

Natural gas  
Class D oil  
Dual fuel

130 kW  
to  
4000 kW

## *Unical Ellprex*

High efficiency steel boiler



- **Seasonal efficiency of over 84% for most models gives compliance with ADL2B 2010 for gas-fired boilers without the need for additional heating credits**
- **Combustion chamber welding detail minimises thermal stress**
- **Very low stand-by losses**
- **Wide range of 2-stage gas and oil, dual-fuel and modulating gas burners available**

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## General information

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### Operating principles

Ellprex are a range of reverse-flame steel boilers, with the third pass through tubes fitted with turbulators to maximise heat exchange (see fig 2 below). For models 170 to 630, the combustion chamber is welded to both the front and rear plates. For models 760 to 4000, the combustion chamber is attached only to the front plate by a double-bevel butt weld (as per EN 303-1 Table 2). This allows the combustion chamber to freely expand and so minimises metallurgical stress.



Fig 1 Ellprex boiler

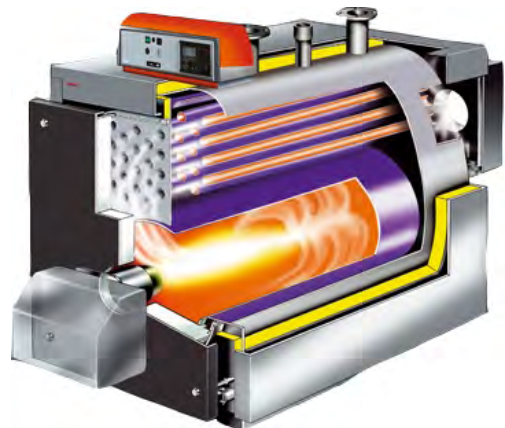
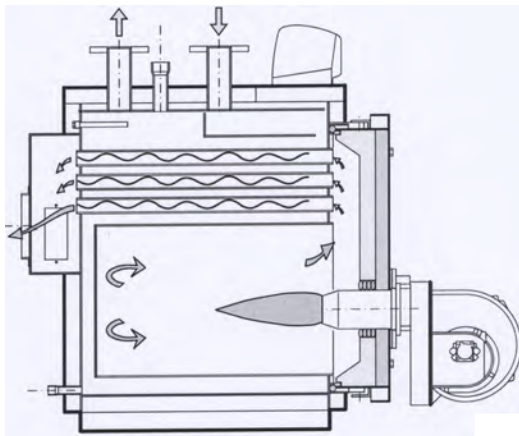


Fig 2 Passage of flue gases

### Standby loss and operating loss

Standby losses are the sum of heat losses by radiation and convection from the boiler when the burner is not operating. Reducing these losses makes a significant contribution to high seasonal efficiencies. Ellprex boilers have 80 mm of glass wool insulation mattress with mineral fibre backing to minimise these losses.

## General information

### Application

The Ellprex range are reverse-flame steel boilers, manufactured and tested in accordance with EN 303 -1. The carbon steel sheet used is to EN 10025 and the boiler tubes are of ST 37.0 steel to DIN 1626. Ellprex are tested in accordance with the Boiler Efficiency Directive 92/42/EEC. They are suitable for use in LTHW or MTHW heating systems with a maximum operating pressure of 6.0 bar (see Technical data). Maximum system operating temperatures are 90°C for LTHW systems and 105°C for MTHW systems.

Ellprex boilers are supplied with Natural gas, Class D oil or Dual fuel burners with 2-stage operation. Modulating burners are optionally available.

The boiler is suitable for use in either open vented or pressurised heating systems. It is not suitable for use as a direct water heater. Where wholesome water is required, a matching calorifier or plate heat exchanger must be provided in the system.

### Statutory requirements

Ellprex boilers are CE marked and must be fired by a compatible burner certified to EN676 (gas firing) or EN267 (oil firing) to comply with the Boiler (Efficiency) Directive 1993.

The installation and commissioning of the boiler must be carried out by a qualified engineer in accordance with the instructions provided.

Gas supplies and gas burners must be installed and commissioned by a qualified person, eg. a Gas Safe registered engineer.

### Handling

Offloading, dry storing and placing of equipment in the boiler room is the responsibility of the installer. Lifting hooks are attached to the boiler.

Equipment must be dry stored and protected from frost. Cartons must not be crushed or otherwise damaged.

### Commissioning

Clyde undertake commissioning of boilers. Commissioning charges do not include servicing during the guarantee period, although this may be carried out under service contract or to specific order. Boilers should be commissioned in line with CIBSE Commissioning Code B.

### Servicing

The importance of regular maintenance cannot be over-emphasised if maximum efficiency is to be maintained. Customers are strongly advised to place the equipment under service contract immediately commissioning is complete.

### Guarantee

Subject to correct handling, installation and operation, all equipment is guaranteed for twelve months from the date of despatch. Boiler heat exchangers are guaranteed for a period of two years from the date of despatch.

The guarantee is not valid if the boiler is not installed in accordance with these instructions, becomes blocked with debris and/or carbonate deposits from the system water and/or there is no documented evidence of commissioning by a competent engineer.

### Boiler Log book

A boiler log book that provides a permanent record of commissioning and servicing data and measurements is supplied with every boiler. It is recommended that the owner ensures that this log book is kept safe and brought up to date on every occasion that routine or emergency work is carried out on the boiler.

## Installation requirements

### Electrical supply (Refer Fig 3)

A 400V 3PH supply is required for most standard burners offered. The boiler control panel requires an additional 230V 1PH supply.

If a 230V 1PH burner is being used, the fused supply should be taken to the boiler control panel only. The harness and connector supplied by Clyde will feed the burner.

The electricity supplies to the burner and boiler control panel must be wired in accordance with IEE Regulations. A separate supply and isolating switch is required for each boiler in the plant room.

All isolating switches and fuses must be provided by the installer. Burner start/run currents for fuse specification are available on request. Burner wiring diagrams and technical data are also available on request.

All connections between the boiler control panel and the burner are made through harnesses with matching plugs and sockets, supplied as standard.

**Note:** Fig 3 is only diagrammatic. Double pole switches with the required minimum separation must always be used.

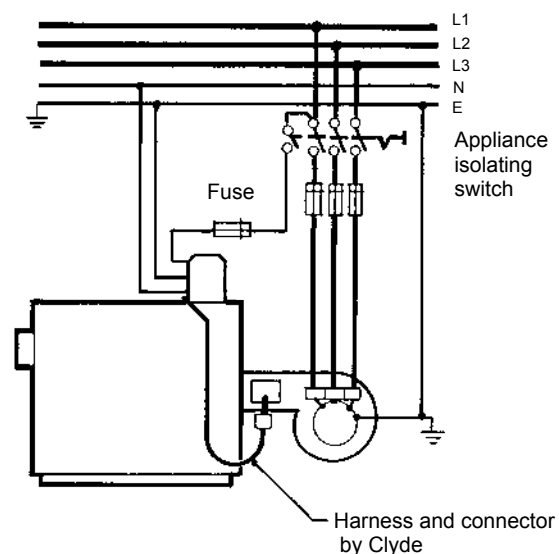
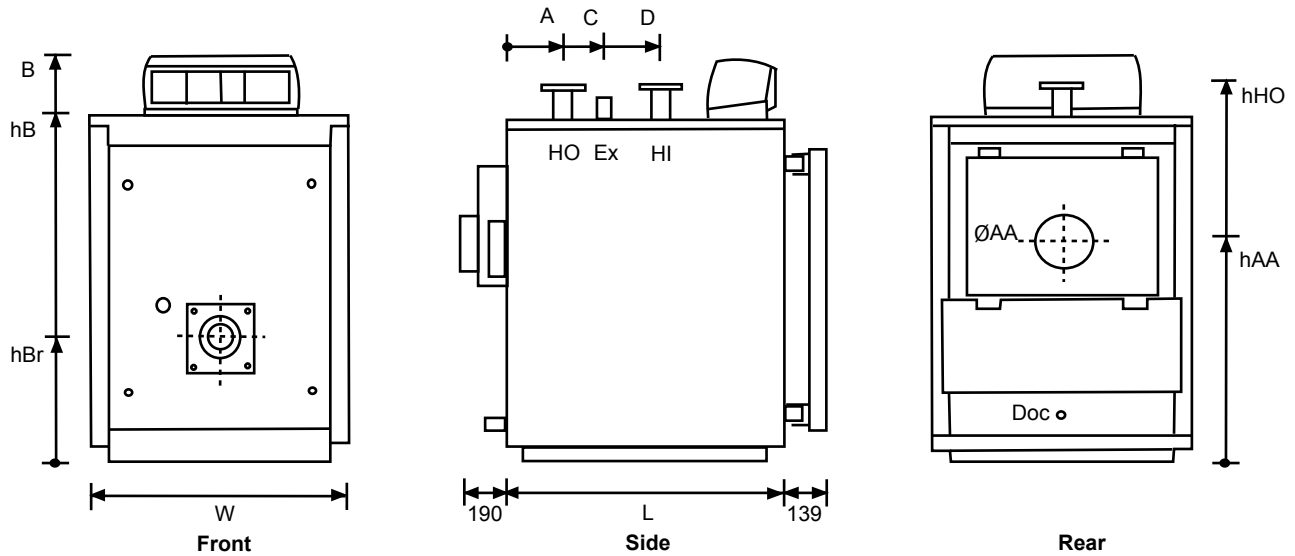


Fig 3 - Electricity supply

# Dimensions and Technical data



### Dimensions

| Boiler model                   |     |    | 170  | 240  | 290  | 340  | 420  | 510  | 630  |
|--------------------------------|-----|----|------|------|------|------|------|------|------|
| Overall length                 | L   | mm | 785  | 1045 | 982  | 1112 | 1177 | 1372 | 1682 |
| Overall width                  | W   | mm | 820  | 820  | 860  | 860  | 890  | 890  | 890  |
| Overall height                 | B   | mm | 1272 | 1272 | 1372 | 1372 | 1542 | 1542 | 1542 |
| Boiler height                  | hB  | mm | 1082 | 1082 | 1182 | 1182 | 1352 | 1352 | 1352 |
| Burner height                  | hBr | mm | 380  | 380  | 400  | 400  | 440  | 440  | 440  |
| Boiler flow connection         | HO  | DN | 65   | 65   | 80   | 80   | 100  | 100  | 100  |
| Boiler return connection       | HI  | DN | 65   | 65   | 80   | 80   | 100  | 100  | 100  |
| Expansion vessel connection    | Ex  | Rp | 1??  | 1??  | 2    | 2    | 2    | 2    | 2    |
| Connection height              | hHO | mm | 1210 | 1210 | 1310 | 1310 | 1485 | 1485 | 1485 |
| HO centre from rear            | A   | mm | 175  | 175  | 215  | 215  | 255  | 255  | 255  |
| Ex centre from rear            | C   | mm | 305  | 565  | 425  | 555  | 540  | 735  | 1045 |
| HI centre from rear            | D   | mm | 490  | 750  | 675  | 805  | 855  | 1050 | 1360 |
| Flue spigot (inside dimension) | AA  | DN | 200  | 200  | 250  | 250  | 250  | 250  | 300  |
| Flue spigot height             | hAA | mm | 648  | 648  | 708  | 708  | 748  | 748  | 748  |
| Drain off cock                 | Doc | Rp |      |      |      | ¾    |      |      |      |

### Technical data

|   |      |      |      |      |      |      |      |      |
|---|------|------|------|------|------|------|------|------|
| Nominal heat output (full load)         | kW   | 170  | 240  | 290  | 340  | 420  | 510  | 630  |
| Nominal heat input (full load) ncv      | kW   | 186  | 262  | 317  | 371  | 459  | 557  | 688  |
| Efficiency at 100% load (ncv)           | %    | 91.4 | 91.6 | 91.4 | 91.6 | 91.5 | 91.5 | 91.5 |
| Efficiency at 30% load (ncv)            | %    | 92.7 | 93.2 | 93.4 | 93.6 | 93.9 | 93.9 | 93.9 |
| Boiler seasonal efficiency (1)          | %    | 83.3 | 83.7 | 83.8 | 84   | 84.2 | 84.2 | 84.2 |
| Oil consumption (ncv)                   | kg/h | 15.7 | 22.1 | 26.7 | 31.3 | 38.7 | 47   | 58   |
| Natural gas consumption (gross cv)      | m³/h | 19.2 | 27.1 | 32.7 | 38.3 | 47.4 | 57.5 | 71   |
| Dry weight                              | kg   | 435  | 510  | 588  | 629  | 796  | 919  | 1049 |
| Water content                           | l    | 190  | 251  | 264  | 298  | 398  | 462  | 565  |
| Gas side resistance                     | Pa   | 147  | 274  | 245  | 333  | 284  | 421  | 539  |
| Flue gas temperature rise Class D oil   | °C   | 171  | 171  | 172  | 164  | 166  | 165  | 175  |
| Flue gas mass flow (Max)                | kg/h | 284  | 401  | 485  | 568  | 702  | 852  | 1053 |
| Flue gas temperature rise Natural gas   | °C   | 159  | 159  | 160  | 152  | 154  | 153  | 163  |
| Flue gas mass flow (Max)                | kg/h | 279  | 393  | 476  | 557  | 689  | 837  | 1034 |
| CO <sub>2</sub> in flue gas Class D oil | %    | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 | 12.8 |
| CO <sub>2</sub> in flue gas Natural gas | %    | 9.8  | 9.8  | 9.8  | 9.8  | 9.8  | 9.8  | 9.8  |
| Maximum hydraulic working pressure      | bar  |      |      |      | 6    |      |      |      |

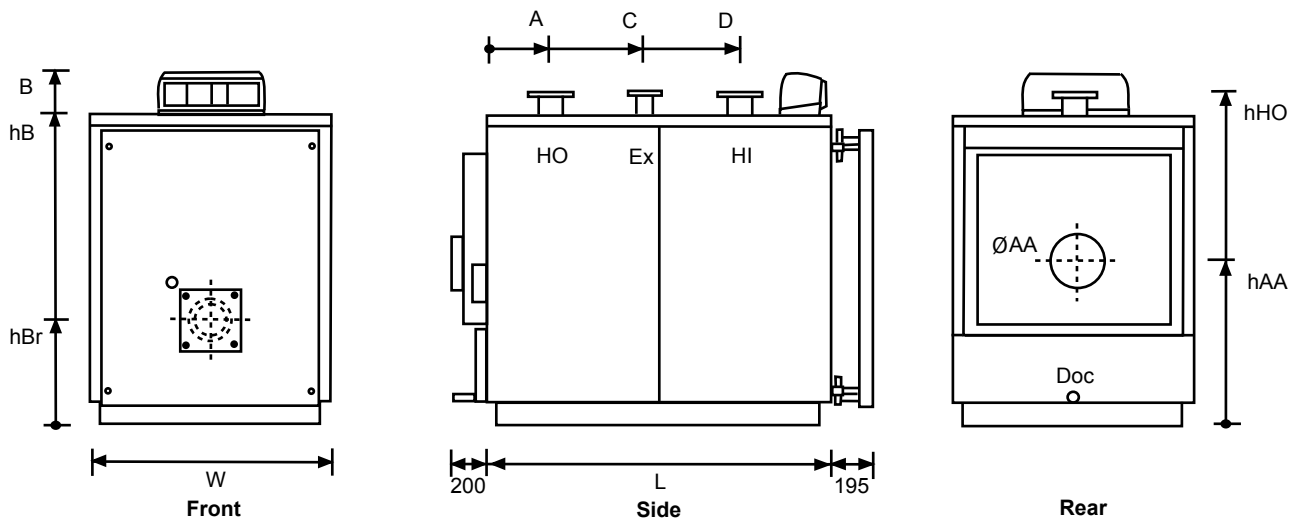
Notes: (1) Calculated from the non-domestic heating and cooling compliance guide for conformance with ADL2A and ADL2B 2010 using the formula  $n_{seasonal} = 0.81n_{30\%} + 0.19n_{100\%}$

### Water flow rates and hydraulic resistances

|   |     |      |      |      |      |      |      |      |
|---|-----|------|------|------|------|------|------|------|
| Water flow rate at 15°C temp. rise      | l/s | 2.7  | 3.8  | 4.6  | 5.4  | 6.7  | 8.1  | 10   |
| Hydraulic resistance at 15°C temp. rise | kPa | 1.47 | 3.23 | 2.06 | 2.74 | 1.67 | 2.45 | 3.72 |
| Min water flow rate (2)                 | l/s | 1    | 1.5  | 1.8  | 2.1  | 2.6  | 3.1  | 3.9  |
| Hydraulic resistance at min flow rate   | kPa | 1    | 1    | 1    | 1    | 1    | 1    | 1    |

Notes: (2) Minimum boiler return temperature is 55°C

## Dimensions and Technical data



### Dimensions

|                                |     |    |      |      |      |
|--------------------------------|-----|----|------|------|------|
| Boiler model                   |     |    | 760  | 870  | 970  |
| Overall length                 | L   | mm | 1605 | 1800 | 1995 |
| Overall width                  | W   | mm | 1122 | 1122 | 1122 |
| Overall height                 | B   | mm | 1622 | 1622 | 1622 |
| Boiler height                  | hB  | mm | 1432 | 1432 | 1432 |
| Burner height                  | hBr | mm | 480  | 480  | 480  |
| Boiler flow connection         | HO  | DN | 125  |      |      |
| Boiler return connection       | HI  | DN | 125  |      |      |
| Expansion vessel connection    | Ex  | DN | 65   |      |      |
| Connection height              | hHO | mm | 1540 | 1540 | 1540 |
| HO centre from rear            | A   | mm | 298  | 298  | 298  |
| Ex centre from rear            | C   | mm | 733  | 928  | 1123 |
| HI centre from rear            | D   | mm | 1173 | 1368 | 1563 |
| Flue spigot (inside dimension) | AA  | DN | 350  |      |      |
| Flue spigot height             | hAA | mm | 765  | 765  | 765  |
| Drain off cock                 | Doc | Rp | 1¼   |      |      |

### Technical data

|   |      |      |      |       |
|---|------|------|------|-------|
| Nominal heat output (full load) ncv     | kW   | 760  | 870  | 970   |
| Nominal heat input (full load) ncv      | kW   | 830  | 950  | 1060  |
| Efficiency at 100% load (ncv)           | %    | 91.5 | 91.5 | 91.5  |
| Efficiency at 30% load (ncv)            | %    | 93.9 | 93.9 | 93.9  |
| Boiler seasonal efficiency (1)          | %    | 84.2 | 84.2 | 84.2  |
| Oil consumption (ncv)                   | kg/h | 70   | 80.1 | 89.4  |
| Natural gas consumption (gross cv)      | m³/h | 85.7 | 98.1 | 109.5 |
| Dry weight                              | kg   | 1341 | 1447 | 1553  |
| Water content                           | l    | 671  | 753  | 836   |
| Gas side resistance                     | Pa   | 500  | 559  | 480   |
| Flue gas temperature rise Class D oil   | °C   | 173  | 172  | 177   |
| Flue gas mass flow (Max)                | kg/h | 1271 | 1454 | 1632  |
| Flue gas temperature rise Natural gas   | °C   | 161  | 160  | 165   |
| Flue gas mass flow (Max)                | kg/h | 1247 | 1428 | 1593  |
| CO <sub>2</sub> in flue gas Class D oil | %    | 12.8 | 12.8 | 12.8  |
| CO <sub>2</sub> in flue gas Natural gas | %    | 9.8  | 9.8  | 9.8   |
| Maximum hydraulic working pressure      | bar  | 6    |      |       |

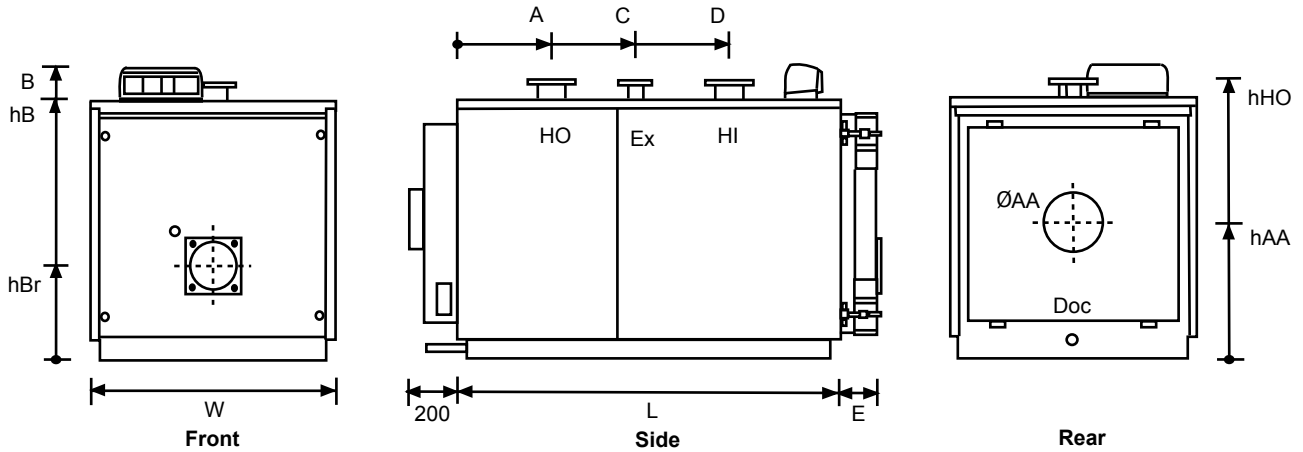
Notes: (1) Calculated from the non-domestic heating and cooling compliance guide for conformance with ADL2A and ADL2B 2010 using the formula  $n_{\text{seasonal}} = 0.81n_{30\%} + 0.19n_{100\%}$ .

### Water flow rates and hydraulic resistances

|   |     |      |      |      |
|---|-----|------|------|------|
| Water flow rate at 15°C temp. rise      | l/s | 12.1 | 13.9 | 15.5 |
| Hydraulic resistance at 15°C temp. rise | kPa | 2.55 | 3.23 | 4    |
| Min water flow rate (2)                 | l/s | 4.6  | 5.3  | 5.9  |
| Hydraulic resistance at min flow rate   | kPa | 1    | 1    | 1    |

Notes: (2) Boiler minimum return temperature is 55°C

## Dimensions and Technical data



### Dimensions

| Boiler model                   |     |    | 1100 | 1320 | 1570 | 1850 | 2200 | 2650 |
|--------------------------------|-----|----|------|------|------|------|------|------|
| Overall length                 | L   | mm | 1952 | 2292 | 2282 | 2652 | 2692 | 3014 |
| Overall width                  | W   | mm | 1352 | 1352 | 1462 | 1462 | 1622 | 1622 |
| Overall height                 | B   | mm | 1622 | 1622 | 1732 | 1732 | 1892 | 1892 |
| Boiler height                  | hB  | mm | 1432 | 1432 | 1542 | 1542 | 1702 | 1702 |
| Burner height                  | hBr | mm | 595  | 595  | 640  | 640  | 690  | 690  |
| Boiler flow connection         | HO  | DN | 150  | 150  | 175  | 175  | 200  | 200  |
| Boiler return connection       | HI  | DN | 150  | 150  | 175  | 175  | 200  | 200  |
| Expansion vessel connection    | Ex  | DN | 80   | 80   | 100  | 100  | 125  | 125  |
| Connection height              | hHO | mm | 1540 | 1540 | 1650 | 1650 | 1810 | 1810 |
| HO centre from rear            | A   | mm | 461  | 461  | 561  | 561  | 661  | 662  |
| Ex centre from rear            | C   | mm | 791  | 1131 | 1071 | 1441 | 1331 | 1652 |
| HI centre from rear            | D   | mm | 1291 | 1631 | 1621 | 1991 | 2031 | 2352 |
| Projection of door             | E   | mm | 207  | 207  | 227  | 227  | 258  | 258  |
| Flue spigot (inside dimension) | AA  | DN | 400  | 400  | 450  | 450  | 520  | 520  |
| Flue spigot height             | hAA | mm | 810  | 810  | 880  | 880  | 950  | 950  |
| Drain off cock                 | Doc | Rp | 1/4  |      |      |      |      |      |

### Technical data

|   |                   |       |       |       |       |       |       |
|---|-------------------|-------|-------|-------|-------|-------|-------|
| Nominal heat output (full load)         | kW                | 1100  | 1320  | 1570  | 1850  | 2200  | 2650  |
| Nominal heat input (full load) ncv      | kW                | 1200  | 1442  | 1715  | 2020  | 2400  | 2890  |
| Efficiency at 100% load (ncv)           | %                 | 91.6  | 91.5  | 91.5  | 91.5  | 91.6  | 91.6  |
| Efficiency at 30% load (ncv)            | %                 | 93.9  | 93.9  | 93.9  | 93.9  | 93.9  | 93.9  |
| Boiler seasonal efficiency (1)          | %                 | 84.2  | 84.2  | 84.2  | 84.2  | 84.2  | 84.2  |
| Oil consumption (ncv)                   | kg/h              | 101.2 | 121.6 | 144.6 | 170.3 | 202.4 | 243.7 |
| Natural gas consumption (gross cv)      | m <sup>3</sup> /h | 123.9 | 148.9 | 177.1 | 208.6 | 247.8 | 298.4 |
| Dry weight                              | kg                | 1821  | 2030  | 2780  | 3280  | 4145  | 4465  |
| Water content                           | l                 | 1040  | 1242  | 1418  | 1617  | 2086  | 2324  |
| Gas side resistance                     | Pa                | 510   | 657   | 588   | 715   | 637   | 745   |
| Flue gas temperature rise Class D oil   | °C                | 175   | 179   | 177   | 178   | 176   | 175   |
| Flue gas mass flow (M <sub>ax</sub> )   | kg/h              | 1837  | 2208  | 2626  | 3093  | 3675  | 4425  |
| Flue gas temperature rise Natural gas   | °C                | 163   | 166   | 165   | 166   | 164   | 163   |
| Flue gas mass flow (M <sub>ax</sub> )   | kg/h              | 1803  | 2167  | 2577  | 3036  | 3607  | 4344  |
| CO <sub>2</sub> in flue gas Class D oil | %                 | 12.8  | 12.8  | 12.8  | 12.8  | 12.8  | 12.8  |
| CO <sub>2</sub> in flue gas Natural gas | %                 | 9.8   | 9.8   | 9.8   | 9.8   | 9.8   | 9.8   |
| Maximum hydraulic working pressure      | bar               | 6     |       |       |       |       |       |

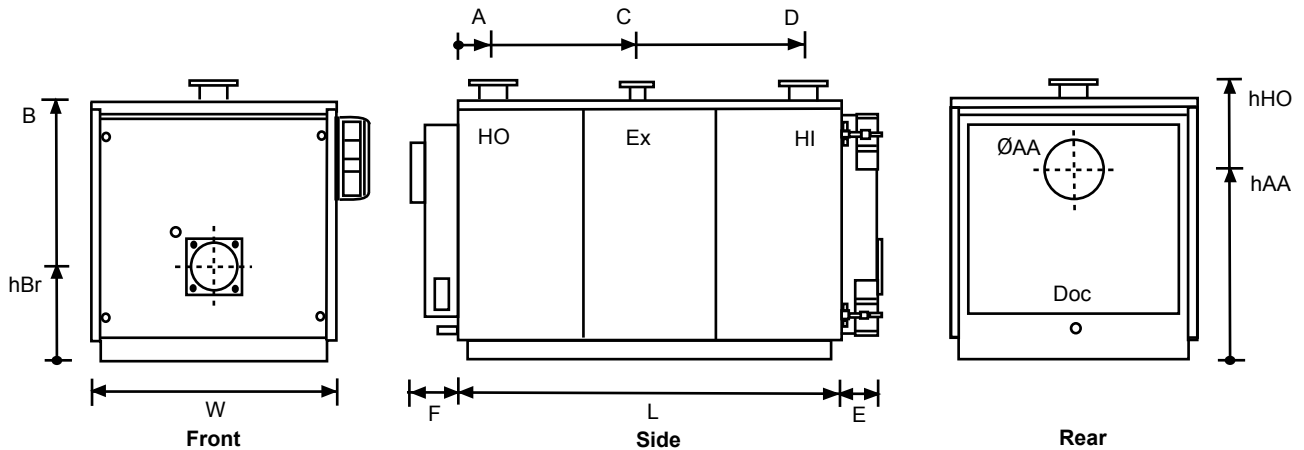
Notes: (1) Calculated from the non-domestic heating and cooling compliance guide for conformance with ADL2A and ADL2B 2010 using the formula  $n_{seasonal} = 0.81n_{30\%} + 0.19n_{100\%}$

### Water flow rates and hydraulic resistances

|   |     |      |      |      |      |      |      |
|---|-----|------|------|------|------|------|------|
| Water flow rate at 15°C temp. rise      | l/s | 17.5 | 21.1 | 25   | 29.5 | 35.1 | 42.3 |
| Hydraulic resistance at 15°C temp. rise | kPa | 2.94 | 3.43 | 3.23 | 4.41 | 3.33 | 4.7  |
| Min water flow rate (2)                 | l/s | 6.7  | 8.1  | 9.6  | 11.3 | 13.4 | 16.2 |
| Hydraulic resistance at min flow rate   | kPa | 1    | 1    | 1    | 1    | 1    | 1    |

Notes: (2) Boiler minimum return temperature is 55°C

## Dimensions and Technical data



### Dimensions

|                                |     |    |      |      |      |
|--------------------------------|-----|----|------|------|------|
| Boiler model                   |     |    | 3000 | 3500 | 4000 |
| Overall length                 | L   | mm | 3230 | 3194 | 3594 |
| Overall width                  | W   | mm | 1720 | 1970 | 1970 |
| Overall height                 | B   | mm | 1830 | 2090 | 2090 |
| Burner height                  | hBr | mm | 772  | 915  | 915  |
| Boiler flow connection         | HO  | DN | 200  | 200  | 250  |
| Boiler return connection       | HI  | DN | 200  | 200  | 250  |
| Expansion vessel connection    | Ex  | DN | 125  |      |      |
| Connection height              | hHO | mm | 1990 | 2271 | 2271 |
| HO centre from rear            | A   | mm | 325  | 377  | 377  |
| Ex centre from rear            | C   | mm | 1425 | 1437 | 1837 |
| HI centre from rear            | D   | mm | 2755 | 2717 | 3257 |
| Boiler door projection         | E   | mm | 295  | 325  | 325  |
| Flue hood projection           | F   | mm | 340  | 390  | 360  |
| Flue spigot (inside dimension) | AA  | DN | 570  | 620  | 620  |
| Flue spigot height             | hAA | mm | 1315 | 1535 | 1535 |
| Drain off cock                 | Doc | Rp | 1¼   |      |      |

### Technical data

|   |      |       |       |       |
|---|------|-------|-------|-------|
| Nominal heat output (full load) ncv     | kW   | 3000  | 3500  | 4000  |
| Nominal heat input (full load) ncv      | kW   | 3280  | 3825  | 4371  |
| Efficiency at 100% load (ncv)           | %    | 91.4  | 91.4  | 91.5  |
| Efficiency at 30% load (ncv)            | %    | 93.9  | 93.9  | 93.9  |
| Boiler seasonal efficiency (1)          | %    | 84.2  | 84.2  | 84.2  |
| Oil consumption (ncv)                   | kg/h | 276.6 | 322.5 | 368.5 |
| Natural gas consumption (gross cv)      | m³/h | 338.7 | 395   | 451.3 |
| Dry weight                              | kg   | 5110  | 6700  | 7500  |
| Water content                           | l    | 2667  | 4142  | 4455  |
| Gas side resistance                     | Pa   | 588   | 764   | 784   |
| Flue gas temperature rise Class D oil   | °C   | 180   | 180   | 179   |
| Flue gas mass flow (Max)                | kg/h | 5022  | 5861  | 6693  |
| Flue gas temperature rise Natural gas   | °C   | 167   | 167   | 166   |
| Flue gas mass flow (Max)                | kg/h | 4930  | 5754  | 6570  |
| CO <sub>2</sub> in flue gas Class D oil | %    | 12.8  | 12.8  | 12.8  |
| CO <sub>2</sub> in flue gas Natural gas | %    | 9.8   | 9.8   | 9.8   |
| Maximum hydraulic working pressure      | bar  | 6     |       |       |

Notes: (1) Calculated from the non-domestic heating and cooling compliance guide for conformance with ADL2A and ADL2B 2010 using the formula  $n_{\text{seasonal}} = 0.81n_{30\%} + 0.19n_{100\%}$

### Water flow rates and hydraulic resistances

|   |     |      |      |      |
|---|-----|------|------|------|
| Water flow rate at 15°C temp. rise      | l/s | 47.8 | 55.8 | 63.8 |
| Hydraulic resistance at 15°C temp. rise | kPa | 6.1  | 8.23 | 8.33 |
| Min water flow rate (2)                 | l/s | 18.3 | 21.4 | 24.4 |
| Hydraulic resistance at min flow rate   | kPa | 2    | 2    | 2    |

Notes: (2) boiler minimum return temperature is 55°C

## Installation requirements

### Boiler location (See fig 4)

The location chosen for the boiler(s) must be frost free, provide for a satisfactory flue system and an adequate air supply for combustion and ventilation. Adequate access is necessary for boiler and burner servicing.

Boilers must not be installed in areas where inflammable vapours are likely to be present. To avoid damage to the boilers, contamination of the combustion air by high levels of dust or halogenated hydrocarbons (eg. Solvents, spray can propellants, cleaning agents, adhesives, etc) must be avoided.

Boilers should be installed on a plinth which is at least 50mm high and is smooth and level. The plinth must support the entire boiler base, eg minimum dimensions will be W x L from pages 4 to 7. (NB : For some burners with acoustic shrouds the plinth may need to be higher - refer Clyde Sales Office).

### Burners

Boilers can be supplied with two stage Natural gas, Class D oil or Dual fuel burners. Modulating burners are also available with load-matching control equipment. A choice of burner makes is available.

### Fuel specification

Natural gas (GCV 38.76 MJ/m<sup>3</sup>) with a minimum gas inlet pressure according to the burner model specified.

BS2869 Class D oil (35 sec). Advice should be sought from the oil supplier regarding the storage of Class D oil.

### Fuel supply pipework

Install gas or oil supply pipe(s) and service valve(s) so as to allow free access to the boiler and full opening of the furnace door without removing the burner from the boiler door (see below).

Commissioning of the gas supply pipework and components must be carried out by a qualified person, eg. a Gas Safe registered engineer. The gas meter and supply must be sited in accordance with the requirements of BS6400.

### Plant room layout

When planning the layout of the boiler room, allowance must be made for opening the boiler door, boiler cleaning and maintenance. The boiler door may be hinged from the right (as illustrated) or the left.

The table below shows the minimum clearances around the boiler.

Dimension W2 = length of burner + 200mm.

Dimension L1 = length of boiler (recommended) for cleaning

Dimension W1 = 1000mm for access to rear of boiler

Dimension W3 = minimum 600mm

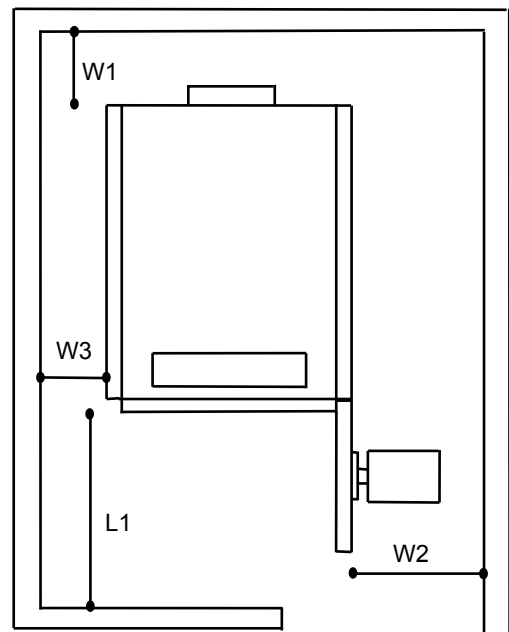


Fig 4 Boiler clearances



# Installation requirements

## Air supply

Air for ventilation and combustion must be provided for gas fired boilers in accordance with either BS 6644:2005 (up to 1.8 MW net input) or IGE/UP/10. Air supply for oil fired boilers must conform to BS 5410 : Part 2.

## Chimney design

The Ellprex boiler is designed to operate with a pressurised combustion chamber and the chimney is not required to assist the burner in overcoming the boiler resistance. The chimney must cater for the total internal resistance of the flue system from each boiler outlet and not impose an additional load on the burner.

## Water circulation (See figs 5 & 6)

The flow water temperature from the boiler must reach 60°C (gas firing) or 50°C (oil firing) within 10 minutes of the boiler being brought into operation. Thereafter, water circulation should be maintained through the boiler such that the boiler flow water temperature is always above 60°C (gas firing) or 50°C (oil firing). A pump overrun facility is necessary to ensure that water circulation is maintained for at least three minutes after the boiler is switched off. It is also important that a minimum flow be maintained through the boiler at all times - see Technical

data on pages 4 to 7. A pump overrun facility is necessary to ensure that water circulation is maintained for at least three minutes after the boiler is switched off.

The minimum return water temperature for the boiler is 55°C.

There are several ways of providing boiler protection and minimum flow rates, eg shunt pumps, primary loops, etc. A typical boiler pump and 3-port valve arrangement is shown in fig 5.

For multi-boiler systems a 'reverse return' pipework configuration is required to ensure equal distribution of water flow through the boilers.

## Water treatment

Whenever a new boiler is connected to an existing system, the pipework must be thoroughly cleaned and flushed. Clyde recommend that a permanent means of filtration be fitted into the return pipework, such as a sludge trap (which can be supplied by Clyde), hydrocyclone or full flow duplex filters. The boiler guarantee will be invalid if waterways are blocked by debris or carbonate deposits. Long term water treatment is essential to the economic operation and life of both new and refurbished heating systems.

For full information on cleaning, flushing and protecting hot water systems, refer to BSRIA Application Guide AG 1/2001.

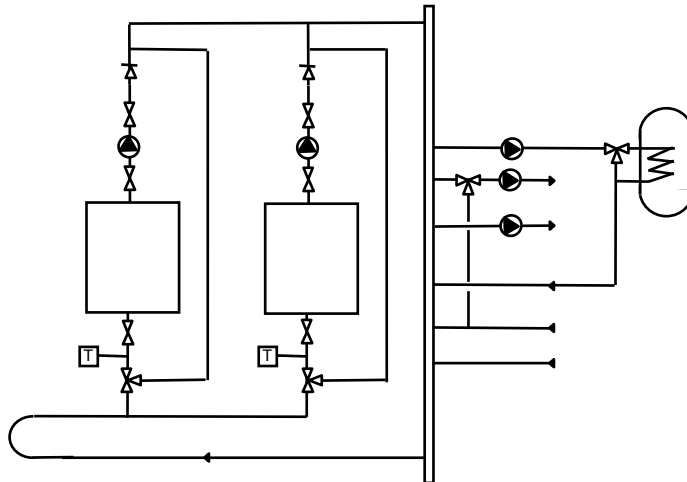


Fig 5 Multiple boilers with individual pumps

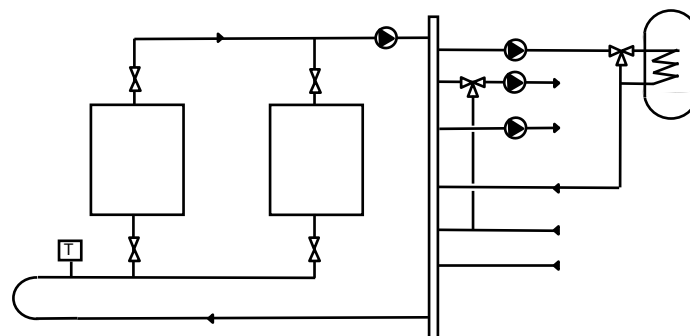


Fig 6 Alternative arrangement for boiler protection with a primary loop

## Boiler control panel

Control panel 21057 (see fig 7) provides either 1-stage burner control for on/off, modulating or LFS operation or 2-stage burner control for high/low operation via a dual-thermostat with a fixed differential of 6°C. There is an overheat limit thermostat and a switch for control of a circulating pump via a relay (not supplied). If this pump control is used, there is a minimum temperature thermostat within the module that will hold back the pump until the boiler reaches 50°C.

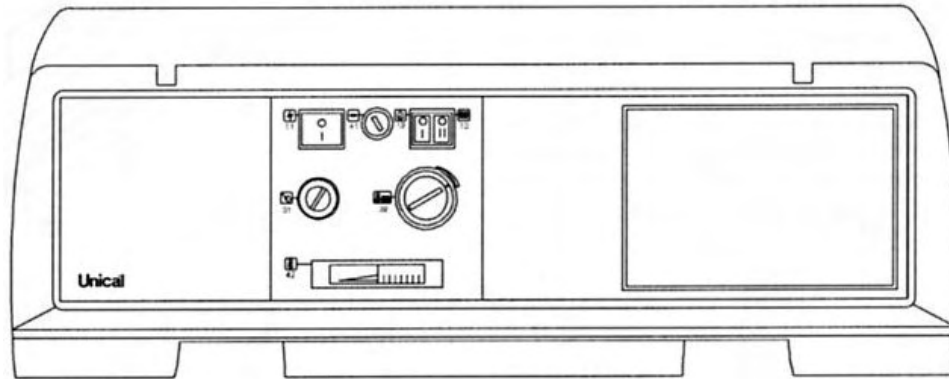


Fig 7 Boiler control panel 21057

### Control panel 21057 standard components

Illuminated on/off switch  
4A fuse

Overheat limit thermostat and manual reset  
Boiler on/off switch

Circulating pump on/off switch (relay required)  
Control thermostat (range 60°C to 90°C)  
Thermometer

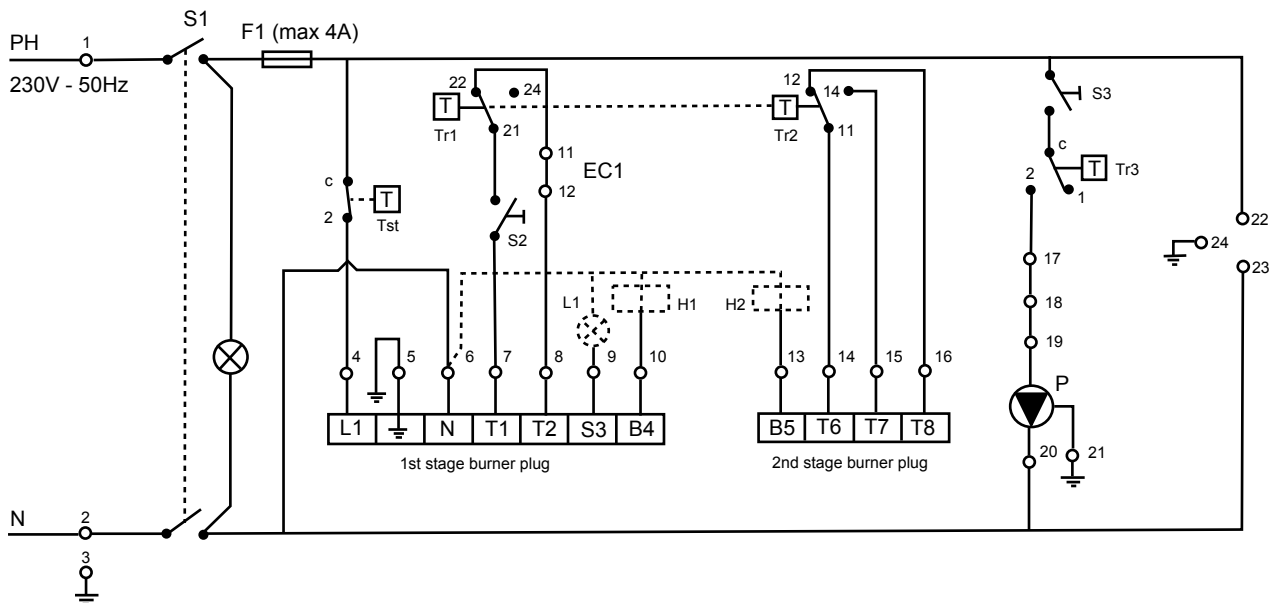


Fig 8 wiring schematic

### Key to fig 8 wiring schematic

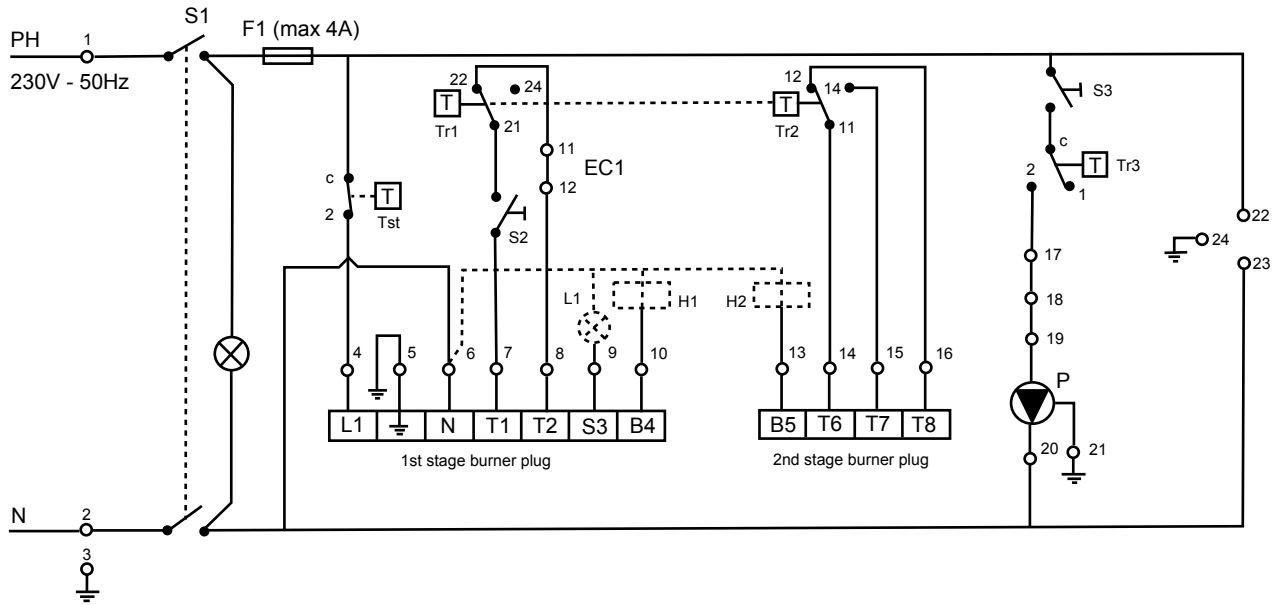
EC1 External volt-free control (eg timeclock)  
H1 External stage 1 hours run counter  
H2 External stage 2 hours run counter  
L1 External remote lock-out lamp  
P External circulating pump  
S1 Panel on/off switch

S2 Burner on/off switch  
S3 Circulating pump on/off switch  
Tst Boiler overheat thermostat (100°C)  
Tr1 Stage 1 thermostat (60°C to 90°C)  
Tr2 Stage 2 thermostat (54°C to 84°C)  
Tr3 Minimum temperature thermostat (50°C)

# Boiler control panel with volt-free indicators

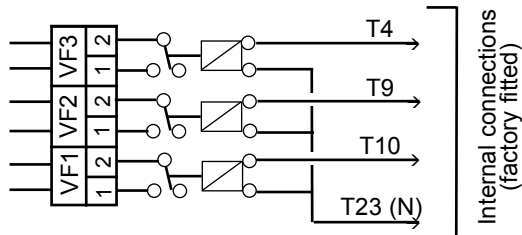
Control panel 21057 is optionally available with volt-free indicators for ;

- Boiler run / total hours run
- Burner lock-out
- Boiler high-temperature lock-out



- Volt-free indication boiler overheat (nc) \*
- Volt-free indication burner lockout (no)
- Volt-free indication total hours run (nc)

External wiring by installer



Optional volt-free relay module

Fig 9 wiring schematic with optional volt-free indicators

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