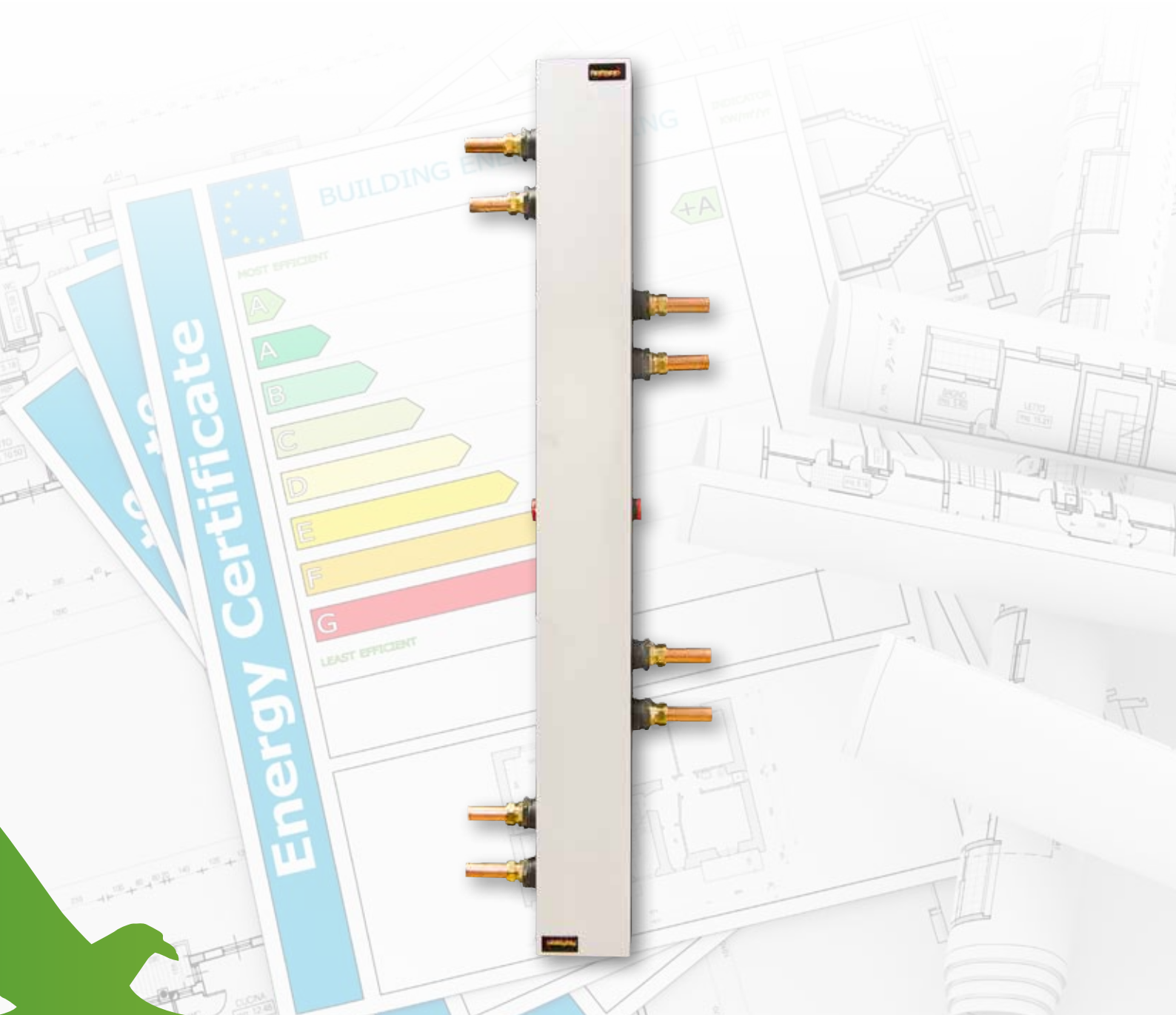


100%  
IRISH



HEATING SOLUTIONS

# LIGHT COMMERCIAL CASCADING SYSTEM MANUAL



| <b>INDEX</b>                                 | Page |
|--|------|
| 1. System Installation .....                 | 3    |
| 2. System Location .....                     | 3    |
| 3. System Layout .....                       | 4    |
| 3.1 Two Boiler Installation .....            | 4    |
| 3.2 Three Boiler Installation .....          | 5    |
| 3.3 Four Boiler Installation .....           | 6    |
| 4. Plumbing .....                            | 7    |
| 4.1 Boilers on the Left .....                | 7    |
| 4.2 Boilers on the Right .....               | 8    |
| 5. Domestic Hot Water Schematic .....        | 9    |
| 6. Wiring .....                              | 10   |
| 6.1 Controller Wiring .....                  | 10   |
| 6.2 Boilers with Electronic Controller ..... | 11   |
| 6.3 Popular Boiler with Dual Stat. ....      | 12   |
| 6.4 External Switching of Controller .....   | 13   |
| 6.5 Pump Overrun Stat. Wiring .....          | 14   |
| 7. Flue Options .....                        | 15   |
| 8. Terms and Conditions of Warranty .....    | 17   |

## SAFETY NOTES

- Installation must conform to all standards and regulations and operating accordingly.
- Ensure the following codes and standards are adhered to where applicable:
  - BS EN 14336:2004 Heating Systems in Buildings  
Installation and Commissioning of Water Based Heating Systems
  - BS EN 12828:2003 Heating Systems in Buildings  
Design of Water Based Heating Systems
  - BS EN 12831:2003 Heating Systems in Buildings  
Method of Calculation of the Design Heat Load
- All other relevant technical building guidance documents and/or codes should be adhered to.
- Please read this manual carefully prior to installation of the unit.

## SYSTEM INSTALLATION

All installation work must be carried out by a qualified, competent person with a good knowledge of fitting these types of systems. A pressure relief valve must be fitted to the system.

The Low loss Header "LLH" is constructed from a 4mm steel plate with a dense insulation enclosed in a mild steel plastic coated casing.

All boilers connected to the low loss header must be of equal output.

Ensure that all pipes are sized appropriately for the installation, things to take into account are distance and flow rate.

This system must not be connected directly to under floor heating. It may be used for under floor heating via a mixing valve and the return temperature to the boiler must be over 40°C after the first heating cycle.

This LLH must be operated by the Firebird Cascading Management Controller. Please see separate manual for details on operating the controller.

## SYSTEM LOCATION

The LLH must be attached vertically to a solid wall/object. Sufficient space should be left around the LLH to facilitate pipe work fittings and to allow access to the drain cock for servicing/draining the unit.

In order for the unit to work to its optimum, please review the schematics carefully, choosing the most appropriate set up for the installation, failure to do so may cause this unit to operate inefficiently.

| kW Needed * | Boiler No. | Boiler kW ** | LLH Size mm | LLH Code | Pump Size m | Flow Rate ltr/min. | No. of Pumps | No. of Non-Return Valves | No. of Pipe Thermostats | Oil Pipe Sizing mm | Flue Size for each Boiler mm | Min. dia. Main Flue Size mm |
|-------------|------------|--------------|-------------|----------|-------------|--------------------|--------------|--------------------------|-------------------------|--------------------|------------------------------|-----------------------------|
| 52          | 2          | 26           | 75          | LLH3     | 6           | 65.52              | 2            | 2                        | 2                       | 15                 | 80                           | 115                         |
| 70          | 2          | 35           | 75          | LLH3     | 6           | 88.20              | 2            | 2                        | 2                       | 15                 | 80                           | 115                         |
| 78          | 3          | 26           | 75          | LLH3     | 6           | 147.42             | 3            | 3                        | 3                       | 15                 | 80                           | 140                         |
| 88          | 2          | 44           | 75          | LLH3     | 8           | 110.88             | 2            | 2                        | 2                       | 15                 | 100                          | 150                         |
| 104         | 4          | 26           | 100         | LLH4     | 6           | 262.08             | 4            | 4                        | 4                       | 20                 | 80                           | 160                         |
| 105         | 3          | 35           | 100         | LLH4     | 6           | 198.45             | 3            | 3                        | 3                       | 15                 | 80                           | 140                         |
| 116         | 2          | 58           | 100         | LLH4     | 8           | 146.16             | 2            | 2                        | 2                       | 20                 | 100                          | 150                         |
| 132         | 3          | 44           | 100         | LLH4     | 8           | 249.48             | 3            | 3                        | 3                       | 20                 | 100                          | 175                         |
| 140         | 4          | 35           | 100         | LLH4     | 6           | 352.80             | 4            | 4                        | 4                       | 20                 | 80                           | 160                         |
| 146         | 2          | 73           | 100         | LLH4     | 8           | 183.96             | 2            | 2                        | 2                       | 20                 | 125                          | 180                         |
| 174         | 3          | 58           | 100         | LLH4     | 8           | 328.86             | 3            | 3                        | 3                       | 20                 | 100                          | 180                         |
| 176         | 4          | 44           | 100         | LLH4     | 8           | 443.52             | 4            | 4                        | 4                       | 20                 | 100                          | 200                         |
| 200         | 2          | 100          | 100         | LLH4     | 8           | 252.00             | 2            | 2                        | 2                       | 20                 | 150                          | 220                         |
| 219         | 3          | 73           | 100         | LLH4     | 8           | 413.91             | 3            | 3                        | 3                       | 20                 | 125                          | 220                         |
| 232         | 4          | 58           | 100         | LLH4     | 8           | 584.64             | 4            | 4                        | 4                       | 20                 | 125                          | 200                         |
| 292         | 4          | 73           | 150         | LLH6     | 8           | 735.84             | 4            | 4                        | 4                       | 20                 | 125                          | 250                         |
| 300         | 3          | 100          | 150         | LLH6     | 8           | 567.00             | 3            | 3                        | 3                       | 20                 | 150                          | 260                         |
| 400         | 4          | 100          | 150         | LLH6     | 8           | 1,008.00           | 4            | 4                        | 4                       | 20                 | 150                          | 300                         |

\* Max. kW Needed

\*\* Min. kW Needed eg. zone or lowest zone demand

## 2 SYSTEM LOCATION & 3 SYSTEM LAYOUT

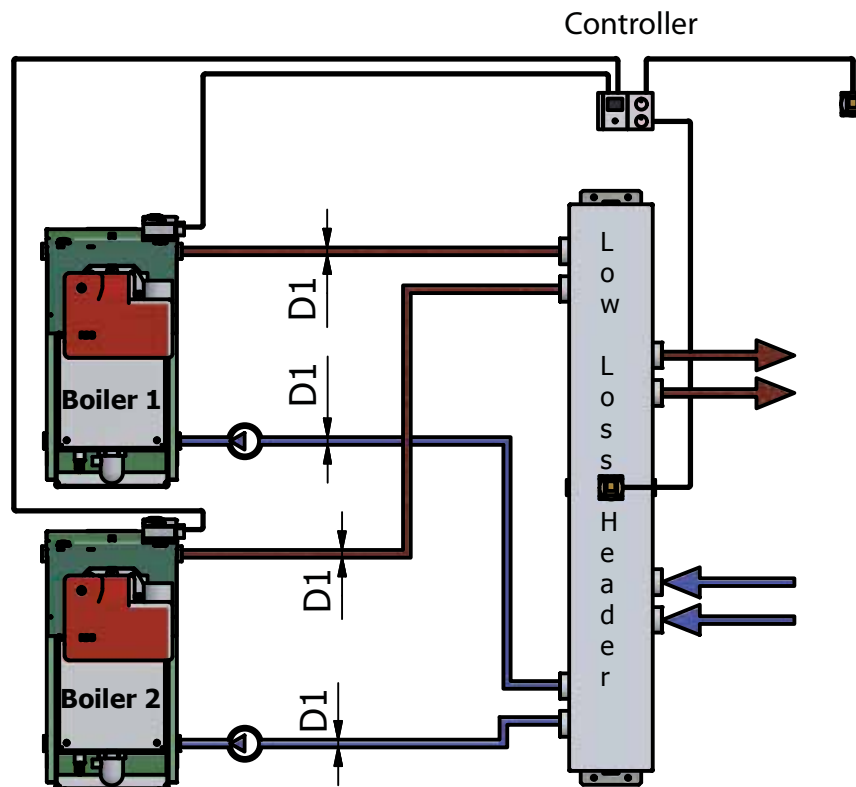
It is recommended by the burner manufacturers that at least 8mm id. supply pipe be used for a burner of up to 35kW and 10mm id. for a burner of up to 100kW in order to have an adequate supply of oil. Using a cross sectional calculation, 20mm id. pipe is sufficient to supply 4x100 and T'd off to each boiler with 10mm id. pipe. For smaller systems, 15mm is sufficient.

Note: these calculations are based on an oil tank level with or above the level of the burner.

The condensate from the boilers needs to be transferred to an appropriate disposal drain by means of a 40mm/1½" wastepipe made from a suitable material and T'd off so each boiler can be evacuated.

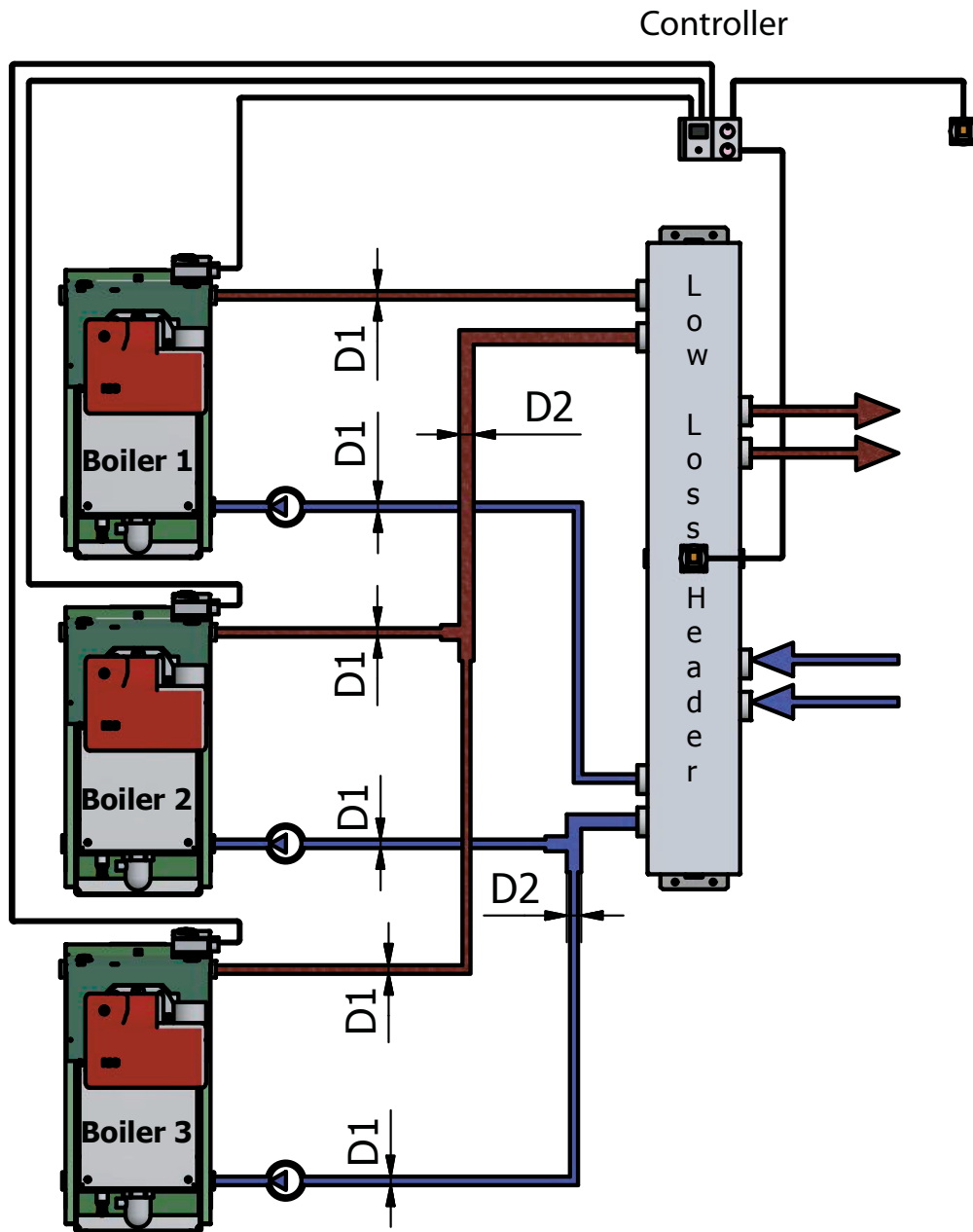
### 3.1 SYSTEM LAYOUT - TWO BOILER INSTALLATION

Below are some layout options for different numbers of boilers with different kW ranges. All boilers used must be of equal output.



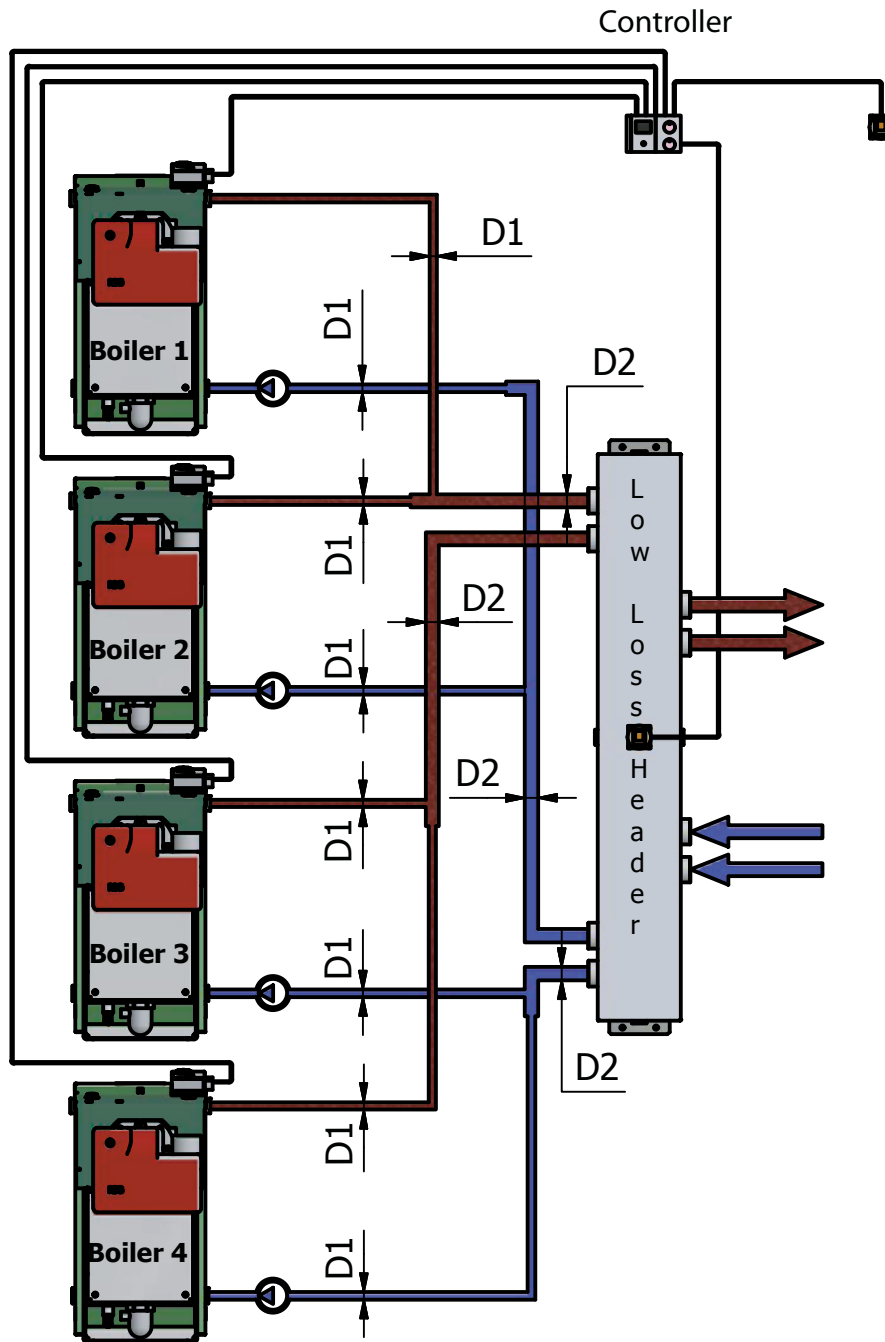
| Boiler Output Range kW | Combined Output kW | Tapping Size BSP" | Flow Rate Each Boiler kg/s | D1 Pipe Size mm | Pump Size m | Total Flow kg/s | Header Size |
|------------------------|--------------------|-------------------|----------------------------|-----------------|-------------|-----------------|-------------|
| 20-26                  | 52                 | 1                 | 0.310                      | 28              | 6           | 0.620           | LLH3        |
| 26-35                  | 70                 | 1                 | 0.417                      | 28              | 6           | 0.835           | LLH3        |
| 36-44                  | 88                 | 1 ½               | 0.525                      | 35              | 8           | 1.050           | LLH3        |
| 58                     | 116                | 1 ½               | 0.692                      | 35              | 8           | 1.385           | LLH4        |
| 73                     | 146                | 1 ½               | 0.871                      | 35              | 8           | 1.743           | LLH4        |
| 73-100                 | 200                | 2                 | 1.194                      | 35              | 8           | 2.388           | LLH4        |

### 3 3.2 SYSTEM LAYOUT - THREE BOILER INSTALLATION



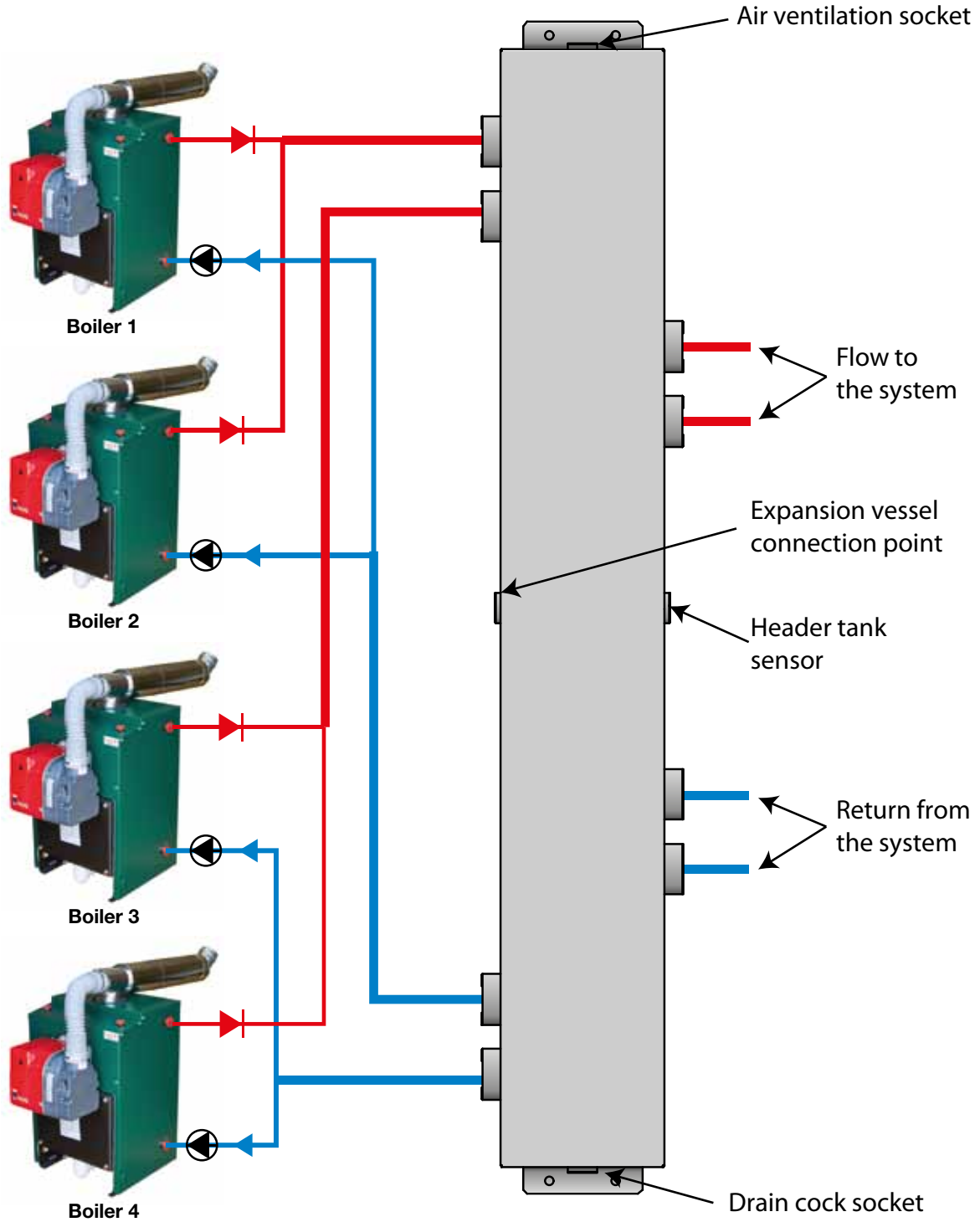
| Boiler Output Range kW | Combined Output kW | Tapping Size BSP" | Flow Rate Each Boiler kg/s | D1 Pipe Size mm | D2 Pipe Size mm | Pump Size m | Total Flow kg/s | Header Size |
|------------------------|--------------------|-------------------|----------------------------|-----------------|-----------------|-------------|-----------------|-------------|
| 20-26                  | 78                 | 1                 | 0.310                      | 28              | 28              | 6           | 0.930           | LLH3        |
| 26-35                  | 105                | 1                 | 0.417                      | 28              | 35              | 6           | 1.251           | LLH3        |
| 36-44                  | 132                | 1 ½               | 0.525                      | 35              | 42              | 8           | 1.575           | LLH4        |
| 58                     | 174                | 1 ½               | 0.692                      | 35              | 54              | 8           | 2.076           | LLH4        |
| 73                     | 219                | 1 ½               | 0.871                      | 35              | 54              | 8           | 2.613           | LLH6        |
| 73-100                 | 300                | 2                 | 1.194                      | 35              | 54              | 8           | 3.582           | LLH6        |

### 3 3.3 SYSTEM LAYOUT - FOUR BOILER INSTALLATION



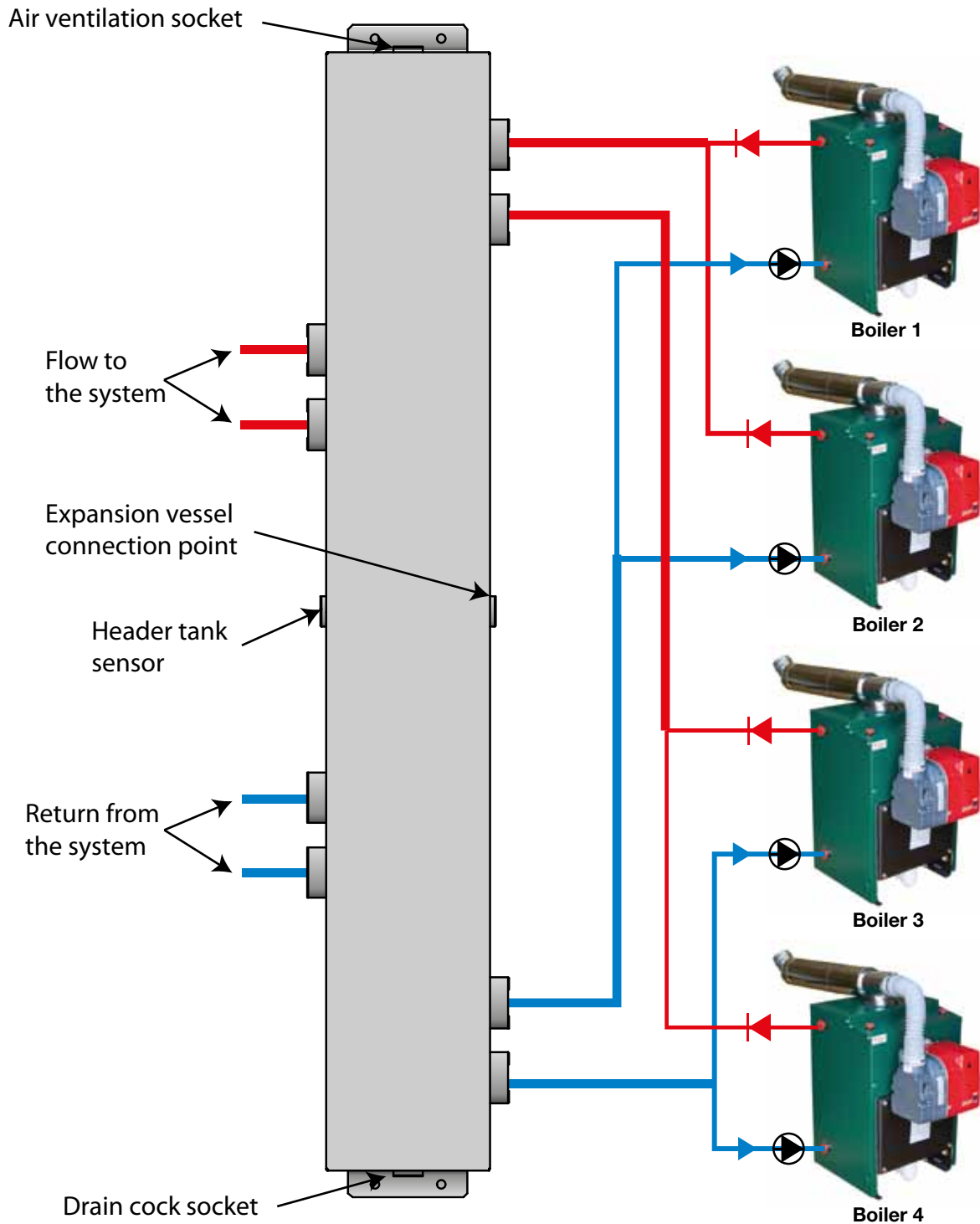
| Boiler Output Range kW | Combined Output kW | Tapping Size BSP" | Flow Rate Each Boiler kg/s | D1 Pipe Size mm | D2 Pipe Size mm | Pump Size m | Total Flow kg/s | Header Size |
|------------------------|--------------------|-------------------|----------------------------|-----------------|-----------------|-------------|-----------------|-------------|
| 20-26                  | 104                | 1                 | 0.310                      | 28              | 28              | 6           | 1.240           | LLH3        |
| 26-35                  | 140                | 1                 | 0.417                      | 28              | 35              | 6           | 1.668           | LLH4        |
| 36-44                  | 176                | 1 ½               | 0.525                      | 35              | 42              | 8           | 2.100           | LLH4        |
| 58                     | 232                | 1 ½               | 0.692                      | 35              | 54              | 8           | 2.768           | LLH6        |
| 73                     | 292                | 1 ½               | 0.871                      | 35              | 54              | 8           | 3.484           | LLH6        |
| 73-100                 | 400                | 2                 | 1.194                      | 35              | 54              | 8           | 4.776           | LLH6        |

## 4 4.1 PLUMBING - BOILERS ON THE LEFT



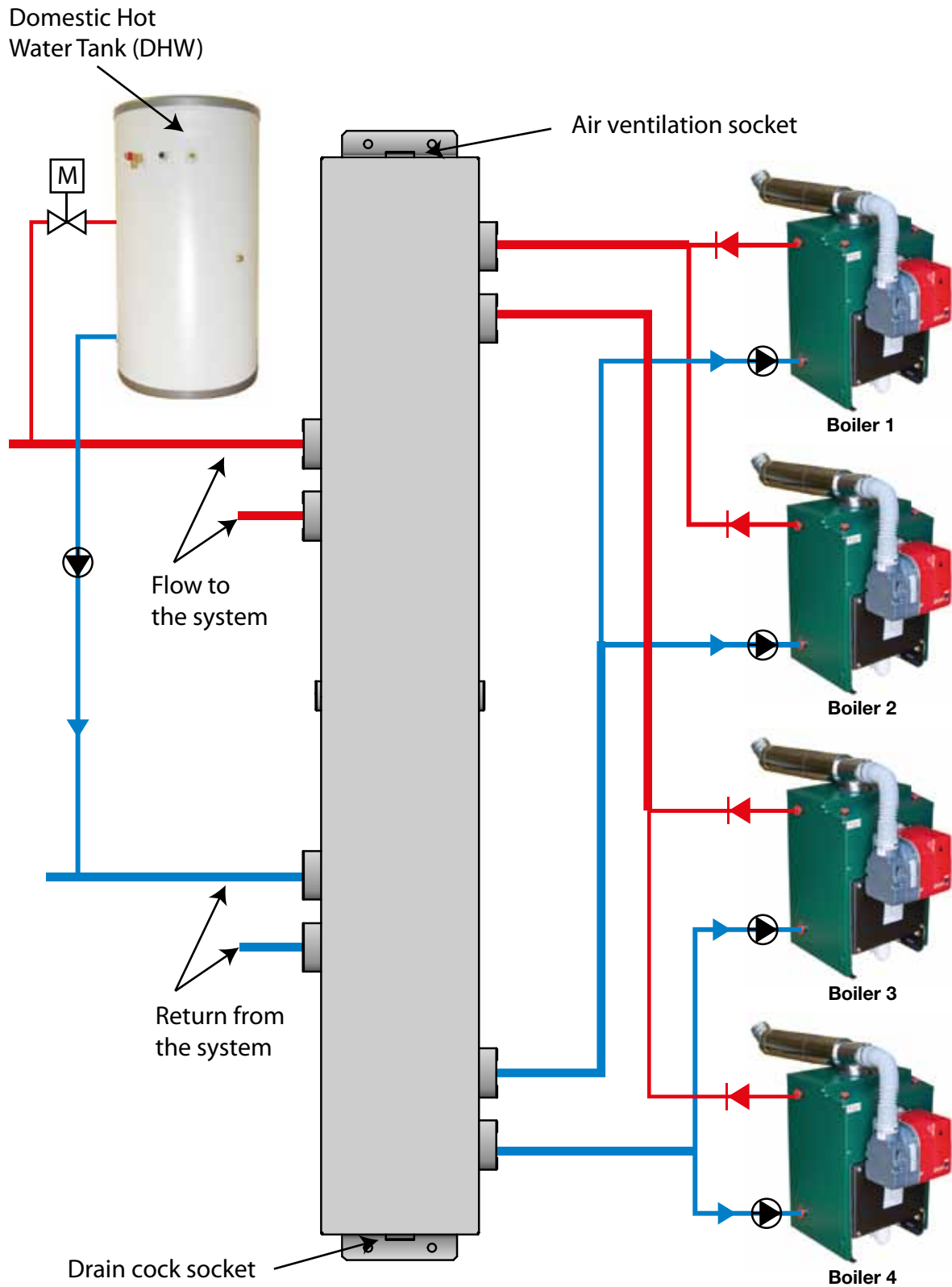
**Note:** all Low Loss Headers have 2" fittings.

## 4 4.2 PLUMBING - BOILERS ON THE RIGHT



**Note:** all Low Loss Headers have 2" fittings.

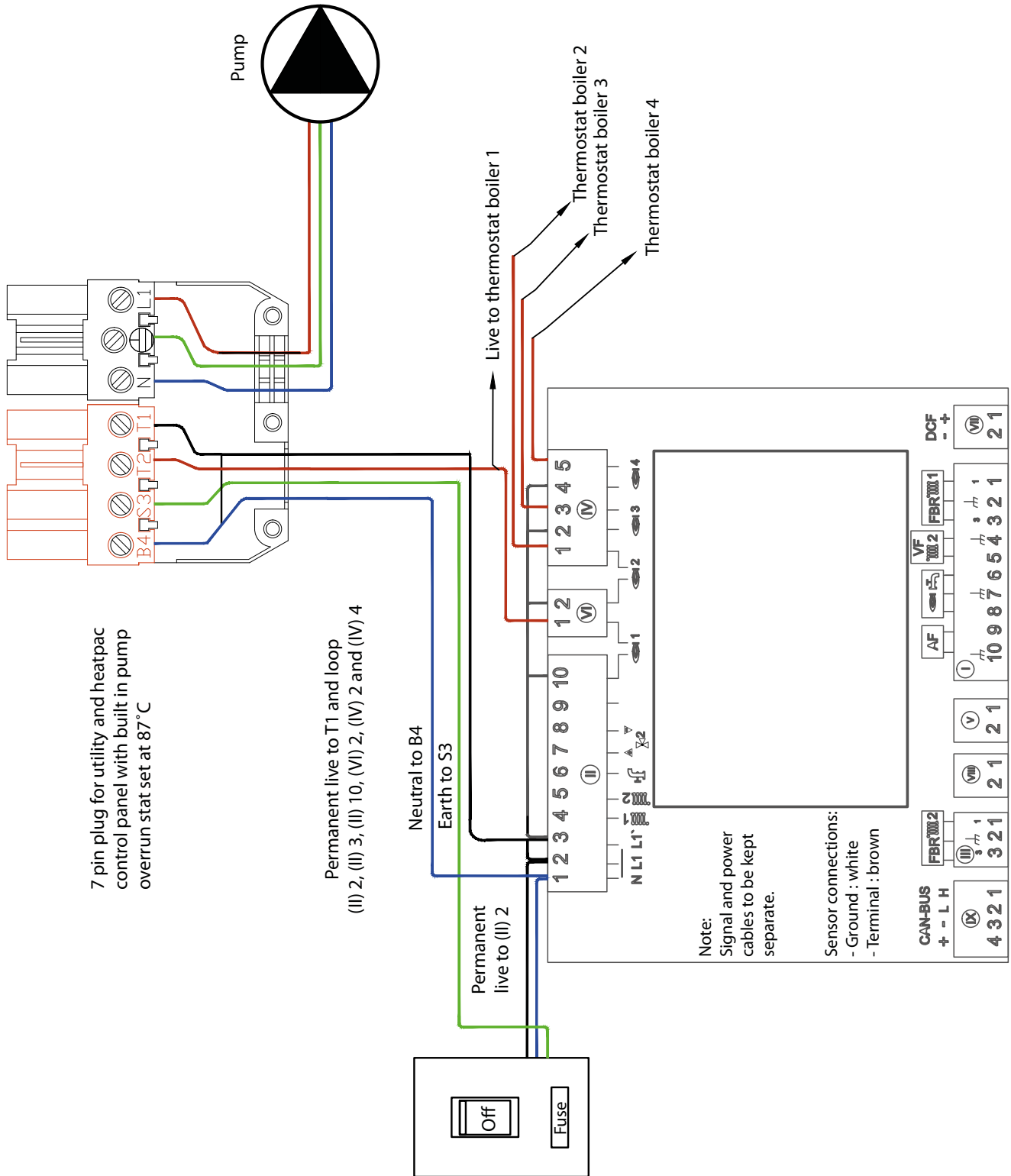
## 5 DOMESTIC HOT WATER SCHEMATIC



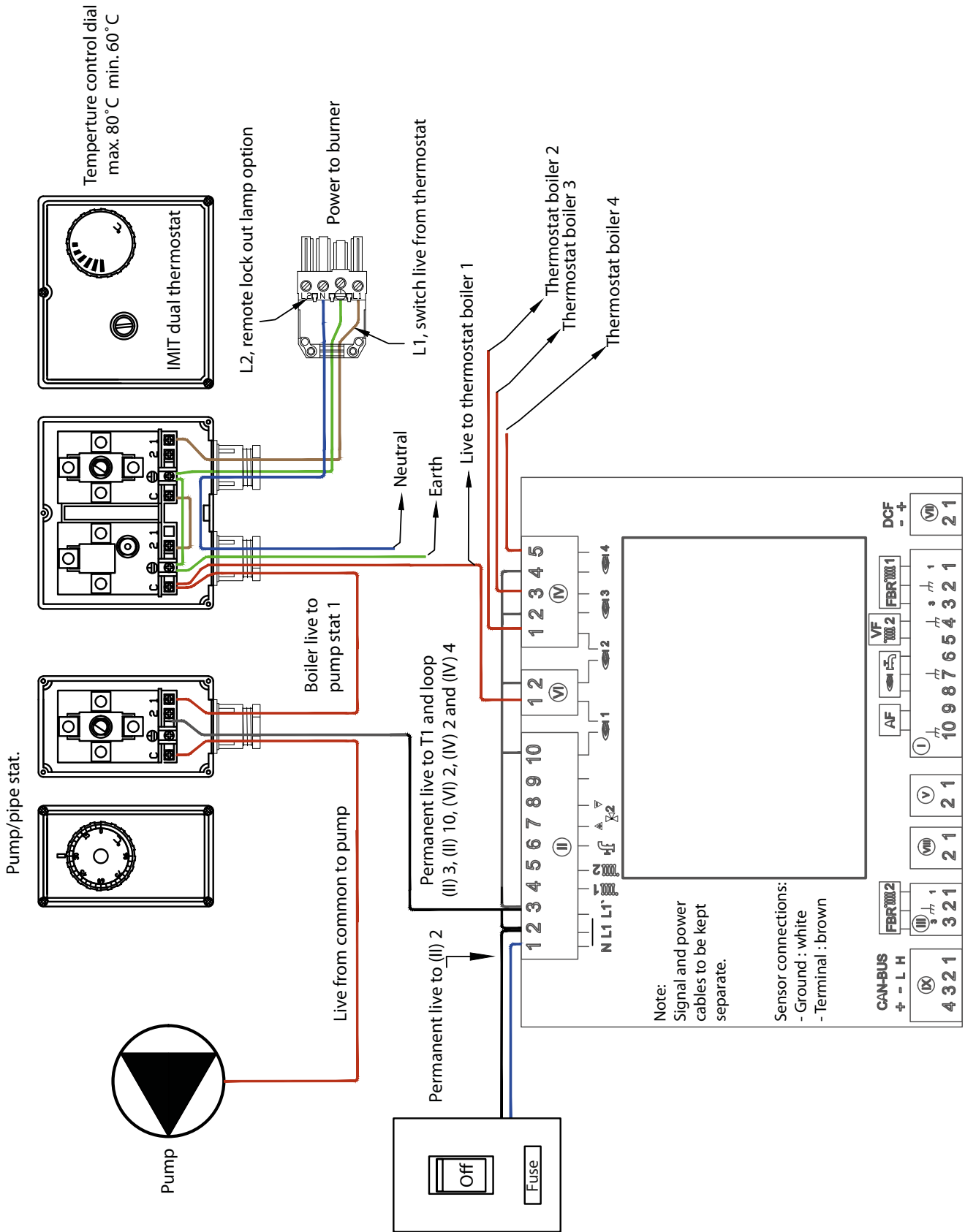
**Note:** all Low Loss Headers have 2" fittings.



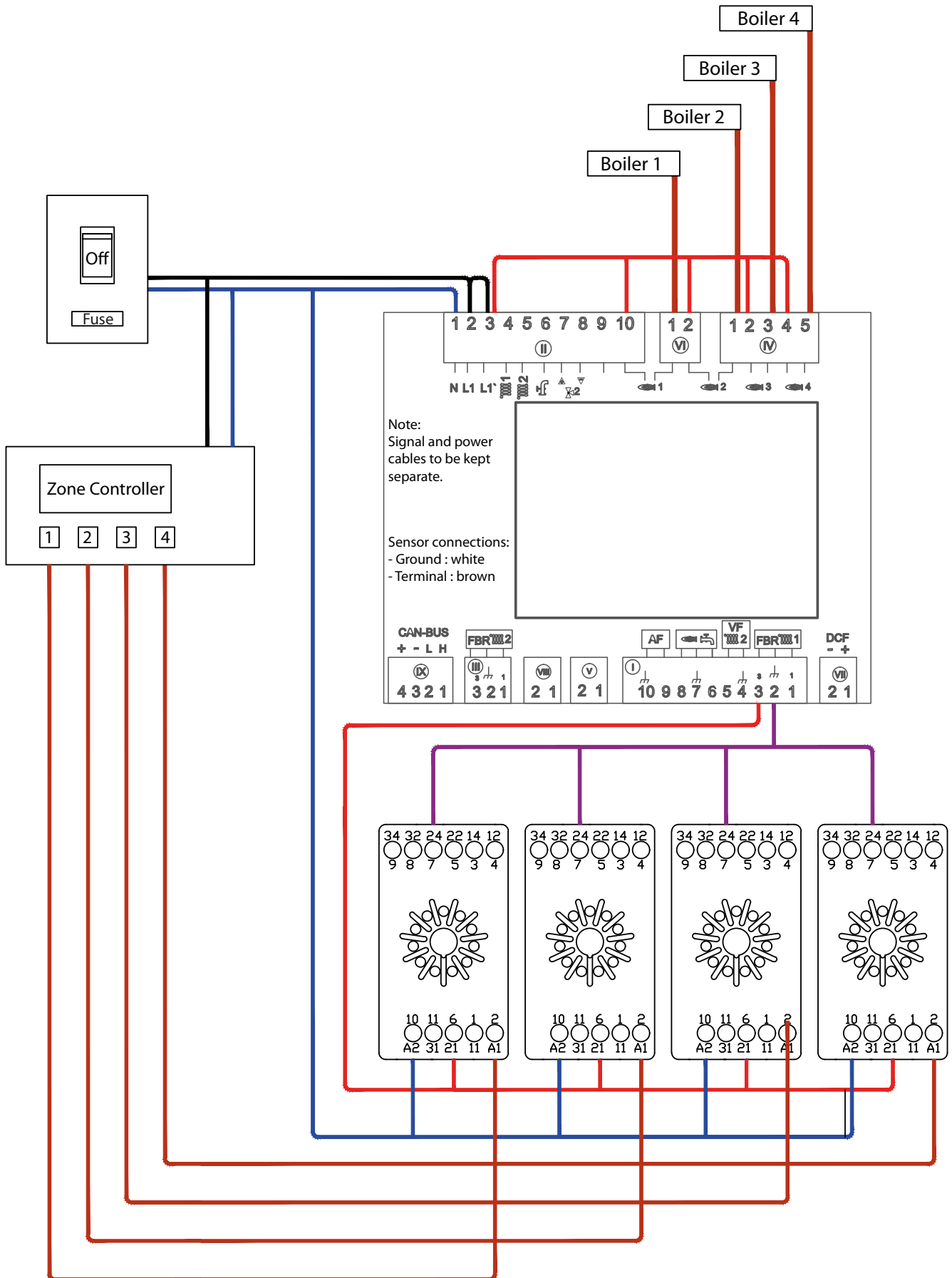
## 6 6.2 WIRING - BOILER WITH ELECTRONIC CONTROLLER



## 6 6.3 WIRING - POPULAR BOILER WITH DUAL STAT.

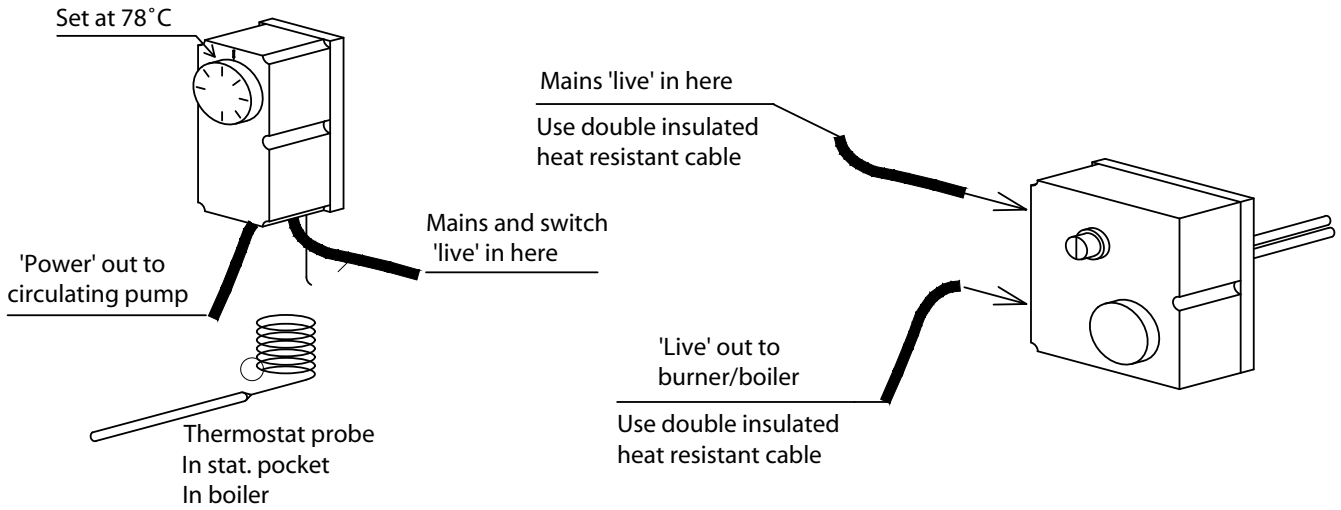


## 6 6.4 WIRING - EXTERNAL SWITCHING OF CONTROLLER



## 6 6.6 WIRING - PUMP OVERRUN STAT.

### INSTALLING A PUMP OVERRUN STAT. WITH A FIREBIRD POPULAR BOILER

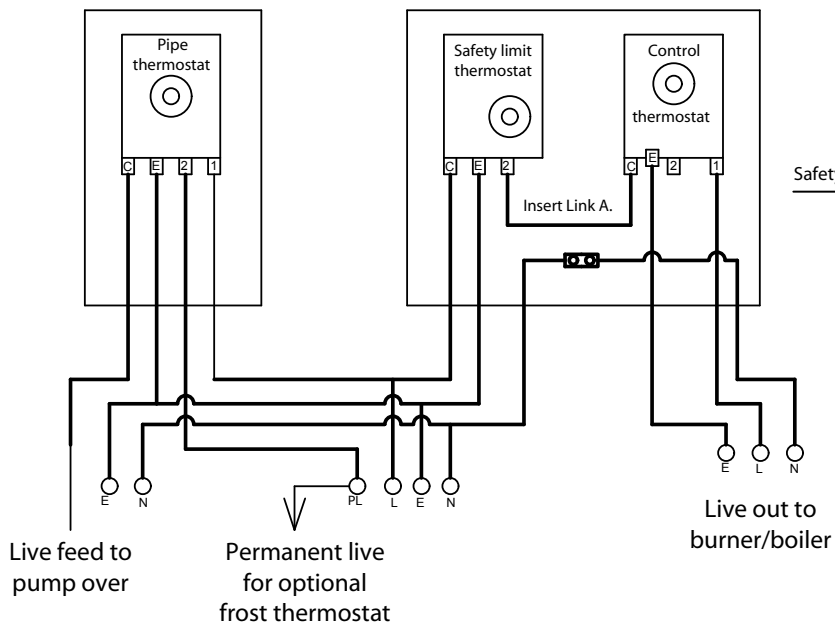


#### IMPORTANT

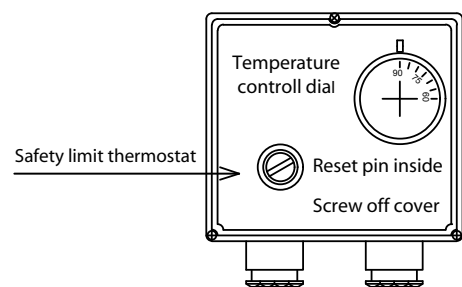
When connecting the mains supply to this unit ensure that:

1. Double insulated heat resistant cable is used (core cable).
2. No single insulated cable is exposed at connection points on the thermostat, burner, plug and socket.
3. Rubber grommets are replaced on control box base of the burner after completing wiring.
4. All relevant lids and covers are properly replaced and secured correctly.

#### OVER HEAT THERMOSTAT

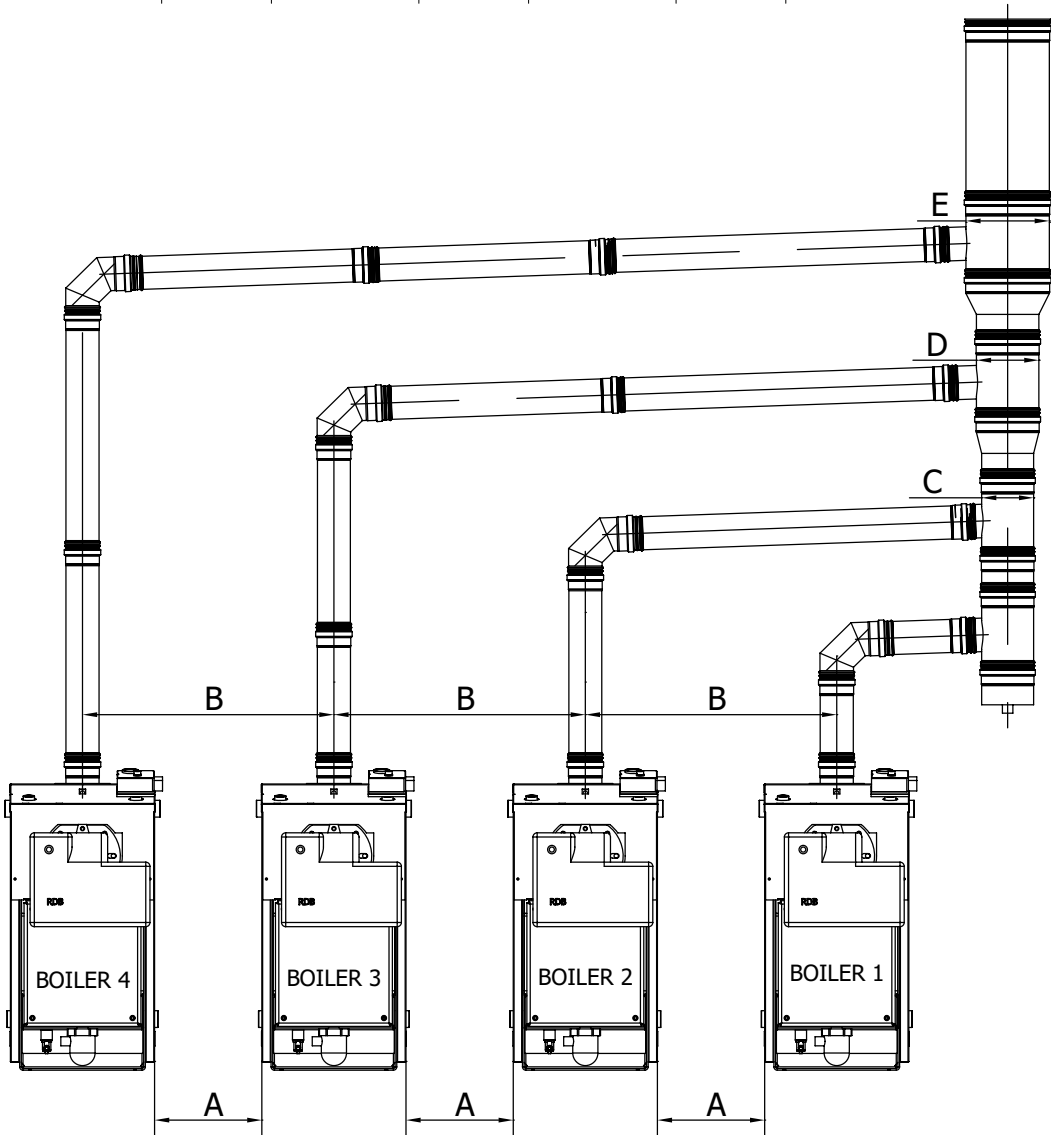
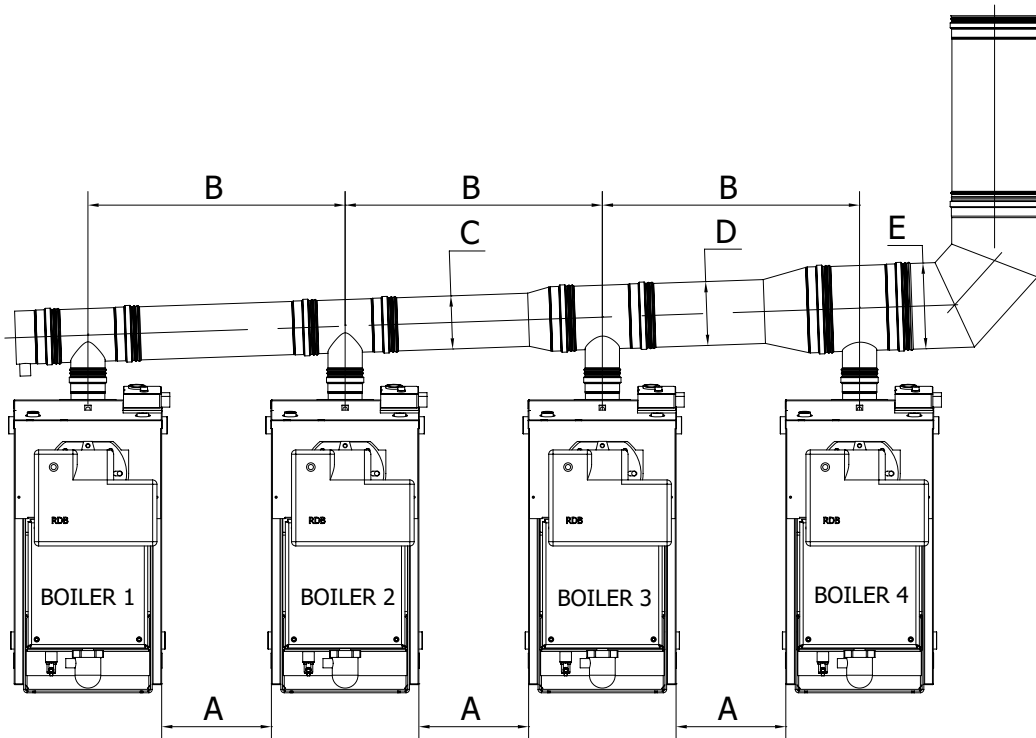


#### IMIT DUAL THERMOSTAT



Use double insulated heat resistant cable

# 7 FLUE OPTIONS



## 7 FLUE OPTIONS

| Boilers kW | H    | W   | D   | Flue dia. for Each Boiler | A<br>Min. Space Between Boilers | B<br>Space + Flue Center to Center | C<br>Main Header Size for 2 Boilers | D<br>Main Header Size for 3 Boilers | E<br>Main Header Size for 4 Boilers |
|------------|------|-----|-----|---------------------------|---------------------------------|------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 100        | 1052 | 625 | 745 | 150                       | 150                             | 775                                | 250                                 | 300                                 | 300                                 |
| 73         | 873  | 530 | 525 | 125                       | 150                             | 680                                | 250                                 | 250                                 | 250                                 |
| 58         | 815  | 470 | 531 | 100                       | 150                             | 620                                | 150                                 | 200                                 | 200                                 |
| 44         | 815  | 470 | 531 | 100                       | 150                             | 620                                | 150                                 | 200                                 | 200                                 |
| 35         | 684  | 441 | 381 | 80                        | 150                             | 591                                | 125                                 | 150                                 | 200                                 |
| 26         | 684  | 441 | 381 | 80                        | 150                             | 591                                | 125                                 | 150                                 | 200                                 |
| 20         | 684  | 441 | 381 | 80                        | 150                             | 591                                | 125                                 | 150                                 | 200                                 |
| 18         | 684  | 344 | 381 | 80                        | 150                             | 494                                | 125                                 | 150                                 | 200                                 |
| 12         | 684  | 344 | 381 | 80                        | 150                             | 494                                | 125                                 | 150                                 | 200                                 |

All dimensions are in mm.

| Sales Codes | Description                       |
|-------------|-----------------------------------|
| PDK080RTA   | PDK 80mm into 125mm Reducing Tee  |
| PDK080RTB   | PDK 80mm into 150mm Reducing Tee  |
| PDK080RTC   | PDK 80mm into 150mm Reducing Tee  |
| PDK100RTA   | PDK 100mm into 150mm Reducing Tee |
| PDK100RTB   | PDK 100mm into 200mm Reducing Tee |
| PDK125RTA   | PDK 125mm into 250mm Reducing Tee |
| PDK150RTA   | PDK 150mm into 250mm Reducing Tee |
| PDK150RTB   | PDK 150mm into 300mm Reducing Tee |

For all other flue parts or boiler sales codes, please consult our product guide or contact our technical team here at Firebird on **026 45253** or [service@firebird.ie](mailto:service@firebird.ie). The product guide and boiler information can also be found on our website [www.firebird.ie](http://www.firebird.ie).

## 8 TERMS AND CONDITIONS OF WARRANTY

---

This Firebird product is designed and manufactured to give many years of trouble-free service. We provide a comprehensive warranty of 5 years on the Low Loss Header.

The warranty will only apply if the appliance is installed by a competent, qualified person and is checked annually thereafter.

The following terms, laid out in the warranty must be adhered to:

- (a) All claims under the warranty programme must be received within 5 years from the date of installation.
- (b) Installation of the Low Loss Header must be in accordance with this manual and all relevant standards and codes of practice.
- (c) Firebird will not accept any liability in respect of any defect arising from incorrect installation, negligence, fair wear and tear, misuse, alteration or repair by unqualified persons.
- (d) The warranty programme extends to reasonable labour costs except under clause (a) where any valid claim made after 3 years will not include labour costs.
- (e) Firebird's prior authorisation must be obtained before examination or repair of the appliance takes place.
- (f) Firebird will examine all claims made under the warranty programme and for any claims deemed invalid, costs incurred will be borne by the owner.
- (g) In the case of a warranty claim, the Low Loss Header must be returned to Firebird.
- (h) Any defective part removed under any or all of the warranty programmes must be returned to Firebird.

This system is designed to be used in a pressurised system.

Note: all regulations with respect to pressurised heating systems must be adhered to.

THE STATUTORY RIGHTS OF THE CUSTOMER ARE NOT AFFECTED BY THIS WARRANTY.



**Please complete the following details to register your Firebird Low Loss Header Warranty/Commissioning Card.**

**CUSTOMER**

Name: .....  
Address: .....  
.....  
.....  
Tel: .....

**INSTALLER**

Name: .....  
Address: .....  
.....  
.....  
Tel: .....

**LOW LOSS HEADER**

- Serial Number: .....
- Combined boiler output to system ..... kW.
- Total number of boilers connected to the LLH .....
- System is installed in accordance with manual guidelines.
- System is installed in accordance with building regulations.

**Commissioning and Handover Details**

- System brought up to temperature by undersigned, operating safely and transferring heat.
- Manuals handed to householder.

Installer Signature: .....

Date: .....



CUT ALONG DOTTED LINE



CUT ALONG DOTTED LINE







## CUSTOMER SERVICE

Firebird pride themselves on offering the highest levels of customer service possible. The level of service provided is monitored on a regular basis to ensure customers' requirements are always met.



## TECHNICAL SUPPORT

Our Technical Team provides customers with a comprehensive technical support package which is designed to make the specification and installation process as simple as possible. For technical support please contact the Firebird Technical Team on **026 45253** or [service@firebird.ie](mailto:service@firebird.ie)



## QUALITY

All Firebird products are produced to the highest quality standards and are put through rigorous testing procedures by external standards agencies. Every product is designed to meet a specific requirement and has been manufactured using premium quality materials to precise standards and tolerances.



## WARRANTY

Firebird offers a 5 year warranty on the Low Loss Header and Firebird boilers. Full terms and conditions of Firebird's warranty programme can be viewed on [www.firebird.ie](http://www.firebird.ie).



**Firebird Heating Solutions Ltd.**  
Údarás Industrial Estate,  
Baile Mhic Íre, Co. Cork,  
Ireland,  
P12 HK51.

t: +353 (0)26 45253  
f: +353 (0)26 45309  
e: [info@firebird.ie](mailto:info@firebird.ie)  
[www.firebird.ie](http://www.firebird.ie)

**Firebird Heating Solutions Ltd.**  
Shean, Forkhill,  
Newry,  
BT35 9SY.

t: +44 (0)28 3088 8330  
f: +44 (0)28 3088 9096  
e: [firebirdproducts@hotmail.co.uk](mailto:firebirdproducts@hotmail.co.uk)  
[www.firebird.ie](http://www.firebird.ie)

**Firebird Products Ltd,**  
Phoenix House,  
Eastern Wood Road,  
Langage Industrial Estate,  
Plympton,  
Plymouth PL7 5ET.

t: +44 (0)1752 691177  
f: +44 (0)1752 691131  
e: [sales@firebird.uk.com](mailto:sales@firebird.uk.com)  
[www.firebird.uk.com](http://www.firebird.uk.com)