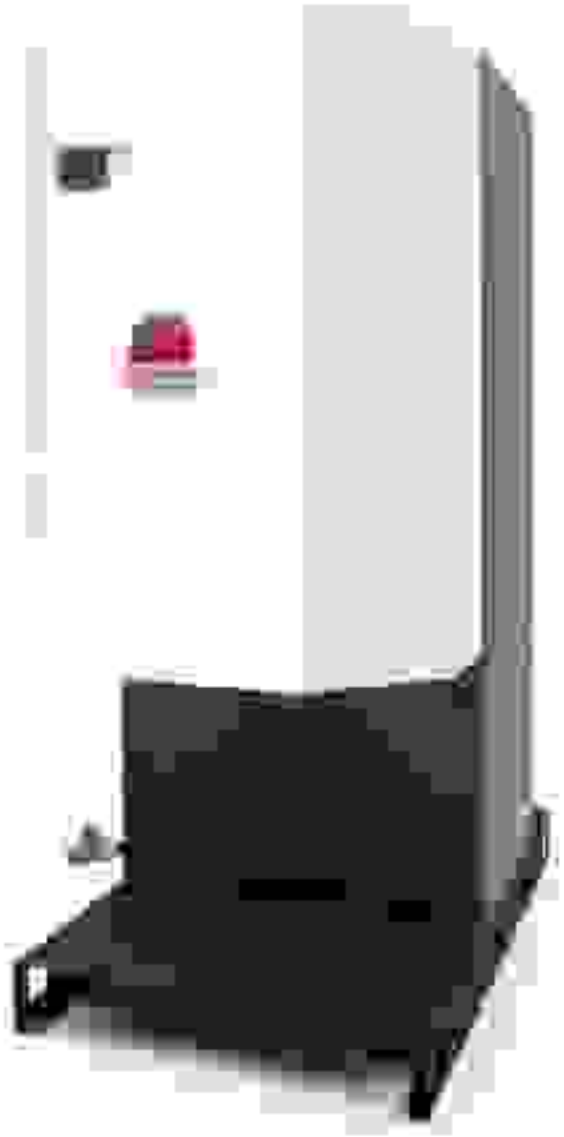
MAXXflo EVO Lite

High efficiency condensing stainless steel direct storage water heater

SC15/201, SC25/201, SC35/201, SC45/201



Please read and understand these instructions before commencing installation and leave this manual with the customer for future reference.

Andrews. Built to perform.

ANDREWS WATER HEATERS

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Andrews Storage Water Heaters have been designed and manufactured to comply with current international standards of safety. In the interests of the health and safety of personnel and the continued safe, reliable operation of the equipment, safe working practices must be employed at all times. The attention of UK users is drawn to their responsibilities under the Health and Safety Regulations 1993.

All installation and service on Andrews Water Heaters must be carried out by properly qualified personnel and, therefore, no liability can be accepted for any damage or malfunction caused as a result of intervention by unauthorised personnel.

Andrews Water Heaters' policy is one of continuous product improvement and, therefore, the information in this manual, whilst completely up to date at the time of publication, may be subject to revision without prior notice.

Further information and assistance can be obtained from:

Customer Support
Monday - Friday
8am - 5pm

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1 Safety

1.1 General safety instructions

Danger
If you smell gas:
1. Do not use naked flames, do not smoke and do not operate electrical contacts or switches (lighting, motor, lift etc)
2. Shut off the gas supply
3. Open the windows
4. Trace possible leaks and seal them off immediately
5. If the leak is upstream of the gas meter, notify the gas supplier.

Danger
Danger to life.
Observe warnings affixed to this heater. Incorrect operation of this heater could lead to considerable damage.

Danger
Commissioning should only be carried out by an approved installer . The installer checks the tightness of the gas supply, control and safety equipment and ensures that the combustion values are correct. If this work is not carried out correctly there is a risk of harm to persons, the environment and property.

Danger
Risk of poisoning:
Never use condensate as drinking water. Condensate is not suitable for consumption by people or animals. Avoid contact with skin.

Danger
This heater is not intended for use by persons under the age of 12, or persons with reduced physical, sensory or mental capabilities, lack of experience or knowledge. Only users given supervision or instruction concerning the safe operation of this heater and understand the hazards involved should be operating this appliance. Children should be supervised to ensure that they do not play with the heater.

Danger
Unauthorised conversions and modifications to this heater are not permitted, as these can put persons in danger and could cause damage to the water heater. Failure to comply with these instructions renders the warrantee for the heater void.

Danger
Do not store any explosive or highly flammable materials close to the heater.

Warning
Risk of burns!
Be careful when using domestic hot water. Depending on the heater settings the temperature of the hot water can rise above 65°C.

To protect from injury, you should install approved mixing valves in the water system to reduce water temperature at the outlet.

For safety reasons the discharge pipe from the safety valve must always be open so that water can escape during an emergency overheat situation.

Warning
The use of the heater and the installation by you must be limited to the operations described in this manual. All other actions may only be undertaken by a qualified engineer.

Warning
The condensation drain must not be changed or sealed. If a condensate neutralisation system is used, they system must be cleaned regularly in accordance with the instructions provided by the manufacturer.

Caution
Ensure that the heater is regularly serviced. Contact a qualified installer/engineer or arrange a maintenance contract for the servicing of the heater.

Caution
Only genuine spare parts may be used, fitted by a qualified engineer.

Caution
Secure against unintentional switch on. When the DHW tank is empty, ensure that the heater cannot be switched on accidentally.

Caution If there is a danger of freezing do not shut the gas supply or power off to the heater. This will allow the frost protection systems of the heater to operate provided the heater is not in a fault condition.

Caution
Do not drill holes in the casing of the appliance or fix wiring or isolating switches to the front cover. The cover of the appliance is removable for maintenance and forms part of the combustion air channel supplying the burner.

1.2 Recommendations

Removal and disposal of the water heater must be carried out by a qualified installer in accordance with local and national regulations.

If the mains lead is damaged, it must be replaced by the original manufacturer, the manufacturer's dealer or another suitably skilled person to prevent hazardous situations from arising.

Always disconnect the mains supply and isolate from the gas supply before working on the heater**.**

For safety reason, we recommend fitting gas leak and CO alarms at suitable places in the building in which the heater is installed.

Check the entire system for leaks after maintenance and servicing work.

Keep this document near to the heater

Only remove the casing for maintenance and repair operations. Refit all panels when maintenance work and servicing are complete.

Instruction and warning labels must never be removed or covered and must be clearly legible throughout the entire service life of the heater. Damaged or illegible instructions and warning stickers must be replaced immediately.

Modifications to the heater require the written approval of **Andrews Water Heaters.**

1.3 Specific safety instructions

1.3.1 Additional guidelines

In addition to the legal requirements and guidelines, the supplementary guidelines in this manual must also be followed. Supplements or subsequent regulations and guidelines that are valid at the time of installation shall apply to all regulations and guidelines specified in this manual.

1.4 Liabilities

1.4.1 Manufacturer’s liability

Our products are manufactured in compliance with the requirements of the various Regulations and Directives applicable. They are therefore delivered with UKCA/CE marking and any documents necessary. In the interests of the quality of our products, we strive constantly to improve them. We therefore reserve the right to modify the specifications given in this document.

Our liability as manufacturer may not be invoked in the following cases:
- Failure to abide by the instructions on installing and maintaining the appliance.
- Failure to abide by the instructions on using the appliance.
- Faulty or insufficient maintenance of the appliance.

1.4.2 Installer’s liability

The installer is responsible for the installation and initial commissioning of the appliance. The installer must observe the following instructions:

- Read and follow the instructions given in the manuals provided with the appliance.
- Install the appliance in compliance with prevailing legislation and standards.
- Carry out initial commissioning and any checks necessary.
- Explain the installation to the user.
- If maintenance is necessary, warn the user of the obligation to check the appliance and keep it in good working order.
- Give all the instruction manuals to the user.

1.4.3 User’s liability

To guarantee optimum operation of the system, you must abide by the following instructions:
- Read and follow the instructions given in the manuals provided with the appliance.
- Call on a qualified professional to carry out installation and initial commissioning.
- Get your installer to explain your installation to you.
- Have the required inspections and maintenance carried out by a qualified installer.
- Keep the instruction manuals in good condition close to the appliance.

2 About this manual

2.1 General

This manual describes the installation, use and maintenance of a MAXXflo EVO Lite Water Heater. This manual is part of all the documentation supplied with the heater.

2.2 Additional documentation

The following documentation is available in addition to this manual:

- User operating instruction manual
- Quick start guide

2.3 Symbols used in this manual

This manual uses various danger levels to draw attention to special instructions. We do this to improve user safety, to prevent problems and to guarantee correct operation of the appliance.

Danger
Risk of dangerous situations that may result in serious personal injury

Danger of electric shock
Risk of electric shock

Warning
Risk of dangerous situations that may result in minor personal injury

Caution
Risk of material damage

Important
Please note: important information

See
Reference to other sources of information

3 Technical specifications

3.1 Homologations

3.1.1 Certifications

Tab.1

UKCA Product Identification Number	0558DM2335
CE Product Identification Number	0558DM2335
Class NOx(1)	6
Type of flue gas connection	B_{23}(2)
	C_{13}, C_{33}, C_{53}, C_{63}
(1) EN 15502-1 (2) When installing a heater with B_{23} flue, a gas alarm **must** be fitted (2) When installing a heater with B_{23} flue, a CO alarm **must** be fitted	

3.1.2 Unit categories

Tab .2

Country	Category	Gas type	Connection pressure
Great Britain & Ireland	I_{2H} I_{3P} II_{2H3P}	G20 G31 G20 / G31 (Propane)	20 mbar 37 mbar 20 / 37 mbar

3.1.3 Factory test

Before leaving the factory, each water heater is optimally set and tested for:

- Electrical safety.
- Adjustment of CO^2.
- Water tightness.
- Gas tightness.
- Parameter setting.
- Functional operation.

3.2 Technical data

Tab. 3 General performance data

	Unit	SC15	SC25	SC35	SC45
Heat input - gross (min - max)	kW	6.1 - 15.0	10.7 - 25.0	10.7 - 35.0	10.7 - 45.0
Heat input - net (min - max)	kW	5.5 - 13.5	9.6 - 22.5	9.6 - 31.5	9.6 - 40.5
Output (min - max)	kW	6.0 - 14.7	10.5 - 24.5	10.5 - 34.4	10.5 - 44.2
NOx (EN 89) GCV	mg/kwh	25	29	25	30
NOx class (EN 89)		6			

Tab. 4 G20 performance data

	Unit	SC15	SC25	SC35	SC45
Gas inlet pressure permitted range	mbar	17 - 25			
Gas consumption (min - max)	m^3/h	0.59 - 1.43	1.02 - 2.40	1.02 - 3.34	1.02 - 4.25
Max gas input CO^2	%	9.0 % (+/- 0.2%)			
Expected CO at maximum output	ppm	24	25	46	84

Tab. 5 G31 performance data

	Unit	SC15	SC25	SC35	SC45
Gas inlet pressure permitted range	mbar	30 - 50			
Gas consumption (min - max)	m^3/h	0.23 - 0.57	0.38 - 0.94	0.38 - 1.32	0.38 - 1.69
Gas consumption (min - max)	kg/h	0.42 - 1.04	0.75 - 1.74	0.75 - 2.44	0.75 - 3.13
Max gas input CO^2	%	10.0 % (+/- 0.2%)		10.1 % (+/- 0.2%)	
CO at maximum output	ppm	21	21	53	92

Tab. 6 Electrical data

	Unit	SC15	SC25	SC35	SC45
Electrical connection		230 V~ / 50Hz max 5.0A			
Power consumption - max load (Watts)	W	66	84	100	125
Power consumption - standby (Watts)	W	4.5			
Electrical protection index	IP	IP20			

Tab. 7 Hot water data

	Unit	SC15	SC25	SC35	SC45
Thermal standby losses	kWh/day	1.68			
Approximate heat-up time (DT = 50^OC)	minutes	52	31	22	17
Recovery time through 50^OC	l/hr	232	386	541	695
Recovery time through 56^OC	l/hr	207	345	483	621
Maximum operating DHW temperature	^OC	65			

Tab. 9 Flue data

	Unit	SC15	SC25	SC35	SC45
Flue connection single	mm	80			
Flue connection concentric	mm	80 / 125			
Max flue equivalent length (single) B23	m	40			
Max flue equivalent length (concentric) C13, C33	m	20			
Max flue equivalent length (twin) C53	m	35			
Flue gas mass flow rate @ 60^{O}C (G20)	kg/h	9.0 - 22.2	15.8 - 37.0	15.8 - 51.8	15.8 - 66.6
Flue gas volume @ 60^{O}C (G20)	m^3/h	9.6 - 22.6	16.8 - 37.7	16.8 - 52.7	16.8 - 67.8
Max delivery pressure at flue gas outlet	Pa	18	35	70	120
Flue gas temperature (60^{O}C setpoint)	^{O}C	45 - 56			
Max allowable flue pressure difference	Pa	78	95	130	185
Max condensate production	l/h	1.5	2.5	3.5	4.5

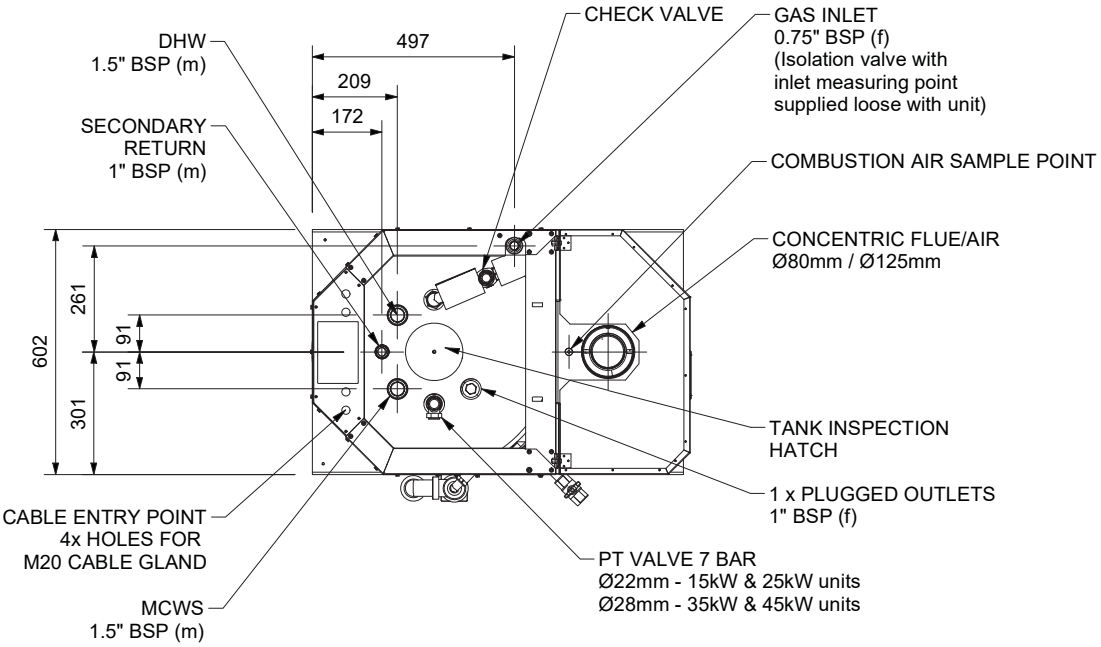
Tab. 10 Weight data

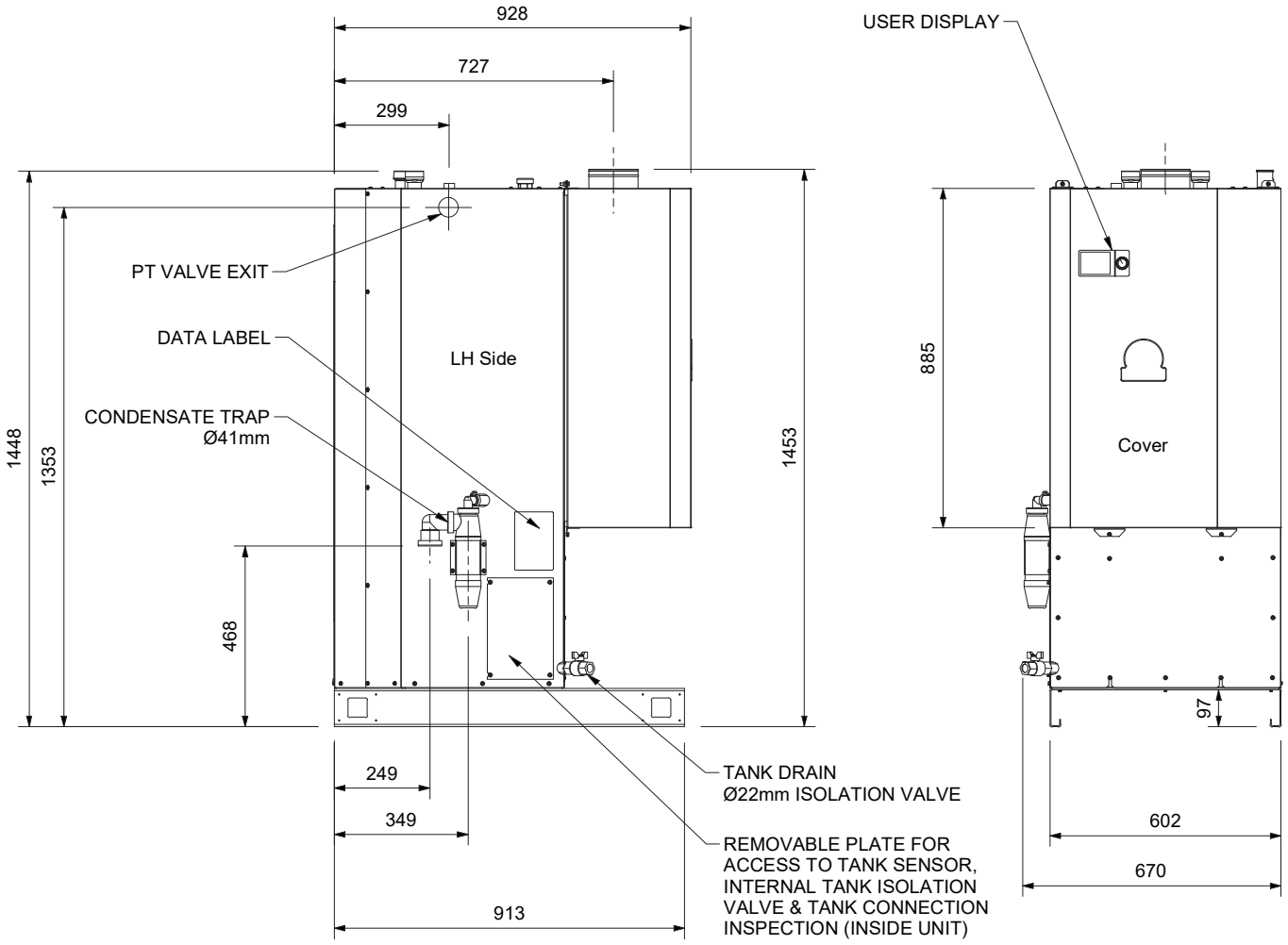
	Unit	SC15	SC25	SC35	SC45
Weight (including packaging)	kg	170	173		
Weight installed (empty)	kg	118	120		
Weight installed (water filled)	kg	321	324		

Tab. 12 Other data

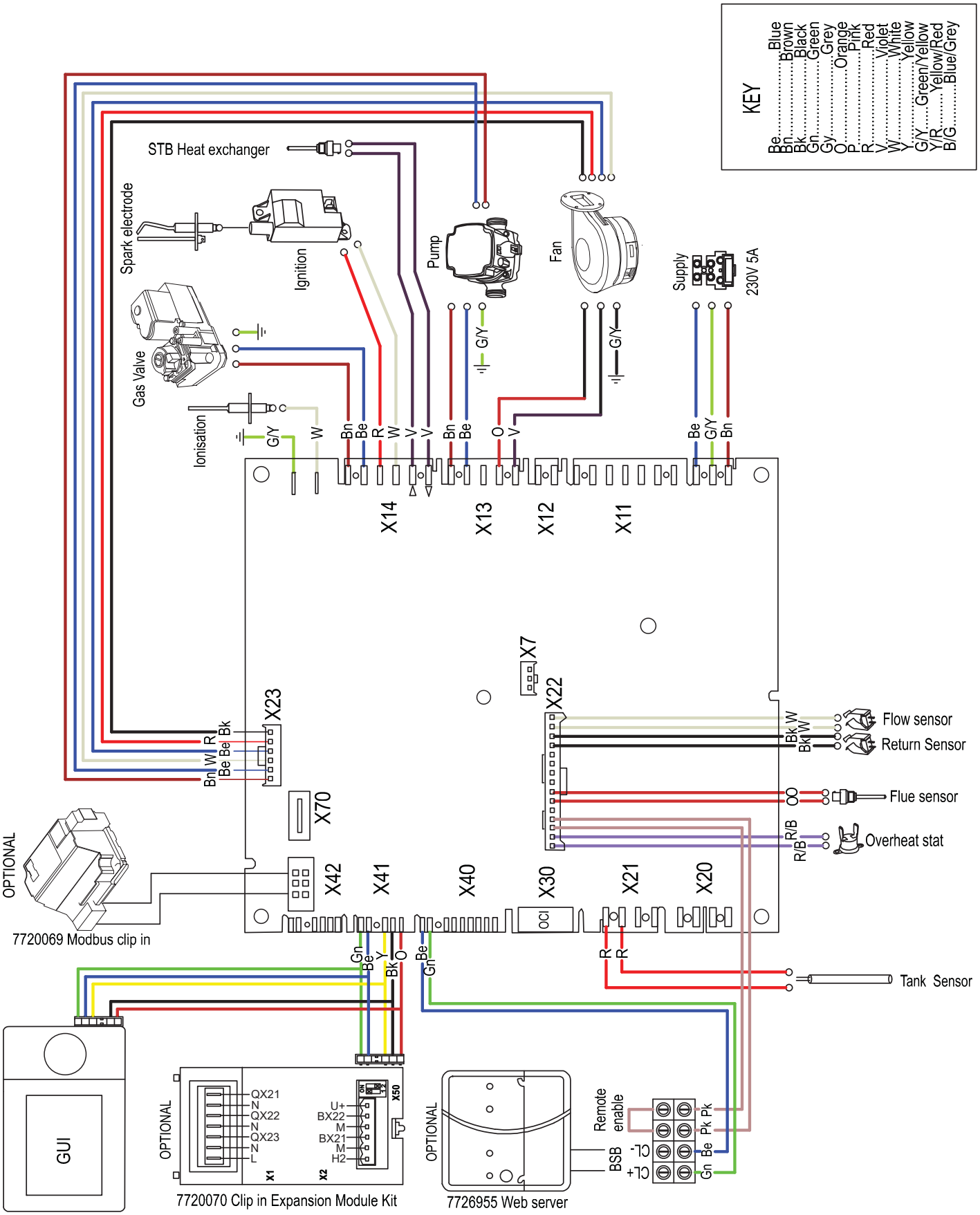
	Unit	SC15	SC25	SC35	SC45
Sound pressure level LpA - 1m away (free field)	dB(A)	37	42	47	51
Sound power level L_{WA} - according (EN 15036-1)	dB(A)	48	53	57	62
PMS Inlet / Operating pressure min (max)	bar	1.2 (6.0)			
Water inlet / outlet connections	BSP	1 1/2”			
Water return connection	BSP	1”			
Gas connection	BSP	3/4”			
Condensate connection	mm	41 (Polypipe)			
Tank drain connection	mm	22mm			
Temperature & Pressure valve connections	mm	22		28	
Service clearance - Above	mm	400			
Service clearance - Left	mm	300			
Service clearance - Right	mm	0			
Service clearance - Front	mm	600			
Service clearance - Rear	mm	0			

3.3 Dimensions & connections





3.4 Electrical diagram



4 Description of the product

4.1 General description

This Andrews Water Heater is a gas fired, low NOx, direct fired water heater, with an integrated stainless steel tank. Fully automatic electronic controls are integrated into the heater, with a wide range of control strategies and sensors

4.2 Operating Principle

4.2.1 Combustion and condensate gains

The burner heats the primary water flowing through the heat exchanger. If the temperature of the flue gases is lower than the dew point (approx. 55°C), water vapour condenses inside the heat exchanger. The energy released during this condensation process (referred to as latent heat) is also transferred to the primary water. The cooled flue gases are discharged through the flue gas discharge pipe. The condensed water is discharged through a siphon.

4.2.2 Control system

The flow (or charging) temperature is continuously monitored by the controls and the burner along with the pump are modulated to maintain a precise flow temperature from the heat exchanger into the DHW tank. Multi-layers of control level thresholds, ensure the heater operates safely at all times.

The electronic control system ensures that your water heating system is smart and reliable. This means that the heater responds practically to negative environmental influences (such as limited water flow or high flue temperatures). In the event of such adverse influences, the controls will seek to modulate back the burner in the first instance, applying a lockout condition if all other control methods have not been effective.

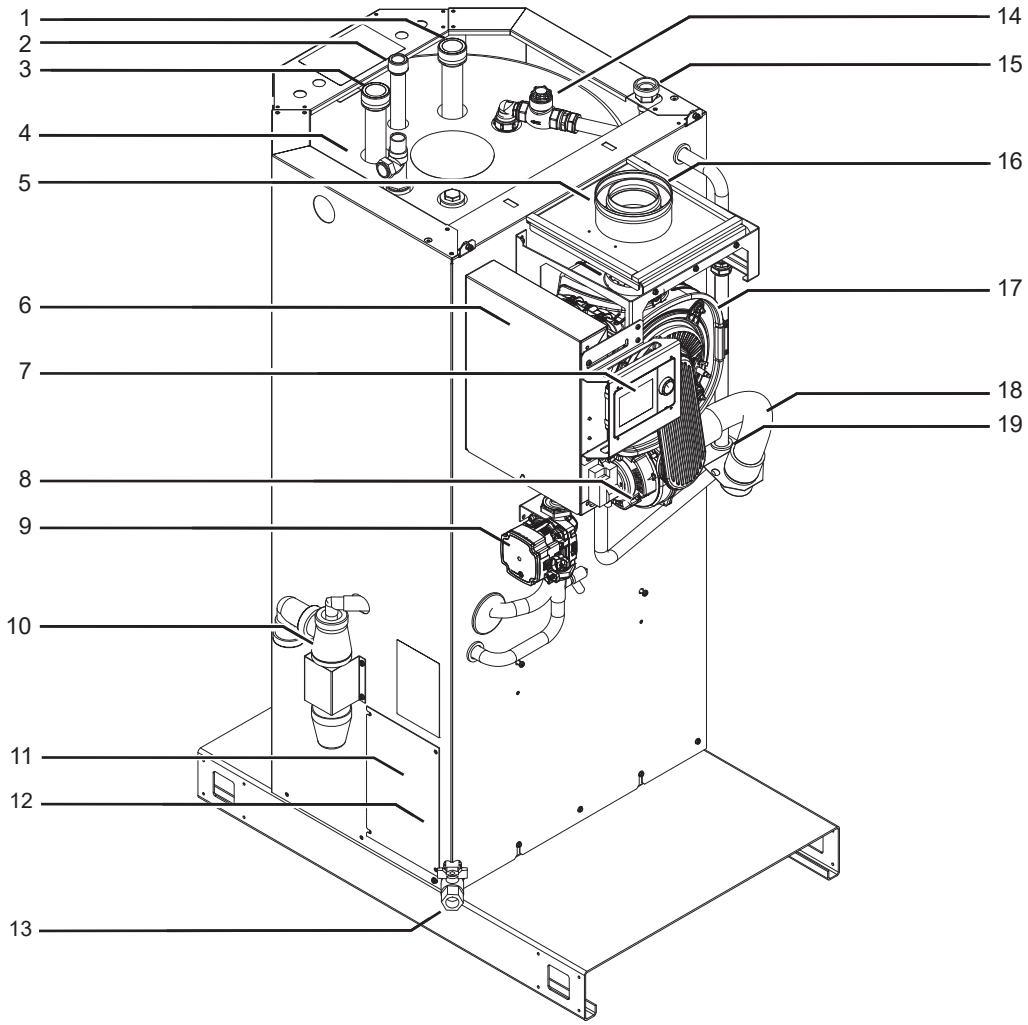
4.2.3 Gas/air regulation

The heater is equipped with a casing that also serves as an air box. The fan draws the combustion air from within the casing, which is supplied via the chosen flue system. The gas is injected into the venturi and mixed with the combustion air. The fan speed is controlled on the basis of the settings, the heat demand and the prevailing temperatures measured by the temperature sensors. The gas/air ratio control ensures an accurate mixture of the required amounts of gas and air. This provides optimum combustion over the entire heat input range at all times. The gas/air mixture goes to the burner, where it is ignited by the ignition electrode.

4.3 Main components

4.3.1 Water heater components

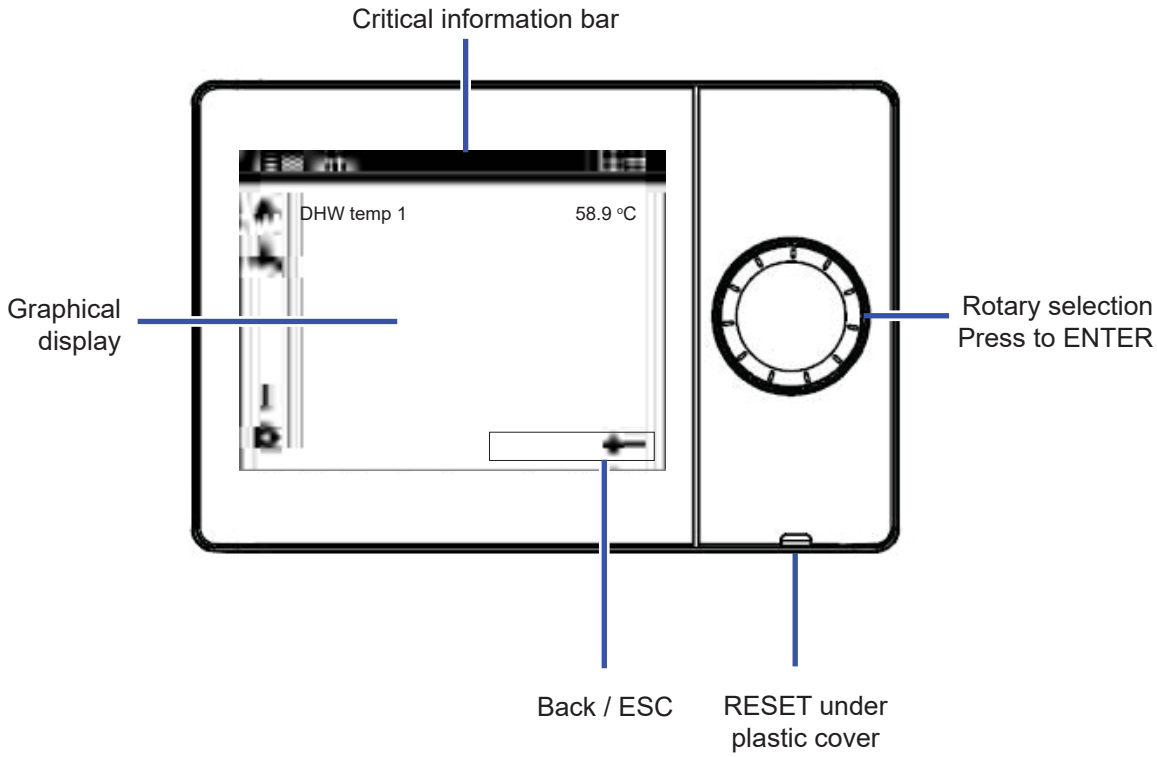
1. Hot water outlet
2. Return water inlet
3. Cold water inlet
4. DHW tank
5. Combustion air sample point
6. Controller
7. GUI Display
8. Combustion fan
9. Circulation pump
10. Condensate trap
11. Tank sensor well (behind plate)
12. Internal tank isolation valve (behind plate)
13. DHW tank drain point
14. Check valve assembly
15. Gas connection
16. Flue connection
17. Heat exchanger
18. Air intake
19. Gas valve and venturi



4.4 Control panel description

4.4.1 Control panel display

The control knob is used to operate the Graphical User Interface.
Press the control knob inwards to press ENTER



See section 8.1 for details

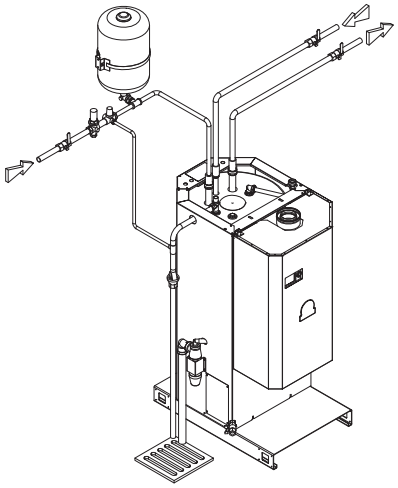
4.5 Standard delivery

4.5.1 Items included with standard package

List of standard items as part of water heater package:

- MAXXflo EVO Lite water heater
- Upper gas union (for connection to gas supply)
- Gas shutoff valve with pressure tapping point
- Tundish
- ErP energy label
- LPG conversion kit and labels
- Installation and maintenance manual
- User operation manual
- Quick start guide

4.6 Accessories and options



4.6.1 Unvented system kit

Designed to complement the heaters performance it enables the heater to be connected directly to the cold water supply and is suitable for an average sized pipework system. The kit (part number 7799195) contains the following items:

- Cold water inlet control valve (set to 3.5 bar with 6.0 PRV)
- 24 ltr Expansion vessel and wall fixings
- Continuous circulation valve (Anti-legionella device that prevents the expansion vessel becoming a dead leg)

4.6.2 Expansion module

This expansion module can be used to add additional functions to the heater and its system (for example adding the 300 litre buffer tank). A module consists of:

- 3 freely configured relay outputs
- 2 freely configured temperature sensor inputs
- 1 multipurpose input

The module kit (part number 7720070) is available from Andrews Water Heaters.

4.6.3 Return sensor kit

This strap-on temperature sensor kit is designed for mounting onto the DHW return pipe to acquire the temperature of the water flowing inside. The strap-on sensor consists of a plastic housing with a snap on cover and can be connected to a pipe having a diameter of between 15 mm and 100 mm. The Return sensor kit (part number 7720071) is available from Andrews Water Heaters.

4.6.4 Modbus communication module

Device used to enable direct two way communication with a Building Management system. This device plugs directly into the heater control PCB and translates the internal boiler protocol language into Modbus. The module kit (part number 7720069) is available from Andrews Water Heaters.

4.6.5 Web server

A device for remote plant control and monitoring via the Internet and smart phone App. Features include the following:

- Operate heater via a web browser or Smart phone App
- Visualisation of heater operation via customised web pages
- Send fault messages to a max of 4 e-mail recipients
- Display fault messages on Web or Smart phone App
- Data monitor all data points and create instant charts and graphs
- Energy indicators give clear signals when “Green limits” are exceeded

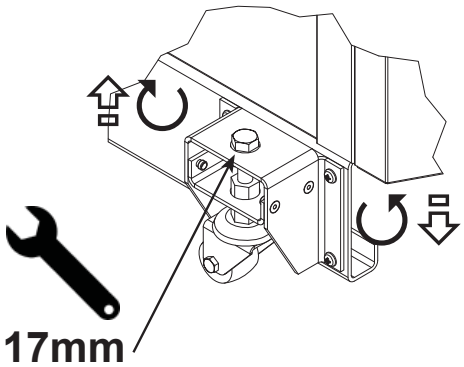
The web server kit (part number 7726955) is available from Andrews Water Heaters.

4.6.6 Anti vacuum valve

An Anti-vacuum valve must be fitted to prevent a vacuum forming in installations where there is the potential of the draw off rate exceeding the rate of flow to the inlet; this can occur in properties with multiple outlets below the base of the hot water heater. The valve contains a check cartridge which under normal conditions is held closed by the system pressure.

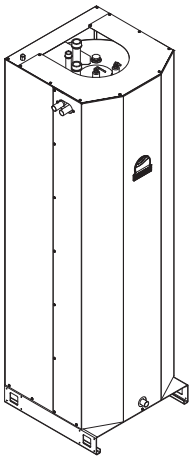
When a vacuum condition exists, the suction will cause the check cartridge to open and air to flow through, equalising the pressure within the hot water heater. The capacity of an anti-vacuum valve should be equal to or greater than the rate of the vacuum formation in the vessel being protected. An Anti-vacuum valve kit (part number 7799189) is available from Andrews Water Heaters. To assist selection, reference should be made to BS 853 cl 10.3 or to the capacities of the valve in this kit detailed below:

AIR	
Vacuum Pressure mbar	**DN15 (1/2”)**
250	2 std. litres/sec
500	3 std. litres/sec



4.6.7 Castor assembly kit

This castor assembly kit is designed for mounting onto the base corners of the MAXXflo EVO Lite water heater. It enables the water heater (whilst empty) to be raised slightly and positioned where required, without the need for a pallet truck. The Castor assembly kit (part number 7709385) is available for use with the MAXXflo EVO Lite.



4.6.8 300 litre additional storage tank

The Buffer SS300-10 (7735728) Provides hot water storage and can be installed as a single or as twin units giving up to 600 litres of additional hot water storage. Features include:

- 300 litre stainless steel tank
- Electronically controlled by water heater
- Maximum working pressure -10 bar

4.6.9 Heat exchanger flushing kit

A Heat exchanger flushing kit consists of 2x copper tails that can be fitted directly to the inlet/outlet of the heat exchanger. This allows for the heat exchanger to be flushed/descaled independantly from the tank. Each end of the copper tail offers a 22mm straight copper pipe connection that enables the engineer to connect directly onto their flushing/descaling device.

The Heat exchanger flushing kit (part number 7812352) is available from Andrews Water Heaters.

4.6.10 Maintenance kit

The maintenace kit contains the following items.

- 1x Burner door gasket
- 1x Burner door rope seal
- 4x Burner door nuts
- 1x Fan gasket
- 1x Venturi gasket
- 1x Ignition electrode/gasket/screws
- 1x Ionisation electrode/gasket/screws
- 2x Pump washers
- 2x Heat exchanger flow/return pipe connection O-rings

The Maintenance kit (part number 7812351) is available from Andrews Water Heaters.

4.6.11 Paint touch up kit

The Paint touch up kit contains four touch up paint pots that have an integral application brush, to suit all colour panels on the water heater.

The Paint touch up kit (part number 7784718) is available from Andrews Water Heaters.

5 Before installation

This heater must be installed in accordance with relevant Standard Specifications, Codes of Practice and current Building Regulations, together with any special regional requirements of the Local Authorities, Gas undertaking and Insurance Regulations for the Electrical Equipment of Buildings. The installation of this heater must be in accordance with the relevant requirements of:

5.1 Installation regulations

- Health and safety at work act 1974
- Building regulations 2010
- Electricity at work regulations 1989
- Management of health and safety at work regulations 1998
- Manual handling regulations 1992
- Model water byelaws 1986
- BS 7671 - Requirements for electrical installations, IEE wiring, regulations
- BS 5546 - Specification for the installation and maintenance of gas-fired water-heating appliances of rated input not exceeding 70kW.
- BS 7074-2 - Applications selection and Installation of expansion vessels and ancillary equipment for sealed water systems.
- CP 342:2 Code of practice for centralised hot water supply. Buildings other than individual dwellings.
- IM/11 - Flues for commercial and Industrial Gas Fired Boilers and Air Heaters
- IGE/UP/1 - Soundness Testing and Purging Procedure for Non Domestic Installations
- IGE/UP/2 - Gas Installation Pipe work, Boosters and Compressors for Industrial and Commercial Premises
- IGE/UP/10 - Installation of flued gas appliances in industrial and commercial premises.
- IGE/UP/16 - Design for Natural Gas installations on industrial and commercial premises with respect to hazardous area classification and preparation of risk assessments

Warning
These manufacturer's notes must not be taken in any way as over-riding statutory obligations.

The UKCA & CE marking documents of this heater confirms compliance with the essential requirements of the following directives or Regulations:

- Gas Appliance (GAR) Regulation 2016/426
- Ecodesign Requirements for Energy Related Products (ERP) 2009/125/EC
- Electromagnetic Compatibility (EMC) Directive 2014/30/EU
- Low Voltage (LVD) Directive 2014/35/EU
- Boiler Efficiency (BED) Directive 92/42/EEC

5.2.1 Gas supply

The installation of the gas supply must conform, to the Standards and Codes of Practice listed in Section 5.1 of this manual.

This water heater is intended to be installed only on a gas supply with a governed meter.

The gas meter, regulator and supply pipework must be sized so as to provide an adequate supply to the heater. A minimum of 17 mb gas pressure, must be available at the heater inlet, with this heater and all other appliances connected to the same gas supply, operating at maximum load.

5.2.2 Electricity supply

This heater is designed to operate from a 230V, single phase supply fused at 5 amps. Mains input cable should be at least 0.75mm^2, 3 core cable.

The method of connection to the mains electricity supply should facilitate complete electrical isolation of the heater. A fused double pole switch or fused spur box serving only the heater should be used. The point of connection and isolation to the mains electricity supply should be readily accessible and adjacent to the heater, and should be connected to the mains supply as detailed above.

5.2.3 Water quality (and treatment)

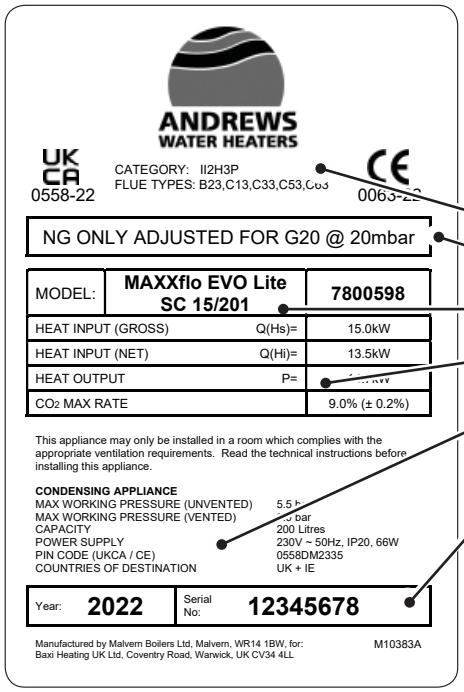
It is essential, for the long life of the appliance that the following water quality limits are not exceeded:

Tab. 13

Water Hardness	< 150 ppm
Chlorides	< 200 mg/l
Acidity	7.5 to 9.5 pH
Iron	< 0.5 mg/l
Copper	< 0.1 mg/l

In hard water areas scale formation can occur in all hot water systems. The higher the volume and hotter the water used, the greater the scale formation can be. Water treatment is usually recommended when the hardness levels measures greater than 150 ppm (7-10 degrees Clark). For this reason, base exchange water treatment is strongly recommended in hard water areas.

When installing Andrews Water Heaters in hard water areas we would recommend that a water treatment specialist is consulted



5.3.1 Checking the data plate

There is one data plate located on the heater. This is mounted on the outside of the heater (left hand side)

KEY

1 Type approval designation
2 Gas type and pressure
3 Model Name
4 Heat, gas flow & CO_2 data
5 Technical data
6 Serial number and year

5.3.2 Location requirements

This heater MUST be installed indoors and located in an area where the general public does not have access.

Caution
Keep appliance area free from combustible materials, petrol and other flammable liquid and vapours

Caution
This heater must only be installed in environments with clean combustion air. The heater should not be operated in areas where there is heavy dust e.g. During construction work.

Aggressive foreign substances in the combustion air can cause premature heater failure or damage the heat exchanger and components. Special consideration should be given to avoid locating the heater, where the combustion air is drawn from areas with high concentrations of aggressive substances. These substances could include the following but not limited to:

- Heavy dust (e.g. Sawdust, flour, laundry lint, plasterboard particles or drywall dust)
- Solvents (e.g. Paint or glue)
- Ammonia, Nitrites & Sulphides (e.g. Recycling facilities)
- Chlorine (e.g. Swimming pools)
- Alkali agents
- Halogenated hydrocarbons
- Freon (e.g. Aerosol production)
- Acids (e.g. Galvanising process)

For damages occurring due to the installation in an unsuitable location or improper combustion air supply, there can be no warranty claim.

The location selected for the installation of this heater must allow the provision of a satisfactory flue, an adequate, clean air supply, a drain and be well illuminated. The floor on which the heater is located must be level and of sufficient strength to withstand the weight of the heater when filled with water and should comply with the requirements of the Local Authority and Building Regulations.

A purpose built plant room or compartment is strongly recommended.

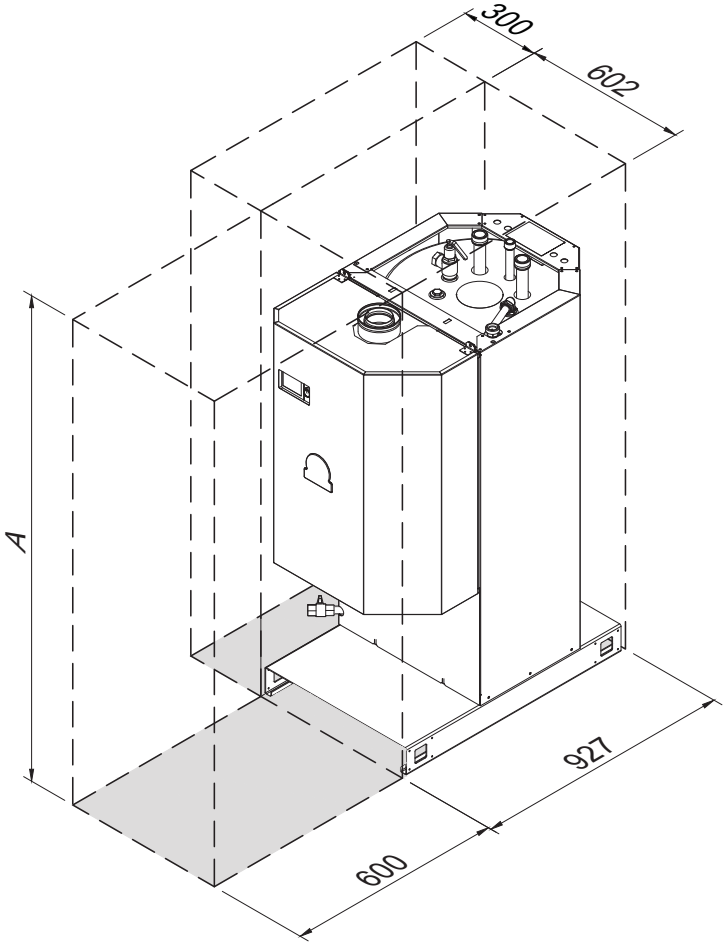
If a purpose built plant room is not available, measures should be taken to protect the heater from damage and prevent any extraneous matter from being stored on or around the heater *(refer to BS6644 clauses 4, 5 & 6 for details).* Any combustible material adjacent to the heater must be so placed and shielded as to ensure that its temperature cannot exceed 66^{O}C.

The heater must be located in a frost free area where leakage from water connections or the combined temperature and pressure safety valve will not result in damage to the area adjacent to it. Where such locations cannot be avoided, a suitable drain tray should be installed under the heater. The drain tray should be no deeper than 38mm and must be at least 100mm wider and longer than the heater. It should be piped to an adequate drain using 20mm diameter pipe, angled for proper drainage.

Access must be provided to the front, top and sides of the heater, with adequate clearance for servicing and operation (see 3.2 table 12 for minimum clearances).

Tab. 14

Unit height	Service clearance required above unit	Total height A
1453mm	400mm	1853mm



5.4 Transportation & unpacking

Inspect packaging for any signs of damage.

Any damage or shortage must be notified with Andrews Water Heaters immediately, as detailed on the warranty card.

Pry off the crate top and sides but keep it on the pallet base until the heater is moved into its permanent position. Remove the polythene cover.

To remove heater from the pallet, undo the 4x fixing bolts holding the 2x metal straps to the pallet. Move the heater from the pallet to the floor of the plant room by walking or sliding.

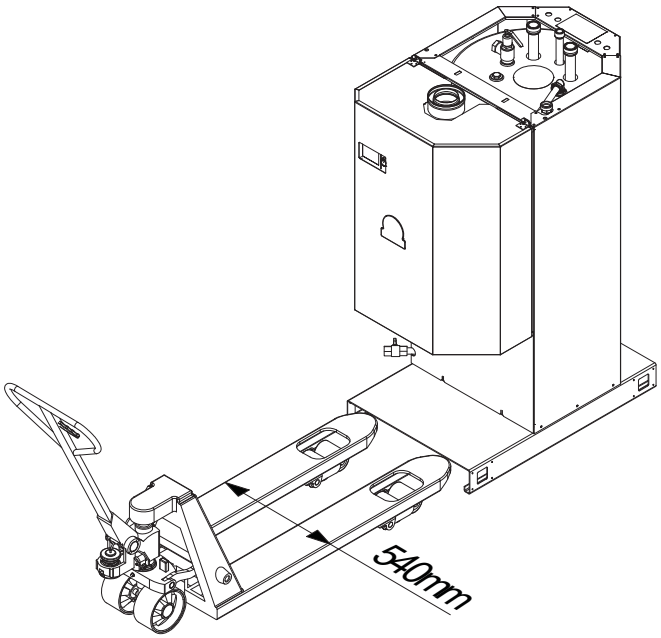
Once heater is removed from the pallet, it is possible to use a narrow pallet truck to position the heater (see section 5.5).

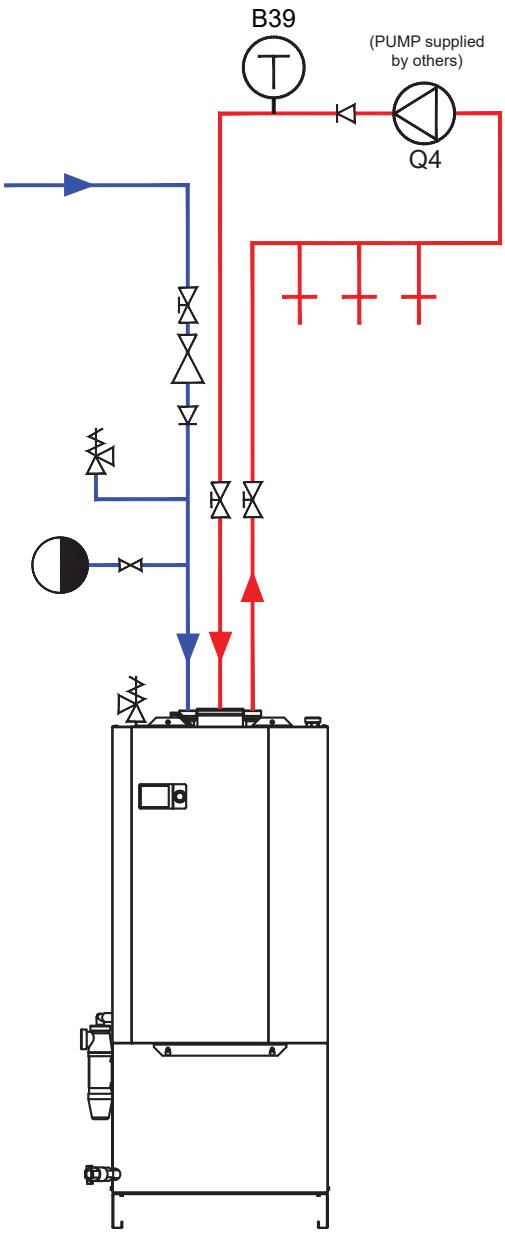
Caution
High centre of gravity - When manoeuvring, be careful to avoid tipping the heater more than 10^{O}

5.5 Positioning the heater

Once the heater is removed from the pallet, it is possible to use a 540mm narrow pallet truck (either at the front or rear of the unit) to move the heater into position inside the plant room.

A castor wheel assembly kit is available from Andrews (section 4.6.7).





5.6.1 Secondary return pump Q4

To enable this function in the MAXXflo EVO Lite controls, it is first necessary to purchase from Andrews Water Heaters the Expansion module kit (7720070).

When only circulation pump Q4 is fitted (pump supplied by others), activation of this pump is achieved via an internal time clock (time clock 5) accessible via the heater controls.

When the optional return sensor B39 is installed (kit part number 7720071), in addition to time clock control, the pump can be turned on and off according to the temperature measured at B39 pipe temperature sensor. This will ensure that a minimum circulation temperature is maintained in the return pipe system

When the anti-legionella function is activated and the B39 sensor is fitted, this sensor is used to detect when the desired anti-legionella function setpoint is reached. This ensures that the DHW tank and the entire water system achieves the setpoint required for a successful anti-legionella cycle.

When the anti-legionella function is activated and the B39 sensor is not fitted the desired anti-legionella function setpoint must be satisfied by the internal DHW tank sensor B3. Therefore, only the DHW tank will achieve a successful anti-legionella cycle.

If a secondary return circuit is fitted with a secondary pump, it is important to ensure that the flow rate of this pump does not exceed the maximum flow rate of the heater. An excessive flow in the secondary circuit can cause excessive mixing inside the DHW storage tank, resulting in stored water temperature less than the set temperature.

Recommended maximum circulation pump Q4 flow rates are as follows:

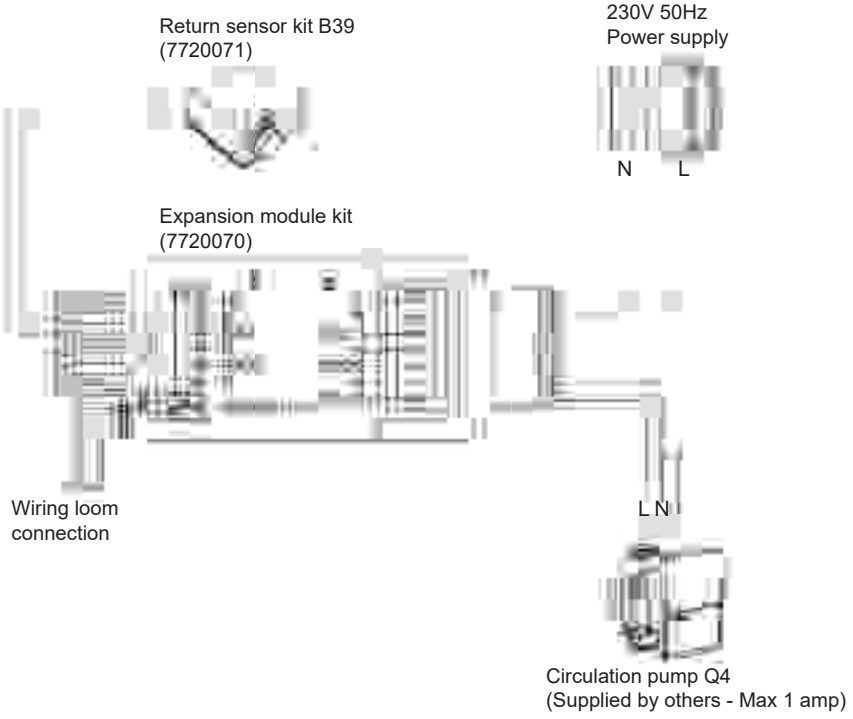
Tab. 16

Recommended maximum flow rates for secondary return circuit	
Model	Flow (ltrs/min)
SC15	8.3
SC25	18.5
SC35	18.5
SC45	18.5

It is important that the heat losses from the return system are minimised (through pipe insulation), otherwise the heater may be operating for extended periods of time on minimum load, constantly replacing the heat lost from the return system pipes.

Refer to “Controls - User Operating Instruction Manual” for further details on the Anti-legionella function.

When installing the Pump (Q4) and the optional return sensor kit (B39), it is recommended that they are wired to the inputs/outputs of the expansion module as per the illustration below:



Tab. 15

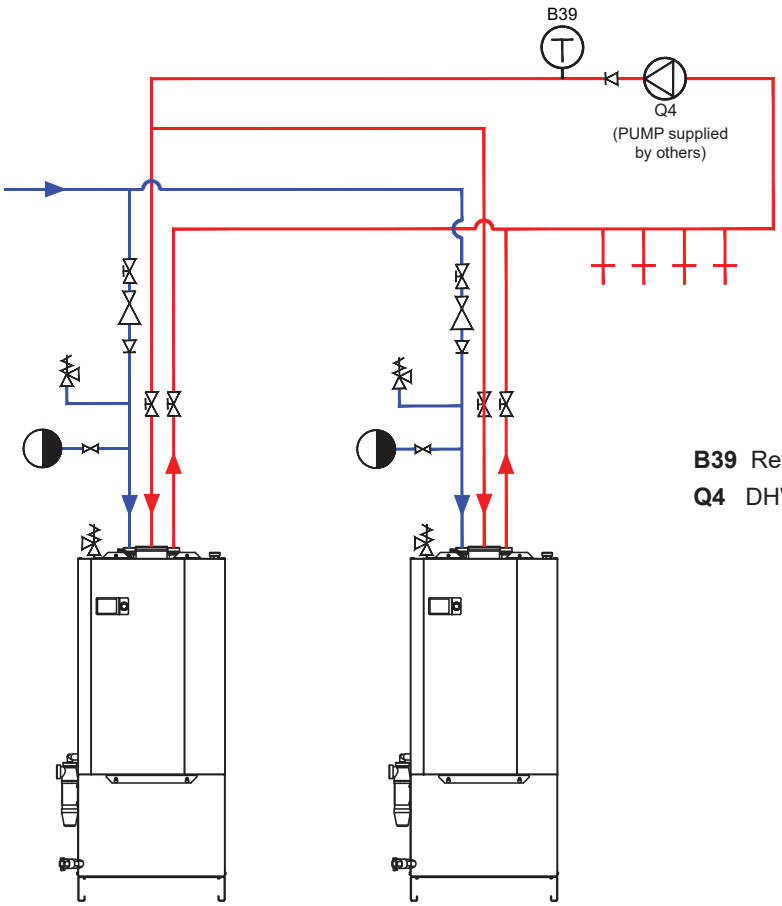
Suggested Parameter settings:

Menu	Para' No'	Suggested setting	Notes
DHW	1647	OFF	If the function is turned OFF, circulation pump Q4 will be switched OFF while the "Legionella" function is performed (anti-legionella action performed on tank only). If the function is turned ON, circulation pump Q4 is switched ON while the "Legionella" function is performed (anti-legionella action performed on DHW system).
	1660	Time program 5	The circulation pump Q4 will be subject to operation according to time program 5
	1661	OFF	When switched on, the circulation pump Q4 will cycle on and off during the activation period (on for 10 minutes then off for 20 minutes repeatedly). Where B39 sensor has been installed this function will become active only once the circulation setpoint has been achieved.
	1663	45^{O}C	When B39 sensor is installed on the DHW distribution return pipe, the heater controller will monitor the return temperature during the activation time of the circulation pump Q4. Whenever the temperature acquired by the sensor falls below the circulation setpoint, circulation pump Q4 will be active until the setpoint has been exceeded (minimum pump run time is 10 minutes). During a legionella cycle operation the temperature at the sensor can be used to adjust the dwell time, ensuring that the entire DHW system reaches the legionella setpoint for the total dwell time length set. The dwell time counter is not started until the temperature at the sensor reaches legionella setpoint.
Configuration	6020	Multifunctional	Set "Multifunctional" to be able to use the inputs and outputs of the expansion module.
	6030	DHW circulation pump Q4	Up to 1 amp at 230V can be used to activate the Secondary return pump Q4
	6040	DHW circulation sensor B39	During the activation of a legionella function, if parameter 1647 is set to ON the temperature of this sensor is used to start the dwell time/duration timer. This timer is started when the temperature at this sensor reaches legionella setpoint. *Note : If the heat losses from the return pipes are very high, the legionella function may not be able to reach the required temperature at this sensor in order to start the dwell time/duration timer. This will result in an error message "127 : DHW Legionella temperature not reached". Should this occur consider improving the insulation on the return pipes, or turning circulation pump Q4 OFF during the legionella function, or consider using the DHW Nominal setpoint and DHW reduced setpoint with the time clock to create brief daily operation periods at 70^{o}C (contact Andrews Water Heaters for further advice)*

5.6.2 Two heaters fitted in parallel

Two or more heaters can be connected together on the same water system.

The input/output for Q4 and B39 will be managed by any one of the two heaters.

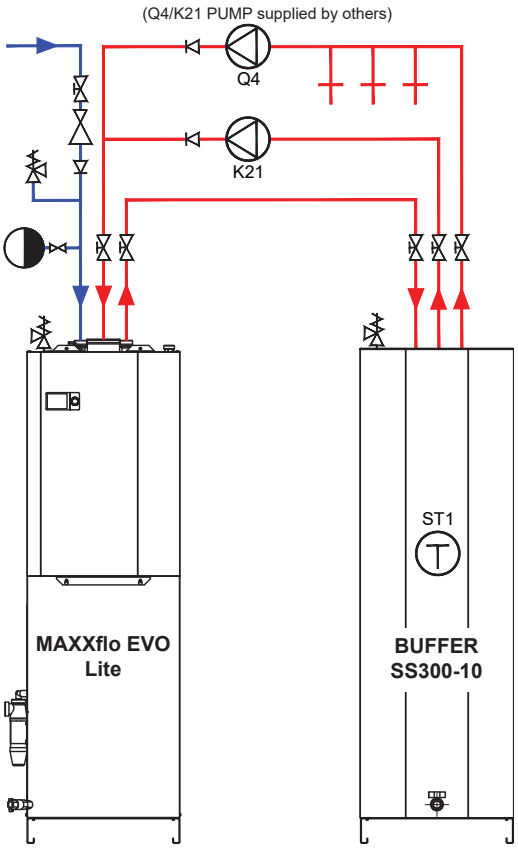


B39 Return Temperature Sensor
Q4 DHW Circulation pump (supplied by others)

5.6.3 With SS300-10 buffer tank

When a greater stored water capacity is needed for periods of peak loads the optional SS300-10 stainless steel buffer tank is recommended as it is specifically designed for this purpose.

The SS300-10 buffer tank is designed to work seamlessly with the MAXXflo EVO Lite, with the heating times and temperature only required to be set once. When the temperature setpoint of the MAXXflo EVO Lite is changed the buffer tank operation is automatically changed to support this new temperature.



Q4 Return system circulation pump (supplied by others) see 5.6.1 for details
K21 Buffer tank transfer pump (supplied by others)
ST1 Buffer tank temperature sensor (pre-fitted to Buffer tank)

Full fitting instructions are supplied with the SS300-10 buffer tank, available from Andrews Water Heaters (7735728).

6 Installation

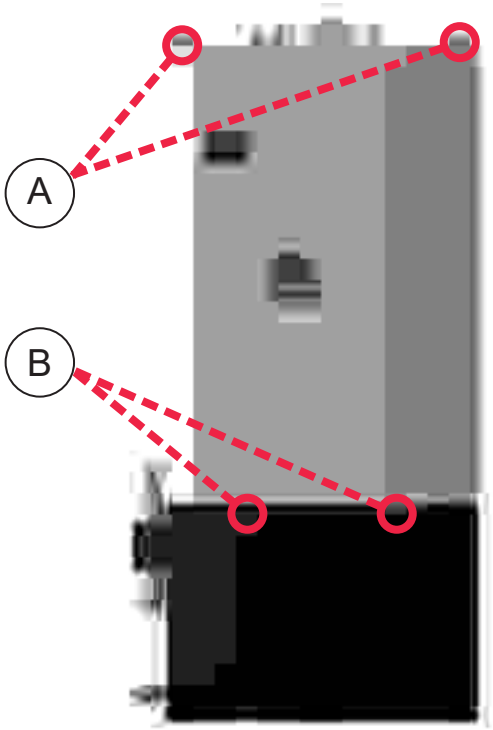
6.1 General

Caution
High centre of gravity - When manoeuvring, be careful to avoid tipping the heater more than 10^{O}

Caution
Installation of the appliance must be done by a qualified engineer in accordance with prevailing local and national regulations

6.2 Preparation

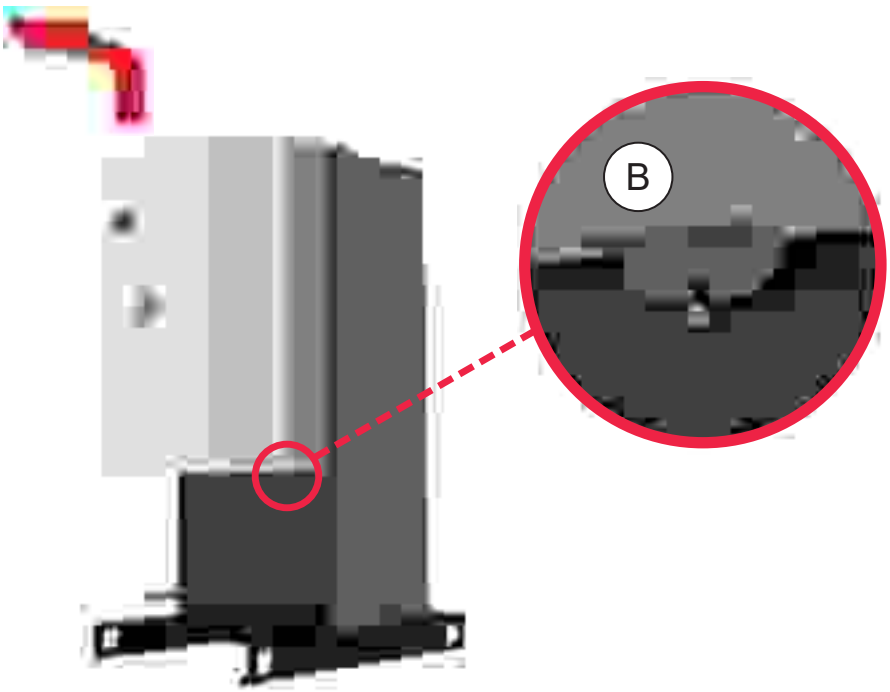
6.2.1 Front cover removal



Once the water heater is in position remove the outer cover to gain access to the internal pipework.

Remove the 2x Pozi M6 screws (A) at the top of the bulkhead.

Loosen but do not remove, the 2x Pozi M6 screws (B) at the bottom of the case. Lift the case slightly (2cm) so the 2x open slots disengage from the 2x Pozi M6 screws retained in the bulkhead. Pull the case forwards and away to remove.



6.3.1 Connecting the cold water system

The cold water inlet and hot water outlet connection nipples are identified on the top of the heater. Connect the cold water feed and hot water outlet to these nipples with union adaptors for ease of servicing.

Fit a check valve and isolator in the cold water supply before the inlet to the water heater

CAUTION
Do not apply excessive torque to these nipples when making connections. The use of an appropriate drinking water sealing compound is recommended.

The use of galvanised pipework is not recommended due to issues such as galvanic attack.

6.3.2 Water systems

The MAXXflo EVO Lite range of storage water heaters are designed to operate from a mains fed unvented water supply. An unvented system kit is available from Andrews Water Heaters. However, the heater may be connected to an open vent supply provided minimum supply pressures are satisfied.

CAUTION
When connected to a sealed or open vent water system a minimum water pressure of 1.2 bar must be maintained at all times, or damage to the heat exchanger could occur

6.3.3 Anti-vacuum valve

An Anti-vacuum valve must be fitted to prevent a vacuum forming in installations where there is the potential of the draw off rate exceeding the rate of flow to the inlet; this can occur in properties with multiple outlets below the base of the hot water heater. The valve contains a check cartridge which under normal conditions is held closed by the system pressure.

When a vacuum condition exists, the suction will cause the check cartridge to open and air to flow through, equalising the pressure within the hot water heater. The capacity of an anti-vacuum valve should be equal to or greater than the rate of the vacuum formation in the vessel being protected. An Anti-vacuum valve kit (part number 7799189) is available from Andrews Water Heaters. To assist selection, reference should be made to BS 853 cl 10.3 or to the capacities of the valve in this kit detailed in section 4.6.6.

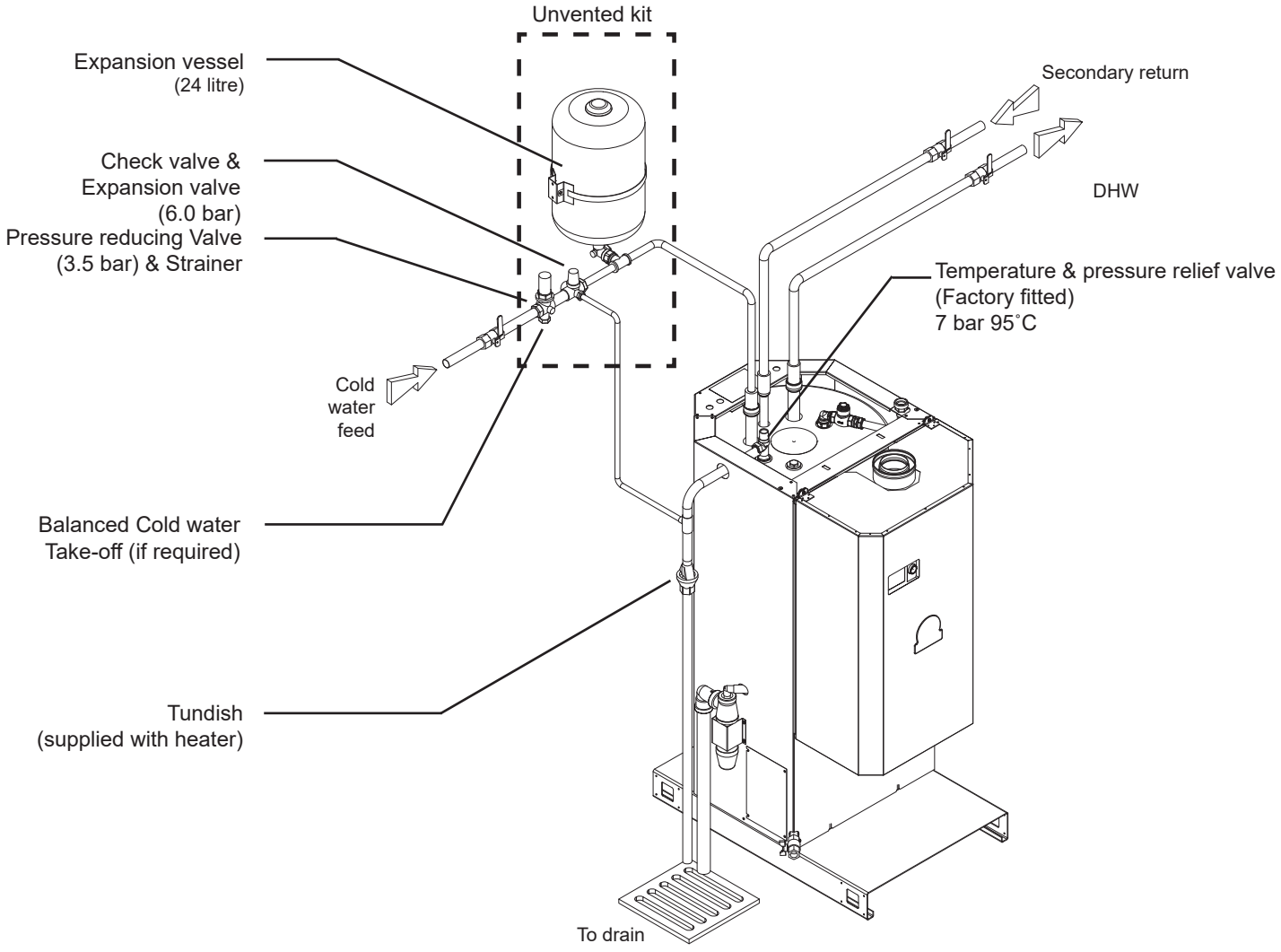
6.3.4 Unvented system

CAUTION
An unvented system **must** be fitted by an approved installer.

When using the heater on an unvented hot water storage system, the Unvented System Kit, available from Andrews Water heaters (part number 7799195) **must** be fitted. When used in an unvented system, the Heater will supply hot water at a maximum of 3.5 bar or at the pressure available at the mains feed if this is lower.

During conditions of no-flow, system pressure may rise to a maximum of 6.0 bar, whilst the burner is operating. When testing the system, it is recommended that a maximum test pressure of 7.0 bar is used.

For the hot water supply, a 24 litre expansion vessel is suitable for the stored volume of all models and an average pipework system. For systems with larger pipe volumes or additional storage, expansion vessels with greater capacity are available. Assemble the components of the unvented system kit as shown below



When fitting the Pressure Reducing Valve and Check Valve of the unvented system kit, ensure that the flow arrows marked on the components are pointing in the direction of flow, that is towards the heater.

6.3.5 De-stratification pump

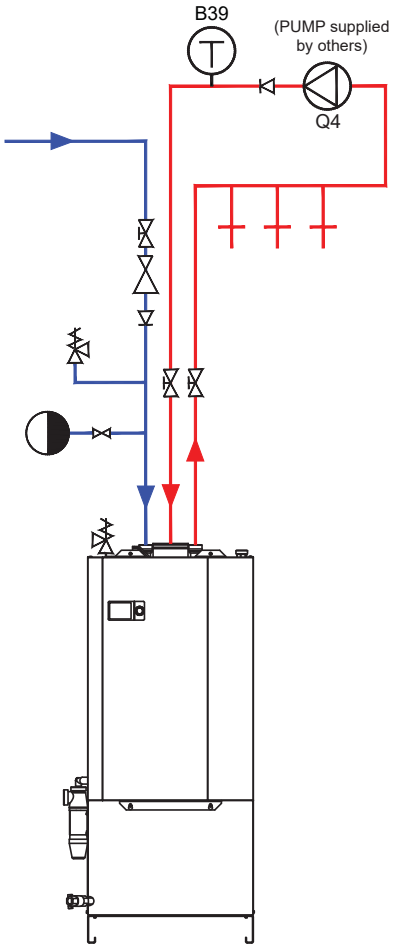
By virtue of its design, an internal DHW tank de-stratification pump is not required.

6.3.6 Pressure relief valves

The relief valves fitted to this heater must not be used for any other purpose. No fitting should be installed between the expansion valve and the cylinder.

The cold water for services may be drawn from the 22mm compression port up stream of the Pressure Reducing Valve. The water pressure at this point will be similar to that available at the hot water outlet of the water heater. If higher flow rates are required for the cold water services, a suitable tee fitting should be fitted to the pipework, upstream of the Pressure Reducing Valve.

CAUTION
All fittings and materials supplying water to the storage vessel must be suitable for use with drinking water and listed in the current Water Research Centre “Materials and Fittings Directory”. Installation of unvented hot storage water systems must comply with Part G of Schedule 1 of the Building Regulations.



6.3.7 Secondary return system

A Secondary Return circuit may be fitted to the 1” nipple at the top of the heater. In all cases, for serviceability, the recirculation pipe must be fitted with an isolation valve immediately before the connection point.

It is important that the heat losses from the return system are minimised (through pipe insulation), otherwise the heater may be operating for extended periods of time on minimum load, constantly replacing the heat lost from the return system pipes.

For a more detailed description of the setup required to operate a secondary return system using the MAXXflo EVO Lite please refer to section 5.6.1

6.3.8 Condensate connection

Condensation is formed in the normal operation of the heater and this must be continuously discharged into a drain. Given the acidity level of condense discharge (pH 3.5 - 4.5) only plastic material can be used for the discharge pipe work. A 35kW burner can produce up to 3.5 litres of water per hour, whilst at full load.

Use of 41mm plastic pipe with a drop of at least 45 mm for every metre of pipework is recommended. The trap supplied as part of the appliance can be connected into an internal drain in most cases without the requirement for an additional air break.

Any external pipework passing through a wall to the outside should be run in a minimum of 41mm diameter. External pipework should be insulated to a minimum of 13mm protection against frost and freezing temperatures. Insulation must be waterproof and UV resistant. The end of the pipe must be cut to 45^{o} and be insulated to the tip of the pipe.

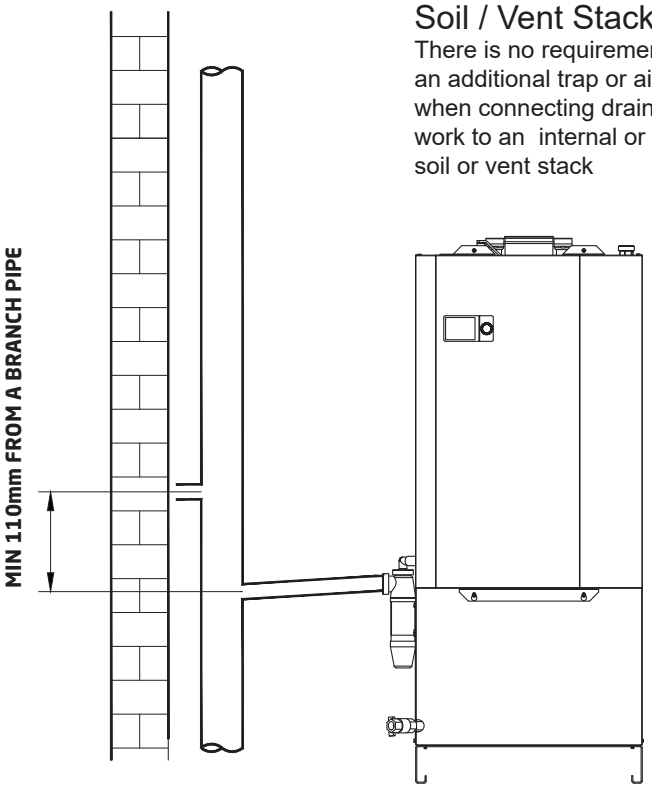
CAUTION
The condensate trap must be filled with water before operating the heater.

CAUTION
It is important that the condensate flow must be maintained, even in freezing conditions. In the event that the condensate becomes blocked, the heater will shutdown completely, and will not operate again until the flow has been restored.

Two examples of condensate connection are shown below:

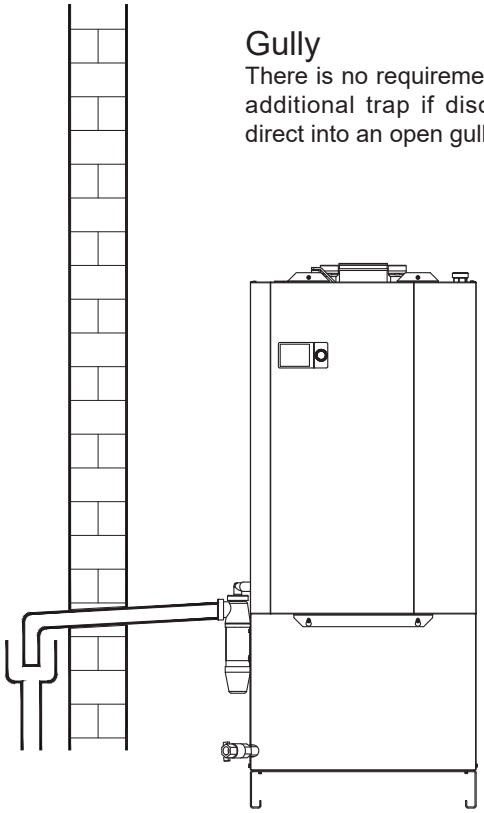
Soil / Vent Stack

There is no requirement for an additional trap or air break when connecting drain pipework to an internal or external soil or vent stack

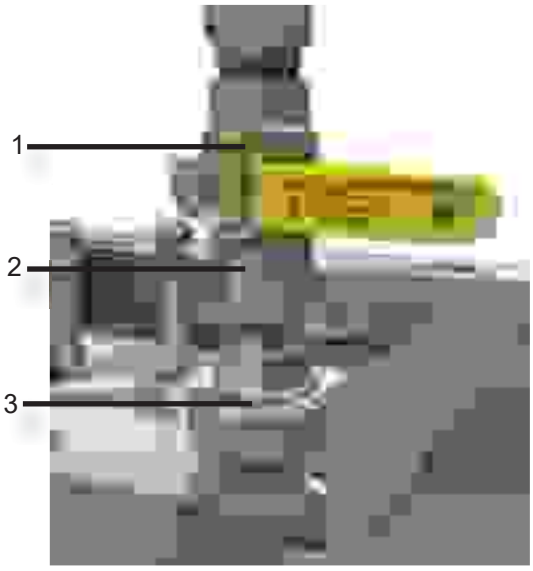


Gully

There is no requirement for an additional trap if discharging direct into an open gully.



6.4 Gas connection



6.4.1 Gas supply connections

A 3/4” BSP threaded isolation valve with inlet pressure measuring point is supplied with the heater, to provide a union connection at the top right side of the heater.

In order to ensure the gas isolation valve handle falls into the closed position, it may be necessary to remove the handle and replace it 180° from its original position.

1 Isolation valve
2 Inlet pressure tapping measurement point
3 Union connection

Where this heater is installed in a plant room or purpose built compartment, a manually operated valve must be fitted. The valve must be easily identified and readily accessible.

The gas supply pipework should be fitted with suitable unions so the heater can be safely removed for major service or repair.

Follow guidance given in IGEM - IGE/UP/1 to strength check the gas tightness of the pipe work connected to the water heater. Gas and combustion soundness within the heater should also be checked using sense of smell and leak detection fluid. Ensure gas tightness before moving onto commissioning.

Danger
The entire gas inlet pipe, particularly the joints, must be checked for leakages before commissioning

6.5 Air supply / flue gas outlet connections

6.5.1 General requirements

The installer is responsible for ensuring that the right type of flue system is used and that the diameter and length are correct. For optimal installation, the accessories supplied by Andrews Water Heaters should ensure that the correct system components are used.

The coupling and connection methods may vary depending on the manufacturer of the flue system. It is not permitted to combine pipes, coupling and connection methods from different manufacturers. This also applies to roof feed-throughs and common channels.

If connecting this heater to an older existing flue system, care must be taken to ensure that this system is of the correct size and specification. If the flue system is aluminium, a condensate trap must be fitted in the flue before it connects to the heater.

Refer to the following standards and guidance notes before installing the flue system :

BS5440 : Flues and ventilation for gas appliances of rated input not exceeding 70kW (net)

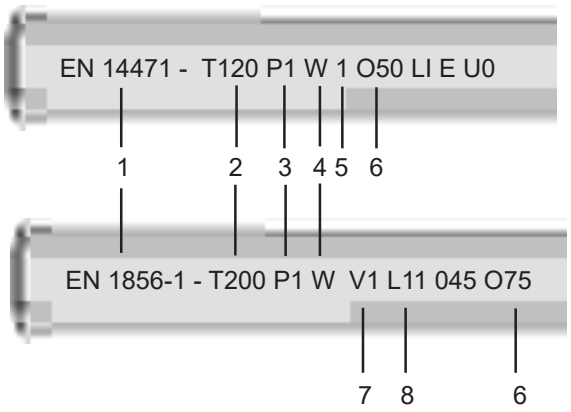
IGEM UP 10 : Installation of flued gas appliances in industrial and commercial premises

Building Regulations Part J Section 3 : Additional provisions for gas burning appliances with a rated input up to 70kW (net)

6.5.2 Material

When using a flue system that has not been supplied by Andrews Water Heaters, make sure that they are certified for the type and use. Check the text string printed on the flue system to ensure the correct materials are selected.

Example :



1. This material is CE approved to these standards
   EN 14471 for plastic flue
   EN 1856-1 for metal flue
2. Temperature rating: Class cannot be lower than T120, but can be higher
3. Pressure rating: P & H ratings are allowed, N rating is not allowed
4. Condensate resistance: Must be W (wet) rated. D (dry) rating is not allowed
5. Corrosion resistance : Classes 1 & 2 are allowed
6. Distance to combustibles: Take note of this minimum distance given here in mm when installing the flue system
7. Corrosion resistance: Must be V1 (gas combustion products) rated. V2 & V3 are not allowed
8. Material: Must be L11 minimum (Aluminium) but can be a higher value

6.5.3 B_{23} Ventilation general requirements

DANGER

Flue type B_{23} - Is an open flue appliance where air is drawn from the room or compartment in which the heater is installed and therefore the room or compartment must be ventilated to outside air. Only in exceptional circumstances can ventilation air be taken from inside (see IGEM/UP/10 section 7 for details)

DANGER

Adequate ventilation shall be provided to permit the safe operation of any appliance installed within the room or space, including other fuel-fired appliances which may be affected by the operation of this gas appliance

DANGER

Consideration shall be given to the purpose of the internal space from which ventilation is provided. The internal space should not be part of a dwelling

DANGER

The ventilation system (including mechanical ventilation) shall be designed such as not to cause the installation space to be under suction to the extent that downdraft in the chimney system could lead to a reverse flow of combustion products into the room or appliance.

DANGER

All vents must be permanent with no means of closing, and positioned to avoid accidental obstruction by blocking or flooding

CAUTION

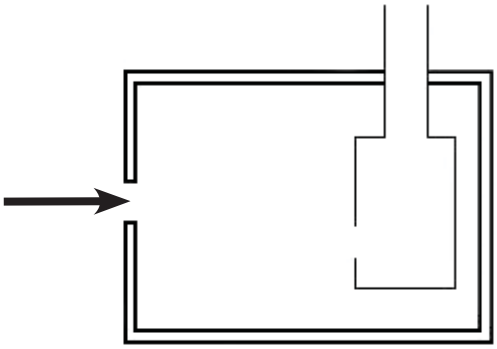
The temperature within a room, enclosure or balanced compartment, assuming ambient air conditions of 15°C shall not exceed the following temperatures:

Tab. 18

High level (100mm below ceiling level)	40°C
Mid level (1500mm from floor level)	32°C
Low level (100mm above floor level)	25°C

6.5.4 B_{23} Ventilation in a room or space

Installations in a room or space with ventilation direct to outside air require the following minimum free area of permanently open vent:

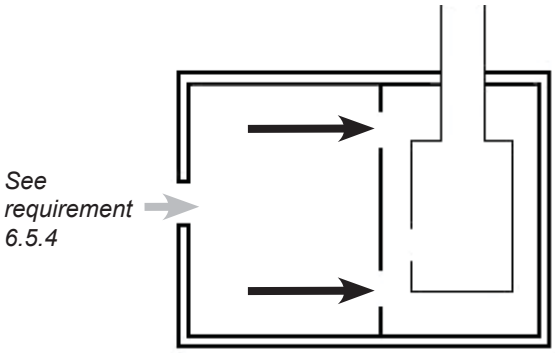


Tab. 19

Heater Model	Minimum vent free area
SC 15	65 cm^2
SC 25	110 cm^2
SC 35	155 cm^2
SC 45	200 cm^2

6.5.5 B_{23} Ventilation in a compartment via an internal adjoining space

Where in addition to the previous requirement, the heater is to be installed within a compartment, ventilated via an adjoining room or space with connection to outside air, the compartment must be ventilated at high and low level. The minimum free area of permanently open vents must be as follows:-

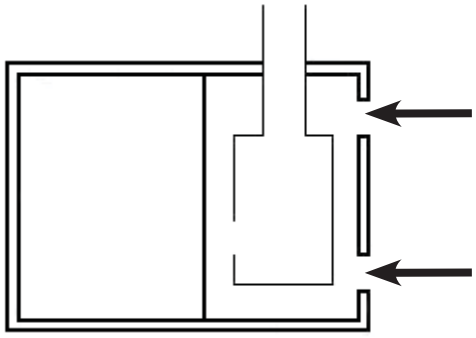


Tab.20

Minimum free vent area		
Heater Model	**Low level**	**High level**
SC 15	250 cm^2	125 cm^2
SC 25	425 cm^2	215 cm^2
SC 35	605 cm^2	305 cm^2
SC 45	790 cm^2	395 cm^2

6.5.6 B_{23} Ventilation in a compartment ventilated direct to outside

Installations within a compartment ventilated directly to outside air must be ventilated at high and low level. The minimum free area of permanently open vents must be as follows:-



Tab. 21

Minimum free vent area		
Heater Model	**Low level**	**High level**
SC 15	125 cm^2	65 cm^2
SC 25	215 cm^2	110 cm^2
SC 35	305 cm^2	155 cm^2
SC 45	400 cm^2	200 cm^2

6.5.7 B_{23} Flue terminal positions

Terminals should be so positioned as to avoid products of combustion entering openings into buildings or other flues or vents

Tab. 22 Minimum clearance

Code	Description	mm
A	Directly below an opening, air brick, opening window etc	300
B	Above an opening, air brick, opening window etc	300
C	Horizontally to an opening, air brick, opening window etc	300
D	Below gutters, soil pipes or drainpipes	75
E	Below eaves	200
F	Below a balcony or car port roof	200
G	Above ground, roof or balcony level	300
H	From vertical drain or soil pipe	150
J	From an internal or external corner or to a boundary alongside the terminal	300
K	From a terminal facing a terminal	1,200
L	Vertically from a terminal on the same wall	1,500
M	Horizontally from a terminal on the same wall	300
N	From a surface or a boundary line facing a terminal	600
P	From a opening in a carport (e.g. door, windows) into the building	1,200*
Q	Above a pitched roof	300
R	From an adjacent wall (edge of terminal) or a vertical structure on a roof	2,500
S	Above a flat roof	300
	From any other roof flue terminal	300

Not Recommended* - Risk assessment required

6.5.8 C_{13} C_{33} C_{53} C_{63} General requirements

Flue and air ducts are supplied to a concentric design and are 80/125mm flue size. See section 6.5.11 for component choices.

Terminal positions must comply with the requirements detailed in section 6.5.10

- **Flue type C_{63} -** Any terminal used must comply with the requirements of BS EN 1856-1
- **Flue type C_{53} -** Any terminal used for the separate supply of air and for the evacuation of combustion products must not be installed on opposite walls of a building
- **Flue type C_{13} & C_{33} -** If separate terminal outlets are used, they shall fit inside a square of 50cm
- **Flue type C_{63} -** Any terminal used must comply with the requirements of BS EN 1856-1

CAUTION
Any terminal must be fitted with a guard if less than 2m above ground level or if it is in a position where it may cause harm to persons as a result of touching a hot surface.

Ensure the inner flue section is sealed at all joints. For ease of assembly, it is recommended that a small quantity of petroleum jelly is used to lubricate each flue seal, before fitting flue sections together.

Care must be taken to avoid long horizontal runs of flue duct and continuous discharge of condensate from a horizontal flue terminal. Ensure that the flue slopes back by 3^{O} towards the heater

6.5.9 C_{13} C_{33} C_{53} C_{63} Ventilation requirements

Where the heater is installed in a **DEDICATED PLANT ROOM** or **COMPARTMENT** no additional ventilation should be required, provided the following ambient conditions are not exceeded:

Tab. 23

Air humidity	93% RH @ 25 ^{O} C
Ambient temperature (1.5m from floor level)	32 ^{O} C

Where the room sealed heater is installed in a boiler room with an air change rate >0.5 changes per hour, no additional ventilation is required.

If the air change rate is less than 0.5 changes per hour, ventilation must be provided at low and high levels. The minimum permanent free vent area is as follows:-

Tab. 24

Model	Min free area of high & low vent
SC 15	40 cm^2
SC 25	65 cm^2
SC 35	95 cm^2
SC 45	125 cm^2

6.5.10 C_{13} C_{33} C_{53} C_{63} Flue terminal positions

Terminals should be so positioned as to avoid products of combustion entering openings into buildings or other flues or vents

Tab. 25 Minimum clearance

Code	Description	mm
A	Directly below an opening, air brick, opening window etc	300
B	Above an opening, air brick, opening window etc	300
C	Horizontally to an opening, air brick, opening window, door	300
D	Below gutters, soil pipes or drainpipes	75
E	Below eaves	200
F	Below a balcony or car port roof	200
G	Above ground, roof or balcony level	300
H	From vertical drain or soil pipe	150
J	From an internal or external corner or to a boundary alongside the terminal	300
K	From a terminal facing a terminal	1,200
L	Vertically from a terminal on the same wall	1,500
M	Horizontally from a terminal on the same wall	300
N	From a surface or a boundary line facing a terminal	600
P	From a opening in a carport (e.g. door, windows) into the building	1,200*
Q	Above a pitched roof	300
R	From an adjacent wall (edge of terminal) or a vertical structure on a roof	300
S	Above a flat roof	300
	From any other roof flue terminal	300

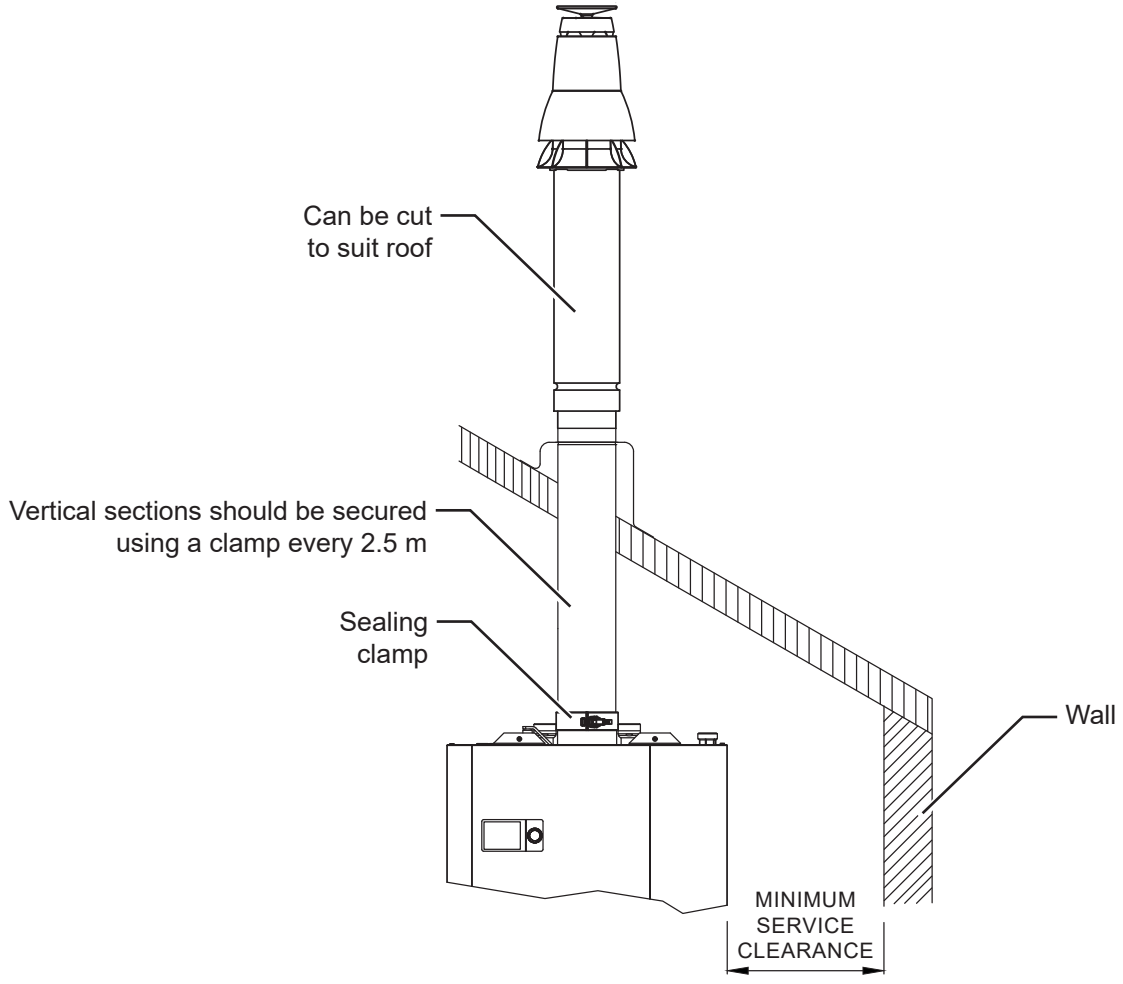
Not Recommended* - Risk assessment required

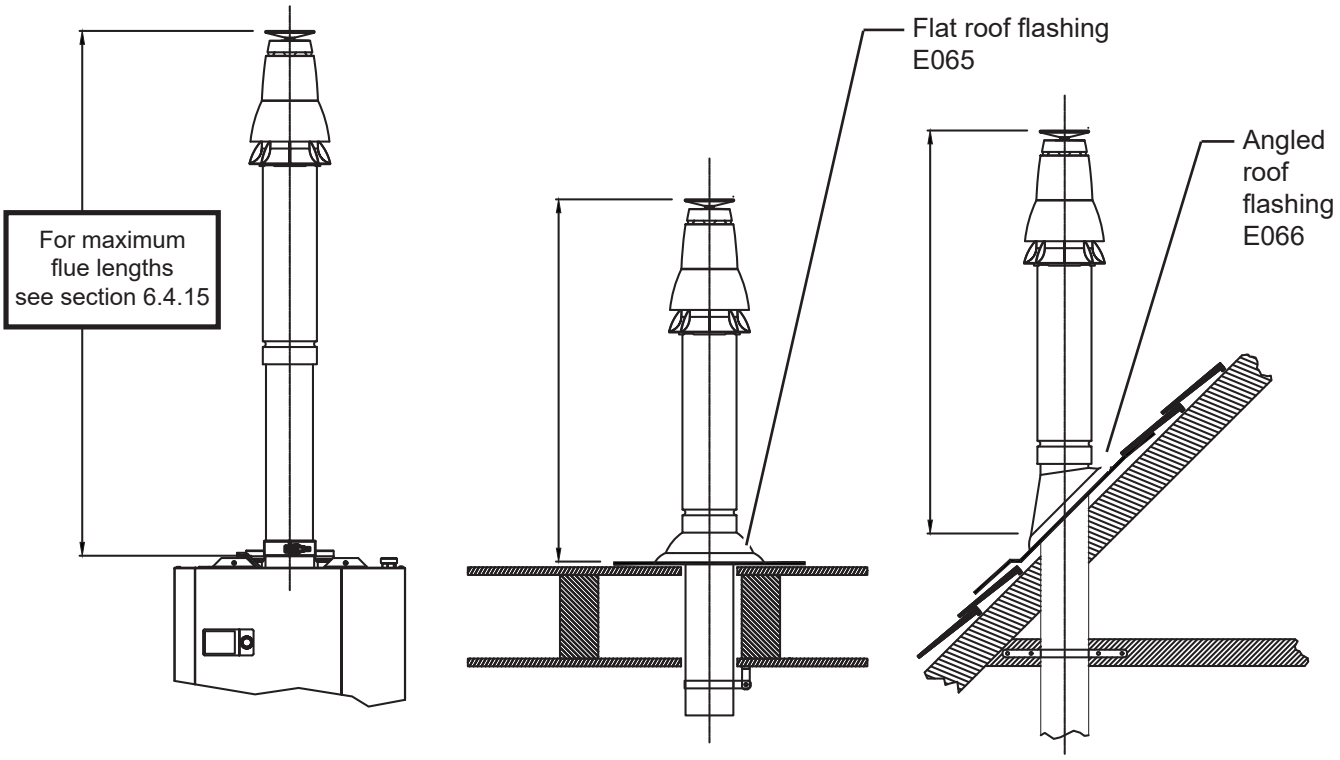
6.5.11 Flue parts available

Tab. 26

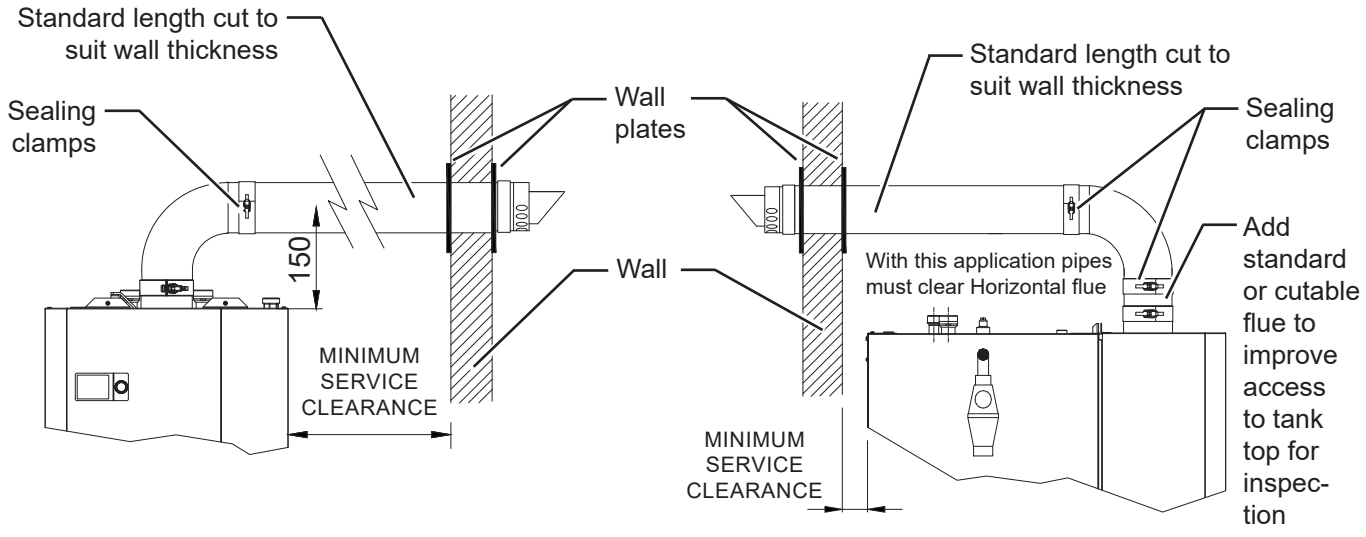
Part number:	Flue Kits - Description
5103917	VERT FLUE KIT PP 80/125 INC. SUPPORT BRACKET CLAMP & SEAL
7726957	HORIZ FLUE KIT HORIZ FLUE KIT PP 80/125 INC. ELBOW & WALL COVER PLATES
Part number:	**Optional Flue Parts - Description**
5136148	80/125 1 METER CUTABLE EXT.
5136150	80/125 45 deg ELBOW 45˚ FLUE ELBOW
5136151	80/125 87 deg ELBOW 90˚ FLUE ELBOW
5136152	125 WALL BRACKET
5136154	125 LOCKING CLAMP
5136155	80/125 FLUE SEAL FLUE
7726982	FLUE CONDENSE TRAP
E065	FLAT ROOF PLATE WEATHER SLATE
E066	ANGLED ROOF PLATE WEATHER SLATE
E105	16” x 16” x 7” STAINLESS GUARD
E211	CONDENSATE BOTTLE PP H150
E261	CONDENSATE SYPHON CONNECTION

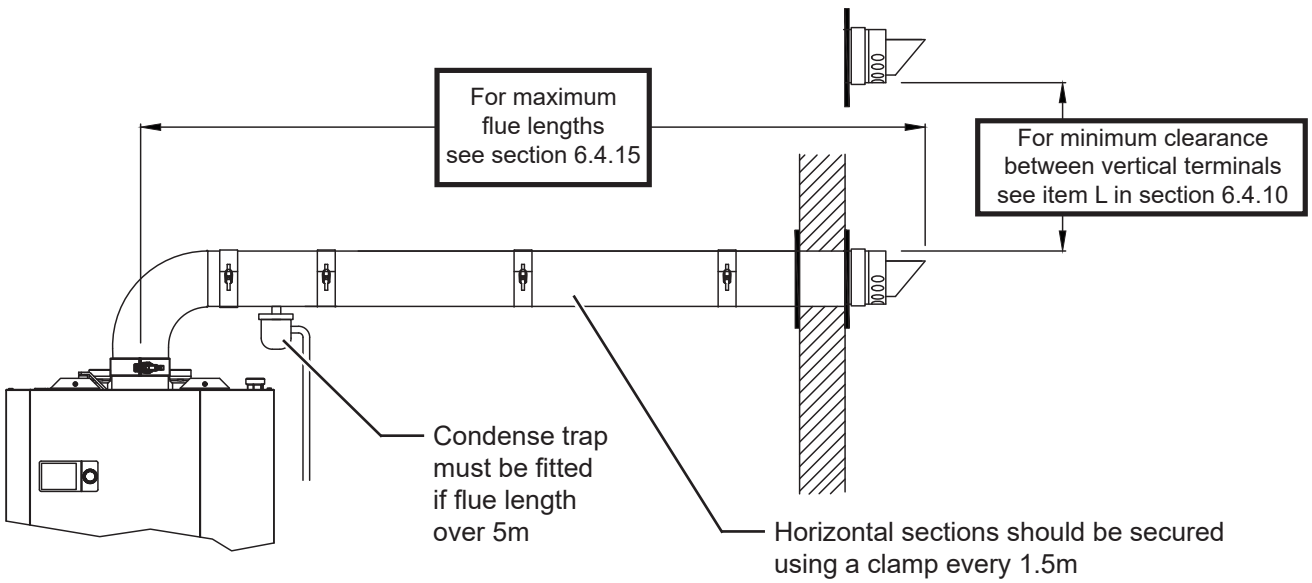
6.5.12 Vertical flue set up



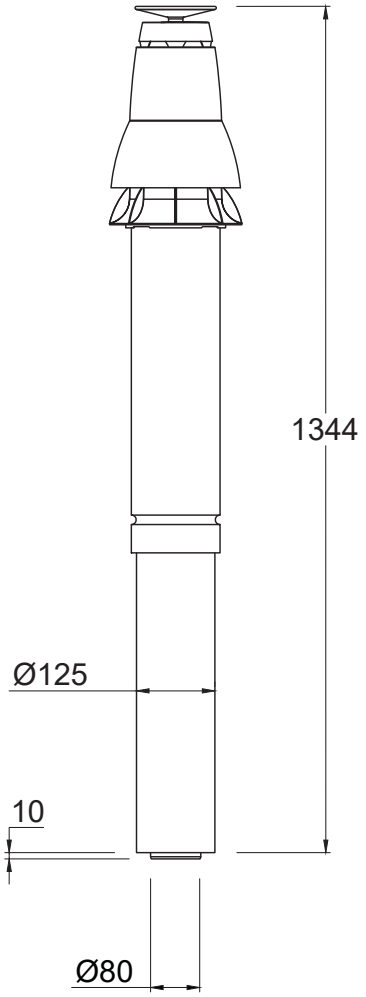


6.5.13 Horizontal flue set up

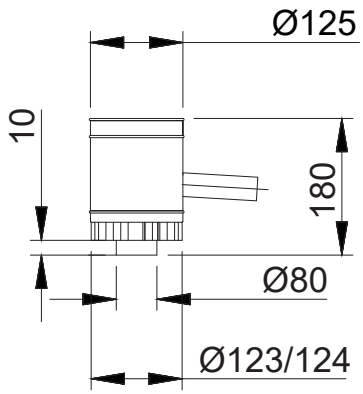




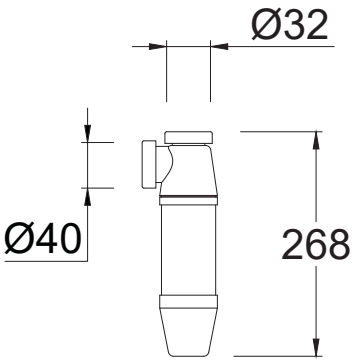
Vertical flue terminal
inc. Clamp
Part no 5103917



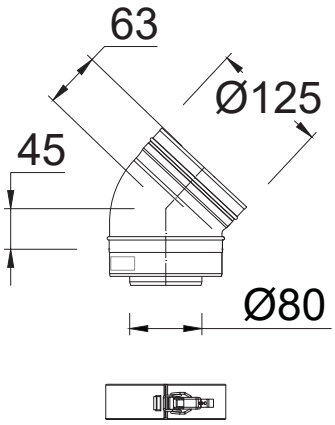
Flue condensate trap
Part no 7726982



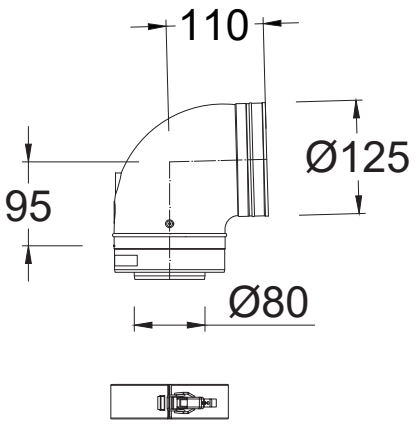
Condensate trap
Part no E211



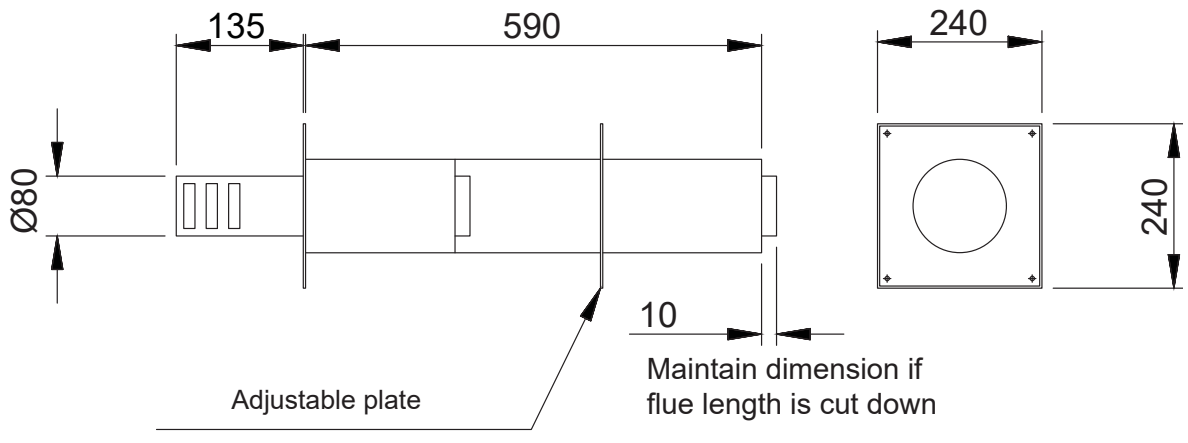
45^{O} Elbow inc. Clamp
Part no 5136150



90^{O} Elbow inc. Clamp
Part no 5136151



Horizontal terminal inc. Wall plates & 90^{O} elbow
Part no 7726957



6.5.15 Maximum flue lengths

Flue Equivalent Length (FEL) for type B_{23} flue = 40 m
Flue Equivalent Length (FEL) for type C_{13} C_{33} flue = 20 m
Flue Equivalent Length (FEL) for type C_{53} flue = 35 m
Maximum number of 45^{O} or 90^{O} bends = 5

The flue duct can discharge either vertically or horizontally by selection of the correct flue terminal. The flue system can be fitted with 90^{O} and 45^{O} bends, as well as extensions.

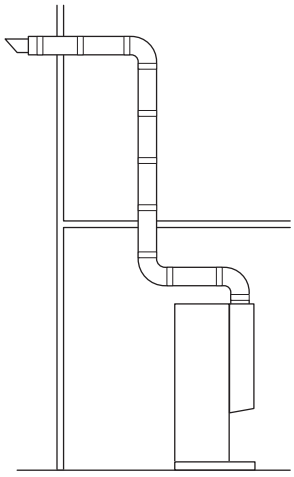
Each flue accessory such as bends and straight lengths restrict the flue system and have a Flue Equivalent Length (**FEL)** which must be added together to determine the total. Referring to the table below, select a suitable flue system for the particular installation requirement and then calculate the **FEL** of the system, this must not be greater than that stated above. Note: The FEL values below are typical values. Always check with the flue supplier for exact values.

Tab. 27

FLUE PARTS 80mm	**F.E.L (B23 TYPE)**
1.0 m Length	1.0 m
0.5 m Length	0.5 m
90° Bend	4.0 m
45° Bend	1.5 m
Vertical Terminal kit	2.0 m
Horizontal Terminal kit	1.5 m
Flue Condense Trap	4.0 m
Terminal Guard	N/A
Wall Clamp 80mm	

Tab. 28

FLUE PARTS 80 / 125mm	**F.E.L (C13, C33 TYPE)**
1.0 m Concentric Length	1.0 m
0.5 m Concentric Length	0.5 m
Concentric 90° Bend	1.2 m
Concentric 45° Bend	0.8 m
Vertical Terminal kit	1.6 m
Horizontal Terminal kit	1.0 m
Flue Condense Trap	1.5 m
Terminal Guard	N/A
Wall Clamp 125mm	



Example C_{33} : A flue system that uses six straight lengths, three 90° bends and a horizontal terminal.

6 x 1m straight lengths	6.0 m
3 x 90° bends	3.6 m
1 x Horizontal Terminal	1.0 m
Total (within 20m limit)	**10.6 m**

6.6 Electrical connections

6.6.1 General requirements

External wiring to the heater must be installed in accordance with current Regulations for the wiring of buildings and to any Local Regulations that may apply.

This heater is designed to operate from a 230V, single phase supply fused at 5 amps. Mains input cable should be at least 0.75mm^2, 3 core cable.

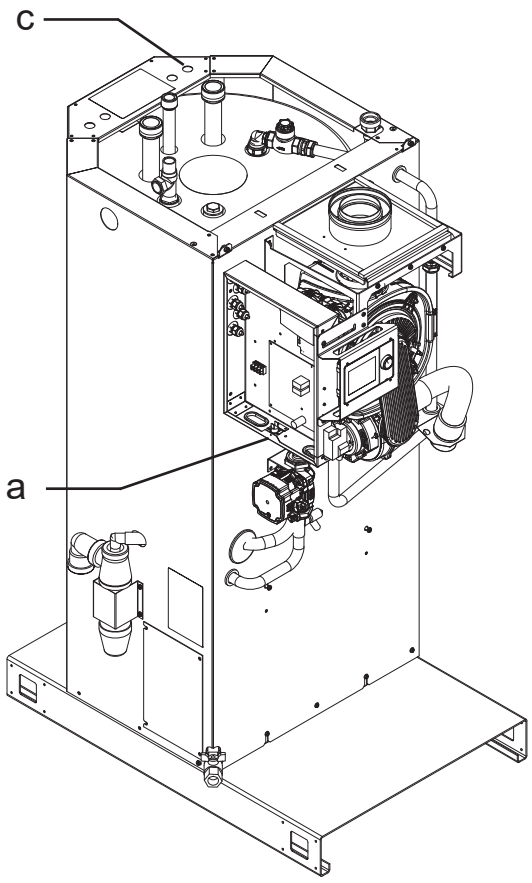
The method of connection to the mains electricity supply should facilitate complete electrical isolation of the heater. A fused double pole switch or fused spur box serving only the heater should be used. The point of connection and isolation to the mains electricity supply should be readily accessible and adjacent to the heater, and should be connected to the mains supply as detailed above.

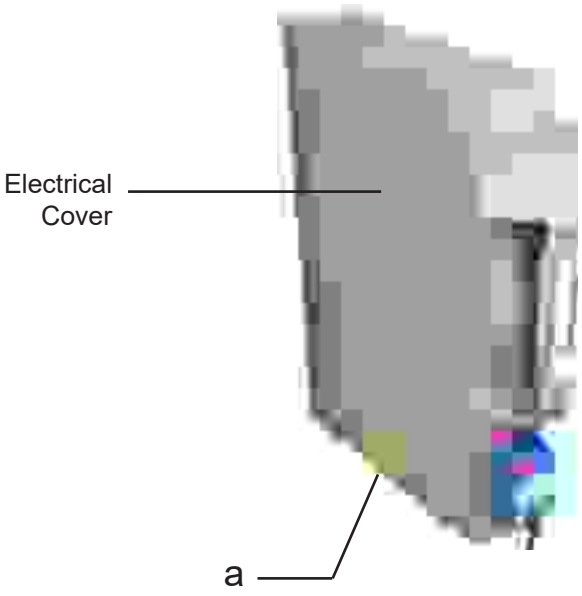
CAUTION
Isolate the mains electrical supply to the heater before starting any work and observe all relevant safety precautions

WARNING
This heater **MUST** be earthed

6.6.2 Terminal connections

To access the wiring terminal connections remove the heater cover (see 6.2.1). Loosen but do not remove the securing screw (a) for the electrical enclosure cover. The cover can be lifted and removed leaving the screw in place. A wiring diagram is located on the inside of the enclosure cover.





Inside the electrical enclosure at the top is the location for the fused terminal strip (c) for installer wiring.

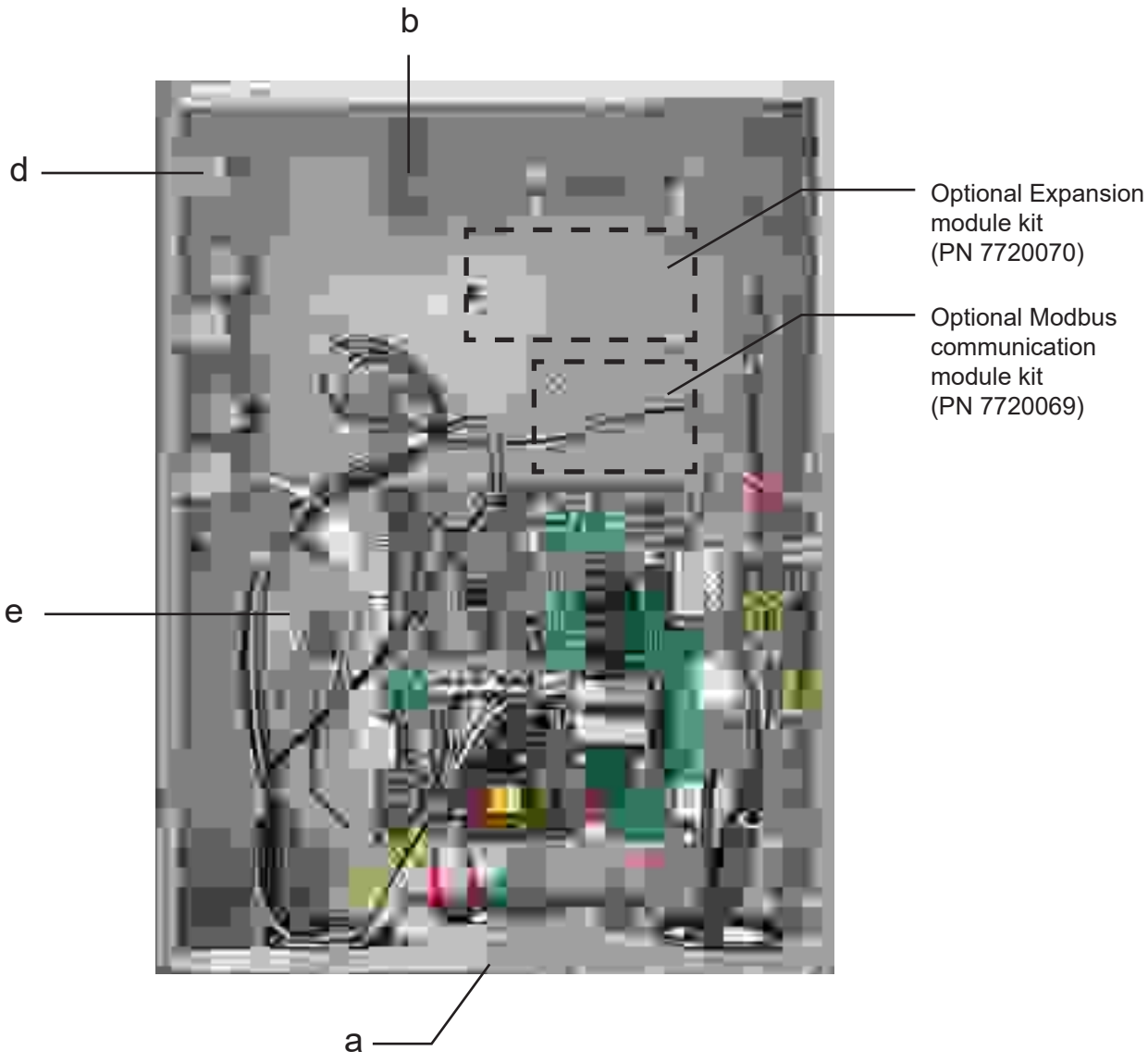
For cable entry to the heater there are 4x plain holes (c) located on the top of the heater which can be used for DN20 cable glands (not supplied).

Cables must be supplied to the electrical panel via one of the spare cable glands (d) located in the bulkhead. Loosen the gland clamp then remove the rubber sealing tube. Feed the cable through the gland and secure the cable to the required terminals, routing the cables to avoid cable strain. Retighten the cable gland so that a seal is maintained through the bulkhead.

A secondary wiring terminal (e) exists for **COMS** & **REMOTE ENABLE** connections.

COMS - BSB (Boiler System Bus) is the communication system of the heater, which can be used by the optional OZW672 Web Server, to provide access to the heater via the Internet or mobile phone app.

REMOTE ENABLE - Volt free. A loop of wire is pre-installed and this will need to be removed, when installing BMS activation wiring.



6.6.3 BMS connections - Basic

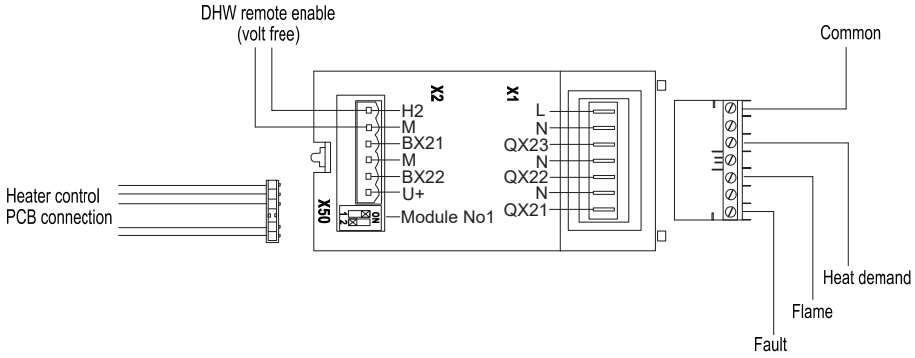
This heater has communication connections, which can be used for a Building Management System, web server or expansion of inputs/outputs.

Basic BMS connection (Fault, Operation signal & remote enable)

Clip the Expansion module into the 3 chassis holes provided and connect the ribbon cable to the bottom left (see section 6.6.2 for location illustration).

Using the live input as the common terminal voltages from 0 to 230V can be passed through the relay. Do not exceed 1A current at 230V.

Example wiring configuration



Tab. 29 Example control settings

Menu	Parameter	Settings	Notes
Configuration	6020 Function extension module 1	Multifunctional	AGU2.5 expansion module can be freely configured
	6030 Relay output QX21 module 1	Alarm output K10	When a fault occurs the relay contacts will close
	6031 Relay output QX22 module 1	Status information K36	When burner operation is confirmed the relay contacts will close
	6032 Relay output QX22 module 1	Heat request K27	When the internal controls demand heat the relay contacts will close
	6046 Function input H2 module 1	Operation mode changeover DHW	Remote enable of DHW function (on/off)

6.6.4 BMS connections - Modbus

Modbus - Is a BMS language protocol which BMS systems can interface with, either directly or through a gateway. Parameter values can be read and written directly to the water heater controller.

Install the modbus device according to the instructions (see section 6.6.2 for location illustration).

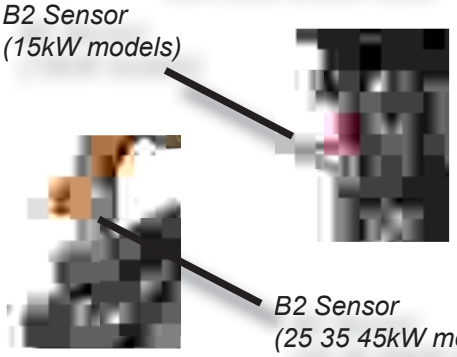
Modbus settings:

Menu	Parameter	Settings
Modbus	6651 Slave address	If connecting more than one device to the Modbus network, each heater must have its own unique slave address.
	6652 Baud rate	All devices in the Modbus network must have the same rate of transmission. The higher the transmission rate the shorter the lines between the devices has to be (doubling the baud rate halves the cable lengths). Recommended baud rate with a cable of less than 500m length “19,200”
	6653 Parity	All devices in the Modbus network must have the same parity. Recommended setting “Even”
	6654 Stop bit	All devices in the Modbus network must have the same number of stop bits (1 or 2). If 2 stop bits are set, then parity must be set to none. Recommended setting is “1”

BSB (Boiler System Bus) - Is the communication system of the water heater, which is used to send and receive information from the other controllers (if fitted) and can be used by the optional Siemens OZW672 Web Server, to provide access to the heater via the Internet or mobile phone app. Please contact Andrews Water Heaters for further advice.

Tank drain shutoff valve

B2 Sensor (15kW models)



B2 Sensor (25 35 45kW models)

Free pump here

6.7.1 Filling the condensate trap

Once the heater is in its final location and connected up to the condensate drain. It is important before commencing commissioning to fill up the condensate trap.

Carefully pull the blue elbow from the top of the condensate trap and fill the trap with water until water flows out of the drain pipe. Check that there are no leaks from the bowl at the bottom of the trap. Tighten the bowl by hand if necessary.

Replace the blue elbow into the top of the condensate trap when completed.

6.7.2 Filling the system & removal of air

In order to ensure safe removal of air from the hot water system, please perform the following actions:

1. Check that the tank drain valve is closed.
2. If the heater is connected to a hot water recirculation system, open the isolation valve immediately before the connection point to the tank.
3. Turn on all hot water outlets.
4. Turn on the cold water supply and fill the DHW tank.
5. Close each hot water outlet when water is discharged.
6. After initial filling, open each hot water outlet in succession and check that all the air is vented from the system.
7. Check for leaks inside and outside of the heater.
8. Turn on power to the heater and operate the circulation pump by unplugging the wiring from the front flow temperature sensor (B2) of the heat exchanger. This will automatically operate the pump (see note below if there is no sound of pump operation)
9. Continue to operate the pump until the sound of air in the system has diminished.
10. Replace the flow temperature sensor (B2) wiring and reset any lockout errors on the front display before continuing.

Important
If the pump does not appear to be rotating (no sound of air when the pump is first turned on), place a cross head screw driver into the hole at the centre of the pump head. Push the screwdriver inwards and turn to free the pump.

CAUTION
It is ESSENTIAL that all air is removed from the heater before proceeding with commissioning the burner, otherwise permanent damage may occur to the heat exchangers and this damage is not covered *by warrantee.*

7 Commissioning

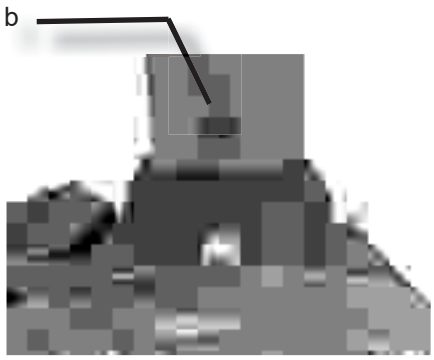
7.1 General

Danger
Commissioning should only be carried out by an approved installer. Failure to correctly install this heater could cause injury to persons or damage to property.

Caution
The gas mixture and burner off-set gas rate (minimum load rate) is preset by the manufacturer. Please DO NOT attempt to change the settings of the off-set governor behind the sealed cover (a).

Note
The burner of this heater has been tested and set by the manufacturer, but this will need to be checked again when the heater has been fully installed into its operating environment. The commissioning process involves the operation of the burner at the maximum possible heat load.

7.2 Commissioning Procedure

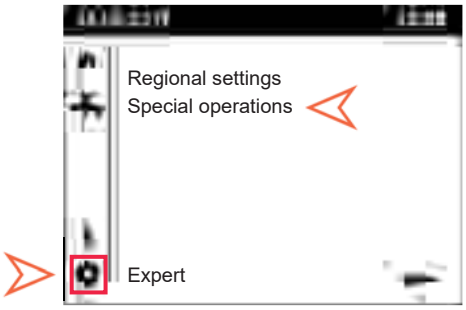


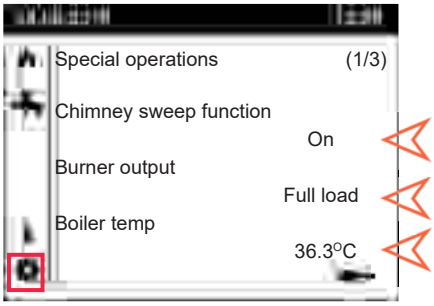
7.2.1 Preparing the burner

Ensure that all of section 6.7 “Filling the installation” has been completed successfully before proceeding with the following:

1. Remove the front cover, if not already removed (see 6.2.1).
2. Turn on power supply.
3. Access flue sample test point (b), careful to not pull on any wires when removing or replacing the sample point plug.
4. Insert a calibrated analyser sample probe (approximately 65mm) inside the flue sample test point.
5. Turn on gas supply.

7.2.2 Activate chimney sweep function





Using the control screen situated on the front face of the heater, perform the following actions to operate the burner:

1. Rotate thumb wheel clockwise to scroll down to the “setup” screen.
2. Press thumb wheel to select (or enter) the “setup” page.
3. Rotate thumb wheel to select “special operations”, then press thumb wheel to enter.
4. Rotate thumb wheel to highlight “off”, below “Chimney sweep function”.
5. Press thumb wheel and rotate to change the setting to “On”.
6. Press thumb wheel to activate the Chimney sweep function.
7. Burner output should be at “Full load”, but if it is not, use the thumb wheel to select and change the value to “Full load”. Activate the change by pressing the thumb wheel.
8. The burner should now start it’s ignition sequence, which is commenced with the activation of the pump and burner fan. The burner after ignition will proceed to maximum rate.

Important
The boiler flow temperature is visible at the bottom of the screen. In order to maintain maximum burner input, ensure that this temperature does not exceed 70°C, as the burner may begin to automatically reduce its input. Open DHW outlets to reduce this temperature if necessary.

7.2.3 Checking the CO^2 rate

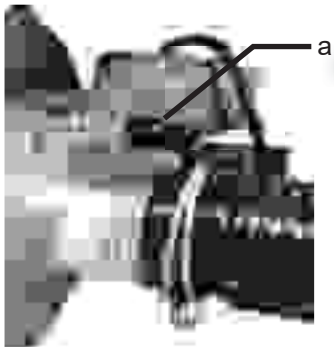
If this is the first time that the burner has been operated, allow for several ignition attempts, whilst the gas pipework is being purged of air. It may be necessary to reset the ignition fault code using the thumb wheel of the control screen.

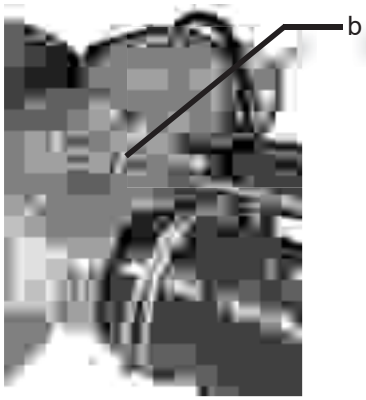
Once ignition is successful, allow the burner to fully warm up before checking the combustion. The burner will normally be fully warmed up after 3 - 5 minutes.

With the sealed cover in place and stable figures taken from the flue gas analyser, compare the readings with the following table:

Models	Maximum expected CO (+/- 25 ppm)	Target CO^2 (Variance allowed)
SC15	25ppm	9.0% (+/- 0.2%)
SC25	30ppm	
SC35	55ppm	
SC45	90ppm	

7.2.4 Adjusting the CO^2 rate

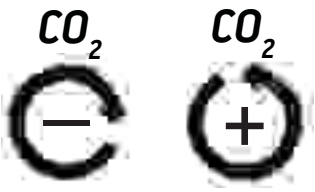




If the CO^2 readings taken from the gas analyser are within the values given in the table of section 7.2.3, then no adjustment is necessary

If adjustment is required perform the following tasks:

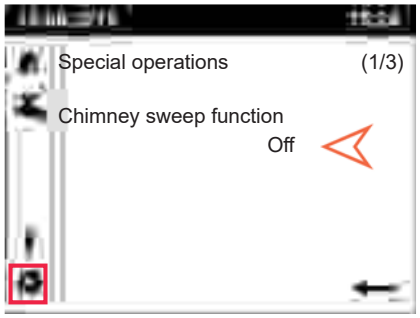
1. Remove the gas valve throttle cover (a).
2. Insert a 4mm allen key or medium flat blade screw driver to adjust (b)
3. Make adjustments in small increments (no more than 1/8 of a full rotation).



4. Wait one minute between adjustments.
5. Remove the gas analyser and replace the flue sample point plug (see 7.2.1).
6. Replace the throttle adjustment screw cover (a).
7. Replace the front cover of the heater and secure the cover using the 4 screws.

CAUTION
If you are experiencing CO readings that exceed 200 ppm after 20 minutes of burner operation. Check that you have followed these instructions correctly and check that your gas analyser is functioning correctly. Contact Andrews Water Heaters on the customer support number given on the rear cover of this manual, for advice.

7.2.5 Checking the gas rate



Check the gas input rating of the heater using the following table:

Tab. 32

	G20 GAS (38.8 MJ/m³)
	Metric meter
Model	*Time taken to consume 0.1m³ of gas*
SC15	4m 10s (+/- 13s)
SC25	2m 30s (+/- 8s)
SC35	1m 48s (+/- 5s)
SC45	1m 25s (+/- 4s)

Contact Andrews Water Heaters for advice if the gas input rating is outside the values given in the table above.

Combustion can also be tested at minimum gas rate by setting burner output to “minimum load” (see 7.2.2)

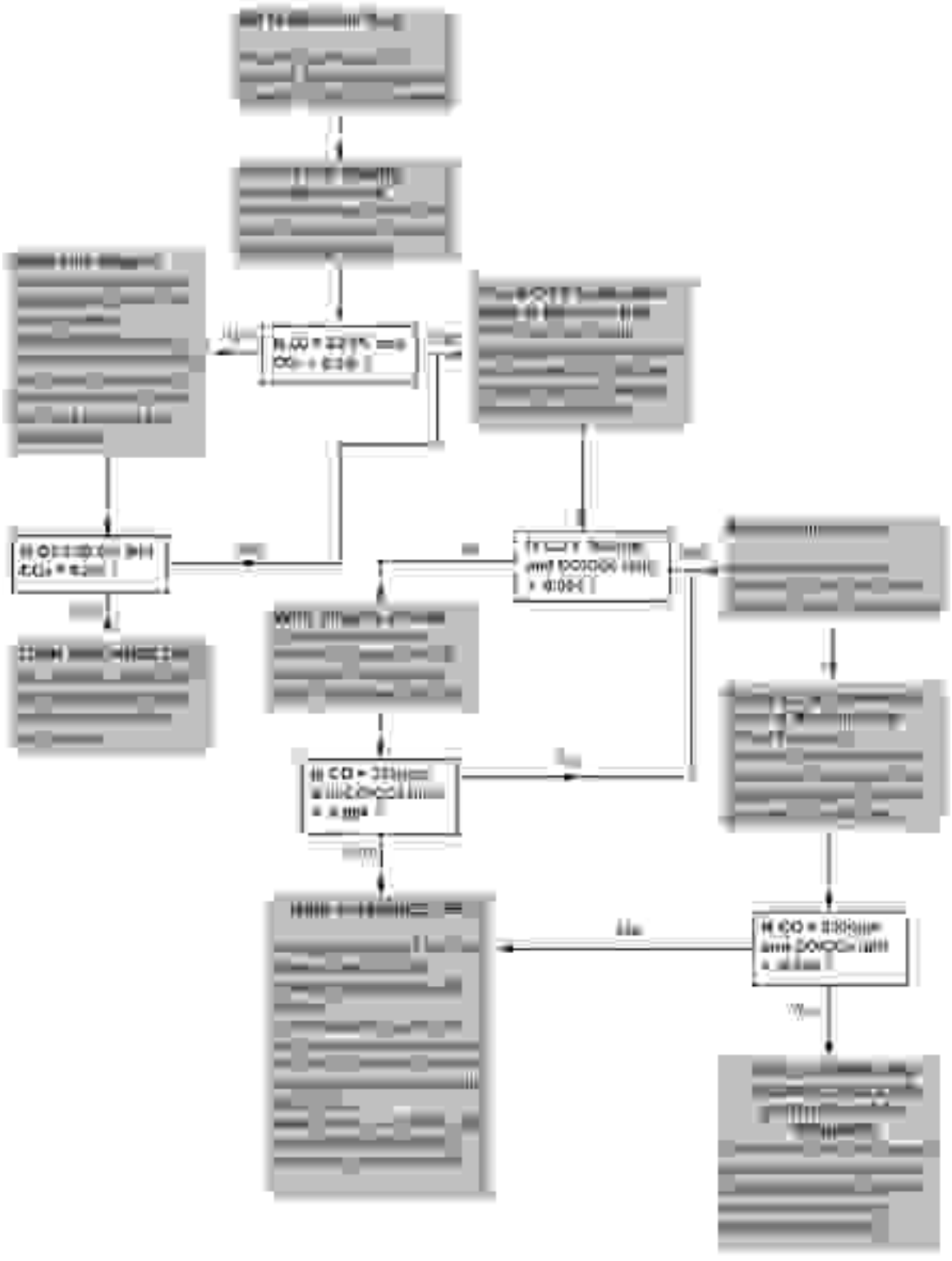
Turn off “chimney Sweep” function when testing is complete.

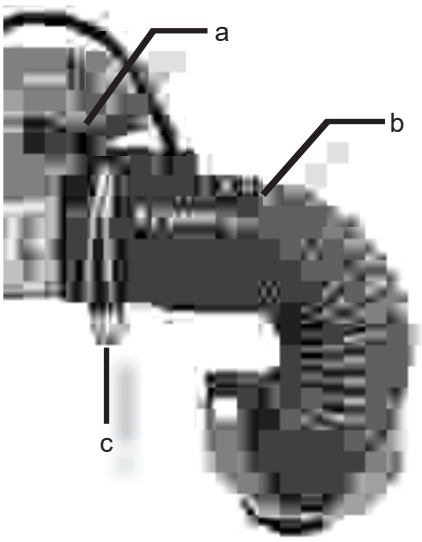
7.2.6 Flue integrity and combustion check

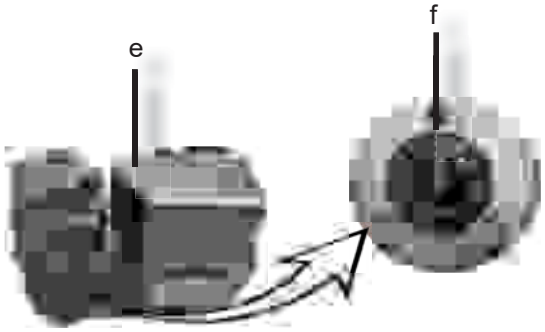
The integrity of the flue system can be now be checked by operating the appliance and using a gas analyser to check if there is CO^2 being returned into the air being supplied into the appliance casing.

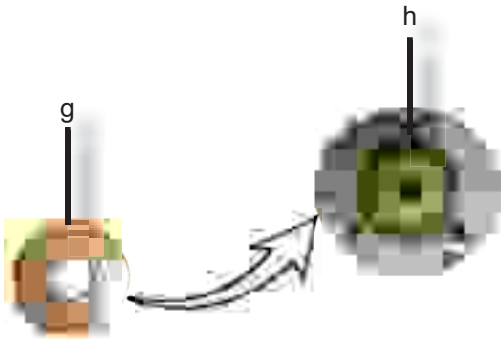
A combustion air sample point is built into the casing (*see section 3.3 on page 14 for location details*)

Remove the rubber bung to use the sample point, then replace the bung when the test has been completed.









7.3.1 Conversion from Natural gas (G20) to Propane (G31)

This water heater is supplied from the factory already set up for G20 Natural Gas, but each heater can be converted on site to operate on Liquefied Propane Gas (G31).

CAUTION
This conversion must be carried out by a competent qualified person using only the parts provided by the manufacturer.

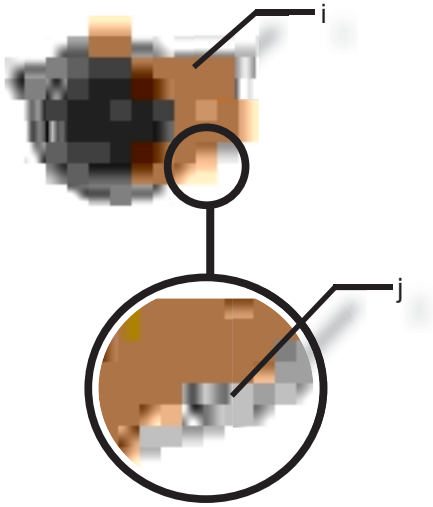
Before work commences turn off the Mains Electricity and Gas Supply to the heater. The conversion can then be achieved by following these steps:

1. Remove the throttle adjustment screw cover (a).
2. Undo the hose clamp (c) to release the air intake hose (b) from the gas valve venturi. Completely remove the intake hose and put to one side.
3. Undo and remove the screws securing the venturi to the gas valve and fan (d).
4. Remove the venturi completely and if you can, do not disturb the cork gasket if it is stuck to one of the two metal surfaces (this will be helpful during re-assembly).
5. Check the size of the orifice is correct (refer to table below). The orifice will be stamped on one of the faces or along the edge.

Tab. 33

Model	SC15	SC25 SC35 SC45
Orifice marking	440	555

6. Fit the orifice (g) into the rubber seal (f) that is located in the bottom outlet of the gas valve (e).
7. Ensure that the orifice is seated flush with the body of the gas valve (h).



8. Before re-assembly examine the condition of the cork gasket (i) and replace if it is damaged.

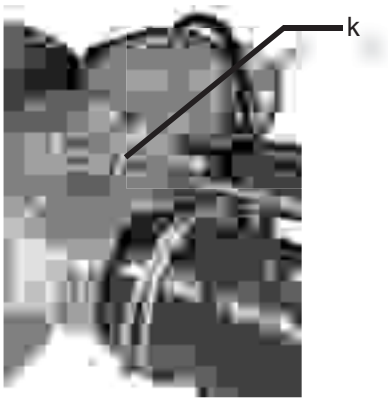
9. Re-assemble the venturi between the fan and gas valve and secure onto the fan using 2 screws.

10. Ensue the cork gasket between the fan and the venturi is correctly positioned by inserting a screw through the venturi (j) to hold the gasket in position.

11. Re-secure the venturi to the gas valve with the remaining 3 screws, ensuring that the rubber seal and orifice remains in place inside the gas valve.

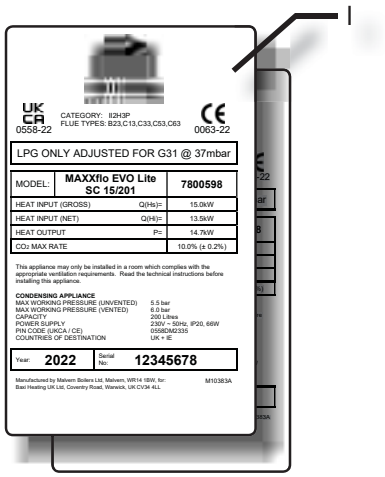
12. Replace the air intake hose and secure onto the venturi using the hose clamp.

13. Initially turn the throttle adjustment screw (k) according to the following table:



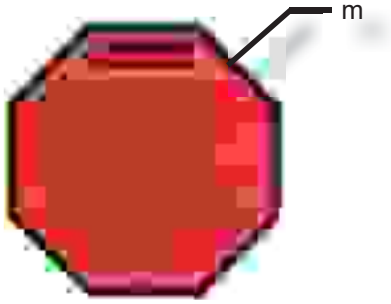
Model	SC15	SC25	SC35	SC45
G20 to G31 Initial throttle adjustment	2.5 rotations anti-clockwise	No initial adjustment necessary		
G31 CO_2 Combustion setting (+/- 0.2%)	Case open 9.9% Case closed 10.0%		Case open 10.0% Case closed 10.1%	

14. Follow the commissioning procedure in section 7.2 with the exception that the CO_2 combustion setpoint should now be as listed in the table above.



15. Whilst the burner is operating check for the smell of gas around the gas valve and fan. If gas is detected remove the venturi and check that it is properly seated onto the fan and gas valve.

16. Affix the new G31 gas data plate label supplied with the heater over the top of the existing G20 gas data plate (l).



17. Fit the red octagon warning label (m) to the heater cover.

Important
It should not be necessary to turn the throttle screw more than two turns away from the initial adjustment setting to achieve ignition. If this is the case, ensure that the components are refitted correctly and also be aware that the gas carrying pipes may need purging before gas is available for ignition at the burner.

7.4.1 Setting the time clock and DHW program

The DHW time clock is factory programmed to optimise this heaters efficiency at the declared load profile under Ecodesign Regulations.

It is essential that the time / date is set correctly and the DHW operation times have been programmed according to the requirements of the end user. Refer to the instruction sheet “Quick start guide” or section 3.0 of the “Controls - User operating instruction manual” for guidance on how to setup the controls.

7.4.2 Cleaning the heater

The casing is finished with a polyester coating and will mark if abrasive cleaners are used. It should be cleaned using standard non abrasive cleaning products. A soft cloth used with soap and warm water should be sufficient to clean the casing.

7.4.3 User Handover

When commissioning is satisfactorily completed the user must be instructed on the safe use and operation of the heater and in particular detail:

- Basic operation of the heater
- Explain the importance of air vents and the flue outlet system, and that they should not be altered or interfered with in any way
- Explain that the DHW tank temperature should not be set below 55^{O}C for any length of time as this can allow the growth of harmful bacteria (such as legionella). Discuss methods or setting options to limit the formation of harmful bacteria (see 8.3.2 for details)
- Remind the user that in order to comply to the regulations in force, the heater has to be serviced regularly (at least once every 12 months) and only an engineer who is trained and competent should carry out any work on the heater (i.e. a Gas Safe registered engineer)
- Explain that between 10:00 and 10:30 every Friday all pumps being controlled by the heater will be activated in turn for 30 seconds each. This will occur even if the heater is in standby mode. This function is automatic and is designed to help prevent pumps from sticking if the heater has not been in operation for some time
- Hand over this manual and any other literature supplied

8 Operation

8.1 General

All access to functions and information for the operation of the heater is made via a Graphical User Interface (GUI). Input is made using the rotary control and selection / entering is made by pushing the rotary control inwards. A long press of the rotary selector will take the user back to the home screen.

8.2 Use of the control panel

8.2.1 Main function pages

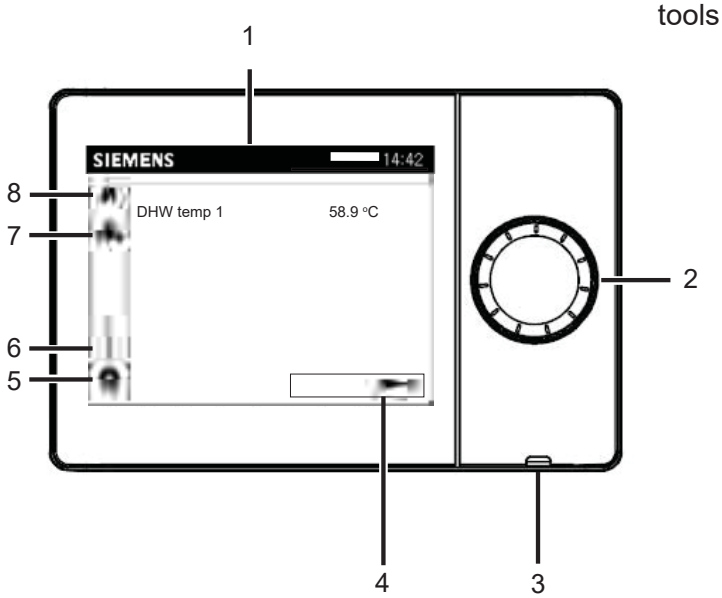
The four main display pages contain the following information:

Home page - This is the default screen and display the temperature of the DHW tank

DHW page - This page is used to turn ON and OFF DHW generation, setting the required temperature and also to set the times for DHW generation

Info page - Contains information regarding the status of the burner, heater and DHW generation

Setup page - Used to access settings for this heater, such as time and date, anti legionella functions and diagnostic tools



1 Information bar
2 Rotary selection (Press to ENTER)
LONG Press to exit back to home screen
3 RESET under plastic cover
4 Back / Escape
5 Setup page
6 Info page
7 DHW page
8 Home page

8.2.2 Information bar symbols

The information bar displays the operational status of the heater and the four symbols that can be displayed are described below:

Standby - Heater is in standby mode. Only frost protection is active.

Burner active - The burner is in operation and a flame is present.

Maintenance - The heater is operating in a manual “Chimney sweep” mode, or the maintenance period counter indicates that a service is due. A text message within the info screen will give further details.

Alarm - The heater is in an alarm mode. This should be accompanied by a screen message detailing the nature of the alarm. Depending on the type of alarm, the heater may by “locked out” or waiting for a temporary situation to clear before continuing (e.g. a “Start prevention” alarm will clear when the temporary issue is resolved).

8.2 Frost protection

The Heater is fitted with automatic Frost Protection. Provided there is mains power, gas connected and the heater is not in a lockout condition, if the temperature registered by the DHW tank temperature sensor falls below 5°C the burner will ignite to bring DHW tank temperature up to 6°C before turning off again.

8.3.1 General information

Legionella bacteria is commonly found in water. The bacteria multiply where temperatures are between 20 - 45°C and nutrients are available. The bacteria are dormant below 20°C and do not survive above 60°C.

Legionnaires' disease is a potentially fatal type of pneumonia, contracted by inhaling airborne water droplets containing viable Legionella bacteria. Anyone can develop Legionnaires' disease, but the elderly, smokers, alcoholics and those with cancer, diabetes or chronic respiratory or kidney disease are at more risk.

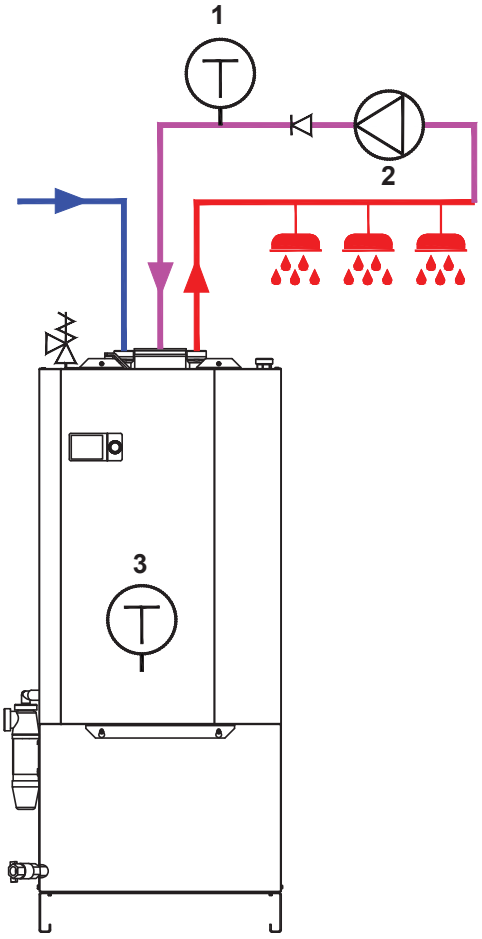
The Health and Safety Executive in the UK Advises conducting a complete risk assessment of the hot and cold water systems and ensure adequate measures are in place to control the risks. Recognised measures include but are not limited to the following:

- Cold water should be stored and distributed below 20ºC
- Hot water cylinders should store water at 60ºC or higher
- Hot water should be distributed at 50ºC or higher (any thermostatic mixer valves need to be fitted as close as possible to outlets)
- Regular temperature checks of hot water tanks (at least every month)
- Regular temperature checks of cold water tanks (if used, at least every 6 months)
- Regular temperature checks of outlets closest and furthest from the hot water tank
- Flush out infrequently used outlets at least weekly and clean and de-scale shower heads every 3 months
- Inspect the DHW tank for signs of debris during the annual service. Clean as necessary.
- Design water systems to minimise Legionella growth, by:
    - Keeping pipe work as short as possible
    - Avoid dead legs/dead ends in pipe work
    - Keep water turning over regularly. Fit an anti-legionella valve on the expansion vessel to maintain circulation around the vessel
    - Insulating circulation pipes and any cold water tanks

Other methods to control legionella include copper and silver ionisation and biocide treatments. Consult a water treatment expert for advice on these measures.

This heater has been designed to minimise the formation of Legionella bacteria. The pumped tank charging process ensures that the water at the bottom of the tank reaches the same temperature as in the rest of the tank and all of the water is circulated, with no stagnation possible. A hatch in the main tank can be used for inspection and cleaning. Only metals listed in 4MSI are used in this heater, and the heater has a Kiwa Regulation 4 approval pending.

8.3.2 Anti-Legionella settings



1 B39 Return sensor
2 Q4 Return pump
3 B3 DHW Tank sensor

When activated via the heater controls, the anti-legionella function will be satisfied when the DHW tank temperature sensor (B3) has detected that the anti-legionella setpoint has been reached for the length of time set (1646 Legionella function duration). If the optional return sensor (B39) has been installed and Q4 pump is turned on during the function (1647 Legionella function circulation pump), the temperature requirement to satisfy the function moves from the DHW tank sensor (B3) to the return sensor (B39). See Tab. 36 below for typical settings

Important
In a return system where the heat losses are greater than 3°C, the temperature reached at B39 sensor may never be enough to confirm that the anti-legionella setpoint has been achieved.

For example: If the legionella requirement was for a 70°C setpoint for 1 minute (see Tab 35 below) and the heat losses on the return system were 5°C, The temperature leaving the tank would be at a maximum of 73°C (anti-legionella setpoint + maximum boost) and this would return to the tank at 68°C. The anti-legionella function would never be satisfied in this scenario and the controls would attempt to achieve the anti-legionella setpoint for a total of up to 48 hours before resuming normal operation and displaying an error message .

Tab. 35

Temperature	Time required at setpoint
70°C	1 MINUTE
66°C	2 MINUTES
60°C	32 MINUTES
55°C	6 HOURS

An alternative solution when return pipe system heat losses are high, the B39 return sensor is installed and the Circulation pump Q4 is required to be on is suggested as follows:-

1. Set “1612 Reduced setpoint” as the normal DHW tank temperature (e.g. 60°C).
2. Set “1610 Nominal setpoint” as the temperature required for an anti-legionella cycle (e.g. 70°C).
3. Set “5070 Automatic push” to OFF.
4. Use time program 4 to set the length of time and the day that you want to run your anti-legionella cycle (every day is recommended) – For guidance on the length of time required please refer to the Tab 35

Tab. 36

Line	Description	Default	Notes
1640	Legionella Function	Off	Function activated or deactivated with this parameter
1641	Legionella function periodically	7 days	No of days before the legionella function will activate
1642	Legionella function weekday	Sunday	Fixed day the legionella function will activate
1644	Legionella function time	01:00	Time the legionella function will activate
1645	Legionella function setpoint	70°C	Setpoint to be achieved for legionella function
1646	Legionella function duration	10 mins	Length of time DHW tank sensors/B39 circulation return sensor (if fitted) should achieve the setpoint, before the function is completed. If setpoint not reached within a 48 hour period, an error message will be displayed.
1647	Legionella function circulation pump	Off	Circulation pump Q4 can be ON or OFF when the legionella function is active

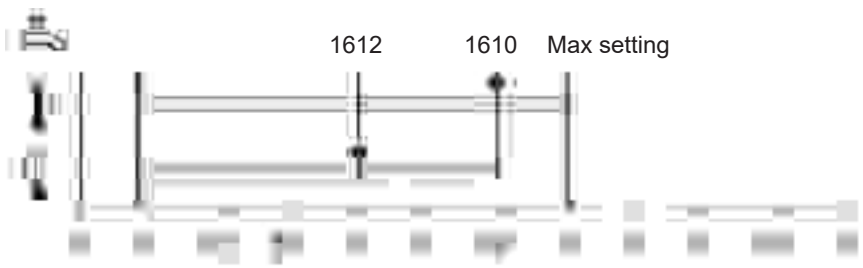
9 Settings

9.1 List of parameters

Tab. 37

PARAMETER	DESCRIPTION	FACTORY DEFAULT	NOTES
Time of day and date			
1	Time & Date	-	Current time and date settings. These settings can be changed.
5	Start of summertime	-	Date of start for British Summer Time. An automatic one hour adjustment will be made at 01:00 on this date. Please remember that this date changes by a few days every year, so adjustment of these dates at the start of the year is recommended.
6	End of summertime	-	Date of start for British Winter Time. An automatic one hour adjustment will be made at 01:00 on this date. Please remember that this date changes by a few days every year, so adjustment of these dates at the start of the year is recommended.
Operator section			
20	Language	English	Change languages if required
40	Used as	Operator unit 1	Operator unit 1 only should be set
42	Assignment device 1	-	Has no effect on DHW operation
44	Operation zone 2	-	Has no effect on DHW operation
46	Operation zone 3	-	Has no effect on DHW operation
48	Warmer / cooler device 1	-	Has no effect on DHW operation
70	Software version	-	Current firmware version for this Graphical User Interface (GUI)
Time program 4 (water heater)			
	Set time program	Optimised for BS EN 13302-1	Used to set the time program for DHW heating (can also be set on the DHW water heater menu of the user screen) Follow section 2.3 for instruction on how to set the time clock.
576	Default values	06:00 - 22:00 daily	Reverts time clock settings to default values
Time program 5 (Q4 secondary return pump)			
	Set time program	24 hours every day	Used to set the time program for DHW secondary return. Follow section 2.3 for instruction on how to set the time clock.
616	Default values	06:00 - 22:00 daily	Reverts time clock settings to default values
DHW			
1600	DHW operating mode	-	On or Standby (operation via switch on front of heater)
1610	Nominal setpoint	60°C	Normal DHW set point (setpoint when activated within program 4 times)
1612	Reduced setpoint	15°C Optimised for EN13302-1	This reduced temperature setpoint is active when the current time is outside the water heating time program settings (time program 4).

Example:



PARAMETER	DESCRIPTION	FACTORY DEFAULT	NOTES
DHW (continued)			
1620	DHW release	Time Programme 4	Defines when the heater is released for DHW heating
24h / day When this setting is used, DHW heating is continuously released as long as it is switched on. **Time program 4/DHW** When using this setting, a specific time program is available for DHW heating. For every weekday, a time program with a maximum of three on phases can be set. During the release time, the nominal DHW setpoint applies, outside the release time, the reduced DHW setpoint. If the legionella function is pending, it will be performed when DHW heating is released for the first time in the morning. Setting “Once / several times per day” has no impact. If DHW heating is switched off, the frost protection setpoint will apply.			
1630	DHW charging priority	Absolute	Only used when the controls are operating other space heating circuits
1640	Legionella function	Off	Used to activate function (operation modes are “Periodically” or “Fixed weekday”
1641	Legionella function periodic	7	No of days before the legionella function will activate
1642	Legionella function day	Sunday	Fixed week day the legionella function will start
Periodically The legionella function is repeated according to the interval set (operating line 1641).			**Fixed weekday** The legionella function can be activated on a fixed weekday (operating line 1642). When using this setting, heating up to the legionella setpoint takes place on the selected weekday, independent of previous storage tank temperatures.
1644	Time for legionella function	01:00	Time the legionella function will start
1645	Legionella function setpoint	70°C	The setpoint to be achieved for the legionella function. If B39 is installed and the function setpoint cannot be achieved (because of pipe work heat losses) try lowering the setpoint and increasing the dwell time. Note: The higher the setpoint the shorter the required dwelling time.
1646	Dwelling time at legionella function setpoint	10 mins	The length of time the DHW tank sensors and B39 circulation return sensor (if fitted) are required to remain at setpoint. If the legionella function cannot be performed successfully within a 48 hour period, an error message will be displayed. If no dwelling time is set, the legionella function is completed the moment the setpoint is met.
1647	Legionella function circulation pump	Off	If the function is turned OFF, the secondary return circulation pump will be switched OFF while the “Legionella” function is performed (anti-legionella action performed on tank only). If the function is turned ON, the secondary return circulating pump is switched ON while the “Legionella” function is performed (anti-legionella action performed on DHW system).

PARAMETER	DESCRIPTION	FACTORY DEFAULT	NOTES
DHW (continued)			
1660	Pump release	Time programme 5	Set desired option for activation of the DHW circulation pump (see below)
DHW release With this parameterization, the circulating pump is released when DHW heating is released also.		**Time program 4/DHW** The circulating pump is released according to time program 4 / DHW.	**Time program 5** The circulating pump is released according to independent time program 5.
1661	Pump cycling	Off	When switched on, the circulation pump will cycle on and off during the activation period (on for 10 minutes then off for 20 minutes repeatedly). Where B39 sensor has been installed this function will become active only once the circulation setpoint has been achieved.
1663	Circulation setpoint	45°C	When B39 sensor is installed on the DHW distribution return pipe, the heater controller will monitor the return temperature during the activation time of the pump. Whenever the temperature acquired by the sensor falls below the circulation setpoint, the pump will be active until the setpoint has been exceeded (minimum pump run time is 10 minutes). During a legionella cycle operation the temperature at the sensor is used to adjust the dwell time, ensuring that the entire DHW system reaches the legionella setpoint for the total dwell time length set. The dwell time counter is not started until the temperature at the sensor reaches legionella setpoint.
Boiler			
2300	Frost protection for plant boiler pump	On	When turned on the pump is activated when the temperature in the heat exchanger drops below 5°C
2322	Pump speed minimum	SC15 = 72% SC25 = 55% SC35 = 72% SC45 = 100%	Used to increase the minimum pump speed. Increasing minimum pump speed decreases the difference between flow and return temperatures (DeltaT). Increasing minimum pump speeds may be useful in reducing scale formation in very hard water areas.
DHW Storage tank			
5012	DHW forced charging	On	The first charge activation of the day is calculated using a switching differential of 1°C regardless of the setting of parameter 5024.
5020	DHW setpoint boost	0°C	Used by the control strategy to calculate the internal flow temperature required to raise the actual water temperature to the DHW set point. Examples: A boost of 2°C will reduce the re-charging time ,but the water draw off temperature could be 2°C above the tank setpoint. Burner efficiency will decrease slightly with a higher boost. A boost of -2°C will increase the re-charging time ,but the water draw off temperature will be at no higher than tank setpoint. Burner efficiency will increase slightly with a lower boost.
5024	DHW switching differential	10°C	Defines by how much the temperature of the water in the DHW tank can drop below set point before recharging takes place. This differential applies both to the Nominal as well as the Reduced DHW tank setpoint

PARAMETER	DESCRIPTION	FACTORY DEFAULT	NOTES
DHW Storage tank			
5050	Charging temp max	75°C	Maximum temperature that can be charged by the burner(s)
5060	DHW electric immersion heater operating mode	Substitute	In place of the gas burner , DHW can also be heated with an electric immersion heater. If DHW heating is provided by an electric immersion heater, no request will be sent to the gas burner. The changeover between gas burner and electric immersion heater takes place based on the following criteria:

Substitute

The electric immersion heater is only used if the controls delivers a fault status message or has been shut down via burner lock. This means that in normal situations the DHW is always heated by the gas burner.

Summer

The electric immersion heater is used as soon as all connected heating circuits have switched to summer operation. The DHW is again heated by the gas burner as soon as at least 1 of the heating circuits has switched back to heating operation. But the electric immersion heater is also used if the gas burner delivers a fault status message or has been shut down via burner lock.

Always

DHW is heated with the electric immersion heater throughout the year. This means that when using this application, the gas burner is never required for DHW heating.

5061	DHW electric immersion heater release	DHW release	Defines when the immersion can be activated (See options below):

24h/day

The electric immersion heater is continuously released independently of the time programs.

DHW Release

The electric immersion heater is released within the DHW release period.

Time program 4/DHW

The electric immersion heater is released within switching program 4.

5062	DHW electric immersion heater control	DHW sensor	Defines control method for activating the immersion. Either the MAXXflo EVO Lite internal sensors or an external mechanical thermostat
5070	DHW automatic push	ON	If the DHW storage tank temperature falls below 2 switching differentials, automatic push is activated heating the DHW tank to the upper setpoint. Once activated it cannot be turned off, except by removing power to the heater

ON

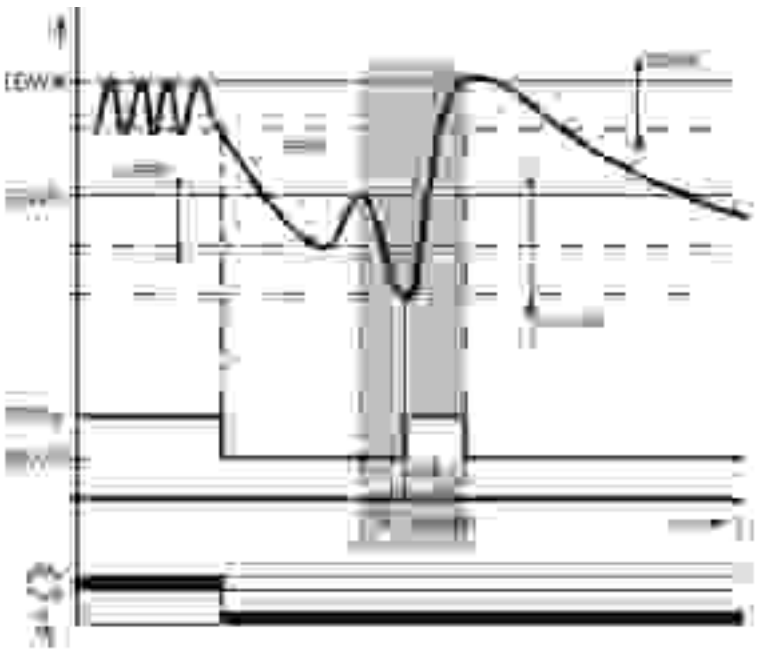
If the DHW temperature drops by more than 2 switching differentials (operating line 5024) below the Reduced setpoint (operating line 1612), one-time charging to the nominal DHW setpoint is effected again (operating line 1610).

Legend:

SDBW Switching differential DHW (5024)
TBWw Nominal DHW temp setpoint (1610)
TBWR Reduced DHW temp setpoint (1612)

OFF

DHW push can only be triggered manually.



PARAMETER	DESCRIPTION	FACTORY DEFAULT	NOTES
DHW storage tank (continued)			
5101	Pump speed minimum DHW	SC15 = 72% SC25 = 55% SC35 = 72% SC45 = 100%	Limitation of minimum pump speed set using parameter 2322
General functions (used for controlling the optional BUFFER SS300-10			
5570	Temp diff on dT contr 1	2.0°C	If the temperature difference between the BUFFER SS300-10 tank and the MAXXflo EVO Lite tank is greater than this value, K21 transfer pump output will be turned on
5571	Temp diff off dT contr 1	1.0°C	If the temperature difference between the BUFFER SS300-10 tank and the MAXXflo EVO Lite tank is less than this value, K21 transfer pump output will be turned off
5572	On temp min dT contr 1	0°C	Not used
5573	Sensor 1 dT contr 1	DHW sensor B3	Sensor used for delta T comparison for K21 transfer pump activation
5574	Sensor 2 dT contr 1	Special temperature sensor 1	Sensor used for delta T comparison for K21 transfer pump activation
5575	On time min dT contr 1	30s	Represents the minimum time that K21 will be activated even if parameter 5571 conditions are met
5577	Pump/valve kick K21	On	Pump output on
5580	Temp diff on dT contr 2	2.0°C	If the temperature difference between the BUFFER SS300-10 tank and the MAXXflo EVO Lite tank is greater than this value, K22 transfer pump output will be turned on
5581	Temp diff off dT contr 2	1.0°C	If the temperature difference between the BUFFER SS300-10 tank and the MAXXflo EVO Lite tank is less than this value, K22 transfer pump output will be turned off
5582	On temp min dT contr 2	0°C	Not used
5583	Sensor 1 dT contr 2	DHW sensor B3	Sensor used for delta T comparison for K22 transfer pump activation
5584	Sensor 2 dT contr 2	Special temperature sensor 1	Sensor used for delta T comparison for K22 transfer pump activation
5585	On time min dT contr 2	30s	Represents the minimum time that K22 will be activated even if parameter 5581 conditions are met
5587	Pump/valve kick K22	On	Pump output on
Configuration			
6020	Function extension module 1	None	Defines purpose of AGU2.550 expansion module. When using an expansion module with the MAXXflo EVO Lite this setting should be changed to “Multifunctional”
6024	Function input of EX21 module 1	None	Defines purpose of AGU2.600 expansion module. Not used in this heater
6030	Relay output QX21 module 1	Status information K36	Defines the purpose of the output QX21 on a AGU2.550 expansion module. Pre-defined as a “burner run” signal
6031	Relay output QX22 module 1	Alarm output K10	Defines the purpose of the output QX22 on a AGU2.550 expansion module. Pre-defined as a “fault” signal
6032	Relay output QX23 module 1	DHW Circulation pump Q4	Defines the purpose of the output QX23 on a AGU2.550 expansion module. Pre-defined as Q4 Circulation pump
6040	Sensor input BX21 module 1	DHW Circulation sensor B39	Defines the purpose of the sensor input BX21 on a AGU2.550 expansion module. Pre-defined for B39 Circulation sensor
6041	Sensor input BX22 module 1	None	Defines the purpose of the sensor input BX21 on a AGU2.550 expansion module

PARAMETER	DESCRIPTION	FACTORY DEFAULT	NOTES
Configuration (continued)			
6046	Function input H2 module 1	None	Defines purpose of H2 multi-use input on a AGU2.550 expansion module
6047	Contact type H2 module 1	Normally Closed NC	Define whether the input is NO or NC (for 0 - 10 Volt setup this value is ignored)
6049	Voltage value 1 H2 module 1	0	Define a voltage value 1 that applies to function value 1 (e.g. 0.5V)
6050	Funct value 1 H2 module 1	0	Define a function value 1 that applies to voltage value 1 (e.g. 400 for 40.0^{O}C)
6051	Voltage value 2 H2 module 1	0	Define a voltage value 2 that applies to function value 2 (e.g. 10.0V)
6052	Funct value 2 H2 module 1	0	Define a function value 2 that applies to voltage value 2 (e.g. 700 for 70.0^{O}C)
6200	Store sensor		Used to store the current sensors available to the controls at the present time. Useful in clearing errors that may be caused by sensor removal, as the controls will continue to give error messages for a sensor that has been removed. (NB. When sensors have been stored to remove a sensor fault , It may be necessary for midnight to pass on the internal clock before a sensor missing fault code is cleared completely).
6220	Device SW version	-	Version of Software in use
6230	Info 1 OEM	-	Year of parameter set in use
6231	Info 2 OEM	-	Code for parameter set in use
6258	Info 3 OEM	-	Not currently used
6259	Info 4 OEM	-	Not currently used
LPB System			
6600	Device address	1	Not relevant for MAXXflo EVO Lite, as heater is not designed for cascade use
6601	Segment address	0	Used when more than one MAXXflo EVO Lite is connected to an OZW672.04 or OZW672.16 Web Server. Each heater must have a unique segment number (Max 16) for each MAXXflo EVO Lite to be separately identifiable.
6605	LPB Power supply status	-	Status of power supply for OCI345 units (not relevant for MAXXflo EVO Lite models)
6612	Alarm delay	5 mins	This is the delay that is built into the controls to avoid reporting short term/temporary faults. When a fault in the controller is first present there will be a delay of this parameter value before the fault relay is activated. If short term faults are undesirable increase this value to eliminate them.
6640	Clock time source	Controller is the time clock master	If the MAXXflo EVO Lite is connected to an OZW672 Web server, the Web server will be the time “clock master”. If this is the case this parameter would need to be change to “slave with remote setting”, as it is not possible to have two “Time clock masters” connected on the same communications bus.
6651	Modbus slave address	---	Define Modbus settings
6652	Modbus laud rate	19,200	Define Modbus settings
6653	Modbus parity	Even	Define Modbus settings
6654	Modbus stop bit	1	Define Modbus settings

PARAMETER	DESCRIPTION	FACTORY DEFAULT	NOTES
Error / Fault			
6700 - 6999	Fault history	---	Fault history for last 20 reported faults. Time, date , phase no, error codes and sub codes.
Service/special operation			
7040	Burner hours run maintenance interval	---	Burner run hours that must be exceeded before a maintenance message is displayed
7041	Burner hours run since maintenance	---	**COUNTER CAN BE RESET** Burner run hours elapsed since maintenance was carried out and the counter was reset
7042	Burner starts maintenance interval	---	Number of burner starts that must be exceeded before a maintenance message is displayed
7043	Burner starts since maintenance	---	**COUNTER CAN BE RESET** Number of burner starts since maintenance was carried out and the counter was reset
7044	Maintenance interval	12 months	Limit of time elapsed before a maintenance message is displayed
7045	Time since maintenance	---	**COUNTER CAN BE RESET** Number of months elapsed since maintenance was carried out and the counter was reset. NB: When a period of 12 months has been exceeded since the counter was last reset a maintenance message and symbol will appear on the GUI. The heater will continue to operate as normal whilst the message is displayed. Enter this parameter to RESET the counter after a service has been conducted to clear the maintenance message.
7130	Chimney sweep function	Off	Function used to operate the individual burner at either minimum or maximum gas rate. Function useful when performing a flue gas analysis. NB The maximum flow temperature permitted is 75^{O}C, if the flow temperature exceeds this value the function will be turned off. Open hot water outlets if necessary to ensure that the maximum flow temperature is not exceeded.
7131	Chimney sweep function burner output	High fire	Sets burner output level in chimney sweep mode
7143	Controller stop function	Off	Function used to operate the individual burner at a rate from 0% to 100% modulation levels. It is also possible to view the performance of the ionisation current. NB The maximum flow temperature permitted is 75^{O}C, if the flow temperature exceeds this value the function will be turned off. Open hot water outlets if necessary to ensure that the maximum flow temperature is not exceeded
7145	Controller stop setpoint	100%	Defines the burner modulation rate for the function
7170	Telephone customer service	---	A customer service number can be entered into this line, which will be displayed on the GUI when there is a fault or when the maintenance symbol is displayed.
7250	PStick storage pos	---	Defines the parameter set selection from a manufacturers programming stick, for purposes of firmware updates.
7251	PStick data description	---	Display line for contents of inserted manufacturers programming stick.
7252	PStick command	---	Define the operation of the inserted manufacturers programming stick (e.g. Read from stick).
7253	PStick	---	Display line for programming stick reading/writing progress in %
7254	PStick status	---	Programming stick status

PARAMETER	DESCRIPTION	FACTORY DEFAULT	NOTES
Input/output test			
7700	Relay test	No test	Used to test the outputs of the heater control PCB (QX2 is the internal heat exchanger pump) or the outputs of the AGU2.5 expansion module
7713	Output test P1	0%	Used to test internal pump speed control. Set the pump speed (min - 100%) to test output
7714	PWM output P1	---	Displays the PWM output signal of P1 (QX2 internal pump)
7750	DHW temperature B3	---	Current temperature of the DHW tank
7760	Boiler temp B2	---	Current internal primary flow temperature B2
7820	Sensor temperature BX1	---	Flue gas temperature
7821	Sensor temperature BX2	---	Not used
7822	Sensor temperature BX3	---	Return circulation temperature sensor
7823	Sensor temperature BX4	---	Not used
7830	Sensor temperature BX21 module 1	---	User defined sensor
7831	Sensor temperature BX22 module 1	---	User defined sensor
7845	Voltage signal H2 module 1	---	Measured voltage of user defined input
7846	Contact state H2 module 1	---	Contact state of user defined input
7854	Voltage signal H3	---	Voltage signal from pressure transducer (90 & 120 models only)
7855	Contact state H3	---	Not used by pressure transducer
7862	Frequency H4	---	Not used
7860	Contact state H4	---	Not used
7865	Contact state H5	---	Not used
7872	Contact state H6	---	Operation switch contact state
7874	Contact state H7	---	Air pressure switch contact state
Status			
8003	Status DHW	---	Current operational status of DHW
8005	State boiler	---	Current operational status of water heater
8009	State burner	---	Current operation status of gas burner

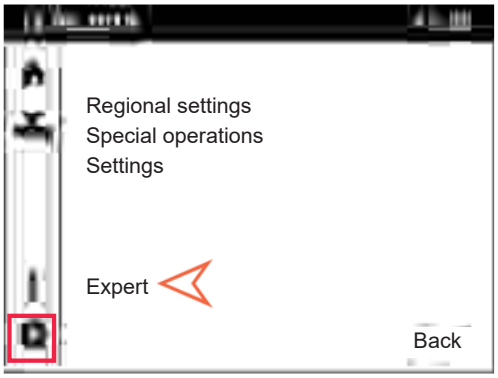
PARAMETER	DESCRIPTION	FACTORY DEFAULT	NOTES
Diagnostics producer			
8304	Boiler pump Q1	---	Status of Primary system pump
8308	Boiler pump speed	---	Internal pump speed
8310	Boiler temp	---	Current primary flow temperature
8311	Boiler set point	---	System calculated flow temperature set point
8312	Boiler switch point	---	Indicates next flow temperature demand target for current heater activity
8314	Boiler return temp	---	Current primary return temperature
8315	Boiler return sensor setpoint	---	Indicates next return temperature demand target for current heater activity
8316	Flue gas temp	---	Current flue gas temperature
8318	Flue gas temp max	---	**COUNTER CAN BE RESET** Maximum flue gas temperature reached.
8323	Fan speed	---	Current fan speed in rpm
8324	Set point fan	---	System calculated fan speed set point
8325	Current fan control	---	Current fan control as a percentage
8326	Burner modulation	---	Current burner modulation rate in percent
8329	Ionisation current	---	Current Ionisation flame signal (> 9.0μA is a strong flame signal < 7.0μA is a weak flame signal, with the burner at 100% modulation)
8330	Burner hours run stage 1	---	**COUNTER CAN BE RESET** Total number of hours the heater has been operating
8331	Number of burner starts stage 1	---	Total number of burner starts performed by the heater
8390	Current phase number	---	Current phase stage of burner operation
Diagnostics consumers			
8830	DHW temperature (B3)	---	Actual DHW tank temperature
8831	DHW temperature setpoint	---	Current DHW temperature set point
8835	DHW circulating temperature	---	Actual DHW circulating return temperature (if fitted)
8836	DHW charging temperature	---	Current DHW charging temperature at heat engine outlet.
8950	Common flow temperature	---	Same as parameter 8310
8951	Common flow temperature setpoint	---	Same as parameter 8311
9009	Water pressure H3	---	Current primary system pressure. Internal water pressure of the heaters internal primary circuit. NB This pressure must not be allowed to drop below 0.1 bar or the heater will stop.
9016	Special temp 1	---	If using the BUFFER SS300-10 expansion tank system the temperature of the first BUFFER SS300-10 tank will be displayed here.
9017	Special temp 2	---	If using the BUFFER SS300-10 expansion tank system the temperature of the second BUFFER SS300-10 tank will be displayed here.
9031	State relay output QX1	---	Current status of DHW circulation pump Q4
9032	State relay output QX2	---	Current status of DHW primary pump Q1
9033	State relay output QX3	---	Current status of fan power
9034	State relay output QX4	---	Current status of DHW pump Q3
9050	State relay output QX21 module 1	---	Current status of QX21 output
9051	State relay output QX22 module 1	---	Current status of QX22 output
9052	State relay output QX23 module 1	---	Current status of QX23 output

PARAMETER	DESCRIPTION	FACTORY DEFAULT	NOTES
Burner control			
9500	Prepurge time	5s	The length of time to purge the flue system on startup of the burner can be increased up to 51 seconds if required
9501	Prepurge time min	5s	Minimum possible pre-purge time, beyond which it is not possible to reduce parameter 9500
9512	Required speed at ignition	SC15 = 2000rpm SC25 = 2500rpm SC35 = 2500rpm SC45 = 2500rpm	Fan speed required for ignition (G20 gas)
9513	Required speed ignition max	SC15 = 2500rpm SC25 = 3300rpm SC35 = 3300rpm SC45 = 3300rpm	Maximum limitation of 9512 (G31 gas)
9524	Required speed Low Fire	SC15 = 1450rpm SC25 = 1800rpm SC35 = 1800rpm SC45 = 1800rpm	Fan speed required at minimum burner modulation
9525	Required speed Low Fire minimum	SC15 = 1450rpm SC25 = 1800rpm SC35 = 1800rpm SC45 = 1800rpm	Minimum limitation of 9524
9529	Required speed High Fire	SC15 = 2750rpm SC25 = 3400rpm SC35 = 4600rpm SC45 = 5790rpm	Fan speed required at maximum burner modulation
9530	Required speed High Fire maximum	SC15 = 2750rpm SC25 = 3400rpm SC35 = 4600rpm SC45 = 5790rpm	Maximum limitation of 9529
9540	Postpurge time	15s	Number of seconds that the fan will continue to operate after the gas valve has closed
9542	Postpurge time minimum	15s	Minimum limitation of 9540
9650	Chimney drying	Off	Function can be used to dry out the lining of a chimney or used to check the operation of a burner fan without firing the burner (only the fan runs in this mode). Only active when the heater is in standby mode and can be interrupted at any time with a request for heat
9651	Required speed chimney drying	1500rprm	Predetermined speed for chimney drying function. A minimum fan speed of 1500rpm is recommended
9652	Duration chimney drying	10 minutes	Duration of chimney drying function (maximum 1440 minutes)

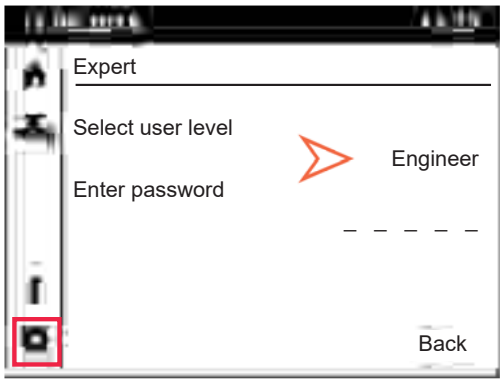
9.2 Setting the parameters

In order to be able to access any of the parameters listed in section 9.1 it will be necessary first to log into the controls as an engineer.

9.2.1 Logging into engineer mode

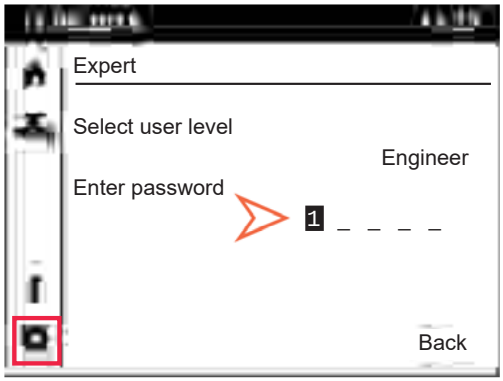


1. Using the Graphical User Interface (GUI), screen, move the control knob to select “Setup” page on the navigation bar and press ENTER.

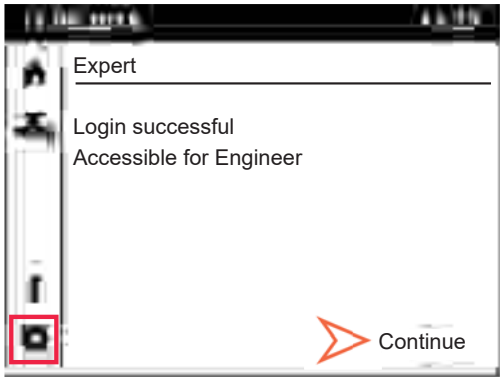


2. In the work area , use the control knob to select “Expert” field and press ENTER.

3. Select “Engineer” using the control knob and press ENTER to select it. Press ENTER to continue into commissioning mode.

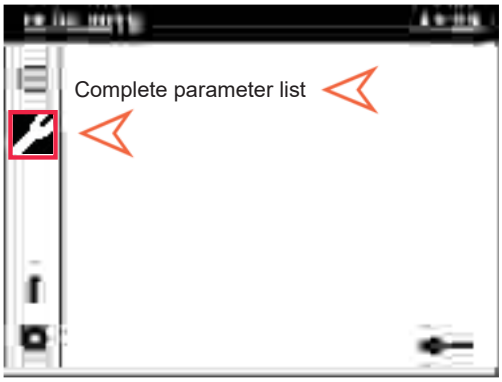


4. Enter password **‘10001’** by rotating the control knob, and then press ENTER after each number.



5. Confirm successful login by pressing ENTER.

9.2.2 Accessing complete parameter list



1. After logging into engineer mode. Use the control knob to select the adjustment page tab and press ENTER.

2. Select “Complete parameter list” and press ENTER.

You now have access to all available parameters for viewing and adjustment starting from “Time of day and date” screen.

Select or deselect the section heading to move through the sections and select or deselect the pages to scroll through the pages of each section.

10 Maintenance

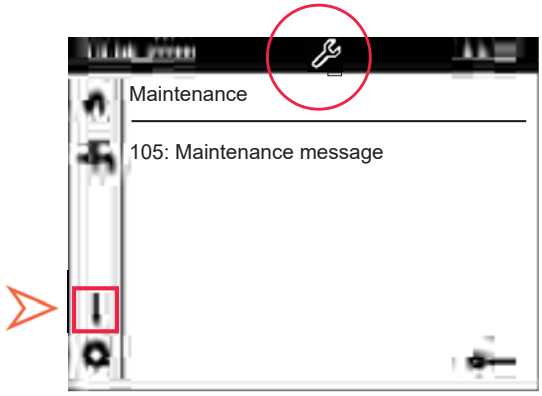
10.1 General

To ensure continued efficient operation of the heater it is recommended that it is checked and serviced at regular intervals. The frequency of servicing will depend upon the particular installation and usage but in every case a maximum of twelve months should be allowed between service inspections.

DANGER
It is a legal requirement that any service work should be carried out by a suitably qualified and Gas Safe registered engineer

CAUTION
In all cases, before work commences turn off the Electricity and Gas Supply to the heater

10.2 Maintenance message



This heater is factory set to remind the user that a service is due after 12 months of calendar operation.

If the maintenance symbol appears in the information bar at the top of the GUI screen and the burner is not operating under “Chimney sweep” mode, the maintenance interval has been exceeded.

Using the rotary control, select information pages to view details of the message.

10.2.1 Resetting the maintenance message

Once a service operation has been completed the monthly counter can be set back to zero using parameter line 7045 in the “Service / special operation” menu.

Refer to section 9.2 for details.

10.3.1 Minimum service requirements

It is recommended that the heater is inspected annually or every 4000 hours of operation. Any maintenance work found during the inspection should be done according to need.

This maintenance work should include:

1. Inspect and clean the following, by removing the burner:
   - Burner tube
   - Vapour seal
   - Rope Gasket
   - Combustion chamber
   - Spark electrode
   - Ionisation electrode
   - Heat exchanger insulation
2. Check condition of condensate pipework
3. Empty and clean condensate trap
4. Check ignition performance
5. Inspect internal air and flue system
6. Inspect cover seals for damage or leakage
7. Perform flue gas analysis and set CO_2 if necessary
8. Inspect and flush DHW storage tank (especially in hard water areas)

   Greater details of these specific operations are covered in section 10.4.1 through to 10.4.12.

Does not exclude annual gas safety checks required under Gas Safety (Installation and Use) Regulations 1998.

10.3.2 Inspect and clean burner assembly

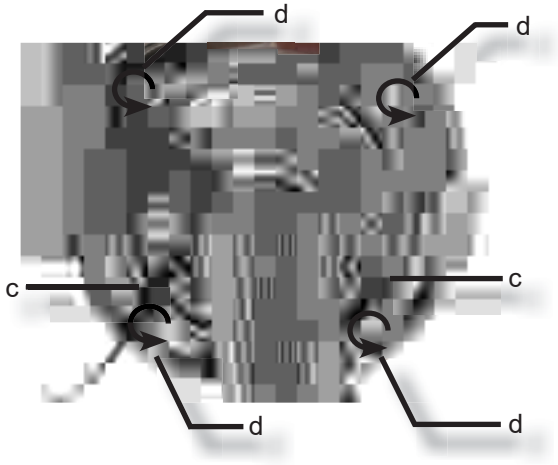
Important
For a complete inspection of the burner and the inside of the heat exchanger it is recommended that the burner assembly is removed from the front of the heat exchanger complete with the fan, venturi and gas valve.

The following steps need to be completed before the combustion chamber and burner can be inspected:-

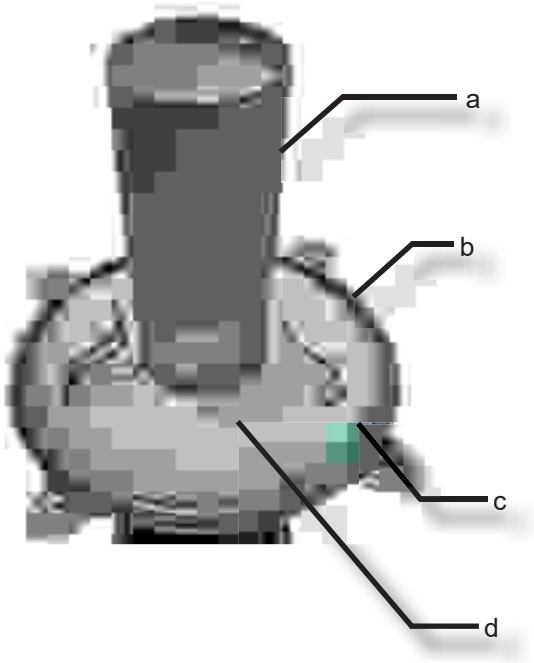
1. Isolate heater from the electrical and gas supply.
2. Remove the main heater cover (see section 6.2.1).
3. Disconnect the electrical connections of the fan (a).

Important
Avoid damage to the wiring connections, do not to pull on the wires when removing electrical connectors.

4. Disconnect the venturi from the fan, by removing the two cap head screws (b).
5. Retain the cork gasket for re-assembly.



6. Disconnect the spark and Ionisation leads (c).
7. Remove the four burner door nuts (d).
8. Pull the whole burner assembly outwards and left, away from the gas valve and place on a suitable surface for inspection.

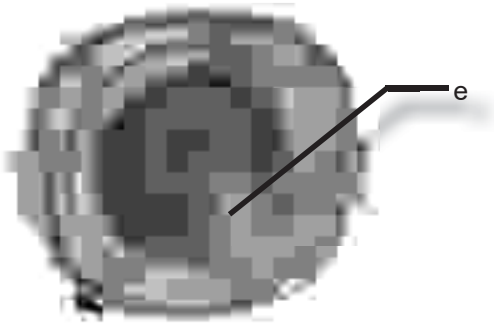


9. Inspect the black silicone moisture seal (b). Replace seal if it is hard to the touch, cracked or is damaged. In any case, replacement of the silicone gasket every two years is recommended.

10. Inspect the thermal rope gasket (c). Replace if there are gaps in the rope or it is damaged.

11. Inspect the burner tube (a). Replace if deformed, has burnt metal areas or rouge holes are found in the burner surface.

12. Inspect the insulation pad (d). Replace if cracked or significantly eroded (minor surface cracks, discolouration or fine surface powder deposits are acceptable).



13. Inspect the inside of the heat exchanger (e) for signs of carbon build up or blockages between the tubes.

14. If cleaning is necessary:

- Clean the heat exchanger using a nylon (nonmetallic) brush
- Use a vacuum cleaner, to remove loose debris
- To remove more stubborn deposits, white vinegar can be used
- Use a low pressure applicator (e.g. a hand sprayer) to apply the coils with vinegar
- Wait approximately five minutes
- Scrub heat exchanger coils with a nylon brush
- Rinsing away all deposits with clean low pressure water, until the condense pipe runs clear
- Repeat process again with white vinegar if required

Important

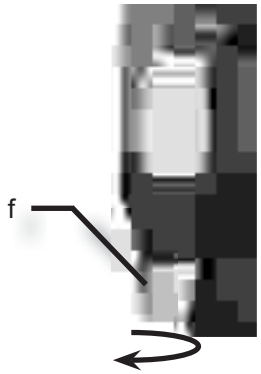
Use only white vinegar - damage to the heat exchanger may occur if other chemicals are used.

CAUTION

Take care not to excessively soak the insulation material at the rear of the heat exchanger, as this could cause the material to deteriorate

15. Reassembly is the reverse.

10.3.3 Clean out condensate trap



Remove the condensate trap bowl (f), unscrew by hand. Rinse out and refit.

10.3.4 Ionisation and spark electrode inspection (burner assembly removed)

With the burner removed

1. Inspect the Ionisation (h) and spark electrode (g) assemblies. Replace any electrode where cracks or metal defects are visible.

2. Check the spark electrode gap (i) and ensure that it is within the following tolerance:

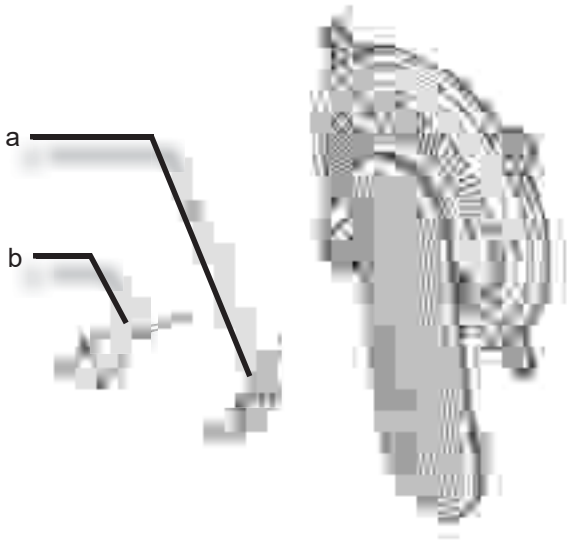
5.0mm (+/- 0.5mm)

10.3.5 Re-assembly of burner

Reassembly is the reverse of 10.3.2

Information
If the cork gasket between the venturi and the fan has become dislodged from one of the metal surfaces, ensure that the cork gasket is in the correct position by using the screw nearest the front of the heater to hold the gasket in place (j).

10.3.6 Ionisation and spark electrode inspection

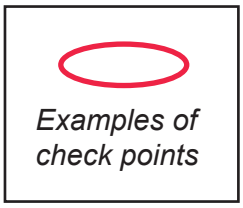


In order to maintain optimum reliability, it is recommended that both sets of electrodes are replaced every three years regardless of their condition. Both of these electrodes are best inspected when they are still in place and the entire heat exchanger door has been removed (see 10.3.2), but can also be inspected by carrying out the following :

1. Turn off the heater and pull off the electrode leads (See 10.3.2).
2. Unscrew the two screws retaining the spark electrode (a) in position and carefully withdraw.
3. Inspect for damage and correct spark gap (see 10.3.4).
4. Undo the two screws retaining the Ionisation electrode (b).
5. Withdraw and inspect for wear or damage (see 10.3.4).
6. Replace electrode(s) if older than 36 months or if worn or damaged.
7. Assembly is the reverse, ensure the gasket is undamaged and correctly placed.

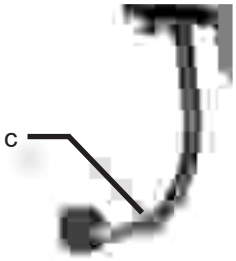
10.3.7 Flue outlet seals inspection

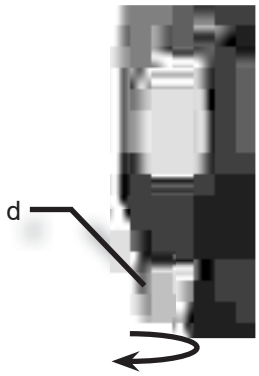
1. Push on the flue sections to ensure firm connection between the joints and heat exchanger outlet.
1. A visual inspection should establish if there are leaks around any of the seals, including the flexible air duct to the venturi.
2. Replace if there is any doubt as to the integrity of the seals.



Examples of check points

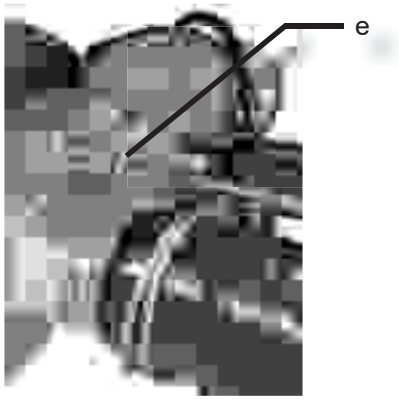
10.3.8 Condensate pipework and trap





1. Inspect all joints in the condensate pipework for leaks.
2. The pipes (c) themselves should be clear, flexible and no signs of any cracking should be visible. Investigate any white coloured areas of the condense pipe work. Check connection to the heat exchanger and condensate trap for leaks.
3. The lower bowl of the condensate trap (d) should be unscrewed, examined and cleaned if necessary.

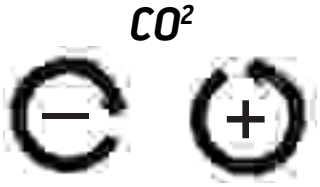
10.3.9 Gas rate and combustion



The gas rate and combustion flue analysis must be carried out when the burner is operating at maximum loading. See Section 7 for full details on how to check and adjust the CO^2.

A brief summary of this check is as follows:

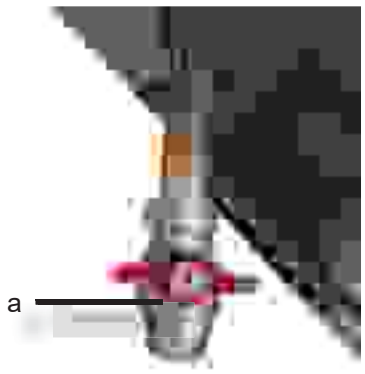
1. Re-establish gas and electricity supply.
2. Operate the burner for at least 3 minutes at maximum gas input before checking CO^2.
3. If adjustment is required remove the throttle screw cover.
4. Insert a 4mm allen key or medium flat blade screw driver to adjust (e)
5. Make adjustments in small increments (no more than 1/8 of a full rotation).



6. Wait one minute between adjustments.

CAUTION
If you are experiencing CO readings that exceed 200 ppm after 20 minutes of burner operation. Check that you have followed instructions correctly (see 7.2.4) and check that your gas analyser is functioning correctly. Contact Andrews Water Heaters on the customer support number given on the rear cover of this manual, for advice.

10.3.10 Inspect and flush DHW storage tank



The storage tank should be inspected annually and cleaned if required. To gain access for inspection please carry out the following procedure:

1. Turn off the electrical supply to the heater.
2. Shut of the cold water supply to the tank.
3. Open a hot water outlet until water flow stops.
4. Shut off hot water outlet and return feed pipes to the tank.
5. Drain approximately 5 - 10 litres of water from the tank drain point (a).
6. Remove the insulation material in the centre top of the tank to reveal the tank hatch connections.

7. If necessary, disconnect any pipework connections to allow removal of the Tank Inspection Hatch (d).
8. Loosen nut (b) of the Tank Inspection Hatch (d) and unscrew nut to the end of the thread, but do not remove.
9. Wrap a length of wire around the threaded shaft underneath the clamp (c) and hold the wire to prevent the hatch (d) falling into the tank, when the nut (b) is removed.
10. Tap the hatch (d), so that it drops downwards but is held in place by the nut (b).
11. Remove the nut (b) and clamp (c) while holding the threaded shaft.
12. Allow the hatch (d) to drop down and then angle the hatch (d) and remove it through the opening.
13. With the use of a torch it should be possible to see to the bottom of the inside of the tank. If the tank is clear of deposits then no further action is necessary and the hatch can be replaced as a reverse of the above procedure. Take care not to drop the hatch into the tank when replacing it.
14. If the tank requires flushing, allow all the water to flow from the tank by opening the drainage tap fully . A hose pipe connected to the cold water supply, can be inserted into the hatch opening to wash away any remaining deposits out of the tank drain point (a) In areas with hard water, it maybe necessary to flush the water heater more frequently.

To refill the tank after inspection or flushing, perform the following procedure:

15. Close the drainage tap.
16. Secure the inspection hatch.
17. Turn on the cold water supply to the tank and open the hot water return pipework.
18. Open hot water outlets in turn until all air is expelled.
19. Follow the proceedures described in section 6.7.2 to ensure that all air is expelled from the heat exchanger, before operating.
20. Turn on power and gas to the heater and activate a hot water demand.

10.4 Specific maintenance operations

10.4.1 General

CAUTION
None of the controls are repairable. If they are not functioning they must be replaced.

CAUTION
In all cases, before any work commences TURN OFF the mains electricity and gas supply to the heater

The majority of component items do not require isolating from the water system before removal. Removal instructions for these components are listed in the following sections and are carried out after removal of the front cover:

10.4.2 Flue temperature sensor (B8)
10.4.3 DHW tank temperature sensor (B3)
10.4.3 Flow (B2) and return temperature sensors (B7)
10.4.4 LMS14 Control PCB Replacement
10.4.5 GUI screen display
10.4.6 Spark generator
10.4.7 Internal overheat protection device
10.4 8 Fan
10.4.9 Gas valve
10.4.10 Electrodes

The following items require isolation of water before removal and bleeding air afterwards

10.4.11 Circulation pump (Q1)
10.4.12 Heat exchanger

10.4.2 Flue temperature sensor (B8)

This is located at the Flue outlet of the heat exchanger.

1. Unplug the connector from the sensor (e). Squeeze the catch on the connector to release.
2. Remove sensor by unscrewing anti-clockwise a quarter turn.
3. Replacement is the reverse.

10.4.3 DHW tank temperature sensor (B3)

Perform the following tasks to remove the Tank sensor B3:

1. Remove tank sensor access panel located at the bottom left hand side of the heater, to reveal the tank (a)

2. Loosen the screw (c) securing the sensor in the sensor well

3. Gently pull the sensor and it's cable (b) out of the sensor well, feed it through the "P" clip and allow it to hang free

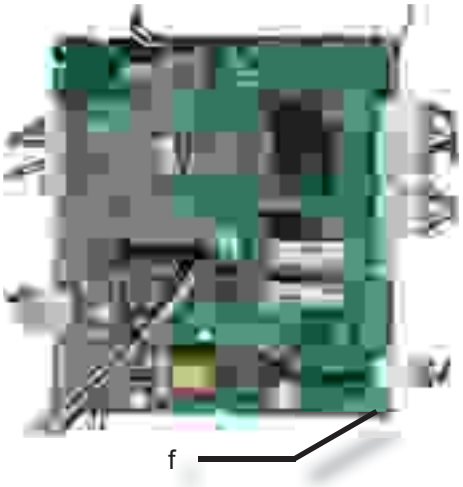
4. Undo the bulkhead seal (d) and pull the sensor up and out through the bulkhead seal

5. Unplug connector (e).

6. Replacement is the reverse

Important
When resecuring the sensor back into the sensor well, create a slight tension in the cable by pushing a small excess of the cable through the "P" clip, so that the sensor is being pushed into the end of the sensor well.

10.4.4 LMS14 Control PCB



CAUTION
Electrostatic sensitive PCB - Handle PCB by edges only and if available wear an earth wristband

This is located inside the electrical enclosure to the top left of the heater. It is important that the correct PCB replacement is used. Check that the model matches the replacement PCB.

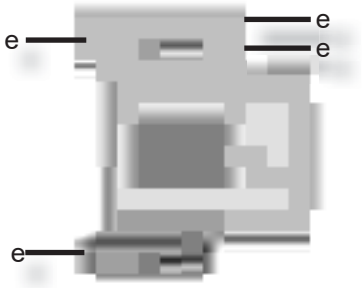
1. Undo but do not remove the screw securing the cover of the electrical enclosure and lift away the cover.

2. Carefully push off all the connectors from the PCB (be careful not to pull on the wires).

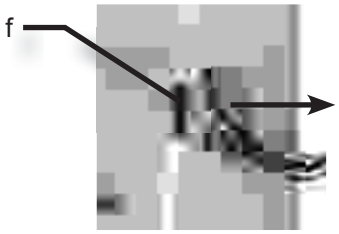
3. Release in turn, all seven PCB support posts (f) by squeezing the barb together at the end of the support post and withdrawing the board from each support, one at a time until the PCB is free.

4. Replacement is the reverse.

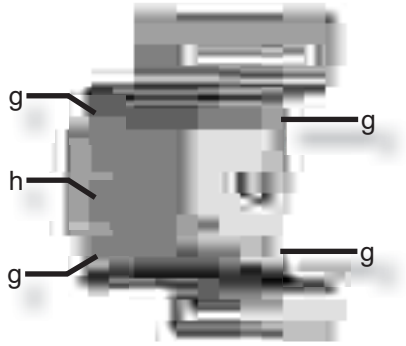
10.4.5 Graphical User Interface



1.Keeping hold of the GUI, remove the four retaining screws (e).



2.Remove the electrical connector from the back of the GUI, by pushing the connector off (f). Do not pull on the wires when removing.



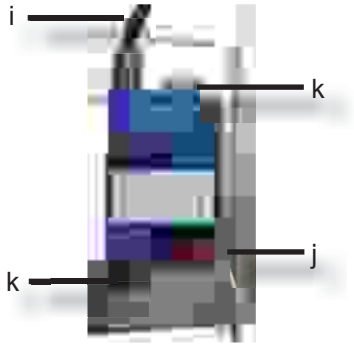
3.Undo the four nuts holding the GUI in the metal frame (g).

4.To release GUI the metal heat shield (h) should be bent out the way.

5.Pull the GUI from mounting studs in the metal frame.

6.Replacement is the reverse.

10.4.6 Spark generator



1.Unplug the ignition cable (i).

2.Unplug the power connections (j). White from position 1. Red from position 2.

3.Remove the 2 fixing screws (k).

4.Replacement is the reverse.

10.4.7 Internal overheat protection device

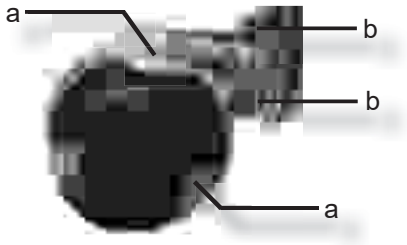
1.Locate the overheat thermostat (l) inside the electrical enclosure.

2.Slide the thermostat (l) out from under the from the clip.

3.Carefully disconnect the two wires.

4.Assembly is the reverse.

10.4.8 Fan



The combustion fan is best removed when the whole burner assembly has been detached from the heat exchanger (see 10.3.2 for details), but can also be removed individually if these steps are followed:

1. Carefully remove the two electrical connectors (a) from the fan.

2. Remove two cap screws (c) securing the venturi to the fan.

3. Remove four bolts (b) securing the fan to the air arm.

4. Slide fan off venturi and remove.

5. Inspect both the venturi gasket and air arm gasket and replace if damaged.

6. Replacement is the reverse.

7. After replacement, operate the burner and check for gas leaks.

8. Perform a flue gas analysis check of the CO & CO_2 settings (see 7.2.3 for details).

Important
Please ensure that the cork gasket between the fan and the venturi is correctly placed before fixing the two venturi screws. Place a screw through the venturi (d) to hold the gasket in place when refitting to fan

10.4.9 Gas valve

1. Turn off the gas supply to the heater.

2. Undo the securing screw and remove the electrical connector (f) from the gas valve.

3. Remove four 4mm allen bolts (g) securing the gas pipe to the valve.

4. Release the gas valve from the venturi by undoing three 4mm allen bolts (e).

5. Transfer the rubber gasket to the new gas valve and orifice if fitted.

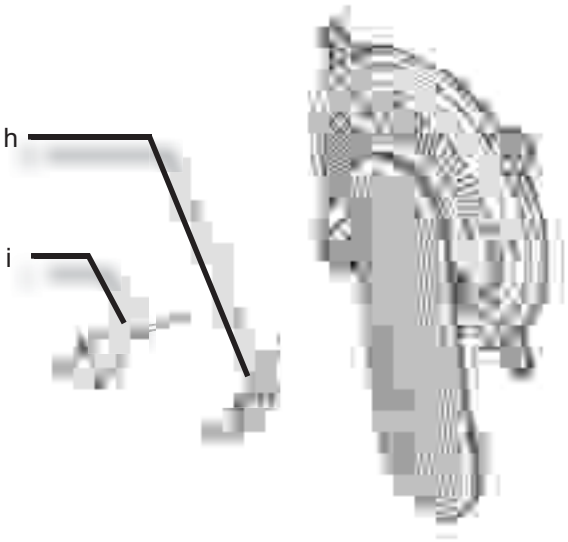
6. Replacement is the reverse.

7. Turn on the gas supply and check for gas leaks.

8. Perform a flue gas analysis check of the CO & CO_2 settings (see 7.2.3 for details).

Valve Coil resistances are 2.8k and 1.6k ohms

10.4.10 Electrodes



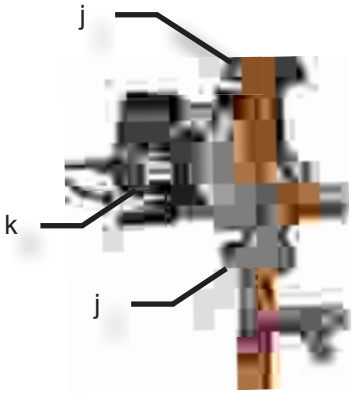
These are located on the front of the heat exchanger.

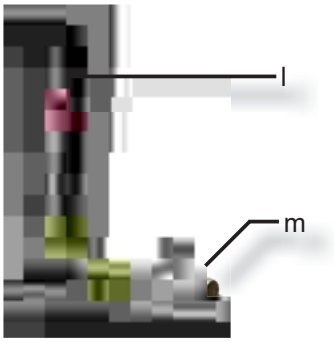
1. Pull off the connector from the Ignition electrode (h) or Ionisation electrode (i).

2. Undo the two screws retaining each electrode bracket and withdraw.

3. Replacement is the reverse ensuring that the gasket seal is placed correctly and is in good condition.

10.4.11 Circulation pump (Q1)





When changing the circulation pump not all spillage of water can be avoided. Reduce spillage by placing a container below the pump and cover the fan with a cloth or plastic bag. Proceed with the following tasks to remove this pump:

1. Shut off the cold water supply to the DHW tank.

2. Reduce the pressure in the DHW tank by opening the DHW tank drain point (m) and draining off 2 - 3 litres of water.

3. Close the DHW tank return valve (l).

4. Open the drain point below the pump to drain off water.

5. Remove the PWM and power connectors (k), using a small flat blade screwdriver to lift the white tabs of the connectors before pulling free.

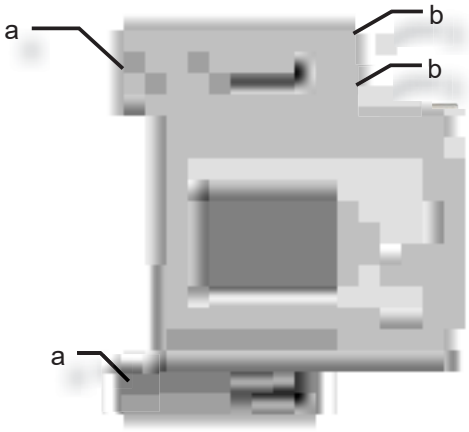
6. Undo the pump unions (j) at the top and bottom of the pump body and remove pump.

7. Fit the new pump seals.

8. Replacement is the reverse.

9. Refill and bleed air by operating the burner with the gas supply turned off, until the sound of air in the heater has diminished.

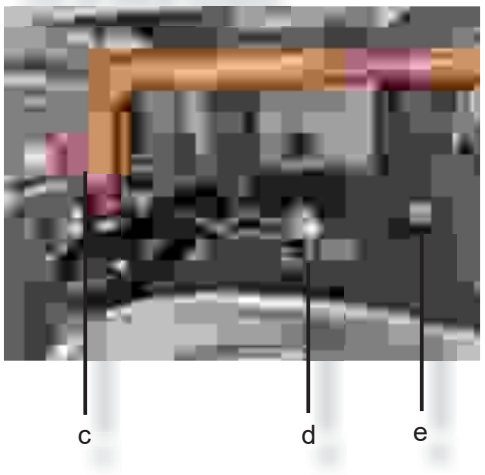
10.4.12 Heat exchanger



CAUTION
Changing the following components will require a partial draining of the water system. Once completed it is essential that all the air is removed from the heat exchanger before the heater is operated. To not do so may damage the heat exchanger and invalidate the warranty.

- With the front cover removed, remove screws (b) and loosen screws (a), then lift and slide the GUI to the left. The slot design allows for the GUI to lock into place.

(25 35 45kW models)

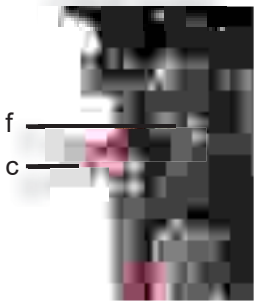


- Disconnect the flue temperature sensor (d) wiring
- Disconnect the flue limit fuse (e) wiring
- Unclip the flow sensor (c) and return sensor (f) from the copper pipes in and out of the heat exchanger.

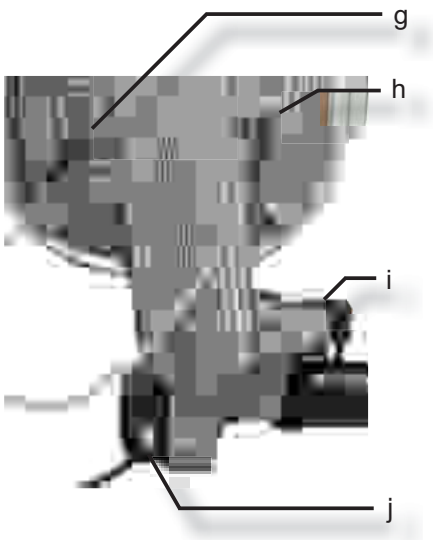
Note:
The rear bottom pipe is the return pipe and the wiring colour for the return sensor (f) is black.

The front bottom pipe or front top pipe (depending on model) is the flow pipe and the wiring colour for the flow sensor (c) is white

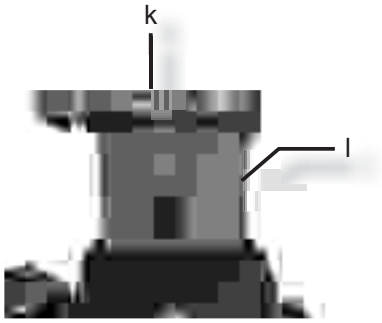
(15kW model)



(25 35 45kW models)

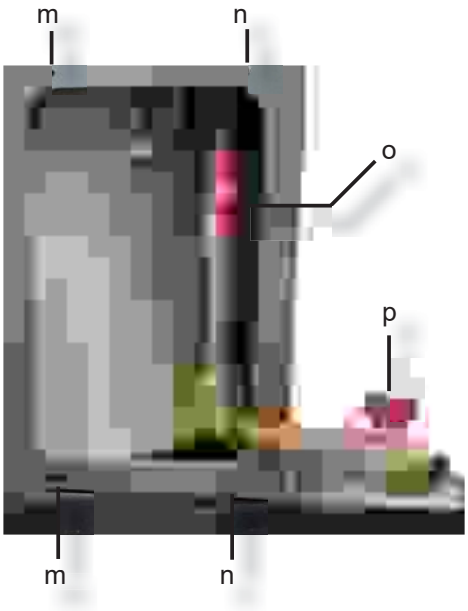


- Disconnect the electrical connections of the ionisation probe (g), ignition probe (h), fan (j) and gas valve (i) and place wiring to one side.
- Remove the complete burner from the heat exchanger (please refer to section 10.3.2 for instructions).



- Loosen the flue clamp (k) and push the flue section (l) upwards so that it clears the heat exchanger.

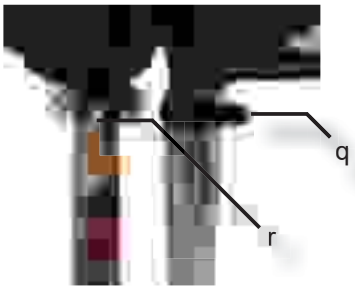
- Isolate the cold water supply, hot water outlet and return system to the heater.



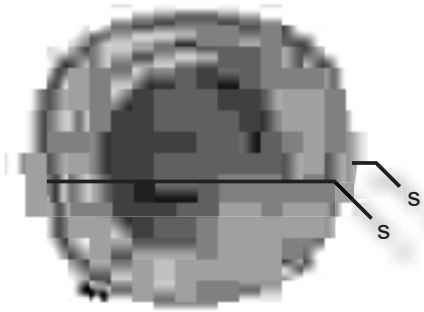
- Remove the lower left hand side panel by loosening two screws (m) and removing two screws (n). Slide the panel to the side and lift away.

- Close the tank shutoff valve (o). Using the tank drain valve (p) carefully drain off approximately two to three litres of water from the tank, or until the water pressure has been reduced to zero.

- Drain water using the drain point below the pump to ensure the heat exchanger is as empty as possible.



- Remove the heat exchanger pipe retaining clips (r) from the flow and return pipework of the heat exchanger.
- Remove the condensate drain pipe by undoing the plastic clamp (q) and pulling the tube clear.



- Remove the 4 screws of the heat exchanger retaining clamps (s) and remove the clamps. Carefully slide out the heat exchanger.

CAUTION
This item is heavy - Before releasing the brackets ensure support is available

- Fitting is the reverse

CAUTION
Ensure that all air is removed from the heat exchanger before operating the burner

11 Troubleshooting

11.1 Error codes

Tab. 38

Error Code	Error Code Description	Diag. Code	Notes
20	Boiler temperature 1, sensor error	Other	Water heater flow sensor (B2) is outside normal limits
		439	Water heater flow sensor (B2) is short-circuit. Check connection for possible contamination or faulty sensor.
		440	Water heater flow sensor (B2) is open-circuit. Check connection for possible contamination or faulty sensor.
28	Flue gas temperature, sensor error	539 543	Flue gas sensor (B8) is short-circuit. Check connection for possible contamination or faulty sensor.
		540 544	Flue gas sensor (B8) is open-circuit. Check connection for possible contamination or faulty sensor.
40	Return temperature 1, sensor error	Other	Water heater return sensor (B7) is outside normal limits
		441	Water heater return sensor (B7) is short-circuit
		442	Water heater return sensor (B7) is open-circuit
50	DHW temperature 1, sensor error	55	Check connections or replace faulty DHW tank sensor (B3)
57	DHW circulating sensor fault	58	Check connections and operation of the strap on return pipe sensor (B39) connected through onto the AGU2.5 expansion module
82	LPB address collision	103	LPB address duplicated on another Siemens controlled appliance. Check addresses of all Siemens controlled appliances via parameter 6600
83	BSB short circuit	595	No BSB communication or wires shorted - Check operation of GUI or OZW672 (if fitted)
84	BSB address collision	104	Two appliances connected through BSB (e.g. OZW672) have the same allocation address. Change one of the appliances address via parameter 6600
98	Clipin 1 Fault	605	Indicates that an expansion module can no longer be “seen” by the controls. To clear this message when no clipin is installed, perform a “Store sensors” (parameter 6200) command, to perform a controls handshake with all connected sensors and ancillaries. NB: When applying power to the heater, this fault message may appear briefly, but should self clear within 5 minutes. If message persists perform a “Store sensors” command
100	More than one clock time master	105	Only one device should be set as the time master, check on the GUI (parameter 6640) and any OZW672 connected (in case of connection to an OZW672, this device should be the master)
102	Clock master without power reserve	106	The display backup battery for the time clock may have become depleted. This message more commonly occurs following the restoration of power to the heater. This message normally self clears within 20 minutes of power being restored. If the message does not clear, turn the power off, wait 10 seconds and turn the power on again. This message does not prevent the operation of the heater in any way but if it persists it indicates that the clock time may not be retained in periods of power outages. Contact Andrews Technical Helpline for advice.
105	Maintenance message	87	Item requiring attention but not preventing appliance operation (e.g. 12 Month service due reminder message). Check details of message on the appliance Front GUI screen.

Error Code	Error Code Description	Diag. Code	Notes
110	SLT Lockout	306 431 432 433 434 435 436 756	Electronic temperature limits exceeded. General overheating issue. Check for pump operation, trapped air and heat exchanger blockages. Monitor temperatures of system to establish problem area.
		429 818	Safe reset of the error sub code 433 (see above) has not been met. Allow the water heater to cool further before resetting.
		305 412 550 551 754	Mechanical overheat protection circuit is open circuit (connection X18 on control PCB). Check connector is fully inserted
		426 437 815	Flow temperature heat up gradient exceeded. Check pump operation and presence of trapped air in the heat exchanger. Flow through heat exchanger may be restricted.
		438 817	Maximum Delta T of system exceeded. Check pump operation and presence of trapped air in the heat exchanger. Flow through heat exchanger may be restricted.
		428	Maximum Delta T of system exceeded. Initial starting of the pump before the burner is operated, can cause this error. If accompanied by code 429 within the same minute, this error can be disregarded.
		427 816	Safe reset criteria has not been met. Allow the water heater to cool further before resetting.
		420 421 819 820	Return temperature greater than flow temperature. Check that the flow and return sensors are operating correctly
		419 430 813 814	Flow temperature limit exceeded. Check for overheating issues and flow sensor (B2) performance.
		809 810 422 423	Flow temperature not plausible - Reading less than 0^{O}C or greater than 124^{O}C . Check flow sensor (B2) and replace if necessary.
		425 812	Return temperature limit exceeded. Check for overheating issues and return sensor (B7) performance.
		424 811	Return temperature not plausible - Reading less than 0^{O}C or greater than 124^{O}C . Check return sensor (B7) and replace if necessary.
111	Shutdown limit thermostat	264	Heat exchanger temperatures have been exceeded. Investigate flow rates, shutoff valves and controls to determine causes of temporary fault code.
125	Maximum boiler temperature exceeded	286 500 740	Temperature supervision lockout. Check pump, shutoff valves, burner and flow rates before resetting
		501	Temperature has not increased at flow sensor after burner start. Check flow sensor is correctly clipped to pipe work.
		502	Temperature has not increased at return sensor after burner start. Check return sensor is correctly clipped to pipe work.
126	DHW charging temperature not reached	72	Charging temperature not achieved within a two hour time scale. Check operation and heat up times for heater. Is DHW demand too high for the designed performance of this heater? Refer to the technical data in this manual for guidance.
127	DHW legionella temperature not reached	73	Check operation of legionella function and DHW system. Legionella setpoint has not been achieved within 48 hours of the legionella function activation. When using a secondary return system and sensor, do not set the legionella function temperature too high, as the heat losses of the hot water pipework may not permit this setpoint to be achieved if measured using a B39 Return Sensor.

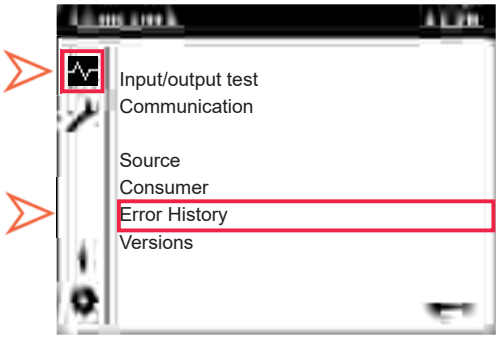
Error Code	Error Code Description	Diag. Code	Notes
128	Loss of flame during operation	244 625	Count of loss-of-flame incidents exceeded (a maximum of 15 loss of flame incidents are permitted in a 24 hour period)
		394 834	Flame lost in operation during safety time, before the start of the modulation phase. Check the burner CO^2 is set correctly. Check operation and condition of the ionisation electrode.
		854	Flame lost in operation within the first 7 seconds after safety time. Check the burner CO^2 is set correctly. Check operation and condition of the ionisation electrode.
		253	Flame lost in modulation phase
130	Flue gas temperature too high	Any	Check causes of high temperatures before operating Appliance. Inspect inside of heat exchanger for dirt build up. Check CO_2 levels at min and max output.
133	Safety time exceeded	254 395 755	Records individual ignition failures and the times they have occurred. Check gas supply, spark electrode, spark generator, Ionisation probe, burner CO^2 setting and flue system
		245 625 757	A total of 5 unsuccessful ignition attempts has occurred within a 24 hour period, resulting in a permanent lockout
142	Device failure (Bus)	Any	Check that the appliance and any OZW672 installed is powered and connected correctly.
151	BMU Internal error	330	Error when closing ignition relay - Check ignition generator and connections from controls - Replace control PCB if no fault found
		331	Error when opening ignition relay - Check ignition generator and connections from controls - Replace control PCB if no fault found
		332	Error when closing gas valve relay - Check gas valve and connections from controls - Replace control PCB if no fault found
		333	Error when opening gas valve relay - Check gas valve and connections from controls - Replace control PCB if no fault found
		336 337	Internal safety relay error - Check if polarity of live and neutral has been reversed to the appliance. Replace PCB if fault repeatedly occurs.
152	Parameterization error	Any	Incorrect / conflicting parameters input (last changed parameters need to be investigated).
		All others	Fan speed setting error. For example the ignition speed cannot be set lower than the minimum fan speed - Review fan speeds and adjust.
153	Unit Locked	622	Temperature inside the appliance casing has exceeded $90^{O}C$. Check burner door seals and door nuts are correctly tightened. Activating a reset for more than 10 seconds will also produce this lockout.
		848 849	Parameter update finished. Press reset to apply changes.
160	Fan speed threshold not reached	Any	Fan does not reach required speed setpoint via PWM control- Check wiring and operation of fan. Replace fan if necessary
183	Unit in parameterisation mode	770	Code will be displayed when a programming stick is used but should clear when programming is complete. Repeat stick operation if fault code persists
		Any	Press reset after any programming has been actioned to remove lockout
217	Sensor error	765 766	Short circuit of Ionisation circuit. Check operation of ionisation probe using parameter 8329 (menu - Diagnostics heat generation). Ionisation probe may need replacing. Check electrical supply to the heater and burner - pay special attention to the earth circuit and supply.

Error Code	Error Code Description	Diag. Code	Notes
317	Grid frequency outside permitted range	275 461	The frequency (Hz) of the electrical supply is outside permitted tolerance. Check electrical supply to heater.
324	Input BX, same sensors	110	BX sensor duplicated - Two sensor inputs have been defined twice with the same sensor type (e.g. B3). Review last parameters programmed to remove duplication.
325	Input BX/extension module, same sensors	Any	Input BX expansion module 1 sensor duplicated - Two sensor inputs have been defined twice with the same sensor type (e.g. B3). Review last parameters programmed for the expansion module to remove duplication.
327	Extension module, same function	Any	AGU2.5 expansion module function duplicated - check parameter setup (in “Configuration” menu)
335 / 336	Sensor input BX21 / BX22 without function	211 / 212	A sensor has been detected connected to BX21 of the AGU2.5 expansion module 1, but not defined. Define the sensor using the parameters or remove the sensor if not required.
		213 214 215 216	As above except the undefined sensor is connected to an AGU2.5 expansion module 1. The AGU2.5 expansion module should be defined as module 1 - Check the dip switches on the front of the device is set correctly
384	Extraneous light	252 393	Ionisation current detected before whilst in standby mode. Check ionisation current (“Diagnostics producer” parameter 8329). If the current present is greater than 0.61 whilst the burner is in standby, turn off the gas supply to check gas valve is closing completely. If current is still present, remove ionisation probe and use a screwdriver to clear the opening through the burner door before replacing the probe and testing again. *Persistent errors may indicate that the burner is only operational for very short periods. Try increasing the switching differential by at least 1^{O}C (parameter 5024) to increase burner run time.*
		Other	Ionisation current detected during ignition phase before the gas valve is opened.
385	Mains under voltage	554 555	Mains voltage below 185v - check electrical supply to the appliance.
386	Fan speed tolerance	388	Fan outside allowed speed tolerance during standby phase
		531 389	Fan outside allowed speed tolerance during pre-purge phase
		374 383 384	Fan outside allowed speed tolerance during ignition phase.
		375 386	Fan outside allowed speed tolerance during min modulation phase.
		385	Fan outside allowed speed tolerance during max modulation phase.
		532 534 382 390	Fan outside allowed speed tolerance during post-purge phase
		Other	Check connections and wiring loom of the fan. Replace fan if no fault found. If necessary use parameter 9650 Chimney drying mode to test the function of the fan without having to operate the burner.
432	Function earth not connected	Any	No Ignition earth, X1 / X17 not connected or earth fault. Check internal and external earth wiring to the heater
433	Heat exchange temperature	Any	Heat exchanger temperature is too high. Investigate all sources of overheating. When the issue has been resolved examine the heat exchanger for damage before putting back into operation.
NA	DHW Operating mode locked	Any	Check to see if the remote enable link wire is fitted or external controls wired to these terminals are closing this circuit. To activate DHW operation this circuit must be closed.

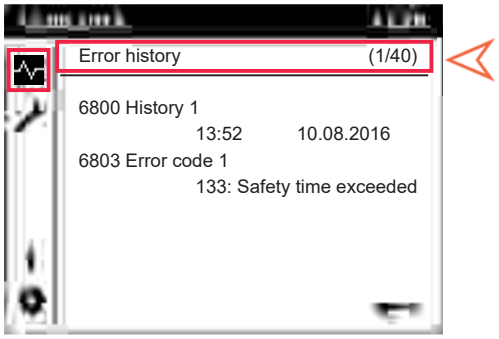
11.2.1 Accessing error history

The GUI screen can display information about the last 20 errors or maintenance messages recorded by the controls. Each of the 20 recorded entries contains the time and date that the incident was logged, software diagnostic code and burner control phase. Log in as an engineer to access this history.

Refer to section 9.2.1 for details on how to log in as an engineer

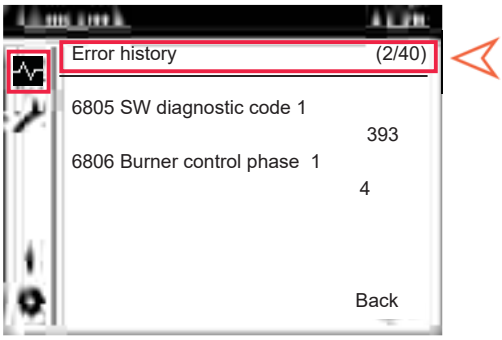


One logon is successful, Highlight “Error History” by rotating the control knob and select the function by pressing enter.



With the error history bar highlighted you will be able to view the error history of the last 20 error incidents.

Refer to section 11.1 for guidance on the meaning of each error code.



Each historic error code page will also be accompanied by a second page which includes a further sub code which can help to identify a specific issue in more detail.

Refer to section 11.1 for guidance on the meaning of each error code and sub codes.

Also useful is knowing the burner control phase in which the error has occurred. Please refer to the table in 11.3 for details.

11.3.1 Burner control phase

As well as the details of the error it is also useful to know the burner control phase in which the error has occurred. The control phase will detail what operation mode the controls were active in, at the time of the error.

Please refer to the table below for details.

Tab. 39

Phase No.	Phase display reference code	Phase section	Phase description	Notes
1	TNB	Homerun	Permitted afterburn time	Not relevant
2	TLO	Homerun	Permitted time with air pressure switch closed or fan speed	Time after post purge as the fan speed runs down
3	TNN	Homerun	Permitted time with fan speed	Time after post purge when the fan is permitted to overrun
4	STY	Standby	No demand	No heat demand, burner is not active
	STV	Standby	Start prevention	Burner held until a temporary condition has been removed
6	THL1	Startup	Fan ramp up time to pre purge speed	Time for fan to reach pre purge speed
7	THL1A	Startup	Fan ramp up time to ignition speed	Time for fan to reach ignition speed
8	TV	Startup	Pre purging	Fan pre purging time
9	TBRE	Startup	Fan adjustment	Adjustment of fan speed to reach ignition speed after pre purging
10	TW1	Startup	Waiting time	Fan time at ignition speed 1
11	TW2	Startup	Waiting time	Fan time at ignition speed 2
12	TVZ	Startup	Pre-ignition phase	Time before ignition
13	TSA1	Safety time	1st safety time	Flame monitoring with spark ignition
14	TSA2	Safety time	2nd safety time	Flame monitoring after spark ignition
15	TI	Operation	Interval	Stabilisation of flame (10 seconds)
16	MOD	Operation	Control mode	Burner is modulating normally - Main operation phase
17	THL2	Shutdown	Change to post purging at last operating fan speed	Demand has been turned off, gas valve will be closed
18	THL2A	Shutdown	Change to post purging at prepurge speed	Demand has been turned off, gas valve will be closed
19	TN	Shutdown	Post purging at last operating speed	Demand has been turned off, gas valve will be closed
20	SAF	Error	Boiler error state	Certain types of error can force the burner control to jump to this phase and all safety related outputs are deactivated
21	STOE	Error	Boiler error state	If the burner controls detect a system error that would drive the water heater into an unsafe state (i.e. lockout), the controls jumps to this phase. Only an applied reset can resume operation.
22	TNA	Shutdown	Post purging at pre purge speed	Last phase of fan post purge before the burner controls to standby phase
23	KT	Standby	Start prevention	Temporary start prevention condition becomes a permanent condition after a period of time has elapsed
24	TN2	Shutdown	Interruptible post purging	Interruptible post purging at last fan operation speed. If there is a new heat demand during the post purge period, post purging can immediately be interrupted.

12 Decommissioning, removal & recycling

12.1 Decommissioning & recommissioning

If the heater is to be left unused for an extended period of time (three months or more) it is recommended that the heater is isolated and drained, until the heater is required to be brought back into use once again. Proceed as follows:

12.1.1 Decommissioning procedure

1. Switch off the heater's electrical connection
2. Shut off the gas supply
3. Shut off the water supply
4. Drain the tank
5. Drain water from the internal pipe work

12.1.2 Recommissioning procedure

The heater can be put back into use by following the instructions from 6.7 onwards of this manual.

12.2 Removal & recycling

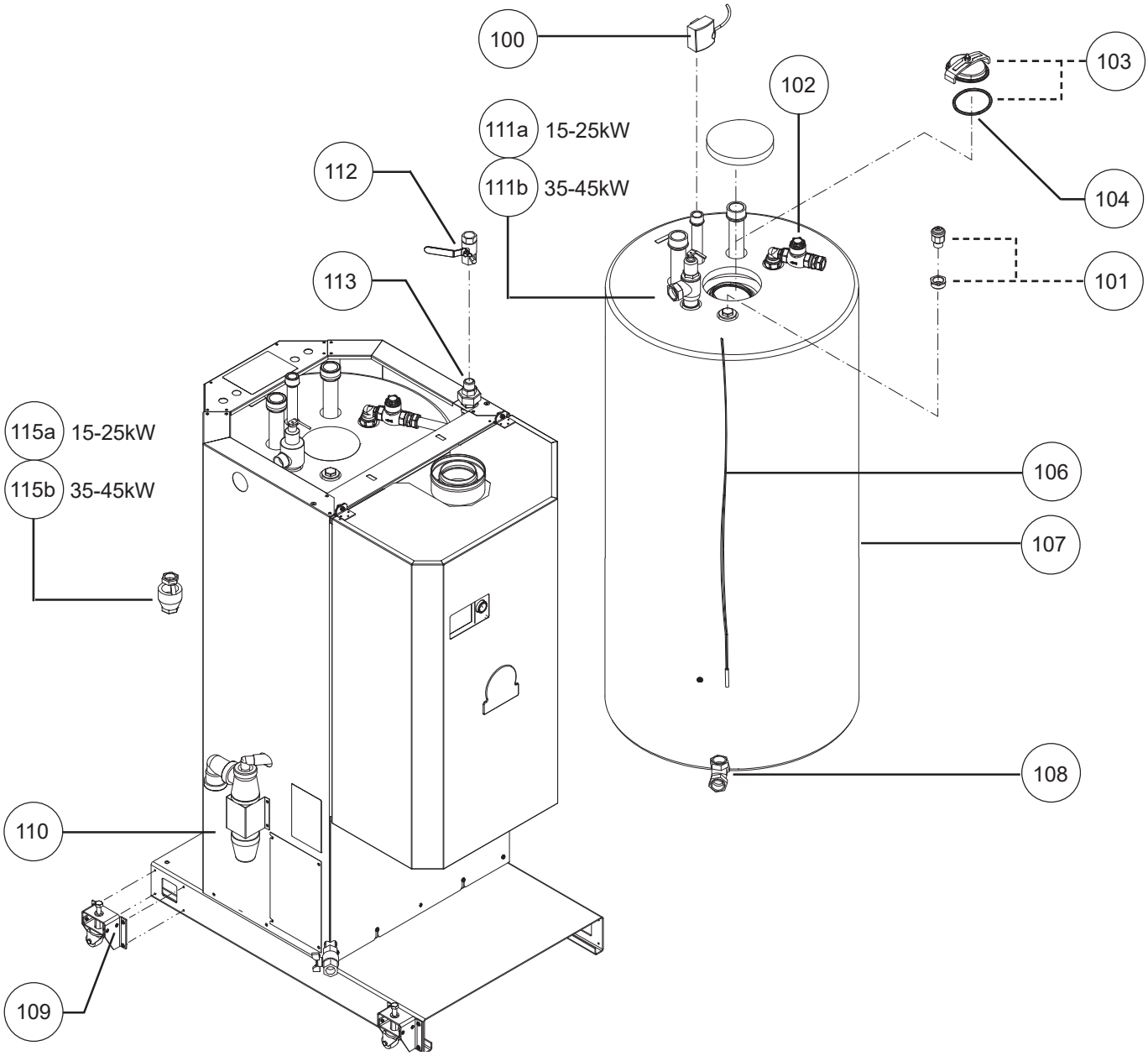
CAUTION
Only qualified professionals are permitted to remove and dispose of the water heater, in accordance with local and national regulations.

To remove the water heater, proceed as follows:

1. Switch off the heater's electrical connection
2. Shut off the gas supply
3. Shut off the water supply
4. Drain the tank
5. Remove the siphon
6. Remove the air supply/flue gas outlet pipes
7. Disconnect all pipes on the water heater
8. Remove the water heater
9. Dismantle the water heater ready for recycling

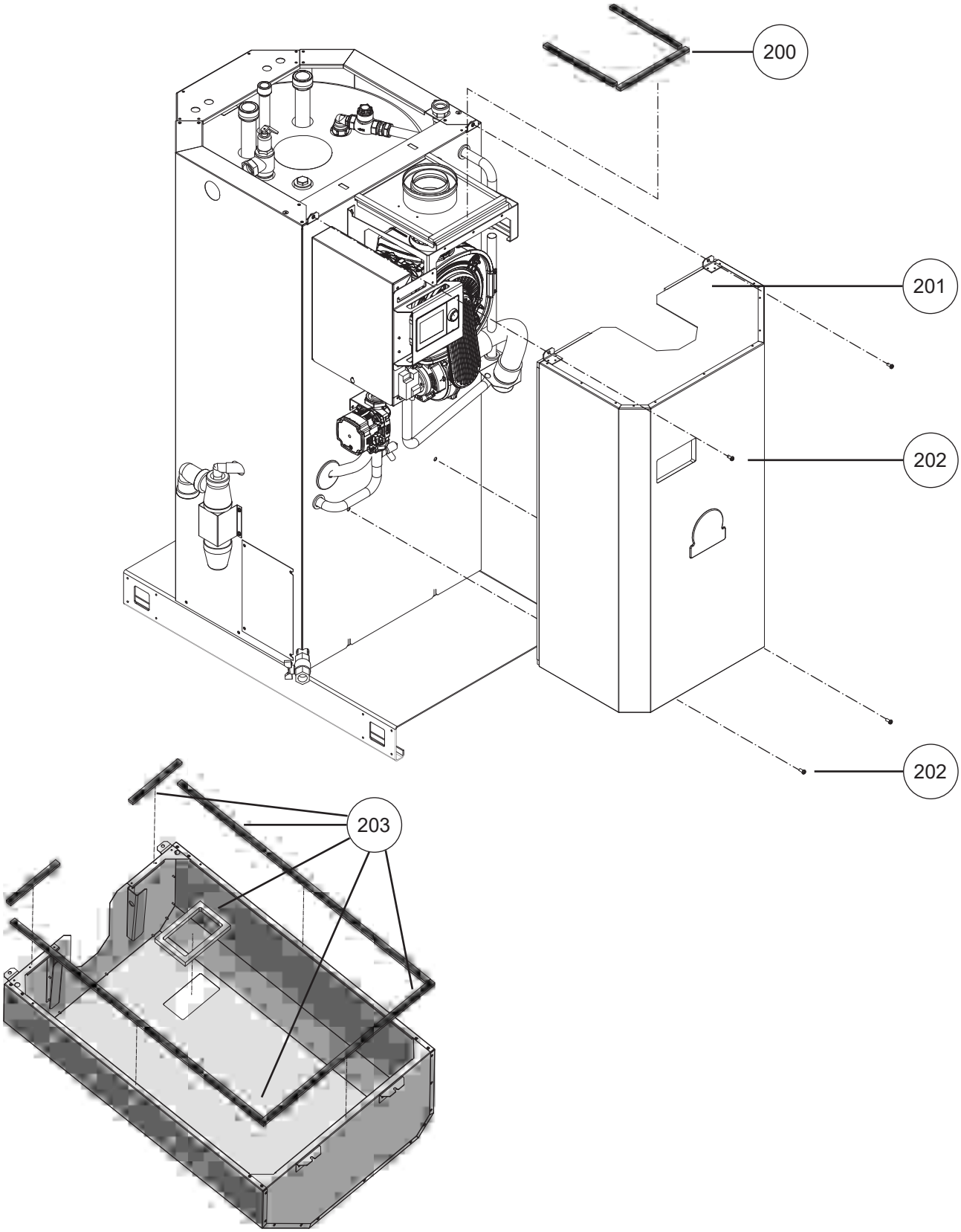
13 Spare parts

13.1 Tank & sundry spares



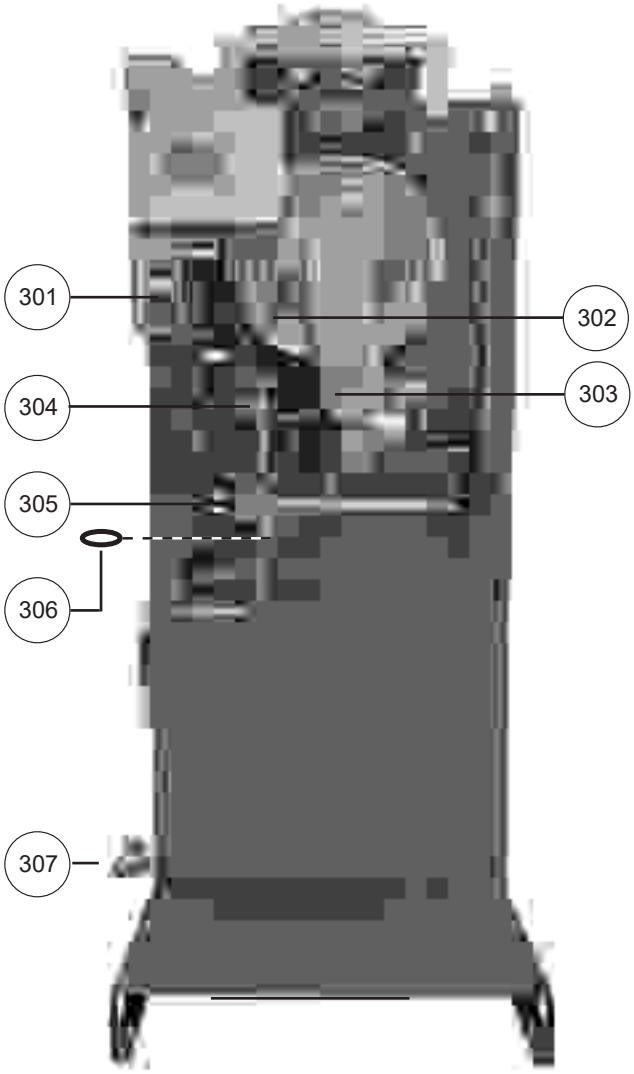
Item No.	Description	Part Number
100	Option - Return sensor kit	7720071
101	Option - Anti vac valve	7799189
102	3/4” Check valve assembly	7805932
103	Inspection hatch c/w bridge, nut & o-ring	G175
104	Access hatch o-ring	5142675
106	Temp sensor DHW tank B3	7709329
107	200 Litre tank	7816999
108	28mm Comp. T c/w reducers	7805885
109	Option - Castor assembly	7709385
110	Condensate trap	7617073
111a	3/4” Temperature/pressure relief valve 7.0 bar 90-95°C	G068
111b	1” Temperature/pressure relief valve 7.0 bar 90-95°C	5139805
112	3/4” Gas cock c/w test nipple	7733025
113	3/4” Gas union M&F	7733026
114	Option - Paint touch up kit	7784718
115a	22 x 28mm Tundish	7807481
115b	1” x 1.25” Tundish	5139811

13.2 Cover spares

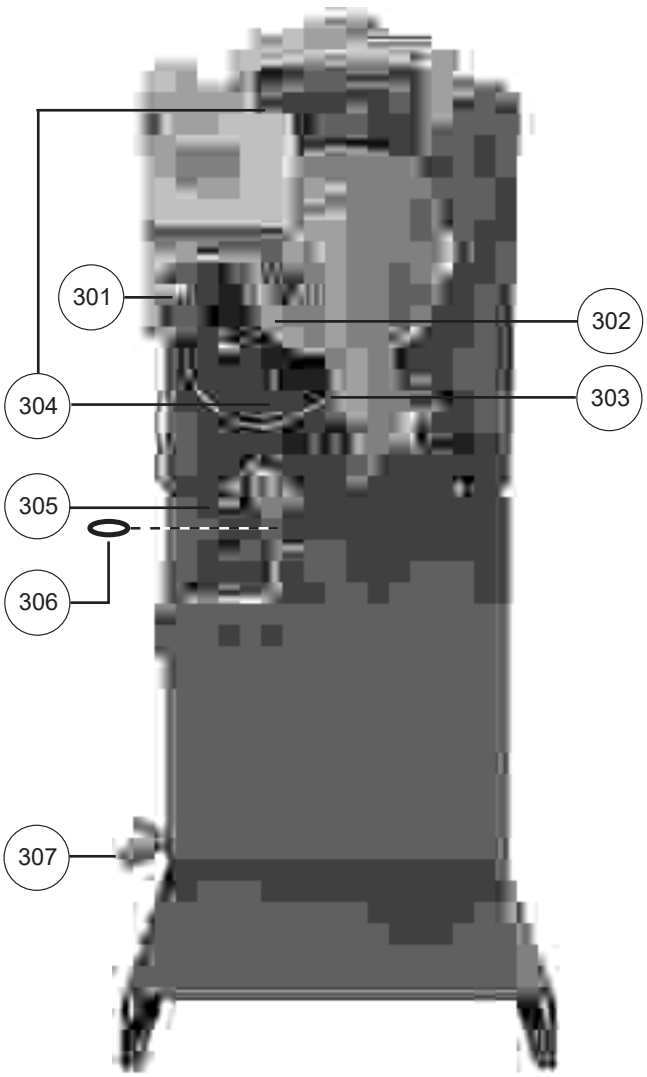


Item No.	Description	Part Number
200	Duct plate gasket Set	7805886
201	Cover white (c/w gaskets and logo)	7805887
202	Cover fixings set	7805930
203	Cover gasket set	7805931

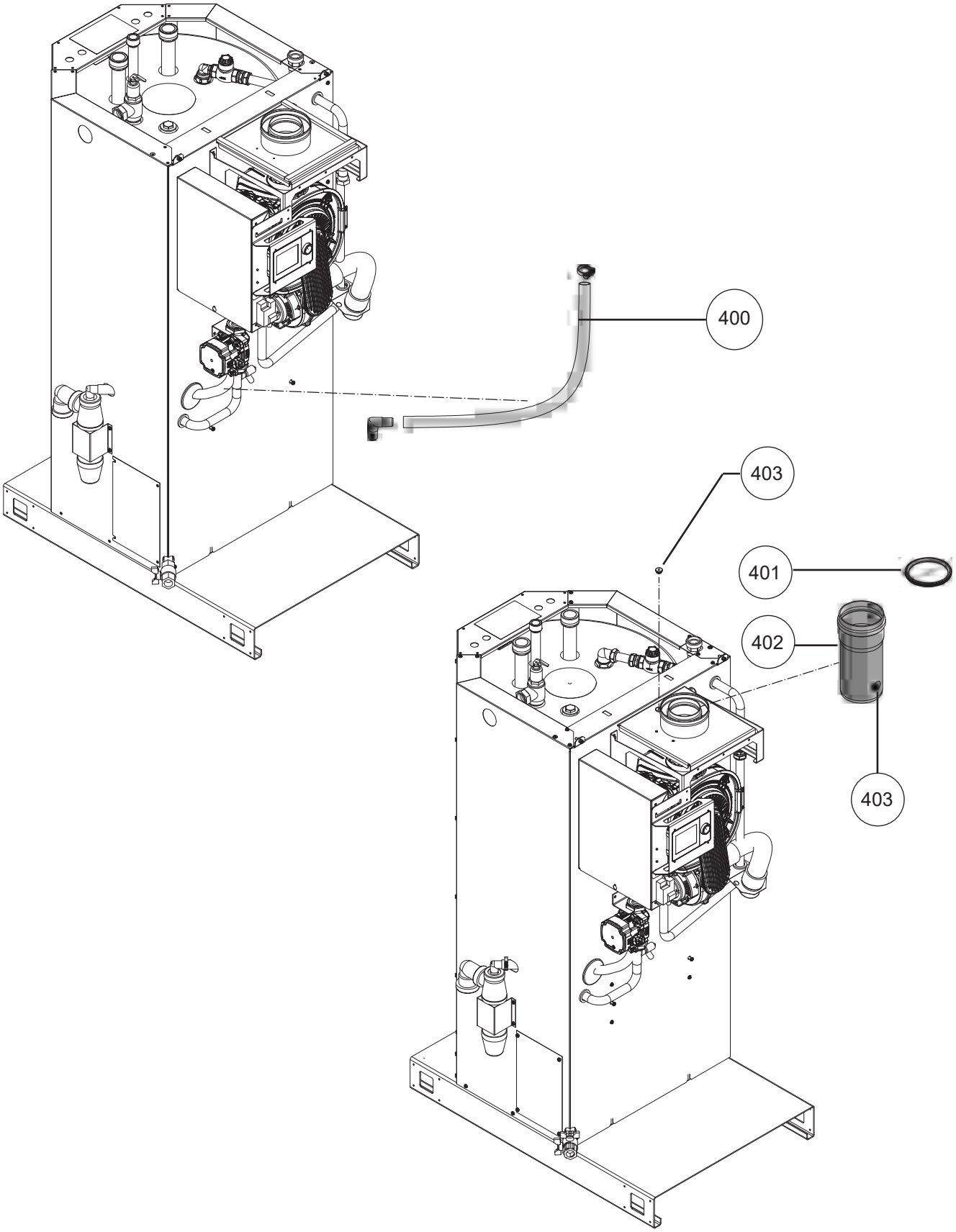
SC 15kW



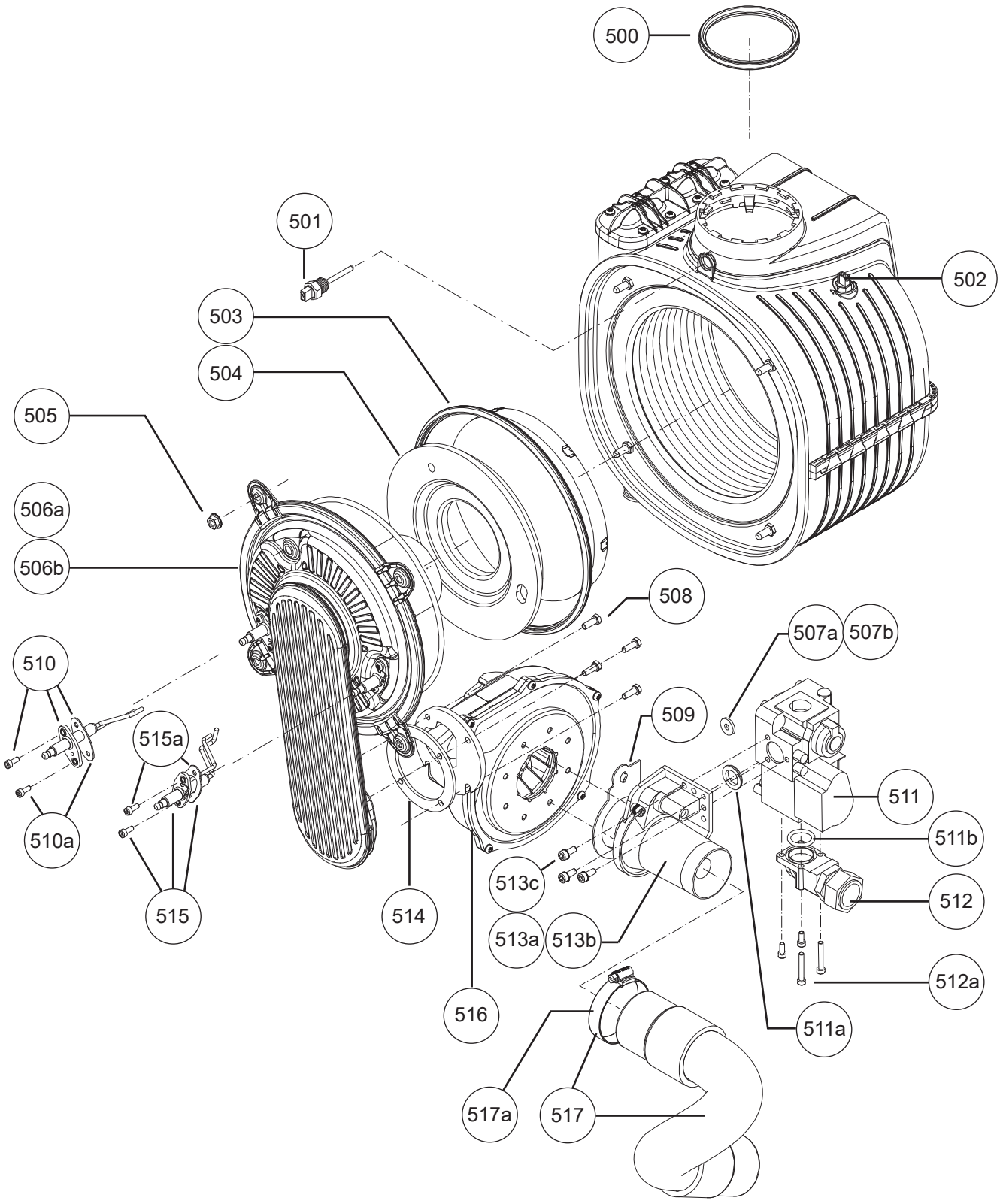
SC 25-35-45kW



Item No.	Description	Part Number
301	Spark generator	7709314
302	Ionisation lead	5142139
303	Lead for spark electrode	7709313
304	Flow and return temperature sensors	7805933
305	Pump	7709310
306	Pump Gasket	7720039
307	Spare drain valve 22mm	7727903



Item No.	Description	Part Number
400	Condensate pipe assembly	7805934
401	Flue seal set	S102186
402	Flue pipe	7805935
403	Sample point bung	5142574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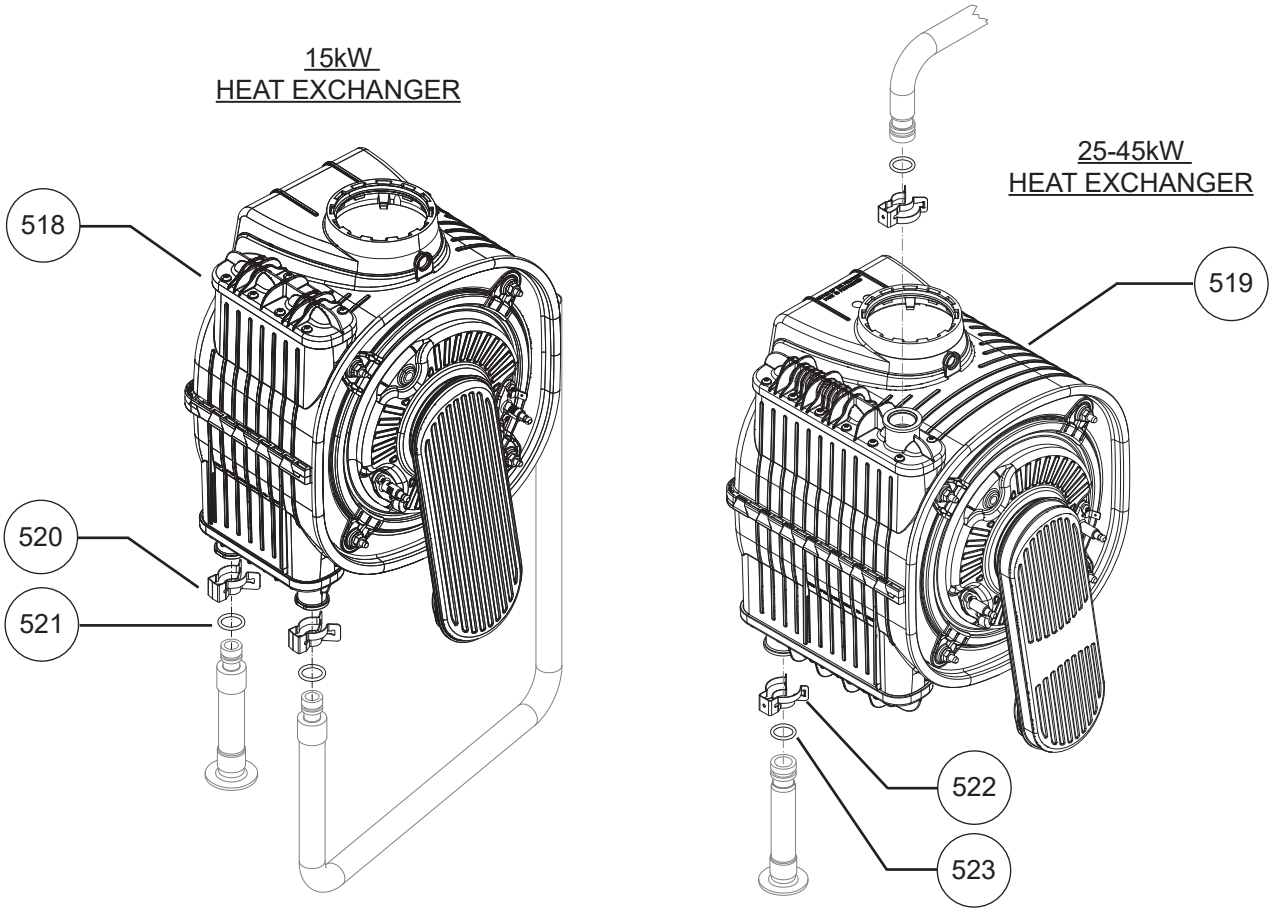
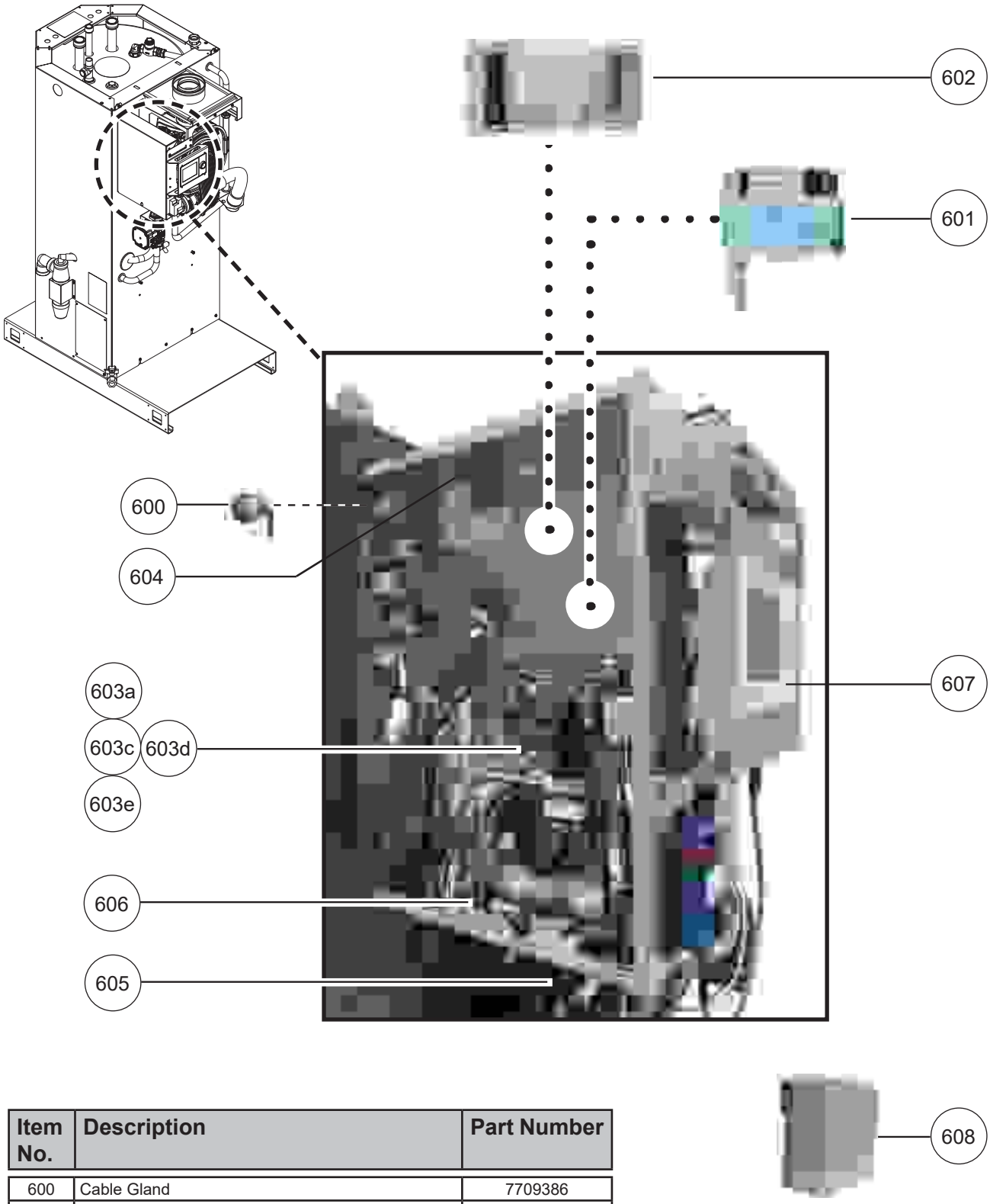
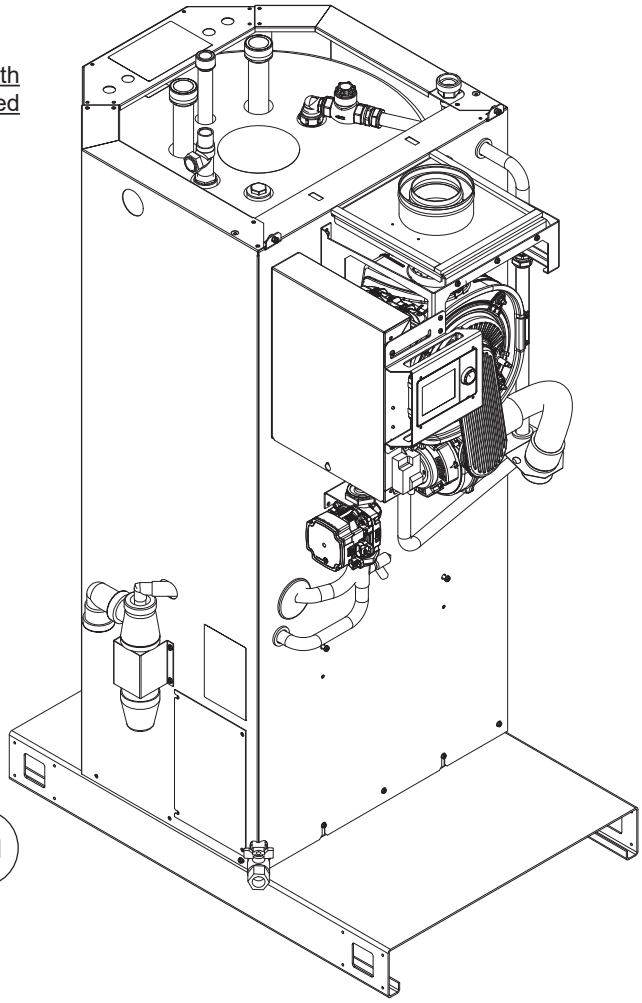


Item No.	Description	Part Number
500	Flue outlet gasket	7805936
501	Temp sensor flue B8	5139798
502	Thermal fuse	Not replaceable
503	H/E Silicone door seal	5139774
504	H/E Burner door insulation	7805937
505	H/E Nut set for burner door	7817002
506a	H/E Burner door 15kW	7805938
506b	H/E Burner door 25+35+45kW	7805939
507a	LPG kit for SC 15kW	7805942
507b	LPG kit for SC 25+35+45kW	7805943
508	Fastener set for fan-venturi	7709303
509	Venturi gasket	7709304
510	Ionis. electr. inc gasket+screws	7805940
510a	Gasket and screws - Ionisation electrode	7840041
511	Gas valve	7709308
511a	Gasket - Gas valve/Venturi	5140812
511b	Gasket - Gas valve / Straight connection	G061
512	22 x 1/2” BSP M straight conn	7709369
512a	Screw set - Straight connection	7836174
513a	Venturi 15kW	7709305
513b	Venturi 25+35+45kW	7709307
513c	Screw set - Venturi to gas valve	7836175
514	Fan gasket	7709302
515	Sparkelec. inc gasket+screws	7805941
515a	Gasket and screws - Spark electrode	7840043
516	Fan	7709301
517	Air hose (inc. Clip)	7805944
517a	Clip - Air hose	7840044
518	15kW Heat exchanger c/w CBD & electrodes	7805945
519	25+35+45kW Heat exchanger c/w CBD & electrodes	7805946
520	H/E clip 15kW	7805947
521	H/E O ring 15kW	7805948
522	H/E Clip 25+35+45kW	7805949
523	H/E O ring 25+35+45kW	7805950

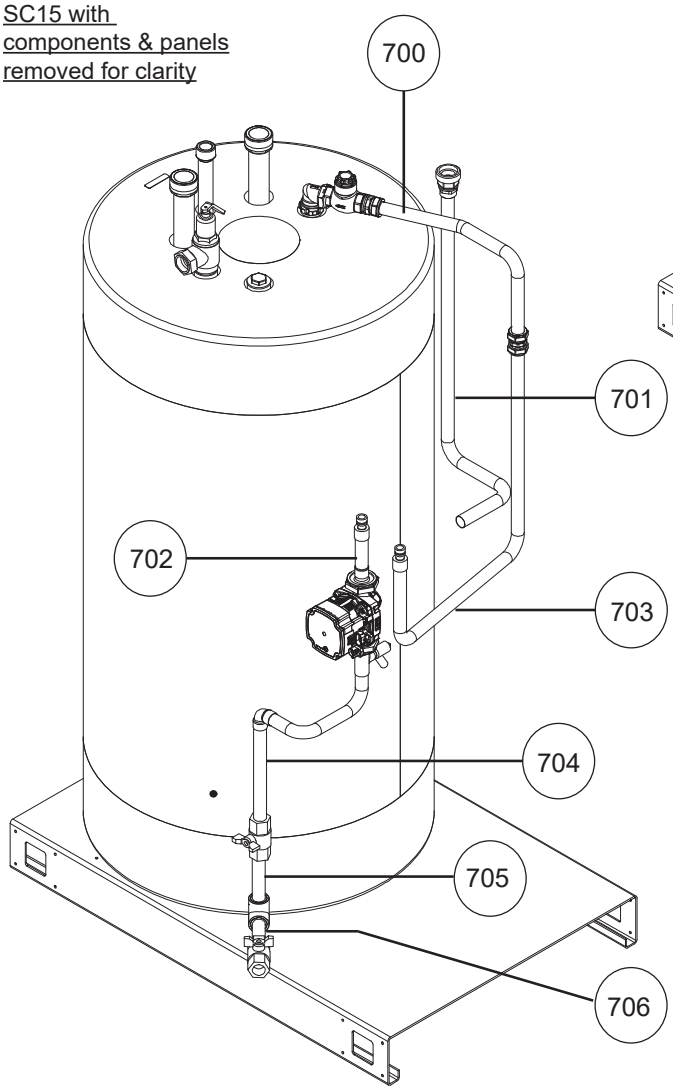


Item No.	Description	Part Number
600	Cable Gland	7709386
601	Option - Modbus clip-in module kit	7720069
602	Option - Expansion module kit	7720070
603a	Control PCB SC15	7805951
603c	Control PCB SC25	7805952
603d	Control PCB SC35	7805953
603e	Control PCB SC45	7805954
604	Control PCB fuses (2 pack)	7709324
605	Complete wiring loom	7805955
606	Temp limit thermostat 90°C	7709331
607	Graphical User Interface	7709326
608	Option - Web server	7726955

SC15 with
cover removed

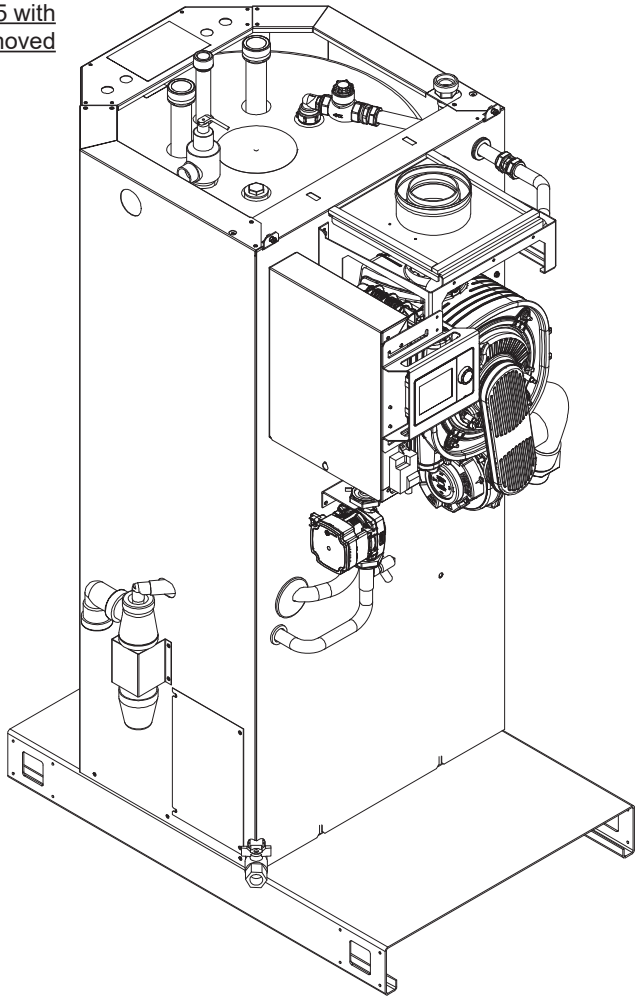


SC15 with
components & panels
removed for clarity

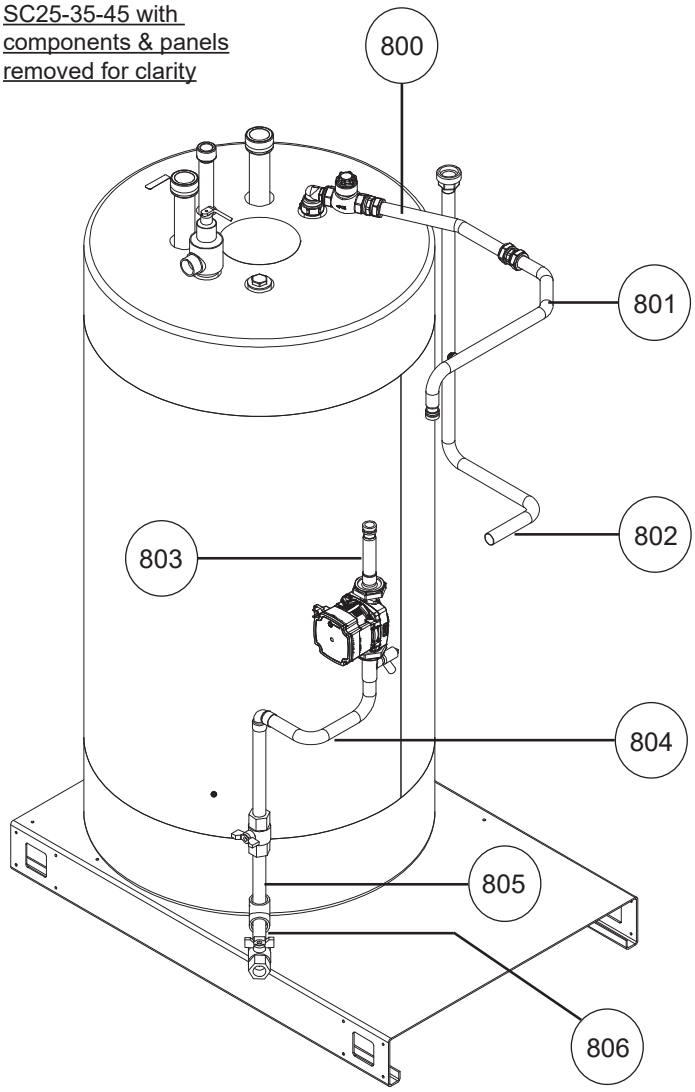


Item No.	Description	Part Number
700	Pipe 15kW tank connection flow	7805956
701	Pipe 15kW Gas	7805957
702	Pipe 15kW H/E Return	7805958
703	Pipe 15kW H/E Flow	7805959
704	Pipe 15kW 200L Bulk head return	7805960
705	Pipe tank return	7805961
706	Pipe drain straight	7805962

SC 25-35-45 with cover removed



SC25-35-45 with components & panels removed for clarity



Item No.	Description	Part Number
800	Pipe 25+35+45kW tank connection flow	7805963
801	Pipe 25+35+45kW H/E Flow	7805964
802	Pipe 25+35+45kW gas	7805965
803	Pipe 25+35+45kW H/E Return	7805966
804	Pipe 25+35+45kW 200L Bulk head return	7805967
805	Pipe tank return	7805961
806	Pipe drain straight	7805962

MAXXflo EVO Lite

Models			SC15 201	SC25 201	SC35 201	SC45 201
Daily electricity consumption	Q_{elec}	kWh	0.125	0.149	0.155	0.162
Declared load profile			XL	XL	XL	XL
Sound power level, indoors	L_{WA}	dB	48	53	57	62
Daily fuel consumption	Q_{fuel}	kWh	17.667	17.875	17.945	18.055
Emissions of nitrogen oxides	NO_X	mg/kWh	25	29	25	30
Weekly fuel consumption with smart controls	$Q_{fuel, week, smart}$	kWh	-	-	-	-
Weekly electricity consumption with smart controls	$Q_{elec, week, smart}$	kWh	-	-	-	-
Weekly fuel consumption without smart controls	$Q_{fuel, week}$	kWh	-	-	-	-
Weekly electricity consumption without smart controls	$Q_{elec, week}$	kWh	-	-	-	-
Storage volume	V	l	200	200	200	200
Mixed water at 40 °C	$V40$	l	554	∞	∞	∞
Harmonised standards applied	EN: 13203-2					
Specific precautions that shall be taken when the water heater is assembled, installed or maintained:	Before any assembly, installation or maintenance the installation and operation manual has to be read attentively and followed					

MAXXflo EVO Lite

Models		SC15 201	SC25 201	SC35 201	SC45 201
Declared load profile		XL	XL	XL	XL
Water heating energy efficiency class		A	A	A	A
Water heating energy efficiency	ηwh %	104.2	103.0	102.6	102.0
Annual energy consumption	*AEC kWh* (1)	56	57	57	56
	AFC GJ (2)	14	14	14	14
Other load profiles for which the water heater is suitable to use and corresponding water heating efficiency and annual electricity consumption(3)					
Thermostat temperature setting	°C	60	60	60	60
Sound power level L_{WA} indoors	*dB*	48	53	57	62
Ability to off-peak hours functioning(3)		Yes	Yes	Yes	Yes
Enabled smart control settings(4)		-	-	-	-

(1) Electricity

(2) Fuel

(3) If applicable

(4) If smart control setting value is "1", the water heating energy efficiency and annual electricity / fuel consumption only relate to enabled smart control settings

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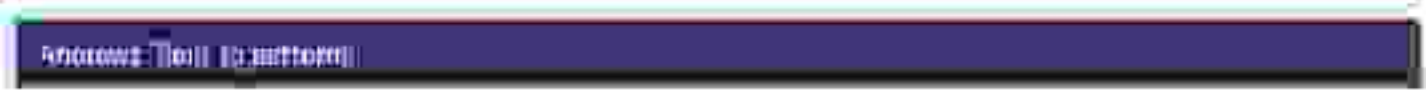
January 2023