

+ MULTILINE FLUE KIT

EVOMAX

30 - 150

30P - 80P

When replacing any part on this appliance, use only spare parts that you can be assured conform to the safety and performance specification that we require. Do not use reconditioned or copy parts that have not been clearly authorised by Ideal.

For the very latest copy of literature for specification and maintenance practices visit our website www.idealcommercialboilers.com where you can download the relevant information in PDF format.

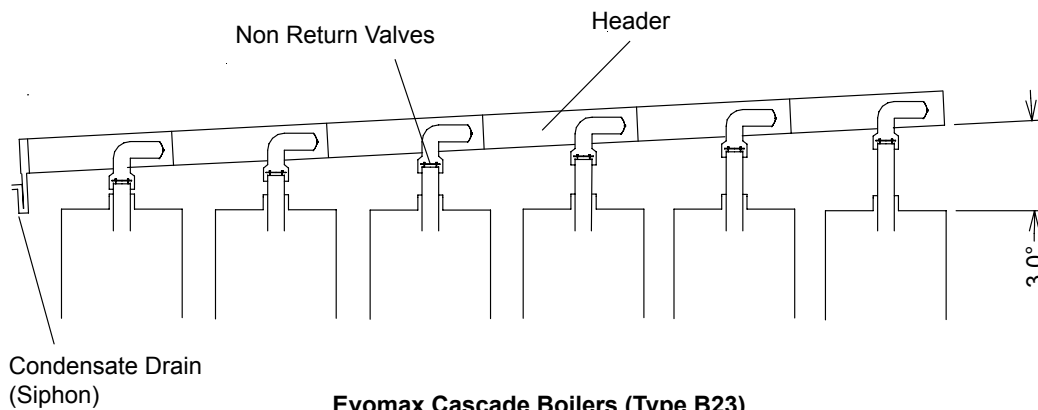
CONTENTS

Introduction	3
Cascade Flue Components	4
Assembly	5
Flue Design	6
Commissioning	9
Starter Kit Components	10
Extension Kit Components	12

NOTE TO THE INSTALLER: LEAVE THESE INSTRUCTIONS ADJACENT TO THE GAS METER.

INTRODUCTION

1.0 EVOMAX CASCADE FLUE SYSTEM



1.1 INTRODUCTION

The Cascade Flue system enables Evomax boilers of 'open flue' Type B23 to be connected via a common flue header. The Cascade Header may be coupled to a bespoke flue outlet system designed by a flue specialist (section 3).

To ensure safety of operation non-return valves are incorporated to prevent back-flow of combustion products through any individual boiler that is not firing.

The condensate produced within the flue drains through the central trough of the header duct and exits via a siphon.

The maximum permissible system capacity is limited to the value shown in Table 1.2; this is necessary to ensure acceptable operation of any individual boiler operating at its minimum output under the influence of the total system pressure generated by the adjacent boilers.

There are optional system configurations that will provide different characteristics, these options should be considered to optimise the system performance. (Table 1.2).

1.2 SYSTEM CONFIGURATIONS

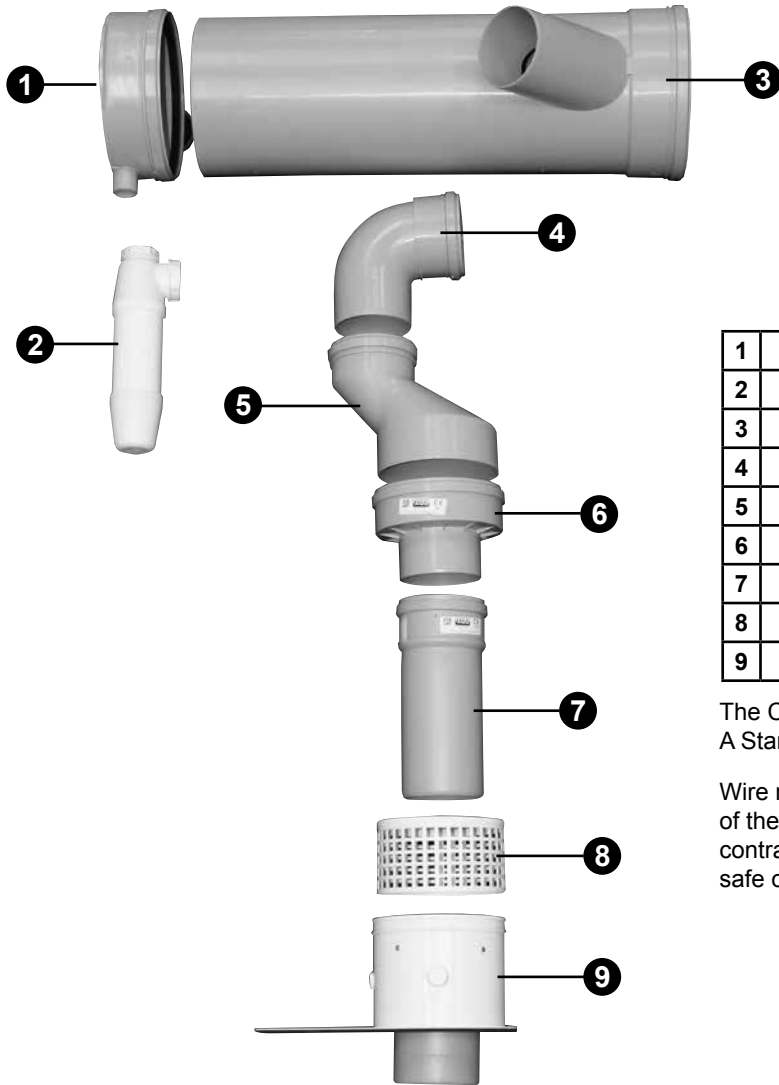
Option	Gas Type	Evomax Models	Max number of boilers	Max System Capacity
1	Natural Gas	Combinations of 100,120,150	6	600kW
2		Combinations that include a 30,40,60 or 80	6	400kW
3	Propane	Combinations of 30P,40P,60P,80P	6	400kW

Choosing the most appropriate configuration to the required application will influence the performance in the following ways;

- System Capacity.
- Number of Boilers
- Turn-Down capability
- Flue length capability *Refer to Section 3.0 for details*

COMPONENTS

2.0 CASCADE FLUE COMPONENTS (FIGURE 2.1)



1	End Cap
2	Siphon
3	Collector Pipe (200 dia)
4	Elbow (90° x 100)
5	Non-Return Valve Connector (100 x 150)
6	Non-Return Valve Body (150 x 100 or 80)
7	Flue Extension Tube (100 or 80)
8	Air Intake Grill
9	Flue Connector (100/150 or 80/125)

The Cascade Flue system is supplied in two kits. A Starter Kit & Extension Kit.

Wire retaining clips are also provided to prevent movement of the tube connections by the influence of expansion and contraction. These **must** be fitted to the ductwork to ensure safe operation of the system.

2.2 STARTER KIT

This kit comprises all of the items shown in Figure 2.1.

There are two Kits available;
 UIN 210264 for the 30-80 models
 UIN 210268 for the 100-150 models
Drawings appended (p10 & p11)

2.3 EXTENSION KIT

This kit comprises the components required to fit additional single boilers to the system.

There are two Kits available;
 UIN 210265 for the 30-80 models
 UIN 210269 for the 100-150 models
Drawings appended (p12 & 13)

2.4 ASSEMBLY

It is recommended that Evomax applications of the Cascade Flue System should be installed in combination with the Ideal Frame & Header Kit.

The Polypropylene flue tubes are designed to assemble together by push fit connection, a recessed flexible seal is incorporated to create a gas tight join.

The seal should be lubricated with water to facilitate assembly. Other lubricants must not be used.

The non-return valve is a two part assembly; the valve connector and the valve body. The valve connector has an eccentric axis, by rotation of the connector the relative position of the boiler and header may be adjusted. This feature will accommodate any positional tolerance of the header during installation and permit 30-80 models and 100-150 models within the same system (Figure 2.5).

The flue extension tube is either 80mm dia or 100mm dia according to the models being installed, the supplied flue tube length is 500mm.

The header gradient should be 3 degrees falling to the condensate drain end to allow adequate condensate drainage; to create this slope the extension tubes of adjacent boilers must be cut to the required length (Fig 2.6).

Condensate Drain Connection

For the correct termination of the condensate drain refer to the advice given with respect to condensate drain acceptable practice as provided in the Installation and Servicing Instructions provided with the Evomax appliance.

The flue connector is specific to either the 30-80 models or 100-150 models, the inner tube is manufactured in Polypropylene in accordance with the cascade system. Flue connectors with an aluminium inner tube must not be used.

FIGURE 2.5 ECCENTRIC VALVE CONNECTOR POSITIONING

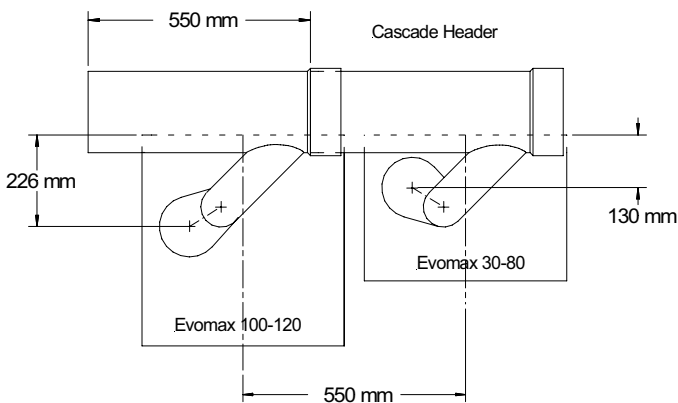
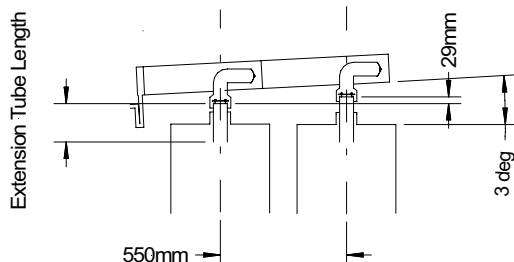


FIGURE 2.6 CONDENSATE FALL DIMENSIONS

Increase in the extension tube length required between adjacent boilers = 29mm



2.7 WIRE RETAINING CLIPS

To prevent movement of the tube connections by the influence of expansion and contraction, securing clips are provided. The wire spring clip locates under the rim of the female component and is secured by a nut and bolt around the locating spigot, this creates a resistance to any opposing force. (Fig 2.9)

There is one Wire Retaining Clip provided for each of the flue connections.

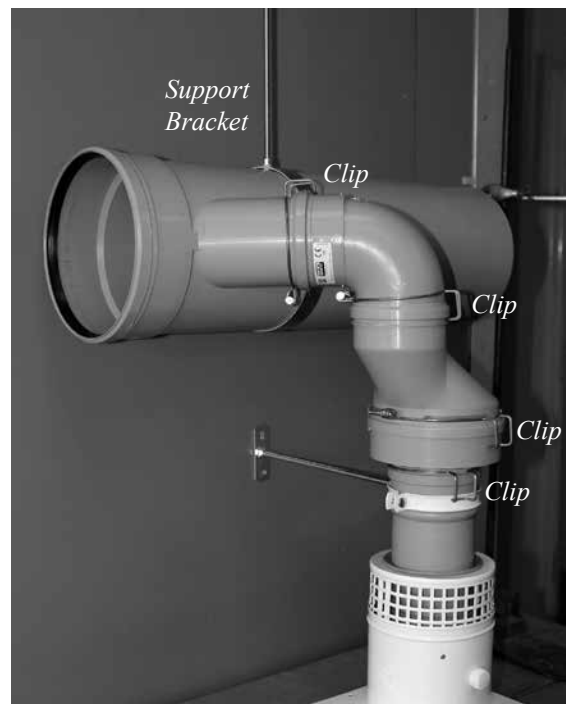
The wire retaining clips must be fitted to every join to ensure safe operation of the system.

2.8 HEADER INSTALLATION

The Cascade Header is suspended from a ceiling or overhead structure by studding attaching to brackets holding the circumference of the header duct. There is one bracket and stud rod supplied with each of the Starter & Extension Kits. (Fig 2.9)

The boiler flue tube of each boiler is secured by a clamp and tie rod either to a wall or supporting structure. (Fig 2.9)

FIGURE 2.9



Wire retaining clips are also fitted to the starter kit End Cover and Syphon connection (not shown).

Refer to diagrams shown in pages 10-13 for correct location of all wire retaining clips.

Important: All wire retaining clips must be fitted to the ductwork to ensure safe operation of the system.

FLUE DESIGN

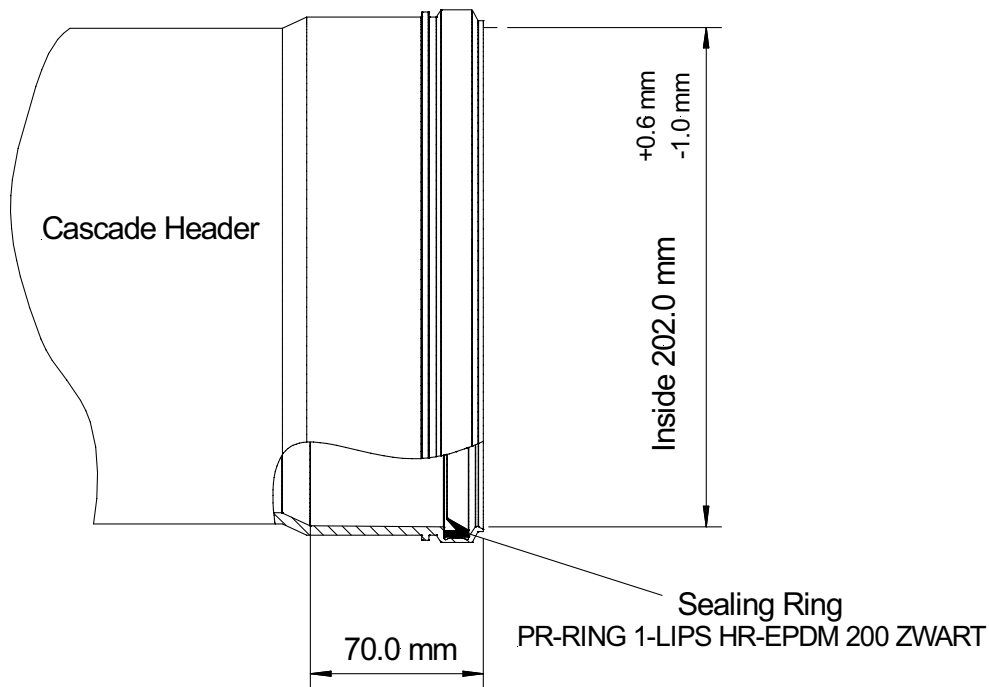
3.0 FLUE DESIGN



IMPORTANT: LEAKAGE OF FLUE PRODUCTS INTO THE ROOM WILL DEplete THE OXYGEN LEVEL & INHIBIT SAFE COMBUSTION.

- 3.01 The following standards are relevant to the construction, installation & testing of flue systems.
- | | |
|-------------|--|
| BSEN 14471 | Plastic Chimneys – requirements and test methods |
| BSEN 1856-1 | Metal Chimneys – Requirements |
| BSEN 1859 | Metal Chimneys – Test methods |
| BS 6644 | Installation & Maintenance of gas fired hot water boilers 70kW – 1.8MW |
- 3.02 The Flue Stack must be specified by a Flue Specialist
- 3.03 Design of the connecting flue spigot must refer to the dimensions of the mating collar (Fig 3.1).
- 3.04 The Polypropylene header and EPDM seal are certified to BSEN 14471.
- 3.05 Integrity of the flue joints and safety of operation must be proven by the installer.
- 3.06 The flue resistance at 'A' in Figure 3.2 is not permitted to exceed the maximum static pressure specification [Pmax] quoted in Table 3.3 when operating at the maximum capacity.
- 3.07 The flue route should be planned to enable the least directional change, one elbow is recommended as depicted in Figure 3.2.
- 3.08 The flue pipe diameter must be at least 200mm, larger diameters will permit longer flue length.
- 3.09 The flue material must be suitable for condensing operation.
- 3.0.10 The terminal guard must prevent the ingress of objects greater than 15mm diameter to comply with EN15502.
- 3.0.11 The Flue Terminal design should be selected to create the least resistance and not compromise the potential flue length. A wire mesh type is recommended with a 14mm grid.
- 3.0.12 Rain ingress may be ignored as the header design enables excess water to be discharged through the condensate drain.

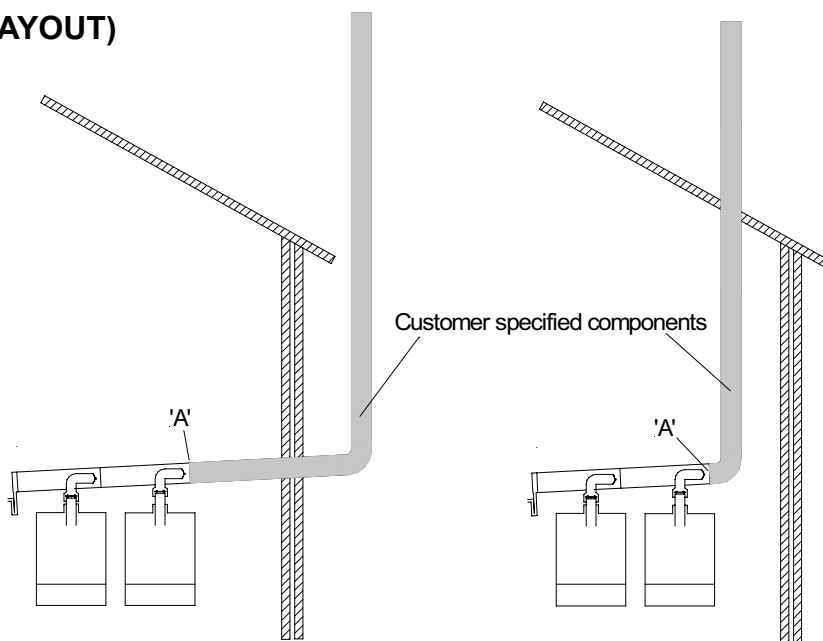
**FIGURE 3.1
(CASCADE HEADER INTERFACE DETAIL - FEMALE FLUE SOCKET CONNECTION)**



NOTE: Connecting flue must comply with CE approval requirements

FLUE DESIGN

**FIGURE 3.2
(FLUE SYSTEM LAYOUT)**



3.3 EVOMAX CASCADE FLUE SYSTEM DATA

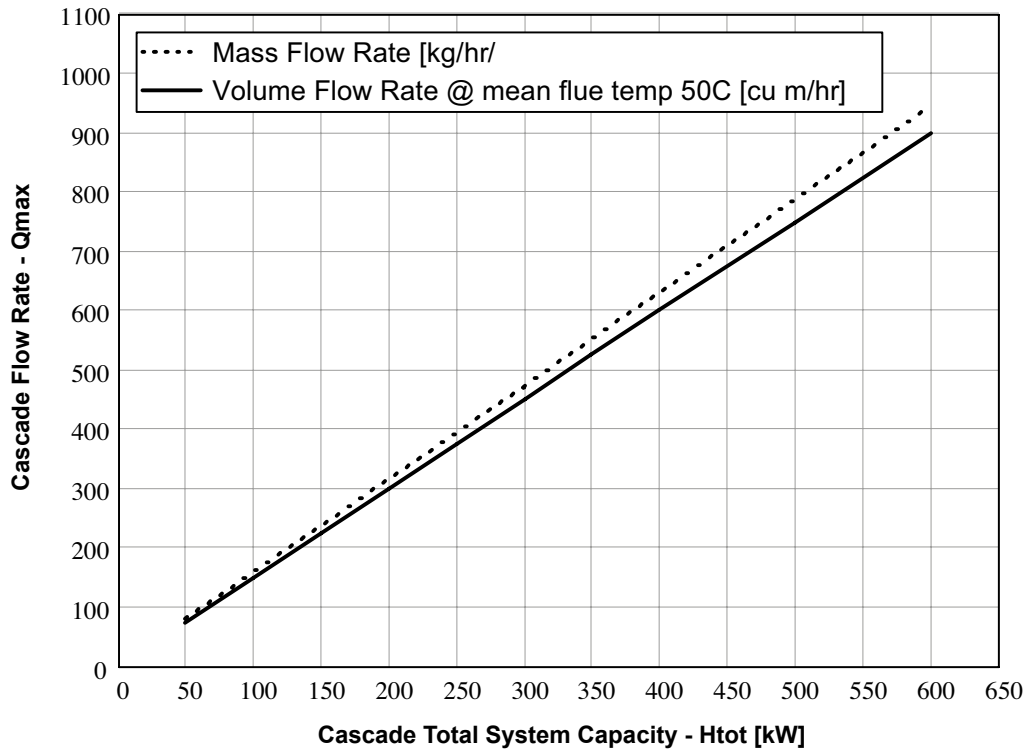
Evomax Model Output		Cascade System Limits		Combustion Products Data		
Model		Maximum System Capacity	Maximum Permissible Header Pressure 'A' (Static)	max rate CO ₂	min rate CO ₂	Temperature Max
Max	Min	Hmax	Pmax	± 0.5	± 0.5	
kW	kW	kW	Pa	%	%	C
30	7.5	400	40	9.7	9.0	72
40	10					
60	15					
80	20					
100	25	600	80	9.7	9.0	
120	30					
150	37.5					
30P	7.5	400	40	11.4	10.6	
40P	10					
60P	15					
80P	20					

3.4 DESIGN PROCEDURE

1. Determine the required total heat output. (H_{tot}) [maximum of 6 boilers per system].
2. Determine the required minimum heat output.
3. From Table 3.3 select the Evomax models required.
4. Using Figure 3.5 read the Combustion Products Flow Rate (Q_{max}) at the Total System Capacity (H_{tot}).
5. Record the information in Table 3.6
6. Calculate the maximum permissible flue length at conditions Q_{max} & P_{max}.
 $L = [a - (c + d)] / b$ (Table 3.6)

FLUE DESIGN

**FIGURE 3.5
(COMBUSTION PRODUCTS FLOW RATE)**



**FIGURE 3.6
(EVOMAX CASCADE FLUE SYSTEM DATA)**

System	System Models	System Capacities			Combustion Products Data			Flue Data			
		Total	Min	Turn Down Ratio	Flow Rate Qmax		Header Pressure Pmax	Pressure Losses			Max length
		Htot	Hmin		Mass	Vol @ 50C	(a) static	(b) 1m	(c) 90°	(d) guard	L
		<i>kW</i>	<i>kW</i>		<i>Kg/hr</i>	<i>m3/hr</i>	<i>Pa</i>	<i>Pa</i>	<i>Pa</i>	<i>Pa</i>	<i>m</i>
Ex 1	(4x80) + (1x30)	350	7.5	40:1	550	525	40				
Ex 2	3 x 120	360	30	12:1	560	550	80				

Example 1
This example requires a total output of 350kW and comprises (4 x 80) + (1 x 30) models; the inclusion of the 30kW model enables the greatest turn-down (40:1) but the maximum permissible header pressure is limited to 40Pa.

Example 2
The heat requirement here is also 350kW; by selecting 3 x 120kW models (360kW) the maximum permissible header pressure is raised to 80Pa which will enable greater flue length. The turn-down ratio will be reduced to 12:1.

COMMISSIONING

4.0 COMMISSIONING

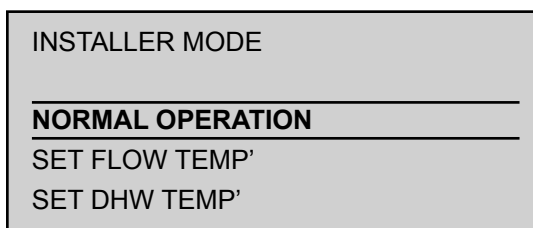
To accommodate the flue pressure generated by the connection of multiple boilers to a common flue, the minimum rate (equivalent to minimum fan speed) of each Evomax appliance operating on the Multiline cascade system is increased to offset the maximum back-pressure created.

Table 4.1 shows the revised performance of each Evomax model where it differs from standard standalone operation as shown in the Evomax Installation & Servicing instructions.

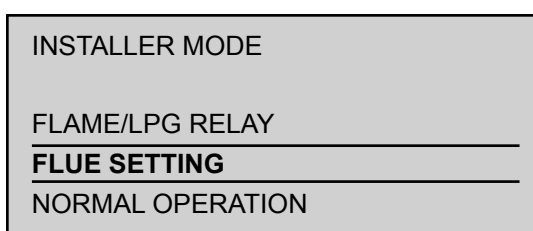
To convert Evomax operation with the Multiline flue as described, the change is made by accessing the operating parameters on the Evomax user interface control panel following the procedure below. This change must be made to each Evomax operating on the Multiline cascade system.

Procedure for selecting Multiline cascade flue operation on Evomax user interface control panel.

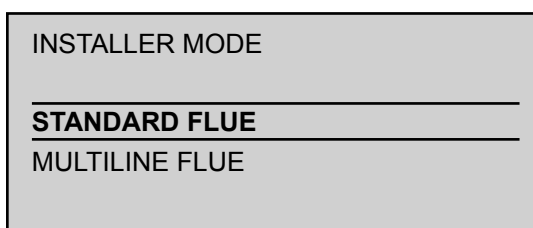
- 1.0 Press SELECT and then hold + and – buttons down together for more than 5 seconds, the following screen will be displayed.



- 2.0 Rotate the KNOB clockwise and scroll downwards towards the end of the list until the following screen is displayed.



- 3.0 Press SELECT and the following screen will be displayed.



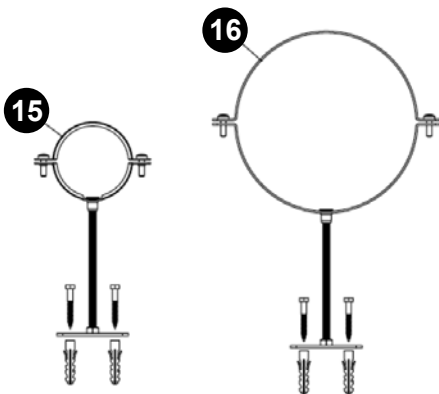
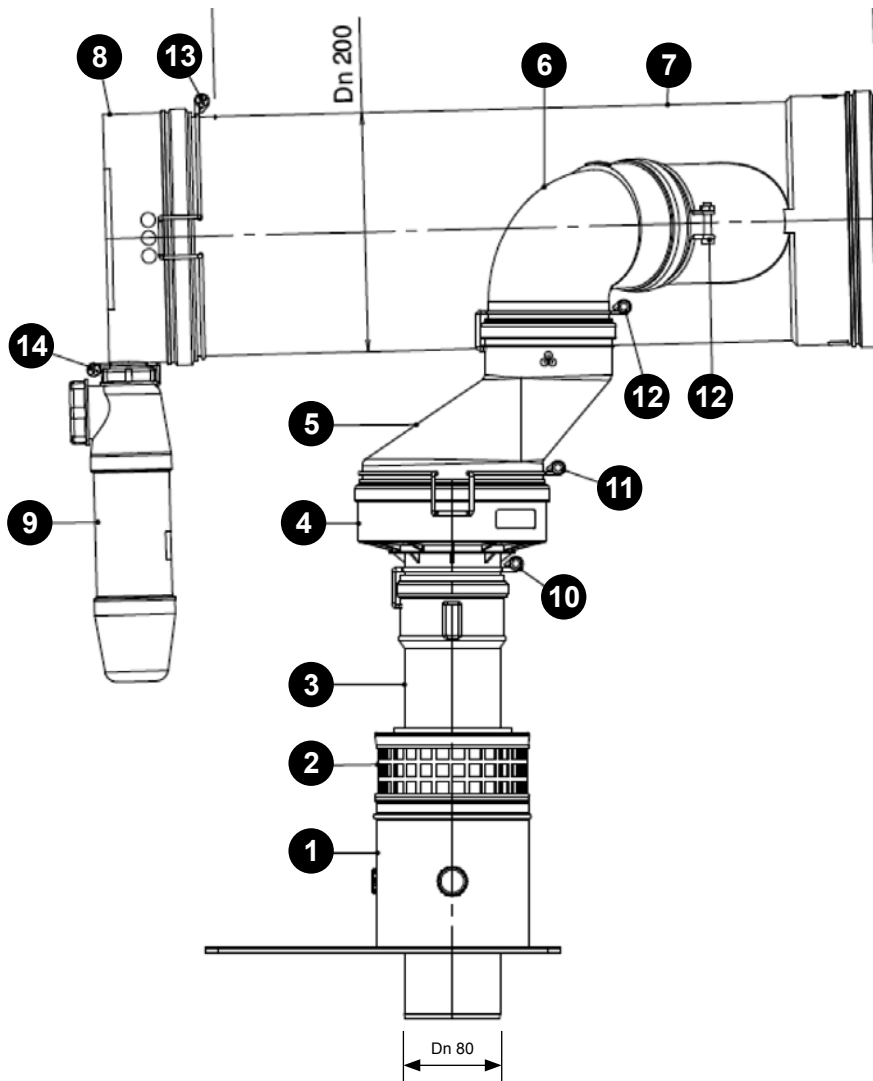
- 4.0 Press + or - to highlight 'Multiline Flue' and then press ENTER to store.
- 5.0 Rotate the KNOB clockwise until Normal Operation is highlighted again and press SELECT to return to normal operation.

4.1 EVOMAX CASCADE FLUE SYSTEM – MINIMUM RATE BOILER SETTINGS & DATA

Evomax Boiler Model			30	30P	40	40P	60	60P	80	80P	100	120	150
Fan Speed		rpm	1980	2100	2400	2340	1800	1800	2340	2220	2280	1860	1800
Input	net	kW	7.6	7.6	10.1	10.1	15.2	15.2	20.5	20.5	25.6	30.7	38.4
	gross	kW	8.4	8.3	11.2	11.0	16.9	16.5	22.7	22.3	28.4	34.1	42.6
Output <i>non-condensing</i>		kW	7.5	7.5	10	10	15.0	15.0	20	20	25.0	30.0	37.5
Output <i>condensing</i>		kW	8.0	7.8	10.7	10.4	16.0	15.7	21.6	21.2	27.0	32.4	40.5
Flue CO ₂	± 0.5	%	9.0	10.6	9.0	10.6	9.0	10.6	9.0	10.6	9.0	9.0	9.0
NO _x (weighted)	Cat 5	mg/kWh	33	82	41	84	35	84	42	68	43.5	41	40.5

STARTER KITS

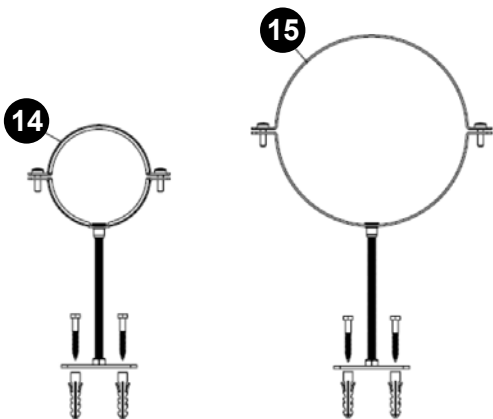
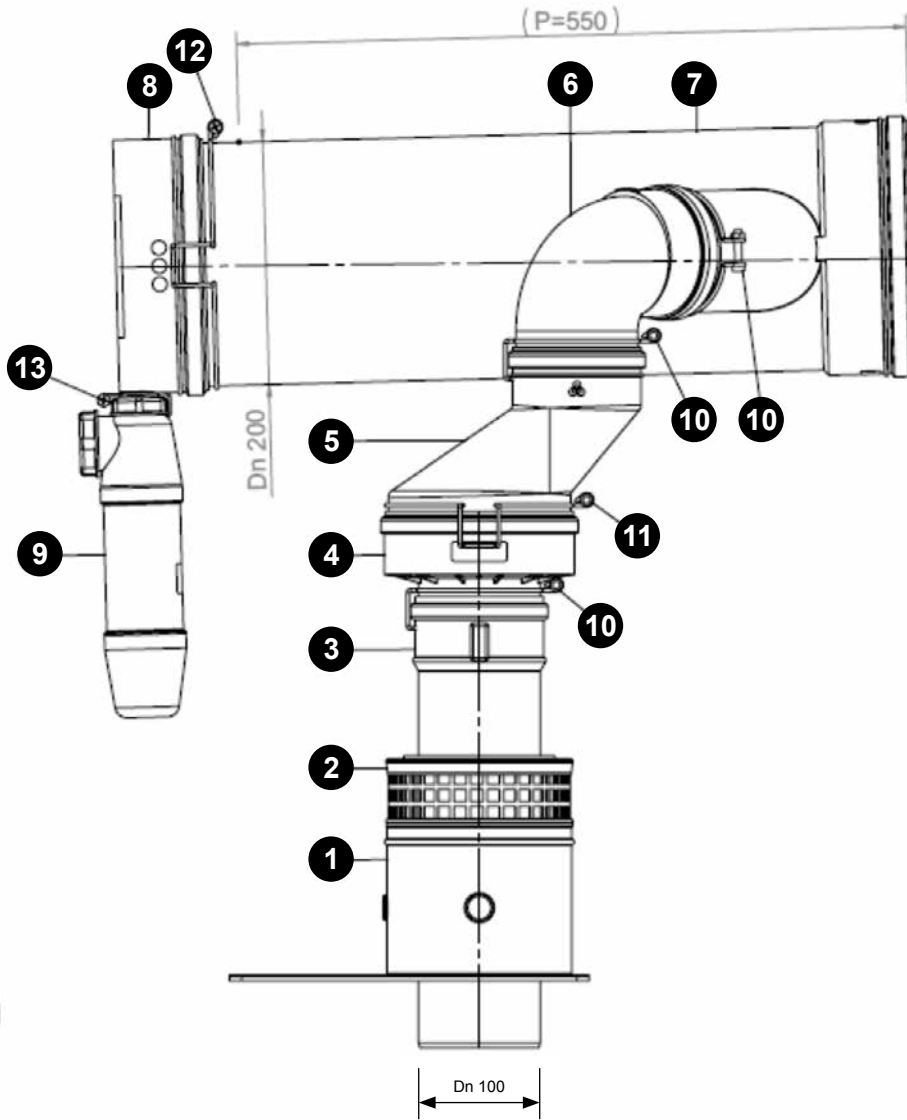
STARTER KIT COMPONENTS FOR 30-80 MODELS [UIN 210264]



POS.	QTY.	DESCRIPTION
1	1	ADAPTER CONCENTRIC PP 80/125 + MP
2	1	AIR INLET GRILL AL 125-80 H=85
3	1	EXTENSION PP 80x500
4	1	VALVE PP 80-150
5	1	REDUCER EXC. PP 150-100
6	1	ELBOW SHORT PP 100 90°
7	1	COLLECTOR PP 200x610 1x100 45°
8	1	COVER PP 200 + CONDENSATE
9	1	SYPHON PP H=150
10	1	LOCKING CLIP 80
11	1	LOCKING CLIP 150
12	2	LOCKING CLIP 100
13	1	LOCKING CLIP 200
14	1	LOCKING CLIP 32
15	1	WALL BRACKET 80 RAL-9016
16	2	WALL BRACKET AL 200 + WALL PLATE

STARTER KITS

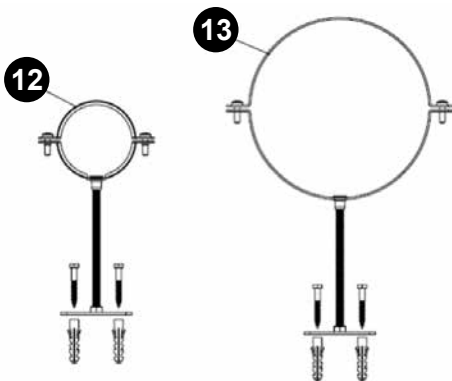
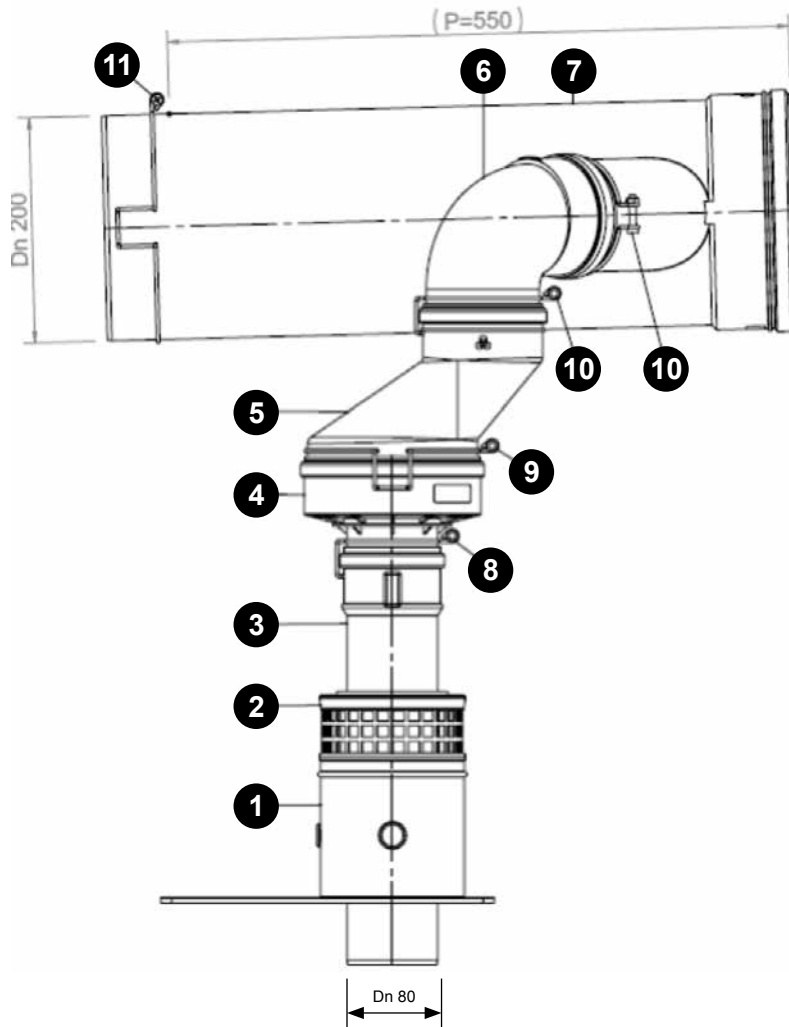
STARTER KIT COMPONENTS FOR 100-150 MODELS [UIN 210268]



POS.	QTY.	DESCRIPTION
1	1	ADAPTER CONCENTRIC PP 100/150 + MP
2	1	AIR INLET GRILL AL 150-100 H=85
3	1	EXTENSION PP 100x500
4	1	VALVE PP 100-150
5	1	REDUCER EXC. PP 150-100
6	1	ELBOW SHORT PP 100 90°
7	1	COLLECTOR PP 200x610 1x100 45°
8	1	COVER PP 200 + CONDENSATE
9	1	SYPHON PP H=150
10	3	LOCKING CLIP 100
11	1	LOCKING CLIP 150
12	1	LOCKING CLIP 200
13	1	LOCKING CLIP 32
14	1	WALL BRACKET 100 RAL-9016
15	2	WALL BRACKET AL 200 + WALL PLATE

EXTENSION KITS

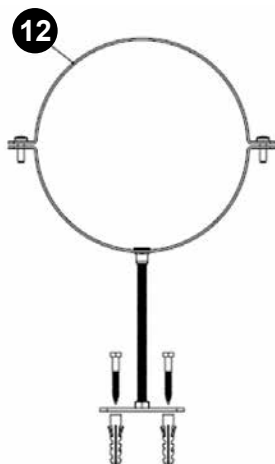
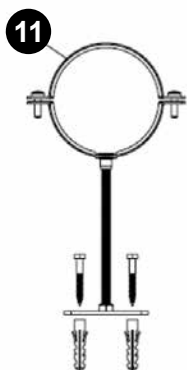
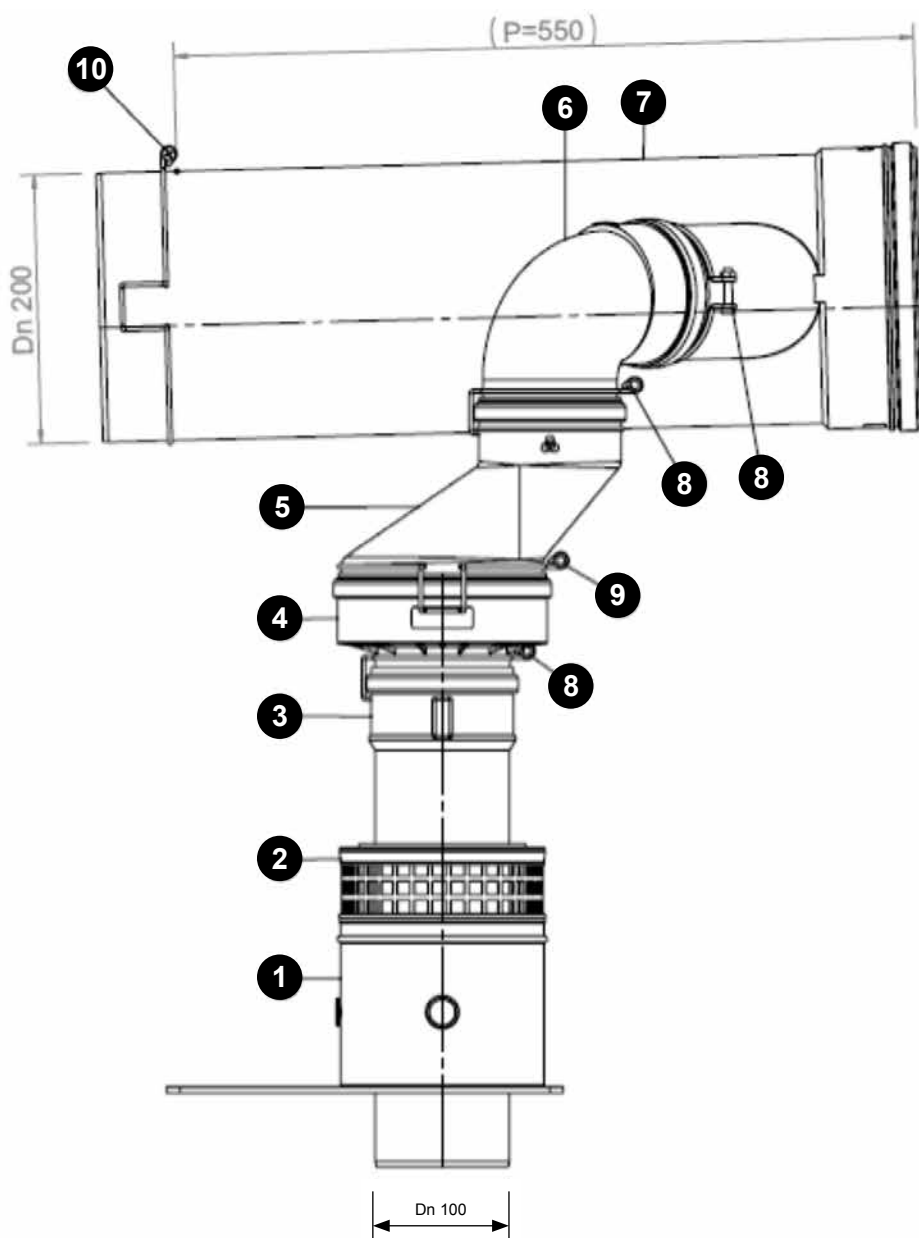
EXTENSION KIT COMPONENTS FOR 30 -80 MODELS [UIN 210265]



POS.	QTY.	DESCRIPTION
1	1	ADAPTER CONCENTRIC PP 80/125 + MP
2	1	AIR INLET GRILL AL 125-80 H=85
3	1	EXTENSION PP 80x500
4	1	VALVE PP 80-150
5	1	REDUCER EXC. PP 150-100
6	1	ELBOW SHORT PP 100 90°
7	1	COLLECTOR PP 200x610 1x100 45°
8	1	LOCKING CLIP 80
9	1	LOCKING CLIP 150
10	2	LOCKING CLIP 100
11	1	LOCKING CLIP 200
12	1	WALL BRACKET 80 RAL-9016
13	1	WALL BRACKET AL 200 + WALL PLATE

EXTENSION KITS

EXTENSION KIT COMPONENTS FOR 100-150 MODELS [UIN 210269]



POS.	QTY.	DESCRIPTION
1	1	ADAPTER CONCENTRIC PP 100/150 + MP
2	1	AIR INLET GRILL AL 150-100 H=85
3	1	EXTENSION PP 100x500
4	1	VALVE PP 100-150
5	1	REDUCER EXC. PP 150-100
6	1	ELBOW SHORT PP 100 90°
7	1	COLLECTOR PP 200x610 1x100 45°
8	3	LOCKING CLIP 100
9	1	LOCKING CLIP 150
10	1	LOCKING CLIP 200
11	1	WALL BRACKET 100 RAL-9016
12	1	WALL BRACKET AL 200 + WALL PLATE

Technical Training

The Ideal Boilers Technical Training Centre offers a series of first class training courses for domestic, commercial and industrial heating installers, engineers and system specifiers. For details of courses please ring: 01482 498 432

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