

# SERVICE BULLETIN - MAXICONDENSE WALL TYPE CONDENSING BOILER

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## **1. PRODUCT INTRODUCTION**

### **1.1. Product Specific Innovations**

Premix burner providing constant gas-air mixture.

16.3 - 100 kW thermal power range for HK 100 M and HK 100 S products.

Capability to obtain 400 kW power from the cascade system formed by 8 units.

Capability to use B1 polypropylene waste gas piping thanks to maximum 80 °C waste gas temperature.

Up to 30 meters of clean air and waste gas pipe connection for the HK 50 M product.

Optional water and gas connection kits.

Error reporting with microprocessor-control card and LEDs.

Control of up to 60 units within the cascade system, with the electronic control unit. Frost protection safety that runs in coordination with the room thermostat or the device temperature.

Capability of controlling low (30-50 °C) and high temperature (50-80 °C) installations with the room thermostat.

Capability of prioritizing between adaptation heating and domestic water installations with the outdoor air sensor.

Capability of prioritizing the domestic water installation.

Capability of appointing two different modes of operation to two different installations.

Equal time operation of units in cascade systems.

In the event of a failure in the master device, capability to control the slave devices in an emergency. Legionella protection feature entry via remote control system.

### **1.2. Product Types**

The product is available in 3 types. These are HK 50 M, HK 100 M and HK 100 S models.

HK 50 M and HK 100 M models are devices that can operate and control other devices connected to itself in cascade systems referred to as the master. HK 100 S model is a device that can operate in connection with a master device. Numbers 50 and 100 in the model names indicate the thermal load capacity of the device in kW. Letter M indicates that the device is of master type and the letter S indicates that the device is of slave type.

### **1.3. General Information**

HK 50 M, HK 100 M and HK 100 S are condensing wall type boilers for heating purposes, that run with natural gas or LPG and which have a wall-mounted premix burner, with one heating unit (50 M model) or two heating units (100 M - 100 S models). Devices compatible with cascade systems can work on the same heating systems by interconnecting via a station (with master device). Each heating unit has a heating power of 48.5 kW in case of heating from 30 °C to 50 °C. It allows modulation in the range of 30-100% and achieves 108.7% efficiency. Low waste gas temperature allows using up to 30 meters of B1 polypropylene waste gas piping with a diameter of 50 mm for the HK 50 M product. For every 90° bends, 2m should be deducted from the total waste gas piping.

With the electronic card, it can communicate rapidly with systems providing different types of heating and domestic water, so that personal preferences can be applied in cascade systems.

### **1.4. Warnings regarding installation and use of the device and general warranty conditions**

- Installation of the equipment must be performed by an authorized Dealer of DemirDöküm or by **DemirDöküm** Installation Service.
- Necessary electrical connections for the device must be made by an Authorized DemirDöküm Service.



- It is recommended to make periodic maintenance contracts with Demirdöküm Authorized Services in order to ensure that the devices run efficiently continuously.
- After opening the packaging boxes, make sure that the devices are not damaged.
- Ensure that the safety valves and components are properly connected to the installation.
- Device operation pressures are 1-1.5 bar. System pressure cannot exceed 3 bars.
- If the unit will not be operated for a long time, Authorized Demirdöküm Service must be called to ensure that water in the installation is completely discharged. Before this process, the Service;
  - will cut off the system's electrical connection.
  - will cut off gas and water connections connected to the heating circuit.
  - In order to prevent freezing, will drain the water in the system to the drainage.
- If gas leakage is felt in the device, gas valve is closed first. Electric knobs and other electrical devices are not opened. No action to give out flames or sparks is taken. The windows are opened and fresh air is provided in the environment. The gas company official or Demirdöküm authorized service is called.
- It is recommended to use special waste gas piping with the device. If the waste gas system recommended by DD is not used, the rules and tests defined by gas companies for the waste gas system are followed/made and the flue and waste gas system can be made by the companies approved by the gas company.
- In Cascade applications, it is mandatory to use the flue closing valves provided by DD.
- Ventilation conditions in the installation sites of the devices, upper and lower vent-hole measures according to the device cascade powers are defined in the device operating instructions and in this booklet. Ventilation measurements below the specified dimensions are not acceptable.
- If HK 50 M will be used as a single unit, the, the system can have a PP piping with a total length of 30 m, with a diameter of 50 mm. For every 90° bends, 2m should be deducted from the total length.
- The device is allowed to be installed in the indoor environment. It is not suitable for outdoor installation.
- Condensate must be connected to the waste water system. In cascade applications over 200 kW, it is recommended that condensate is not transferred to the waste water system and subjected to an additional neutralization process. (It must be provided as PH: 6-8.)
- Do not place flammable or explosive materials in the installation site of the devices.
- Start-up must be done by a DemirDöküm authorized service.
- Interventions to the device to be performed by the DemirDöküm authorized service during the warranty period (2 years) or in case of spare parts replacement not provided by DD, the warranty conditions of the device will be discharged.

## **1.5 Products that can be used together**

The unit can operate in coordination with high temperature (80°C-50°C), low temperature (50°C-30°C) and domestic water heating systems. Accordingly, hot water is supplied by using the boiler. Circuit diagrams for related systems have been given in the next sections.

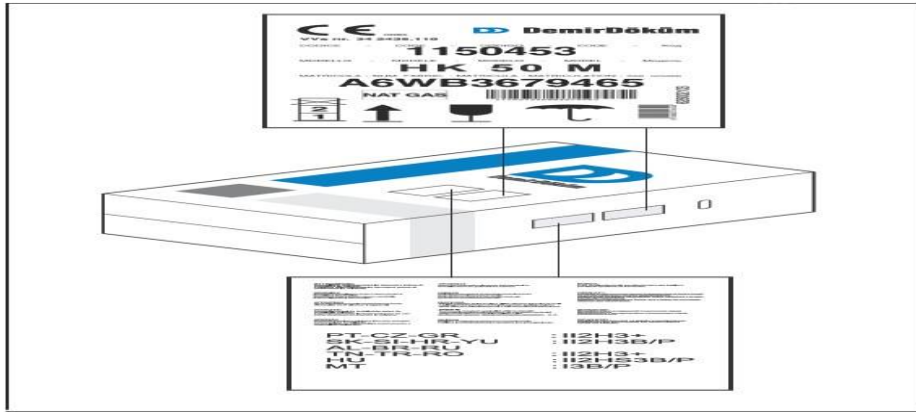
## **1.6. Boiler packaging, registry label and gas label identification - Device technical information**

- 1.6.1 Packaging labeling:** This label includes CE<sub>0085</sub> marking, product type (example Maxi Condense 100 M), stocking marking (up to 2 points on top of another) and other protection markings and DD logo.

 <b>DemirDöküm</b>  TIR 75802C  <b>HK 50 M</b>	Gas type :			Gas category :	 0085 „D“  0085AQ0713
	UK: G20=20mbar G30/G31=30mbar			II2H3B/P	
	IT: G20=20mbar G30/G31=28-30/37mbar			II2H3+	
	HU: G20/G25.1=25mbar G30/G31=30mb			II2H3B3/P	
	RO: G20=20 mbar G30/G31=30 mbar			II2H3B/P	



### 1.6.2. Device registry label:

Technical and performance data of the device is given.



### 1.6.3 Gas label:

This label is on the side surface of the rear frame plate. It describes the type of gas in the country where the device will be used.

Gönderildiği ülke :  

Aparat tipi: B23, C63, C63x  
Kazan kategorisi: II2H3+

Gaz besleme basınçları:  
G20 20 mbar  
G30+G31 28-30/37 mbar

Üretici tarafından gerçekleştirilmiş ayarlama:  
G20 - 20 mbar - 2H METAN

**DİKKAT**

Aparatı kurmadan ve hizmete almadan önce kullanım kılavuzunu dikkatle okuyunuz.

Calabria DDO 068324\_1\_E1

**HAREKET ETTİRME**  
Ambalajından çıkardıktan sonra HK kazanının hareket ettirilmesi, aparatı resimde gösterilen noktalardan tutarak, yatırarak ve kaldırarak manuel olarak gerçekleştirilir.



- ⚠ Kazanı panel kısmından tutmayınız, taban veya arka yapısı gibi "sabit" taraflarından tutunuz.
- ⚠ İş kazalarını önleyici uygun korumaları kullanınız.

**1.6.4. Technical Specifications Table**

Definition	Maxicondense			Unit
	HK 50 M	HK 100 M	HK 100 S	
Fuel type	G20 - G30 - G31			
Device category	II2H3 +			
Device type	B23 - C63			
Thermal load (Min. - Max.)	16.3 - 50	16.3 - 100	16.3 - 100	KW
Thermal power (Min. - Max.)	15 - 45	15 - 90	15 - 90	KW
Thermal power (80°C / 60°C)	44.2	88.3	88.3	KW
Thermal power (50°C / 30°C)	48.5	96.8	96.8	KW
Efficiency (80°C / 60°C)	98.2	98.2	98.2	%
Efficiency (50°C / 30°C)	107.7	107.7	107.7	%
Efficiency in 30% load (50°C /	108.7			%
Flue loss (While device is active)	1.3			%
Flue loss (While device is inactive)	0.1			%
Circuit heat loss	0.5			%
Waste gas temperature	(Installation return temperature) +			°C
CO <sub>2</sub> (Min. - Max.)	8.4 - 9.4			%
CO (Min. - Max.)	< 10 - 120			p.p.m.
NOx (Min. - Max.)	< 10 - 20			p.p.m.
NOx class	5			
CH max. operating pressure	6			bar
Max. installation outlet temperature	90			°C
Installation temperature setting	20 – 80 (± 3)			°C
Heat exchanger water capacity	5	10	10	liter
Electric supply	230 ~ 50			V ~ Hz
Maximum electricity consumption	169	333	333	W
Electrical protection class	X0D			IP
Condensing amount	7.2	14.4	14.4	kg/h

**1.7. INTRODUCTION TO BASIC COMPONENT OF THE DEVICE**
**1.7.1 Burner:**

Burner; full premix, micro-flammable and low-emission burner. After burner has been installed in the exchanger, a fan group is placed onto it and it is connected to the heat exchanger body with 4 screws (Figure 1.4)

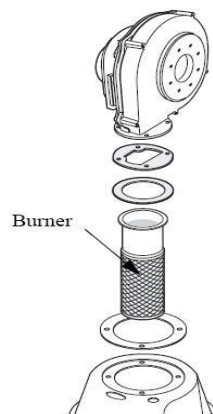


Fig. 1.4

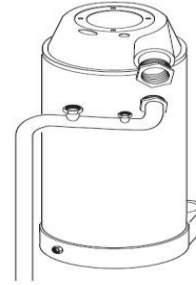


### 1.7.2 Main heat exchanger

In order to bond 321 stainless steel pipe on the copper pipe inside the exchanger and increase the heating surface of the pipe, the bimetallic pipe is composed of threads with specific pitches. The heat exchanger is formed by wrapping the outer body around the inner wall. (Figure 1.5)



Fig. 1.5



### 1.7.3 Combustion chamber

The cylinder shaped upper valve part is the body made of aluminum casting, including a heat exchanger within. (figure 1.6) HK 50 M type has 1 piece, HK 100M and HK 100S types have 5 pieces. (Figure 1.5)

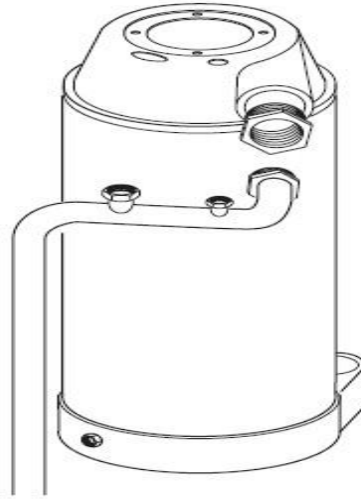


Fig. 1.5

### 1.7.4 Flame ignition and detection electrode

The electrode is mounted on the upper left side of the combustion chamber. Its function is to enable ignition by creating a high-voltage spark near the burner. Its second task is to detect the presence of flame (Figure 1.7).

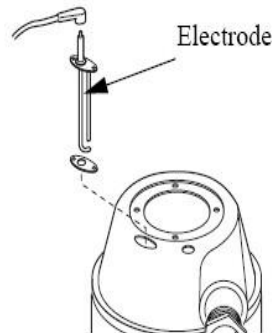


Fig. 1.7



### 1.7.5 Flow and Return NTC probes

With the sensors, the temperature measurements on the flow and return lines of the combustion unit are read on the electronic card.

(Figure 1.8)

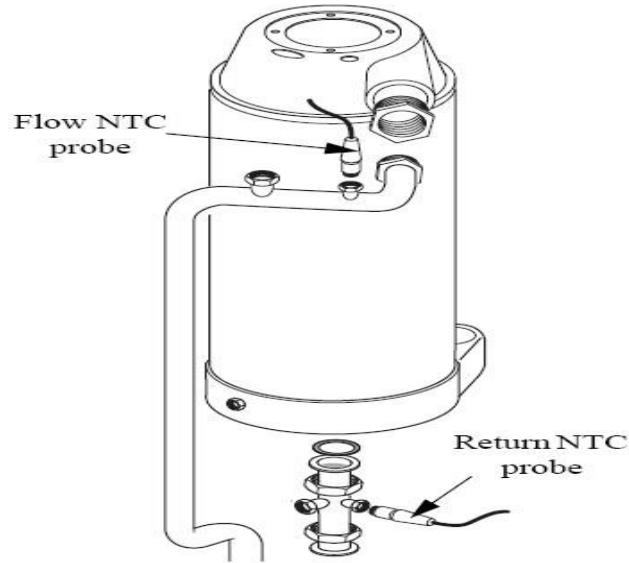


Fig. 1.8

### 1.7.6 Safety thermostat

The safety thermostat can be set again manually. It's on the flow line. It is activated when water flow temperature is 90°C and closes the burner. (Figure 1.9)

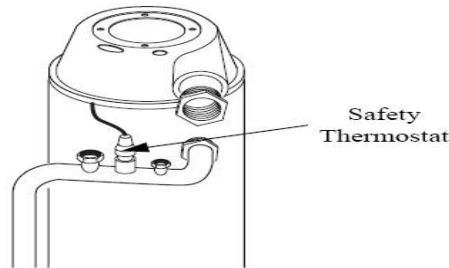


Fig. 1.9

### 1.7.7. Flue probe

It is under the heat exchanger. It is activated when the waste gas temperature exceeds 80°C and closes the burner. (Figure 1.10)

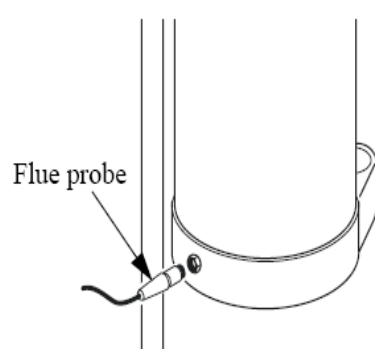


Fig. 1.10

### 1.7.8. Fan

It enables the air gas mixture to reach the burner and combustion chamber by means of the venturi (air gas mixer). The other task of the fan is to send the waste gas to the waste gas system. (Figure 11)

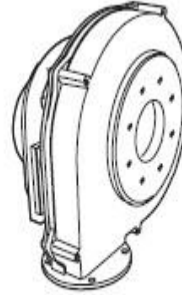


Fig. 1.11

### 1.7.9. Gas valve

It is connected to the venturi above the combustion chamber. It has an aluminum casting body. There are two safety valves electrically. It runs as electrically parallel and mechanically serial connected.

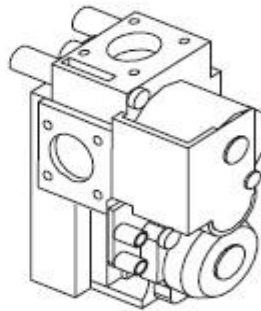


Fig. 1.12

### 1.7.10. Venturi

Venturi is an aluminum material. By creating a venturi, it sends air and gas mixture to the burner via the fan. Figure. 1.13

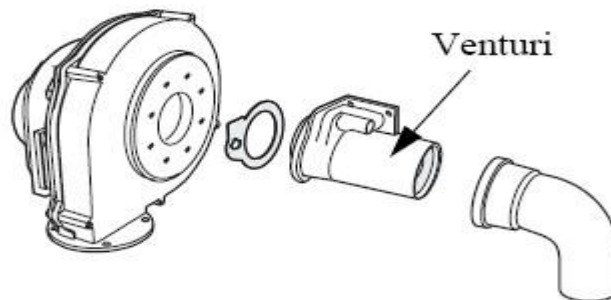


Fig. 1.13

### 1.7.11. Condense collection siphon

It's under the combustion chamber, on the right side. It is made from composite material. (Figure 1.14)

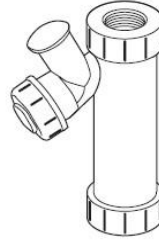


Fig. 1.14

### 1.7.12. Control panel

In HK 50 M and HK 100 M model products, it has one master card (main PCB) and one or two slave PCBs. HK 100 S model has 2 slave PCBs. In cascade applications, with HK 50 M and HK 100M, it controls the **slave cards** connected to the whole system via a BUS connection.

The device is controlled by a microprocessor and a self-diagnosis based system. It is possible to connect 60 heating units to the system. In cascade applications, besides device heating, it is possible to make fast connection to 2 different zones and to domestic hot water systems. (Figure 1.15)

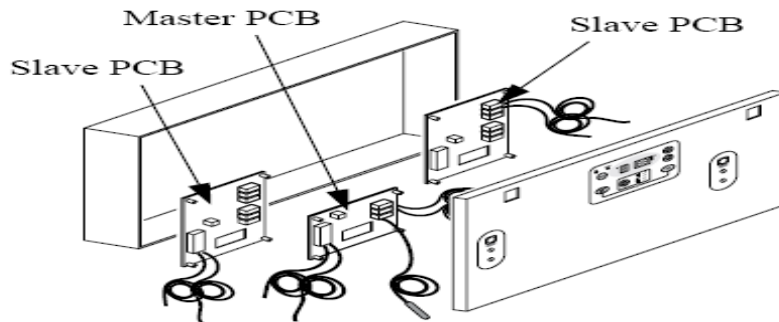


Fig. 1.15

### 17.13. Water differential pressure switch

It is under the unit combustion chamber. If the flow water flow rate in one unit is below 500 l/h, it turns off the system.

When there is no water in the system, it turns off the burner and protects the system. (Figure 1.16)

Working threshold;

ON system water flow rate > 700-720 l/h (p 50-55 mbar)

OFF system water flow rate < 540-560 l/h (p 35-40 mbar)

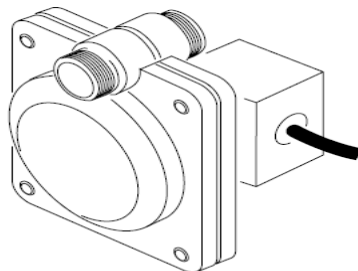


Fig. 1.16

### 1.7.14. Safety valve

It is on the water flow pipe. It must be connected to the waste water system with a drainage hose. It protects the hydraulic circuit at high pressures caused by overheating of the primary circuit. It is set to 6 bars. (Figure 1.17)

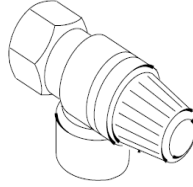
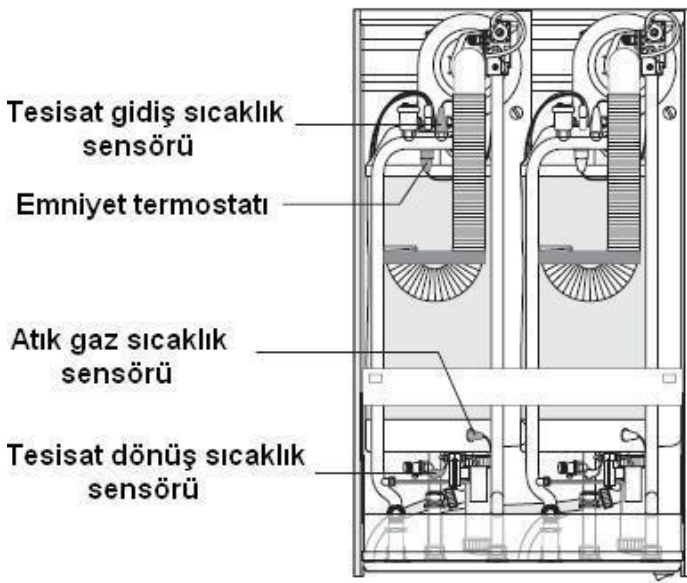


Fig. 1.17

### Introducing the Safety Components of the Device



**Safety Thermostat:** It has manual reset. When 90 °C is exceeded, it is activated and turns off the device.

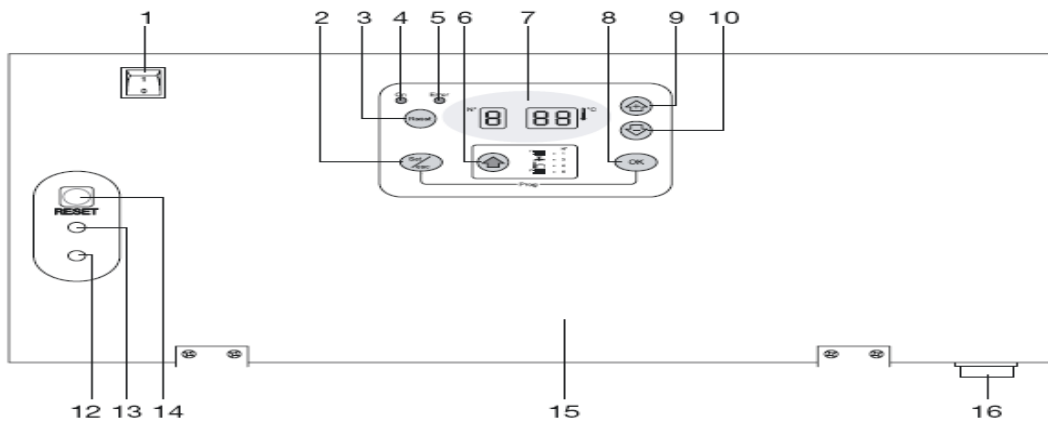
**Waste Gas Temperature Sensor:** When the waste gas temperature rises above 80 °C, it turns off the system.

**Installation Circuit Protection:** It prevents the device from working with insufficient water with installation flow and return temperature sensors and water differential switch.

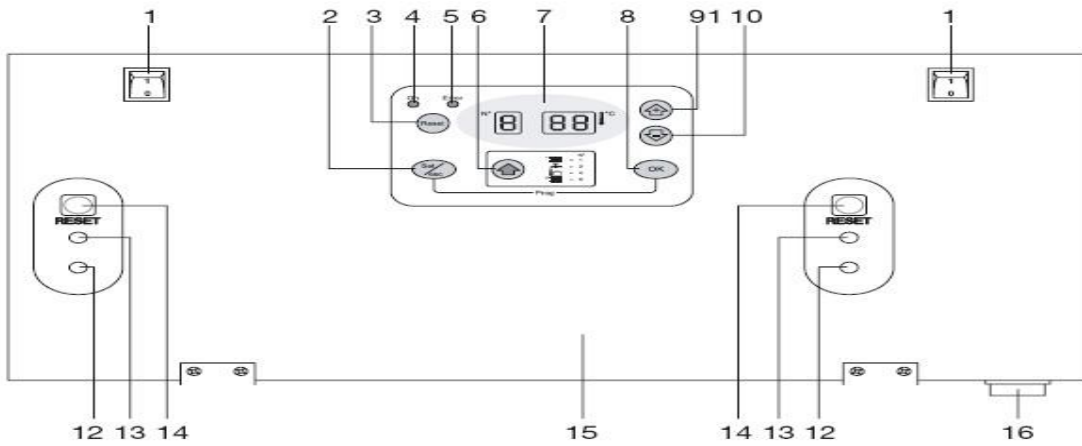
**Frost Protection Function:** It is activated if the waste gas temperature drops below 5 °C.

### 1.7.15 Introduction to the control panel

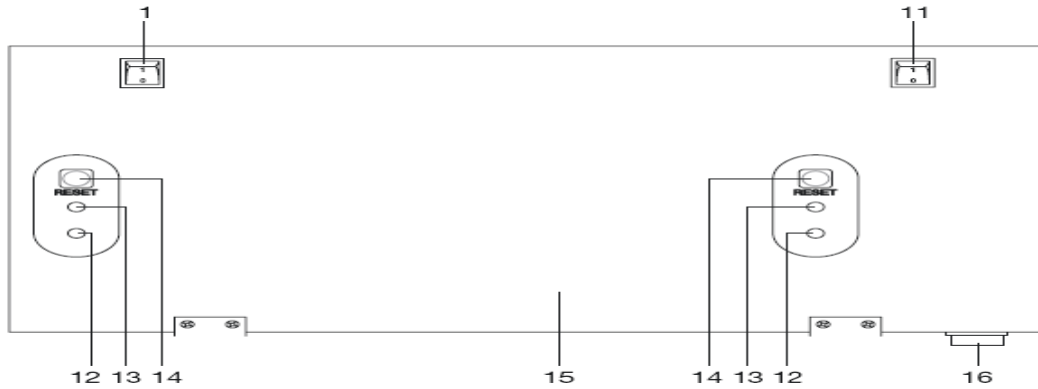
HK 50M



### HK 100M

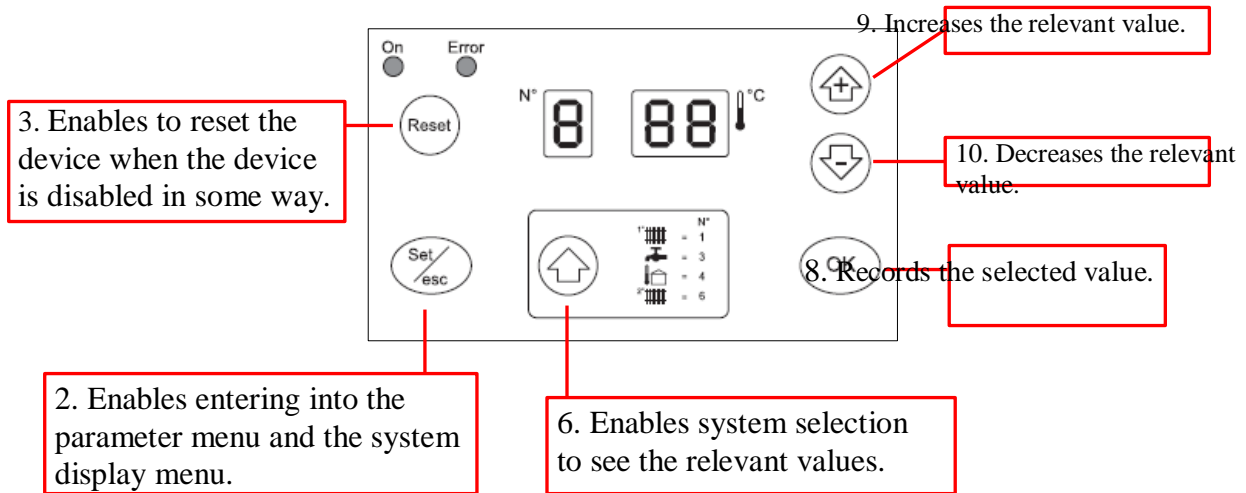


### HK 100S



- 1 First heating unit switch  
Operation mode selection button (Enables entering into the Parameter menu and the system display menu.
- 2
- 3 Reset button (Master)
- 4 Signal indicating that the system is powered
- 5 Boiler is disabled
- 6 Parameter selection button
- 7 Display
- 8 Memorizing button
- 9 Value increase button
- 10 Value decrease button
- 11 Second unit heating switch
- 12 << Slave power signals
  - low flash: stand-by state
  - high flash: ignition on
  - continuous light: flame is observed, system is active
- 13 Slave boiler is disabled
- 14 Reset button (slave)
- 15 board card
- 16 Main boiler on/off switch

### 1.7.16. DISPLAY (Display Mode)



If the above 5 (error) lamp lights red, this indicates that the system is disabled due to an error. (If the system is normal, the system is activated by pressing the Reset key (14) on the master and slave units)

#### 1.7.16.1 Display - display mode:

##### Description

##### Display

No request for heating or water heating      Single digit on left = 0

(The two digits on the right indicate the water flow temperature (Example T1=30°C)

0 30

First or both units are in heating      Single digit on left = 1

(The two digits on the right indicate the water flow temperature (Example T1=80°C)

1 80

There is a request from water heating or at the same time there is water heating/heating. (There is a flash while Left digit = 1 and below) (The two digits on the right show the water flow temperature (Example T1=80°C)

1 80

No request for heating or water heating      Single digit on left = 0

(The two digits on the right indicate the water flow temperature (Example T1=30°C)

0 30

In the frost protection function

F 30

Heating in the second unit      Single digit on left = 1

(The two digits on the right indicate the water flow temperature (Example T1=80°C)

1' 80

Heating or domestic water heating is not required

(The two digits on the right indicate the water flow temperature (Example T1=30°C)

0 30

## 1.7.16.2 Readout mode

(Temperature values and operational states in various circuits)



Key is pressed (the point next to I is turned off (press once), then continue with the menu. The following data are observed in order.

### Description

### Display

1. The highest flow water temperature in the heating circuit  
Example T1: 80°C

**T1**

1 80

2. Domestic water temperature **T3**  
Sample: Boiler temperature T3: 50°C

3 50

3. Outdoor air sensor temperature **T4**  
Sample: T4: 7°C

4 07

4. Second circuit water flow temperature **T6**  
Sample : 2nd zone floor heating T6: 50°C

6 50

5. Room thermostat closed or open for 1st circuit  
OFF = ignition on  
ON = ignition off

H 0F  
H 0n

6. Room thermostat closed or open for 2nd circuit  
OFF = ignition on  
ON = ignition off

L 0F  
L 0n

7. 0-10 V analog input  
Sample 5.5 V-10 V

7 5.5  
7 10

8. Operating position of the mixing valve  
Off (\_C), on (80), standby (\_ \_)

8 00  
8 80  
8 00

9. Operating position of the main pump  
1.0 is not working, 1.1 working.

P 10  
P 11

10. Operating position of the boiler pump  
2.0 is not working, 2.1 working.

P 20  
P 21


11. Operating position of the second circuit pump  
3.0 is not working, 3.1 working.

P 30  
P 31

Press **OK** key to exit the reading mode. If no key is pressed, then the Display mode will automatically be displayed after 5 minutes.





### 1.7.16.3 Monitor mode (It is used to control operation values for each heating unit and 1-60 addresses can be defined.)

Press "Set/Esc" key for 5 seconds to see **U 01** on the display, then switch to the following other modes by pressing the  key.


#### Operation

#### Display

1. High temperature circuit (1st circuit) boiler is active (80°C)
2. Press the "Set/Esc" button for 5 seconds to read the 1st heating unit
3. Press the "+" or "-" key to access the other heating units. (Example 19th unit)
4.  Press the  key and access to the "reading" values of the heating unit accessed in the third stage.

1. 80  
U 01  
U 19  
1 70

For example, hereshows the flow water temperature of the 19th unit.

As a result, after entering the desired unit in the 3rd stage, the values of the respective heating unit are accessed with the  key.

1. 80

5. Press the "OK" button to exit monitor mode.

If no key is pressed for 5 minutes, the display returns to the 1st position.

#### Value

#### Screen

1. Water flow temperature Example 70 °C (1)
2. Water return temperature Example 50 °C (2)
3. Waste gas temperature Example 60 °C (5)
4. Ionization current (index 0-90) Example: index 44
5. Fan PWM signal (%)  
(99 is read if PWM = 100) Example 66 (7)
6. Flow water temperature is on/off (not active)

1 70  
2 50  
5 60  
C 44

Sample contact open (F)

7. Pump or motorized valve on/off (8)

Example pump on, off

8. Maximum ionization current (0-90) Example 80 (I)

9. Total running time of the unit (0-9999) (h)  
(Example, for a unit running 8050 hours, 80 and 50 are written one on top of another)

7 66  
F 00  
F 0F  
8 00  
8 0F  
I 80  
8 80  
8 50

## 2. WORK FLOW FOR START-UP OF THE DEVICE

### 2.1 START-UP OPERATION

#### Gas connection:

- The device works with natural gas or LPG. Gas connections must be made in accordance with the relevant standards.

Following points must be observed before making connection:

- The device to be connected and the gas type must be the same.
- Connection pipes must be clean and not obstructed.
- Gas connection pipes must be the same size or larger than the gas inlet (3/4"); the pressure drop during this time must be less than the pressure drop between the gas line and the device.
- After gas connections have been made, it must be checked that there are no leaks at the joints.
- A suitable filter should be mounted on the gas inlet.
- Make sure the gas valve or valves are open.
- Use the correct gas for the unit (In LPG applications, LPG set must be installed in the device).

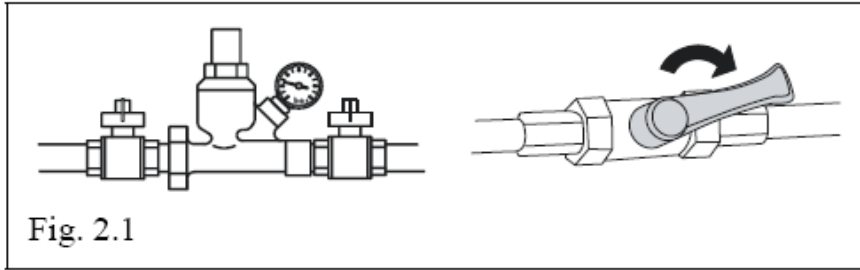


Fig. 2.1

- The system must be filled cold and set around 1.5 bars.
- Expansion tank must be connected to the system by calculating that it is the proper size.
- Electrical connections must be made by suitable and qualified personnel.

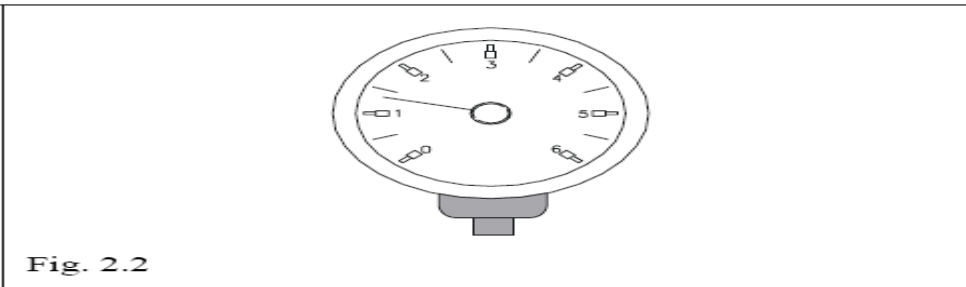


Fig. 2.2

### Pump connections

**Pumps must be connected to the system with suitable fasteners in order to be easily accessible in manual emergence situations.**

- Before operating the pumps, they must be checked by turning the screwdriver after removing the front cover and the screw.

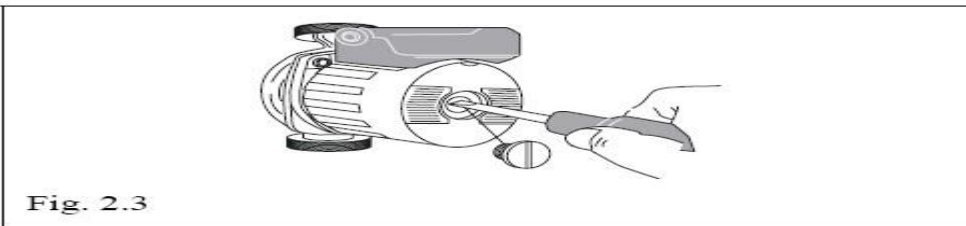


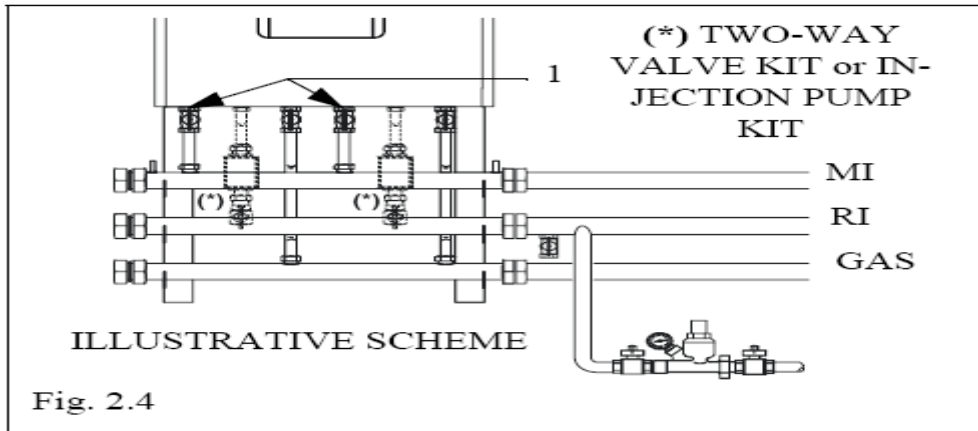
Fig. 2.3

- Protect electrical equipment from possible water spills before loosening and removing the pump's screw.

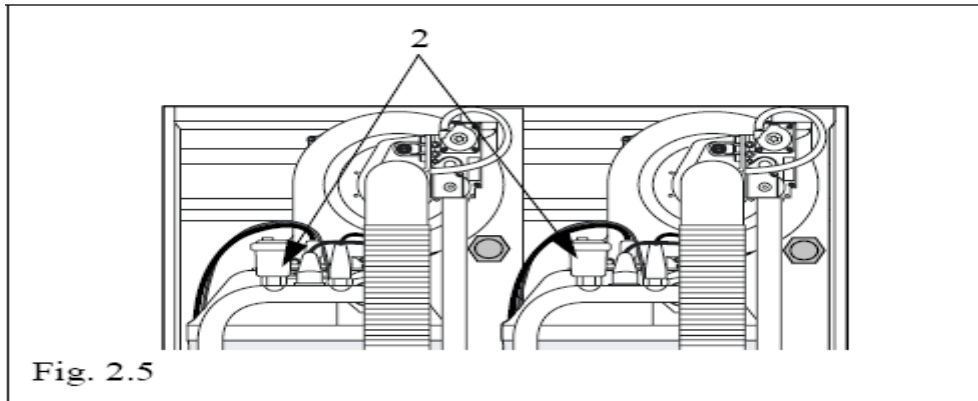
## 2.2 FILLING AND DISCHARGING THE SYSTEM

### 2.2.1 Filling

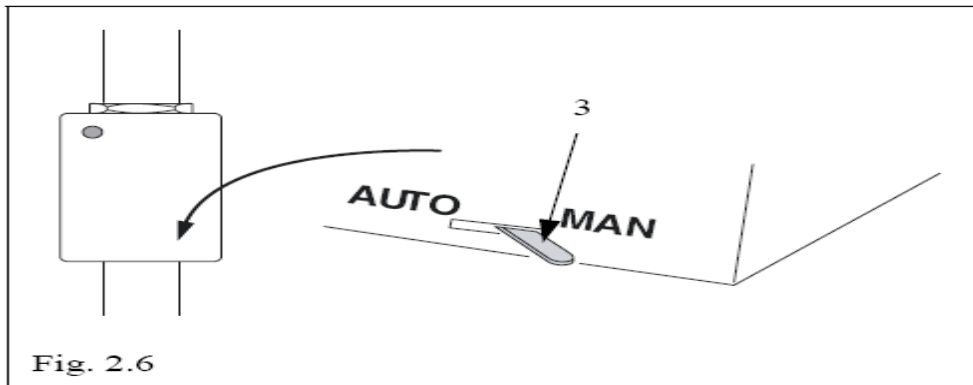
- Open valves no (1) (Figure 2.4)



- Turn on air discharge air relief cocks (2) (Figure 2.5)



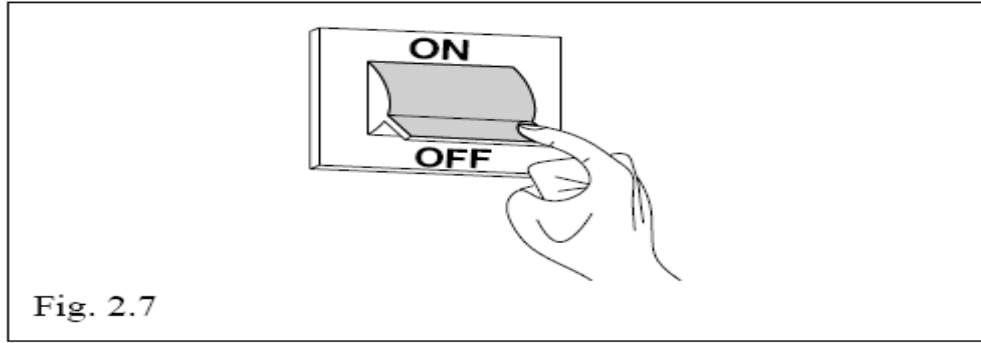
- If there is a 2-way valve in the system, bring the position to MANUAL position (It is the handle below the two-way valve (Fig. 2.6))



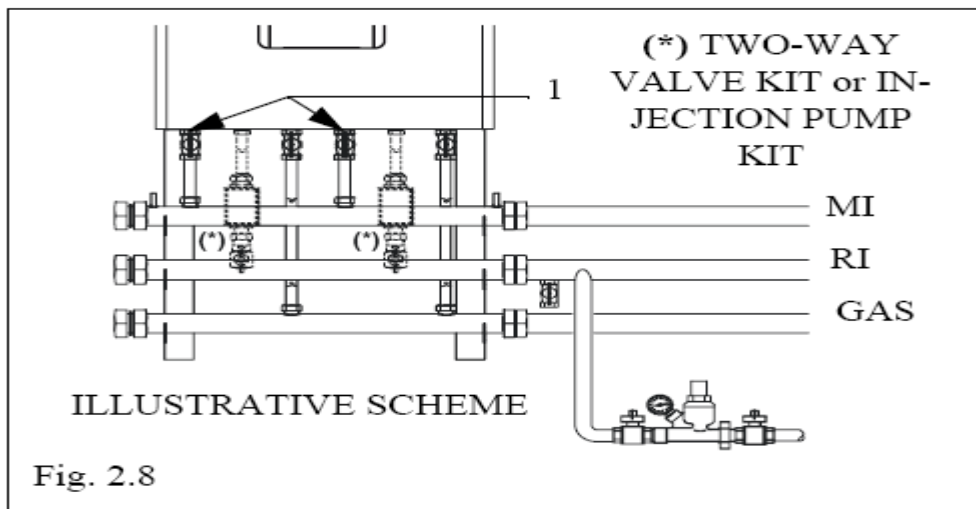
- The system will be filled with water until the pressure reaches 1.5 bars.
- The filling valve is closed.
- Two way valve arm is set to "AUTOMATIC" position. (This is done for all devices.
- Make sure that automatic air relief cocks of all devices are loose.

### 2.2.2. Discharging the water inside the device

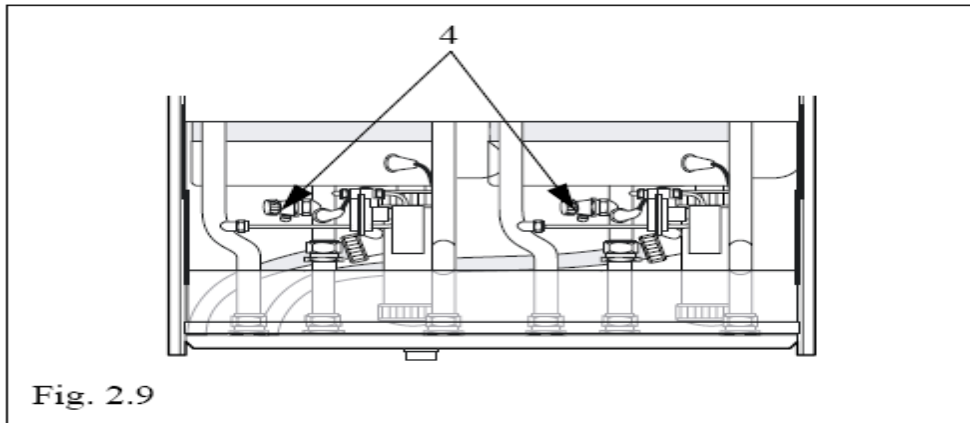
The main power switch is turned OFF before draining the system water.



The valves under the devices are closed.

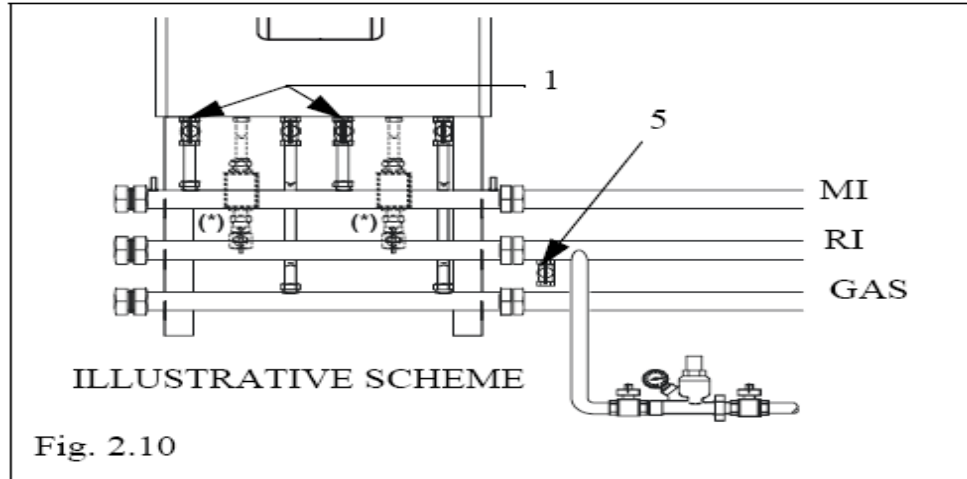


In each unit, plastic hoses are connected with 2-way valves and water is drained. / Electrical equipment must be protected from the discharged water.

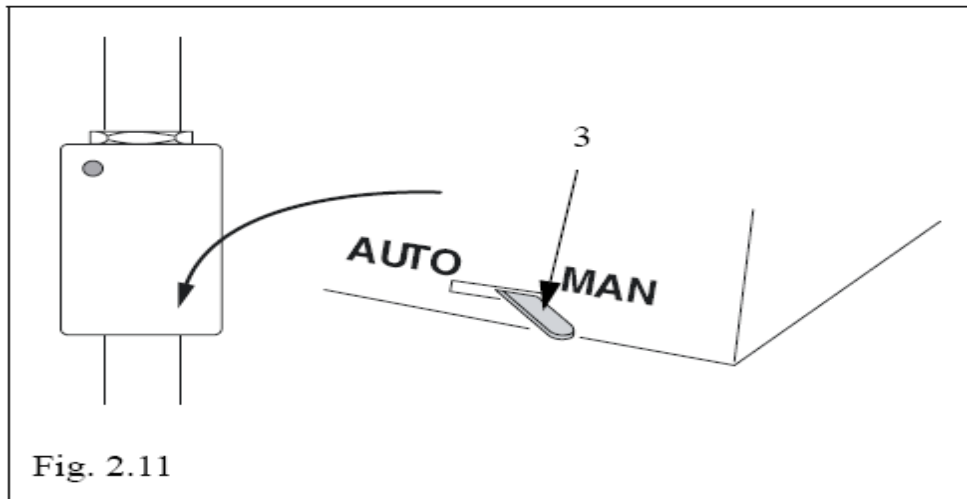


### 2.2.3. Discharging the water inside the installation

- Make sure the valves are open in the water circuit
- Connect the drain hose to the drain plug in the return line (Figure 2.10 (component 5))
- Switch the 2-way valve of each heating unit to the "MANUEL" position.

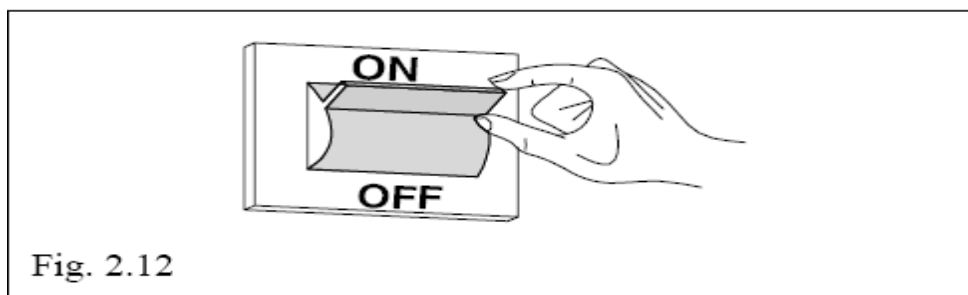


- After draining water in each unit is completed, the 2-way valves are switched to the "AUTOMATIC" position. (Figure 2.11)

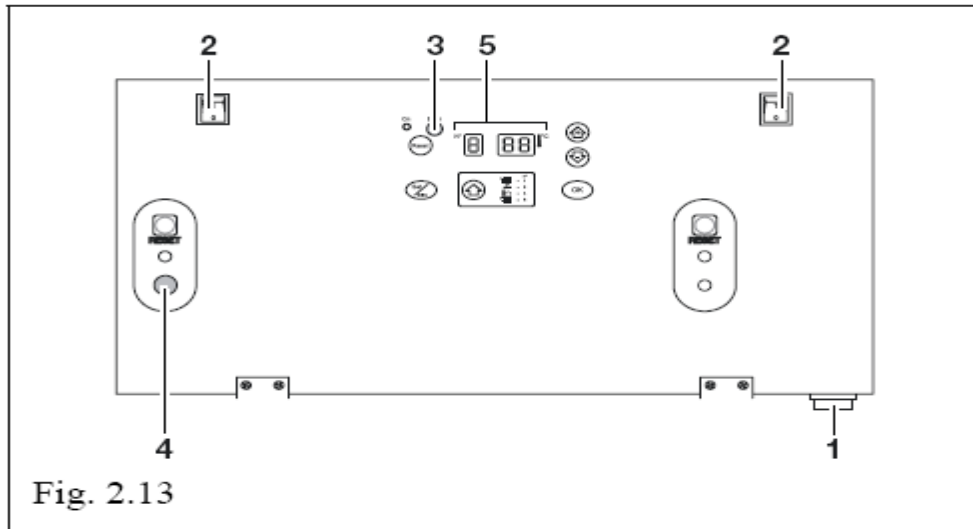


### 2.3. FIRST IGNITION

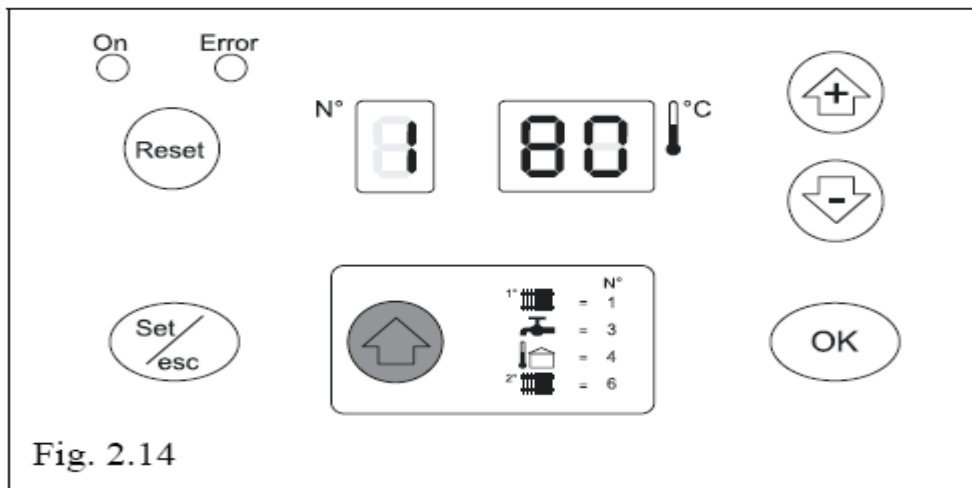
- Turn the main switch to "ON" position.



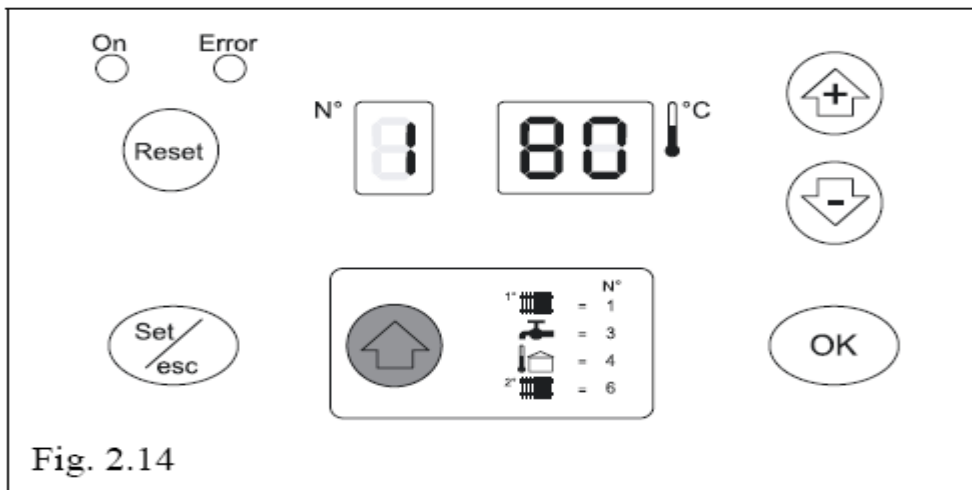
- Turn all **1** and **2** line switches in the system to the "ON" position. (Figure 2.13)
- The **3** and **4** lamps on the card will "flash". (Figure 2.13)
- **5** On the display screen, the highest flow water temperature will be displayed.
- In the high and low flow water temperature zones, the room temperatures will be set to 20 °C



- When the button is pressed, the maximum flow water temperature will appear, its symbol is 1. (In figure, 2.14 it is 80 °C)



- Press and hold the "Set/Esc" key until the screen flashes. (Figure 2.15) Press "+" and "-" to change, press "OK" key when desired value is reached. Here, the maximum temperature for the flow water of the high heating circuit is set.



- Pressing to the key, access to display 6 (press 4 times), then low flow water system (it can be the floor heating zone) is accessed. (Figure 2.16)

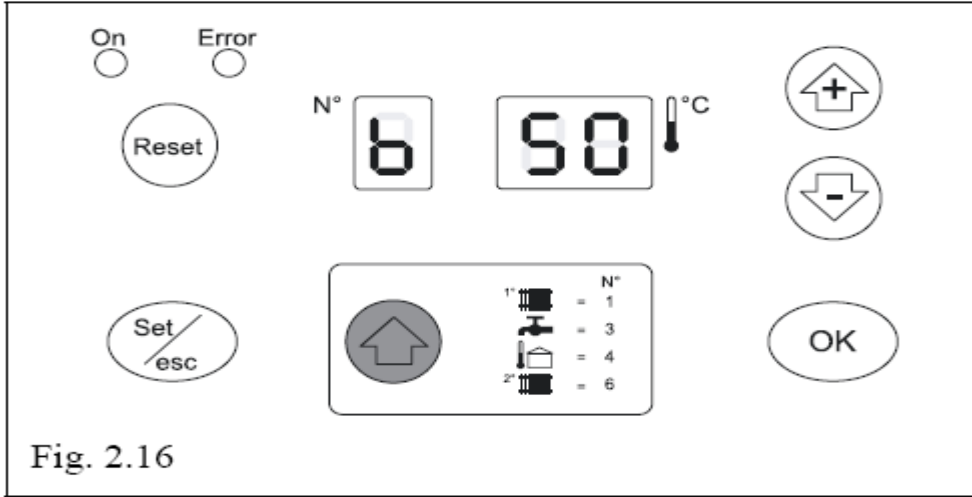


Fig. 2.16

- Press and hold the "Set/Esc" key until the screen flashes. (Figure 2.15) Press "+" and "-" keys to change press "OK" key when desired value is reached. Here, the maximum temperature for the flow water of the low heating circuit is set. (Figure 2.17)

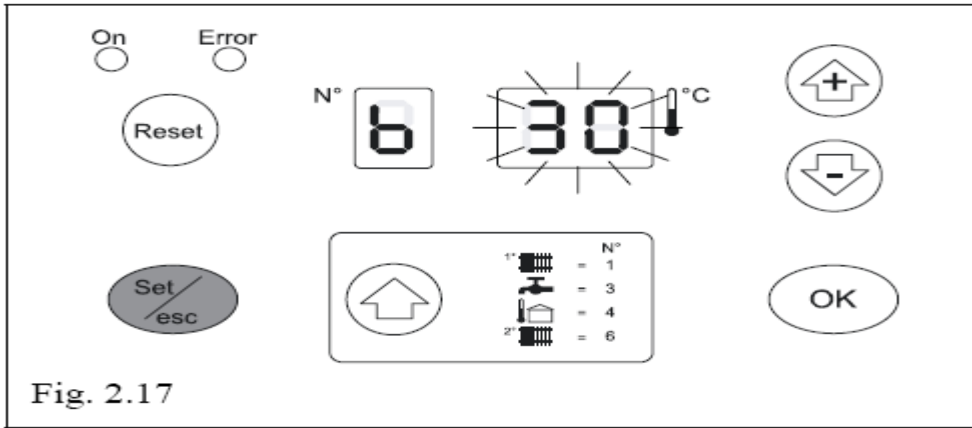



Fig. 2.17

- In low temperature systems, temperature can be selected among 20 °C -45 °C. (Figure 2.17)
- If the parameters are set as (parameter 23 =T\_CH-Low limit), the system will automatically set as 50 °C.

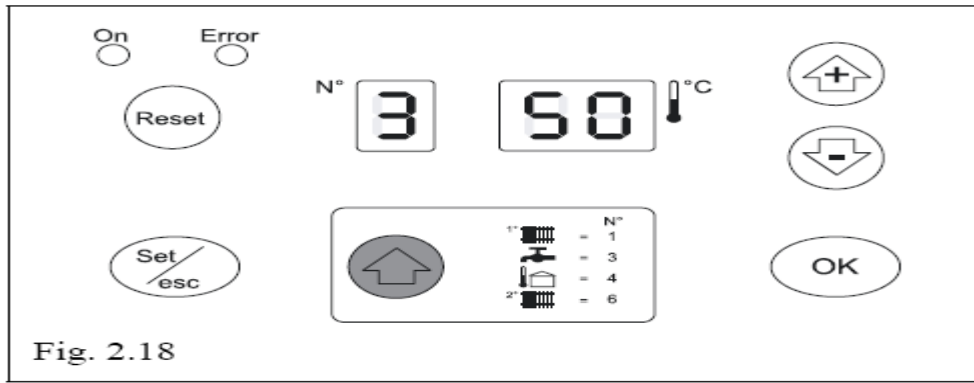
- **If a boiler tank is connected to the system**, parameter must be set to **6**. (Factory setting = 0 meaning there is no boiler in the system) To introduce the boiler to the system, it is defined in the Installer program. Here instead of 0; if **2** entered, then program entry is done with boiler tank probe

If **6** is entered, program entry is done with thermostat.

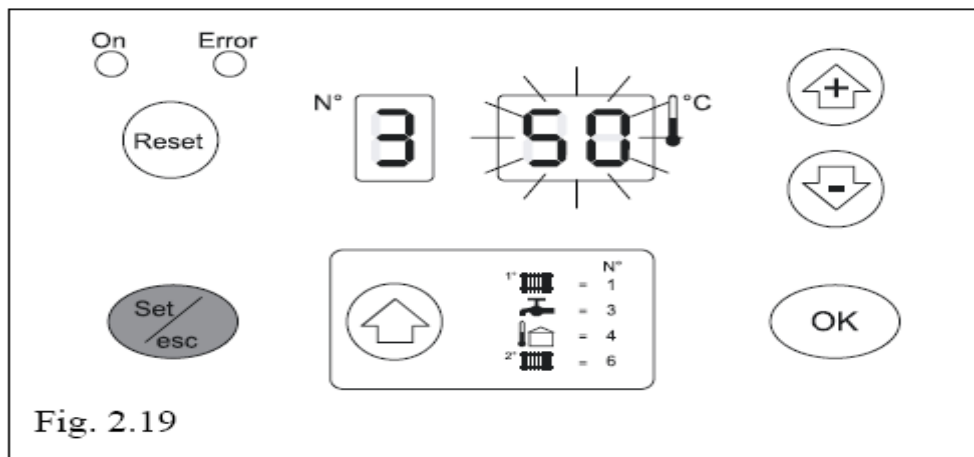
In addition, parameter **9** (Boylar priority - DHW Priority) must be selected. If **2** state is entered (probe state), the T 3 parameter on the display can change between 10 °C to 50 °C. If 6 is selected (thermostat-boiler) The boiler temperature is T 3 = 50 °C.

-Press  key 2 times to access display 3. (Figure 2.18)

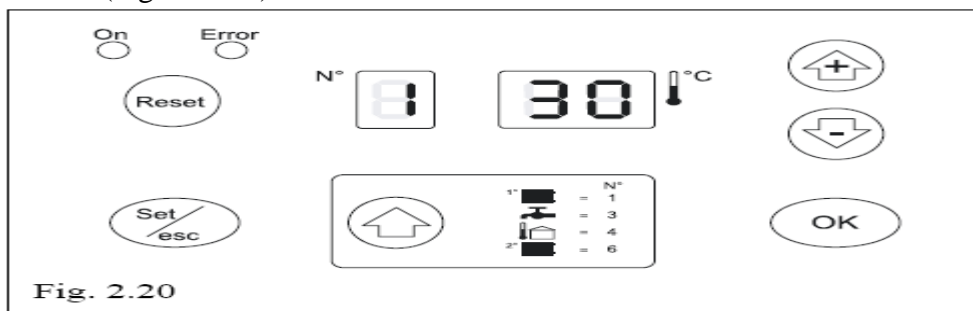




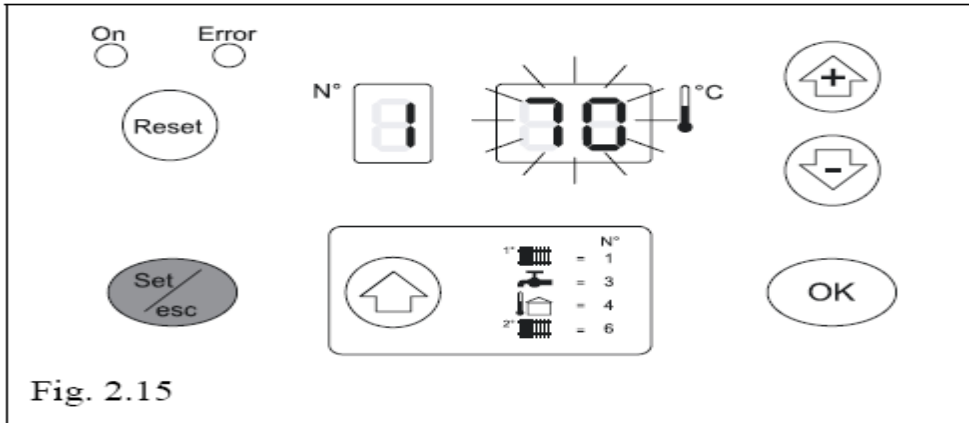
- Press and hold the "Set/Esc" key until the screen flashes. (Figure 2.15) Press "+" and "-" to change, press "OK" key when desired value is reached. Here, the maximum temperature for the Boiler flow water is set. (Figure 2.19)



- If the boiler is in stand-by mode, on display screen the flow water temperature will appear in the "1" position. (Figure 2.20)



- If there is a fault in the combustion or operation, display lamps will flash (blink) and the error lamp will flash red (Figure 2.21)



Errors A and E are removable errors.

- Type A errors can be removed by pressing the RESET key.
- Type E errors disappear automatically. (Section 6 provides information on the errors.)

## **2.4. CONTROLS TO BE PERFORMED AFTER AND DURING THE FIRST IGNITION**

After the ignition is complete;


- Check whether the zone thermostat contacts are closed (active)
- If domestic water is connected to the boiler system (display 6 is active), it must be checked whether it is 2 in the probe-boiler and 6 in the thermostat-boiler.  
It must be checked whether hot water is actually present in the hot water tap
- Check that the OFF switch turns off the heating system
- Check whether room thermostat or programmed thermostat is running
- Gas pressure and leakage (with foam) must be checked
- Check combustion, check for waste gas leaks




### 3 BOILER OPERATION

#### 3.1 FACTORY SETTINGS AND FUNCTIONAL PARAMETER SETTINGS

During boiler installation, the following properties must be re-entered in the parameter blocks on the HK 50 M or HK 100 M master units.

- 2 when using different heating system (high temperature and low temperature zone) outdoor air sensor (Par.14 = 1) must be entered.
- In primer circuit, (Par 34 = 0) is entered in the forming of "ring" system pump modulation.
- If no boiler connection is available for domestic water (Par.6 = 0) is entered.
- If there is no priority between High or Low temperature systems (par.16 = 0) is entered.
- Par.1 is used for maximum water flow temperature in high temperature system (Example Par.1 = 70 °C), Par = 6 is used for the low temperature system (Example par. 6= 40 °C)
- In systems with a gas flue height of less than 15 meters tons (Par 31 = 1) is entered.

In case of using boiler for high flow water temperature (Normal 80/60 system), low flow water temperature system (50/30 system) and domestic water, the following display values must be entered by pressing the  key. These parameters can be entered by the user. A password is required to enter other parameters.


High-flow-water circuit parameter	
Boiler circuit parameter	
Low-flow water temperature circle	

##### To change set temperatures;

- Press and hold the **"Set/Esc"** key until the 2-digit display on the right flashes.
- Press **"+" and "-"** keys to bring to the desired value and press **"OK"**.
- The newly entered value will flash for 3 seconds and be activated.

##### Example

Read high temperature circuit temperature

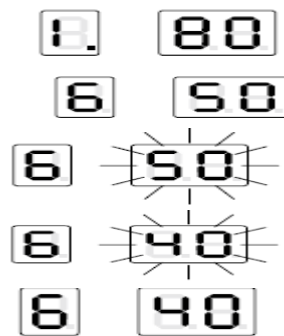
 press until you reach parameter "6"

Press **"Set/Esc"** key until it flashes

Press **"-"** key until it becomes 40 °C.

Press **"OK"**, then new values are set.

After 3 seconds it will return to the display position with the new set values.



**Note:** If you do not press any key for 10 seconds after pressing "Set/Esc" button, it returns to Display position. If you do not press the "Ok" key after pressing the "+" or "-" key, the system will return to its previous position within 1 minute.

### 3.2. CENTRAL HEATING PARAMETERS

Following parameters must be set for the Central Heating (CH) function.

#### 3.2.1. Setpoint\_T\_CH\_High

##### Setting of high temperature circuit (parameter 1)

- In case a constant value will be set in the operation mode, (par.14 = CH\_type\_high = 0) is entered.
- If outdoor air sensor is used in the system, then the operation mode is a variable mode depending on the outdoor air temperature. Here (par.14 = CH\_type\_high = 1) is entered. Here, in the min outdoor temperatures, max flow water temperature is set ( $T_{out\_min}$ =par.37, pre-set to 0 °C), minimum set points are set with parameter 18 ( $T_{CH\_high\_foot}$ ,pre-set to 50 °C) and with parameter 17 ( $T_{out\_max}$ ,pre-set to 18 °C), maximum value is defined for 70 °C flow water). Therefore, the program detects it as ( $T_{CH\_high\_limit}$ ,pre-set to 80 °C).

As a result, in the case of parameter 14 = 1, the system will modulate at the flow water temperature depending on the program, depending on the outdoor air sensor. (Figure 3.1)

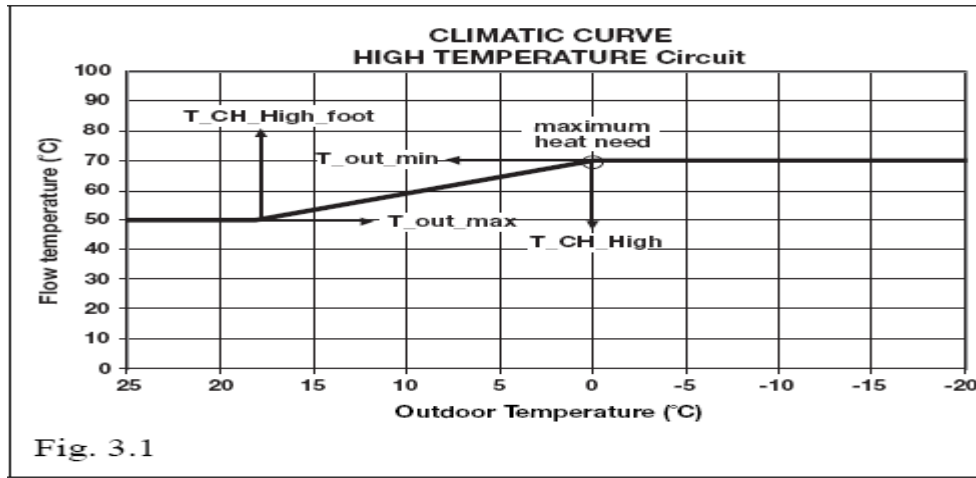


Fig. 3.1

#### 3.2.2. Setpoint\_T\_CH\_Low

##### Setting the low temperature circuit

- In case a constant value will be set in the operation mode, (par.22=CH\_type\_low=0) is entered.
- If outdoor air sensor is used in the system, then the operation mode is a variable mode depending on the outdoor air temperature. Here (par.22=CH\_type\_low=1) is entered. Here, in the min outdoor temperatures, max flow water temperature is set ( $T_{out\_min}$ =par.37, pre-set to 0 °C), minimum set points are set with parameter 24 ( $T_{CH\_high\_foot}$ ,pre-set to 25 °C) and with parameter 23 ( $T_{out\_max}$ ,pre-set to 18 °C), maximum value is defined for 40 °C flow water). Therefore, the program detects it as ( $T_{CH\_low\_limit}$ , pre-set to 50 °C).

As a result, in the case of parameter 14 = 1, the system will modulate at the flow water temperature depending on the program, depending on the outdoor air sensor. (Figure 3.2)

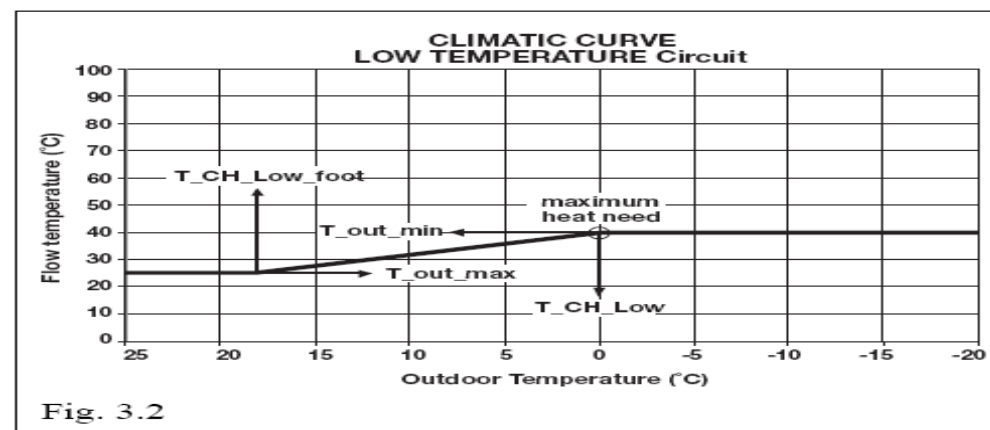


Fig. 3.2

### 3.2.3. CENTRAL SYSTEM PRIORITY

#### (Parameter 16)

- If parameter 16 = 0 is set, the central system has no high temperature zone (80/60 system) or low temperature zone (50/30) priority.
- If parameter 16 = 1, the low temperature zone is ignored.
- If parameter 16 = 2, the high temperature zone is ignored.

**For both zones, the parameter must be 16 = 0.**

#### NOTE:

If the priority will be selected; Figure 3.3 shows the algorithms for different applications.

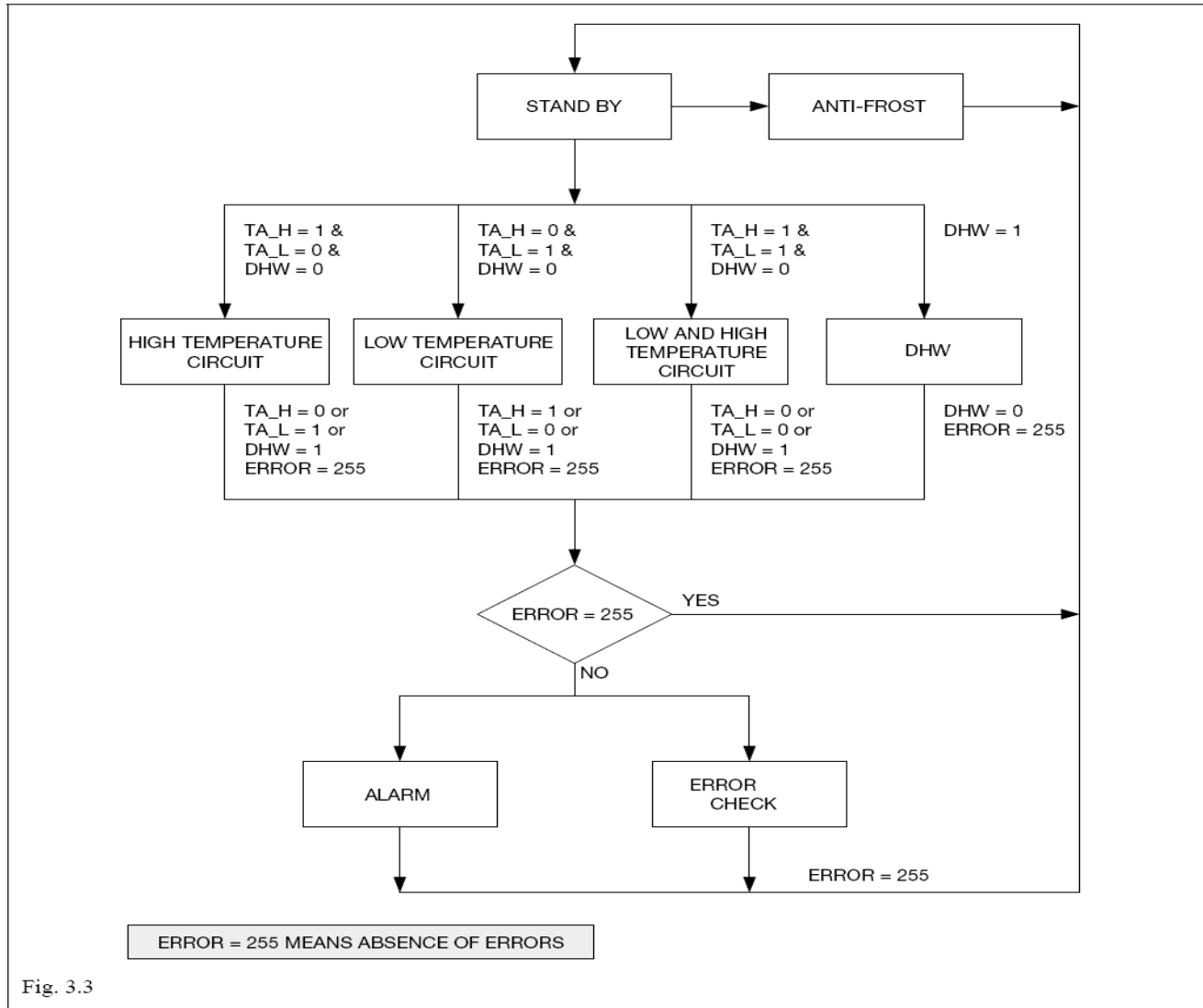


Fig. 3.3

- Domestic water (BOILER) priority: Only Dhwh\_Priority Par.9 = 2 and Ch-Priority Par.16 = 0 are made.
- In case of high temperature system priority, Ch\_Priority Par.16=1 and for Boiler it is Dhwh\_Priority Par.9 =0. In this case, the Low temperature zone does not work.
- In case of low temperature system priority, Ch\_Priority Par.16=2 and for Boiler it is Dhwh\_Priority Par.9 =0. In this case, the High temperature zone does not work.

### **3.3. DOMESTIC HOT WATER PARAMETER SETTINGS**

The following set points are the functions set for the domestic water circle.

#### **3.3.1. Setpoint\_DHW (Domestic hot water setting)**

Domestic water hot water settings (parameter 2)

It is the value that determines the requested domestic water temperature. The maximum limit is set by parameter 8. (T\_DHW\_limit, Temperature can be set to 60 °C) The set temperature is 50 °C.

#### **3.3.2. BOILER type (DHW\_Type) (Parameter 6)**

**0 = No system for domestic hot water**

**1 = Quick hot water exchanger with probe type**

**2 = Tank with probe type**

**6 = Tank with thermostat type**

For tank with thermostat type, if the system contact is closed, the hot water system is active. Otherwise, it is not active. (If it is not desired to be active, it is set to Pre-set 0)

#### **3.3.3. Domestic hot water priority (DHW\_Priority) (parameter 9)**

##### **0 = Sliding priority A**

During the priority supply of the domestic water request, if it is at a very low temperature in the heating system the system allows heating of the central heating system with the following function. Parameter 9 = 0 is entered for this.

$(\text{Setpoint\_Ch}-50\text{ }^{\circ}\text{C}) < \text{Manifold temp.} < (\text{Setpoint\_Ch}+1\text{ }^{\circ}\text{C})$

Note: Here, the heating system will be activated depending on whether the heating system is selected for high or low temperature.

##### **1= Sliding priority B**

If parameter 9 = 1 is entered, the system does not stop the long-term heating system. As an explanation, we can say that the system does not allow the temperature to fall.

For this purpose, the detection of the system in the program is as follows.

$(\text{Setpoint\_Dhw}+\text{T\_Tank\_extra})-50\text{ }^{\circ}\text{C} < \text{Manifold temp.} < (\text{Setpoint\_Dhw}+\text{T\_Tank\_extra})+1\text{ }^{\circ}\text{C}$

T\_tank\_extra = Par.10 = preset to 30 °C

##### **2 = Absolute priority (priority is only for domestic water preparation boiler)**

### **3.4. MAIN FUNCTIONS**

#### **3.4.1 Domestic hot water function priority:**

Domestic hot water priority; over the master card, the system has a priority on the operation position at high or low temperature.

#### **3.4.2. Frost protection function:**

Frost protection is possible in system stand-by mode. If the installation water temperature falls below 5 °C, the system starts to operate at the high temperature heating circuit.

If outdoor air sensor is connected to the system, if the outdoor air temperature falls below 3°C and if the water temperature of the installation manifold drops below 5°C after 10 minutes, one burner in the system starts to work at max load and works until the manifold water temperature reaches 20 °C.

If the outdoor air temperature is below 3°C and the manifold temperature is above 5°C the system's pumps will run until the outside air temperature rises above 3°C.

### **3.4.3. Installation distribution function:**

In system high or low temperature operating mode, the pumps continue to run for 5 minutes after the last burner has shut down. After the 6th minute, the two-way valve closes and the pump stops. The process is independent of the room thermostat.

### **3.4.4. Cascade management function:**

In cascade applications, it is possible to select the minimum and maximum number of burners depending on the power demanded by the system.

### **3.4.5. ON/OFF switching management function:**

In cascade applications, the burners have the function of commissioning according to the ignition and shutdown numbers.

This application is possible in both heating systems.

### **3.4.6 Emergency function:**

It is possible to control the slave cards manually if there is a failure in the master card.

#### **- Control via eBUS manifold probe:**

The system power is turned off. The BUS contact connection is removed. All addresses on slave cards are turned to 000000 position. (J10 and J17 OFF) An intermediate electrical connection between 21 and 28 are made (21-28 Vac to the BUS)

If (Manifold temperature < Emergency Temp. (par. 40; Pre-set 70 °C; set 10-80 °C) is made, then all the burners work at max power. If Manifold Temperature > Emergency Temp. +5 °C, all burners are closed.

#### **- Control via PC**

The system power is turned off. The BUS contact connection is removed. The system is unplugged with BUS. (Interconnect is cut off.) PC interconnection is connected to the system. With the help of the PC, commands to operate the burners are sent to the slave boards.

**- The applications listed above may be performed by contacting the Service Administration or by a competent service personnel.**



### 3.5. PARAMETER SETTINGS

#### 3.5.1 Password settings

Parameters to be entered by the service personnel are done by entering 22 as a password in reading mode. The password can be changed by the user. The procedure for entering the password is as follows.

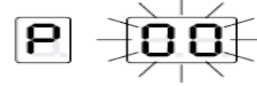
##### Procedure

1. For example, system temperature 80 °C

Screen (Display)



2. Press "Set/Esc" and "OK" keys, it will flash after 5 seconds.



3. Enter the password with "+" and "-" keys.



4. Press the "OK" key to encrypt the password.



5. Enter the new password with "+" and "-" keys. (Example 22)



6. Press "OK" to save the new password. If the Password is entered incorrectly, the program will return to the Display mode (1 position).

7. By holding down the "+" and "-" keys, you can scroll all the parameters and the password. When the "Set / Esc" key is pressed, setting of the parameters will start. P-XX code and an alternative value will appear on the screen.

8. . Change the parameter value using the "+" and "-" keys. When any button is pressed, the changing parameter and the corresponding value will stop in 5 seconds and only the value will be displayed.

9. Press the "OK" button to save the new parameter

10. Press the "Set/Esc" button to exit the program.

### 3.5.2 Parameter list

Master Card parameters are given below.

No	Name	Lower	Upper	Factory settings	Explanation
<b>USER PARAMETERS</b>					
1	Setpoint_ch_high	10	Par.17	<b>70</b> °C	If Par.14 = 0, It is high temperature heat circuit setting value. If Par.14 = 1, It indicates that high temperature heat circuit is at the maximum temperature setting.
2	Setpoint_DHW	10	Par.8	<b>50</b> °C	
3	Setpoint_ch_low	10	Par.23	<b>40</b> °C	If Par.22 = 0, It is low temperature heat circuit setting value. If Par.22 = 1, It indicates that low temperature heat circuit is at the maximum temperature setting.
No	Name	Lower	Upper	Factory settings Symbol	Explanation
<b>USER PARAMETERS (can be entered with password 22)</b>					
6	DHW_type	0	Par. 6	<b>0</b>	0 = There is no BOILER for domestic water. 1 = Instant domestic water heater with NTC sensor 2 = Water heater with NTC sensor 5 = Instantaneous water heater with flow switch (water sensor) 6 = Water heater with thermostat tank
7	P_DHW_max	1	255	<b>230</b>	Defines the maximum power and heating speed for the boiler. 15 For KW = 1 and 45 kW, it is 255 kW. If 30 kW heating is required, value 127 is entered. Each digit is equivalent to 0.12 kW.
8	T_DHW_limit	10	80	<b>60</b> °C	It is the limit temperature value for the boiler.
9	DHW_priority	0	2	<b>0</b>	0 = Sliding A (if the system temperature is too low, heat will be given to the system) 1 = Sliding B (does not wait for the temperature to drop to give heat to the system) 2 = Absolute DHW (Prepares hot water for the boiler first)
10	T_tank_extra	0	50	<b>30</b> °C	Thermal unit temperature in the boiler = Par.2 + Par.10
11	T_tank_hyst_up	0	20	<b>1</b> °C	Upper boiler differential
12	T_tank_hyst_down	0	20	<b>5</b> °C	Lower boiler differential
13	N <sup>o</sup> _bruc_DHW	1	60	<b>60</b>	Number of burners that can be defined for domestic water
14	CH_type_high	0	3	<b>1</b>	For high temperature circle 0 = Fix flow water temperature 1 = Variable flow water temperature dependent on outdoor air sensor 2 = Heat demand flow water temperature dependent on 0-10 Vdc change 3 = Flow water temperature dependent on 1-10 Vdc change in temperature

15 P_ch_max	1	255	<b>155 (DEP) 230</b>	For central heating system: Maximum power and heating speed
16 CH_priority	0	2	<b>0</b>	0 = No priority for heating systems 1 = High flow water temperature heating circuit priority 2 = Low flow water temperature heating circuit priority
17 T_CH_high_limit	10	80	<b>80</b>	°C High temperature circuit maximum setting for user
18 T_CH_high_foot	10	Par.1	<b>50</b>	°C High temperature circuit minimum setting according to the maximum outdoor air temperature (par.38)
19 CH_high_mod_hyst_on	0	20	<b>7</b>	°C Pump ON hysteresis for high temperature
20 CH_high_mod_hyst_off	0	20	<b>3</b>	°C Pump OFF hysteresis for high temperature
21 Attenuation high	0	0	<b>70 0</b>	°C Decreasing the set adjustment activity in systems with room thermostat open (HIGH HEATING CIRCUIT)
22 CH_type_low	0	3	<b>1</b>	For low temperature circle 0 = Fix flow water temperature 1 = Variable flow water temperature dependent on outdoor air sensor 2 = Heat demand flow water temperature dependent on 0-10 Vdc change 3 = Flow water temperature dependent on 1-10 Vdc change in temperature
23 T_CH_low_limit	10	70	<b>50</b>	°C Low temperature circuit maximum setting for user
24 T_CH_low_foot	10	Par.13	<b>25</b>	°C Low temperature circuit minimum setting according to the maximum outdoor air temperature (par.38).
25 Attenuation_high thermostat open	0	70	<b>0</b>	°C Decreasing the set adjustment activity in systems with room thermostat open (LOW HEATING CIRCUIT)
26 CH_high_mod_hyst_on	0	20	<b>5</b>	°C ON hysteresis for low temperature circuit, calculated based on mixture temperature
27 CH_high_mod_hyst_off	0	20	<b>3</b>	°C ON hysteresis for low temperature circuit, calculated based on mixture temperature
28 Mix_valve_step_open_time	0	255	<b>5</b>	s The mixture valve opens the valve for 1/2 of the set value at each step
29 Mix_valve_step_close_time	0	255	<b>7</b>	s The mixture valve closes the valve for 1/2 of the set value at each step
30 Mix_valve_interval_time	0	255	<b>7</b>	s Mixture valve delay
31 Mixing_p_hyst	0	255	<b>2</b>	°C Hysteresis for maximum valve opening
32 Mixing_still_hyst	0	255	<b>2</b>	°C
33 Power control mode	0	1	<b>1</b>	0 =Minimum number of burners 1 = Maximum number of burners
34 3 <sup>rd</sup> pump	0	1	<b>0</b>	0 =System/circle 1 = Low temperature circuit
35 Frost protection	-30	15	<b>3</b>	°C System
36 Gas_type	1	7	<b>1</b>	Parameters related to waste gas height and gas type 1 = 15m small flue system and Natural gas 2 = 15m large flue system and Natural gas 3 = 15m small flue system and LPG 4 = 15m large flue system and LPG
37 T_out_min	-20	30	<b>0</b>	°C Minimum outdoor temperature
38 T_out_max	0	30	<b>18</b>	°C Maximum outdoor air temperature
39 T_out_correct	-30	30	<b>0</b>	°C Outdoor air temperature correction
40 T_emergency	10	80	<b>70</b>	°C
41 Parameter_reset	0	1	<b>0</b>	°C Brings the user and service parameters to OEM values.
42 Flow sivitc yes/no	0	1	<b>1</b>	°C 0= Slave cannot be controlled with the pressure switch



**MANUFACTURER PARAMETERS (OEM)**
**NOTE:** These parameters cannot be modified

44	T_ch_high_max	10	117	<b>90</b>	°C	Upper limit (for parameter 17)
45	P_factor_CH_high	0	255	<b>30</b>		Proportional step constant for high hot flow water circle power modulation
46	I_factor_CH_high	0	255	<b>70</b>		Full step constant for high hot flow water circle power modulation
47	D_factor_CH_high	0	255	<b>128</b>		Secondary step constant for high hot flow water circle power modulation
48	CH_H_block_time	0	255	<b>0</b>	min	A new temperature request is accepted by system TA_H after the set time.
49	Postcirc_high	0	255	<b>5</b>	min	P1(+P3) post circulation
50	T_H_correct_20°	-30	30	<b>0</b>	°C	20 °C Correction value read by the C collector sensor
51	T_H_correct_85°	-30	30	<b>1</b>	°C	20 °C Correction value read by the C collector sensor
52	Blocking_time_DHW-CH to the heating system	0	255	<b>0</b>	min	OFF time of the burners in the transition from domestic water boiler
53	T_ch_low_max	10	90	<b>80</b>	°C	Upper limit (for parameter 23)
54	P_factor_CH_low modulation	0	255	<b>30</b>		Proportional step constant for low hot flow water circle power
55	I_factor_CH_low modulation	0	255	<b>70</b>		Full step constant for low hot flow water circle power
56	D_factor_CH_low modulation	0	255	<b>70</b>		Secondary step constant for low hot flow water circle power
57	CH_H_block_time	0	255	<b>128</b>		A new temperature request is accepted by system TA_H after the set time.
58	T_dhw_max	10	117	<b>80</b>	°C	Upper limit for boiler
59	P_factor_DHW_instantaneous heater circuit power modulation	0	255	<b>30</b>		Proportional step constant for Instantaneous domestic water
60	I_factor_DHW_instantaneous	0	255	<b>70</b>		Full step constant for instantaneous domestic water heater circuit power modulation
61	D_factor_DHW_instantaneous	0	255	<b>128</b>		Secondary step constant for instantaneous domestic water heater power modulation
62	P_factor_DHW_storage	0	255	<b>30</b>		Proportional step constant for boiler circle power modulation
63	I_factor_DHW_storage	0	255	<b>70</b>		Full step constant for boiler circuit power modulation
64	D_factor_DHW_storage	0	255	<b>128</b>		Secondary step constant for boiler circuit power modulation
65	Dhw_&_ch_hysteresis_up	1	80	<b>1</b>		Boiler and heating circuit hysteresis high
66	Dhw_&_ch_hysteresis_down	0	80	<b>50</b>		Boiler and heating circuit hysteresis low
67	T_tank_hyst_down_2	0	20	<b>5</b>		
68	T_tank_hyst_up_2		20	<b>3</b>		
69	Postcirc_sanitary		255	<b>3</b>	min	

70 Hyst_up_reduce_burner	0	20	<b>2</b>	°C
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71 Hyst_up_down-add_burner	0	20	<b>5</b>	°C
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72	Hyst_up_quick_stop	0	80	<b>4</b>	
73	Quick stop time	0	255	<b>2</b>	s
74	Quick start time	0	255	<b>2</b>	s
75	T_H_correct_85°	0	255	<b>30</b>	s
76	Wait time after burner_switched	0	1	<b>0</b>	
77	circle_limitation	0	255	<b>60</b>	
78	circle_limit_stop	0	255	<b>30</b>	
79	circle_limit_inc	0	50	<b>1</b>	
80	Cascade Rotation	0	255	<b>24</b>	hours
81	Flow switch	0	1	<b>0</b>	0= Flow switch NO 1=Flow switch YES
82	Return probe	0	1	<b>1</b>	0 = Return water sensor NO 1=Controlled by return water sensor
83	Maximum_fan_speed_slave	20	70	<b>57</b>	rpm
84	Minimum_fan_speed	20	Par.83	<b>25</b>	rpm
85	Ignition_fan_speed	Par.84	Par.83	<b>45</b>	rpm
86	Prepurge_fan_speed	Par.84	Par.83	<b>45</b>	rpm
87	Max.flow temperature	10	117	<b>90</b>	°C
88	Max.return temperature	10	117	<b>80</b>	°C
89	Max.flue temperature	10	117	<b>80</b>	°C
90	Flue Temperature safety	0	1	<b>0</b>	0= Volatile lockout 1 = permanent lockout
91	T.max flow /return safety	0	1	<b>0</b>	0= Volatile lockout 1 = permanent lockout
92	Pump postcirculation/slave valve	0	255	<b>6</b>	min 255= in continuous function
93	D_max_flow_return	10	99	<b>35</b>	°C Par.93 : OFF Par.93-5 °C : Minimum Par.93-10 °C : Power reduced by 60 °C
94	Postcirculation 3 <sup>rd</sup> pump	0	255	<b>5</b>	min 255= in continuous function
95	Password	00	99	<b>22-44</b>	CAN NOT BE CHANGED
96	Hyst_up_PID_I_reduce	0	10	<b>1</b>	
97	I_reduce_value	0	30	<b>1</b>	s If T. flow> setpoint + par.96, Par.97; it will make a difference greater than the set value. It will further reduce the integral factor.
98	Low_load waiting	0	255	<b>60</b>	s In low heat demands; defines the waiting time on the master card.



99 Low_load period	0	255	<b>60</b>	s	Defines the waiting time for low temperature demand. If T flow temperature is above the temperature defined in PAR.9B, it waits until the time set by Par. 99 is reached.
9A Neg_delta2_T	0	20	<b>8</b>	°C	Enables burners to run up to T flow water temperature < Setting value - par. 9. If the sample flow temperature is 80 °C, at 72 °C, the burner will be activated.
9B Calc_neg_delta	0	1	<b>1</b>		Calculation from heat load lower than 0=85 Calculation from heat load lower than 1=set temperature It is used to reduce the burners power
9C Neg_delta2_T	0	30	<b>0</b>	°C	It is used to reduce the burners power when T.mand> Setpoint_par.9C. the power reduction is 60/1 °C
9D Low_load_Δ	0	20	<b>5</b>	°C	In case of low heat demand T. If flow water temperature > set temperature + Par.9 D
9E Hyst_Δ	0	5	<b>2</b>	°C	It is the hysteresis of Par93. Δ value> par. 93, then the burner is closed. If the Δ value < Par.93-par E the burner runs.

### 3.6 GAS SETTINGS

#### Running in TEST mode.

In test mode; heating at high temperature is possible in maximum and minimum heat demands. The fans of the whole system should be activated. If the service staff wants some slaves to be disabled, other slaves must be connected to the Master card.

The following procedure is followed to enter the Test mode from the display screen.

#### Procedure Display

1. Press and hold for 5 seconds the "**Set/esc**" and "+" keys on the control panel of the device.



After 5 seconds, press "+" to select the maximum fan speed and press "-" for minimum fan speed.

H = maximum speed

L = minimum speed

2. Press the "OK" key to exit the Test mode.



Displaymode appears.

#### Gas settings:

The device is shipped from factory as set for the G20 gas. The gas settings in situations such as replacement of the gas valve, gas conversion, etc. should be done by following the steps below:

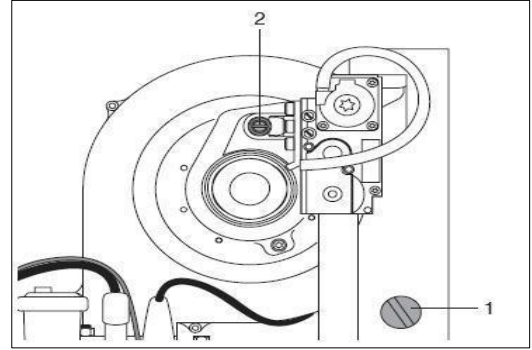
**NOTE: WHILE SETTING; THE ANALYSIS DEVICE MUST BE SET SO THAT THE PROBE TIP WILL BE AT THE CENTER OF THE WASTE GAS PIPE.**

### **3.6.1 Setting of the CO<sub>2</sub> value for maximum output (power):**

Press and hold for 5 seconds the "Set/esc" and "+" keys on the control panel of the device.

- Switch on the device with the room thermostat. The device starts to work at maximum, H<sup>1</sup> warning appears on the display.  
It continues with flow temperature (flue temperature). (Flue sweep function)

- Remove the plug (1) by mounting the waste gas analyzer.  
- M4 hex head screw (2) on the fan assembly is turned counterclockwise to make the CO<sub>2</sub> settings. (9.4% for G20, 10.7% for G30-G31)

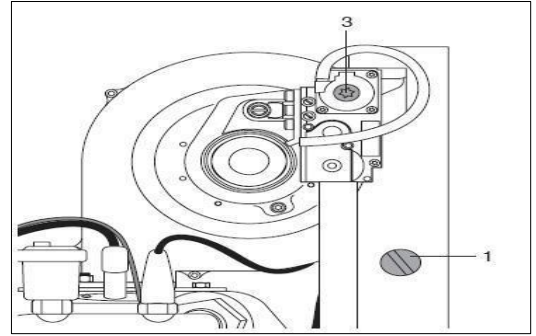


### **3.6.2 Setting of the CO<sub>2</sub> value for minimum output (power):**

- Press and hold for 5 seconds the "Set/esc" and "+" keys on the control panel of the device.

The device starts to work at minimum, L warning appears on the display. It continues with flow temperature.

- The torque plug on the gas valve is removed, with the plastic adjustment screw (3) M5 underneath, the CO<sub>2</sub> setting is made accurately clockwise and counterclockwise (8.4% for G20, 8.7% for G30-G31).



### **3.6.3 Checking the calibration (Settings):**

- Press and hold for 5 seconds the "Set/esc" and "+" keys on the control panel of the device.

- Check the CO<sub>2</sub> value of the device at maximum power. (9.4% for G20, 10.7% for G30-G31)

- Press and hold for 5 seconds the "Set/esc" and "+" keys on the control panel of the device.

Check the CO<sub>2</sub> value of the device at minimum power.  
(8.4% for G20, 8.7% for G30-G31)

After doing the checks:

- Press the "OK" key to stop the flue sweep function.  
- Adjust the room thermostat so as to terminate the operation of the device.  
- Remove the gas analyzer on the waste gas pipe and install the plug (1).

## **3.7. GAS EXCHANGES**

### **3.7.1 General description of gas conversion**

- The unit is shipped as set to G20 gas at the factory.  
- Necessary kits can also be used with the G30 and G31 (LPG) gas types.  
- The parameter setting of the device converted must be done.

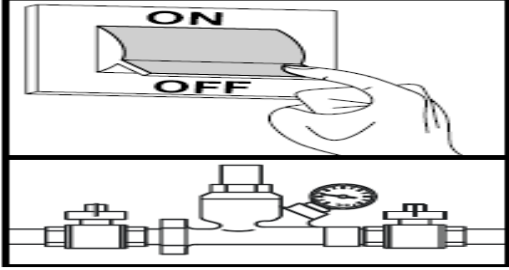
### **3.7.2 Materials to be replaced in gas exchange**

- Only the diaphragm in the gas valve changes for gas conversion of the device. No other part replacement is needed otherwise.  
- The gas information label is changed for information purposes and the registry label on the side of the device is canceled.

### 3.7.3 To-do's and presets

The steps below should be followed when gas conversion of the device is performed:

- The device should be disconnected from the mains.
- The gas valve must be closed



- Remove the front panel (2) by removing the screws (1). (Figure 3.6)

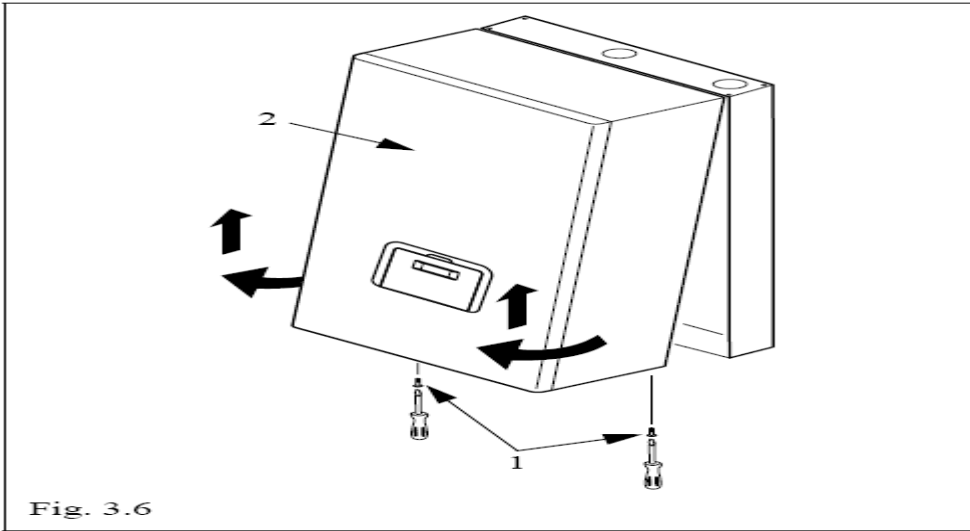


Fig. 3.6

- Set parameter 36 to 3 or 4 depending on waste gas pipe length.  
(If the waste gas pipe length is <15 m, it is 3; if the waste gas pipe length is > 15 m, it is 4) The fan speed is automatically adjusted.
- Remove the screw (3) in Figure 3.7 and remove the gas valve.

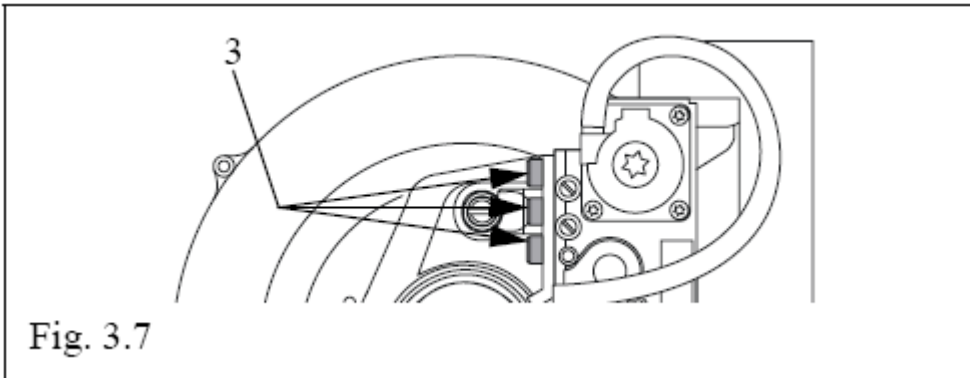
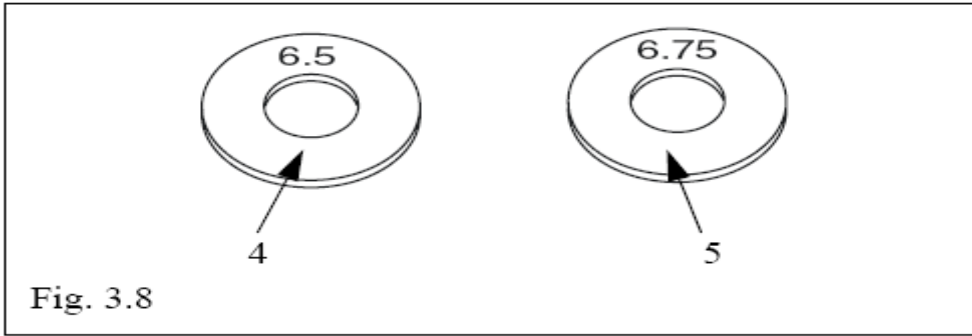
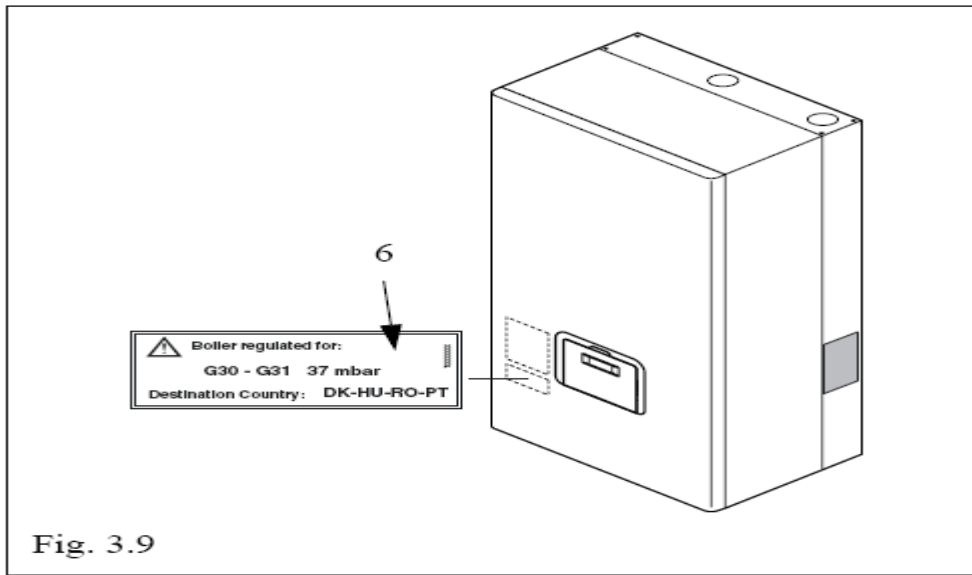


Fig. 3.7

- Install the gas jet and gasket. If the device is working with DG, there will be no diaphragm.
- Change the set diaphragm on the gas valve, diaphragm with code 6.5 that is supplied with the conversion kit. If there is a problem with the gas burning, use the diaphragm with 6.75 code. (Figure 3.8)



- Attach the G31 gas information label by removing the G20 gas information label on the front panel. (Figure 3.9)



- Remove the registry label on the side panel.

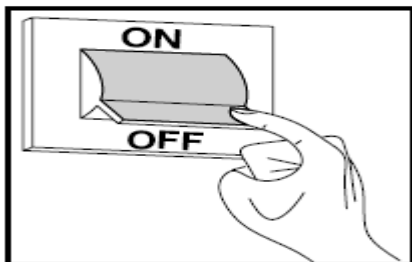
#### **3.7.4 After installing the gas exchange kit, make the necessary adjustments described below.**

- Make sure that the gaskets and fittings are connected as leak proof.
- Perform the calibration operation described in section 3.6.3.

### **3.8 BURNER PRESSURE ADJUSTMENTS**

#### **3.8.1 Gas circle pressure control**

- Close the system master switch



- Remove the front panel (2) by removing the screws (1). (Figure 3.10)

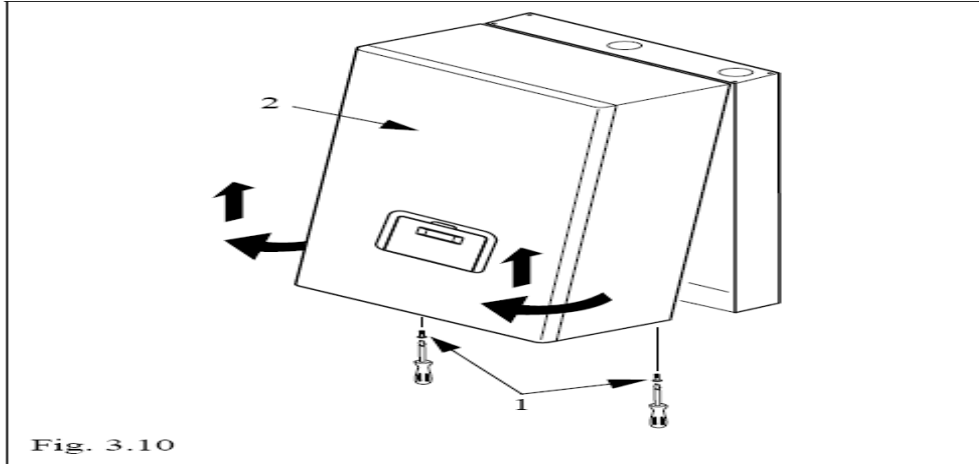


Fig. 3.10

- Remove the screw (3) on the gas valve (Figure 3.11) and connect a pressure gauge.

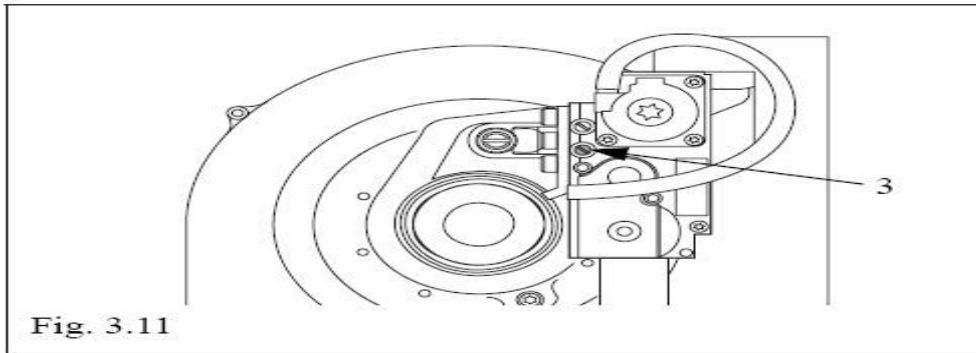
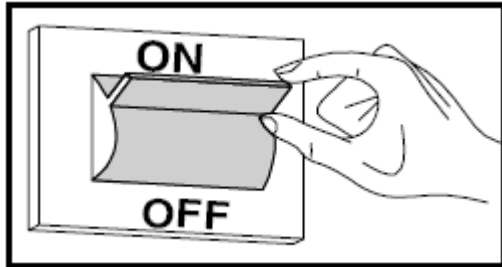


Fig. 3.11

- The system main switches are turned back on.



In TEST mode, it is possible to generate maximum thermal power for heating at high temperature. To do this;

- Press "Set/Esc" and "+" keys together for 5 seconds.
- Start the boiler via the room thermostat.

"H" and flue outlet temperature (flue sweeping function) continue in the boiler display.

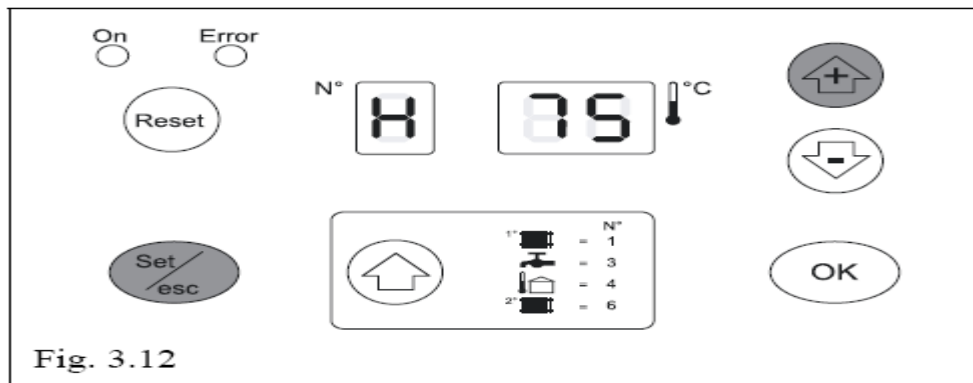


Fig. 3.12

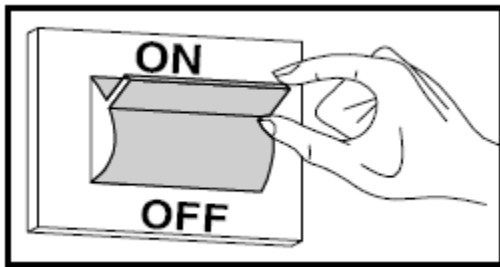
- Check the burner gas outlet pressure according to the table below.

Description	G20	G30	G31	
Wobbe index	45,7	80,6	70,7	MJ/m <sup>3</sup>
Rated supply pressure	20	28-30	37	mbar

- Ensure that the boiler is switched off from the room thermostat.
- Press the **"OK"** key to exit the TEST mode.
- Unscrew the pressure gauge and tighten the screw again. (Figure 3.11)

### 3.9. COMBUSTION CONTROL

- Turn the main switch to "ON" position. (The other main switches connected to the system will be ON.)



In TEST mode, it is possible to generate maximum thermal power for heating at high temperature. To do this;

- Press **"Set/Esc"** and **"+"** keys together for 5 seconds.
- Start the boiler via the room thermostat.

"H" and flue outlet temperature (flue sweeping function) continue in the boiler display.

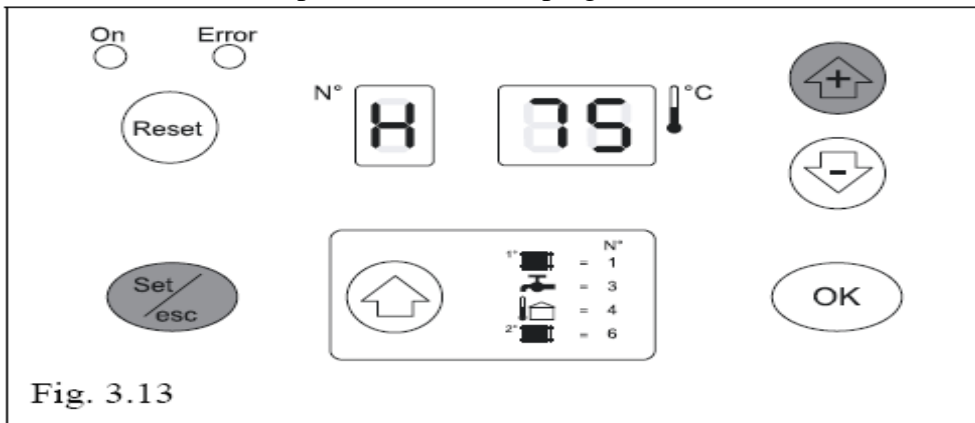


Fig. 3.13

- Burning is checked by removing the 4 cover in figure 3.14. (4) is replaced by the analysis probe.

**Note: The boiler will be modulated to power value and ensured to reach the set value**

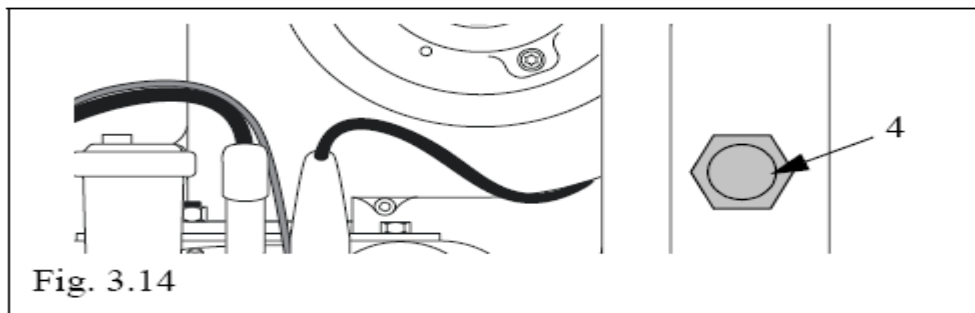


Fig. 3.14

- After the test is finished, press the **"OK"** key to exit the flue sweep function.
- Ensure that the boiler is switched off from the room thermostat.
- Disassemble the analysis probe, carefully re-tighten the protective cover

**NOTE: The test for each heating unit is done separately**

### 3.10. FAN SPEEDS

The fan speed is changed by the parameter 36 according to the flue height and the gas type.

- It is input to parameter 36 (as specified in paragraph 3.5).

Parameters related to waste gas height and gas type

- 1 = 15m small flue system and Natural gas
- 2 = 15m large flue system and Natural gas
- 3 = 15m small flue system and LPG
- 4 = 15m large flue system and LPG

After the checks are completed, the front cover is closed.

**Note: These inputs can only be made by DemirDöküm services.**

### 3.11. TERMOREGULATION SETTINGS

#### 3.11.1. Central heating high temperature circuit function

Setting for the heating circuit burner delay time at the high temperature, determines the time interval between the two burners that are activated in order for the heat demanded by high temperature heat circuit. (Ch\_high\_blocking\_time; Par. 48 , Factory setting (OEM) = 0. It can be set between 0-255 minutes.)

The time delay is active when the room thermostat is not in operation and the burner OFF time caused by hysteresis. The delay time is not active during domestic hot water request.

In case of maximum thermal power demands in central heating system, linear change of Master and Slave boilers are set to 230 for HK 50 M, HK 100M and HK 100S models for Parameter 15. (P\_ch\_max; Par 15 = 230)

#### 3.11.2. Attenuation\_High (Delay high temperature heating circuit)

(Parameter 21 = In high temperature heating circuit, delay in set setting in case no room thermostat is present)

Two cases are possible

- Application; Runs at the fixed temperature value. Par. Calculation from heat load lower than 14=0
- Application; Runs as variable depending on the outdoor air temperature. Par. Calculation from heat load lower than 14=1

#### Setting of the application at the fixed temperature (Par. 14=0)

- In deactivations when high temperature heating circuit is not selected, Par 21 = 0 high temperature heating circuit works with room thermostat. Otherwise, the system will stop.
  - The main programmer activates the high temperature circuit (PZ1) pumps and the circulation (PZ2) pump. If the third pump is set to 0 (par.34 = 0), the third pump remains OFF.
- The high temperature heating circuit can be set by the main controller. Setpoint\_T\_CH\_High=Par.1, new setting =70°C. Can be set to 80 °C with T\_CH\_high\_limit=Par.17. Set point parameter to be used will be the value in 1.
- If manifold temperature (Unit return water temperature) < Set temperature - start hysteresis (par.19) then, the burner will start to work.



- Hysteresis ON can be set. Parameter 19= 7 °C is the factory setting. It can be set between 0-20 °C (CH\_High\_mod\_hyst\_on=Par. 19) Master controller performs this operation for each slave control according to the heat requirement.
- If manifold temperature > Set temperature + start hysteresis (par. 20) the burner will shut down.
- Hysteresis OFF can be set. (It is CH\_High\_mod\_Hyst\_off= Par.20. The factory setting is 3 °C. Can be set between 0-20 °C values. (CH\_High\_mod\_hyst\_off=Par. 20)
- High temperature heating circuit delay is possible. In all temperature values where par. 21 is not 0 Contact will not be accepted in the high temperature circuit thermostat. However, heating will start in case that the manifold water temperature < set temperature-hysteresis temperature (Par.19).
- Heating circuit; If manifold water temperature > set temperature + hysteresis temperature (par.20), the burner will turn off. (set temperature = set water flow temperature)
- If the thermostat turns off the circuit while the system is running Parameter 1 (setpoint\_T\_CH\_High) set temperature value and the set value with system delay will intersect.
- If no heat is required while low temperature circuit is active, the mixing valve is closed and the required thermal power from the slave heater circuits is calculated by the PID control at high temperature. It enables modulation according to the temperature and manifold temperature set in parameter 1 by the PID control (parameter 45, parameter 46 and parameter 47). (As OEM, it is selected as parameter 45=30, parameter 46=70 and parameter 47=128).
- Heat demand from slave boilers depends on the chosen cascade strategy.
- When the room thermostat switches on TA\_H contact, the heat demand is over. The burner is turned off. The high temperature circuit pump (P1) continues to operate up to the post-circulation time. (In par 49, 5 minutes additional run time as OEM setting is provided. This time can be set from 0 to 255 minutes.) If parameter 34 (3rd pump = system pump) is set to 0, the circulation will continue for additional circulation time by the circulation pump. (In case of cascade systems, the device will be provided with six ejection pumps.)

### **Setting the application with the outdoor air sensor (Par. 14=1)**

If a high temperature circuit delay (reduction in efficiency) is not desired, parameter 21 = 0 and the system will operate according to the above application. Besides, the system will operate by calculating the system setting temperature according to the outdoor air temperature. In this case;

- Parameter 37 is used for outdoor air temperature minimum setting, OEM setting is 0 °C. In this case, the system set point (set temperature) is parameter 17. (OE setting = 80 °C)
- Parameter 38 is used for outdoor air temperature maximum setting, OEM setting is 18 °C. In this case; system set point (set temperature) is parameter 18. (OEM setting = 50 °C)

The system set temperature is linearly calculated according to the two outdoor air temperature setting values.



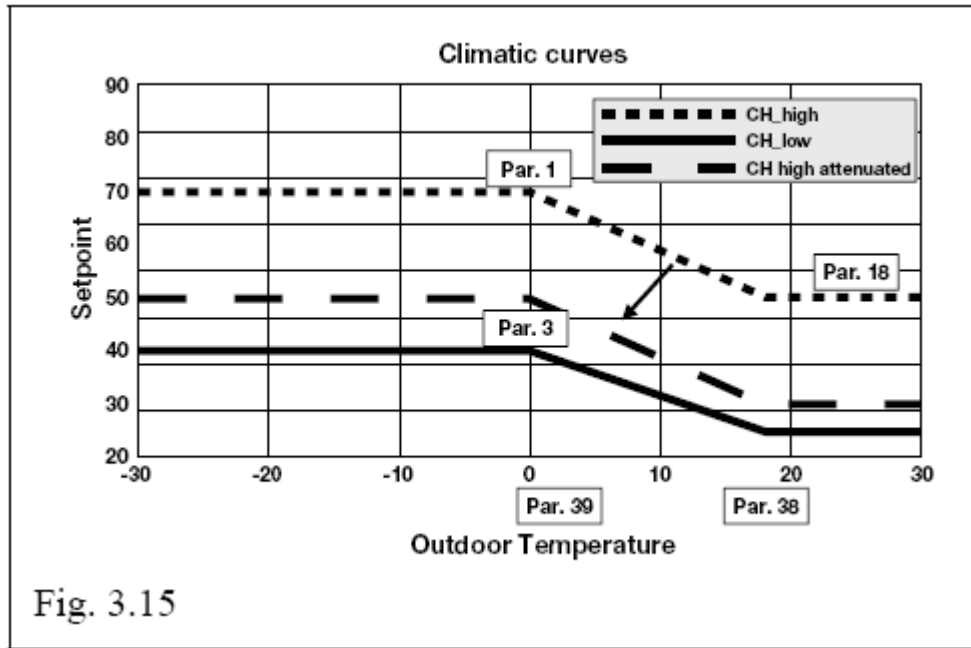


Fig. 3.15

Outdoor air temperature can be measured between -30 °C and 98 °C. It is defined in the system with parameter 39 (T<sub>out\_correct</sub>). OEM set value is 0 °C and can be set to -30 °C and 30 °C.

If the delay time in the high temperature heating circuit is different from 0 (Parameter 21), the room thermostat TA\_H will not be affected by all heating demands.

When heat is requested, the system will be activated as described below.

- Outdoor air temperature < T<sub>out\_max</sub> (parameter 38, as OEM 18 °C is set.)
- Water flow temperature < Parameter 1 (setting temperature, OEM is set to 70 °C.) – Parameter 19 (ON hysteresis, OEM is set to 7 °C.)

When there is no heat request, the system will be deactivated as described below.

- Outdoor air temperature > T<sub>out\_max</sub> (parameter 38, as OEM 18 °C is set.)
- Water flow temperature > Parameter 1 (setting temperature, OEM is set to 70 °C.) + Parameter 20 (OFF hysteresis, OEM is set to 3 °C.)

The system with outdoor air sensor operates as above, but if delay or reduction in efficiency is required in the high temperature circuit (parameter 21), parameter 21 = 0 and the room sensor must be on.

### 3.11.3. Central heating, low temperature heating circuit function

Low temperature circuit burner delay time (parameter 57, OEM is set to 0, can be set between 0-255 minutes.) It defines the delay time between the burners to be activated consecutively in the heat demand of the low temperature system. When the room thermostat is not on, the burner which is closed due to hysteresis is only activated by the delay time. Delay time; is not active in domestic hot water demand.

In case of maximum thermal power demands in central heating system, linear change of Master and Slave boilers are set to 230 for HK 50 M, HK 100M and HK 100S models for Parameter 15. (P<sub>ch\_max</sub>; Par 15 = 230)

**3.11.2. Attenuation\_Low** (Deceleration-efficiency reduction low temperature heating circuit)

(Parameter 25 = In low temperature heating circle, delay in set setting in case no room thermostat is present)  
Two cases are possible

- Application; Runs at the fixed temperature value. Par. Calculation from heat load lower than 14=0
  - Application; Runs as variable depending on the outdoor air temperature.
- Par. Calculation from heat load lower than 14=1

**Setting of the application at the fixed temperature (Par. 22=0)**

- In deactivations when low temperature heating circuit is not selected, Par 25 = 0 high temperature heating circuit works with room thermostat. Otherwise, the system will stop.
- The main programmer activates the low temperature circuit (PZ2) pumps (except the low temperature circuit pump). Main programmer; runs the system according to parameter 3 value (OEM is set to 40 °C) and runs the system according to parameter 23 value (OEM is set to 50 °C.)
- If manifold temperature < Set temperature + start hysteresis (par. 26), then the burner will start to operate.
- Hysteresis ON can be set. Parameter 26= 5 °C is the factory setting. It can be set between 0-20 °C (CH\_low\_mod\_hyst\_on=Par. 26) Master controller performs this operation for each slave control according to the heat requirement.
- If manifold temperature > Set temperature + start hysteresis (par. 27), the burner will shut down.
- Hysteresis OFF can be set. (It is CH\_low\_mod\_Hyst\_off= Par.27. The factory setting is 3 °C. It can be set between 0-20 °C values. ( CH\_low\_mod\_hyst\_off=Par. 27)
- Low temperature heating circuit delay is possible. In all temperature values where par. 25 is not 0 Contact will not be accepted in the high temperature circuit thermostat. However, the burner will start running in case that the manifold water temperature < set temperature-hysteresis (parameter 26).
- It will be OFF if heating circuit; Manifold water temperature > set temperature + hysteresis (par. 27). (set temperature = set water flow temperature)
- If the thermostat shuts off the circuit while the system is running Parameter 3 (setpoint\_T\_CH\_low) set temperature value and the set value with system delay will intersect.
- If there is no heat demand from the high temperature heat circle, the mixing valve is fully opened and the required heat power from the slave heater circuit is calculated by the PID control at low temperature. It runs according to the temperature set in parameter 3 by the PID control (parameter 54, parameter 55 and parameter 56). For quick start and stop, it depends on low temperature heating circuit setting temperature (Parameter 3 = setpoint\_ch\_low) and manifold temperature. (As OEM; it is selected as parameter 54= 30, parameter 55=70 and parameter 56=128).
- Heat demand from slave boilers depends on the chosen cascade strategy.
- If there is a heat demand from the high temperature heat circuit, the mixing circuit is controlled step by step according to the low temperature circuit of set temperature (parameter 3).
- When the room thermostat switches on TA\_L contact, the heat demand is over. The burner is turned off. The low temperature circuit pump continues to operate up to the post-circulation time. (In par 49, 5 minutes additional run time as OEM setting is provided. This time can be set between 0-255 minutes)

### Setting the application with the outdoor air sensor (Par. 22=1)

If a low temperature circuit delay (reduction in efficiency) is not desired, parameter 25 = 0 and the system will operate according to the above application. Besides, the system will operate by calculating the system setting temperature according to the outdoor air temperature. In this case;

- Parameter 37 is used for outdoor air temperature minimum setting, OEM setting is 0 °C. In this case, the system set point (set temperature) is parameter 23. (OEM setting= 50°C)
- Parameter 38 is used for outdoor air temperature maximum setting, OEM setting is 18 °C. In this case; system set point (set temperature) is parameter 24. (OEM setting= 25°C)

The system set temperature is linearly calculated according to the two outdoor air temperature setting values.

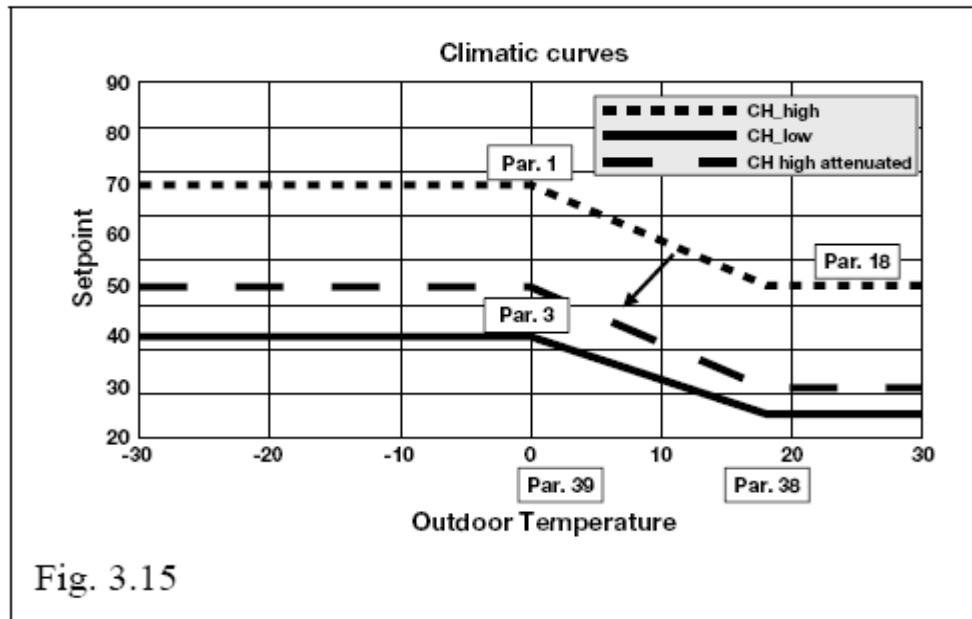


Fig. 3.15

Outdoor air temperature can be measured between -30 °C and 98 °C. It is defined in the system with parameter 39 (T\_out\_correct). OEM set value is 0 °C and can be set to -30 °C and 30 °C.

If the delay time in the low temperature heating circuit is different from 0 (parameter 25), the room thermostat TA\_L will not be affected by all heating requirements.

When heat is requested, the system will be activated as described below.

- Outdoor air temperature < T\_out\_max (parameter 38, as OEM 18 °C is set.)
- Water flow temperature < Parameter 3 (setting temperature, OEM is set to 40 °C.) – Parameter 26 (ON hysteresis, OEM is set to 5 °C.)

When there is no heat request, the system will be deactivated as described below.

- Outdoor air temperature > T\_out\_max (parameter 38, as OEM 18 °C is set.)
- Water flow temperature > Parameter 3 (setting temperature, OEM is set to 40 °C.) + Parameter 27 (OFF hysteresis, OEM is set to 3 °C.)

The outdoor air sensor system works as above, but if delay or reduction of efficiency in the high temperature circuit is required (Parameter 25), parameter 21 = 0 and the room sensor must be open.

### **3.11.5 T\_out\_correct (Outdoor air temperature correction parameter\_parameter 39)**

The value that normally appears on the display is the value read by the outdoor air sensor. It is a value that can be entered for the calibration of the sensor. The OEM setting is 0. +/- 30 °C correction is possible.

### **3.11.6 T4\_frost\_protection (Frost control parameter 35)**

- Master card activates the frost protection function when the unit is in stand-by mode. For this reason, it is necessary that the device is not turned off before an activated device is completely discharged. Frost protection occurs at 2 stages. In the first stage only the pump is operated. In the second stage, the pump and the burner start to work.
- If the manifold temperature is < 5 °C, the high temperature circuit pump and the circulation pump will start to work or if the system is operating in conjunction with the outdoor air sensor, the high temperature circuit pump and circulation pumps will start to operate when outdoor air temperature is < 3 °C (parameter 35).
- If the manifold (mixing tank) temperature is <5 °C for 10 minutes, one boiler burner is switched on and the burner runs with the pumps until the manifold temperature is > 20 °C.
- In systems connected with outdoor air sensors (parameter 14 or 22 = 1); even if the manifold temperature is > 5 °C after 10 minutes, the pumps continue to operate until the system reaches the outside temperature set at parameter 35. (OEM value is 3 °C. This value can be set between -30 °C and 15 °C.)

### **3.11.7 Thermal power control mode**

#### **Cascade management (parameter 33)**

Management of the system based on thermal power is provided by two cascade strategies. In both cases, the operation starts with a new burner and following the first operation, the second burner and the others consecutively connected is started in turn. If the master controller requires more burners to be engaged, consecutive burners are activated in turn. In the event of a malfunction in the burner, the master controller checks and activates the following burner. It reduces the number of burners operating depending on the heating demand.

#### **Minimum number of burners operating modes (parameter 33 = 0)**

It is modulated by the system thermal power PID control algorithm. Manifold temperature is controlled by the set values. (According to set values of high temperature heating, low temperature heating and domestic hot water circle) PID control; it directly controls the last two burners when maximum thermal power is requested. (Previous burners already work at maximum load with the system request.)

- If the manifold temperature < set temperature - 5 °C the second burner will be activated and the PID control will modulate for both burners. When the third burner is activated, the first activated burner will operate with maximum power and the next 2 burners will operate with modulated PID control. The main control waits for 30 seconds before the following burner switches on (manifold temperature < setting temperature - 5 °C).
- If the manifold temperature > set temperature + 2 °C, the main control closes the last burner. The last 2 burners continue to modulate with the PID. The main control waits 30 seconds before closing the last burner and closes if "manifold temperature > set temperature + 2 °C" does not change.

#### **Maximum number of burners operating modes (parameter 33 = 1)**

All burners are controlled by PID algorithm. (According to set values of high temperature heating, low temperature heating and domestic hot water circle)



- If the manifold temperature  $< \text{set temperature} - 5\text{ }^{\circ}\text{C}$ , the second burner will be activated. If, after 30 seconds manifold temperature  $< \text{set temperature} - 5\text{ }^{\circ}\text{C}$ , condition is still maintained, the following burner will be activated.
- If the manifold temperature  $> \text{set temperature} + 2\text{ }^{\circ}\text{C}$ , the main control closes the last burner. If the "manifold temperature  $> \text{set temperature} + 2\text{ }^{\circ}\text{C}$ " does not change after 30 seconds, the burners are turned off in turn.

## **ADDITIONAL FUNCTIONS FOR CASCADE MANAGEMENT**

### **Burner ignition order rotation**

After a command is given for the main control to ignite the first burner, in the following ignition, this burner will ignite the last.

### **Limitations for start and stop**

After each start and stop phase, a minimum time must be given for the main control to ignite the first burner.

### **Quick start and stop**

- If the manifold temperature  $< \text{set-temperature} - 70\text{ }^{\circ}\text{C}$ , the burners are switched on within 2-second intervals.
- If the manifold temperature  $< \text{set-temperature} - 4\text{ }^{\circ}\text{C}$ , the burners are deactivated within 2-second intervals.

### **Low load**

Low load function prevents burners from entering and leaving the system in low heat load requests. The conditions under which the low load function is activated are controlled by each slave card. This function is provided by the command sent to the slave cards by the master card. In normal operation, the set temperature of the flow circuit (high, low temperature circuits, or domestic circuit) is reported to each slave card. And the set temperature values of the heating unit are controlled by each slave card.

- If the heating circuit temperature  $> \text{set temperature} - 8\text{ }^{\circ}\text{C}$  or if the heating circuit temperature  $> 85\text{ }^{\circ}\text{C}$  -  $8\text{ }^{\circ}\text{C}$  The burner start signal will not be active.

When the burner is on, if it is read by the slave card 3 times that a boiler has a temperature higher than  $85\text{ }^{\circ}\text{C}$ , the burner will stop.

Each heating unit has  $85\text{ }^{\circ}\text{C}$  limit thermostat. Each boiler operation is also limited by the limit thermostat.

- If boiler temperature  $> \text{set temperature} - \text{Neg\_slave}$ , the burner operates as modulated.
- If boiler temperature  $> \text{set temperature} - \text{Neg\_slave} + 4,5\text{ }^{\circ}\text{C}$ , the burner operates as modulated.

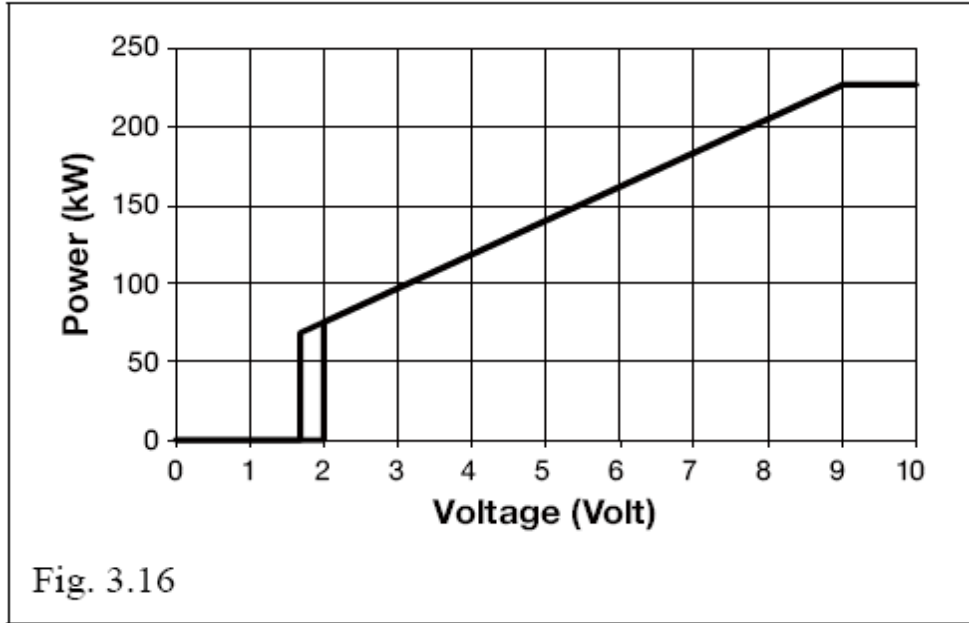
In the boiler temperature  $> 85\text{ }^{\circ}\text{C}$ , at low load (for low heat demand) parameter 99 is used for the waiting time. (OEM setting is 60 seconds) or Parameter 9D is used, accordingly, the boiler runs up to set temperature + Par 9D. (Parameter 9D =  $5\text{ }^{\circ}\text{C}$  has been given as OEM) the information sent to the master card with both parameters will decrease the burner start/stop number. The main controller will reduce the number of burners operating each time, with +60 second and the set temperature  $+5\text{ }^{\circ}\text{C}$  parameters, until a burner operates.

**Control of heat demand by analog input in high temperature heating circuit (Parameter 14 = 2 or 3)**

If system set values input signal is used (room thermostat is not used in high temperature heating circuit). For this, according to the circuit diagram given in APPENDIX G, the system can be operated by connecting an analog signal generator to the terminals 13-14. Similarly, it can be used in low temperature heating circuits as well. However, the analog signal generator can only be used for a single heating circuit.

**Managing in the heating circuit based on heating power in heating circuit with the analog input (parameter 14-2 or 3 (parameter 22 =2 or 3)**

It is given in Figure 3.16

**Analogue input for temperature, Par. 14 = 3 (Par. 22 = 3 for low temperature circuits)****At -0-2 V**

There is no heat demand of the heating circuit.

**-Within 2-9 volt range**

In each slave boiler, an analog signal for a thermal power demand is also produced. 9 volt is the max power (parameter 15), there is a linear calculation between 2-9 volts. For each request, there is a 0.2 volt aging. For example, if there is 2 V request, it will be detected as 1.8 volt.

The burners start as follows.

- System temperature = set temperature (high heating circuit = parameter 1) - Hysteresis ON (parameter 26). (Parameter 26 is set to 5 °C as OEM.)

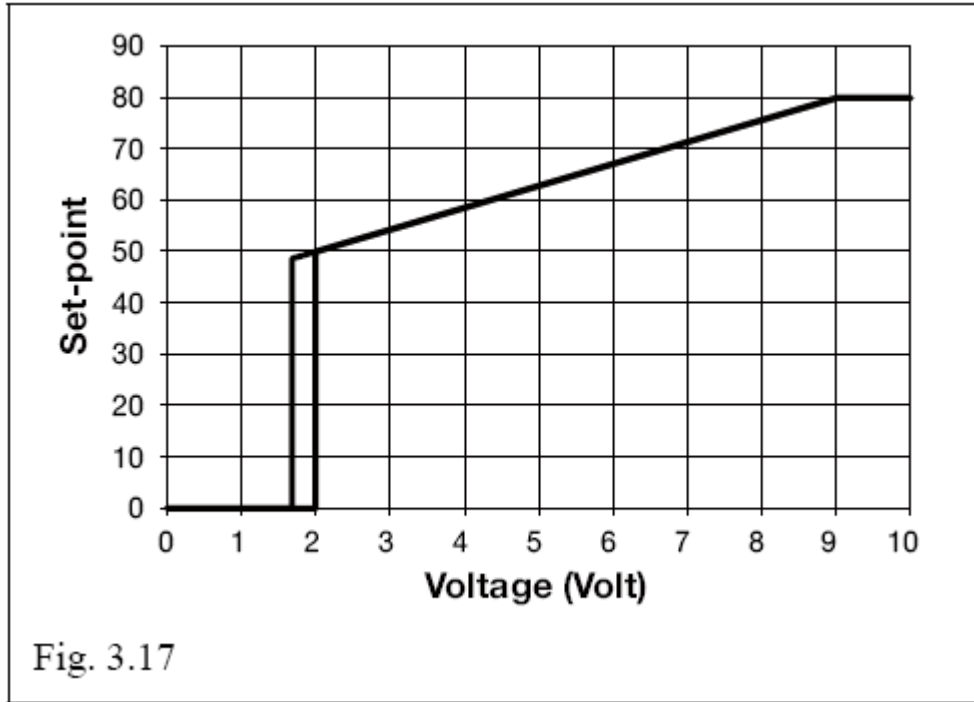
- System temperature = set temperature (low heating circuit = parameter 3) - Hysteresis ON (parameter 26). (Parameter 26 is set to 5 °C as OEM.)

The burners stop as follows.

- System temperature = set temperature (high heating circuit = parameter 1) - Hysteresis OFF (parameter 20). (Parameter 20 is set to 3 °C as OEM.)

- System temperature = set temperature (low heating circuit = parameter 3) - Hysteresis OFF (parameter 27). (Parameter 27 is set to 3 °C as OEM.)

**Managing in the heating circuit based on heating power in heating circuit with the analog input (parameter 14-2 or 3 (parameter 22 =2 or 3))**



#### **At -0-2 V**

There is no heat demand of the heating circuit.

#### **-Within 2-9 volt range**

In each slave boiler, an analog signal for a thermal power demand is also produced. This process is performed with PID\_CH\_high or PID\_CH\_low algorithms. While parameter 18 (High temperature heating circuit, OEM setting 50 °C) or parameter 24 (low temperature heating circuit, OEM setting 25 °C) corresponds to 2 volt value, Parameter 1 (High temperature heating circuit, OEM setting 70 °C) or parameter 3 (low temperature heating circuit, OEM setting 50°C) has been determined as 9 volts. Intermediate voltage values are linear between 2 values. (See figure 3.17)

The burners start as follows.

- System temperature = set temperature (high heating circuit = parameter 1) - Hysteresis ON (parameter 19). (Parameter 19 is set to 7 °C as OEM.)

- System temperature = set temperature (low heating circuit = parameter 3) - Hysteresis ON (parameter 26). (Parameter 26 is set to 5 °C as OEM.)



The burners stop as follows.

- System temperature = set temperature (high heating circuit = parameter 1) - Hysteresis OFF (parameter 20). (Parameter 20 is set to 3 °C as OEM.)
- System temperature = set temperature (low heating circuit = parameter 3) - Hysteresis OFF (parameter 27). (Parameter 27 is set to 3 °C as OEM.)

### **3.11.8. Slave cards safety functions**

- If the boiler water flow temperature is more than 90 °C for 5 seconds, the slave card will be locked (E46)
- If the boiler water return temperature is more than 80 °C for 5 seconds, the slave card will be locked (E47)
- If the waste gas temperature is more than 80 °C for 5 seconds, the slave card will be locked (E48) and the fan will run at maximum speed for 10 minutes.

The slave card prevents the main heat exchanger to endanger in low water circulation. This is done in three ways.

- 1= water flow sensor
- 2= $\Delta T$  difference between water flow and return temperatures,
- 3 = 1 and 2 together

If controlled by T, T\_max (OEM, 35 °C set) and the following limits are provided with the outlet limits. These;

If  $\Delta T_{\text{max}} - 5\text{ °C} > \Delta T > \Delta T_{\text{max}} - 10\text{ °C}$  the burner modulates.

If  $\Delta T_{\text{max}} > \Delta T > \Delta T_{\text{max}} - 5\text{ °C}$  the burner runs at minimum.

If  $\Delta T > \Delta T_{\text{max}}$ , the burner stops.

### **3.11.9 Mixing valve management**

The mixing valve is controlled by the following parameters.

- Mixing valve opening time (Mix\_valve\_step\_open\_time; parameter 28), OEM setting is 5 seconds.
  - Mixing valve closing time (Mix\_valve\_step\_close\_time; Parameter 29), OEM setting is 7 seconds.
  - Mixing valve interval time (Mix\_valve\_step\_interval\_time; Parameter 30), OEM setting is 5 seconds.
  - Mixing valve opening hysteresis (Mix\_valve\_p\_hyst ;Parameter 31), OEM setting is 2°C.
  - Mixing valve hysteresis continue (Mix\_valve\_still\_hyst; Parameter 32), OEM setting is 2°C.
- Before opening or closing, it waits for the time set in parameter 30. Requirements for opening and closing

the mixing valve;

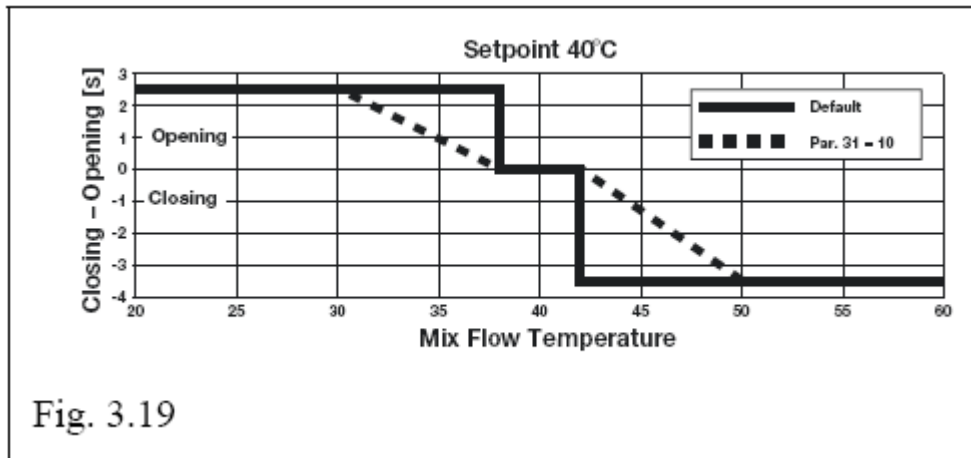
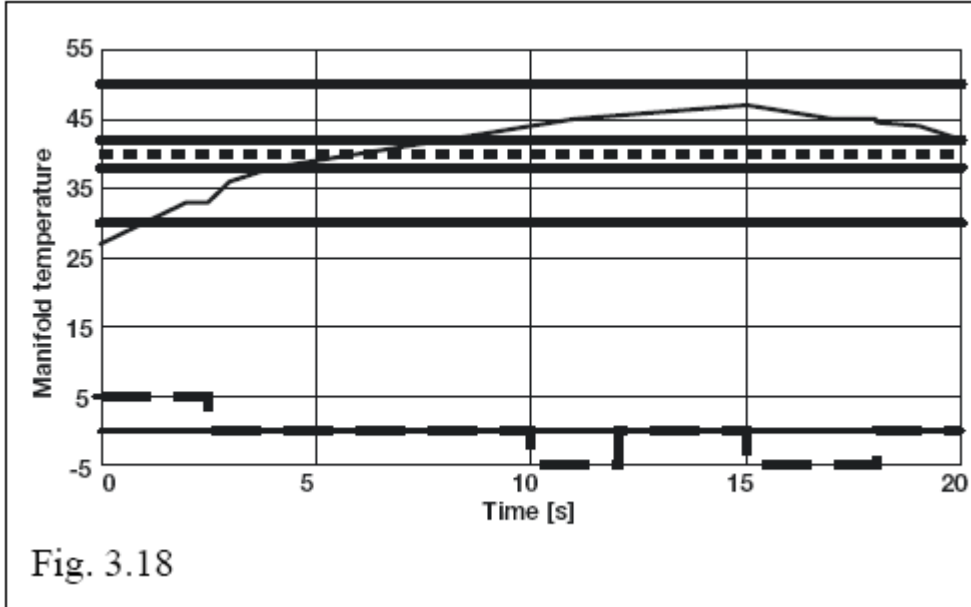
- If low temperature system flow temperature is lower than the setting temperature and hysteresis, the mixing valve opens. (Set temperature - the temperature specified in parameter 32). According to the OEM values (parameter 3 (40 °C) - It will be activated at parameter 32 (2°C) = 38 °C)

- If low temperature system flow temperature is higher than the setting temperature and hysteresis, the mixing valve closes. (Set temperature + the temperature specified in parameter 32). According to the OEM values (parameter 3 (40 °C) - It will be closed at parameter 32 (2°C) = 42 °C)

It will wait for the following times before opening and closing. According to this;

Considering the above example, when the flow water temperature reaches 38 °C, the mixing valve will wait until the time specified in parameter 28 (5 seconds in the example). After this time, the valve will open.

Similarly, for closing, the system will wait as long as specified in parameter 29 when it reaches to 42 °C based on the example (7 seconds in the example). After this time, the valve will close.



### 3.11.10 Gas type (fan speeds)

In parameter 36, a value between 1 and 4 must be entered into the system depending on the DG or LPF waste gas flue height.

According to the selected gas type in the parameter, according to the different phases of the burner, it changes the fan speed automatically.

In parameter 36; parameters changing up to 14 are reported to the slave cards by the master card.

Parameter 36, Parameters related to waste gas height and gas type

- 1 = 15m small flue system and Natural gas
- 2 = 15m large flue system and Natural gas
- 3 = 15m small flue system and LPG

4 = 15m large flue system and LPG

### 3.11.11 Burner ignition procedure

Status	OFF	Pump	Relay safety ON	Relay safety OFF	Flow switch off	Pre-sweeping	Ignition phase 0 before the	Ignition phase 1 ignition	Burner ON
Time	0	TC> 80°C				10 s	10 s	5 s	24 hr max <sup>5</sup>
Required power	0	-	-	-	-	-	-	-	>0 <sup>4</sup>
Fan	0	0	0	0	0	Par.86 Pre-sweeping	Par.85 Ignition	Par.85 Ignition	When the second is needed
Pump	0	1	1	0	1 <sup>6</sup>	1	1	1	1
Gas valve	0	0	0	0	0	0	0	1	1
Ignition	0	0	0	0	0	0	1	1 <sup>3</sup>	0
Ionization	0	0	0	0	0	0	0 <sup>1</sup>	1 <sup>2</sup>	1

If the ignition procedure is initiated, the system will complete the process even if it does not demand heat.

1. Slave cards are permanently locked if a flame has been observed after the first pre-ignition.(Continuous flame the gas valve is open)

2. If the flame does not appear within a defined period of time (OEM, 5 seconds set), the Slave card fan will start the fan and ensure that it sweeps the unburned gas in the system. Then, it initiates an ignition attempt. If there is no burn after 3 ignition, the slave card permanently locks. (Closes the gas valve.)

3. Ignition spark exists in all safety times reduced by 1 second.

4. The requested thermal power is updated by the master card. If no power is requested, the slave burner is turned off.

5. The burner can work 24 hours. It is turned off after 24 hours and turns it back on. (In cascade applications, 2nd burner is activated, the burner that runs 24h becomes the latest burner to run in the sequence.)

6. If there is a flow switch in the system (measures the flow in the flow meter), the master card closes the system according to the pressure difference. In this case the slave card detects and deactivates the pressures and if it cannot detect the pressure difference within 10 seconds, it starts the burner. If the pressure switch contacts are open, it closes the burner and initiates a new ignition attempt. If the pressure switch does not close the contacts after the ignition, the slave card closes the burner.

7. It controls during pre-sweeping and fan acceleration functions. Acceleration function; minimum 0,5 Hz/300 ms (1,67 rps<sup>2</sup>) maximum 7.5 Hz/300 ms can be set.

### 3.11.12 Factory settings (OEM settings)

Parameter 41 (parameter reset), if all parameters are required to be reset to the factory setting, parameter 41 is set by pressing the RESET key. Only Parameter 36 (specifies the gas type), 42 (Sets the flow switch position and 43 (protocol) does not change. OEM setting of this parameter = 0.

### 3.12 ADDRESSING SETTINGS IN CASCADE CONNECTIONS

#### 3.12.1. Master card (Master PCB)

Master card can manage up to 60 slave cards.

Power demand	230 Vac (-15% +10%), 50 Hz
Operating temperature	0-60°C (peak temperatures, not continuous)
Storage temperature	-25 +75°C
Moisture	93% at 25°C
Fuses	2x3,15A-T,230V

#### 3.12.2 Slave card

Power demand	230 Vac (-15% +10%), 50 Hz
Operating temperature	0-60°C (peak temperatures, not continuous)
Storage temperature	-25 +75°C
Moisture	93% at 25°C
Fuses	1x3,15A-T,230V
Safety time	5 seconds
Ignition frequency (consecutively)	3
Surveillance electrode	with separate or ionization
Minimum ionization current	1,2 µA
Surveillance initial ionization current	1,3 µA
Maximum ionization current	4,9 µA

#### **CAUTION:**

**Cards are sensitive in neutral and operating change. It can be locked while switching from neutral to operation. (E33)**

All slave cards have locking functions and are designed to perform all functions directly from a burner when necessary.

#### 3.12.3. Slave card user interface

- If heating is not desired, the green LED flashes at a frequency of 1 Hz.
- If in ignition phase, the green LED flashes at a frequency of 2 Hz.
- If the green LED flashes continuously, there is a flame. (Burner is on)
- If the red LED does not flash (dim) there is no locking.
- If there is a temporary locking, the red LED flashes at 2Hz.
- If the red LED flashes continuously, there is permanent locking.

#### 3.12.4. Slave PCB inputs

The micro-switches on the slave boards are provided with a master card interface (HK 50M or HK 100M) and with one slave connected to the boiler (100S), as factory-set. If it is necessary to connect the slave boilers, it is only necessary to reset the micro-switches on the boilers.

- Turn off the main system switch.

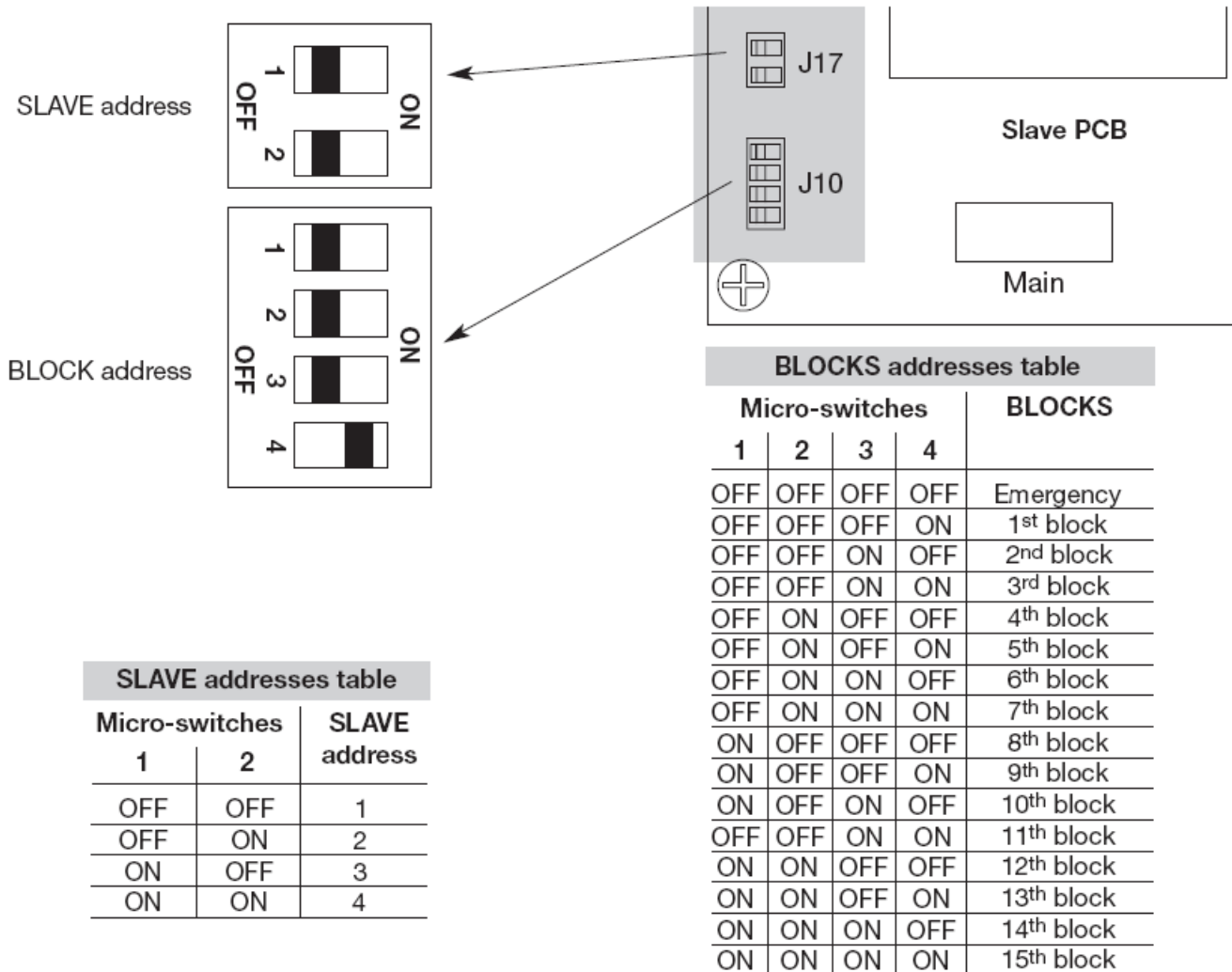
- As described in Procedure 5.62, enter the slave cards in the master card.
- Follow procedure 3.12.5 for addressing settings. Make boiler connections with special bus cables (APPENDIX H)

### 3.12.5. Addressing settings

Each slave card (one for each heating unit) must be configured in the correct order on the master card. Slave boilers must be partitioned into blocks. The system uses 15 blocks for each 4 slave heating units (each heating unit). For example, there are 2 blocks when 5 slave heating units are connected to the master card. The first block is connected to 4 slave heaters and 1 slave is connected to the 2nd block.

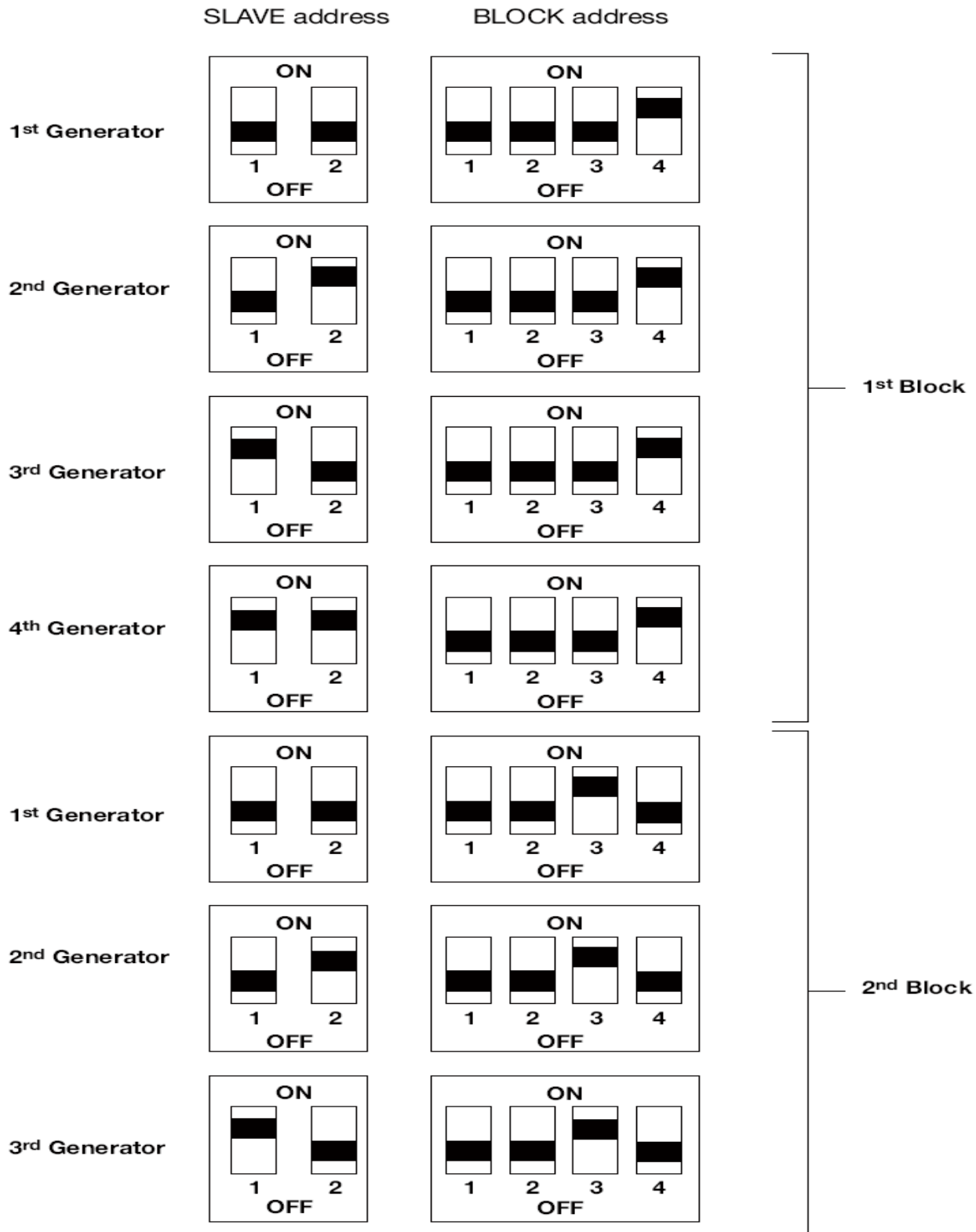
**Addressing must be set as follows.**

- Determine block (Examples 1,2, ..., 15)
- Determine the position of slave heaters for each block (positions 1, 2, 3, 4)



### Sample : Configuration for 7-burner cascade configuration

If 7 slave heat generator settings are required, there are 2 blocks. 4 slave heaters is connected to the first, 3 slave heaters is connected to the second.



## 4. DECOMMISSIONING THE BOILER

### TEMPORARY DECOMMISSIONING

The following procedure is applied on occasions where a temporary shut-down is required on the weekend, during a short trip.

- Set room thermostat to **10 °C**
- Set parameter "2" (domestic hot water) to "**10**" or alternatively, Boiler thermostat to **10 °C**

**While turning off the device, the green LED begins flashing. Do not cover the gas inlet for boiler protection.**

**Frost protection is active in stand-by mode. Frost protection is active at 2 levels.**  
(Section3.11.6)

#### Protection by pump only

- Master card activates the frost protection function when the unit is in stand-by mode. For this reason, it is necessary that the device is not turned off before an activated device is completely discharged. Frost protection occurs at 2 stages. In the first stage only the pump is operated. In the second stage, the pump and the burner start to work.

- If the manifold temperature is  $< 5\text{ °C}$ , the high temperature circuit pump and the circulation pump will start to work or if the system is operating in conjunction with the outdoor air sensor, the high temperature circuit pump and circulation pumps will start to operate when outdoor air temperature is  $< 3\text{ °C}$  (parameter 35).

#### Pump and burner protection together

- If the manifold (mixing tank) temperature is  $< 5\text{ °C}$  for 10 minutes, one boiler burner is switched on and the burner runs with the pumps until the manifold temperature is  $> 20\text{ °C}$ .
- In systems connected with outdoor air sensors (parameter 14 or 22 = 1); even if the manifold temperature is  $> 5\text{ °C}$  after 10 minutes, the pumps continue to operate until the system reaches the outside temperature set at parameter 35. (OEM value is  $3\text{ °C}$ . This value can be set between  $-30\text{ °C}$  and  $15\text{ °C}$ .)

### 4.2 LONG-TERM DECOMMISSIONING

If the heating units will not operate for a long time, the following operations must be performed.

- Turn off the main system main switch (default 4.1) (2) green indicator light will turn off.

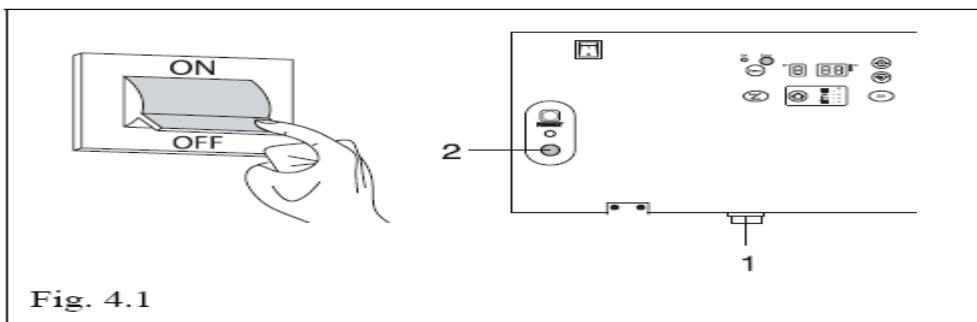
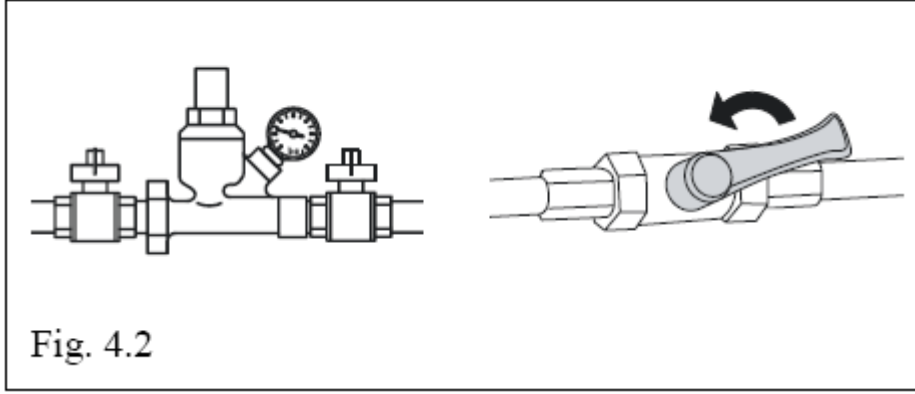


Fig. 4.1

- Close the gas and water valves







Water frost protection must be taken inside the unit or in the boiler.

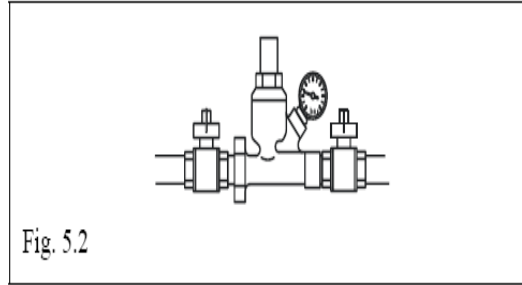
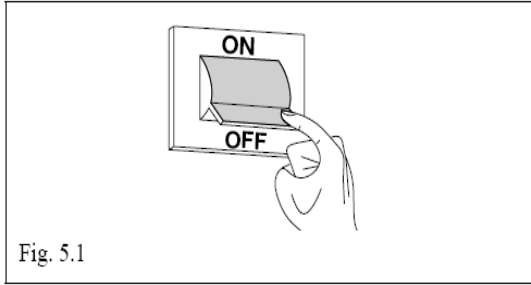
## 5.MAINTENANCE

It is necessary to fulfill all the features and characteristics of the products and meet the legal obligations, make systematic checks of the products at regular intervals.

The frequency of controls depends on the installation site and usage conditions. Therefore, it must be checked at least once a year by an authorized service.

During the checks, waste gas collectors, condensation tanks near the device and in the environment where device is located should be checked, cleaned and checked for leaks, especially at the joints, after the device is cleaned and installed.

The main power supply must be turned OFF before starting maintenance of the unit (figure 5.1) and the gas inlet (figure 5.2) must be cut off. Maintenance works should be carried out by an authorized service personnel.



### 5.1. NORMAL MAINTENANCE PROCESS

Following applications should be performed during normal maintenance operations.

- If there are any oxide traces on the burner, clean it,
- If there is any waste, sediment on the heat exchanger, clean it,
- Clean up to the flue valve, collector and connection vertical to the flue, (there will be no waste gas leak after starting the installation)
- Check the boiler from the outside
- Check whether the boiler and if any, the oil boiler circuit is working,
- Operate the device for a while to check whether there is leakage in the waste gas circuit and water installation connections,
- Run the unit at maximum and minimum power and check the gas consumption.
- Check ignition and ionization electrode positions,
- Check the gas security.

**Never** clean with an alcoholic or greasy cloth (easily flammable)

**Never** clean the device elements with solvents such as thinner.

## 5.2. FAILURE MAINTENANCE PROCESS

In case of interruption of boiler functions or in case of fault occurrences;

- replacing
- repair
- component control are made.

Special tools must be used for disassembly and replacement and the instructions must be followed.

## 5.3. PERIODICALLY PROGRAMMED MAINTENANCE TABLE

<b>ANNUAL MAINTENANCE TABLE</b>	<b>1st year</b>	<b>2nd year</b>	<b>3rd year</b>	<b>4th year</b>
COMBUSTION ANALYSIS (See SECTION 3.6)				
FRESH AIR SUCTION, WASTE GAS COLLECTOR, SIPHON AND TERMINAL CONTROL (see SECTION				
IGNITION ELECTRODE CONTROL AND CLEANING (See SECTION 5.6.4)				
CHECKING AND CLEANING THE VENTURI (See SECTION 5.6.5)				
FAN CONTROL AND CLEANING (See SECTION 5.6.6)				
BURNER CONTROL AND CLEANING (See SECTION 5.6.7)				
CHECKING AND CLEANING THE HEAT EXCHANGER CONDENSE SECTION (See SECTION 5.6.7)				
SIPHON CONTROL AND CLEANING (See SECTION 5.6.8)				
SAFETY CONTROLS; LOCKING, AFTER FLAME SHUTDOWN FUNCTION, MODULATION OPERATIONS				
CONTROL OF SETTING VALUES (See SECTION 3.6)				

## 5.4. TOOL KIT FOR MAINTENANCE

- Magnetic screwdriver (PH1)
- Wide mouth screwdriver
- 5, 7, 10, 11, 13, 14, 15, 17, 23, 24, 27, 29 and 36 mm-mouth wrenches
- Scissors (tinplate)
- Cleaning cloth (American cloth)
- Heat resistance paste
- Drill
- Magnetic screwdriver (PH2)
- Socket wrenches 7mm-10mm
- Molikot 111 type lubricant
- Brush
- Pens, pliers

## 5.5. SAFETY RULES

Installation and maintenance work of the devices must be carried out by authorized and trained personnel and all safety rules must be observed.

Before each operation;

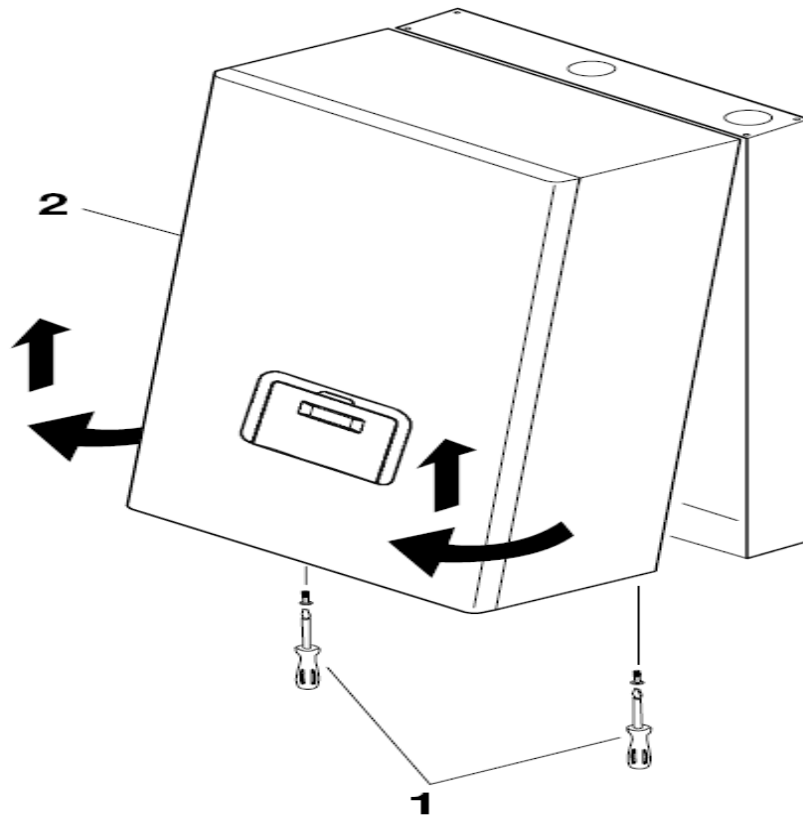
- Switch off the main power supply switch
- Close the gas valve
- If it is necessary to switch off the domestic water and the heating circuit valves, take the necessary measures to drain the water. (Section 7.8)

## 5.6. ACCESSABILITY TO COMPONENTS

The disassembly and accessibility of all major components of the device is described in this section.

### 5.6.1. Dismounting the front sheet-metal group

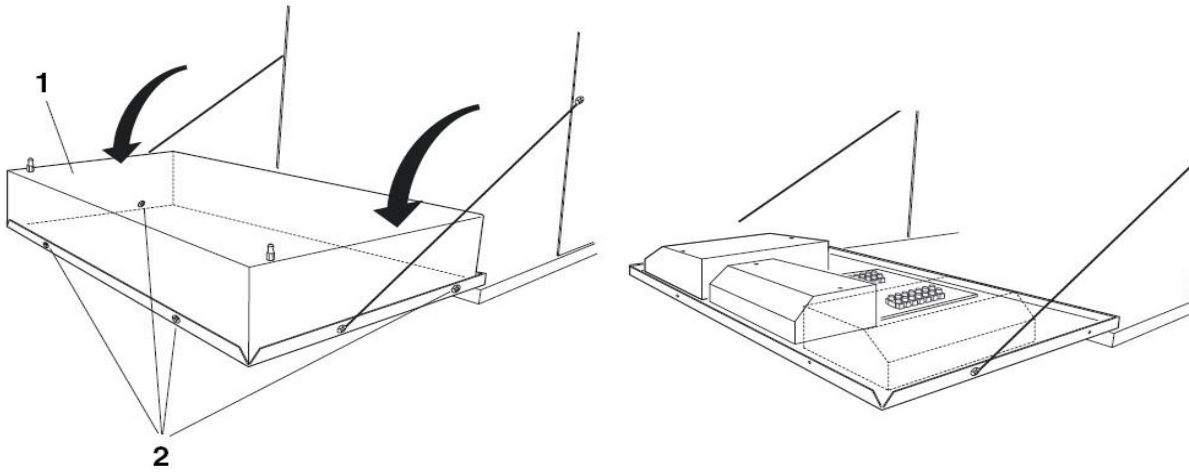
OPERATION ORDER	COMPONENT	REQUIRED TOOL KIT
1	Turn the system power OFF and close the gas valve	
1.1	disassemble (1) bolts	2 screws Magnetic screwdriver
1.2	Remove the front cover by pulling and lifting up slightly	Front sheet metal Manually



**5.6.2. Dismounting the control panel**

OPERATION ORDER	COMPONENT	REQUIRED TOOL KIT
2	Turn the system power OFF and close the gas valve	
2.1	Remove the front cover. (Section	Magnetic screwdriver
2.2	Pull the control panel towards yourself Turn 90o. Remove 4 bolts and separate them from the rear sheet-	4 screws Magnetic screwdriver

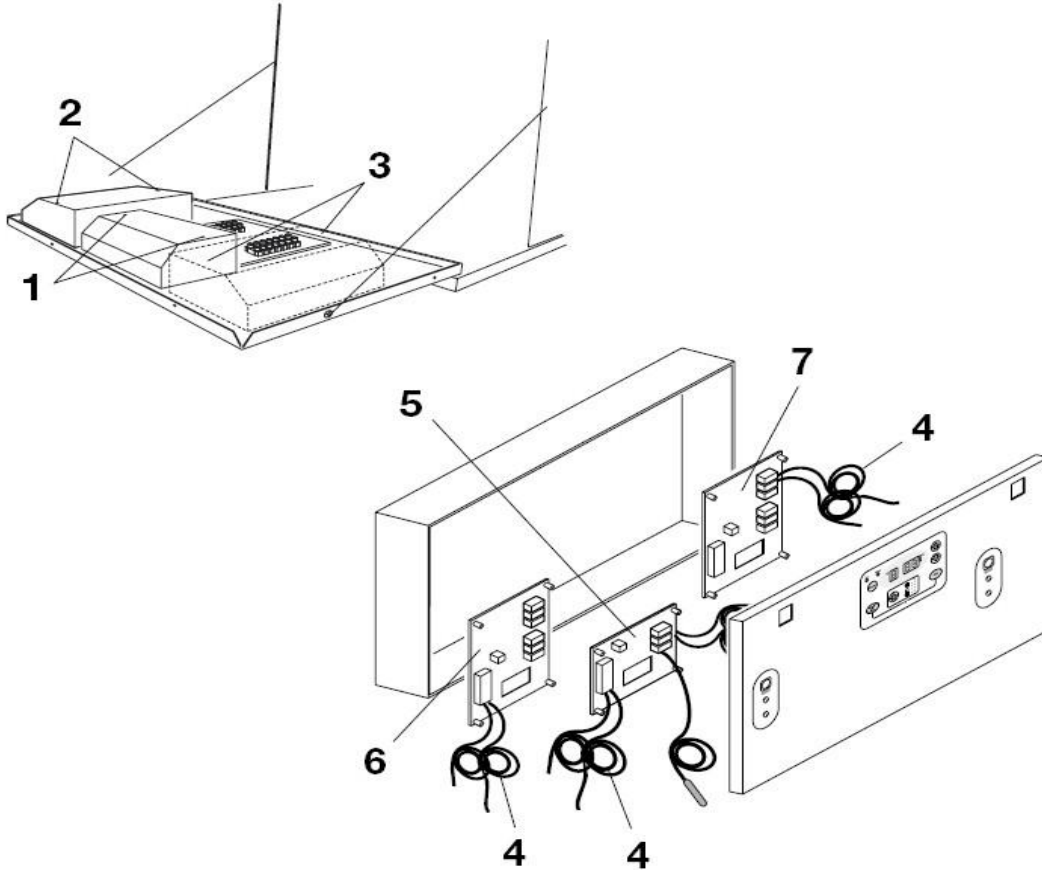
**Reassembly is the opposite of the disassembly phase.**



### 5.6.3. Dismounting the electronic card

OPERATION ORDER	COMPONENT	REQUIRED TOOL KIT
3	Turn the system power OFF and close the gas valve	
3.1	Remove the front cover. (Section	
3.2	Remove the control panel (Section	
3.3	Remove bolts (1) and remove the master card cover	2 screws Magnetic screwdriver
3.4	Remove the first and second Slave cards by removing bolts (2) and (3)	2 + 2 = 4 screws Screwdriver
3.5	Remove the cable group from terminal (4)	Screws Screwdriver
3.6	Within the control panel; There is one master card (5) for HK 50 M, 1 master card for HK 100M and 1 slave card (6), 2 slave cards (7) in HK 100S.	

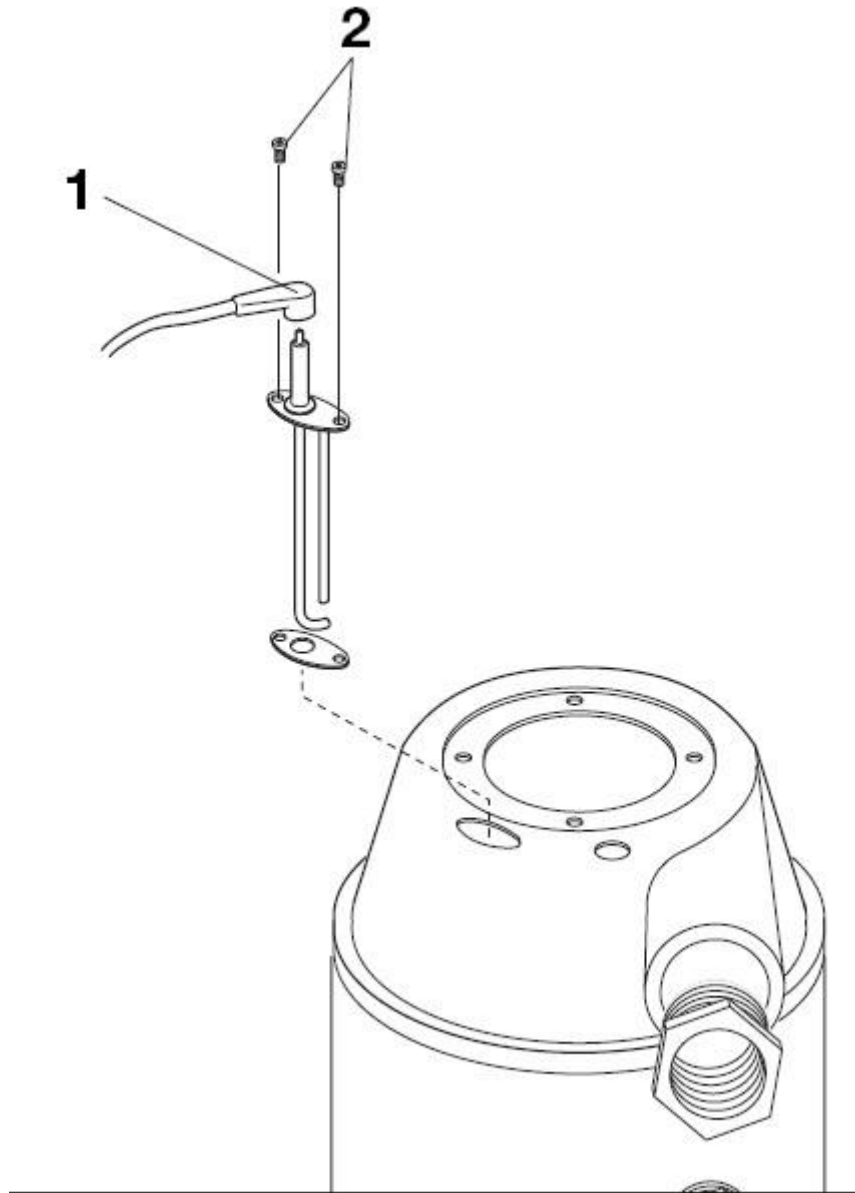
**Reassembly is the opposite of the disassembly phase.**



**5.6.4. Dismounting the ignition electrode**

OPERATION ORDER	COMPONENT	REQUIRED TOOL KIT
4	Turn the system power OFF and close the gas valve	
4.1	Remove the front cover. (Section	
4.2	Remove the electrode protection	Cover Manually
4.3	Remove the electrode by removing	2 screws screwdriver

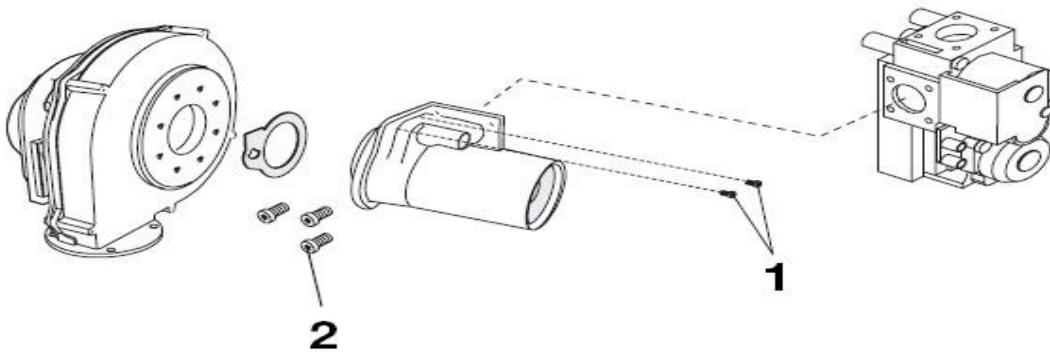
**Reassembly is the opposite of the disassembly phase.**



### 5.6.5. Dismounting the venturi

OPERATION ORDER	COMPONENT	REQUIRED TOOL KIT
5	Turn the system power OFF and close the gas valve	
5.1	Remove the front cover. (Section	
5.2	Remove the screws (1) and separate the venturi from the	2 screws screwdriver
5.3	Remove the screws (2) and separate the venturi from the gas	3 screws screwdriver

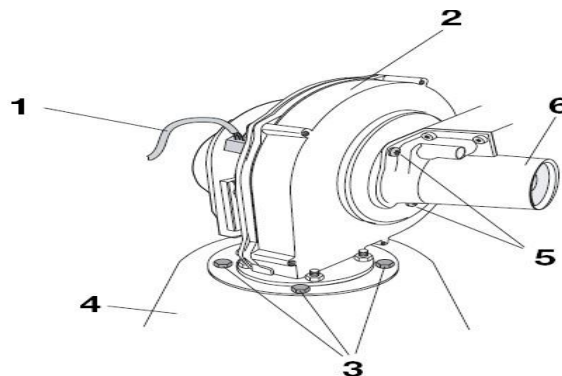
**Reassembly is the opposite of the disassembly phase.**



### 5.6.6. Dismounting the fan

OPERATION ORDER	COMPONENT	REQUIRED TOOL KIT
6	Turn the system power OFF and close the gas valve	
6.1	Remove the front cover. (Section	
6.2	Separate cable group (1) from the fan	Cable group
6.3	Remove 4 bolts (3) from the heat exchanger	4 bolts 8 mm socket wrench
6.4	Removes two screw (5) and separate from fan group (2) and	2 screws Screwdriver
6.5	Remove the fan (2)	Fan Screwdriver

**Reassembly is the opposite of the disassembly phase.**

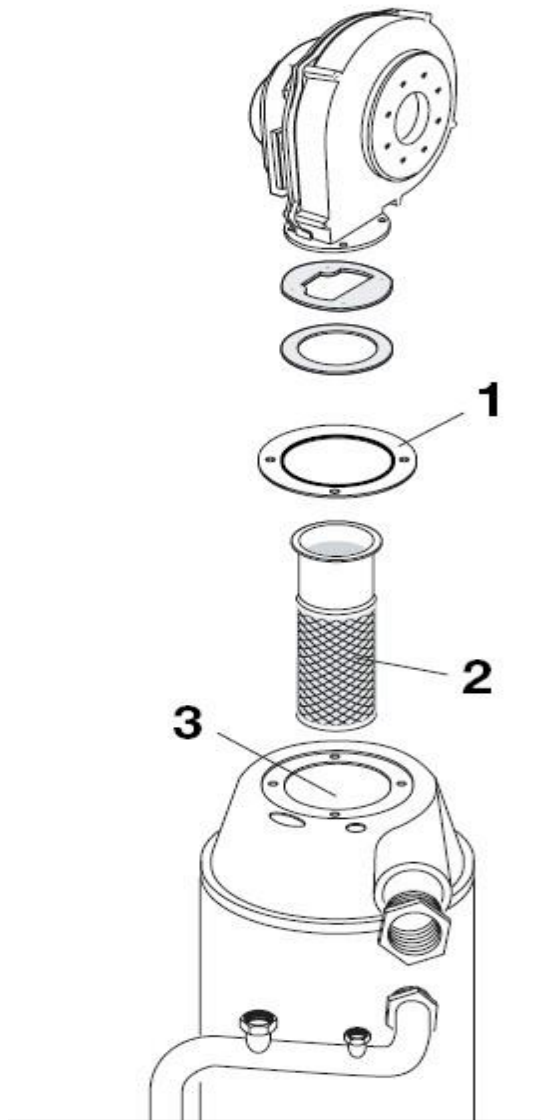




**5.6.7. Dismounting the burner and cleaning the combustion chamber**

OPERATION ORDER	COMPONENT	REQUIRED TOOL KIT
7	Turn the system power OFF and close the gas valve	
7.1	Remove the front cover. (Section	
7.2	Remove the van. (Section 5.6.6)	
7.3	Take the gasket (1) and disassemble the burner (2)	Gasket and burner Manually
7.4	After the burner has been removed, if possible, clean the walls of the combustion chamber (3) with hair pencil (not metallic pencil),	

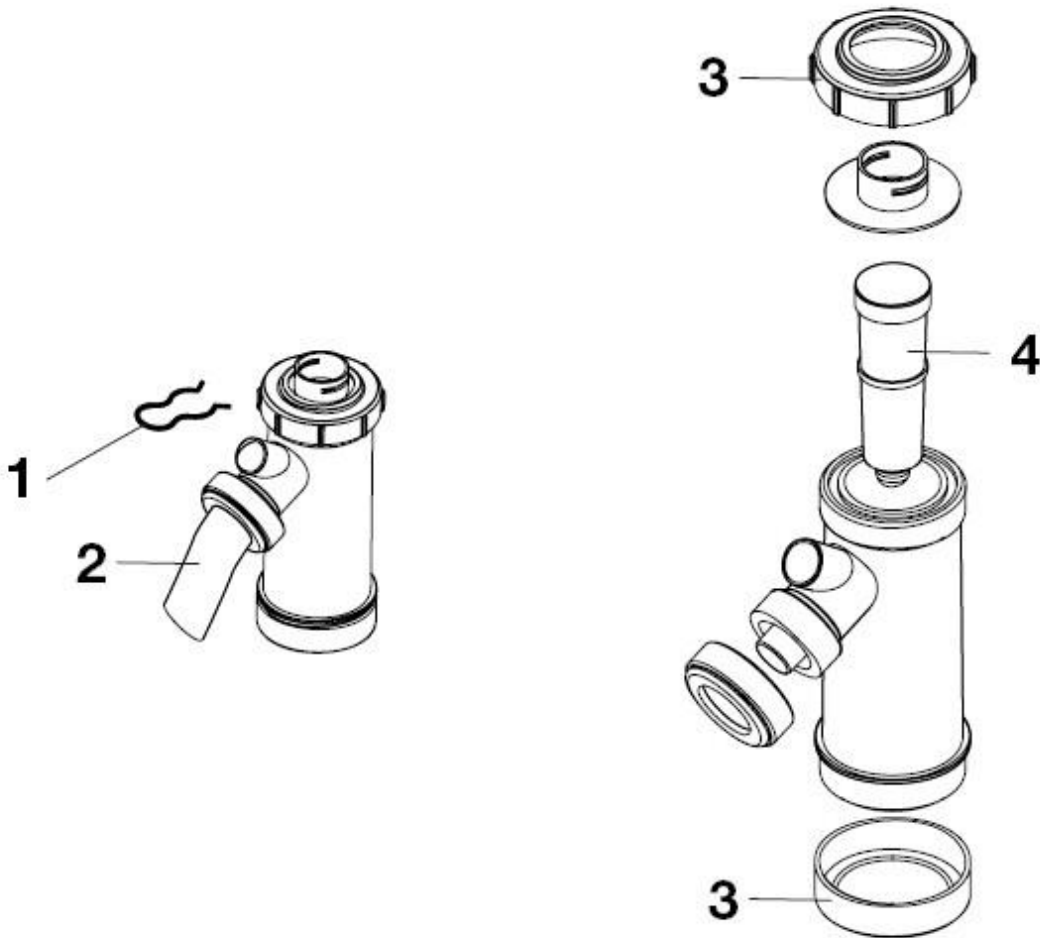
**Reassembly is the opposite of the disassembly phase.**



**5.6.8. Dismounting the condense siphon**

OPERATION ORDER	COMPONENT	REQUIRED TOOL KIT
8	Turn the system power OFF and close the gas valve	
8.1	Remove the front cover. (Section	
8.2	Remove the clamp (1) and disassemble the coiled hose	Clamp and helix hose With pliers
8.3	Remove 2 screws (3) and remove the siphon	screws Manually
8.4	Remove the siphon floater and clean the	floater Manually

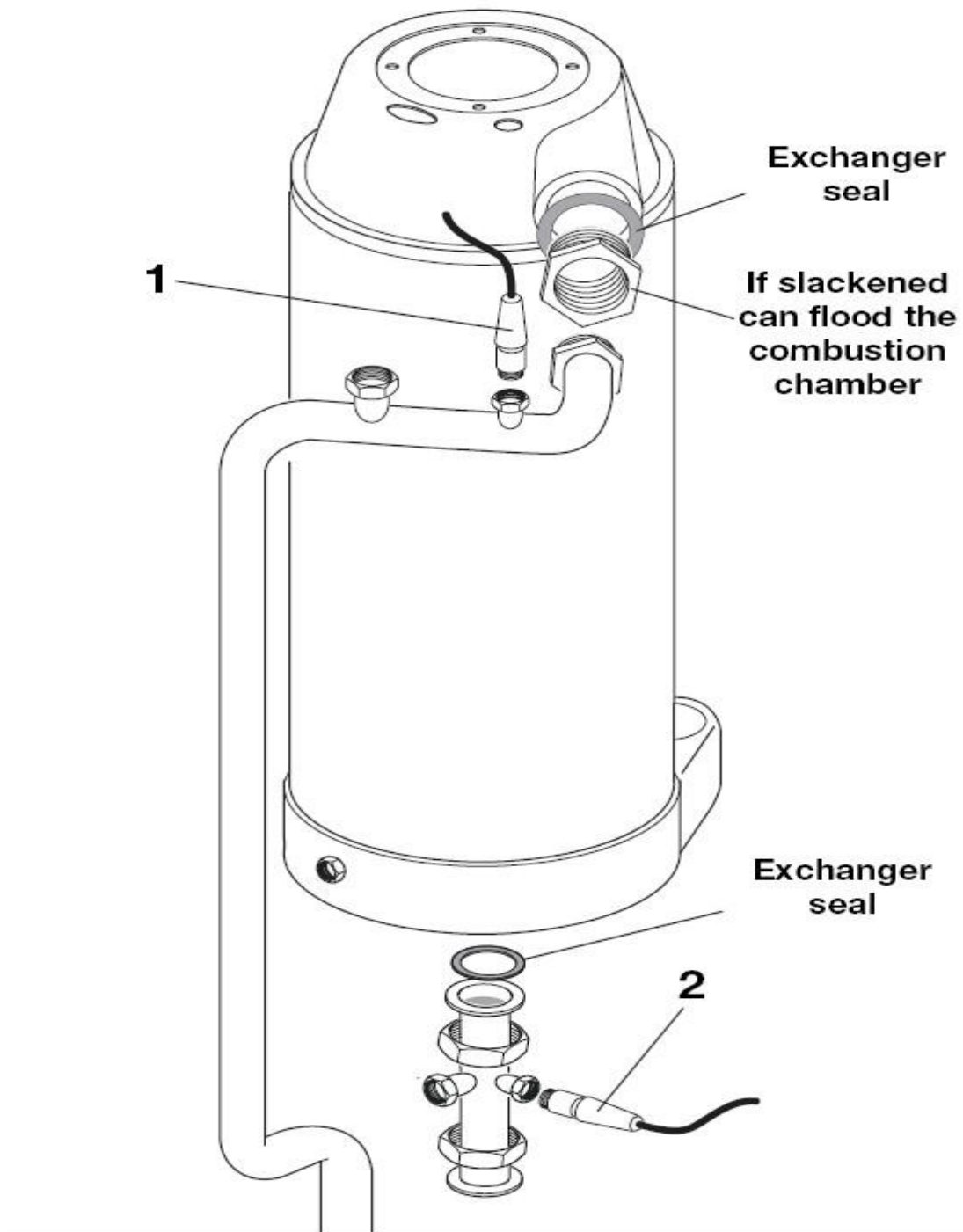
**Reassembly is the opposite of the disassembly phase.**



**5.6.9. Dismounting the NTC sensors**

OPERATION ORDER	COMPONENT	REQUIRED TOOL KIT
9	Turn the system power OFF and close the gas valve	
9.1	Remove the front cover. (Section	
9.2	Remove the NTC sensor (1)	Flow water temperature 15 mm open mouth switch
9.3	Remove the NTC sensor (2)	Return water temperature sensor 15 mm open mouth switch

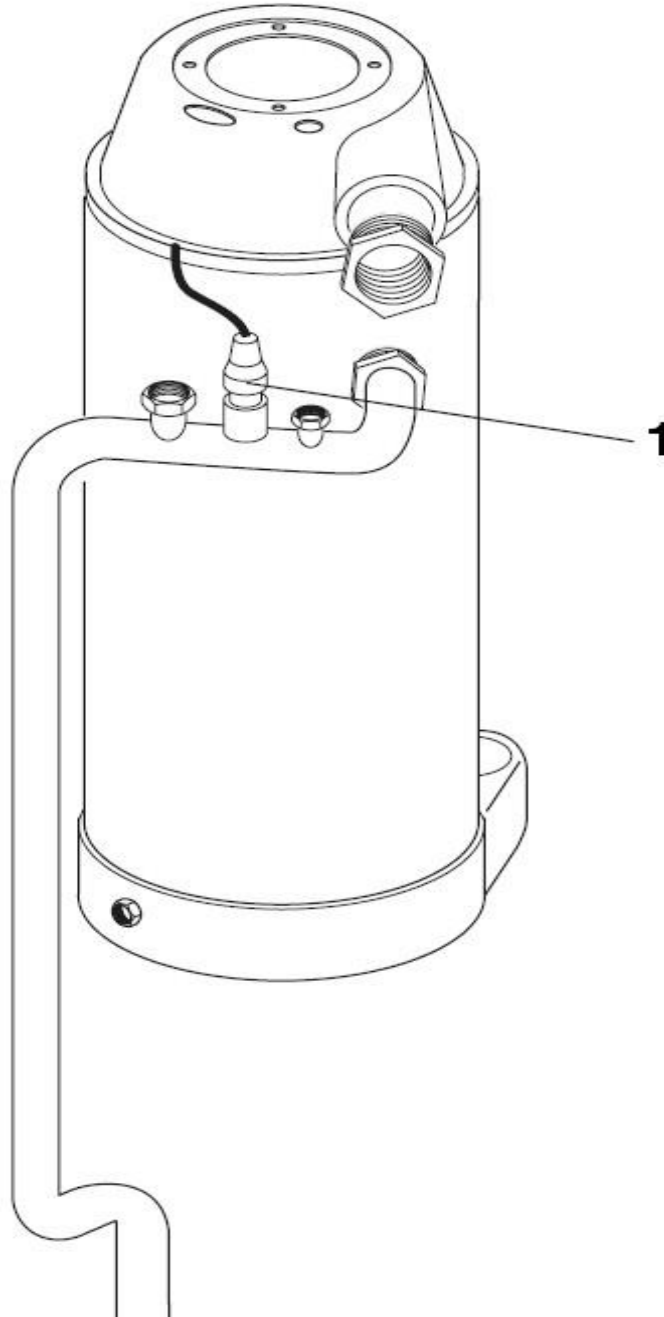
**Reassembly is the opposite of the disassembly phase.**



**5.6.10. Dismounting the safety thermostat**

OPERATION ORDER	COMPONENT	REQUIRED TOOL KIT
10	Turn the system power OFF and close the gas valve	
10.1	Remove the front cover. (Section	
10.2	Remove the connector (1)	Connector Manually
10.3	Remove safety thermostat 2 screw.	Safety thermostat With a screwdriver

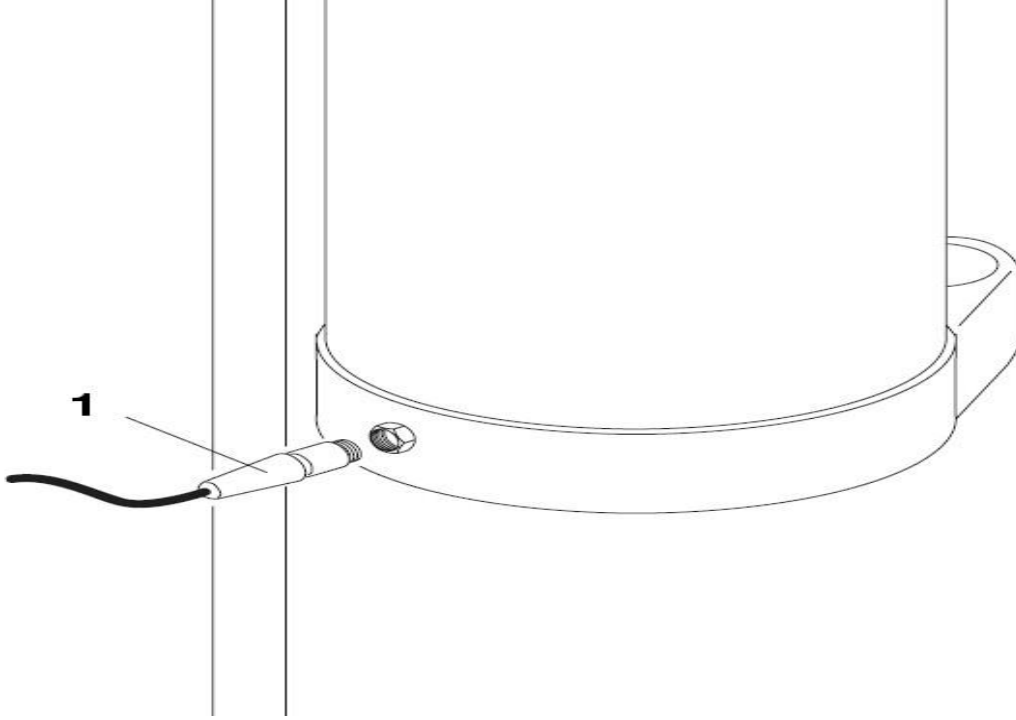
**Reassembly is the opposite of the disassembly phase.**



**5.6.11. Dismounting the waste gas sensor**

OPERATION ORDER	COMPONENT	REQUIRED TOOL KIT
11	Turn the system power OFF and close the gas valve	
11.1	Remove the front cover. (Section	
11.2	Disconnect the electrical connector on the waste gas probe	Waste gas probe Manually
11.3	Remove the waste gas probe	Safety thermostat 13 mm open mouth switch

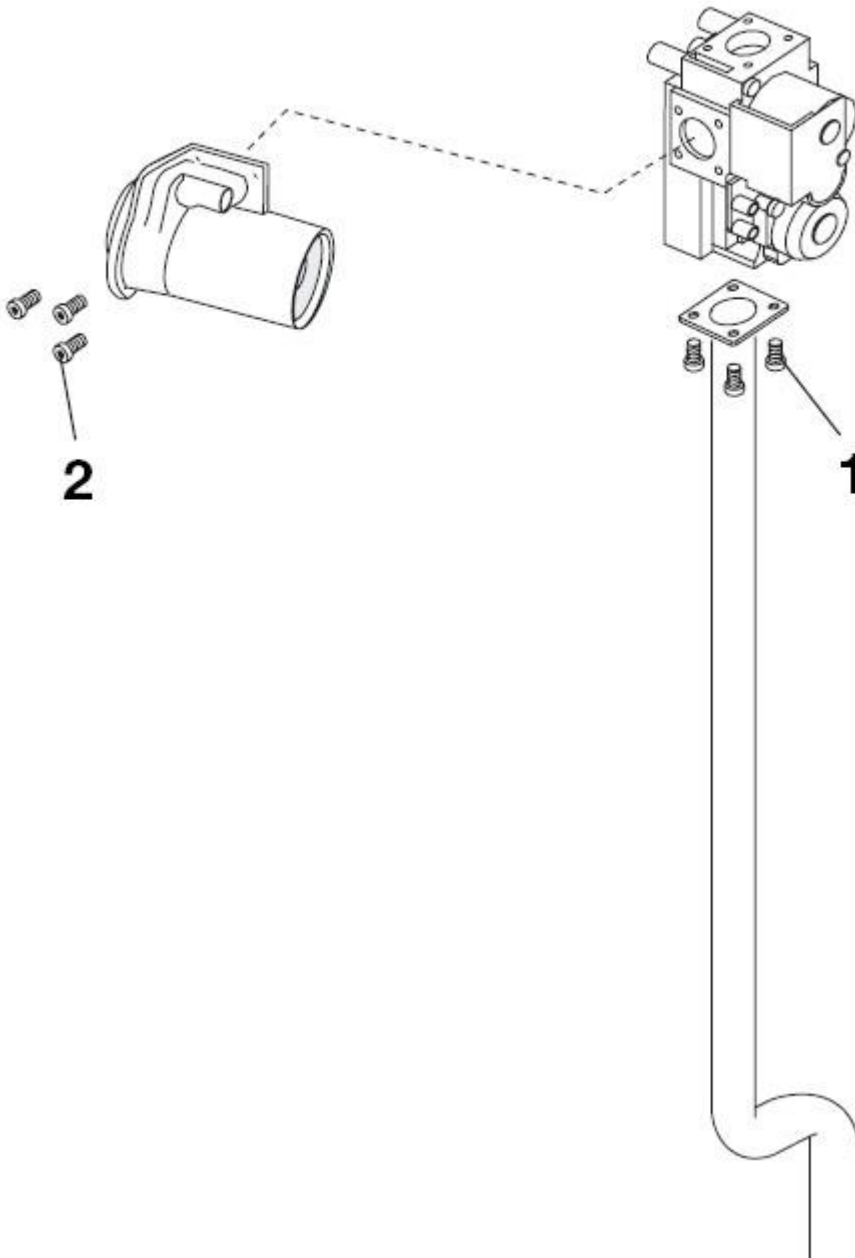
**Reassembly is the opposite of the disassembly phase.**



**5.6.12. Dismounting the gas valve**

OPERATION ORDER	COMPONENT	REQUIRED TOOL KIT
12	Turn the system power OFF and close the gas valve	
12.1	Remove the front cover. (Section	
12.2	Remove the screws (1) connecting the gas valve to the gas pipe	4 screws screwdriver
12.3	Remove the screws (2) connecting the gas valve to the venturi	3 screws screwdriver

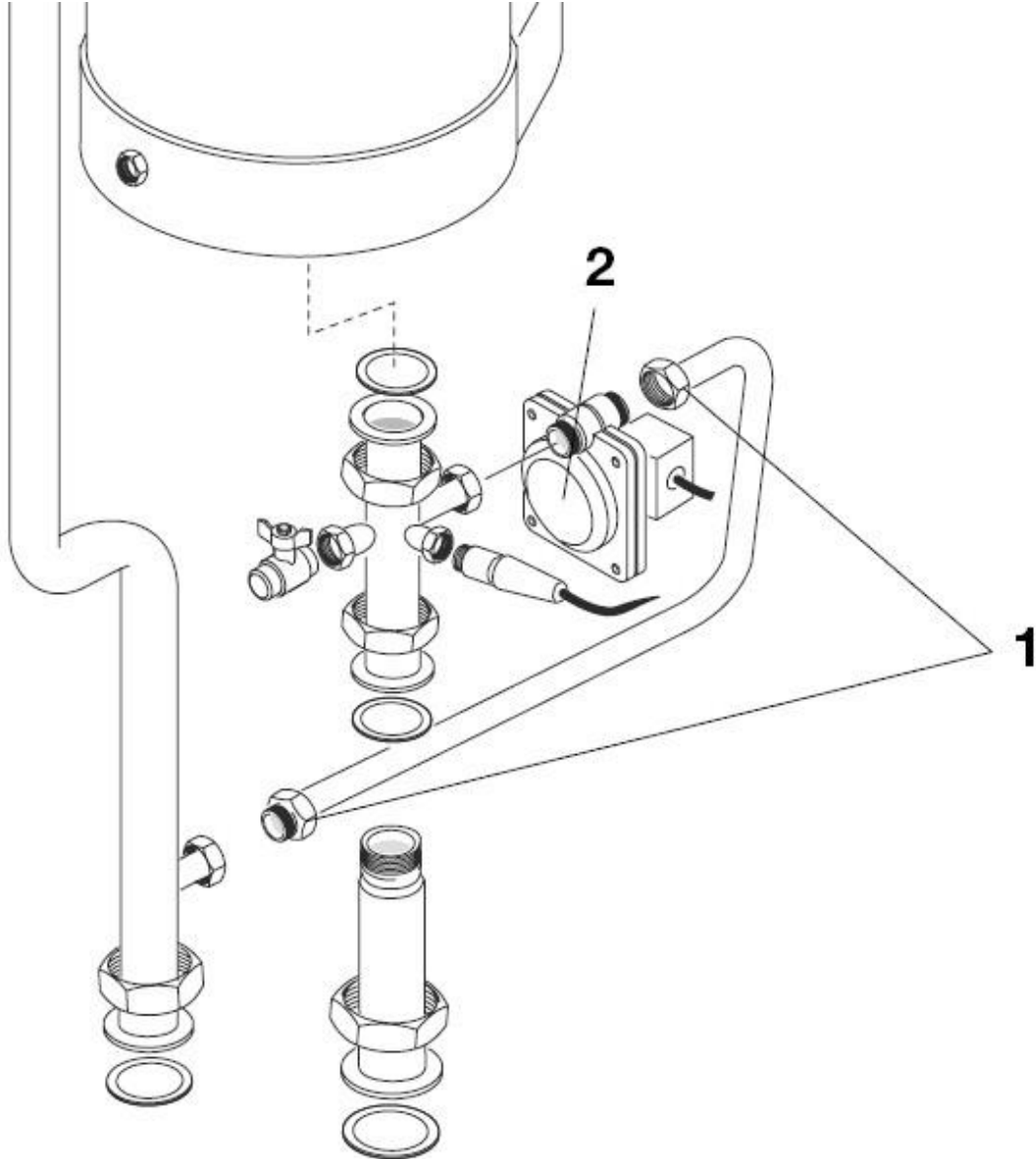
**Reassembly is the opposite of the disassembly phase.**



**5.6.13. Dismounting the water pressure switch**

OPERATION ORDER	COMPONENT	REQUIRED TOOL KIT
12	Turn the system power OFF and close the gas valve	
12.1	Remove the front cover. (Section 5.6.1)	
12.2	Remove the connection tube nuts (1) 2 screws	17 mm open mouth switch
12.3	Remove the water pressure switch (2)	Water pressure switch

**Reassembly is the opposite of the disassembly phase.**



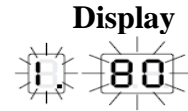
## 6. TROUBLESHOOTING

### 6.1. ERROR MODE

If there is a fault in any heating unit, the screen will flash. The procedure for fault identification is as follows.

#### Procedure

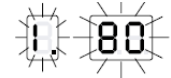
1. If there is one or more errors on the screen, the screen will flash.



2. When “+” key is pressed, the first unit parameter addresses  
The first error code will appear. Press the “+” key again, with this unit  
Other relevant error will appear. In the other units, the errors will be  
displayed when “+” and “-” keys are pressed. (Sample: **E02** error in the 2nd unit)  
If the errors are due to the master card U 00 and below **E** error code will appear.



3. Press “Set/Esc” to exit the error code and return to the screen position.



### 6.2. CONTINUOUS (PERMENANT) LOCKING

The “**RESET**” key is pressed when there is a permanent lock on the burners.

If “**RESET**” key is pressed while in reading mode, all slave units will be reset.

If there is a continuous lock due to an error, pressing the “**RESET**” key will only reset the unit that gives the error message.

### 6.3. LOCKING CODES

#### 6.3.1. Master card lockings

The table below describes the errors that occur on the master card. These errors are collected in two groups.

- Type A errors: Press the “**RESET**” key to remove these errors. (See section 1.6 key 3)
- E type errors are errors that cannot be resolved automatically after waiting for a certain period of time.

#### Permanent Errors TYPE A

<u>No</u>	<u>Cause</u>	<u>Control and Resolution</u>
A 16	EEPROM contents incorrect	Re-insert the master card
A 18	EEPROM is not detected.	Re-insert the master card

#### Errors automatically corrected TYPE E

The following faults are errors that cannot be automatically resolved.

If one of these errors occurs, the red LED lights up (see Section 1.6, lamp 4)



<b>No</b>	<b>Cause</b>	<b>Control and Resolution</b>
E 25	Unable to read EEPROM	Reinsert the master card
E 23	Temperature readout value is outside the limits	Reinsert the master card
E 24	Temperature readout value is outside the limits	Reinsert the master card
E 25	Temperature readout value is outside the limits	Reinsert the master card
E 26	Temperature readout value is outside the limits	Reinsert the master card
E 32	SLAVE NOT CONNECTED	Each unit connected to the system ON key press Check slave electrical connections
E 34	50 Hz error message	Main frequency not 50 Hz
E 02	NTC 1 contact open (water flow sensor)	Water flow sensor not connected or disconnected
E 04	NTC 3 contact open (boiler sensor)	Boiler sensor not connected or disconnected
E 18	NTC 1 short circuit (boiler sensor)	Water flow sensor short circuit
E 20	NTC 1 short circuit (boiler sensor)	Boiler sensor short circuit

### 6.3.2. Slave card locks

If the slave errors can be reset, the Slave "RESET" key is used. (Section 1.6, key 13)

<b>No</b>	<b>Cause</b>	<b>Control and Resolution</b>
A 01	Locking after ignition 5 times	Check if the gas valve is open Is the spark between the two electrodes? Check the ignition wire <u>Re-insert the slave card</u>
A 02	Too much ignition is occurring. A 04	When the gas valve is open, the limit thermostat is switched on
A 05	When the gas valve is closed or on internal cables <u>Live and neutral twisted</u>	Re-insert the slave card
A 06	Safety relay does not close	Re-insert the slave card
A 07	Safety relay does not open	Re-insert the slave card
A 08	Safety relay opens instead of closing	Re-insert the slave card
A 09	RAM error	Re-insert the slave card
A 10	EEPROM error	Re-insert the slave card
A 11	Register (memory) error	Re-insert the slave card
A 12	EEPROM typo	Re-insert the slave card
A 16	Safety relay closes instead of opening	Re-insert the slave card
A 17	Flow water NTC sensor is over limit temperature (Extremely high temperature)	Check water circulation there will be at least 2 m3/h in a unit
A 18	Return water NTC sensor is over limit temperature (Extremely high temperature)	Check water circulation there will be at least 2 m3/h in a unit
A 19	Waste gas NTC sensor is over limit temperature At least 2 m3/h will be circulated in a unit	- Check water circulation (working at extremely high temperature-flue-fan runs at max speed) - Clean heat exchanger water and waste gas side
A 20	Check whether the Gas valve runs correctly after closing the flame gas valve It delays in closing.	Replace the gas valve. Between the measured fan speed and the read fan speed is very different
A 24	Fan failure	Check the fan, check the electrical connection Replace the fan.

**Slave error list, Automatic reset**

<b>No</b>	<b>Cause</b>	<b>Control and Resolution</b>
E 33	Operation and neutral run in reverse	Fix operation and neutral connection
E 34	Reset key error	Wait until the error disappears when the reset button has been pressed more than 7 times within 30 minutes If the error continues for more than 40 minutes re-insert the slave card or replace it if necessary
E 35	Water pressure difference switch failure (ignition on)	Check the water pressure for each unit Clean the pump and replace it if 2m3/h is low. Replace water pressure switch (set 500 l/h) Check that there is no air in the boiler installation
E 36	EEPROM readout error	Re-insert slave board or replace if necessary
E 37	Flame surveillance fault	Clean the electrode or replace if necessary
E 38	Waste gas short circuit fault	Check waste gas sensor connection or replace if necessary
E 39	Waste gas open circuit fault	Check waste gas sensor connection or replace if necessary
E 40	Frequency not 50 Hz	Check frequency at main power supply
E 41	Communication error	Re-insert slave board or replace if necessary
E 42	Water flow sensor short circuit fault	Check water flow sensor connection or replace if necessary
E 43	Water flow sensor open circuit fault	Check water flow sensor connection or replace if necessary
E 44	Water return sensor short circuit fault	Check water flow sensor connection or replace if necessary
E 45	Water return sensor open fault error	Check water return sensor connection or replace if necessary
E 46	Water flow sensor is over limit temperature error	Check water pressure for each unit Clean the pump and replace it if 2m3/h is low.
E 47	Water return sensor is over limit temperature	Check water pressure for each unit Clean the pump and replace it if 2m3/h is low.
E 48	Waste gas sensor is over limit temperature (in case of this fault the fan runs at maximum speed)	Check water pressure for each unit Clean the pump and replace it if 2m3/h is low. Clean water and waste gas sides of the heat exchanger

**6.4. UNEXPECTED (ANORMAL) ERRORS AND MEASURES**

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
Gas odor	Leakage in the gas supply line	Test the connection points with foam, do not approach with fire
Waste gas odor	Waste gas circuit	Waste gas system; - Check the connection points  - Check whether there is blockage
Waste gas Odor in the condense line	Waste gas temperature too low	Adjust the combustion settings check the gas flow rate

PROBLEM	CAUSE	SOLUTION
Irregular combustion	Burner gas pressure	Check setting values
	Diaphragm is not suitable (LPG)	Check diaphragm diameter
	Burner and heat exchanger are not	Check, clear
	Entries to the heat exchanger are	Check, clean
	Fan is faulty	Check fan operation
Ignition delay in burner operation start-up	Burner gas pressure	Check setting values
	Ignition electrode error	Check electrode position Check status
Thermal group gets dirty in a short time	Combustion	Check flame color
		Check combustion setting values
Boiler main card balancing signal gets signal from the main card	Gas valve	Check whether it has 230 Vac input  Check the gas valve terminals and cable
Boiler is not working	No energy input (No on screen image)	- Check the electrical connection - Check the fuse
The boiler does not reach the desired working temperature	Heat exchanger, burner, ignition	Clean the combustion chamber, burner and
	Burner insufficient gas flow	Check the burner setting parameters
	Boiler command system (main and slave cards)	Are operation parameters correct
		Check operation (check flow temperatures)
Boiler is locked for thermal safety	No water	Check whether the operation is
		Check whether the set
		Check whether the cable connections are correct
		Check whether the sensor positions are correct
	Thermal group setting is incorrect	Check whether the automatic purge is working Check the heating circuit pressure (may be low)

PROBLEM	CAUSE	SOLUTION
The boiler reaches the desired temperature but the system is cold	There is air in the system	
	Pump is defective	Bleed the system air
		Pump is blocked
		Check the pump, replace if necessary
		Check the pump electrical connections
Frequent system safety valve malfunction (increase)	System expansion tank failure	Check the expansion tank
	Heating system circuit pump failure	Check and lower the pressure
		Check the pressure reducer (safety)
	System safety valve malfunction	Check safety valve
Pump is not working	Pump is defective	Pump is blocked
		Check the pump, replace if necessary
		Check the pump electrical connections

## 7. INSTALLATION

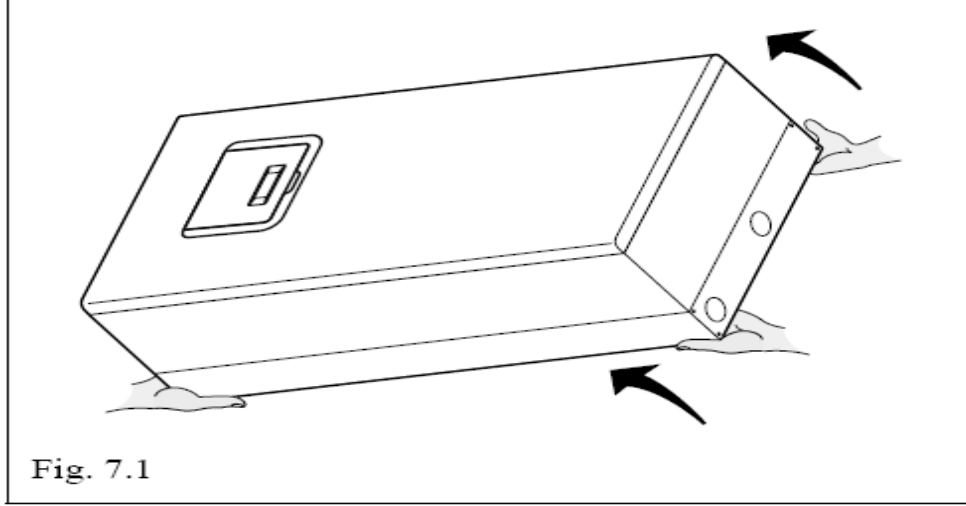
### 7.1. DEVICE HANDLING AND ACCESSORIES AVAILABLE BEFORE DELIVERY

#### Transport

After the device package is opened, it must be handled and lifted by 2 people as in Figure 7.1.

△ Sufficient safety precautions must be taken when lifting and handling the device.

⊘ Packaging materials should not be distributed, should be given as waste to where children cannot reach.



#### Form of Delivery for the Device and accessories and materials supplied

- The device is delivered in a single package.
- Device packing box,
- Device manual
- Warranty document
- Device sling plate
- LPG conversion kit
- Outdoor air sensor

### 7.2. BOILER OR CASCADE SYSTEM INSTALLATION ROOM

The room in which the boilers are to be installed must be used entirely for the boilers. It should not be used for any other purpose. The following ventilation conditions must be provided in the chambers where the boiler is installed.

1. For natural ventilation, the bottom vent hole must be at most 50 cm above the bottom and the bottom vent hole must be at most 40 cm below the ceiling and must be open to the atmosphere. Ventilation vent holes, ducts and grills should be made of corrosion resistant metal material. If DKP sheet metal is used, it must be painted with anti-corrosion dye. If the vent hole has a rectangular section, the short edge should be at least 10 cm and an eye section of the grills must be at least 10 x 10 mm. Of course the boiler room will be directly ventilated. The vent holes will be in the area where the boiler is located. The cross sections are provided in the following table.

2. Force ventilation should be made when the boiler room is under the ground floor or where air circulation is difficult or in locations where the vent holes exceed 10 meters from the boiler. In this case, fresh air is supplied by the fan from the bottom vent hole. And the waste air is discharged from the upper vent hole. Here, the vent hole sections are given in the following table, as it is in natural ventilation. The following table gives the minimum amount of air to be provided by the fan through the lower vent hole and the vent hole sections are given according to the total nominal thermal power.

3. Natural waste is also possible without using a fan when the upper vent hole is open to the atmosphere in boiler rooms with forced ventilation. However, it is absolutely not possible to use in the application where the lower vent hole is natural and the upper vent hole is with fan, since it creates a negative pressure in the vent hole application. Upper ventilation alone cannot be a forced ventilation.

#### NATURAL OR FORCED VENTILATION VENT HOLE SECTIONS AND REQUIRED CLEAN AIR QUANTITY

Total nominal thermal power kW	Vent hole dimensions (at least)		In case of using forced ventilation
	*Lower vent hole, cross-sectional area cm <sup>2</sup>	*Upper vent hole, cross-sectional area cm <sup>2</sup>	At least fresh air amount m <sup>3</sup> /hour
50	350	200	80
100	500	300	160
150	600	400	240
200	750	500	320
250	900	600	400
300	1000	700	480
350	1150	800	560
400	1300	900	640

\*It is accepted that the vent holes are circular or with rectangular cross-section and grill where the long edge is not more than 1.5 times of the short edge.

⚠ The electrical protection rules must be observed in the room where the device is located. ⚠ The devices must be mounted at least 500 mm above the base.

⚠ Installation should be done with spaces where service personnel can easily access the device. The device is designed for indoor use. Cautions:

⚠ The place where the appliance is to be installed must have sufficient vent holes for ventilation. (The vent hole measurements are given in the operating manual and above.)

⚠ Sufficient gaps must be left to the device during installation in case of emergency. ⚠ Electrical connection must be made in accordance with the electrical protection class of the device.

☯ Boilers can never be installed outside the room, fully open to the atmosphere, semi open (canopy hood), etc.

### 7.3. Adaptation to Previous Devices

If the device is to be used within the old installation, the following points should be observed.

- The unit should be equipped with a drainage through which the water resulting from the condensation within the installation can be connected to the drainage.
- The electrical installation must comply with the relevant standards. If not, it should be regulated by authorized persons.
- LPG transmission lines and components must be manufactured and installed in accordance with the relevant standards.
- The expansion tank should compensate the amount of water expansion in the system.
- Pump flow rates and safety valves must be of the system requirements.
- The characteristics of the water to be used in the system should comply with the table below.

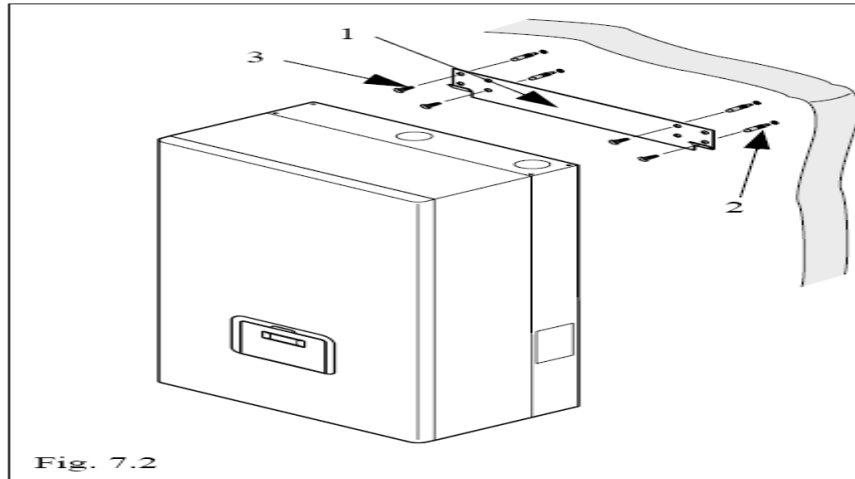
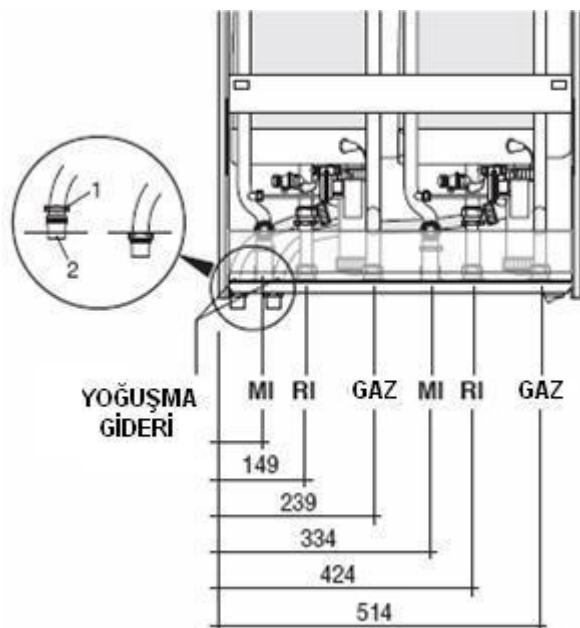
Values of water to be used	
pH	Can be set between 6-8
Electrical conductivity (25°C)	Less than 200mV/cm
Chloride ions	Less than 50 ppm
Sulfuric acid ions	Less than 50 ppm
Amount of iron	Less than 0.3 ppm
Alkanite	Less than 50 ppm
Hardness	Less than 20°F
Sulfur ions	There will be none
Ammonium ions	There will be none
Silica ions	Less than 30 ppm

- ⚠ The installer firm will be responsible for the damages to the unit due to improper installation of the waste gas system. DD service will not commission the system if the system's waste gas, water leakage or condense is given to the environment during the first start-up. The installer firm will be responsible for the damages to the unit due to improper installation of the waste gas system, DD will not be responsible for such damages.
- ⚠ It is mandatory to give condense to the sewer system.

#### 7.4 The device must be installed in the following order: (Figure 7.2)

- The device must be hung on a wall at least 200 cm above the floor
- Holes are drilled as shown on the figure, to be horizontal on the wall with the mounting template of the device.
- Insert dowels (2) into the holes.
- Mount the sling sheet (1) on the wall with the screws (3).
- Hang the device on the sling plate.
- The sling sheet should be mounted on the brick. It should not be mounted on the plaster.

Note: If original installation set is used in the installation of the device, the original carcass installation rules document will be used.



#### 7.5. HYDRAULIC CONNECTIONS

##### Connection of the heating circuit

The device has 3 connections including 1" (MI), installation return 1" (RI) and gas inlet 3/4" (GAS). It should be connected to the relevant installation as appropriate. It is recommended to use optional collectors.



Note: In case of using the original installation components of the device, the installation is done according to the original installation connection documents.

After water is filled;

- Make sure the valves are open.
- The water system must be full. (In cold condition, the pressure should be around 1.5 bar.

**Condense collection:**

The condense drain hose (2) that must be paid attention during installation must be connected with the nut (1) as shown in the figure.

The nut must be connected by plugging it from the outside.

It is recommended to connect the neutralization system before the sewage connection to the condense drainage in installations over 200 kW (HK 250 > systems). In areas required by gas companies, the Seller must be supplied externally by the companies.

The condense circuit must be leak-proof up to the sewage.

- ⚠ The system owner is responsible for any damages caused by any damage or dismantling of the condense siphon or the condensation system during use. This should be warned during initial start-up.

**Hydraulic system cleaning.**

It is necessary to clean and rinse the lime sludge, sand, etc., in the installation before the system is newly commissioned.

If the system is an old heating system, before dismantling

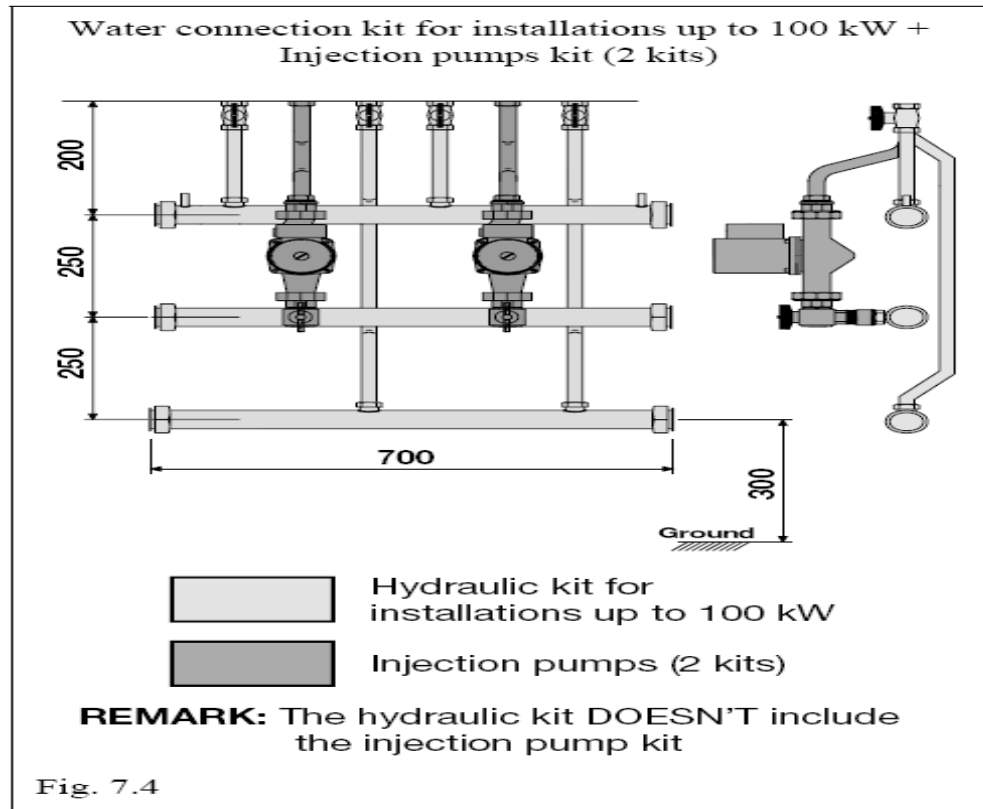
- ⚠ . the system must be recirculated for 7 days by adding descalers and after the installation has been drained it needs to be rinsed with fresh water. If the wastes continue, the process is repeated.
- ⚠ Service Manager may suggest additives that delay corrosion. No chemicals other than the recommended one should be used.

**HYDRAULIC KITS**

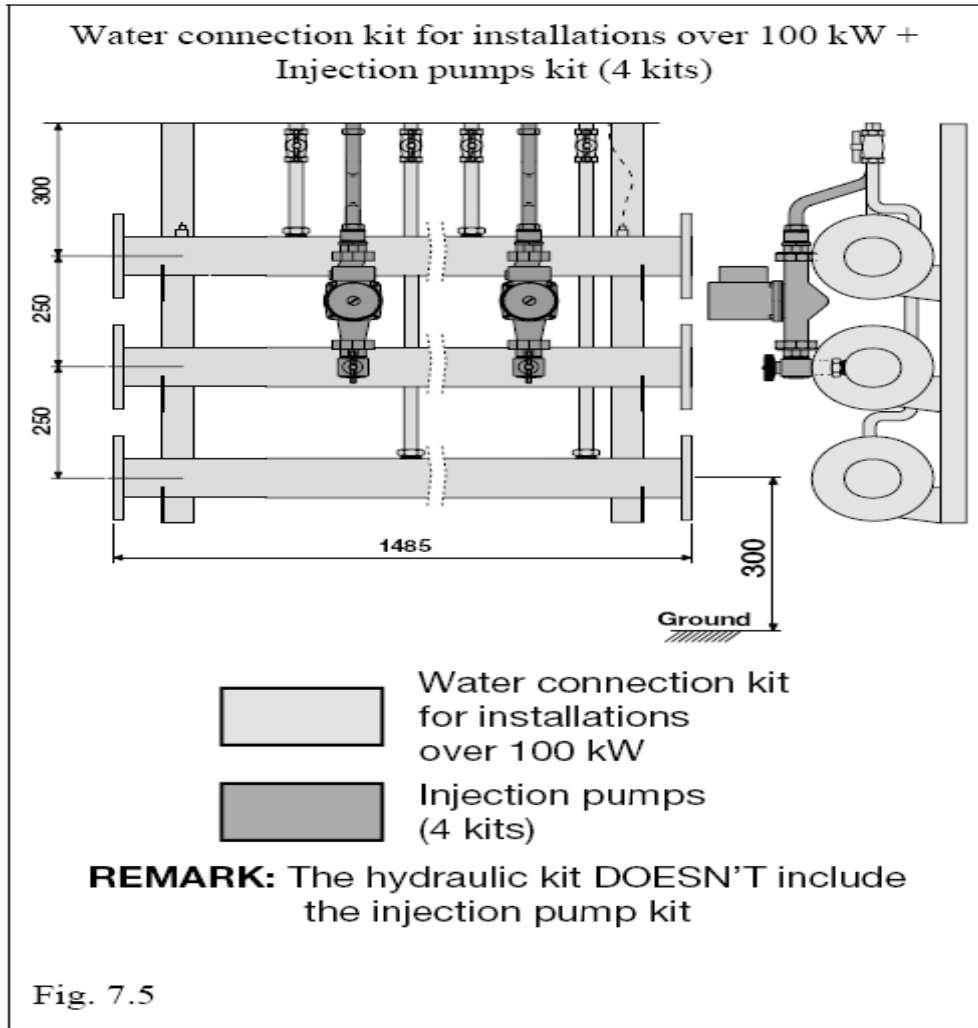
Pump mounting kits and hydraulic installation circuit kits can be used in 100 kW < and 100 kW > devices to facilitate installation of the installation circuit.

- DD will offer original installation kits as an option.
- In installations where DD original installation is not used
  - \* It is mandatory to use a pump that is higher or equal to the pump feature recommended by DD.
  - \* In the installation that use different zones such as dirt holders, pressure gauges, mixing tank (with air relief cock on top), floor heating (low temperature heating system), 3-way motor valves and an expansion tank with dimensions recommended in the installation must be used.
  - \* The pump will be connected under each heating unit.
  - \* Condense drainage will be definitely leak-proof and be connected to sewer. In 200kW > installation, if required by the environmental board, it will be connected to the condense circuit drainage in the neutralization unit.



**100kW < devices hydraulic installation (figure 7.4)**

- 1 gas manifold 45 mm (must be at least 300 mm above ground)
- Water flow manifold 45 mm (must have socket connection)
- Water return manifold 45 mm
- Manifold tips 2" female fitting
- Gas inlet inside (3/4"), 1" for water valves

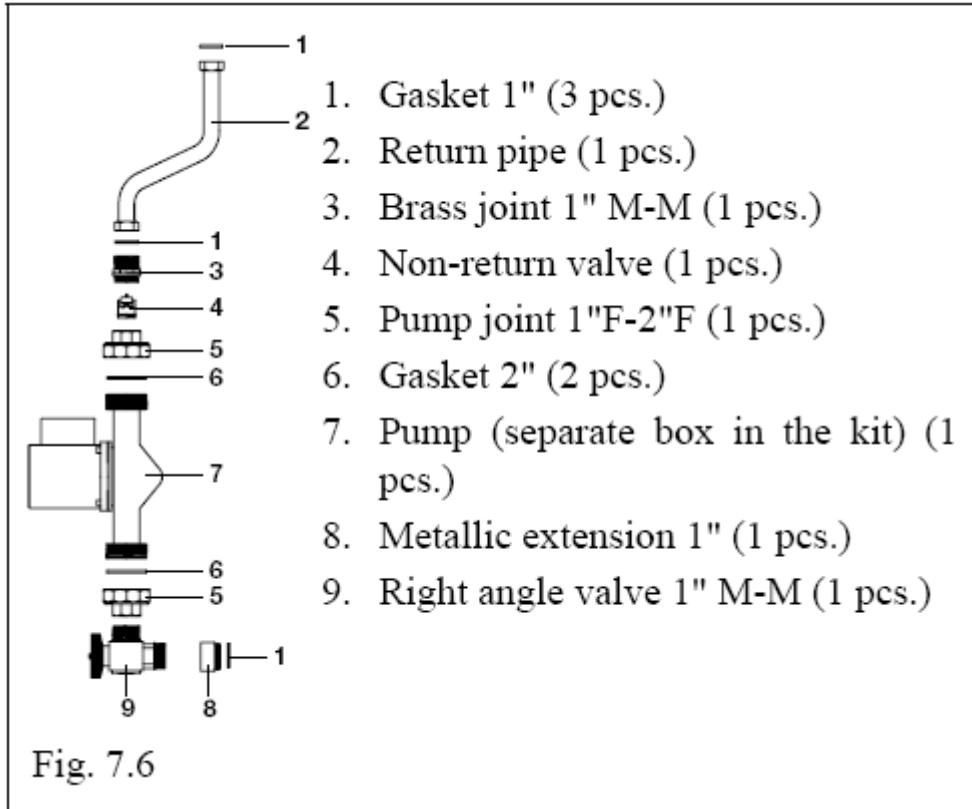
**100kW > devices hydraulic installation (figure 7.5)**

- 1 gas manifold 3" (must be at least 300 mm above ground)
- Water flow manifold (insulated) 3" (must have socket connection)
- Water return manifold (insulated) 3"
- DN80–PN 6 flange pipes
- Manifold wall and base support elements (Manifolds will be secured to the floor or walls)
- Gas inlet inside (3/4"), 1" valves for water

- ⚠ It will be appropriate to plan the outdoor air sensor, the boiler sensor, pump cables are at minimum length so that they are closest to the outlet of the Master boiler (main boiler).
- ⚠ The water flow should be positioned in the central system nearest to the outlet in the flow direction.

**Under device pump kit (figure 7.6)**

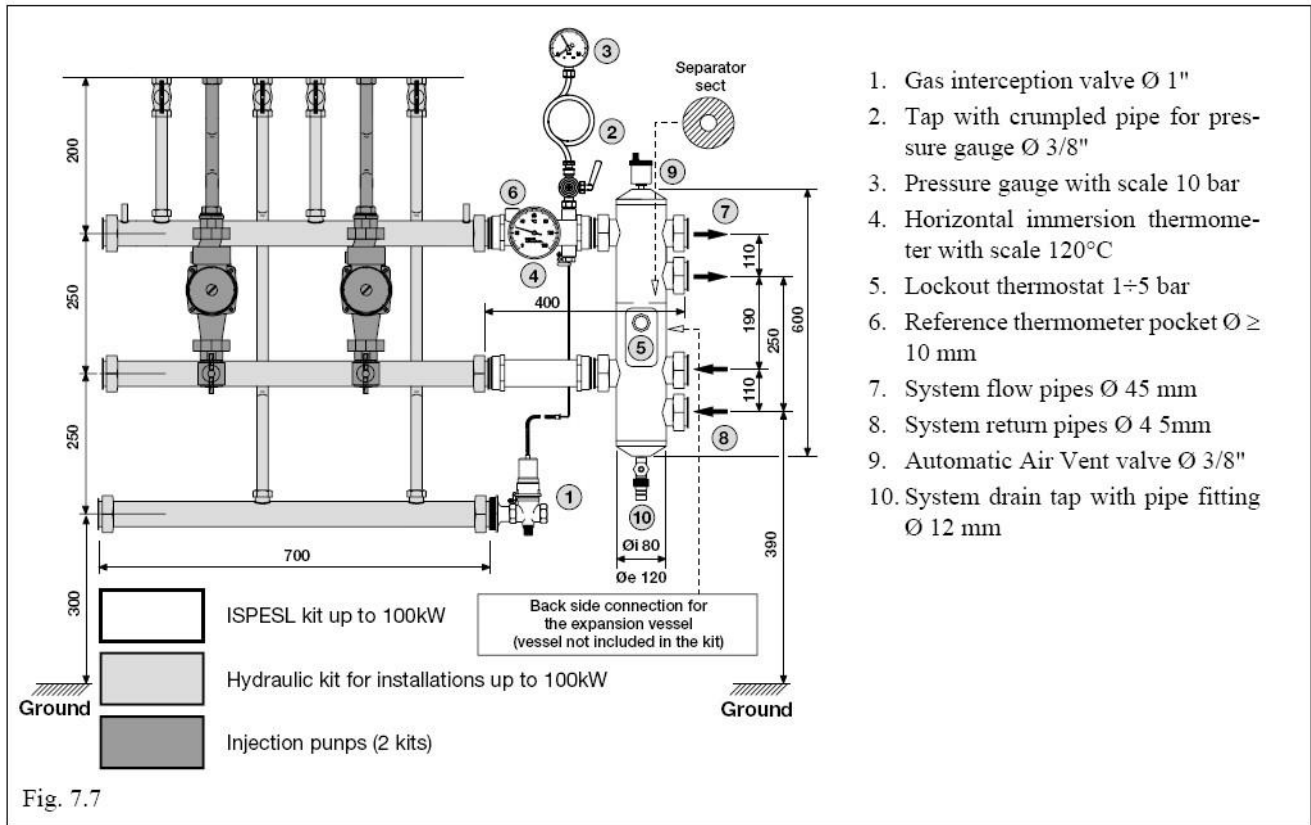
1. Gasket 1" (3 pieces)
2. Return tube (1 piece)
3. 1" brass reduction M-M (1 piece)
4. Reverse return blocking valve (1 piece)
5. Pump connection sleeve 1"F-2"F (2 pieces)
6. Gasket 2" (2 pieces)
7. Pump (one for each unit)
8. Metal extension 1" (1 piece)
9. Right angle valve 1" M-M (1 piece)

**With gas shut-off valve in 100 kW > installation - Original (ISPESL) (figure 7.7)**

**Note: This installation is mandatory installations material to be used in installations over 100 kW in some European countries.**

It is offered as an option by DD.

- 1. Gas cut-off valve  $\varnothing 1''$
- 2. Manometer copper spiral pipe  $\varnothing 3/8''$
- 3. 10 bar scale manometer
- 4. Dipping thermometer with  $120^{\circ}\text{C}$
- 5. 1-5 bar safety thermostat
- 6. Reference thermometer (for calibration or control) inlet  $\varnothing > 10\text{mm}$
- 7. Installation flow side pipe  $\varnothing 45\text{ mm}$
- 8. Installation return side pipe  $\varnothing 45\text{ mm}$
- 9. Automatic air relief cock  $\varnothing 3/8''$
- 10. System drain pipe (with fittings)  $\varnothing 12\text{ mm}$



Gas cutting kit can be used in systems with hydraulic mixer.

Systems with kit do not require safety valve.

If the kit is attached to the left or right of the installation, it does not create any problems.

The hydraulic mixer should be designed to give a maximum flow rate (11.6 m<sup>3</sup>/h). (The flow rate does not change because the hydraulic circuit is a high or low temperature heating circuit)

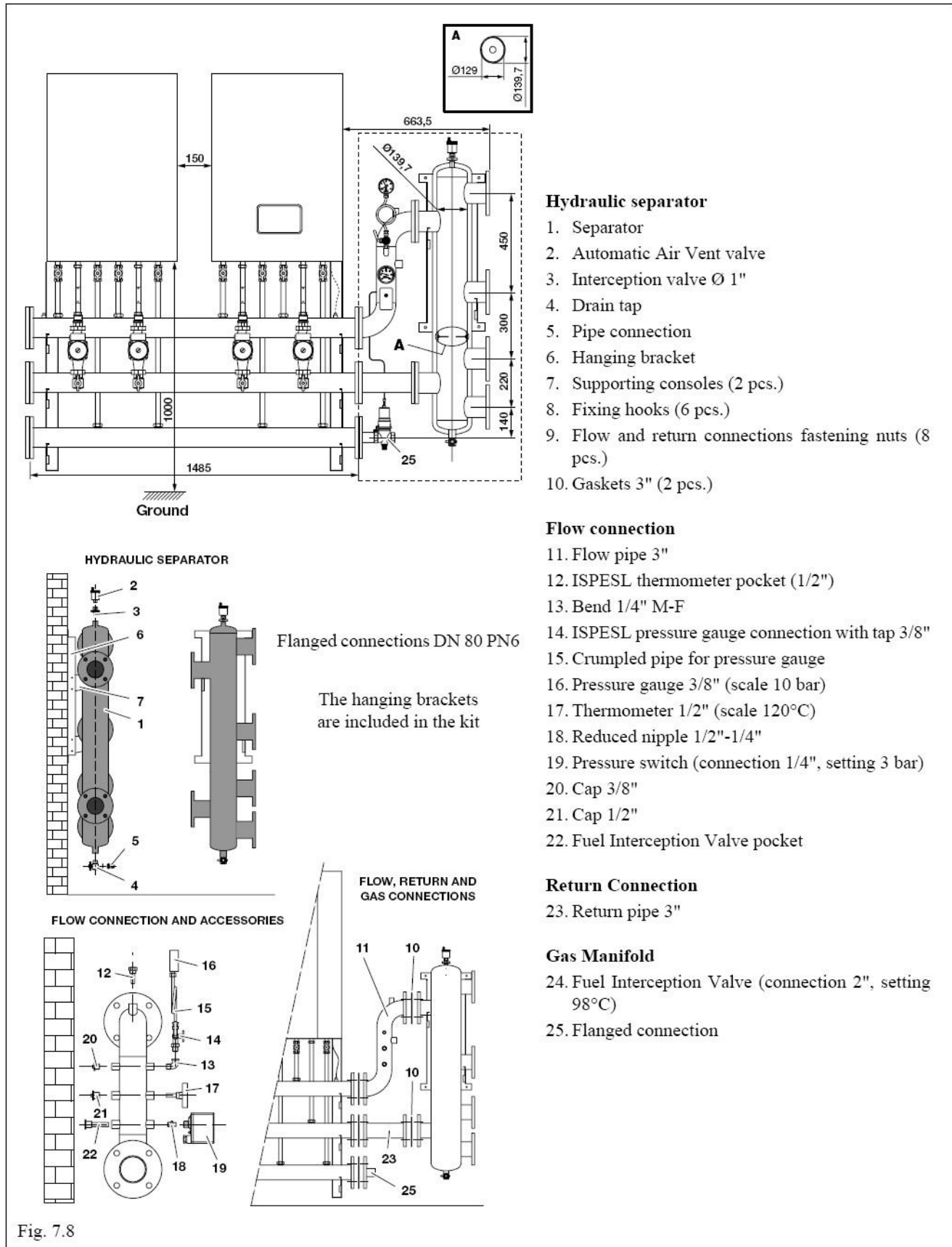
### Use of gas shutoff valve in 100 kW > cascade installations - Original (ISPEL) (Figure 7.8)

Gas cut-off valve 200kW > in cascade systems (fitting to right or left is appropriate)

- Hydraulic mixer unit should be fixed to the wall.
- All connections are given in Figure 7.8.
- The hydraulic mixer should be designed to give a maximum flow rate (11.6 m<sup>3</sup>/h). (The flow rate does not change because the hydraulic circuit is a high or low temperature heating circuit)

#### Hydraulic mixer materials (Figure 7.8)

- 1- Separator
- 2- Automatic air relief cocks
- 3- Gas cut-off valve 1"
- 4- Discharging tap
- 5- Discharging pipe connection
- 6- Wall bracket
- 7- Support consoles (2)
- 8- Hanging hooks (6 pieces)
- 9- Flow and return connections (8pcs)
- 10- Gasket 3" ( 2 pcs)



**Water flow line (Figure 7.8)**

11. Water flow manifold (gooseneck) 3"
12. Gas cutting system thermometer inlet (1/2")
13. Bend (1/4"9 M-F
14. Gas cutting system pressure gauge connection with 3/8" tap
15. Spiral copper pipe for manometer
16. 10 bar-scale manometer - inlet 3/8"
17. 120 °C scale immersion thermometer - inlet 1/2"
18. Reduction-nipple 1/2"-1/4"
19. Pressure switch (with installation connection 1/4") - 3 bar adjustable
20. 3/8" blind plug
21. 1/2" blind plug
22. Gas cut-off valve inlet

**Water return line (Figure 7.8)**

23. Water return manifold 3"

**Gas manifold (Figure 7.8)**

24. 25. Gas cut-off valve connection 2" and 98°C adjustable –(flange connection)

**Use of gas shutoff valve in 400kW < cascade installations - Original (ISPESL) (Figure 7.9)**

**The primary circuit of the cascade installation is used for systems where the building installation is heated as secondary with a heat exchanger (DD cascade systems 400 kW <). It is given for information.**

- Hydraulic mixer unit should be fixed to the wall.
- All connections are given in Figure 7.9.
- The hydraulic mixer should be designed to give a maximum flow rate (28 m3/h).

**Hydraulic mixer (Figure 7.9)**

- 1- Separator (DN 80)
- 2- Automatic air relief cock (3/8")
- 3- Gas cut-off valve
- 4- Drain tap (1-1/2")
- 5- Flow and return connection nuts (40 pcs)
- 6- Seal DN80 PN16 (4 pcs)

**Water flow manifold (Figure 7.9)**

- 7- Water flow pipe (DN80 PN6/PN 16)
- 8- Gas cut-off system (ISPESL) thermometer connection socket
- 9- Gas cut-off system (ISPESL) manometer, with 3/8" tap
- 10-Helical pressure gauge pipe
- 11- Pressure gauge (3/8"), scale-10 bar
- 12 Thermometer (1/2") – scale 120°C
13. Pressure switch (1/4") - 3 bars adjustable
- 14 1/2" blind plug
15. 1/4" M Nipple



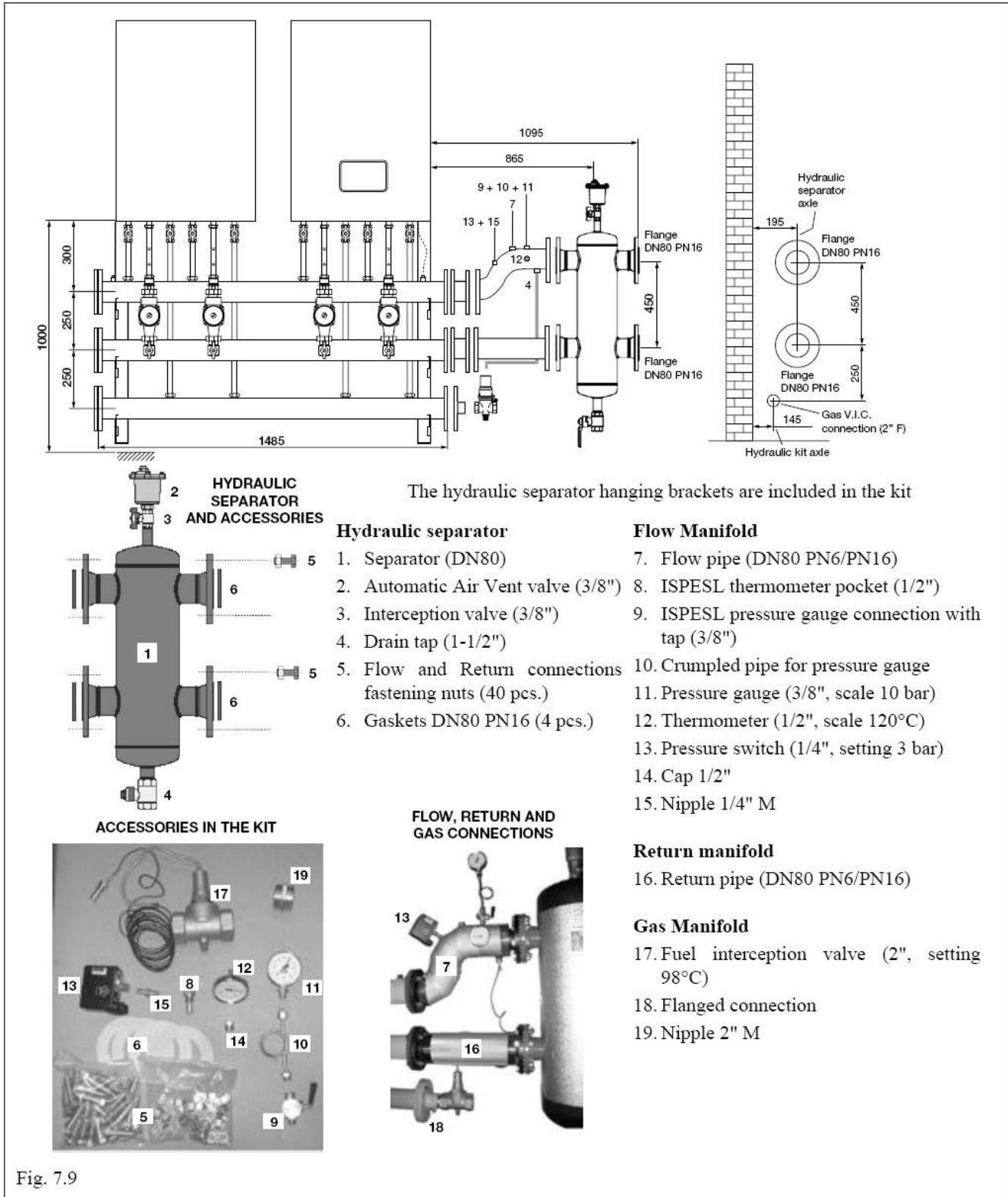


Fig. 7.9

**Water return line (Figure 7.9)**

16. Water return manifold (DN 80 PN 6/PN16)

**Gas manifold (Figure 7.8)**

17. /18 Gas cut-off valve connection 2" and 98°C adjustable –(flange connection)

19 Nipel 2" M

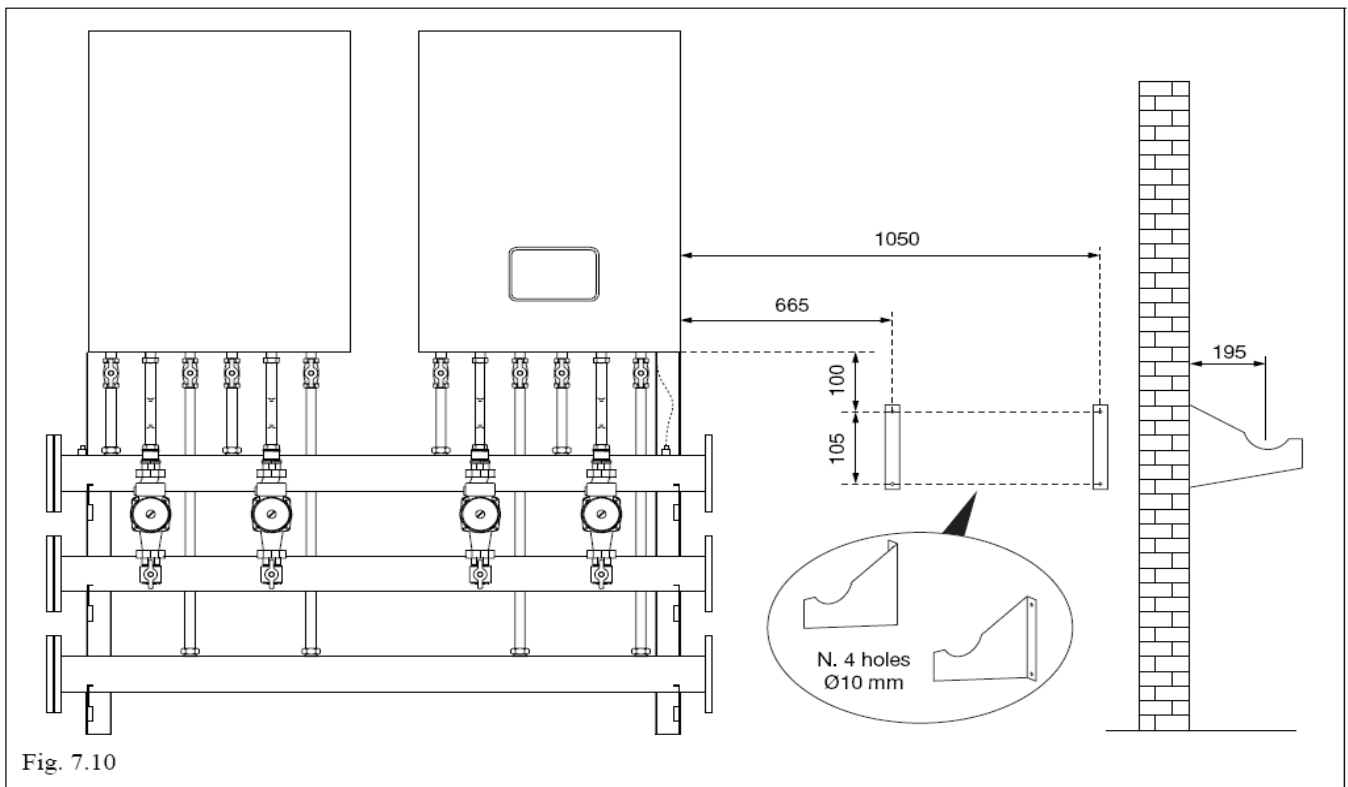
**Installation guide (for 400 kW <) (figure 7.10)**

First of all, install the hydraulic manifold (code\_110 2409 (manufacturer code) to the wall using the suspension brackets (Given in Appendix I) (Carcass-systems are connected to the carcass)

Remove the protective plastic cover on the hydraulic manifold flanges and adjust the flanged inserts and the hydraulic kit with hydraulic separator.

Connect two units with gaskets and bolts (gaskets and bolts are supplied with the kit)

After connecting the flow and return manifolds to the hydraulic separator gap pieces, gas cut-off unit, pressure gauge, thermostat, pressure switch, blind plugs and sensors are connected on the interconnection kit.





**Installation of the low temperature circuit (figure 7.11)**

Low temperature circuit kit (code\_110 2409 (manufacturer code) is given in Appendix I)); it comprises of a sensor and 3-way mixing valve.

- PN: 10 bar
- Nominal diameter DN 32 mm, 1-1/4"
- Fluid coefficient Kvs and Kvo (Flow rate is measured as m<sup>3</sup>/h,  $\Delta p_v$  : 1 bar) 100kPa = 10mCa01 bar  
Kvs= 18 m<sup>3</sup>/h  
Kvo=0,18m<sup>3</sup>/h  
F1 1/4" : 3-way valve (opening and closing 230 Vac neutral 9 Kvs 18 m<sup>3</sup> / h (max flow rate at 1 bar pressure), Kvo. 0.18

Pumps between the hydraulic mixer and the system are not supplied with this kit. Instead of a direct pump connected to the boiler power transfer must be provided with relays.

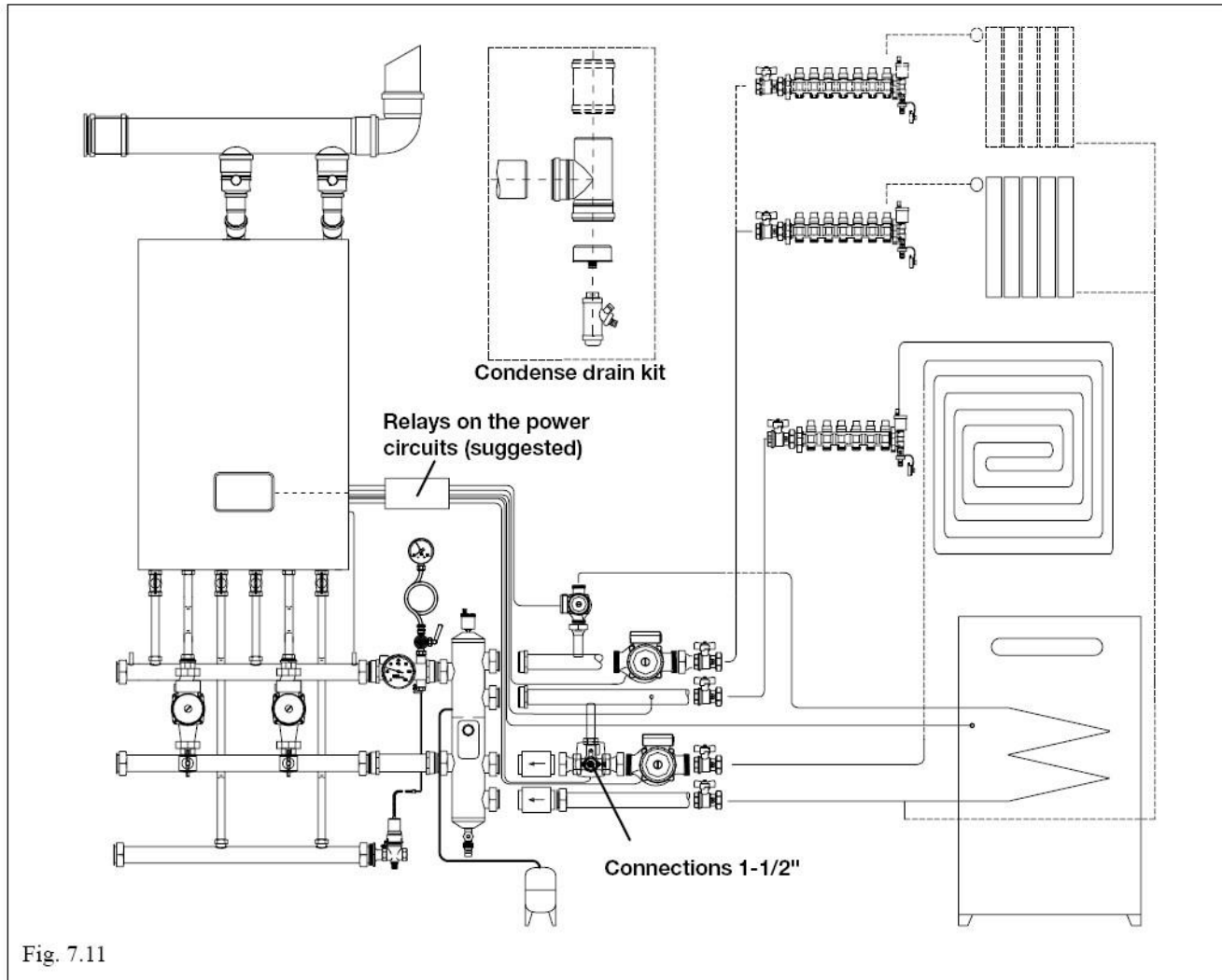


Fig. 7.11

## 7.6. GAS CONNECTIONS

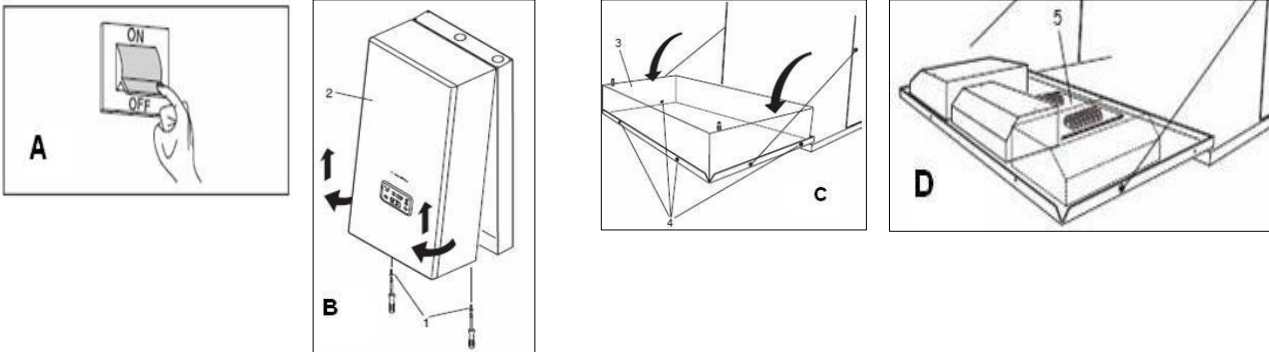
- The device works with natural gas or LPG. Gas connections must be made in accordance with the relevant standards. Following points must be observed before making connection:
- The device to be connected and the gas type must be the same.
- Connection pipes must be clean and not obstructed.
- Gas connection pipes must be the same size or larger than the gas inlet (3/4"); the pressure drop during this time must be less than the pressure drop between the gas line and the device.
- After gas connections have been made, it must be checked that there are no leaks at the joints.
- A suitable filter should be mounted on the gas inlet.
- Make sure the gas valve or valves are open.
- Use the correct gas for the unit (In LPG applications, LPG set must be installed in the device).

## 7.7 ELECTRICAL CONNECTION

The device comes with an electric power cord. In operations such as connection to electronic cards the power cable of the device must be disconnected from the wall outlet. For electrical connections:

- Turn off the electricity to the device (A)
- Remove the lower panel of the appliance and remove the front panel as shown in the figure. (B)
- Open the instrument control panel forwards. (C)
- Disconnect the control panel connections to access the electronic card of the device. (D)

Make the required room thermostat, outdoor air sensor etc. connections according to the detailed electronic card.



Only the room thermostat(s), outdoor air sensor's and the pumps are connected to the corresponding terminals on the card.

The HK 100 S models also have a communication cable.

(Bus cable) relevant connections points are shown on the master card.

### The elements on the HK 50- HK 100 Master card

**PB** : Boiler pump terminal terminals (28-27)

**PZ 1** : High-temperature system pump terminals (26-25)

**PZ 2** : Recirculation or **Pbas** –Low temperature system pump terminals (24-23)

**VM** : 3-way mixing valve terminals (22-21-20)

**Alarm signal terminals** ( 19-18)

**SZ1** : High temperature system (zone) sensor terminals 1 (1-2)

**SB** : Boiler (domestic water) sensor terminals (3-4)

**SZ2** : Low temperature system (zone) sensor terminals 1 (5-6)

**SE** : Outdoor air sensor terminal (7-8)



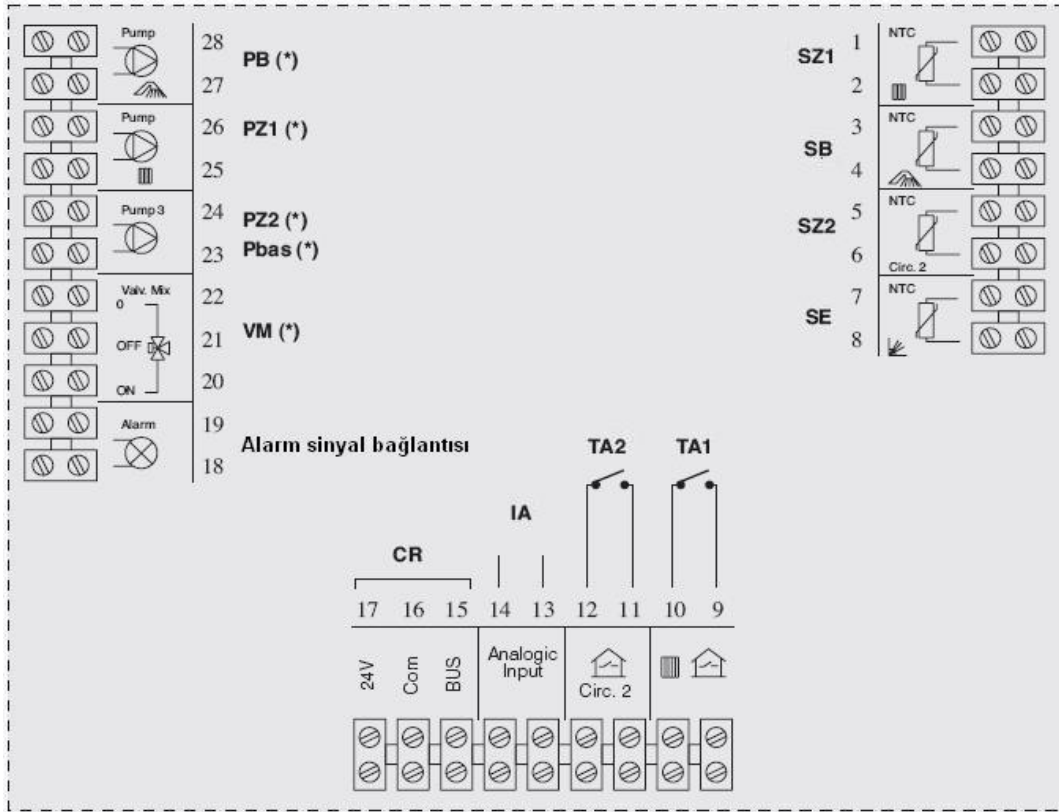
**CR:** Remote control terminals (17: 24v, 16: Com, 15: BUS)

**IA:** Analog input 0-10 V terminals (14-13)

**TA1:** High temperature system (zone) room thermostat terminals (12-11)

**TA2:** High temperature system (zone) room thermostat terminals (10-9)

### HK 50 M – HK 100 M TERMINALS ON MASTER CARD



**230v-50hZ**

### ATTENTION

The following measurements and rules must be observed.

1. Cut off the main switch connection using the multi-polar thermal overload switch (Compatible with the CEI-EN standard) (contact gap is minimum 3mm)
2. Differentiate the current (L) and neutral (N) connections The ground connection must be 2 cm longer than the current connections.
3. The cable cross section should be at least 1.5 mm<sup>2</sup> and with pointed end terminal.
4. In any operation on the electrical system, the circuit diagrams in this manual should be referred to.
5. The system must be connected to the effective grounding system.

Proper electrical connection should be made so that the pumps can intervene manually in case of emergency. Do not transfer room thermostat or other power cables from hot surfaces. (water pipes) DD is not responsible for the electrical connections where earthing is interrupted.

## 7.8. Water Filling/Bleeding the Water Circuit/

### Filling Water into the System:

It does not contain a filling tap to fill water into the system. Therefore, a valve connected to the return line is used in the filling process.

The system must be filled with water, by following the steps below:

- Open the installation return and installation flow valves (1).

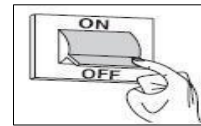
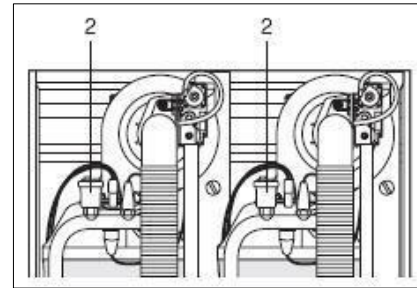
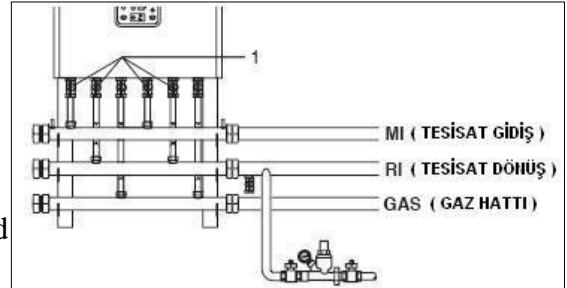
- The air relief cock is loosened by turning it 2 to 3 turns counterclockwise. (2)

- Keep the valve open until the pressure on the valve mounted on the return line of the installation reaches 1.5 bar:

- Close the valve until 1.5 bar value is read.



Make sure that the automatic air relief cock mounted on the heating unit (exchanger) of the device is open.



### Emptying the Water in the Device:

The steps below should be followed when draining the system water:

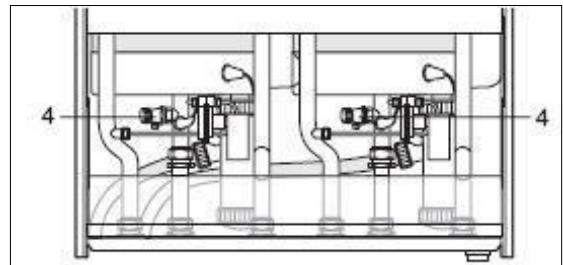
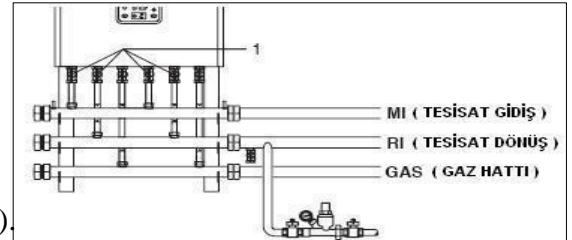
- Switch off the device's electrical connection.

- Switch off the installation flow and installation return valves (1).

- Connect a plastic hose to the safety valve outlet (4) and open the safety valve.

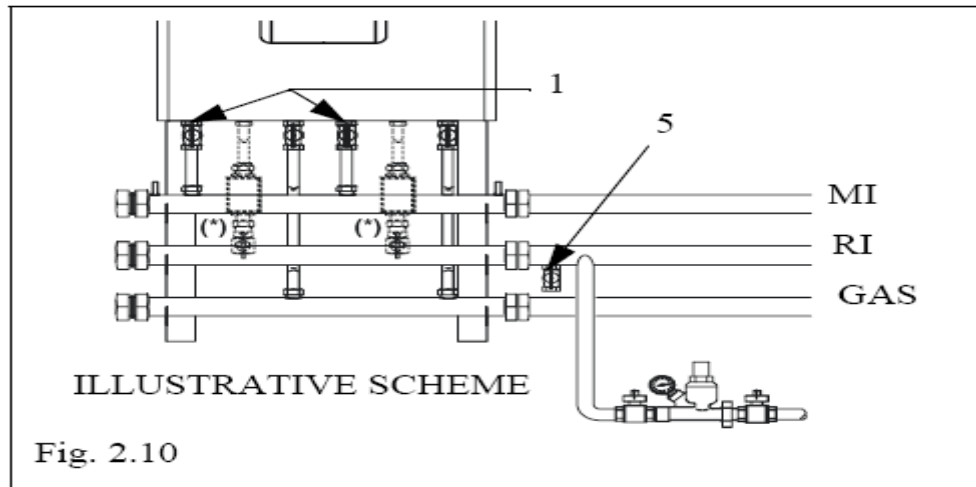


Before opening the safety valve, protect the electrical connections under the drain hose from water leaks.

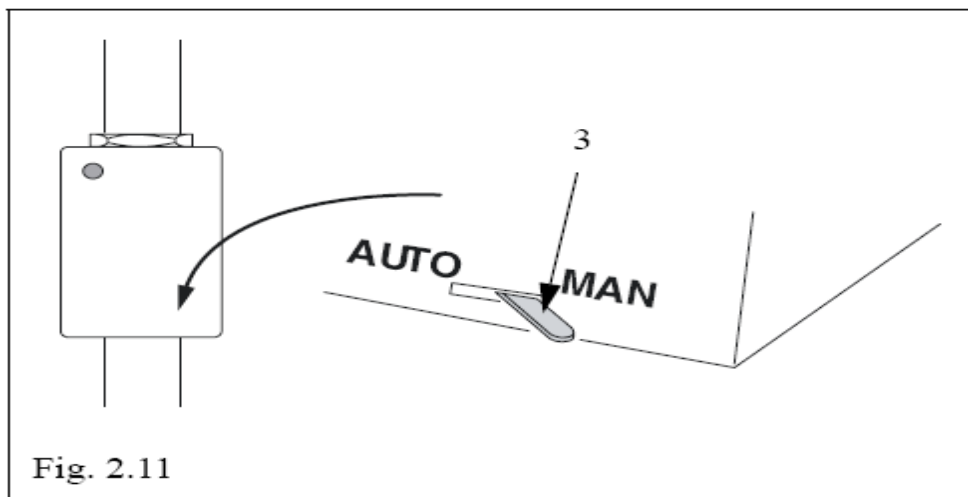


**Emptying the Water in the System:**

- Make sure the valves are open in the water circuit
- Connect the drain hose to the drain plug in the return line (Figure 2.10 (component 5))
- Switch the 2-way valve of each heating unit to the “MANUEL” position.



- After draining water in each unit is completed, the 2-way valves are switched to the "AUTOMATIC" position. (Figure 2.11)



## 7.9. WASTE GAS DISCHARGE AND COMBUSTION AIR SUPPLY

Waste gas installation and flue connection should be made according to the standards and rules applied by gas companies.

In applications over 50kW, in the systems connected to the waste gas flue with collector, for each heating unit it is necessary to use the waste gas flue cover recommended by DD.

The waste gas system must be rigid, mechanical resistant to temperature and resistant to the condense.

If the waste gas system recommended by DD is used, the collector and flue elements are manufactured from PP material with CE certificate. Flue system cannot be plastic + stainless.

**In applications where leakage check has not been carried out in the valve and fittings projected by DD in the flue system, the (o-ring) has not been used in the connections, DD will not be responsible for the dangers that may occur. Responsibility belongs to the firm that installs the flue.**

A separate isolation is also recommended to minimize the risk of waste gas leaking from the waste gas system. However, the waste gas system, which is recommended once a year, should be renewed every time after the cleaning process of the cleaning gap piece used to access the system.

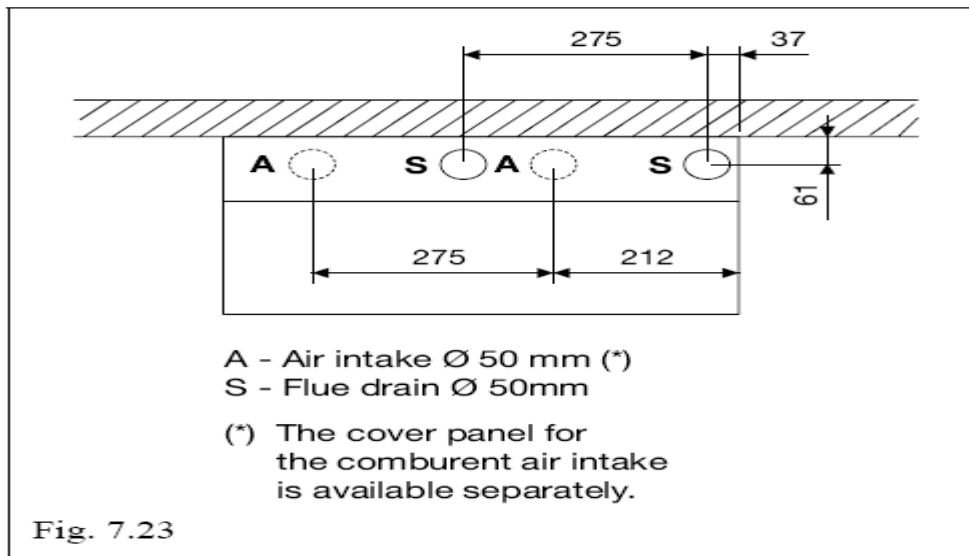
In annual periodic cleaning, cleaning of the waste gas system should be reported to the final consumer.

### 7.9.1. Maximum length of the flue pipe and cautions

If the flue system is made with one pipe (50 kW) from the heating unit from every device, for the Flue pipe of 50 mm 30 m flue is used, but for each 90° bend, 2m flue length should be deducted.

At the entrance of the flue (A condense siphon must be connected from horizontal to vertical and this siphon should be connected to the sewer with plastic hose.)

The flue outlet and the fresh air suction dimensions on the device are given in the figure 7.23 below. It is possible to receive the combustion air from inside the device.

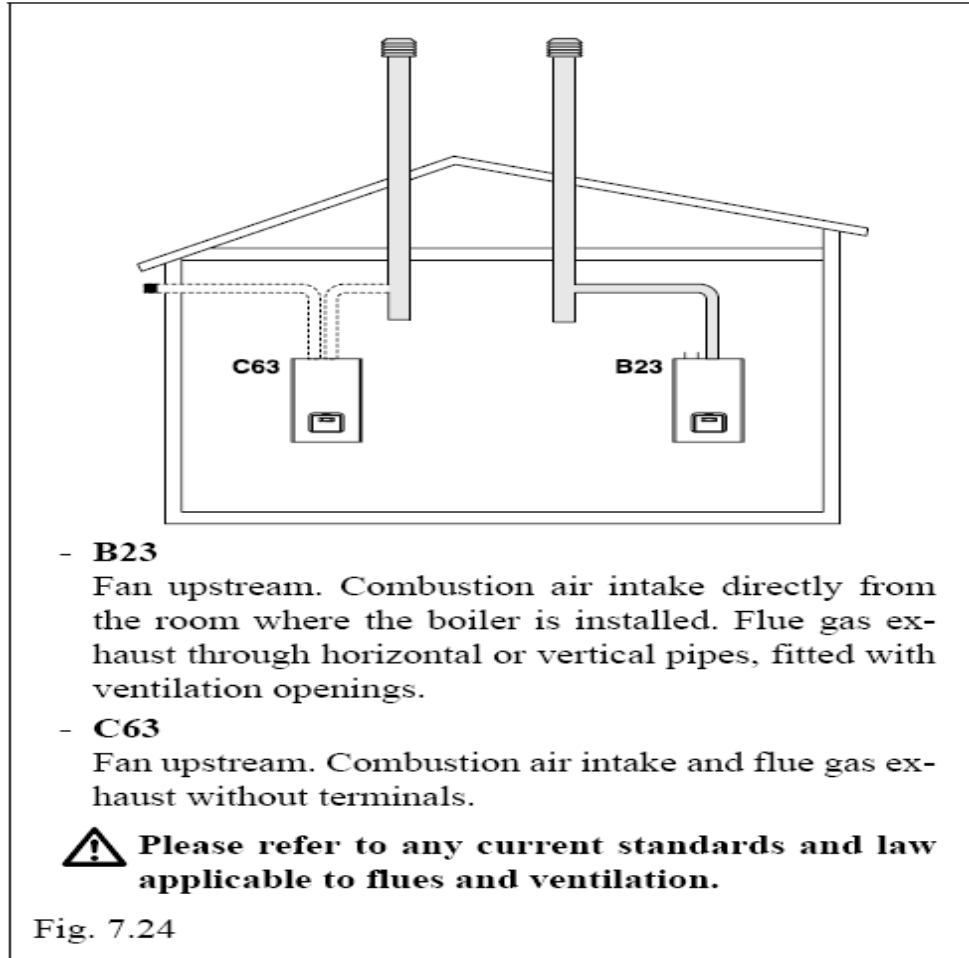


The waste gas system for two 50 kW with different flue outlets is given in figure 7.24

1 unit (50 kW) B23 type in the HK 50 M heating system, i.e. combustion air from the environment (Here, the gas company rules must be complied with and the vent hole conditions given in Article 7.2 must be ensured).

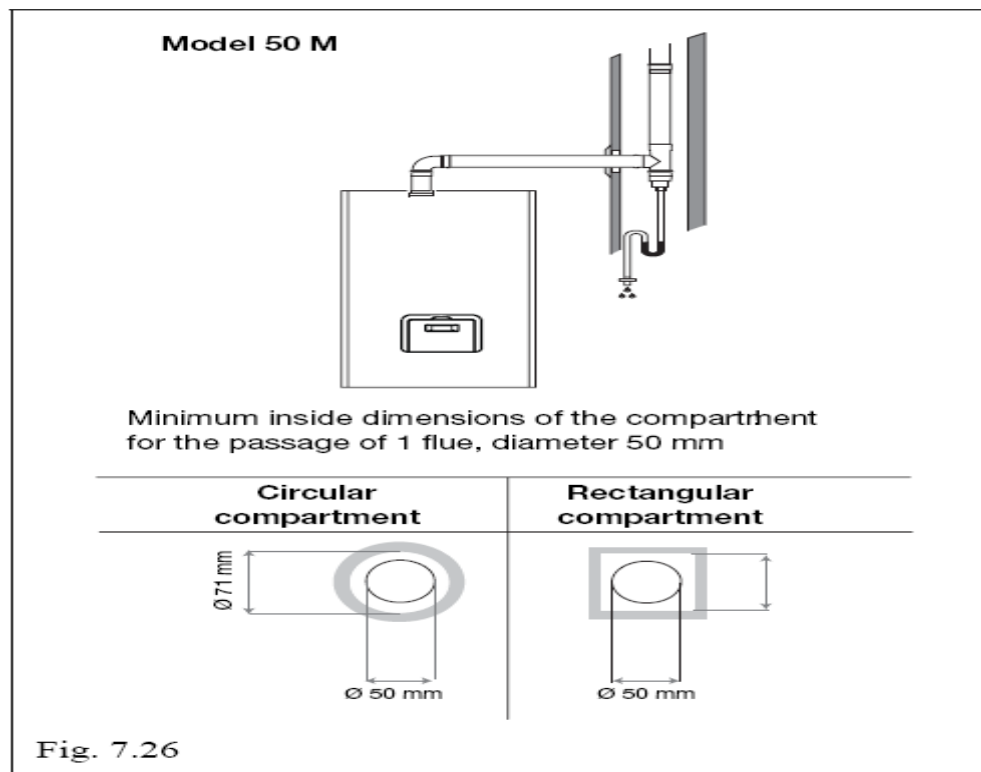
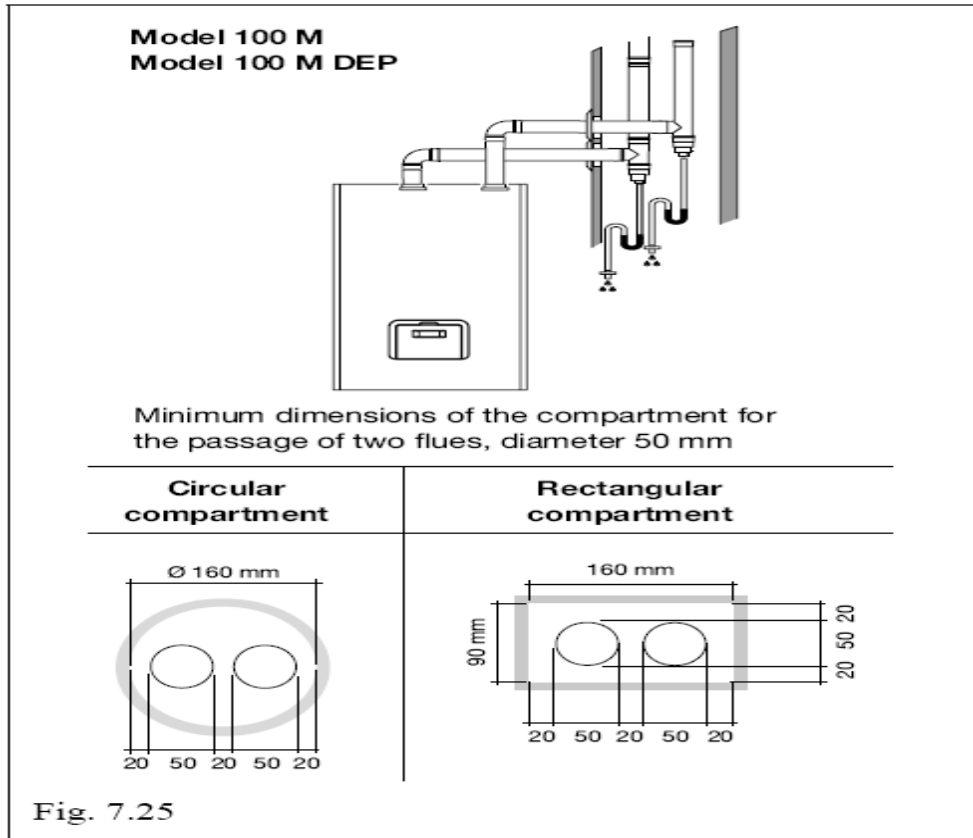
The other application is that fresh air can be supplied from outside environment in C63 type connection.

In cascade applications, C63 type application is invalid. It is mandatory to use valves in ventilation conditions such as B 23 and in each heating unit.

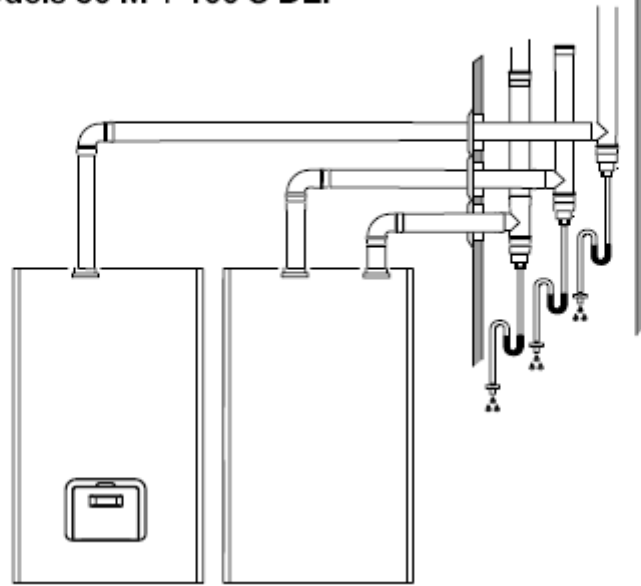


In Figures 7.25, 7.26 and 7.27, minimum outlet measurements in single flue outlets for each unit are given. As it will be seen here, there should be a vertical outlet siphon under the flue and the condense should be connected to the sewer system as sealed.





**Models 50 M + 100 S**  
**Models 50 M + 100 S DEP**



Minimum dimensions of the compartment  
 for the passage of three flues, diameter 50 mm

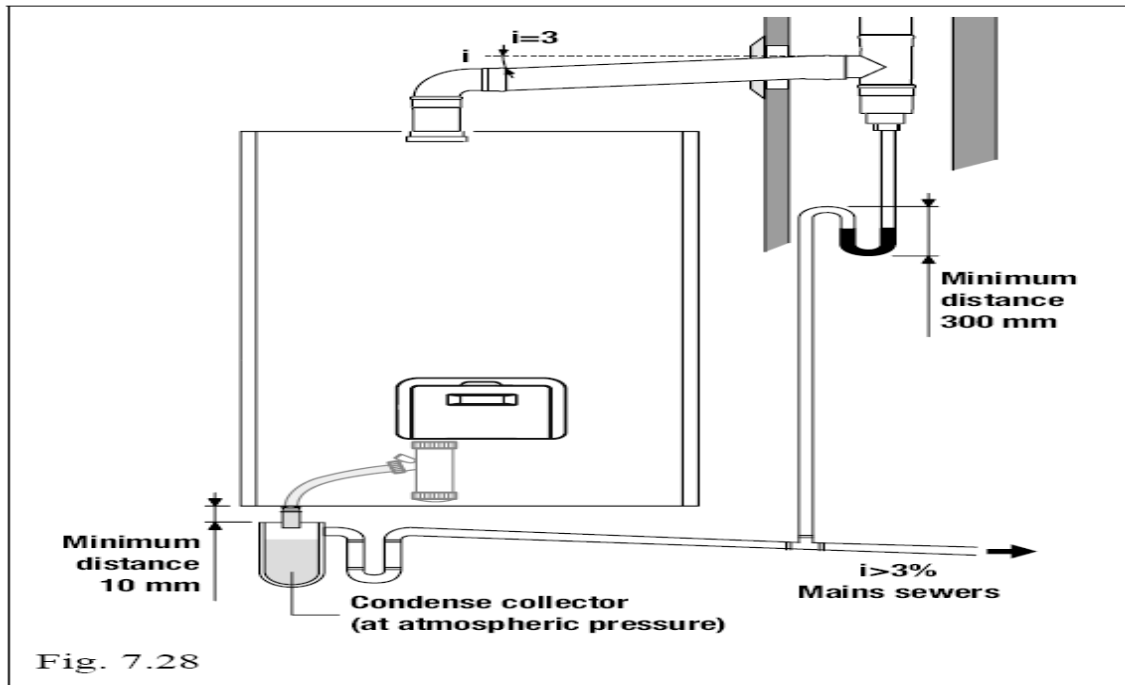
Square compartment	Rectangular compartment
<p>20 50 20 50 20</p> <p>160 mm</p>	<p>230 mm</p> <p>90 mm</p> <p>20 50 20 50 20 50 20</p>

**Fig. 7.27**

### 7.9.2. Arrangement of condense drainage (Figure 7.28)

In the normal operation of Maxicondense boilers, as a result of combustion with atmospheric pressure, condense is sent to the drainage from inside the device. However, under high temperature cycling conditions (80/60 °C) some condensate will naturally get condense in the waste gas system due to the low ambient temperature. Therefore, it is necessary to place the condensation unit at the last point on the waste gas system. Also at the bottom of the flue vertical installation, an additional cooling unit is recommended.

- It is recommended to apply the condensate through the neutralization unit before being given to the sewage system in applications over 200 kW. Some municipalities may be obliged to apply the rule.
- The condensation unit must be leak-proof and connected to the city sewer system.
- The condensation siphon must be connected to the sewer with a slope of  $3^0$ .
- Condensate must be connected to the sewer system both from the device, if necessary with a siphon from the waste gas system and must be sealed.



### 7.9.3 Valve (Figure 7.11)

In applications above 50 kW, there must be valve between the waste gas system and the device. The table below gives the maximum flue heights for the DN 125 flue diameter.

The device must be used with a waste gas pipe given as an accessory.

It should be noted that the device is semi-hermetic. Therefore, the waste gas piping only removes the waste gas from the resident.

Fresh air is drawn from the environment by the device. Therefore, the necessary vent holes must be prepared in the environment where the device is installed.

**For every 90° bend, it requires a 2 m reduction from the total pipe length.** The applicable waste gas pipe lengths are given in the table below.

Definition	Maximum Thermal	Maximum waste gas Pipe length (m)	Pipe diameter (mm)
<b>1 HK 50 M</b>	<b>&lt; 45</b>	<b>55</b>	<b>125</b>
<b>1 HK 100 M</b>	<b>&lt; 90</b>	<b>55</b>	<b>125</b>
<b>1 HK 50M + 1 HK 100 S</b>	<b>&lt; 135</b>	<b>55</b>	<b>125</b>
<b>1 HK 100 M + 1 HK 100 S</b>	<b>&lt; 180</b>	<b>50</b>	<b>125</b>
<b>1 HK 50M + 2 HK 100 S</b>	<b>&lt; 225</b>	<b>30</b>	<b>125</b>
<b>1 HK 100 M + 2 HK 100 S</b>	<b>&lt; 275</b>	<b>30</b>	<b>125</b>
<b>1 HK 100 M + 3 HK 100 S</b>	<b>&lt; 360</b>	<b>25</b>	<b>125</b>

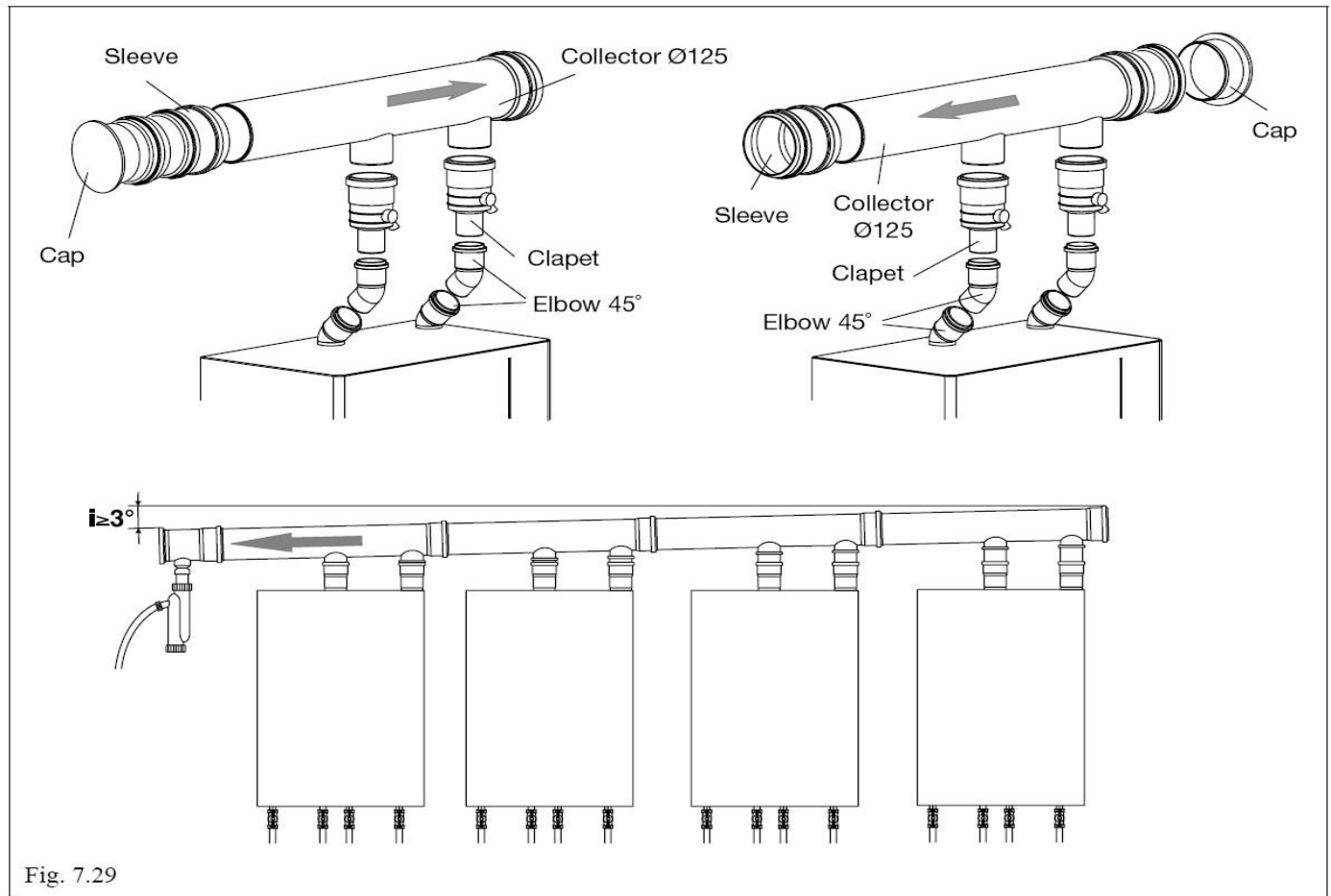
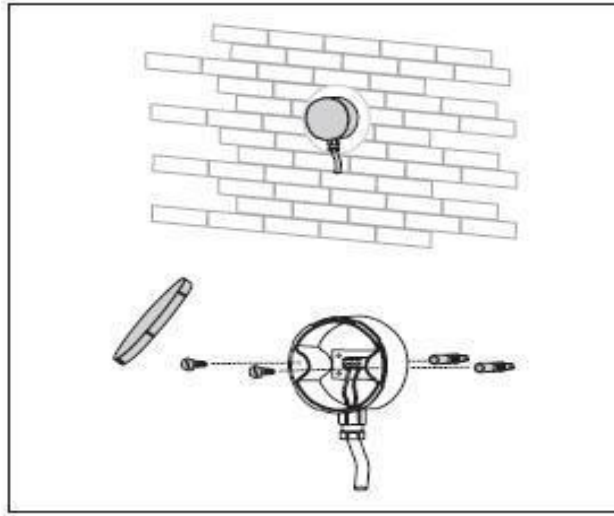


Fig. 7.29

## 7.10 OUTDOOR AIR SENSOR CONNECTION

The outdoor air sensor is the basic part that automatically regulates the heating. The following steps should be followed for installation:

- The outdoor air sensor protection cover is removed and the connection terminals and screw nuts are accessed. (5x25mm dowel connection- The connection points are drilled according to the template.)
- Connection cable with 0.5~1 mm<sup>2</sup> cross section is connected to the terminals on the sensor housing. Terminals 7 and 8 are connected on the electronic board by exiting from the hole in the body (see Appendix G).
- The protective cover is closed.



Points to note about the sensor are:

- The environment heated should be installed on the wall facing 2/3 of the north or northwest should be mounted so as not to see direct sunlight.
- The sensor should contact the wall directly. The wall must have a smooth surface.
- The maximum cable length between the sensor and the electronic board in the control panel must be 50 m. If it is more than 50 m, correction must be made with parameter 37 for correct measurement.
- No addition is recommended in the wiring between the sensor and the card. If any addition is made, it should be well-insulated.
- Contact should be avoided between the conductive leads used for the connection cable used between the sensor and the card and the power cable.
- If outdoor air sensor is not to be installed, Parameters 14 and 22 should be set to 0.
- The cable must be wired separately from the 230 Vac power cable to avoid any interference.

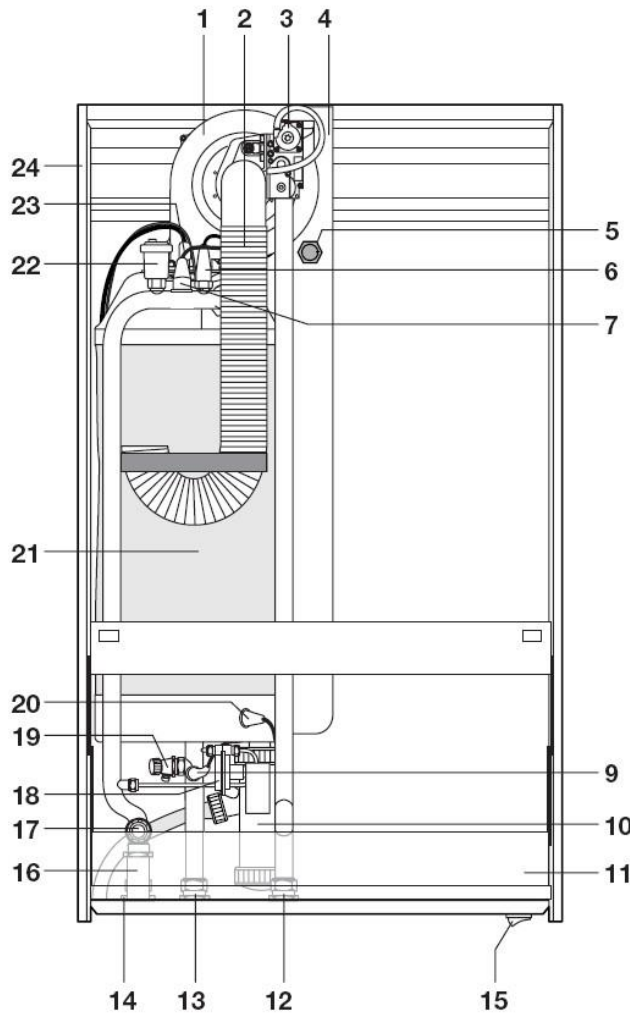
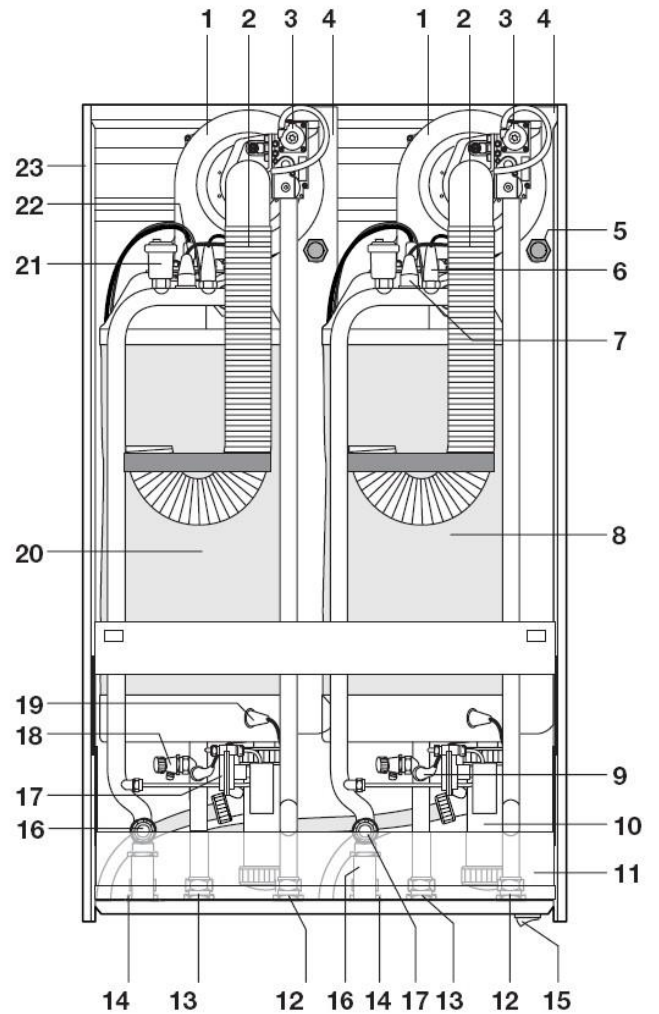
**Measured temperature - corresponding resistance values**

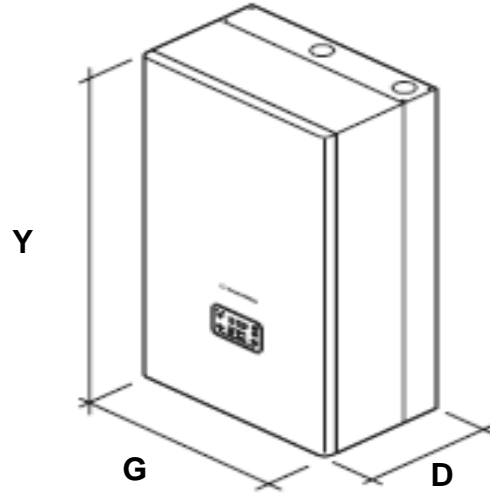
Observed temperature (°C) - Sensor measurement resistance (ohm)

T (°C)	R (ohm)	T (°C)	R (ohm)	T (°C)	R (ohm)	T (°C)	R (ohm)	T (°C)	R (ohm)	T (°C)	R (ohm)
-20	67739	2	25044	24	10382	46	4751	68	2365	90	1266
-19	64571	3	24004	25	9999	47	4595	69	2296	91	1232
-18	61568	4	23014	26	9633	48	4444	70	2229	92	1199
-17	58719	5	22069	27	9281	49	4300	71	2164	93	1168
-16	56016	6	21168	28	8945	50	4161	72	2101	94	1137
-15	53452	7	20309	29	8622	51	4026	73	2040	95	1108
-14	51018	8	19489	30	8313	52	3897	74	1982	96	1079
-13	48707	9	18706	31	8016	53	3773	75	1925	97	1051
-12	46513	10	17959	32	7731	54	3653	76	1870	98	1024
-11	44429	11	17245	33	7438	55	3538	77	1817	99	998
-10	42449	12	16563	34	7196	56	3426	78	1766	100	973
-9	40568	13	15912	35	6944	57	3319	79	1717	101	948
-8	38780	14	15289	36	6702	58	3216	80	1669	102	925
-7	37079	15	14694	37	6470	59	3116	81	1622	103	901
-6	35463	16	14126	38	6247	60	3021	82	1577	104	879
-5	33925	17	13852	39	6033	61	2928	83	1534	105	857
-4	32461	18	13062	40	5828	62	2839	84	1491	106	836
-3	31069	19	12565	41	5630	63	2753	85	1451	107	815
-2	29743	20	12090	42	5440	64	2669	86	1411	108	796
-1	28481	21	11634	43	5258	65	2589	87	1373	109	776
0	27279	22	11199	44	5082	66	2512	88	1336	110	757
1	26135	23	10781	45	4913	67	2437	89	1300		

**APPENDIX A- MAIN COMPONENTS**

- |                                  |   |
|----------------------------------|---|
| 1. Fan                           | 2. Fresh air intake                       |
| 3. Gas valve                     | 4. Waste gas outlet pipe                  |
| 5. Waste gas measuring point     | 6. Installation outlet (flow) sensor      |
| 7. Safety thermostat             | 8. Second heat exchanger (for Model S100) |
| 9. Installation return sensor    | 10. Condensate container                  |
| 11. Control panel                | 12. Gas entry                             |
| 13. Installation return          | 14. Installation flow                     |
| 15. Main control knob            | 16. Safety valve (6 bar)                  |
| 17. Pressure balancing switch    | 18. Condensate container drainage outlet  |
| 19. Waste gas temperature sensor | 20. The first exchanger                   |
| 21. Automatic purge              | 22. Ignition/surveillance electrode       |
| 23. Panel body                   |   |

**Power Plus 50 M****Power Plus 100 M - 100 S**

**APPENDIX B DEVICE MEASUREMENTS AND WEIGHT**

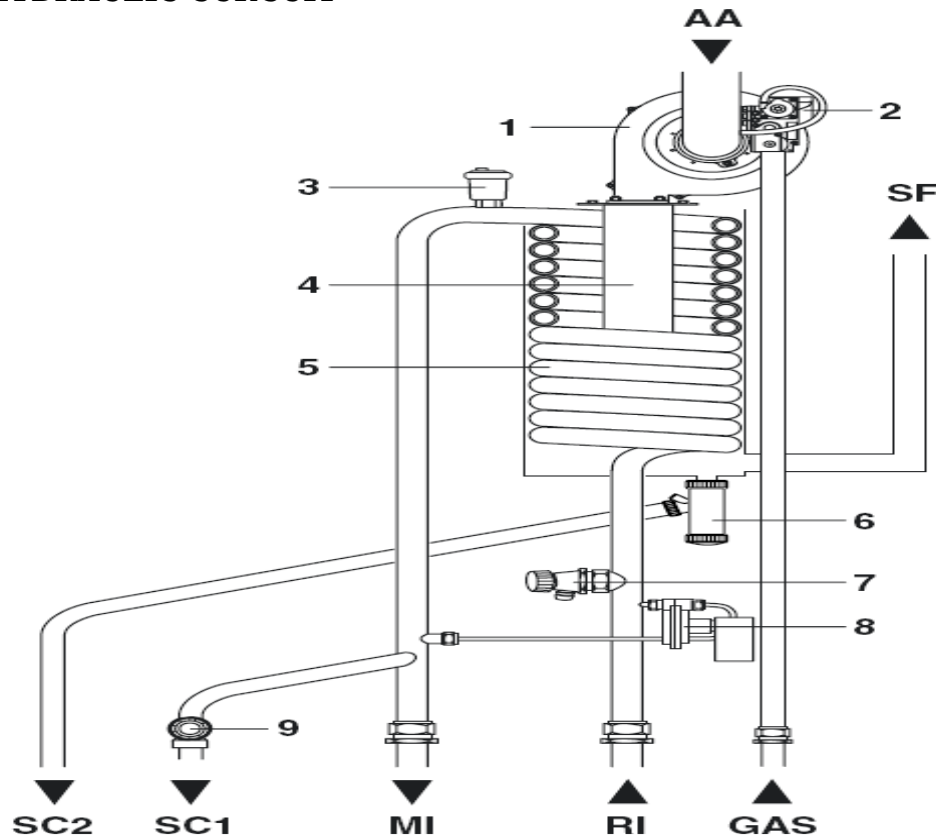
	HK 50 M	HK 100 M	HK 100 S
Width (W)	600	600	600
Depth (D)	380	380	380
Height (H)	1000	1000	1000
Net Weight [kg]	~60	~90	~90



**APPENDIX C- TECHNICAL INFORMATION TABLE**

Definition	Maxicondense			Unit
	HK 50 M	HK 100 M	HK 100 S	
Fuel type	G20 - G30 - G31			
Device category	II2H3 +			
Device type	B23 - C63			
Thermal load (Min. - Max.)	16.3 - 50	16.3 - 100	16.3 - 100	KW
Thermal power (Min. - Max.)	15 - 45	15 - 90	15 - 90	KW
Thermal power (80°C / 60°C)	44.2	88.3	88.3	KW
Thermal power (50°C / 30°C)	48.5	96.8	96.8	KW
Efficiency (80°C / 60°C)	98.2	98.2	98.2	%
Efficiency (50°C / 30°C)	107.7	107.7	107.7	%
Efficiency in 30% load (50°C /	108.7			%
Flue loss (While device is active)	1.3			%
Flue loss (While device is inactive)	0.1			%
Circuit heat loss	0.5			%
Waste gas temperature	(Installation return temperature) + 5			°C
CO <sub>2</sub> (Min. - Max.)	8.4 - 9.4			%
CO (Min. - Max.)	< 10 - 120			p.p.m.
NOx (Min. - Max.)	< 10 - 20			p.p.m.
NOx class	5			
CH max. operating pressure	6			bar
Max. installation outlet temperature	90			°C
Installation temperature setting	20 – 80 (± 3)			°C
Heat exchanger water capacity	5	10	10	liter
Electric supply	230 ~ 50			V ~ Hz
Maximum electricity consumption	169	333	333	W
Electrical protection class	X0D			IP
Condensing amount	7.2	14.4	14.4	kg/h

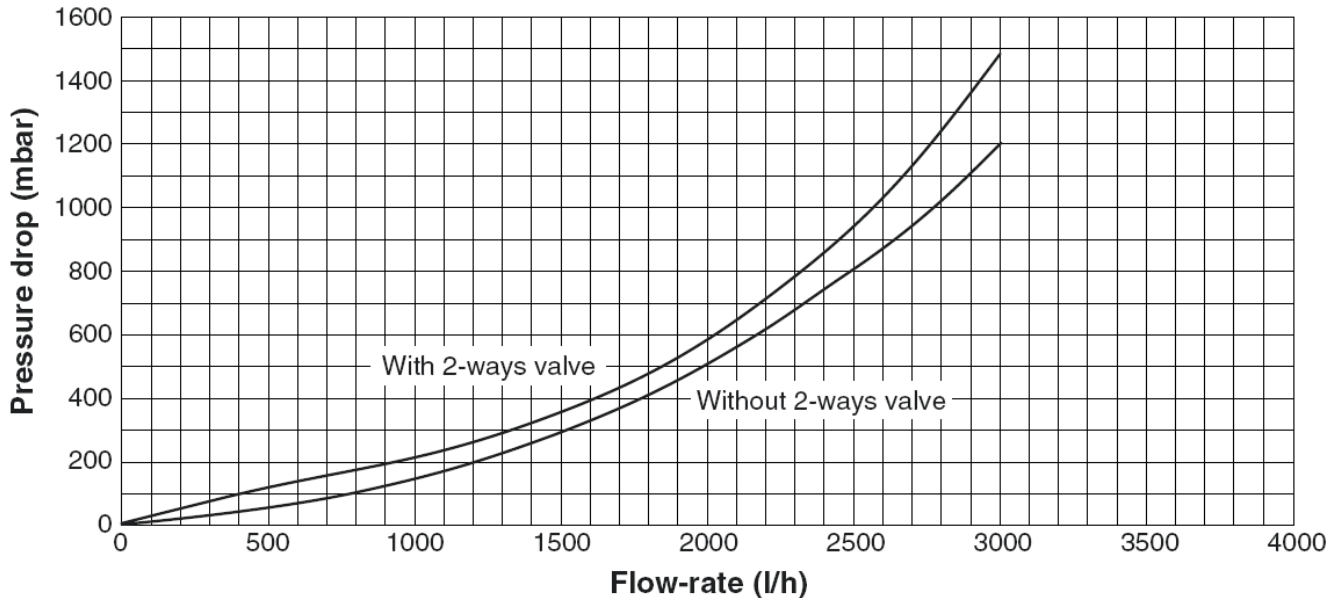
## APPENDIX D - HYDRAULIC CURCUIT

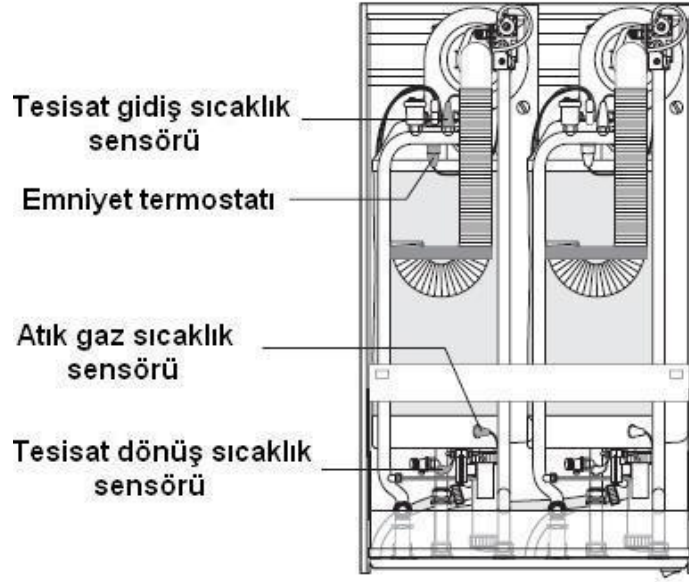


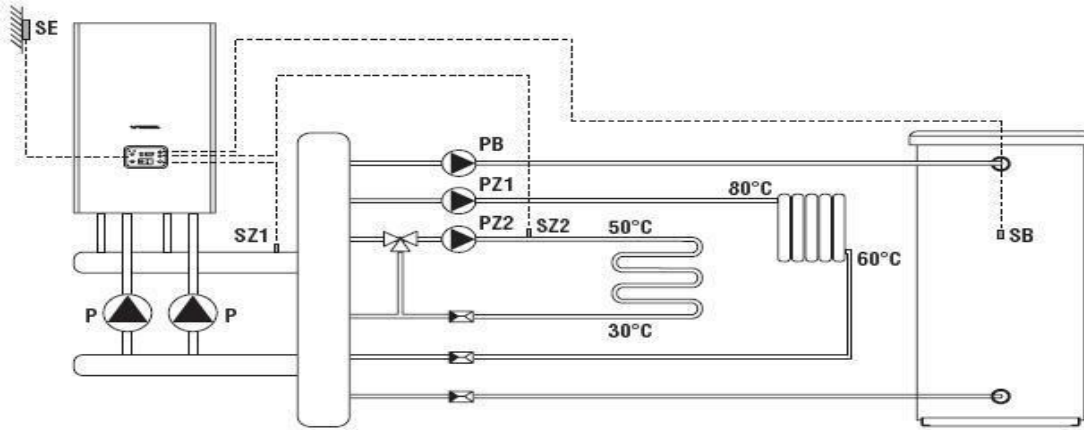
- |                       |                          |                                 |
|-----------------------|--------------------------|---------------------------------|
| 1.Fan                 | 2.Gas valve              | 3. Automatic air relief cock    |
| 4.Burner              | 5.Heat exchanger         | 6.Condensate container          |
| 7.Discharging tap     | 8. Water differential    | 9. Safety valve (5.5 bar)       |
| AA AIR INLET          | SF - WASTE GAS OUTPUT    | SC - CONDENSATE WATER DISCHARGE |
| MI- INSTALLATION FLOW | RI - INSTALLATION RETURN | GAS-GAS INLET                   |

### D.1 Water side heat losses

Pressure drop curve (mbar) of water flow rate with or without 2-way valve depending on the water flow



**APPENDIX E- NTC SENSOR POSITIONS**

**APPENDIX F- PUMPS**

**Configuration with injection pumps (\*)**

Boiler discharge head: 6 mWC

Boiler flow-rate: 2 m³/h for each pump.

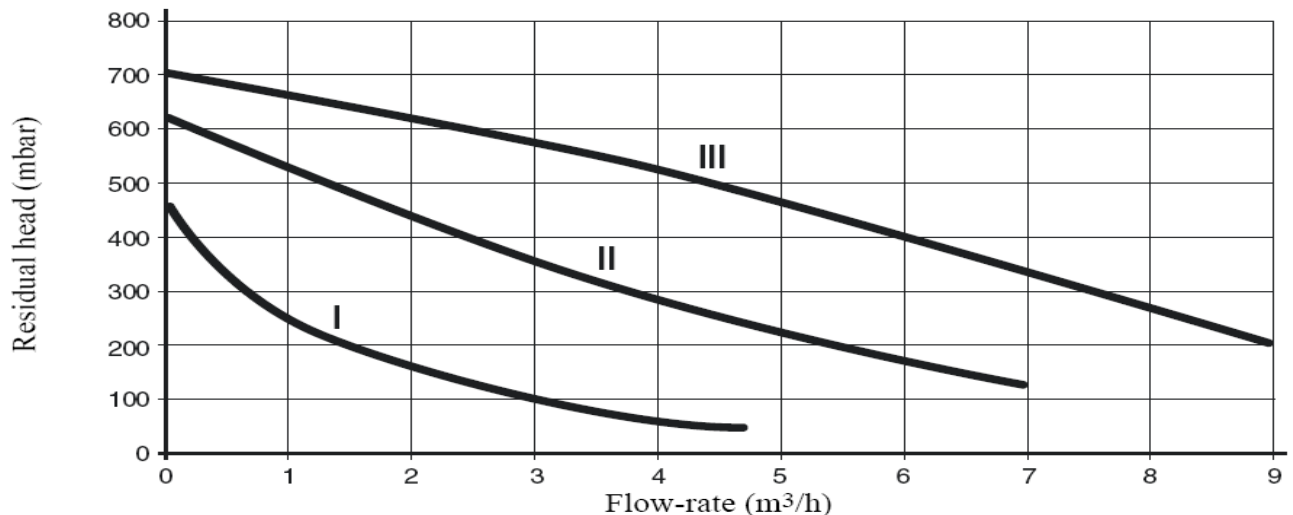
PB - DHW pump  
 PZ1 - Pump in zone 1  
       (high temperature)  
 PZ2 - Pump in zone 2  
       (low temperature)  
 P - Injection pump

SZ1 - Probe in zone 1  
 SZ2 - Probe in zone 2  
 SB - DHW probe  
 SE - Outside probe

(\*) Accessory code 480306.

**Boiler max. Water pressure 6 m WSS**
**Pump circulation min: 2 m³/hr (For each pump)**

SZ1 (High heating circuit flow sensor), SZ2 (Low heating circuit flow sensor) and SB (Boiler sensor) cables are connected together before entering into the boiler. SE outdoor air sensor comes as a separate line.

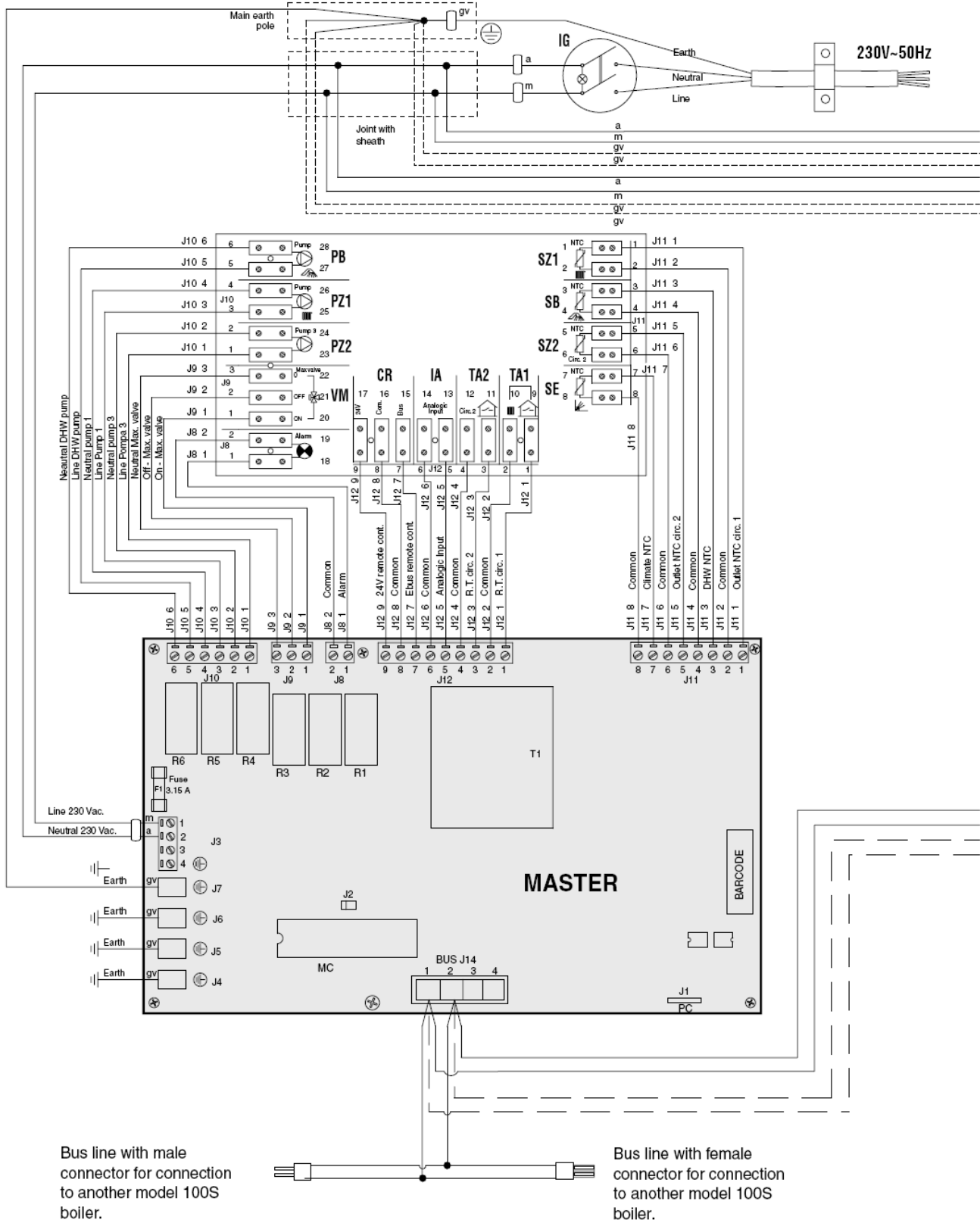
**PB: Boiler pump**
**PZ1: High temperature heating circuit installation pump**
**PZ2: Low temperature heating circuit installation pump**
**V2\_ Two-way valve**
**Pump Type A Under device pump curves (Pressure-Flow Rate)**
**Pump TYPE A – Typical curves injection pump available as an accessory**


## APPENDIX G- ELECTRIC DIAGRAMS

### G.1 Maxicondense 50 M -100M (Master card - Manufacturer code: R105920)

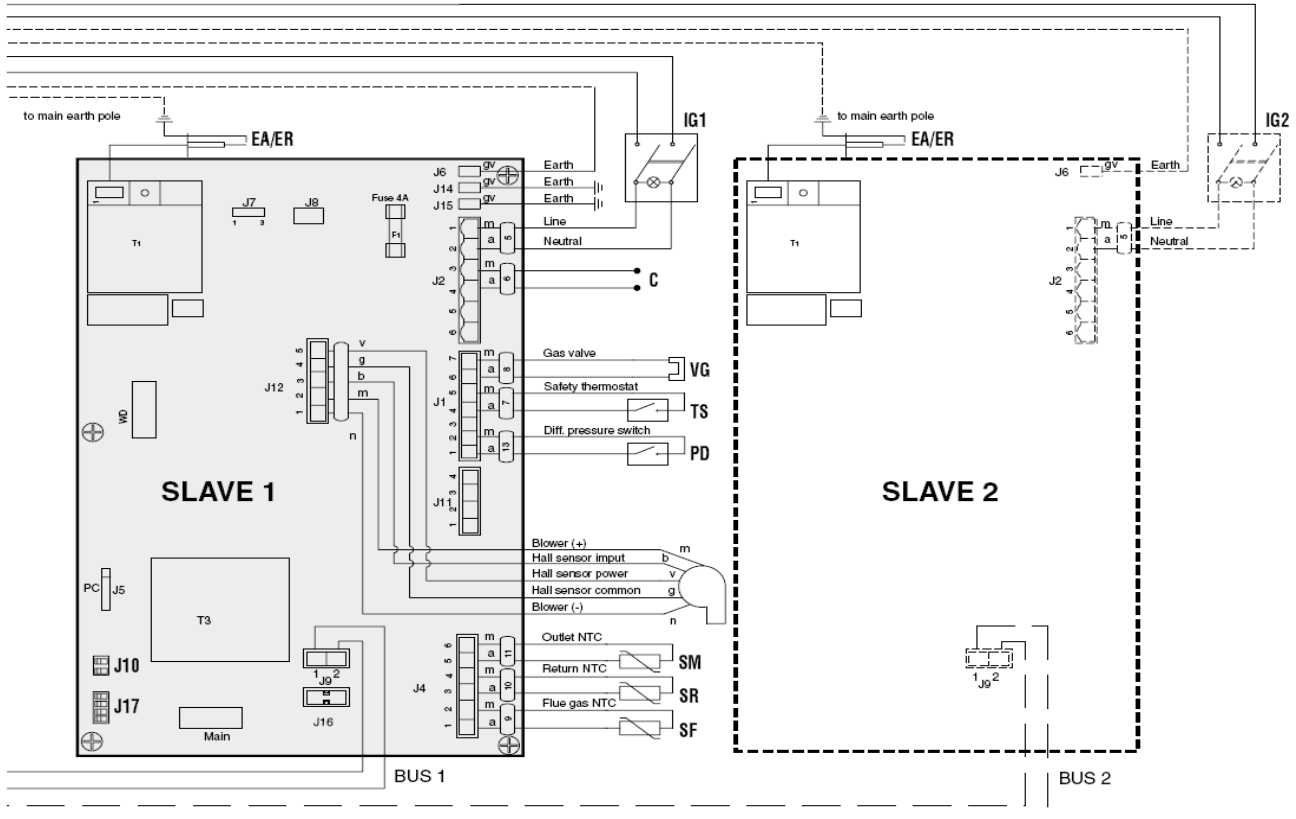
**Note: Manufacturer's code. Manufactured in 2 different codes. Code on the card should be read.**

#### 1st section



**Note: Pumps should be connected with appropriate connectors for emergency response situations.**

**2nd section**



- PB - DHW pump
- PZ1 - Pump in zone 1 (high temperature)
- PZ2 - Pump in zone 2 (low temperature)
- VM - Mixing valve
- CR - Remote control (accessory)
- IA - Analogue input
- SB - DHW probe
- SZ1 - Probe in zone 1
- SZ2 - Probe in zone 2
- SE - Outside probe
- TA1 - Room thermostat in zone 1 (high temperature)
- TA2 - Room thermostat in zone 2 (low temperature)

**SYSTEM**

**SYSTEM**

- PB:** Boiler pump
- PZ1:** High temp. heating circuit pump
- PZ2:** Low temp. heating circuit pump
- VM:** Mixing valve
- CR:** Remote control
- IA:** Analog input
- SB:** Boiler sensor
- SZ1:** High temp. circuit sensor
- SZ2:** Low temp. circuit sensor
- SE:** Outdoor air sensor
- TA1:** High temp. circuit room sensor
- TA 2:** Low temp. circuit room sensor

- VG - Gas valve
- TS - Safety thermostat
- PD - Water differential pressure switch
- SM - Outlet probe
- SR - Return probe
- SF - Flue gas probe
- EA/ER - Ignition/detection electrode
- C - Cable for connection to two-way valve or injection pump (accessories)
- IG - Main boiler switch
- IG1 - FIRST heating unit switch
- IG2 - SECOND heating unit switch
- J10/J17 - Microswitches for setting the address (see page 54)

**HEATING UNIT**

**BOILER**

- VG:** Gas valve
- TS:** Safety thermostat
- PD:** Water differential pressure switch
- SM:** Outdoor air sensor
- SR:** Return water sensor
- SF:** Waste gas sensor
- EA/ER:** ignition/surveillance electrode
- C:** Two-way valve or pump under device cable
- IG:** Main boiler switch
- IG 1:** High temperature circuit switch
- IG 2:** High temperature circuit switch
- J10/ J17:** Address setting switches

**Note: Manufacturer's code. Manufactured in 2 different codes. Code on the card must be read.**

## POWER PLUS 50 M - 100 M

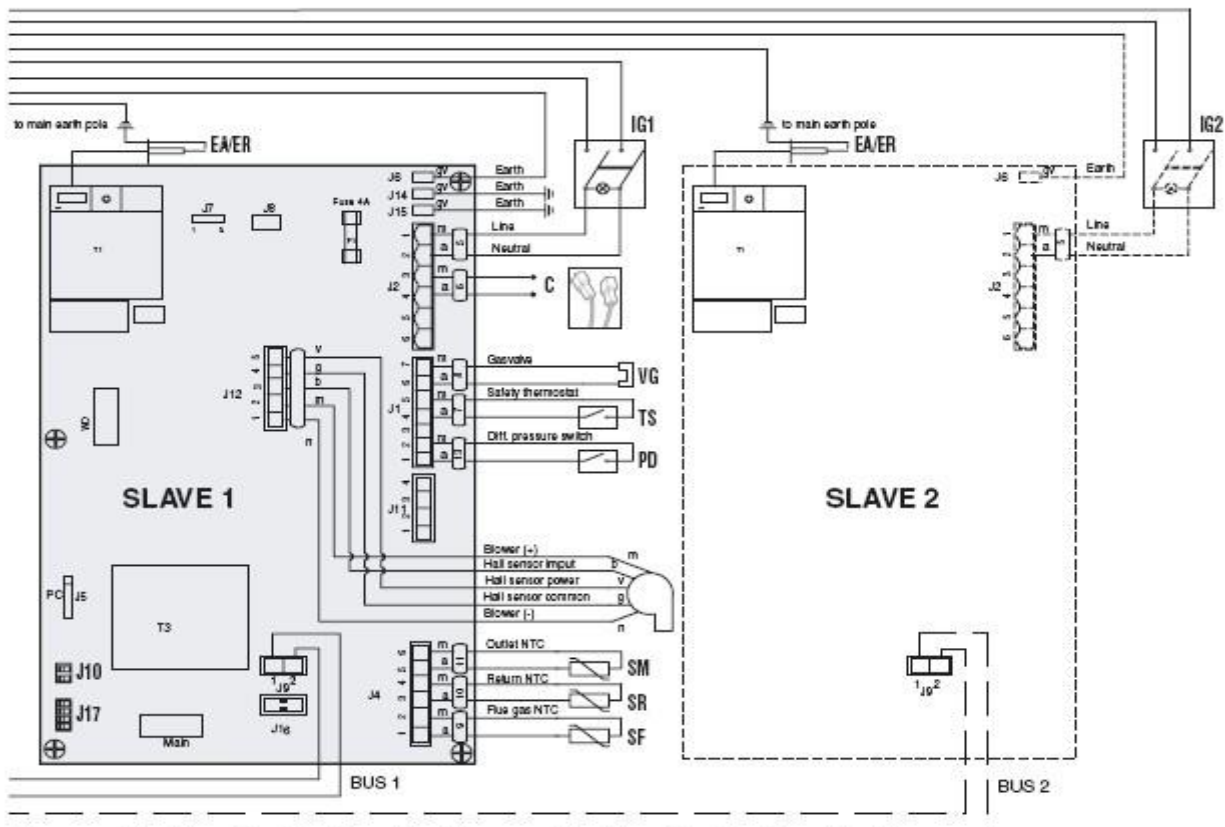
Wiring diagram of a 100S boiler control system. The diagram shows the internal components of the boiler, including relays (PB, PZ1, PZ2, VM, CR, IA, TA2, TA1, SE), switches (SZ1, SZ2, SB), and various sensors (J11 1-7, J11 10-14). It also shows the main power supply (230V-50Hz) and the connection to a 100S boiler. The diagram is labeled "MASTER" and includes a "BARCODE" label. The wiring is color-coded: blue for neutral, brown for live, and green/yellow for earth. The diagram shows the connection of the boiler to a 100S boiler, with a bus line with male connector for connection to another model 100S boiler.

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03/2010



**Section 2:**



- |     |  |
|-----|--|
| PB  | - DHW pump                                     |
| PZ1 | - Pump in zone 1 (high temperature)            |
| PZ2 | - Pump in zone 2 (low temperature)             |
| VM  | - Mixing valve                                 |
| CR  | - Remote control (accessory)                   |
| IA  | - Analogue input                               |
| SB  | - DHW probe                                    |
| SZ1 | - Probe in zone 1                              |
| SZ2 | - Probe in zone 2 (low temperature)            |
| SE  | - Outside probe                                |
| TA1 | - Room thermostat in zone 1 (high temperature) |
| TA2 | - Room thermostat in zone 2 (low temperature)  |

**SYSTEM**

**SYSTEM**

- Boiler pump  
**PZ1:** High temp. heating circuit pump  
**PZ2:** Low temp. heating circuit pump  
**VM:** Mixing valve  
**SR:** Return water sensor  
**IA:** Analog input  
**SB:** Boiler sensor  
**SZ1:** High temp. circuit sensor  
**SZ2:** Low temp. circuit sensor  
**SE:** Outdoor sensor  
**TA1:** High temp. circuit room sensor  
**TA 2:** Low temp. circuit room sensor

- |         |   |
|---------|---|
| VG      | - Gas valve   |
| TS      | - Safety thermostat   |
| PD      | - Water differential pressure switch                                    |
| SM      | - Outlet probe  |
| SR      | - Return probe  |
| SF      | - Flue gas probe  |
| EA/ER   | - Ignition/detection electrode  |
| C       | - Cable for connection to two-way valve or injection pump (accessories) |
| IG      | - Main boiler switch  |
| IG1     | - FIRST heating unit switch   |
| IG2     | - SECOND heating unit switch  |
| J10/J17 | - Microswitches for setting the address (see page 54)                   |

**HEATING UNIT**

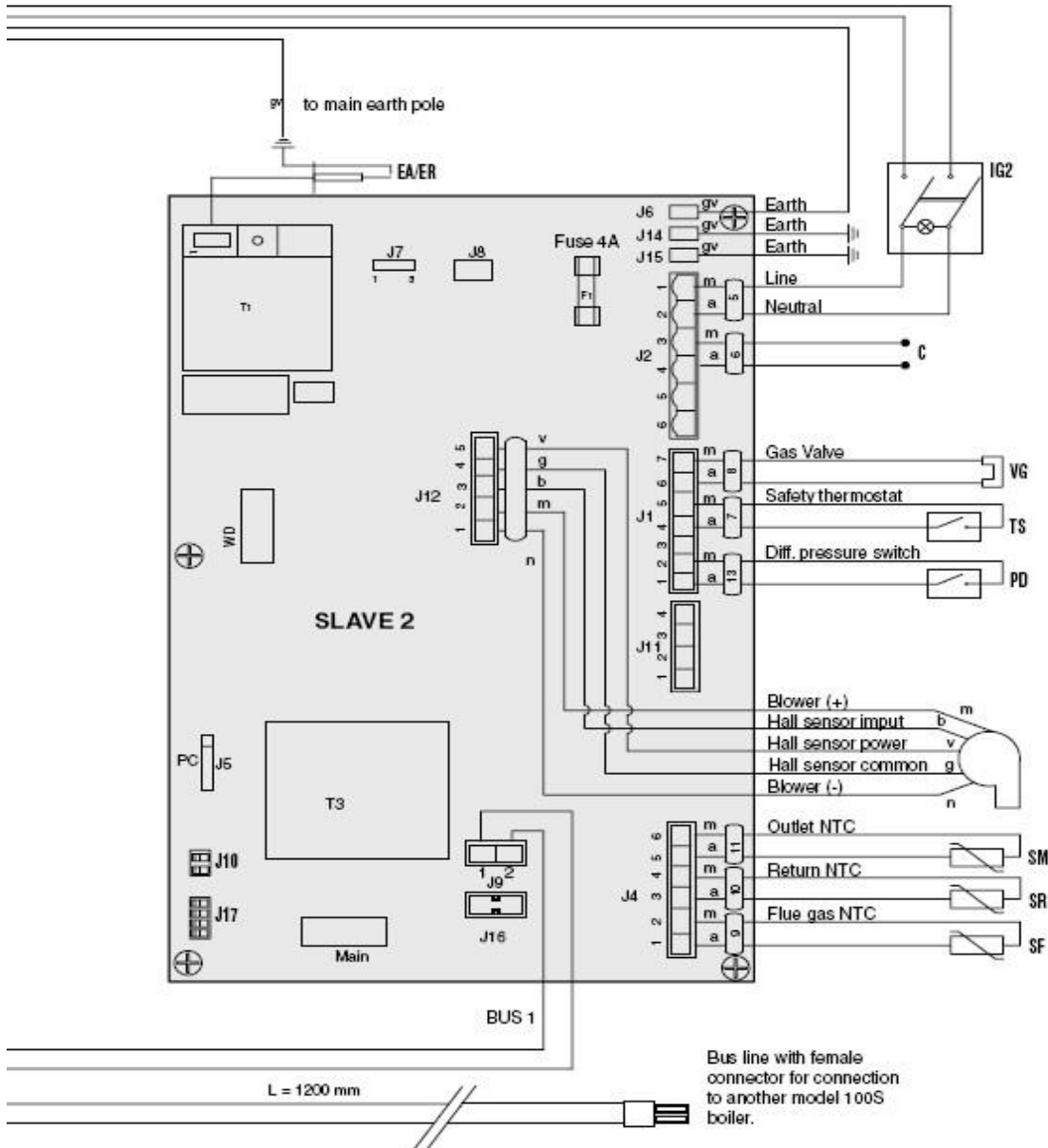
**BOILER PB:**

- VG:** Gas valve  
**TS:** Safety thermostat  
**PD:** Water differential pressure switch  
**SM:** Outdoor air sensor  
**SF:** Waste gas sensor  
**EA/ER:** ignition/surveillance electrode  
**C:** Two-way valve or pump under device cable  
**IG:** Main boiler switch  
**IG 1:** High temperature circuit switch  
**IG 2:** High temperature circuit switch  
**J10/ J17:** Address setting switches





- VG - Gas valve
- TS - Safety thermostat
- PD - Water differential pressure switch
- SM - Outlet probe
- SR - Return probe
- SF - Flue gas probe
- EA/ER - Ignition/detection electrode
- C - Cable for connection to two-way valve or injection pump (accessories)
- IG - Main boiler switch
- IG1 - FIRST heating unit switch
- IG2 - SECOND heating unit switch
- J10/J17 - Microswitches for setting the address (see page 54)



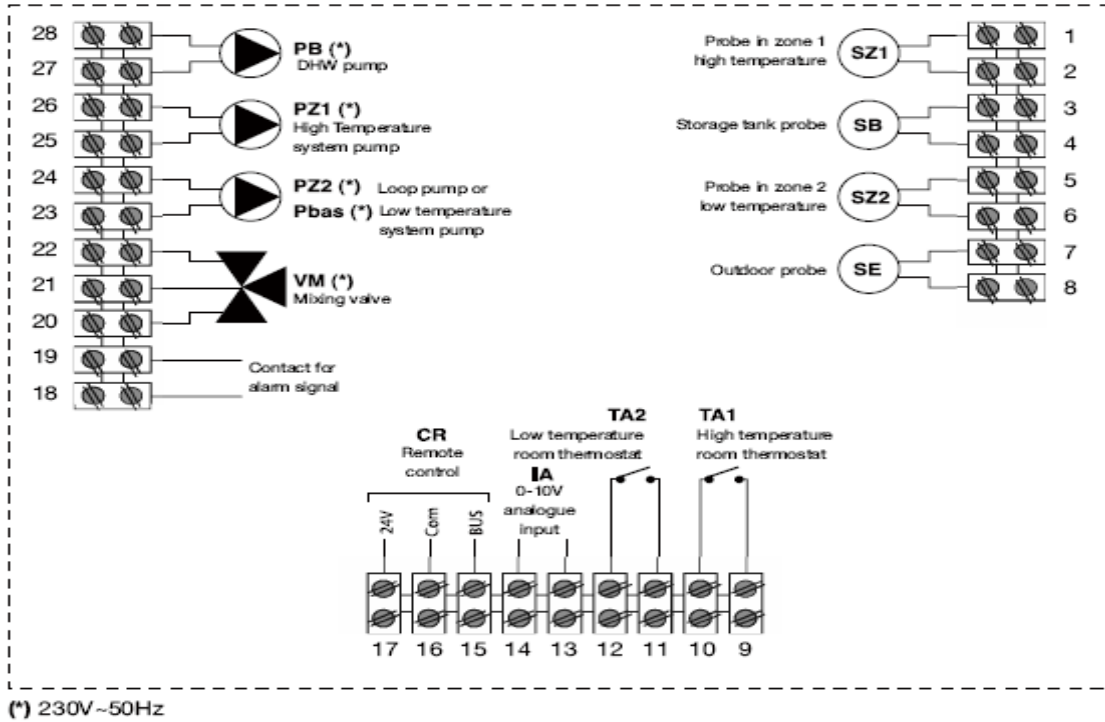
**VG:** Gas valve  
**Water differential pressure switch**  
**Return water sensor**  
**EA/ER:** ignition/surveillance electrode  
**IG.** Main boiler switch cable  
**IG 1:** High temperature circuit switch

**TS:** Safety thermostat **PDF:**  
**SM:** Outdoor air sensor **SR.**  
**SF:** Waste gas sensor  
**C:** Two-way valve or pump under device  
**IG 2:** High temperature circuit switch  
**J10/ J17:** Address setting switches

## APPENDIX H - ELECTRICAL

### CONNECTIONS

#### Master card terminal connection



### ATTENTION

The following measurements and rules must be observed.

1. Cut off the main switch connection using the multi-polar thermal overload switch (Compatible with the CEI-EN standard) (contact gap is minimum 3mm)
2. Differentiate the current (L) and neutral (N) connections The ground connection must be 2 cm longer than the current connections.
2. The cable cross section should be at least 1.5 mm<sup>2</sup> and with pointed end terminal.
3. In any operation on the electrical system, the circuit diagrams in this manual should be referred to.
4. The system must be connected to the effective grounding system.

Proper electrical connection should be made so that the pumps can intervene manually in case of emergency. Do not transfer room thermostat or other power cables from hot surfaces. (water pipes) DD is not responsible for the electrical connections where earthing is interrupted.

CODE	COMPONENT NAME	TERMINAL
PB	DHW (Domestic water) system pump	27-28
PZ1	1st system (80°C/60°C) pump	25-26
PZ2, Pbas	2nd system (50°C/30°C) pump or loop pump	23-24
VM	Mixing valve (Balancing valve)	20-21-22
-	<b>Connection for alarm signal</b>	<b>18-19</b>
SZ1	1st system (80°C/60°C) sensor	1-2
SB	Boiler sensor	3-4
SZ2	2nd system (80°C/60°C) sensor	5-6
SE	Outdoor air sensor	7-8
TA1	1st system (80°C/60°C) room thermostat	9-10
TA2	2nd system (80°C/60°C) room thermostat	11-12
A	0 ~ 10V Analog input	13-14
CR	Remote control unit	15-16-17

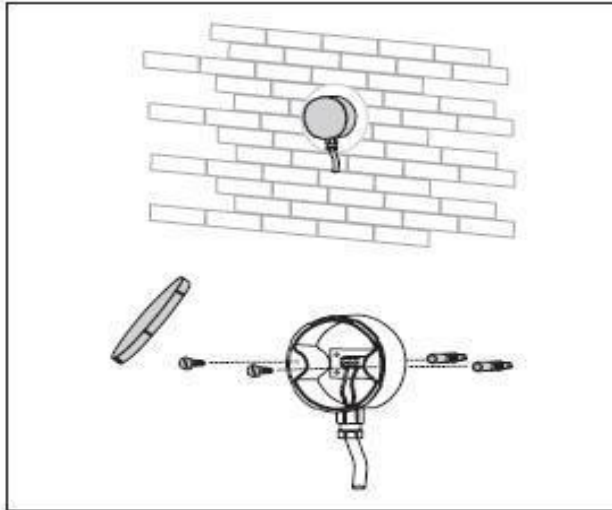
### H.1 Outdoor air sensor connection

The outdoor air sensor is the basic part that automatically regulates the heating. The following steps should be followed for installation:

- The outdoor air sensor protection cover is removed and the connection terminals and screw nuts are accessed.

(5x25mm dowel connection- The connection points are drilled according to the template.)

- Connection cable with 0.5~1 mm<sup>2</sup> cross section is connected to the terminals on the sensor housing. Terminals 7 and 8 are connected on the electronic board by exiting from the hole in the body (see Appendix G).
- The protective cover is closed.



Points to note about the sensor are:

- The environment heated should be installed on the wall facing 2/3 of the north or northwest should be mounted so as not to see direct sunlight.
- The sensor should contact the wall directly. The wall must have a smooth surface.
- The maximum cable length between the sensor and the electronic board in the control panel must be 50 m. If it is more than 50 m, correction must be made with parameter 37 for correct measurement.
- No addition is recommended in the wiring between the sensor and the card. If any addition is made, it should be well-insulated.

- Contact should be avoided between the conductive leads used for the connection cable used between the sensor and the card and the power cable.
- If outdoor air sensor is not to be installed, Parameters 14 and 22 should be set to 0.
- The cable must be wired separately from the 230 Vac power cable to avoid any interference.

## H.2. External 0-10 V thermoregulation

For external thermoregulation adjustment, there is a connection point in the boiler terminal block for 0-10 V signal connection. . Terminal input numbers are 13 and 14.

## H.3. External alarm device connection

The visual or acoustic alarm device can be connected to terminals 18 and 19. Terminals 18 and 19 are voltage-free contact terminals. The external alarm device must take its energy externally.

## H.4. Remote control kit

### Assembly

The kit must be installed by a DD service center.

For proper installation, the room sensor must also be correctly positioned.

- Inside the room, it should be installed on the wall away from hot/cold water pipes.
- Must be installed up to 1.5 m from the floor.
- It should not be mounted near the door or window, in the oven or hood, in the radiator or on the walls where faulty temperature measurement can be made.

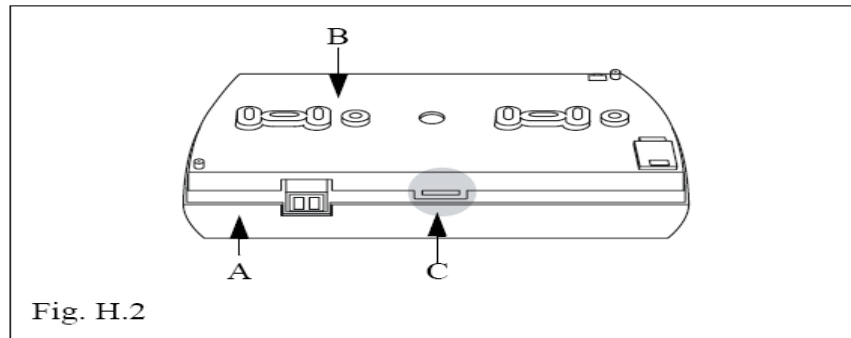


Fig. H.2

### To connect the room controller to the wall;

- By pressing the latch (C), (A) control panel is separated from the (B) rear panel.
- The rear panel (B) is connected to the previously drilled (with 5mm tip) and dowelled points.

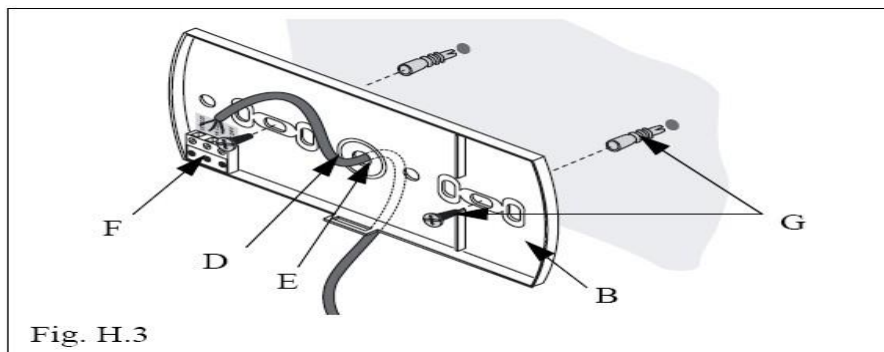


Fig. H.3

- Before connecting the 3-wire connection cable (D) to the terminal (F), take it through the hole (E) by passing it under the rear panel (B) and connect it to the terminal (F). (Cable will be 0.5 and 1mm2 cross section.) **(The cable will be supplied by the Service.)**  
**Note:** Check that it is correctly mounted on the wall surface.
- The other end of the cable that connects to the (F) terminal is connected to the terminals "15-16-17" on the master card. (BUS-Com-24V) A label indicates the correct position of the cables.
- (B) rear panel is mounted on the wall.
- (A) control panel is mounted.
- **Cable length can be up to 100 meters. (Between boiler and room thermostat)**
- **It will be convenient if the cable is a single piece. However, if it is very necessary, it should be insulated appropriately.**
- **Must be installed as 230 volt from the main current cable as plus due to a magnetic interference.**

### Electrical connections

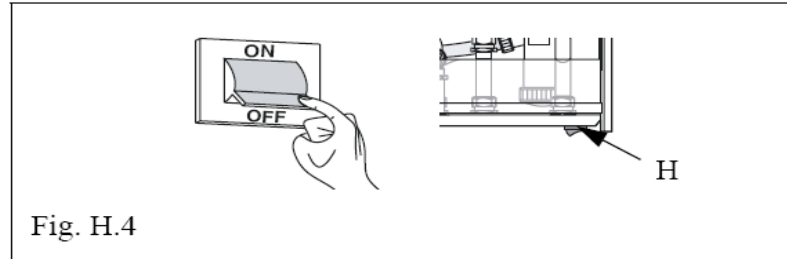


Fig. H.4

- Cut the system power first (Figure H4 OFF)

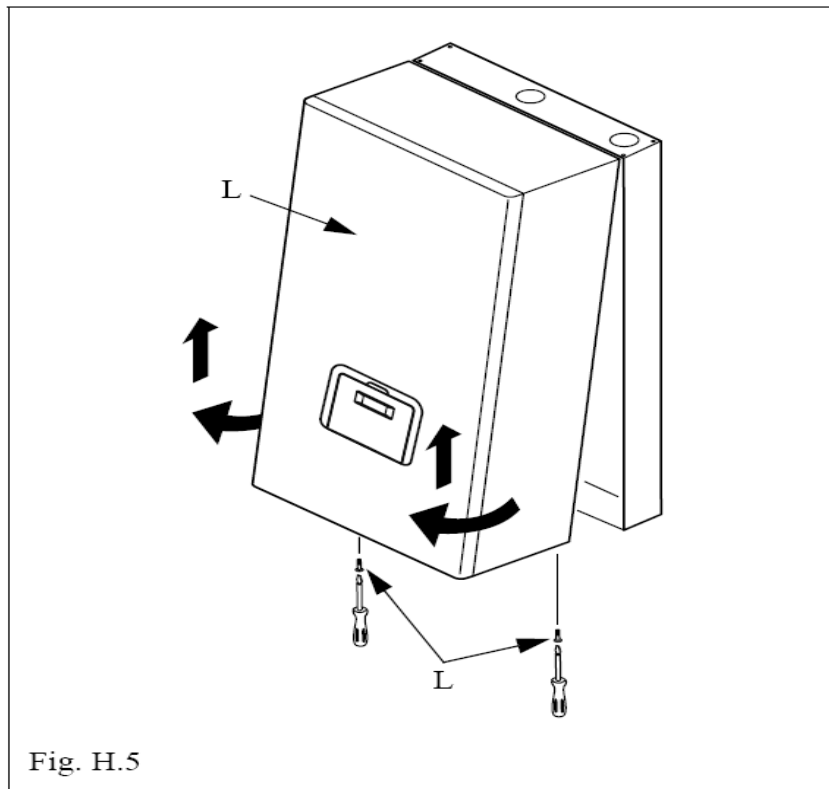
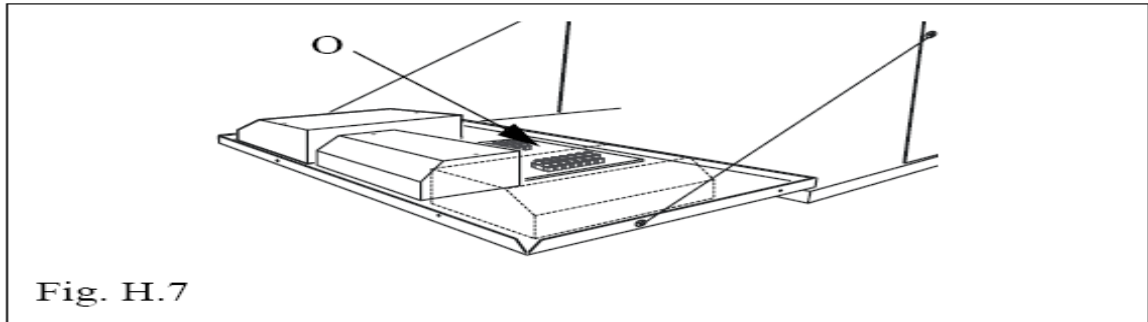
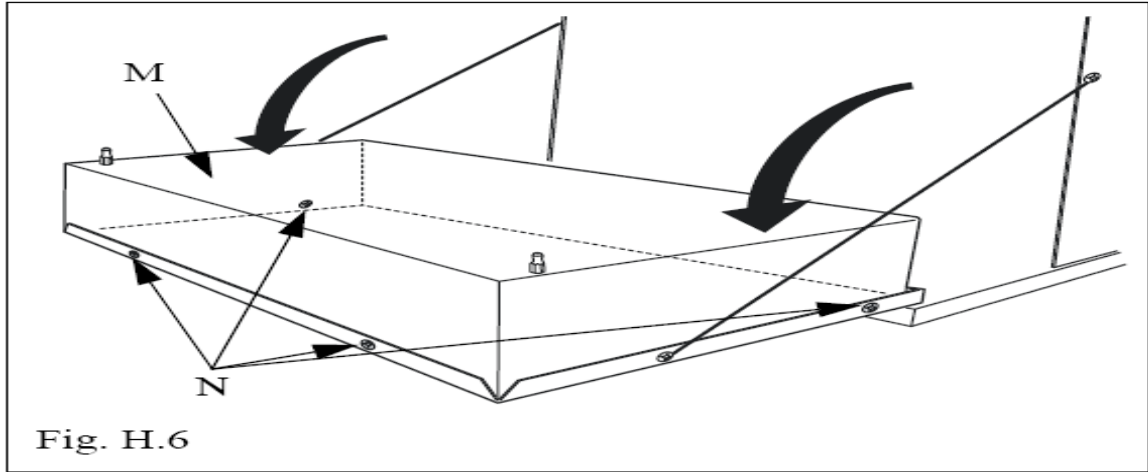
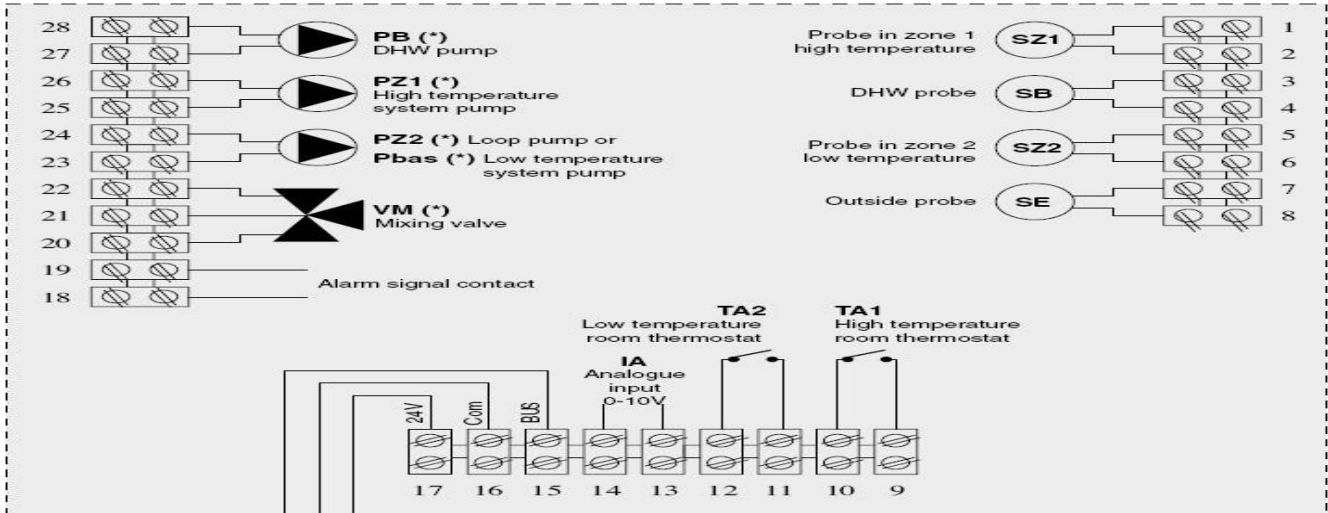


Fig. H.5

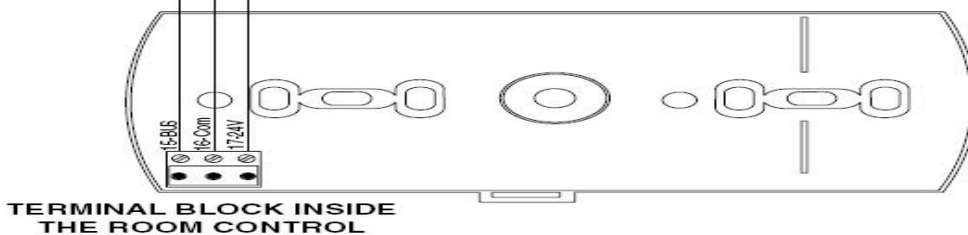


- Figure H 5 Remove (I) screws, remove the front panel by moving the front panel forward and up.
- Figure H 6 (M) tilt the main panel towards yourself for 90°, remove 4 (Figure 6 –N) screws and remove the panel from the rear side.
- Make the following connections (17-16-15) to the terminal in Figure 7 (O)

**TERMINAL BLOCK INSIDE THE MASTER CONTROL PANEL**



(\*) 230V~50Hz





## Remote control

Remote control; while following the connection to the device master card, observe the main system parameters and make changes in the program. (Time programming, operating times for 3 circuits (high temperature, low temperature and boiler), pump statuses, installation outputs etc.) Main characteristics of the remote control device;

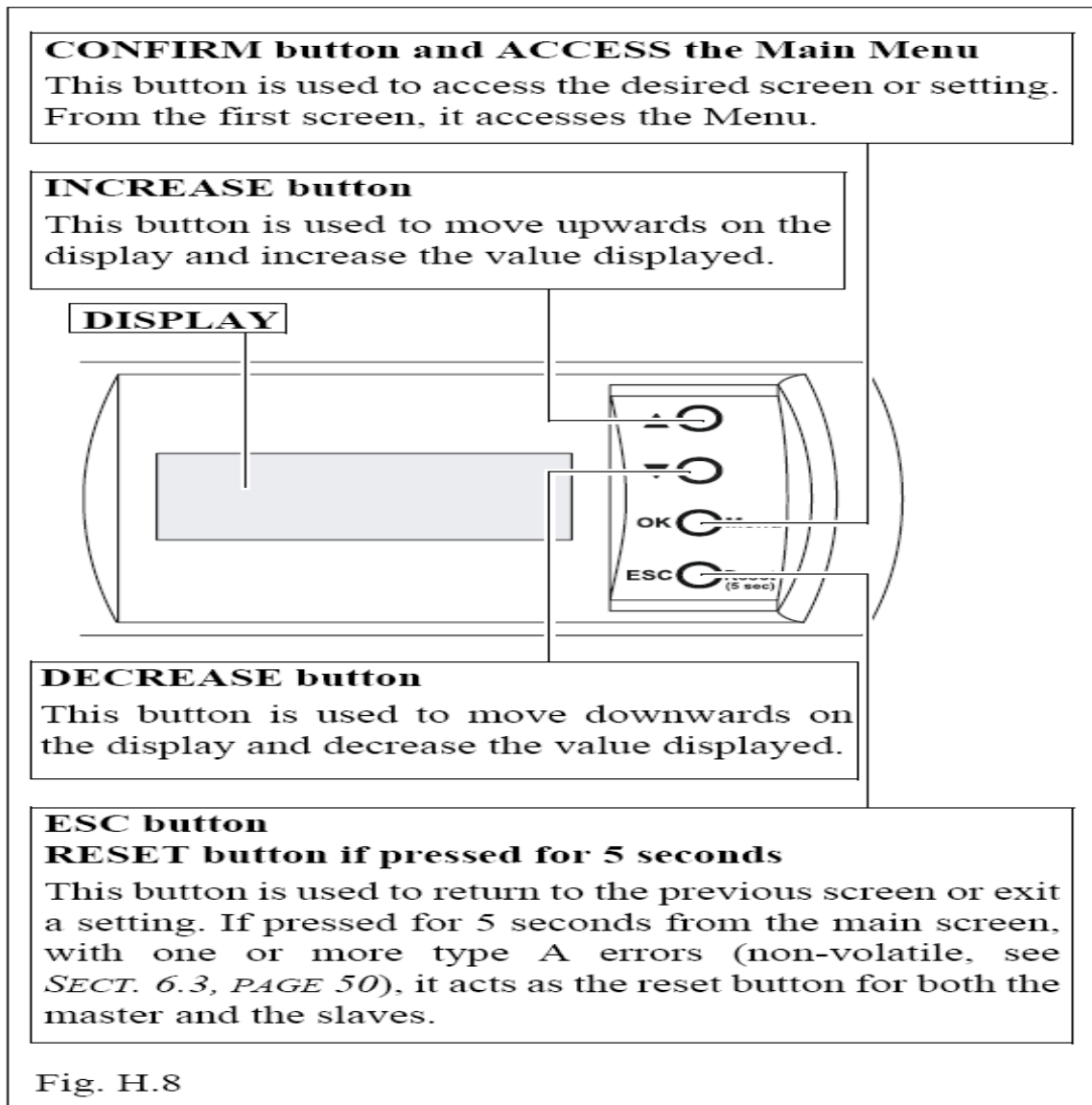
- Backlit 4x20 screen
- Maximum room control unit installation distance can be 100 m.
- Simple program and display
- 24 Vdc power demand
- More sensitive than the room thermostat

### General information about the remote control screen

Screenshots are explained below. (Figure 8)

The section displayed in gray in Figure 8 is the display screen. Display values are reached by using the ▲ and ▼ cursors. If system is entered, it increases and decreases parameter values.

Press the **OK** key to enter the main menu and enter the changed parameter values into the system. If you want to cancel the set value or return to the previous screen display, press the "Esc" key. If A type error occurs, the fan and slave cards will be reset if pressed for 5 seconds.

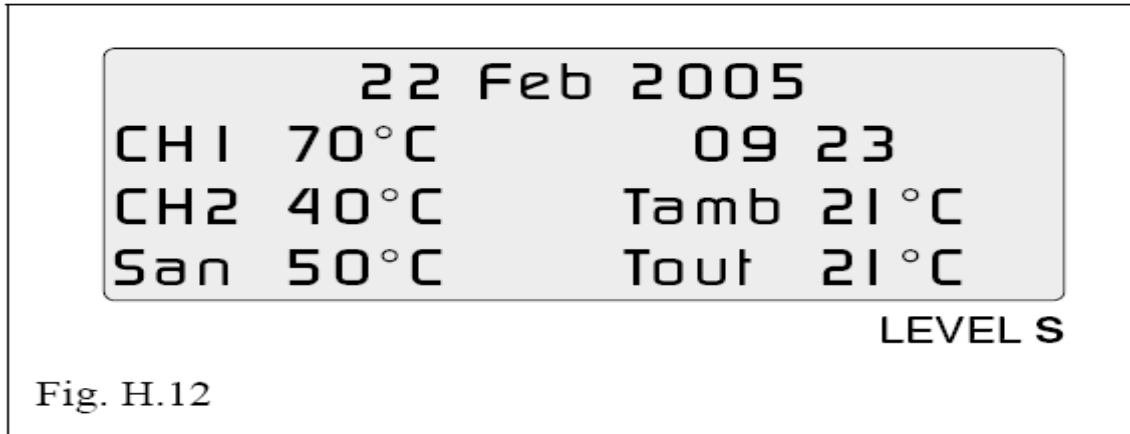




### Controlling of the remote control

The images displayed on the remote control screen are numbered. Separate information are provided below.

#### First image; (Figure H12)



#### Displays information about the system.

Date: **22 feb 2005** (February 22nd, 2005)

Time: **09.23**

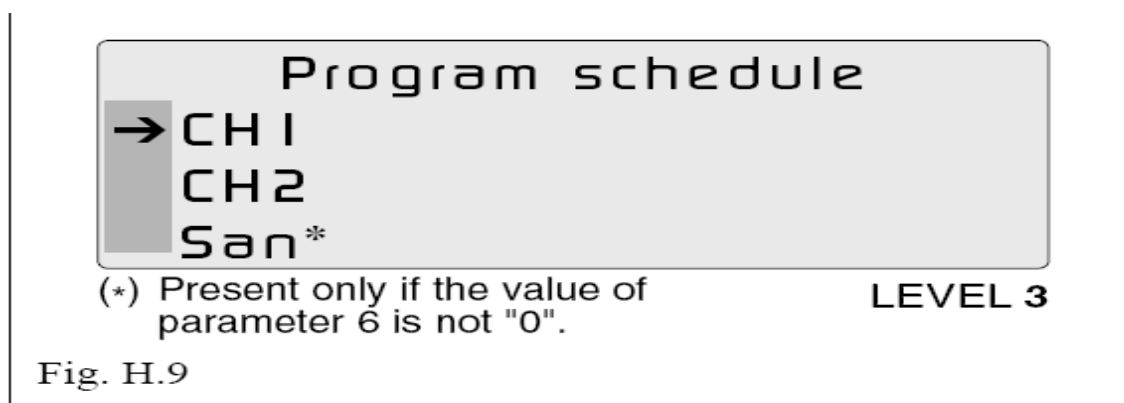
Room temperature (**Tamb**): **21°C**

Outdoor air temperature (**Tout**): **21°C** (If the outdoor air sensor is not connected properly or is not connected, this temperature will not appear)

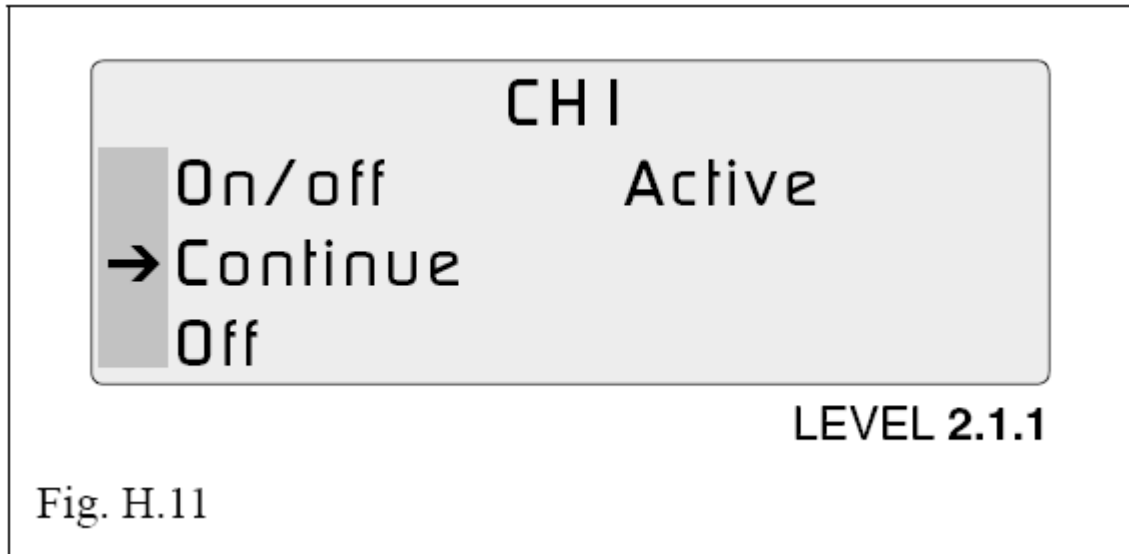
High temperature heat circuit flow water set temperature (**CH 1**): **70°C**

Low temperature heat circuit flow water set temperature (**CH 2**): **40°C**

Boiler heat circuit set temperature (**San**) : **50°C** (This circuit appears if boiler is connected to the system)



Set values are reached by using the ▲ and ▼ cursors. San \*It will appear if parameter 6 is not 0. (It appears if boiler is connected to the system.)

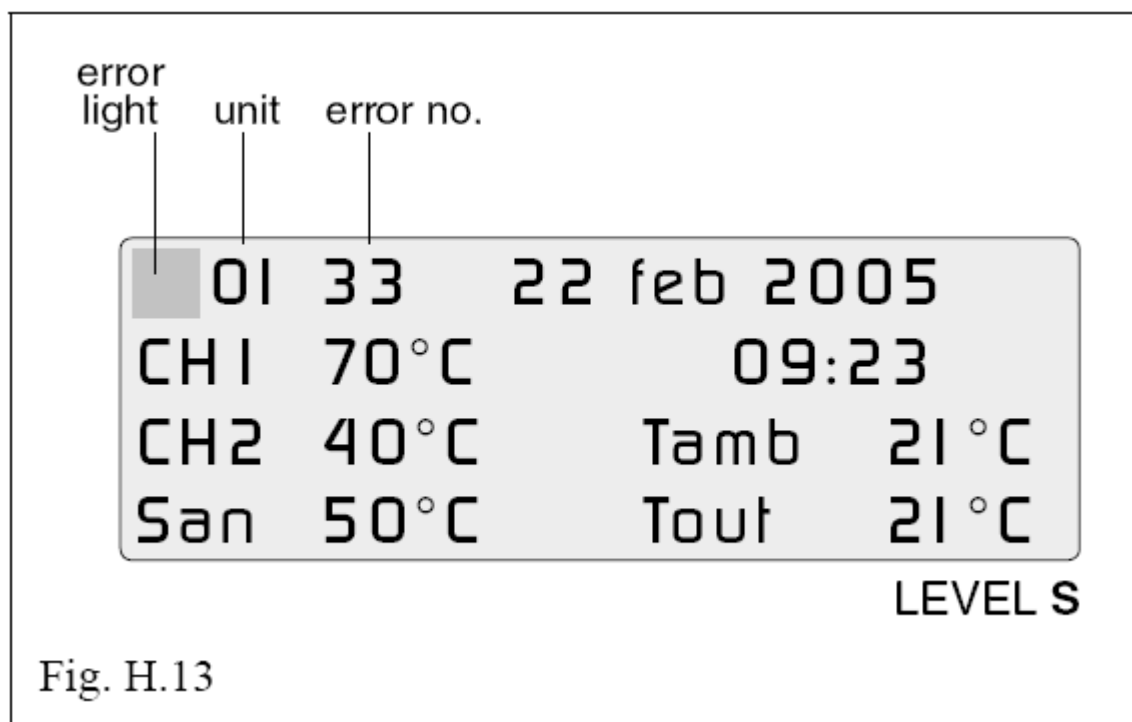


When an option is selected, the **Active** message will appear. Relevant menu data are entered with on/off. (Example CH 1 value is reached) If you want to switch to another screen in the menu, continue with "**Continue**".

If you want to access the value on the screen, press "**OK**" button.

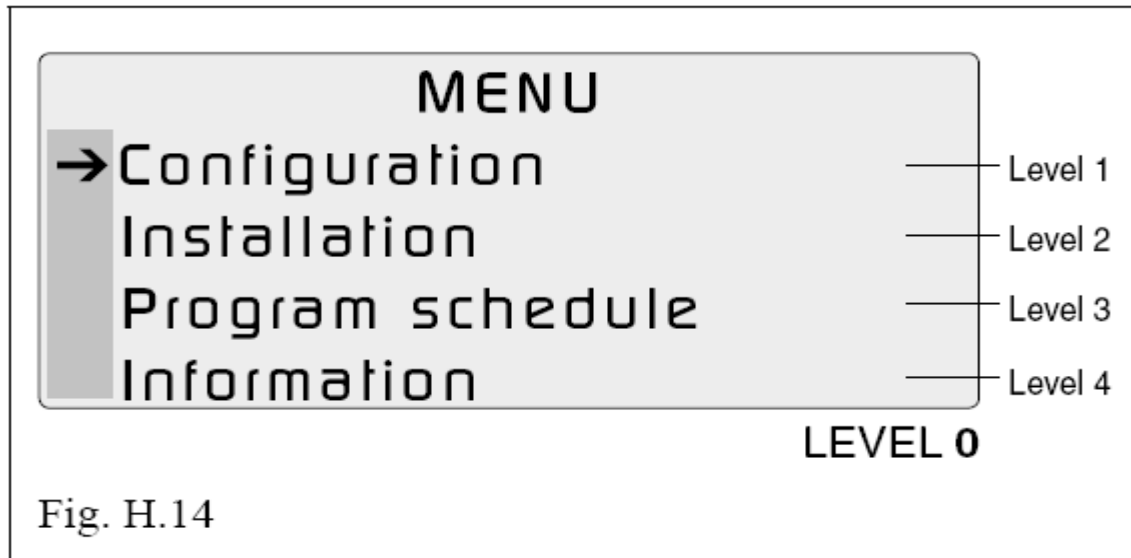
## ERROR INDICATORS

If any error occurs in the system, the error lamp will light up in the upper left corner of the screen (figure H 13). The unit where the error occurred and the error number is displayed next to the Error lamp. In the example in Figure H 12, it is shown as the device 1 and the error 33.



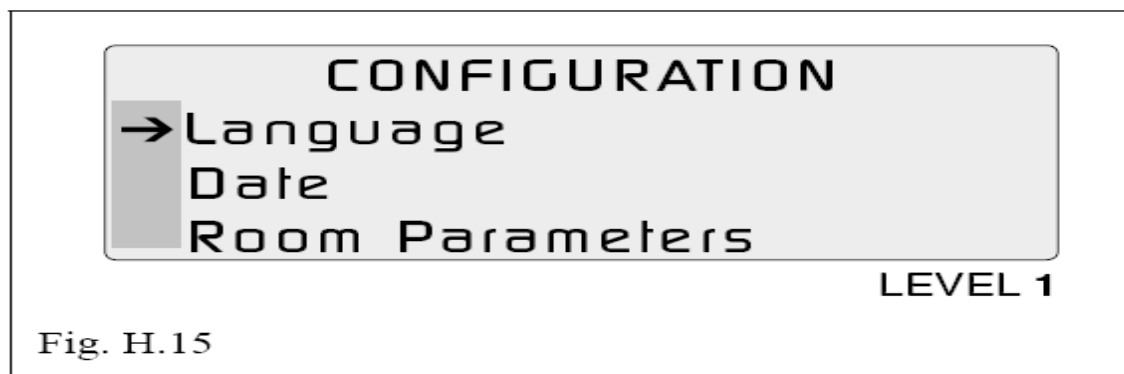
## General Menu:

Main display ((S) - Remote control's display menu), press "OK" button, Figure H 14 MENU screen is accessed. This screen has 4 submenus. These sub menus are accessed by using the ▲ and ▼ cursors. It is accepted by pressing "OK" key. These are;

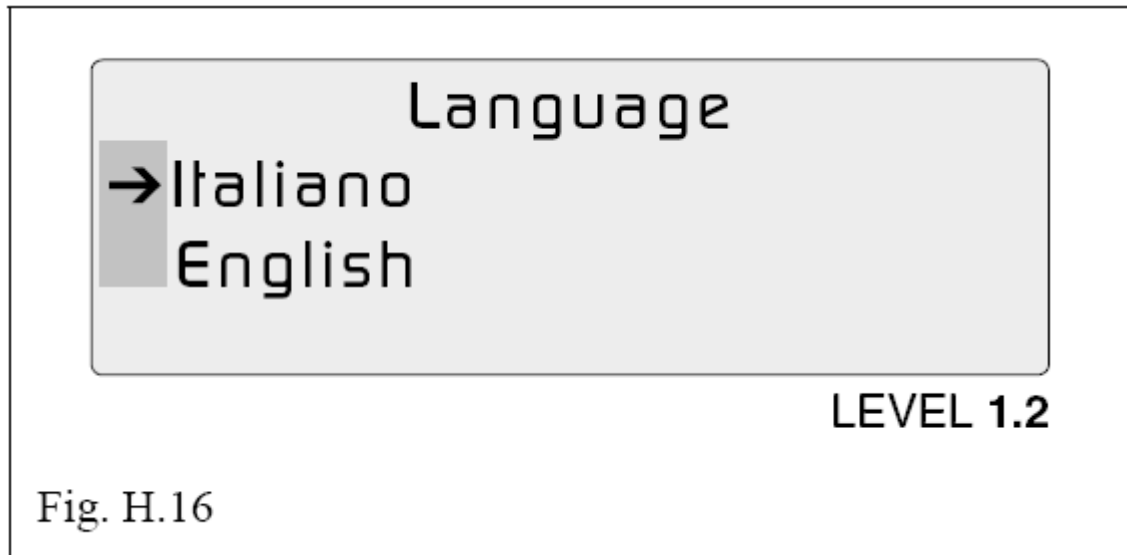


- **Configuration mode:** (For language, date and room temperature correction parameters)
- **Installation mode** (Heating circle control - high temperature/low temperature, boiler and parameters are accessed)
- **Program Schedule mode;** In this mode the weekly operating times of the heating circuits are entered.
- **Information mode:** The number of the devices are in the system, how many devices are in use, error codes, the temperature values in each device, how many hours it has operated etc. information can be found here).

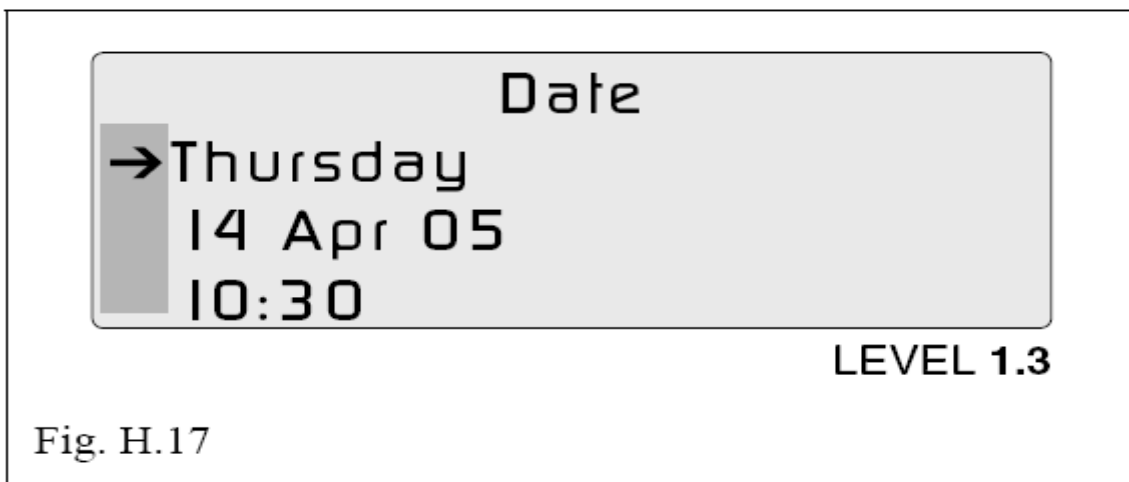
## CONFIGURATION mode



(Figure H 15 1.2 - 1.4) The parameters for Language, Date and Room are entered.



Language is English and Italian. Since the English terms are used more frequently, English menu translation has been done.



Date is the year, month, day, and hour-second ▲and▼ setting is made. Press "ok" key to finish the setting.

**Date:** Date

**Months:** January: January, February, March, April, May, June, July, August, September, October, November, December

**Days:** Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday

**Room temperature correction setting: (Tamb corr.)**

The menu indicated in figure H 18 is used to correct the room temperature value. In Parameter 39, it is set to 0 °C as the default (default setting). This factor describes the value at which the difference value is entered if there is a difference between the Tamb temperature and the temperature measurement value made by the calibrated thermometer beside the room sensor. In the example room sensor main menu, if Tamb= 20 °C and the value measured with the calibrated thermometer is 19 °C, then Tamb= -1 °C is entered.

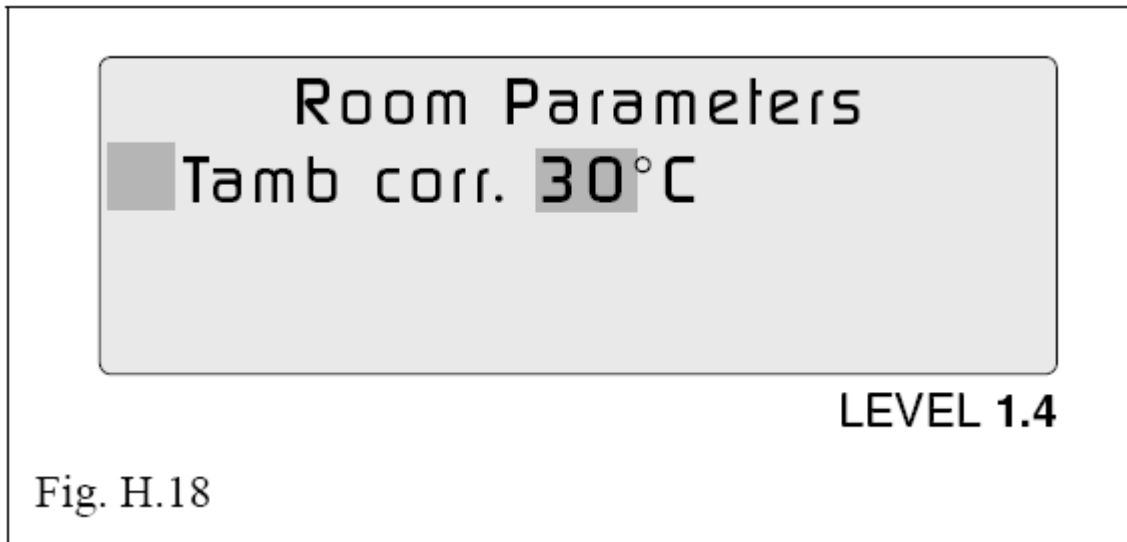


Fig. H.18

### INSTALLATION mode

This mode (Figure 19) is entered to modify the parameters of the boiler and the boiler heating circuit. (These values can be changed by entering the password by the service staff)



Fig. H.19

### Heating circuit controls (See Figure H 20-H21)

- Control circuits > CH 1, CH2, San\*



Fig. H.20

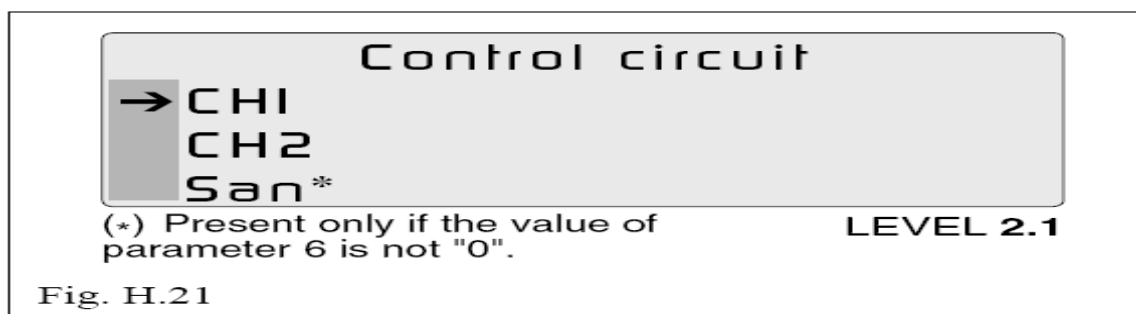


Fig. H.21

- High temperature (80/60 °C system) circuit: CH 1
- Low temperature (50/30 °C system) circuit: CH 2
- Boiler circuit: San\* (If no boiler is connected to the system, Parameter 6 = 0 and **San** is not displayed on the screen)

Parameters related to three heating circuits can be controlled by remote control. This option is set to OFF in the system as OEM (It can be defined as factory setting or default as well). If the circuits are not "Activated" in systems to which remote control is connected, then the boiler does not start.

**To enable heating circuits on the remote control;**

The operating times of the heating systems can be programmed if **on/off** is selected according to the presence of the heating circuit, as shown in Figure H 22 (adjustable if 3 heating circuits are connected to the system). "**Active**" will be displayed on the screen.

If "**CONTINUE**" is selected, if room thermostat is on, the system will operate at the set temperature. No matter whether the room thermostat is on or off, the boiler will continue to operate at boiler time intervals. In case the room thermostat is open, energy saving will be ensured since the boiler will be activated with a delay.

If the "**off**" switch is selected, the boiler will shut down completely.

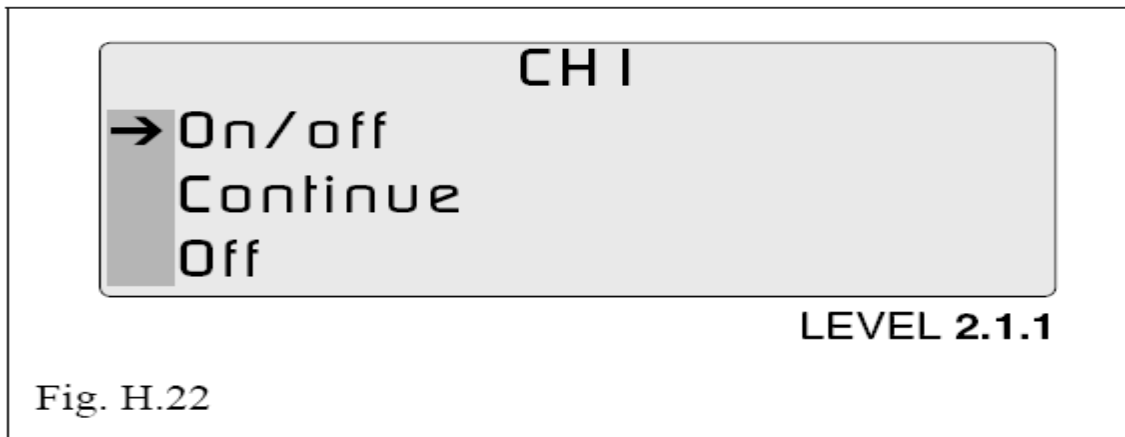


Fig. H.22

Similarly if the system 2, i.e. the 2-zone system is connected to the system or if the system is operating in the low-temperature circuit;

By selecting **Control circuit > CH2** as in the CH1 circuit above **Figure H 23**

if **On/off** is activated, it means that pumping will be made

if **Continue** is selected, it means that the boiler will work (delayed if room thermostat is on)

if it is **OFF**, it means that the boiler will not work in the CH2 zone.

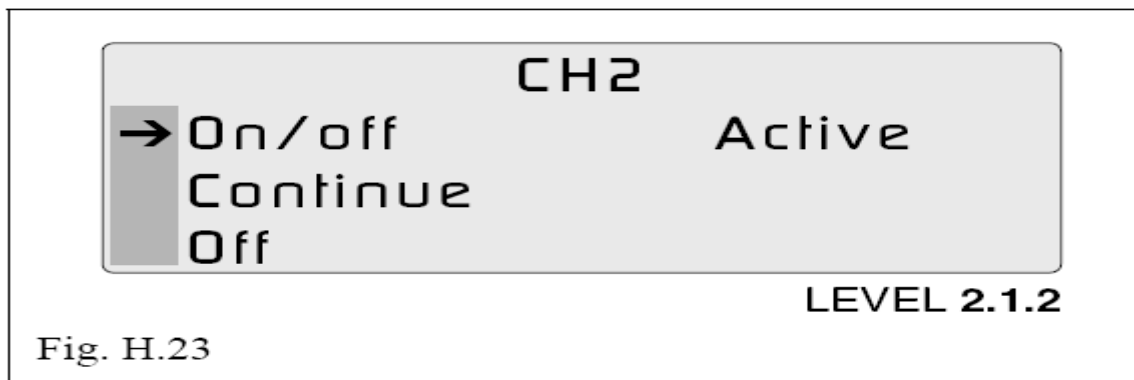


Fig. H.23

If a boiler is connected to the system;

Select **Control circuit > San** as in **Figure H 24**, it is entered as **On** and to remove the Legionella bacteria thermally, system **Antilegionella 70 °C** adjustment is made.

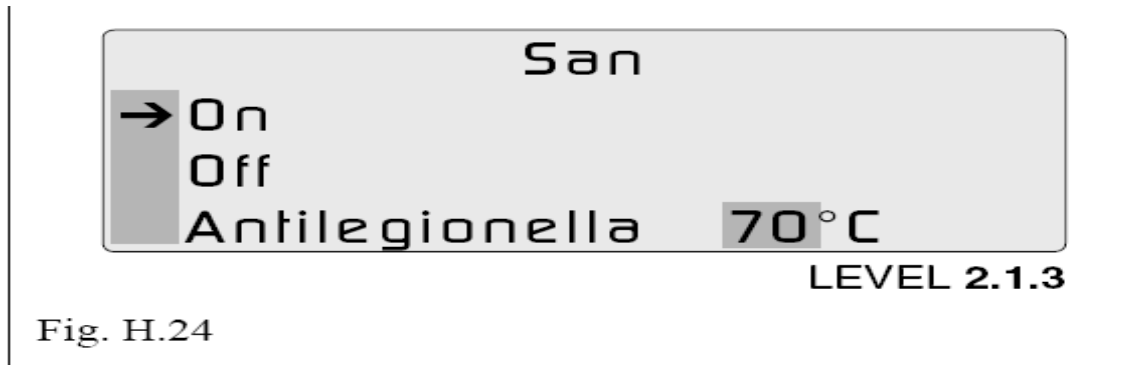


Fig. H.24

### PARAMETERS entry in INSTALLATION Mode

**MENU > Installation > Parameters**

**Password "22"** is entered by the service technician to enter the **parameter** menu. (**Figure H 25**)

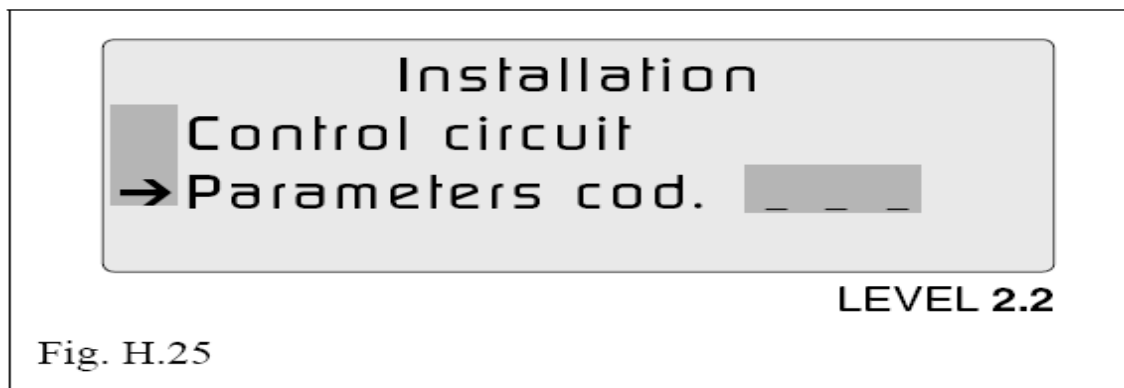


Fig. H.25

The **set** values of the **CH1**, **CH2** and **San** circuits will be displayed before the **password code** is entered. After entering the parameter group, the figure **H - 26** menu will appear.



Fig. H.26

- When the "OK" key is pressed in the **Complete list** key, it is possible to enter and change 1-43 parameters (shown on pages 31 and 32).
- **POWER**- Power related parameters.
- **SLAVES**-Parameter entries are made for each slave boiler.
- **CH 1**-High heating circuit parameters
- **CH 2**-Low heating circuit parameters
- **San**- Boiler circuit parameters are entered

### PROGRAM SCHEDULE mode

#### NOTE:

If Installation mode> Control circuits > CH 1 (CH2 or San) >On/off (Active) or Continue is selected, programming menu entries can be made. Programming can be done while the boiler is running.

### OPERATION TIME ADJUSTMENT (Day-Hour)

Operation can be programmed using the ▲ and ▼ keys and “OK” keys after the setting, depending on the heating circuit (In the example CH 1 \_High temperature heating circuit). Similarly, in the **CH2** and **San** circuits you need to program separately. As can be seen in Figure 27 and 28, it is entered as

**MENU> Program Schedule> CH 1**

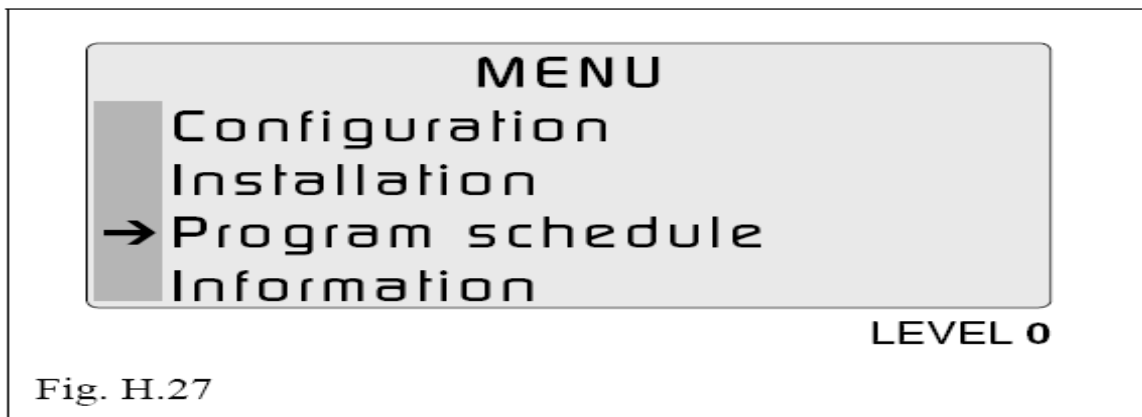


Fig. H.27

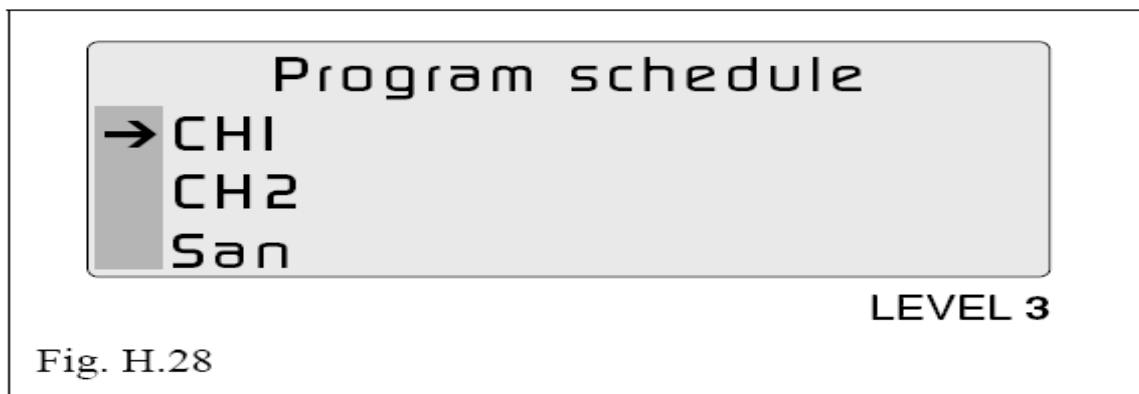


Fig. H.28



The first screen will appear (Figure H 29)

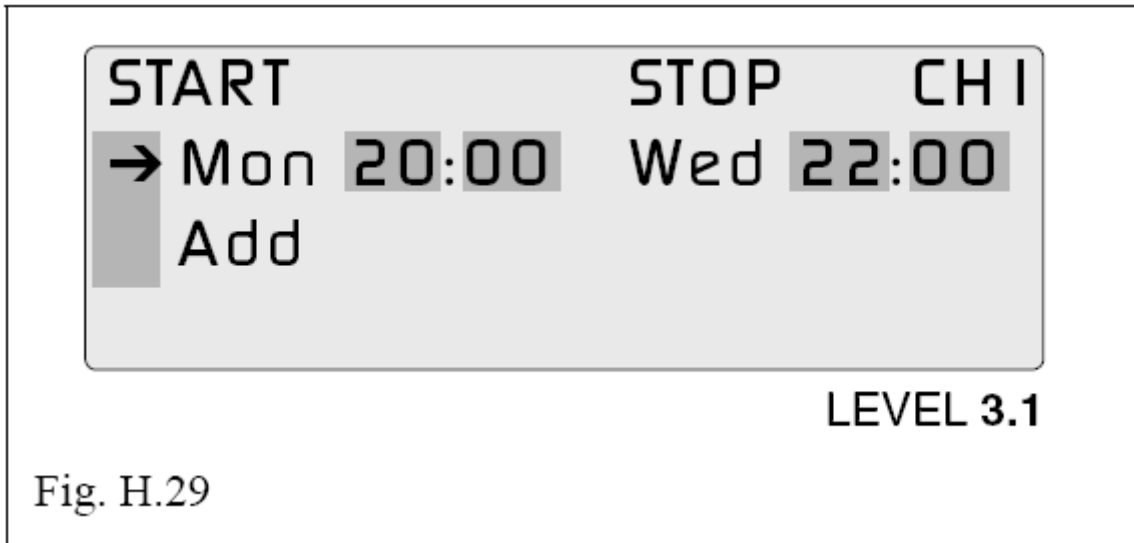


Fig. H.29

**Figure 29** shows that the example display where it will work every Monday from 20:00 to Wednesday 22:00. With the cursor **▲** and **▼** keys, the date and time settings are made. For this, under **START**, date and time for the beginning is programmed and under **STOP** date and time for ending is programmed. It is possible to program for 2 different times within one day. There is a separate program entry for each day. If it is desired not to operate the devices for any day, the starting and ending days and hours are selected as shown in figure H30.



Fig. H.30

### Operating periods and water temperature setting

As mentioned above, when the program values entered with **Level 3.1** is entered into the system with the “OKAY” key, as in **Figure H 31**, Program operating duration (**start, stop**), System water flow temperature (**Temp**) (Inputs; If done in CH 1 High temperature circuit, then the high hot water circuit flow water temperature), the temperature difference determined for the delay in case that the system will be activated with a delay (**Attenuat.**) will appear. Similarly, when the Level 3.1 program in CH2 is accepted as entry, the low heating circuit flow water temperature and delay temperature will be displayed. If the boiler circuit is selected, the boiler water set temperature and anti-legionella temperature will be displayed.

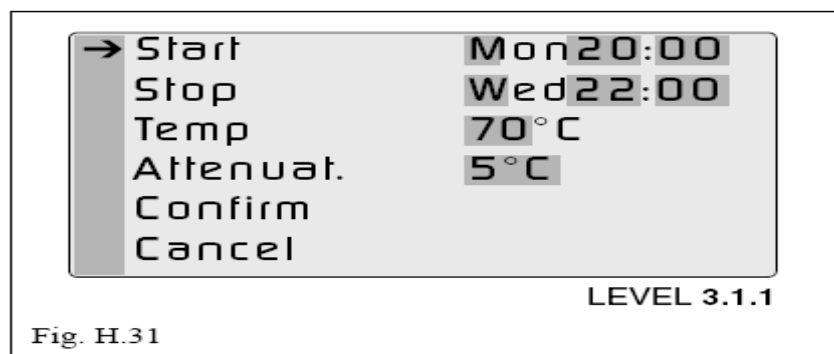


Fig. H.31

### Attenuation function activation in the central heating circuit

Delay parameter, in CH 1 and CH 2 heating circuits, the delay temperature value in (Menu > Installation > on/off active > continue) mode is always activate. (This value is entered with the parameters 21 and 25) Normally a delay temperature of 5 °C difference is appropriate. It is 0 °C as OEM, no delay is entered.

If an input or temperature has occurred over 80 °C (accidental input or accidental measurement) system, next to the Temp. display on the screen, the AUTO message will be shown first and the set temperature will be displayed. This means that the system works in the room thermostat.

#### Delay temperature difference entered

1. If the system is at a temperature set in the parameter block via the master card and at the temperature set as OEM, the system will be delayed until the delay temperature difference, if the delay temperature difference (parameter 21 or 25) is entered. If the sample delay temperature is 5 °C and the high temperature circuit water flow temperature is 70 °C, the system will be activated at 65 °C.
2. In systems with room thermostats, the delay time is active as it is in the 1st paragraph. However, the temperature values set by the room thermostat are essential to system temperatures.

If the room thermostat is used and the delay temperature difference is entered in the system, "fi \*" mark appears on the room thermostat and "cl \*" mark appears on the remote control.

### Legionella disease protection function for boiler (domestic hot water circuit) circuit

If Menu> Installation> San> On> Atilegionella 70 °C> OKEY value is entered, the system will activate the antilegionella function automatically. (Fig. H 33) The value Confirm > Okay cannot be done on this screen.

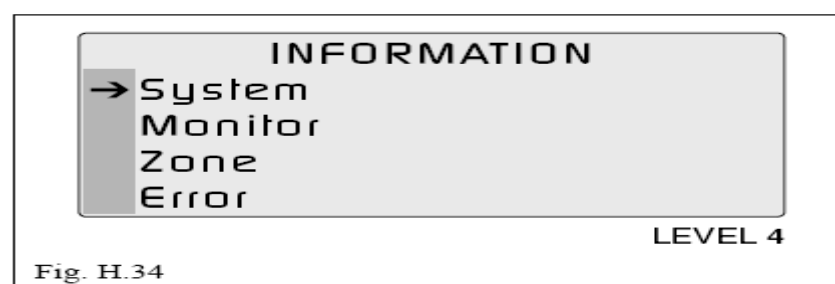


### INFORMATION mode

Information mode is accessed via Menu > Information > Okay entry. (Figure H 34)

Here, on the display

- System
- Monitor
- Zone
- Error information is available.



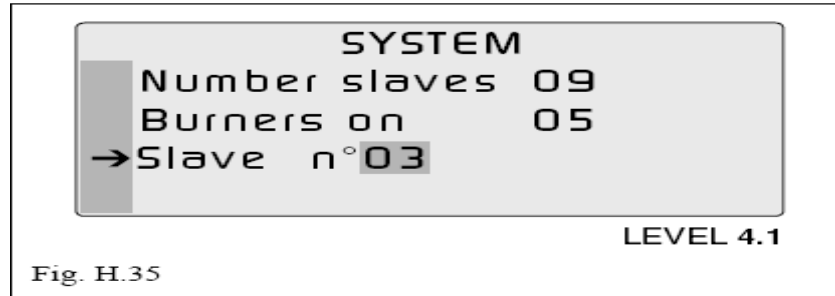
**On the information display about the system;**

If on the first screen, it the user desires to get info on the number of boilers in the system, the number of working burners and more information there is a 2-digit cursor to enter the number of each boiler. Below, with **Figure H 35**, when System information is reached,

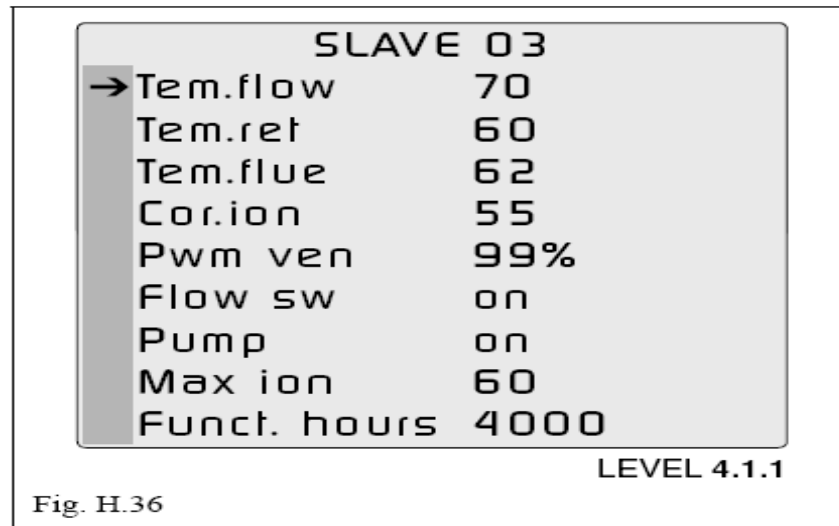
**Menu>Information>System**

**Number of slaves:** Indicates the number of boilers connected to the system,

**Burners on:** The number of burners operating in the system at the time of receiving information.



If **Slave n ° 03** is selected (in this system, it can be entered separately for 1-9 boilers), the parameter values of the boiler 3 points are accessed (**Figure H 36**)



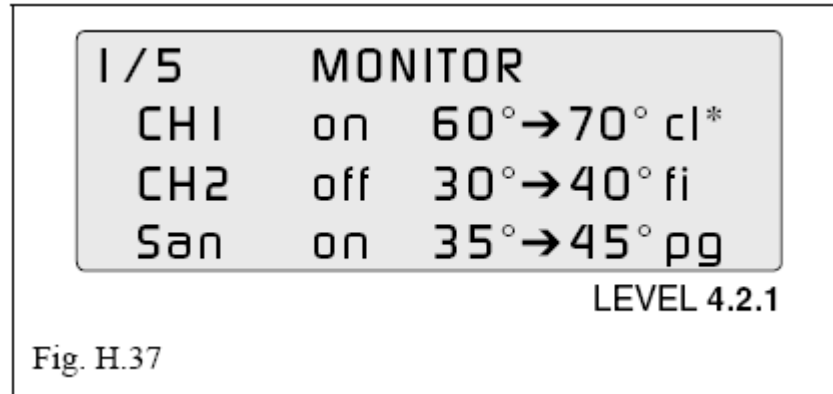
Here; boiler 3

<b>Tem. Flow</b>	(Water flow water temperature)	<b>70</b>
<b>Tem. Ret</b>	(Return water temperature)	<b>60</b>
<b>Tem. Flue</b>	(Waste gas temperature)	<b>62</b>
<b>Cor. Ion</b>	(Ionization current)	<b>55</b>
<b>Pwm ven</b>	(% of fan operation)	<b>99%</b>
<b>Flow sw</b>	(Pressure switch is on with the flow switch)	<b>on</b>
<b>Pump</b>	(The pump below the boiler runs)	<b>on</b>
<b>Max ion</b>	(Maximum ionization current)	<b>60</b>
<b>Funct. Hours</b>	(Sets the total number of hours of operation of the boiler since the device was installed)	
<b>4000</b>		

**Heating circuit temperature information (measured ° C > set water temperature ° C (1/5 screen)  
figure H 37 (shows 3 system information)**

In this chapter; it is the display that indicates the water temperature value set by the measured water temperature value in the desired heating circle.

**Examining Sample Figure 37,**



- In CH 1 (High temperature heating circuit), the temperature measured is **60 °C**. The system runs (on) to reach to the adjusted **70 °C**. The system is controlled by room thermostat (**cl**) and delay temperature difference in the system is active (\*)
- In CH 2 circuit (Low temperature heating circuit), it is not active (**off**). In the low heating circuit, the measured temperature is **30 °C**. System must run to reach the set **45 °C**. (In this application, the system does not work for being turned **off**, it will run if the system is made **on**. The system temperature has been fixed (**fi**) and the delay temperature difference parameter has not been entered in the system. (**0°C**)
- Domestic hot water boiler (San) temperature is **35 °C**. System runs (on) to reach the set temperature of **45 °C**. If the temperature is measured as **45 °C** >, the water temperature of the boiler will be increased during the measurement of the system due to the Antilegionella function.

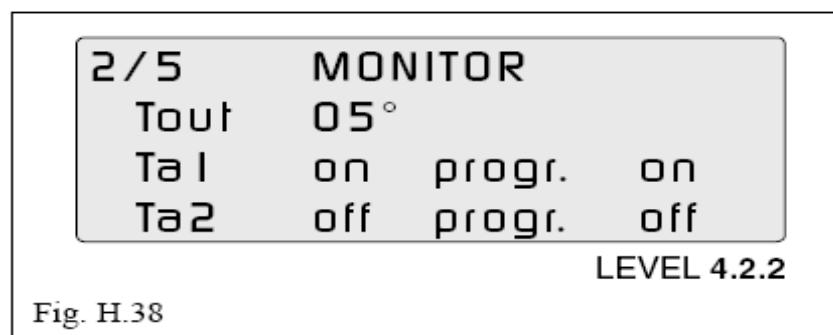
**Outdoor air temperature and room temperature information (2/5 screen)**

If the cursor moves forward ▼ , 2/5 screen will appear. In Figure H 38 , in the screen 2/5 shown

**Tout** : Outdoor air temperature (In the example **5 ° C**)

**Ta 1** Room temperature at the 1st heating circuit (if room thermostat is open, it is on)

**Ta 2** Room temperature at the 1st heating circuit (if room thermostat is **closed** or if there is **no** room thermostat, it is off)



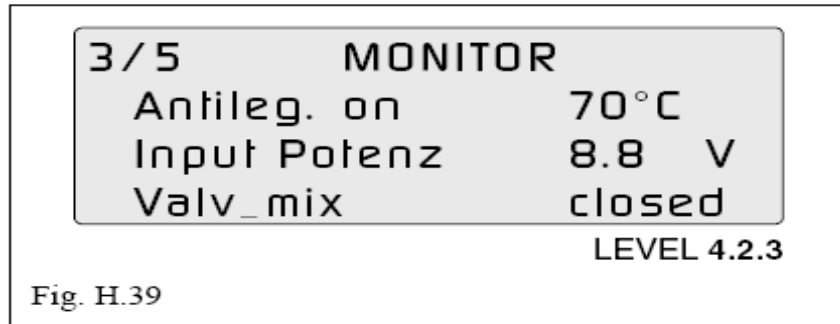
### Other information (Display 3/5)

If the cursor moves forward ▼ , 3/5 screen will appear. In Figure H 39, in the screen 3/5 shown

**Antileg. on 70 ° C:** Legionella protection is on and the temperature is set to 70 ° C

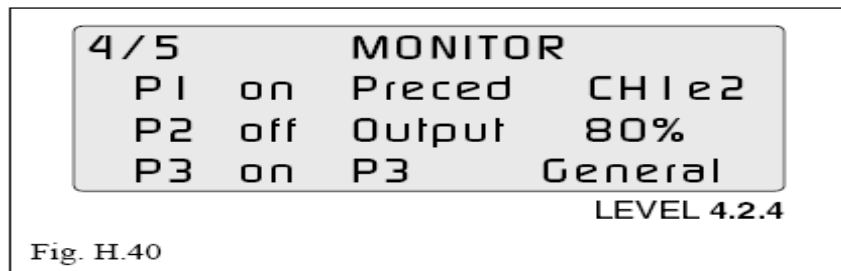
**Input Potenz 8.8 V:** Voltage value for analog signal input (When information is received, 8.8 volts is read on the display)

**Valv\_mix closed :** Mixing valve position (closed when information is received)



### Information screen about pumps: (4/5 screen)

On the information screen about pumps; various information about pumps is given. (Figure H.40)



#### 1-Pump describes the pump that circulates water to the 1 radiator system.

This pump is the water flow side pump after the mixing tank.

If both CH1 and CH2 systems are connected to each other and priority is desired for one of the systems, 0 or 1 or 2 value is entered in parameter 16. (O : no priority, 1: CH1 priority, 2: CH 2 priority)

**P1 pump is on**

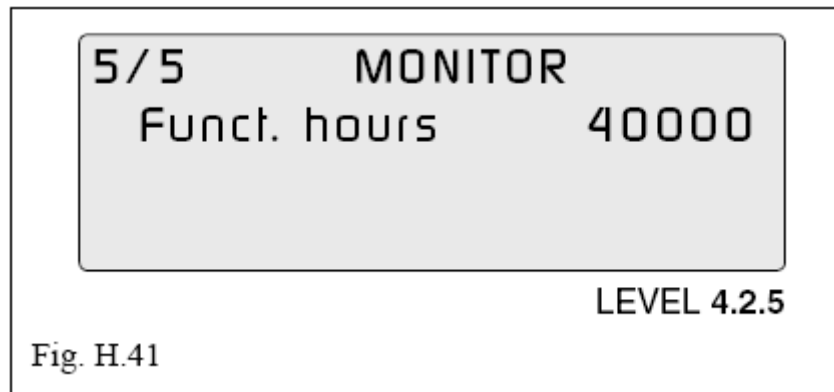
#### 2-P2 refers to the hot water circuit pump.

Looking at the information display above in Figure H40, it shows that the P2 domestic water pump is off. 80% defines the amount of heat required by the system when the pump is started. For example, if the hot water system is on, in this case, it will be 0% when the desired temperature value is reached (except for Anti leginalla heating).

**3- P3 is hot water circuit return pump. Naturally, it has to be constantly "on".**

### Display of the total working hours of the system: (Figure H 41)

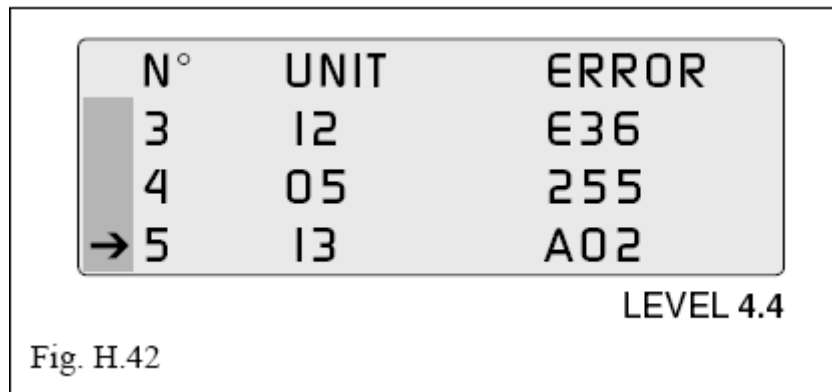
Defines the final set value related to the operating time of the system. (For example, 40,000 hours - figure H 41) This function will be able to be restarted from the ANA software A05 version.



### ERROR INFORMATION

If an error occurs in the system, the Room control unit sorts the code of the error and in which unit the error occurred, according to the error occurrence sequence. For example, in the screen given in figure H 42;

1. Defines that the third error is in error code E36 and it is in heating unit 12.
2. Defines that the fourth error is in error code 255 and it is in heating unit 5.
3. Defines that the fifth error is in error code A02 and it is in heating unit 13.



If the cursor **OK** is pressed, it explains the details of the error. A02 error - no flame (blocking flame- no ignition), defines that the system will not function until the fault is removed (**figure H 43**)

**APPENDIX I - ACCESSORIES**

<u>Accessory</u>	<u>Code</u>
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<u>Waste gas kit 50kW (DN125)</u>	<u>1102819</u>
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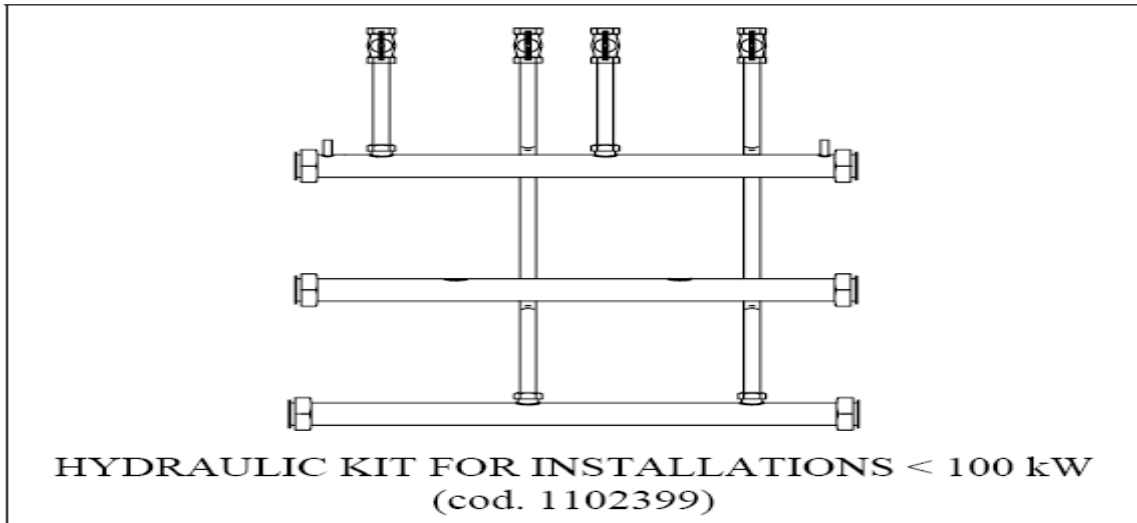
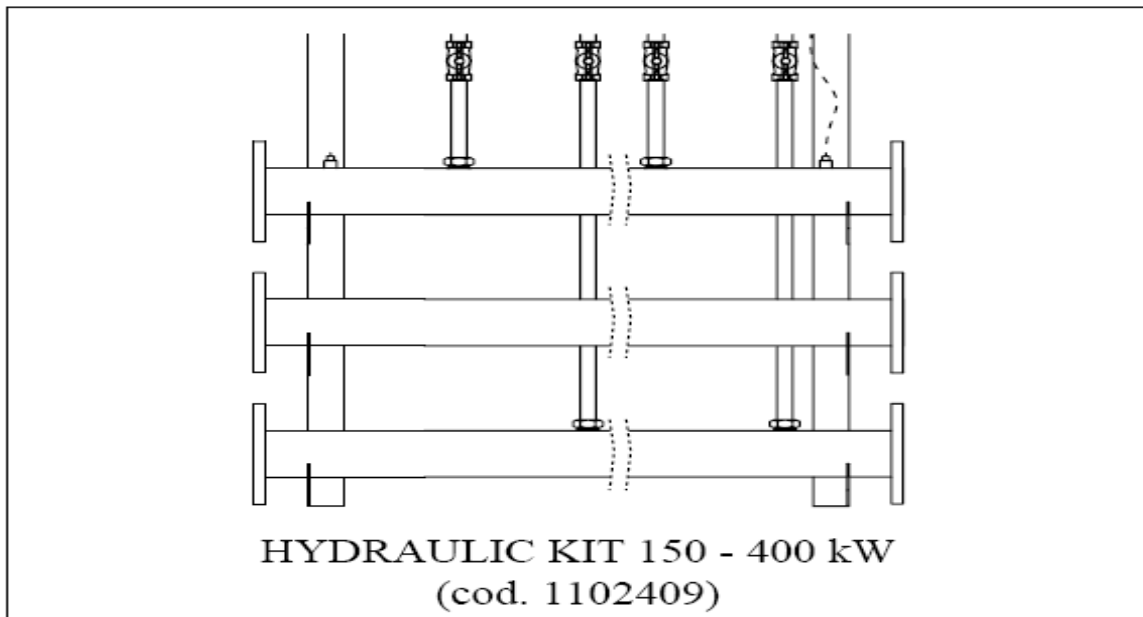


<u>Waste gas kit 100kW (DN125)</u>	<u>1102389</u>
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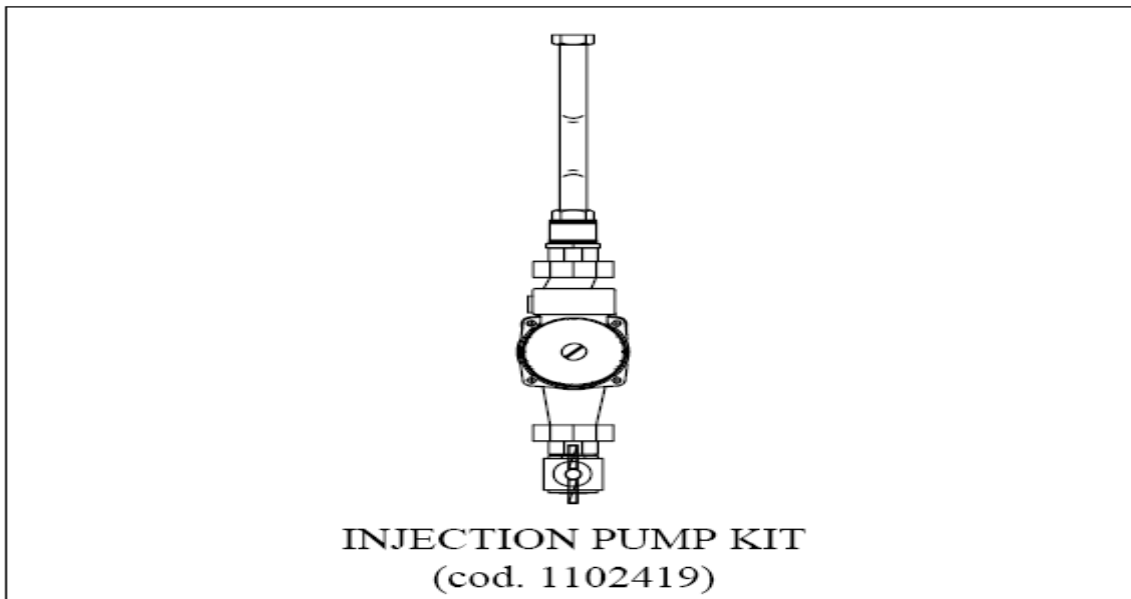


<u>Condensate kit (DN125)</u>	<u>1102809</u>
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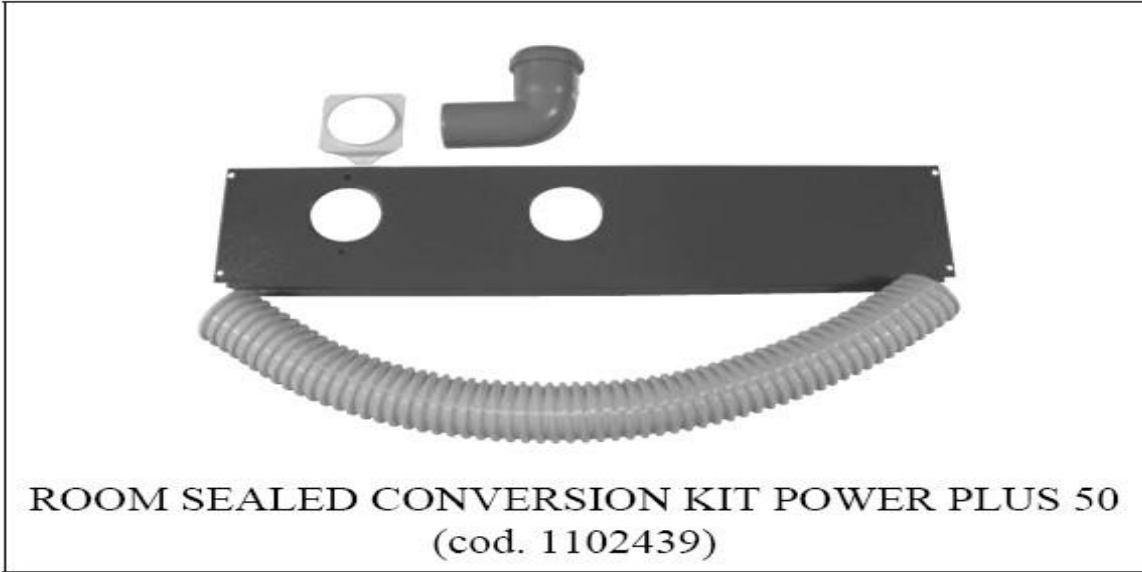
**Hydraulic mounting kit <100kW****1102399****Hydraulic mounting kit >100kW****1102409****3" flange (for hydraulic kit > 200kW interconnection) 1102579**



**3" Blind flange (Hydraulic kit > 100kW blind flange) 1102589****Remote control kit 1102379****Pump kit 1102419**

Fresh air connection kit 50kW

(When fresh air must be taken from the outdoor environment) 1102439

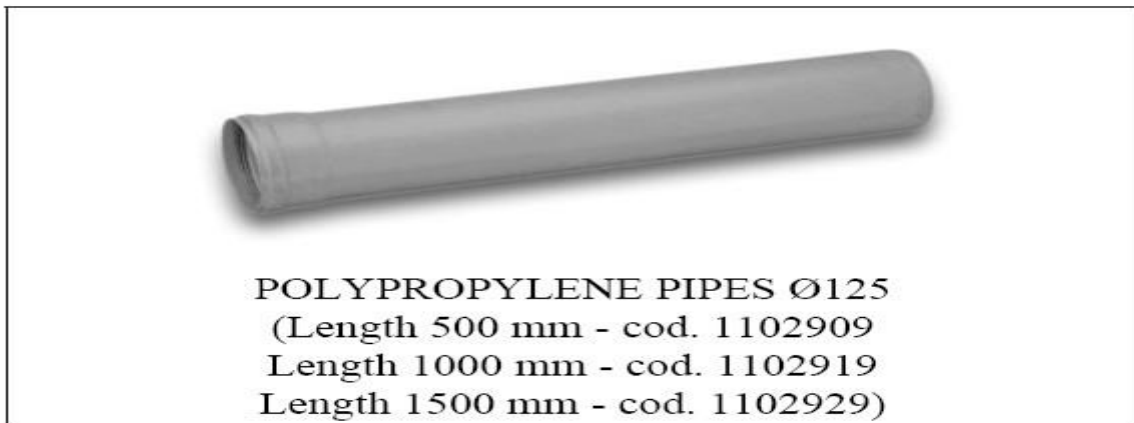


Fresh air connection kit 100kW

(When fresh air must be taken from the outdoor environment) 1102449



- Polypropylene pipe
- Length 0.5 m DN125 Code NO 1102909
- Length 1.0 m DN125 Code NO 1102919
- Length 1.5 m DN125 Code NO 1102929



- **Polypropylene bend DN 125**
  - 90° bend                      Code Number 1102689
  - 45° bend                      Code Number 1102769

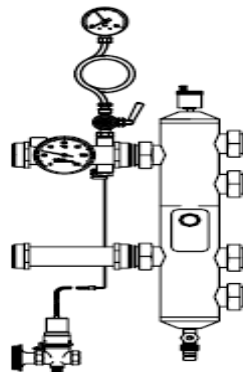


**POLYPROPYLENE 90° ELBOW**  
(Ø50 cod. 1102639 - Ø125 cod. 1102779)

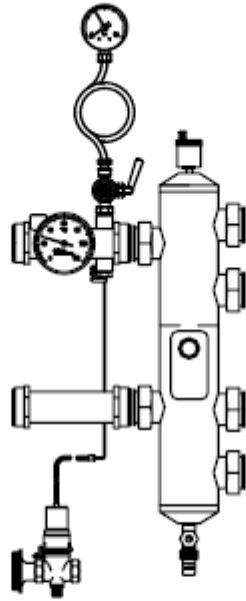


**POLYPROPYLENE 45° ELBOW**  
(Ø50 cod. 1102689  
Ø125 cod. 1102769)

### **ISPESL Kit and Hydraulic mixer**



**ISPESL KIT WITH HYDRAULIC SEPARATOR**  
(Up to 100 kW - cod. 1102829  
Up to 200 kW - cod. 1102559  
Up to 400 kW - cod. 1102569)



### ISPEL KIT WITH HYDRAULIC SEPARATOR

(Up to 100 kW - cod. 1102829

Up to 200 kW - cod. 1102559

Up to 400 kW - cod. 1102569)