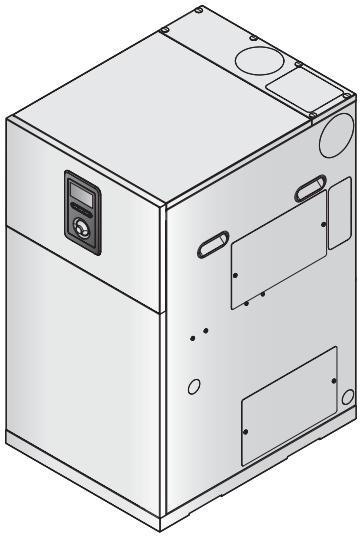
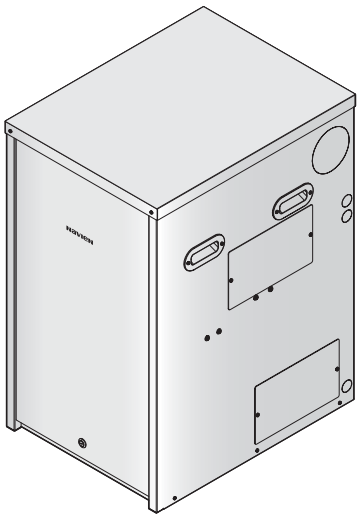




NAVIEN

Condensing Blue Flame Oil-Fired Boiler

Installation & Operation Manual

Installation Location	Type	Model
Internal	Regular	LCB700-21RS LCB700-28RS LCB700-36RS
	System	LCB700-21LS LCB700-28LS LCB700-36LS
	Combi	LCB700-21LC LCB700-28LC LCB700-36LC
External	Regular	LCB700-21RSX LCB700-28RSX LCB700-36RSX
	System	LCB700-21LSX LCB700-28LSX LCB700-36LSX
	Combi	LCB700-21LCX LCB700-28LCX LCB700-36LCX

Keep this manual near this boiler for future reference whenever maintenance or service is required.

⚠ WARNING

If the information in these instructions is not followed exactly, a fire or explosion may result, causing property damage or personal injury.

- **Do not store or use petrol or other flammable vapours and liquids in the vicinity of this or any other appliance.**
- **Installation and service must be performed by a qualified installer or service agency.**

WRAS CE 0086 energy saving trust endorsed product OFTEC™ ErP SEDBUK A

KD NAVIEN

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1. Safety Information

The following safety symbols are used in this manual. Read and follow all safety instructions in this manual precisely to avoid unsafe operating conditions, fire, explosion, property damage or personal injury.

DANGER

Indicates an imminently hazardous situation which, if not avoided, could result in severe injury or death.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in injury or death.

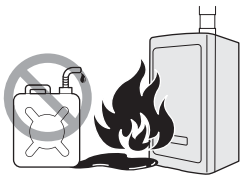
CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in property damage.

Note

Used for emphasis or for providing useful information not directly connected with the surrounding text but of importance to the user.

DANGER



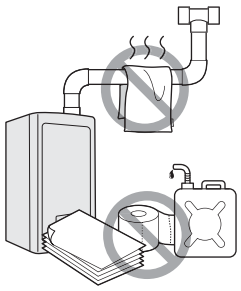
If oil fumes or leaks from the appliance:

- Extinguish any naked flames.
- Isolate the electrical supply.
- Isolate the fuel supply to the boiler.
- Rectify the fault.

Do not use or store flammable products, such as petrol, solvents, or adhesives in the same room or area as the boiler.

- The boiler has a main burner flame that can turn on at any time and can ignite flammable vapours. Vapours from flammable liquids can explode and catch fire, causing severe burns.
- Vapours cannot be seen and are heavier than air. They can travel long distances along the ground and can be carried from other rooms to the boiler's main burner flame by air current.
- Keep all flammable products far away from the boiler and store them in approved containers. Keep the containers closed tightly and out of the reach of children and pets.

⚠ WARNING



- **Do not store or use petrol or other flammable liquids near this boiler.**
  Doing so may result in fire or explosion.
- **Do not place combustibles, such as newspapers or laundry, near the boiler or flue system.**
  Doing so may result in a fire.
- **Do not place or use hair sprays, spray paints, or any other compressed gases near the boiler or flue system, including the flue termination.**
  Doing so may result in fire or explosion.
- **Do not operate the boiler with the front cover opened.**
  Doing so may result in fire or carbon monoxide (CO) poisoning, which may result in property damage or personal injury.
- **Do not operate this boiler without proper flue system.**
  Doing so may result in fire or carbon monoxide (CO) poisoning, which may result in property damage or personal injury.
- **Do not touch the power cord or internal components of the boiler with wet hands.**
  Doing so may result in electric shock.

⚠ WARNING

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

CAUTION

- **Do not turn on the boiler unless the water and oil supplies are fully opened.**
  Doing so may damage the boiler.
- **Do not turn on the water if the cold water supply shut-off valve is closed.**
  Doing so may damage the boiler.
- **Do not use this boiler for anything other than its intended purpose, as described in this manual.**
- **Do not remove the front cover unless the power to the boiler is turned off or disconnected.**
  Failure to do so may result in electric shock.
- **When servicing the controls, label all wires prior to disconnecting them.**
  Failure to do so may result in wiring errors, which can lead to improper or dangerous operation. Verify proper operation after servicing.
- **Do not use unapproved replacement or accessory parts.**
  Doing so may result in improper or dangerous operation and will void the manufacturer's warranty.
- **Do not place anything in or around the flue terminals, such as a clothes line, that could obstruct the air flow in or out of the boiler.**

DANGER



To prevent burns:

- Use the lowest operating temperature setting necessary to provide comfortably hot water.
- If your household has children or elderly or disabled residents, consider using a lower temperature setting.
- Read all the instructions in this manual carefully before changing the temperature setting.
- Feel the water before using it on children, the elderly, or the disabled. Extinguish any naked flames.

DANGER

This boiler's water temperature is set to 49°C at the factory for your safety and comfort. Increasing the temperature increases the risk of accidental scalding. Water temperatures at or above 52°C can cause instant scalding or severe burns. Before you decide to change the temperature setting, read the following charts carefully.

Water Temperature	Time in which a young child can suffer a full thickness (3rd degree) burn
70°C	Less than 1 second
60°C	1 second
55°C	10 seconds
49°C	10 minutes
37°C	Very low scald risk

General Installation Guidelines

Navien ensures that this product contains no harmful substances and that no harmful materials have been used in its manufacture.

Current legislation must be taken into account on installing this appliance, and it must be installed in a place with suitable ventilation.

The boiler must be installed by an installer authorised by the Ministry of Industry and it must be started up by an Official Technical Assistance Service authorised by Navien.

The requirements included in the following regulations must be observed on installing the boiler:

- The Technical Building Code.
- The Regulation for Heating Installations in Building.
- The Low Voltage Regulation.

Complying with the building regulations

This heating appliance forms part of the controlled services for the building. It is law that all controlled services for buildings must comply with building regulations. You must be able to satisfy your Local Authority Building Control Body (LABC) that the work carried out concerning the installation and commissioning of this heating appliance has been carried out to a satisfactory standard.

OFTEC operates a competent persons scheme and registered installers are able to certify that their work complies with building regulations.

Under the scheme:

- OFTEC must be informed about every installation.
- OFTEC will issue a building regulations compliance certificate to the householder and will notify the LABC.

OFTEC provide controlled document forms CD10 and CD11 for use during installation and commissioning respectively.

Other organisations operate self-certification schemes, e.g., NAPIT and BESCA Ltd., and it may be possible for installers who are members of these organisations to self-certify their work.

Alternatively you must submit a building control notice to the LABC before installing any boiler. The LABC will then arrange regular inspection visits during the work to ensure that the installation complies with the regulations.

Installation

Failure to install appliances correctly could lead to prosecution.

The appliance should be installed by a competent person. The person installing the appliance should be aware of the Health and Safety at Work Act and take appropriate action to ensure that the regulations are adhered to. In order to give optimum efficiency and trouble free operation the appliance must be commissioned by a qualified OFTEC engineer.

Compliance with a British Standard does not, in itself, confer immunity from legal obligations. In particular, the installation of this appliance must be in accordance with the relevant requirements of the following British Standards and regulations in respect of the safe installation of equipment:

Standard	Description
BS 5410	part 1: Code of practice for Oil Fired Boilers.
BS 799	part 5: Specification for Oil Storage Tanks.
BS 7593	Code of Practice for treatment of water in domestic hot water central heating systems.
BS 5449	part 1: Specification for forced circulation hot water central heating for domestic premises.
BS 5955	part 8: Specification for the installation of thermoplastic pipes and associated fittings for use in domestic hot and cold water services and heating systems.
BS 7291	Thermoplastic pipes and associated fittings for hot and cold water for domestic purposes and heating installations in buildings.
BS 7074	part 1: Application, selection and installation of expansion vessels and ancillary equipment for sealed water systems.
BS 1254-2	Copper and copper alloys plumbing fittings part 2: Fittings with compression ends for use with copper tubes.
BS 7671	IEE Wiring Regulations, current edition.
BS 1362	Specification for general purpose fuse links for domestic and similar purposes.

The Building Regulations Part G, Part J and L1, England and Wales; Part F and Part J Section III, Scotland; Part L and Part F, Northern Ireland. Local water company bylaws. The Control of Pollution (Oil) Regulations. OFTEC Standards.

Where no specific instruction is given, reference should be made to the relevant codes of practice.

Installations in Eire (Republic of Ireland)

The Installation must be performed by a competent and suitably trained person in accordance with the following Eire regulations.

Current building regulations - Part J, Republic of Ireland

ETCI rules for electrical installation

For further guidance see:

OFTEC Technical book three - Regional requirements: Republic of Ireland

EC Conformity Declaration

CE 0086

Navien, hereby declares that the LCB700 models to which this declaration refers, conform to and comply with the essential requirements of the following applicable European Standards and Directives.

appliances: Directive 2009/142/EC Standards EN 15034 and EN 267

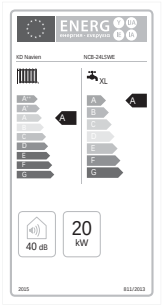
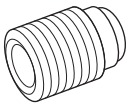
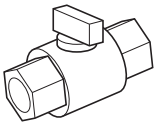
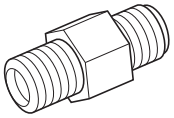
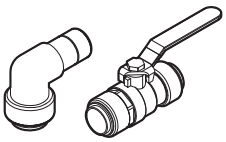
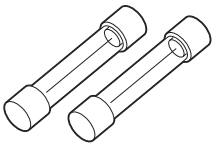
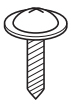
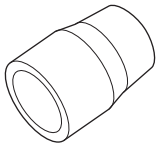
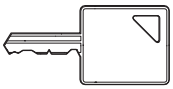
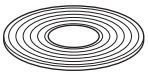
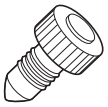
Boiler Efficiency : Directives 92/42/EEC and 93/68/EEC
Regulation (EN) No. 813/2013 Standards EN 15034

Navien, manufactures its products using a Quality Assurance system in compliance with Standard EN-ISO 9001:2000.

2. About the Boiler

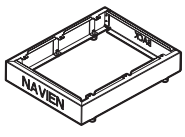
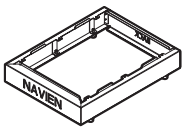
2.1 Items Included

When you open the box, you will find the following items with the boiler. Check the box for each of the following items before installing the boiler. If it seems like there is a problem, do not use the boiler. Contact your supplier. Keep the included items out of the reach of children, as they can be dangerous. When you no longer wish to use the boiler, disable any parts that could be potentially hazardous.

		
Installation & Operation Manual	ErP Label	Oil Pump Return Line Plug
		
Oil Line Cut Off Valve	Oil Line Nipple	Pre-plumbing Kit
		
Fuse	Flue Fixing Screw	Reducer (36 kW)
		
Key (External Model)	Condensate Pipe Packing (External Model)	Dust Cap for Automatic Air Vent

2.2 Accessories

The following optional accessories are available for the boiler.

	
Support (Internal Model) (Height: Max. 140 mm)	Support (External Model) (Height: Max. 140 mm)

2.3 Specifications

The following tables list the general specifications and energy consumption for the boiler.

DESCRIPTION			UNITS	Internal Model			External Model		
				21RS 21LS 21LC	28RS 28LS 28LC	36RS 36LS 36LC	21RSX 21LSX 21LCX	28RSX 28LSX 28LCX	36RSX 36LSX 36LCX
Heat Input	Stage 1/Stage 2		kW	17/22	22/29	30/37	17/22	22/29	30/37
Heat Output	80/60℃	Stage 1/Stage 2	kW	16/21	21/28	29/36	16/21	21/28	29/36
	50/30℃	Stage 2	kW	23.0	30.3	39.0	23.0	30.3	39.0
Water capacity	Heat Exchanger		ℓ	14	13.5	16.4	14	13.5	16.4
	Storage Tank(Combi Models)		ℓ	30	30	30	30	30	30
Central Heating	Flow Rate (△t 20℃)		ℓ/min	15	20	25.8	15	20	25.8
	Waterside resistance (△t 20℃)		mbar	130	200	220	130	200	220
	Max. Operation Pressure		bar	2.5			2.5		
	Supply Temp. Control Range		℃	40 – 85 (Default 85)			40 – 85 (Default 85)		
Domestic Hot Water	Max. Operation Pressure		bar	10			10		
	Supply Temp. Control Range		℃	30 – 60 (Default 50)			30 – 60 (Default 50)		
Connection	Central Heating	supply	mm	Φ22	Φ22	Φ22 (Φ28)	Φ22	Φ22	Φ22 (Φ28)
		return	mm	Φ22	Φ22	Φ22 (Φ28)	Φ22	Φ22	Φ22 (Φ28)
	DHW (Domestic Hot Water) Outlet		mm	Φ15	Φ15	Φ15	Φ15	Φ15	Φ15
	DCW (Domestic Cold Water) Inlet		mm	Φ15	Φ15	Φ15	Φ15	Φ15	Φ15
	Condensate		mm	Φ21.5			Φ21.5		
	Oil		inch	1/4" BSP Male			1/4" BSP Male		
	Flue System	Flue Size	mm	Coaxial Φ100/60 (plastic)			Coaxial Φ100/60 (plastic)		
		Max. horizontal length	m	20			20		
		Max. vertical length	m	21			21		
		90˚ elbow length	m	1.3			1.3		
		45˚ elbow length	m	1			1		
Electrical	Power supply		V/Hz	AC 230 V/50 Hz			AC 230 V/50 Hz		
	Fuse		A	250 V (Φ5×20), 5 A/3.15 A			250 V (Φ5×20), 5 A/3.15 A		
	Consumption		W	95	105	125	95	105	125
	Circulation Pump (System/Combi Model)		W	60	60	60	60	60	60
Safety shut off			℃	95			95		
Flue gas temperature			℃	Less than 70			Less than 70		
Sealed System	System pre-charged pressure		bar	1			1		
	Maximum operating pressure		bar	2.5			2.5		
	Expansion vessel (System/Combi Model)		ℓ	12			12		
General Data	Dimensions	Regular/System Models models (RS,RSX/LS,LSX)	mm	470×600×860			515×673×882		
		Combi models (LC,LCX)		600×600×860			650×673×900		
	Weight (NET)	Regular models (RS,RSX)	kg	58	59	62	64	65	68
		System models (LS,LSX)	kg	66	67	70	72	73	76
		Combi models (LC,LCX)	kg	91	92	95	98	99	102

Product Datasheet On Energy Consumption

The following product data complies with the requirements of EU Regulations No. 811/2013 and No. 812/2013 as supplement to the Directive 2010/30/EU.

Product data	Symbol	Unit	LCB700		
			21RS, RSX 21LS, LSX 21LC, LCX	28RS, RSX 28LS, LSX 28LC, LCX	36RS, RSX 36LS, LSX 36LC, LCX
Condensing boiler	-	-	Yes	Yes	Yes
Low-temperature** boiler	-	-	No	No	No
B1 boiler	-	-	No	No	No
Combination heater (LC, LCX models)	-	-	Yes	Yes	Yes
Rated heat output	P_{rated}	kW	21	28	36
Seasonal space heating energy efficiency	η_S	%	93	93	93
Energy efficiency class	-	-	A	A	A
Useful heat output					
At rated heat output and high temperature regime*	P_4	kW	21.23	28.38	36.51
At 30 % of rated heat output and low temperature regime**	P_1	kW	6.75	8.87	11.53
Useful efficiency					
At rated heat output and high temperature regime*	η_4	%	92.13	92.48	92.27
At 30 % of rated heat output and low temperature regime**	η_1	%	97.63	97.56	97.91
Auxiliary electricity consumption					
At full load	elmax	kW	0.0935	0.1013	0.1242
At part load	elmin	kW	0.0281	0.0268	0.0328
In standby mode	P_{SB}	kW	0.0016	0.0018	0.0017
Other items					
Standby heat loss	P_{stby}	kW	0.0731	0.0843	0.0731
Ignition burner power consumption	P_{ign}	kW	0	0	0
Emissions of nitrogen oxides (only gas or oil fired)	NO_x	mg/kWh	57.2	62.5	63.2
Sound power level (External Model)	L_{WA}	dB	49	52	56
Additional data for combination heaters					
Declared load profile	-	-	XL	XL	XL
Daily electricity consumption	Q_{elec}	kWh	0.348	0.310	0.304
Annual electricity consumption	AFC	kWh	74	66	65
Daily fuel consumption	Q_{fuel}	kWh	26.469	27.083	27.078
Annual fuel consumption	AFC	GJ	20	20	20
Water heating energy efficiency	η_{wh}	%	74.4	73.3	73.4
Water heating energy efficiency class	-	-	B	B	B

* High-temperature regime means 60 °C return temperature at heater inlet and 80°C feed temperature at heater outlet.
** Low temperature means for condensing boilers 30°C, for low-temperature boilers 37°C and for other heaters 50°C return temperature (at heater inlet).

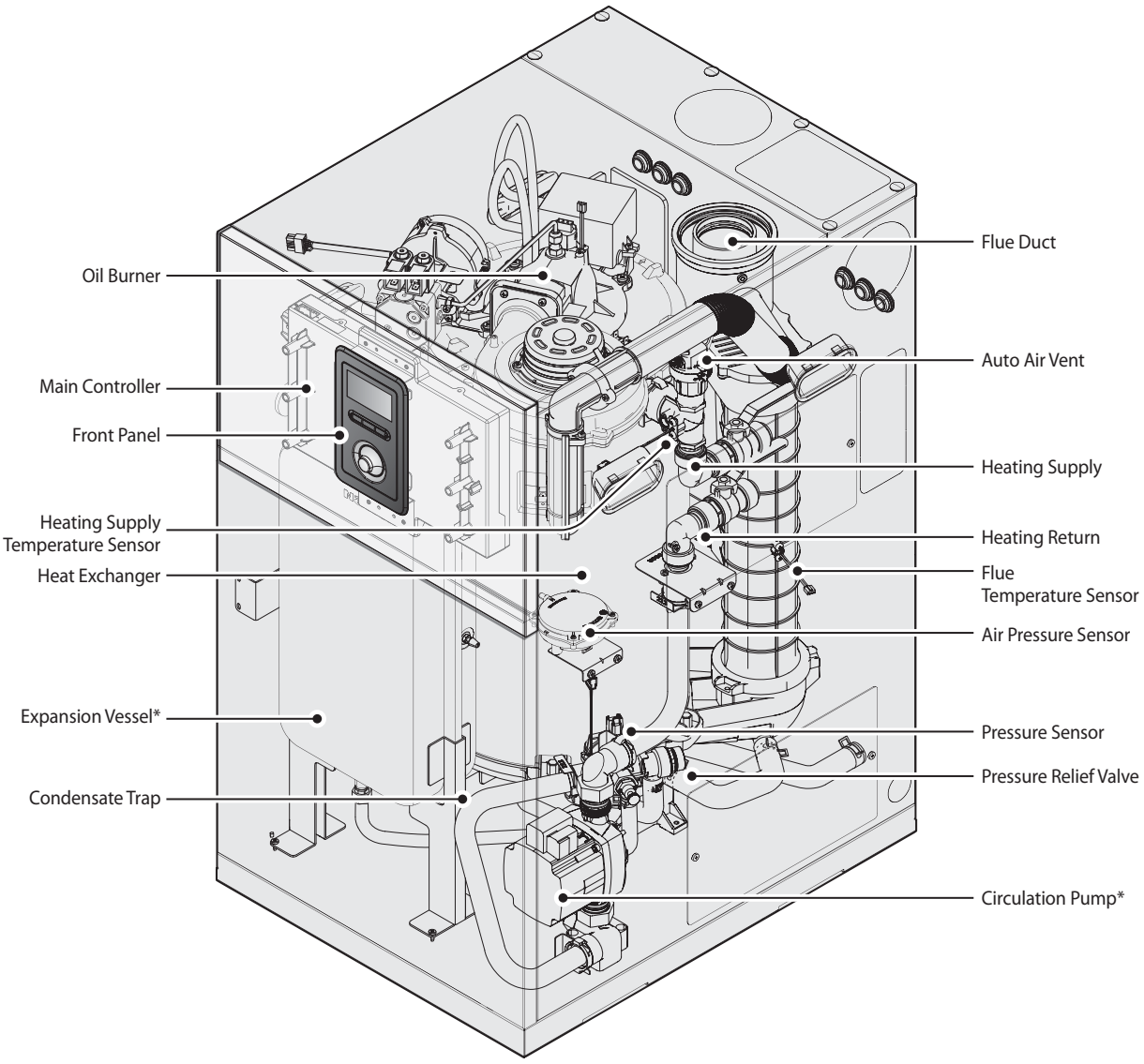
Specific Precautions

Read the user's information and installation manual before the application is assembled, installed or maintained.

2.4 Components

Internal Model (Regular / System)

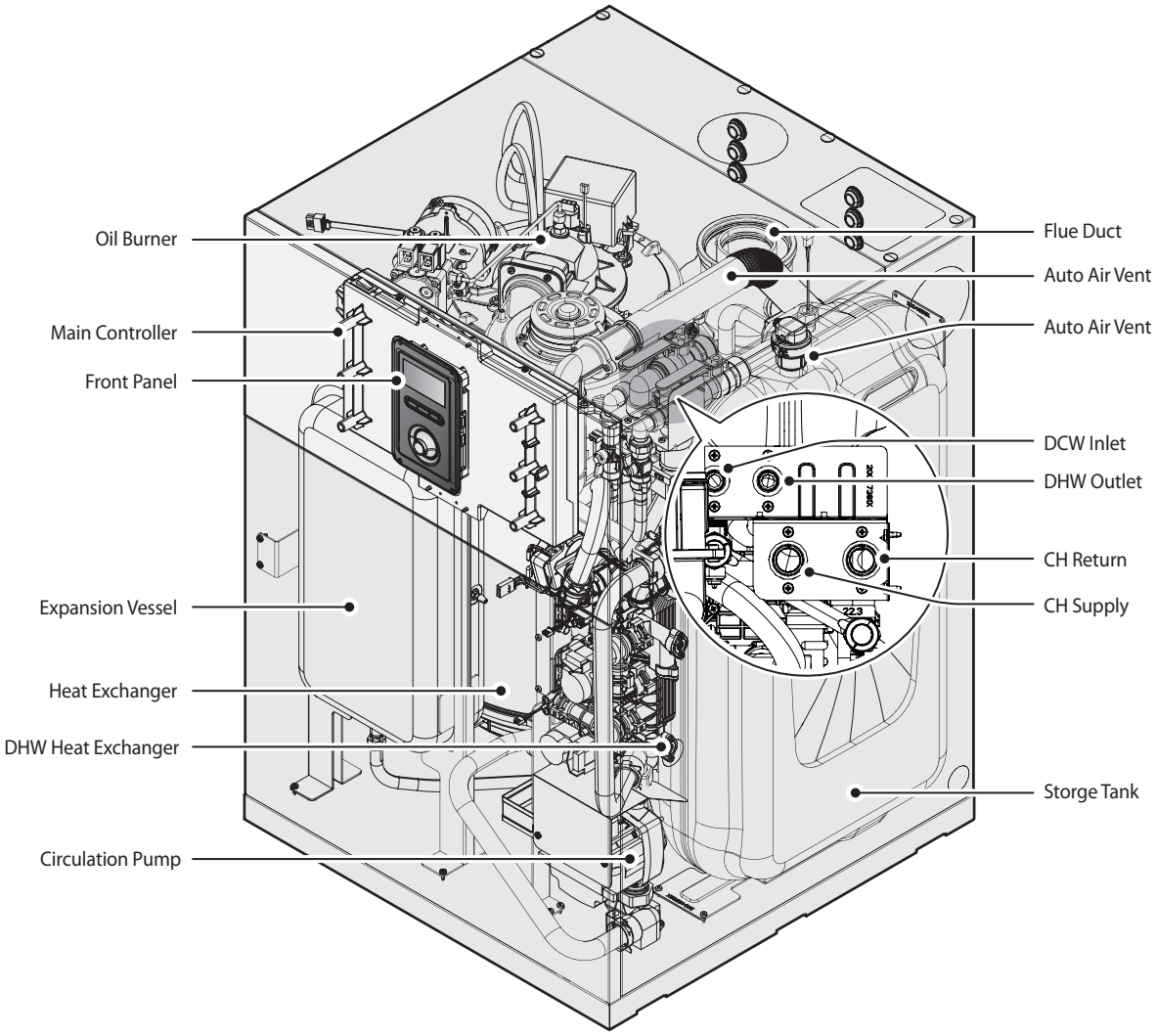
The following diagram shows the key components of the boiler. Component assembly diagrams and particular parts lists are included in the Appendixes.



* The expansion vessel and circulation pump are not included in the regular model.

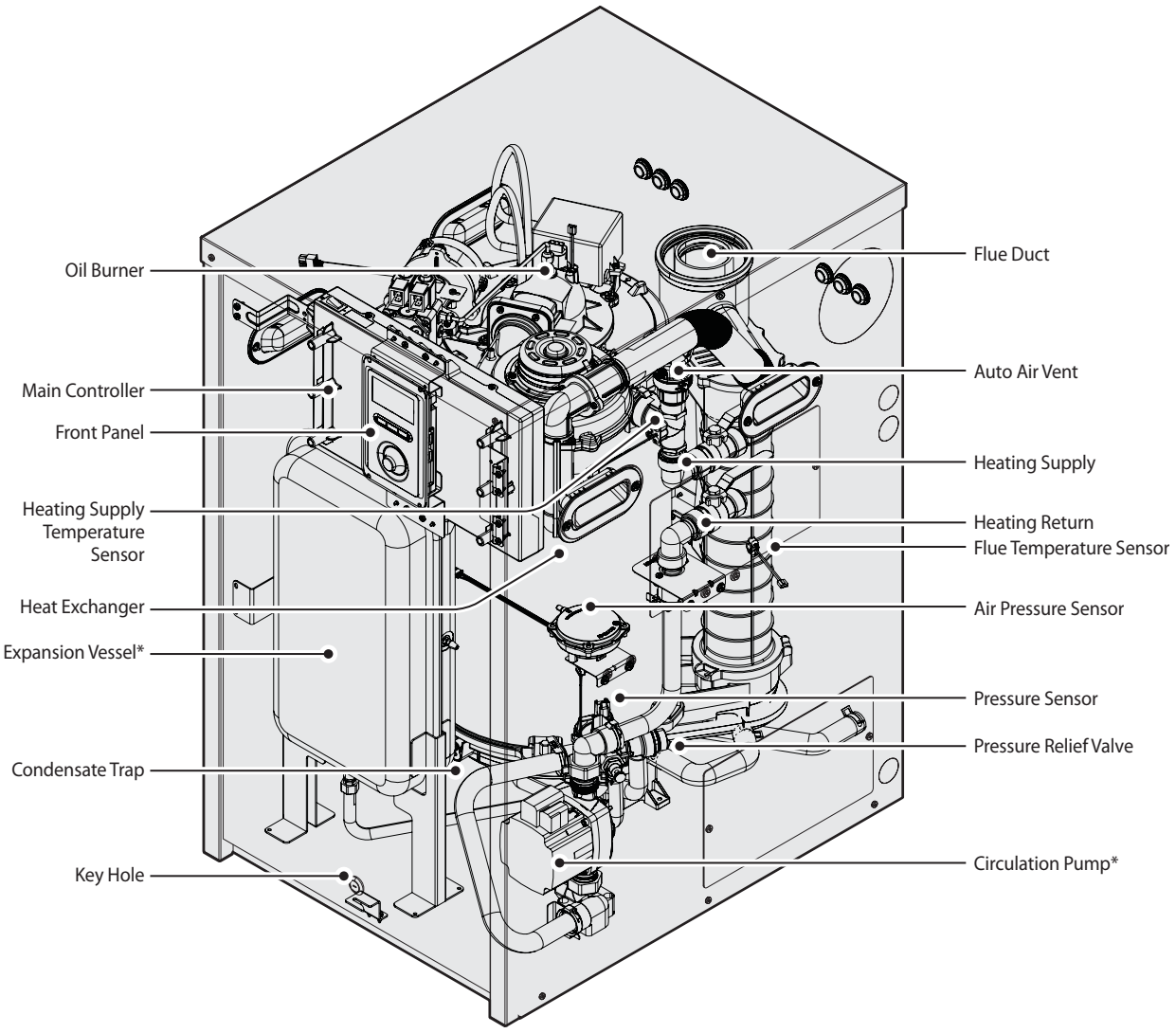
Internal Model (Combi)

The following diagram shows the key components of the boiler. Component assembly diagrams and particular parts lists are included in the Appendixes.



External Model (Regular / System)

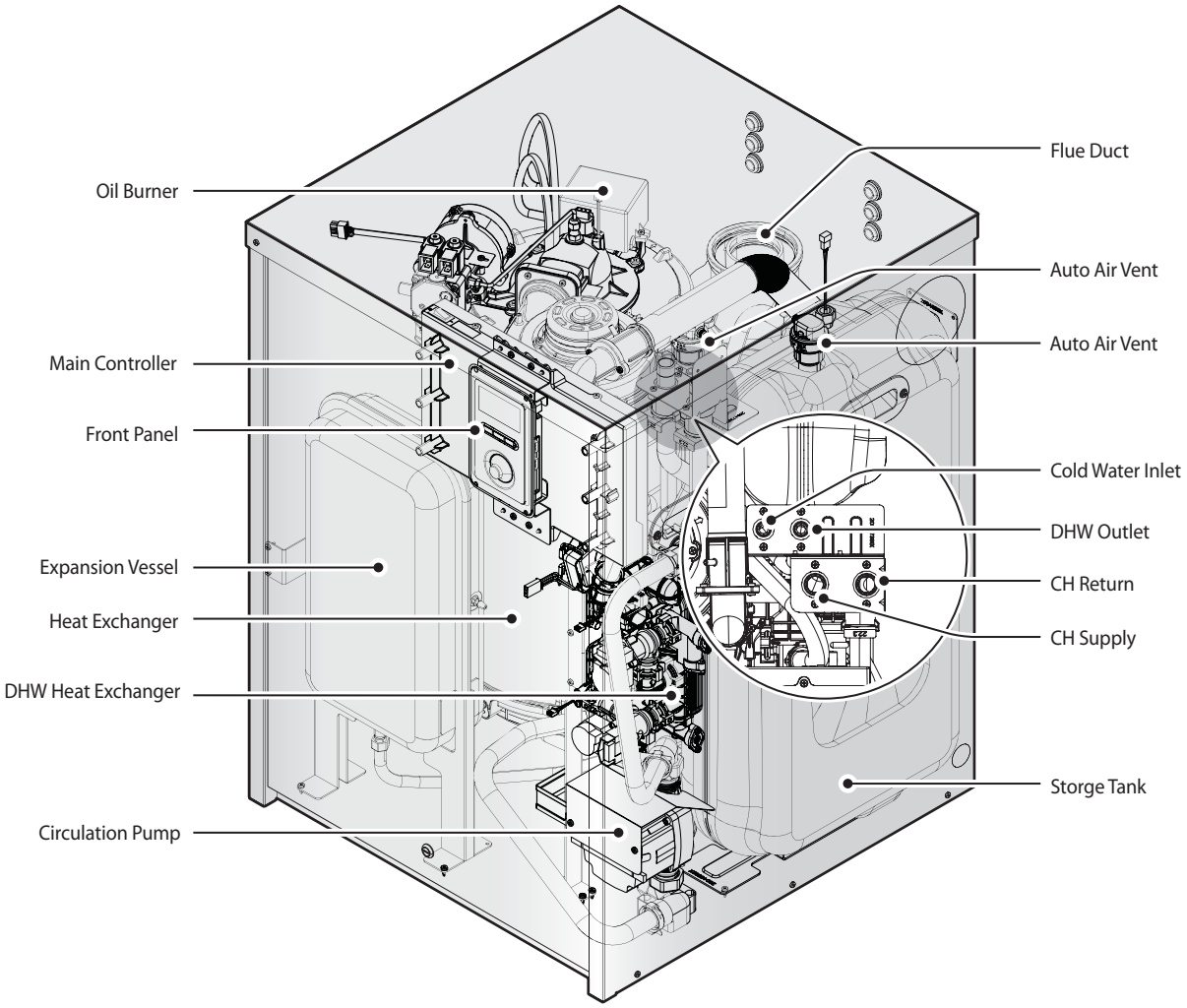
The following diagram shows the key components of the boiler. Component assembly diagrams and particular parts lists are included in the Appendixes.



* The expansion vessel and circulation pump are not included in the regular model.

External Model (Combi)

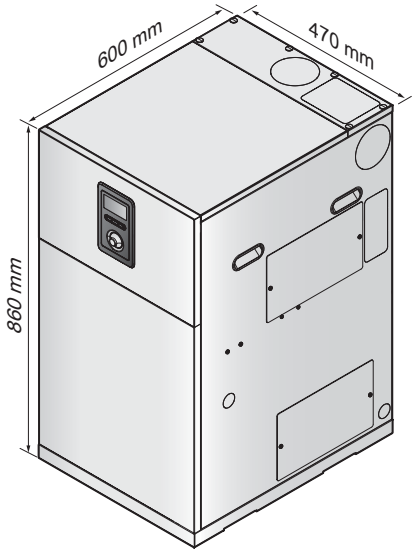
The following diagram shows the key components of the boiler. Component assembly diagrams and particular parts lists are included in the Appendixes.



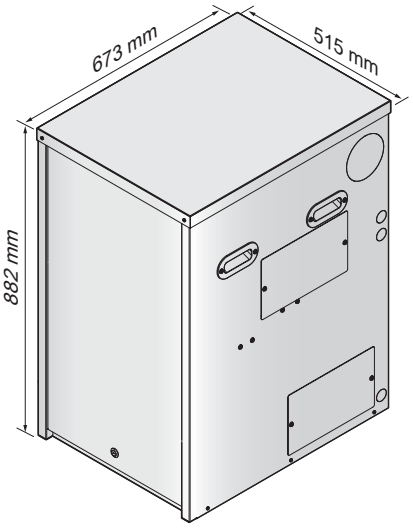
2.5 Dimensions

The following diagrams show the dimensions of the boiler and the table lists the supply connections.

Internal Model (Regular / System)



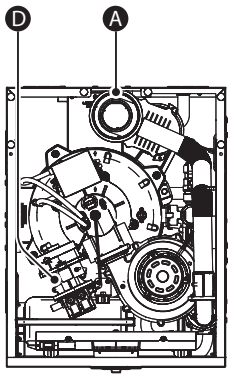
External Model (Regular / System)



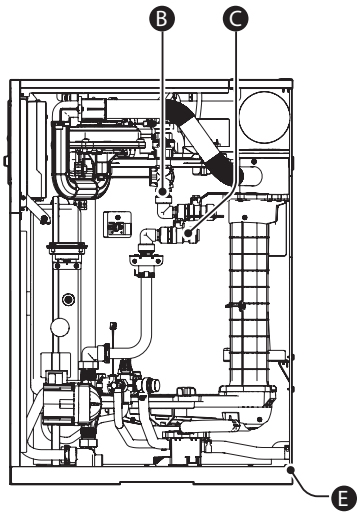
Supply Connections

Symbol	Description	LCB700		
		21RS, RSX 21LS, LSX	28RS, RSX 28LS, LSX	36RS, RSX 36LS, LSX
A	Flue Exhaust	Φ60/100		
B	Central Heating Supply	Φ22	Φ22	Φ22 (Φ28)
C	Central Heating Return	Φ22	Φ22	Φ22 (Φ28)
D	Oil Supply Inlet	1/4" Ball Valve (Female)		
E	Condensate Drain	More than Φ21.5 (Plastic Pipe)		

Top View

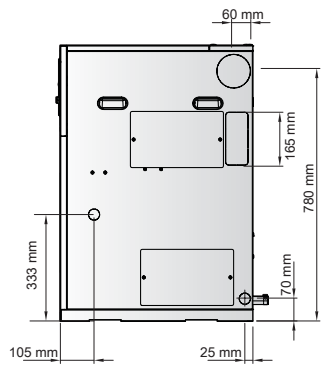


Right View

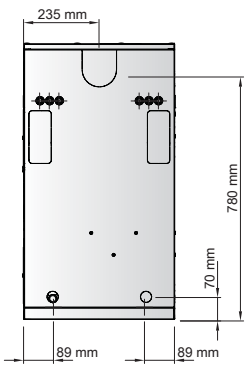


Internal Model (Regular / System)

Right View

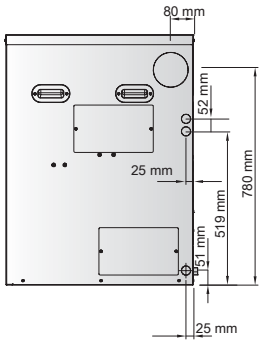


Back View

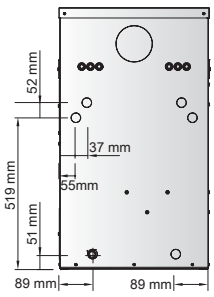


External Model (Regular / System)

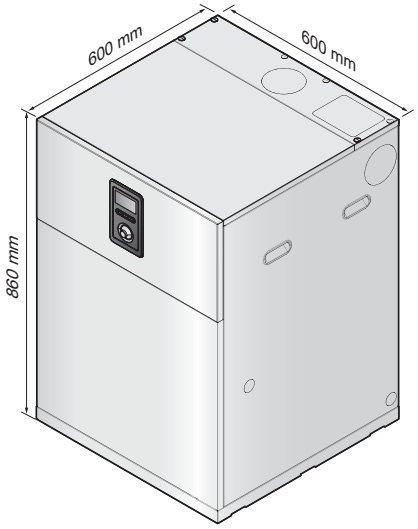
Right View



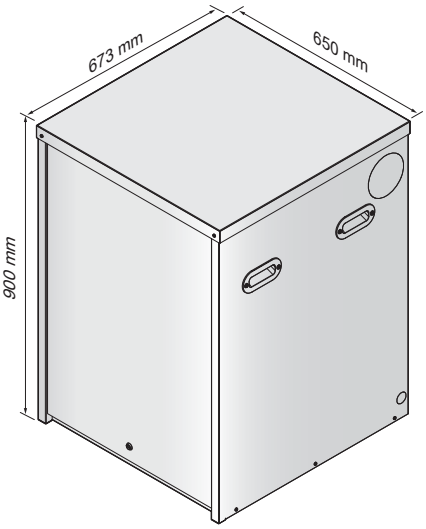
Back View



Internal Model (Combi)



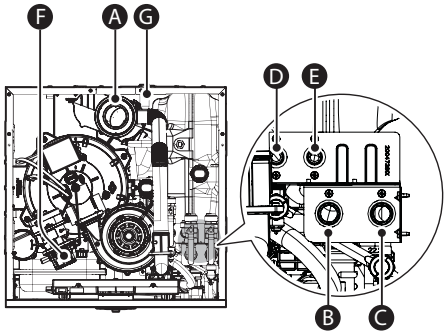
External Model (Combi)



Supply Connections

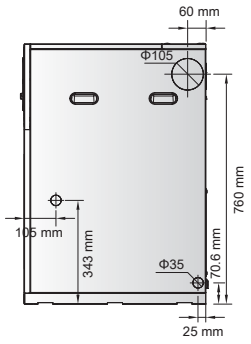
Symbol	Description	LCB700		
		21LC, LCX	28LC, LCX	36LC, LCX
A	Flue Exhaust	Φ60/100		
B	Central Heating Supply	Φ22	Φ22	Φ22 (Φ28)
C	Central Heating Return	Φ22	Φ22	Φ22 (Φ28)
D	DCW Inlet	1/4" Ball Valve (Female)		
E	DHW Outlet	More than Φ21.5 (Plastic Pipe)		
F	Oil Supply Inlet	1/4" Ball Valve (Female)		
G	Condensate Drain	More than Φ21.5 (Plastic Pipe)		

Top View

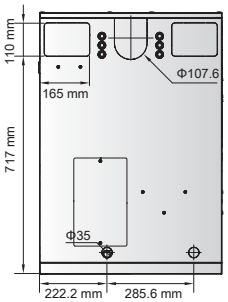


Internal Model (Combi)

Right View

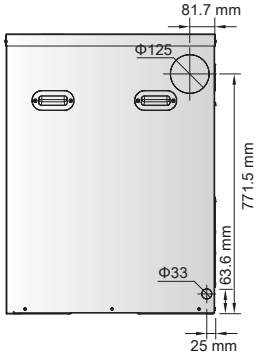


Back View

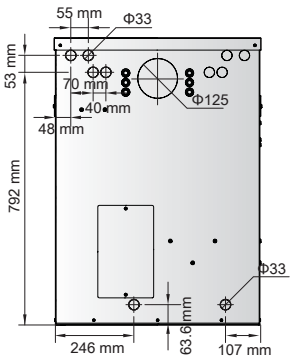


External Model (Combi)

Right View



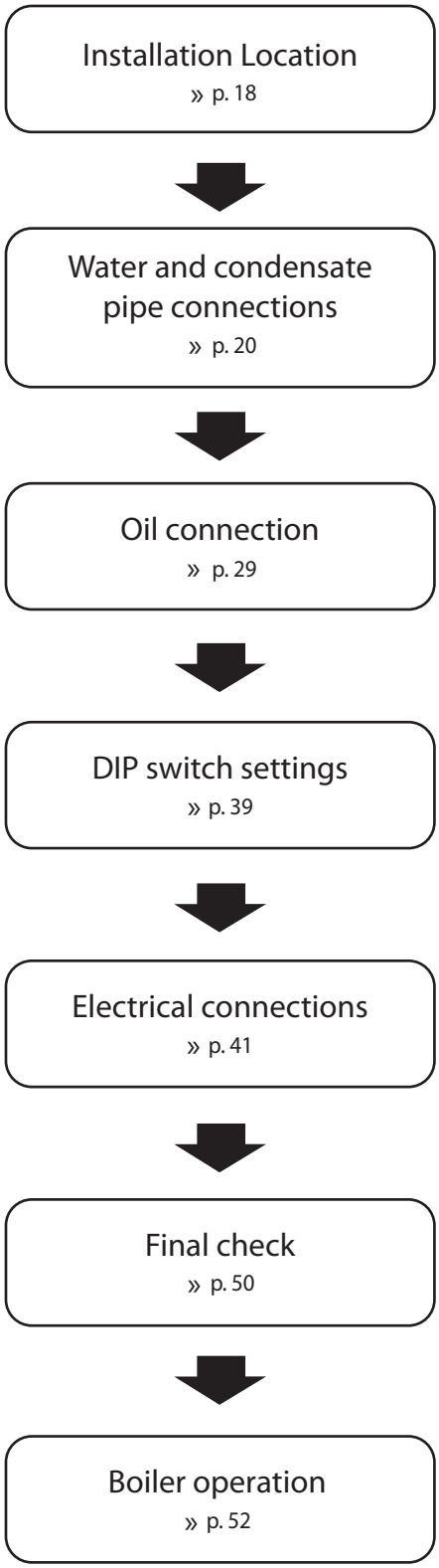
Back View



3. Installing the Boiler

3.1 Installation Procedure

The flow diagram below provides a step-by-step description of the recommended procedure for clear, easy installation of the LCB700 boiler in its final location. A detailed description is given of the procedure in the sequenced sections below:



3.2 Choosing an Installation Location

When choosing an installation location, you must ensure that the location provides adequate clearance for the boiler, adequate venting and drainage options, and sufficient access to fuel, water, and electrical supplies.

Carefully consider the following factors when choosing an installation location.

Compliance Requirements

This boiler must be installed by qualified personnel in compliance with the applicable Laws and Regulations. In general, these Laws and Regulations are the Heating, Air Conditioning and Domestic Water Installation Regulation and all other local regulations.

Access to Utilities

- Water – the installation location should be near where the domestic water supply enters the building.
- Fuel – the installation location should be near where the fuel supply enters the building.
- Electricity – the installation location should be near where the electrical supply enters the building.

Humidity and Contact with Water

When installing the boiler, avoid places with excessive humidity. The boiler has electric ignition components. Water spray or droppings can get inside the boiler and damage the ignition system. The boiler must be installed in a way to ensure that the ignition system components are protected from water (dripping, spraying, rain, etc.) during operation and service.

Proximity to Fixtures and Appliances

Install the boiler near fixtures that deliver or use hot water, such as bathroom, kitchen, and laundry room faucets. Select a location that minimises the water piping required between major fixtures. If the distances are long or if the user requires "instant" hot water, installation of a recirculation line which circulates domestic hot water back to the boiler from the furthest fixture is recommended. Insulate as much of the hot water supply and recirculation lines as possible. For more information about the water supply, refer to "4.2 Installing a System Application" on page 23.

Adequate Drainage

The boiler produces a significant amount of condensate during operation. The boiler should be located near a suitable drain and where damage from a possible leak will be minimal. Installing the boiler in a location without a drain will void the warranty and Navien will not be responsible for water damages that occur as a result. For more information about condensate drainage, refer to "4.3 Connecting the Condensate Drain Line" on page 25.

The boiler must be located in an area where leakage of the unit or connections will not result in damage to the area adjacent to the appliance or to lower floors of the structure. When such locations cannot be found, installation of an adequately drained drain pan under the boiler is highly recommended. When installing the drain pan, ensure that the installation does not restrict combustion air flow.

Adequate Flue and Ventilation

The boiler must be located so that the grilles of the premises are not obstructed and normal boiler maintenance is possible even if installed between items of furniture.

Select a location that requires minimal flue. Consider flue restrictions caused by windows, doors, air intakes, foliage, and other buildings. For more information about flue system, refer to "6. Flue System" on page 35.

To ensure adequate flue and ventilation, follow these guidelines:

- Maintain proper clearances from any openings in the building.
- Install the boiler with a minimum clearance of 300 mm above an exterior grade or as required by local codes.
- Do not enclose the flue termination.
- Install the exhaust flue in an area that is free from any obstructions, where the exhaust will not accumulate.
- Do not install the boiler where moisture from the exhaust may discolor or damage walls.
- Do not install the boiler in bathrooms, bedrooms, or any other occupied rooms that are normally kept closed or not adequately ventilated.

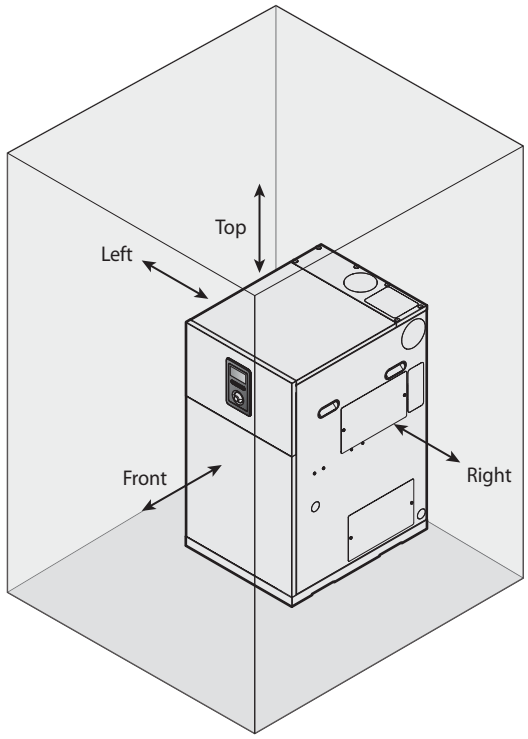
The requirements and recommendations stipulated in the Regulation for Heating Installations in Buildings (RITE) and any other applicable legislation in this field must be observed.

Adequate Installation Clearances

CAUTION

Do not install the boiler on carpeted floors.

Install the boiler in an area that allows for service and maintenance access to utility connections, piping, filters, and traps. Based on the installation location, ensure that the following clearances are maintained:



Position	Service Clearances	Maintenance and Repair Clearances
Top	10 mm	300 mm
Left	10 mm	10 mm
Right	10 mm	10 mm
Front	600 mm	600 mm

Note

- A removable section of worktop above the boiler is required to provide access for heat exchanger servicing.
- Maintain proper installation clearances based on the installation site condition.

Clean, Debris and Chemical-free Combustion Air

- Do not install the boiler in areas where dust and debris may accumulate or where hair sprays, spray detergents, chlorine, or similar chemicals are used.
- Do not install the boiler in areas where petrol or other flammables are used or stored.
- Ensure that combustible materials are stored away from the boiler and that hanging laundry or similar items do not obstruct access to the boiler or its flue system.

4. Installing the System Piping

The installation must be made by sufficiently qualified technicians, authorised to do so. For correct installation, all the requirements and recommendations described in the Regulation for Heating Installations in Buildings (RITE) must be complied with, together with all other national and/or local regulations applicable at the time of installation. However, the following recommendations must be complied with:

- Prior to connecting plumbing to the boiler, flush the entire system to ensure it is free of sediment, flux, solder, scale, debris or other impurities that may be harmful to the system and boiler. During the assembly of the heating system, it is important to keep the inside of the piping free of any debris including construction dust, copper burr, sand and dirt.
- For retrofits, all system piping including radiators, must be cleaned of all build-up including sludge and scale. All systems, old and new, must be cleaned to remove flux, grease and carbon residue. Navien recommends cleaning the boiler system with cleaning products specially formulated for boiler systems. For retrofit applications with heavy lime scale and sludge deposits, a heavier duty cleaner may be required. For information on performing the cleaning, follow the instructions included with the boiler system cleaner products.
- If the boiler is installed in an existing system, any unsuitable additives must be removed by thoroughly cleaning the system. Cleaning of all the systems must be done in compliance with the requirements in standard BS 7593. In areas with hard water, treatment may be necessary in order to prevent scale from forming in the boiler. Make sure to use the water treatment product in the right concentration, according to the producer's instructions.
- It is recommended to fit shut-off valves to the heating installation output and return pipes, to avoid having to drain the installation when maintenance work is carried out on the boiler.
- Bleed the air from the boiler and heating installation. Ensure there is no air in the heating circuit.
- The LCB700 boiler is a condensing boiler, and it is therefore essential for the condensate outlet to lead to a drain, in compliance with all applicable national and/or local regulations to this respect.
- The boiler drain must not be located above a window, entry door or other public point of access. Bear in mind that boiling water or steam could come out when draining.
- Draining must be done in a downward direction.

WARNING

- Failure to rid the heating system of the contaminants listed above will void the warranty and may result in premature heat exchanger failure and property damage.
- Tighten the boiler water connections, taking care not to damage them. Do not force the tube connections excessively, as this could damage the connections and cause leaks.
- Any dirt in the tubes could reduce boiler efficiency and cause it to malfunction.
- Any pipes exposed to the elements or which could freeze in winter must be insulated with suitable insulating material.

CAUTION

Failure to follow the instructions provided in this section will void the warranty and may result in property damage, fire or serious injury.

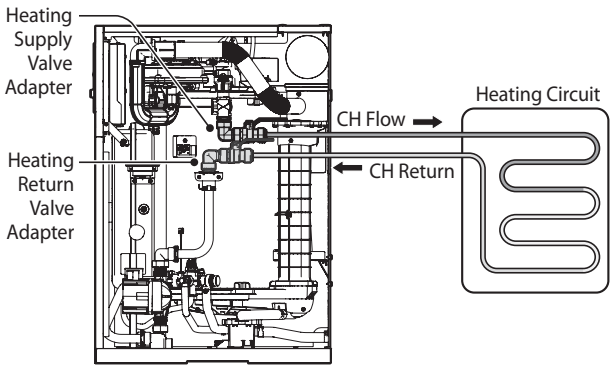
4.1 Installing a Central Heating System

The fire-tube type heat exchanger of the Navien LCB700 boiler is designed to attain the highest level of heat transfer in a compact design. To accomplish this, the heated gas flows through a series of small-diameter tubes, maximizing the heat transfer area. To maintain the efficient and reliable operation of the heat exchanger, and to avoid heat exchanger failure, it is critical to ensure the rules and guidelines in this section are followed.

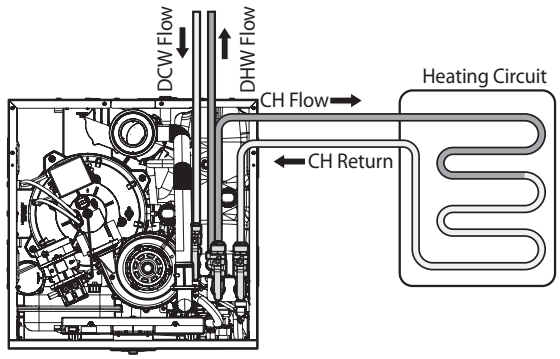
CAUTION

- The installation must be made by sufficiently qualified technicians, authorised to do so.
- For correct installation, all the requirements and recommendations described in the Regulation for Heating Installations in Buildings (RITE) must be complied with, together with all other national and/or local regulations applicable at the time of installation.

Refer to the following illustration for a typical heating piping example for the boiler.



<Regular, System Models - Right View>



<Combi Models - Top View>

When connecting the central heating system, follow these guidelines:

- Tighten the connection valves with care to avoid damage.
- Test the boiler for proper central heating flow and inspect for leaks.

4.1.1 Guidelines for a Central Heating Installation

Read and follow the guidelines listed below to ensure safe and proper installation of a boiler heating system.

Freeze Protection for a Central Heating System

- Freeze protection products may be used for the central heating system. Freeze protection for new or existing systems requires specially formulated glycol, which contains inhibitors to prevent the glycol from attacking the metallic system components.
- Before using freeze protection products, ensure that system fluid contains proper glycol concentration and the inhibitor level is appropriate. Navien recommends against exceeding a 35% concentration of glycol.
- When using the freeze protection products, the system must be tested at least once a year, and as recommended by the manufacturer of the glycol solution.
- When using the freeze protection products, allowance should be made for expansion of the glycol solution.
- Freeze damage is not covered by the warranty.

WARNING

For systems requiring freeze protection, use only inhibited propylene glycol, specially formulated for hydronic heating systems; use of other types of antifreeze may be harmful to the system and will void the warranty.

System Pressure

- The Navien LCB700 boiler is intended solely for use in pressurised closed loop heating systems operating with 1~2.5 bar water pressure at the boiler outlet. To obtain the minimum system design pressure, follow the piping diagrams illustrated in this section.
- The Navien LCB700 boiler's central heating system is not approved for operation in an "open system", thus it cannot be used for direct potable water heating or to process heating of any kind.

Air Elimination

This boiler may only be installed in a pressurised closed-loop heating system, free of air and other impurities. To avoid the presence of air, ensure all of the air is removed from the system during commissioning via strategically placed and adequately sized air removal devices located throughout the heating system.

Note See the examples of system application at the end of this section detailing the installation location of the air removal device in case an additional air removal device is required for a specific application.

WARNING

- Immediately repair any leaks in the system plumbing to avoid adding make-up water. Make-up water adds oxygen and minerals to the system that may lead to heat exchanger failure.
- Failure to follow these instructions may result in poor performance, unnecessary wear of system components and premature failure.

CAUTION

Do not solder piping directly onto the water connections, as the heat may cause damage to internal components. Use threaded water connections only.

4.1.2 Essential Elements in a Central Heating System

Auto Air Vent

The LCB700 boiler is equipped with an automatic air vent so that the air from the boiler is automatically discharged. A separate automatic air vent must be installed at the top of the piping system to exhaust air from the entire piping system.

Expansion Vessel

An expansion vessel must be installed in the central heating piping to prevent excessive pressure from building up in the system.

The expansion vessel must be sized in accordance with the water volume of the system as well as the firing rate of the appliance.

Note Ensure that the expansion vessel used is of sufficient size for the system volume. Refer to BS 7074:1:1989 or The Domestic Heating Design Guide for sizing the required vessel.

It is important to locate the expansion vessel and make-up water connection, on the inlet side of any pump in the system, as doing so will guarantee the lowest pressure in the system will be at least equal to the vessel and make-up water pressure.

CAUTION

Ensure the expansion vessel cannot become isolated from the boiler anytime the system is operating. Failure to follow these instructions may lead to discharge from the pressure relief valve, which may result in property damage or injury.

Pressure Relief Valve

The requirements recommended for the pressure relief valve are as follows:

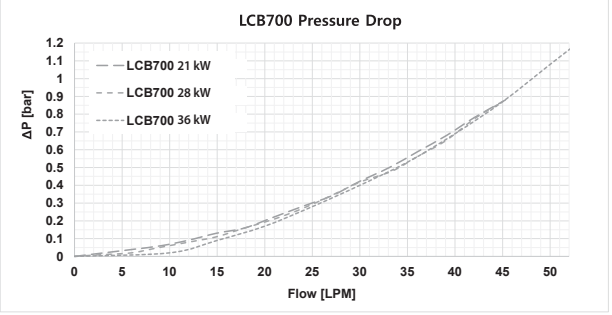
- The pressure relief valve is calibrated to be activated at a maximum pressure of 3 bar, and all the pipes and connections must therefore be able to withstand pressures of up to 3 bar.
- It must tilt in a downstream direction throughout its entire length, and the water must run off to a suitable drain. It must be positioned so as not to cause damage to cabling, electrical equipment or persons. Please ensure the drain hose is in a conspicuous position.
- The pressure relief discharge pipe must not be located above a window, entry door or any other public access point. Bear in mind that boiling water or steam could come out when operating.

4.1.3 Central Heating System Piping

When connecting the central heating system, follow these guidelines:

- Carefully tighten all connections to avoid damage to fittings.
- After installing the boiler, check the central heating system's operation and inspect for leaks.

Items		Unit	Model		
			21RS/RSX 21LS/LSX 21LC/LCX	28RS/RSX 28LS/LSX 28LC/LCX	36RS/RSX 36LS/LSX 36LC/LCX
△t 10°C	Flow Rate	lpm	30.1	40.1	51.6
	Head	m	4.3	7.0	11.1
△t 15°C	Flow Rate	lpm	20.1	26.8	34.4
	Head	m	2.1	3.5	5.2
△t 20°C	Flow Rate	lpm	15.1	20.1	25.8
	Head	m	1.2	2.0	3.0
△t 25°C (Minimum)	Flow Rate	lpm	12	16	20
	Head	m	0.9	1.2	1.7



Note Refer to the performance curve to select a pump that suits your application. The boiler can supply up to a maximum of 100 W current at the boiler pump connection terminal.

4.1.4 Water Quality Standards for Appliance Quality Assurance

The water supplied to the boiler must satisfy the water quality requirements on the following table.

Water Chemistry	Standards for Appliance Quality Assurance
Hardness	Below 200 ppm
Chloride Concentration	Below 150 ppm (Below 4 ppm of residual chlorine)
TDS (Total Dissolved Solids)	Below 500 ppm
pH	6.5–8.5

- **The water hardness must be below 200 ppm.**
  Using water with a hardness above 200 ppm for the boiler may create lime scale inside the boiler and cause a product malfunction. Use a water softener to satisfy the standards for appliance quality assurance (below 80 ppm is recommended).

  Note Using indirect heat exchange through a plate-type heat exchanger is an exception.

- **The chloride concentration of water must be below 150 ppm (below 4 ppm of residual chlorine).**
  Using the water with a chloride concentration above 150 ppm or 4 ppm for residual chlorine for the boiler may cause a product malfunction due to corrosion.
- **The pH must be between 6.5 and 8.5.**
  - Using water with a pH below 6.5 may cause a product malfunction due to corrosion.
  - Using water with a pH above 8.5 may cause a product malfunction due to lime scale created inside the boiler.

  Note The following situations adversely impact the quality of the appliance

- **The water supplied to the boiler does not satisfy the water quality requirements in the table above.**
  - Using chemically unbalanced water for the boiler may cause a product malfunction or reduce the product lifetime.
- **Water below the minimum circulation flow rate is supplied to the boiler (to see detailed flow rate information, refer to the "4.1.3 Central Heating System Piping" on page 22.**
  - Using water that is below the minimum circulation flow rate for the boiler may cause a product malfunction due to the creation of lime scale inside the boiler or a reduction in product efficiency. If the flow rate is lower than the minimum rate, use an external pump (below 100 W) to maintain a flow rate above the minimum. Also, ensure the pipes used for the boilers are not blocked and check if there are any pressure drops.

CAUTION

If the water supplied to the boiler does not satisfy the water quality requirements, contact an authorised technician or licensed professional to avoid product malfunctions due to poor water quality before supplying water to the boiler.

4.2 Installing a System Application

Refer to the following examples to properly implement a system for central heating, DHW supply, or both. These examples are provided to suggest basic guidelines when you installing the boiler system. However, the actual installation may vary depending on the circumstances, local building codes or regulations.

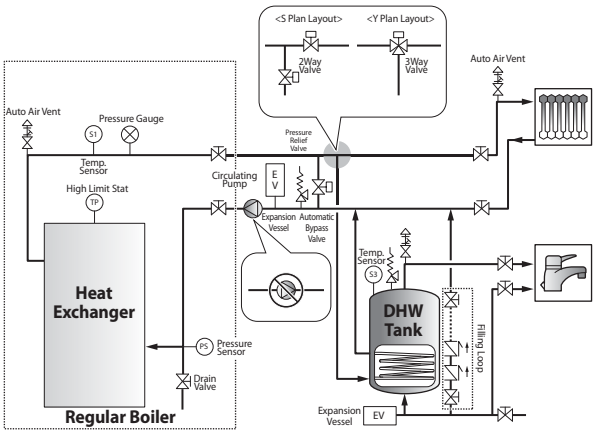
The heating capacity of the unit must be previously established by calculating the building's heat requirement according to the current regulations. To ensure proper operation and long boiler life, the plumbing system must be adequately sized and complete with all the necessary accessories, including a room thermostat, a thermostatable valve (TRV), etc. The system delivery and return pipes must have a diameter of at least 22 mm for the first 3 m of length from the unit.

If the system delivery and return pipes follow a path where air pockets can form in certain places, it is advisable to install vent valves at these points. Also, drain cocks must be installed at the lowest points in the system to allow complete emptying.

An automatic bypass with a flow rate of at least 6 l/min must be installed (as far away as possible from the boiler) if radiators with thermostatic valves have been connected to combination boilers and in front of any motorised valves for system/regular boilers.

CAUTION

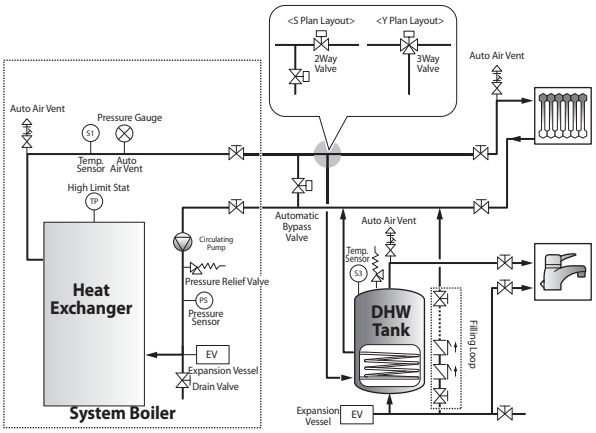
- The installation must be made by sufficiently qualified technicians, authorised to do so.
- For correct installation, all the requirements and recommendations described in the Regulation for Heating Installations in Buildings (RITE) must be complied with, together with all other national and/or local regulations applicable at the time of installation.



<Regular Boiler Heating & DHW Cycle>

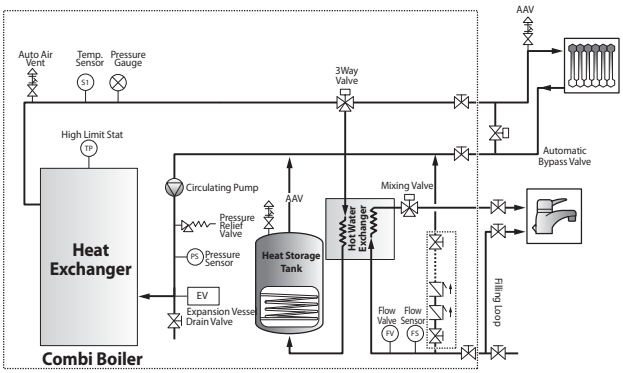
CAUTION

When installing an optional circulating pump, ensure that it is installed in the proper direction. Also, install the circulator pump to the return pipe and allow it to circulate hot water towards the boiler. If a circulator pump is installed in the wrong direction, the boiler's heat exchanger cannot be vented properly, which may damage the boiler and cause it to malfunction.



<System Boiler Heating & DHW Cycle>

Note Refer to "7. Setting the DIP Switches" to control the boiler using the external CH Controller and DHW Tank.



<Combi boiler Heating & DHW Cycle>

When installing the system, follow these guidelines:

Use only pipes, fittings, valves, and other components (such as solder), that are approved for use in potable water systems.

Tighten the connection valves with care to avoid damage.

The external hydraulic bypass valve is required.

An additional expansion vessel must be installed to the system in the central heating return.

4.3 Connecting the Condensate Drain Line

The Navien LCB700 boiler creates condensation when it operates. This condensation has an acidic pH of 2-5. Follow all local codes and regulations when disposing of condensate from the boiler. We recommend draining the condensate into the Navien condensate neutralizer kit, as the alkali in the kit will neutralize the acid in the condensate. However, other suitable water disposal methods may be used in accordance with local codes.

CAUTION

For correct installation and trouble free operation of the appliance the following advice should be followed:

- All condensate pipework must 'fall' from the appliance by a minimum of 3 degrees (52 mm per metre) to ensure adequate condensate flow.
- The pipework route must allow air to be supplied back to the appliance for correct operation of the condensate trap.
- Connection to a rainwater down pipe must include an air break.

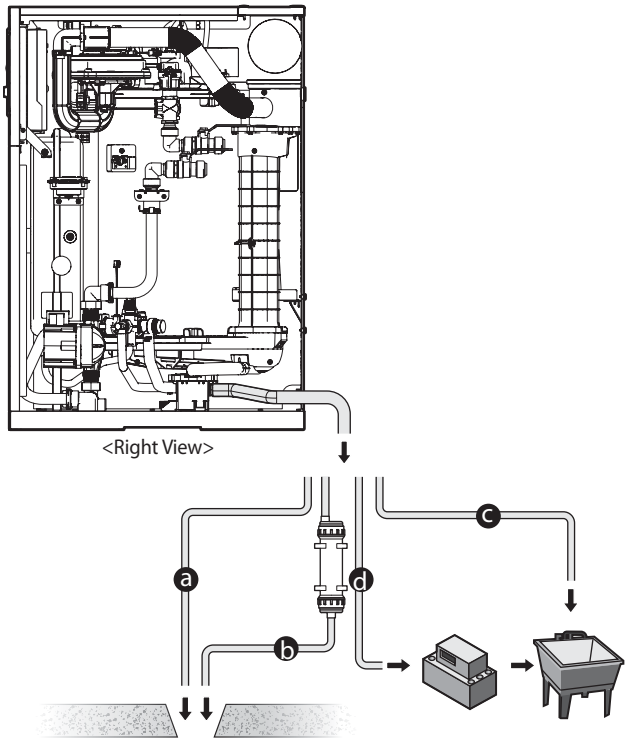
Also:

- Keep external pipework as short as possible and not exceed 3 metres length. If the external pipes exceed 3 metres in length, use a support (optional) to adjust the height of the boilers installed on the floor.
- External pipework should be increased to a minimum diameter of 32mm and ideally be insulated.
- Minimise the number of bends and connectors.
- Remove burrs after cutting pipe.
- Remove surplus solvent from the interior of the pipe.

The requirements recommended for the condensate drain line installation are as follows:

- For correct condensate drain line installation, the tube must have a minimum diameter of Ø21.5 mm.
- The tube must be made of a material that can withstand corrosion, e.g. PVC, PVC-U, ABS, PVC-C or PP. It must not be made of metal.
- For safety reasons, the end of the tube must be as close as possible to the draining point.
- When the condensate drainage is connected to a general drain network inside the building, the effects of overpressure that could occur inside it must be taken into account, installing suitable pressure release and ventilation elements.
- The length of the tubes outside the building must be as short as possible. They must also be installed with as much tilt as possible. The tubes must be insulated if they are exposed to extremely cold weather or blizzards. If the tubes are not insulated, they must have a diameter of at least Ø32 mm.
- The drain tube must have a minimum tilt of 2.5° downstream of the boiler.
- For tubes with Ø21.5 mm, the maximum permitted length is 3 metres.
- If the appliance is installed in non-heated premises, the tube system must be treated as if it was an outdoor installation.
- To prevent the risk of tripping, the outdoor tubes must be fixed to the walls.

Before connecting the condensate drain, choose one of the following disposal options:



a. From the boiler directly into an external drain.

Note Do not install a fixed connection for the drain.

b. From the boiler, through a neutralizing agent, and then into an external drain.

Note If you choose this option, the neutralizing agent must be replaced periodically. Depletion of the neutralizing agent will vary, based on the usage rate of the boiler. During the first year of operation, the neutralizer should be checked every few months for depletion and replaced as needed.

c. From the boiler into a laundry tub.

Note The bottom of the boiler must be higher than the top of the laundry tub to use this option. The condensate line must have a negative slope to drain properly.

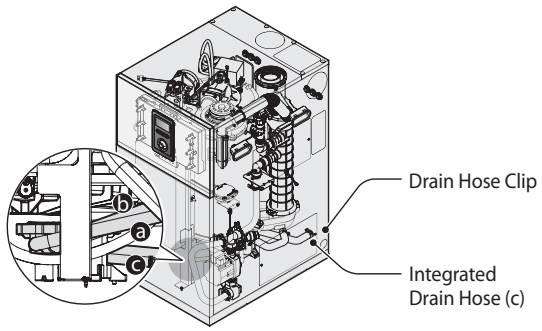
d. From the boiler into a condensate pump, and then into a laundry tub.

Note A pump can be used when there is a long distance between the boiler and the laundry tub or when the bottom of the boiler is lower than the top of the laundry tub.

To connect the condensate drain:

1. Connect an integrated drain hose to the 21.5 mm at the bottom of the boiler.

   Use only corrosion-resistant material for the integrated drain hose, such as PVC or CPVC. Do not reduce the size of the integrated drain hose to less than 21.5 mm. The integrated drain hose can be connected to the condensate trap using a condensate trap hose. The hose connection must be secured with a drain hose clip.



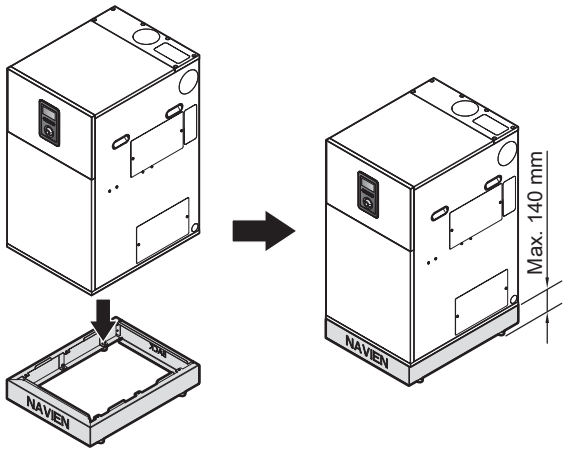
Symbol	Description
a	Pressure relief valve drain hose
b	System drain hose
c	Integrated drain hose

2. Place the free end of the integrated drain hose into an appropriate drain.
3. If you are using a condensate pump, ensure that the pump allows for up to 3 LPH of drainage for each boiler in the system.
4. If you are not using a condensate pump, ensure that the integrated drain hose is pitched downward at a minimum slope of 6 mm per 30 cm.

Note Water must be poured into the exhaust connection to fill the condensate trap.

4.4 Installing the Support (Optional)

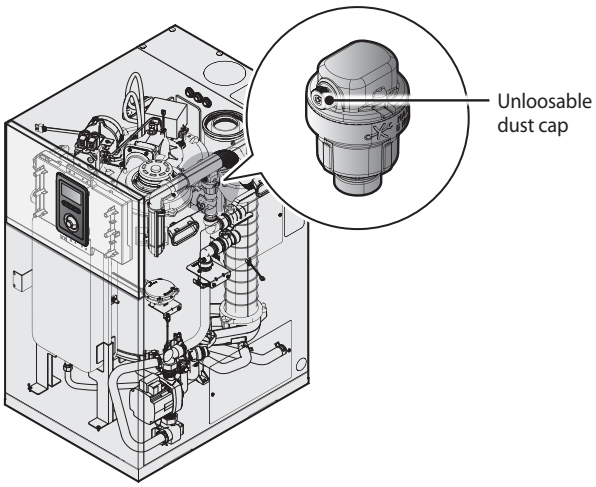
Place the support on a flat floor, and then place the boiler on the support securely so that the boiler does not move during operation.



Note If the support is not level with the floor, adjust the height of the stoppers on the support to make it level with the floor.

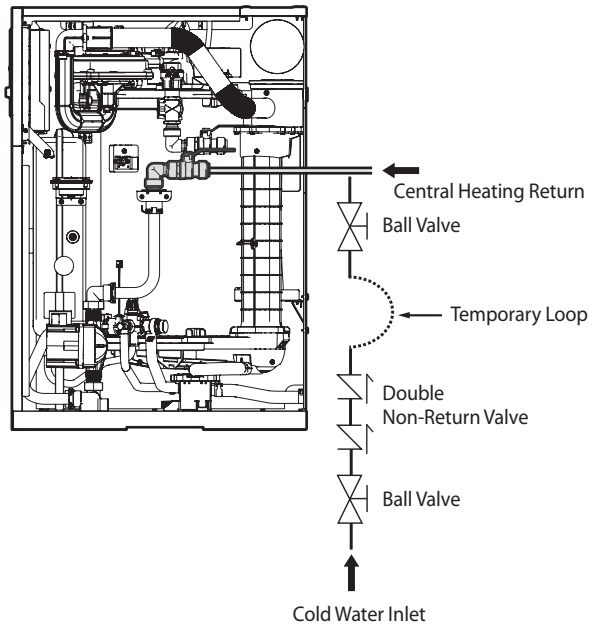
4.5 Filling the System

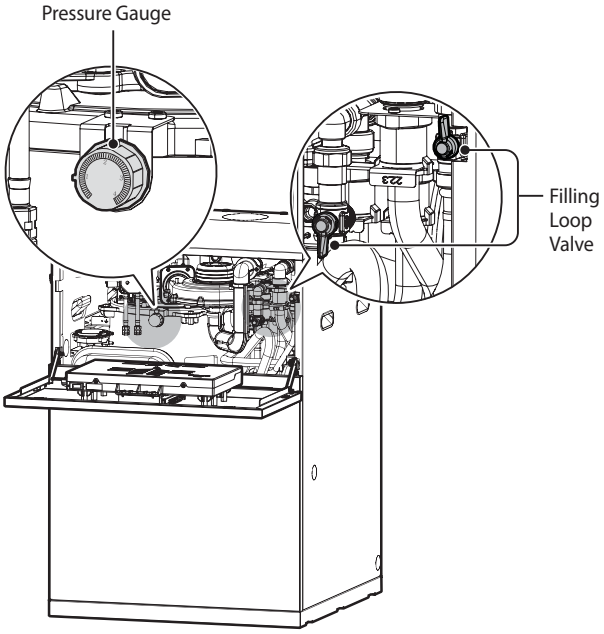
The LCB700 boiler is equipped with an automatic air vent. This automatic air vent eliminates air in heating systems without the need for manual intervention. This prevents undesired noise, wear of devices in the circuits and inefficient performance of heating units.



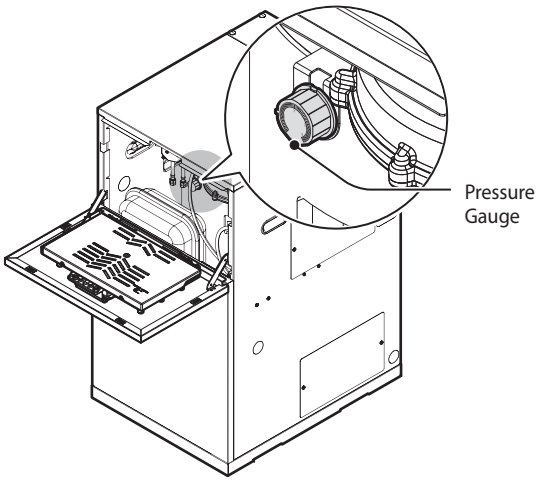
Note The dust cap is separated and shipped in the accessory. If the air vent is out of order or leaking due to a malfunction, close the air vents using the dust cap included in the accessory.

Refer to the following illustration for system fill.





<Combi Model Pressure Gauge and Filling Loop Position>



<Regular/System Model Pressure Gauge Position>

Note

- The system must be filled with approved equipment and comply with all regulations for system fill.
- The expansion vessel fitted is supplied with a charge pressure of 1.0 bar. Do not pressurise the vessel above 1.5 bar.
- To perform an air purge after initially filling the boiler pipes, the pump will run for 5 minutes and 20 seconds. The boiler will operate normally after performing an air purge.

4.6 Testing the Water System

WARNING

Ensure that the boiler is full of water before firing the burner. Operating the unit without filling it will damage the boiler. Such damage is not covered by the warranty, and may result in property damage or severe personal injury.

Perform a fill test after installing the boiler's water system to make sure that the system has been installed properly. Follow the instructions below to perform a fill test on the water system.

1. Close the manual air vent and the boiler drain valve.
2. Fill the boiler. The correct pressure will vary with each application.
3. If the pressure is lower than the minimum pressure set (0.4 bar by default), error code E302 will appear on the display.
4. Fill the boiler with more water until the error message disappears.
5. At initial fill and during boiler start-up and testing, check the system thoroughly for leaks. Repair any leaks before proceeding further.

WARNING

Eliminate all system leaks. The continual introduction of fresh makeup water will reduce boiler life. Minerals can build up in the heat exchanger, reducing heat transfer, overheating the heat exchanger and causing heat exchanger failure.

CAUTION

Before operating the boiler for the first time, ensure that the boiler system is filled with water. Purge the air inside the system to avoid damage to the boiler.

5. Connecting the Oil Supply

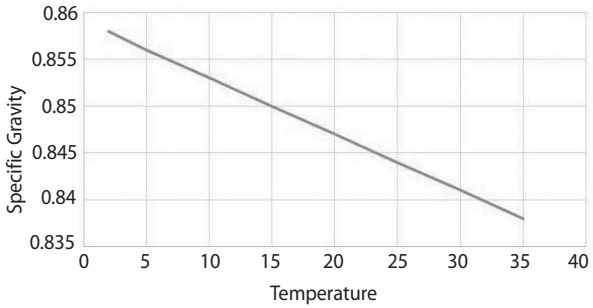
5.1 Essential Elements in the Oil Supply

This appliance is suitable for Kerosene (Class C2) and Light-oil. No other fuel may be used.

CAUTION

The specific gravity of fuels supplied to the burner oil pump must be 0.85 or lower at the reference temperature of 15℃. And the temperature of fuels supplied from the fuel storage tank to the boiler must be maintained at 5℃ or higher in the field. Otherwise, ignition failure or noise may occur and Navien's Limited Warranty will be voided.

Refer to the graph below for special gravity variations of the fuel by temperature. If you want to check the special gravity, contact your agent or installer.



Fuel Storage Tank

The tank should be positioned in accordance with the recommendations given in BS 5410:1:1997, which gives details for filling, maintenance and protection from fire.

A steel tank may be used and must be constructed to BS 799:5:1987 and OFS T200.

CAUTION

- A galvanised tank must not be used.
- A plastic tank may be used and must comply with OFS T100.

Note Plastic tanks should be adequately and uniformly supported on a smooth level surface, across their entire base area, that is, the area in contact with the ground.

Regulations & Standards

In England and Wales, installations in singe family dwellings have to comply with building Regulations Part J. This requires compliance with BS 5410 Part 1:2014. All tanks either deemed to be at risk or with a capacity of more than 2500 litres are required to be bunded.

For installation in Scotland, Building Standard Part F applies. This requires compliance with BS 5410 Part 1:2014 and BS 5410 Part 2:2013. All tanks either deemed to be at risk or with a capacity of more than 2500 litres are required to be bunded.

Those externally installed tanks with a capacity of less than 2500 litres will require a bund if located not more than 50 metres from a spring or bore hole, 10 metres from controlled waters and, additionally, where it may constitute a hazard.

The above risks and hazards are described in OFTEC book 3.

In Northern Ireland, the Building Regulations do not currently cover the installation of oil storage tanks.

In the Republic of Ireland the requirements of BS 5410 Part 1:2014 and BS 5410 Part 2:2013 are required to be in compliance with Building Regulations Part J.

Fuel Pipes

Fuel supply pipes should be of copper tubing with an external diameter of at least 10 mm.

Galvanised pipes may not be used.

All pipe connections should preferably use flared fittings. Soldered connections must not be used on oil pipes.

CAUTION

Flexible hoses must not be used outside the boiler.

Fire Valve

A fire valve is an essential part of the oil supply system. It should be capable of cutting off the flow of oil outside the building in the event of a fire starting within the boiler. The valve should be located just outside the building at the point where the oil supply line enters. It must be activated by a remote sensor located over the burner, but in a position clear of any direct radiation or excessive heat.

Note
- Fire valves should comply with OFTEC Standards OFS E101.
- Fitting of fire valves should comply with BS5410 Part 1:2014 and OFTEC book 3.

Oil Strainer & Water Separator

Fit an oil strainer and water separator to the oil supply pipe, near the oil storage tank.

Fit an additional oil filter (74μm max filtration size) close to the boiler, but not inside the boiler.

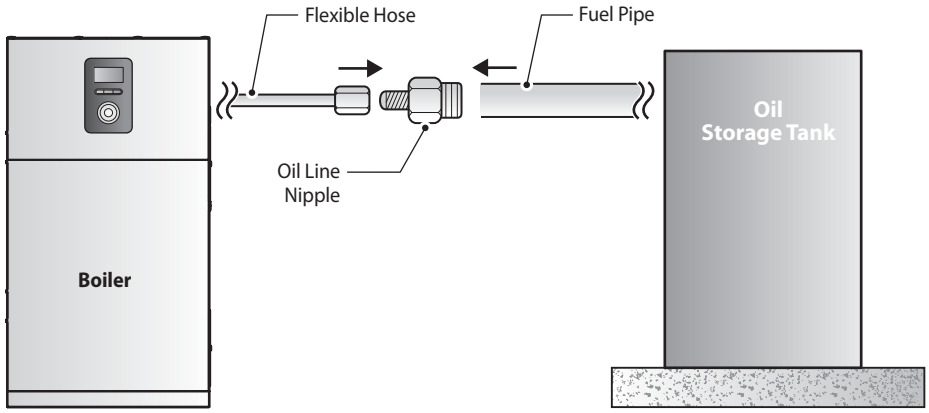
Install a manual shut-off valve. It should be fitted before installing the filter, to allow the filter to be serviced. Install the valve as close to the oil storage tank as possible.

CAUTION

Contaminants can lead to system damage. The oil line must be flushed prior to commissioning.

5.2 Connecting the Flexible Hose to the Fuel Pipe

After installing the boiler, use the oil line nipple (included with the boiler) to connect the flexible hose to the fuel pipe of the oil storage tank.



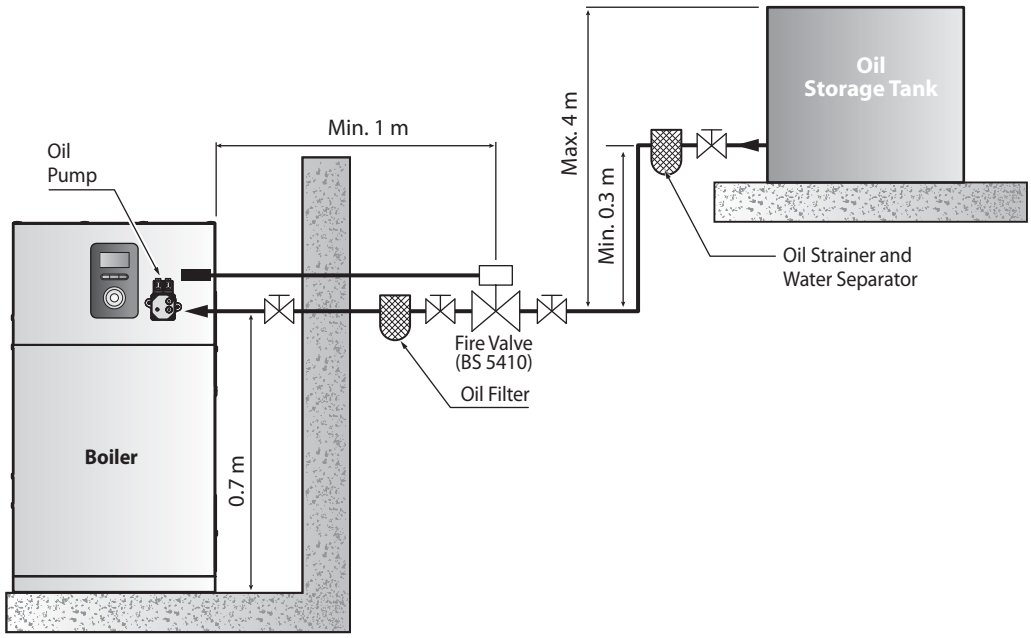
CAUTION

The oil line nipple must be correctly joined between the flexible hose and the fuel pipe to avoid a possible leak.

5.3 Oil Supply

Single Pipe Gravity Feed System

The oil storage tank must be positioned so that the oil level does not exceed 4 metres above the level of the boiler oil pump and, in addition, the oil level must be at least 300 mm above the oil pump. Where the maximum oil level in the oil storage tank exceeds 4 metres, a head breaking device must be installed between the tank and the boiler oil pump.



Head	Max. Oil Pipe Length	
	Φ10 ㎜	Φ12 ㎜
0.5 m	15 m	30 m
1.0 m	25 m	70 m
1.5 m	40 m	90 m
2.0 m	50 m	100 m
2.5 m	60 m	100 m
3.0 m	75 m	100 m
3.5 m	90 m	100 m
4.0 m	100 m	100 m

Double Pipe Sub-Gravity Feed System

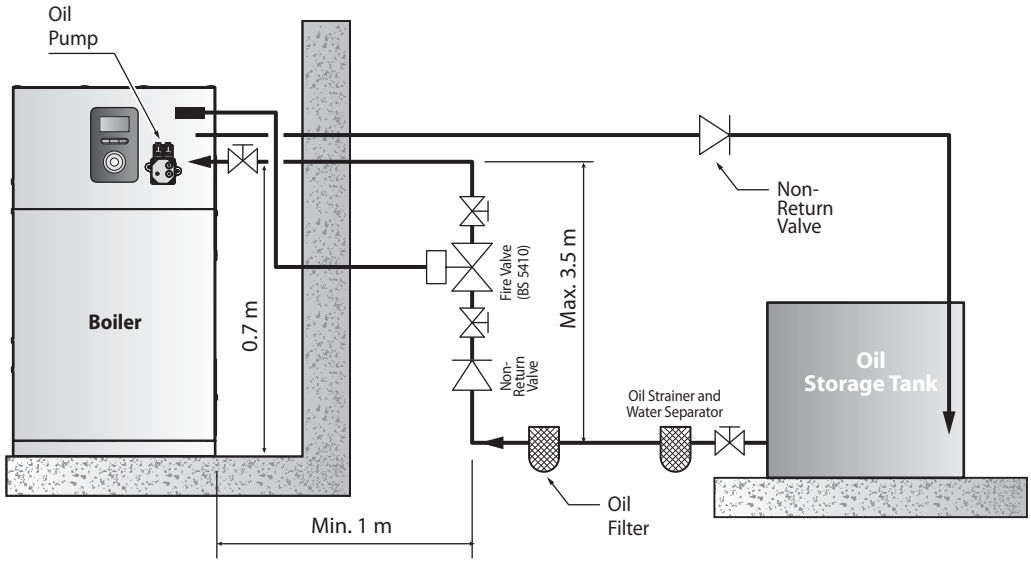
With the storage tank outlet below the burner, a two pipe system should be used. The return pipe should be at the same level in the tank as the supply pipe, both being 75 to 100 mm above the base of the tank. The pipe ends should be a sufficient distance apart so as to prevent any sediment from being disturbed by the return entering the supply pipe.

Make sure that the bottom of the tank is more than 3.5 m below the burner.

A non-return valve should be fitted in the supply pipe together with the filter and fire valve. A non-return valve should be fitted in the return pipe if the top of the tank is above the burner.

The pump vacuum should not exceed 0.4 bar. Beyond this limit gas is released from the oil.

For guidance on the installation of top outlet fuel tanks and suction oil supply sizing, see OFTEC technical book 3.



Head	Max. Oil Pipe Length	
	Φ10 ㎜	Φ12 ㎜
0 m	50 m	100 m
-0.5 m	45 m	30 m
-1.0 m	40 m	95 m
-1.5 m	30 m	80 m
-2.0 m	25 m	65 m
-2.5 m	20 m	50 m
-3.0 m	15 m	35 m
-3.5 m	10 m	20 m

Single Pipe Suction Lift with De-Aerator System

When the storage tank is below the burner, an alternative to a two pipe system can be achieved using an oil de-aerator. This effectively removes the air from the oil supply on a single pipe lift.

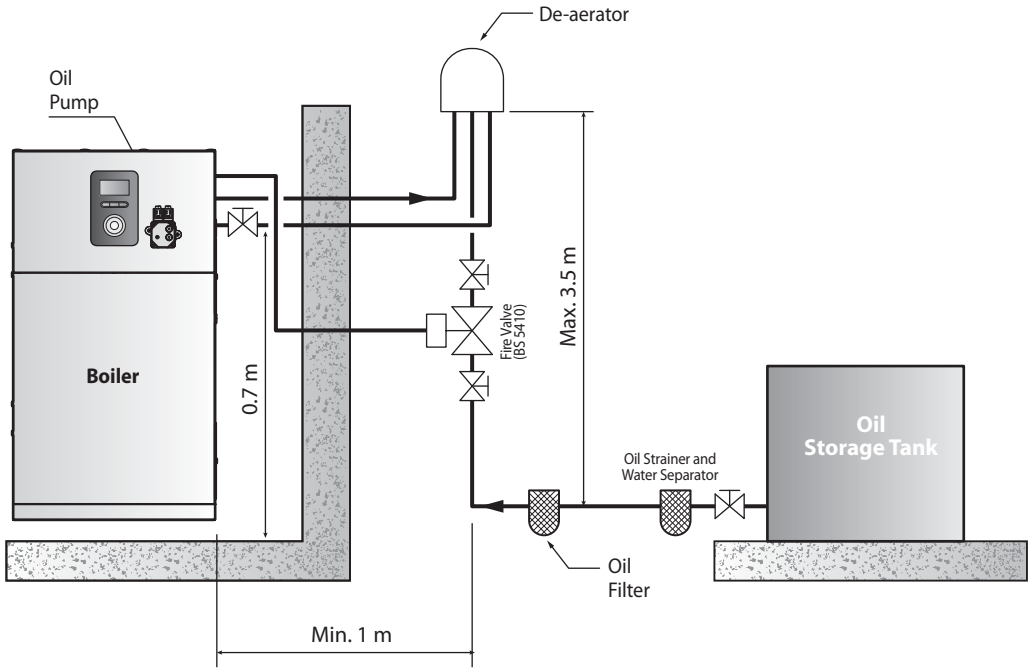
The maximum suction height 3.5 metres. The oil tank must be positioned below the oil pump. Create an inlet and return loop between the de-aerator and oil pump.

A non-return valve must be incorporated within the de-aerator or fitted to the oil line between the oil storage tank and the de-aerator.

A top feed oil tank fitted with a de-aerator using an internal non-return valve should have any non-return valves fitted in the base of the tank to the suction line removed to assist purging air from the oil line.

The de-aerator is connected close to the boiler as a two pipe system as shown in the following illustration. Refer to the manufacturer's instructions supplied with the de-aerator.

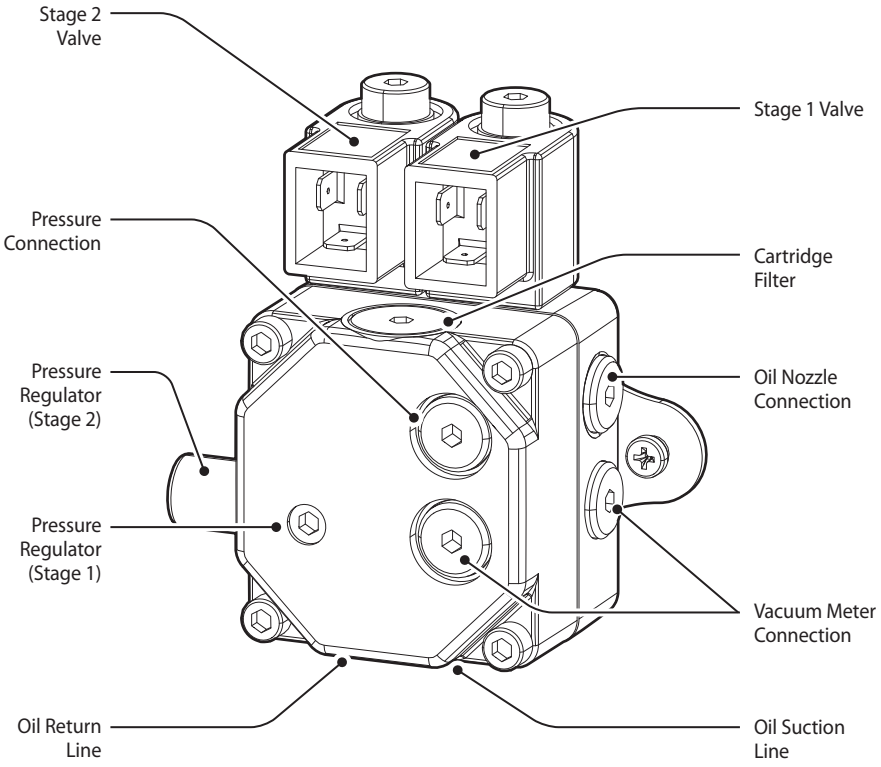
The de-aerator must be mounted vertically, as shown in the following illustration.



5.4 Burner Oil Connection

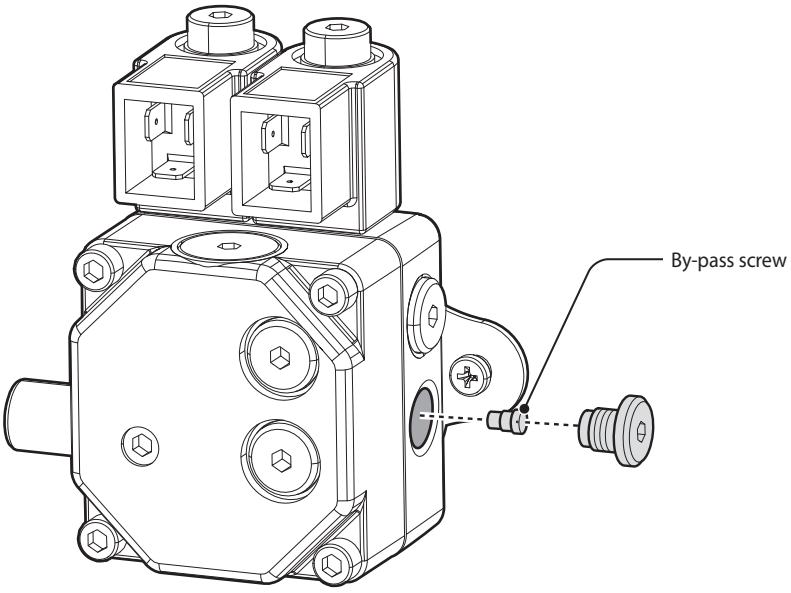
The oil pump is supplied for use with a double pipe oil supply system.

The oil pump return line plug is supplied in the boiler accessory pack.



< Oil Pump >

For use on a single pipe system, remove the by-pass screw.



< Single Pipe System >

6. Flue System

WARNING

Improper flue of the boiler can result in excessive levels of carbon monoxide, which can lead to severe personal injury. Flue should be performed only by a licensed professional.

No specific ventilation is required in the room the boiler is installed in. If it is installed in a cupboard or compartment, no specific ventilation is required, providing the aforementioned dimensions are observed. The requirements and recommendations stipulated in the Regulation for Heating Installations in Buildings (RITE) and any other applicable legislation in this field must be observed.

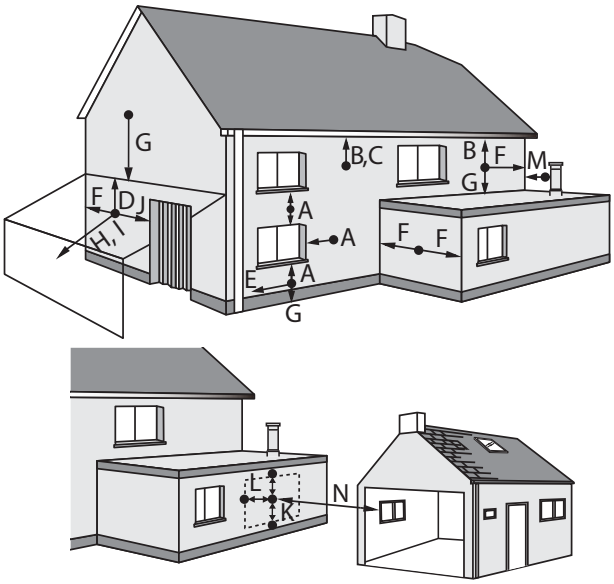
6.1 Flue Terminal Positions

CAUTION

- The terminal must be fitted with suitable protection if it is less than 2 m from a balcony, on a flat roof or surface that could be accessed by people.
- The wall that the gas removal and air intake ducts are fixed to must not be made of combustible or flammable materials. The wall that the end of the duct passes through must lead to the outside of the home. There must be no hazardous materials or obstructions near the duct.
- If the outlet passes through a wall made of combustible material the end terminal must be covered with at least 20 mm of incombustible material and must maintain a distance of at least 50 mm from any flammable material.
- The parts connecting the flue outlet must be correctly joined using sealing gaskets. Ensure that there are no leaks from any part of the removal circuit.
- Switch off the boiler and wait for the pipes to cool down before cleaning the gas removal and air intake ducts.
- The gas removal and air intake ducts must be protected from snow accumulation.

The installation of the flue exhaust and combustion air intake system must be calculated and made by sufficiently qualified and authorised staff. On designing and mounting the installation, all national and local regulations, standards and stipulations applicable at the time of installation must be taken into account.

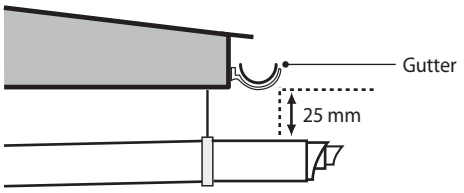
The minimum distances between the flue exhaust terminal and the building elements must comply with those shown in the following table:



Terminal Position		Minimum Distance (mm)
A	From openings (e.g. doors, windows, ventilation grilles)	300
B	Under a cornice	200
C	Under a gutter or drainpipes	75
D	Under a balcony or car port roof	200
E	From vertical drainpipes	150
F	From internal and external corners of the building	300
G	From the ground, roof and balconies	300
H	When no other outlet is installed	600
I	From the wall with the pipe to the front wall	1200
J	From openings (e.g. doors, windows) under the roof	1200
K	Vertically from a flue	1500
L	Horizontally from a flue	300
M	Vertical flue clearance (Non combustible building material)	500
N	From a front surface with openings	2000

Note

- For vertical ducts, the outlet must be at least 60 cm from any opening.
- The dimensions (B, C, D, and E) may be reduced to 25 mm, as long as the flue terminal is extended to clear any overhangs.



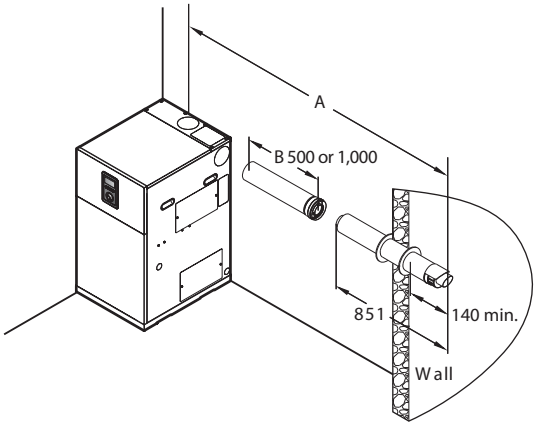
Extended to clear any overhang

6.2 Coaxial Systems

Refer to the following sections for the detailed clearances of the coaxial system types.

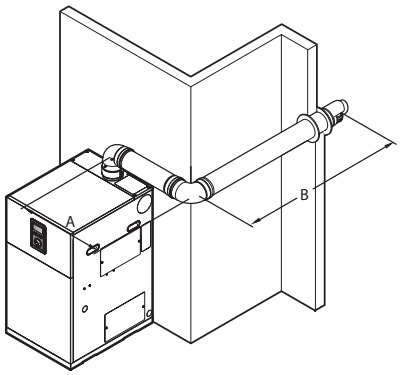
6.2.1 Horizontal Coaxial Removal (Type C_{13})

Standard Removal System

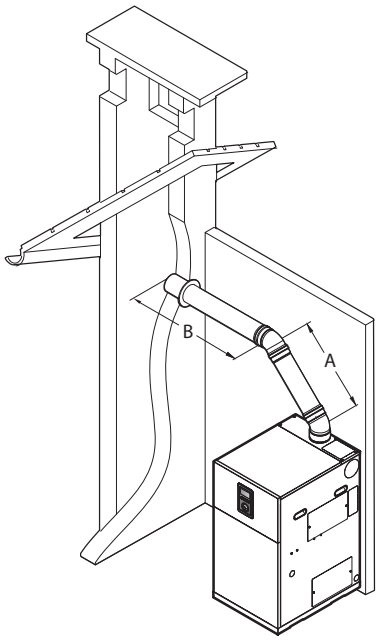


Ø60/100 => Max. length: A=20 m
Ø80/125 => Max. length: A=68 m

Extended Removal System



Ø60/100 => Max. length: A+B-(1 x 90°elbow) = 20-1.3 = 18.7 m
Ø80/125 => Max. length: A+B-(1 x 90°elbow) = 68-2.2 = 65.8 m

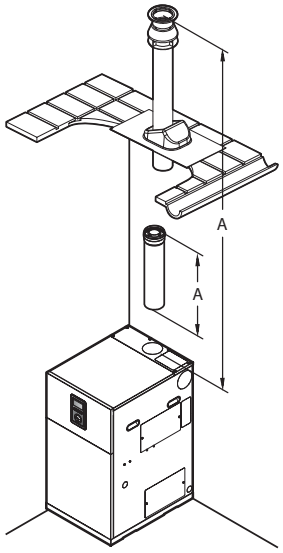


Ø60/100 => Max. length: A+B-(1 x 45°elbow) = 20-1 = 19 m
Ø80/125 => Max. length: A+B-(1 x 45°elbow) = 68-1 = 67 m

Pipe Diameter (mm)	Maximum Length (m)	Elbow	Equivalent Length (m)
Ø60/100	20	45°	1.0
		90°	1.3
Ø80/125	68	45°	1.0
		90°	2.2

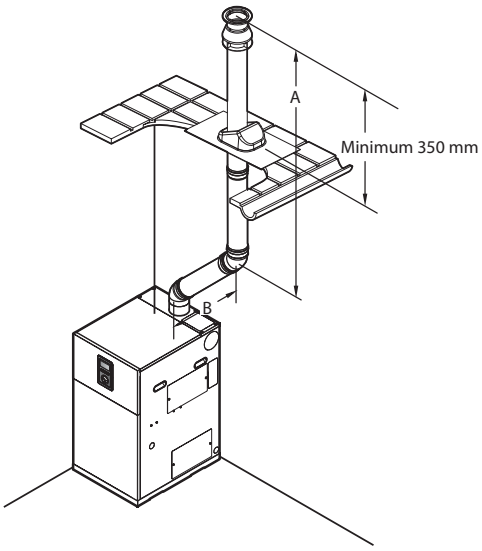
6.2.2 Vertical Coaxial Removal (Type C_{33})

Standard Removal System



Ø60/100 => Max. length: A=21 m
Ø80/125 => Max. length: A=70 m

Extended Removal System



Ø60/100 => Max. length: A+B-(1 x 45°elbow) = 21-1 = 20 m
Ø80/125 => Max. length: A+B-(1 x 45°elbow) = 70-1 = 69 m

Pipe Diameter (mm)	Maximum Length (m)	Elbow	Equivalent Length (m)
Ø60/100	21	45°	1.0
Ø80/125	70		

6.3 Measuring Flue Length

The gas removal and air intake systems may be oriented in any direction (north, south, east or west). Some special components such as elbows are used to help reach certain positions. Each removal terminal kit includes an adapter for connection to the boiler and a removal terminal.

The total length of the tubes must not exceed the maximum value defined. If the removal installation includes elbows while calculating the total length you must take into account that each elbow has a resistance equal to a specific linear Leq equivalent length (see table).

Carefully study the diagrams representing the different types of removal and select the one that best suits the conditions of your installation. To choose the removal accessories required for each installation, see the list of accessories on the NAVIEN price list.

Maximum Total Length

Type	Pipe Diameter (mm)	Orientation	Maximum Length (m)
Coaxial	Ø60/100	Horizontal	20
		Vertical	21
	Ø80/125	Horizontal	68
		Vertical	70

Equivalent Length of Elbows and Adapters

Type	Pipe Diameter (mm)	Elbow	Equivalent Length (m)
Coaxial	Adapter Ø60/100 -> Ø80/125	-	0.5
	Ø60/100	45°	1.0
		90°	1.3
	Ø80/125	45°	1.0
		90°	2.2

6.4 Terminating the Flue

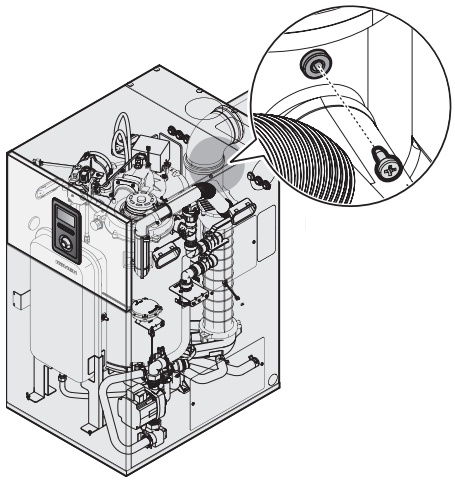
Before installing the boiler, determine what type of flue termination is appropriate for the installation location and situation. The subsections that follow describe some typical flue configurations.

CAUTION

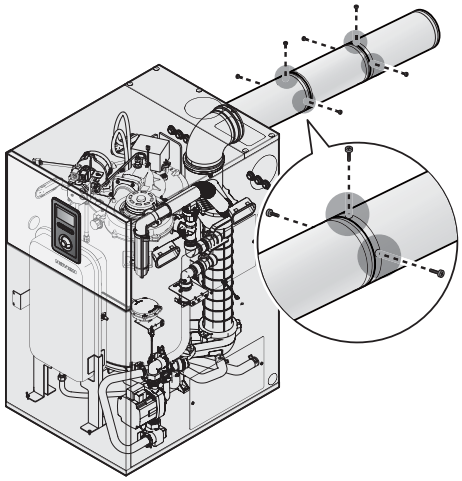
Minimum Clearance to Metering devices and Relief equipment. Maintain a minimum horizontal clearance of 1.22 m from electric meters, gas meters, regulators, and relief equipment. Do not install the boiler above or below electric meters, gas meters, regulators, or relief equipment unless a 1.22 m horizontal clearance is maintained.

6.5 Fixing the Flue

After installing the flue vent, fasten the screw to fix the flue vent to the flue duct. (Use screws supplied by Navien.)



Flue connections must be firmly pressed together so that the gaskets from an airtight seal. To ensure optimum joint connection, it is recommended to secure with three self tapping screws. Secure the flue to the wall or ceiling with pipe clamps or perforated hanger iron.



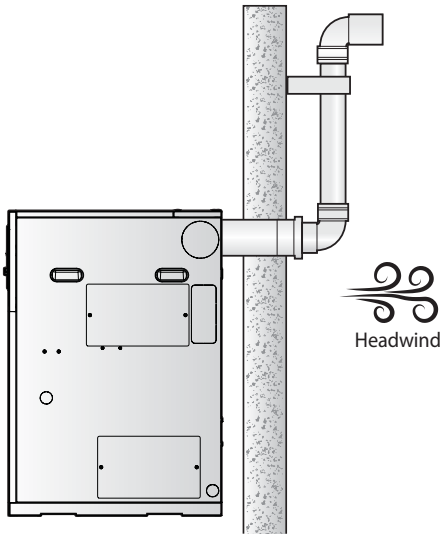
WARNING

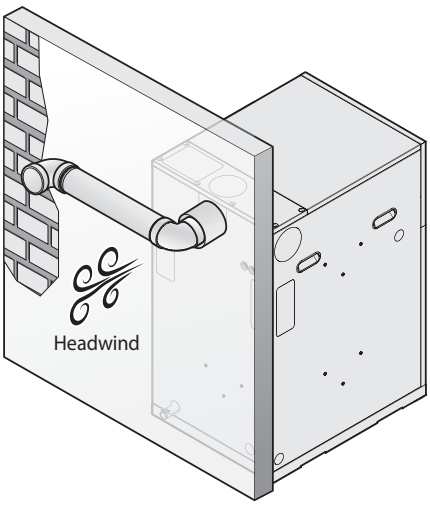
The screw must be fastened completely to fix the flue vent to the flue duct. If it is not properly fastened, it can result in excessive levels of carbon monoxide, which can lead to severe personal injury. Flue vent installation should be performed only by a licensed professional.

6.6 Preventing Exhaust Gas Backflow

If the coaxial exhaust is installed in a place subject to a headwind, the exhaust gas may flow backwards and result in noise and flame loss.

To prevent exhaust gas backflow, extend the exhaust gas termination to make it longer than a minimum of 300 mm from the intake air termination. If the extended exhaust gas termination is higher than the intake air termination, install a shield on the intake air termination to prevent rain from entering it.





7. Setting the DIP Switches

CAUTION

Do not remove the front cover unless the power to the boiler is turned off or disconnected. Failure to do so may result in electric shock.

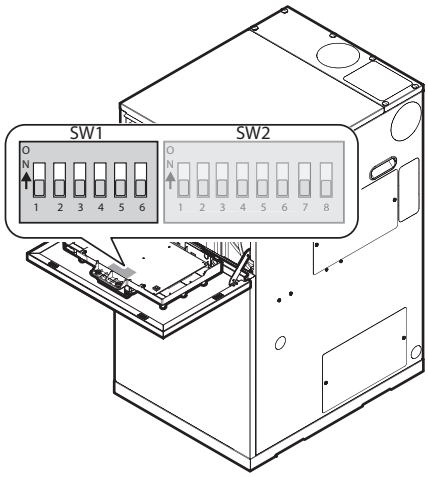
The boiler has 2 sets of DIP switches on the main controller (PBA) and 2 sets of DIP switches on the front panel. DIP switches are used to control the functionality of the boiler. Set the DIP switches appropriately, based on the installation environment.

Note To access the main controller (PBA), refer to "9.1 Accessing the Main Controller (PBA)" on page 41.

7.1 PCB DIP Switches

DIP Switch 1 (Set of 6)

The DIP SW 1 on the circuit board configures operation status, and boiler model/capacity.

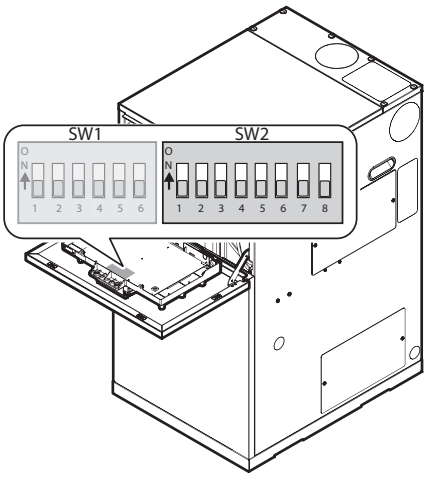


Switch 1	Function	Setting	
1 & 2	Operation Status	Normal (Default)	1-OFF, 2-OFF
		Stage 1 (Low)	1-OFF, 2-ON 1-ON, 2-ON
		Stage 2 (High)	1-ON, 2-OFF
3	Boiler Type	Solo (System/ Regular)	3-OFF
		Combi	3-ON
4	Not Used	Not Used	4-OFF
		Not Used	4-ON
5 & 6	Capacity	21 kW	5-OFF, 6-OFF
		28 kW	5-ON, 6-OFF
		36 kW	5-OFF, 6-ON
		Not Used	5-ON, 6-ON

7.2 Front Panel DIP Switches

DIP Switch (Set of 8)

The DIP SW 2 on the circuit board configures the fuel selection, country, makeup water method, and source of the heat demand.



Switch 2	Function	Setting	
1 & 2	Fuel Type	Kerosene	1-OFF, 2-OFF
		Light Oil*	1-ON, 2-OFF
		Not Used	1-OFF, 2-ON
		Not Used	1-ON, 2-ON
3	Not Used	Not Used	3 - OFF
		Not Used	3 - ON
4	Not Used	Not Used	4 - OFF
		Not Used	4 - ON
5	Not Used	Not Used	5 - OFF
		Not Used	5 - ON

* Refer to the manufacturer's instructions when using light oil.

Switch 2	Function	Setting	
6 & 7 & 8	CH Heat Demand	Switched Live	6-OFF, 7-OFF, 8-OFF
		CH Thermostat	6-ON, 7-OFF, 8-OFF
		Navien Thermostat or Navien Roomcon	6-OFF, 7-ON, 8-OFF
		OT R/C	6-ON, 7-ON, 8-OFF
		Not Used	6-OFF, 7-OFF, 8-ON
		Not Used	6-ON, 7-OFF, 8-ON
		Not Used	6-OFF, 7-ON, 8-ON
		Not Used	6-ON, 7-ON, 8-ON

8. Connecting the Power Supply

WARNING

- Improperly connecting the power supply can result in electrical shock and electrocution. Follow all applicable electrical codes of the local authority having jurisdiction.
- When connecting the boiler to the power supply, do not touch the power cord or internal components of the boiler with wet hands. Doing so may result in electric shock.

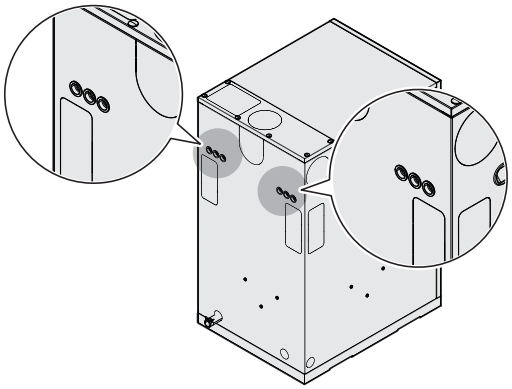
Connecting the power supply should be performed only by a licensed professional.

When connecting the power supply, follow these guidelines:

- Do not connect the electric supply until all piping is complete and the boiler has been filled with water.
- Do not connect the boiler to a 110-120 V AC power supply. Doing so will damage the boiler and void the warranty.
- All the Navien LCB boilers are supplied with a factory-installed, 3 core wire (Live, Neutral, Earth). The boiler's current rating is 3 A and can be plugged into any grounded electrical outlet adjacent to the boiler. A dedicated power supply is not required.
- The boiler must be electrically grounded. If wiring the boiler directly to a power supply, do not attach the ground wire to oil or water pipes as plastic pipe or dielectric unions may prevent proper grounding.
- We recommend using a surge protector to protect the boiler from power surges.
- If there is a power failure in cold weather areas, the freeze prevention system in the boiler will not operate and may result in the heat exchanger freezing. In cold areas where power failures are common, you must completely drain the boiler to prevent damage if power cuts last for extended periods. Damage caused by freezing is not covered under warranty.

WARNING

When connecting cables to the boiler through the rubber stopper on the back of the boiler, cut a hole (or an X) into the rubber stopper to ensure the cables can pass through the rubber stoppers. Removing the rubber stoppers and connecting cables to the boiler may damage the cables, due to the boiler housing's sharp edges, and result in electric shock.



CAUTION

Label all wires before disconnecting them when you work on the controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

9. Connecting Electrical Supplies

WARNING

Improperly connecting the electrical supplies can result in electrical shock and electrocution. Follow all applicable electrical codes of the local authority having jurisdiction. Connecting the electrical components should be performed only by a licensed professional.

DANGER

- You must ensure that the boiler is disconnected from the electrical supply before carrying out any servicing inside the boiler and, particularly, on the electric terminal strips.
- If the electrical supply is connected electrical contact could occur, causing serious damage due to electrocution.

CAUTION

Label all wires before disconnecting them when you work on the controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

The boiler electrical connections must be made by sufficiently qualified staff in strict compliance with the sections below and with any electrical safety regulations applicable at the time of installation.

Note The LCB700 boiler has an electrical protection degree of IPX5D. The electrical connection must be made via a bipolar switch located on the same premises as the boiler. The switch must have a minimum pole separation of 3 mm.

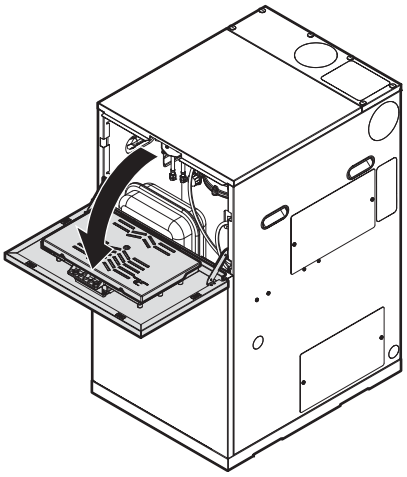
9.1 Accessing the Main Controller (PBA)

DANGER

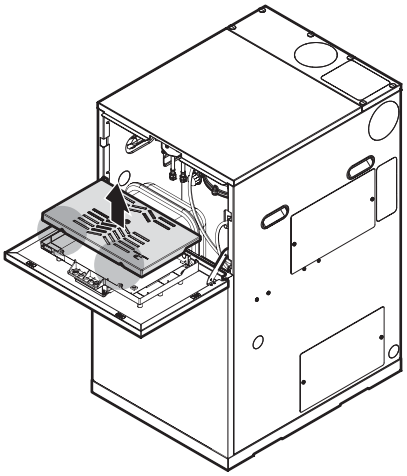
You must ensure that the boiler is disconnected from the electrical supply before carrying out any servicing inside the boiler and, particularly, on the Main Controller (PBA)

To access the PBA, carefully follow the steps below:

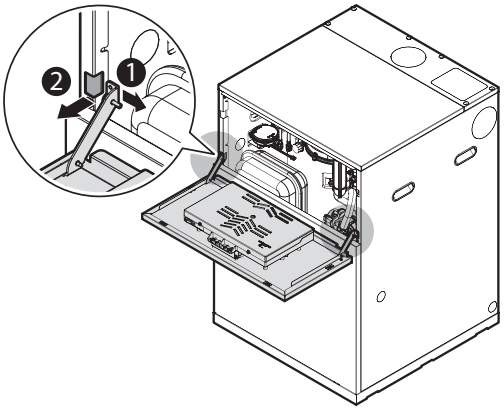
1. Turn off the power supply to the boiler.
2. Open the front cover by pulling its sides.



3. Loosen the two screws at the top of the PBA cover and remove the PBA cover. If the PBA cover is completely removed, you can gain access to the internal components.

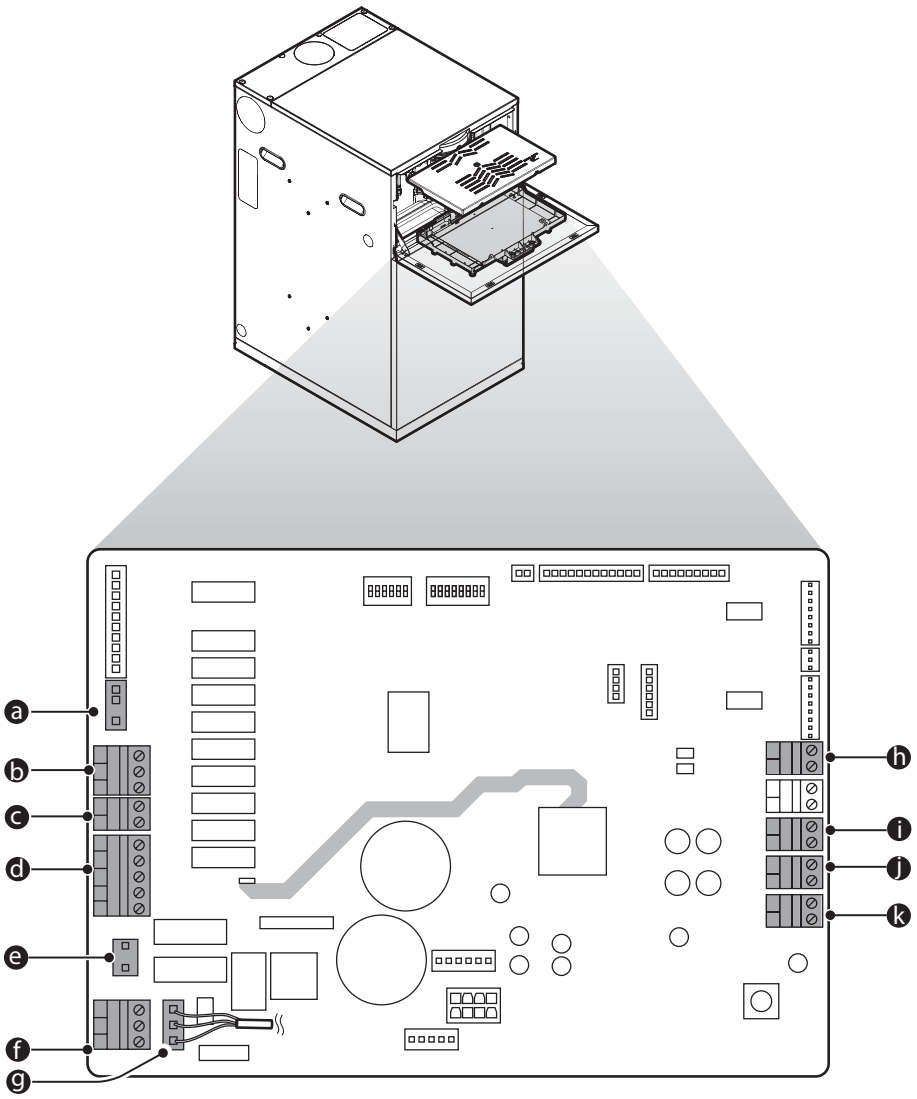


Note To completely remove the front cover, pull out the fixation hooks from the holes.



9.2 About the Main Controller (PBA)

Refer to the following illustration for the main controller (PBA) wiring description.



Part	Ref	Applications
AC application	a	System/Combi: Internal recirculation pump Regular: External recirculation pump
	b	Combi: 3 Way Valve (Internal) System/Regular: DHW Valve (S,Y plan)
	c	System/Regular: CH Valve (S, Y, W plan)
	d	Junction box connection 1. CH_ON 2. DHW_ON 3. DHW_OFF 4. AC Thermostat (Switched Live) 5. L **Note** The AC Thermostat (Switched Live) and L terminals must be shorted using a jumper.
AC power line	e	Power S/W
	f	Power out: CONZ3 (Connected to the wiring centre)
	g	Power in: CONZ1 (AC Power supply) 1. Live (L) 2. Neutral (N) 3. Earth (PE) **Note** The power cord is connected to the CONZ1 (POWER IN) port by default.
DC application	h	Outdoor temp sensor
	i	CH thermostat
	j	Cylinder stat
	k	OpenTherm

9.3 Setting the Heating Demand

Set the heating demand on the DIW switch. To use the DHW tank, control the panel for DHW settings.

9.3.1 CH Demand Setting

The DIP SW on the circuit board that configures source of the heat demand is listed in the following table.

Switch2	Function	Setting	
6 & 7 & 8	CH Heat Demand	Switched Live	6-OFF, 7-OFF, 8-OFF
		CH thermostat	6-ON, 7-OFF, 8-OFF
		Navien Thermostat	6-OFF, 7-ON, 8-OFF
		OT RC	6-ON, 7-ON, 8-OFF
		Not used	6-OFF, 7-OFF, 8-ON
		Not used	6-ON, 7-OFF, 8-ON
		Not used	6-OFF, 7-ON, 8-ON
		Not used	6-ON, 7-ON, 8-ON

9.3.2 DHW Tank Demand Setting (System/ Regular)

You can set the DHW tank demand on the 4-3 DHW Call Signal menu.

Item	Description
4-1 DHW Thermostat	Aquastat
4-2 Wiring Centre	When VCU-10R (wiring centre) is connected to the boiler

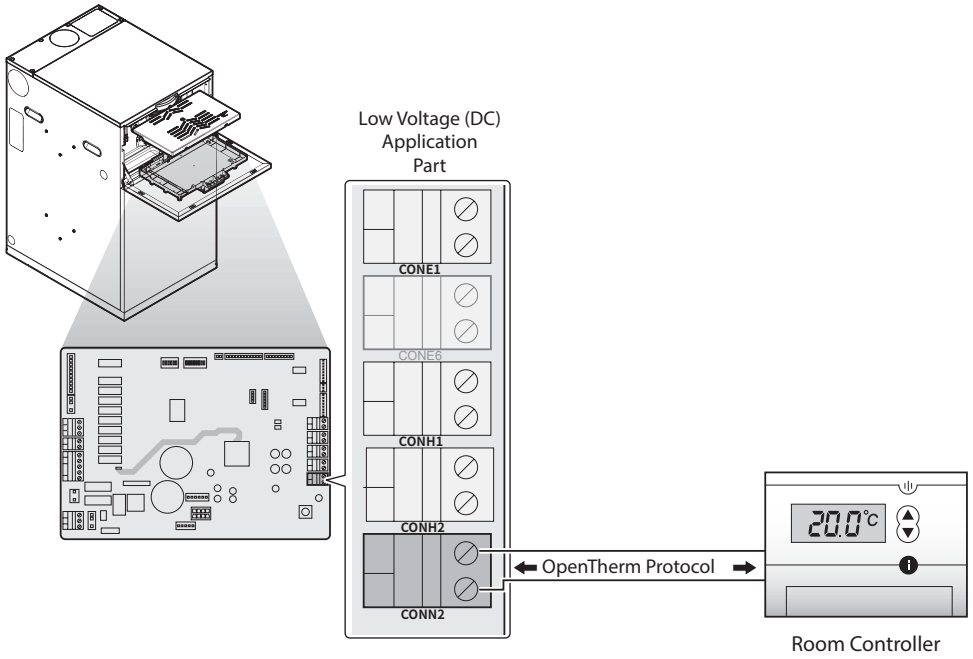
Note The 4-2 Wiring Centre menu is displayed only when the CH heat demand is set to Navien Thermostat and the wiring centre (VCU-10R) is connected to the boiler.

9.4 Connecting Applications - Low Voltage (DC) Application Part

These connections are low voltage DC only and 240 V AC is not to be fitted to these terminals. Doing so may damage the PCB and will not be covered under warranty.

9.4.1 Connecting the OpenTherm

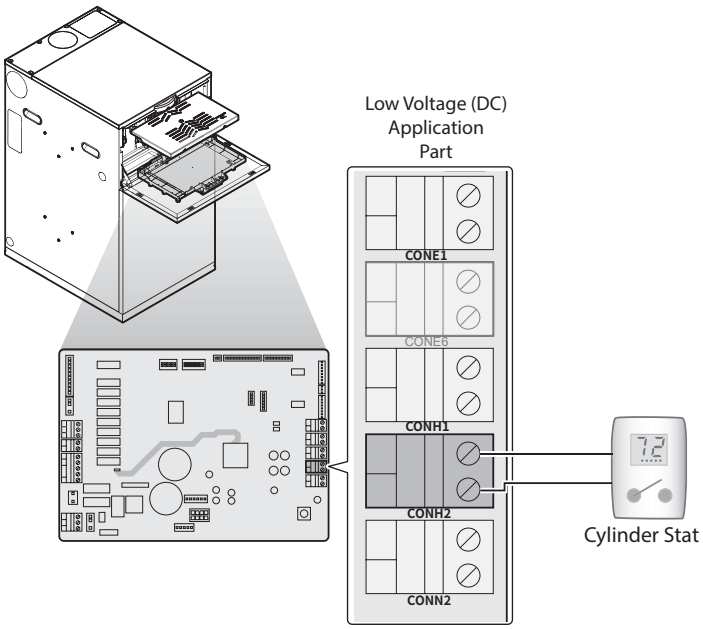
The boiler is designed to be connected to an OpenTherm. The OpenTherm cables are to be connected to the CONN2 in the low voltage (DC) application part.



Note OpenTherm® is an industry standard modulating control available from several control manufacturers and the LCB700 boiler has an OpenTherm® interface. This enables our modulating range of OpenTherm® room controls to be connected without any further modifications.

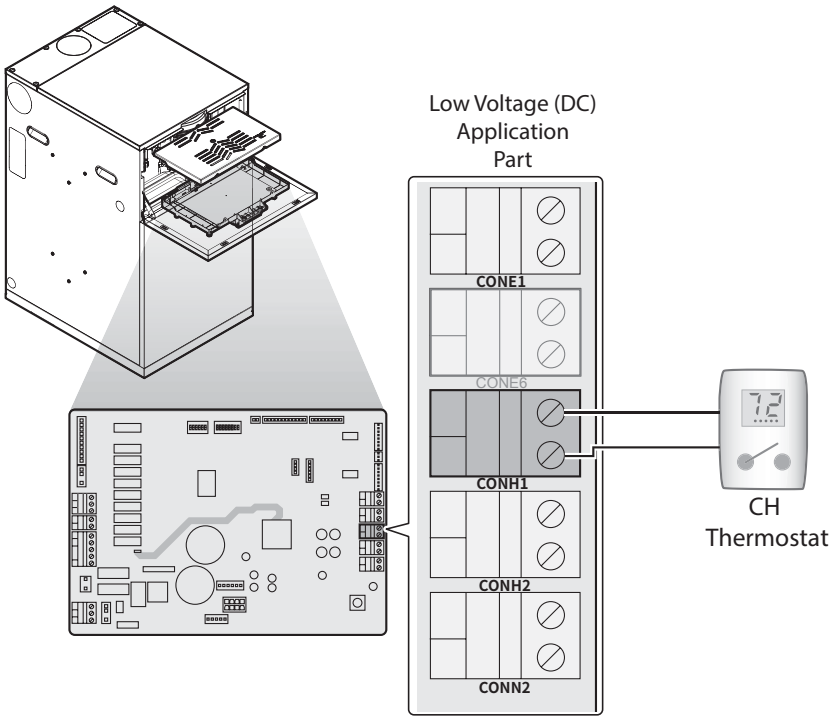
9.4.2 Connecting the Cylinder Stat

The boiler is designed to be connected to a cylinder stat. The thermostat cables are to be connected to the CONH2 in the low voltage (DC) application part.



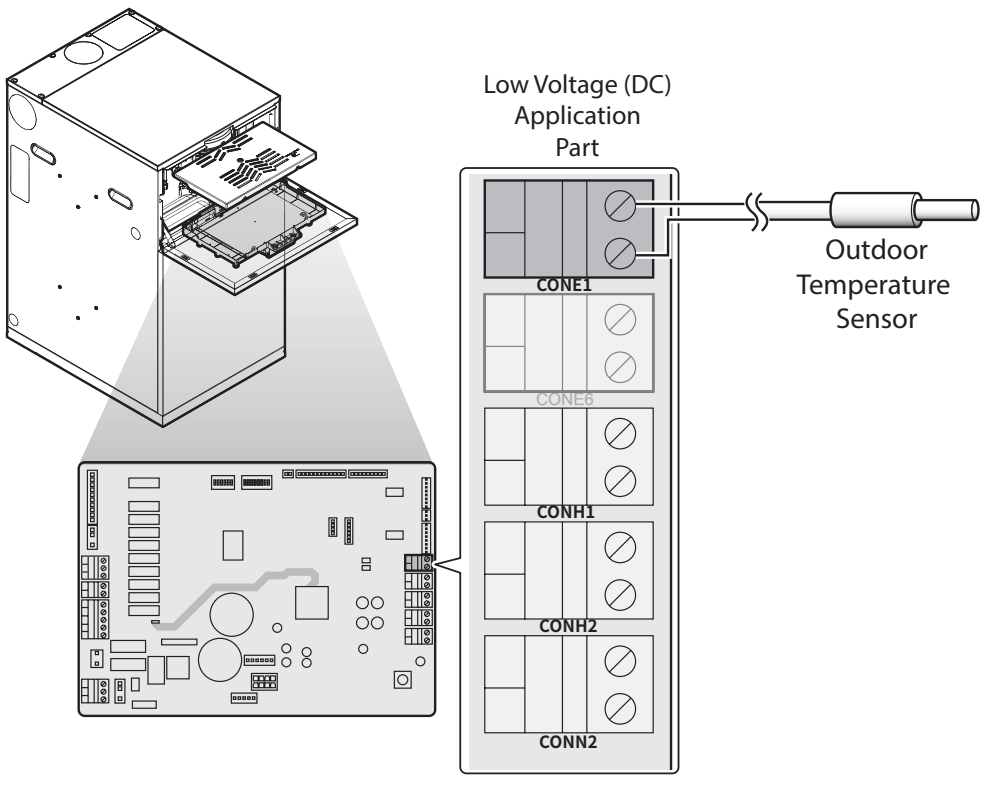
9.4.3 Connecting the CH Thermostat

The boiler is designed to be connected to a CH thermostat. The CH thermostat cables are to be connected to the CONH1 in the low voltage (DC) application part.



9.4.4 Connecting the Outdoor Temperature Sensor

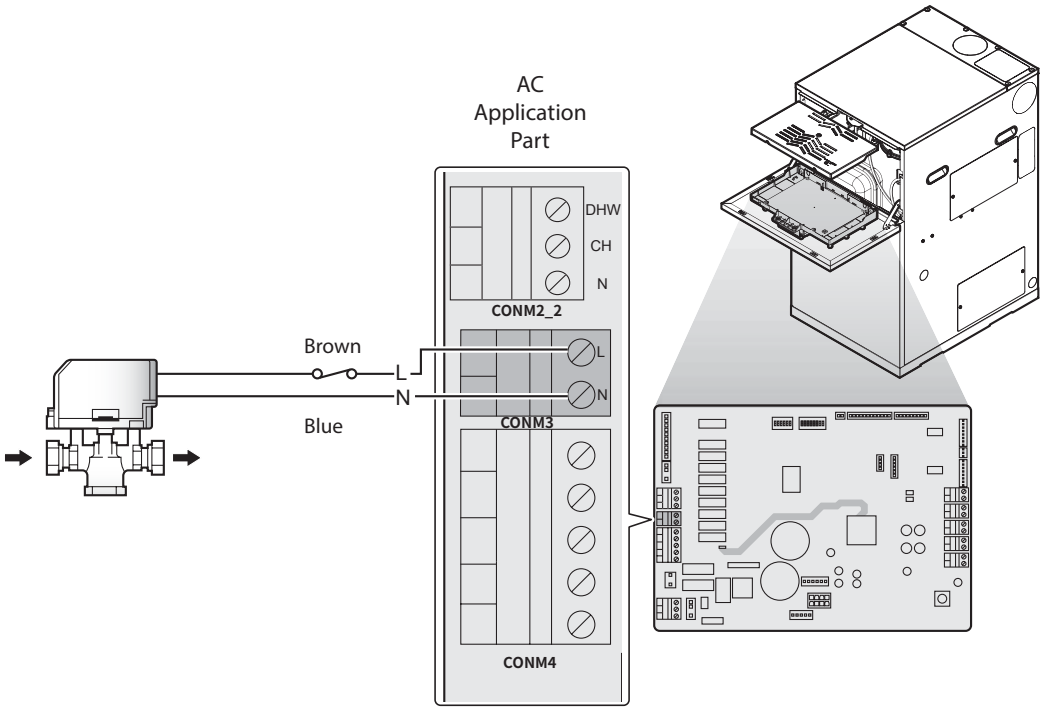
The boiler is designed to be able to function with an outdoor temperature sensor. The sensor cables are to be connected to the CONE1 in the low voltage (DC) application part.



9.5 Connecting Applications to the AC Application Part

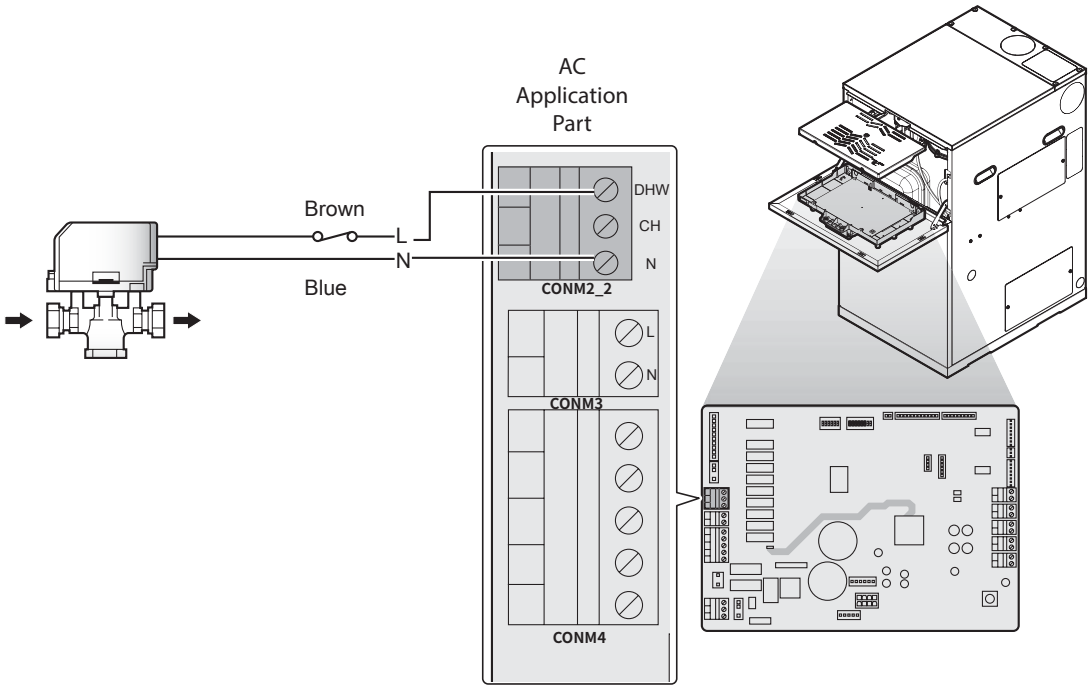
9.5.1 Connecting the 2 Port Diverter Valve (CH)

The boiler is designed to be connected to a 2 port diverter valve (CH). The valve cables are connected to the terminals 1 (L) and 2 (N) of the CONM3 in the AC application part. It only operates when there is an operating signal from the CH thermostat.



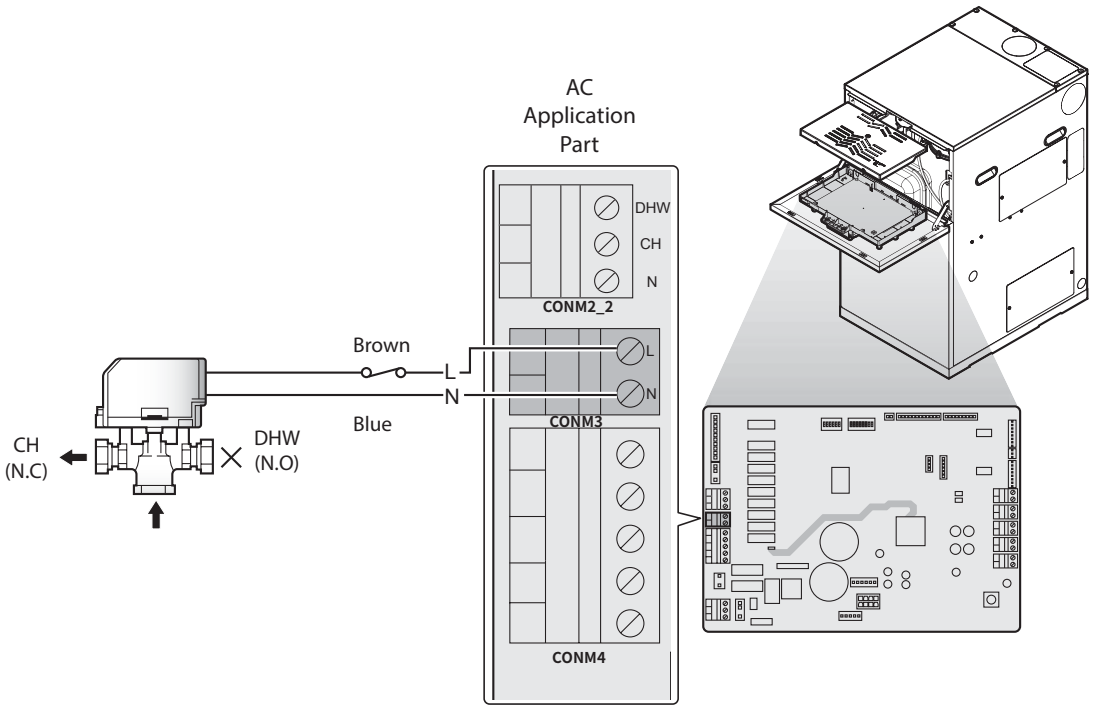
9.5.2 Connecting the 2 Port Diverter Valve (DHW)

The boiler is designed to be connected to a 2 port diverter valve (DHW). The valve cables are connected to the terminals 1 (L) and 3 (N) of the CONM2_2 in the AC application part. It only operates when there is an operating signal from the cylinder stat.



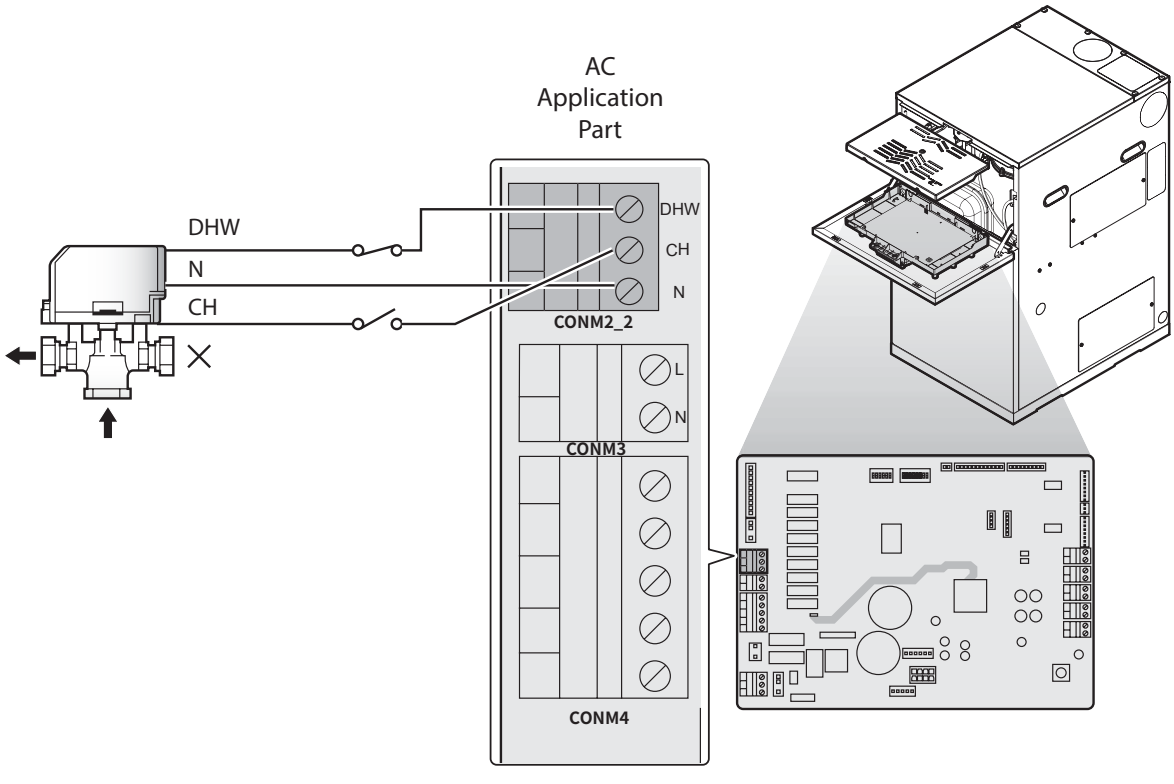
9.5.3 Connecting the 3 Port Diverter Valve

The boiler is designed to be connected to a 3 port diverter valve. The valve cables are connected to the terminals 1 (L) and 2 (N) of the CONM3 in the AC application part. It only operates when there is an operating signal from the cylinder stat or CH thermostat.



9.5.4 Connecting the 3 Way Valve (Type C Contact)

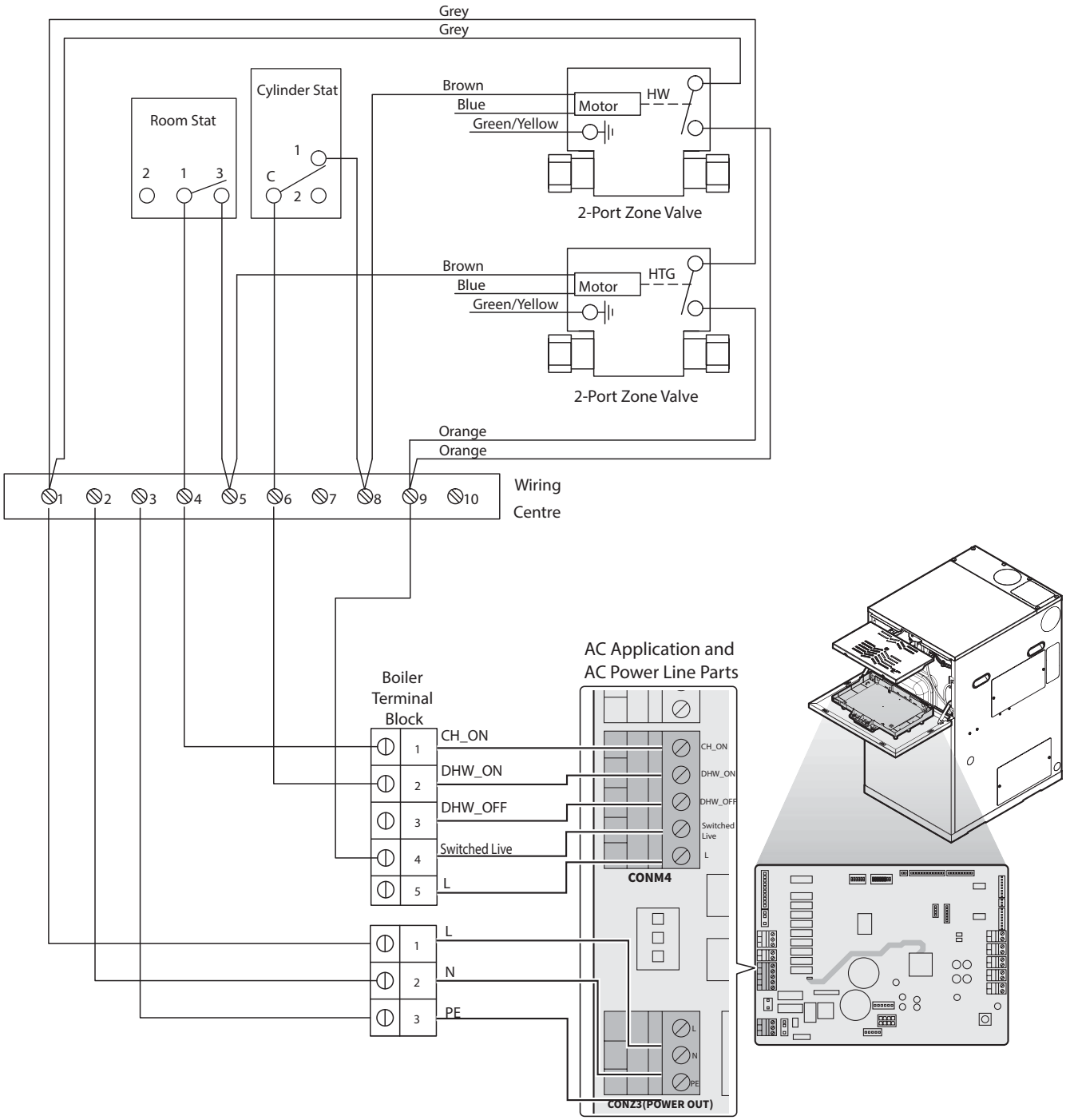
The boiler is designed to be connected to a 3 way valve (Type C Contact). The valve cables are connected to the terminals DHW, CH and N of the CONM2 in the AC application part. It only operates when there is an operating signal from the cylinder stat or CH thermostat.



9.6 Connecting Applications to AC Application Part (With Junction Box)

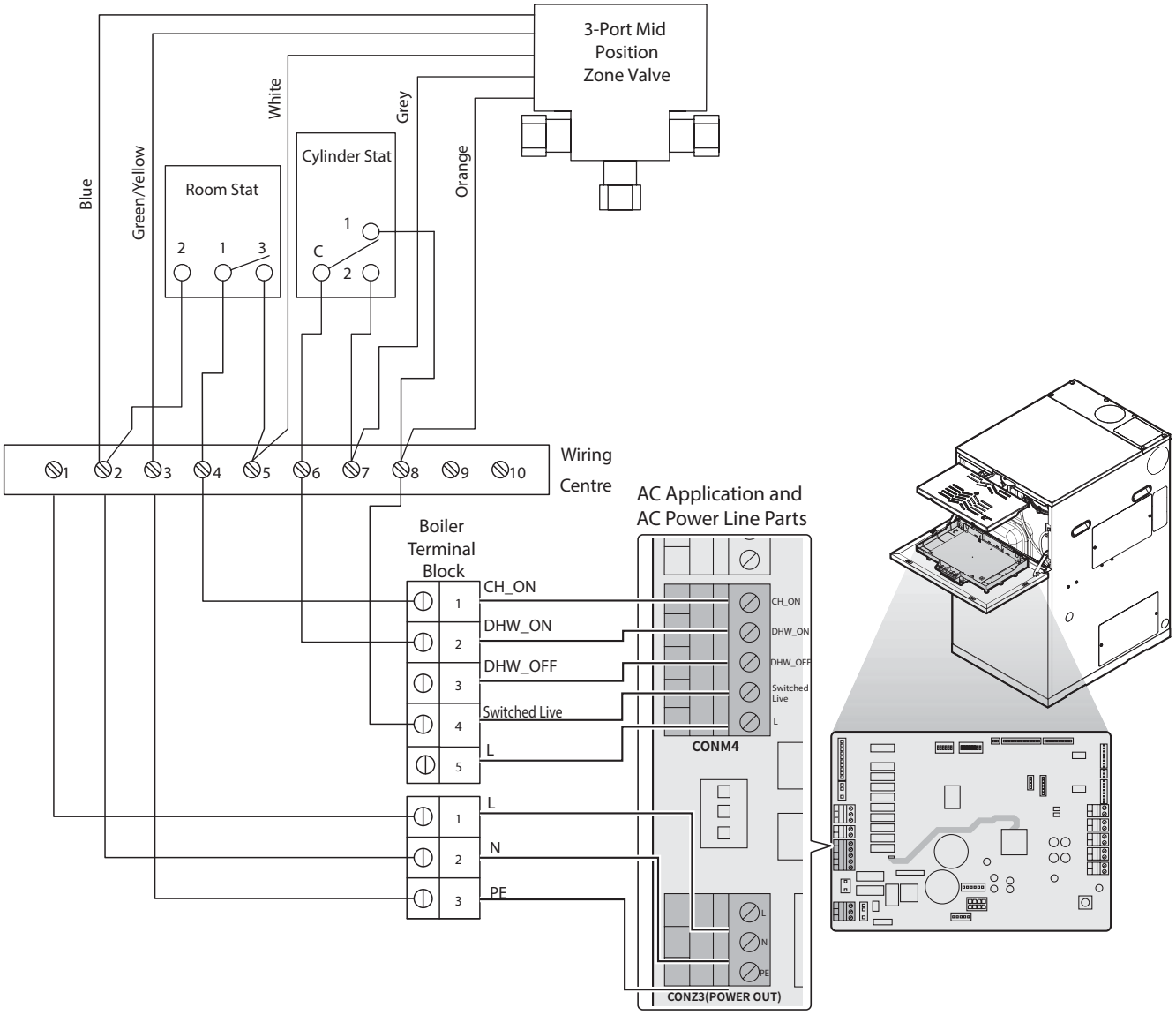
9.6.1 Connecting the Junction Box Connection (S Plan)

The boiler is designed to be connected to a junction box (S Plan). The Junction box cables are connected to the terminals 1-5 of the CONM4 in the AC application part and the CONZ3 (POWER OUT) in the AC power line part.



9.6.2 Connecting the Junction Box Connection (Y Plan)

The boiler is designed to be connected to a junction box (Y Plan). The Junction box cables are connected to the terminals 1-5 of the CONM4 in the AC application part and the CONZ3 (POWER OUT) in the AC power line part.



10. Installation Check list

After installing the boiler, review the following checklist. Complete the boiler start-up process by carrying out the checks listed in the table below.

If you have additional questions or need assistance with installation, contact an official Technical Assistance Service (TAS), or refer to the technical support section of Navien's website (www.navien.co.uk).

Installing the Boiler	Yes	No
Have you maintained the proper service and maintenance clearances?		
Is the boiler and flue piping clear of combustible materials, including clothing, cleaning materials, and rags?		

Connecting the Space Heating Piping	Yes	No
Did you wash the pipeline to prevent any deposits, fluxes, solder, scale, debris, or other impurities that could harm the boiler before connecting the heating pipe to the boiler?		
Has the system been filled(less than 1 bar) and purged of air?		
Is there an expansion tank installed and set to the proper system pressure?		
If antifreeze has been used, is it the proper type and is the concentration appropriate?		
Did you install an automatic bypass valve of at least 6ℓ/min when connected to radiators with thermostatic valves?		
Did you check for leaks in space heating piping?		
Is the exposed outdoor heating pipe properly insulated?		

Connecting the Pressure Relief Valve	Yes	No
Have you installed an approved pressure relief valve on the boiler?		
Does the rating of the pressure relief valve match or exceed the maximum bar rating of the boiler?		

Connecting the Condensate Drain	Yes	No
Have all condensate pipework must 'fall' from the appliance by a minimum of 3 degrees (52 mm per metre) to ensure adequate condensate flow?		
Have you ensured that air is returned to the unit in the pipework work path for the condensate trap to function properly?		
If you connected to a rainwater pipe, did you block the air flow?		
Are the external piping as short as possible and not more than 3 meters in length?		
Is the external piping ideally isolated by increasing the minimum diameter to 32 mm and insulated?		

Connecting the Oil Supply	Yes	No
Is the fuel used Kerosene or Light-oil?		
Did you use a galvanized pipe as the fuel line?		
Did you install a fire valve?		
If the oil line was installed with a single pipe, did the oil tank be installed more than 300 mm above the oil pump?		
Did you check for leaks in oil supply piping?		

Flue System	Yes	No
Have you flue the boiler in accordance with all local codes and the guidelines in this manual?		
Are the outlets and horizontal tubes of the flue sloping upwards (about 3 degrees)?		
Are the air intake and flue connections on the lines correctly sealed?		
Is the total flue length within the maximum length restriction?		
Did you fix the flue system so that it does not fall out after installing the flue system?		
Did you check for leaks in flue system?		

Connecting the Power Supply	Yes	No
Is the supplied voltage 220-230 V AC?		
Is the ground wire properly connected?		

Operating the Boiler	Yes	No
Is the DIP switch on the controller PCB set for the model?		
Have you given the Installation & Operation Manual to the owner for future reference?		

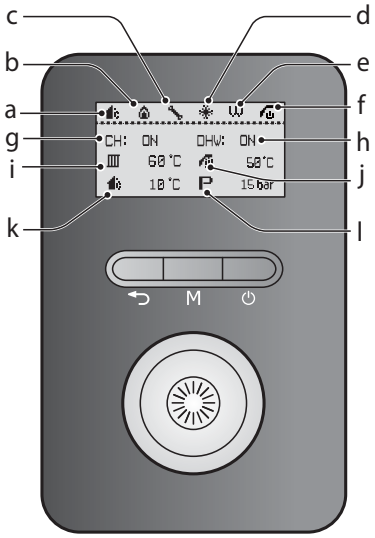
11. Operating the Boiler

11.1 Using the Front Panel

The front panel allows you to adjust the temperature and view the operating status or error codes. Remove the protective film from the front panel before using it.

11.1.1 Icons and Digital Display

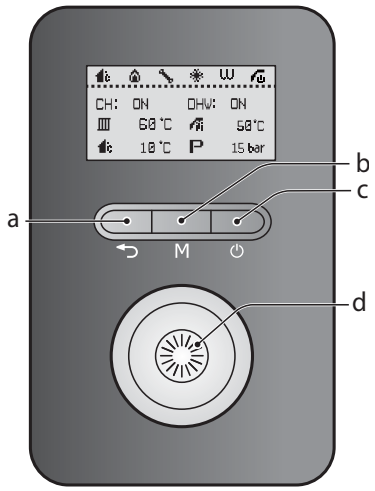
The icons and digital display on the front panel provide important information required for the boiler's operation. Refer to the following table for detailed information.

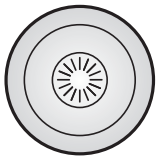


a		**Outdoor temperature compensation (OTC)** Displayed when the outdoor temperature compensation (OTC) is enabled.	**b**		**Combustion** Displayed when the burner is combusting.
c		**System fault** Displayed when a system fault is detected.	**d**		**Anti-freeze** Displayed when the boiler is operating in anti-freeze mode.
e		**Schedule programming mode** Displayed when the boiler's schedule programming operation is set.	**f**		**DHW preheat** Displayed when the DHW preheat feature is enabled. (Combi Model Only)  Always On  Weekly  Intelligent
g		**Central heating demand** Indicates the central heating demand is present.	**h**		**DHW demand** Indicates that DHW demand is present.
i		**Central heating set temperature** When the central heating temperature is set: Displays the currently set central heating temperature. When the central heating temperature is not set: Displays the current supply water temperature.	**j**		**DHW set temperature** When the DHW temperature is set: Displays the currently set DHW temperature. When the DHW temperature is not set: Displays the current supply water temperature when using the DHW thermostat. Displays the current DHW tank temperature when using the DHW sensor.
k		**Outdoor temperature** Displays the outdoor temperature.	**l**		**System pressure** Displays the internal water pressure of the boiler system.

11.1.2 Buttons and Command Dial

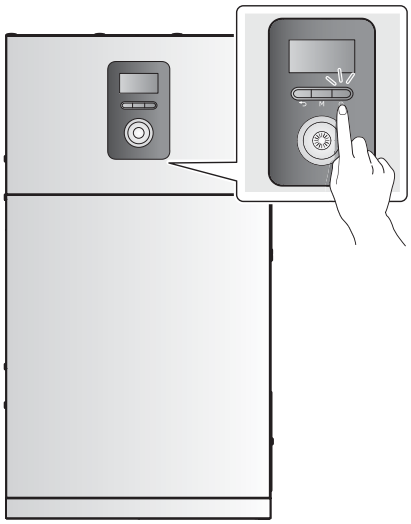
Using the buttons and the Command dial on the front panel, you can turn on or off the boiler, monitor the current operation status, and set the values required for the boiler's operation, such as central heating and DHW supply temperatures. Refer to the following table for detailed information.



a	⮌	**Back button** Return to the previous menu or screen.	**b**	M	**Mode button** Enter the boiler's main menu.
c	⏻	**Power button** Turn on or off the boiler.	**d**		**Command dial** Rotate to switch between menu items, or to increase/decrease values. Press to make a selection or to confirm changes.

11.2 Turning the Boiler on or off

To turn the boiler on or off, press the Power button (⏻) for 0.3 seconds.



When the power is on, the boiler automatically enters normal operation mode, and the boiler's operating conditions are displayed on the screen.

Note

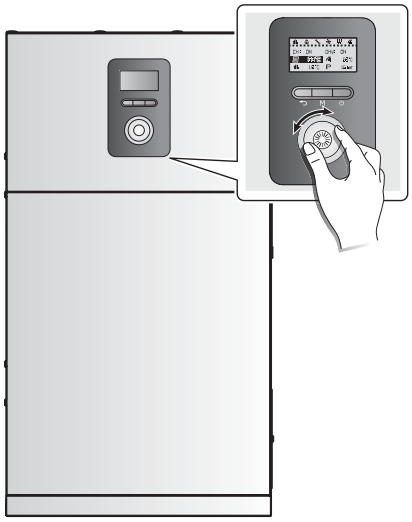
- The boiler status icons remain displayed when the boiler is turned off.
- To prevent formation of soot, the minimum running time of the burner in the boiler is 2 minutes and 30 seconds. Therefore, if you turn off the boiler within 2 minutes and 30 seconds of it being turned on, the burner does not stop running immediately.

11.3 Adjusting the Temperature

11.3.1 Adjusting the Central Heating Temperature

To adjust the heating temperature:

1. In normal operation mode, rotate the Command dial (◎) . The central heating temperature (▥) is highlighted on the screen.



2. Press the Command dial (◎) to select the central heating temperature (▥). The highlighted section will flash.



3. Rotate the Command dial (◎) to the right or left to increase or decrease the temperature.
4. Press the Command dial (◎) to confirm the new temperature.
5. Press the Back button (↩) to return to normal operation mode, or rotate the Command dial (◎) to adjust other operation conditions.

You can adjust the temperature while the highlighted section is flashing. Once the flashing stops, the current temperature setting is stored.

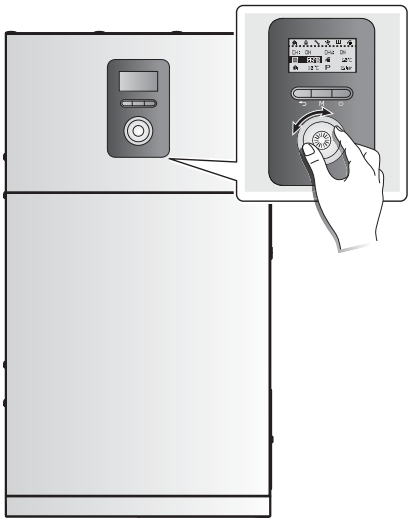
Note

- The central heating temperature cannot be adjusted when the Outdoor Reset Control is used.
- The central heating temperature cannot be adjusted if the boiler is operating as a sub unit in a cascade system. The main unit's set temperature will be displayed on the screen.
- In case of outdoor reset sensor malfunction, the boiler will operate at this set temperature.
- Take note of the original heating temperature in case you want to restore it to the default.
- The default central heating supply water temperature range is 40°C (Absolute MIN) to 85°C (Absolute MAX).
- The default central heating return water temperature range is 30°C (Absolute MIN) to 65°C (Absolute MAX).
- You can adjust the temperature ranges in the parameter settings menu.
- The boiler will retain your settings during a power outage.

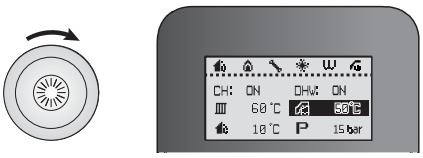
11.3.2 Adjusting the DHW Temperature

To adjust the water temperature:

1. In normal operation mode, rotate the Command dial (). The central heating temperature () is highlighted on the screen.



2. Rotate the Command dial () to the right to select the DHW temperature ().



3. Press the Command dial () to select the indirect DHW temperature (). The highlighted section will flash.



4. Rotate the Command dial () to the right or left to increase or decrease the temperature.
5. Press the Command dial () to confirm the new temperature.
6. Press the Back button () to return to normal operation mode, or rotate the Command dial () to adjust other operation conditions.

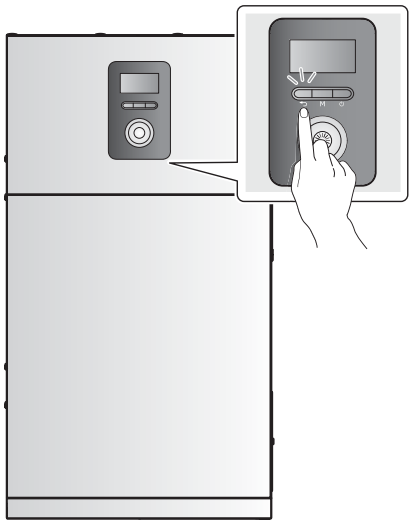
You can adjust the temperature while the display is flashing. Once the display stops flashing, the current temperature setting is stored.

Note

- Take note of the original DHW indirect supply temperature in case you want to restore it to the default.
- The default DHW temperature range is 40°C (Absolute MIN) to 85°C (Absolute MAX).
- You can adjust the temperature ranges in the parameter settings menu.
- The boiler will retain your settings during a power outage.
- System/Regular boilers: The default DHW Supply Temperature range is 40°C (Absolute Min) to 85°C (Absolute Max).
- Combi boilers: The default DHW Temp range is 30°C (Absolute Min) to 60°C (Absolute Max).

11.3.3 Resetting the Boiler

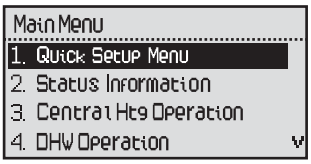
If an error message appears during boiler operation, reset the boiler to resolve the problem. Press the Back button (⮌) on the front panel to reset the boiler.



If resetting the boiler does not solve the problem, refer to the Troubleshooting section of this manual or contact Technical Support at 0844 332 2323.

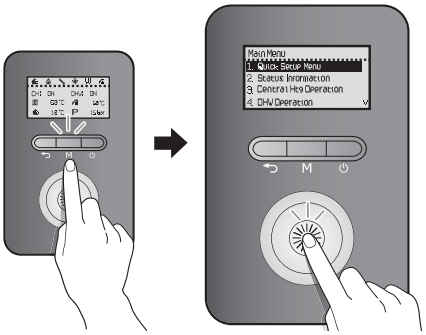
11.4 Accessing Basic Menu Items

In the Main Menu screen, you can view the boiler's operating conditions, configure the central heating and DHW temperatures, and review error history. Press the Menu button (M) to enter the Main Menu screen.



11.4.1 Quick Setup Menu

The Quick Setup Menu is designed to help configure the boiler settings after installation is complete. To enter the Quick Setup Menu, press the Menu button (M), and select "1.Quick Setup Menu".



Press the Back button (⮌) to return to the previous screen.

System/Regular Models

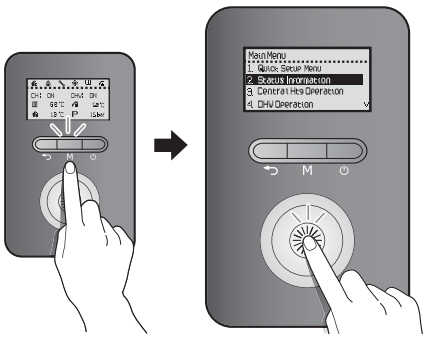
Item	Description
1. DHW ON/OFF	Set the DHW operation.
2. DHW Call Signal	Set the demand type for the DHW operation.
3. Time Setting	Set the system clock (RTC). • Display format: YYYY.MM.DD/ HH:MM:SS

Combi Models

Item	Description
1. Time Setting	Set the system clock (RTC). • Display format: YYYY.MM.DD/ HH:MM:SS

11.4.2 Viewing Basic Information

To view information about the boiler, press the Menu button (M), and then select "2. Status Information".



Rotate the Command dial ( ) to switch between the information items. Press the Command dial ( ) to select an item and view the information.

Press the Back button ( ) to exit information view mode.

System/Regular Models

Item	Description
1. Operation State	Current Operation State
2. Heat Capacity	Heat capacity (Low or High)
3. CH Set Temp	Central heating set temperature (°C)
4. DHW Set Temp	DHW indirect supply set temperature (°C)
5. Supply Temp	Heating supply temperature (°C)
6. Burner Temp	Burner housing sensor temperature (°C)
7. Outdoor Temp	Outdoor temperature (°C)
8. Inlet Temp	Inlet temperature (°C)
9. Flame Value	Flame detector AD value • Flame On: 8bit AD values equal to or lower than 70 • Flame Off: 8bit AD values equal to or higher than 175
10. Fan Target RPM	Set the fan speed (RPM)
11. Fan Current RPM	Current fan speed (RPM)
12. Fan Target APS	• Set APS voltage (V)
13. Fan Current APS	Set the oil pump speed (RPM)
14. Oil Pump Target RPM	Current oil pump speed (RPM)
15. Oil Pump Current RPM	Oil Pump speed(RPM)
16. Exhaust Temp	Exhaust temperature (°C)
17. OTC ON/OFF	OTC Status (Enable/Disable)
18. K-Factor	K-Factor for the OTC
19. Model	Model type
20. Type	Boiler type
21. Oil	Oil type
22. Main F/W ver	Main firmware version
23. Panel F/W Ver	Panel firmware version

Combi Models

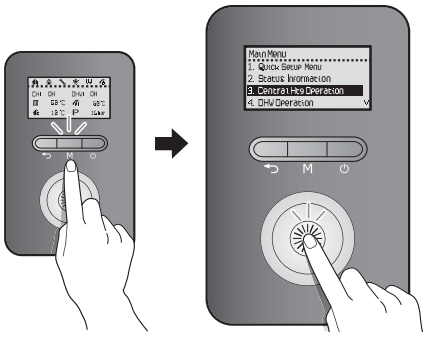
Item	Description
1. Operation State	Current Operation State
2. Heat Capacity	Heat capacity (Low or High)
3. CH Set Temp	Central heating set temperature (°C)
4. DHW Set Temp	DHW set temperature(°C)
5. Supply Temp	Heating supply temperature (°C)
6. Burner Temp	Burner housing sensor temperature (°C)
7. Outdoor Temp	Outdoor temperature (°C)
8. Inlet Temp	Inlet temperature(°C)
9. DHW Temp	DHW temperature(°C)
10. Outlet2 Temp	DHW outlet2 temperature(°C)
11. Tank Temp	DHW pre-heat tank temperature(°C)
12. Water Press	Water pressure (bar)
13. Flame Value	Flame detector AD value • Flame On: 8bit AD values equal to or lower than 70 • Flame Off: 8bit AD values equal to or higher than 175
14. Fan Target RPM	Set the fan speed (RPM)
15. Fan Current RPM	Current fan speed (RPM)
16. Fan Target APS	• Set APS voltage (V)
17. Fan Current APS	Set the oil pump speed (RPM)
18. Oil Pump Target RPM	Current oil pump speed (RPM)

Item	Description
19. Oil Pump Current RPM	Oil Pump speed(RPM)
20. Exhaust Temp	Exhaust temperature (°C)
21. OTC ON/OFF	OTC Status (Enable/Disable)
22. K-Factor	K-Factor for the OTC
23. Model	Model type
24. Type	Boiler type
25. Oil	Oil type
26. Main F/W ver	Main firmware version
27. Panel F/W Ver	Panel firmware version

Note The fan motor controls APS, so the Fan Target RPM is only for your reference.

11.4.3 Setting the Central Heating Operation

To set the boiler's central heating operation, press the Menu button (M), and then select "3. Central Htg Operation".



Rotate the Command dial ( ) to switch between the list items or to increase/decrease setting values. Press the Command dial ( ) to select an item or to confirm after making changes.

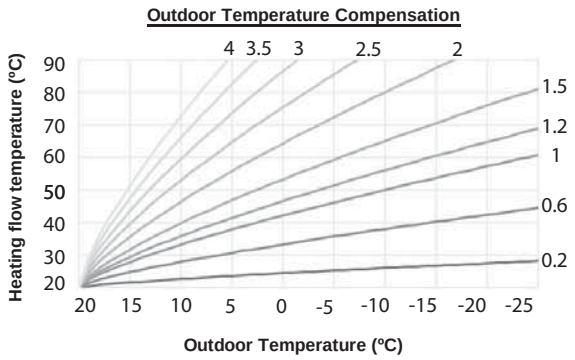
Press the Back button ( ) to return to the previous screen or menu.

Item	Description
1. Central Htg ON/ OFF	Enable or disable central heating operation. • Setting range: Enable/Disable • Default: Enable
1-1 CH Set Temp	Set the central heating target temperature (°C) • Setting range: 40-85°C • Default: 85°C This option is available only when "1. Central Htg ON/OFF" is set to "Enable".

Item	Description
2. OTC ON/OFF	Enable or disable the outdoor temperature compensation control option.
2-1 K-Factor*	K-Factor for the central heating
2-2 WWSD Temp	Set the Warm Weather Shut-down temperature. • Setting range: OFF, 10°C – 40°C • Default: OFF
2-3 WWSD On Diff	Set the differential temperature to deactivate the Warm Weather Shutdown. • Setting range: 1°C – 20°C • Default: 3°C
3. CH Control Method (System/ Regular Only)	Select the heating control type. 1: Supply Temperature 2: Return Temperature • Default: Supply Temperature

* When the boiler is connected to an outdoor temperature sensor (optional), functioning may be activated according to outdoor temperature conditions and K-factor values using the parameters.

The graph shows how the set temperature is determined. K-factor values can be set using the front panel or the Smart Room Controller.

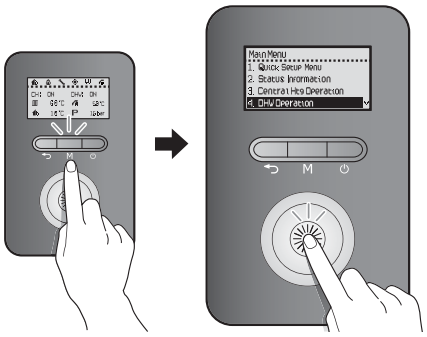


If there is an input from the outdoor temperature sensor, OTC (Outdoor Temperature Compensation) control will be enabled automatically. Also, if there is no input from the outdoor temperature sensor, OTC control will be disabled automatically.

OTC control can be enabled or disabled by the room thermostat signals. If the room thermostat is on (short), and the set supply water temperature calculated by the outdoor temperature and the K-factor values is above 30°C, OTC control is enabled. If the set supply water temperature is below 30°C, OTC control is disabled.

11.4.4 Setting the DHW Operation

To set the boiler's indirect (System/Regular) or direct (Combi) DHW operation, press the Menu button (M), and then select "4. DHW Operation".



Rotate the Command dial (⊛) to switch between the list items or to increase/decrease setting values. Press the Command dial (⊛) to select an item or to confirm after making changes.

Press the Back button (↩) to return to the previous screen or menu.

System/Regular Models

Item	Description
1. DHW ON/OFF	Set the DHW operation.
2. DHW Supply Set Temp	Set the DHW tank supply water temperature. • Setting range: 40 – 85°C • Default: 85°C
3. DHW Call Signal	Select a device for sensing the DHW demand. 1. DHW Thermostat 2. Wiring Centre: This option is available only when CH Demand is set to Navien Thermostat.

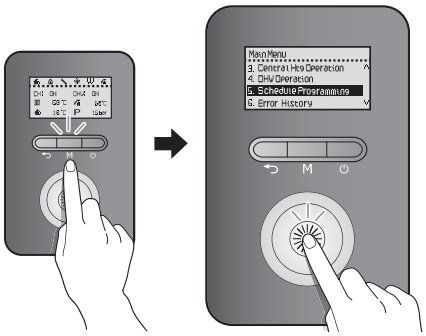
Combi Models

Item	Description
1. DHW Supply Set Temp	Set the DHW tank supply water temperature. • Setting range: 40 – 85°C • Default: 85°C
2. DHW Set Temp	Set the DHW temperature. • Setting range: 30 – 60°C • Default: 50°C

* DHW Priority Time refers to the time duration that the boiler will give priority to DHW over central heating (Combi boiler only).

11.4.5 Setting the Schedule Programming Operation

To set the boiler's schedule programming operation, press the Menu button (M), and then select "5. Schedule Programming".



Rotate the Command dial (⊛) to switch between the list items or to increase/decrease setting values. Press the Command dial (⊛) to select an item or to confirm after making changes.

Item	Description
1. CH_Schedule	Set the central heating weekly timer.
2. DHW_Schedule	Set the DHW tank (System/Regular) or DHW PreHeat (Combi) Weekly Timer.
3. Schedule Check	Check the weekly schedule.

Note To select this option, you must set up the Time settings in the Configuration menu.

If you select an item, you can select the certain day to schedule the central heating or DHW modes.

System/Regular Models - Central Heating or DHW Mode

Item	Description
1. 7 Day	Schedule a command for each day of the week.
2. 5 + 2 Day	Schedule a command for weekday and weekend.
3. 5 + 1 + 1 Day	Schedule a command for weekdays, Saturdays, and Sundays.
4. OFF (Not Used)	Disable the schedule function.

Combi Models - Central Heating Mode

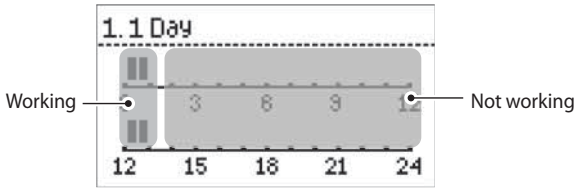
Item	Description
1. 7 Day	Schedule a command for each day of the week.
2. 5 + 2 Day	Schedule a command for weekday and weekend.
3. 5 + 1 + 1 Day	Schedule a command for weekdays, Saturdays, and Sundays.
4. OFF (Not Used)	Disable the schedule function.

Combi Models - DHW Mode

Item	Description
1. Always On	Preheat always ON.
2. Intelligent	The boiler analyzes your hot water consumption pattern and preheats the water when the set conditions are met.
3. Weekly	Set the DHW mode settings to be the same as space heating mode.
4. OFF (Not Used)	Disable the schedule function.

Set the Weekly Schedule

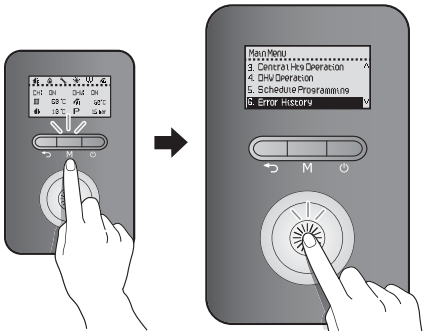
When setting up the Weekly option, select 'Weekly,' and select between 1 Day, 3 Day, and 7 Day to go to the Schedule menu.



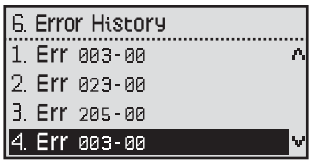
Rotate the Command Dial (⊛) to choose the scheduled time. You can choose the time in 30 minutes intervals.

11.4.6 Viewing Error History

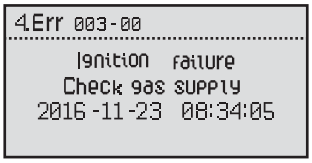
To view the error history, press the Menu button (M), and then select "6. Error History".



A list of 10 recent errors are displayed on the screen, with the most recent error displayed at the top of the list.



Rotate the Command dial (⊛) to switch between the list of errors. Press the Command dial (⊛) to select an error to view detailed information.



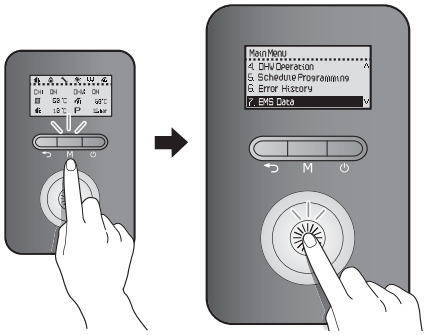
Press the Back button (↩) to return to the previous screen or menu.

Note

- The front panel display flashes in red and the error icon is displayed (flashing) when a level 1 error is detected. You can press the Command dial (⊛) to enter error display mode. Boiler operation is maintained during a level 1 error.
- A level 1 error is automatically cleared when the problem is resolved.
- You can press the Power button (⏻) to clear a level1 error. Then the error is cleared if the problem has been resolved.

11.4.7 Viewing Other System Information

To view the miscellaneous system information, press the Menu button (M), and then select "7. EMS Data".



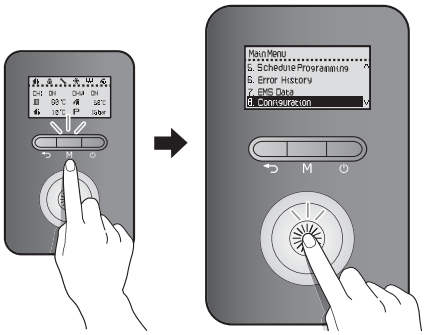
Rotate the Command dial (⊛) to switch between the information items. Press the Command dial (⊛) to select an item and view the information.

Press the Back button (⮌) to return to the previous screen or menu.

Item	Description
1. CH Operation Time	View monthly central heating operation logs.
2. DHW Operation Time	View monthly DHW operation logs.
3. Oil Consumption	View monthly oil consumption.

11.4.8 Setting the Display Options

To set the front panel display options, press the Menu button (M), and then select "8. Configuration".



Rotate the Command dial (⊛) to switch between the list items or to increase/decrease setting values. Press the Command dial (⊛) to select an item or to confirm after making changes.

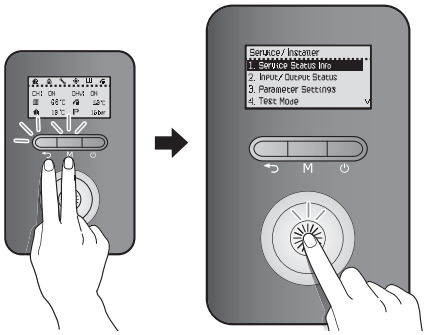
Press the Back button (⮌) to return to the previous screen or menu.

Item	Description
1. Language	Select the display language. 1. English • Default: English
2. °C/°F Setting	Select the temperature unit. 1. Celsius (°C) 2. Fahrenheit (°F) • Default: Celsius (°C)
3. PSI/BAR Setting	Select the water pressure unit. 1. PSI 2. BAR • Default: BAR
4. Time Setting	Set the system clock (RTC). • Display format: YYYY.MM.DD/ HH:MM:SS
5. Backlight Time Setting	Set the backlight time. • Setting range: 0 – 60 sec • Default: 2 sec

11.5 Accessing Advanced Menu Items

11.5.1 Viewing Service Information

To view service information about the boiler, press the Back button (⮌) and the Menu button (M) simultaneously for 3 seconds, and then select "1. Service Status Info".



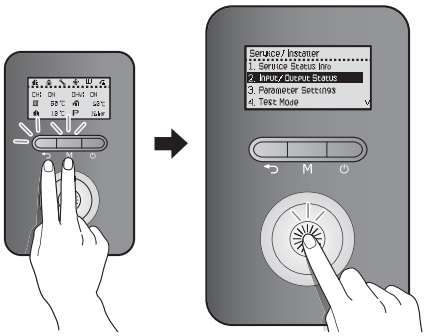
Rotate the Command dial (⊛) to switch between the information items. Press the Command dial (⊛) to select an item and view the information.

Press the Back button (⮌) to return to the previous screen or menu.

Item	Description
1. Elapsed Time After Install	Elapsed time since installation
2. HEX Overheat - No. of Times	Number of times the heat exchanger high limit stat has activated
3. Flame Loss - No. of Times	Number of times a flame loss/misfire has occurred
4. 2nd ignition - No. of Times	Number of second ignition attempts
5. 3rd ignition - No. of Times	Number of third ignition attempts

11.5.2 Viewing Input and Output Status

To view the boiler's input and output status, press the Back button (⮌) and the Menu button (M) simultaneously for 3 seconds, and then select "2. Input/Output Status".



Rotate the Command dial (⊛) to switch between the information items. Press the Command dial (⊛) to select an item and view the information.

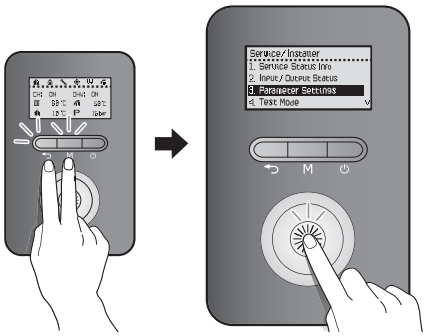
Press the Back button (⮌) to return to the previous screen or menu.

Item	Description
1. CH Switched Live Status	CH switched live input status
2. CH Thermostat Status	CH thermostat input status
3. DHW Thermostat Status	DHW thermostat input status
4. Boiler Pump Status	Boiler pump output status
5. 2 Way Valve	2 Way valve output status
6. 3 Way Valve	3 Way valve output status
7. HTL Input Status	HTL input status

11.5.3 Setting the Operation Parameters

To set the boiler's operation parameters, press the Back button (⮌) and the Menu button (M) simultaneously for 3 seconds, and then select "3. Parameter Settings".

> **CAUTION**
>
> Parameters must be set by a qualified professional with an extensive understanding of the boiler system. Setting parameters improperly may lead to property damage or injury.



In the password screen, rotate the Command dial (◎) to change numbers and places, and press the Command dial (◎) to enter the password.

The factory default password is "1234".



After entering the parameter setting screen, rotate the Command dial (◎) to switch between the parameters or to increase/decrease setting values. Press the Command dial (◎) to select a parameter or to confirm after making changes.

Press the Back button (⮌) to return to the previous screen or menu.

System/Regular Models

Item	Description
1. Supply MIN Set-point	Set the central heating supply minimum temperature. • Setting range: 25°C – [MAX Set-point – 20°C] • Default: 40°C
2. Supply MAX Set-point	Set the central heating supply maximum temperature. • Setting range: [MIN Set-point + 20°C] – 85°C • Default: 85°C
3. CH Burning Off Diff	Set the temperature range for turning off central heating. • Setting range : 0°C – 30°C • Default : 2°C
4. CH Buring On Diff	Set the temperature range for turning on central heating. • Setting range : 1°C – 30°C • Default : 13°C
5. Anti Fast Cycling Time*	Set the anti-fast cycling time. • Setting range: 0 – 20 min • Default: 3 min
6. Burner Switching Diff	Set the temperature range for the SH combustion switch. • Setting range: 5°C– 30°C • Default: 5°C
7. Freeze protection	Set the pump freeze protection temperature. • Setting range: 6°C – 10°C • Default: 10°C **Note** The system freeze protection temperature is set based on the pump freeze protection temperature.
8. Boiler Pump Delay	Set the boiler pump off delay time. • Setting range: 3 – 40 min • Default: 40 min
9. Low Pressure	Set the low water pressure. • Setting range: 0.1 – 1.2 bar • Default: 0.4 bar

Item	Description
10. Oil CMPS Rate	Set the oil consumption compensation rate. • Setting range : -25% – 25% • Default : 0 %
11. Service Notif Time	Set the time for service notification. • Setting range: 30 – 3650 days (10 years) • It can be set in 10 day increments. • Default: 1820 days (5 years)
12. Service Notif Cycle	Set the service notification according to the operating times. • Setting range: 300 – 36500 cycles • It can be set in 100 cycle increments. • Default: 18200 cycles
13. Factory Reset	Initialize all parameter settings (panel and main controller) to factory default.
14. P/W Change	Change the parameter setting password. Rotate the Command dial (⊛) to change numbers and places, and press the Command dial (⊛) to save the new password.
15. Control Air Flow	Set the control air flow • Setting range: -2Step, -1Step, Default, +1Step, +2Step • Default: Default

Combi Models

Item	Description
1. Supply MIN Set-point	Set the central heating supply minimum temperature. • Setting range: 25°C – [MAX Set-point – 20°C] • Default: 40°C
2. Supply MAX Set-point	Set the central heating supply maximum temperature. • Setting range: [MIN Set-point + 20°C] – 85°C • Default: 85°C
3. CH Burning Off Diff	Set the temperature range to turn off central heating. • Setting range : 0°C – 30°C • Default : 2°C
4. CH Buring On Diff	Set the temperature range to turn on central heating. • Setting range : 1°C – 30°C • Default : 13°C
5. Anti Fast Cycling Time*	Set the anti-fast cycling time. • Setting range: 0 – 20 min • Default: 3 min
6. DHW Pre-Heat Set Temp	Set the DHW Pre-Heating Set temperature. • Setting range: [DHW Set Temp + 10°C] – 80°C • Default: 75°C
7. DHW Burning Off Diff	Set the temperature range to turn off Domestic Hot Water. • Stting range: 0°C – 30°C • Default: 0°C
8. DHW Buring On Diff	Set the temperature range to turn on Domestic Hot Water. • Setting range: 1°C – 30°C • Default: 20°C
9. Burner Switching Diff	Set the temperature range of SH combustion switch. • Setting range: 5°C– 30°C • Default: 5°C
10. Freeze protection	Set the pump freeze protection temperature. • Setting range: 6°C – 10°C • Default: 10°C **Note** The system freeze protection temperature is set based on the pump freeze protection temperature.
11. Boiler Pump Delay	Set the boiler pump off delay time. • Setting range: 3 – 40 min • Default: 40 min
12. Low Pressure	Set the low water pressure. • Setting range: 0.1 – 1.2 bar • Default: 0.4 bar
13. Oil CMPS Rate	Set the oil consumption compensation rate. • Setting range : -25% – 25% • Default : 0 %
14. Service Notif Time	Set the time for service notification. • Setting range: 30 – 3650 days (10 years) • It can be set in 10 day increments. • Default: 1820 days (5 years)

Item	Description
15. Service Notif Cycle	Set the service notification according to the operating times. • Setting range: 300 – 36500 cycles • It can be set in 100 cycle increments. • Default: 18200 cycles
16. Factory Reset	Initialize all parameter settings (panel and main controller) to factory default.
17. P/W Change	Change the parameter setting password. Rotate the Command dial (⟳) to change numbers and places, and press the Command dial (⟳) to save the new password.
18. Control Air Flow	Set the control air flow • Setting range: -2Step, -1Step, Default, +1Step, +2Step • Default: Default

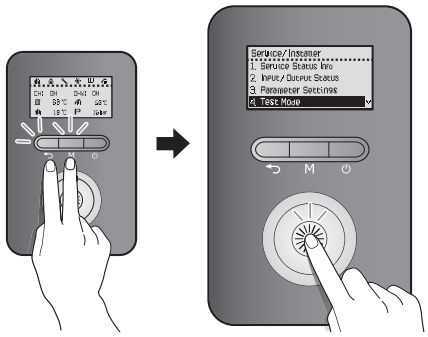
Note

- If you enter an incorrect password 10 times or make no inputs for 5 minutes, the boiler will return to Normal mode.
- To return to the previous mode, press the Reset button.
- The factory default password is "1234".
- If you make no inputs for 10 seconds in the Parameter Edit mode, the current parameter value will be saved automatically.
- Press and hold the Back button (⮌) in Parameter Edit mode for 5 seconds to reset individual parameters to their default values.
- When you reset one of the following parameters, the corresponding parameter will be reset automatically:
  - Supply Min or Max capacity limit
  - Return Min or Max capacity limit

* The anti-fast cycling time is the duration that the boiler stops its central heating operation when the central heating supply or return temperatures reach the set values for boiler operation stop temperatures. The boiler will not resume central heating until the duration elapses, even when the central heating supply or return temperatures return to within the set ranges.

11.5.4 Diagnosing the Boiler System

To run a series of test procedures for a system diagnosis, press the Back button (⮌) and the Menu button (M) simultaneously for 3 seconds, and then select "4. Test Mode".



Rotate the Command dial (⟳) to switch between the test procedures. Press the Command dial (⟳) to run a test procedure.

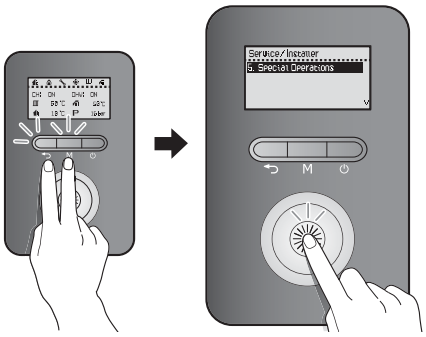
Press the Back button (⮌) to return to the previous screen or menu.

Item	Description
1. Fan Motor	Test the fan operation by manually changing the fan speed. • From a stopped state, the fan speed gradually increases and reaches the top speed, and then the fan speed decreases until the fan stops operating. • Rotate the Command dial (⟳) to run or stop the fan test.
2. Oil Pump	Test the fan operation by manually changing the pump speed. • Test the Oil Pump Operation. The Oil Pump is turned on as soon as you enter the test mode. • Press the Command dial (⟳) to toggle the oil pump operation.
3. Boiler Pump	Test the boiler pump operation. • The boiler pump is turned on as soon as you enter the test mode. • Press the Command dial (⟳) to toggle the pump operation (On -> Off/Off -> On).

Item	Description
4. 2 Way Valve	Test the 2 way valve operation. • The 2 way valve is turned on as soon as you enter the test mode. • Press the command dial (⊛) to toggle the valve operation (On -> Off/Off -> On). **Note** This option is not performed on Combi boilers.
5. 3 Way Valve	Test the 3 way valve operation. • The 3 way valve is turned on as soon as you enter the test mode. • Press the command dial (⊛) to toggle the valve operation [On(DHW) -> Off(CH)/Off(CH) -> On(DHW)].
6. Flow Control Valve (Combi Only)	Test the Flow control Valve operation. • Rotate the valve from its current position to fully open (0%), then fully closed (100%) and then back to the starting position while checking feedback. • Display of the valve close ratio % display of "FEEDBACK" when detecting the feedback
7. Mixing Valve (Combi Only)	Test the Mixing Valve operation. • Rotate the valve from tis current position to fully open (0%), then fully closed (100%) and then back to the starting position while checking feedback. • Display of the valve close ratio % display of "FEEDBACK" when detecting the feedback

11.5.5 Setting the Special Operation Modes

To operate the boiler in special operation modes, press the Back button (⮌) and the Menu button (M) simultaneously for 3 seconds, and then select "5. Special Operations".



Rotate the Command dial (⊛) to switch between the operation modes. Press the Command dial (⊛) to select an operation mode.

The boiler resumes operation in normal operation mode if no input is detected for 3 hours.

Press the Back button (⮌) to return to the previous screen or menu.

Item	Description
1. Normal (Default)	Set the boiler to run in normal operation mode.
2. Stage 1 (Low)	Set the boiler to run in stage 1 (low) operation mode.
3. Stage 2 (High)	Set the boiler to run in stage 2 (high) operation mode.

11.6 Error Codes

When an error code appears on the front panel, refer to the following chart for a definition and possible remedy for the situation.

Item	Error Code	Description	Reset
Combustion	E001	Overheating of heat exchanger	Manual
	E003	Ignition failure	Manual
	E004	False flame detection	Auto
	E012	Flame loss	Manual
	E016	Heat exchanger overheat	Manual
	E030	Abnormal exhaust temperature	Manual
	E031	Burner overheat	Manual
	E046	Abnormal operation: Heat exchanger overheating sensor	Auto
	E047	Abnormal operation: Exhaust thermostat	Manual/Auto
	E056	Abnormal operation: Oil pump	Manual
Air Circulation	E109	Abnormal operation: Fan	Manual
	E110	Exhaust blockage (Condensate blockage)	Manual
	E127	Abnormal operation: APS	Auto (Manual)
	E144	Abnormal operation: Burner temperature sensor	Alarm
	E157	Abnormal operation: APS Hose	Manual
Central Heating Circulation	E205	Heating supply thermistor open or short circuit	Auto
Water Supply	E302	Low water pressure	Manual
	E352	High water pressure	Manual
	E353	Abnormal operation: Water pressure sensor	Auto
DHW Circulation	E407	DHW Outlet thermistor Open or Short Circuit	Alarm
	E421	DHW Inlet thermistor Open or Short Circuit	Alarm
	E441	DHW Outlet thermistor Open or Short Circuit	Alarm
	E445	Abnormal operation: Mixing valve	Alarm
	E480	DHW Tank thermistor Open or Short Circuit	Alarm
Controller (PCB)	E515	Abnormal operation: Relay feedback (PCB)	Manual
	E517	Abnormal operation: DIP switch setting (PCB)	Manual
	E594	Abnormal operation: EEPROM (PCB)	Alarm/Manual
Controller (MCU)	E615	Abnormal operation: Input and memory (MCU)	Manual
Installation	E740	Abnormal operation: Outdoor temperature sensor	Auto
	E782	Abnormal operation: Main panel communication	Auto
	E783	Abnormal operation: OpenTherm remote control	Auto
	E787	Abnormal operation: Reset device	Manual/Power Reset

If the error code is not cleared by resetting the boiler functioning (see "11.3.3 Resetting the Boiler") or if it occurs repeatedly, call the nearest official Technical Assistance Service (TAS), indicating the number of the error code appearing on the front panel.

12. Maintaining the Boiler

12.1 Cleaning the Boiler

CAUTION

Make sure the boiler is turned off and the power supply is disconnected before cleaning the boiler. The boiler may remain hot for several minutes after it is turned off. To prevent burns, wait until the boiler has cooled down before cleaning.

To clean the boiler, wipe the outside with a damp cloth. Use a non-acidic, non-abrasive cleaner to remove any surface stains. The front panel is moisture resistant, but it is not waterproof. Keep it as dry as possible.

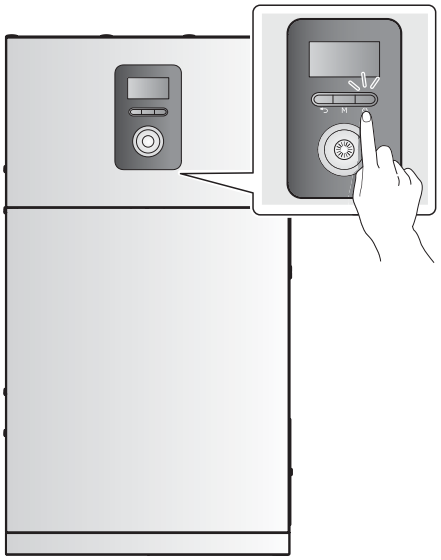
12.2 Draining the Boiler

You will need to drain either both the central heating side and domestic hot water (DHW) side, or one side only before performing maintenance tasks, such as cleaning the adapter filter, or to prevent the boiler from freezing when it will not be used for an extended period.

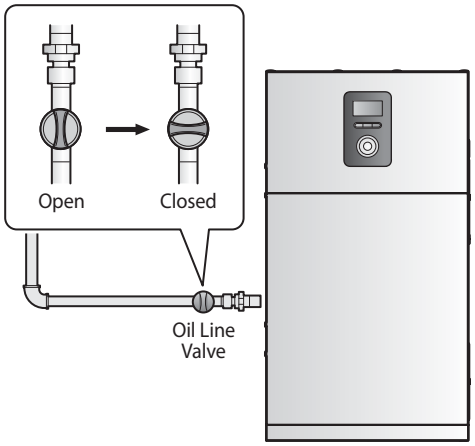
Refer to "2.5 Dimensions" on page 15 for details about part locations.

To drain the boiler:

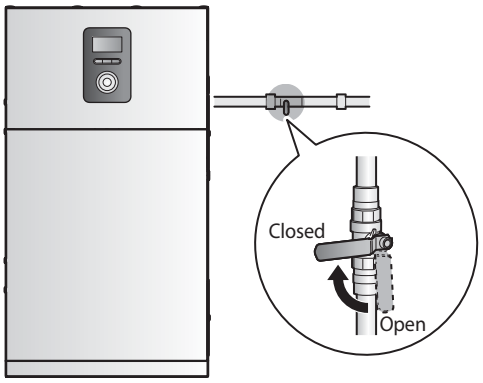
1. Place a bucket under the boiler, to collect the residual water inside the boiler.
2. Press the Power button (⏻) on the front panel to turn off the boiler.



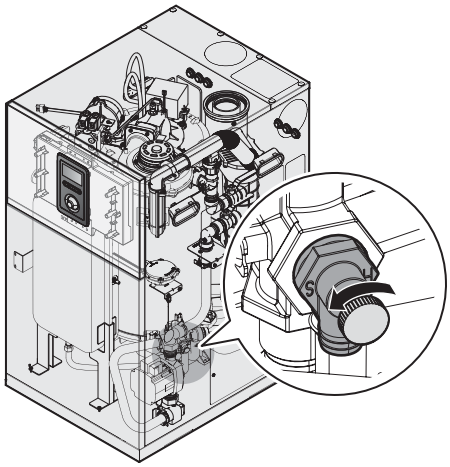
3. Disconnect the power supply from the boiler.
4. Close the oil line valve.



5. Close the water supply valve on the inlet to the boiler. If there is no valve, turn off the water supply at the water main.



6. Close off any heating zones that do not require draining and open a drain valve to drain the central heating side.



7. Open all domestic hot water taps completely to drain the water heating side. The water that remains in the plumbing lines will drain out.
8. Open the pump drain valve.
9. Allow the residual water to drain from the boiler.
10. When the water is completely drained out, close the drain valve.

Note To refill the boiler, follow the steps above in reverse.

12.3 Protecting the Boiler from Freezing

CAUTION

Damage due to freezing is not covered by the Navien limited warranty.

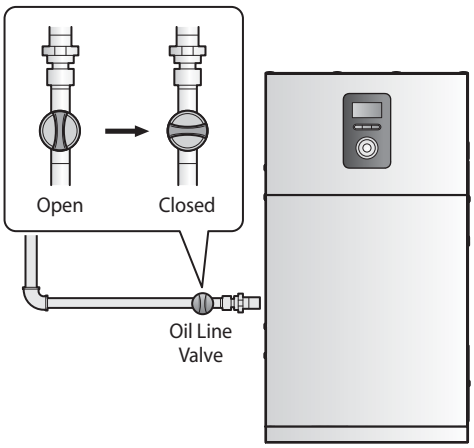
If the boiler is connected to a circuit that could freeze, the circuit pipes must be suitably insulated. All pipes installed outdoors must be insulated according to applicable legislation. The boiler electronic control includes a freeze protection function that prevents the boiler from freezing in very cold weather. It remains on standby and takes priority over all other boiler functions while the boiler is connected to the electrical mains and oil supply, i.e. it remains enabled even when the boiler is in standby position.

To ensure that the boiler does not freeze, follow these guidelines:

- **Do not unplug the power supply cord**, except for routine maintenance. The boiler has a freeze protection function that requires electricity. The freeze protection function will operate regardless of whether or not the power is turned on or off, as long as the electric supply is still connected.
- **Do not close the oil valve**, except for routine maintenance, as this will limit additional freeze protection.
- **If the boiler will not be used for an extended period**, drain the boiler. If the power or oil supplies must be disconnected for an extended period, drain the boiler. Freezing damage may occur if there is water remained in the boiler in cold weather.

If hot water will not flow and you suspect that the boiler is frozen, follow these steps:

1. Press the Power button (⏻) on the front panel to turn off the boiler.
2. Close the oil line valve.



3. Open the hot water tap that is closest to the boiler.
4. Use a hair dryer or a portable electric heater to heat up both the primary and secondary heat exchangers.
5. Check every few minutes to see if water is running at the open tap.
6. When the water starts flowing again, check the boiler and piping for leaks. If you detect any leaks or the boiler is not operating properly, contact an authorised technician or licensed professional.

Note This boiler requires very little maintenance, however a qualified technician should inspect the boiler at the beginning of every heating season and/or when there is a problem.

12.4 Maintenance Schedules

Owner maintenance	
Daily	• Check boiler area • Check pressure/temperature gauge
Monthly	• Check flue piping • Check condensate drain
Periodically	• Check flue termination screens
Every 6 months	• Check boiler piping (oil and water) for leaks
Non-heating season	• Shut boiler down (unless boiler used for domestic hot water)

Service technician (See the following instructions)	
Annual Start-up	General: • Address reported problems • Inspect interior; clean and vacuum if necessary • Clean condensate trap and fill with fresh water • Check for leaks (water, oil, flue, condensate) • Verify flue and air lines are in good condition and sealed tight • Check system piping • Check control settings • Check ignition and UV sensor (clean and reposition) • Clean oil filter • Replace old flexible oil hose and oil nozzle with new ones • Check wiring and connections If combustion or performance indicate need: • Clean heat exchanger • Remove and clean return adapter filter

12.5 Maintaining the Parts

WARNING

- Follow the service and maintenance procedures given throughout this manual and in component literature shipped with the boiler. Failure to perform the service and maintenance could result in damage to the boiler or system.
- Failure to follow the directions in this manual and component literature could result in severe personal injury or substantial property damage.
- The boiler should be inspected annually only by a qualified service technician. In addition, the maintenance and care of the boiler must be performed to assure maximum boiler efficiency and reliability. Failure to service and maintain the boiler and system could result in equipment failure.
- Electrical shock hazard – Turn off power to the boiler before any service operation on the boiler except as noted otherwise in this instruction manual. Failure to turn off electrical power could result in electrical shock, causing severe personal injury.

Addressing the Reported Problems

Inspect any problems reported by the owner and correct before proceeding.

Inspecting the Installation Area

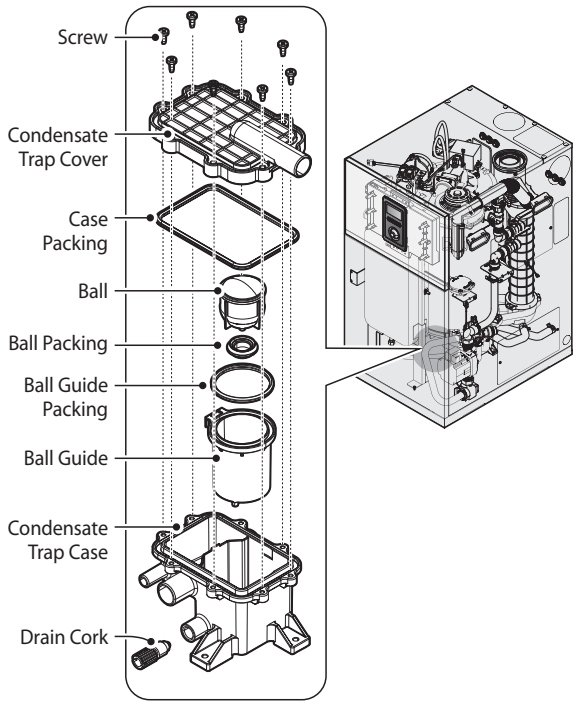
1. Verify that boiler area is free of any combustible materials, petrol and other flammable vapours and liquids.
2. Verify that air intake area is free of any of the contaminants listed in Installation & Operation Manual. If any of these are present in the boiler intake air vicinity, they must be removed. If they cannot be removed, reinstall the air and flue lines per the Installation & Operation Manual.

Inspecting the Boiler Interior

1. Remove the front cover and inspect the interior of the boiler.
2. Vacuum any sediment from inside the boiler and components. Remove any obstructions.

Cleaning the Condensate Trap

1. Loosen the eight screws on the condensate trap cover and remove the cover, case packing, ball, ball packing, ball guide packing, and ball guide.



2. Inspect the condensate drain line, condensate fittings, condensate trap, and the drain cork.
3. Remove any sediment from the trap.
4. Fill with fresh water until the water begins to pour out of the drain.

Checking all Piping for Leaks

Eliminate all system or boiler leaks. Continual fresh makeup water will reduce boiler life. Minerals can build up in sections, reducing heat transfer, overheating heat exchanger, and causing heat exchanger failure. Leaking water may also cause severe property damage.

1. Inspect all water and oil piping and verify to be leak free.
2. Look for signs of leaking lines and correct any problems found.

Checking the Flue System and Air Piping

1. Visually inspect the entire gas flue system for blockage, deterioration or leakage. Repair any joints that show signs of leakage.
2. Verify that boiler flue discharge and air intake are clean and free of obstructions.

WARNING

Failure to inspect for the above conditions and have them repaired can result in severe personal injury.

Checking the Water System

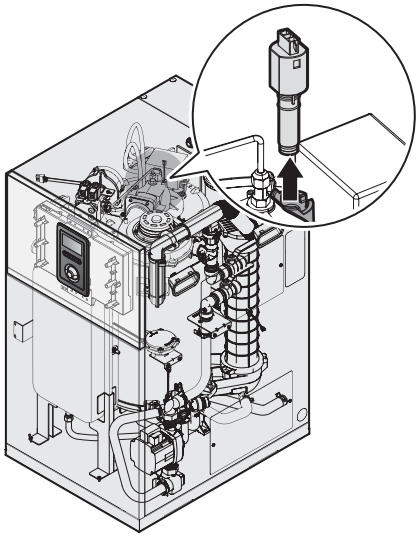
1. Verify all system components are correctly installed and operational.
2. Check the cold fill pressure for the system. Verify it is correct (must be a minimum of 0.8 bar).
3. Watch the system pressure as the boiler heats up (during testing) to ensure pressure does not rise too high.

Note
- If the system contains glycol, test for proper concentration as recommended by manufacturer.
- Excessive pressure rise indicates expansion vessel sizing or performance problem.

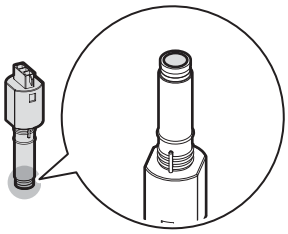
4. Inspect automatic air flues and air separators. Remove air flue caps and briefly press push valve to flush flue.
5. Replace caps. Make sure flues do not leak. Replace any leaking flues.

Inspecting the Flame Detector UV Sensor and Ignition

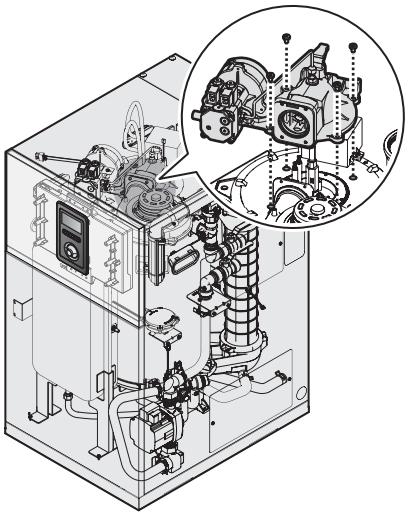
1. Remove the flame detector UV sensor at the bottom of the burner by pulling it.



2. Remove any deposits accumulated at the bottom of the UV sensor.



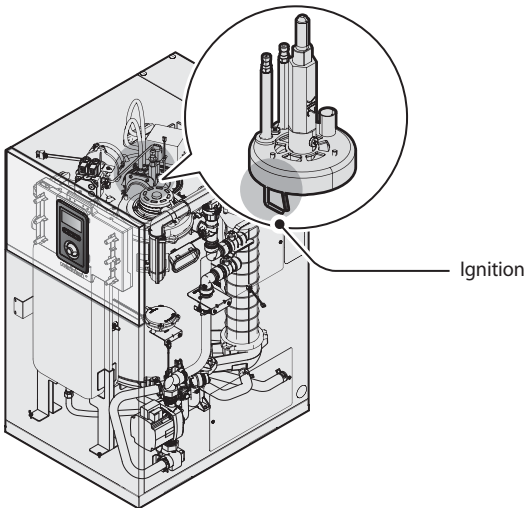
3. Remove the fan and burner assembly.



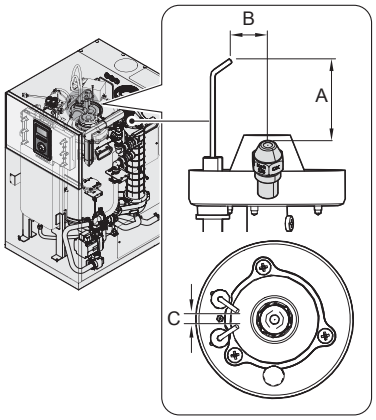
CAUTION

Do not disconnect the fan wire while power is on. It will cause damage to the fan.

4. Remove any deposit accumulated on the ignition.



Note Refer to the following illustrations and table for details about the ignition dimension.



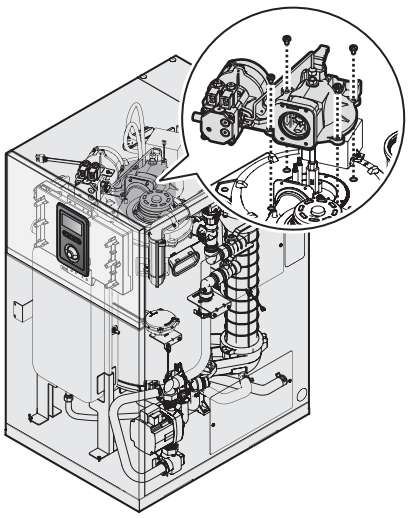
Model		21RS/RSX 21LS/LSX 21LC/LCX	28RS/RSX 28LS/LSX 28LC/LCX	36RS/RSX 36LS/LSX 36LC/LCX
Ignition Dim.	A	30 mm	47 mm	
	B	28 mm	28 mm	
	C	6 mm	4.5 mm	

Replacing the Flexible Oil Hose and Oil Nozzle

CAUTION

Using a worn-out flexible oil hose for a long time may block the nozzle. A blocked nozzle will result in the formation of soot and the burner will not ignite properly which may lead to property damage or injury.

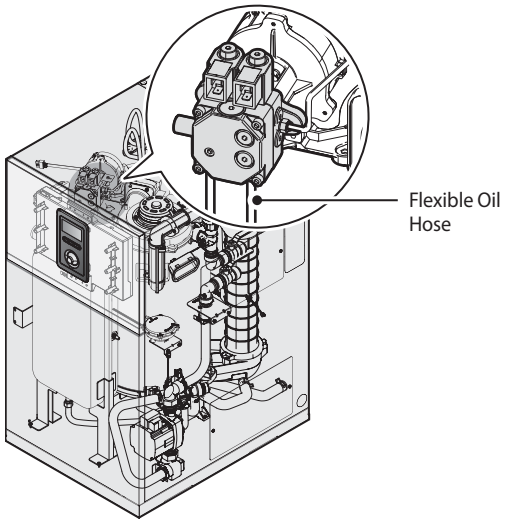
1. Remove the fan and burner assembly.



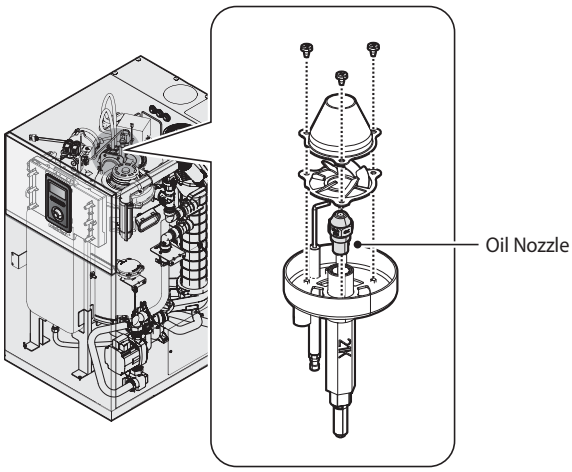
CAUTION

Do not disconnect the fan wire while power is on. It will cause damage to the fan.

2. Replace the old flexible oil hoses with new ones.



3. Remove the three screws on the burner housing and replace the old oil nozzle with new one.



Model				21RS/RSX 21LS/LSX 21LC/LCX	28RS/RSX 28LS/LSX 28LC/LCX	36RS/RSX 36LS/LSX 36LC/LCX
"Kerosene" UK Standard Heating Oil	"ES" Pattern Oil Nozzle	Oil Nozzle		0.55G 80˚ ES	0.75G 80˚ ES	1.0G 80˚ ES
		Oil Pressure	Low	7.0 bar	7.0 bar	7.0 bar
			High	11.5 bar	9.5 bar	10 bar
"Light Oil" EU Standard Heating Oil	"S" Pattern Oil Nozzle	Oil Nozzle		0.4G 80˚ S	0.5G 80˚ S	0.6G 80˚ S
		Oil Pressure	Low	14 bar	14 bar	14 bar
			High	16.5 bar	16.5 bar	16.5 bar

Checking the Ignition Ground Wiring

1. Check that the ground wire is in good condition and securely attached to the boiler casing.
2. Check ground continuity of wiring using a continuity tester.
3. Replace ground wires if ground continuity is not satisfactory.

Checking all Boiler Wiring

Inspect all boiler wiring, making sure wires are in good condition and securely attached.

Checking the Control Settings

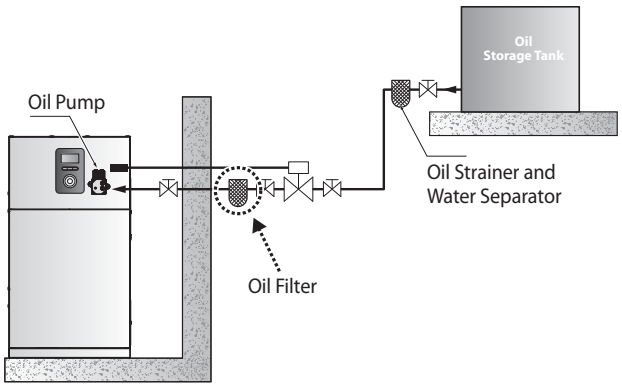
Check settings of external limit controls (if any) and adjust if necessary.

Performing Start-up and Checks

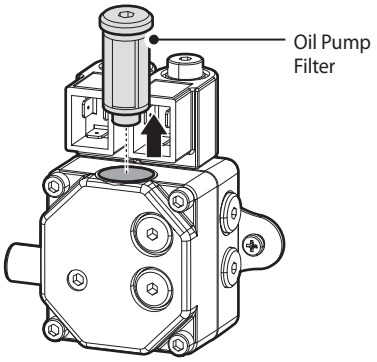
1. Start boiler and make sure that the boiler is operating properly.
2. Verify cold fill pressure is correct and that operating pressure does not go too high.

Cleaning the Oil Filter in the Oil Pump

1. Refer to the following illustration to see the location of the oil pump.



2. Pull out the oil filter from the oil pump and remove any deposits that have accumulated around the filter.

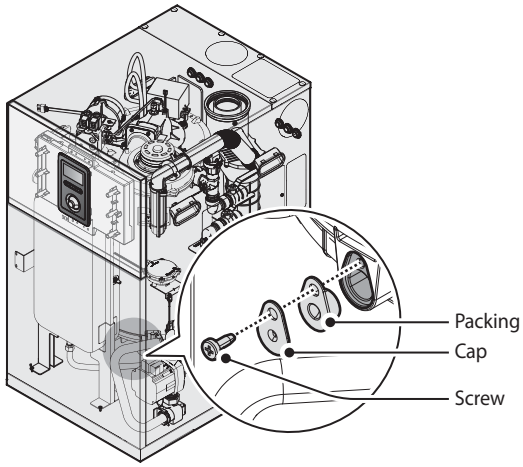


Measuring Combustion and Adjusting Oil Pressure

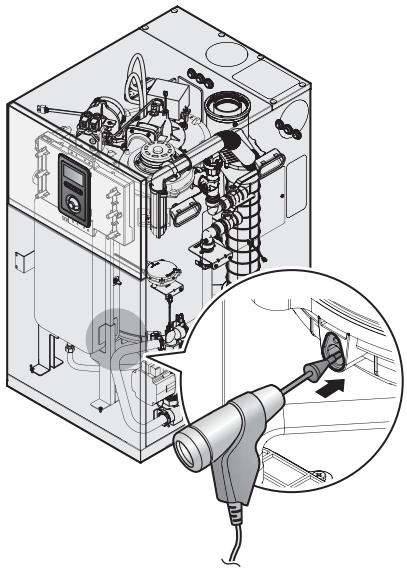
Note

- Measure combustion 2 minutes after boiler operation.
- Forced operation of the Low/High operation mode can be set by selecting the PCB DIP and panel settings.
  - PCB DIP Switch 1 (set of 6): See page 39.
    1) Normal (Default): 1-OFF, 2-OFF
    2) Stage 1 (Low): 1-OFF, 2-ON
       1-ON, 2-ON
    3) Stage 2 (High): 1-ON, 2-OFF
  - Panel: See page 66.
    1) Normal (Default)
    2) Stage 1 (Low)
    3) Stage 2 (High)
- Restore to Normal (default) operation mode after completing the test.

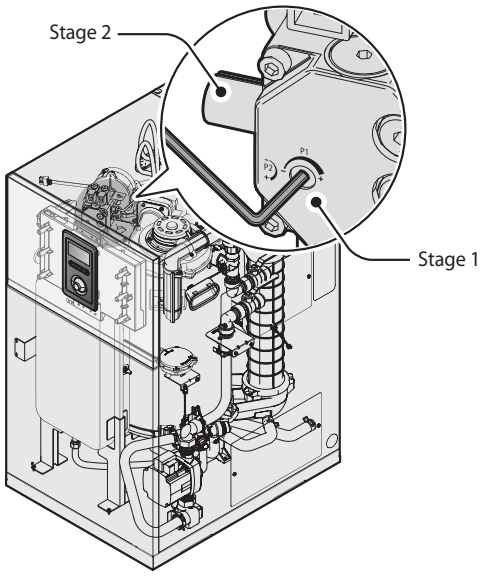
1. Loosen the screw located at the middle and bottom of the heat exchanger and remove the cap and packing.



2. Insert the analyser in the port and measure the combustion.



3. Using a 4 mm Allen wrench, adjust the oil pump pressure at the top of the burner based on the following table (+: Clockwise, -: Counterclockwise).



Note

- Measure combustion two minutes after boiler operation.
- Control the oil pressure based on the CO_2 or O_2 levels.
- Refer to the following table to adjust the oil pressure properly.

Description		21 kW	28 kW	36 kW
Low Mode (Stage 1)	O_2	5.5% (5.0–6.0%)	5.0% (4.5–5.5%)	4.5% (4.0–5.0%)
	CO_2	11.4% (11.1–11.8%)	11.8% (11.4–12.2%)	12.2% (11.8–12.5%)
High Mode (Stage 2)	O_2	4.5% (4.0–5.0%)	4.5% (4.0–5.0%)	4.5% (4.0–5.0%)
	CO_2	12.2% (11.8–12.5%)	12.2% (11.8–12.5%)	12.2% (11.8–12.5%)

CAUTION

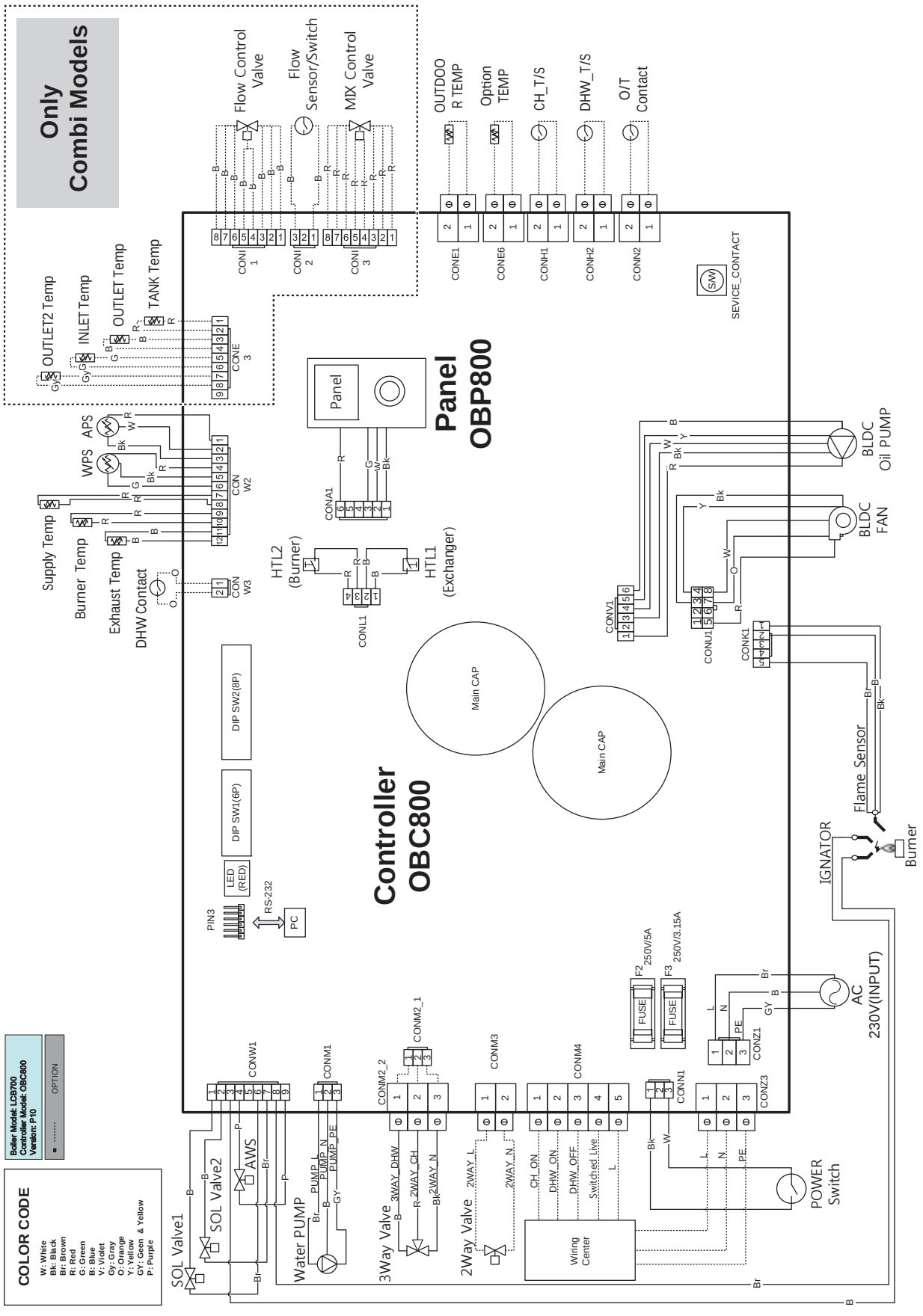
When controlling the kerosene pressure, ensure not to exceed 6 bar in low mode and 12 bar in high mode. It may cause combustion noise and/or soot deposits.

Review with the Owner

1. Review the User's Information Manual with the owner.
2. Emphasize the need to perform the maintenance schedule.
3. Remind the owner of the need to call a licensed contractor should the boiler or system exhibit any unusual behaviour.
4. Remind the owner to follow the proper shutdown procedure and to schedule an annual start-up at the beginning of the next heating season.

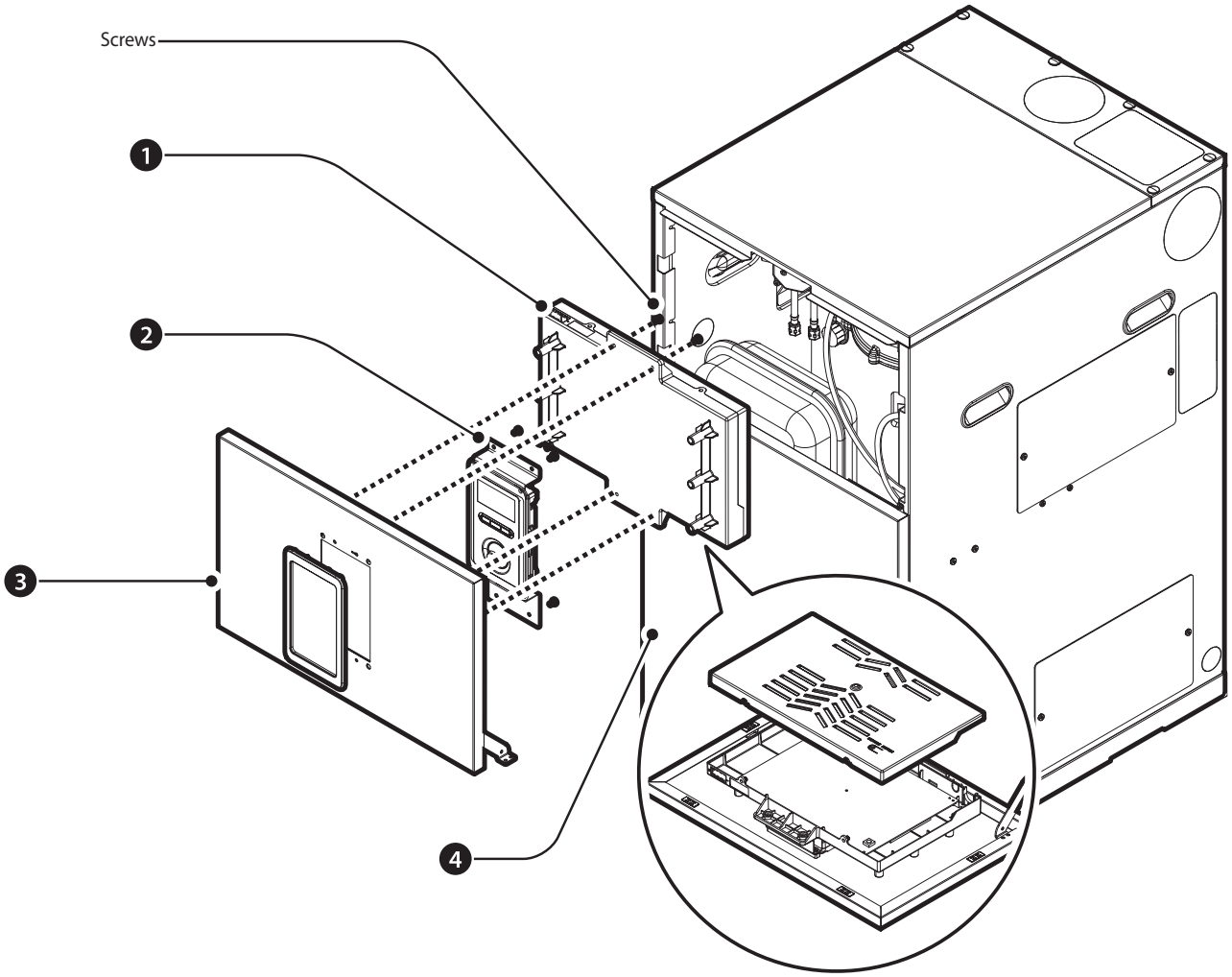
13. Appendices

13.1 Wiring Diagram



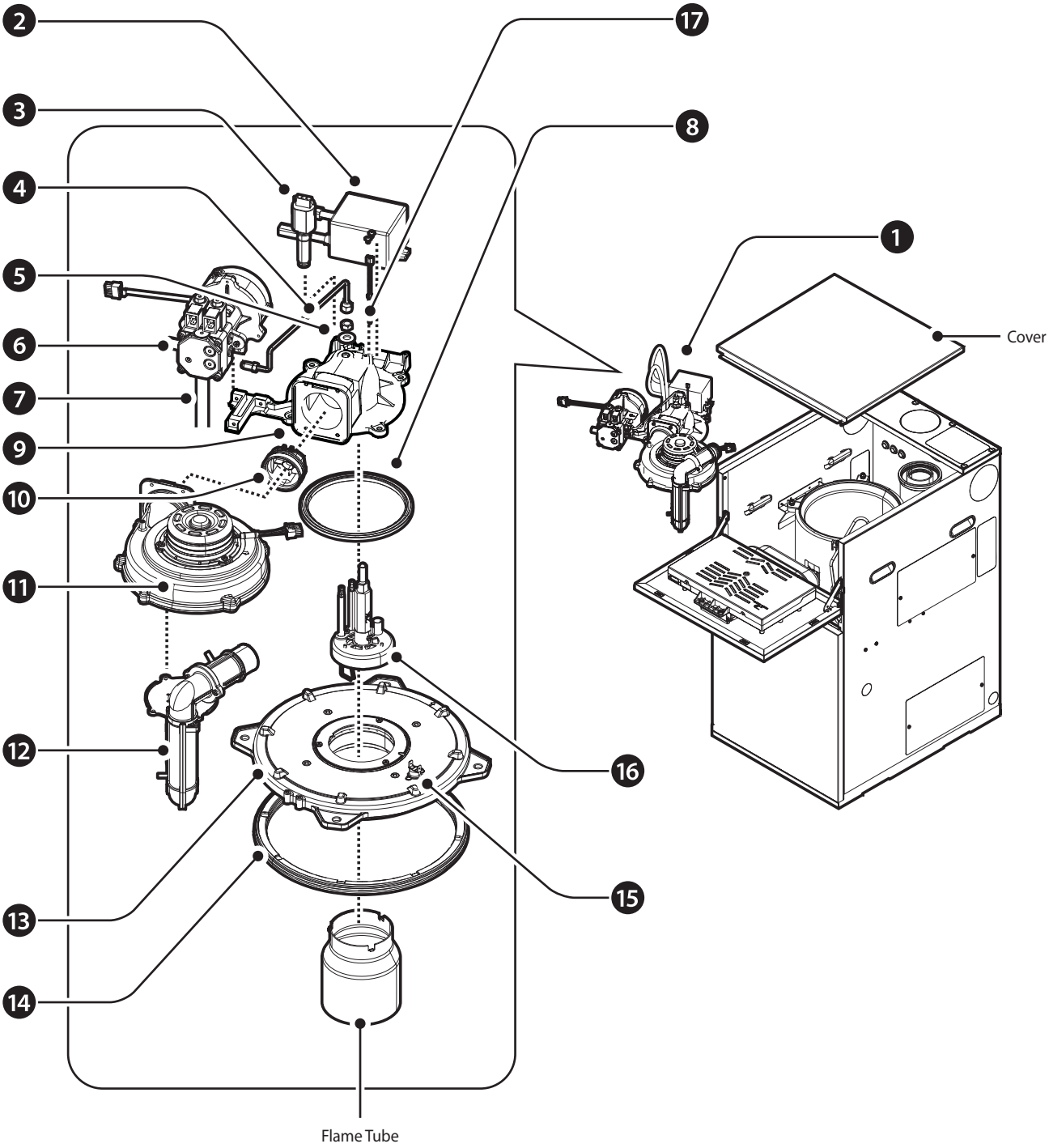
13.2 Component Assembly Diagrams and Parts

13.2.1 Controller and Panel

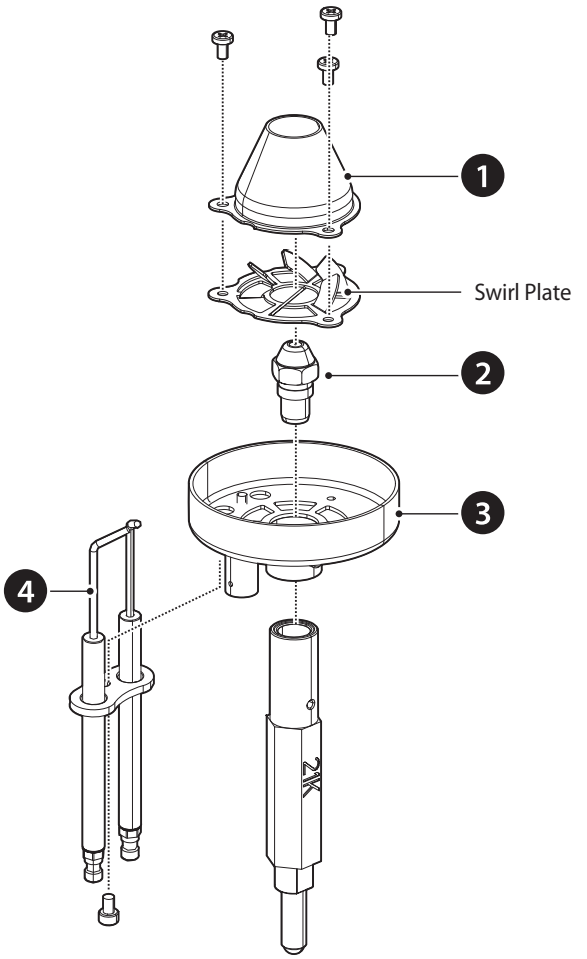


#	Description	Part #	Remark
1	Controller	30021889A	System
	Controller	30021890A	Regular
	Controller	30021891A	Combi
2	Panel	30021314A	System/Regular
	Panel	30024506A	Combi
3	Front Case	20043423A	Internal(System/Regular)
	Front Case	20046860A	Internal(Combi)
	Front Case	20044629A	External(System/Regular)
	Front Case	20047456A	External(Combi)
4	Front Bottom Case	20043419A	Internal(System/Regular)
	Front Bottom Case	20046830A	Internal(Combi)

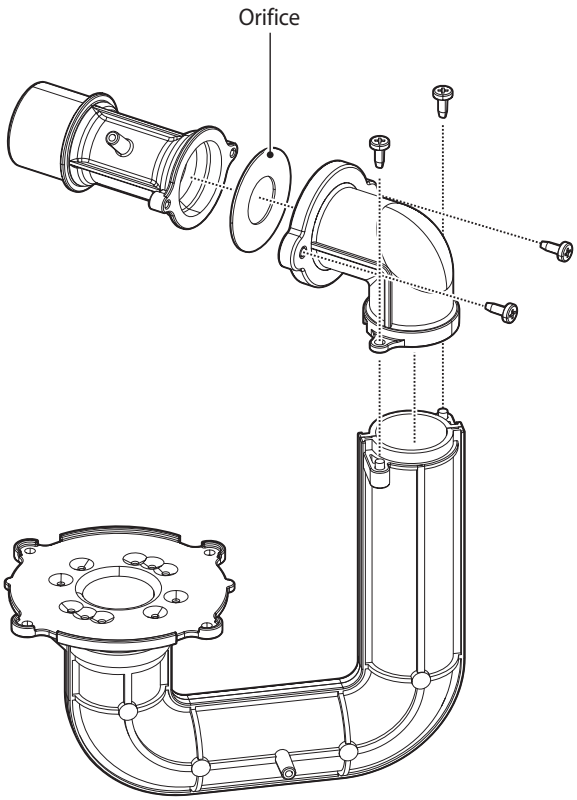
13.2.2 Burner



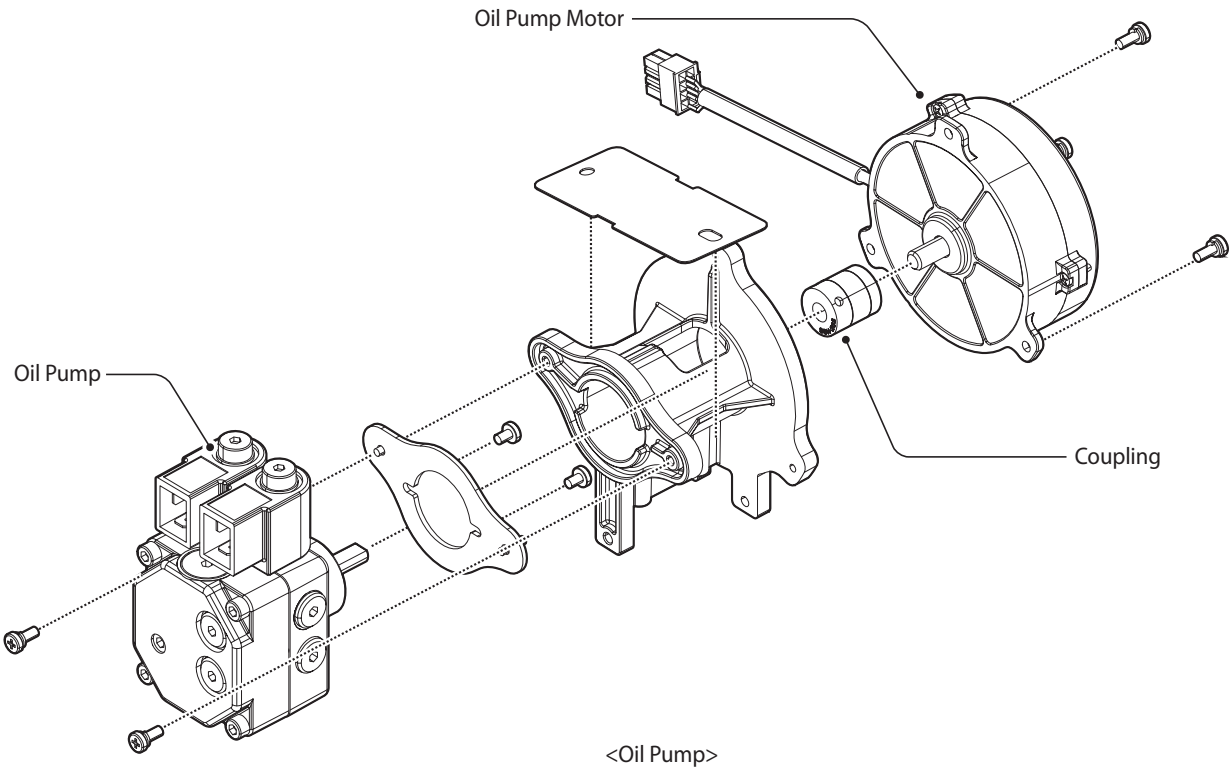
#	Description	Part #	Remark
1	Burner Assembly	30021123A	21 kW
	Burner Assembly	30021124A	28 kW
	Burner Assembly	30021125A	36 kW
2	Ignition Transformer	30021149A	
3	UV Sensor	30021145A	
4	Oil Pipe	30021150A	
5	Nut - Oil Inner Tube Fix	20009942A	
6	Oil Pump Assembly	30021151A	
7	Flexible Oil Hose	20010105E	
8	Packing for Burner House	20043392A	
9	Packing for Fan	20042399A	
10	Back Draft Damper	30008825A	
11	Fan Assembly	30021329A	21/28 kW
	Fan Assembly	30021328A	36 kW
12	Intake Pipe Assembly	30021807A	21 kW
	Intake Pipe Assembly	30021809A	28 kW
	Intake Pipe Assembly	30021827A	36 kW
13	Combustion Top Cover Assembly	30021121A	21/28 kW
	Combustion Top Cover Assembly	30021823A	36 kW
14	Packing for Combustion Cover	20043390A	21/28 kW
	Packing for Combustion Cover	20044609A	36 kW
15	High Limit Stat for Combustion Cover	30014887A	
16	Flame Holder Assembly	30021142A	21 kW
	Flame Holder Assembly	30021143A	28 kW
	Flame Holder Assembly	30021144A	36 kW
17	Temperature Sensor	30020489A	



<Flame Holder Assembly>



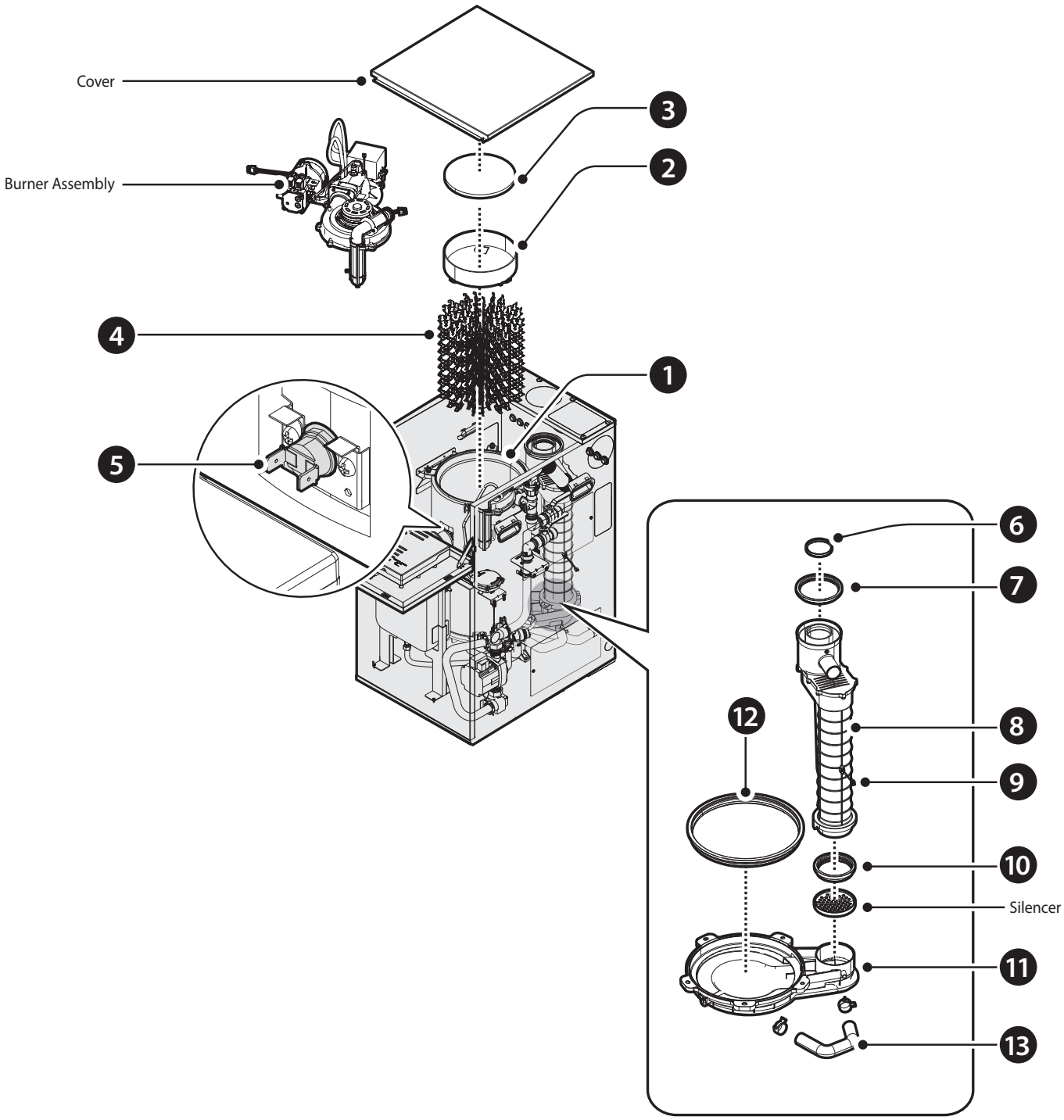
<Intake Pipe>



<Oil Pump>

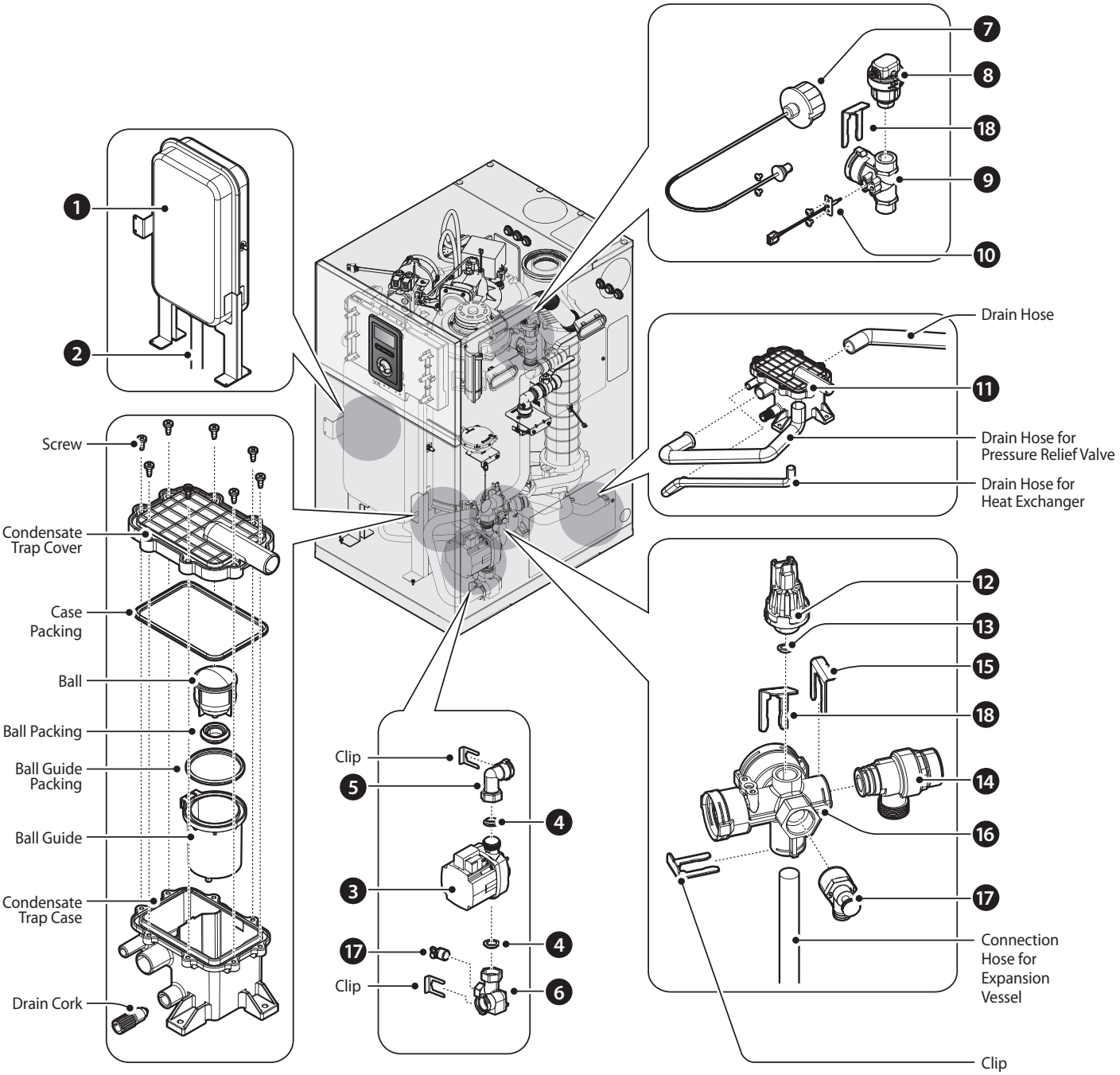
#	Description	Part #	Remark
1	Air Nozzle	20043449A	21 kW
	Air Nozzle	20043450A	28 kW
	Air Nozzle	20043451A	36 kW
2	Oil Nozzle (Kerosene)	20043603A	21 kW
	Oil Nozzle (Kerosene)	20043604A	28 kW
	Oil Nozzle (Kerosene)	20043605A	36 kW
	Oil Nozzle (Light-Oil)	20051175A	21 kW
	Oil Nozzle (Light-Oil)	20051176A	28 kW
	Oil Nozzle (Light-Oil)	20051177A	36 kW
3	Flame Holder	30021071A	
4	Ignition	30022883D	21 kW
	Ignition	30022885D	28/36 kW

13.2.3 Heat Exchanger Turbulence and Exhaust Duct



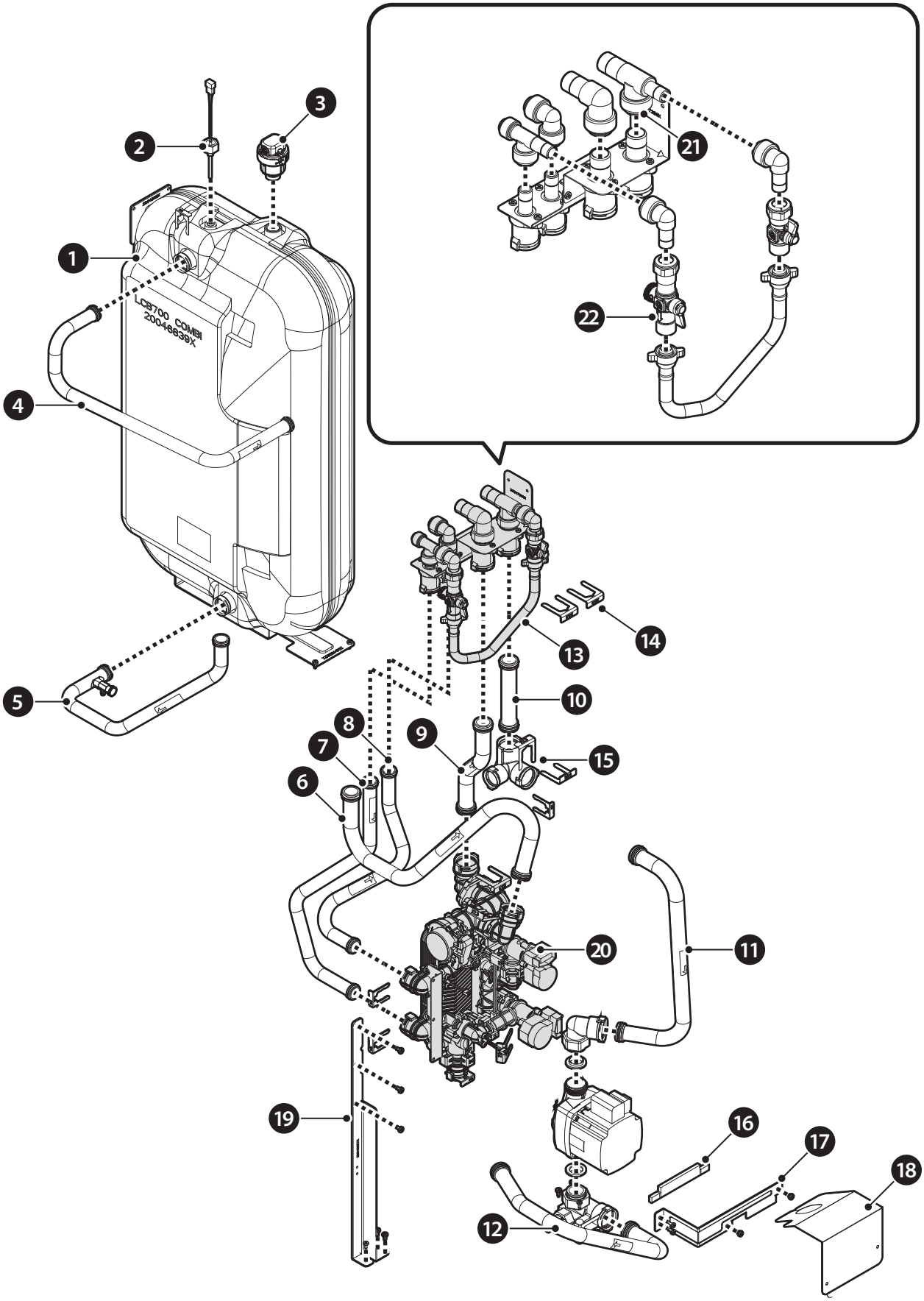
#	Description	Part #	Remark
1	Heat Exchanger	30021066A	21 kW
	Heat Exchanger	30021067A	28 kW
	Heat Exchanger	30021068A	36 kW
2	Guide for Combustion	30021083A	21/28 kW
	Guide for Combustion	30021204A	36 kW
3	Insulation	20043518A	
4	Turbulence	20043515A	
5	High Limit Stat for Heat Exchanger	30002557A	
6	Packing for Exhaust	20029713A	
7	Air Supply Packing	20043645A	
8	Exhaust Duct	30021130A	System/Regular
		30023172A	Combi
9	Temperature Sensor	30020489A	
10	Packing for Exhaust Duct	20040241A	
11	Condensate Pan	30021084A	21/28 kW
	Condensate Pan	30021825A	36 kW
12	Packing for Condensate Pan	20043394A	21/28 kW
	Packing for Condensate Pan	20044605A	36 kW
13	Condensate Discharge Hose	30021085A	

13.2.4 Water Piping Parts



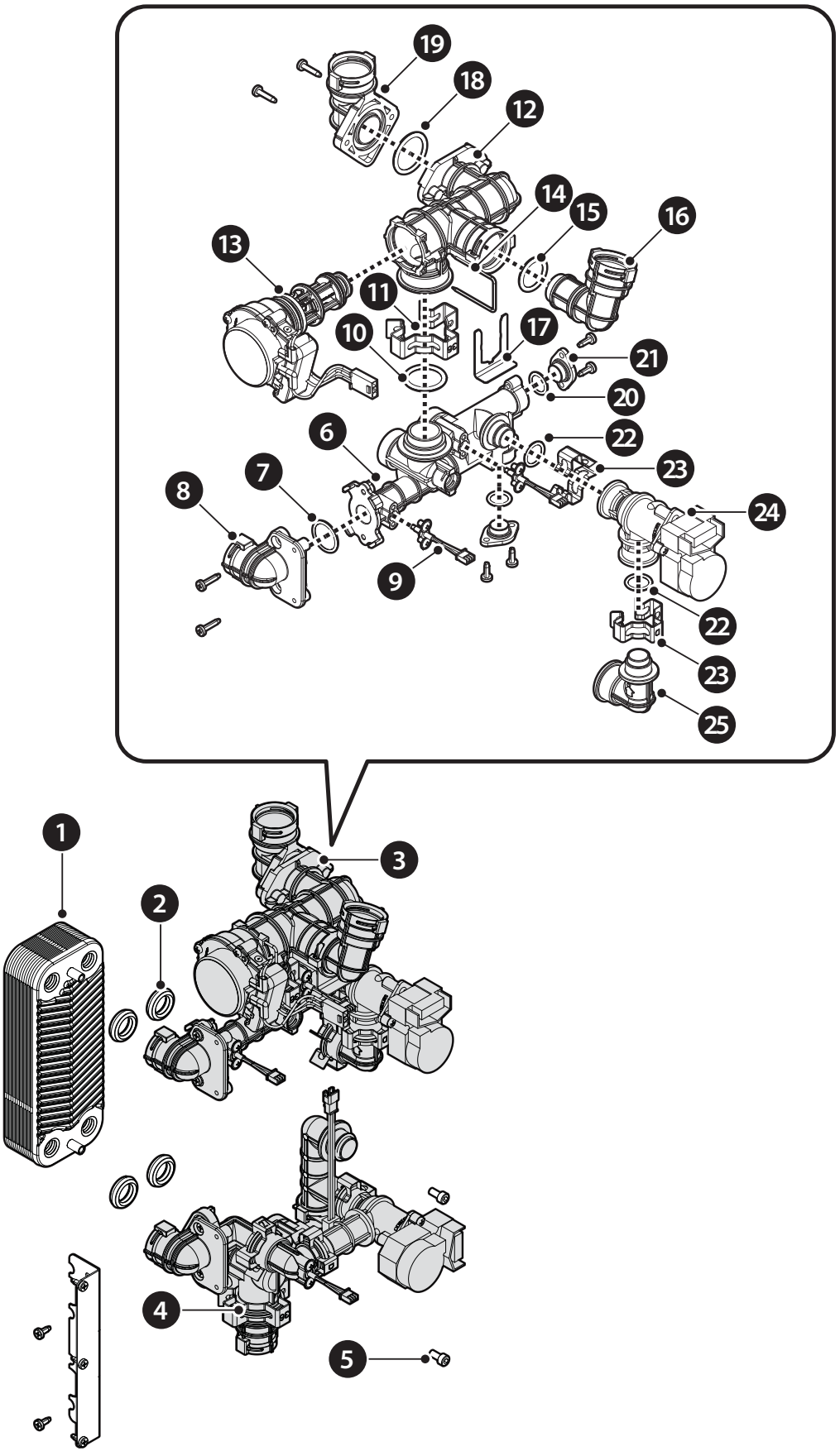
#	Description	Part #	Remark
1	Expansion Vessel	30022587A	System/Combi
2	Flexible Hose	20043593A	System/Combi
3	Circulation Pump	30022230A	System/Combi
4	Packing	20044484A	System/Combi
5	Pump Inlet Adapter	30022969A	System/Combi
6	Pump Outlet Adapter	30022970A	System/Combi
7	Pressure Gauge	30020258A	
8	Air Vent	30023517A	
9	Central Heating Supply Water Adapter	20043463A	System/Regular
		20047273A	Combi
10	Temperature Sensor	30012907A	
11	Condensate Trap	30022910A	
12	Pressure Sensor	30014699A	
13	Pressure Sensor Packing	20006873A	
14	Pressure Relief Valve	30002251A	
15	Clip	20007837B	
16	Central Heating Return Water Adapter	20043464A	
17	Drain Valve	20043465A	
18	Clip	20040255A	

13.2.5 DHW Parts



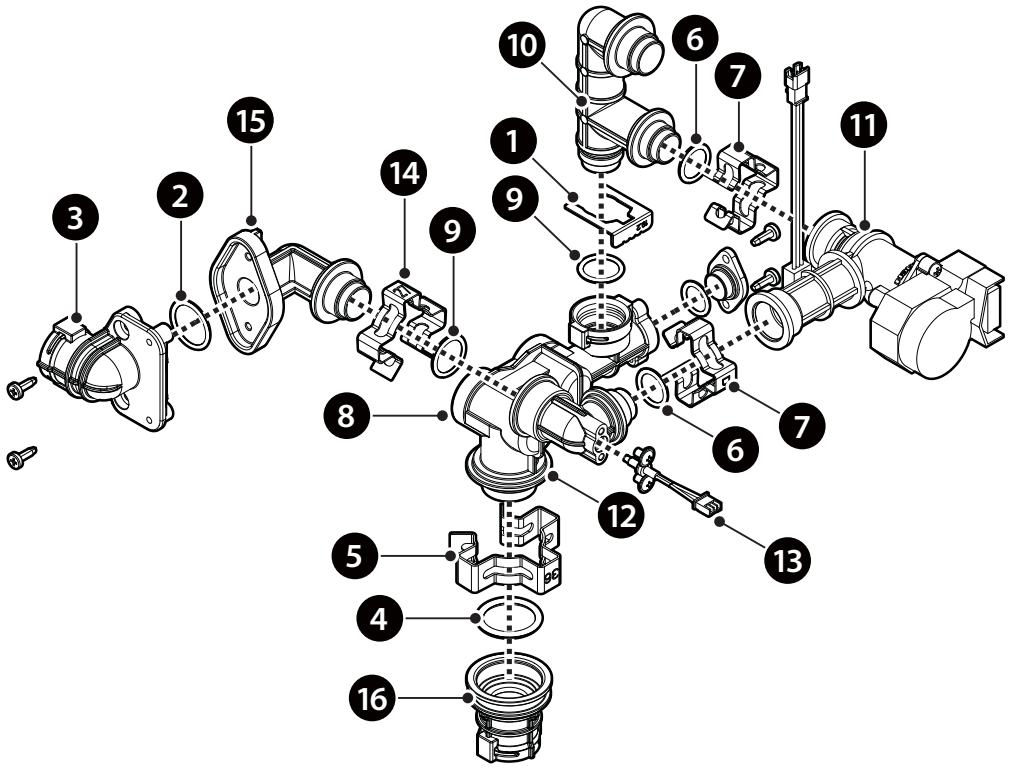
#	Description	Part #	Remark
1	Storage Tank	30022441A	
2	Temperature Sensor	30002659A	
3	Air Vent	30023517A	
4	Pipe_Tank Outlet	30023511A	
5	Pipe_Tank Inlet	30023282A	
6	Pipe_Heat Exchanger Outlet	30023512A	
7	Pipe_Domestic Cold Water Inlet	30023281A	
8	Pipe_Domestic Hot Water Outlet	30023280A	
9	Pipe_Heating Outlet	30023285A	
10	Pipe_Heating Return	30024736A	
11	Pipe_Heating Return_Pump	30023287A	
12	Pipe_Heat Exchanger Inlet	30023513A	
13	Clip_STS430,Φ19.2×1t	20007733B	
14	Clip_STS430,Φ22.3×1t	20033662A	
15	Adaptor_Heating Return_tank	20046875A	
16	Packing_Fix Pump	20047567A	
17	Bracket_Fix Pump	20047564A	
18	Film_Protection Pump	20047565A	
19	Bracket_DHW Block	20046827A	
20	DHW Block Assembly	30023207A	
21	Valve Kit	30023732A	
22	Filling Loop	30023733A	

13.2.6 DHW Block and Heating Supply Assembly



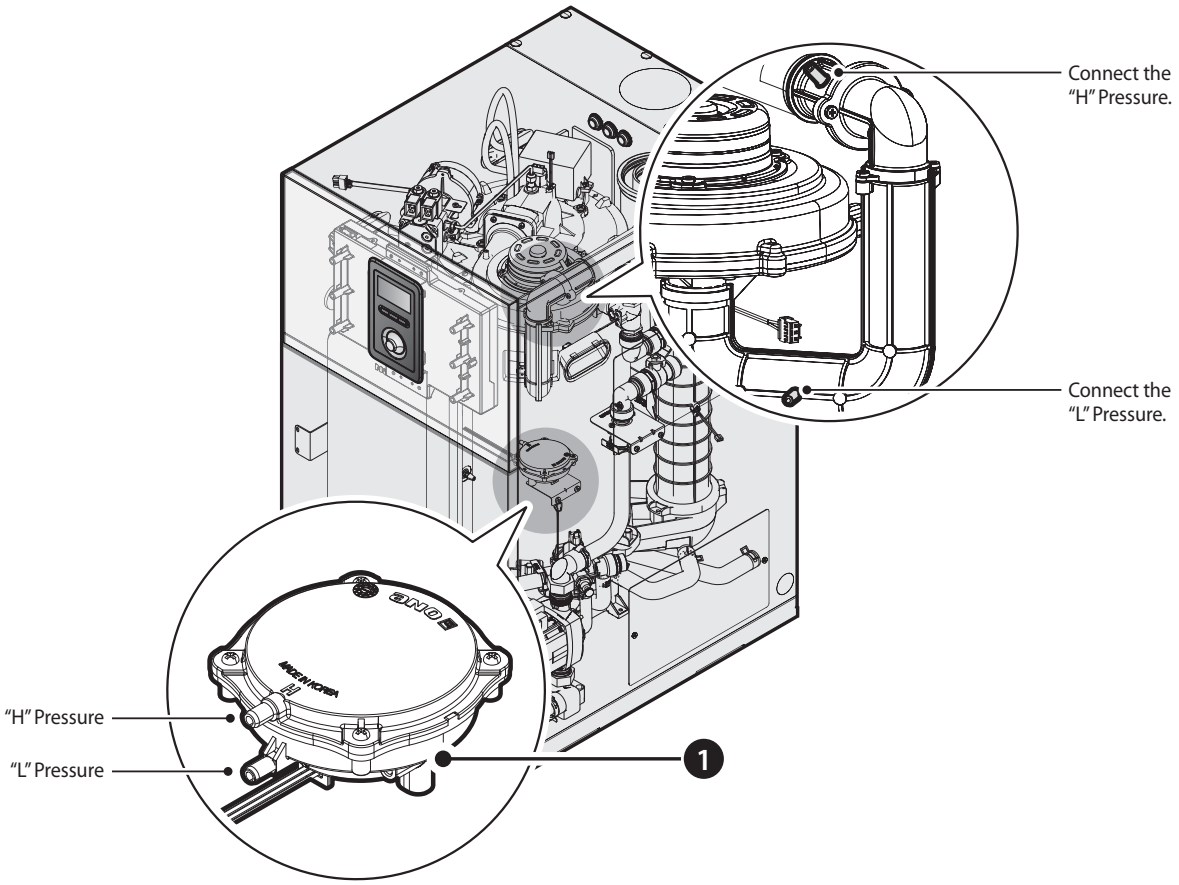
#	Description	Part #	Remark
1	DHW Heat Exchanger	30018296A	
2	Packing_DHW Heat Exchanger	20035234B	
3	DHW_Heating Supply Assembly	30023439A	
4	DHW_Cold Water Inlet Assembly	30023438A	
5	Bolt_Hex Wranch M5×10L	20009865A	
6	Manifold_Heating Supply	20044482A	
7	O-ring_P22	20018011A	
8	Adaptor_DHW_In/Outlet	20047162A	
9	Temperature Sensor	30015178A	
10	O-ring_P26	20032409A	
11	Clip_Φ36	20017724A	
12	Heating Water Return	20046493A	
13	3-Way Valve	XXXXXXXXA	
14	Clip_Wire_3-Way Valve	20029414A	
15	O-ring_P22	20033699A	
16	Adaptor_3-Way Inlet	20047160A	
17	Clip_STS430,Φ19.2×1t	20007733B	
18	O-ring_P28	20022142A	
19	Adaptor_Heating Water	20047161A	
20	O-ring_P14	20011438A	
21	Cap	20017744A	
22	O-ring_P16	20017210A	
23	Clip_D_Φ25	20007859A	
24	Mixing Valve	30011532A	
25	Adapter_Elbow	20025962B	

13.2.7 DHW Cold Water Inlet Assembly



#	Description	Part #	Remark
1	Clip_STS430,Φ19.2×1t	20007733B	
2	O-ring_P22	20018011A	
3	Adaptor_DHW_In/Outlet	20047162A	
4	O-ring_P26	20032409A	
5	Clip_Φ36	20017724A	
6	O-ring_P16	20017210A	
7	Clip_D_Φ25	20007859A	
8	Manifold_Cold Water Inlet	20044471A	
9	O-ring_P18	20006947A	
10	Adapter_Connect	20044469A	
11	Water Adjust Valve	30008247A	
12	Adapter_Elbow_Temp. Sensor	20044470A	
13	Temperature Sensor	30022207A	
14	Clip_Φ27	20017726A	
15	Adapter_DHW Outlet	20044477A	
16	Adapter_Manifold Connect	20047163A	

13.2.8 APS Hose Connection Locations



#	Description	Part #	Remark
1	Air Pressure Sensor	30022962A	

Memo

Memo

Memo

NAVIEN Condensing Blue Flame Oil-Fired Boiler

Installation & Operation Manual

Getting Service

If your boiler requires service, you have several options for getting service:

- Contact an official Technical Assistance Service (TAS) at 0844 332 2323 or go to the website (www.navien.co.uk).
  For warranty service, always contact an official Technical Assistance Service (TAS) first.
- Contact the technician or professional who installed your boiler.

When contacting an official Technical Assistance Service (TAS), please have the following information available:

- Model number
- Serial number
- Date purchased
- Installation location and type
- Error code, if any appears on the front panel display

20047769B

Version: 1.20 (November.2020)

KD NAVIEN **Navien LTD**
Building 2, Guildford Business Park, Guildford, GU2 8XH
TEL 0844 332 2323 www.navien.co.uk