

Technical information

# Remeha Quinta Cascade guide

Cascade guide

Cascade systems



 remeha



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## FOREWORD

This technical information contains useful and important information for dimensioning a cascade system with wall-hung boilers properly and for using the complete Remeha cascade systems with modulating wall-hung boilers, the Remeha Quinta 45, Quinta 65, Quinta 85 and Quinta 115, correctly.

If you still have any questions regarding cascade configurations or wish to discuss any related subjects, please contact our **Sales Support department**:

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The data published in this technical information is based on the most recent information. It is issued with the reservation that it is subject to change. We reserve the right to change the design and/or performance of our products at any time without obligation to modify earlier deliveries accordingly.

## 1 GENERAL DESCRIPTION OF CASCADE SYSTEMS

### 1.1 Optimum number of boilers in a cascade

In certain situations it is advantageous to spread the total required heat output over several boilers. This is made possible by means of a “cascade system”. In a cascade configuration, boilers are connected together hydraulically with sequence or step controls to more accurately follow the property load demand. If the heat demand increases or decreases, boilers are switched on or off respectively. It is then important to determine the ideal number of boilers for the cascade. The following factors need to be taken into account when deciding on the number of boilers:

- **Investment**; when boilers are split up, the investment costs (boiler cost including installation, fittings, pipe work, pumps and control equipment) can work out lower or higher. However, this depends to a large extent on the situation.
- **Reliability**; reliability increases with the number of boilers. However, there is a distinct upper limit to this principle. Research has shown that reliability is virtually optimum for systems with four boilers in a cascade.
- **Efficiency**; there is no appreciable difference in terms of efficiency between several small or one or two larger boilers.
- **Maintenance and faults**; there is a greater overall risk of faults in a system with several boilers. However, the priority is lower when a fault occurs. A larger group of engineers can service and maintain smaller boilers.
- **Installation**; the lightweight and compact design means that you have more flexibility when positioning the boilers. Very little floor space is required and there is minimum load on the floor.
- **Control**; when using several boilers and modulating controls, the heat output provided more closely matches the heat output requested.

### Conclusion:

The points mentioned above must be considered to ensure a “cascade system” is an appropriate solution on a project-by-project basis. In practice there are very few installations that cannot benefit from a “cascade installation”

### 1.2 Compact cascade configuration

The Remeha Quinta 45 (40.0 kW\*), Quinta 65 (61.0 kW\*), Quinta 85 (84.2 kW\*) and Quinta 115 (107 kW\*) wall-hung boilers are particularly suitable for use in a cascade configuration. Their width of only 50 cm each means that a large kW output can be installed on a relatively short length of wall. This big difference becomes apparent when comparing Quinta cascade systems with floor standing boilers of a similar output. For example, using 6 Remeha Quinta 115 would only require a wall of 3.5 m long to provide 690 kW output (at 80/60°C).

\* nominal output at 80/60°C

### 1.3 Cascade configurations: various options

For installing 2 to 6 boilers, Remeha’s range of cascade sets are very comprehensive and easy to assemble and install. The hydraulic and gas pipework can be put together entirely without welding, by using screw connections, compression connections and flanges (see *Chapter 2*).

If you want to fabricate your own cascade configuration independently, please refer to the guide given in *Chapter 5*.

### 1.4 Hydraulic isolation - low loss header

Practical experience has shown that a hydraulic isolation between the ‘boiler circuit’ and the ‘system circuit’ by means of a low loss header is beneficial in most cases. This means that a widely varying volume flow on the system side has no influence on the volume flow on the boiler side and visa versa. This allows a widely varying volume flow on either side of the low loss header allowing this design to be utilized in both new and re-firbishment installations. In re-firbishment installations the use of a low loss header has an additional benefit by allowing the existing system pumps to be either re-used as they are or replaced at the same duty minimizing the need for time consuming calculations trying to determine the actual system resistance to be added to the new boilers resistance in an effort to select the correct pumps.

### 1.5 Points to consider when replacing boilers

If the boiler output is reduced, the water flow must be adjusted accordingly. Suppose 4 Quinta 45s are switched in cascade. Then the total water flow is (at  $\Delta T=20^{\circ}\text{C}$ )  $4 \times 1.7=6.8 \text{ m}^3/\text{h}$ . If  $8.8 \text{ m}^3/\text{h}$  is now pumped round the system,  $2 \text{ m}^3/\text{h}$  flows in the low loss header from the return pipe to flow pipe. The  $\Delta T$  in the system is then  $6.8/8.8 \times$  as big as on the boiler side. Suppose the boilers heat to  $90/70^{\circ}\text{C}$ . The system then heats with a flow temperature of around  $85^{\circ}\text{C}$ . Most heat transfer elements (such as radiators) have an exponential curve. This means that a slightly lower flow temperature leads to a much smaller heat transfer. This can result in complaints of being too cold. The solution is then to adjust the rate of flow in the system to the rate of flow in the boilers. A lower flow temperature is worse than a lower water flow, particularly for heat transfer elements requiring a high water temperature.

For installing cascade configurations independently with 2 or 3 Remeha Quinta 45/65 wall-hung boilers, our low loss headers can also be used, the DUO and TRIO Low loss headers respectively, see *par. 5.4*.

### 1.6 Heat output control

For optimum heat output control of a cascade system with the modulating Remeha Quinta 45/65/85/115 wall-hung boilers, we recommend using our Celcia MC4 modulating cascade controller in conjunction with the Celcia 20 Time / Weather compensation controller

## 2 COMPLETE HYDRAULIC CASCADE SYSTEMS

The compact design of the Remeha Quinta, combined with the smart connection technology of the hydraulic cascade system, makes it possible to install a high heat output in a small area.

To simplify matters further we have created a series of packaged cascade sets to suit each Quinta model allowing 2 or more (up to a max of 6) boilers to be connected together to a common low loss header.

For different configurations (specials):

### Consult our Sales Support department

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### General information

The return, flow, and gas connections of the individual boilers are connected to the header system using the pipework and fittings supplied. These pipes are welded onto a frame that rests on the floor and can be secured to the wall or to a free-standing frame.

The horizontal gas and water pipework is designed in a modular format with flanges at both ends, this allows the low loss header and optional gas filter be mounted at either end allowing left or right hand connections to be decided on site during assembly. The blank flanges supplied are therefore be used to blank the opposite ends.

Note:

When the optional gas filter is used, a pressure loss of 3 mbar over the gas filter must be taken into account, therefore the minimum gas pressure at the inlet to the filter must be 20 mbar for Natural Gas.

The PVC pipework required to collect and dispose of the condensate is not supplied with the cascade set. However provision has been made within the frames (including the required drainage slope) to accommodate this pipework which can also be handed left or right.

See the *table 01* for the combined output of groups of each model type

No of boilers	2	3	4	5	6
Quinta 45	80	120	160	200	240
Quinta 65	122	183	244	305	366
Quinta 85	168	252	336	420	504
Quinta 115	214	321	428	535	642

*table 01 Combined Nominal output at 81/70 °C kW*

### Note:

**Boilers should be ordered separately from the cascade systems!**

### 3 COMPOSITION OF THE SYSTEMS

The cascade systems consist of the following components:

- Main horizontal pipes
- Low loss header
- Boiler pumps
- Fitting bracket
- Boiler connection kits
- Free-standing frames (option)
- Accessories (options)

#### 3.1 Main pipes

The main horizontal pipe sets consist of flow, return and gas pipe with brackets and are supplied as a 2 or 3 boiler module or as a combination of both modules to suit cascade set of up to 6 boilers in a linear configuration or in a back-to-back configuration of 2 sets of 5 boilers.

Diameter flow and return pipe 65 mm:

- item no. 110968: main pipes for 2 boilers with gas pipe Dn 50 (PN16)
- item no. 110967: main pipes for 3 boilers with gas pipe Dn 50 (PN16)
- item no. 110966: main pipes for 4 boilers with gas pipe Dn 50 (PN16)

Diameter flow and return pipe 100 mm:

- item no. 110961: main pipes for 2 boilers with gas pipe Dn 65 (PN16)
- item no. 110960: main pipes for 3 boilers with gas pipe Dn 65 (PN16)
- item no. 110954: main pipes for 4 boilers with gas pipe Dn 65 (PN16)

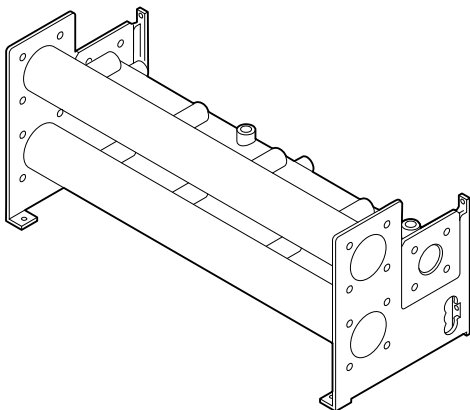


fig. 01 main pipes for 3 boilers

110545-01

#### 3.2 Low loss header

The low loss headers have the following connecting flanges:

- low loss header for main pipes with diameter = 65 mm:
  - Boiler side; Dn 65 (PN6, DIN 2631; 4 holes).
  - System side; Dn 100 (PN6, DIN 2631; 4 holes).
- low loss header for main pipes with diameter = 100 mm:
  - Boiler side; Dn 100 (PN6, DIN 2631; 4 holes)
  - System side; Dn 125 (PN6, DIN 2631; 4 holes).

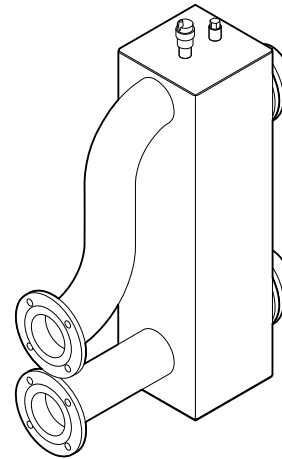


fig. 02 low loss header

110545-02

#### 3.3 Boiler pump

The cascade sets are supplied complete with a pump for each Quinta, sized for nominal flow rate based on a design condition of 20°C ΔT on the boiler primary side of the header. The pump is installed on the return connection with the pump being connected to and powered by the boiler.

Quinta 45 - typical pump – Grundfos UPS 25-60

Quinta 65 - typical pump – Grundfos UPS 25-70

Quinta 85 - typical pump – Grundfos UPS 25-80 (setting II)

Quinta 115 - typical pump – Grundfos UPS 25-80 (setting III)

Note: Actual pump supplied may be different to that listed but with a similar duty

## 3.4 Boiler connection kits

The boiler connection kit consists of service shut-off valves in the flow, return and gas pipe and the pipes between boiler and main horizontal pipe sets. In a back-to-back configuration (BB), the length of the pipes that go to the **rearmost** row of boilers has been adjusted. It is assumed that, when an odd number of boilers are supplied, the largest number of boilers are mounted on the front.

The service shut-off valve in the return includes safety valve, non return valve, filling and drain cock and expansion vessel connection. For a system with a calorifier connection, a 24 V spring-loaded three-way valve is supplied with cable, Honeywell V8044C1065B type (only for Quinta 45 and 65). The calorifier can also be charged using a DHW pump.

The return valve has a T-piece for additional connection (for expansion vessel or calorifier, for example).

### 3.4.1 Connection kit with pump (for boilers without integrated pump)

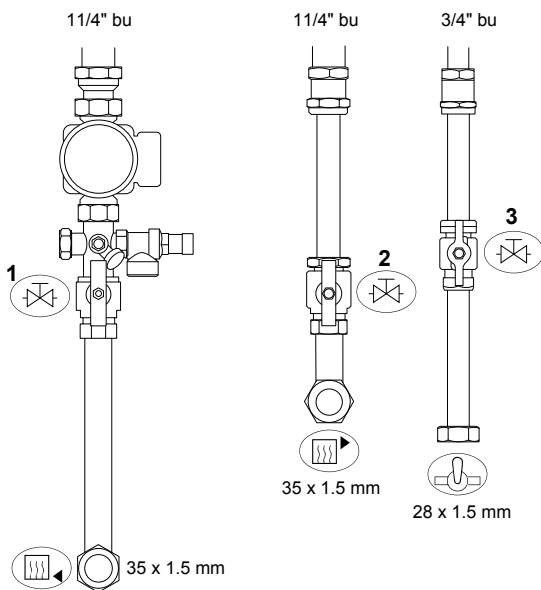


fig. 03 Connection kit with pump (for boilers without integrated pump)

110545-04

- 1) Flow (1 1/4" bu to boiler and 35x1.5 mm to main pipe)
  - 2) Return (1 1/4" bu to boiler and 35x1.5 mm to main pipe)
  - 3) Gas connection (3/4" bi to boiler and 28x1.5 mm to main pipe)
  - 4) Grundfos UPS 25-80 boiler pump
- 1) Ball valve, overflow, non return valve, expansion vessel connection (3/4" bu) and filling/drain cock in return pipe
  - 2) Ball valve in flow pipe
  - 3) Gas cock

## 3.5 Free-standing frames

The free-standing frames consist of a combination of I and/or L poles with a frame. One frame per boiler is required. The L poles have bolt holes for fixing to the floor. The frame is equipped with a fitting bracket. The nuts and bolts required are included with the delivery, along with installation instructions. Fasteners for fixing to the floor are not included.

Frame: item no. 110496

L-leg: item no. 110948

I-leg: item no. 110950

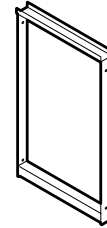


fig. 04 Frame

110545-69



fig. 05 L-leg

110545-67



fig. 06 I-leg

110545-68

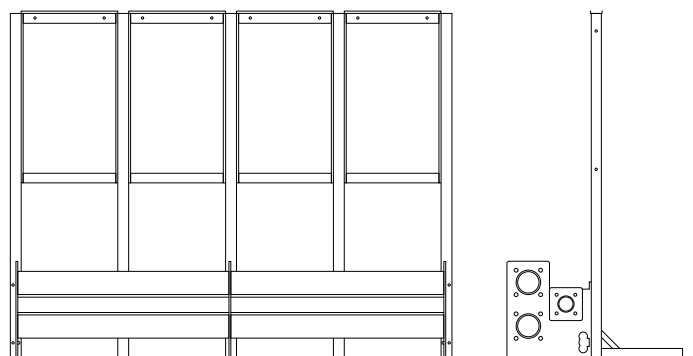


fig. 07 frame with fitted main pipes

110545-08



### 3.6 Scope of delivery

Broag only supplies cascade sets of 2 up to 6 equal boilers.

They can be ordered in the following configurations (on basis of output):

- LW (wall-mounted linear configuration)
- LV (free-standing linear configuration)
- RG (back-to-back configuration)
- LW with boiler connection set (wall-mounted linear configuration)
- LV with boiler connection set (free-standing linear configuration)
- RG with boiler connection set (back-to-back configuration)

#### LW cascade sets include:

- Boilers
- Piping set(s) including couplings
- Blind flange gas
- Blind flange water
- Low loss header
- Wall bracket(s)
- Main piping set(s)
- Pumps (optional)

#### LV cascade sets include:

- Boilers
- Piping set(s) including couplings
- Blind flange gas
- Blind flange water
- I-standard(s)
- Low loss header
- Frame (s)
- Main piping set(s)
- Pumps (optional)

#### RG cascade sets include:

- Boilers
- Piping set(s) including couplings
- Piping set(s) including couplings (RG)
- Blind flange gas
- Blind flange water
- I-standard(s)
- L-standard(s)
- Low loss header
- Pumps (optional)
- Frame (s)
- Main piping set(s)

#### LW cascade sets with boiler connection set include:

- As LW cascade sets but with boiler connection

#### LV cascade sets with boiler connection set include:

- As LV cascade sets but with boiler connection

#### RG cascade sets with boiler connection set include:

- As RG cascade sets but with boiler connection

### 3.7 Optional Accessories

- Elbow kit for connections at 90° to the low loss header in 65 and 100 mm diameters.
- Connecting flanges for system side of the low loss header<sup>\*)</sup>
- Celcia MC4 modulating controller (always with a Celcia 15 or Celcia 20 controller); item no. S62.518
- Frame fixing plate for Celcia MC4 + Celcia 20; item no. 112829
- Insulation sets for linear and back-to-back configuration, low loss header and low loss header elbow
- Gas filters
- Gas filter extension piece (for fitting gas filter next to insulated low loss header); item no. 111805 for Dn 65 and item no. 111806 for Dn 100
- Sealing caps for unused gas and water boiler connections.
- Immersion sensor for low loss header; item no. 54663
- Adjustable legs
- Calorifier connection + three-way valve
- Frame fixing plate for plug-sockets

<sup>\*)</sup> **Please note:** depending on the system resistance, it may be necessary to switch to a larger pipe diameter after the connecting flanges

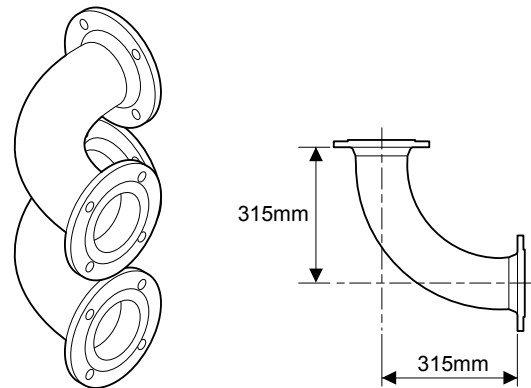


fig. 08 elbow kit for angled connection of the low loss header

110545-09

### 3.8 Installation area and dimensions of cascade system

Select the desired number of Remeha Quinta boilers on the basis of the space available and the total required heat output (see table 01). We recommend a clearance of at least 60 cm in front of the cascade set for maintenance purposes. A wall bracket is supplied with the cascade set for linear configuration (LW) which must be mounted at a height of 1695 mm. This sets a standard distance between each boiler of 3 cm.

We recommend a min clearance of at 40 cm above the units. This area also depends on any installation of flue gas discharge and air supply collector pipes. Consult the flue gas tables in Chapter 7.

### 4 DRAWINGS

Please also consult our Cad library at [www.broag-remeha.com](http://www.broag-remeha.com) under cascade sets

The low loss headers have the following connecting flanges:

- For main pipes with diameter = 65 mm: Boiler side Dn 65 and System side Dn 100.
- For main pipes with diameter = 100 mm: Boiler side Dn 100 and System side Dn 125.

Broag only supplies sets of 2 up to 6 equal boilers. In the drawings mixed sets are given to show all possible variations in one drawing.

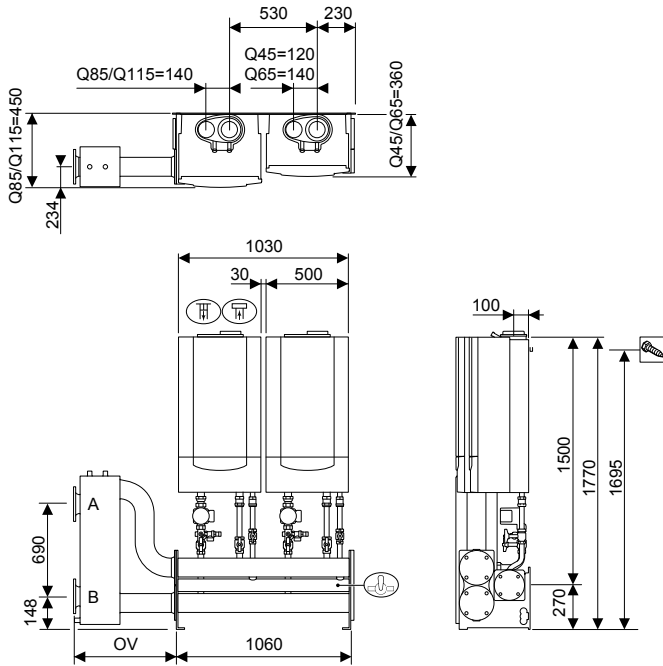


fig. 09 LW (wall-mounted linear configuration): 2 boilers  
110545-30

- A System flow; Dn 100 (PN6, DIN 2631; 4 holes).
- B System return; Dn 100 (PN6, DIN 2631; 4 holes).
- Gas supply Dn 50 DIN 2633 (4 holes)
- Air supply (Q45 = 80 mm, Q65/85/115 = 100 mm)
- Flue gas discharge (Q45 = 80 mm, Q65/85/115 = 100 mm)
- Suspension points
- OV Low loss header (Dn65 = 617 mm; Dn100 = 631 mm)

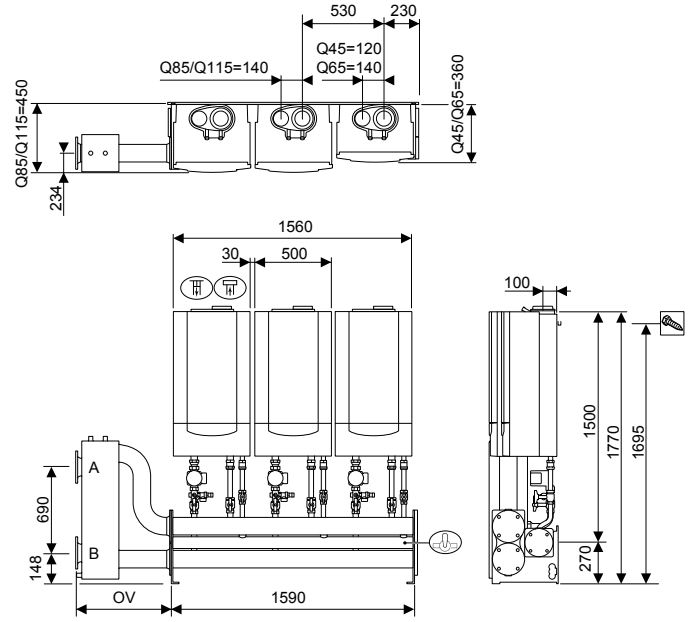


fig. 10 LW (wall-mounted linear configuration): 3 boilers  
110545-31

- A System flow; Dn 100 (PN6, DIN 2631; 4 holes).
- B System return; Dn 100 (PN6, DIN 2631; 4 holes).
- Gas supply Dn 50 DIN 2633 (4 holes)
- Air supply (Q45 = 80 mm, Q65/85 = 100 mm)
- Flue gas discharge (Q45 = 80 mm, Q65/85/115 = 100 mm)
- Suspension points
- OV Low loss header (DN65 = 617 mm; DN100 = 631 mm)

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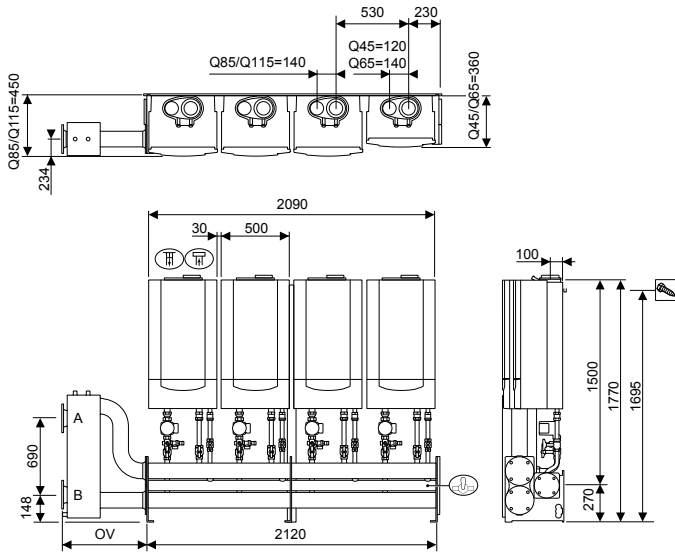


fig. 11 LW (wall-mounted linear configuration): 4 boilers  
110545-32

- A System flow; Dn 100 (PN6, DIN 2631; 4 holes).
- B System return; Dn 100 (PN6, DIN 2631; 4 holes).
- Gas supply Dn 50 DIN 2633 (4 holes)
- Air supply (Q45 = 80 mm, Q65/85 = 100 mm)
- Flue gas discharge (Q45 = 80 mm, Q65/85/115 = 100 mm)
- Suspension points
- OV Low loss header (DN65 = 617 mm; DN100 = 631 mm)

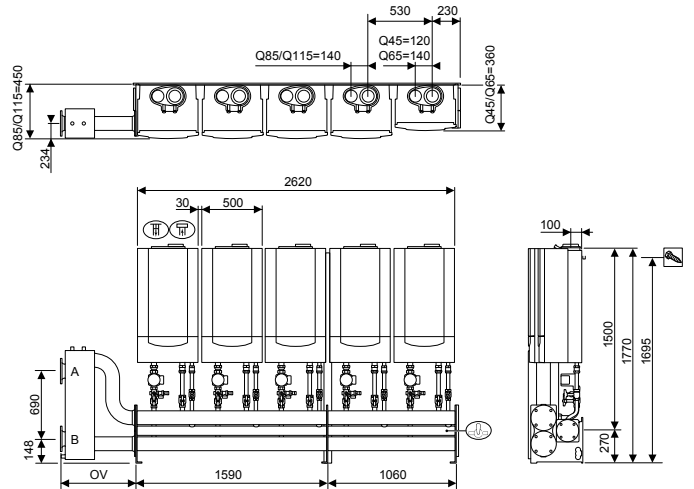


fig. 12 LW (wall-mounted linear configuration): 5 boilers  
110545-33

- A System flow; Dn 125 (PN6, DIN 2631; 4 holes).
- B System return; Dn 125 (PN6, DIN 2631; 4 holes).
- Gas supply Dn 65 DIN 2633 (4 holes)
- Air supply (Q45 = 80 mm, Q65/85 = 100 mm)
- Flue gas discharge (Q45 = 80 mm, Q65/85/115 = 100 mm)
- Suspension points
- OV Low loss header (DN65 = 617 mm; DN100 = 631 mm)

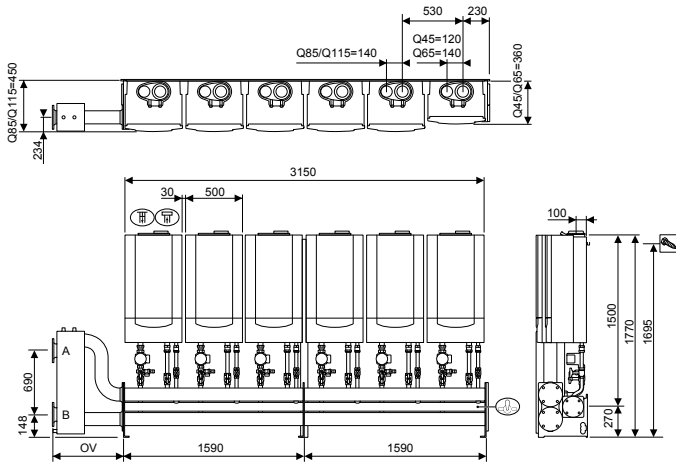


fig. 13 LW (wall-mounted linear configuration): 6 boilers  
110545-34

- A System flow; Dn 125 (PN6, DIN 2631; 4 holes).
- B System return; Dn 125 (PN6, DIN 2631; 4 holes).
- Gas supply Dn 65 DIN 2633 (4 holes)
- Air supply (Q45 = 80 mm, Q65/85 = 100 mm)
- Flue gas discharge (Q45 = 80 mm, Q65/85/115 = 100 mm)
- Suspension points
- OV Low loss header (DN65 = 617 mm; DN100 = 631 mm)

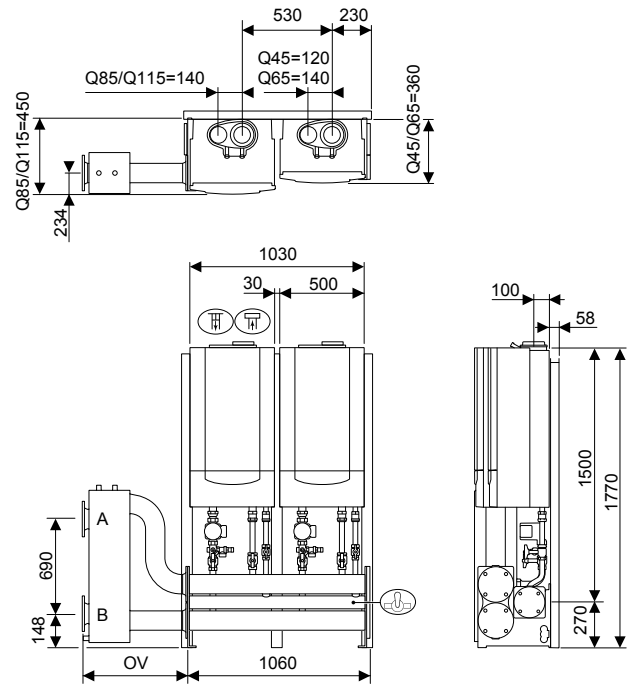


fig. 14 LV (free-standing linear configuration): 2 boilers  
110545-36

- A System flow; Dn 100 (PN6, DIN 2631; 4 holes).
- B System return; Dn 100 (PN6, DIN 2631; 4 holes).
- Gas supply Dn 50 DIN 2633 (4 holes)
- Air supply (Q45 = 80 mm, Q65/85 = 100 mm)
- Flue gas discharge (Q45 = 80 mm, Q65/85/115 = 100 mm)
- OV Low loss header (DN65 = 617 mm; DN100 = 631 mm)

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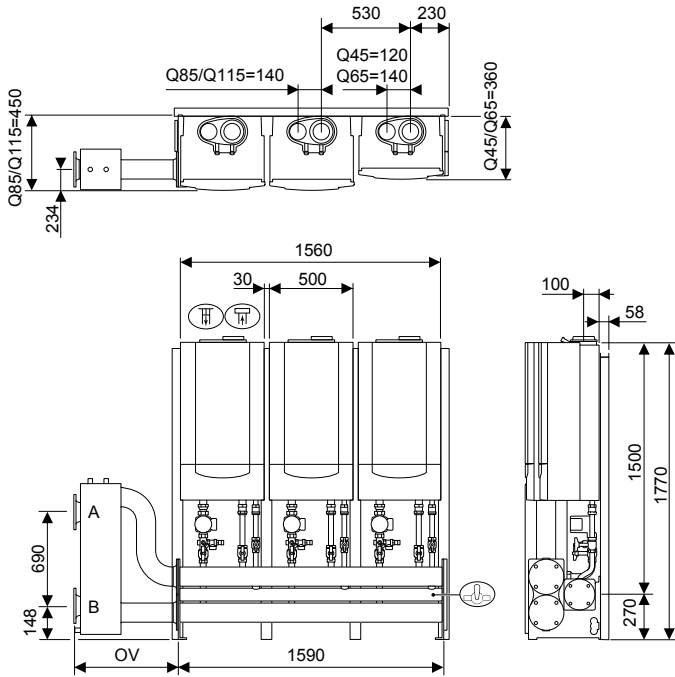


fig. 15 LV (free-standing linear configuration): 3 boilers  
110545-37

- A System flow; Dn 100 (PN6, DIN 2631; 4 holes).
- B System return; Dn 100 (PN6, DIN 2631; 4 holes).
- Gas supply Dn 50 DIN 2633 (4 holes)
- Air supply (Q45 = 80 mm, Q65/85 = 100 mm)
- Flue gas discharge (Q45 = 80 mm, Q65/85/115 = 100 mm)
- OV Low loss header (DN65 = 617 mm; DN100 = 631 mm)

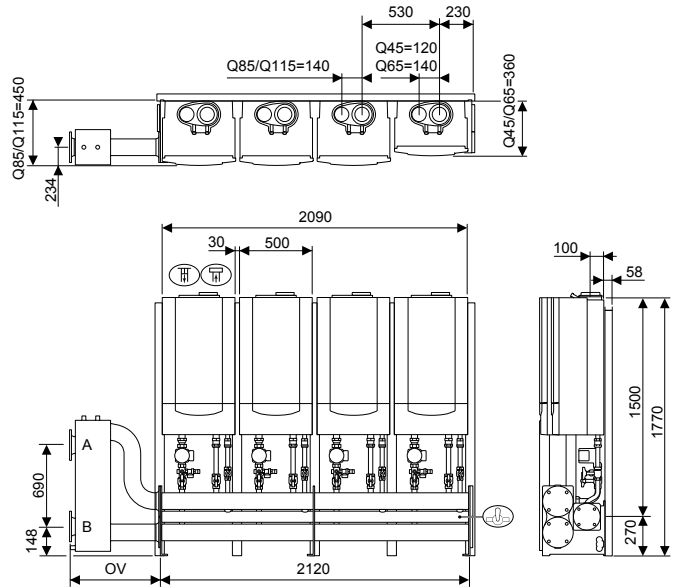


fig. 16 LV (free-standing linear configuration): 4 boilers  
110545-38

- A System flow; Dn 100 (PN6, DIN 2631; 4 holes).
- B System return; Dn 100 (PN6, DIN 2631; 4 holes).
- Gas supply Dn 50 DIN 2633 (4 holes)
- Air supply (Q45 = 80 mm, Q65/85 = 100 mm)
- Flue gas discharge (Q45 = 80 mm, Q65/85/115 = 100 mm)
- OV Low loss header (DN65 = 617 mm; DN100 = 631 mm)

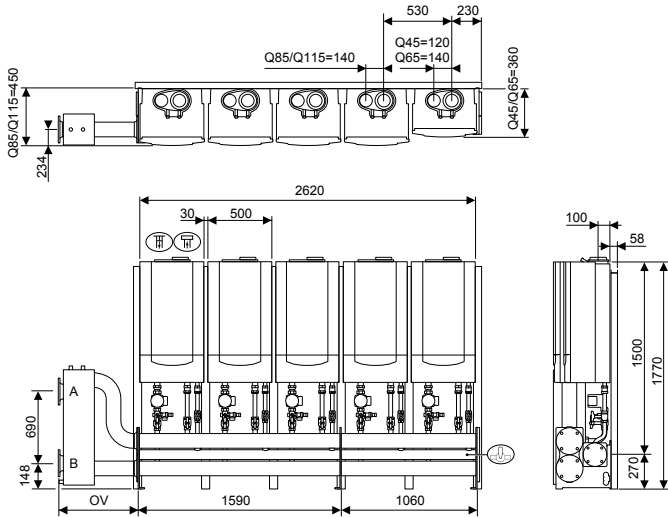


fig. 17 LV (free-standing linear configuration): 5 boilers  
110545-39

- A System flow; Dn 125 (PN6, DIN 2631; 4 holes).
- B System return; Dn 125 (PN6, DIN 2631; 4 holes).
- Gas supply Dn 65 DIN 2633 (4 holes)
- Air supply (Q45 = 80 mm, Q65/85 = 100 mm)
- Flue gas discharge (Q45 = 80 mm, Q65/85/115 = 100 mm)
- OV Low loss header (DN65 = 617 mm; DN100 = 631 mm)

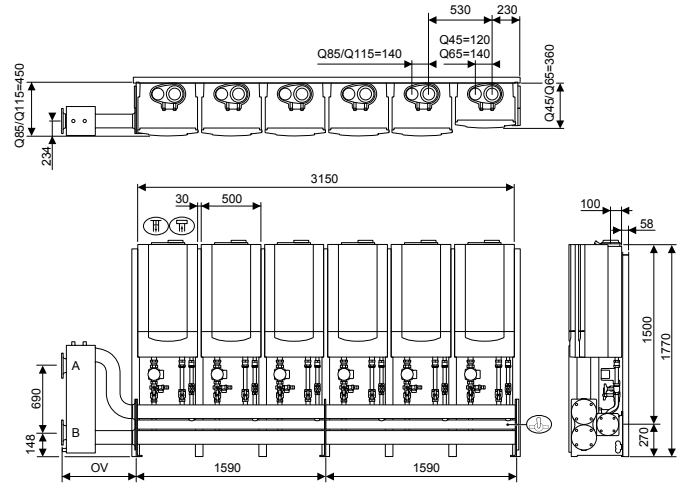


fig. 18 LV (free-standing linear configuration): 6 boilers  
110545-40

- A System flow; Dn 125 (PN6, DIN 2631; 4 holes).
- B System return; Dn 125 (PN6, DIN 2631; 4 holes).
- Gas supply Dn 65 DIN 2633 (4 holes)
- Air supply (Q45 = 80 mm, Q65/85 = 100 mm)
- Flue gas discharge (Q45 = 80 mm, Q65/85/115 = 100 mm)
- OV Low loss header (DN65 = 617 mm; DN100 = 631 mm)

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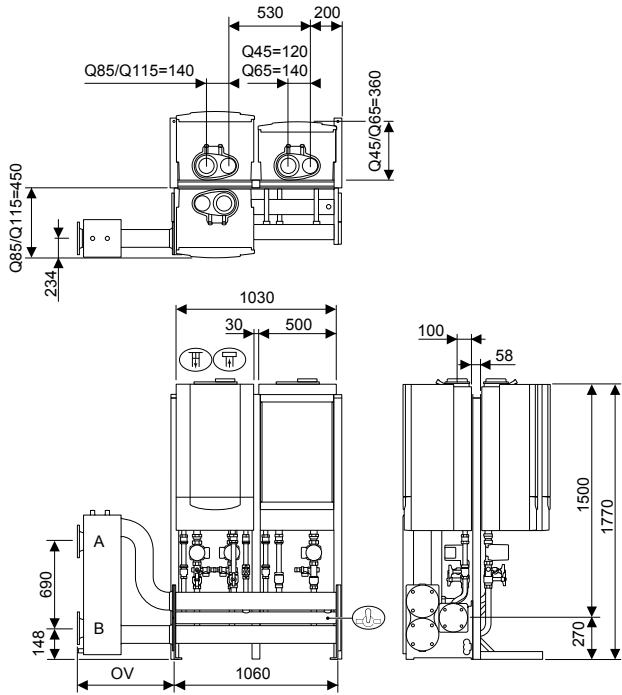


fig. 19 RG (back-to-back configuration): 3 boilers

110545-42

- A System flow; Dn 100 (PN6, DIN 2631; 4 holes).
- B System return; Dn 100 (PN6, DIN 2631; 4 holes).
- Gas supply Dn 50 DIN 2633 (4 holes)
- Air supply (Q45 = 80 mm, Q65/85 = 100 mm)
- Flue gas discharge (Q45 = 80 mm, Q65/85/115 = 100 mm)
- OV Low loss header (DN65 = 617 mm; DN100 = 631 mm)

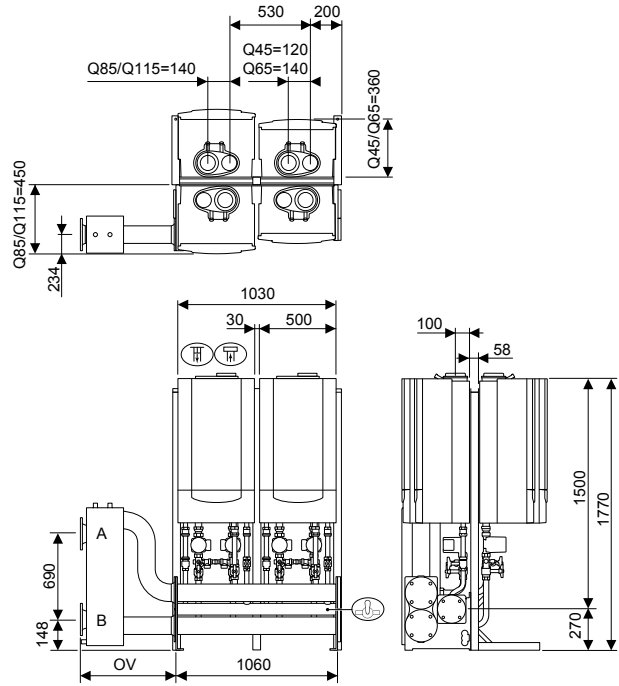


fig. 20 RG (back-to-back configuration): 4 boilers

110545-43

- A System flow; Dn 100 (PN6, DIN 2631; 4 holes).
- B System return; Dn 100 (PN6, DIN 2631; 4 holes).
- Gas supply Dn 50 DIN 2633 (4 holes)
- Air supply (Q45 = 80 mm, Q65/85 = 100 mm)
- Flue gas discharge (Q45 = 80 mm, Q65/85/115 = 100 mm)
- OV Low loss header (DN65 = 617 mm; DN100 = 631 mm)



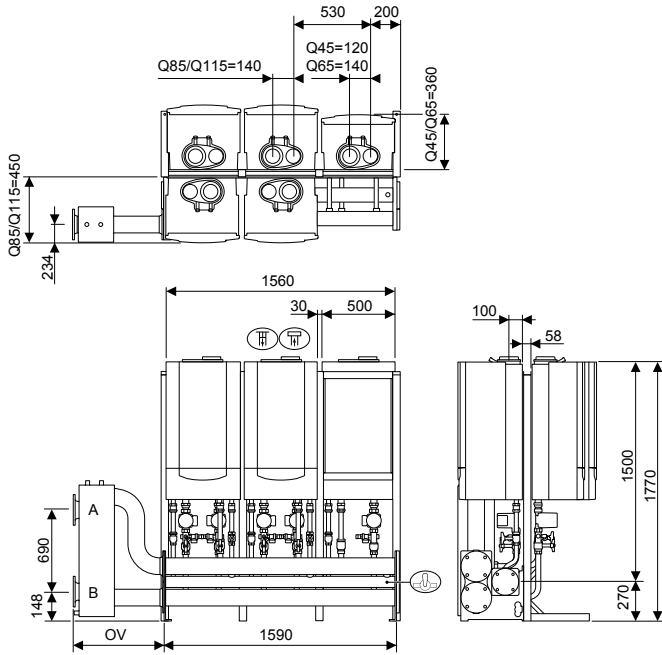


fig. 21 RG (back-to-back configuration): 5 boilers

110545-44

- A System flow; Dn 125 (PN6, DIN 2631; 4 holes).
- B System return; Dn 125 (PN6, DIN 2631; 4 holes).
- Gas supply Dn 65 DIN 2633 (4 holes)
- Air supply (Q45 = 80 mm, Q65/85 = 100 mm)
- Flue gas discharge (Q45 = 80 mm, Q65/85/115 = 100 mm)
- OV Low loss header (DN65 = 617 mm; DN100 = 631 mm)

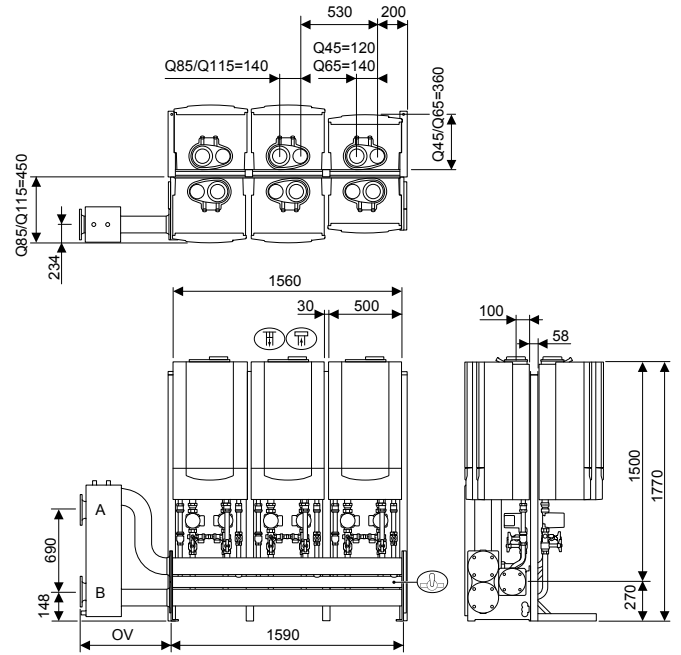


fig. 22 RG (back-to-back configuration): 6 boilers

110545-45

- A System flow; Dn 125 (PN6, DIN 2631; 4 holes).
- B System return; Dn 125 (PN6, DIN 2631; 4 holes).
- Gas supply Dn 65 DIN 2633 (4 holes)
- Air supply (Q45 = 80 mm, Q65/85 = 100 mm)
- Flue gas discharge (Q45 = 80 mm, Q65/85/115 = 100 mm)
- OV Low loss header (DN65 = 617 mm; DN100 = 631 mm)

## 5 SITE FABRICATED CASCADE INSTALLATION

### 5.1 General

In specific situations, where you want to determine the position of the boilers and the piping yourself, it is always possible to design an appropriate cascade system consisting of several Remeha Quinta 45/65/85/115 units. To make this easier to do, this chapter provides a guide to the components to be used.

### 5.2 Standard cascade system

A typical schematic diagram of a standard cascade system is shown in *fig. 23*.

Note: this does not constitute a full system design, simply a guide to the process

On the primary circuit (boiler side), the boilers are connected in parallel to the low loss header.

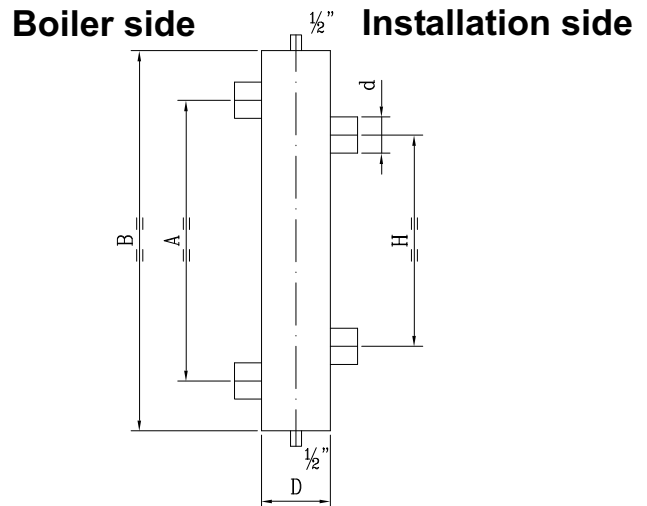
The secondary circuit (system side) is formed by one or more system groups taken from the low loss header.

In order to guarantee that the cascade system works correctly, we recommend that the hydraulic installation is carried out in accordance with the example diagram.

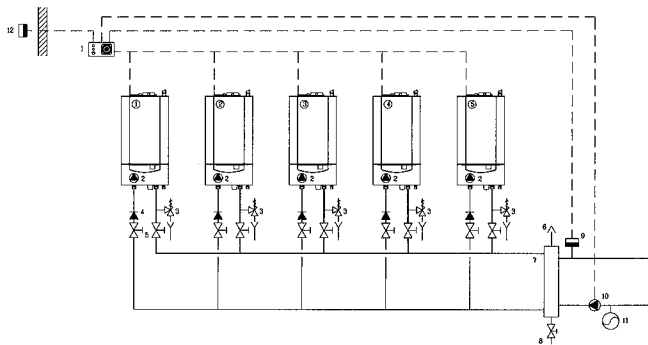
### 5.3 Dimensioning a standard low loss header

As already stated, the low loss header (*see fig. 24*) serves to isolate the boiler circuit from the system circuit. Consequently, the resistance of the low loss header must be very low and the rate of flow in the low loss header must not exceed 0.25 m/sec.

Please refer to *table 02* for the correct dimensions of a standard low loss header.



*fig. 24* Standard low loss header



*fig. 23* Hydraulic schematic diagram

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- 1 = Cascade controller
  - 2 = Boiler pump\*
  - 3 = Safety valve
  - 4 = Non return valve
  - 5 = Manual seal
  - 6 = Air vent
  - 7 = Low loss header
  - 8 = Drain cock
  - 9 = Flow sensor (clamp sensor or immersion sensor)
  - 10 = System pump
  - 11 = Expansion vessel
  - 12 = External sensor
- \* boiler pumps are not internal on all UK boilers and must be placed between non-return valve and boiler.

Nominal Output	Capacity Q	d	D Ø		D	H	A	B
kW	m <sup>3</sup> /h at ΔT 11°C	inch	inch	DN	mm	mm	mm	mm
80*	6,25	1,25	4	100	100	316	421	554
100*	7,82	1,25	5	125	110	353	470	608
120	9,38	1,5	5	125	120	386	515	656
140	10,95	2	6	150	130	417	557	700
160	12,51	2	6	150	140	446	595	742
180	14,07	2	6	150	140	473	631	781
200	15,64	2	8	200	150	499	665	818
220	17,20	2,5	8	200	160	523	698	853
240	18,76	2,5	8	200	170	546	729	886
260	20,33	2,5	8	200	170	569	758	918
280	21,89	2,5	8	200	180	590	787	949
300	23,45	2,5	8	200	190	611	815	979
320	25,02	2,5	10	250	190	631	841	1008
360	28,15	3	10	250	200	669	892	1063
400	31,27	3	10	250	210	705	941	1115
440	34,40	3	10	250	220	740	987	1165
480	37,53	3	10	250	230	773	1030	1212
520	40,65	4	12	300	240	804	1073	1257
560	43,78	4	12	300	250	835	1113	1301
600	46,91	4	12	300	260	864	1152	1343
640	50,04	4	12	300	270	892	1190	1384

table 02 Table of low loss header dimensions

\* Use of TRIO low loss header possible

### 5.4 Remeha DUO and TRIO low loss header for Quinta 45 and/or Quinta 65

For installing 2 or 3 Remeha Quinta 45 and/or Quinta 65 wall-hung boilers, our range of products includes special compact low loss headers, the DUO and TRIO low loss headers respectively (see fig. 25). The flow and return (1") of the Remeha Quinta 45/65 boilers can be directly connected to it (see fig. 26). There are two (1/2" female thread) connections above and below the low loss header for installing an air vent and a drain cock. To ensure they operate correctly the low loss header must be assembled vertically.

Note: These headers have an internal baffle plate which allow the use of independent boiler F/R connections

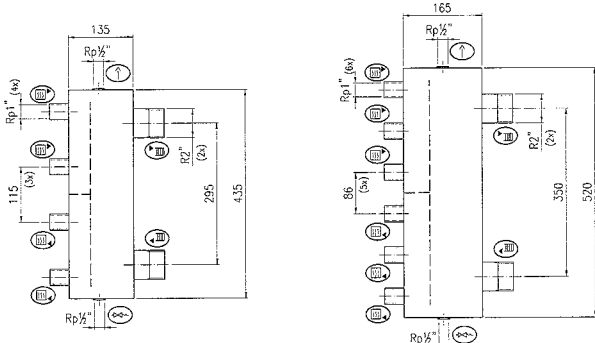


fig. 25 DUO and TRIO low loss header

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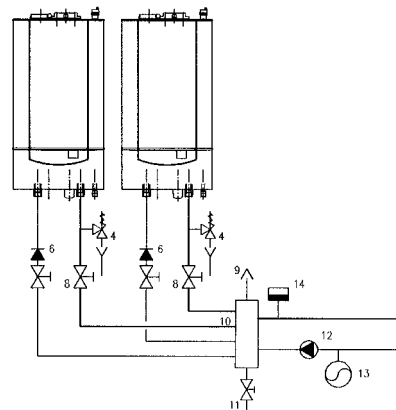


fig. 26 Installation drawing with DUO low loss header

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- 4 safety valve
- 6 non return valve
- 8 manual seal
- 9 air vent
- 10 low loss header (DUO low loss header)
- 11 drain cock
- 12 system pump
- 13 expansion vessel
- 14 flow sensor (clamp sensor or immersion sensor)

**Note:** boiler pumps are not internal on all UK boilers and must be placed between non-return valve and boiler.

## 5.5 Boiler and system pumps

We have boiler pumps available for each boiler sized for nominal flow rate based on a design condition of 20°C  $\Delta T$  on the boiler primary side of the header:

- Quinta 45 - typical pump – Grundfos UPS 25-60
- Quinta 65 - typical pump – Grundfos UPS 25-70
- Quinta 85 - typical pump – Grundfos UPS 25-80 (setting II)
- Quinta 115 - typical pump – Grundfos UPS 25-80 (setting III)

Note: Actual pump supplied may be different to that listed but with a similar duty

The pump will be more than adequate for the cascade configurations illustrated and the Remeha cascade systems.

The total output of the system pump(s) must not be more than the joint capacity  $Q$ , (see *table 02*) of the boiler pumps. Otherwise, with full take-up and all boilers operating, the system pump will pump part of the system return water straight to the system flow. This means that the flow temperature to the system will be lower than the flow temperature from the boilers. In addition, the selected system pump must be able to overcome the hydraulic resistance from the system.

The boiler water resistance can be deduced from *fig. 27* to *fig. 30*.

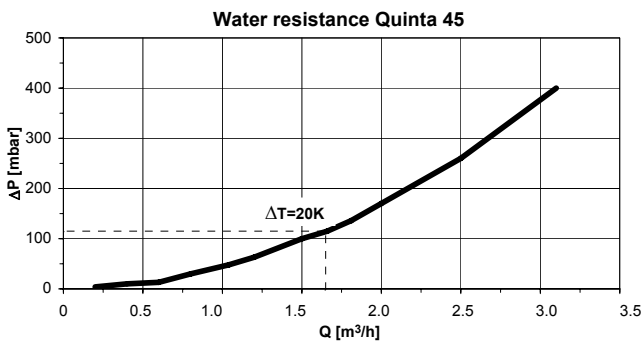


fig. 27 Water resistance Remeha Quinta 45

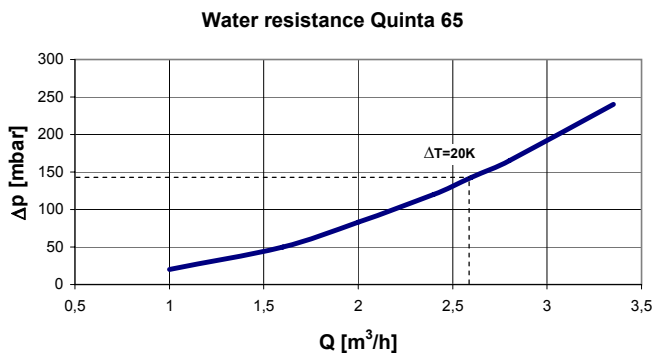


fig. 28 Water resistance Remeha Quinta 65

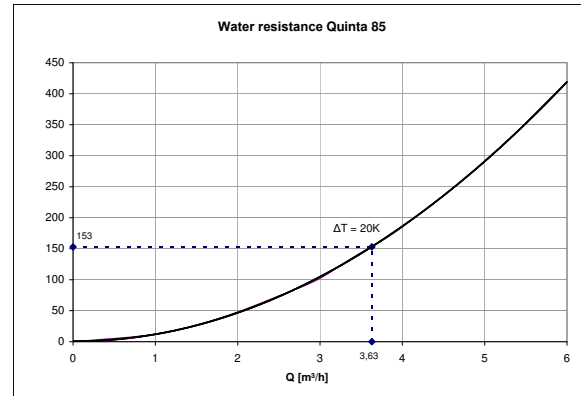


fig. 29 Water resistance Remeha Quinta 85

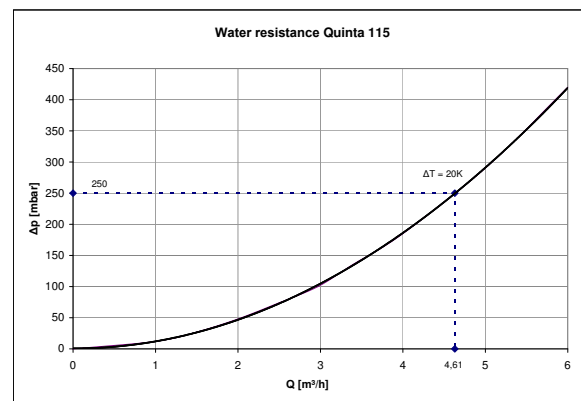


fig. 30 Water resistance Remeha Quinta 115

## 5.6 Configuration and Installation

Select the desired quantity of Remeha Quinta 45, Quinta 65, Quinta 85 and Quinta 115 boilers on the basis of the required heat output. The boilers can be installed next to each other or back to back. Mount the boilers level on a wall or mounting frame that is sufficiently strong to carry the total weight of the boilers when full of water.

All aspects of the individual boiler installations are to be in accordance with the Technical instructions supplied with each boiler.

## 6 FLUE GAS DISCHARGE AND AIR SUPPLY

### 6.1 General

For flue gas discharge please refer to the Technical instructions supplied with each boiler

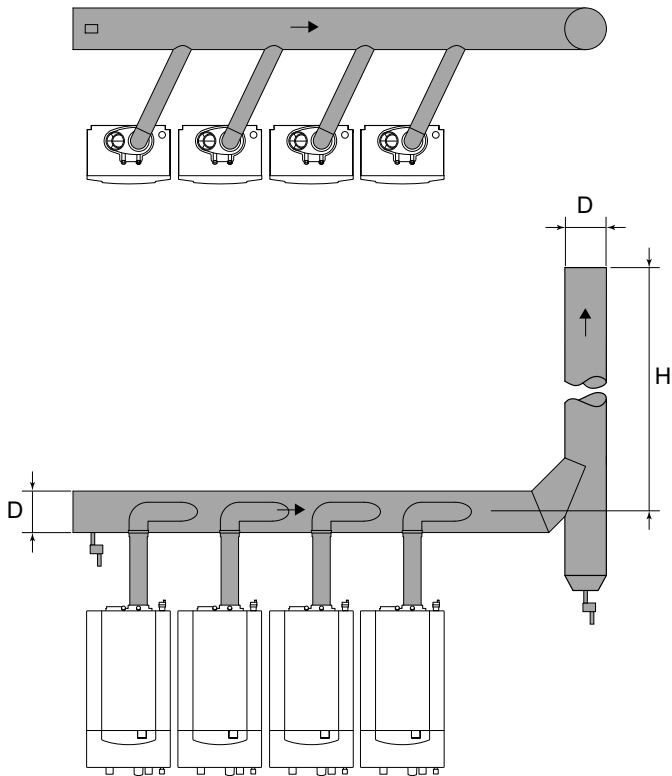
**7 FLUE GAS TABLES FOR COMBINED FLUE DISCHARGE**

**7.1 Dimensioning flue gas discharge/air supply  
linear configuration**

The following paragraphs contain tables for dimensioning cascade systems in a series configuration with the most frequently occurring combinations. The tables run from one to six units (in a linear or back-to-back configuration). For unit combinations not described here or a configuration that differs from the drawings, please consult our Sales Support department.

When compiling the tables, we assumed that the units would be switched on and off one by one and that there would be no elbows in the horizontal and vertical collector pipes.

**7.1.1 Linear configuration: series connection, room ventilated operation**



*fig. 31 linear configuration: series connection, room ventilated operation*

110545-50

flue gas discharge  
Quinta 45: 80mm Ø  
Quinta 65/85/115: 100mm Ø

Instructions for using the tables.

- Select the desired **heat output P** (in kW at 81/70 °C) in *table 03*
- Find the desired **heat output P** (in kW at 81/70 °C) in the left-hand column of *table 04*.
- The **Boiler types** column lists the combination of boilers used for the calculation (Q = Quinta).
- Then take the required draught height **H** from the 4 right-hand columns.
- Round up the diameter found to one that is commercially available, if necessary.

No of boilers	2	3	4	5	6
Quinta 45	80	120	160	200	240
Quinta 65	122	183	244	305	366
Quinta 85	168	252	336	420	504
Quinta 115	214	321	428	535	642

*table 03 Combined Nominal output at 81/70 °C kW*

Heat output P (kW)	Boiler types	Ø d = Ø D (mm)			
		H = 2-5 m	H = 5-9 m	H = 9-13 m	H = 13-17 m
80	2xQ45	130	125	125	130
120	3xQ45	180	170	165	165
160	4xQ45	220	205	195	195
200	5xQ45	255	230	220	215
240	6xQ45	280	255	240	235
122	2xQ65	155	145	145	145
183	3xQ65	220	200	195	190
244	4xQ65	265	240	230	225
305	5xQ65	305	275	255	250
366	6xQ65	340	300	280	275
168	2xQ85	175	165	160	160
252	3xQ85	250	225	215	215
336	4xQ85	305	270	255	250
420	5xQ85	350	310	290	280
504	6xQ85	390	345	320	310
214	2xQ115	200	185	180	180
321	3xQ115	285	255	240	235
428	4xQ115	345	305	285	275
535	5xQ115	395	345	323	315
642	6xQ115	440	385	355	345

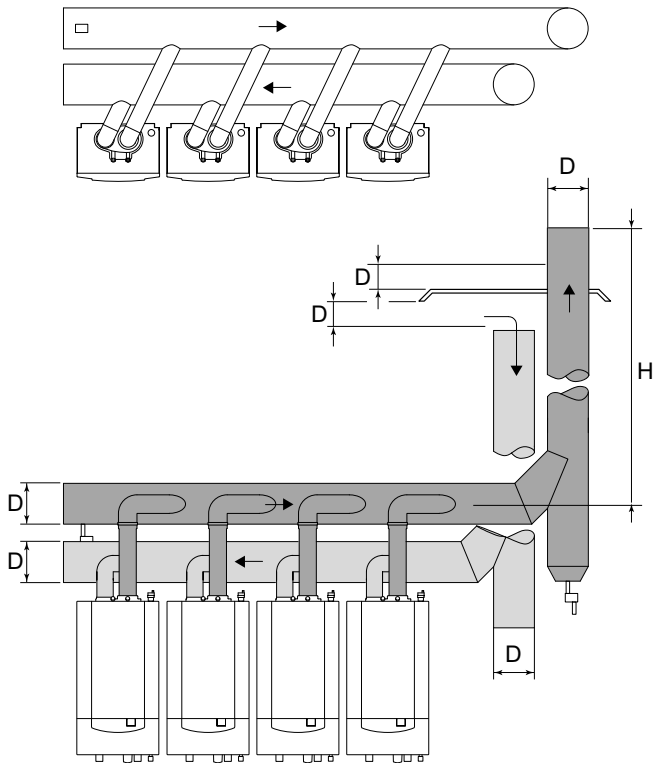
*table 04 Discharge system diameters: linear configuration, series connection, room ventilated operation*

\* please contact our **Sales Support department**

**Remark:** connect the boilers to the horizontal header using swept connections



**7.1.2 Linear configuration: series connection, room sealed operation**



*fig. 32 linear configuration: series connection, room sealed operation*

110545-51

flue gas discharge/air supply

Quinta 45: 80/80 mm Ø

Quinta 65/85/115: 100/100 mm Ø

Instructions for using the tables.

- Select the desired **heat output P** (in kW at 81/70 °C) in *table 05*
- Find the desired **heat output P** (in kW at 80/60°C) in the left-hand column of *table 06*
- The **Boiler types** column lists the combination of boilers used for the calculation (Q = Quinta).
- Then take the required draught height **H** from the 4 right-hand columns.
- Round up the diameter found to one that is commercially available, if necessary.

No of boilers	2	3	4	5	6
Quinta 45	80	120	160	200	240
Quinta 65	122	183	244	305	366
Quinta 85	168	252	336	420	504
Quinta 115	214	321	428	535	642

*table 05 Combined Nominal output at 81/70 °C kW*

Heat output P (kW)	Boiler types	Ø d = Ø D (mm)			
		H = 2-5 m	H = 5-9 m	H = 9-13 m	H = 13-17 m
80	2xQ45	150	140	140	140
120	3xQ45	210	190	185	185
160	4xQ45	255	230	220	220
200	5xQ45	300	265	250	245
240	6xQ45	335	295	280	270
122	2xQ65	175	165	160	165
183	3xQ65	250	225	220	215
244	4xQ65	305	275	260	255
305	5xQ65	360	320	300	285
366	6xQ65	405	355	330	320
168	2xQ85	200	185	180	180
252	3xQ85	285	255	245	240
336	4xQ85	350	310	290	285
420	5xQ85	410	265	335	325
504	6xQ85	460	405	370	355
214	2xQ115	240	215	205	205
321	3xQ115	330	295	275	270
428	4xQ115	405	355	330	320
535	5xQ115	465	410	380	360
642	6xQ115	*	*	420	400

*table 06 Discharge system diameters: linear configuration, series connection, room sealed operation*

\* please contact our **Sales Support department**

**Remark:** connect the boilers to the horizontal header using swept connections

For Flue discharge / Air inlet requirements not detailed in this brochure please contact our

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63805-1106 Subject to alterations



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