



# Evinox CD Condensing Boiler

## Instructions for Installation and Service



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Data indicated in the present manual is liable to changes.  
Evinox Ltd has the right to make modifications without notice of any product of its range.

## 1. INTRODUCTION

The main characteristics of the **EVINOX CD** boiler are:

- Maximum efficiency in every kind of installations at any working temperature.
  - Installations with traditional heat radiators
  - New installations of very Low Temperature (UFH, fan-coils, A.H.U., etc.).
  - Domestic Hot Water (D.H.W.S.), in accordance with anti-legionella regulations.
- EEC Approval by AFNOR, with 4 performance stars for its high energetic efficiency (according to the European directive 92/42/EEC).
- Seasonal efficiency up to 108%.
- Boiler certified as “Condensing”: flow temperature up to 90°C, no limit of return temperature.
- Boiler heat exchanger in stainless steel.
- Power outputs from 68 to 675 kW.
- Maximum efficiency:
  - Variable temperature on boiler.
  - Boiler power modulation according to the demands of the installation.
  - High reduction of stop/start cycles.
  - Minimum heat losses due to convection/radiation through the boiler.
  - Inconsiderable heat losses through the chimney when the boiler is not operating.
- Gas boilers with modulating burner starting from 30% of power (depending on the installation conditions and models).
- Burner power modulation by varying the pre-mix air-gas flow by means of a motor fan of variable speed.
- Reduced electric consumptions per year thanks to the motor fan of variable speed for the air-gas inlet.
- Ecological combustion (“PREMIX” burner of innovative design).  
NOx: about 10 ppm, CO: about 50 ppm (both referred to 3% O<sub>2</sub>).
- Boiler regulation and control adaptable to all systems available on the market:
  - The boiler can operate by means of its own regulation.
  - It can be connected to a sequence control unit in an installation with several boilers.
  - It can be connected to Building Manage System (B.M.S.).
  - It can be connected to telecomputing.
- Minimal dimensions and weight:  
Boiler heat exchanger EVINOX CD 475 (440 kW of output) → Large: 81 cm, Long: 94 cm, Weight: **490 kg**  
Easy to install in boiler rooms with difficult access.  
Space saving in plant room (440 kW in less than 0,76 m<sup>2</sup>).

## 2. REGULATIONS

The installation must be designed and installed by qualified professionals in accordance with the current regulations relating to gas, ventilation, flue evacuation, electricity, safety, fire prevention, etc.

The boiler maintenance must be undertaken following the instructions of the manufacturer's technical manual and with a minimum regularity as indicated by the current regulations.

## 3. EEC APPROVALS AND CERTIFICATIONS

EVINOX CD boilers are certified as follows:

MODEL EVINOX CD	70 to 375	550 to 750
GAS BOILERS DIR. 90/396/EEC	<b>1312CL5483</b> (AND EFFICIENCY DIR. 92/42/EEC)	<b>1312CL5489</b>

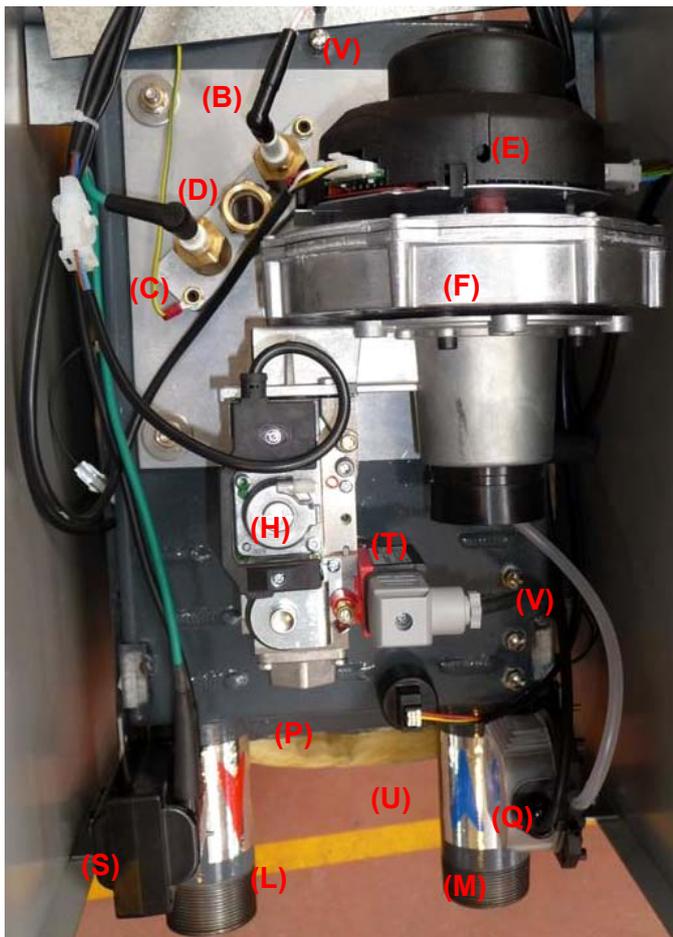
The European Directive of Boilers Efficiency, dir. 92/42/EEC, only applied to boilers from 4 to 400 kW.



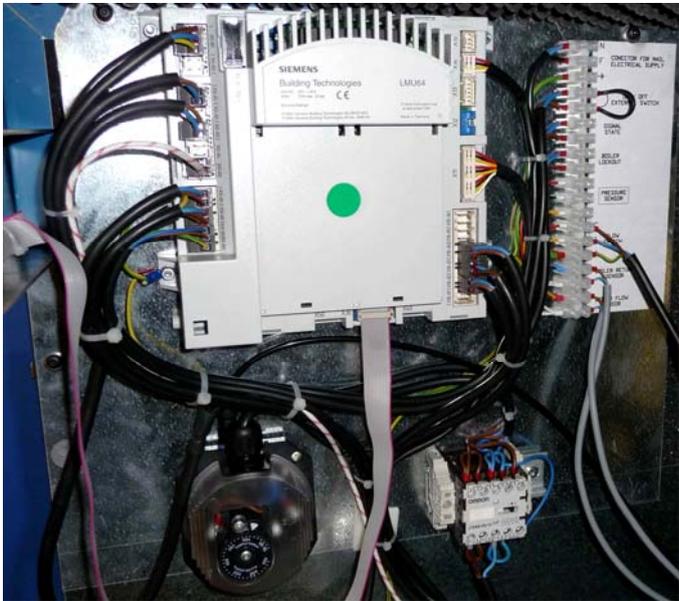
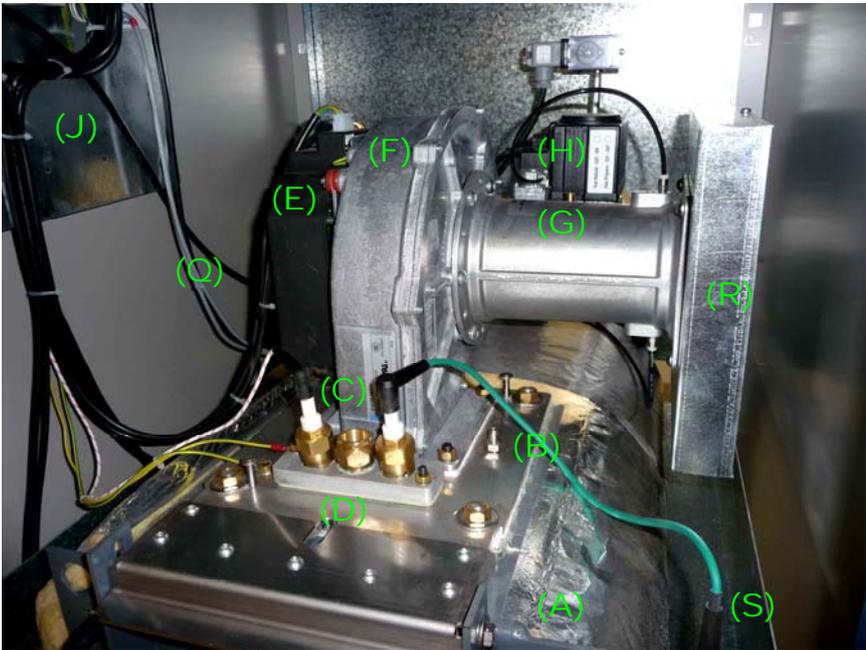
#### 4. BOILER GENERAL VIEW: DESCRIPTION OF THE COMPONENTS

A	Boiler heat exchanger (higher collector)
B	Flanges (boiler heat exchanger – burner – air/gas fan)
C	Ignition kit
D	Flame indicator
E	Motor fan (variable speed)
F	Fan
G	Venturi for air inlet and mix with gas
H	Multiblock gas valve
J	Boiler control unit and power modulation
L	Hot water flow
M	Hot water return
N	Flue outlet
P	Gas connection
Q	Air pressure switch
R	Air filter
S	Ignition transformer
T	Gas pressure switch
U	Pressure sensor
V	Air purgers (manual)

#### Models EVINOX CD 70 to 120 (view from above):

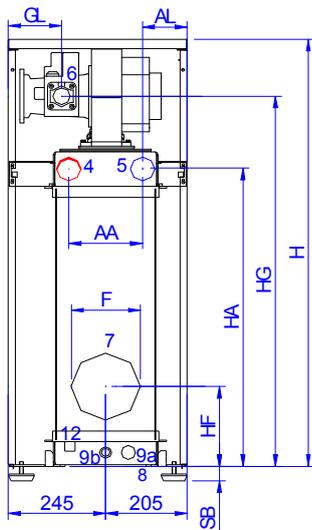


EVINOX CD 175 and higher

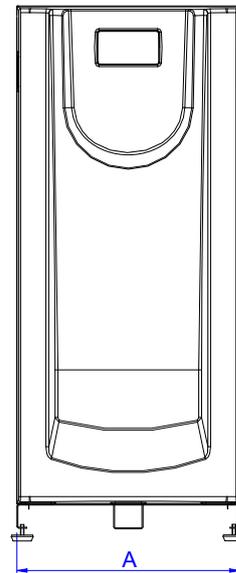
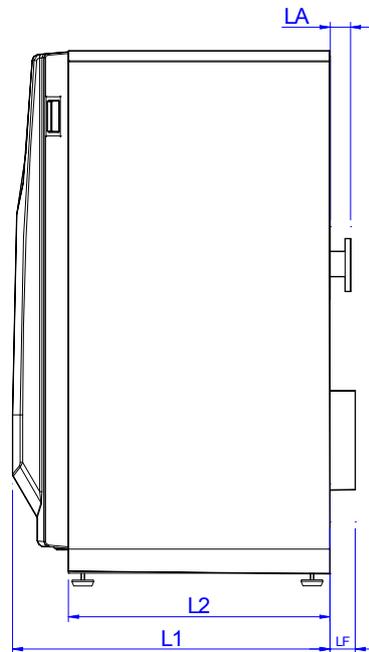
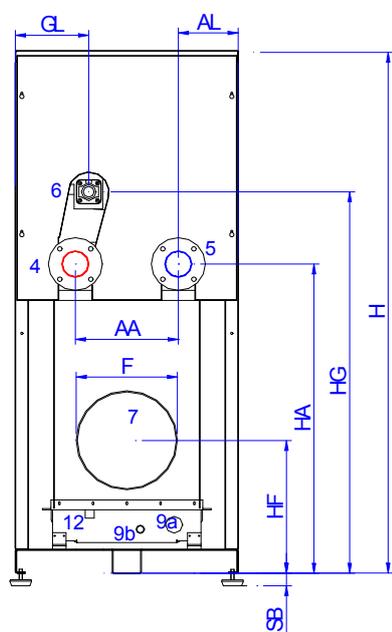
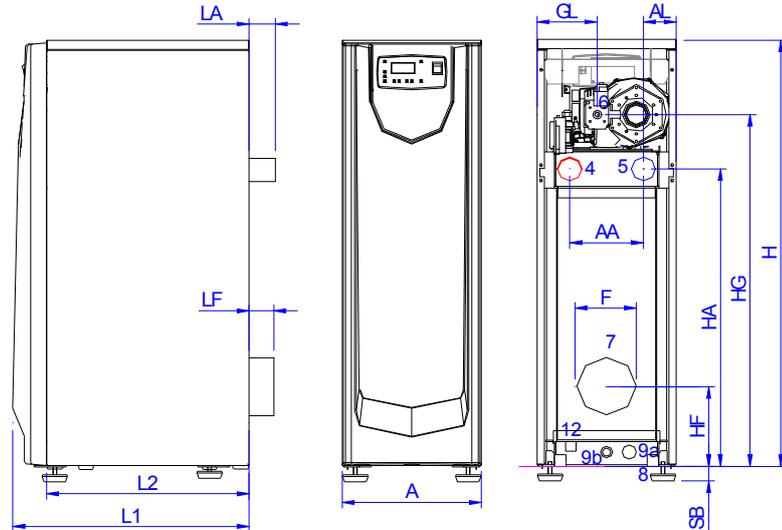


## 5. DIMENSIONS

### ADI CD 120



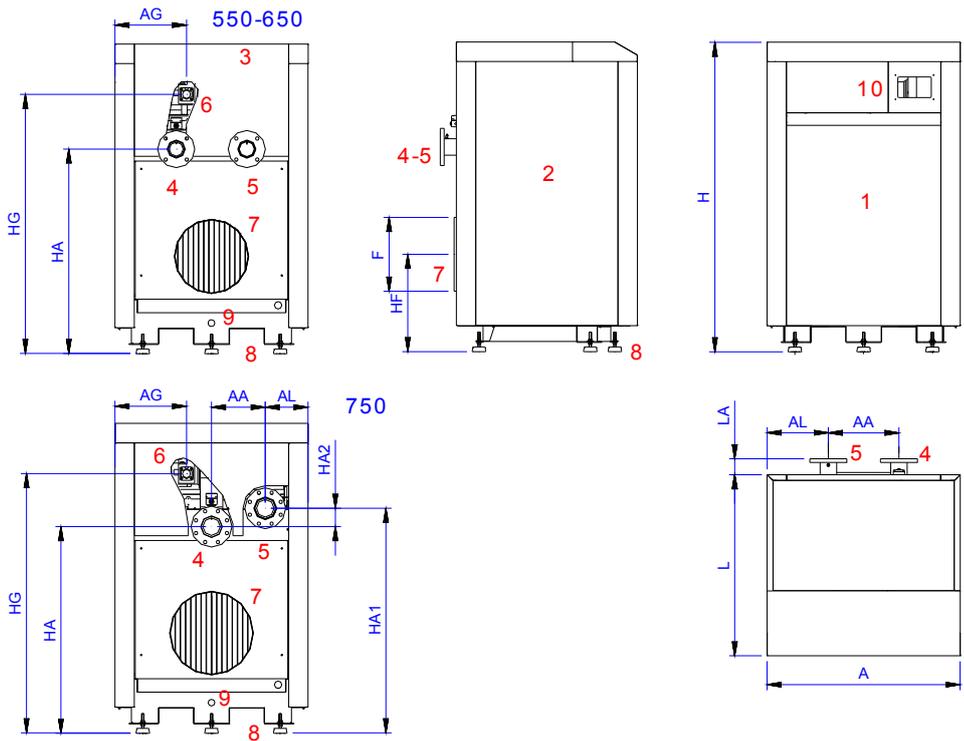
### ADI CD 70 - 105



### ADI CD 175 - 450

Model CD	A	AA	AL	F (7)	H	HA	HF	HG	L1	L2	LA	LF	GL
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
70	350	185	82,5	150	1100	774	208	915	595	510	66	62	151,5
85	350	185	82,5	150	1100	774	208	915	615	510	66	62	151,5
105	350	185	82,5	150	1100	774	208	915	635	510	66	62	151,5
120	450	185	112,5	150	1100	774	208	963	635	530	66	62	134,3
175	660	305	177,5	175	1583	936	403	1156	940	771	61	75	217,3
200	660	305	177,5	175	1583	940	403	1156	940	775	61	75	217,3
250	660	305	177,5	175	1583	940	403	1156	940	775	61	75	217,3
325	810	360	225	250	1583	936	445	1156	940	775	61	75	292
375	810	360	225	250	1583	936	445	1190	940	775	61	75	249,3
450	810	360	225	250	1583	936	445	1190	940	775	61	75	249,3
550	1040	380	330	350	1668	1102	524	1397	975	-----	86	-----	360
650	1040	380	330	350	1668	1102	524	1397	975	-----	86	-----	360
750	1040	289	231	350	1668	1112/1211	539	1397	975	-----	80	-----	360

(\*) NOTE: Dimensions H, HG, HA and HF do not include the additional height of the silent-block feet supplied with the boiler (dimension "SB").



Model	ADI CD	4-5	6	9	12
		Diam.	Diam.	Diam.	Diam.
70		2"	3/4"	1"	1/2"
85		2"	3/4"	1"	1/2"
105		2"	3/4"	1"	1/2"
120		2"	1"1/4"	1"	1/2"
175		2 1/2"	1"1/4"	1"1/2"	1/2"
200		2 1/2"	1"1/4"	1"1/2"	1/2"
250		2 1/2"	1"1/4"	1"1/2"	1/2"
325		2 1/2"	1"1/4"	1"1/2"	1/2"
375		2 1/2"	1"1/4"	1"1/2"	1/2"
450		2 1/2"	1"1/4"	1"1/2"	1/2"
550		3"	1"1/4"	1"1/2"	1/2"
650		3"	1"1/4"	1"1/2"	1/2"
750		4"	1"1/4"	1"1/2"	1/2"

(\*) NOTE: Dimensions H, HG, HA and HF do not include the additional height of the silent-block feet supplied with the boiler (dimension "SB").

Legend	Concept
1	Boiler front view
2	Boiler side view
3	Boiler back view
4	Hot water flow
5	Hot water return
6	Gas connection
7	Flues outlet (connection to chimney)
8	Anti-vibration supports
9	Boiler water draining (female-threaded sleeve)
12	Draining of condensed products (female-threaded sleeve)
13	Control panel

Gas connection: the installation company must install a female 3-pieces coupling, to simplify dismantling and maintenance of the boiler.

Add gas filter.

EVINOX CD 70 to EVINOX CD 120: flow-return, male-threaded connections of 2".  
Higher models: flanged connections, PN 6.

## 6. TECHNICAL DATA RANGE ADI CD

CONCEPT		Units	70	85	105	120	175	200	250	325	375	450	550	650	750
Power output	Maximum (average water temp: 70°C)	kW	68	85	104	120	161.8	197.5	241	294	354	440	530	598	675
	Minimum (average water temp: 40°C)	kW	22.0	27.5	33.7	38.9	51.8	63.1	77.4	94.4	113.6	140.9	229.8	258.7	291.1
Power input	Maximum	kW	69.99	87.7	107.18	123.45	166.08	202.2	246.5	300.5	361.2	448.2	548.1	619	695.8
	Minimum	kW	21.0	26.3	32.2	37.0	49.8	60.7	74.0	90.2	108.4	134.5	219.2	247.6	278.3
Natural Gas (G20)	Gas flow Max. output	m <sup>3</sup> /h	6.5	8.2	10.0	11.5	15.4	18.8	22.9	27.9	33.6	41.7	51.0	57.5	64.7
	Flues flow	m <sup>3</sup> /h	152.2	190.2	232.7	268.6	377.4	459.2	559.8	682.9	820.6	1017.9	1170.4	1320.6	1490.6
Max. water pressure		bar	5	5	5	5	5	5	5	5	5	5	5	5	5
Boiler weight without water		kg	110	116	120	135	295	330	350	440	445	490	554	579	614
Water capacity		litros	30	33	36	36	77	86	90	112	118	118	210	210	223
Water flow rate	ΔT = 10°C	m <sup>3</sup> /h	5.8	7.3	8.9	10.3	13.9	17.0	20.7	25.3	30.4	37.8	45.6	51.4	58.1
	ΔT = 12°C	m <sup>3</sup> /h	4.9	6.1	7.5	8.6	11.6	14.2	17.3	21.1	25.4	31.5	38.0	42.9	48.4
	ΔT = 15°C	m <sup>3</sup> /h	3.9	4.9	6.0	6.9	9.3	11.3	13.8	16.9	20.3	25.2	30.4	34.3	38.7
Electric connection	Consumption at the max. output	W	236	240	255	245	267	261	290	334	301	768	770	789	1003
	Supply	V	230 V a 50 Hz, single phase and earth												

Natural gas L.C.V. = 10,757 kW/m<sup>3</sup> (38,728 MJ/m<sup>3</sup>)

Propane gas = Check with Evinox

Electric supply to the boiler: 230 V, 50 Hz, single-phase and Earth.

The electric protection of each boiler must be prepared considering the maximum value between the electric consumption at the start-up and the electric consumption at the maximum power output.

## 7. BOILER HEAT EXCHANGER

The heat exchanger (flues-water) is constructed from stainless steel, which is enriched with a special alloy (for a better resistance to corrosion and to high temperatures).

Consisting of 2 water collectors, an upper one and a lower one, the heat exchanger is connected by means of multiple vertical tubes forming the combustion chamber. The vertical tubes generate a large heat transfer surface that uses the latent heat from the flue gases.

During the manufacturing process, the boiler is subjected to a strict quality control, including the process of three leak tests: one with penetrant liquids, another one with air pressure and the last one with water pressure.

The boiler heat exchanger is insulated.

Several manual purgers are installed in the higher part of the boiler for the air venting of the boiler.



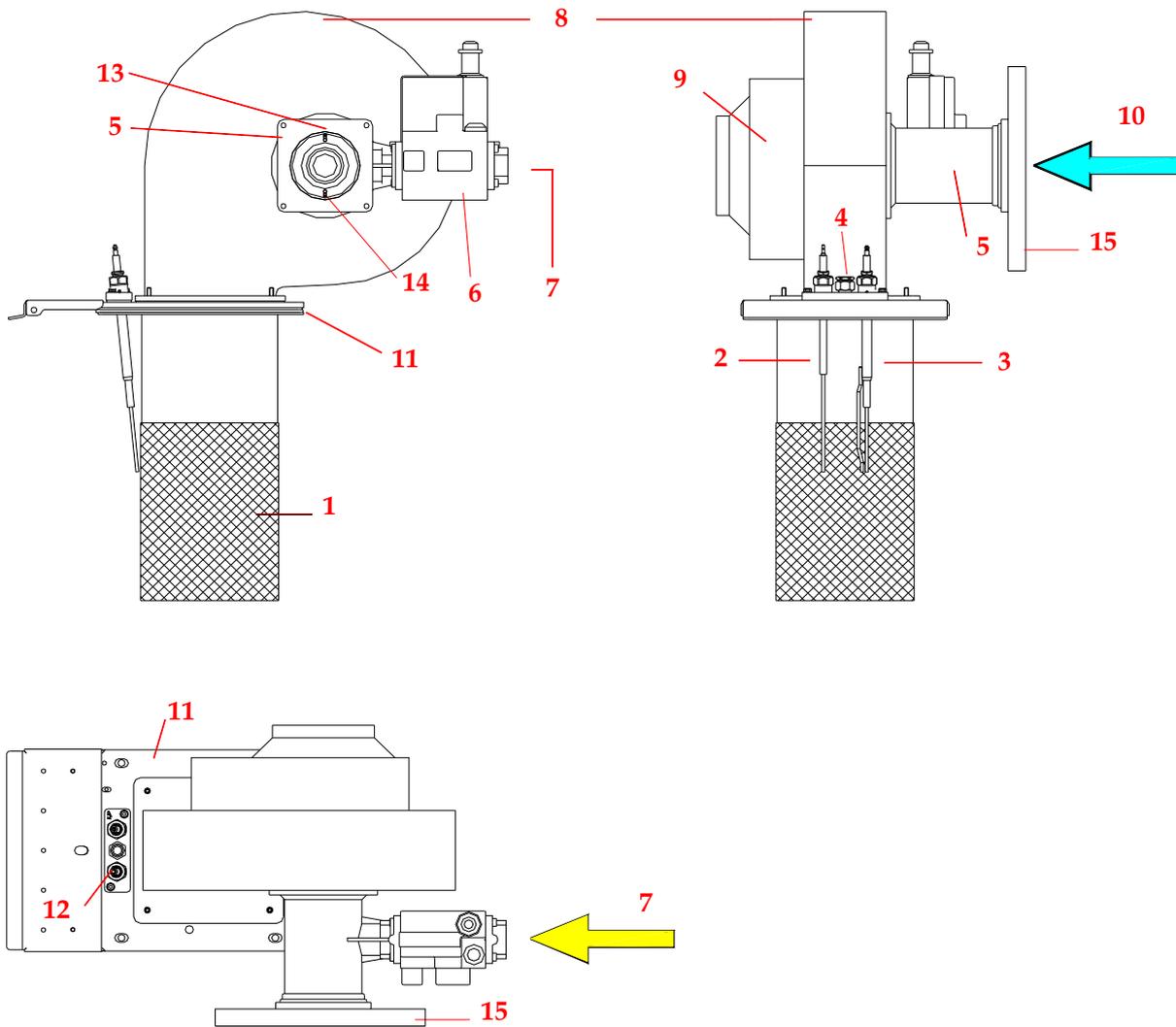
Back view: models EVINOX CD 120 and lower



EVINOX CD 175 and higher



## 8. POWER MODULATION AND COMBUSTION SYSTEM

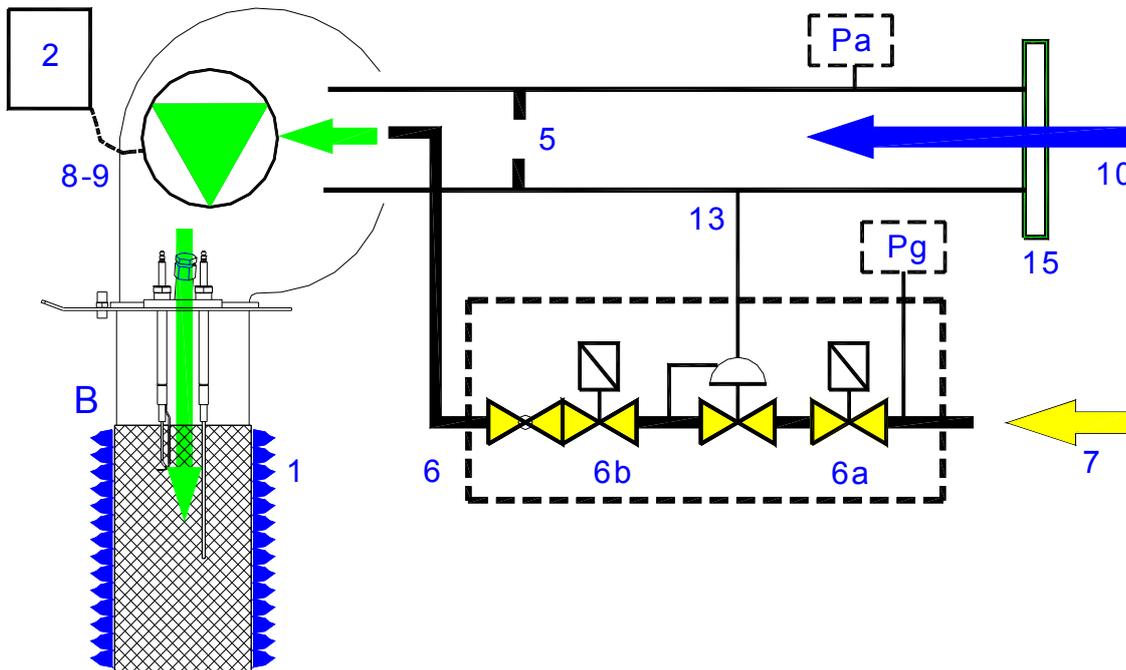


- (1) Burner - fire resistant alloy mesh
- (2) Ionization electrode (checking the flame presence)
- (3) Ignition electrode
- (4) Pilot flame
- (5) Venturi for the air-gas mix
- (6) Double multi-block gas valve
- (7) Gas inlet (boiler gas connection to the installation)
- (8) Fan for the air-gas mix
- (9) Motor fan, of variable speed
- (10) Air inlet
- (11) Flange of the group motor-fan, to be coupled to the flange for the boiler heat exchanger
- (12) Ignition-ionization kit
- (13) Pressure connection for the gas valve (just models CD 175 and higher).
- (14) Pressure connection for the safety air pressure switch
- (15) Air filter (just models CD 175 and higher).
- (16) Electrodes support
- (17) Gasket for electrodes support.

NOTE: this is a guide diagram; according to the model, the position of the electrodes, the pilot flame, motor fan and the double multi-block gas valve can vary.

## 8.1 ASSEMBLY OF GAS CONNECTION – AIR-GAS INLET

The EVINOX CD boiler includes an air-gas pre-mix fully modulating burner, composed of:



- V. Venturi operating as an air-gas mixer, ensuring combustion with a constant proportion of air/gas to the premix burner, throughout its power modulation range.  
The venturi produces a depression and drives the gas (G) towards the gas valve outlet (VV).  
It operates as additional safety: if there is no air inlet, there will be no gas admission.
- VV. The multiblock gas valve regulates the gas outlet pressure according to the pressure value in the venturi.

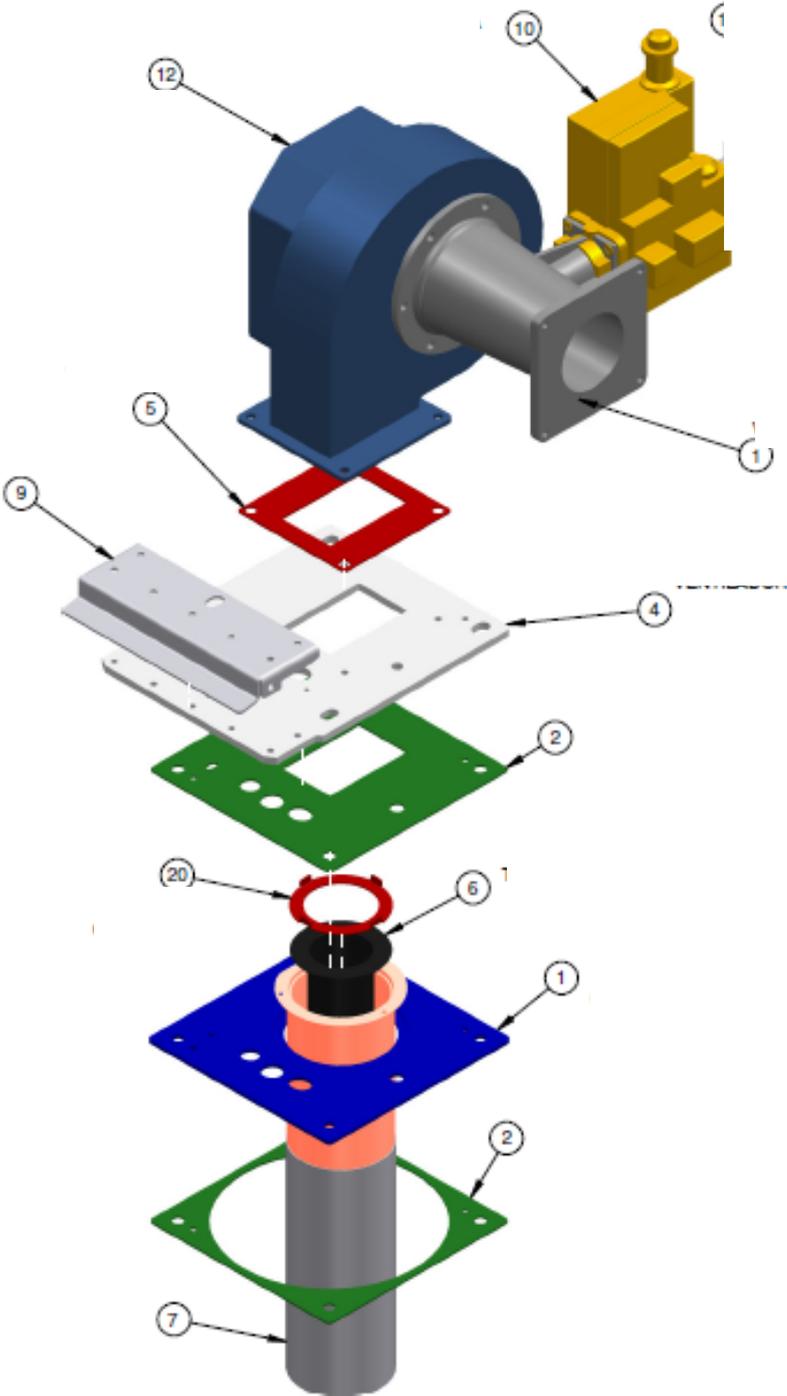
Note: (13) in models CD 175 and higher: a coupling pipe between the multi-block gas valve and the venturi measures the pressure drop before the mix. For lower models there is no pipe, the connection between the multi-block gas valve and the venturi is internal.

- M. The power modulation is achieved by varying the fan speed, which also produces a variation of the air-gas mix flow entering into the burner (B).
- Pg. Minimum inlet pressure switch: adjusted at 15 mbar.
- Pa. Air pressure switch: safety of operation, in case of obstruction of the air inlet, the motor-fan stops.

**Models EVINOX CD 70 to 120** include - burner, burner-holder plate, motor-fan, venturi and multi-block gas valve assembled.



**Exploded view of the assembly burner – fan – gas valve for models CD 175 and higher:**



## 8.2 AIR INLET FILTER

The air inlet to the venturi is protected by a filter, which prevents dust from the atmosphere entering.

Attention: it is important to avoid excessively dusty or dirty environments (for example, where building work is taking place in the same room or in places next to the ventilation ducts of the boiler room) or environments with aggressive steams (evacuation or air outlet of industrial laundries)

See an example of the filter in the attached photo.

(Only included in models CD 175 and higher)



## 9. BURNER

The boiler includes an air-gas premix burner of innovative design and material:

- Fire resisting alloy mesh.
- Homogeneous and stable combustion in case of any change in the power demand.
- High mechanic resistance and high resistance to high temperatures.
- Very low thermal inertia → fast cooling (for an easier maintenance).
- Quick response to changes in demand for power.
- Thanks to its structure and design, noise produced by the combustion is very low and without resonance.

The cylindrical shape of the burner allows the flame to be evenly distributed. It is vertically introduced in the boiler.

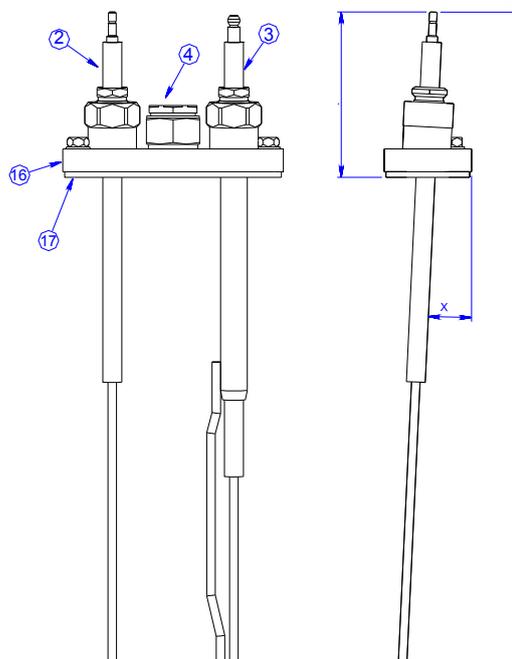
The boiler incorporates an ionization flame control. The minimum ionization value must always be superior to 5 microamperes.

### 9.1 IGNITION AND IONIZATION KIT

The ignition is electronic by means of an electric transformer that produces a train of sparks on the ignition electrode (3), with the special feature that the sparks fly from the electrode to the mass included in this electrode, and not on the burner.

The safety of flame presence is provided by means of an ionization electrode (2).

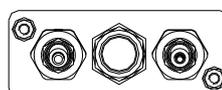
The minimum ionization value must always be higher than 5 microamperes.



ADI CD	Inclination (X)
70 – 105	13°
120	16°
175 and higher	5,5°

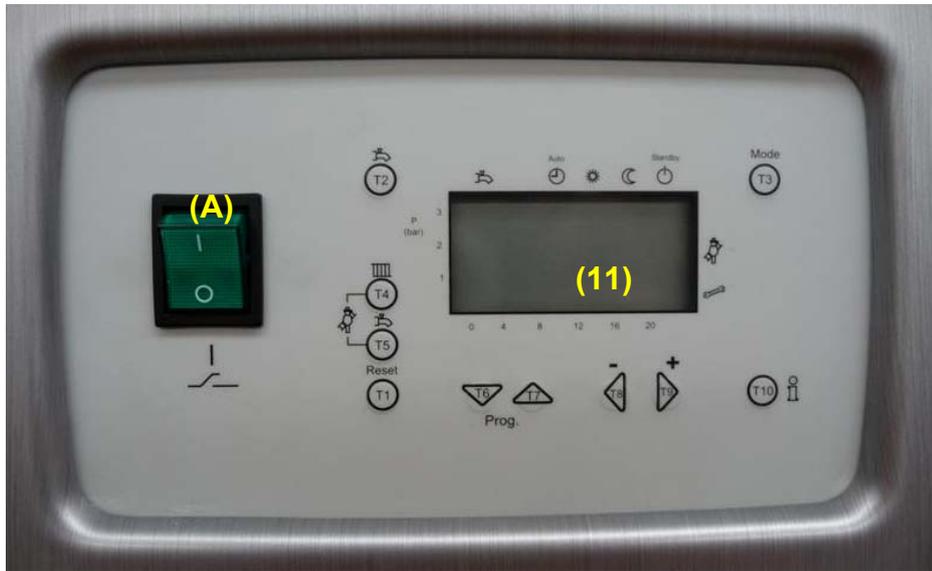
(16) Electrodes holder plate

(17) Joint for the set.



## 10. CONTROL PANEL - SIEMENS

The boiler control panel is placed in the upper part of the front of the boiler.



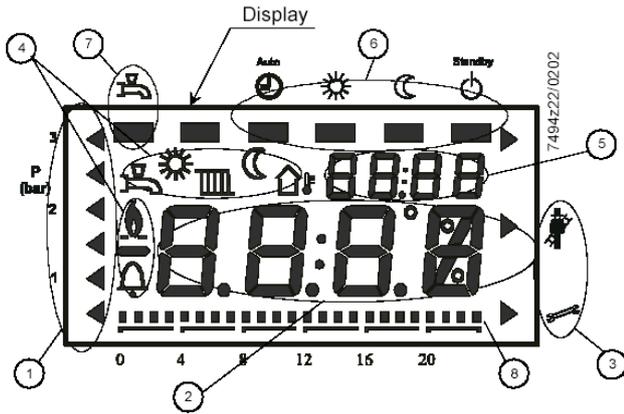
(A) Boiler on/off switch

(11) Display: readings, messages, errors...

ITEM		Concept
1		Button for boiler reset (T1)
2		Not operational: Select D.H.W.S. circuit (T2). D.H.W.S. on/off
3		Select heating circuit 1 (T3). Change the operation mode: <ul style="list-style-type: none"> <li>Automatic mode: Circuit 1 works according to hourly programme 1 </li> <li>Permanent nominal mode according to the circuit setpoint , adjustment by default.</li> <li>Permanent mode according to reduced setpoint </li> <li>Standby: circuit 1 disconnected, anti-freezing function activated </li> </ul>
4		Adjust boiler set-up flow temperature (T4)
5		Not operational: Adjust D.H.W. .S. set-up temperature
6		Button to change the line of the display that you want to select (T6) → to go down, (T7) → to go up.
7		
8		To modify the values of adjustment of the parameters on the display, To decrease (T8), and to increase (T9)
9		
10		Access to the available information
11		Display of data and operation modes
12		Function maintenance, stop controller (press simultaneously switches 4 and 5)

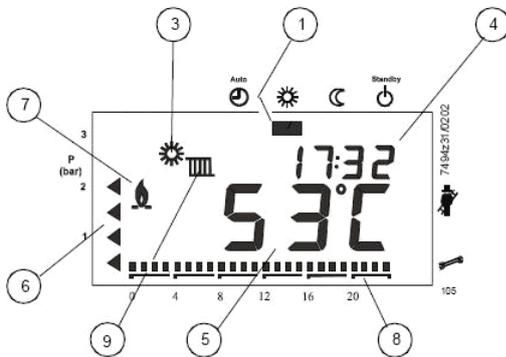
To go to the initial display, press T2 

### 10.1 DISPLAY



1	Not available (water pressure)
2	Values
3	Maintenance, manual operation To take measurements of the boiler flues. Stop of the active controller
4	Not available: D.H.W.S.: temperature or D.H.W.S. activated. Heating activated or reading of boiler set-up temperature : reading of the outside temperature : level of operation at a nominal set-up temperature : level of operation at a reduced set-up temperature : flame : failure
5	Time of day, adjustments of parameters or error code
6	Heating circuit operation mode: <b>Auto</b> Automatic, according to the hourly programme at a nominal set-up temperature or at a reduced set-up temperature. : operation at a nominal set-up temperature all the time. : operation at a reduced set-up temperature all the time. : boiler in standby / waiting.
7	Not available: D.H.W.S. operation mode
8	Hourly programming of use of the heating circuit

### 10.2 STANDARD OR INITIAL DISPLAY



1	Operation mode for heating
2	Not available (D.H.W.S. mode)
3	Level of operation of the heating circuit
4	Time of day
5	Real value of the boiler flow temperature
6	Not available
7	State of the flame
8	Hourly bar
9	Boiler operation mode

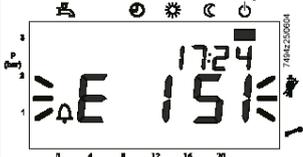
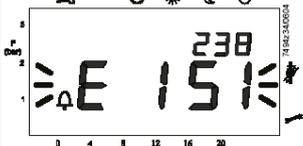
### 10.3 ADJUSTMENT OF THE SET-UP BOILER FLOW TEMPERATURE

Buttons	Display
1 	
2 	
3 	

Meaning
Press the T4 button for the flow temperature to adjust the set-up temperature of the heating circuit
Increase the set-up value by pressing T9, or decrease it by pressing T8
Press the T2 button to save the changes and go back to the initial display.

The boiler flow temperature will be set according to the configuration (with or without external temperature sensor).

### 10.4 BOILER LOCKOUT CODE

Button	Display	Meaning
1		In case of boiler lockout, a glittering error code appears on the display (see example: E 151)
2 		Press key T2 and then press key info, T10, to get access to the error subcode (see example: 238)

To detect the type of error, see the list of “Error codes visualized on the display” described in paragraph 11.3 of this manual.

Once the cause of the lockout has been resolved, reset the boiler by holding down the T1 button for more than half a second.



To go back to the initial display, press the T2 button



### 10.5 FUNCTION BOILER MAINTENANCE

- If you are on the main display (if not, press the button T3), press T10, “info” 
- Press simultaneously the buttons T4 and T5 for more than 6 seconds,



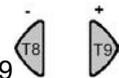
and then press both again,

On the right of the display a pointer will flicker pointing to 

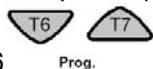
The display will show the percentage (%) of power at which the boiler is working.

In order to view the maintenance operations, the action PID of the controller on the boiler will be deactivated.

The boiler power can be increased or decreased, by pressing one of the buttons T8 or T9



If you wish to go directly to the maximum power (on the display: 100%) or to the minimum power (on the display: 0%), you can press T7 or T6



To get out of the maintenance mode, press T2



## 10.6 AVAILABLE PARAMETERS THAT CAN BE ADJUSTED BY THE END USER

- Press the button T6 or T7  , to directly access the programming level “final user”.
- Select the required line by pressing the buttons T6 and T7,  , the display will show “Pxxx”
- Adjust the required value by pressing the buttons T8 and T9,  . The adjusted value will be saved when changing line.
- Press the button T2 to get out of the programming level. Changes won't be saved.
- Press the button T10 to get out of the programming level. Changes will be saved.

If nothing changes after 8 minutes or any other button has been pressed, you will come back to the initial display and changes won't be saved.

If you go to another level or line, changes will be automatically saved.

Line	Function	Adjustment range	Unit	Resolution	Value by default	
1	Current time	0 ... 23:59	h / min	1 min	---	
5	Boiler reduced set-up temperature	TRN	°C	0.5	69.0	
Hourly programming 	11	Hourly programme Heating circuit 1: phase 1, time of start-up	00:00... 24:00	hh:mm	10 min	06:00
	12	Hourly programme Heating circuit 1: phase 1, time of stop	00:00... 24:00	hh:mm	10 min	22:00
	13	Hourly programme Heating circuit 1: phase 2, time of start-up	00:00... 24:00	hh:mm	10 min	24:00
	14	Hourly programme Heating circuit 1: phase 2, time of stop	00:00... 24:00	hh:mm	10 min	24:00
	15	Hourly programme Heating circuit 1: phase 3, time of start-up	00:00... 24:00	hh:mm	10 min	24:00
	16	Hourly programme Heating circuit 1: phase 3, time of stop	00:00... 24:00	hh:mm	10 min	24:00
31-36	Not available: Hourly programmes of D.H.W.S. circuit	00:00... 24:00	hh:mm	10 min	06:00	
45	Standard time programmes for heating  (press simultaneously T8 and T9,   , during 3 seconds)	No / Yes	----	-----	No	

## 11. DATA AND INFORMATION SHOWN ON THE DISPLAY – SIEMENS

### 11.1 AVAILABLE INFORMATION

#### 11.1.1 Available readings at the User level

- When you are on the main display (if not, press the button T2), press T10, “info”  
- Every time you press T10, a different message appears on the display.
- To go back to the initial or normal display, press the button T2  
(if you do not change anything after 8 minutes, you will automatically go back to the initial display).

General information (user level)		
Step		Value shown on the display
1		Not available: D.H.W.S. temperature
2		Not available: boiler circuit water pressure
3	<b>X.</b>	Phase of the boiler operation (see paragraph 11.2)
4		Available only if an outside temperature probe is connected: reading of the outside temperature.
5	<b>Ex</b>	Error code (see paragraph 11.3) In case of no error, a 0 will appear on the display, in the opposite case, the corresponding error code will be visualized.
6		Reading of the boiler flow temperature.

#### 11.1.2 Available readings at Maintenance level 1

- When you are on the main display (if not, press the button T2), press T10, “info”  
- Press simultaneously for 3 seconds at least, buttons T6 and T7  .  
The first reading will be shown on the display, corresponding to the letter “b0”.
- Choose the required parameter by pressing the buttons T8 and T9  
- To go back to the initial or normal display, press T2  
(if you do not change anything after 8 minutes, you will automatically go back to the initial display)

Information of temperatures (maintenance level 1)	
Code	Description
b0	Internal diagnosis code (software) for the LMU control unit
b1	Boiler return temperature
b2	Value not available: D.H.W.S. temperature (probe 2)
b3	Not available (only available for the condensing range ADI CD: combustion flues temperature)
b4	Outside temperature ((if the external probe is connected and the control unit is programmed)
b5	Outside temperature, (average of hours) (if the external probe is connected and the control unit is programmed). In the last hour.
b6	Outside temperature (average of summer/winter) (if the external probe is connected and the control unit is programmed). Yearly average.
b7	Value not available: flow temperature of the mixing circuit (according to programming and installation)
b8	Value not available: flow temperature in the common collector, by means of an additional probe.
b9	Value not available: temperature in the primary circuit collector, by means of an additional probe.

#### 11.1.3 Available readings at Maintenance Level 2

- When you are on the main display (if not, press switch T2), press button T10, “info”  
- Press simultaneously, for 3 seconds at least, buttons T6 and T7  .

- Press T7 once, 
- Choose the required parameter by pressing buttons T8 and T9  
- To go back to the initial display, press button T2 (if you do not change anything after 8 minutes you will automatically go back to the initial display).

Operation values (maintenance level 2)	
Code	Description
c0, c7-c9	Not used
c1	Value of the ionization current (must be higher than 5 microamperes)
c2	Fan revolutions per minute (Rpm) at that moment (multiply the obtained reading by 100 to have "rpm")
c3	Operation value between "maximum value defined" and "minimum value defined" (% PWM)
c4	Percentage of the boiler input/charge at that moment (%): Value "0" → minimum output; value "100" → maximum output.
c5	Not available: percentage of operation or of setting of the modulating pump (signal PWM)
c6	Difference between the boiler set-up flow temperature and the real temperature

#### 11.1.4 Available readings at Maintenance Level 3

- When you are on the main display (if not, press switch T2), press the button T10, "info"  
- Press simultaneously, for 3 seconds at least, buttons T6 and T7  .
- Press button T7 3 times, 
- Choose the required parameter by pressing buttons T8 and T9  
- To go back to the initial or normal display, press button T2 (if you do not change anything after 8 minutes you go automatically back to the initial display).

Set-up temperatures (maintenance level 3)	
Code	Description
d0, d7-d9	Not used.
d1	
d2	
d3	Not available: Set-up room temperature (according to programming and installation)
d4	Not available: set-up D.H.W.S. temperature (according to programming and installation)
d5	Maximum percentage of the fan modulation for the boiler model, refer to the maximum fan figures in this manual.
d6	Maximum speed of the fan at maximum output (multiply the read value by 100 to obtain r.p.m.)

#### 11.2 CODES OF THE BOILER OPERATION PHASES

Display	Meaning
00	Boiler in stand-by (the installation does not have any request of heat)
01	Signal of boiler start-up
02	Motor fan is activated (revolutions increase)
03	Phase of pre-venting
04	Time of stand-by (control of the fan speed)
05	Time of pre-ignition
06	Safety time of ignition and ionization control (constant). The image of a flame appears.
07	Safety time of ignition and ionization control (variable)
10	Operation in heating mode
11	Phase not available: Operation of D.H.W.S.
12	Phase not available: Operation of heating and D.H.W.S. in parallel.
20 / 21	Post air venting starts and fan stops
22	Self-test and return to the initial position
99	Alarm / lockout (the alarm code is visualized on the display)

If the phases finish off in a short time, its code is not shown on the display.

### 11.3 ERROR CODES SHOWN ON THE DISPLAY

**See the error code list in the appendix at the end of this document.**

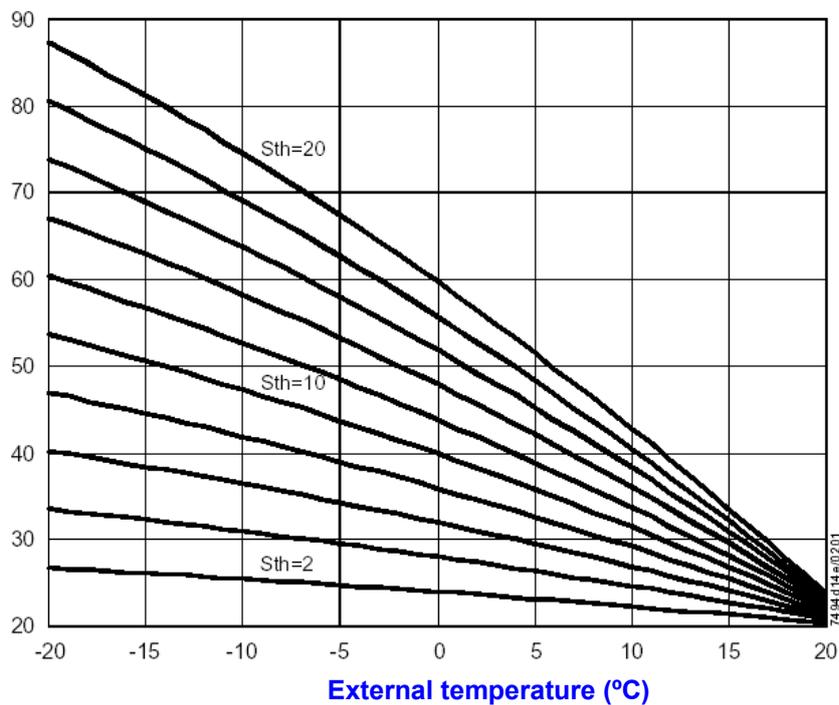
To show the error subcode, follow the procedure indicated in paragraph 10.4 of this document.

### 11.4 OPTIONAL: FLOW TEMPERATURE FUNCTION OF OUTSIDE TEMPERATURE

Attention: this function is optional and must be specified at time of ordering so that it can be activated. An outside temperature probe should be fitted (supplied separately from the boiler and not included in the price) and connected to terminals 1 and 2 of the strip X10-06 positioned in the LMU control unit of the EVINOX CD boiler.

These are the possible curves of operation:

**Boiler flow temperature (°C)**



### 11.5 VIEW OF THE BOILER CONTROL UNIT



According to the boiler model, the position of the control unit varies:

The position of the strip and of the contactor vary (just in models of large power output). See electric diagrams.

## 11.6 REGULATION OF SEVERAL BOILERS

In an installation with several boilers it is important that the power generated by the boilers adapts at any moment to the demand of the installation, always optimising the generators' efficiency.

### 11.6.1 Boilers simple sequence

The control unit must regulate the stop/start sequence of each boiler according to the demand of the installation (by means of the flow temperature probe, which is common to all boilers, at a constant flow temperature). Then, each boiler will regulate its own power modulation according to the set-up temperature programmed for each one.

The set-up temperature value of the control unit must be higher than the value adjusted in each boiler.

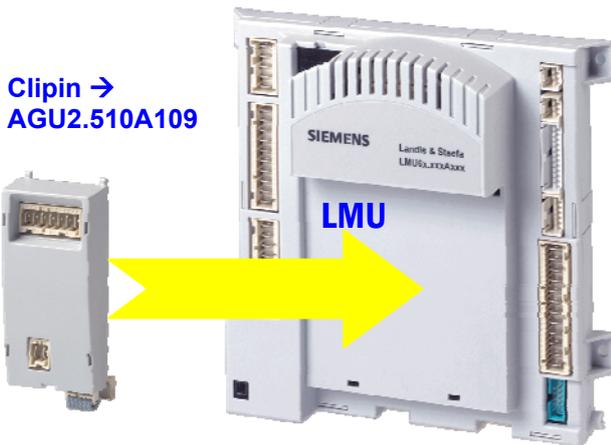
We recommend applying the boilers' sequence and regulation according to the instructions indicated in the following paragraphs.

### 11.6.2 External control unit with signals 0...10 V to regulate the start-up and modulation of each boiler.

So that each boiler can receive and process an external signal type 0...10 V, it must be provided with:

- An additional module, or clip-in, model AGU 2.51
- A cable for connecting the additional module to the boiler control unit, mod. AGU2.104A109

Clipin →  
AGU2.510A109



This module enables an analog entry, that can be of two types:

- Probe (NTC, 10 KΩ)
- Voltage signal: 0...10 V

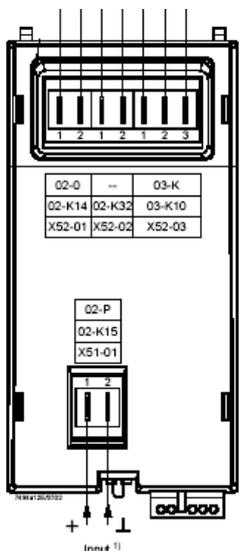
The signal 0...10 V will transmit to the boiler or a set-up temperature value or a percentage of power output, so that it can operate (as it will be set up at the factory).

The signal 0...10 V must be connected to the terminal + (1) of the strip X51-01 of the "clipin"; to terminal 2 is connected neutral + earth.

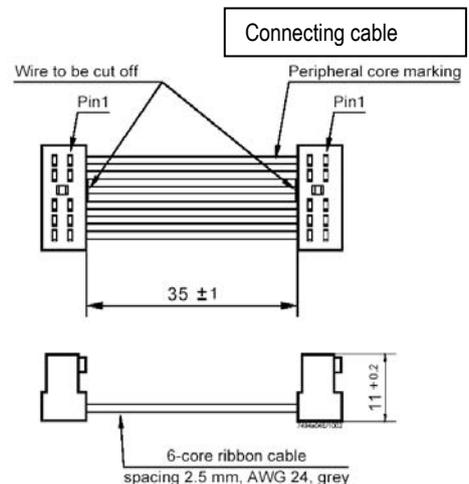
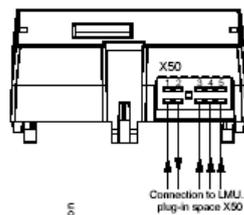
Just one module type AGU2.510 can be connected to the boiler control unit LMU, even though a total of 2 modules of different type can be connected.

The connection between the module clip-in AGU2.510 and the boiler control unit LMU must be made by connecting the cable to the terminal X50 of the LMU (see electric diagrams).

Do not connect the cable to terminals X52.



Front and lower view of the "clipin"



### 11.6.3 External control unit regulating and optimising all the boilers' combined operation.

When there are several boilers supplying the same installation, the control units type RVS 63 can provide sequencing of up to 15 boilers equipped with the LMU control unit.

The sequence control unit allows evaluating the demand of the installation and regulating the boilers according to a strategy of selection.

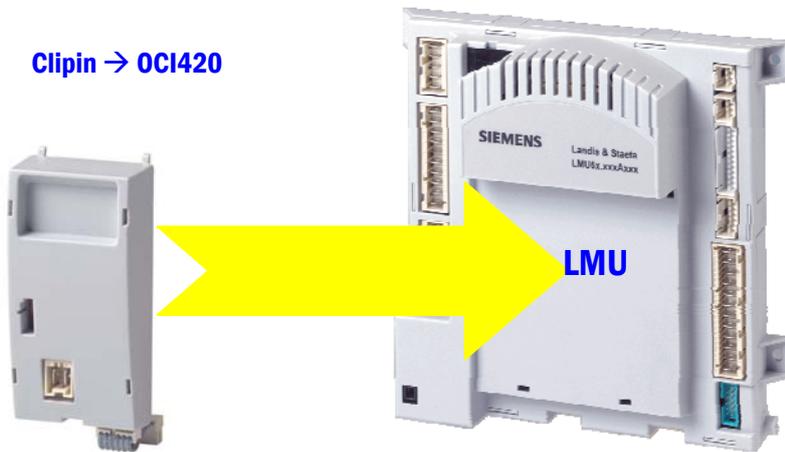
The communication bus LPB allows visualizing on the display of the sequence control unit RVS any error or message coming from one of the boilers connected.

a) Add to each boiler:

- An additional module "Clip-in" (consult the current pricelist) of communication bus type LPB, module OCI 420
- A cable for connecting the additional module to the boiler control unit, mod. AGU2.104A109.

This control requires changes to the internal parameters which must be carried out by authorised Evinox Technical Persons only.

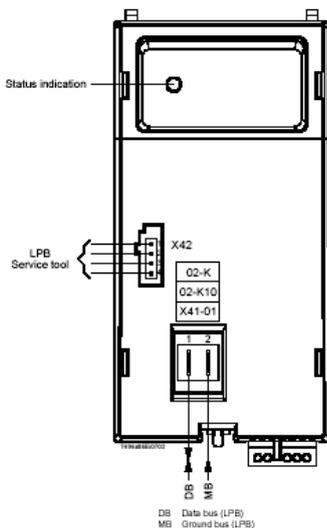
The additional module OCI 420 must be connected to the LMU control unit of each boiler.



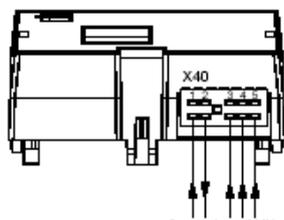
Just one module type OCI420 can be connected to the boiler control unit LMU, but there can be a total of 2 different modules.

The module OCI420 must be connected to the boiler control unit LMU by connecting the cable (ref. AGU2.104) to the terminal X40 (see electric diagrams)

Connect the cables (normal electric cable) to terminals 1 and 2 of the strip X41-01 of the module OCI420, in order to connect the sequence control unit RVS 63 (or another control unit) and make the connection by bus LPB.

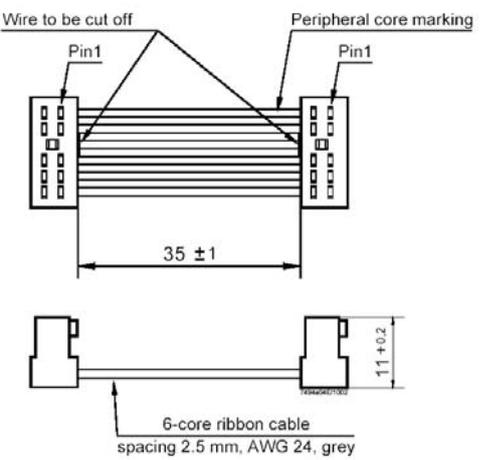


Front and lower view of the "clipin"

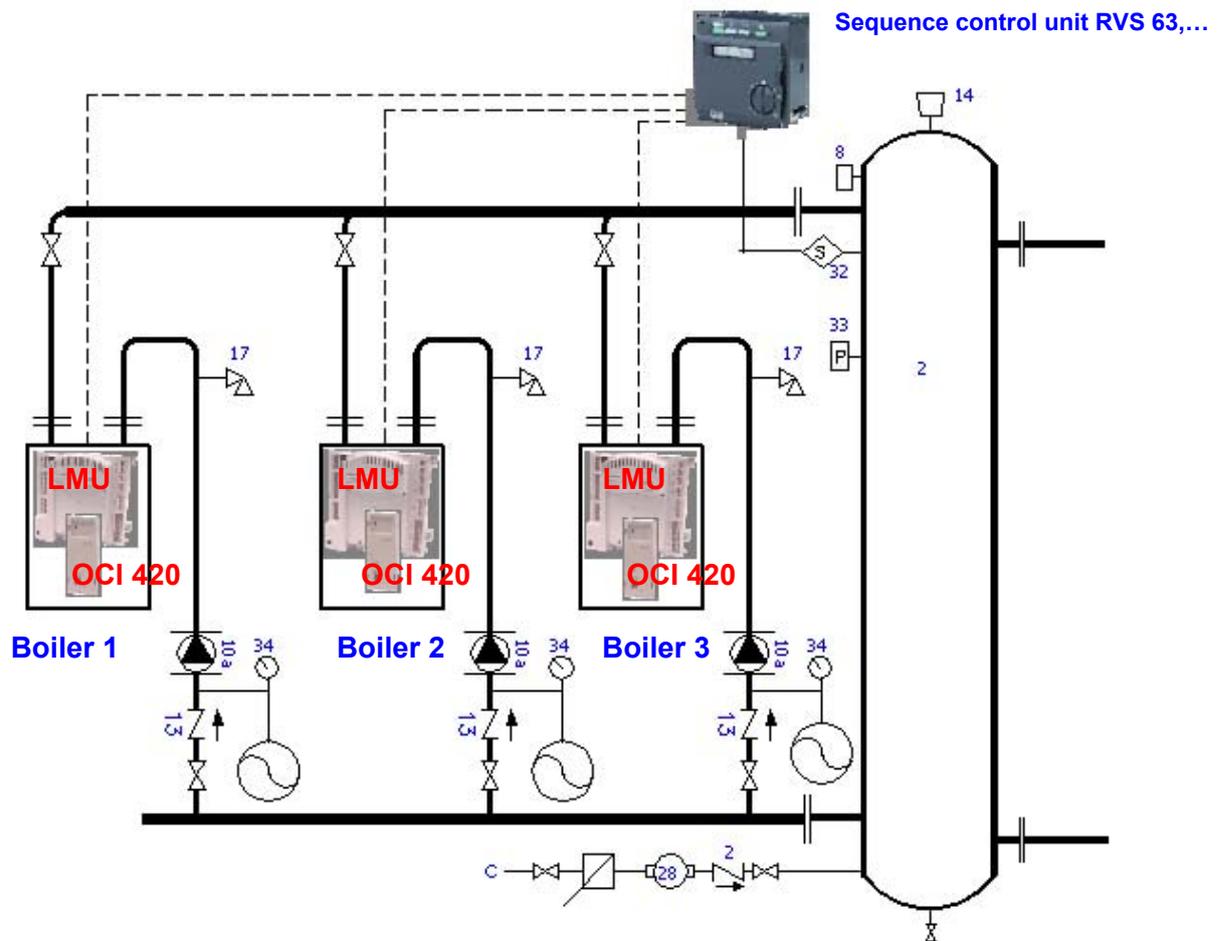


Connection to LMU... plug-in space X40

Connecting cable

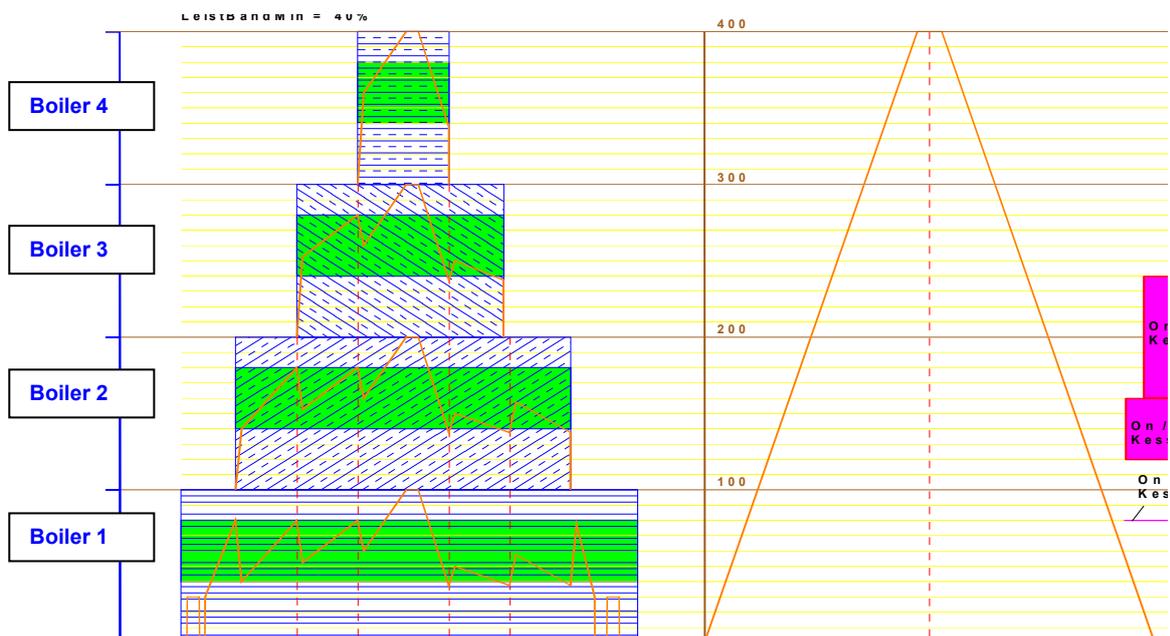


b) Boilers and installation

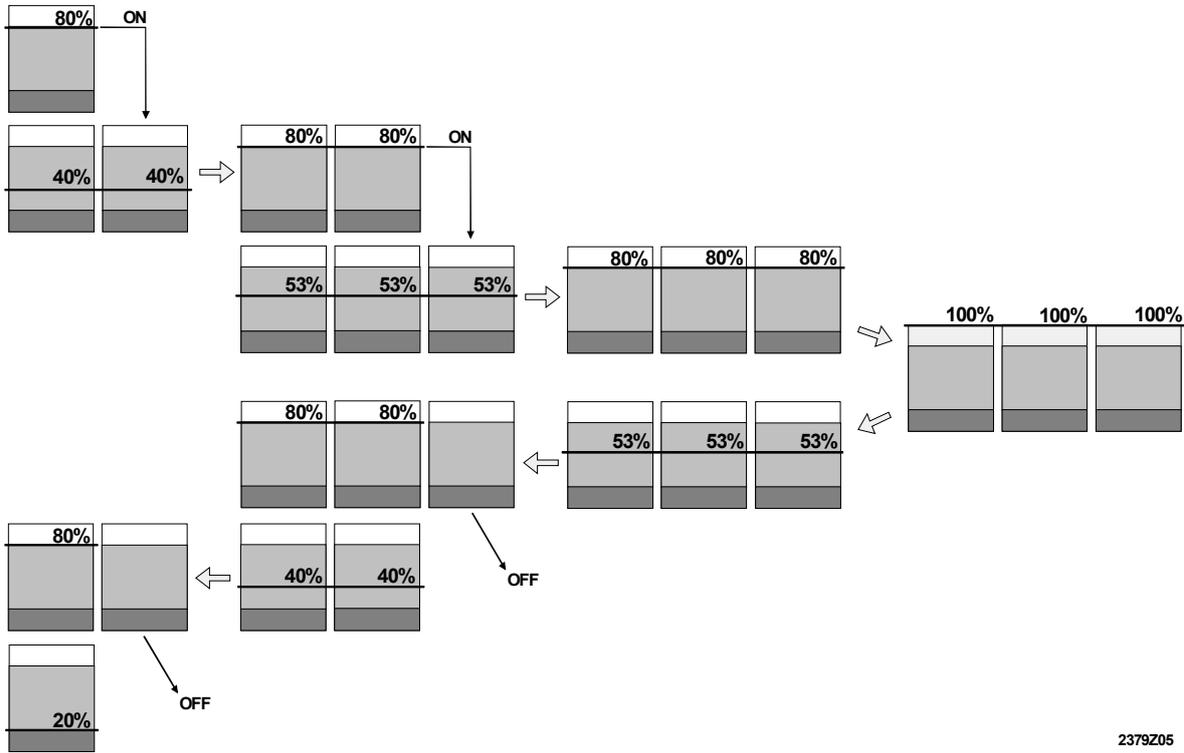


c) Example of boilers sequence and power regulation

Example of possible sequencing that can be achieved (multiple options can be chosen).



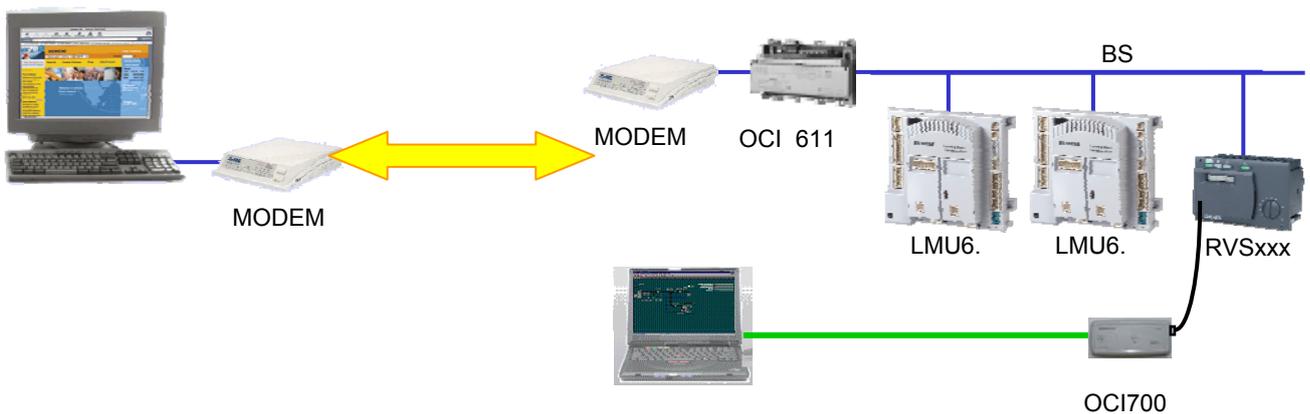
In this example, the boilers activation and their power regulation would be achieved as shown below:



2379Z05

#### 11.6.4. Remote Control or Internet Communication

Both boilers provided with a LMU control unit and with RVS control units (both of sequence and of control of circuits), always of the same mark, can be connected to a module OCI 611 of communication by MODEM, that allows both a control of the installation and a control of the boilers' operation.



## 12. WIRING DIAGRAMS

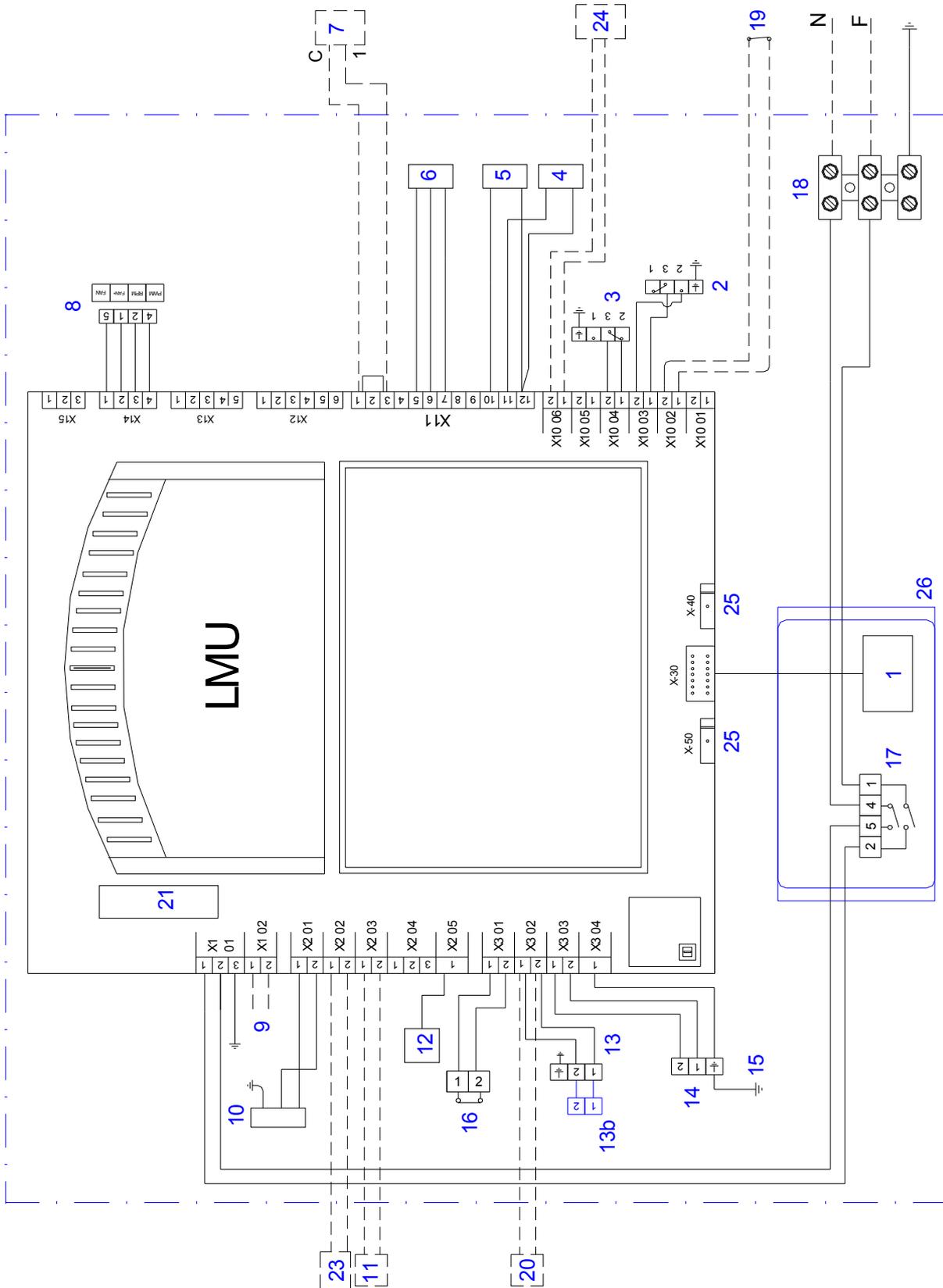
The electric supply must be 220/230 V, 50 Hz, single phase, earth connection. The electric installation must comply with the current rules. The electric power consumed by each boiler is indicated in the table of technical characteristics.

(Remember: in case of 220/230 V, two phase, it is necessary to install an electric insulating transformer with one of the phases of the secondary connected to earth acting as neutral).

### Wiring Diagram Legend:

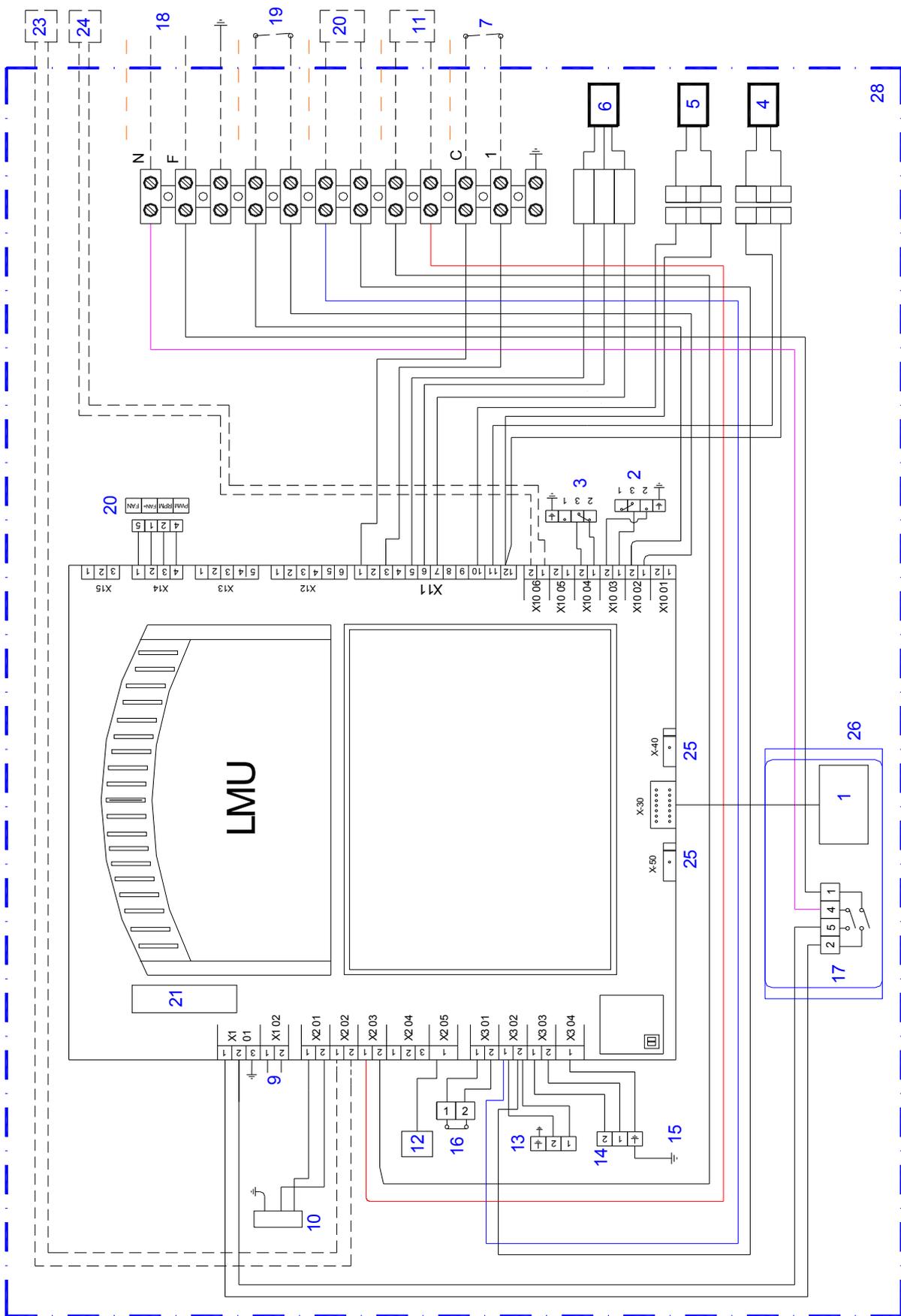
1. Display
2. Minimum gas pressure switch
3. Air pressure switch
4. Flow water temperature probe/sensor
5. Return water temperature probe/sensor
6. Water pressure sensor.
7. In order to connect an external safety flow switch or similar (not included): pump contactor...
8. Signal of control of the modulation of the variable speed fan (PWM).
9. Optional: electric supply of 220/230 V for additional modules "clip-in"
10. Electric supply of the motor fan
11. Alarm indicator of boiler lockout: these are terminals with live tension of 220/230 V, to be separated by means of a relay.
12. Probe / ionization electrode
13. Electric supply (220/230 V) of the multi-block gas valve  
13b. Adaptor / connector only used in models EVINOX CD 70 to 105
14. Ignition transformer (220/230 V)
15. Earth connection for burner
16. Safety overheating thermostat
17. General switch: ON/OFF.
18. Electric supply: 220/230 V, 50 Hz, single phase with earth connection (main supply to the boiler).
19. Stop/start switch external to the boiler: Stop/start external contact (open/close).
20. Signal of the boiler status: terminals with tension of 220/230 V, to be separated by means of a relay
21. Fuse
23. Option: Boiler pump stop/start  
(Consult: the use of separation relays depends on the programming of the control unit)
24. Option: Outside temperature probe (Consult: according to programming and installation)
25. Communication bus with additional modules "clip-in". See corresponding paragraphs.
26. Boiler control panel
27. Contactor
28. Boiler

# 12.1 WIRING DIAGRAM EVINOX CD 70 - EVINOX CD 120



Note: (13b) only included in models CD 70 - 105

## 12.2 WIRING DIAGRAM EVINOX CD 175 - EVINOX CD 375





### 13. SAFETY

Included in the boiler:

Cause for safety activation	Safety component of the boiler	Boiler restart
No flame	Ionization electrode	Manual reset
Fan failure/air passage obstruction	Air pressure switch	Manual reset
Overheating	Safety overheating thermostat	> 90°C+- hysteresis: the regulation stops the boiler. > 95°C: boiler lockout, error on the display. Manual reset. > 100°C: fan at the maximum power to cool down the boiler. > around 103°C: lockout, other error on the display, manual reset.
No gas	Minimum gas pressure switch	Automatic reset
Low water flow through the boiler	Boiler control unit	<u>Safety 1</u> : if the DeltaT in the boiler is higher than the maximum Delta T, the power drops by 20%. <u>Safety 2</u> : if it overcomes "the maximum Delta T" + 8°C, the boiler operates at the minimum power. <u>Safety 3</u> : if it overcomes a higher value, the boiler stops and an error message appears on the display E 154/434 or E 154/433.
Lack of water pressure in the circuit	Pressure sensor	The boiler stops for safety if pressure in the circuit is around 0,8 bar.

### 14. BOILER IDENTIFICATION LABEL

The identification label of each boiler is placed:

- a) In the front of the boiler, attached to the higher water collector of the boiler heat exchanger.  
In order to access it, you must lift up the top casing of the boiler and remove the front casing. You will see the serial number and the boiler model.
- b) There is an adhesive label in the external part of the boiler, where you can find additional data.

BOILER FRONT VIEW



## 15. INSTALLATION

### 15.1 BOILER HEAT OUTPUT

The boiler's total power output to be installed must be correctly sized to meet the demands of the installation. In order to generate heating with the maximum efficiency at all times, it is important to consider the number of the boilers to be installed, so that the total power should be appropriate for the different demands of the installation in the different periods of the year.

### 15.2 LIFTING AND TRANSPORTING THE BOILERS BY A CRANE

#### 15.2.1 Models EVINOX CD 175 and above:

a) In order to lift the boilers by a crane, attach the straps to the boiler hooks: there are two in the front and one in the back of the boiler heat exchanger. Before doing this, you must dismantle / take out all the casing panels from the boiler.

- b) They are provided with some sections on the base to ease their transport by transpallet.
- c) Anti-vibrating supports (silent-blocks) are supplied with each boiler.



#### 15.2.2 Models EVINOX CD 120 and lower

These models are supplied on a pallet. Anti-vibrating supports (silent-blocks) are supplied with each boiler.

### 15.3 BOILER ROOM

The boiler room must be clean and well vented with adequate lighting, and must comply with the current regulations for gas equipment. It is important to avoid environments with excess humidity, dust and aggressive steams. If the boiler room is undergoing building works, the boilers should be switched off and protected in order to avoid dust.

To simplify maintenance it is important to respect the minimum distances indicated by the regulations and the manufacturer's instructions, both for one boiler and for several boilers. Every part of the boiler must be easily accessible.

**Installation of several boilers (modular assembly):** As access for boiler maintenance is via the front and the back, several boilers can be installed in-line leaving a minimum distance of 10 cm between them.

#### MINIMUM FREE HEIGHT TO REMOVE THE BURNER:

In order to remove the burner, leave a free space between the top of the boiler and the ceiling -

Model	70-105	120	175	200	250	325	375	450	550	650	750
Minimum nett free space from the top of the boiler	250	500	97	97	97	97	167	167	282	282	282
Free height from the leaing point of the boiler on the floor	1375	1625	1705	1705	1705	1705	1775	1775	1975	1975	1975

**Boiler draining:** Connect the boiler drain to the boiler room drainage.

In order to drain water from the boiler, turn off the boiler, close the cut-off valves and open the boiler drain. Beside the boiler drain, there is a connection with a



threaded bar that must be unscrewed and taken out in order to allow the draining of the water from the boiler

## 15.4 GAS SUPPLY

The gas supply pressure, the gas flow and the dimensions of the gas connection, are all determined by the type of gas used, according to the boiler installed and the current regulations.

Gas connection: the installation company must install a three-piece coupling per boiler in order to facilitate the dismantling and the maintenance of every boiler.

The boiler incorporates a small mesh. If the connecting pipe is not clean or has particles, the mesh will immediately block, so the installation company must install a gas filter before the boiler gas connection.

If the boiler gas pressure is higher than the maximum value indicated in this manual, it is necessary to install a gas pressure governor so that the inlet working pressure can be set in accordance with the values required.

It is advisable to install a flue gas header to the boilers that will operate as a gas inertial tank when the boilers start working.

When different consumptions are simultaneously required, the dimensions of the gas pipes and of the gas connections must be calculated so that, when all the consumptions are demanded simultaneously, the inlet working gas pressure to each boiler will correspond to the values indicated in this manual (see table TECHNICAL DATA).

### 15.4.1. Gas pressure higher than 45 mbar.

Units	Boiler model	Inertial volume
		m <sup>3</sup>
1	CD 70	<b>0,0065</b>
1	CD 85	<b>0,0082</b>
1	CD 105	<b>0,0100</b>
1	CD 120	<b>0,0115</b>
1	CD 175	<b>0,0154</b>
1	CD 200	<b>0,0188</b>
1	CD 250	<b>0,0229</b>
1	CD 325	<b>0,0279</b>
1	CD 375	<b>0,0336</b>
1	CD 450	<b>0,0417</b>
1	CD 550	<b>0,0510</b>
1	CD 650	<b>0,0575</b>
1	CD 750	<b>0,0647</b>
2	CD 325	<b>0,0736</b>
2	CD 375	<b>0,0736</b>
2	CD 450	<b>0,0899</b>
2	CD 550	<b>0,1058</b>
2	CD 650	<b>0,1196</b>
2	CD 750	<b>0,1196</b>
3	CD 375	<b>0,1348</b>
3	CD 450	<b>0,1587</b>
3	CD 550	<b>0,1794</b>
3	CD 650	<b>0,2016</b>
3	CD 750	<b>0,2016</b>

A gas pressure governor must be installed to reduce pressure to a value in accordance with the table of paragraph "Technical data". To select the type and its speed of opening/closing, consult the Evinox Technical Department.

An inertial tank must be installed between the gas pressure governor and the boiler, acting as a gas inertial volume when the boiler starts up and as an absorber/compensating of the pressure rise produced by the closing of the gas pressure governor when the boiler stops (see diagrams below).

Its volume will be at least equal to 1/1000 of the boilers maximum flow per hour.

This inertial tank must be placed as close as possible to the boiler.

DIAGRAM OF 1 BOILER

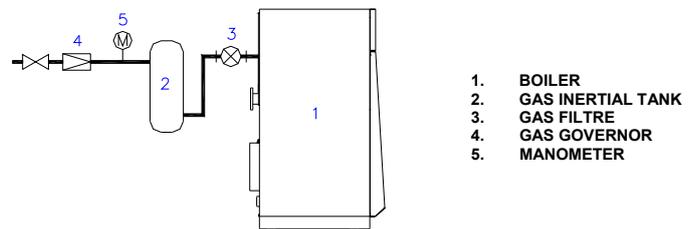
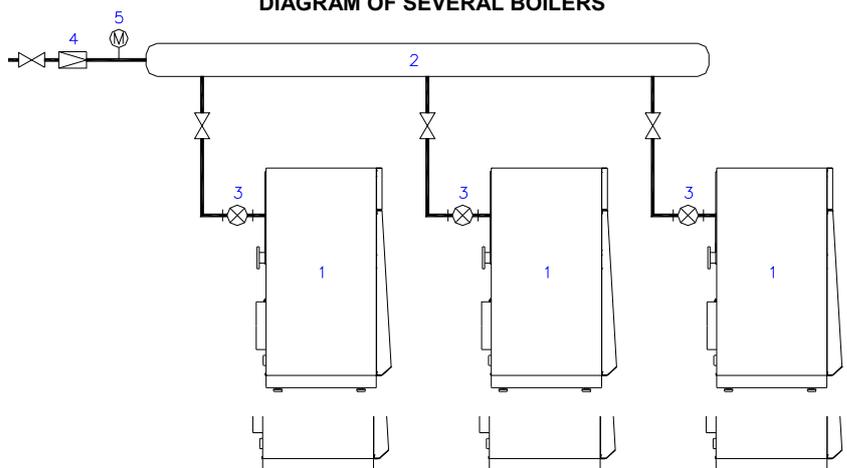


DIAGRAM OF SEVERAL BOILERS



## 15.5 DRAINING OF BOILER CONDENSATE

### 15.5.1. Condensing performance

As the EVINOX CD heat exchanger is constructed from stainless steel, there is no limit to the minimum return temperature. This leads to low flue gas temperatures, which enables an improved combustion performance and achieves higher efficiencies.

- Sensible heat: the heat transferred due to the cooling of burnt gases.
- Latent heat: the heat transferred due to the energy issuing from the water steam when it condenses and turns into liquid.

The energetic efficiency added due to the use of the latent heat of the condensed products can be up to 11% in the case of natural gas, which is the relation between the High Calorific Value (HCV) and the Low Calorific Value (LCV).

The theoretical volume of the condensed products can be:

- 1,63 kg / m<sup>3</sup>
- up to 0,14 kg / kWh

### 15.5.2. Neutralisation treatment of the condensed products.

For natural gas, the condensed water has a pH value that can be between 3,5 and 5,5.

It is recommended to neutralise the condensed products before discharging them to the general drainage of the building, or similar.

Generally, you should mix the condensed with a powder, which can be calcium carbonate, hydrolyte of magnesium (salt formed by calcium hydride, CaH<sub>2</sub>, and magnesium) or similar, in order to neutralise them, which means to increase the value of its pH so that it will be between 6,5 and 9.

It is recommended to take periodical measurements of the water pH after the neutralisation treatment: when the value measured is lower than 6,5 it is recommended to replenish with the powder.

This treatment must be done in accordance with the local, autonomous and national laws.

The neutralisation system should be placed at a level of height lower than the boiler draining/outlet of the condensed products. If this is not possible, consider the installation of a pump for the condensed products.

### 15.5.3. Evacuation piping of condensed products.

- The boiler outlet for the condensate should be connected to a siphon.  
(Fill the siphon with clean water before starting the boiler).
- Some boiler models should be placed on a base with sufficient height to allow the installation of the draining of the condensed products, of the siphon and of the connection to the neutralisation piping of the condensate.
- The evacuation of the condensate to the general drainage should be done in a visible way, through a visible connection, open funnel or similar.
- Due to the characteristics of the condensed water, the material of the piping must be resistant to the action of the acid water, for example: plastics (P.V.C).
- The evacuation pipe must have a minimum slope of 30 mm / metre
- Drainage by means of external piping is not recommended, due to the risks of condensation and corrosion.

#### 15.5.4. Boiler chimney

The chimney must be constructed with materials that are resistant to condensed water, which is acid. The gaskets joining the components of the chimney must be watertight. The chimney must comply with the national and European regulations.

### 15.6 CHIMNEYS

The flues outlet, according to current regulations, must ensure a correct evacuation of the flue gases, without backward flows and without producing condensed products. The natural draught of the chimney must evacuate the burnt gases from the boiler flues outlet.

#### 15.6.1. Chimney sizing

The internal diameter depends on:

- Heat input of the boilers, type, number of boilers installed and water working temperatures.
- Type of gas.
- Chimney: vertical height, horizontal length (minimum slope: of 3 to 5%).
- Number of elbows and their angles (they should be reduced to the minimum).
- The chimney material and if it is insulated or not.

If several boilers are connected to the same chimney, it is important to consider the distance between them and the dimensions of the flue header.

With regard to boilers, the following information should be considered for calculation:

- Draught of the chimney (when cold) at the boiler outlet: between -5 Pa and -9,8 Pa. In case of excessive draught / depression (this can cause vibrations in the chimney), you have to install a flue draught stabilizer inside the chimney (see paragraph 15.6.2).
- Values of CO<sub>2</sub>, for Natural Gas:

Models	Range CO <sub>2</sub> (%) for Natural Gas
EVINOX CD 105 to 200	<b>7,2 - 9%</b>
EVINOX CD 250 to 475	<b>7,2 - 8,2%</b>
EVINOX CD 550 to 750	<b>7,5 - 9%</b>

- Flues temperature:

Average water temperature in the boiler (°C)	Flues temperature, with the burner operating at	
	Minimum power (30% of the total)	High fire (100%)
40°C	Between water return temp. and 40 °C	Between 40 and 50°C
70°C	Water return temperature	70 to 80°C

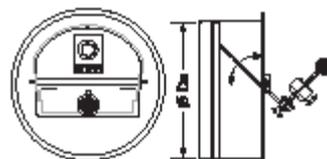
The base of the vertical chimney must include a drainage pipe to evacuate the condensate.

#### 15.6.2. Flue draught stabilizer

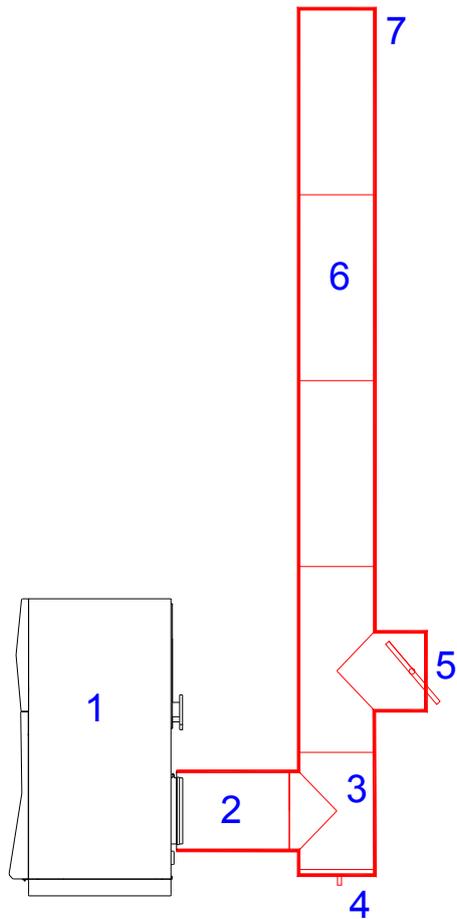
In case of excessive draught / depression (this can cause vibrations in the chimney), you should install a flue draught stabilizer inside the chimney.

In this case, you must install a stabilizer for each boiler to guarantee the correct draught of the chimney in all the boiler operating modes: at the minimum power, at the maximum power and at intermediate points.

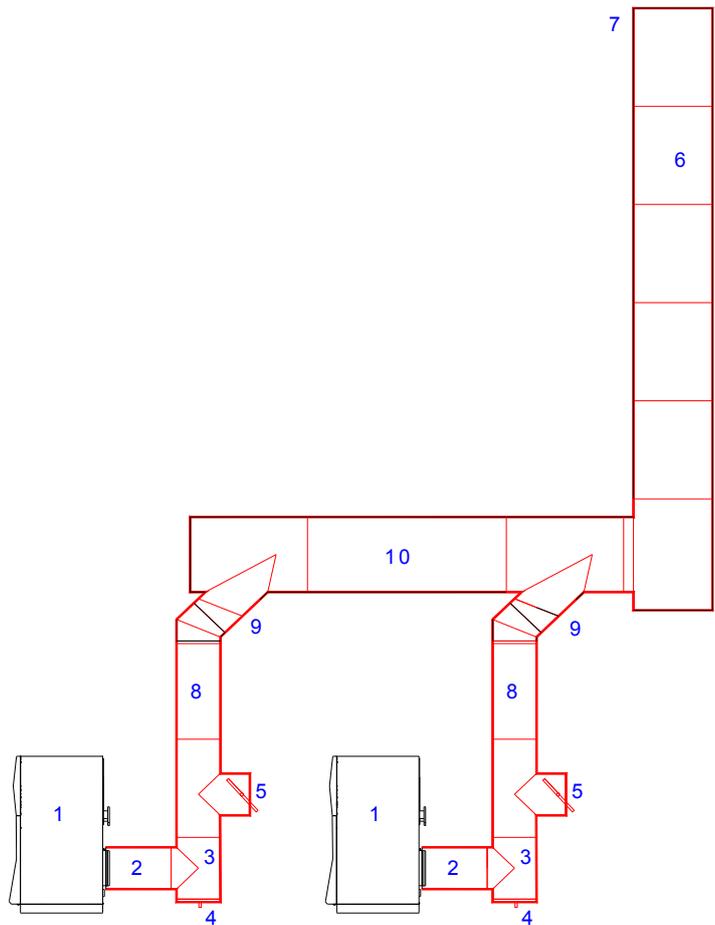
Example of a flue draught stabilizer:



### Example 1: installation with 1 boiler



### Example 2: installation with two boilers and one common chimney (see regulations)



#### Legend:

1. Boiler
2. Horizontal section connected to the boiler flues outlet (it should be as shortest as possible and with the minimum number of elbows)
3. "T" chimney
4. Draining: outlet of the condensed products and of rain water
5. Flue draught stabilizer
6. Vertical section of the chimney
7. Chimney outlet
8. Connection between boilers and flues collector
9. "T" to connect the flues collector to each boiler
10. Flues collector (we recommend that it has an upward slope up to the vertical section of the chimney, min. 3%)

#### 15.6.3. Refurbishments

- Where a metallic and insulated chimney is already installed, it is advisable to verify that the chimney has the correct dimensions to allow for a sufficient evacuation of the flue gases and access for cleaning of its interior.
- When using an existing brick chimney, it is necessary to fit it with an internal metal lining in order to avoid excessive water condensation from causing damage to the brickwork. If it is not possible to do this, it is advisable to install a new insulated chimney, preferably made of stainless steel and in accordance with the current regulations.

## 15.7 HYDRAULIC INSTALLATION

### 15.7.1 Data to be considered

Concept	Value
Minimum water working pressure	1 bar
Maximum water working pressure	5 bar
Maximum flow temperature	90°C

It is important to consider the following instructions (see hydraulic diagrams):

- Cut-off/closing valves in the flow and return pipes of each boiler.
- Do not weld the boiler to the installation piping.
- Models EVINOX CD 70 to EVINOX CD 120: male threaded flow-return connections of 2".
- Higher models: flanged connections, PN 6.
- Closed expansion vessel, calculated and installed according to the regulations.
- Overpressure safety valves and boiler draining in accordance with the current regulations.
- A pressure switch whose function is to stop the boiler if the hydraulic pressure is lower than the minimum value.
- An air venting, or automatic purger of big capacity, installed in the flow pipe or in the higher part of the flow circuit of the installation.
- A filter with a stainless-steel mesh of 0.3 mm in the heating return of every boiler.
- A water meter in the refilling of the primary circuit.
- A draining pipe for the evacuation of condensate: it must be connected to the drainage of the boiler room and it is important that the outlet is visible to verify if it condenses.

### 15.7.2 Overpressure safety valve

The boilers maximum operating pressure is 5 bar. This value must never be exceeded and precautions must be taken to avoid this.

It is important to install overpressure safety valves in each boiler, according to the current regulations and to the equipments installed. Minimum dimensions of the safety valve:

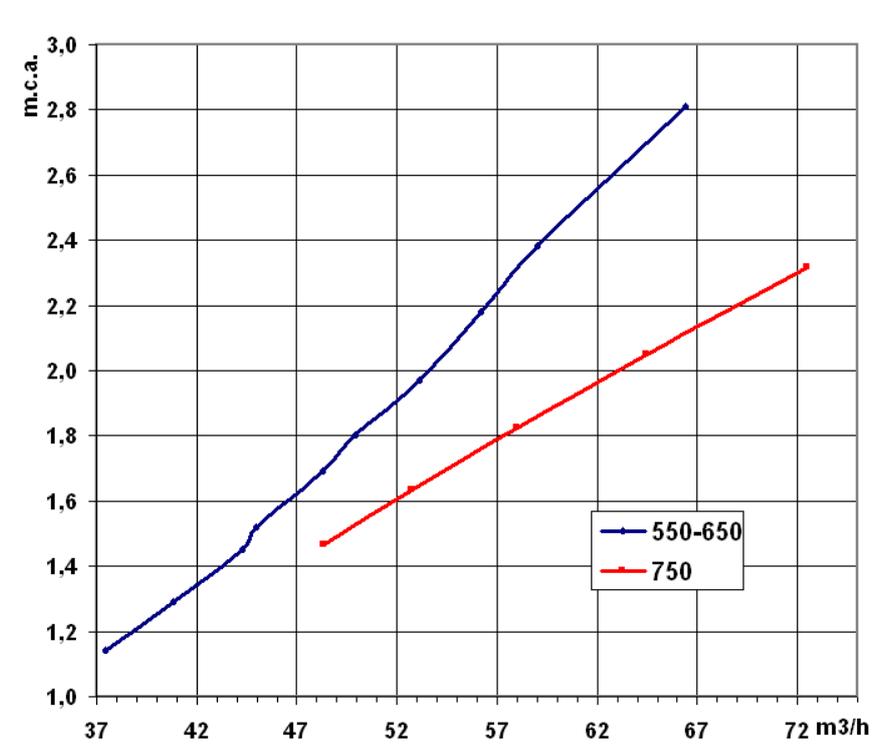
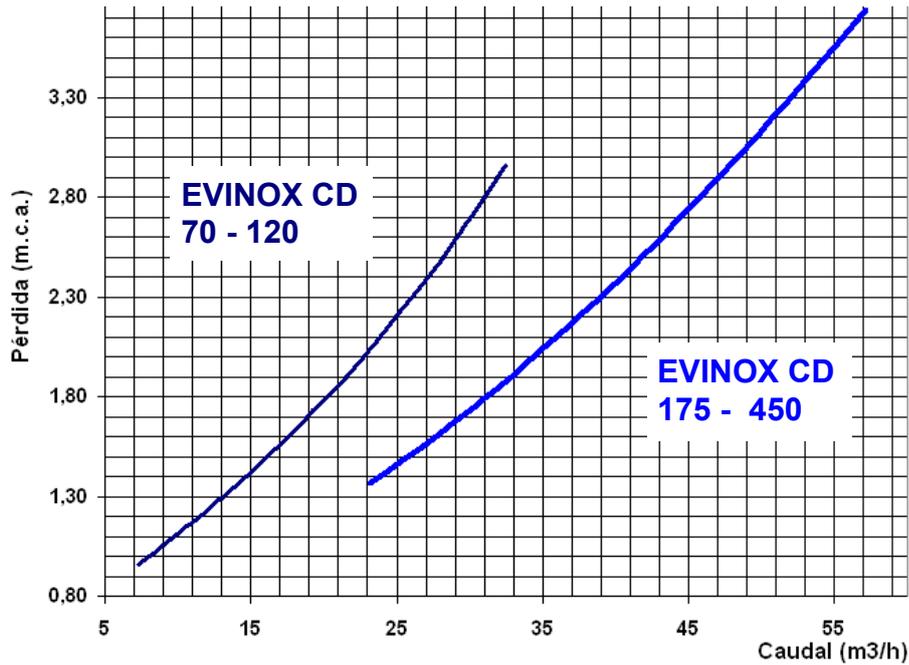
EVINOX CD	70	85	105	120	175	200	250	325	375	450	550	650	750
INCH	1"	1"	1"	1"	1"1/4	1"1/4	1"1/4	1"1/2	1"1/2	2"	2"	2"	2"

### 15.7.3 Hydraulic pressure drop

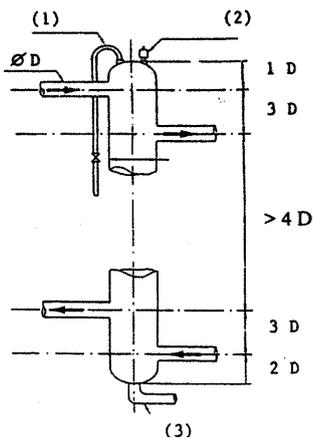
The boiler pressure drop depends on the water flow; the maximum  $\Delta T$  must be 15 °C:

<b>EVINOX CD</b>	Units	<b>70</b>	<b>85</b>	<b>105</b>	<b>120</b>	<b>175</b>	<b>200</b>	<b>250</b>	<b>325</b>	<b>375</b>	<b>450</b>	<b>550</b>	<b>650</b>	<b>750</b>
<b>Flow rate <math>\Delta T = 7^{\circ}\text{C}</math></b>	m <sup>3</sup> /h	5,8	7,3	8,9	10,3	13,9	17,0	20,7	25,3	30,4	37,8	45,6	51,4	58,1
<b>Flow rate <math>\Delta T = 10^{\circ}\text{C}</math></b>	m <sup>3</sup> /h	4,9	6,1	7,5	8,6	11,6	14,2	17,3	21,1	25,4	31,5	38,0	42,9	48,4
<b>Flow rate <math>\Delta T = 12^{\circ}\text{C}</math></b>	m <sup>3</sup> /h	3,9	4,9	6,0	6,9	9,3	11,3	13,8	16,9	20,3	25,2	30,4	34,3	38,7

If you have to stop the boiler pump, it is required that you stop it with a time delay (3 to 5 minutes) once the boiler has stopped. This can be obtained by installing a timer-disconnect electrical relay.



### 15.7.4 Water manifold

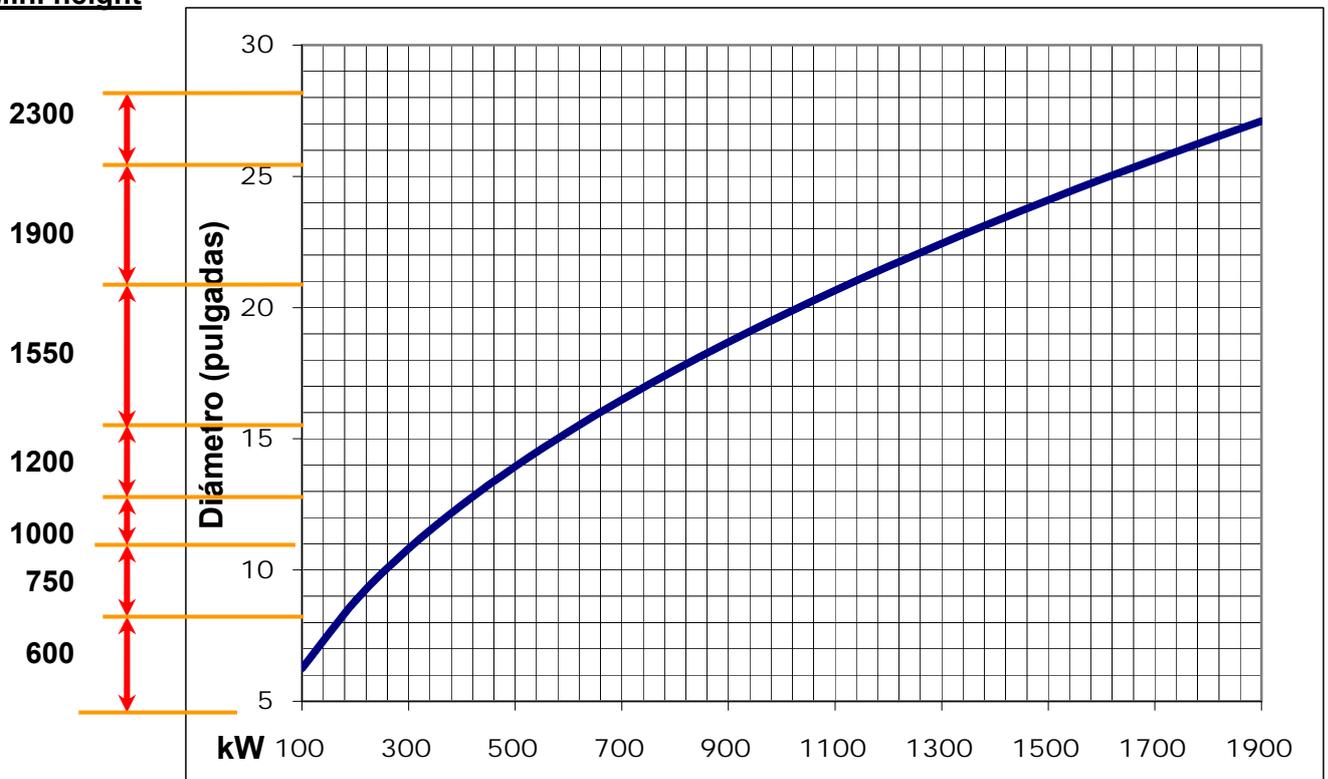


- It avoids hydraulic unbalances between the circuits and the boilers.
- It ensures a constant water flow to the boiler, independently from the consumptions required. In accordance with current regulations.
- In case of heavy sludge in the water, it drives it to the bottom of the tank. It can't avoid lighter sludge.

It is necessary to install (2) an automatic purger of big capacity in the higher part of the tank, (3) an appropriate drainage with a diameter of 50/60, and optionally, (1) a manual purger with a diameter of 15/21.

According to the total power installed (the sum of the heating output of all the boilers installed), we can calculate the dimensions of the water manifold, as shown in this chart: diameter (inches) and minimum height.

#### Min. height



#### Installations with a sufficient inertial volume and a constant water flow, without interruption.

These are installations where the main circuit/s has/have a minimum water capacity ensuring a constant and uninterrupted water flow to the boilers (unless the boilers stop). For example:

- Heating circuits with a main loop that are connected to A.H.U., fan-coils, where there are the regulation elements and valves. This loop will have a sufficient water capacity to ensure a constant water flow to the boilers.
- Renovation of old boilers rooms (previously located in the basement) which have been moved to the top of the building or terrace, where the flow and the return piping connecting the new boilers room to the old one have a sufficient water capacity to guarantee a constant water flow, without interruption, through the boiler.

See system drawings.

### 15.7.5 Water quality of the installation

It is important to follow the instructions indicated in this manual. As the primary circuit is a closed circuit, it cannot be refilled with non-treated water.

Periodical refillings with non-treated water could cause a constant input of:

- Oxygen and dissolved gases (contributing to produce oxidation and corrosion in the installation). This problem can be minimised by installing air/gas venting in the higher part of the water flow connection or in a common flow pipe.
- Carbonates (contributing to produce scaling in the boilers).

Therefore, water refillings must be reduced to the minimum, and a water meter must be installed in the refilling of the primary circuit.

It is necessary to take the appropriate precautions with respect to the quality of the circuit water, in order to avoid corrosion and oxidation of the installation and allow the equipment to operate at maximum performance.

**Evinox insists on the use of the following heating system water conditioning products to validate the warranty:**

- Our dirt separators must be installed on the boiler return to protect the boiler at all times.
- BIONIBAL corrosion inhibitor.
- BIONIBAGEL antifreeze and corrosion inhibitor.

**a. Water characteristics**      These are the values of the circuit water and of the refilling water.

Concept	VALUE	Concept	VALUE
<b>Total hardness (TH)</b>	Lower than 12 °F	<b>Maximum volume allowed of refilling water of the installation (m3)</b>	0,04 x P output / (TH x 0.1) being: P output: power output total sum in kW TH: water hardness in °F, Ca(HCO <sub>3</sub> ) <sub>2</sub>
<b>Chloride</b>	Lower than 100 mg/l	<b>Salinity</b>	Lower than 50 mg/litre
<b>pH</b>	between 9.6 and 10	<b>Conductivity</b>	Lower than 500 µS/cm
<b>Resistivity</b>	Higher than 2.000 Ohms x cm	<b>Iron</b>	Lower than 1 mg/litre

**b. A WATER TREATMENT IS ABSOLUTELY ESSENTIAL FOR THE INSTALLATION OF THE PRIMARY CIRCUIT IN THE FOLLOWING CASES:**

1. Wide installations (with large water contents).
2. Characteristics of the refilling water different from the hardness (TH) indicated in the table above.
3. Frequent refillings of the installation with new water (because of system draining, water leaks, repairs), even if the water has a hardness lower than 12°F.
4. When the maximum volume allowed for refilling water has been exceeded (see table above).

**c. A mesh filter should be installed before each boiler, mesh of 0.3 mm.**

**d. Air purging/venting:**

If the boilers circuit incorporates a common vertical water manifold: place a purger of large capacity in its highest point.

Otherwise: it is necessary to install a purger of large capacity or corrosion inhibitor equipment in a high point of the circuit behind the boilers.

**e. Old installations**

d1) Before replacing the existing boilers with new boilers, proceed to clean the installation.

If a chemical product is used it must be compatible with the installation materials.

Drainage must be installed from a low point of the installation, if possible in a different location from the boilers' draining point.

d2) A separator of oxides and sludge must be installed in the circuits' return, so that all the return water flow can pass through it, allowing its draining without suspending the service.

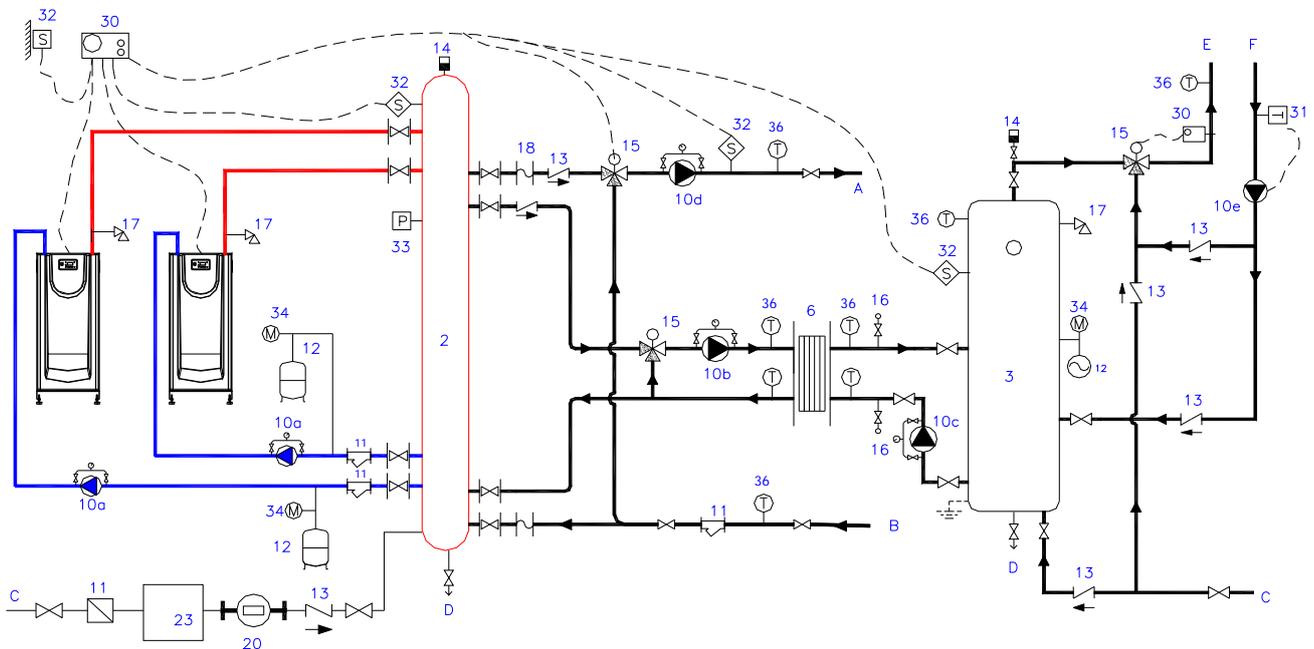
Apply the considerations of paragraphs “a,b,c,d”.

If the circuit is in very bad condition and the previous measures taken were not sufficient, or the cleaning of the installation was not efficient, the solution would be to separate the boilers’circuit from the heat emitters’circuit, so that they are independent from each other, by means of a plate heat exchanger or similar, according to the hydraulic diagrams included in this manual (see the corresponding paragraph).

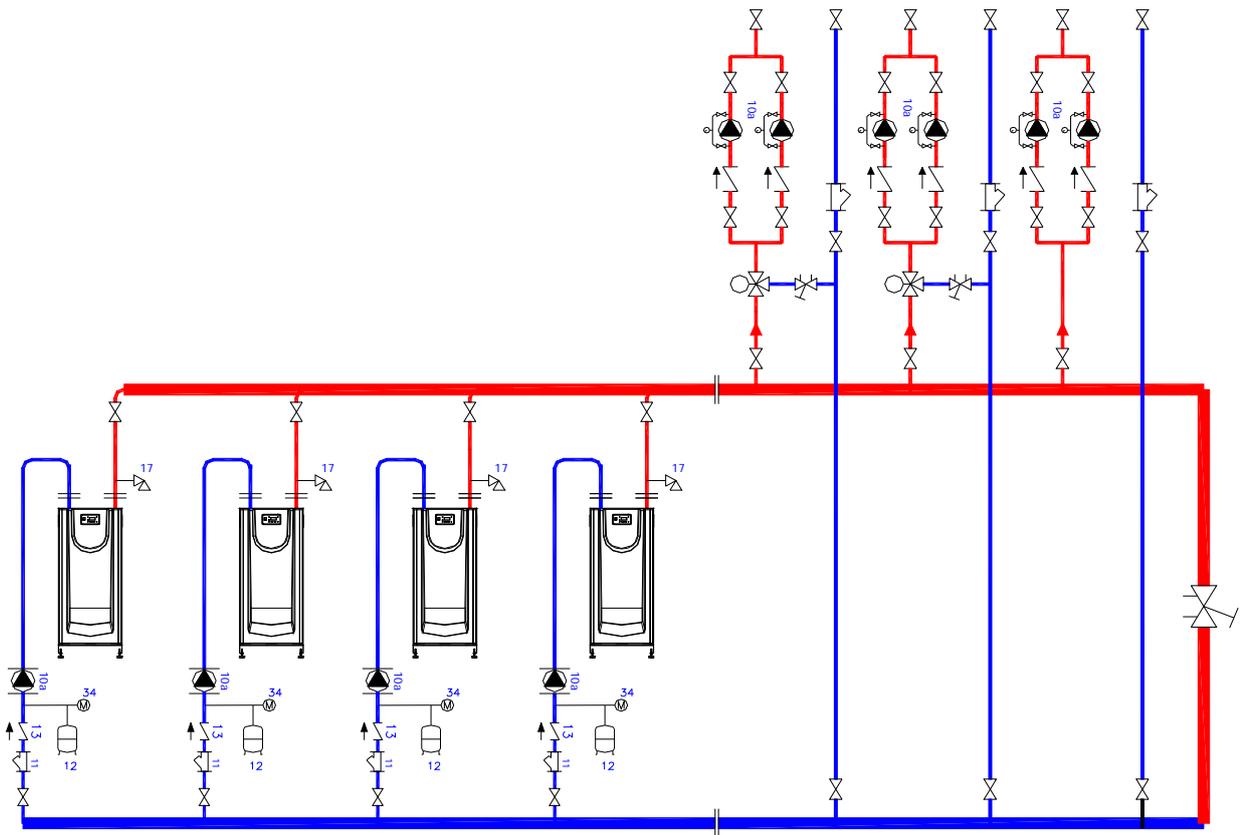
### 15.7.6 System drawings

1	Boiler	30	Controller
2	Water collector or water manifold	31	Thermostat
3	D.H.W.S. buffer vessel	32	Temperature sensor
6	Plate heat exchanger	33	Pressure switch
10	Boiler circulation pump	34	Manometer
11	Mesh filter	36	Thermometer
12	Closed expansion vessel	37	Filter to separate sludge, oxides
13	Non-return valve	A	Flow to the heating circuit
14	Automatic air venting	B	Return from the heating circuit
15	Mixing valve	C	Cold feed
16	Keys to clean D.H.W.S. PHE secondary circuit	D	Drain
17	Overpressure safety valve	E	Flow to D.H.W.S. circuit
18	Non-vibrations mounts	F	Return from D.H.W.S. circuit
19	Adjusting water flow valve		
20	Water meter		
23	Water treatment		

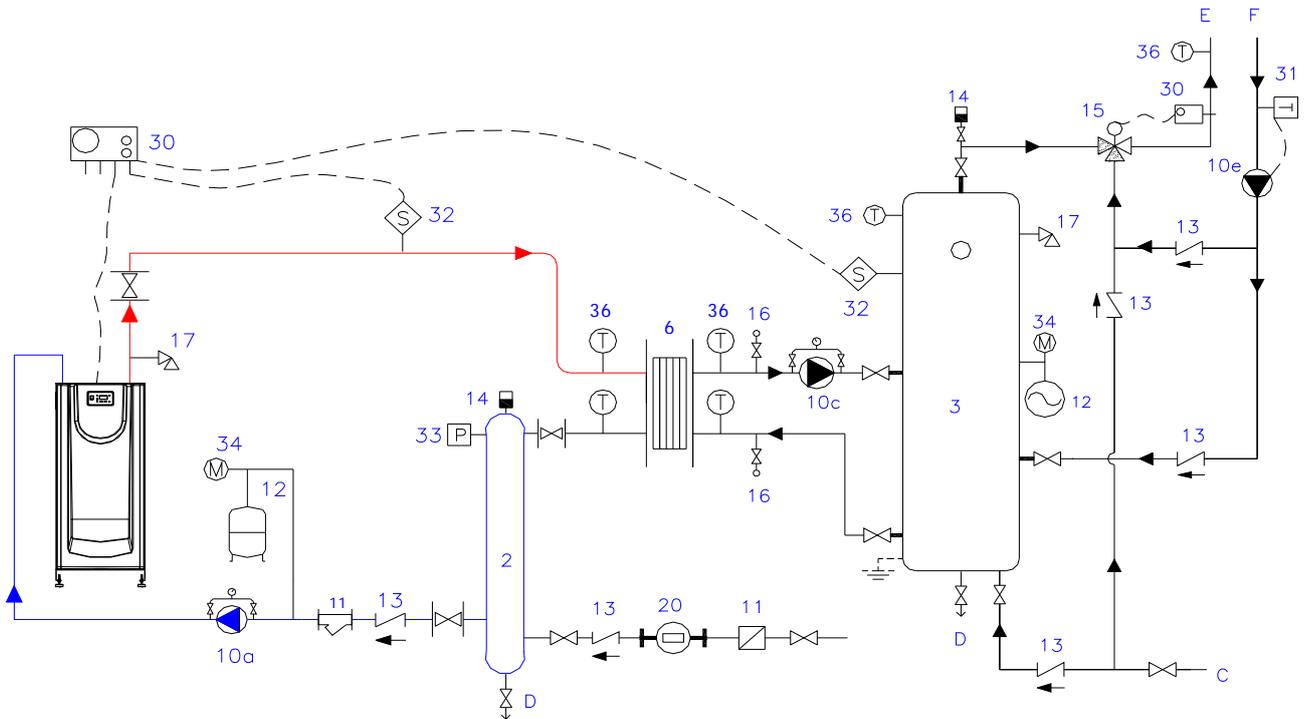
- **System drawing of two boilers: heating and D.H.W.S.**



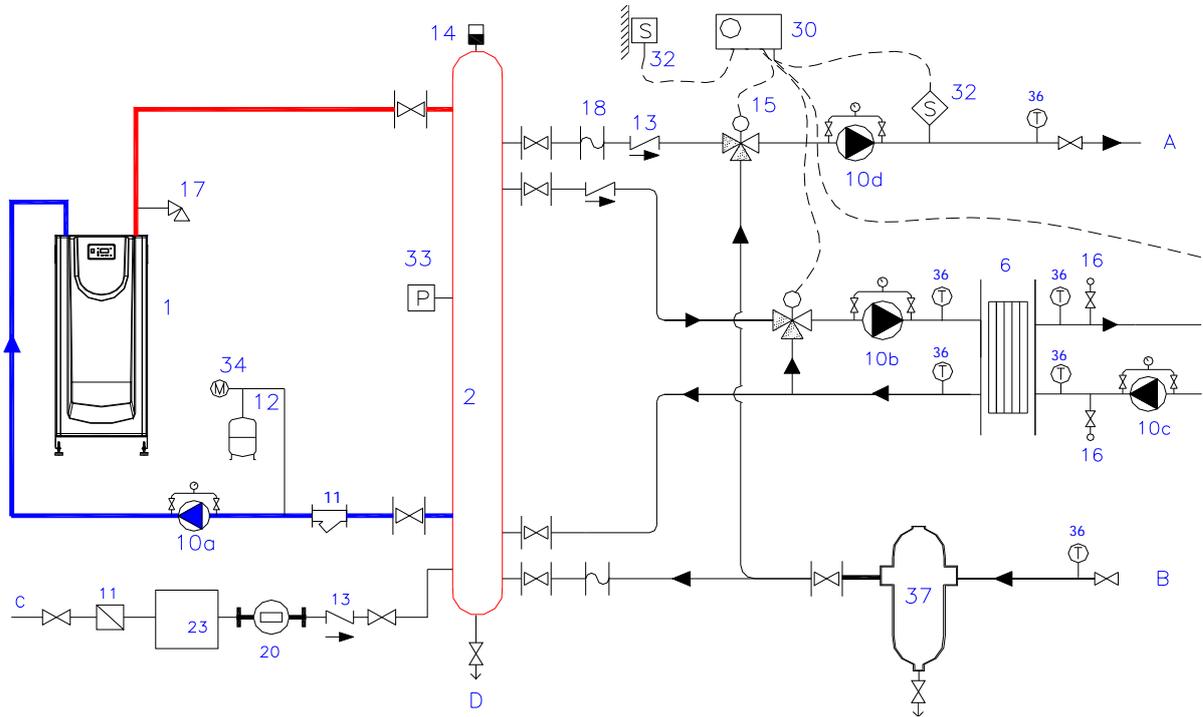
**System drawing of heating circuits**



- **System drawing of one boiler and only D.H.W.S.**

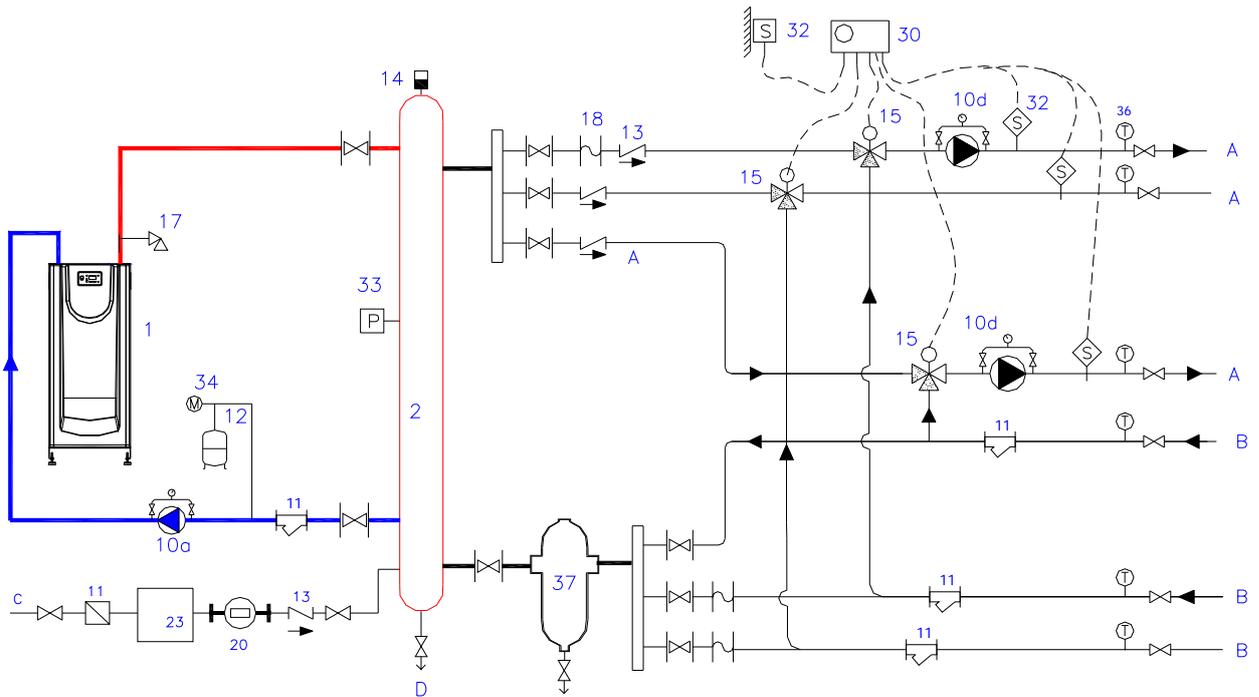


- **System drawing: D.H.W.S. and heating circuit**



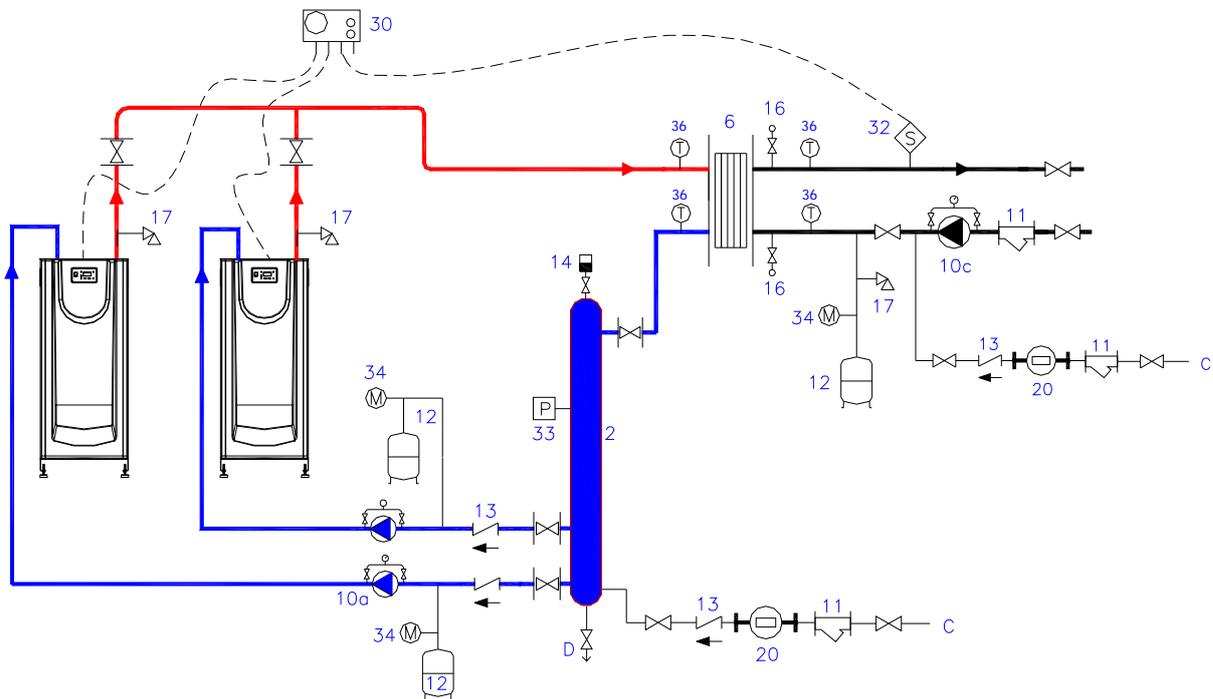
See comments under the corresponding paragraph.

- **System drawing of an old installation: heating circuit**



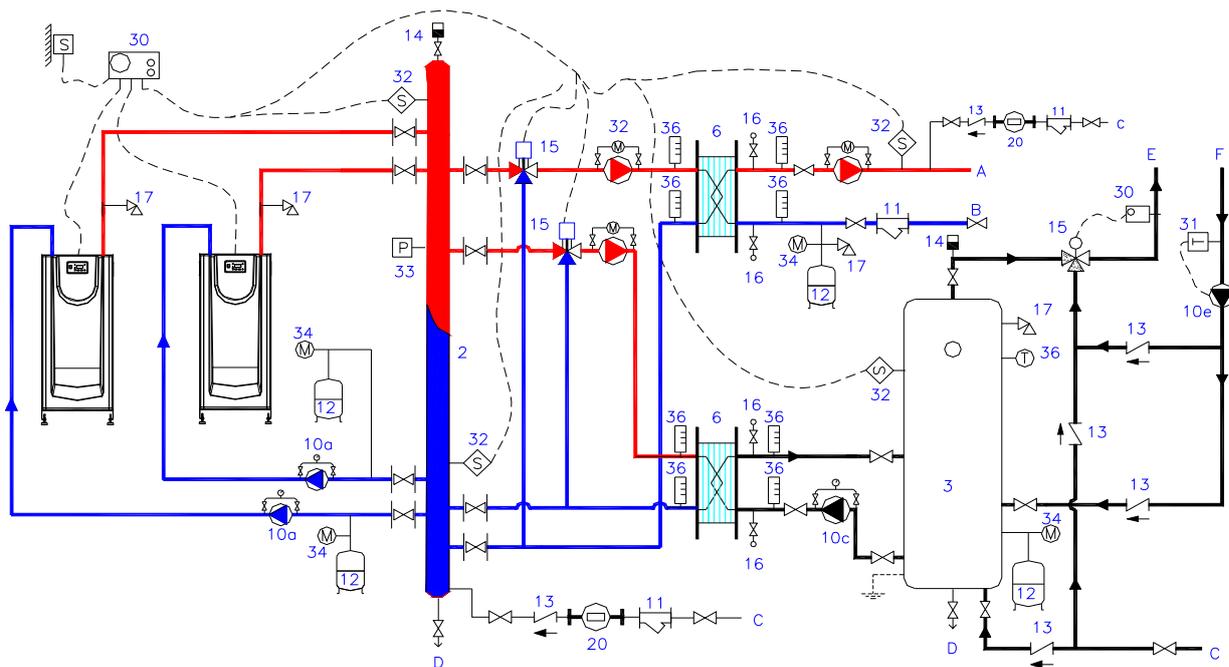
See comments under the corresponding paragraph.

- **System drawing of an installation with high pressure in the secondary circuit (very high building with the boiler room on the ground floor), or old installation in very bad conditions: heating circuit.**



See comments under the corresponding paragraph.

- **System drawing of an installation as in the previous case: D.H.W.S. and heating circuit.**



## 16. THE BOILER START-UP

### 16.1 BEFORE THE START-UP

The first start-up is a very important operation on which the future effectiveness and reliability of the equipment will depend. The first start-up / firing of the boiler must be carried out by authorised Evinox Technical Personnel, who will ensure the boiler is correctly commissioned and set-up. Before the start-up, it is important to check that:

- The installation is in accordance with this manual's instructions and with the local regulations.
- The installation is full of water and vented of air.
- The static water pressure of the installation (when cold) is between 1 bar minimum and 4 bar maximum.
- The water circulation pumps operate in the correct direction.
- The water cut-off valves are open.
- The gas type and pressure correspond to the ones indicated for that boiler (see the boiler identification plate)
- The gas valves are open, the air of the gas installation purged and there are no gas leaks.
- The electric connections are correct (220/230 V, 50 Hz, single phase, earth) so that the boiler is electrically supplied.
- The controls are set so as to require heat from the system.

#### Instruments required for the start-up:

- A manometer to check the combustion chamber pressure drop, the gas injector's pressure and the inlet gas pressure. We recommend the use of two digital manometers (or U-shaped manometers with water columns).
- A flue electronic analyser to measure CO, CO<sub>2</sub>, O<sub>2</sub> and the flues temperature.
- Ammeter/electrical tester.
- Ionisation electrode, ignition electrode, fuses, screws, nuts.

#### AIR AND GAS PRESSURE SWITCH:

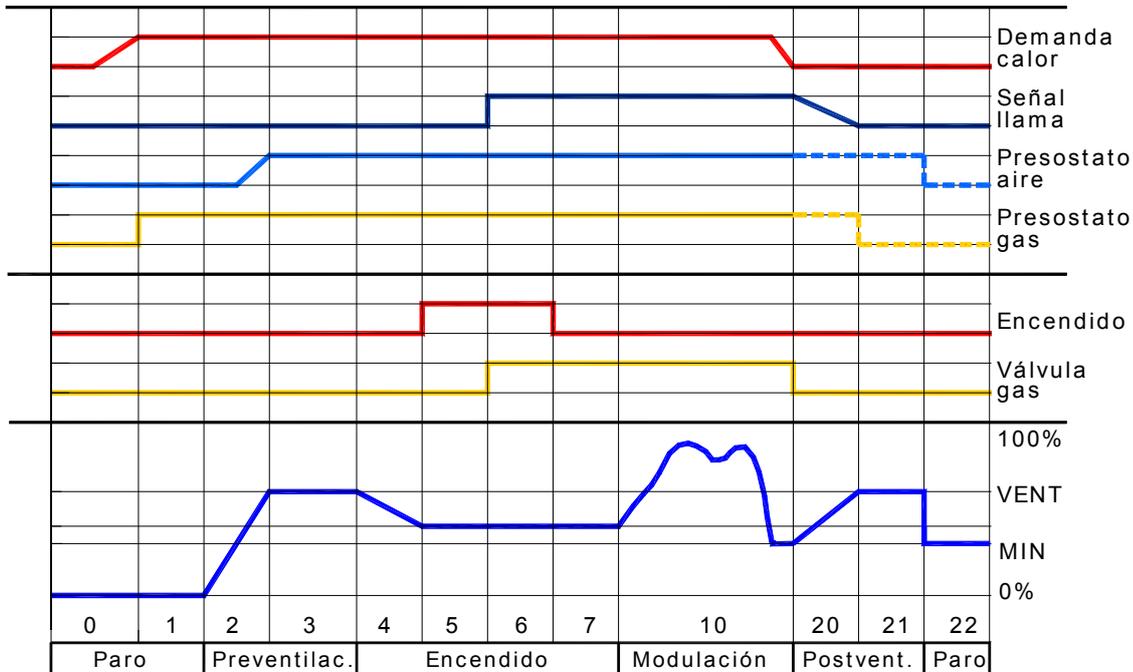
Model	Air pressure switch	Gas pressure switch		
		Adjustment (mbar)	Type	Image
EVINOX CD	Adjustment (mbar)	Adjustment (mbar)		
70 – 105	0,4	10	Blind cover, open the cover to adjust	
120	0,9	14	Transparent cover, fixed to the side of the multi-block gas valve	
The remaining models in the range	0,9	14	Transparent cover, connected to a pipe to facilitate access	

## 16.2 THE BOILER CONTROL UNIT AND OPERATING CYCLE

The control unit regulates:

- The boiler operating cycle.
- The boiler safeties (by indicating also the possible reasons for the boiler lockout).
- The boiler power modulation.

Short description of the boiler operating cycle:



LEGEND of the operating phases:

Display	Meaning
00	Boiler in stand-by (the installation is not receiving any request of heat)
01	The boiler stops due to lack of gas pressure (minimum gas pressure switch)
02	Motor fan is activated (revolutions increase)
03	Start of the pre-venting phase
04	Time out (control of the fan speed)
05	Time of pre-ignition
06	Safety time of ignition and ionization control (constant)
07	Safety time of ignition and ionization control (variable)
10	Operation in the heating mode
11	Not available phase: D.H.W.S. operation (according to the installation and to the boiler configuration)
12	Not available phase: Heating and D.H.W.S. operating in parallel (according to the installation and to the boiler configuration)
20 / 21	Post air-venting and fan stop
22	Self-test and return to the initial position
99	Alarm / lockout (alarm code visualized on the display)

## 16.3 GAS - AIR ADJUSTMENTS

All EVINOX CD boilers are tested in the factory and every one is supplied with a table indicating the combustion figures. Both the start-up and the maintenance must be undertaken by a qualified person.

First of all verify: electric supply, if the gas connection is air vented, type of gas and pressure, if the heating demand is at the maximum value, correct draught of the chimney, if the hydraulic installation is purged, if the pump is correctly working.

The process is as follows:

- First adjust the combustion at the minimum power (to avoid lockout).
- Adjust combustion at the maximum power.
- Adjust combustion at the minimum power.
- Repeat the previous steps at minimum and maximum power.
- Once adjusted, check the combustion at the intermediate stages between the minimum and the maximum power.

Any change in the multiblock gas valve produces a change in the combustion, both at the maximum and the minimum power. Check them in-turn until you reach the required combustion figures.

Check combustion in the main burner:

- Ionisation current (> 5 m microamperes): connect in series the meter to the ionisation electrode and to its electric connection.
- Pressure: gas (Pg), combustion chamber (Pf), air-gas mix (Pa) (similar to the values indicated in the combustion document issued in our factory).
- Gas flow.
- Combustion parameters: CO<sub>2</sub>, O<sub>2</sub>, CO, flues temperature, air temperature, efficiency, water temperatures.

Models	CO <sub>2</sub> range (%) for Natural Gas
EVINOX CD 70 - 120	<b>7,2 - 9%</b>
EVINOX CD 175 to 450	<b>7,2 - 8,2%</b>
EVINOX CD 550 to 750	<b>7,5 - 9%</b>

These checks must be undertaken by a qualified person

### 16.3.1 Combustion adjustment

- a) Once the boiler is operating.
- b) Increase the set-up temperature to the maximum.
- c) In the control panel press simultaneously the buttons 4 and 5 for around 6 seconds.
- d) The boiler is now in manual operation mode, and the display shows:
  - the lower right pointer flickers intermittently
  - the relative power is adjusted.The function of the controller PID is disabled.
- e) First adjust the combustion at the maximum power.
- f) Increase the fan revolutions to the maximum value configured for the boiler:
  - You can increase (press the button 9) or decrease the power (press the button 8) point by point (in percentage)
  - You can directly select the maximum power (press the button 7) or the minimum power (press the button 6).
- g) Check the content of CO<sub>2</sub> with the flue analyzer (by introducing the probe inside the flue outlet of the boiler that you are adjusting).

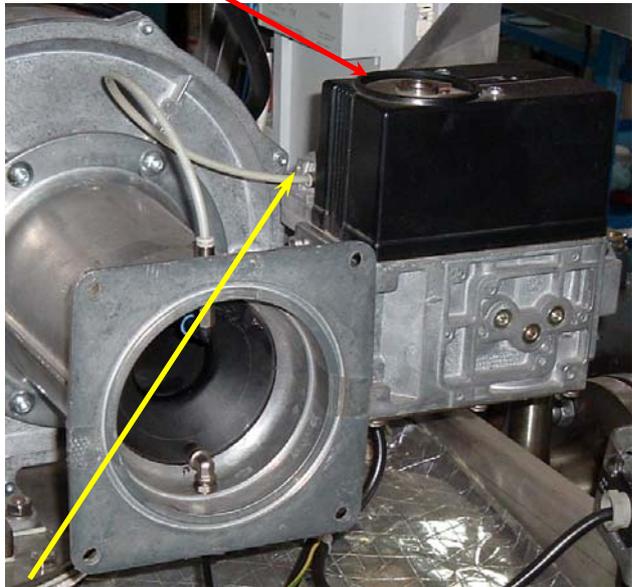
- h) To vary CO<sub>2</sub> (to vary the gas flow) for models EVINOX CD 120 and higher: turn (with a key HEX3) the adjustment wheel positioned in the higher part of the gas valve, with the boiler in front:
- By turning counter clockwise the gas flow increases (and so CO<sub>2</sub>)
  - By turning clockwise the gas flow decreases (and so CO<sub>2</sub>).

- i) Then proceed to adjust the combustion at the boiler minimum power.

- j) Decrease the fan revolutions to the minimum, by pressing button (3) on the control panel. The display (13) will show two big zeros.

- k) Check the content of CO<sub>2</sub> with the flues analyzer (by introducing the probe inside the chimney flue outlet of the boiler that you are adjusting).

- l) To vary CO<sub>2</sub> (to vary the gas flow) for models EVINOX CD 120 and higher: turn (with a screwdriver type TORX T40 or similar) the adjustment wheel positioned in the front corner of the gas valve, with the boiler in front:
- By turning clockwise the gas flow increases (and so CO<sub>2</sub>).
  - By turning counter clockwise the gas flow decreases (and so CO<sub>2</sub>).



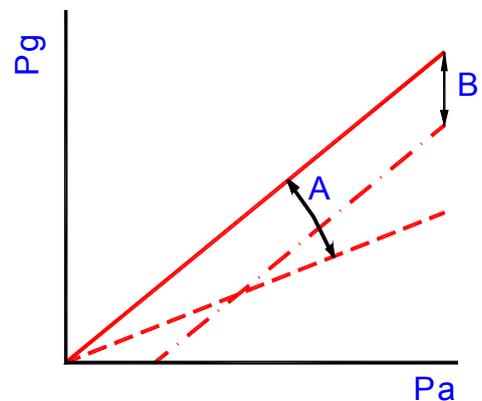
- m) Repeat the previous steps both at the maximum and the minimum power until the values of CO<sub>2</sub> are correct at both stages.

- n) Once finished, press button 3 or 2 to go back to the automatic operation mode.

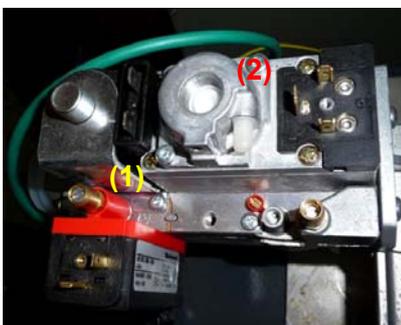
This enables you to obtain two points of a straight line, as you can see in the chart, where "Pg" is the gas pressure (mbar) and "Pa" is the air pressure (mbar).

With the higher control of the gas valve you can vary the slope of the straight line (movement A in the chart).

With the lower control of the gas valve you can move the straight line vertically (movement B in the chart).



Detail of the multi-block gas valve in model EVINOX CD 70 - 105:



- (1) Adjustment of the maximum power: turn clockwise → less gas flow. By means of a Torx wrench.

- (2) Adjustment of the minimum power: turn counter clockwise → more gas flow (the opposite than before). By means of a flat screwdriver.

### 16.3.2 Change of fuel: from Propane gas to Natural gas

In order to change the fuel, it is sufficient to adjust the boiler combustion, with the new fuel, to the correct parameters either for Natural Gas or for Propane Gas.

The process is the same if you have to change from natural gas to propane.

**Note: just available for models with power output lower than 500 kW.**

## 17. MAINTENANCE

The maintenance operations must be accessed via:

- The front of the boiler (main burner, electrodes, control panel, sight hole).
- The back of the boiler (multi-block gas valve, air damper, fan motor).

This allows for several boilers to be installed in a modular configuration, one beside the other (leaving a distance of 10 cm between them).

### 17.1 PROCEDURE TO DISMANTLE THE BURNER

Ensure that:

- the boiler general switch is on the OFF position.
- The gas duct to the boiler is closed.

Take out the front casing panel of the boiler and lift the top.

Once these steps have been taken, you can place the control panel in two different positions, in order to allow the reading of parameters when you are undertaking the boiler maintenance.

EVINOX CD 70 to 120:

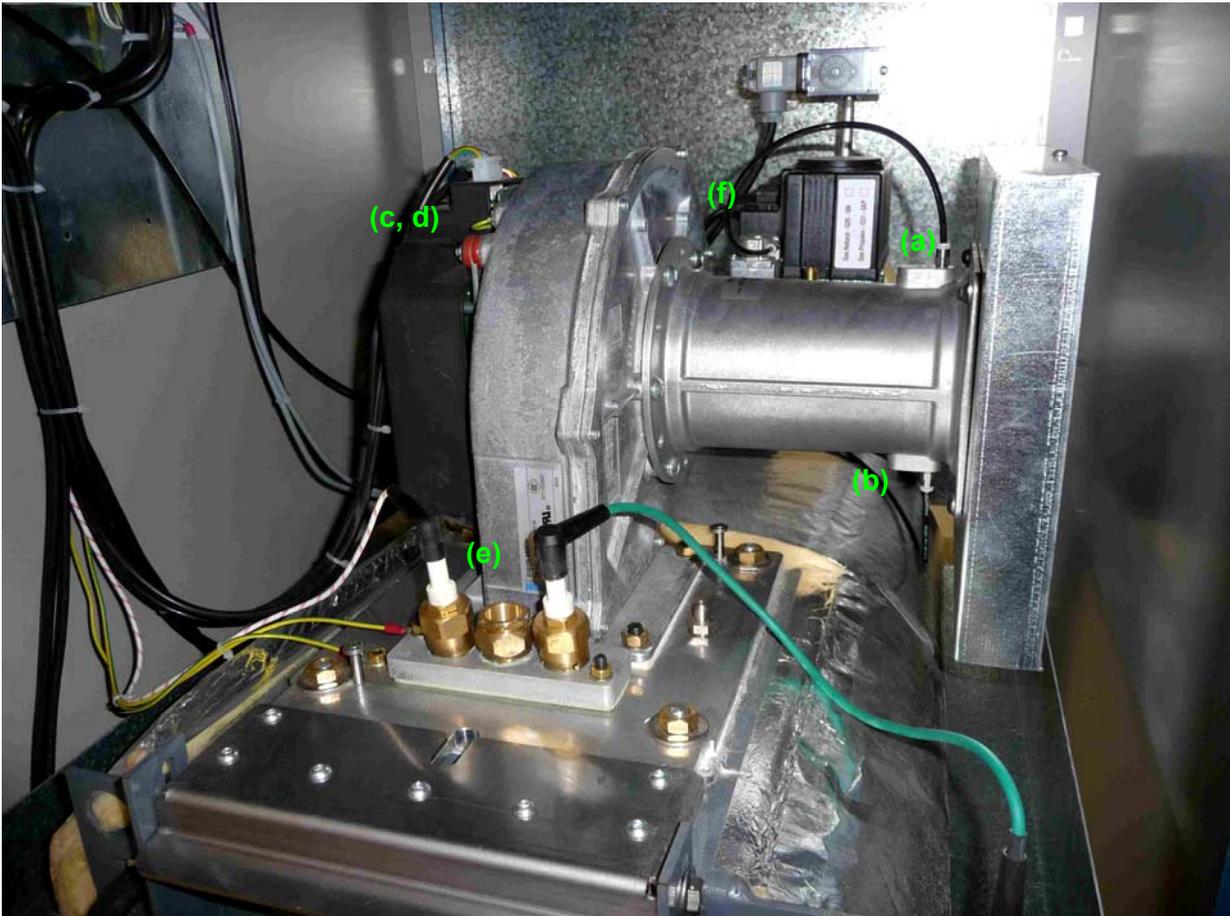
Front view of the boiler without lower casing panel



Second position of the control panel



Front view of the inside of the boiler:



Disconnect the electrical connections and the pressure pipes:

- (a) Pressure pipe connecting the gas valve to the venturi (just included in models EVINOX CD 175 and higher).
- (b) Pressure pipe connecting the air pressure switch to the venturi.
- (c) Motor fan: electric supply connection (in the higher part of the motor).
- (d) Motor fan: control indicator PWM
- (e) Ionisation-ignition kit: ionisation electrode cap, ignition electrode cap and earth connection cable.
- (f) Gas valve: electric supply connection.

Note: (a) and (b) have fast connections (by pressing the plastic ring you can remove the pipe).

Remove the ionisation-ignition kit.

If the gas connection has a two-pieces coupling, disconnect it.

Disconnect the two flanges of the gas valve (each flange has Allen screws of 4 mm).

Remove the nuts/screws of the flange connecting the fan-burner group to the boiler heat exchanger.

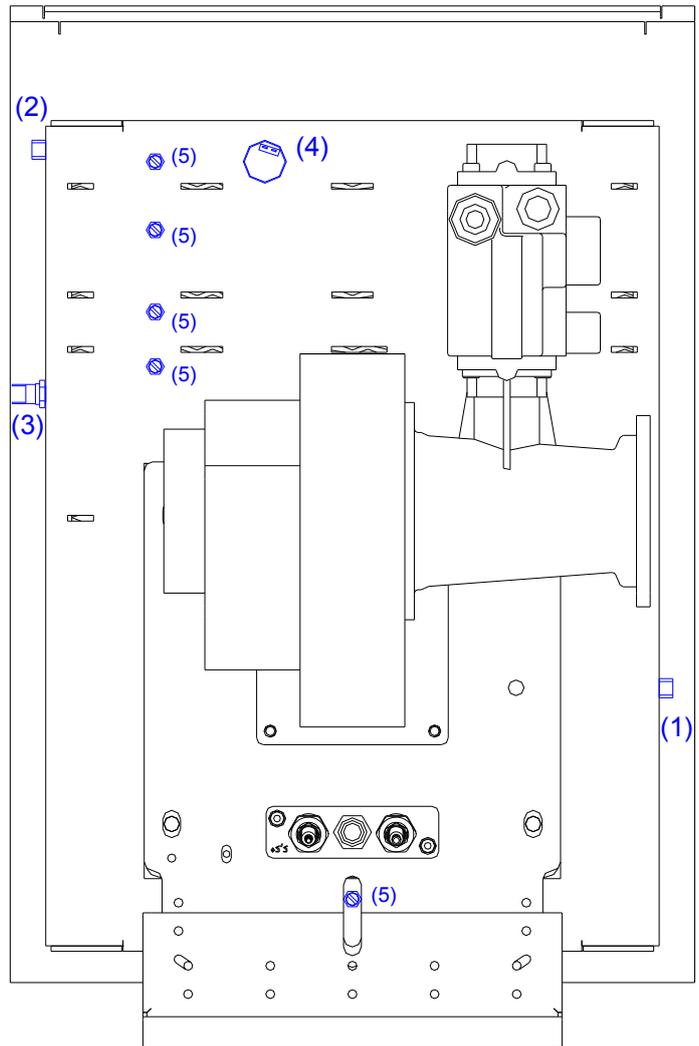
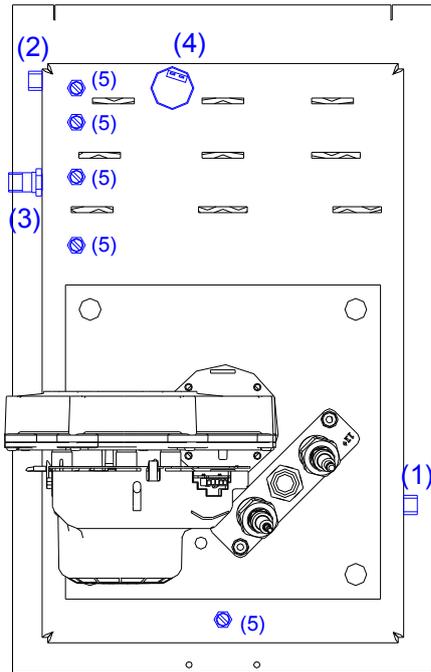
By tilting the assembly motor-fan, you will find:

- Fiberglass joint of 3 mm
- Burner flange
- Fiberglass joint of 3 mm
- Flange connected to the boiler heat exchanger

Consider the minimum free height between the highest level of the boiler and the ceiling in order to extract/tilt the burner (see paragraph "boilers room").

## 17.2 POSITION OF PROBES AND SENSORS

- (1) Water flow temperature sensor
- (2) Water return temperature sensor
- (3) Safety overheating thermostat
- (4) Water pressure sensor
- (5) Manual air purgers/venting (their number varies according to the model).



## 18. BOILER GUARANTEE

1. Evinox guarantees the EVINOX CD boiler as follows:

- \* **5 years for the boiler heat exchanger**
- \* **2 years for the other components**

2. The GUARANTEE takes effect from the commissioning date.

3. The **COMMISSIONING** cost is not included in the price of the boiler.

### **FINAL COMMISSIONING IS ONLY TO BE CARRIED OUT BY AN EVINOX ENGINEER.**

Note: Our technical personnel, who will visit when the boiler has been installed to arrange for its final commissioning and calibration, do not perform the role of inspector and/or approval officer for the system. Its compliance with standards and instructions remains the exclusive responsibility of the installation company.

4. Repairing or replacing components or parts of the boiler does not extend the period of the guarantee, neither for the pieces that are replaced.
5. The elements included in the guarantee will be repaired or replaced freely in case of manufacturing faults.
6. Only Evinox Engineers may carry out repairs under guarantee and Evinox will send its technical staff according to its own internal organisational planning. If anyone other than Evinox carries out work on the boiler the guarantee will become void.
7. The parts that are replaced under guarantee will remain the property of Evinox, and the user is obliged to return them to Evinox free of charges within a maximum period of 7 days, otherwise the spare parts provided will be invoiced.
8. The guarantee only covers the materials required for repairing the boiler. The guarantee does not cover the cost of dismantling the equipment, for the installation or connection of new equipment, or for additional work necessary to repair the material.
9. The installation must comply with the requirements described in this manual. In order for the "GUARANTEE" to be effective and cover the spare parts or the replaced boiler components.

Guarantee will not be valid when breakdowns are due to:

- A. Incorrect installation, improper use, inadequate maintenance of the boiler.
- B. **Incorrect Electric supply**. This must be 220/230 V, 50Hz, single phase, earth connection.
- C. **Incorrect sizing or construction of the flue system**. Poor evacuation of the condensed products generated by the flue gases in the chimney.
- D. **Force of nature** such as: fire, flood, sinking, freezing of the circuit water.
- E. **Incorrect or no water quality treatment** both for primary circuit water and the water supplied.

### **Evinox insists on the use of the following heating system water conditioning products to validate the guarantee:**

- Our dirt separators must be installed on the boiler return to protect the boiler at all times.
- BIONIBAL corrosion inhibitor
- BIONIBAGEL antifreeze and corrosion inhibitor

Values must be:

- Total hardness (TH): lower than 12°F
- PH: between 9,6 and 10
- Iron content: lower than 1 mg/litre

- Resistivity: higher than 2000 Ohms\*cm (conductivity lower than 500 microS/cm)
- Turbidity: lower than 10 mg/litre
- Salinity: lower than 50 mg/litre
- Chloride: lower than 100 mg/litre

- F. **Lack of water**. The installation must be supplied with at least the minimum water content, so that it can circulate through the boiler with a constant uninterrupted flow.
- G. **Gas connection**: Incorrect pressure, improper dimensions or the incorrect type of gas.
- H. **Incorrect air ventilation** in the boiler room, or excess humidity, dust or aggressive vapours or steams.
- I. **Operating water pressures** lower than 1,5 bar or higher than 5 bar.
- J. **Incorrect sizing or installation of the expansion systems** (safety valve, expansion vessel, etc.).
- K. **Incorrect calculation** of the heating consumption of the installation
- L. **Natural wear and tear** of the boiler.

## 19. APPENDIX I: LIST OF ERROR CODES

Alba_Nr	Diagn_Nr	DIAGNOSIS	TEXT	REACTION	Complementary
10	150	FAILURE OF THE EXTERNAL PROBE	Short circuit in outside temperature probe (if it is installed)	Message	Short circuit
10	151		Open circuit in outside temperature probe (if it is installed)	Message	Open circuit
20	142	FAILURE OF THE FLOW PROBE	Short circuit in boiler flow temperature probe (B2)	Shut-off for safety with start prevention	Short circuit
20	143		Open circuit in boiler flow temperature probe (B2)	Shut-off for safety with start prevention	Open circuit
32	524	FAILURE OF THE CIRCUIT FLOW PROBE	Short circuit in flow temperature probe to the heating circuit 2	Message	Short circuit in the flow temperature probe of the heating circuit nr 2
32	525		Open circuit in flow temperature probe to the heating circuit 2	Message	Open circuit in the flow temperature probe of the heating circuit nr 2
40	144	FAILURE OF THE RETURN PROBE	Short circuit in return temperature probe to boiler (B7)	Shut-off for safety with start prevention	Short circuit
40	145		Open circuit in return temperature probe to boiler (B7)	Shut-off for safety with start prevention	Open circuit
77	156	FAILURE OF THE AIR SENSOR	Short circuit	Message	Short circuit
77	157		Open circuit	Message	Open circuit
81	518	BUS "LPB"	Short circuit in LPB or lack of electric current	Message	LPB-short circuit or no electric supply
82	519		Interference in address LPB	Message	LPB-interference of addresses
100	520		Two master clocks are connected with the LPB in the system	Message	Two master clicks are connected with the LPB in the system.
100	539		One QAA and one OCI are connected to the LMU as master clocks	Message	One "QAA" and one "OCI" are connected to the LMU as master clocks
110	17	ELECTRONIC THERMOSTAT OF EXCEEDED MAXIMUM WORKING TEMPERATURE	Open circuit	Lockout - reset	Open circuit
110	115		Overheating temperature exceeded / lockout of SLT (electronic SLT)	Shut-off for safety with start prevention	SLT overheating temperature exceeded
110	129		Open circuit (SLT or internally)	Lockout - reset	Open circuit
110	422		The SLT control unit has stopped / cut off (residual heat)	Lockout - reset	el. SLT has opened / conmuted (overheating)
110	470		The SLT control unit has stopped / cut off (residual heat)	Shut-off for safety with start prevention	el. SLT has opened / conmuted (overheating)
111	141		No more difference with respect to Albatros code	Shut-off for safety with start prevention	No more difference with respect to Albatros code
128	98		Loss of flame during the operation	Shut-off for safety with start prevention	Loss of flame during the operation
128	99	Loss of flame during the operation	Shut-off for safety with start prevention	Loss of flame during the operation	
128	100	Loss of flame during the operation	Lockout - reset	Loss of flame during the operation	
128	570	IONISATION	The ionisation current has fallen below threshold "IonLimitGrenz", the repetitions counter will be reduced	Shut-off for safety with start prevention	The ionisation current has fallen below threshold "IonLimitGrenz", the repetitions counter will be reduced .
128	571		The ionisation current has fallen below threshold "IonLimitGrenz" several times, the repetitions counter has arrived at the end --> boiler lockout	Lockout - reset	The ionisation current has fallen below threshold "IonLimitGrenz" several times, the repetitions counter has arrived at the end --> boiler lockout.
129	78	AIR PRESSURE SWITCH	APS (pressure switch) has opened	Shut-off for safety with start prevention	Air pressure switch open
129	79		APS (pressure switch) has incorrectly closed or the speed limit was not respected (fan speed too high)	Shut-off for safety with start prevention	The air pressure switch has closed with no reason or the limit of the fan speed has been exceeded (very high speed)
129	80		APS (pressure switch) has opened or the speed limit was not respected (fan speed too low)	Shut-off for safety with start prevention	The air pressure switch has opened with no reason or the fan speed is lower than the limit (very slow speed).
129	84		Non-fulfilment of the maximum speed limit	Shut-off for safety with start prevention	Failure in the limit of the fan maximum speed.
129	85	CHECK FAN PWM PARAMETERS	Non-fulfilment of the minimum speed limit	Shut-off for safety with start prevention	Failure in the limit of the fan maximum speed.
129	86		Non-fulfilment of the minimum speed limit	Shut-off for safety with start prevention	Failure in the limit of the fan maximum speed.
129	87		Non-fulfilment of the minimum speed limit	Lockout - reset	Failure in the limit of the fan maximum speed.
129	89		Non-fulfilment of the minimum speed limit	Shut-off for safety with start prevention	Failure in the limit of the fan maximum speed.
129	90		The fan speed has fallen below the pre-venting speed	Lockout - reset	The fan speed is lower than the preventing speed limit
132	93	MINIMUM GAS PRESSURE SWITCH	GPS input has been set up as a contact for preventive start (FaEinstellFlags2) and contact is/was open during safety time. 2 hours it starts to lock out.	Shut-off for safety with start prevention	GPS input has been set up as a contact of preventive start (FaEinstellFlags2) and the contact is open during the safety time.
132	94		GPS input has been set up as a contact of preventive start (FaEinstellFlags2) and the contact is/was open during the safety time. After 2 hours it starts to lock out.	Shut-off for safety with start prevention	GPS input has been set up as a contact of preventive start (FaEinstellFlags2) and the contact is open during the safety time. 2 hours of preventive start.
133	102	FAILURE OF IONISATION 2ND TIME	Lack of flame on completion of safety time.	Lockout - reset	Lack of flame on completion of safety time.
140	521	WRONG ADDRESS OF LMU	Segment number or device number of Bus LPB is inadmissible	Message	Segment number or device number of Bus LPB is inadmissible
148	517	INCOMPATIBILITY	Incompatibility of LPB interface/basic unit	Message	Incompatibility of LPB interface/basic unit
151	1	INTERNAL FAILURE OF LMU	Error of software µC2	Lockout - reset	Failure of software µC2

Alba_Nr	Diagn_Nr	DIAGNOSIS	TEXT	REACTION	Complementary
152	6	SET-UP ERROR	Error of software µC2	Lock-out - reset	Failure of software µC2
152	540		"LmodZL_QAA (608)" is higher than "LmodZL (38)"	Lock-out - reset	"LmodZL_QAA" (608) is higher than "LmodZL" (38)
152	541		"LmodVL_QAA (610)" is higher than "LmodVL (40)"	Lock-out - reset	"LmodVL_QAA" (610) is higher than "LmodVL" (40)
152	542		LmodTL_QAA (609) is lower than LmodTL (39)	Lock-out - reset	"LmodTL_QAA" (609) is lower than "LmodTL" (39)
152	543		"N_ZL_QAA (611)" is higher than "N_ZL (48)"	Lock-out - reset	"N_ZL_QAA" (611) is higher than "N_ZL" (48)
152	544		"N_VL_QAA (613)" is higher than "N_VL (46)"	Lock-out - reset	"N_VL_QAA" (613) is higher than "N_VL" (46)
152	545		"N_TL_QAA (612)" is lower than "N_TL (50)"	Lock-out - reset	"N_TL_QAA" (612) is lower than "N_TL" (50)
152	548		Funtion "Programmable input" is not possible when the relay clipin is connected	Mensaje	Funtion "Programmable input" is not possible when the relay clipin is connected
152	580		Parameter "Tv_QAA" is lower than "Tv"	Lock-out - reset	The parameter "Tv_QAA" is lower than parameter "Tv".
152	581		Parámetro "Tn_QAA" is lower than parameter "Tn"	Lock-out - reset	The parameter "Tn_QAA" is lower than parameter "Tn".
152	589		"LmodVor_QAA" is lower than "LmodVor"	Lock-out - reset	
152	590		"N_Vor_QAA" is lower than "N_Vor"	Lock-out - reset	
152	601		The set-up electronic D.H.W.S. safety flow switch conflicts with (does not correspond to) the hydraulic diagram	Message	
152	610		Condition "TkMax > TkSmax + 3 K" not fulfilled	Message	
153	259	LMU CONTROL UNIT IS LOCKED - RESET WAS MADE WITHOUT NEEDING IT	No more difference with respect to Albatros code	Lock-out - reset	No more difference with respect to Albatros code
154	400	CHECK PUMP OPERATION	The return temperature to boiler is higher than or equal to "(boiler temperature + Sd_RL_grosser_VL)"	Shut-off for safety with start prevention	The return temperature to boiler is higher than or equal to: boiler temperature + "Sd_RL_grosser_VL"
154	401		The return temperature to boiler is higher than/equal to "(boiler temperature + Sd_RL_grosser_VL - 2K)"	Shut-off for safety with start prevention	The return temperature to boiler is higher than/equal to : boiler temperature + "Sd_RL_grosser_VL"-2K
154	402		No more difference with respect to Albatros code	Shut-off for safety with start prevention	No more difference with respect to Albatros code
154	404		The error counter has exceeded in error 400 the set-up value of "GrenzeRL_grosserVL"	Lock-out - reset	The error counter has exceeded in error 400 the set-up value of "GrenzeRL_grosserVL"
154	425		The error counter has exceeded in error 426 the set-up value of "GrenzeGradient [320]"	Lock-out - reset	The error counter has exceeded in error 426 the set-up value of "GrenzeGradient"
154	426		The boiler temperature rises faster than allowed in "TempGradMax"	Shut-off for safety with start prevention	The boiler temperature rises faster than allowed in parameter "TempGradMax"
154	427		Reset was not possible after error 426 (reset: boiler temperature < boiler set-up temperature and "dT < dTkTrSTB")	Shut-off for safety with start prevention	Reset was not possible after error 426 (criterion reset: "boiler temperature < boiler set-up temperature" y "Delta-T < dTkTrSTB")
154	433		dT is higher than the desing differential "dTTrSTB + 16K"	Shut-off for safety with start prevention	Delta-T is higher than the design differential "dTTrSTB + 16K"
154	434		Reset after error 433 has not been possible (criterion reset : "dT < ½ dTkTrSTB")	Shut-off for safety with start prevention	Reset after error 433 has not been possible (criterion reset: Delta T < ½ dTkTrSTB)
154	435		The error counter has exceeded in error 433 the set-up value of "GrenzeDeltaT [321]"	Lock-out - reset	The error counter has exceeded in error 433 the set-up value of "GrenzeDeltaT"
154	476	BOILER TEMPERATURE LIMIT EXCEEDED	Set-up flow temperature of HMI is lower than "TkSmin"	Message	Set-up flow temperature of HMI is lower than "TkSmin"
154	477		Set-up flow temperature of HMI is higher than "TkSnorm"	Message	Set-up flow temperature of HMI is higher than "TkSnorm"
154	498		Diagram with the 2nd heating circuit and the room unit is not available: time switch 2 for DHWS and time switch 2 with action on DHWS and on the 2nd heating circuit have been set up.	Message	Hydraulic diagm of Circuit 2 and RU not available: parametrizados time switch 2 with relay for D.H.W.S. and time switch 2 with relay with action on D.H.W.S. and heating circuits have been set up.
160	83	CHECK FAN PARAMETERS	The permitted speed band for ignition load has not been reached during the start-up.	Lock-out - reset	The permitted speed band for ignition load has not been reached during the start-up.
160	281		The fan speed is not below the required limit, phase "Ph_TLO: (N_TL - N_TH_Delta)", phase "Ph_TNN: NoG_Null". Remedy: increase the speed limit or reduce control.	Lock-out - reset	No more difference with respect to Albatros code. Remedy: decrease the speed limit or increase control
160	282		The fan speed is below the required limit, "PH_THL1_1: (N_Vor - N_Vor_Delta)", "PH_THL1_2: (N_ZL - N_ZL_Delta)", "PH_THL2_2: (N_Vor - N_Vor_Delta)". Remedy: reduce the speed limit or increase control.	Lock-out - reset	No more difference with respect to Albatros code. Remedy: decrease the speed limit or increase control
161	110		Non-fulfilment of the maximum speed limit.	Lock-out - reset	The fan maximum speed has been exceeded
162	82	AIR PRESSURE SWITCH	APS (air pressure switch) does not close	Lock-out - reset	LP does not close.
164	137	PRESSURE SENSOR	No more difference with respect to Albatros code	Lock-out - reset	No more difference with respect to Albatros code
164	138		No more difference with respect to Albatros code	Shut-off for safety with start prevention	No more difference with respect to Albatros code

Alba_Nr	Diagn_Nr	DIAGNOSIS	TEXT	REACTION	Complementary
166	81	AIR PRESSURE SWITCH	APS (air pressure switch) does not open if it turns off (¿contactos pegados?)	Lock-out - reset	LP does not open when the boiler stops (¿contactos pegados?)
181	169	FUNCTION MAINTENANCE	The function Controller Stop is activated	Message (only if the controller stops)	No more difference with respect to Albatros code
183	104	LMU CONTROL UNIT IN SETTING /PROGRAMMING MODE	Change to programming mode (by means of PC)	Off for safety with start prevention	Change to programming mode (by means of PC)
183	105		The unit is in programming mode (by means of PC)	Lock-out - reset (Programming mode)	Operating in programming mode (by means of PC)
183	279		Parameters setting required, via OT bus	Off for safety with start prevention	No more difference with respect to Albatros code
183	497		Parameters setting required, via LPB	Off for safety with start prevention	Demand of programming via LPB
184	602	MODEM ACTIVATED	The function Modem is activated	Message	



Evinox reserves the right to make changes and improvements which may necessitate alteration to the specification without prior notice.

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