Wall-hung gas-fired condensing boilers

MCA Pro 45/65/90/115

Product may not be exactly as shown.

Installation and Service Manual

⚠⚠⚠ DANGER

If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or death.
Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL GAS:
- Do not try to light or operate any appliance.
- Evacuate all people.
- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Installation and service must be performed by a professional licensed heating contractor, qualified installer, service agency or the gas supplier.

⚠⚠⚠ DANGER

When using either PVC, CPVC, Polypropylene or stainless steel venting the components must be certified according to ULC-S636 and or UL1738. Read the Installer and Service Manual prior to installing. Failure to follow the instructions in the manuals could lead to death, serious personal injury and or substantial product and or property damage.

⚠⚠ WARNING

This manual and all instructions must be read in its entirety by a qualified and certified installer with the appropriate gas fitter's license for the jurisdiction within the area of installation. This manual and ALL documentation MUST BE READ BEFORE installation to avoid any possible dangerous conditions. Failure to do so may create a seriously dangerous situation which may cause death, severe personal injury or substantial product/property damage.

C US ASME H CERTIFIED DESIGN CERTIFIED ENERGY STAR

De Dietrich BOILERS

www.dedietrichboilers.com

Safety and Warranty Information

Symbols used

Read this manual carefully before installing the boiler or putting it into operation. This manual must be retained for future reference. If the information in this manual is not followed exactly, a fire or explosion may result causing property/product damage, serious personal injury and possibly death. Make sure all the requirements detailed in this manual are understood and completed.

⚠⚠⚠	**DANGER**	Indicates the presence of a hazardous situation which, if ignored, will result in death, serious injury or substantial product/property damage.
⚠⚠	**WARNING**	Indicates a potentially hazardous situation which, if ignored, can result in danger, serious injury or substantial product/property damage.
⚠	**CAUTION**	Indicates a potentially hazardous situation which, if ignored, may result in minor injury or product/property damage.
📖	**More Information**	Indicates recommendations made by De Dietrich for the installers which reference other pages or chapters in this or another manual.
i	**Best Practices**	Indicates recommendations made by De Dietrich for the installers which help to ensure optimum operation and longevity of the equipment.

Professional licensed heating contractor

The assembly, installation, adjustment, service and maintenance of this boiler must be performed by a professional licensed heating contractor.

Boiler Documentation

Make sure to read all documentation related to the product before starting the installation. The product documentation should be stored near the boiler where it can be accessed for future reference.

Advice for the owner

When the installation has been completed, the heating contractor has to familiarize the operator/ owner with the installed equipment as well as any safety precautions and requirements, and shut-down procedures. The heating contractor also needs to inform the operator/owner of the need for professional annual servicing of the boiler prior to the heating season.

Contaminated air

Chemicals can contaminate the air and cause by-products during the combustion process. These by-products are poisonous to the occupants and very destructive to De Dietrich boilers.

Carbon monoxide

Flue products can flow into living spaces if improperly installed, adjusted, serviced or maintained. The flue gases contain carbon monoxide which is poisonous.

Fresh air

Adequate ventilation and combustion air must be provided for the equipment as it requires fresh air for safe operation. Make sure the equipment is installed ensuring an adequate supply of fresh air.

Boiler venting

Always operate the boiler with an installed vent system. Carbon monoxide poisoning can be caused by an improperly installed vent system. All combustion products must be vented safely to the outdoors.

Warranty

The information in this manual and any other related manuals must be read and proper procedures followed.
The warranty is rendered null and void if the procedures are not followed as prescribed.

i Some products may not be exactly as illustrated. Information contained herein is deemed as accurate as possible. Clarification of material supply, pipe sizing, thread type, and typographical errors should be noted as soon as possible. Dimensions have been converted from the Metric standard. Fractional rounding may affect dimensional tolerances.

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Operation

Before operating the boiler, make sure you fully understand its method of operation. Your heating contractor should always perform the initial start-up and explain the system. Any warranty is null and void if these instructions are not followed.

⚠⚠⚠ DANGER

What to do if you smell flue gas

- Ensure all people are evacuated from the house immediately
- Deactivate heating equipment.
- Open windows and doors.
- Do not try to light any appliances.
- Do not touch any electrical switches, do not use any phone in your building.
- Immediately call your heating contractor or gas supplier from a neighbour's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

Working on the equipment

All personnel working on the equipment or the heating system must have the proper qualifications and hold all necessary licenses.
Ensure main power to equipment, heating system, and all external controls has been deactivated. Close main gas supply valve. Take precautions in all instances to avoid accidental activation of power during service work.

Dangerous conditions

- Deactivate main power immediately.
- Close gas supply valve.

⚠ CAUTION

Incomplete combustion and poisonous gases result if the fresh air intakes in the mechanical room are closed. Never close these openings.

Maintenance and cleaning

Regular inspection and service by a qualified heating contractor is critical to the performance of the boiler. Neglected maintenance impacts the warranty; regular cleaning and maintenance ensures clean, environmentally friendly and efficient operation. We recommend a maintenance contract with a qualified heating contractor.

For safe operation

We recommend that you frequently:

- Check for debris which could obstruct the flow of flue gases. The vent or chimney must not be blocked. A blocked or partially blocked vent or chimney can cause flue gases to leak into the structure. Flue gases leaking into the house can cause injury or death. Blocked or partially blocked chimneys must have the blockage removed by a qualified heating contractor. Check pressure gauge for correct system (water) pressure.
- Check for water on the floor from the discharge pipe of the pressure relief valve or any other pipe, pipe joint, valve or air vent.
- Check for moisture, water, or appearance of rust on the flue gas pipes, their joints as well as vent dampers, or side wall vent terminals (if so equipped).
- Ensure that nothing is obstructing the flow of combustion and ventilation air and no chemicals, propane tanks, garbage, gasoline, combustible materials, flammable vapours and liquids are stored (not even temporarily) in the vicinity of the boiler.
- Do not allow unsupervised children near the boiler.
- Service/inspection of the boiler and the system must be serviced yearly. Maintenance, service and cleaning are specified in the Installation Instructions.
- Before the heating season begins, the boiler must be serviced by a qualified heating contractor.

⚠⚠ WARNING

• There are no user serviceable parts on the boiler, burners or control. Failure to heed this warning can cause property damage, severe personal injury, or loss of life.

• Improper installation, adjustment, service, or maintenance can cause flue products to flow into living space. Flue products contain poisonous carbon monoxide gas which can cause nausea or asphyxiation resulting in severe personal injury or loss of life.

• Should overheating occur or the gas supply fail to shut off, do not disconnect the electrical supply to the pump. Instead, shut off the gas supply at a location external to the appliance.

Do not use this boiler if any part has been under water. Immediately call a qualified heating contractor to inspect the boiler and to replace any part of the control system and any gas control which has been under water.
Do not store chemicals containing chlorine or other corrosive materials near the boiler, such as bleach, cleaning solvents, detergents, acids, hair spray, spray cans, paint thinners, paint, or water softener salt.

Boiler modification and spare parts

This boiler uses specific original manufactured parts. The boiler must not be modified or non-OEM parts used without the written approval from DDR Americas Inc.

Carbon monoxide

The installation of carbon monoxide detectors is highly recommended by the U.S. Consumer Product Safety Commission for buildings with gas burning equipment. Sources of carbon monoxide include exhaust vents for gas appliances or wood burning fireplaces that are not properly vented, malfunctioning furnaces and exhaust fumes from idling cars.
Carbon monoxide is a colourless and odourless gas that is highly toxic. It can interfere with the delivery of oxygen by the blood to the body. Exposure to low levels of CO can cause headaches, confusion, nausea, dizziness, fatigue, and shortness of breath. High level exposure of CO can cause impaired vision, convulsions, coma and possibly death.
Have a qualified service technician inspect the heating equipment exhaust vent pipes and chimney flues on a yearly basis.
In winter, inspect the exhaust vents for the dryer, furnace, wood burning or gas stove, fireplace and heat recovery ventilator to ensure they are not obstructed by snow build-up.
Carbon monoxide detectors should be installed and maintained in buildings that house gas burning equipment. It is recommended to use a carbon monoxide detector that is in compliance with a nationally recognized standard such as ANSI/UL 2034-2002 or CSA 6.19-01.

⚠⚠⚠ DANGER

Improper installation, adjustment, service, or maintenance can cause flue products to flow into living space. Flue products contain poisonous carbon monoxide gas which can cause nausea or asphyxiation resulting in severe personal injury or loss of life.

Codes

Installation, servicing and maintenance of this product must be performed by a licenced and trained heating contractor, experienced in hot water heating boilers as well as gas and oil combustion. The installation must conform to all national and local codes having jurisdiction:

- In Canada, CSA B149.1 Gas Code
- In USA, ANSI Z223.1 (NFPA 54) Gas Code, and ASME CSD-1 Automatically Fired Boilers.

If you have any technical questions or need assistance with this product, please call your local Sales Representative or DDR Americas Inc.

Standards applied

We hereby certify that the series of appliances specified hereinafter are in compliance with the latest standards described, and that they are manufactured and marketed in compliance with the requirements of the following North American standards:

- ASME Section IV
- CSA B51
- ANSI Z21.13-CSA 4.9 - Gas fired steam and hot water boilers.
- CAN/CGA 2.17-M91 - Gas fired appliances for use at high altitude.
- CGA P.2-1991 (R1999) - Testing method for measuring annual fuel efficiencies or residential furnaces and boilers.
- CAN/CSA C22.2 No.0-M91 - General requirements - Canadian electrical codes part II.
- CSA C22.2 No.3-M1988 - Electrical features of fuel burning equipment.

Water pipe freezing hazard

⚠⚠ WARNING

Serious property damage and/or personal injury can occur if the pipes are not protected from freezing, resulting in the pipes bursting. The boiler may also shut down. Turn off the water supply and drain the water pipes or protect them from freezing when leaving the home unattended for long periods of time during very cold weather conditions.

The boiler is designed to provide a comfortable and warm environment and is not designed for the prevention of frozen water pipes. In case an unsafe condition occurs, the boiler has been designed and equipped with several safety devices that will shut down the boiler and stop it from restarting.
If the boiler is dormant for an extended period of time during cold winter weather, the water pipes may freeze and burst which can result in extensive water damage and lead to mold growth. A variety of molds can cause serious health and respiratory problems. If water damage should occur, immediately dry the affected areas to avoid the possibility of mold growth.
If the building will be empty for an extended period of time in cold winter conditions, then the following steps should be taken:

- Turn off the building's water supply, drain the pipes and add some antifreeze for potable water for the toilet tanks and drain traps.
- Open faucets where appropriate.
- Have the building monitored and checked during cold winter weather and call a qualified service technician if necessary.
- Remote temperature sensors are available which will alert someone if freezing conditions occur in the building.

Combustion sources and ventilation air contaminants

Contaminants are likely to be found in these areas:

- Auto body shops
- New construction
- Metal manufacturing plants
- Swimming pools
- Refrigeration repair shops
- Garages with workshops
- Furniture refinishing shops
- Plastic manufacturing plants
- Hobby rooms and remodelling areas
- Dry cleaners and laundromats
- Photo processing companies
- Beauty salons

Contaminants found in various products:

- Paint and varnish removers
- Chlorinated cleaners and waxes
- Glues and cements
- Swimming pool chemicals containing chlorine
- Refrigerant leaks
- Water softener salt containing sodium chloride
- Cleaning products such as chlorine-based bleaches, detergents and cleaning solvents
- Spray cans containing chlorofluorocarbons
- Muriatic and hydrochloric acid
- Calcium chloride utilized in thawing
- Permanent wave solutions
- Adhesives utilized for building products and other similar items
- Fabric softeners used in clothing dryers

Requirements for installation in the state of Massachusetts

Boiler Installations within the Commonwealth of Massachusetts must conform to the following requirements:

- Boiler must be installed by a plumber or a gas fitter who is licensed within the Commonwealth of Massachusetts.
- Prior to unit operation, the complete gas train and all connections must be leak tested using a non-corrosive soap.
- The vent termination must be located a minimum of 4 feet above grade level. If side-wall venting is used, the installation must conform to the following requirements **extracted from 248 CMR 5.08 (2):**

(a) For all side wall horizontally vented gas fueled equipment installed in every dwelling, building or structure used in whole or in part for residential purposes, including those owned or operated by the Commonwealth and where the side wall exhaust vent termination is less than seven (7) feet above finished grade in the area of the venting, including but not limited to decks and porches, the following requirements shall be satisfied:
1. INSTALLATION OF CARBON MONOXIDE DETECTORS: At the time of installation of the side wall horizontal vented gas fueled equipment, the installing plumber or gasfitter shall observe that a hard wired carbon monoxide detector with an alarm and battery back-up is installed on the floor level where the gas equipment is to be installed. In addition, the installing plumber or gasfitter shall observe that a battery operated or hard wired carbon monoxide detector with an alarm is installed on each additional level of the dwelling, building or structure served by the side wall horizontal vented gas fueled equipment. It shall be the responsibility of the property owner to secure the services of qualified licensed professionals for the installation of hard wired carbon monoxide detectors.

a. In the event that the side wall horizontally vented gas fueled equipment is installed in a crawl space or an attic, the hard wired carbon monoxide detector with alarm and battery back-up may be installed on the next adjacent floor level.
b. In the event that the requirements of this subdivision cannot be met at the time of completion of installation, the owner shall have a period of thirty (30) days to comply with the above requirements; provided, however, that during said thirty (30) day period, a battery operated carbon monoxide detector with an alarm shall be installed.

2. APPROVED CARBON MONOXIDE DETECTORS: *Each carbon monoxide detector as required in* accordance with the above provisions shall comply with NFPA 720 and be ANSI/UL 2034 listed and IAS certified.

3. SIGNAGE: A metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight (8) feet above grade directly in line with the exhaust vent terminal for the horizontally vented gas fueled heating appliance or equipment. The sign shall read, in print size no less than one-half (1/2) inch in size, **"GAS VENT DIRECTLY BELOW. KEEP CLEAR OF ALL OBSTRUCTIONS". (Continued)**

4. INSPECTION: The state or local gas inspector of the side wall horizontally vented gas fueled equipment shall not approve the installation unless, upon inspection, the inspector observes carbon monoxide detectors and signage installed in accordance with the provisions of 248 CMR 5.08(2)(a)1 through 4.
(b) EXEMPTIONS: The following equipment is exempt from 248 CMR 5.08(2)(a)1 through 4:

1. The equipment listed in Section 10 entitled "Equipment Not Required To Be Vented" in the most current edition of NFPA 54 as adopted by the Board; and
2. Product Approved side wall horizontally vented gas fueled equipment installed in a room or structure separate from the dwelling, building or structure used in whole or in part for residential purposes.

(c) MANUFACTURER REQUIREMENTS - GAS EQUIPMENT VENTING SYSTEM PROVIDED. When the manufacturer of Product Approved side wall horizontally vented gas equipment provides a venting system design or venting system components with the equipment, the instructions provided by the manufacturer for installation of the equipment and the venting system shall include:

1. Detailed instructions for the installation of the venting system design or the venting system components; and
2. A complete parts list for the venting system design or venting system.

(d) MANUFACTURER REQUIREMENTS - GAS EQUIPMENT VENTING SYSTEM NOT PROVIDED. When the manufacturer of a Product Approved side wall horizontally vented gas fueled equipment does not provide the parts for venting the flue gases, but identifies "special venting systems", the following requirements shall be satisfied by the manufacturer:

1. The referenced "special venting system" instructions shall be included with the appliance or equipment installation instructions; and
2. The "special venting systems" shall be Product Approved by the Board, and the instructions for that system shall include a parts list and detailed installation instructions.

(e) A copy of all installation instructions for all Product Approved side wall horizontally vented gas fueled equipment, all venting instructions, all parts lists for venting instructions, and/or all venting design instructions shall remain with the appliance or equipment at the completion of the installation.

…….[End of Extracted Information From 248 CMR 5.08 (2)]……

Start-up

Initial start-up

The heating contractor must perform the initial start-up and explain the operation of the system.
The operation of the boiler control must also be explained to the system operator/ultimate owner by the heating contractor. Refer to literature packaged with boiler control.

Necessary preparations prior to initial start-up, your contractor will:

1. Check for water on the floor from the discharge pipe or the pressure relief valve or any other pipe, pipe joint, valve or air vent.
   If pressure relief valve is discharging, the contractor will locate the source of the problem and take corrective measures. Never cap or plug end of pressure relief valve discharge pipe. Ensure correct system (water) pressure.
2. Ensure fresh combustion air supply vents to boiler room are open and unobstructed. Nothing must obstruct the flow of combustion and ventilation air.
3. Open main fuel supply valve.
4. Activate the system. Ensure power supply is activated and then activate system power switch.

Your heating system is now ready for operation.

Operation

Refer to "Lighting and operation instructions", page 11.
The boiler control regulates operation of the heating system automatically in conjunction with the indoor/outdoor control and any programmed settings (if applicable).
Changes to the settings or programming can be made according to separate instructions provided with the boiler control.

For optimum operation

Keep the boiler and the boiler room clean and free of dust and dirt.

Ensure proper system pressure by occasionally checking pressure gauge.

Allow a qualified heating contractor to service and maintain your heating system on a yearly bases.

Neglected maintenance impacts on product warranty; regular cleaning and maintenance ensures clean, environmentally friendly and efficient operation.

We recommend a maintenance contract with a qualified heating contractor.

If you require assistance finding a qualified heating contractor, please contact your local Sales Representative or DDR Americas Inc.

Shut-down

Shut-down procedure

1. Deactivate system power switch.

2. Deactivate main power supply to boiler and control.

3. Close main fuel supply valve.

We recommend that you contact your heating contractor prior to and after an extended shut-down period. In this manner, the appropriate precautions, i.e. system freeze-up protection or heat exchanger maintenance, can be taken.

⚠⚠ WARNING

Do not attempt to start the burner if excessive fuel has accumulated in the combustion chamber.

Do not open the boiler door or clean outs when the boiler is hot.

Lighting and Operating Instructions

For your safety, read before operating

⚠⚠ WARNING

If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

- BEFORE OPERATING, smell all around the appliance area for gas. Be sure to smell next to the floor because some gases are heavier than air and will settle on the floor.

⚠⚠⚠ DANGER

WHAT TO DO IF YOU SMELL GAS:
- Do not try to light or operate any appliance.
- Evacuate all people.
- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

- Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it: call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- Do not use this appliance if any part has been under water. Immediately call a qualified technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

Start-up procedure

- Ensure boiler door is closed and properly latched.
- Ensure the gas system is ready. Proper vent connections. Required combustion and ventilation air provided.
- Waterside of system properly filled and vented of air.
- Lighting instruction followed.
- To be performed by a licensed tradesperson in accordance with the guidelines shown in this manual.
- Mandatory factory start-up report to be completed and returned to comply with the warranty process.
- Proper operating instructions of equipment to be related to operating personnel.

1. Introduction

1.1 Abbreviations

- HS: Heating system
- DHW: Domestic hot water
- PCB: Printed Circuit Board
- SU: Safety PCB
- PCU: Primary Control Unit - PCB for managing burner operation
- SCU: Secondary Control Unit - Electronic printed circuit board for extra connections
- IF-01: 0 - 10V control PCB
- SCU-S02: Extended control PCB
- PWM: Pulse Width Modulation
- OT: OpenTherm

1.2 General

1.2.1. Operator/ultimate owner liability

To guarantee optimum and reliable operation of the boiler, the Operator/ultimate owner must respect the following instructions:

- Read and follow the instructions given in the manuals provided with the appliance.
- Call a professional licensed heating contractor to carry out installation, initial start up and maintenance.
- Get your installing contractor to explain your installation to you.
- Keep the instruction manuals in good condition close to the appliance. (Preferably in a service binder).
- Care should be taken to ensure that children do not play with or near the appliance.

1.2.2. Manufacturer's liability

Our products are manufactured in compliance with the requirements of the various North American codes and standards. They are therefore delivered with CSA certification and all relevant documentation.
In the interest of our customers, we are continuously endeavouring to make improvements in product quality. All the specifications stated in this document are therefore subject to change without notice.
Our liability and warranty may not be invoked in the following cases:

- Failure to abide by the instructions on using the appliance.
- Poor, insufficient or a lack of maintenance of the appliance.
- Failure to abide by the instructions on installing the appliance.

1.2.3. Installer's liability

The installer is responsible for the installation and inital start-up of the appliance. The installer must respect the following instructions:

- Read and follow the instructions given in the manuals provided with the boiler.
- Carry out installation in compliance with all national and local codes having jurisdiction.
- Perform the initial start-up and carry out all mandatory checks.
- Explain the installation and operation of the boiler to the user.
- Maintenance is necessary; warn the Operator/ ultimate owner of the obligation to check the appliance and maintain it in good working order.
- Give all the instruction manuals to the Operator/ ultimate owner.

⚠⚠ WARNING

Serious property damage and/or personal injury can occur if the pipes are not protected from freezing, resulting in the pipes bursting. The boiler may also shut down. Turn off the water supply and drain the water pipes or protect them from freezing when leaving the home unattended for long periods of time during very cold weather conditions.

The boiler is designed to provide a comfortable and warm environment and is not designed for the prevention of frozen water pipes. In case an unsafe condition occurs, the boiler has been designed and equipped with several safety devices that will shut down the boiler and stop it from restarting.
If the boiler is dormant for an extended period of time during cold winter weather, the water pipes may freeze and burst which can result in extensive water damage and lead to mold growth. A variety of molds can cause serious health and respiratory problems. If water damage should occur, immediately dry the affected areas to avoid the possibility of mold growth.
If the building will be empty for an extended period of time in cold winter conditions, then the following steps should be taken:

- Turn off the building's water supply, drain the pipes and add some antifreeze for potable water for the toilet tanks and drain traps.
- Open faucets where appropriate
- Have the building monitored and checked during cold winter weather and call a qualified service technician if necessary.
- Remote temperature sensors are available and can be installed which will alert someone if freezing conditions occur in the building.

1.3 General informatio

1.3.1. Gas type

Gas type	Supply pressure (operating)
Natural gas	3.5 -14"w.c./ 8.7 - 35 mbar
Propane	8 - 13"w.c./ 20 - 32.5 mbar

1.3.2. Additional requirements

Apart from the legal provisions and codes, the additional requirements described in these instructions must also be observed.
For all provisions and requirements referred to in these instructions, it is agreed that all addenda or subsequent provisions will apply at the time of installation.

⚠⚠ WARNING

Installation of the appliance must be done by a qualified installer in accordance with prevailing local and national regulations.

1.3.3. Factory test

Before leaving the factory, each boiler is set for optimum performance and tested using natural gas and checked for the following items:

- Electrical safety
- Adjustment (CO_2)
- Water tightness/Leaks
- Gas tightness/Leaks
- Parameter settings

The boiler has not being tested in the factory before shipment using propane. Installers are required to alter gas valves on certain models and check combustion using a combustion analyser if propane to be used

2. Safety instructions and recommendations

2.1 Safety instructions

⚠⚠⚠ DANGER

If you do not follow these instructions exactly, a fire or explosion may result causing property damage or personal injury or death. Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

WHAT TO DO IF YOU SMELL FLUE GAS:

- Ensure all people are evacuated from the house immediately
- Deactivate heating equipment.
- Open windows and doors.
- Do not try to light any appliances.
- Do not touch any electrical switches, do not use any phone in your building.
- Immediately call your heating contractor or gas supplier from a neighbour's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

⚠⚠⚠ DANGER

WHAT TO DO IF YOU SMELL GAS:

- Do not try to light or operate any appliance.
- Evacuate all people.
- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

2.2 Recommendations

⚠⚠ WARNING

- Installation and maintenance of the boiler must be carried out by a qualified professional in compliance with all national and local codes having jurisdiction.
- When working on the boiler, always disconnect the power supply and close the main gas inlet valve.
- After maintenance or repair work, check all installations to ensure that there are no leaks.

⚠ CAUTION

The boiler must be installed in a heated, frost-free environment. In cases/installations where the boiler is installed in an unheated environment, extra caution to prevent the boiler from freezing needs to be taken. A secondary heat source may be required.

i Keep this document close to the place where the boiler is installed. Preferably in a service binder.

Casing components

Only remove the casing for maintenance and repair operations. Put the casing back in place after maintenance and repair operations.

Instruction stickers

The instructions and warnings affixed to the appliance must never be removed or covered and must remain legible during the entire lifespan of the appliance. Immediately replace damaged or illegible instructions and warning stickers. Contact DDR Americas Inc. if replacement labels are needed.

Modifications

Modifications may only be made to the boiler after the written permission of DDR Americas Inc. to do so.

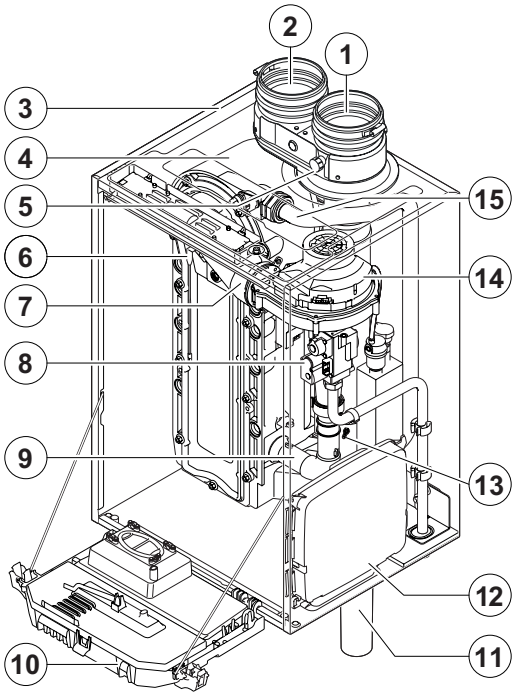
3. Technical description

3.1 General description

The MCA Pro boilers are high-efficiency wall-hung condensing gas-fired boilers

- High efficiency heating.
- Natural gas and propane gas-fired wall-mounted condensing heating boiler.
- Low emissions.
- Suitable for weather-responsive operation in closed loop, forced circulation hot water heating systems. Production of domestic hot water (DHW) can be assured by a separate DHW tank.
- Ideal for cascade systems. Consult factory.
- The boiler is suitable to operate from sea level to a maximum altitudes of 1370m/4550ft. (Above 700/2300ft. altitude, start and minimum fans speed setting should be change

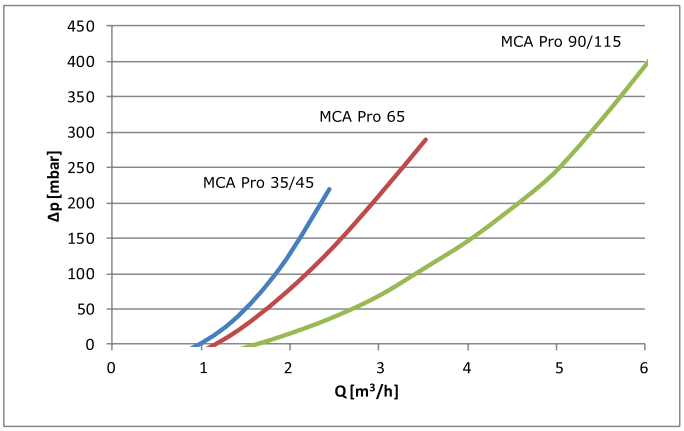
3.2 Main parts

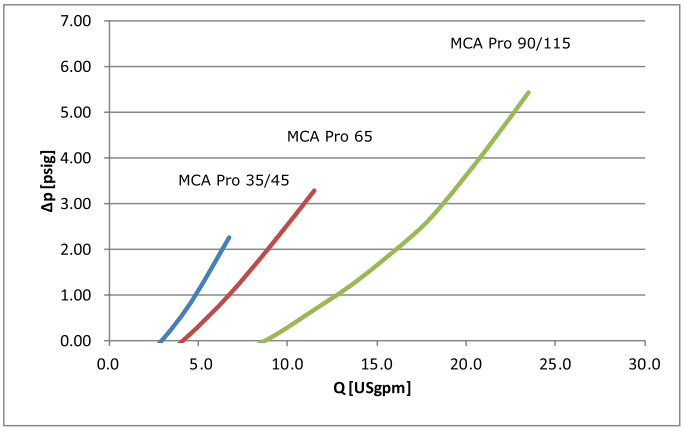


1. Flue gas exhaust
2. Combustion air
3. Boiler casing
4. Heat exchanger
5. Flue gas test port
6. Ignition/ionization electrode
7. Manifold pipe
8. Combined Venturi and gas valve unit
9. Air intake silencer
10. Control panel cabinet
11. Siphon
12. Auxilliary control cabinet
13. Flue gas temperature sensor
14. Fan
15. Internal heating supply pipe

3. Technical description

3.3 Operating principle





Δp Pressure drop
Q Water flow

3.3.1. Boiler pump

⚠ CAUTION

If the power consumption of the pump is more than 150 VA/1.3A, it must be connected to the SCU-S02 (Accessory)

The boiler is supplied without a pump. The proper pump selection has to reflect the pressure drop and system flow calculation which includes the DHW sizing.

Back flow preventer
A backflow preventer must be used in the cold water supply piping when required by national or local codes having jurisdiction.

☞ Refer to the Technical Specifications on page 17.
If possible, install the pump directly under the boiler on the return connection. The pump must be pumping into the boiler.

☞ Refer to chapter 4.5. Installation Examples, (page 25 and 26.)

Recommended pumps for the MCA Pro boilers are:
- Taco
- Wilo
- Grundfos

☞ See chapter: 4.10.3 "Connection possibilities for the PCB (SCU-S02)", page 61

3.3.2. System in cascade

The boiler is ideally suited for a cascade system. There are a number of standard solutions available. For example:
- Cascade systems (quick assembly) for the installation of 2 to 6 boilers next to each other or 3 to 6 boilers mounted back to back on a free-standing frame. When the boilers are mounted next to each other, they can be mounted either on the wall or on a freestanding frame. The wall or the frame must be able to bear the weight of the boilers and must be sufficiently stable.
- Hydraulic separators/Low loss headers for a cascade system of 2 or 3 boilers (MCA Pro 45 and/or MCA Pro 65). The supply and return of each boiler can be directly connected to these.

i Please contact us for further information.

3.3.3. DHW tank connection

An indirect DHW tank can be connected to an individual boiler. The DHW tank can be connected to the boiler in two ways:

- Using a three-way diverting valve.
- Using a DHW tank pump.

3.3.4. Water flow rate

The minimum and maximum waterflow, as listed on the next page should be taken into account to protect the boiler for to low- or high waterflow / temperature differences in the heat exchanger.

The boiler's modulating control system limits the maximum difference in temperature between the heating supply and return and the maximum speed at which the supply temperature increases, this could cause a reduction of heat output of the boiler.

3.Technical specifications

Item	Unit	MCA Pro			
		45	65	90	115
Firing Sequence	Type	Modulating, ON/OFF, Remote 0-10 V			
Minimum Fuel Input	MBH/kW	34-9.9	34	55/16.2	82/24.0
Minimum Fuel Input	MBH/kW	156/45.7	235/68.8	326/95.5	399/117.0
Minimum Heat Output	MBH/kW	33/9.6	45/13.3	54/15.8	79/23.1
Maximum Heat Output	MBH/kW	146/43.0	222/65.0	306/89.5	368/108.0
Efficiency					
Thermal Efficiency CSA Certified	%	94.0			
Combustion Efficiency CSA Certified	%	94.3			
Boiler Usable Effciency	%	Up to 98.2			
Stand by Losses (Average)	%	<0.3			
Gas and Venting Data					
Gas Type	-	Natural Gas/Propane(LPG)			
Gas Inlet Pressure-Natural Gas	inch w.c/mbar	3.5-14 / 8.7-35			
Gas Inlet Pressure-Propane	inch w.c/mbar	8-13 / 20-32.5			
Nox Emission (O2-0%, dry)	ppm	<21			
Flue Gas Mass Range	Lb/h	31-152	46-229	62-304	79-392
	Kg/h	14-69	21-104	28-138	36-178
Max. Flue Gas Temp. PVC/CPVC venting	°F/°C	230/110			
Combustion Air Temperature	°F/°C	32-104/0-40			
Gas Vent Category	Types	IV-BH : ANSI Z21.13a / CSA 4.9			
Vent Size - Single Pipe	Inch/mm	3/76.2	4/101.6	4/101.64	4/101.6
Vent Size - Connection Pipe	Inch/mm	80/125	100/150	100/150	100/150
Residual Fan Duty	inch w.c.	0.6	0.6	0.7	0.9
	mbar	1.5	1.5	1.8	2.2
Water					
Max. Water Temperature Safety Limit	°F/°C	230/110			
Operating Water Temp. Range PVC	°F/°C	68-158/20-70			
Operating Water Temp. Rang CPVC / PP / SS	°F/°C	68-190/20-88			
Water Pressure Range	psig/bar	56/3.9			
Water Coatent	USG/L	1.5/5.5	1.7/6.5	2.0/7.5	2.0/7.5
Water Flow Min.	USGPH	425	640	890	1360
Water Flow Max.	USGPH	1050	1450	1700	1700
Water Resistance (ΔT = 36°F/20°C	ft H_2O	3.0	4.4	4.7	8.2
	mbar	90	130	140	245
Electircal					
Main Supply	V/H/P	120 / 60 / 1			
Tating of the Main Fuse F1	A	6.3 A			
Power Consumption	W	3.5-68	3.5-79	3.5-129	3.5-209
Electrical Protection Index	IP-IEC-N	IP X4D / NEMA-3R			
Other Characteristics					
CSA Certified Installion Altitude	ft/m	Max. 4,500/1,370 (Canada) For higher altitudes consult factory			
Dry Boiler Weight	Lb/kg	117/53	133/60	148/67	150/68
Wetted Weight	Lb/kg	130/59	147/67	165/75	167/76
Noise Level at @ 1m (Aberage)	dB(A)	45	45	52	51

4. Installation

4.1 Regulations governing installation

⚠⚠ WARNING

Installation of the boiler must be done by a qualified professional in accordance with prevailing local and national regulations. The professional must comply with local/national requirements.

4.2 Package list

4.2.1. Standard delivery

- The boiler is fitted with a 3-prong power supply cable/plug
- Power cable for pump
- Mounting rail and mounting accessories for wall mounting
- Wall mount template
- Connection kit accessory with separate assembly instructions
- Installation and Service Manual
- User Guide
- 3 tubes of X100 water treatment
- Outdoor sensor

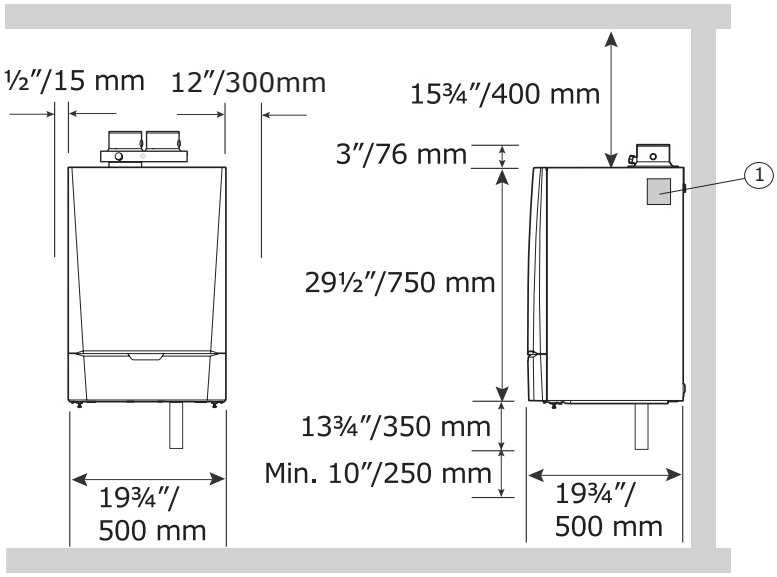
These installation and maintenance instructions deal only with the items included in a standard delivery. For installation and assembly of any accessories supplied with the boiler, see the relevant installation/assembly instructions.

4.2.2. Accessories/Options

Description
Pipe vent adapter 80/125 (MCA Pro 45)
Pipe vent adapter 100/150 (MCA Pro 65/90/115)
DHW sensor
IF-01 control PCB
SCU-S02 control PCB
Heat exchanger cleaning tool
Maintenance set A, B, C
Floor stand

4. Installation

4.3 Rating plate & warning label location



4.3.1. Rating plate

1 Sticker boiler vent rating
2 Rating plate
3 Sticker explanation rating plate
4 Sticker warning and instructions

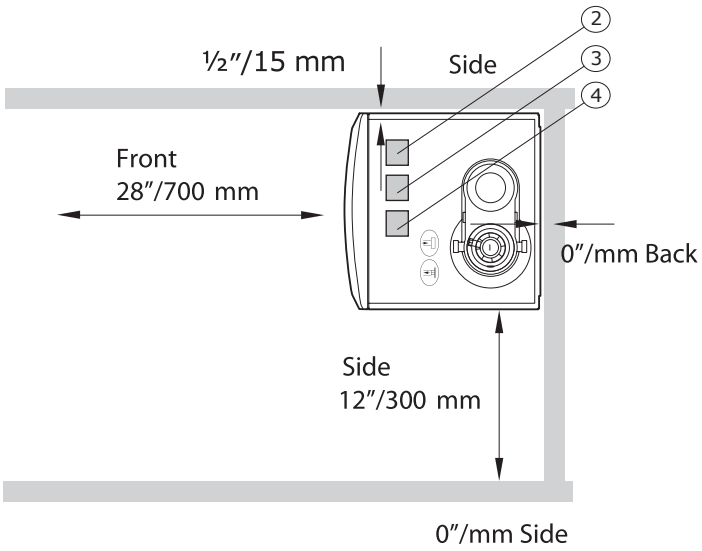
The boiler rating plate on top of the boiler features the boiler serial number and important boiler specifications, for example the model and unit category. Other instruction labels are affixed at the right side of the boiler casing.

4.3.2. Minimum service clearances

- Determine the ideal position for mounting the boiler. Take into account the prevailing codes and clearance requirements around the boiler.
- When choosing the position for mounting the boiler, bear in mind the authorised position of the combustion gas discharge outlets and the air intake opening.
- To ensure adequate accessibility to the appliance and facilitate maintenance, leave enough service space around the boiler.
- 12"/300 mm on the right hand side of the boiler is needed for reading warning and instruction stickers.

⚠⚠ WARNING

- Mount the appliance to a solid wall capable of bearing the weight of the appliance when full of water and fully equipped.
- It is forbidden to store flammable products and materials in the boiler room or close to the boiler, even temporarily.



Minimum Clearances to Combustibles

Top	Front	Rear	Left	Right	Vent pipe *
0	0 A, C	0	15mm	300mm	0

A = Alcove
C = Closet
* Refer to the Installation instructions

⚠ CAUTION

- The boiler must be installed indoors in a frost-free environment.
- A grounded electrical connection must be available close to the boiler.
- A connection to the drainage system for the discharge of condensate must be available close to the boiler. ☞ "Connecting the condensate discharge pipe", page 31

4.3.3. Ventilation

- Installation, servicing and maintenance of this product must be performed by a licenced and trained heating contractor, experienced in hot water heating boilers as well as gas combustion. The installation must conform to all national and local codes having jurisdiction.
- In Canada: CSA B149.1 Gas Code
- In USA: ANSI Z223.1 (NFPA 54) Gas Code and ASME CSD-1. If you have any technical questions or need assistance with this product, please call your local Sales Representative or DDR Americas Inc.

(1) Distance between the front of the boiler and the internal wall of the cupboard.

⚠⚠⚠ DANGER

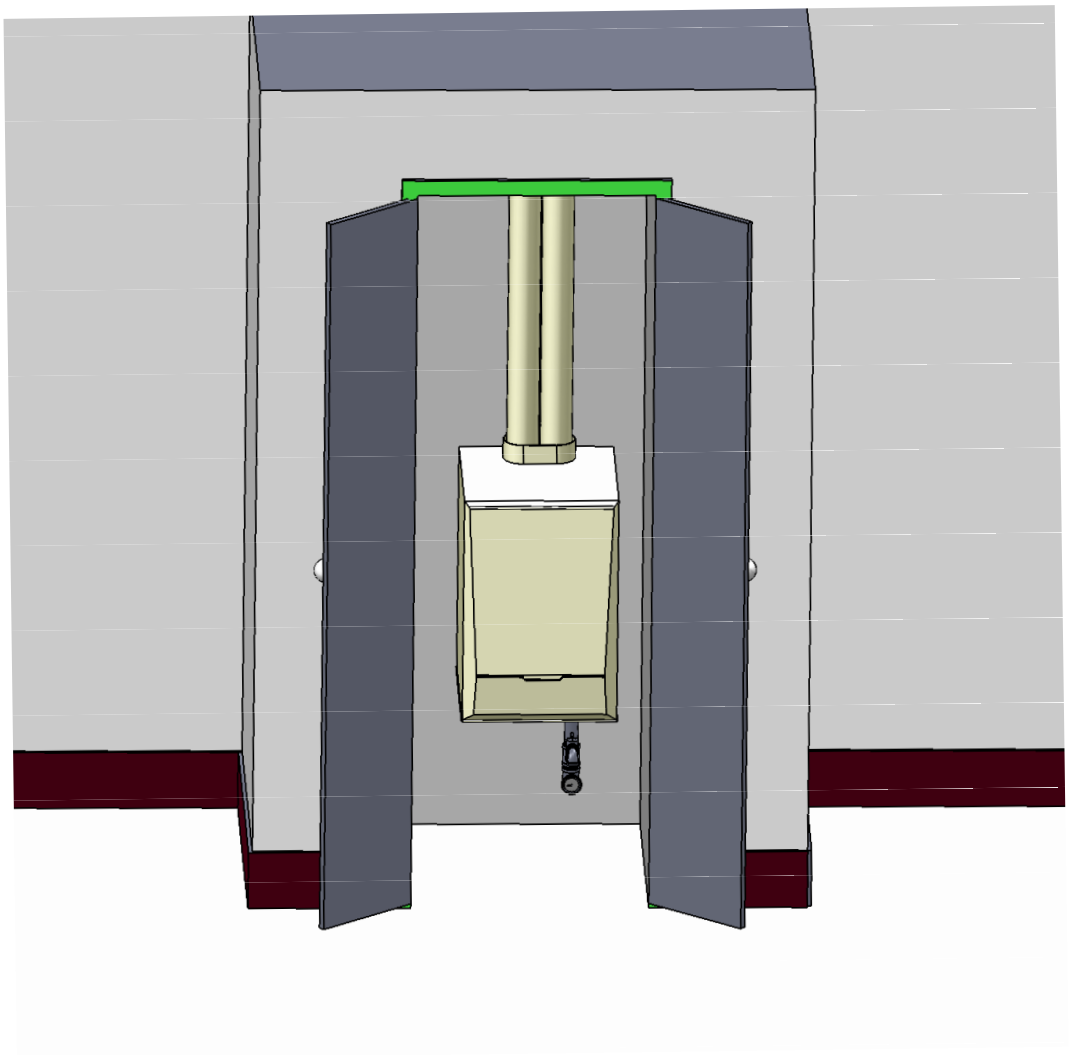
If the boiler is installed in a closed cupboard, respect the minimum dimensions given in the diagram (opposite). Also allow openings to obviate the following hazards:

- Accumulation of gas
- Heating of the cupboard
- Failure to heed this warning could result in personal injury, property damage or death.

In the absence of local code requirements, the minimum cross section of the openings:
S1+S2 = 23.½ in^2/150 cm^2

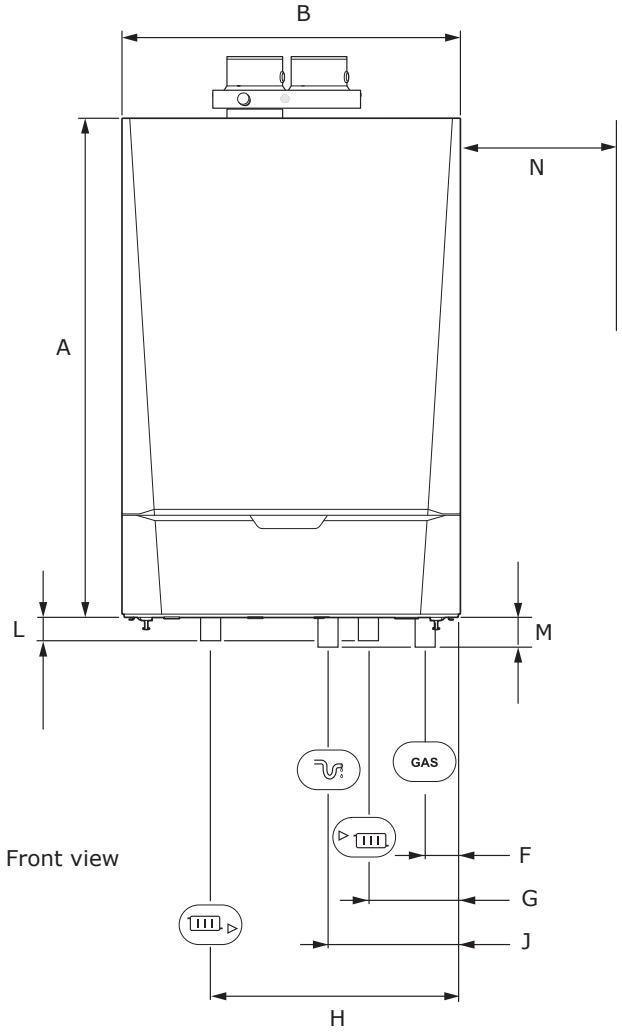
⚠ CAUTION

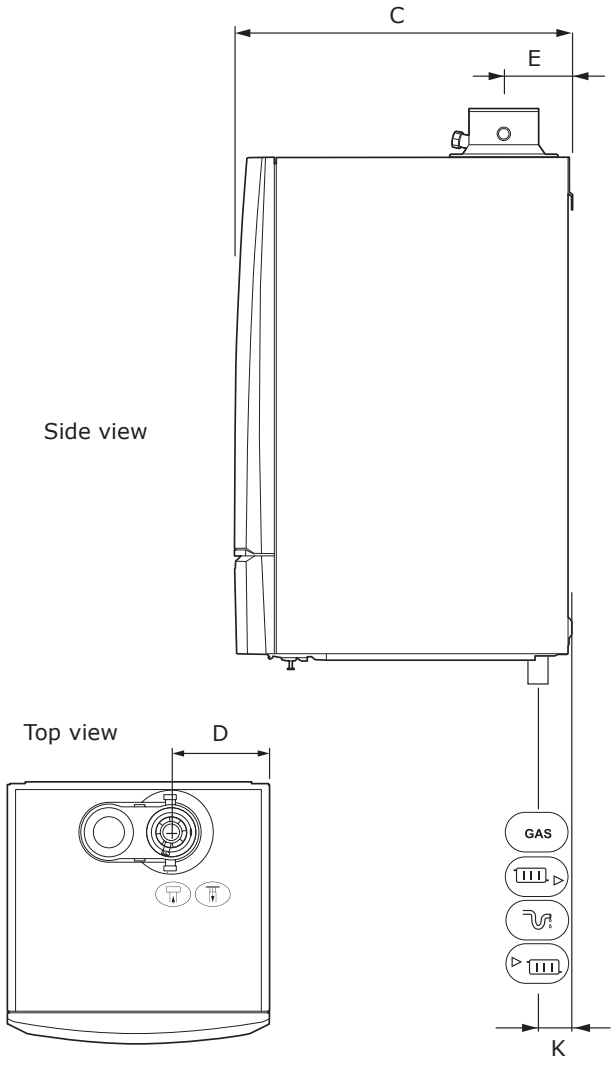
Follow local and national codes having jurisdiction



4. Installation

4.3.4.a Dimensions without bottom connection kit accessory



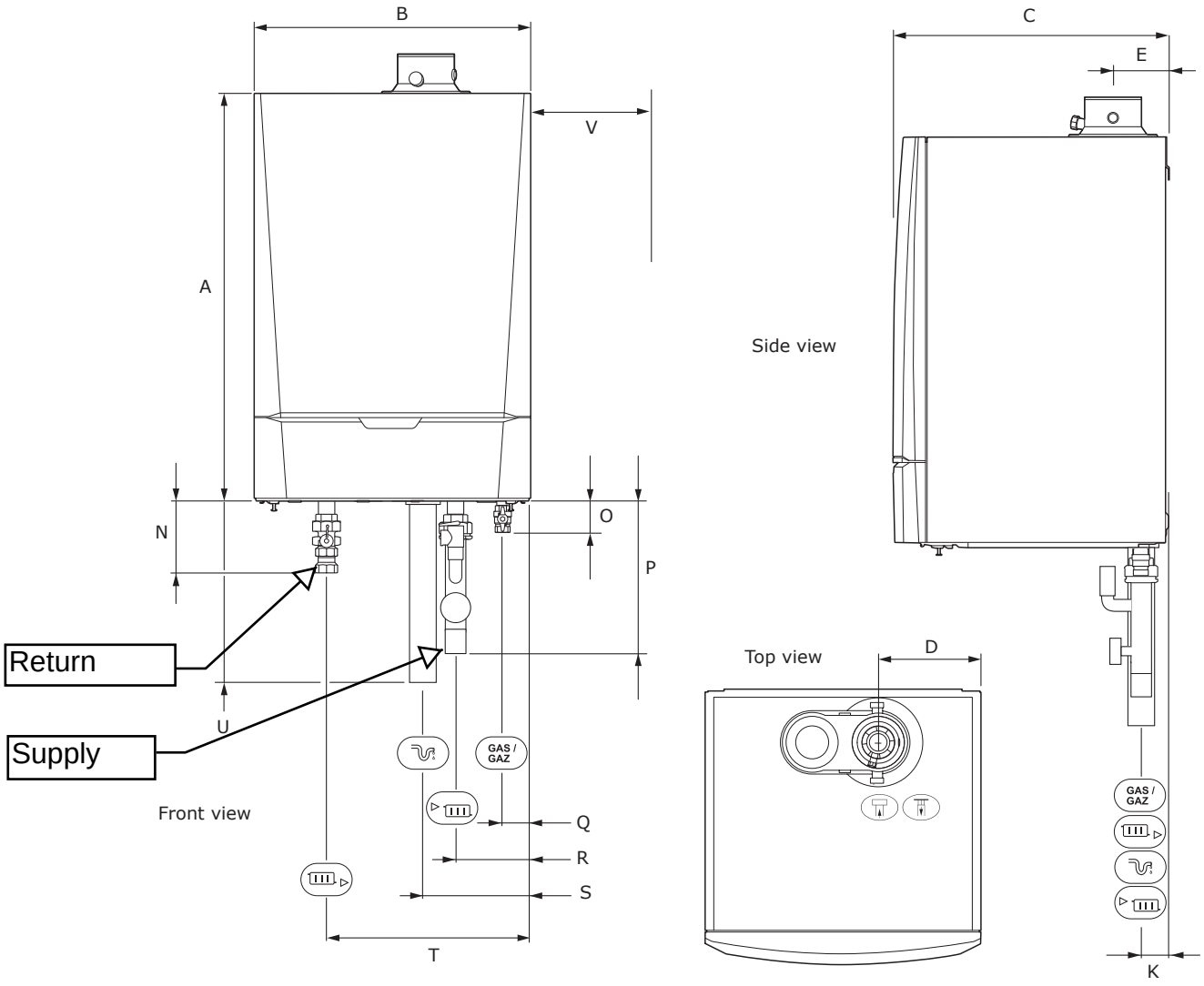


MCA Pro		
		inch/mm
A	Height	29½/750
B	Width	19¾/500
C	Depth	19¾/500
D	Right side/vent	7½/191
E	Back/vent	4/100
F	Right side/gas pipe	2/50
G	Right side/supply pipe	5⅛/130
H	Right side/return pipe	14⅜/365
J	P-trap	7½/191
K	Back/center of pipe	2/50
L	Pipe length of G and H	1 7/16/36
M	Pipe length of F and J	1½/40
N	Distance between boilers	12/300

	Connection of the vent pipe; 3"/80mm(MCA Pro 35/45), 4"/100mm(MCA Pro 65/90/115)
	Connection of the combustion air pipe; 3"/80mm (MCA Pro 35/45), 4"/100mm (MCA Pro 65/90/115)
	P-trap
	Heating circuit return pipe; 1¼" Male thread (NPT)
GAS	Gas connection; ¾" Male thread (NPT)
	Heating circuit supply pipe; 1¼" Male thread (NPT)

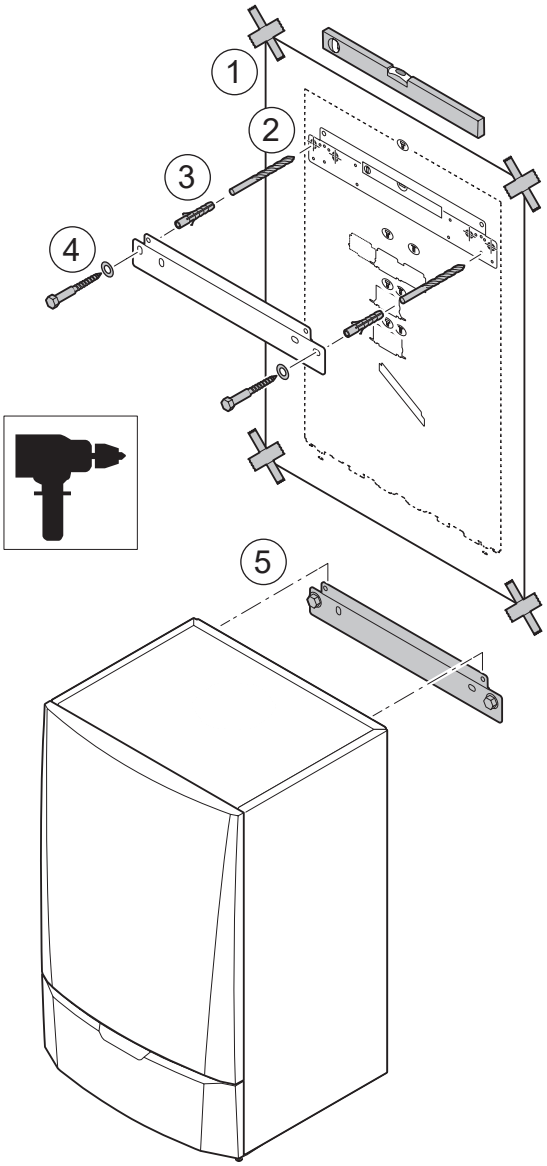
4. Installation

4.3.4.b Dimensions with bottom connection kit accessory



MCA Pro		
		inch/mm
A	Height	29½/750
B	Width	19¾/500
C	Depth	19¾/500
D	Right side/vent	7½/191
E	Back/vent	4/100
K	Back/center of pipe	2/50
N	Pipe length of G and H	5⅜/135
O	Pipe length of F and J	2⅜/60
P	Supply pipe length	11⅛/282
Q	Right side/gas pipe	2/50
R	Right side/supply pipe	5⅛/130
S	P-trap	7½/191
T	Right side/return pipe	14⅜/365
U	P-trap length	13¼/335
V	Distance between boilers	12/300

	Connection of the vent pipe; 3"/80mm (MCA Pro 35/45), 4"/100mm (MCA Pro 65/90/115)
	Connection of the combustion air pipe; 3"/80mm (MCA Pro 35/45), 4"/100mm (MCA Pro 65/90/115)
	P-trap
	Heating circuit return pipe; 1¼" Male thread (NPT)
GAS	Gas connection; ¾" Male thread (NPT)
	Heating circuit supply pipe; 1¼" Male thread (NPT)



4.4 Mounting the boiler

Ensure the boiler and its controls are protected from dripping or spraying water during normal operation.
The boiler should be installed in a location so that any water leaking from the boiler or piping connection or relief valve will not cause damage or the area surrounding the unit or any lower floors in the structure.
The boiler is delivered with a mounting template.
A hanging bracket situated at the rear of the casing enables the boiler to be directly hung on the mounting bracket.

⚠ CAUTION

Check the stability of the wall before mounting the boiler.
Do not install the boiler on a non load bearing wall.

1. Position the mounting template to the wall with masking tape.

⚠ CAUTION

- Using a water level, check that the mounting template is perfectly horizontal.
- During mounting, cover up the vent to protect the boiler and its connections from dust and debris. Only remove this protection when the vent is fitted.
- The boiler must be installed such that no water can get into the boiler casing and electrical parts of the boiler.

2. Drill two Ø ⅝"/16 mm holes by 2”/50mm deep in the concrete.
3. Insert the ⅝”/16 mmwall plugs.
4. Attach the mounting bracket to the wall with the provided ⅝”/16 mm bolts.
5. Hang the boiler on the mounting bracket.
6. Alternately, the hanging bracket can be affixed to a ½"/13 mm plywood sheet fixed to the wall studs or a timber brace spanning the wall studs.

⚠ CAUTION

The boiler is delivered with a connection kit accessory. Install this set before carrying out the water and gas connections as described in the installation examples.

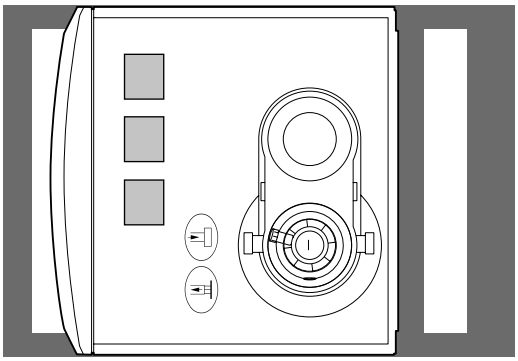
4. Floor stand assembly

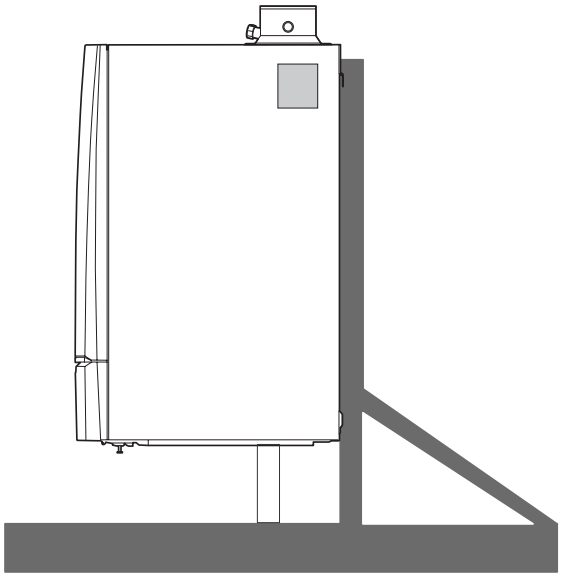
Floor stand assembly

The MCA Pro boilers are designed for wall mounting using the provided wall bracket. Do not install the MCA Pro on the floor or on carpeting. If the MCA Pro is to be installed on the floor, an optional floor stand is available.

⚠⚠⚠ DANGER

When mounting the MCA Pro boiler on a wall, make sure the wall is able to support an minimum of 166.6 lbs/75.6 kg and is vertically plumb. Failure to heed this warning could result in personal injury, property damage or death.





4.5 Installation Examples

4.5.1. MCA Pro Boiler with one heating circuit

This is an example/reference ONLY. Ensure all federal/state/provincial and local codes are adhered to.

1 MCA Pro Boiler

2 Boiler pump with isolation valve

3 Heating load

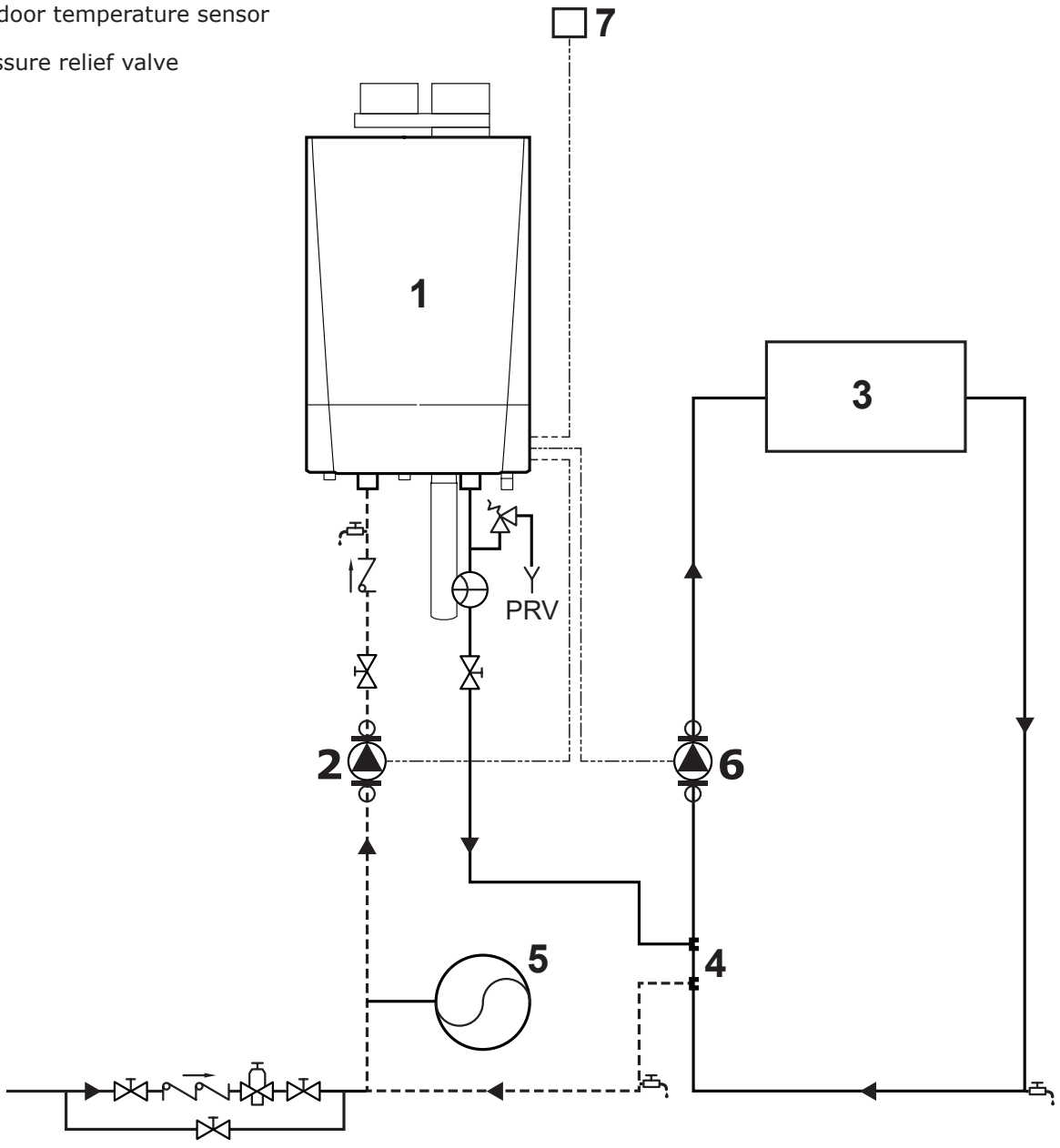
4 Closely spaced tees

5 Expansion tank

6 Heating system pump with isolation valve

7 Outdoor temperature sensor

PRV Pressure relief valve



4. Installation

4.5.2. MCA Pro Boiler with one heating circuit and DHW tank

This is an example/reference ONLY. Ensure all federal/state/provincial and local codes are adhered to.

1 MCA Pro Boiler

2 Boiler pump with isolation valve

3 Heating load

4 Closely spaced tees

5 Expansion tank

6 Heating system pump with isolation valve

7 Outdoor temperature sensor

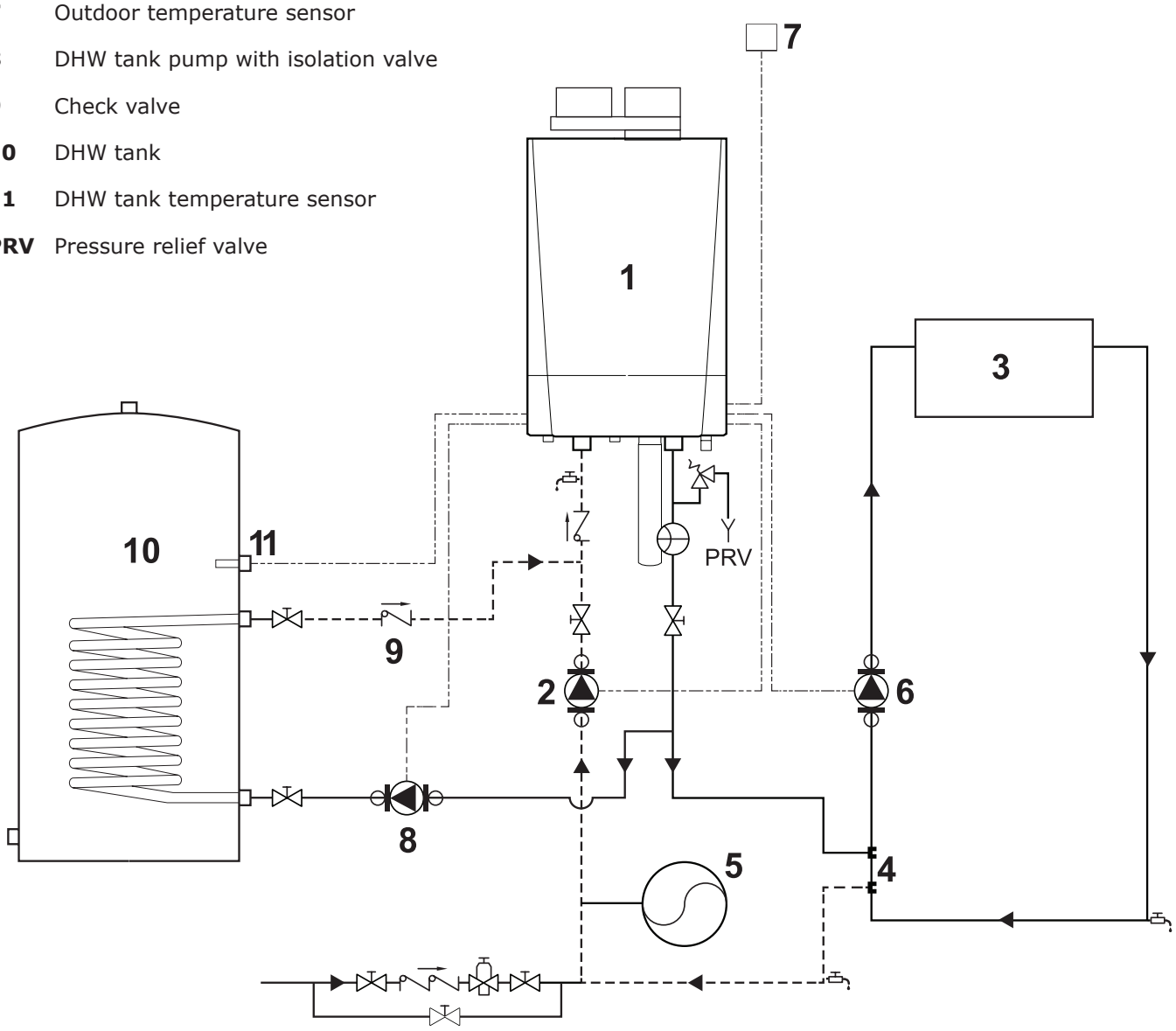
8 DHW tank pump with isolation valve

9 Check valve

10 DHW tank

11 DHW tank temperature sensor

PRV Pressure relief valve



4.6 Water connections

4.6.1. Flushing the system

The installation must be cleaned and flushed according to good installation practices such as CSA B214.
The warranty may become null and void if the installation is not flushed and/or the water quality is inadequate.
It is mandatory to check the water quality of a central heating installation semi-annually, particularly if it is topped up regularly. If the water has been treated, the supplier of the water treatment product can be consulted. The user of the installation is responsible for ensuring good quality installation water at all times. If the user wishes to achieve this water quality with the aid of water treatment systems, this will also be his/her responsibility.
We would advise the user to record all water treatments carried out in a good log book. This log book can also be used to record work started and performed on the central heating boiler(s) and system.

⚠ CAUTION

Consult water quality manual and have the system/ boiler water quality checked.

⚠⚠ WARNING

Do not use petroleum-based cleaning or sealing compounds in boiler system. Damage to elastomer seals and gaskets in system could occur, resulting in subtantial property damage.
Before filling the boiler and system with water, verify the following. DO NOT fill with softened water. Boiler corrosion can occur.

Installing the boiler in new installations (installations less than 6 months old)

In the case of new installations, it is first of all crucial to flush the entire installation thoroughly (without the central heating boiler) before the central heating installation is commissioned. This will remove residues from the installation process (weld slag, fitting products etc.) and preservatives (including mineral oil). To assist in the flushing process, a cleaning agent may be used (this may only be performed by an appropriate expert). Do not soften water to below 1ºf (0.1 mmol/l Ca(HCO3)2), as softened water with lower water hardness is bad for the installation. An inhibitor must be used in combination with softening.

- Clean the installation with a universal cleaner to remove debris (copper, hemp, flux).
- Thoroughly flush the installation until the water runs clear and shows no impurities.

Installing the boiler in existing installations

If the quality of the heating water in an existing installation proves to be inadequate, certain measures must be taken.
One option for removing pollution is to install a filter. Various kinds of filters are available for this. A screen filter is designed to trap large dirt particles. This filter is usually placed in the full flow part of the system. A fabric filter, on the other hand, is designed to trap finer particles. This kind of filter is installed in partial flow conditions, with an additional pump to control circulation over the filter. Another option for removing dirt is to flush the entire installation thoroughly. If a new boiler is being installed in an existing installation, the system must be flushed before the new boiler is installed. The installation should be flushed by an expert; this process involves risk if not performed carefully. Loose dirt can only be removed where there is sufficient flow. Treatment will therefore take place section by section. Complications can occur if it is not possible to ensure that the sections to be cleaned have sufficient circulation and that user influences before and during cleaning can be kept under control. Special attention must also be paid to 'blind spots', where there is only a small amount of flow and a lot of dirt can accumulate. The above points are even more important to note when flushing using chemicals. In particular, there is the possibility of chemicals being left behind, with obvious negative consequences. If the boiler is polluted with dirt or scale deposits, it may be necessary to clean the central heating boiler. Lime scale deposit occurs by far most frequently at the hottest place in the installation, i.e. in the central heating boiler. The central heating boiler must be cleaned by an expert, using a suitable agent.

- Remove sludge from the installation.
- Flush the installation.
- Clean the installation with a universal cleaner to remove debris (copper, hemp, flux).
- Thoroughly flush the installation until the water runs clear and shows no impurities.

If a water treatment product is used, the product must have been found suitable for all materials used in the central heating installation. The supplier of the water treatment product must be consulted in this regard.
It is always important to adhere very closely to the regulations and instructions provided by the supplier of the water treatment product. This includes a periodic inspection and periodic replacement if necessary.
Given that a variety of water treatment products are available, it is not feasible for De Dietrich to investigate all possible products. A number of well-known manufacturers and their products are:

Fernox
US Customer Support
Cookson Electronics
4100 6th Avenue
Altoona, PA 16602 USA
Tel: 800-289-3797
Fax: 814-944-8094
Email: fernox_americas@cooksonelectronics.com
Website: www.fernox.com

- F3 Cleaner restorer (neutral universal cleanser for existing and pre-commissioning new systems)
- F1 Protector (protects against corrosion and lime scale in mixed metal systems)
- Alphi-11 (antifreeze + protection agent) Fernox Protector Alphi-11 is a combined antifreeze and inhibitor, which gives long term protection of domestic central heating systems against internal corrosion and lime scale formation. It prevents corrosion of all metals found in these systems, i.e. ferrous metals, copper and copper alloys and aluminium. Fernox Protector Alphi-11 is compatible with all metals and materials commonly used in central heating systems.

Sentinel Water & Energy Solutions
Douglas Products and Packaging
1550 E. Old 210 Highway
Liberty, MO 64068 USA
Tel: 877-567-2560

- X100 (inhibitor)
- X200 (noise reducer, lime scale remover, very strong, can be left in the system permanently)
- X300 (cleaning agent for new installations)
- X400 (cleaning agent for existing installations)
- X500 (antifreeze + protection agent)

Agents from other manufacturers may also be used, provided that the relevant manufacturer guarantees that it is suitable for all materials used and is corrosion-resistant.

Using the correct quantity of antifreeze
1. Determine the required freezing temperature (to protect against the lowest possible temperature that the system water will encounter).
2. Check the antifreeze container for the manufacturer's data to help determine the necessary amount of antifreeze that is required at the specific temperature.
3. Using the Technical Specification chart on page 17, determine the water content of the boiler. Add the water content volume of the boiler, the expansion tank, all the components, and the complete system piping.
4. To figure out he required amount of antifreeze, multiply the total water volume calculated in step 3 with percentage of antifreeze. This will provide the number of gallons of antifreeze that should be added to the water.
5. Never use 100% antifreeze as the efficiency will be dramatically affected.

Check/verify the water chemistry
Verify the chlorine concentration and water pH level after the system has been filled and leak tested to make sure they are acceptable.

⚠ CAUTION

Care must be taken when treating the water. If the instructions accompanying the water treatment product are not fully observed, or a particular product is used and/or dosed incorrectly, this may result in damage to health, the environment, the heating boiler or the heating system.

Aluminium Heat Exchangers

Acidity level (untreated water)		7–8.5 pH	
Acidity level (treated water)		7–8.5 pH	
Conductivity		≤ 800 µS/cm (at 25°C)	
Chlorides		≤ 150 mg/l	
Other components		< 1 mg/l	
Water hardness			
	Maximum total water hardness of the installation water and make-up water*		
Total installed heat output kW	mmol/l	°dH	°f
≤ 70	0.1–3.5	0.5–20	1–35
70–200	0.1–2.0	0.5–11.2	1–20
200–550	0.1–3.5	0.5–8.4	1–15
> 550	0.1–0.5	0.5–2.8	1–5

Please note: For installations that are heated at constant high temperatures above 200 kW, a maximum total water hardness of 2.8ºdH (0.5 mmol/l, 5ºf) applies. Please note: For installations that are heated at constant high temperatures up to a maximum of 200 kW installed heat output, a maximum total water hardness of 8.4ºdH (1.5 mmol/l, 15ºf) applies.

4. Installation

4.6.2 Connection of the heating circuit

The boiler is supplied with the following NPT type threaded components which include:

1¼"x 1¼"x ½" NPT black iron malleable TEE fitting	1
1¼"x 1¼"x ¾" NPT black iron malleable TEE fitting	1
1¼" NPT x 4 inch long black iron nipple	1
1¼" NPT x 1 inch close black iron nipple	1
¾" NPT black iron 90° street elbow	2
Watts PRV, 30 psig, model M3351M1 or Conbraco	1
Watts 2½" Temp. Pressure gauge, ½" DPTG3-2.5	1
⅜" by 3 inch long lag bolts	2
⅜" x 1 ¾" inches long lag shield	2
⅜" flat washer	2
1¼" Brass union	1
¾" NPT black iron malleable tee fitting	1

Note:
All components must be installed onto the boiler BEFORE the boiler is to be installed onto the wall bracket.

Installation procedure for water connection kit

Step 1 Remove the anti-dust plugs supplied with boilers, some water may come out of the boiler (from factory testing of boiler)

Step 2 Lay the boiler on its side and use cardboard under the boiler to prevent scratching of the boiler casing surface

Step 3 Remove all fittings from the components box supplied, and add pipe dope to all male threads, including the 1¼" NPT inlet and 1¼" NPT outlet threads on the boiler

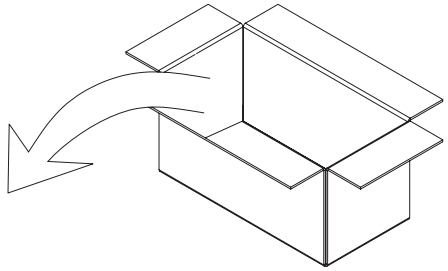
Step 4 Use a chain pipe wrench on the 1¼" NPT outlet side and install male side of the 1¼" NPT brass union. Be careful not to apply torque onto the 1¼" NPT brass union without a chain pipe wrench on the 1¼" NPT outlet pipe as this could cause the boiler casing to distort.

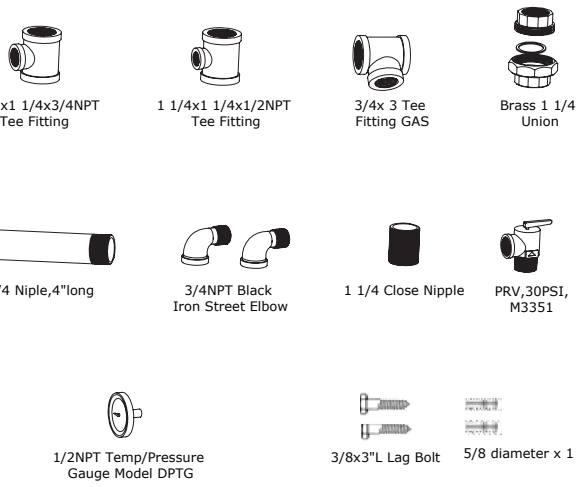
Step 5 Using a pipe vise, attach the female side of the brass union to one end of the 1¼" NPT x 6" long pipe nipple, and attach the 1¼" X 1¼" X ¾" NPT tee to opposite end of 1¼" NPT nipple

Step 6 Install a close nipple onto the 1¼" x 2" x ½" inch NPT tee to bottom of the assembly

Step 7 Install ¾" street elbows in ¾" inch portion of the assembly, ensure the street elbow is facing upwards.

Step 8 Install supplied ¾" brass pressure relief valve Model M3351 in street elbow. Ensure the pressure relief valve is facing outwards





⚠⚠⚠ DANGER

NEVER INSTALL A PRESSURE RELIEF VALVE THAT IS RATED HIGHER THAN 56 PSIG / 3.9 BAR, as severe personnel injury or death can occur.

Step 9 Install the remaining ¾" street elbow into the outlet port of the pressure relief valve, ensure this ¾" NPT street elbow is facing downwards

Step 10 Install the supplied temperature and pressure gauge in the ½" NPT port of the bottom 1¼" x 1¾" X½" NPT tee fitting

Step 11 Install the pipe assembly onto the boiler by tightening the brass 1¼" NPT union

Step 12 Install the siphon container onto the boiler

Now the boiler is ready to be installed onto the wall bracket, please ensure two people handle the boiler and carefully place the assembled boiler onto the wall bracket.
After the boiler is installed onto the wall bracket, use a water level to ensure the boiler is level in all planes.

4. Installation

⚠⚠ WARNING

- Do not install an isolation valve between boiler and pressure relief valve.
- The discharge pipe for the pressure relief valve must be oriented to prevent scalding.
- Pipe pressure relief valve discharge pipe close to floor drain.
- Never pipe discharge pipe to the outdoors.

A Boiler below radiation

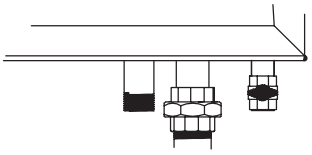
B Boiler above radiation

HV Hi vent

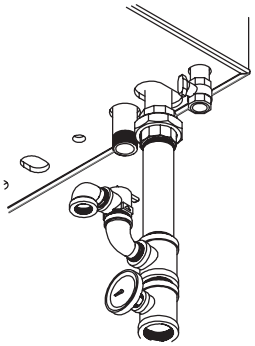
LWCO Low water cut-off

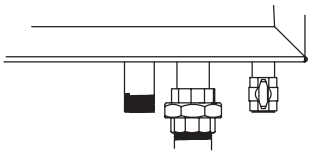
Heating circuit return pipe

Heating circuit supply pipe

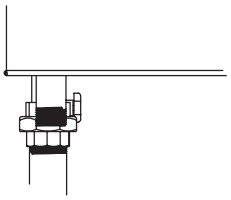


Front View
Close Position





Front View
Open Position

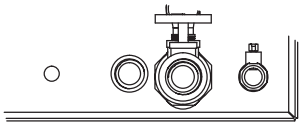


Side View

⚠ CAUTION

CAUTION

- A low water cut-off may be required by local codes.
- If the boiler is installed above radiation level, a low water cut-off device of approved type (field supplied) must be installed in all instances.
- Do not install an isolation valve between boiler and low water cut-off.



Bottom View

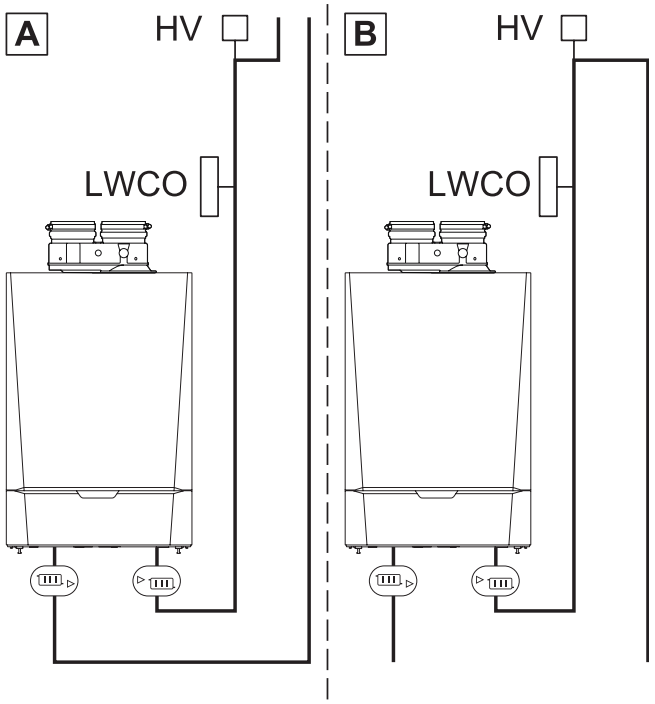
4.6.3. Connecting the expansion tank

Install the expansion tank on the heating return pipe upstream of the boiler pump.

4.6.4. Connecting the condensate discharge pipe

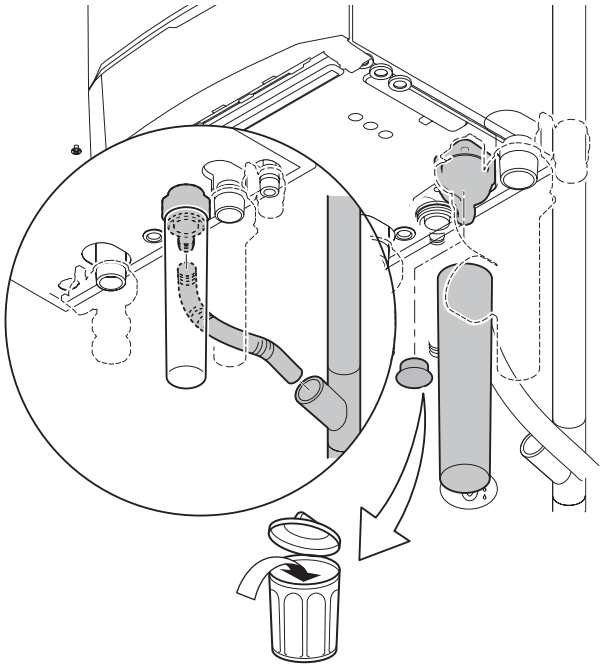
The boiler comes with a built-in condensate trap. An external trap is not required when connecting the field drain to flexible discharge tubing.

Discharge tubing (field supplied) must be of 1”/2.5 cm diameter. The drain pipe and fittings must conform to ANSI standards and ASTM D1785 or D2846.CPVC or



4. Installation

PVC cement and primer must conform to ASTM D2564 or F493. In Canada use CSA or ULC listed schedule 40 CPVC or PVC drain pipe, fittings and cement.



1. Fit the condensate tube and the siphon to the boiler with water .
2. Mount a standard drainage pipe leading to the main drainage system. The drain connection must terminate into an open or vented drain as close to the boiler as possible to prevent siphoning of the boiler drain.
3. Mount a trap or a siphon in the discharge pipe.

⚠ CAUTION

- Do not make a fixed connection allowing maintenance work on the siphon to be performed.
- Do not plug the condensate discharge pipe.
- Set the discharge pipe at a gradient of at least 0.36”/ft - 30 mm/m , maximum horizontal length 16.4 ft/5 m.
- Do not drain condensation water into a roof gutter at any time.
- Connect the condensate discharge pipe in accordance with prevailing local code requirements.
- Condensate pipes shall not be subject to freezing conditions.
- A condensate pump must be installed if the condensate outlet of the boiler is lower than the drain. The selected pump must be approved for condensing boiler applications. Select a pump with an overflow switch in order to avoid condensate spillage.
- The drain connection must terminate into an open or vented drain as close to the boiler as possible to prevent siphoning of the boiler drain.

Filling the siphon

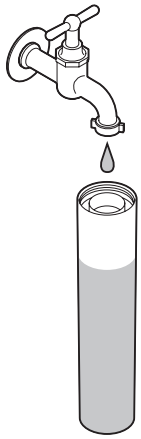
1. Remove the siphon.
2. Fill the siphon with tap water. This must be completely filled.
3. Re-assemble the siphon.

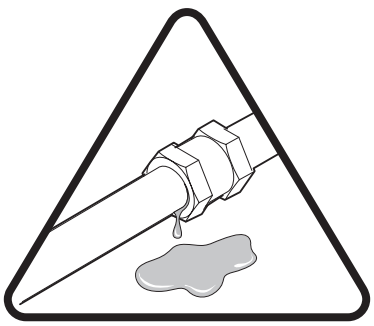
⚠ CAUTION

Fill the water siphon before starting the boiler to avoid combustion products escaping from the boiler.

⚠ CAUTION

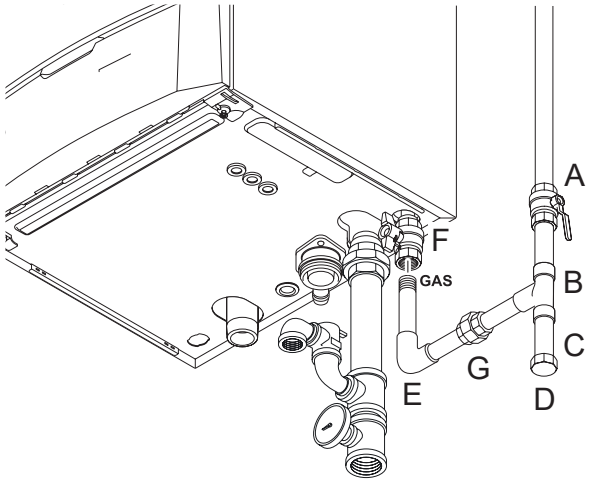
During operation, check condensation siphon is draining properly.





4. Installation

4.7 Gas connection



A Gas shut-off valve (Field supplied)
B T-fitting (Factory supplied)
C Drip leg (Field supplied)
D Cap (Field supplied)
E Elbow (Field supplied)
F Gas shut-off valve (Factory supplied)
G ¾" Pipe union (Field supplied)

4.7.1. Making piping connections

Support piping by proper suspension method. Piping must not rest on or be supported by boiler. Use Teflon tape to connect pipe work. Leave 2 end threads bare.

⚠ CAUTION

Use only yellow Teflon tape (CSA4-90, UL listed) that is approved for gas use.

4.7.2. Gas connection

⚠⚠ WARNING

- Close the main gas valve before starting work on the gas pipes.
- Before mounting, check that the gas meter has sufficient capacity. To do this, you should keep in mind the consumption of all appliances.
- If the gas meter has too low a capacity, inform the gas/utility supply company.

Make gas connections in accordance with codes CAN/CSA B149.1 and 2 or National Fuel Gas Code ANSI Z223.1/NFPA 54, as well as local codes.

1. Connect the gas pipe to the pre-assembled gas shut off valve under the boiler (NPT side).
2. Once connected, close gas shutoff valve on boiler.
   Refer to current CAN/CSA B149.1 and 2 or National Fuel Gas Code ANSI Z223.1/NFPA 54, as well as local codes for gas piping requirements and sizing. Pipe size to the boiler must be determined based on:
   - Pipe length
   - Number of fittings
   - Type of gas used
   - Maximum input requirements of all gas appliances in the residence. Design piping layout in such a way that piping does not interfere with serviceable components.
3. Before connecting boiler to gas line, install ground joint union, capped drip leg and a manual equipment shutoff valve as shown. (Valves must be listed by a nationally recognized testing agency).
4. Make boiler gas connection. Support piping by proper and accepted methods. Boiler must never carry the weight of the piping system.
5. Perform gas piping pressure test (Maximum gas supply pressure is 14"w.c/0.5 psig).
6. When performing the gas piping pressure test, the gas supply pressure should be equal to or less than 14"w.c/0.5 psig. Isolate the boiler from the gas supply system by using the installed shut-off valves. If the gas supply pressure is greater than 14"w.c/0.5 psig, the boiler must be disconnected from the gas supply system piping.
7. Ensure that no noticeable pressure drop occurs in the gas supply line when all appliances connected to it are operating.
8. When performing the leak test, use approved liquid solution for the bubble test. Ensure that no liquid comes in contact with any electrical components, wires or connectors. Do not allow the leak detection fluid to come in contact with the gas valve or regulator.
9. Correct any and all deficiencies.
10. Purge any air from the gas lines and the system.
11. Identify shutoff valves as such with a tab and familiarize operator/ultimate owner of boiler with these valves.

4. Installation

⚠⚠⚠ DANGER

The gas supply piping must be leak tested before placing the boiler in operation. Never check for gas leaks with an open flame. Carry out the leak test according to good engineering practices.

⚠ CAUTION

- Ensure that there is no dust in the gas pipe.
- We recommend installing a gas filter on the gas pipe to prevent clogging of the gas valve unit.
- Connect the gas pipe in accordance with prevailing codes and regulations.
- Exposing the gas valve and regulator to extreme pressures will render the warranty null and void.

Operating Instructions

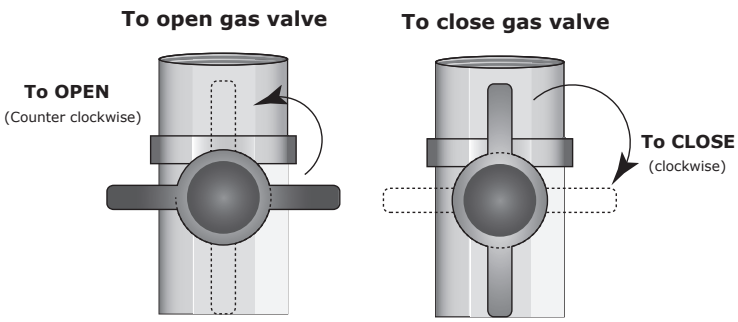
⚠ CAUTION

Start up of boiler is only possible ofter complete installation & approval by your local inspector. This inculdes water, gas, electrical and flue systems.

1. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
2. Set room thermostat(s) to lowest setting. Verify external manual gas valve is open (valve handle parallel to gas piping).
3. Turn OFF all electrical power to the appliance.
4. Turn boiler manual gas valve knob counter clockwise ↶ to open gas supply
5. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, **STOP!.**

What to do if you smell Gas

- Evacuate all people.
- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.



If you don't smell gas, go to the next step.

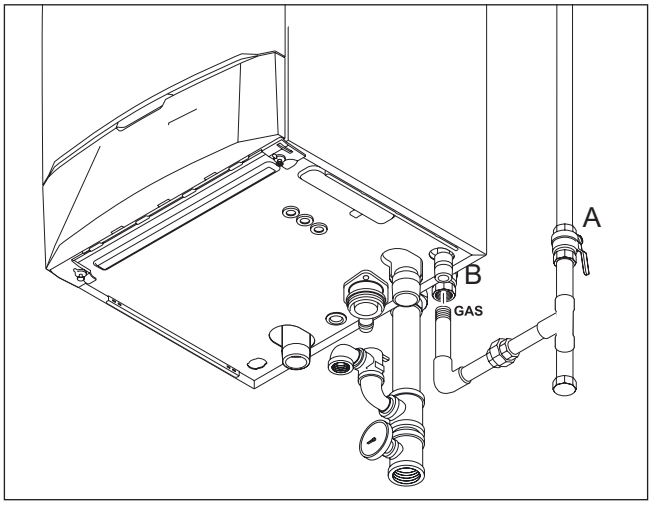
8. Turn ON all electrical power to the appliance.
9. Set thermostat(s) to desired setting.
10. The control display will show symbols and text describing the status of the boiler as it proceeds through its operating sequence. "Standby" status means there is no call for heat. A faucet or flame symbol on the display means the boiler is firing.
11. If the appliance will not operate when there is a call for heat and piping is not hot, follow the instructions "to turn Off Gas To Appliance" below and call your service technician or gas supplier.

To turn off gas to the appliance

1. Set room thermostats to lowest setting.
2. Turn OFF all electrical power to the appliance.
3. Close external manual gas valve (valve handle perpendicular to gas piping). Remove boiler access door. Turn boiler manual gas valve knob clockwise ↷ to close gas supply.
4. Replace boiler access door.

4.7.3 Installation procedure for gas valve

Step 1 Remove anti dust plug.
Step 2 Apply yellow Teflon tape (type Milspec A-A-58092 for gas only) to male thread.
Step 3 Tighten gas valve onto ½" NPT thread using a pipe wrench.
Step 4 Ensure tight fit and no damage to shut-off lever.



A Gas shut-off valve (Field supplied)
B Gas shut-off valve (Factory supplied)

4.8 Connections for the air and flue pipes

4.8.1. General

The MCA Pro boiler is suitable for sealed combustion air. The boiler vent collar is equipped with a 3" or 4" adapter suitable for imperial size air and flue systems. Sealed combustion terminals should comply with the local and national codes. Any horizontal pipe-work in the flue gas discharge system should slope towards the boiler. Horizontal pipe-work in the air supply system should slope towards the supply opening and may require a drain point at the low point. Care should be taken when locating flue exit positions as a vapor plume will be visible when the boiler is operational (Flue gas temperature may be less than 133ºF/56ºC resulting in the water vapor condensing out on contact with the air).

⚠ CAUTION

Always follow the Installation instructions supplied with the venting system.

■ **Vent pipe connection**

The boiler vent collar is a double assembly 3" or 4" PVC/CPVC Schedule 40 vent pipe (A).

i Use a converting adapter to connect imperial sized piping to the metric sized vent collar.

3"	MCA Pro 35/45
4"	MCA Pro 65/90/115

4.8.2. Flue gas venting

Use only Certified category II (Negative vent pressure) and Category IV (Positive vent pressure), metallic or non- metallic vent material. Plastic vent material (CPVC/PVC/PP) can be used where local/national codes allow.
Special vent connector adapters are required: Consult the vent supplier or DDR Americas Inc. for assistance.

- In Canada: Vent types must be an approved type ULC S636 type BH non metallic or metallic vent system.
- In USA:ULC S636 and/or UL1738 approved vent types (non metallic solid PVC, CPVC or othe approved non metallic vent system), or an approved stainless steel vent system.

This boiler is factory set for the use of UL1738 or ULC-S636 approved PVC venting material. To protect the venting system for too high flue temperatures this boiler is equipped with a flue temperature sensor. This sensor will limit the boiler to the maximum allowed flue temperature of PVC, 65°C. If the boiler will be installed with other (higher qualified) venting material the flue temperature limit parameter should be changed to the maximum allowed flue temperature of the venting material, see table:

Venting allowable	Max. Material temp allowable		Flue temp. Limit parameter	
	°F	°C	°F	°C
PVC	149	65	149	65
CPVC	194	90	194	90
PP	248	120	230	110
SS	600	315	230	110

⚠⚠ WARNING

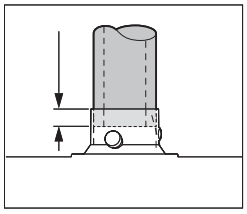
It's not allowed to use venting systems other than ULC-S636 and/or UL1738 certified venting materials!

⚠⚠⚠ DANGER

When using either PVC, CPVC, Polypropylene or stainless steel venting the components must be certified according to ULC-S636 and or UL1738. Read the Installer and Service Manual prior to installing. Failure to follow the instructions in the manuals could lead to death, serious personal injury and or substantial product and or property damage.

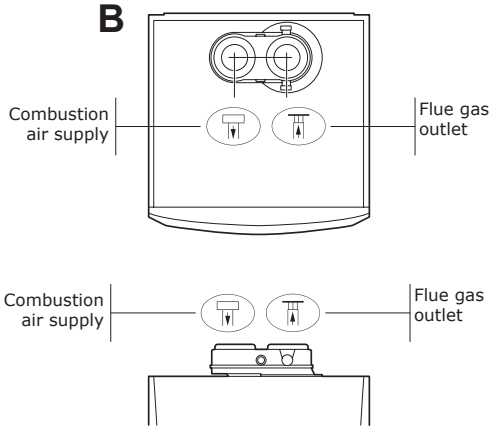
A

ø 3"/ 80 mm
ø 4"/100 mm



Concentric adaptor is optional and not supplied with boiler

B



Standard 2 pipe adaptor supplied with boiler suited for imperial size certified PVC/CPVC flue systems.

Venting/air piping – general

⚠⚠⚠ DANGER

The MCA Pro boiler cannot be installed into a common vent with another appliance. Doing so will result in flue gas leaking or a malfunction of the appliance which will result in death, serious injury or substantial product/property damage.

⚠⚠ WARNING

After an existing boiler is removed, the existing common venting system may be too large for the connected remaining appliance.

⚠⚠⚠ DANGER

If the information in this manual is not followed exactly, the result can be leaking flue gas and carbon monoxide emissions which may cause death or severe personal injury.

Removal of an existing boiler from a common vent system

The MCA Pro boiler cannot be common vented with other appliances. When replacing an existing boiler with the MCA Pro boiler, the MCA Pro cannot be connected to the existing common vent. As outlined in this manual, the MCA Pro needs its own venting and air piping. There may be a problem for the existing appliances on the common vent as it may be too large. To check for proper operation of the existing appliances, perform the following test on the common vent system.

Verification of the existing vent system

During the removal of an existing boiler, adhere to the following steps for each of the remaining appliances still connected to the common vent system and placed in operation while the non-operational are still connected to the common vent system. Any unused openings in the common vent system have to be sealed.

Testing the existing vent

This test is intended to help determine whether the existing appliances that remain on the existing vent system will operate in a satisfactory manner.

1. Inspect and verify that the venting system is sized properly, has the correct pitch, no leak, corrosion, no restriction or blockage, or any other deficiency that can cause unsafe conditions.
2. To test the vent system. Close all windows and doors in the building that are between the area where the remaining existing appliance is connected to the common venting system and the other areas of the building. Next turn on the clothes dryer and any other appliances not connected to the common vent system. Turn on any bathroom exhausts, range hoods and any other exhaust fans to their highest setting so that they are operating at the maximum setting or speed. Close the fireplace dampers. Do not operate the summer exhaust fan.
3. The appliance being inspected will now be placed into operation. Follow the lighting instructions and adjust the thermostat in order for the appliance to operate continuously.
4. Once the main burner has been operating for 5 minutes, test the drafty hood for spillage with the help of the flame from a candle, match or smoke from a pipe, cigar or cigarette.
5. After following this testing procedure and once it has been verified that the remaining appliances that are connected to the common vent system properly vent, all windows, doors, clothes dryer, fireplace dampers, exhaust fans and any remaining gas-burning appliances can be returned to their pre-test state.
   If any improper common vent system operation shall be corrected in order for the installation to conform with the National Fuel Gas Code ANSI Z223.1, latest edition. Use the appropriate tables in Part II of the code in order to correct or re-size to the required minimum size.
   Installations in Canada must comply with the B149.1 or B149.2 Installation Code.

⚠⚠⚠ DANGER

Combustion air must be piped to the boiler air intake.

Follow the instructions in this manual for the installation of the air inlet piping for the MCA Pro boiler.

To ensure that the flue products are not able to enter the air intake, follow the vent outlet instructions outlined in this manual and adhering to the clearances and geometry when installing the air termination fittings.

The combustion air cannot contain any of the contaminants next page. For example, do not pipe the combustion air near a swimming pool and avoid areas that are subject to fumes from laundry facilities as these areas contain contaminants.

Combustion air that is contaminated will damage the MCA Pro boiler which could possibly result in death, serious injury or substantial product/property damage.

Combustion sources and ventilation air contaminants

Contaminants are likely to be found in these areas:
- Auto body shops
- New construction
- Metal manufacturing plants
- Swimming pools
- Refrigeration repair shops
- Garages with workshops
- Furniture refinishing shops
- Plastic manufacturing plants
- Hobby rooms and remodelling areas
- Dry cleaners and laundromats
- Photo processing companies
- Beauty salons

Contaminants found in various products:
- Paint and varnish removers
- Chlorinated cleaners and waxes
- Glues and cements
- Swimming pool chemicals containing chlorine
- Refrigerant leaks
- Water softener salt containing sodium chloride
- Cleaning products such as chlorine-based bleaches, detergents and cleaning solvents
- Spray cans containing chlorofluorocarbons
- Muriatic and hydrochloric acid
- Calcium chloride utilized in thawing
- Permanent wave solutions
- Adhesives utilized for building products and other similar items
- Fabric softeners used in clothing dryers

⚠⚠⚠ DANGER

Follow the instructions in this manual for piping the combustion and ventilation air for the MCA Pro boiler.
Each boiler must have its own vent. Never common vent with any other appliance as outlined on page 43.
Thoroughly inspect the completed air and vent piping to verify that all are airtight and in compliance with all the requirements of applicable codes.
A failure to install and provide a properly installed air and vent system will result in death, serious injury or substantial product/property damage.

⚠⚠⚠ DANGER

All installations must be in compliance with the National Fuel Gas Code ANSI Z223.1 for installations in the US, and B149.1 0r B149.2 for installations in Canada.

⚠⚠⚠ DANGER

Only use the materials listed in this manual for the air pipe, vent pipe and fittings. If this information is not followed exactly, it could result in death, serious injury or substantial product/property damage.

⚠⚠ WARNING

If a masonry chimney is to be used, it can only be used as a pipe chase for air and vent pipes.
The installation instructions in this manual must be followed for the air and vent piping and all joints must be sealed. The MCA Pro boiler must be the only appliance using the chimney and no other appliance or fireplace can be connected to the chimney.
The air and vent piping must be in compliance with the instructions in this manual and the chimney must be straight with no elbows.
There must be a sealed access opening so that the interior of the chimney can be inspected.
An annual inspection must be performed to verify the condition of the chimney and the liner.
If this information is not followed exactly, it could result in death, serious injury or substantial product/property damage.

Piping for combustion air
1. Combustion air must be piped to the boiler from the outside as per the instructions in this manual and also in compliance with all national and local codes having jurisdiction. Refer to the section regarding combustion sources and ventilation air contaminants on page 8 to ensure that the air intake pipe will not be drawing in contaminated air.
2. Each boiler must have its own combustion air piping. The air piping always has to terminate on the same side or roof of the building as the vent.

Vent piping
1. The flue gases from the boiler must be piped from the boiler to the outside as per the instructions in this manual and also in compliance with all national and local codes having jurisdiction. The termination of the vent pipe must be either sidewall or through the roof and positioned with the correct distance and separation from the air termination. Refer to the sidewall termination diagram and corresponding instructions on page 46 or 47 or 48.
2. Do not common vent the MCA Pro boiler. Each boiler must have a separate vent.

Air and vent piping materials
1. Refer to the table on page 34 and 39 for the approved air and vent piping materials.

4. Installation

Air and vent piping termination options
1. The MCA Pro 35/45 are shipped with a 3”/80 mm size kit.
2. The MCA Pro 65/90/115 are shipped with a 4”/100 mm size kit.
3. For any other required parts and termination options, refer to page 44.

Air and vent pipe requirements
Refer to the chart below for the air and vent pipe diameters.

Boiler Model	3” Plastic or 3” AL29-4C	4” Plastic or 4” AL29-4C
35/45	Yes	No
65	Yes (with adapter)	yes
90	No	Yes
115	No	Yes
Where required, use the apropriate adapters. The MCA Pro 35 to 45 requires 3”, MCA Pro 65 to 115=4" OD pipe at the boiler air and vent connections.		

Air and vent minimum length
The air and vent pipe each must be at least 2 feet long.

Air and vent pipe installation procedure
1. Install the MCA Pro boiler.
2. Determine the type of termination - vertical or sidewall, separate pipes or concentric, etc.
3. Determine the proper location for roof or wall penetration for each termination.
4. Install the termination assembly as per the instructions in this manual.
5. Install the air and vent piping from the boiler to the termination.
6. Install the pipe supports and brackets, if required.

Commonwealth of Massachusetts
If the boiler is installed within the Commonwealth of Massachusetts it must:
- Be installed by a professional licensed heating contractor, licensed plumber or gas fitter.
- Refer to page 46 or 47 or 48 for sidewall vent air installations.

⚠⚠ WARNING

Where the pipe size is different from the termination connections, pipe adapters will need to be provided, if necessary, and for all the AL29-4C Verne pipe connections at the termination and at the boiler.

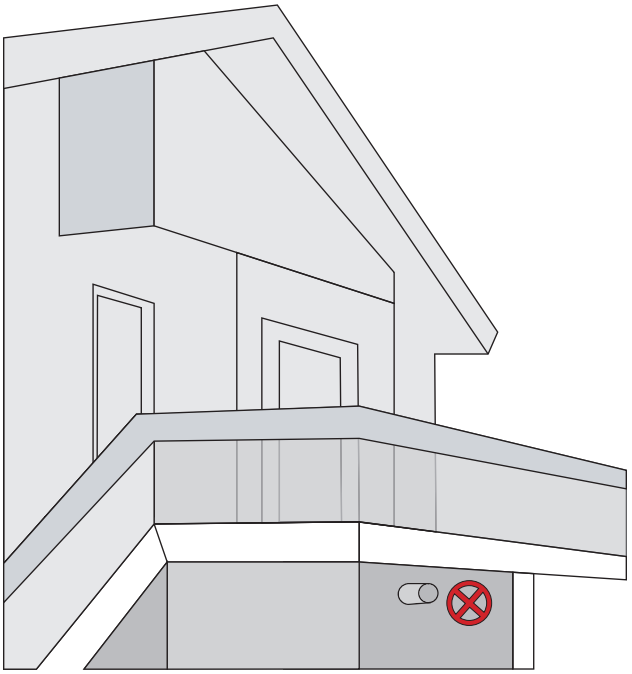
Allowable air and vents materials
Only use the materials that are listed on page 34 + 39.

Maximum pipe length
1. Position the termination in such a way that the total air and vent piping from the boiler to the termination does not exceed the maximum length shown on page 45 to 50.

Connection from the boiler to the termination
Read the following instructions on how to install the termination.
Determine the location for the termination cap

⚠⚠⚠ DANGER

A gas vent which extends through an exterior wall cannot terminate next to the wall or below any building extensions such as balconies, eaves, decks or parapets. Failure to heed this warning could result in death, severe personal injury or substantial product/property manage.



1. Use the following guidelines to position the air/vent termination.
2. The surroundings must be taken into consideration when termination the air and vent:
   a. The vent termination must be positioned in such a way as to avoid damaging nearby bushes, air conditioning equipment, plants and be aesthetically pleasing.
   b. When the air is cold, there will be a noticeable plume produced from the flue gas product. Avoid any areas where the plume could be an obstruction to a window view.
   c. Where the flue products impinge on plants or the building surface, prevailing winds could cause freezing of the condensate and possible water/ ice build-up.
   d. Avoid any possibility of people and pets accidentally coming in contact with the flue products.
   e. Never locate the air or vent terminations in areas such as stairwells, window wells, inside building corners, courtyards, near adjacent buildings or surfaces, alcoves, or other recessed areas.
   f. Never terminate under a deck or above any door or window. Ice formations can be caused by the condensate freezing.
   g. The vent should be positioned or guarded in such a way that it prevents condensate damage to the exterior finishes.
3. Ensure the clearances on page 44 are maintained and the following must also be adhered to:
   a. The vent must terminate:
      - A minimum of 6'/2 m from any adjacent wall.
      - A minimum of 7'/2.1 m above any public doorway.
      - No closer than 5'/1.5 m below a roof overhang.
      - A minimum of 3'/1 m above any forced air intake within a 10'/3 m distance.
      - No closer than 12"/305 mm below or horizontally from any window, door, or any other gravity air inlet.
   b. The air inlet must have at least a 12"/305 mm clearance above the grade or snow line.
   c. A minimum distance of 4'/1.2 m horizontally, above or below, must be kept from any electric meter, regulator, relief valve, gas meter, or any other equipment.
4. Ensure that the terminations are located in areas where they are not going to be damaged by foreign objects such as stones, balls, or subjected to the build-up of sediment or leaves.

Multiple air/vent terminations

1. For the termination of more than one MCA Pro boiler, ensure that the instructions in this manual are followed for each air/vent termination connection.

⚠⚠⚠ DANGER

All of the air inlets and vent pipes must be terminated at identical heights to avoid the possibility of death, severe personal injury or substantial product/property damage.

1. Follow the instructions and example on page 44 in order to obtain the minimum clearance required for US installations. For the Canadian installations follow the required clearances as per the CSA B149.1 or B149.2 Installation Code.
2. The MCA Pro air inlet is part of a direct vent connection and as such is not classified as a forced air intake with regards to the spacing from any adjacent boiler vents.

4.8.3 Use only the materials listed below, ensuring that all materials meet national and local codes having jurisdiction

<table>
<tr><th rowspan="2">Item</th><th rowspan="2">Material</th><th colspan="2">Standards for installations in:</th></tr>
<tr><th>United States</th><th>Canada</th></tr>
<tr><td colspan="4">Plastic piping materials</td></tr>
<tr><td rowspan="2">Vent or Air pipe and fittings</td><td>PVC schedule 40</td><td rowspan="4">UL1738 and / or ULC-S636</td><td rowspan="4">Plastic vent pipe must be certified to ULC S636 when required (Note2)
Air pipe can be any of those listed at left if acceptable for local codes</td></tr>
<tr><td>CPVC schedule 40 (Note 1)</td></tr>
<tr><td rowspan="2">PVC & ABS pipe cement & primer</td><td>PVC</td></tr>
<tr><td>CPVC (Note 1)</td></tr>
<tr><td>Polypropylene vent pipe, fittings, terminations and cement</td><td>Obtain all materials from:
• M&G (Simpson-Duravent)</td><td>UL1738 and / or ULC-S636</td><td>ULC S636</td></tr>
<tr><td colspan="4">AL29-4C Stainless steel piping materials</td></tr>
<tr><td colspan="4">De Dietrich stainless steel bird screens, 2” or 3” (purchase separately)</td></tr>
<tr><td colspan="4">Note 1: De Dietrich concentric vent kits are made from PVC pipe and fittings (Manufacturer: IPEX)
Note 2: IPEX PVC concentric terminations utilize PVC pipe/fittings certified to ULC S636. Where ULC S636 compliance is required, use only IPEX System 636 pipe, fittings and cement.</td></tr>
</table>

⚠⚠ WARNING

Do not mix piping from different pipe manufacturers unless using adapters specifically designed for the purpose by the manufacturer.

⚠⚠ WARNING

Do not use cellular core pipe.

4. Installation

Exhaust Vent Material-Canada

Use CPVC or Polypropylene (PP) vent component systems approved under ULC-S636 Standard for Type BH Gas Venting Systems, or stainless steel Type BH venting systems*. Permitted PP materials comprise single wall rigid pipe and fittings and flexible. Ensure compliance with exhaust temperature limitations for the respective materials, which typically are:

- ULC-S636 CPVC: 194°F / 90°C
- ULC-S636 PP: 230°F / 110°C

In the standard configuration, MCA Pro series boilers can supply water temperatures up to 170°F.

Exhaust Vent Materials-USA

De Dietrich requires that only certified CPVC, PP and PVC vent component systems approved under ULC-S636 and/or UL17838 Standard for type BH Gas Venting System, or stainless steel type BH venting systems* are to be used

Many local jurisdictions in the USA allow the use of PVC (Sch.40 ASTM D 1785 or D2665 and fittings). If PVC vent pipe is to be used, it must be ULC-S636 and/or 1738 certified material.
Standard configration for the MCA Pro boiler with PVC venting will allow a maximum of 170°F.

Do not use ABS or any cellular core pipe for exhaust venting.

The boiler offers venting connections (3" for MCA Pro 30/45, and 4" for MCA Pro 65/90/115). Fittings are to be used to adapt to the appropriate diameter-see Vent Travel below. Exhaust venting is to be inserted directly into the 4".

For PP material, use either a 3" transition/adapter (MCA 35/45) or a 4" transition/adaptor fitting (Sch 40 to PP) (MCA Pro 65/90/115) offered by the PP manufacturer M&G Dura Vent/PolyProTM (#4PP-AD). For PP material exposed to outdoor weather, follow the venting supplier's recommendations on UV protection.

Venting shall be supported in accordance with national and local codes having jurisdiction.

* Manfacturers of stainless steel Type BH venting systems must submit their approved transition fitting to DDR Americas Inc. for evaluation and written approval.

⚠⚠⚠ DANGER

Only ULC-S636 and/or UL1738 certified venting materials are allowed for MCA Pro boiler

This boiler is factory set for the use of UL1738 or ULC-S636 approved CPVC and PVC venting material. To protect the venting system for too high flue temperatures this boiler is equipped with a flue temperature sensor. This sensor will limit the boiler to the maximum allowed flue temperature of 65°C. If the boiler will be installed with other (higher qualified) venting material the flue temperature limit parameter should be changed to the maximum allowed flue temperature of the venting material, see table:

Material	Max. allowed flue temp.	Flue temp. Limit parameter
PVC	65°C / 149°F	65°C / 149°F
CPVC	90°C / 194°F	90°C / 230°F
PP	120°C / 248°F	110°C / 230°F
SS	315°C / 600°F	110°C / 230°F

4. Installation

Venting and combustion air piping—Direct vent only: Options and piping limits

NOTICE: The table below lists the acceptable vent/combustion air pipe material described in this manual. Follow all instructions provided by acutal vent maufacturer. For these applications, use ONLY the manufacturers' parts listed.

Maximum vent and combustion air pipe length as per page 45-50 (minimum length for all applications is 2 feet)

Approved plastic exhaust venting material		
Material	**Standards for installation in:**	
	United States	**Canada**
PVC schedule 40/80	UL1738 and/or ULC-S636	ULC-S636**
CPVC Schedule 40/80		ULC-S636**
PP		ULC-S636**
		** Note: IPEX is an approved Manufacturer in Canada supplying vent material listed to ULC-S636
Approved plastic intake venting material		
Material	**Standards for installation in:**	
	United States	**Canada**
PVC-cellular foam Core*		
PVC DWV		
PVC schedule 40/80	UL1738 and/or ULC-S636	ULC-S636**
CPVC schedule 40/80		ULC-S636**
PP		
		N/A
		N/A
*Note: Cellular Foam Pipe must only be used on INTAKE piping		**Note:IPEX is an approved Manufacturer in Canada supplying vent material listed to ULC-S636
Approved plastic condensate piping material		
Material	**Standards for installation in:**	
	United States	**Canada**
PVC schedule 40/80	UL1738 and/or ULC-S636	ULC S636**
CPVC schedule 40/80		**Note: IPEX is an approved manufacturer in Canada supplying vent material listed to ULC-S636

4. Installation

Approved plastic condensate piping material		
Material	**Standards for installation in:**	
Cement and Primer	**United States**	**Canada**
CPVC	UL1738 and/or ULC-S636	IPEX system 636 Cements and Primers
PVC		
Approved metalic exhaust venting material		
Material	**Standards for installation in:**	
	United States	**Canada**
AL29-4C	UL listed	UL listed
Approved metalic intake venting material		
Material	**Standards for installation in:**	
	United States	**Canada**
"B" Gas Vent	UL listed	UL Listed
Galvanized	UL Listed	UL Listed

WARNING: All elbows in vent and air combution piping must be long sweep elbows ONLY. DO NOT use short-radius elbows.	
Equivalent feet for elbows (USE LONG SWEEP ELBOWS ONLY)—deduct from max equivalent length of piping (do not apply to termination fittings). 7 feet per for each additional 3-inch 90° sweep elbow or 45° elbow –if piping contains more than 2 elbows in air or vent piping	
Note 1:	Material abbreviations: PP=polypropylene, SS=AL29-4C stainless steel When using polypropylene or stainless pipe, provide adapters for 3” or 4" boiler connections and for terminations, when required IPEX 3” PVC concentric vent kits can be used with standard PVC pipe, fittings and cement (ANSI/UL1738) except where ULC-S636 compliance is required. For ULC-S636 compliance, all pipe, fittings and cement must be IPEX system 636. Contact De Dietrich for ordering information and availability of De Dietrich venting kits.

⚠⚠ WARNING

USE LONG SWEEP ELBOWS FOR ALL VENT AND AIR COMBUSTION PIPING –DO NOT use short radius elbows for vent or air piping. Boiler performance could be affected

⚠⚠ WARNING

ALL vent and air pipes require a BIRDSCREEN at each termination. Most kits do not include the bird screens. Purchase bird screens separately from De Dietrich or vent kit supplier if not included.

⚠⚠⚠ DANGER

In the standard configuration the MCA Pro series boiler can supply water temperatures up to 170°F, when using a PVC flue system. A proper anti- legionella functionality cannot be guaranteed when the MCA Pro boiler is used in conjection with PVC venting system.

Combustion air supply requirements

The boiler must be provided with an adequate combustion air supply, the combustion air supply requirements must be determined and sized in accordance to national and local codes having jurisdiction.
CSA B148 & ANSI Z223.1 - More than one combustion air source may be required. Combustion air inlet vent must terminate with either an approved termination or a 90º elbow and must be provided with a debris/bird-rodent screen.

⚠ CAUTION

The boiler requires a clean, fresh and adequate supply of combustion air. Failure to provide sufficient combustion air supply will result in carbon monoxide (CO) production that could lead to personal injury including loss of life or damage to boiler or property. Do not store any flammable liquids, fluids, vapors or materials near the vicinity of the boiler.

Special attention

- Quality of combustion air
- Dust, fumes, corrosive elements, hydrocarbons, other unknown containments
- Paint, beauty, automotive, shops

Air supply structure

The air supply pipe must be airtight. Horizontal sections in the air supply must slope away from the boiler towards the supply opening and incorporate a drain connection if the route rises from a lower point. It is necessary to provide an easily removable air vent for maintenance reasons.

Combustion air vent materials

Use metallic (aluminum or stainless steel) and non metallic types of materials that comply with the construction requirements of UL 181 or ULC S-110, Class 1.

⚠⚠ WARNING

The boiler should never be operated in a negative building pressure. Caution should be exercised with exhaust fans, air handling and other devices, that could affect the buildings air pressure or combustion air supply. All venting must be arranged to avoid and prevent the accumulationof flue gas condensation.

⚠⚠ WARNING

An improperly sealed venting system could result in carbon monoxide poisoning; ensure adequate support and fastening of the system. Ensure venting can safely exhaust all flue gases to the outside in a safe and effective manner. Do not puncture or drill holes in any portion of the venting, the boiler is equipped with a pressure and emission test port.

Co-venting - Retrofitting

⚠⚠ WARNING

- This boiler must not be co-vented with a category I or III appliance.
- Do not co-vent the boiler, when venting the boiler either direct vent (sidewall) or in sealed combustion venting application.

At the time of removal of any existing boiler from a common vent system, the following steps shall be performed with each remaining appliance connected to the common vent in operation and not in operation. The boiler must have a vent damper installed when coventing with other appliances.

a. Any used opening of the vent system be properly sealed.
b. Visually inspect the venting system for proper size and horizontal pitch. Determine there is no blockage, restriction, leakage, corrosion and other deficiencies that could cause an unsafe condition.
c. Close all building doors, windows and all doors between the appliances which remain connected to the common venting system and other space of the building. Turn on clothes dryers, exhaust fan at maximum speed and any appliance not connected to the common vent system, close fireplace dampers. Do not operate a summer exhaust fan.
d. Place in operation each of the appliances installed in the common vent system being inspected. Follow the lighting instructions. Adjust thermostat so appliance will operate continuously.
e. Test for spillage near and around each of the gas appliances after 5 minutes of main burner operation.
f. After determining that each appliance remains connected to the common venting system properly vents when tested as outlined above, return all doors, windows, exhaust fan, fireplace dampers and any other gas burning appliance to their normal positions.
g. Any improper operating of the venting system must be corrected so the installation conforms to both ANSI Z223.1/NFPA 54 or CAN/ CSA B149.1 gas installation codes. When resizing any portion of the common venting system, the common venting system shall be resized to approach the minimum size as determined using the appropriate tables in Part II of ANSI Z223.1/NFPA 54 gas code and/ or CAN/CSA B149.1 natural gas and propane installation code.

4. Installation

Vent terminations installation precautions

Consult national and local codes for other requirements

- All exhaust terminations for conventional chimney must be finished with a finishing cone with tapered end, with a bird/rodent screen.
- All sidewall vented and sealed combustion systems must be finished with TEE termination.
- Combustion air inlet vent must terminate with either an approved termination or a 90º elbow and must be provided with a debris/bird-rodent screen.
- All terminals shall be arranged to avoid and prevent the accumulation of flue gas condensation.

⚠⚠ WARNING

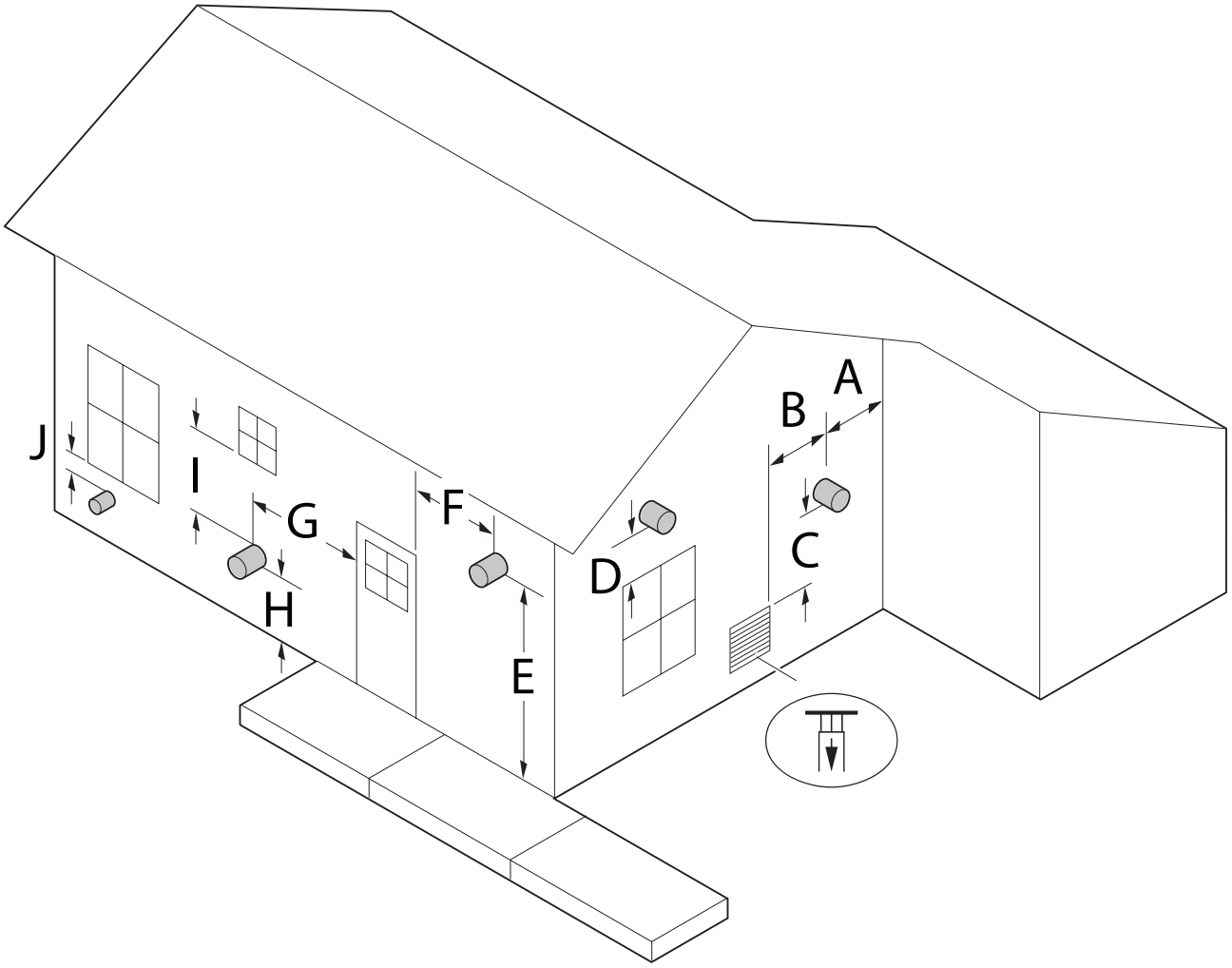
In all installations avoid vent termination locations where excessive debris or snow could accumulate leading to blocking of the vent terminals or where prevailing winds and rain could enter the vent terminal creating additional resistance to the venting system.

A	Minimum distance 3 ft/1 m	G	Minimum distance 3 ft/1 m
B	Minimum distance 10 ft/3 m	H	Minimum distance 12"/30 cm
C	Minimum distance 3 ft/1 m	I	Minimum distance 4 ft/1.2 m
D	Minimum distance 12"/30 cm	J	Minimum distance 12"/30 cm
E	Minimum distance 7 ft/2.1m		Forced air inlet
F	Minimum distance 4 ft/1.2m		

Vent terminals should not being installed where the building exterior could be tarnished from the flue gases, a shield or another location should be considered.
Terminals shall not be less than 2"/50 mm from the wall surface or more than 10"/254 mm from the center line of the terminal to the wall. For high traffic locations, the vent terminal shall be guarded.

According to the national gas codes CSA B149/ANSI Z223.1/NFPA 54 a vent shall not terminate:

- Directly above a paved walkway or driveway which serves two or more buildings or where the flue gas condensation or vapor could create a hazard or improper operation of regulators, relief's or valves or any other device.
- Above or below any electric or gas meter, regulators and relief devices unless a 4 ft/1.2 m horizontal clearance distance to be maintained.
- Less than 7 ft/2.1 m above any paved sidewalk or driveway.
- Less than 6 ft/1.8 m from any combustion air inlet source from any nearby building.
- Less than 4 ft1.2 m above a meter/regulator assembly horizontally from a vertical centerline of the regulator vent outlet to a maximum vertical distance of 15 ft/4.6 m
- Less than 1 ft/0.3 m above grade or normal snow level in the area is expected.
- Less than 3 ft/0.9 m from windows, doorways, and combustion air supplies nearby buildings or other appliances.
- Under a veranda, porch or deck, unless:
  - The veranda, porch or deck is fully open on at least two sides underneath.
  - The distance between the top of the terminal and the grade is greater than 1 ft/0.3 m.


A
B
C
D
E
F
G
H
I
J

4. Installation

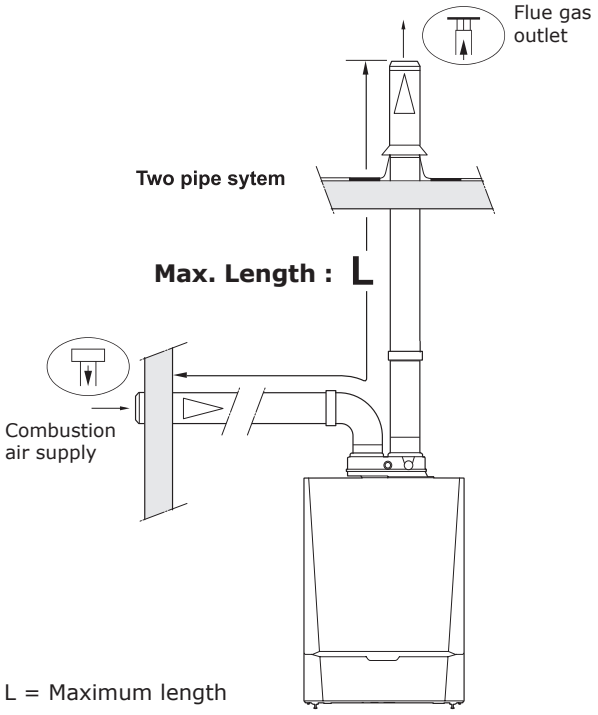
4.8.4 Lengths of the air/flue gas pipes

■ **Type 2: Sealed combustion systems applications**
Vertical or horizontal venting systems for both, the flue gases and combustion air operating at two different pressure zones or vent terminal locations.

Combustion air supply

Flue gas outlet

- Flue gas vertical termination must be tapered with a bird/rodent screen.
- Horizontal breeching proportions shall be kept to a minimum.
- Horizontal sections of the venting must slope downward towards the boiler ½" per linear foot (42mm/m) and adequate vent support must be provided.
- Horizontal sections in the air supply must slope away from the boiler towards the supply opening and incorporate a drain connection if the route rises from a lower point.
- The maximum combined length L as seen in the drawing can be found in the table.



L = Maximum length

Conventional chimney application with sealed air (two pipe system) and different pressure zones

MCA Pro	Vent ø		Max. length		Number of elbows 90° and equivalent feet/meters															
					1		2		3		4		5		6		7		8	
	in	mm	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m
35	3	80	131	40	118	36	105	32	92	28	79	24	66	20	52	16	39	12	26	8
45	3	80	131	40	118	36	105	32	92	28	79	24	66	20	52	16	39	12	26	8
65	3*	80	108	33	95	29	82	25	69	21	56	17	43	13	29	9	16	5	3	1
65	4	100	131	40	115	35	99	30	83	25	67	20	51	16	34	11	18	6	2	1
90	4	100	131	40	115	35	99	30	83	25	67	20	51	16	34	11	183	6	2	1
115	4	100	131	40	115	35	99	30	83	25	67	20	51	16	34	11	18	6	2	1

Conventional chimney application with sealed air (two pipe system) and different pressure zones

MCA Pro	Vent ø		Max. length		Number of elbows 45° and equivalent feet/meters															
					1		2		3		4		5		6		7		8	
	in	mm	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m
35	3	80	131	40	127	39	123	38	119	36	115	35	112	34	108	33	104	32	100	30
45	3	80	131	40	127	39	123	38	119	36	115	35	112	34	108	33	104	32	100	30
65	3*	80	108	33	104	32	100	31	96	29	92	28	89	27	85	26	81	25	77	23
65	4	100	131	40	127	39	122	37	118	36	114	35	110	34	105	32	101	31	97	30
90	4	100	131	40	127	39	122	37	118	36	114	35	110	34	105	32	101	31	97	30
115	4	100	131	40	127	39	122	37	118	36	114	35	110	34	105	32	101	31	97	30

* with a 4" to 3" adaptor

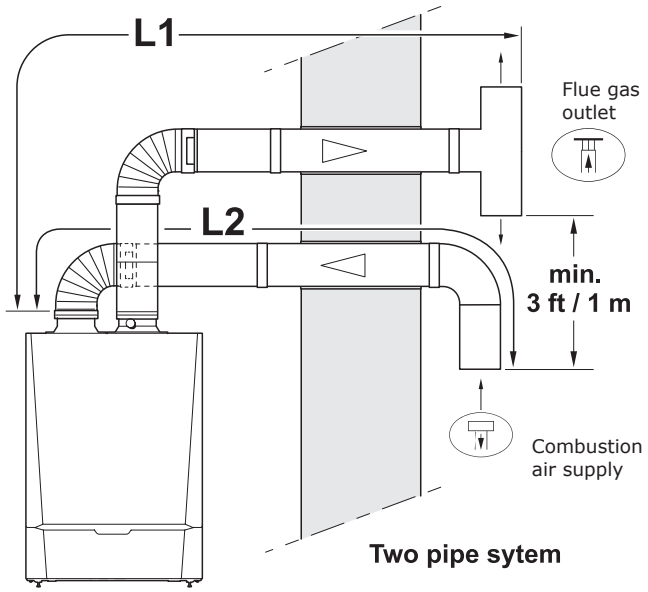
4. Installation

■ Type 3: Direct vent (side wall) applications

A horizontal vent system with a 2 pipe system. Room supplied combustion air is not allowed

Combustion air supply

Flue gas outlet



L1 Plus L2 = Maximum length

Sidewall vented with sealed combustion air (two pipe system) (L1 + L2 combined length)																				
MCA Pro	Vent ø		Max. length		Number of elbows 90° and equivalent feet/meters															
					1		2		3		4		5		6		7		8	
	in	mm	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m
35	3	80	131	40	118	36	105	32	92	28	79	24	66	20	52	16	39	12	26	8
45	3	80	131	40	118	36	105	32	92	28	79	24	66	20	52	16	39	12	26	8
65	3*	80	49	15	36	11	23	7	10	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
65	4	100	131	40	115	35	99	30	83	25	67	20	51	16	34	11	18	6	2	1
90	4	100	118	36	102	31	86	26	70	21	54	16	38	12	21	7	5	2	N/A	N/A
115	4	100	79	24	63	19	47	14	31	9	15	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

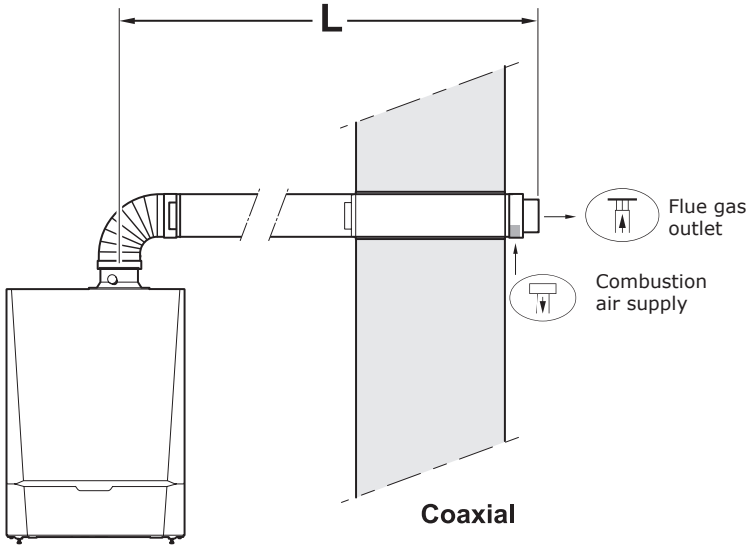
Sidewall vented with sealed combustion air (two pipe system)																				
MCA Pro	Vent ø		Max. length		Number of elbows 45° and equivalent feet/meters															
					1		2		3		4		5		6		7		8	
	in	mm	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m
35	3	80	131	40	127	39	123	38	119	36	115	35	112	34	108	33	104	32	100	30
45	3	80	131	40	127	39	123	38	119	36	115	35	112	34	108	33	104	32	100	30
65	3*	80	49	15	45	14	41	13	37	11	33	10	30	9.0	26	8	22	7	18	5
65	4	100	131	40	127	39	122	37	118	36	114	35	110	34	105	32	101	31	97	30
90	4	100	118	36	114	35	109	33	105	32	101	31	97	30	92	28	88	27	84	26
115	4	100	79	24	75	23	70	21	66	20	62	19	58	18	53	16	49	15	45	14

* with a 4" to 3" adaptor

4. Installation

■ Type 3: Direct Vent (Concentric Side Wall) application

A Concentric Vent System vented directly through a side wall



L = Maximum length

Vertical vented with sealed combustion air (coaxial)																	
MCA Pro	Vent ø	Max. length		Number of elbows 90° and equivalent feet/meters													
				2		3		4		5		6		7		8	
	in/mm	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m
35	3/5 80/125	98	30	84	26	78	24	72	22	65	20	58	18	52	16	45	14
45	3/5 80/125	98	30	84	26	78	24	72	22	65	20	58	18	52	16	45	14
65	3/5* 80/125	69	21	56	17	49	15	43	13	36	11	29	9	23	7	16	5
65	4/6 100/150	98	30	85	26	78	24	72	22	65	20	58	18	52	16	45	14
90	4/6 100/150	98	30	85	26	78	24	72	22	65	20	58	18	52	16	45	14
115	4/6 100/150	98	30	85	26	78	24	72	22	65	20	58	18	52	16	45	14

Vertical vented with sealed combustion air (coaxial)																	
MCA Pro	Vent ø	Max. length		Number of elbows 45° and equivalent feet/meters													
				2		3		4		5		6		7		8	
	in/mm	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m
35	3/5 80/125	98	30	91	28	88	27	85	26	82	25	78	24	75	23	72	22
45	3/5 80/125	98	30	91	28	88	27	85	26	82	25	78	24	75	23	72	22
65	3/5 * 80/125	69	21	62	19	59	18	56	17	53	16	49	15	46	14	43	13
65	4/6 100/150	98	30	91	28	88	27	85	26	82	25	78	24	75	23	72	22
90	4/6 100/150	98	30	91	28	88	27	85	26	82	25	78	24	75	23	72	22
115	4/6 100/150	98	30	91	28	88	27	85	26	82	25	78	24	75	23	72	22

* Additional concentric adaptor to be used

4. Installation

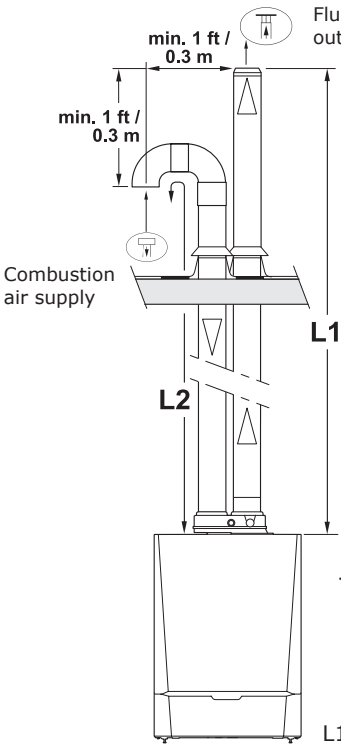
■ Type 4: Seal combustion system applications

A vertical venting system either coaxial or 2 pipe system, for the exhaust flue gases and combustion air at same termination and pressure level.

Combustion air supply

Flue gas outlet

- Two pipe system - Vent terminal shall be T type The vent terminal must be located at least 3 ft/ 1m away from the combustion air supply opening.
- Horizontal breeching proportions shall be kept to a minimum.
- Horizontal sections in the air supply must slope away from the boiler towards the supply opening and incorporate a drain connection if the route rises from a lower point.
- Horizontal sections of the venting must slope downward towards the boiler ½"/ per linear foot (42mm/m) and adequate vent support must be provided.
- The maximum length L as seen in the drawing can be found in the table.



L1 Plus L2 = Maximum length

Vertical vented with sealed combustion air (two pipe system) (L1 + L2 combined length)

MCA Pro	Vent ø		Max. length		Number of elbows 90° and equivalent feet/meters													
					2		3		4		5		6		7		8	
	in	mm	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m
35	3	80	131	40	105	32	92	28	79	24	66	20	52	16	39	12	26	8
45	3	80	131	40	105	32	92	28	79	24	66	20	52	16	39	12	26	8
65	3*	80	79	24	47	14	31	9	15	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
65	4	100	131	40	99	30	83	25	67	20	51	16	34	11	18	6	2	1
90	4	100	131	40	99	30	83	25	67	20	51	16	34	11	18	6	2	1
115	4	100	108	33	76	23	60	18	44	13	28	9	11	4	N/A	N/A	N/A	N/A

Vertical vented with sealed combustion air (two pipe system)

MCA Pro	Vent ø		Max. length		Number of elbows 45° and equivalent feet/meters													
					2		3		4		5		6		7		8	
	in	mm	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m
35	3	80	131	40	122	37	118	36	114	35	110	34	105	32	101	31	97	30
45	3	80	131	40	122	37	118	36	114	35	110	34	105	32	101	31	97	30
65	3*	80	79	24	70	21	66	20	62	19	58	18	53	16	49	15	45	14
65	4	100	131	40	122	37	118	36	114	35	110	34	105	32	101	31	97	30
90	4	100	131	40	122	37	118	36	114	35	110	34	105	32	101	31	97	30
115	4	100	108	33	99	30	95	29	91	28	87	27	82	25	78	24	74	23

* with a 4" to 3" adaptor

4. Installation

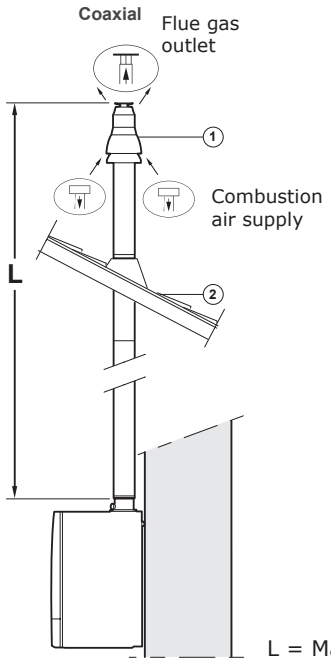
■ Type 4: Seal combustion system applications

Combustion air supply

Flue gas outlet

i

- Horizontal sections of the venting must slope downward towards the boiler ½" per linear foot (42 mm/m) and adequate vent support must be provided.
- Flue gas vertical termination shall be a tapered (finishing cone) with a bird/rodent screen.
- Combustion air vertical termination shall be equipped with a offset (gooseneck) configuration as shown with a bird/rodent screen.
- The maximum length L as seen in the drawing can be found in the table.



L = Maximum length

Vertical vented with sealed combustion air (coaxial)																	
MCA Pro	Vent ø	Max. length		Number of elbows 90° and equivalent feet/meters													
				2		3		4		5		6		7		8	
	in/mm	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m
35	3/5 80/125	98	30	84	26	78	24	72	22	65	20	58	18	52	16	45	14
45	3/5 80/125	98	30	84	26	78	24	72	22	65	20	58	18	52	16	45	14
65	3/5* 80/125	69	21	56	17	49	15	43	13	36	11	29	9	23	7	16	5
65	4/6 100/150	98	30	85	26	78	24	72	22	65	20	58	18	52	16	45	14
90	4/6 100/150	98	30	85	26	78	24	72	22	65	20	58	18	52	16	45	14
115	4/6 100/150	98	30	85	26	78	24	72	22	65	20	58	18	52	16	45	14

Vertical vented with sealed combustion air (coaxial)																	
MCA Pro	Vent ø	Max. length		Number of elbows 45° and equivalent feet/meters													
				2		3		4		5		6		7		8	
	in/mm	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m	ft	m
35	3/5 80/125	98	30	91	28	88	27	85	26	82	25	78	24	75	23	72	22
45	3/5 80/125	98	30	91	28	88	27	85	26	82	25	78	24	75	23	72	22
65	3/5 * 80/125	69	21	62	19	59	18	56	17	53	16	49	15	46	14	43	13
65	4/6 100/150	98	30	91	28	88	27	85	26	82	25	78	24	75	23	72	22
90	4/6 100/150	98	30	91	28	88	27	85	26	82	25	78	24	75	23	72	22
115	4/6 100/150	98	30	91	28	88	27	85	26	82	25	78	24	75	23	72	22

* Additional concentric adaptor to be used from M & G (Dura Vent)

4.9 Electrical Connections

4.9.1. Control unit

The boiler is not polarity sensitive. The boiler is fully pre-wired. The boiler comes with a 6'/2 m power cord, with a 3-prong power supply cable/plug. All external connections can be made on the connection terminal strip (low voltage). The main characteristics of the control unit are described in the table below.

Power supply voltage	120 VAC/60Hz
Rating of the main fuse F1	6.3 A
Fuse rating F2	2 A
Fan	120 VAC

⚠ CAUTION

Unearthed networks must be earth grounded/bonded.

⚠ CAUTION

The following boiler components are at a voltage of 120 VAC:

- Electrical connection of the heating pump (CH).
- Electrical connection of the combined gas valve unit.
- Electrical connection of the fan.
- The majority of components in the control panel.
- Ignition transformer.
- Connection of the power supply cable.

⚠ CAUTION

- When the power supply cable has to be replaced, it must be ordered from DDR Americas Inc.
- The boiler plug must be accessible at all times.

It is possible to connect various controls, safety and regulation systems to the boiler. The standard control PCB can be extended with:

☞ For the optional PCBs, see chapter: "Optional electrical connections", page 59-62

4.9.2. Recommendations

⚠⚠ WARNING

- Always make sure that the power has been turned off before starting any electrical work.
- Only qualified professionnals may carry out electrical connections, always with the power off.
- The boiler is entirely pre-wired. Do not modify the connections inside the control panel.
- Ground the boiler in accordance with the requirements of the authority having jurisdiction, or in the absence of such requirements, with the National Electrical code ANSI/NFPA 70 and or the Canadian Electrical Code Part I, CSA 22.1, Electrical Code.
- Ground the appliance before making any electrical connections.

Make the electrical connections of the boiler according to:

- The instructions of the prevailing standards
- The instructions on the electrical diagrams provided with the boiler.
- The recommendations in the instructions.

⚠ CAUTION

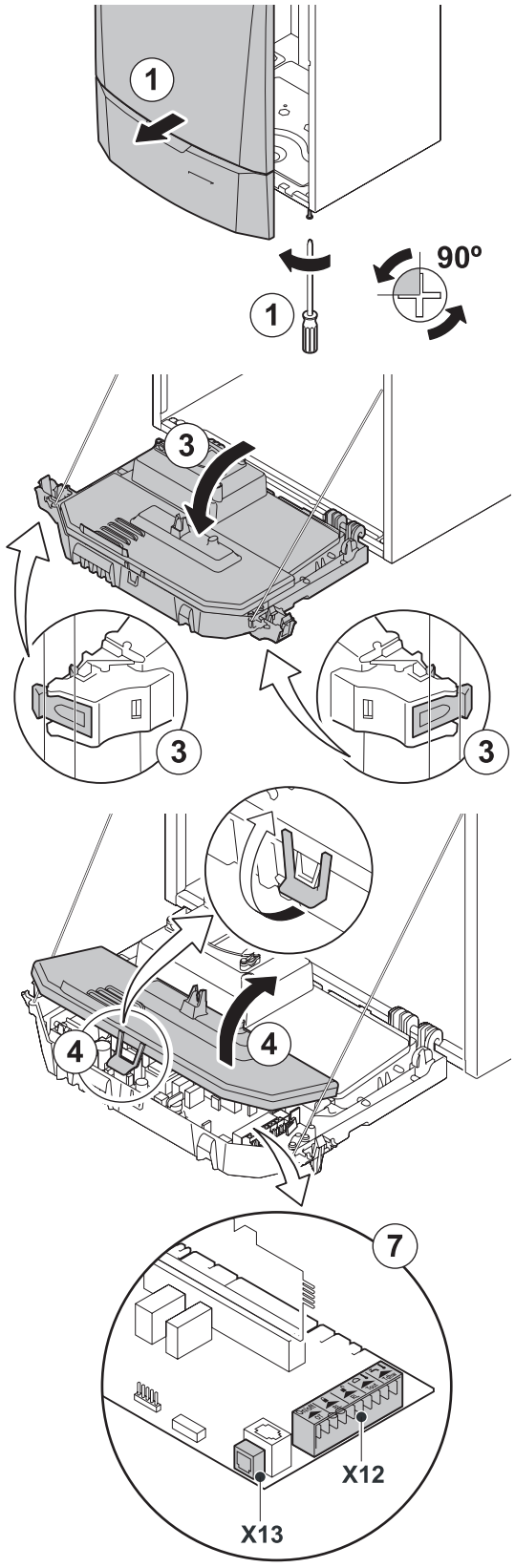
Separate the sensor cables from the 120 V circuit cables.

4.9.3. Standard PCB control

Various thermostats and controllers can be connected to the standard control PCB (PCU) (X12 connector block). Refer to 4.10.3, page 61

Access to the connector block:

1. Unscrew the two screws located under the front panel by a quarter turn and remove the panel.
2. Guide the cables from the controller or thermostat through the round grommet(s) on the right in the boiler bottom plate.
3. Tilt the control box forwards by opening the holding clips located at the sides.
4. Open the control panel cabinet by opening the clip fastener on the front side.
5. Run the connection cable(s) through the grommet(s) in the control panel cabinet.
6. Unscrew the necessary cable clamps (to access the connector block) and introduce the cables.
7. Connect the cables to the appropriate terminals on the connector block.
8. Firmly retighten the cable clamps and close the control panel cabinet.



4.9.4. Connecting the pump

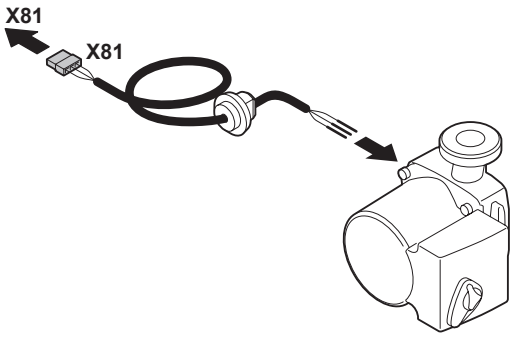
The pump must be connected to standard control PCB (PCU). To do this, proceed as follows:

⚠ CAUTION

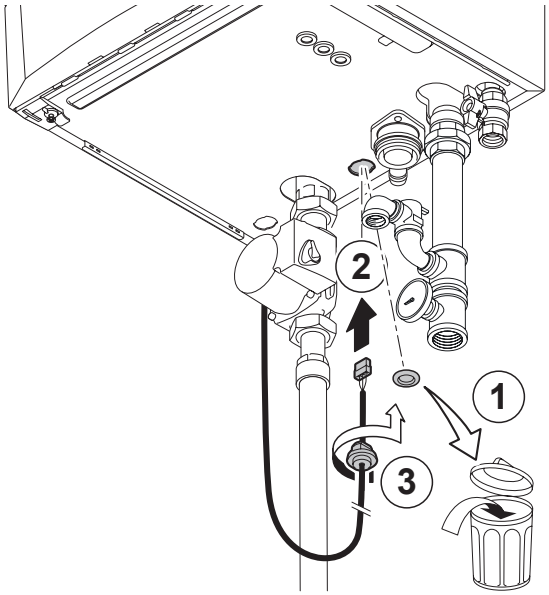
If the power consumption of the pump is more than 150 VA/0.2 FHP/1.3A, it must be connected to the SCU SO2 (Accessory)

☞ See chapter: "Connection possibilities for the PCB (SCU-S02)", page 59-62

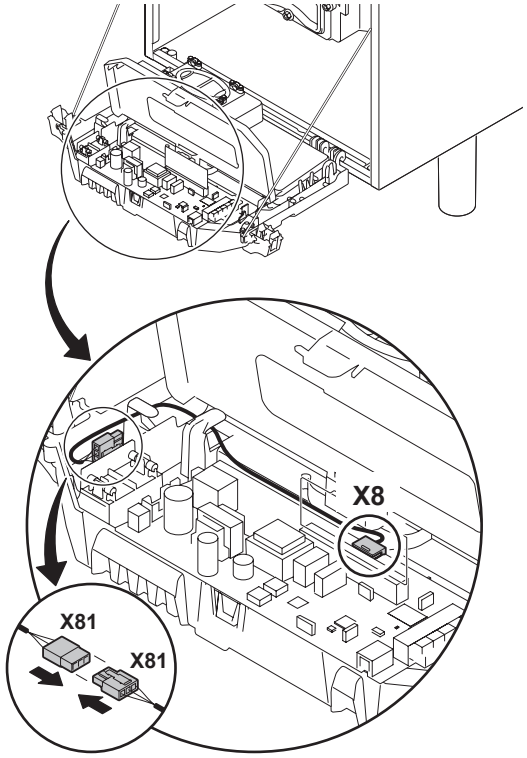
1. Connect the cable, that is delivered with the boiler, to the pump.



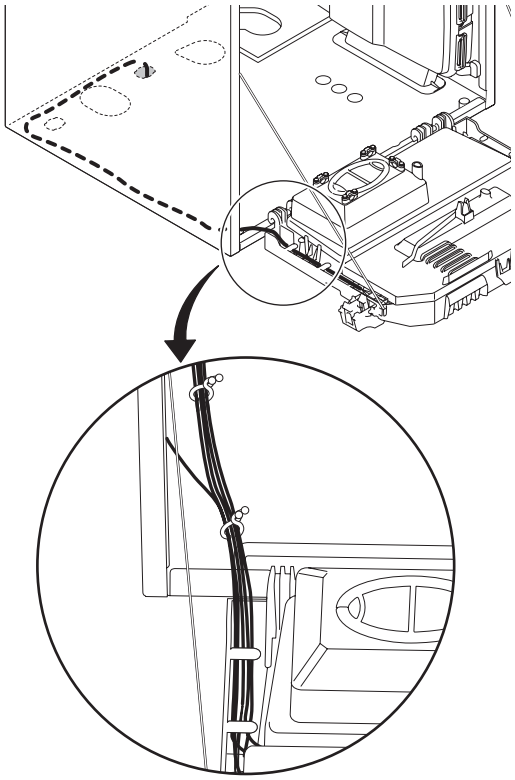
2. Remove the grommet from the opening in the middle of the base of the boiler. Pass the pump connection cable through the base of the boiler and seal the opening again by tightening the bayonet fitting to the cable.



3. Connect the pump connection cable to the cable in the instrument box that is connected with connector **X8.**



4. Connect the pump connection cable to the cable bundle by opening and closing the cable bundle bands.



4.9.5. Connecting a third party control unit

■ Connecting modulating controller

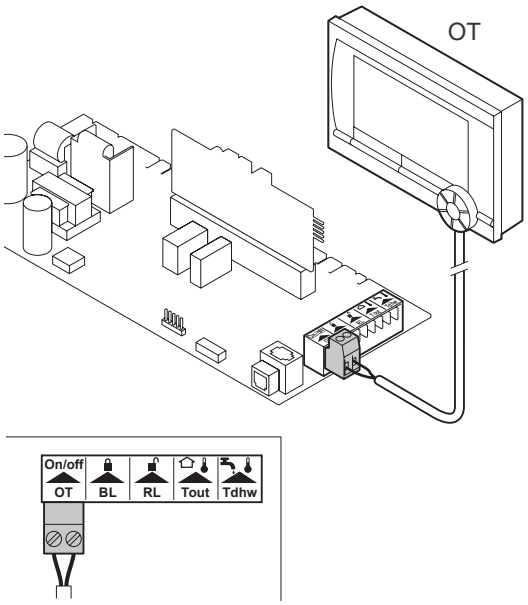
OT **OpenTherm** regulator

The boiler is fitted with a **OpenTherm** connection as standard.

As a result, modulating **OpenTherm** controllers can be connected without further modifications (Room, weather-dependent and cascade controllers).

- In the case of a room thermostat: Install the room thermostat in the reference room (generally the living room).
- Connect the two-wire cable to terminals **ON/OFF-OT** of the connector.

i If the DHW temperature can be set on the **OpenTherm** controller, then the boiler supplies this temperature, with the set value on the boiler as the maximum.



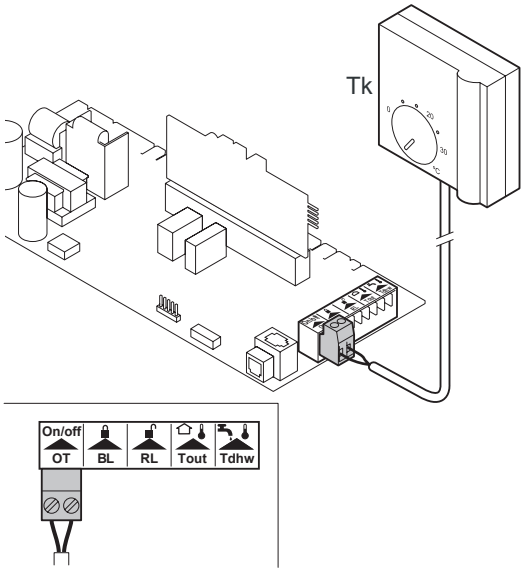
■ Connect ON/OFF thermostat

Tk ON/OFF room thermostat

The boiler is suitable for connection to a 2 wire ON/OFF room thermostat.

- Install the room thermostat in the reference room (generally the living room).
- Connect the 2 wire 24V room thermostat to the **ON/OFF-OT** terminals of the connector.

i If a room thermostat with an anticipation element is used, this must be converted using parameter P5.



Note: This boiler is not suitable for a Nest type thermostat without an external AC power supply.

- Standard boiler configuration : DC 24v - 7mA
- Optional boiler configuation : DC 24v - 120mA

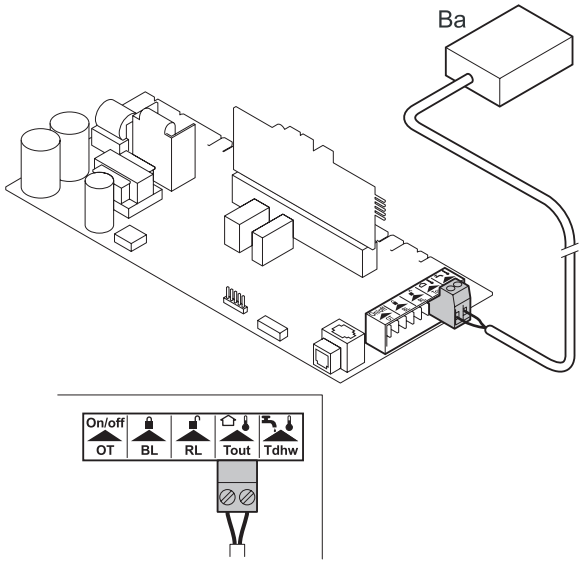
4. Installation

4.9.6. Connecting the outdoor temperature sensor

Ba Outdoor sensor

In accordance with the United States Energy Policy and Conservation Act, an outdoor sensor is supplied with the boiler. Where there is an on/off thermostat controller, the boiler will control the temperature with the set point of the internal heating curve.

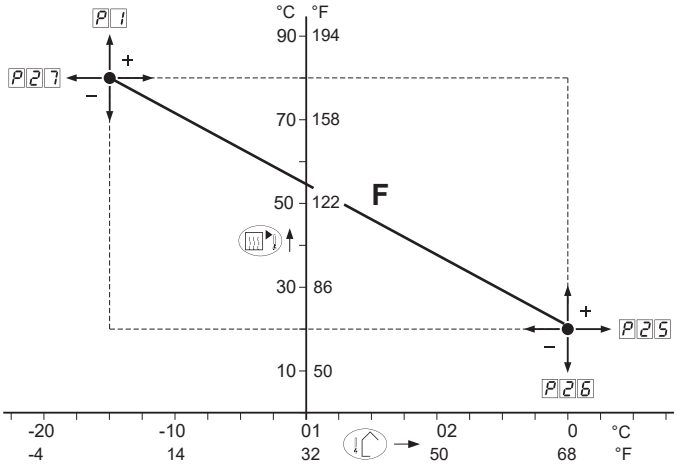
i An OpenTherm controller can also use this outdoor sensor. The heating curve required must then be set on the controller.



Low voltage wiring

i All wiring must be NEC Class 1. If any of the originally supplied boiler wiring needs to be replaced, use only wire with a TEW 105°C or equivalent designation.
The boiler has to be electrically grounded as required by the latest National Electrical Code ANSI/NFPA 70.

■ Heating curve setting



F Factory setting

Outdoor temperature

Supply temperature

P1 Supply temperature (maximum)

P25 Supply temperature (minimum)

P26 WWSD (Warm Weather Shutdown)

P27 Outdoor temperature (default)

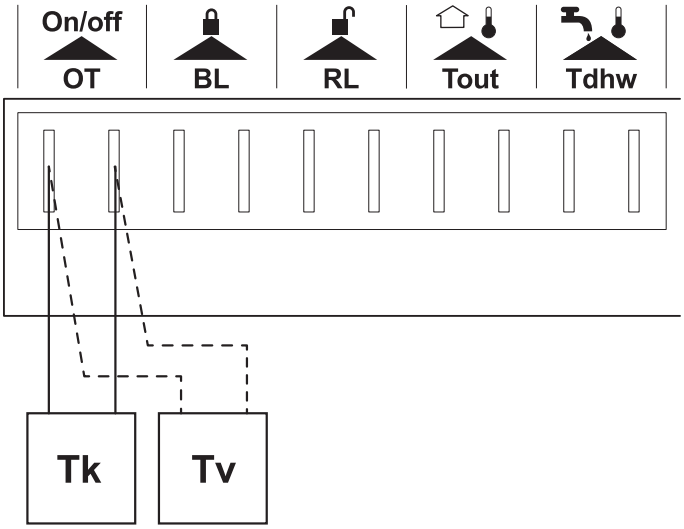
If an outdoor temperature sensor is connected, it is possible to adjust the heating curve. The setting can be modified using parameters P1, P25, P26 and P27.

4.9.7. Frost protection

Frost protection in combination with ON/OFF thermostat

If an on/off thermostat is used, it is advisable to protect any rooms where there is risk of frost by using a frost thermostat. The radiator valve in a room where there is a risk of frost must, however, be open.

- In rooms where there is a risk of frost, a frost thermostat **(Tv)** should preferably be installed.
- Connect the frost thermostat in parallel with an on/off room thermostat **(Tk)** to the **ON/OFF-OT** terminals of the connector.



i When using a **OpenTherm** thermostat, a frost thermostat cannot be connected in parallel to the **ON/OFF-OT** terminals. Implement frost protection for the heating system in combination with an external sensor.

Frost protection in combination with an outdoor sensor

The heating system can also be protected against frost in combination with an outdoor sensor. The radiator valve in a room where there is a risk of frost must, however, be open. Connect the outdoor sensor to the Tout terminals of the connector.

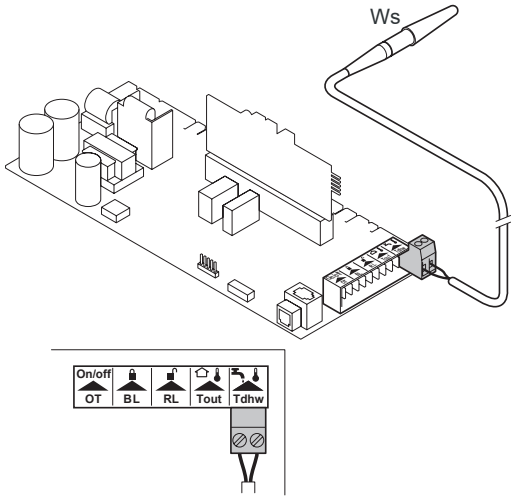
The frost protection functions as follows where an outdoor sensor is used:

- At an outdoor temperature lower than 14ºF/-10ºC (can be set with parameter P30): the circulation pump switches on.
- At an outdoor temperature higher than 14ºF/-10ºC (can be set with parameter P30): the circulation pump continues to run and then switches off.

4.9.8. Connecting the DHW tank sensor/ thermostat

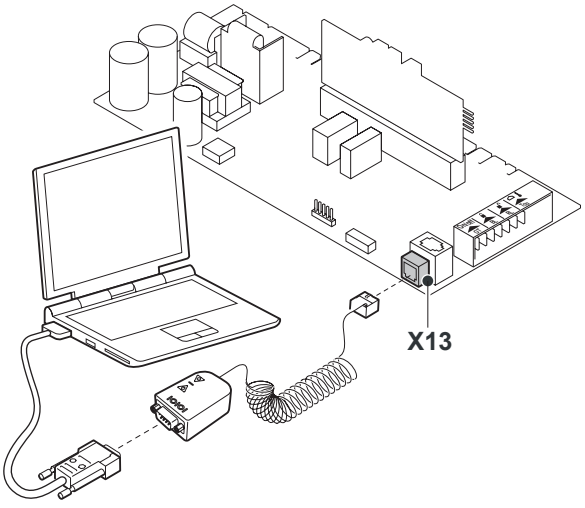
Ws DHW sensor

Connect the DHW tank sensor or thermostat to the Tdhw terminals of the connector.



4.9.9. PC/Laptop connection

A PC or Laptop can be connected to the telephone connector using the optional **Recom** interface. Using the **Recom** PC/Laptop service software, you can enter, change and read out various boiler settings.



4.9.10. Shutdown input

The boiler has a shutdown input. This input is on the BL terminals of the connector.

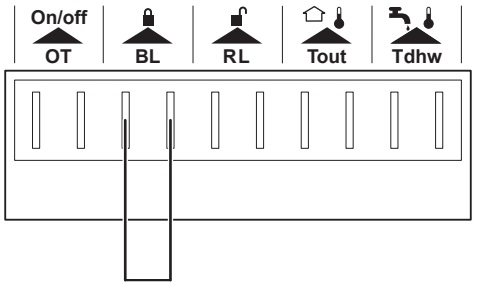
⚠ CAUTION

Only suitable for potential-free contacts.

i For use of this input remove the jumper cable

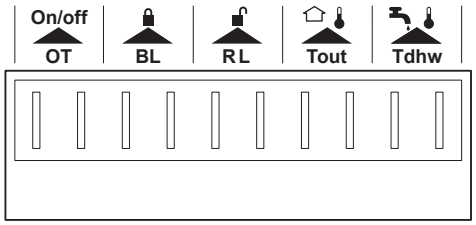
The behaviour of the input can be changed using P 36.

☞ See chapter: "Parameter descriptions", page 76



4.9.11. Release input

The boiler has a release input. This input is on the RL terminals of the connector.



⚠ CAUTION

Only suitable for potential-free contacts.

The behaviour of the input can be changed using P 37.

☞ See chapter: "Parameter descriptions", page 76

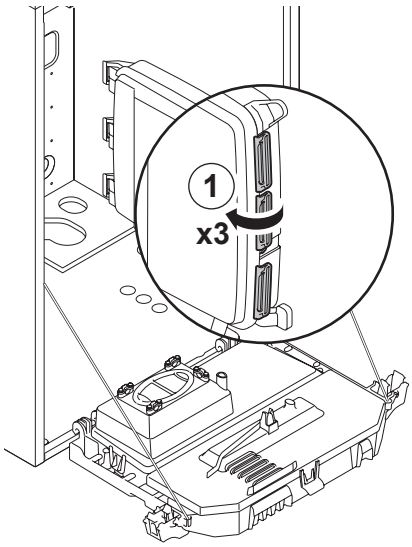
4.10 Optional electrical connections

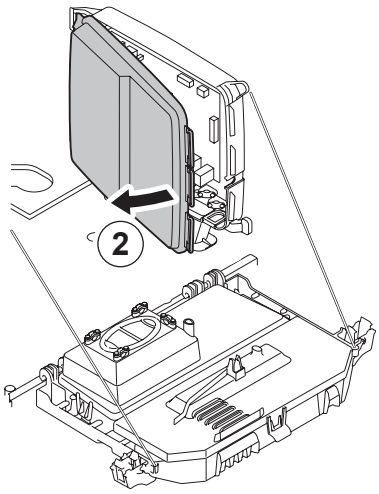
4.10.1. Box for the control PCBs

The control PCBs are located in the auxilliary control cabinet for PCBs. See the instructions provided with the control PCB.

1. Unclip the PCB cover.
2. Remove the cover.

i The boiler comes standard with an auxilliary control cabinet for the optional PCBs.



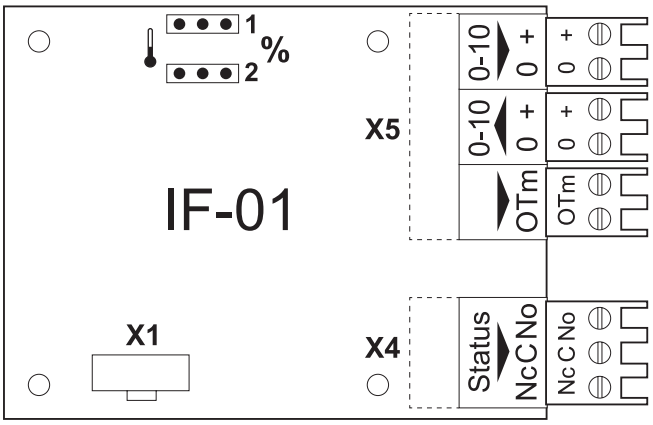


4.10.2. Connection options for the 0-10 V control PCB (IF-01)

The IF-01 control PCB can be built into the instrument box or the housing for the control PCBs. Refer to the instructions supplied with the product.

⚠ CAUTION

Do not connect a frost thermostat or room thermostat to the boiler if using the 0-10 V control PCB.



■ Connection status (Nc)

If the boiler locks out, a relay is de-energised and the alarm can be transmitted via a potential-free contact (maximum 120 VAC- 1A) on terminals **Nc** and C of the connector.

■ Connection (OTm)

The interface communicates with the boiler control via **OpenTherm**. The OTm connection must be connected to the **OpenTherm** input OT of the boiler control.

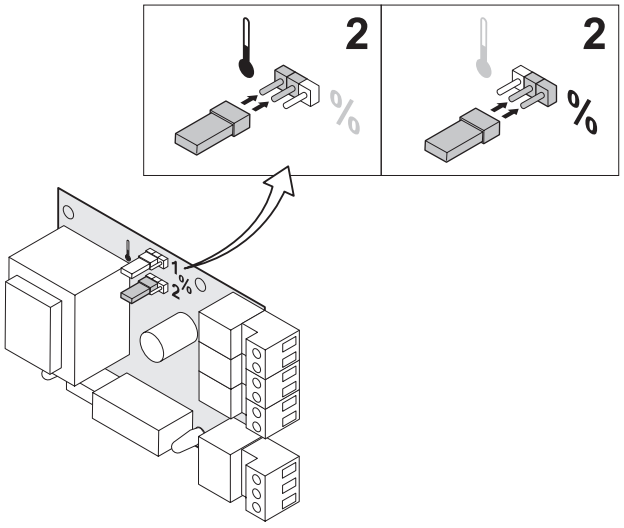
■ Analogue input (0-10 V)

This control can be based on temperature or heat output. The two controls are described briefly below. For analogue control, the 0-10 V signal must be connected to the interface.

■ Analogue temperature-based control (*)

The 0 - 10 V signal controls the boiler supply temperature between 32ºF/0ºC and 212ºF/100ºC. This control modulates on the basis of supply temperature, whereby the heat output varies between the minimum and maximum values on the basis of the supply temperature set point calculated by the controller.

A jumper (2) on the interface is used to select either temperature control (🌡) or heat output control (%).



Jumper 2	Input signal (V)	Temperature ºF/ºC	Description
🌡	0-1.5	32-59/ 0-15	Boiler off
	1.5-1.8	59-64.4/ 15-18	Hysteresis
	1.8-10	64,4-212/ 18-100	Temperature required

■ Analogue heat output-based control (%)

The 0-10V signal controls the boiler output between 0% and 100%.
The minimum and maximum values are limited. The minimum output is linked to the boiler's modulation depth. The output varies between the minimum and maximum value on the basis of the value determined by the controller.

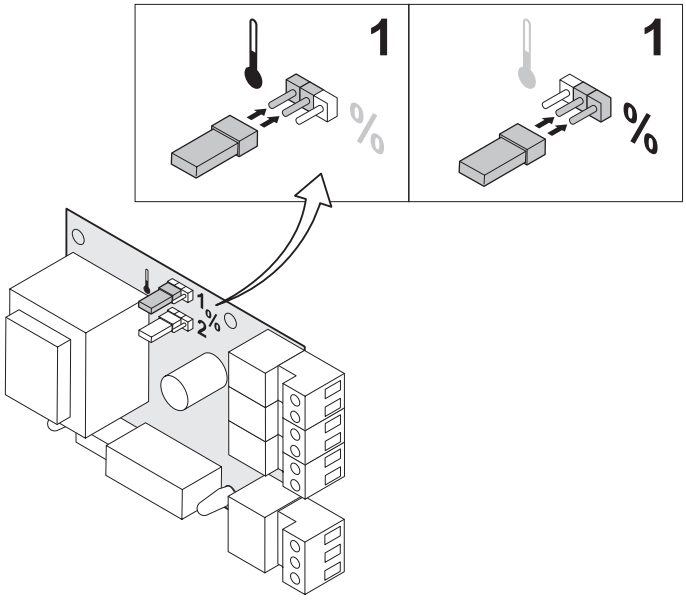
Jumper 2	Input signal (V)	Heat output (%)	Description
%	0 - 2.0	0 - 20	Boiler off
	2.0 - 2.2(1)	20 - 22	Hysteresis
	2.0 - 10(1)	20 - 100	Heat output requested
(1) Dependent on the minimum modulation depth (set speeds, standard 20%)			

■ Analogue output (0-10 V)

The temperature or heat output can be chosen for this feedback message. The two controls are described briefly below.

A jumper **(1)** on the interface is used to select either temperature control (🌡) or heat output control (%).

Jumper1	Output signal (V)	Temperature ºF/ºC	Description
🌡	0	0-15	Boiler off
	0.5	15-20	Alarm
	2.0-10(1)	20-100	Heat output supplied
(1) Dependent on the minimum modulation depth (set speeds, standard 20%)			

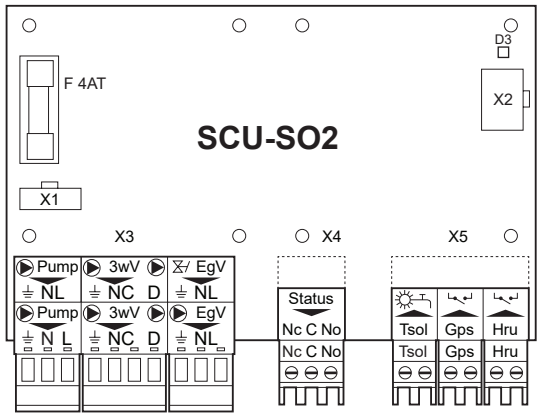


4.10.3. Connection possibilities for the PCB (SCU-S02)

If the boiler is fitted with the control PCB (SCU-S02), then this is automatically recognised by the automatic control unit of the boiler.

⚠ CAUTION

On removing this PCB, the boiler will show fault code E:38. To prevent this fault, an auto-detect must be carried out after removing this PCB.
☞ See chapter: "Carrying out an auto-detect", page 81.



The LED status indicator D3 at the top right of the control PCB indicates the status:
- Continuous signal: PCB working normally
- Flashing signal: No connection
- No signal: No voltage or faulty PCB (Check the wiring)

■ Control of external heating system pump (Pump)

An external heating system pump can be connected to the Pump terminals of the connector. The maximum input power is 300 VA/ 0.4 FHP. Use an auxiliary relay for a pump with a larger input.

■ Control of external three-way valve (3wV)

The external three-way valve (120 VAC) can be used when connecting an indirectly heated DHW tank. The neutral position of the three-way valve can be set using parameter P34.
The three-way valve is connected as follows:

- N = neutral
- C = heating system
- D = tank

■ Control of external DHW hot water pump (3wV)

It is also possible to connect an external DHW pump to the terminals **3wV**. Connect the pump as follows:

- N = N pump
- D = L pump
- Q = Ground

⚠ CAUTION

If the neutral position of the three-way valve is adjusted with parameter P34, the pump should be connected as follows:

- N = N pump
- C = L pump
- ⏚ = Ground

■ Control of external gas valve (EgV)

If there is a heat demand, an alternating voltage of 120 VAC, 1 A (maximum) becomes available on the EgV terminals of the connector to control an external gas valve.

■ Operation signal and failure signal (Status)

The alarm or operation signal is selected using parameter P40.

- If the boiler is operating, the operation signal can be switched via a potential-free contact (maximum 120 VAC, 1 A) on the **NO** and **C** terminals of the connector.
- If the boiler locks out, the alarm can be transmitted via a potential free contact (maximum 120 VAC, 1 A) on the **No** and **C** terminals of the connector.

■ Pressure switch minimum Gps

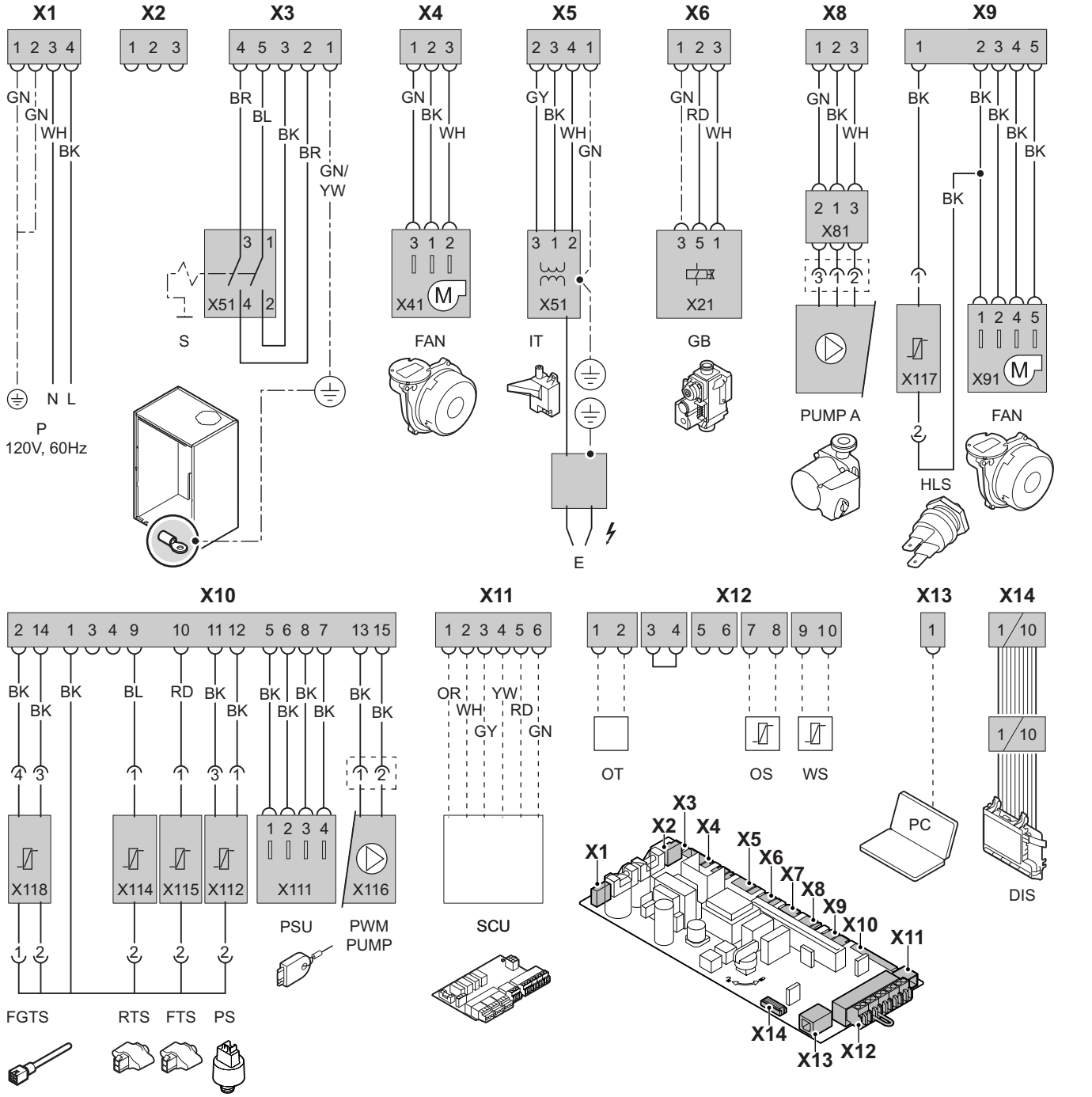
The minimum gas pressure switch shuts the boiler down if the inlet gas pressure becomes too low. Connect the minimum gas pressure switch to the Gps terminals of the connector. The presence of the gas pressure switch must be set using parameter P41.

n Heat Recovery Unit (Hru)

This connection will not be used in Canada or USA.

4. Installation

4.11 Electrical Diagram



P	Main supply	**GB**	Combined Venturi and gas valve unit	**PSU**	Storage parameter
SCU	Extended control PCB	**PUMP A**	Boiler pump	**OT**	Thermostat
S	ON/OFF switch	**HLS**	Safety themostat	**OS**	Outdoor Temp. Sensor
FAN	Fan	**RTS**	Return sensor	**WS**	DHW sensor
IT	Ignition transformer	**FTS**	Flow sensor	**PC**	Connection Computer
E	Ignition power relay	**PS**	Pressure sensor	**DIS**	Display
		FGTS	Flue gas temperature sensor		

4. Installation

4.12 Filling the heating system

Refer to Section 4.6 (water connections for water treatment information)

4.12.1 Water treatment

Refer to section 4.6 water connection for water treatment information

4.12.2. Filling the siphon

1. Remove the siphon.
2. Fill the siphon with tap water. This must be completely filled.
3. Re-assemble the siphon.

⚠ CAUTION

Fill the water siphon before starting the boiler to avoid combustion products escaping from the boiler.

⚠ CAUTION

During operation, check condensation siphon is draining properly.

4.12.3. Filling the heating system

⚠ CAUTION

Before filling, open the valves on every heating circuit in the installation.

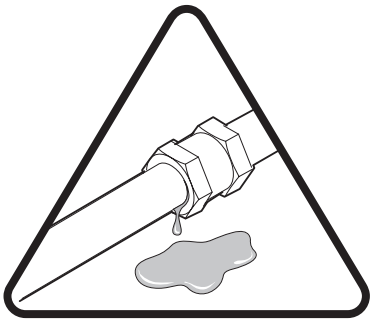
i In order to be able to read off the water pressure from the boiler display, the boiler must be switched on.

1. Fill the system with clean tap water (advised water pressure is between 22 - 30 psig/1.5 - 2 bar).
2. Check the tightness of the water connections.

i After switching on the power and if there is adequate water pressure, the boiler always runs through an automatic venting program lasting approximately 3 minutes (During filling, air can escape from the system via the automatic air vent). If the water pressure is lower than 11.6 psig/0.8 bar , the symbol will appear. If necessary, top up the water level in the heating system (recommended system pressure between 22 - 30 psig/1.5 - 2 mbar).

⚠ CAUTION

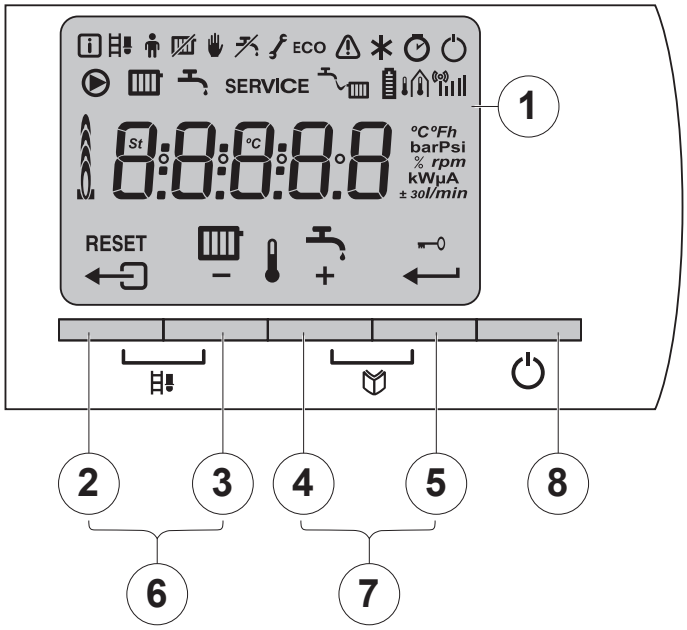
- The filling must be carried out within 30 minutes, otherwise the venting program starts and that would be undesirable if the device is not filled. Switch off the boiler if the heating system is not being topped up immediately.
- When venting air from the system piping, prevent water from getting into the boiler casing and electrical parts of the boiler.



5. Commissioning

5.1 Control Panel

5.1.1. Display functions



1	Display	
2		[Escape] or **RESET** button
3		Heating temperature button or [-]
4		DHW temperature button or [+]
5		[Enter] or cancel button lock-out
6		[Chimney-sweeping] button (press the 2 and 3 buttons simultaneously)
7		[Menu] buttons (press the 4 and 5 buttons simultaneously)
8		ON/OFF switch

5.1.2 Symbols

	Information menu: Reading the various current values.
	Chimney-sweeping position: Forced full or part load for CO2 measurement.
	User menu: Parameters at user level can be changed.
	Heating program deactivated: The heating function is deactivated.
	Manual mode: Boiler is set to manual operation.
	DHW programme deactivated: The DHW mode is deactivated.
	Service menu: Parameters at installer level can be changed.
ECO	**Energy-saving mode:** Economic mode activated.
	Fault: Boiler indicates a fault. This can be seen from the E code and red display.
	Frost protection: Boiler is running in frost protection mode.
	Hour counter menu: Readout of the operating hours, number of successful starts and hours on mains supply.

	ON/OFF switch: After 5 lock-outs, the boiler must be switched OFF/ON again.
	Boiler pump: The pump operates.
	Heating system function: Access to heating system temperature parameter.
	DHW function: Access to potable hot water temperature parameter.
SERVICE	Yellow display with the symbols: + SERVICE + A (Maintenance message).
	Water pressure: The water pressure is too low.
	Battery symbol: Status of battery of wireless controller.
	Signal strength symbol: Signal strength of the wireless controller.
	Burner level: Boiler is running at full or low load.
	Locking the keys: Key lock-out is activated.

5. Commissioning

5.2 Check points before commissioning

5.2.1. Preparing the boiler for commissioning

⚠⚠ WARNING

Do not put the boiler into operation if the supplied gas is not in accordance with the approved gas types.

Preparatory procedure for boiler commissioning:

- Check that the gas type supplied matches the data shown on the boiler's rating plate.
- Check the gas circuit.
- Check the hydraulic circuit.
- Check the water pressure in the heating system.
- Check the electrical connections to the thermostat and the other external controls.
- Check the other connections.
- Test the boiler at full load. Check the setting of the gas/air ratio and, if necessary, correct it.
- Test the boiler at part load. Check the setting of the gas/air ratio and, if necessary, correct it.
- Finalizing work.

i **Complete the checklist.**
☞ See chapter: "Checklist for commissioning", **page 113.**

5.2.2. Gas circuit

⚠⚠ WARNING

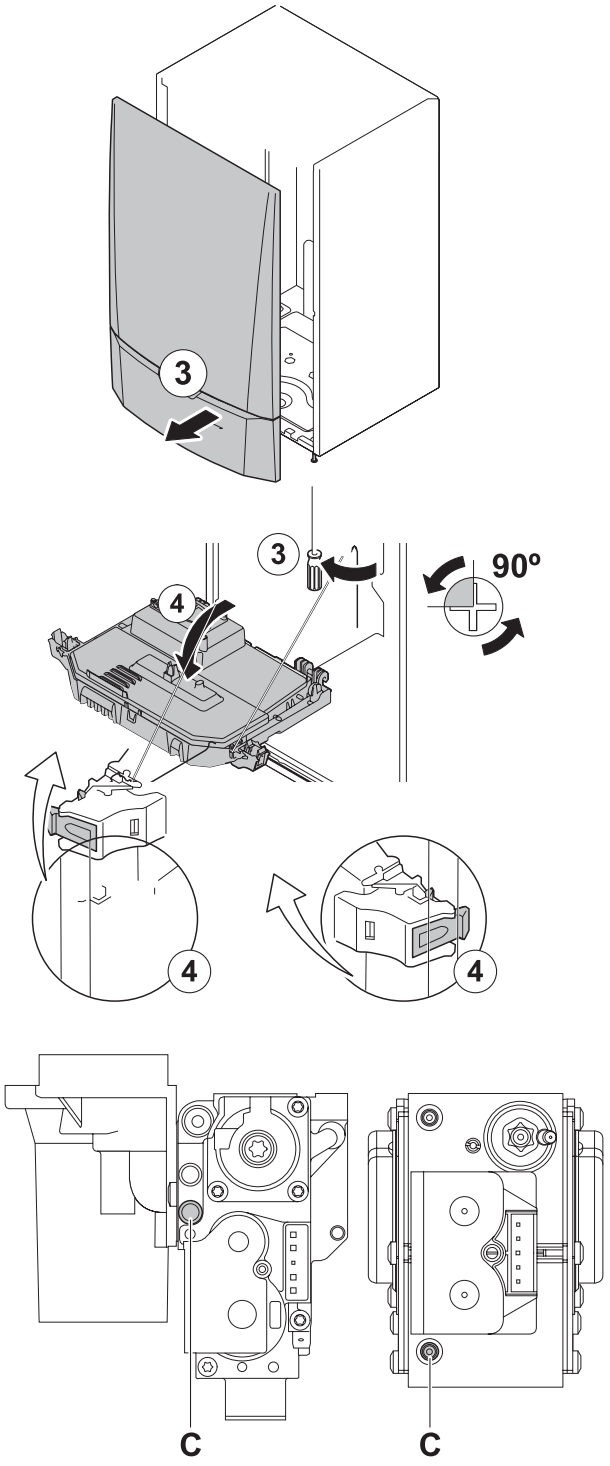
Ensure that the boiler is switched off.

1. Open the main gas supply.
2. Open the gas shutoff valve on the boiler.
3. Unscrew the two screws located under the front panel by a quarter turn and remove the panel.
4. Tilt the control box forwards by opening the holding clips located at the sides.
5. Check the gas supply pressure at the pressure outlet C on the gas valve unit.

⚠⚠ WARNING

☞ To ascertain the gas types permitted, see chapter: "Gas type", **page 13**

6. Check the tightness of the gas connections made after the gas valve unit in the boiler.
7. Check the tightness of the gas line, including the gas valves. The test pressure must not exceed 0.87 psig/60 mbar.
8. Purge the gas supply pipe within the boiler by unscrewing the pressure outlet on the gas block. Tighten the measurement point when the pipe has been sufficiently purged.
9. Check the tightness of the gas connections in the boiler.



5.2.3. Waterside connections

- Check the siphon — this must be completely filled with clean water.
- Check that there are no leaks on the water connections.

5.2.4. Electrical connections

- Check the electrical connections, particularly the ground.
- Check the electrical connections to the thermostat and the other external controls.

5.3 Commissioning the boiler

⚠⚠ WARNING

If adapting to another gas type i.e. propane, the gas valve must be adjusted before switching on the boiler.
☞ See chapter: "Gas type", page 13

1. Tilt the control box upwards again and fasten it using the clips located at the sides.
2. Open the main gas supply.
3. Open the gas shutoff valve on the boiler.
4. Insert the boiler plug into an earthing socket.
5. Turn on the boiler using the ON/OFF switch.
6. Set the controls (thermostats, control system) so that they generate a call for heat.
7. The start-up cycle begins and cannot be interrupted. During the start-up cycle, the display shows the following information: A short test where all segments of the display are visible.

F□:XX : Software version
P□:XX : Parameter version
The version numbers are displayed alternately.

8. A vent cycle of a duration of around 3 minutes is carried out automatically.

i If a DHW sensor is connected and the anti-legionella function is activated, the boiler starts to heat the water in the DHW tank as soon as the vent programme has been completed.

By pressing the ↵ button for a short time, the current operating status is shown on the display:

Heat demand	Heat demand stopped
1 : Fan on	1 : Post-purge
2 : Boiler is igniting	5 : Burner stop
	6 : Post-circulation of the pump
3 : Heating System	0 : STAND-BY

In addition to 0, in STAND-BY the display normally shows the water pressure and the symbols , and .

Error during the start-up procedure:

- No information is shown on the display:
  - Check the mains supply voltage
  - Check the main fuses
  - Check the fuses on the control panel: (F1 = 6.3 AT, F2 = 2 AT)
  - Check the connection of the power cable to the connector X1 in the instrument box
- A fault is indicated on the display by the fault symbol c and a flashing fault code.
  - The meaning of the error codes is given in the error table.
  - Press for 3 seconds on key **Reset** button to restart the boiler.

i If the economy setting (eco setting) is on, then, after heating system operation, the boiler will not start to run for hot tap water production.

⚠⚠⚠ DANGER

In the standard configuration the MCA Pro series boiler can supply water temperatures up to 170°F, when using a PVC flue system. A proper anti-legionella functionality cannot be guaranteed when the MCA Pro boiler is used in conjection with PVC venting system.

5.3.1 High Altitude Applications

The boiler is supplied from the factory with fans speed that are established for correct combustion from sea level to a maximum of 700m/2300ft. For altitudes above 700m/2300ft. to a maximum of 1370m/4500ft, fans speed need to be adjusted to the following specifications below.

Fan speed adjustment for altitudes from 700m/2300ft. to 1370m/4500ft

High fire fan speed settings should not be changed.

Fan speed setting altitude application				
Gas type	Natural gas		Propane	
	low fire	start	low fire	start
MCA Pro 45	1750	2800	1750	2800
MCA Pro 65	1800	2800	1800	2800
MCA Pro 90	1800	2800	Propane not available	
MCA Pro 115	2150	2800	2150	3100

5. Commissioning

5.4 Gas setting

5.4.1. Fuel conversion

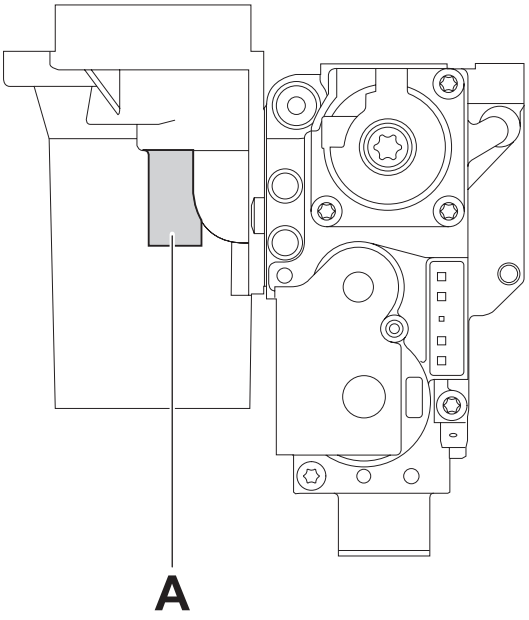
⚠⚠ WARNING

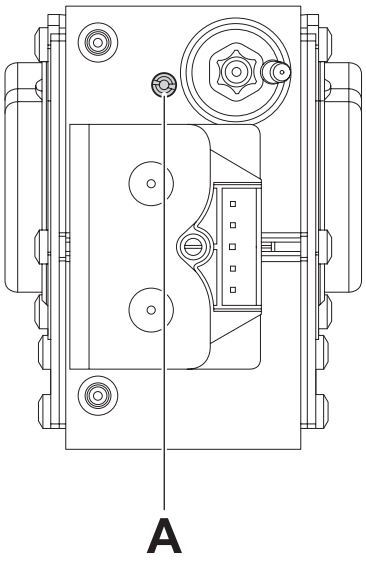
Only a qualified professional may carry out the following operations.

The boiler is preset in the factory to operate on natural gas.

For operation on another group of gases, carry out the following operations. In the case of functioning on propane:
1.

MCA Pro	For conversion to propane
45	Rotate the adjusting screw **A** on the Venturi 4¾ turns in a clockwise direction
65	Rotate the adjusting screw **A** on the Venturi 6½ turns in a clockwise direction
90	Propane not available for this model untile further notice
115	First turn the setting screw **A** clockwise until it is closed, then: Rotate the adjusting screw **A** on the gas block 3½ - 4 turns in an counterclockwise direction





2. Regulate the Fan Speed as indicated in the table (if required). The setting can be modified using parameters P17, P18, P19 and P20:

☞ See chapter: "Parameter descriptions", page 75.

3. Set the air/gas ratio. For more detailed information:

☞ See chapter: "Setting the air/gas ratio (Full load)", page 69.

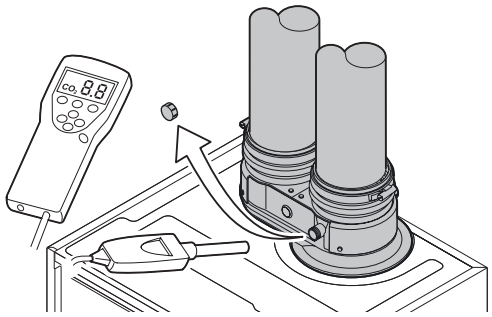
☞ See chapter: "Setting the air/gas ratio (Part load)", page 70.

Fan speed setting propane						
Gas type	Sea level			Altitude application		
	Low fire	High fire	Start	Low fire	High fire	Start
MCA Pro 45	1550	5600	2500	1750*	5600	2800*
MCA Pro 65	1600	5600	2500	1800*	5600	2800*
MCA Pro 90	Propane not available for this model until further notice					
MCA Pro 115	1900*	6600	2700*	2150*	6600	3100*

* non factory settings

5.4.2. Setting the air/gas ratio (Full load)

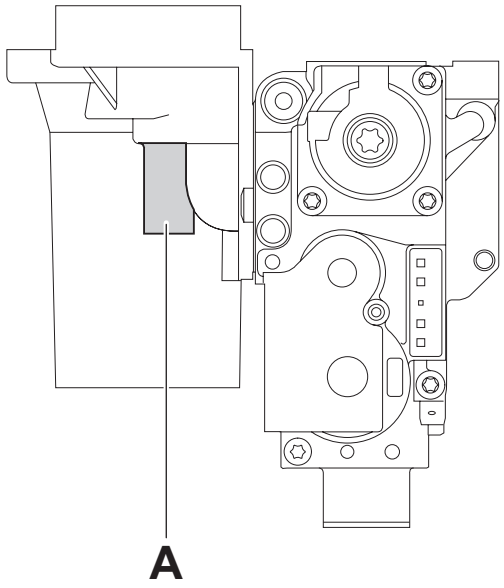
1. Unscrew the plug of the flue gas measurement point.
2 Connect the flue gas analyser.



⚠⚠ WARNING

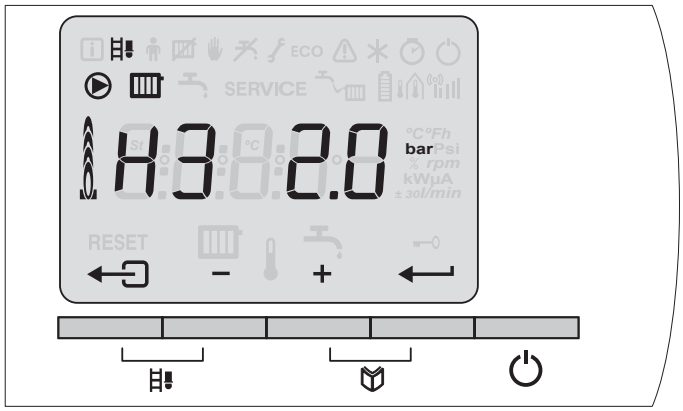
Ensure that the opening around the combustion analyzer probe is completely sealed when taking measurements.

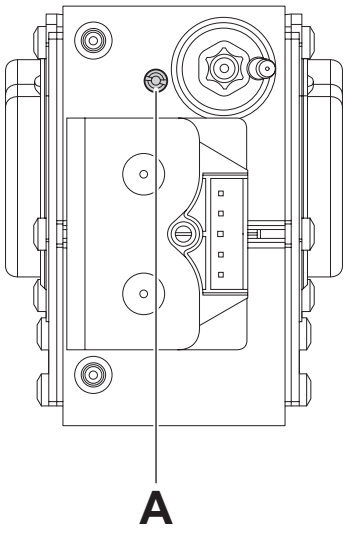
3. Set the boiler to full load. Press the two buttons simultaneously. The display shows H3. The symbol appears.
4. Measure the percentage of O_2 or CO_2 in the flue gases.
5. Compare the values measured with the checking values given in the table (Front panel removed).
6. If necessary, adjust the gas/air ratio using the adjusting screw **(A)**.



Control and setting values $O2/CO_2$ at full load natural gas				
Boiler type	Setting value		Checking value	
	O_2 (%)	CO_2 (%)	O_2 (%)	CO_2 (%)
MCA Pro 45	4.7/5.0	8.9/9.1	4.5/5.1	8.8/9.2
MCA Pro 65	4.7/5.0	8.9/9.1	4.5/5.1	8.8/9.2
MCA Pro 90	4.7/5.0	8.9/9.1	4.5/5.1	8.8/9.2
MCA Pro 115	4.5/4.8	9.0/9.2	4.3/5.0	8.9/9.3

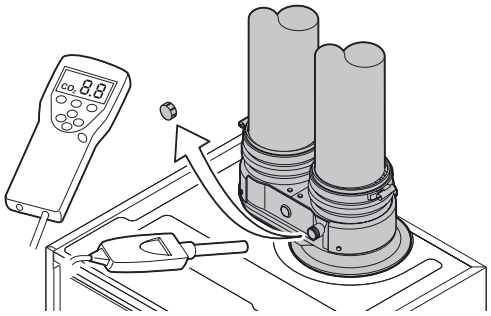
Control and setting values O_2/CO_2 at full load for propane				
Boiler type	Setting value		Checking value	
	O_2 (%)	CO_2 (%)	O_2 (%)	CO_2 (%)
MCA Pro 45	4.4/4.8	10.6/10.8	4.3/4.9	10.5/10.9
MCA Pro 65	4.4/4.8	10.6/10.8	4.3/4.9	10.5/10.9
MCA Pro 90	Propane not available			
MCA Pro 115	4.8/5.1	10.4/10.6	4.6/5.2	10.3-10.7





5.4.3. Setting the air/gas ratio (Part load)

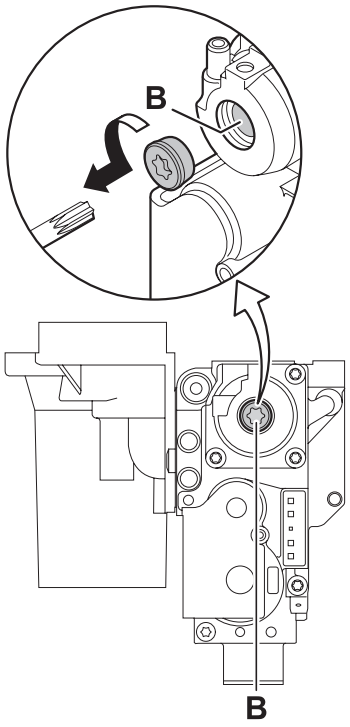
1. Unscrew the plug of the flue gas measurement point.
2. Connect the flue gas analyser.



⚠⚠ WARNING

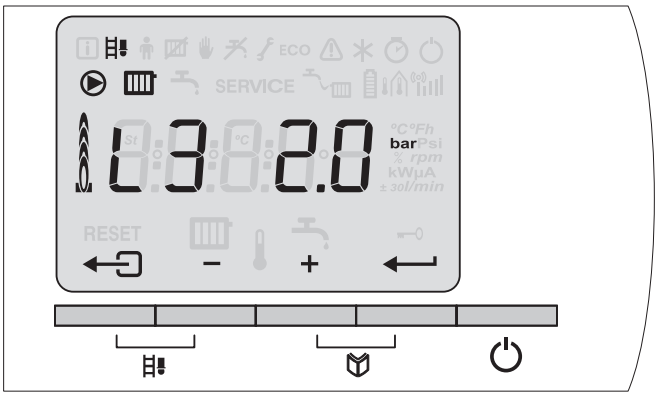
Ensure that the opening around the combustion analyzer probe is completely sealed when taking measurements.

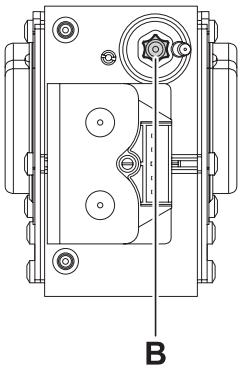
3. Set the boiler to part load. Press the [-] key several times until [L3] is displayed on the screen.
4. Measure the percentage of O_2 or CO_2 in the flue gases.
5. Compare the values measured with the checking values given in the table (Front panel removed).
6. If necessary, adjust the gas/air ratio using the adjusting screw **(B)**.



Control and setting values O_2/CO_2 at part load for natural gas				
Boiler type	Setting value		Checking value	
	O_2 (%)	CO_2 (%)	O_2 (%)	CO_2 (%)
MCA Pro 45	5.6/5.9	8.4/8.6	5.4/6.1	8.3/8.7
MCA Pro 65	5.6/5.9	8.4/8.6	5.4/6.1	8.3/8.7
MCA Pro 90	5.6/5.9	8.4-8.6	5.4/6.1	8.3/8.7
MCA Pro 115	5.4/5.7	8.5/8.7	5.2/5.9	8.4/8.8

Control and setting values O_2/CO_2 at part load for propane				
Boiler type	Setting value		Checking value	
	O_2 (%)	CO_2 (%)	O_2 (%)	CO_2 (%)
MCA Pro 45	5.2/5.5	10.1/10.3	5.1/5.7	10.0/10.4
MCA Pro 65	5.2/5.5	10.1/10.3	5.1/5.7	10.0/10.4
MCA Pro 90	Propane not available			
MCA Pro 115	6.3/6.6	9.4/9.6	6.1/6.7	9.3/9.7

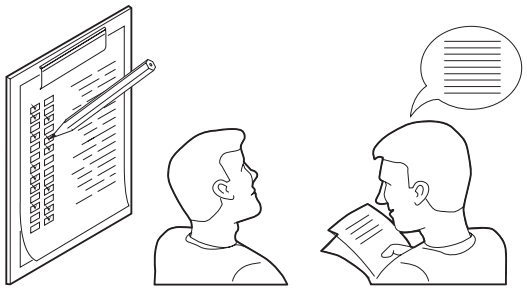




5. Commissioning

5.5 Finalizing work

1. Remove the analyzer probe.
2. Put the flue gas sampling plug back in place.
3. Refit the front panel. Tighten the two screws by a quarter turn.
4. Push ↩ button to return the boiler to normal operating mode.
5. Raise the temperature in the heating system to approximately 158ºF/70ºC or desired setpoint.
6. Shut down the boiler.
7. After about 10 minutes, vent the air in the heating system.
8. Switch on the boiler.
9. Check for leaks in the flue and air inlet connections.
10. Checking the system pressure. If necessary, top up the water level in the heating system (recommended system pressure between 22 - 30 psig/1.5 - 2 bar).
11. Test the ignition system of the boiler. For this test, close the gas shut-off valve under the boiler: In a red flashing display the fault code E: 14 must appear (No ignition).
12. Tick the gas category used on the rating plate.
13. Explain the operation of the installation, the boiler and the regulator to the users.
14. Give all the instruction manuals to the user.



5.6 Reading out measured values

The automatic control unit continuously measures various boiler parameters. These parameters can be read off the boiler control panel.

5.6.1. Reading the various current values

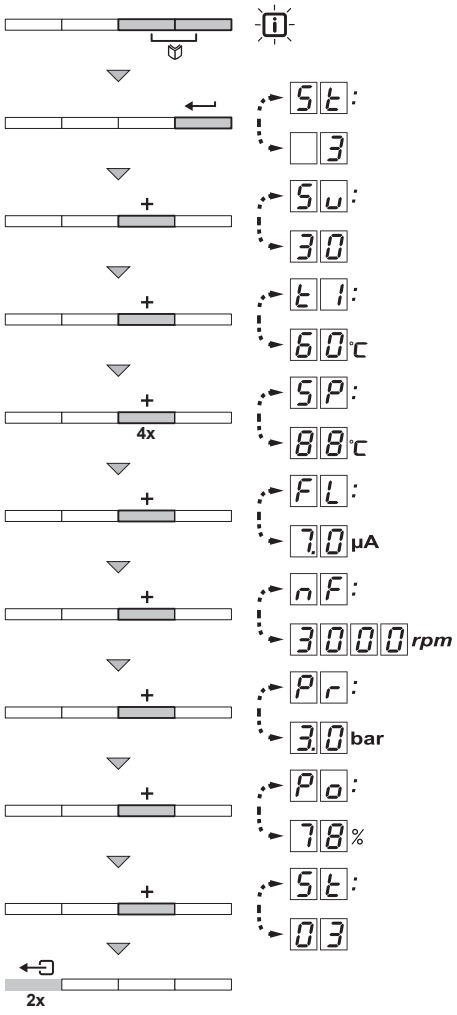
The following current values can be read off the information menu ⓘ:

- St = State.
- Su = Sub-status.
- t1 = Supply temperature ºF/ºC.
- t2 = Return temperature ºF/ºC.
- t3 = DHW tank temperature ºF/ºC.
- t4 = Outdoor temperature ºF/ºC (Only with an outdoor temperature sensor: Optional).
- t5 = Solar boiler temperature ºF/ºC.
- t6 = Flue gas tempreature ºF/ºC.
- SP = Internal set point ºF/ºC.
- FL = Ionization current (µA).
- nF = Fan speed in rpm.
- Pr = Water pressure psig/bar.
- Po = Supplied relative heat output (%).

5. Commissioning

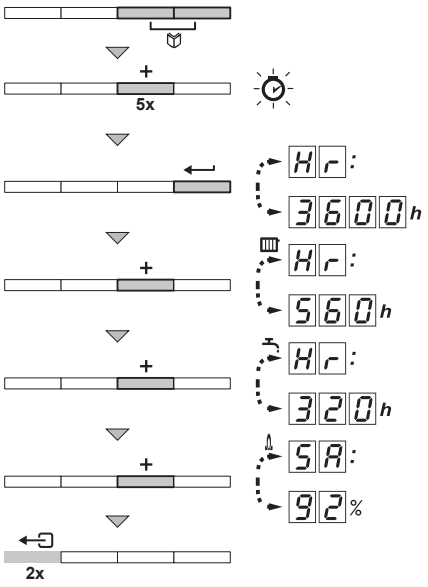
The current values can be read as follows:

1. Press the two buttons simultaneously. The symbol flashes.
2. Confirm using button . St is displayed, alternating with the current status 3 (for example).
3. Press the **[+]** button. su is displayed, alternating with the current sub-status 30 (for example).
4. Press the **[+]** button. t1 is displayed, alternating with the current flow temperature 60°C (for example).
5. Press the **[+]** button successively to scroll down to the various parameters. t2, t3, t4, t5, t6.
6. Press the **[+]** button. SP is displayed, alternating with the internal set point 88°C (for example).
7. Press the **[+]** button. FL is displayed, alternating with the current ionization current 7.0µA (for example).
8. Press the **[+]** button. nF is displayed, alternating with the current fan rotation speed 3000 rpm (for example).
9. Press the **[+]** button. Pr is displayed, alternating with the current water pressure 3.0 bar (for example). If no water pressure sensor is connected, **[-.-]** appears on the display.
10. Press the **[+]**button. Po is displayed, alternating with the current modulation percentage 78% (for example).
11. Press the **[+]** button. The readout cycle starts again with St.
12. Press the buttons 2 times to return to the current operating mode.



5.6.2 Readout from the hour counter and precentage of successful starts

1. Press the two buttons simultaneously and then [+] button until the symbol flashes on the menu bar.
2. Press the button. Hr and the number of hours of boiler operation 3600 (for example) are displayed alternately.
3. Press the **[+]** button. The display shows . Hr is displayed, alternating with the number of operating hours in heating system operation 560 (for example).
4. Press the **[+]** button. The display shows . Hr is displayed, alternating with the number of operating hours used for heating tap water 320 (for example).
5. Press the **[+]** button. The display shows . SA is displayed, alternating with the percentage of successful starts 92 % (for example).
6. Press the button 2 times to return to the current operating mode.



5.6.3. Status and sub-status

The information menu ⓘ gives the following status and sub-status numbers:

State St		Sub-status Su	
0	Rest	0	Rest
1	Boiler start (Heat demand)	1	Short cycling protection function
		2	Control three-way valve
		3	Start pump
		4	Wait for the correct temperatures for burner start
2	Burner start	10	Open flue gas damper/external gas valve
		11	Increase fan speed
		13	Pre-purge
		14	Wait for release signal
		15	Burner on
		17	Pre-ignition
		18	Main ignition
		19	Flame detection
		20	Intermediate ventilation
3	Burning for heating system operation	30	Temperature control
		31	Limited temperature control (ΔT safety)
		32	Output control
		33	Temperature protection gradient level 1 (Modulate down)
		34	Temperature protection gradient level 2 (Part load)
		35	Temperature protection gradient level 3 (Blockage)
		36	Modulate up for flame control
		37	Temperature stabilisation time
		38	Cold start
4	DHW mode running	30	Temperature control
		31	Limited temperature control (ΔT safety)
		32	Output control
		33	Temperature protection gradient level 1 (Modulate down)
		34	Temperature protection gradient level 2 (Part load)
		35	Temperature protection gradient level 3 (Blockage)
		36	Modulate up for flame control
		37	Temperature stabilisation time
		38	Cold start
5	Burner stop	40	Burner off
		41	Post-purge
		42	Close flue gas damper/external gas valve
		43	Recirculation protection
		44	Stop fan

5. Commissioning

6	Boiler stop (End of heat demand)	60	Pump post circulation
		61	Pump off
		62	Control three-way valve
		63	Start anti-hunting
8	Stop	0	Wait for burner start
		1	Short cycling protection function
9	Lock-out	XX	Shutdown code XX
17	Bleed	0	Rest
		2	Control three-way valve
		3	Start pump
		61	Pump off
		61	Control three-way valve

5. Commissioning

5.7 Changing the settings

The boiler control panel is set for the most common heating systems. With these settings, practically all heating systems operate correctly. The user or installer can optimise the parameters according to own preferences.

☞ For the other settings, refer to the instruction manuals for the control panel.

5.7.1. Parameter descriptions

Parameter	Description	Adjustment range				
			45	65	90	115
P1	Supply Temperature (Set temperature)	68 to 194ºF 20 to 90ºC	180ºF/70ºC			
P2	Domestic hot water Temperature: T**SET**	104 to 149ºF 40 to 65 ºC	131ºF/55ºC			
P3	Heating / DHW mode	0 = Heating deactivated / DHW deactivated 1 = Heating activated / DHW activated 2 = Heating activated / DHW deactivated 3 = Heating deactivated / DHW activated	1			
P4	ECO mode	0 = Comfort 1 = Energy-saving mode 2 = Management using a programmable thermostat	2			
P5	Anticipation resistance	0 = No anticipation resistance for the ON/ OFF thermostat 1 = Anticipation resistance for the ON/OFF thermostat	0			
P6	Display screen	0 = Simple 1 = Comprehensive 2 = Automatic switching to simple after 3 minutes 3 = Automatic switching to simple after 3 minutes; Key blocking is active	2			
P7	Post-circulation of the pump	1 to 98 minutes 99 minutes = continuous	3			
P8	Brightness of display lighting	0 = Dimmed 1 = Bright	1			
P17	Maximum fan speed (Heating)*	Natural gas(1) (x100 rpm)	56	56	64	66
		Propane (x100 rpm)	56	56		66
P18	Maximum fan speed (DHW)*	Natural gas(1) (x100 rpm)	56	56	64	66
		Propane (x100 rpm)	56	56		66
P19	Minimum fan speed (Heating+DHW)*	Natural gas(1) (x100 rpm)	15	16	16	18
		Propane(x100 rpm)	15	16		19
P20	Minimum fan speed (offset)*	Natural gas(1) (x100 rpm)	50	0	00	50
		Propane	50	0		0
P21	Start speed*	(x100 rpm)				
P21	Open vented: Start speed	(x100 rpm)				
P22	Minimum water pressure	0 to 3 bar (x 0.1 bar) 0 to 43.5psig (x 0.1 psig)				
P23	Maximum supply temperature of system	32 to 190ºF 0 to 88ºC				

* Sea level values: see for altitude adjustments (chapter 5.3.1 , Page 67 and 5.4.1, Page 68)

5. Commissioning

Parameter	Description	Adjustment range				
			45	65	90	115
P24	Anti-hunting/short cycling differential for heating system operation	5 to 59ºF -15 to 15ºC				
P25	Heat curve set point (Maximum outdoor temperature) WWSD (Warm Weather Shutdown)	32 to 86ºF 0 to 30ºC (Only with an outdoor temperature sensor)				
P26	Heat curve set point (Supply temperature)	32 to 194ºF 0 to 90ºC (Only with an outdoor temperature sensor)				
P27	0 to 30 ºC (Only with an outdoor temperature sensor) Heat curve set point (Minimum outdoor temperature)	-22 to 32ºF -30 to 0ºC (Only with an outdoor temperature sensor				
P28	Setting the pump speed (Minimum pump speed for heating system operation)	2 - 10 (x 10 %)				
P29	Setting the pump speed (Maximum pump speed for heating system operation)	2 - 10 (x 10 %)				
P30	Frost protection temperature	-22 to 32ºF -30 to 0ºC				
P31	P31 Legionella protection DHW only	0 = Off 1 = On (After commissioning, the boiler will operate once a week at 65°C for DHW) 3 = Management using a programmable thermostat				
P32	Set point increase for DHW tank -22 to 32ºF -30 to 0 ºC	32 to 68ºF 0 to 20ºC				
P33	DHW cut-in temperature DHW sensor	35.6 to 59ºF 2 to 15ºC				
P34	Control of three-way valve	0 = Normal 1 = Reverse				
P35	Boiler type	0 = Heating only 1 = Open vented				
P36	Shutdown input function	0 = Heating activated 1 = Shutdown without frost-protection 2 = Shutdown with frost protection 3 = Lock-out with frost protection (Pump only)				
P37	Release function	0 = Hot water on 1 = Release input				
P38	Release waiting time	0 to 255 seconds				
P39	Gas valve switching time	0 to 255 seconds				

5. Commissioning

Parameter	Description	Adjustment range				
			45	65	90	115
P42	HRU connected (Optional)	0 = Not connected 1 = Connected				
P43	Mains detection phase	0 = Off 1 = On				
P44	Maintenance message	Do not modify				
P45	Service operating hours	Do not modify				
P46	Service burning hours	Do not modify				
P47	ΔT Modulate down	50 to 104ºF 10 to 40ºC				
P48	DHW stabilization time	10 to 100 seconds				
P49	Display units	0 = ºC/bar 1 = ºF/psig				
P51	Flue gas tempreature	0 = PVC 65°C / 149°F 1 = CPVC 90°C / 194°F 2 = PP/SS 110°C / 230°F				
Ad	Detection of connected SCUs	0 = No detection 1 = Detection				
dF and dU						
(1) Do not modify these factory settings unless absolutely necessary. E.g. to adapt the boiler to:Propane						

⚠⚠⚠ DANGER

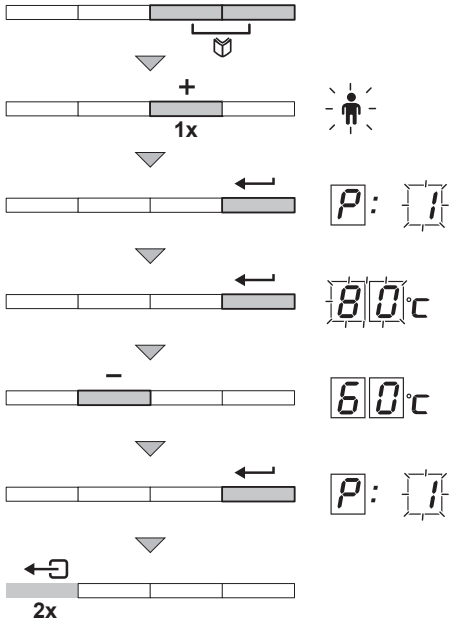
In the standard configuration the MCA Pro series boiler can supply water temperatures up to 170°F, when using a PVC flue system. A proper anti-legionella functionality cannot be guaranteed when the MCA Pro boiler is used in conjection with PVC venting system.

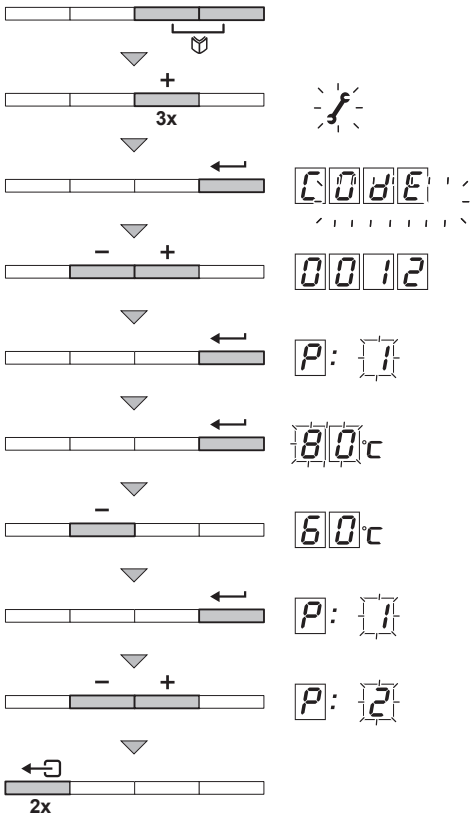
5.7.2. Modification of the user-level parameters

Parameters P1 to P8 can be modified by the user in order to meet heating system and DHW comfort needs.

⚠ CAUTION

Modification of the factory settings may be detrimental to the functioning of the appliance.





1. Press the two Menu buttons simultaneously and then **[+]** buttons until the symbol flashes on the menu bar.
2. Select the users menu using the P:1 button is displayed with 1 flashing.
3. Press the ↵ button a second time. The value 80°C appears and flashes (for example).
4. Change the value by pressing the **[-]** button or **[+]** button. In this example using button **[-]** to 60°C.
5. Confirm the value with the ↵ button. P1 is displayed with 1 flashing.
6. Press the ⏎ button 2 times to return to the current operating mode.

> **i** The parameters P1 to P8 are changed in the same way as P1. After step 2, use the **[+]** button to move to the required parameter.

5.7.3. Modification of the installer-level parameters

Parameters P17 to dF must only be modified by a qualified professional. To prevent unwanted settings, some parameter settings can only be changed after the special access code 0012 is entered.

⚠ CAUTION

Modification of the factory settings may be detrimental to the functioning of the appliance.

1. Press the two buttons simultaneously and then **[+]** button until the symbol flashes on the menu bar.
2. Select the fitter menu using the ↵ button. CodE appears on the display.
3. Use **[-]** or **[+]** button to input the installer code 0012.
4. Confirm using ↵ button. P:1 is displayed with 1 flashing.
5. Press the ↵ button a second time. The value 80°C appears and flashes (for example).
6. Change the value by pressing the **[-]** or **[+]** button. In this example using **[-]** button to 60°C.
7. Confirm the value with the ↵ button: P:1 is displayed with 1 flashing.
8. If necessary, set other parameters by selecting them using the **[-]** or **[+]** button.
9. Press the ⏎ button 2 times to return to the current operating mode.

> **i** The boiler also returns to operating status if no buttons are pressed for 3 minutes.

5.7.4. Setting the maximum fuel input for heating system operation

Note: These values for natural gas.

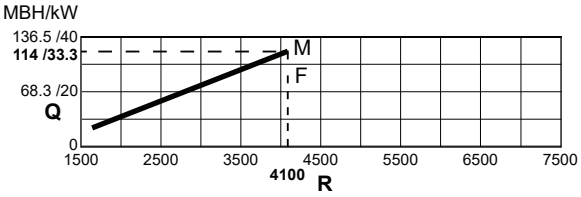
MCA Pro 35

M Maximum fuel input

F Factory setting

Q Fuel input MBH/kW

R Fan rotation speed (rpm)



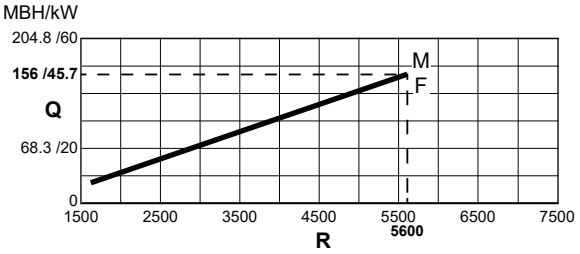
MCA Pro 45

M Maximum fuel input

F Factory setting

Q Fuel input MBH/kW

R Fan rotation speed (rpm)



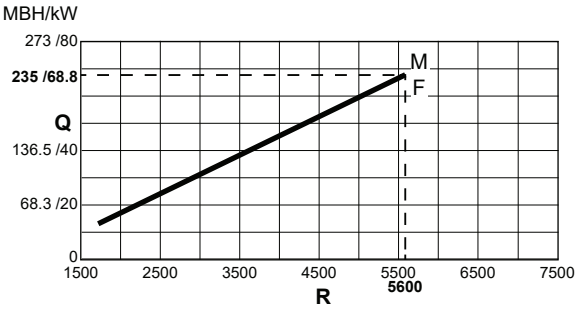
MCA Pro 65

M Maximum fuel input

F Factory setting

Q Fuel input MBH/kW

R Fan rotation speed (rpm)



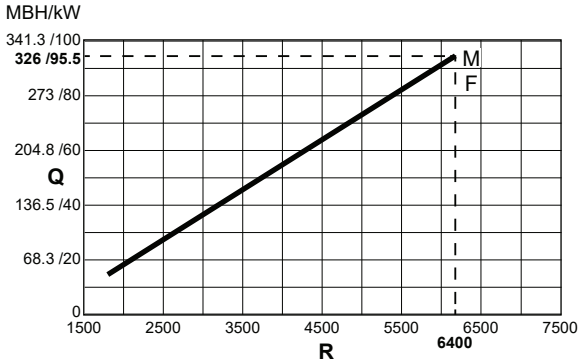
MCA Pro 90

M Maximum fuel input

F Factory setting

Q Fuel input MBH/kW

R Fan rotation speed (rpm)



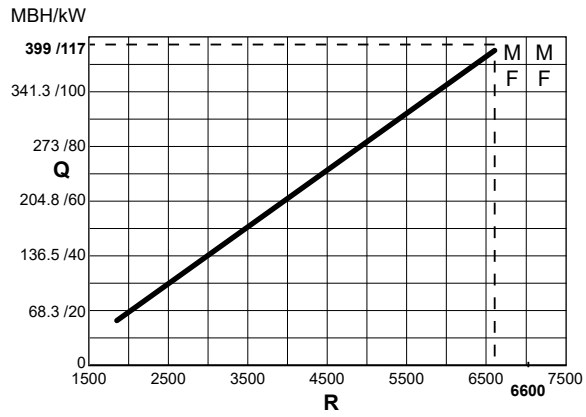
MCA Pro 115

M Maximum fuel input

F Factory setting

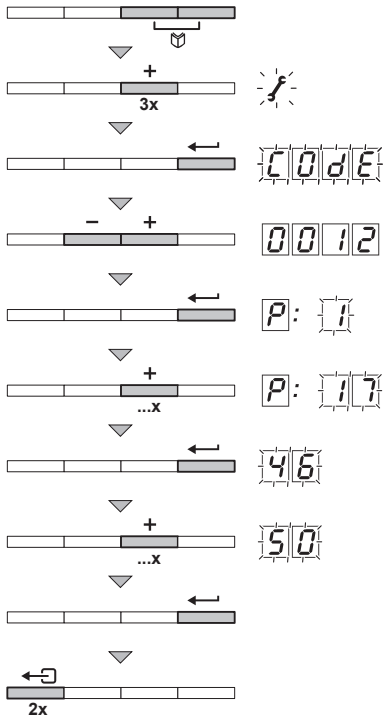
Q Fuel input MBH/kW

R Fan rotation speed (rpm)

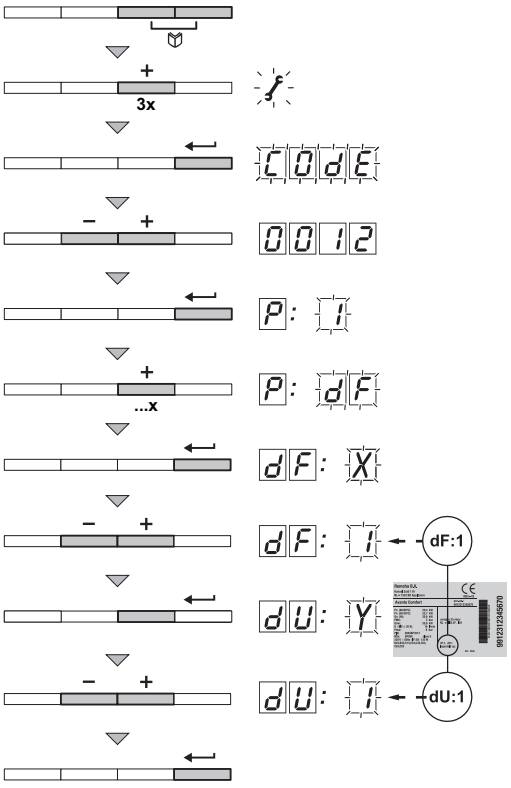


See the graphs for the relationship between heat input and speed for natural gas. The speed can be changed using parameter P17. To do this, proceed as follows:

5. Commissioning



1. Press the two buttons simultaneously and then [+] button until the symbol flashes on the menu bar.
2. Select the installers menu using the ⟵ button. CodE appears on the display.
3. Use **[-]** or **[+]** button to input the installer code 0012.
4. Confirm using ⟵ button. P: 1 is displayed with 1 flashing.
5. Press the **[+]** button to go to parameter P: 17.
6. Confirm using ⟵ button.
7. Press the **[+]** button to increase the speed from 46 to, for example, 50 (see the graphs for the associated heat output).
8 Confirm the value with the ⟵ button.
9. Press the ⟵ button 2 times to return to the current operating mode.



5.7.5. Return to the factory settings

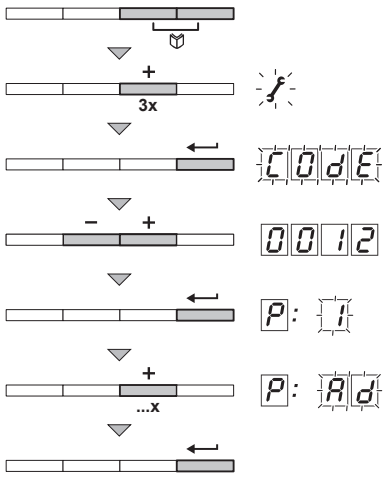
1. Press the two buttons simultaneously and then [+] button until the symbol flashes on the menu bar.
2. Select the installers menu using the ⟵ button. CodE appears on the display.
3. Use **[-]** or **[+]** button to input the installer code 0012.
4. Confirm using ⟵ button. P: 1 is displayed with 1 flashing.
5. Press the **[+]** button several times. P: dF is displayed with df flashing.
6 Press the ⟵ button. dF:x is displayed with X flashing. This is the current value of X. for dF. Check this against the value of X. on the type plate.
7. Enter the value of X. shown on the type plate using the **[-]** or **[+]** button.
8. Confirm the value with the ⟵ button, dF: Y is displayed with Y flashing. This is the current value of Y for dU. Check this against the value of Y on the type plate.
9. Enter the value of Y shown on the type plate using the **[-]** or **[+]** button.
10. Confirm the value with the ⟵ button. The factory settings are reset.
11. The display returns to the current operating mode.

5. Commissioning

5.7.6. Carrying out an auto-detect

After removing a control PCB, an auto-detect must be carried out. To do this, proceed as follows:

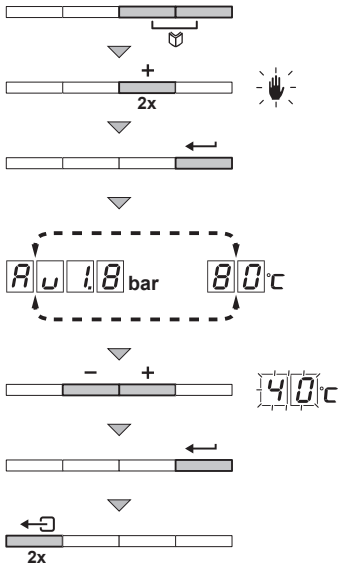
1. Press the two buttons simultaneously and then **[+]** button until the symbol flashes on the menu bar.
2. Select the installers menu using the ⟵ button. CODE appears on the display.
3. Use **[-]** or **[+]** button to input the installer code 0012.
4. Confirm using ⟵ button . P:1 is displayed with 1 flashing.
5. Press the **[+]** button several times. P:Ad is displayed with Ad flashing.
6. Confirm using ⟵ button. Auto-detect is carried out.
7. The display returns to the current operating mode.



5.7.7. Setting the manual mode

In some cases it may be necessary to switch the boiler to manual operation. For example, if the controller has not yet been connected, the boiler can be switched to automatic or manual operation under the symbol . To do this, proceed as follows:

1. Press the two buttons simultaneously and then **[+]** button until the symbol E flashes on the menu bar.
2. Press the ⟵ button:
   or
   The text Au with the current water pressure (only if an outdoor sensor is connected). The supply temperature is determined by the internal heating curve.
   or
   The value of the minimum flow temperature.
3. Press the **[-]** or **[+]** button to increase this value temporarily in manual operation.
4. Confirm the value with the ⟵ button. The boiler is now set to manual operation.
5. Press the ⟵ button 2 times to return to the current operating mode.



6 Shutting down the system

6.1 Shut-down

If the heating system is not used for a long period, we recommend shutting down the boiler.

- Switch the ON/OFF switch to OFF.
- Cut the power supply to the boiler.
- Shut off the gas supply.
- Ensure that the boiler and system are protected against frost damage.

6.2 Frost protection

⚠ CAUTION

If you are not going to use your home or building for an extended period of time and there is a chance of frost, drain the boiler and heating system.

- Set the temperature control low, for example at 50ºF/10ºC.

To prevent radiators and the system from freezing in rooms where there is a risk of frost (e.g. a garage or storage room), a frost thermostat or outdoor sensor can be connected to the boiler.

☞ See chapter: "Frost protection".

⚠ CAUTION

- The frost protection does not function if the boiler is switched off.
- The integrated protection system only protects the boiler, not the installation.
- The pump only start up in the event that the heating pump is controlled by the boilers controls

When the heating water temperature in the boiler gets too low, the integrated protection system in the boiler starts up. This protection functions as follows:

- If the water temperature is lower than 45ºF/7ºC, the heating pump starts up.
- If the water temperature is lower than 40ºF/4ºC, the boiler starts up.
- If the water temperature is higher than 50ºF/10ºC, the boiler shuts down and the heating pump continues to run for a short time.

7. Checking and maintenance

7.1 Annual start-up and general maintenance

Responsible		Description	Schedule
Service technician (refer to the following pages for instructions)		Any reported issues.	**Annual start-up (see first year special inspection)**
		Inspect the interior. If necessary, clean and vacuum. WARNING - **DO NOT USE SOLVENTS!**	
		Clean the condensate trap and fill with fresh water. Check for any leaks - gas, water, condensate, flue.	
		If used, check the system water chemistry, antifreeze concentration and inhibitor level.	
		Verify that the air and flue lines are sealed tight and in good condition.	
		Check the expansion tank, system piping and water pressure.	
		Check the control settings.	
		Clean the ignition electrode with steel wool and reposition. Replace if worn.	
		Ground wiring and ignition.	
		Check the wiring and connections.	
		Perform start-up and verify the performance beginning with the filling of the system.	
		Inspect the flame. Is it stable and consistent?	
		Checking ionization current, see page 90	
		Inspect the boiler gas piping and water piping.	
		If the flue temperature is more than 54°F/°C above the return water temperature, the heat exchanger will need to be cleaned.	
		Inspect the front casing gaskets v replace if necessary	
Owner maintenance (refer to the User manual for instructions)		Inspect the boiler area.	**Daily**
		Inspect the air openings.	
		Inspect the temperature/pressure gauges.	
		Ensure the boiler front door is secure.	
		Inspect the vent piping.	**Monthly**
		Inspect the air piping.	
		Inspect the relief valve.	
		Inspect the condensate system.	
		Inspect the automatic air vents, if used.	
		Test the low water cut off, if one is used.	**Periodically**
		Ensure the relief valve is operating properly.	**Every 6 months**
		Shut down the boiler unless it is used for domestic hot water.	**End of season**

Additional items if deemed necessary by the performance or combustion:

- Clean the heat exchanger.
- Remove and clean the burner. Use compressed air only.
- Vacuum the blower.

Review:

- Review the maintenance performed with the owner.

⚠⚠⚠ DANGER

Adhere to the maintenance and service procedures provided in this manual and other boiler literature. The boiler and/or the system could be damaged if the maintenance and service is not performed. Failure to adhere to the instructions in this and other boiler manuals could result in severe personal injury, substantial property damage or death.

Handling ceramic fiber materials

⚠⚠ WARNING

The burner gasket for the MCA Pro series and the cover plate insulation on all models contain ceramic fiber material. In very high temperature applications, the ceramic fiber can be converted to cristobalite. The IARC, International Agency for Research on Cancer, has come to the conclusion that, "Crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1)."

- Avoid any contact with eyes and skin and avoid breathing the dust.
  - Use dust respirators that are NIOSH certified (N95). This type of respirator is based on the OSHA requirements for cristobalite at the time this manual was written. There may be other types of respirators needed depending on the condition of the job site. The current NIOSH recommendations can be found on the NIOSH website at http://www.cdc.gov/niosh/homepage.html. You can also find a listing for NIOSH approved respirators, manufacturers, and phone numbers on the website.
  - Wear eye protection, gloves, and long-sleeved, loose fitting clothing.
- To prevent airborne dust, apply an adequate amount of water to the combustion chamber lining or base lining.
- Remove the base insulation or combustion chamber lining from the boiler and carefully place in a plastic bag for disposal.
- Wash any potentially contaminated clothing separately from any other clothing and rinse the clothes washing machine thoroughly.

NIOSH stated First Aid

- Contact with eyes: Irrigate/rinse immediately.
- Breathing: Fresh air.

Year one special inspection Notice

Before attempting the first year inspection, it is recommended that you obtain a maintenance kit for the MCA Pro boiler to ensure that all parts that might be requires are available. Included in this kit are a new ignitor, ignitor gasket, heat exchanger cover plate gasket, and a burner gasket (MCA Pro 35 and 45 only). Refer to the replacement parts section of this manual as these parts must be on hand to perform the first year inspection and replaced if necessary.

⚠⚠⚠ DANGER

A failure to replace the above mentioned items could result in death, severe personal injury or substantial product/property damage.

1. The first year inspection must be performed **no later than 12 months** after the boiler installation. The following must be included **in addition to the routine annual start-up procedures.**
   a. Follow the instructions on page 92 for the removal and replacement of the heat exchanger cover plate.
   b. Visually inspect the heat exchanger and, if necessary, clean. Refer to the cleaning instructions and diagrams on page 92 (Cleaning the heat exchanger - pin side when required).
   c. Inspect the condition of the cover plate insulation and the gasket and replace if necessary.
   d. Remove the burner and inspect it carefully and clean thoroughly with a vacuum cleaner and a soft brush if needed. Ensure that there is no accumulation of debris or blockage in the burner or burner ports. If necessary, replace the burner.
   e. Disconnect the drain lines and condensate trap, inspect them and then flush thoroughly
2. Determine any follow-up maintenance and service needs based on the conditions of the condensate lines and heat exchanger.
   a. If the condensate lines show an accumulation of sediment or if the heat exchanger shows substantial fouling, schedule a follow-up service call to perform the year one inspection again earlier than the 12 month period.
   b. An indication of possible combustion air contamination can be found in the heavy fouling of the heat exchanger or condensate lines. The air intake area will need to be carefully inspected and any possible contaminants removed. Refer to page 8 for a listing of products to avoid.

⚠⚠ WARNING

To ensure reliable operation of the MCA Pro boiler and the system, all causes of contamination and corrosion must be eliminated.

7. Checking and Maintenance

⚠⚠ WARNING

The boiler must be inspected and started up on an annual basis, at the beginning of the heating season, and only by a professional licensed heating contractor. In addition, the care and maintenance of the boiler as outlined on page 87 and explained on the following pages must be performed to ensure the maximum boiler reliability and efficiency. Failure to maintain and service the MCA Pro boiler and system could result in the equipment failing.

⚠⚠⚠ DANGER

Electrical shock hazard. Disconnect or turn off power to the boiler prior to any boiler servicing except as noted otherwise in this manual. Failure to disconnect or turn off electrical power could result in electrical shock causing death or severe personal injury.

Inspect any reported problems
Before proceeding, inspect and correct any issues or problems reported by the owner.

Inspect the boiler area
1. Inspect and verify that the boiler area is free from any gasoline, combustible materials, and any other flammable liquids and vapors.
2. Inspect and verify that the air intake area is free of any contaminants that are listed on page 8. If any contaminants are found in the air intake area, they must be removed. If removal is not possible the air and vent lines will have to be reinstalled as per the instructions found in this manual.

Inspection of door gaskets and the boiler interior
1. Remove the front door casing and inspect the interior of the boiler.
2. Make a visual inspection of the door gaskets and verify that they are all in good condition. Replace if necessary.

⚠⚠ WARNING

The door gaskets must be in perfect condition and must provide a reliable seal. Replace any damaged gaskets.

3. If necessary, remove and clean the Venturi air inlet silencer. Replace the silencer.
4. Use a vacuum to remove any sediment from the inside of the boiler and the boiler components. Remove any obstructions.

⚠⚠ WARNING

Never use solvents to clean any of the MCA Pro boiler components as these components could be damaged which would result in unreliable and unsafe boiler operation.

Cleaning the condensate trap
1. Unscrew condensate container and empty the water from the trap line, inspect the line and flush out with fresh water if needed.
3. Inspect the condensate container, the condensate line to the drain and flush if necessary to clean it. Ensure the condensate trap is filled with water before operational boiler.Refer to chapter 4.12.2.
4. Reinstall the condensate trap line and tighten the hose clamps.

Checking the pipes for leaks

⚠⚠ WARNING

All boiler or system leaks must be eliminated. The life of the boiler will be reduced with the addition of continual fresh make-up water. There can be a build-up of minerals on the sections, reducing heat transfer, overheating the heat exchanger, and causing the heat exchanger to fail. Severe property damage can also be caused by leaking water.

1. Inspect and verify that all water and gas pipes are leak free.
2. Check for any signs of lines leaking and rectify and problems that are found.

Checking the air openings
1. Inspect and verify that the combustion and ventilation air openings to the boiler room and/or the building are unobstructed and open. If used, check the wiring and operation of the automatic air dampers.
2. Inspect and verify that the boiler air intake and vent discharge are clean and free of obstructions.

Air piping and flue vent system
Make a visual inspection of the entire combustion air piping and flue gas vent system for any blockages, leakage, or signs of deterioration. Repair any and all joints that show signs of leakage in accordance with the vent manufacturer's instructions.

⚠⚠⚠ DANGER

A failure to inspect the boiler and system for the above conditions and subsequently have them repaired can result in death or severe personal injury.

Checking the water system
1. Inspect and verify that all system components are correctly installed and operational.
2. Check and verify that the cold fill pressure for the system is correct. This is usually around 13 psig/ .88 Bar.
3. During testing, watch the boiler system pressure as it heats up in order to ensure that the pressure does not rise too high. An excessive pressure rise indicates a performance issue or an expansion tank problem.
4. Inspect the air separators and automatic air vents. To flush the vent, remove the air vent caps and briefly press the push valve. Reinstall the vent caps. Ensure that the vents do not leak and replace any leaking vents.
5. Check the pH, hardness and inhibitor level of the water system chemistry. Refer to page 28.

Checking the expansion tank
1. An expansion tank provides space for the water

to move in and out as the heating system water expands due to temperature increase or contracts as the water cools. The expansion tanks may be closed or diaphragm, open or bladder type. Refer to page 30 of this manual for the suggested location of an expansion tank or air eliminator.

- Closed type is located above the boiler and welded gas tight and the tank is partially filled with water which leaves an air cushion for expansion.
  - Ensure that this type of tank is fitted with a tank fitting (such as Taco Taco-Trol or B & G Tank-Trol) which reduces the gravity circulation of air saturated tank water back into the system and prevents the air from bubbling up trough the water as it returns from the system.
  - Systems with the closed type tanks cannot use the automatic air vents. Instead of returning to the tank, the air will escape from the system. This will lead to the tank eventually becoming waterlogged and no longer being able to control pressurization and the boiler relief valve will frequently weep.
- Diaphragm or bladder type is most often found near the boiler but may be located at any point in the system. It is welded gas tight and has a rubber membrane to separate the tank pressurizing air and the water.
  - At least one automatic air vent is required by systems with this type of expansion tank and located preferably on top of an air eliminator. This is shown in examples found in this manual.
- Open type expansion tank is located above the highest baseboard or radiator unit and is usually found in the closet or attic. This expansion tank has a gauge glass and an overflow pipe to a drain.

2. The expansion tank may be undersized or waterlogged if the relief valve has a tendency to frequently weep.
   - Diaphragm or bladder type expansion tank - verify that the tank size is large enough for the system. If the expansion tank is too small, one or more additional tanks will have to be added in order to provide sufficient expansion. If the expansion tank is large enough, remove it. From the system and check the charge pressure which is usually 12 psig for residential applications. If the expansion tank does not hold the pressure, it indicated that the membrane has been damaged. The tank will need to be replaced.

Inspection of the ignition electrode

Inspection of the ignition electrode

1. Remove the ignition electrode plug from the ignition transformer.

i The ignition cable is fixed to the ignition electrode and therefore may not be removed.

2. Unscrew the 2 screws. Remove the unit.
3. Wipe off all traces of deposits using an abrasive cloth.
4. Check the ignition electrode for wear. Replace if necessary.
5. Check the gasket.
6. Refit all parts, replacing those that are damaged.

Checking the ignition wiring

1. Check the boiler ground wire from the heat exchanger access cover to the ground terminal strip.
2. Inspect and verify that all wiring is in good condition and attached in a secure manner.
3. Use a continuity meter to check the ground continuity of the wiring.
4. If after checking the results are not satisfactory, replace the ground wires.

Checking all the boiler wiring

Check and verify that all boiler wiring is in good condition and attached in a secure manner.

Checking the control settings

1. Navigate through all the settings using the control display and adjust settings if needed.
2. Checks and adjust, if needed, the external limit controls settings (if any).

Perform the start-up and checks

1. Start the boiler and perform the checks and tests outlined in this manual.
2. Check and verify that the cold fill pressure is correct and that the operating pressure does not go too high.
3. The check-out procedure can now be completed as outlined on **page 118**.

Checking the burner flame

⚠⚠ WARNING

The MCA Pro boiler contains ceramic fiber materials. Follow the instructions on **page 84** In this manual when handling ceramic fiber materials. Failure to heed this warning could result in severe personal injury.

1. Follow the procedure on below when inspecting the flame through the observation window.
2. If the flame is not satisfactory at either low fire or high fire, turn the boiler off and let it cool down. Remove the burner and thoroughly clean it with

a vacuum cleaner or compressed air. Never use compressed air to clean the burner if you are doing this procedure inside a building.
3. In order to access the burner, the heat exchanger cover will have to be removed by following the procedure outlined on page 92.
4. Inspect and verify that the gasket is in good condition and correctly positioned before replacing the burner. Once the three retainer screws have been tightened, bend up the retainer tabs as shown below in order to prevent screw rotation.
5. Reinstall the cover plate using the procedure shown on page 95.
6. After the servicing has been completed, reinstall all the boiler components and retest the boiler.

Checking the boiler relief valve

1. Check the pressure relief valve and lift the lever to verify the flow as in the following warnings, . Prior to operating any relief valve, ensure that it is piped with its discharge in a safe area in order to avoid the potential for a severe scald.**Refer to page 25 & 26** before proceeding any further.

⚠⚠⚠ DANGER

Pressure relief valve safety instructions
This device is designed for emergency safety pressure relief and shall not be used as an operating control. The safety pressure relief valve shall be connected to the boiler with the valve in the vertical position, directly onto the 3/4" street elbow which is mounted directly into the $1^{1/4"}$ X $1^{1/4"}$ X 3/4 NPT black iron malleable TEE fitting. Ensure the exit relief port is connected to the second 3/4" street elbow and ensure that this 3/4" street elbow is facing downward.
Failure to comply with these instructions can result in serious personal injury or death and/ or severe property damage.

⚠⚠ WARNING

To avoid water damage or scalding due to valve operation, discharge line must be connected to valve outlet and run to a safe place of disposal. Discharge line must be as short as possible and be the same size as the valve discharge connection throughout its entire length. Discharge line must pitch downward from the valve and terminate at least 6”/152 mm above the floor drain where any discharge will be clearly visible. The discharge line shall terminate through plain (unthreaded) pipe. Discharge line material must conform to local plumbing code or ASME requirements. No shutoff valve shall be installed between the relief valve and oiler, or in the discharge line.

⚠⚠ WARNING

If discharge occurs, CALL A PLUMBER IMMEDIATELY. A licensed contractor must evaluate the system and determine the cause of discharge and correct the cause immediately. Discharge may indicate that an unsafe pressure condition exists within the tank which requires immediate attention by a licensed plumbing contractor.

⚠⚠ WARNING

Following installation, the valve lever MUST be operated AT LEAST ONCE A YEAR by the boiler owner to insure that waterways are clear. Certain naturally occurring mineral deposits may adhere to the valve, rendering it inoperative. When manually operating the lever, water will discharge and precautions must be taken to avoid contact with hot water and to avoid water damage. BEFORE operating lever, check to see that a discharge line is connected to this valve directing the flow of hot water from the valve to a proper place of disposal otherwise personal injury may result. If no water flows, valve is inoperative. **CALL A PLUMBER IMMEDIATELY.**

Notice
This valve must be installed by a licensed plumbing contractor in accordance with these instructions. Repair or alteration of valve in any way is prohibited by national safety standards/local codes.
This boiler water safety relief valve is for protection against excessive water pressure caused by thermal expansion of the water. Although the valve also has an emergency BTU steam discharge capacity if runaway firing conditions occur, do not use for continuous steam service.

⚠⚠ WARNING

REINSPECTION OF SAFETY RELIEF VALVES; Safety Relief Valves should be reinspected AT LEAST ONCE EVERY THREE YEARS by a licensed plumbing contractor or authorized inspection agency, to insure that the product has not been affected by corrosive water conditions and to insure that the valve and discharge line have not been altered or tampered with illegally. Certain naturally occurring conditions may corrode the valve or its components over time, rendering the valve inoperative. Such conditions are not detectable unless the valve and its components are physically removed and inspected. **Do not attempt to conduct this inspection on your own.** Contact your plumbing contractor for a reinspection to assure continuing safety.

FAILURE TO REINSPECT THIS VALVE AS DIRECTED COULD RESULT IN UNSAFE PRESSURE BUILD-UP WHICH CAN RESULT IN SERIOUS INJURY OR DEATH AND/OR SEVERE PROPERTY DAMAGE.

2. If, after following the aforementioned warning directions, the relief valve weeps or will not seat properly, it will need to be replaced. Verify that the reason for the w eeping of the relief valve is in fact the valve and not over pressurization of the system due to the expansion tank being waterlogged or undersized.

Review with the owner

1. Review the User Information Manual with the owner.
2. Inform the owner of the maintenance schedule specified in this manual and the User Information Manual.
3. Remind the owner of the necessity to call a professional licensed heating contractor in the event that the boiler or the system exhibit any

Kits

Part No.	Item Description	Boiler Model
MM176234DD	Kit for low water cut-off with test button	MCA Pro 35-115
S52484	Cleaning tool for heat exchanger	MCA Pro 35/45/65
S58286	Cleaning tool for heat exchanger	MCA Pro 90/115
S103209 Service Kit A	*Annual maintenance kit (Sealing heat exchanger front plate, M6 nuts frontplate, Ignition/ionization electrode including gasket and screws)	MCA Pro 35-115
S103210 Service Kit B	*Annual maintenance kit (Sealing heat exchanger front plate, M6 nuts frontplate, Ignition/ionization electrode including gasket and screws, Insulation plate heat exchanger)	MCA Pro 35-115
S103211 Service Kit C	*Annual maintenance kit (Sealing heat exchanger front plate, M6 nuts frontplate, Ignition/ionization electrode including gasket and screws, Insulation plate heat exchanger, Non return valve with gasket)	MCA Pro 35-115
S57241	Sealing heat exchanger front plate	MCA Pro 35-115
S54731	Insulation plate heat exchanger	MCA Pro 35-115

** Annual maintenance is representative of 2000 hours each of boiler use per year*

7.2 Maintenance message

It is mandatory to have the boiler inspected and serviced on a yearly basis. To determine the best time for maintenance, the boiler is fitted with a function that automatically signals any maintenance to be carried out. The appearance of this service message on the boiler display is determined by the automatic control unit

⚠⚠ WARNING

- Maintenance operations must be done by a qualified proffesional.
- An annual inspection is mandatory.
- Only original spare parts must be used.

7.3 Preventive maintenance with automated service message

When it is time to carry out maintenance on the boiler, the following instructions are shown on the display:
In a yellow display:

- The symbol
- The symbol **SERVICE**
- Maintenance message A, b or C

The maintenance message indicates which kit should be used. If no other faults are noted during the inspection initiated subsequent to the maintenance message, these maintenance kits include all of the parts needed for the maintenance concerned (such as the gaskets, for example). The automatically transmitted maintenance message makes it is possible to carry out preventive maintenance and therefore use the maintenance kits defined by DDR Americas Inc.

i When a maintenance message is displayed, it must be acted upon within the 2 months following the appearance of the message.

⚠ CAUTION

Reset the maintenance message to zero after each inspection

⚠⚠ WARNING

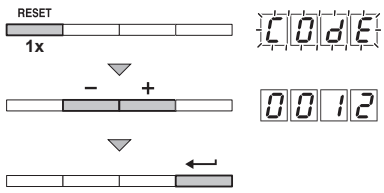
The behaviors of the boiler can be altered when parts are removed and reinstalled. The boiler performance needs to be checked after each maintenance procedure to verify that it is operating properly. This can be done by following the complete system start-up procedure in this manual. Failure to follow proper start-up procedure could result in severe personal injury, substantial property damage or death.

7. Checking and maintenance

7.3.1. Resetting the automatic maintenance message

A service message on the boiler display must be reset by a qualified installer after the maintenance service has been carried out using the relevant service set. To do this, proceed as follows:

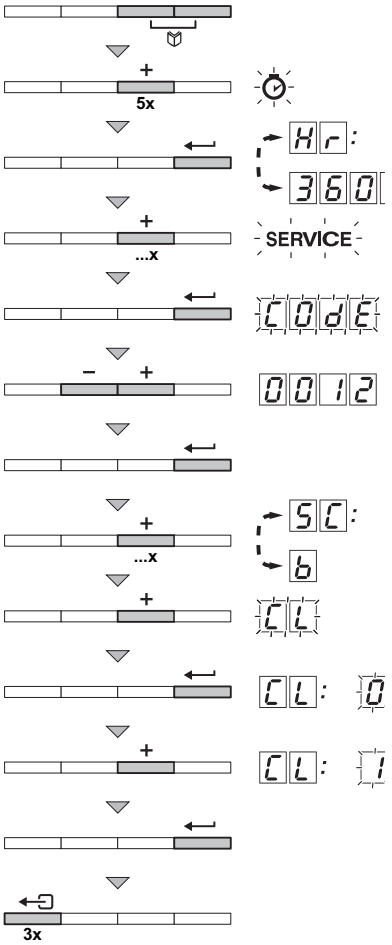
1. When the maintenance message is displayed, press **RESET** button 1 time. CODE appears on the display.
2. Use **[-]** or **[+]** button to input the installer code 0012.
3. Confirm using ↵ button. The maintenance message is reset. The display returns to the current operating mode.



7.3.2. Dealing with the next maintenance message and starting the new maintenance period

For an interim service it is advisable to read out in the boiler service menu what maintenance service should be carried out. Use the indicated DDR Americas Inc. Maintenance Kit (A, B or C). This service message must be prevented by carrying out a reset. Start the next service interval. To do this, proceed as follows:

1. Press the two buttons simultaneously and then [+] button until the symbol flashes on the menu bar.
2. Press the ↵ button. Hr and the number of hours of boiler operation 3600 (for example) are displayed alternately.
3. Press **[+]** button several times until **SERVICE** flashes on the menu bar.
4. Press the ↵ button. CODE appears on the display.
5. Use **[-]** or **[+]** button to input the installer code 0012.
6. Confirm using ↵ button.
7. Press **[+]** button several times until SC:b. is displayed with b. (for example) flashing To determine the best time to carry out maintenance, the boiler is fitted with a single automatic maintenance indicator.
8. Press the **[+]** button a second time. CL appears on the display.
9. Press the ↵ button. CL:0 is displayed with 0 flashing.
10. Press **[+]** button to modify the value to 1.
11. Confirm using ↵ button. The new maintenance period begins.
12. Press the ↵ button 3 times to return to the current operating mode.



> *i* After a service complete the checklist.
> ☞ See chapter: "Checklist for periodic inspection and maintenance", page 114.

7. Checking and maintenance

7.4 Standard inspection and maintenance operations

⚠ CAUTION

- During inspection and maintenance operations, always replace all gaskets on the parts removed.
- During inspection and maintenance operations always protect all electrical components from water (dripping, sprying, etc.).
- If connected: Inspection of LWCO and flushing float pipes.

7.4.1. Checking the system pressure

The system pressure must reach a minimum of 11.6 psig/0.8 bar. If the water pressure is too low, the symbol [u.5:i4] will appear.

i If necessary, top up the water level in the heating system (recommended system pressure between 22 - 30 psig/1.5 - 2 bar).

7.4.2. Checking the ionization current

Check the ionization current at full load and low load. The value is stable after 1 minute. If the value is less than 4 µA, clean or replace the ignition electrode.
☞ See chapter: "Reading the various current values", page 72.

7.4.3. Checking the tightness of the flue gas venting and air inlet connections

- Check the tightness of the flue gases evacuation and air inlet connections.
- Check the condition of the vent system. Carry out a visual check for the presence of any damages and/ or corrosion.

7.4.4. Checking combustion

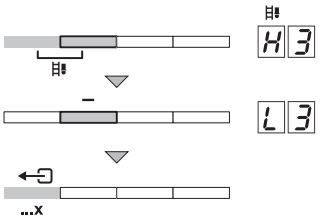
The check on combustion is done by measuring the percentage of O_2/CO_2 in the flue gas discharge flue. To do this, proceed as follows:

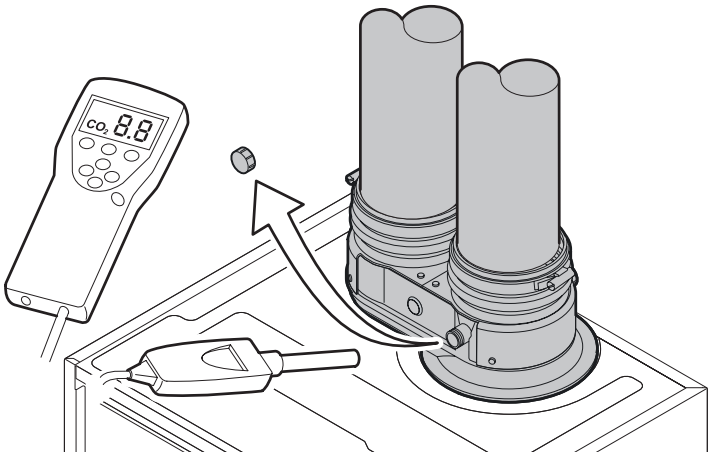
1. Unscrew the plug of the flue gas measurement point.
2. Connect the flue gas analyser.

⚠ CAUTION

Ensure that the opening around the combustion analyzer probe is completely sealed when taking measurements.

3. Set the boiler to full load. Press the two ☰ buttons simultaneously.
   The ☰ symbol is visible on the menu bar and [H3] appears in the display. The boiler is now operating at full load.
4. Measure the percentage of CO_2 and compare this value with the checking values given.
   ☞See chapter: "Setting the air/gas ratio (Full load)", page 69.
5. Set the boiler to part load. Press the **[-]** buttons several times until [L3] is displayed on the screen. The boiler is now operating on part load.
6. Measure the percentage of CO_2 and compare this value with the checking values given.
   ☞ See chapter: "Setting the air/gas ratio (Part load)", page 70.

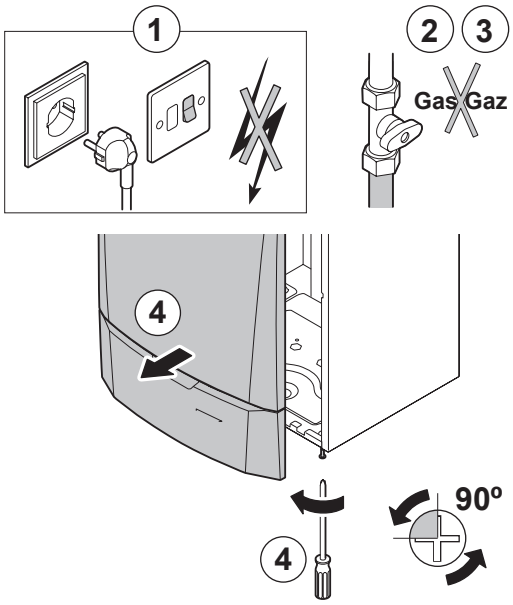




7. Checking and maintenance

7.4.5. Checking the automatic air vent

1. Switch off the boiler electrical power supply.
2. Close the gas valve on the boiler.
3. Close the main gas inlet valve.
4. Unscrew the two screws located under the front panel by a quarter turn and remove the panel.
5. Tilt the control box forwards by opening the holding clips located at the sides.
6. Check whether there is any water in the small hose on the automatic air vent.
7. If any leaks are detected, replace the air vent.



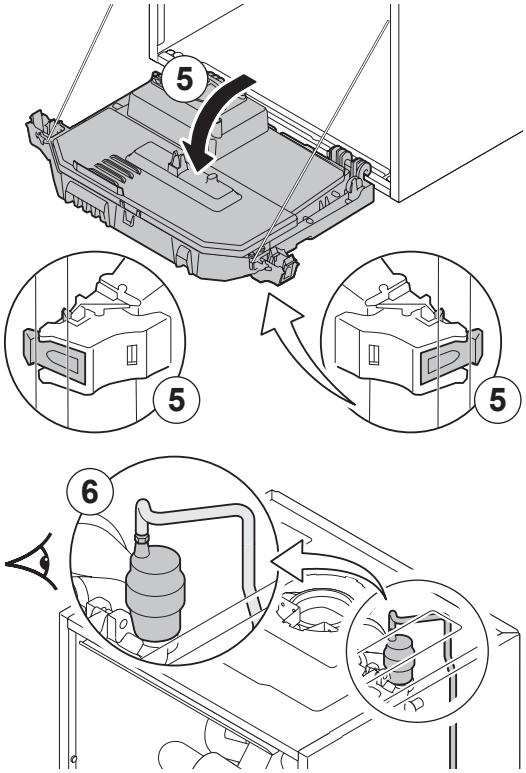
7.4.6. Checking the siphon

⚠⚠ WARNING

Siphon must always be full.

⚠⚠ WARNING

Under no circumstance can trisodium phosphate, commonly known as TSP, be used to clean a system that contains aluminium.
This cleaning solution has a very high pH level which will remove the natural protective oxide layer off of the aluminium. Although the layer of oxide will reform, if there are small amounts of trisodium phosphate left in the system, they will continue to remove the protective oxide layer which in turn will reduce the life of the heat exchanger.



7.4.7. Checking the burner and cleaning the heat exchanger

⚠⚠⚠ DANGER

Electrical shock hazard. Prior to performing boiler maintenance, make sure to disconnect all electrical power to the boiler. Failure to do this could result in severe personal injury, substantial property damage or death.

⚠ CAUTION

During inspection and maintenance operations, always replace all gaskets on the parts removed.

1. Remove the air inlet flue on the Venturi.
2. Loosen the union on the gas block.
3. Remove the plugs from the fan.
4. Remove the plugs from the gas block.
5. Remove the ignition electrode plug from the ignition transformer.
6. Remove the front plate from the heat exchanger
7. Carefully lift the front plate including the burner and fan from the heat exchanger.
8. Use a vacuum cleaner fitted with a narrow endpiece to clean the top part of the heat exchanger (combustion chamber).
9. Thoroughly clean with the vacuum cleaner again without the top cleaning brush on the endpiece.
10. Check (using a mirror, for example) whether any dust can still be seen. If so, vacuum it up.
11. Clean the lowermost part of the heat exchanger with the special cleaning knife (accessory).
12. The burner does not require any maintenance, it is self-cleaning. If necessary, clean the cylindrical burner using compressed air. Check that there are no cracks and/or other tears on the surface of the dismantled burner. If this is not the case, replace the burner.
13. Checking the ignition electrode / ionization sensor.
14. The front plate insulation blanket needs to be inspected. If the installation blanket appears to damaged or severally burned the installation blanket must be replaced with part number S54731
15. To re-assemble, the front plate sealed must be replaced part number S57241. Perform the assymbly in the revised order as above. actions in reverse order.

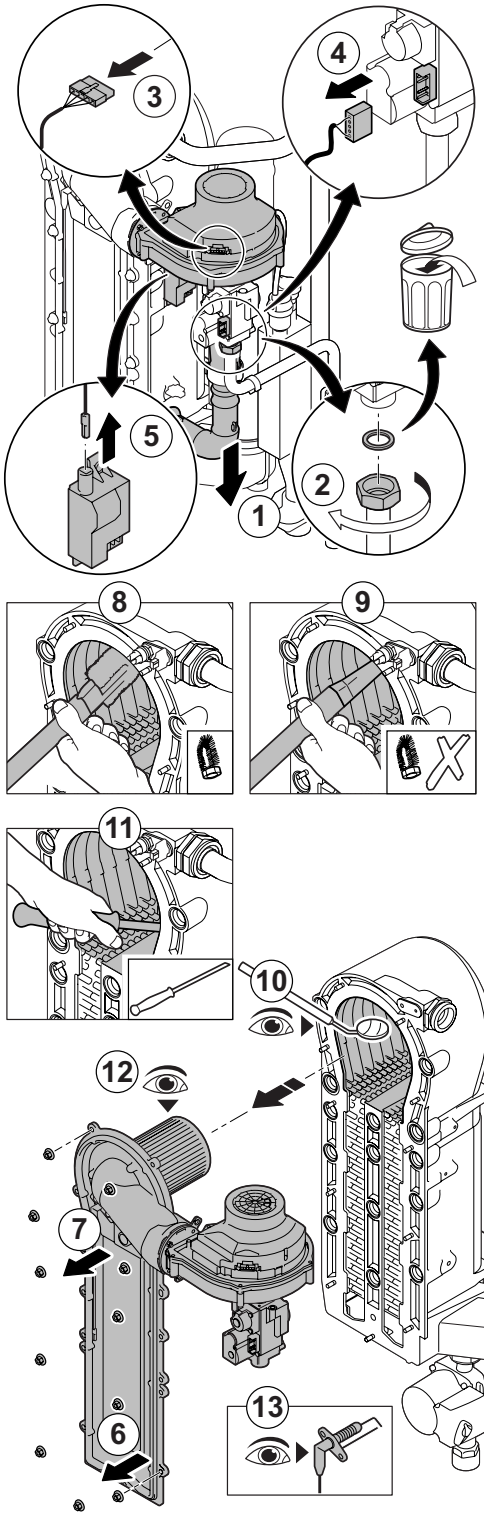
⚠ CAUTION

- Remember to reconnect the connector to the fan.
- Check that the gasket is correctly positioned between the mixing elbow and the heat exchanger. (Completely flat in the appropriate groove means it is leak proof).

15. Open the gas inlet valves and switch on the mains supply to the boiler.

Cleaning the heat exchanger water side

Use only approved cleaning products for the MCA pro boiler. Refer to Section 4.6 Water Connections for aproved products.

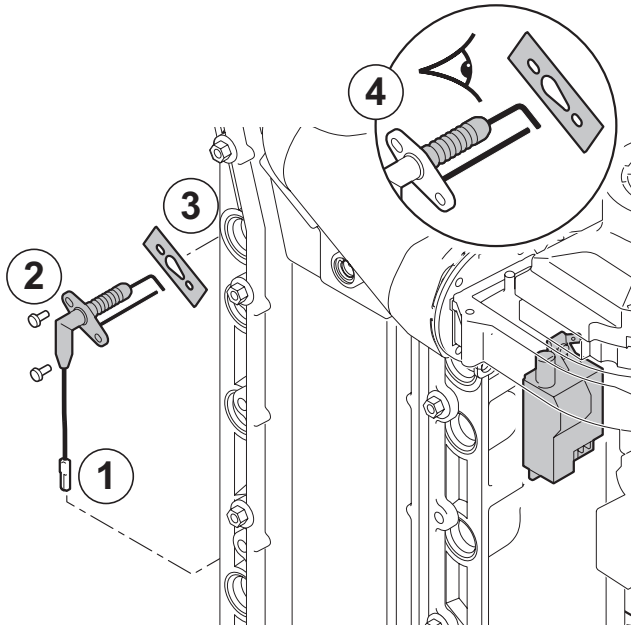


Cleaning the heat exchanger pin side

⚠⚠ WARNING

Ceramic fiber materials are used in the boiler. Care should be taken when handling these materials. Failure to heed and comply with these warnings could result in severe personal injury.

1. Shut down the boiler:
   a. Follow the instructions in the "To turn off gas to appliance" on the boiler and lighting instructions.
   b. Unless the boiler will be exposed to freezing temperatures, it does not need to be drained. If antifreeze is used in the boiler system, do not drain the boiler.
2. If the boiler has been firing, it will need to cool down to room temperature.
3. To remove the front casing door, remove the two screws at the lower front. Lift the casing door to remove it from the boiler.



7.5 Specific maintenance operations

If the standard inspection and maintenance operations have revealed the necessity to carry out additional maintenance work, proceed as follows, depending on the nature of the work:

7.5.1. Inspection of the ignition electrode

1. Remove the ignition electrode plug from the ignition transformer.

i The ignition cable is fixed to the ignition electrode and therefore may not be removed.

2. Unscrew the 2 screws. Remove the unit.
3. Wipe off all traces of deposits using an abrasive cloth.
4. Check the ignition electrode for wear. Replace if necessary.
5. When reassembling the front cover alway replace the gasket.

Rinse the heat exchanger pins after the cleaning

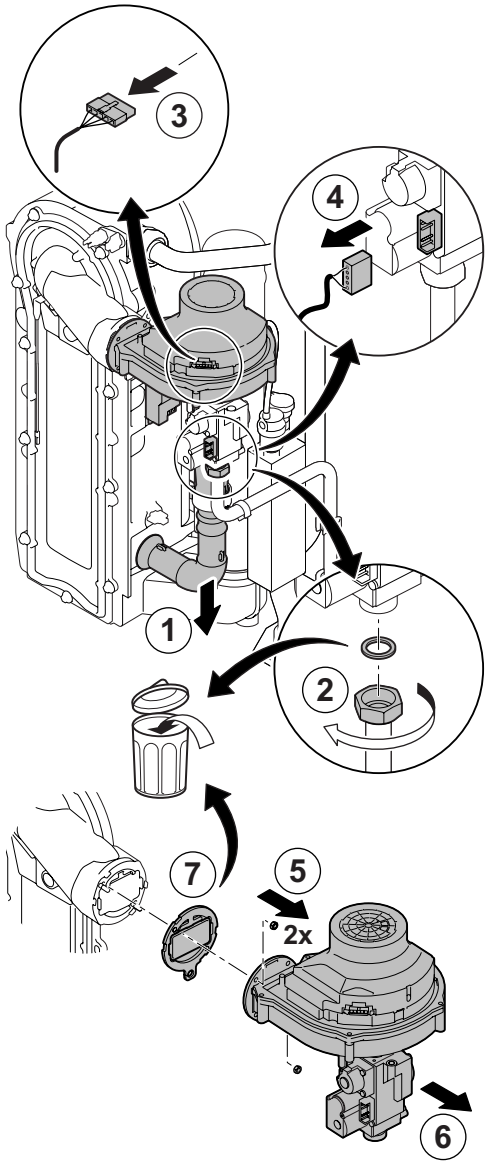
1. Once the cleaning of the the heat exchanger pins has been completed with the cleaning tool, rinse the pins to flush out the remaining sediment.
2. Remove the remainder of the sediment from the bottom of the heat exchanger using a vacume cleaner fitted a narrow end piece.
3. Disconnect the condensate line located at the bottom of the heat exchanger.
   a. Loosen the hose clamps located at both ends of the condensate line.
   b. Remove the condensate line and place a bucket or container underneath the trap connection.
   c. Fill the bottom of the heat exchanger with water and flush out the remaining sediment to the condensate outlet.
   d. Flush the condensate line thoroughly with water to remove any sediment particulates.
   e. Remove the bucket or container and replace the condensate line.
   f. Follow the steps on pages 94+95 to check the components and replace the burner cover.

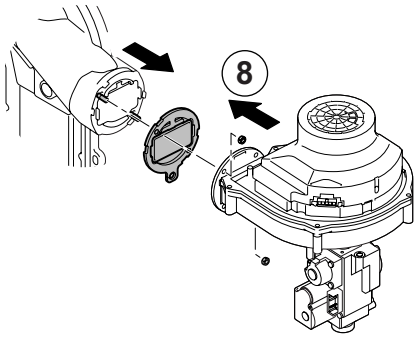
6. Refit all parts, replacing those that are damaged.

7.5.2. Replacing the non-return valve

Replace the nonreturn valve when faulty or when the maintenance kit contains one. To do this, proceed as follows:

1. Remove the air inlet flue on the Venturi.
2. Loosen the union on the gas block.
3. Remove the plugs from the fan.
4. Remove the plugs from the gas block.
5. Dismantle the fan.
6. Completely remove the fan/mixing elbow unit.
7. Replace the non-return valve located between the mixing elbow and the fan.
8. To re-assemble, perform the above actions in reverse order.





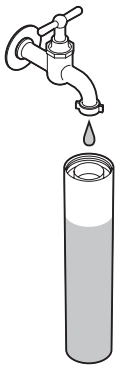
7.5.3. Assembling the boiler

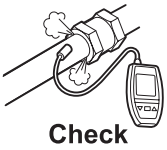
1. Follow the procedure in reverse to re-assemble all of the components.

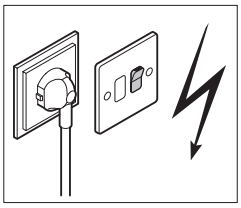
Reinstall the front casing after start-up or servicing

⚠⚠⚠ DANGER

Reinstall the front casing after start-up or servicing.
The front casing must be securely attached to the boiler in order to prevent it from drawing air from inside the boiler room. This is very important especially if other appliances are located in the same room as the boiler.
Inspect the gaskets of the front boiler casing.
There should be no tears or gaps in the gaskets.
If the gaskets are not in good condition, replace if necessary.
If the front casing is not sealed or secured properly, it could result in severe personal injury or death.







i After a service complete the checklist.
☞ See chapter: "Checklist for periodic inspection and maintenance", page 114.

8. Troubleshooting

8.1 Error codes

The boiler is fitted with an electronic regulation and control unit. The heart of the control system is a microprocessor, the **Comfort Master©**, which controls the boiler and also protects the boiler. If a fault is detected anywhere in the boiler, the boiler locks out and the display will show the fault code as follows:

In a red flashing display:
- The symbol ⚠
- The symbol **RESET**
- The fault code (for example E:01)

The meaning of the error codes is given in the error table. To do this, proceed as follows:

i Note the error code displayed.
The fault code is important for correct and fast tracing of the nature of the fault and for obtaining support from your heating contractor.

- Press the **RESET** button for 2 seconds. If the error code continues to display, search for the cause in the error table and apply the solution.

i If the display does not show **RESET** but rather ⏻, the boiler must be switched OFF and then switched ON again after 10 seconds before the fault can be reset.

Error code	Description	Probable causes	Checking / solution
E:00	Storage unit PSU parameter not found	• Bad connection	• Check the wiring
E:01	The safety parameters are incorrect	• Bad connection • PSU defective	• Check the wiring • Replace PSU
E:02	Supply temperature sensor short circuited	• Bad connection • Sensor fault • Sensor not or badly connected	• Check the wiring • Check that the sensors are operating correctly • Check that the sensor has been correctly fitted • Replace the sensor if necessary
E:03	Supply temperature sensor open circuit	• Bad connection • Sensor fault • Sensor not or badly connected	• Check the wiring • Check that the sensors are operating correctly • Check that the sensor has been correctly fitted • Replace the sensor if necessary
E:04 E:05	Temperature of heat exchanger too low Exchanger temperature too high	• Bad connection • Sensor fault • Sensor not or badly connected • No circulation	• Check the wiring • Replace the sensor if necessary • Vent the air in the heating system • Check the circulation (direction, pump, valves) • Check the water pressure • Check that the sensors are operating correctly • Check that the sensor has been correctly fitted • Check the cleanliness of the heat exchanger

8. Troubleshooting

Error code	Description	Probable causes	Checking / solution
E:06	Return temperature sensor short circuited	• Bad connection • Sensor fault • Sensor not or badly connected	• Check the wiring • Check that the sensor has been correctly fitted • Check that the sensors are operating correctly
E:07	Return temperature sensor open circuit	• Bad connection • Sensor fault • Sensor not or badly connected	• Check the wiring • Check that the sensor has been correctly fitted • Check that the sensors are operating correctly
E:08 E:09	Return temperature too low Return temperature too high	• Bad connection • Sensor fault • Sensor not or badly connected • No circulation	• Check the wiring • Replace the sensor if necessary • Vent the air in the heating system • Check the circulation (direction, pump, valves) • Check the water pressure • Check that the sensors are operating correctly • Check that the sensor has been correctly fitted • Check the cleanliness of the heat exchanger
E:10 E:11	Difference between the supply and return temperatures too great	• Sensor fault • Sensor not or badly connected • No circulation	• Replace the sensor if necessary • Vent the air in the heating system • Check the circulation (direction, pump, valves) • Check the water pressure • Check that the sensors are operating correctly • Check that the sensor has been correctly fitted • Check the cleanliness of the heat exchanger • Check that the heating pump is operating correctly
E:12	Temperature of heat exchanger above normal range (high-limit thermostat STB)	• Bad connection • Sensor fault • Sensor not or badly connected • No circulation	• Check the wiring • Replace the sensor if necessary • Vent the air in the heating system • Check the circulation (direction, pump, valves) • Check the water pressure • Check that the sensors are operating correctly • Check that the sensor has been correctly fitted • Check the cleanliness of the heat exchanger • Check that parameter P35 has been set correctly

8. Troubleshooting

Error code	Description	Probable causes	Checking / solution
E:14	5 burner start-up failures	No ignition	• Check cabling of ignition transformer • Check the ionization/ignition electrode • Check breakdown to earth • Check the condition of the burner set • Check the grounding • Defective control SU PCB
		• Presence of the ignition arc but no flame formation	• Purge the gas supply to remove air • Check that the gas valve is fully opened • Check the supply pressure • Check the operation and setting of the gas valve unit • Check that the air inlet and flue gas discharge flues are not blocked • Check the wiring on the gas valve unit • Defective control SU PCB
		• Presence of the flame but insufficient ionization (<3 µA)	• Check that the gas valve is fully opened • Check the supply pressure • Check the ionization/ignition electrode • Check the grounding • Check the wiring on the ionization/ignition electrode
E:16	False flame signal	• Ionization current present when there should not be a flame • Ignition transformer defective • Gas valve defective • The burner remains very hot: CO2 too high	• Check the ionization/ignition electrode • Check the gas valve and replace if necessary • Set the CO2
E:17	Problem on the gas valve SU PCB	• Bad connection • Defective SU PCB	• Check the wiring • Inspect the SU PCB and replace it if need be
E:34	Fan fault	• Bad connection • Fan defective	• Check the wiring • Replace the fan if need be • Check for adequate draw on the chimney connection
E:35	Supply and return reversed	• Bad connection • Sensor fault • Sensor not or badly connected • Water circulation direction reversed	• Replace the sensor if necessary • Check the circulation (direction, pump, valves) • Check that the sensors are operating correctly • Check that the sensor has been correctly fitted

8. Troubleshooting

Error code	Description	Probable causes	Checking / solution
E:36	5x Flame loss	• No ionization current	• Purge the gas supply to remove air • Check that the gas valve is fully opened • Check the supply pressure • Check the operation and setting of the gas valve unit • Check that the air inlet and flue gas discharge flues are not blocked • Check that there is no recirculation of flue gases
E:37	Communication error with the SU PCB	• Bad connection	• Check whether the SU PCB has been correctly fitted in the connector on PCU PCB
E:38	Communication error with the SCU PCB	• Bad connection • Defective SCU PCB	• Check the wiring • Replace SCU PCB
E:39	Shutdown input in locked-out mode	• Bad connection • External cause • Parameter incorrectly set	• Check the wiring • Suppress the external cause • Check the parameters
E:40	HRU/URC unit test error	• Bad connection • External cause • Parameter incorrectly set	• Check the wiring • Suppress the external cause • Check the parameters

8.2 Shutdowns and lock-outs

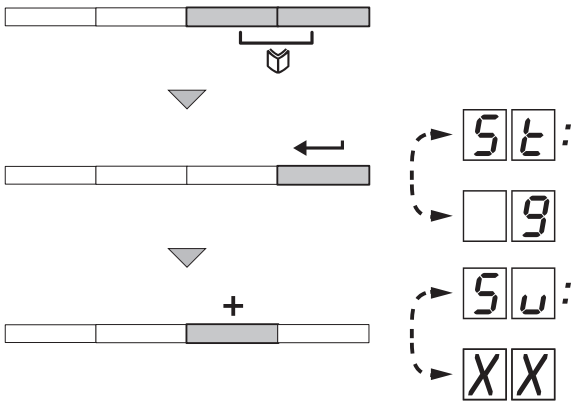
8.2.1. Blockage

If the blocking conditions still exist after several start up attempts, the boiler will switch into locking mode (fault). The boiler can only start operating again once the causes of the lock-out have been rectified and after pressing the ↵ button.

8.2.2. Lock-out

A (temporary) blocking mode is a boiler operating function caused by an unusual situation. In this case, the display gives a code of blocking (code St[:9). The boiler control will try to re-start several times. The boiler will start up again after the blocking conditions have been eliminated. The shutdown codes can be read out as follows:

1. Press the two ☐ buttons simultaneously.
2. Confirm by pressing ↵ button. St is displayed, alternating with the shutdown code 9.
3. Press the **[+]** button. Su. appears on the display.



i The boiler starts up again automatically when the reason for the blocking has been removed.

8. Troubleshooting

Shutdown code	Description	Probable causes	Checking / solution
uS:0	Parameter error	• Parameter error on the PSU PCB	• Reset dF and dU. • Restore parameters with Recom
uS:1	Maximum supply temperature exceeded	• Non-existent or insufficient circulation	• Check the circulation (direction, pump, valves) • Reasons for the heat demand
uS:2	Maximum increase of the flow temperature has been exceeded	• Non-existent or insufficient circulation • Sensor error	• Check the circulation (direction, pump,valves) • Check the water pressure • Check that the sensors are operating correctly • Check that the sensor has been correctly fitted • Check the cleanliness of the heat exchanger
uS:7	No release signal	• External cause • Parameter error • Bad connection	• Suppress the external cause • Check the parameters • Check the wiring
uS:9	Phase and neutral of mains supply mixed up	• Mains supply incorrectly wired • Floating or 2 phase network	• Phase and neutral mixed up • Set parameter P43 to 0
uS:10	Shutdown input is open	• External cause • Parameter error • Bad connection	• Suppress the external cause • Check the parameters • Check the wiring
uS:11	Shutdown input active or frost protection active	• External cause • Parameter error • Bad connection	• Suppress the external cause • Check the parameters • Check the wiring
uS:13	Communication error with the SCU PCB	• Bad connection with BUS • SCU PCB not installed in the boiler	• Check the wiring • Carry out automatic detection
uS:14	Water pressure too low	• Water pressure too low	• Check the water pressure • Fill the boiler and the installation with water
uS:15	Gas pressure too low	• Non-existent or insufficient circulation • Incorrect setting of the Gps gas pressure switch on the SCU PCB	• Check that the gas valve is fully opened • Check the supply pressure • Check whether the Gps gas pressure control system has been correctly fitted • Replace the Gps gas pressure control system if need be
Su:16 (1)	Configuration fault or SU PCB not recognised	• Wrong SU PCB for this boiler	• Replace the SU PCB
Su:17 (1)	Configuration fault or default parameter table incorrect	• Parameter error on the PCU PCB	• Replace the PCU PCB

8. Troubleshooting

Shutdown code	Description	Probable causes	Checking / solution
Su:18 [1]	Configuration fault or PCU PCB not recognised	Wrong PCU PCB for this boiler	• Replace the PCU PCB
Su:19 [1]	Configuration fault or parameters dF-du unknown		• Reset dF and du
Su:20 [1]	Configuration procedure active	• Active for a short time after switching on the boiler	• No action required
Su:21	Communication error with the SU PCB	• Bad connection	• Check whether the PCU PCB has been correctly fitted in the connector on SU PCB
Su:22	No flame during operation	• No ionization current	• Purge the gas supply to remove air • Check that the gas valve is fully opened • Check the supply pressure • Check the operation and setting of the gas valve unit • Check that the air inlet and flue gas discharge flues are not blocked • Check that there is no recirculation of flue
Su:25 (1)	Internal error on the SU-PCb SU PCB		• Replace the SU PCB
Su:29	tFG. sensor above maximum setpoint	Non-existing or insufficient circulation / sensor error	Replace the flue gas sensor.
Su:30	No tFG. sensor connected / shorted Boiler stop	Fluegas sensor disconnected / Sensor error	Replace the flue gas sensor.
Su:32	tFG.1 and tFG.2 max. deviation exceeded	Non-existing or insufficient circulation / sensor error	Replace the fue gas sensor.
Su:33	after 5 times tF>tF Max: controlled stop	Non-existing or insufficient circulation / sensor error	Replace the flow sensor.
Su:34	after 5 times tFG.>tF max: controlled stop	Non-existing or insufficient circulation / sensor error	Replace the flue gas sensor.
(1) These lock-outs are not stored in the fault memory			

8. Troubleshooting

8.3 Error memory

The boiler control is equipped with an error memory. The last 16 errors encountered are recorded in this memory.

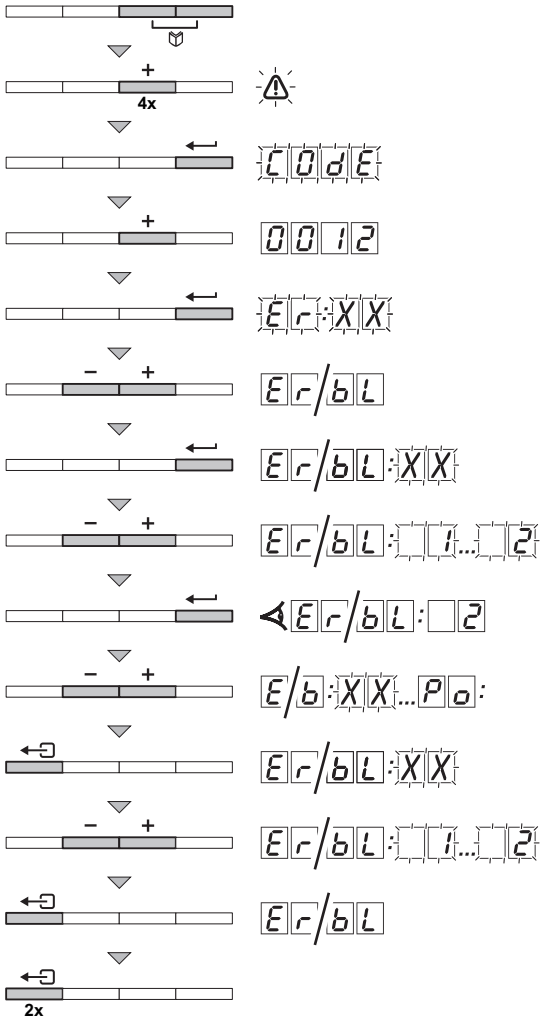
In addition to the error codes, the following data are also saved:

- Number of times that the error occured: (n□:XX).
- Boiler operating mode selected (St:XX).
- The supply temperature (t1:XX) and the return temperature (t2:XX) when the error occured.

To view the error memory, you first have to enter access code 0012

8.3.1. Error memory readout

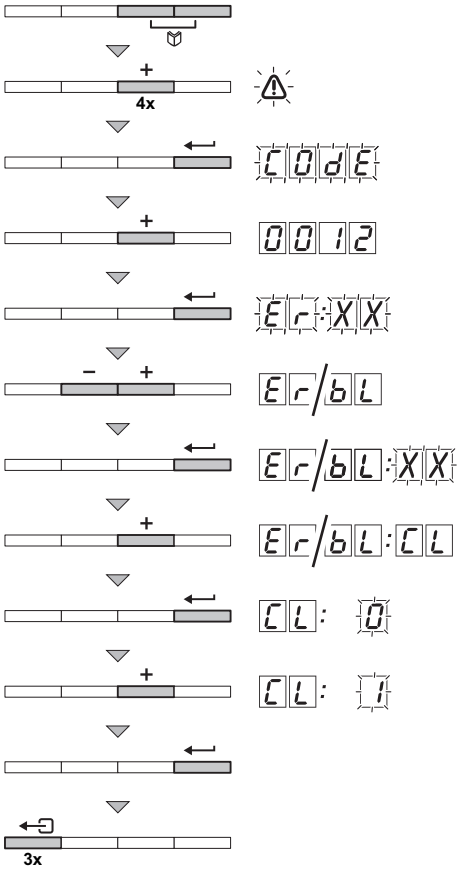
1. Press the two ⋎ buttons simultaneously and then **[+]** button until the symbol ⚠ flashes on the menu bar.
2. Select the installers menu using the ↵ button. CodE appears on the display.
3. Use **[-]** or **[+]** button to input the installer code 0012.
4. Press the ↵ button. Er:XX appears on the display.
5. The fault list or shutdown list can be displayed by pressing the **[-]** or **[+]** button.
6. Confirm using ↵ button . Er:XX is displayed with XX flashing = Last error which occured, For example □2 .
7. Use the **[-]** or **[+]** button to scroll through the faults or shutdowns.
8. Press the ↵ button to display the details of the faults or shutdowns.
9. Press the **[-]** or **[+]** button to view the following information:
   n.:1 = Number of times that the error occured.
   Hr = The number of operating hours.
   St = State.
   Su. = Sub-status.
   t1 = Supply temperature ºF/ºC.
   t2 = Return temperature ºF/ºC.
   t3 = DHW tank temperature ºF/ºC.
   t4 = Outdoor temperature ºF/ºC (Only with an outdoor temperature sensor).
   t5 = Solar boiler temperature ºF/ºC.
   t6 = Flue gas tempreature ºF/ºC.
   SP = Internal set point ºF/ºC.
   FL = Ionization current (µA).
   n.F = Fan speed in rpm.
   Pr = Water pressure psig/bar.
   Po = Supplied relative heat output (%).
10. Press the ⇤ button to interrupt the display cycle. Er:XX is displayed with XX flashing = Last error which occured.
11. Use the **[-]** or **[+]** button to scroll through the faults or shutdowns.
12. Press the ⇤ button to show the fault list or shutdown list.
13. Press ⇤ button 2 times to exit the error memory.



8. Troubleshooting

8.3.2. Deletion of the error display

1. Press the two buttons simultaneously and then **[+]** button until the symbol ⚠ flashes on the menu bar.
2. Select the installers menu using the ↵ button. CodE appears on the display.
3. Use **[-]** or **[+]** button to input the installer code 0012.
4. Press the ↵ button. Er:XX appears on the display.
5. The fault list or shutdown list can be displayed by pressing the **[-]** or **[+]** button.
6. Confirm using ↵ button. Er:XX is displayed with XX flashing.
7. Press the **[+]** button several times until Er:CL is displayed on the screen.
8. Press the ↵ button. CL:0 is displayed with 0 flashing.
9. Press **[+]** button to modify the value to 1.
10. Press the ↵ button to delete the errors from the error memory.
11. Press ⏎ button 3 times to exit the error memory.



9. Spare parts

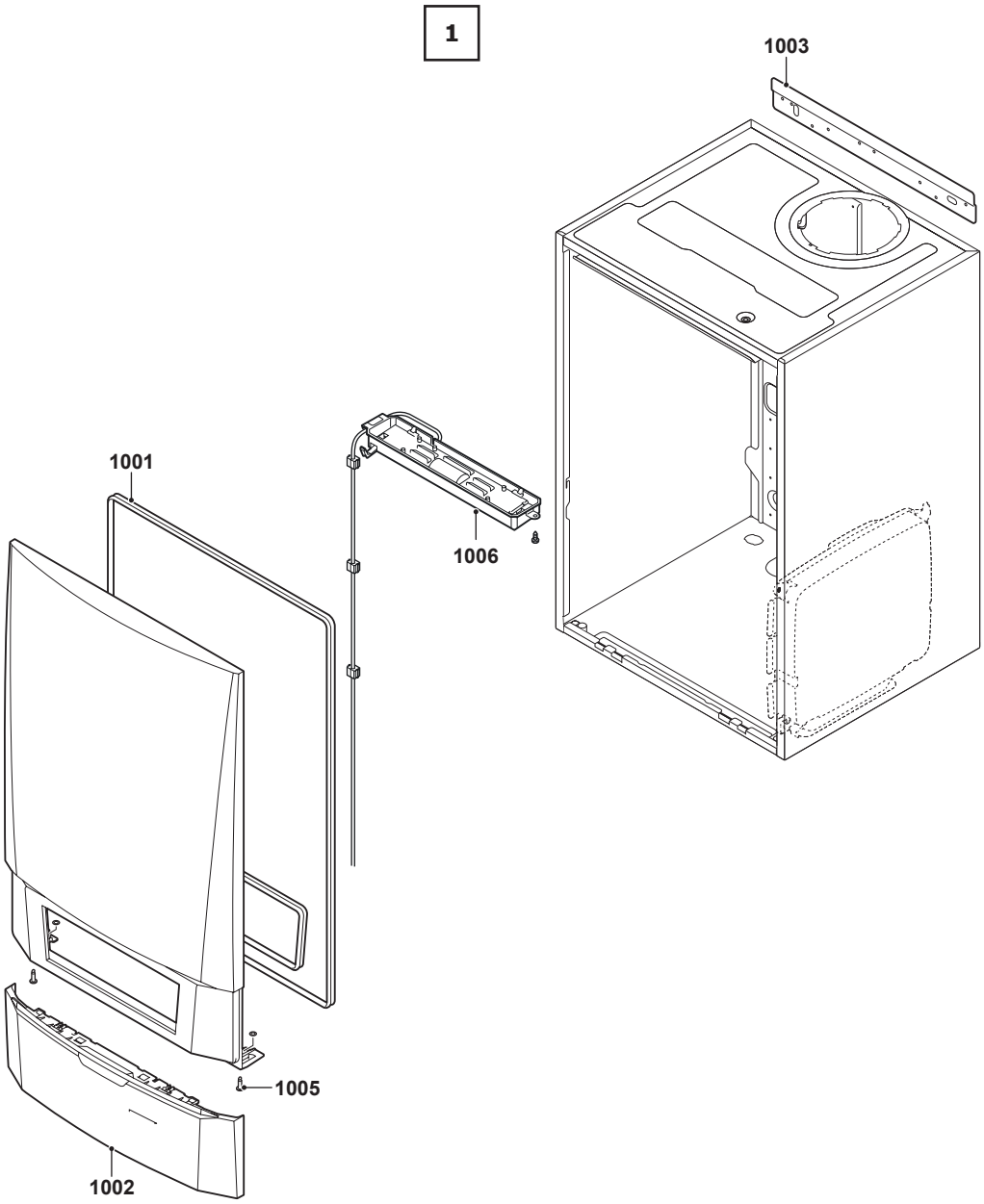
9.1 General

If it is deamed necessary after a boiler inspection or maintenance work that a part needs to be replaced, use only original spare parts or recommended spare parts and equipment.

i To order a spare part, give the reference number shown on the list.

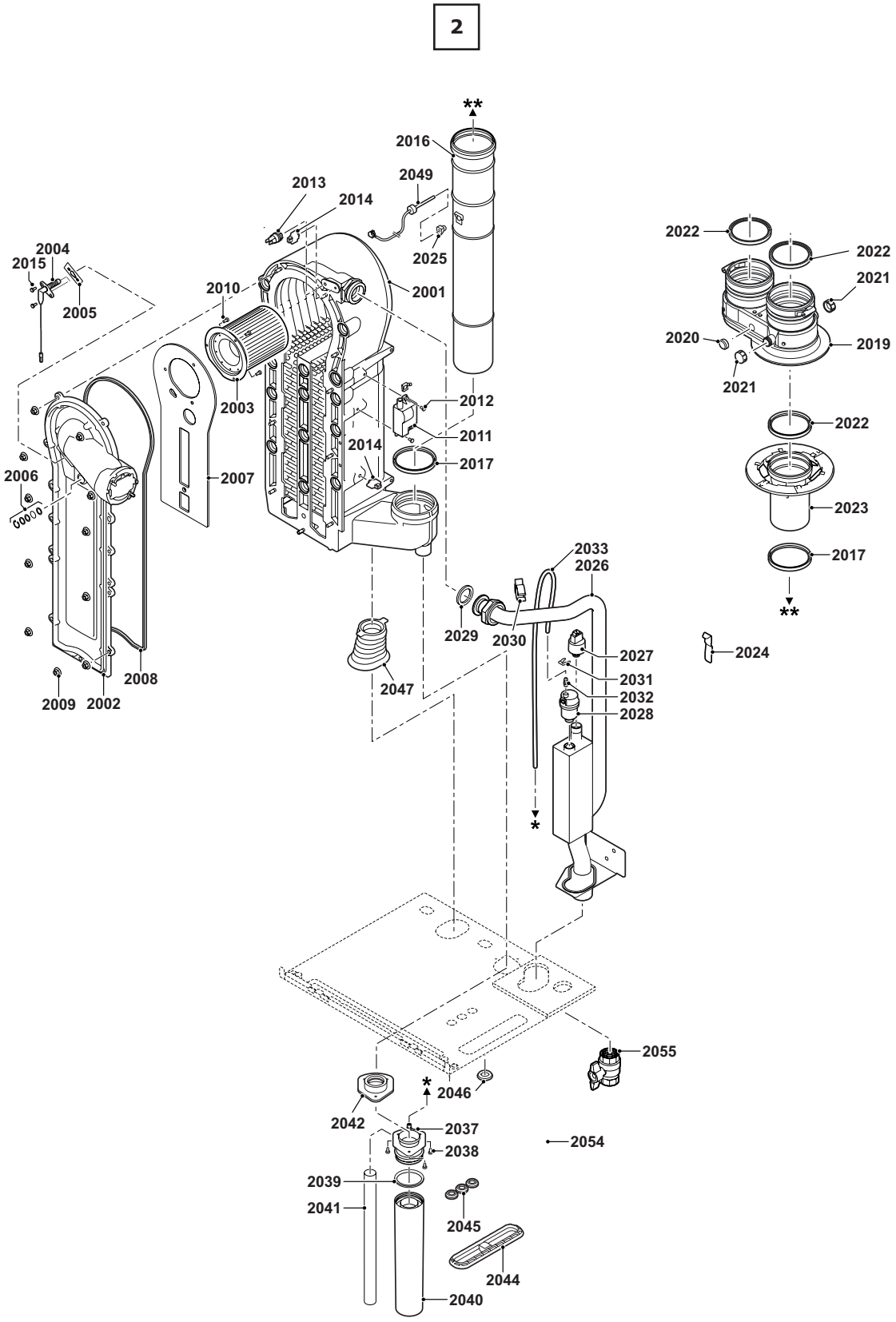
9.2 Spare parts

9.2.1 Casing



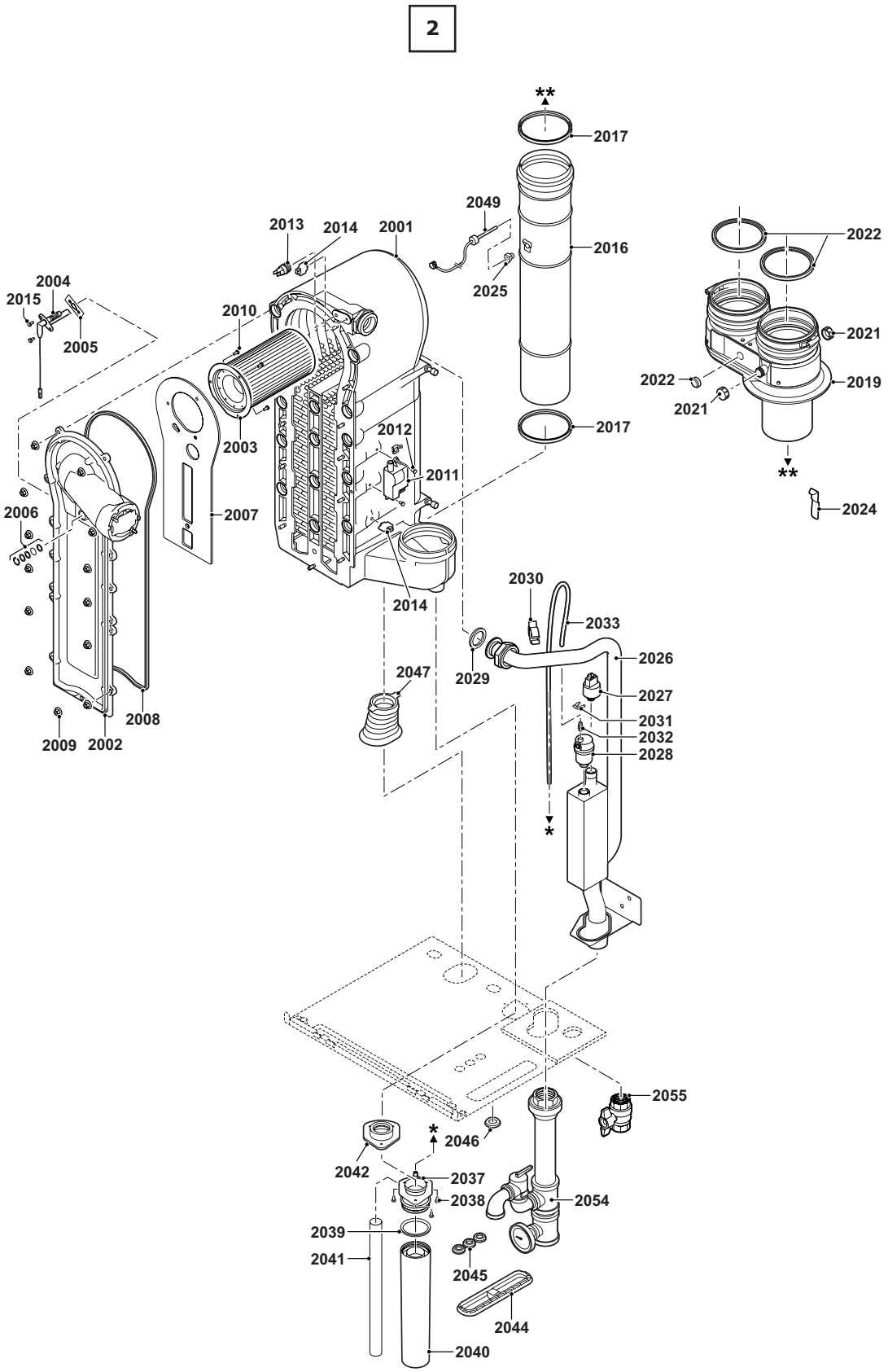
9. Spare parts

9.2.2. Heat exchanger and burner - MCA Pro 35/45



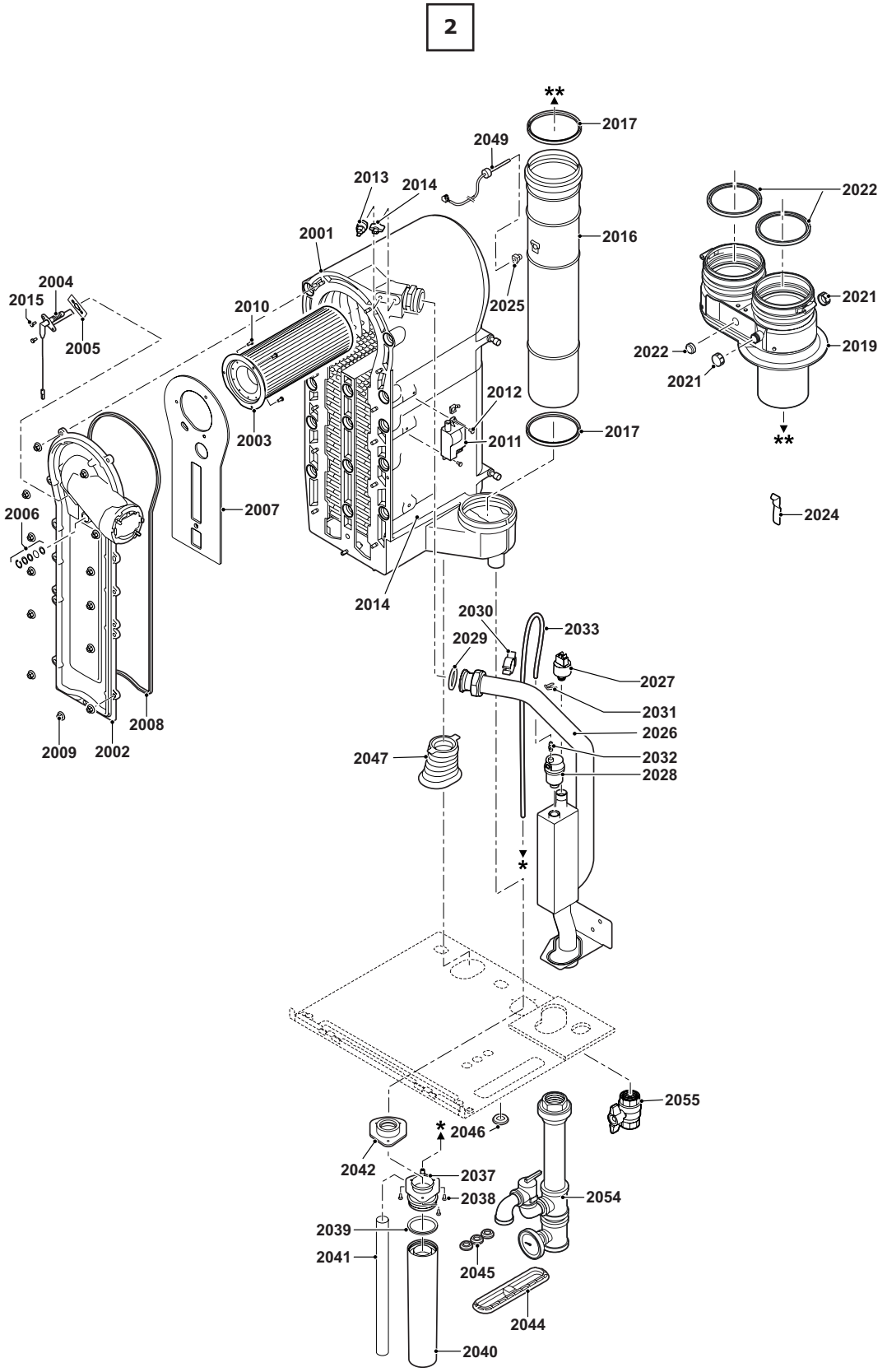
9. Spare parts

9.2.3.Heat exchanger and burner - MCA Pro 65



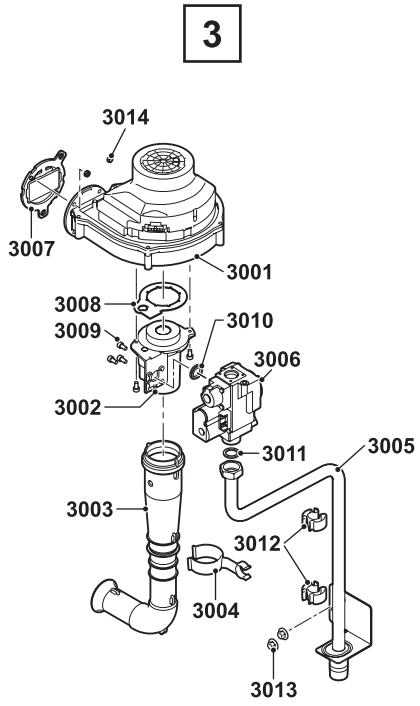
9. Spare parts

9.2.4. Heat exchanger and burner - MCA Pro 90/115

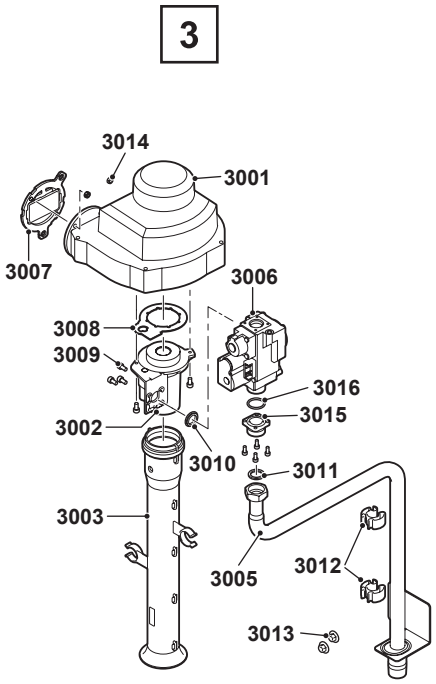


9. Spare parts

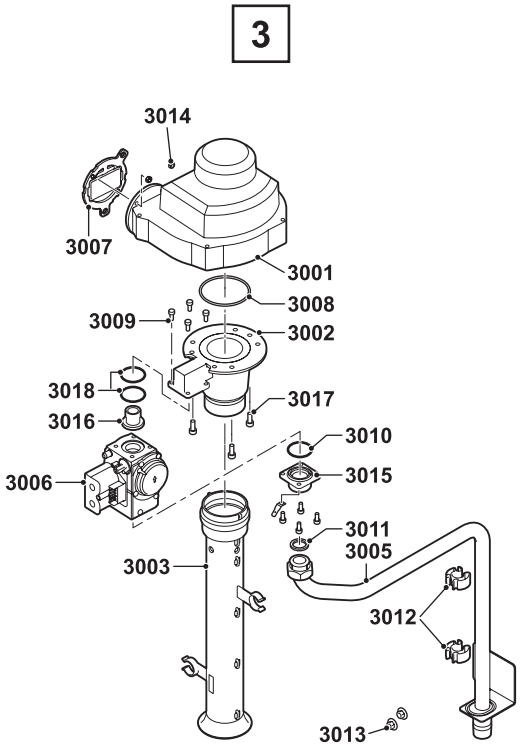
9.2.5. Fan - MCA Pro 35/45/65



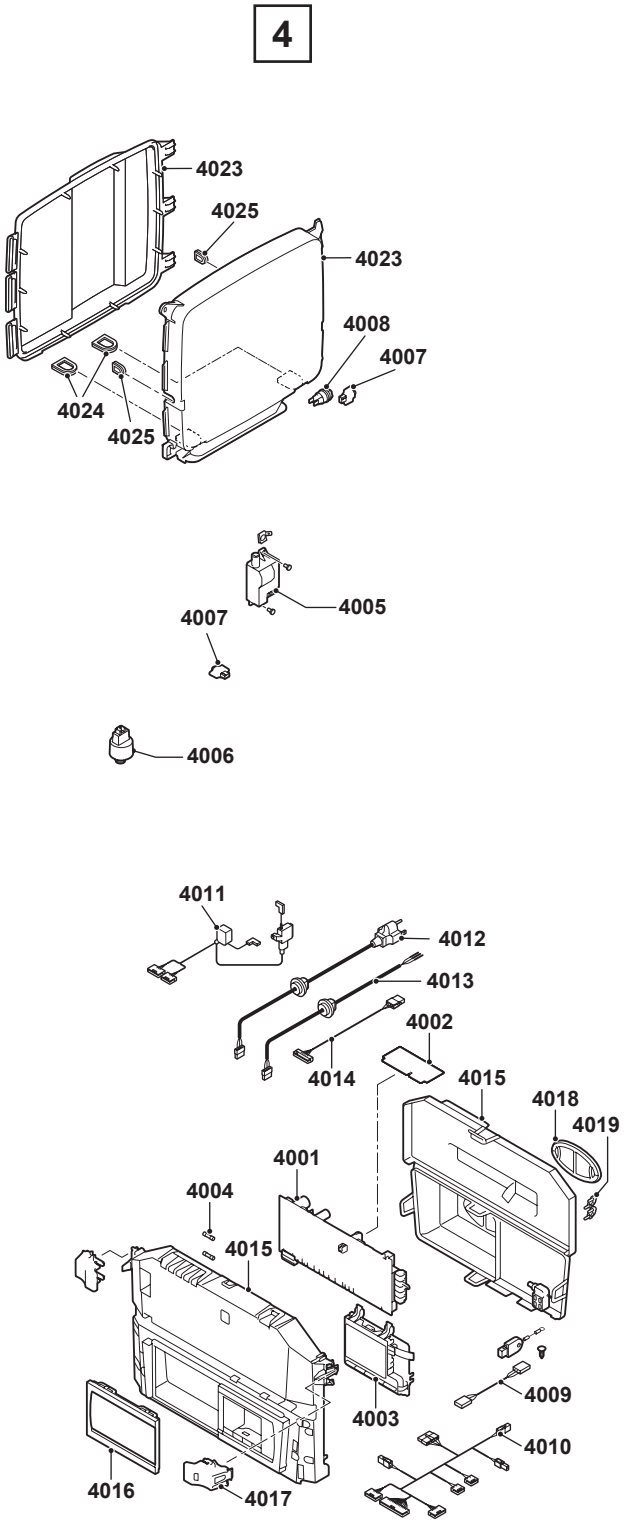
9.2.6. Fan - MCA Pro 90



9.2.7. Fan - MCA Pro 115



9.2.8. Control Panel



9. Spare parts

9.2.9. Spare parts list

Markers	Code no.	Description	Quantity	MCA 35	MCA 45	MCA 65	MCA 90	MCA 115
1 Casing								
1001	S101575	Front casing	1	×	×	×	×	×
1002	S103207	Cover HMI	1	×	×	×	×	×
1003	S103297	Wall Suspension bracket	1	×	×	×	×	×
1005	S101403	Quarter lock stud	1	×	×	×	×	×
1006	7602110	Lighting unit	1	×	×	×	×	×
2 Heat exchanger and burner								
2001	S103183	Heat exchanger 35/45 kW	1	×	×			
2001	S103184	Heat exchanger 65 kW	1			×		
2001	S103185	Heat exchanger 90/115 kW	1				×	×
2002	S101564	Heat exchanger front plate	1	×	×	×	×	×
2003	S54753	Burner -35/45 kW	1	×	×			
2003	S54754	Burner - 65 kW	1			×		
2003	S57477	Burner - 90/115 kW	1				×	×
2004	S101566	Ignition/ionization electrode	1	×	×	×	×	×
2005	S53489	Sealing plate for the ignition electrode	10	×	×	×	×	×
2006	S59118	Inspection glass	1	×	×	×	×	×
2007	S54731	Insulation plate heat exchanger	1	×	×	×	×	×
2008	S57241	Sealing heat exchanger front plate	1	×	×	×	×	×
2009	S54755	M6 nut	20	×	×	×	×	×
2010	S100052	Screw M4×10	20	×	×	×	×	×
2011	S103206	Ignition Coil	1	×	×	×	×	×
2012	S101509	Screw M4x5	5	×	×	×	×	×
2013	7602131	HL temperature sensor	1	×	×	×	×	×
2014	S101003	NTC temperature sensor	2	×	×	×	×	×
2015	S48950	Screw M4 ×10	50	×	×	×	×	×
2016	7602113	Flue gas discharge pipe Ø80 mm	1	×	×			
2016	7602115	Flue gas discharge pip Ø100 mm	1			×	×	×
2017	S55914	Sealing ring Ø80 mm	5	×	×			
2017	S55915	Sealing ring Ø100 mm	5			×	×	×
2019	7602111	Adapter flue gas 3" (MCA 35/45)	1	×	×			
2019	7602112	Adapter flue gas 4" (MCA 65/90/115)	1			×	×	×
2020	S62233	Sealing plug	5	×	×	×	×	×
2021	S62232	Screw Cap	5	×	×	×	×	×
2022	S62233	Cap	5	×	×	×	×	×
2023	S101567	Ring adapter	1	×	×			
2024	S100901	Plate lock	1	×	×	×	×	×
2025	S59659	Grommet flue gas temperature sensor	5	×	×	×	×	×
2026	7602120	Heating supply pipe CH	1	×	×	×		
2026	7602121	Heating supply pipe CH	1				×	×
2027	S101632	Pressure sensor	1	×	×	×	×	×
2028	S101608	Automatic air vent	1	×	×	×	×	×
2029	S100737	Sealing ring Ø 44 ×32 ×4 mm	5	×	×	×	×	×
2030	S101576	Cable clamp 28-35	5	×	×	×	×	×
2031	S101644	Clip 10.2	5	×	×	×	×	×

9. Spare parts

Markers	Code no.	Description	Quantity	MCA 35	MCA 45	MCA 65	MCA 90	MCA 115
2032	S100895	Nipple hose M7x1	1	×	×	×	×	×
2033	S101570	Silicone hose 8X2X740	1	×	×	×	×	×
2037	S101558	Siphon base	1	×	×	×	×	×
2038	S14254	Screw 4,2X9,5	20	×	×	×	×	×
2039	S101580	Sealing ring Ø60 mm	1	×	×	×	×	×
2040	S101559	Siphon	1	×	×	×	×	×
2041	S101606	Siphon hose	1	×	×	×	×	×
2042	S101581	Siphon gasket	1	×	×	×	×	×
2044	S101298	Closing plate SCU	1	×	×	×	×	×
2045	S62727	Grommet Ø 20 mm	15	×	×	×	×	×
2046	S101607	Grommet Ø 25X35X2 mm	5	×	×	×	×	×
2047	S101605	Sealing (Heating circuit return)	1	×	×	×	×	×
2049	S103186	Flue gas temperature sensor	1	×	×	×	×	×
2054	S103296	Connection kit	1	×	×	×	×	×
2055	7602126	Gas valve	1	×	×	×	×	×
3 Fan								
3001	S103190	Fan 35/45/65/ kW - 115V	1	×	×	×		
3001	S103191	Fan 90 kW - 115V	1				×	
3001	S103192	Fan 115 kW - 115V	1					×
3002	S54765	Venturi 35/45 kW	1	×	×			
3002	S54766	Venturi 65 kW	1			×		
3002	S57488	Venturi 90 kW	1				×	
3002	S101595	Venturi 115 kW	1					×
3003	S101543	Air intake silencer 35/45/65W	1	×	×	×		
3003	S101520	Air intake silencer 90 kW	1				×	
3003	S101578	Air intake silencer 115 kW	1					×
3004	S101590	Clamp intake silencer	1	×	×			
3005	7602122	Gas inlet pipe	1	×	×	×		
3005	7602123	Gas inlet pipe	1				×	
3005	7602124	Gas inlet pipe	1					×
3006	S103193	Gas block 35/45kW incl. venturi	1	×	×			
3006	S103213	Gas block 65kW incl. venturi	1			×		
3006	S103194	Gas block 90kW incl. venturi	1				×	
3006	S103195	Gas block 115kW incl. venturi	1					×
3007	S101565	Non return valve with gasket	1	×	×	×	×	×
3008	S54777	Venturi gasket	5	×	×	×	×	
3008	S100059	o-ring	5					×
3009	S48512	Screw M5X10	10	×	×	×	×	
3009	S100468	Screw M5X12	10					×
3010	S101591	Set of gaskets 35/45/65 kW	1	×	×	×		
3010	S101592	Set of gaskets - 90 kW	1				×	
3010	S101593	Set of gaskets - 115 kW	1					×
3011	S56155	Leakproof seal Ø 23.8X17.2X2 mm	20	×	×	×	×	×
3012	S101519	Cable clamp	5	×	×	×	×	×
3013	S54755	Flanged nut M6	20	×	×	×	×	×
3014	S100055	M5 nut	20	×	×	×	×	×

9. Spare parts

Markers	Code no.	Description	Quantity	MCA 35	MCA 45	MCA 65	MCA 90	MCA 115
3015	S57827	Flange for gas valve unit	1				×	
3016	S57828	O-ring (Gas inlet pipe) Ø 26.88X22X2.5 mm	1				×	
3016	S101631	Nozzle inlet venturi	1					×
3017	S100054	Screw M5x16 (20pcs)	20	×	×	×	×	×
3018	S101664	O-ring	5					×
4. Control Panel								
4001	S103198	PCU-04 PCB	1	×	×	×	×	×
4002	S103300	SU-01 PCB	1	×	×	×	×	×
4003	S103214	Display plate	1	×	×	×	×	×
4004	S6778	6.30 glass fuse A slow	10	×	×	×	×	×
4004	S43562	3,15 glass fuse A slow	10	×	×	×	×	×
4005	S103206	ignition transformer	1	×	×	×	×	×
4006	S101632	Pressure sensor	1	×	×	×	×	×
4007	S101003	NTC temperature sensor	2	×	×	×	×	×
4008	7602131	HL temperature sensor	1	×	×	×	×	×
4009	S103196	PCU pump cable	1	×	×	×	×	×
4010	S103200	24 V cable	1	×	×	×	×	×
4011	S103204	Cable harness 115V, 35/45/65/90kW	1	×	×	×	×	
4011	S103203	Cable harness 115V, 115kW	1					×
4012	S103199	Electric cable 1500 mm	1	×	×	×	×	×
4013	S103208	Pump cable	1	×	×	×	×	×
4014	S103197	Cable for fan	1	×	×	×	×	×
4015	7602127	Control panel	1	×	×	×	×	×
4016	S100852	Protective cover	1	×	×	×	×	×
4017	S101514	Fastening	2	×	×	×	×	×
4018	S100861	Oval sealing gasket	5	×	×	×	×	×
4019	S59372	Strain relief	1	×	×	×	×	×
4023	7602130	Box SCU	1	×	×	×	×	×
4024	S101862	SCU grommet	5	×	×	×	×	×
4025	S101000	SCU grommet	5	×	×	×	×	×
5. Items not illustrated								
5001	S103209	Service Kit A	1					
5002	S103210	Service Kit B	1					
5003	S103211	Service Kit C	1					
6. Standard delivery items and accessories								
6001	S100316	Outdoor sensor						
6002	S43946	DHW tank temperature sensor						

10. Checklists

10.1 Checklist for commissioning

No.	Work to be undertaken for commissioning	Attachment / Measured values
1	Filling the heating system with water and checking the water pressure	
2	Fill the siphon with water	
3	Vent the air in the heating system	
4	Checking the water-side connections for tightness	
5	Checking the type of gas supplied. Checking that the boiler is suitable for the gas supplied?	
6	Checking the gas supply pressure	
7	Checking the capacity of the gas meter	
8	Checking the tightness of the connections and the gas pipes	
9	Purge the gas supply pipe of the boiler	
10	Checking the electrical connections	
11	Checking the air supply connections and flue gas discharge connections	
12	Checking the functioning and operational status of the boiler	
13	Checking the air/gas ratio	
14	Remove the measuring device and close the measurement points	
15	Correctly fit the front housing of the boiler	
16	Attaching the Gas Type sticker	
17	Set the room thermostat or the regulator	
18	Instruct the user and hand over the necessary documents	
19	Fill in the warranty card together with the user	
20	Confirmation of commissioning	
	Date	(dd-mm-yy)
	Company name, signature of engineer	

10. Checklists

10.2 Checklist for periodic inspection and maintenance

No.	Inspection and/or service activities	Confirmation and date				
1	Checking the system pressure (Recommendation: 22 - 30 psig / 1.5 - 2 bar)					
2	Checking the tightness of the flue gas venting and air inlet connections					
3	Checking the automatic air vent					
4	Checking the safety valve					
5	Checking the siphon					
6	Checking the ionization current					
7	Checking the burner and heat exchanger (heating system)					
8	Inspection of the ionization electrode/ignition electrode					
9	Assembling the boiler (Replace all removed gaskets)					
10	Filling and refitting the siphon					
11	Checking combustion (CO_2) (Full load/Part load)					
12	Number of operating hours					
13	Number of successful starts (%)					
14	Service message deleted or service indicator reset					
15	Maintenance kit A, B or C used					
16	Boiler visually inspected					
17	Extra maintenance work that was undertaken					
18	Check the water chemistry					
19	Confirmation of inspection					
	Date	(dd-mm-yy)	(dd-mm-yy)	(dd-mm-yy)	(dd-mm-yy)	(dd-mm-yy)
	Company name, signature of engineer					

10. Checklists

10.3 Lighting instructions

FOR YOUR SAFETY READ BEFOFRE OPERATING

W A R N I N G: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
WHAT TO DO IF YOU SMELL GAS
- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

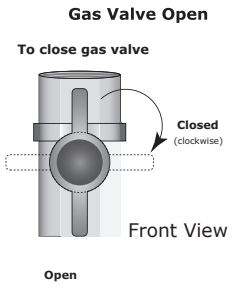
C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set thermostat or other operating control to lowest setting.
3. Turn off all electric power to the appliance.
4. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

Manual gas shutoff



5. Close main gas shut-off valve.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
7. Open main gas shut-off valve.
8. Turn on all electric power to the appliance.
9. Set thermostat or other operating control to desired setting.
10. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

TO TURN OFF GAS TO APPLIANCE

1. Set thermostat or other operating control to lowest setting.
2. Turn offall electric power to the appliance if service is to be performed.
3. Close main gas shut-off valve.

10. Installation and Service Certificate

Boiler Model: _____ **Serial Number:** _____ **Date Installed:** _____

MBH Input: _____ ☐ Installation instructions have been followed

☐ Check-out sequence has been performed

☐ Above information is certified to be correct

☐ Information received and left with owner/maintenance person

Installer: _____ _____

(Company) (Phone)

_____ _____

(Address) (Installer's name)

_____ _____

(Address) (Installer's Signature)

START-UP DATA					
Boiler Model		CO2 High fire	%	CO2 Low fire	%
Fuel	Natural __LP__	CO high fire	ppm	CO Low fire	ppm
Was orifice changed?_____ Was gas valve throttle adjusted (U2A Pro 115) for propane?					
Natural gas input rate measured_____Btuh					
CONTROL SET-UP DATA					
Boiler Model		WWSD Temp	°F	Add'l Heat Demand Type	1__2__3__4
High Altitude	yes___ no _____	Adjust Outdoor	°F	Add'l Heat Demand Time	minutes
Manual Reset Temp	°F/°C				

PRIORITY 1 Settings		PRIORITY 2 Settings		PRIORITY 3 Settings	
System Type		System Type		System Type	
Max. Supply	°F	Max. Supply	°F	Max. Supply	°F
Min. Supply	°F	Min. Supply	°F	Min. Supply	°F
Max OD Reset	°F	Max OD Reset	°F	Max OD Reset	°F
Min. OD Reset	°F	Min. OD Reset	°F	Min. OD Reset	°F
Modulate On Diff	°F	Modulate On Diff	°F	Modulate On Diff	°F
Modulate Off Diff	°F	Modulate Off Diff	°F	Modulate Off Diff	°F
Max. On Time	minutes	Max. On Time	minutes	Max. On Time	____
Min. On Time	____	Min. On Time	minutes	Min. On Time	minutes
Boost Interval	minutes	Boost Interval	minutes	Boost Interval	minutes
Pre-pump Time	seconds	Pre-pump Time	seconds	Pre-pump Time	seconds
Post-pump Time	seconds	Post-pump Time	seconds	Post-pump Time	seconds
Circulator 1	on-off	Circulator 1	on-off	Circulator 1	on-off
Circulator 2	on-off	Circulator 2	on-off	Circulator 2	on-off
Circulator 3	on-off	Circulator 3	on-off	Circulator 3	on-off
Maximum Rate	%Rate	Maximum Rate	%Rate	Maximum Rate	%Rate
Minimum Rate	%Rate	Minimum Rate	%Rate	Minimum Rate	%Rate

Circulator Exercising		Freeze Portection Circulators	
Circulator 1	on_____off_____	Circulator 1	on_____off_____
Circulator 2	on_____off_____	Circulator 2	on_____off_____
Circulator 3	on_____off_____	Circulator 3	on_____off_____

De Dietrich
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