EN

ACV
EXCELLENCE IN HOT WATER

N1 - N2 - N3

Eco

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

for the Installer and the User

A1005170 - 664Y7700 • C

TABLE OF CONTENTS

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 OIL APPLIANCES

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 OIL 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.

MEANING OF SYMBOLS

Symbols on the packaging	Meaning
	Fragile
	Keep dry
	This way up
	Hand truck or pallet truck required for transport

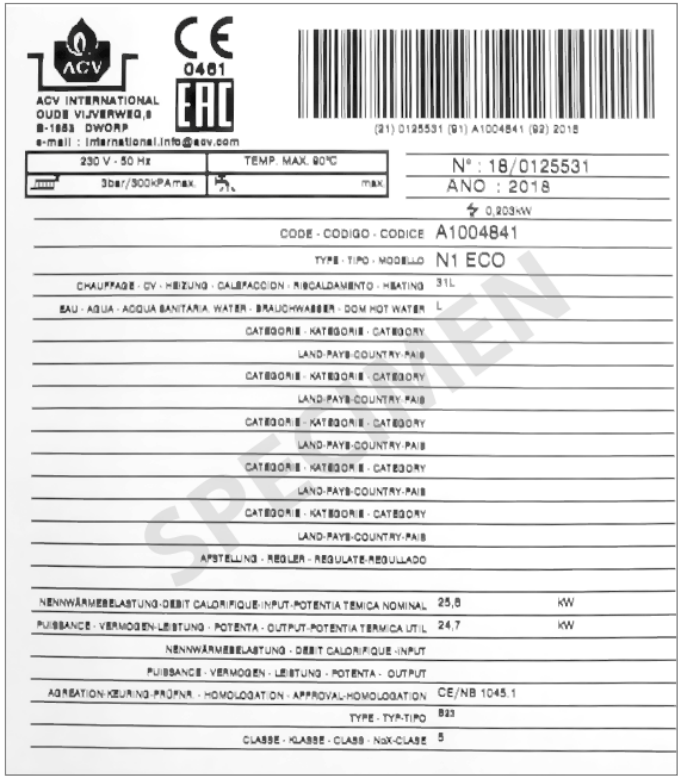
Symbols on the appliance	Meaning
	Primary circuit
	Connection to the sewage system
	Electricity

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
	Safety valve connected to the sewage system
	Connection to the sewage system

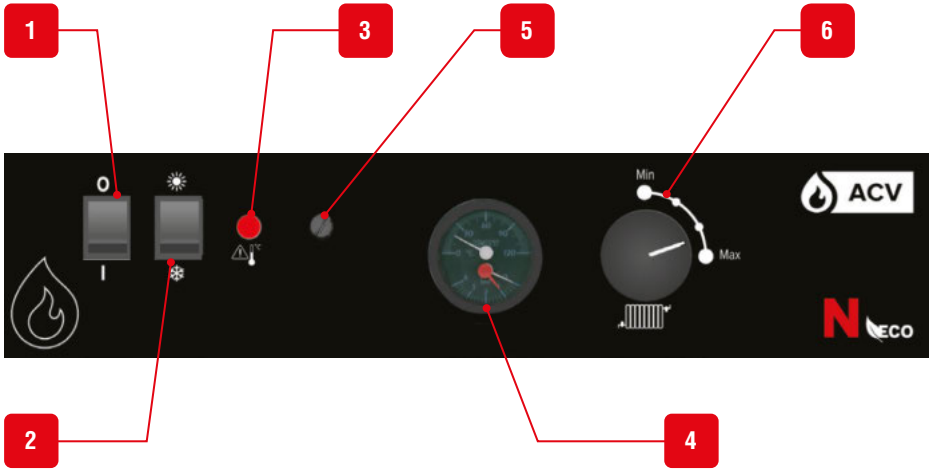
BOILER MARKING

Location: At the back of the appliance

The part number (Code) and serial number (N°) 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.



CONTROL PANEL



1. **Boiler ON/OFF master switch**
2. **Summer/winter switch** - used to turn the heating pump on or off.
3. **Burner safety cutout warning indicator** - lights when the primary circuit water temperature is too high.
4. **Temperature and pressure gauge** - indicates both the temperature of the boiler and the pressure within the primary circuit.
5. **Manual reset safety thermostat** - allows to reset the boiler after a primary circuit fluid overheat.
6. **Control thermostat** - allows to adjust the boiler temperature between 60°C (min. position) and 90°C (max. position).

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 0.7 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 damaged definitively.**
- **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.**

N ECO BOILER DESCRIPTION

The **N eco series boilers** are oil appliances, that are certified in accordance with European standards (EN15034). They also bear the Belgian label “OPTIMAZ” (oil boiler).

The **N eco series** are single-circuit (heating) boilers providing a heating output range from 25 to 43 kW. Three different models are available:

- **N1 eco model (provided with BMV3 burner)** maximum output: 25 kW.
- **N2 eco model (provided with BMV4 burner)** maximum output: 30 kW.
- **N3 eco model (provided with BMV5 burner)** maximum output: 43 kW.

The **N eco boilers** can be directly connected to the flue pipe, using a B23-type connection

Easy control, guaranteed safety - The heating circuit water temperature is adjusted through the control thermostat, whose bulb is located next to the outlet section of the boiler. A manual reset safety thermostat stops the burner if the primary circuit fluid temperature reaches 103°C. A minimum thermostat, fitted at the rear of the boiler and preset at 45°C, delays the heating pump activation. This prevents the risks of corrosion of the combustion chamber.

Production of domestic hot water - The **N eco boilers** can be combined with any ACV hot water production tank.

Operation of the heating pump

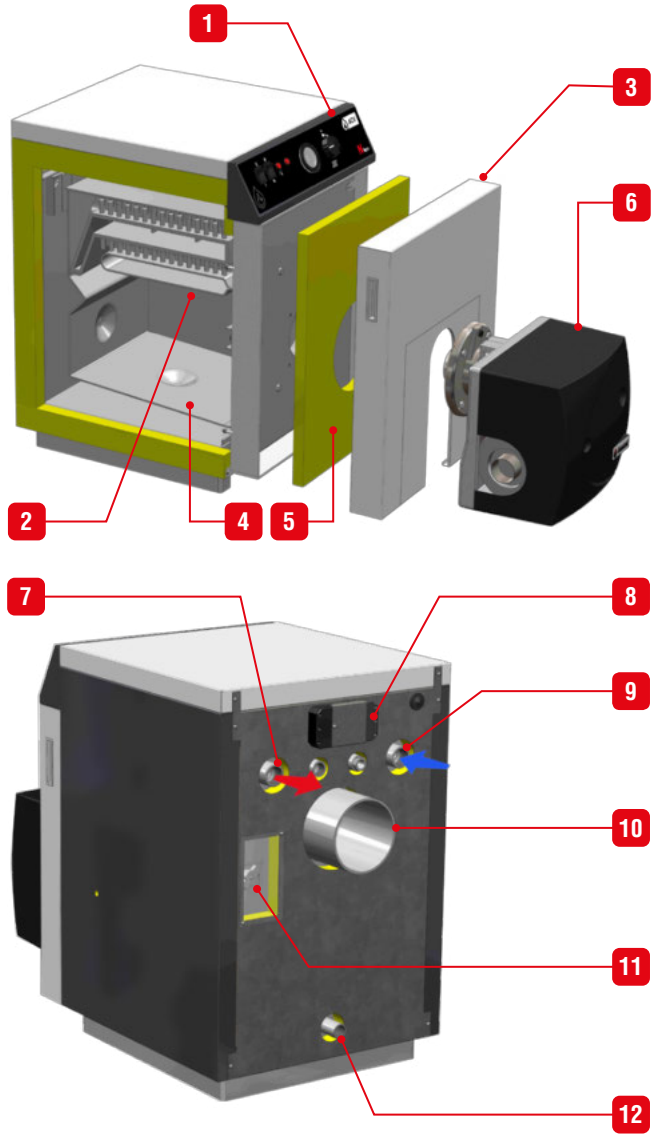
The heating pump is controlled by the minimum thermostat fitted at the back of the boiler. It is preset at 45°C, which delays the operation of the heating pump at burner start up and protects the combustion chamber against corrosion.

Gauge pressure of the heating system

The installation must be fitted with a safety valve set at 3 bar.

Make sure that the system water is always under pressure. When the system is cold and the air has been bled, the pressure gauge must indicate a pressure between 1 and 1.5 bar depending on the building height.

N ECO BOILER OVERVIEW



1. Control panel
2. Heat exchanger
3. Front panel
4. Heating body
5. Burner chamber plate
6. Oil burner (delivered with appliance)
7. Heating circuit supply
8. Electrical supply connection plug of the boiler
9. Heating circuit return
10. Flue pipe connection
11. Minimum thermostat set at 45°C (T.O.D.)
12. Connection for draining valve

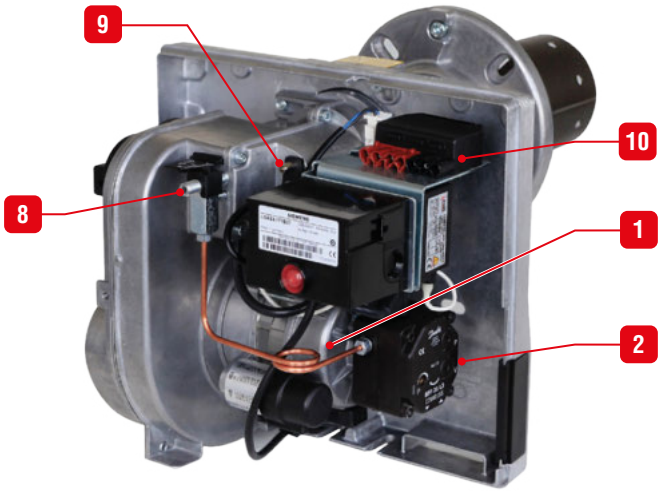
BURNER DESCRIPTION

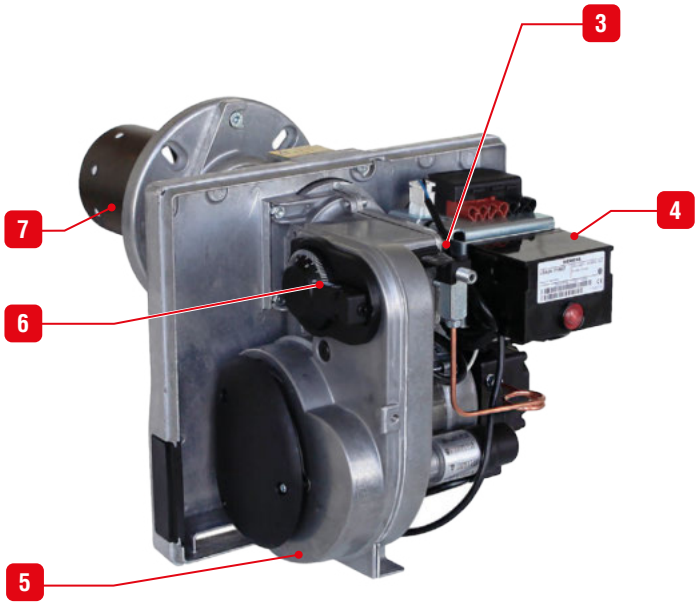
The BMV burner model is a modern generation flame burner. This burner construction offers extensive energy saving operation with very low emissions.

Refer to the burner technical manual for installation, operation and maintenance instructions and for the technical characteristics.

Key

1. Motor
2. Oil pump with filter
3. Photocell (not shown)
4. Automatic oil firing unit
5. Fan
6. Air adjustment regulation
7. Burner pipe and recirculation tube
8. Baffle plate set screw
9. Pressure measurement fitting
10. Burner electrical supply connection



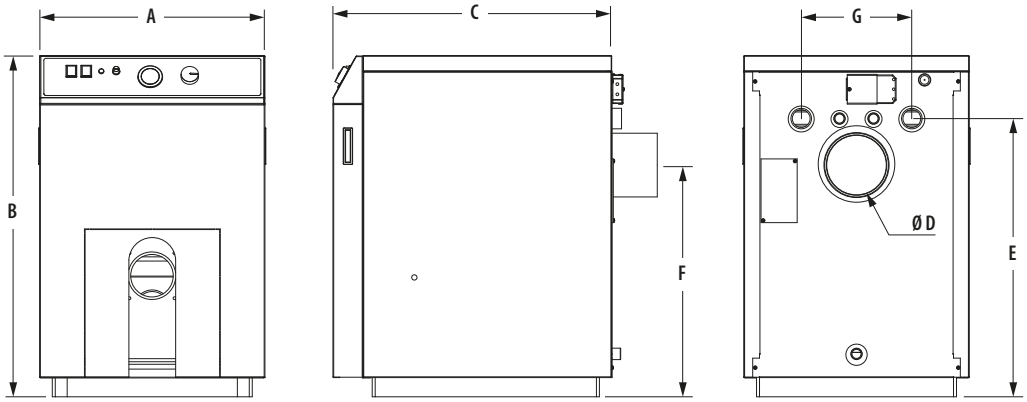


DIMENSIONS

Boiler Dimensions		N1 eco	N2 eco	N3 eco
A	mm	470	470	530
B	mm	700	765	805
C	mm	565	565	655
D (∅ of flue pipe)	mm	130	130	150
E	mm	550	615	645
F	mm	445	510	550
G	mm	260	260	260
Heating Connection [F]	“	1	1	1.1/4
Drained weight	Kg	108	122	157
Capacity (primary)	L	31	37	53

CLEARANCE

Boiler Clearance		N1 - N2 - N3 eco
Front (mm)	Recommended	600
	Minimum	500
Rear (mm)	Recommended	200
	Minimum	150
Sides (mm)	Recommended	150
	Minimum	100
Top (mm)	Recommended	400
	Minimum	300



COMBUSTION CHARACTERISTICS

Main Characteristics			N1 eco	N2 eco	N3 eco
Input (PCI)	max	kW	25.6	31.3	45.1
Output at 100%	(80/60°C)	kW	24.7	30.3	43.4
Efficiency at 100%	(80/60°C)	%	96.5	96.7	96.2
Efficiency at 30% load (EN677)		%	98.5	97.9	97.2
NOx (Class 5)	Weighted	mg/kWh	110	110	110
CO	Max. output	ppm	19	19	19
CO2	Max. output	%CO2	13	13	14
Temp of flue gases	Normal	°C	120	120	120
	Max.	°C	130	130	135

MAXIMUM OPERATING CONDITIONS

Maximum Service Pressure (tank full of water) *
- Primary circuit : ..... 3 bar

Maximum Operating temperatures
- Maximum temperature (primary) : ..... 90°C

Water Quality

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

Oil Quality

- Low Sulfur oil (50 ppm)
- Standard oil (2000 ppm)
- Bio oil at 7% methyl esters of fatty acids.

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

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 appliance 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 appliance 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 appliance**
   - Before the system is filled, it must be cleaned in accordance with standard EN14336. Chemical cleaning agents can be used.
   - 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 appliance 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.
   - Automatic filling systems are not recommended unless the fill frequency is monitored and the scale and corrosion inhibitor remain at the correct levels.
   - 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 deaerator (on the appliance flow line) combined with a dirt separator (upstream of the appliance) must be installed according to the manufacturer's instructions.
   - ACV recommends using additives that keep the oxygen in solution in the water, such as Fernox (www.fernox.com) and Sentinel (www.sentinel-solutions.net) products.
   - The additives must be used in accordance with the instructions issued by the manufacturer of the water treatment product.

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).
   - Check regularly the water hardness and enter the values in the service log.
   - Water hardness table :

Water hardness	°fH	°dH	mmolCa(HCO3)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

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	6,6 < pH < 8,5
Conductivity	< 400 µS/cm (at 25°C)
Chlorides	< 125 mg/l
Iron	< 0,5 mg/l
Copper	< 0,1 mg/l

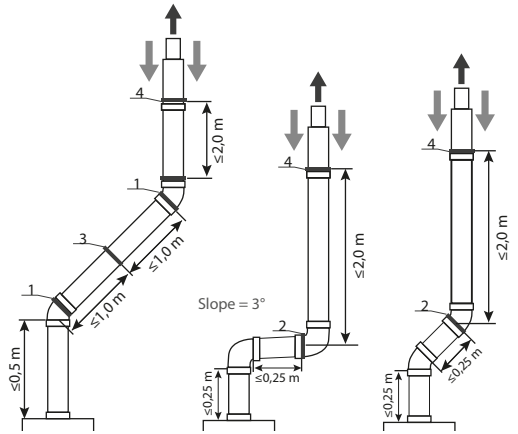
GENERAL RECOMMENDATIONS FOR CHIMNEY CONNECTION

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.

N ECO CHIMNEY CONNECTION CHARACTERISTICS

Main Characteristics		N1 eco	N2 eco	N3 eco
Flue pipe Ø	mm	130	130	150
Available connection type			B23	

Essential recommendations for the correct operation of the appliance

- **The product must be installed and serviced by an approved and qualified engineer, in accordance with applicable standards and regulations.**
- **The chimney flue pipe diameter must not be smaller than that of the boiler flue reduction collar. A flue disconnection piece is required.**
- **Due to the high efficiency of our boilers, the flue gases exit at a low temperature. Therefore, there is a risk that the flue gases condense and possibly damage the chimney. It is thus strongly recommended to line the chimney. Please contact your installer for any further information.**
- **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.**

Fresh air supply

The boiler room must be provided with a high and a low fresh air supply .

Each user must make sure that the boiler room fresh air supply complies with the local regulations in force.

For information, the table below indicates the values defined according to the Belgian regulation.

Ventilation		N1 eco	N2 eco	N3 eco
Fresh air supply	m3/h	50	72	102
High-level air supply (A)	cm2	150	150	150
Low-level air supply	cm2	150	150	170

Recommended Lengths of Flue Pipes

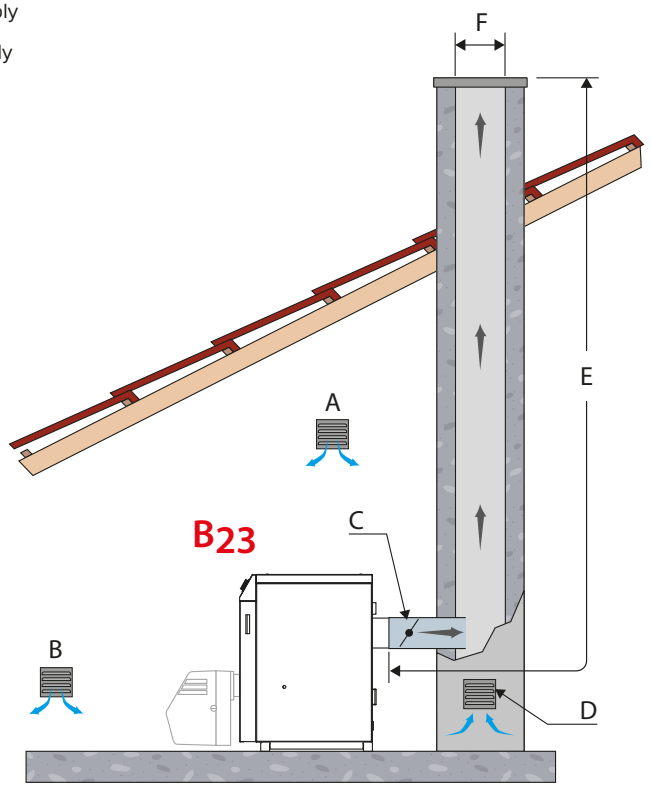
Chimney		N1 eco	N2 eco	N3 eco
E = 5 m Ø min. F	mm	130	150	150
E = 10 m Ø min. F	mm	130	130	150
E = 15 m Ø min. F	mm	130	130	170

FLUE PIPE CONNECTION TYPES

It is mandatory to use ACV flue systems to connect the appliance.

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.

A. High-level fresh air supply
B. Low-level fresh air supply
C. Draught stabilizer
D. Manhole opening
E. Chimney height
F. Chimney diameter

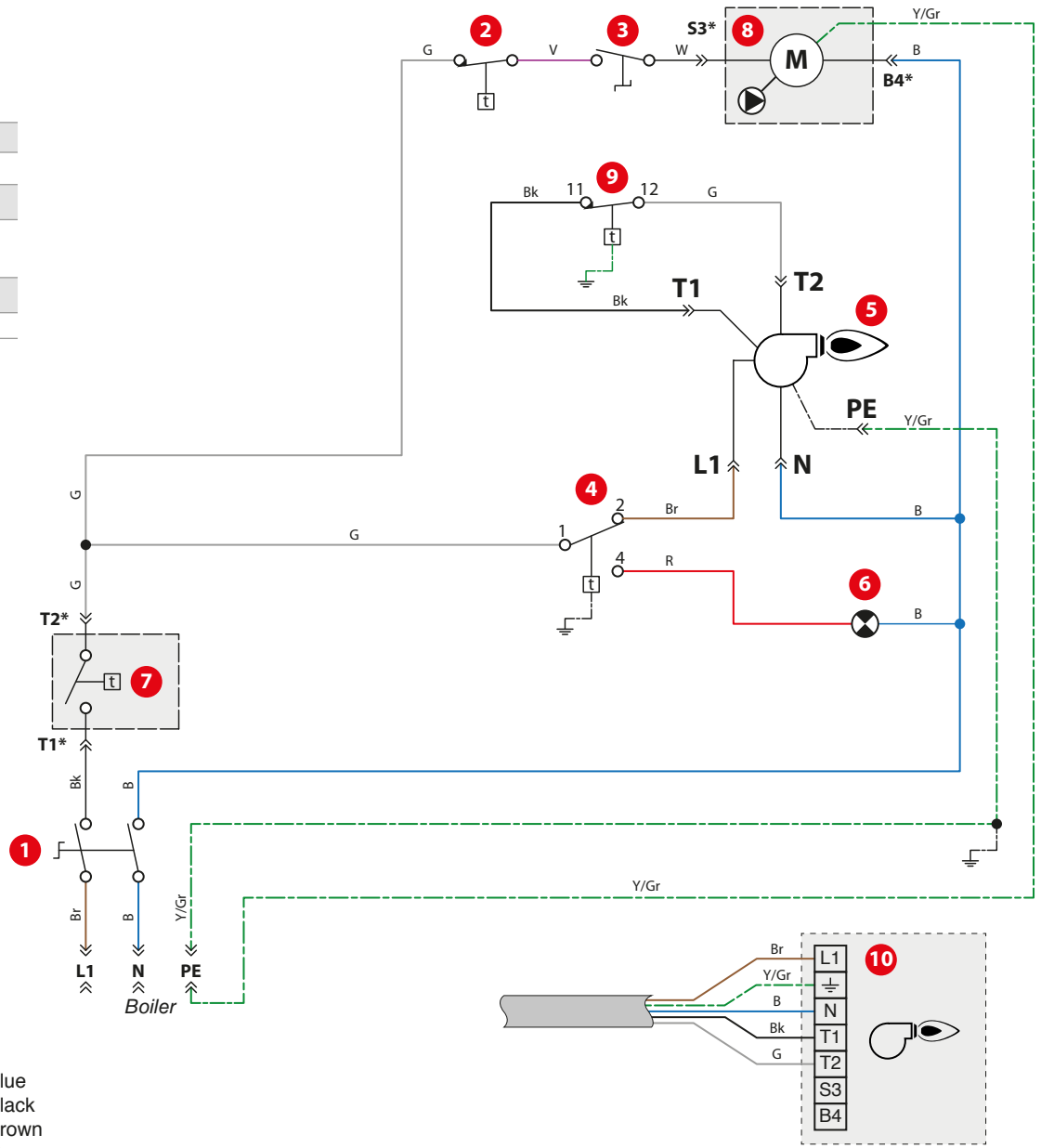


ELECTRICAL CHARACTERISTICS

			N1 - N2 - N3 eco
Main Characteristics			
Rated voltage		V~	230
Rated frequency		Hz	50
Electrical consumption	Max.	W	210
Electrical consumption in standby		W	0
Rated current (Fuse)		A	6
Class			IP 20

N1 - N2 - N3 eco boiler wiring diagram

1. ON/OFF master switch
2. Minimum thermostat set at 45°C (T.O.D.)
3. Summer/winter switch
4. Manual reset high limit thermostat (103°C max.)
5. Burner
6. Safety cutout warning indicator
7. Room thermostat (option)
8. Installation heating pump (not provided)
9. Control thermostat of the boiler
10. Burner plug



B.	Blue
Bk.	Black
Br.	Brown
G.	Grey
V.	Violet
R.	Red
W.	White
Y/Gr.	Yellow/Green

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 the condensate outlet is never obstructed and that a condensate neutralisation system is installed if required.
- 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.

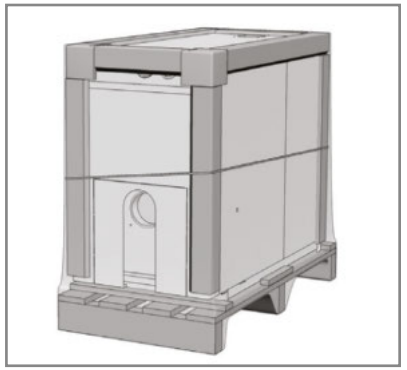
Essential recommendations for the correct operation of the appliance

- 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 appliances are tested and packaged on a wooden support. They are are delivered with a burner to be installed.

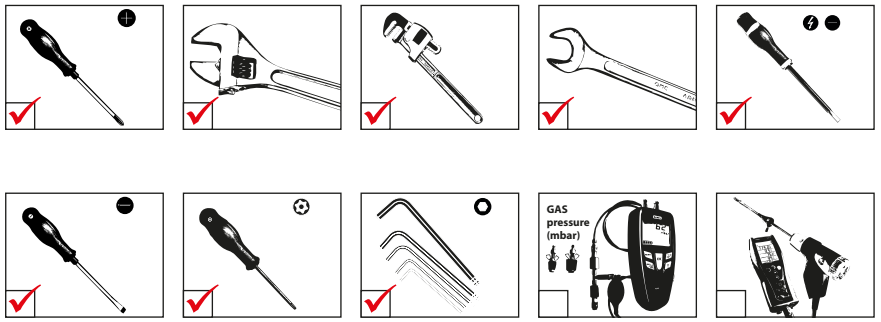
At product reception and after removal of packaging, check the package contents and that the appliance is free of damages.



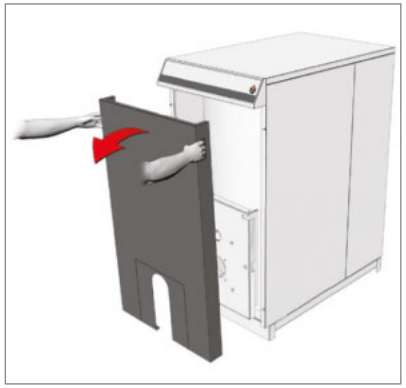
Contents of package

- N eco boiler.
- Boiler Multilingual Installation, Operation and Maintenance Instructions.
- Oil burner
  - N1 eco with BMV3 burner,
  - N2 eco with BMV4 burner
  - N3 eco with BMV5 burner.
- Burner Multilingual Installation, Operation and Maintenance Instructions

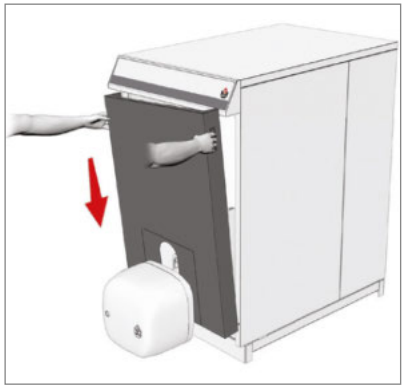
TOOLS REQUIRED FOR THE INSTALLATION

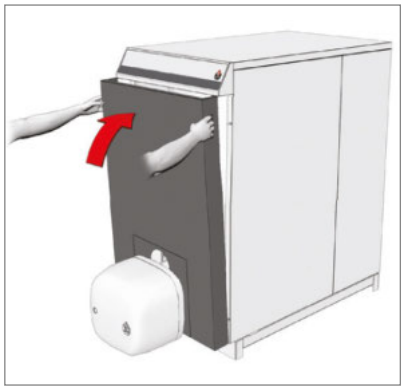


BURNER INSTALLATION



Please refer to the burner manual to install the burner on the boiler, to connect the oil circuit and get more information about the burner operation and maintenance.





OIL CONNECTION

General remark

- The oil connection must comply with all applicable standards.

Essential recommendation for safety

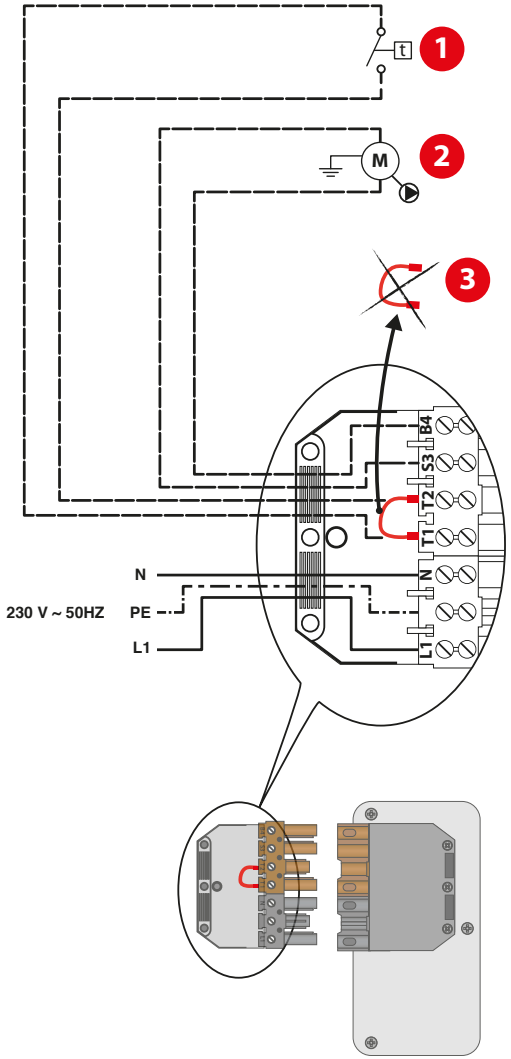
- Refer to the technical characteristics and safety instructions of the burner technical manual. Failure to comply with the instructions could result in damage to the material, personal injury or death.

Essential recommendations for the correct operation of the appliance

- Bleed the oil duct and check thoroughly if all the boiler tubes, both internal and external, are tight.
- Control the oil supply connection and tightness.

ELECTRICAL CONNECTION

1. Room thermostat
2. System heating pump
3. Bridge (to be removed before installing the room thermostat)



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.

Optional accessories are available to control a regular high or low temperature heating circuit. For more information, contact your ACV representative.

HEATING CONNECTION

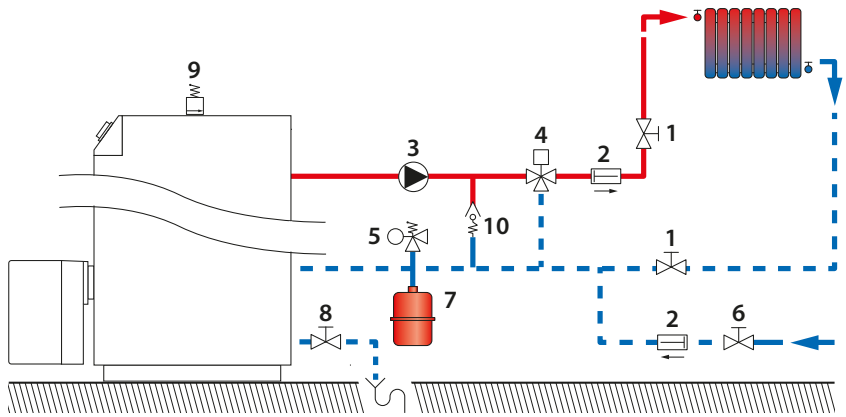
Typical connection - high temperature

1. Heating circuit isolating valve
2. Check valve
3. Heating pump of the system
4. Mixing valve
5. Safety group
6. Primary circuit filling valve
7. Heating circuit expansion vessel
8. Drain valve
9. Automatic air bleed valve
10. Bypass
11. Safety thermostat for floor heating circuit

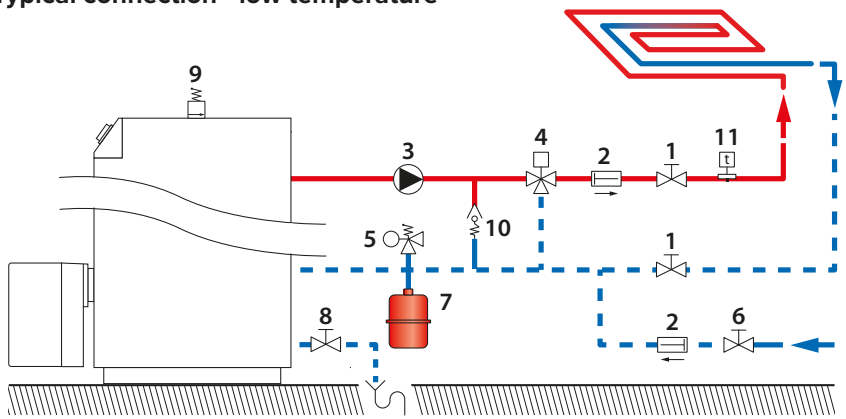
Do not install thermostatic valves on the radiators located in rooms fitted with a room thermostat.

Cold water

Hot water



Typical connection - low temperature



SAFETY INSTRUCTIONS FOR STARTING UP

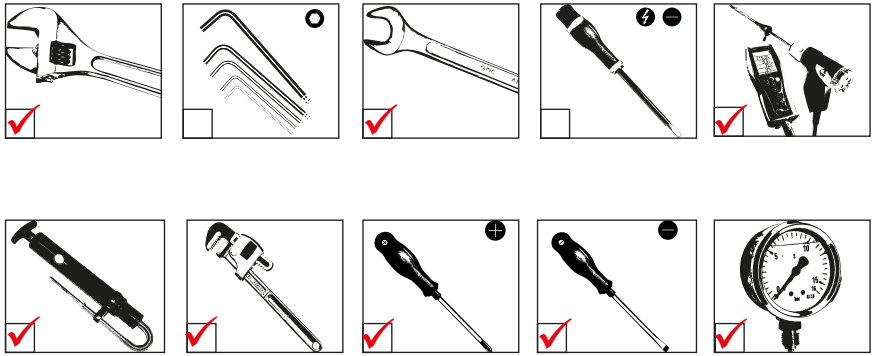
Essential recommendations for safety

- 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

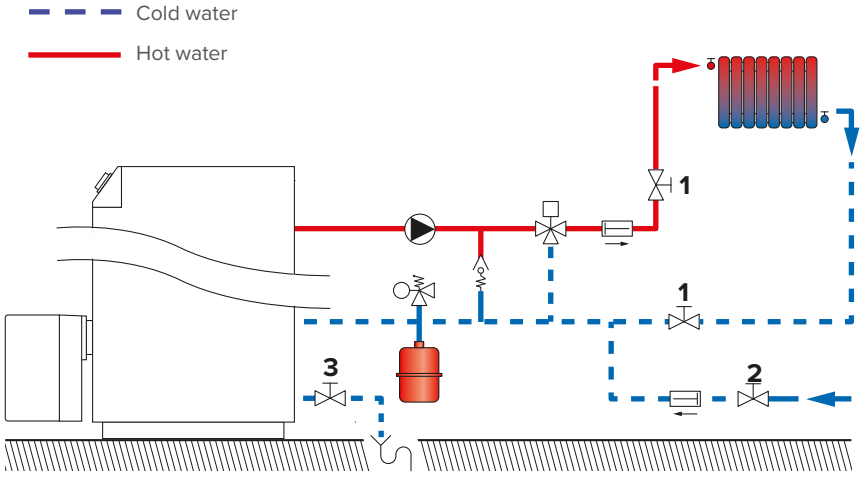
- External power supply isolated
- DHW circuit (if any) under pressure

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. Make sure the air vent is open, as required.
5. Once the system is bled from air, bring the pressure to the static pressure between1.5 bar and 2 bar.
6. Close the filling valve (**2**)

Follow-on tasks

1. Check there is no leak.



STARTING UP THE BOILER

Set-up conditions

- All connections made
- External power supply enabled
- Oil supply open and circuit tight
- DHW (if any) and heating circuits full of water

Procedure

1. Set the boiler thermostat between 60 and 90°C.
2. Put the summer/winter switch on "Winter".
3. Put the ON/OFF master switch on "ON".
4. Check with your hand (motor vibrations) that the heating pump of the system is not blocked and unblock it if required.

Follow-on tasks

- Adjust the combustion, see opposite.

COMBUSTION ADJUSTMENT

Set-up conditions

- Operating boiler

Procedure

1. Refer to the Initial Operation instructions detailed in the technical manual of your burner.
2. Adjust CO_2 according to the values provided in the basic adjustment table below and by setting the oil pressure as well as the air flap as described in the Initial Operation paragraph of the burner manual.
3. Check the flue temperature and CO values according to the combustion characteristics (refer to “Combustion characteristics” on page 9.

Follow-on tasks

- Bleed the heating circuit again to restore a 1.5 bar pressure.
- Repeat the sequence until complete evacuation of the air contained in the circuit.

Basic Adjustment table

Boiler/ Burner model	Burner Output	Oil mass flow	Oil nozzle		Oil pressure	Fan pressure	Air flap scale	Baffle plate scale
	kW	kg/h	Usgal/h		bar	mbar	%	mm
N1 eco/ BMV3	25	2.11	0.60	60°H	10.0	2.5	30	6
N2 eco/ BMV4	32	2.70	0.60	60°H	14.5	2.5	32	9
N3 eco/ BMV5	43	3.63	1.00	45°H	12.0	2.5	46	10

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.

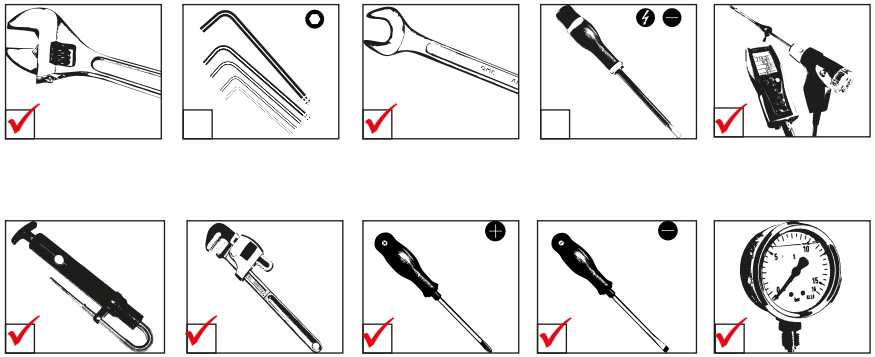
Essential recommendations for safety

- 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



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 all oil, hydraulic and electrical connections are correctly fastened and tight.		X	
4.	Check the flue gas exhaust: correct fastening, correct installation, no leaks or clogging.		X	
5.	Check that there is no discoloured or cracked area on the burner chamber plate.		X	
6.	Check the combustion parameters (CO and CO_2), see the burner manual.		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 burner nozzle and ignition electrode, refer to the burner manual.			X
9.	Remove the front panel, open the front door and clean the combustion chamber, see “Cleaning the Combustion Chamber” on page 21.			X

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 oil supply valve of the boiler.

DRAINING THE HEATING CIRCUIT OF THE BOILER

Essential recommendations for safety

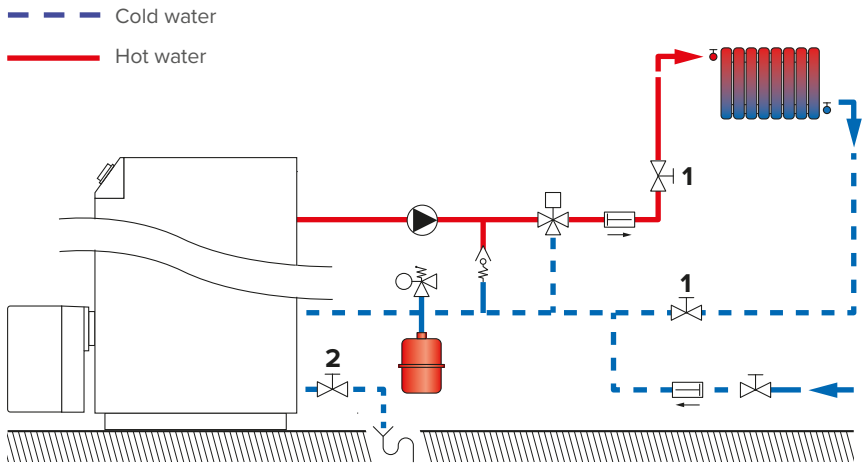
- **If the system is fitted with an external hot water tank, isolate the DHW circuit before draining the heating (primary) circuit.**
- **Water flowing out of the drain valve may be extremely hot and could cause severe scalding. Keep people away from the hot water discharge.**

Set-up conditions

- Boiler switched off using the ON/OFF master switch
- DHW circuit (if any) isolated
- External power supply isolated
- Oil 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. If possible, open the circuit air vent to accelerate the draining process.
5. Close the drain valve (**2**) and the air vent once the heating circuit of the boiler is empty.



CLEANING THE COMBUSTION CHAMBER

Set-up conditions

- Boiler shut down
- External power supply isolated
- Oil supply closed
- Front panel removed
- Burner removed
- Front door open.

Procedure

1. Using the brush provided with the boiler, remove any accumulated soot from the heating unit and heat exchanger.
2. Vacuum clean any residue from the bottom of the combustion chamber.
3. Check the braid is correctly positioned.
4. Close the door and tighten it with sufficient torque to ensure the flue gas tightness.

Follow-on tasks

1. Reinstall the burner.
2. Restart the boiler in accordance with procedure “Restarting after Maintenance” on page 21.

RESTARTING AFTER MAINTENANCE

Set-up conditions

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

Procedure.

1. Switch the appliance on using the ON/OFF master switch.
2. Set the appliance at maximum power and check the combustion values, refer to “Combustion adjustment” on page 19.

Follow-on tasks

None

SERVICE LOG

Service date	CO2 %	Flue gas T°	Efficiency	Remarks	Name	Signature

CE

DECLARATION OF CONFORMITY TO STANDARDS

1/1

Product type:	**Low temperature boilers fired with liquid fuels**
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:	**N1 eco** **N2 eco** **N3 eco**

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

Directives	Description	Date
2009/125/EC	Ecodesign Directive (implemented by EU regulation 813/2013, Annex II)	21.10.2009
2006/95/EC	Voltage Limits Directive	12.12.2006
2004/108/EC	Electromagnetic Compatibility Directive	15.12.2004
2014/C 207/02	Commission Communication (in the framework of the implementation of EU regulations 813/2013 - Ecodesign and 811/2013 - Energy Labelling)	03.07.2014

Relevant harmonised standards :

EN 15502-1	EN ISO 9614-2	EN 55014-1
EN 15034	EN 60335-2-102	EN 55014-2
EN 15036-1		

The notified body, (SZU, s.p., [1045.1], Engineering Test Institute, Public Enterprise, Hudcova 424/56b, 621 00 Brno, CZ) performed a Type examination and issued the certificate(s) : 32-0359/ZP, 32-0359/T.

Signed for and on behalf of
ACV International SA/NV

Dworp, 01/03/2018

R&D Director
Sara Stas

Boiler type and model			N1 eco	N2 eco	N3 eco
Condensing boiler			—	—	—
Low temp boiler			√	√	√
Combination heater			—	—	—
Useful heat output					
at 30% of rated heat output	P_1	kW	9,04	10,80	16,10
at rated output and high-temp regime	P_4	kW	24,65	30,3	43,42
Useful efficiency					
at 30% of rated heat output	η_1	%	98,47	97,93	97,66
at rated output and high-temp regime	η_4	%	96,42	96,67	96,13
Auxiliary electricity consumption					
At full load	elmax	W	203	217	220
At part load	elmin	W	64	67	68
In standby mode	P_{SB}	W	0	0	0
Standby heat loss	P_{stby}	W	220	249	271

Product fiche : N1 eco - N2 eco – N3 eco
Referring to Commission Delegated Regulation N° 811/2013

Model	N1 eco	N2 eco	N3 eco
Medium temperature application	Low Temperature	Low Temperature	Low Temper
declared load profile for water heating	-	-	-
Seasonal space heating energy efficiency class	B	B	B
Water heating efficiency class	-	-	-
rated heat output (kW)	25	30	43
Annual energy consumption for space heating (Kwh)	15670	19116	27684
Annual energy consumption for water heating (kwh)	-	-	-
Seasonal space heating efficiency %	86	86	86
Water heating efficiency (%)	-	-	
Sound power level indoors LWA:	57	57	57
Able to work only during off-peak hours:	No	No	No

ACV International Oude Vijverweg, 6 1653 Dworp (Belgium)
01/03/2018
Rev A