



*proteus* PREMIX

# PROTEUS PREMIX CONDENSING BOILER

PROTEUS PREMIX PPR  
14/20/24/28/30/35 HM-HCH-HST

INSTALLATION AND  
MAINTENANCE  
INSTRUCTIONS





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# 1-SAFETY RULES AND WARNINGS

## 1.1. Safety Instructions

### *When a gas leak is found or suspected;*

- ✓ Turn off the gas valve of the boiler and the valves of all other devices operating with gas.
- ✓ Shut off the stove, oven and similar appliances to put their flame out.
- ✓ Do not light matches, lighter etc, and stub out your cigarette.
- ✓ Ventilate the environment by opening doors and windows.
- ✓ Do not ever touch the buttons and plugs of your electrical appliances.
- ✓ Turn off the gas valves in the apartment and building entrance.
- ✓ Do not use the phones at places where the gas leak is suspected.
- ✓ Call your gas safe engineer as soon as possible.
- ✓ Do not place and use flammable and explosive liquid or materials around the boiler.
- ✓ Keep materials such as water, foam away from electrical connections during operations such as cleaning, gas leak test etc.
- ✓ Do not lay the LPG container down
- ✓ Do not block air vents, openings made in the walls of the room which provide fresh air to the installation room.
- ✓ Telephone number of the **National Gas Emergency Service 0800 111 999**

## 1.2. Water Systems & Gas Supply Line

- ✓ Before installation of the boiler, the water systems (CH & DHW circuit) and gas supply line must be completed in accordance with the relevant regulations and standards by installer.
- ✓ Installation for gas supply pipes must be fitted according to BS6891 for GB and I.S.813.2002 for IE.
- ✓ Install the connection pipes such that they are free from mechanical stress.

## 1.3. Gas Type Conversion

- ✓ The standard gas type of boiler is Natural Gas. In case of a demanding gas type conversion, this is made with charge.
- ✓ Gas type conversion must be performed by the gas safe engineer. Gas leak test must be made after the conversion operation.
- ✓ Gas conversion label that indicates boiler is converted from NG to LPG must be placed on the boiler after gas type conversion.

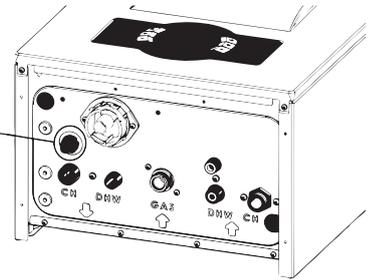
## 1.4. Installation

- ✓ The boiler must be installed in accordance with national and local requirements, gas safety regulations, relevant standards and this manual by gas safe engineer.
- ✓ The boiler must be mounted against a closed wall.
- ✓ The boiler can not be positioned having direct contact to steam, detergent or gases.
- ✓ Any change of flue position must not be made without consulting gas safe engineer.
- ✓ Sunlight can cause color change on the exterior of your boiler over time.

✓ The boiler must be installed in indoor spaces under normal conditions. However, it can be operated in a suitable cabinet in places such as garage, open balcony. Please consult E.C.A for proper cabine sizes.

✓ If boiler is located in an unheated area, it must be connected to mains, switched on, and pressure of installation should be within operation range so that freeze protection would be activated. Even if boiler is O□□ position, freeze protection stays activated.

✓ Connecting the drain pipework for the expansion relief valve



## 1.5. Boiler Start Up

- ✓ Boiler start up must be performed certainly by gas safe engineer.
- ✓ Gas Type (Natural Gas / □□G), gas supply pressure (mbar), maximum DHW operating water pressure (bar) and electricity supply voltage on the information plate must be suitable with mains supply conditions. This is checked by gas safe engineer.
- ✓ After boiler start up, you should request information about operating the boiler and safety precautions from gas safe engineer.

## 1.6. Usage and Maintenance

- ✓ Read carefully instructions and precautions in this manual against wrong usage which causes unsafe conditions.
- ✓ The boiler should be checked and serviced for general maintenance once a year. Maintenance and service operations must be carried out only gas safe engineer.
- ✓ Only a damp cloth should be used for cleaning the outer surface of the boiler and then the surfaces should be dried completely. Do not use chemical substances or solutions which cause rust and scratches in your boiler.

**CAUTION:** This boiler is not intended for use by persons (including children) who are low physical or sensory and mental capacity and inexperienced persons without informing and supervising the use of the boiler by responsible persons. Ensure that children under 8 years do not play with the boiler.



**CAUTION:** If boiler is used incorrectly or for other than its intended use, it may present a life hazard and may cause material damage to the product and its surroundings.



**CAUTION:** The boiler must be transported and lifted by at least 2 people due to heavy weight.



## 2- TECHNICAL DATA

Product type	Unit	PROTEUS PREMIX 14 HM-HCH- HST	PROTEUS PREMIX 20 HM-HCH- HST	PROTEUS PREMIX 24 HM-HCH- HST	PROTEUS PREMIX 28 HM-HCH- HST	PROTEUS PREMIX 30 HM-HCH- HST	PROTEUS PREMIX 35 HM-HCH- HST
Gas Category		I2H, I3P, I2Esi, I2E(S), I12L3P, I12H3P, I12ELL3P, I12Esi3P					
Flue Types		C <sub>13</sub> (X), C <sub>33</sub> (X), C <sub>43</sub> (X), C <sub>53</sub> (X), C <sub>63</sub> (X), C <sub>83</sub> (X), B <sub>23</sub> , B <sub>33</sub>					
Gas Input Pressure (G20)	mbar	20					
Gas Input Pressure (G25)	mbar	20/25					
Gas Input Pressure (LPG G31)	mbar	37/50					
<b>Capacity-Efficiency</b>							
Min. Heating power - (@60°C min)	kW	5,6	5,6	5,6	6,4	6,9	8
Max. Heating power - (@80/60°C) (P4)	kW	14,1	20,2	24,5	28	30	35
Min. Heating power - (@30°C min)	kW	6,7	6,7	6,7	7,7	8,3	9,6
Max. Heating power- (@50/30°C)	kW	15	22,2	26	29,6	31,7	37
Min. Heat input (Qn)	kW	6,2	6,2	6,2	7,2	7,7	9
Max. Heat input (Qn)	kW	14,5	20,7	25,2	28,7	30,8	35,9
Efficiency (@80°/60° C Max) (Gross Calorific value)	%	97,50%	97,50%	97,50%	97,50%	97,50%	97,50%
Efficiency (30°C Return) (Gross Calorific value)	%	107,50%	107,50%	107,50%	107,50%	107,50%	107,50%
<b>ERP Informations</b>							
Seasonal Space Heating Energy Efficiency Class		A	A	A	A	A	A
Water Heating Energy Efficiency Class/ Load Profile		A/XL	A/XL	A/XL	A/XL	A/XL	A/XL
Rated Heat Output (Prated)	kW	20,2	20,2	24,5	28	30	35
Seasonal Space Heating Energy Efficiency	%	91,11	91,4	92,2	92,4	92	92,9
Water Heating Energy Efficiency	%	83,6	83,6	83,6	83,9	82,8	82,8
Sound Power Level	db(A)	49	49	49	49	49	49
Efficiency at Rated Heat Output At High Temperature Regime ( $\eta_4$ )	%	87,9	87,9	87,9	87,9	87,9	87,9
Efficiency at 30% of rated Output At Low Temperature Regime ( $\eta_1$ )	%	97	97	97,2	97,4	97	97,9
At Full Load elmax	kW	0,028	0,035	0,04	0,051	0,056	0,066
At Part Load elmin	kW	0,012	0,012	0,012	0,012	0,013	0,013
In standby Mode	kW	0,004	0,004	0,004	0,004	0,004	0,004
Standby Heat Loss	kW	0,065	0,065	0,065	0,065	0,065	0,065
Emissions of Nox Level	mg/kWh	25,91	27,2	25,91	21,29	25,91	25,91
Daily Electricity Consumption (Qelect)	kWh	0,423	0,423	0,194	0,22	0,24	0,24
Daily Fuel Consumption (Qfuel)	kWh	22,88	22,88	22,8	22,8	23,021	23,021
<b>Gas Consumption</b>							
Natural Gas (@Min-Max Capacity)	m <sup>3</sup> /h	0,65-1,53	0,65-2,2	0,65-2,65	0,75-3,02	0,81-3,25	0,94-3,79
LPG (@Min-Max Capacity)-Propane	kg/h	0,51-1,2	0,51-1,7	0,51-1,98	0,59-2,26	0,63-2,46	0,74-2,87
NO <sub>x</sub> Class		6	6	6	6	6	6
<b>Central Heating</b>							
Min. Water Pressure	bar	0,4	0,4	0,4	0,4	0,4	0,4
Max. Water Pressure	bar	3	3	3	3	3	3
Operation Range (@Radiator heating)	°C	30-80	30-80	30-80	30-80	30-80	30-80
Operation Range (@Underfloor heating)	°C	30-45	30-45	30-45	30-45	30-45	30-45
Max. Limit temperature	°C	>90	>90	>90	>90	>90	>90

Domestic Hot Water (only valid for HM)							
Min. Domestic flow for operating	L/min	2 (±%10)	2 (±%10)	2 (±%10)	2 (±%10)	2 (±%10)	2 (±%10)
Min. Domestic flow for closing	L/min	1,5 (±%10)	1,5 (±%10)	1,5 (±%10)	1,5 (±%10)	1,5 (±%10)	1,5 (±%10)
Max. Domestic hot water flow rate	L/min	10 ±%15 (ΔT = 34,7°C)	10 ±%15 (ΔT = 34,7°C)	10 ±%15 (ΔT = 34,7°C)	12 ±%15 (ΔT = 33,5°C)	12 ±%15 (ΔT = 35,8°C)	14 ±%15 (ΔT = 35,8°C)
Min. Water Pressure	bar	0,4	0,4	0,4	0,4	0,4	0,4
Max. Water Pressure	bar	10	10	10	10	10	10
Operation Range	°C	30-65	30-65	30-65	30-65	30-65	30-65
Max. Limit temperature	°C	≥ 71	≥ 71	≥ 71	≥ 71	≥ 71	≥ 71
General							
Electrical Supply	V AC-Hz	230 VAC-50 Hz					
Electrical consumption (For only HCH model)	Watt	26	41	46	71	91	126
Electrical consumption (Max-HE Pump)	Watt	65	80	85	110	130	165
Protection Class		IPX4D					
Expansion Vessel	lt	8					
Weight (Net)	kg	28,5	28,5	28,5	30	30	32
Weight (Net) (only for HCH model)	kg	22,5	22,5	22,5	24	24	26
Dimesions (HxWxD)	mm	678*410*288					
Flue Lengths							
C13 60/100 Max.	m	10	10	10	10	10	10
C13 80/125 Max.	m	20	20	20	20	20	20
C33 60/100 Max.	m	10	10	10	10	10	10
C33 80/125 Max.	m	20	20	20	20	20	20
C43 60/100 Max.	m	10	10	10	10	10	10
C53 60/100 Max.	m	10	10	10	10	10	10
C83 80/80 Max.	m	28	28	28	28	28	28
C83 80/80 Min.	m	3	3	3	3	3	3
B23 80 Max.	m	28	28	28	28	28	28
B33- 60/100 Max.	m	10	10	10	10	10	10
Emission Values							
CO <sub>2</sub> ratio (@max-G20)	%	9,15 ± 0,2	9,2 ± 0,2	9,5 ± 0,2	9,5 ± 0,2	9,5 ± 0,2	9,5 ± 0,2
CO <sub>2</sub> ratio (@min-G20)	%	8,9 ± 0,2	8,9 ± 0,2	8,9 ± 0,2	8,9 ± 0,2	8,9 ± 0,2	8,9 ± 0,2
CO <sub>2</sub> ratio (@max-G31)	%	10,3 ± 0,2	10,3 ± 0,2	10,6 ± 0,2	10,6 ± 0,2	10,6 ± 0,2	10,6 ± 0,2
CO <sub>2</sub> ratio (@min-G31)	%	9,7 ± 0,2	9,7 ± 0,2	9,9 ± 0,2	9,9 ± 0,2	9,9 ± 0,2	9,9 ± 0,2
Boiler Circuit (only valid for HST)							
Operation Range	°C	30-65	30-65	30-65	30-65	30-65	30-65

Table 1. Technical Table

### 3- NOTES ON THE DOCUMENTATION

#### Building Regulations and the Benchmark Commissioning Checklist

Building Regulations (England & Wales) require notification of the installation of a heating appliance to the relevant Local Authority Building Control Department. This can be achieved via a Competent Persons Self Certification Scheme as an option to notifying the Local Authority directly.

The Health & Safety Executive operates the 'Gas Safe Register', a self certification scheme for gas heating appliances.

This company is a member of the Benchmark initiative and fully supports the aims of the programme. Its aim is to improve the standards of installation and commissioning of central heating systems in the UK and to encourage the regular servicing of all central heating systems to ensure safety and efficiency. Building Regulations require that installations should comply with manufacturer's instructions. It is therefore important that the commissioning checklist is completed by the installer. The relevant section of Building Regulations only relates to dwellings. Therefore the checklist only applies if the boiler is being installed in a dwelling or some related structure.

Benchmark places responsibilities on both manufacturers and installers. The purpose is to ensure that customers are provided with the correct equipment for their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by gas safe engineer and that it meets the requirements of the appropriate Building Regulations. The Benchmark Checklist can be used to demonstrate compliance with Building Regulations and should be provided to the customer for future reference.

Installers are required to carry out installation, commissioning and servicing work in accordance with the Benchmark Code of Practice which is available from the Heating and Hotwater Industry Council who manage and promote the scheme.



Visit [centralheating.co.uk](http://centralheating.co.uk) or [installersfirst.co.uk](http://installersfirst.co.uk) for more information

PRODUCT NAME	PRODUCT CODE	GC NUMBER
PROTEUS PREMIX 14 HM NG ERP UK	8116941010	47-814-30
PROTEUS PREMIX 20 HM NG ERP UK	8116944010	47-814-29
PROTEUS PREMIX 24 HM NG ERP UK	8116450010	47-814-01
PROTEUS PREMIX 28 HM NG ERP UK	8116451010	47-814-02
PROTEUS PREMIX 30 HM NG ERP UK	8116452010	47-814-03
PROTEUS PREMIX 35 HM NG ERP UK	8116453010	47-814-04
PROTEUS PREMIX 14 HST NG ERP UK	8116943010	41-814-54
PROTEUS PREMIX 20 HST NG ERP UK	8116948010	41-814-56
PROTEUS PREMIX 24 HST NG ERP UK	8116458010	41-814-05
PROTEUS PREMIX 28 HST NG ERP UK	8116459010	41-814-06
PROTEUS PREMIX 30 HST NG ERP UK	8116460010	41-814-07
PROTEUS PREMIX 35 HST NG ERP UK	8116461010	41-814-08
PROTEUS PREMIX 14 HCH NG ERP UK	8116942010	41-814-50
PROTEUS PREMIX 20 HCH NG ERP UK	8116946010	41-814-52
PROTEUS PREMIX 24 HCH NG ERP UK	8116454010	41-814-01
PROTEUS PREMIX 28 HCH NG ERP UK	8116455010	41-814-02
PROTEUS PREMIX 30 HCH NG ERP UK	8116456010	41-814-03
PROTEUS PREMIX 35 HCH NG ERP UK	8116457010	41-814-04
PROTEUS PREMIX 14 HM NG ERP YBK UK	8116941110	47-814-26
PROTEUS PREMIX 20 HM NG ERP YBK UK	8116944110	47-814-25
PROTEUS PREMIX 24 HM NG ERP YBK UK	8116450110	47-814-05
PROTEUS PREMIX 28 HM NG ERP YBK UK	8116451110	47-814-06
PROTEUS PREMIX 30 HM NG ERP YBK UK	8116452110	47-814-07
PROTEUS PREMIX 35 HM NG ERP YBK UK	8116453110	47-814-08
PROTEUS PREMIX 14 HST NG ERP YBK UK	8116943110	41-814-62
PROTEUS PREMIX 20 HST NG ERP YBK UK	8116948110	41-814-64
PROTEUS PREMIX 24 HST NG ERP YBK UK	8116458110	41-814-13
PROTEUS PREMIX 28 HST NG ERP YBK UK	8116459110	41-814-14
PROTEUS PREMIX 30 HST NG ERP YBK UK	8116460110	41-814-15
PROTEUS PREMIX 35 HST NG ERP YBK UK	8116461110	41-814-16
PROTEUS PREMIX 14 HCH NG ERP YBK UK	8116942110	41-814-58
PROTEUS PREMIX 20 HCH NG ERP YBK UK	8116946110	41-814-60
PROTEUS PREMIX 24 HCH NG ERP YBK UK	8116454110	41-814-09
PROTEUS PREMIX 28 HCH NG ERP YBK UK	8116455110	41-814-10
PROTEUS PREMIX 30 HCH NG ERP YBK UK	8116456110	41-814-11
PROTEUS PREMIX 35 HCH NG ERP YBK UK	8116457110	41-814-12

Table 2. Product Definition and Codes

**HM Model (Boiler)** : Both Central Heating (CH) and Domestic Hot Water (DHW).

**HCH Model (Heat Only)** : Only for Central Heating (CH).

**HST Model (System Boiler)** : Both for Central Heating (CH) and Domestic Hot Water (DHW) with external storage tank (not included).

Usage information of 14/20/24/28/30/35kW HM-HCH-HST Proteus Premix condensing boilers are available in this manual. Detailed information have been provided in the guide regarding the technical specification of the boiler, selection of the boiler location, fitting its water, gas, flue and electric supply connections, gas conversion, maintenance information and solving of possible failures. Please carefully read the manual in order to benefit from all the features of your boiler.

**The Benchmark Checklist and Service Record Card are located at the back of the Operating Manual.**



**The Benchmark Checklist must be filled by gas safe engineer during installation. Operating Instructions, Installation and Maintenance Instructions must be handed over the user for future operations. Service Record Card must be filled by gas safe engineer and handed over the user after each service operation and annual maintenance.**

### 3.1. Installer's Responsibility

The installer is responsible for the installation and initial start-up of the boiler. Instructions are given below.

- ✓ Check Operating Instructions, Installation and Maintenance Instructions and follow instructions before installation.
- ✓ Carry out installation in compliance with the prevailing legislation and standards.
- ✓ Be sure that the system is flushed and inhibitor added.
- ✓ Only gas safe engineer must operate the boiler.
- ✓ Explain the user about installation and operation of boiler.
- ✓ Fill the Commissioning Checklist.
- ✓ Give all Operating and Service manuals to user.
- ✓ The warranty certificate must be registered by gas safe engineer within 30 days after installation.



Indicates that the situation that can only be interfered by gas safe engineer.



Explanation containing information that should be considered by the user.



**CAUTION:** It means that you may suffer from material damage or slight personal injury.  
**DANGER:** It means that you may suffer from sever personal injury.



It means that you may connect ground wire.

### 3.2. Definition of Symbols

SYMBOL	DEFINITION
	Domestic Hot Water
	Gas Supply
	Parameter Adjustment
<b>R</b>	Reset
	Winter Mode
	Summer Mode
	Solar Panel Mode
<b>ECO</b>	ECO Mode
<b>COMFORT</b>	Comfort Mode
$\emptyset$	Diameter
<b>LPG</b>	Liquid Petroleum Gas
<b>DHW</b>	Domestic Hot Water
<b>NTC</b>	Negative Temperature Coefficient (sensor)
<b>RCD</b>	Residual Current Device
<b>ECV</b>	Emergency Control Valve
<b>SEDBUK</b>	Seasonal Efficiency of Domestic Boilers in the United Kingdom

Table 3. Definition of Symbols and Abbreviation

### 3.3. Main Components and Description

#### 3.3.1 HM Model (Boiler)

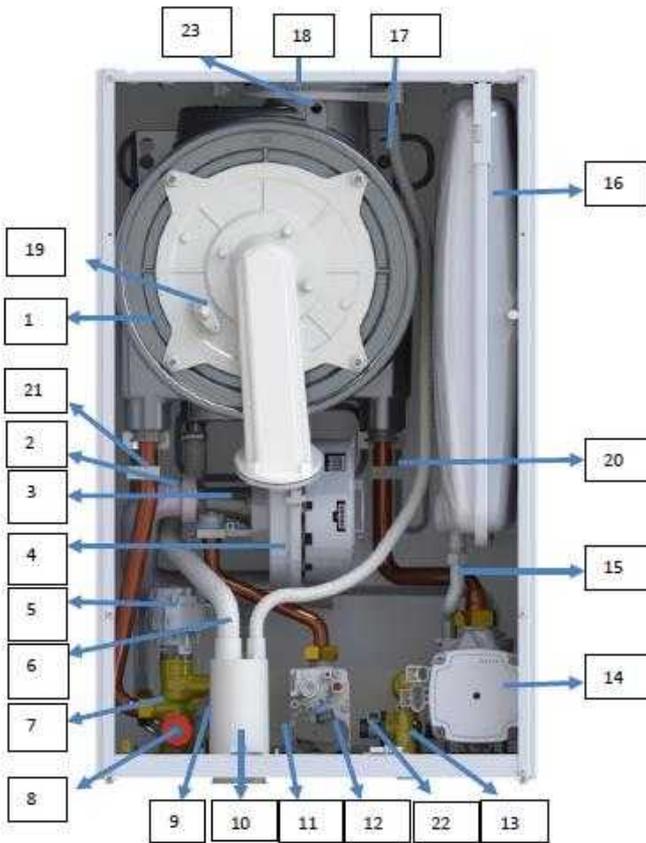


Figure 1. HM Boiler

#### 3.3.2 HST Model (System Boiler)

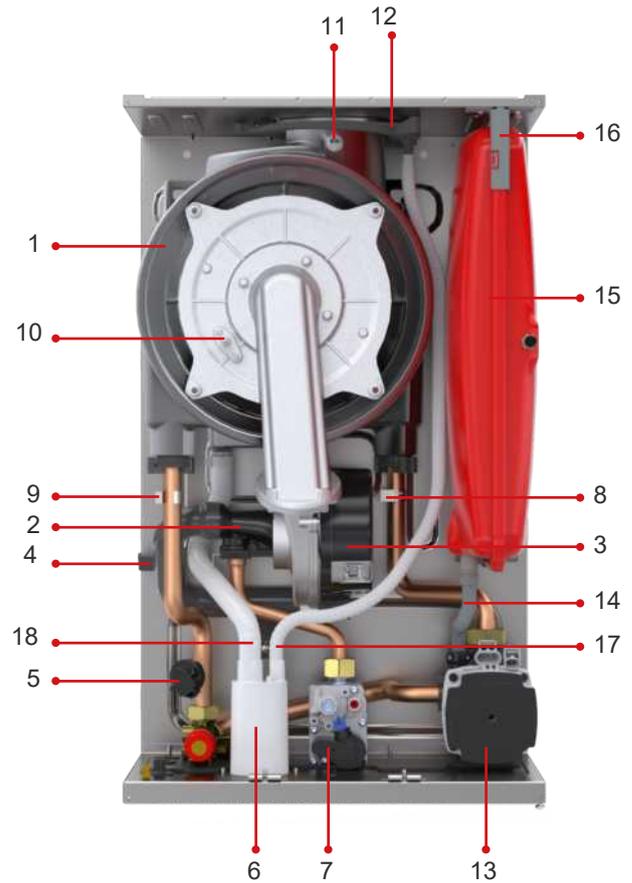


Figure 2. HST Boiler

- 1- Main Exchanger
- 2- Silencer
- 3- Mixer
- 4- Fan
- 5- 3 Way Valve
- 6- Condensing Water Hose
- 7- Outlet Manifold
- 8- 3 Bar Safety Valve
- 9- Pressure Sensor
- 10- Condensate Trap
- 11- Plated Heat Exchanger
- 12- Gas Valve
- 13- Return Manifold
- 14- Pump
- 15- Flexible Connection Hose
- 16- Expansion Vessel (8L)
- 17- Rainwater Hose
- 18- Rainwater Collection Reservoir
- 19- Ignition Electrode
- 20- CH Return Temperature Sensor
- 21- CH Supply Temperature Sensor
- 22-Turbine
- 23-Flue Gas Sensor

- 1- Main Exchanger
- 2- Mixer
- 3- Fan
- 4- Silencer
- 5- Pressure Sensor
- 6- Condensate Trap
- 7- Gas Valve
- 8- CH Return Temperature Sensor
- 9- CH Supply Temperature Sensor
- 10- Ignition-Ionisation Electrode
- 11- Flue Gas Sensor
- 12- Rain Water Collection Reservoir
- 13- Pump
- 14- Flexible Connection Hose
- 15- Expansion Vessel(8L)
- 16- Expansion Tank Holder Bracket
- 17- Rainwater Hose
- 18- Condensing Water Hose

### 3.3.3 HCH Model

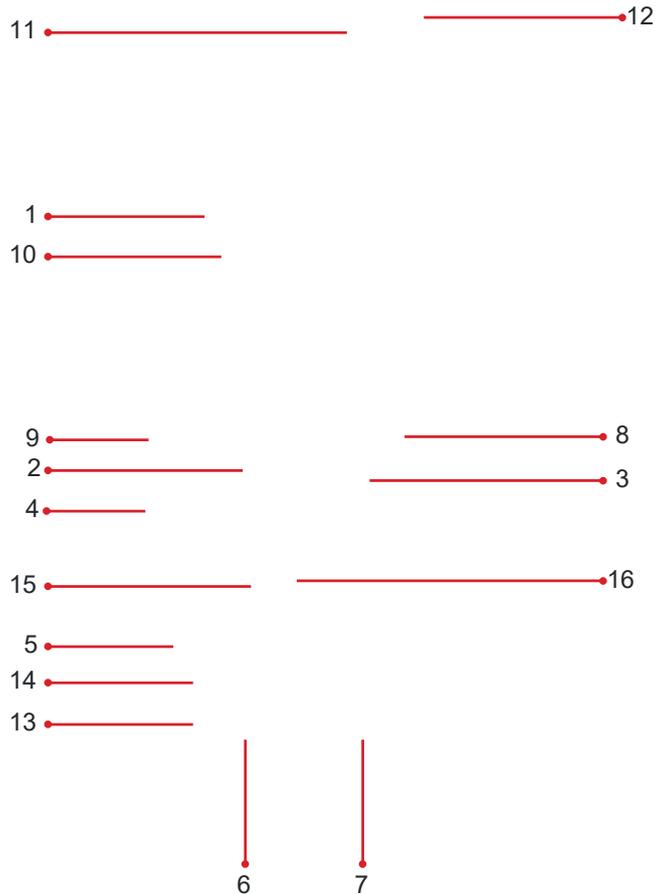


Figure 3. HCH Boiler

- |                                    |
|------------------------------------|
| 1-Main Exchanger                   |
| 2-Mixer                            |
| 3-Fan                              |
| 4-Silencer                         |
| 5-Pressure Sensor                  |
| 6-Condensate Trap                  |
| 7-Gas Valve                        |
| 8-CH Return Temperature Sensor     |
| 9-CH Supply Temperature Sensor     |
| 10-Ignition-Ionisation Electrode   |
| 11-Flue Gas Sensor                 |
| 12-Rain Water Collection reservoir |
| 13-3 Bar Safety Valve              |
| 14- Outlet Manifold                |
| 15- Condensing Water Hose          |
| 16- Rain Water Hose                |

### 3.4. Safety Devices

- ✓ Flame Failure Safety System
- ✓ Boiler Over-Heat Safety System (95 °C)
- ✓ DHW (Domestic Hot Water) Over-Heat System (71°C)
- ✓ High Water Pressure Protection System (3 bar)
- ✓ Low Water Pressure Protection System (0.4 bar)
- ✓ Low Voltage Protection System (170 VAC)
- ✓ Thermal Accumulation Protection System (with by-pass circuit and "pump over-run")
- ✓ Frost Protection System for both CH and DHW circuit
- ✓ Domestic Hot Water Flow Control (only for HM Model)
- ✓ Pump Anti-sticking Function
- ✓ 3 Way Valve Anti-sticking Function (except HCH - HST Model)
- ✓ Automatic Air Vent
- ✓ Expansion Vessel (8 liters)
- ✓ Water ingress protection from flue
- ✓ Annual Maintenance Reminder

## 4- SETUP

### 4.1. Minimum Clearances

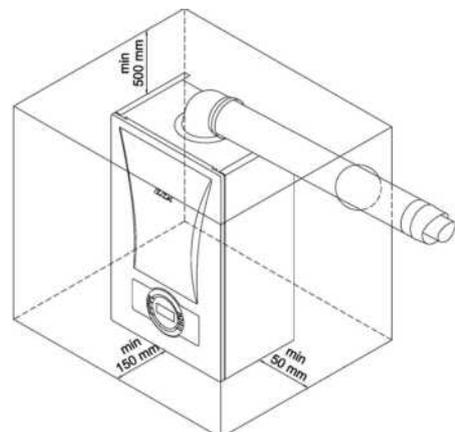
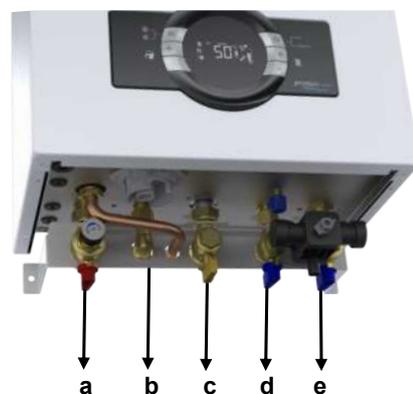


Figure 4. Combi Mounting Clearances

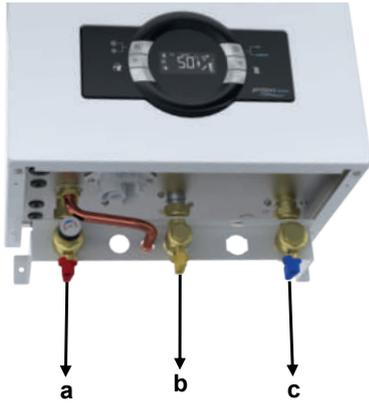
### 4.2. Dimensions

#### 4.2.1. HM Model



- a) CH flow  $\frac{3}{4}$ " (hot)
- b) DHW outlet  $\frac{1}{2}$ " (hot)
- c) Gas inlet  $\frac{3}{4}$ "
- d) DHW inlet  $\frac{1}{2}$ " (cold)
- e) CH return  $\frac{3}{4}$ " (cold)

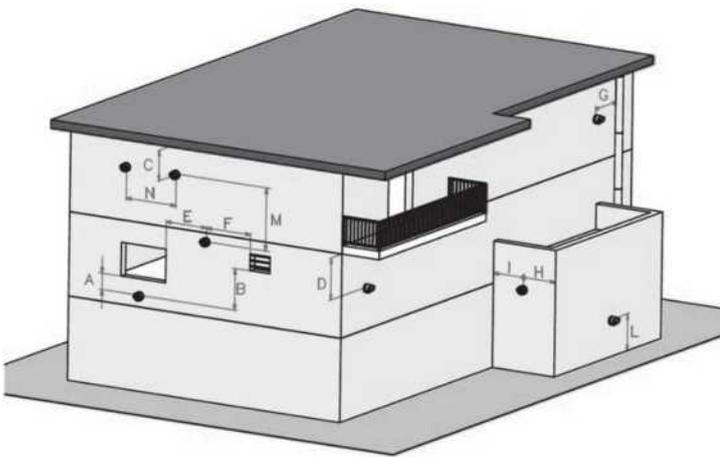
#### 4.2.2. HCH-HST Model



- a) CH flow  $\frac{3}{4}$ " (hot)
- b) Gas inlet  $\frac{3}{4}$ "
- c) CH return  $\frac{3}{4}$ " (cold)

- ✓ Isolating Valve set provided with boiler must be used for water and gas connections.
- ✓ 3 bar safety valve connection must be installed with copper pipe.
- ✓ National and local requirements and legislations must be taken into consideration.

#### 4.3. Position Of The Air/Flue Terminal



POSITION	DISTANCE(cm)
A-Below a windows	60
B- Below an air vent	60
C- Below rain channel	30
D- Under the balcony	30
E- Next to a window	40
F- Next to an air grill	60
G- Next to vertical or horizontal pipe	60
H- Below the distance grille from the outside of the building	30

I- Distance from the inner corner of the building	100
L- From the ground or from the floor	180
M- Vertical distance of two flue outlets	150
N- Horizontal distance of two flue outlets	100

Table 4. Flue Connection Information

### 5-CONNECTIONS

#### 5.1 Flue Connections

##### 5.1.1 Flue Sizes

Flue gas connections between the boiler and the flue terminal must be made using original components specially designed for the condensing boiler to ensure that the boiler operates efficiently and correctly. Flue gas pipes and fittings of non-condensing boilers can not be used for exhausting gases from condensing boilers. In the horizontal concentric flues, the exhaust gas pipe (the inner pipe) facing outwards should be inclined upward and the fresh air pipe (outer pipe) should be inclined downward. When the original flue set is installed parallel to the ground, the exhaust gas pipe is automatically inclined upwards. Equivalent length for each 90° elbow: 1 m  
Equivalent length for each 45° elbow: 0.5 m

##### 5.1.2 Flue Types

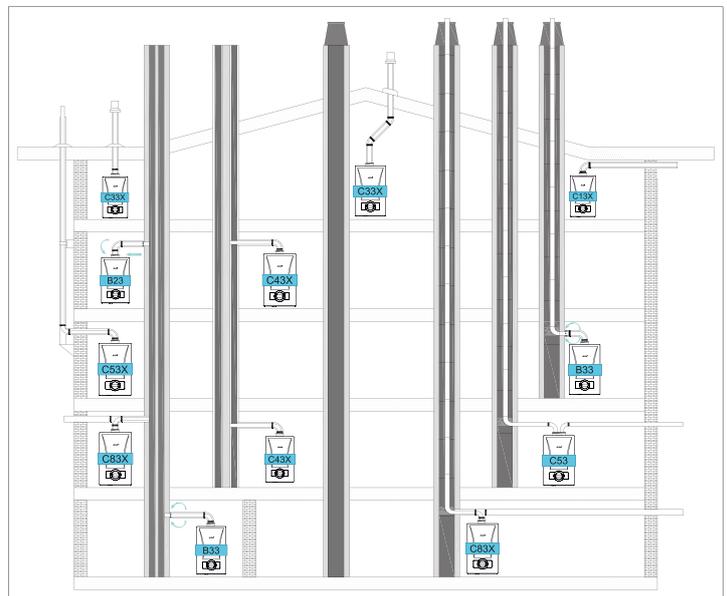


Figure 5. Flue Connections

### 5.1.3. Plume Management Kit

Standard plume management kit length is 1m. It is an accessory and part code is 7006991251. The minimum distance between nearest window and air inlet side of the flue must be bigger than 150 mm.

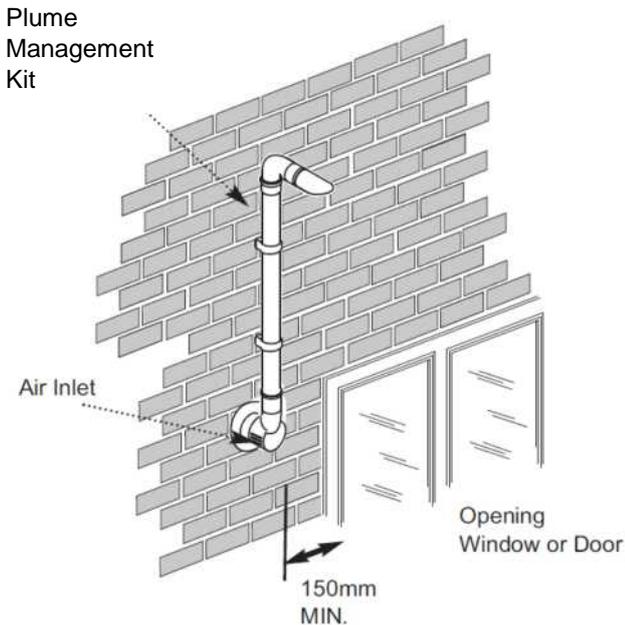


Figure 6. Plume Management Kit

### 5.1.4. PLUME KIT ASSEMBLY

For Plume kit installation, follow the instructions in the image below, you must disassemble the part at the end of the horizontal flue kit (7006991167) and assemble with the Plume kit (700991251).

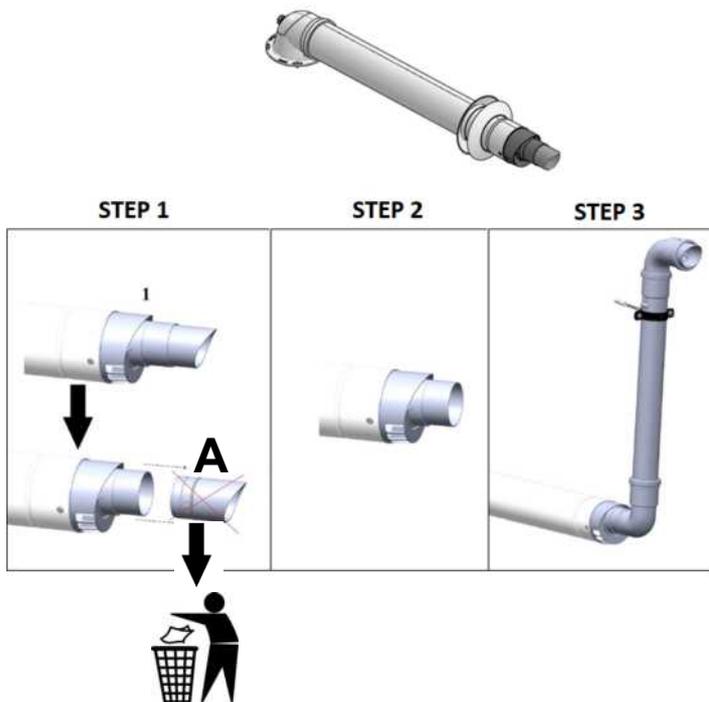


Figure 7. Plume Kit



Do not disassemble this part "A" in case of single horizontal flue kit usage.

## 6- INSTALLATION

### 6.1. Selection of Location of Boiler

The boiler must be installed in accordance with gas safety regulations and relevant standards. Additionally, the clearance around the boiler should be as shown in fig 12. In order to make service, maintenance and usage easier.

Figure 12: It shows the minimum distances required from the top and sides of the boiler (Dimensions given in mm).

The installation must comply with the following minimum distances so that servicing and maintenance of the boiler can be performed correctly. The position of the boiler must be checked against technical requirements.

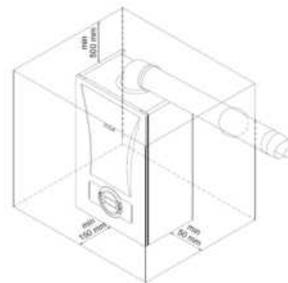


Figure 8. Combi Mounting Clearances



Figure 9. Isolation Valve Cover Mounting

### CAUTIONS :

- ✓ Do not install your boilers in locations that will be exposed to direct sunlight. Sunlight can cause color change on the exterior of your boiler over time.
- ✓ Ambient temperature of boiler's installation location should be between 5 -35°C.
- ✓ The boiler can be used at altitudes up to 2000 m above sea level.
- ✓ There is no need to remove side panels in the combi boiler service operations. Minimum 50 mm clearances are given taking into consideration the share of possible side panel sheet changes.



- ✓ Since the outside temperature of the boiler does not rise above 85° C at the maximum heating power, no special protective measures are required against the combustible construction materials and components.

- ✓ Since the outside temperature of the boiler does not rise above 85 ° C at the maximum heating power, no special protective measures are required against the combustible construction materials and components.

**Information**

- ✓ It is not recommended to install "Isolating Valve Cover" (figure 13-No 1) to the boiler if kitchen cupboard is used for installation place. It can be used at open space areas to hide valve set and filling loop.

## 6.2. Independent Operation from Ambient Air (Type C)



**DANGER:** For room sealed operation, the boiler location and air/flue terminal position must obey national and local requirements, gas safety regulations and relevant standards.

- ✓ Type C (hermetic) boilers are not suitable for outdoor installations. These boilers should be installed inside the building.
- ✓ In case of gas leakage, it is necessary to vent the installation room according to national and local requirements, although the room sealed operation boilers are independent of room volume and ventilation.

**DANGER:** Do not block the air vents, which provide fresh air to the installation room.



- ✓ The air/flue terminal must be exposed to the external air and allow free passage of air cross it at all times.
- ✓ The minimum acceptable dimensions from the terminal to obstructions and ventilation openings must obey national and local requirements.

- ✓ All horizontally fitted ducts (air/flue) should be fitted 2° or 3° upwards incline to allow condensate water drain to the boiler.

**Information**

- ✓ The flue ducts are always wet.
- ✓ Under cold or excessive humid weather conditions the water vapor inside the waste gas may condensate while leaving the flue.

## 6.3. Mounting The Boiler

Having determined the boiler location,

- ✓ The points of lock screws of wall bracket and assembly bracket are marked by using the wall-mounting template provided with the boiler.
- ✓ After drilling the marked points, wall assembly bracket and assembly bracket are fixed on the wall by the dowel and lock screws, which are inside the packaging of the boiler.
- ✓ Finally, the boiler is hanged on the wall by placing the assembly bracket on the back side of the boiler on the mounting bracket assembled on the wall.

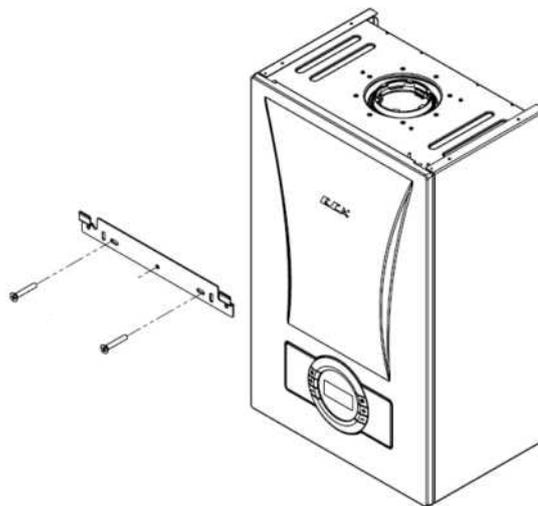


Figure 10. Boiler & Wall Hanging Bracket

## 6.4. Condensate Discharge Connection

**Information**

- ✓ All condensing boilers generate condensate water discharge. The amount of the condensate water depends on the working conditions of your boiler. This can be up to 1.7 litres condensate water an hour.

- ✓ The condensation water must be connected to a drain with the help of a plastic hose which is connected to the end of condensate trap. The use of standard discharge hose is recommended for connection to the drain. The addition of 1 cable connection on the hose should be made for fixing.
- ✓ If drain hose will be connected to drain outside of the building, insulation should be provided to prevent freeze of hose.
- ✓ The condensate discharge hose and interconnection parts must be made of plastic material.
- ✓ All horizontal parts must be connected at least 2,5 ° downwards incline to ensure a good flow. It can not rise at any point along its length.



✓Condensate discharge must be installed correctly, otherwise operation of the boiler will be affected negatively.

✓It is recommended to make condensate discharge internally into the household drainage system. If it is not possible, needed precaution must be taken to prevent freezing.

✓Ensure the discharge of condensate complies with any national or local regulations (BS 6798).

✓Condensate discharge pipe must be PVC, PVC-U, PVC-C or PP. Metal pipe work is not suitable.

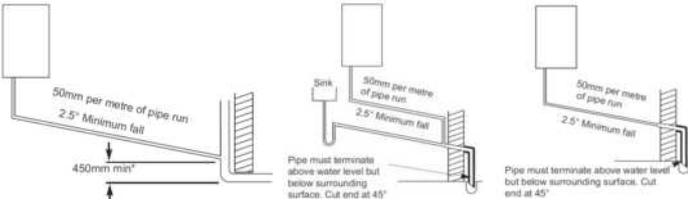


Figure 11. Connection to an internal soil-vent pipe, external termination with sink, to drain or gully

A boiler discharge pump must be used if there is no drain or sink nearby that the condensate can be discharged into. Condensate discharge pump is not standard part of the boiler. Further information must be followed supplied with the pump.

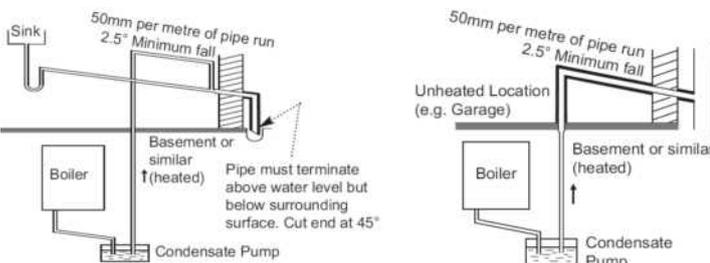


Figure 12 Condensate discharge pump connections

## 6.5. Electrical Connection

Electrical installation must be made according to the national and local instructions. The boiler must be earthed and a standard 230 V AC – 50 Hz supply is required.



**CAUTION:** Disconnect power supply to prevent electrical shock before connecting the electrical supply.



**CAUTION:** If the supply cord is damaged, it must be replaced by the gas safe engineer in order to avoid a hazard.



**CAUTION:** The  $\leq 3$  A bipolar fuse (BS 1362) with a minimum contact opening of 3 mm must be used in the electrical connection of the boiler.



**CAUTION:** The cable diameter (including insulation) of the electrical installation to be installed must be at least 14 mm and the pipe diameter used must be at least 16 mm.

## 6.6. Installation for HM Boiler

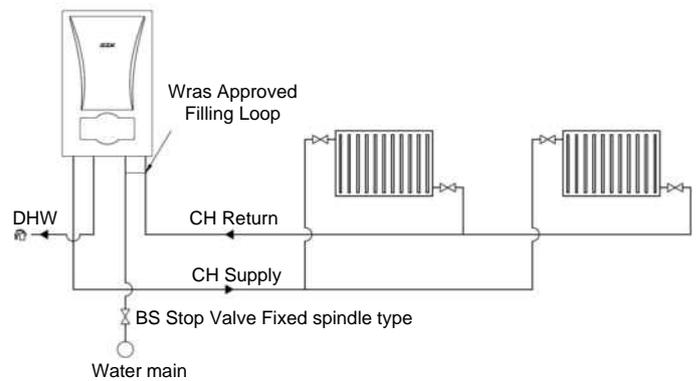


Figure 13. Installation for HM Boiler

## 6.7. Installation for HST Boiler

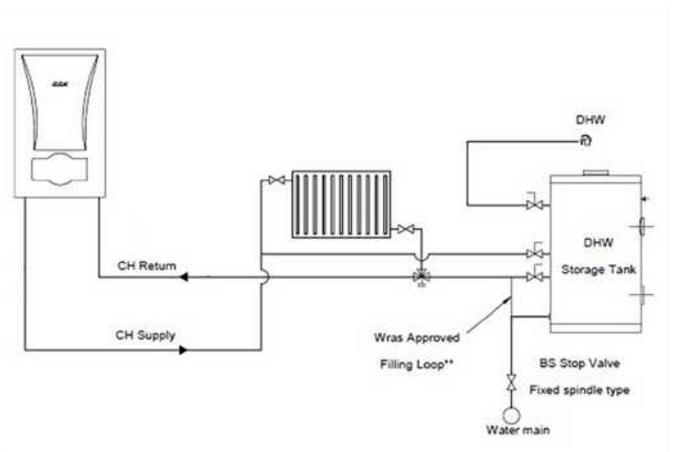


Figure 14. Installation for HST Boiler

**\*\*External WRAS approved filling loop must be added during installation.**

## 6.8. Installation for HCH Boiler

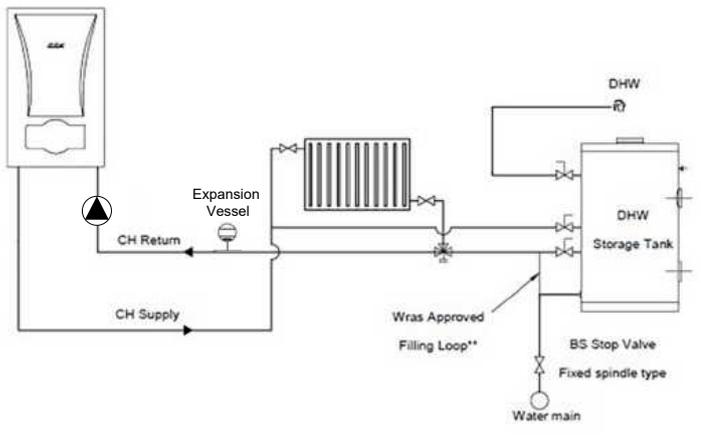
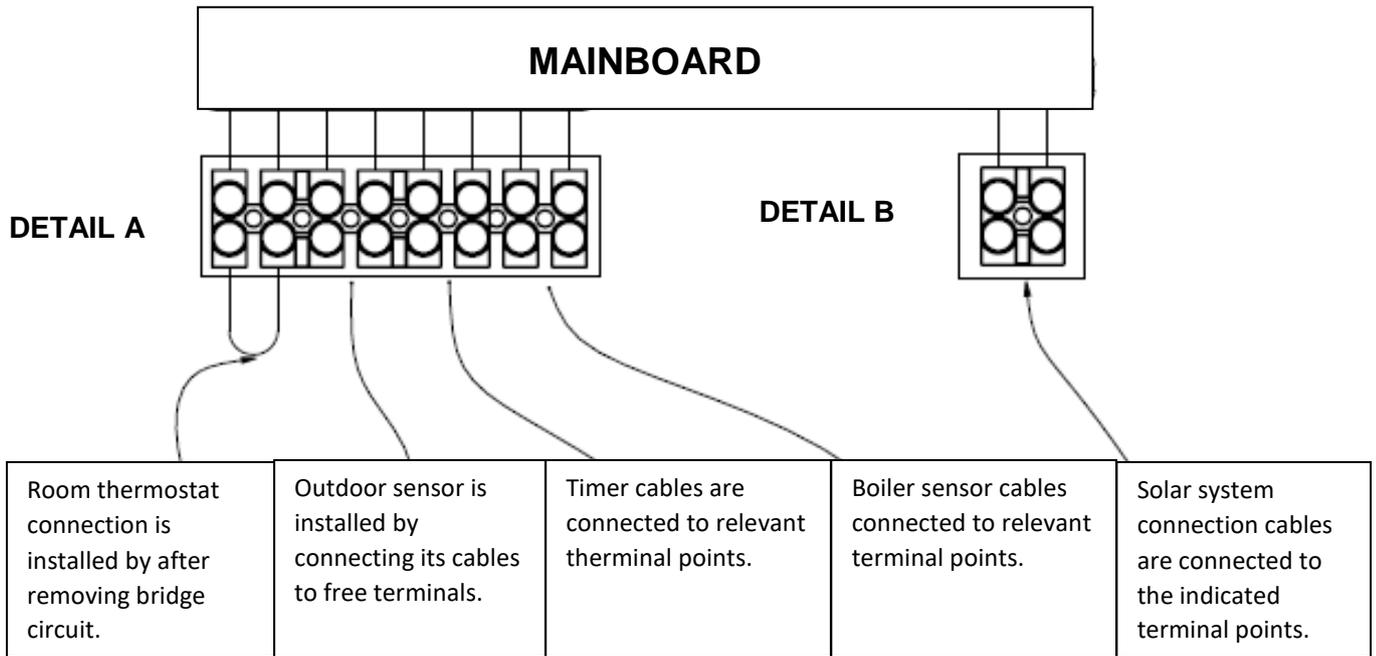


Figure 15. Installation for HCH Boiler (Heat Only Type Installation)

**\*\*External WRAS approved filling loop must be added during installation.**

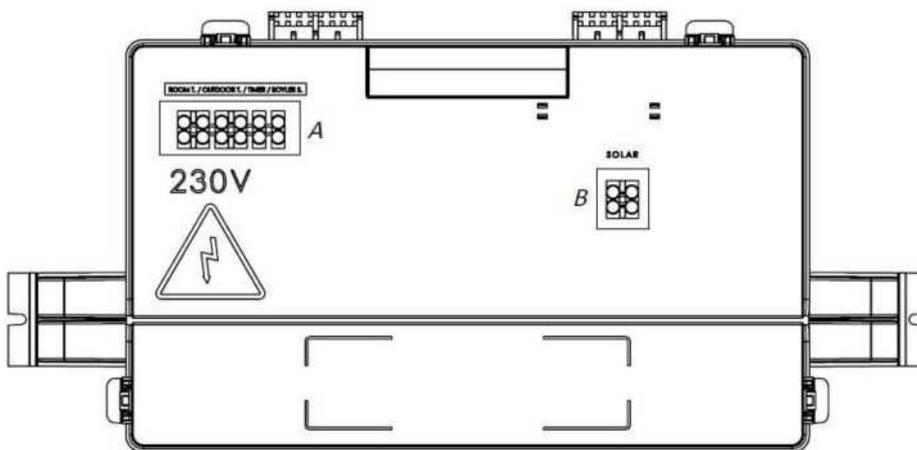
## 6.9. Controller Installation



- ✓ Remove the bridge on the other side on room thermostat connection.
- ✓ Gas safe engineer must install the room controller device to boiler.
- ✓ HM Model Boiler is working only with 24 VDC room thermostats.



The connections of room thermostat, outdoor sensor and timer must be performed certainly by gas safe engineer.



## 7- OPERATION

### 7.1. Control Panel



Figure 16. Control Panel View

#### 7.1.1 Functions of Buttons

The control panel consists of the relevant elements as shown in figure 24 below.

##### A-Position Selection Button

The position can be changed by pressing the position selection button once to change between the winter mode and the summer mode. If the button is pressed for 3 seconds, the boiler will switch into "standby" position. It will be enough to press the button once to get the boiler in operation position.

##### B-Reset Button

Main functions:

- ✓ Exit from lockout error (EXX)
- ✓ ECO mode activation
- ✓ Comfort mode activation

When your boiler fails, the error code will start flashing on the display. There are 2 types of errors, lockout (EXX) and blocking (FXX) error. When a lockout error condition occurs (EXX), the error must first be corrected so that the error code can be removed from the LCD screen. After pressing the "Reset" key once, the boiler can switch back to normal operation state. As for a blocking error, the fault cannot be removed from the LCD display pressing the "Reset" button (FXX). When this error is corrected, the error code automatically disappears from the LCD screen. The first time the boiler starts, it will start working in Comfort mode.

Once the Reset button is pressed when operating in Comfort mode, the boiler will switch to Eco mode. Then when the Reset button is pressed again, the unit will switch to Comfort mode.

##### C-Domestic Hot Water Increase Temperature Button

The temperature of the domestic water can be increased up to 65 °C thanks to the domestic water temperature increase button.

##### D-Central Heating Water Increase Temperature Button

The temperature of the heating water can be increased up to 80 °C thanks to the heating water temperature increase button.

##### E- Domestic Hot Water Decrease Temperature Button

The temperature of the domestic water can be decreased down to 30 °C thanks to the domestic water temperature decrease button.

##### F-Central Heating Water Decrease Temperature Button

The temperature of the heating water can be decreased down to 30 °C thanks to the heating water temperature decrease button.

### 7.2. LCD Screen

LCD screen display icons described here below.

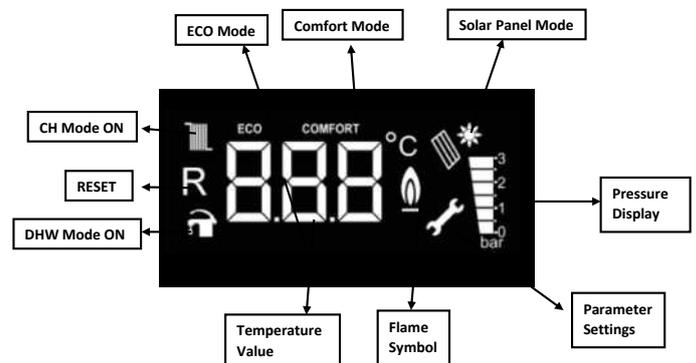


Figure 17. Description of Symbols

**7.2.1. Flame Icon:** When operating between 0% and 50% capacity range, the icon is displayed on the LCD screen as a single bar, whereas it is displayed as two bars when operating between 50% -100% capacity range.

**7.2.2. Pressure Indicator:** The LCD display shows 0-0,5-1-1,5-2-2,5-3 bar water pressure values. The values other than these ones are not displayed. Only when filling after F37 (Low water pressure error) fault, the pressure value is displayed in the temperature value section.

## 7.3. Operation Functions

**7.3.1. Standby (OFF Mode):** The mode where boiler can be set to standby mode. In this mode, no requests for heating water and domestic water can be made. To activate the OFF mode, it is necessary to keep button no. 1 (position selector) pressed for 3 seconds continuously. When -OFF- is displayed on screen, mode is activated.

**7.3.2. Air Purge Mode (AP Mode):** It is the process that the boiler automatically activates to discharge air in the central heating installation for 160 seconds. In this mode, "AP" is displayed on the screen. The circulation pump runs for 15 seconds and then stops every 5 seconds in intervals of every 20 seconds. The three-way valve motor also changes position between a CH-DHW in 40 seconds. The situations where this mode is activated is listed here below.



**CAUTION: Do not press 'RESET' while AP mode is active.**

**7.3.3. Winter mode-Radiator Heating:** If the boiler in the standby position is set to the winter position, it will heat the water in the heating circuit until the domestic water is needed. In the winter mode, both the tap and the radiator icon are displayed on the LCD screen.

When a request for heating is made for radiator, radiator icon flashes (once/second), tap icon stays fixed. When a request for domestic water is made, tap icon flashes (once/second), radiator icon stays fixed. In this mode, radiator heating circuit's temperature can be set between 30-80 °C. For under floor heating applications, the temperature range can be set between 30-45 °C.

**7.3.4. Summer Mode:** If the boiler in the OFF position is set to the summer position, the boiler will only respond to the domestic hot water demands. In summer mode, the tap symbol appears fixed on the LCD screen, the radiator icon does not appear. When the domestic hot water is heating request, the tap symbol flashes (1 time/sec). In this mode, the domestic hot water temperature can be adjusted between 30-65 °C.

**7.3.5. Comfort Mode:** The standard operating mode of the boiler is Comfort mode. By pressing the "Reset" button, Eco-Comfort modes can be switched. When Comfort mode is active, "Comfort" icon is displayed on the LCD screen. Comfort mode is only for radiator heating circuit. It has no effect on use of domestic water circuit. In this mode, the boiler responds to fast heating demands by running in modulation.

**7.3.6. ECO Mode:** By pressing the "Reset" button, Eco-Comfort modes can be switched. When Eco mode is active, "Eco" icon is displayed on the LCD screen. Eco mode is only for radiator heating circuit. It has no effect on use of domestic water circuit. This mode allows savings on fuel by performing on-off operation.

## 7.3.7. Annual Maintenance

**Reminder:** This mode reminds user that "annual maintenance time is very soon". When this mode is active, only "ASE" is displayed on screen and boiler continues to meet heating requests. Electrical connection of boiler must be always connected to mains, otherwise function will not work properly. When you see "ASE" on screen, please check your boiler start up date and contact with gas safe engineer if annual maintenance period is arrived. If maintenance of the boiler is done before "ASE" appears on screen, you can skip it by pressing "R" button.



**7.3.8. Anti-Frost Mode:** During the winter season, when the installation water temperature falls below 6 ° C, the anti-freeze function is activated and the boiler continues to operate until the water output of installation rises to 15 ° C. In order for anti-freeze function to be activated, the following conditions must be checked and ensured by the customer.

- ✓ The power supply of the boiler must be switched on.
- ✓ The gas valve and radiator valves must be open.
- ✓ Water pressure of system should be at appropriate level.
- ✓ The anti-freeze function helps protect your boiler, it does not protect your installation.
- ✓ If the boiler will not be operated for a while in places where there is risk of freezing, then it is necessary to drain the water or to use an anti-freeze agent

## 7.4. Access to Menu

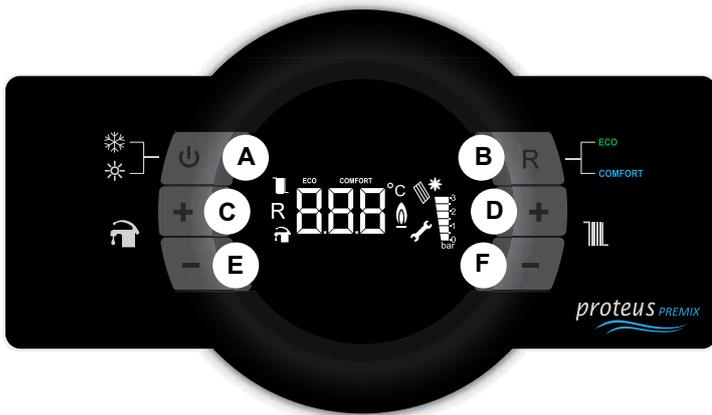


Figure 18. Control Panel

DHW (+) (C) and DHW (-) (E) buttons make parameter changes.

CH(+) (D) and CH (-) (F) buttons are used for selecting and changing the value of any parameter. Such values are automatically saved.

There are 2 ways to exit from “tS” parameters. You may exit from settings if no button is pressed in 2 minutes, or by pressing ON/OFF “A” button.

Access to service menu by pressing on “B” RESET button for 10 seconds.

Exit from the service menu by pressing on “A” ON/OFF button for 1 second.

It is possible to select one of the following options respectively by means of the heater circuit buttons “D” and “F”

- “tS” enables accessing to service parameters.
- “In” gives information on certain data not displayed on the screen.
- “Hi” gives the details of the last 8 errors.

Accessing this parameter is by means of “B” RESET button.

- **“tS” Service Mode:** It is the menu where the parameters configurable by gas safe engineer are found.

- “tS” icon starts to light on the LCD at the first Access the menu.

When tS is selected by pressing on “B” RESET button, “000” is seen on the screen.

When “B” RESET button is pressed again, and password entry is displayed.

Password is set by CH(-) (F) and CH(+) (D) buttons.

**(Password is 003).**

Entering password is configured to the system by DHW (+) (C) button. When password is correct “---” is displayed.

- When “B” RESET button is pressed again, parameters are entered.

“tS” parameters are started to be displayed on the input screen after displaying “P00”.

The service personnel may access to and amend only "P00, P01, P26, P27, P33, P37, P38, P39, P42, P43, P44" parameters out of the following parameters.

LIST OF SERVICE PARAMETERS										
Category	E2prom parameters		Unit	PR	PR	PR	PR	PR	PR	
	Parameter	Description		PREMIX 14	PREMIX 20	PREMIX 24	PREMIX 28	PREMIX 30	PREMIX 35	
Boiler Type	P00	DHW configuration	1=Instantaneous	Num.	1	1	1	1	1	1
			2=Instantaneous + Solar							
			3=Storage tank							
			4 = Solar storage tank							
			5 = CH only							
Gas Type	P01	Gas type selection 0 = Natural gas / 1 = LPG	Num.	0	0	0	0	0	0	
CH	P26	CH burner of duration	Min.	3	3	3	3	3	3	
CH	P27	CH pump additional operation time	Min.	1	1	1	1	1	1	
CH	P33	OTC curve selection	Num.	0	0	0	0	0	0	
DHW	P37	System Configuration (Water pressure circuit + flow sensor circuit)	1 Emas Hydroblok (CCB Pakkens)	Num.	1	1	1	1	1	1
			2 - Fugas Hydroblok							
			3 - Bitron Hydroblok							
CH	P38	Heating system type	0- Radiator heating	Num.	0	0	0	0	0	0
			1- Floor heating							
CH	P39	Eco mode burner on set value	Num.	1	1	1	1	1	1	
DHW	P42	DHW Hysteresis OFF		Num.	0	0	0	0	0	0
		0: OFF at 71°C								
		1: Standard algorithm								
System	P43	ASE maintenance counter reset			Res					
System	P44	Room thermostat activation		Num.	1	1	1	1	1	1

Table 5. Service Parameters

- **CH Burner OFF Duration:** The boiler stays turned off for this period when it is turned off at hysteresis. At the end of this period, if the water temperature drops below hysteresis opening value, the boiler restarts burning; however, the boiler is not activated if it does not drop below that value.
- **CH Pump Overrun Time:** Pump continues to run for a given period of time after the heat demand.
- **Eco Mode Hysteresis Turn-on Set Value:**

P39	1	0
Set Value	CH Return Water Temperature	CH Return Water Temperature
30	27	22
35	27	22
40	31	26
45	34	29
50	36	31
55	40	35
60	44	39
65	47	42
70	51	46
75	53	48
80	57	52

Table 6. Set Values

- P39:1 is the default value. Example: When CH set value is set at 30°C, no flame is formed before boiler return water temperature sensor reaches to 27°C.
- P39: 0 is an optional parameter. When it is activated, boiler waits lower temperatures than its normal working condition to operate again.
- When P43 parameter is selected to reset the ASE maintenance counter, select "reset" text on the screen and then ASE maintenance counter is reset. In 0.46 software, ASE mode was exited by pressing the reset button once. In software 0.56, it is possible to reset of ASE counter from P43 parameter with a password.
- In software before 0.56, it is sufficient to press the Reset button once to exit the ASE mode.

**AP Mode:** During this mode "AP" and water pressure values will appear on the screen.

- **Accessing to Inquiry Mode (In):** Inquiry Menu; gives details on the status of the boiler during operation. Values of certain data may be checked spontaneously by accessing this menu.

➤ When "In" is selected by pressing on "B" button in the menu, "i00" is displayed on screen. It is possible to select any parameter wished by pressing on DHW(-)(E) and DHW(+)(C) buttons.

➤ It is possible to select and see value of any parameter by means of CH(+)(D) and CH(-)(F) buttons. Any short or open circuit in the sensors are displayed on screen.

Actual fan speed is always given as rpm/10.

Actual flame current is always given as  $\mu A \times 10$

➤ When "In" is selected by pressing on "B" button in the menu, "i00" is displayed on screen. It is possible to select any parameter wished by pressing on DHW(-)(E) and DHW(+)(C) buttons.

➤ It is possible to select and see value of any parameter by means of CH(+)(D) and CH(-)(F) buttons. Any short or open circuit in the sensors are displayed on screen.

Actual fan speed is always given as rpm/10.

Actual flame current is always given as  $\mu A \times 10$

➤ It is possible to go back "In" parameter by pressing on "B" (RESET) button for 1 second; after that, pressing on "A" button again takes you out of the inquiry mode.

➤ There are 2 ways to go out of "In" mode. You may exit from settings if no button is pressed in 2 minutes, or by pressing on "A" button.

Code	Description	Range
<b>i00</b>	CH Supply Water Sensor Temperature (°C)	Range of 00 - 125
<b>i01</b>	CH Return Water Sensor Temperature (°C)	Range of 00 - 125
<b>i02</b>	DHW Sensor Temperature (°C)	Range of 00 - 125
<b>i03</b>	DHW Sensor Temperature (°C) – Storage Tank Bottom	Range of 00 - 125
<b>i04</b>	Solar Panel Temperature (°C)	Range of 00 - 125
<b>i05</b>	Flue Gas Sensor Temperature (°C)	Range of 00 - 125
<b>i06</b>	Outdoor Sensor Temperature (°C)	-
<b>i07</b>	Actual Fan Speed (rpm / 10)	-
<b>i08</b>	Actual Water Pressure (bar)	-
<b>i09</b>	Ionization Current (μAx10)	Range of 00 - 99
<b>i10</b>	Firmware Version	C_x.xx

Table 7. Inquiry Menu

- **Accessing to Last Errors Display Mode (Hi):**

It provides details of the last 8 errors occurred from the latest to earliest, respectively.

- When “Hi” is selected by pressing on “B” button in the menu, “H01” is displayed on screen. It is possible to select any parameter wished by pressing DHW (-)(E) and DHW (+)(C) buttons. It is possible to select and see the value of any parameter by means of CH (-) (F) and CH (+)(D) buttons.
- It is possible to go back to “Hi” parameter by pressing on “B” RESET button for 1 second; after that, pressing on “B” button again takes you out of the “Hi” mode.
- There are 2 ways to go out of “Hi” mode. You may exit from settings if no button is pressed in 2 minutes, or by pressing on “A” button.

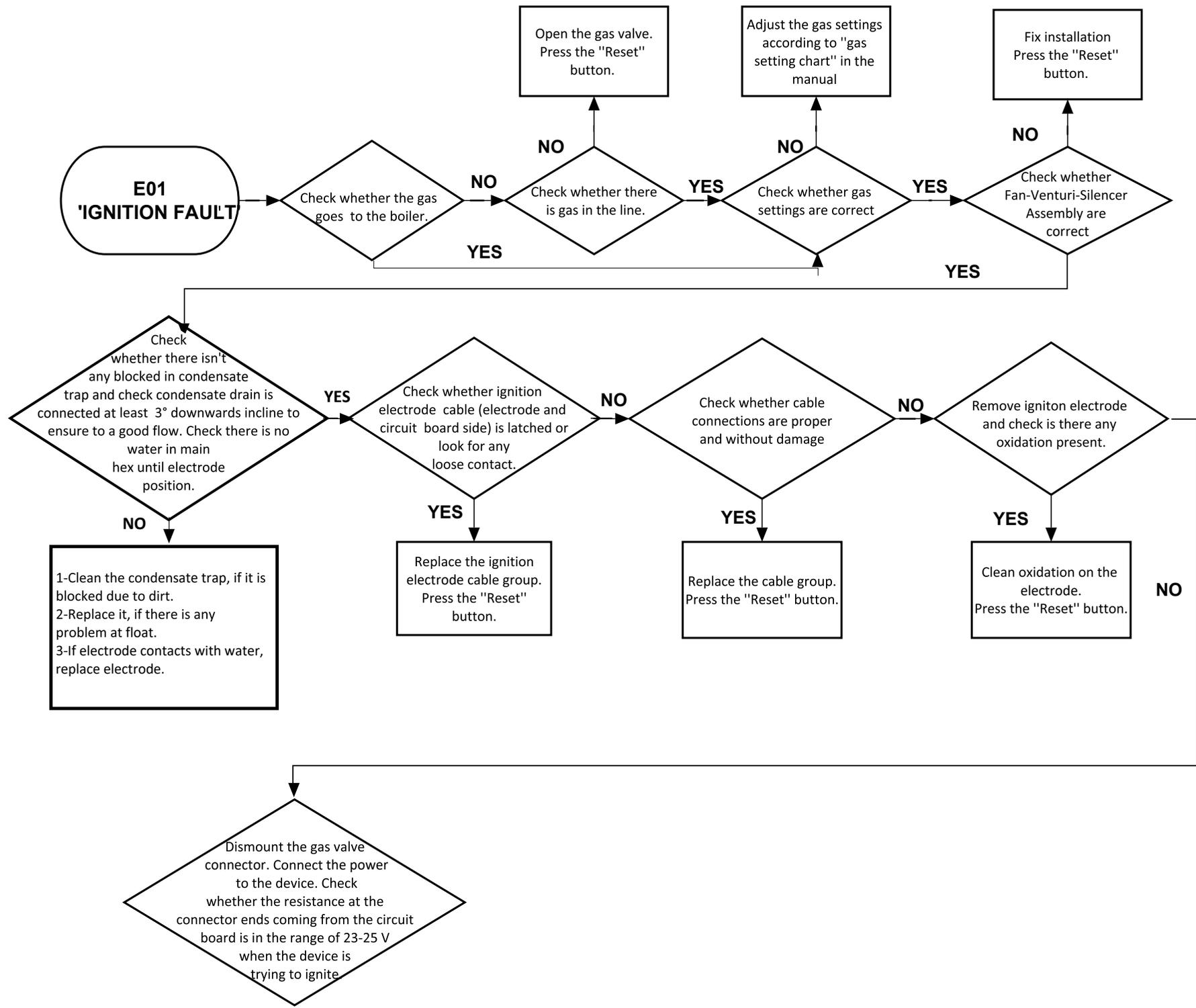
<b>H01</b>	<b>Last Error 1 (Latest Error) - EXX or FXX</b>
<b>H02</b>	<b>Last Error 2 - EXX or FXX</b>
<b>H03</b>	<b>Last Error 3 - EXX or FXX</b>
<b>H04</b>	<b>Last Error 4 - EXX or FXX</b>
<b>H05</b>	<b>Last Error 5 - EXX or FXX</b>
<b>H06</b>	<b>Last Error 6 - EXX or FXX</b>
<b>H07</b>	<b>Last Error 7 - EXX or FXX</b>
<b>H08</b>	<b>Last Error 8 - EXX or FXX</b>

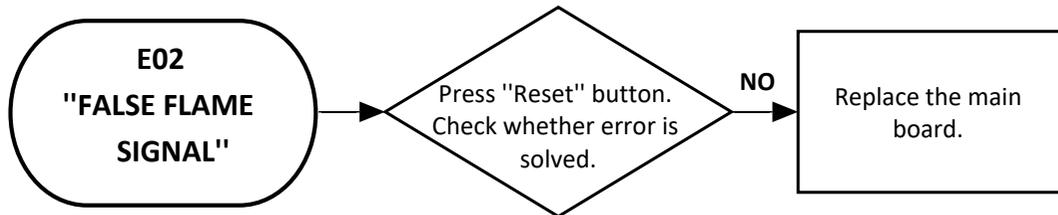
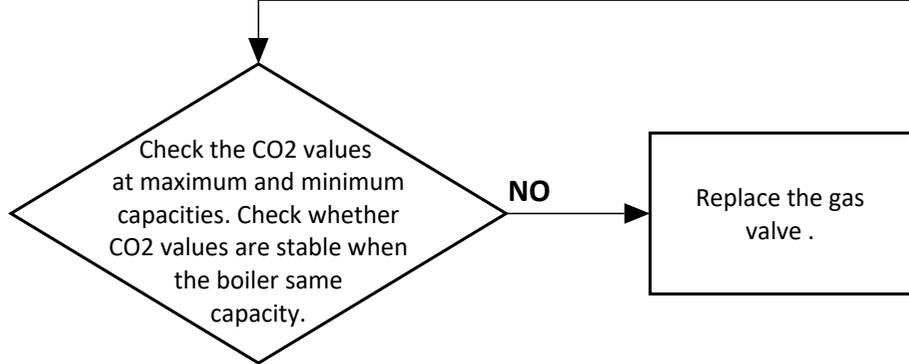
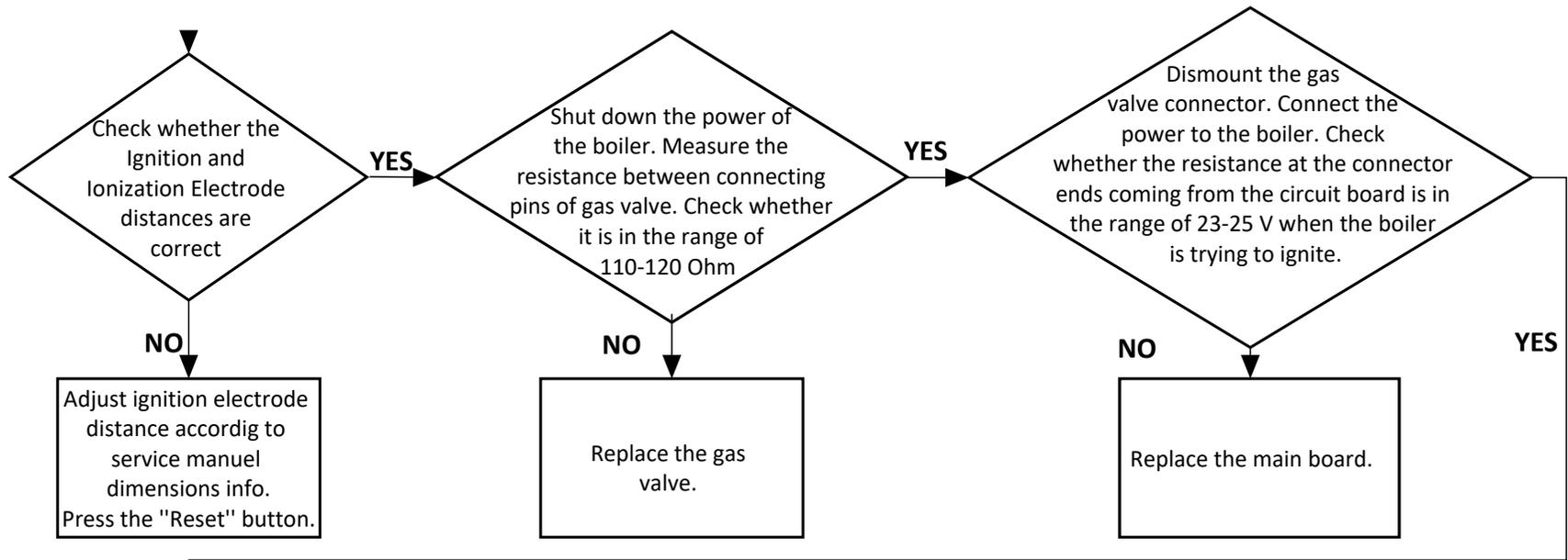
Table 8. History Menu

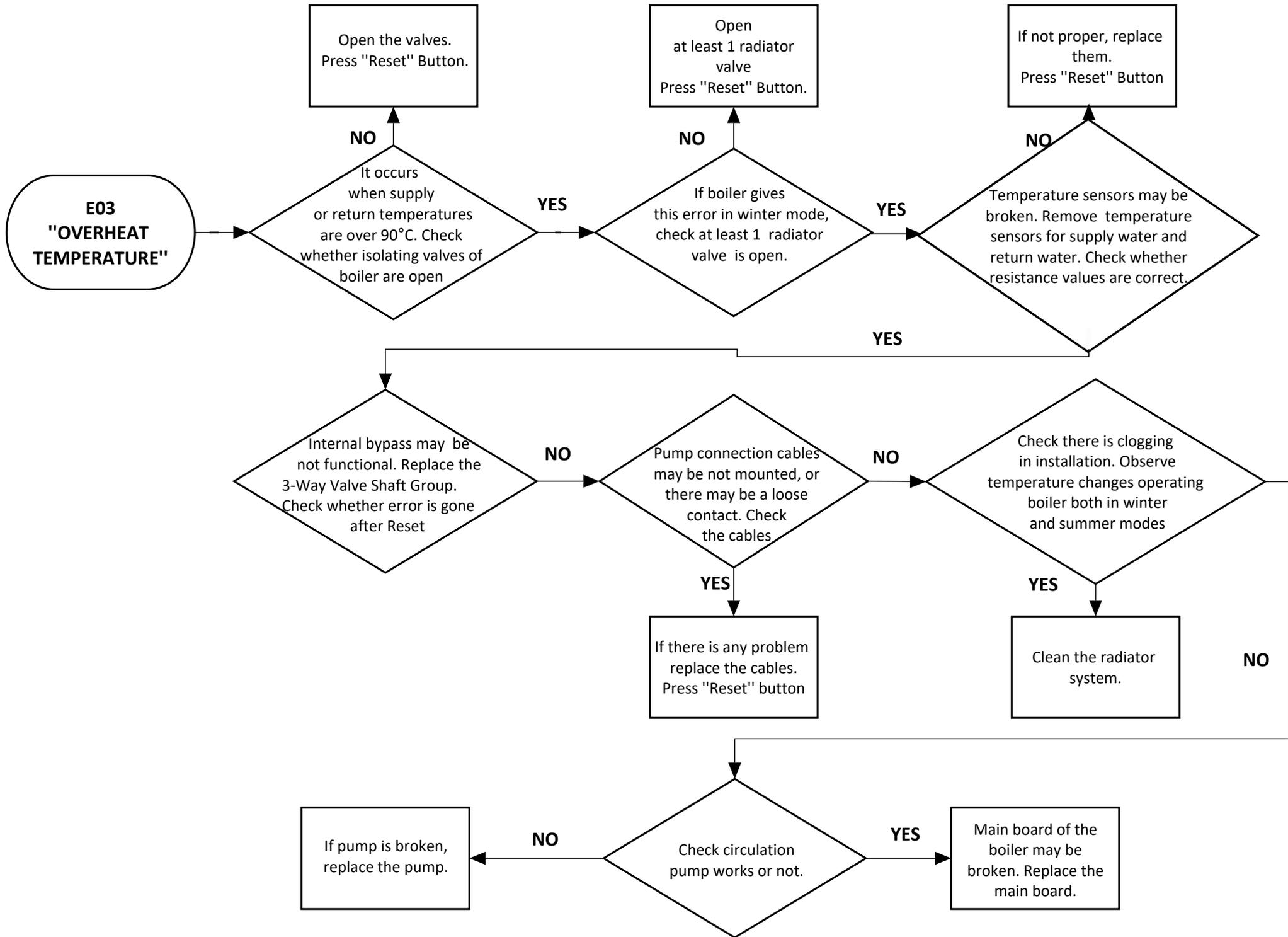
## 7.5. Error Codes and Description

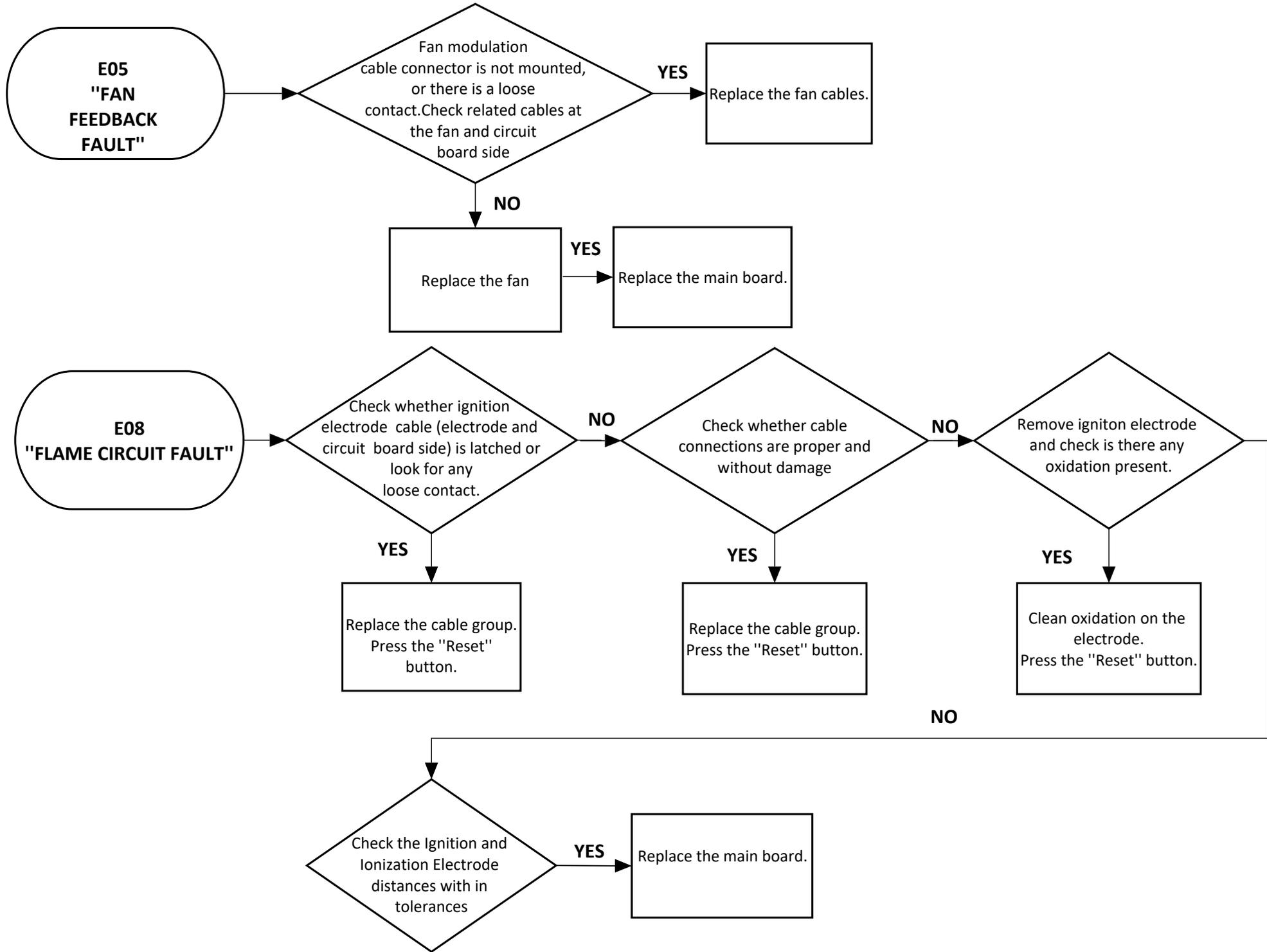
<b>Error Code</b>	<b>Description</b>	<b>Error Code</b>	<b>Description</b>
<b>E01</b>	Ignition Lockout indication	<b>E82</b>	Flame lost too many times in recent past
<b>E02</b>	False flame indication	<b>F07</b>	Flue sensor temperature too high error
<b>E03</b>	High limit temperature protection (supply or return sensor)	<b>F13</b>	Remote reset volatile lockout
<b>E05</b>	No frequency feedback from fan after 1 minute	<b>F25</b>	Electronic Card Fault
<b>E08</b>	Flame circuit failure	<b>F34</b>	Low power supply from mains
<b>E09</b>	Valve feedback error	<b>F37</b>	Water pressure is too low
<b>E12</b>	EEPROM integrity lockout	<b>F39</b>	Outdoor temperature sensor error
<b>E15</b>	Drift sensors check failed	<b>F40</b>	The water pressure in the CH installation is too high
<b>E16</b>	Supply sensor stuck_at test failed	<b>F47</b>	Water pressure sensor is not connected
<b>E17</b>	Return sensor stuck_at test failed	<b>F50</b>	DHW solar storage tank BOTTOM sensor error
<b>E18</b>	Cracked sensor test failed	<b>F51</b>	PT1000 temperature sensor error
<b>E21</b>	Analog to digital converter failure	<b>F52</b>	DHW water temperature sensor error
<b>E33</b>	Return water temperature sensor error	<b>F53</b>	Flue sensor short or open circuit
<b>E35</b>	Supply water temperature sensor error	<b>F58</b>	Flue Gas Lock Up at High Temperature
<b>E80</b>	Supply return swap test	<b>F81</b>	Drift test waiting

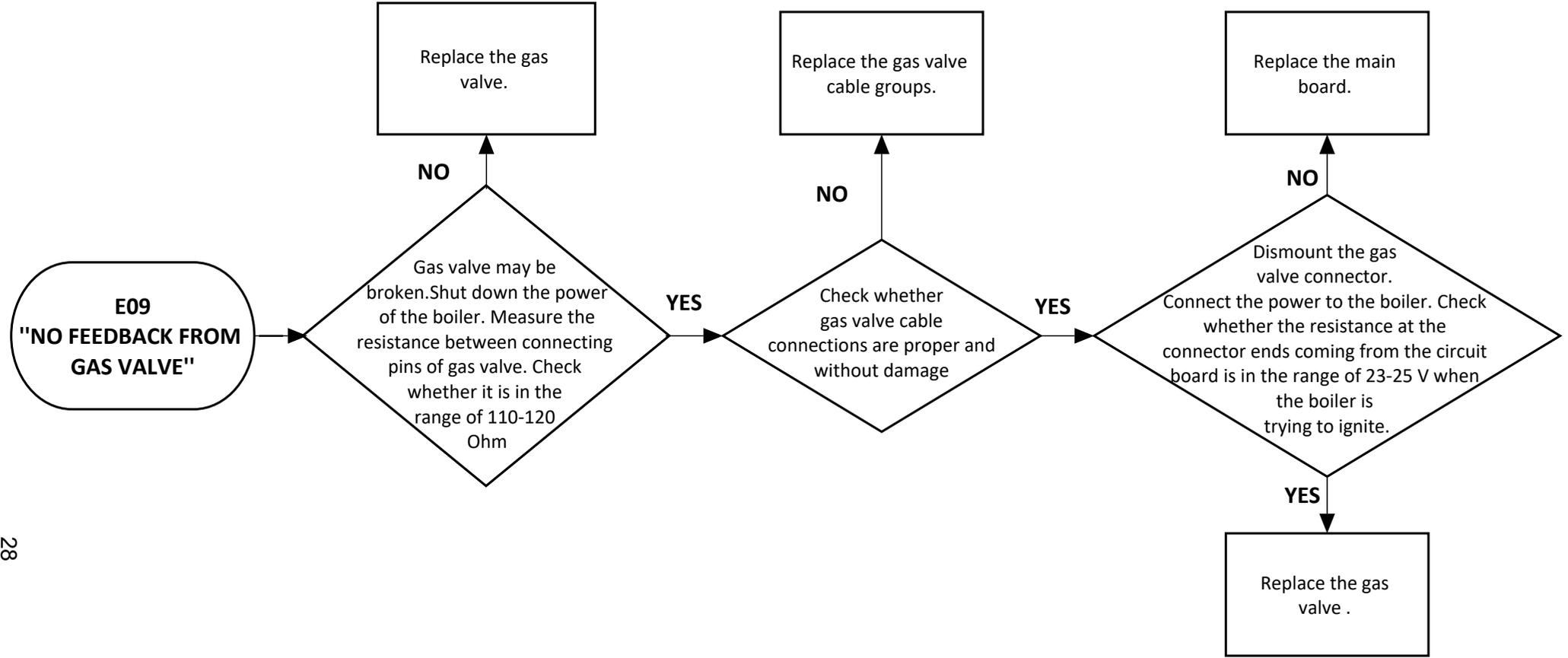
*Table 9. Error Codes and Description*



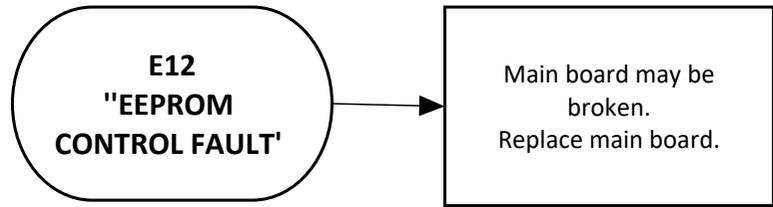


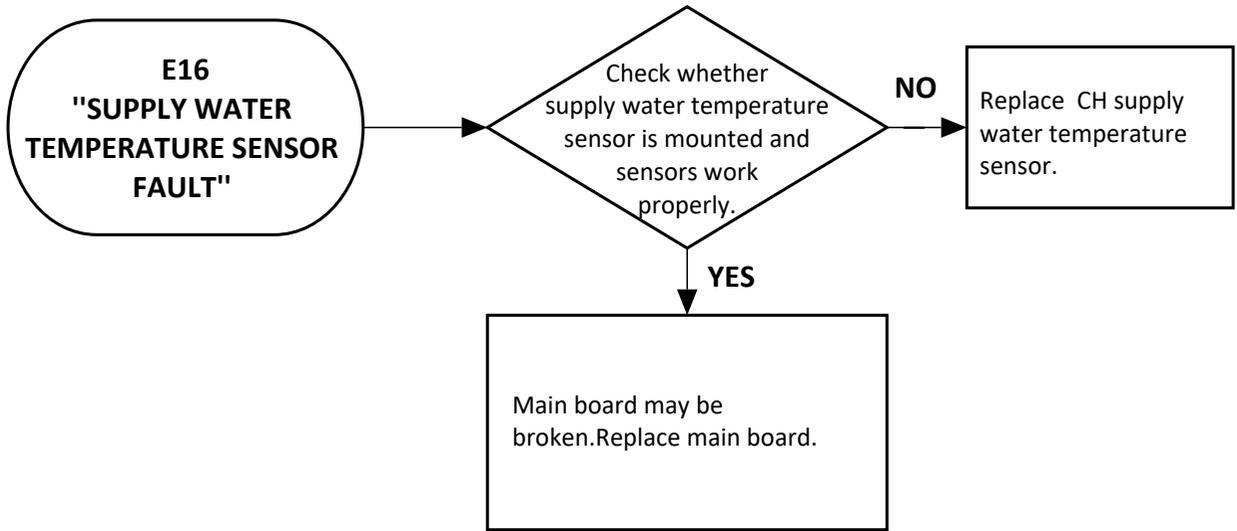
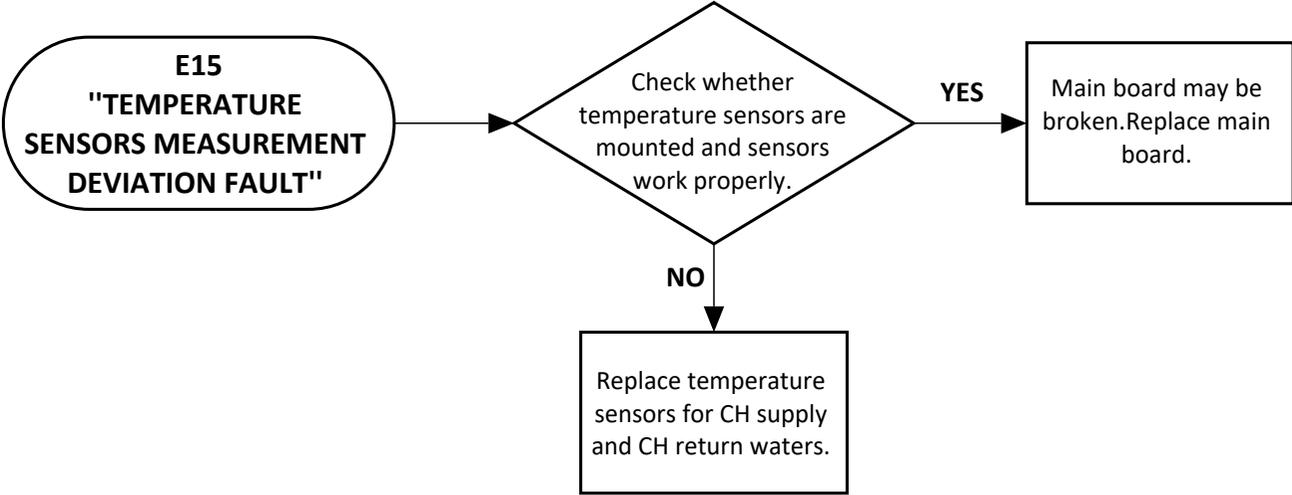


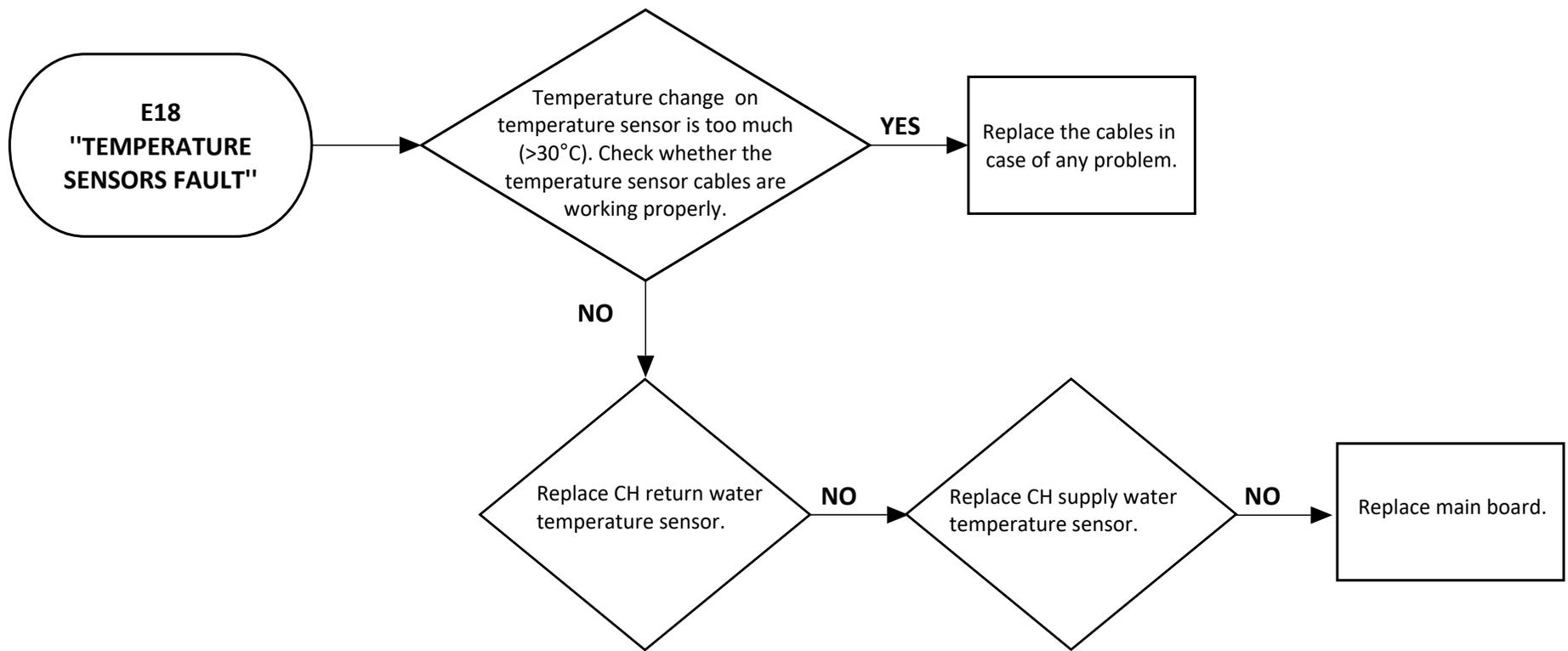
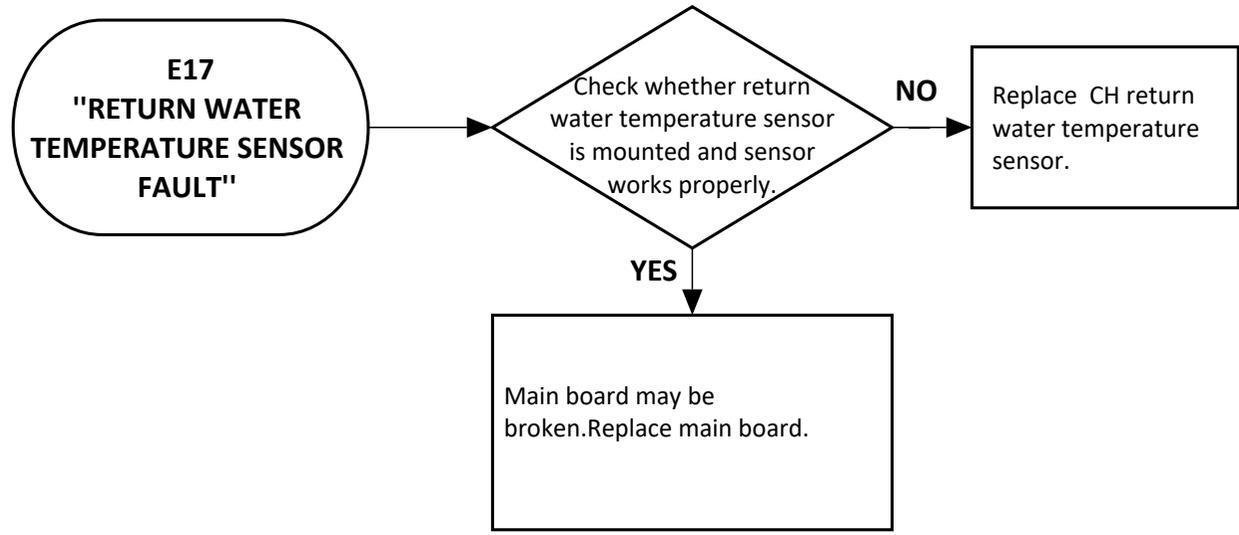


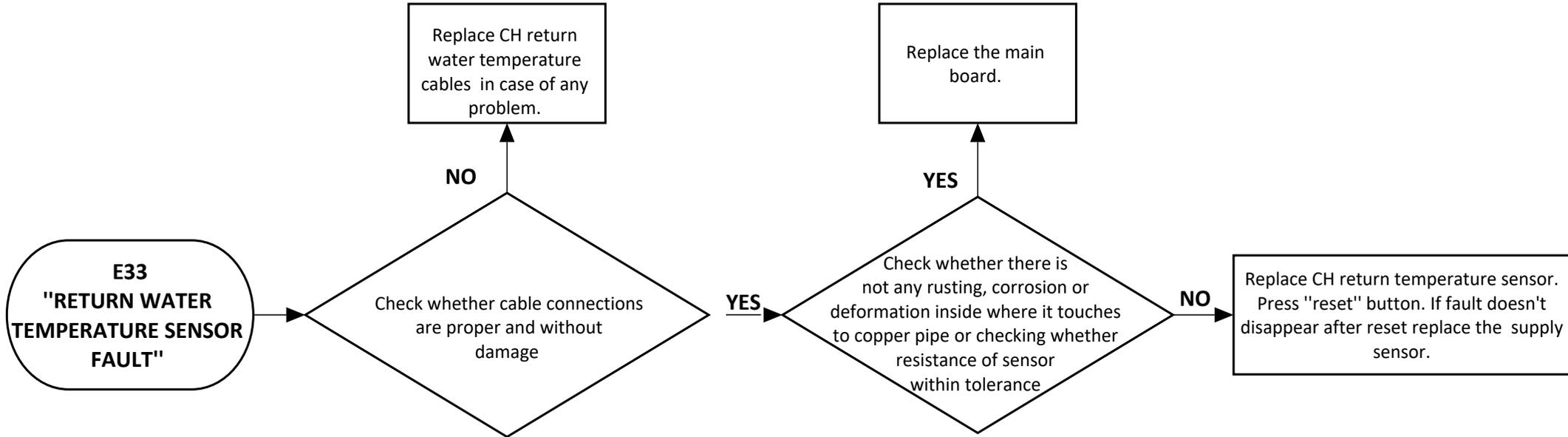
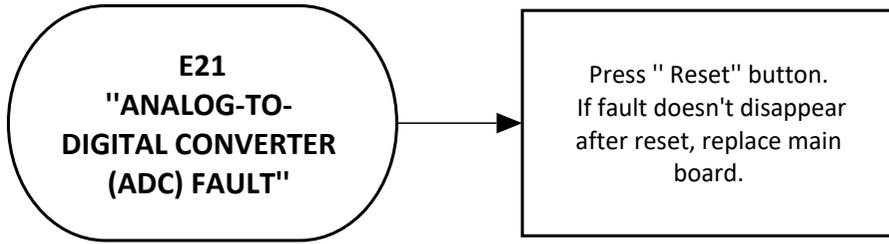


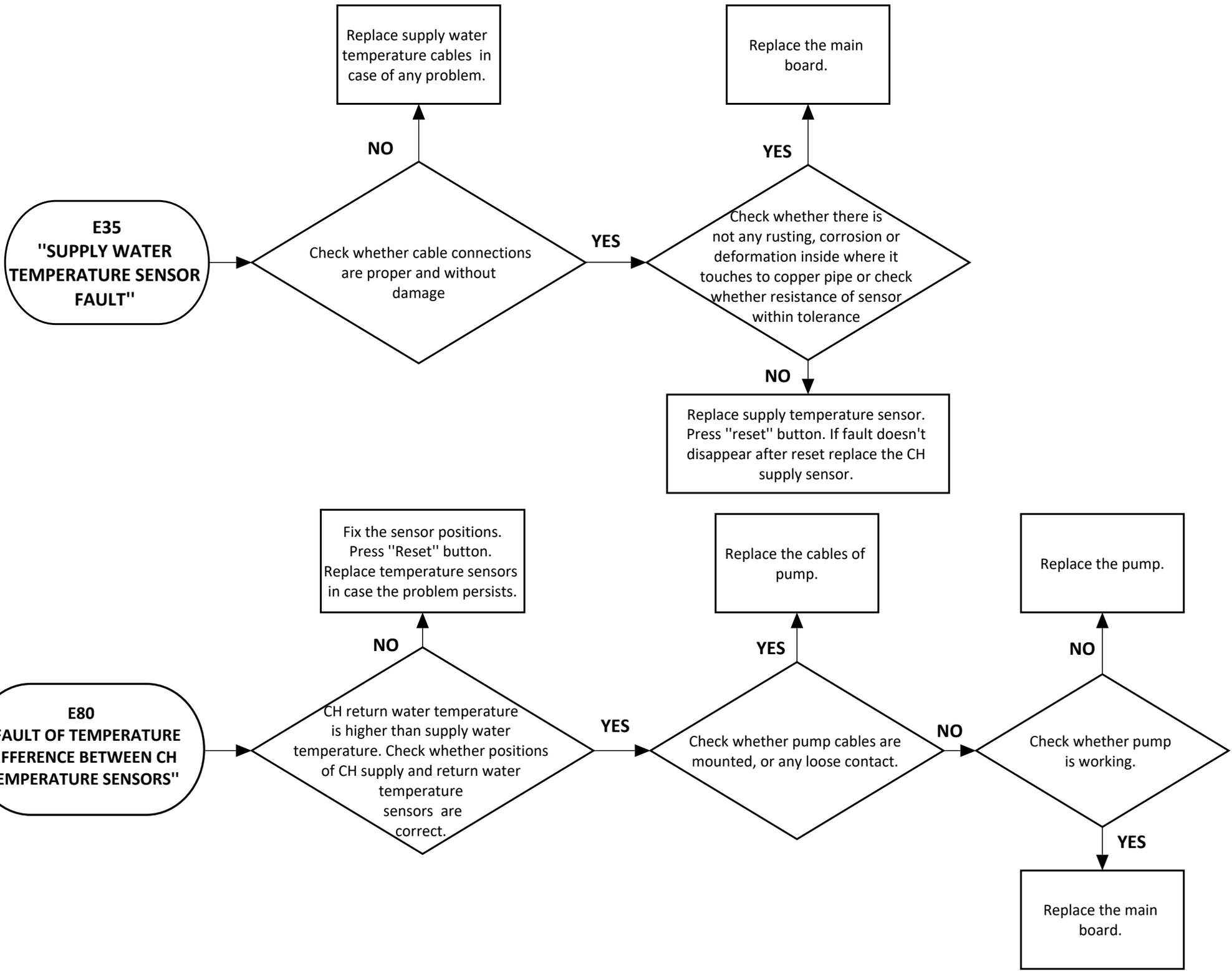
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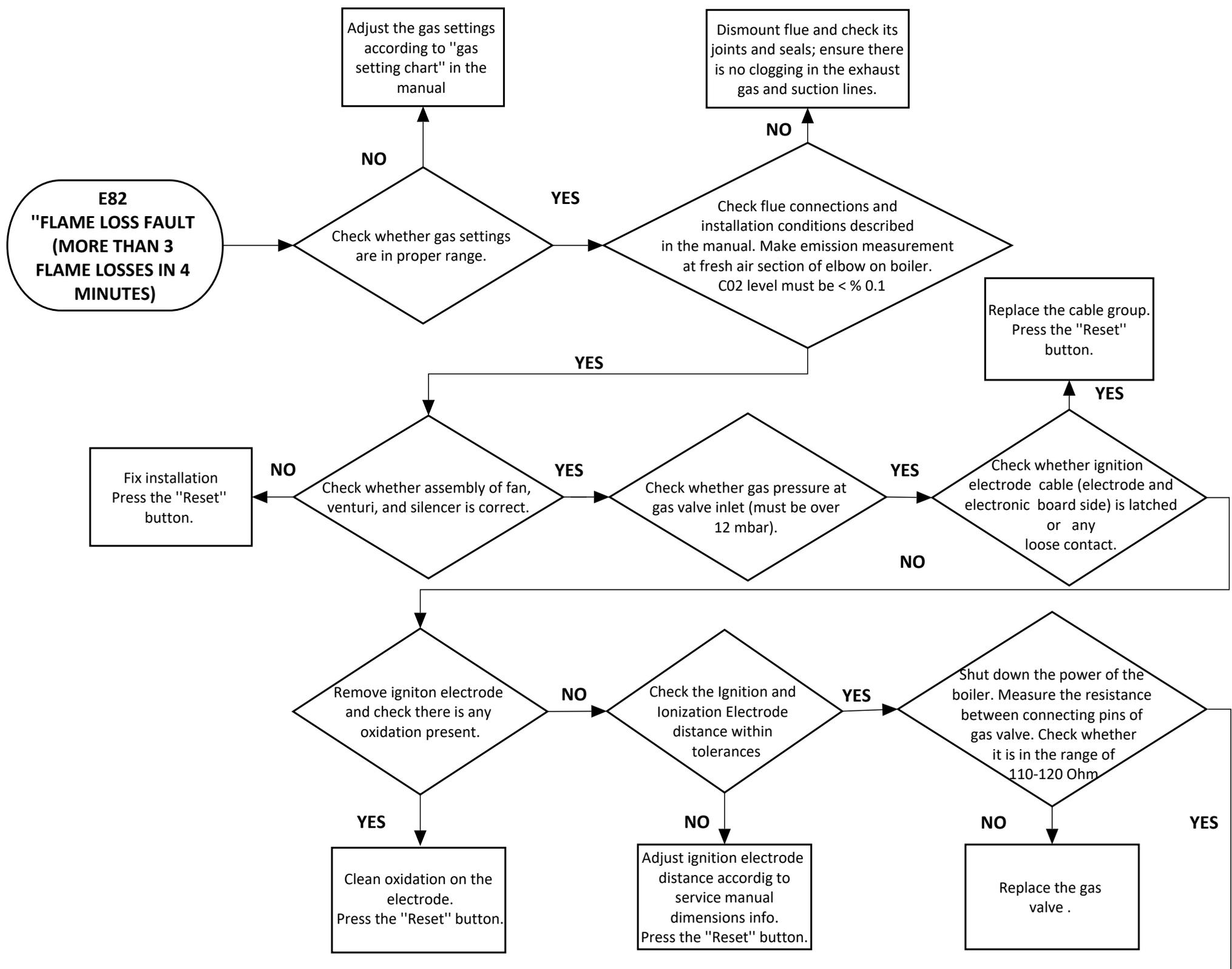


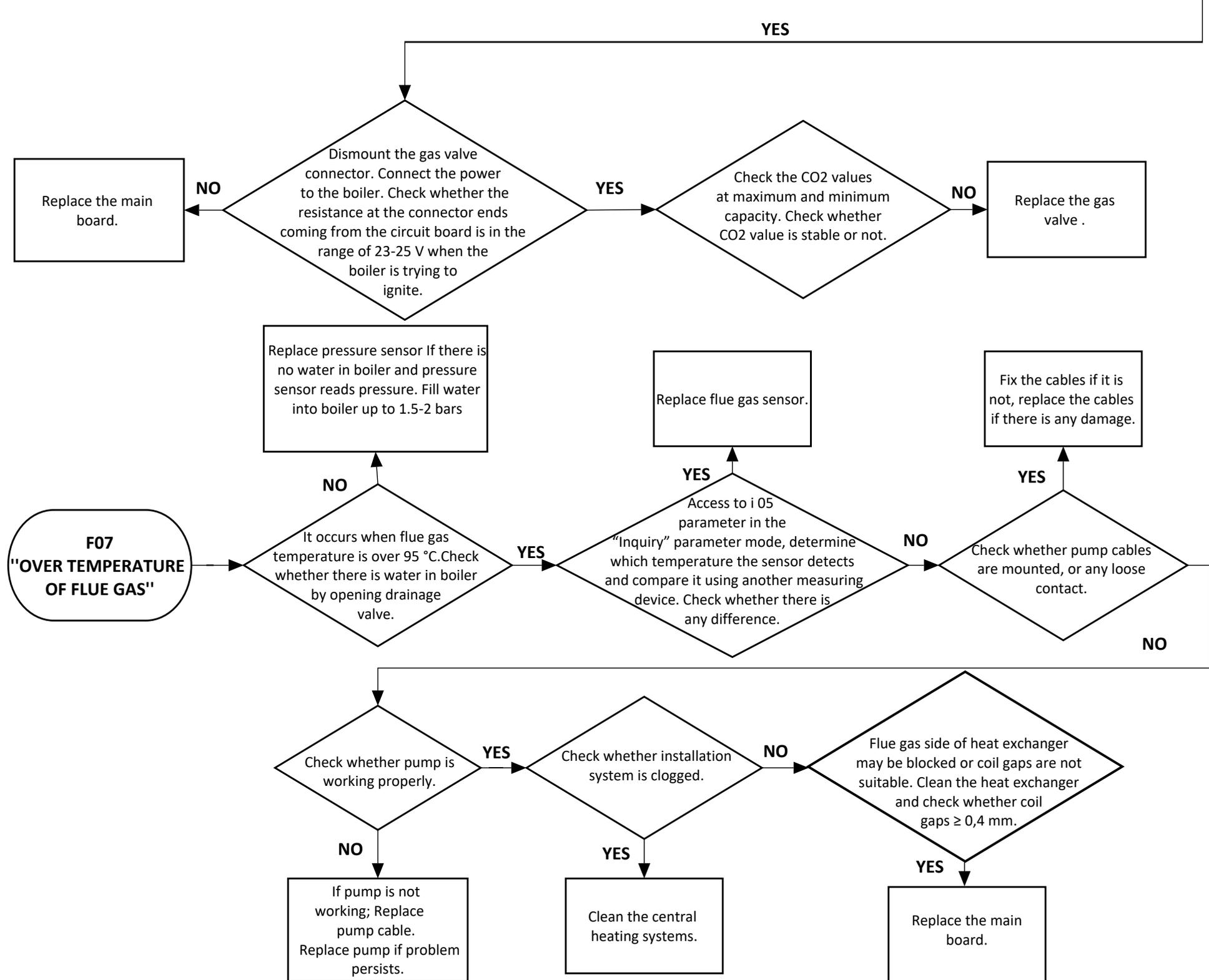


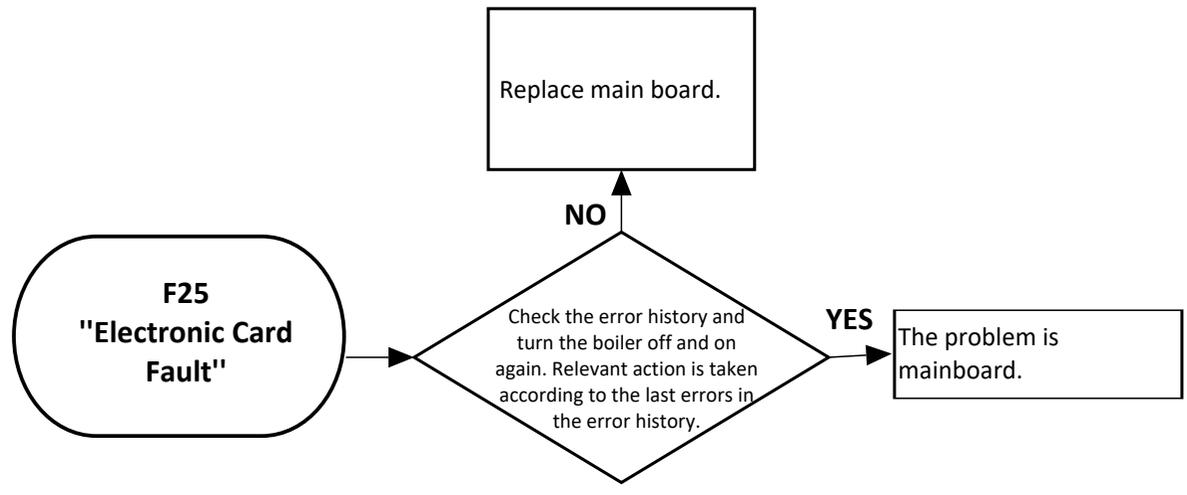
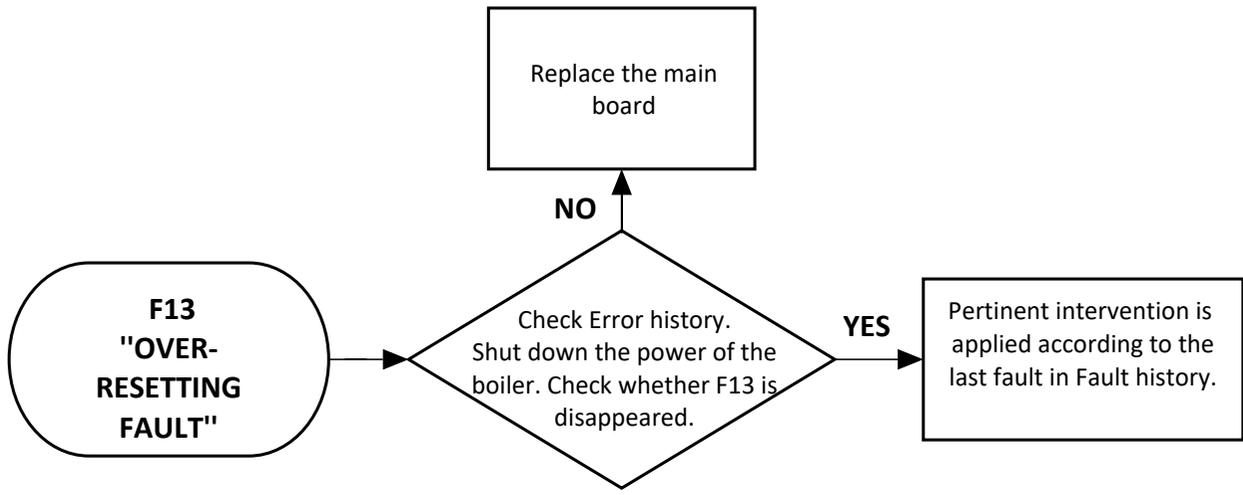


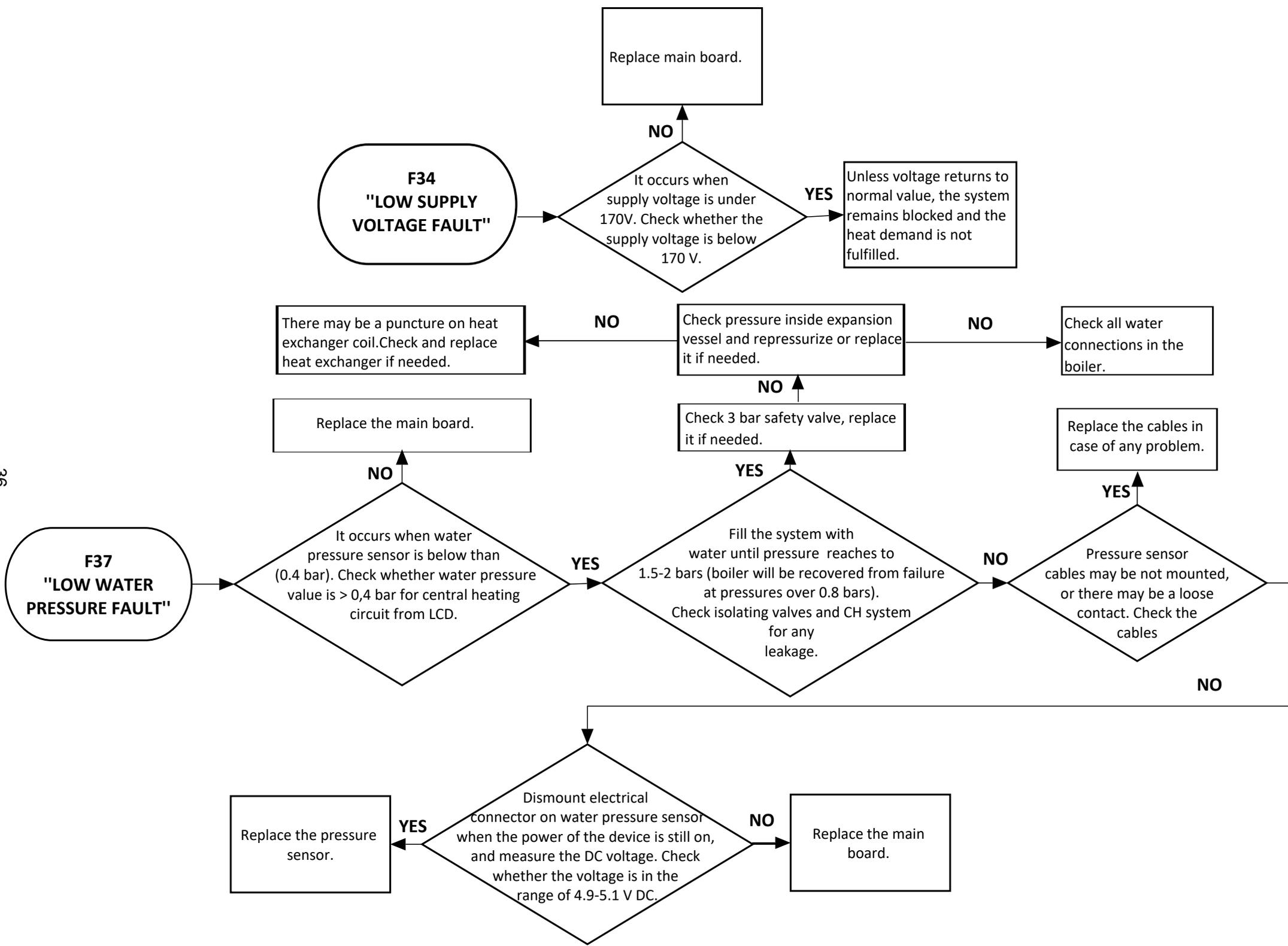


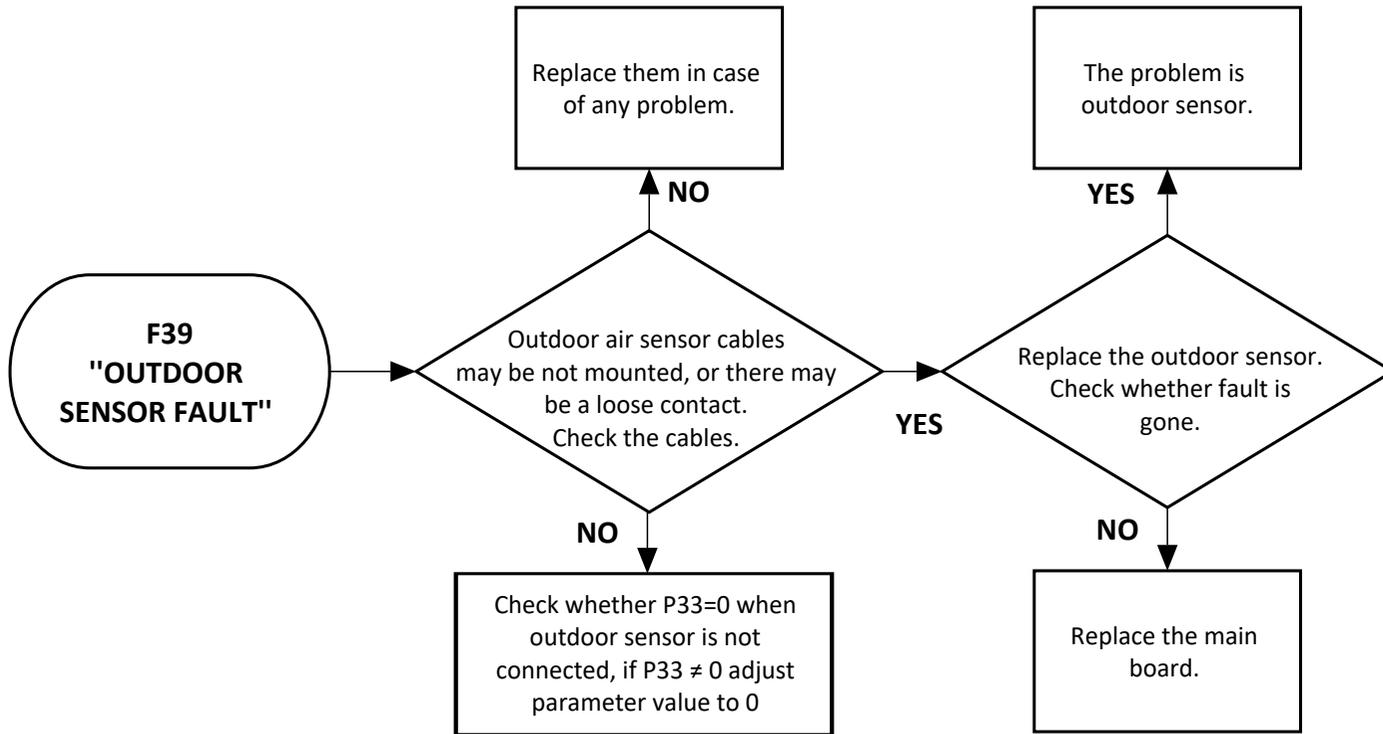


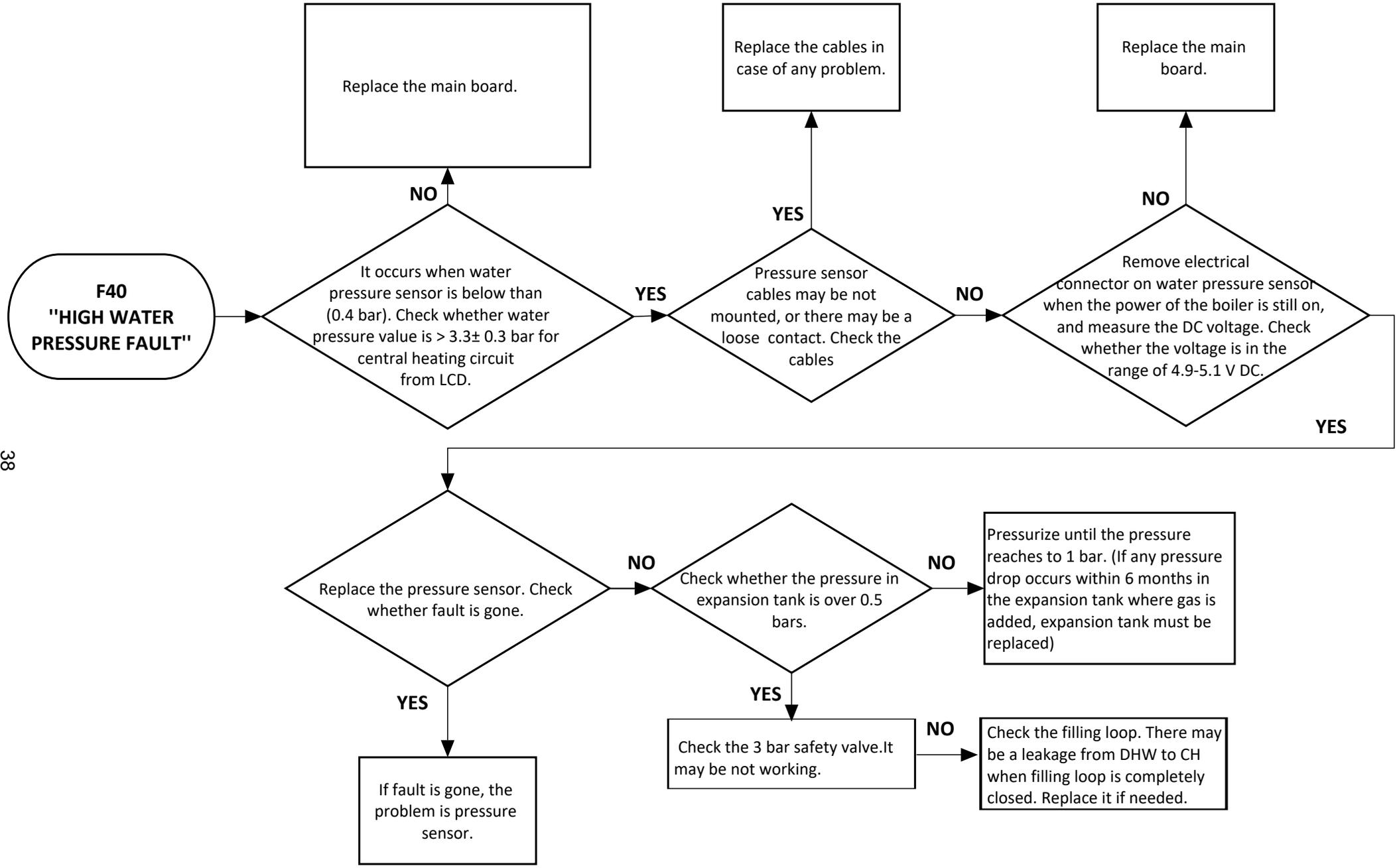


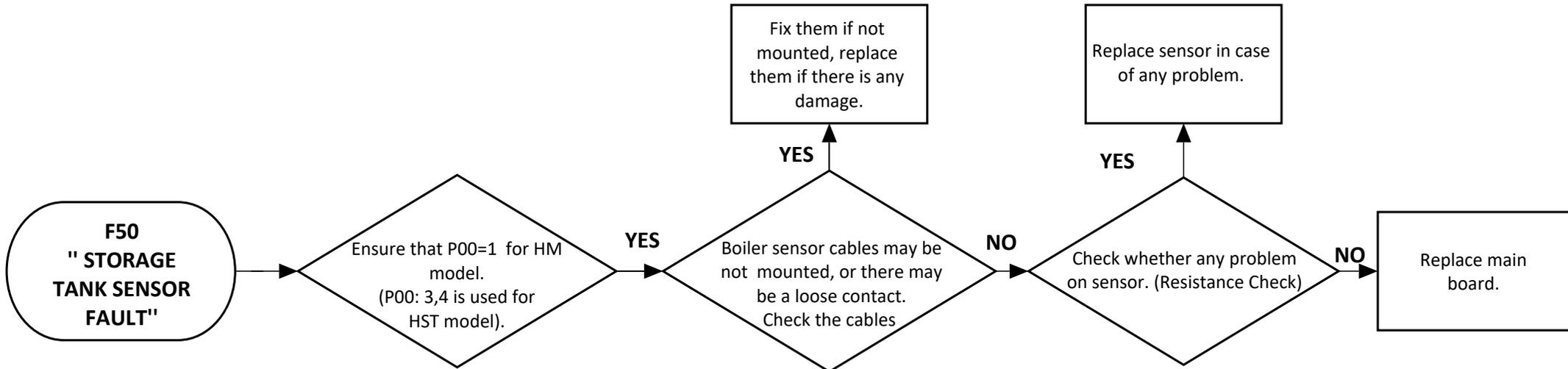
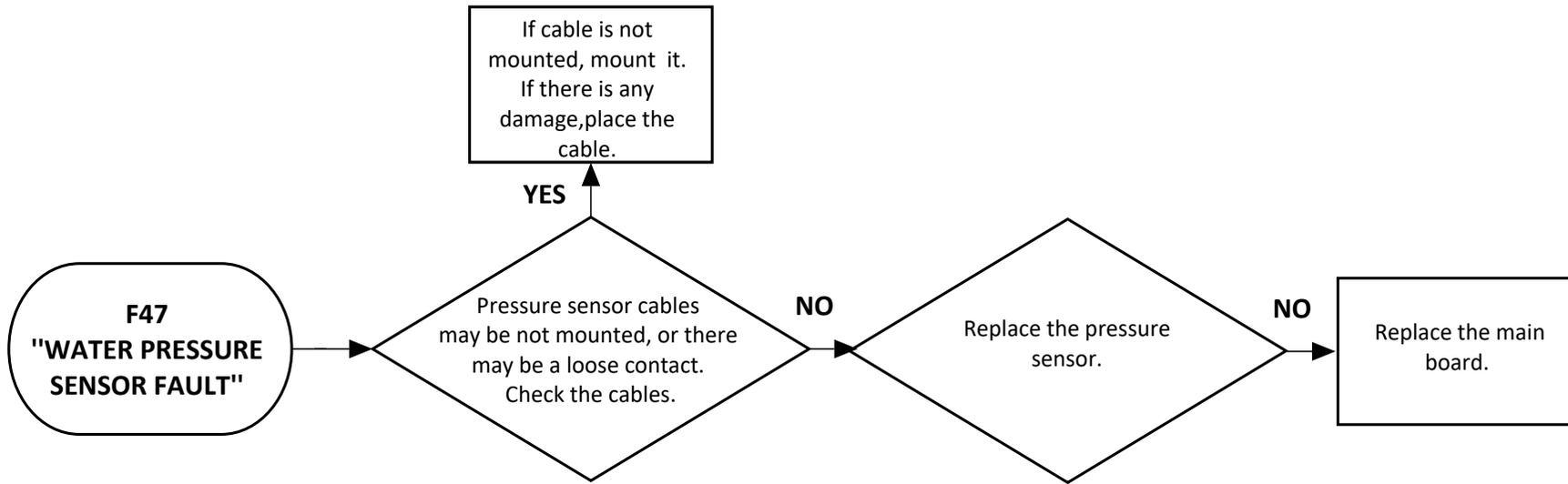


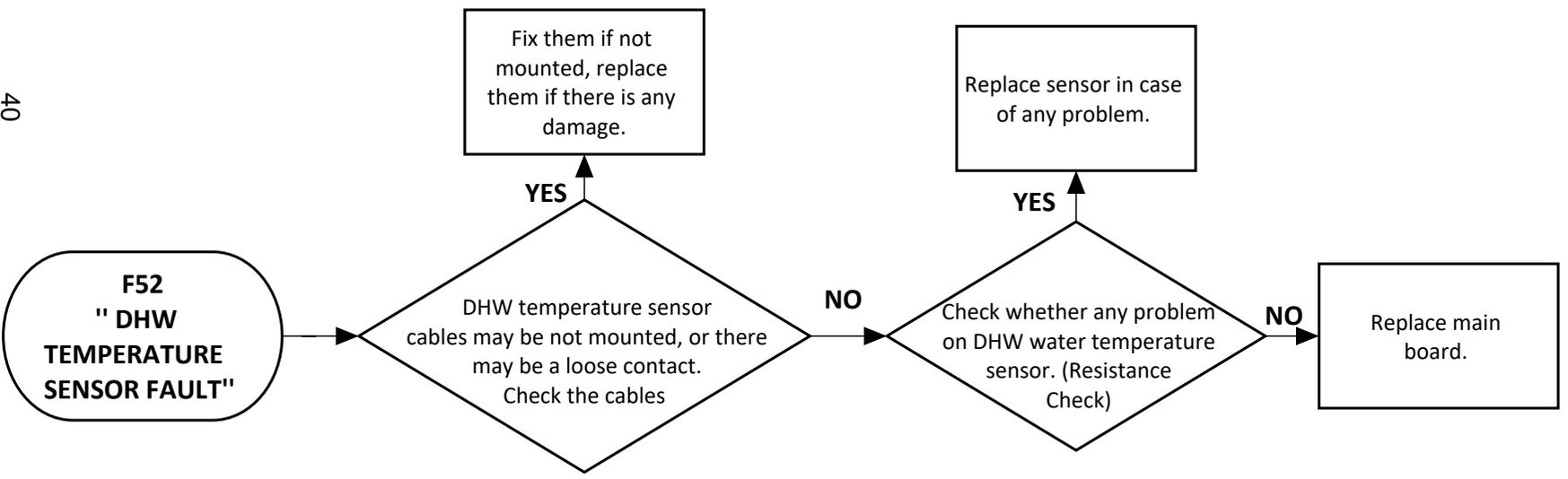
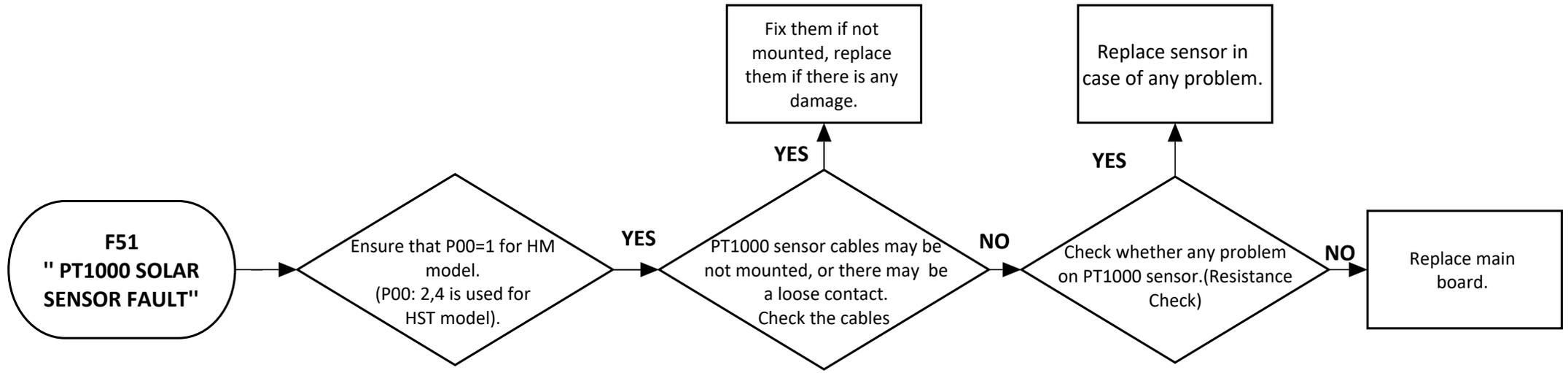


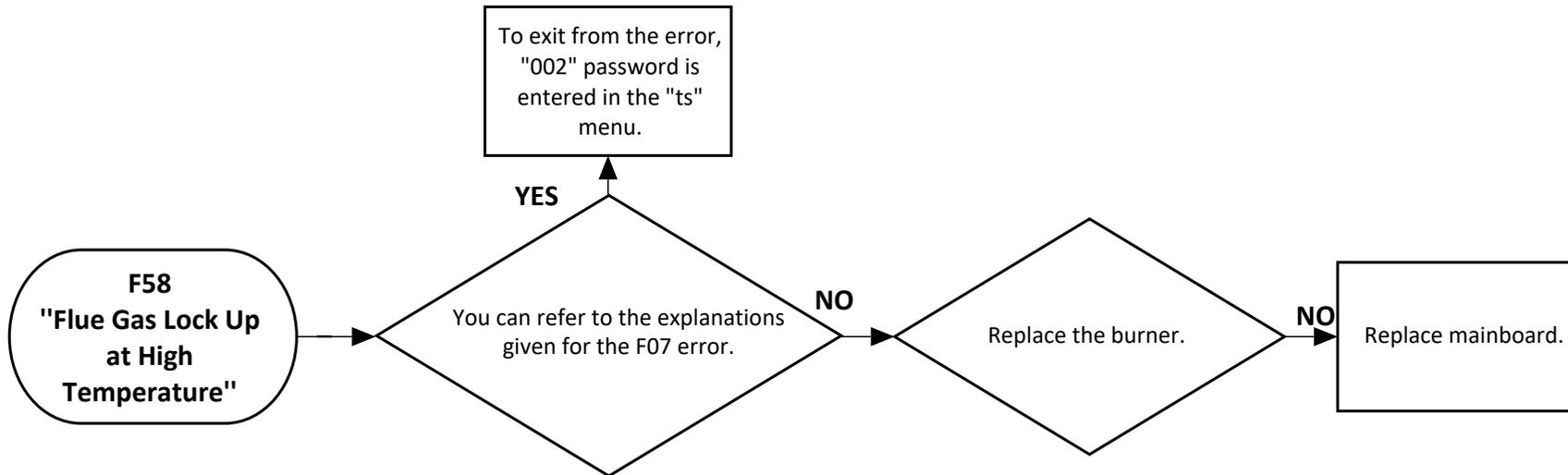
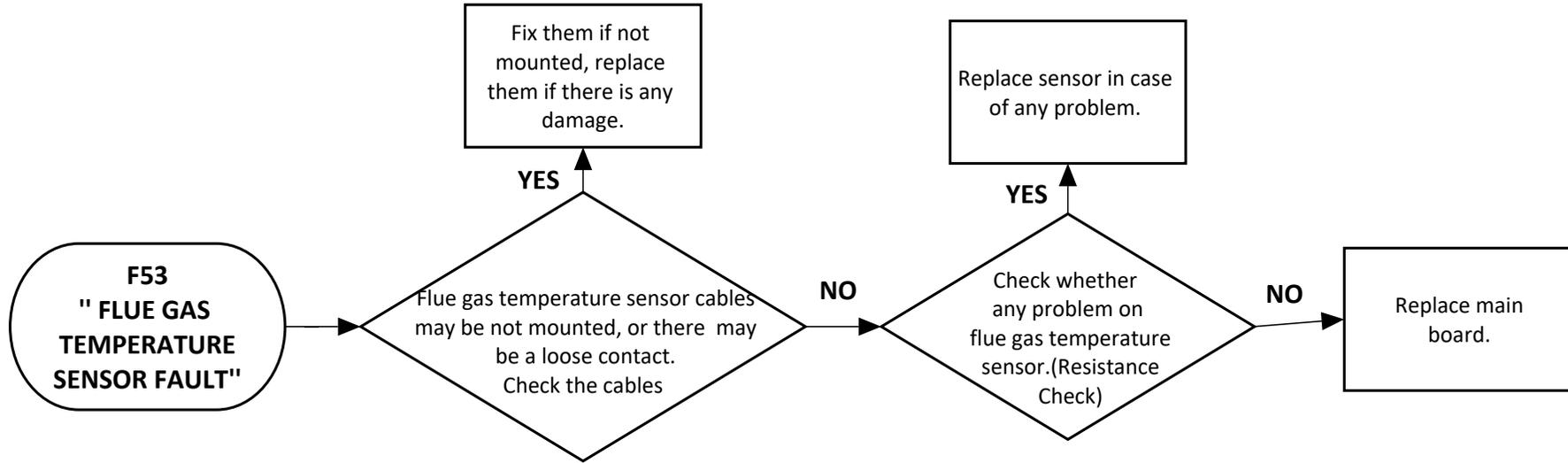


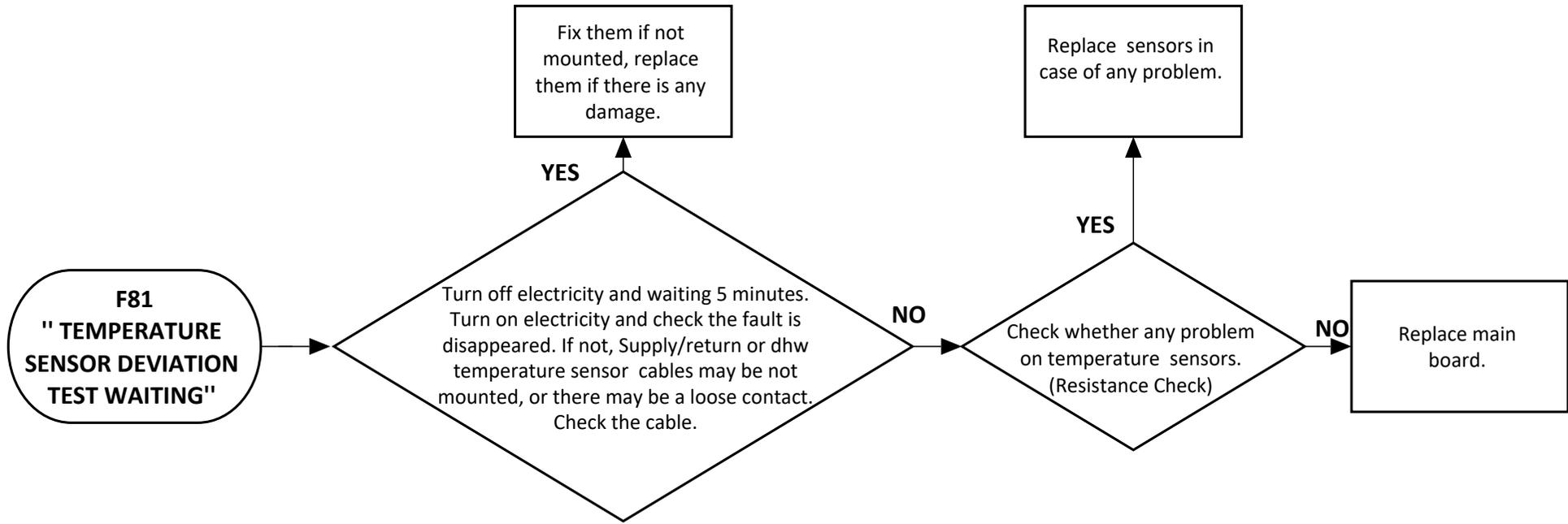












## 8- INSPECTION AND MAINTENANCE

### 8.1. Gas Conversion

Gas conversion (Natural Gas-LPG) by replacement of gas throttle washer, amending gas pressure settings (capacity settings) by gas valve, and changing P01 parameter from service parameters are performed. Natural gas and LPG parameters are given below. There will be a stamping of the diameter and the last 3 digits of stock code on gas throttle washer (if there is no stamping, marking with colored pen).

#### ➤ GAS SETTING CHART

Capacity	Gas Type	Gas Orifice (mm)	Maximum Fan Speed (rpm)	Minimum Fan Speed (rpm)	Ignition Fan Speed (rpm)	Fan Offset Fan Speed (rpm)	Front Cover (Open) CO2 (Max/Min) (%)	Front Cover (Close) CO2 (Max/Min) (%)
14 kW	NG	7,65±0,05	3700	1850	2750	3400	9,3±0,2 / 8,7±0,2	9,5±0,2 / 8,9±0,2
20 kW	NG	7,65±0,05	5100	1850	2750	3400	9,3±0,2 / 8,7±0,2	9,5±0,2 / 8,9±0,2
24 kW	NG	7,65±0,05	6250	1850	2750	3400	9,3±0,2 / 8,7±0,2	9,5±0,2 / 8,9±0,2
28 kW	NG	7,9±0,05	6500	1900	2750	3450	9,3±0,2 / 8,7±0,2	9,5±0,2 / 8,9±0,2
30 kW	NG	7,9±0,05	6900	2100	2750	3650	9,3±0,2 / 8,7±0,2	9,5±0,2 / 8,9±0,2
35 kW	NG	8,1±0,05	7600	2300	3750	4450	9,3±0,2 / 8,7±0,2	9,5±0,2 / 8,9±0,2
14 kW	LPG	6,5±0,05	3600	1850	2750	3250	10,4±0,2 / 9,7±0,2	10,6±0,2 / 9,9±0,2
20 kW	LPG	6,5±0,05	4900	1850	2750	3250	10,4±0,2 / 9,7±0,2	10,6±0,2 / 9,9±0,2
24 kW	LPG	6,5±0,05	6100	1850	2750	3250	10,4±0,2 / 9,7±0,2	10,6±0,2 / 9,9±0,2
28 kW	LPG	6,7±0,05	6200	1900	2750	3300	10,4±0,2 / 9,7±0,2	10,6±0,2 / 9,9±0,2
30 kW	LPG	7,1±0,05	6850	2100	2750	3500	10,4±0,2 / 9,7±0,2	10,6±0,2 / 9,9±0,2
35 kW	LPG	7,1±0,05	7600	2300	3750	4550	10,4±0,2 / 9,7±0,2	10,6±0,2 / 9,9±0,2
14 kW	G25	7,75±0,05	3800	1850	2750	3250	9,3±0,2 / 8,7±0,2	9,5±0,2 / 8,9±0,2
20 kW	G25	7,75±0,05	5200	1850	2750	3250	9,3±0,2 / 8,7±0,2	9,5±0,2 / 8,9±0,2
24 kW	G25	7,75±0,05	6250	1850	2750	3250	9,3±0,2 / 8,7±0,2	9,5±0,2 / 8,9±0,2
28 kW	G25	8,8±0,05	6500	1900	2750	3300	9,3±0,2 / 8,7±0,2	9,5±0,2 / 8,9±0,2
30 kW	G25	8,8±0,05	6900	2100	2750	3500	9,3±0,2 / 8,7±0,2	9,5±0,2 / 8,9±0,2
35 kW	G25	8,95±0,05	7600	2300	3750	4550	9,3±0,2 / 8,7±0,2	9,5±0,2 / 8,9±0,2

Table 10. Gas Setting

### 8.2. Gas Pressure Adjustment



Figure 19. Gas Valve

Maximum and minimum gas pressure adjustment procedures are listed below. Adjusting maximum egress pressure;

- ✓ Remove the front panel and pull the control panel down to front.
- ✓ Set the boiler to maximum operation mode (testing mode). (Testing mode: It is activated by pressing on CH temperature increase and decrease buttons (button 4 and 6 on the control panel) for 5 seconds)
- ✓ Turning "1" the maximum gas setting point slowly clockwise increases gas flow going to the burner, and the contrary reduces it.

- ✓ When adjusting settings, CO2 value is checked by the emission boiler.
- ✓ When CO2 value is in the range given in the chart, maximum gas setting is completed.

**Required Equipment:** 4mm Allen tool

Minimum Exhaust Pressure Adjustment;

- ✓ Set the boiler in the minimum operation mode. For this, press the CH temperature increase button (button 6 on the control panel) when the boiler is in the testing mode.
- ✓ After removing the protective cover of the screw for "2" minimum gas setting point shown on the photo, turning it clockwise increases gas flow and anticlockwise reduces it.
- ✓ When adjusting settings, CO2 value is checked by the emission boiler.
- ✓ When CO2 value is in the range given in the chart, minimum gas setting is completed.
- ✓ Pay attention to put back the cover of 2 minimum gas pressure setting regulator after completing necessary adjustments.
- ✓ Remount the front panel and the control panel, which were removed earlier.

**Required Equipment:** T40 Torx Screwdriver

## 8.4. Dissambly

➤ **Dismounting Front Cover:** Undo 2 screws holding the front panel, side panels and the bottom chassis, and dismount the front panel.

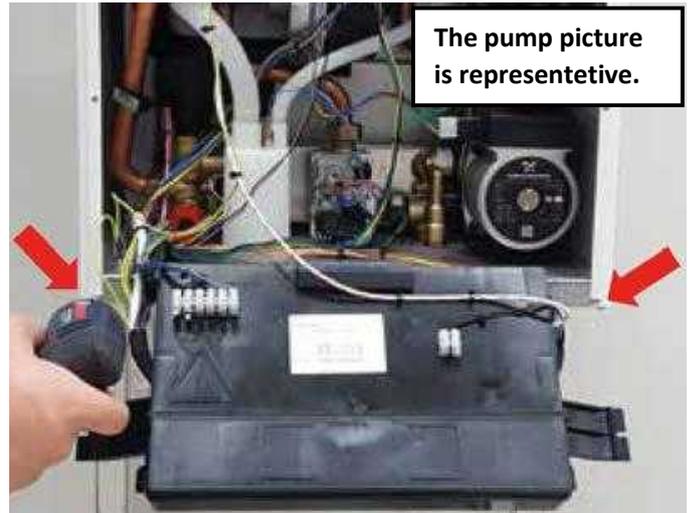


Dismounting Side Panel: Unscrew 2 screws affixing the control panel to the side panels.

**NOTE:** All part changes may be performed without removing the side panels. Disassembly of side panels is give for information purposes.



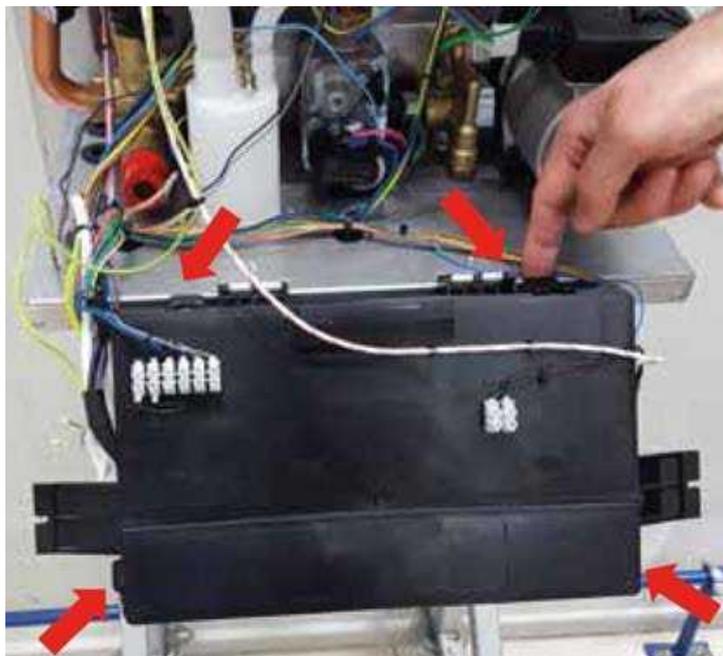
➤ Unscrew 4 screws holding side panels, bottom chassis, and the main housing.



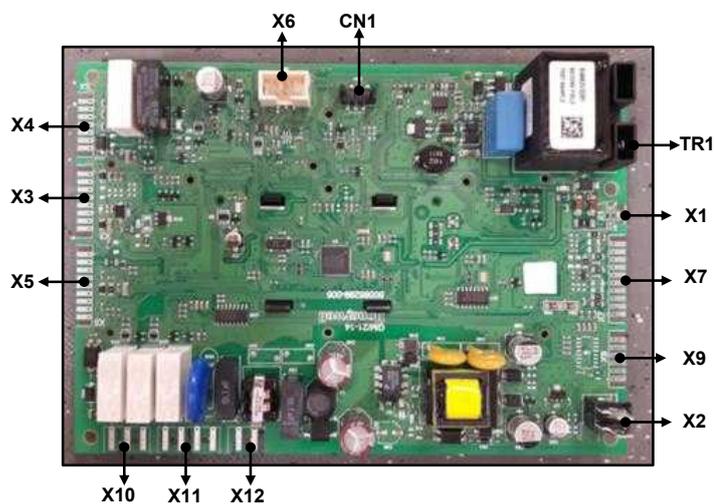
➤ Remove side panels.



➤ **Dismounting Control Panel:** Detach the connecting terminal of the room thermostat, and ignition and ionization cables Mounted to the notches on the control panel. Open the cover by unlatching the notches of the control panel.



➤ **Main Board connections:** Each of the sockets required to be Mounted on the main board are shown in the photo below.



CONNECTOR NAME	FUNCTION
X1	Condensate Trap
X2	Earth
X3	Outdoor Temperature Sensor
	OpenTherm (3.0) / Room Thermostat
X4	Program Timer
	DC Gas valve
X5	Fan Driver Interface
	Flue Sensor Input
	DHW Instantaneous Sensor
	DHW Storage Tank Sensor
	DHW Solar Storage Tank TOP Sensor
	DHW Thermostat (Storage Tank)
	Supply sensor
X6	Return sensor
	MicroCom and uP Flash
X7	Programming Connector
	WP Sensor/Switch
	PWM Supply Pump
X9	DHW Flow Sensor/Switch
	Not Used
X10	3Way Valve
X11	Fan Power Supply
	Supply Pump Power Supply
X12	Main Power Supply
CN1	Optional Solar Panel PCB

Table 11. Main Board Connections

- **Dismounting/ mounting flue gas sensor:** Mount the flue gas sensor to the point shown in the photo.



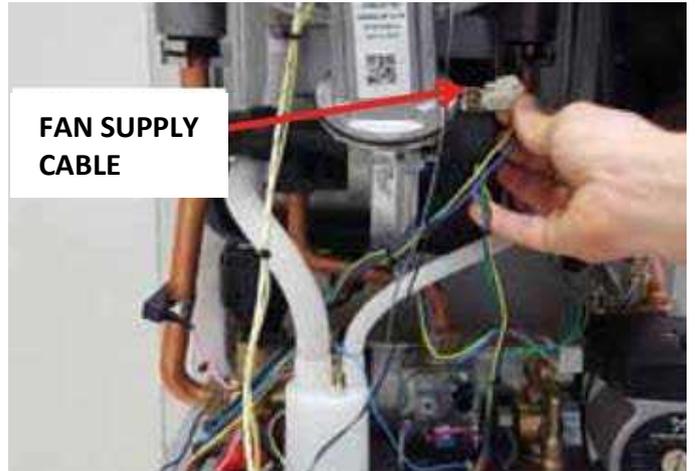
- **Dismounting/ mounting ignition and ionization electrode:** Mount the electrode and grounding cable as shown in the photo.



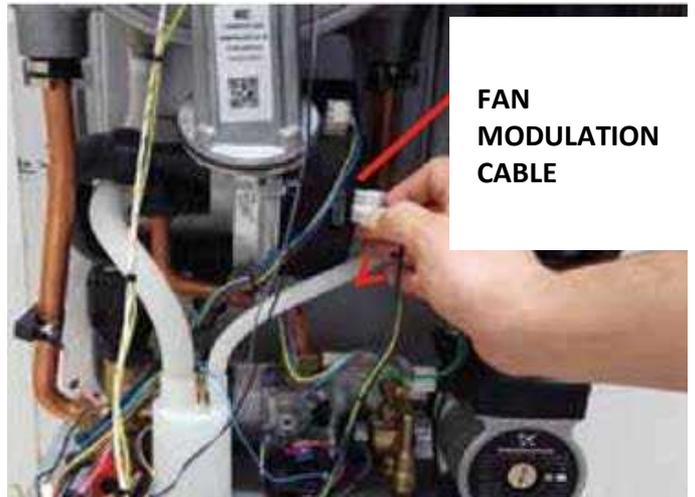
**NOTE:** When mounting the electrode, you must hear the locking sound as "click".

- **Dismounting/ mounting fan cables:** Mount the cables of fan modulation and fan supply as shown in the photo.

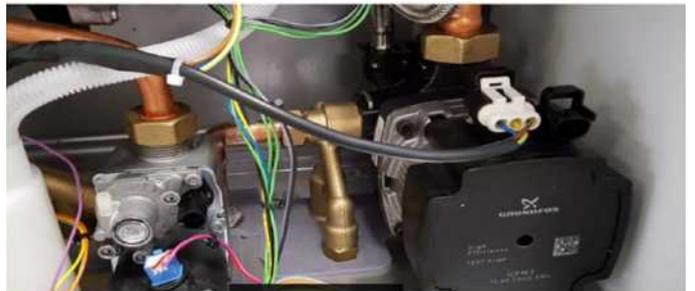
**High Voltage;**



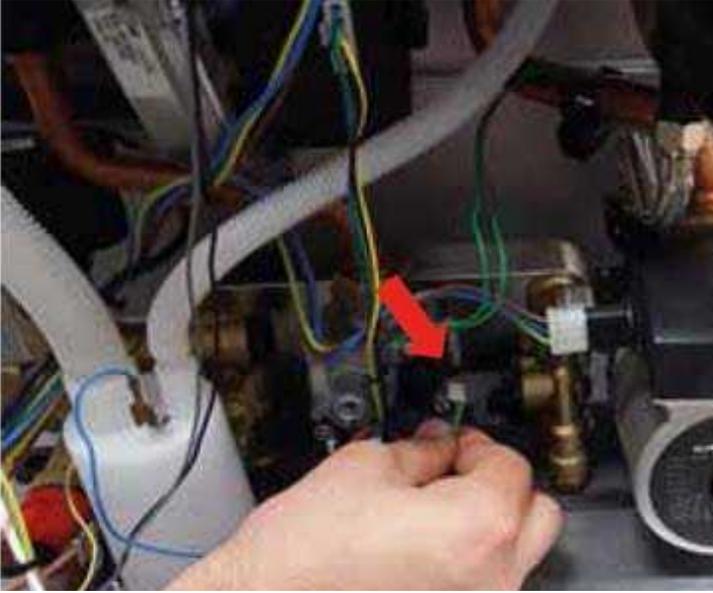
**Low Voltage;**



- **Dismounting/ Mounting pump cable:**



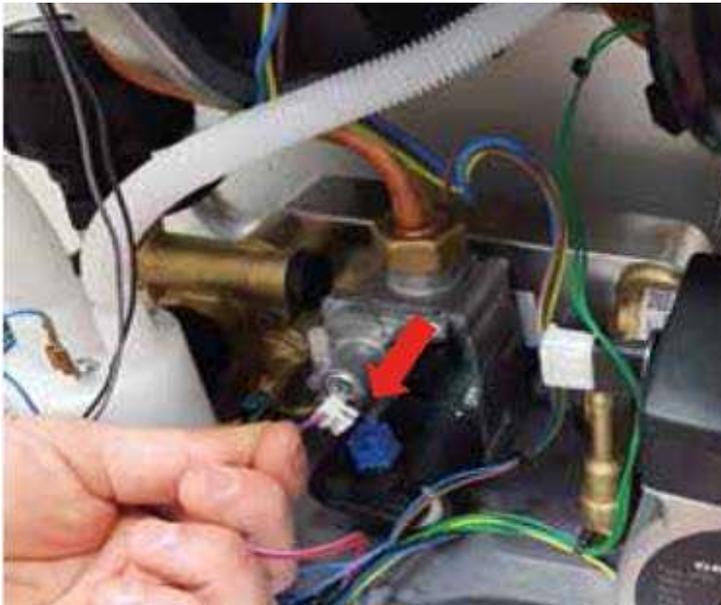
➤ **Dismounting/ Mounting flow sensor and cable:** Flow sensor (Hall Effect sensor) in the tap water line shown in the photo.



➤ **Dismounting/ Mounting surface-type NTC and cable:** There are 2 surface type NTC on CH Supply and CH Return pipes in boiler.



➤ **Dismounting/ Mounting gas valve cable:**



**Dismounting/ Mounting condensate trap and condensate trap hose:**



- Remove 2 hoses on condensate trap.
- Remove 2 screws on the lower chassis for complete Dismounting of condensate trap.



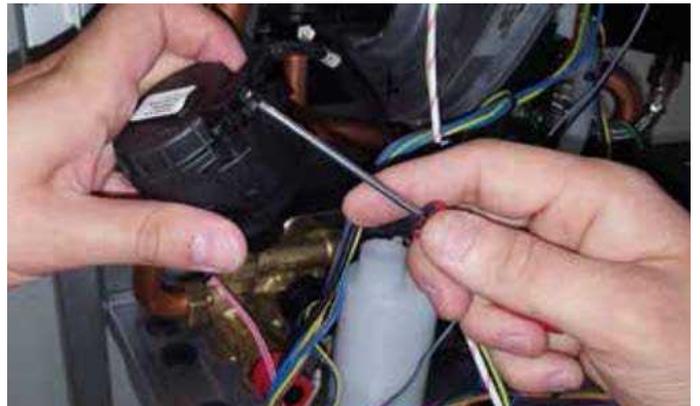
- Remove 2 screws on the lower chassis for complete Dismounting of condensate trap.



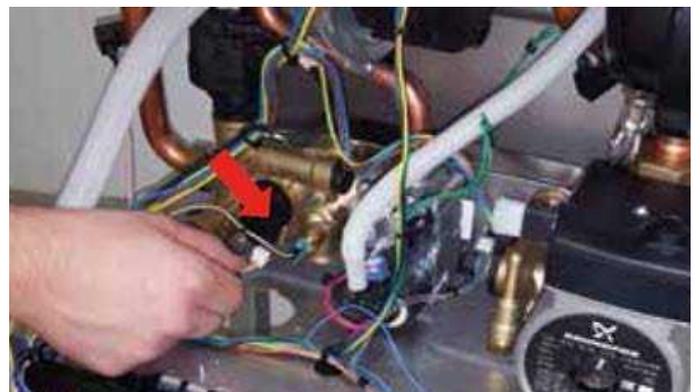
**➤ Mounting/ dismounting motorized valve:**  
Remove the motorized valve by unlatching the clip holding the manifold and the motorized valve.



- Unscrew the screw on the valve motor in order to replace the cable of the motorized valve. Remove the notch of cable from its hold using a hand tool.



**➤ Dismounting/ mounting water pressure sensor:**  
It is necessary firstly to dismount the condensate trap completely in order to dismounting water pressure sensor. Afterward, remove the water pressure sensor cable.



- Dismount the water pressure sensor using a wrench. Pay attention to put the seal when remounting.



- **Mounting/ dismounting immersion-type NTC:** Remove NTC using a 18mm wrench.



- **Mounting/ dismounting 3 bar Safety Valve:** Remove firstly the hose at the end of safety valve. Remove the connecting screw of lower chassis to the side panel. Afterwards, unscrew the nut on the manifold using an Allen screwdriver. In order to remove the safety valve, it is necessary to apply some downward pressure on the bottom chassis.



- **Mounting/ dismounting Plate Exchanger:** Undo the nuts on manifold using an Allen and remove the plate exchanger.



- **Mounting/ dismantling Gas Valve:** Undo 2 nuts fastening the gas valve to the lower chassis.



- Remove the brass nut joining the gas valve and gas pipe using a wrench.
- Placing gas throttle washer: Place the orifice washer between 2 seals into the gas valve.



- **Mounting/ dismantling Venturi:** Remove the clip fastening the gas pipe and venturi. Undo the nut fastening silencer to the burner housing. After removing the silencer, dismantle the venturi by rotating.



- After removing the silencer, dismount the venturi by rotating.



- **Mounting/ dismounting the expansion tank:** For dismounting the expansion tank, remove the clip holding the flexible hose to the pump using a hand tool.



- Unscrew the nut affixing the expansion tank and the flexible hose using a wrench.



- Remove the gripper brackets of expansion tank.



- **Mounting/ dismounting the Main Exchanger group:** Undo the screws of fan and manifold connections using an Allen tool. Remove the clips of CH Supply/Return pipes.



- Undo the screws of fan and manifold connections using an Allen screwdriver.





➤ Remove the Duroboard as shown in the photo.



➤ Undo the ignition /ionization electrode screws using an Allen tool.



➤ Remove 4 nuts fastening the burner and the cover using an Allen tool.



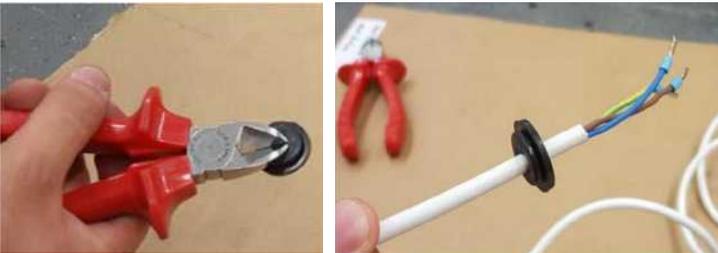
➤ Remove 4 screws of the burner door. Follow the order of operations (shown as wrench symbol) inscribed on the burner door when dismantling and remounting.



- **Connection of Controller:** Remove the passage rubber on the bottom console.



- Cut the end of passage rubber and slip it on the controller cable.



- Mount the controller cable to the terminal block as shown in the photo.



- **Mounting/ dismounting the main board:** Remove the main board by flexing the notches holding the main board on the control panel.



- **Mounting/ dismounting the mounting part of 3-way shaft group:** Remove the mounting part on the CH supply manifold using a wrench.



- **Mounting/ dismounting the pump:** Remove the nut of the CH return pipe using a wrench.



- Remove CH return manifold.



- **Mounting/ dismantling of flow sensor:** Remove it using a wrench.



- Remove the screws fastening the pump and to bottom consol.



- **Dismounting of tap water filter:** Remove the filter on tap DHW inlet pipe using a fine hand tool.



## 9-PART DEFINITIONS & MAINTENANCE INSTRUCTIONS

### ➤ CONDENSATE TRAP

Subject	Description
<b>Part Function</b>	It is the component allowing the discharge of condensate and rain water without allowing the exhaust gas discharge
<b>Impact in case of Faulty Operation</b>	1- Raise of water in condensate trap due to clogging of condensate trap 2- Discharge of exhaust gas from condensate trap's drain to outdoor
<b>Primary Relevant Error Codes</b>	-
<b>Troubleshooting and Testing Method</b>	Visual inspection and cleaning of any dirt, burrs, etc. inside condensate trap cleaning steps: 1- Move the condensate trap up and down. 2- Rotate it counterclockwise. 3- Pull it downward by hand or a hand tool. 4- Rinse any dirt in the condensate trap. 5- If any, remove any deposits in the condensate hose.
<b>Maintenance Period</b>	Once a year or if condensate trap is blocked, according to instruction written above.



**1**



**2**



**3**



**4**



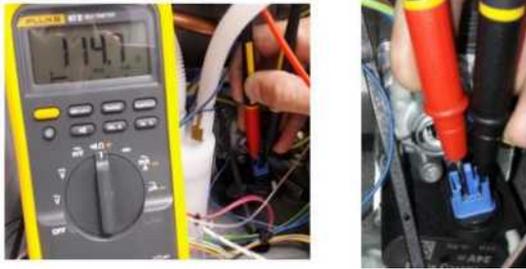
**5**

➤ MAIN BOARD

Subject	Description
<b>Part Function</b>	Control every electronic and electromechanical component. Indicates overall operation status of boiler as well as sensor data.
<b>Impact in Case of Faulty Operation</b>	1- In general, PCB failure gives an error code on LCD screen and does not fulfill heating necessity.
<b>Primary Relevant Error Codes</b>	E01, E02, E08, E12, E21, F25
<b>Troubleshooting and Testing Method</b>	Visual Inspection: Inspection of whether cable connections are proper and without any damage, and checking any abnormality of components/circuits on the circuit board (tarnishing, solder cracks/splits, etc.)
<b>Maintenance Period</b>	No special maintenance requirement.
	

➤ GAS VALVE

Subject	Description
<b>Part Function</b>	1- Adjust the amount of gas required for burning and transmits it to venturi.
<b>Impact in Case of Faulty Operation</b>	1- Boiler does not burn. 2- Gas regulation is improper.
<b>Primary Relevant Error Codes</b>	E01,E02, E08, E12, E21, E82
<b>Troubleshooting and Testing Method</b>	Visual Inspection and Testing: 1- Checking whether cable connections are proper and without damage 2- Resistance check 3- Voltage Testing
<b>Maintenance Requirement</b>	It requires no special maintenance.
<b>Maintenance Period</b>	-
	

Testing Definition	Testing Method
<b>Gas Valve Resistance Control</b>	Cut off the power of the boiler. Measure the resistance between connecting pins of gas valve. Check whether it is in the range of 110-120 Ohm.
	
<b>Measuring Gas Valve Supply Voltage</b>	Cut off the power of the boiler. Dismount the gas valve connector. Connect the power to the boiler. Check whether the resistance at the connector ends coming from the main board is in the range of 23-25 V when the boiler is trying to ignite.
	

## ➤ MAIN HEAT EXCHANGER

Subject	Description
<b>Part Function</b>	It is the main component in the central heating circuit enabling heat transfer to water.
<b>Impact in Case of Faulty Operation</b>	1- Failure to fully meet heating demand 2- Water or gas leakage
<b>Primary Relevant Error Codes</b>	E01, E03, F07, F37, F58
<b>Troubleshooting and Testing Method</b>	1- Checking whether there is any dirt on pipes of exchanger wings and clogging between pipes 2- Visual inspection of cracks or holes on exchanger pipes 3- Noises of boiling, bubbling, etc. coming from inside exchanger 4- Fresh air emission measurement testing
<b>Maintenance Requirement</b>	Exchanger inner pipe cleaning
<b>Maintenance Period</b>	Once a year, according to instructions below.
	

Maintenance Definition	Maintenance Method
<b>Exchanger Inner Pipe Cleaning</b>	1- Unscrew 4 nuts and open the burner door 2- Suck any deposits on pipes using a vacuum cleaner. 3- Clean any deposits on pipes using a brush (with non-metallic wires). 4- Flush rinse inside of the exchanger with water. 5- Complete the maintenance after cleaning the condensate trap since dirt will accumulate in the condensate trap after washing with water. Note: Cleaning deposits should never be made using any acidic or alkali-based cleaning agents.

➤ **PLATE HEAT EXCHANGER**

Subject	Description
<b>Part Function</b>	1- It is the component transferring the heat of hot water coming from the main exchanger to the tap water plumbing for meeting tap water demand. 2- When all radiator valves are closed, it continues its function on water circulation itself (internal by-pass).
<b>Impact in Case of Faulty Operation</b>	1- In case of partial or full clogging, not heating or constantly overheating the tap water 2- Overheating of central heating system because of failure of internal by-pass function 3- Constant pressure increase in central heating system (infiltration of tap water into central heating circuit due to a hole inside the plate exchanger)
<b>Primary Relevant Error Codes</b>	E03, F07, E16, E17, E80, F40
<b>Troubleshooting and Testing Method</b>	1- Visual inspection for whether plate exchanger has a leak to outside 2- Checking whether central heating circuit pressure varies extremely after tap water is turned on
<b>Maintenance Requirement</b>	Cleaning of Plate Hex
<b>Maintenance Period</b>	Once a year or if its blocked, according to instructions below.

Maintenance Definition	Maintenance Method
Inner Cleaning of Plate	1- Dismount the plate exchanger. 2- Fill the holes of plate exchanger with a lime remover agent (HN03) and wait for 10 minutes. 3- Rinse inside the plate exchanger after emptying the lime remover agent.
	

➤ PUMP

Subject	Description
Part Function	1- It ensures water circulation inside the central heating circuit. 2- It discharges the air in the central heating installation thanks to internal air vent on it.
Impact in Case of Faulty Operation	1- Boiler gives “overheating” or “no heat is detected by temperature sensor” error. 2- No water is heated on tap water demand. 3- Freeze protection function fails to work properly. 4- Water, instead of air, comes out of pump air relief cock, and is discharged into boiler. If it persists to occur, there may be low pressure error.
Primary Relevant Error Codes	E03, E16, E17, E80, F07, F37
Troubleshooting and Testing Method	Visual Inspection: 1- Checking whether cable connections are proper and without damage 2- Checking for connectors on the pump are installed properly 3- Checking whether water comes out of the pump air vent or not 4- Voltage Testing 5- Checking for water filter is clogged or not
Maintenance Requirement	No special maintenance requirement
Maintenance Period	-
	
<p>Energy efficiency Pump      Air Pressure Relief Cock</p>	

Testing Definition	Testing Method
<b>Pump Voltage Control</b>	When the power is on, the voltage between pump's high voltage supply connector pins (brown is the phase and blue is the neuter). Check whether it is in the range of 215-240 V AC.
	
<b>Pump Blockage Control</b>	There is automatic blockage function in energy efficient pumps. When pump is blocked, it tries to run automatically at a maximum torque at every 1.5 seconds in order to eliminate blockage. In order to support blockage operation manually, it is necessary to rotate counterclockwise by pressing on the point shown with "A" using a No. 2 screwdriver.
	

➤ VENTURI

Subject	Description
<b>Part Function</b>	It is the component where gas coming from gas valve and air sucked in from silencer part.
<b>Impact in case of Faulty Operation</b>	1- Burning emission values are improper. 2- Boiler load may be higher or lower. 3- It may operate noisily (whistling).
<b>Primary Relevant Error Codes</b>	E01, E82
<b>Troubleshooting and Testing Method</b>	1- Visual inspection: Checking whether there is any burrs, dirt, etc. pieces at the inlet and outlet ends, and inside venturi 2- Checking installation of it with gas pipe, fan, and silencer 3- Checking burning emission values using a gas analysis boiler
<b>Maintenance Requirement</b>	-
<b>Maintenance Period</b>	-
	

➤ IMMERSION TYPE NTC

Subject	Description
<b>Part Function</b>	It is the component measuring the water temperature in the tap water circuit.
<b>Impact in Case of Faulty Operation</b>	1- There may be a inconformity and hot water rippling because of difference between the temperature set by user and actual temperature. 2- The boiler does not function.
<b>Primary Relevant Error Codes</b>	E18, F52
<b>Troubleshooting and Testing Method</b>	Visual Inspection and Testing: 1- Checking whether cable connections are proper and without damage 2- Checking whether there is any rusting, corrosion, or deformation on the immersion probe 2- Resistance check
<b>Maintenance Requirement</b>	No special maintenance requirement
<b>Maintenance Period</b>	-
	

Testing Definition	Testing Method
<b>Immersion Type NTC Resistance Control</b>	Cut off the power to the boiler. Remove immersion type NTC from the boiler and keep them rest at room temperature for about 10 minutes for cooling. Measure resistance between NTC ends. Check whether resistance value conforms to the following chart.



Ambient Temperature (°C)	Resistance measured on Surface Type NTC ends (kohm)
0-5	27,3 - 22,1
6-10	21,2 - 18
11-15	17,3 - 14,7
16-20	14,1 - 12,1
21-25	11,6 - 10
26-30	9,63 - 8,3
31-35	8 - 6,95
36-40	6,7 - 5,8

➤ FLUE GAS SENSOR

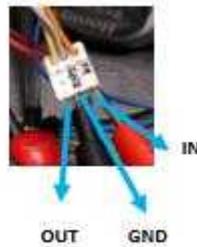
Subject	Description
<b>Part Function</b>	It is the component protecting the boiler from overheating by measuring flue gas temperature.
<b>Impact in Case of Faulty Operation</b>	1- Where ingress or egress surface type NTC sensors malfunction, the boiler continues to burn without giving overheating warning and cause deformation of exchanger. 2- The boiler does not function.
<b>Primary Relevant Error Codes</b>	E18, F07, F53
<b>Troubleshooting and Testing Method</b>	Visual Inspection and Testing: 1- Checking whether cable connections are proper and without damage 2- Checking whether there is any rusting, corrosion, or deformation on the immersion probe 3- Resistance check
<b>Maintenance Requirement</b>	No special maintenance requirement
<b>Maintenance Period</b>	-
	

Testing Definition	Testing Method
<b>Flue Gas Sensor Resistance Control</b>	Cut off the power to the boiler. Remove the flue gas temperature sensor the boiler and keep them rest at room temperature for about 10 minutes for cooling. Measure resistance between NTC ends. Check whether resistance value conforms to the following chart.
	
<b>Ambient Temperature (°C)</b>	<b>Resistance measured on Surface Type NTC ends (kohm)</b>
0-5	30,9 - 24,5
6-10	24 - 19,5
11-15	19 - 15,7
16-20	15,2 - 12,7
21-25	12,2 - 10,3
26-30	9,8 - 8,4
31-35	8 - 6,9
36-40	6,5 - 5,7

➤ WATER PRESSURE SENSOR

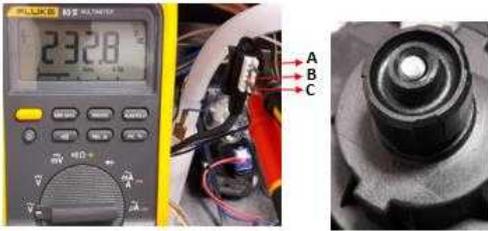
Subject	Description
<b>Part Function</b>	It is the component measuring water pressure in the central heating circuit.
<b>Impact in Case of Faulty Operation</b>	1- The boiler gives low or high water pressure error. 2- It detects water pressure different from user's actual value. 3- It may not detect pressure increase even if user fills water into the system.
<b>Primary Relevant Error Codes</b>	F37, F40, F47
<b>Troubleshooting and Testing Method</b>	Visual Inspection and Testing: 1- Checking whether cable connections are proper and without damage 2- Checking whether water inlet of water pressure sensor is clogged 3- Voltage Testing
<b>Maintenance Requirement</b>	No special maintenance requirement
<b>Maintenance Period</b>	-

Testing Definition	Testing Method
<b>Water Pressure Sensor</b>	Remove electrical connector on water pressure sensor when the power of the boiler is still on, and measure the DC voltage on "IN"- "GND" ends shown below. Check whether the voltage is in the range of 4.9-5.1 V DC.



➤ 3 WAY VALVE MOTOR

Subject	Description
<b>Part Function</b>	It is used for directing water to the central heating and tap water circuits.
<b>Impact in Case of Faulty Operation</b>	1- Boiler remains only in the central heating mode. 2- When in the summer mode, radiators may get warm. 3- During changing of motorized valve modes, noise may come from the motor. 4- Wearing may cause heating problems.
<b>Primary Relevant Error Codes</b>	E03, F07
<b>Troubleshooting and Testing Method</b>	Visual Inspection: 1- Checking whether cable connections are proper and without damage 2- Checking whether connectors on the 3-way motor are installed properly 3- Voltage Testing (for central heating and tap water modes)
<b>Maintenance Requirement</b>	No special maintenance requirement
<b>Maintenance Period</b>	-
	

Testing Definition	Testing Method
<b>3-Way Motorized Valve Voltage and Mode Control (Central Heating)</b>	Measure the voltage between A-B on the motorized valve connector in the central heating mode when the power on the boiler is still on. Check whether the voltage is in the range of 215-240 V AC. Motorized valve pin must be at the end.
	

Testing Definition	Testing Method
<b>3-Way Motorized Valve Voltage and Mode Control (Tap Water Heating)</b>	Turn on the tap water when the power on the boiler is on. Measure the voltage between B-C on the motorized valve connector in the tap water heating mode. Check whether the voltage is in the range of 215-240 V AC. Motorized valve pin must be at the back.
	

➤ **3 BAR SAFETY VALVE**

Subject	Description
<b>Part Function</b>	When water pressure in the central heating system reaches to 3 bars, it opens the discharge end for discharging excess water out.
<b>Impact in Case of Faulty Operation</b>	1- Low pressure error due to over-discharge of water 2- High pressure error due to no discharge of water 3- Risk of leakage occurrence in plumbing where user continues to fill water after high pressure error
<b>Primary Relevant Error Codes</b>	F37,F40
<b>Troubleshooting and Testing Method</b>	1- Checking whether the end of safety valve is water-tight when water pressure in the central heating circuit is in the range of 0.8-2.5 bars 2- Opening Pressure Testing
<b>Maintenance Requirement</b>	No special maintenance requirement
<b>Maintenance Period</b>	-
	
Testing Definition	Testing Method
<b>Safety Valve On-Off Pressure Testing</b>	Open the supply tap and fill water into the central heating system. In the range of 2.7-3.3 bars, safety valve opens its drain due to high water pressure; discharge must continue until water pressure drops to the range of 2.5-2.7 bars.

➤ **IGNITION – IONIZATION ELECTRODE**

Subject	Description
<b>Part Function</b>	1- To ignite and start burning the gas-air mixture coming from the burner. 2- To detect whether flame is formed in the burner.
<b>Impact in Case of Faulty Operation</b>	1- No ignition and burning as result of that the distance between electrode ends is too much or too narrow 2- Noisy burning (explosion burning) as result of late ignition 3- Due to electrode being away from the burner, reduced ionization flow and flame loss in boiler time to time
<b>Primary Relevant Error Codes</b>	E01, E82
<b>Troubleshooting and Testing Method</b>	1-Visual inspection: If there is any oxidation, etc. on electrode rods, it must be cleaned with a cloth. 2- Electrode dimensional measurement controls 3- Ionization flow control 4- Replace electrode and electrode gasket together
<b>Maintenance Period</b>	Once a year or in any erros due to electrode, according to instruction written above. The electrode gasket must be replaced after each dismounting operation.
	

Maintenance Definition	Maintenance Method
<b>Electrode Measurement Controls</b>	A) Distance between electrode rods must be in the range of 9.5-10.5 mm. B) Measure the distance between two ends of electrode; it must be in the range of 3.5-4.5 mm. C) The closest distance of electrode rod to the burner must be in the range of 6,5-8,5 mm.
	
Testing Definition	Testing and Maintenance Method
<b>Ionization Current Control</b>	After starting, access to Inquiry mode "In". Access to i09 inquiry parameter. Wait at this parameter for 2 minutes and check whether ionization flow is at least "25" or over on LCD screen.

➤ EXPANSION VESSEL

Subject	Description
<b>Part Function</b>	Cold water filled into the central heating system expands as it gets warm. It is used for preventing the increase of the water pressure in the system.
<b>Impact in Case of Faulty Operation</b>	Pressure increase in the central heating circuit and discharging water through safety valve
<b>Primary Relevant Error Codes</b>	F37, F40
<b>Troubleshooting and Testing Method</b>	Measuring the expansion tank gas pressure
<b>Maintenance Period</b>	Once a year, according to instructions below.
	

Maintenance Definition	Maintenance Method
<b>Measuring Expansion Tank Gas Pressure</b>	<p>Drain water in the central heating plumbing. Afterwards, measure the gas pressure at the pressure relief valve of expansion tank using a manometer.</p> <p>The pressure value measured should be over 0.5 bars. Otherwise, it is necessary to add gas until the pressure reaches to 1 bar. (If any pressure drop occurs within 6 months in the expansion tank where gas is added, expansion tank must be replaced).</p>
	

➤ FLOW SENSOR

Subject	Definition
<b>Part Function</b>	It is the component allowing that tap water demand may be detected by boiler.
<b>Impact in Case of Faulty Operation</b>	Boiler cannot detect tap water demand; even if there is any tap water demand, it always runs in the CH mode.
<b>Primary Relevant Error Codes</b>	-
<b>Troubleshooting and Testing Method</b>	Visual Inspection and Testing: 1- Checking whether cable connections are proper and without damage 2- Checking whether there is any oxidation, etc. around the flow sensor cable inlet 3- Voltage Testing 4- Filter cleaning and flow turbine group inspection Note: If P00 parameter is "5", the boiler does not function with the tap water since it will be only in the central heating mode
<b>Maintenance Requirement</b>	No special maintenance requirement
<b>Maintenance Period</b>	-
	

Testing Definition	Testing Method
<b>Flow Sensor</b>	Turn the tap water on when the power on the boiler is on. Remove electrical connector on flow sensor and measure the DC voltage on "IN"-"GND" ends shown below. Check whether the voltage is in the range of 11.5-12.5 V DC.
	

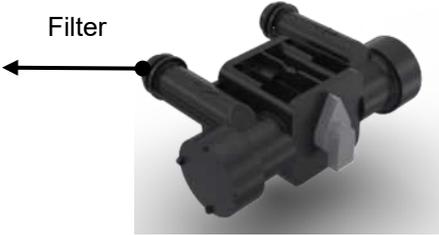
➤ FLOW TURBINE

Subject	Description
<b>Part Function</b>	In case of tap water demand, its turbine structure starts rotating to form the magnetic field that flow sensor will detect.
<b>Impact in Case of Faulty Operation</b>	Boiler can not detect tap water demand; even if there is any DHW water demand, it always runs in the central heating mode.
<b>Primary Relevant Error Codes</b>	-
<b>Troubleshooting and Testing Method</b>	Visual Inspection and Testing: 1- Checking whether there is any deformation, crack, fissure, etc. on flow turbine blades 2- Filter cleaning and flow sensor inspection Note: If P00 parameter is "5", the boiler does not operate with the tap water since it will be only in the central heating mode.
<b>Maintenance Period</b>	Once a year, according to instructions given above.
	

➤ 3 WAY SHAFT GROUP

Subject	Description
<b>Part Function</b>	1- It is the group getting its motion from 3-way motorized valve in order to ensure that boiler goes in the summer mode and the winter mode. 2- It ensures the internal by-pass function when the central heating valves are closed.
<b>Impact in Case of Faulty Operation</b>	1- Boiler may remain constantly in the summer or winter mode in case the valves are jammed. 2- Internal by-pass function may not be functional. 3- There may be water leakage at 3-way motorized valve connections.
<b>Primary Relevant Error Codes</b>	E03, F07
<b>Troubleshooting and Testing Method</b>	1- Set and operate the boiler in the winter mode. Check whether there is any temperature increase on CH return temperature sensor. 2- Set and operate the boiler in the summer mode. Check whether there is any temperature increase on immersion type temperature sensor. When boiler operates in the summer mode, no heating should be on the radiator core located to the closest to boiler. Check it. 3- Remove three-way motorized valve and check whether there is any water at the bottom.
<b>Maintenance period</b>	-
	

➤ WRAS APPROVED FILLING LOOP

Subject	Description
<b>Part Function</b>	It is used for filling water to the central heating system.
<b>Impact in Case of Faulty Operation</b>	1- No water is filled into combi boiler. 2- It cannot be turned off when filling water to boiler, and it causes water discharge by opening safety valve. 3- It leads to mixing of tap water with the water in the central heating system. 4- Where the pressure of main tap water system is very low, it may cause low pressure error by emptying water in the central heating system due to a faulty valve.
<b>Primary Relevant Error Codes</b>	F40, F37
<b>Troubleshooting and Testing Method</b>	Visual Inspection and Testing: 1- Checking whether there is any dirt, burrs, wear, deformation, etc. on filling loop o-ring and filter.
<b>Maintenance Period</b>	Once a year filter cleaning, according to informations above.
<div style="display: flex; align-items: center; justify-content: center;">  <div style="text-align: center;"> <p>Filter</p>  </div> </div>	

## 10- INSPECTION AND MAINTENANCE CHECKLIST

#	Maintenance work	Interval	
1	Record all of the analysis results in the Benchmark service record in these instructions	Annually	
2	Ask the end user whether any significant problems occur when operating the product	Annually	
3	Use the diagnostics system to check the product's fault history	Annually	
4	Visually inspect whether the air/flue pipe and its opening have been installed correctly in accordance with the set-up instructions	Annually	
5	Check that the unit has been installed correctly and the connections have been secured	Annually	
6	Check all of the connections for tightness	Annually	
7	Check that the condensate pipe is in good condition, that it is leak-tight and that the drain is correct	Annually	
8	Check whether all of the externally routed condensate pipes are dimensioned correctly and have been insulated sufficiently (frost protection)	Annually	
9	Check whether the gas flow rate corresponds with the specifications on the data plate and lies within the tolerances specified in these instructions	Annually	
10	If the gas flow rate lies outside of the tolerances specified in these instructions, eliminate the fault in accordance with the regulations and the current technology	Annually	
11	Check the general condition of the product and, if required, eliminate any faults that are found	Annually	
12	Carry out the combustion analysis: Measure the CO content, CO <sub>2</sub> content and the CO/CO <sub>2</sub> ratio. For products with a rear air/flue connection: The combustion analysis can only be carried out when the unit casing has been removed; it is not necessary to test these products for flue gas recirculation	Annually	
13	Check the product's recirculation at the supply air test point on the air/flue pipe. If required, inspect the entire air/flue system and, if necessary, correct the fault	Annually	
14	Disconnect the product from the electrical installation	Annually	
15	Check and, if required, correct the electrical installation	Annually	
16	Remove the unit casing, check the condition of all of the functional components, in particular for leaks, corrosion, rust, etc. and, if required, repair any damage	Annually	
17	Visual inspection of the heat exchanger and burner seals. If required, replace the seals.	Annually	
18	Carefully clean the inside of the product: The air passages to the burner must be clear and clean	Annually	
19	Close the installation's gas stopcock and, if required, service valves	Annually	
20	Check the quality of the heating water: Clarity (clouding), correct inhibitor and pH value	Annually	
21	Checking the burner	Annually	
22	Check and, if required, clean the ignition electrode	at regular intervals	
23	Cleaning the heat exchanger	at regular intervals	
24	Check and, if required, replace the insulating mat in the burner area	at regular intervals	
25	Cleaning the condensate trap	Annually	

26	Check the water flow rate (domestic hot water). Insufficient water flow rate → Check the incoming water supply. Incoming water supply sufficient, water flow rate too low → Clean or replace the strainer in the cold water inlet	Annually	
27	Check the impeller sensor for dirt/damage and, if required, replace it	Annually	
28	Reassemble the product	After each time maintenance work is carried out	
29	Open the service valves, carry out the required leak-tightness test	Annually	
30	Fill the product/heating installation to the filling pressure specified for the system	Annually	
31	Connect the product to the electrical installation	Annually	
32	Run the test operation on the product/heating installation including hot water generation (if available) and, if required, purge the product/heating installation	Annually	
33	Measure the CO content, CO <sub>2</sub> content and the CO/CO <sub>2</sub> ratio again	Annually	









## PRODUCTION

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