

# Remeha P 420

Fuel oil/gas boilers

English  
06/04/06



Technical  
instructions

CE

63190



UK 300008441-001-C

 **remeha**

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## Introduction




### Directive 97/23/EC

Gas and oil boilers with a maximum operating temperature of 110°C and hot water tanks with a maximum operating pressure of 10 bar pertain to article 3.3 of the directive, and therefore, cannot be CE-marked to certify compliance with the directive 97/23 EC.

The boilers and hot water tanks are designed and manufactured in accordance with the sound engineering practice, as requested in article 3.3 of the directive 97/23/EC; it is certified by compliance with the directives 90/396/EC, 92/42/EC, 73/23 EC and 89/336/EC.

 **Warning : The boiler shall be assembled and installed by a qualified professional only.**  
**For a proper operating of the boiler, follow carefully the instructions.**

### Symbols used

	Caution danger	Risk of injury and damage to equipment. Attention must be paid to the warnings on safety of persons and equipment
	Specific information	Information must be kept in mind to maintain comfort
	Reference	Refer to another manual or other pages in this instruction manual

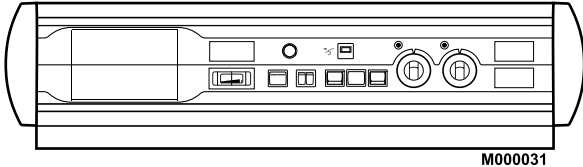
## Description

The boilers of the P 420 range are pressurised hot water boilers designed for connecting to a flue pipe which require a separate automatic fuel-oil or gas burner.

The useful power of P 420 boilers is between 300 and 780 kW.

### Models available

Boiler with control panel, which may be fitted with an optional Rematic 2945 C3 control unit for heating only or heating and domestic hot water production.



## 1 Technical characteristics

Maximum operating pressure: 6 bar

Boiler thermostat setting: 30 to 90°C

Maximum operating temperature: 100°C

Boiler			P 420-8	P 420-9	P 420-10	P 420-11	P 420-12	P 420-13	P 420-14
Useful output		kW	300-390	390-450	450-540	540-600	600-670	670-720	720-780
Power input		kW	333.7-443.3	443.3-511.4	511.4-613.6	613.6-681.8	681.8-761.4	761.4-818.2	818.2-886.4
Number of sections			8	9	10	11	12	13	14
Water capacity		l	366	409	452	495	538	581	624
Water resistance	$\Delta T = 10K$	mbar	37	55	86	105	136	161	204
	$\Delta T = 15K$		20	27	37	47	62.5	78.5	110
	$\Delta T = 20K$		9.5	13.5	22.5	27	33.5	40	54
Pressure in the furnace for nozzle pressure = 0 <sup>(1)</sup> <sup>(3)</sup> <sup>(2)</sup>		mbar	1.1	1.5	2.0	2.5	2.5	2.5	3.5
Smoke temperature <sup>(1)</sup> <sup>(3)</sup> <sup>(2)</sup> *		°C	< 220	< 220	< 220	< 220	< 220	< 220	< 220
Mass flue gas flow rate <sup>(1)</sup> <sup>(2)</sup>	Fuel oil	Kg/h	650	750	900	1000	1116	1200	1450
	Gas		700	810	972	1080	1207	1297	1405
Combustion chamber	Diameter, combustion chamber	mm	530	530	530	530	530	530	530
	Width, combustion chamber	mm	638	638	638	638	638	638	638
	Depth, combustion chamber	mm	1183	1343	1503	1663	1823	1983	2143
	Volume	m <sup>3</sup>	0.310	0.354	0.396	0.439	0.481	0.523	0.565
Maintenance consumption*	à 50°C	W	315	358	413	451	494	505	555
Shipping weight		kg	1470	1650	1830	2010	2190	2370	2550

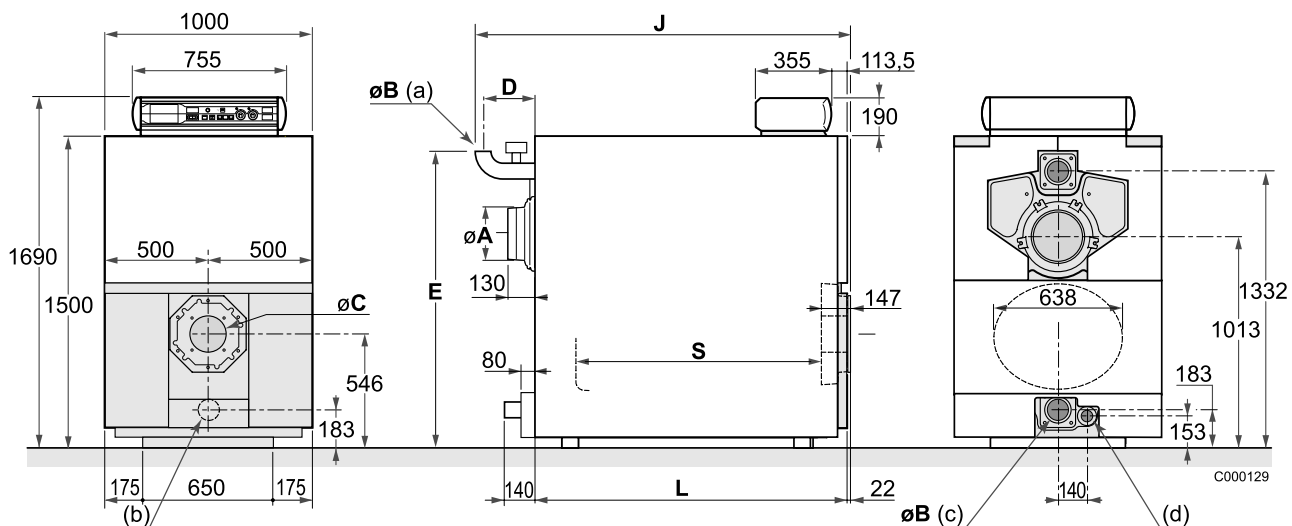
\*Maintenance consumption: total heat emission when the burner is off as a percentage of the nominal input power when the difference between the mean boiler temperature and the room temperature is 30 K.

<sup>(1)</sup> Nominal operation (top boiler power)

<sup>(2)</sup> CO<sub>2</sub> = 13.1 to 13.5% with fuel oil and 9.5% with natural gas.

<sup>(3)</sup> Boiler temperature : 80 °C - Ambient temperature : 20 °C

## 2 (Main dimensions)



(a) Boiler flow - weld

(c) Boiler return - weld

(b) Sludge removal hole  $\varnothing$  Rp 2 1/2 - plugged

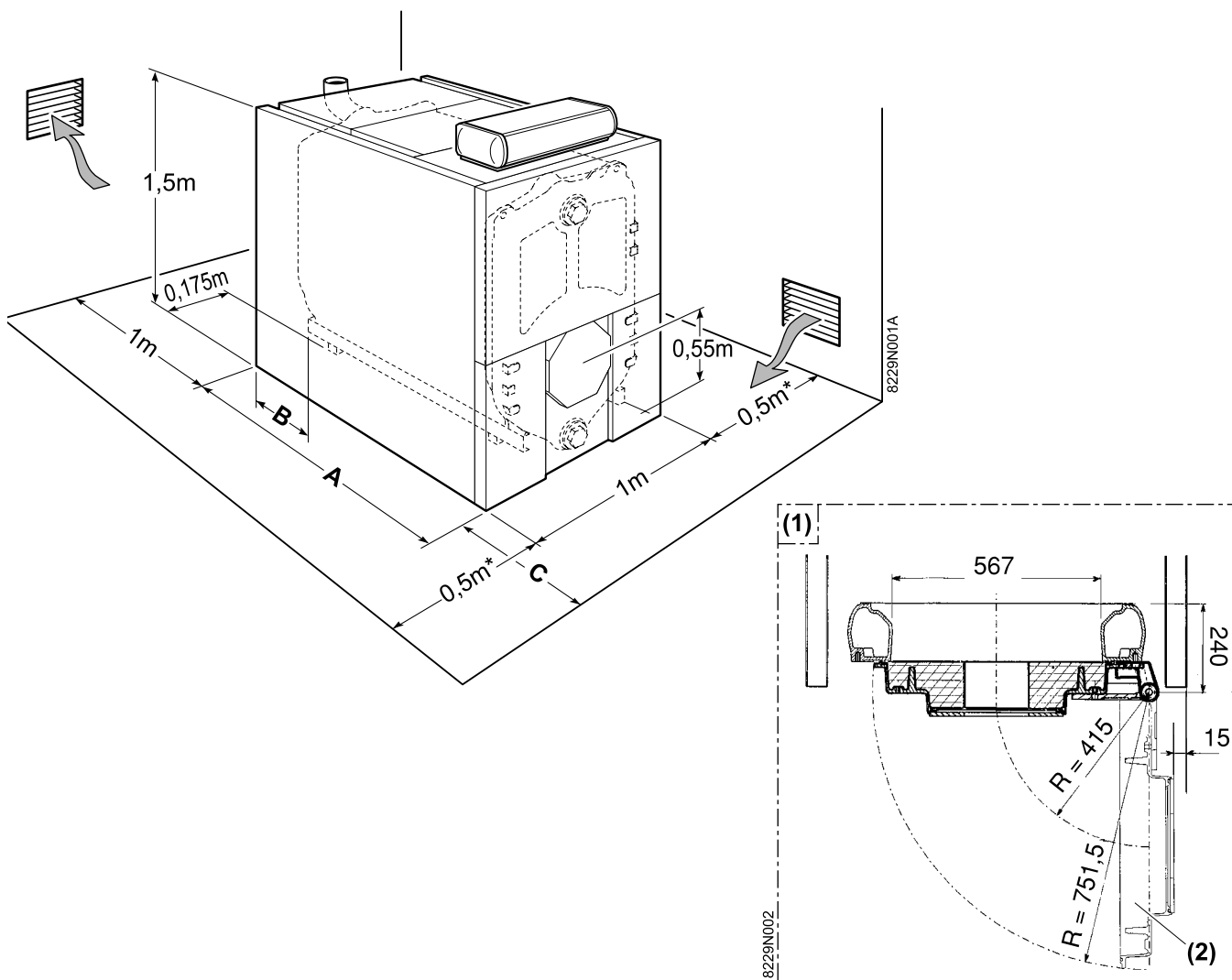
(d) Rp 2 draining outlet - plugged

Boiler type	P 420-8	P 420-9	P 420-10	P 420-11	P 420-12	P 420-13	P 420-14
$\varnothing$ A	250	250	250	300	300	300	300
$\varnothing$ B	2" 1/2	2" 1/2	2" 1/2	3"	3"	3"	3"
$\varnothing$ C	135 - 175 - 190 - 240 - 250 - 290 or Plain plate						
D	235	235	235	254	254	254	254
E	1427	1427	1427	1447	1447	1447	1447
J	1800	1950	2120	2305	2465	2625	2785
L	1505	1665	1825	1985	2145	2305	2465
S	1183	1343	1503	1663	1823	1983	2143

# Installing the boiler

## 1 Boiler location

For the assembly and because of their design, P 420 boilers require no special base. Their closed furnace system means that the floor need not have refractory properties. All you have to ensure is that the floor can support the weight of the boiler when it is fitted for operation. If the boiler location is not determined precisely, leave enough space around the boiler to facilitate monitoring and maintenance operations.



(1) Top view

(2) Burner door

	P 420-8	P 420-9	P 420-10	P 420-11	P 420-12	P 420-13	P 420-14
A	1505	1665	1825	1985	2145	2305	2465
B	130	-40	120	-40	120	-40	120
C	1.5	2	2	2	2.5	2.5	2.5

**Warning:** adapt the dimensions on the basis of the dimensions of the burner when the door is open.

## 2 Ventilation

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The location of air inlets in relation to the high ventilation openings shall ensure that the air is renewed in the entire volume of the boiler room.

It is in any case imperative to conform to the local regulations in force.

### **Warning:**

In order to avoid damage to the boilers, it is necessary to prevent the contamination of combustion air by chlorine and/or fluoride compounds, which are particularly corrosive.

These compounds are present, for example, in aerosol sprays, paints, solvents, cleaning products, washing products, detergents, glues, snow clearing salts, etc.

Therefore:

- Do not suck in air evacuated from premises using such products: hairdressing salons, dry cleaners, industrial premises (solvents), premises containing refrigeration systems (risk of refrigerant leakage), etc.
- Do not stock such products close to the boilers.

**If the boiler and/or peripheral equipment are corroded by such chloride or fluoride compounds, the contractual guarantee cannot be applied.**

## Mounting

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For mounting instructions, see installation instructions.



## Hydraulic connections

### 1 Important recommendations on connecting the heating circuit to the boiler and the drinking water system

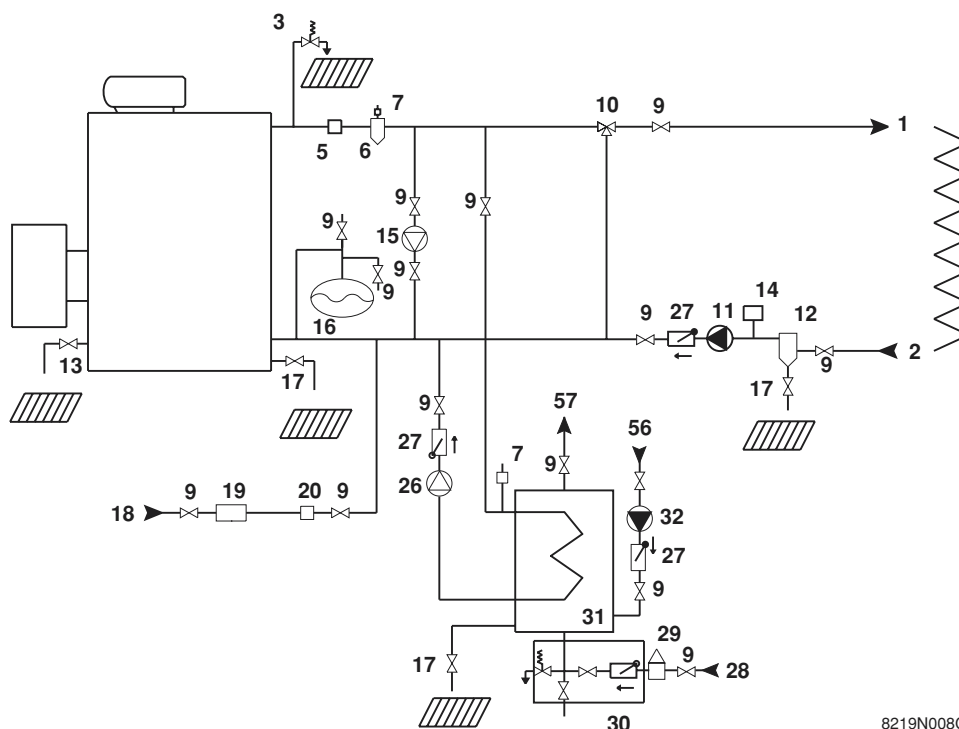
Installation must be carried out in accordance with the prevailing regulations, the codes of practice and the recommendations in these instructions.

The expansion tank must be connected directly to the boiler without valves or stop valves.

Likewise, the safety valve must be connected directly to the boiler without valves or stop valves.

#### Example of an installation:

The example of an installation shown below does not cover every possible configuration.



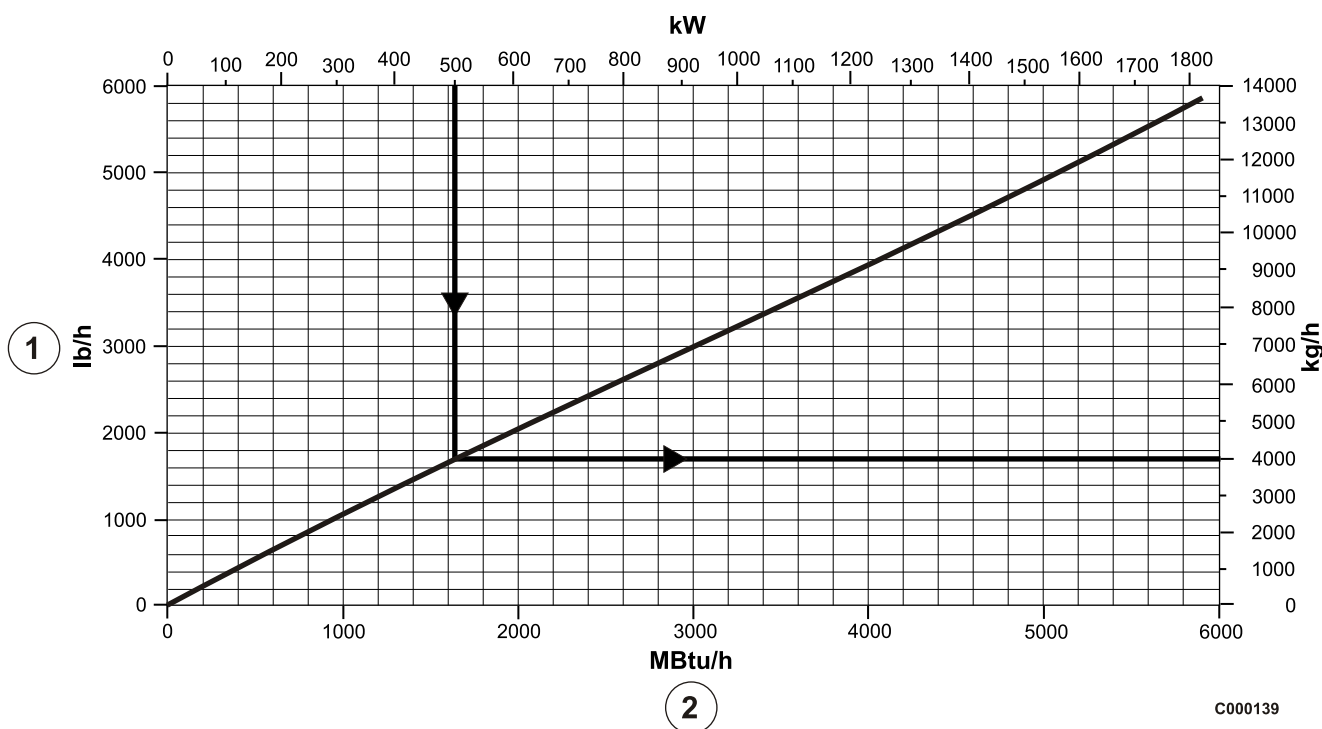
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- |     |   |     |  |
|-----|---|-----|--|
| 1.  | Heating outlet  | 32. | Domestic hot water loop pump (optional)    |
| 2.  | Heating return  | 56. | Domestic hot water circulation return loop |
| 3.  | 3 bar safety valve + manometer  | 57. | Domestic hot water outlet                  |
| 5.  | Flow switch   |     |  |
| 6.  | Air separator   |     |  |
| 7.  | Automatic bleed valve   |     |  |
| 9.  | Isolation valve   |     |  |
| 10. | 3-way mixing valve  |     |  |
| 11. | Boiler pump   |     |  |
| 12. | Sludge decanting pot (particularly recommended on older installations)          |     |  |
| 13. | Flush valve   |     |  |
| 14. | Water low safety pressure-sensitive switch                                      |     |  |
| 15. | Recycling pump  |     |  |
| 16. | Expansion chamber   |     |  |
| 17. | Drain cock  |     |  |
| 18. | Heating circuit filling (with disconnecter depending on prevailing regulations) |     |  |
| 19. | Water treatment if TH > 25°   |     |  |
| 20. | Water meter   |     |  |
| 26. | DHW load pump   |     |  |
| 27. | Non-return valve  |     |  |
| 28. | Domestic cold water inlet   |     |  |
| 29. | Pressure reducer (if mains pressure 5.5 bar)                                    |     |  |
| 30. | Sealed safety unit calibrated to 7 bar with indicator type discharge            |     |  |
| 31. | Independent domestic hot water tanks  |     |  |

## 2 Important recommendations for connecting the boiler to the heating circuit

Installation must be carried out in accordance with the prevailing regulations, the codes of practice and the recommendations in these instructions.

### ► Minimum safety valve flowrate as a function of maximum boiler nominal output :



- ① Minimum relieving capacity
- ② Maximum gross boiler output

#### Example

Maximum boiler nominal output is 500 kW.  
 Minimum safety valve flowrate must be 4000 Kg/h

### ► Water flow in the boiler :

The water flow in the boiler when the burner is operating must correspond with the following formulae:

- Nominal water flow  $Q_n = 0.86 P_n / 20$
- Minimum flow  $Q_{min} = 0.86 P_n / 45$  (this flow also corresponds with the minimum recycle flow in the boiler)
- Maximum water flow  $Q_{max} = 0.86 P_n / 5$

$Q_n$  = flow in  $m^3/h$

$P_n$  = Nominal output (full boiler output) in kW.

### ► Operation in cascade

After stopping the burner:

- Timeout required before the order to close a butterfly valve: 3 min
- Switch a possible shunt pump (located between the boiler and a butterfly valve) off via the end of run contact of the butterfly valve

### ► Operation with 2-stage burner

- The water temperature in the boiler is maintained at 50°C or more ; the first stage must be set to a minimum of 30% of the nominal stage
- Operation at modulated low temperature (minimum outlet temperature: 40°C) ; the first stage must be set to a minimum of 50% of the nominal stage

### ►Operation with modulating burner


- The water temperature in the boiler is maintained at 50°C or more: the burner can modulate down to 30% of the nominal stage
- Operation at modulated low temperature (minimum outlet temperature: 40°C) ; the burner can modulate down to 50% of the nominal stage

### 3 Filling the system

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Filling shall be performed with a low flow rate from a low point in the boiler room in order to ensure that all the air in the boiler is bled from the high point of the system.

Always stop the pump before filling.

 **VERY IMPORTANT : Instructions for starting up the boiler for the first time after the system is fully or partly drained :** If all the air is not bled naturally to an expansion vessel which opens out onto the air, the system must include manual bleeder valves, in addition to automatic bleeder valves with the capability to bleed the system by themselves when it is operating; the manual bleeder valves are used to bleed all the high points of the system and to make sure that the filled system is free of air before the burner is turned on.

 **Do not add cold water suddenly into the boiler when it is hot.**

### 4 Sludge removal

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A tapped  $\varnothing$  2" 1/2 hole with a plug has been provided on the bottom of the front of the boiler.. Fit a 1/4 turn valve (not supplied) on the opening to remove the sludge.

Sludge removal leads to the draining of large quantities of water, so remember to refill the system after the operation.

#### **Comments :**

never replace a boiler in an existing system without carefully rinsing the system first. Install a sludge decanting pot on the return pipe, very close to the boiler.

## Chimney connection

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The high-performance features of modern boilers and their use in specific conditions as a result of the advance in burner technology (e.g. first-stage or low modulation range operation) lead to very low flue gas temperatures (<160°C).

For this reason :

- Use flue gas pipes designed to enable the flow of condensates which may result from such operating modes in order to prevent damage to the chimney.
- Install a draining tee at the bottom of the chimney.

The use of a draught moderator is recommended as well.

### 1 Flue size

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Refer to applicable regulations while determining the size of the flue. Please note that P 420 boilers have pressurised and tight furnaces and that the pressure at the nozzle must not exceed 0 mbar, unless special sealing precautions have been taken, for instance in order to connect a static condenser/regenerator.

### 2 Chimney connection

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The connection shall be removable, and offer minimum load losses, i.e. it must be as short as possible with no sudden change in section.

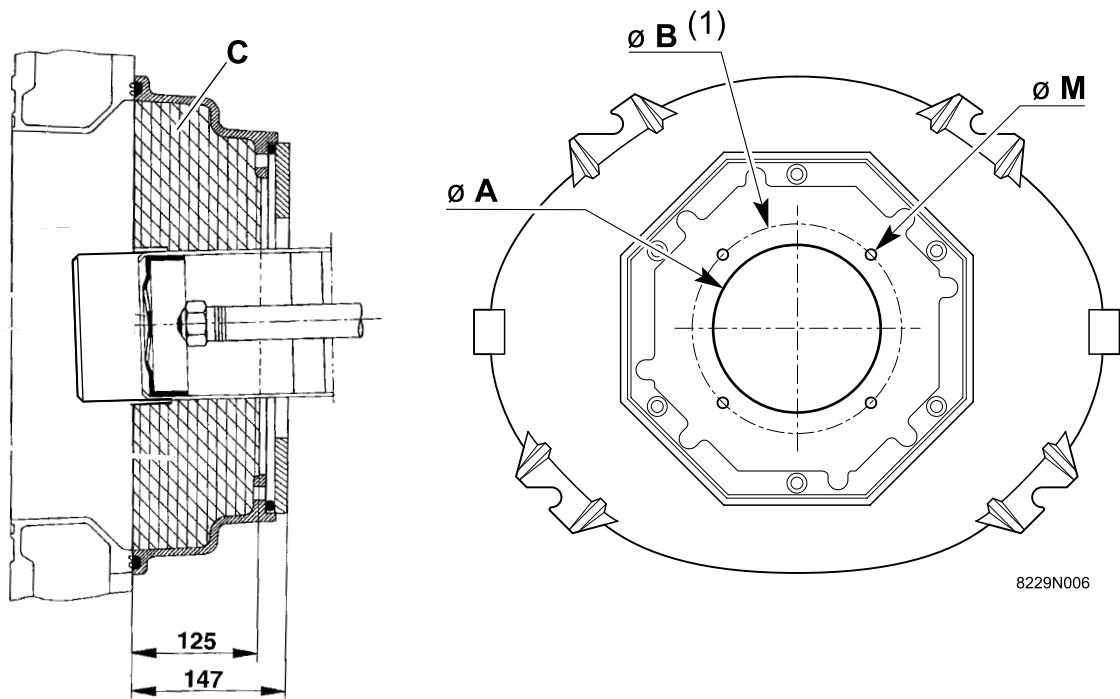
Its diameter shall always be at least equal to that of the boiler outlet, i.e.:

ø 250 mm: for 7 to 10 sections

ø 300 mm: for 11 to 14 sections.

## Fuel-oil or gas connections

 The burner head deflector must be flush with the insulation of the burner door.




(1) Max attachment diameter:

- Max  $\varnothing B = 290$  mm
- Max  $\varnothing B = 330$  mm with 4 fastenings at  $15^\circ$  or  $45^\circ$


$\varnothing A$	135	175	190	240	250	290
$\varnothing B$	170	200	220	270	325	330
$\varnothing M$	8	8	10	10	14	12

Refer to the instructions supplied with the burner.

## Electrical connections

 Refer to the connection instructions supplied with the control panel..

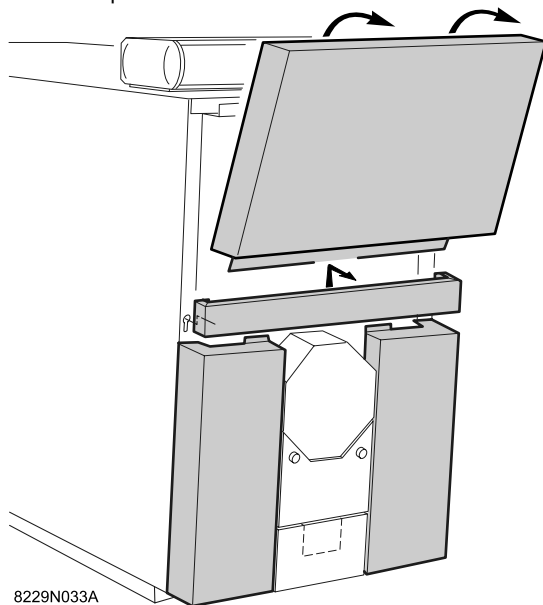
## Maintenance

 The operations described below shall only be performed with the boiler and power supply off.

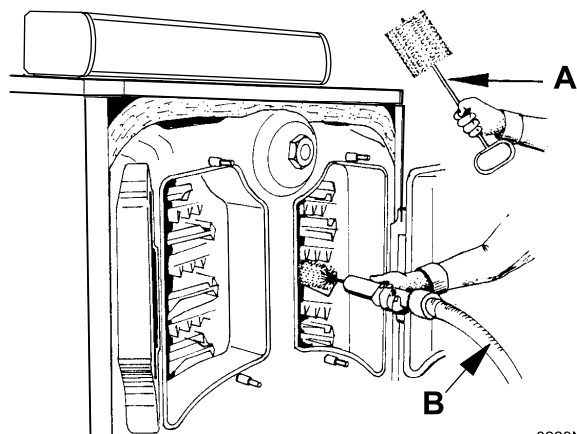
### 1 Sweeping

The boiler will only operate efficiently if the exchange surfaces are kept clean.

The boiler should be cleaned as soon as required and as the chimney, **at least once a year or more**, depending upon applicable regulations and specific needs.



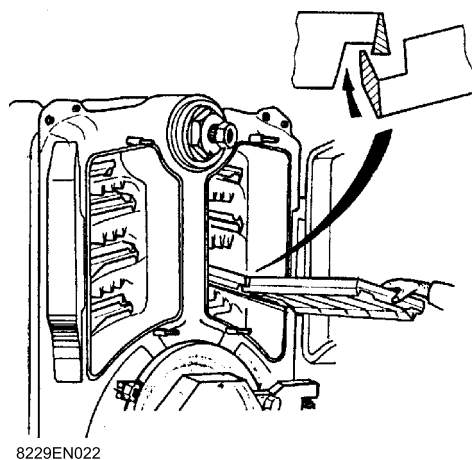
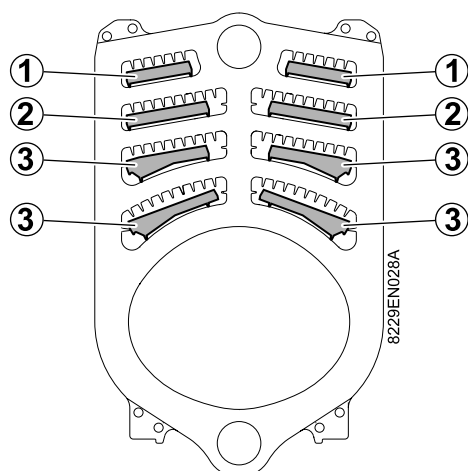
- Cut the power supply to the boiler.
- Remove the upper front panel.



- Open the sweeping doors (upper doors) by unscrewing the 3 nuts using a 19 mm spanner
- Remove the baffle plates from the upper flue ways.
- Carefully sweep the four flue ways with the brush supplied for that purpose.
- Brush the baffle plates as well.
- If possible, use a vacuum cleaner.

## Positioning of the baffles

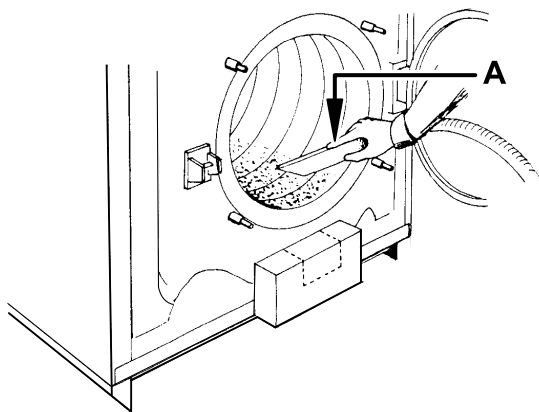
- Replace the baffle plates as per the assembly sequence by hooking them into each other before finally positioning them in the flue way.
- Close the sweeping doors.



**!** Follow the assembly sequence for the baffle plates as shown in the diagram below.  
The 8-figure part number of the baffle plate is moulded into the metal

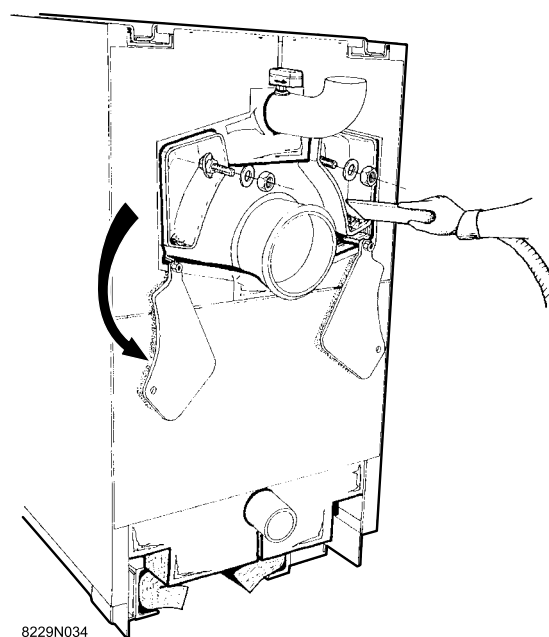
Flue ways		P 420-8	P 420-9 - P 420-10	P 420-11	P 420-12	P 420-13 - P 420-14
Upper	①	8229-0010 and 8229-0022	2 x 8229-0010	2 x 8229-0010 and 1 x 8229-0022	2 x 8229-0010 and 1 x 8229-0022	3 x 8229-0010
Central	②	8229-0011 and 8229-0023	2 x 8229-0011	2 x 8229-0011 and 1 x 8229-0023	2 x 8229-0011 and 1 x 8229-0023	3 x 8229-0011
Lower	③	8229-0012 and 8229-0024	2 x 8229-0012	2 x 8229-0012 and 1 x 8229-0024	2 x 8229-0012	3 x 8229-0012

## Cleaning the combustion chamber



- Unscrew the 4 closing nuts and open the furnace door
- Brush out the inside of the furnace
- Use a vacuum cleaner to remove any soot which has accumulated in the combustion chamber
- Close the door and replace the front panel.

## Cleaning the flue gas box



To do so:

- Open the left and right cleaning hatches on the flue gas box (2 nuts H 12 + flat washers with a 19 mm spanner) and remove any soot which has accumulated using a vacuum cleaner.
- Replace the cleaning hatches.

## 2 Cleaning the casing material

Use a soapy solution and a sponge only. Rinse with clean water and dry with chamois leather or a soft cloth.

## 3 Precautions required in the case of long boiler stops (one or more years)

The boiler and the chimney must be swept carefully. Close all the doors of the boiler to prevent air from circulating inside the boiler.

We advise removing the pipe which connects the boiler to the chimney and to close off the nozzle with a cover.

## 4 Precautions required if the heating is stopped when there is a risk of freezing

We recommend the use of a correctly dosed antifreeze agent to prevent the heating circuit from freezing. If this cannot be done, drain the system completely.



## Burner maintenance

Refer to the instructions supplied with the burner.

## System maintenance

### 1 Water level

Regularly check the level of water in the system and top up if required, taking care that cold water is not added suddenly into the boiler when it is hot.

This operation should be required only a few times in each heating season, with very low quantities of water; otherwise, look for the leak and repair it.

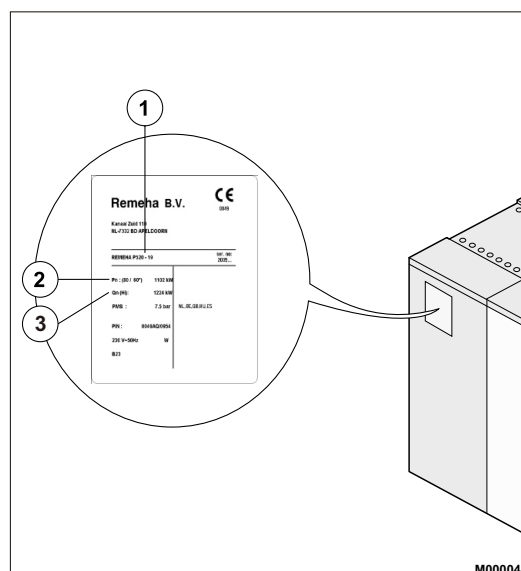
### 2 Draining

We advise you against draining the system unless it is absolutely necessary.

## Identification plate

The identification plate fixed on the side of the boiler during installation is used to identify the boiler correctly and also provides the main specifications of the boiler.

- ① Boiler type
- ② Power ranges
- ③ Thermic output



## Spare parts

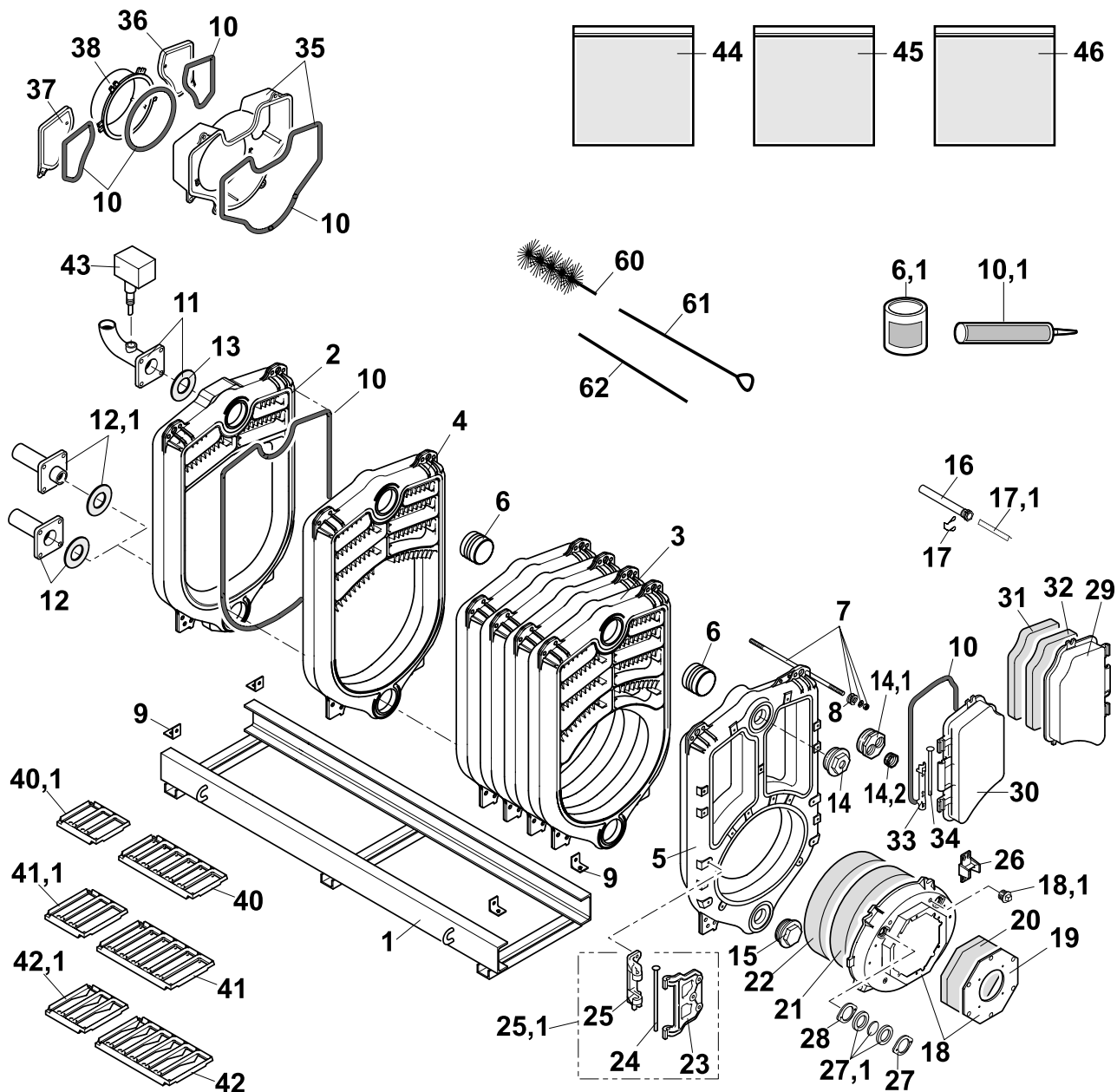
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## Spare parts - P 420

**i** To order a spare part, quote the reference number next to the part required.

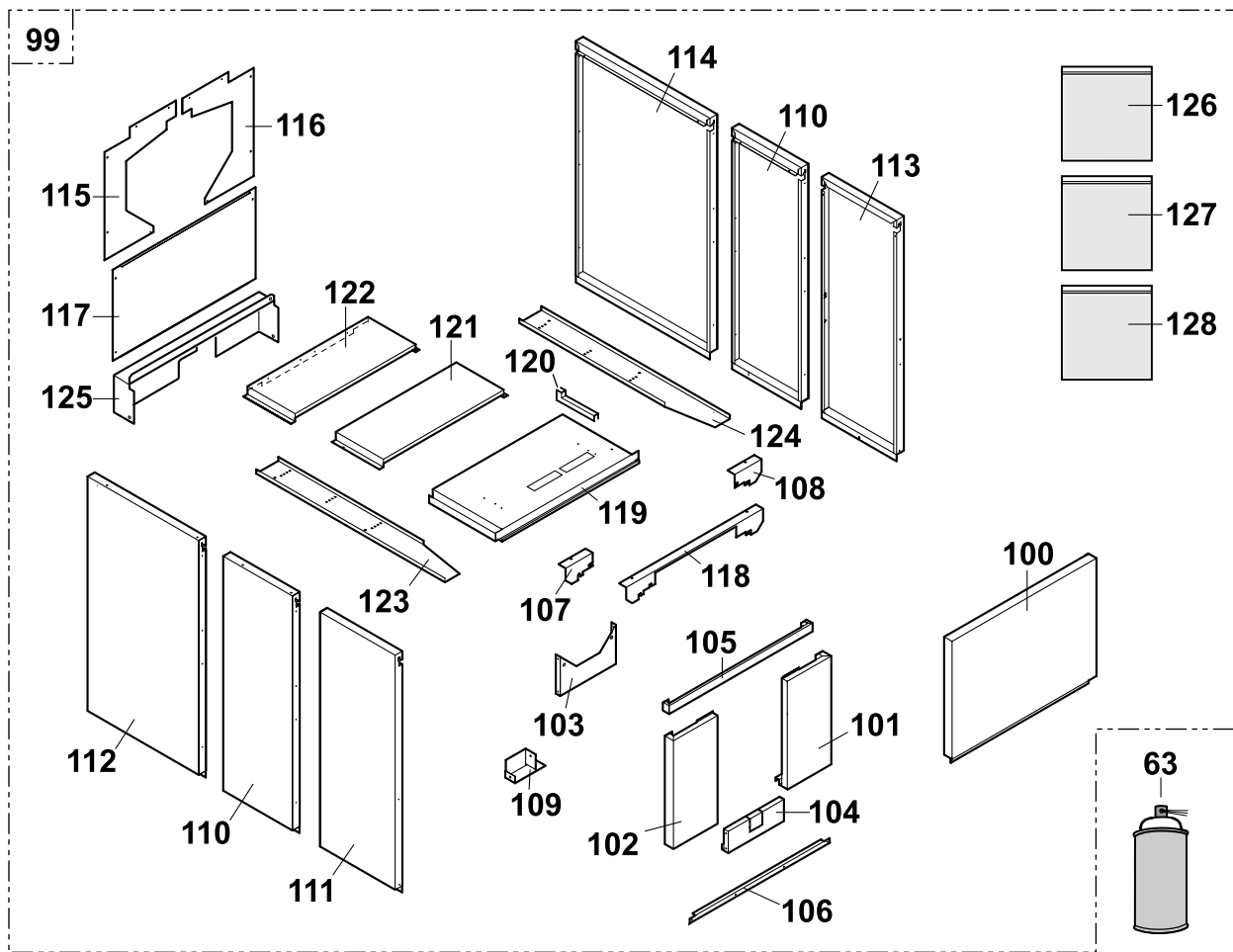
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### Boiler body

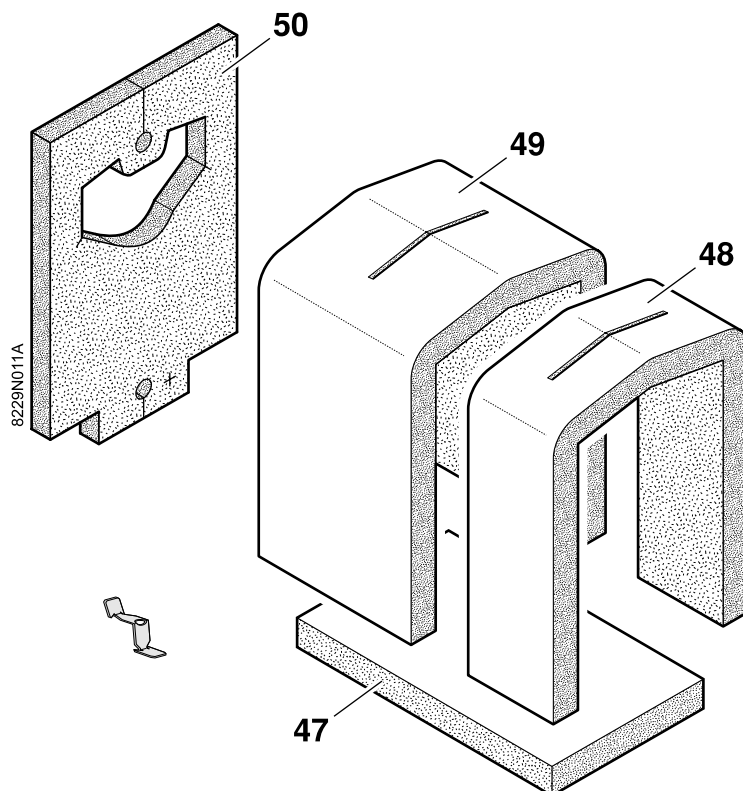


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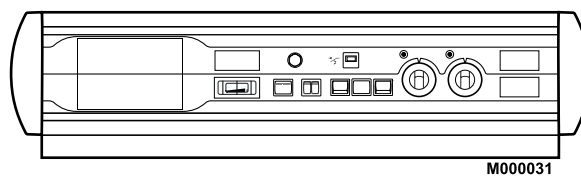
# Cladding



## Insulating material for body



## Panel RC 1



Markers	Code no.	Description
		<b>Boiler body + Accessories</b>
		<b>Base frame</b>
1	8229-8900	Complete frame 7-8 sections
1	8229-8901	Complete frame 9-10 sections
1	8229-8902	Complete frame 11-12 sections
1	8229-8903	Complete frame 13-14 sections
2	8229-8940	Complete rear section
3	8229-0029	Normal intermediate section
4	8229-0030	Special intermediate section
5	8229-8941	Complete front section
6	8005-0200	Nipple
6.1	9430-5027	Nipple greasing product
7	8229-8919	Assembly rod 425
7	8229-8920	Assembly rod 620
7	8229-8921	Assembly rod 784
8	9754-0120	Spring
9	9752-5232	Mounting square
10	9508-6032	Glass fibre cord ø 10 mm (metre)
10.1	9428-5095	Tube of silicon mastic
11	8229-8923	Outlet pipe + seal, 7 to 10 sections
11	8229-8918	Outlet pipe + seal, 11 to 14 sections
12	8104-8965	Return collector + seal, 7 to 10 sections
12.1	8229-8922	Return collector + seal, 11 to 14 sections
13	9501-4135	Gasket 12x120x4
14	8202-0028	2" 1/2 plug with 1/2" opening
14.1	8202-0049	Plug 2 1/2"-1/2"-USA+NL
14.2	9494-8080	Nipple N241-1/2"x1/4"
15	8013-0028	Solid plug 2" 1/2
16	8500-0027	Sensor tube
17	9758-1286	Spring for pocket
17.1	9536-5613	Contact spring for thimble tube
18	8229-8911	Complete combustion chamber door, no opening
18	8229-8943	Complete 10 mm combustion chamber door with opening on request
18	8229-8947	Complete 15 mm combustion chamber door with opening on request
18.1	9495-0050	Plug 1/4"
19	8229-0532	Plate for combustion chamber door, no opening
19	8229-0546	Plate for combustion chamber door with opening ø 135
19	8339-0508	Plate for combustion chamber door with opening ø 175
19	8229-0531	Plate for combustion chamber door with opening ø 190

Markers	Code no.	Description
19	8229-0533	Plate for combustion chamber door with opening ø 240
19	8339-0509	Plate for combustion chamber door with opening ø 250
19	8229-0534	Plate for combustion chamber door with opening ø 290
19	8229-0548	Plate for combustion chamber door with opening on request
19	8229-0548	Plate for combustion chamber door with opening on request
20	9755-0258	Height converter, insulation
21	9755-0259	Furnace door guard
22	9755-0260	Furnace door insulation
23	8229-0204	Hinge
24	9756-0213	Hinge pin for combustion chamber door
25	8229-0205	Hinge for combustion chamber door
25.1	8229-8944	Hinge unit
26	8229-0025	Ramp
27	9757-0027	Inspection flange
27.1	8015-7700	Viewport + seals
28	9501-0080	Flame detection cell seal
29	8229-8905	Complete sweeping door, right
30	8229-8906	Complete sweeping door, left
31	9755-0256	Insulation, sweeping door
32	9755-0257	Inner protection, sweeping door
33	8229-0202	Hinge for sweeping door
34	9756-0214	Hinge pin for sweeping door
35	8229-8907	Complete flue gas box
36	8229-8908	Complete right-hand cleaning trap
37	8229-8909	Complete left-hand cleaning trap
38	8229-8916	Flue gas nozzle ø 250 - 7 to 10 sections
38	8229-8917	Flue gas nozzle ø 250 - 11 to 14 sections
40	8229-0010	Upper baffle plate, width 190 mm
40.1	8229-0022	Additional upper baffle plate, width 190 mm
41	8229-0011	Upper baffle plate, width 240 mm
41.1	8229-0023	Additional upper baffle plate, width 240 mm
42	8229-0012	Lower baffle plate
42.1	8229-0024	Additional upper baffle plate
		<b>Flow switch</b>
43	8802-4703	Flow controller P 420-7
43	8802-4707	Flow controller P 420-8
43	8802-4710	Flow controller P 420-9
43	8802-4712	Flow controller P 420-10
43	8802-4722	Flow controller P 420-11

Markers	Code no.	Description
43	8802-4725	Flow controller P 420-12
43	8802-4727	Flow controller P 420-13
43	8802-4729	Flow controller P 420-14
44	8229-8936	Screws and accessories bag
45	8229-8937	Variable screws and accessories bag
46	8229-5500	Body screws packet
		<b>Insulating material for body</b>
47	8229-4010	Lower insulation, boiler body - 7 and 8 sections
47	8229-4016	Lower insulation, boiler body - 9 and 10 sections
47	8229-4034	Lower insulation, boiler body - 11 and 12 sections
47	8229-4036	Lower insulation, boiler body - 13 and 14 sections
48	8229-4004	Front boiler body insulation, width 500 mm
49	8229-4015	Boiler body insulation, width 500 mm
49	8229-4018	Boiler body insulation, width 600 mm
49	8229-4009	Boiler body insulation, width 800 mm
49	8229-4012	Boiler body insulation, width 900 mm
50	8229-4005	Rear insulation
		<b>Miscellaneous</b>
60	9750-5025	Brush
61	9750-5060	1300 mm brush rod
62	9750-5048	Extension for brush rod 650 mm
63	9434-5102	Retouching spray paint - anthracite grey
63	9434-5104	Retouching spray paint - ivory
		<b>Cladding</b>
100	200003654	Complete upper front panel
101	8229-1001	Complete lower front panel, right
102	8229-1003	Front panel, burner
103	8229-1004	Complete lower front panel, left
104	8229-1005	Sludge removal cap
105	8229-8834	Complete front cladding support
106	8229-0537	Lower front crosspiece
107	8229-8807	Upper cladding support, left
108	8229-8808	Upper cladding support, right
109	8229-8010	Lower cladding support
110	8545-0500	Side panel, left or right, width 480 mm
111	8545-8006	Complete front side panel, left
112	8545-8004	Complete side panel, left, width 770 mm
112	8545-8003	Complete side panel, left, width 610 mm
112	8545-8005	Complete side panel, left, width 930 mm
113	8545-8007	Complete front side panel, right
114	8545-8000	Complete side panel, right, width 610 mm
114	8545-8001	Complete side panel, right, width 770 mm
114	8545-8002	Complete side panel, right, width 930 mm

Markers	Code no.	Description
115	8229-8835	Complete upper rear panel, left
116	8229-8836	Complete upper rear panel, right
117	8229-8012	Lower back panel
118	8229-8837	Complete upper cross-bar
119	8229-8809	Complete front cover
120	9755-0187	Rubber profile for cable way
121	8229-0515	Complete intermediate cover
122	8229-0518	Complete rear cover, width 170 mm
122	8229-0511	Complete rear cover, width 330 mm
122	8229-0514	Complete rear cover, width 490 mm
123	8229-8818	Complete cable way, left, P 420-7
123	8229-8819	Complete cable way, left, P 420-8
123	8229-8820	Complete cable way, left, P 420-9
123	8229-8821	Complete cable way, left, P 420-10
123	8229-8822	Complete cable way, left, P 420-11
123	8229-8823	Complete cable way, left, P 420-12
123	8229-8824	Complete cable way, left, P 420-13
123	8229-8825	Complete cable way, left, P 420-14
124	8229-8826	Complete cable way, right, P 420-7
124	8229-8827	Complete cable way, right, P 420-8
124	8229-8828	Complete cable way, right, P 420-9
124	8229-8829	Complete cable way, right, P 420-10
124	8229-8830	Complete cable way, right, P 420-11
124	8229-8831	Complete cable way, right, P 420-12
124	8229-8832	Complete cable way, right, P 420-13
124	8229-8833	Complete cable way, right, P 420-14
125	8229-5501	Additional lower rear panel
126	8229-8933	Screw bag, common parts
127	8229-8934	Screw bag, variable parts CS11
128	8229-8935	Screw bag, variable parts CS13
		<b>Control panel K - RC 1</b>
		Refer to the connection instructions supplied with the control panel..



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Subject to alterations.