

# ALUTHERM<sup>®</sup>

## *Heating*



***Alutherm C 850 - 1050 - 1250***

Installation, User and Service Manual | instructions for user

## INSTRUCTIONS FOR USER

If you have questions concerning the use of your boiler or heating system, please ask your installer. It is in your own interest and that of the installer that you are aware of how to operate your boiler and heating system safely and efficiently.

The appliance is not to be used by children or persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge. Children, even if being supervised, must not play with the appliance

In the case of failure or malfunction of the appliance, do not attempt to repair it yourself. Please contact your installer. Repairs must only be carried out by qualified technicians. Failure to comply with these requirements can compromise the safety of the appliance.

### Operation

Water, coming from the radiators or from the DHW unit is heated in the aluminium heat exchanger. The CH or DHW pump guarantees circulation of water. The air needed for combustion is sucked in by a rpm controlled fan. At low boiler temperatures the flue gases can be cooled sufficiently for condensation of the water. This water is drained to the sewer via a built in syphon. This drainage must never be blocked. A burner controller with built in micro processor provides the electrical control of the boiler.

### Topping up

The built in manometer indicates if the waterpressure is sufficient. As soon as the water pressure drops below 1 bar topping up is necessary. If topping up becomes a regular occurrence, your installation should be checked by an installer.

Disconnect from the main. Connect the filling hose to the cold water tap and to the fill and drain valve of the boiler. Before tightening the coupling in the installation slowly fill the hose with water allowing any air present to escape. Open the fill and drain valve and slowly fill the installation until a pressure between 1.5 and 2.0 bar is reached. When finished connect again to the main.

### Bleeding

To remove any air present in the heating system and boiler, bleeding is necessary. Disconnect from the main. Open all the radiator valves. Bleed the air from all the radiators starting with the ones at the lowest point in the system. After bleeding, check the water pressure and top-up if required (if water pressure has dropped below 1 bar). Connect to the main again.

### Starting the boiler

Please ask your installer how to start the boiler. Depending on how your heating system is controlled, this could be via an external timeclock, thermostat, switch or otherwise. Once the boiler volt-free enable contacts are closed, the boiler will commence its starting sequence.

### Boiler flow temperature

The burner controller can adjust the flow temperature between 20 ° and 85 °C. The temperature setting can be changed using the control panel. The installation manual provides the instructions for setting the flow temperature.

### DHW (Hot Water) temperature ( if applicable)

From the factory, the DHW temperature is set to a value of 60 °C. This set value can be changed to any value between 35 and 65 °C using the buttons on the control panel. If the DHW device has a thermostat the DHW temperature can be adjusted by setting this thermostat.

### Switching off the boiler

During summer time the room thermostat can be set to a lower value to turn off the boiler. During winter or during a longer period of absence this temperature never should be set to a lower value than 15 °C. Don't switch off the power. During a period of frost all the radiators should be partly or totally opened to avoid danger of freezing.

The integrated pump control will activate the pump every 24 hours for a short period even if no demand is present. This prevents the pump jamming. Only when work on the boiler is being carried out may the main electricity supply and gas supply be turned off (your installer can show where these are located).

### Errors

If an error occurs first check the following

- Is the room thermostat properly set?
- Is the boiler connected to the main? Power supply present?
- Is the gas valve opened?
- Are the radiator valves open?
- Is the water pressure in the installation higher than 1 bar?
- Is the installation bled thoroughly?

An error is indicated by a code on the display. It is very important for the sake of a correct diagnosis to mention this code when calling your installer. Reset the burner controller by pressing the ok button on the control panel. If the error occurs frequently contact your installer.

### Maintenance

A yearly inspection of the boiler must be done by your installer. The lifespan and the reliability of the installation are improved by doing so. The casing of the boiler may be cleaned with a soft cloth (no abrasives). Never use solvents like thinner!

### Caution

The air supply (for air needed for combustion) and the flue parts are essential parts for safe and efficient operation of the boiler. Changes on these systems by non qualified persons are not allowed e.g. the settings of the gas valve. The gas/air ratio is set to a lambda value of approximately 1.26. This corresponds with a CO<sub>2</sub> level of 9,3 % (full load).

For further information see installation manual.

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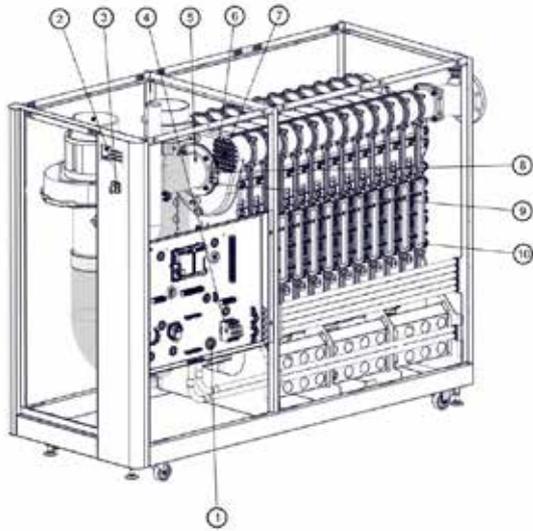
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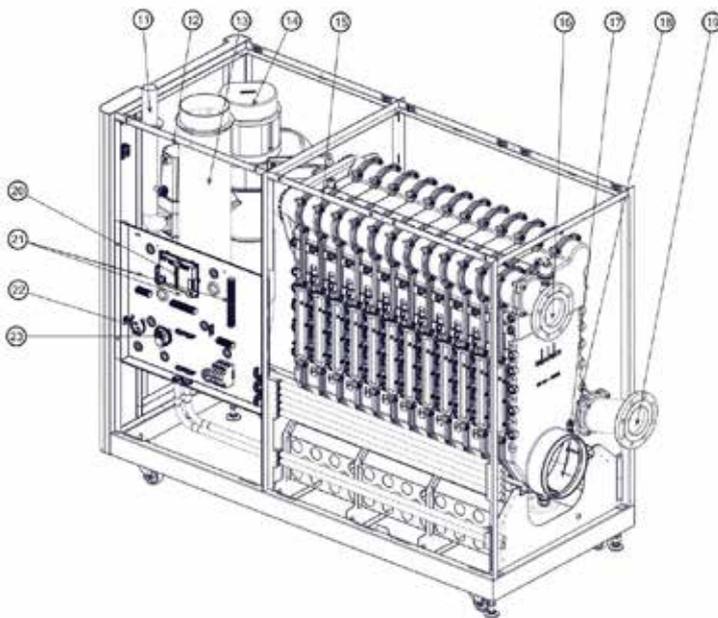
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**Note: This manual is the translation of the original manufacturer instructions.**

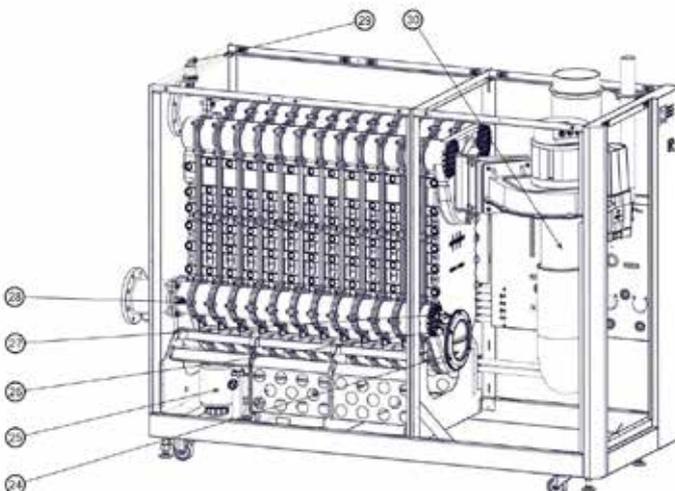
## 1 DESCRIPTION BOILER



- 1 Manometer
- 2 Display LCD
- 3 Power switch
- 4 Fuse
- 5 Burnerhood
- 6 Sight glass
- 7 Flow NTC
- 8 Ignition electrode
- 9 Ionisation flame detector
- 10 Inspection cover



- 11 Gas pipe
- 12 Gas valve
- 13 Air supply
- 14 Fan
- 15 Overheat limiter
- 16 Flow
- 17 Flue gas NTC
- 18 Exhaust
- 19 Return
- 20 Maxsys
- 21 Terminal strip
- 22 Syphon pressure switch
- 23 Air pressure switch



- 24 Sump inspection cover
- 25 Syphon
- 26 Fill and drain valve
- 27 Water pressure switch
- 28 Return NTC
- 29 Automatic air vent
- 30 Venturi

## 2 TECHNICAL DATA

TECHNICAL DATA ALUTHERM C 850 - 1050 - 1250				
	850	1050	1250	
<b>Central heating</b>				
Nominal input max load (Hi)	850	1100		kW
Nominal input min load (Hi)	204	204		kW
Nominal output max load 80-60 °C	828,8	994,5		kW
Nominal output min load 80-60 °C	198,5	198,5		kW
Efficiency max load 80-60 °C (Hi)	97,5	97,5		%
Efficiency min load 80-60 °C (Hi)	97,3	97,3		%
Efficiency max load 50-30 °C (Hi)	103,1	103,1		%
Efficiency 30 % load 30 °C (return) (Hi)	108,3	108,3		%
<b>Flue-gas</b>				
Temperature flue-gas max load 80-60 °C	65-70	65-70		°C
Temperature flue-gas min load 80-60 °C	60-65	60-65		°C
Mass-flow flue-gases at max load G25	1221	1465		m <sup>3</sup> /h
Mass-flow flue-gases at min load G25	245	294		m <sup>3</sup> /h
Maximum flue-resistance	500	500		Pa
Emission CO (n=1)	96	96		ppm
Emission NOx (n=1)	6	6		class
Types B23, C(11)3, C33, C63	yes	yes		
<b>Gas</b>				
Gas flow max load G25	104,5	125,4		m <sup>3</sup> /h
Gas flow max load G25	21	25,1		m <sup>3</sup> /h
Gas flow max load G25.3	99,9	119,8		m <sup>3</sup> /h
Gas flow max load G25.3	20	24		m <sup>3</sup> /h
Gas flow max load G20	90	108		m <sup>3</sup> /h
Gas flow min load G20	24	24		m <sup>3</sup> /h
CO <sub>2</sub> content max load G20	9,3	9,3		%
CO <sub>2</sub> content min load G20	9,1	9,1		%
O <sub>2</sub> content max load G25	3,90 +0,10-0,30	3,90 +0,10-0,30		%
O <sub>2</sub> content max load G25	4,30 +0,35-0,20	4,30 +0,35-0,20		%
O <sub>2</sub> content max load G25.3	3,95 +0,10-0,35	3,95 +0,10-0,35		%
O <sub>2</sub> content max load G25.3	4,35 +0,35-0,25	4,35 +0,35-0,25		%
O <sub>2</sub> content max load G20	4,25 +0,10-0,35	4,25 +0,10-0,35		%
O <sub>2</sub> content min load G20	4,60 +0,40-0,20	4,60 +0,40-0,20		%
<b>Water</b>				
Maximum flow temperature	85	85		°C
Content heat-exchanger (without manifolds)	100	118		ltr
Working pressure (PMS)	0,8/6	0,8/6		Bar
Hydraulic resistance	200	225		mbar
(DT 20 nominal flow at full load 80-60 °C)				
Maximum DT max load/min load	25/35	25/35		°C
Maximum water flow	71,3	85,6		m <sup>3</sup> /h
<b>Weight</b>				
Mass heat-exchanger*	348,4	412,6		kg
Total mass Alutherm boiler	625	700		kg
<b>Sizes of casing</b>				
Width	880	880		mm
Depth without exhaust connection	2096	2096		mm
Height with wheels	1660	1660		mm
<b>Electrical</b>				
Electrical voltage/frequency	230/50	230/50		V/Hz
Standby power consumption*	15	15		W
Min load power consumption*	50	50		W
Max load power consumption*	1560	2000		W
Maximum allowable power consumption	2300	2300		W
Fuse	10	10		A

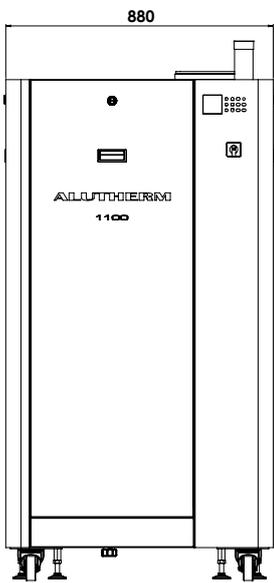
\* as coming from factory without extra devices connected

## 2.1 COMPONENT MATRIX

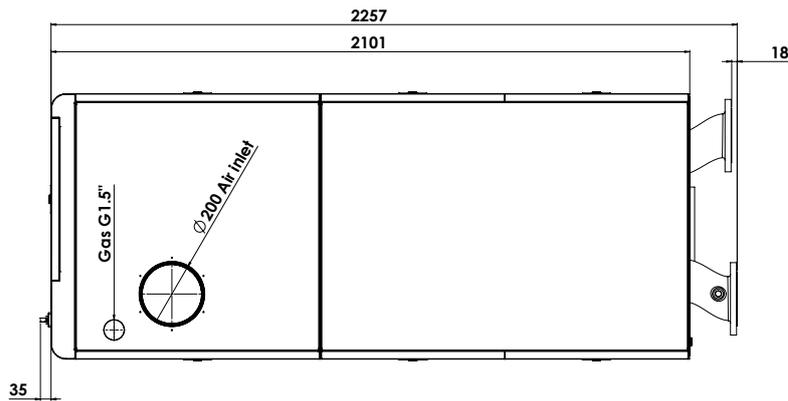
COMPONENT MATRIX			
PART	C 850	C 1050	C 1250
Boiler control Honeywell Maxsys	S4966V2052	S4966V2052	
Display (user interface)	DSP 49G2193	DSP 49G2193	
2 Line EMC Filter 250 V EPCOS	no	B84112G	
Fan MVL 230 VAC	G3G250MW5001	G3G250250MW5001	
Gas-valve Dungs 230 VAC	MBC-700-SE-S02	MBC-1200-SE-S02	
Venturi type DT	DT850	DT1020	
Texi Burner round 140 mm Worgas	1011	1200	
Silencer flue-gas round 250 mm L=500mm	yes	yes	
NTC-12k, L=50 mm x D5 , ¼" BSP	3	3	
NTC 12 k OTC	optional	optional	
Water low pressure sensor 1,4/0,8 bar (WPS)	yes	yes	
Pressure difference switch 40 Pa in and 25 Pa out (APS)	yes	yes	
Syphon pressure difference switch 15,0 mbar out (SPS)	yes	yes	
Gas pressure switch : in 11,7-14,3 and out 8,6-11,4 mbar (GPS)	yes	yes	

Soon available

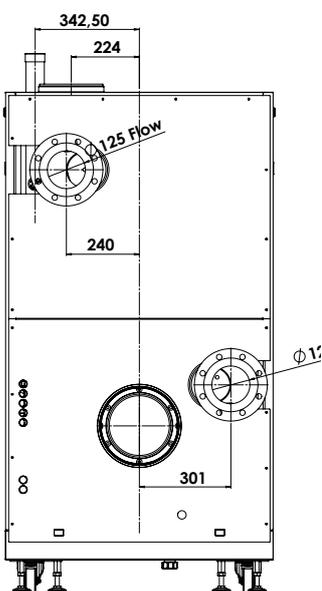
## 3 DIMENSIONS



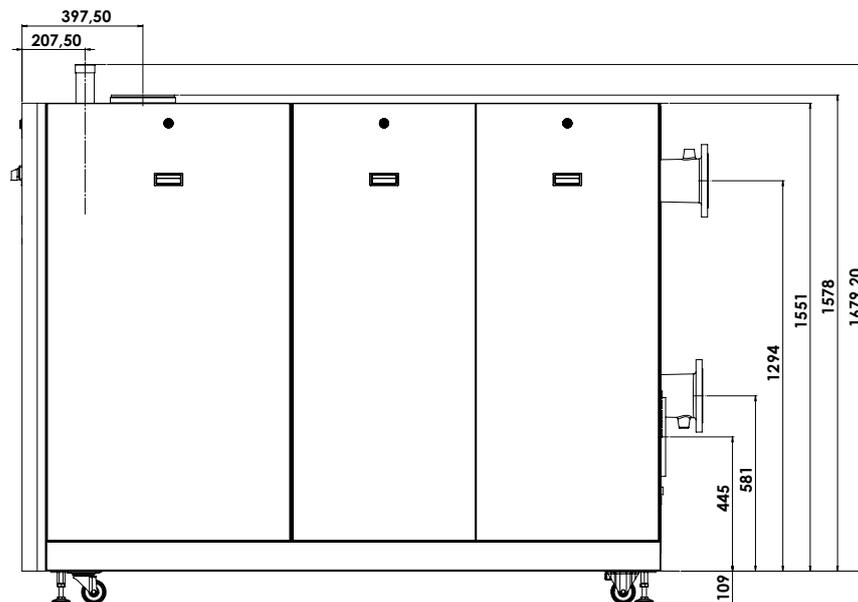
**FRONT**



**TOP**



**BACK**



**SIDE**



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## 4 OPERATION

### 4.1 General

The Intermodul is a floor standing boiler, equipped with a cast aluminium heat-exchanger. During heat demand the controller activates the pump. The controller checks the air pressure switch (zero check) and increases the fan speed to perform an airflow-check. Once the air pressure switch closes, the fan speed increases to ignition speed and a 5 second pre-purge is performed. The water pressure sensor, gas pressure switch and siphon pressure switch are checked. When all pressure switches are closed and the water pressure is ok, the ignition is started.

The air needed for combustion is taken in from the outside (if room sealed) or the boiler house (type B flue installation) by the fan. The air is transported through a gas/air mixing device creating a negative pressure. This negative pressure is an indication of the amount of air being transported. The negative pressure is supplied to the gas valve by an internal tube. The gas valve automatically adjusts the amount of gas that will be injected into the venturi and that will be mixed with the air-flow. This mixture is supplied to the burner.

Ignition and flame-control of the mixture is done by two electrodes mounted on the burnerhood.

Temperature control and safeguarding is done using two NTC's. The boiler monitors the sensors continuously in order to control operation and ensure safe operation.

### 4.2 Central Heating (CH)

#### 4.2.1 On-off room thermostat

As standard the boiler is programmed for using an on-off room thermostat. The room thermostat has to be connected to the pin nrs. 1 + 2 on the terminal strip. Open Therm will be recognized if connected on 1 + 2. The desired flow temperature is adjustable, but as standard is set to 85 °C.

At CH heat request from the room thermostat (and no DHW heat request present) the CH-pump is activated after 10 seconds. The controller will adjust the burner-input in such a way that a flow-temperature of 85 °C towards the CH-circuit is achieved.

Warning : do not supply any voltage to these terminals as you may damage the controller

#### 4.2.2 Optional 0-10V

The boiler may be controlled using a 0-10 V DC signal. Connect the negative (0V DC) to No. 3, and the positive (0-10V DC) to No.4 on terminal strip C2. A loop of wire must be placed between the pin nrs. 1 and 2 of terminal strip C2.

In the technician menu, enable 0-10V in the advanced CH settings menu by setting, CH request to either 0-10V DC % or 0-10V DC SP.

##### 4.2.2.1 0-10V DC % power control

A value between 2 and 10V DC generates a CH power demand proportional to this value between 0 and 100% (0% = minimum load, 100% = nominal load). The heat demand is removed when the control signal falls below 1 volt. The setpoint of maximum flow temperature is set to 90°C.

In the user/technician menu, under diagnostics, boiler information the actual voltage input and target power are displayed.

##### 4.2.2.2 0-10V DC Setpoint

A value between 2 and 10V DC generates a CH setpoint demand proportional to this value between CH minimum flow temperature and maximum CH flow temperature. The heat demand is removed when the control signal falls below 1 volt.

The minimum and maximum CH flow temperature can be set in the technician menu, advanced CH settings, CH temperatures.

In the user/technician menu, under diagnostics, boiler information the actual voltage input and boiler setpoint are displayed.



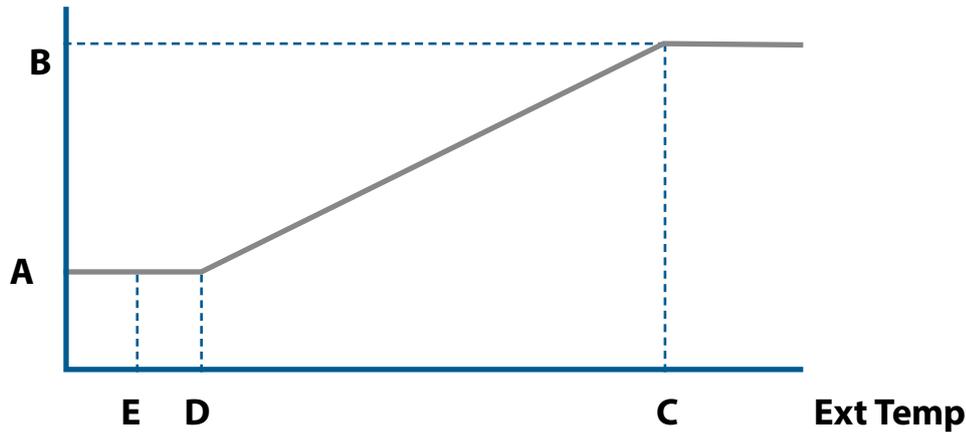
**Caution : Ensure that the 0-10V DC signal is free from electrical interference!**

## 4.2.3 Outside Temperature Control OTC (optional)

The boiler may use an outdoor sensor to provide weather compensation (OTC).

To activate weather compensation connect an outdoor sensor to numbers 5 and 6 on the terminal strip C2. Pin numbers 1 and 2 have to be bridged by a wire. Alternatively those pin numbers (1 and 2) can be used for connecting room thermostat on/off. In the technician menu, under advanced CH settings, CH request, OTC only must be selected. The outdoor sensor is then automatically detected by the controller. The parameters corresponding with A-E in the figure below can be set in the technician menu (advanced CH settings).

### CH Setpoint



- A** OTC offset: minimum CH setpoint value
- B** OTC setpoint maximum: maximum CH setpoint value
- C** OTC weather cold: external temperature value at which the maximum CH value will be used.
- D** OTC weather warm: external temperature value at which the minimum CH value will be used
- E** OTC warm weather shutdown: external temperature value at which the CH demand will end

In the user menu an eco setpoint reduction (night reduction) can be set. Day, week and weekend options are also available (on, eco, off)

The outdoor sensor is available as an optional accessory.

The sensor should be installed on the north-side of the building at a height of approximately 2 meters.

Note : The resistance of the outdoor NTC should be 12 kOhm at 25 °C.  
Also see table of resistance for NTC's at 6.6.2

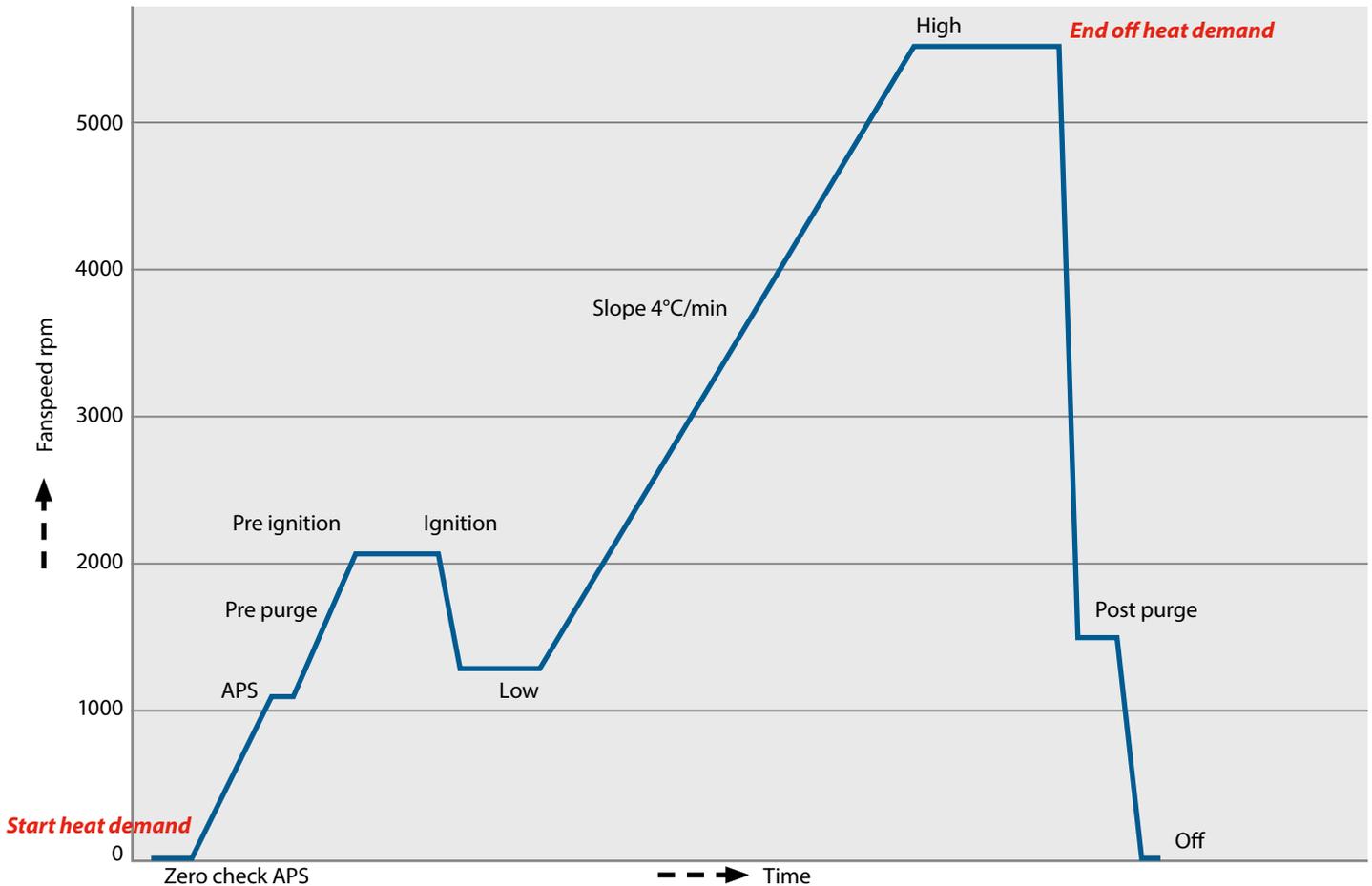
## 4.2.4 Optional digital communication

The boiler supports digital communication with room thermostats using Open-Therm communication protocols (automatically recognised if connected to pins 1 + 2 on terminal strip C2, also see 4.2.1.)

## 4.2.5 Slow start

The boiler uses the "slow start" procedure to prevent the boiler from supplying excessive power in low load situations. After "zero check" APS and closure APS with pre purge ignition starts. Following, a stabilization period, the boiler modulates down to low capacity and maintains this capacity for 1 minute. Subsequently the boiler power increases at a target rate of 4 °C/min until maximum capacity or set temperature has been reached. Once heat demand has finished the burner will turn off following a set post purge period. The graph below illustrates this;

### Slow start sequence



## 4.2.6 Protection against insufficient flow through boiler

When the requirements of 6.3.2 are fulfilled the boiler will protect itself against insufficient flow. This is done by checking the difference in temperature between flow and return (so called  $\Delta T$ ).

In a low flow scenario the  $\Delta T$  will rise rapidly. The  $\Delta T$  safe-guarding principle is as follows ;

At  $\Delta T > 22$  the boiler starts modulating

At  $\Delta T$  between 22 and 27 the boiler continues modulating

At  $\Delta T > 27$  boiler the fan speed will reduce until  $\Delta T < 25$

## 4.3 Domestic Hot Water (DHW)

## 4.3.1 External storage tank with thermostat (electric 3-way valve)\*

As standard the DHW configuration is factory pre-set for an external storage tank + tank thermostat.

For hydraulic connection of an external storage tank to the boiler via an electric 3 way valve one should either use :

- the default configuration 2 pumps: 230 VAC DHW pump (terminal strip C1: 12,13,14) and CH pump (terminal strip C1: 15,16,17)
- an electric 3-way valve with a maximum travel time of 255 sec. (terminal strip C1: 13,14,15,16). At the end of the travel time in either direction DHW or CH the 230 VAC on the 3-way valve will be switched off.

The 2 wires of the tank thermostat must be connected to numbers 7 and 8 on terminal strip C2.

In the case of using an electric 3-way valve adjust the setting in the technician menu, system settings, boiler parameters, number of pumps to: pump and 3-way valve.

The 3-way valve travel time can be changed in the technician menu, system setting, boiler parameters, 3-way valve travel time.

## 4.3.2 External storage tank with NTC sensor

In case the storage tank is equipped with an NTC sensor, adjust the setting in technician menu, advanced DHW settings, DHW request to sensor.

Note: The resistance of the NTC sensor must have a value of 12 kOhm at 25 °C.

The 2 wires of the tank NTC sensor must be connected to numbers 7 and 8 on terminal strip C2.

The set point temperature of the storage tank is adjustable (default set at 60°C, the flow temperature is DHW setpoint + 20K). Warning : if a CH heat demand exists immediately after finishing the heat request for DHW, it is possible for high temperatures to flow into the CH system regardless of CH set point (hot shot).

## 4.3.3 DHW priority/General behaviour with external storage tank

Disabling hot water operation : press Summer-Winter button R2-C4 (not active in main screen). See later in manual for further explanation.

Enabling hot water operation : press Summer-Winter button R2-C4 (active in main screen). See later in manual for further explanation.

In the default boiler configuration, (2 pumps-DHW and CH pump), a DHW request has priority over CH request

In the technician menu, advanced DHW settings, DHW priority, the DHW priority over CH can either be disabled or a maximum DHW priority time may be set.

In the case where the DHW priority is disabled and both demands are active at the same, both pumps (CH and DHW) will be activated. During this time the flow temperature is set to either 80 °C (tank thermostat) or DHW setpoint + 20K (NTC sensor).

Notice : At outputs  $\geq 40$  kW double separation between exchanging media is required.

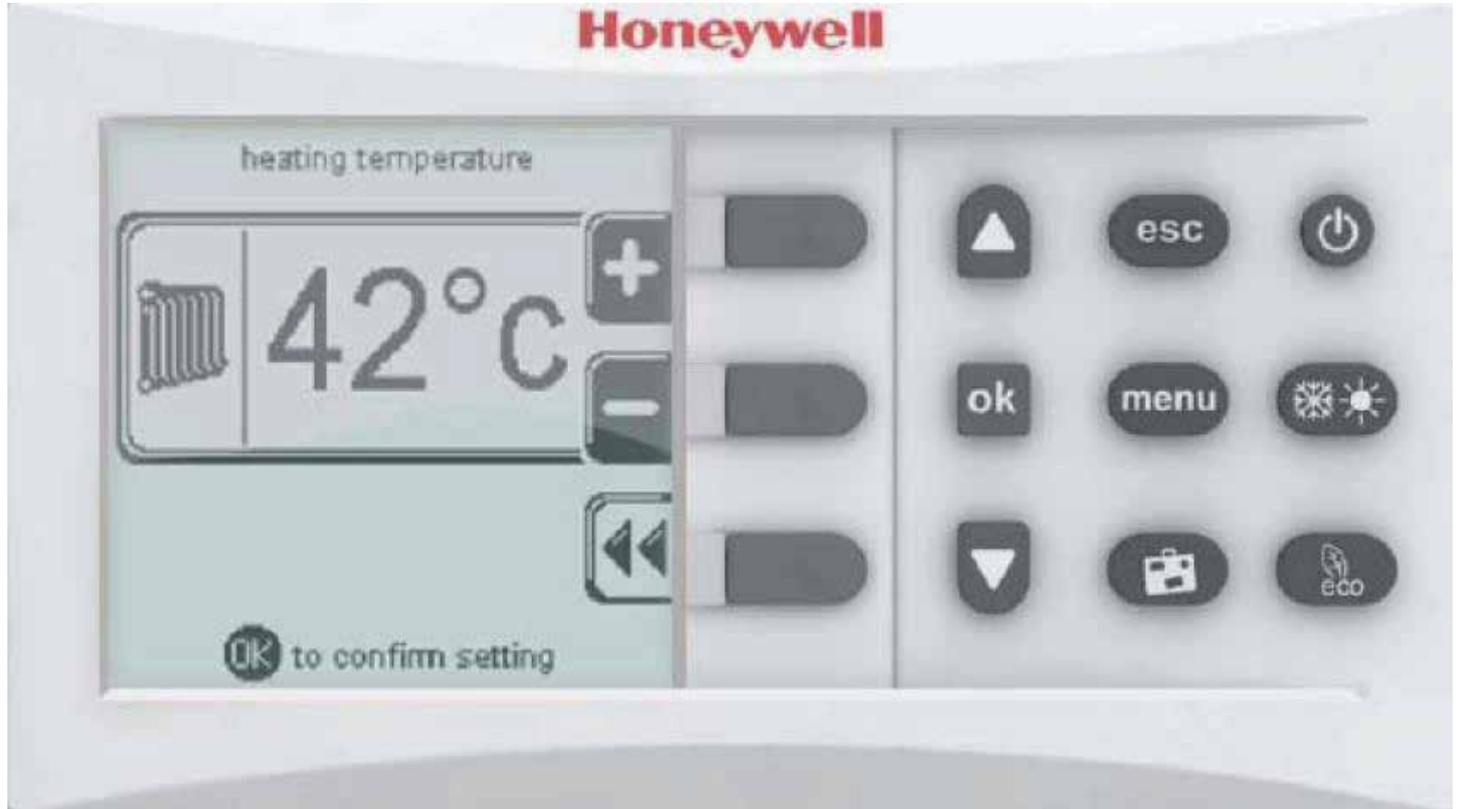
## 4.4 Cascade

For cascade application see appendix "cascade"

## 5 BOILER CONTROL

### 5.1 Control Panel

The control panel has 12 buttons and a display as shown in the figure below.



### 5.2 Push buttons on control panel

Description of push button use



- R1-C1, R2-C1 and R3-C1(back) buttons follow, if pressed, the associated icon in the display (left)
- R1-C2 and R3-C2 (up-down) buttons, scroll, if pressed, through the different menus
- R2-C2 button confirms, if pressed, the highlighted selection, or confirms what is required by LCD
- R1-C3 button (escape) returns, if pressed, to main screen
- R1-C4 (on-off) button puts boiler in off mode, main logo and date/time stay displayed
- R2-C3 (menu) button enables, if pressed, access to both user and installer menu
- R2-C4 (summer-winter) button enables-disables, if pressed, CH and DHW in main screens
- R3-C3 (holiday) button enables, if pressed, holiday function in main screens
- R3-C4 (eco) enables, if pressed, eco function in main screens

## 5.3 User menu

By pressing the “menu-button” the display will show the text as given in the figure below.

By pressing the button marked “3” in the figure above the user menu is accessed. Pressing the button marked “5” returns back to the main screen.

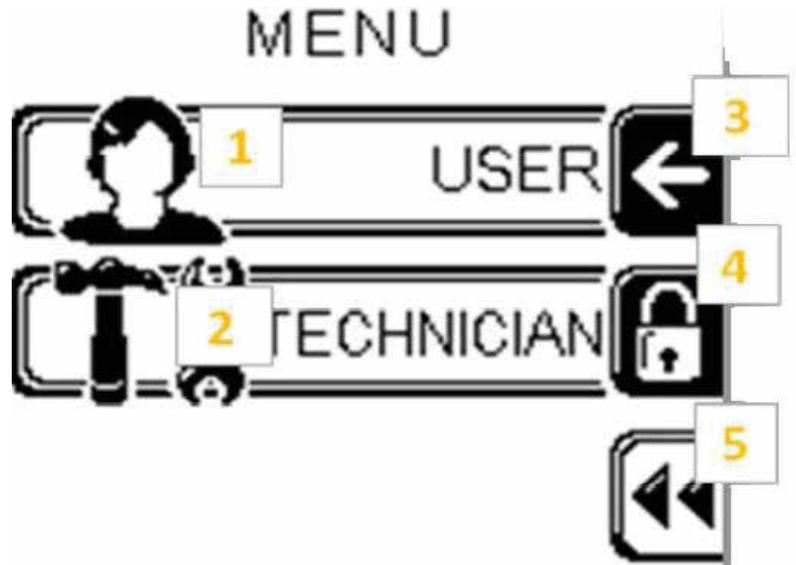
By pressing the button marked “4” the installer menu is accessed.

In the user menu the following options will be shown :

1. HEATING
2. DOMESTIC HOT WATER
3. HOLIDAY
4. MAINTENANCE
5. SETTINGS
6. CHIMNEY-SWEEPER
7. DIAGNOSTICS

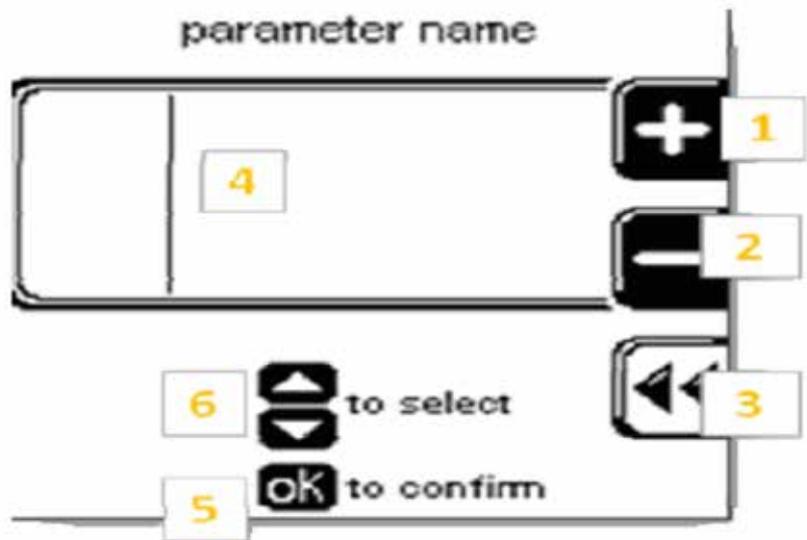
By pressing up and down (R1-C2 and R3-C2) one of the six options as shown above will highlight the desired parameter. By pressing the OK button (R2-C2) the chosen option will be selected.

Once an option has been selected it is possible to change the parameters corresponding with the chosen option



### 5.3.1 Parameter/value setting

Pressing the up and down (R1-C2 and R3-C2) buttons will highlight the desired parameter. Pressing the OK button (R2-C2) will allow the chosen parameter to be modified. This is shown below.



The actual value can be changed by pressing the R1-C1 and R2-C1 buttons. The changed value can be confirmed by pressing the OK (R2-C2) button. Pressing the back (R3-C1) button leaves the actual displayed parameter. If there are more parameters shown in the parameter value area (4) the desired parameter can be selected by pressing the up and down ((R1-C2 and R3-C2) buttons).

### 5.3.2 Parameters accessible by user

An overview of the parameters accessible by the user is given on the next pages

USER MENU	SUBMENU 1	SUBMENU 2	SUBMENU 3	SUBMENU 4	NOTES
1 Heating	1 CH temperature /OTC set	1 CH setpoint			Heating user settings
		2 Outside temperature for CH off			Set the CH temperature and OTC curves parameters
					Adjust setpoint of CH circuit
					Set the external temperature at which Heat demand is removed . If set OFF, heat demand will never be removed by controller (Only by removing RT or bridge between terminal strip C2:1,2)
	2 ECO setpoint reduction				Set the temperature that will be subtracted from the actual setpoint when ECO mode is activated
	3 Scheduler set				Invoke scheduler menu
		1 Enable/disable on board scheduler			Based on selection is possible to enable/disable on board scheduler
			Enable		Enable on board scheduler
			Disable		Disable on board scheduler
		2 Scheduler set			Select to set scheduler
			1 Monday 2 Tuesday 3 Wednesday 4 Thursday 5 Friday 6 Saturday 7 Sunday 8 Monday – Friday 9 Monday – Sunday 10 Saturday - Sunday		Used to program on board scheduler (On, Off, Eco)
2 Domestic hot water					Domestic hot water user settings
	1 DHW set point				Set the DHW temperature (in case of a DHW with sensor this is the actual DHW temperature, in case of DHW with thermostat this is the base boiler flow temperature)
	2 ECO set point reduction				Set the temperature that will be subtracted from the actual setpoint when ECO mode is activated
	3 Scheduler set				Invoke scheduler menu
		1 Enable/disable on board scheduler			Based on selection possible to enable/disable DHW on board scheduler
			Enable		Enable on board scheduler
			Disable		Disable on board scheduler
		2 Scheduler set			Select to set scheduler
			1 Monday 2 Tuesday 3 Wednesday 4 Thursday 5 Friday 6 Saturday 7 Sunday 8 Monday – Friday 9 Monday – Sunday 10 Saturday - Sunday		Used to program on board scheduler (On, Off, Eco)

USER MENU	SUBMENU 1	SUBMENU 2	SUBMENU 3	SUBMENU 4	NOTES
3 Holiday					Holiday temperatures settings
	1 CH holiday set point				Set CH temperature used when Holiday mode active
	2 DHW holiday set point				Set DHW temperature used during holiday mode
4 Maintenance					Set maintenance related info
	1 Service information				Used to display service company phone number or entered info
	2 Service due date				Show next service due date . When date expire a MSG is shown on lower part of main screen asking for service
5 Settings					Boiler option settings
	1 Select Language				Allow selection of a different language
		English			Select for English
		Italian			Select for Italian
		German			Select for German
		Russian			Select for Russian
	2 Select units				Allow selection of different unit
		Fahrenheit			Select for Fahrenheit
		Celsius			Select for Celsius
	3 Set date				Allow RTC date setting
	4 Set time				Allow RTC time set. When selected a screen asking for time format 24/12 Hours is opened. When selected appropriate format screens jump to time entering screen
		24 hours			Select for 24 hours clock
		12 hours			Select for 12 hours clock
	5 Restore factory data				Pressing OK all the user settings will be restored to the original factory default settings. See 1)
6 Chimney sweeper					Manual mode. Hitting OK will force boiler to operate at % of power
					Timeout 15 minutes. While test in progress navigating through other menus is allowed.
7 Diagnostics					Will display boiler usage information and errors
	1 Boiler information				Boiler information
		"1 CH request 2 DHW demand 3 Firing rate 4 Flame ionization current 5 Boiler set point 6 Boiler supply temperature 7 Return temperature 8 Flue temperature 9 Outdoor temperature 10 DHW storage temperature 11 Boiler fan speed 12 CH ignitions 13 CH runtime 14 DHW ignitions 15 DHW runtime 16 System pressure 17 Heat Exchanger Temp. 18 0-10V input 19 Target power"			Will display the information shown in SUBMENU 2
					When the line has a * at the end of the line means that hitting OK when the line is highlighted will open a graph that shows the latest 120 variable values stored every 12 minutes (24 hour history)

## 5.4 Installer (technician) menu

If the button marked "4" (page 21) is pressed the screen as given in the figure below will appear.

Once the menu is accessed by entering the code the following options will be shown

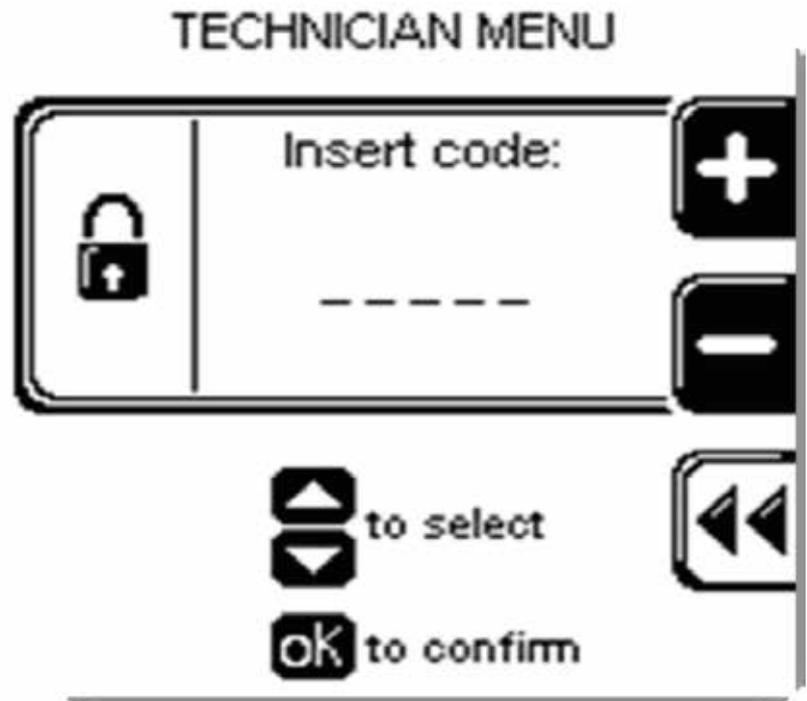
1. **ADVANCED CH SETTINGS**
2. **ADVANCED DHW SETTINGS**
3. **SYSTEM SETTINGS**
4. **DIAGNOSTICS**
5. **USER SETTINGS**
6. **CASCADE**
7. **RESTORE FACTORY SETTINGS**

Pressing the up and down (R1-C2 and R3-C2) buttons will highlight the desired parameter group. Pressing the OK button (R2-C2) selects the chosen parameter group.

Pressing the up and down (R1-C2 and R3-C2) buttons will highlight the desired parameter subgroup. Pressing the OK button (R2-C2) selects the chosen parameter subgroup.

Once a parameter subgroup option has been chosen it is possible to change the parameters corresponding with the selected subgroup.

Follow the instructions as per 5.3.1 to set or change a parameter.



### 5.4.1 Parameters accessible by installer (technician)

An overview of the parameters accessible by the installer (technician) is given on the following pages.

TECHNICIAN MENU	SUBMENU 1	SUBMENU 2	SUBMENU 3	SUBMENU 4	NOTES
	Lockout history				Show a list of recent errors. Hitting OK on the highlighted error will open screens that contain details on boiler status when error occurred
1 Advanced CH settings					Heating installer advanced settings
	1 CH power set				Set power of boiler in CH mode
		1 Maximum power			Set % of boiler maximum power in CH mode
		2 Minimum power			Set % of boiler minimum power in CH mode
	2 CH temperatures				Set (selecting OK) and show CH temperatures
		1 Absolute max temp			Set CH absolute max temperature (CH temperature boiler settings will never exceed). <b>DO NOT EXCEED 90°C</b>
		2 CH maximum set point			Determine higher boundary of CH setpoint
		3 CH minimum set point			Determine lower boundary of CH setpoint
		4 CH set point hysteresis			Set CH setpoint hysteresis (temperature above setpoint at which boiler will be switched off)
	3 OTC parameters				Set the OTC parameters
		1 Outside temp for max CH			Define external temperature at which OTC will set maximum CH setpoint
		2 Outside temp for min CH			Define external temperature at which OTC will set the minimum CH setpoint
		3 Outside temp for CH off			Set the external temperature at which Heat demand is removed . If set OFF heat demand will never be removed by controller (Only by removing RT or bridge between terminal strip C2:1,2)
		4 OTC set point table			Show in a table the link between external temperature and actual setpoint determined by the OTC parameter selection
		5 OTC curve			Show in a curve the link between external temperature and actual setpoint determined by the OTC parameter selection
	4 CH pump settings				Set pump usage related parameters
		1 post pump time			Set the CH pump overrun time.
	5 CH anti cycling timer				Set the ant cycling timer (minimum time between boiler goes off till next ignition)
	6 CH request type				Allow selection of different CH requests:
		Only OTC			Select OTC: outdoor Temperature controller 3)
		Room Tstat			Select RT/OT: Room Thermostat or OpenTherm
		0-10V Signal [%]			Select 0-10Vdc input for Power mode 3)
		0-10V Signal[SP]			Select 0-10Vdc input for setpoint mode 3)
2 Advanced DHW settings					Domestic hot water advanced settings
	1 DHW power				Set power of boiler in DHW mode
		1 Maximum power			Set % of boiler maximum power in DHW mode
		2 Minimum power			Set % of boiler minimum power in DHW mode
	2 DHW temperatures				Set (selecting OK) and show DHW temperatures
	2 DHW temperatures				Set (selecting OK) and show DHW temperatures
		1 Storage temperature set point			Set Flow temperature during DHW mode when DHW done via a thermostat (Switch)
		2 Boiler temperature set point			Set DHW temperature setpoint when DHW done with temperature sensor

TECHNICIAN MENU	SUBMENU 1	SUBMENU 2	SUBMENU 3	SUBMENU 4	NOTES
	3 DHW pump settings				Define pump usage in DHW mode
		DHW post pump time			Set the DHW pump overrun time added to the prefixed time of 3 minute.
	4 DHW priority				Define DHW priority over CH
		1 DHW priority status	Enabled		Enable /disable DHW priority over CH
			Disabled		Enable
					Disable
		2 DHW priority timeout			Define after how much time DHW priority is ended. (CH can be served if present for the same amount of time).
			Off		Select for no timeout (While DHW priority status is enabled)
			1..60	minutes	Set timeout in minutes. (While DHW priority status is enabled)
	5 DHW request type				Define DHW request switch or sensor
		Switch			DHW start when DHW thermostat closes
		Sensor			DHW start based on required vs actual DHW temperature
3 System setting					Boiler and system parameters
	1 Boiler parameters				Boiler related parameters
		1 Ignition power			Set power % used when igniting burner. <b>DO NOT EXCEED 30%</b>
		2 Delay siphon check			Delay time to validate a syphon error <b>DO NOT ALTER</b>
		3 Number of boiler pump			Define Pump and 3-way valve or 2 pumps
			Pump and 3WayValve		System with pump and 3-way valve
			Two pumps		System with 2 pumps
		4 Pump speed max			Maximum % of PWM pump speed
		5 Pump speed min			Minimum % of PWM pump speed
		6 Antilegionella			Based on selection possible to enable/disable Antilegionella protection
			Enabled		Enable Antilegionella protection
			Disabled		Disable Antilegionella protection
		7 Modbus parameters			Set Modbus parameters
			Address		Set address default: 1
			Baudrate		Set baudrate default: 38400 bps
			Frame		Set frame 8NI
		8 3 Way valve travel time			Select for setting travel time 3WV in seconds
	2 User interface settings				
		1 Select language			Allow selection of a different language
			English		Select for English
			Italian		Select for Italian
			German		Select for German
			Russian		Select for Russian

TECHNICIAN MENU	SUBMENU 1	SUBMENU 2	SUBMENU 3	SUBMENU 4	NOTES
		2 Select unites			Allow selection of different unit
			Fahrenheit		Select for Fahrenheit
			Celsius		Select for English
		3 Set date			Set system date
		4 Set time			Set system time
	3 Service settings				Service information
		1 Service information			Used to insert service company phone number (selection done as per technician password enter)
		2 service due date			Next service due date (input done as per date entering)
4 Diagnostics					Boiler information and lockout history
	1 Boiler information				Boiler information
		"1 CH request 2 DHW demand 3 Firing rate 4 Flame ionization current 5 Boiler set point 6 Boiler supply temperature 7 Return temperature 8 Flue temperature 9 Outdoor temperature 10 DHW storage temperature 11 Boiler fan speed 12 CH ignitions 13 CH runtime 14 DHW ignitions 15 DHW runtime 16 System pressure 17 Heat Exchanger Temp. 18 0-10V input 19 Target power"			Will display the information shown in SUBMENU 2  When the line has a * at the end of the line means that hitting OK when the line is highlighted will open a graph that shows the latest 120 variable values stored every 12 minutes (24 hour history)
	2 Lockout history				Shows the list of recent errors. Hitting OK on the highlighted error will open new screen that contains details of the boiler status when the error occurred.
	3 Manuel test				See chimney sweeper.
5 User settings					Access the user settings from the advanced menu.
	1 Heating				Heating user settings
		1 CH temperature/ OTC set			Set the CH temperature and OTC curves parameters
			1 CH set point		Adjust setpoint of CH circuit
			2 Outside temperature for CH off		Set the external temperature at which Heat demand is removed .
		2 ECO set point reduction			Set the temperature that will be subtracted from the actual setpoint when ECO mode is activated
		3 Scheduler set			Invoke scheduler menu
			1 Enable/dis - able on board scheduler		Based on selection is possible to enable/disable on board scheduler
				Enable	Enable on board scheduler
				Disable	Disable on board scheduler

TECHNICIAN MENU	SUBMENU 1	SUBMENU 2	SUBMENU 3	SUBMENU 4	NOTES
			2 Scheduler set	"1 Monday 2 Tuesday 3 Wednesday 4 Thursday 5 Friday 6 Saturday 7 Sunday 8 Monday – Friday 9 Monday – Sunday 10 Saturday - Sunday"	Select to set scheduler Used to program on board scheduler
	2 Domestic hot water				Domestic hot water user settings
		1 DHW set point			Set the DHW temperature (in case of a DHW with sensor this is the actual DHW temperature, in case of DHW with thermostat this is the base boiler flow temperature)
		2 ECO set point reduction			Invoke scheduler menu
		3 Scheduler set			Invoke scheduler menu
			1 Enable/disable on board scheduler		Based on selection is possible to enable/disable on board scheduler
				Enable	Enable on board scheduler
				Disable	Disable on board scheduler
			2 Scheduler set		Select to set scheduler
				"1 Monday 2 Tuesday 3 Wednesday 4 Thursday 5 Friday 6 Saturday 7 Sunday 8 Monday – Friday 9 Monday – Sunday 10 Saturday - Sunday"	Used to program on board scheduler
	3 Holiday				Holiday temperatures settings
		1 CH holiday set point			Set CH temperature used when Holiday active
		2 DHW holiday set point			Set DHW temperature used during holiday mode

TECHNICIAN MENU	SUBMENU 1	SUBMENU 2	SUBMENU 3	SUBMENU 4	NOTES
7 Cascade	1 Cascade set				Access to cascade information and settings
		1 cascade switch delay			Delay between switching on and of different boilers
		2 cascade min power			Minimum power of boilers in cascade
		3 Burner power			Max power of SINGLE boiler in cascade
		4 Boiler for DHW			Number of boilers assigned to DHW
		5 PI loop period			Base time for PI loop calculation
		6 Burner water flow delay			Water propagation time delay. <b>DO NOT ALTER</b>
		7 Different boiler size			Heterogeneous mode with 2 power groups DHW+ CH /CH only
			Disabled		Disable Heterogeneous mode
			Enabled		Enable Heterogeneous mode
		8 Cascade pump speed max			Cascade pump full speed
		9 Cascade pump min speed			Cascade pump min speed
	2 Cascade info	1 Cascade role			Role of boiler in cascade mode= MASTER, SLAVE, TERMINAL SLAVE. If not in cascade mode: STANDALONE
		2 System temperature *			Cascade temperature value. Hitting OK when highlighted will open graph that shows the latest 120 variable values stored every 12 minutes (over the past 24 hours). Samples will not be averaged over the 12 minutes period.
		3 Numbers of burners on			Number of burners that are switched on
		4 Modulation level			Actual percentage of cascade modulation level
	3 Cascade auto detect				Pressing OK will start the auto detection of the cascade configuration. Can only be started from the master boiler.
7 Restore factory settings					Pressing OK all the advanced settings will be restored to the original factory defaults <sup>1</sup> <b>SEE NOTE BELOW</b>

<sup>1</sup> Do not perform a factory reset prior to consulting with RVR Energy Technology Ltd. Depending on the firmware version present on the controller, additional steps may be required to restore normal operation.

## 5.5 Manual Chimney sweep mode

For routine maintenance and/or service purposes a CH request can be generated to force the burner to a specific load from minimum to nominal (0-100%). This is only possible if no error condition is present. The chimney sweep function can be started from the user menu and will be active for 15 minutes. While active it is possible to navigate through other menus to check the boiler status and functionality.

## 5.6 Disabling CH request

The CH function can be disabled. See 5.3.2 parameters accessible by user at 1 HEATING nr 3 scheduler set.

## 5.7 Service code

To access the service-level of the controller it is necessary to enter the service-code. How this done is explained in 5.4 installer (technician) menu.

## 5.8 Tacho fan speed

For service purposes it is possible to read the fan speed.

See 5.4.1 parameters accessible by installer (technician) at 4 DIAGNOSTICS nr 1 boiler information.

## 5.9 Errors

For service purposes it is possible to see a list of recent errors. See 5.3.2 parameters accessible by user at 6 DIAGNOSTICS nr error history.

## 5.10 ECO working mode

When the ECO button (R3-C4) is pressed a programmable value (see user menu 1.HEATING under 2 ECO set point reduction) is automatically subtracted from the flow temperature setpoint weather compensated (OTC) set point, or 0-10V setpoint. The same principal is applicable for DHW (see user menu 2.DOMESTIC HOT WATER under 2 ECO set point reduction)

## 5.11 Holiday mode

When the Holiday button (R3-C3) is pressed a start and end date of a holiday period may be entered. The desired flow temperature and the DHW temperature for this period can be set (see user menu 3. HOLIDAY under 1 and 2).

## 5.12 Schedules for CH and DHW

For CH and DHW separate schedules can be set.  
Both schedules are set to enabled and always on by default.

Schedules may be set (ON, ECO, OFF) for each day, for a group of weekdays, for weekend days or for an entire week. The status of the schedule is shown on the main screen (ON, ECO, OFF).

The schedule can be set in the user menu, heating or domestic hot water or in the technician menu, user settings, heating or domestic hot water.

Eco mode can also be forced by pushing the ECO button on the control panel (R3-C4).

## 5.13 Cascade and Modbus

Cascade and Modbus options are shown in two separate attachments "Modbus" and "Cascade".

## 5.14 Parameter settings

The parameter settings are listed on the following pages

### Notice

*The following parameters in the technician menu have restrictions :*

*Technician menu----> 1 advanced settings----> 2 CH temperatures----> 1 absolute max. temperature  
Setting higher than 90 degrees is not allowed*

*Technician menu----> 3 system settings----> 1 boiler parameters----> 2 delay siphon check  
This setting must have a value between 1 and 5*

*Technician menu----> 3 system settings----> 1 boiler parameters----> 1 ignition power  
The setting of 20 % must not be changed*

*If instructions as written above are not followed Alutherm can not be held responsible for eventual consequences*

User Menu						
		Recommended	Min	Max	After factory reset	
1	1 CH temperature/OTC set	85	20	90/Technician	75	
	2 Outside temperature for CH off	OFF	7	30	OFF	
	3 Scheduler set	Enabled	Disabled	Enabled	Enabled	
2	1 DHW setpoint (Switch)	ON	ON OFF	ECO	ON	
	1 DHW setpoint (NTC sensor)	80	35	85	80	
	2 ECO setpoint reduction	60	10	65	60	
3	1 Scheduler set	20	0	50	20	
	1 Enable/disable on board scheduler	Enabled	Disabled	Enabled	Enabled	
	2 Scheduler set	ON	ON OFF	ECO	ON	
3	1 CH holiday setpoint	20	20	90/Technician	20	
	2 DHW holiday setpoint (Thermostated)	80	35	85	80	
	2 DHW holiday setpoint (NTC sensor)	60	10	65	60	
4	1 Service information	Service tel. set by Technician				
	2 Service due date	Date set by Technician				
5	1 Select language	English	English Italian	German Russian		
	2 Select units	Celsius	Fahrenheit	Celsius		
	3 Set date	set date				
	4 Set time	24 hours	24 hours	12 hours		
6	1 Restore factory settings	Reset to factory/check settings				
	2 Restore factory settings	OFF	0	100		
7	1 Boiler information	Real time boiler status				
	2 Lockout history	Status boiler at time of lock/block				

Technician Menu						
		Recommended	Min	Max	After factory	
1	1 CH power set	100	0	100	100	
	2 Minimum power	0	0	100	0	
	1 Absolute max. temperature	90	20	90	80	
		Higher than 90 not allowed				
3	2 CH maximum setpoint	85	20	Abs. max CH	75	
	3 CH minimum setpoint	20	20	70	40	
	4 CH setpoint hysteresis	5	2	10	3	
	1 Outside temp for max CH	-10	-34	10	-10	
2	2 Outside temp for min CH	18	15	25	18	
	3 Outside temp for CH off	OFF	7	30	OFF	
	4 OTC setpoint table	OTC table				
	5 OTC curve	OTC curve				
4	1 CH pump settings	10	1	30	5	
	5 CH anticycling timer	3	0	15		
6	1 CH request type	RT+SP/OT				
	2 CH request type	onlyOTC RT	01-Vdc% SP			
1	1 DHW power	100	0	100	100	
	2 Minimum power	0	0	100	0	
	1 Storage temperature setpoint	80	35	85	80	
	2 Boiler temperature setpoint	60	35	65	60	
2	3 DHW setpoint hysteresis	6	2	10	3	
	1 DHW post time	1	OFF	180	30	
	1 DHW priority Status	Enabled	Enabled	Disabled	Enabled	
	2 DHW priority TimeOut	Off	1	60	Off	
5	1 DHW request type	Switch	Switch	Sensor	Switch	
	2 DHW request type	Switch	Switch	Sensor	Switch	

		Recommended	Min	Max	After factory reset			
3	SYSTEM SETTINGS	Boiler parameters	1 Ignition power	0	100			
			2 Delay siphon check	3	Higher than 30 not allowed			
					0	20		
			3 Number of boiler pumps	2 pump	Check syphon is not emptied by new value			
			4 PWM pump speed Max	100	1	100	2 pump	
			5 PWM pump speed min	40	1	100	100	
			6 Antilegionella	Enabled	Disabled	Enabled	Disabled	
			7 Modbus parameters	Address	Baudrate	Frame		
			8 3 Way valve travel time	180	1	255	10	
			2	User interface settings	1 Select language	English   Italian	German   Russian	
					2 Select units	Celsius	Fahrenheit	Celsius
					3 Set date	Set date		
					4 Set time	24 Hours	24 hours	12 hours
			3	Service settings	1 Service information	Set telephone number		
					2 Service due date	Set service date		
4	DIAGNOSTICS	1 Boiler information	Real time boiler status					
		2 Lockout history	Status boiler at time of lock/block					
		3 Manual test	See chimney sweeper					
5	USER SETTINGS	1 CH temperature/OTC set	85	20	90/abs max CH			
		2 Outside temperature for CH off	off	7	25	off		
		2 ECO setpoint reduction	50	0	50			
		3 Scheduler set	Enabled	Disabled	Enabled			
			Set time scheduler (Time/On/ECO/OFF)					
		1 DHW setpoint (NTC sensor)	60	35	65			
2	DHW setpoint (Thermostated)	80	35	85				
		20	0	50				
		3 Scheduler set	Enabled	Disabled	Enabled			
6	CASCADE	1 CH holiday setpoint	Set time scheduler (Time/On/ECO/OFF)	Enabled				
		1 DHW holiday setpoint (Thermostated)	20	20	90/Abs max CH			
		2 DHW holiday setpoint (Sensor)	80	35	85			
			60	10	65			
		1 Cascade set	30	0	255			
		2 Cascade min power	20	0	100			
7	RESTORE FACTORY SETTINGS	3 Burner power (default value)	x	0	2550			
		4 Boiler for DHW	0	1	6	0		
		5 PI loop period	5	0	15	5		
		6 Burner water flow delay	30	0	255	30		
		7 Different boiler size	Disabled	Disabled	Enabled	Disabled		
		8 Cascade pump speed mx.	100	15	100	100		
		9 Cascade pump speed min	40	15	100	30		
		1 Cascade Role : see Cascade auto	Standalone	Standalone	Master   Slave			
		2 System temperature	Actual temperature	Cascade system sensor				
		3 Number of boilers on	Actual number of burners /boilers on in cascade					
		4 Modulation level	Actual cascade modulation level					
		3 Cascade auto detect : press OK to start detecting role boiler in cascade chain	Standalone	Standalone	Master   Slave			
	Reset to factory/check settings							

## 6 INSTALLATION

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### 6.1 Installing the boiler

The installation must be done in accordance with all local and national codes, regulations and standards, and in accordance with the directives of all relevant authorities.

1. The boiler must only be installed in an area where it is allowed to install it.  
Make sure that this area is protected against the danger of freezing.
  2. The area should have sufficient ventilation and cooling to prevent overheating.
  3. When delivered the boiler is on a pallet.  
Install the boiler on a flat non-combustible floor and level it by using its positioning bolts.
  4. A minimum free space of 50 cm should be left on each side of the boiler for service access.
  5. Remove the sealing/protection caps from the connection tubes.  
Warning : take care as residual water from testing may drip
  6. Fill the condensate trap with clean water.  
This can be done by flushing some water into the cast aluminium exhaust connection from the rear.  
This water will then drain into the syphon and fill it.
- 

### 6.2 Frost protection



**The boiler is protected against frost.**

If the boiler detects an NTC flow temperature below 8 °C, the CH-pump will be activated. If temperatures continues to fall the boiler will start at a flow temperature of 6 °C and it will run on minimum load until the flow NTC senses a temperature of 15 °C. The CH-pump will stay running for another 10 minutes. This only protects the boiler and does not protect the installation, pipework or radiators against freezing.

During longer periods of absence in the winter, the installation itself should be protected by activating the heating periodically and by partly opening the radiator valves.

Where a room thermostat is controlling the demand, do not set the room thermostat to a value below 15 °C.

To protect frost sensitive radiators against frost it is possible to connect a frost thermostat in parallel with a Volt free room thermostat.

It is also possible to set the CH pump to activate automatically under OTC settings when an outdoor sensor is present (this must be set by the installer). In this case, the CH pump will be activated if the outdoor temperature drops below 8 °C.

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## 6.3 Water connection

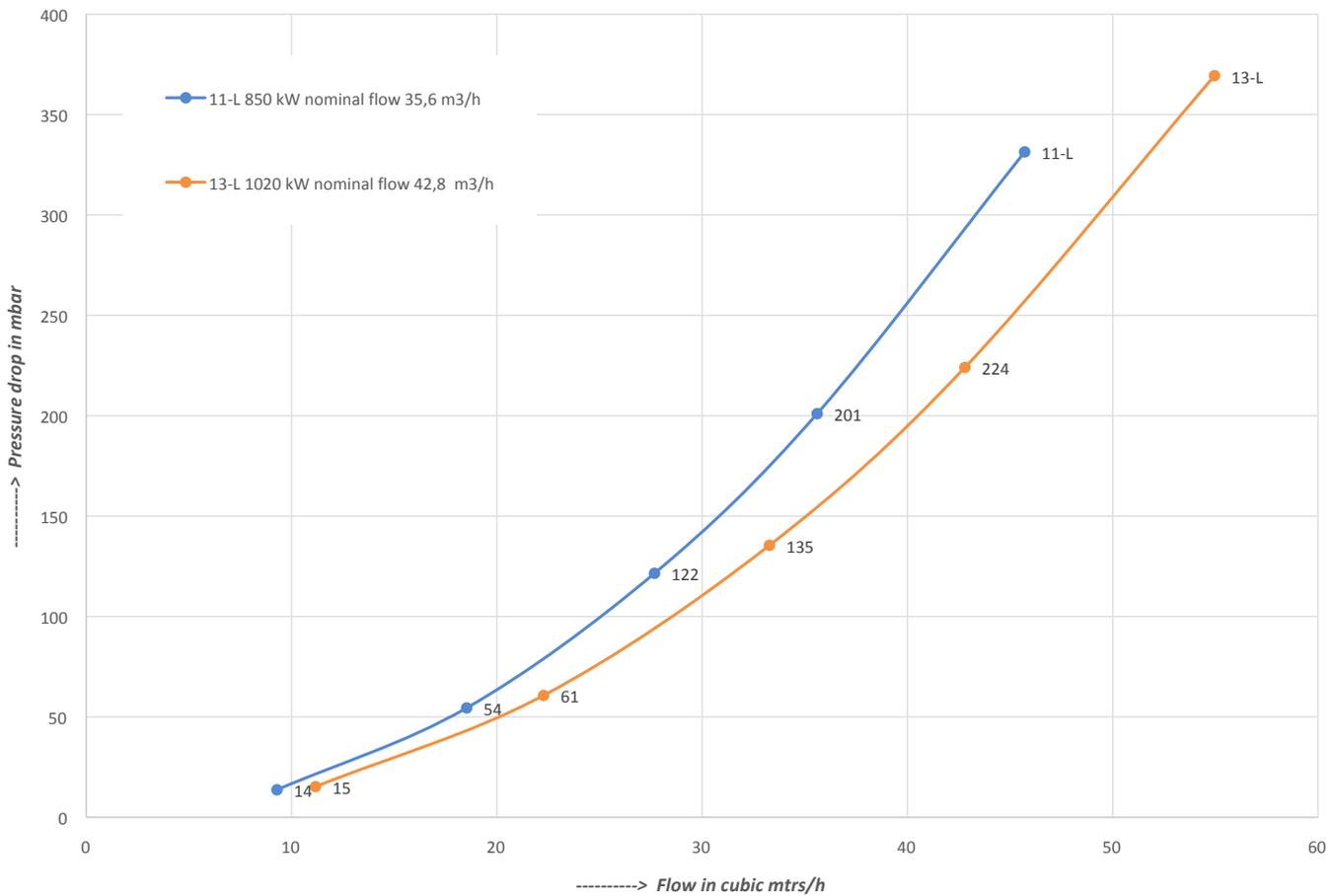
### 6.3.1 Pump

The boiler does not have a built in CH-pump. Therefore a CH-pump must be mounted separately . Select a pump that matches the hydraulic resistance of the boiler and the installation.

The graph below shows the resistance characteristics for the different boiler models

For electrical connections see chapter 6.7.

**Hydraulic pressure drop Alutherm series**



### 6.3.2 Minimum flow



**The minimum flows shown below must be guaranteed.**

Minimum flow			
Input in kW	Flow [m3/h] @ delta T 25 full load	Flow [m3/h] @ delta T 30 Start = 25%	Flow [m3/h] @ delta T 30 part load
C 850	29,2	9,7	4,9
C 1050	35,1	11,9	5,8
C 1250			

We recommend to keep the minimum flow at least above 50% of the nominal flow in all cases. When the actual flow is lower than nominal adjust the hysteresis to prevent hunting.

### 6.3.3 Water-treatment

 Before filling up the installation (old and new), the installation should be rinsed thoroughly with clean water from the tap. There are some rinsing/cleaning products listed below and it is recommended that these are used.

- The pH must be kept between 7 and 8,5 at all times.
- The maximum allowed content of chlorides is 150 mg/ltr.
- The water hardness of the heating system must be according to the German VDI guideline 2035. See table beneath.

Water hardness in heating systems according to VDI 2035 guidelines

Water-treatment			
<0,11 °dH = demineralised °dH = German VDI hardness	Installation < 20 ltr/kW	Installation between 20 and 50 ltr/kW	Installation > 50 ltr/kW
50-300kW total boiler capacity	<11,2 °dH	<8,4 °dH	<0,11 °dH
300-600kW total boiler capacity	<8,4 °dH	<0,11 °dH	<0,11 °dH
>600kW total boiler capacity	<0,11 °dH	<0,11 °dH	<0,11 °dH

This means for the Alutherm boilers that the system should be filled with demineralised water (smallest capacity > 600 kW).

- For instance: for an Intermodul 340 kW boiler and a total hardness of 8,4 °dH (German hardness) the total volume of filled, refilled and topped up water must not exceed 20 ltr/kW. If this hardness value is exceeded the total amount of filling, refilling and topping up water is:  $(8,4/\text{actual hardness in } ^\circ\text{dH}) \times \text{ltrs/kW}$ . In case of water hardness of 15 °dH the maximum volume/kW is:  $(8,4/15) \times 20 = 11,2 \text{ ltr/kW}$ . If higher values are present, the water should be softened. The water may only be partly softened to a value of 20 % of its original value. Example: if the initial hardness is 15 °D, then it may only be softened to 3,0 °D. Note that water softening by means of ion exchange principle is not allowed. If the installation is filled with demineralised or distilled water additives must be added to stabilise the pH value in order to prevent corrosion. Before filling with demineralised water the complete installation must be rinsed.
- The maximum allowed content of chlorides is 150 mg/ltr
- The conductivity of the non treated installation water must not exceed the value of 300 µs/cm in combination with max O2 content of 0,1 mg/ltr. If the O2 content is lower than 0,02 mg/ltr a higher conductivity limit of 600 µs/cm is allowed. If the conductivity is higher than the values mentioned, empty the system, flush and fill with clean tap water, preferably by adding the recommended cleaning products.
- The water pressure must be higher than 0,8 bar
- The water quality must be checked on a regular basis (at least once per year)
- There are many products available on the market which pretend to clean and protect heating systems. Unfortunately there are only a few that have really proven this in practice. Therefore Alutherm only allows the following quality products for water treatment;

- |                 |   |  |
|-----------------|---|--|
| Producer:       | Fernox  | <a href="http://www.fernox.com">www.fernox.com</a>                     |
| - Cleaner F3:   | removes corrosion, lime and sludge  |  |
| - Protector F1: | protects against corrosion, lime and sludge   |  |
| - Alphi-11:     | anti-freeze and protection against corrosion and lime   |  |
| Producer:       | Sentinel  | <a href="http://www.sentinelprotects.com">www.sentinelprotects.com</a> |
| - X100:         | Inhibitor scale and corrosion protection  |  |
| - X200:         | Noise reducer long life system treatment to eliminate noise   |  |
| - X300:         | System cleaner for new hydronic heating systems   |  |
| - X400:         | System restorer non acid cleaning of older systems  |  |
| - X500:         | Inhibites antifreeze against scale and corrosion in all types of indirect heating systems at low temperatures |  |

Note that these products must be used strictly in accordance with the water treatment manufacturers instructions.

Furthermore we strongly recommend the following ;

- Use the above mentioned water treatment protection products to fill and protect the installation
- Use a log book to record water filling, refilling, topping up, water quality measurements and water treatment
- Only use diffusion tight material, especially for under floor heating
- Always mount air vents at the highest points in the installation.
- Install isolation/check valves near the boiler and on strategic locations (anticipating any future expansions of the system) to avoid fills, refills and topping up as much as possible.
- Install a water meter to check the amount of filled, refilled and topped up water.
- Install a filter (magnetite and dirt) in the return.
- Install an isolation heat-exchanger to separate the boiler from the installation to protect dirt or lime in the secondary system from affecting the boiler.
- avoid leaks and if there is a leak, repair as soon as possible.

## 6.3.4 Water connection general

1. Water connections for flow and return are size DN125
2. The installation must have a pressure relief valve (with a capacity higher than the boiler output) and an expansion vessel. The capacity of this vessel should be sufficient for the installation.
3. To avoid blocking and non volatile lock-out of the boiler control it is recommended to install a by-pass in the installation to guarantee the minimum flow through the boiler.  
The by-pass valve should be mounted as far away from the boiler as possible to have the biggest possible content of the bypass-circuit (also a big radiator without valves could be used).
4. Drain the condensate via a tundish and an U-trap to the sewer.
5. At the highest point of the installation a de-airing device should be mounted.

## 6.4 Gas connection

1. The gas connection must be done in accordance with all local and national codes, regulations and standards, and in accordance with the directives of all relevant authorities.
2. The gaspipe of the boiler has a R 2" connection.
3. In order to avoid blockage of the gas valve, ensure that there is no dirt in the gas pipework prior to commissioning.
4. The maximum allowable inlet pressure for the gas valve is 50 mbar.
5. Check the heat input of the boiler. The load as given on the type plate should be checked.

## 6.5 Air-supply and flue-gas connection

Air connection : All types have air connection  $\varnothing$  200 mm  
Flue gas connection :  $\varnothing$  250 mm for all types

Allowed Appliance types:

Possibilities for air / flue system ; B23, C33, C63

Warning : Read the manual included in the package very carefully.

### 6.5.1 B23

As standard the boiler is delivered as type B23 where the supply air is taken from the room where the boiler has been installed in.

A vertical terminal is recommended

Roof terminals and extensions and/or condensate trap/collector must be obtained by M&G. See page 35.

For pressure drop calculation of appliance type B23 use the table for pressure drop per component and the table for total pressure drop calculation. See page 32.

For total available pressure drop see table on page 33.

### 6.5.2 C33

Roof terminals and extensions and/or condensate trap/collector must be obtained from M&G. See page 35.

For pressure drop calculation of appliance type C33 use the table for pressure drop per component and the table for total pressure drop calculation. See page 32.

For total available pressure drop see table on page 33.



**Terminals should be installed in the same pressure area (within a plane of 1m<sup>2</sup>)**

## 6.5.3 C63

C63 appliances may only be equipped with Gastec QA materials and terminals or according NEN 14989-2



**Note: When using a C63 type flue configuration it is essential to ensure that C63 is allowed in the country where the boiler is installed.**

It is recommended to use a full aluminium flue system. A PP (Temperature class T120) or stainless steel flue system can also be used (See TPW table below). In this case the condensate must be drained before it flows back into the aluminium parts of the boiler. Otherwise aggressive condensate from the non-aluminium flue system can corrode the aluminium parts of the boiler. A condensate trap/collector must be mounted just before entering the silencer(s) of the boiler (also see 6.5.5.1 general).

T-P-W Class table	
Temperature range	T120
Pressure range	P1
Condensate resistance (W=wet / D=Dry)	W

The minimal combustion products temperature, mass flow rate and CO<sub>2</sub> are given in the table below.

Type	Part load	Vol. Flue m <sup>3</sup> /h	Vol. Air m <sup>3</sup> /h	CO <sub>2</sub> %	T Fluegas °C	rho kg/m <sup>3</sup>
C 850	170	220	191	9,1	30	1,12
C 1050	204	264	229	9,1	30	1,12
C 1250						

The maximum allowed recirculation rate under wind conditions is 10 %

Maximum allowable combustion air temperature 45 °C

The tables below give an indication of maximum lengths (in mtrs) for parallel air supply and flue outlet pipes. The equivalent of pipe length in mtrs of bends 90 ° and 45 ° is given.

Maximum lengths (in mtrs) for parallel air supply		
Type	max. allowed pressure drop (*)	Parallel Air/Fluegas Ø200/Ø250
C 850	500 Pa	42 m (**)
C 1050	500 Pa	25 m
C 1250		

(\*) : Without roof terminal, bend(ump) and condensate trap

(\*\*) : Maximum allowed draught is 120 Pa, this means that in case of vertical flue the maximum length is limited to 30 mtrs

Equivalent of pipe length in meters	
Bend	Pipe diameter
C 850 - 1050 - 1250	Parallel Air/fluegas Ø200/Ø250 mm
Bend 90°	5.8
Bend 45°	4.0



**Warning : Do not install the terminals for supply of combustion air and for the exhaust of combustion products on opposite walls of the building. Terminals should be installed in the same pressure area (within a plane of 1m<sup>2</sup>)**

#### 6.5.4 Pressure drop calculations

The first 90 ° bend must be mounted directly to the boiler and followed by the chimney silencer (this bend is not part of the calculation (as it is already taken into account)).

Flue-outlet and air-supply calculations ;

Total pressure drop available for flue-outlet and air-supply is given in the table below.

Air connection : All types have air connection Ø 200 mm

Flue gas connection : Ø 250 mm for all types

Type Boiler	Total available Pressure drop In [Pa] for B23, C33, C63
C 850	500
C 1050	500
C 1250	

For pressure drop calculation of appliance types **B23,C33** use the next two tables on the following pages.

## Pressure drop table per component

Boiler type						
	1	2	3	4	5	6
Component	C 850		C 1050		C 1250	
Pressure drop [Pa]	Flue gas [Pa]	Air [Pa]	Flue gas [Pa]	Air [Pa]	Flue gas [Pa]	Air [Pa]
Pipe length 1 m Ø 250mm	2,6		3,8			
Pipe length 1 m Ø 150mm		6,2		8,9		
Bend 90° Ø 250mm	15,9		22,9			
Bend 90° Ø 150mm		35,4		50,9		
Bend 45° Ø 250mm	10,9		15,7			
Bend 45° Ø 150mm		23		33,2		
Terminal C33 Ø250mm,Ø250mm	128,9		185,6			
Terminal B23 Ø250mm	38		54,6			

 **Note: Maximum allowed draught is 120 Pa, this means that in case of vertical flue the maximum length is limited to 30 mtrs**

Table for total pressure drop calculation								
1	2	3	4	5	6	7	8	9
	Number Flue gas Ø250mm	Number Air Ø150mm	delta pressure component Fluegas	delta pressure component Air	Total pressure drop Fluegas out [Pa] (2*4)	Total pressure drop Air in [Pa] (3*5)	Total Pressure Terminal In [Pa]	Total pressure drop Fluegas + air in [Pa] (6 + 7 + 8)
1 Meter Pipe								
Bend 90°								
Bend 45°								
Terminal:								
	Total delta pressure [Pa]							

Note : Maximum allowed draught is 120 Pa, this means that in case of vertical flue the maximum length is limited to 30 mtrs

#### How to use the table:

- Column 1 : used material
  - Column 2: total number of used material of column 1 for flue gas out
  - Column 3: total number of used material of column 1 for air in
  - Column 4: pressure drop from pressure drop table /component for flue gas components
  - Column 5: pressure drop from pressure drop table /component for air components
- Select the correct column for the selected boiler type  
(850-11: 1,2 , 1020-13: 3,4)
- Column 6: total pressure drop flue gas: multiply column 2 \*4
  - Column 7: total pressure drop air: multiply column 3 \*5
  - Column 8: total pressure drop terminal
  - Column 9: total pressure drop flue gas and air: column 6 + 7 + 8
  - Finally add all together column 9

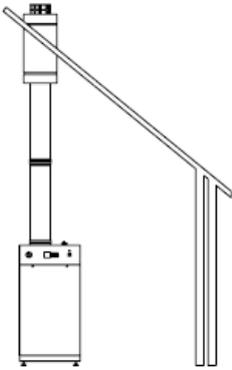
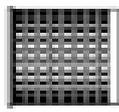
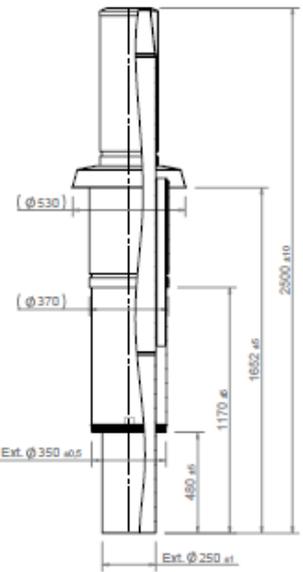
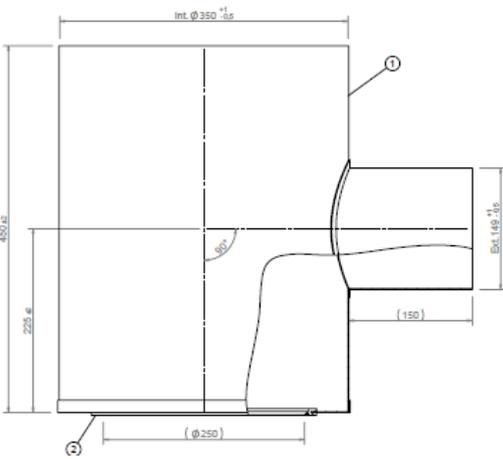


**Total pressure drop must be lower than 500 Pa (Alutherm C 850) and (Alutherm C 1050).**

If the combined inlet/outlet system exceeds the maximum allowed pressure, this will result in a decrease of more than 5 % of heat capacity.

**This is not allowed.** All components must be obtained from M&G

A list of allowed articles of M&G with corresponding OEM nrs is given below and on the next page

APPLIANCE TYPE	FLUEGAS OUTLET	SUPPLY AIR INLET	
<p>B23</p> 	<p>ROOF TERMINAL ALU 250</p>	<p>LEAF CATCHER ALU</p>	<p>B23</p> 
<p>C33</p> 	<p>ROOF TERMINAL ALU 250/350</p>		<p>C33 T-PIECE ALU 200/350</p>

COMPONENTS	OEM ART. NO M&G
<b>Roof terminals</b>	
ROOFTERM ALU 250 B23	40.045.26.65
ROOFTERM ALU 250/350 C33	41.012.31.94
T-PIECE ALU 200/350 C33	41.012.31.91
LEAF CATCHER (AIR INLET GRILL) 200-180	41.012.31.93
<b>Flue gas</b>	
<b>ALUMINUM Ø 250 mm</b>	
ELBOW ALU 250 90°	40.045.16.86
ELBOW ALU 250 45°	40.045.16.88
EXTENSION ALU 250x1000	40.045.16.84
EXTENSION ALU 250x500	40.045.16.83
<b>Combustion air</b>	
<b>ALUMINUM Ø 200 mm</b>	
ELBOW ALU 200 90°	41.008.05.40
ELBOW ALU 200 45°	41.008.05.41
EXTENSION ALU 200x2000	41.008.05.33
EXTENSION ALU 200x1000	41.008.05.32
EXTENSION ALU 200x500	41.008.05.31
<b>PP Ø 200 mm</b>	
ELBOW PP 200 90° EPDM	41.007.04.11
ELBOW PP 200 45° EPDM	41.007.04.12
EXTENSION PP 200x1900	41.007.04.04
EXTENSION PP 200x1000	41.007.04.02
EXTENSION PP 200x500	41.007.04.01
<b>GENERAL</b>	
WALL BRACKET 250	40.045.22.35
WALL BRACKET 200	41.008.71.98
SEAL SIL 250 mm ( for DN250 ALU)	40.045.18.15
SEAL SIL 200 (ALU 200)	41.002.73.70
SEAL EPDM 200 (PP DN 200)	41.007.52.95
WEATHER SLATE FLAT ALU 368 0° (for 41.007.65.59)	41.007.65.71
WEATHER SLATE FLAT ALU 275 (for 40.045.26.65)	40.045.31.98

## 6.5.5 DOP

All the prescribed articles (flue and air) must be installed in accordance with the following DOP's :

For aluminium :

0.1 (Dn 60-250) (rigid, single) (flue) T200 P1 W V1 L10/11/13 150 030

The latest versions of these DOP's can be found on the M&G site : <https://www.mg-flues.com> download center certifications

## 6.5.6 Installing flue-exhaust and air inlet

### 6.5.6.1 General

- Do not use materials from different manufacturers for either exhaust or air inlet
- Only the manufacturers of exhaust gas and air inlet components as mentioned in this manual may be used
- Both systems (exhaust and air) should be mounted free of tension

#### Condensate, ice-free terminal, tundish and U-trap

The boilers can produce flue gasses with very low temperatures, which can lead to condensation in the flue pipes and flue terminal. Therefore one should always mount an ice free terminal.

Drain the condensate via a tundish and a U-trap to the sewer.

#### Air inlet

If PP material is used for the air inlet a minimum distance of 35 mm between exhaust and air inlet should be respected.

The minimum insert length of the sleeve, leaf catcher or pipe must be 40 mm.

#### Flue exhaust

A horizontal flue exhaust pipe must be installed with a fall of 3° (50 mm per mtr) downwards towards the boiler to allow condensate to flow back in the sump or condensate collector.

The minimum insert length into the sleeve and the minimum length of the pipe end for aluminium and stainless steel must be 40 mm.

If PP is used pay attention to the expansion (elongation) of the PP due to rise in flue gas temperature.

Insert the PP pipe into the sleeve and redraw over a length of 10 mm (10 mm for maximum pipe length of 2 mtr).

After mounting the minimum insert length into the sleeve and the pipe end must be 40 mm.

#### Condensate trap/collector

The condensate trap/collector must be either connected by

a tube to a syphon that provides the same height of water column as the one supplied with the boiler or by a T-piece to the syphon as supplied with the boiler.



**Note: The chimney pieces (silencers) that are delivered with the boiler need to be mounted correctly as shown in the figure beneath**



## 6.5.6.2 Brackets, mounting

### Air inlet

- The first bracket should be mounted 0.5 mtr away from the boiler
- Horizontal and non vertical pipes should be bracketed equally divided with a maximum distance of 1 mtr between the brackets
- Vertical pipes should be bracketed equally divided with a maximum distance of 2 mtrs between the brackets
- In case of a chimney shaft, first identify the air inlet. The end of the air inlet pipe should be at least 0.5 mtr above the shaft. The last component before entering the shaft should be fixed. If a bend is the last component also fix the component before the bend.

### Flue exhaust

- A bracket must be mounted to every component except in the case that the length of the pipe before and after the bend < 0.25 mtr. In this case mount the first bracket at a length of max 0.5 mtr away from the boiler
- Horizontal and non vertical pipes that have a distance between the fixing brackets > 1 mtr should be equipped with a non clamping (to allow minor movement) bracket in between
- Vertical pipes should be bracketed equally divided with a maximum distance of 2 mtrs between the brackets
- In case of a chimney shaft, first identify the flue outlet. Check if the used shaft pipes are damaged or blocked. The ends of the exhaust pipe should be at least 0.5 mtr above the shaft. The last component before entering the shaft should be fixed. If a bend is the last component also fix the component before the bend.

All brackets must be obtained from M&G

## 6.5.6.3 Sealing and joining

- Prevent incorrect or damaged seals by shortening pipes squarely and by deburring after shortening.
- Joins or connections in the exhaust flue may not be screwed.
- In the air inlet only aluminium or stainless steel joins or connections may be screwed. It is not allowed to screw PP joins or connections.
- Do not use glue or foam like silicon or PUR.
- To assure soundness all components must be sealed.
- For smooth joining only use a soap solution (1% in water). Do not use oil, grease or (acid free) Vaseline

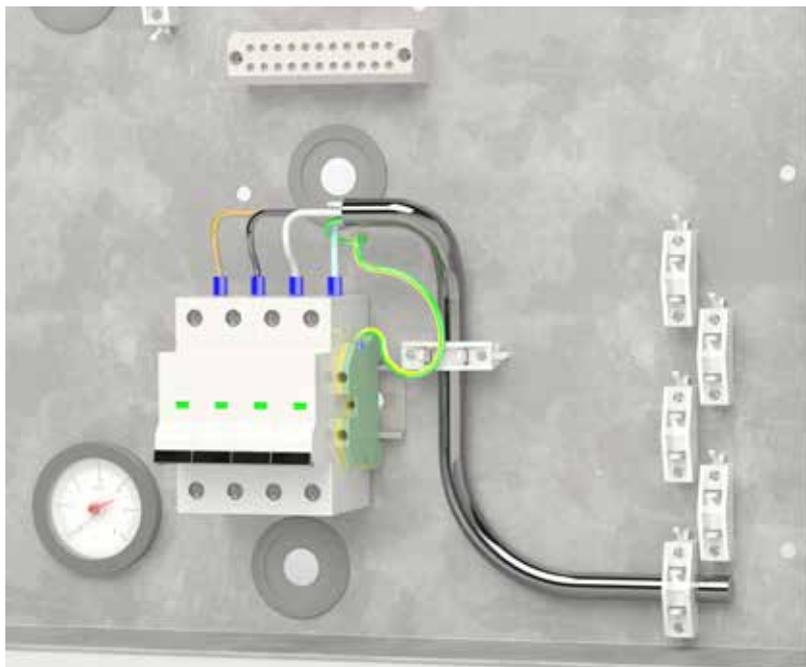


### **Important notice**

*If instructions as written above are not followed and or the materials for air inlet and flue gas exhaust as quoted above are not used Alutherm can not be held responsible for eventual consequences*

## 6.6 Electrical connection

1. The electrical installation should be in accordance with national and local codes and regulations.
2. As standard the boiler is configured for 400 VAC + 3N/50Hz
3. The terminal strip is accessible by opening the side cover (unscrew with screw driver) behind which the control is mounted.
4. A means of disconnection must be incorporated in the fixed wiring in accordance with the wiring rules. Use the cable guide indicated with a 400 VAC +3N/50 Hz sticker on the backpanel of the boiler. As it is a stationary appliance without means for disconnection from the supply a contact separation in all poles that provide full disconnection under voltage category III must be provided. The minimum cross section of the supply wire is 5 x 2.5 mm<sup>2</sup> and must be connected to the circuit breaker 400V 4 pole 10 A (see figure beneath).The supply wire should be secured by a pull relief.
5. It is not permissible to alter the internal wiring as fitted by the manufacturer.
6. The enable connected to numbers 1 and 2 of the strip C2 must be Volt free (also see warning under 4.2.1). To set, select from the technician menu, advanced settings, CH request to Room Tstat. The 0-10 V DC (Power or Setpoint mode) should be connected to the numbers 3 (=negative-) and 4 (=plus+) and a short wire loop should be placed between the numbers 1 and 2 of strip C2. To set, from the technician menu, advanced CH settings, CH request select either 0-10V % (power mode) or 0-10 V SP (setpoint mode).  
Digital communication (open Therm OT+ version 3.0) should be connected to the numbers 1 and 2 of the strip C2. Select from the technician menu, advanced CH settings, CH request for Room Tstat. For digital communication with EBV like RS30 or Theta an additional communication module is required. For the internal OTC (outdoor temperature controller) a 12 kohm at 25° C (see NTC table at 6.2.2) should be connected to the numbers 5 and 6 of strip C2 and a short wire loop should be placed between the numbers 1 and 2 of strip C2. Finally from the technician menu, advanced CH settings, CH request, select only OTC.
7. If a storage tank is connected to the boiler, the tank thermostat (or the tank NTC) should be connected to the numbers 7 and 8 on the strip C2. Select from the technician menu, advanced DHW settings, DHW request.  
Note that a tank NTC should be 12 kohm at 25 °C (see NTC table at 6.6.2.)
8. The CH system pump should be connected to the numbers 7 (=PE), 8 (=L), 9 (=N) on strip C1 if in use in combination with a 3-way valve. (also see chapter 4.3). A PWM pump should be connected to 21 (=PE), and 22 (=N) on strip C1. If 230 VAC is applicable than 23,24 or 25 can be used for L.The PWM signal should be connected to 14 (PWM signal) and 13 (PWM ground) on strip C2. From the technician menu, system settings, boiler parameters the max and min pump speed can be set.
9. The DHW pump (or 230 VAC 3-way valve) should be connected to 10 (=PE), 11 (=L1), and 12 (=N) on strip C1. If a CH pump is used it should be connected to 13 (=PE), 14 (=L1) and 15 (=N) on strip C1.
10. If the system pump, CH pump, PWM pump, DHW pump, alarm connection or the 3-way valve consumes more than 0,8 A, it needs to be switched by an auxiliary relay.
11. The alarm output on the numbers 19 and 20 on strip C1 is a potential free relay output (230 VAC), max 0,8 A).  
The cascade/system pump output on the numbers 29 and 30 on strip C1 is a potential free relay output (230 VAC, 0,8A).
12. The B-B (Burner Block) on the numbers 31 and 32 on strip C1 provides an external (remote) burner block (error 76). The external contact must be a potential free contact (rated at 230 VAC).
13. The SPS\_B (Burner Block) on the numbers 11 and 12 on strip C2 also provides an external (remote) burner block (error 77). In this case the external contact must be a potential free contact (24 VDC).
14. The B-L (Burner Lock) on the numbers 9 and 10 on strip C2 provides an external burner lock (error 3). The external contact must be a potential free contact (rated at 24 VDC).
15. The main-fuse is a circuit breaker as shown in the figure below 4 pole 10 A.
16. If the supply wire needs to be replaced, act as described under 4.
17. Connect current carrying conductors in such a way that they become taut before earthing conductor. See figure beneath



General remarks :

Use the 5 tubes on the left side on the back to guide the high voltage  
The lowest of the 5 is for 400 VAC + 3N/50 Hz (supply)  
The upper 4 are for 230 VAC or eventually 400 VAC + 3N/50Hz

Use the 2 tubes on left side on the back to guide the low voltage connections from C2 and C3

Also see wiring diagram on next pages



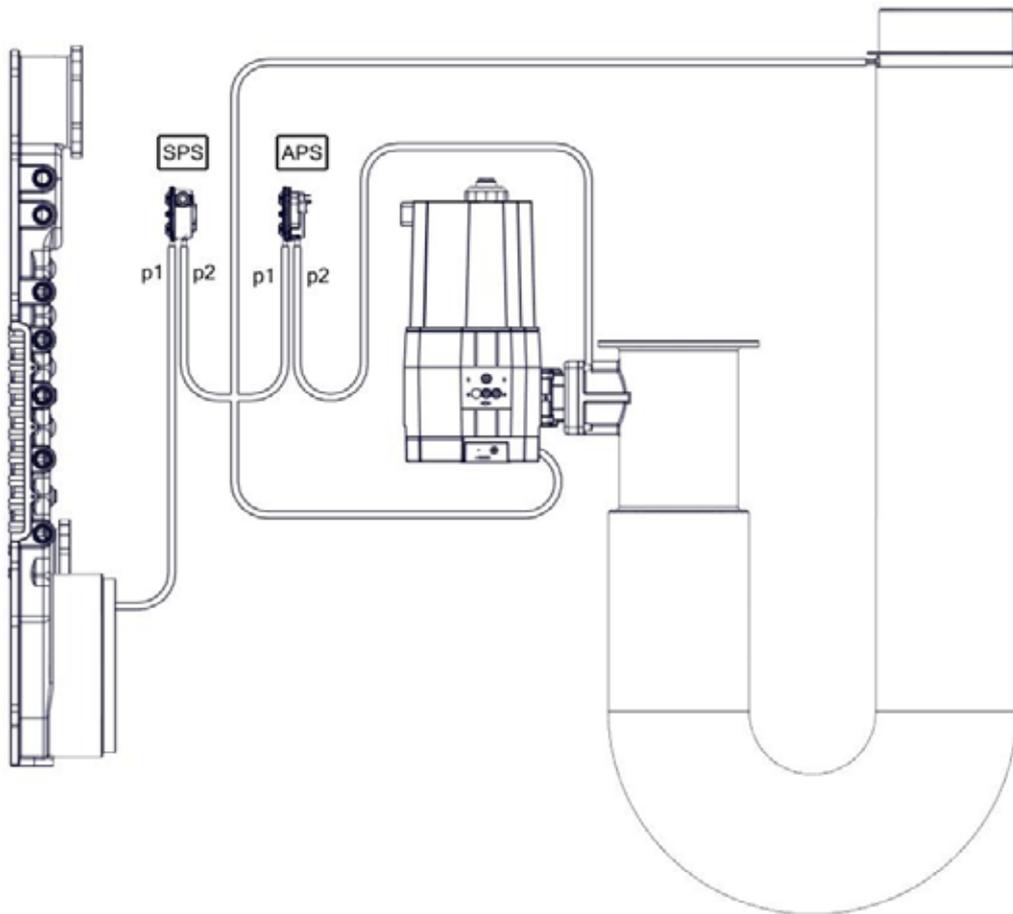
BC	Burner control
D	Display
C1	Connector 230V
C2	Connector low voltage
C3	Connector service
C4	Connector 380V
CH-P	Central heating pump
DHW-P	Domestic hot water pump
PWM-P	Modulating pump
A-P	Appliance pump max 0,8A
HE	Heat exchanger
NTC1	Flow temperature sensor
NTC2	Return temperature sensor
NTC3	Domestic hot water sensor or switch
NTC4	Outside temperature sensor
NTC5	Flue gas temperature sensor
NTC6	Cascade sensor
WPS	Waterpressure sensor
APS	Air pressure switch
SPS	Siphon pressure switch
GPS	Gas pressure switch
GV	Gas valve
S	Switch on/off
3WV	3 way valve
OT-RT	Open therm or room thermostat on/off
OTC	Outdoor temperature control 12K
SPS-B	Siphon pressure switch block
B-L	Burner lock
A	Alarm
C-P	Cascade pump potential free contact
B-L	Burner lock
A	Alarm
C-P	Cascade pump potential free contact
B-B	Burner Block
PE	Earth cable or connector
N	EMC netfilter

## 6.6.2 NTC resistance table

NTC resistance table	
Temperature [°C]	Resistance [kΩ]
-30	
-20	98.200
-15	75.900
-10	58.800
-5	45.900
0	36.100
5	28.600
10	22.800
15	18.300
20	14.700
<b>25</b>	<b>12.000</b>
30	9.800
35	8.050
40	6.650
45	5.520
50	4.610
55	3.860
60	3.250
70	2.340
75	1.940
80	1.410
85	1.470
90	1.260
95	1.100
100	950
105	
110	
115	
120	

## 6.7 Pneumatic connections

A pneumatic diagram for the Intermodul 850 kW (11 sections) and the Intermodul 1020 kW (13 sections) is given in the figure below. The siphon pressure switch, connected to the sump, prevents overflow of the syphon in the case of excess back pressure in the flue. The air pressure switch, connected to the venturi, checks the amount of air (by means of a  $\Delta p$  measurement) before startup.



## 6.8 PC-connection

For information regarding connection of a PC to the boiler please contact your supplier.

## 7 COMMISSIONING

1. Fill and bleed the system. Fill the boiler until a pressure between 1.5 and 2 bar is achieved. The maximum working pressure is 6 bar. The boiler (not the installation!) is automatically bled by a built in automatic air vent.
2. Check all gas and water connections thoroughly for leaks.
3. Bleed the gas pipe.
4. As standard the boiler is set for G20 or G25 or G25.3.  
Check that the installation provides the correct type of gas to the boiler.
5. Check the inlet pressure : 20 mbar or 25 mbar
6. Turn on the boiler by setting the main switch on the control panel of the boiler to position 1 (on).
7. Generate (create) a heat demand.
8. Just before ignition the control checks if the contacts of the gas pressure, syphon pressure and water pressure switches are closed.  
If not, the boiler will block and the display will show E76.
9. If gas, water syphon pressure switches are closed the burner will be ignited.
10. Perform a thorough check on flue-gas joints for leakage.
11. Check the heat input and the gas pressure at maximum load.
12. Heat up the installation. Stop the heat request.
13. Bleed the installation again, topping up the water system pressure if required.
14. Explain the operation of the boiler to the user.
15. Explain to the user the significance of error codes and the need to report them when requesting service engineer support.
16. After installation the datasheet as shown in chapter 9.1 should be filled in.  
This should be repeated at every service-interval.
17. Safely store the installation and the user manual preferably in close proximity to the boiler.

## 7.1 Gas category

The types of gas and supply pressures vary by country. In the table below the gas category and supply pressure are listed by country.

Countries	Countries	Category	Pressure [mbar]
AT	Austria	I2H	20
BE	Belgium	I2E(R)	20/25
BG	Bulgaria	I2H	20
HR	Croatia	I2H	20
CY	Cyprus	I2H	20
CZ	Czech Republic	I2H	18
DE	Germany	I2E	20
DK	Denmark	I2H	20
EE	Estonia	I2H	20
ES	Spain	I2H	20
FI	Finland	I2H	20
FR	France	I2Esi , I2Er	20 / 25
GB	United Kingdom	I2H	20
GR	Greece	I2H	20
HU	Hungary	I2H	25
IE	Ireland	I2H	20
IT	Italy	I2H	20
LT	Lithuania	I2H	20
LU	Luxembourg	I2E	20
LV	Latvia	I2H	20
NL	Netherlands, the	I2L , I2EK	25
PL	Poland	I2E	20
PT	Portugal	I2H	20
RO	Romania	I2E, I2H	20
SE	Sweden	I2H	20
SL	Slovenia	I2H	20
SK	Slovakia	I2H	20
NO	Norway	I2H	20
CH	Switzerland	I2H	20
LI	Liechtenstein	I2H	20
IS	Iceland		
MT	Malta		

As the responsible manufacturer of my products, I'm aware that the above mentioned countries have adopted the Gas Appliance Regulation (EU) 2016/426 in their national law. I understand that the CE mark has meaning only in these countries, where the GAR is implemented in the national regulations. Although other countries might value and respect the CE mark, it has no formal value.

This boiler can be adjusted for category K(I2K) and is in this case suitable for the use of G and G+ distribution gasses according to the specifications as shown in NTA 8837:2012 Annex D with Wobbe-index 43,46-45,3 MJ/m<sup>3</sup> (dry, 0 °C, Hs) or 41,23 – 42,98 (dry, 15 °C, Hs)

This boiler can also be converted and re-adjusted for category E (I2E)

This means that the boiler is : either is suitable for G+ gas and H-gas or provable suitable is for G+ gas and provable can be made suitable for H-gas as meant by "Besluit van 10 Mei 2016" until changes in this document are made

## 7.2 Adjustment % CO2 (O2 %) and check input

The boiler is equipped with an automatic gas/air regulator. This means that the amount of gas is regulated depending on the amount of air. The % CO2 needs to be adjusted according to the table below ;

Type of boiler	Gas type	inlet pressure	%CO2 * on max load	%CO2 on min load
C 850	G20 / G25/G25.3	20 / 25 mbar	9,3 +0,2-0,05	9,1 +0,15-0,2
C 1050	G20 / G25/G25.3	20 / 25 mbar	9,3 +0,2-0,05	9,1 +0,15-0,2
C 1250	G20 / G25/G25.3	20 / 25 mbar	9,3 +0,2-0,05	9,1 +0,15-0,2

\*For O2 percentage see Chapter 2 Technical data

The boiler has a gas valve that is connected to a venturi. See figure below and filter instructions in 7.3 ;

### Adjustment for max. load ;

- wait until the boiler is stable and measure % CO2
- if required, correct CO2 with the throttle ; turning towards + gives a higher CO2 percentage (a ½ turn (180°) causes a change of approximately 0,85 % CO2)

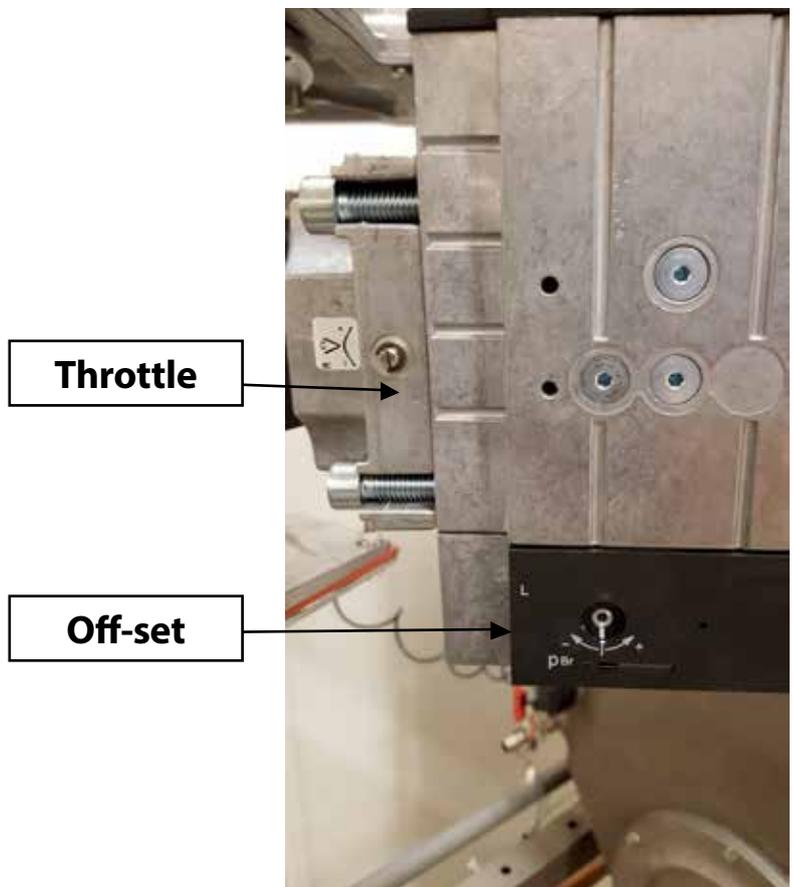
### Adjustment for min. load ;

- wait until the boiler is stable
- if required, correct the CO2 with the off-set ; turning towards + gives a higher CO2 percentage. Note : this offset adjustment is very sensitive : half a turn (180°) causes a change of approximately 1 % CO2.

### Check on heat input

In the table below the relationship between nominal maximum input and fan speed and gasflow is given for G20 as sample. The nominal fan speed can be ± 5% due to adjustments in production. Write down your initial settings (between 850 and 1020kW) for input in the table as shown in 9.1

If the gas flow is too low it may be due to an obstruction (dirt) in the air/flue system. Check and if necessary clean. The gas flow must then be re-checked



Model	C 850	C 1050	C 1250	
Nominal input	850	1020		[kW Hi]
Fan speed nominal	5800	6100		[rpm]
Gasflow G20	90	108		[m3/h]



## 8 ERRORS

### 8.1 General

If there is no data visible on the display, the fuse (10,0 A slow blow) in the control panel near the main switch should be checked (as well as the position of the on/off switch) and should if required be replaced (after the cause for break down has been determined and rectified).



**WARNING! THIS FUSE IS PART OF THE 230 V CIRCUIT. DISCONNECT THE BOILER FROM THE MAINS ELECTRICITY SUPPLY BEFORE REPLACING THE FUSE!**

If there is still no data visible on the display, one has to check if there is 230 VAC present on the connections "L" and "N" of connector X00 in the MAXSYS. Also see electrical wiring diagram.

If there is 230 VAC present (terminal connector C1: 25,22) , then the 230 V fuses F1 and F2 inside the Maxsys should be renewed. Disconnect the boiler from the main supply and remove the connectors from the Maxsys.

Notice : for this it is not necessary to unscrew the Maxsys from the mounting plate

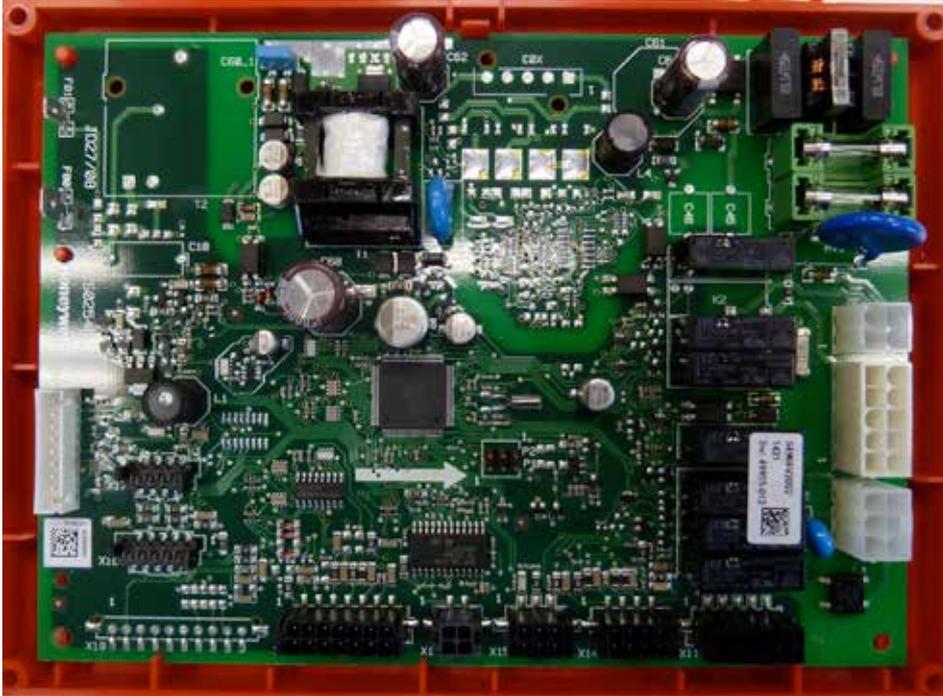
Release the six security clips with a long thin screw driver. Then remove the protective cover of the Maxsys. Replace the 230 V fuse(s) F1: T3.15 AL 250V and/or F2 T3.15 AL 250V inside the Maxsys.

A blown fuse in the Maxsys controller could be caused by a short-circuited pump. It is recommended to also check the CH-pump and also the DHW pump in this case.

If the 230 V fuses are OK and the display is still blank, then the cable of the display to the Maxsys (X15) should be checked. If this is also ok, the Maxsys should be renewed.

six security clips





F1: T3.15A 250 V

F2: T3.15A 250 V

If you are not sure that there is any heat demand, you can force the boiler to start as described in 5.5.

On heat demand, the boiler control will perform a zero-check of the air pressure switch before starting the fan. Following this, the fan will start and wait for air pressure switch to close. As soon as APS has closed, starting procedure will continue.

APS closes at  $\Delta P > 40$  Pa.

If there is a problem with APS, the display will show blower speed error.

The boiler control checks the status of the built-in pressure switches for water, gas and syphon just before ignition ; Water pressure should be  $> 1,4$  bar (E47); Gas pressure should be  $> 14$  mbar (E76); Syphon pressure should be  $< 15$  mbar (E77)

## 8.2 DHW errors

Boiler does not respond to DHW heat request

- Check the storage tank-NTC or thermostat and its wiring (also see electrical wiring diagram).
- Check if DHW is enabled using the control panel

Insufficient DHW flow

- Dirty filters in taps.
- Insufficient water pressure.

DHW temperature too low

- Tapping flow too high
- Temperature set point too low
- Leakage 3-way valve (towards CH-circuit), 3-way valve not fully in DHW position
- Faulty DHW pump
- DHW operation set to off
- Storage tank-NTC or thermostat and or wiring defect.
- Input too low due to too much resistance in air/flue system.

Boiler operates only for DHW

- Storage tank-NTC or thermostat defect and or its wiring.
- 3-way valve stuck (remains in direction towards storage tank)

## 8.3 CH-errors

CH circuit stays cold

- Incorrect connection to the mains electricity supply.
- Main switch on control panel is switched off (boiler off).
- Room thermostat defect, incorrect wiring, temperature set too low
- Outdoor sensor and/or its wiring defect.
- CH operation off
- 3-way valve defect (remains in direction towards storage tank)

## 8.4 Errors (hard and soft lockouts)

Errors are indicated by a text and an E-code on the bottom line on the display.  
The error message can be displayed by pressing the "information" button

Following an error with a hard lockout, the boiler will not fire again until a manual reset is performed (eg max temp limit).  
These errors can be found under column "hard lockout code" in the following table.

Following an error with a soft lockout the boiler will automatically resume normal operation after the cause of block is solved (eg gas pressure too low). They can be found under column "soft lockout code" in the following table.

The cause of error (hard or soft lockout) can be found with the help of the error-list below.

After the cause of error has been determined and the error has been resolved, the boiler can be put back into operation again.

## Errors (hard and soft lockouts)

Hard Lockout Code	Description	Cause of the fault	checking and finding a solution for the fault
E1	Failed ignition	The burner failed to light after 3 ignition attempts.	<ol style="list-style-type: none"> <li>1. Check gas supply to boiler.</li> <li>2. Check Ignition cable connection in control box.</li> <li>3. Check electrode for defects, and distance between the pins.</li> <li>4. Check gas valve and electrical connections to gas valve.</li> </ol>
E2	False flame	Flame detected prior to ignition.	<ol style="list-style-type: none"> <li>1. Check good electrical ground connection to unit.</li> <li>2. Check electrode for pollution and deposition of dirt.</li> </ol>
E3	High boiler temperature	The boiler temperature exceeds 105°C. Correct condition which caused high temperature or limit to open.	<ol style="list-style-type: none"> <li>1. Check water flow in the system (radiator valves).</li> <li>2. Check Pump and pump electrical connections.</li> </ol>
E4	APS failed zero position check	Air pressure switch closed at appliance start.	<ol style="list-style-type: none"> <li>1. Check the draft over the appliance Air intake and flue outlet when at rest. Switchpoints Airpressure switch: On at 0,4 mbar, Off at 0,25 mbar.</li> </ol>
E5	Blower speed	Blower speed not correct or speed signal is not received by MAXSYS.	<ol style="list-style-type: none"> <li>1. Check blower and wiring harness.</li> <li>2. If during start the APS switch does not close the air flow is not enough.</li> <li>3. The APS closing pressure difference during start should be over 40 Pa.</li> <li>4. Under normal condition if actual fan speed is 1000 rpm different from set fan speed an error is displayed.</li> <li>5. Only exception when actual fan speed &gt; 3000 rpm at max. PWM.</li> </ol>
E6	Air flow/Airpressure	Switch open during appliance run: APS opened more than 5 times during heat demand.	<ol style="list-style-type: none"> <li>1. Check the Air inlet / flue outlet for any obstructions.</li> <li>2. Check if the flue system is sensitive to backdraft / Wind.</li> </ol>
E7	High Flue temp	Flue temperature exceeds high limit.	<ol style="list-style-type: none"> <li>1. Heat exchanger may require cleaning.</li> <li>2. Boiler will automatically reset once flue temperature returns to normal range.</li> </ol>
E8	Flame Circuit Error	Flame circuit test failed.	<ol style="list-style-type: none"> <li>1. Turn boiler off.</li> <li>2. Check and clean the electrode.</li> <li>3. Check ignition and grounding cables are firmly connected.</li> </ol>
E9	Gas valve circuit error	Gas valve circuit test failed.	<ol style="list-style-type: none"> <li>1. Check the gas valve and wiring harness.</li> <li>2. If the problem persists replace the "MAXSYS" circuit board.</li> </ol>
E 12	Internal Control Fault	EEPROM misconfiguration	<ol style="list-style-type: none"> <li>1. Turn unit off and on to resume normal operation.</li> <li>2. If the problem persists replace the "MAXSYS" circuit board.</li> </ol>
E 13	Reset limit reached	Resets are limited to 5 every 15 minutes.	<ol style="list-style-type: none"> <li>1. Turn unit off and on to resume normal operation.</li> <li>2. If the problem persists replace the "MAXSYS" circuit board.</li> </ol>
E 15	Sensor Drift	Supply or return sensor reading has drifted	<ol style="list-style-type: none"> <li>1. Check supply and return temperature sensors and wiring harness</li> </ol>
E16	Supply Sensor Stuck	Supply sensor reading is not changing.	<ol style="list-style-type: none"> <li>1. Check supply temperature sensor and wiring harness for shortcuts or other defects.</li> <li>2. Check waterflow and the temperature balance in the system, because CH supply temperature does not change.</li> </ol>
E 17	Return Sensor Stuck	Return sensor reading is not changing.	<ol style="list-style-type: none"> <li>1. Check return temperature sensor and its position, check wiring harness for shortcuts or other defects.</li> <li>2. Check waterflow and the temperature balance in the system, because CH return temperature does not change.</li> <li>3. Failure may happen at low output capacity when supplying from a big tank!</li> </ol>
E 18	Sensor Failure	Supply or return sensor reading changed very rapidly.	Check supply and return temperature sensors and wiring harness.
E 21	Internal Control Fault	A / D conversion error.	Turn unit off and on then press OK to resume normal operation.
E 25	Internal Control Fault	CRC check error.	Turn unit off and on to resume normal operation.
E 30	Supply Sensor Shorted	A short circuit has been detected in the boiler supply temperature sensor circuit.	<ol style="list-style-type: none"> <li>1. Check supply temperature sensor and wiring harness for a short circuit.</li> <li>2. If necessary replace the sensor, or the wire harness.</li> <li>3. After fixing the problem, reset the appliance and resume normal operation.</li> </ol>

## Errors (hard and soft lockouts)

Hard Lockout Code	Description	Cause of the fault	checking and finding a solution for the fault
E 31	Supply Sensor Open	An open circuit has been detected in the boiler supply temperature sensor circuit.	<ol style="list-style-type: none"> <li>1. Check supply temperature sensor, connectors and wiring harness for an open circuit.</li> <li>2. If necessary replace the sensor, or the wire harness.</li> <li>3. After fixing the problem reset the appliance and resume normal operation.</li> </ol>
E 32	DHW Sensor Shorted	A short circuit has been detected in the DHW temperature sensor circuit.	<ol style="list-style-type: none"> <li>1. Check DHW temperature sensor and wiring harness for a short circuit.</li> <li>2. If necessary replace the sensor, or the wire harness.</li> <li>3. After fixing the problem reset the appliance and resume normal operation.</li> </ol>
E 33	DHW Sensor Open	An open circuit has been detected in the DHW temperature sensor circuit.	<ol style="list-style-type: none"> <li>1. Check DHW temperature sensor, connectors and wiring harness for an open circuit.</li> <li>2. If necessary replace the sensor, or the wire harness.</li> <li>3. After fixing the problem reset the appliance and resume normal operation.</li> </ol>
E 34	Low Voltage	Line voltage has fallen below an acceptable operating level.	The boiler will automatically reset once line voltage returns to normal.
E 37	Low Water	Water level has fallen below 0.7 bar.	<ol style="list-style-type: none"> <li>1. Increase pressure to normal range.</li> <li>2. The boiler will automatically reset once water level returns to normal.</li> </ol>
E 43	Return Sensor Shorted	A short circuit has been detected in the boiler return temperature sensor circuit.	<ol style="list-style-type: none"> <li>1. Check return temperature sensor and wiring harness for a short circuit.</li> <li>2. If necessary replace the sensor, or the wire harness.</li> <li>3. After fixing the problem, reset the appliance and resume normal operation.</li> </ol>
E 44	Return Sensor Open	An open circuit has been detected in the boiler return temperature sensor circuit.	<ol style="list-style-type: none"> <li>1. Check return temperature sensor, connectors and wiring harness for an open circuit.</li> <li>2. If necessary replace the sensor, or the wire harness.</li> <li>3. After fixing the problem, reset the appliance and resume normal operation.</li> </ol>
E 45	Flue Sensor Shorted	A short circuit has been detected in the boiler flue temperature sensor circuit.	<ol style="list-style-type: none"> <li>1. Check flue temperature sensor and wiring harness for a short circuit.</li> <li>2. If necessary replace the sensor, or the wire harness.</li> <li>3. After fixing the problem reset the appliance and resume normal operation.</li> </ol>
E 46	Flue Sensor Open	An open circuit has been detected in the boiler flue temperature sensor circuit.	<ol style="list-style-type: none"> <li>1. Check flue temperature sensor, connectors and wiring harness for an open circuit.</li> <li>2. If necessary replace the sensor, or the wire harness.</li> <li>3. After fixing the problem reset the appliance and resume normal operation.</li> </ol>
E 47	Water pressure sensor error	Water pressure sensor is disconnected or broken	<ol style="list-style-type: none"> <li>1. Check water pressure sensor, connectors and wiring harness.</li> <li>2. If necessary replace the sensor, or the wire harness.</li> <li>3. After fixing the problem reset the appliance and resume normal operation.</li> </ol>
E 76	External Limit Open	An external automatic reset boiler limit has opened.	<ol style="list-style-type: none"> <li>1. Correct condition which caused limit to open.</li> <li>2. Boiler will automatically reset once external limit closes.</li> </ol>
E 77	Siphon error	Siphon switch open	Check the air intake and the flue outlet for any obstructions. The pressure over the appliance is too high. $\Delta P < 8.3$ mbar.
E 80	Return > Supply	Return temperature is higher than supply temperature.	Confirm water flows in boiler return and out boiler supply.
E 81	Sensor Drift	Supply and return temperatures are not equal.	<ol style="list-style-type: none"> <li>1. Check water is flowing through boiler.</li> <li>2. Wait a few minutes for the water to equalise the temperature, the boiler will automatically reset once temperatures become equal.</li> <li>3. If boiler doesn't reset, check the NTC's and check the wire harness, replace if necessary.</li> </ol>
E 87	Overtemp lockout	An external boiler limit has opened.	<ol style="list-style-type: none"> <li>1. Correct condition which caused limit to open, then reset boiler.</li> <li>2. The boiler needs to be reset once external limit closes.</li> </ol>

## Errors (hard and soft lockouts)

Hard Lockout Code	Description	Cause of the fault	checking and finding a solution for the fault
E88	VPS Check time out *)		
E 89	Incorrect Setting	A parameter setting is outside the settings range.	<ol style="list-style-type: none"> <li>1. Check that the controller and display types are correct.</li> <li>2. Review CH &amp; DHW settings and OTC setting and correct as necessary.</li> <li>3. The boiler will automatically reset once corrected.</li> </ol>
E 90	Firmware Mismatch	Control module and display firmware versions are incompatible.	One or several components are not compatible with the system. Replace mismatched component(s).
E 91	Cascade Sensor Shorted	A short circuit has been detected in the system temperature sensor circuit.	<ol style="list-style-type: none"> <li>1. Check the Cascade temperature sensor is correctly wired (Terminal strip C2, pins 15 and 16) and the absence of short circuit.</li> <li>2. If necessary replace the sensor, or the wire harness.</li> <li>3. After fixing the problem reset the appliance and resume normal operation.</li> </ol>
E 92	Cascade Sensor Open	An open circuit has been detected in the system temperature sensor circuit.	<ol style="list-style-type: none"> <li>1. Check the Cascade temperature sensor is correctly wired (Terminal strip C2, pins 15 and 16) and the absence of an open circuit.</li> <li>2. If necessary replace the sensor, or the wire harness.</li> <li>3. After fixing the problem reset the appliance and resume normal operation.</li> </ol>
E 93	Outdoor Sensor Shorted	A short circuit has been detected in the outdoor temperature sensor circuit.	<ol style="list-style-type: none"> <li>1. Check outdoor temperature sensor and wiring for a short circuit.</li> <li>2. If necessary replace the sensor, or the wire harness.</li> <li>3. After fixing the problem reset the appliance and resume normal operation.</li> </ol>
E 94	Internal Display Fault	Display memory error	Turn unit off and on to resume normal operation.
E 95	Cascade CH Supply Sensor Error	Supply sensor reading is invalid.	<ol style="list-style-type: none"> <li>1. Check wiring between display and control module.</li> <li>2. If necessary replace the sensor, or the wire harness.</li> <li>3. After fixing the problem reset the appliance and resume normal operation.</li> </ol>
E 96	Outdoor Sensor Open	An open circuit has been detected in the outdoor temperature sensor circuit.	<ol style="list-style-type: none"> <li>1. Check outdoor temperature sensor and wiring for an open circuit.</li> <li>2. If necessary replace the sensor, or the wire harness.</li> <li>3. After fixing the problem reset the appliance and resume normal operation.</li> </ol>
E 97	Cascade Mismatch	Cascade configuration has changed.	<ol style="list-style-type: none"> <li>1. Run autodetection if change was intentional, or else check wiring between boilers.</li> <li>2. Boiler will automatically reset once repaired.</li> </ol>
E 98	Cascade Bus Error:	Communication with other boilers has been lost.	<ol style="list-style-type: none"> <li>1. Check wiring between boilers.</li> <li>2. Boiler will automatically reset once repaired.</li> </ol>
E 99	Controller Bus Error	Communication between boiler display and control module has been lost.	<ol style="list-style-type: none"> <li>1. Check wiring between components.</li> <li>2. Boiler will automatically reset once repaired.</li> </ol>

## 9 ANNUAL INSPECTION MAINTENANCE



**Maintenance must only be done by a qualified installer or technician.  
The appliance must be inspected once every year according to table 9.1.  
Maintenance and inspection must be done once every two years according to table 9.1**

The appliance is not to be used by children or persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge. Children, even if being supervised, must not maintain or clean the appliance or play with the appliance

In the case of failure or malfunction of the appliance, do not attempt to repair it yourself. Please contact your installer. Repairs must only be carried out by qualified technicians. Failure to comply with these requirements can compromise the safety of the appliance.

### Inspection (also see 9.1, 9.2, 9.3 and 9.4)

Inspection set (article nr. 101181) must be used. Switch off the boiler. Disconnect from the mains electricity supply.

Remove the syphon and clean it. Refill the condensate trap with clean water and reconnect it with the new O-ring from the inspection set (article nr. 101181). Replace the electrode with seal (parts of inspection set (article nr. 101181). Distance between the two pins must be  $3,5 \pm 0,5$  mm.

Put the boiler into operation on max. load (see section 5.5). Determine the heat input of the boiler. Check % CO<sub>2</sub>. Repeat for min load. Check the gas-parts for leakages and correct eventually.

Check the flue-gas parts for flue-gas leakages and condensate leakages and correct eventually.

Check for in general for leakages and correct if necessary.

Compare the heat input (max and min) with that measured at installation.

If the figures as mentioned in table (chapter 9.1) are comparable the inspection is done.

If the heat input is now considerably lower then there is probably an obstruction in the air inlet or the flue-outlet or in the boiler itself.

Switch off the boiler. Disconnect from the mains electricity supply. First check the air-inlet and the exhaust flue-outlet.

Remove the front cover, top cover and side cover.

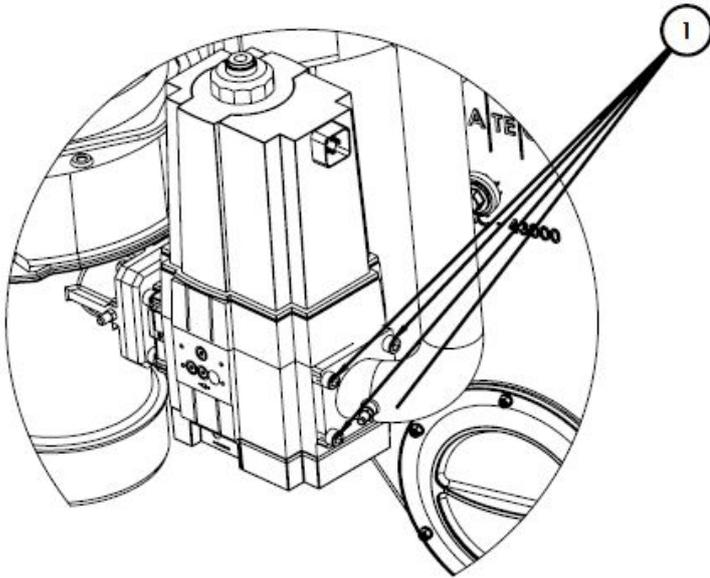
Remove the inspection cover\* of the sump on the front side beneath the controls.

The inner part of the sump and the bottom part of the heat-exchanger should be inspected and, if necessary, be cleaned.

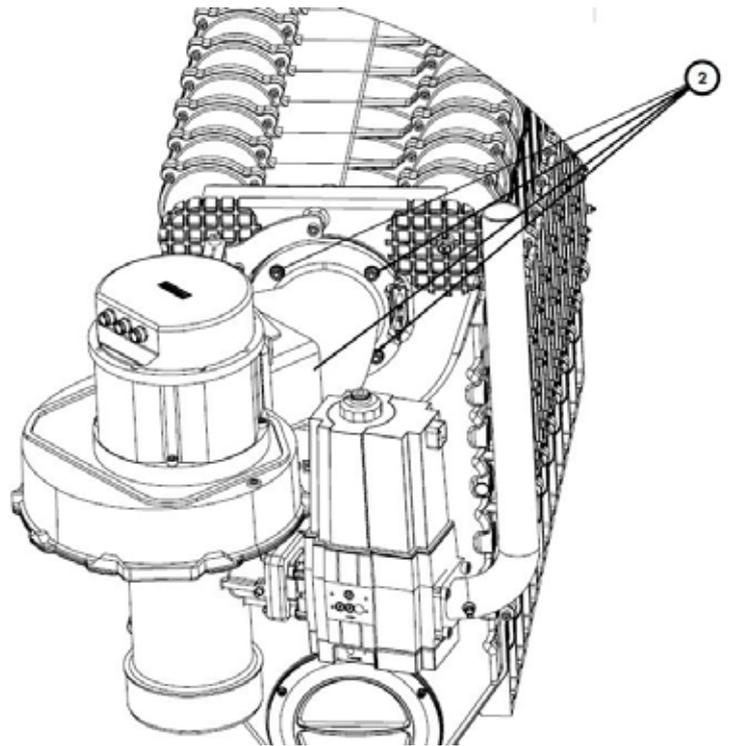
If the bottom part of the heat-exchanger is clogged, the inspection covers on the left-hand side of the heat-exchanger should be removed\*. Using a special tool (see figure next page) makes it possible to clean the heat-exchanger lids partially.

In case of dirt in the sump it is also advisable to inspect the upper part of the heat-exchanger as well. Close the main gas supply. Loosen the four bolts from the gasvalve (as shown in figure on next page (1))

Then remove the 4 bolts from the burnerhood as shown in figure beneath (2)



Now the burnerhood /fan /gasvalve assembly can be rotated to the side. See next figure



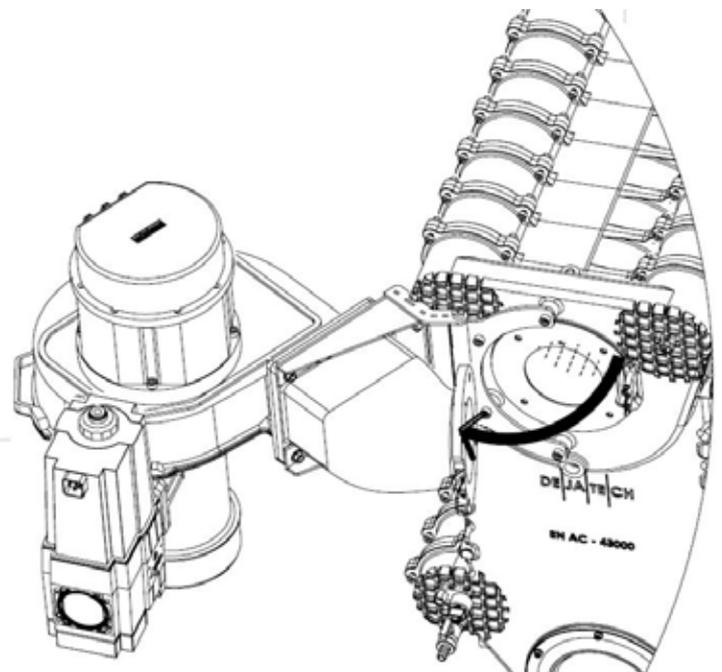
Now the burner\* is visible and can be taken out and inspected. If necessary clean the cold side with a vacuum cleaner (or carefully with compressed air) and a nylon brush (never use a steel brush). Inspect the combustion chamber.

In case of a dirty heat-exchanger it can be cleaned with water. Check the burner seal\* and replace if necessary. Tighten with torques as mentioned in 9.3.

Put everything back in its place. Check the CO<sub>2</sub>-content and correct if necessary.

Check the gas-parts for leakages.

Check the flue-gas parts for flue-gas leakages and condensate leakages



Fill in the data in table 9.1

## Maintenance (also see 9.1, 9.2, 9.3 and 9.4)

Maintenance set (article nr. 101105) must be used. All parts of the set should be used as replacement. Switch off the boiler. Disconnect from the mains electricity supply. First check the air-inlet and the exhaust flue-outlet. Remove the front cover, top cover and side cover. Remove the syphon and clean it.

Remove the inspection cover\* of the sump on the front side beneath the controls.

The inner part of the sump and the bottom part of the heat-exchanger must be cleaned.

Remove the inspection covers on the left-hand side of the heat-exchanger\*. Using a special tool (see figure 9.1) makes it possible to clean the heat-exchanger lids partially. See next page for procedure putting back in place inspection covers on the left-hand side of the heat-exchanger.

Also inspect the upper part of the heat-exchanger. To get access to the burner see the procedure as described under "inspection"\*. Once the burner\* is visible it can be taken out and inspected. Clean the cold side with a vacuum cleaner (or carefully with compressed air) and a nylon brush (never use a steel brush). Inspect the combustion chamber. In case of a dirty heat-exchanger it must be cleaned with water. Check the burner seal\* and replace it by a new one. Tighten with torques as mentioned in 9.4.

Refill the condensate trap with clean water and reconnect it.

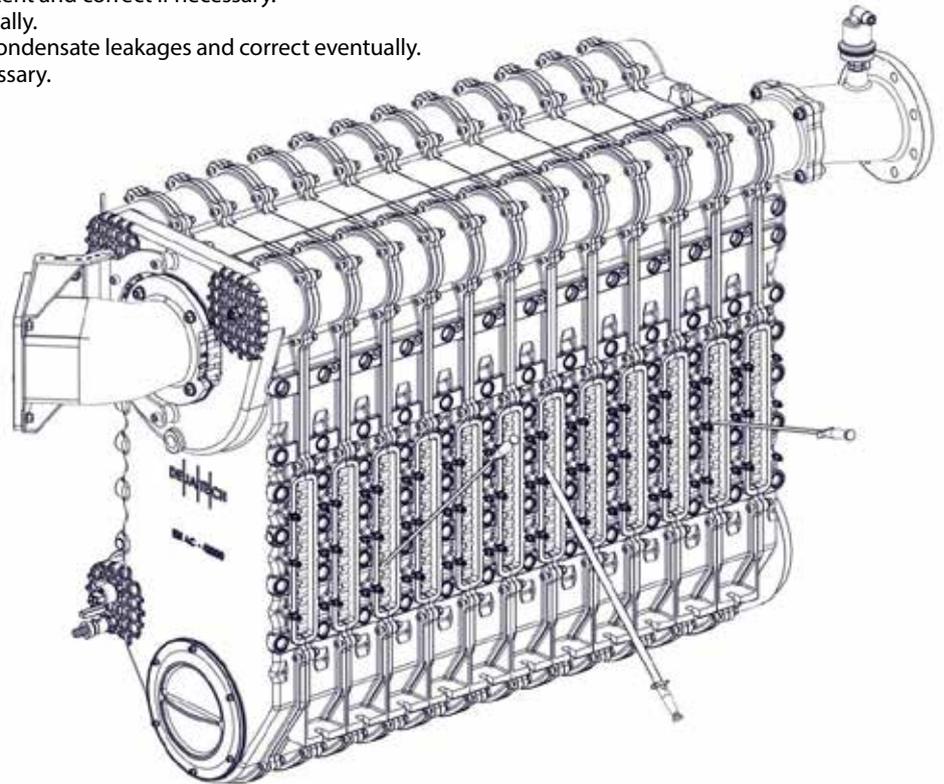
Replace the electrode by a new one, check the distance between the two pins ( $3,5 \pm 0,5$  mm).

Put everything back in its place. Check the CO<sub>2</sub>-content and correct if necessary.

Check the gas-parts for leakages and correct eventually.

Check the flue-gas parts for flue-gas leakages and condensate leakages and correct eventually.

Check for in general for leakages and correct if necessary.



 **\*Note : be careful during maintenance not to damage seals.**

Fill in the data in table 9.1

## 9.1 Service-maintenance table

When commissioning/inspecting the boiler CO<sub>2</sub>, CO, T flow, T return,  $\Delta P$  air pressure switch and Psyphon pressure switch must be measured and the measured values must be written down in the table below.

Measure these values when the boiler is in equilibrium at maximum load (also see chapter 5.5). Repeat for minimum load.

During annual inspection and maintenance we advice to measure and write down these values also and compare them to the previous values and analyse any change.

At the factory the maximum load of the boiler was measured within 5% tolerance from the nominal load.

In the field the load can decrease due to increased resistance in the boiler, the air inlet or the exhaust outlet or due to malfunctioning of the fan or other causes.

At maximum load the installation should be designed for nominal  $\Delta T$  of 15 K to 20 K.

When the  $\Delta T$  is higher than 25 K, the boiler cannot continue at maximum load anymore and will start to modulate because water flow through the boiler is insufficient.

T flow and T return can be read in "info mode" on the display (see 5.4 diagnostics)

Valves, malfunctioning pumps, dirt, corrosion products from the installation, dirty filters etc. can have negative impact on water flow through the boiler.

Before ignition the boiler control checks  $\Delta P$  aps during prepurge. During burner operation this check will be carried out. If the value decreases over successive years, this could indicate a problem e.g. malfunctioning of the fan, dirty air inlet, dirty burner, dirty heat exchanger or dirty exhaust system.

Syphon pressure (P sps) should be lower than the maximum allowable flue resistance. If P sps is too high ( $> 15$  mbar), the boiler will be stopped.

In this case the exhaust system may be blocked.

Syphon pressure (P sps) should be lower than the maximum allowable flue resistance. If P sps is too high ( $> 15$  mbar), the boiler will be stopped.

In this case the exhaust system may be blocked.

## 9.1 Service-maintenance table

Date	Gasflow [m <sup>3</sup> /h] or load [kW]	CO <sub>2</sub> [%]	CO [ppm]	T <sub>flow</sub> [°C]	T <sub>return</sub> [°C]	P air pressure switch [mbar]	P syphon pressure switch [mbar]
Installed							
Installed + 1 year inspection							
Installed + 2 year maintenance							
Installed + 3 year inspection							
Installed + 4 year maintenance							
Installed + 5 year inspection							

## 9.2 Tubing and fixation

During the inspection and maintenance also all the tubing and its fixations as shown in the pneumatic diagram in chapter 6.7 must be checked. Check for leakage and correct fixation. In case of doubt replace tubing and or fixation.

The tubing, especially the P1 connection, are essential for safety and proper functioning of the boiler.

After reconnection of the tubing check for proper functioning of the boiler and also check the input and CO/CO2 figures (see 7.2)

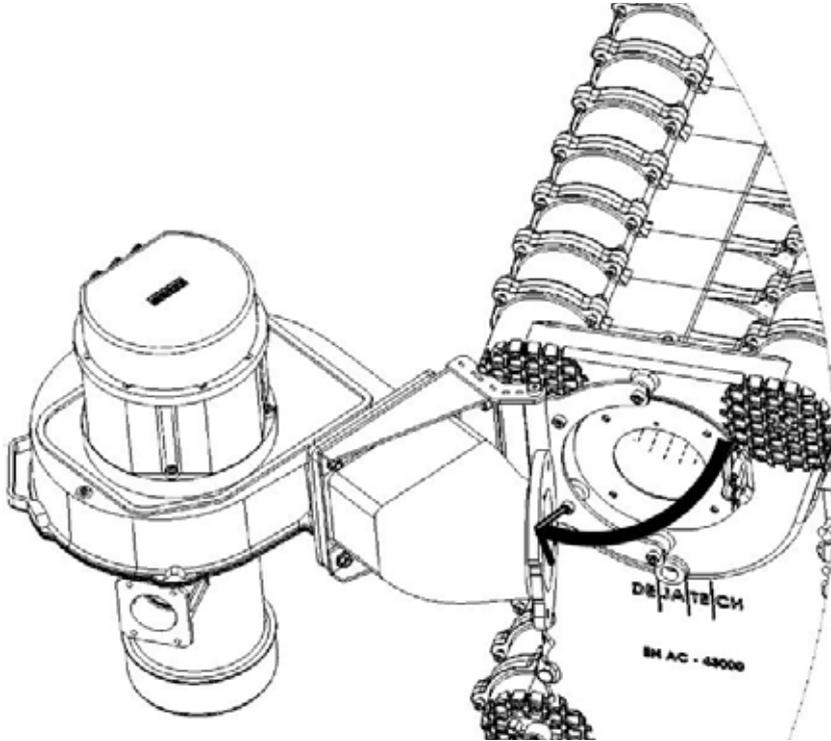
Also see detail in picture beneath.

Tubing and fixation

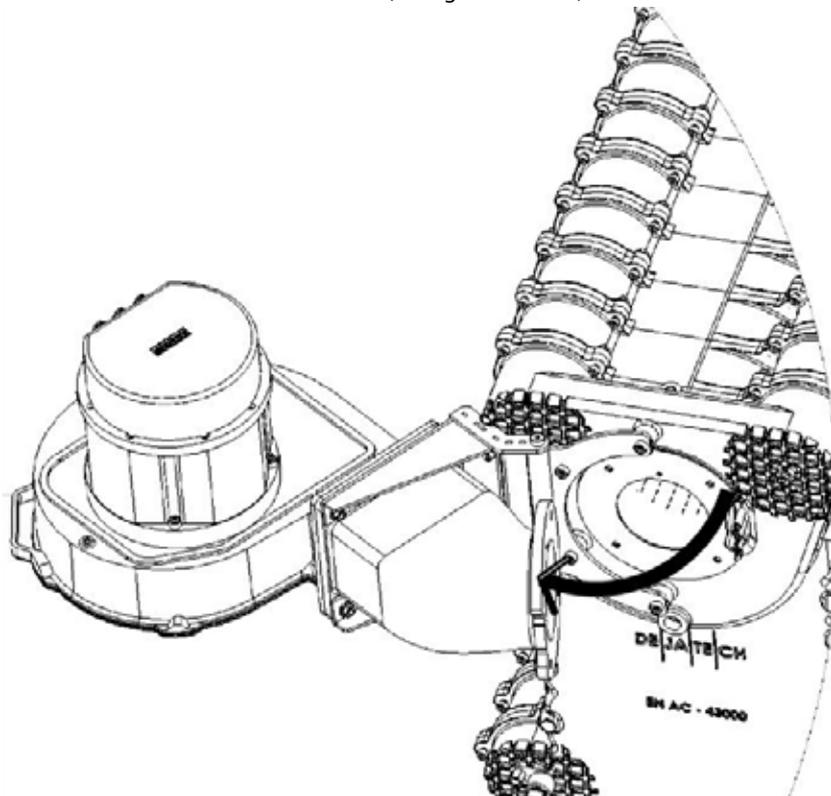


## 9.3 Non return valve NRV in burnerhood (Implemented soon)

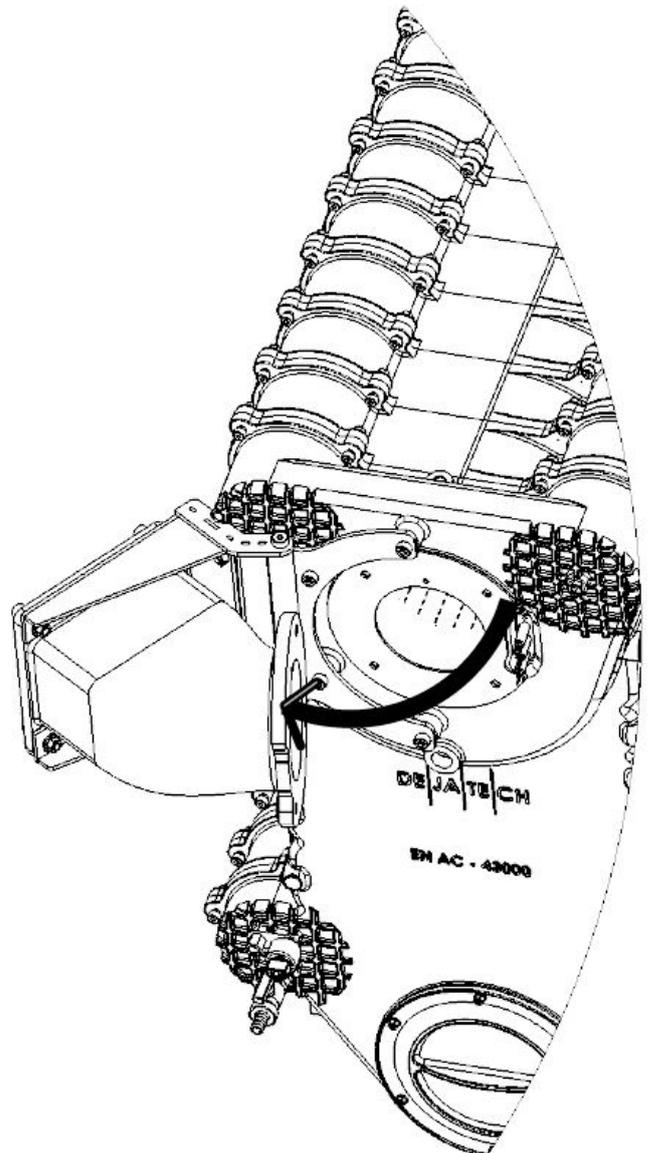
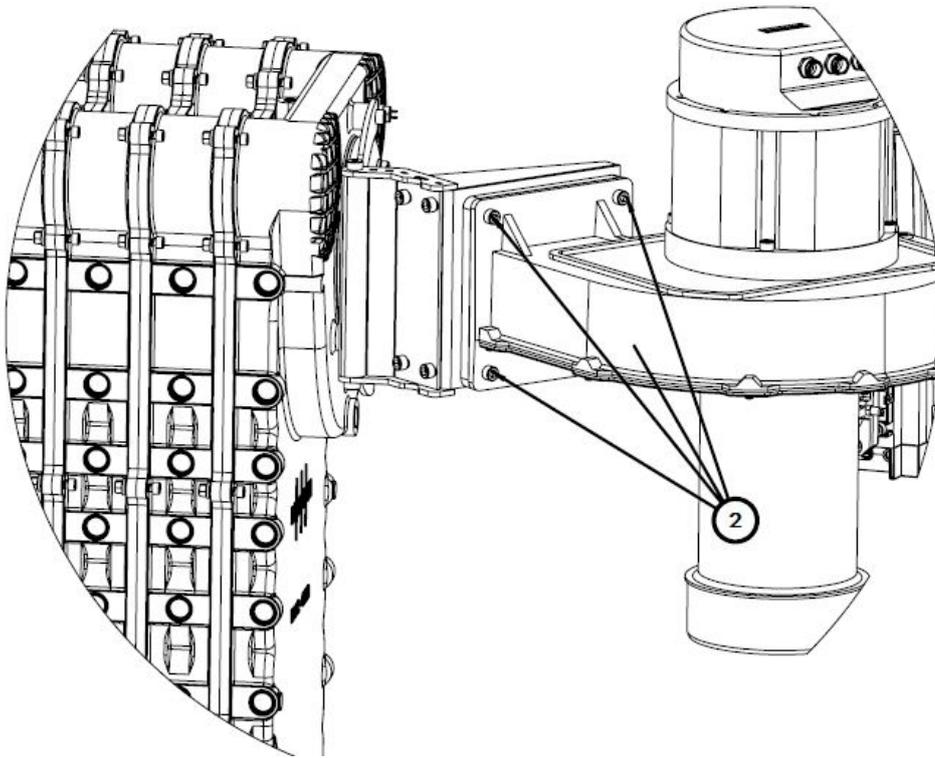
For cascade also read the "cascade" manual.  
During the following procedure two persons are required due to the heavy weight of some components.  
Follow the procedure as mentioned under "inspection" to get access to the burner.  
Remove the gasvalve from the venturi as shown in picture beneath



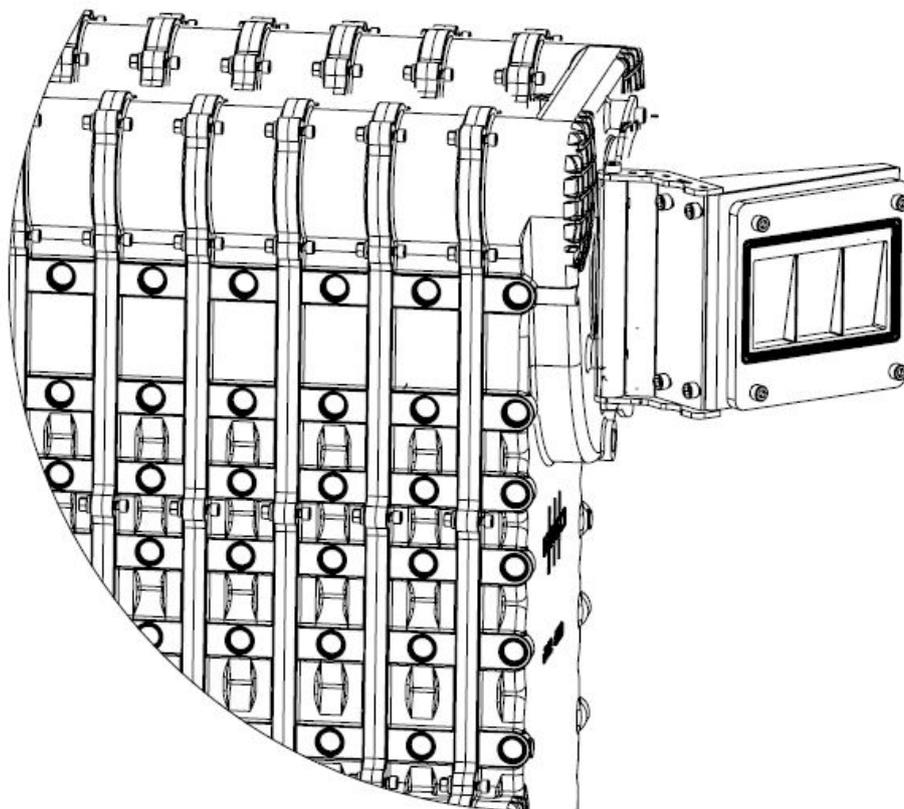
Then unscrew the venturi from the fan (see figure beneath)



Finally remove the fan (see next page)  
First remove the four nuts shown in the figure beneath.  
Only unscrew the nuts, leave the bolts inside (they are essential for correct alignment)

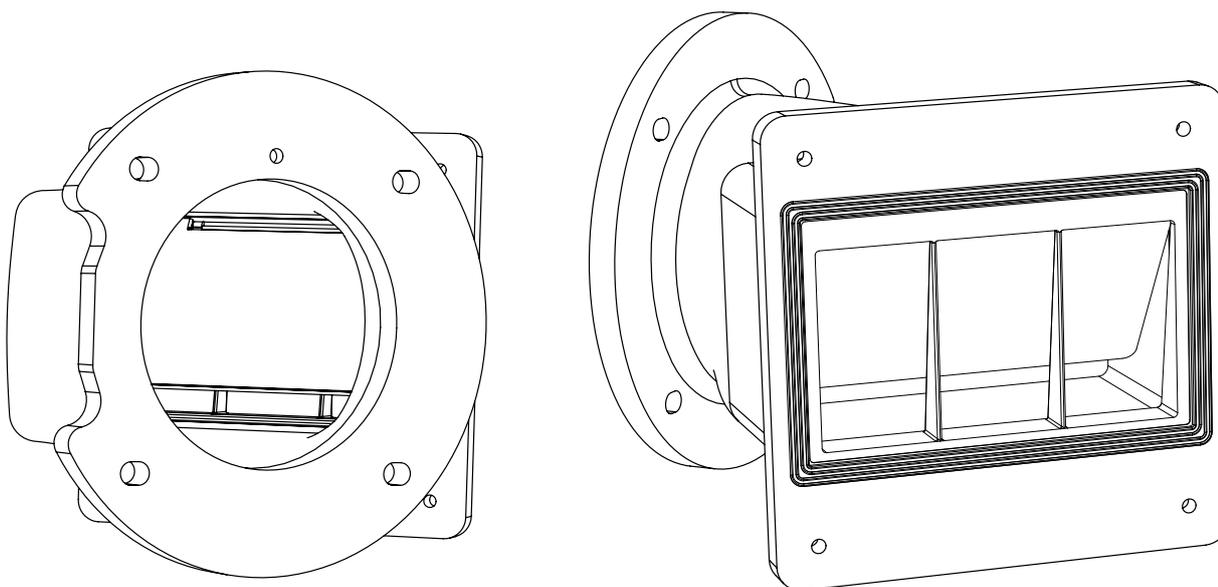


Now the NRV valve and its sealings can be seen (see picture next page)



During inspection the seals and the correct functioning (closure and non sticking) must be checked. In case of doubt replace.  
During maintenance the outer seal (red part) of the non return valve must be replaced.  
Also check the black foam part for correct closure (sealing)  
In case of doubt replace the valve (article nr. 100997).

Also see pictures beneath.



Non return valve in burnerhood

\*Note : be carefull during inspection/maintenance not to damage seals.

## 9.4 Torque table

Torque table	
Concerning part	Torque in Nm
Inspection cover sump	4
Burnerhood on heat-exchanger	30
Venturi on fan	12
Fan on burnerhood	7
Air-inlet on fan	4
Gasvalve on fan	4
Electrode ignition	1,5
Electrode ionisation	1,5
Inspection cover on left-hand side heat-exchanger middle	5
Inspection cover on left-hand side heat-exchanger front	5
Inspection cover on left-hand side heat-exchanger back	5
Manifold return	--
Manifold flow	--
Connection PN flow	30
Connection PN return	30
Waterconnection on flow manifold	--

## Declaration of Conformity van Alutherm Heating.

### EC Conformity Declaration



CE 0063

0063CS3708

Alutherm Heating B.V., Craenakker 3a, NL 5951 CC Belfeld, The Netherlands, hereby declares that the condensing central heating boilers, type

### Alutherm C 850-1050

Conform to and comply with the essential requirements of the following European standards and directives.

Regulation/ Directive	Description	Date
(EU) 2016/426	Regulation relating to appliances burning gaseous fuels	09.03.2016
2009/125/EC	Ecodesign Directive (implemented by EU regulation 813/2013)	21.10.2009
2014/35/EU	Low Voltage Directive	26.02.2014
2014/30/EU	Electromagnetic Compatibility Directive	26.02.2014

Relevant harmonized standards:

EN 15502-1	EN 55014-1	EN 61000-3-2
EN 15502-2	EN 55014-2	EN 61000-3-3
EN 60335-2-102		

Signed for and behalf of Alutherm Heating B.V.:

G.J.W. Helmes

Belfeld, 2/10/2019

Senior Area Sales Manager

**ALUTHERM**  
*Heating*

**Alutherm Heating B.V.**

Craenakker 3a | 5951 CC Belfeld | The Netherlands

Telephone +31 (0)77 303 19 76

E-mail [info@aluthermheating.nl](mailto:info@aluthermheating.nl)

Website [www.aluthermheating.nl](http://www.aluthermheating.nl)