

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

for the Installer and the User



Compact Condens

170 - 210 - 250 - 300

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GENERAL RECOMMENDATIONS

NOTE

This manual contains important information with respect to the installation, the starting up and the maintenance of the appliance.

This manual must be provided to the user, who will read it carefully and keep it in a safe place.

We accept no liability should any damage result from the failure to comply with the instructions contained in this technical manual.



Essential recommendations for safety

- It is prohibited to carry out any modifications to the appliance without the manufacturer's prior and written agreement.
- The product must be installed by a qualified engineer, in accordance with applicable local standards and regulations.
- The installation must comply with the instructions contained in this manual and with the standards and regulations applicable to heating systems.
- Failure to comply with the instructions in this manual could result in personal injury or a risk of environmental pollution.
- The manufacturer declines all liability for any damage caused as a result of incorrect installation or in the event of the use of appliances or accessories that are not specified by the manufacturer.



Essential recommendations for the correct operation of the appliance

- In order to ensure that the appliance operates correctly, it is essential to have it serviced by a certified installer or maintenance contractor every year.
- In case of anomaly, please call your service engineer.
- Faulty parts may only be replaced by genuine factory parts.



General remarks

- The availability of certain models as well as their accessories may vary according to markets.
- The manufacturer reserves the right to change the technical characteristics and features of its products without prior notice. Please check for an updated version of this manual in the documentation page on the website www.acv.com.
- In spite of the strict quality standards that ACV applies to its appliances during production, inspection and transport, faults may occur. Please immediately notify your approved installer of any faults.

GENERAL SAFETY INSTRUCTIONS FOR GAS APPLIANCES

If you smell gas:

- Immediately isolate the gas supply.
- Open windows and doors to ventilate the area.
- Do not use any electrical appliances and do not operate any switches.
- Immediately notify your gas supplier and/or your installer.

DO NOT STORE ANY FLAMMABLE OR CORROSIVE PRODUCTS, PAINT, SOLVENTS, SALTS, CHLORIDE PRODUCTS AND OTHER DETERGENT PRODUCTS NEAR THE APPLIANCE.

THIS APPLIANCE CAN BE USED BY CHILDREN AGED FROM 8 YEARS OLD AND ABOVE AND PERSONS WITH REDUCED PHYSICAL, SENSORY OR MENTAL CAPABILITIES OR LACK OF EXPERIENCE AND KNOWLEDGE, IF THEY HAVE BEEN GIVEN SUPERVISION OR INSTRUCTION CONCERNING THE USE OF THE APPLIANCE IN A SAFE WAY AND UNDERSTAND THE HAZARDS INVOLVED.

CLEANING AND USER MAINTENANCE SHALL NOT BE PERFORMED BY CHILDREN WITHOUT SUPERVISION.

CHILDREN SHALL NOT PLAY WITH THE APPLIANCE.








A BYPRODUCT OF ANY GAS FIRED APPLIANCE IS CARBON MONOXIDE. ACV RECOMMENDS THE INSTALLATION OF A MINIMUM OF TWO (2) HARD-WIRED CARBON MONOXIDE DETECTORS WITH AN ALARM AND BATTERY BACK-UP; ONE IN THE MECHANICAL ROOM WHERE THE BOILER IS LOCATED AND ANOTHER INSTALLED IN THE LIVING AREA OUTSIDE THE BEDROOM(S) FOR ALL INSTALLATIONS.









General remarks

- For any question regarding the use of the boiler or the heating system, please ask your installer.
- The end user is only allowed to carry out the basic set-up operations mentioned in "Boiler Setup Guide for the User" on page 8, after he has received all relevant instructions from the installer. Any other set-up must be carried out by an approved installer.
- If the end user misuses the installer code to access installer-specific parameters and makes changes that cause a system failure, any warranty claim will be void.

MEANING OF SYMBOLS

Symbols on the packaging	Meaning
	Fragile
	Keep dry
	Keep standing, up
	Danger of tipping over
	Hand truck or pallet truck required for transport
	Do not cut packaging to open
	Do not stack

Symbols on the appliance	Meaning
	Heating circuit
	Domestic Hot Water circuit


Symbols in the manual	Meaning
	Essential recommendation for safety (of persons and equipment)
	Essential recommendation for electrical safety (electrical hazard)
	Essential recommendation for the correct operation of the appliance or the system
	General remark

BOILER MARKING


Location: At the back of the boiler




The part number (Typ) and serial number of the appliance are indicated on its rating plate and must be provided to ACV in case of warranty claim. Failure to do so will make the claim void.

		ACV INTERNATIONAL OUDE VIJVERWEG N°6 1653 DWORP		CE 0063-2016 0063CQ3790	
Typ	100394 / A1002889	Country	P[mbar]	Cat	
Model	Compact Condens 170	AT	20	I2H	
Qn (Hi)	33,6 - 168 kW	BE	20/25	I2E (R)	
Pn (50-30)	172,7 kW	CH	20	I2H	
Pn (80-60)	32,6 - 163,6 kW	DE	20	I2E	
Tmax	90 °C	ES	20	I2H	
PMS	6 bar	FR	20/25	I2Esi	
V	20 L	GB	20	I2H	
Pe (max)	1150 Watt	IE	20	I2H	
IP	00b	IT	20	I2H	
230 VAC	50 Hz 5 A	LU	20	I2E	
		NL	25 I2L, I2EK		
		PL	20	I2H	
Ser. Nr.	100394141161600000002	B23 C33 C53 C63 EN 15502-1, 15502-2-1			


Compact Condens 170

		ACV INTERNATIONAL OUDE VIJVERWEG N°6 1653 DWORP		CE 0063-2016 0063CQ3790	
Typ	100396 / A1002891	Country	P[mbar]	Cat	
Model	Compact Condens 250	AT	20	I2H	
Qn (Hi)	50,4 - 252 kW	BE	20/25	I2E (R)	
Pn (50-30)	259,0 kW	CH	20	I2H	
Pn (80-60)	48,9 - 245,4 kW	DE	20	I2E	
Tmax	90 °C	ES	20	I2H	
PMS	6 bar	FR	20/25	I2Esi	
V	20 L	GB	20	I2H	
Pe (max)	1150 Watt	IE	20	I2H	
IP	00b	IT	20	I2H	
230 VAC	50 Hz 5 A	LU	20	I2E	
		NL	25 I2L, I2EK		
		PL	20	I2H	
Ser. Nr.	100396141161600000001	B23 C33 C53 C63 EN 15502-1, 15502-2-1			

Compact Condens 250

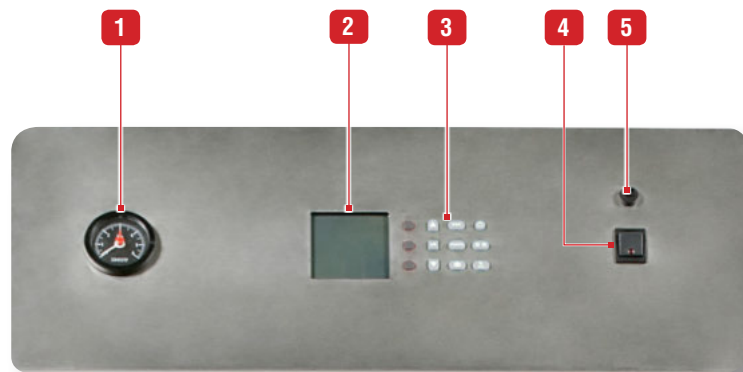
		ACV INTERNATIONAL OUDE VIJVERWEG N°6 1653 DWORP		CE 0063-2016 0063CQ3790	
Typ	100395 / A1002890	Country	P[mbar]	Cat	
Model	Compact Condens 210	AT	20	I2H	
Qn (Hi)	42 - 210 kW	BE	20/25	I2E (R)	
Pn (50-30)	215,9 kW	CH	20	I2H	
Pn (80-60)	40,7 - 204,5 kW	DE	20	I2E	
Tmax	90 °C	ES	20	I2H	
PMS	6 bar	FR	20/25	I2Esi	
V	24 L	GB	20	I2H	
Pe (max)	1150 Watt	IE	20	I2H	
IP	00b	IT	20	I2H	
230 VAC	50 Hz 5 A	LU	20	I2E	
		NL	25 I2L, I2EK		
		PL	20	I2H	
Ser. Nr.	100395141161600000001	B23 C33 C53 C63 EN 15502-1, 15502-2-1			

Compact Condens 210

		ACV INTERNATIONAL OUDE VIJVERWEG N°6 1653 DWORP		CE 0063-2016 0063CQ3790	
Typ	100397 / A1002892	Country	P[mbar]	Cat	
Model	Compact Condens 300	AT	20	I2H	
Qn (Hi)	58,8 - 290 kW	BE	20/25	I2E (R)	
Pn (50-30)	298,1 kW	CH	20	I2H	
Pn (80-60)	57,0 - 282,5 kW	DE	20	I2E	
Tmax	90 °C	ES	20	I2H	
PMS	6 bar	FR	20/25	I2Esi	
V	32 L	GB	20	I2H	
Pe (max)	1150 Watt	IE	20	I2H	
IP	00b	IT	20	I2H	
230 VAC	50 Hz 5 A	LU	20	I2E	
		NL	25 I2L, I2EK		
		PL	20	I2H	
Ser. Nr.	100397141161600000001	B23 C33 C53 C63 EN 15502-1, 15502-2-1			

Compact Condens 300

CONTROL PANEL AND DISPLAY

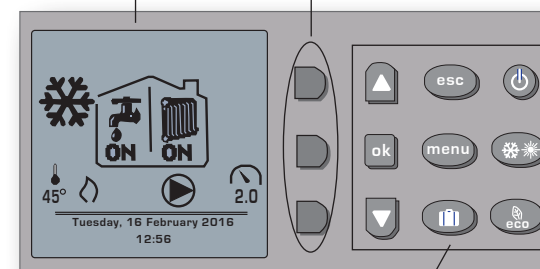
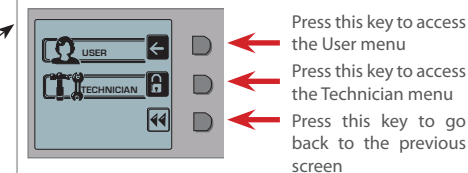


Panel Description

1. **Pressure gauge** - Indicates the primary circuit pressure (min. 1 bar when cold).
2. **MAXSYS LCD Display** - It is the setup interface of the boiler and indicates the parameter values, the error codes and the set-up status of the parameters. It displays a series of screens, each showing information and/or icons.
3. **Keypad** - To browse through the screens of the MAXSYS controller, set up the boiler, increase and decrease the displayed values and validate the selections and access the User or Installer set-up screens. See detail on the right.
4. **ON/OFF master switch of the boiler** - To turn the appliance ON and OFF.
5. **5A Fuse** - To protect the electrical system of the boiler.

Home screen : It shows the status of CH and DHW circuits (ON or OFF, as defined by the user/installer in the setup), the activation of the anti-freeze function, the current temperature, the current pressure, the operation of the circulation pump, the current date and time. A flame symbol is also displayed when the unit is fired.

Display keys: Allow to select specific items on the display, as well as increase/decrease the values shown on specific screens (when associated with "+" or "-" symbol on the display) or go back to the previous screen (when associated with "◀" on the display). See the example below.



Key	Function
▲	To scroll up the menus on the display
ok	To validate a selection or a value
▼	To scroll down the menus on the display
esc	To exit a screen and go back to the Home screen
menu	To access the User / Technician menu selection screen
	To activate the "Holiday function"
	To put the boiler in OFF mode
	To enable/disable the CH and DHW functions
eco	To enable the ECO function

WHAT TO CHECK ON A REGULAR BASIS

Essential recommendations for the correct operation of the appliance

ACV recommends to check the system at least every 6 months as follows:

- Check that the system water pressure is at least 1 bar when cold. If the pressure drops below 0.8 bar, the built-in pressure sensor blocks the appliance until the pressure exceeds 1.2 bar.
- If it is required to top up the system to maintain the minimum recommended water pressure, always turn the appliance off and only add small amounts of water at a time. If a large amount of cold water is added in a hot boiler, the boiler can be permanently damaged.
- If the system needs to be refilled repeatedly with water, please contact your installer.
- Check that there is no water on the floor under the boiler. If there is, please call your installer.
- If a condensate neutralisation system is installed, check it and have it cleaned regularly.
- Check regularly that there is no error code (lockout) flashing on the display. Refer to paragraph below.

LOCKOUT SCREEN

If a problem occurs, the Lockout screen replaces the Home screen. The error is indicated by a code and message on the display. Pressing the OK key will reset the boiler.

Using the code on the display, solve the problem with the table on the right, then reset the boiler.

If the problem cannot be solved and/or if the code is not provided in this table, please contact your installer.

IN CASE OF PROBLEM...

Check the list of faults and corresponding codes below to get the solution(s). If no solution is provided here, please contact your installer who will determine the correct solution.

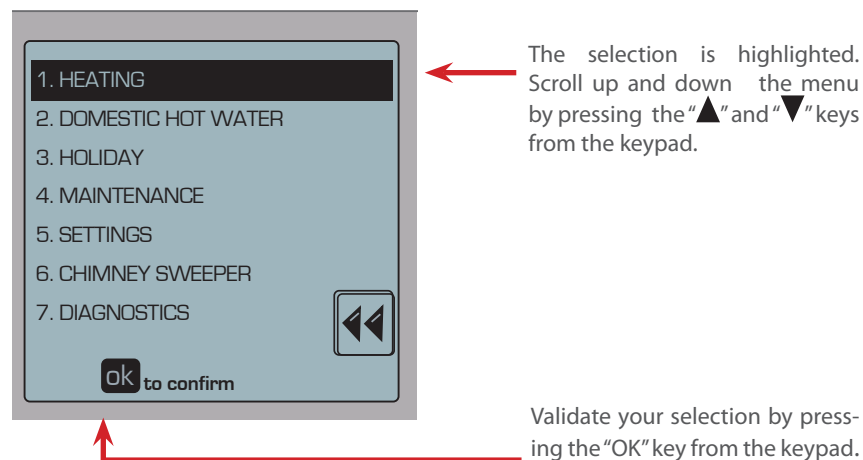
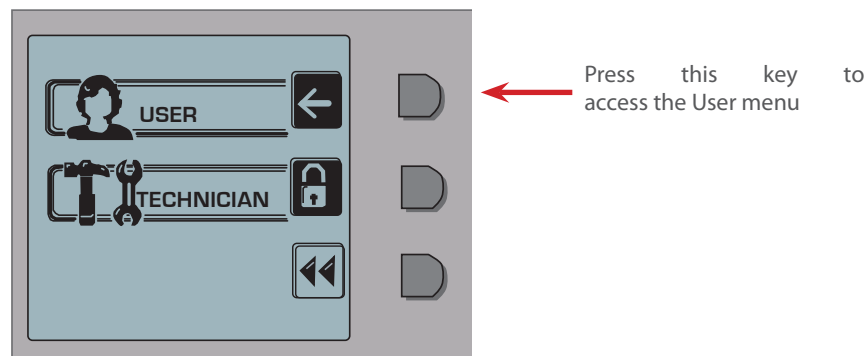
Fault code	Problem	Possible Cause(s)	Solution
-	The appliance does not turn on when pressing the ON/OFF Master switch	No power supply	Check the power supply and that the appliance power plug is connected to the network.
-	The appliance is ON, but not producing any heat	Room thermostat not set	Set the room thermostat to the required temperature to generate a heat demand.
		Radiator valves not open	Open the radiator valves.
		The system contains air	Bleed the system to remove all air.
E1	Failed ignition	The burner failed to light after 3 ignition attempts	Check gas supply to the boiler.
E13	Reset limit reached	Resets are limited to 5 every 15 minutes	Turn unit OFF and ON to resume normal operation.
E34	Low voltage	Line voltage has fallen below an acceptable operating level	The boiler will automatically reset once line voltage returns to normal.
E37	Low Water	Water pressure has fallen below an acceptable operating level (0.8 bar)	Refill the system to reach a normal range pressure. The boiler will automatically reset once water pressure returns to normal.
E94	Internal Display Fault	Display memory error	Turn appliance off and on to resume normal operation.

BOILER SETUP GUIDE FOR THE USER

The main parameters of the Compact Condens boilers can be set up by the user using the user setup function of the controller. It allows the user/installer to quickly setup the appliance for immediate operation according to the system configuration.

A more extensive menu is also provided for the Installer, refer to "Installer's menu and parameter descriptions" on page 14.

Accessing the User menu - Press the "menu" key from the keypad to access the screen shown below

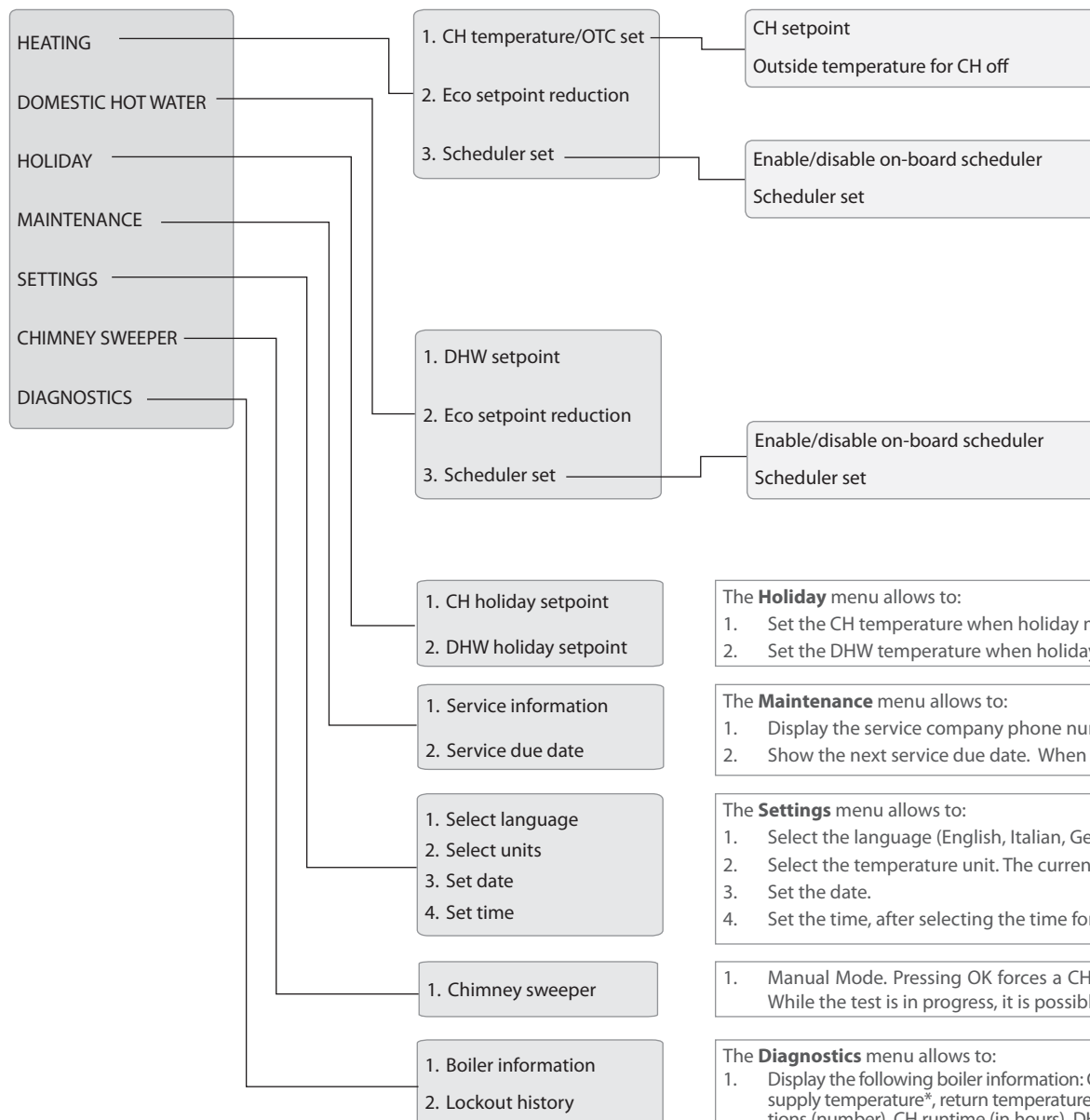


Through the User menu, the following parameters can be set :

Heating	The user can define the CH setpoint, the outside temperature at which the heating must be stopped (Outside air temp. sensor required), the temperature reduction for the Eco mode, and they can schedule the operation of the CH circuit.
Domestic Hot Water	When an external DHW tank is installed in the system, the user can define the DHW setpoint, the temperature reduction for the Eco mode, as well as schedule the operation of the DHW circuit.
Holiday	This menu allows to define the CH and DHW setpoints applicable in holiday mode.
Maintenance	This function provides information related to the maintenance operations (contact details and maintenance due date).
Settings	In this menu, various general settings can be defined, such as language, units, date, time, etc.
Chimney Sweeper	This is a manual mode that forces a heat demand and allows to test the boiler.
Diagnostics	In the diagnostics, the user can find the boiler usage information as well as the history of errors.

For a detail of the screens and descriptions of the user's menu, see the diagram on the following page.

USER'S MENU AND PARAMETER DESCRIPTIONS



The **Heating** menu (user) allows to:

1. Set the CH temperatures and OTC curve parameters :
 - **CH setpoint**: to adjust the setpoint of CH circuit.
 - **Outside temperature for CH off**: to set the external temperature at which heat demand is stopped. If set to OFF, the heat demand will never be stopped by the controller (unless RT is removed, or there is a bridge between terminal strip C2: 1, 2).
2. Set the temperature that will be subtracted from actual setpoint if ECO mode is active, using the **Eco setpoint reduction**.
3. Display the scheduler menu
 - **Enable/disable scheduler**: to Enable or disable the CH on board scheduler.
 - **Scheduler set**: to program scheduler according to the days of the week, per day, or per range of days.

The **Domestic Hot Water** menu (user) allows to:

1. Set the actual DHW temperature (in case there is a sensor in the DHW circuit) OR set the base boiler flow temperature (in case there is a switch).
2. Set the temperature that will be subtracted from actual setpoint if ECO mode is activated, using the **Eco setpoint reduction**.
3. Display the scheduler menu
 - **Enable/disable scheduler**: to Enable or disable the DHW on board scheduler.
 - **Scheduler set**: to program scheduler according to the days of the week, per day, or per range of days.

The **Holiday** menu allows to:

1. Set the CH temperature when holiday mode is active.
2. Set the DHW temperature when holiday mode is active.

The **Maintenance** menu allows to:

1. Display the service company phone number or any other entered information.
2. Show the next service due date. When the period is expired, an indication shows on the screen.

The **Settings** menu allows to:

1. Select the language (English, Italian, German, Spanish or Russian). The current language is highlighted
2. Select the temperature unit. The current unit used in the controller is highlighted.
3. Set the date.
4. Set the time, after selecting the time format (24/12 hours).

1. Manual Mode. Pressing OK forces a CH demand that will ignite the boiler, which will operate at % of power (timeout: 15 minutes). While the test is in progress, it is possible to navigate the other menus.

The **Diagnostics** menu allows to:

1. Display the following boiler information: CH request, DHW demand, Firing rate (in %)*, Flame ionization current (µA)*, boiler setpoint*, boiler supply temperature*, return temperature*, flue temperature*, outdoor temperature*, DHW storage temperature*, boiler fan speed, CH ignitions (number), CH runtime (in hours), DHW ignitions (number), DHW runtime (in hours), system pressure (water pressure in bar/psi) , Heat exchanger temp., 0-10V input, Target power (Items with an * at the end will open a graph that shows the latest 120 variable values stored every 12 minutes (24 hours history) when pushing OK).
2. Display the list of recent errors. Pushing on OK when the lockout is highlighted will open a screen that contains details on the boiler status when the error occurred.

FACTORY SETTINGS

USER MENU

						Default	Min	Max
1	HEATING	1	CH temperature/OTC set	1	Ch setpoint	85	20	90/Technician
				2	Outside temperature for CH off	OFF	7	30
		2	ECO setpoint reduction			50	0	50
		3	Scheduler set	1	Enable/disable on board scheduler	Enabled	Disabled	Enabled
				2	Scheduler set	ON	ON OFF	ECO
2	DOMESTIC HOT WATER	1	DHW setpoint (Switch)			80	35	85
		1	DHW setpoint (NTC sensor)			60	10	65
		2	ECO setpoint reduction			20	0	50
		3	Scheduler set	1	Enable/disable on board scheduler	Enabled	Disabled	Enabled
				2	Scheduler set	ON	ON OFF	ECO
3	HOLIDAY	1	CH holiday setpoint			20	20	90/Technician
		2	DHW holiday setpoint (Thermostated)			80	35	85
		2	DHW holiday setpoint (NTC sensor)			60	10	65
4	MAINTENANCE	1	Service information			Service tel. set by Technician		
		2	Service due date			Date set by Technician		
5	SETTINGS	1	Select language			English	English Italian/Spanish	German Russian
		2	Select units			Celsius	Fahrenheit	Celsius
		3	Set date			set date		
		4	Set time			24 hours	24 hours	12 hours
6	CHIMNEY SWEEPER					OFF	0	100
7	DIAGNOSTICS	1	Boiler information			Real time boiler status		
		2	Lockout history		Overview lockout history	Status boiler at time of lock/block		

PRINCIPLES OF OPERATION

General

The Compact Condens is a floor standing boiler, equipped with a cast aluminium heat-exchanger. The boiler is provided with a heating circuit, but no internal Domestic Hot Water production tank. However, an external DHW tank can be installed in the system. Refer to "System Configurations" on page 40.

The CH circuit is not provided with a CH-pump. The installer must therefore install one in the system, whose hydraulic resistance will match the hydraulic resistance of the boiler(s) and system. Please contact your ACV representative for the correct accessories.

The boiler is equipped with an air-gas premix burner. The combustion air is taken from the outside (if room sealed) or the boiler room (Type B flue system) by the fan, then passes through a gas/air mixing device creating a negative pressure. As this negative pressure is an indication of the amount of air present for combustion, the gas valve automatically adjusts the amount of gas to be injected in the venturi for mixture with the air flow. The mixture is supplied to the burner, where two burnerhood-mounted electrodes ignite the air-gas mixture. Temperature control and safety are ensured by 2 NTCs that are continuously monitored by the boiler, through the MAXSys processor. The MAXSys also controls the hydraulic circuits (CH and DHW) of the Compact Condens.

Heating Circuit

The heating circuit can be controlled using various devices (see "Electrical connections" on page 12 and "Wiring Diagram and Electrical Connections" on page 26 to check how to connect them correctly):

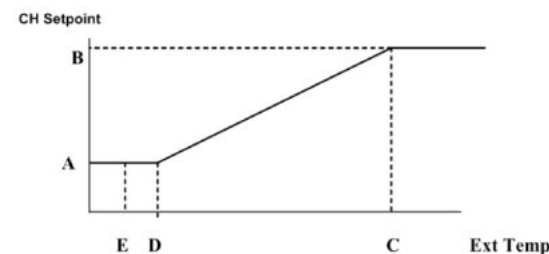
- **On-off room thermostat (standard)** - As standard the boiler is programmed to use an on-off room thermostat. The desired flow temperature is adjustable, but as standard is set to 85 °C. At CH heat request from the room thermostat (and no DHW heat request present) the CH pump is activated after 10 seconds. The controller will adjust the burner-input in such a way that a flow-temperature of 85 °C is achieved and supplied to the CH circuit.
- **0-10V Control (optional)** - The boiler may be controlled using a 0-10 V DC signal. In the **Technician menu, advanced CH settings, CH request**, either 0-10Vdc % or 0-10Vdc SP can be selected.
 - **0-10Vdc % power control**
A value between 2 and 10Vdc generates a CH power demand proportional to this value, between 0 and 100% (0% = minimum load, 100% = nominal load). The heat demand is cancelled when the control signal falls below 1 volt.
The setpoint of maximum flow temperature is set to 90°C. In the **User/Technician menu, diagnostics, boiler information**, the actual voltage input and target power are displayed.
 - **0-10Vdc Setpoint**
A value between 2 and 10Vdc generates a CH setpoint demand proportional to this value, between minimum CH flow temperature and maximum CH flow temperature. The heat demand is cancelled when the control signal falls below 1 volt.
The minimum and maximum CH flow temperatures can be set in the **Technician menu, advanced CH settings, CH temperatures**.
In the **User/Technician menu, diagnostics, boiler information**, the actual voltage input and boiler setpoint are displayed.

 Take care that the 0-10 V DC signal is free from electrical interference!

- **Outside Temperature Control OTC (optional)** - The boiler is prepared to work with an outdoor sensor to provide weather compensation (OTC).

In the **Technician menu, Advanced CH settings, CH request**, select **OTC only**. The outdoor sensor is then automatically detected by the controller.

The parameters corresponding with A-E in the figure below can be set in the **Technician menu (Advanced CH settings)**.



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

In the **User menu**, an **Eco setpoint reduction** (night reduction) can be set. A day, week and week-end scheduler is also available (on , eco, off)

The outdoor sensor is optional. Please contact your ACV representative for more information.

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

 The resistance of the outdoor NTC should be 12 kOhm at 25 °C.

- **Digital communication (optional)** - The boiler is also prepared for digital communication with room thermostats, using communication protocols like Open-Therm (automatically recognised if correctly connected, refer to "Electrical connections" on page 12 and "Wiring Diagram and Electrical Connections" on page 26). Please contact your ACV representative for more details and the correct accessories.

Domestic Hot Water preparation (DHW)

- **External storage tank with thermostat (electric 3-way valve)** - As standard, the DHW configuration is set to use storage tank + tank thermostat :

For hydraulic connection of an external storage tank to the boiler, one should either use:

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

The 2 wires of the tank thermostat need to be connected as indicated in "Electrical connections" on page 12.

When using an electric 3-way valve, adjust the setting in the **Technician menu, system settings, boiler parameters, number of pumps** to "Pump and 3-way valve".

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

- **External storage tank with NTC sensor** - If the storage tank is equipped with an NTC sensor, adjust the setting in **Technician menu, advanced DHW settings, DHW request** to "Sensor".

 **The resistance of the outdoor NTC should be 12 kOhm at 25 °C.**

The 2 wires of the tank NTC sensor need to be connected as indicated in "Electrical connections" on page 12.

Heat request and keeping on temperature of the storage tank is done at an adjustable temperature (default set at 60°C, the flow temperature is DHW setpoint + 20K).

 **In case of a CH heat request, immediately after finishing the heat request for DHW, there is a risk of hot water flowing into the CH system (hot shot).**

General behaviour with external storage tank (DHW priority)

- Disabling/Enabling warm water operation : press the Summer-Winter button.
- In the default boiler configuration, meaning 2 pumps (DHW and CH pump), a DHW request has priority over CH request
- In the **Technician menu, Advanced DHW settings, DHW priority**, the "DHW priority over CH" can be disabled or the period after which the DHW priority ends can be defined.
- In case the DHW priority is disabled and both demands are active at the same time, both pumps (CH and DHW) will be activated. During that time, the flow temperature is set to either 80 °C (thermostat) or DHW setpoint + 20K (NTC sensor).

 **In some countries, at outputs ≥ 40 kW, double separation is required between exchanging media.**

Safety features


The Compact Condens features various safety devices to protect the boiler and the complete system:

- **Main fuse (5A)**, located near the On/Off switch, on the right side of the control panel.
- **Protection against insufficient flow through boiler**: If the minimum flow (refer to "Hydraulic Characteristics" on page 29) is fulfilled, the boiler will protect itself against insufficient flow. The difference in temperature between flow and return (so called ΔT) is checked by the controller. In a low flow scenario the ΔT will rise rapidly. The ΔT safe-guarding principle is as follows ;
 - At $\Delta T > 22$ the boiler starts modulating
 - At ΔT between 22 and 27 the boiler continues modulating
 - At $\Delta T > 27$ the boiler fan speed will reduce until $\Delta T < 25$
- **Siphon pressure switch**, connected to the sump (P1), prevents overflow of the siphon in case the back pressure is too high in the chimney
- **Overheat limit switch (thermostat)**, set at 105°C.
- **Air pressure switch**, connected to the venturi, checks the amount of air (by means of a Δp measurement) before start.
- **A Frost protection mechanism**: This function protects the **boiler only**, not the system. As soon as the flow temperature drops below 8°C, the central heating pump is activated. As soon as the flow temperature is at 6°C, the burner starts up at minimum load until the flow temperature rises to 15°C. The CH-pump will continue to run for 10 minutes. The function can be enabled or disabled through the Technician's menu. When the frost protection is disabled, only the pump operate.

- An **anti-freeze function** is also available using a frost thermostat connected in parallel with the room thermostat. Another possibility is the use of an outdoor sensor in combination with the OTC settings (to be set by the installer). The CH pump will be activated if the outdoor temperature drops below 8 °C. In order to enable the Compact Condens boiler to protect the whole system against freezing, all the valves of the radiators and the convectors should be completely open.

Other features

Eco working mode - When the Eco button () is pressed, a programmable value is subtracted from the flow temperature setpoint. The value can be changed through the "ECO setpoint reduction" in the User menu or the Technician menu.

Holiday mode - When the Holiday button () is pressed, a request is displayed, asking to enter the start and end dates of the holiday period. It is also possible to set the CH flow and DHW temperatures wished for this period.

Manual mode (Chimney Sweeper) - For periodical maintenance and/or service, a CH request can be generated to force the burner (not in "error" condition) to a specific load, from minimum to nominal (100%). The chimney sweeper can be started from the User menu and will be active for 15 minutes. While active, it is possible to navigate through other menus to check the boiler status and functionality.

CH and DHW Schedulers - For CH and DHW, separate schedulers can be set. By default, both schedulers are enabled and always on. Scheduler set (ON, ECO, OFF) can be done for each day, for a group of weekdays, for weekend days or for an entire week. The status of the scheduler is set on the main screen (ON, ECO, OFF). The scheduler can be set in the **User menu, heating or domestic hot water** or in the **Technician menu, User settings, Heating or Domestic hot water**.

Cascade - The boilers can be set up in a cascade configuration, without the use of an external controller. Please refer to "Integrated Cascade Functionality" on page 18.

Modbus - A Modbus controller can also be used to control the boiler(s). Refer to «Modbus» on page 22.

Electrical connections

	To be connected to	Remark
On-Off room thermostat	Strip C2, pins 1 and 2	
0-10 V control	Strip C2, pin 3 (negative 0Vdc) and pin 4 (+ positive)	Shortcut to be installed on terminal C2, between pins 1 & 2
Outside Temperature Control (OTC)	Strip C2, pins 5 and 6	Bridge to be installed on terminal C2, between pins 1 & 2 (or use them to connect room thermostat on/off)
Digital communication (Open therm)	Strip C2, pins 1 and 2	
DHW pump	Strip C1, pins 6, 7 and 8	
CH pump	Strip C1, pins 9, 10 and 11	
Hydraulic 3-way valve	Strip C1, pins 6, 7 and 8	
Electric 3-way valve	Strip C1, pins 6, 7, 8 and 9	
Tank thermostat	Strip C2, pins 7 and 8	

	To be connected to	Remark
Tank NTC sensor	Strip C2, pins 7 and 8	
Cascade	Special Kit (Terminal strip C3 to be installed + cables)	Refer to "Integrated Cascade Functionality" on page 18
Modbus	Special Kit (Terminal strip C3 to be installed + cables)	Refer to "Modbus" on page 22

Start up process

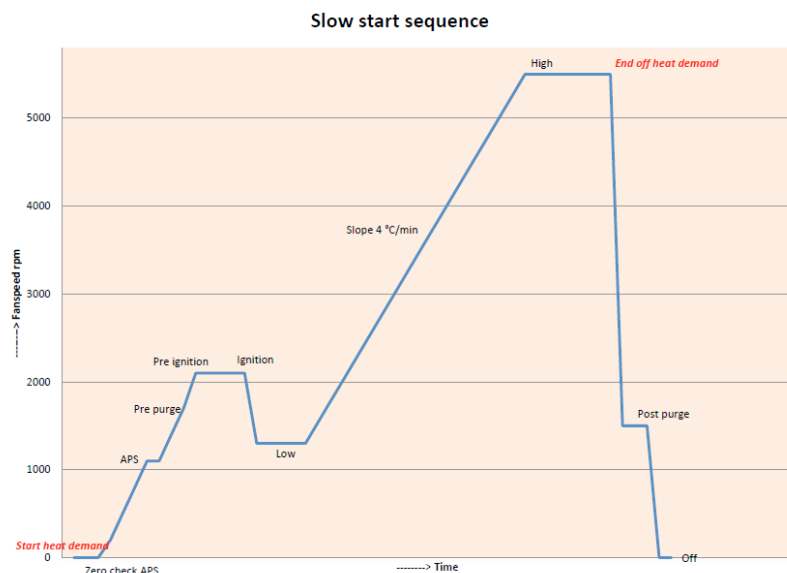
During heat demand, the pump is activated by the controller. After zero-check of the air pressure switch the fan speeds up to airflow-check fan speed. Once the air pressure switch is closed the fan goes to ignition speed and a 5 second pre-purge is performed. Then the water pressure sensor, gas pressure switch and siphon pressure switch are checked. When all pressure switches are closed and the water pressure is OK, the ignition starts.

The temperature control and safeguarding is done with the use of 2 NTCs. Data coming from these NTCs is processed by the controller (MAXSys) that takes care of control and safe-guarding of the boiler.

"Slow start" principle

The boiler uses a "slow start" procedure to prevent the boiler from supplying excessive power in low load situations.

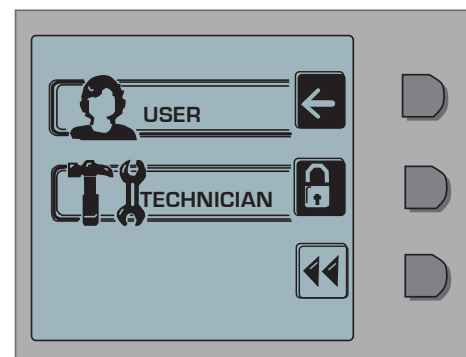
After APS "zero check" and APS closure with pre purge, ignition starts. After a stabilisation time, the boiler modulates down to low capacity and maintains it for 1 minute. Subsequently the boiler power increases at a rate of 4 °C/min until maximum capacity or set temperature has been reached. Once heat demand has finished the boiler will stop after its set pre-purge period. See graph below.



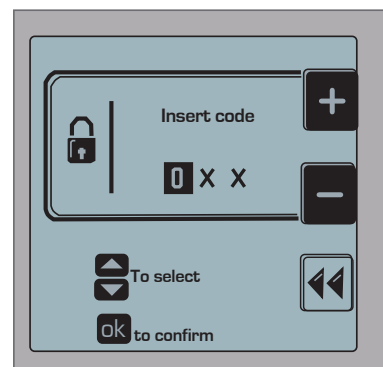
BOILER SETUP GUIDE FOR THE INSTALLER

The parameters of the Compact Condens boilers can be set up by the installer using the Technician setup function of the controller. It allows the installer to setup extensively the appliance according to the system configuration.

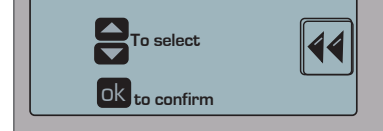
Accessing the Technician menu - Press the "menu" key from the keypad to access the screen shown below. Then type the Installer code "231" using the display keys corresponding to the "+" and "-" signs on the display.



Press this key to access the Technician menu.



Press the corresponding display keys to reach the desired value for the selected number (Code: 231). Then press the "ok" key to go to the next position.



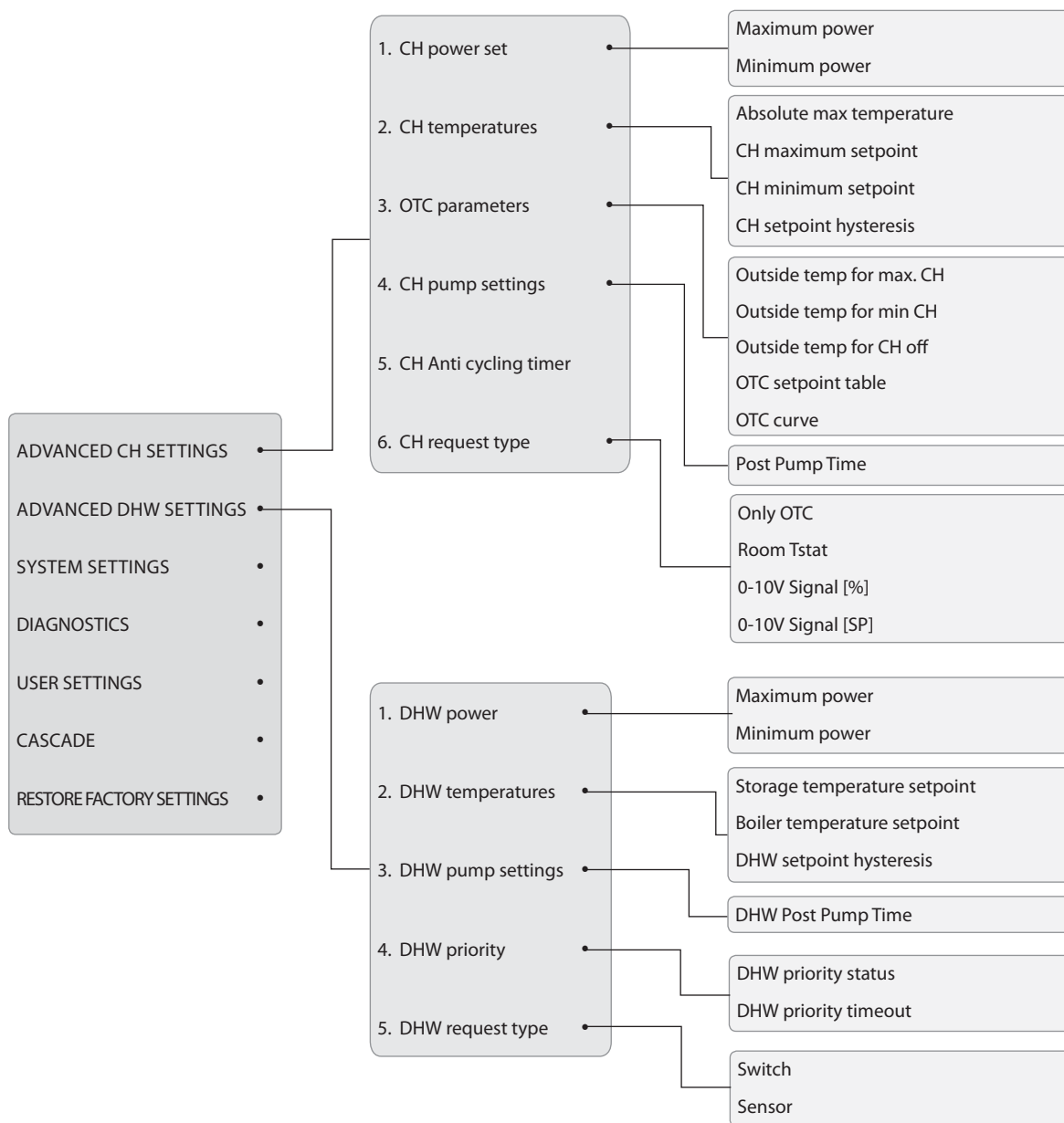
Press the corresponding display keys to get back to the User/Technician menu selection screen.

The following parameters can be accessed by the installer.

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

See the following pages for more details.

INSTALLER'S MENU AND PARAMETER DESCRIPTIONS

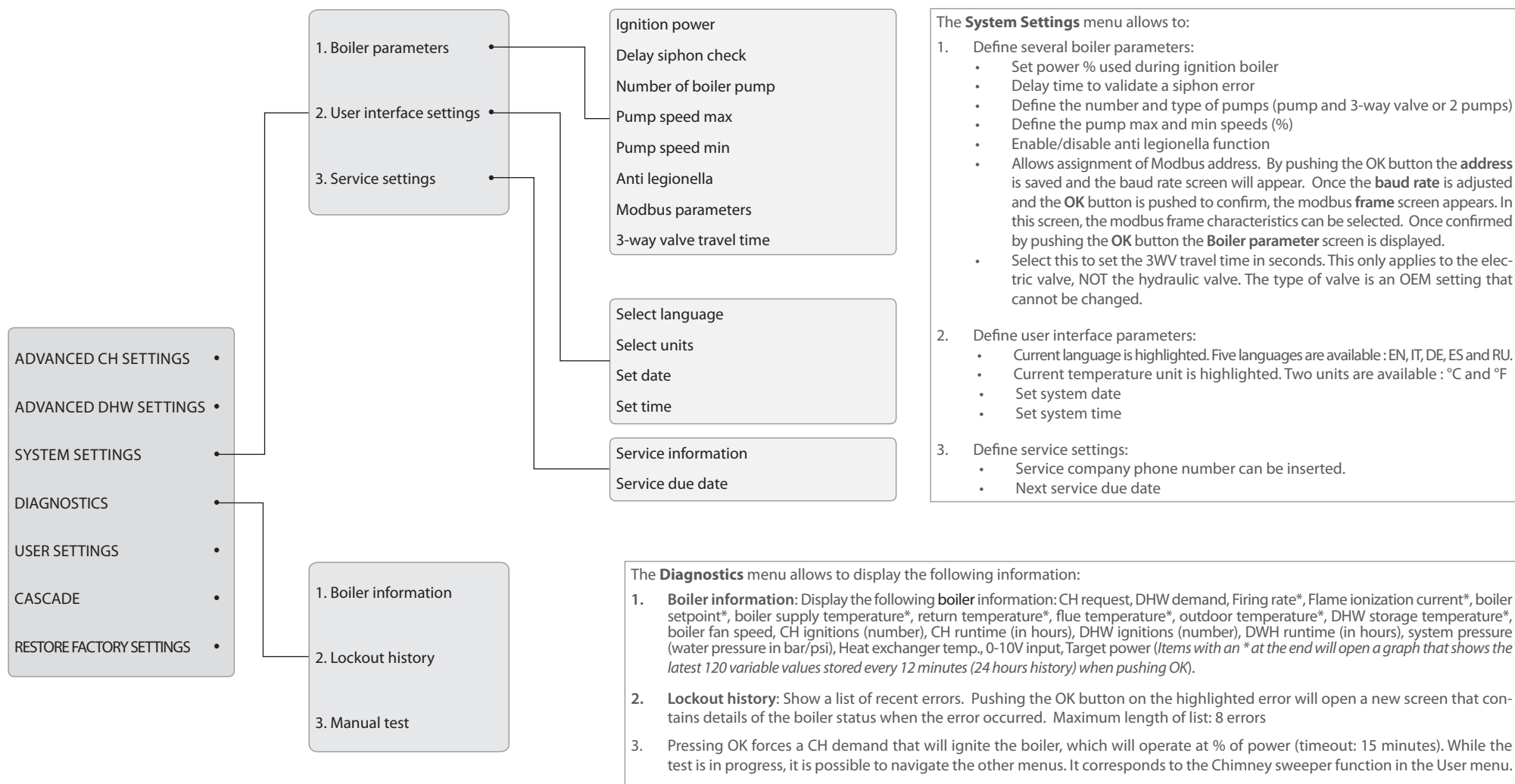


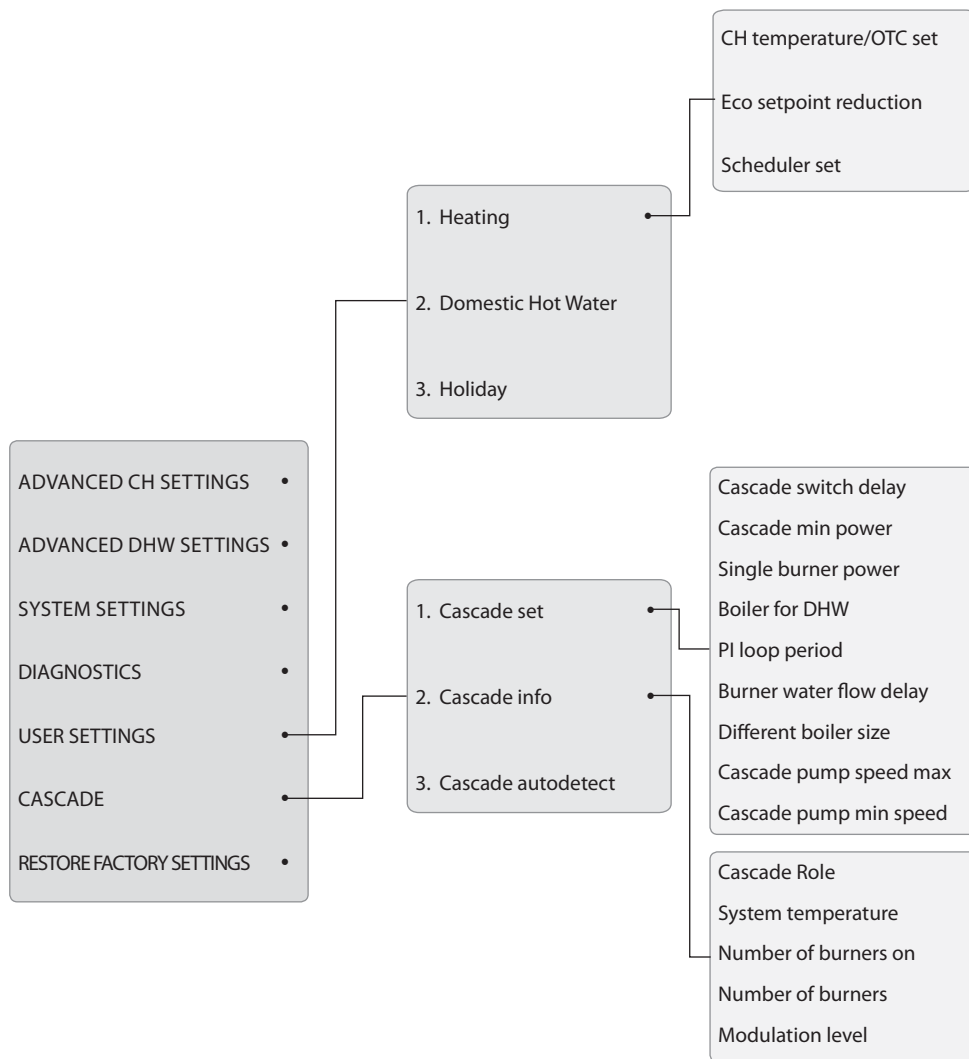
The **Advanced CH Settings** menu (Technician) allows to:

- Set % of boiler maximum / minimum power in CH mode
- Show and set boiler CH temperatures:
 - Set absolute CH max temperature that CH circuit will never exceed.
 - Set the maximum CH temperature.
 - Set the minimum CH temperature.
 - Set CH setpoint hysteresis (temperature above setpoint at which boiler will switch off).
- Set OTC parameters:
 - Define external temperature at which OTC will set a maximum CH setpoint.
 - Define external temperature at which OTC will set a minimum CH setpoint.
 - Set the external temperature at which heat demand is stopped. If set to OFF, heat demand will never be stopped by the controller (only by removing RT or bridge between pins 1 & 2 on strip C2).
 - Show in a table the link between external temperature and actual setpoint determined by the OTC parameter selection.
 - Show in a curve the link between external temperature and actual setpoint determined by the OTC parameter selection.
- Adjust pump related parameters
 - Pump overrun time after heat demand.
- Determines the minimum time between boiler stop and next ignition.
- Allows the selection of different CH requests:
 - Outdoor Temperature Controller
 - Room thermostat or Open therm
 - 0-10V input for Power mode
 - 0-10V input for Setpoint mode

The **Advanced DHW Settings** menu allows to:

- Set % of boiler maximum / minimum power in DHW mode.
- Show and set DHW temperatures
 - Set DHW temperature setpoint coming from thermostat (switch).
 - Set flow temperature during DHW demand coming from sensor.
 - Set temperature above setpoint at which boiler will be switched off.
- Adjusts pump related parameters in DHW mode
 - Pump overrun time after DHW demand.
- Define DHW priority over CH
 - Enable/disable the DHW priority over CH.
 - Define after how much time the DHW priority is ended (CH can be served if present for the same amount of time). Select OFF for no timeout while DHW priority status is enabled, or Minutes to set timeout in minutes.
- Define demand by switch or sensor
 - DHW starts when switch (thermostat) closes
 - DHW starts based on difference between actual and required DHW temperature





The **User Settings** menu allows to access the user settings from the Technician menu:

- Heating settings**
 - Set the CH temperature and OTC curve parameters (adjust CH setpoint and outside temperature for CH off).
 - Set the temperature that will be subtracted from actual setpoint if ECO mode is active, through the **Eco setpoint reduction**.
 - Display the scheduler menu
- Domestic Hot Water settings**
 - In case there is a sensor, set the actual DHW temperature and in case there is a switch in the DHW circuit, set the base boiler flow temperature.
 - Set the temperature that will be subtracted from actual setpoint if ECO mode is active, through the **Eco setpoint reduction**.
 - Display the scheduler menu
- Holiday settings**

Refer to "User's menu and parameter descriptions" on page 9 for more details.

The **Cascade** menu allows to access the cascade-related parameters:

- Cascade set**
 - Cascade switch delay: delay between switching on and off different boilers.
 - Cascade min power : minimum power of boilers in cascade.
 - Single burner power : Max power of SINGLE boiler in the cascade.
 - Boiler for DHW: Number of boilers assigned to DHW.
 - PI loop period: Base time for PI loop calculation.
 - Burner water flow delay: water propagation time delay.
 - Different boiler size: Heterogeneous mode, with 2 power groups (DHW+CH / CH only), that can be enabled/disabled
 - Cascade pump speed max: Cascade pump full speed
 - Cascade pump min speed
- Cascade info** menu provides information related to the cascade
 - Cascade Role : Role of boiler in cascade mode (Master, Slave, Terminal Slave or Standalone if not in cascade mode).
 - System temperature: Cascade temperature value. Pushing on OK when it is highlighted will open a graph that shows the latest 120 variable values stored every 12 minutes (over the past 24 hours). Samples will not be averaged over the 12 minutes period.
 - Number of burners on : number of burners that are switched on.
 - Number of burners: number of burners in a cascade.
 - Modulation level: Actual percentage of cascade modulation level
- Cascade autodetect** - Pressing **OK** will start the autodetection process of the cascade configuration. It can only get started from the Master boiler.

Refer to "Integrated Cascade Functionality" on page 18 for more details.

The **Restore factory settings** menu allows to restore all the advanced settings to the original default factory settings by pressing on OK.



Please contact your ACV representative to get the default values for your appliance.

FACTORY SETTINGS

TECHNICIAN MENU													
1	ADVANCED CH SETTINGS	1	CH power set	1	Maximum power	default	Min	Max	After factory reset				
				2	Minimum power	100	0	100	100				
				1	Absolute max. temperature	90	20	100	80				
		2	CH temperatures	Higher than 90 not allowed									
				2	CH maximum setpoint	85	20	Abs. max CH temp	75				
				3	CH minimum setpoint	20	20	70	40				
				4	CH setpoint hysteresis	5	2	10	3				
				3	OTC parameters	1	Outside temp for max CH	-10	-34	10	-10		
		2	Outside temp for min CH			18	15	25	18				
		3	Outside temp for CH off			OFF	7	30	OFF				
		4	OTC setpoint table			OTC table							
		5	OTC curve			OTC curve							
		4	CH pump settings	1	Post pump time	10	1	30	5				
		5	CH anticycling timer	3				0	15				
		6	CH request type	RT+SP/OT				onlyOTC RT	01-Vdc % SP	RT+SP/OT			
2	ADVANCED DHW SETTINGS	1	DHW power	1	Maximum power	100	0	100	100				
				2	Minimum power	0	0	100	0				
		2	DHW temperatures	1	Storage temperature setpoint	80	35	85	80				
				2	Boiler temperature setpoint	60	35	65	60				
				3	DHW setpoint hysteresis	6	2	10	3				
		3	DHW pump settings	1	DHW post time	1	OFF	180	30				
				1	DHW priority Status	Enabled	Enabled	Disabled	Enabled				
		4	DHW priority	1	DHW priority TimeOut	Off	1	60	Off				
				2	DHW request type	Switch	Switch	Sensor	Switch				
		3	SYSTEM SETTINGS	1	Boiler parameters	1	Ignition power	10	0	20			
Higher than 20 not allowed													
2	Delay siphon check					3	0	20	10				
check syphon is not emptied by new value													
3	Number of boiler pumps					2 pump	Pump 3-w-valve	2 pump	2 pump				
4	PWM pump speed Max					100	1	100	100				
5	PWM pump speed min					40	1	100	30				
6	Antilegionella					Enabled	Disabled	Enabled	Disabled				
2	User interface settings			7	Modbus parameters	Adress	Baudrate	Frame					
				8	3 Way valve travel time	180	1	255	10				
				1	Select language	English	English Italian Spanish	German Russian					
				2	Select units	Celsius	Fahrenheit	Celsius					
				3	Set date	Set date							
				4	Set time	24 Hours	24 hours	12 hours					
3	Service settings			1	Service information	Set telephone number							
				2	Service due date	Set service date							
4	DIAGNOSTICS			1	Boiler information	Real time boiler status							
				2	Lockout history	Status boiler at time of lock/block							
				3	Manual test	See chimney sweeper							
5	USER SETTINGS			0	Heating	1	CH temperature/OTC set	1	CH set point	85	20	90/abs max CH temp	75
		2	ECO setpoint reduction			2	Outside temperature for CH off	off	7	25	off		
		3	Scheduler set			1	Enable/disable on board scheduler	Enabled	Disabled	Enabled			
		2	Domestic hot water	2	Scheduler set	Set time scheduler (Time/On/ECO/OFF)							
				1	DHW setpoint (NTC sensor)	60	35	65	60				
				1	DHW setpoint (Thermostated)	80	35	85	80				
				2	ECO setpoint reduction	20	0	50					
				3	Scheduler set	1	Enable/disable on board scheduler	Enabled	Disabled	Enabled			
				2	Scheduler set	Set time scheduler (Time/On/ECO/OFF)							
		3	Holiday	1	CH holiday setpoint	20	20	90/Abs max CH temp					
				1	DHW holiday setpoint (Thermostated)	80	35	85					
				2	DHW holiday setpoint (Sensor)	60	10	65					
				6	Cascade	1	Cascade set	1	Cascade switch delay	30	0	255	
								2	Cascade min power	20	0	100	
3	Burner power (default value x= 170,210,250,290 boiler speciific) kW	x	0					2550					
4	Boiler for DHW	0	1					6	0				
5	PI loop period	5	0					15	5				
6	Burner water flow delay	30	0					255	30				
7	Different boiler size	Disabled	Disabled					Enabled	Disabled				
8	Cascade pump speed mx.	100	15					100	100				
9	Cascade pump speed min	40	15					100	30				
2	Cascade info	1	Cascade Role : see Cascade auto detection			Standalone	Standalone	Master Slave					
		2	System temperature	Actual temperature Cascade system sensor									
		3	Number of boilers on	Actual number of burners /boilers on in cascade									
7	RESTORE FACTORY SETTINGS	3	Cascade auto detect : press OK to start detecting role boiler in cascade chain	4	Modulation level	Actual cascade modulation level							
				3	Cascade auto detect : press OK to start detecting role boiler in cascade chain	Standalone	Standalone	Master Slave					
					Reset to factory/check settings								

INTEGRATED CASCADE FUNCTIONALITY

General

The integrated cascading functionality (boilers delivered from November 2016) makes it possible to connect up to 4 boilers together without requiring the use of an external cascading controller and to manage the cascade from the Master boiler display. The cascade algorithm is designed to run in parallel as many boilers as possible and is optimised for condensing boilers.

The **first boiler** of the chain is the master of the cascading logic and handles the heat requests. All other boilers in the chain are slaves. The **last boiler** is called the terminal slave. All displays (DSP) are equal and can be swapped. After having been correctly wired, using a special cascade kit for each boiler (available as an accessory), the auto-detection of the cascading chain is initiated from the master boiler (refer to "Wiring the cascade chain", page 20).

After a successful auto-detection, the role of each single boiler (master, slave, terminal slave) is shown in the technician menu of each boiler (**Technician menu > cascade > cascade info > CASCADE ROLE**).

Cascade operation

In a regular cascade systems, all boilers are managed for CH and/or DHW. The CH and/or DHW demand is validated by an external controller which generates a CH demand. The cascade system will only ensure that a certain temperature is reached at its output (at the cascade temperature sensor).

With this integrated cascade controller, it is possible to let the cascade system perform the DHW validation by itself. The DHW sensor or switch has to be connected to only the first (master) boiler. In case of a DHW demand, the cascade controller will regulate the cascade sensor directly to the DHW setpoint. All boilers will be on, without the need to follow the CH algorithm. The cascade system pump output relays from the master boiler will be switched off. The DHW pump or 3WV of each boiler will be switched on.

If a CH demand is also connected to the first (master) boiler, the cascade system will follow the CH algorithm (minimum time, slope) and regulate the cascade sensor to the CH setpoint. The cascade system pump output relay (master only) will be activated. Boilers are added clockwise and removed counter-clockwise. At every heat demand, the next boiler (clockwise) will be the first to start. When a demand lasts for more than 24 hours, a rotation will also take place.

The CH and/or DHW request type must be set correctly from the master boiler display. All boilers in the chain are supposed to be equal, meaning that they have the same maximum capacity and minimum modulation level. Both are parameters of the cascade setting.

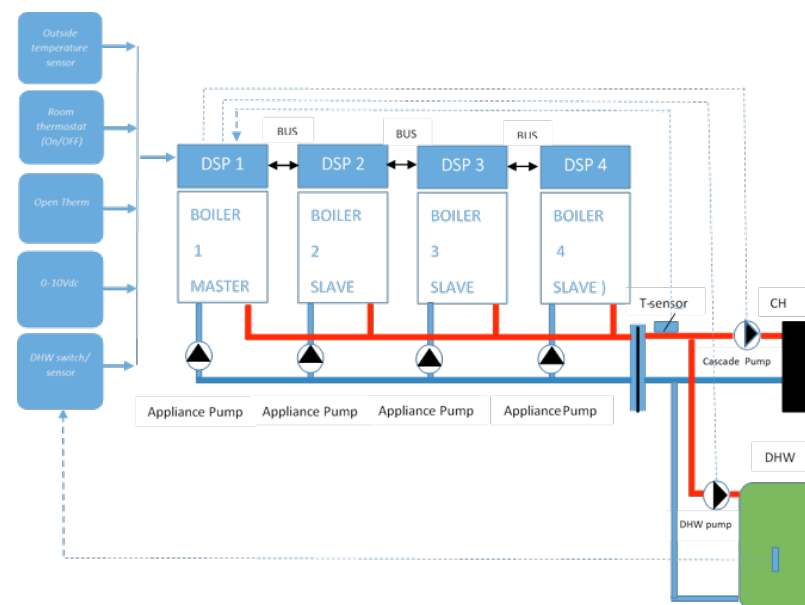
The minimum cascade power is the minimum modulation level of a single boiler, while the maximum cascade power is the maximum single boiler power multiplied with the number of boilers in the chain.

A parameter CASCADE SWITCH DELAY can be set to prevent that boilers are too frequently added or removed to obtain the requested cascade power.

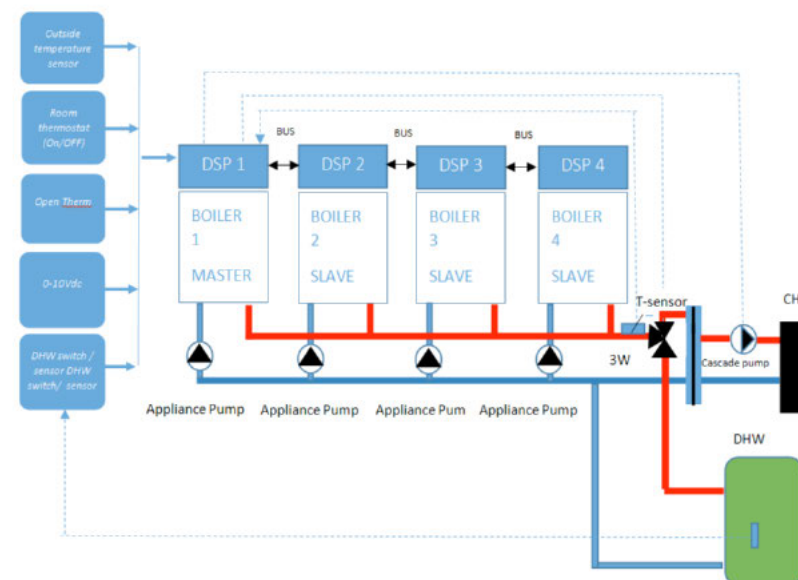
From the master display, the parameter BOILERS FOR DHW must be set to 0 (default) and DIFFERENT BOILER SIZE must be disabled (default).

Capacity limitations for either CH or DHW done from the master menu (Advanced settings) will limit the capacity for each boiler in the chain. Refer to "Installer's menu and parameter descriptions" on page 14 for the menu layout. (**Technician > Cascade > cascade set > ...**).

Example 1 : Cascade system. Each boiler is equal, and all boilers for CH and / or DHW



Example 2 : Cascade system. Each boiler is equal, and all boilers for CH and / or DHW



Split DHW

Instead of assigning all boilers to CH and/or DHW, it is also possible to assign only some of the boilers to CH + DHW while the other boilers are available to serve only CH. This is called "split DHW". In case there is no DHW heat demand, all the boilers will be available for CH.

Split DHW configuration is done by setting the parameter BOILER FOR DHW in the cascade set menu (MASTER) to the number of boilers that should serve DHW (See example 3). The DHW boilers must be the first boilers in the cascade chain.

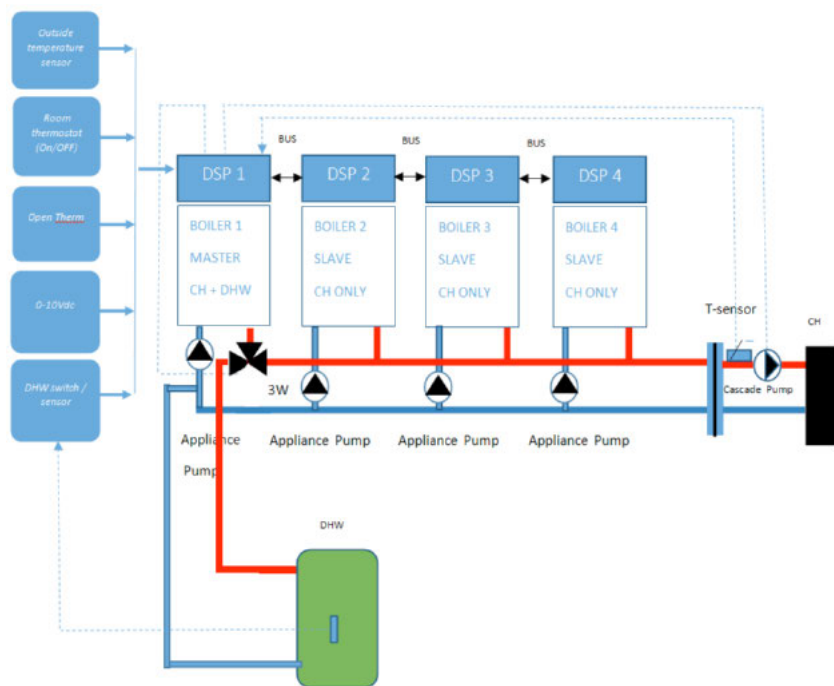
The CH and DHW heat demands are connected to and managed by the first (master) boiler. In case of a DHW request, all DHW boilers will regulate the temperature to the DHW setpoint and control the pump(s) and 3WV as in a normal local DHW demand.

In case of a CH request and there is no DHW request at the same time, the demand is processed by a rotating system, where boilers are added clockwise and removed counterclockwise, respecting the CASCADE SWITCH DELAY parameter.

In case of a mutual request (CH and DHW), each boiler will either serve for DHW or CH depending on the group it belongs to.

Remember to set the parameters of the CH and DHW request from the first (master) boiler. Instead of a 3WV a DHW pump may be configured.

Example 3 : Split DHW cascade system. Each boiler is equal, 3 for CH only and 1 for CH + DHW (Parameter in cascade set , BOILER FOR DHW =1, but may differ)



Heterogeneous cascade

Besides creating two groups (DHW + CH group and CH only) in which each boiler is equal, it is also possible to allow a different power rating to the DHW + CH group boilers compared to the CH only group boilers.

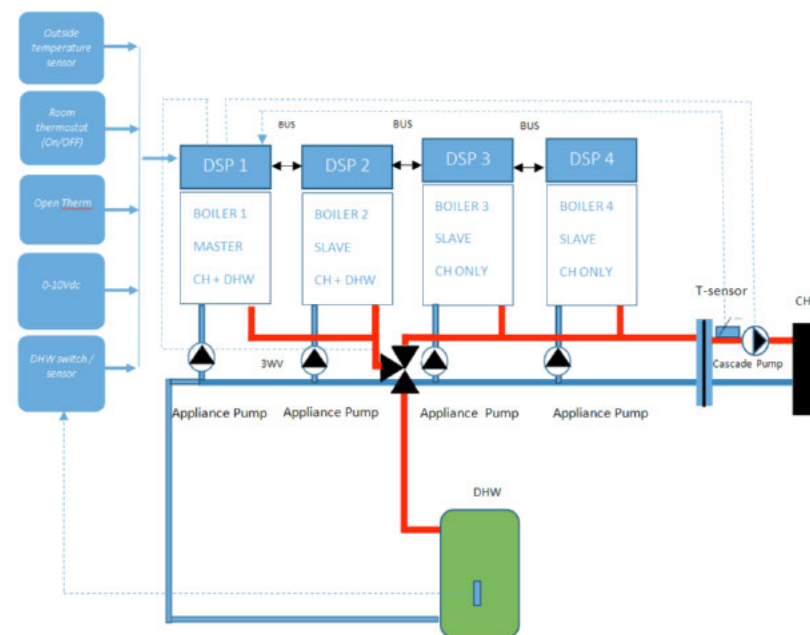
This is called a heterogeneous cascade system (example 4). In the cascade set menu the parameter DIFFERENT BOILER SIZE must be enabled.

The parameters SINGLE BURNER POWER and CASCADE MIN POWER in the master display are obtained from the first DHW + CH boiler and set for all the boiler belonging to the same group.

Likewise is the power rating for each boiler in the CH only group equal and set after AUTO-DETECTION initialized from the master.

In case of a CH request and there is no DHW request, the demand is processed by the CH only boilers first and after reaching the maximum modulation level also the CH + DHW boilers are added to serve for CH demand.

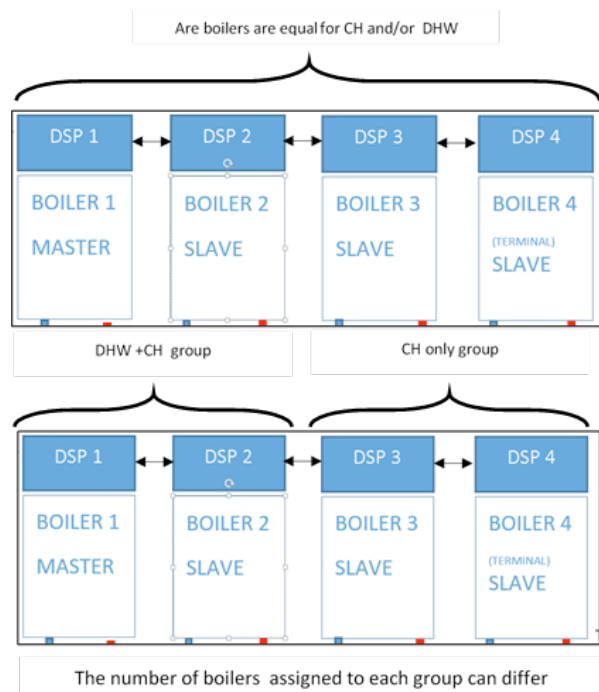
Example 4 : Heterogeneous Cascade system. 2 CH only and 2 CH + DHW boilers.



Wiring the cascade chain

The integrated cascading functionality of the display (boilers delivered from November 2016), makes it possible to connect up to 4 boilers together without requiring an external cascading controller.

When all boilers are equal, the first boiler in the chain is the master and the others are slaves. When two groups are defined, (DHW + CH group and CH only group) start the chain with all boilers of the CH + DHW group followed by all boilers of the CH only group. The first DHW + CH boiler is the master. All the others are slaves.



Each boiler is wired up to the next boiler using a special cascade connection kit (3-wire shielded cable + terminal strip C3 to be installed). Please contact your ACV representative for the correct accessory.

Wiring procedure

1. Disconnect the 230V supply from all the boilers and open the front panel of each boiler.
2. On each boiler, mount terminal strip C3 left of the low voltage terminal strip C2, as shown in the picture on the right.

On the master boiler, do not replace the existing connection on X03, which is used for the diagnostic connector.

3. On the master, connect X06 and X07 **BUT NOT** X03
4. On all the slaves (second to the last boiler) connect X03, X06 and X07 to the display. X03 replaces the connection coming from the diagnostic connector in the left upper corner.
5. Starting from the first boiler to the next and the next, to the last, wire up the cascade chain as shown in the picture on the right.



General Remarks

- The heat demands (CH, DHW) must be connected to the first (master) boiler to terminal strip C2.
- From the master boiler Technician menu, select the correct CH and DHW requests.
- DHW pump and or 3WV connections can be done from every boiler in the DHW + CH group, depending on the configuration of the DHW of each boiler but preferred from only the master, this because of the communication delay.
- Connect the cascade supply sensor (12k at 25 °C) terminal strip C2 : 15, 16 of the master boiler, otherwise Error 92 will occur.
- The terminal strip C1 contacts 19 and 20 of the master boiler provides the cascade system with pump potential free relays output (230V, max 0,8 A).
- The terminal strip C1 contacts 17 and 18 of each boiler provides potential free alarm relays output (230V max 0,8 A).

Electrical connections

	To be connected to	Remark
Terminal strip C3	X03, X06 and X07 on all boiler displays EXCEPT on Master boiler	Refer to diagram on following page
	Connect to next boiler	
Cascade supply sensor	Master boiler, Strip C2, pins 15 and 16,	

Auto-detection

After being correctly wired, the auto-detection of the cascading chain is initiated from the master boiler. In case the (hydraulic) configuration is designed to operate as a split DHW system, set the parameter BOILERS FOR DHW to the number of boilers belonging to the CH +DHW group.

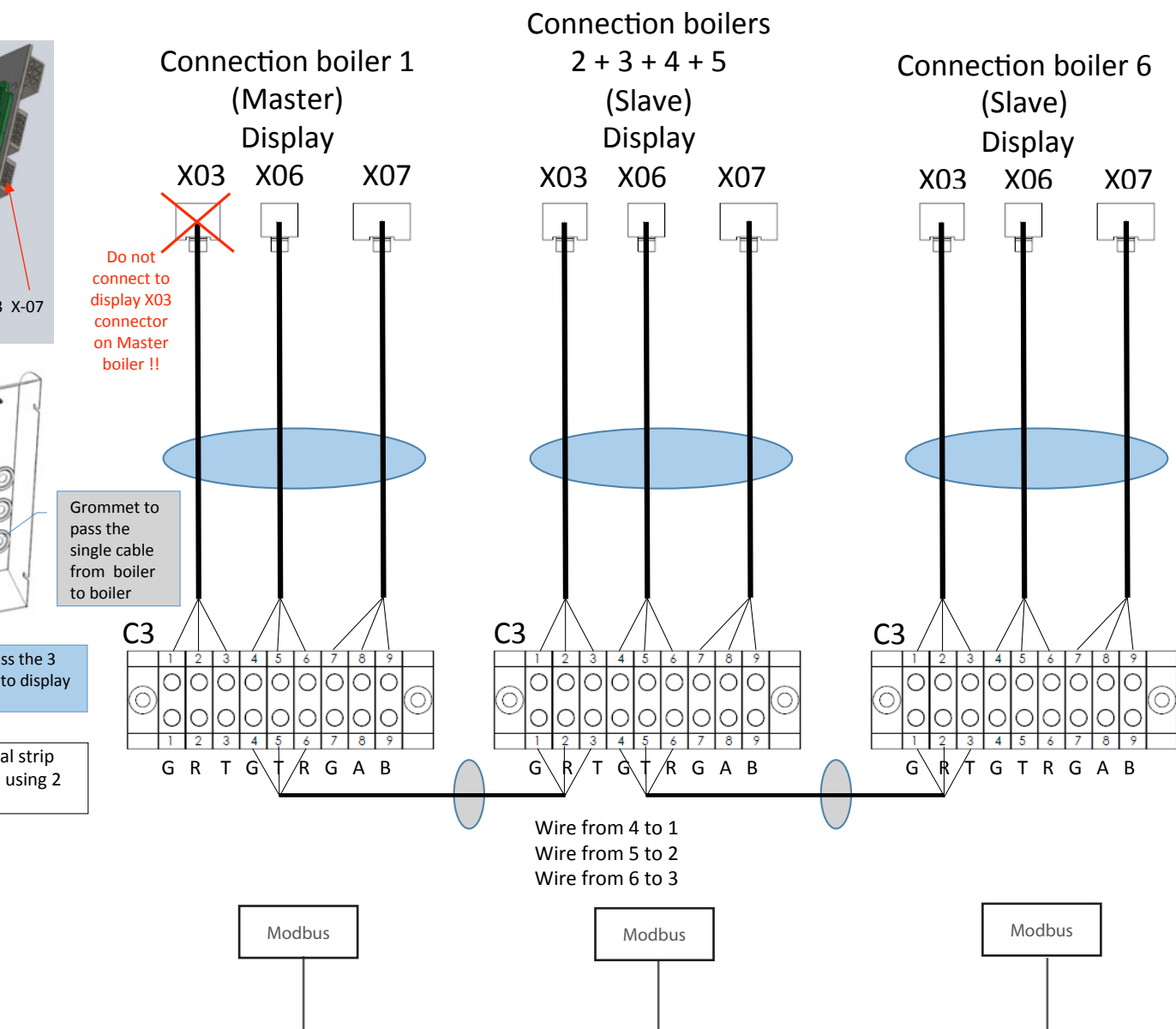
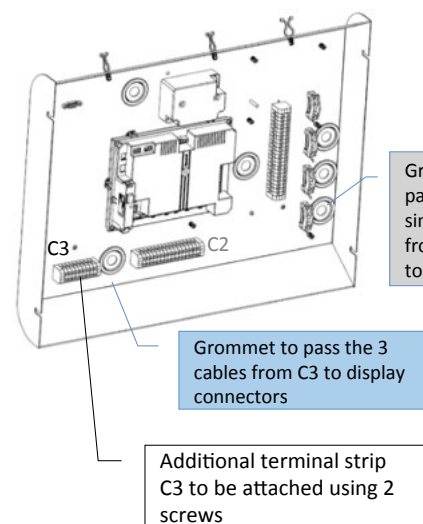
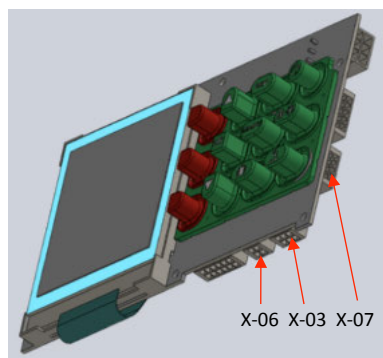
When the "CH only" group has a different power rating, set the parameter DIFFERENT POWER SIZE to "enabled". Disable all heat demands and power on all the boilers. Set the correct CH and/or DHW request type and the correct numbers of pumps (or pump and 3WV) from the first (master) boiler.

From the first (master) boiler start the AUTO-DETECTION. When successful, the numbers of burners (boilers) is shown on the display. Press the OK button to confirm. If the number is incorrect, press ESC on the keypad and check the wiring between the boilers.

After a successful configuration, each display will show the cascade symbol in the upper right corner. Create a CH and/or demand and check for correct operation of the cascade chain. After changing a Cascade set parameter, perform an auto-detection once again.

Cascade parameters

The cascade-related parameters can be set from the first (master) boiler, Technician menu, Cascade, Cascade set, refer to "Installer's menu and parameter descriptions" on page 14.



Cascade errors

Each boiler has a potential free alarm relay contact on terminal strip C1 (17, 18) which closes when an error (Lock, block) occurs, as it would when operating in standalone mode. In addition, the corresponding error code is displayed on the user interface of the concerned boiler.

As the master manages all the heat requests, the same error is also visible on the master display. A reset can be done from either the master or boiler with the error, after resolving the problem.

In the upper right corner of the master display, the number of the boiler with the error is indicated. Eventually the alarm relay output of the master boiler will close, to indicate there is a problem in the cascade chain.

The power of a single boiler in the chain, even when in error mode may not be switched off. When switched off, the next boiler(s) cannot be reached by the master, resulting in a cascade bus error (E98).

When a boiler must be switched off for a longer time, the cascade chain must be rewired temporarily, taking the boiler out of the chain. Terminal strip C3 (pins 4, 5, 6) of the boiler located before the boiler with the error must be connected to terminal strip C3 (pins 1, 2, 3) of the boiler located after the boiler with the error.

After re-wiring, perform an AUTO-DETECTION again. The new numbers of boilers will be detected. When bringing a boiler back into the chain, do not forget to rewire in the original sequence, then to repeat the AUTO-DETECTION. The original number of boilers will be displayed.

The Cascade-related error codes are E89 to E92, E95, and E97 to E99.

Refer to "Locking Codes" on page 50 for a detail of the cascade-related codes.

MODBUS

To connect a Modbus controller, an additional kit (terminal strip C3 + shielded cable) is required. Contact your ACV representative for the correct accessory. In case of a cascade configuration, refer to wiring diagram on previous page.

Supported commands

The following basic Modbus commands are built in the boiler display:

- 0x03 Read Holding Registers
- 0x04 Read input Registers
- 0x06 Write Single Register
- 0x10 Write Multiple Registers
- 0x11 Report Slave ID

Wiring procedure

1. Disconnect the 230V supply from the boiler(s) and open the front panel.
2. Mount terminal strip C3 left to the low voltage terminal C2 as shown in the picture on previous page.
3. Connect X06 and X07 to the display.



Do not replace the existing connection on X03 used for the diagnostic connector.

4. For Modbus connections only use pins 7 (GND), 8 (A), 9 (B) of terminal strip C3.
5. Use a 3 wire (shielded) cable and route it through the bottom (low voltage) cable guide.

Electrical connections

	To be connected to	Remark
Terminal strip C3	X06 and X07 on boiler display	Refer to diagram on previous page
Modbus controller	Strip C3, pins 7 (GND), 8 (A) and 9 (B)	

Configuration parameters

The Modbus communication line is set to 38,400 b/s by default and can be changed from the Technician menu via the boiler display (**Technician menu**, **system settings**, **boiler parameters**, **Modbus**).

In addition, the default communication frame is set to 8 bit, 1 stop, parity none (8N1).

The default Modbus address is 1.

MODBUS register map

The table below shows the Modbus register map.

ID	R/W	Accessible by command	Name	Format	Range	Notes
0	R/-	0x04 (Input registers)	MB: Esys flags	Flag8	0-255	Bit: description 0: CH mode 1: DHW mode 2: Test mode 3: flame
			LB: Esys flags	Flag8	0-255	Bit: description 0: fault 1: valve1 2: valve2 3: aps 4: fan 5: pump
1	R/-	0x04 (Input registers)	MB: Error flags	Flag8	0-255	Bit: description 1: lockout
			LB: Error code	U8	0-99	OEM specific error number.
2	R/-	0x04 (Input registers)	MB:			
			LB: Error source	U8	0-F	0 : Esys burner controller in cascade F : Dot-Matrix display
3	R/-	0x04 (Input	MB:			

ID	R/W	Accessible by command	Name	Format	Range	Notes
		registers)	LB: Comfort state	U8	0-255	Cascade comfort state: 0: Standby 1: Test mode 2: DHWCH init 3: DHWCH mode 4: DHWCH cool mode 5: DHWCH frost mode 6: DHW init 7: DHW mode 8: DHW cool mode 9: CH init 10: CH mode 11: CH cool 12: Frost mode
4	R/-	0x04 (Input registers)	MB: LB: Cascade status	Flag8 Flag8	0-255 0-255	Bit description 0: test mode [active, inactive] 1: DHW mode [active, inactive] 2: CH mode [active, inactive] 3: frost mode [active, inactive] 4: flame present [present, not present] 5: CH pump [active, inactive] 6: DHW pump [active, inactive] 7: cascade pump [active, inactive]
256	-W	0x06 (Write single register)	MB: 0xAA LB: 0x55	U8 U8		Dot-Matrix display provides a reset command on device which is filled in Error source. The resetting is done when previous command return none zero value.
512	R/W	0x03 (Read Holding Registers) 0x06 (Write single register) 0x10 (Write multiple registers)	MB: Heat demand flags LB: Heat demand	U8 U8	0-255 0-255	Bit: description 0: DHW enable Reading: 0 = No heat demand detected 0xFF = Heat demand present Write: 0 = no heat demand 0x55 = CH demand 0xFF = Test demand Value is valid for 30s from the last successful write. When this register is written, the modbus control logic is activated and registers 513, 514 are used for control.
513	R/W	0x03 (Read Holding Registers) 0x06 (Write single register)	MB: LB: Max percentage	 U8	 0-100	0-100% maximal percentage power Used for Modbus control

ID	R/W	Accessible by command	Name	Format	Range	Notes
		0x10 (Write multiple registers)				
514	R/W	0x03 (Read Holding Registers) 0x06 (Write single register) 0x10 (Write multiple registers)	MB: LB: Control Set point	 U8		Limited to OTC offset, CH set point and Abs max set point Control set point in degrees of Celsius. This value is used as a target temperature for supply sensor, when Modbus heat demand is generated.
768	R/-	0x04 (Input registers)	CH supply temperature	S16		Value *0,1 [°C] example : 278 = 27,8°C 0x8000 invalid value
769	R/-	0x04 (Input registers)	MB: LB: CH return temperature	 S8		Value in degrees of Celsius
770	R/-	0x04 (Input registers)	MB: LB: DHW temperature	 S8		Value in degrees of Celsius
771	R/-	0x04 (Input registers)	MB: LB: Flue temperature	 S8		Sensor : Value in degrees of Celsius 0x8000 – invalid value Switch: ad value > 250 0x7FFF – Flue sensor open ad value < 5 0x0000 – Flue sensor closed If switch input is outside limits 0x8000 – invalid value
772	R/-	0x04 (Input registers)	MB: LB: OTC temperature	 S8		Outside temperature sensor Value in degrees of Celsius 0x8000 – invalid value
773	R/-	0x04 (Input registers)	MB: LB: Water pressure [bar]	 U8		value from water pressure sensor/switch value * 0.1 [bar]
774	R/-	0x04 (Input registers)	MB:			

MODELS - COMPACT CONDENS 170- 210 - 250 - 300

The Compact Condens is a floor-installed gas condensing boiler meeting the requirements of current "HR-Top" standards in Belgium. The boiler is certified compliant with "EC" standards as a connected appliance: C33(x) - C53(x) - C63(x), but it can also be connected as an open appliance in category B23, which can operate with a positive pressure.

The boiler is a room-sealed boiler, equipped with a cast aluminium heat-exchanger.

As standard the boiler is programmed to operate with an on-off room thermostat. It can also be operated using either an optional 0-10V signal, or an Outside temperature control (OTC) system. The boiler also features an optional function for digital communication with room thermostats.

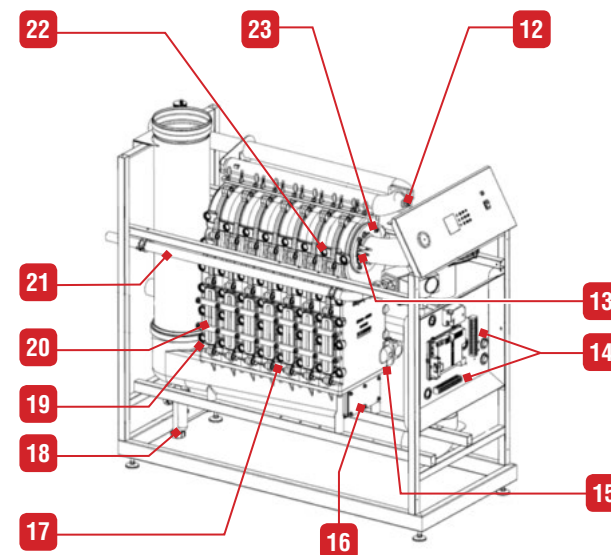
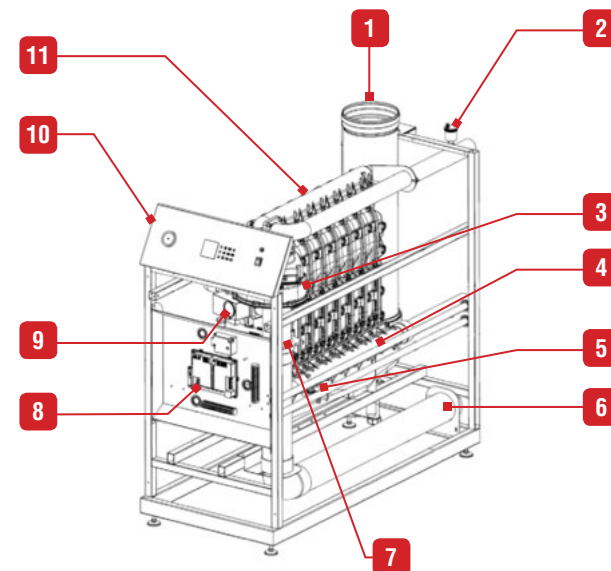
An external DHW tank with a thermostat or sensor can be installed in the system. It will be controlled by the built-in MAXSys controller.

Among the operating modes, the boiler can operate either in holiday mode or in Eco mode, taking into account the user's schedules.

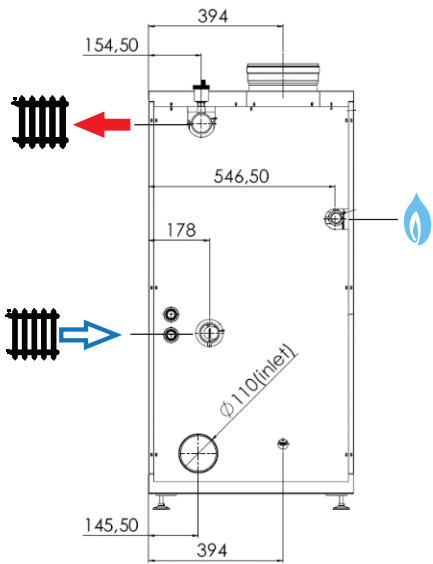
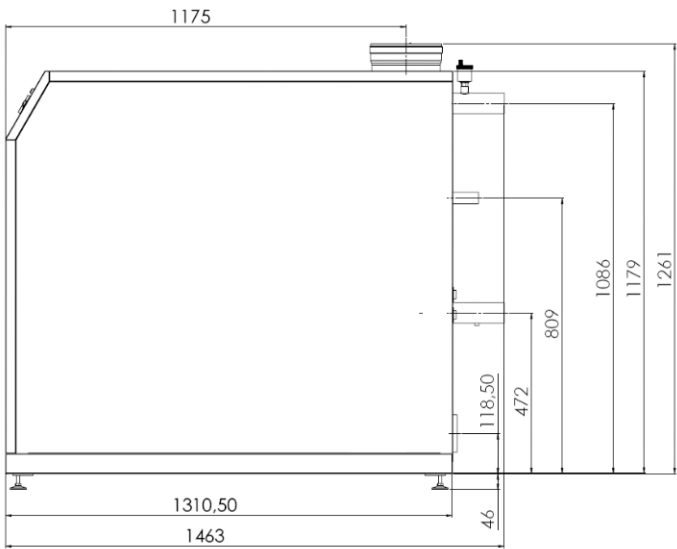
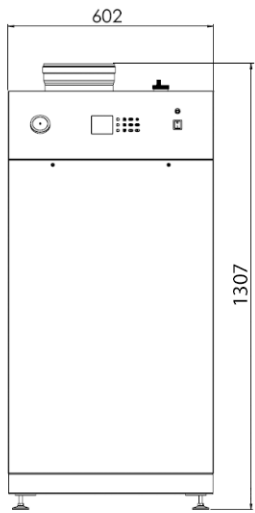
The boiler also features a built-in frost protection mechanism, as well as an anti-freeze function that will protect both the appliance and the system. For more information and details on the boiler's capabilities, refer to "Principles of Operation" on page 11.

Key



1. Chimney connection Ø 200
2. Auto air vent
3. Fan
4. Heating return and return NTC
5. Fill and drain valve (+ water pressure sensor)
6. Air inlet (Ø 110)
7. Venturi
8. MAXSys Controller
9. Gas valve
10. Control panel with display and pressure gauge
11. Heating supply
12. Flow NTC
13. Ignition and ionization electrodes (2x)
14. C1 & C2 terminal strips for electrical connections
15. Air pressure switch (backside)
16. Inspection sump cover
17. Cast aluminium heat exchanger
18. Condensate trap (siphon)
19. Siphon pressure switch + flue gas NTC
20. Inspection cover
21. Gas pipe
22. Overheat limiter switch
23. Flame sight glass



DIMENSIONS



COMPACT CONDENS

		170	210	250	300
 [M]	"	2	2	2	2
 [M]	"	1	1	1	1
Min. Ø of flue pipe	mm	200	200	200	200
Drained weight	Kg	209	217	233	259
Clearance required (on access side(s))	mm	1000	1000	1000	1000

ELECTRICAL CHARACTERISTICS COMPACT CONDENS 170 - 210 - 250 - 300

		COMPACT CONDENS			
Main Characteristics		170	210	250	300
Rated voltage	V~	230	230	230	230
Rated frequency	Hz	50	50	50	50
Electrical consumption	W	1150	1150	1150	1150
Electrical consumption in standby	W	5	5	5	5
Class	IP	00b	00b	00b	00b
Fuse	A	5	5	5	5

Min cross section of supply wire : 3 x 1.0 mm²

NTC RESISTANCE

Internal NTC (Flow/Return/Flue) : 12 K [Ω] at 25°C

Outdoor sensors : 12 K [Ω] at 25°C

WIRING DIAGRAM AND ELECTRICAL CONNECTIONS

Ref	Description	To be connected to
BC	Burner Control	
D	Display	
C1	230V Connector (terminal strip)	Pins 0 (PE), 1 (L) and 2 (N) to be used for supply wire connection
C2	Low voltage Connector (terminal strip)	
C3	Optional Cascade/Modbus terminal strip (refer to "Integrated Cascade Functionality" on page 18)	
CH-P	Central Heating pump	Strip C1, pins 11 (PE), 9 (L) and 10 (N) (see A-P if 3WV installed)
DHW-P	Domestic Hot Water pump	Strip C1, pins 6 (PE), 7 (L) and 8 (N) OR Strip C1, pins 11 (PE), 9 (L) and 10 (N) if 3WV installed
PWM-P	Modulating pump	Strip C1, pins 14 (PE), 12 (L) and 13 (N) PWM signal : Strip C2, pins 14 (PWM signal) and 13 (PWM ground)
A-P	Appliance Pump (CH) (max 0,8 A) (if 3WV installed)	Strip C1, pins 3 (PE), 4 (L) and 5 (N)
HE	Heat exchanger	
MT	Overheat limit switch	
NTC1	Flow temperature sensor	
NTC2	Return temperature sensor	

Ref	Description	To be connected to
NTC3	Domestic Hot Water sensor or switch (12 kΩ at 25°C)	Strip C2, pins 7 and 8
NTC4	Outside temperature sensor or switch	Strip C2, pins 5 and 6
NTC5	Flue gas temperature sensor	
NTC6	Cascade sensor	Strip C2, pins 15 and 16
WPS	Water pressure switch	
APS	Air pressure switch	
SPS	Siphon pressure switch	
GPS	Gas pressure switch	
GV	Gas valve	
S	On/Off switch	
3WV	3-way valve	Strip C1, pins 6 (PE), 7 (L) and 8 (N) (+ pin 9, if electric 3WV)
OT-RT	Open Therm, Room Thermostat On/Off (24 Vdc, 5mA), 0-10 V	OT et RT : Strip C2, pins 1 + 2 (for automatic recognition) 0-10 V : strip C2, pins 3 (-) and 4 (+) (+ short cut installed between pins 1 + 2)
OTC	Outdoor Temperature Control 12K	Strip C2, pins 5 + 6 (+ short cut installed between pins 1 + 2)
F	Fuse	
SPS-B	Siphon pressure switch block (Err 76) (potential free contact, 24 Vdc)	
B-L	Burner lock (Err 3) (potential free contact, 24 Vdc)	
A	Alarm potential free contact (potential free relay output, 230 Vac, max 0,8 A)	
C-P	Cascade Pump potential free contact (potential free relay output, 230 Vac, max 0,8 A)	
B-B	Burner block (Err 77) (potential free contact, 230 Vac,)	
PE	Earth cable or connector	
Fr	Frame	
MP	Mounting Plate	
CP	Cover Plate	
FP	Front Plate	



Essential recommendation for the correct operation of the appliance or the system

If the system pump, CH pump, PWM pump, DHW pump, alarm connection or the 3-way valve consumes more than 0.8 A, it needs to be switched by an auxiliary relay.



General remark

Use the right lower grommet to route the low voltage cables from C2, and the 2 right upper grommets for the 230V connections from C1.



EXCELLENCE
IN HOT WATER



COMBUSTION CHARACTERISTICS

			COMPACT CONDENS			
			170	210	250	300
Input (PCI)	max	kW	168	210	252	290
	min	kW	33.6	42	50.4	58.8
Output at 100%	(80/60°C)	kW	163.6	204.5	245.4	282.5
Efficiency at 100%	(80/60°C)	%	97.4	97.4	97.4	97.4
	(50/30°C)	%	102.8	102.8	102.8	102.8
Efficiency at 30% load (EN677)		%	107.5	107.5	107.5	107.5
NO _x (Class 5)	Weighted	mg/kWh	50	50	50	50
CO	Max. output	mg/kWh	40.8	41.8	39.7	37.5
CO ₂	Max. output	%CO ₂	9.3	9.3	9.3	9.3
	Min. output	%CO ₂	9.1	9.1	9.1	9.1
O ₂	G20 min load	%	4.60 +0.40 / -0.20			
	G20 max load	%	4.25 +0.10 / -0.35			
	G25 min load	%	4.30 + 0.35 / -0.20			
	G25 max load	%	3.90 +0.10 / -0.30			
	G25.3 min load	%	4.35 + 0.35 / -0.25			
	G25.3 max load	%	3.95 +0.10 / -0.35			
Max gas flow rate G20/G25 /G25.3	G20 (20 mbar)	m ³ /h	17.4	21.8	26.2	30.2
	G25 (25 mbar)	m ³ /h	20.2	25.2	30.3	34.9
	G25.3	m ³ /h	19.75	24.65	29.6	34.05
Temp. of flue gases	Nominal	°C	70	70	70	70
	Max.	°C	70-75	70-75	70-75	70-75
	Min.	°C	65-70	65-70	65-70	65-70
Mass flow rate* of flue gases	Nominal	g/s	80	108	120	138
	at min output	g/s	15	19	23	27

* Mass flow rate values were calculated for G20 with an air factor of 1.3.

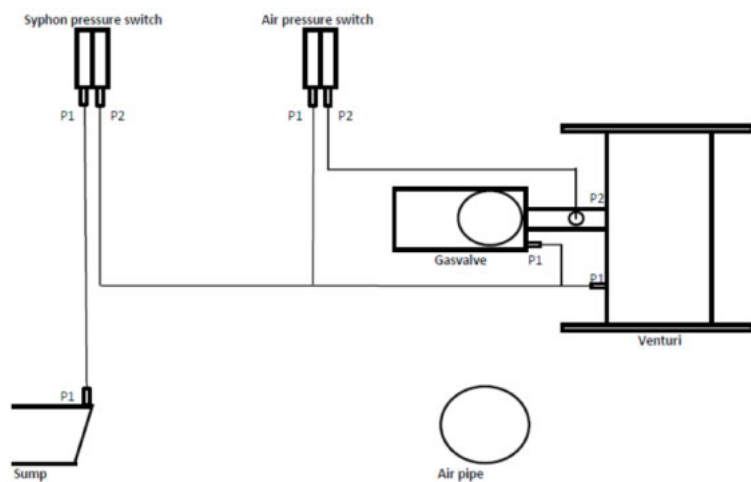
GAS CATEGORIES

Gas type		G20	G25	G20 ↔ G25
Pressure (mbar)		20	25	20 ↔ 25
Country code	Category			
AT	I ₂ H	●		
BE	I ₂ E(R)			●
BG	I ₂ H	●		
CH	I ₂ H	●		
CY	I ₂ H	●		
CZ	I ₂ H	●		
DE	I ₂ ELL	●		
DK	I ₂ H	●		
EE	I ₂ H	●		
ES	I ₂ H	●		
FI	I ₂ H	●		
FR	I ₂ Esi			●
GB	I ₂ H	●		
GR	I ₂ H	●		
HR	I ₂ H		●	
IE	I ₂ H	●		
IT	I ₂ H	●		
LI	I ₂ H	●		
LT	I ₂ H	●		
LU	I ₂ E	●		
LV	I ₂ H	●		
NL	I ₂ L		●	
	I ₂ EK		●	
NO	I ₂ H	●		
PL	I ₂ H	●		
PT	I ₂ H	●		
RO	I ₂ E	●		
	I ₂ H	●		
SE	I ₂ H	●		
SI	I ₂ H	●		
SK	I ₂ H	●		
SL	I ₂ H	●		

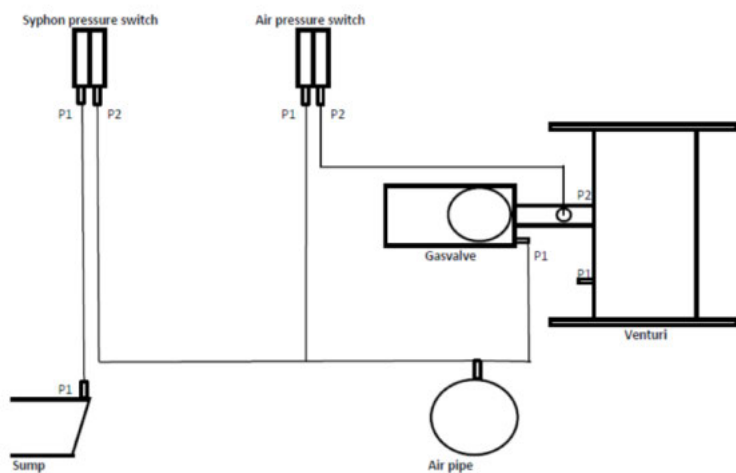


This boiler can be adjusted for category K(I2K) and is in this case suitable for the use of G and G+ distribution gases according to the specifications as shown in NTA 8837:2012 Annex D with a Wobbe-index of 43.46-45.3 MJ/m³ (dry, 0 °C, Hs) or 41.23 – 42.98 (dry, 15 °C, Hs). This boiler can also be converted and re-adjusted for category E (I2E). This means that the boiler: either is suitable for G+ gas and H-gas or demonstrably suitable is for G+ gas and can demonstrably be made suitable for H-gas as meant by “Besluit van 10 Mei 2016” until changes are made in this document.

PNEUMATIC CONNECTIONS



Compact Condens 170 (5 sections) and 300 (8 sections)



Compact Condens 210 (6 sections) and 250 (7 sections)

The syphon pressure switch, connected to the sump (P1), prevents overflow of the syphon in case of too high back pressure in the chimney.

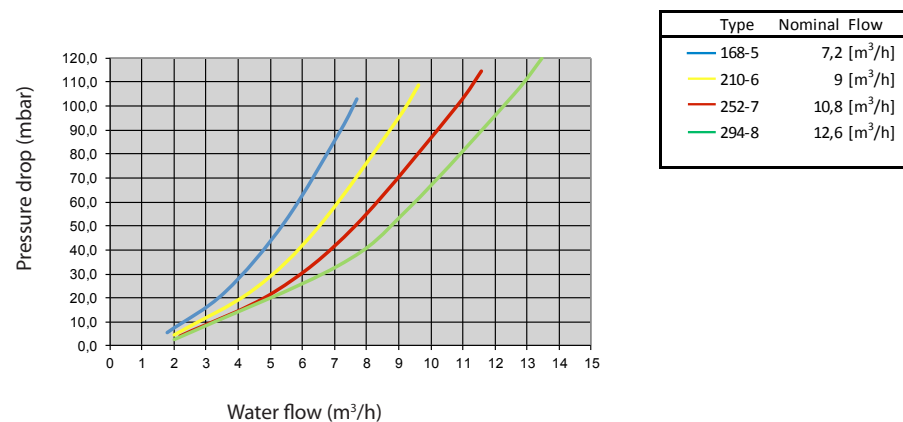
The air pressure switch, (P1 and P2), connected to the venturi, checks the amount of air (by means of a Δp measurement) before start.

HYDRAULIC CHARACTERISTICS

		COMPACT CONDENS			
Main Characteristics		170	210	250	300
Capacity (primary)	L	16.9	21.3	24.7	30.2
Max. operating pressure of primary circuit	bar	6	6	6	6
Water pressure drop (primary circuit) ($\Delta t = 20$ K)	mbar	90	96	99	103
Min. required flow rate, Δt_{25} , full load	m ³ /h	5.8	7.2	8.7	10.0

HYDRAULIC PRESSURE DROP CURVE OF THE BOILER

Compact Condens - Pressure drop vs Water flow



MAXIMUM OPERATING CONDITIONS

Maximum Service Pressure *

- Primary circuit :6 bar

Maximum Operating Conditions

- Maximum temperature (primary) :85°C

Water Quality

See "Recommendations for the Prevention of Corrosion and Scaling in Heating Systems" on the following page.

* The hydraulics of the boiler have been tested according to EN-15502, and the boiler is classified as a pressure class 3 appliance.

RECOMMENDATIONS FOR THE PREVENTION OF CORROSION AND SCALING IN HEATING SYSTEMS

How oxygen and carbonates can affect the heating system

Oxygen and dissolved gasses in the water of the primary circuit contribute to the oxidation and the corrosion of the system components that are made of ordinary steel (radiators, ...). The resulting sludge is then deposited in the boiler exchanger.

The combination of carbonates and carbon dioxide in the water results in the formation of scale on the hot surfaces of the installation, including those of the boiler exchanger.

These deposits in the heat exchanger reduce the water flow rate and thermally insulate the exchange surfaces, which is likely to damage them.

Sources of oxygen and carbonates in the heating circuit

The primary circuit is a closed circuit; the water it contains is therefore isolated from the mains water. When maintaining the system or filling up the circuit, water renewal results in the addition of oxygen and carbonates in the primary circuit. The larger the water volume in the system, the larger the addition.

Hydraulic components without an oxygen barrier (PE pipes and connections) admit oxygen into the system.

Prevention Principles

1. Clean the existing system before installing a new boiler

- Before the system is filled, it must be cleaned in accordance with standard EN14336. Chemical cleaning agents can be used (see list provided further on).
- If the circuit is in bad condition, or the cleaning operation was not efficient, or the volume of water in the installation is substantial (e.g. cascade system), it is recommended to separate the boiler from the heating circuit using a plate-to-plate exchanger or equivalent. In that case, it is recommended to install a hydrocyclone or magnetic filter on the installation side.

2. Limit the fill frequency

- Limit fill operations. In order to check the quantity of water that has been added into the system, a water meter can be installed on the filling line of the primary circuit.
- At total hardness of 11.2 °dH (= 2 mmol/litre) the total volume of filled, refilled and topped up water must not exceed 20 litres/kW.
- If de-mineralised or distilled water is used in the system, make sure to use additives, otherwise the water will severely corrode the aluminium heat exchanger. Make sure to rinse thoroughly the installation before doing so.
- Automatic filling systems are not recommended.
- If your installation requires frequent water refilling, make sure your system is free of water leaks.
- Inhibitors may be used in accordance with standard EN 14868.

3. Limit the presence of oxygen and sludge in the water

- A de-aerator (on the boiler flow line) combined with a dirt separator (upstream of the boiler) must be installed according to the manufacturer's instructions.
- ACV recommends using additives that keep the oxygen in solution in the water, see list provided further on.

4. Limit the carbonate concentration in the water

- The fill water must be softened if its hardness is higher than 20° fH (11.2° dH). If this hardness value is exceeded then the total amount of filling, refilling and topping up water is calculated using the following formula : $(11/\text{hardness in } ^\circ\text{dH}) \times \text{value given above}$.
Example ; in case of water hardness of 15 °dH : $(11/15) \times 20 = 14.7 \text{ L/kW}$. If larger values are achieved the water should be softened. The water may only be partly softened until a value of 20 % of its original value, so if the initial hardness is 15°dH, then it may only be softened to 3.0 °dH.
- Check regularly the water hardness and enter the values in the service log.

- Water hardness table :

Water hardness	°fH	°dH	mmolCa(HCO ₃) ₂ / l
Very soft	0 - 7	0 - 3.9	0 - 0.7
Soft	7 - 15	3.9 - 8.4	0.7 - 1.5
Fairly hard	15 - 25	8.4 - 14	1.5 - 2.5
Hard	25 - 42	14 - 23.5	2.5 - 4.2
Very hard	> 42	> 23.5	> 4.2



Water softening by means of the ion exchange principle is not allowed.

5. Control the water parameters

- In addition to the oxygen and the water hardness, other parameters of the water must be checked.
- Treat the water if the measured values are outside the range.

Acidity	7.0 < pH < 8.5
Conductivity (at max O ₂ content of 1mg/L)	< 300 µS/cm (at 25°C)
Chlorides	< 125 mg/l
Iron	< 0.5 mg/l
Copper	< 0.1 mg/l

Additional recommendations and recommended water treatment additives:

- Use a log book to record water filling, refilling, topping up, water quality measurements and water treatment
- Only use diffusion tight material, especially for floor heating
- Always mount de-airing devices at the highest points in the installation
- Install valves in the installation near the boiler and in strategic locations (anticipating on future expansions of the system) to avoid fills, refills and topping up as much as possible.
- Install a water meter to check the amount of filled, refilled and topped up water.
- Install a filter (magnetite and dirt) in the return.
- Install an extra heat-exchanger to separate the boiler from the installation in case of any doubts.
- Avoid leakages and if there is a leakage repair as soon as possible
- Use water additives from the following approved manufacturers, as required :

FERNOX (www.fernox.com):

- Cleaner F3 removes corrosion, lime and sludge
- Protector F1 : protects against corrosion, lime and sludge
- Alphi-11 : anti-freeze and protection against corrosion and lime

SENTINEL (www.sentinelprotects.com):

- X100 : Inhibitor scale and corrosion protection
- X200 : Noise reducer long life system treatment to eliminate noise
- X300 : System cleaner for new hydronic heating systems
- X400 : System restorer non acid cleaning of older systems
- X500 : Antifreeze with inhibitor against scale and corrosion in all types of indirect heating systems at low temperatures.



Use the additives strictly in accordance with the instructions issued by the manufacturer of the water treatment product.

SAFETY INSTRUCTIONS FOR THE INSTALLATION



Essential recommendations for safety

- Install the boiler on a level base or vertically plumb support made of non-combustible materials and of sufficient strength to support the boiler weight.
- Use extreme care not to drop the boiler or cause bodily injury while lifting or mounting the boiler onto the wall bracket or base. Once mounted, verify that the boiler is securely attached to the bracket and wall or safely set on its base.
- Do not use or store any flammable, explosive or corrosive products, such as paint, solvents, salts, chloride products and other detergent products near the appliance.
- Make sure that all air vents are unobstructed at all times.



Essential recommendations for the electrical safety

- Only an approved installer is authorized to carry out the electrical connections.
- Make sure that the appliance is connected to the earth.
- Install a 2-way switch and a fuse or circuit breaker of the recommended rating outside the appliance, so as to be able to shut power down when servicing the appliance or before performing any operation on it.
- Isolate the external electrical supply of the appliance before performing any operation on the electrical circuit.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless supervised or unless they have been given instruction concerning the use of the appliance by a person responsible for their safety.



Essential recommendations for the correct operation of the appliance

- All connections (electrical, flue pipe, hydraulic, gas/fuel) must be carried out in accordance with current standards and regulations in force.
- The boiler must be installed in a dry and protected area, with an ambient temperature comprised between 0 and 45°C.
- Install the appliance to ensure easy access at all times.
- Make sure that the mains water used to fill the boiler has a minimum pressure of 1.2 bar.
- Make sure to install a pressure reducing valve set at 4.5 bar if the mains supply pressure is in excess of 6 bar.
- If works need to be performed (in the boiler room or close to the air vents), make sure to turn off the boiler to prevent dust from entering and accumulating in the boiler heating system.

PACKAGE CONTENTS

The Compact Condens boilers are delivered assembled and packaged.

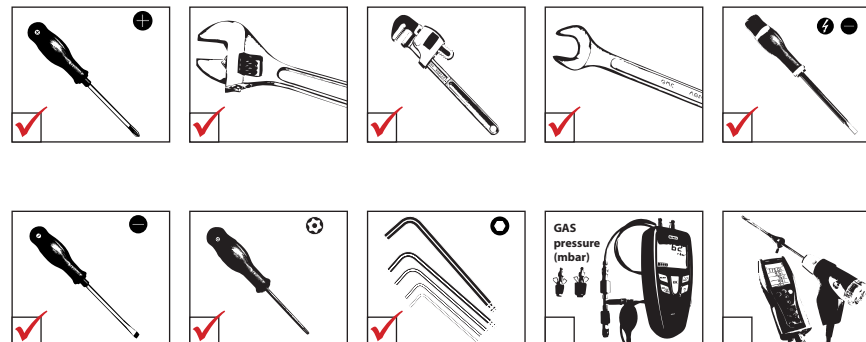


At product reception and after removal of packaging, check the package contents and that the appliance is free of damage.

Contents

- Boiler
- Installation, Operation and Maintenance Instructions, for the User and the Installer

TOOLS REQUIRED FOR THE INSTALLATION



BOILER PREPARATION

1. Install the boiler on a flat non combustible floor and level it using the positioning bolts.
2. Remove the sealing/protection caps from the connection tubes. Some residual water from testing might come out.
3. Fill the condensate trap with water by pouring some water into the cast aluminium exhaust connection at the back. It will then drain into the syphon and fill it.
4. Make all the required electrical connections of accessories (pumps, thermostats, etc.). Refer to "Wiring Diagram and Electrical Connections" on page 26.

RECOMMENDATIONS FOR HYDRAULIC CONNECTIONS



Essential recommendations for safety

- If the boiler is not equipped with one, the heating circuit of the system must be fitted with an approved safety pressure relief valve, according to the pressure mentioned on the type plate.
- Use a two-wrench method when tightening field piping onto the boiler piping connections. Use one wrench to prevent the boiler connections from the turning and the second to tighten field piping. Failure to support the boiler piping connections could damage piping or cause a leak.



Essential recommendations for the correct operation of the appliance

- If the boiler is not equipped with one, make sure to install an expansion vessel in the primary circuit, which is adapted to the boiler power/size and the type of system.



General remark

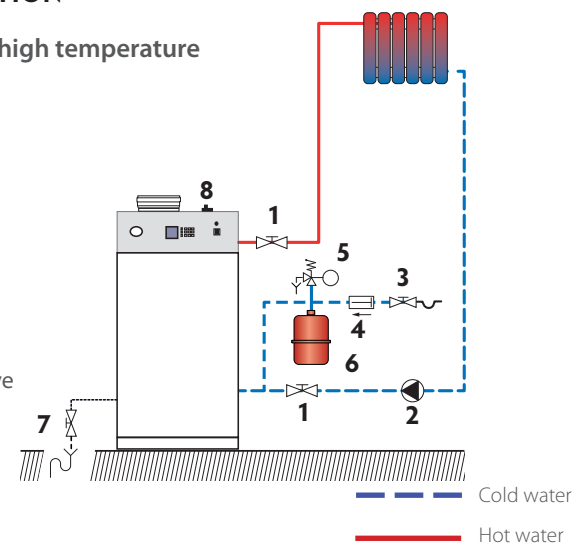
- The circuit illustrations are basic principle diagrams only.

HEATING CONNECTION

Typical connection - high temperature

Description

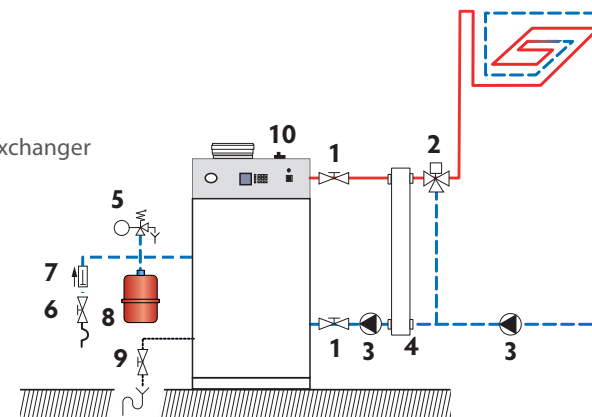
1. Isolating valve
2. Heating pump
3. Filling valve
4. Check valve
5. Safety valve
6. Expansion vessel
7. Drain valve
8. Auto air bleed valve



Typical connection - low temperature

Description

1. Isolating valve
2. 3-way mixing valve
3. Heating pump
4. Plate-to-plate heat exchanger
5. Safety valve
6. Filling valve
7. Check valve
8. Expansion vessel
9. Drain valve
10. Auto air bleed valve



Essential recommendations for the correct operation of the system

- As there is no built-in safety group (safety valve + pressure release valve) in the boiler, make sure to install them in the system.
- As there is no built-in CH pump in the boiler, the installer must provide one in the system.
- The heating circuit must be designed so as to ensure a continuous flow in the boiler; this flow may be obstructed if all the thermostatic valves are closed. In this case, install a bypass. The bypass valve should be mounted as far as possible from the boiler.

REMOVAL AND INSTALLATION OF THE FRONT AND SIDE PANELS

Set-up conditions

- External power supply isolated

Removal Procedure

Front panel

1. Using a cross-head screwdriver, release two screws (1) located at the top of the front panel. Retain for re-installation.
2. Pull slightly the panel top towards you, then lift the whole panel to disengage the bottom lug from the boiler casing mounting slot.
3. Disconnect the earth wire.

Side panels

1. Release 3 screws at the back of the boiler and remove the top cover.
2. On the side where access is required, release the attaching screws from the back, the top and the front locations. Retain the screws for re-installation.
3. Remove the panel.

Installation procedure

Side panels

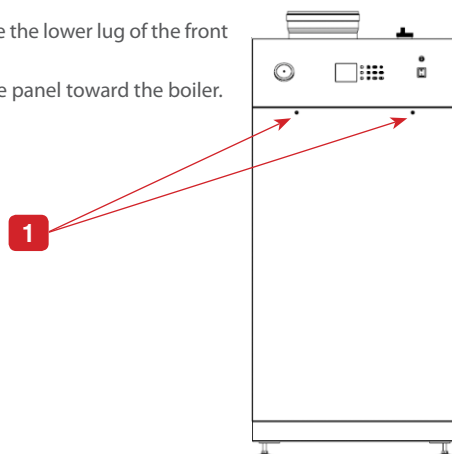
1. Place the panel in position.
2. Install and tighten the screws retained at removal in their front, top and back locations.
3. Install the top cover and tighten 3 attaching screws retained at removal.

Front panel

1. Connect the earth wire.
2. Hold the front panel at a slight angle to engage the lower lug of the front panel in the boiler casing mounting slot.
3. Lower panel in the slot and push the top of the panel toward the boiler.
4. Install 2 screws (1) retained at removal.

Follow-on tasks

None



GENERAL RECOMMENDATIONS FOR CHIMNEY CONNECTION



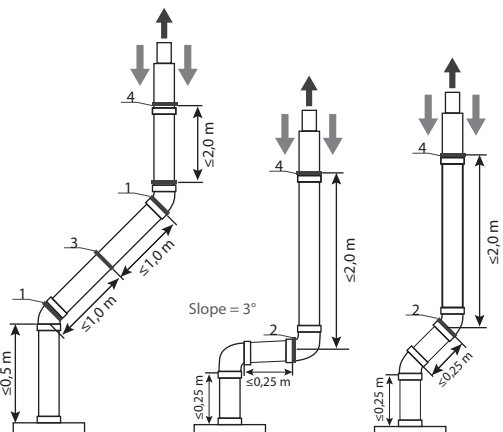
Essential recommendations for safety

- Do not install the boiler into a common flue piping with any other gas or oil appliances. This will cause flue gas spillage or appliance malfunction.
- Verify installed combustion air and flue piping are sealed gas tight and meet all provided instructions and applicable codes and standards.
- Failure to properly support the flue system can cause the flue system to fail, resulting in substantial property damage, serious injury, or death.
- A byproduct of any gas/oil fired appliance is carbon monoxide. Failure to install carbon monoxide detectors with alarms can result in serious injury, or death. Refer to applicable local regulations.



Essential recommendations for the correct operation of the appliance

- A condensation outlet connected to the sewer must be fitted close to the boiler to prevent the condensation products from the flue pipe from running into the boiler.
- Install a condensate neutralisation system if required by national and/or local regulations and have it cleaned regularly.
- Only use flue system components from the same manufacturer to connect this appliance and ensure that the pipe and connection diameters all match.
- Make sure to secure the flue piping to a solid structure.
- Exclusively use provided brackets to support the flue system.
- Install the horizontal flue pipes with a slight slope of 5 cm per meter (3°), so that the acid condensation water flows to a condensate recovery container and does not damage the heating body.



1. Each elbow and straight element will be secured at the sleeve.
2. In case the straight element before or after the first elbow is shorter than 25 cm, secure the straight element after the elbow using a bracket.
3. In case a straight (horizontal or sloped) element is longer than 1 m, support the element in its center using a clamp, making sure to allow free movement of the pipe.
4. Secure with a clamp every 2 meters in vertical piping/1 meter in horizontal/sloped piping, making sure to distribute the clamps evenly on the length of piping.


- If the appliance is provided with a condensate drain assembly, make sure to install the complete assembly on the boiler. If the assembly is incomplete, replace the entire assembly.
- Make sure that the condensate drain assembly is filled with water before starting up the boiler and check regularly the water level. Fill with water as necessary.
- It is mandatory to ventilate the boiler room. The high or low air vent opening dimensions depend on the boiler power and the boiler room size. Refer to the local regulations in force.
- If the combustion air inlet is located in an area likely to cause or contain contamination, or if products which could contaminate the air cannot be removed, the combustion air must be repiped and terminated at another location.
- Pool, laundry, common household, and hobby products often contain fluorine or chlorine compounds, which can form strong acids and corrode the internal components and flue system.
- In the case of parallel flue systems, make sure to maintain sufficient distance (at least 40 mm) between the boiler flue piping and combustible materials, and between the flue pipe and air inlet pipe if the latter is made of plastic material.
- Do not use screws to fasten together any flue pipe elements or any PP air inlet elements.
- Do not bond piping elements together using glue (e.g. silicone) or foam (e.g. PUR).

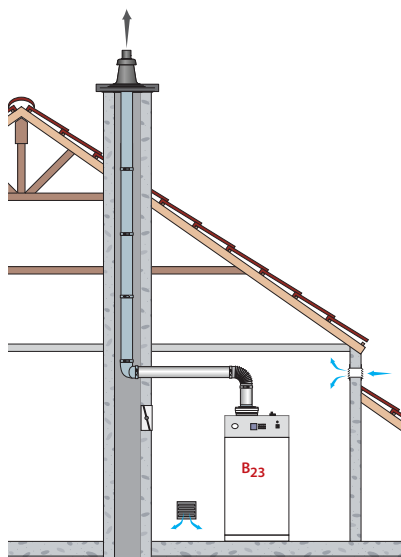
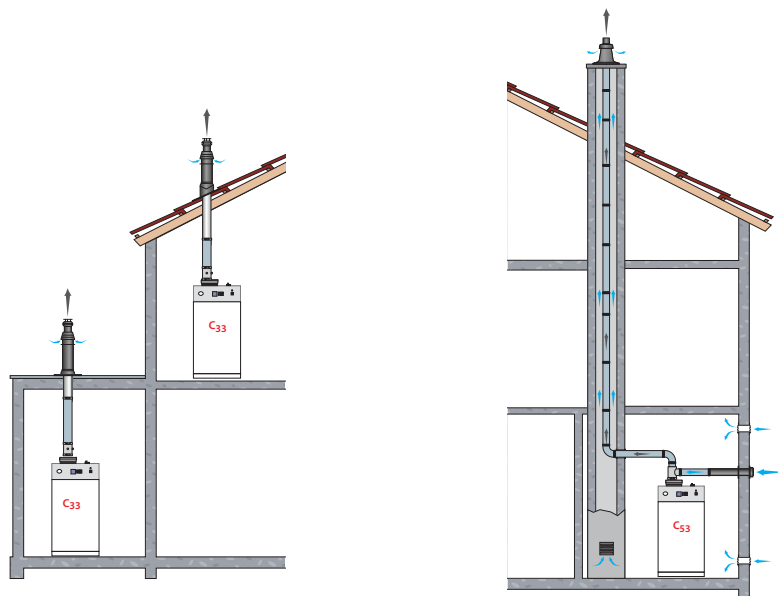


General remark

- For safety reasons and to make assembly easier, it is recommended to prefer the use of concentric flue pipes when possible.
- It is recommended to isolate the flue piping in damp rooms to prevent condensation water from forming on the piping and drip.
- When cutting the pipes to dimension, make sure to cut squarely and deburr the edges to prevent seals from being incorrect or damaged.
- To make piping assembly easier, exclusively use a mixture of water and soap (1%) on the extremity of the pipe to be fit in.
- When fitting metal flue pipes, make sure to always fit the pipe into the sleeve to the end stop.
- When fitting plastic flue pipes, make sure to allow material expansion by leaving about 10 mm between the pipe end and the sleeve end stop.
- Make sure to install the piping without any strain.
- Make sure to install an inspection opening in the flue system.
- When connecting the flue pipes, make sure not to exceed the maximum length recommended for the product, otherwise the system power might decrease.
- ACV-approved components will be used for the chimney connection. Failure to do so will make any warranty claim void.
- For C63 connection type (not allowed in Belgium), make sure to use the correct piping material according to the resistance to temperature, pressure, chemical composition of flue, condensation and soot. A code (as explained in EN 1443), marked on the pipe, allows to determine if the material complies with the flue system requirements.

CHIMNEY CONNECTION

 It is mandatory to ventilate the boiler room. The high or low air vent opening dimensions depend on the boiler power and the boiler room size. Refer to the local regulations in force.



General Remarks

- Boilers are delivered as standard in this configuration
- It is recommended to install a filter or leaf catcher if the inlet air is likely to be contaminated.
- A vertical terminal is recommended.

FLUE PIPE CONNECTION TYPES



It is mandatory to use recommended flue systems to connect the appliance. For any specific request, please contact ACV.

- B23** : Connection to an exhaust duct that discharges the combustion products outside the room where it is installed, with the combustion air being drawn directly from the boiler room.
- C33(x)** : Connection using pipes fitted with a vertical terminal that simultaneously takes in fresh air for the burner and discharges combustion products outside through openings that are either concentric or close enough together to be subjected to similar wind conditions, i.e. openings shall fit inside a square of 50 cm for boilers up to 70 kW and inside a square of 100 cm for boilers above 70 kW .
- C53(x)** : Connection to separate ducts for supplying combustion air and discharging combustion products; these ducts may end in zones with different pressure levels, but are not allowed to be installed on opposite walls of the building.
- C63(x)** : Type C boiler meant to be connected to a system for supplying combustion air and discharging combustion products, that is approved and sold separately (**Prohibited in Belgium**). Terminals for the supply of combustion air and for the evacuation of combustion products are not allowed to be installed on opposite walls of the building. See also the following additional specifications:
 - C63 appliances may only be equipped with Gastec QA materials and terminals or according to EN 14989-2
 - Maximum allowable recirculation rate of 10% under wind conditions.
 - Maximum allowable combustion air temperature: 45 °C



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

T-P-W Class

Temperature range	T120
Pressure range	P1
Condensate resistance (W=wet / D=Dry)	W

The minimum combustion products temperature and mass flow rate and the CO₂ are given in the table below

Compact Condens	Part load	Vol. Flue m ³ /h	Vol. Air m ³ /h	Co2 %	T fluegas °C	rho kg/m ³
170	33,6	43	38	9,1	30	1,12
210	42	54	47	9,1	30	1,12
250	50,4	65	57	9,1	30	1,12
300	58	75	65	9,1	30	1,12

ADDITIONAL INFORMATION FOR THE INSTALLATION OF THE CHIMNEY SYSTEM

Essential recommendations for the correct operation of the appliance

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

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

- The boilers can produce flue gases with very low temperatures, which can lead to condensation in the flue pipes and flue terminal. Therefore one should always mount an ice free terminal. Drain the condensate via a tundish and a U-trap to the sewer.

Air inlet

- If PP material is used for the air inlet, a minimum distance of 35 mm between exhaust and air inlet should be respected.
- The minimum insert length of the sleeve, leaf catcher or pipe must be 40 mm.

Flue exhaust

- The minimum insert length into the sleeve and the minimum length of the pipe end for aluminium and stainless steel must be 40 mm.
- If PP is used pay attention to the expansion (elongation) of the PP due to rise in flue gas temperature. Insert the PP pipe into the sleeve and redraw over a length of 10 mm (10 mm for maximum pipe length of 2 mtr).
- After mounting, the minimum insert length into the sleeve and the pipe end must be 40 mm.

Condensate trap/collector

The condensate trap/collector must be either connected by:

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

Also refer to "Recommendations for chimney connection" on page 34 for more information on the installation of flue exhaust and air inlet piping.

CALCULATION OF THE MAXIMUM FLUE PIPE LENGTH



When connecting the flue pipes, make sure not to exceed the maximum length in meters recommended for the product, otherwise the system power might decrease.

The flue pipe dimensions can be calculated using the following tables, indicating the corresponding length in meters of straight pipes, applied to each of the connection components. Then compare the calculation result with the recommended maximum flue pipe length provided for each type of Compact Condens model.



The following tables are based on equipment recommended by ACV and cannot be applied as a rule.

Maximum length (in meters)					
Model	Max. allowed pressure drop	Parallel air/flue gas Ø110/200	Parallel air/flue gas Ø180/180	Parallel air/flue gas Ø150/200	Parallel air/flue gas Ø200/200
170	150 Pa	13 m	112 m**	83 m**	—
210		9 m	75 m**	53 m**	120 m**
250		6 m	45 m**	36 m**	82 m**
300		4 m	33 m**	26 m**	60 m**

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

Calculated equivalent length of components				
	Pipe Ø200	Pipe Ø180	Pipe Ø150	Pipe Ø110
1m straight pipe	1.0	1.0	1.0	1.0
90° Elbow	5.75	4.5	4.0	3.5
45° Elbow	3.75	2.5	1.7	1.5

Sum the applicable value (length) of all the components in the system, and check that the resulting length is smaller than or equal to the maximum length provided in the table above.

CALCULATION OF THE PRESSURE DROP



When connecting the flue pipes, make sure not to exceed the maximum flue pressure drop value, recommended for the product, otherwise the system power might decrease.

Component	Model	Pressure drop (Pa) per component							
		170		210		250		300	
		Flue	Air	Flue	Air	Flue	Air	Flue	Air
Straight pipe (1m)	Ø200 mm	0.4		0.7		1.0		1.4	
	Ø150 mm		1.4		2.1		3.1		4.2
Elbow (90°)	Ø200 mm	2.5		4.0		5.7		7.8	
	Ø150 mm		5.3		8.3		12.0		16.4
Elbow (45°)	Ø200 mm	1.7		2.6		3.7		5.1	
	Ø150 mm		2.3		3.5		5.1		6.9
C33 Terminal	Ø200 mm		12.4		19.4		27.9		36.9
	Ø150 mm								
B23 Terminal	Ø200 mm	3.7		5.8		8.4		11.1	
C53 Terminal	Ø200 mm	3.7	12.2	5.8	19.0	8.4	27.4	11.1	36.3
	Ø150 mm								
Condensate trap Ø200 mm T + Bend 90°		5.0		8.0		11.4		15.4	
Expander 110/150mm			0.7		1.0		1.5		2.1



If the combined inlet/outlet system exceeds the maximum allowed pressure, this will result in a decrease of more than 5% of heat input capacity, which is not allowed.

Calculation Method

1	2	3	4	5	6	7	8
	Qty of Flue gas components Ø200mm	Qty of air components Ø150mm	Delta pressure component Fluegas	Delta pressure component Air	Total pressure drop Fluegas out [Pa] (2*4)	Total pressure drop Air in [Pa] (3*5)	Total pressure drop Fluegas + air in [Pa] (6 + 7)
1 Meter Pipe							
Elbow 90°							
Elbow 45°							
Condensate trap							
Expander							
Terminal							
Total pressure drop [Pa]							

For pressure drop calculation of appliance types B23, C33 and C53 use the table above and fill it in with the values provided in the table on the left, as follows:





- Column
- 1: Used material
 - 2: Quantity of flue gas components used in the system
 - 3: Quantity of air inlet components used in the system
 - 4: Pressure drop per component for flue gas components (as per table on the left)
 - 5: Pressure drop per component for air inlet components (as per table on the left)
 - 6: Total pressure drop for flue gas components: multiply columns 2 and 4
 - 7: Total pressure drop for air inlet components: multiply columns 3 and 5
 - 8: Total pressure drop for the system (flue gas and air components): add columns 6 and 7

Finally add all together at the bottom of column 8 to get the total pressure drop of the system.

Total pressure drop must be lower than 150 Pa.

Boiler Models	Connection Types	Material / Ø (mm)	Components *						
			Terminals	Pipes	Adjustable pipes	Elbows	Measurement / condensate collection	Accessories	Adapters
Compact Condens 170-210-250-300	B23 C33 C53	PP Ø 200	<ul style="list-style-type: none"> Roof terminal (537D6497) Roof Terminal Ø 200-Ø 150 -> Ø 200/300 (A1003105) Wall terminal, Air Ø 150 (A1003104) 	<ul style="list-style-type: none"> Extension 1000 mm Ø 200 (537D6462) Extension 1900 mm Ø 200 (537D6500) 	—	<ul style="list-style-type: none"> Elbow 45° Ø 200 (537D6501) Elbow 90° Ø 200 (537D6463) 	—	<ul style="list-style-type: none"> Angled lead weather slate Ø 200 25°-45° (537D6498) Weather Slate Flat lead Ø 200 (537D6499) Air inlet grid DN150 (A1003103) Weather Slate Flat alu Ø 320 (A1003106) Wall Bracket Ø 200 (537D6506) 	chimney connection kit PP 200. Mandatory. (A1003102)

* Designations and references (between brackets) are provided as information only. Please refer to the latest ACV price list to get more information and exact references or contact your ACV representative.
An additional list of components is also available on next page.

APPLIANCE TYPE	FLUEGAS OUTLET	SUPPLY AIR INLET	
 B23	ROOF TERMINAL ALU 200 OR ROOF TERMINAL PP 200 7021	LEAF CATCHER ALU EXPANDER 110- 150 EPDM	 B23
 C33	ROOF TERMINAL ALU 200/200- 200/300	EXPANDER 110- 150 EPDM	
 C53	ROOFTERMINAL ALU 200 OR ROOFTERMINAL PP 200 7021	WALL TERMINAL AIR PP 150 EXPANDER 110- 150 EPDM	

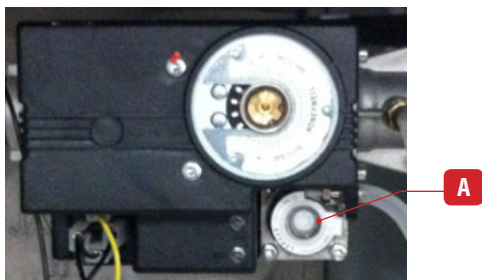
COMPONENTS	OEM ART.NO M&G
PP Ø 200 mm	
ELBOW PP 200 90° EPDM	41.007.04.11
ELBOW PP 200 45° EPDM	41.007.04.12
EXTENSION PP 200x500	41.007.04.01
EXTENSION PP 200x1000	41.007.04.02
EXTENSION PP 200x1900	41.007.04.04
ROOFTERM PP 200 7021	B23- C53 41.007.04.39
PP Ø 150 mm	
ELBOW PP 150 90°	41.007.03.31
ELBOW PP 150 45°	41.007.03.32
EXTENSION PP 150x2000	41.007.03.24
EXTENSION PP 150x1000	41.007.03.22
EXTENSION PP 150x500	41.007.03.21
EXPANDER EPDM Ø110- Ø150	41.008.56.32
LEAF CATCHER (AIR INLET GRILL) DN 150	41.007.54.36
WALLTERM PP 150 AIR C53	41.008.97.76
ALUMINUM	
ELBOW ALU 200 90°	41.008.05.40
ELBOW ALU 200 45°	41.008.05.41
EXTENSION ALU 200x1000	41.008.05.32
EXTENSION ALU 200x2000	41.008.05.33
EXTENSION ALU 200x500	41.008.05.31
ROOFTERM ALU 200	B23- C53 41.008.67.20
ROOFTERM ALU 200/200-200/300 C33	40.045.29.27
WALLTERM ALU 200/200-200/300 C13	41.002.78.30
GENERAL	
WALL BRACKET 200	41.008.71.98
SEAL EPDM 200 (PP DN 200)	41.007.52.95
SEAL SIL 200 (ALU 200)	41.002.73.70
WALL BRACKET 150	41.008.71.96
SEAL EPDM 150 mm (PP DN 150)	41.002.73.58
CONNECTION KIT PP DN 200	41.008.97.95
EXTENSION PP 200+ SAMPLING	41.007.04.06
WEATHER SLATE STEEP LEAD 210 25°- 45° (for 41.007.04.39)	41.007.69.03
WEATHER SLATE FLAT ALU 210 0° (for 41.007.04.39)	41.007.96.12
WEATHER SLATE FLAT ALU 320 0° (for 40.045.29.27)	41.007.96.48
WEATHER SLATE STEEP LEAD 320 18°- 62° (for 40.045.29.27) Mention "slope" when ordering	40.047.06.62 .. 40.047.06.70
WEATHER SLATE FLAT ALU 228 0° (for 41.008.67.20)	41.007.96.47
WEATHER SLATE STEEP LEAD 228 18°- 62° (for 41.008.67.20) Mention "slope" when ordering	41.000.63.20 .. 41.000.63.28

RECOMMENDATIONS FOR GAS CONNECTION



Essential recommendations for safety

- The gas connection must comply with all applicable local standards and regulations, and the circuit will be equipped with a gas pressure regulator as required.
- Do not check for gas leaks with an open flame. Use a gas detection device or bubble test.
- The gas burners are factory preset for use with natural gas [equivalent to G20]. Do not adjust or attempt to measure gas valve outlet pressure. The gas valve is factory-set for the correct outlet pressure and requires no field adjustment.
- The natural gas to propane conversion or the reverse is not authorized in certain countries such as Belgium. Refer to the table of gas categories in the technical characteristics of this manual.
- The gas orifice installed on the boiler must never be modified or replaced with a different size orifice, except in the case of a gas conversion process, which shall be performed according to the provided procedure and requirements.
- The CO₂, gas flow rate, air flow rate and air/gas supply parameters are factory-preset and may not be modified in Belgium, except for type I 2E(R)B boilers.
- Do not change the OFFSET (A) setting of the gas valve: it is factory-preset and sealed.



Essential recommendations for the correct operation of the appliance

- Refer to the technical characteristics of this manual or to the burner documentation to know the connection diameters.
- Bleed the gas duct and check thoroughly if all the boiler tubes, both internal and external, are tight.
- Check that the gas type and pressure from the distribution network are compatible with the appliance settings. Refer to the product type plate.
- Check the boiler electrical connection, the boiler room air vent system, the tightness of flue gas outlet pipes and of the burner chamber plate.
- Control the gas pressure and consumption at appliance start up.
- Check the boiler CO₂ adjustment (refer to the adjustment procedure and the technical data).

SYSTEM CONFIGURATIONS

The Compact Condens boilers can be setup in different types of systems, either high or low temperature, or both, with or without Domestic Hot Water tank. They can also be configured in a Cascade system (using the integrated cascade function or using an external controller). Refer to "Integrated Cascade Functionality" on page 18. Only the hydraulics and electronics systems can be connected in a cascade, not the flue system.

It is up to the installer to determine the best solution to achieve the results the user is expecting.

One basic configuration is shown in this manual (see next page). For any other configuration, please contact your ACV representative.

BOILER LOAD SETTINGS

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

In the field, the load can decrease due to more resistance in the boiler, the air inlet or the exhaust outlet or due to a malfunction of the fan.

At maximum load, the system should be designed for a nominal ΔT of 15 K to 20 K.

When the ΔT is higher than 25 K, the boiler cannot run on maximum load anymore and will start to modulate because of an insufficient water flow through the boiler.

Flow and return temperatures can be read in the boiler information menu (in the DIAGNOSTICS menu, refer to "User's menu and parameter descriptions" on page 9 and "Installer's menu and parameter descriptions" on page 14).

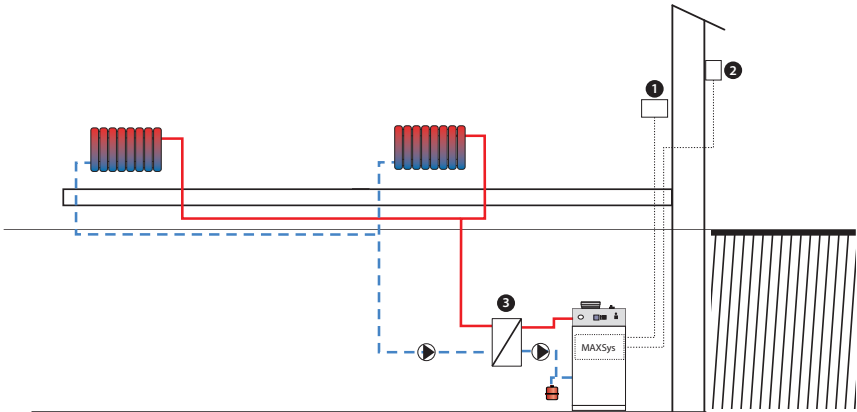
Valves, malfunctioning pumps, dirt, corrosion products from the system, dirty filters etc. can have a negative impact on water flow through the boiler.

Before ignition the boiler control checks ΔP aps during pre-purge. During burner operation, this check will be carried out. If the value is decreasing over the years, this could indicate e.g. malfunctioning of the fan, polluted air inlet, polluted burner, polluted heat exchanger or polluted exhaust system.

Siphon pressure (P SPS) should be smaller than the maximum allowable flue resistance. If P SPS is too high (> 8.3 mbar), the boiler will be stopped.

In this case, the exhaust system is probably blocked. Refer to "Troubleshooting" on page 48 for more information and to "Maintenance" on page 44.

BASIC CONFIGURATION - COMPACT CONDENS: HIGH TEMPERATURE HEATING CIRCUIT CONTROLLED BY ROOM THERMOSTAT AND OPTIONAL OUTDOOR SENSOR.



ITEM	DESCRIPTION	QTY	ELECT. TERMINALS TO CONNECT TO**
1	Room thermostat	1	Strip C2 Pins 1 & 2
2	Outdoor temperature sensor, 12kΩ	1	Strip C2 Pins 5 & 6
3	Plate-to-Plate heat exchanger	1	-
	Circulation pump	2	--

Block Diagram

The heating system (radiators) is controlled by an On/Off room thermostat.

In this configuration, the boiler constantly adapts its operation to the outdoor temperature, if an outdoor temperature sensor is connected.

The heating pump is triggered as soon as the room thermostat generates a heat demand.

* The illustrations are for information only. For more details on the required accessories, refer to your ACV representative.

** For electrical detail, refer to wiring diagram in "Wiring Diagram and Electrical Connections" on page 26.

SAFETY INSTRUCTIONS FOR STARTING UP



Essential recommendations for safety

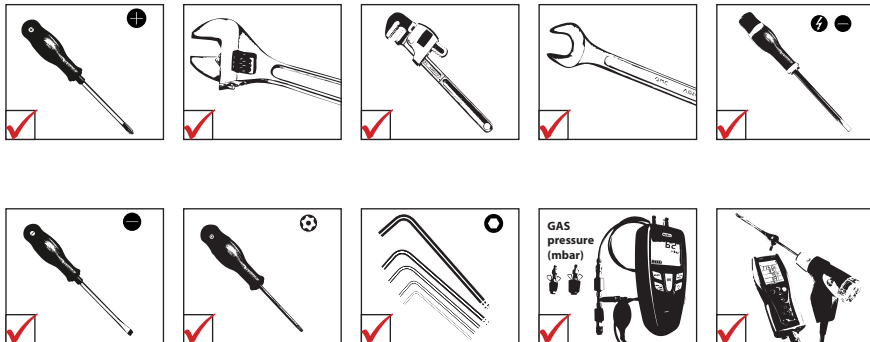
- The components inside the control panel may only be accessed by an approved installer.
- Set the water temperature in accordance with usage and local plumbing codes.
- Make sure that the heating circuit filling valve is closed once the starting up process is complete.
- If there is a drain assembly, make sure that the condensate drain assembly is filled with water before starting up the boiler. Fill with water as necessary.
- Make sure that all connections are made and tight.



General remark

- In normal operation, the burner starts automatically as soon as the boiler temperature drops below the preset temperature.

TOOLS REQUIRED FOR STARTING UP



CHECKS BEFORE STARTING UP



Essential recommendation for safety

- Check the tightness of the flue pipe connections.



Essential recommendation for the correct operation of the appliance

- Control the tightness of the hydraulic circuit connections.

FILLING THE HEATING CIRCUIT



If the system is fitted with an external hot water tank, first put the DHW circuit under pressure before pressurizing the heating (primary) circuit. Refer to the hot water preparation tank manual for more information.

Set-up conditions

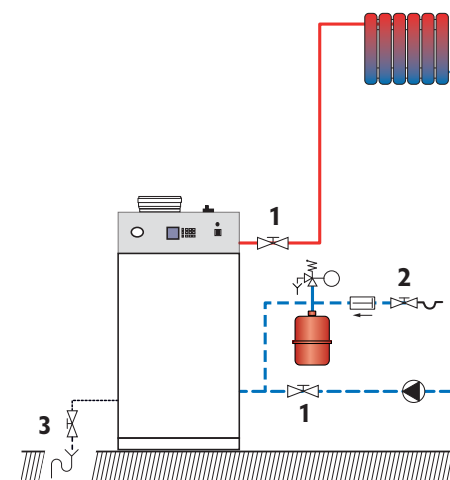
- External power supply isolated
- DHW circuit (if any) under pressure

Filling procedure

1. Open the isolating valves (1).
2. Make sure that the drain valve (3) is tightly closed.
3. Open the filling valve (2).
4. Once the system is bled from air, bring the pressure to the static pressure between 1.5 bar and 2 bar.
5. Close the filling valve (2).

Follow-on task

1. Check there is no leak.



STARTING UP

STARTING UP THE BOILER

Set-up conditions

- All connections made
- Condensate trap full of water
- Electrical power supply on
- Gas supply open
- Hydraulic circuit full of water

Procedure

1. Check that there is no gas leak.
2. Set the ON/OFF master switch on the "I" position.
3. If a room thermostat is installed, possibly increase the temperature set-point to generate a demand.
4. Check that the gas pressure, siphon pressure and water pressure contacts are closed. If not, the boiler will block and display the E76 error code.
5. Check the gas pressure and allow the boiler to heat up for a few minutes.
6. Check there is no leak at flue-gas joints.
7. Check and adjust the burner according to local standards and regulations, refer to "Checking and Adjusting the Burner" on page 43.
8. Set the central heating temperature to the required value using the control panel. Refer to "Installer's menu and parameter descriptions" on page 14.
9. After 5 minutes of operation, bleed the heating circuit until all air is evacuated and restore a 1.5 bar pressure.
10. Bleed the central heating circuit once again and top it up with water to get the required pressure, if necessary.
11. Make sure that the central heating system is properly balanced and, if needed, adjust the valves to prevent certain circuits or radiators from getting a flow rate that is far above or below the set rate.

Follow-on tasks

1. Check that there are no leaks.
2. Check that the flow rate in the appliance is sufficient as follows :
 - Operate the boiler at maximum power
 - Once the temperatures are stable, read out the supply and return temperatures
 - Check that the difference between the supply and return temperature is equal to or lower than 20K.
 - If the Delta T is higher than 20K, check the pump settings/specifications.

CHECKING AND ADJUSTING THE BURNER



When the burner operates at full power, the CO₂ rate must be within the limits mentioned in the technical characteristics, (see "Combustion Characteristics" on page 28).

Set-up conditions

- Operating boiler

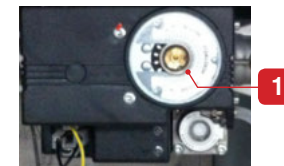
Procedure

1. Check if the MAXSYS parameters are set to meet the user's requirements (refer to "Installer's menu and parameter descriptions" on page 14), and change them if required.
2. Put the boiler to maximum power mode (refer to "Installer's menu and parameter descriptions" on page 14, chimney sweeper function).



The boiler is equipped with an automatic gas/air regulator. This means that the amount of gas is regulated according to the amount of air.

3. Using a pressure tester, check that the dynamic gas pressure at the gas valve is at least 18 mbar.
4. Allow the appliance to heat for a few minutes until its temperature is stable.
5. Measure the burner combustion by placing the flue gas analyser probe into the measurement unit port on the flue pipe and compare the CO and CO₂ values displayed with those indicated in the combustion characteristics table. Refer to "Combustion Characteristics" on page 28.
6. If the CO₂ value differs by more than +0.2% / -0.05 from the value mentioned in the "Combustion Characteristics" on page 28, carry out the adjustment as follows :
 - Turn the throttle to the right to lower the CO₂ percentage (a ½ turn (180°) gives a change of approximately 0.2 % CO₂)
7. Then put the boiler to the minimum power mode (Refer to "Installer's menu and parameter descriptions" on page 14).
8. Allow the boiler to stabilize for a few minutes.
9. Measure the CO₂ level. It must be lower than the value at full power, with a maximum of 0.5%. In case of significant deviation, please contact ACV's Maintenance department.



Follow-on tasks

1. Fill in the service log with the required initial values, in order to be able to compare the boiler changes over time. Refer to "Service log" on page 53.

RECOMMENDATIONS FOR THE BOILER MAINTENANCE



Essential recommendations for the electrical safety

- Before opening the boiler for maintenance, turn off the boiler by pushing on the ON/OFF master switch.
- Isolate the external power supply of the appliance before performing any operation, unless it is required to take measurements or perform system setup.



Essential recommendations for safety

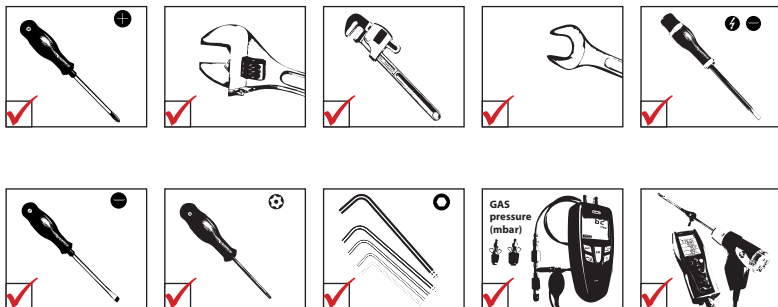
- Water flowing out of the drain valve may be extremely hot and could cause severe scalding.
- Do not use solvents to clean any of the burner components. The components could be damaged, resulting in unreliable or unsafe operation.
- Check the tightness of the flue pipe connections.



Essential recommendations for the correct operation of the appliance

- It is recommended to have the boiler and the burner serviced at least once a year or every 1,500 hours by a qualified technician, preferably at the start of the heating season. More frequent servicing may be required depending on boiler use. Please consult your installer for advice.
- The boiler and burner maintenance will be carried out by a qualified engineer, and the defective parts may only be replaced by genuine factory parts.
- Make sure to replace any gaskets or seals on the removed components before reinstalling them.
- To ensure maximum efficiency and reliability of the unit, it is recommended that the end-user perform the periodic checks mentioned in the Safety section of this manual.
- Control the tightness of the hydraulic circuit connections.

TOOLS REQUIRED FOR MAINTENANCE



BOILER SHUT-DOWN FOR MAINTENANCE

1. Switch the boiler off using the ON/OFF master switch and isolate the external power supply.
2. Close the gas supply valve of the boiler.

PERIODIC BOILER MAINTENANCE TASKS

Tasks	Frequency		
	Periodic inspection	1 year	2 years
	End-user	Professional	
1. Make sure that the system water pressure is at least 1 bar when cold. Top up the system if necessary, adding small quantities of water at a time. In case of repeated fills, call your installer.	X	X	
2. Check that there is no water on the floor under the boiler. Call your installer if there is.	X	X	
3. Check that no error code is displayed on the control panel. Call your installer if necessary.	X	X	
4. Check that all gas, hydraulic and electrical connections are correctly fastened and tight.		X	
5. Check the flue gas exhaust: correct fastening, correct installation, no leaks or clogging.		X	
6. Check the combustion parameters (CO and CO ₂), see "Checking and Adjusting the Burner" on page 43.		X	
7. Check visually the heating body: no evidence of corrosion, soot deposits or damages. Carry out all required cleaning tasks, repairs and replacements that might be required.		X	
8. Check the electrodes, see "Removal, Check and Installation of the Burner Electrodes" on page 47			X
9. Remove the burner and clean the exchanger, see "Removal, Check and Installation of the Burner" on page 46 and "Cleaning the Exchanger" on page 47.			X
10. Check that the condensate trap is not clogged. If it is, remove it, clean it, and reinstall it.*		X	
11. Open and inspect the condensate recovery dish.*		X	
12. If a condensate neutralisation system is installed, check it and have it cleaned.	X	X	

*To access the condensate trap and the condensate recovery dish, open the side panel, refer to "Removal and Installation of the Front and Side Panels" on page 33.

DRAINING THE HEATING CIRCUIT OF THE BOILER



Essential recommendations for safety

- If the system is fitted with an external hot water tank, isolate the DHW circuit before draining the heating (primary) circuit.
- Water flowing out of the drain valve may be extremely hot and could cause severe scalding. Keep people away from the hot water discharge.

Set-up conditions

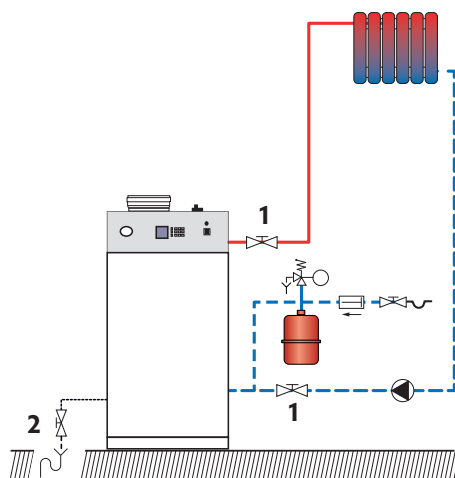
- Boiler switched off using the ON/OFF master switch
- DHW circuit (if any) isolated
- External power supply isolated
- Gas supply closed

Heating circuit draining procedure

1. Close the isolating valves (1).
2. Connect the drain valve (2) to the sewer with a hose.
3. Open the drain valve (2) to empty the heating circuit of the boiler.
4. Close the drain valve (2) once the heating circuit of the boiler is empty and remove hose as required.

Follow-on task

1. None



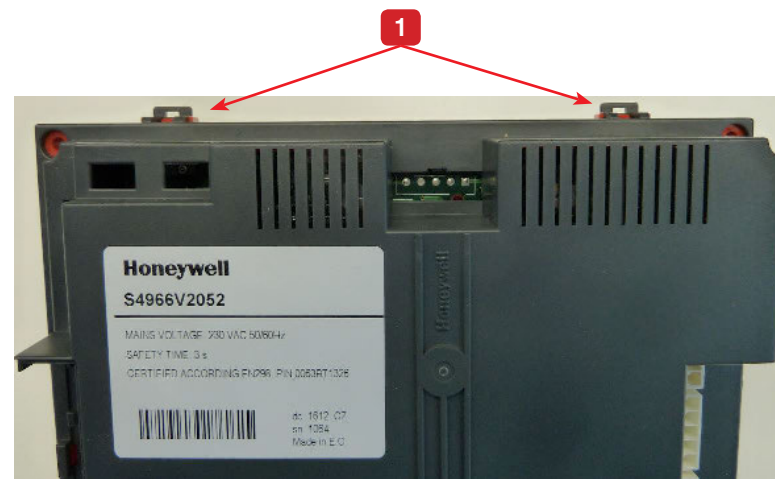
ACCESSING THE MAXSYS (FUSE REPLACEMENT)

Set-up conditions

- External power supply isolated
- Front panel open, refer to "Removal and Installation of the Front and Side Panels" on page 33

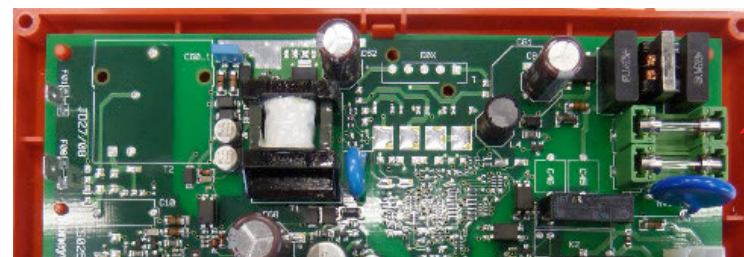
Procedure

1. Disconnect all connectors from the Maxsys.
2. Release the security clips (1) with a long thin screw driver.



It is not necessary to unscrew the Maxsys from the mounting plate

3. Remove the protective cover of the Maxsys.
4. Remove and replace the required fuse (2)



F1: T3. 15 A 250V
F2: T3. 15A 250V

Follow-on tasks

1. Close front panel as indicated in "Removal and Installation of the Front and Side Panels" on page 33.

REMOVAL, CHECK AND INSTALLATION OF THE BURNER

Set-up conditions

- Boiler shut down
- External power supply isolated
- Gas supply closed
- Front and side panel(s) removed (refer to "Removal and Installation of the Front and Side Panels" on page 33).

Removal procedure

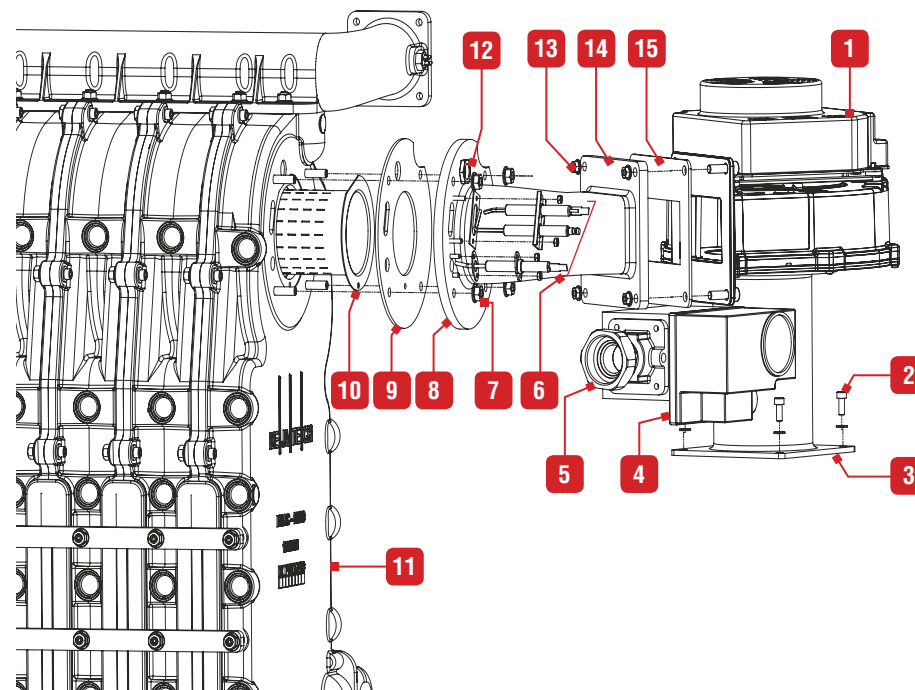
1. Disconnect all plugs and tubes from the fan assembly (1), the gas valve (4) and the electrodes (6), as required.
2. Release the gas connection (5).
3. Release 4 attaching bolts (13) from the fan assembly flange (14). Discard the gasket (15). Retain the bolts for re-installation.
4. Release 4 screws (2) from the air inlet flange (3) and disconnect the air inlet. Retain the screws and washers for re-installation.
5. Using a socket wrench, release the burner hood (8) attaching nuts (7) and retain them for re-installation.
6. Pull the burner assembly out of the exchanger (11).
7. If required, clean the exchanger, see "Cleaning the Exchanger" on page 47.
8. If not removed previously, remove, check and reinstall the electrodes, refer to "Removal, Check and Installation of the Burner Electrodes" on page 47.

Installation procedure

1. Check the burner hood insulation block (9) condition. Replace if required.
2. Reinstall the burner assembly into the exchanger (11).
3. Install the attaching nuts (7) of the burner hood (8) and fasten them in a crosswise pattern
4. Install the fan assembly on the fan assembly flange (14), with a new gasket (15). Tighten 4 attaching bolts (13) retained at removal.
5. Install the air inlet on the air inlet flange (3) using 4 screws and washers (2) retained at removal.
6. Reconnect the gas connection (5).
7. Reconnect all plugs and tubes disconnected at removal, to the electrodes (6), the gas valve (4) and the fan assembly (1), as required.

Follow-on tasks

None



Key

1. Fan assembly
2. Air inlet attaching screws and washers
3. Air inlet flange
4. Gas valve
5. Gas connection
6. Electrodes
7. Burner attaching nuts
8. Burner hood
9. Burner hood insulation block
10. Burner tube
11. Heat exchanger
12. Flame sight glass
13. Fan assembly attaching bolts
14. Fan assembly flange
15. Fan assembly gasket

REMOVAL, CHECK AND INSTALLATION OF THE BURNER ELECTRODES

Essential recommendations for the correct operation of the appliance

- Remove the electrodes to control them in case of ignition problems.

Set-up conditions

- Boiler shut down
- External power supply isolated
- Gas supply closed
- Front panel open, refer to "Removal and Installation of the Front and Side Panels" on page 33.

Removal procedure

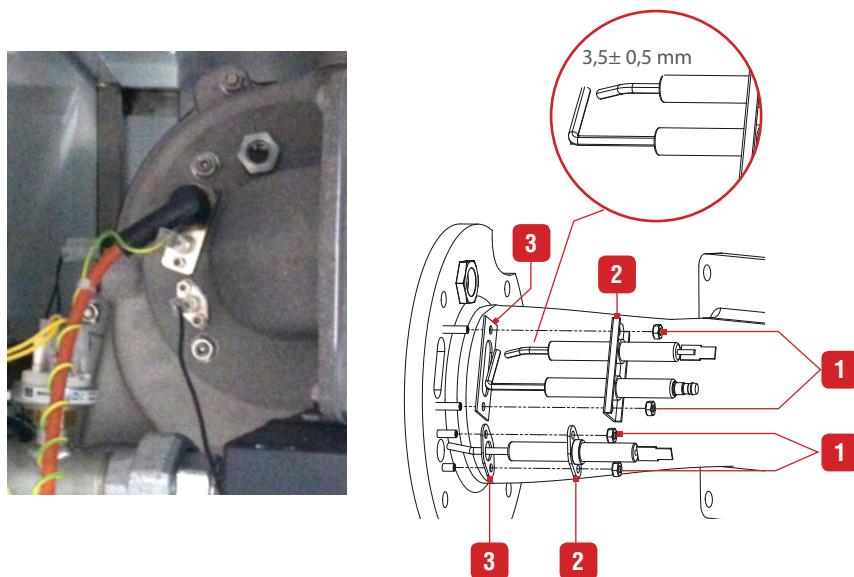
1. Disconnect all the cables from the electrodes.
2. Remove two mounting screws (1) and retain them for re-installation.
3. Remove the 2 electrodes (2) and their gasket (3).
4. Check the correct alignment of the electrode ends and that the gap corresponds to the value indicated on the figure below.
5. Replace the electrodes if required.

Installation procedure

1. Install a new gasket.
2. Install both electrodes (2) using their two retained screws (1).

Follow-on tasks

1. Reconnect all the cables to the electrodes.



CLEANING THE EXCHANGER

Set-up conditions

- Boiler shut down
- External power supply isolated
- Gas supply closed
- Burner and fan assembly removed i.a.w. procedure "Removal, Check and Installation of the Burner" on page 46.
- Front and side panel(s) open, refer to "Removal and Installation of the Front and Side Panels" on page 33.

Procedure

1. Open the inspection sump cover, refer to "Models - Compact Condens 170- 210 - 250 - 300" on page 24 for location.
2. Inspect and clean the inner part of the sump and the bottom part of the heat-exchanger using a nylon brush and a vacuum cleaner.
3. In case of clogging in this section, remove the left inspection covers and clean this section.

Never use a metal brush to clean the heat exchanger.

4. Using a nylon brush, and a vacuum cleaner, clean the combustion chamber.
5. Pour some water in the chamber to flush away any foreign deposits that may be present in the heat exchanger.
6. Clean the condensate trap and fill the siphon with clean water.

Follow-on tasks

1. Reinstall the siphon.
2. Close all inspection covers.
3. Reinstall the burner according to procedure "Removal, Check and Installation of the Burner" on page 46.
4. Restart the boiler in accordance with procedure below.

RESTARTING AFTER MAINTENANCE

Set-up conditions

- All removed components reinstalled
- All connections made
- Power supply
- Gas supply open
- Hydraulic circuit(s) full of water

Procedure

1. Make sure there is no gas leak at the gas connections.
2. Switch the appliance on using the ON/OFF master switch.
3. Set the appliance at maximum power and check the absence of gas leaks.
4. Check the gas pressure and CO₂ adjustment in accordance with "Checking and Adjusting the Burner" on page 43.

Follow-on tasks

1. Close all opened panels, refer to "Removal and Installation of the Front and Side Panels" on page 33.
2. Check there are no leaks.

GENERAL

Problem	Probable cause(s)	Solution(s)
1. No data visible on the display	On/Off Master switch on "O" position	Place On/Off Master switch on "I" position
	Fuse (5,0 AT) in the control panel blown	THIS FUSE IS PART OF THE 230 V CIRCUIT. SO FIRST SWITCH OFF FROM THE MAIN ! Check fuse - Replace as required
	230 VAC tension	Connect the boiler to the power supply
		Check if there is 230 VAC tension on the connections "L" and "N" of connector X00 in the MAXsys (see "Wiring Diagram and Electrical Connections" on page 26).
		If there is tension, replace 230 V fuses F1 and F2 inside the MAXsys (no need to remove MAXsys controller from panel, just release the 6 clips with a screwdriver to remove the cover). Check flat cable of the display. If it is OK, replace MAXSys controller
2. Blown fuse inside the Maxsys	Short-circuited pump	Check wiring of CH pump and DHW pump if any. Replace faulty pump if required.
3. Data visible on the display, but no boiler activity	No heat demand generated	Generate a heat demand : <ul style="list-style-type: none"> Through the User Menu/Chimney Sweeper OR the Technician Menu/Diagnostics/manual test, set the boiler to a fixed fan speed between minimum and maximum CH-fanspeed. At heat demand, the boiler control will perform zero-check of air pressure switch before starting the fan. After that the fan will start and wait for air pressure switch to close. As soon as air pressure switch has closed ($\Delta P > 40$ Pa), starting procedure will continue.
4. Error code shown on display		Refer to "Errors (hard and soft lockouts)" on page 49 and section "Locking Codes" on page 50.

CH CIRCUIT

Problem	Probable cause(s)	Solution(s)
5. CH circuit remains cold	Faulty power supply	Refer to problem 1 above
	CH operation OFF	Activate CH operation through control panel. Refer to "Installer's menu and parameter descriptions" on page 14
	Faulty room thermostat	Check wiring connection, refer to "Wiring Diagram and Electrical Connections" on page 26 If connection is correct, replace thermostat
	CH preset temp too low	Change CH setting through control panel
	Faulty Outdoor temperature sensor	Check wiring connection, refer to "Wiring Diagram and Electrical Connections" on page 26 If connection is correct, replace Outdoor temperature sensor
	Faulty 3-way valve faulty	Check that 3-way valve is not stuck on the DHW circuit. Release or replace as required.

DHW CIRCUIT

Problem	Probable cause(s)	Solution(s)
6. Boiler does not respond to DHW heat request	DHW operation OFF	Activate DHW operation through control panel. Refer to "Installer's menu and parameter descriptions" on page 14.
	Faulty storage tank-NTC or thermostat	Check the storage tank-NTC or thermostat and its wiring, refer to "Wiring Diagram and Electrical Connections" on page 26.
7. Insufficient DHW flow	Insufficient water pressure	Check water pressure from the mains
	Dirty filters in taps	Clean tap filters
8. DHW temperature too low	Setting of temperature too low	Define DHW preset temperature through control panel. Refer to "Installer's menu and parameter descriptions" on page 14.
	Leakage 3-way valve (towards CH-circuit)	Check 3-way valve for leak. Clean or replace as required.
	Faulty DHW pump	Check wiring of DHW pump. Replace faulty pump if required.
	Input too low due to too much resistance in air/flue system	Check the absence of obstruction in air/flue system. Clean air filter if any. Check the burner, refer to "Removal, Check and Installation of the Burner" on page 46
9. Boiler operates only for DHW	Faulty storage tank-NTC or thermostat	Check the storage tank-NTC or thermostat and its wiring, refer to "Wiring Diagram and Electrical Connections" on page 26.
	Faulty 3-way valve	Check that 3-way valve is not stuck on the DHW circuit. Replace as required.

ERRORS (HARD AND SOFT LOCKOUTS)

Errors are indicated by a text and an E-code on the display. There are two types of errors :

- **An error with a hard lockout.** This means that it is a final stop and that a manual reset is required to enable normal operation again (eg max temp limit).
- **An error with a soft lockout.** The boiler will automatically resume normal operation after the cause of block is solved (eg gas pressure too low).

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

The cause of error (hard or soft lockout) can be found with the help of the error-list, refer to "Installer's menu and parameter descriptions" on page 14. A list of all the error codes and the solution(s) to the fault can be found in the section "Locking Codes" on page 50.

Codes	Description of the fault	Solution for the fault
E 01	Failed ignition: The burner failed to light after 3 ignition attempts.	<ol style="list-style-type: none"> 1. Check gas supply to boiler. 2. Check Ignition cable connection in control box. 3. Check electrode for defects, and distance between the pins. 4. Check gas valve and electrical connections to gas valve.
E 02	False flame: Flame detected prior to ignition.	<ol style="list-style-type: none"> 1. Check good electrical ground connection to unit. 2. Check electrode for pollution and deposition of dirt.
E 03	High Boiler temp. : The boiler temperature exceeds 105°C	<p>Correct condition which caused high temperature or limit to open.</p> <ol style="list-style-type: none"> 1. Check water flow in the system (radiator valves). 2. Check Pump and pump electrical connections.
E 04	APS failed zero position check : Air pressure switch closed at appliance start,	<ol style="list-style-type: none"> 1. Check the draft over the appliance Air intake and flue outlet when at rest. Switchpoints Airpressure switch: On at 0,4 mbar, Off at 0,25 mbar.
E 05	Blower speed: Blower speed not correct or speed signal is not received by MAXSYS.	<ol style="list-style-type: none"> 1. Check blower and wiring harness. 2. Under normal condition if actual fan speed is 1000 rpm different from set fan speed an error is displayed (after 60sec in running and after 30 sec. at startup). 3. Only exception when actual fan speed > 3000 rpm at max. PWM.
E 06	Air flow/Airpressure switch open during appliance run : APS opened more then 5 times during heat demand.	<ol style="list-style-type: none"> 1. Check the Air inlet / flue outlet for any obstructions. 2. Check if the flue system is sensitive to backdraft / Wind.
E 07	High Flue temp.: Flue temperature exceeds high limit.	<ol style="list-style-type: none"> 1. Heat exchanger may require cleaning. 2. Boiler will automatically reset once flue temperature returns to normal range.
E 08	Flame Circuit Error: Flame circuit test failed	<ol style="list-style-type: none"> 1. Turn boiler off. 2. Check and clean the electrode. 3. Check ignition and grounding cables are firmly connected.
E 09	Gas valve circuit error: Gas valve circuit test failed.	<ol style="list-style-type: none"> 1. Check the gas valve and wiring harness. 2. If the problem persists replace the "MAXSYS" circuit board.
E 12	Internal Control Fault: EEPROM misconfiguration	<ol style="list-style-type: none"> 1. Turn unit off and on to resume normal operation. 2. If the problem persists replace the "MAXSYS" circuit board.
E 13	Reset limit reached: Resets are limited to 5 every 15 minutes.	<ol style="list-style-type: none"> 1. Turn unit off and on to resume normal operation. 2. If the problem persists replace the "MAXSYS" circuit board.
E 15	Sensor Drift: Supply or return sensor reading has drifted.	Check supply and return temperature sensors and wiring harness.
E 16	Supply Sensor Stuck: Supply sensor reading is not changing.	<ol style="list-style-type: none"> 1. Check supply temperature sensor and wiring harness for shortcuts or other defects. 2. Check waterflow and the temperature balance in the system, because CH supply temperature does not change.
E 17	Return Sensor Stuck: Return sensor reading is not changing.	<ol style="list-style-type: none"> 1. Check return temperature sensor and its position, check wiring harness for shortcuts or other defects. 2. Check waterflow and the temperature balance in the system, because CH return temperature does not change. 3. Failure may happen at low output capacity when supplying from a big tank !
E 18	Sensor Failure: Supply or return sensor reading changed very rapidly.	Check supply and return temperature sensors and wiring harness.
E 21	Internal Control Fault: A / D conversion error.	Turn unit off and on then press OK to resume normal operation.
E 25	Internal Control Fault: CRC check error.	Turn unit off and on to resume normal operation.

Codes	Description of the fault	Solution for the fault
E 30	Supply Sensor Shorted: A short circuit has been detected in the boiler supply temperature sensor circuit	<ol style="list-style-type: none"> 1. Check supply temperature sensor and wiring harness for a short circuit. 2. If necessary replace the sensor, or the wire harness. 3. After fixing the problem, reset the appliance and resume normal operation.
E 31	Supply Sensor Open: An open circuit has been detected in the boiler supply temperature sensor circuit	<ol style="list-style-type: none"> 1. Check supply temperature sensor, connectors and wiring harness for an open circuit. 2. If necessary replace the sensor, or the wire harness. 3. After fixing the problem reset the appliance and resume normal operation.
E 32	DHW Sensor Shorted: A short circuit has been detected in the DHW temperature sensor circuit	<ol style="list-style-type: none"> 1. Check DHW temperature sensor and wiring harness for a short circuit. 2. If necessary replace the sensor, or the wire harness. 3. After fixing the problem reset the appliance and resume normal operation.
E 33	DHW Sensor Open: An open circuit has been detected in the DHW temperature sensor circuit	<ol style="list-style-type: none"> 1. Check DHW temperature sensor, connectors and wiring harness for an open circuit. 2. If necessary replace the sensor, or the wire harness. 3. After fixing the problem reset the appliance and resume normal operation.
E 34	Low Voltage: Line voltage has fallen below an acceptable operating level.	The boiler will automatically reset once line voltage returns to normal.
E 37	Low Water: Water level has fallen below 0.7 bar.	<ol style="list-style-type: none"> 1. Increase pressure to normal range. 2. The boiler will automatically reset once water level returns to normal.
E 43	Return Sensor Shorted: A short circuit has been detected in the boiler return temperature sensor circuit.	<ol style="list-style-type: none"> 1. Check return temperature sensor and wiring harness for a short circuit. 2. If necessary replace the sensor, or the wire harness. 3. After fixing the problem, reset the appliance and resume normal operation.
E 44	Return Sensor Open: An open circuit has been detected in the boiler return temperature sensor circuit.	<ol style="list-style-type: none"> 1. Check return temperature sensor, connectors and wiring harness for an open circuit. 2. If necessary replace the sensor, or the wire harness. 3. After fixing the problem, reset the appliance and resume normal operation.
E 45	Flue Sensor Shorted: A short circuit has been detected in the boiler flue temperature sensor circuit	<ol style="list-style-type: none"> 1. Check flue temperature sensor and wiring harness for a short circuit. 2. If necessary replace the sensor, or the wire harness. 3. After fixing the problem reset the appliance and resume normal operation.
E 46	Flue Sensor Open: An open circuit has been detected in the boiler flue temperature sensor circuit.	<ol style="list-style-type: none"> 1. Check flue temperature sensor, connectors and wiring harness for an open circuit. 2. If necessary replace the sensor, or the wire harness. 3. After fixing the problem reset the appliance and resume normal operation.
E 47	Water pressure sensor error: Water pressure sensor is disconnected or broken	<ol style="list-style-type: none"> 1. Check water pressure sensor, connectors and wiring harness. 2. If necessary replace the sensor, or the wire harness. 3. After fixing the problem reset the appliance and resume normal operation.
E 76	External Limit Open: An external automatic reset boiler limit has opened.	<ol style="list-style-type: none"> 1. Correct condition which caused limit to open. 2. Boiler will automatically reset once external limit closes
E 77	Siphon error : Siphon switch open	Check the air intake and the flue outlet for any obstructions. The pressure over the appliance is too high. Delta P < 8.3 mbar

Codes	Description of the fault	Solution for the fault
E 80	Return > Supply: Return temperature is higher than supply temperature.	Confirm water flows in boiler return and out boiler supply.
E 81	Sensor Drift: Supply and return temperatures are not equal.	<ol style="list-style-type: none"> 1. Check water is flowing through boiler. 2. Wait a few minutes for the water to equalise the temperature, the boiler will automatically reset once temperatures become equal. 3. If boiler doesn't reset, check the NTC's and check the wire harness, replace if necessary.
E 87	Overtemp lockout: An external boiler limit has opened.	<ol style="list-style-type: none"> 1. Correct condition which caused limit to open, then reset boiler. 2. The boiler needs to be reset once external limit closes.
E 89	Incorrect Setting: A parameter setting is outside the settings range.	<ol style="list-style-type: none"> 1. Check that the controller and display types are correct. 2. Review CH & DHW settings and OTC setting and correct as necessary. 3. The boiler will automatically reset once corrected.
E 90	Firmware Mismatch: Control module and display firmware versions are incompatible.	One or several components are not compatible with the system. Replace mismatched component(s).
E 91	Cascade Sensor Shorted: A short circuit has been detected in the system temperature sensor circuit	<ol style="list-style-type: none"> 1. Check the Cascade temperature sensor is correctly wired (Terminal strip C2, pins 15 and 16) and the absence of short circuit. 2. If necessary replace the sensor, or the wire harness. 3. After fixing the problem reset the appliance and resume normal operation.
E 92	Cascade Sensor Open: An open circuit has been detected in the system temperature sensor circuit.	<ol style="list-style-type: none"> 1. Check the Cascade temperature sensor is correctly wired (Terminal strip C2, pins 15 and 16) and the absence of an open circuit. 2. If necessary replace the sensor, or the wire harness. 3. After fixing the problem reset the appliance and resume normal operation.
E 93	Outdoor Sensor Shorted: A short circuit has been detected in the outdoor temperature sensor circuit.	<ol style="list-style-type: none"> 1. Check outdoor temperature sensor and wiring for a short circuit. 2. If necessary replace the sensor, or the wire harness. 3. After fixing the problem reset the appliance and resume normal operation.
E 94	Internal Display Fault: Display memory error	Turn unit off and on to resume normal operation.
E 95	Cascade CH Supply Sensor Error: Supply sensor reading is invalid	<ol style="list-style-type: none"> 1. Check wiring between display and control module. 2. If necessary replace the sensor, or the wire harness. 3. After fixing the problem reset the appliance and resume normal operation.
E 96	Outdoor Sensor Open: An open circuit has been detected in the outdoor temperature sensor circuit.	<ol style="list-style-type: none"> 1. Check outdoor temperature sensor and wiring for an open circuit. 2. If necessary replace the sensor, or the wire harness. 3. After fixing the problem reset the appliance and resume normal operation.
E 97	Cascade Mismatch: Cascade configuration has changed.	<ol style="list-style-type: none"> 1. Run autodetection if change was intentional, or else check wiring between boilers. 2. Boiler will automatically reset once repaired.
E 98	Cascade Bus Error: Communication with other boilers has been lost.	<ol style="list-style-type: none"> 1. Check wiring between boilers. 2. Boiler will automatically reset once repaired.
E 99	Controller Bus Error: Communication between boiler display and control module has been lost.	<ol style="list-style-type: none"> 1. Check wiring between components. 2. Boiler will automatically reset once repaired.

[illegible]



Product Fiche: Compact Condens
Referring to Commission Delegated Regulation N° 811/2013

Model	Compact Condens 170	Compact Condens 210	Compact Condens 250	Compact Condens 300	Compact Condens 340
Medium temperature application	condensation	condensation	condensation	condensation	condensation
Declared load profile for water heating	-	-	-	-	-
Seasonal space heating energy efficiency class	A	A	A	A	A
Water heating efficiency class	-	-	-	-	-
Rated heat output (kW)	164	205	245	283	331
Annual energy consumption for space heating (kWh)	-	-	-	-	-
Annual energy consumption for water heating (kWh)	-	-	-	-	-
Seasonal space heating efficiency (%)	92.0	92.1	92.1	92.2	92.6
Water heating efficiency (%)	-	-	-	-	-
Sound power level indoors LWA (dB)	69	70	71	72	72
Able to work only during off-peak hours:	No	No	No	No	No

ACV International Oude Vijverweg, 6 1653 Dworp (Belgium)
01/09/2017
A1003261 – Rev B

Boiler type and model	Compact Condens		170	210	250	300
Condensing boiler			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Low temp boiler			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Combination heater			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Useful heat output						
at 30% of rated heat output and low-temp regime	P_1	kW	54	75	81	93
at rated output and high-temp regime	P_4	kW	162	202	242	279
Useful efficiency						
at 30% of rated heat output and low-temp regime	η_1	% Hs	97.0	97.0	97.0	97.0
at rated output and high-temp regime	η_4	% HS	86.8	86.8	86.8	86.8
Auxiliary electricity consumption						
At full load	e_{lmax}	kW	0.35	0.35	0.35	0.35
At part load	e_{lmin}	kW	0.043	0.043	0.043	0.043
In standby mode	P_{sb}	kW	0.005	0.005	0.005	0.005
Standby heat loss	P_{stby}	kW	0.272	0.272	0.272	0.272



DECLARATION OF CONFORMITY TO STANDARDS

1/1

Product type: **Condensing boiler**

Name and address of manufacturer: **ACV International SA / NV**
Oude Vijverweg, 6
B-1653 Dworp
Belgium

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Model: **Compact Condens 170**
Compact Condens 210
Compact Condens 250
Compact Condens 300

We declare hereby that the appliance specified above is conform to the following regulations and directives:

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

Relevant harmonised standards :

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

The notified body, (KIWA Nederlands B.V., Wilmersdorf 50, PO Box 137, 7300 AC APELDOORN, The Netherlands [0063]) performed a Type Examination and issued the certificate(s) Nb 91425/01 and 18GR0489/01, ID # **0063CQ3790**

Signed for and on behalf of
ACV International SA/NV

Dworp, 10/09/2018

R&D Director
 Sara Stas
