



# PLATE HEAT EXCHANGER KITS

## **EVOMAX**

30 - 150

30P - 80P

## **EVOMAX 2**

30 - 150

30P - 120P

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](http://www.idealcommercialboilers.com) where you can download the relevant information in PDF format.

This kit is suitable for the following boilers:

**Evomax 30, 40, 60, 80, 100, 120, 150, 30P, 40P, 60P 80P**

**Evomax 2 30, 40, 60, 80, 100, 120, 150, 30P, 40P, 60P 80P, 100P, 120P**

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# IMPORTANT

**THESE INSTRUCTIONS MUST BE USED IN CONJUNCTION WITH THE  
LOW OR STANDARD HEIGHT FRAME & HEADER KIT INSTRUCTIONS  
SUPPLIED WITH THE EVOMAX HEADERS**

# 1 INTRODUCTION

This technical data contains information for dimensioning & assembly of a cascade system kit for the Evomax and Evomax 2 ranges.

Standard Height Frame & Header kits are available in both 'in line' (6 boilers wide) and back to back options (3 boilers wide). Low Height Frame & Header kits available 'in line' (4 boilers wide).

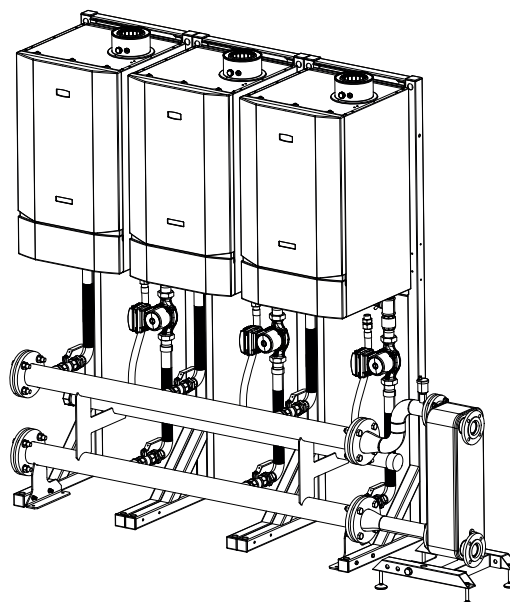
## GENERAL DESCRIPTION OF FRAME & HEADER KITS

A requirement to spread the total required heat output over several boilers can be accommodated by the use of the Evomax multiple boiler frame & header kit options.

The Varican optional accessory can be installed (1 per boiler) for cascade control, see Varican Installation Instructions for further information.

The flue configurations for the range of appliances using these system kits are C13, C33 & B23 (See appliance manual). **Note.** In the case of the 150kW boiler, this must be flued in accordance to the Clean Air Act.

All headers and pipe work should be insulated in accordance with the Non Domestic Building Services Compliance Guide. To ensure compliance with the maximum heat loss criteria, insulation thickness should be calculated according to BS EN ISO 12241 using standardised assumptions.



# 2 GENERAL DESCRIPTION OF CASCADE SYSTEMS

## 2.1 FRAME AND HEADER KIT DESIGN OPTIONS

The Evomax boilers are suitable for use in a multiple boiler configuration. The Evomax multiple boiler system is available in both in-line (low and standard height) and back to back options giving the opportunity to choose the optimum footprint size or wall space for a given output. Frame 7 states available and gives the minimum number of appliances required, the appropriate floor space & the kit product number (N.B. The kits do not include the boilers).

Standard height kits do not include the support frame as the boilers can be wall mounted but a frame kit is available if wall space etc. does not facilitate boiler/header wall mounting.

**Note:** All boilers need to be sized in accordance to the total required heat load and the modulation capabilities of the appliances.

Available Evomax 2 Appliances	
kW (NG)	Product No.
Ideal Evomax 2 30	220814
Ideal Evomax 2 40	220815
Ideal Evomax 2 60	220816
Ideal Evomax 2 80	220817
Ideal Evomax 2 100	220818
Ideal Evomax 2 120	220919
Ideal Evomax 2 150	220820
kW (Propane)	Product No.
Ideal Evomax 2 30 Propane	220823
Ideal Evomax 2 40 Propane	220824
Ideal Evomax 2 60 Propane	220825
Ideal Evomax 2 80 Propane	220826
Ideal Evomax 2 100 Propane	220827
Ideal Evomax 2 120 Propane	220828

Table 1

Plate Heat Exchanger Kit			
PHE Maximum Output kW	Low Height	Standard Height	Back to Back
60	DN50 1 Boiler (222219)	DN80 2 Boiler (222220)	
	DN65 2 Boiler (222993)		
150	DN50 1 Boiler (222221)	DN80 2 Boiler (222222)	
	DN65 2 Boiler (222994)		
300	DN65 2 Boiler (222223)		
	DN80 3 Boiler (222225)		
		DN100 3 Boiler (222995)	
450		DN80 3 Boiler (222226)	
	DN100 4 Boiler (222996)		
600	DN100 4 Boiler (222227)		
750		DN100 5 Boiler (222228)	
900		DN100 6 Boiler (222229)	

**Note:** The total system output must not exceed the Plate Heat Exchanger Kit Rating.

One Plate Heat Exchanger Kit required per cascade.

continued . . . . .

**Table 2**

**Note:** The following table shows the PHE Kit outlet connection sizes.

PHE Kits (kW)	Outlet Connection Size
60	DN25 FLANGE
150	
300	DN50 FLANGE
450	
600	
750	DN80 FLANGE
900	

## 2.2 MULTIPLE BOILER INSTALLATIONS

For installing 1 to 6 boilers, the product range includes water and gas headers capable of assembly using threaded socket, compression and flange connections.

## 2.3 HYDRONIC ISOLATION: LOW LOSS HEADER & PLATE HEAT EXCHANGER

A low loss header or plate heat exchanger allows flow separation within a hydronic system.

This allows two flow circuits to operate with their own flow and pressure drop environments whilst effectively transferring heat to its adjoined water circuit.

This enables the modern high resistant, high efficiency boilers to operate under their optimum conditions, while the main heating circuit operates to its own controlled optimum requirements. Ideal Commercial brazed plate heat exchangers ensure optimum heat transfer efficiency and low resistance within a compact footprint. The heat exchanger allows hydraulic segregation between the boiler primary and secondary heating circuits. Used in conjunction with Ideals low and standard height frame and header kits covering duties from 60kW to 900kW.

The design is based on standard components and a modular brazed concept. Each unit is manufactured to the highest standard and part of the AHRI certified program that ensures thermal performance in accordance with the product specifications.

### Benefits

- Compact design
- No gaskets
- Easy installed with Ideal Commercial's Frame and Header Kits
- Low maintenance/ self-cleaning
- All units are pressure tested

## 2.4 OUTPUT CONTROL

All pumps are designed to be wired to the appliance to allow a controlled pump over run.

If using an external pump control system the capability of a timed pump over run signal provided by the appliance must be maintained at all times.

The optional Varican accessory control can be installed (1 per boiler) to enable cascade control.

## 2.5 GAS SUPPLY

For Evomax the 30, 40, 60, 80, 100, 120 & 150 boilers are configured for use with natural gas. The 30P, 40P, 60P & 80P boilers are configured for use with LPG / Propane.

For Evomax 2 the 30, 40, 80, 60, 100, 120 & 150 boilers are configured for use with natural gas. The 30P, 40P, 60P, 80P, 100P & 120P boilers are configured for use with LPG / Propane.

Connection to the gas supply must be in accordance to with all the applicable regulations.

A single frame and DN50 water header kit will require the gas inlet to be made up to the gas tap provided, connecting it to the inlet of the appliance.

2, 3, 4 and 6 boiler units will be supplied with a 2" gas header and all the necessary components and pipe work to connect it to the appliances.

Note: Test points are provided at each end of the 2" gas header. The test point nearest to the gas inlet is intended to be used as the appliance inlet pressure point.

## 2.6 ASSEMBLY

The frames must be located in a suitable place that affords a flat and level floor-area of suitable load bearing capacity. Care must be taken when locating the frames that space is available for the servicing, installation and maintenance of the appliance and all of the associated connections and equipment. (See Appliance manuals)

When using multiple frames they must be bolted together and where necessary secured to the floor.

## 2.7 SAFE HANDLING

Installation may require 2 or more operatives to move it to its installation site, remove it from its packaging base and during movement into its installation location. Manoeuvring may include the use of a sack truck and involve lifting, pushing and pulling.

Caution should be exercised during these operations.

Operatives should be knowledgeable in handling techniques when performing these tasks and the following precautions should be considered:

- Grip the boiler at the base
- Be physically capable
- Use personal protective equipment as appropriate, e.g. gloves, safety footwear

During all manoeuvres and handling actions, every attempt should be made to ensure the following unless unavoidable and/or the weight is light.

- Keep back straight
- Avoid twisting at the waist
- Avoid upper body/top heavy bending
- Always grip with the palm of the hand
- Use designated hand holds
- Keep load as close to the body as possible
- Always use assistance if required

## 3 MULTIPLE BOILER SYSTEM COMPONENTS

### 3.1 GENERAL

The multiple boiler systems consist of the following components:

- Frame kit (optional 1 per boiler)
- Boiler gas header.
- Boiler flow and return headers supported on mounting skid
- Low loss mixing header (optional)
- Hardware pack (includes essential connection and valve components)
- Plate Heat exchanger kit (optional)
- Boiler Shunt pump (MUST be used, sold separately)

### 3.2 MAIN WATER HEADERS

The main water headers consist of: water flow, water return headers custom sized for all boilers. It is possible to extend the system to a maximum of 4 boilers in a low height linear configuration, 6 boilers in a standard height linear configuration or 2 x 3 boilers in a back-to-back configuration. In a back-to-back configuration with an odd number of boilers, the unused connections must also be capped off using blanking caps provided.

Each header kit provides water flow and return headers sized either DN50, DN65, DN80 or DN100 dependent on total maximum combined heating output required.

### 3.3 GAS HEADER

The Gas header consists of a custom manufactured 2" manifold. This is located in a cradle incorporated within the header mounting skid.

### 3.4 LOW LOSS HEADERS (MIXING HEADER) OPTION

The mixing headers are supplied with an auto air vent and drain point as standard.

### 3.5 BOILER SHUNT PUMP

Pump kits and External pump controls (**sold separately**) are designed to provide the optimum flow around the appliance water circuit ensuring the maximum flow rates are contained within the design constraints of the appliance.

It is not recommended to fit additional pumps directly to the appliance circuit unless they have been designed to ensure the maximum permissible appliance flow rate is not exceeded.

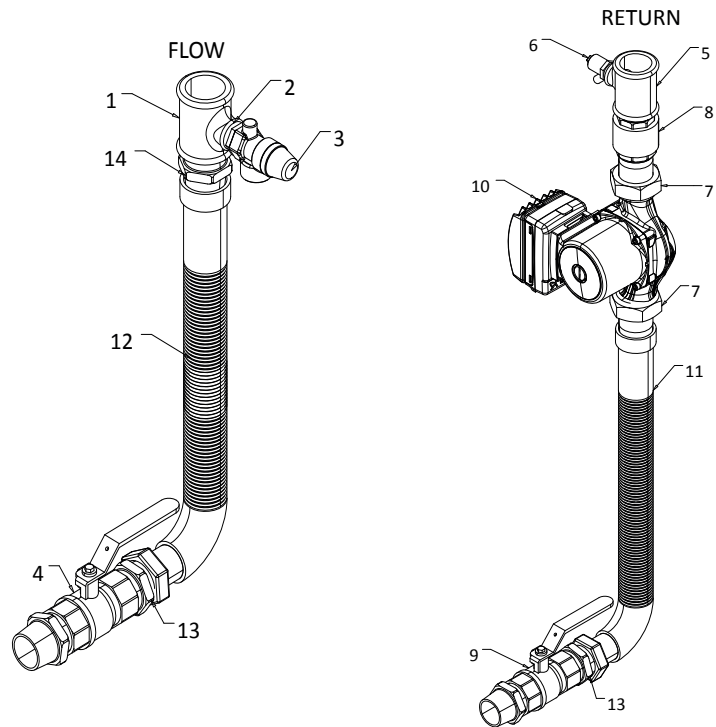
### 3.6 BOILER CONNECTION KITS

The connection kit contains the following components:

1. Boiler return leg complete with isolating valve, pump, non return valve, drain cock and fibre seals
2. Boiler flow leg complete with isolating valve, pressure relief valve and fibre seals
3. Header blanking flanges, fasteners and gaskets
4. Mixing header fasteners and gasket

#### LEGEND

1. 1 1/4" X 3/4" X 1 1/4" Tee
2. Close taper nipple
3. Safety relief valve 3 bar
4. Isolation valve
5. 1 1/4" X 1/2" X 1 1/4" Tee
6. Drain cock
7. Pump union
8. Non return valve
9. Isolation Valve
10. Pump inc. gaskets
11. Boiler return flexible connection from header
12. Boiler flow flexible connection from header
13. 1 1/4" taper male to 1 1/4" parallel hex adapter
14. 1 1/4" male hex nipple



**Gas Connection:** Conical Adapter, Flexi-hose

### 3.7 FREE-STANDING FRAMES

If boilers in cascade are positioned in-line the installer has the option to either wall mount the boilers or mount boilers on optional frame kits available. If mounting in-line product on frames, optional frame kit UIN 206970 must be specified in the correct quantity, one frame kit for each boiler installed in cascade for in-line and back to back.

### 3.8 INSTALLATION AREA AND DIMENSIONS

Care must be taken to ensure adequate access for boiler / cascade system installation and servicing.

A minimum of 450mm clearance must be provided from the front of the installed boilers in cascade to facilitate boiler servicing. Additional clearance must also be considered in the event of boiler replacement.

Consideration to connecting heating flow and return pipework, gas supply and condensate drainage must be given. Routing of the condensate drain must be made to allow a minimum fall of 1 in 20 away from the installed boilers in cascade, throughout its length. Adequate room above the boilers must be provided to install and service the boiler flue system. Further information with respect to flue and condensate drain connection is provided in the installation and servicing instructions provided within the boilers packaging carton.

### 3.9 SYSTEM REQUIREMENTS

#### Notes.

1. Ancillary components can be connected to the system via the G 3/4" tapping's on the header blanking flanges. See diagram below for guidance (diagram for illustration purposes only).
2. The method of filling, refilling, topping up or flushing sealed primary circuits from the mains via a temporary hose connection is only allowed if acceptable to the local water authority.
3. When installing the filling device, it must be connected as shown to fully comply with the water regulations. This may involve the fitting of an approved WRAS approved isolator valve to the mains supply, and appropriate back flow prevention device.

#### Safety valve (Supplied with kit)

1. A spring loaded non-adjustable 3 bar safety valve complying with the relevant standards of BS6759 Pt1 is fitted close to the boiler with no intervening valve or restriction.
2. A manual testing device.
3. The safety valve outlet should be piped to ensure water or steam discharge cannot create a hazard to personal or damage electrical components or wiring.

#### Pressure gauge (Not supplied)

A pressure gauge covering at least 0-4 bar must be fitted to the system visible from the filling point.

#### Expansion vessel (Not supplied)

1. A diaphragm type expansion vessel complying with BS. EN 13831 must be fitted without incorporating isolation valves of any sort.
2. The vessel capacity must be adequate to accept the expansion of system water when heated to 110°C.
3. The charge pressure must not be less than the static water head above the vessel. The pressure attained in the system when heated to 110°C should be at least 0.35bar less than the lift pressure of the safety valve. For guidance on vessel sizing refer to the Table 3.

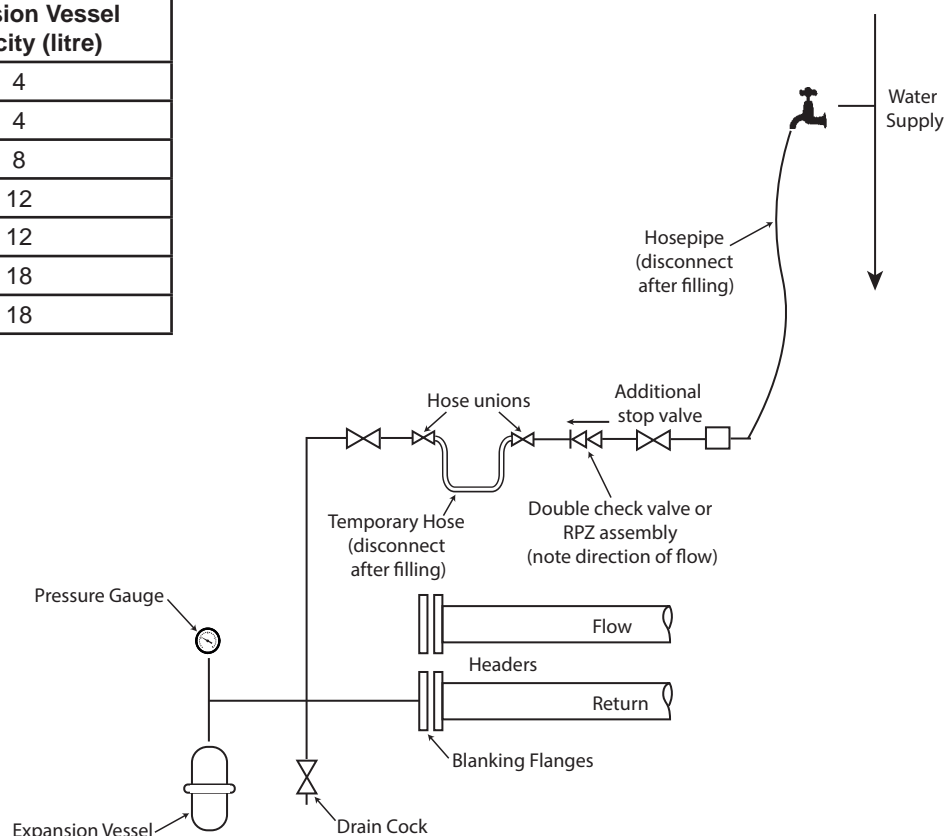
**Note:** The largest Plate Heat Exchanger (900kW) with 6 x Evomax 150kW boilers would require a 15 litre expansion vessel.

#### System drain cock (Not supplied)

A drain cock should be fitted to the lower blanking flange on the lowest header.

Table 3

Plate Heat Exchanger Kits (kW)	Recommended Expansion Vessel Capacity (litre)
60	4
150	4
300	8
450	12
600	12
750	18
900	18



# IMPORTANT POINTS

## **Before commencing installation:**

### **If Wall mounting:**

- Ensure wall is capable of supporting the weight of boilers to be mounted
- Mark drill points of header using floor mounting template
- Mark height on to the wall from the floor to the top of the boiler
- Ensure floor is flat and level and is of suitable load bearing capacity

### **If Frame mounting:**

- The frames must stand on a flat and level floor of suitable load bearing capacity.
- If using a frame kit (UIN 206970) the header must be bolted to the frame before the hoses are connected to the boiler.

## **MOUNTING FRAME MUST BE SECURED TO THE FLOOR WITH BOLTS**

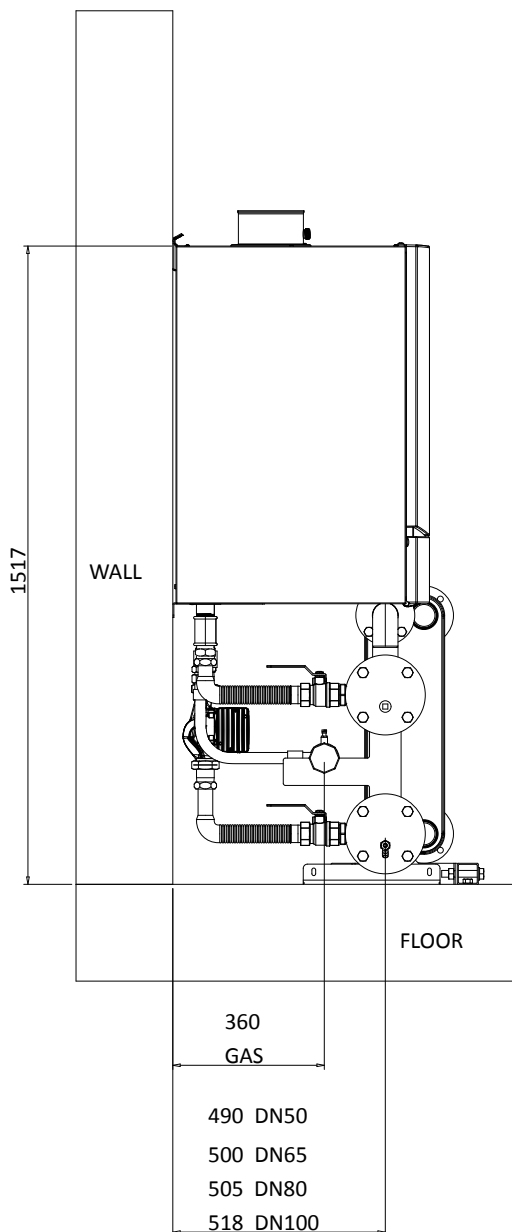
These Installations refer to perpendicular wall and floor. If walls are not perpendicular, it is recommended that a frame kit be used. The correct number of frames should be ordered (1 per boiler).

Allowances must be made for installation where skirting boards or other features are in place that may affect the nominal installation conditions.

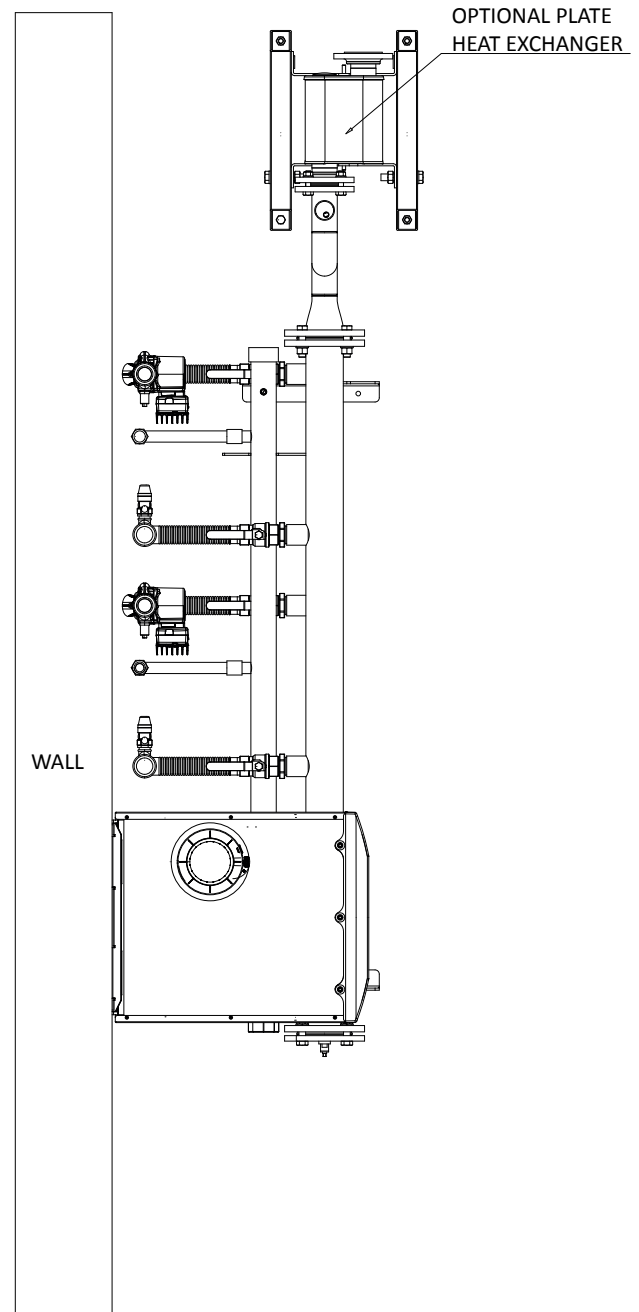
## 4 WALL MOUNTING

### 4.1 WALL MOUNTED IN-LINE OPTION (LOW HEIGHT)

SIDE VIEW



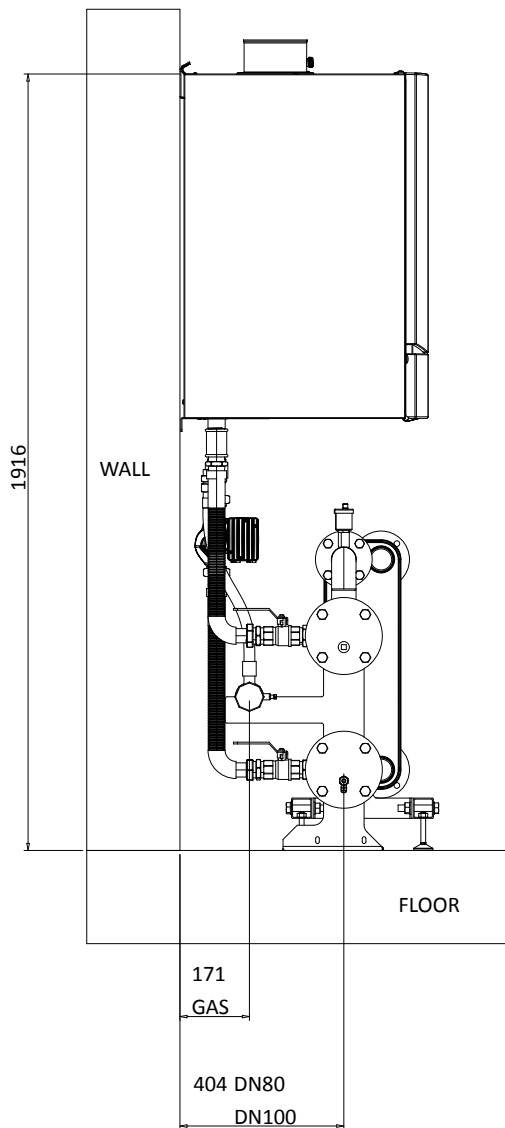
PLAN VIEW



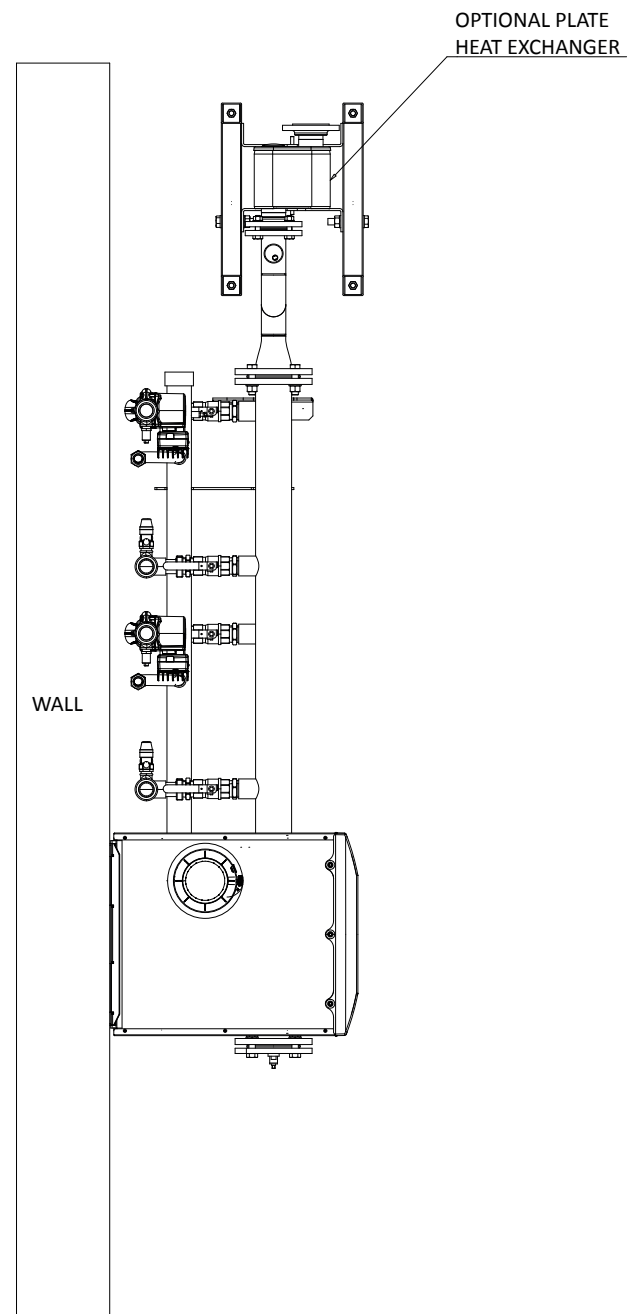
**Careful consideration MUST be given to the installation tolerances. If these are not adhered to, hoses may become kinked or connections may not fit.**

## 4.2 WALL MOUNTED IN-LINE OPTION (STANDARD HEIGHT)

SIDE VIEW



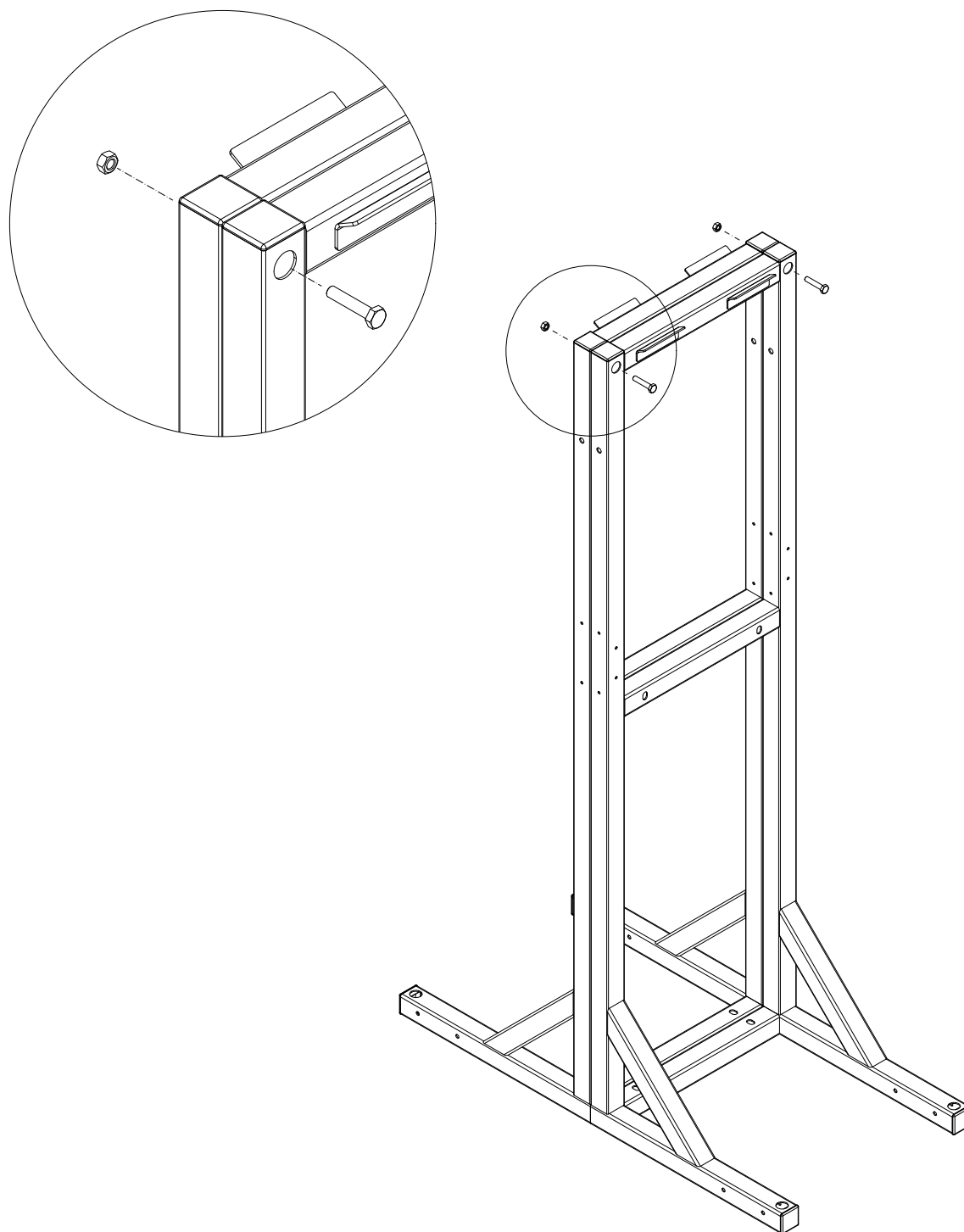
PLAN VIEW



**Careful consideration MUST be given to the installation tolerances. If these are not adhered to, hoses may become kinked or connections may not fit.**

## 5 BACK TO BACK MOUNTING

### 5.1 FRAME MOUNTED BACK TO BACK OPTION (STANDARD HEIGHT)

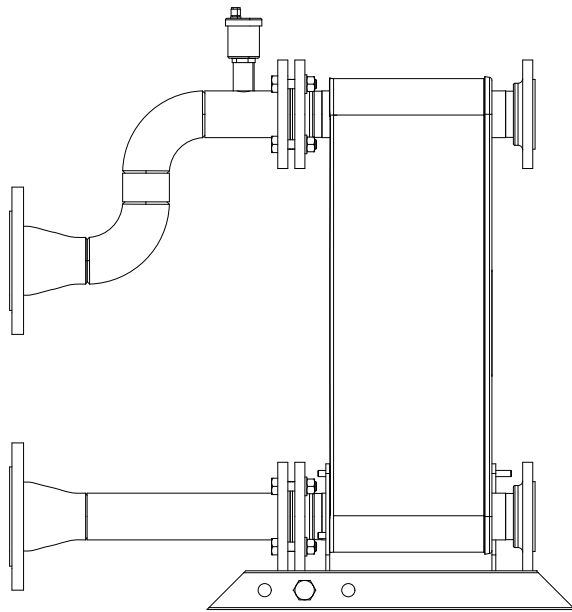


**For Back to Back installations, align the frames as shown and bolt through using the fixings supplied with the Back to Back Header Kits.**

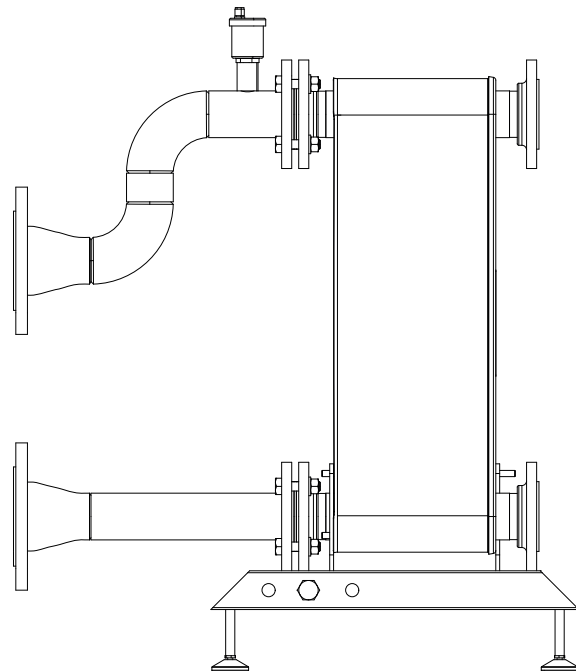
## 6 PLATE HEAT EXCHANGER KIT (OPTIONAL ACCESSORY)

### 6.1 PLATE HEAT EXCHANGER FEET

**Note:** Plate Heat Exchanger Kit feet are not required for low height installations.



LOW HEIGHT CONFIGURATION (FEET NOT REQUIRED)



STANDARD HEIGHT CONFIGURATION (FEET INSTALLED)

### 6.2 FITTING PLATE HEAT EXCHANGER AND BLANKING FLANGES

1. Fit the Plate Heat Exchanger and blanking flanges in the chosen positions.

**Note:** Plate Heat Exchanger can be located either LHS or RHS of the headers.

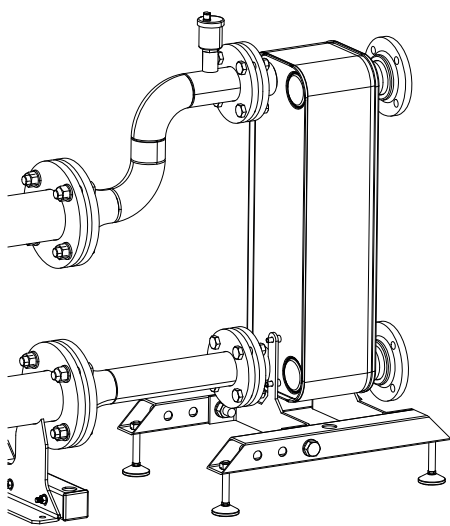
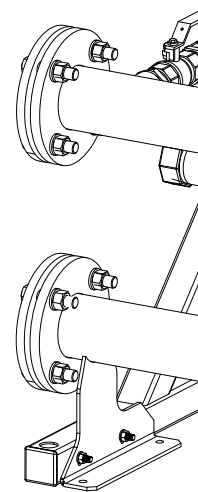


Plate Heat Exchanger



Blanking Flange

## 7 INSTALLATION DRAWINGS FOR MULTIPLE BOILER SYSTEMS

### 7.1 GENERAL

The low height boiler systems are available in a two format:

- 1 to 4 boilers in a linear configuration, mounted on a wall.
- 1 to 4 boilers in a linear configuration, mounted on a free-standing frame.

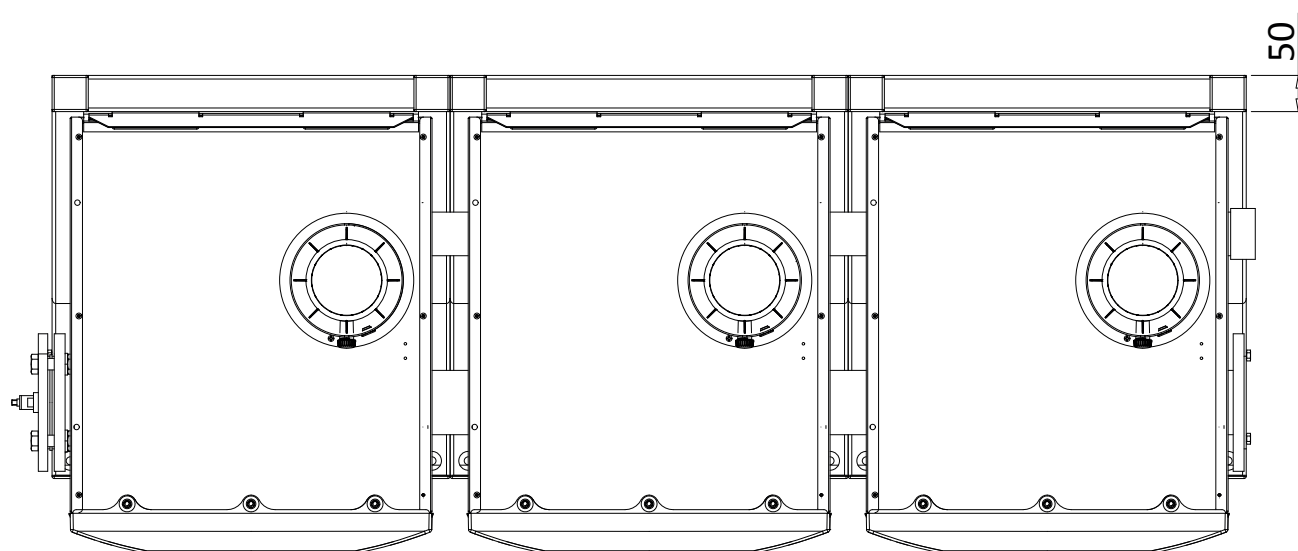
The standard height boiler systems are available in three formats:

- 2 to 6 boilers in a linear configuration, mounted on a wall.
- 2 to 6 boilers in a linear configuration, mounted on a free-standing frame.
- 2 to 6 boilers in a back-to-back configuration, mounted on a free-standing frame.

**The boiler side of the cascade systems is sized to water flow and return differential  $20\Delta T$ .**

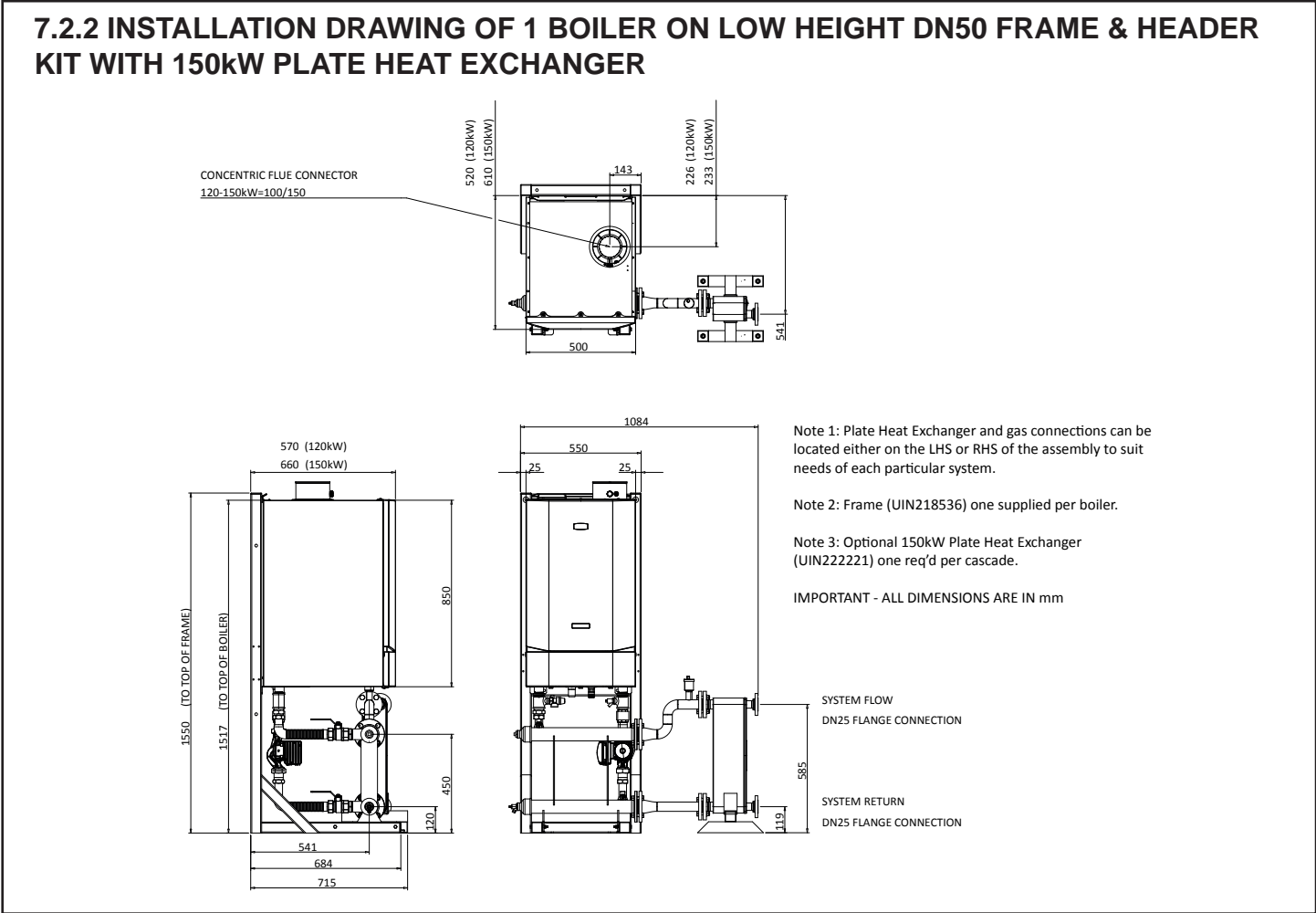
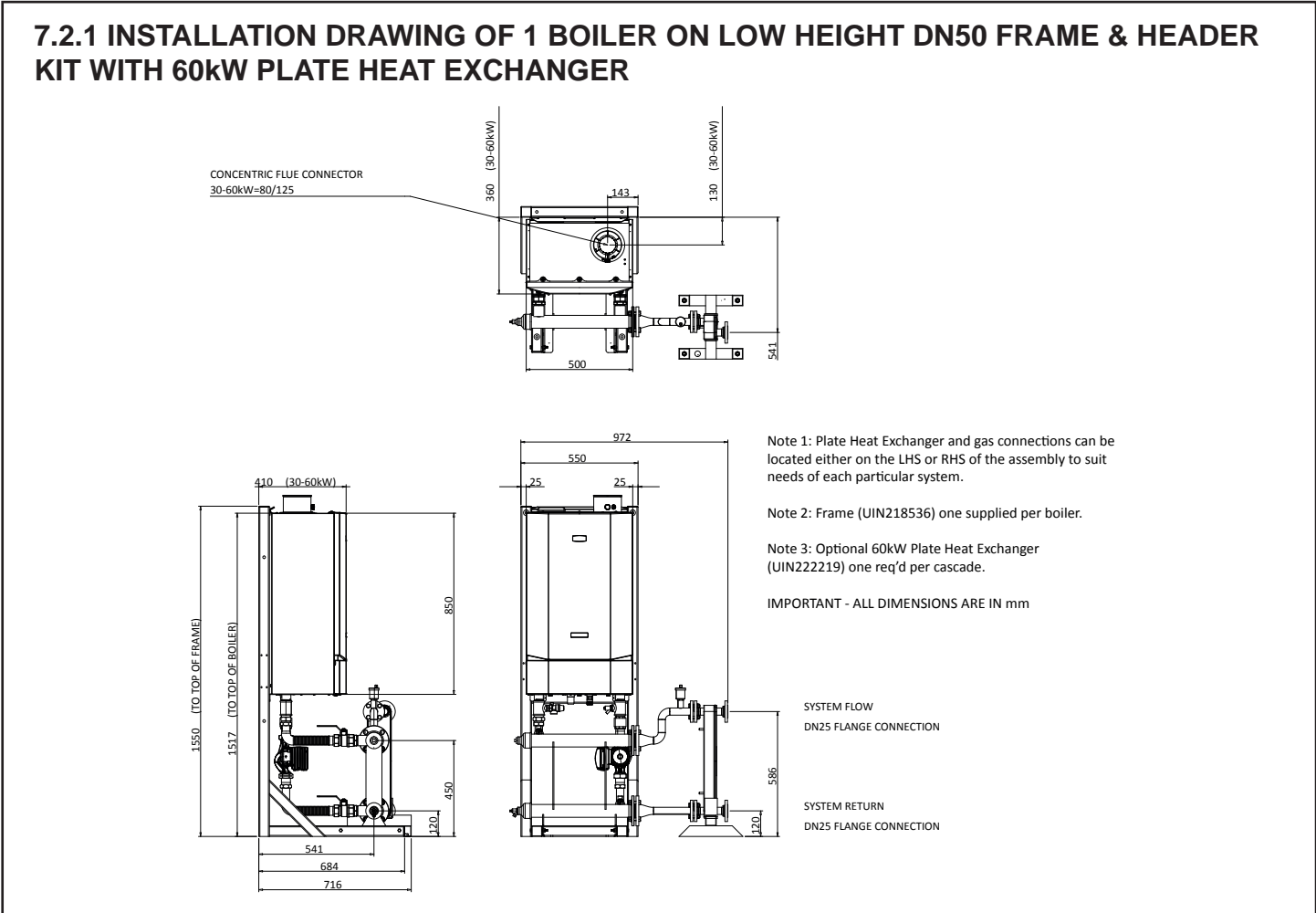
**IMPORTANT:** Please note not all possible configurations are shown.

**Note:** The total system output must not exceed the Plate Heat Exchanger Kit Rating - refer to Table 1 for the range of Plate Heat Exchanger kits available.

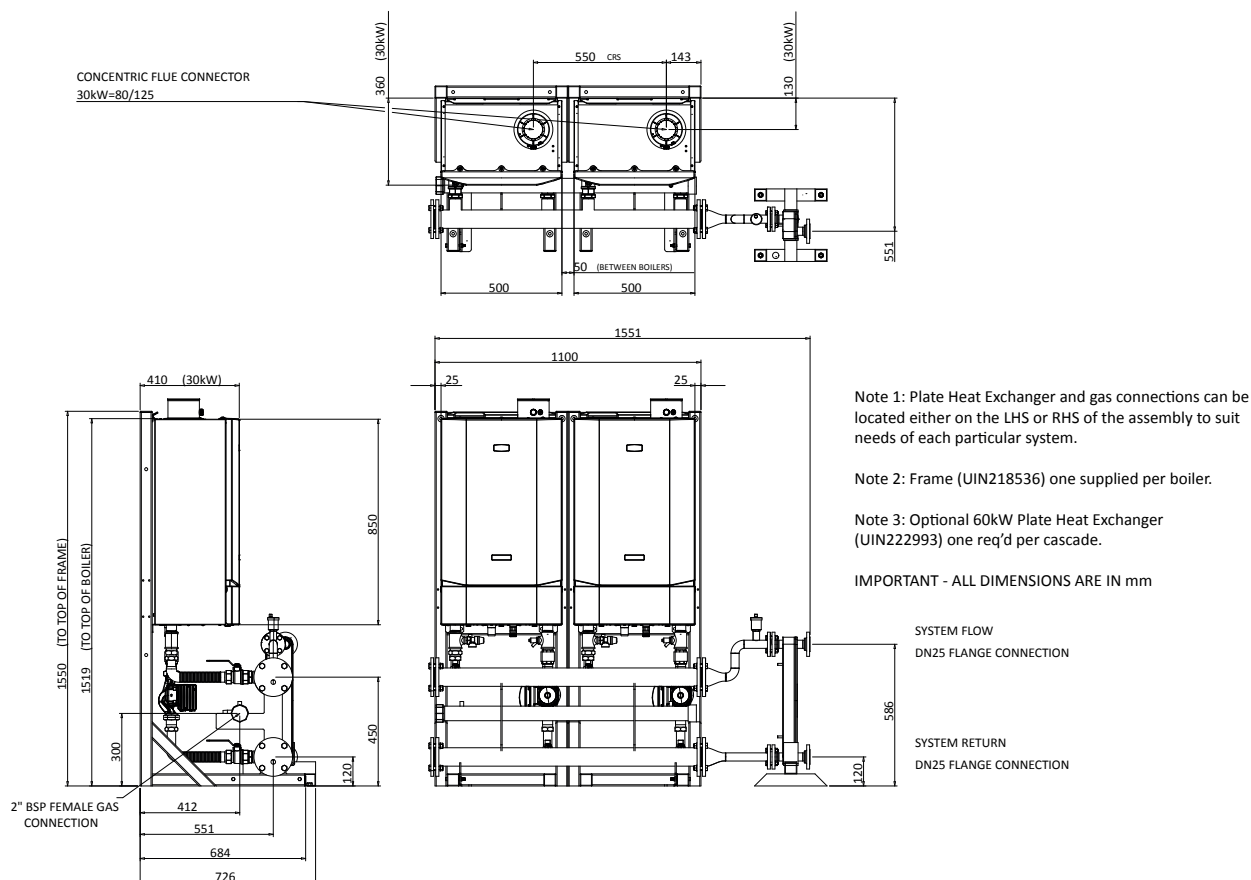


**NOTE:** For frame mounted cascades - Add the thickness of the frame (50mm) to the dimensions provided where required.

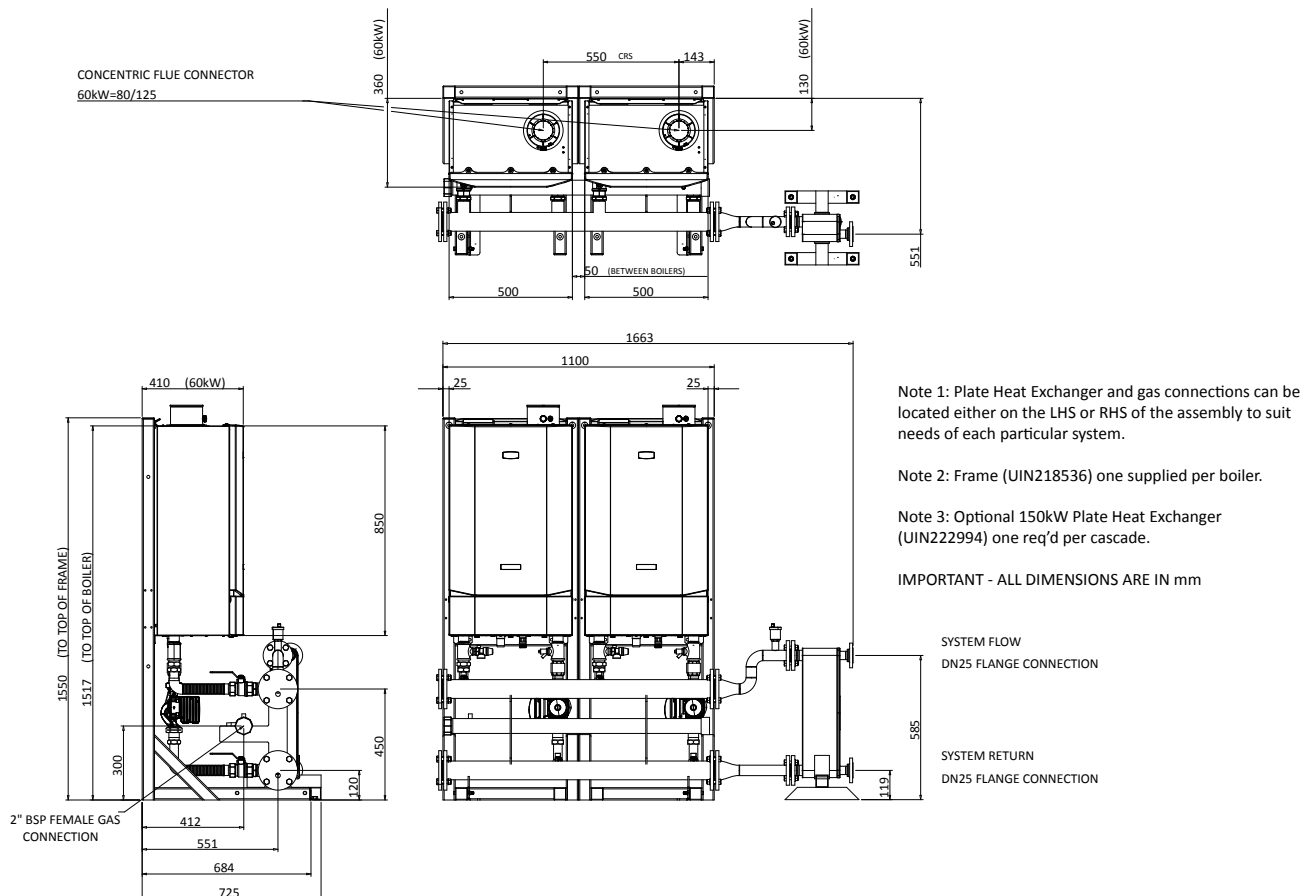
7.2 LOW HEIGHT FRAME KIT CONFIGURATION



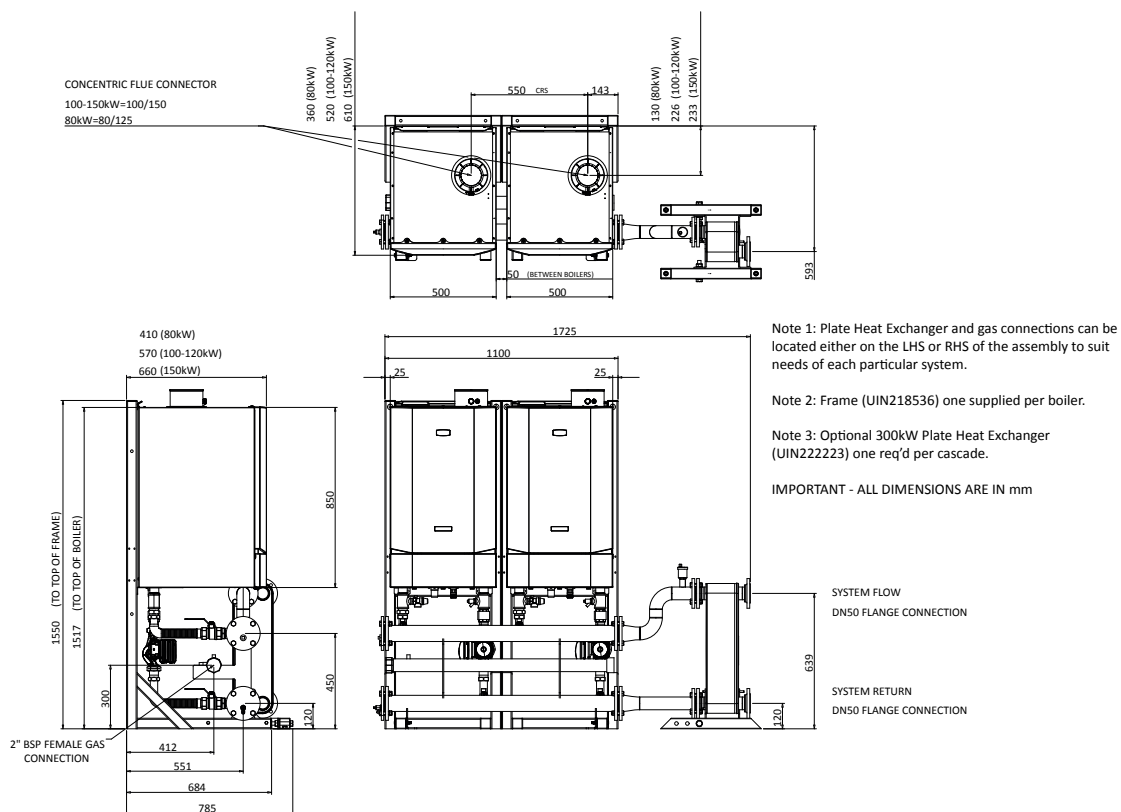
### 7.2.3 INSTALLATION DRAWING OF 2 BOILERS ON LOW HEIGHT DN65 FRAME & HEADER KIT WITH 60kW PLATE HEAT EXCHANGER



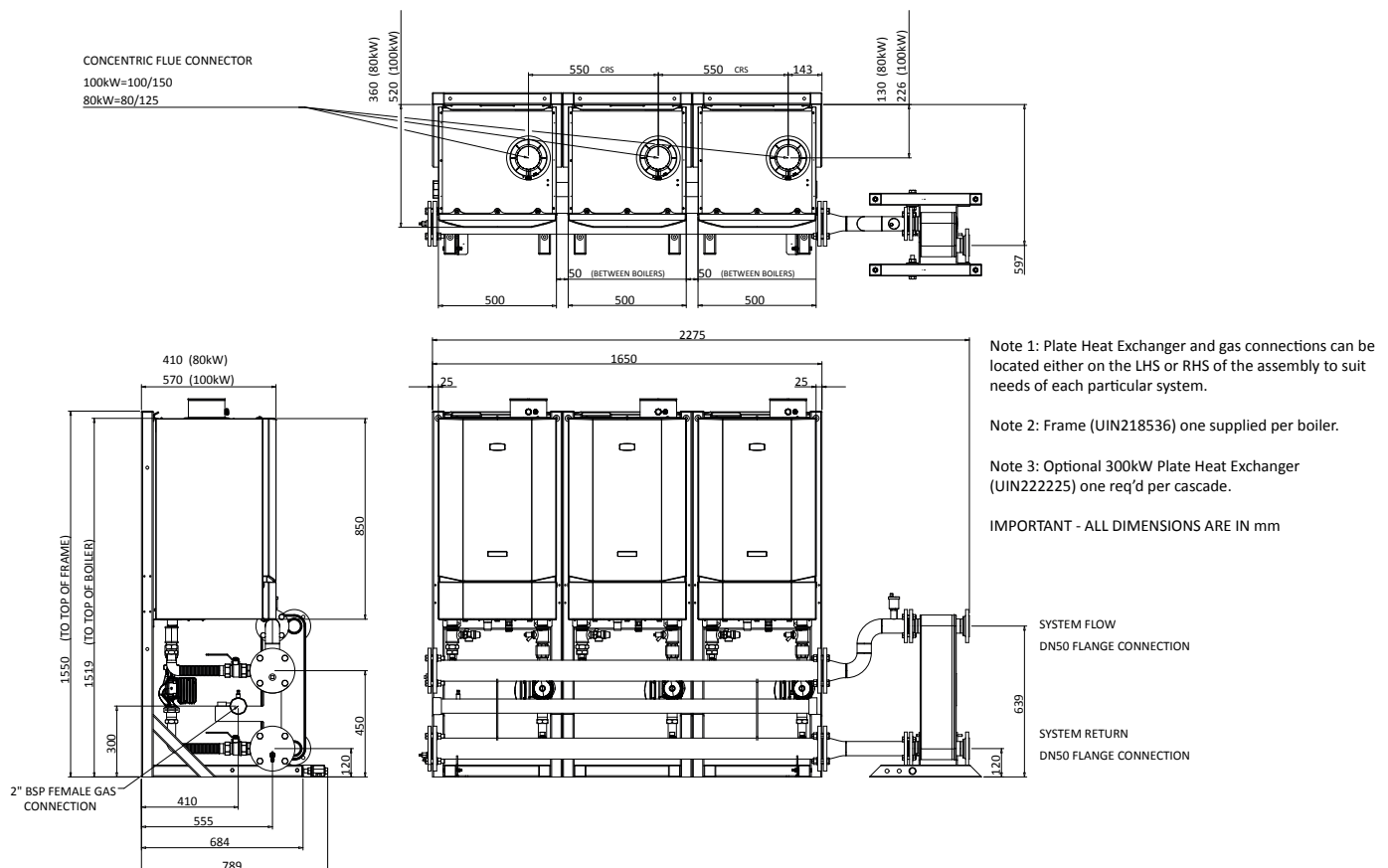
### 7.2.4 INSTALLATION DRAWING OF 2 BOILERS ON LOW HEIGHT DN65 FRAME & HEADER KIT WITH 150kW PLATE HEAT EXCHANGER



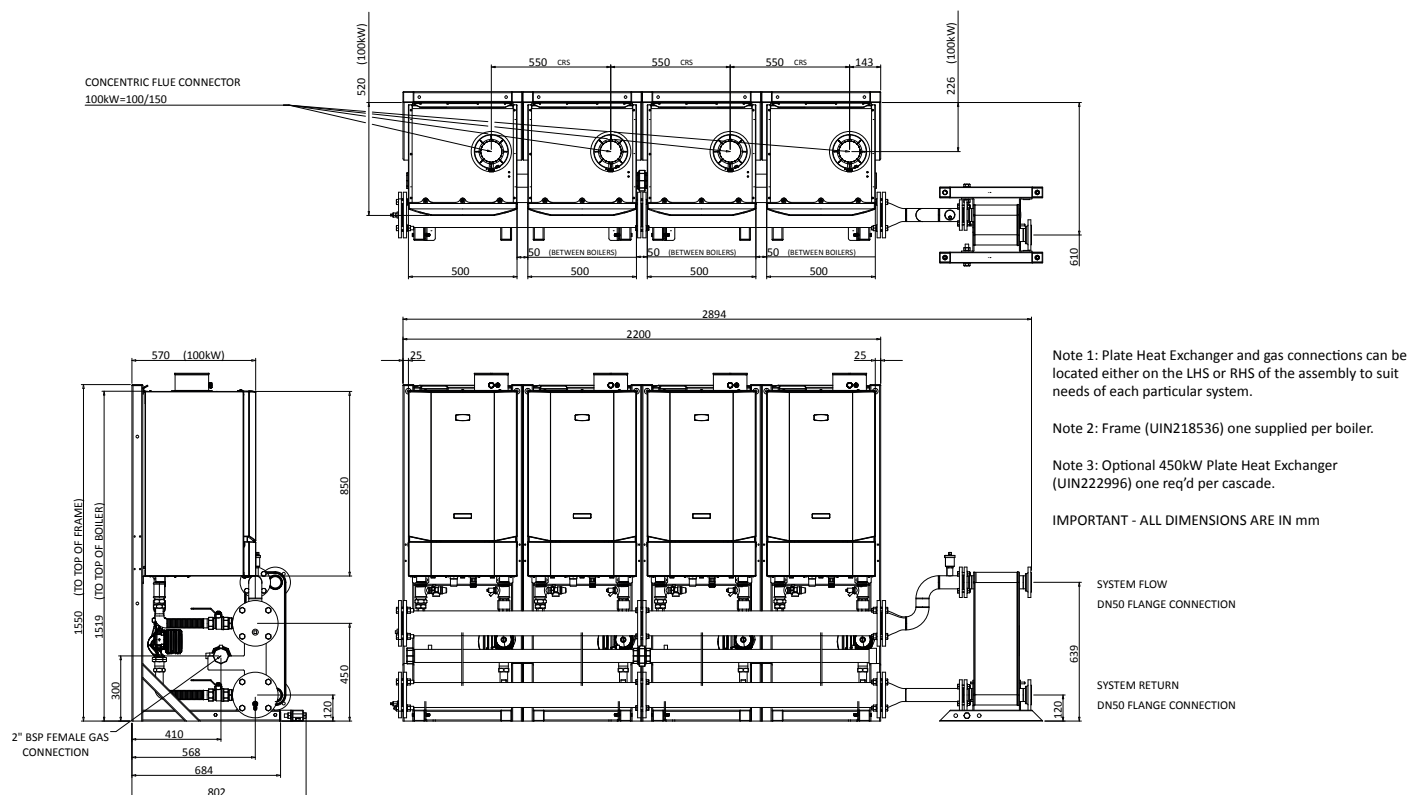
## 7.2.5 INSTALLATION DRAWING OF 2 BOILERS ON LOW HEIGHT DN65 FRAME & HEADER KIT WITH 300kW PLATE HEAT EXCHANGER



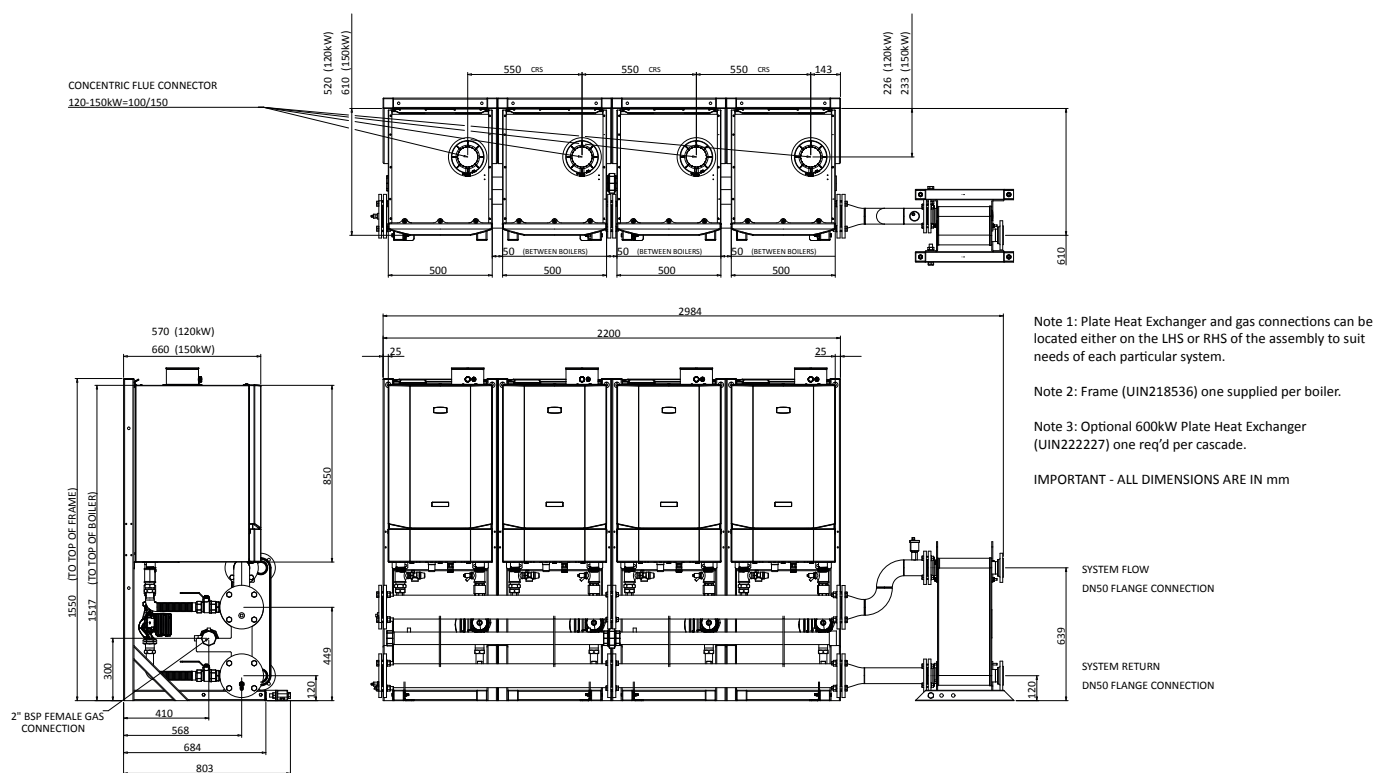
## 7.2.6 INSTALLATION DRAWING OF 3 BOILERS ON LOW HEIGHT DN80 FRAME & HEADER KIT WITH 300kW PLATE HEAT EXCHANGER



## 7.2.7 INSTALLATION DRAWING OF 4 BOILERS ON LOW HEIGHT DN100 FRAME & HEADER KIT WITH 450kW PLATE HEAT EXCHANGER

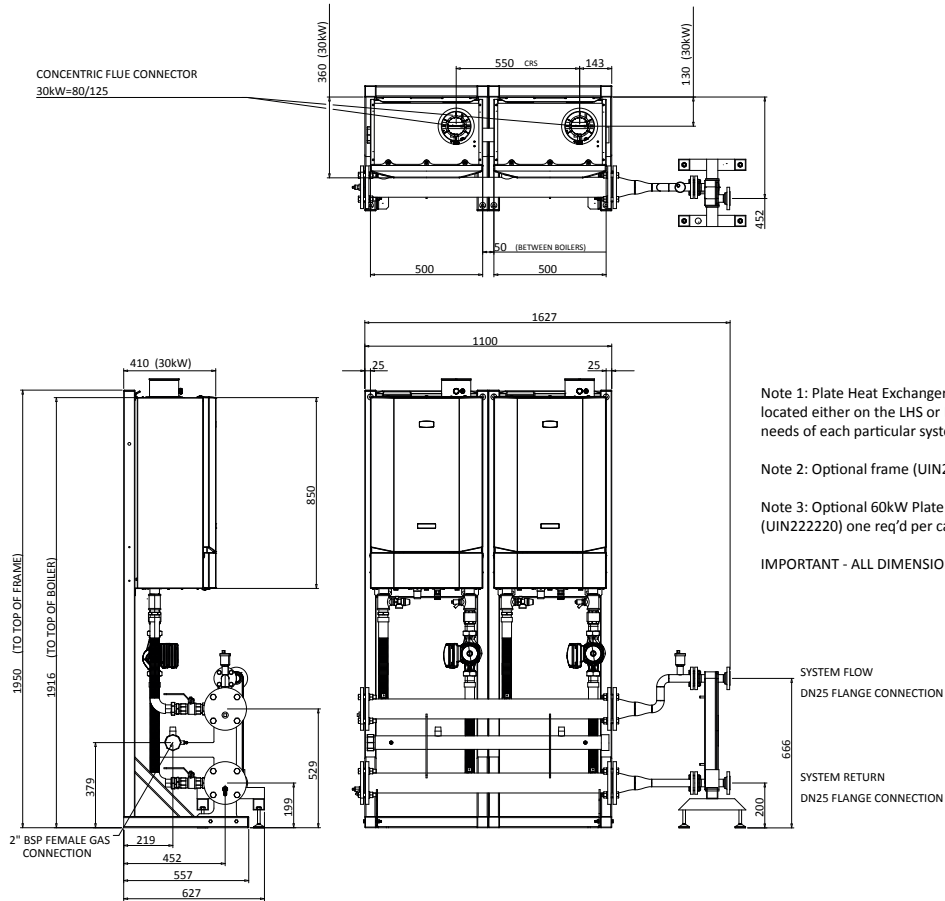


## 7.2.8 INSTALLATION DRAWING OF 4 BOILERS ON LOW HEIGHT DN100 FRAME & HEADER KIT WITH 600kW PLATE HEAT EXCHANGER



7.3 IN-LINE FRAME KIT CONFIGURATION

7.3.1 INSTALLATION DRAWING OF 2 BOILERS ON IN-LINE DN80 FRAME & HEADER KIT WITH 60kW PLATE HEAT EXCHANGER



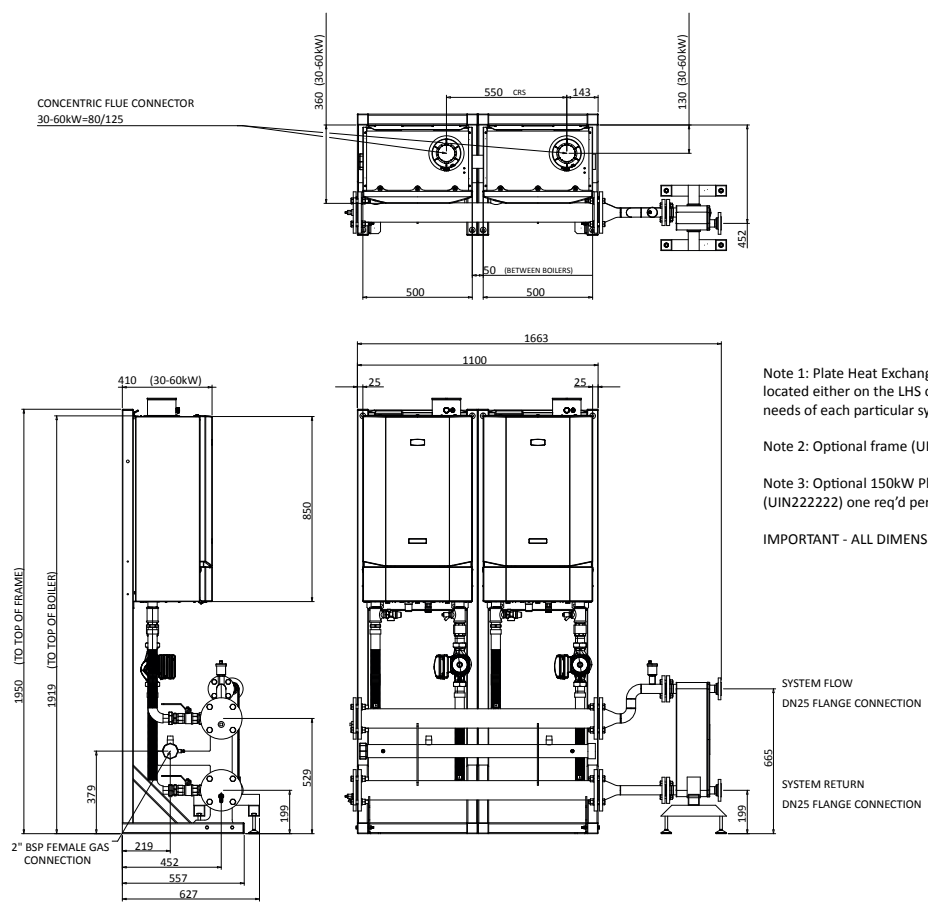
Note 1: Plate Heat Exchanger and gas connections can be located either on the LHS or RHS of the assembly to suit needs of each particular system.

Note 2: Optional frame (UIN206970) one req'd per boiler.

Note 3: Optional 60kW Plate Heat Exchanger Kit (UIN222220) one req'd per cascade.

IMPORTANT - ALL DIMENSIONS ARE IN mm

7.3.2 INSTALLATION DRAWING OF 2 BOILERS ON IN-LINE DN80 FRAME & HEADER KIT WITH 150kW PLATE HEAT EXCHANGER



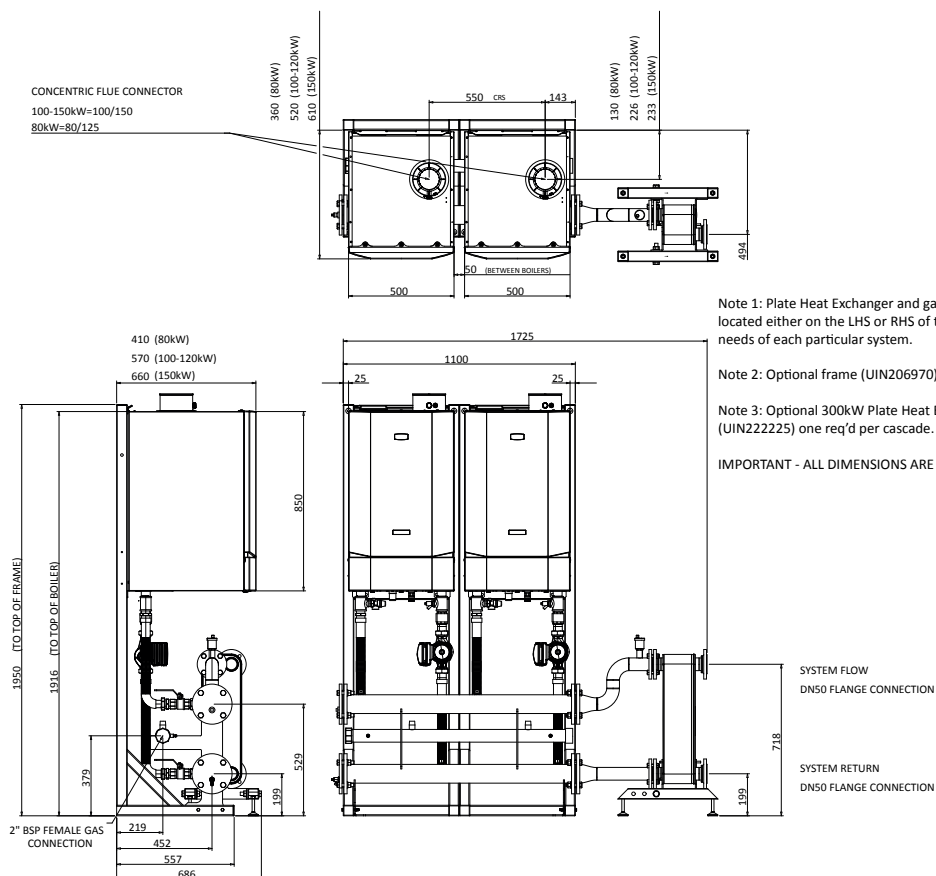
Note 1: Plate Heat Exchanger and gas connections can be located either on the LHS or RHS of the assembly to suit needs of each particular system.

Note 2: Optional frame (UIN206970) one req'd per boiler.

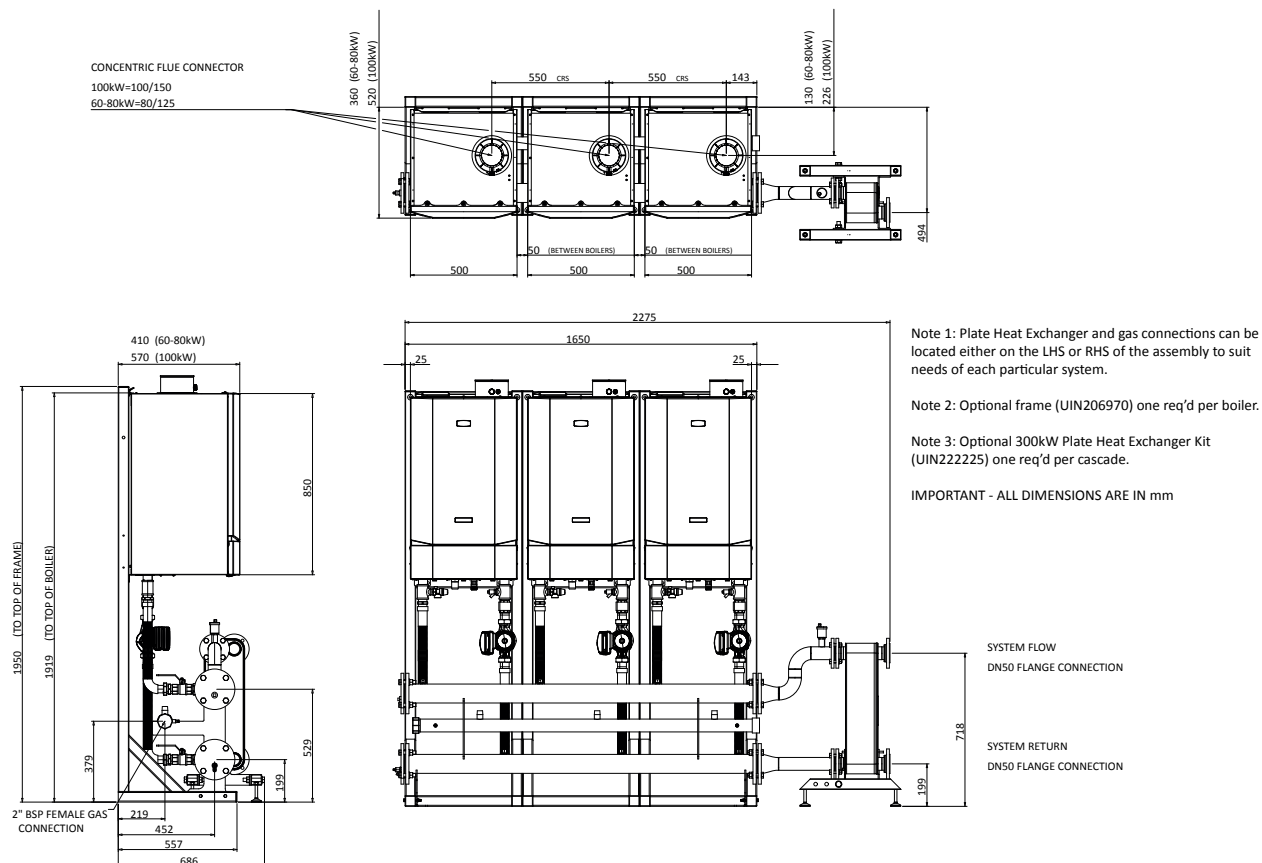
Note 3: Optional 150kW Plate Heat Exchanger Kit (UIN222222) one req'd per cascade.

IMPORTANT - ALL DIMENSIONS ARE IN mm

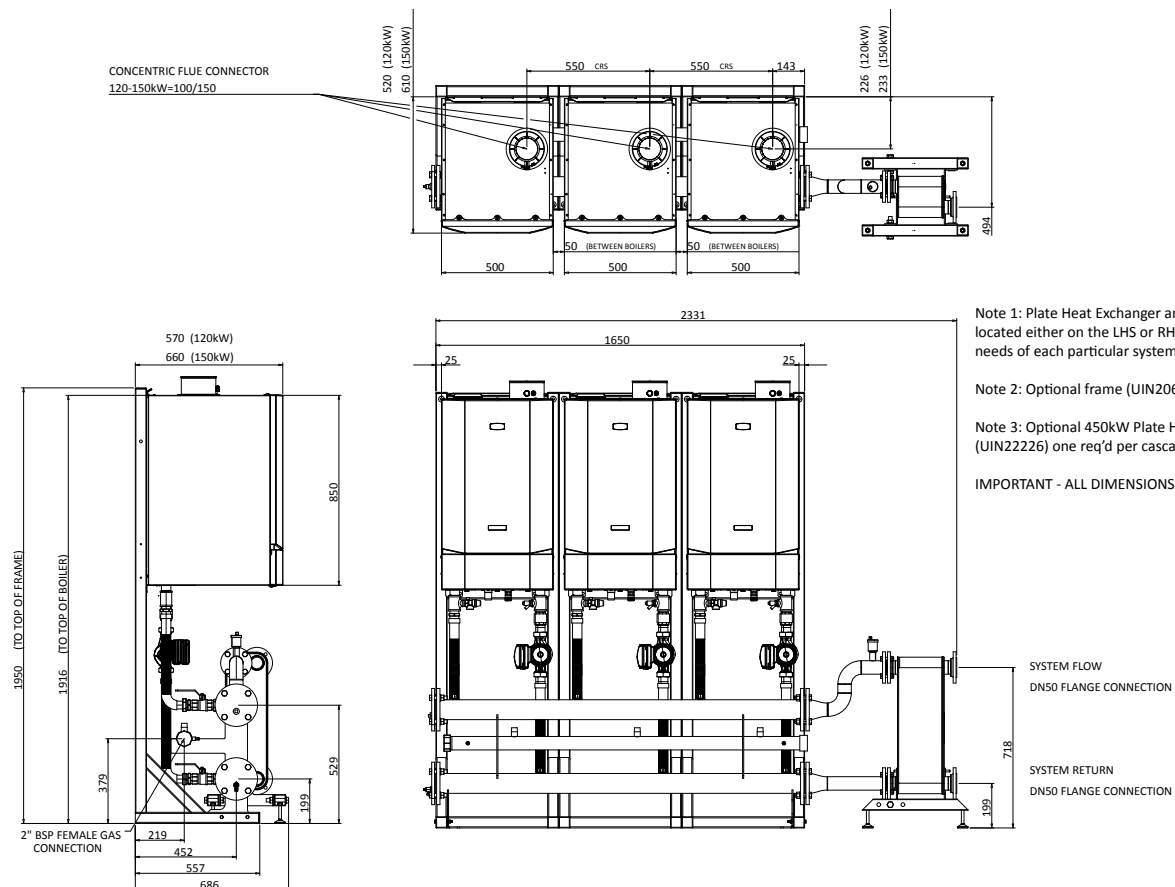
### 7.3.3 INSTALLATION DRAWING OF 2 BOILERS ON IN-LINE DN80 FRAME & HEADER KIT WITH 300kW PLATE HEAT EXCHANGER



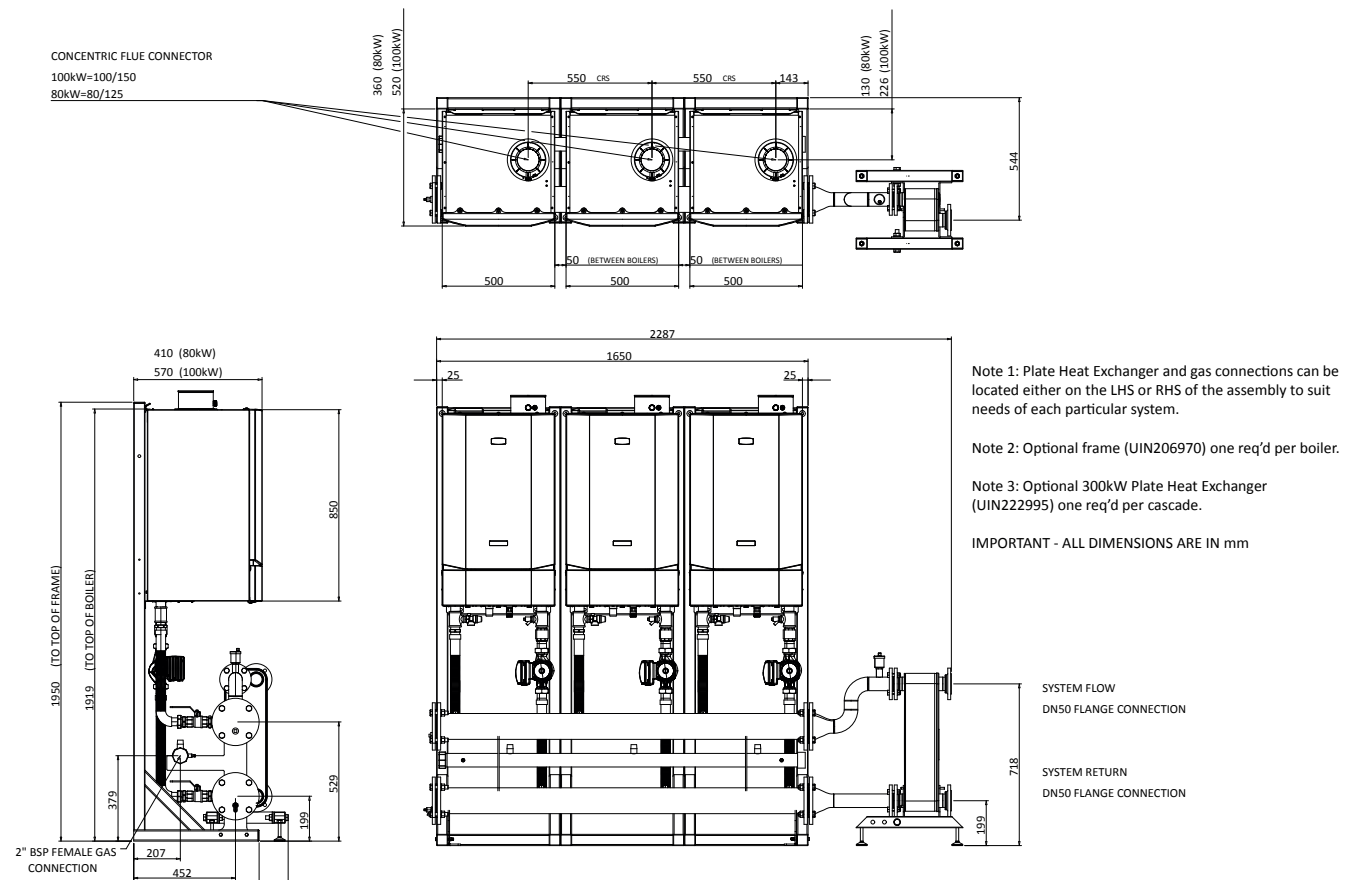
### 7.3.4 INSTALLATION DRAWING OF 3 BOILERS ON IN-LINE DN80 FRAME & HEADER KIT WITH 300kW PLATE HEAT EXCHANGER



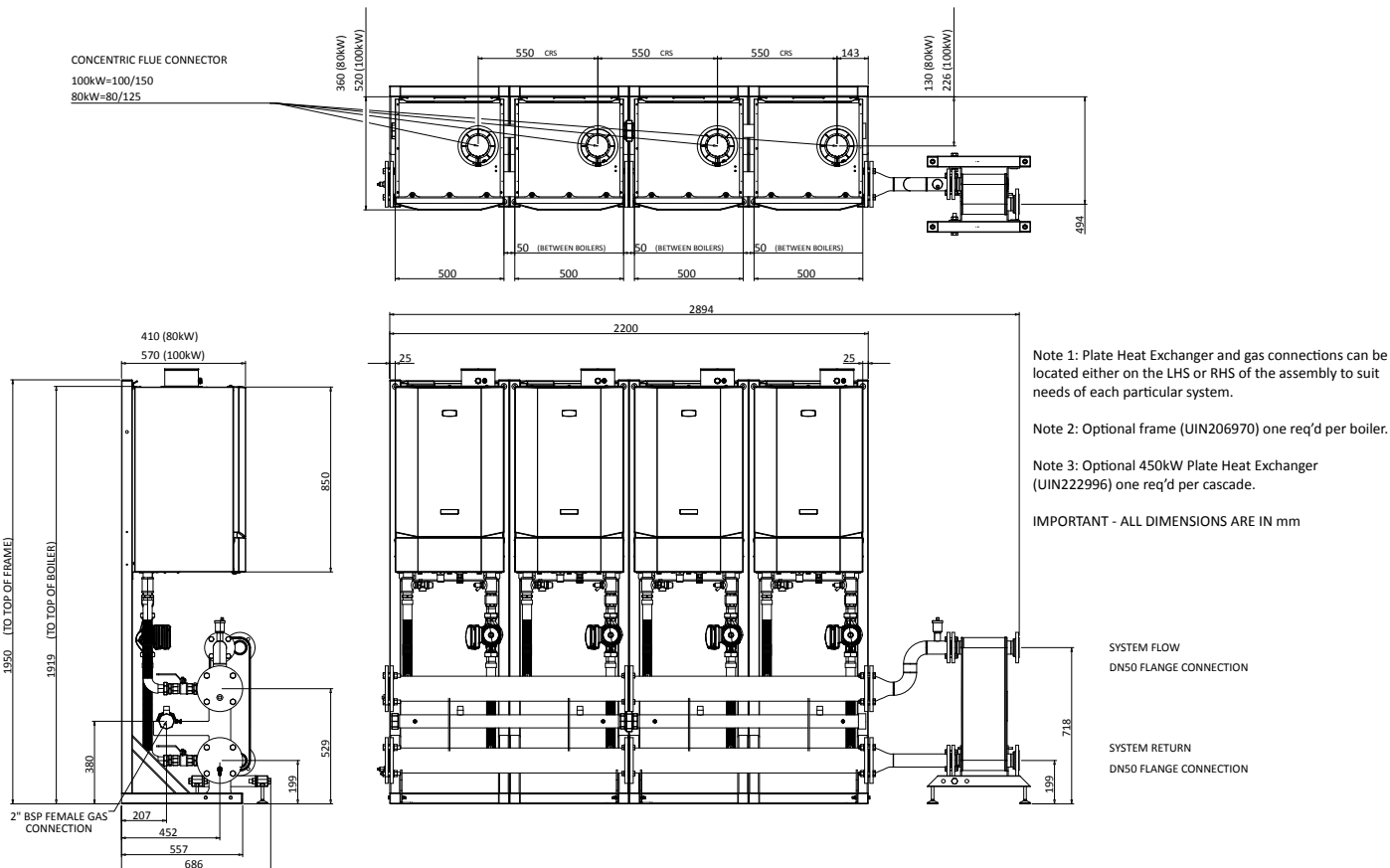
### 7.3.5 INSTALLATION DRAWING OF 3 BOILERS ON IN-LINE DN80 FRAME & HEADER KIT WITH 450kW PLATE HEAT EXCHANGER



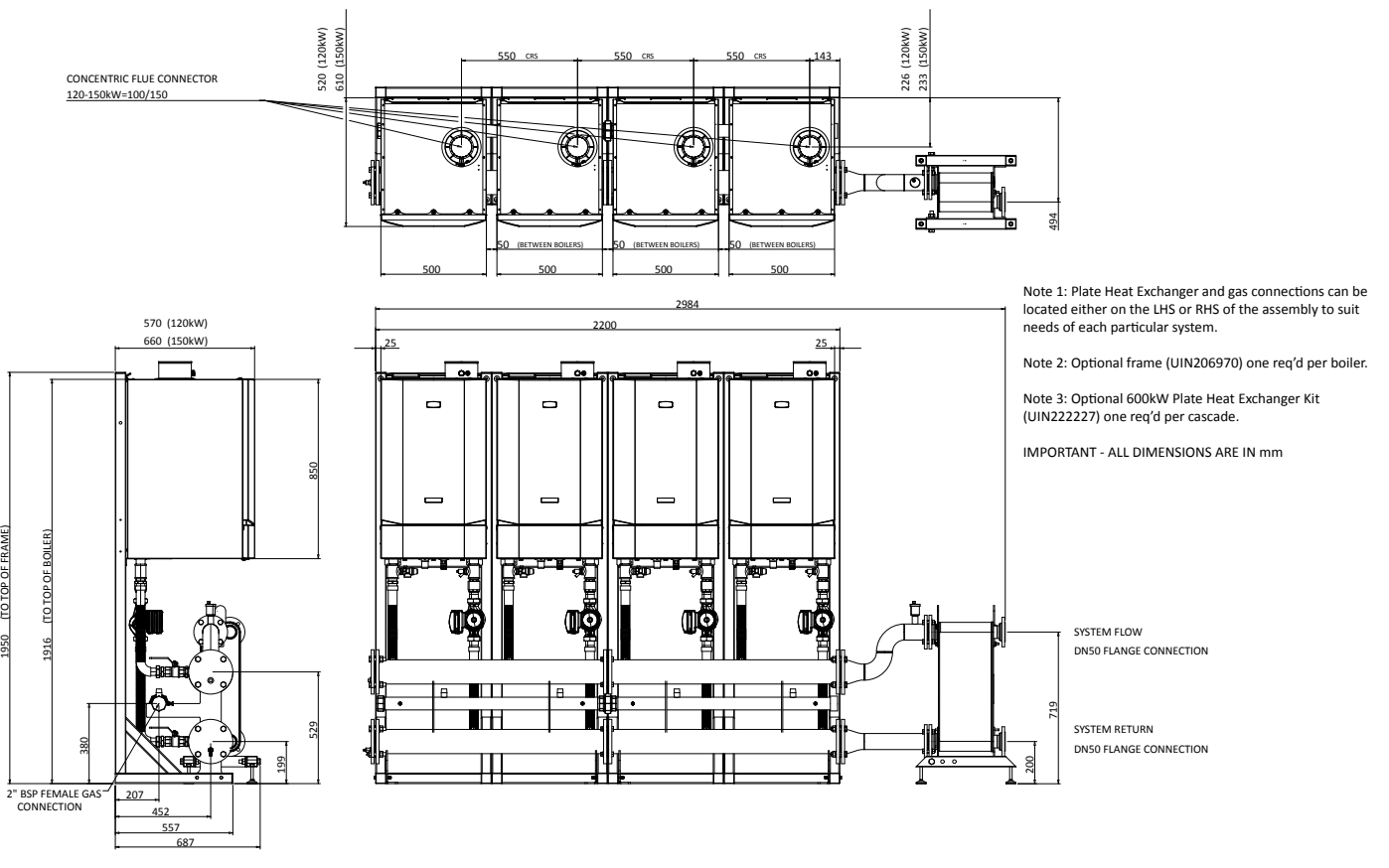
### 7.3.6 INSTALLATION DRAWING OF 3 BOILERS ON IN-LINE DN100 FRAME & HEADER KIT WITH 300kW PLATE HEAT EXCHANGER



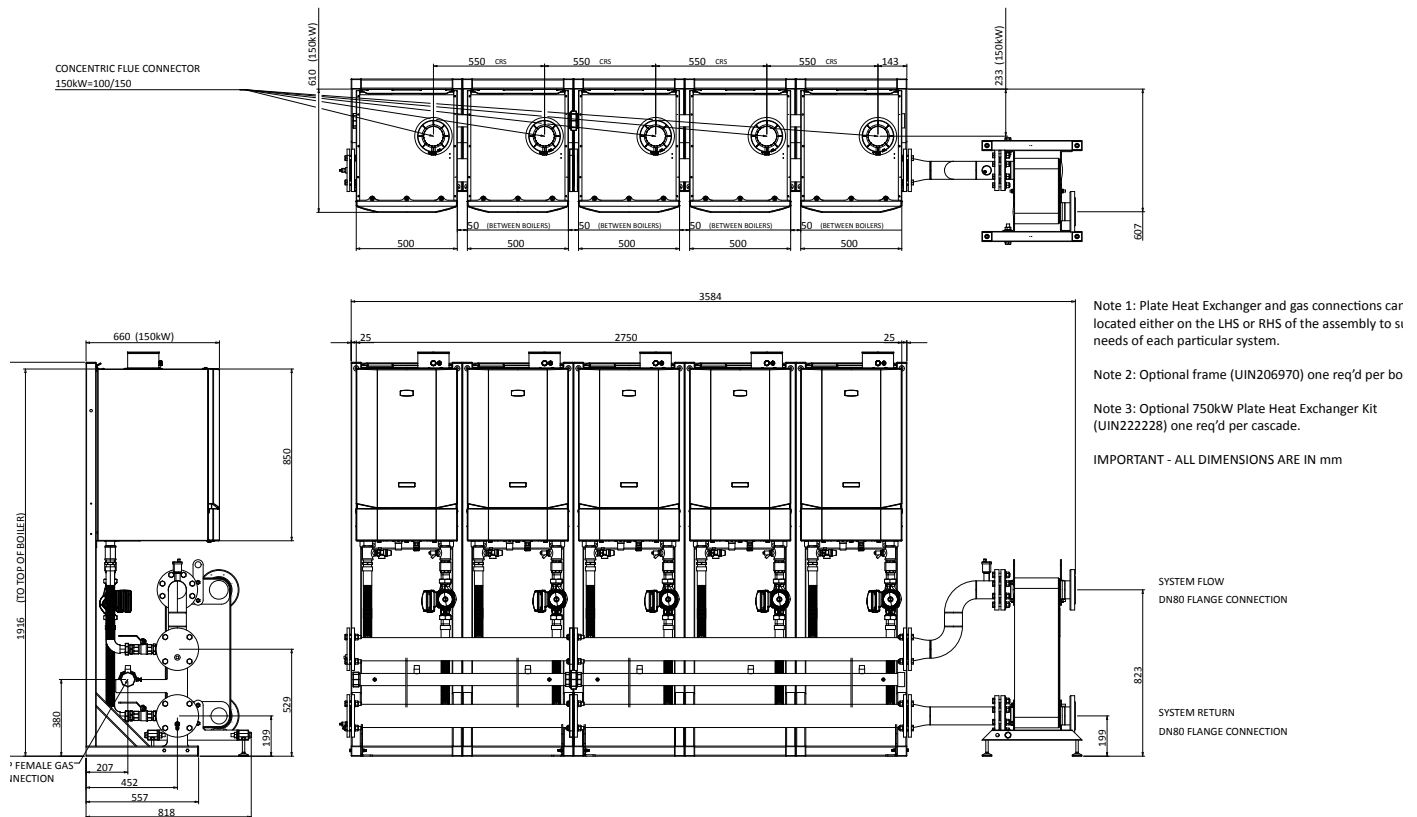
### 7.3.7 INSTALLATION DRAWING OF 4 BOILERS ON IN-LINE DN100 FRAME & HEADER KIT WITH 450kW PLATE HEAT EXCHANGER



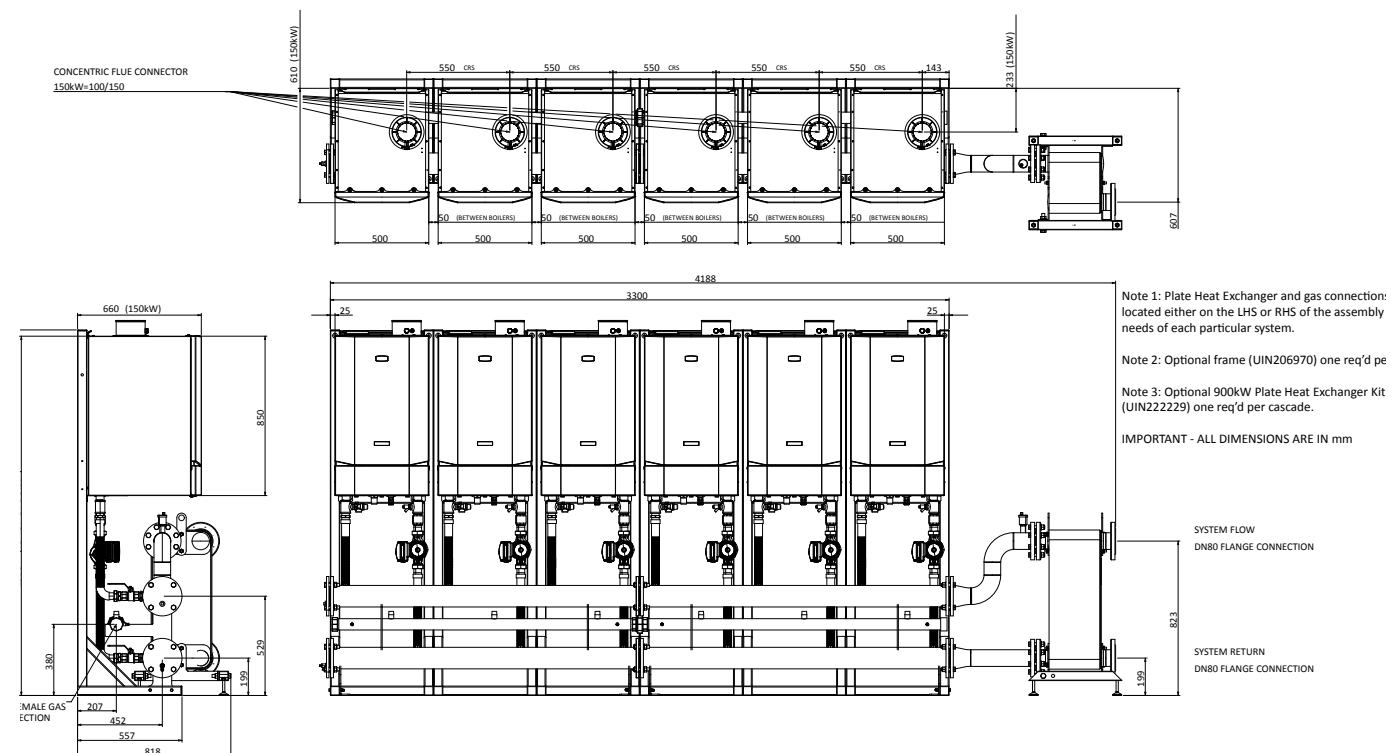
### 7.3.8 INSTALLATION DRAWING OF 4 BOILERS ON IN-LINE DN100 FRAME & HEADER KIT WITH 600kW PLATE HEAT EXCHANGER



### 7.3.9 INSTALLATION DRAWING OF 5 BOILERS ON IN-LINE DN100 FRAME & HEADER KIT WITH 750kW PLATE HEAT EXCHANGER

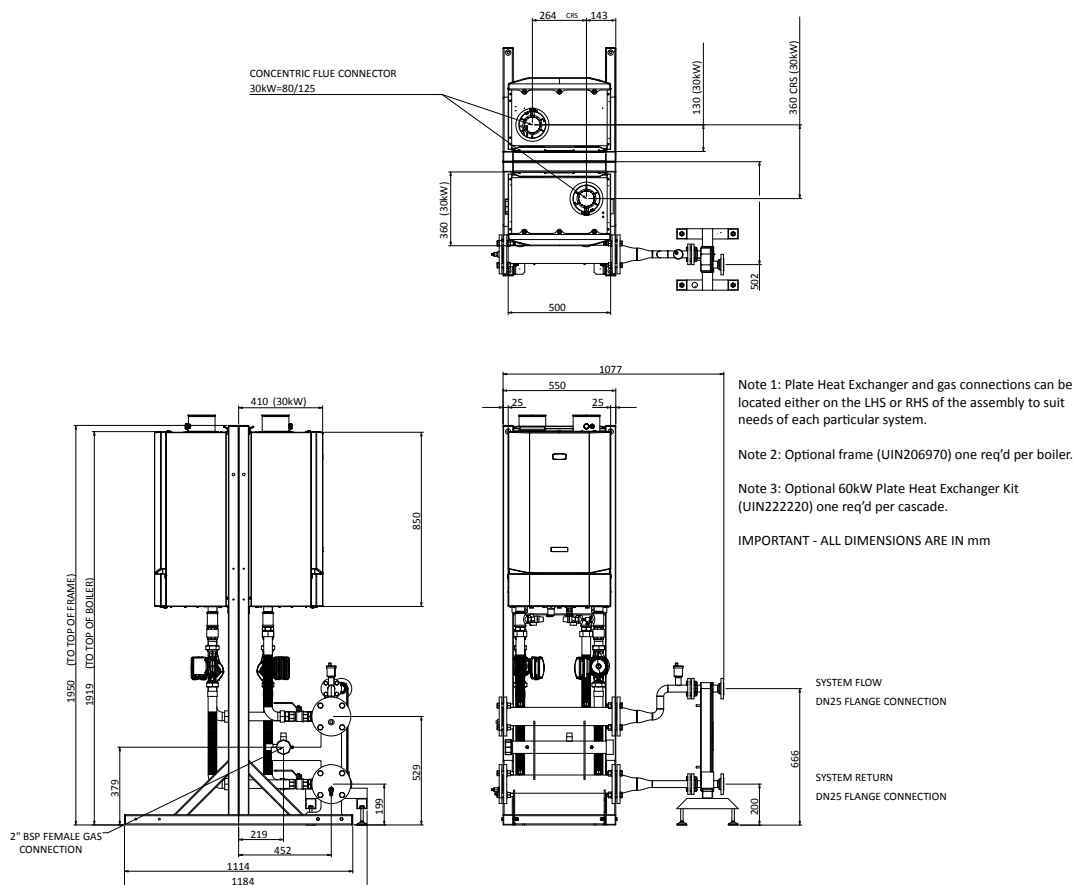


### 7.3.10 INSTALLATION DRAWING OF 6 BOILERS ON IN-LINE DN100 FRAME & HEADER KIT WITH 900kW PLATE HEAT EXCHANGER

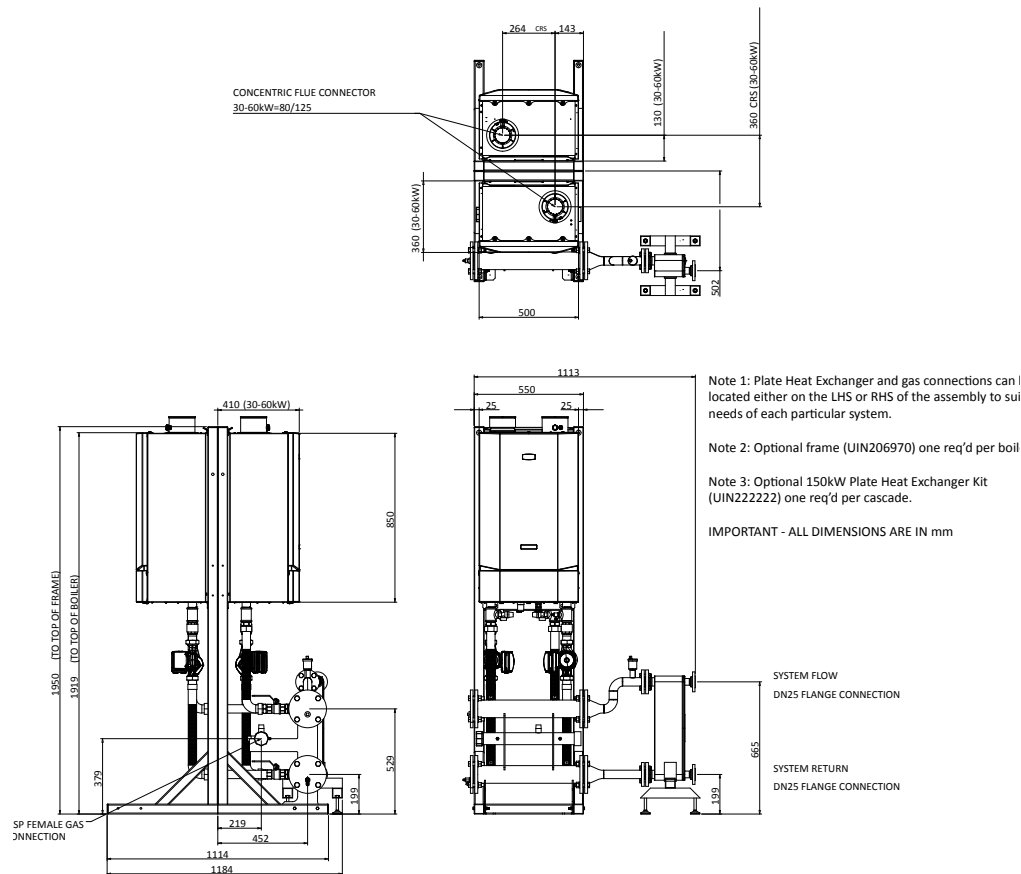


## 7.4 BACK TO BACK FRAME KIT CONFIGURATION

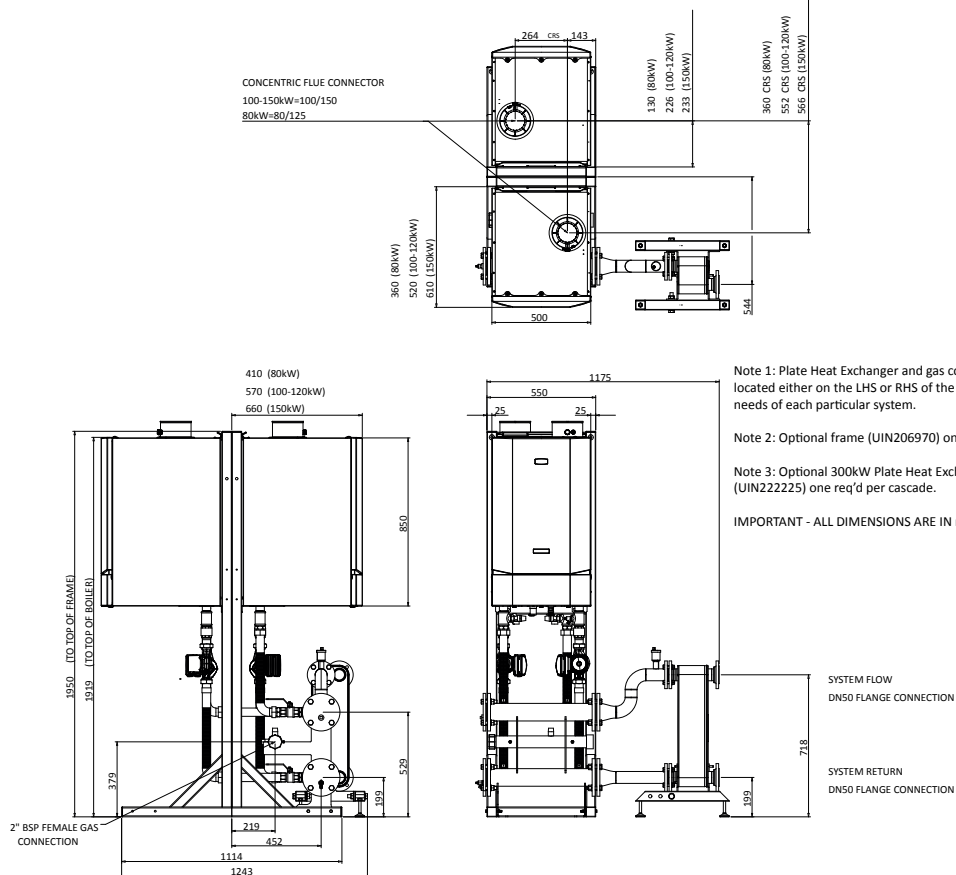
### 7.4.1 INSTALLATION DRAWING OF 2 BOILERS ON BACK TO BACK DN80 FRAME & HEADER KIT WITH 60kW PLATE HEAT EXCHANGER



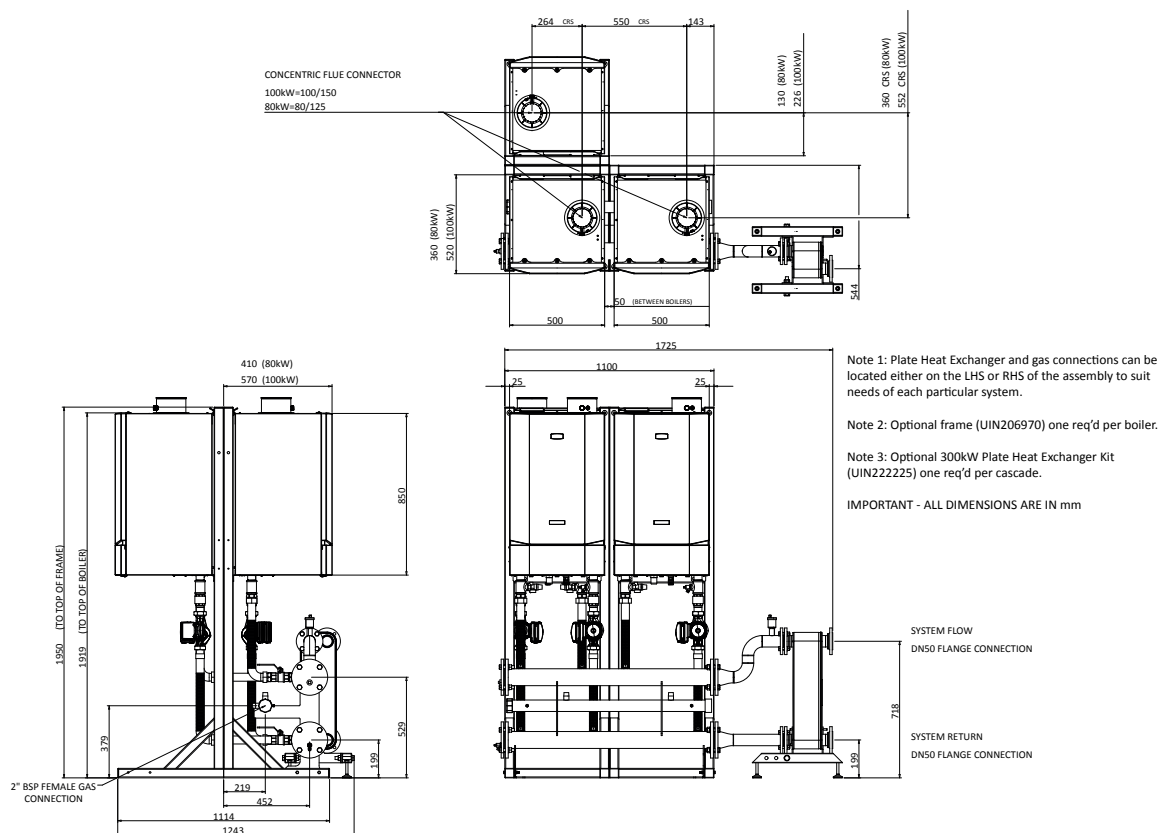
### 7.4.2 INSTALLATION DRAWING OF 2 BOILERS ON BACK TO BACK DN80 FRAME & HEADER KIT WITH 150kW PLATE HEAT EXCHANGER



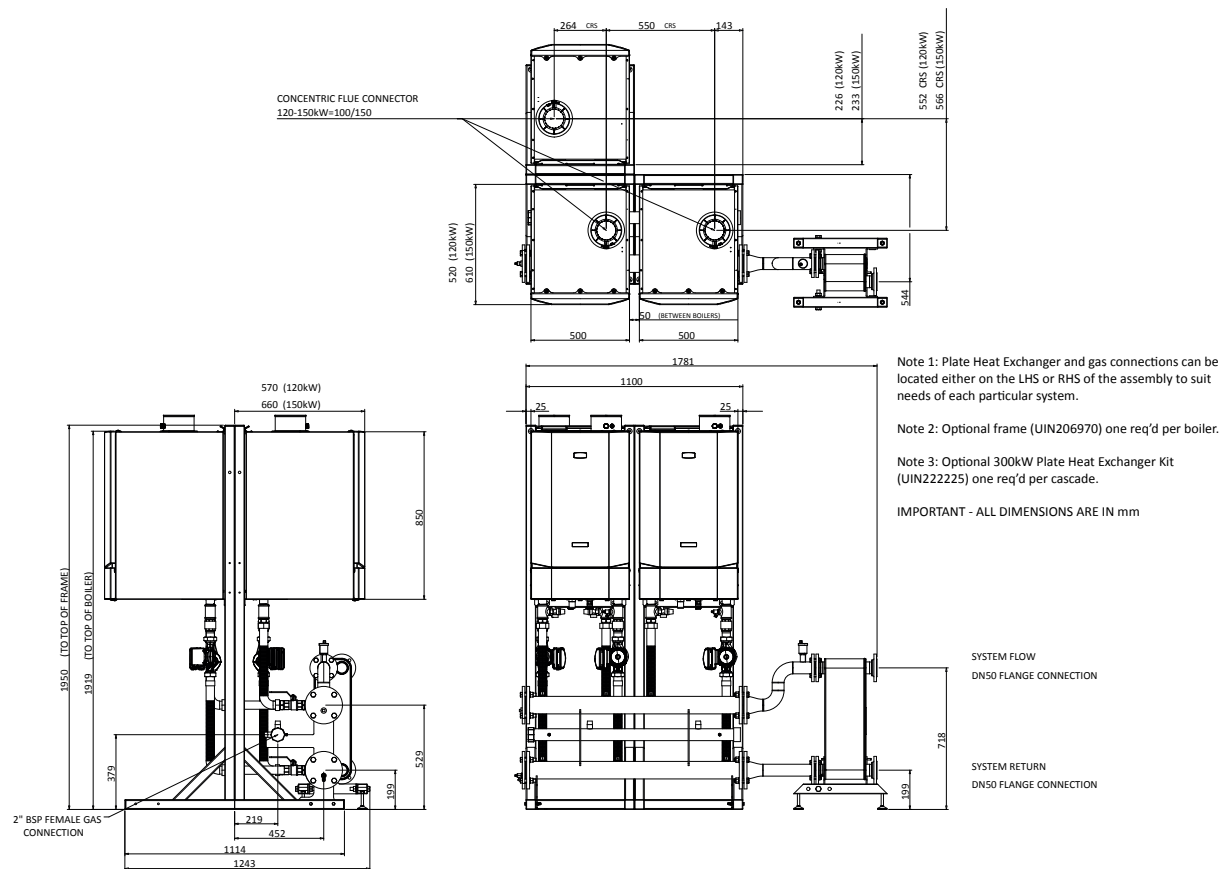
### 7.4.3 INSTALLATION DRAWING OF 2 BOILERS ON BACK TO BACK DN80 FRAME & HEADER KIT WITH 300kW PLATE HEAT EXCHANGER



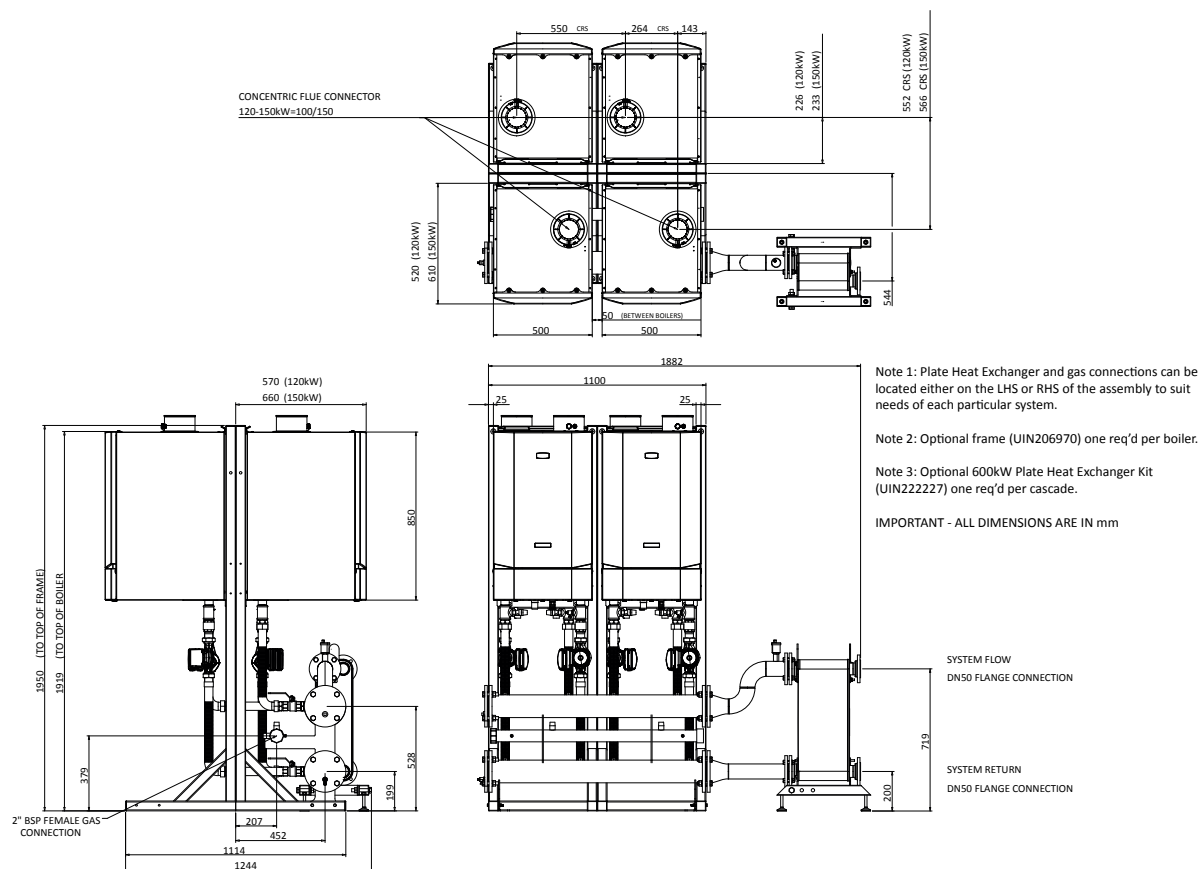
### 7.4.4 INSTALLATION DRAWING OF 3 BOILERS ON BACK TO BACK DN80 FRAME & HEADER KIT WITH 300kW PLATE HEAT EXCHANGER



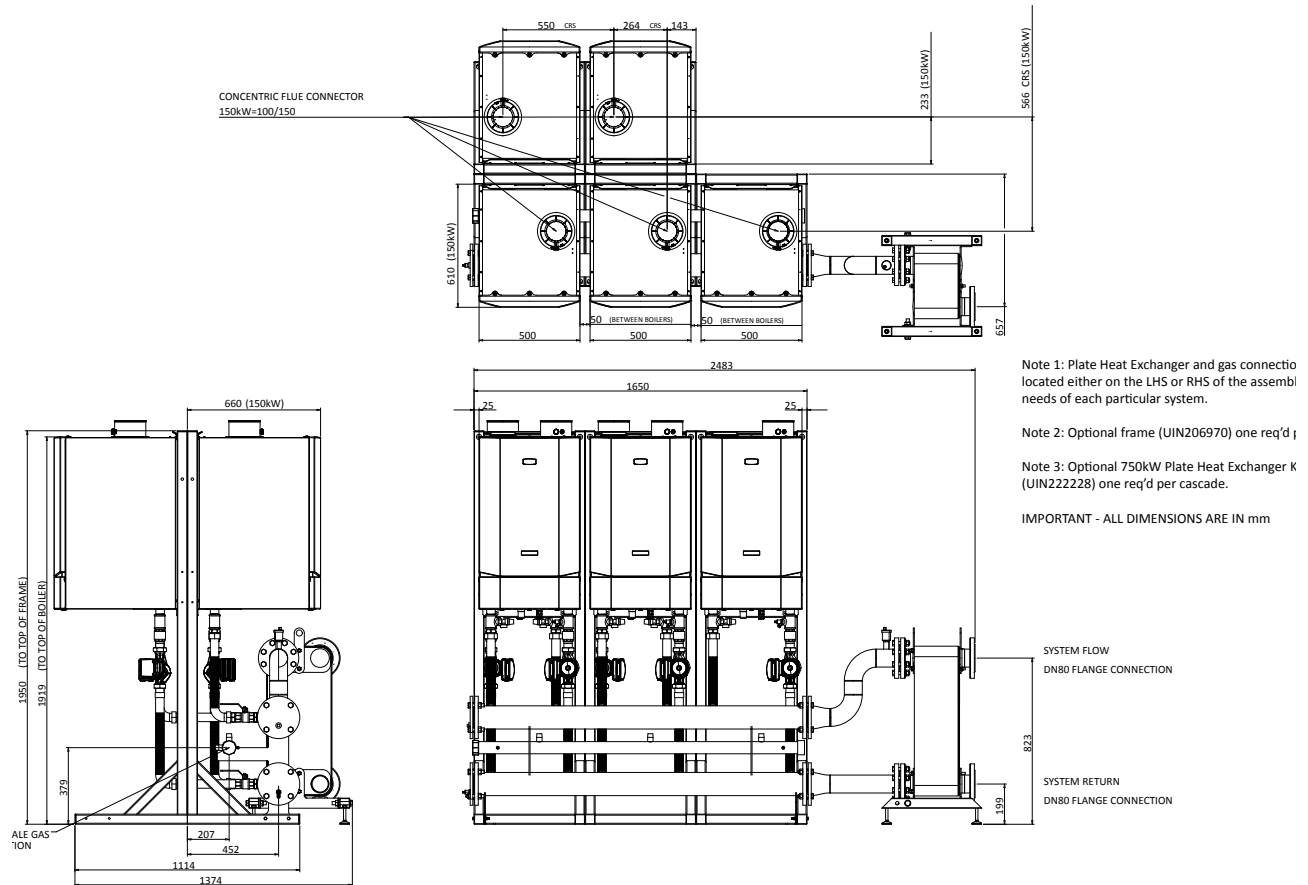
### 7.4.5 INSTALLATION DRAWING OF 3 BOILERS ON BACK TO BACK DN80 FRAME & HEADER KIT WITH 450kW PLATE HEAT EXCHANGER



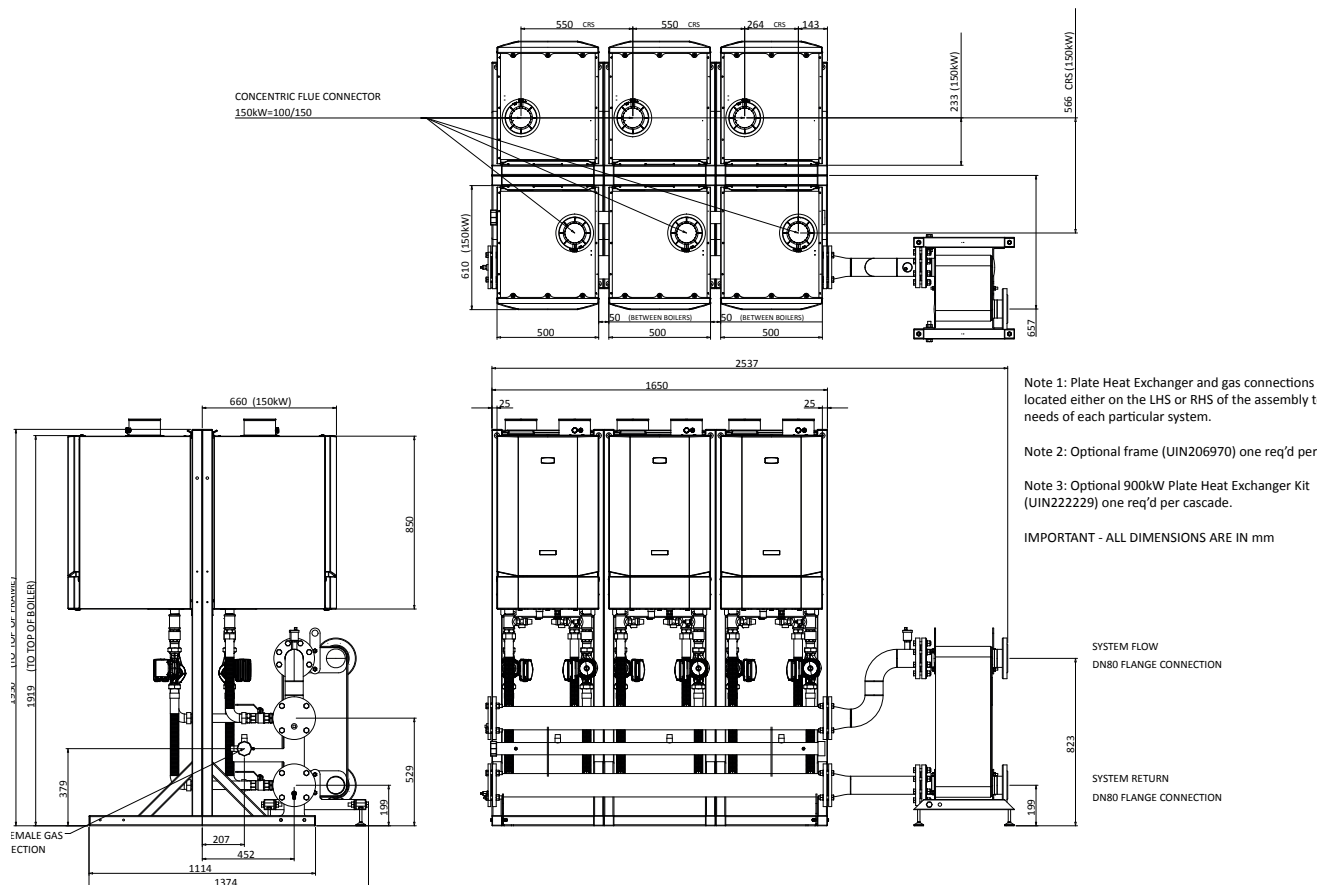
### 7.4.6 INSTALLATION DRAWING OF 4 BOILERS ON BACK TO BACK DN100 FRAME & HEADER KIT WITH 600kW PLATE HEAT EXCHANGER



## 7.4.7 INSTALLATION DRAWING OF 5 BOILERS ON BACK TO BACK DN100 FRAME & HEADER KIT WITH 750kW PLATE HEAT EXCHANGER



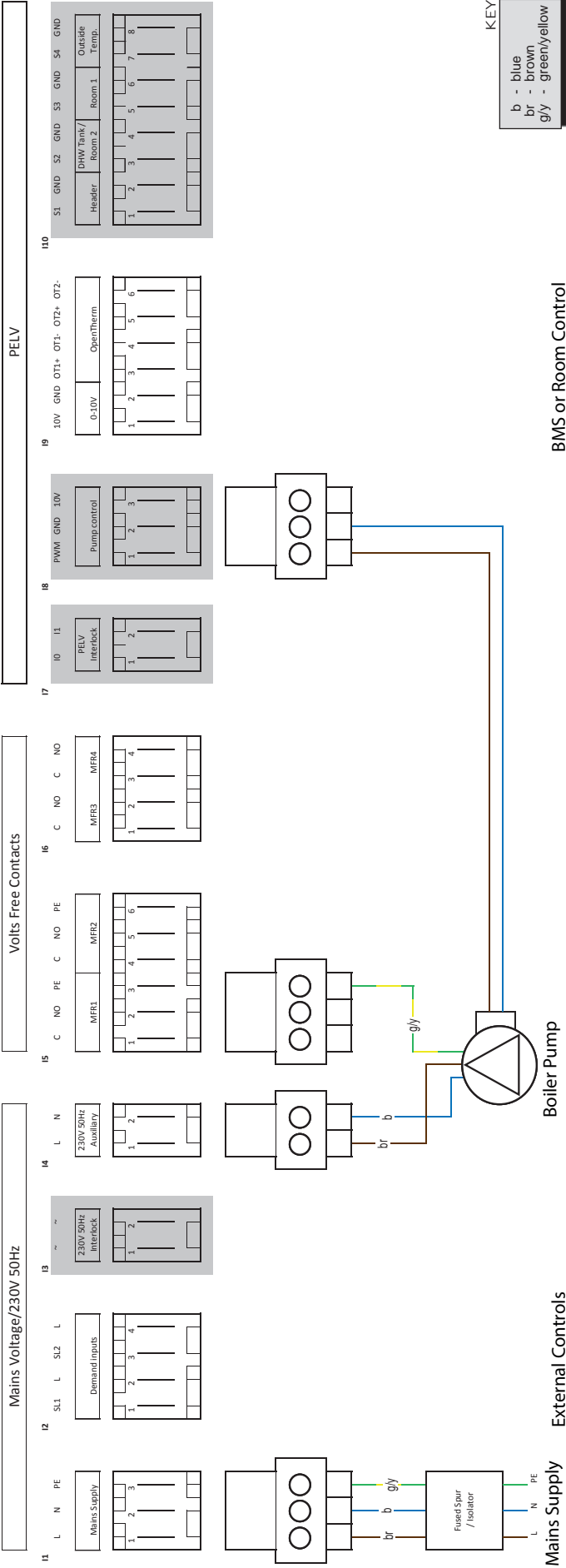
## 7.4.8 INSTALLATION DRAWING OF 6 BOILERS ON BACK TO BACK DN100 FRAME & HEADER KIT WITH 900kW PLATE HEAT EXCHANGER



# 8 ELECTRICAL CONNECTIONS & WIRING DIAGRAM

## Boiler Pump Speed Control via PWM output

Note: Refer to the boiler Installation Manual for boiler pump control configuration



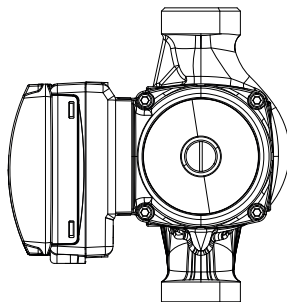
Refer to the Wiring Connection section in the boiler Installation Instructions for wiring details.

**IMPORTANT:** Ensure the boiler pumps are wired to the boiler in order to ensure the boiler pump overrun facility is provided.

## 9 COMMISSIONING AND TESTING

1. Electrical and gas safety checks must be carried out on completion of installation as with individual boiler commissioning.
2. Pump setting - follow instructions on pump types shown below;

### EVOMAX



UPMXXL for use with Plate Heat Exchangers  
(1 per boiler)

**IMPORTANT:** PWM Control to be wired directly to the boiler PCB &  
**MUST** be wired in last. For pump and external pump control wiring refer  
to this instruction & the boiler Installation Manual.

### Technical Training

The Ideal 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 498432



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