

**E.C.A.**<sup>®</sup>

**fELiS**

**FELIS  
WALL TYPE CONDENSING BOILER**

**FELIS FL 50/65/100/125/150 HM**



**SERVICE MANUAL**

## 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

Final Model Name	OEM Product Number	GC No Allocated by British Gas**
FELIS FL 50 HM NG GB	8116724000	41-814-41
FELIS FL 65 HM NG GB	8116720000	41-814-42
FELIS FL 100 HM NG GB	8116721000	41-814-43
FELIS FL 125 HM NG GB	8116722000	41-814-44
FELIS FL 150 HM NG GB	8116723000	41-814-45

## 1. INTRODUCTION

E.C.A. Felis condensing boilers are designed for efficient, safe and comfortable central heating needs. In this manual, you will find the installation, service and usage information of E.C.A. FELIS condensing boilers that can work with natural gas and LPG. Detailed explanations are given in the service manual on the technical features of the device, assembly / disassembly information, operating principle, maintenance information and detection and elimination of possible malfunctions.

Please read this manual carefully to take advantage of all the features of the device and to ensure long-term trouble-free operation.

Keep all documents supplied with your device for use when necessary.

- It complies with the regulations on the restriction of the use of some harmful substances in electrical and electronic goods.
- It does not contain polychlorobiphenyl, asbestos or mercury.

## 2. GENERAL FEATURES

E.C.A. Felis condensing boilers are designed for safe and comfortable central heating needs. Felis devices should be connected to the heating system and hot water distribution system, which is suitable for the performance and power level of the boiler. Felis condensing boilers operate with natural gas and LPG.

They provide space saving in usage areas with its design providing ease of service and maintenance, and width and length dimensions that do not change between capacities. They look elegant thanks to their rounded lines and designs.

The stylish cover on the display panel protects the panel from the environmental effects of boiler rooms and mounting areas.

The operating functions and safety of the device are provided through a central "main board". Main board : controls the gas valve, fan, and circulation pump. Whether there is a flame in the burner is constantly checked through the ionization electrode, and this can be monitored on the LCD screen and via the LEDs on the display panel.

The control panel is ergonomically designed and easy to use. Featuring a visualized plastic control panel and an advanced LCD screen, Felis condensing boiler provides ease of use and service with menus in English. You can see operating positions icons, heating circuit and domestic water set values, heating circuit water current temperature value, English explanation error / fault codes and heating water installation pressure on a white LCD screen.

With the safety systems in your device, you and your device are fully secured. These safety systems are;

- Flame Extinguishing Safety
- Heater Circuit Water Overheat Safety (90 °C)
- Flue Gas Overheating Safety (95 ° C)
- Over Temperature Safety (105 ° C)
- High Water Pressure Safety (6 bars)
- Low Water Pressure Safety (0.8 bars)
- Low Voltage Safety (170 VAC)
- Freezing Safety (Your device should not be disconnected from the electricity for the freeze safety to work)
- Automatic Air Purge
- Annual Maintenance Reminder System

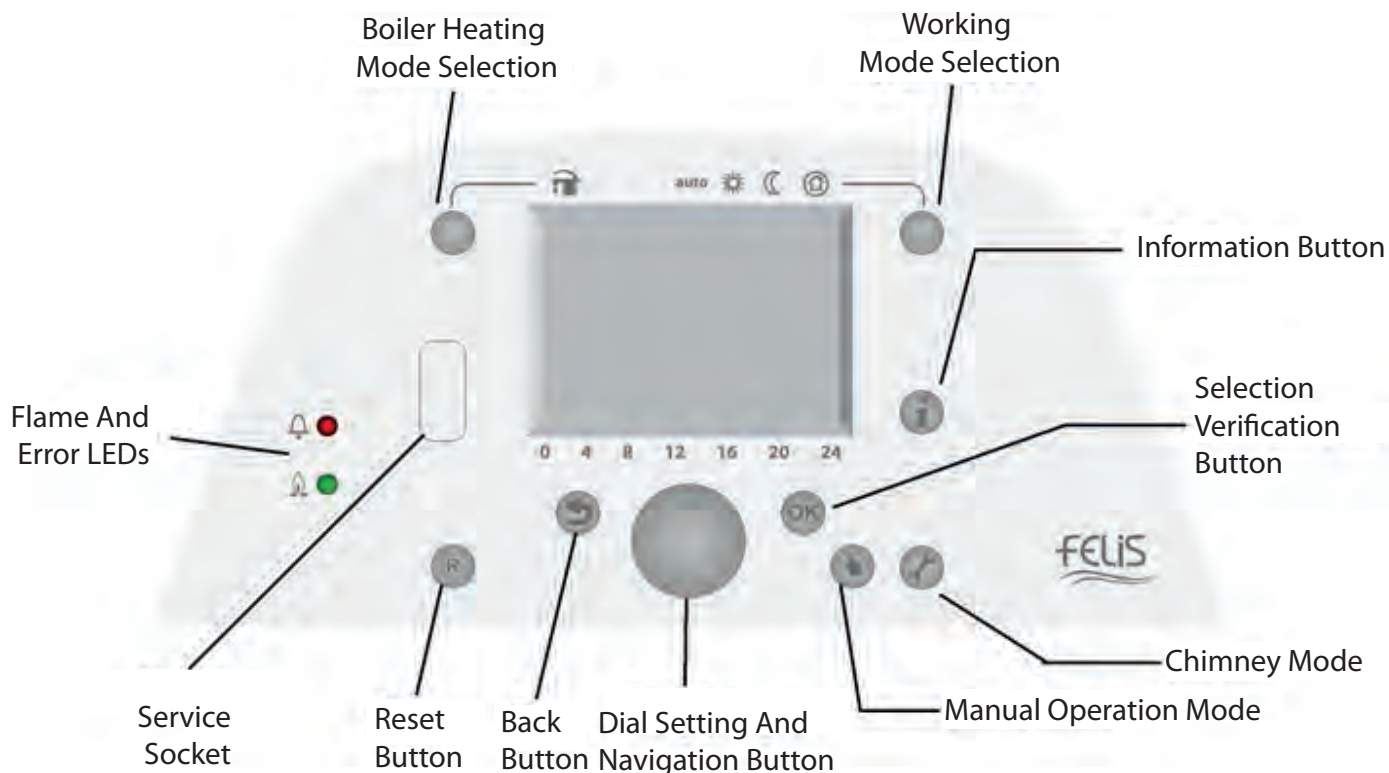
### 3. TECHNICAL FEATURES

Product Type	Unit	FELIS FL 50 HM	FELIS FL 65 HM	FELIS FL 100 HM	FELIS FL 125 HM	FELIS FL 150 HM
<b>General</b>						
Gas Category		I <sub>2H</sub> , I <sub>2E</sub>	II <sub>2H3B/P</sub>	I <sub>2H</sub> , I <sub>2E</sub>	II <sub>2H3B/P</sub>	I <sub>2H</sub> , I <sub>2E</sub>
Flue Types		C13(x), C33(x), C43(x), C63(x), C93(x), B23P				
Hermetic Type		Fully Hermetic				
Gas Inlet Pressure (G20)	mbar	20				
Gas Inlet Pressure (G30)	mbar	-	29	-	29	-
Gas Inlet Pressure (G31)	mbar	-	37	-	37	-
Electric Supply	V AC-Hz	230 VAC-50 Hz				
Electric Consumption	Watt	75	117	143	228	306
Protection Class		IPX4D				
Weight (Net)	kg	42	53	66	74	89
Water Volume	L	3	4,5	6,5	8	9,5
Dimensions (net) (HxWxD)	mm	835x501x525	835x501x590	835x501x590	835x501x660	835x501x730
Dimensions (gross) (HxWxD)	mm	1055x665x595	1055x665x650	1055x665x650	1055x665x720	1055x665x790
<b>Capacity - Efficiency</b>						
Q <sub>max</sub> , Maximum Heating Load - (@80/60°C)	kW	47,05	68,05	96,70	120,71	140,77
Q <sub>min</sub> , Minimum Heating Load - (@60°C) (G20)	kW	8,18	13,50	20,09	24,20	26,57
Q <sub>min</sub> , Minimum Heating Load - (@60°C) (G30/G31)	kW	-	14,70	-	31,20	-
P <sub>min</sub> , Minimum Heating Power - (@60°C)	kW	7,84	13,03	19,4	22,54	25,75
P <sub>max</sub> , Maximum Heating Power - (@80/60°C)	kW	45,55	66,04	94,05	116,75	135,67
P <sub>min</sub> , Minimum Heating Power - (@30°C)	kW	9,09	14,89	22,34	26,29	29,82
P <sub>max</sub> , Maximum Heating Power - (@50/30°C)	kW	49,91	73,36	102,00	129,01	150,43
Efficiency - (60°C return) (max min)	%	96,8% - 95,8%	93,4% - 97,1%	97,3% - 96,9%	96,6% - 96,6%	97,0% - 96,4%
Efficiency - (30°C return) (max min)	%	104,8% - 108,0%	106,2% - 108,1%	105,7% - 108,0%	105,4% - 107,6%	105,5% - 107,7%
<b>ErP Information</b>						
Seasonal Space Heating Energy Efficiency Class		A				
Seasonal Space Heating Energy Efficiency (η <sub>s</sub> )		91,8	91,4	91,8	92	91,8
Rated Heat Output (Prated)	kW	45,6	68,05	96,7	120,7	140,8
Sound Power Level	dB(A)	53	53	53	51	51
Efficiency at Rated Output at High Temperature Regime	%	86,4	84,3	87,8	87,1	87,5
Efficiency 30% Output at Low Temperature Regime (η <sub>1</sub> )	%	97,2	97,5	97,4	97,1	97,2
Electrical Consumption at Full Load (el <sub>max</sub> )	Watt	75	115	139	226	297
Electrical Consumption at Part Load (el <sub>min</sub> )	Watt	16	22	33	35	27
Electrical Consumption at Standby (P <sub>sb</sub> )	Watt	4	4	4	3	4
Standby Heat Loss (P <sub>stby</sub> )	kW	0,411	0,939	1,564	0,644	1,6
Yearly NO <sub>x</sub> Emissions	mg/kWh	37,82	28,13	26,4	42,91	34,06
Space Heating Annual Energy Consumption	kWh	39713	57390	83085	102765	118623
Space Heating Annual Energy Consumption	GJ	143	207	299	370	427

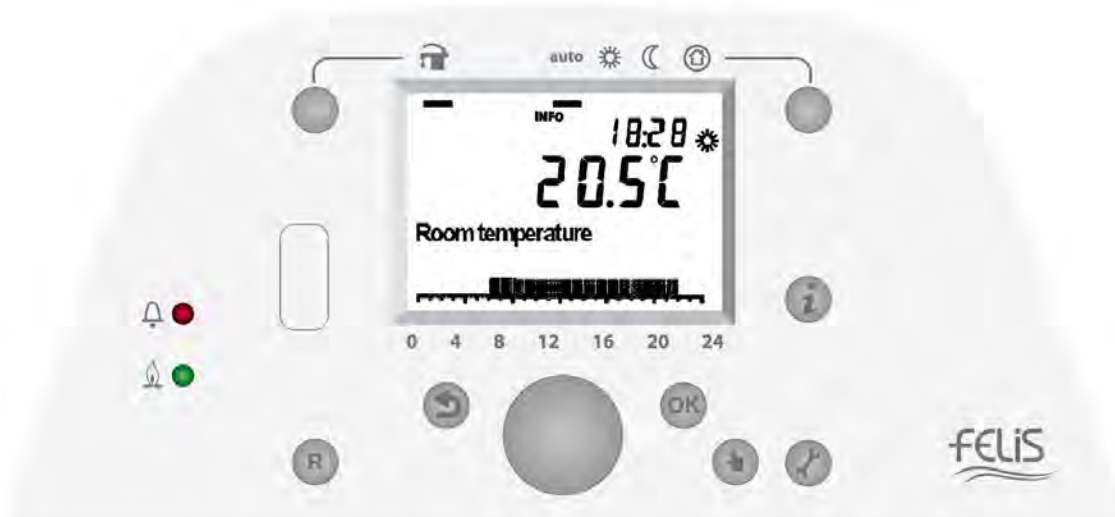
<b>Gas Consumption</b>						
Natural Gas - G20 (@Min-Max Capacity)	m <sup>3</sup> /h	0,882 - 5,120	1,464 - 7,384	2,179 - 10,506	2,513 - 13,100	2,878 - 15,148
LPG - G30 (@Min-Max Capacity)	kg/h	-	0,832 - 4,038	-	1,817 - 6,767	-
LPG - G31 (@Min-Max Capacity)	kg/h	-	1,117 - 5,216	-	2,289 - 9,143	-
NO <sub>x</sub> Class		6				
<b>Central Heating</b>						
Min. Water Pressure	bar	0,8				
Max. Water Pressure	bar	3	4,5	6		
Operation Range (@Radiator Heating)	°C	30-85				
Max. Limit Temperature	°C	85				
<b>Emission Values</b>						
CO <sub>2</sub> @ max capacity (G20)	%	9,69 ± 0,2	9,32 ± 0,2	9,38 ± 0,2	9,50 ± 0,2	9,83 ± 0,2
CO <sub>2</sub> @ min capacity (G20)	%	8,60 ± 0,2	8,54 ± 0,2	8,52 ± 0,2	8,75 ± 0,2	8,89 ± 0,2
CO <sub>2</sub> @ max capacity (G30)	%	-	11,63 ± 0,2	-	10,92 ± 0,2	-
CO <sub>2</sub> @ min capacity (G30)	%	-	10,49 ± 0,2	-	10,11 ± 0,2	-
CO <sub>2</sub> @ max capacity (G31)	%	-	10,95 ± 0,2	-	10,12 ± 0,2	-
CO <sub>2</sub> @ min capacity (G31)	%	-	10,31 ± 0,2	-	9,60 ± 0,2	-
Flue Gas Temperature	°C	<82	<75,4	<75,6	<76,8	<74,4
Flue Gas Flow Rate (min-max)	g/s	3,52 - 17,59	5,28 - 22,17	9,35 - 45,08	9,90 - 48,93	12,1 - 54
<b>Flues</b>						
Flue Diameter	∅ mm	80 / 125			100 / 150	
C13 (x) - Max. Flue Length (Horz.)	m	10	10	11	11	11
C33 (x) - Max. Flue Length (Vert.)	m	12	12	13	13	13
B23P - Max. Flue Length	m	11	11	12	12	12
* Maximum flue lengths are given for straight connections. Each 90° elbow equals to 1,5m, each 45° elbow equals to 1m flue length.						

## 4. CONTROL PANEL

E.C.A. Felis condensing boilers convey a lot of information to the user about the status of the devices and the installation, with a large LCD screen and menus with full English explanation and with their easy-to-use menu structure they allow full control over the devices.



By pressing the “Information” button (if appropriate accessories are available), many information about the device and the installation such as “Flow temperature, Outdoor temperature, Room Temperature, Water Pressure, Authorized Service Phone” can be displayed on the screen.
















In cascade applications, a control panel without display and keypad is used in slave devices. With the help of Errors and LEDs on the device, the status of secondary devices can be monitored. Possible errors can be tracked on the primary (master) device’s screen, along with the error code and device address information where the error is located. Devices that go into error state can be reset with the help of the reset button on each device.



With the help of the large LCD screen on the control panel, it is possible to get information about the operating mode, current menu level, operating heating circuit, maintenance and error conditions. Descriptions of the symbols that appear on the screen are as follows.



- |   |                                      |   |                                      |
|---|--------------------------------------|---|--------------------------------------|
|  | Comfort setpoint mode                |  | Knowledge level enabled              |
|  | Reduced set value mode               |  | Programming is active                |
|  | Frost protection mode                |  | Heating mode is temporarily disabled |
|  | Processing in progress - please wait |  | Eco mode activated                   |
|  | Change the battery                   |  | Vacation function activated          |
|  | The burner is running                |  | Heating circuit                      |
|   |                                      |  | Maintenance / special work           |
|   |                                      |   | Error messages                       |

## DATE / TIME SETTINGS

The correct date/time settings of your device are important for the smooth running of time programs and summer / winter transitions. You can change the date/time settings and summer/winter transition dates from the “Date and time of day” menu, which is the first sub menu in the main menu, which you can access by pressing OK button on the main screen.



P. No	Description
1	Hours / minutes
2	Day / month
3	Year
5	Beginning of the summer period
6	End of the summer period

## TIME PROGRAMS

You can program the time intervals on the control panel of your device that you want the heating function to be activated. You can define these settings on weekdays (Mon-Fri), weekend (Sat-Sun), all week (Mon-Sun) or different time periods for each day, and you can set three different time periods within a day. While the device works in accordance with the Comfort Setting Value within the hours set in the time programs, it will operate in accordance



P. No	Description
500	Day range selection
501	1. on time
502	1. off time
503	2. on time
504	2. off time
505	3. on time
506	3. off time

When you enter the menu by pressing the OK button on the main screen, then enter the sub menu called “Heating circuit-1 Time program”, you can program the hours during which you want to turn the heating function of the device on and off with the parameters between 501-506 after selecting the day interval you want to program with the number 500 parameter. The set time program can be seen at the bottom of the screen as a bar graph in 24-hour order.

## Operating Modes

### Selecting the Heating Mode

Switching between four different central heating modes takes place via the Heating Mode button located in the upper right corner of the display panel. The currently selected heating mode is indicated on the screen by the line under the icon on the panel.



In cascade-connected devices, heating mode change, comfort and reduced temperature values and other adjustment operations should be made on the screen of the primary (master) device.



## Automatic Mode

Automatic mode continues the operation of the device according to the specified time programs.

Operating features in automatic mode are:

- Heating mode is based on set time programs.
- Temperature setting values are “Comfort setting value” or “Reduced setting value” according to time schedule.
- Protection functions are activated.
- Summer/winter transition is done automatically on the set date. (ECO function)

## Continuous Operating Mode

Continuous operating mode adjusts the room temperature to the selected continuous operating mode.

 Comfort setting value heating mode

 Reduced setting value heating mode

Operating features in continuous operating mode are:

- Continuous heating without time program
- Protection functions are activated
- Automatic summer/winter transition and 24-hour heating limit are disabled when continuous heating is enabled at the comfort setting value.

## Protection Mode

While in protection mode, heating features are disabled. However, as long as the device has an electricity supply, frost protection features are activated.



Operating features in protection mode are:

- Central heating off
- Frost protection temperature is activated at the set value
- Protection functions are activated
- Automatic summer/winter transition and automatic 24-hour heating limit are activated

## Selecting Domestic Water Heating Mode

The domestic water (boiler) heating mode selection button is on the top right of the display panel. The selection made with this button is indicated on the screen by the line under the icon on the panel. When domestic water heating mode is ON, boiler heating is performed in accordance with the selected startup program.

## Selecting Room Temperature Setting Value

While in the main screen, the “Comfort setting value” change mode is activated by turning the rotary knob counterclockwise. Here, the desired comfort temperature  is set with the rotary knob and the selection is saved with the OK button. To change the reduced setting temperature value , enter the menu by pressing OK button on the main screen, go to the “Heating circuit-1” menu with the rotary navigation button, enter the menu by pressing OK, the “Reduced temperature value” parameter in this menu can be changed.



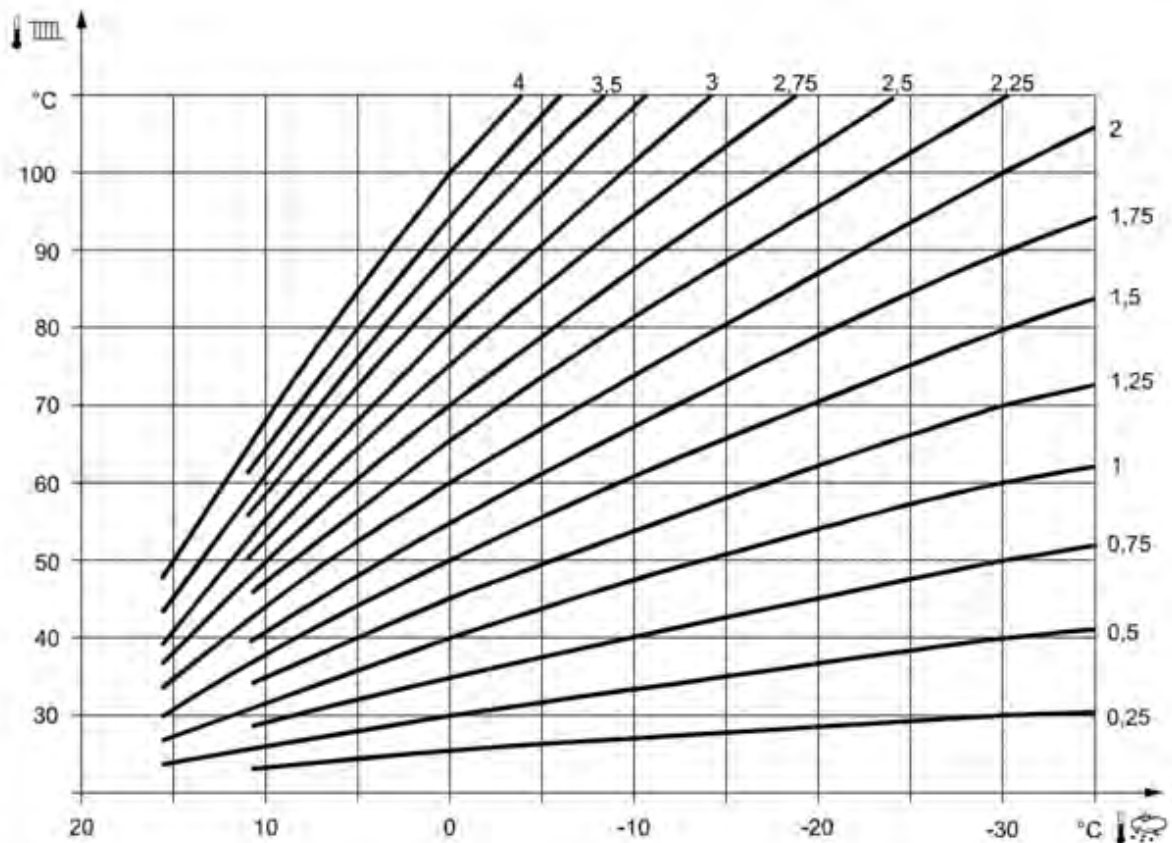
Setting Comfort Setting Value

P. No			Description
ID1	ID2	ID3	
710	1010	1310	Comfort setting value
712	1012	1312	Reduced setting value
714	1014	1314	Frost protection setting
720	1020	1320	Heating curve slope
726	1026	1326	Heating curve adaptation

The heating curve is used to create a specific flow water temperature value depending on the current weather conditions. The heating curve can be adjusted in different ways. So you can adjust the heat demand and room temperature according to the need.

As the slope of the heating curve increases, the outside temperature drops and the flow water temperature rises. In other words, if the room temperature value is not read correctly at low outdoor temperatures but read correctly when the outdoor temperature is high, the slope of the heating curve must be adjusted.

Increasing the slope: It increases the flow water temperature, especially when the outside temperature is low.  
 Decreasing the slope: It decreases the flow water temperature, especially when the outside temperature is low.



Heating Curves for 20 °C Comfort Set Value

## Switching Off The Device and Holiday Function



**CAUTION:** Even if you do not use the boiler, do not cut off the mains electricity of the device. For the frost protection function to be activated, the device must have an electrical connection even when not in use.

In cases where the heating system will not be used for a long time, the operation mode can be set to Freeze Protection mode with the operation mode selection button on the device screen or the holiday period can be set and the device can be operated in holiday mode.

## Holiday Function

With the holiday function, you can program the holiday period you have specified for one calendar year. When the holiday period is active, you can change the operating level as Frost protection or Reduced mode. An active holiday period is shown on the screen by the suitcase icon. The operating mode of the heating circuit does not change.



P. No			Description
ID1	ID2	ID3	
641	651	661	Preselection
642	652	662	Beginning of the
643	653	663	End of the
648	658	668	Operating level

Holiday Function

Holiday periods are only active in Auto mode. In other operating modes, it is started and activated in the background, but is activated when Auto mode is on.

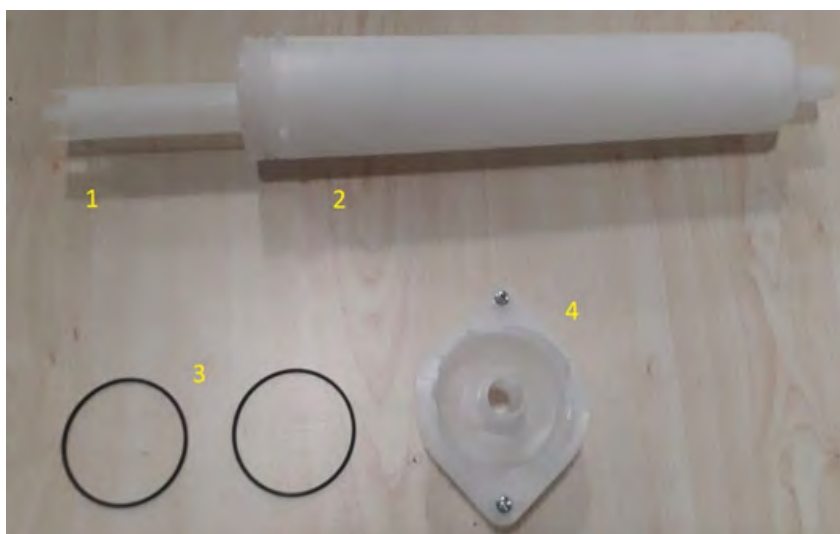
When a holiday period is completed, the controller automatically deletes it. If you want to set up a holiday period on the same date next year, you need to reprogram it. A holiday period starts at 0:00 on the first day and ends at 24:00 on the last day of the holiday and is then deleted.

You can determine your holiday period by entering the first and last day of the holiday. You can choose the desired operating level during the holiday (Reduced or Frost protection). The selected level of work is the same for all holiday periods.

Deactivation of an active holiday period is possible by switching to a non-automatic operating mode or deleting the holiday period.

## 5. IMPORTANT INFORMATION AND WARNINGS

1. The condensate siphon kit included in the box of Felis condensing boilers should be mounted on the device after the device installation.



The siphon pieces numbered in the picture above are:

1	7006721276	SIPHON INNER PIPE
2	7006721278	FELIS SIPHON BODY ULTRASONIC WELDED
3	7006721230	SIPHON O-RING
4	7006721274	SIPHON TOP COVER

The Siphon Inner Pipe 1 is inserted into the Siphon Top Cover Part 4, which is mounted on the device bottom sheet. Then the siphon body consisting of the combination of parts 2 and 3 is inserted into the Siphon Top Cover piece 4 and it is turned counter-clockwise to lock the nails on the piece. While doing this process, it is ensured that 2 pieces of Siphon O-Ring No. 3 are attached on the siphon body.

2. Felis condensing boilers are suitable for cascade connection. In a cascade-connected installation, monitoring of the sensor data of the system and system controls are carried out by the primary (master) boiler. Secondary (slave) boilers operate in accordance with the heat demand transmitted from the primary boiler. This control arrangement eliminates the need to have a screen control panel on devices used as secondary boilers. Possible errors that may occur in the secondary boilers are shown on the primary boiler screen with the boiler number and error code.

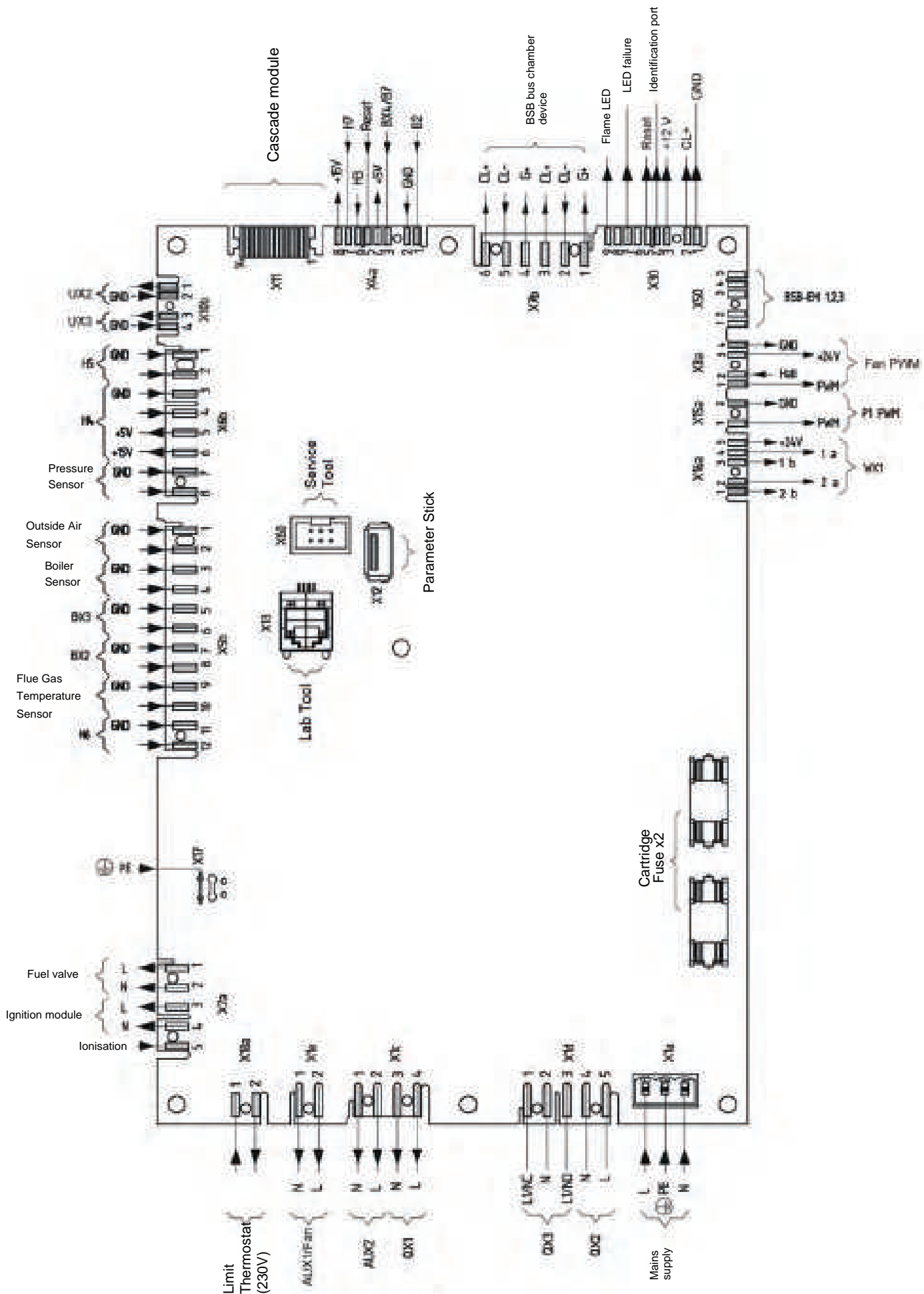
3. After the connection of any additional components (cascade sensor, boiler pump, installation pump, etc.) meant to be connected to the system in the boiler installation is made in the appropriate places shown in the circuit diagram, the equipment connected with the connector connected to the device menu should be assigned. (For example: QX2 - Installation Pump, BX2 - Cascade Flow Sensor, QX3 - Boiler Pump ...) Otherwise, the function will not be activated or the device may give sensor error.

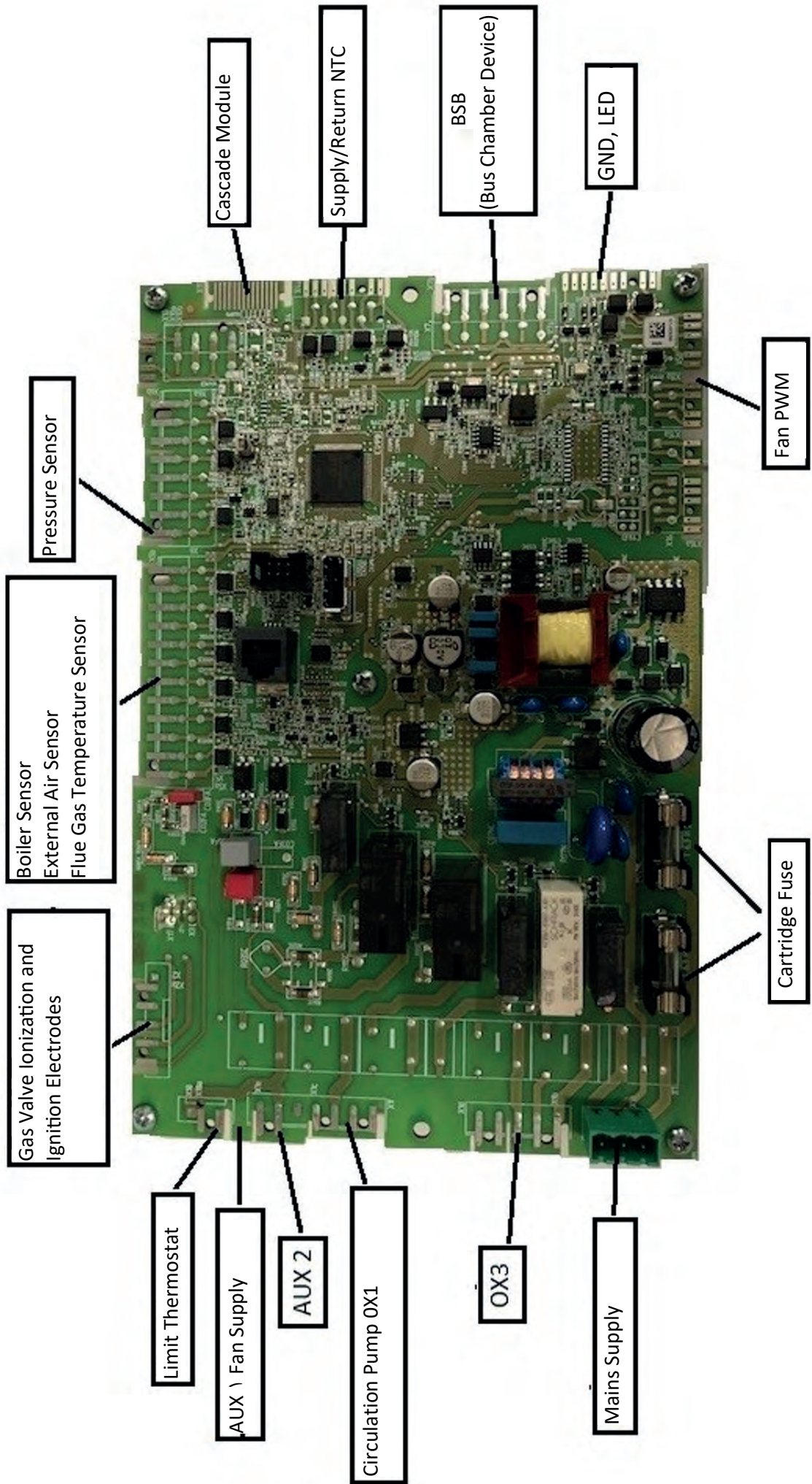
4. For cascade installation of more than one device, device addressing should be performed in order to avoid address conflict before making cascade module connections between devices. Device addressing is described in the Cascade Installation section of the manual.

5. When the engineer is at the authorization level, the "Authorized Service Phone" can be defined from the parameter 7170 under the Service / special working menu, so that by pressing the "Information" button on the main screen, the phone number of the authorized service can be reached.

## 6. CIRCUIT DIAGRAM

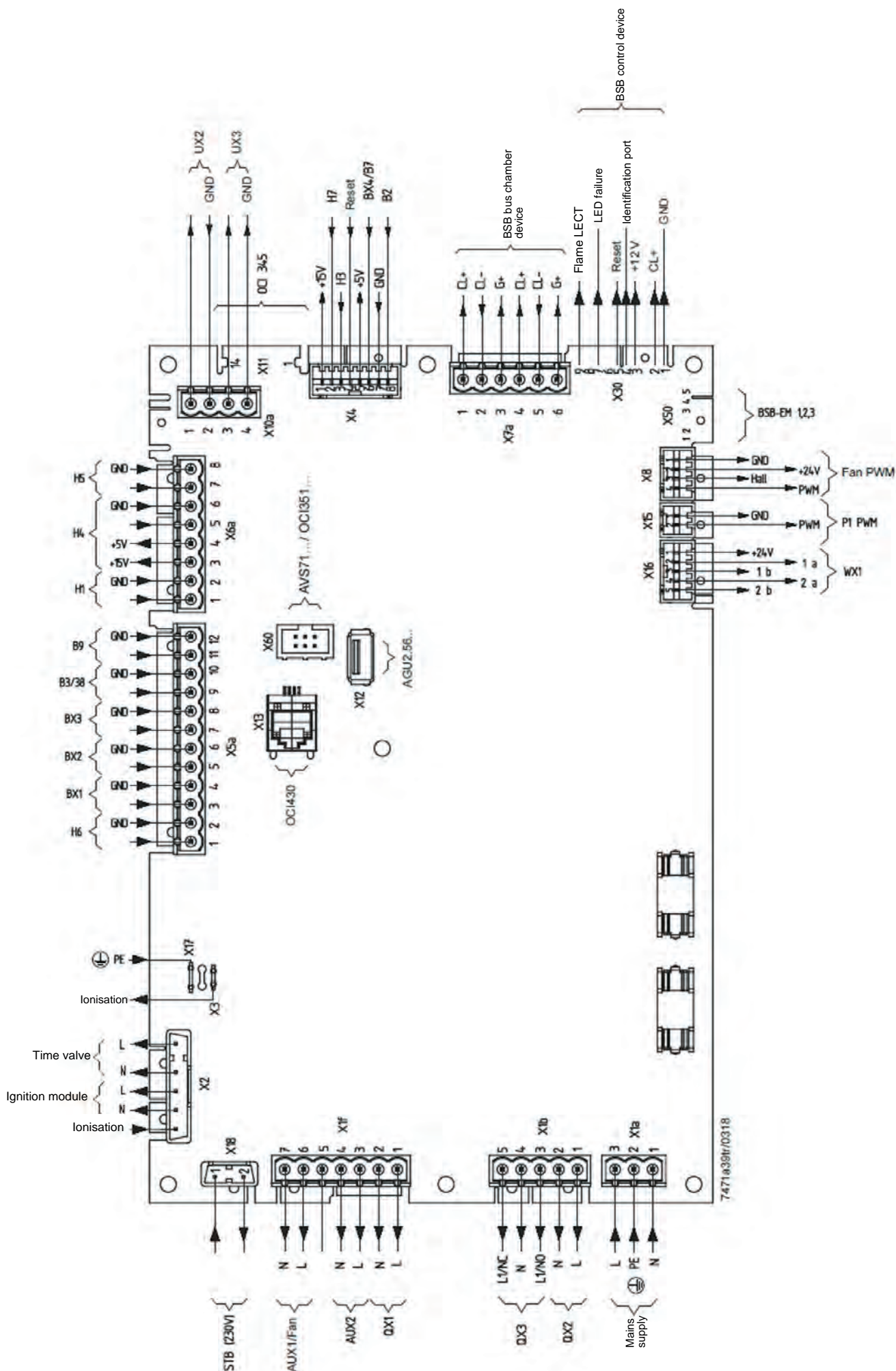
### 6.1. EDGE CONNECTOR (Used in Version V2, V3 and V4.)



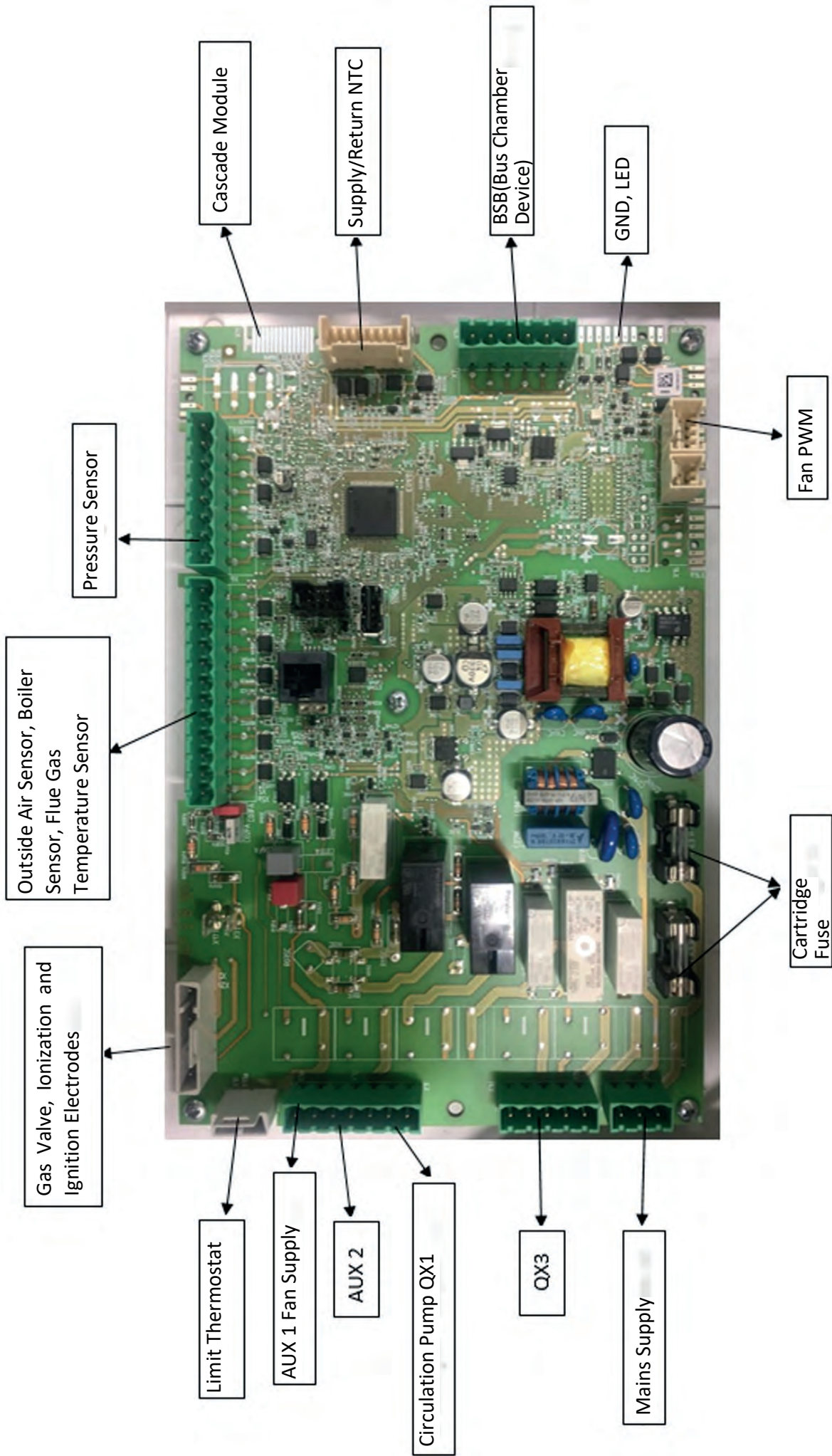


Connected Part	Connector	Pins	Link name	Status
Gas Valve	X2a	1-2	N/A	Factory Defined
Ignition Transformer	X2a	3-4	N/A	Factory Defined
Ionization Electrode	X2a	5	-	Factory Defined
Limit Thermostat	X18a	1-2	N/A	Factory Defined
Earthing	X17	-	-	Factory Defined
Pressure Sensor	X6b	5-7-8	H1	Factory Defined
External Air Sensor	X5b	1-2	B9	Factory Defined
Boiler Sensor	X5b	3-4	B3	Factory Defined
Flue Gas Temperature Sensor	X5b	9-10	BX1	Factory Defined
Fan PWM Signal Connection	X8a	1-2-3-4	Fan PWM	Factory Defined
Fan Power Connection	X1e	1-2	AUX1	Factory Defined
Circulation Pump Power Connection	X1c	3-4	QX1	Factory Defined
Installation Pump Power Connection	X1d	1-2/4-5	QX3/QX2	Should be defined
Cascade Module	X11	1-14	N/A	Factory Defined
Cascade Output Sensor	X5b	5-6/7-8	BX3/BX2	Should be defined
Boiler Pump	X1d	1-2/4-5	QX3/QX2	Should be defined
Three Way Control Card	X50	1-5	N/A	Factory Defined
Display and LED board	X30	1-9	N/A	Factory Defined
Room Thermostat	X6b	1-2/3-4	H5/H4	Should be defined

## 6.2. MEDIUM CONNECTOR (Used in Version V1.)







Gas Valve, Ionization and Ignition Electrodes

Outside Air Sensor, Boiler Sensor, Flue Gas Temperature Sensor

Pressure Sensor

Limit Thermostat

AUX 1 Fan Supply

AUX 2

Circulation Pump QX1

QX3

Mains Supply

Cartridge Fuse

Fan PWM

GND, LED

BSB (Bus Chamber Device)

Supply/Return NTC

Cascade Module

Connected Part	Connector	Pins	Link name	Status
Gas Valve	X2	-	-	Factory Defined
Ignition Transformer	X2	-	-	Factory Defined
Ionization Electrode	X2	-	-	Factory Defined
Limit Thermostat	X18	1-2	N/A	Factory Defined
Earthing	X17	-	-	Factory Defined
Pressure Sensor	X6a	1-2-4	H1	Factory Defined
External Air Sensor	X5a	11-12	B9	Factory Defined
Boiler Sensor	X5a	9-10	B3	Factory Defined
Flue Gas Temperature Sensor	X5a	3-4	BX1	Factory Defined
Fan PWM Signal Connection	X8	-	Fan PWM	Factory Defined
Fan Power Connection	X1f	6-7	AUX1/Fan	Factory Defined
Circulation Pump Power Connection	X1f	1-2	QX1	Factory Defined
Installation Pump Power Connection	X1b	4-5/1-2	QX3/QX2	Should be defined
Cascade Module	X11	1-14	N/A	Factory Defined
Cascade Output Sensor	X5a	7-8/5-6	BX3/BX2	Should be defined
Boiler Pump	X1b	4-5/1-2	QX3/QX2	Should be defined
Three Way Control Card	X50	1-5	N/A	Factory Defined
Display and LED board	X30	1-9	N/A	Factory Defined
Room Thermostat	X6a	8-7/5-6	H5/H4	Should be defined

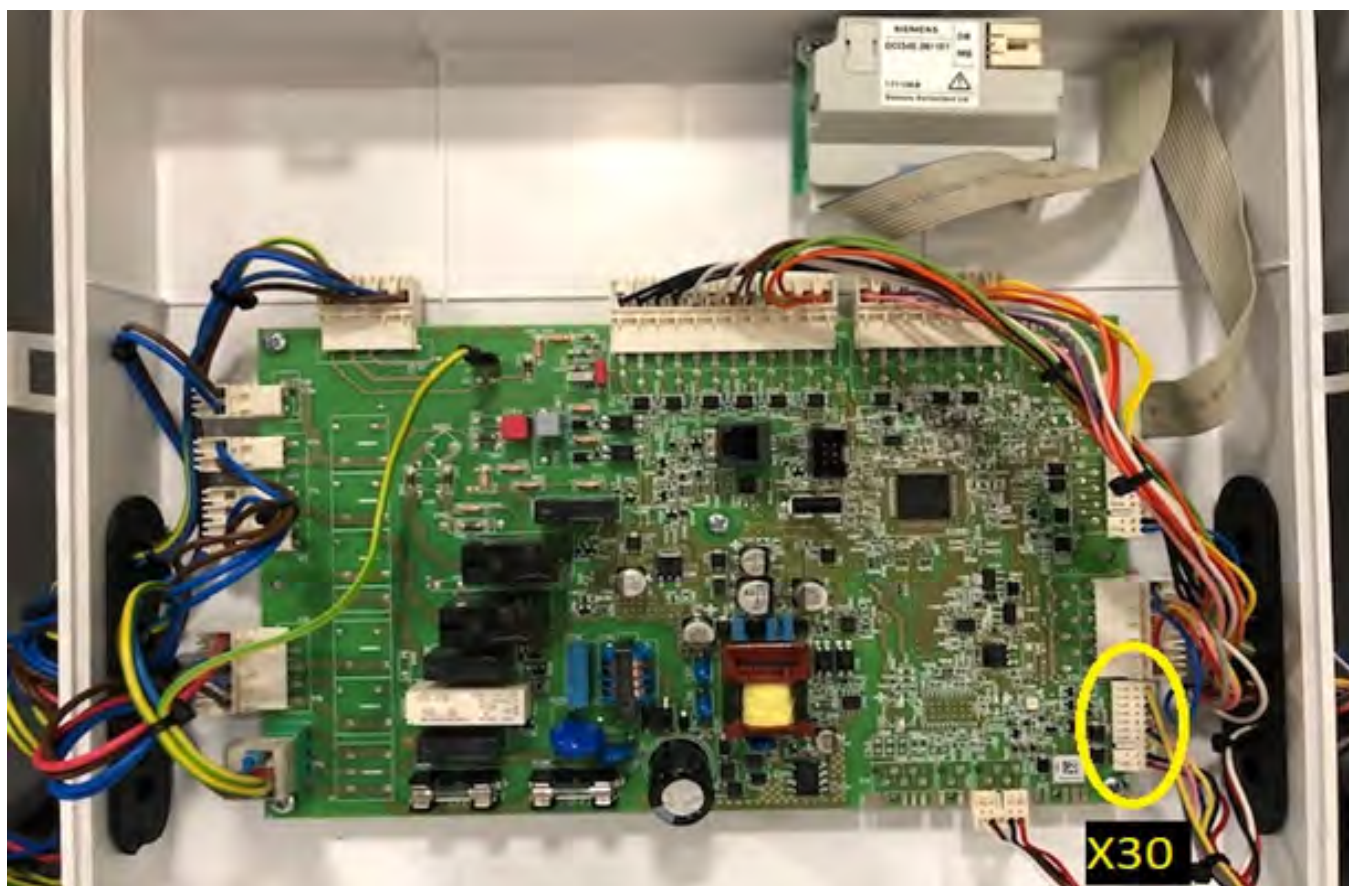
Terminals are left outside the main board box for the parts to be connected during and after installation such as outdoor Sensor, Cascade Sensor, Boiler Sensor, Circulation pump, installation pump, cascade module, room thermostat. With the help of the labels on the terminal cables, it can be seen which terminal belongs to which connection point. After the parts are connected to these terminals, parameter definition must be made according to the connection point (H5, QX2, BX3 etc.) for the parts that need to be defined.

## SCREEN PANEL CONNECTION

Felis condensing boilers are suitable for cascade connection. In a cascade-connected installation, monitoring of the sensor data of the system and system controls are carried out by the primary (master) boiler. Secondary (slave) boilers operate in accordance with the heat demand transmitted from the primary boiler. This control arrangement eliminates the need to have a screen control panel on devices used as secondary boilers. Possible errors that may occur in the secondary boilers are shown on the primary boiler screen with the boiler number and error code.

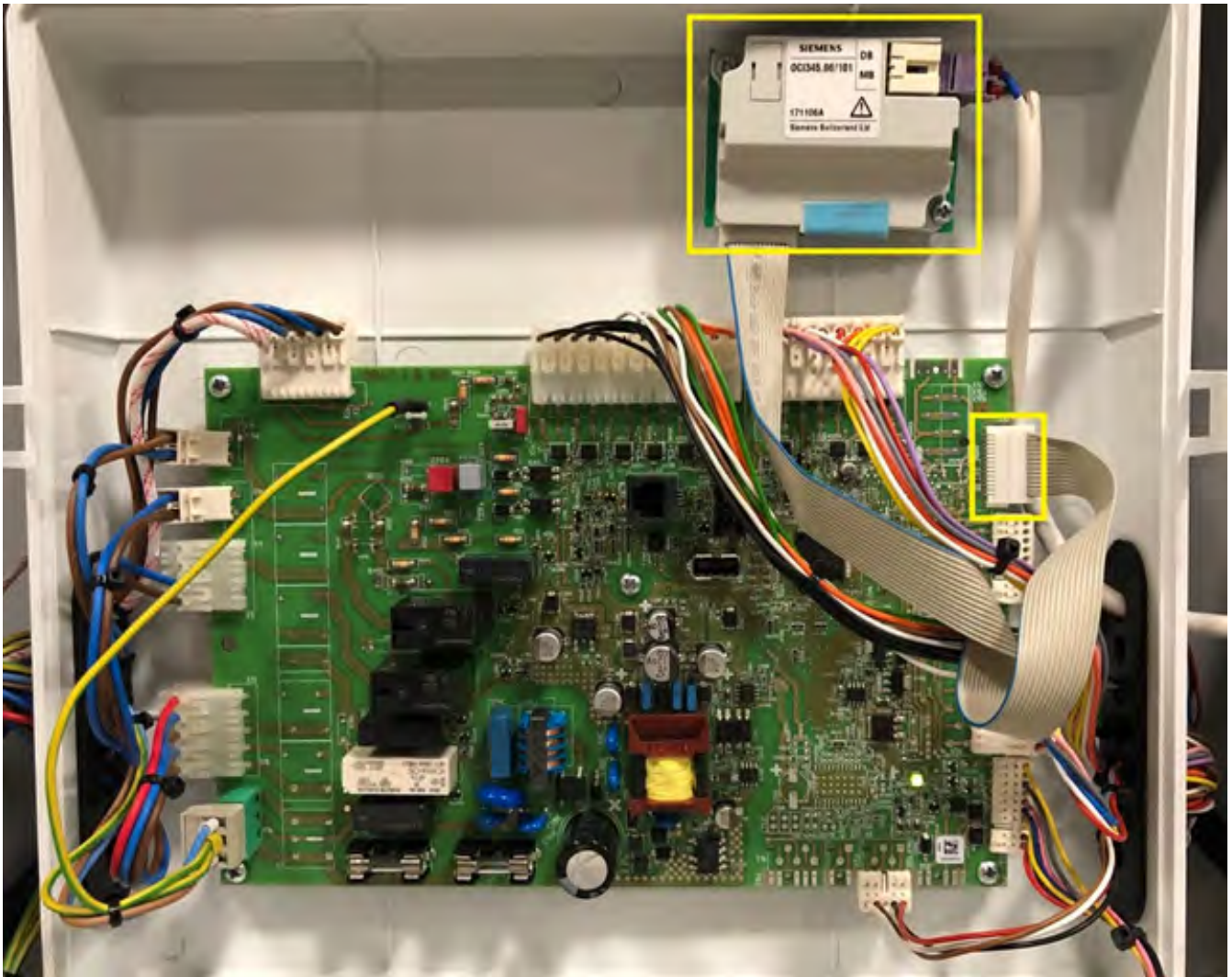
During cascade installation or when it is necessary to intervene the slave boilers with the help of display panel, the display panel to be used for the primary (master) device can be connected to the secondary devices. The following steps should be followed for the connection of the display panel.

- 1) After the front cover of the device is removed, the main board box opens.
- 2) The connector of the LED card on the display panel and the interface cable connected to the display card are connected to the X30 connector on the main board.



## CASCADE INSTALLATION

There are some wiring and parameter settings that need to be activated in order to connect the devices in cascade layout. AF12 Cascade Communication Module, which is available as an accessory, must be available on every device that will operate in cascade layout. The assembly of the cascade communication module can be made in the section reserved in the main board box, as seen in the photo below.



The communication cable attached on the AF12 Cascade Communication Module is connected to the X11 connector of the device main board as shown in the photo. AF12 Cascade Communication Module should be connected to all devices to be installed in cascade.

Before connecting the communication cables between the devices, device addressing is done in order to prevent address conflicts and device errors.

In order to enter the parameter setting menus related to the cascade system, it is first necessary to enter the Engineer authorization level in the main board menu.

## Entering Engineer Authorization Level

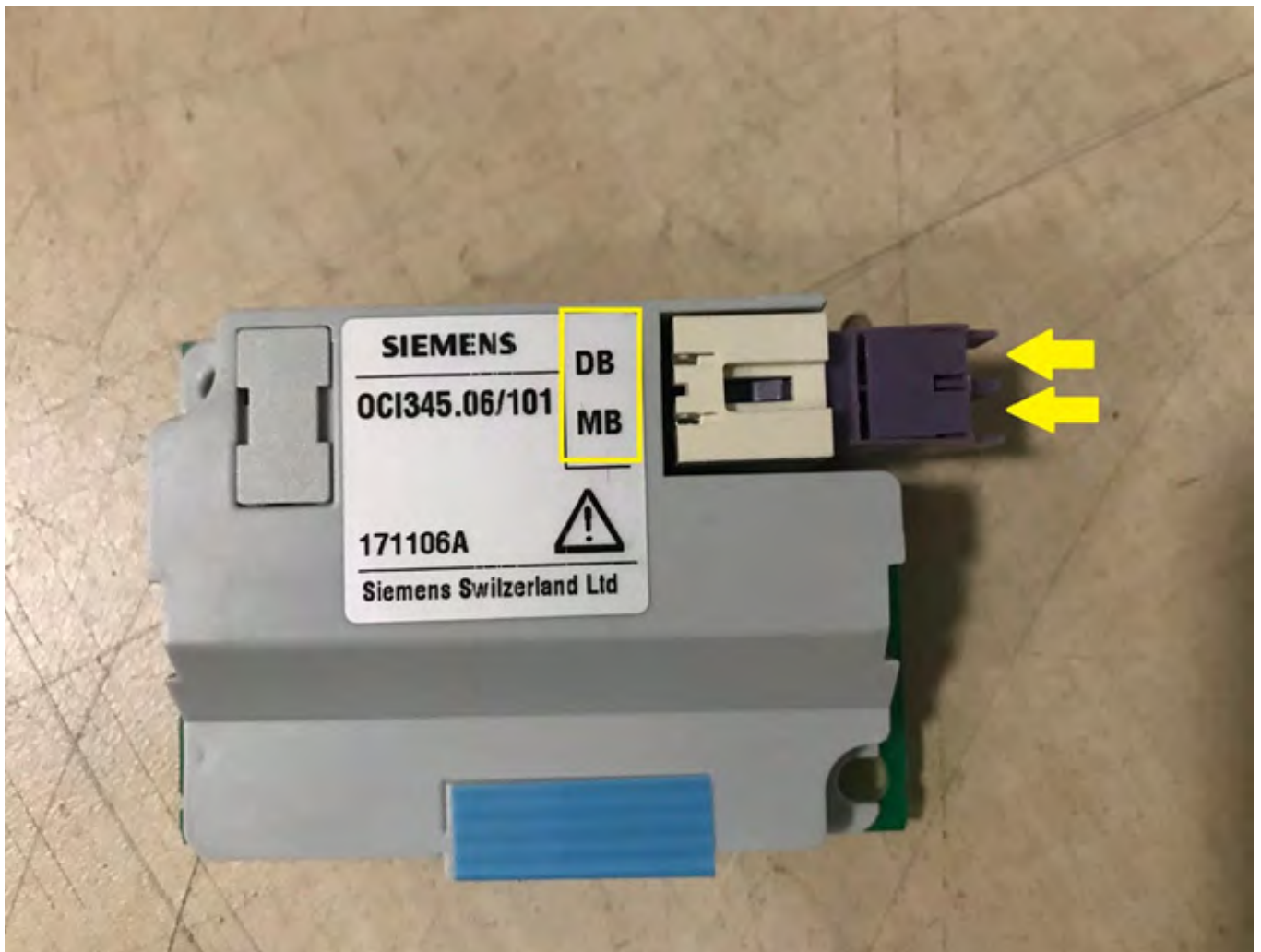
- When the device has electrical connection and is on the main screen, the menu is entered by pressing OK button once. (We can press the Back key several times to make sure we're on the main screen.)
- After entering the menu, "i" button is pressed for 3-5 seconds. An authorization menu will appear on the screen. The options in this menu are "End user, Commissioning, Engineer, OEM".
- In this menu, the "Engineer" option is accessed with the help of the dial and the OK button is pressed once and the selection is confirmed.
- After this process, the menu appears on the screen, some submenus and parameters that could not be entered before can now be accessed.

**• When returning to the main screen using the back button, the Engineer authorization level is exited. If it is necessary to set parameters again, the same procedures can be repeated to enter the level of Engineer authority.**

While the engineer is at the level of authority, the "LPB system" menu is reached with the help of the rotary knob in the main menu, and the menu is entered by pressing the OK button.

- The parameter "Device address" with code 6600 is set to "1" for the master (primary) boiler. For slave (secondary) boilers, the numbers progressing in the form of "2-3-4..." are set. Make sure that the device addresses are not the same.
- The parameter "Segment address" with code 6601 is set to "0" for all devices.
- The parameter "Clock mode" with code 6640 is set to "Master" for the master boiler. It is set as "Remote.Set. Cannot be done. Slave" for slave (secondary) boilers.
- By pressing the back button, the main menu is exited. Then, with the help of the rotary pushbutton, the "Configuration" menu is reached and the menu is entered by pressing the OK button.
- The parameters "Heating circuit-1, Heating circuit-2, Heating circuit-3" with codes 5710, 5715 and 5721 under the Configuration menu will be opened according to the usage status in the master (primary) boiler and set to "Off" in the slave (secondary) boilers.
- In all master (primary) and slave (secondary) boilers, parameter 6110, "Building time constant" under the Configuration menu will be set to "1". Thus, the devices will operate according to the current outdoor temperature information.

After the parameter adjustments, cable connections should be made between the devices that will work in cascade layout. Connection to the DB / MB terminals of the AF12 Cascade Communication Modules in the devices is made using the 2 meter cascade communication cable that comes with the AF12 accessory.



While making the cascade connection between the devices, it should be paid attention that the cable coming out of the DB input of the cascade module of one device will enter the DB input of the cascade module of the other device.

After making cable connections between devices, sensor and pump definitions should be made according to the condition of the components (boiler, 3-way valve, number of zones etc.) in the installation.

## SENSOR / PUMP PARAMETER IDENTIFICATION

After the sensor or pump connections are made, we need to introduce to which port we connect that sensor / pump on the main board to work properly. To do this, first of all, it is necessary to enter the Engineer authorization level in the main board menu.

### Entering Engineer Authorization Level

- When the device has electrical connection and is on the main screen, the menu is entered by pressing OK button once. (We can press the Back key several times to make sure we're on the main screen.)
- After entering the menu, "i" button is pressed for 3-5 seconds. An authorization menu will appear on the screen. The options in this menu are "End user, Commissioning, Engineer, OEM".
- In this menu, the "Engineer" option is accessed with the help of the dial and the OK button is pressed once and the selection is confirmed.
- After this process, the menu appears on the screen, some submenus and parameters that could not be entered before can now be accessed.

**• When returning to the main screen using the back button, the Engineer authorization level is exited. If it is necessary to set parameters again, the same procedures can be repeated to enter the level of Engineer authority.**

### Sensor / Pump Parameters

It is necessary to define a function from the menu after sensor or pump connections are made according to the circuit diagram. After entering the engineer authorization level, while in the main menu, with the help of the dial the "Configuration" menu is reached. By pressing the OK button once, it is entered into the Configuration menu. Then the parameter to be defined as sensor (BX ..), pump (QX ..) or function (H ..) is found with the help of a dial. The list of sensors / pumps / functions that can be defined is in the table below.

Parameter No	Parameter Name	Options	Remark
5890	Relay output QX1	None ; Recirculation pump Q4 ; Electric immersion heater domestic water.K6 ; Collector pump Q5 ; Consumption circuit pump VK1 Q15 ; <b>Boiler pump Q1</b> ; Bypass.pump.Q12 ; Alarm outlet K10 ; 2nd pump speed heating circuit1 Q21 ; 2nd pump speed heating circuit2 Q22 ; 2nd pump speed heating circuit3 Q23 ; Heating circuit pump ID3 Q20 ; Consumption circuit pump VK2 Q18 ; System pump Q14 ; Heat production shut-off valve Y4 ; Solid fuel boiler pump Q10 ; Time schedule 5 K13 ; Storage tank return valve.Y15 ; Solar.energy.pump.external heat exchanger.K9 ; Solar energy collector element storage tank K8 ;	It is set to "Boiler pump Q1" at the factory.

Parameter No	Parameter Name	Options	Remark
		<p>Solar energy collector element swimming pool K18 ;  Swimming pool pump Q19 ; Cascade pump Q25 ; Storage tank transfer pump Q11 ;  Domestic water mixing pump Q35 ;  Domestic water circuit pump Q33 ; Heating request K27 ;  Cooling request K28 ; Heating circuit pump ID1 Q2 ; Heating circuit pump ID2 Q6 ;  Domestic water control element Q3 ; Instant water heater control element Q34 ; Water filling K34 ; 2nd Boiler pump speed Q27 ; Status output K35 ;  Status info K36 ; Flue gas damper K37 ; Fan closing K38 ; Control device  1.K21.Temperature difference ; Control device  2.K22.Temperature difference</p>	
5891	Relay output QX2	<p>None ; Recirculation pump Q4 ; Electric immersion heater domestic water.K6 ; Collector pump Q5 ; Consumption circuit pump VK1 Q15 ; Boiler pump Q1 ; Bypass.pump.Q12 ;  Alarm outlet K10 ; 2nd pump speed heating circuit1 Q21 ; 2nd pump speed heating circuit2 Q22 ; 2nd pump speed heating circuit3 Q23 ; Heating circuit pump ID3 Q20 ;  Consumption circuit pump VK2 Q18 ;  System pump Q14 ;  Heat production shut-off valve Y4 ; Solid fuel boiler pump Q10 ; Time schedule 5 K13 ;  Storage tank return valve.Y15 ;  Solar.energy.pump.external heat exchanger.K9 ;  Solar energy collector element storage tank K8 ;  Solar energy collector element swimming pool K18 ;  Swimming pool pump Q19 ; Cascade pump Q25 ; Storage tank transfer pump Q11 ;  Domestic water mixing pump Q35 ;  Domestic water circuit pump Q33 ; Heating request K27 ;  Cooling request K28 ; Heating circuit pump ID1 Q2 ; Heating circuit pump ID2 Q6 ;  Domestic water control element Q3 ; Instant water heater control element Q34 ; Water filling K34 ; 2nd Boiler pump speed Q27 ; Status output K35 ;  Status info K36 ; Flue gas damper K37 ; Fan closing K38 ; Control device  1.K21.Temperature difference ; Control device  2.K22.Temperature difference</p>	



Parameter No	Parameter Name	Options	Remark
5892	Relay output QX3	None!Recirculation pump Q4 ! Electric immersion heater domestic water.K6 ! Collector pump Q5 ! Consumption circuit pump VK1 Q15 !Boiler pump Q1 ! Bypass.pump.Q12 ! Alarm outlet K10 ! 2nd pump speed heating circuit1 Q21 ! 2nd pump speed heating circuit2 Q22 ! 2nd pump speed heating circuit3 Q23 ! Heating circuit pump ID3 Q20 ! Consumption circuit pump VK2 Q18 ! System pump Q14 ! Heat production shut-off valve Y4 ! Solid fuel boiler pump Q10 ! Time schedule 5 K13 ! Storage tank return valve.Y15 ! Solar.energy.pump.external heat exchanger.K9 ! Solar energy collector element storage tank K8 ! Solar energy collector element swimming pool K18 ! Swimming pool pump Q19 ! Cascade pump Q25 ! Storage tank transfer pump Q11 ! Domestic water mixture pump Q35 ! Domestic water mid circuit pump Q33 ! Heat demand K27 ! Cooling request K28 ! Heating circuit pump ID1 Q2 ! Heating circuit pump ID2 Q6 ! Domestic water control element Q3 ! Instant water heater control element Q34 ! Water filling K34 ! 2nd Boiler pump speed Q27 ! Status output K35 ! Status info K36 ! Flue gas damper K37 ! Fan closing K38 ! Control device 1.K21.Temperature difference ! Control device 2.K22.Temperature difference	
5930	BX1 sensor input	None! Domestic water sensor B31 ! Collector sensor B6 ! Domestic water circulation sensor B39 ! Accumulator tank sensor B4 ! Accumulator tank sensor B41 ! Flue gas temperature sensor B8 ! Cascade flow sensor B10 ! Solid fuel boiler sensor B22 ! Domestic water feed sensor B36 ! Accumulator tank sensor B42 ! General return sensor B73 ! Cascade return sensor B70 ! Swimming pool sensor B13 ! Solar energy flow sensor B63 ! Solar energy return sensor B64 ! Primary heat exchanger sensor B26	It is factory set to "Flue gas temperature sensor B8".
5931	BX2 sensor input	None! Domestic water sensor B31 ! Collector sensor B6 ! Domestic water circulation sensor B39 ! Accumulator tank sensor B4 ! Accumulator tank sensor B41 ! Flue gas temperature sensor B8 ! Cascade flow sensor B10 ! Solid fuel boiler sensor B22 ! Domestic water feed sensor B36 ! Accumulator tank sensor B42 ! General return sensor B73 ! Cascade return sensor B70 ! Swimming pool sensor B13 ! Solar energy flow sensor B63 ! Solar energy return sensor B64 ! Primary heat exchanger sensor B26	

Parameter No	Parameter Name	Options	Remark
5932	BX1 sensor input		
5950	H1 input task	None ; Operating mode change request circuit+domestic water ; Operating mode change domestic water ; Operating mode change heating circuit ; Operating mode change heating circuit 1 ; Operating mode change heating circuit2 ; Operating mode change heating circuit3 ; Heat generation lock ; Error/alarm message ; Consumer demand VK1 ; Consumer demand VK2 ; Use of swimming pool heating source ; Excess heat discharge ; Use of sun energy in swimming pool ; Operating level domestic water ; Operating level heating circuit1 Operating level heating circuit2 ; Operating level heating circuit3 ; Room thermostat heating circuit1 ; Room thermostat heating circuit2 ; Room thermostat heating circuit3 ; Domestic water flow switch ; Domestic water thermostat ; Pulse counter ; Flue gas input from damper notification signal ; Start inhibit ; Boiler flow switch ; Boiler pressure switch ; Consumer demand VK1 10V ; Consumer demand VK2 10V ; Pressure measurement 10V ; Exit request 10V	It is set to "Pressure measurement 10V" at the factory.
5970	H4 input task	None ; Operating mode change request circuit+domestic water ; Operating mode change domestic water ; Operating mode change heating circuit ; Operating mode change heating circuit 1 ; Operating mode change heating circuit2 ; Operating mode change heating circuit3 ; Heat generation lock ; Error/alarm message ; Consumer demand VK1 ; Consumer demand VK2 ; Use of swimming pool heating source ; Excess heat discharge ; Use of sun energy in swimming pool ; Operating level domestic water ; Operating level heating circuit1 ; Operating level heating circuit2 ; Operating level heating circuit3 ; Room thermostat heating circuit1 ; Room thermostat heating circuit2 ; Room thermostat heating circuit3 ; Domestic water flow switch ; Domestic water thermostat ; Pulse counter ; Flue gas input from damper notification signal ; Start inhibit ; Boiler flow switch ; Boiler pressure switch ; Flow measurement Hz	
5971	H4 contact type	Normally closed ; Normally Open	
5973	Frequency rating 1 H4	0 / 1000	
5974	H4 function rating 1	-1000 / 5000	
5975	Frequency rating 2 H4	0 / 1000	
5976	H4 function rating 2	-0,2	

Parameter No	Parameter Name	Options	Remark
5977	H5 input task	None; Operating mode change request circuit+domestic water ; Operating mode change domestic water ; Operating mode change heating circuit ; Operating mode change heating circuit 1 ; Operating mode change heating circuit2 ; Operating mode change heating circuit3 ; Heat generation lock ; Error/alarm message ; Consumer demand VK1 ; Consumer demand VK2 ; Use of swimming pool heating source ; Excess heat discharge ; Use of sun energy in swimming pool ; Operating level domestic water ; Operating level heating circuit1 ; Operating level heating circuit2 ; Operating level heating circuit3 Room thermostat heating circuit1 ; Room thermostat heating circuit2 ; Room thermostat heating circuit3 ; Domestic water flow switch ; Domestic water thermostat ; Pulse counter ; Flue gas input from damper notification signal ; Start inhibit ; Boiler flow switch ; Boiler pressure switch	
5978	H5 contact type	Normally closed ; Normally Open	
6008	H6 input task	None; Operating mode change request circuit+domestic water ; Operating mode change domestic water ; Operating mode change heating circuit ; Operating mode change heating circuit 1 ; Operating mode change heating circuit2 ; Operating mode change heating circuit3 ; Heat generation lock ; Error/alarm message ; Consumer demand VK1 ; Consumer demand VK2 ; Use of swimming pool heating source ; Excess heat discharge ; Use of sun energy in swimming pool ; Operating level domestic water ; Operating level heating circuit1 ; Operating level heating circuit2 ; Operating level heating circuit3 Room thermostat heating circuit1 ; Room thermostat heating circuit2 ; Room thermostat heating circuit3 ; Domestic water flow switch ; Domestic water thermostat ; Pulse counter ; Flue gas input from damper notification signal ; Start inhibit ; Boiler flow switch ; Boiler pressure switch ; Gas pressure switch	
6009	H6 contact type	Normally closed ; Normally Open	

## RELAY / SENSOR TEST

The Felis condensing boiler has a relay / sensor test function on the device main board to check the connections and operation status of the components connected to the sensor, pump and function outputs.

Enter the “Engineer Authorization Level” menu and enter the “Relay / Sensor Test” menu with the help of the dial. “Relay test” parameter numbered 7700 is normally set to “No test”. When we enter this parameter and select the relay output that we want to test, electricity is supplied to the relevant relay output. In this way, it can be checked whether the component connected to the relevant relay output is working.

After completing the relay tests with parameter 7700, it is necessary to change the parameter setting back to “No test”.

Parameter No	Parameter Name	Options	Remark
7700	Relay test	No test   Everything off   Relay output QX1   Relay output QX2   Relay output QX3   Relay output QX4   Relay output QX21 modul 1   Relay output QX22 modul 1   Relay output QX23 modul 1   Relay output QX21 modul 2   Relay output QX22 modul 2   Relay output QX23 modul 2   Relay output QX21 modul 3   Relay output QX22 modul 3   Relay output QX23 modul 3	
7730	Outside temperature B9	- 50/50	
7750	Boiler temperature B3/B38	0 / 140	
7760	Boiler temperature B2	-28 / 350	
7820	BX1 sensor temperature	-28 / 350	
7821	BX2 sensor temperature	-28 / 350	
7822	BX3 sensor temperature	-28 / 350	
7823	BX4 sensor temperature	-28 / 350	
7830	BX21 module 1 sensor temperature	-28 / 350	
7831	BX22 module 1 sensor temperature	-28 / 350	
7832	BX21 module 2 sensor temperature	-28 / 350	
7833	BX22 module 2 sensor temperature	-28 / 350	
7834	BX21 module 3 sensor temperature	-28 / 350	
7835	BX22 module 3 sensor temperature	-28 / 350	
7840	Voltage signal H1	0 / 10	
7841	Contact condition H1	On / Off	

Parameter No	Parameter Name	Options	Remark
7845	Voltage signal H2 module 1	0 / 10	
7846	Contact condition H2 module 1	On / Off	
7848	Voltage signal H2 module 2	0 / 10	
7849	Contact condition H2 module 2	On / Off	
7851	Voltage signal H2 module 3	0 / 10	
7852	Contact condition H2 module 3	On / Off	
7854	Voltage signal H3	0 / 10	
7855	Contact condition H3	On / Off	
7860	Contact condition H4	On / Off	
7862	Frequency H4	0 / 2000	
7865	Contact condition H5	On / Off	
7872	Contact condition H6	On / Off	
7874	Contact condition H7	On / Off	

## ZONE CONTROL KIT (ADDITIONAL MODULE) CONNECTIONS

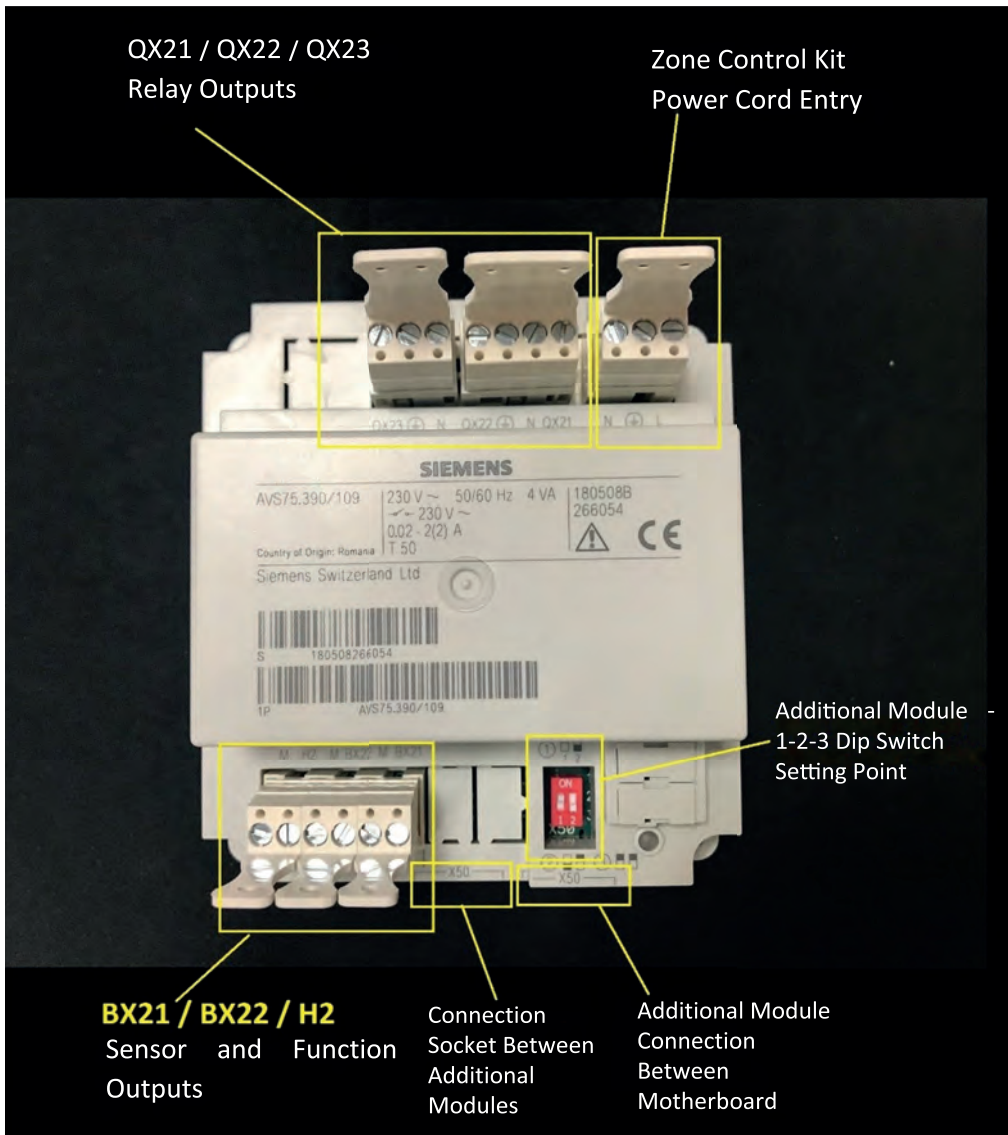
The AF16 numbered model Zone Control Kit should be used to control the three-way valves used in the installation to which Felis condensing boilers are connected. The Zone Control Kit can also be used as an additional module when the sensor / pump / function outputs on the device main board are insufficient in installations with many components. There are additional 3 relay outputs, 2 sensor outputs and 1 function output on a Zone Control Kit. Up to 3 AF16 Zone Control Kits can be used in a cascade installation.

When more than one Zone Control Kit is used, addressing should be done with the help of the dip switches on the module.

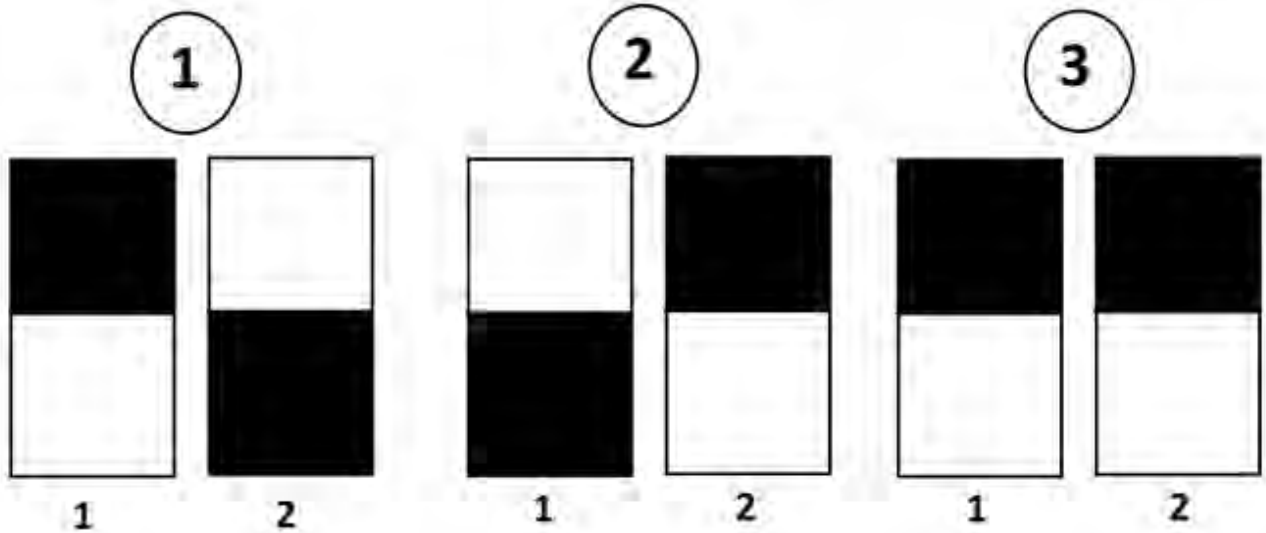
If the Zone Control Kit is to be used to drive three-way valves, the task parameter of 6020 Add.module.1 under the Configuration menu should be defined as "Heating circuit-1". Then, the opening, closing and power supply outputs of the three-way valve should be connected to the QX21 / QX22 / QX23 outputs of the Zone Control Kit.

- QX21 on the additional module = Three-way valve opening tip
- QX22 on the additional module = Three-way valve closing tip
- QX23 on the additional module = Three-way valve circuit pump
- BX21 on the additional module = Three-way valve sensor

If the Zone Control Kit will be used for additional modules, parameter 6020 must be defined as "Multifunction". The parameter definitions for the Zone Control Kit are given in the table below.



The dip switch settings should be as follows for Zone Control Kit 1, 2 and 3.



Parameter No	Parameter Name	Options	Remark
6020	Add.module.1 task	None   Multi-functional   Heating circuit-1   Heating circuit-2   Heating circuit 3   Return temperature control   Solar energy domestic water   Main control device /system pump	
6021	Add.module.2 task	None   Multi-functional   Heating circuit-1   Heating circuit-2   Heating circuit 3   Return temperature control   Solar energy domestic water   Main control device /system pump	
6022	Add.module.3 task	None   Multi-functional   Heating circuit-1   Heating circuit-2   Heating circuit 3   Return temperature control   Solar energy domestic water   Main control device /system pump	
6030 / 6031 / 6032	Relay output QX21 module 1 / Relay output QX22 module 1 / Relay output QX23 module 1	None   Recirculation pump Q4   Electric immersion heater domestic water.K6   Collector pump Q5   Consumption circuit pump VK1 Q15   Boiler pump Q1   Bypass.pump.Q12   Alarm outlet K10   2nd pump speed heating circuit1 Q21   2nd pump speed heating circuit2 Q22   2nd pump speed heating circuit3 Q23   Heating circuit pump ID3 Q20   Consumption circuit pump VK2 Q18   System pump Q14   Heat production shut-off valve Y4   Solid fuel boiler pump Q10   Time schedule 5 K13	

		<p>Storage tank return valve.Y15 ;  Solar.energy.pump.external heat exchanger.K9 ;  Solar energy collector element storage tank K8 ;  Solar energy collector element swimming pool K18 ; Swimming pool pump Q19 ;  Cascade pump Q25 ; Storage tank transfer pump Q11 ;  Domestic water mixing pump Q35 ;  Domestic water circuit pump Q33 ;  Heating request K27 ;  Cooling request K28 ; Heating circuit pump  ID1 Q2 ; Heating circuit pump ID2 Q6 ;  Domestic water control element Q3 ;  Instant water heater control element Q34 ;  Water filling K34 ; 2nd  Boiler pump speed Q27 ; Status output K35  ; Status info K36 ; Fan closing K38 ;  Control device 1.K21.Temperature difference ; Control device  2.K22.Temperature difference</p>	
6033 / 6034 / 6035	<p>Relay output QX21  module 2 /  Relay output QX22  module 2 /  Relay output QX23  module 2</p>	<p>None ; Recirculation pump Q4 ; Electric immersion heater domestic water.K6 ;  Collector pump Q5 ; Consumption circuit pump VK1 Q15 ; Boiler pump Q1 ;  Bypass.pump.Q12 ;  Alarm outlet K10 ; 2nd pump speed heating circuit1 Q21 ; 2nd pump speed heating circuit2 Q22 ; 2nd pump speed heating circuit3 Q23 ; Heating circuit pump ID3 Q20 ; Consumption circuit pump VK2 Q18 ;  System pump Q14 ;  Heat production shut-off valve Y4 ; Solid fuel boiler pump Q10 ; Time schedule 5 K13 ;  Storage tank return valve.Y15 ;  Solar.energy.pump.external heat exchanger.K9 ;</p>	



		<p>Solar energy collector element storage tank K8 ;  Solar energy collector element swimming pool K18 ; Swimming pool pump Q19 ;  Cascade pump Q25 ; Storage tank transfer pump Q11 ;  Domestic water mixing pump Q35 ;  Domestic water circuit pump Q33 ;  Heating request K27 ;  Cooling request K28 ; Heating circuit pump  ID1 Q2 ; Heating circuit pump ID2 Q6 ;  Domestic water control element Q3 ;  Instant water heater control element Q34 ;  Water filling K34 ; 2nd  Boiler pump speed Q27 ; Status output K35  ; Status info K36 ; Fan closing K38 ;  Control device 1.K21.Temperature difference ; Control device  2.K22.Temperature difference</p>	
6036 / 6037 / 6038	<p>Relay output QX21 module 3 /  Relay output QX22 module 3 /  Relay output QX23 module 3</p>	<p>None ; Recirculation pump Q4 ; Electric immersion heater domestic water.K6 ;  Collector pump Q5 ; Consumption circuit pump VK1 Q15 ; Boiler pump Q1 ;  Bypass.pump.Q12 ;  Alarm outlet K10 ; 2nd pump speed heating circuit1 Q21 ; 2nd pump speed heating circuit2 Q22 ; 2nd pump speed heating circuit3 Q23 ; Heating circuit pump ID3 Q20 ; Consumption circuit pump VK2 Q18 ;  System pump Q14 ;  Heat production shut-off valve Y4 ; Solid fuel boiler pump Q10 ; Time schedule 5 K13 ;  Storage tank return valve.Y15 ;  Solar.energy.pump.external heat exchanger.K9 ;  Solar energy collector element storage tank K8 ;</p>	

		<p>Solar energy collector element swimming pool K18 ; Swimming pool pump Q19 ; Cascade pump Q25 ; Storage tank transfer pump Q11 ;</p> <p>Domestic water mixing pump Q35 ; Domestic water circuit pump Q33 ; Heating request K27 ; Cooling request K28 ; Heating circuit pump ID1 Q2 ; Heating circuit pump ID2 Q6 ; Domestic water control element Q3 ; Instant water heater control element Q34 ; Water filling K34 ; 2nd Boiler pump speed Q27 ; Status output K35 ; Status info K36 ; Fan closing K38 ; Control device 1.K21.Temperature difference ; Control device 2.K22.Temperature difference</p>	
6040 / 6041	<p>BX21 module 1 sensor input /</p> <p>BX22 module 1 sensor input</p>	<p>None ; Domestic water sensor B31 ; Collector sensor B6 ; Domestic water circulation sensor B39 ; Accumulator tank sensor B4 ; Accumulator tank sensor B41 ; Flue gas temperature sensor B8 ; Cascade flow sensor B10 ; Solid fuel boiler sensor B22 ; Domestic water feed sensor B36 ; Accumulator tank sensor B42 ; General return sensor B73 ; Cascade return sensor B70 ; Swimming pool sensor B13 ; Solar energy flow sensor B63 ; Solar energy return sensor B64 ; Primary heat exchanger sensor B26</p>	
6042 / 6043	<p>BX21 module 1 sensor input /</p> <p>BX22 module 1 sensor input</p>	<p>None ; Domestic water sensor B31 ; Collector sensor B6 ; Domestic water circulation sensor B39 ; Accumulator tank sensor B4 ; Accumulator tank sensor B41 ; Flue gas temperature sensor B8 ; Cascade flow sensor B10 ; Solid fuel boiler sensor B22 ; Domestic water feed sensor B36 ; Accumulator tank sensor B42 ; General return sensor B73 ; Cascade return sensor B70 ; Swimming pool sensor B13 ; Solar energy flow sensor B63 ; Solar energy return sensor B64 ; Primary heat exchanger sensor B26</p>	

6044 / 6045	BX21 module 3 sensor input / BX22 module 3 sensor input	None ; Domestic water sensor B31 ; Collector sensor B6 ; Domestic water circulation sensor B39 ; Accumulator tank sensor B4 ; Accumulator tank sensor B41 ; Flue gas temperature sensor B8 ; Cascade flow sensor B10 ; Solid fuel boiler sensor B22 ; Domestic water feed sensor B36 ; Accumulator tank sensor B42 ; General return sensor B73 ; Cascade return sensor B70 ; Swimming pool sensor B13 ; Solar energy flow sensor B63 ; Solar energy return sensor B64 ; Primary heat exchanger sensor B26	
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Parameter No	Parameter Name	Options	Remark
6046 / 6054 / 6062	H2/H21 modul 1.fonk.output / H2/H21 modul 2.fonk.output / H2/H21 modul 3.fonk.output	None ; Operating mode change request circuit+domestic water ; Operating mode change domestic water ; Operating mode change heating circuit ; Operating mode change heating circuit 1 ; Operating mode change heating circuit2 ; Operating mode change heating circuit3 ; Heat generation lock ; Error/alarm message ; Consumer demand VK1 ; Consumer demand VK2 ; Use of swimming pool heating source ; Excess heat discharge ; Use of sun energy in swimming pool ; Operating level domestic water ; Operating level heating circuit1 ; Operating level heating circuit2 ; Operating level heating circuit3 ; Room thermostat heating circuit1 ; Room thermostat heating circuit2 ; Room thermostat heating circuit3 ; Domestic water flow switch ; Domestic water thermostat ; Limit thermostat ; Heating circuit ; Start inhibit ; Boiler flow switch ; Boiler pressure switch ; Consumer demand VK1 10V ; Consumer demand VK2 10V ; Pressure measurement 10V ; Exit request 10V	

6047 / 6055 / 6063	Module 1 H2 / H21 contact type / Module 2 H2 / H21 contact type / Module 3 H2 / H21 contact type	NK   Normally Open	
6049 / 6057 / 6065	Module 1, H2 / H21 voltage rating1 / Module 2, H2 / H21 voltage rating1 / Module 3, H2 / H21 voltage rating1	0/10 V	
6050 / 6058 / 6066	H2 / H21 module 1st function. rating1 / H2 / H21 module 2nd func. rating1 / H2 / H21 module 3rd func. rating1	-1000 / 5000	
6051 / 6059 / 6067	Module 1, H2 / H21 voltage rating2 / Module 2, H2 / H21 voltage rating2 / Module 3, H2 / H21 voltage rating2	0/10 V	
6052 / 6060 / 6068	H2 / H21 module 1st function. rating2 / H2 / H21 module 2nd func. rating2 / H2 / H21 module 3rd func. rating2	-1000 / 5000	

## WEB SERVER INSTALLATION

For information, see the 'Web Server Commissioning' booklet.

## SWIMMING POOL CONTROL

Connect the pump that pumps water to the swimming pool to a suitable relay output on the LMS14 card.

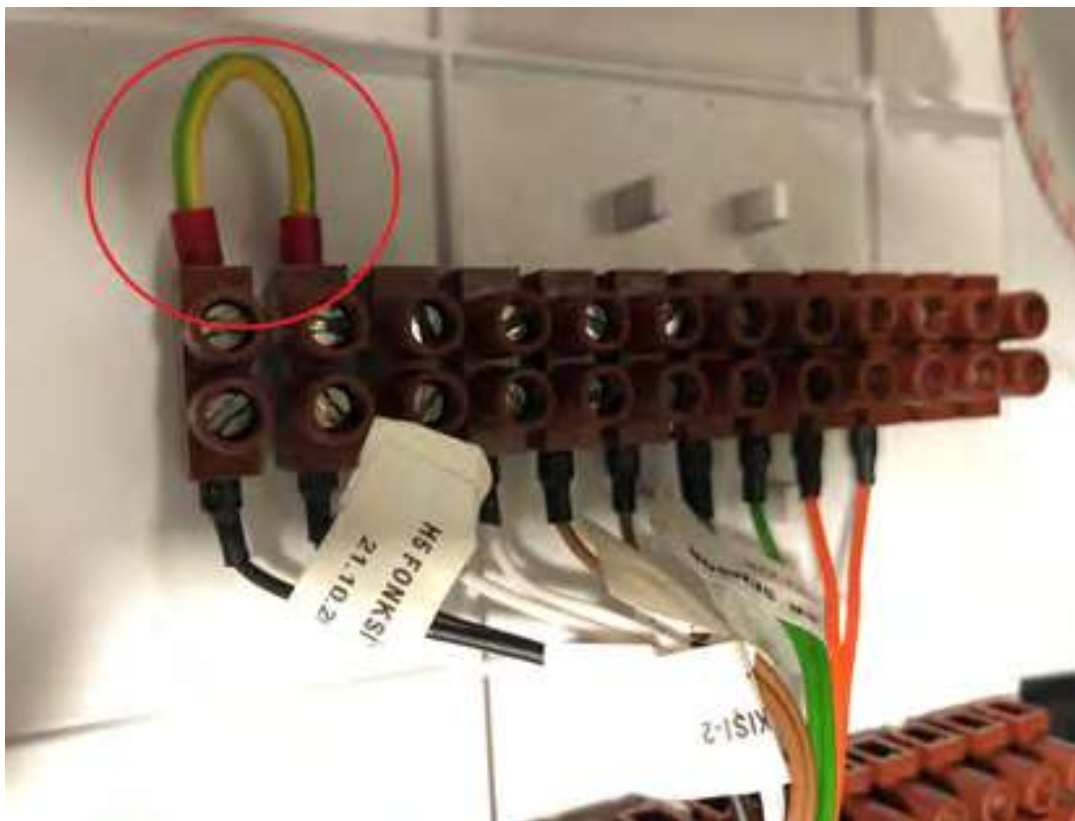
5892	Relay output QX3 None   Circulating pump Q4   El imm heater DHW K6   Collector pump Q5   Cons circuit pump CC1 Q15   Boiler pump Q1   Bypass pump Q12   Alarm output K10   2nd pump speed HC1 Q21   2nd pump speed HC2 Q22   2nd pump speed HC3 Q23   Heat circuit pump HC3 Q20   Cons circuit pump CC2 Q18   System pump Q14   Heat gen shutoff valve Y4   Solid fuel boiler pump Q10   Time program 5 K13   Buffer return valve Y15   Solar pump ext exch K9   Solar ctrl elem buffer K8   Solar ctrl elem swi pool K18   <b>Swimming pool pump Q19</b>   Cascade pump Q25   St tank transfer pump Q11   DHW mixing pump Q35   DHW interm circ pump Q33   Heat request K27   Refrigeration request K28   Heat circuit pump HC1 Q2   Heat circuit pump HC2 Q6   DHW ctrl elem Q3   Instant WH ctrl elem Q34   Water refill K34   2nd boiler numn speed Q27   Status output K35   Status
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For example, you have connected to QX3. Accordingly, choose "Swimming pool pump Q19" among the options for QX3 from the relay outputs in "Configuration" page of the "Engineer" page.

After completing the pump selection, you need to identify the swimming pool sensor. Assign this sensor to a suitable sensor input as "B13 Swimming pool sensor".

5932	Sensor input BX3 None   DHW sensor B31   Collector sensor B6   DHW circulation sensor B39   Buffer sensor B4   Buffer sensor B41   Flue gas temp sensor B8   Common flow sensor B10   Solid fuel boiler sensor B22   DHW charging sensor B36   Buffer sensor B42   Common return sensor B73   Cascade return sensor B70   <b>Swimming pool sensor B13</b>   Solar flow sensor B63   Solar return sensor B64   Primary exch sensor B26   Special temp sensor 1   Special temp sensor 2
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For example, a blank H input on the LMS14 card; Select H5 (Parameter 5977) as “Swimming pool heating resource use”. Bridge the input H on the board.



5977	Function input H5 None ; Optg mode change HCs+DHW ; Optg mode changeover DHW ; Optg mode changeover HCs ; Optg mode changeover HC1 ; Optg mode changeover HC2 ; Optg mode changeover HC3 ; Heat generation lock ; Error/alarm message ; Consumer request CC1 ; Consumer request CC2 ; Release swi pool source heat ; Excess heat discharge ; Release swi pool solar ; Operating level DHW ; Operating level HC1 ; Operating level
------	--

After the assignments you have made in this way, the menu will appear on the “Engineer” page as “Swimming pool circuit”. In this menu, set the desired temperature value in the pool with the parameter 1959 below.

Line no.		Operating line
	SC	
	<b>1959</b>	<b>Flow temp setpoint</b>

The swimming pool pump will be activated when it is colder than the setting value entered in parameter 2056 below. (On the “Engineer” page “Swimming pool” page)

<i>Line no.</i>	<i>Operating line</i>
<b>2056</b>	<b>Setpoint source heating</b>

## **HEATING CIRCUIT WITH 3 WAY VALVE AND BOILER CONTROL**

As an example, let’s examine the following installation structure:

The pump coming out of the main supply collector goes to the heat exchanger and from there it feeds to the boiler with another pump. There are 3 boilers in the cascade system. There are 3 three-way valve heating circuits and 1 boiler.

Control of three three-way valve heating circuits should be provided through 3 additional modules to be connected to the master boiler.

Here on the card on the master boiler;

QX3 relay output can be used by assigning Q3 tank pump.

QX2 relay output can be used as a circulation pump between Q33 boiler and heat exchanger.

In addition, on the master boiler;

Considering that BX1 = B8 is assigned as flue gas sensor

BX2 = B10 Cascade sensor,

It can be assigned as BX3 = B36 sensor.

In this way, we have used all the sensors in the master boiler.

You can use the B31 sensor by connecting to a suitable BX sensor input in the slave boiler.

## **FLOOR HEATING CIRCUIT WITH 3 WAY VALVE AND BOILER CONTROL**

As an example, let’s examine the following installation structure:

There are 3 zones with a 3-cascade application with the boiler control panel:

- Boiler
- Turkish bath (with three-way valve)
- Floor heating around the pool (with three-way valve)

Hence:

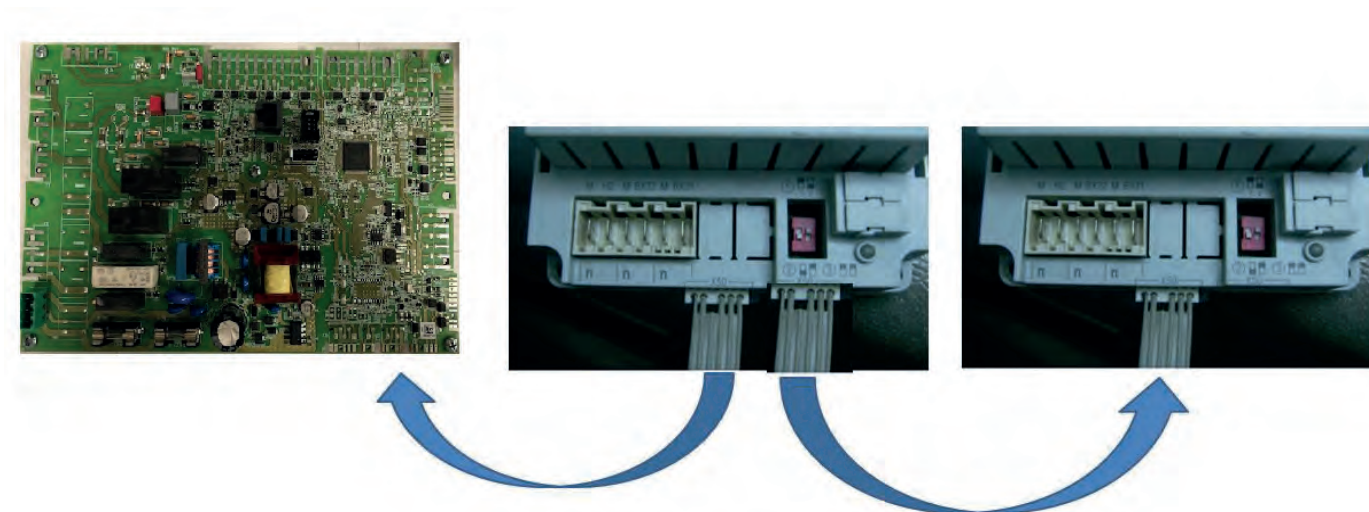
The boiler circuit pump must be connected to QX3 and the sensor to B3.

- Since the Turkish bath and the pool environment is controlled by underfloor three-way valve, it is necessary to use 1 additional module for both circuits. There is no separate three-way valve control for the heating circuit in the LMS14 boiler control panel. Each module controls 1 three-way valve.

The image of the additional module is as follows.



Connect the additional module to the X50 socket on the LMS14 boiler control panel. Please consider the wiring diagram below.



After connecting the additional modules as above, you need to make the following settings on the Engineer page of LMS14.

The action we need to take is to determine for which purpose each additional module will be used. In our example, there are 2 additional modules.

So, on the Engineer → Configuration page

Parameter 6020 "Heating circuit 1"

Parameter 6021 "Heating circuit 2"



Line no.	Operating line
6020	<b>Function extension module x</b>
6021	None
6022	Multifunctional
	Heating circuit 1
	Heating circuit 2
	Heating circuit 3
	Return temp controller
	Solar DHW
	Prim contr/system pump

After selecting the function of the add-on module, set the bottom switches on it. For example, if you have 2 add-on modules, set the bottom switch of the first add-on module with the number 1 in the round. Adjust the bottom switch of the second additional module in the round with the number 2.



In this way, you have introduced additional modules to the system. The next step will be the electrical connections of the three-way valve and the pump.

QX21 on the additional module = Three-way valve opening tip

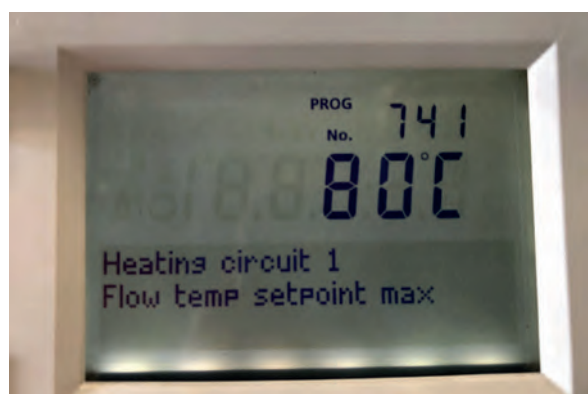
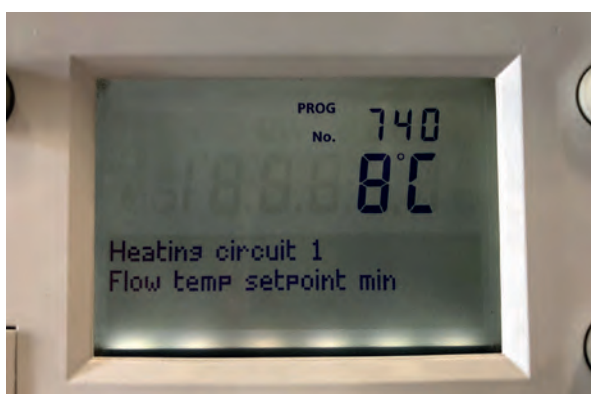
QX22 on the additional module = Three-way valve closing tip

QX23 on the additional module = Three-way valve circuit pump

BX21 on the additional module = Three-way valve sensor

You can now set the parameters of the heating circuits and, if necessary, the time program.

If there is a demanded temperature limitation for both the Turkish bath and around the pool floor heating, you can set the minimum and maximum water temperatures from the relevant heating circuit parameters. For example, you can set the parameters for heating circuit 1 from parameters 740 and 741 as follows.



For the second circuit, you can also use parameters 1040 and 1041 in Heating circuit 2.

## SOLAR COLLECTOR AND BOILER CONTROL

QX1 = Q1 Boiler pump

QX3 = Q3 Boiler pump (DHW control element)

QX2 = Q5 Solar collector pump

BX1 sensor input = Cascade flow sensor (B10)

BX2 sensor input = Solar collector sensor (B6)

BX3 sensor input = Flue gas sensor (B8)

B3 sensor input = Boiler sensor

Make the connections to be assigned as above, in the “Configuration” page of the “Engineer” page.

1- Q5 solar collector pump and B6 solar collector sensor for solar power system

On the Engineer → Configuration page

Set the relay output QX2 as the solar collector pump Q5.

5891	Relay output QX2 None ; Circulating pump Q4 ; El imm heater DHW K6 ; Collector pump Q5 ; Cons circuit pump CC1 Q15 ; Boiler pump Q1 ; Bypass pump Q12 ; Alarm output K10 ; 2nd pump speed HC1 Q21 ; 2nd pump speed HC2 Q22 ; 2nd pump speed HC3 Q23 ; Heat circuit pump HC3 Q20 ; Cons circuit pump CC2 Q18 ; System pump Q14 ; Heat gen shutoff valve Y4 ; Solid fuel boiler pump Q10 ; Time program 5 K13 ; Buffer return valve Y15 ; Solar pump ext exch K9 ; Solar ctrl elem buffer K8 ; Solar ctrl elem swi pool K18 ; Swimming pool pump Q19 ; Cascade pump Q25 ; St tank transfer pump Q11 ; DHW mixing pump Q35 ; DHW intern circ pump Q33 ; Heat request K27 ; Refrigeration request K28 ; Heat circuit pump HC1 Q2 ; Heat circuit pump HC2 Q6 ; DHW ctrl elem Q3 ; Instant WH ctrl elem Q34 ; Water refill K34 ; 2nd boiler pump speed Q27 ; Status output K35 ; Status information K36 ; Flue gas damper K37 ; Fan shutdown K38 ; dT controller 1 K21 ; dT controller 2 K22
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Set a suitable BX sensor input as the “B6 Solar collector” sensor. For example BX2.

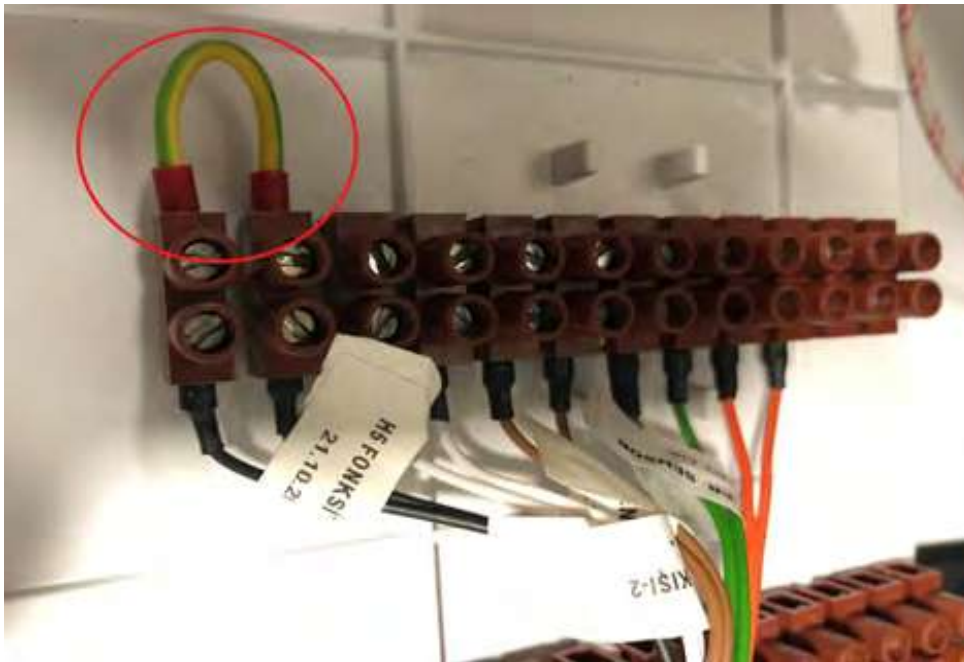
5931	Sensor input BX2 None ; DHW sensor B31 ; Collector sensor B6 ; DHW circulation sensor B39 ; Buffer sensor B4 ; Buffer sensor B41 ; Flue gas temp sensor B8 ; Common flow sensor B10 ; Solid fuel boiler sensor B22 ; DHW charging sensor B36 ; Buffer sensor B42 ; Common return sensor B73 ; Cascade return sensor B70 ; Swimming pool sensor B13 ; Solar flow sensor B63 ; Solar return sensor B64 ; Primary exch sensor B26 ; Special temp sensor 1 ; Special temp sensor 2
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## SUBSTATION CONTROL

The substation works with constant temperature water application. Here, a cascade sensor is placed on the balance cup or main collector.

The H input available on the configuration page can be used. (All H inputs on LMS14 ... card can be used for constant temperature water applications.)

For example, use H5. A bridge like the following will be made on the LMS14 ... card.



Then assign the function of the H5 input to → “Consumer circuit 1” in the “Engineer” “Configuration” page as follows.

5977	Function input H5 None   Optg mode change HCs+DHW   Optg mode changeover DHW   Optg mode changeover HCs   Optg mode changeover HC1   Optg mode changeover HC2   Optg mode changeover HC3   Heat generation lock   Error/alarm message   <b>Consumer request CC1</b>   Consumer request CC2   Release swi pool source heat   Excess heat discharge   Release swi pool solar   Operating level DHW   Operating level HC1   Operating level HC2   Operating level HC3   <b>Room thermostat HC1</b>   Room thermostat HC2   Room thermostat HC3   DHW flow switch   DHW thermostat   Pulse count   Checkb sign flue gas damper   Start prevention   Boiler flow switch   Boiler pressure switch
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After assignment as consumer circuit 1, determine which relay you will control the water pump at constant temperature and assign it to a suitable relay output as “Consumer circuit pump VK1 Q15” as below. For example QX2.

5891	Relay output QX2 None   Circulating pump Q4   El imm heater DHW K6   Collector pump Q5   <b>Cons circuit pump CC1 Q15</b>   Boiler pump Q1   Bypass pump Q12   Alarm output K10   2nd pump speed HC1 Q21   2nd pump speed HC2 Q22   2nd pump speed HC3 Q23   Heat circuit pump HC3 Q20   Cons circuit pump CC2 Q18   System pump Q14   Heat gen shutoff valve Y4   Solid fuel boiler pump Q10   Time program 5 K13   Buffer return valve Y15   Solar pump ext exch K9   Solar ctrl elem buffer K8   Solar ctrl elem swi pool K18   Swimming pool pump Q19   Cascade pump Q25   St tank transfer pump Q11   DHW mixing pump Q35   DHW interm circ pump Q33   Heat request K27   Refrigeration request K28   Heat circuit pump HC1 Q2   Heat circuit pump HC2 Q6   DHW ctrl elem Q3   Instant WH ctrl elem Q34   Water refill K34   2nd boiler pump speed Q27   Status output K35   Status information K36   Flue gas damper K37   Fan shutdown K38   dT controller 1 K21   dT controller 2 K22
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After making this selection, you will see a menu like “Consumer circuit 1” on the “Engineer” page. Enter here how many degrees of constant temperature water is requested from parameter 1859.

Consumer circuit 1					
1859	Flow temp setp cons request	70	8	120	°C

**Cascade sensor is taken into account as there is no additional sensor in constant temperature water application.**

## DEVICE PARAMETERS

- It may be necessary to enter the Engineer authorization level to reach all parameters specified in the tables.

The current date and time.			
Parameter No	Parameter Name	Factory Setting	Remark
1	Hours / minutes		
2	Day / month		
3	Year		
5	Beginning of the summer period	25.03.2018	
6	End of the summer period	25.10.2018	

Boiler			
Parameter No	Parameter Name	Factory Setting	Remark
2203	Use under outside temperature	0	
2208	Accumulation tank full feed	Off	
2210	Minimum setting value	40	
2211	Minimum OEM setting value	40	
2212	Max setting value	80	
2213	Max OEM setting value	85	
2214	Manual control set value	60	
2217	Frost protection setting value	8	
2222	Stage 2 forced change	Off	
2241	Minimum burner on time	0	
2243	Minimum burner off time	0	
2245	Burner off time transition difference	15	
2253	Boiler pump overtime	1	
2260	Consumer boiler start protection	Off	
2264	Boiler start protection wait time	0	
2270	Minimum return temperature setting value	8	
2271	Minimum return temperature setting value OEM	8	
2272	Return temperature effect in consumers	On	
2301	Heat production lock boiler pump	Off	
2305	Heat production lock effect	Heating mode only	
2310	Limit thermostat function	On	
2316	Max temperature difference	20	
2317	Nominal temperature difference	10	
2320	Pump Modulation	Request	
2321	Start speed	100	
2322	Minimum pump speed	40	
2323	Max pump speed	100	
2327	Minimum pump speed OEM	40	
2328	Max pump speed OEM	100	
2329	Pump setpoint reduction	10	
2330	Nominal output	50	

2331	Basic stage output	30	
2334	Output at minimum pump speed	0	
2335	Output at maximum pump speed	100	
2441	Heating mode max fan speed	3800	
2442	Full feed max fan speed	3800	
2443	Instantaneous water heater fan speed start value	0	
2444	Boiler heating mode max fan speed	-	
2445	Heating mode fan off	Off	
2446	Fan shutdown delay	3	
2450	Controller delay	Heating mode only	
2452	Controller delay speed	2400	
2453	Controller delay time	10	
2454	Transition difference in heating circuits	4	
2455	Min transition difference heating circuits	5	
2456	Max transition difference closed heating circuit	7	
2457	Heating circuits setting time	10	
2460	Transition difference in boiler	5	
2461	Min transition difference closed boiler	6	
2462	Max transition difference closed boiler	8	
2463	Boiler adjustment time	10	
2464	Period transition difference in setting value difference	Off	
2467	Burner open dynamic transition difference	On	
2470	Special working heat demand delay	0	
2473	Flue gas temperature output reduction	80	
2474	Flue gas temperature closure limit	85	
2476	Turning off flue gas control	Lockout location	
2477	Flue gas control start inhibit time	10	
2478	Flue gas temperature output limit	80	
2479	Flue gas control time constant for modulation	0	
2480	Closing static pressure control	Lockout location	
2490	Switching off from dynamic pressure monitoring	Lockout location	
2550	Gas energy measurement	Off	
2551	Gas energy measurement setting	1	
2560	Flue gas damper closing delay	30	
2630	Auto air bleeding procedure	Off	
2655	Air bleeding function open time	10	
2656	Air bleeding off time	5	
2657	Number of repeats	3	
2662	Heating circuit air bleeding time	10	
2663	Boiler air bleeding time	5	

Burner Control			
Parameter No	Parameter Name	Factory Setting	Remark
9500	Pre-purge time	15 sec (65 kW), 30 sec (100 kW), 30 sec (125 kW), 10 sec (150 kW)	
9501	Min. pre-purge time	15 sec (65 kW), 30 sec (100 kW), 30 sec (125 kW), 10 sec (150 kW)	
9504	Pre-purge required speed	5000	
9505	Pre-purge min. required speed	3000 (65 kW), 5000 (100 kW), 5000 (125 kW), 5000 (150 kW)	
9506	Pre-purge speed tolerance	400	
9512	Speed required for ignition	2500 (65 kW), 3900 (100 kW), 2900 (125 kW), 4800 (150 kW)	
9513	Maks. speed required for ignition	3000 (65 kW), 3900 (100 kW), 2900 (125 kW), 4800 (150 kW)	
9514	Ignition speed tolerance	650	
9517	Pre-ignition time	1.2 secs	
9518	Safety time	6.0 secs	
9519	Safety time with ignition	5.6 secs	
9524	Low flame required speed	1800 (65 kW), 1800 (100 kW), 2500 (125 kW), 2000 (150 kW)	
9525	Low flame required min. speed	1800 (65 kW), 1800 (100 kW), 1950 (125 kW), 2000 (150 kW)	
9526	Low flame speed tolerance	300	
9529	High flame required speed	5900 (65 kW), 6200 (100 kW), 7150 (125 kW), 7900 (150 kW)	
9530	High flame required max. speed	5900 (65 kW), 6200 (100 kW), 7150 (125 kW), 7900 (150 kW)	
9531	High flame speed tolerance	400	
9534	Working time with ignition load	1.0 secs	
9540	Post-purge time	10.0 secs	
9541	Max. Post-purge time limit Trms.	5	
9542	Min. post-purge time	10.0 secs	
9545	Post-purge in lockout position	Off	
9551	Required max. stopping speed	500	
9610	Capacity	120 kW and above	
9614	Post-purge level	Post-purge	
9615	Forced pre-purge in error	On	
9616	Max.speed	9000	
9618	External light ionization current level	0.59	
9619	Flame loss ionization current level	0.59	
9650	Flue drying	Off	
9651	Flue drying required speed	500	
9652	Flue drying time	10	

Cascade			
Parameter No	Parameter Name	Factory Setting	Remark
3510	Leadership strategy	Open late, close early	
3511	Minimum output band	40	
3512	Max output band	90	
3530	Source array usage integral	50	
3531	Source array integral reset	20	
3532	Restarting lock	300	
3533	Change delay	5	
3534	Basic level forced time	60	
3535	Opening delay boiler	2	
3540	Source array of automatic change	500	
3541	Source array of automatic extraction	None	
3544	Master boiler	Welding 1	
3560	Min. return temperature setting value	8	
3561	Min. return temperature setting value OEM	8	
3562	Return temperature effect in consumers	On	
3590	Minimum temperature difference	-	

Heating Circuit 1 Time Schedule			
Parameter No	Parameter Name	Factory Setting	Remark
500	Preselection	Monday-Sunday	
501	The first phase is open	06:00-00:00	
502	The first phase is closed	22:00-00:00	
503	The second phase is open	24:00-00:00	
504	The second phase is closed	24:00-00:00	
505	The third phase is open	24:00-00:00	
506	The third phase is closed	24:00-00:00	
516	Factory specification	No	

Heating Circuit 2 Time Schedule			
Parameter No	Parameter Name	Factory Setting	Remark
520	Preselection	Monday-Sunday	
521	The first phase is open	06:00-00:00	
522	The first phase is closed	22:00-00:00	
523	The second phase is open	24:00-00:00	
524	The second phase is closed	24:00-00:00	
525	The third phase is open	24:00-00:00	
526	The third phase is closed	24:00-00:00	
536	Factory specification	No	

Heating Circuit 3 Time Schedule			
Parameter No	Parameter Name	Factory Setting	Remark
540	Preselection	Monday-Sunday	
541	The first phase is open	06:00-00:00	
542	The first phase is closed	22:00-00:00	
543	The second phase is open	24:00-00:00	
544	The second phase is closed	24:00-00:00	
545	The third phase is open	24:00-00:00	
546	The third phase is closed	24:00-00:00	
556	Factory specification	No	

Domestic wWater Circuit 4 Time Schedule			
Parameter No	Parameter Name	Factory Setting	Remark
560	Preselection	Monday-Sunday	
561	The first phase is open	06:00-00:00	
562	The first phase is closed	22:00-00:00	
563	The second phase is open	24:00-00:00	
564	The second phase is closed	24:00-00:00	
565	The third phase is open	24:00-00:00	
566	The third phase is closed	24:00-00:00	
576	Factory specification	No	

Heating circuit 1 Holidays			
Parameter No	Parameter Name	Factory Setting	Remark
641	Preselection	Period 1	
642	Start	-	
643	Terminate	-	
648	Operating level	Frost Protection	

Heating circuit 2 Holidays			
Parameter No	Parameter Name	Factory Setting	Remark
651	Preselection	Period 1	
652	Start	-	
653	Terminate	-	
658	Operating level	Frost Protection	

Heating circuit 3 Holidays			
Parameter No	Parameter Name	Factory Setting	Remark
661	Preselection	Period 1	
662	Start	-	
663	Terminate	-	
668	Operating level	Frost Protection	



Heating Circuit 1			
Parameter No	Parameter Name	Factory Setting	Remark
700	Operating mode heating circuit 1	Automatic	
710	Comfort setting value	20	
712	Reduced setting value	16	
714	Frost protection setting value	10	
716	Max comfort setting value	35	
720	Heating curve slope	1.5	
721	Heating curve parallel shift	0	
726	Heating curve adaptation	Off	
730	Summer / winter heating limit	18	
732	24-hour heating limit	-3	
733	24-hour heating limit extension	Yes	
740	Min flow temperature setting value	8	
741	Max flow water temperature setting value	80	
742	Flow temperature set value with room thermostat	65	
744	Room thermostat opening rate set value	-	
746	Heat demand delay	0	
750	Room effect	-	
760	Room temperature limitation	1	
761	Room control heating limit	-	
770	Rapid heating	5	
780	Rapid retract	Down to reduced setting value	
790	Optimum start control max	0	
791	Optimum stop control max	0	
809	Continuous pump operation	No	
812	Frost protection with flow temperature	On	
820	Pump circuit over-temperature protection	On	
830	Mixing valve additive value	5	
832	Actuator type	3-Way	
833	2-Way transition difference	2	
834	Actuator run time	120	
850	Floor drying function	Off	
861	Extracting excess heat	Always	
870	Accumulation tank	Yes	
880	Pump speed reduction	Characteristic	
881	Start speed	100	
882	Min. pump speed	50	
883	Max pump speed	100	
898	Operating level change	Reduced	
900	Operating mode change	Protection	

Heating Circuit 2			
Parameter No	Parameter Name	Factory Setting	Remark
1000	Operating mode heating circuit 2	Automatic	
1010	Comfort setting value	20	
1012	Reduced setting value	16	
1014	Frost protection setting value	10	
1016	Max comfort setting value	35	
1020	Heating curve slope	1.5	
1021	Heating curve parallel shift	0	
1026	Heating curve adaptation	Off	
1030	Summer / winter heating limit	18	
1032	24-hour heating limit	-3	
1033	24-hour heating limit extension	Yes	
1040	Min flow temperature setting value	8	
1041	Max flow water temperature setting value	80	
1042	Flow temperature set value with room thermostat	65	
1044	Room thermostat opening rate set value	-	
1046	Heat demand delay	0	
1050	Room effect	-	
1060	Room temperature limitation	1	
1061	Room control heating limit	-	
1070	Rapid heating	5	
1080	Rapid retract	Down to reduced setting value	
1090	Optimum start control max	0	
1091	Optimum stop control max	0	
1109	Continuous pump operation	No	
1112	Frost protection with flow temperature	On	
1120	Pump circuit over-temperature protection	On	
1130	Mixing valve additive value	5	
1132	Actuator type	3-Way	
1133	2-Way transition difference	2	
1134	Actuator run time	120	
1150	Floor drying function	Off	
1161	Extracting excess heat	Always	
1170	Accumulation tank	Yes	
1180	Pump speed reduction	Characteristic	
1181	Start speed	100	
1182	Min. pump speed	50	
1183	Max pump speed	100	
1198	Operating level change	Reduced	
1200	Operating mode change	Protection	

Heating Circuit 3			
Parameter No	Parameter Name	Factory Setting	Remark
1300	Operating mode heating circuit 3	Automatic	
1310	Comfort setting value	20	
1312	Reduced setting value	16	
1314	Frost protection setting value	10	
1316	Max comfort setting value	35	
1320	Heating curve slope	1.5	
1321	Heating curve parallel shift	0	
1326	Heating curve adaptation	Off	
1330	Summer / winter heating limit	18	
1332	24-hour heating limit	-3	
1333	24-hour heating limit extension	Yes	
1340	Min flow temperature setting value	8	
1341	Max flow water temperature setting value	80	
1342	Flow temperature set value with room thermostat	65	
1344	Room thermostat opening rate set value	-	
1346	Heat demand delay	0	
1350	Room effect	-	
1360	Room temperature limitation	1	
1361	Room control heating limit	-	
1370	Rapid heating	5	
1380	Rapid retract	Down to reduced setting value	
1390	Optimum start control max	0	
1391	Optimum stop control max	0	
1409	Continuous pump operation	No	
1412	Frost protection with flow temperature	On	
1420	Pump circuit over-temperature protection	On	
1430	Mixing valve additive value	5	
1432	Actuator type	3-Way	
1433	2-Way transition difference	2	
1434	Actuator run time	120	
1450	Floor drying function	Off	
1461	Extracting excess heat	Always	
1470	Accumulation tank	Yes	
1480	Pump speed reduction	Characteristic	
1481	Start speed	100	
1482	Min. pump speed	50	
1483	Max pump speed	100	
1498	Operating level change	Reduced	
1500	Operating mode change	Protection	

Boiler			
Parameter No	Parameter Name	Factory Setting	Remark
1600	Operating level domestic hot water	On	
1610	Nominal setting value	55	
1612	Reduced setting value	40	
1614	Nominal setting value max	65	
1620	Use	Time program heating circuits	
1630	Feed priority	Mixing circuit is variable, pump circuit is absolute	
1640	Legionella function	Fixed weekday	
1641	Periodic legionella function	3	
1642	Legionella function day	Monday	
1644	Legionella function time	-	
1645	Legionella function setting value	65	
1646	Legionella function period	30	
1647	Legionella function circulation pump	On	
1660	Circulation pump control released	Domestic water released	
1661	Circulation pump cycle	On	
1663	Circulation setting value	45	
1680	Operating mode change	Off	

Swimming Pool Circuit			
Parameter No	Parameter Name	Factory Setting	Remark
1959	Fluid temperature setting value consumption demand	70	
1974	Boiler feed priority	Yes	
1975	Extracting excess heat	On	
1978	With accumulation tank	Yes	
1980	First control / system with pump	Yes	

Swimming Pool			
Parameter No	Parameter Name	Factory Setting	Remark
2055	Solar energy heating setting value	26	
2056	Source heating setting value	22	
2065	Solar energy feeding priority	Priority 1	
2070	Max swimming pool temperature	32	
2080	With solar energy integration	Yes	

Primary Control / System Pump			
Parameter No	Parameter Name	Factory Setting	Remark
2110	Min flow temperature setting value	8	
2111	Max flow water temperature setting value	80	
2121	System pump in heat generation lock	Off	
2130	Mixing valve additive value	10	
2132	Actuator type	3 points	
2133	2-Way transition difference	2	
2134	Actuator run time	120	
2135	Mixing valve Xp	32	
2136	Mixing valve Tn	120	
2150	Primary control / system pump	At the accumulator tank outlet	

Solar Energy			
Parameter No	Parameter Name	Factory Setting	Remark
3810	Commissioning temperature difference	8	
3811	Cut-off temperature difference	4	
3812	Boiler min supply temperature	-	
3813	Accumulation tank opening temperature difference	-	
3814	Accumulation tank closing temperature difference	-	
3815	Accumulation tank min feeding temperature	-	
3816	Swimming pool opening temperature difference	-	
3817	Swimming pool closing temperature difference	-	
3818	Swimming pool min feeding temperature	-	
3822	Storage tank feeding priority	Domestic water storage tank	
3825	Feed time according to the relevant priority	-	
3826	Waiting time according to the relevant priority	5	
3827	Parallel run wait time	-	
3828	Secondary pump delay	60	
3830	Collector start function	-	
3831	Collector pump min working time	20	
3840	Collector frost protection	-	
3850	Collector outlet over-temperature protection	-	
3860	Evaporator heat carrier	-	
3865	Collector pump 1. starting speed	100	
3867	Heat exchanger pump starting speed	100	
3868	Accumulation tank pump starting speed	100	
3869	Swimming pool pump starting speed	100	
3870	Min. pump speed	40	
3871	Max pump speed	100	
3880	Antifreeze	None	
3881	Antifreeze density	30	
3884	Pump capacity	200	

Accumulation Tank			
Parameter No	Parameter Name	Factory Setting	Remark
4720	Automatic heat generation lock	With B4	
4721	Automatic heat generation lock transition difference	8	
4722	Accumulation tank / heating circuit temperature difference	-5	
4724	Min accumulation tank hot heating mode	-	
4750	Max feeding temperature	80	
4751	Max storage tank temperature	90	
4755	Cooling back temperature.	60	
4756	Cooling back boiler / heating circuits	Off	
4757	Cooling back collector	Off	
4783	With solar energy integration	None	
4790	Return routing opening temperature difference	10	
4791	Return routing closing temperature difference	5	
4795	Return routing temperature comparison	With B42	
4796	Partial feeding setting value	Temperature rise	
4800	Full feeding	-	
4810	Min full feeding temperature	Off	
4811	Full feeding sensor	8	
4813	Collector outlet over-temperature protection	With B42/B41	

DHW Storage Tank			
Parameter No	Parameter Name	Factory Setting	Remark
5010	Feeding	Few times a day	
5020	Flow setting value contribution	16	
5021	Transfer contribution	8	
5022	Feeding type	Full feeding	
5024	Transition difference	5	
5030	Feeding time limiting	150	
5040	Discharge protection	Automatically	
5042	Discharge protection after feeding	Off	
5050	Max feeding temperature	80	
5051	Max storage tank temperature	90	
5055	Cooling back temperature.	80	
5056	Cooling back heat generation heating circuits	Off	
5057	Cooling back collector	Off	
5060	Electric immersion heater in operating mode	Spare	
5061	Electric immersion heater released	Domestic water released	
5062	Electric immersion heater control	Domestic water released	
5070	Automatic forcing	On	
5071	Timed boiler feeding trigger	0	
5085	Extracting excess heat	On	
5090	With accumulation tank	No	
5092	First control / system with pump	No	
5093	With solar energy integration	Yes	
5101	Min. pump speed	40	
5102	Max pump speed	100	
5108	Feeding pump starting speed	100	
5109	Intermediate circuit pump starting speed	100	
5130	Transfer strategy	Always	
5131	Transfer comparison temperature	Domestic water sensor B3	

Instant Water Heater			
Parameter No	Parameter Name	Factory Setting	Remark
5420	Fluid setting value contribution	16	
5429	Transition difference	5	
5441	Flow measurement	None	
5444	Flow control threshold	5	
5445	Flow control transition difference	0.5	
5450	Slope at the end of consumption	0.25	
5451	Keep the slope warm at the start of consumption	-1	
5452	Slope at the beginning of consumption	-2	
5460	Keeping warm setting value	50	
5464	Keeping warm released	Domestic water released	
5468	Min consumption time for keeping warm	5	
5470	Time to keep warm without heating	10	
5471	Time to keep warm with heating	5	
5472	Keeping warm pump overwork	20	
5473	Keeping warm pump overwork	0	
5475	Keeping warm control sensor	Boiler sensor B2	
5482	Consumption, flow switch time	0	
5530	Min. pump speed	40	
5531	Max pump speed	100	
5537	Start speed	100	
5550	Air Pressure Tank	No	

Configuration			
Parameter No	Parameter Name	Factory Setting	Remark
5700	Presetting	Replaced	
5710	Heating circuit -1	On	
5711	Cooling circuit -1	Off	
5715	Heating circuit -2	Off	
5721	Heating circuit -3	Off	
5730	Boiler sensor	Domestic water sensor B3	
5731	Boiler feeding component	Feeding pump	
5732	Control valve boiler pump closing time	0	
5733	Boiler pump closing delay	0	
5734	Boiler parser valve base position	Final request	
5736	Boiler separate circuit	Off	
5737	Boiler adjustment valve working movement	Position in domestic water	
5738	Boiler adjustment valve middle position	Off	
5774	Boiler pump / boiler valve control	All requests	
5775	Boiler pump with boiler	Off	
5840	Solar control component	Feeding pump	
5841	External solar heat exchanger	Domestic water storage tank	
6092	Modulation pump PWM min	0	
6093	Modulation pump PWM max	100	
6097	Collector sensor type	NTC	
6098	Collector sensor calibrated	0	
6100	Outside weather sensor calibrated	0	
6101	Flue gas temperature sensor type	NTC	
6102	Flue gas sensor calibration	0	
6110	Building Time Constant:	15	
6116	Building constant setting value compensation	0	
6117	Central setting value compensation	20	
6118	Setting value decline delay	-	
6120	Facility frost protection	Off	
6140	Water pressure maximum	6	
6141	Water pressure minimum	0.8	
6142	Water pressure critical minimum	0.5	
6200	Save sensors	None	
6204	Save parameters	None	
6205	Return to factory values	None	
6355	Heating circuit 1 room control	Internal	
6356	Heating circuit 2 room control	Internal	
6357	Heating circuit 3 room control	Automatically	

LPB System			
Parameter No	Parameter Name	Factory Setting	Remark
6600	Device address	1	
6601	Segment address	0	
6604	Bus power supply function	Automatically	
6605	Bus power supply status	On	
6610	View system messages	Yes	
6621	Summer changing	Locally	
6623	Operating mode change	Centrally	
6624	Manual source lock	Locally	
6625	Boiler assignment	All heating circuits in the system	
6630	Cascade master	Automatically	
6631	External source in eco mode	Off	
6632	External limit of external source	No	
6640	Hour mode	Independently	

Service Private Work			
Parameter No	Parameter Name	Factory Setting	Remark
7040	Burner hour range	-	
7041	Burner operating hours since maintenance	0	
7042	Burner starting range	-	
7043	Starting a burner since maintenance	0	
7044	Maintenance interval	-	
7045	Time since maintenance	0	
7050	Fan speed ionization current	0	
7051	Ionizing current message	No	
7130	Flue cleaning function	Off	
7131	Burner output	Max heating load	
7140	Manual control	Off	
7143	Controller stop function	Off	
7145	Controller stop setting value	50	
7146	Air purging function	On	
7147	Ventilation type	None	
7252	Pstick command	No operate	

Status			
Parameter No	Parameter Name	Factory Setting	Remark
8000	Heating circuit 1 status	-	
8001	Heating circuit 2 status	-	
8002	Heating circuit 3 status	-	
8003	Boiler (DHW) status	-	
8005	Boiler status	-	
8007	Solar energy status	-	
8008	Solid fuel boiler status	-	
8009	Burner status	-	
8010	Accumulation tank status	-	
8011	Swimming pool status	-	



Heat Generation System Control			
Parameter No	Parameter Name	Factory Setting	Remark
8304	Boiler pump Q1		
8308	Boiler pump speed	-	
8310	Boiler temperature	-	
8311	Boiler setting value	-	
8312	Boiler change point	-	
8313	Control sensor	None	
8314	Boiler return temperature	-	
8315	Boiler return temperature setting value	-	
8316	Flue gas temperature	-	
8323	Fan speed	-	

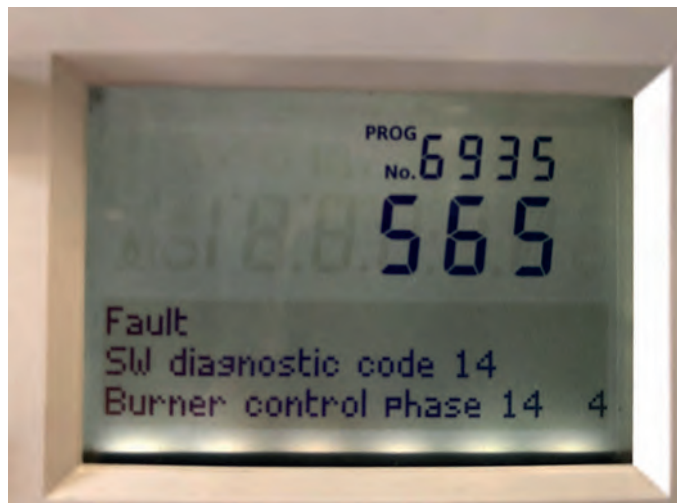
Consumers System Control			
Parameter No	Parameter Name	Factory Setting	Remark
8700	Outside temperature	-	
8701	Minimum outside temperature	-	
8702	Maximum outside temperature	-	
8703	Reduced outside temperature	-	
8704	Composite outside temperature	-	
8730	Heating circuit pump 1	Off	
8731	Heating circuit mixing valve 1 open	Off	
8732	Heating circuit mixing valve 1 closed	Off	
8735	Heating circuit 1 pump speed	0	
8740	Room temperature 1	-	
8749	Room thermostat 1	No demand	
8820	Boiler pump	Off	
8825	Domestic water pump speed	0	
8826	Boiler intermediate circuit pump speed	0	
8827	Instant boiler heating pump speed	0	
8830	Boiler temperature 1	-	
8831	Boiler setting value	-	
8860	Boiler flow	-	

## ERROR and MAINTENANCE

Faults and malfunctions that may occur in the components of Felis condensing boilers are displayed in English on the LCD screen with an error code. Descriptions of error codes are often sufficient to get quick information about the cause and solution of the error. All error codes that can be given by the device main board are in the table below.

### Viewing error history

Felis condensing boilers have the feature of displaying the last 20 errors on the main board. The last 20 errors given by the device can be seen in the error history menu with date-time information.



To view the error history, Engineer authorization level must be entered in the main menu.

### Entering Engineer Authorization Level

- When the device has electrical connection and is on the main screen, the menu is entered by pressing OK button once. (We can press the Back key several times to make sure we're on the main screen.)
  - After entering the menu, "i" button is pressed for 3-5 seconds. An authorization menu will appear on the screen. The options in this menu are "End user, Commissioning, Engineer, OEM".
  - In this menu, the "Engineer" option is accessed with the help of the dial and the OK button is pressed once and the selection is confirmed.
  - After this process, the menu appears on the screen, some submenus and parameters that could not be entered before can now be accessed.
- When returning to the main screen using the back button, the Engineer authorization level is exited. If it is necessary to set parameters again, the same procedures can be repeated to enter the level of Engineer authority.

Then, with the help of the dial button, the “Error” sub-menu is reached and the OK menu is entered with the OK button. With the help of the dial button, the code, date-time and software identification code (sub-refraction code) of the last 20 errors can be viewed by scrolling through the parameters.

Parameter No	Parameter Name	Options	Remark
6800	History 1		
6805	Software identification code 1		
6810	History 2		
6815	Software identification code 2		
6820	History 3		
6825	Software identification code 3		
6830	History 4		
6835	Software identification code 4		
6840	History 5		
6845	Software identification code 5		
6850	History 6		
6855	Software identification code 6		
6860	History 7		
6865	Software identification code 7		
6870	History 8		
6875	Software identification code 8		
6880	History 9		
6885	Software identification code 9		
6890	History 10		
6895	Software identification code 10		
6900	History 11		
6905	Software identification code 11		
6910	History 12		
6915	Software identification code 12		
6920	History 13		
6925	Software identification code 13		
6930	History 14		
6935	Software identification code 14		
6940	History 15		
6945	Software identification code 15		
6950	History 16		
6955	Software identification code 16		
6960	History 17		
6965	Software identification code 17		
6970	History 18		
6975	Software identification code 18		
6980	History 19		
6985	Software identification code 19		
6990	History 20		
6995	Software identification code 20		

## ERROR CODES

ERROR CODES	ERROR DEFINITIONS
10	Outdoor Temp. sensor error
20	Boiler temperature 1, sensor error
26	General flow water temperature, sensor error
28	Flue gas temperature, sensor error
30	Flow water temperature 1, sensor error
32	Flow water temperature 2, sensor error
38	Flow water temperature, Main control device, sensor error
40	Return water temperature 1, sensor error
46	Cascade return water temperature, sensor error
47	General return water temperature, sensor error
50	DHW temperature 1 sensor error
52	DHW temperature 2 sensor error
54	Flow water temperature DHW, sensor error
57	DHW, recirculation sensor error
60	Room temperature 1, sensor error
65	Room temperature 2, sensor error
68	Room temperature 3, sensor error
70	Storage tank temperature 1 (top), sensor error
71	Storage tank temperature 2 (bottom), sensor error
72	Storage tank temperature 3 (middle), sensor error
73	Collector temperature 1, sensor error
78	Water pressure, sensor error
82	LPB Address Conflict
83	BSB cable cross-section / no communication
84	BSB cable Address Conflict
85	BSB RF communication error
91	Data overwork on EEPROM
98	Additional module 1, error
99	Additional module 2, error
100	2 time clock leader
102	Lead time clock without backup
103	Communication error
105	Maintenance message
109	Boiler temperature control
110	STB (SLT) Lock
111	Temperature limit safety shutdown
117	Water pressure is too high
118	The water pressure is too low.
119	Water pressure switch disengagement

121	Heating circuit 1 flow water temperature not reached
122	Heating circuit 2 flow water temperature not reached
125	Maximum boiler temperature exceeded
126	DHW feeding temperature not reached
127	DHW legionella temperature not reached
128	Flame loss in operation
129	Wrong air supply
130	Flue gas temperature limit exceeded
132	Gas pressure switch safety shutdown
133	Safety time exceeded for flame formation
146	Sensor / control element configuration error
151	LMS14 ... internal error
152	Parameter error
153	The device is locked manually
160	Fan speed threshold not reached
162	Air pressure switch not closing
164	Flow / pressure switch, heating circuit error
166	Air pressure switch error, not open
169	Sitherm Pro system error
170	Water pressure sensor failure, primary side
171	Alarm contact 1 active
172	Alarm contact 2 active
173	Alarm contact 3 active
174	Alarm contact 4 active
176	Water pressure 2 is too high
177	Water pressure 2 is too low
178	Heating circuit 1 temperature limiter
179	Heating circuit 2 temperature limiter
183	Device in parameter mode
195	The maximum time per charge is exceeded
196	Maximum charge per week exceeded
209	Heating circuit error
214	Monitoring the motor
215	Decomposer valve fan air error
216	Boiler error
217	Sensor error
218	Pressure control
241	Flow sensor error for efficiency measurement
242	Return sensor error for efficiency measurement
243	Swimming pool sensor error
260	Flow water temperature 3, sensor error
270	Exchanger temperature difference too high

317	Network frequency is outside the allowed range
320	DHW supply temperature, sensor error
321	DHW output temperature, sensor error
322	Water pressure 3 is too high
323	Water pressure 3 is too low
324	BX input, same sensor
325	BX input / additional module, same sensor
326	BX input / mix group, same sensor
327	Additional module, same function
328	Mixture group, same function
329	Additional module / mix group, same function
330	Sensor input BX1 no function
331	Sensor input BX2 no function
332	Sensor input BX3 no function
333	Sensor input BX4 no function
335	Sensor input BX21 no function
336	Sensor input BX22 no function
339	Collector pump Q5 missing
340	Collector pump Q16 missing
341	B6 sensor missing
342	Solar power supply B31 sensor missing
343	Solar energy integration missing
344	Solar energy control element reserve tank K8 missing
345	Solar enj. control element swimming pool K18 missing
346	Solid fuel boiler pump Q10 missing
347	Solid fuel boiler comparison sensor missing
348	Solid fuel boiler address error
349	Condensate tank return valve Y15 missing
350	Accumulation tank address error
351	Main controller / system pump, address error
352	No pressure heading, address error
353	B10 sensor lost
371	Heating circuit 3 flow water temperature
372	Heating circuit 3 temperature limiter
373	Additional module 3
374	Sitherm Pro calculation
375	BV step motor
376	Drift test limit value
377	Drift test prevented
378	Built-in repetition

382	Repetition Speed
384	Auxiliary light
385	Network low voltage
386	Fan speed tolerance
387	Air pressure tolerance
388	DHW sensor no function
391	Room kontrol device 1
392	Room kontrol device 2
393	Room kontrol device 3
426	Flue gas damper feedback
427	Flue gas damper configuration
429	Dynamic water pressure is too high
430	Dynamic water pressure is too low
431	Primary heat exchanger sensor
432	Soil function is not connected
433	The primary exchanger temperature is too high

## ERROR CODE SUB-BREAKS

Some error codes that can be seen in Felis condensing boilers may have more than one reason. The main board software reports error subcodes to provide detailed information about the cause of the error in such error codes.

In order to display the error subcodes, engineer authority level is entered in the main menu. Then, with the help of the dial, the “Error” sub-menu is entered. When viewing the error history, the code seen in the “Software identification code” parameter of the related error is the sub-break of that error code.

Error Code	Error Description	Error Subcode	Remark
110	STB (SLT) Lock		
		431	Limit thermostat temperature repeatedly exceeded
		432	Limit thermostat temperature exceeded
		433	Limit thermostat temperature exceeded
		434	Limit thermostat temperature exceeded
		435	Limit thermostat temperature exceeded
		436	Electronic limit thermostat line (residual heat)
		437	Repeated experience of 426 subcoded error
		438	Repeated experience of 433 subcoded error
		756	Limit thermostat temperature exceeded
		306	Limit thermostat temperature exceeded
		412	Limit thermostat open
		754	Limit thermostat open
		305	Limit thermostat open
		412	Limit thermostat open
		421	Boiler return temperature higher than outlet temperature
		820	Boiler return temperature higher than outlet temperature
		420	Boiler return temperature higher than outlet temperature
		819	Boiler return temperature higher than outlet temperature
		429	Failure to reach reset criteria after 433 subcoded error
		818	Failure to reach reset criteria after 433 subcoded error
428	DeltaT value is greater than sum of parameters [3916.1] + [6604.1]		
817	DeltaT value is greater than sum of parameters [3916.1] + [6604.1]		
426	Boiler temperature [4091.1] is increasing with the acceleration faster than the MaxRate Trise flow parameter is allowed.		
815	Boiler temperature [4091.1] is increasing with the acceleration faster than the MaxRate Trise flow parameter is allowed.		



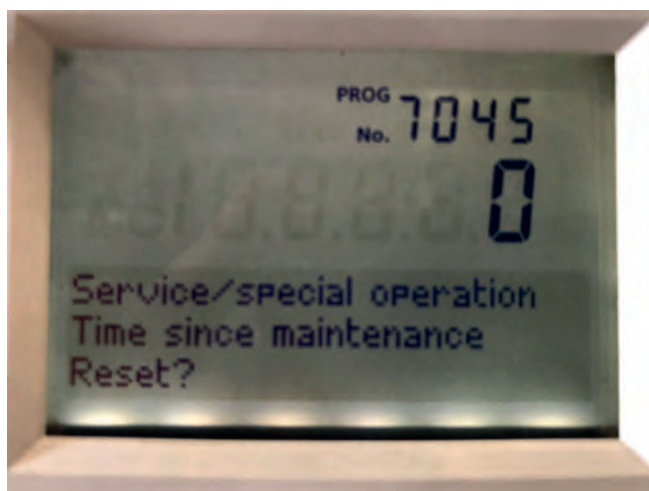
		430	Boiler outlet temperature> [3639.1] TempBoilerMaxSLTSec parameter
		814	Boiler outlet temperature> [3639.1] TempBoilerMaxSLTSec parameter
		419	Boiler outlet temperature> [3639.1] TempBoilerMaxSLTSec parameter
		813	Boiler outlet temperature> [3639.1] TempBoilerMaxSLTSec parameter
		425	Boiler return temperature> [3925.1] TempRetMaxSLTSec parameter
		812	Boiler return temperature> [3925.1] TempRetMaxSLTSec parameter
		424	Boiler return temperature is not at the desired level (<0 ° C)
		811	Boiler return temperature is not at the desired level (<0 ° C)
		423	Boiler outlet temperature is not at the desired level (> 124 ° C)
		810	Boiler outlet temperature is not at the desired level (> 124 ° C)
		422	Boiler outlet temperature is not at the desired level (<0 ° C)
		809	Boiler outlet temperature is not at the desired level (<0 ° C)
		550	Limit thermostat circuit open, start inhibit
		551	Limit thermostat circuit open, start inhibit
151	Internal BMU error		
		330	Error when ignition relay is closing
		331	Error when ignition relay is opening
		332	Error when closing gas valve relay 1
		333	Error when opening gas valve relay 1
		336	Error when closing the safety relay
		337	Error when opening safety relay

## MAINTENANCE REMINDER

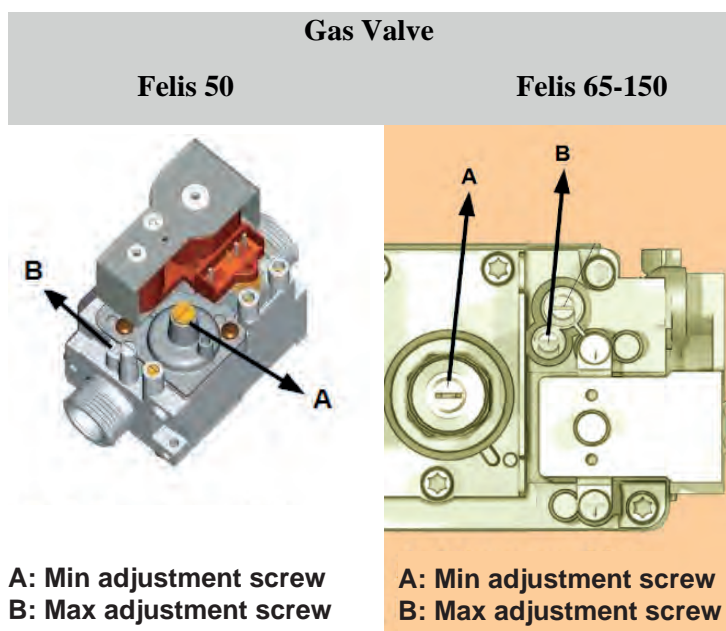
Felis condensing boilers have a maintenance reminder feature. The maintenance reminder option is set to activate according to the burner operating hours, the number of burner startups or the time since last maintenance. When one of these three criteria is fulfilled, a 105 message Maintenance message is displayed on the main screen.

Maintain			
Parameter No	Parameter Name	Factory Setting	Remark
7040	Brulor.time.range	1500	
7041	Burner operating hours since maintenance	-	
7042	Burner starting range	9000	
7043	Burner starting since maintenance	-	
7044	Maintenance interval	24	
7045	Hours since maintenance	-	

After maintenance, "7045: Time.since.maintenance" parameter reset.



## GAS SETTINGS



### Maximum Gas Setting

- 1) The flue gas analyzer is connected to the connection point on the flue terminal.
- 2) By pressing the «Heating mode selection» button shortly, the heating mode is set to «Protection» mode.
- 3) The «Heating mode selection» button is held pressed for 3 seconds, the message «Controller stop point open» appears on the display.
- 4) The «Information» button is pressed and the percentage of the controller is displayed on the screen.
- 5) Press the «OK» button and turn the adjustment knob to set the working percentage to 100%, confirm with the OK button.
- 6) With a flat head screwdriver, the adjustment screw indicated by «B» in the gas valve diagram is turned and the gas is adjusted according to the gas values specified in the table.

## Minimum Gas Setting

- 1) The flue gas analyzer is connected to the connection point on the flue terminal.
- 2) By pressing the «Heating mode selection» button, the heating mode is set to «Protection» mode.
- 3) The «Heating mode selection» button is held pressed for 3 seconds, the message «Controller stop point open» appears on the display.
- 4) The «Information» button is pressed and the percentage of the controller is displayed on the screen.
- 5) Press the «OK» button and turn the adjustment knob to set the working percentage to 0%, confirm with the OK button.
- 6) With a flat head screwdriver, the adjustment screw indicated by «A» in the gas valve diagram is turned and the gas is adjusted according to the gas values specified in the table.

		Unit	Felis 50	Felis 65	Felis 100	Felis 125	Felis 150
Minimum Gas Flow Rate	Minimum Limit	m3/h	0.75	1.28	2	2.22	2.7
	Maximum Limit	m3/h	0.85	1.38	2.13	2.67	2.9
Minimum CO2	Minimum Limit	%	8.32	7	7.7	7	7
	Maximum Limit	%	9.59	8.5	8.8	8.6	9
Maximum Gas Flow Rate	Minimum Limit	m3/h	4.64	6.9	9.9	12.3	14.15
	Maximum Limit	m3/h	5.05	7.1	10.24	13.4	14.7
Maximum CO2	Minimum Limit	%	8.76	7.8	8.53	9	8
	Maximum Limit	%	9.7	8.8	9.6	9.8	9

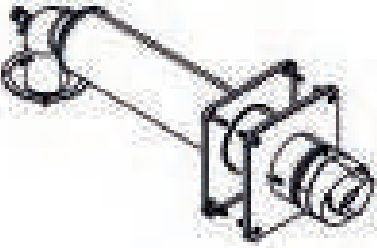
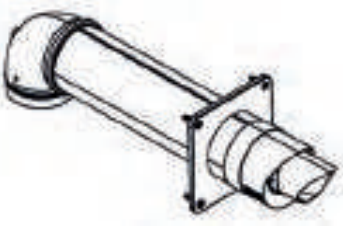
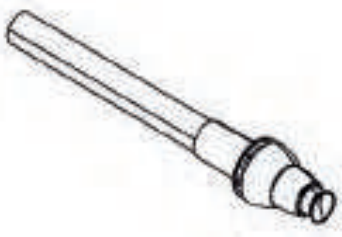
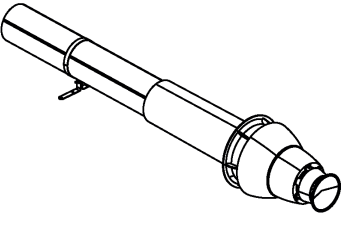

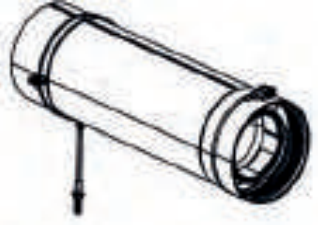
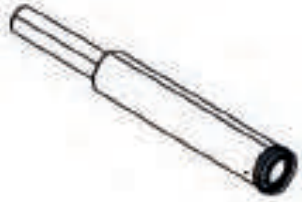
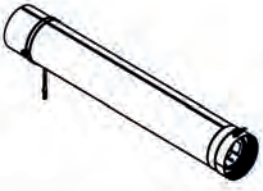




## ATTACHED FITTINGS

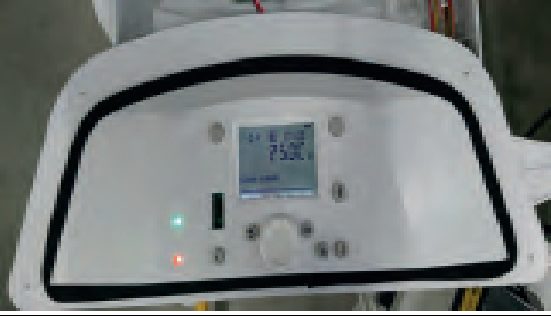




<b>CONTROL PANEL and ACCESSORIES</b>		
<b>PRODUCT CODE</b>	<b>PRODUCT DESCRIPTION</b>	<b>MODEL</b>
7006721314	Cascade Control Panel Group with Display (for master Boilers)	AF11
7006721430	Cascade Control Module Board (With Connection Cable)	AF12
7006721429	External Air Sensor	AF13
7006721438	Cascade Temperature Sensor (Clamp type)	AF14
7006721432	Boiler Temperature Sensor (Immersion type)	AF15
7006721434	Zone Control Kit (Card + Cable)	AF16
7006721435	Room Control Unit (Digital)	AF17
7006721436	Room Unit	AF18
7006721437	Web Server Communication Module	AF19
7006907522	Wireless Room Thermostat (On / Off)	AF20





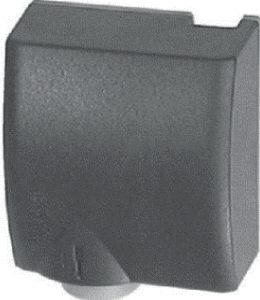
<b>HORIZONTAL and VERTICAL HERMETIC FLUE ACCESSORIES (Ø80 / 125 mm) for FELIS FL 50, FELIS FL 65 HORIZONTAL and VERTICAL HERMETIC FLUE ACCESSORIES (Ø100 / 150 mm) for FELIS FL 100, FELIS FL 125, FELIS FL 150</b>		
<b>PRODUCT CODE</b>	<b>PRODUCT DESCRIPTION</b>	<b>MODEL</b>
7006721458	Horizontal Hermetic Flue Kit, Ø80 / 125 mm	AB55
7006721459	Horizontal Hermetic Flue Kit, Ø100/150 mm	AB56
7006721460	Vertical Hermetic Flue Kit, Ø80 / 125 mm	AB57
7006721461	Vertical Hermetic Flue Kit, Ø100/150 mm	AB58
7006721462	Extension L=500 mm, Ø80/125 mm	AB59
7006721463	Extension L=500 mm, Ø100/150 mm	AB60
7006721464	Extension L=1000 mm, Ø80/125 mm	AB61
7006721465	Extension L=1000 mm, Ø100/150 mm	AB62
7006721466	90 ° Elbow, Ø80 / 125	AB63
7006721467	90 ° Elbow, Ø100/150	AB64
7006721493	45° Elbow, Ø80 / 125	
7006721494	45° Elbow, Ø100/150	

<b>PRIMER CIRCUIT CIRCULATION PUMPS</b>		
<b>PRODUCT CODE</b>	<b>PRODUCT DESCRIPTION</b>	<b>MODEL</b>
1452542800	Modulating Primary Circuit Circulation Pump	AP95
7006721468	Energy Efficient Primary Circuit Circulation Pump 50/65/100/125	AP98
7006721469	Energy Efficient Primary Circuit Circulation Pump 150	AP99

# FLUES

<p><b>7006721458</b> Horizontal Hermetic Flue Kit, <math>\varnothing</math>80/125 mm</p> 	<p><b>7006721459</b> Horizontal Hermetic Flue Kit, <math>\varnothing</math>100/150 mm</p> 	<p><b>7006721460</b> Vertical Hermetic Flue Kit, <math>\varnothing</math>80/125 mm</p> 
<p><b>7006721461</b> Vertical Hermetic Flue Kit, <math>\varnothing</math>100/150 mm</p> 	<p><b>7006721462</b> Extension L=500 mm, <math>\varnothing</math>80/125 mm</p> 	<p><b>7006721463</b> Extension L=500 mm, <math>\varnothing</math>100/150 mm</p> 
<p><b>7006721464</b> Extension L=1000 mm, <math>\varnothing</math>80/125 mm</p> 	<p><b>7006721465</b> Extension L=1000 mm, <math>\varnothing</math>100/150 mm</p> 	<p><b>7006721466</b> 90° Elbow, <math>\varnothing</math>80/125</p> 
<p><b>7006721467</b> 90° Elbow, <math>\varnothing</math>100/150</p> 	<p><b>7006721493</b> 45° Elbow, <math>\varnothing</math>80/125</p> 	<p><b>7006721494</b> 45° Elbow, <math>\varnothing</math>100/150</p> 

	<p><b><u>Cascade Control Panel Group with Display (AF11)</u></b></p> <p>It is an electrical control panel group with a display, keypad and operation / error warning leds for controlling the system and the boiler for the master boiler in cascade applications.</p>
	<p><b><u>Cascade Control Module Board (AF12)</u></b></p> <p>It provides communication between slave devices and master device in cascade connection systems. The devices have a cable connection to communicate between each device and a communication cable connection between the cascade module board and the main board.</p>
	<p><b><u>Zone Control Kit (AF16)</u></b></p> <p>It provides control of up to two zones in applications with additional heating systems. Together with this control card, it adjusts the operating status of the heating circuit depending on the zone requested according to the desired temperature.</p>
	<p><b><u>Web Server Communication Module (AF19)</u></b></p> <p>It is used in the automation indicator of the system where the device is attached.</p>
	<p><b><u>Boiler Temperature Sensor (AF15)</u></b></p> <p>In applications with domestic water, temperature is measured with immersion type NTC from the boiler and connection is provided from the sensor input to the main board. In addition, the same sensor is used in the system for the measurement of the balance container temperature.</p>

	<p><b><u>Room Unit Digital (AF17)</u></b></p> <p>With the room unit, the heating demands of the device are adjusted and programmed. Digital work is done on the screen. The operating mode can be set on the room unit.</p>
	<p><b><u>Room Unit (AF18)</u></b></p> <p>With the room unit, the heating demands of the device are adjusted and programmed. There are temperature setting and instant temperatures on the screen. The operating mode can be set on the room unit.</p>
	<p><b><u>E.C.A Wireless On/Off Room Thermostat (AF20)</u></b></p> <p>The wireless room thermostat, which is connected to the main board of the device from the sensor inputs, is set according to the room temperature of the device. The set temperature can be read on the display of the room thermostat.</p>
	<p><b><u>Outside Air Sensor (AF13)</u></b></p> <p>It measures the outside air temperature and transmits it to the system and helps the system to provide the desired water temperature with efficient operation.</p>
	<p><b><u>Cascade Temperature Sensor (AF14)</u></b></p> <p>It helps to adjust the modulation rate of the devices and to provide the desired water temperature by measuring the total water temperature in the balance container of the system in cascade connected devices.</p>

## Part assembly / disassembly operation definitions

### • Felis FL 50 HM

- **Disassembly of Front Cover:** Combining the front cover, the side sheets and the subframe, 2 pieces of 4x9,5 Sheettracs Screw coded 7006990123, are removed as shown in the figure and the front cover is disassembled as follows.

**Torque:  $1 \pm 0.2$  N.m**



- **Disassembly of Side Panel :** 2 pieces of 4x9,5 Sheettracs Screw coded 7006990123, fixing the control panel to the side panels, are removed.

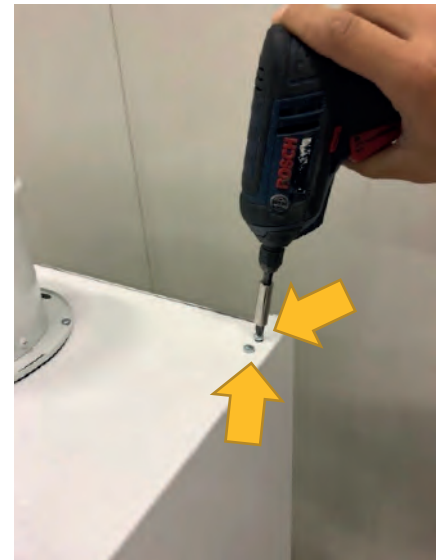
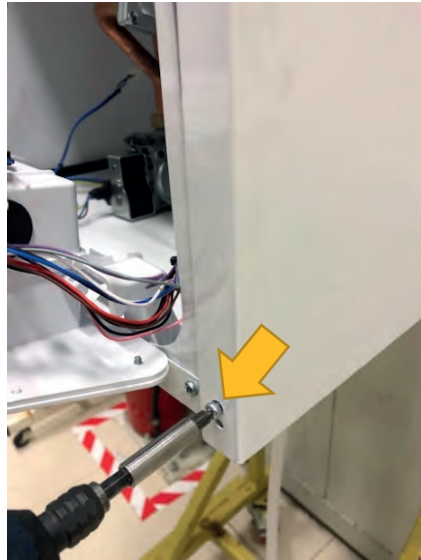
**Torque:  $2.5 \pm 0.2$  N.m**





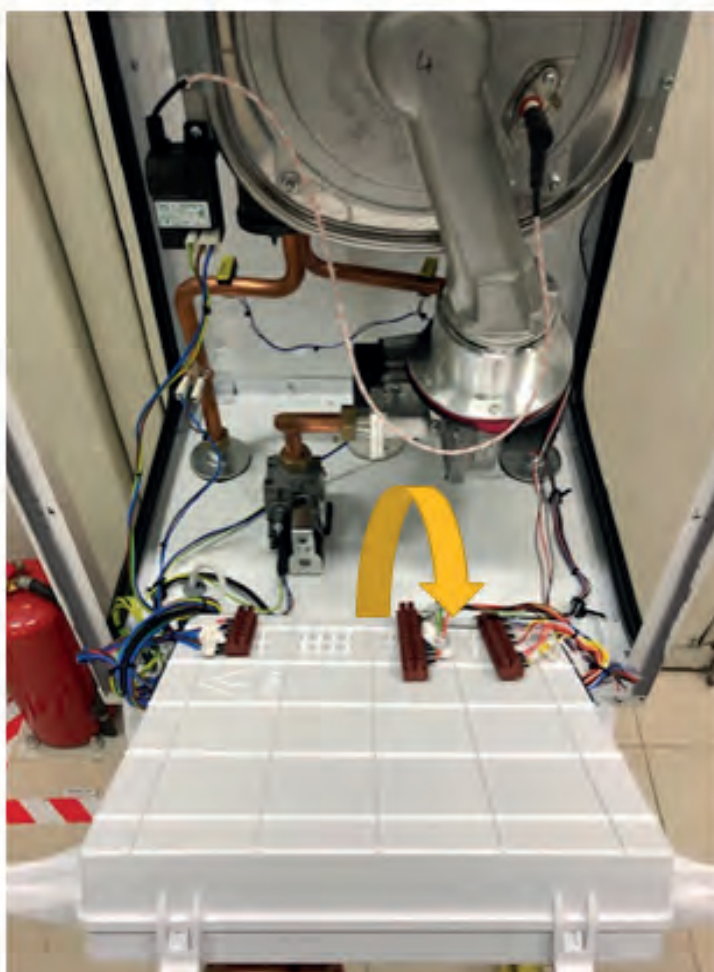
Disassembling of the side panels are performed by removing 4 pieces of 4x9,5 Sheettracs Screw (for one panel) coded 7006990123, fixing the side panels with the upper and lower frame.

**Torque:  $2 \pm 0,2$  N.m**

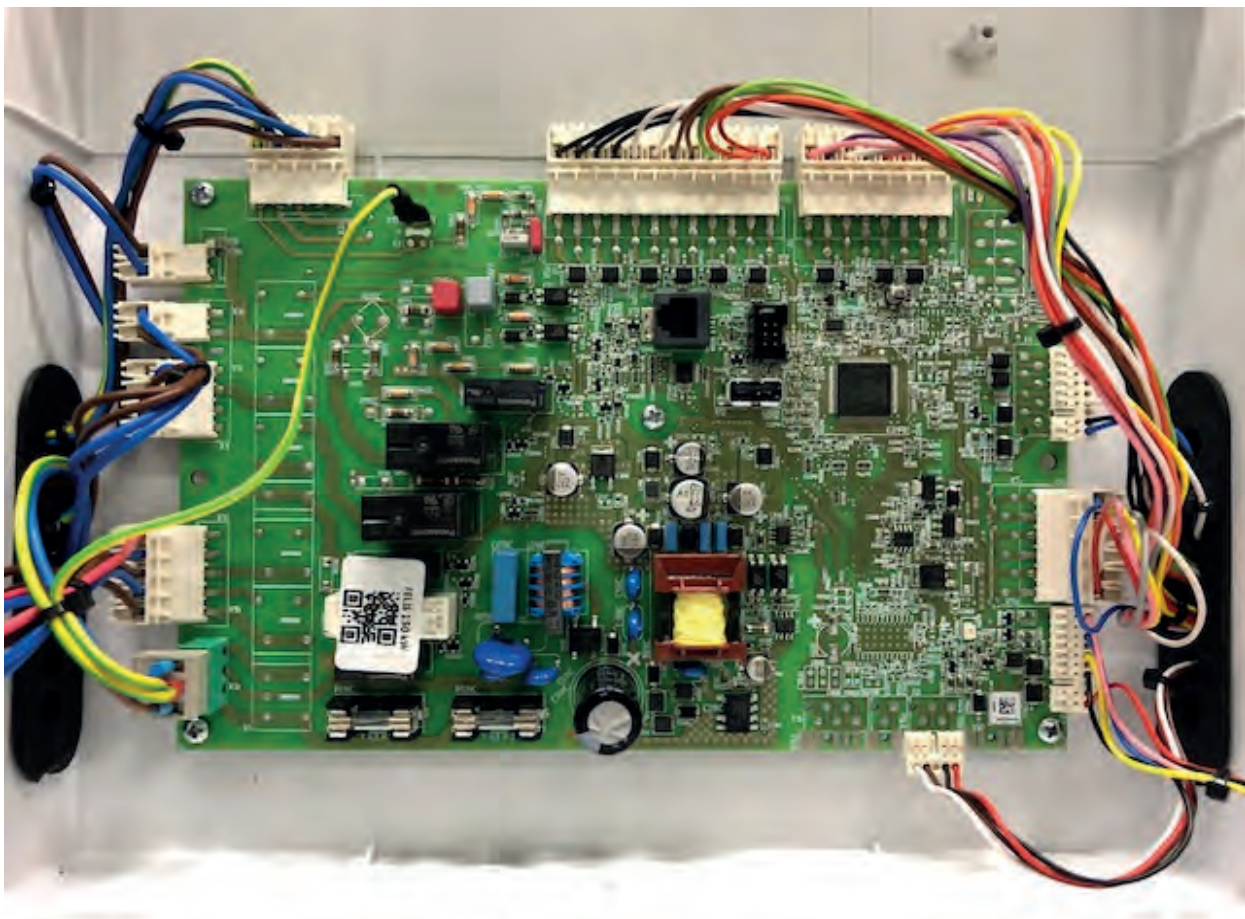
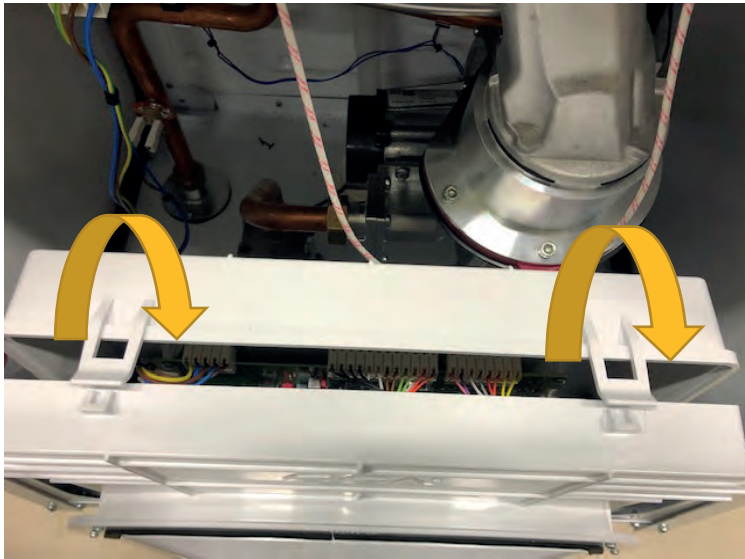


**NOTE:** All parts can be changed without disassembling the side panels. Side panel disassembly is provided for information purposes.

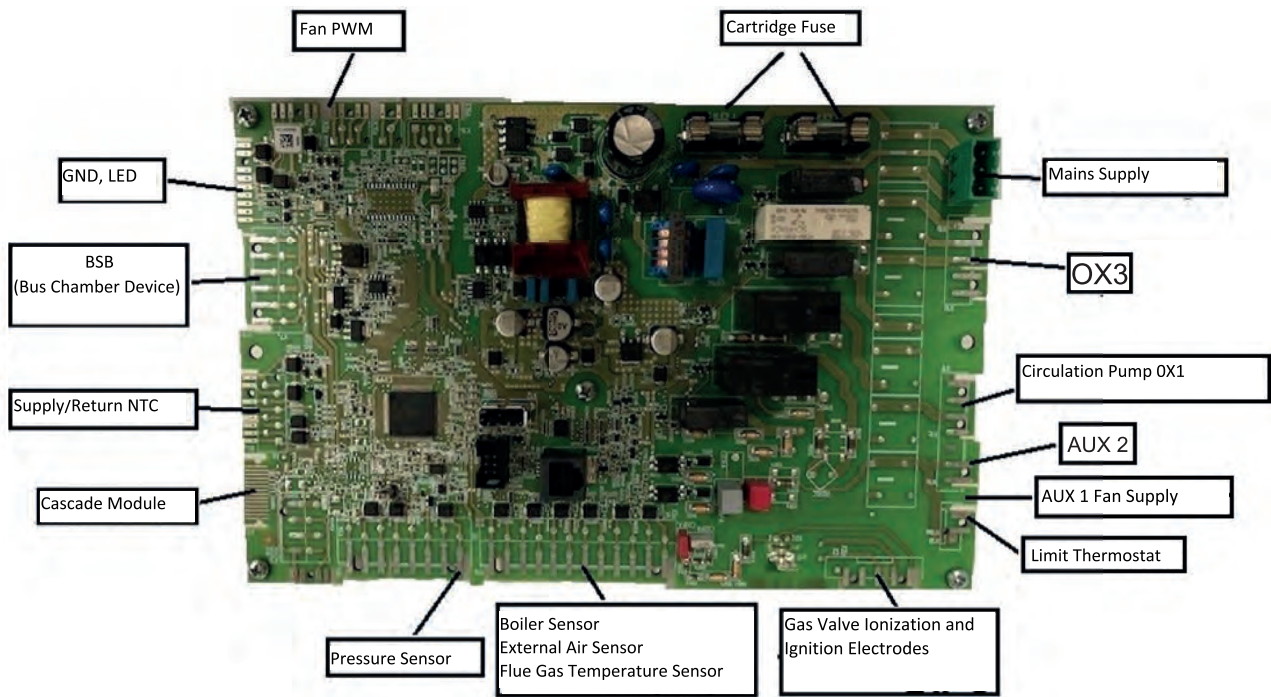
**Disassembly of Control Panel:** After removing 2 pieces of 4x9,5 Sheettracs Screw coded 7006990123 on the side panels, the tabs on the lower frame are stretched and the control panel is disassembled.



The control panel tabs are opened as shown in the figure and the main board and video card connections are reached.



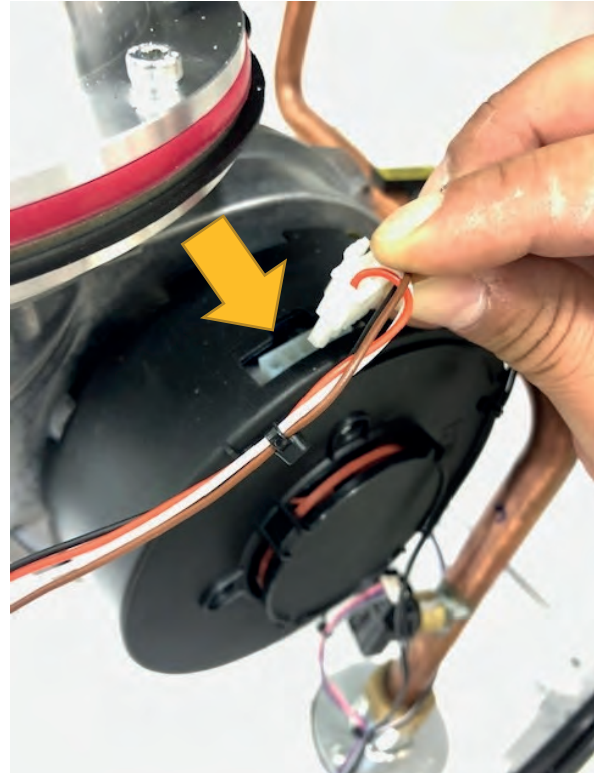
- **Main Board Connections:** Each socket on the main board is shown in the picture below.



- **Assembly / Disassembly of Flue Gas Sensor:** The flue gas sensor is assembled / disassembled as follows from the connection point in the picture.



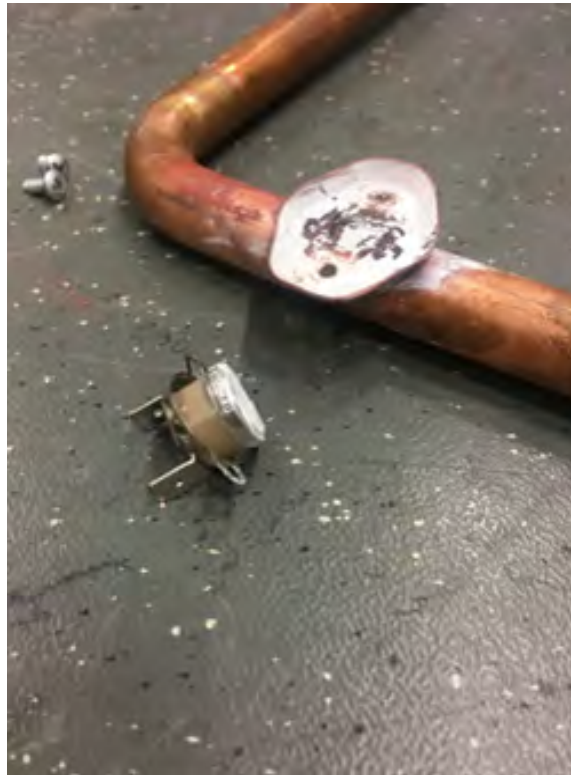
• **Assembly / Disassembly of Fan Cables:** Fan modulation and fan supply cables are assembled / disassembled as follows.



• **Assembly / Disassembly of Limit Thermostat and Its Cable:** Limit thermostat cable is assembled / disassembled as shown in the figure. Later, 2 pieces of 7006802173 coded 2.9 X 6.5 YSB screws connecting the limit thermostat to the water pipe are disassembled and the safety thermostat is disassembled as follows.

**Torque:  $0.5 \pm 0.02$  N.m**





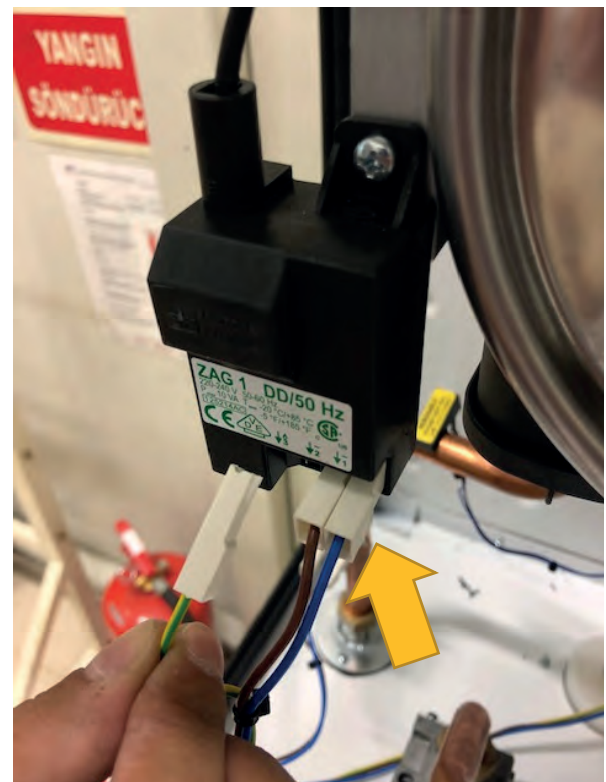
• **Assembly / Disassembly of Surface Type NTC** : 2 surface type NTC and connection cables in the flow and return pipes are assembled / disassembled as follows.



• **Assembly / Disassembly of Pressure Sensor:** Water pressure sensor cable is assembled / disassembled as follows.



• **Assembly / Disassembly of Transformer:** System transformer cables are assembled / disassembled as shown in the figure.

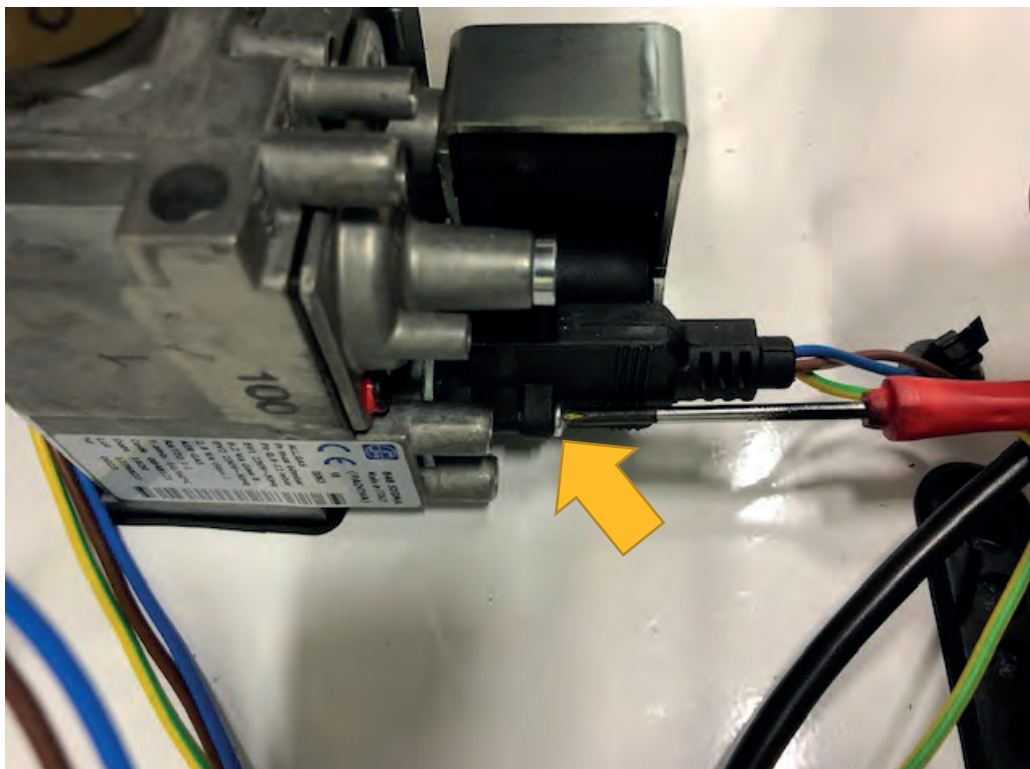


After the cables are disassembled, transformer disassembling is performed by removing 1 piece of 4 x 9.5 Sheettracs Screw, which connects the transformer to the right front post.

**Torque:  $3 \pm 0.2$  N.m**



• **Disassembly of Gas Valve Cable and Gas Valve:** Disassembling the cables is done by removing the Gas Valve Cable Screw, which provides the connection of the gas valve cables and the gas valve.

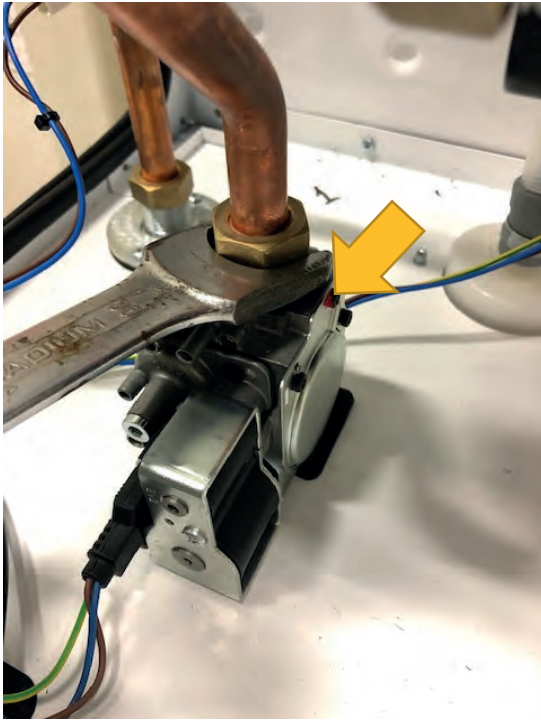




Disassembling the gas valve is performed by removing the M4x8 YSB (DIN 7500) screw coded 7006990145 and the gas pipe of the gas valve, which provides the bottom sheet connection with the gas valve.

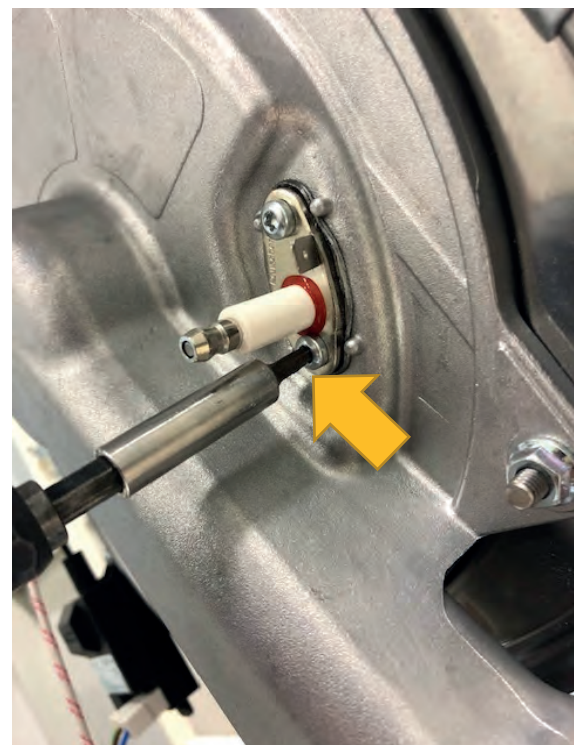
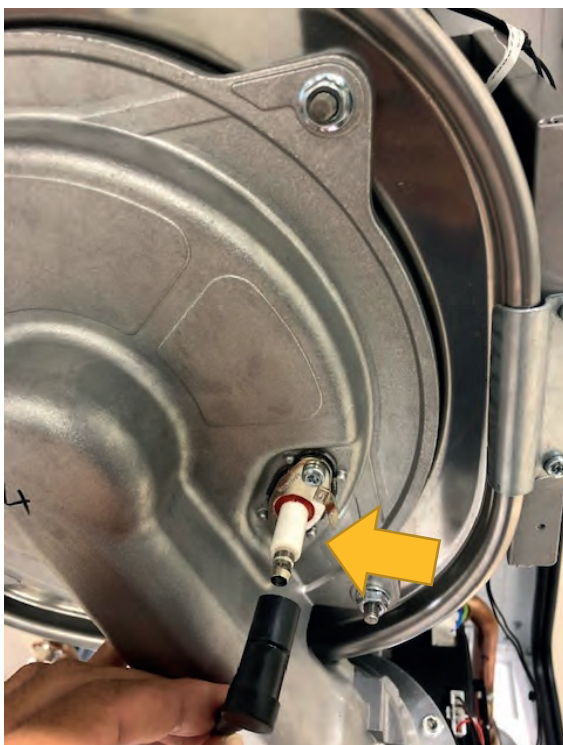
**Torque: 1.5 ± 0.2 N.m (Pneumatic Screwdriver)**

**Torque: 30 ± 2 N.m (Torque Switch)**



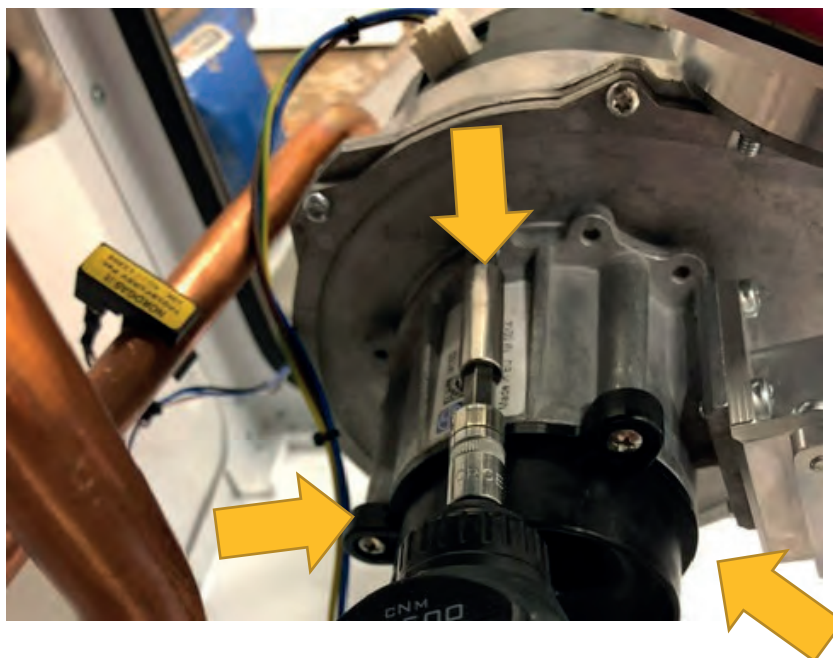
• **Assembly/Disassembly of Electrode Cable and Electrode:** The electrode cable is removed as shown. After the cable is disconnected, 2 pieces of Electrode Screw coded 7006721554 are disassembled and the electrode is removed from the heat exchanger bed.

**Torque: 2.2 ± 0.2 N.m**



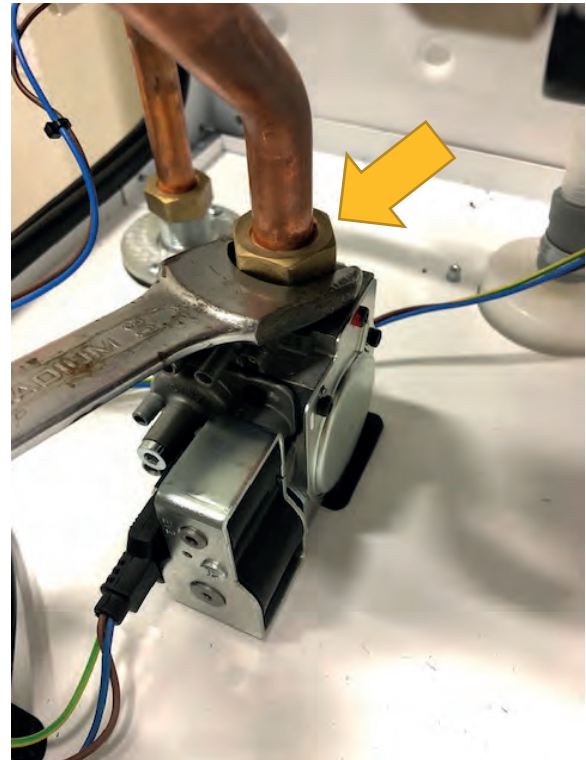
• **Disassembly of Fan:** The disassembly of the fan is performed by removing 4 pieces of M6 x 20 Impus Bolts coded 7006990728 located at the flap connection between the fan and the heat exchanger and 3 pieces of M4 x 12 Bolt coded 7006801162 located between the fan and the venturi with a pneumatic screwdriver.

Torque:  $2 \pm 0.2$  N.m



• **Disassembly of Gas Pipe:** Connecting the gas pipe to the gas valve and the gas inlet adapter, 2 pieces of 7006301243 coded R3 / 4 "Union Nut are disconnected and the gas pipe is disassembled.

**Torque:**  $30 \pm 0.2$  N.m



• **Disassembly of Heating Flow / Return Pipes:** Clips in the inlet and outlet pipes are removed. 7006301243 R3 / 4 " Fitting Nut connections of the Flow / Return group pipes are removed with a wrench and the pipes are removed.

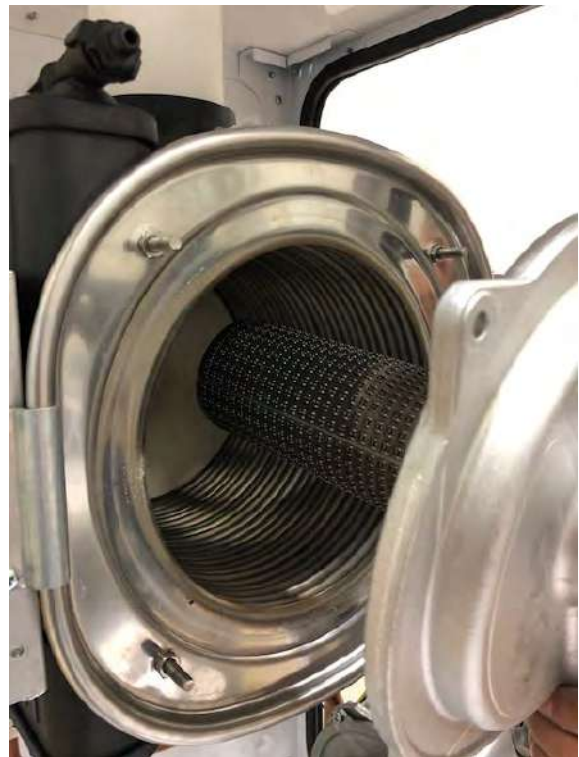
**Torque:**  $20 \pm 2$  N.m





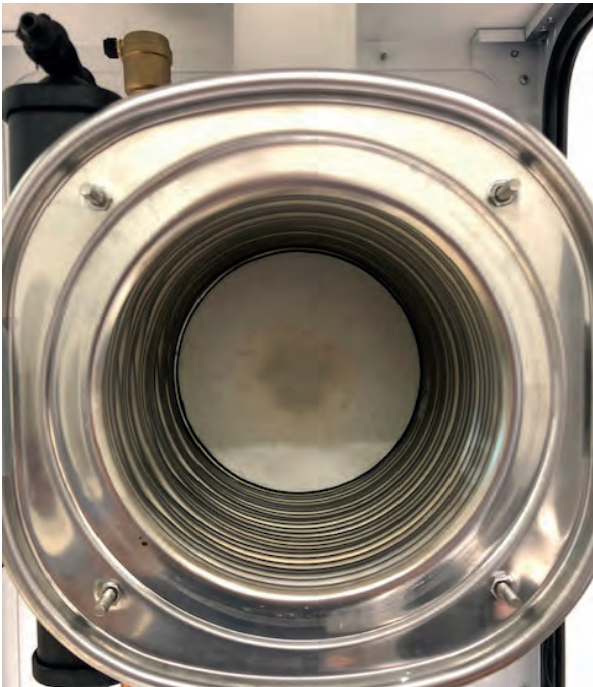
• **Disassembly of Heat Exchanger:** The heat exchanger cover is removed by removing the 4 bolts with a wrench.

**Torque:**  $3.2 \pm 0.5$  N.m



After removing the heat exchanger cover, 2 pieces of 4x9,5 Sheettracs Screws coded 7006990123 in the holder brackets in the heat exchanger bracket are disassembled. The heat exchanger body, which is fitted with a rivet on the rear frame, must be pulled forward and disassembled.

**Torque: 0.8 ± 0.2 N.m**



• **Disassembly of Siphon:** Disassembly of the pipe is performed by removing 1 piece of siphon hose screw coded 7006985115, which connects the clips of the siphon hose between the heat exchanger and the siphon connection as shown in the figure.

**Torque: 1.5 ± 0.2 N.m**



The siphon lower chamber is inserted into the siphon and when turned to the left, it is disassembled by getting rid of the tabs.



While the siphon head is disassembled from the subframe, 2 pieces of 7006801162 Bolt M4 \* 12 DIN 933 EN-ISO 4017 and 7006721491 M4 Rivet Nut connection are removed from the subframe by screwdriver.

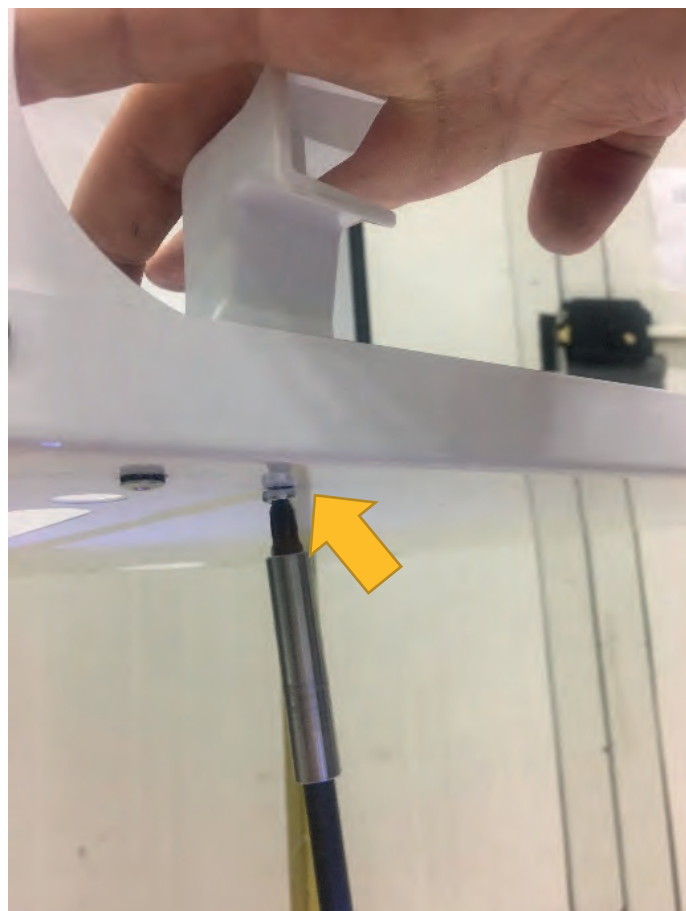
**Torque: 2.5 ± 0.2 N.m**



• **Disassembly of 220 V Cable Entry Gland:** Cable disassembly is done by loosening the 220 V cable screw transition piece.



To disassemble, 7006801162 Bolt M4 \* 12 DIN 933 EN-ISO 4017 and 7006721491 M4 Rivet Nut connection located on the control panel holder tabs attached to the subframe are removed from the subframe by screwdriver.



- **Disassembly of Upper Frame:** Disassembly of the upper frame is performed by disassembling 4x9,5 Sheettracs Screw coded 7006990123, which connects the upper frame with the side post and the rear frame.

**Torque:  $3 \pm 0.2$  N.m**



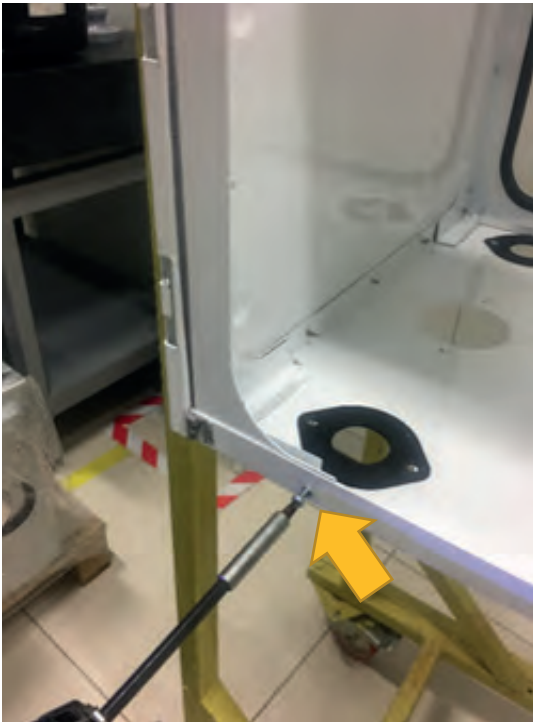
The gaskets in the posts are removed before the upper frame is disassembled.





- **Disassembly of Side Post:** After the upper frame is disassembled, 4 pieces of 4x9,5 Sheettracs screws coded 7006990123 are disassembled by removing the screws.

**Torque:  $3 \pm 0.2$  N.m**



- **Disassembly of Lower Frame:** After the posts have been disassembled, 3 pieces of 4x9,5 Sheettracs screws coded 7006990123, which connect the lower frame with the rear frame are removed and the lower frame is disassembled.

**Torque:  $3 \pm 0.2$  N.m**



- Felis FL 65 HM

- **Disassembly of Front Cover:** 2 pieces of M3.5 X 5 YSB screws coded 7006802315 connecting the front cover, side sheets and lower frame are removed as shown in the figure and the front cover is disassembled as follows.

**Torque:  $1 \pm 0.2$  N.m**



- **Disassembly of Side Panel :** 2 pieces of 4x9,5 Sheettracs Screw coded 7006990123, fixing the control panel to the side panels, are removed.

**Torque:  $2.5 \pm 0.2$  N.m**



Disassembling of the side panels are performed by removing 4 pieces of 4x9,5 Sheettracs Screw (for one panel) coded 7006990123, fixing the side panels with the upper and lower frame.

**Torque:  $2 \pm 0,2$  Nm**

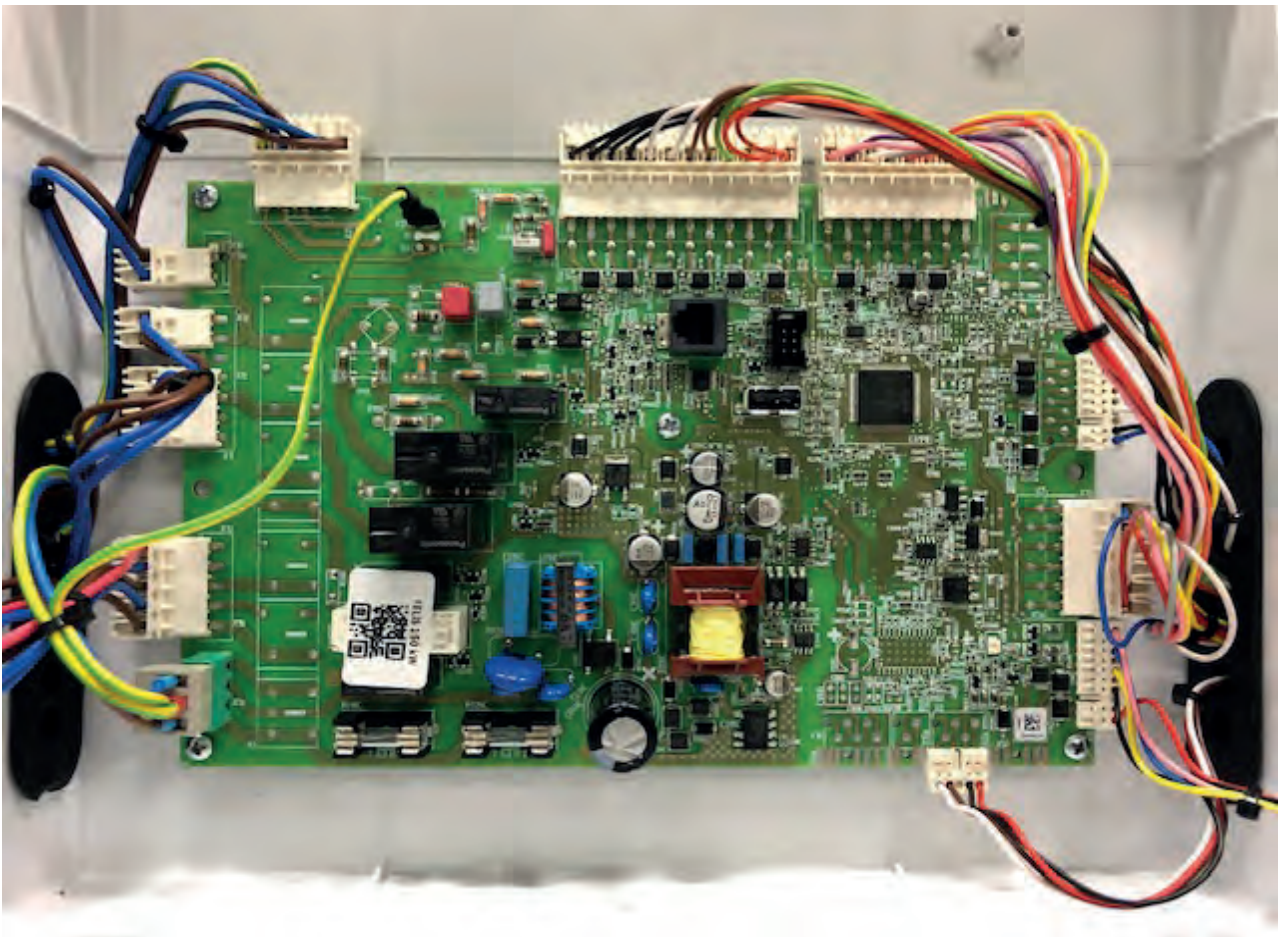
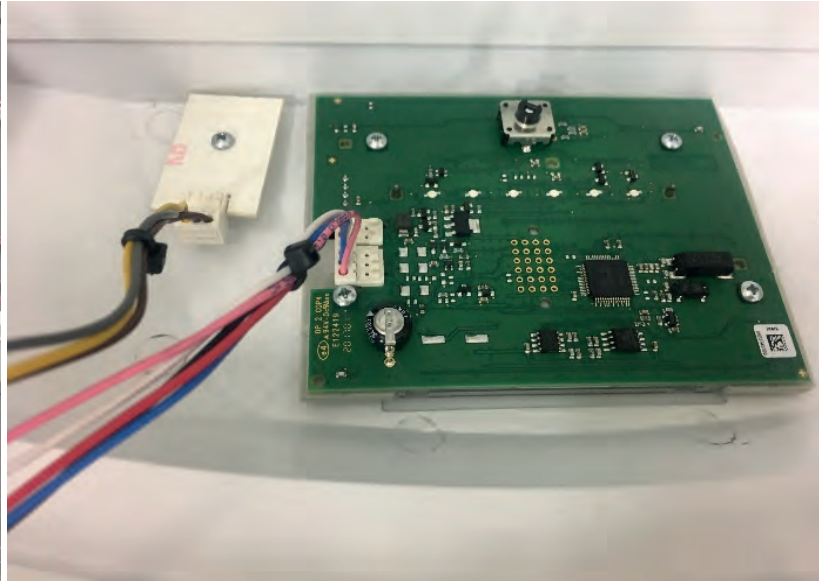


**NOTE: All parts can be changed without disassembling the side panels. Side panel disassembly is provided for information purposes.**

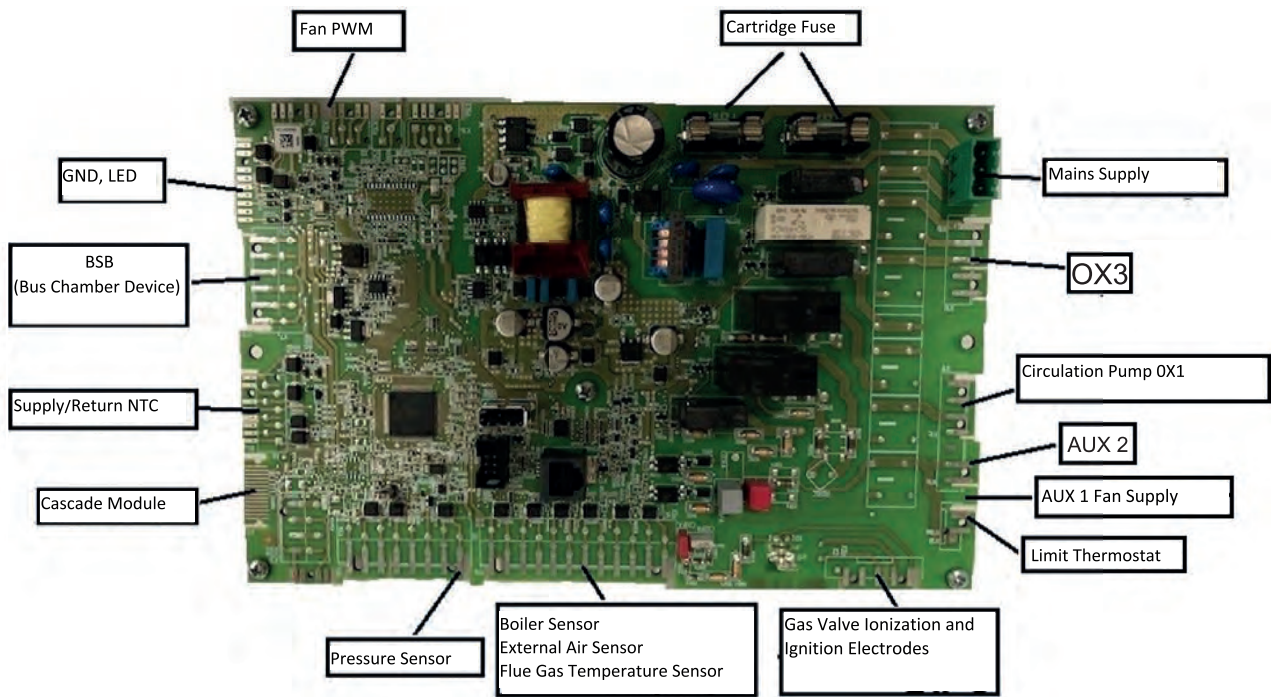
• **Disassembly of Control Panel:** After removing 2 pieces of 4x9,5 Sheettracs Screw coded 7006990123 on the side panels, the tabs on the lower frame are stretched and the control panel is disassembled.



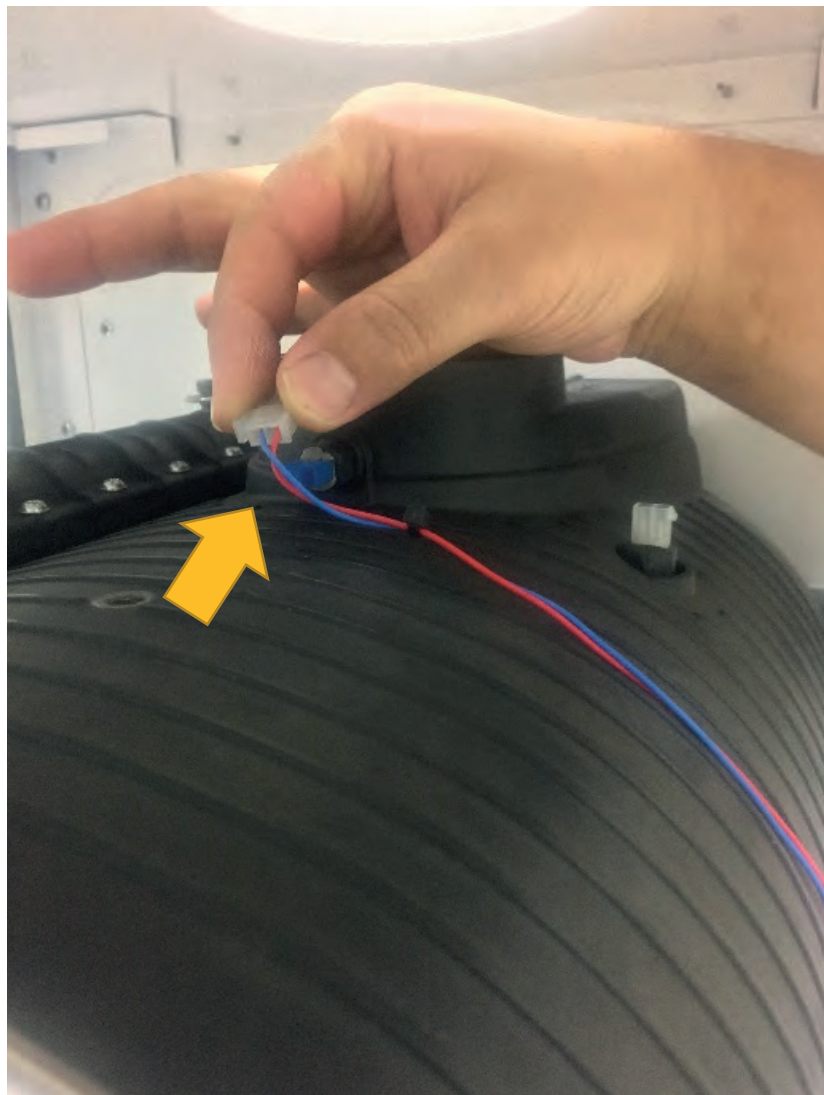
The control panel tabs are opened as shown in the figure and the main board and video card connections are reached.



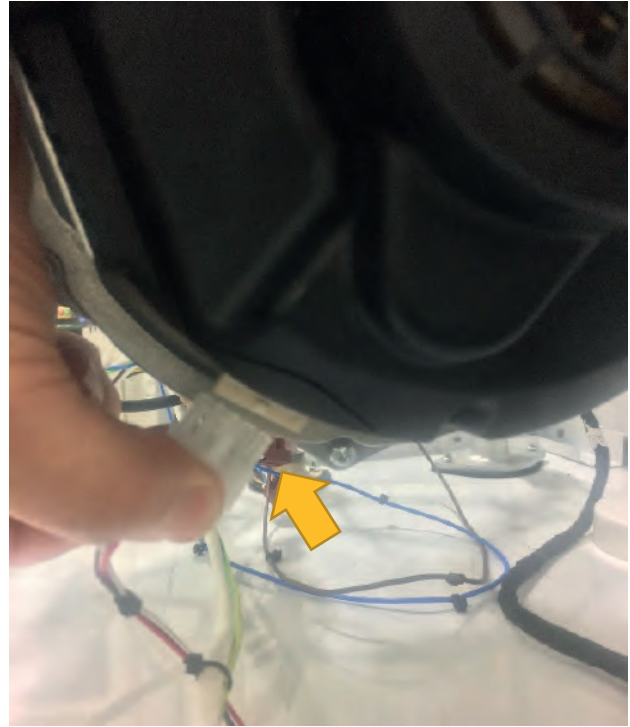
- **Main Board Connections:** Each socket on the main board is shown in the picture below.



- **Assembly / Disassembly of Flue Gas Sensor:** The flue gas sensor is assembled / disassembled as follows from the connection point in the picture.



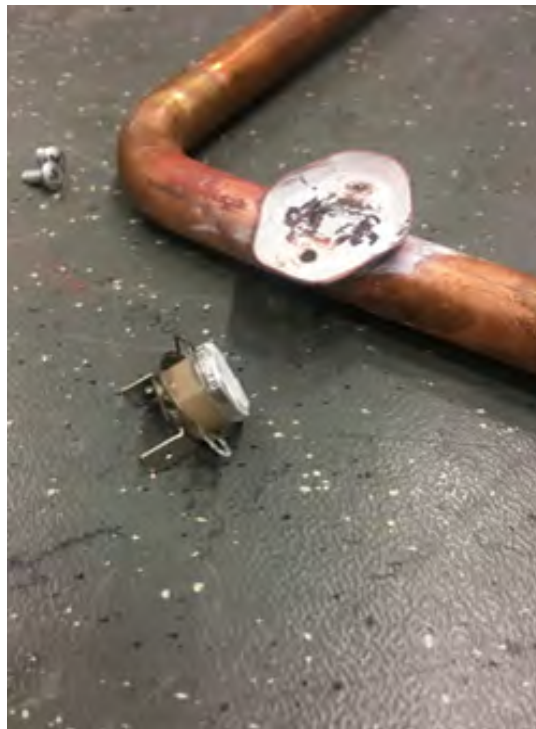
• **Assembly / Disassembly of Fan Cables:** Fan modulation and fan supply cables are assembled / disassembled as follows.



• **Assembly / Disassembly of Limit Thermostat and Its Cable:** Limit thermostat cable is assembled / disassembled as shown in the figure. Later, 2 pieces of 2.9 X 6.5 YSB screws coded 7006802173 connecting the limit thermostat to the water pipe are disassembled and the safety thermostat is disassembled as follows.

**Torque: 0.5±0.02 N.m**

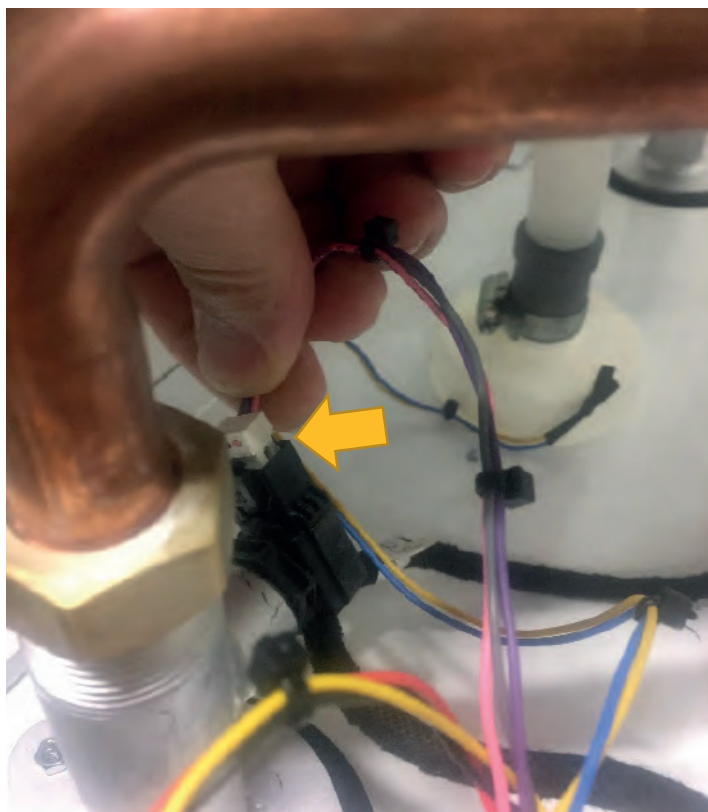




• **Assembly / Disassembly of Surface Type NTC** : 2 surface type NTC and connection cables in the flow and return pipes are assembled / disassembled as follows.



• **Assembly / Disassembly of Pressure Sensor:** Water pressure sensor cable is assembled / disassembled as follows.



• **Assembly / Disassembly of Transformer:** System transformer cables are assembled / disassembled as shown in the figure.





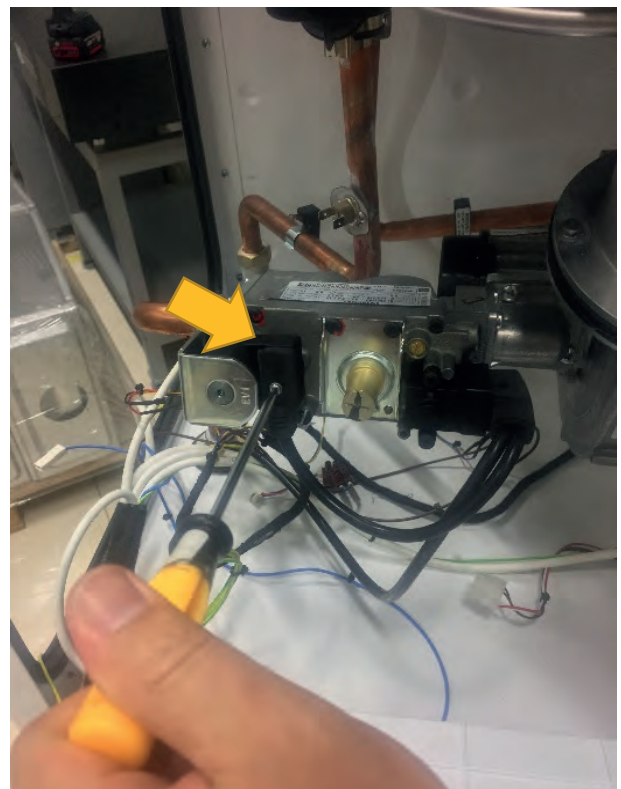
After the cables are disassembled, transformer disassembling is performed by removing 1 piece of 4 x 9.5 Sheettracs Screw, which connects the transformer to the right front post.

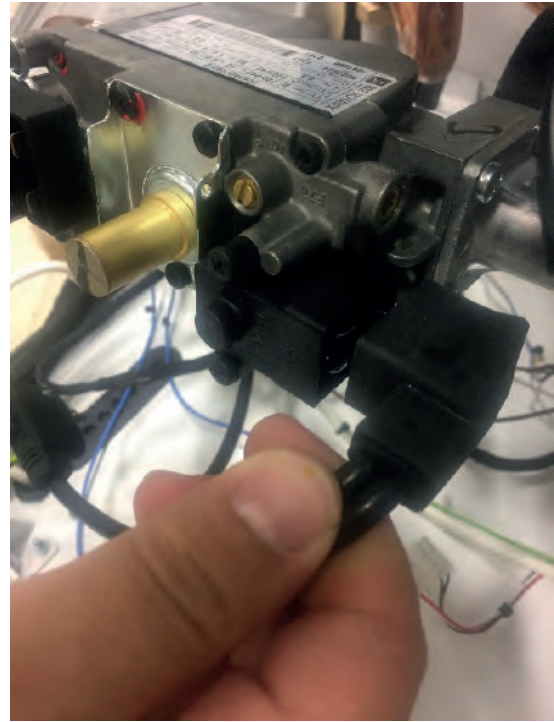
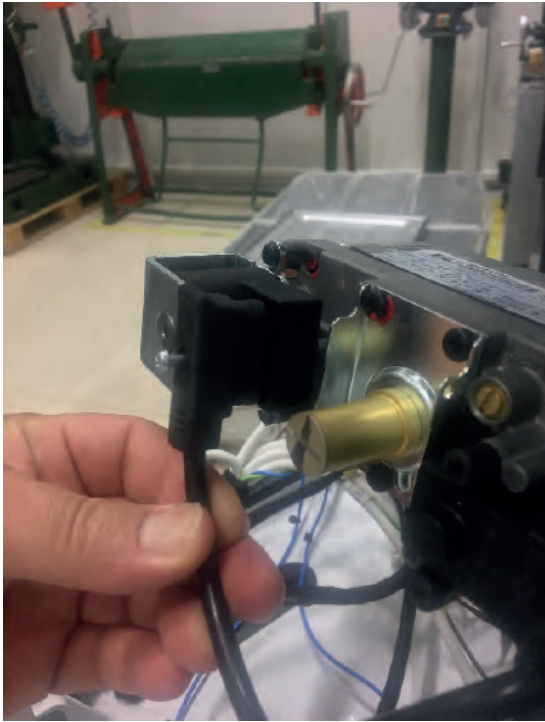
**Torque:  $3 \pm 0.2$  N.m**



• **Disassembly of Gas Valve Cable and Gas Valve:** The disassembly of the cables is performed by removing 2 screws that connect the gas valve cables to the gas valve.

**Torque:  $0.7 \pm 0.02$  N.m**



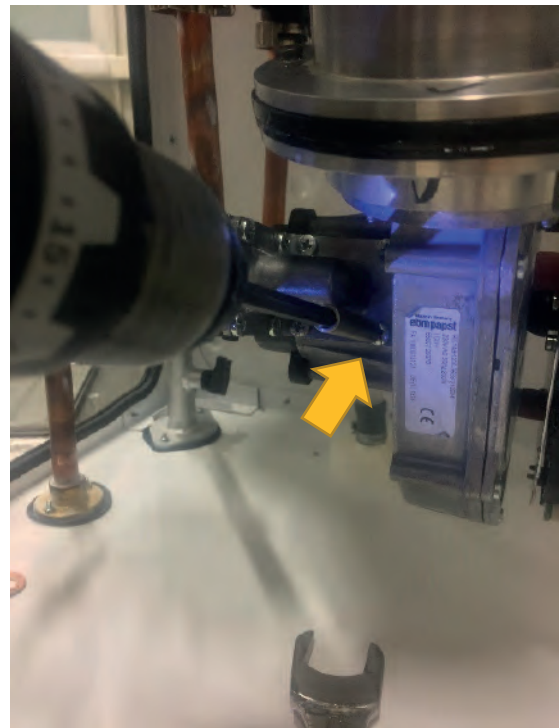
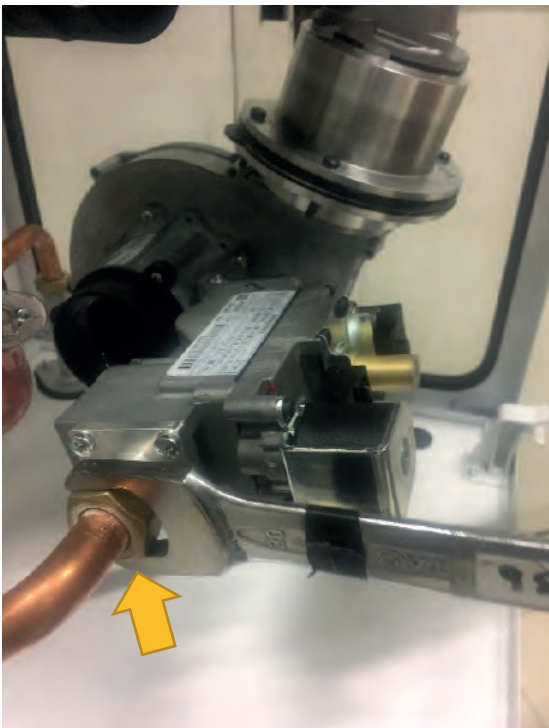


Disassembling the gas valve is performed by removing 4 pieces of M5 x12 YSB screw coded 7006801325 providing connection of gas valve and fan and nut connection of the gas valve with the gas pipe.

**Torque: 2.5 ± 0.2 N.m (Pneumatic Screwdriver)**

**Torque: 20.5 ± 2 N.m (Torque Switch)**

**NOTE:** To prevent the nut from moving during disassembly of the gas valve, nut must be held while removing.





- **Assembly/Disassembly of Electrode Cable and Electrode:** The electrode cable is removed as shown. After the cable is disconnected, 2 pieces of M4x8 screw coded 7006990263 are disassembled and the electrode is removed from the heat exchanger bed.

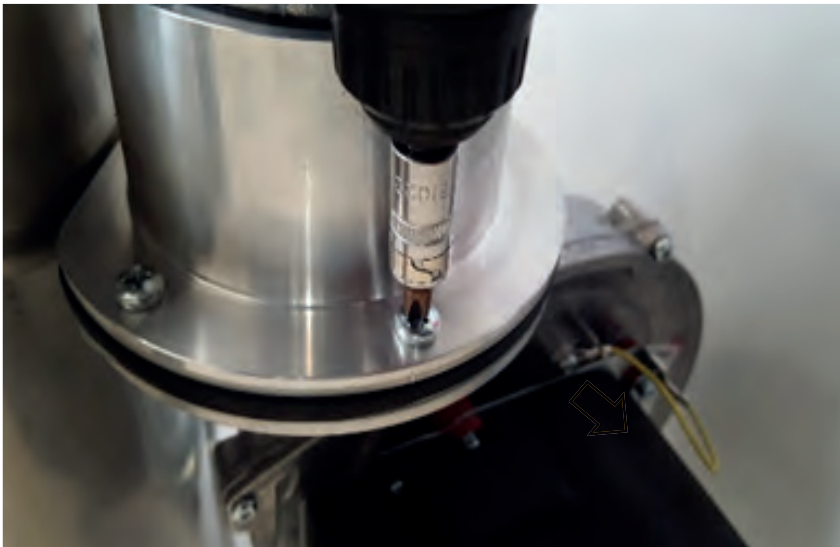
**Torque: 2.2± 0.2 N.m**





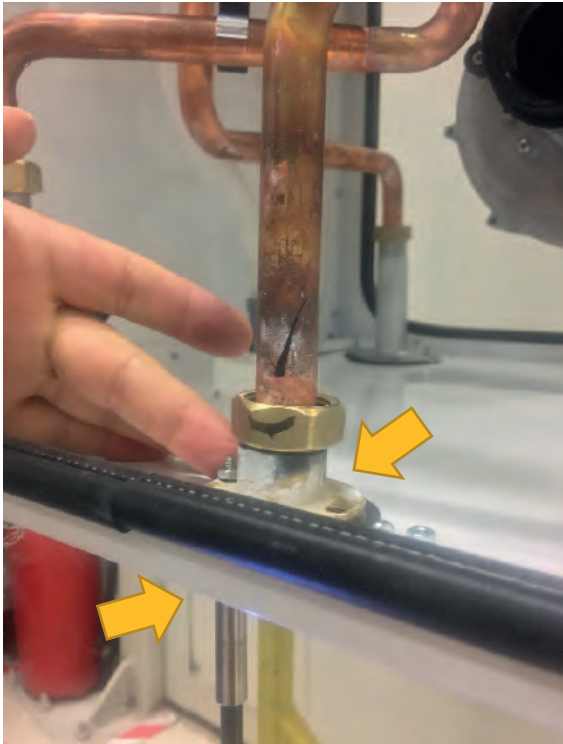
- **Disassembly of Fan:** After disconnecting the gas valve from the fan, disassembly of the fan is performed by removing 4 pieces of M5x20 YSB screw code 7006985120 at the Clapper connection between the fan and the heat exchanger with a pneumatic screwdriver.

**Torque:  $2.5 \pm 0.2$  N.m**



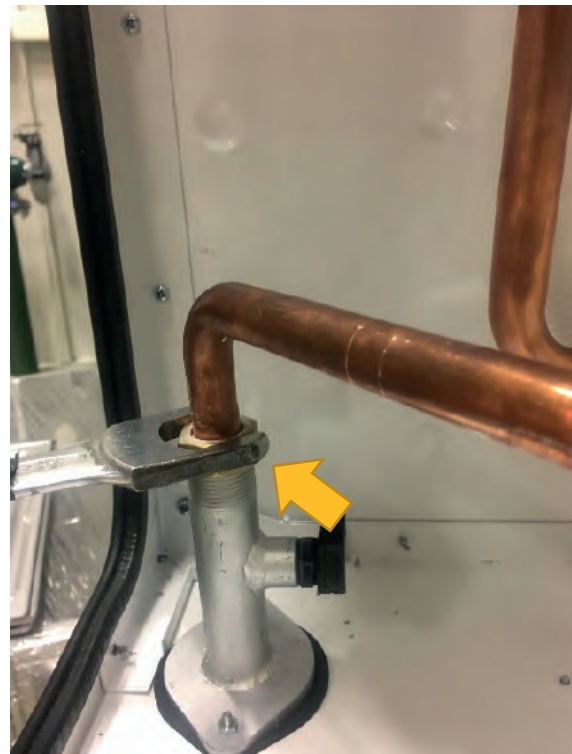
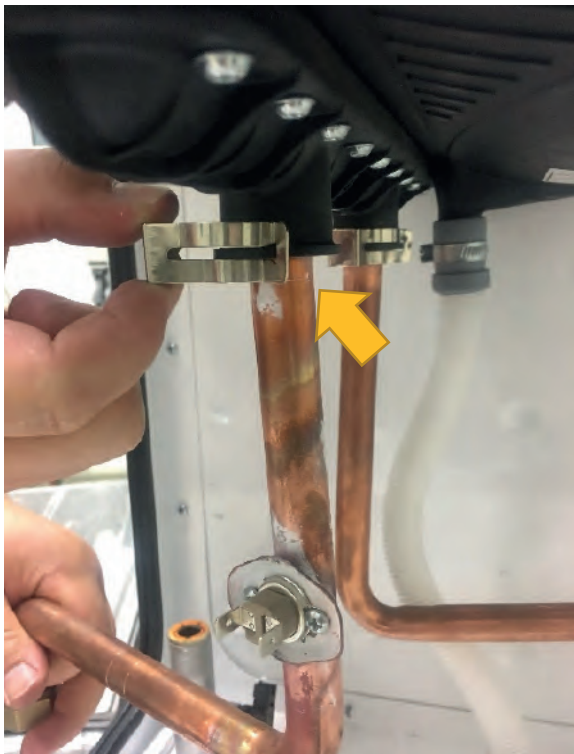
• **Disassembly of Gas Pipe:** Disassembly of gas pipe is performed by removing 2 pieces of 4x9,5 Sheet-racs screw coded 7006990123 connecting the gas pipe to the lower frame.

**Torque:**  $0.9 \pm 0.3$  N.m



• **Disassembly of Heating Flow / Return Pipes:** Clips in the inlet and outlet pipes are removed. Nuts of the Flow / Return group pipes 7006990221/7006990220 are removed with a wrench and the pipes are removed.

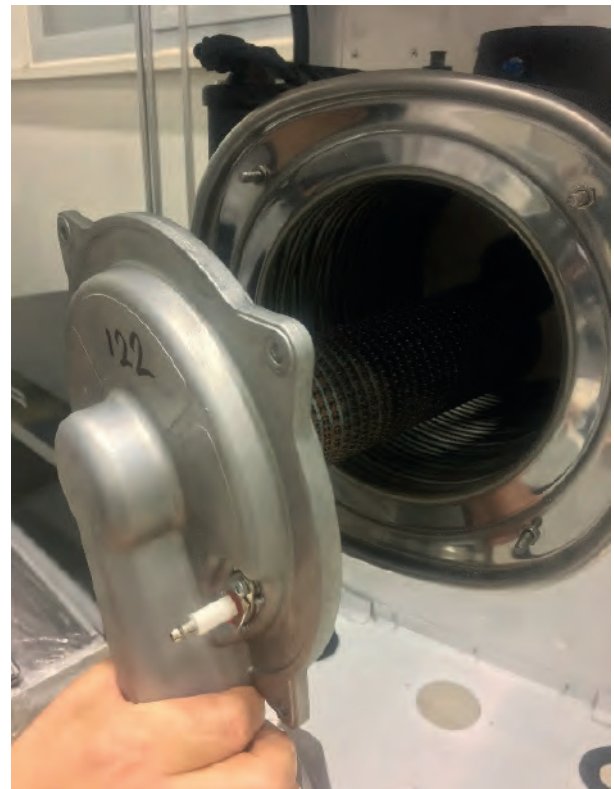
**Torque:**  $20 \pm 2$  N.m





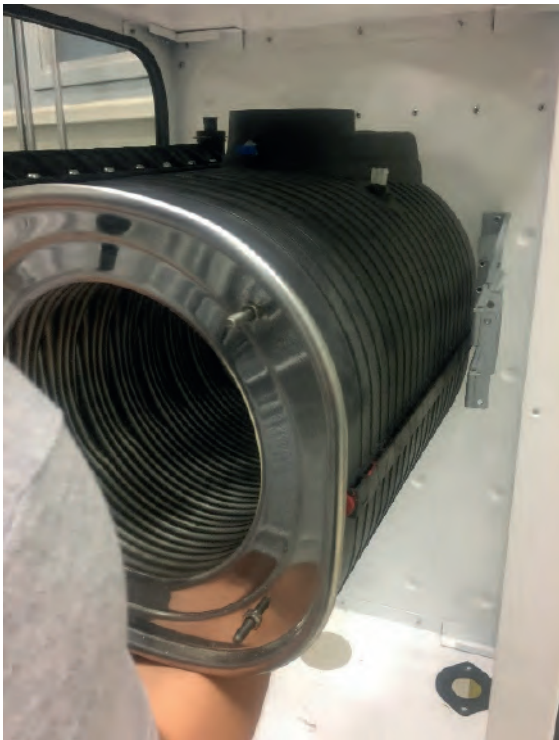
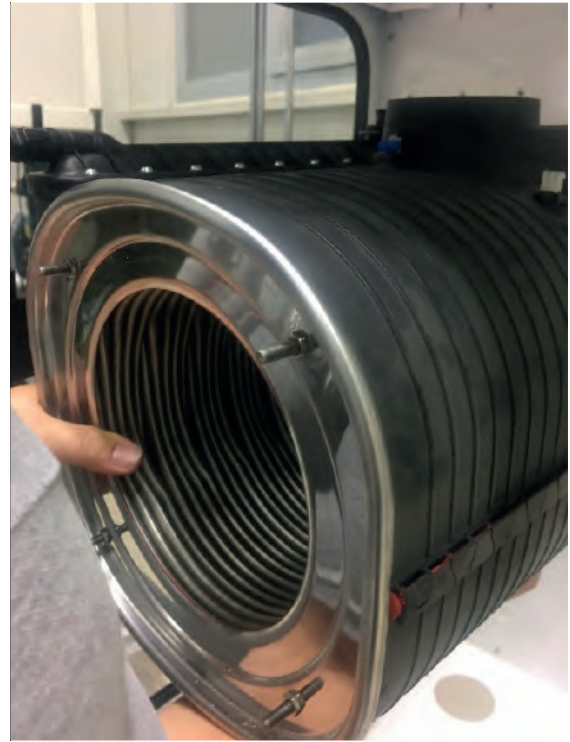
• **Disassembly of Heat Exchanger:** The heat exchanger cover is removed by removing the 4 bolts with an allen.

**Torque:  $3.2 \pm 0.5$  N.m**



After removing the heat exchanger cover, 2 pieces of 4x9,5 Sheettracs Screws coded 7006990123 in the holder brackets in the heat exchanger bracket are disassembled. The heat exchanger body, which is fitted with a rivet on the rear frame, must be pulled forward and disassembled.

**Torque: 0.8 ± 0.2 N.m**



• **Disassembly of Siphon:** Disassembly of the pipe is performed by removing 1 piece of siphon hose screw coded 7006985115, which connects the clips of the siphon hose between the heat exchanger and the siphon connection as shown in the figure.

**Torque:  $1.5 \pm 0.2$  N.m**



The siphon lower chamber is inserted into the siphon and when turned to the left, it is disassembled by getting rid of the tabs.





While the siphon head is disassembled from the lower frame, 2 pieces of 4x9,5 Sheettracs screw coded 7006990123 are removed from the lower frame.

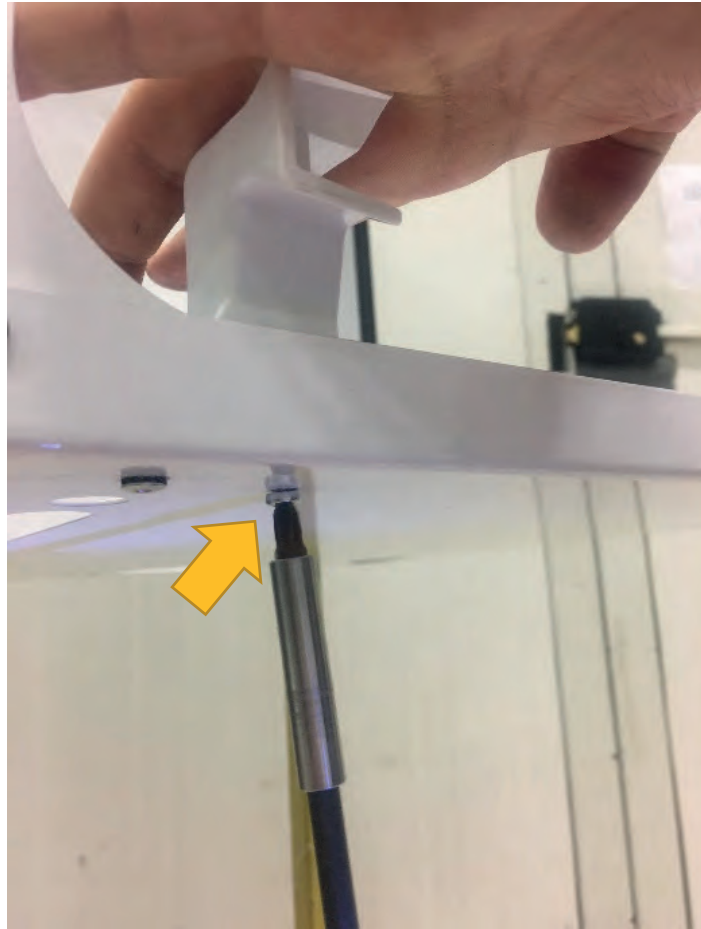
**Torque: 2.5 ± 0.2 N.m**



• **Disassembly of 220 V Cable Entry Gland:** Cable disassembly is performed by loosening the 220 V cable screw transition piece.

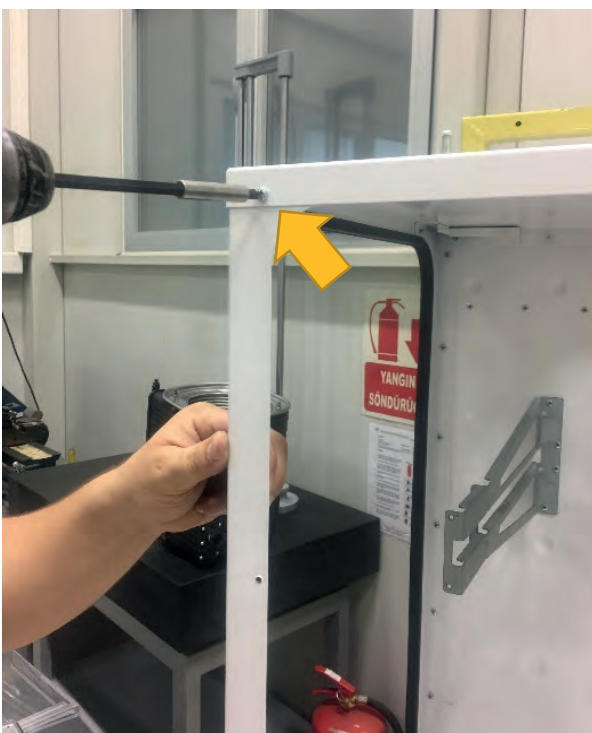


Disassembly is performed by removing 1 piece of 4x9,5 Sheettracs screw coded 7006990123 located on the control panel holder tabs attached to the subframe.



• **Disassembly of Upper Frame:** Disassembly of the upper frame is performed by removing 13 pieces of 4x9,5 Sheettracs Screw coded 7006990123, which connects the upper frame with the 4 side posts and the rear frame.

**Torque:  $3 \pm 0.2$  N.m**

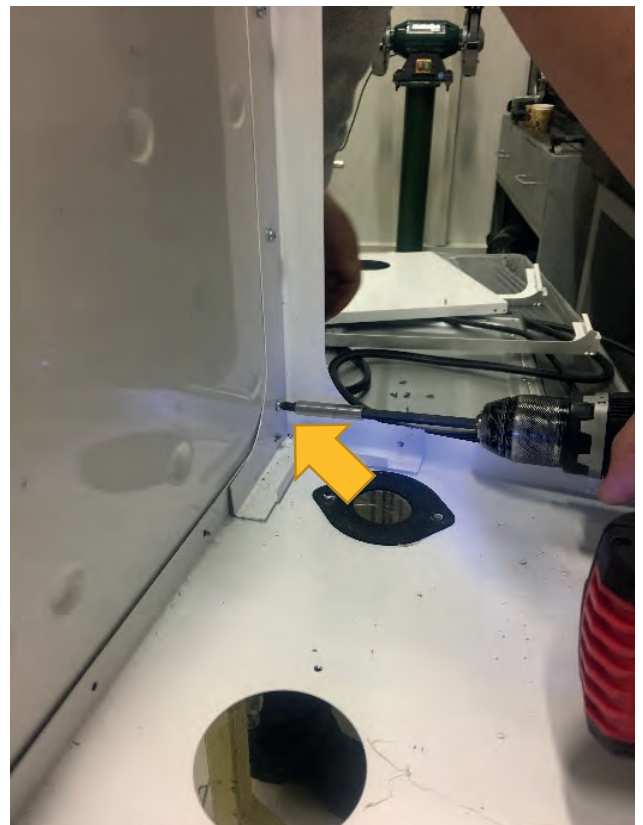
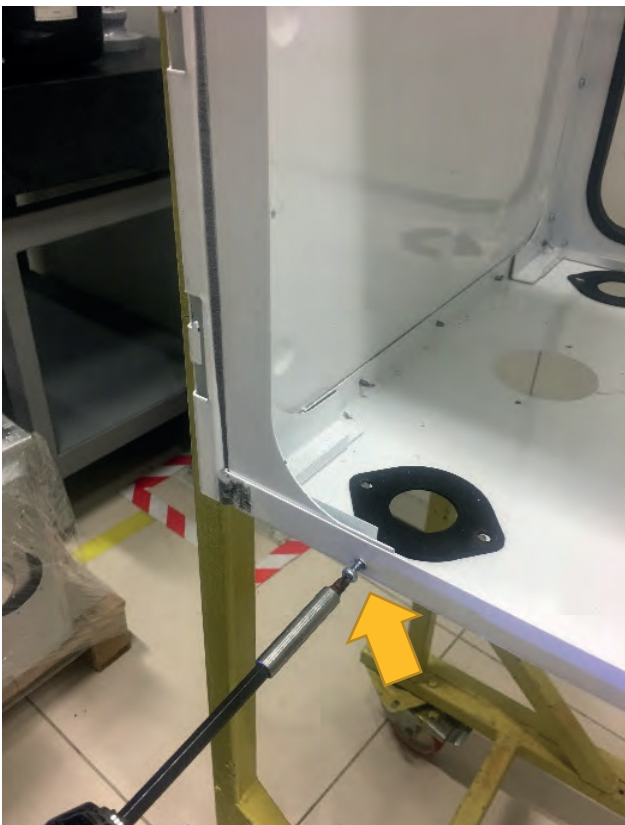


The gaskets in the posts are removed before the upper frame is disassembled.



• **Disassembly of Side Posts:** After the upper frame is disassembled, the posts are disassembled by removing the 4 pieces of 4x9,5 Sheettracs screw coded 7006990123 located on the 4 posts.

**Torque:  $3 \pm 0.2$  N.m**



• **Disassembly of Lower Frame:** After the posts have been disassembled, disassembly of the lower frame is performed by removing 3 pieces of 4x9,5 Sheettracs screws coded 7006990123 connecting the lower frame with the rear frame.

**Torque:  $3 \pm 0.2$  N.m**



• Felis FL 100 HM DG / Felis FL 125 HM DG / Felis FL 150 HM

• **Disassembly of Front Cover:** 2 pieces of M3.5 X 5 YSB screws coded 7006802315 connecting the front cover, side sheets and lower frame are removed as shown in the figure and the front cover is disassembled as follows.

**Torque:**  $1 \pm 0.2$  N.m



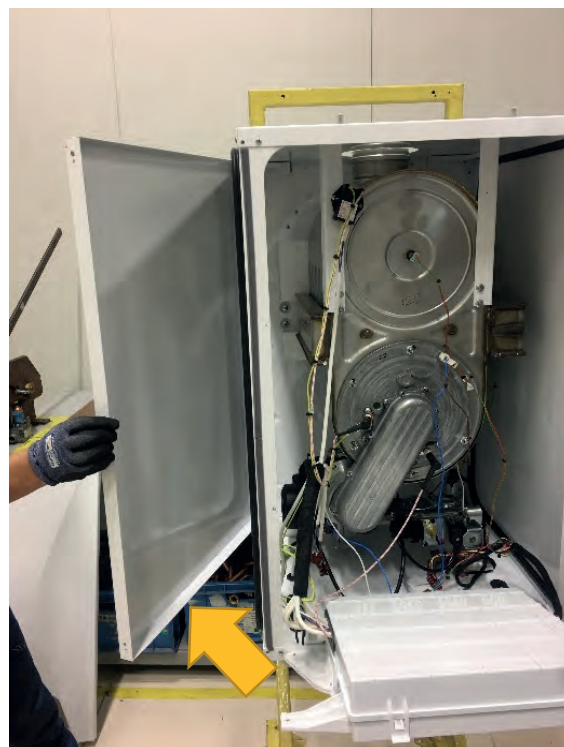
• **Disassembly of Side Panel :** 4 pieces of 4x9,5 Sheettracs Screw coded 7006990123, fixing the control panel to the side panels, are removed.

**Torque:**  $2.5 \pm 0.2$  N.m



Disassembling of the side panels are performed by removing 4 pieces of 4x9,5 Sheettracs Screw (for one panel) coded 7006990123, fixing the side panels with the upper and lower frame.

**Torque:  $2 \pm 0,2$  Nm**



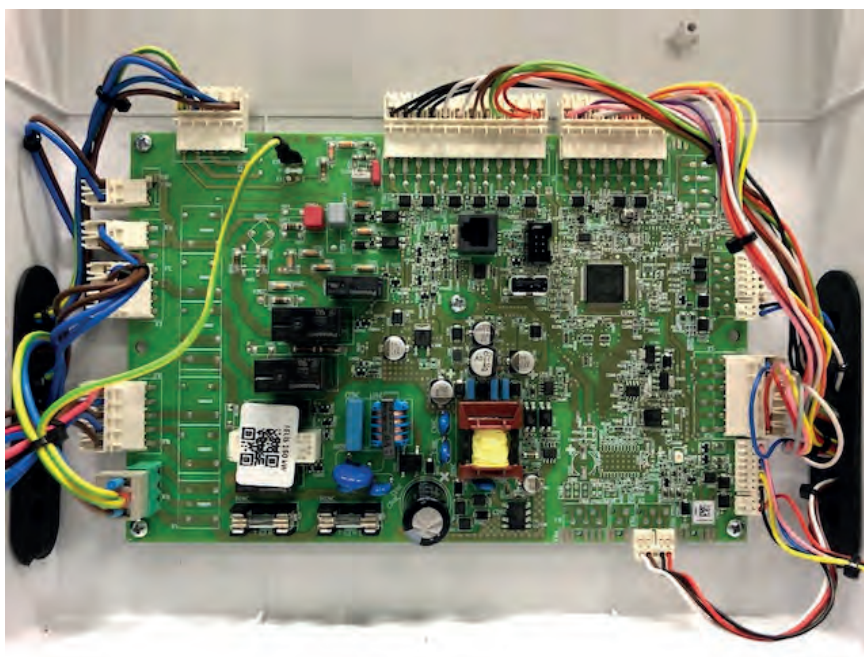
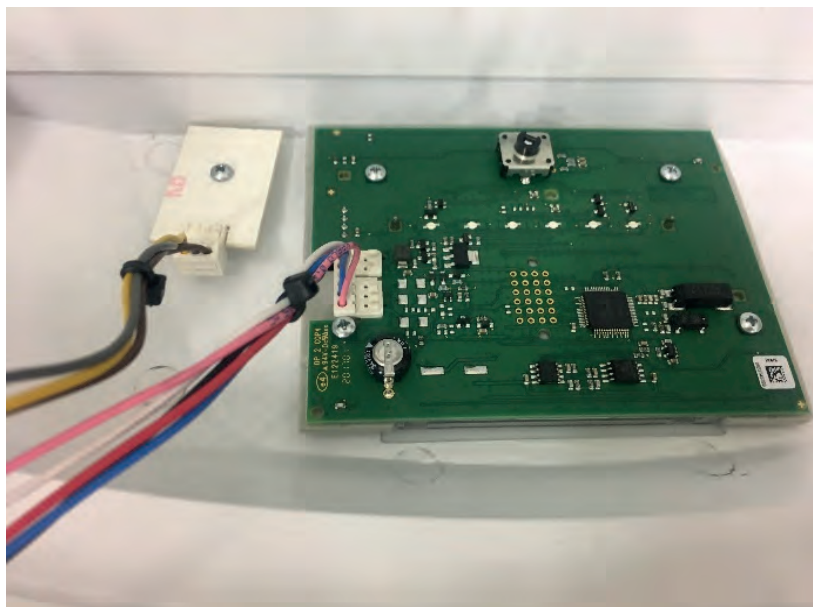
**NOTE: All parts can be changed without disassembling the side panels. Side panel disassembly is provided for information purposes.**

• **Disassembly of Control Panel:** After removing 2 pieces of 4x9,5 Sheettracs Screw coded 7006990123 connected to the ribbed angles, the tabs on the lower frame are stretched and the control panel is disassembled.

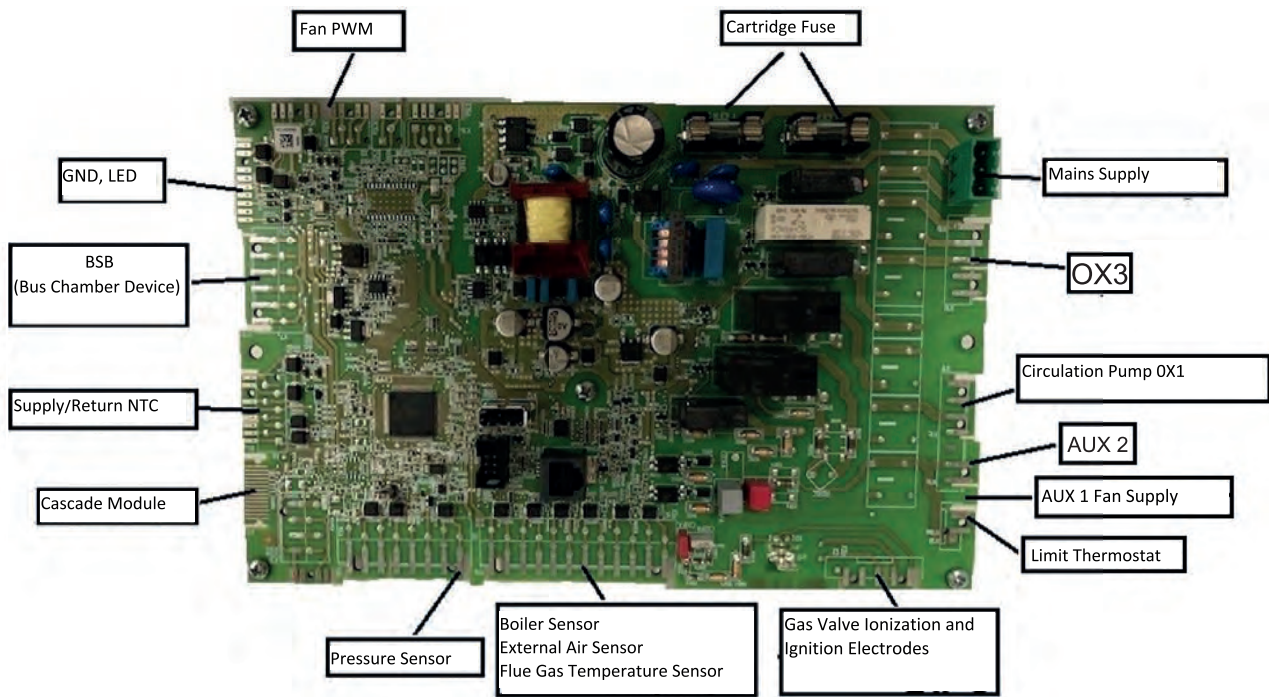
**Torque:  $2.5 \pm 0.2$  N.m**



The control panel tabs are opened as shown in the figure and the main board and video card connections are reached.



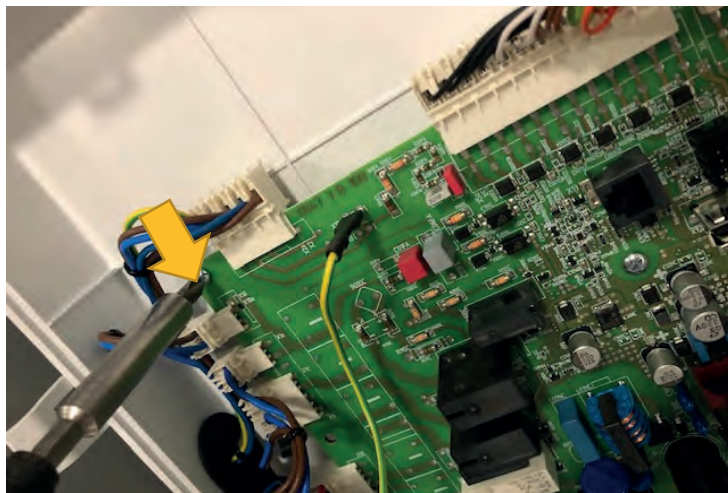
- **Main Board Connections:** Each socket on the main board is shown in the picture below.



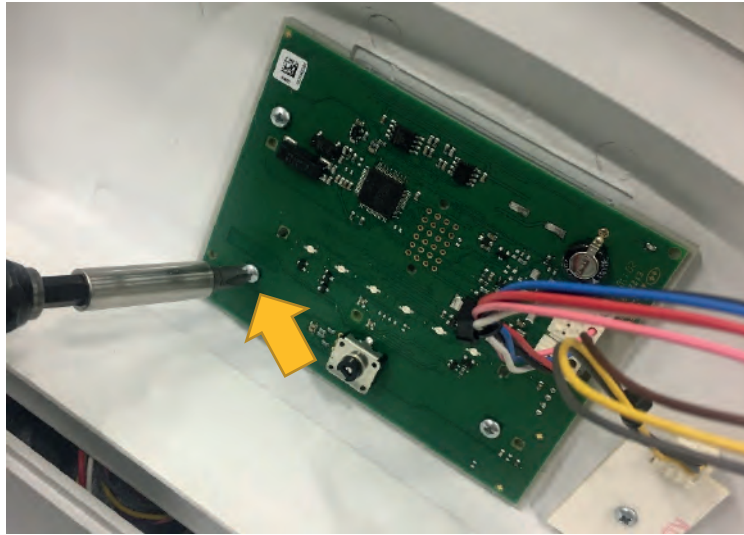
- **Disassembly of Main Board / Display Board :** After disconnecting the main board and display board terminals from the main board and display board, disassembly of main board / display board is performed by removing 4 pieces of M3,5 X 5 YSB screw coded 7006802315 on the main board and 4 pieces of Torx screw on the display board.

**Torque: 0.5 ± 0.1 N.m (Main board)**

**Torque: 0.2 ± 0.05 N.m (Display board)**







When disassembling the LED card, 1 Torx screw is disassembled as shown.

**Torque:  $0.3 \pm 0.1$  N.m (LED card)**



After the display board is disassembled, the keypad and screen underneath are also removed.



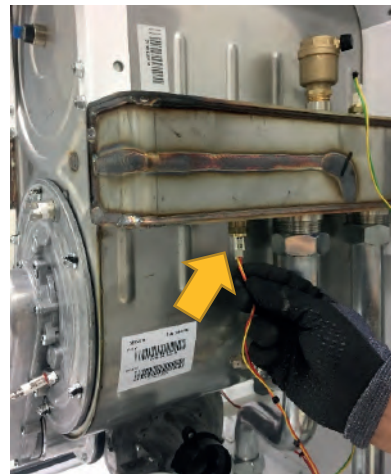
- **CABLE DISASSEMBLY INSTRUCTIONS**

- **Disassembly of Ignition Transformer Cable:** Ignition transformer cable disassembly is done as follows.

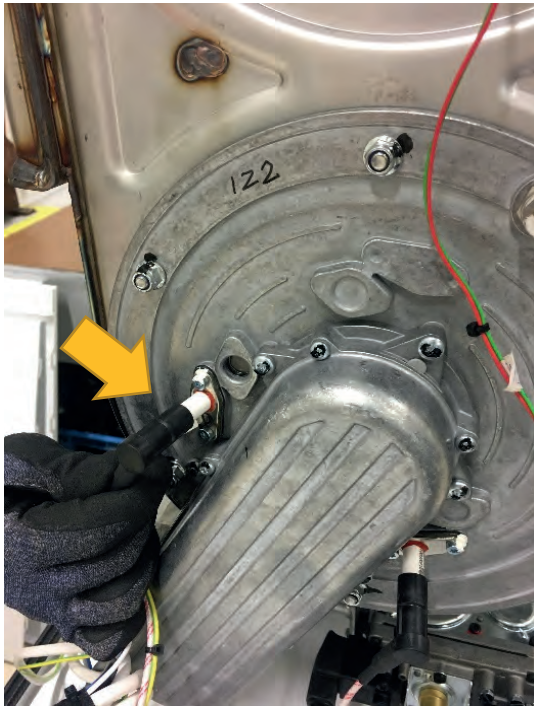


**NOTE:** It must be ensured that the ignition transformer cables are installed in the right place. Otherwise, the device will not work.

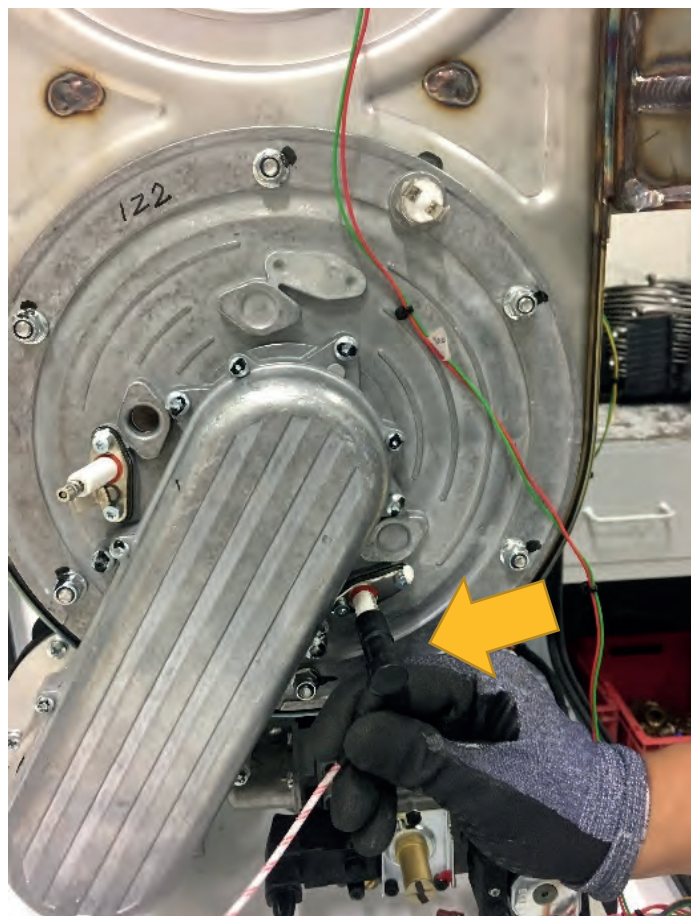
- **Disassembly of Immersion Type NTC Cable:** A total of 3 immersion type NTC assemblies on the heat exchanger and inlet-outlet pipes are made as follows.



- **Disassembly of Ignition / Ionization Electrode Cables:** Ignition and Ionization electrode cables are disassembled as follows. The electrode with the double wire is the ignition, and the electrode with the single wire is the ionization electrode.



**Ignition Electrode**



**Ionization Electrode**

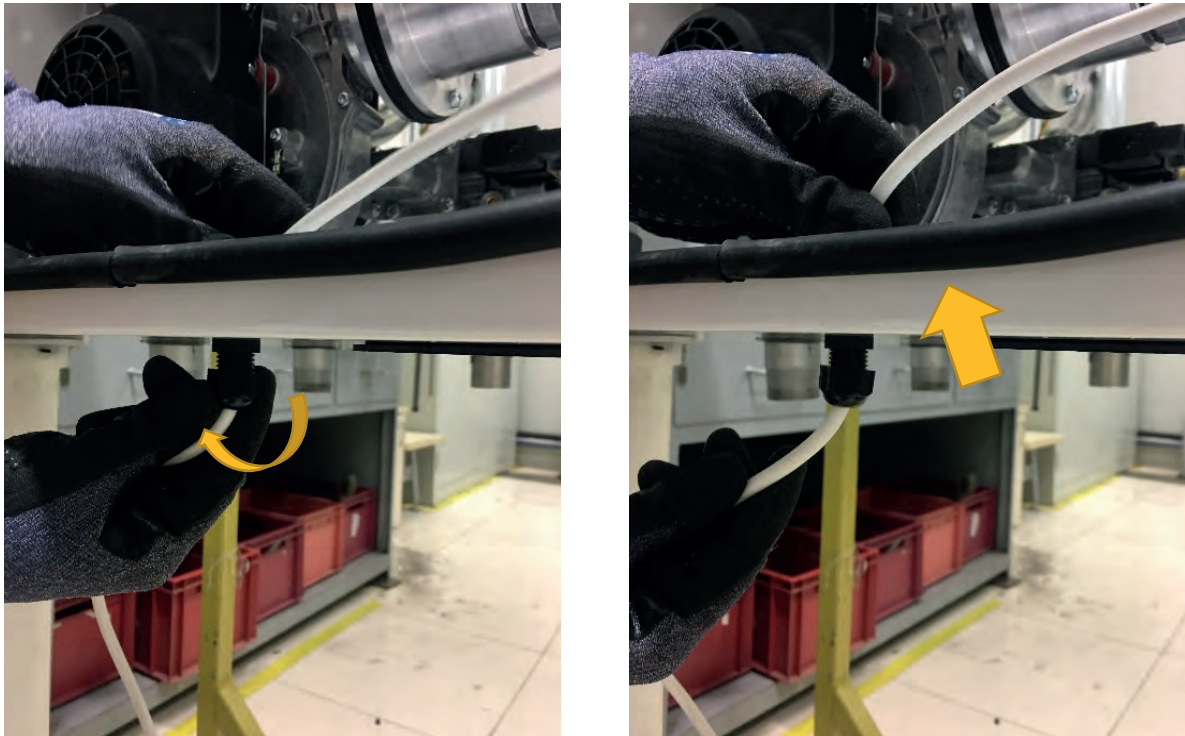
- **Disassembly of Safety Thermostat Cable:** Safety thermostat cable is disassembled as follows.



- **Disassembly of Fan Cable:** The disassembly of the fan cables is done as follows.



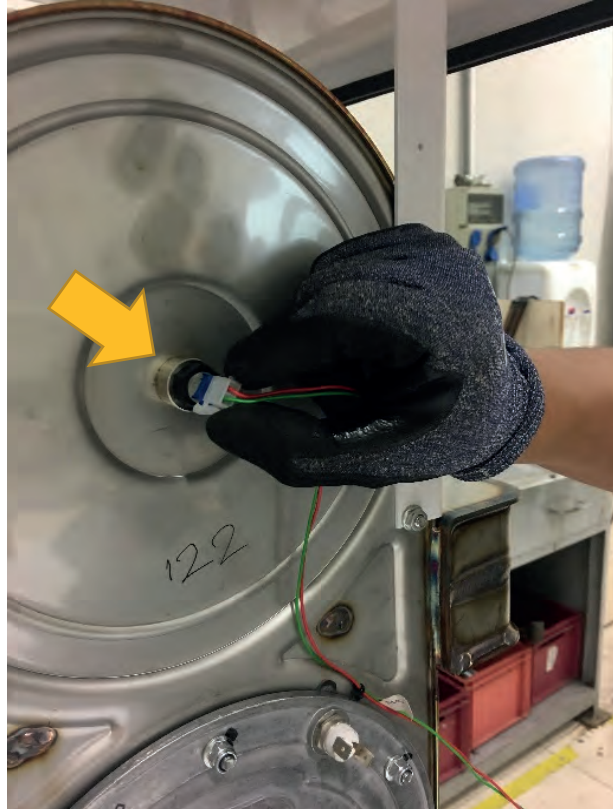
• **Disassembly of 220 V Supply Cable:** While disconnecting the supply cable, the cable gland is first loosened. Then the cable is pulled up and disassembled.



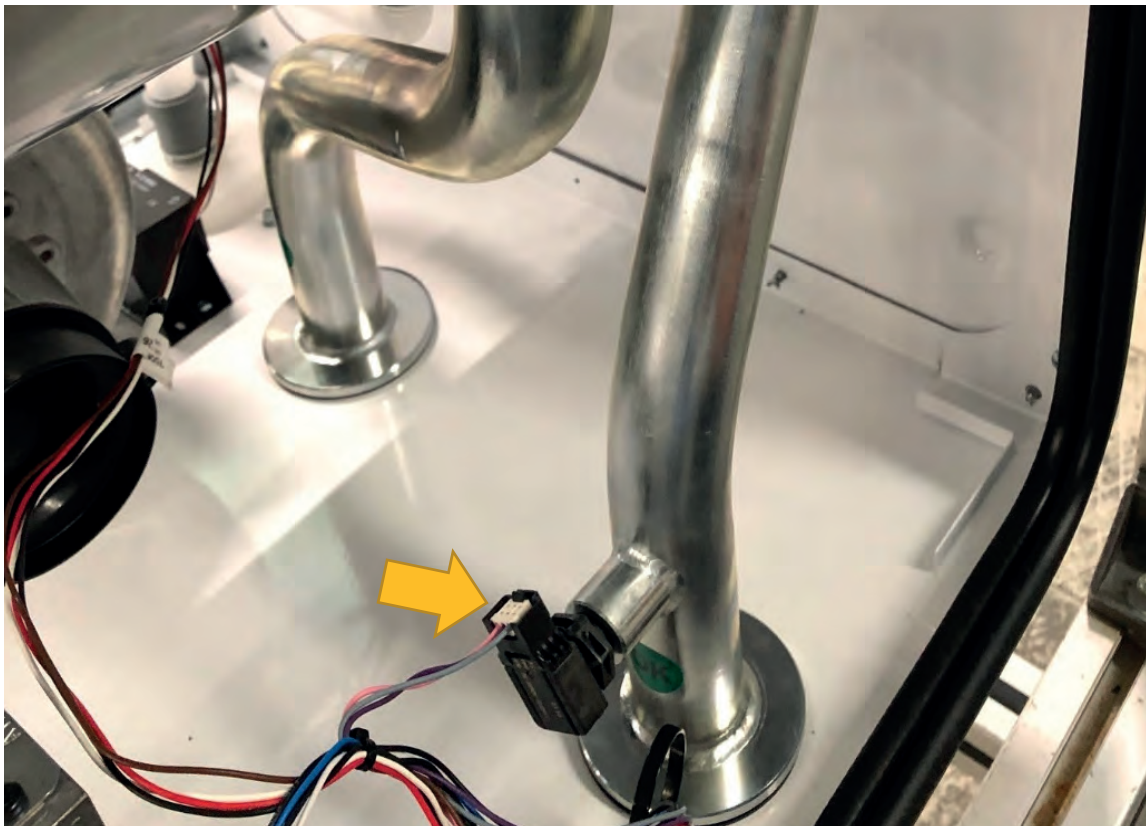
• **Disassembly of Grounding Cable:** Disassembly of the grounding cable from the subframe is done as follows.



• **Disassembly of Flue Gas Sensor Cable:** The flue gas sensor on the heat exchanger is disassembled as follows.

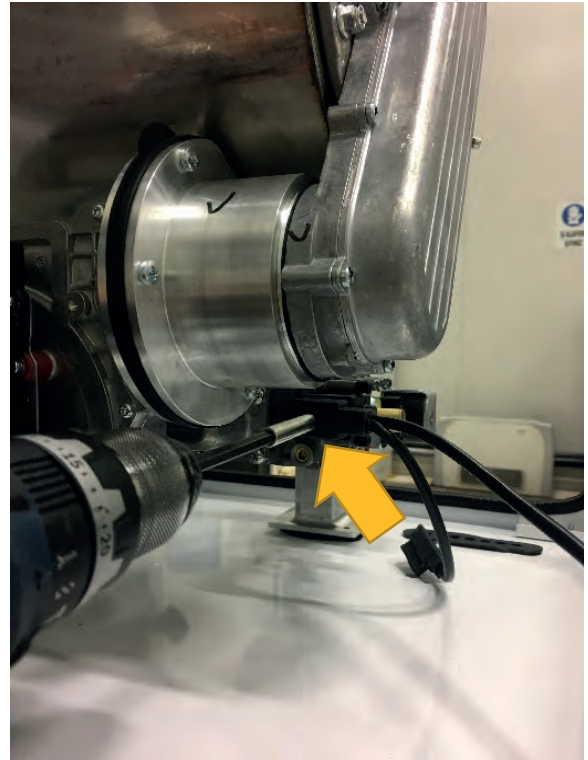
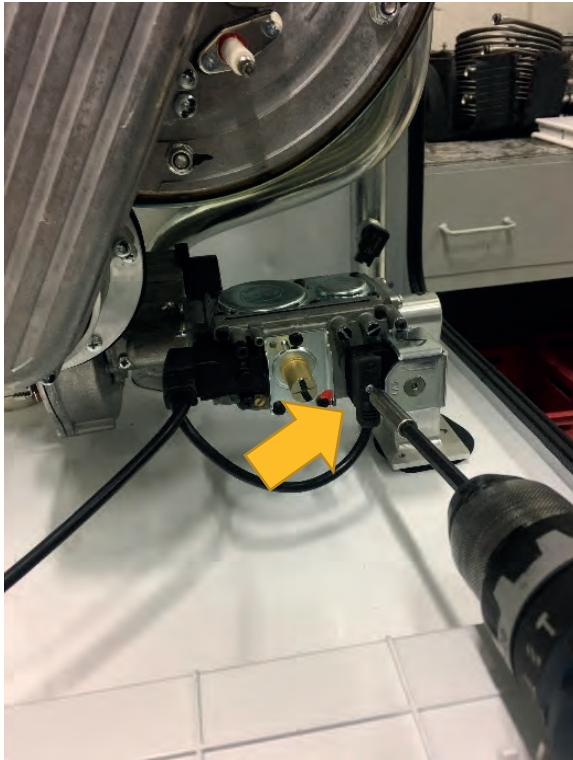


• **Disassembly of Pressure Sensor Cable:** The pressure sensor cable is disassembled as follows.



• **Disassembly of Gas Valve Cables:** While the gas valve cables are disassembled, 2 screws that disconnect the cable and gas valve connectors are removed.

**Torque:**  $0.7 \pm 0.02$  N.m



• **Disassembly of Flue Gas Sensor:** After the flue gas sensor cable is disassembled, it can be disassembled with the help of allen.

**Torque:**  $0.8 \pm 0.2$  N.m



• **Disassembly of Ignition Transformer** : For disassembly, 1 piece 4x9,5 Sheettracs screw with code 7006990123 providing the connection between the ignition transformer and the heat exchanger holder brackets is removed.

**Torque:**  $3 \pm 0.2$  N.m



• **Disassembly of Immersion Type NTC**: Immersion type NTCs on the heat exchanger inlet and outlet pipe sides are disassembled with allen as below.

**Torque:**  $5 \pm 0.2$  N.m

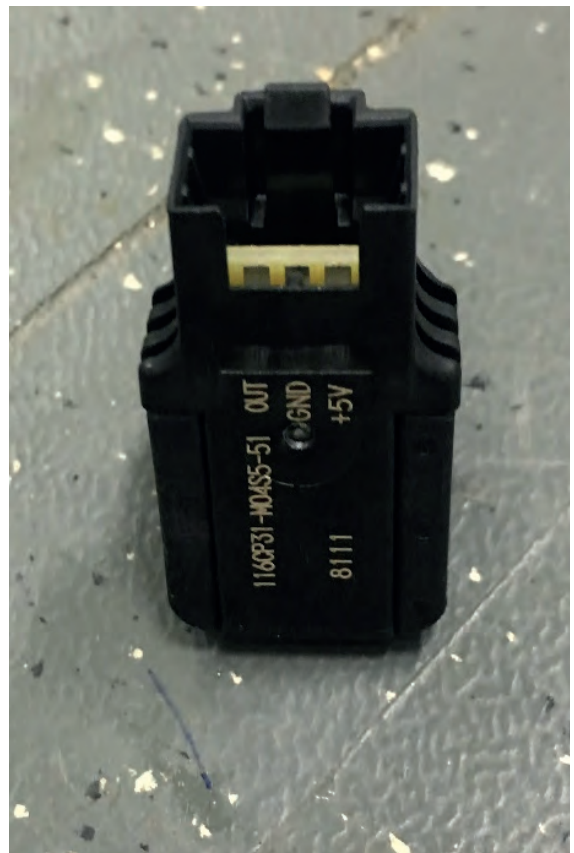






• **Disassembly of Pressure Sensor:** The pressure sensor on the boiler water inlet pipe is disassembled as follows with the help of a wrench.

**Torque:  $5 \pm 0.2$  N.m**



• **Disassembly of Air Vent:** The air vent in the heat exchanger is disassembled as follows with the help of a wrench.

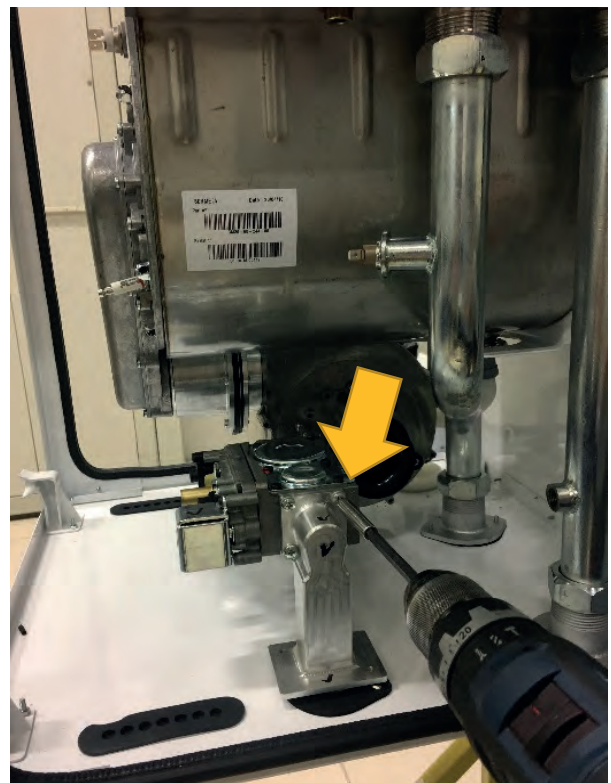
**Torque:**  $12.5 \pm 0.5$  N.m



• **Disassembly of Gas Valve Adapter:** Disassembly is performed by removing 2 pieces of M6 X 12 YSB screw coded 7006801325 connecting the gas valve adapter to the lower frame and 4 pieces of M6 x12 YSB screw coded 7006801325 connecting the gas valve adapter to the gas valve.

**Torque:**  $5 \pm 0.2$  N.m

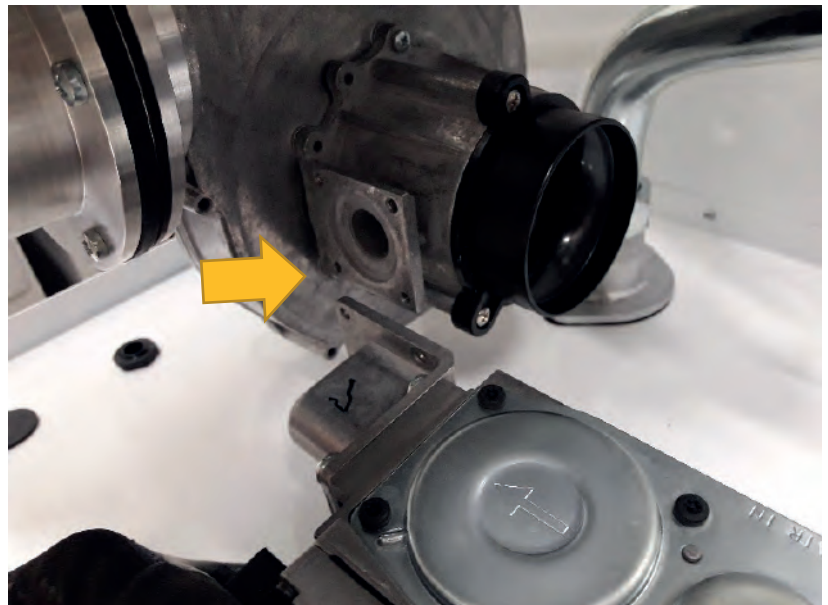
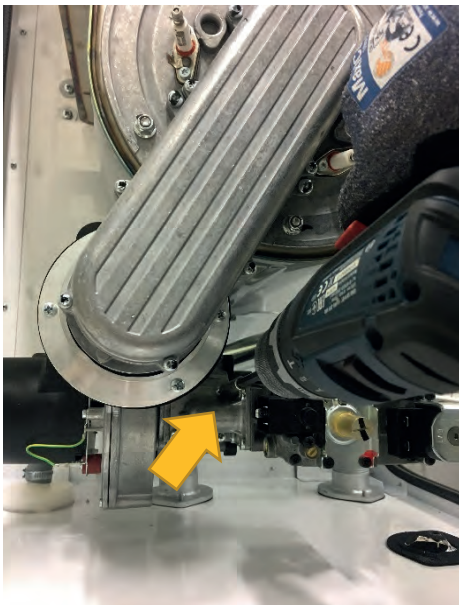
**Torque:**  $5 \pm 0.2$  N.m





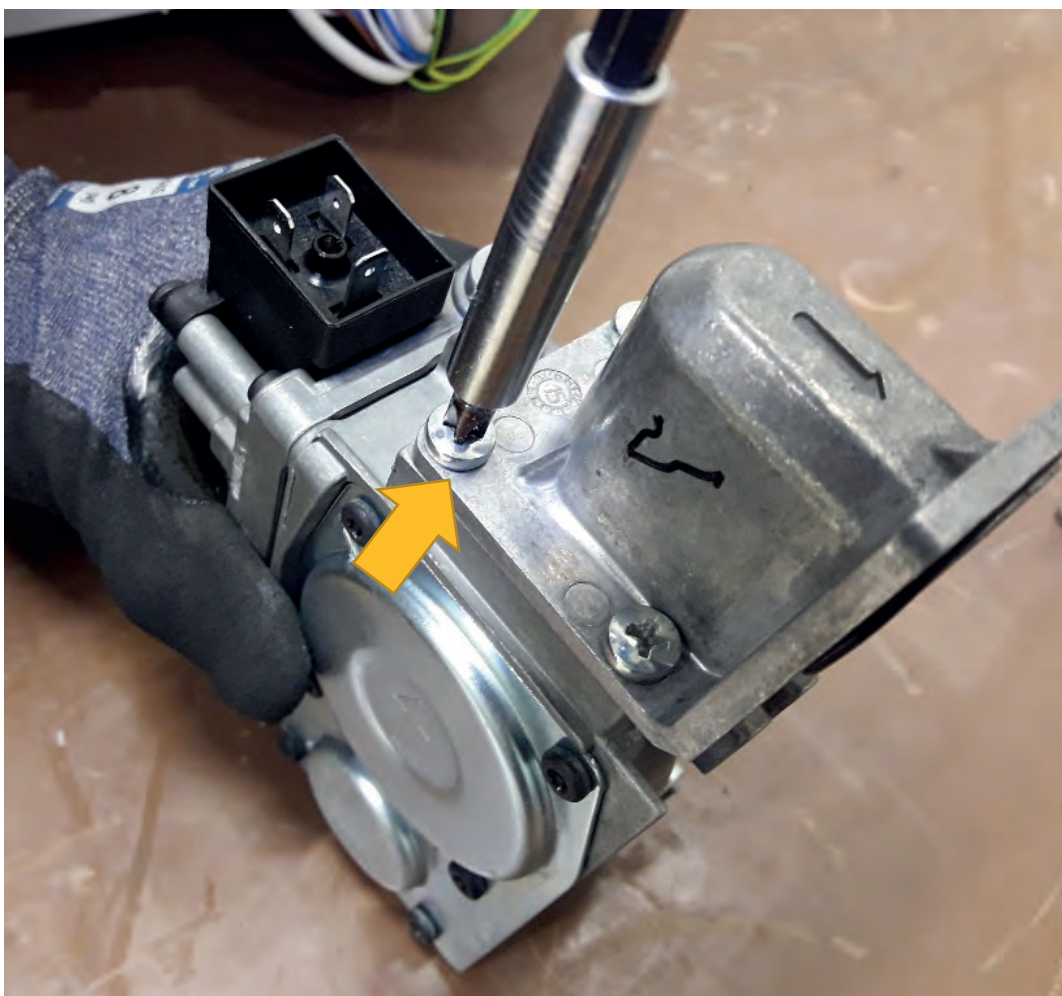
• **Disassembly of Gas Valve:** Disassembly of the gas valve is performed by removing 4 pieces of M5 x12 YSB screw coded 7006801325 connected to the venturi.

**Torque:  $5 \pm 0.2$  N.m**



After the gas valve is disassembled, gas valve disassembly is completed by removing 4 pieces of M5 x12 YSB screw coded 7006801325 providing the connection between the gas valve and the gas adapter.

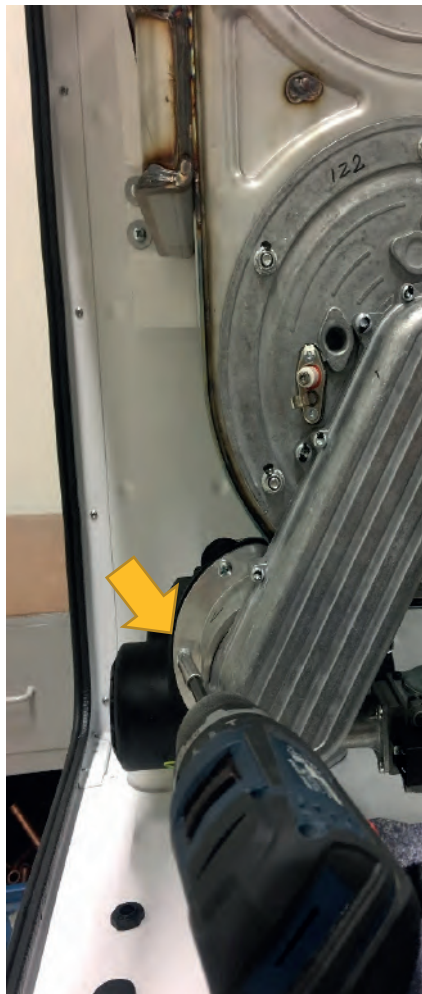
**Torque:  $5 \pm 0.2$  N.m**





- **Disassembly of Fan:** After disconnecting the connection between the venturi and the gas valve, disassembly of the fan is performed by removing 4 pieces of M5x20 YSB screw coded 7006985120 providing the plug connection between the heat exchanger and the fan.

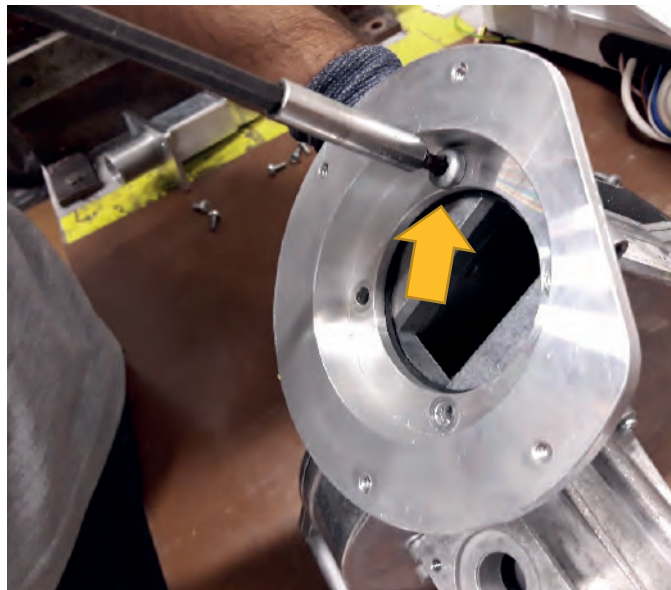
**Torque:  $2.5 \pm 0.2$  N.m**





While the connection between the fan manifold body and the fan manifold gasket is disassembled, 4 pieces of 4x9,5 Sheettracs screw coded 7006990123 removed and the valve is disassembled as follows.

**Torque:  $50 \pm 1$  N.m**



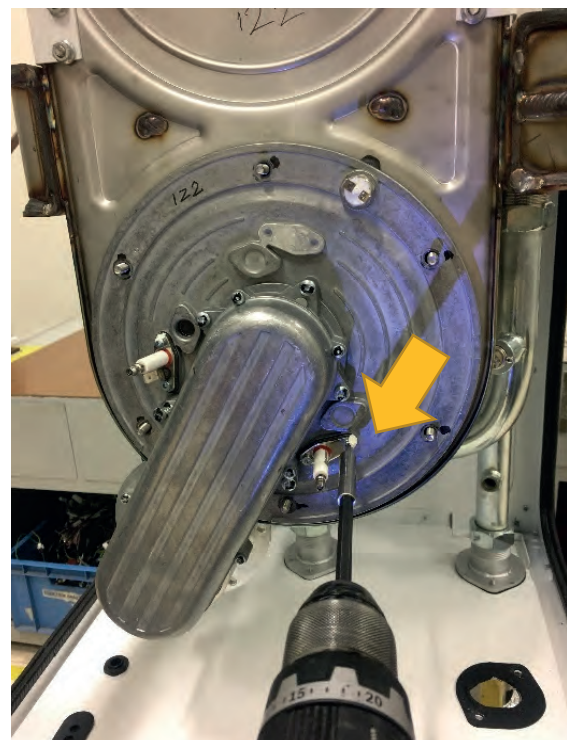
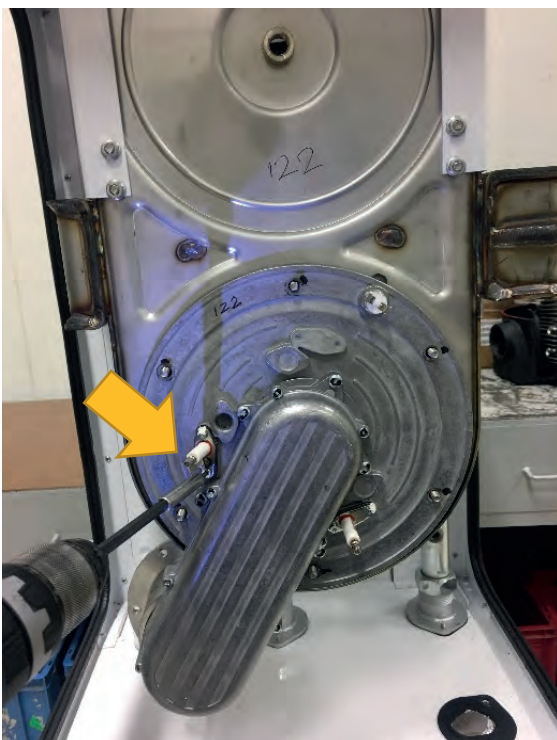
- **Disassembly of Venturi:** After disassembling the fan plug connections, 6 pieces of M4x12 bolt coded 7006801162 on the part that connects the fan with the venturi are removed.

**Torque:  $3 \pm 0.3$  N.m**



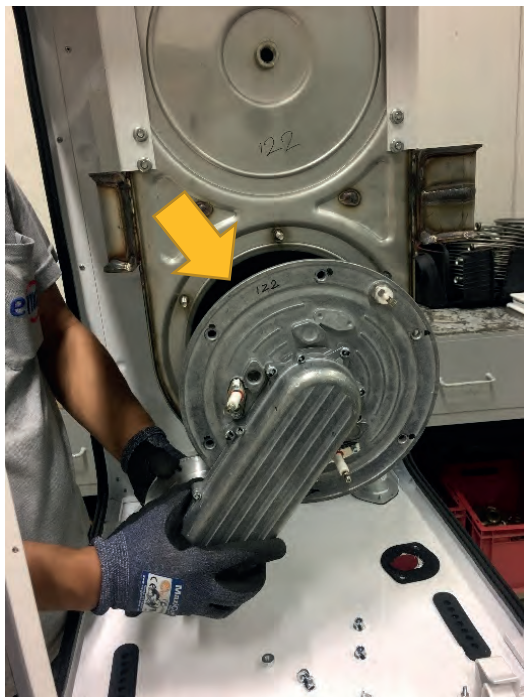
- **Disassembly of Ignition / Ionization Electrode:** For disassembly, 2 pieces, in total 4 pieces of M4x8 screw coded 7006990263 on the ionization and ignition electrodes located on the heat exchanger cover are removed.

**Torque:  $2.2 \pm 0.2$  N.m**



• **Disassembly of Heat Exchanger Cover:** Heat exchanger cover is disassembled by removing 6 bolts located on the heat exchanger cover.

**Torque:**  $3\pm 0.2$  N.m

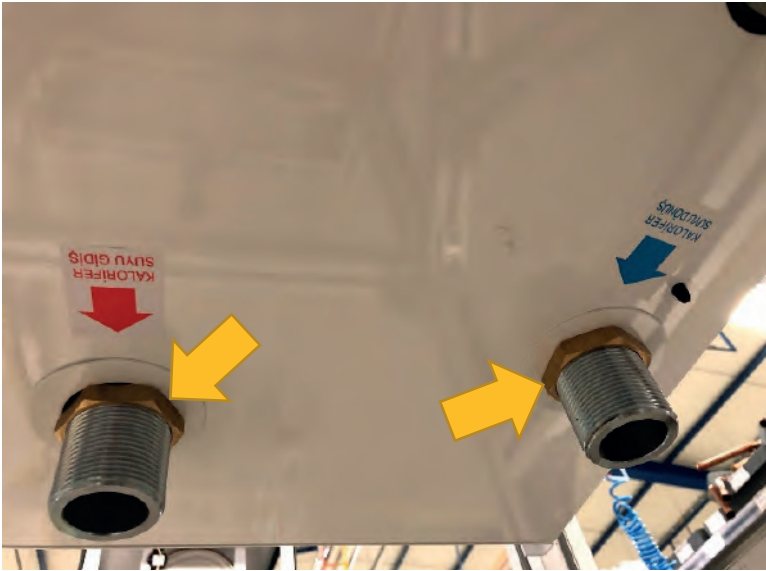


• **Disassembly of Heating Flow / Return Pipe:** Nuts that provide the connection of the heating flow and return pipes with the heat exchanger are removed with the help of a wrench as follows. After the connection is removed, the pipes are pulled out.

**Torque:**  $85\pm 2$  N.m





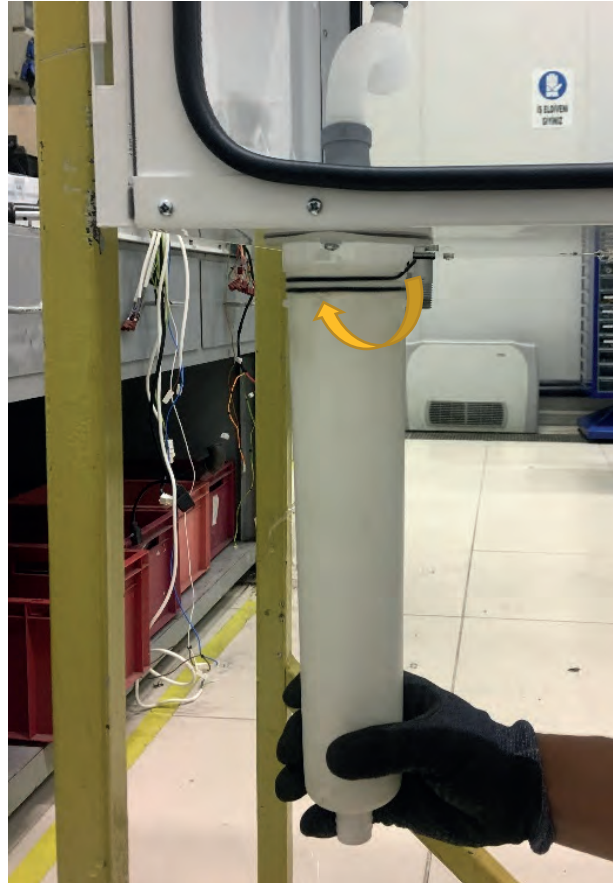


- **Disassembly of Limit Thermostat:** After the limit thermostat return pipe on the heating return pipe is disassembled, disassembly is performed by removing 2 pieces of 2.9 x 6.5 YSB screw coded 7006802173 providing the connection between the pipe and the thermostat.

**Torque:  $1 \pm 0.2$  N.m**



• **Disassembly of Siphon:** The siphon lower chamber is inserted and when turned to the clockwise, as below, it is disassembled by getting rid of the tabs.



2 pieces of 4x9,5 Sheettracs screw coded 7006990123 connecting the siphon with the lower frame are removed as shown below and bracket is disassembled.

**Torque: 2.5 ± 0.2 N.m**



2 pieces of siphon hose clamp screw coded 7006985115 holding the clips of the hose connecting the siphon hose with the siphon bracket and the heat exchanger on the lower frame are removed as below.

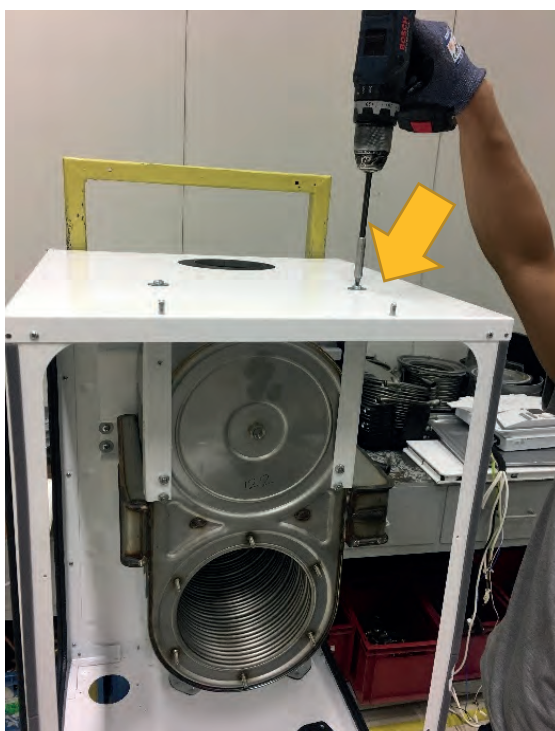
**Torque:  $1.5 \pm 0.2$  N.m**

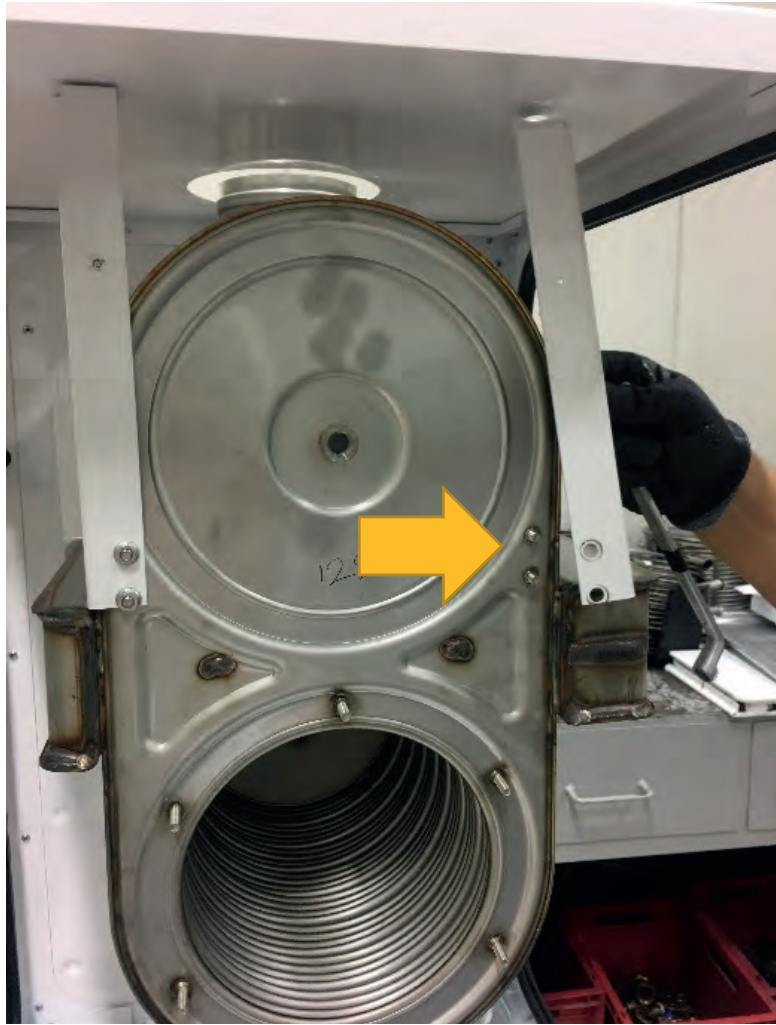


• **Disassembly of Heat Exchanger Holder Bracket:** 2 screws, which enable the connection of the heat exchanger holder bracket to the upper frame, are disassembled. Then, 4 pieces of M6 stainless flanged nut coded 7006721299 providing the connection of the bracket with the heat exchanger, are removed with a torque wrench.

**Torque:  $4 \pm 0.4$  N.m**

**Torque:  $50 \pm 0.1$  N.m**

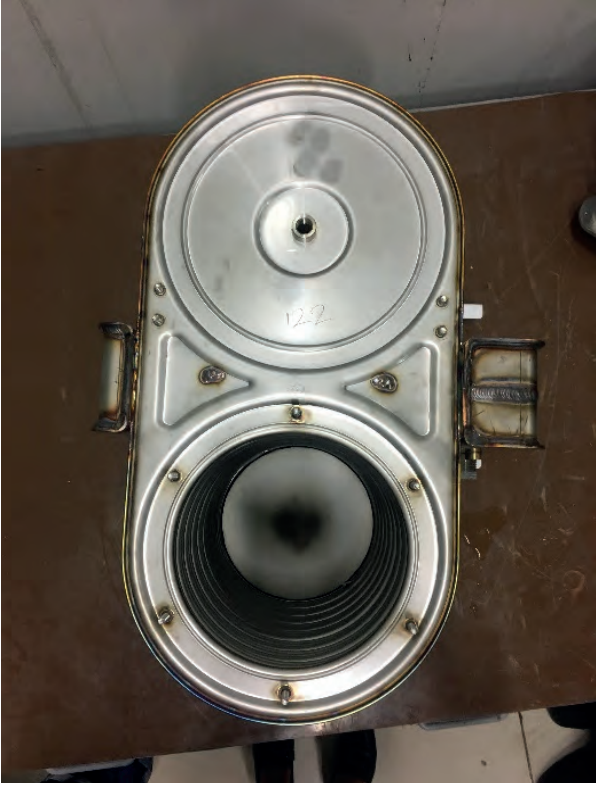




• **Disassembly of Heat Exchanger:** After the heat exchanger bracket is disassembled, 4 pieces of M6x20 Screw YSB Nut coded 7006985121 connecting the hanger bracket that holds the heat exchanger to the riveted piece with the rear frame, are removed. The heat exchanger is then removed with the suspension bracket.

**Torque:  $4.5 \pm 0.2$  N.m**





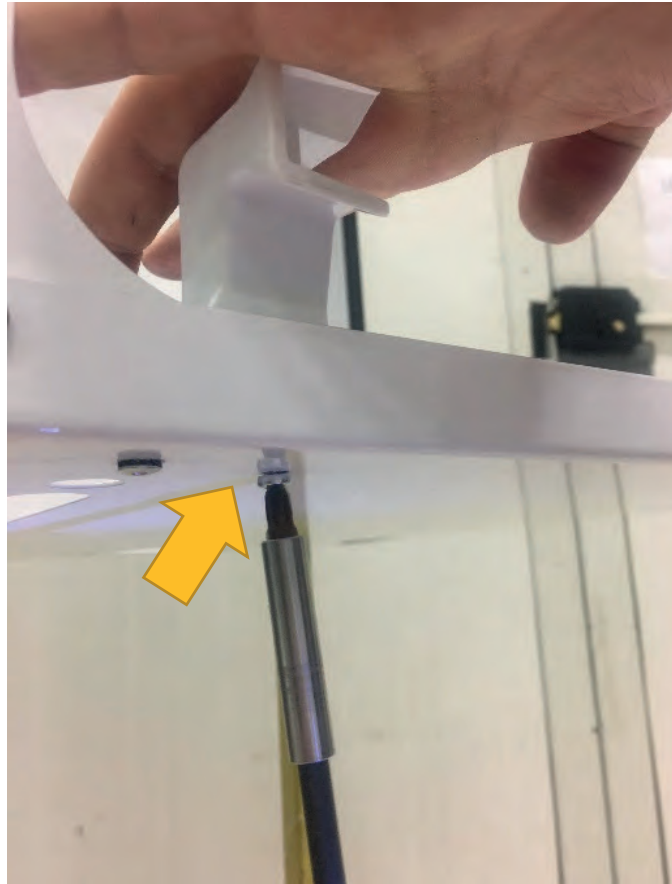
8 pieces of M6 stainless flanged nut coded 7006721299 providing the connection of the suspension bracket with the heat exchanger, are removed with a torque wrench as below.

**Torque:  $50 \pm 0.1$  N.m**



• **Disassembly of Control Panel Holder Bracket:** Disassembly is performed by removing 2 piece of 4x9,5 Sheettracs screw coded 7006990123 located on the control panel holder tabs attached to the lower frame.

**Torque: 3±0.2 N.m**



• **Assembly / Disassembly of Upper Frame:** Disassembly of the upper frame is performed by removing 13 pieces of 7006990123 coded screw connecting the upper frame with the 4 side posts and the rear frame.

**Torque: 3±0.2 N.m**

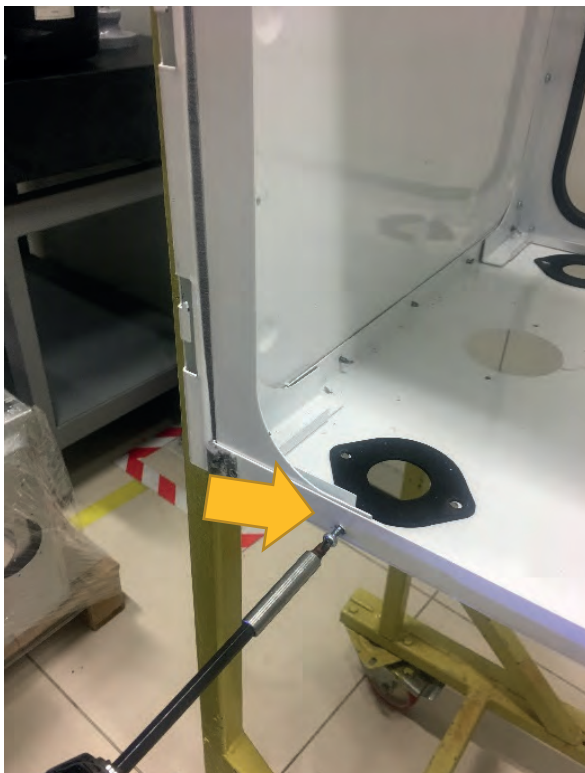


The gaskets in the posts are removed before the upper frame is disassembled.



• **Disassembly of Ribbed Angle:** After the upper frame is disassembled, posts are disassembled by removing 4 pieces of 4x9,5 Sheettracs screw coded 7006990123 located on 4 posts.

**Torque:  $3 \pm 0.2$  N.m**




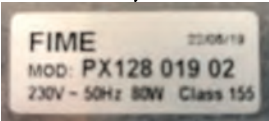

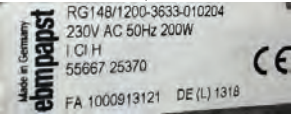

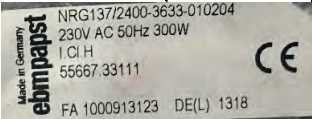
• **Disassembly of Lower Frame:** After the posts have been disassembled, 3 pieces of 4x9,5 Sheettracs screw coded 7006990123 connecting the lower frame with the rear frame are removed and the lower frame is disassembled.

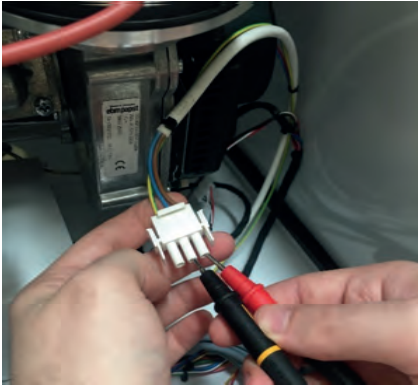

**Torque:  $3 \pm 0.2$  N.m**



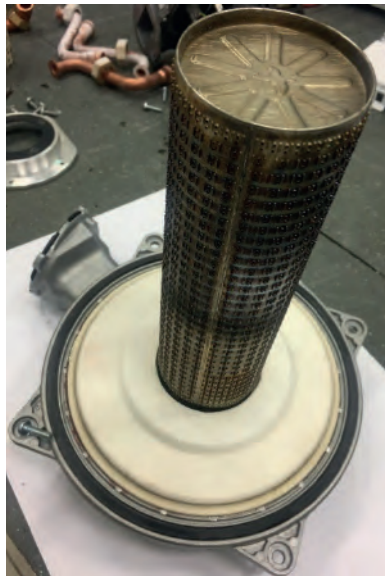



## PART TABLES

7006721676 – 50 kW PX128 FAN 7006721407 – 65/100 kW RG148 FAN 7006721333 – 125/150 kW NRG137 FAN	
Subject	Description
<b>Part Function</b>	1- It provides the fresh air required for combustion. 2-It provides the air-gas mixture to be blown into the heat exchanger for combustion and the waste gases released after combustion to be discharged from the flue.
<b>Impact in Case of Malfunction</b>	There may be a decrease in performance due to dusting between the blades, in this case, the device cannot perform the first start and goes to the error position.
<b>Main Associated Error Codes</b>	160: Fan Speed Threshold Not Reached 386: Fan Speed Tolerance
<b>Diagnostics and Test Method</b>	1- Checking if the fan power cable is plugged- checking the working status of the fan 2- Checking if the cable of fan modulation is plugged - checking the device modulation control in production test station 3- Operation of the fan speed setting outside the tolerance according to the value in the specified tolerance parameter - error code 386 appears on the screen.
<b>Maintenance Requirement</b>	Checking the voltage at the power input of the fan (min: 179V - max: 255V) Checking the connection of the fan modulation cable with multimeter in case of non-contact
<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">   <p>Device Used: 50 kW</p> </div> <div style="text-align: center;">   <p>Device Used: 65-100 kW</p> </div> <div style="text-align: center;">   <p>Device Used: 125-150 kW</p> </div> </div>	

Test Description	Test Method
<b>Fan Voltage Check</b>	The voltage between the fan high voltage supply connector pins is measured.
<div style="display: flex; justify-content: space-around;">   </div>	

BURNER	
Subject	Description
<b>Part Function</b>	It is the component on which the gas + air mixture exits and flame is formed.
<b>Impact in Case of Malfunction</b>	<b>1</b> -Irregularity in the emission of the boiler <b>2</b> -Sound problem caused by combustion <b>3</b> -Flame loss
<b>Main Associated Error Codes</b>	128: Flame loss during operation 133: Safety time exceeded for flame formation
<b>Diagnostics and Test Method</b>	Checking whether there are conditions such as closed hole, oxidation and deformation on the burner; cleaning with a non-metallic brush if any
<b>Maintenance Requirement</b>	In annual maintenance, the burner should be cleaned with a non-metallic brush.



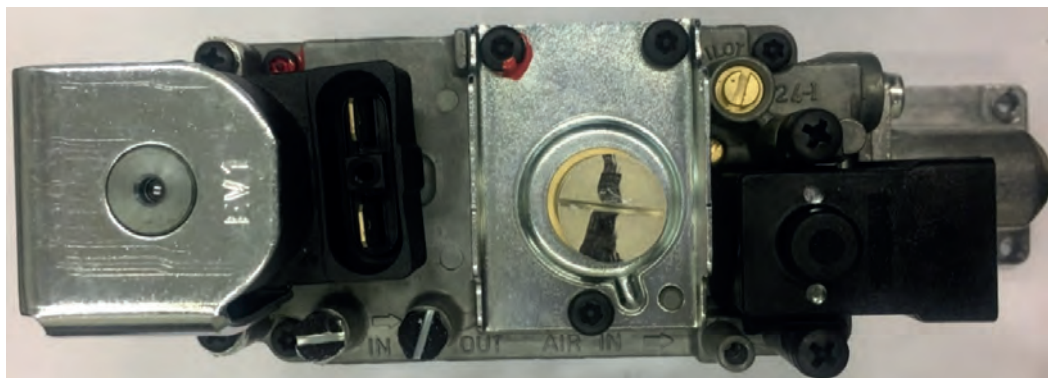
7006721675 - 50 kW EXCHANGER 7006721145 - 65 kW EXCHANGER	
Subject	Description
<b>Part Function</b>	It is the main element that provides heat transfer to the water. It provides the heating of the system by transferring the heat generated by combustion in the burner to the water pipes.
<b>Impact in Case of Malfunction</b>	1-The need for heating is not fully met 2-Water or gas leak
<b>Main Associated Error Codes</b>	
<b>Diagnostics and Test Method</b>	1-Checking whether there is any dirt on the heat exchanger blades' pipes and blockage between the pipes. 2-Crack-hole visual check on heat exchanger pipes 3-Boiling, bubbling etc. sounds coming from the heat exchanger 4-Fresh air emission measurement test
<b>Maintenance Requirement</b>	Heat exchanger inner pipe must be cleaned.
	
Maintenance Description	Maintenance Method
<b>Heat Exchanger Internal Pipe Cleaning</b>	<ol style="list-style-type: none"> <li>1- The burner door is opened by removing 4 nuts.</li> <li>2- The deposits on the pipes are drawn with the help of a vacuum cleaner.</li> <li>3- The deposits on the pipes are cleaned with a non-metal wire brush.</li> <li>4- The inside of the heat exchanger is cleaned with water provided that the insulation material on the back wall is not wetted.</li> <li>5- Since the dirt will accumulate in the siphon after washing with water, the process is completed by cleaning the siphon.</li> </ol>

**7006721674 - 50 kW GAS VALVE**  
**7006721005 - 65/100/125/150 kW GAS VALVE**

Subject	Description
<b>Part Function</b>	It adjusts the amount of gas required for combustion and transmits it to the venturi.
<b>Impact in Case of Malfunction</b>	1-The boiler does not burn. 2-Gas regulation is not proper.
<b>Main Associated Error Codes</b>	128: Flame loss during operation 133: Safety time exceeded for flame formation
<b>Diagnostics and Test Method</b>	1-Check that the cable connections are proper and undamaged 2-Resistance check 3-Voltage test
<b>Maintenance Requirement</b>	There is no special maintenance requirement.



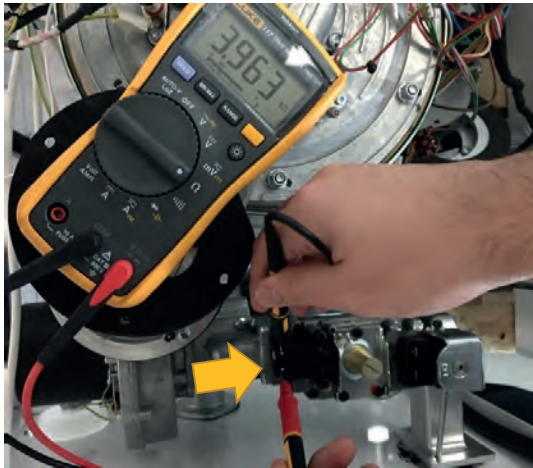
**Device Used: 50 kW**



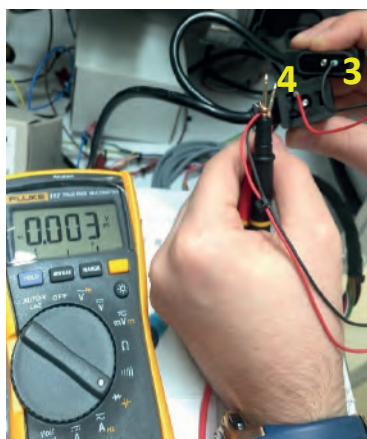
**Device Used: 65 - 100 - 125 - 150 kW**

Maintenance Description	Maintenance Method
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<b>Gas Valve Resistance Check</b>	In the device, electricity is cut off and the resistance measurement is made between the gas valve connector pins.
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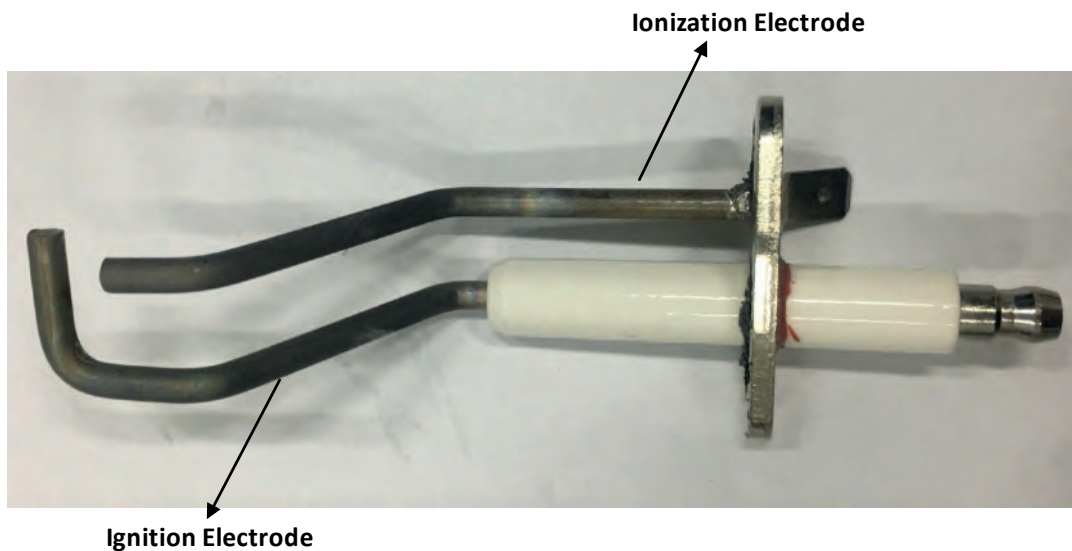


<b>Gas Valve Supply Voltage Check</b>	If the gas valve wires are undamaged, the numbered terminals below are short circuited. The gas valve supply is 230 VAC.
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**7006721553 - 50/65 kW ELECTRODE**

Subject	Description
<b>Part Function</b>	<ol style="list-style-type: none"> <li>1-Igniting and starting the combustion of the gas + air mixture coming from the burner.</li> <li>2-Detecting if there is a flame in the burner</li> </ol>
<b>Impact in Case of Malfunction</b>	<ol style="list-style-type: none"> <li>1- No ignition and combustion due to too much or too little distance at the electrode terminals</li> <li>2-Combustion sound of the device as a result of late ignition (Explosive Combustion)</li> <li>3-Reduced ionization current due to the electrode moving away from the burner and flame loss in the boiler at some times</li> </ol>
<b>Main Associated Error Codes</b>	
<b>Diagnostics and Test Method</b>	<ol style="list-style-type: none"> <li>1-If there are oxide and the like on the electrode rods, they should be cleaned with the help of a cloth.</li> <li>2-Electrode measurement checks should be carried out.</li> <li>3-The ionization current should be checked.</li> </ol>
<b>Maintenance Requirement</b>	During the annual maintenance period, the electrodes should be cleaned with a cloth.



**7006952686 - SURFACE TYPE NTC**

<b>Subject</b>	<b>Description</b>
<b>Part Function</b>	It is the element that measures the inlet and outlet temperature of the water in the heating circuit.
<b>Impact in Case of Malfunction</b>	<b>1-</b> There may be discomfort, as the setting temperature set by the user and the actual temperature are different. <b>2-</b> Appliance will not work.
<b>Main Associated Error Codes</b>	20: Boiler temperature sensor error 40: Return water temperature sensor error
<b>Diagnostics and Test Method</b>	During the operation the error code and its description are seen on the screen of the device. Cable connections should be checked.
<b>Maintenance Requirement</b>	There is no special maintenance requirement.



Test Description	Test Method
<b>Surface Type NTC Resistance Check</b>	The device's power is disconnected. Surface type NTCs in the flow and return pipes are expected to cool. The resistance measurement is made between the NTC terminals.



°C	R(Ω)
-10	55170
0	32600
10	19880
20	12480
25	10000
30	8050
40	5320
50	3600
60	2490
70	1750
80	1260
90	920
100	688
110	510
120	390



7006951197 - FLUE GAS TEMPERATURE SENSOR

Subject	Description
<b>Part Function</b>	It measures the flue gas temperature and protects the device from overheating.
<b>Impact in Case of Malfunction</b>	1- Flue gas temperature is not read correctly.
<b>Main Associated Error Codes</b>	28: Flue Gas Temperature, Sensor Error 130: Flue Gas Temperature Limit Exceeded
<b>Diagnostics and Test Method</b>	1-Checking whether the cable connections are proper and undamaged 2-Checking whether there is rust, corrosion or deformation in the immersion probe part 3-Resistance check
<b>Maintenance Requirement</b>	There is no special maintenance requirement.



Device Used: 50 - 65 kW

Test Description	Test Method
<b>Flue Gas Sensor Resistance Check</b>	The device's power is disconnected. The flue gas sensor is expected to cool. The resistance between the flue gas sensor is measured. The suitability of the resistance value is checked from the table below.



°C	R(Ω)
-20	96761
-10	55218
0	32624
10	19897
20	12493
25	10000
30	8056
40	5324
50	3599
60	2454
70	1748
80	1252
90	912
100	674
110	506
120	384

7006902284 - LIMIT THERMOSTAT	
Subject	Description
<b>Part Function</b>	<p>1-It is opened when the temperature of the heat exchanger exceeds 105 °C and prevents the boiler from working by interrupting the transmission of signal to the electronic card.</p> <p>2-Limit thermostat opening temperature is <math>105 \pm 4</math> °C, closing temperature is <math>105 \pm 6</math> °C.</p>
<b>Impact in Case of Malfunction</b>	<p>In case of malfunction, the boiler water temperature rises and the water starts to boil in the system.</p> <p>If the temperature of the device continues to rise, the limit thermostat on the burner door will stop working.</p>
<b>Main Associated Error Codes</b>	<p>110: SLT Locking</p> <p>111: Temperature limit safety shutdown</p>
<b>Diagnostics and Test Method</b>	<p>1-It is checked whether there is a short circuit on the cable set.</p> <p>2-If the limit thermostat shows a short circuit when measuring with a multimeter at the male terminal ends, it does not work properly if it thermostat blows.</p>
<b>Maintenance Requirement</b>	There is no special maintenance requirement.

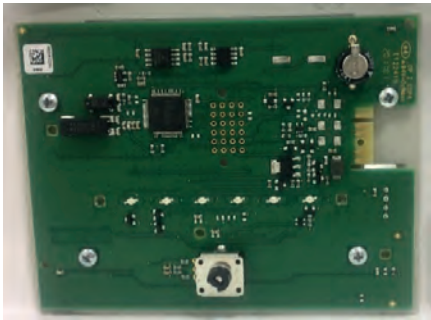


Test Description	Test Method
<b>Limit Thermostat Resistance Check</b>	The device's power is disconnected. A resistance check is made between the terminals of the safety thermostat.

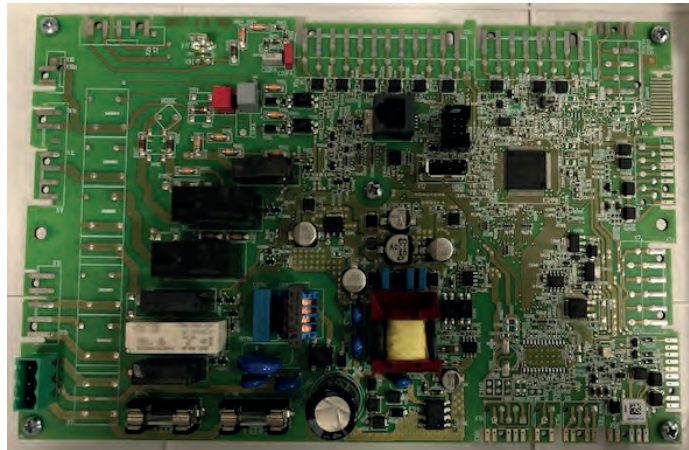


## MAINBOARD

Subject	Description
<b>Part Function</b>	Electronics control each electromechanical component. Shows the sensor data and overall operating status of the boiler.
<b>Impact in Case of Malfunction</b>	When the PCB malfunctions, the bell symbol appears on the LCD screen. In the lower left corner of the LCD screen, the error code and error description are written and the led light flashes.
<b>Main Associated Error Codes</b>	385: Mains low voltage
<b>Diagnostics and Test Method</b>	Check whether the cable connections are proper and undamaged, and check for component/circuit abnormality on the electronic board (blackening, solder crack/rupture, etc.).
<b>Maintenance Requirement</b>	There is no special maintenance requirement.



**Graphic Card**




**Mainboard**

7006907918 - IMMERSION TYPE NTC

Subject	Description
<b>Part Function</b>	It is the element that measures the outlet temperature of the water.
<b>Impact in Case of Malfunction</b>	<ol style="list-style-type: none"> <li>1-There may be discomfort, as the setting temperature set by the user and the actual temperature are different.</li> <li>2-Appliance will not work.</li> </ol>
<b>Main Associated Error Codes</b>	20: Boiler temperature sensor error 40: Return water temperature sensor error
<b>Diagnostics and Test Method</b>	<p><b>During the operation the error code and its description are seen on the screen of the device.</b></p> <ol style="list-style-type: none"> <li>1-Checking whether the cable connections are proper and undamaged</li> <li>2-Checking whether there is rust, corrosion or deformation in the immersion probe part</li> <li>3-Resistance check</li> </ol>
<b>Maintenance Requirement</b>	There is no special maintenance requirement.



Test Description	Test Method
<b>Immersion Type NTC Resistance Check</b>	The device's power is disconnected. Immersion type NTC is removed from the boiler and allowed to cool to room temperature. The resistance measurement is made between the NTC terminals. The suitability of the resistance value is checked from the table below.
	
°C	R(Ω)
-10	55170
0	32600
10	19880
20	12480
25	10000
30	8050
40	5320
50	3600
60	2490
70	1750
80	1260
90	920
100	688
110	510
120	390

7006721146 - VENTURI 100/125/150 kW

Subject	Description
<b>Part Function</b>	It is the component where the gas from the gas valve and the air absorbed are mixed.
<b>Impact in Case of Malfunction</b>	<ol style="list-style-type: none"> <li>1-Combustion emission value is deteriorated.</li> <li>2-The device load may be higher or lower.</li> <li>3-It may work loudly.</li> </ol>
<b>Main Associated Error Codes</b>	
<b>Diagnostics and Test Method</b>	<ol style="list-style-type: none"> <li>1-Checking for burrs, dirt and similar parts in and around the venturi inlet/outlet ports</li> <li>2-Checking the installation with the fan</li> <li>3-Checking the combustion emission value with gas analyzer</li> </ol>
<b>Maintenance Requirement</b>	There is no special maintenance requirement.



Ø39.5

7006721148 - VENTURI 65 kW

Subject	Description
<b>Part Function</b>	It is the component where the gas from the gas valve and the air absorbed are mixed.
<b>Impact in Case of Malfunction</b>	1-Combustion emission value is deteriorated. 2-The device load may be higher or lower. 3-It may work loudly.
<b>Main Associated Error Codes</b>	
<b>Diagnostics and Test Method</b>	1-Checking for burrs, dirt and similar parts in and around the venturi inlet/outlet ports 2-Checking the installation with the fan 3-Checking the combustion emission value with gas analyzer
<b>Maintenance Requirement</b>	There is no special maintenance requirement.



Ø35



7006721677 - VENTURI 50 kW

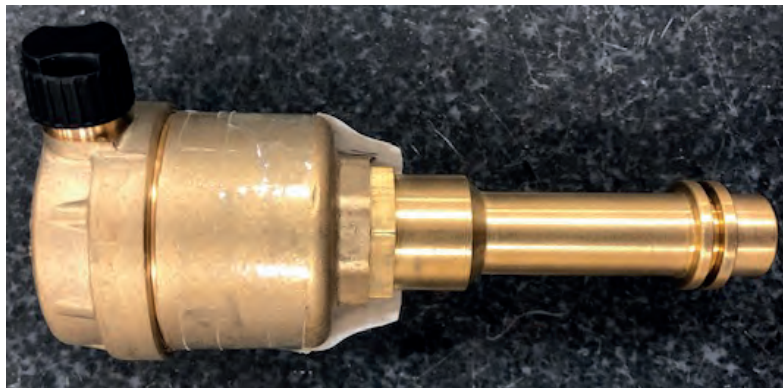
Subject	Description
<b>Part Function</b>	It is the component where the gas from the gas valve and the air absorbed are mixed.
<b>Impact in Case of Malfunction</b>	<ol style="list-style-type: none"> <li>1-Combustion emission value is deteriorated.</li> <li>2-The device load may be higher or lower.</li> <li>3-It may work loudly.</li> </ol>
<b>Main Associated Error Codes</b>	
<b>Diagnostics and Test Method</b>	<ol style="list-style-type: none"> <li>1-Checking for burrs, dirt and similar parts in and around the venturi inlet/outlet ports</li> <li>2-Checking the installation with the fan</li> <li>3-Checking the combustion emission value with gas analyzer</li> </ol>
<b>Maintenance Requirement</b>	There is no special maintenance requirement.



Ø24.5

7006721698 - AIR PURGE  
7006721024 - AIR PURGE

Subject	Description
<b>Part Function</b>	The device ensures discharge of air remaining in the water channel.
<b>Impact in Case of Malfunction</b>	1- Air remaining in the device may cause noisy water circulation. 2- Since the device has water pressure, value can be read high.
<b>Main Associated Error Codes</b>	
<b>Diagnostics and Test Method</b>	1- The plastic cap screw should be loose during the first water filling.
<b>Maintenance Requirement</b>	There is no special maintenance requirement.



Type of Use : 50 kW



Type of Use: 100 - 125 - 150 kW

7006721112 - 100 kW DUO 8+4 HEAT EXCHANGER  
 7006721309 - 125 kW DUO 10+5 HEAT EXCHANGER  
 7006721144 - 150 kW DUO 12+6 HEAT EXCHANGER

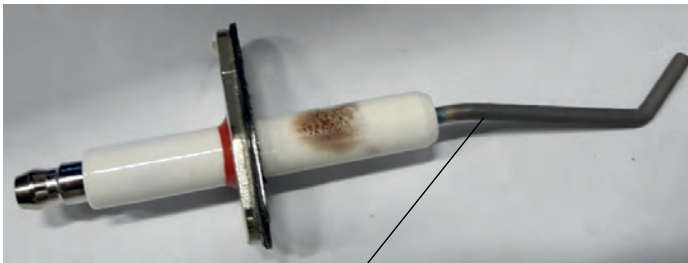
Subject	Description
<b>Part Function</b>	It is the main element that provides heat transfer to the water. It provides the heating of the system by transferring the heat generated by combustion in the burner to the water pipes.
<b>Impact in Case of Malfunction</b>	1-The need for heating is not fully met 2-Water or gas leak
<b>Main Associated Error Codes</b>	
<b>Diagnostics and Test Method</b>	1-Checking whether there is any dirt on the heat exchanger blades' pipes and blockage between the pipes. 2-Crack-hole visual check on heat exchanger pipes 3-Boiling, bubbling etc. sounds coming from the heat exchanger 4-Fresh air emission measurement test
<b>Maintenance Requirement</b>	Heat exchanger inner pipe must be cleaned.



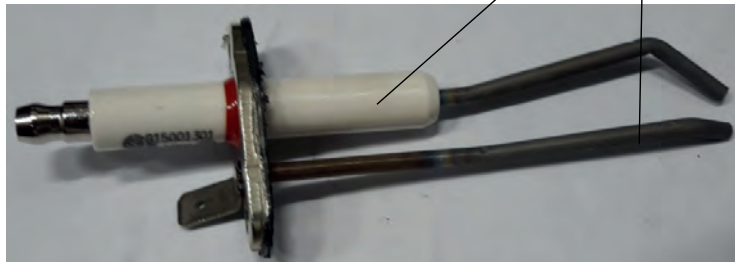
Maintenance Description	Maintenance Method
<b>Heat Exchanger Internal Pipe Cleaning</b>	<ol style="list-style-type: none"> <li>1- The burner door is opened by removing 6 nuts.</li> <li>2- The deposits on the pipes are drawn with the help of a vacuum cleaner.</li> <li>3- The deposits on the pipes are cleaned with a non-metal wire brush.</li> <li>4- The inside of the heat exchanger is cleaned with water provided that the insulation material on the back wall is not wetted.</li> <li>5- Since the dirt will accumulate in the siphon after washing with water, the process is completed by cleaning the siphon.</li> </ol>

**7006721509 - 100/125/150 kW ELECTRODE**

Subject	Description
<b>Part Function</b>	<ol style="list-style-type: none"> <li>1-Igniting and starting the combustion of the gas + air mixture coming from the burner</li> <li>2-Detecting if there is a flame in the burner</li> </ol>
<b>Impact in Case of Malfunction</b>	<ol style="list-style-type: none"> <li>1- No ignition and combustion due to too much or too little distance at the electrode terminals</li> <li>2-Combustion sound of the device as a result of late ignition (Explosive Combustion)</li> <li>3-Reduced ionization current due to the electrode moving away from the burner and flame loss in the boiler at some times</li> </ol>
<b>Main Associated Error Codes</b>	128: Flame loss during operation 133: Safety time exceeded for flame formation
<b>Diagnostics and Test Method</b>	<ol style="list-style-type: none"> <li>1-If there are oxide and the like on the electrode rods, they should be cleaned with the help of a cloth.</li> <li>2-Electrode measurement checks should be carried out.</li> <li>3-The ionization current should be checked.</li> </ol>
<b>Maintenance Requirement</b>	During the annual maintenance period, the electrodes should be cleaned with a cloth.



**Ionization Electrode**



**Ignition Electrode**

**7006721427 - PRESSURE SENSOR**

Subject	Description
<b>Part Function</b>	It is the element that measures the water pressure in the heating circuit.
<b>Impact in Case of Malfunction</b>	<ol style="list-style-type: none"> <li>1-Device gives low/high water pressure error.</li> <li>2-The user sees the water pressure different from the user actual value.</li> <li>3-Even if the user fills water into the system, he may not see the pressure increase.</li> </ol>
<b>Main Associated Error Codes</b>	
<b>Diagnostics and Test Method</b>	<ol style="list-style-type: none"> <li>1-Check that the cable connections are proper and undamaged.</li> <li>2-Check if the water pressure sensor water inlet hole section is clogged</li> <li>3-Voltage test</li> </ol>
<b>Maintenance Requirement</b>	There is no special maintenance requirement.



**7006721487 - RESETELED LED CARD**  
**7006721365 - LED CARD**

Subject	Description
<b>Part Function</b>	It is the part that indicates the devices in error condition and the devices that are currently lit with the help of red and green light.
<b>Impact in Case of Malfunction</b>	<p>1- In cascade installation, the error status of slave devices cannot be seen at first sight, it is necessary to look at the screen of the master device.</p> <p>2- It is not possible to see at first glance which devices are lit at that moment.</p>
<b>Main Associated Error Codes</b>	
<b>Diagnostics and Test Method</b>	LED card cable connection is checked. Cable contacts are checked with the help of a multimeter.
<b>Maintenance Requirement</b>	There is no special maintenance requirement.



**7006721229 - 50/65 kW TRANSFORMER**

Subject	Description
<b>Part Function</b>	It provides the necessary spark for the first combustion of the air-gas mixture blown into the burner.
<b>Impact in Case of Malfunction</b>	<ul style="list-style-type: none"> <li>- The device cannot be ignited.</li> <li>- In case of delayed operation, explosive combustion may occur.</li> </ul>
<b>Main Associated Error Codes</b>	133: Safety time exceeded for flame formation 151: Internal BMU Error (sub-refraction 330-331)
<b>Diagnostics and Test Method</b>	<ul style="list-style-type: none"> <li>- Contact in the cable connections are checked with a multimeter.</li> <li>- It is checked that the order of the attached cables is as in the picture.</li> <li>- At the stage that the device needs to ignite, it is checked whether there is an ignition sound from the transformer.</li> </ul>
<b>Maintenance Requirement</b>	There is no special maintenance requirement.



7006721100 - 100/125/150 kW TRANSFORMER

Subject	Description
<b>Part Function</b>	It provides the necessary spark for the first combustion of the air-gas mixture blown into the burner.
<b>Impact in Case of Malfunction</b>	<ul style="list-style-type: none"> <li>- The device cannot be ignited.</li> <li>- In case of delayed operation, explosive combustion may occur.</li> </ul>
<b>Main Associated Error Codes</b>	133: Safety time exceeded for flame formation 151 Internal BMU Error (sub-refraction 330-331)
<b>Diagnostics and Test Method</b>	<ul style="list-style-type: none"> <li>- Contact in the cable connections are checked with a multimeter.</li> <li>- It is checked that the order of the attached cables is as in the picture.</li> <li>- At the stage that the device needs to ignite, it is checked whether there is an ignition sound from the transformer.</li> </ul>
<b>Maintenance Requirement</b>	There is no special maintenance requirement.





**7006721516 - BURNER COVER LIMIT THERMOSTAT**

Subject	Description
<b>Part Function</b>	<p>1- It is opened when the temperature of the burner cover exceeds 260°C and prevents the boiler from working by interrupting the transmission of signal to the electronic card.</p> <p>2- Limit thermostat closing temperature is <math>260 \pm 6</math> °C.</p> <p>3- It is designed to be activated in case of other temperature control elements malfunctioning.</p>
<b>Impact in Case of Malfunction</b>	In case of malfunction, the device temperature may rise and the burner cover may be damaged.
<b>Main Associated Error Codes</b>	<p>110: SLT Locking</p> <p>111: Temperature limit safety shutdown</p>
<b>Diagnostics and Test Method</b>	<p>1-It is checked whether there is a short circuit on the cable set.</p> <p>2-If the limit thermostat shows a short circuit when measuring with a multimeter at the male terminal ends, it does not work properly if it thermostat blows.</p>
<b>Maintenance Requirement</b>	There is no special maintenance requirement.

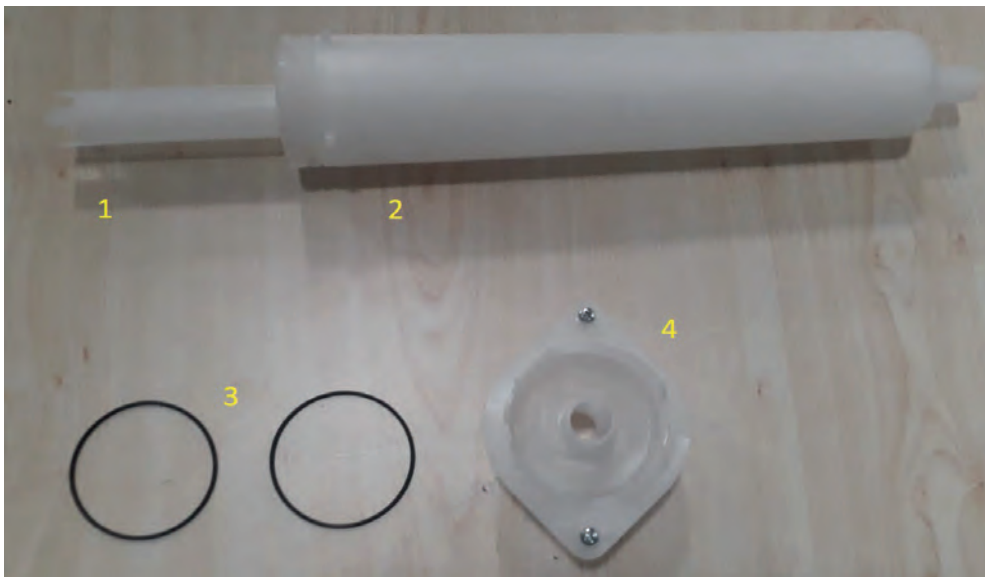


Test Description	Test Method
<b>Limit Thermostat Resistance Check</b>	The device's power is disconnected. A resistance check is made between the terminals of the safety thermostat.



## SIPHON INSTALLATION

Subject	Description
<b>Part Function</b>	It ensures that condensate formed during combustion is transferred out of the device. It prevents the waste gas in the combustion chamber from leaking into the environment where the device is located.
<b>Impact in Case of Malfunction</b>	<ul style="list-style-type: none"><li>- Exhaust gas may leak into the environment.</li><li>- In case of siphon clogging, condensate water may be filled into the heat exchanger.</li></ul>
<b>Main Associated Error Codes</b>	128: Flame loss during operation 133: Safety time exceeded for flame formation
<b>Diagnostics and Test Method</b>	<ul style="list-style-type: none"><li>- It should be noted that the siphon hose is mounted so that it does not make a U shape.</li><li>- Care should be taken during routine checks that the siphon tank is not dirty enough to cause clogging.</li></ul>
<b>Maintenance Requirement</b>	Siphon kit should be removed and cleaned with water during maintenance and checks.





## PRODUCTION

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