



# Manual

Model : K1-22E/28E/34E/40E  
(Wall Hung type & Indirectly Water heater  
& Combination boiler)

- Natural Gas(NG) – Factory Default
- Liquid Propane Gas (LP) – Field-replaceable  
(Refer to the gas conversion manual.)



## WARNING

Read the Installation Manual carefully and be sure that your combination boiler has properly assembled, installed and maintained. Failure to follow these instructions exactly could result in a fire or explosion, serious bodily injury and/or property damage.

This product must be installed and serviced by a licensed plumber, a licensed gas fitter, or a professional technician in accordance with all local codes.

Improper installation and/or operation by an unqualified person will void the warranty.

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

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- WHAT TO DO IF YOU SMELL GAS
  - Do not try to light any appliance.
  - Do not touch any electrical switch; do not use any phone in your building.
  - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
  - If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

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## 1. Safety

### 1.1 Safety Symbols

In this instruction, various levels are employed to draw the user's attention to particular information. In so doing, we wish to safeguard the user's safety, prevent hazards and guarantee correct operation of the boiler.

For safety symbols, 'DANGER', 'WARNING', 'CAUTION' are indicated and the definitions for these terms are as follow:

#### DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations.

#### WARNING

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

#### CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It is also used to alert against unsafe practices and hazards involving only property damage.

#### WARNING

##### FOR YOUR SAFETY READ BEFORE OPERATING

If you do not follow these instructions exactly, a fire or explosion could result causing property damage, personal injury or loss of life.

- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
- B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
- Do not try to light any appliance.
  - Do not touch any electric switch; do not use any phone in your building.
  - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
  - If you can not reach your gas supplier, call the fire department.
- C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

## 2. Introduction

### 2.1 General Information

The Kiturami Combi Boilers are wall mounted, fully automation, operation modulating, high efficient, condensing combination gas boilers.

- Central Heating (CH) output is fully modulating with a range of:
  - 22 K1-22E
  - 28 K1-28E
  - 34 K1-34E
  - 40 K1-40E
  
- Instantaneous domestic hot water (DHW) output is also fully modulating with a maximum of:
  - 22 K1-22E
  - 28 K1-28E
  - 34 K1-34E
  - 40 K1-40E

This boiler is supplied assembled with DHW plate heat exchanger, divert valve, high efficiency pump, pressure sensor, safety relief valve and CH expansion tank.

And also this boiler includes below,

- Automatic bypass
- Frost protection
- Self-diagnostics system

CH and DHW's temperature control system also are fully automatic and arranged on the Front Control Panel in which monitoring in all conditions easily for the users and installers.

### 2.2 Advice for the Installer

The installation of the boiler must be performed by qualified personnel in compliance with current national regulations regarding installation, and in conformity with any requirements established by local authorities and public health organizations.

After the boiler has been installed, and installer must ensure that the end user receives the declaration of conformity and the operating manual, and should provide all necessary information as to how the boiler and the safety devices should be handled.



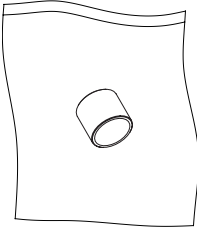
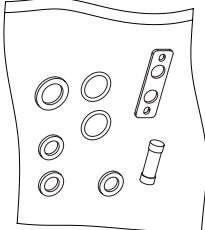
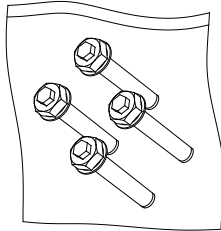
### 2.3 CE Labeling

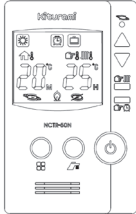
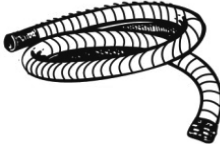
Kiturami these boilers conformed to the following Standard and Directives;

- Gas appliance: Directive 2009/142/EEC  
Standard EN 15502
- Boiler Efficiency: Directive 92/42/EEC and 93/68/EEC  
Standard EN 15502
- Low Voltage: Directive 73/23/EEC and 93/68/EEC  
Standard EN 60335-1, EN 60338-2-30
- Electro-Magnetic Compatibility: Directive 2004/108/EC  
Standard EN 55014 Product/Production certified by:  
Notify Body 1015

## 3. Product Information

### 3.1 Accessories (Included Accessories)

Item	Description	Qty
Kiturami Combination Boiler		1
Manual	 <p><b>Kiturami</b> H1-2E2BE34E4E COMBINATION BOILER</p> <p><b>Manual</b></p> <p>Model: H1-2E2BE34E4E          20kW (7.5kW) 24V 24V 24V 24V          &amp; Combination boiler</p> <p>• Natural draft          • 100% Propane          • 100% Propane G20 (LPG) - Please refer to the manual          (Refer to the gas conversion manual)</p> <p>CE mark of ISO 9001</p> <p><b>WARNING</b></p> <p>Read the installation manual carefully and be sure that your combination boiler has properly installed, installed and repaired. Failure to follow these instructions could result in fire or explosion, serious injury or death, or property damage.</p> <p>The product used in this manual is intended for use in a limited jurisdiction, a licensed gas fitter or a professional technician is required for all gas work.</p> <p>Improper installation or use of this boiler may result in fire or explosion.</p> <p>If you are not a qualified person, do not use the warranty.</p> <p>If the information in these instructions are not followed exactly, the manufacturer may not accept any responsibility for damage, personal injury or death.</p> <ul style="list-style-type: none"> <li>Do not allow any gas leaks or other flammable vapors and gases in the vicinity of the any other appliances.</li> <li>Do not touch any electrical switch, do not use any phone in your building.</li> <li>Immediately call your gas supplier from a neighborly phone, when the gas meter is malfunctioning.</li> <li>If you cannot reach your gas supplier, call the fire department.</li> <li>Installation and service should be performed by a qualified technician, service agency or the gas supplier.</li> </ul>	1
Gas Conversion Kit		1
Spare Parts Kit Gaskets and O-Rings		1
Anchor		1

Item	Description	Qty
Room Thermostat		1
Condensate Hose		1

## 3.2 Specification

Model	Unit	K1-22E		K1-28E		K1-34E		K1-40E	
Nominal Heat Input [GCV]	kW	21.5-3.8		27.3-3.8		33.1-4.7		38.8-11.6	
Nominal Heat Input [NCV]	kW	17.7 – 3.3		23.5 – 3.3		29.3 – 4.14		35.0 – 9.0	
DHW Input (Max-Min) [GCV]	kW	27.3-3.8		27.3-3.8		33.1-4.7		38.8-11.6	
Heating Output (Max-Min) at 80/60°C	kW	18.7-3.1		23.3-3.1		29.1-4.0		34.9-10.9	
DHW Output (Max-Min)	kW	23.3-3.1		23.3-3.1		29.1-4.0		34.9-10.9	
Condensing Heating Output (Max-Min) at 50/30C	kW	20.6-3.5		25.9-3.5		32.5-4.4		37.2-11.3	
Efficiency at Max-Arithm. Mean-Min Output at 80/60C [NCV]	%	98.4/97.8/ 94.8		98.4/97.8/ 94.8		98.4/99.1/ 97.5		98.4/99.1/ 97.5	
Efficiency at Max-Min Output at 50/30C [NCV]	%	107.9/ 106.4		107.9/ 106.4		105.1/ 108.5		105.1/ 108.5	
Part load Efficiency (30%) with 30°C return temperature [NCV]	%	105.1		105.1		107.1		107.1	
Mass rate of combustion products at Max-Min in domestic water mode	g/s	12.55/1.63		12.55/1.63		15.22/2.09		17.84/5.9	
Mass rate of combustion products at Max-Min in heating mode	g/s	9.89/1.63		12.55/1.63		15.22/2.09		17.84/5.9	
NOx Class	-	6		6		6		6	
Gas Consumption at nominal input	m <sup>3</sup> /h	G20	G31	G20	G31	G20	G31	G20	G31
		1.88	0.81	2.39	1.03	2.90	1.25	3.4	1.46
Appliance Category	-	II2H3P, II2E3P, II2Er3P							
Appliance Heating Circuit System	-	Closed Circuit							
Appliance Installation	-	Wall Mounted							
Safety Discharge Heating Circuit Pressure	Bar	3.0							
Operating Heating Circuit Pressure (Max/Min)	Bar	2.5~0.7							
Maximum Central Heating Circuit Temperature	C	85							
Adjustable Central Heating Circuit Temperature	C	45~85							
System Expansion Vessel Total Volume	Liter	8							
Expansion Vessel Factory Setting Pressure	Bar	1.0							
Minimum DHW Pressure	Bar	1.05		1.05		1.09		1.09	
Minimum DHW Flow Rate	Liter	1.6							
Maximum DHW Pressure	Bar	10.0							



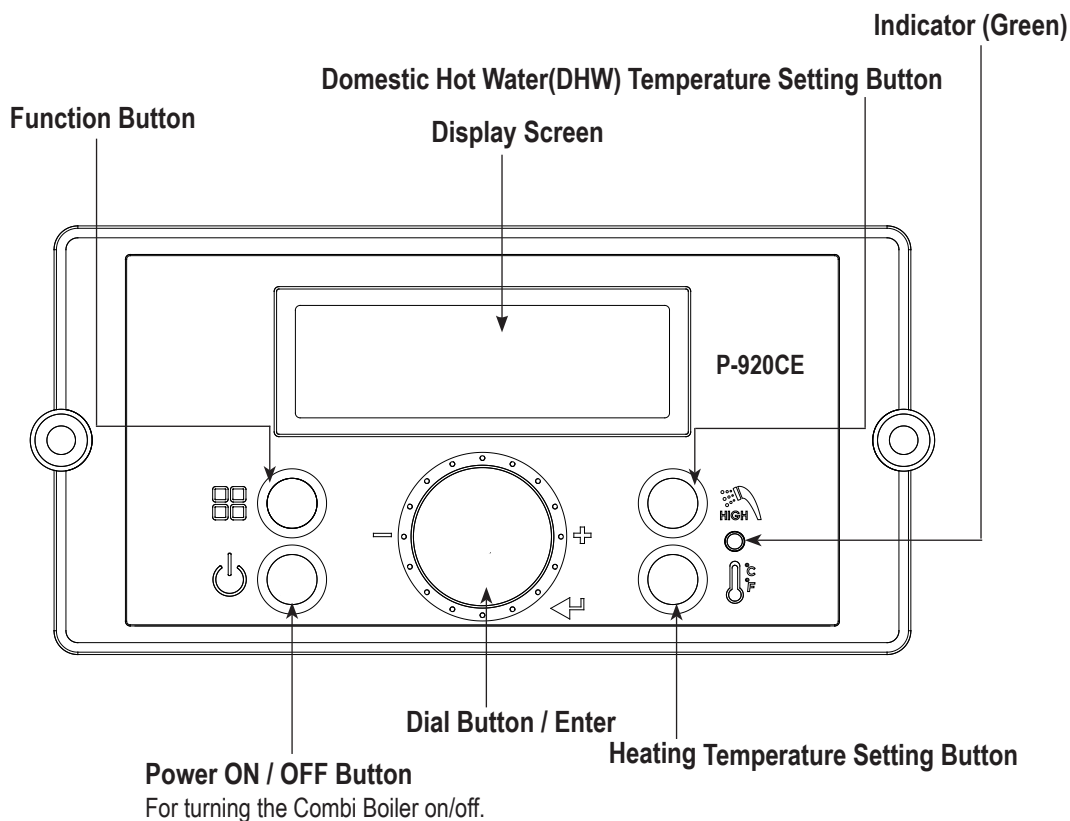
Model	Unit	K1-22E	K1-28E	K1-34E	K1-40E
SpecificFlow (dt=25°C)	Liter/ min	13.3	13.3	16.6	20
SpecificFlow (dt=30°C)		10.0	11.1	13.9	16.7
SpecificFlow (dt=45°C)		7.4	7.4	9.2	11.1
Electrical Supply	V/Hz	230V/50Hz			
Electrical Maximum Consumption	W	115			
Type ofFuel	-	G20(Natural Gas)), G31(Propane Gas)			
Gas Supply	mbar	G20/20mbar,G31/37mbar			
ElectricalSystemProtection	-	IPX 4D			
ApplianceFlueSystem (Air Intake / FlueExhaust)	-	B23-C13-C33-C43-C53-C63-C83-C93			
Indirectcountriesofdestination	-	CH, CZ, ES, GB, GR, IE, IT, LT, PL, SI, SK			
DiameterforFlueSystem	-	Coaxial Ø60/100 and SeparatelyFlue Ø80/80			
Dimension (Width x Depth x Height)	mm	440 x 394 x 740			
WeightwithPackaged Boiler Carton&Accessories	kg	39		41	
WeightwithoutPackaged Boiler Carton&Accessories		36		38	
Connection Diameter	Heating	mm	22		
	DHW	mm	15		
	Gas	mm	22		
	Condensate Drain	mm	15		

Technical Parameters for boiler combination heaters

The following product data satisfy the requirements of the EU Regulations No. 813/2013 AnnexII 5.

KITURAMI K1 COMBI ErP	Symbol(unit)	K1-22E	K1-28E	K1-34E	K1-40E
Rated Heat Output					
At rated Heat Output (Arithmetic mean)	P4 (kW)	10.95	13.25	16.55	22.6
At 30% of rated heat output	P1 (kW)	3.6	4.4	5.3	7.3
Auxiliary electricity Consumption					
At full load (Arithmetic mean input)	elmin (kW)	0.028	0.035	0.038	0.047
At part load (30% of Arithmetic)	elmin (kW)	0.019	0.02	0.022	0.020
In standby mode	PSB (kW)	0.005	0.005	0.003	0.005
Seasonal Space Heating Energy Efficiency					
Seasonal Space Heating Energy Efficiency (GCV)	$\eta_s$ (%)	91	90	91	91
At rated Heat Output (Arithmetic mean) (GCV)	$\eta_4$ (%)	89.4	88.9	88.7	88.3
At 30% of rated heat output (GCV)	$\eta_1$ (%)	96.8	95.6	96	95.6
For Combination Heaters					
Declare load profile	-	XL	XL	XL	XL
Daily electricity consumption	Qelec (kWh)	0.230	0.230	0.218	0.218
Water heating energy efficiency	$\eta_{wh}$ (%)	80	80	81	81
Daily Fuel Consumption	Qfuel (kWh)	15.917	15.917	15.553	15.730
Other Items					
Standby Heat Loss	Pstby (kW)	0.090	0.075	0.056	0.053
Emissions of Nitrogen Oxides	NOx(mg/kWh)	15 (NCV) 13 (GCV)	17 (NCV) 16 (GCV)	9 (NCV) 8 (GCV)	16 (NCV) 15 (GCV)

## 3.3 Control Panel

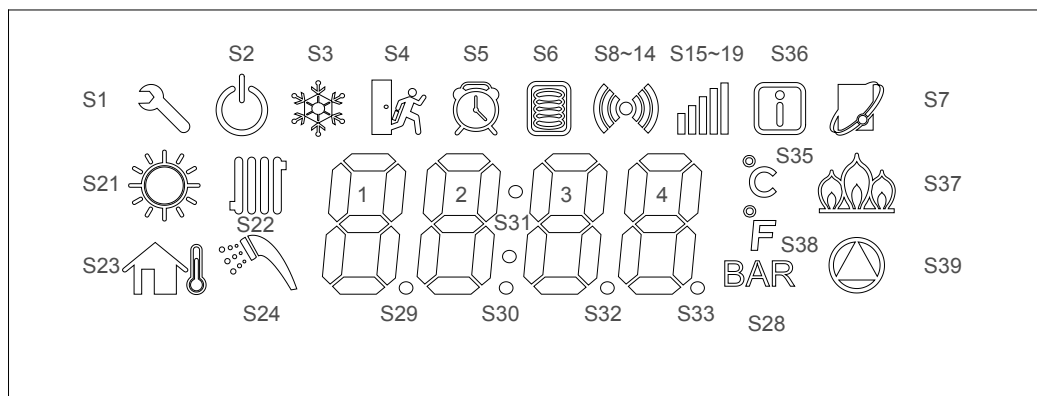













Buttons	Functionality	
	Press (under 5 seconds)	Press and Hold (more than 5 seconds)
Power ON / OFF Button	Control Panel Power ON/OFF	N/A
Function Button	Cancel / Return	Status display mode at power ON mode. Installer Mode at power OFF mode
Domestic Hot Water (DHW) Temperature Setting Button	DHW Temperature Setting Mode : Max 49°C(120°F)	Higher DHW Temperature Setting Mode : Max 60°C(140°F)
Heating Temperature Setting Button	1. When connecting an external input : Indicates calculated CH set value 2. Normal : CH set-point change mode	Temperature Unit Change (°C / °F)
Dial (Enter) Button	Menu and Value Up(+) / Down(-)	N/A

## 3.4 Control Panel LCD

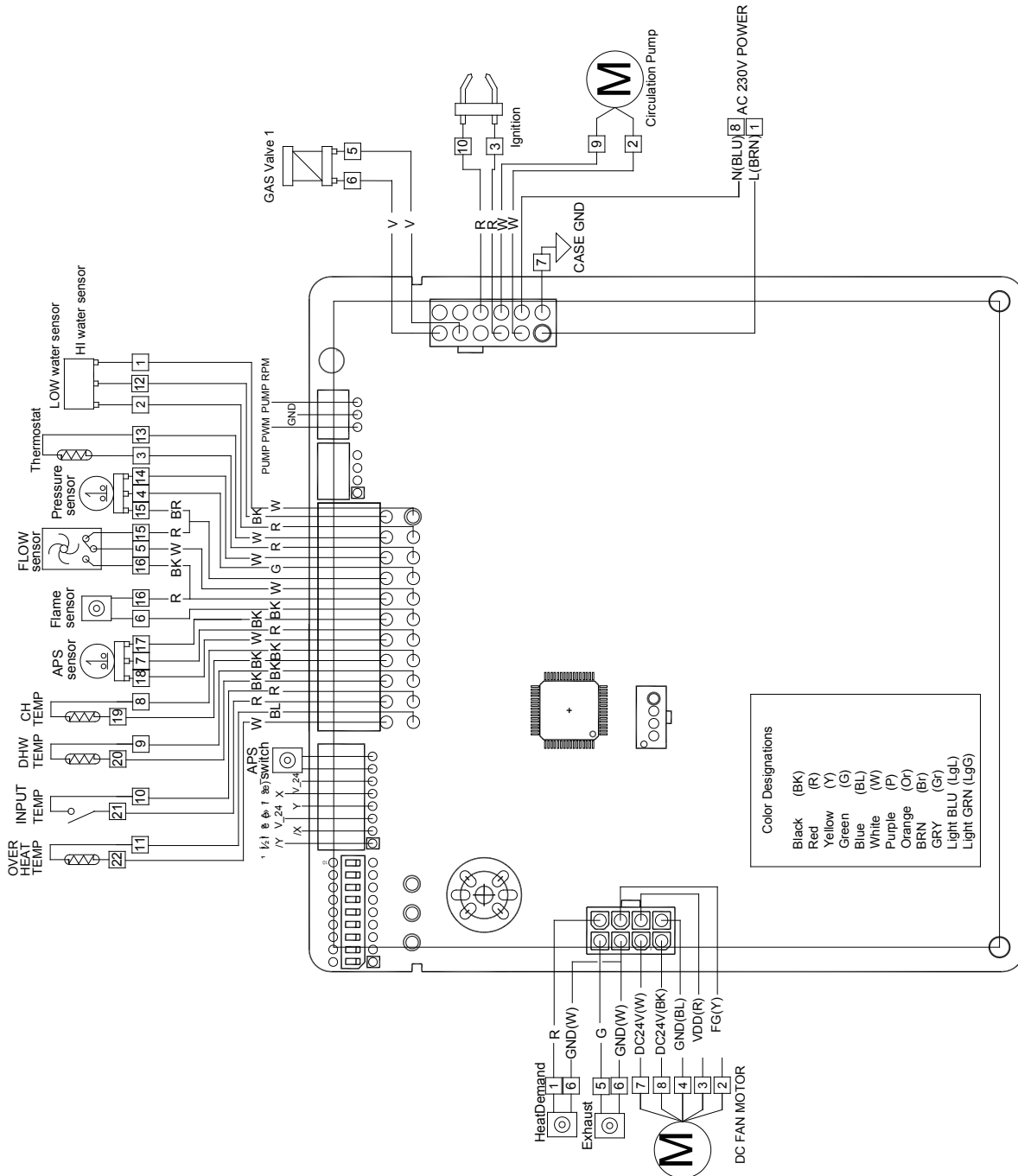
LCD has a backlight that will illuminate:

- When a user action is detected (a button is pressed).
- The timeout is approximately 20 seconds.

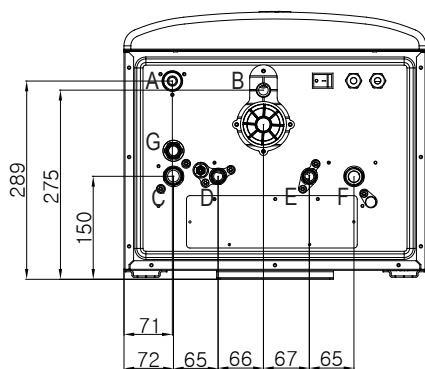
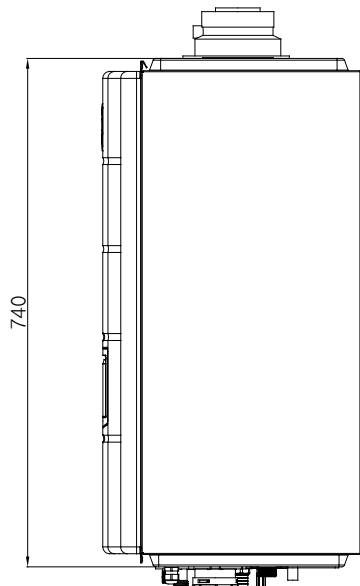
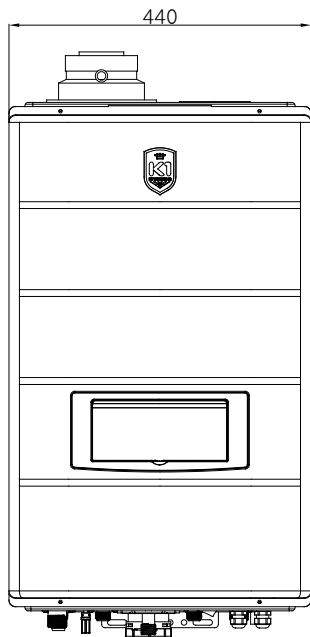
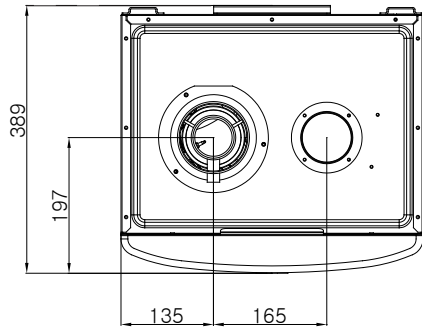


Segment	Name	Description
	Test mode	Test mode indication
	Anti-freeze mode	Anti-freeze mode indication
	Storage Heating mode	Stored Water Being Heated, can be adjusted
	Lock mode	Buttons-locked mode icon
	Communication	Communication icon
	CH mode	Central Heat mode icon can be adjusted
	Outside temp	Operating by outside temperature
	DHW mode	Combination boiler Set Point, can be adjusted
	Status and Installer mode	The Status Mode or the Installer Mode is Active (all parameters)
	Flame signal	Flame Signal icon
	Pump icon	Water pump operation (CH or DHW) icon

## 3.5 Electrical Diagram

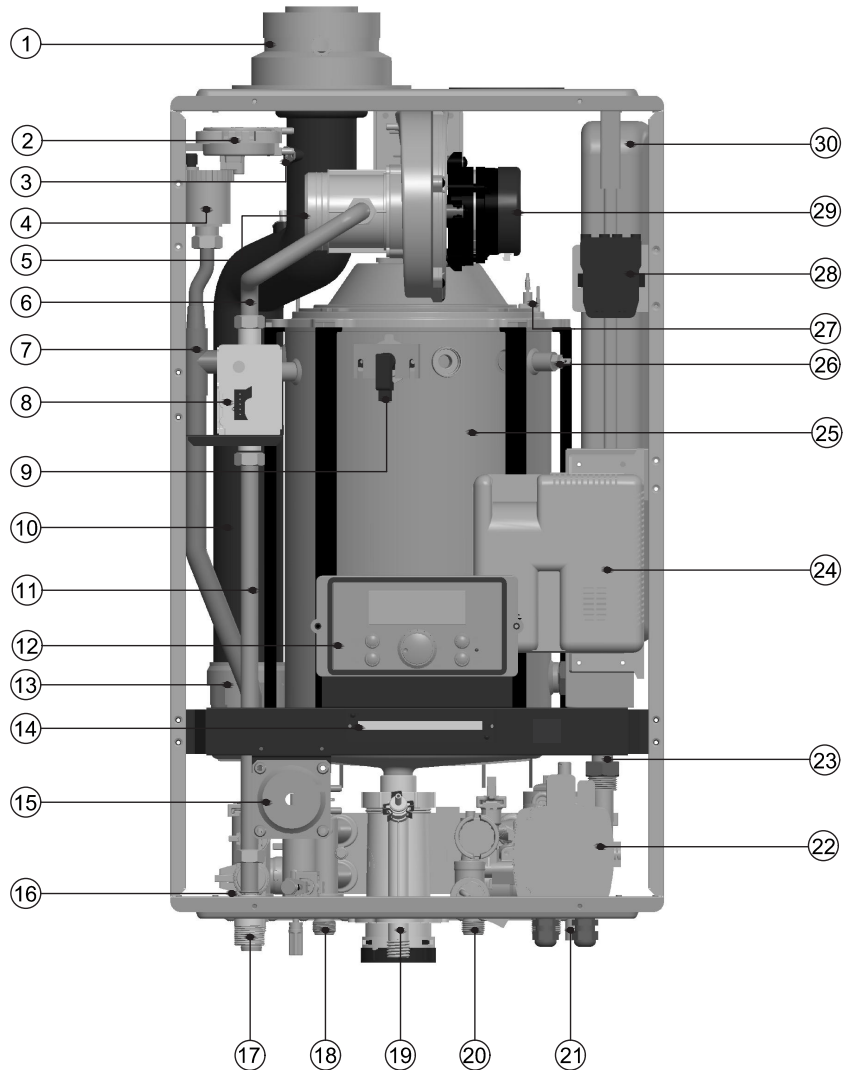


## 3.6 Dimension



	Description	Diameter
A	Gas Inlet	3/4" PT
B	Condensate Drain	1/2"
C	Central Heating Outlet	3/4" PT
D	Domestic Hot Water Outlet	1/2" PT
E	Domestic Hot Water Inlet	1/2" PT
F	Central Heating Return	3/4" PT
G	Safety Relief Valve Drain	3/4" PT

## 3.7 Names of components



NO	Name of Component
1	Flue Connection
2	Air Pressure Sensor
3	Exhaust Sensor
4	Air Vent
5	AGM Mixer
6	Gas Pipe 1
7	Central Heating Outlet Pipe
8	Gas Valve
9	Flame Sensor
10	Exhaust Pipe
11	Gas Pipe 2
12	Display Panel
13	Condensate Body
14	Terminal Block
15	Air Pressure Switch

NO	Name of Component
16	Central Heating Outlet
17	Gas Valve Adapter
18	DHW Outlet
19	Condensate drain
20	DHW Inlet
21	Central Heating Inlet
22	Grundfos Pump Block
23	Heating Water Inlet Pipe
24	Main Controller
25	Heat Exchanger
26	Low Water Sensor
27	Ignition Rod
28	Ignition Transformer
29	Fan Assembly
30	Nitrogen Tank

## 4. Description of the Boiler

### 4.1 General Description

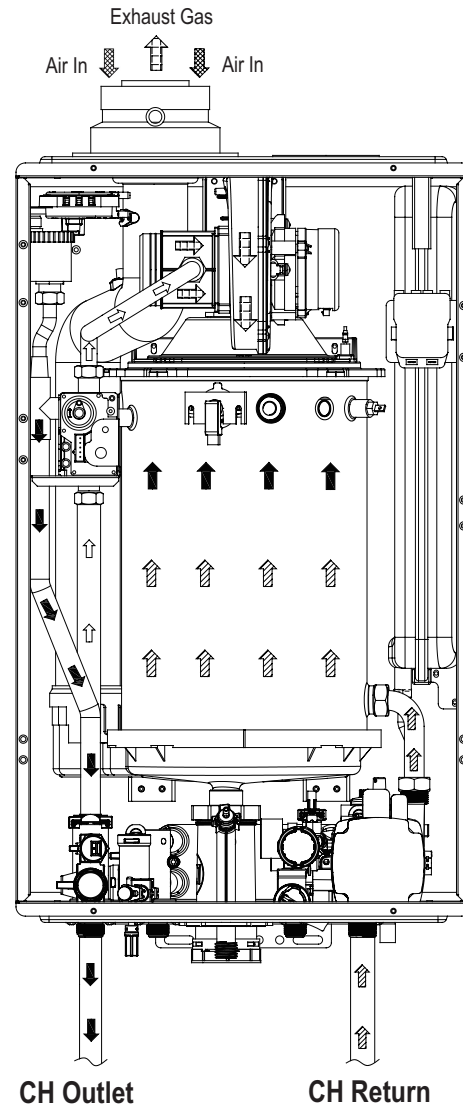
- This Kiturami K1 Series Combi boilers are fully automatic gas fired wall mounted condensing combination boilers. They are perfectly room sealed and fan assisted, and will serve central heating and provide domestic hot water.
- The boiler is set to give a maximum output of:
  - 22E model, 18.7kW
  - 28E model, 23.3kW
  - 34E model, 29.1kW
  - 40E model, 34.9kW
- The boiler is suitable for use only fully pumped built-in for heating system. Priority is given to domestic hot water.

### 4.2 Operating Mode

#### 4.2.1 Central Heating Mode

- To operate the CH mode, press the CH button on the control panel and setting a CH temperature set-point higher than current CH temperature.
- The CH mode begins when the heating demand comes from installed room thermostat, for example, under the condition the boiler is set in 'Heat' condition.
- If the room thermostat is not connected the CH mode begins as soon as the boiler is set in 'Call for Heat' condition.
- 3-Way Valve moves to heating side and the high efficiency pump and fan are energized starts up, and after checking the fan speed suitable for a correct burner ignition, the burner control working is enabled.
- If the boiler's supply water temperature is lower than the desired temperature set-point, the boiler ignites right away and heats up the heating system until the desired temperature is reached.
- If the burner modulation point is reached, the rising of capacity is stopped and the control passes to the modulation mode to achieve the CH set-point.
- In case of the water temperature exceeds the temperature set-point in CH mode or there is no further call for heat (e.g. not come from room thermostat), the burner switches Off and the anti-fast cycling timer is activated.
- The burner starts again when the water temperature falls under the temperature set-point in CH mode and if the AFCT is finished.

#### Operating Principle (Central Heating Mode)

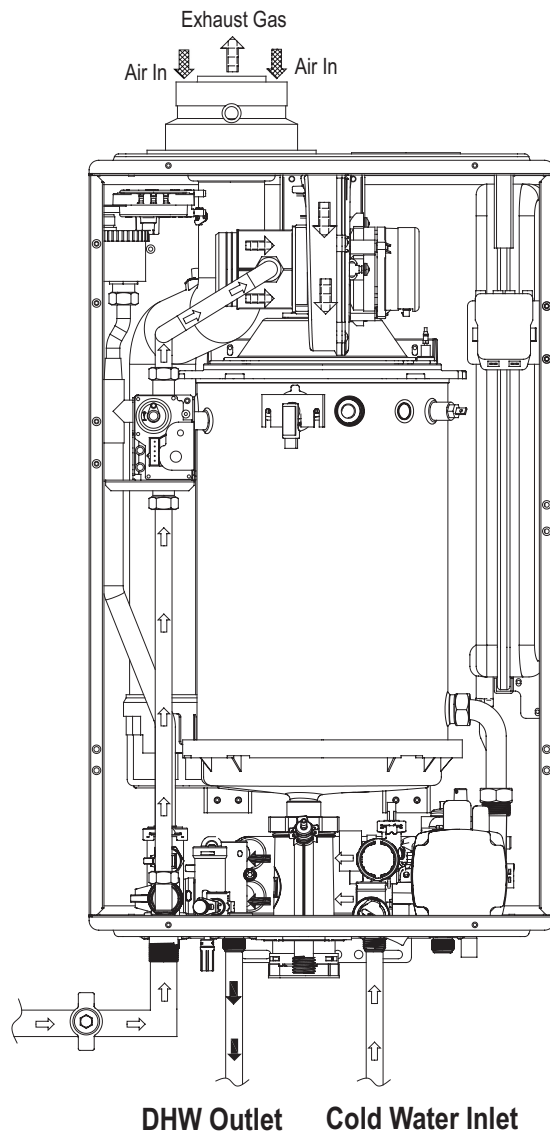


#### 4.2.2 DHW Mode

- When a hot water faucet opens in the home where any places, the boiler flow sensor detects DHW demand, the 3-Way Valve moves to DHW mode and the high efficiency pump runs, which makes the hot water in the boiler primary circuit flow through the DHW heat exchanger, making instant hot water.
- DHW production mode ends when the DHW flow stops. During the DHW mode, the boiler checks two temperature sensors by the DHW and the CH thermistors.
- When there is no further DHW demand, e.g. the hot water faucet stopped, the burner switches Off and the 3-Way Valve remains in DHW mode side during a wait time, so that it can work more efficiently and provide more flexibility if the taps are continuously turned on and off.
- When the wait time has elapsed, the 3-Way Valve returns to the heating side and the boiler is ready to supply heating.



## • Operating Principle (DHW Mode)



### 4.2.3 Electrical Devices Stick Prevention

- This activates once a week if there has been any demand.  
The electrical devices run for 30 seconds to prevent sticking.

## 5. Before Installation

### DANGER

This boiler must be installed by qualified personnel in compliance with the applicable laws and regulations. In general, these laws and regulations are the basic gas installation standards, and all other local regulations.

### CAUTION

Isolate the mains supplies before starting any work and observe all relevant safety precautions.

NOTE: Water treatment

### 5.1 Cleaning Primary System

- Debris from the system can damage the boiler and reduce efficiency. Failure to comply with the guidelines for the use of water treatment with the appliance will invalidate the appliance guarantee and contravene the Building Regulations.
- It is recommended that you fit a primary water cleanser to the system. KITURAMI recommends fitting a filter that will help remove both magnetite and non-magnetic debris.

### 5.2 Electrical Supply

- The appliance requires an earth 230V~ 50Hz supply and must be in accordance with local regulations.
- It must also be possible to be able to completely isolate the appliance electrically. Connection should be via a 3 amp double pole fused isolating switch with contact separation of at least 3mm on both poles. Alternatively, a fused 3 Amp, 3pin plug and un-switched socket may be used, provided it is not used in a room containing a bath or shower. It should only supply the appliance.

### 5.3 Gas Supply

- The gas installation should be in accordance with the local codes and relevant regulations.
- The connection of gas supply to the boiler is a 22 mm located at the rear of the gas service cock.
- Boiler using Natural Gas (NG) must be connected to a governed meter.
- Liquid Petroleum Gas (LPG) must be connected to a regulator properly.
- Ensure that the pipework from the meter to the boiler is of adequate size, and the demands of any other gas appliances in the property are taken into consideration. It is highly recommended that pipe of at least 22 mm diameter is used.
- The gas service cock incorporates a pressure test point. The service cock must be on to check the pressure.

- The meter or regulator and pipework to the meter must be checked, preferably by the gas supplier.
- If you use gas other than the one specified in the boiler lower right hand rating plate, it may cause incomplete combustion that can cause a fire or an explosive ignition.
- When using a gas container, place the container in the cool shady place away from direct sunlight in the outdoors and fix the container properly to prevent tipping.

### 5.4 Water Supply

This boiler is suitable for sealed heating system only.

- The boiler is suitable for sealed system only. The maximum working pressure for the appliance is 3 bar.
- All fittings and pipe-work for the appliance should be of the same standard. If there is a possibility of the incoming mains pressure exceeding 3 bar, particularly at night, then a suitable pressure limiting valve must be fitted on the incoming position.
- The boiler designed to provide hot water on demand to multiple outlets within the property. If there is a requirement for greater demands, for example if the boiler has several bathrooms and cloakrooms, a vented or unvented hot water storage system may be used.

#### FLUSHING THE SYSTEM

- Fill the system with cold water and check for leaks.
- Open all drain cocks and drain the system.
- Close drain cocks and add a suitable flushing agent compatible with aluminum at the correct strength for the system conditions in accordance with the manufacturer's instructions.
- The pH value of the system water must be less than 8 or the appliance guarantee will be invalidated.
- Circulate the flushing agent before the boiler is fired up.
- Run the boiler/system at normal operating temperature as directed by the manufacturer of the flushing agent.
- Drain and thoroughly flush the system to remove the flushing agent and debris.
- It may be necessary to use a power flushing machine to aid the cleansing procedure in some circumstances.
- Close the drain cocks and refill with fresh water and a suitable inhibitor.
- Vent any air from the boiler and system.

## 5.5 Choice of the Location

### 5.5.1 Location of the boiler

Locate the boiler in an area where leakage from the boiler or connections will not result in damage to the area adjacent to the boiler or to the lower floor of the structure. When such locations cannot be avoided, it is required that a suitable drain pan, adequately drained, be installed under the boiler.

- The boiler may be fitted to any suitable wall with the flue passing through an outside wall or roof and discharging to atmosphere in a position permitting satisfactory removal of combustion products and providing an adequate air supply.
- The boiler should be fitted within the building unless otherwise protected by a suitable enclosure i.e. garage or outhouse. (The boiler may be fitted inside of cupboard.)



- Where the boiler is sited in an unheated enclosure and during periods when the heating system is to be unused it is recommended that the permanent live is left on to give BOILER frost protection.
- If the boiler is fitted in a room containing a bath or shower reference must be made to the relevant requirements or Wiring Regulations, Building Regulations.
- If the boiler is to be fitted into a building of timber frame construction then reference must be made to the current or latest edition of Institute of Gas Engineers Publication.

### 5.5.2 Ventilation

Where the appliance is installed in a cupboard or compartment, no air vents are required. Local Codes refer to room sealed appliances installed in compartments. The appliance will run sufficiently cool without ventilation.

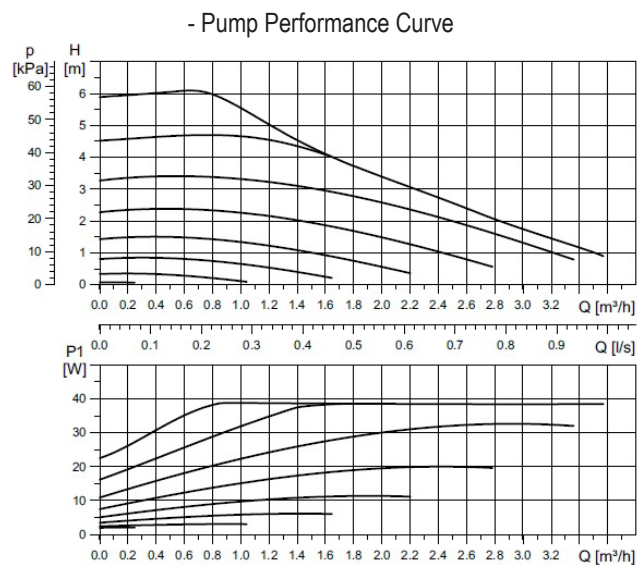
Examples are shown of the following methods of termination:

- to an internal soil & vent pipe
- via an internal discharge branch (e.g. sink waste) downstream of the trap
- to a drain or gully
- to a purpose made soak away
- pumped into an internal discharge branch (e.g. sink waste) downstream of the trap pumped into an external soil & vent pipe.
- to a drain or gully with extended external run & trace heating.

### 5.5.3 Available Pump Head

K1 boilers are supplied with built-in circulating pump.

The available head to the system are showed in the following diagrams.

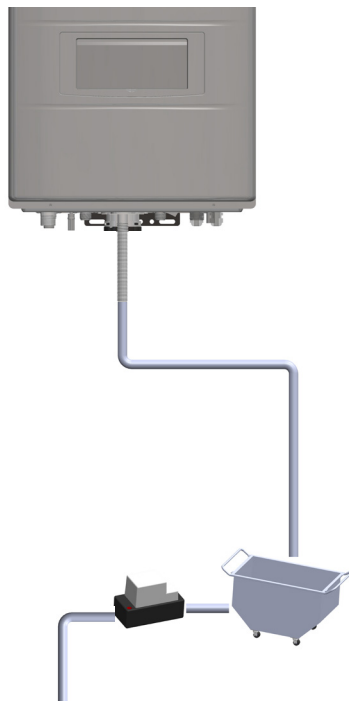


All boilers [KE-22E/28E/34E/40E] were installed by the same pumps which made in grundfos Model No. UPS15-60.

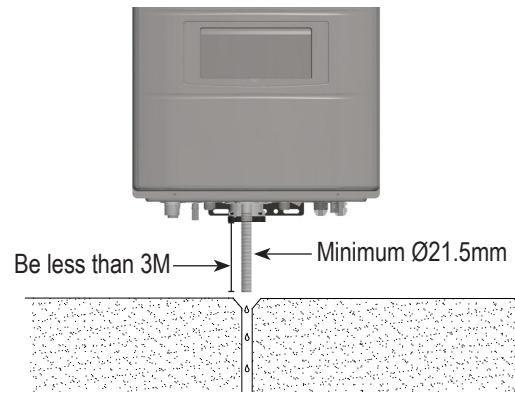
## 5.5.4 Condensate Drain

The boiler condensate trap included a seal, therefore it is unnecessary to install an air break and trap in the discharge pipework.

- The condensate outlet will accept 21.5mm(3/4") plastic overflow pipe. It is highly recommended that this discharge internally into the household drainage system. Where this is not possible providing every possible precaution is taken to prevent freezing.
- Ensure the discharge of condensate complies with any national or local regulations in force.
- The discharge pipe should be run in a proprietary drain pipe material e.g. PVC, PVC-U, ABS, PVC-C or PP.



- Metal pipework is not suitable for use in condensate discharge systems.
- The pipe should be a minimum of 21.5 mm diameter and must be supported using suitably spaced clips of the correct design to prevent sagging.
- It is advisable that the full length of condensate pipe is run internally and preferably be less than 3 meters.
- Internal runs greater than 3 meters or runs in cold areas should use 32 mm water pipe.
- External runs must be a minimum of 32 mm and fully insulated with material suitable for external use.



- If the boiler is fitted in an unheated location the entire condensate discharge pipe should be treated as an external run and sized and insulated accordingly.
- In all cases discharge pipe must be installed to aid disposal of the condensate. To reduce the risk of condensate being trapped, as few bends and fittings as possible should be used and any burrs on cut pipe removed.
- When discharging condensate into a soil stack or waste pipe the effects of existing plumbing must be considered. If soil pipes or waste are subjected to internal pressure fluctuations when WC's are flushed or sinks emptied then backpressure may force water out of the boiler trap and cause appliance lockout.
- A boiler discharge pump is available which will dispose of both condensate and high temperature water from the relief valve. It has a maximum head of 5 meters. Follow the instructions supplied with the pump.
- Condensate Drain Pipe 'Trace Heating' elements are available in various lengths, 1, 2, 3 & 5 meters. Where the drain is between 3 & 5 meters a 5 meters kit can be used and 'double back' upon itself.
- It is possible to fit the element externally on the condensate drain or internally as detailed in the instructions provided.
- The fitting of a 'Trace Heating' element is not a substitute for correct installation of the condensate drain. All requirements in this section must still be adhered to.

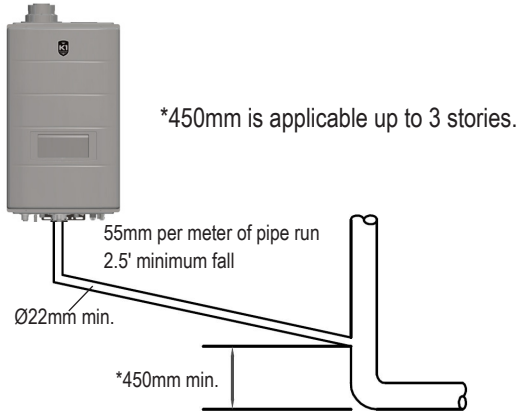
Note: If any condensate pipework is to be installed externally then it should be kept to a minimum and be insulated with a waterproof insulation and have a continuous fall. The total length of external pipe used should not exceed 3 meters.

### DANGER

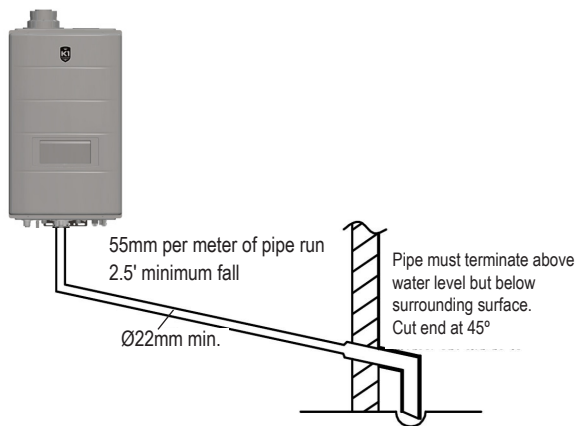
Risk of death from escaping flue gases!  
The Condensate drain pipework for the siphon must not be connected tightly to wastewater piping because, otherwise, the internal condensate trap may be drained fully and flue gas may escape.

Some examples of the type of condensate terminations can be found below.

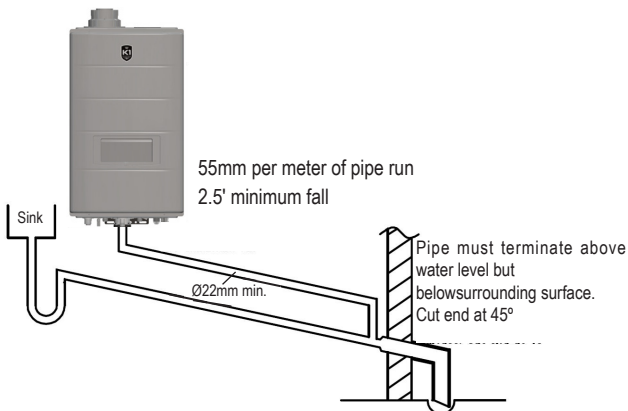
- Termination to an internal soil and vent pipe



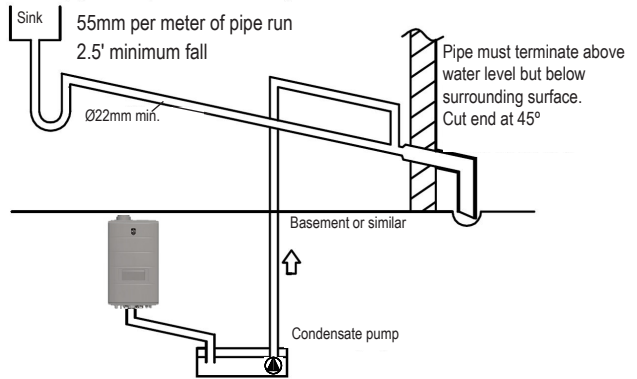
- Terminal to a drain or gully.



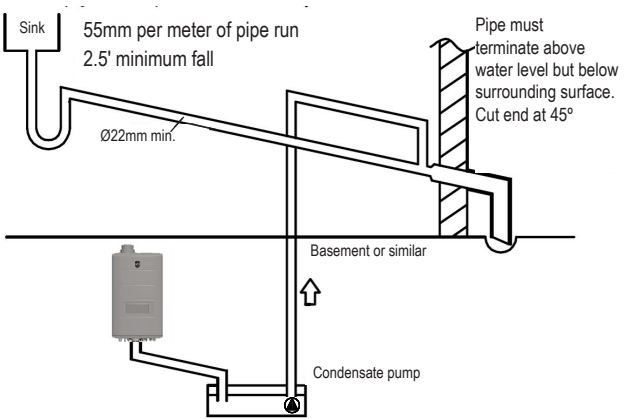
- External termination via internal discharge branch e.g. sink waste – downstream.



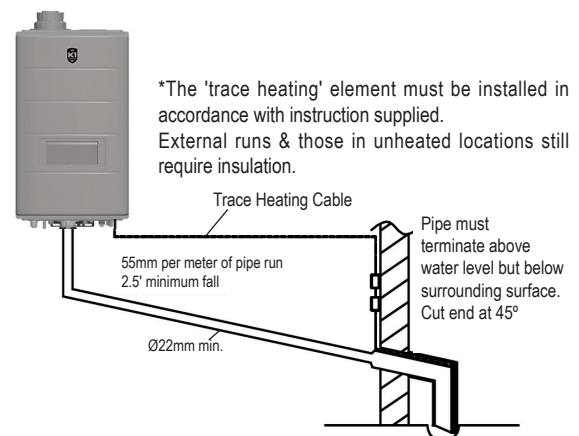
- Termination to a purpose made soakaway.



- Pumped into an external soil and vent pipe

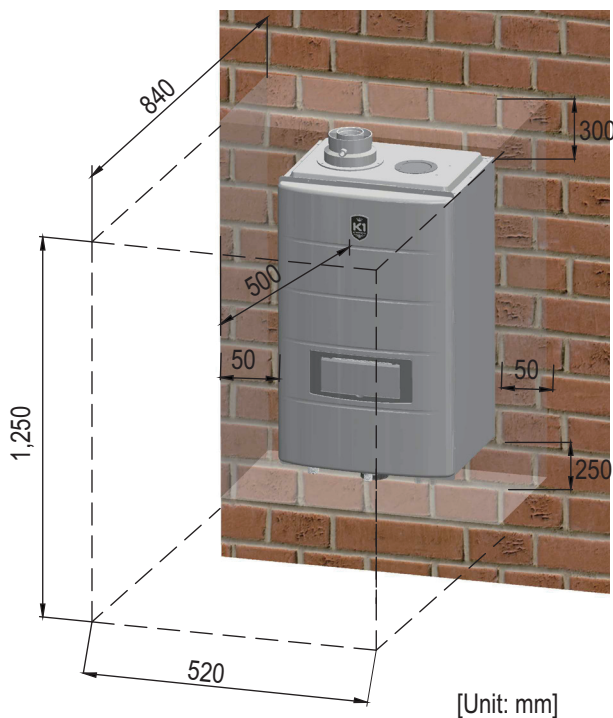


- To a drain or gully with extended external run & trace heating.



## 5.5.5 Minimum Clearances

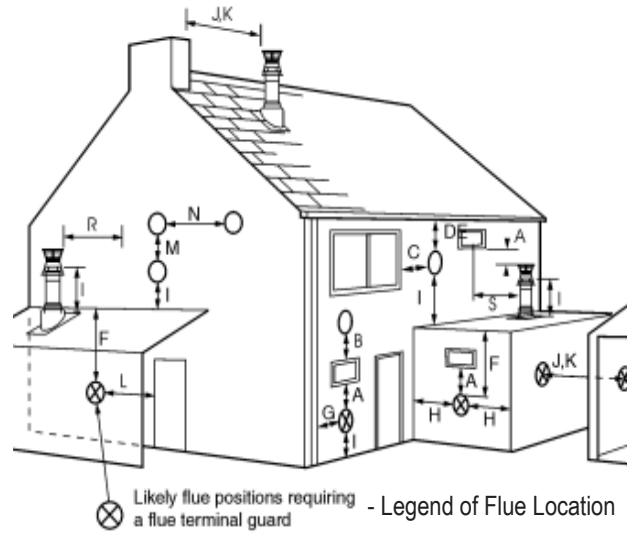
- A flat vertical area is required for the installation of the boiler.
- Minimum clearances must be maintained.
- If fitting the boiler into an airing cupboard use a non-combustible material to separate the boiler from the airing space.
- These dimensions include the necessary clearances around the boiler for case removal, spanner access and air movement. Additional clearances may be required for the passage of pipes around local obstructions such as joists running parallel to the front face of the boiler.
- This is minimum recommended dimension. Greater clearance will help installation and maintenance.



Minimum Clearances	
For installation From Non-Combustibles /combustibles	
Top of appliance	300mm
Front of appliance	500mm
Side of appliance(right)	50mm
Side of appliance(left)	50mm
Bottom of appliance	250mm

## 5.5.6 Flue Terminal Position

The minimum acceptable clearances are shown below;



### CAUTION

All measurements are the minimum clearances required. Terminals must be positioned so to avoid combustion products entering the building. Support the flue at approximately one meter intervals and at a change of direction, use suitable brackets and fitting.

Terminal Position with Minimum Distance (mm)		
A	Directly below an opening, air brick, opening windows, etc.	300
B	Above an opening, air brick, opening window etc.	300
C	Horizontally to an opening, air brick, opening window etc	300
D	Below gutters, soil pipes or drain pipes	75
E	Below eaves.	200
F	Below balconies or car port roof	200
G	From a vertical drain pipe or soil pipe.	150
H	From an internal or external corner.	300
I	Above ground, roof or balcony level.	300
J	From a surface or boundary line facing a terminal.	600
K	From a terminal facing a terminal (Horizontal flue).	1,200/ 600
	From a terminal facing a terminal (Vertical flue).	
L	From an opening in carport (e.g. door, window) into the dwelling.	1,200

Terminal Position with Minimum Distance (mm)		
M	Vertically from a terminal on the same wall.	1500
N	Horizontally from a terminal on the same wall.	300
R	From adjacent wall to flue (vertical only).	300
S	From an adjacent opening window (vertical only).	1,000
T	Adjacent to windows or openings on pitched and flat roofs.	600
U	Below windows or openings on pitched roofs.	2,000

- Minimum Distance

NOTE: In addition, the terminal should be no nearer than 150 mm to an opening in the building fabric formed for the purpose of accommodating a built-in element such as a window frame.

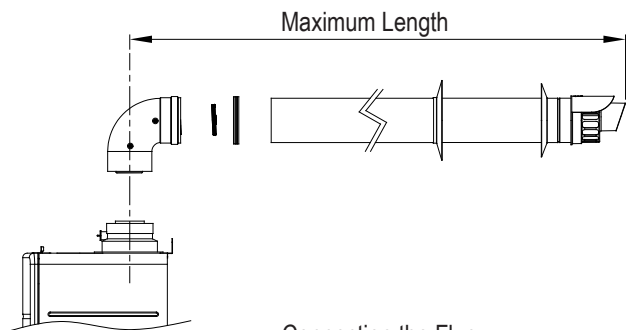
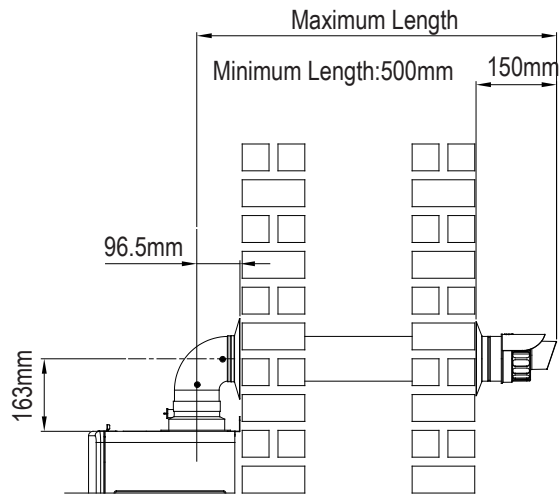
**CAUTION**

- Installations in car ports are not recommended.
- The flue cannot be lower than 1,000mm from the top of a light well due to the build up of combustion products.
- Dimensions from a flue terminal to a fanned air inlet to be determined by the ventilation equipments manufacturer.
- A flue terminal guard should be fitted over a terminal, if persons could come into contact with the terminal, or it could be subject to damage and where the terminal is less than 2,000mm from the finished floor level.

### 5.5.7 Basic Connecting the Flue

**DANGER**

The exhaust gas ducts must not be in contact with or close to inflammable material and must not pass through building structures or walls made of inflammable material. When replacing an old appliance, the flue system must be changed.



- Connection the Flue

**DANGER**

Ensure that the flue is not blocked. Ensure that the flue is supported and assembled in accordance with these instructions.

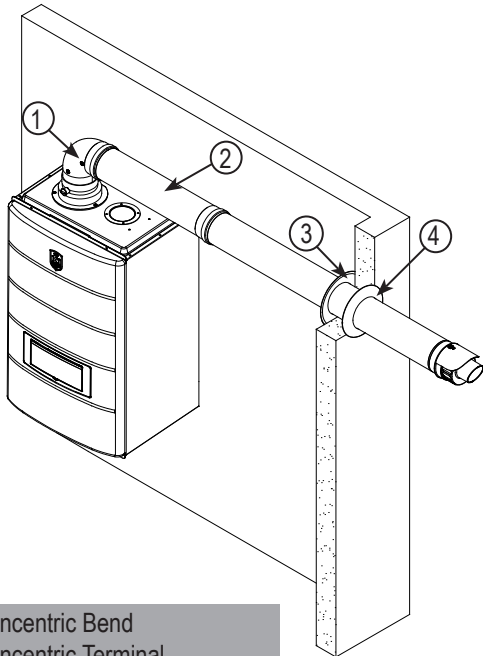
## 5.5.8 Fitting the Coaxial Flue (Ø60/Ø100-Horizontal Flue System)

### ⚠ CAUTION

**SUPPORT-** All flue system must be securely supported at a **MINIMUM** of once every meter & every change of direction. It is recommended that every straight piece is supported irrespective of length. Additional supports are available as accessories.

- The boiler has been positioned on the wall, fit the flue seal into the internal flue turret.
- Fit the elbow into the top of the boiler and rotate to the required position. It is possible to rotate the elbow 360° on its vertical axis.
- Using the flue clamp, seals and screws supplied secure the elbow to the boiler.

- C<sub>13</sub> Horizontal Flue System



- 1) Concentric Bend
- 2) Concentric Terminal
- 3) Internal Wall Sealing Plate
- 4) External Wall Sealing Plate

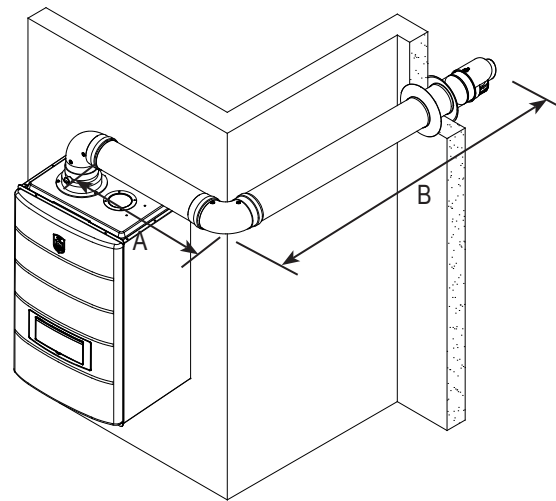
- The 1 meter horizontal flue kit supplied is suitable for an exact generally dimension of 850 mm.
- Measure the distance from the face of the external wall to the face of the flue elbow, this must now be subtracted from 850 mm, now have the total amount to be cut from the plain end of the flue.
- Cut the flue to the required length taking care not to cut the inner flue, next cut the inner flue ensuring that the length between the inner and outer flue is maintained.
- If fitting the flue from inside of the building attach the outer wall seal to the flue terminal and push the flue through hole, once the wall seal has passed through the hole, pull the flue back until the seal is flush with the wall.
- Should the flue require extending, the flue connections are push fit, however,

one flue bracket should be used to secure each meter of flue.

- Any additional "in line" bends in the flue system must be taken into consideration.

- Their equivalent lengths are:
  - Concentric Pipes: 45° bend 1.0 meters / 90° bend 1.5 meters
  - Install the connecting pipe with a minimum fall of 3° towards the boiler.
  - Maximum permissible equivalent flue lengths are below example.

- Calculation C<sub>13</sub> Flue Length



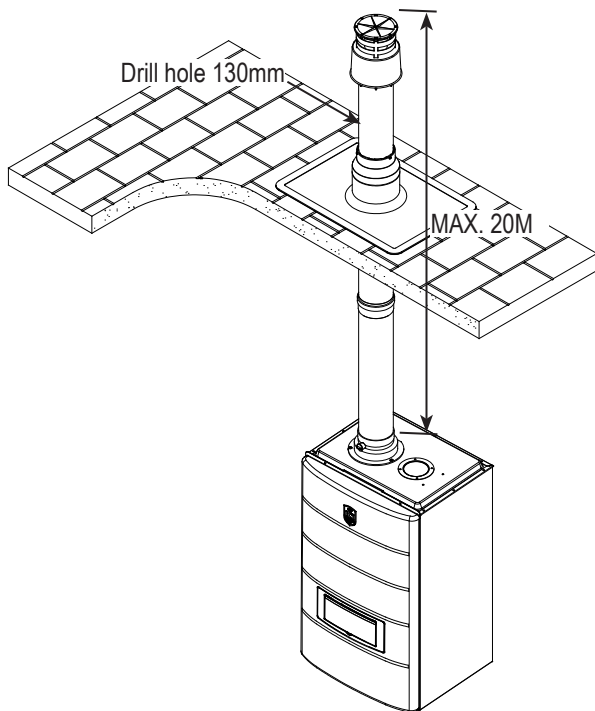
$$\text{Max. Length} = A + B(1 \times 90^\circ \text{ elbow}) = 20 - 1.5 = 18.5\text{M}$$



## 5.5.9 Fitting the Coaxial Flue (Ø60/Ø100-Vertical Flue System)

- The vertical flue kit is supplied with a specially designed weather proof terminal fitted, it can be used either with a flat roof or a pitched roof.
- Before proceeding to fit the flue, ensure that the maximum flue length has not been exceeded 20 meters and that all elbows and bends have been taken into consideration, for each additional 90° elbow 1 meter must be subtracted from the total flue length, and for each 45° 0.5 meters must be subtracted from the total flue length (the height of the vertical adaptor and a 45° bend can be seen in below photo.)
- Mark the position of the flue hole in the ceiling and/or roof. Drill a 130mm diameter hole through the ceiling and/or roof and fit the flashing plate to the roof.

- C<sub>33</sub> Vertical Flue System

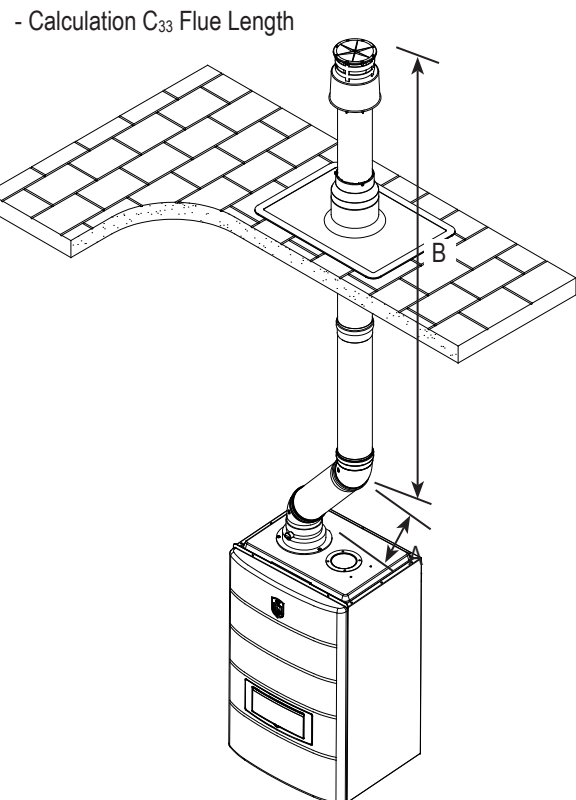


- To connect the vertical flue kit directly to the boiler, place the vertical starter kit onto the top of the boiler and secure with the clamp, fit the vertical adaptor onto the vertical starter kit. There is no need to use a clamp to secure this as it is a push fit connection, the vertical flue kit must then be inserted through the roof flashing, this will ensure that the correct clearance above the roof is provided as the terminal is a fixed height.
- Should extensions be required, they are generally available in 1 meter or 500 mm and they must be connected directly to the vertical starter kit before connecting the adaptor to allow the vertical flue kit to be fitted. In the event that extension pieces need to be shortened, they must only be cut at the male end and it must be ensured that the inner and outer flue remain flush.



Extension Vent Terminal: 1M or 500 mm

- When utilizing the vertical flue system, action must be taken to ensure that the flue is supported adequately to prevent the weight being transferred to the appliance flue connection by using 1 flue bracket per extension.
- Maximum permissible equivalent flue lengths are below example,

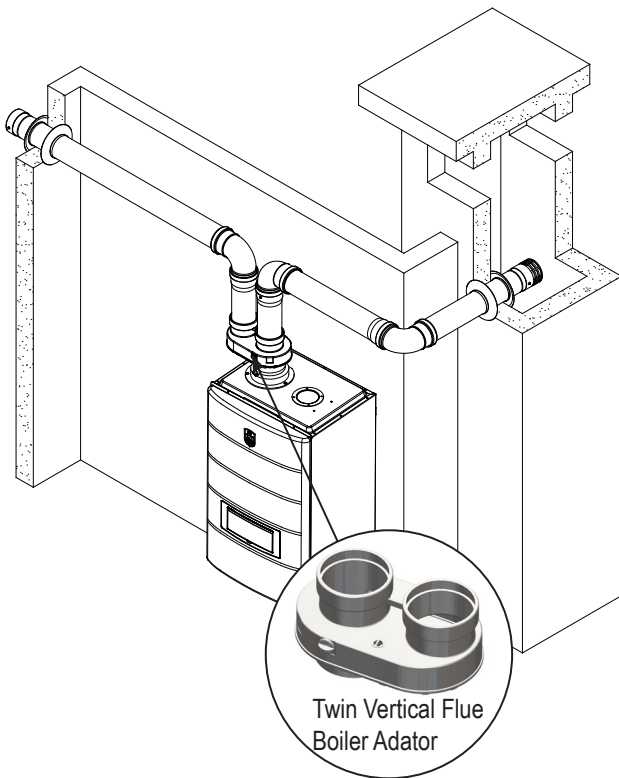


$$\text{Max. Length} = A + B(1 \times 45^\circ \text{ elbow}) = 20 - 1.0 = 19.0\text{M}$$

## 5.5.10 Fitting the Twin Flue (Ø 80/Ø80-Separately Flue System)

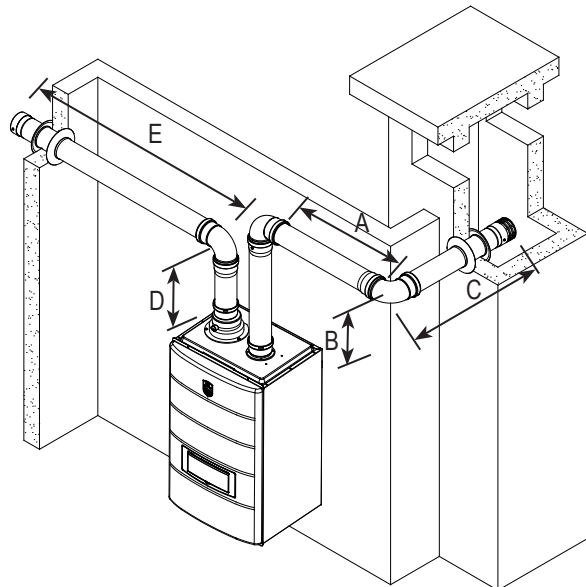
- Where it is not possible to terminate the flue within the distance permitted for coaxial flues, the twin flue pipe can be used by fitting a special adaptor to the flue connector and using the aperture for the air intake located on top of the combustion chamber.
- Take the air intake cover off the top of the appliance.
- Insert the adaptor for intake flue on the appliance.
- Insert the elbow in the boiler air intake hole and fasten it with screws.
- The twin flue pipes can be fitted with or without additional elbows and need no clamps, simply ensure that the lip seal is inserted in the female end of the flue pipe and push the extension piece fully into the previous section of flue pipe or elbow, check that the lip seal is not dislodged when assembling the flue (greasing the seal will aid assembly).
- Twin pipe can also be converted back to Coaxial flue to enable vertical termination with a coaxial kit by using the pipe bridge (Twin - Coaxial Adaptor). When running the twin flue pipe vertically.

- Separately C<sub>83</sub> Flue System (Ø80/Ø80)



- It is not possible to terminate concentrically horizontally. Termination is only possible with separate air and exhaust terminals.
- The air intake pipe can be run horizontally, however, the terminal and the final 1 meter of flue must be installed either horizontally or with a slight fall away from the boiler to avoid rain ingress.
- It is also strongly recommended that the air intake pipe run be constructed of insulated pipe to prevent condense forming on the outside of the tube.
- Maximum permissible equivalent flue lengths are below example,

- Calculation C<sub>83</sub> Flue Length



$$\begin{aligned} \text{Max. Length} &= A+B+C+D+(3 \times 90^\circ \text{ elbow}) \\ &= 21-6.0 = 15.0 \text{ M} \end{aligned}$$

## ▪ Maximum Total Length

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).

Types	Pipe Diameter (mm)	Elbow	Equivalent Length (m)
Coaxial Flue	Ø60/Ø100	45°	1.0
		90°	1.5
Twin Flue	Ø80/Ø80	45°	0.5
		90°	2.0

## - Equivalent Length of Elbows

Types	Pipe Diameter (mm)	Orientation	Maximum Length (m)
Coaxial Flue	Ø60/Ø100	Horizontal	20
		Vertical	20
Twin Flue	Ø80/Ø80	Horizontal	21
		Vertical	21

## - Maximum Flue Length

There are two different types of terminals (horizontal and vertical), for both the coaxial removal system and the dual duct removal system.

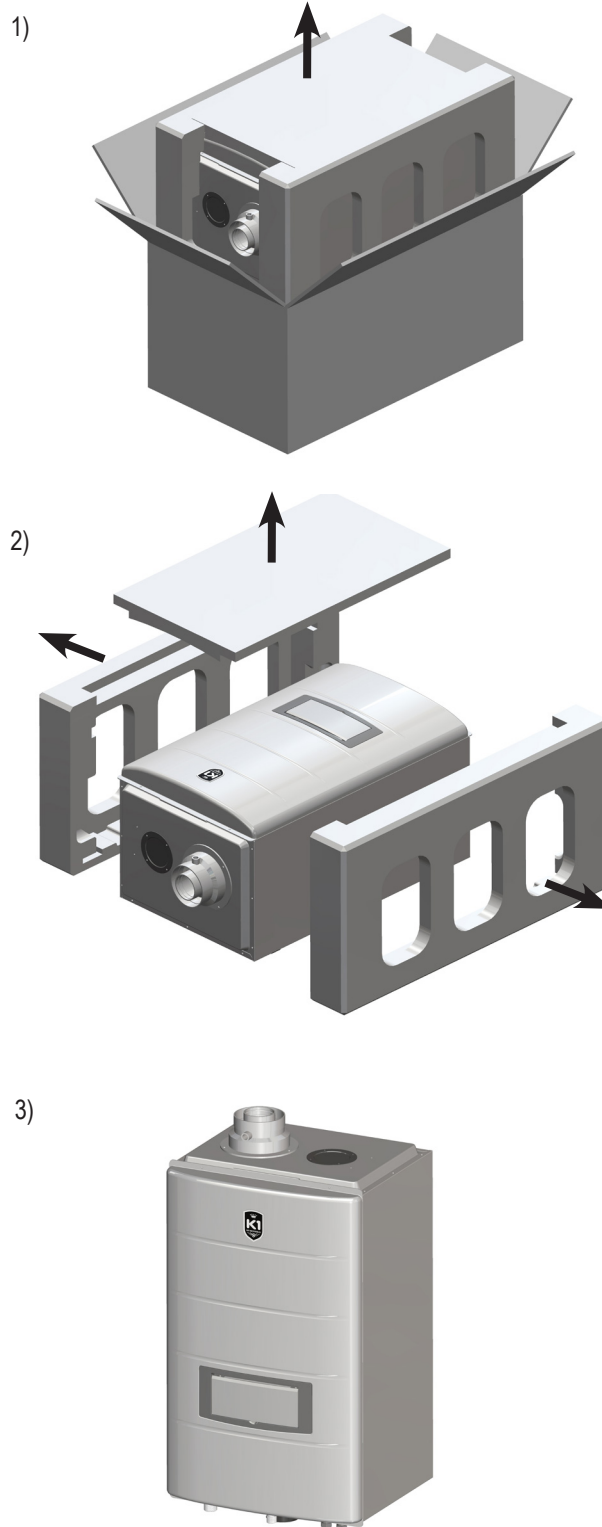
Carefully study the diagrams representing the different types of removal and select the one that best suits the conditions of your installation.

To choose the removal accessories required for each installation, see the list of accessories on the KITURAMI Accessories list provided from our official agencies.

## 5.6 Unpacking

Before installation, check all the items that referred to page 6 "Included Accessories List".

A flue system for rear or side can be supplied as a separate order or buy it in the aftermarket.

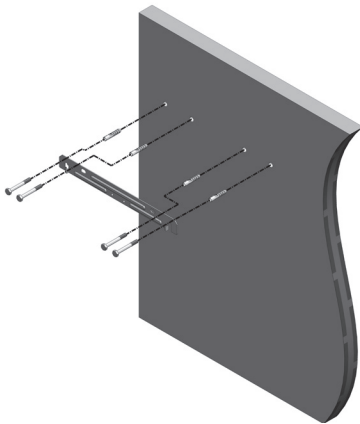


## 5.7 Preparing the Wall

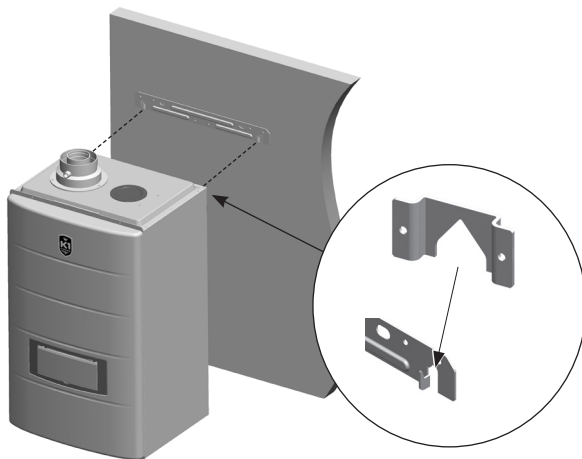
### ⚠ CAUTION

The boiler is heavy. Always lift the unit with assistance. Be careful not to drop the boiler while lifting or handling it to avoid bodily injury or damage to the unit.

- After considering the location position to ensuring it is level both horizontally and vertically.
- Please refer to the template before installing the Combi boiler.
- Attach the template exactly to the location where you want to install the appliance.
- Drill 12mm (0.47 inch) 4 holes at the position of template bracket which is appropriate place for installing the heater.
- After four anchor bolts inserted in the holes, mount the wall bracket.



- Affix the wall bracket securely to the wall. Make sure that it is level and it can support the weight of the Combi boiler.



## 5.8 Heating System Filling and Pressurizing

- When connecting the space heating system, follow these guidelines:
  - Tighten the connection valves with care to avoid damage.
  - Test the boiler for proper space heating flow and inspect for leaks.
- A filling point connection is located on the bottom side of the boiler, first open the handle it and then water comes into heating side from DHW side. At this time, installer must confirm properly pressure in heating side to working. After that, primary installing has to do this often, since might be not enough filled water.
- A filling loop doesn't supplied with the boiler. Then, if your site should be installed a filling loop, must be installed it with qualified technical person. Also, should be followed the local codes.
- The filling method adopted must be in accordance with all relevant water supply regulations and use approved equipment.

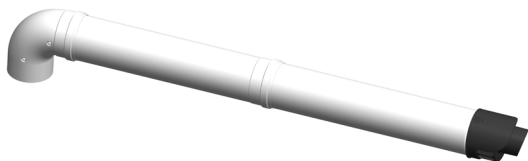
## 5.9 DHW System Filling

- Close all hot water draw off taps.
- Open the cold water inlet cock.
- Slowly open each draw off tap and close them only when clear water, free of bubbles, is visible.
- All DHW circuits, connections, fittings, etc. should be fully in accordance with relevant standards and water supply regulations.
- The boiler's maximum working mains pressure is 10 bars, therefore all pipework, connections, fittings, etc., should be suitable for pressures in excess of 10 bars. A pressure reducing valve must be fitted for pressures in excess of 10 bars. The manufacturer of any outlet fittings, such as a shower valve, may require a lower maximum pressure. The pressure reduction must take account of all fittings connected to the DHW system.

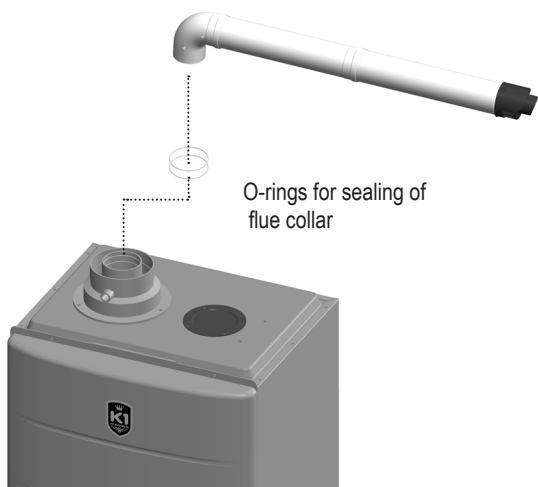
## 6. Installation

### 6.1 Flue System Connection

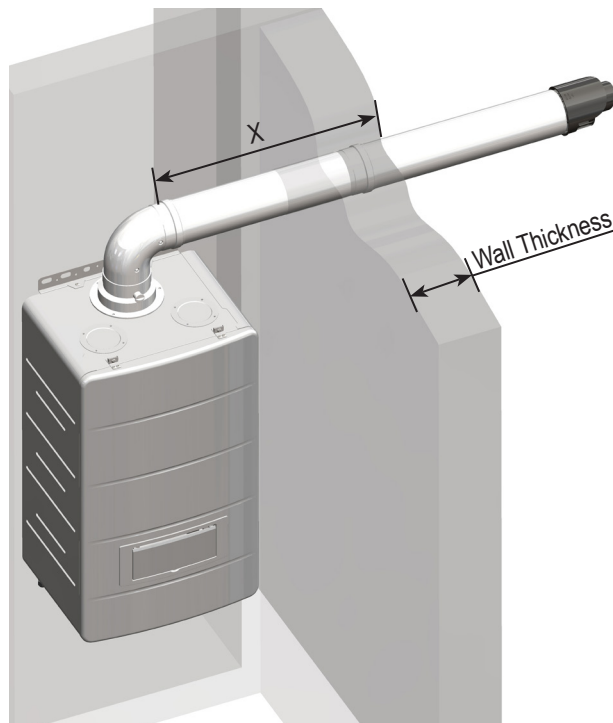
- HORIZONTAL FLUE (Concentric  $\text{Ø}60/\text{Ø}100$ )
- In generally, the terminal assembly length is 850 mm and the elbow is supplied.



- O-rings should be inserted to the top collar of the boiler before the elbow connects to the boiler.



- The terminal length can be adjusted when measured from the flue elbow 850 mm (there is 40 mm engagement into the elbow).  
If necessary to extend over standard 850 mm, can be add the extend flue as standard length 500 mm or 1,000 mm.
- Locate the flue elbow on the adaptor at the top of the boiler. (The flue elbow for condensing boiler is angled at  $93^\circ$  to ensure a fall back to the boiler.)
- Measure the distance "X" from the outside wall face to the elbow.
- In instances where the dimension is under 810 mm it will be necessary to shorten the terminal assembly by careful cutting to accommodate walls of these thicknesses.



- Using the clearance holes in the connection assembly secure it to the terminal assembly using the screws supplied with the flue extended flue.

### 6.2 Electrical Connection

- 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.

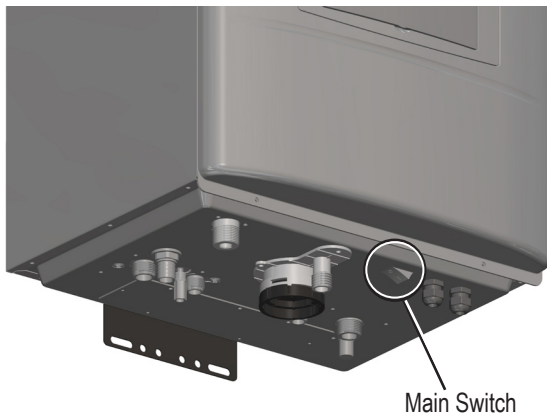
#### 6.2.1 Power Cable Connection

- 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.
- This boiler comes pre-fitted with 1.8m of mains cable. This must be connected to a permanent live supply. If the supply cord is damaged, it must be replaced by the manufacturer, service agent or similarly qualified persons in order to avoid hazard. Should be followed below process,

- Accessing the installer wiring,
  - This appliance must be electrically grounded.
  - Ensure the electrical receptacle that the combination boiler will be plugged into, is properly grounded; if wiring directly.
  - Do not attach the ground wire to either the gas or the water piping as plastic pipe or dielectric unions may isolate the Combination boiler electrically.
  - The wiring diagrams contained in this manual are for reference purposes only.
  - Refer to these diagrams and diagrams from external controls used with this appliance. Read, understand, and follow all wiring instructions.
  - Do not disconnect the power supply when the unit is in normal operation. Damage caused by freezing is not covered under the warranty.
  - Manual(Rocker) switch maximum allowable current for each circulator is 3amp at 230VAC.  
(Housing : Nylon #66 UL 94V-2 , Rocker : Nylon #66 UL 94V-2, Terminal : Copper Alloy )
  - Terminal block (External power connector) : DFT-20A-10P

### 6.2.2 Room Thermostat Connection

- To connect a room thermostat, it is necessary to:
  - Remove the front panel.
  - Insert the wires leading from the room thermostat through bottom another cable gland.
  - Connect the connector of room thermostat wires to the connector from control panel.

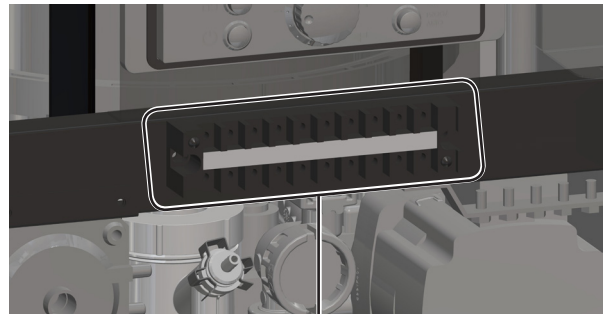


### 6.2.3 Outdoor Temperature Sensor Connection

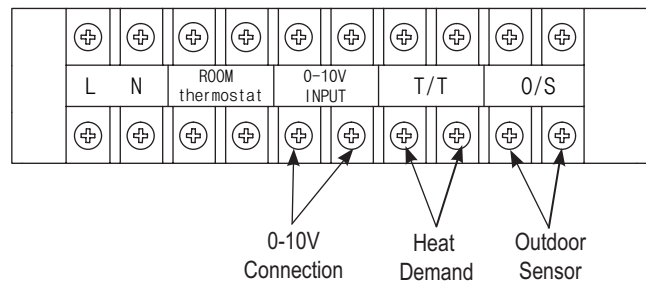
**CAUTION**

The sensor must be fixed to an external wall surface of the property it is serving. The wall must face north or west.

- To connect an Outdoor Sensor, it is necessary to:
  - Remove the front panel.
  - Insert the wires leading from the outdoor sensor through terminal block, not for power supply one.
  - Connect the wires of outdoor sensor to the terminal at the bracket of control panel as indicated in the figure below.



Terminal Block



## 7. Commissioning

### 7.1 Before Commissioning Procedures

- Ensure that the type of gas used corresponds to boiler settings.
- Open the mains water supply to the boiler and all hot water taps to purge the DHW system.
- Check connection to a 230V-50Hz power mains, correct L-N polarity and the earthed connection.
- Ensure that the manually filling valve opens, then open the heating flow and return valves on the boiler.
- Ensure that the cap on the automatic air vent on the pump body is opened. If you need more to time save, might often be opened forcibly safety relief valve.
- The system must be flushed in accordance with properly local or Nation codes, and the flushing agent manufacturer's instructions.
- Pressurize the system to 1.5 bar (Refer to 'Basic Information'- 'D:WP), then close the filling valve.
- Test for gas tightness, turn the gas supply on and purge according to the related local gas appliance regulations.

### 7.2 Commissioning Procedure

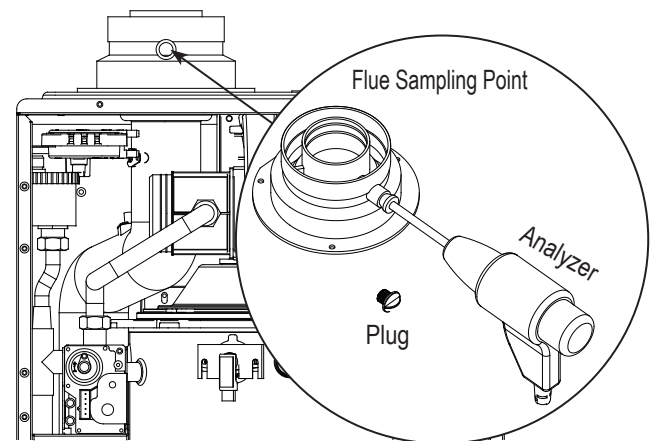
#### 7.2.1 Air-Deration function

- The display backlight remains lit approx. 2 minutes. If the backlight goes out during commissioning it does not mean that the process has been completed.
- Ensure the gas is turned OFF. Turn the power to the boiler ON by manual switch under the boiler or power ON button from control panel. The software version will be displayed.
- The De-Aeration Function is now activated when first power supply and low heating water pressure. The boiler pump will run for approx. 25 seconds. During this time the pump will alternate on and off and the diverter valve will switch between heating & hot water to purge air from the system. During this function is activated, should be open the filling valve.
- At the end of the process the boiler will return to the 'Standby' position.

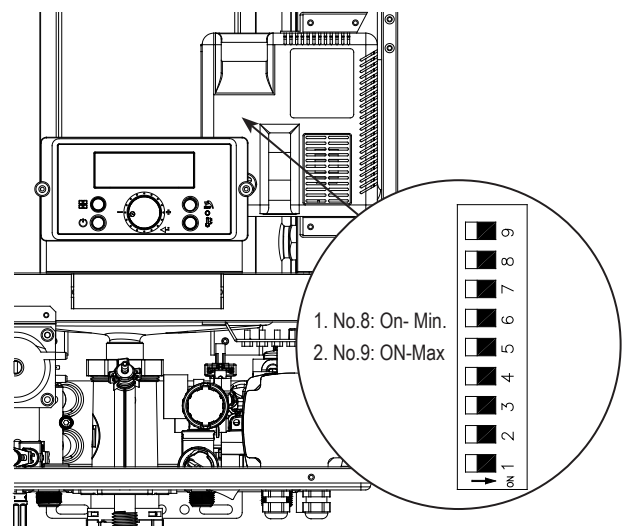
#### 7.2.2 Gas Settings

- Checking the Combustion
- The person who is carrying out a combustion measurement should have been assessed as competent in the use of a flue gas analyzer and the interpretation of the results.
- Allow the combustion to stabilize before inserting the Combustion Analyzer Probe into the Test Point. This will prevent saturation of the analyzer.
  - Turn on the gas and water supply to the boiler.
  - The combustion (CO value) must be measured and recorded at MAXIMUM DHW input & MINIMUM input.
  - Remove the plug by rotating the plug to access the emissions monitoring port. Insert the analyzer into the port.

### - Measuring Exhaust Flue

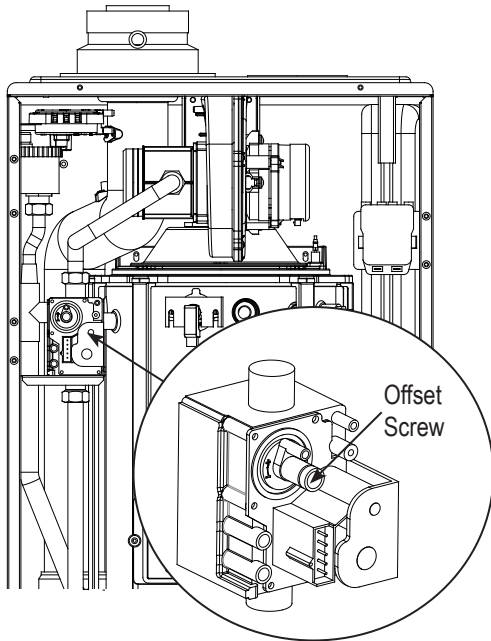


- Fully open several hot water fixtures and set the boiler to operate at min. input condition by moving DIP switch # to OFF position.



### - DIP Switch Location

- Measure the CO<sub>2</sub> value at min. input condition. If the CO<sub>2</sub> value is not within 0.5% of the value listed in Table below, the gas valve offset screw will need to be adjusted. If adjustment is necessary, locate the set screw as shown in Fig below. Using a clockwise to rise or counterclockwise to lower the CO<sub>2</sub> value.



- Fully open several hot water fixtures and set the boiler to operate at input condition by moving DIP switch #9 to OFF position. Measure the CO<sub>2</sub> value at Max. input condition. If CO<sub>2</sub> values measured do not match Table below at Max. input, do not adjust the gas valve. Check for the proper Gas Orifice.

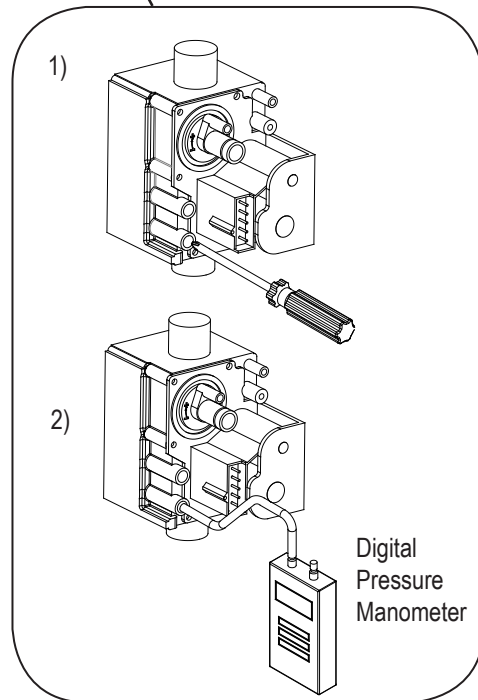
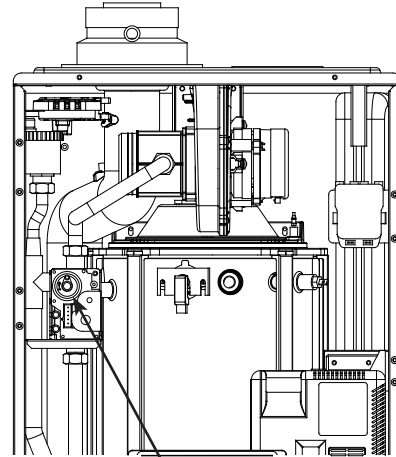
Model	Gas Types	CO <sub>2</sub> (%) Max.	CO <sub>2</sub> (%) Min.
K1-22E	G20	9.3±0.5	9.4±0.3
	G31	10.7±0.5	10.8±0.3
K1-28E	G20	9.3±0.5	9.4±0.3
	G31	10.7±0.5	10.8±0.3
K1-34E	G20	9.3±0.5	9.4±0.3
	G31	10.7±0.5	10.8±0.3
K1-40E	G20	9.3±0.5	9.4±0.3
	G31	10.7±0.5	10.8±0.3

- Combustion Characteristic

- Checking the Gas Flow Pressure
  - Ensure that the gas inlet working pressure can be obtained with all other gas appliances in the property working.
  - Close the gas isolator cock or supply manual valve.
  - Use a screwdriver to undo the measuring nipple screw at the gas valve.
  - Connect a pressure gauge (digital manometer) to the measuring nipple at the gas valve.
  - Open the gas isolator cock or supply manual valve.
  - Start up the appliance to ensure that Max. input can be dissipated into the DHW system by open the hot water fixture.

- With the boiler operating at Max. input check that the gas inlet working pressure at the reference test point complies with the requirements.

- Permissible gas flow pressure for operation with G20 natural gas: 1.3 ... 2.3 kPa (13.0 ... 23.0 mbar)
- Permissible gas flow pressure for operation with G31 liquid gas: 2.3 ... 4.3 kPa (23.0 ... 43.0 mbar)



- Measuring the Gas Supply Pressure

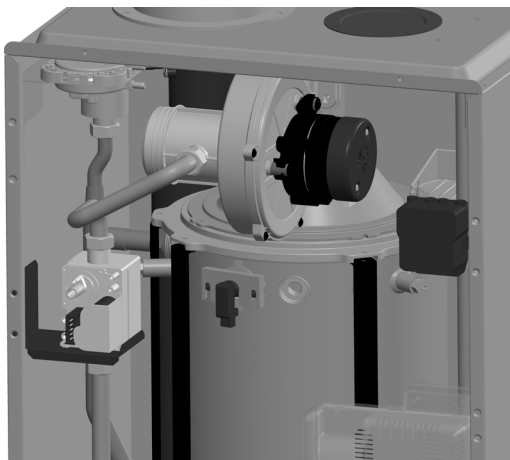


## 7.3 GasConversion

### 7.3.1 Natural Gas to Propane Conversion

- The K1 condensing gas boiler is configured for Natural Gas (NG) from the factory.
- If your gas supply is Propane Gas (LP), your boiler can be converted to burn propane gas as follows:

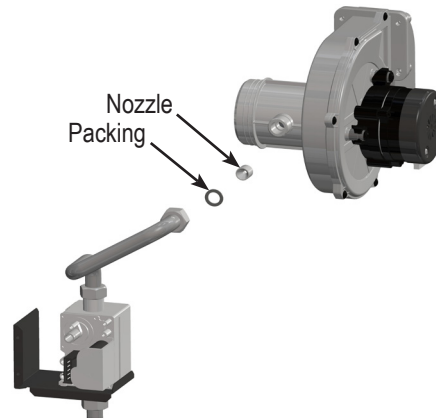
1. Turn OFF the Boiler. The ON / OFF button is located at the bottom left of the Control Display.
2. Turn OFF the GAS and WATER supply to the Boiler. (valves are located on the plumbing pipes.)
3. Using a Phillips screwdriver, remove the 4 screws on the front cover.
4. Locate the Gas Inlet Pipe at the top left of the unit as is shown in Figure below, and loosen the Brass Fittings at both ends of the Gas Inlet Pipe.



5. Completely un-thread the Brass Fitting on the right, and then carefully swing the Gas Inlet Pipe downward just enough so that it is out of the way.



6. Remove the existing Natural Gas orifice. Save the packing for re-use.



7. Replace the old Orifice with the new Orifice for LP (propane) gas. Re-use the packing from previous.
8. Return the Gas Inlet Pipe to its original position and tighten both of the Brass Fittings.
9. Set the main controller Dip Switch to change the gas type.



Dip Switch

Power (Kcal)	Switch Position		
	1	2	3
16,000	-	ON	-
20,000	ON	ON	-
25,000	-	-	ON
30,000	ON	-	ON

Table1

Power (Kcal)	Switch Position	
	5	6
G20	-	-
G21	ON	-
G30	-	ON
G31	ON	ON

Table2

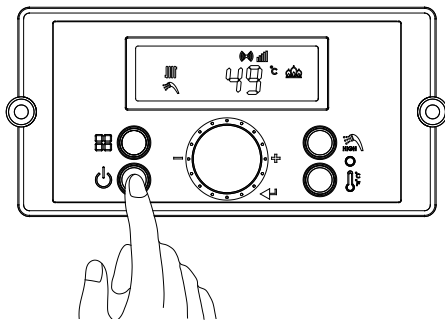
10. Turn ON the GAS and WATER supply to the Boiler.
11. After completing conversion, apply the sticker, present in the conversion kit, near the data-plate. Using an indelible marker pen, cancel the data relative to the old type.

After making sure that conversion was carried out with a nozzle of suitable diameter for the type of gas used and the settings are made at the correct pressure, check that the burner flame is not too high or low and is stable (does not detach from burner).

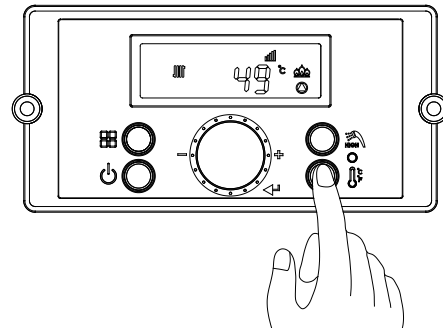
## 8. Operating the Boiler

### 8.1 Adjusting the Temperature

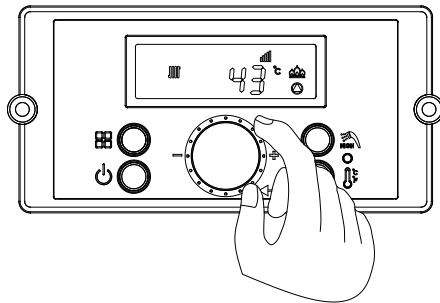
When the power of P-920CE is turned on, the above items will be displayed and standby mode will appear.



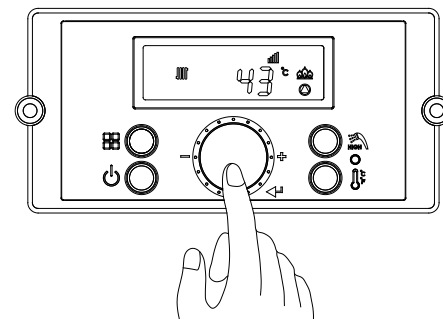
a. Press the 'Power Button' ON.



b. Press the 'Heating Temperature Setting Button' for 5 seconds for Heating Temperature temperature setting.

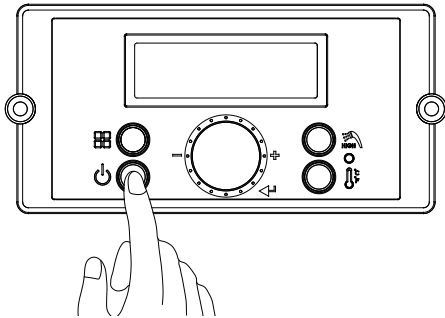


c. The 'Heating Icon' and 'current Heating setting temperature' will be blinking. Heating temperature setting can be adjusted by turning the 'Dial Button' from **49.5°C~60°C in 0.5°C intervals.**

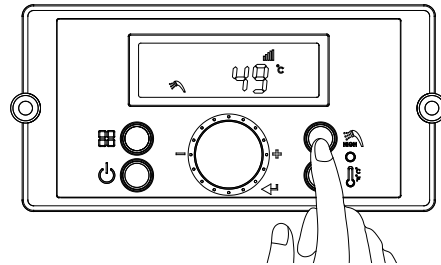


d. After adjusting desired temperature, if 'Dial Button' is pressed, the current temperature setting will be stored.

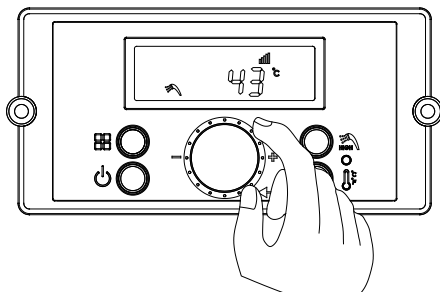
## 8.2 Adjusting the Hot Water Temperature



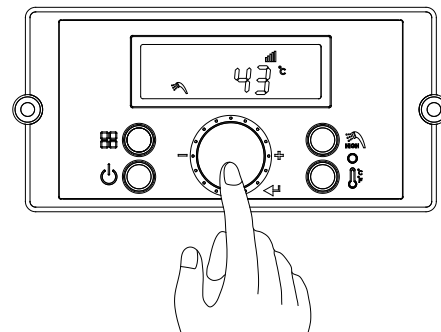
a. Press the 'Power Button' ON.



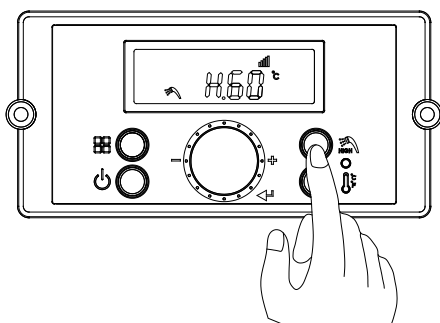
b. Press and hold the 'DHW Temperature Setting Button' for 5 seconds for Domestic Hot Water temperature setting.



c. The 'DHW Icon' and 'current DHW setting temperature' will be blinking. DHW temperature setting can be adjusted by turning the 'Dial Button' from 35°C~49°C in 0.5°C intervals.



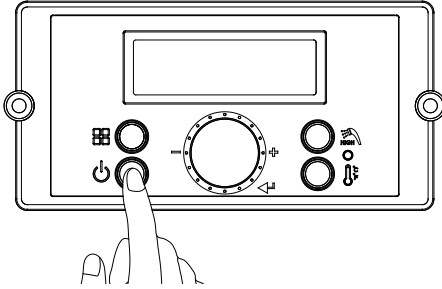
d. After adjusting desired temperature, if 'Dial Button' is pressed, the current temperature setting will be stored.



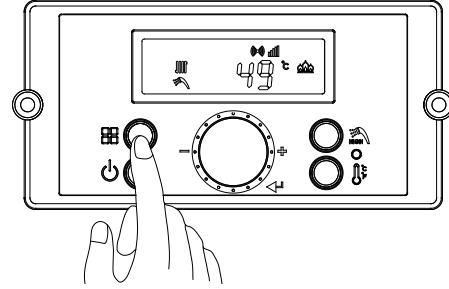
e. If want to get higher DHW temperature over 50°C, press and hold the 'Temperature Setting Button' again for 5 seconds. After adjusting desired temperature, if 'Dial Button' is pressed, the current temperature setting will be stored.

## 8.3 Status Mode

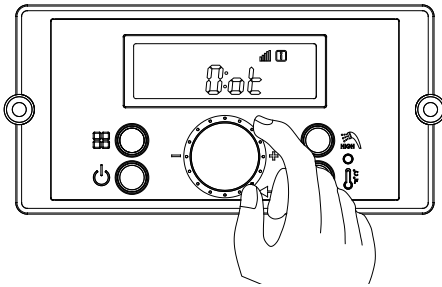
### 8.3.1 Setting the 'Status Mode'



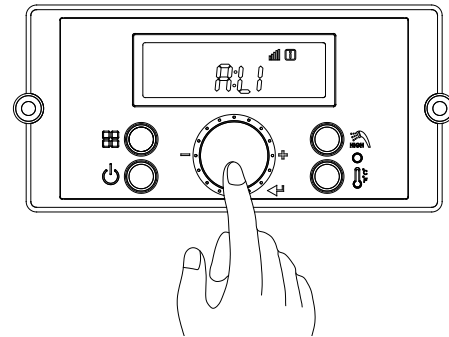
a. Press the 'Power Button' ON.



b. Press and hold the 'Function Button' for 5 seconds to enter Status Mode'.

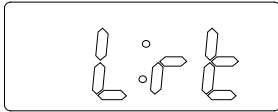
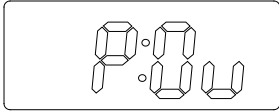
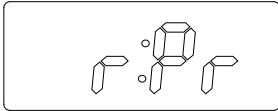


c. '[O:ot]' is displayed on the display screen. Turn the 'Dial Button' clockwise or counter-clockwise to navigate through the 'Status Mode'.



d. After adjusting desired status menu, if 'Dial Button' is pressed, the current status menu setting will be stored.  
d-1. Press the 'Function Button' to return to normal mode.

Display Screen	Description	Display Screen	Description
	Display outdoor temperature		Display flow rate value (Li: L/m, GA: GPM)
	Display cold water temperature		Display fan RPM value
	Locked mode ON/OFF		Display central heating water temperature
	Display hot water temperature		Display exhaust gas temperature

Display Screen	Description	Display Screen	Description
	Operation time display mode		Display pump operation status (CP1, CP2, 3way)
	Display current pressure		

## 8.4 Installer Mode

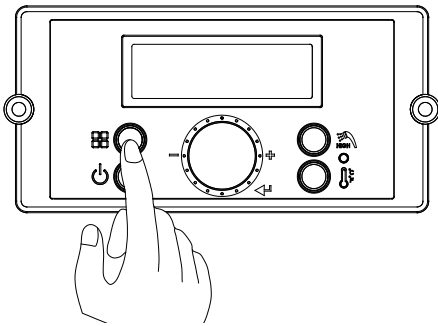
### 8.4.1 Setting the installer mode

User can modify installer mode settings for boiler operations, such as the space heating and DHW temperature ranges, in different operating conditions.

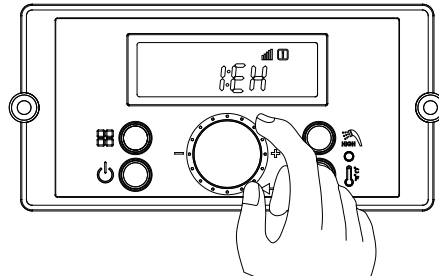
Follow the instructions below to enter the 'Installer Mode' and change parameter settings.

 CAUTION

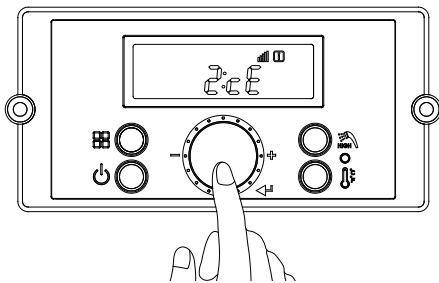
All parameters must be set by a qualified professional with an extensive understanding of the boiler system. Setting parameters improperly may lead to property damage or injury.



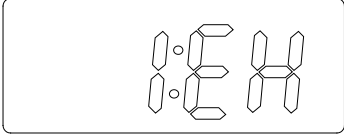
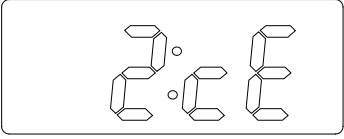
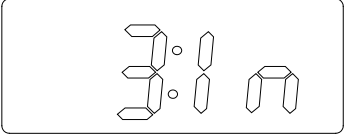
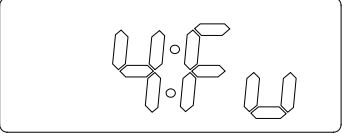
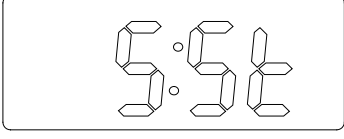
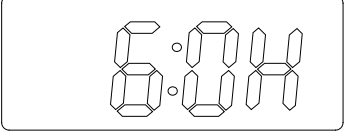
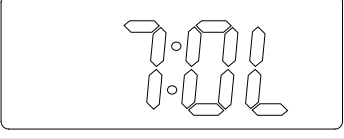
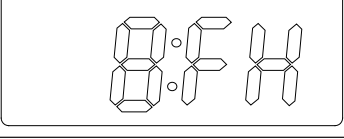
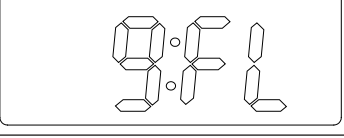
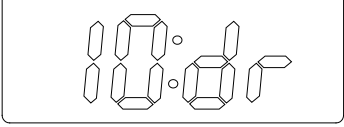
a. Press and hold the 'Function Button' for 5 seconds to enter the 'Installer Mode'.

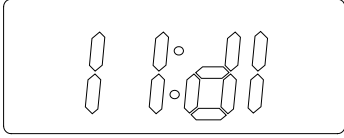
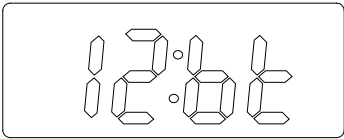
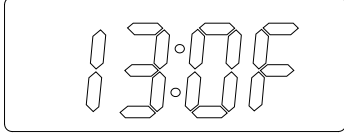
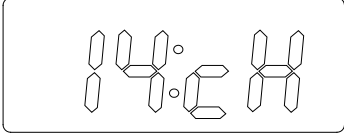
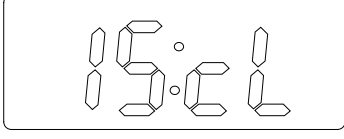
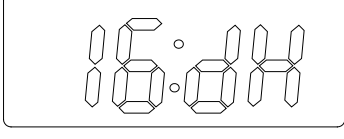
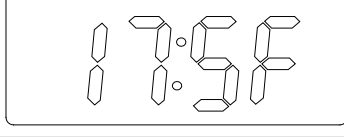
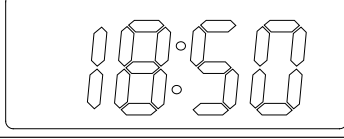
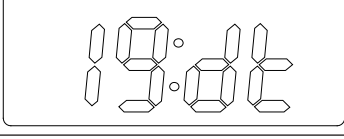
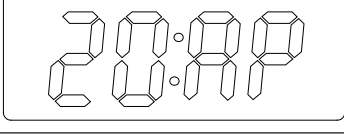
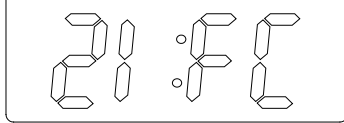


b. Turn the 'Dial Button' to move to a 'Installer Mode Menu'.



c. After adjusting desired installer mode menu, if 'Dial Button' is pressed, the current menu setting will be stored.

Display Screen	Description
	<b>1. History entry</b> : History fault code (E0~E9)
	<b>2. Clear Error History</b> : Clearing of error History buffer
	<b>3. System initialize</b> : System initialize to default
	<b>4. Flow unit</b> : gallon / liter
	<b>5. Heat storage function</b> : Heat storage function On/Off
	<b>6. Maximum Outdoor Temperature</b> : [7:OL+5°C(9°F)] ~110°F(43°C)
	<b>7. Minimum Outdoor Temperature</b> : -4°F(-20°C) ~ [6:OH-9°F]
	<b>8. Max Fan PWM</b> : -30 ~ +30
	<b>9. Min PWM</b> : -30 ~ +30
	<b>10. Delete running time</b> : Delete running time

Display Screen	Description
	<b>11. Delete igniting times</b> : Delete igniting times
	<b>12. Outside Unit Function Delay Time (boost time)</b> : When heating in the outside unit function for the first time, there will be a delay.(0~120 min, Default 0)
	<b>13. Warm Weather Shutdown</b> :This warm weather temperature setting will shut down CH Mode 50°F(10°C) ~ 110°F(43°C)
	<b>14. Maximum Temperature</b> : [17:cL+9°F] ~ 180°F(82°C)
	<b>15. Setting for Heating Minimum Temperature</b> : 86°F(30°C) ~ [16:cH-9°F]
	<b>16. Setting for Hot Water Maximum Temperature</b> : 95°F(35°C)~140°F(60°C)
	<b>17. Heat storage off Temperature</b> :140°F(60°C) ~ 167°F(75°C)
	<b>18. Heat storage on Temperature</b> : 9°F ~ 36°F
	<b>19. Internal CH Pump Post-Purge Time,T/T Satisfied</b> : Range: 0 – 3 minutes
	<b>20. IM Trial run mode</b> : Enter Trial run mode
	<b>21. Fan Center value setting</b> : Fan value is set in the range of Fan min and Fan max.

## 9. Troubleshooting

### 9.1 Error Codes

- If a fault occurs on the boiler, an error code may be shown by the Control Panel Screen.
- The codes are a flashing number.
- By pressing the 'Power Button' to reset the boiler, it is possible to rework the boiler.
- If this does not have any effect, or the codes are displayed regularly further investigation is required.

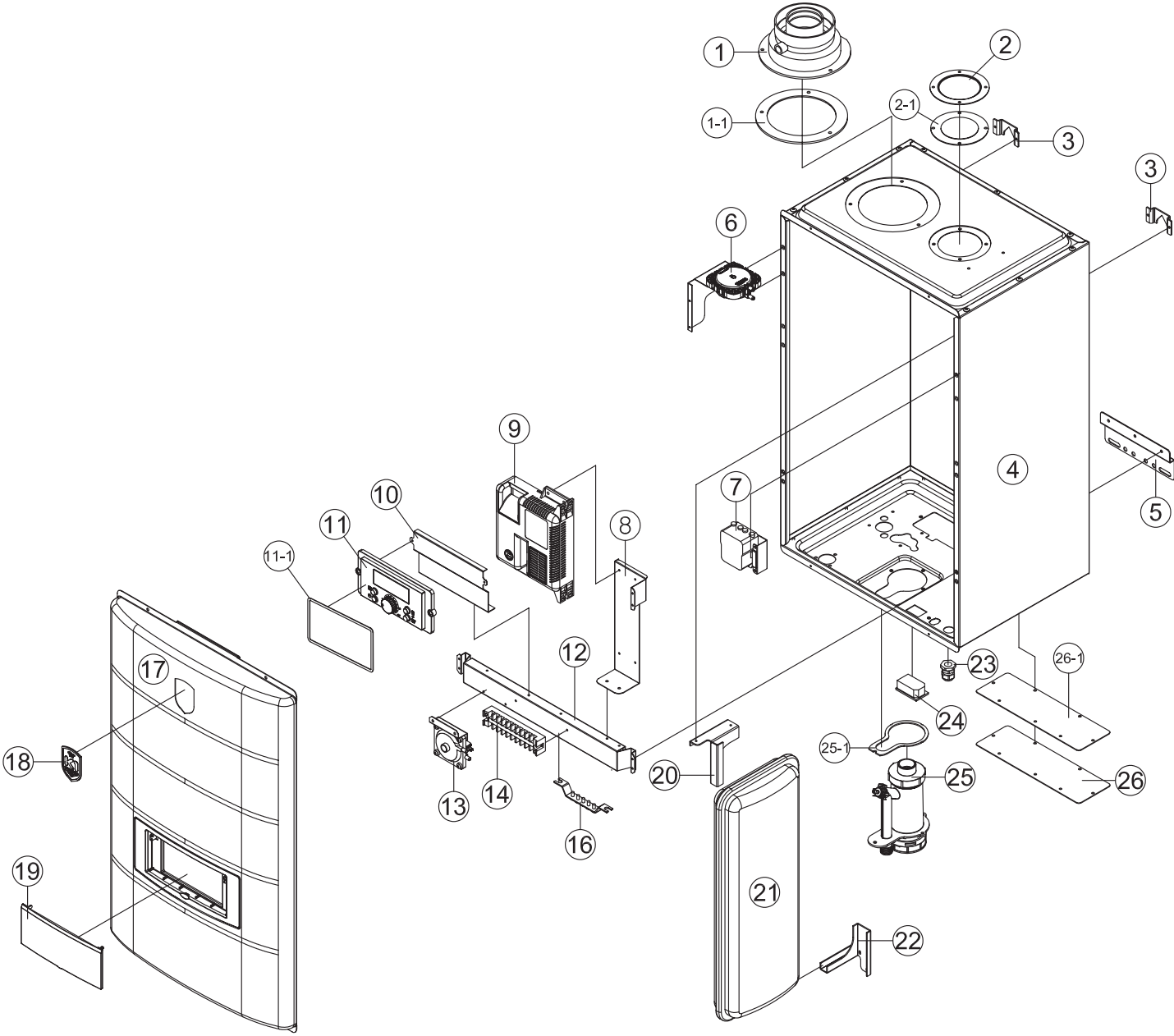
Display Code	Code Description	Possible Remedies
Er.01	Ignition Failure	<ul style="list-style-type: none"> <li>• Make sure that the main gas supply valve is open.</li> <li>• Make sure that the gas supply and inlet gas is within specification.</li> </ul>
Er.02	Failure Flame Detection	<ul style="list-style-type: none"> <li>• Clean the flame window.</li> <li>• Make sure that the front cover is closed securely.</li> <li>• Check the flame sensor.</li> </ul>
	Flame Detect before Burner Ignites	<ul style="list-style-type: none"> <li>• Measure the current from the Flame Sensor when there is no flame.</li> <li>• To reset this error code, the power needs to be disconnected and then connected again.</li> </ul>
Er.03	Flame Loss	<ul style="list-style-type: none"> <li>• Clean the intake air pipe.</li> <li>• Make sure that the main gas supply valve is fully open or have a professional to check the gas supply pressure.</li> </ul>
Er.06	No Input RPM Signal	<ul style="list-style-type: none"> <li>• Check fan motor</li> <li>• Make sure that the connector is secured</li> </ul>
Er.07	Fan Speed Error (High rpm)	<ul style="list-style-type: none"> <li>• To reset this error code, the power needs to be disconnected and then connected again.</li> </ul>
Er.08	Communication Error between Control Panel and Circuit Board	<ul style="list-style-type: none"> <li>• Check connections from Circuit Board to Control Panel.</li> <li>• To reset this error code, the power needs to be disconnected and then connected again.</li> </ul>
Er.10	Fan Speed Error (Low rpm)	<ul style="list-style-type: none"> <li>• Check fan motor</li> <li>• Make sure that the connector is secured</li> </ul>
Er.04	DHW Outlet Thermistor Open or Short Circuit	<ul style="list-style-type: none"> <li>• Ensure connections are secure.</li> <li>• Check sensor resistance. If resistance is zero, replace the sensor.</li> </ul>
Er.05	Heating Storage Thermistor Open or Short Circuit	
Er.14/ Er.19	bimetal (Tapping overheat) Open or Short Circuit	
Er.18	Burner Overheat Thermistor Open or Short Circuit	
Er.15	Exhaust Thermistor Open or Short Circuit	
Er.16	Exhaust Thermistor Abnormality	
Er.21	Earthquake Thermistor Open or Short Circuit	



Display Code	Code Description	Possible Remedies
Er.16	Supply Thermistor during Heating Operation (Exceed 95°C)	<ul style="list-style-type: none"> <li>• The main heat exchanger has overheated.</li> <li>• Flush the heat exchanger.</li> </ul>
Er.20	Pressure Sensor Abnormality	<ul style="list-style-type: none"> <li>• Check the water pressure sensor.</li> <li>• Contact technical support.</li> </ul>
Er.23 /Er.29 Er.44 /Er.45	Air Pressure Switch Abnormality	<ul style="list-style-type: none"> <li>• Make sure that the exhaust pipe is free of obstructions.</li> <li>• Clean the intake air pipe.</li> <li>• Make sure that clogged of condensate trap or drain pipe.</li> </ul>
Er.60~ Er.66	Register, Ram, Rom, I/O Port, AD Abnormal, Important EPROM Data or Safe Data Abnormal	<ul style="list-style-type: none"> <li>• Turn power OFF and ON at the main power switch internal to the appliance.</li> <li>• If the problem persists, replace the main control.</li> </ul>
Er.94/ Er.95	Low Heating Water Pressure	<ul style="list-style-type: none"> <li>• Water pressure lower than [Setting Pressure] bar. Check the setting Low heating water pressure.</li> <li>• Check the water pressure sensor.</li> <li>• Check the water feeder inlet pressure.</li> </ul>
Er.96	Overheating Heating Supply Thermistor during Heating Operation (Exceed 95°C)	<ul style="list-style-type: none"> <li>• The main heat exchanger has overheated.</li> <li>• Flush the heat exchanger.</li> </ul>
Er.97	Gas Leakage is Detected (After room controller is on for 1 minute.)	<ul style="list-style-type: none"> <li>• Check gas connections for leakage with a soapy solution. Fix any leaks.</li> <li>• Check condition of the burner assembly.</li> </ul>
Er.98	Burner Limit Switch Abnormality	<ul style="list-style-type: none"> <li>• Check the minimum capacity whether too low.</li> <li>• Check the high efficiency pump speed whether properly speed or too low.</li> </ul>

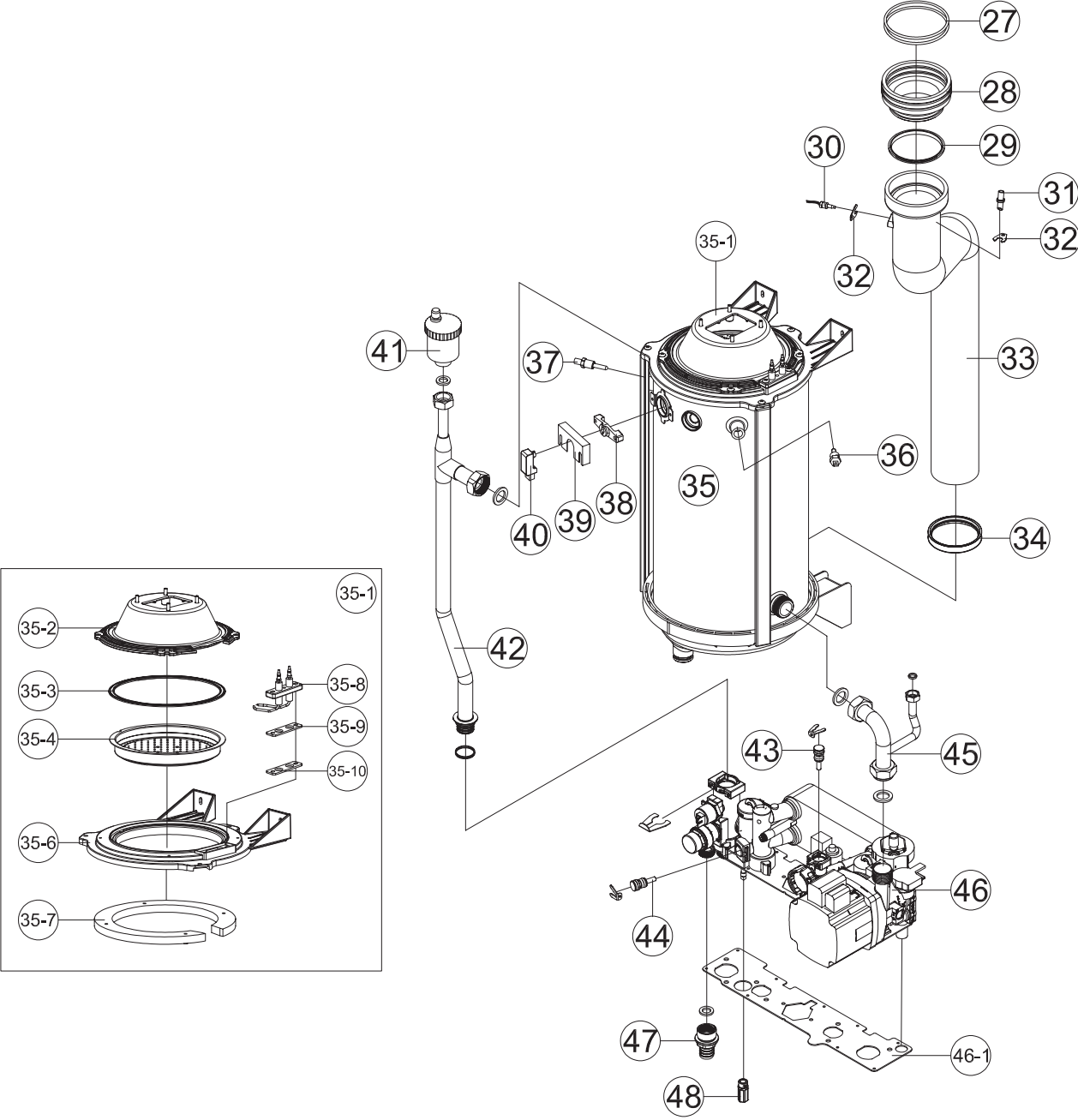
## 10. Spare Part List

■ Case Part (K1-22E/28E)



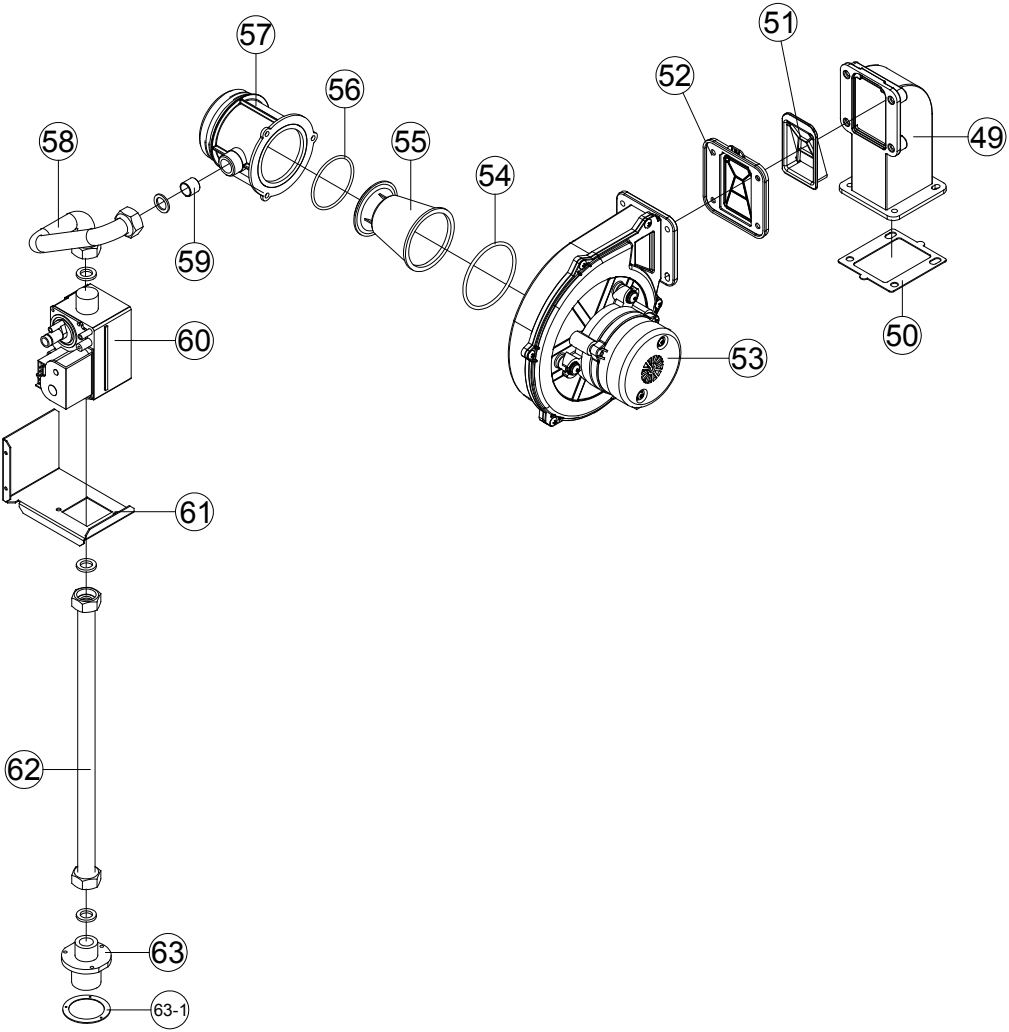
No	Description	Part number
1	S549100262	Coaxial Adaptor
1-1	N/A	Coaxial Adapter packing
2	S489100358	Intake cover
2-1	S562200148	Intake cover pad
3	H140120024	Wall hung bracket (Top)
4	H110330084	Case Ass'y
5	H120900017	Wall hung bracket (bottom)
6	S264100067	Air pressure sensor
7	S223100058	Ignition transformer
8	H140210038	Controller bracket
9	S114110045	Main Controller
10	H140210039	Sub Controller bracket
11	S121110039	Sub Controller
11-1	S554100081	Sub Controller pad
12	H140340011	Condensate body bracket
13	S264100062	Air pressure switch
14	S900140007	Terminal Block
16	S262500026	Earth Block
17	H110130130	Front cover Ass'y
18	S642200316	Emblem
19	H850150050	Display Cover window
20	H140280013	Tank bracket(Top)
21	S161100010	Expansion tank
22	H140280014	Tank bracket(Bottom)
23	S429100024	Cable Grand
24	S264100057	Power switch
25	H160520005	Condensate trap Ass'y
25-1	S562200149	Condensate trap pad
26	H110240424	Bottom case cover
26-1	S562200156	Bottom case cover pad

■ Heat Exchanger Assembly (K1-22E/28E)



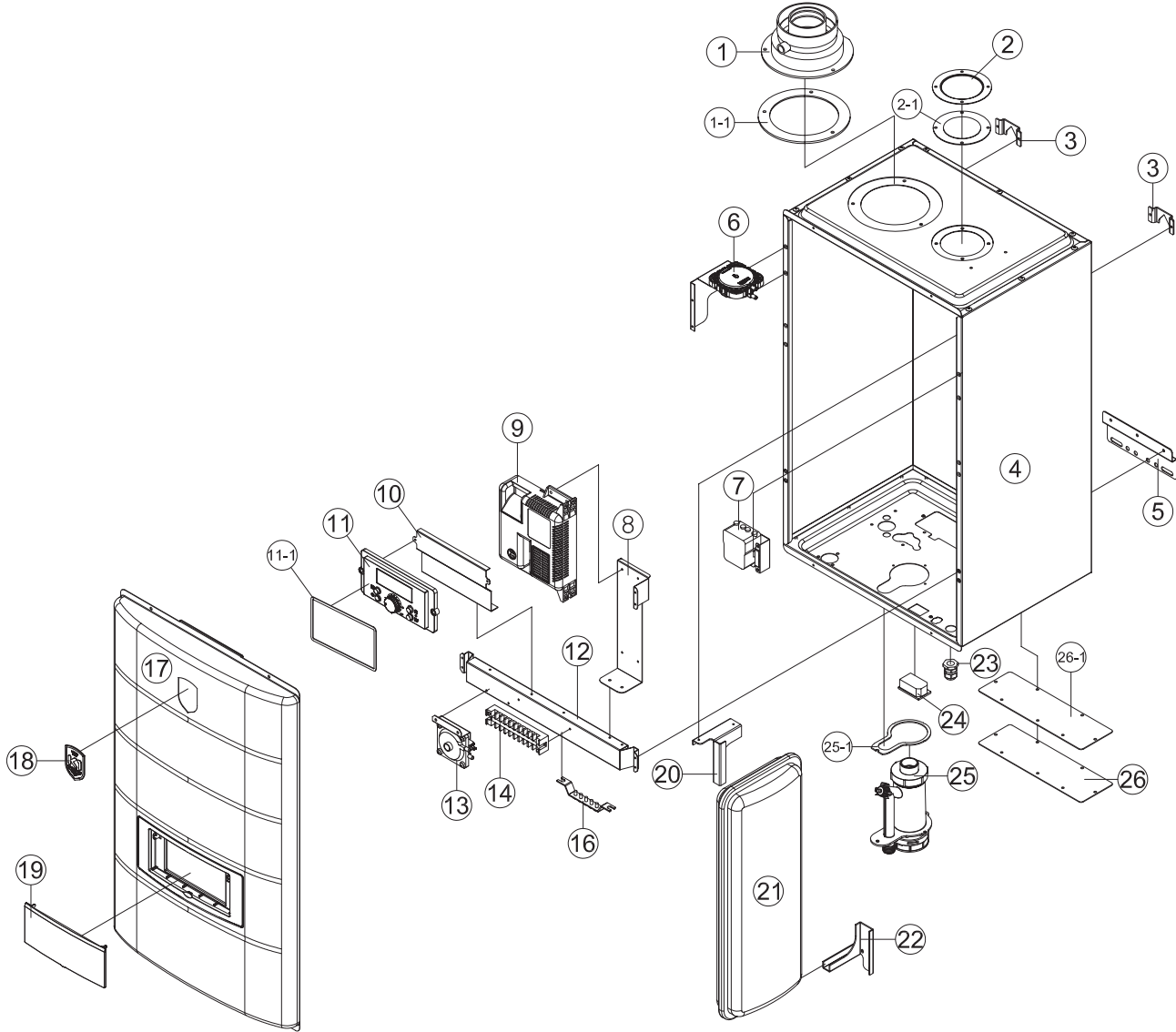
No	Description	Part number
27	S552200084	G80 O-ring
28	S549100288	Flue Connection
29	S552100053	Exhaust pipe packing (top)
30	S311200027	Exhaust sensor
31	S549100223	Exhaust adapter
32	H140240002	Exhaust sensor bracket
33	S549100289	Exhaust pipe
34	S552100054	Exhaust pipe packing (bottom)
35A	H120240555	Heatexchanger Ass'y (22E, 28E)
35-1	H130210033	Burner Ass'y
35-2	H870060128	Burner upper case
35-3	S552100099	Burner Packing
35-4	H130120309	Burner
35-6	H870060130	Burner bottom case
35-7	S562200157	Refractory
35-8	S333100033	Ignition rod
35-9	S554200007	Ignition rod gasket
35-10	S554100086	Ignition rod ceramic gasket
36	S312100011	Low water sensor
37	S311200026	Water temperature sensor
38	H850130001	Flame sensor bracket
39	H140240003	Flame sensor cover
40	S314200007	Flame sensor
41	S322100020	Air vent
42	S419500116	CH supply Pipe
43	S311300021	Cold water temperature sensor
44	S311300022	DHW temperature sensor
45	S419500118	CH return Pipe
46	S134100023	Pump block Ass'y
46-1	S562200146	Pump block pad
47	S492100089	Relief valve adapter
48	S492100088	Water supply valve adapter

■ Fan Assembly (K1-22E/28E)



No	Description	Part number
49	H870060077	Fan Guide
50	S551100071	Fan rubber packing
51	S549100279	Damper body
52	S551100094	Damper packing
53	S242100047	Fan
54	S551200026	Fan O-ring
55	S549100278	AGM Venturi
56	S551200040	AMG O-ring
57	H870060075	AGM body
58	S419500120	Gas pipe(Top)
59	S182100119	Nozzle(LNG)
60	S172110006	Gas valve
61	H140010011	Gas valve bracket
62	S419500122	Gas pipe(bottom)
63	H870060074	Gas adapter
63-1	S562200147	Gas adapter pad

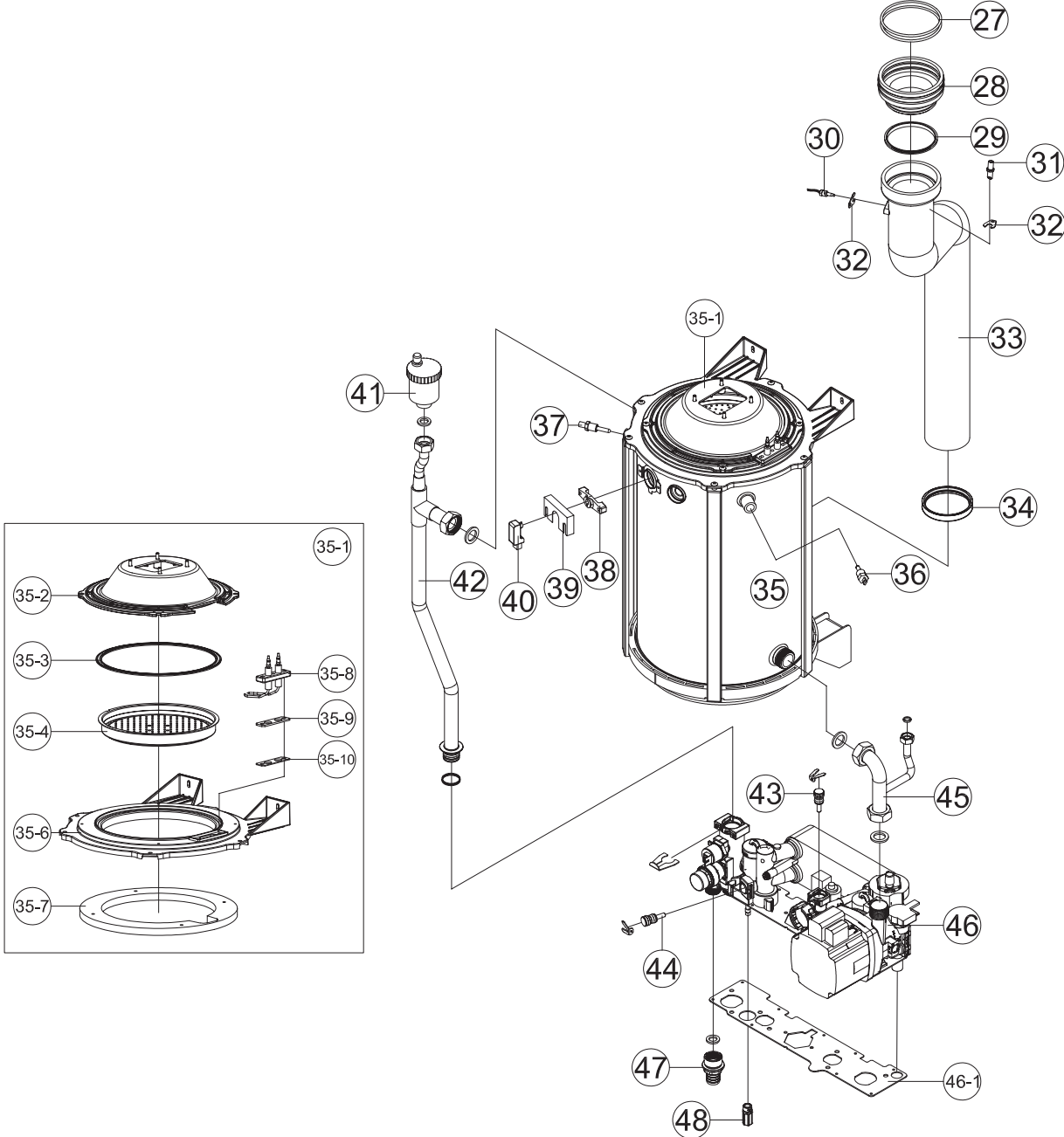
■ Case Part (K1-34E/40E)





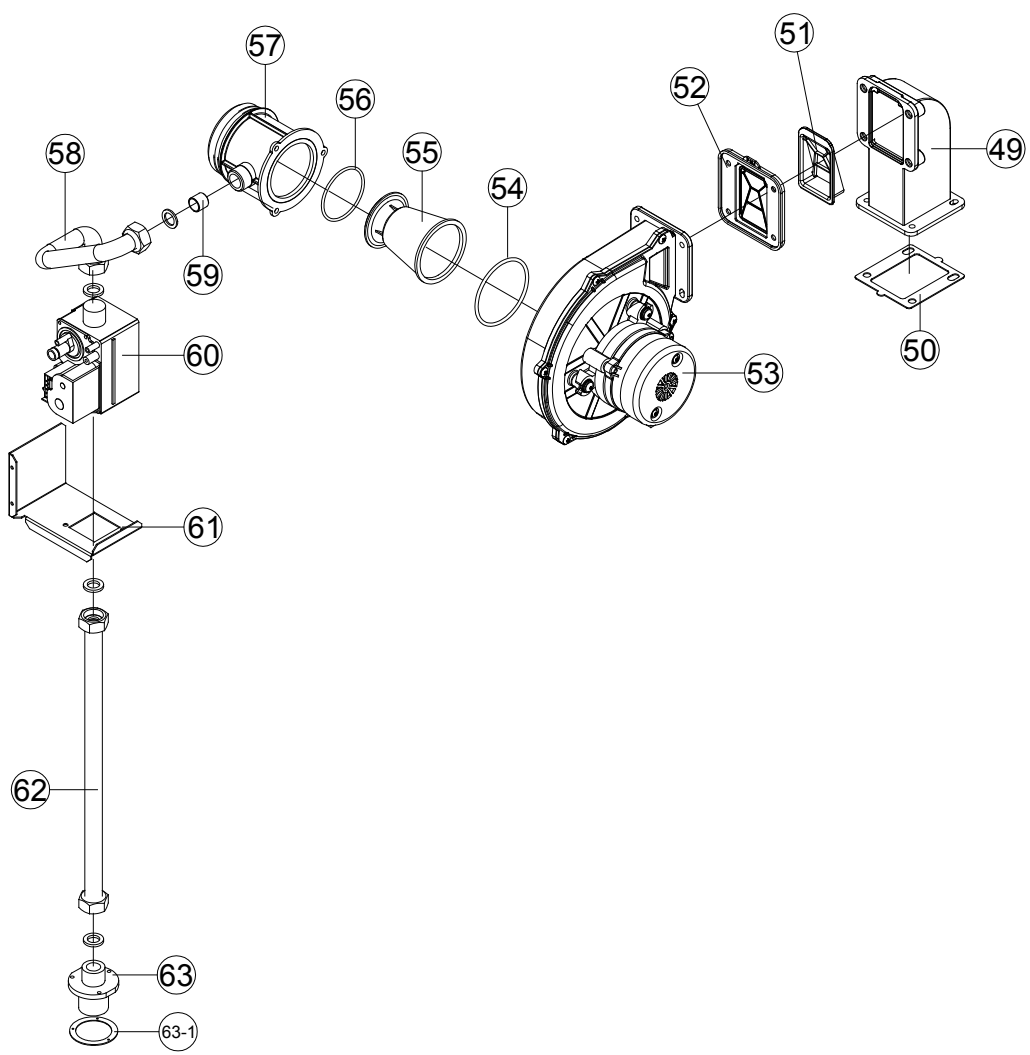
No	Description	Part number
1	S549100262	Coaxial Adaptor
1-1	N/A	Coaxial Adapter packing
2	S489100358	Intake cover
2-1	S562200148	Intake cover pad
3	H140120024	Wall hung bracket (Top)
4	H110330085	Case Ass'y
5	H120900017	Wall hung bracket(bottom)
6	S264100067	Air pressure sensor
7	S223100058	Ignition transformer
8	H140210038	Controller bracket
9	S114110045	Main Controller
10	H140210039	Sub Controller bracket
11	S121110039	Sub Controller
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14	S900140007	Terminal Block
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17	H110130130	Front cover Ass'y
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20	H140280013	Tank bracket(Top)
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24	S264100057	Power switch
25	H160520005	Condensate trap Ass'y
25-1	S562200149	Condensate trap pad
26	H110240424	Bottom case cover
26-1	S562200156	Bottom case cover pad

■ Heat Exchanger Assembly (K1-34E/40E)



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28	S549100288	Flue Connection
29	S552100053	Exhaust pipe packing (top)
30	S311200027	Exhaust sensor
31	S549100223	Exhaust adapter
32	H140240002	Exhaust sensor bracket
33	S549100290	Exhaust pipe
34	S552100054	Exhaust pipe packing (bottom)
35A	H120240556	Heatexchanger Ass'y (34E)
35B	H120240557	Heatexchanger Ass'y (40E)
35-1	H130210034	Burner Ass'y
35-2	H870060129	Burner upper case
35-3	S552100100	Burner Packing
35-4	H130120310	Burner
35-6	H870060131	Burner bottom case
35-7	S562200158	Refractory
35-8	S333100033	Ignition rod
35-9	S554200007	Ignition rod gasket
35-10	S554100086	Ignition rod ceramic gasket
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39	H140240003	Flame sensor cover
40	S314200007	Flame sensor
41	S322100020	Air vent
42	S419500117	CH supply Pipe
43	S311300021	Cold water temperature sensor
44	S311300022	DHW temperature sensor
45	S419500119	CH return Pipe
46	S134100024	Pump block Ass'y
46-1	S562200146	Pump block pad
47	S492100089	Relief valve adapter
48	S492100088	Water supply valve adapter

■ Fan Assembly (K1-34E/40E)



No	Description	Part number
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50	S551100071	Fan rubber packing
51	S549100279	Damper body
52	S551100094	Damper packing
53	S242100047	Fan
54	S551200026	Fan O-ring
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57	H870060075	AGM body
58	S419500121	Gas pipe(Top)
59	S182100120	Nozzle(LNG)
60	S172110006	Gas valve
61	H140010011	Gas valve bracket
62	S419500122	Gas pipe(bottom)
63	H870060074	Gas adapter
63-1	S562200147	Gas adapter pad

Memo

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**Kiturami**