switch the weather-compensator (if fitted) over to manual operation (☞).
- Turn the thermostats to their highest setting.
- Switch on the circulation pump.
- Switch on the main switch.
- Switch on the operation switch in the instrument panel.
- Consult burner manufacturers commissioning details.

Warning

If the instrument panel is fitted with a weather compensator, set the programm switch to 'manual' position (☞). The following will now take place:

- The gas burner fan will start running so that during the purging time the combustion chamber will be ventilated with the air damper fully opened.
- The air damper will then go into start position.
- Ignition flame lights up and is checked.
- Then the control box gives the all clear signal for the burner to switch over to full load.

9.1.2 Putting out of operation

It is sufficient to switch off the operation switch on the instrument panel. It is **important** that in the event of work being carried out on the burner, the boiler/burner unit must be completely electrically isolated and the main gas cock must be shut.

9.2 Pressurized boiler with oil burner

9.2.1 Commissioning procedure

If the boiler is to be put into operation again following a period of non-use, then the following procedure must be carried out :

- Open the main oil cock.
- Switch the weather-compensator (if fitted) over to manual operation (☞).
- Turn the thermostat to their highest setting.
- Switch on the circulation pump.
- Switch on the main switch.
- Switch on the operation switch in the instrument panel.
- Consult burner manufacturer commissioning details.

Warning

If the instrument panel is fitted with a weather compensator, set the programm switch to 'manual' position (☞). The following will now take place:

- The oil burner fan will start running so that during the purging time the combustion chamber will be ventilated with the air damper fully opened.
- The air damper will then go into start position.
- Ignition flame lights up and is checked.
- Then the control box gives the all clear signal for the burner to switch over to full load.

9.2.2 Putting out of operation

It is sufficient to switch off the operation switch on the instrument panel. It is **important** that in the event of work being carried out on the burner, the boiler/burner unit must be completely electrically isolated and the main oil cock must be shut.

10 FAULT FINDING

High Limit thermostat lock out:

- Check the water circulation (circulation pump). Reset the High Limit thermostat (Reset button is on the instrument panel under the cover cap of the High Limit thermostat).
- Advise the installer in the event of continued lock outs.

11 MAINTENANCE RECOMMENDATIONS

11.1 General

Depending on the operational conditions, the block and the burner must be checked and cleaned at least once a year for gas and at least twice a year for oil.

11.2 Maintenance instructions

Cleaning of the boiler:

- Put boiler out of operation.
- Open the front door, if necessary after dismantling the burner.
- Remove the retarders (only for the 4 - 9 sections).
- Clean the combustion chamber and flue passes using a suitable brush.
- Clean the removed retarders (4 - 9 sections).
- Remove the rear panel of the boiler and remove the cleaning cover (underneath the smoke box).
- Vacuum clean the boiler and the combustion chamber.
- Renew the front door seals after cleaning the boiler.
- Re-assemble the removed parts and close the front door.
- Re-assemble the burner (if dismantled).
- Check the boiler combustion side for leakage.
- Check the equipment for proper functioning and if necessary re-adjust the control and safety equipment.
- Carry out combustion analysis.
- Check the water connections.



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Subject to alterations
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Technical Information

Remeha P 300

Remeha P 300

- Pressurized boiler
- Heat output: 278 - 709 kW



remeha



Clean Heat

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Classification type for evacuation of the combustion products: B23.

1.2 Burners

In principle all pressure jet burners are suitable, subject to prior adjustment to the boiler capacity and boiler construction.

The individual boiler satisfies inspection requirement for central heating boilers.

2 CONSTRUCTION DATA

2.1 General

The boiler block consists of cast iron sections which are assembled by means of tapered nipples. The boiler is designed on the basis of the triple pass principle. The boiler block is insulated with a 100 mm thick layer of glass wool.

2.2 Sections

The sections are made of pearlitic cast iron. Weights and measures of the sections:

Section	Measures (H x W) mm	Weights kg
Front	1026 x 630	93
Intermediate	1026 x 640	106
Rear	1026 x 630	114

2.3 Casing

Steel casing, finished with a high quality insulation. The front door is suitable for left or right opening as desired.

3 TECHNICAL DATA AND DIMENSIONS

3.1 Dimensions

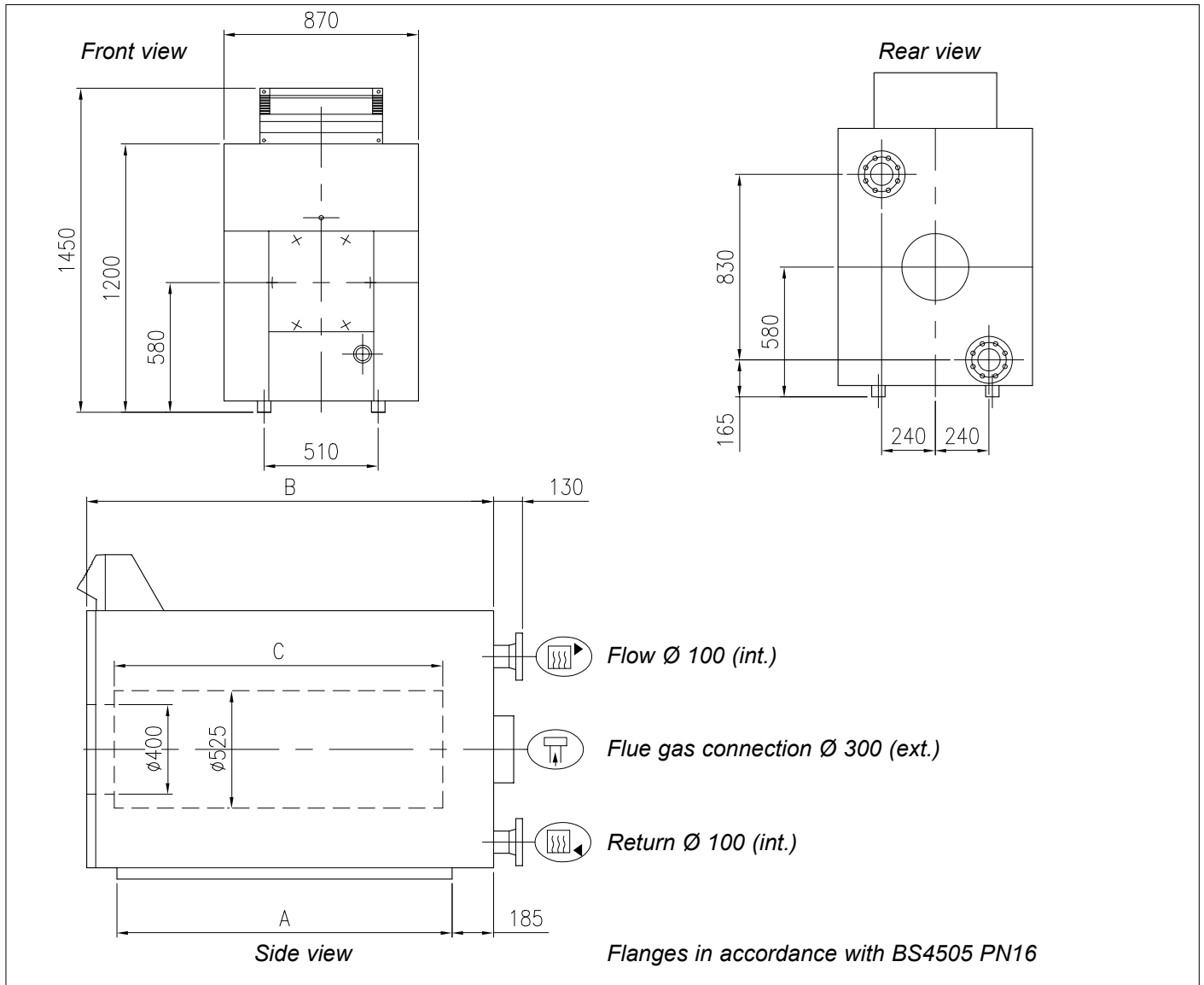


Fig. 01 Dimensions of the Remeha P 300

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No. of sections	Sizes			Weight (dry) approx.
	A	B	C	
	mm	mm	mm	kg
8	1200	1520	1170	1040
9	1350	1670	1320	1145
10	1500	1820	1470	1250
11	1650	1970	1620	1355
12	1800	2120	1770	1460
13	1950	2270	1920	1565
14	2100	2410	2070	1670
15	2250	2560	2220	1775
16	2400	2710	2370	1880

3.2 Technical data

No. of sections	Output	Nominal heat input		Combustion chamber resistance*	Combustion gas side contents	Gas rate**	Waterresistance		Water contents	Flue gas flow rate
		kW	kW-GCV				kW-NCV	mbar		
8	106 - 278	345	311	1.1	0.43	33	11	45	146	485
9	128 - 331	410	369	1.4	0.48	39	14	56	163	576
10	149 - 383	473	425	1.9	0.53	45	18	72	180	663
11	170 - 437	538	484	2.4	0.58	51	22	88	197	756
12	192 - 491	603	542	3.4	0.63	57	27	108	214	846
13	210 - 543	665	598	4.0	0.68	63	34	136	231	933
14	233 - 596	728	655	4.5	0.73	69	42	168	248	1022
15	255 - 651	794	714	4.8	0.78	76	50	200	265	1115
16	278 - 709	862	775	5.0	0.83	82	57	228	282	1210

* Determined with 20% excess air

** G20 (NGA) = 34,0 MJ/m³ NCV

3.3 Quotation specifications

- Heat exchanger manufactured from corrosion resistant "pearlite" cast iron
- Maximum operating pressure of 6 bar
- Maximum operating temperature of 95°C
- Sectional design with three passes for max efficiency and a generously sized combustion chamber for minimising NO_x production
- Water cooled base and rear sections
- Large insulated door (hinged left or right) allowing easy access for service operations
- Supplied in broken down form for ease of delivery and site access
- Powder coated enamel steel casing
- 80 - 100 mm thick glass wool insulation
- Suitable for use with a Natural gas, and/or 35 sec oil fired pressure jet burner (matched with most popular burner manufacturers)
- Supplied as standard with on/off switch, temperature indication, control and high limit thermostats
- Manufactured to ISO 9001
- CE approved.

4 OUTPUT DATA

4.1 Boiler efficiency

Up to 82.2% at H_s (91.3% at H_i) at full load and upto 87.0% at H_s (96.7% at H_i), at part load.

Average water temperature 70°C (80/60°C).

4.2 Combustion efficiency

Up to 82.6% at H_s (91.8% at H_i) at full load and 88.1% at H_s (97.9% at H_i) at part load.

Note: Hi = NCV; Hs = GCV

5 APPLICATION DATA

5.1 Hot water version

5.1.1 Water temperature

Maximum water temperature is 110°C.

The minimum acceptable return water temperature is, both for gas and oil fired boilers 40°C, at a flow rate corresponding to a ΔT of 20°C at nominal heat output.

5.1.2 Water pressure

Maximum pressure 6 bar. The boiler is suitable for open and sealed systems up to a maximum pressure of 6 bar and a minimum pressure of 0.8 bar. Installation of the boiler on rooftop or in basement is possible.

5.1.3 Flow rate

The minimum flow rate through the boiler is obtained from the following formula:

$$\frac{\text{Nominal heat output (kW)}}{70} = \text{m}^3/\text{h}$$

This minimum flow must be maintained for 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 requirement exists other than for over temperature protection.

5.1.4 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 cleaning 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.

5.2 Economisers

ECO's can be delivered upon request (for natural gas only). For specifications please refer to Technical information ECO 13/14/15.

5.3 Flue gas discharge

For the discharge of the flue gases, chimney draught is not required.

Tests have shown that very good combustion results are obtained with zero draught at the boiler outlet.

5.4 Noise production

The noise level taken at a distance of 1 m around the boiler is approx. 70 to 90 dBA. The noise level at the chimney outlet will, depending on load, type of burner and chimney situation, vary from 70 to 90 dBA, taken at a distance of 1 m from the outlet. If this noise production gives rise to problems in the immediate vicinity, then noise reducing or absorbing measures should be taken.

The values that have been taken for the graph in Fig. 02, are averages obtained from various measurements carried out at a distance of approx. 1 m around the boiler and at a height of approx. 1 m.

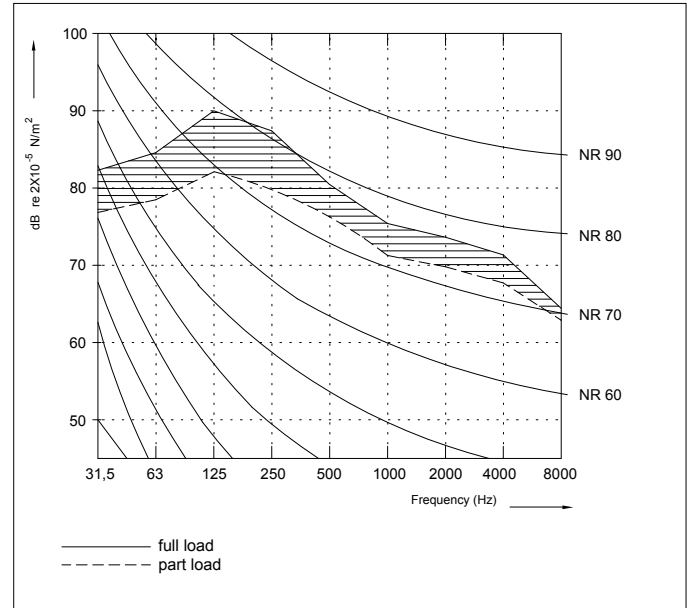


Fig. 02 Noise measurement Remeha P 300 without noise silencer

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6 INSTALLATION REQUIREMENTS

6.1 Installation recommendations in the boiler house

The necessary minimum installation space of the boiler can be seen from Fig. 03.

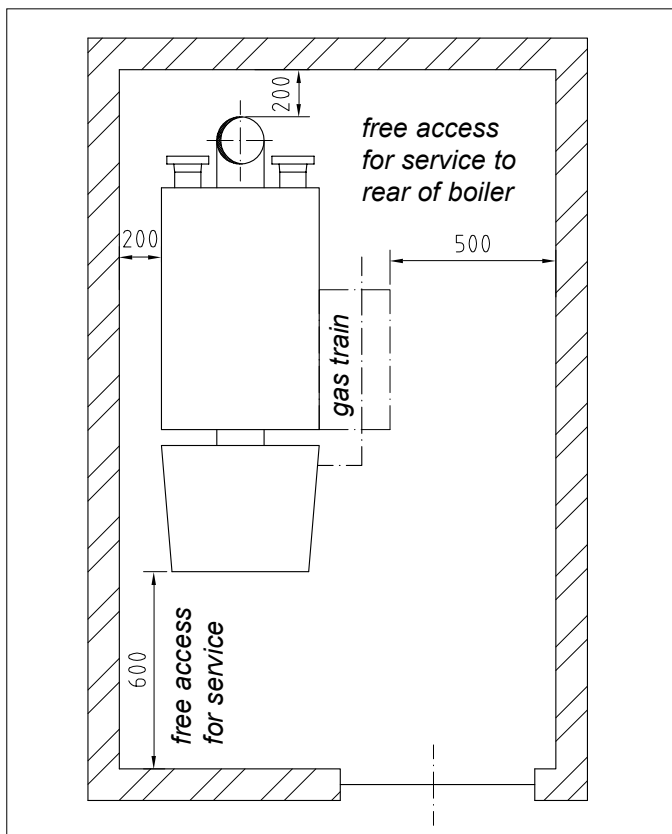


Fig. 03 Installation space of the Remeha P300

6.2 Base details

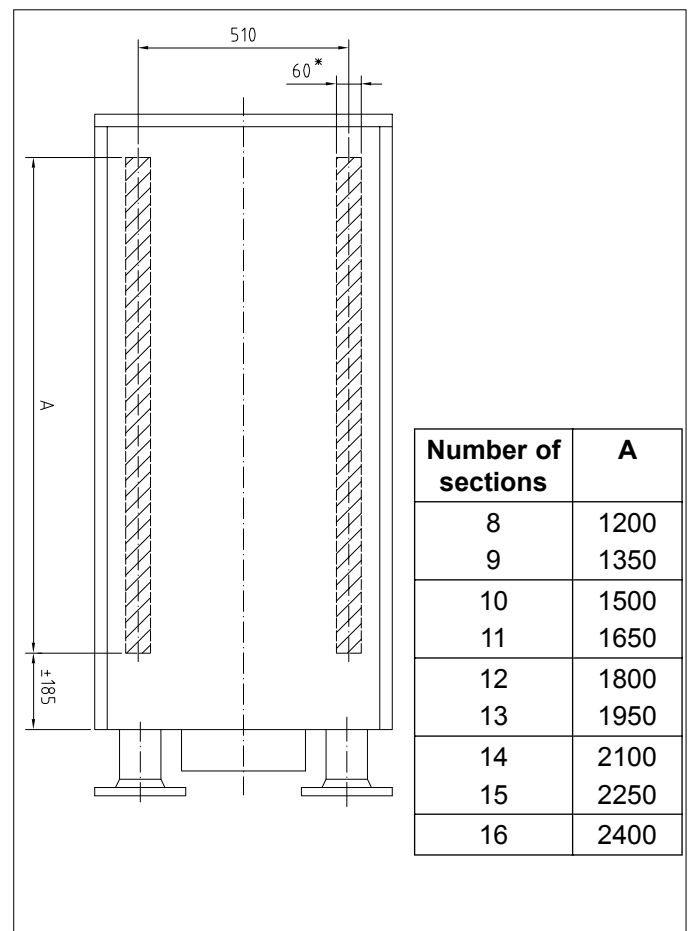


Fig. 04 Base details

00.14B.78.00001

* 50 mm with vibration damper

7 ASSEMBLY GUIDELINES AND INSTALLATION REQUIREMENTS

7.1 General

The Remeha P 300 boiler is delivered in individual sections. The sizes are such that all parts can enter the boiler house through a normal door entrance. The casing and equipment parts are delivered in packaged units. If necessary, the boiler can be put into operation without casing. The casing can be added at a later stage without disconnecting the water connections.

7.2 Boiler assembly

Assembly and installation of the boiler may only be carried out by a recognised and approved engineer and in accordance with the assembly manual. Local regulations laid down by the relevant authorities must be adhered to.

7.3 Water connections

The water connections are at the rear of the boiler. The flow and return connections consist of flanged connections in accordance with DIN 2633. The top flange at the front of the boiler is provided with 3 x R 1/2" threaded holes for the fitting of the thermostat pockets. The return connection is provided with a R 3/4" threaded hole in which a drain off cock is fitted.

8 INSTRUMENT PANEL

8.1 Equipment contents

The panel contains all the necessary control and measuring instruments required to control the boiler. The connections have to be made on a terminal strip. The capillaries and sensor wires, which come from the control panel, are placed in the instrument pockets that are fitted at the front of the boiler. Several extra options can be built into the panels. Ask our technical department.

8.2 Lay out of the instrument panel

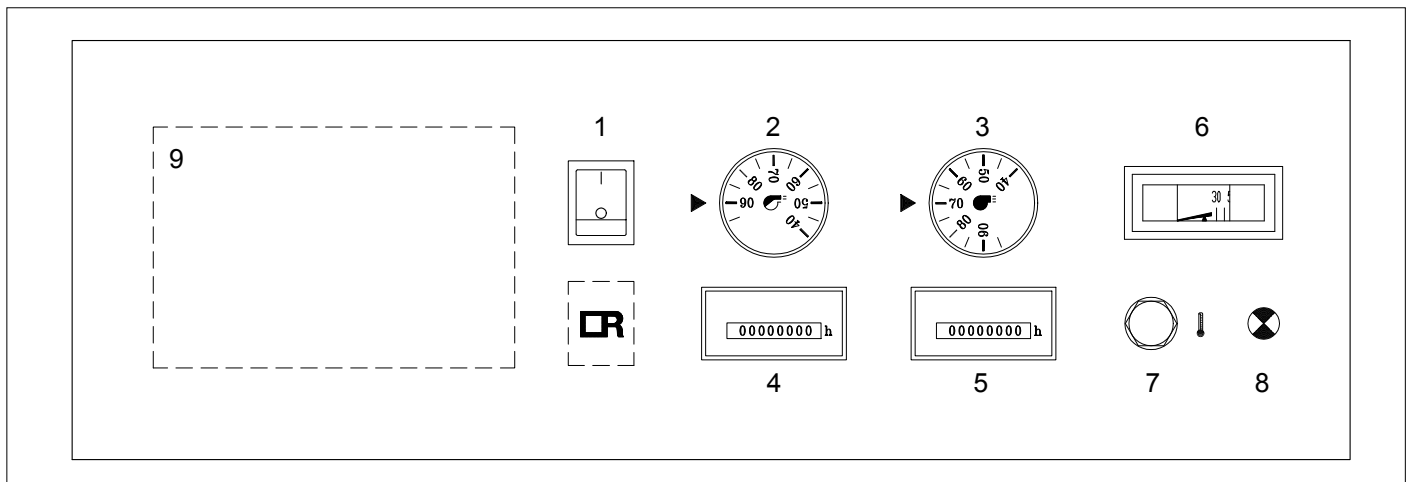


Fig. 05 Layout of the instrument panel High/Low with hour run meters

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1. Operating switch (On/Off).
2. Control thermostat. Setting between 35°C - 90°C.
3. High/Low thermostat. Setting between 35°C - 90°C.
4. Hours run meter total running hours.
5. Hours run meter full load running hours.
6. Analogue thermometer water temperature.
7. High limit thermostat 110°C (locking).
8. Central warning light.
9. Option for **rematic**® weather compensator.

8.3 Wiring diagram instrument panel

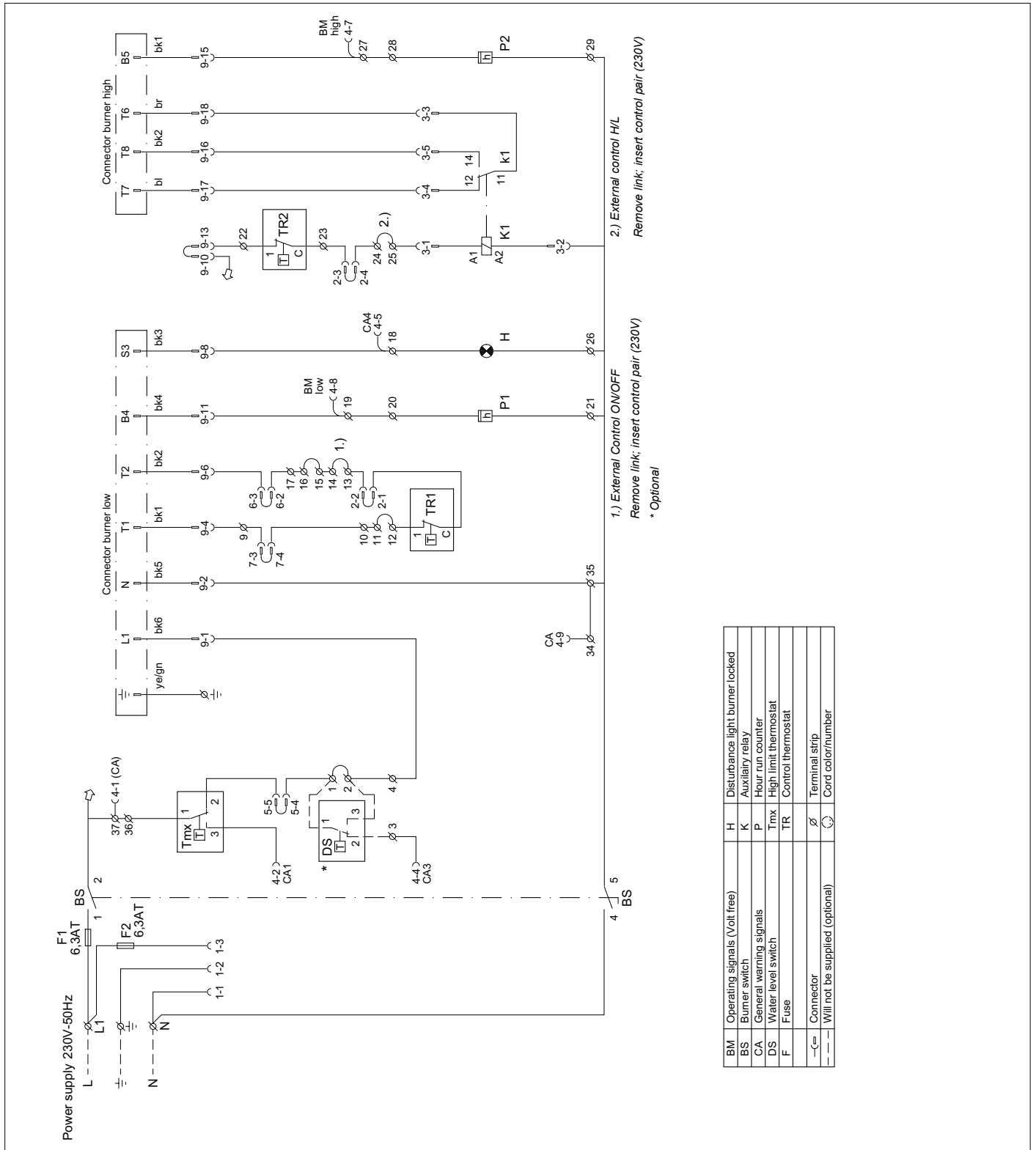


Fig. 06 Wiring diagram instrument panel

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9 COMMISSIONING

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

9.1 Pressurized boiler with gas burner

9.1.1 Commissioning procedure

If the boiler is to be put into operation again following a period of non-use, then the following procedure must be carried out:

- Open the main gas cock.
- Switch the weather-compensator (if fitted) over to manual operation (☞).
- Turn the thermostats to their highest setting.
- Switch on the circulation pump.
- Switch on the main switch.
- Switch on the operation switch in the instrument panel.
- Consult burner manufacturers commissioning details.

Warning:

If the instrument panel is fitted with a weather compensator, set the program switch to 'manual' position (☞). The following will now take place:

- The gas burner fan will start running so that during the purging time the combustion chamber will be ventilated with the air damper fully opened.
- The air damper will then go into start position.
- Ignition flame lights up and is checked.
- Then the control box gives the all clear signal for the burner to switch over to full load.

9.1.2 Putting out of operation

It is sufficient to switch off the operation switch on the instrument panel. It is **important** that in the event of work being carried out on the burner, the boiler/burner unit must be completely electrically isolated and the main gas cock must be shut.

9.2 Pressurized boiler with oil burner

9.2.1 Commissioning procedure

If the boiler is to be put into operation again following a period of non-use, then the following procedure must be carried out:

- Open the main oil cock.
- Switch the weather-compensator (if fitted) over to manual operation (☞).
- Turn the thermostat to their highest setting.
- Switch on the circulation pump.
- Switch on the main switch.
- Switch on the operation switch in the instrument panel.
- Consult burner manufacturer commissioning details.

Warning:

If the instrument panel is fitted with a weather compensator, set the program switch to 'manual' position (☞). The following will now take place:

- The oil burner fan will start running so that during the purging time the combustion chamber will be ventilated with the air damper fully opened.
- The air damper will then go into start position.
- Ignition flame lights up and is checked.
- Then the control box gives the all clear signal for the burner to switch over to full load.

9.2.2 Putting out of operation

It is sufficient to switch off the operation switch on the instrument panel. It is **important** that in the event of work being carried out on the burner, the boiler/burner unit must be completely electrically isolated and the main oil cock must be shut.

10 FAULT FINDING

10.1 High Limit thermostat lockout

- Check the water circulation (circulation pump). Reset the High Limit thermostat ('reset' button is on the instrument panel under the cover cap of the High Limit thermostat).
- Advise the installer in the event of continued lock outs.

11 MAINTENANCE RECOMMENDATIONS

11.1 General

Depending on the operating conditions, the block and the burner must be checked and cleaned one or more times a year.

11.2 Maintenance instructions

- Cleaning of the boiler:
 - Put boiler out of operation.
 - Open the front door, if necessary after dismantling the burner.
 - Remove the retarders.
 - Clean the combustion chamber and flue passes using a suitable brush.
 - Clean the removed retarders.
 - Remove the rear panel of the boiler and remove the cleaning cover (underneath the smoke box).
 - Vacuum clean the boiler and the combustion chamber.
 - Renew the front door seals after cleaning the boiler.
 - Re-assemble the removed parts and close the front door.
 - Re-assemble the burner (if dismantled).
- Check the boiler combustion side for leakage.
- Check the equipment for proper functioning and if necessary re-adjust the gas control and safety equipment.
- Check combustion by means of combustion gas analyses.
- Check the water connections.

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Ours is a policy of continuous development. We reserve the right to alter specifications without prior notification.



Subject to alterations
52754/1000/0402/lp.

Technical information

Remeha P 500

R e m e h a P 5 0 0

- Pressurized boiler
- Heat output: 635 - 1900 kW



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PREFACE

These technical instructions contain useful and important information for the correct operation and maintenance of the Remeha boiler, model P200

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.

A competent Engineer, with the relevant certification (i.e. CORGI, ACOPS, IEE regs. etc) must carry out the installation and commissioning of the boiler.

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 it's 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 DESCRIPTION OF THE UNIT

1.1 General

High efficiency pressurised boiler, suitable for use with natural gas and light oil, by means of a pressure jet burner. Also available with a condensing unit (ECO) (for natural gas only).

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

- Gas appliance directive no. 90/396/EEC
- Electrical low voltage directive no. 73/23/EEC
- E.M.C. directive no. 89/336/EEC
- Efficiency directive no. 92/42/EEC.

Classification type for evacuation of the combustion products: B23.

1.2 Burners

In principle all CE-approved pressure jet burners are suitable, subject to prior adjustment to the boiler capacity and boiler construction. The individual boiler satisfies inspection requirement for central heating boilers.

2 CONSTRUCTION DATA

2.1 General

The boiler block consists of cast iron sections, which are assembled by means of tapered nipples. The boiler is a three-pass design. The boiler block is insulated with a 100-mm thick layer of glass wool.

2.2 Sections

The sections are made of pearlitic cast iron.

Weights and measures of the sections:

- Front section: 220 kg H x W = 1252 x 1130mm
- Intermediate section: 250 kg H x W = 1238 x 1130 mm
- Rear section: 250 kg H x W = 1238 x 1130 mm

2.3 Casing

Steel casing, finished with a high-quality insulation. The front door is suitable for left or right opening as desired.



Fig. 01 Remeha P500

IL50

3 TECHNICAL DATA AND DIMENSIONS

3.1 Dimensions

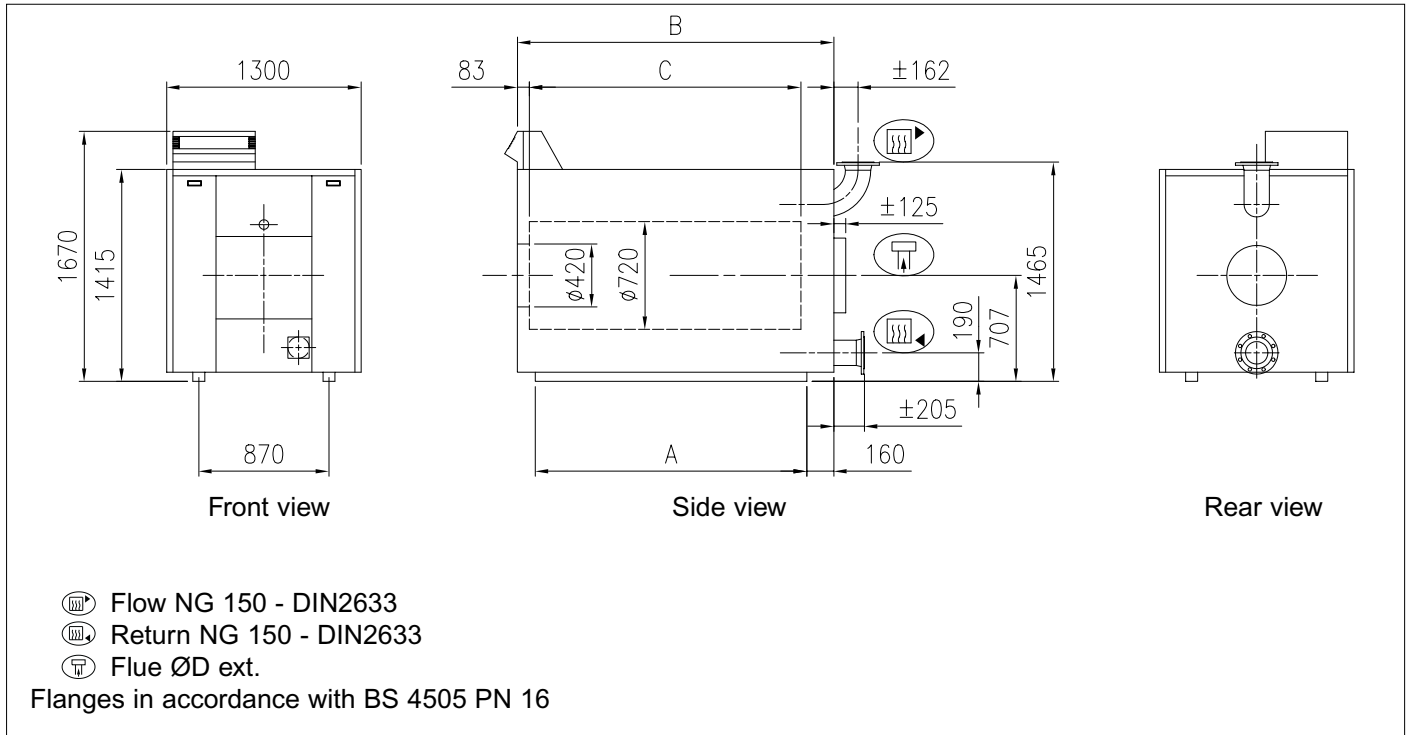


Fig. 02 Dimensions

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3.2 Technical data

Number of sections			9	10	11	12	13	14	15	16	17	18	19	20
Nominal heat output		kW	635	750	865	980	1095	1210	1325	1440	1555	1670	1785	1900
Nominal heat input	Hi / NCV	kW	706	834	962	1090	1218	1341	1468	1592	1719	1846	1973	2100
	Hs / GCV	kW	784	926	1068	1210	1352	1488	1630	1767	1908	2049	2190	2331
Dimensions	A	mm	1350	1500	1650	1800	1950	2100	2250	2400	2550	2700	2850	3000
	B	mm	1660	1810	1965	2115	2265	2415	2565	2715	2870	3020	3170	3320
	C	mm	1270	1420	1570	1720	1870	2020	2170	2320	2470	2620	2770	2920
	ØD	mm	400	400	400	400	500	500	500	500	500	500	500	500
Water resistance	Δ t = 10°C	mbar	149	166	180	194	189	200	213	234	262	295	337	382
	Δ t = 20°C	mbar	37	42	45	47	49	50	53	59	66	74	84	96
Water contents		litre	495	550	605	660	715	770	825	880	935	990	1045	1100

Boiler weight (dry)	kg	2650	2910	3175	3435	3695	3955	4220	4480	4740	5005	5265	5525
Combustion chamber resistance¹⁾	mbar	1.7	2.3	3.0	3.8	3.9	4.8	5.0	5.9	5.5	6.0	6.5	7.0
Combustion gas side content	m ³	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
Flue gas flow rate	kg/h	1102	1302	1502	1702	1901	2081	2292	2485	2683	2882	3080	3278

Table 01 Technical data

¹⁾Determined with 20 % excess air.

3.3 Quotation specifications

- Heat exchanger manufactured from corrosion resistant "pearlite" cast iron
- Maximum operating pressure of 6 bar
- Maximum operating temperature of 95°C
- Sectional design with three passes for max efficiency (gross 83%) and a generously sized combustion chamber for minimising NO_x production
- Water cooled base and rear sections
- Large insulated door (hinged left or right) allowing easy access for service operations
- Supplied in broken down form for ease of delivery and site access
- Powder coated enamel steel casing
- 80 - 100 mm thick glass wool insulation
- Suitable for use with a Natural gas, and/or 35 sec oil fired pressure jet burner (matched with most popular burner manufacturers)
- Supplied as standard with on/off switch, temperature indication, control and high limit thermostats
- Efficiency 83% (Hs - GCV)
- Manufactured to ISO 9001
- CE approved.

4 OUTPUT DATA

4.1 Boiler efficiency

Up to 90.2 % at Hi (81.3 % at Hs) at full load and up to 92.5 % at Hi (83.3 % at Hs) at part load.
Average water temperature 70°C (80/60°C).

4.2 Combustion efficiency

Up to 91.2 % at Hi (82.2 % at Hs) at full load and up to 95.5 % at Hi (86.0 % at Hs) at part load.

Note: Hi = NCV; Hs = GCV

5 APPLICATION DATA

5.1 L.P.H.W. version

5.1.1 Water temperature

Maximum water temperature is 110°C.
The minimum acceptable return water temperature is, both for gas and oil fired boilers 40°C, at a flow rate corresponding to a Δt of 20°C at nominal heat output.

5.1.2 Water pressure

Maximum pressure 6 bar.
The boiler is suitable for open and sealed systems up to a maximum pressure of 6 bar and a minimum pressure of 0.8 bar. The boiler is suitable for installation in basement or rooftop boiler houses.

5.1.3 Flow rate

The minimum flow rate through the boiler is obtained from the following formula:

$$\frac{\text{Nominal heat output (kW)}}{70} = \text{m}^3/\text{h}$$

This minimum flow must be maintained for 5 minutes after the burner stops firing to avoid high temperature shutdown due to residual heat gain. Due to the design and manufacture of the boiler no specific minimum water flow requirement exists other than for over-temperature protection.

5.1.4 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.

5.2 Economisers

ECO's can be delivered upon request (for natural gas only). For specifications please refer to Technical information ECO 13/14/15.

5.3 Flue gas discharge

For the discharge of the flue gases, chimney draught is not required.

Tests have shown that very good combustion results are obtained with zero draught at the boiler outlet.

5.4 Noise production

The noise level taken at a distance of 1 m around the boiler is approximately 75 to 90 dBA. The noise level at the chimney outlet will, depending on load, type of burner and chimney situation, vary from 75 to 90 dBA, measured at a distance of 1 m from the outlet. If this noise production gives rise to problems in the immediate vicinity, then noise reducing or absorbing measures should be taken.

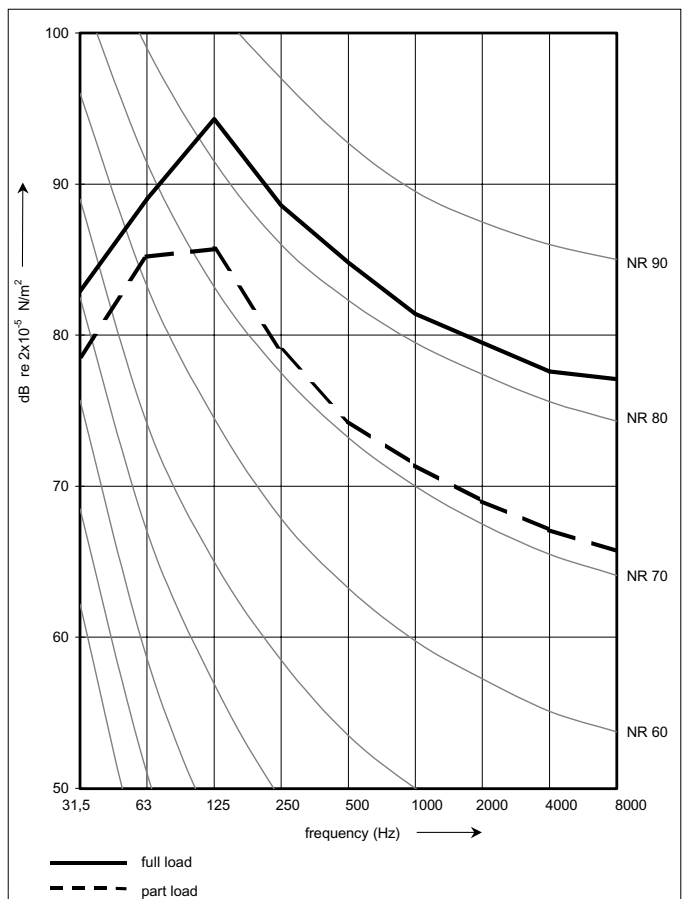


Fig. 03 Noise level readings without burner silencer

The values that have been taken are averages obtained from various measurements carried out at a distance of approximately 1 m around the boiler and at a height of approximately 1 m.

6 INSTALLATION REQUIREMENTS

6.1 Installation recommendations in the boiler house

The necessary minimum installation space of the boiler can be seen from Fig. 04.

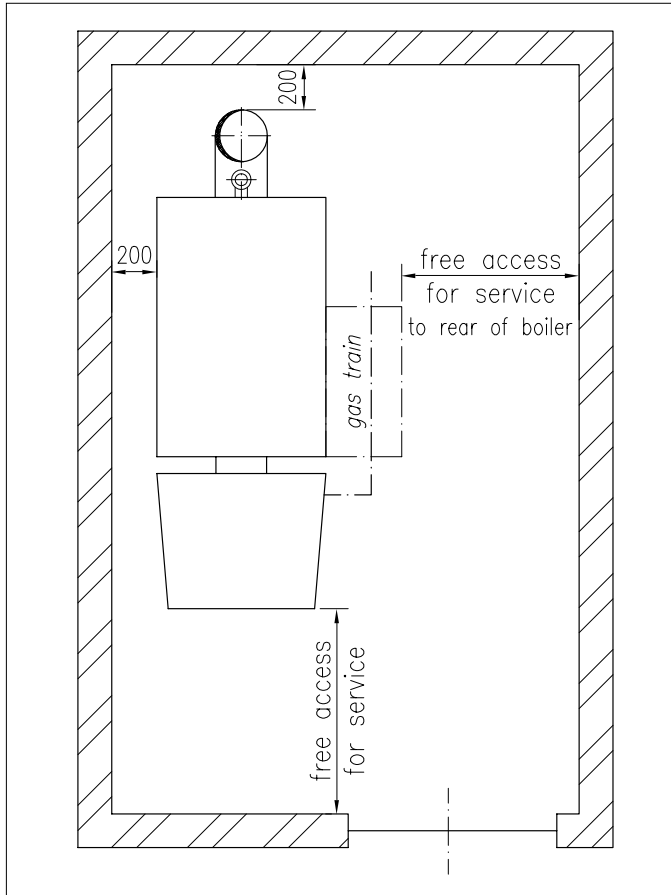


Fig. 04 Installation recommendations in the boiler house

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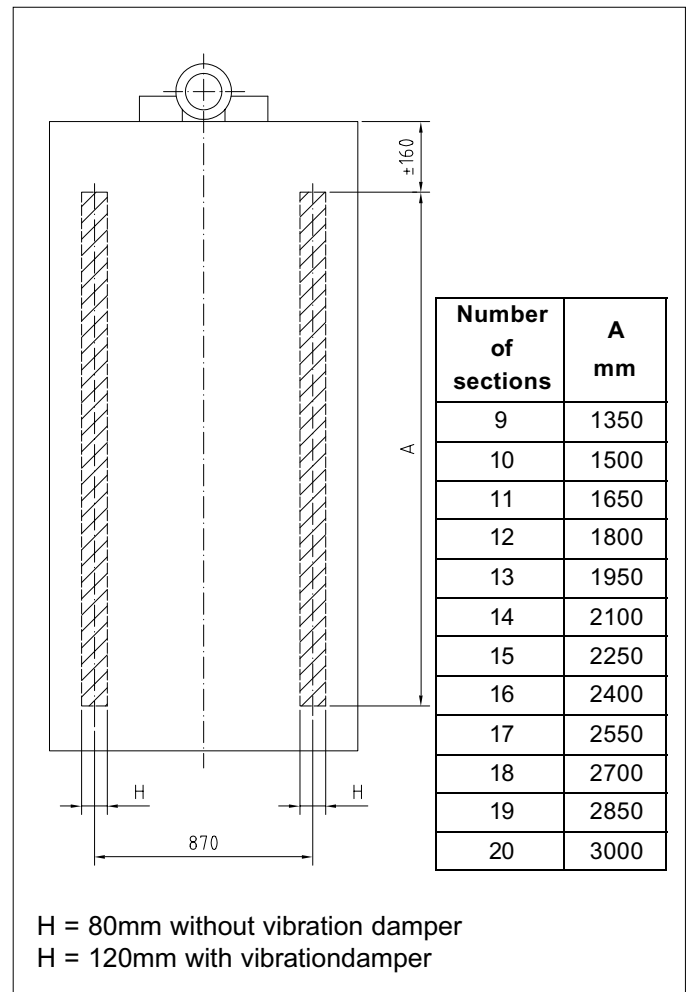


Fig. 05 Base details

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7 ASSEMBLY GUIDELINES AND INSTALLATION REQUIREMENTS

7.1 General

The Remeha boiler P 500 is delivered in individual parts. The sizes of the boiler parts are such that they all can enter the boiler house through a normal entrance. The casing and equipment parts are delivered in packaged units. If necessary, the boiler can be put into operation without casing. The casing can be added at a later stage without dismantling the water connections.

7.2 Water connections

The water connections are at the rear of the boiler. The flow and return connections consist of a flanged flow elbow and a flanged return connection in accordance with DIN 2633. The return connection is provided with a G 3/4" threaded hole in which a drain off cock is fitted.

At the front of the boiler a flange is provided with 2 x G 1/2" threaded holes for the fitting of the thermostat pockets.

7.3 Boiler assembly

Assembly and installation of a boiler delivered in individual parts should only be undertaken by a recognised and approved engineer and in accordance with the assembly manual. Local regulations laid down by the relevant authorities must be adhered to.

8 INSTRUMENT PANELS

8.1 Equipment contents

The panels contain all the necessary control and measuring instruments required to control the boiler. The connections have to be made on a terminal strip. The capillaries and sensor wires, which come from the control panel, are placed in the instrument pockets that are fitted at the front of the boiler.

See par. 8.2 for an instrument panel High/Low with hours run meters. Several extra options can be built into the panels.

Ask our technical department.

8.2 Instrument panel High/Low with hours run meters

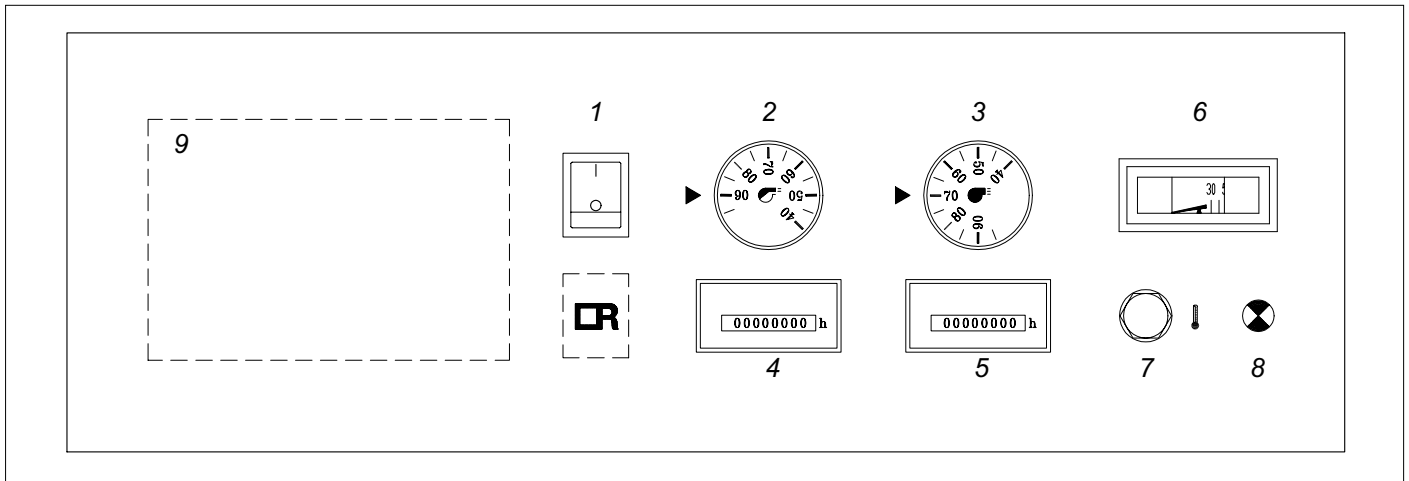


Fig. 06 Layout of the instrument panel High/Low with hours run meters

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1. Operating switch (On/Off)
2. Control thermostat; setting between 35°C - 95°C
3. High/Low thermostat; setting between 35°C - 95°C
4. Hours run meter total running hours
5. Hours run meter full load running hours
6. Analogue thermometer water temperature
7. High limit thermostat 110°C (lock out)
8. Lock out warning lamp
9. Option for **rematic**[®] weather compensator

8.3 Wiring diagram instrument panel High/Low with hours run meters

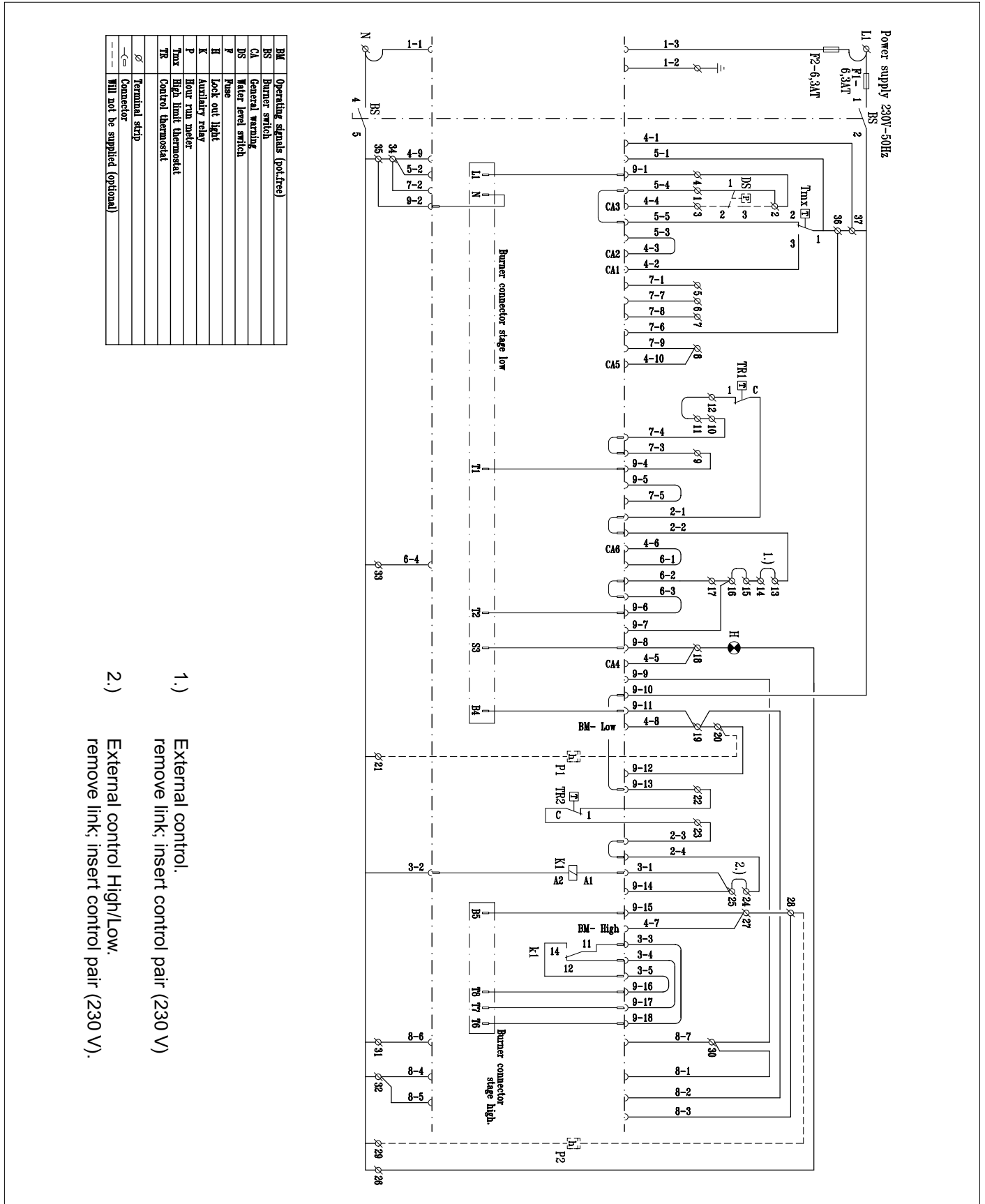


Fig. 07 Wiring diagram instrument panel High/Low with hours run meters

9 COMMISSIONING

Note:

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

9.1 Pressurized boiler with gas burner

9.1.1 Commissioning procedure

If the boiler is to be put into operation again following a period of non-use, then the following procedure must be carried out :

- Open the main gas cock.
- Switch the weather-compensator (if fitted) over to manual operation (☞).
- Turn the thermostats to their highest setting.
- Switch on the circulation pump.
- Switch on the main switch.
- Switch on the operation switch in the instrument panel.
- Consult burner manufacturers commissioning details.

Warning

If the instrument panel is fitted with a weather compensator, set the program switch to 'manual' position (☞).

The following will now take place:

- The gas burner fan will start running so that during the purging time the combustion chamber will be ventilated with the air damper fully opened.
- The air damper will then go into start position.
- Ignition flame lights up and is checked.
- Then the control box gives the all clear signal for the burner to switch over to full load.

9.1.2 Putting out of operation

It is sufficient to switch off the operation switch on the instrument panel. It is **important** that in the event of work being carried out on the burner, the boiler/burner unit must be completely electrically isolated and the main gas cock must be shut.

9.2 Pressurized boiler with oil burner

9.2.1 Commissioning procedure

If the boiler is to be put into operation again following a period of non-use, then the following procedure must be carried out :

- Open the main oil cock.
- Switch the weather-compensator (if fitted) over to manual operation (☞).
- Turn the thermostat to their highest setting.
- Switch on the circulation pump.
- Switch on the main switch.
- Switch on the operation switch in the instrument panel.
- Consult burner manufacturer commissioning details.

Warning

If the instrument panel is fitted with a weather compensator, set the program switch to 'manual' position (☞).

The following will now take place:

- The oil burner fan will start running so that during the purging time the combustion chamber will be ventilated with the air damper fully opened.
- The air damper will then go into start position.
- Ignition flame lights up and is checked.
- Then the control box gives the all clear signal for the burner to switch over to full load.

9.2.2 Putting out of operation

It is sufficient to switch off the operation switch on the instrument panel. It is **important** that in the event of work being carried out on the burner, the boiler/burner unit must be completely electrically isolated and the main oil cock must be shut.

10 FAULT FINDING

High Limit thermostat lock out:

- Check the water circulation (circulation pump). Reset the High Limit thermostat (Reset button is on the instrument panel under the cover cap of the High Limit thermostat).
- Advise the installer in the event of continued lockouts.

11 MAINTENANCE RECOMMENDATIONS

11.1 General

Depending on the operational conditions, the block and the burner must be checked and cleaned at least once a year for gas and at least twice a year for oil.

11.2 Maintenance instructions

Cleaning of the boiler:

- Put boiler out of operation.
- Open the front door, if necessary after dismantling the burner.
- Remove the retarders (only for the 9 - 16 sections).
- Clean the combustion chamber and flue passes using a suitable brush.
- Clean the removed retarders (9 - 16 sections).
- Remove the rear panel of the boiler and remove the cleaning cover (underneath the smoke box).
- Vacuum clean the boiler and the combustion chamber.
- Renew the front door seals after cleaning the boiler.
- Re-assemble the removed parts and close the front door.
- Re-assemble the burner (if dismantled).
- Check the boiler combustion side for leakage.
- Check the equipment for proper functioning and if necessary re-adjust the control and safety equipment.
- Carry out combustion analysis.
- Check the water connections.



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