FLOWMAX™

TECHNOLOGIES

# *Instruction Manual*
## *for model*

# FLOWMAX - 170

*Condensing water heater*
*174,000 BTU*

C ETL LISTED US
Intertek

**⚠WARNING**
If the information in these instructions is not followed exactly, a fire or explosion may result, causing property damage, personal injury or death.

-Do not store or use gasoline or other flammable vapours and liquids in the vicinity of this or any other appliance.
-WHAT TO DO IF YOU SMELL GAS
●Do not try to light any appliance.
●Do not touch any electrical switch; do not use any phone in your building.
●Immediately call your gas supplier from a neighbour'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 qualified installer, service agency or the gas supplier.

*Installation, operating, commissioning and maintenance instructions.*

Water heaters for other than recreational vehicle installation

*Pages*

# 1. GENERAL INFORMATION

## 1.1 General warnings – Installation

⚠ Read all safety warnings in the “Instruction Manual”. The additional safety issues outlined below must also be followed completely when installing this FLOWMAX Combination Water heater.

⚠ Failure to remove or maintain the area free of combustible material, gasoline and other flammable liquids or vapours can result in severe personal injury, death or substantial property damage.

⚠ All applicable local, state, national and provincial codes, ordinances, regulations and laws must be observed.

⚠ For installations in Massachusetts – code requires the units to be installed by a licensed plumbing or gas fitter.

⚠ The appliance cannot operate without the correct amount of air for combustion. Please make sure there is sufficient inflow and outflow of air for ventilation; never obstruct the flow of ventilation air. Failure to provide the proper amount of combustion air can result in a fire or explosion and cause death, serious bodily injury or property damage.

⚠ If an external electrical source is utilized, the appliance, when installed, must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Codes ANSI/NFPA 70 and or the CSA C22.1 Canadian Electrical Code.

⚠ Follow all local codes and/or the most recent edition of the National Fuel Gas Code (ANSI Z223.1/NFPA 54) in the USA or the Natural Gas and Propane Installation Code in Canada (CAN/CSA B149.1).

⚠ This unit is designed for indoor installations. DO NOT operate this unit without the vent piping connected. Exhaust gases must be completely expelled out of the building.

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

⚠ Be sure not to reverse the water and gas connections as this may damage the gas valves.

⚠ Water temperatures over 125ºF can cause severe burns instantly or death from scalding. If the proposed water heater outlet temperature is above 125ºF, a thermostatically controlled mixing valve (or a temperature limiting valve) for reducing point of use water temperature is recommended to reduce the risk of scald injury. Contact a licensed plumber or the local plumbing authority for further information.

⚠ The appliance should be located in an area where leakage within the unit or at its connections will not result in damage to the area adjacent to the appliance or to lower floors of the structure. FLOWMAX will not be responsible for any damage resulting from leaking if adequate drainage is not provided. When such locations cannot be avoided, it is recommended that a suitable drain pan, adequately drained, be installed under the appliance.

⚠ Do not use this combination water heater for any purpose other than water heating and space heating.

⚠ The flow of combustion air and ventilation to the water heater must not be obstructed. The water heater area must be kept clear and free from combustible materials, gasoline and other flammable vapours and liquids.

⚠ If the water quality is known to be highly acidic and/or extremely hard, water treatments (ie water softeners and filtration) are recommended to maintain full warranty. Consult the local water authority.

⚠ DO NOT over-tighten fittings, as pipe and/or fitting damage may occur causing leakage.

⚠ DO NOT install water heater where subject to vibrations.

⚠ For other than a direct vent appliance, the appliance must be located as close as possible to a chimney or gas vent.

⚠ Should overheating occur or the gas supply fails to shut off, turn the manual gas control valve to the appliance. Contact a Service Technician immediately.

⚠ Clearance must be in accordance with the local installation codes and the requirements of the gas supplier.

⚠ Never operate the heater unless it is vented to the outdoors and has adequate air supply to avoid risks of improper operation, fire, explosion or asphyxiation.

⚠ DO NOT install this water heater directly on a carpeted floor. A fire hazard may result. The water heater shall be installed on a metal or wood panel extending beyond the full width and depth of the water heater by at least 3 inches (76.2mm) in any direction or, if the water heater is installed in an alcove or closet, the entire floor shall be covered by the panel.

⚠ For safe operation, an ample supply of air must be provided for proper combustion and ventilation in accordance with the National Fuel Gas Code ANSI Z223.1/NFPA 54 National Fuel Gas Code CSA/B149.1 Natural Gas and Propane Installation Codes or applicable provisions of the local building codes. An insufficient supply of air may result in a yellow, luminous burner flame, carboning or sooting of the heat exchanger, or create a risk of asphyxiation. Do not obstruct the flow of combustion and ventilation air.

⚠ This unit is not intended to operate at gas supply pressures other than those shown on the rating plate. Exposure to higher gas supply pressure may cause damage to gas valves, which can result in fire or explosion. If over-pressure has occurred, such as through improper testing of gas lines or emergency malfunction of the supply system, the gas valves must be checked for safe operation.

⚠ A thermostatic mixing valve must be added to this system to prevent scalding, if regulated by local codes and authorities.

**Check the Rating Plate**

⚠ FLOWMAX units come from the factory configured for use with natural gas. Prior to installation, check the rating plate of the water heater to ensure the unit matches gas type, gas pressure, water pressure and electrical supply. If the unit does not match the requirements, do not install.

⚠ Be sure the gas type and electricity voltage match the rating plate.

⚠ There is a risk in using fuel burning appliances in rooms or areas where gasoline, other flammable liquids or engine-driven equipment or vehicles are stored, operate or are repaired. Flammable vapours are heavy and travel along the floor and may be ignited by the igniter or main burner flames causing fire or explosion. Some local codes permit operation of gas appliances if installed 18 inches or more above the floor. This may reduce the risk if location in such an area cannot be avoided. Flammable items, pressurized containers or any other potential fire hazardous articles must never be placed on or adjacent to the water heater. Open containers of flammable materials should not be stored or used in the same room with the water heater.

⚠ Do not install the FLOWMAX water heater in areas with excessive high humidity.

⚠ Do not install the unit in location where there is excessive humidity, such as a bathroom, damp crawl space and other areas with high levels of humidity. This may cause the unit to malfunction.

⚠ To avoid possible electrical shock, DO NOT touch the internal components of the water heater or the power cord with wet hands.

⚠ DO NOT splash excessive water on the water heater when cleaning, as they are water resistant, not water proof.

⚠ Professionally qualified personnel in accordance with current laws and standards and in line with the manufacturer's instructions must install the appliance.

⚠ The commissioning of the water heater and any subsequent works carried out on the appliance must be effected by an appropriately qualified technician.

⚠ The appliance must be used solely for the purpose for which it has been designed and manufactured: central heating and domestic hot water production. Any other use is deemed as improper and as such dangerous. Under no circumstances will the manufacturer be held responsible for damage or injury to persons or animals caused by errors in the installation and/or use of the appliance, or through non-compliance with current local and national standards and/or the manufacturer's instructions.

⚠ The installation, operation and maintenance manual forms are an integral and essential part of the product and must be kept with the appliance always.

⚠ The warnings contained in this chapter have been written for the appliance user, the installer and the service technician.

⚠ The “operating instructions” chapter of this manual must be read carefully as it provides information on the operation and the operating limits of the appliance.

- After the removal of all the packaging, check that the appliance has not been damaged. In case of doubt, do not attempt to use the product but refer to the supplier. Packing materials (cardboard box, wooden crate, nails, staples, plastic bags, polystyrene, etc.) must not be left within reach of children in that these items represent a potential hazard and must be disposed of in a responsible manner.
- Before carrying out any cleaning or maintenance operations, disconnect the appliance from the mains electricity supply by switching off at the main switch and/or any other isolating device.
- In the case of a fault and/or malfunction in the appliance, shut down the system. Do not interfere with or attempt any repairs. Call for professionally qualified technical assistance only.
- Any warranty repairs to the appliance must be carried out exclusively by the manufacturer’s authorized service dealers using original spare parts. Non-compliance with the above requirements may compromise the safety of the appliance and invalidate the warranty. In order to guarantee the efficiency of the appliance and its correct operation, it must be serviced regularly by professionally qualified personnel in line with the manufacturer’s instructions.
- Only original accessories or optional extras (including electrical parts) must be used with the appliance.
- Should there be a smell of gas present in the room where the appliance is installed, **DO NOT** attempt to activate any electric switches, telephones or any other equipment that may cause sparks. Open doors and windows immediately to create a current of air and ventilate the room. Shut-off the main gas supply valve (at the meter), or on the cylinder in the case of bottled gas, and call an authorized service centre.
- **Do not attempt to interfere with the appliance in any way.**
- As dictated by current legislation, this appliance **must be installed exclusively by qualified personnel.** Before starting the water heater for the first time, make sure that it is connected to a water supply and central heating system compatible with its performance characteristics.
- Prior to start-up, the central heating pipes should be flushed to remove any residues that could compromise the operation of the appliance.
- The domestic power supply must be checked by a qualified electrician to ensure that it can support the maximum power absorption of the appliance, as indicated on the appliance rating plate (positioned on the casing). In particular, make sure that the cable ratings are adequate for the power absorbed.
- Do not use adapters; multiple sockets or extension leads to connect the appliance to the power supply.
- The appliance must be connected to the mains power supply through an appropriate electrical isolator in accordance with the current wiring regulations.
- If the cable is damaged in any way, switch off the appliance and have the cable replaced by a suitably qualified technician.
- **When the appliance is no longer required for use, switch off the main power supply, to switch all electrical components off (circulating pump, burner, etc).**

**Important: Carbon Monoxide Detectors**

Many jurisdictions require the installation of carbon monoxide detectors in building where a side wall vented fuel burning appliance is installed. Installers must abide by local code requirements regarding the installation of CO detectors. The use of a certified carbon monoxide detector is recommended but not required by FLOWMAX.

## "In the State of Massachusetts only"

(a)For all horizontally vented gas fuelled equipment installed in every dwelling, building or structure used in whole or in part for residential purposes, including those owned and 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 fuelled equipment, the installing plumber or gas fitter 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 and on each additional level of the dwelling, building or structure served by the 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 fuelled 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 30 days to comply with the above requirements; provided, however, that during said 30 day period a battery operated carbon monoxide detector with 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 fuelled 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".**

4. INSPECTION. The state or local gas inspector of the side wall horizontally vented gas fuelled 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.

## 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.**

A. This appliance does not have a pilot. It is equipped with a direct 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.

C. Use only your hand to operate the remote control keypad. Never use tools. If the remote keypad doesn't work, do not try to repair it, call a qualified service technician. Forced or improper 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.

### 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.

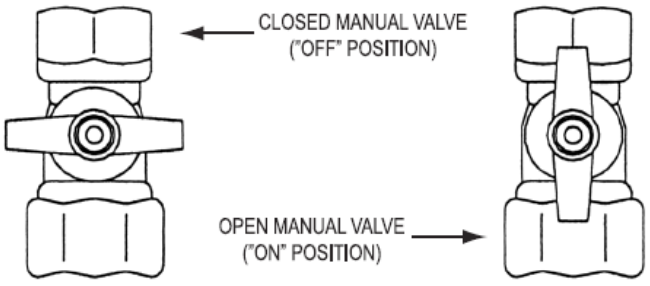
## OPERATING INSTRUCTIONS

1. STOP! Read the safety information above before proceeding.
2. Set the thermostat to the lowest setting.
3. Turn off all power to the electrical appliance.
4. This appliance does not have a pilot. It is equipped with a direct ignition device, which automatically lights the burner. Do not try to light the burner by hand.
5. Turn the manual valve located at the gas inlet of the appliance clockwise to "OFF"
6. Wait (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to next step.
7. Turn the manual valve located at the gas inlet of appliance counterclockwise to "ON" (see Figure 47).
8. Turn on all electric power to the appliance.
9. Set the thermostat 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 THE APPLIANCE

1. Set the thermostat to the lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Turn the manual valve at gas inlet of appliance clockwise to "OFF" (see figure 47).

**Manual Gas Valve**



# ⚠ WARNING


## FIRE AND EXPLOSION HAZARD

Can result in serious injury or death

⚠ Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance. Storage of or use of gasoline or other inflammable vapors or liquids in the vicinity of this or any other appliance can result in serious injury or death.

Vapors from flammable liquids can explode and catch fire causing death or severe burns.

Keep flammable products:

1. far from any possible ignition source,
2. in approved containers
3. tightly closed and
4. out of children's reach

Do not use or store flammable products such as gasoline, solvents or adhesives in the same room or area near this appliance, or any other appliance or any possible ignition source.

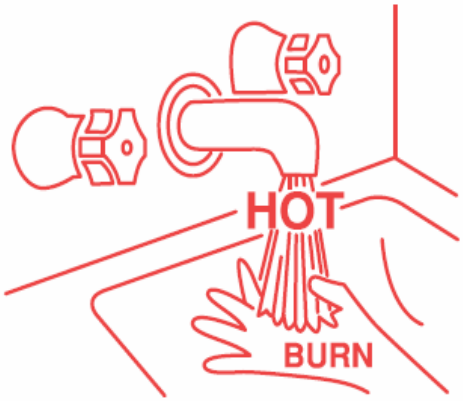
Vapors:

1. cannot be seen,
2. are heavier than air
3. go a long way on the floor
4. can be carried away from other rooms to possible ignition sources by air currents

Water heaters in residential garages must be installed and located, or protected, to avoid physical damage.

Read and follow water heater warnings and instructions. If owner's manual is missing contact the distributor or manufacturer.

# ⚠ DANGER




The temperature at which injury occurs varies with the person's age and time of exposure.

The slower response time of disabled persons increases the hazards to them. Never allow small children to use a hot water tap, or to draw their own bath water. Never leave a child or disabled person unattended in a bathtub or shower.

The water heater should be located in an area where the general public does not have access to the temperature control.

Lower water temperatures should be used to avoid the risk of scalding. It is further recommended, in all cases, that the water temperature be set for the lowest temperature which satisfies the user's hot water needs. This will also provide the most energy efficient operation of the water heater and minimize scale formation in the heat exchanger, thus prolonging the life of the unit.

Setting the water heater temperature at 120°F will reduce the risk of scalds. Some states require settings at specific lower temperatures. The table below shows the approximate time-to-burn relationship for normal adult skin.

Hot water temperatures required for automatic dishwasher and laundry use can cause scalds and burns resulting in serious personal injury and/or death.

Table - Risk of Scalds

| Temperature Setting | Time to Produce, 2nd, 3rd Degree Burns on Adult Skin |
|---|---|
| Over 170 °F | Nearly instantaneous |
| 160 °F | About 1/2 second |
| 150 °F | About 1-1/2 seconds |
| 140 °F | Less than 5 seconds |
| 130 °F | About 30 seconds |
| 120 °F or less | More than 5 minutes |

To protect against injury, you should install a tempering valve in the water system. This valve will reduce point of discharge temperature by mixing cold and hot water in branch supply lines. Such valves are available from the local plumbing supplier.

## WARNING

If the information in these instructions is not followed exactly, a fire or explosion may result, causing property damage, personal injury or death.

-Do not store or use gasoline or other flammable vapours and liquids in the vicinity of this or any other appliance.
-WHAT TO DO IF YOU SMELL GAS
- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbour'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 qualified installer, service agency or the gas supplier.
Minimum clearances from combustible construction, 0-inches sides, 0-inches back, 0-inches top.
For closet installation, 0-inches front, or for alcove installation.
This water heater is provided with a pressure relief valve. For safe operation of the water heater, the relief valve(s) must not be removed from its designated point of installation or unplugged.
The temperature and pressure relief valve provided by the manufacturer shall be installed at the time of installation of the heater in the location specified by the manufacturer. Local codes shall govern installation of relief devices. For safe operation of the water heater, the relief valve must not be removed or unplugged.

**"Warning"**
"This appliance must be installed in accordance with the local codes or, in the absence of local codes, the National Fuel Gas Code, ANSI Z223.1/NFPA 54 or the CSA B149.1, Natural Gas and Propane Installation Code".

**SUITABLE FOR WATER (POTABLE) HEATING AND SPACE HEATING**
Toxic chemicals, such as used for boiler treatment, shall not be introduced into potable water heater used for space heating. This water heater may never be connected to any existing heating system or component(s) previously used with a non potable water heating appliance.

"For operation at outlet water temperatures not in excess of 180$^{o}$F (88$^{o}$C)"

## 1.2 Product conformity

All **FLOWMAX** water heaters are ETL certified and possess technical and functional characteristics that comply with the following standards:

Gas fired water heaters also comply with the following directives:

American National Standard/CSA Standard for Gas Water Heaters Volume III, Storage Water Heaters with input Ratings above 75,000 Btu per Hour, Circulating and Instantaneous. Conforms to ANSI STD Z21.10.3, certified to CSA STD 4.3.

The materials used such as copper, brass, stainless steel, etc. form a compact, homogeneous, highly functional unit that is easy to install and simple to operate. In its simplicity, the wall-mounted appliance is equipped with all the appropriate accessories required to make it a fully independent water heater capable of satisfying domestic hot water production and central heating needs. All water heaters are fully inspected and are accompanied by a quality certificate, signed by the inspector, and a guarantee certificate. This manual must be kept in a safe place and must **accompany the water heater at all times.**

**FLOWMAX will not be held responsible for any misinterpretation of this manual resulting from the inaccurate translation of same.**

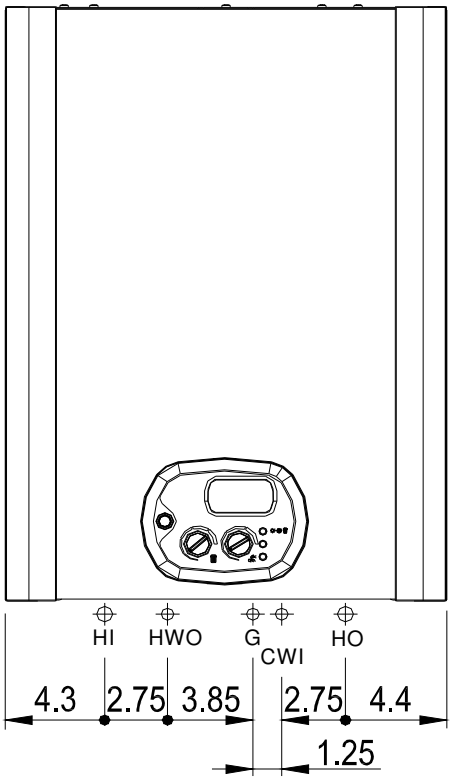
**FLOWMAX will not be held responsible for the consequences in the case of non-observance of the instructions contained in this manual or in the case where actions not specifically described herein are undertaken.**

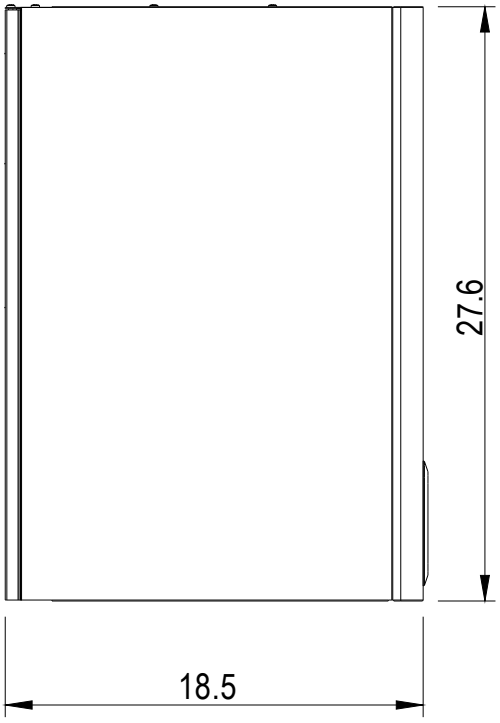
# 2. TECHNICAL CHARACTERISTICS

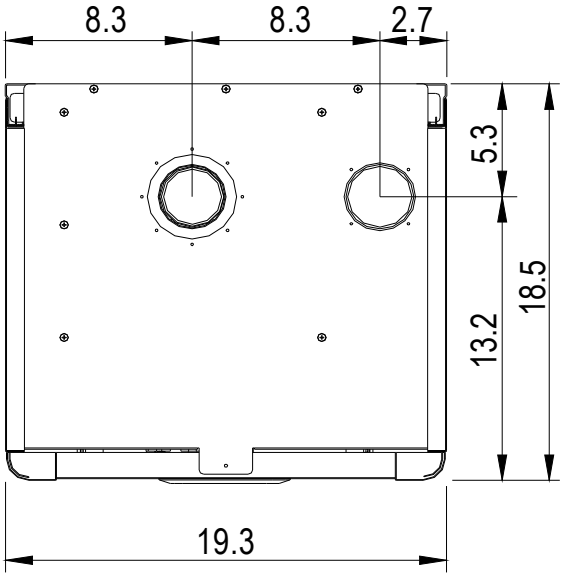
## 2.1 Technical data

| **Model** | | **FLOWMAX 170** |
|---|---|---|
| Heat Input max | kW - BTU/hr | 51 - 174019 |
| Heat Input min | kW - BTU/hr | 12 – 40946 |
| Heat Output max - 122/86°F | kW - BTU/hr | 54.5 – 185859 |
| Heat Output max - 176/140°F | kW - BTU/hr | 49.9 – 170198 |
| Heat Output min - 176/140°F | kW - BTU/hr | 11.65 - 39758 |
| Efficiency 100% (full load 176/140°F) | % | 97.8 |
| **Central Heating circuit** | | |
| Central Heating water temperature setting (min-max) | °C – °F | 30-80 / 25-40 – 86-176 / 77-104 |
| Max. heating working temperature | °C – °F | 80/176 |
| Expansion vessel capacity | gal | 1.58 |
| Max. working pressure (heating) | bar - psi | 2.1 - 30 |
| Min. working pressure (heating) | bar - psi | 0.3 - 4.29 |
| **Domestic Hot Water circuit** | | |
| D.H.W. temperature setting (min-max) | °C – °F | 35-60 – 95-140 |
| Max. Hot water working pressure | bar - psi | 6 - 86 |
| Min. Hot water working pressure | bar - psi | 0.5 - 7.16 |
| D.H.W. flow rate at ΔT 45°F (25°C) | l/min - gal/min | 30 - 7.93 |
| D.H.W. flow rate at ΔT 72°F (22°C) | l/min - gal/min | 18.8 – 4.95 |
| **Dimensions (Water heater casing size)** | | |
| Width | in | 19.3 |
| Height | in | 27.6 |
| Depth | in | 18.5 |
| Weight (net) | lb | 120 |
| **Hydraulic connections** | | |
| Central Heating Flow connection | NPT | 3/4" |
| Central heating Return connection | NPT | 3/4" |
| Cold water mains connection | NPT | 3/4" |
| D. Hot water connection | NPT | 3/4" |
| Gas connection | NPT | 3/4" |
| **Gas Supply** | | |
| Natural gas G 20 | | |
| Inlet pressure | mbar - psi | 20 - 0.29 |
| Gas consumption | $m^3/h$ - $ft^3/h$ | 5.40 – 190.7 |
| **Electrical specifications** | | |
| Power supply | V/Hz | 120/60 |
| Electrical power consumption | W | 225 |

## 2.2 Dimensions



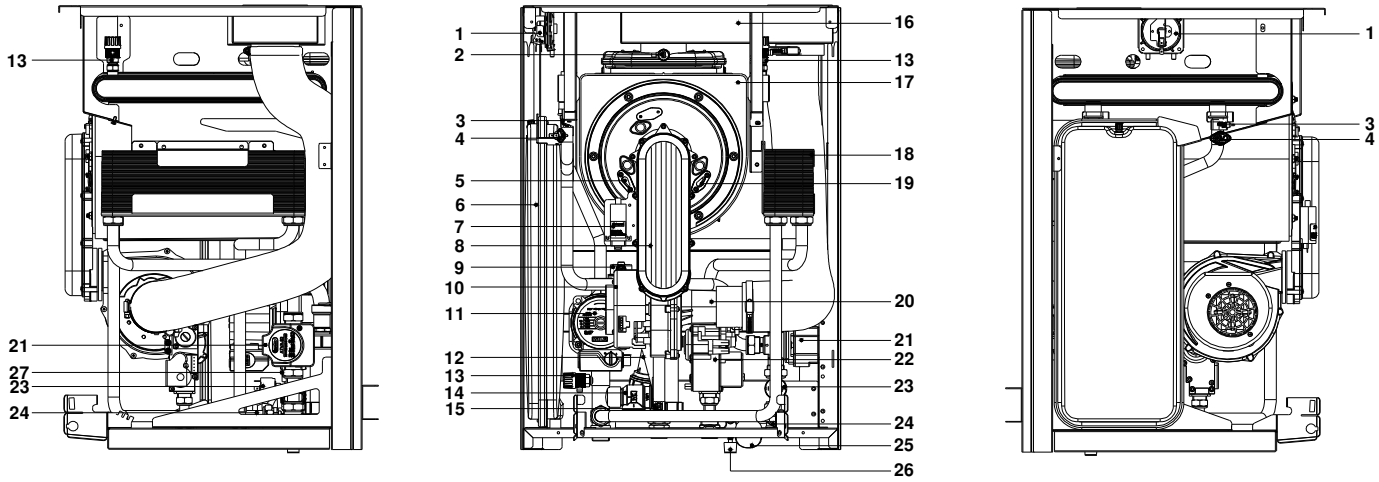




**LEGEND**

| | | |
|---|---|---|
| **HI** | HEATING INTAKE | Ø 3/4" |
| **HO** | HEATING OUTLET | Ø 3/4" |
| **G** | GAS | Ø 3/4" |
| **CWI** | COLD WATER INLET | Ø 3/4" |
| **HWO** | HOT WATER OUTLET | Ø 3/4" |
| **SC** | CONDENSATE DRAIN | Ø 0.98 in |

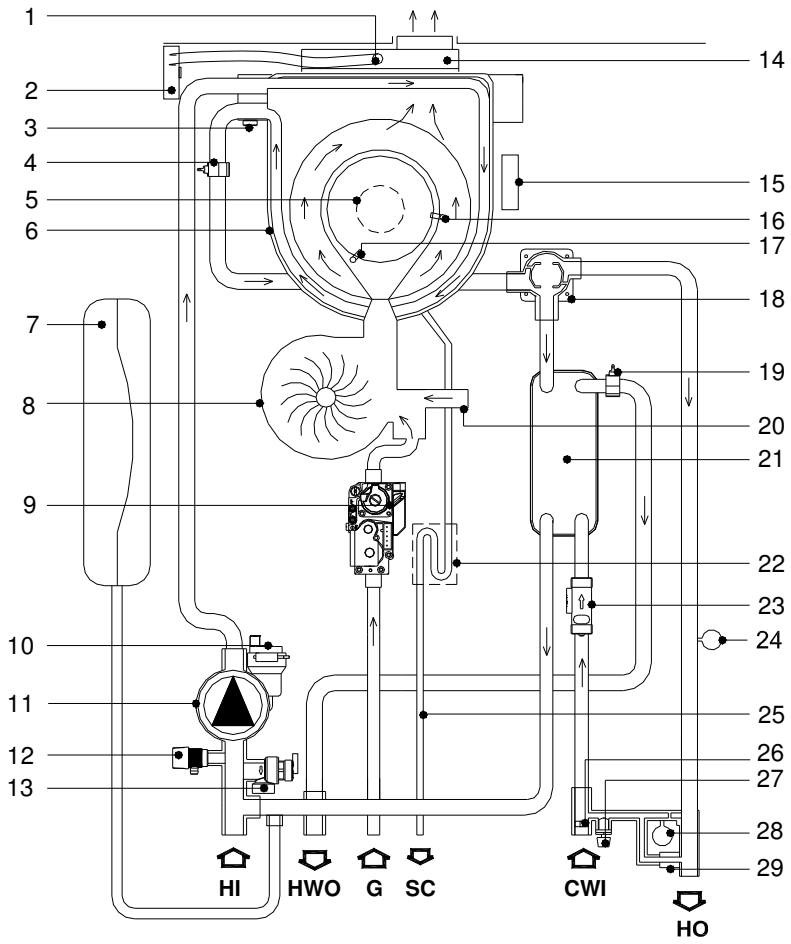
## 2.3 Internal parts of the water heater




### LEGEND

**1.** AIR PRESSURE SWITCH
**2.** SAFETY THERMOFUSE
**3.** HEATING SENSOR
**4.** HEATING SAFETY THERMOSTAT
**5.** IONIZATION ELECTRODE
**6.** EXPANSION TANK
**7.** IGNITION TRANSFORMER
**8.** FLOWMAX BURNER UNIT (GAS MANIFOLD + BURNER)
**9.** AUTOMATIC AIR VENT VALVE
**10.** FAN
**11.** PUMP
**12.** CONDENSATE TRAP
**13.** AIR VENT VALVE 1/4
**14.** SAFETY VALVE 3/4
**15.** D.H.W. SENSOR
**16.** EXHAUST HOOD
**17.** PRIMARY CONDENSING HEAT EXCHANGER
**18.** D.H.W. EXCHANGER
**19.** IGNITION ELECTRODE
**20.** VENTURI
**21.** DIVERTER ACTUATOR VALVE
**22.** ELECTRONIC GAS VALVE
**23.** WATER PRESSURE SWITCH
**24.** NO-RETURN VALVE
**25.** WATER PRESSURE GAUGE
**26.** FILLING TAP
**27.** ELECTRONIC FLOWSWITCH

## 2.4 Water circuit



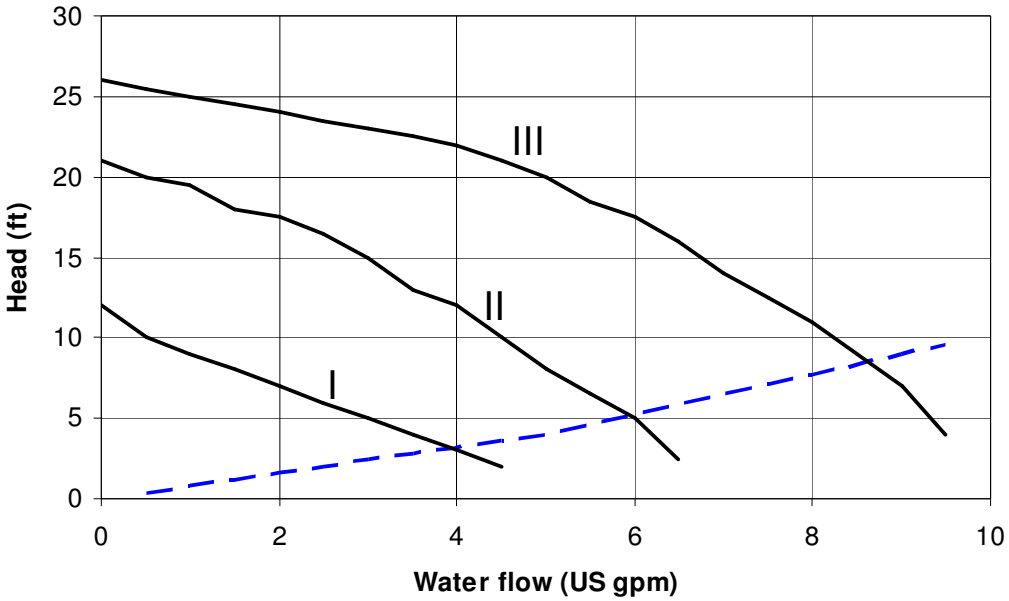

**LEGEND**

**1.** SAFETY THERMOFUSE
**2.** AIR PRESSURE SWITCH
**3.** HEATING SAFETY THERMOSTAT
**4.** HEATING SENSOR
**5.** FLOWMAX BURNER UNIT (GAS MANIFOLD+BURNER)
**6.** PRIMARY CONDENSING HEAT EXCHANGER
**7.** EXPANSION VESSEL
**8.** FAN
**9.** ELECTRONIC GAS VALVE
**10.** AUTOMATIC AIR VENT VALVE
**11.** PUMP
**12.** AIR VENT VALVE 1/4
**13.** PRESSURE RELIEF VALVE
**14.** EXHAUST HOOD
**15.** IGNITION TRANSFORMER
**16.** IGNITION ELECTRODE
**17.** IONIZATION ELECTRODE
**18.** DIVERTER ACTUATOR VALVE
**19.** D.H.W. SENSOR
**20.** VENTURI
**21.** D.H.W. EXCHANGER
**22.** CONDENSATE TRAP
**23.** ELECTRONIC FLOWSWITCH
**24.** WATER PRESSURE SWITCH
**25.** CONDENSATE DRAIN PIPE
**26.** FLOW LIMITER
**27.** FILLING TAP
**28.** WATER PRESSURE GAUGE
**29.** NO-RETURN VALVE

**LEGEND**

| | |
|---|---|
| **HI** | HEATING INTAKE |
| **HO** | HEATING OUTLET |
| **G** | GAS |
| **CWI** | COLD WATER INLET |
| **HWO** | HOT WATER OUTLET |
| **SC** | CONDENSATE DRAIN |

## 2.5 Circulation pump head/flow graph




| | |
|---|---|
| —— | **Pump head** |
| **I, II, III** | **Pump speed** |
| - - - | **Water heater losses** |

## 2.6 DIGITECH® printed circuit board – SM 20021

### Technical characteristics

***Adjustments possible by service personnel only***

- Standard (86-176°F) / reduced (77-104°F) central heating temperature
- Water hammer prevention function
- Central Heating timer - (adjustable from 0 to 7,5 minutes)
- Central Heating pump overrun timer
- Domestic Hot Water pump overrun timer
- Minimum Gas pressure setting
- Maximum Heating Load
- D.H.W. temperature setting 95-160°F

***User settings***

- On/Off
- Heating Temperature setting (86-176°F) – (77-104°F)
- D.H.W. temperature setting (95-140°F) – (95-160°F)
- Summer only mode / Winter only mode / Summer + Winter mode selection

***Operation/Functions display***

- Lock-Out
- Water deficiency indicator
- Temperature display

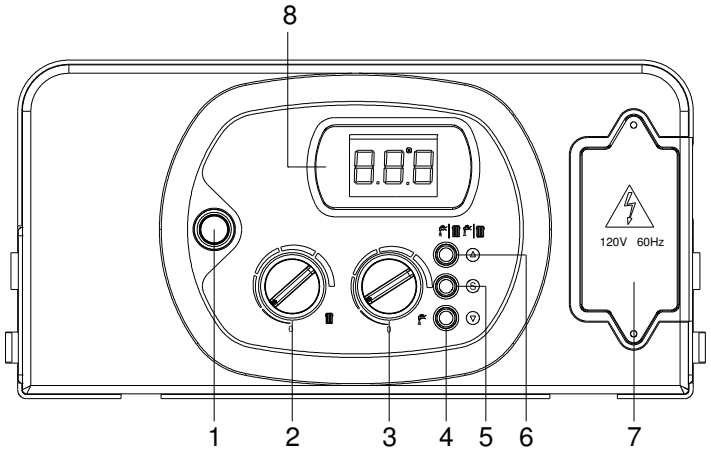
➔ ***When the water heater is switched off at the switch on the control panel, the word OFF appears on the display. The D.H.W and central heating frost protection system, nevertheless, remain enabled. If the water heater was previously on, it is switched off and the post-ventilation, pump overrun , circulation pump and three-way valve inactivity protection functions are enabled.***

➔ ***The remote control, where fitted, remains active and illuminated.***

## 2.7 Control panel

**LEGEND**

1. ON/OFF SWITCH
2. HEATING TEMPERATURE CONTROL KNOB
3. D.H.W TEMPERATURE CONTROL KNOB.
4. D.H.W TEMPERATURE BUTTON. KEEP PRESSED FOR 5 SECONDS TO DISPLAY OUTSIDE TEMPERATURE (ONLY WITH OPTIONAL OUTDOOR SENSOR)
5. SERVICE BUTTON.
6. SUMMER, WINTER OR SUMMER/WINTER MODE SELECTION BUTTON.
7. TERMINAL BOARD FOR EXTERNAL WIRING.
8. TEMPERATURE, ERROR CODE AND OPERATING STATUS DISPLAY



# 3. INSTALLATION (authorized personnel)

## 3.1 Reference standard

Install in accordance with CEC and NEC. All wiring shall conform to CEC , NEC and local building and electrical codes.

This appliance meets the requirements of:

American National Standard/CSA Standard for Gas Water Heaters Volume III, Storage Water Heaters with input Ratings above 75,000 Btu per Hour, Circulating and Instantaneous. Conforms to ANSI STD Z21.10.3, certified to CSA STD 4.3.

Failure to install a gas appliance correctly and in accordance with the above norms could lead to prosecution. It is in the interest of the installer and safety that the law is complied with.

The manufacturer's instructions form an integral part of the installation and should be left with the appliance but do not over ride in anyway statutory obligations.

### Installation requirements

Please refer to local and national standards in force with the Country of destination of the product.

## 3.2 Unpacking

- **The materials (cardboard) used for packing the appliance are fully recyclable.**
- **It is recommended that the packing material is only removed prior to installing the water heater. The manufacturer will not be held responsible for damage caused by incorrect storage of the product.**
- **Packing materials (plastic bags, polystyrene, nails, etc.) must not be left within reach of children, in that these items represent a potential hazard.**

**A.** Place the packed appliance on the floor (see fig. 1) making sure that the "up" arrow is facing down. Remove the staples and open out the four flaps of the box.

**B.** Rotate the water heater 90° while manually supporting it from underneath

**C.** Lift the box and remove the protections. Lift the water heater by grasping the rear part and proceed with the installation.

**STORAGE & HANDLING**

Please note that prior to installation the Radiant water heaters should be stored in the horizontal position with no more than three water heaters to a stack;
Ensure that the water heaters are stored in dry conditions and be aware that the carton is a tow-man lift;

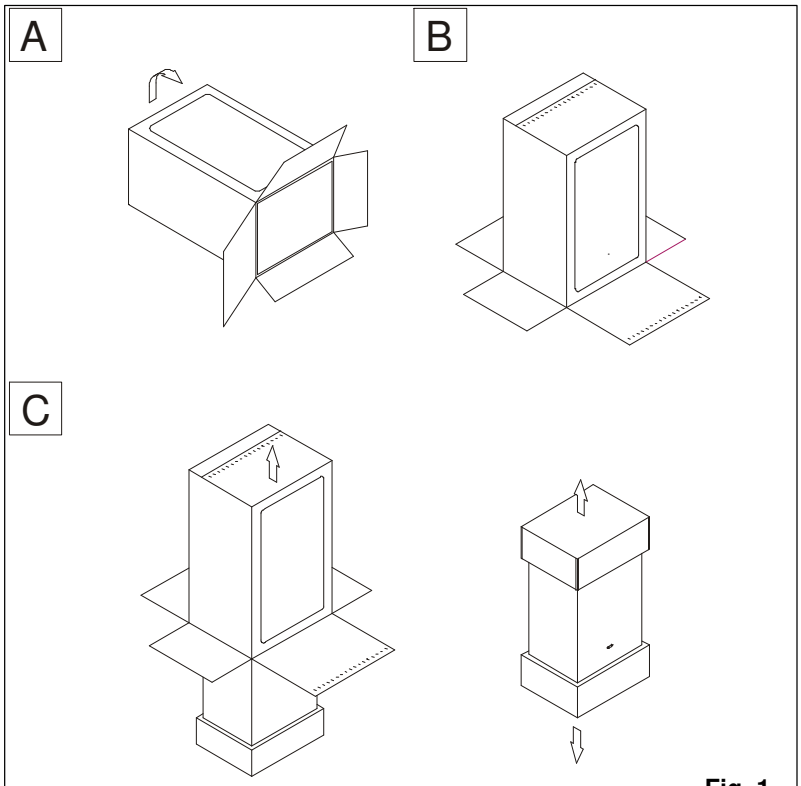


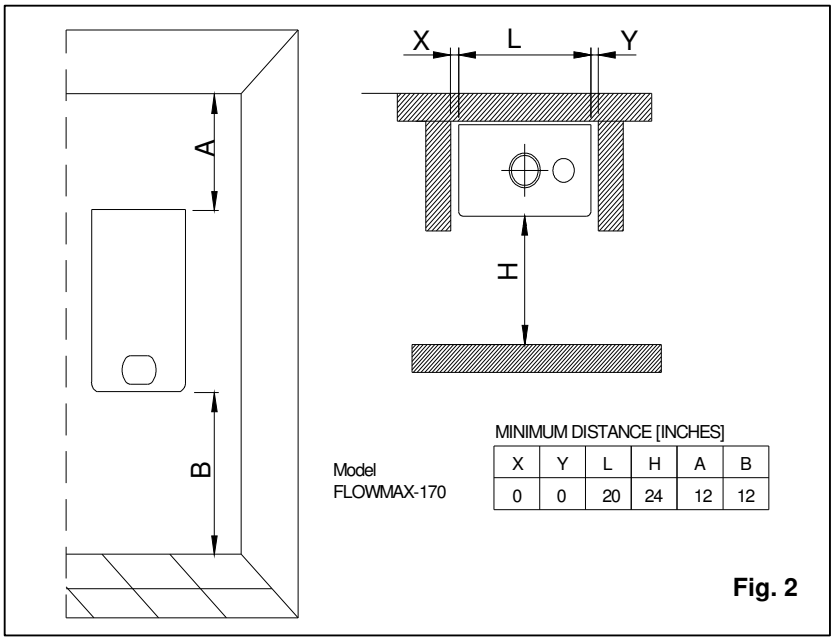

**Fig. 1**

## 3.3 Installing the water heater

⚠ The appliance must be installed exclusively on a vertical solid wall capable of supporting its weight. The water heater should be fitted within the building unless otherwise protected by a suitable enclosure i.e. garage or outhouse. (The water heater may be fitted inside a cupboard)

- If the water heater is sited in an unheated enclosure then it is recommended to leave the ON/OFF switch always in ON position to give frost protection.

In order to allow access to the interior of the water heater for maintenance purposes, it is important that the minimum distances indicated in figure 2 are respected. To make the installation easier, the water heater is supplied with a template to enable the pipe connections to be positioned prior to fixing the appliance to the wall.




MINIMUM DISTANCE [INCHES]

| Model | X | Y | L | H | A | B |
|---|---|---|---|---|---|---|
| FLOWMAX-170 | 0 | 0 | 20 | 24 | 12 | 12 |

**Fig. 2**

To install the water heater, proceed as follows (see fig. 2):

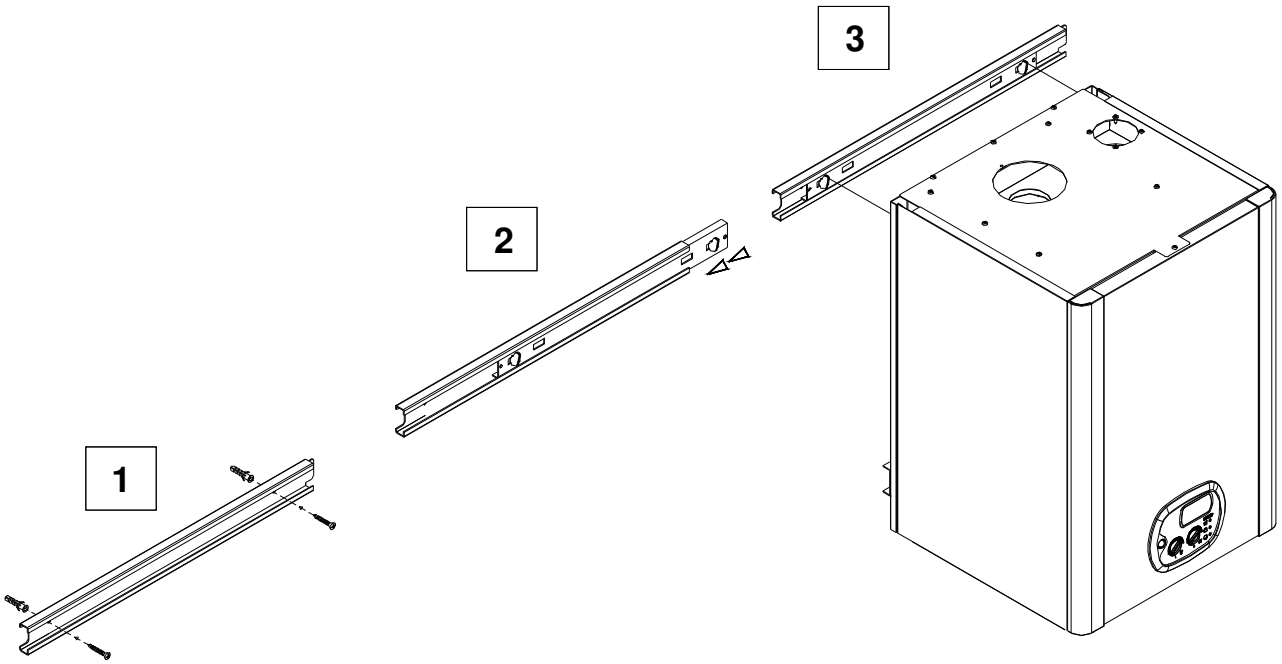
**a.** Use a spirit level (of not less than 25 mm long) to mark a horizontal line on the wall where the water heater is to be fitted.

**b.** Position the top of the template along the line drawn with the level, respecting the distances indicated. Then mark the centres of the positions of the two wall-plugs or anchors. Finally, mark the positions of the water and gas pipes.

**c.** Remove the template and install the supplied bracket securely to the wall. Once the water heater is securely installed, connect the domestic hot and cold water pipes, the gas supply pipe and the central heating pipes using the fittings supplied with the water heater.

**d.** Clearance to Combustibles-
Front –0 inches
Sides – 0 inches
Rear – 0 inches
Top – 0 inches from jacket cover

## 3.4 Fixing the water heater to wall




Instructions as follows:

1) Fix the external part of mounting bracket to wall using proper screw anchors.
2) Insert the inner guide of mounting bracket
3) Hang the water heater onto the opposite hooks.

## 3.5 Water connections

**In order to safeguard the heat exchanger and circulation pump, especially in case of water heater replacement, it is recommended that the system is hot-flushed to remove any impurities (especially oil and grease) from the pipes and radiators.**

**Make sure that the domestic water and central heating pipes are not used to ground the electrical system. The pipes are totally unsuitable for this purpose.**

**Isolation Valves must be installed on the heating and D.H.W circuits. This will facilitate all maintenance and service operations where the water heater needs to be drained.**

- To prevent vibration and noise coming from the system, do not use pipes of reduced diameter, short radius elbows or severe reductions in the cross sections of the water passages.
- In order to guarantee the reliability of the water heater and prevent permanent damage in areas with high water inlet pressure too, a 36.3 psi (2.5 bar) pressure reducing valve should be fitted.
- The water flowing out of the pressure/relief valve during its operation may be extremely hot. Before operating relief valve, make sure drain line is installed to direct discharge to a safe location such as an open drain. Avoid scalding and/or water damage.

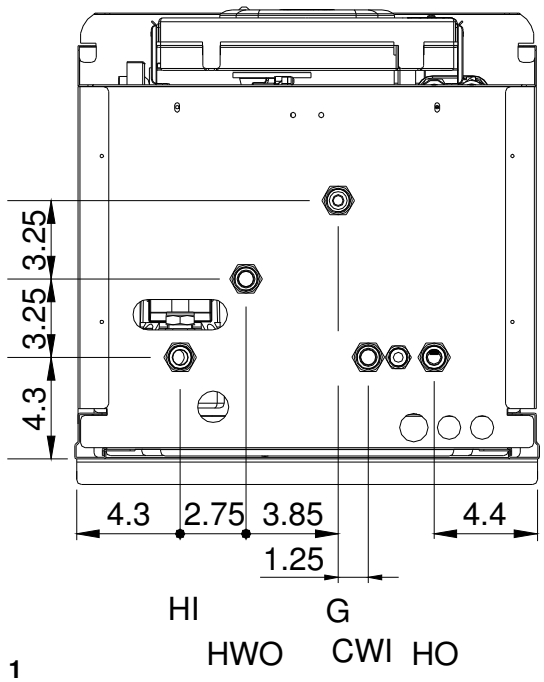



**Fig. 1**

**LEGEND**

| | | |
|---|---|---|
| **HI** | HEATING INTAKE | Ø 3/4 |
| **HO** | HEATING OUTLET | Ø 3/4 |
| **G** | GAS | Ø 3/4 |
| **CWI** | COLD WATER INLET | Ø 3/4 |
| **HWO** | HOT WATER OUTLET | Ø 3/4 |

A pressure relief valve is installed in this dual purpose water heater that is rated in accordance with and complying with either The Standard for relief Valves and Automatic Shutoff Devices for Hot Water Supply Systems, ANSI Z21.22 CSA 4.4 Code.
The relief valve must be installed such that the discharge will be conducted to a suitable place for disposal when relief occurs and that no reducing coupling or other restriction be installed in the discharge line. The discharge line must be installed to allow complete drainage of both the valve and the line. If this unit is installed with a separate storage vessel, the separate vessel must have its own temperature and pressure relief valve. No valve is to be placed between the relief valve and the tank. This valve must also comply with The Standard for Relief Valves and Automatic Shutoff Devices for Hot Water Supply Systems. ANSI Z21.22 or CSA 4.4. If a relief valve discharges periodically, this may be due to the thermal expansion in a closed water system.
Contact the water supplier or local plumbing inspector on how to correct this situation. Do not unplug relief valve.

## 3.6 Domestic hot water circuit/ Condensate Drain

**Warning/ Hard Water**

- If this water heater is installed in an application where the supply water is hard, it must be treated with either a water softener and filtration, which removes the hardness, or by using sequestering agents that reduce the amount of scale deposits.
- Damage to the water heater as a result of water in excess of 14.5 gpg (250mg/L) of hardness is not covered by FLOWMAX Limited warranty. If there a problem with the water quality, contact your local water conditioning company for equipment to condition the water supply to this appliance

**The cold water supply pressure at the inlet to the water heater must be between 7.25 psi (0.5 bar) and 87 psi (6 bar).**

**In areas with higher water inlet pressure a pressure reducing valve must be fitted before the water heater.**

The frequency of the heat exchanger coil cleaning depends on the hardness of the mains water supply and the presence of residual solids or impurities, which are often present in the case of a new installation. If the characteristics of the mains water supply are such that require it to be treated, then the appropriate treatment devices must be installed, while in the case of residues, an in-line filter should be sufficient.

### Central heating circuit

In order to prevent scaling or deposits in the primary heat exchanger, the mains supply water to the heating circuit must be treated according to the requirements of local standards.
This treatment is indispensable in the case where the circuit is frequently topped-up or when the system is often either partially or fully drained.

### Condensate Drain

- FLOWMAX water heater is a high efficient gas appliance that creates condensation when it operates. A condensate trap and flexible drain pipe comes factory installed inside each water tank.

The condensate trap must be primed before operation to prevent exhaust gases from entering the building.

- Follow your local code with regards to the disposal of condensation
- Here are several options for disposal of condensate
  - From combination water heater direct to drain
  - From combination water heater to neutralizer to drain
  - From combination water heater to laundry tub (bottom of water heater must be above the height of the laundry tub; must have a negative slope to properly drain)
  - From combination water heater to condensate pump to laundry tub (for long distances between water heater and laundry tub or when bottom of the water heater is installed below height of the laundry tub)
- Failure to install the condensate discharge properly will affect the reliability of the water heater.

For all units installed with vertical exhaust, must have an additional approved condensate drain. Fittings must be ULC S636 approved.

Failure to properly connect the condensate line will cause combustion gases to enter the room, possibly causing serious injury to occupants or death.

**Note:** Check with your municipality, local codes, or local gas company to determine if disposal of combustion condensate is permitted. In the State of Massachusetts the condensate must be neutralized prior to entering a drain

- Use only PVC, Vinyl or CPVC pipe for the condensate drain line, metal pipe work is not suitable for condensate discharge system.
- The condensate drain line should be a minimum of 1/2" diameter that connects to the 7/8" supplied hose and must be supported to prevent sagging. Manufacturer will supply a ¾" to ½" reducer for connection.
- Keep the length of the condensate drain as short as possible. Long runs or applications where the nearest drain is above the water heater will require the use of a condensate pump. Size the pump to allow for a maximum condensate discharge of 2 gpm from the water heater. The end drain pipe must not be submerged in water or blocked in any way.

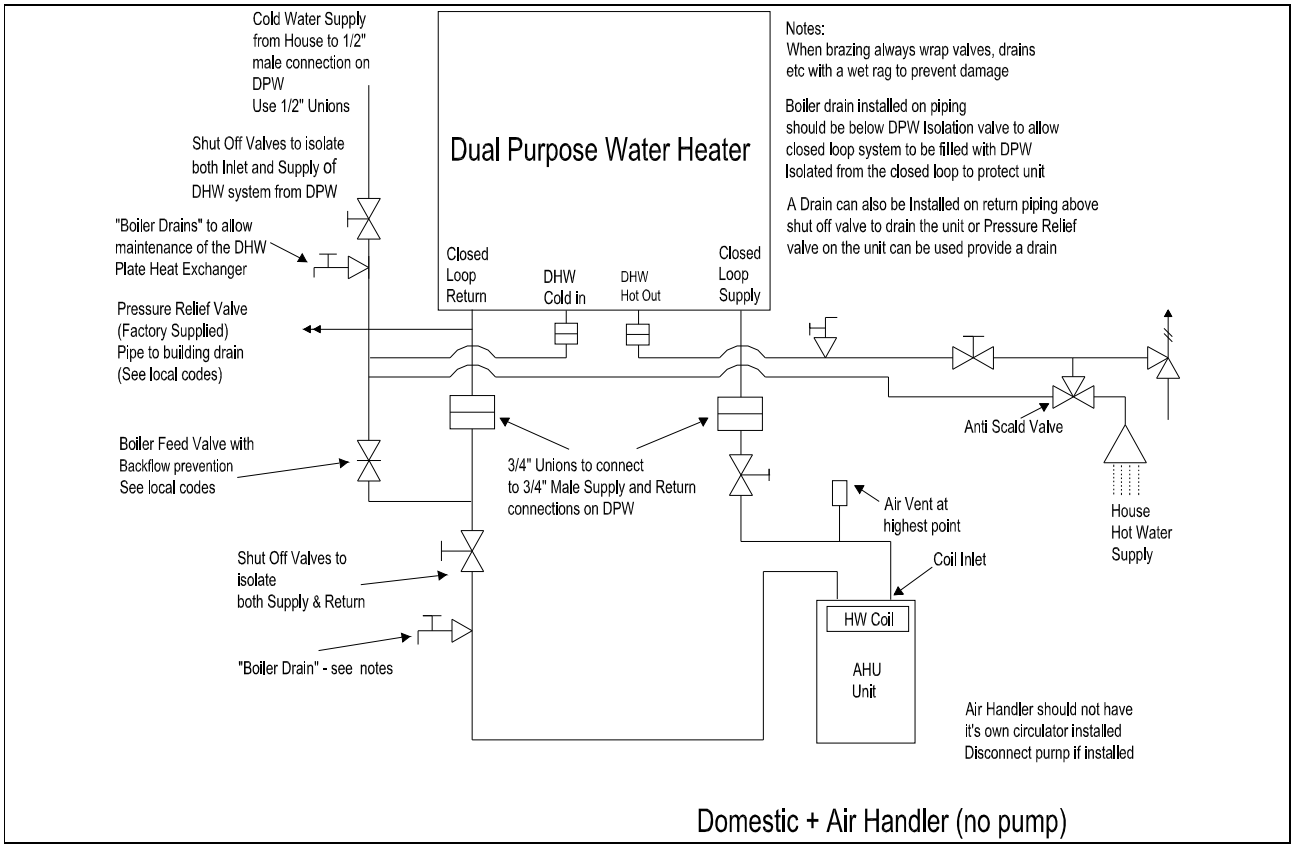
- The condensate pump must be installed with an overflow safety switch that detects downstream clogs and shuts off the water heater before flooding occurs. See condensate pump manufacture for installation instructions.
- Be sure to check that condensate is freely flowing from the drain piping after the system has been installed. Condensate will begin flowing out of the water heater within 15 minutes after operation has started.
- Do not run condensate line outside and take measures to prevent the condensate drain lines from freezing (insulation, heat tape, electric heaters, etc.)
- Be sure to clean the condensate trap at least once per year to prevent any problems, and after cleaning be sure to check for any leaks of condensed water or flue gas.

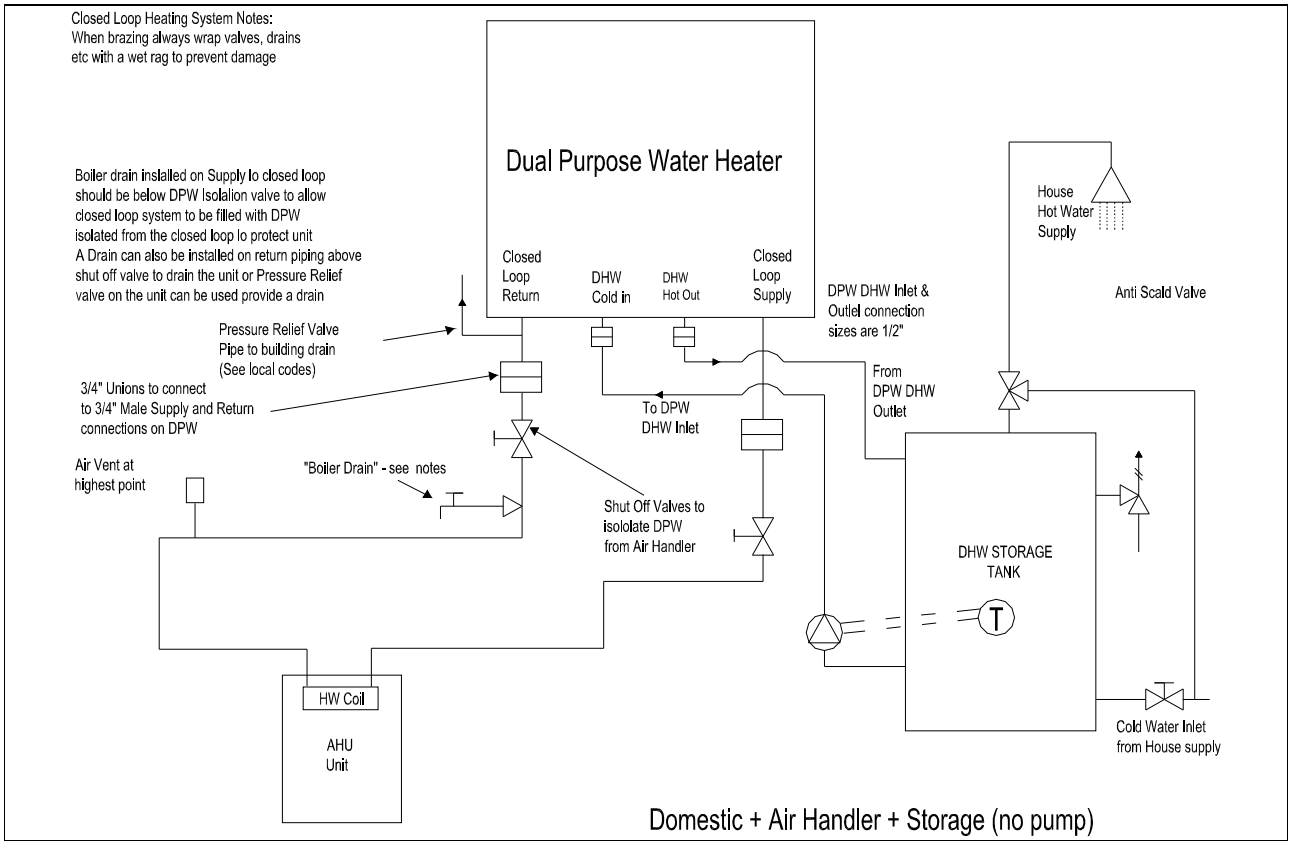
## Space Heating

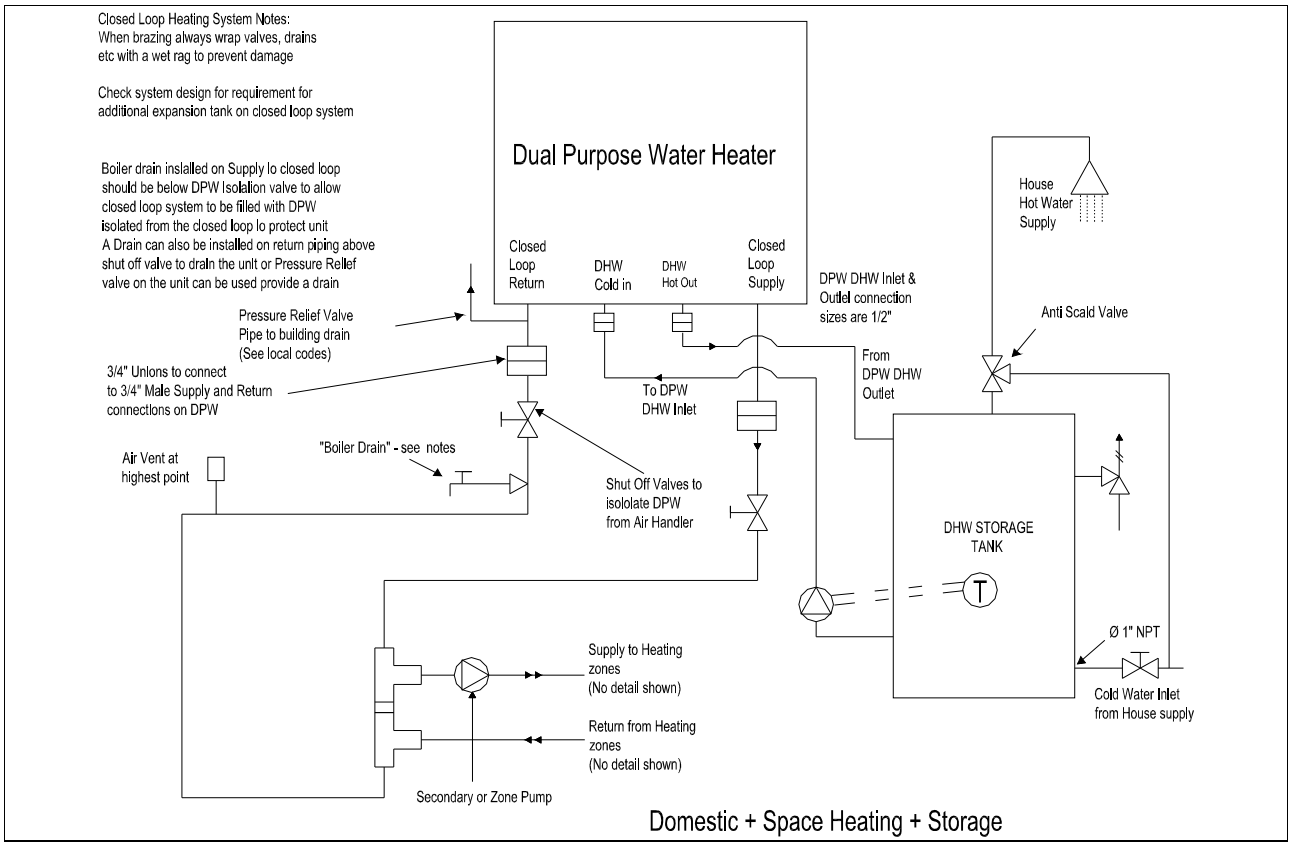
- This water heater is suitable for water (potable) heating and space heating.
- Piping and components connected to the water heater for the space heating application shall be suitable for use with potable water.
- Toxic chemicals, such as used for water heater treatment, shall not be introduced into the potable water used for space heating.
- A water heater which will be used to supply potable water shall not be connected to any heating system of component(s) previously used with nonpotable water heating appliance.
- When the system requires water for the space heating at temperatures higher than required for other uses, a means such as a mixing valve shall be installed to temper the water for those uses in order to reduce scald hazard potential.
- The water heater can be used for potable hot water heating and combination space heating applications.

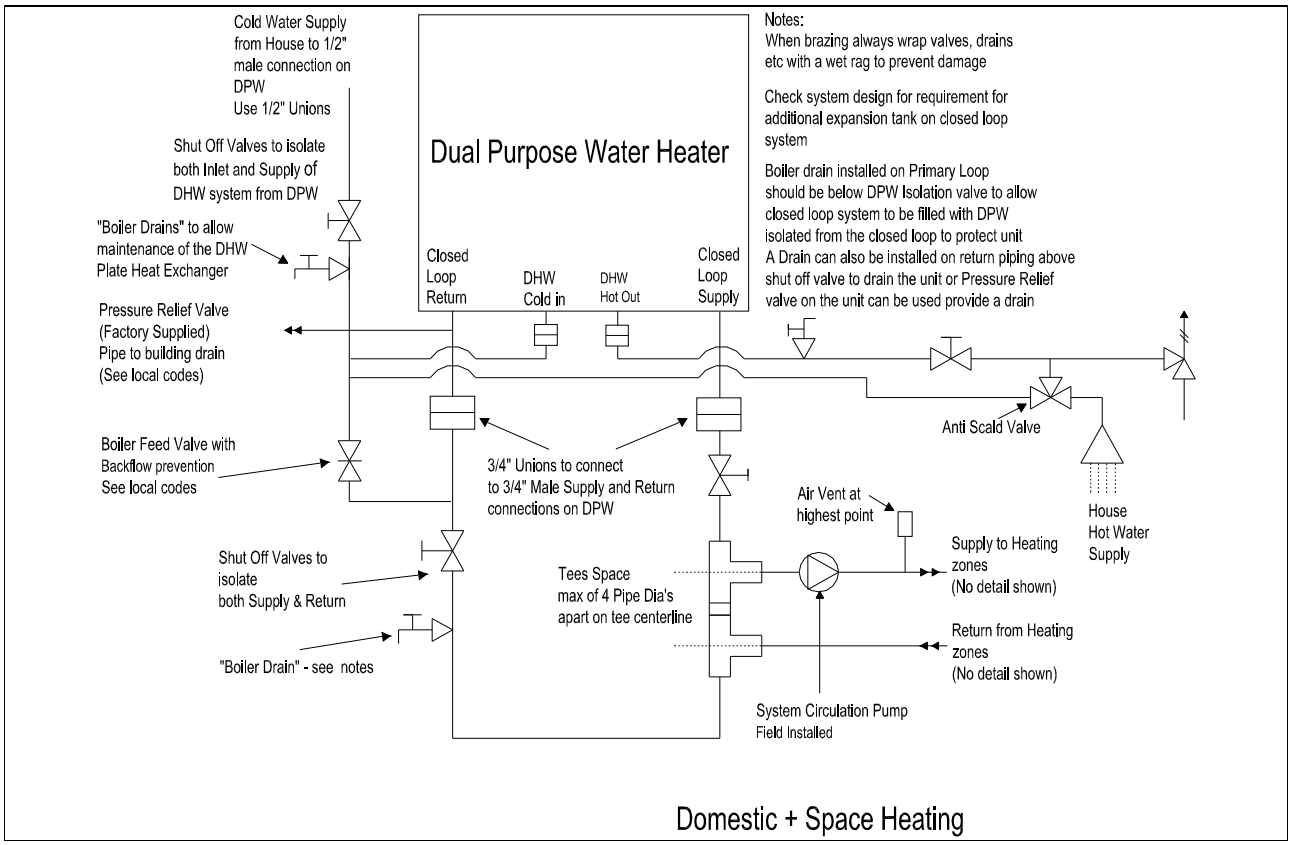
Note: the following illustrations are conceptual designs only. There are many design variations of the equipment presented. Designers must add all necessary safety and auxiliary equipment to conform to Code requirement and proper design practice. For more details, contact the manufacturer or distributors of the products.

# 3.7 Schematic of Piping Installation




Closed Loop Heating System Notes:
When brazing always wrap valves, drains etc with a wet rag to prevent damage
Check system design for requirement for additional expansion tank on closed loop system
Boiler drain inslalled on Supply lo closed loop should be below DPW Isolation valve to allow closed loop system to be filled with DPW isolated from the closed loop lo protect unit
A Drain can also be installed on return piping above shut off valve to drain the unit or Pressure Relief valve on the unit can be used provide a drain
Dual Purpose Water Heater
Closed Loop Return
DHW Cold in
DHW Hot Out
Closed Loop Supply
DPW DHW Inlet & Outlet connection sizes are 1/2"
House Hot Water Supply
Anti Scald Valve
Pressure Relief Valve Pipe to building drain (See local codes)
3/4" Unlons to connect to 3/4" Male Supply and Return connections on DPW
From DPW DHW Outlet
To DPW DHW Inlet
Air Vent at highest point
"Boiler Drain" - see notes
Shut Off Valves to isololate DPW from Air Handler
DHW STORAGE TANK
Ø 1" NPT
Cold Water Inlet from House supply
Supply to Heating zones (No detail shown)
Return from Heating zones (No detail shown)
Secondary or Zone Pump
Domestic + Space Heating + Storage


Cold Water Supply from House to 1/2" male connection on DPW Use 1/2" Unions
Shut Off Valves to isolate both Inlet and Supply of DHW system from DPW
"Boiler Drains" to allow maintenance of the DHW Plate Heat Exchanger
Pressure Relief Valve (Factory Supplied) Pipe to building drain (See local codes)
Boiler Feed Valve with Backflow prevention See local codes
Shut Off Valves to isolate both Supply & Return
"Boiler Drain" - see notes
Dual Purpose Water Heater
Closed Loop Return
DHW Cold in
DHW Hot Out
Closed Loop Supply
Notes:
When brazing always wrap valves, drains etc with a wet rag to prevent damage
Check system design for requirement for additional expansion tank on closed loop system
Boiler drain installed on Primary Loop should be below DPW Isolation valve to allow closed loop system to be filled with DPW isolated from the closed loop to protect unit
A Drain can also be installed on return piping above shut off valve to drain the unit or Pressure Relief valve on the unit can be used provide a drain
Anti Scald Valve
3/4" Unions to connect to 3/4" Male Supply and Return connections on DPW
Air Vent at highest point
House Hot Water Supply
Tees Space max of 4 Pipe Dia's apart on tee centerline
Supply to Heating zones (No detail shown)
Return from Heating zones (No detail shown)
System Circulation Pump Field Installed
Domestic + Space Heating

# 3.8 Gas Connection

## Gas Piping Guidelines

⚠ Follow all local codes and/or the most recent edition of the National Fuel Gas Code (ANSI Z223.1/NFPA 54) in the USA or the Natural Gas and Propane Installation Code in Canada (CAN/CSA B149.1).

## Gas Supply Lines Pressures

⚠ The minimum and maximum inlet gas pressures are *Natural Gas Min. 7.00"WC – Max. 14.00"WC*.

⚠ Gas pressures over and above the specified range will result in adverse performance and dangerous operating conditions; any damage resulting from extreme gas supply pressures will not be covered by the limited warranty.

⚠ Until pressure testing of the main gas supply line is completed, ensure the gas line to the FLOWMAX Combination Water Heater is disconnected to avoid any damage to the water heater.

⚠ The appliance and its individual shut off valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 0.5 psi (3.5 kPa)..

⚠ The appliance must be isolated from the gas supply piping system by closing its individual manual shut-off valve during any pressure testing of the gas supply system at test pressures equal to or less that 0.5 psi (3.5 kPa).

⚠ The gas appliance and its gas connections must be leak tested before placing the appliance in operation. Leaks can be found by using a gas leak detection device or by applying soapy water to all gas fittings. Should bubbles occur, tighten those connections and re-test.

⚠ Always purge the gas line for any debris before connecting to the water heater gas inlet.

⚠ Never use an open flame to test for gas leaks as property damage, personal injury or death could result.

⚠ The maximum inlet gas pressure must not exceed the valve specified by the manufacturer and that the minimum valve listed as for the purposes of input adjustment.

⚠ The connection to the gas supply must be carried out by professionally qualified personnel in accordance with the relevant standards.

- ***Check the internal and external seals of the gas supply system.***
- A gas shut-off valve must be installed upstream of the appliance
- Before starting up the water heater, make sure that the type of gas corresponds to that for which the appliance has been set-up.
- The gas supply pressure must be between the values reported on the rating plate.
- Conversion of the appliance from natural gas to LPG or vice versa must be carried out by qualified personnel.
- The power supply cable must be replaced by a qualified electrician. If the cable is damaged in any way, switch off the appliance and have the cable replaced by a suitably qualified electrician.

**When using an electrical appliance, a few fundamental rules must be observed:**

- Do not touch the appliance with damp or wet parts of the body or when barefoot.
- Do not pull on the electric wires.
- Do not allow the appliance to be used by children or anyone unfamiliar with its operation.

## 3.9 Electrical connections

### General warnings

⚠ Follow the electrical code requirements of the local authority having jurisdiction. In the absence of such requirements, follow the latest edition of the National Electrical Code (NFPA 70) in the U.S. or the latest edition of CGA C22.1 Canadian Electrical Code – Part 1 in Canada.

### Electric Wiring: Ground and Surges

⚠ All units come with factory installed 3-pronged (grounded) plug end. The combination water heater can be plugged into any standard electrical duplex outlet close to the unit as it requires only 4 Amps.

⚠ If the local jurisdiction requires the unit to be wired directly, remove and discard the factory installed plug. An ON/OFF switch controlling the main power between the breaker and the FLOWMAX Water Heater should be provided to facilitate end-user maintenance and servicing. This should be done by a qualified electrician.

⚠ The combination water heater must be electrically grounded. Ensure the electrical receptacle, in which the water heater will be plugged into, is properly grounded; if wiring directly, do not attach the ground wire to either the gas or the water piping as plastic pipe or dielectric unions may isolate the water heater electrically.

⚠ The use of a surge protector is recommended to protect from power surges.

⚠ Do not energize electric power to the unit until all plumbing and gas piping is complete and the combination water heater has been filled with water.

⚠ The electrical supply required by the water heater is 120VAC at 60Hz with a maximum 4A rating with proper grounding.

⚠ DO NOT connect 220-240VAC and any other voltage to this FLOWMAX Combination Water Heater. This will damage the combination water heater and void the warranty.

⚠ Do not disconnect the power supply when the unit is in normal operation.

⚠ If there is a power failure in cold weather areas, the freeze prevention system in the water heater will not operate and may result in freezing of the heat exchanger; in cold weather areas where power failures are common, you must completely drain the unit to prevent damage if the power will be off for any extended period of time.

⚠ Damage caused by freezing is not covered under warranty.

⚠ CAUTION : Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

⚠ The connection to the main power supply must be carried out by professionally qualified electrical personnel, registered in accordance with current legislation and local authorities.

⚠ Always check to make sure that the appliance has an efficient ground system. This requirement is only satisfied if it has been properly connected to an efficient ground system installed in accordance with the requirements of current safety standards and carried out by professionally qualified personnel.

This basic safety measure must be checked, verified and carried out by professionally qualified electrical personnel.
Have the electrical system checked by a qualified electrician. The manufacturer will not be held liable for any damage or injury caused as a result of an inefficient or faulty ground system.

- Ensure the domestic power supply is checked by a qualified electrician to ensure that it can support the maximum power absorption of the appliance, as indicated on the rating plate. In particular, make sure that the cable sizes are adequate for the power absorbed by the appliance;
- The power supply cable must be replaced by a qualified electrician. If the cable is damaged in any way, switch off the appliance and have the cable replaced by a suitably qualified electrician;

**When using an electrical appliance, a few fundamental rules must be observed:**

- Do not touch the appliance with damp or wet parts of the body or when barefoot.
- Do not pull on the electric wires..
- Do not allow the appliance to be used by children or anyone unfamiliar with its operation;

If the unit fails to re-start after any fault, unplug the unit for 30 seconds, then re-plug in the unit and try to restart with the on/off switch. If the unit fails to restart, call a qualified Technician for service.

## Remote control connection

***Connect the power supply to the terminal board inside the control panel as follows:***

**a.** Switch off the power supply at the main switch.
**b.** Remove the front case panel of the water heater.
**c.** Slacken the screws and remove plate A (see fig. 1).
**d.** With the plate removed, connect the wires to the terminal board B as follows:

- Connect the ground wire (normally coloured green/yellow) to the terminal marked with the ground symbol " ⏚ ".
- Connect the neutral wire (normally coloured blue) to the terminal marked with the letter "N".
- Connect the live wire (normally coloured brown) to the terminal marked with the letter "L".
- Terminals identified by the letters: Ta ⇒ Room thermostat
  Se ⇒ Outside temperature sensor

When the wires have been connected, place plate "A" back to position.

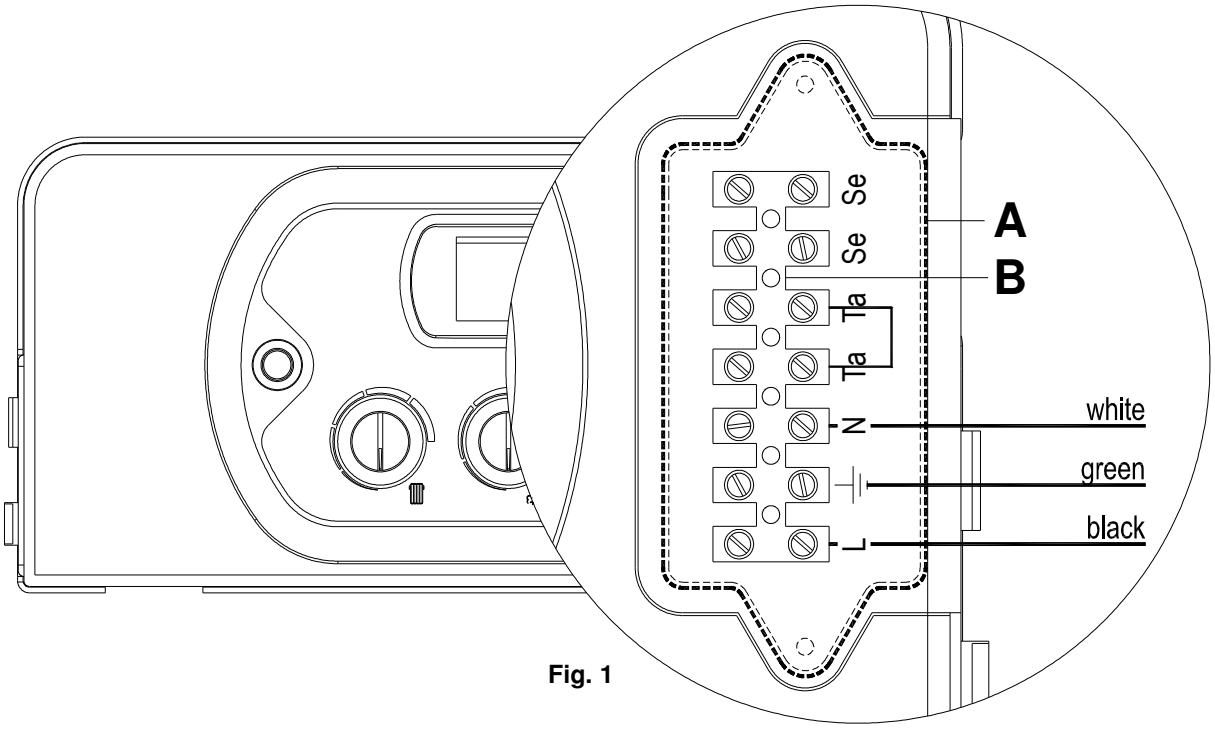



**Fig. 1**

## 3.10 Venting

**Improper venting of combination water heater can result in excessive levels of carbon monoxide which can result in severe personal injury or death. This combination water heater must be vented in accordance with the "Venting of Equipment" section of the latest edition of the ANSI Z223.1 / NFPA 54 Natural Gas Code and/or the "Venting systems and air supply for appliances" section of the latest version of the CAN/CSA B149.1 Natural Gas and Propane Installation Code in Canada and in accordance with all applicable local building codes.**

**Venting Guidelines**

- For best results, keep the vent system as short and straight as possible.
- Locate the combination water heater as close as possible to the vent termination.
- The combination water heater vent must not be common vented with any other gas appliance or vent stack.
- Slope vent upwards towards the vent terminal at a rate of 1/8" per foot (1% slope).
- Vent termination must be a minimum of 12" above grade or expected snowfall.
- Vent and air intake pipe must be supported every 4 feet of horizontal run and every 5 feet of vertical run.

**FLOWMAX and Direct Vent**

- All FLOWMAX Combination Water Heaters are prepared at the factory to be direct vent (sealed combustion) units which draw all of their required combustible air directly from outside the building.
- All FLOWMAX Combination Water Heaters use 2" or 3" diameter exhaust and 2" or 3" diameter air intake pipe.
- The air intake vent materials can be made of ABS, CPVC, PVC materials and in accordance with all applicable local building codes.

**Contaminated Make-Up Air Will Damage the Unit**

- Recommend not to operate the combination water heater in an area that is or will be under construction or renovation.
- The FLOWMAX warranty will not cover damage and premature wear caused to the unit due to installation in a contaminated environment.
- All of the exhaust venting connections must be leak checked with a soap solution upon initial start up of the water heater. Any leaks must be repaired before continuing operation of the water heater.
- Warranty will not be available if the water heater is used for construction heat.

**Exhaust Vent Piping Materials**

- Use only 2” or 3” solid PVC/CPVC schedule 40 PVC/CPVC or ULC S636 pipe and fittings.
- Venting requirements in USA and Canada are different. Please consult with the most recent edition of the National Fuel Gas Code (ANSI Z223.1 / NFPA 54) or CAN/CSA B-149.1 as well as local codes for applicable venting regulations and restrictions.
- For installation in Canada, field supplied plastic vent piping must comply with CAN/CSA B-149.1 (latest edition) and be certified to the standard for type BH Gas Venting Systems, ULC S636 components of this listed system shall not be interchanged with other vent systems or unlisted pipe/fittings. All plastic components and specified primers and glues of the certified vent system must be from a single manufacturer and not intermixed with other system manufacturer’s vent system parts. The supplied vent adaptors are certified as part of the combination water heater.
- For all units installed with vertical exhaust, must have an additional approved condensate drain installed on the Horizontal section of the exhaust vent. Fittings must be ULC S636 approved.
- PVC/CPVC pipe/fittings have been approved for use on this appliance with zero clearance to combustibles.

**Intake Vent Pipe Materials**

- Solid PVC schedule 40 PVC or ULC S636 pipe and fittings and ABS pipe and fittings can be used for combustion air intake on FLOWMAX products.
- Transition cement must be used for the ABS pipe connected to the PVC appliance adaptors.
- All plastic components and specified primers and glues of the certified vent system must be from a single manufacturer and not intermixed with other system manufacturers vent system parts.

**Allowable Vent Lengths**

| Model | Size | Max Equivalent Length Vertical and Horizontal per Vent Run | Type | Exhaust Vent | In-take Vent |
|---|---|---|---|---|---|
| | | | | | |
| FLOWMAX-90 | 2" Diam | 100 ft | Natural Gas or LP | Schedule 40 PVC/CPVC | PVC, CPVC or ABS |
| FLOWMAX-120 | 3" Diam | 100 ft | Natural Gas | Schedule 40 PVC/CPVC | PVC, CPVC or ABS |
| FLOWMAX-170 | 3" Diam | 100ft | Natural Gas | Schedule 40 PVC/CPVC | PVC, CPVC or ABS |

**Equivalent Lengths**

- Reduce the maximum vent length accordingly for each elbow used.
- Each 2”/3” 45º elbow equates to 2.5 linear feet of vent pipe.
- Each 2”/3” 90º short radius elbow equates to 7.5 linear feet of vent pipe.
- Each 2”/3” 90º long radius elbow equates to 5 linear feet of vent pipe.
- The maximum length listed is for exhaust vent only. The intake length should be equal length.
- The total maximum equivalent vent pipe distance cannot exceed 100ft for horizontal and vertical venting distance.
- The maximum lengths are not including elbows.
- Exceeding the maximum venting distances will cause the appliance to malfunction or cause an unsafe condition.

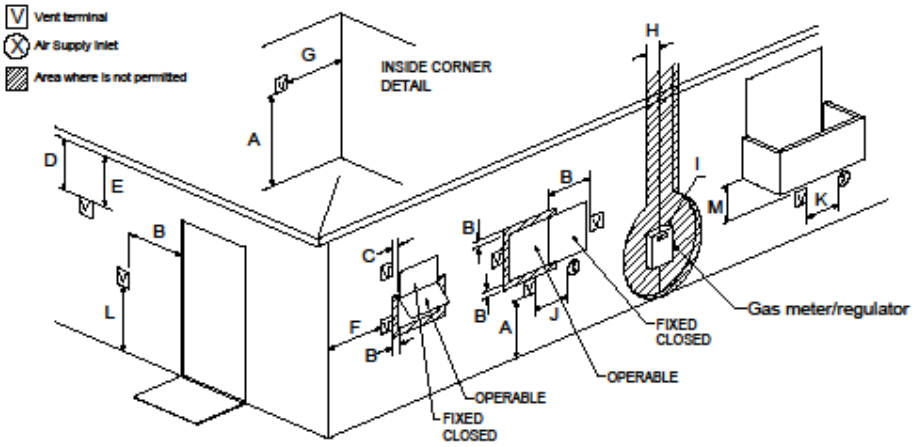
**Minimum Vent Lengths**

- 3" Diameter - 6" pipe (length) plus one elbow.

## VENTING CLEARANCES - DIRECT VENT

### Clearance Requirements from Vent Terminations to Building Openings

* All clearance requirements are in accordance with ANSI Z21.10.3 and the National Fuel Code, ANSI Z223.1 / NFPA54 and CSA B149.1 National Gas and Propane Installation Code..




| | CLEARANCE TO: | U.S. | CANADA |
|---|---|---|---|
| A | Above grade, veranda, porch, deck, or balcony | 12" | 12" |
| B | Window or door that may be opened<br>(12" For appliances > 10,000 BTUh and < 100,000 BTUh)<br>36" For appliances > 100,000 BTUh | 12" | 36"<br>12" > 10,000 BTUh and < 100,000 BTUh |
| C | Permanently closed window | * | * |
| D | Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet from the center of the terminal | * | * |
| E | Unventilated soffit | * | * |
| F | Outside corner | * | * |
| G | Inside corner | * | * |
| H | Each side of center line extended above meter/regulator assembly | 3' within a height 15' above meter/regulator assembly | 3' within a height 15' above meter/regulator assembly |
| I | Service regulator vent outlet | 3' | 3' |
| J | Nonmechanical air supply inlet or combustion air inlet to any other appliance | 12" | 36" |
| K | Mechanical air supply inlet | 3' above if within 10' horizontally | 6' |
| L | Above paved sidewalk or paved driveway located on public property | * | 7'* * * |
| M | Under varanda , porch, deck, or balcony | * | 12"- Canada Only* * * * |

( ) = indicates clearances required in Canada.

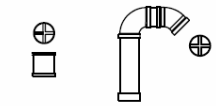
* For clearances not specified in ANSI/Z223.1/NFPA54 and CSA B149.1, clearances are in accordance with local installation codes and the requirements of the gas supplier.

* * * A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.

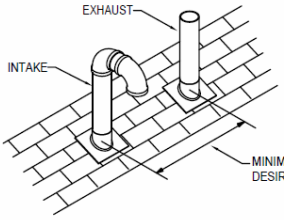
* * * * Permitted only if veranda, porch, deck or balcony is fully open on a minimum of two sides beneath the floor.

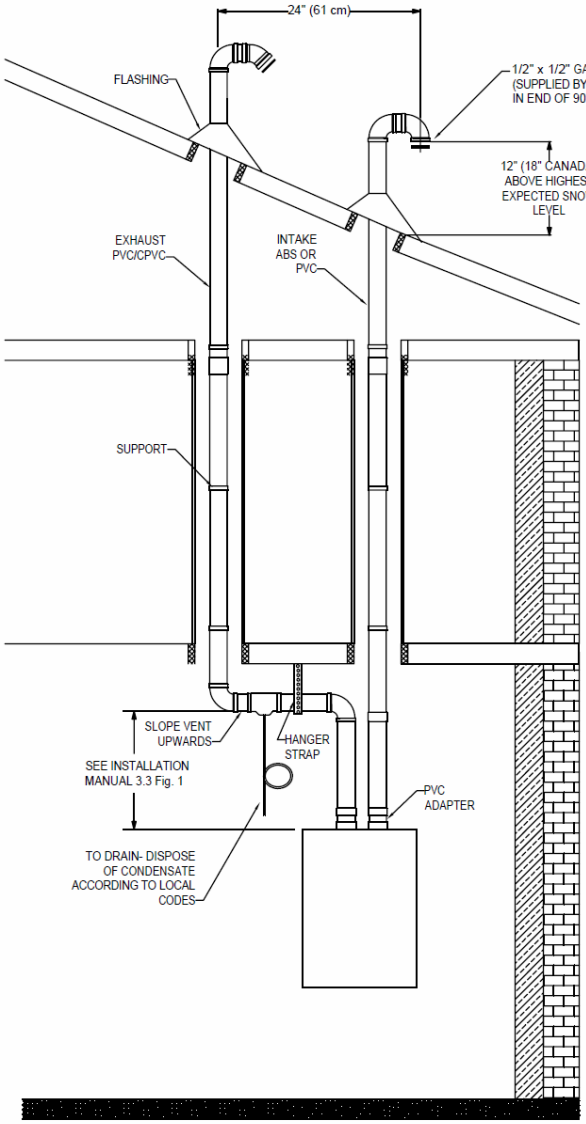
VERTICAL VENT TERMINATION - PVC/CPVC MATERIAL ONLY 2" OR 3"

VERTICAL INTAKE - ABS OR PVC MATERIAL 2" OR 3"



OPTIONAL COUPLING OR 45° ELBOW WITH OPTIONAL 1/2" x 1/2" GALVANIZED SCREEN (SUPPLIED BY MANUFACTURE) INTO EXHAUST END




* THE AIR INLET AND EXHAUST PIPE CAN BE LOCATED IN ANY DESIRED POSITION ON THE ROOF, BUT MUST ALWAYS BE MINIMUM 24" APART.

A PROPER FLASHING SHOULD BE USED TO SEAL THE PIPE WHERE IT EXITS THE ROOF.

THE VENT SYSTEM MUST TERMINATE SO THAT PROPER CLEARANCES ARE MAINTAINED AS CITED IN LOCAL CODES OR THE CURRENT EDITION OF THE NATURAL GAS AND PROPANE INSTALLATION CODE (CAN/CSA-B-149.1) AND ANSI Z223.1/NFPA 54.

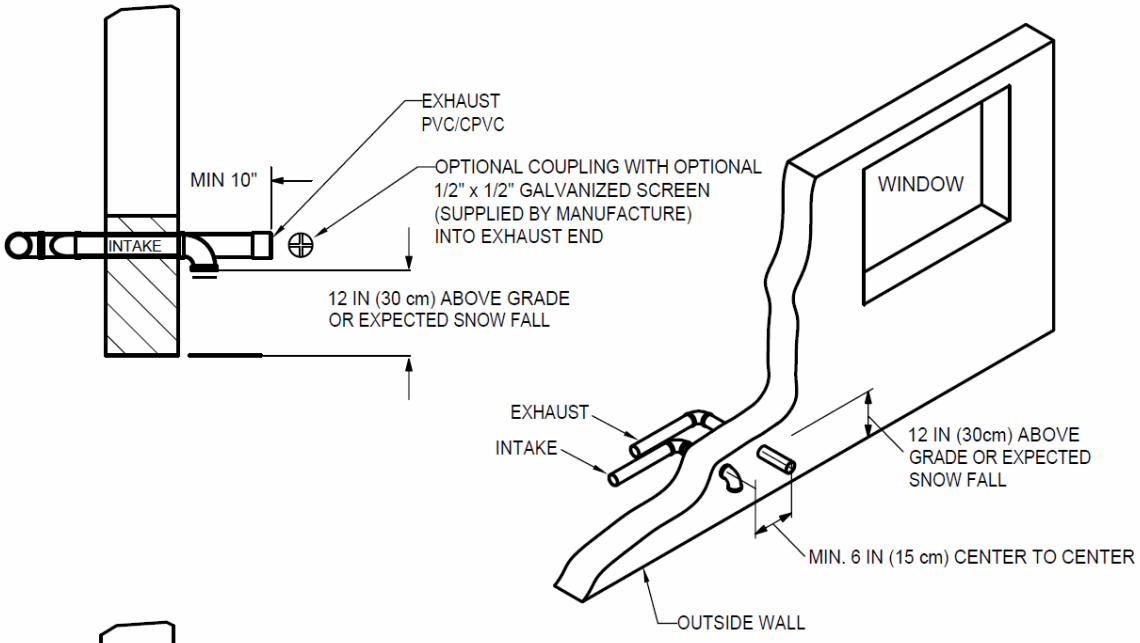
PROVIDE SUPPORT FOR ALL PIPE PROTUDING THROUGH THE ROOF. ALL PIPING SHOULD BE SECURED. THE VENT SYSTEM PIPING SHOULD BE SUPPORTED EVERY 5 FEET (1.5m) OF VERTICAL RUN AND EVERY 3 FEET (1.0m) OF HORIZONTAL RUN. ALL PIPING AND FITTING MUST BE JOINED BY THE PROPER PROCEDURES AS DESCRIBED UNDER VENT PREPARATION.

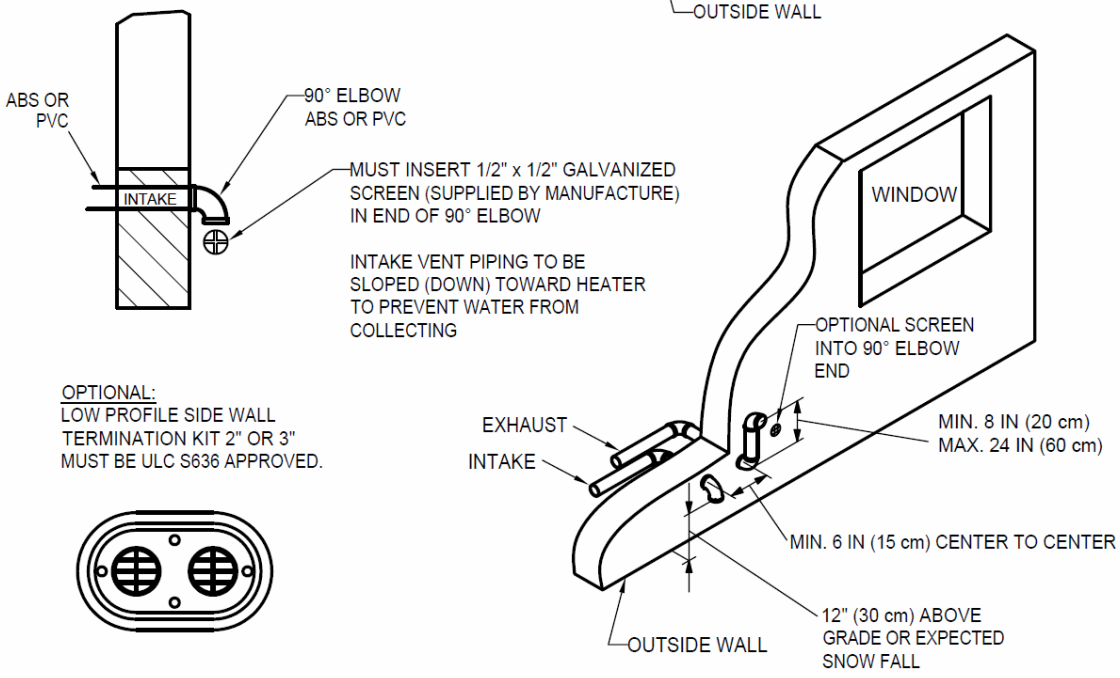
WHEN USING A HORIZONTAL SECTION, SLOPE THE HORIZONTAL VENT 1/8" UPWARDS FOR EVERY 12" (30 cm) (1% SLOPE) TOWARDS THE TERMINATION TO DRAIN CONDENSATE.

EXHAUST VENT PIPE THROUGH AN UNHEATED SPACE MUST BE INSULATED AS PER LOCAL CODES AND AUTHORITIES.

* ALL VERTICAL EXHAUST VENTING MUST HAVE AN ADDITIONAL CONDENSATE DRAIN. ALL FITTINGS MUST BE ULC S636 APPROVED

## HORIZONTAL VENTING - PVC/CPVC/ABS MATERIAL ONLY 2" OR 3"

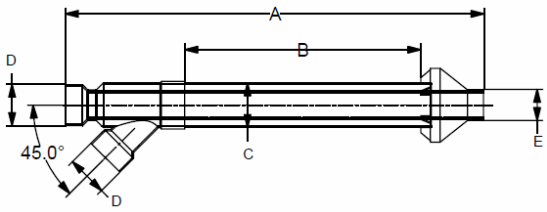


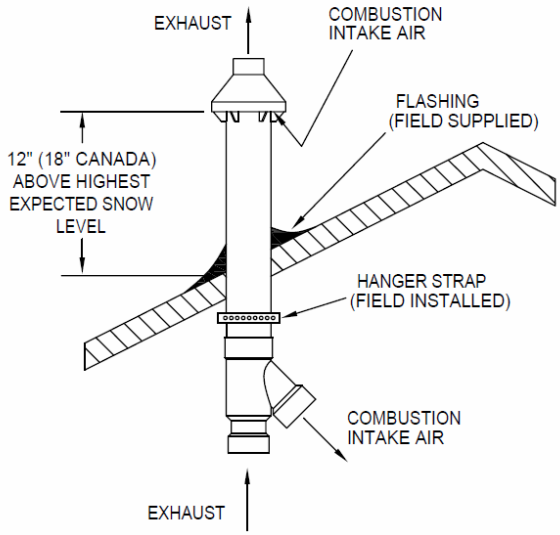

OPTIONAL:
LOW PROFILE SIDE WALL
TERMINATION KIT 2" OR 3"
MUST BE ULC S636 APPROVED.

# CONCENTRIC VENT TERMINATION - 2" OR 3" PVC

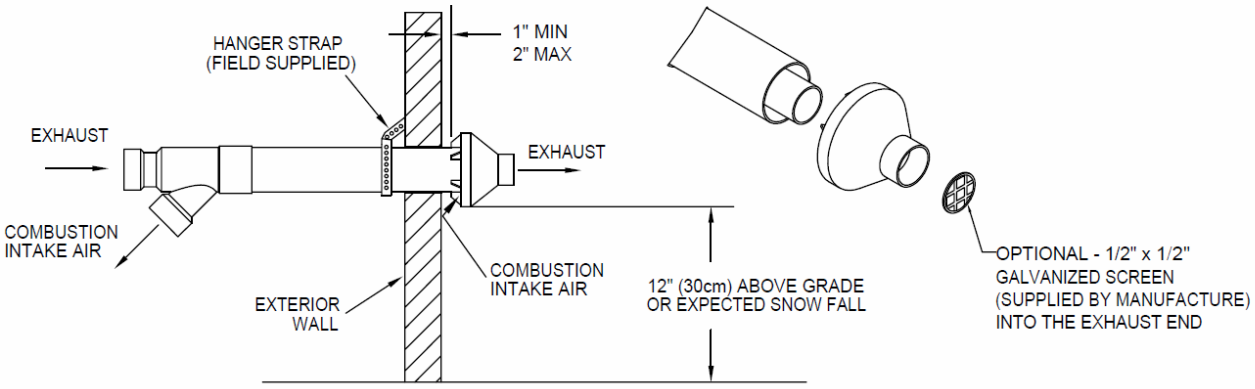
| | Dimension (Inches) | | | | |
|---|---|---|---|---|---|
| | A | B | C | Nominal Pipe Size | |
| | | | | D | E |
| 2" CONCENTRIC KIT | 29 | 16.5 | 3.5 | 2 | 2 |
| 3" CONCENTRIC KIT | 36.1 | 20.5 | 4.5 | 3 | 3 |




ROOF TERMINATION - VERTICAL

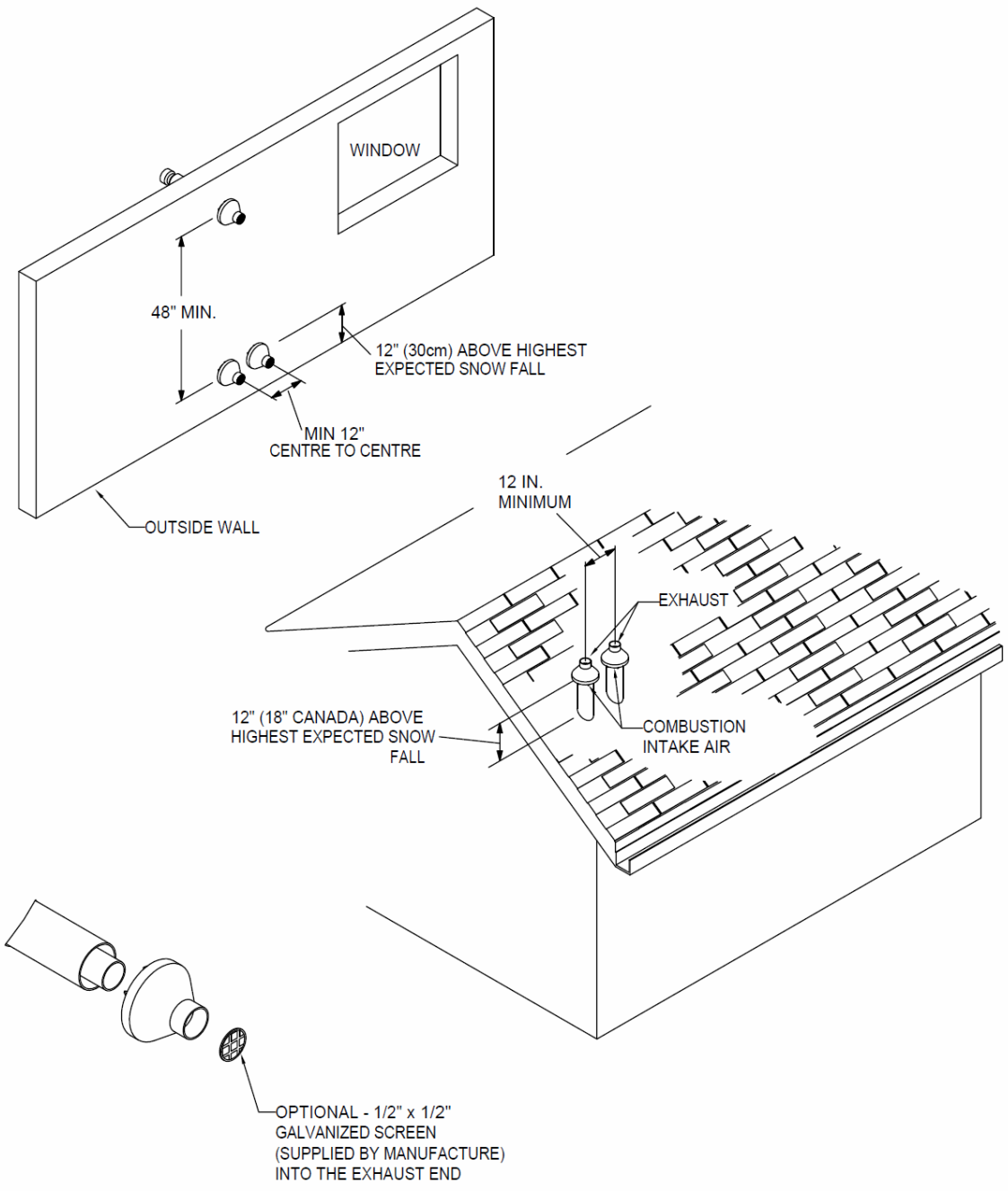



SIDE WALL TERMINATION - HORIZONTAL




NOTE: USE ONLY ULC S636 APPROVED CONCENTRIC VENT TERMINATION - 2" OR 3" PVC

## CONCENTRIC VENT TERMINATION - PVC MATERIAL ONLY 2" OR 3"



# 4. COMMISSIONING THE APPLIANCE

## 4.1 General warnings

⚠ **The following operations must be carried out by professionally qualified personnel, registered in accordance with current legislation.**

⚠ **The water heater leaves the factory pre-set and tested for burning either natural Gas or LPG. Nevertheless, when starting the water heater for the first time, make sure that the information on the rating plate corresponds to the type of gas being supplied to the water heater.**

⚠ **Once the system has been filled and the necessary adjustments made, remember to tighten the screws of the gas valve test point and make sure that there are no gas leaks from the test point and from any pipe fittings upstream of the gas valve.**

### ■ Preliminary operations

Switching the water heater on for the first time means checking that the installation, regulation and operation of the appliance are correct:

- Check that the rating on the rating plate corresponds to that of the mains supply networks (gas, electricity, water));
- Check that the power supply voltage to the water heater complies with the rating plate (120 V – 60 Hz) and that the live, neutral and ground wires are connected properly. Also make sure that the ground connection is sound;
- Check that the gas supply is correctly sized for the flow rate required by the water heater and that it is fitted with all the safety and control devices stipulated current regulations;
- Check that the supply of combustion air and exhaust and condensate discharge systems are functioning correctly and in line with current law and national and local standards;
- Check for the presence of permanent aeration/ventilation openings as required by current law for the type of appliances installed;
- Check that the exhaust vent and its connections to the termination comply with the requirements of current law and national and local standards for the type of appliances installed;
- Make sure that any central heating shut-off valves are open;
- Check that the condensate drain system, including outside the water heater (exhaust system condensate collection devices), allows the condensate to flow freely to the drain.
- Check that there are no flammable materials or liquids in the immediate vicinity of the water heater;

***Flush out both primary and domestic hot water circuits (see 4.3 "Flushing the system").***

## 4.2 Filling the system

⚠ **Check the properties of the water supply and install the appropriate treatment devices if the mains water has a hardness rating more than 14.5 gpg (250mg/L) in order to prevent scaling and eventual damage to the D.H.W heat exchanger.**

⚠ **Use only clean tap water to fill the system.**

⚠ **A pre-filtering system can be installed on the incoming water supply to help reduce impurities and limestone.**

⚠ **This water heater must have adequate water flowing through it whenever the burner is on. Failure to do this will damage the unit and void the warranty.**

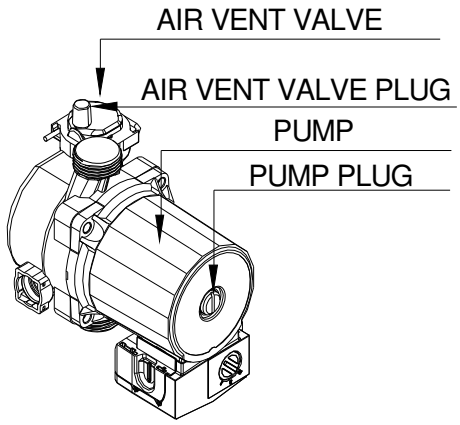



**Fig. 1**

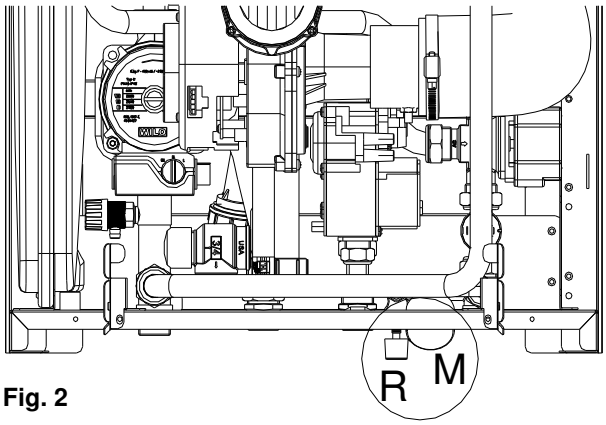



**Fig. 2**

Once the water pipes have been connected, close the gas feed valve and fill the system as follows:

- Check that the circulation pump runs freely;
- Check that the plug of the air vent valve has been slackened slightly to allow air to escape from the system (fig.1);
- Open the main domestic water supply valve;
- Open the filling tap **R** (fig. 2);
- Unscrew the plug on the pump to remove any trapped air, check that the pump is free then re-tighten it when water starts to flow out;
- Open the air vents on the radiators and monitor the air evacuation process. When water starts to flow out of the radiators, close the air vents;
- Use the pressure gauge **M** (fig. 2) to check that the system pressure reaches 1 bar and that the code H2O does NOT appear on the control panel display (see 2.7 section 'Control Panel');
- If, after the above operations, there is a reduction in the pressure, re-open the filling tap **R** until the pressure gauge reads 1 bar and that the code H2O disappears on the control panel display;
- **On completion, make sure that the filling tap R is perfectly closed.**

### Emptying the central heating system

Whenever it is necessary to empty the system, proceed as follows:

- turn off the main power supply switch;
- wait for the water heater to cool down;
- turn the system drain tap R (see fig. 2) and use a container to collect the water that runs out;

### Emptying the domestic hot water system

Whenever there is danger of freezing or any other occurrence, the hot water system could be emptied in the following way:

- Shut off the water at the mains;
- Open all hot and cold water taps;
- Empty from the lowest point (where possible).

## 4.3 Flushing the system

**Failure to flush and add inhibitor to the system will invalidate the appliance operation.**
**All systems must be thoroughly drained and flushed out using additives – corrosion inhibitors and flushing agents/descalers. All flushing must be done for new and retrofit installs.**

⚠ **Warning: Failure to clean the system and add adequate inhibitor invalidates the warranty**

### To flush out the primary side of this unit:

**a.** Fill the water heater with clean water as per the filling instructions.
**b.** Using a drain off cock on the lowest point of the system allow the water to drain from the system and water heater.
**c.** In order to flush the system correctly, turn off all radiators or fan coils. Open the filling loop and drain cock simultaneously and allow the water to flow through the water heater.
**d.** Open each individual radiator or fan coil, allowing water to flow through. Then, turn that radiator or fan coil off and repeat for all radiators or fan coils on the system.
**e.** Turn off the filling loop and close the drain cock. Open all radiators or fan coils and open the filling to fill the system.
**f.** Continue to fill the system until the pressure gauge reaches 14.5 psi (1 bar).
**g.** Add an inhibitor to the system water to prevent limestone and magnetite deposits from forming and to protect the water heater from galvanic corrosion.
**h.** In areas where freezing might occur, an antifreeze (Gycol) may be added to the system water to protect the system. Please adhere to the specifications given by the antifreeze manufacture. Do not use automotive silicate based antifreeze. Please observe that the antifreeze and water mixture does not exceed 40% of the antifreeze content. Do not use antifreeze other than that specifically made for hot water heating systems. Advise systems operator/ultimate owner that system is filled with antifreeze.

### To flush out domestic hot water circuit:

**a.** Open all hot water outlets.
**b.** Turn on inlet group supply so water enters the water heater; leave to fill until water is released from the hot water outlets. Turn off all hot water outlets.
**c.** Connect a hosepipe to the cylinder drain cock and open the drain cock.
**d.** Allow water to flow through the water heater and out of the drain cock.
**e.** Turn off water supply, disconnect the hosepipe, close the drain cock and refill the water heater.

## 4.4 Filling the condensate trap

The condensation trap must be pre-filled when starting the water heater for the first time in order to prevent flue gases from flowing back through the trap.

The filling operation is carried out as follows (see fig. 1):

- Remove plug **T** and fill the trap **S** three quarters full with water;
- Replace plug **T** and connect the drainpipe **P** into a condensate discharge trap conforming to current legislation;

**Attention!** It is recommended to clean the condensate trap, after a few months of water heater operation, to remove deposits/residuals left after the first condensate passage within the water heater new components that may interfere with the correct operation of the trap itself.

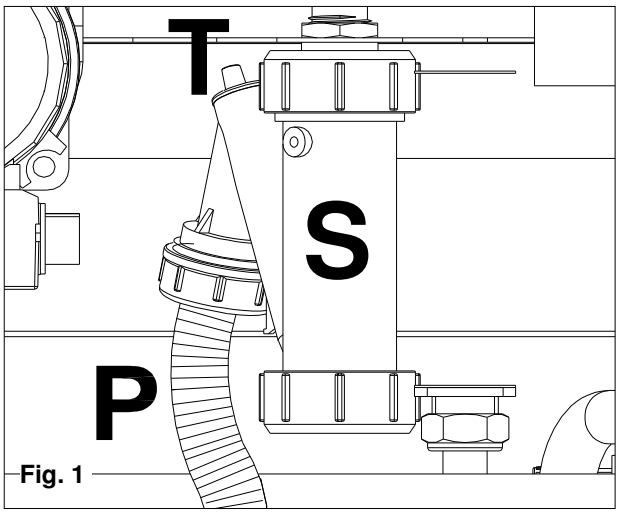


Fig. 1

## 4.5 Starting up the water heater

Once the system has been filled, proceed as follows:

- Check that the exhaust flue is free of obstructions and correctly connected to the water heater;
- Switch on the power supply to the water heater;
- Open the gas isolation valve;
- Place switch **1** in the ON **position** *(see 2.7 "Control Panel")***,** after a few seconds the circulating pump will start to run;
- Use button **6** to set the SUMMER, WINTER or SUMMER/WINTER function. The symbols  will light up (fixed light) to indicate that the water heater is working;
- The automatic ignition system will then light the burner. This operation is repeated for 3 times. It may however be necessary to repeat the operation in order to eliminate all the air from the pipes. To repeat the operation, wait approximately three minutes before re-attempting to light the water heater. To reset the water heater Switch off switch **1** *(see 2.7 "Control Panel")* and switch it back on again and repeat the lighting procedure;
- With the water heater ignited, if the system still emits noises, the operations must be repeated until all the air has been removed;
- Check the pressure in the system. If the pressure has fallen, re-open the filling tap until the code H2O **disappears on the display** and the pressure gauge reads 1 bar on completion, close the filling tap;

**Table n°1**

| Gas type | $CO_2$ % |
|---|---|
| Natural Gas - G20 | 9.3 |
| Liquid Propane Gas - G 31 | 11 |

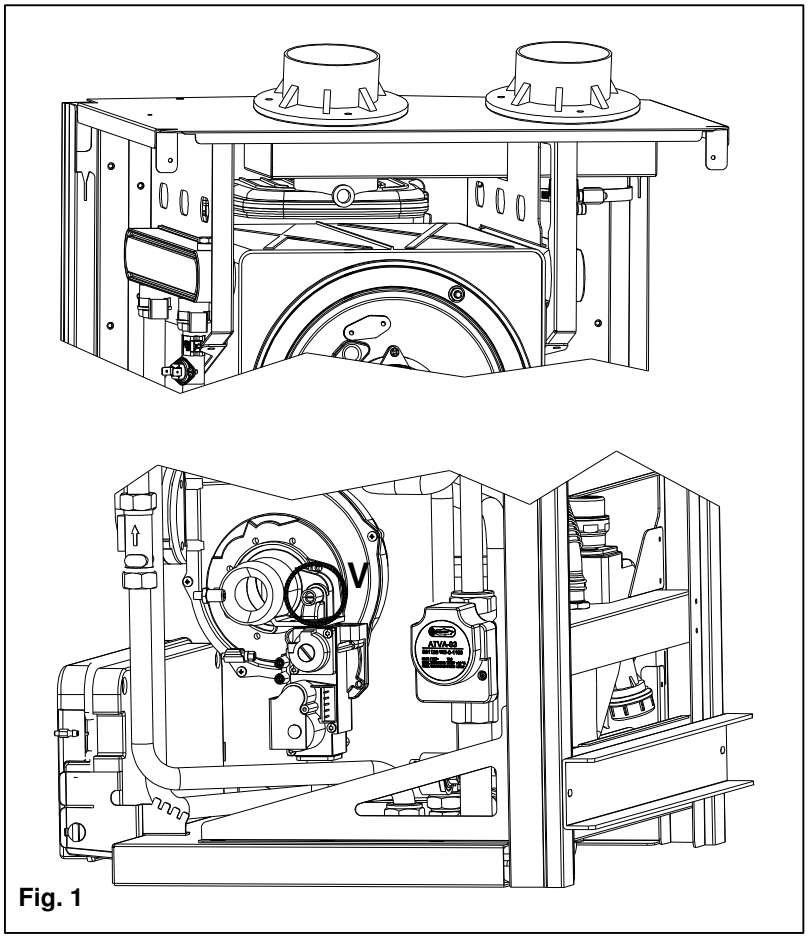



**Fig. 1**

- If the CO2 value does not correspond to the specified value, adjust screw **V** (see fig. 1) on the venturi clockwise to reduce the CO2 value or anticlockwise to increase it;

# 5. REGULATING THE APPLIANCE

## 5.1 Parameters table

| PARAMETER N° | TYPE OF OPERATION | PARAMETER VALUE | FUNCTION |
|---|---|---|---|
| 1 | Selects the type of water heater | 00<br>01<br>02<br>03 | Instantaneous (95-140°F)<br>Water heater with storage tank<br>B. w/storage tank Comfort (+45°F)<br>D.H.W. Temperature 95-160 °F |
| 2 | Selects the type of gas | 00<br>01 | Natural gas<br>Lpg |
| 3 | Sets the central heating temperature | 00<br>01 | Standard (86-176°F)<br>Reduced (77-104°F ) |
| 4[1] | Selects pump mode during heating phase | 00<br>01 | Standard ( 3' pump overrun)<br>Permanent (pump runs continuously) |
| 5 | Water hammer prevention | 00<br>01 | Off<br>On |
| 6 | Central heating timer | 00-90 (default = 36) | Delays the heating restart to prevent frequent On/Offs, Expressed in steps of 5 sec (factory set at 36 x 5 = 180") |
| 7 | Central heating pump overrun timer | 00-90 (default = 36) | The overrun timer can be modified. Expressed in steps of 5 sec (factory set at 36 x 5 = 180") |
| 8 | D.H.W pump overrun timer | 00-90 (default = 18) | The overrun timer can be modified. Expressed in steps of 5 sec (factory set at 18 x 5 = 90") |
| 9 | Minimum gas pressure setting | - | Not applicable for FLOWMAX water heaters |
| 10 | Minimum central heating output setting | - | Not applicable for FLOWMAX water heaters |
| 11 | Maximum gas pressure and maximum central heating output setting | - | Not applicable for FLOWMAX water heaters |
| 12 | Ignition sequence setting | - | Not applicable for FLOWMAX water heaters |
| 13 | D.H.W priority function (2 min delay on dhw function) | 00<br>01 | Off<br>On |
| **14**[4] | Selects the type of burner | 00<br>01<br>02<br>**03** | Atmospheric (not FLOWMAX)<br>FLOWMAX 90<br>FLOWMAX 120<br>**FLOWMAX 170** |
| 15[2] | Zone management board activation | 00<br>01 | Off<br>On |
| 16[3] | Telephone control activation | 00<br>01 | Off<br>On |
| 17 | Minimum fan speed setting | 60 Hz (Natural Gas)<br>60 Hz (propane) | To set the minimum frequency value (Hz) for the fan operation |
| 18 | Maximum fan speed setting | 155 Hz (Natural Gas)<br>143 Hz (propane) | To set the maximum frequency value (Hz) for the fan operation |
| 19 | Minimum fan speed setting (Central Heating) | 60 Hz (Natural Gas)<br>60 Hz (propane) | To set the minimum frequency value (Hz) for the fan operation in heating mode . |
| 20 | Maximum fan speed setting (Central Heating) | 155 Hz (Natural Gas)<br>143 Hz (propane) | To set the maximum frequency value (Hz) for the fan operation in heating mode |
| 21 | Ignition sequence setting | 90 Hz (Natural Gas)<br>110 Hz (propane) | To set the fan frequency value (Hz) at the ignition |
| 22 | Fan frequency value display | 00<br>01 | Off<br>On (for 10 min. time) |

**NOTES:**

1 - Activate only for "heating only" water heaters;

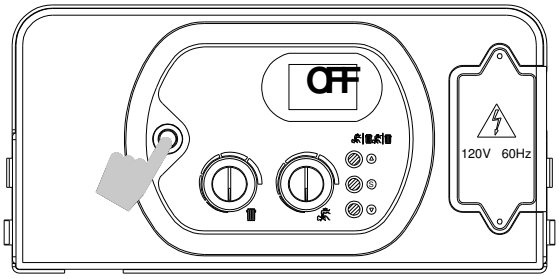
2 - If the heating system has more than one zone, an additional interface board (optional extra) must be installed on the circuit board and parameter 15 set at 01;

3 - To install the telephone control, use non-polarised conductors connected to contact TA of the terminal board in parallel with the remote control if fitted. Set the parameter 16 at 01.

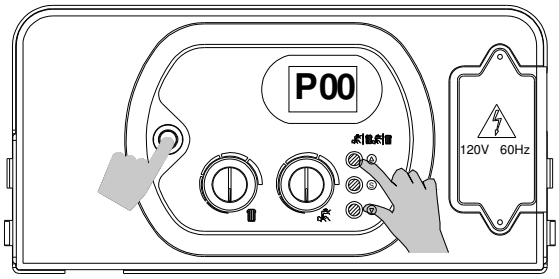
4- When the parameter value 01/02/03 is set, parameters from no.17 to 22 are automatically activated and water heater settings are carried-out in through these parameters (in Hz) that replace parameters from no.9 to no.
Once the parameter value has been set according to the water heater output, the P.C.B will automatically adjust the maximum and minimum values.

## 5.2 Setting the parameters

To modify the preset values of the parameters reported in the previous table, open the parameter settings menu as follows:

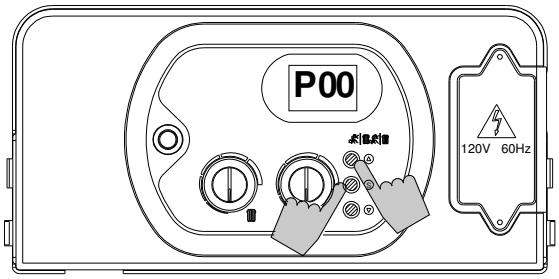



1. Place the On/Off switch in the OFF position.

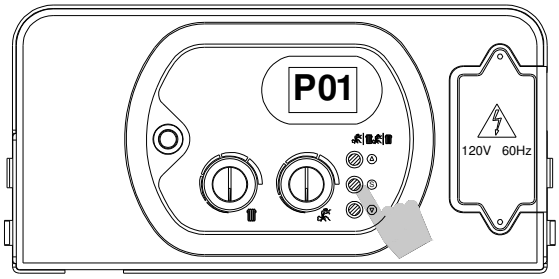



2. Activate the On/Off switch while keeping buttons '+' and "-" pressed. Wait for "P 00" to appear on the display.

3. Release buttons '+' and '-'.



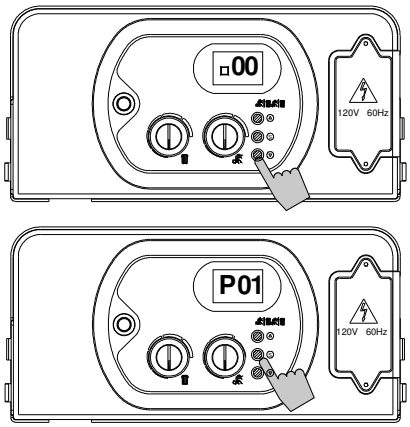

4. Keep button 'S' pressed and use button '+' and '-' to select the parameter to modify**.**




5. Release button 'S', then re-press and release it. The display will indicate the value of the parameter to modify.

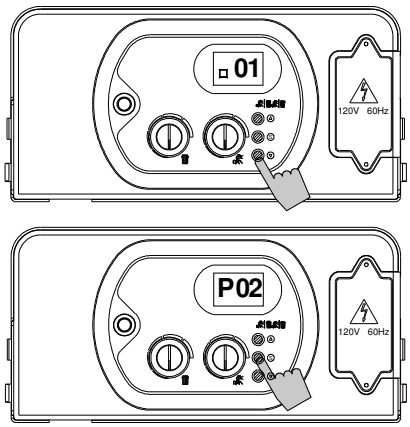
Adjust the value of the parameter using the procedure described in the following pages.

To enter the parameters menu, follow the previously described procedure (steps 1-5).



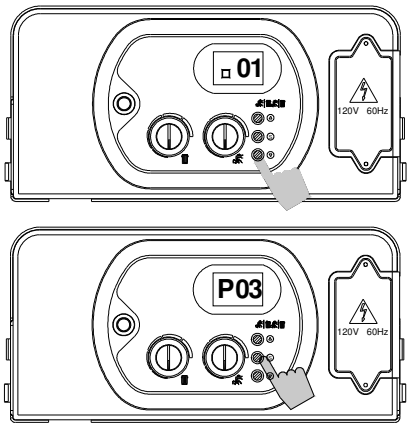

**PARAMETER 1 – TYPE OF WATER HEATER**

6. Use buttons '+' and '-' to modify the value of the parameter:
   00 = Instantaneous water heater
   01 = Storage water heater
   02 = Storage water heater 'comfort' (+ 45 °F)
03 = D.H.W. temperature 95-160°F
7. Press and release button 'S' to confirm. The parameter number (1) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



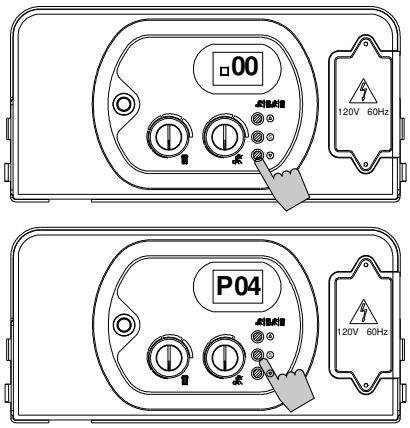

**PARAMETER 2 - GAS SUPPLY**

6. Use buttons '+' and '-' to modify the value of the parameter:
   00 = natural gas
   01 = propane
7. Press and release button 'S' to confirm. The parameter number (2) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



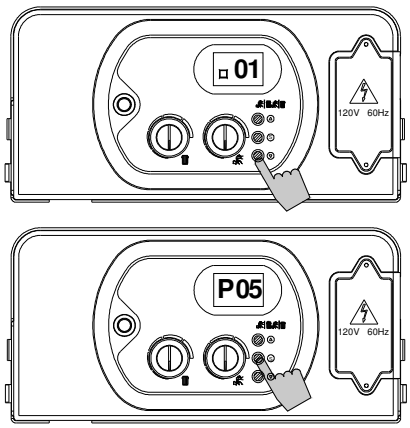

**PARAMETER 3 – CENTRAL HEATING TEMPERATURE**

6. Use buttons '+' and '-' to modify the value of the parameter:
   00 = standard (86ºF – 176°F)
   01 = reduced (77ºF – 104°F) for under-floor heating
7. Press and release button 'S' to confirm. The parameter number (3) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



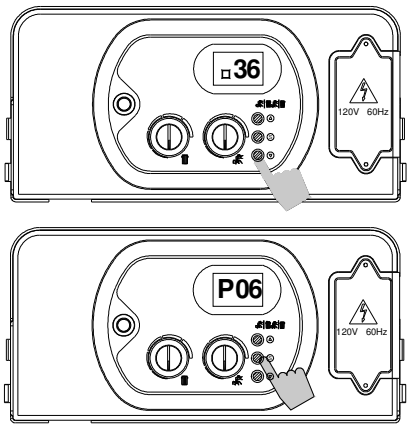

**PARAMETER 4 – CENTRAL HEATING PUMP**

6. Use buttons '+' and '-' to modify the value of the parameter:
   00 = standard (3" overrun)
   01 = permanent (always running)
7. Press and release button 'S' to confirm. The parameter number (4) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



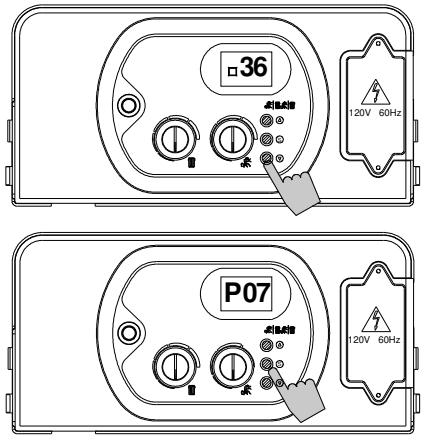

**PARAMETER 5 – WATER HAMMER PREVENTION**

6. Use buttons '+' and '-' to modify the value of the parameter:
   00 = off
   01 = on (default = 2")
7. Press and release button 'S' to confirm. The parameter number (5) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



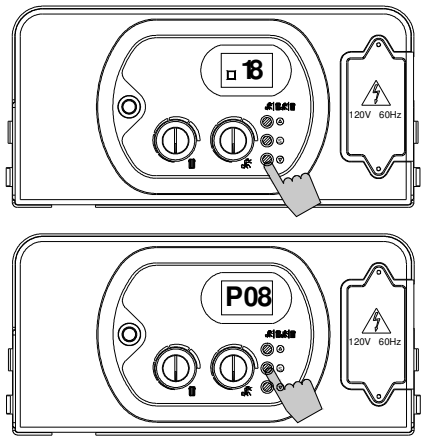

**PARAMETER 6 – CENTRAL HEATING TIMER**

6. Use buttons '+' and '-' to modify the value of the parameter within the prescribed limits
   00 = 0 x 5" = 0"
   90 = 90 x 5" = 450" (7.5 min)
The default value is 36 = 180" = 3 min
7. Press and release button 'S' to confirm. The parameter number (6) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.




**PARAMETER 7 – CENTRAL HEATING PUMP OVERRUN TIMER**

6. Use buttons '+' and '-' to modify the value of the parameter within the prescribed limits
   00 = 0 x 5" = 0"
   90 = 90 x 5" = 450" (7.5 min)
The default value is 36 = 180" = 3 min
7. Press and release button 'S' to confirm. The parameter number (7) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.




**PARAMETER 8 – D.H.W PUMP OVERRUN TIMER**

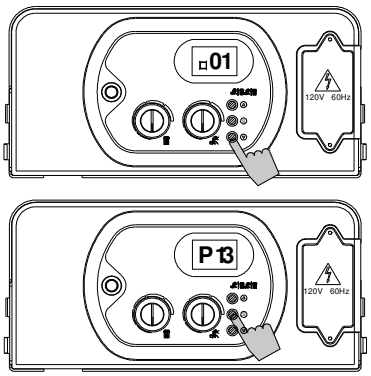
6. Use buttons '+' and '-' to modify the value of the parameter within the prescribed limits
   00 = 0 x 5" = 0"
   90 = 90 x 5" = 450" (7.5 min)
The default value is 18 = 90" = 1.5 min
7. Press and release button 'S' to confirm. The parameter number (8) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.

***PARAMETER NO. 9 – MINIMUM GAS PRESSURE SETTING***
*Not applicable for FLOWMAX burner (only for atmospheric burner)*

***PARAMETER NO.10 – MINIMUM CENTRAL HEATING OUTPUT SETTING***
*Not applicable for FLOWMAX burner (only for atmospheric burner)*

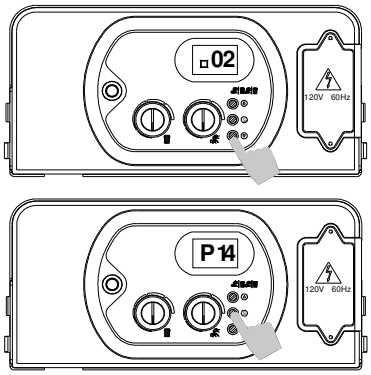
***PARAMETER NO.11 – MAXIMUM GAS PRESSURE AND MAX. CENTRAL HEATING OUTPUT SETTING***
*Not applicable for FLOWMAX burner (only for atmospheric burner)*

***PARAMETER NO.12 – IGNITION SEQUENCE SETTING***
*Not applicable for FLOWMAX burner (only for atmospheric burner)*



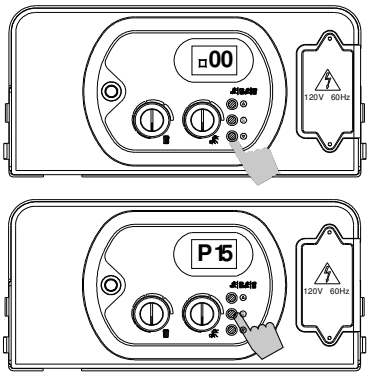

### PARAMETER 13 – D.H.W PRIORITY

6. Use buttons '+' and '-' to modify the value of the parameter:
   00 = off
   01 = on (default = 120")
7. Press and release button 'S' to confirm. The parameter number (13) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



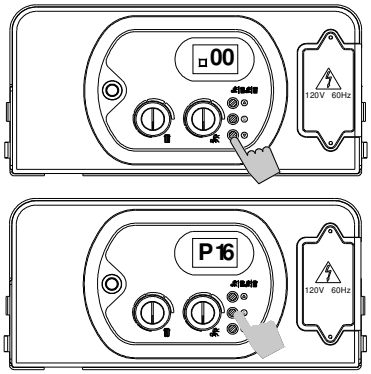

### PARAMETER 14 – TYPE OF BURNER

6. Use buttons '+' o '-' to modify the value of the parameter:
   00 = water heater with atmospheric burner;
   01 = water heater with FLOWMAX - 90
   02 = water heater with FLOWMAX - 120;
   **03 = water heater with FLOWMAX - 170;**
7. Press and release button 'S' to confirm. The parameter number (14) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.




### PARAMETER 15 – ZONED SYSTEM

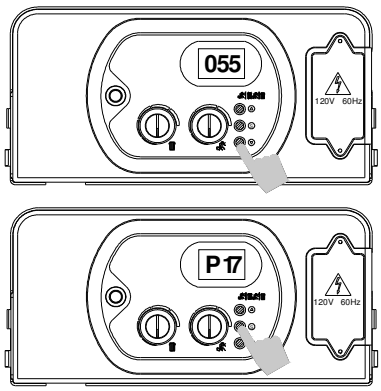
6. If the system is fitted with zone valves, set the parameter at '01'. If a remote control is installed, an extra interface board must be installed to control the zone valves. Then set the parameter at '01'.
7. Press and release button 'S' to confirm. The parameter number (15) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.




### PARAMETER 16 – TELEPHONE CONTROL

6. If a telephone interface is installed, enable the board by setting parameter 16 at '01';
7. Press and release button 'S' to confirm. The parameter number (16) will appear on the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.

*N.B.: The connection of the telephone interface to contact TA of the terminal board must be wired in parallel with the remote control using two non-polarised conductors.*



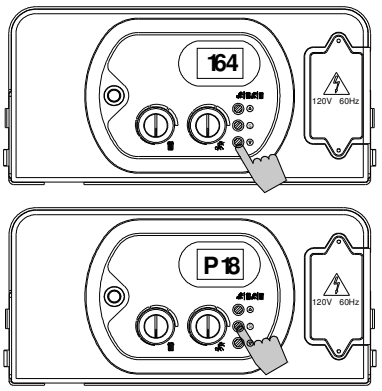

### PARAMETER 17 – MINIMUM FAN SPEED SETTING

6. Use buttons '+' o '-' to modify the value of the parameter between: min = 33 Hz ; max = value of parameter 18

The default value is :

- 60 Hz for Natural Gas;
- 60 Hz for propane;

7. Press and release button 'S' to confirm. The parameter number (17) will appear in the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



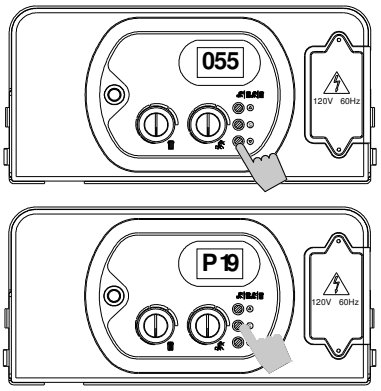

### PARAMETER 18 – MAXIMUM FAN SPEED SETTING

6. Use buttons '+' o '-' to modify the value of the parameter between: min = value of parameter 17; max = 202 Hz.

The default value is:

- 155 Hz for Natural Gas;
- 143 Hz for propane;

7. Press and release button 'S' to confirm. The parameter number (18) will appear in the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



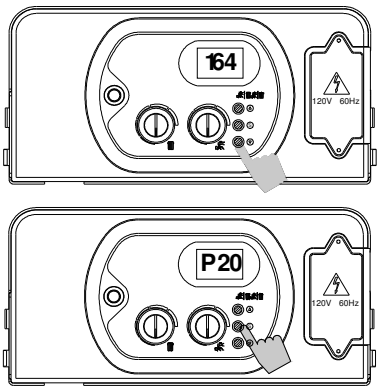

### PARAMETER 19 – MINIMUM FAN SPEED SETTING CENTRAL HEATING MODE

6. Use buttons '+' o '-' to modify the value of the parameter between: min = 33 ; max = value of parameter 18.

The default value is:

- 60 Hz for Natural Gas;
- 60 Hz for propane;

7. Press and release button 'S' to confirm. The parameter number (19) will appear in the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.



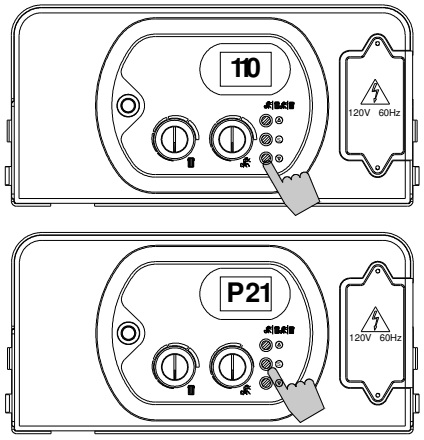

### PARAMETER 20 – MAXIMUM FAN SPEED SETTING CENTRAL HEATING MODE

6. Use buttons '+' o '-' to modify the value of the parameter between: min = value of parameter 17; max = 202 Hz.

The default value is:

- 155 Hz for Natural Gas;
- 143 Hz for propane;

7. Press and release button 'S' to confirm. The parameter number (20) will appear in the display.
8. Switch off the appliance and switch it back on again to render the new parameter operative.




**PARAMETER 21 – IGNITION SEQUENCE SETTING**

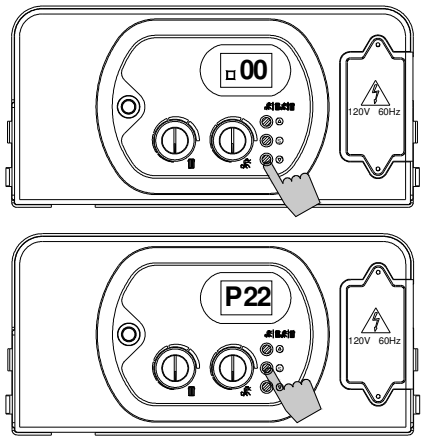
6. Use buttons '+' o '-' to modify the value of the parameter between: min = value of parameter 17; max = value of parameter 18.

The default value is:

- 90 Hz for Natural Gas;
- 110 Hz for propane;

7. Press and release button 'S' to confirm. The parameter number (21) will appear in the display.

8. Switch off the appliance and switch it back on again to render the new parameter operative.




**PARAMETER 22 – FAN FREQUENCY VALUE DISPLAY**

6. Use buttons '+' o '-' to modify the value of the parameter: -

- 00 = Off

- 01 = On

If parameter value 01 is selected, during the water heater operation, the display will show the fan frequency value for 10 min.

7. Press and release button 'S' to confirm. The parameter number (22) will appear in the display.

8. Switch off the appliance and switch it back on again to render the new parameter operative.

## 5.3 Gas data

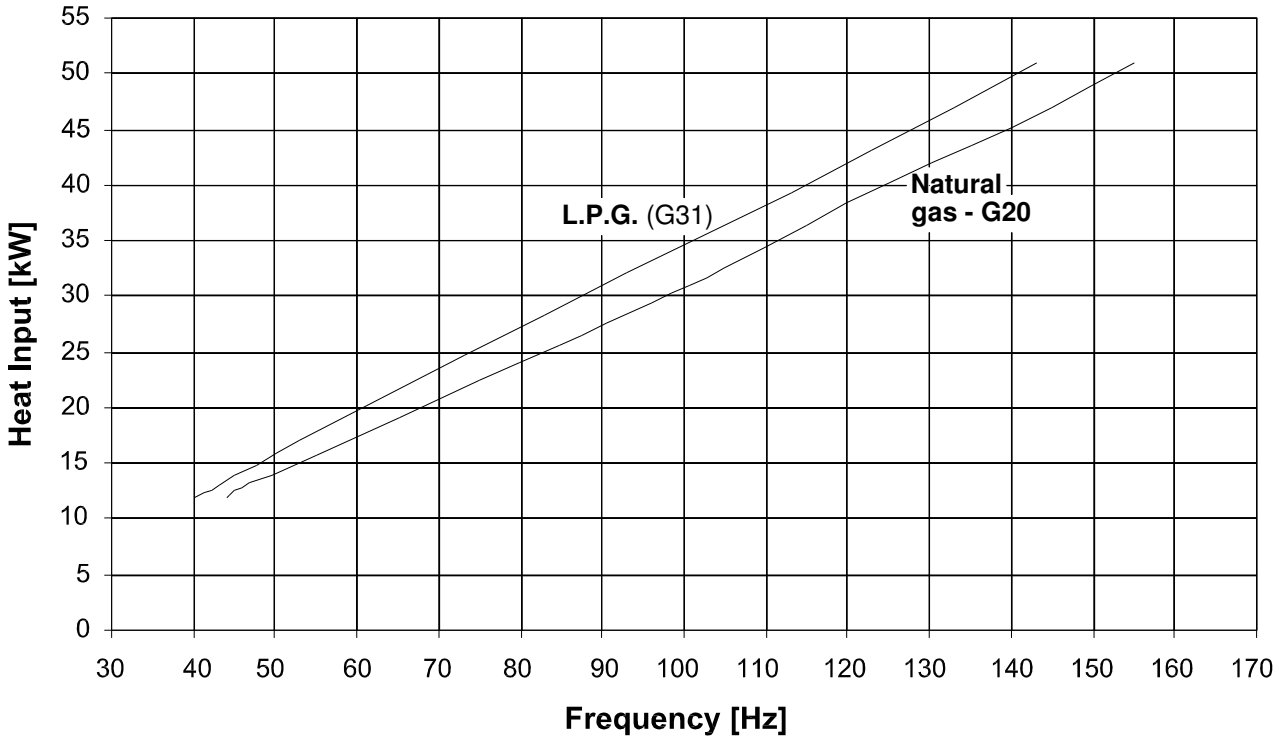
### Technical data tables

| **Table no.1 - $CO_2$ Values** | |
|---|---|
| **Gas type** | **$CO_2$ %** |
| Natural gas - G20 | 9.3 |
| Liquid Propane Gas - G 31 | 11 |

| **Table no.2 - Frequency** | | |
|---|---|---|
| **Gas type** | **Minimum (Hz)** | **Maximum (Hz)** |
| Natural gas - G20 | 60 | 155 |
| Liquid Propane Gas - G 31 | 60 | 143 |

| **Table no.3 - Gas data table** | | **NATURAL GAS G20** | **LIQUID PROPANE GAS G31** |
|---|---|---|---|
| Lower Wobbe Index (59°F; 14.5 psi) | $MJ/Nm^3$ | 45.67 | 70.69 |
| Nominal supply gas pressure | mbar - psi | 20 - 0.29 | 37 - 0.537 |
| Consumption (59°F; 14.5 psi) | $ft^3/hr$ | 190.7 | 73.10 |

### Heating Power (kW) – Fan frequency (Hz) diagram



## 5.4 Regulating the gas valve offset

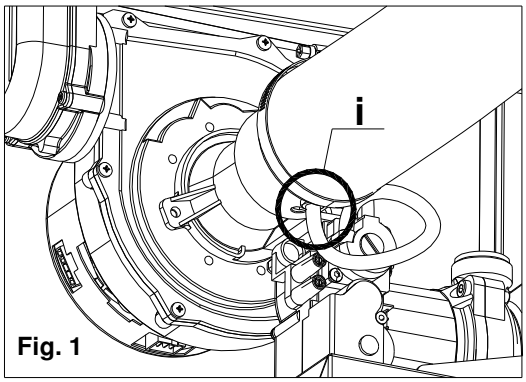


Fig. 1

When replacing the gas valve, it is necessary to regulate the offset on the new gas valve to guarantee a correct operation of the water heater.

**Instructions as follows:**

Fig. 1 – Disconnect the silicon pipe from its connection **i** onto the venturi air intake point.

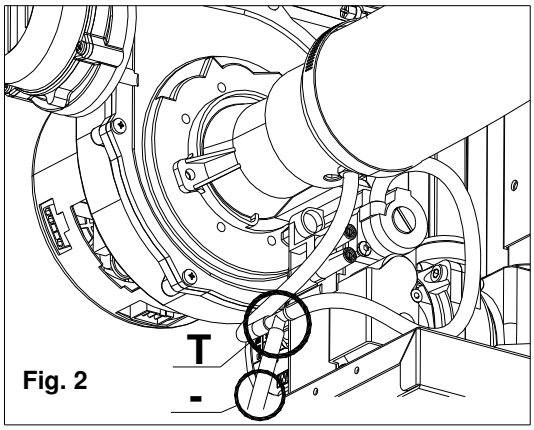


Fig. 2

Fig. 2 – Connect that end of the silicon pipe to a 'T' connection **T** and bring the end of another silicon pipe from the same 'T' connection to the venturi air intake point **i**.

Insert a third silicon pipe on the free connection of the 'T' and connect its end to the negative point **-** of a gas pressure manometer.

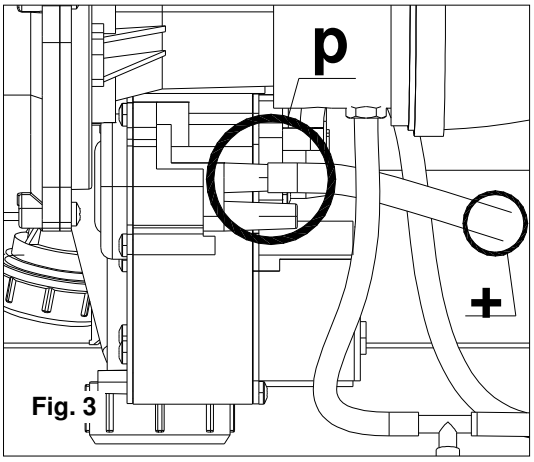


Fig. 3

Fig. 3 – Unscrew the pressure **p** point screw and connect there the pipe that goes to the positive point **+** of the gas pressure manometer.

Switch the water heater On at the minimum power. The manometer should read a value of **-0.04 mbar**; if you read a different value, proceed as follows (Fig.4)

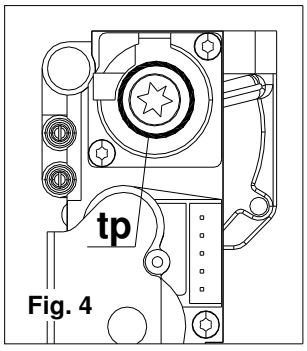


Fig. 4

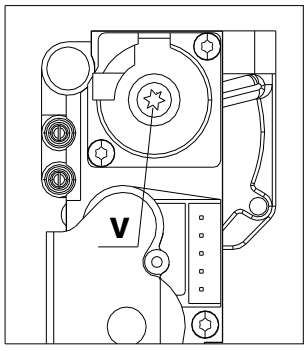



Fig. 4 – Remove the protection cover **tp** of the gas valve and adjust plastic screw **v** with a screwdriver to modify the value on the manometer and to bring it to **-0.04 mbar**.

Once the regulation is completed, disconnect pipes and restore original water heater

# 6. MAINTENANCE (authorized personnel)

## 6.1 General Warnings

⚠ **All maintenance operations must be carried out by professionally qualified personnel, authorized by FLOWMAX.**

⚠ **The frequency of water heater maintenance is recommended to be carried out once a year.**

⚠ **In order to guarantee the long life of the appliance and in accordance with the current gas safety regulations, only use original spare parts**

⚠ **Before carrying out any type of maintenance operation, disconnect the appliance from the electrical supply and shut off the gas valve.**

⚠ **Warranty will not be offered if recommended maintenance is not followed.**

## 6.2 Maintenance

⚠ **Periodic examination of the entire venting system is recommended. Make sure all the venting connections/joints are tight and in good condition where visible.**

⚠ **Clean the burner cylinder using a non-metal brush and without damaging the ceramic fibre.**

⚠ **Clean the heat exchanger using a recommended detergent from FLOWMAX Technologies for the stainless steel. Do not wet the ceramic fibre coating.**

⚠ **Visually inspect the burner flame. The flame must burn with a clear blue, stable flame. If the burner flame appearance is not satisfactory or debris is visible on the burners, remove and clean with a vacuum cleaner.**

⚠ **All electric motors are permanently lubricated and do not need oiling. Remove the combustion air blower and clean wheel and housing with soft brush or vacuum.**

⚠ **Verify proper operation after any servicing.**

⚠ **Wipe the outside surface with a wet cloth; then dry the surface. Use a neutral detergent to clean any stains.**

⚠ **Vent termination should be inspected for blockage during maintenance checks.**

⚠ **Check for blockage at the drain pipe and condensate trap.**

⚠ **Clean condensate trap and check for correct level of water.**

⚠ **Check for water leaks from the equipment and piping.**

⚠ **Warranty will not be offered if recommended maintenance is not followed.**

## 6.3 Water heater inspection

In order to ensure that the water heater operates efficiently and safely, it is recommended that the appliance is inspected by a suitably competent technician at least once a year.
The following operations should be carried out annually

- Check the condition of the gas seals and replace where necessary.
- Check the condition of the water seals and replace where necessary.
- Visually inspect the condition of the combustion chamber and flame.
- When required, check that the combustion is correctly regulated and if necessary proceed in line with section “Commissioning the water heater”.

- Remove and clean any oxidation from the burner.
- Check that the seal of the room-sealed chamber is undamaged and positioned correctly.
- Check the primary heat exchanger and clean if necessary.
- Check the maximum and minimum modulation pressures and the modulation itself.
- Check the condition and operation of the ignition and gas safety systems. If necessary, remove and clean the scaling from the ignition and flame detection electrodes, paying particular attention to replace them at the correct distance from the burner.
- Check the heating safety systems: temperature limit safety thermostat, pressure limit safety device.
- Check the pre-fill pressure of the expansion vessel (see expansion vessel data plate).
- For safety reasons, periodically check the integrity and operation of the exhaust system.
- Check that the connection to the mains electricity supply complies with that reported in the water heater's instruction manual.
- Check the electrical connections inside the control panel.
- Check the D.H.W flow rate and temperature.
- Check that the condensate drain system is working correctly, including any parts of the system outside the water heater such as condensate collection devices along the length of the flue and/or any acid neutralising devices.
- Check that the condensate flows freely and that there are no exhaust fumes present within the appliance.

 **Warranty will not be offered if recommended maintenance is not followed.**

## 6.4 Accessing the water heater

All maintenance operations require one or more of the water heater casing panels to be removed.

The side panels can only be removed after the front panel has been removed.

Front panel:

- Remove the fixing screws at the lower edge of the front panel.
- Grasp the lower part of the panel and pull it outwards ② (fig. 1) and then up.

Left and right side panel:

- Remove the fixing screws at the front and lower edge of the side panel to remove.
- Grasp the bottom of the panel, move it sideways and then upwards to remove it ③.

**To access the electrical connections of the control panel, proceed as follows:**

- Remove the front panel (see fig. 1).
- Grasp the left and right control panel support brackets ④ and pull them outwards, at the same time rotating the panel downwards.
- Unscrew the four fixing screws ⑤ and remove the cover.

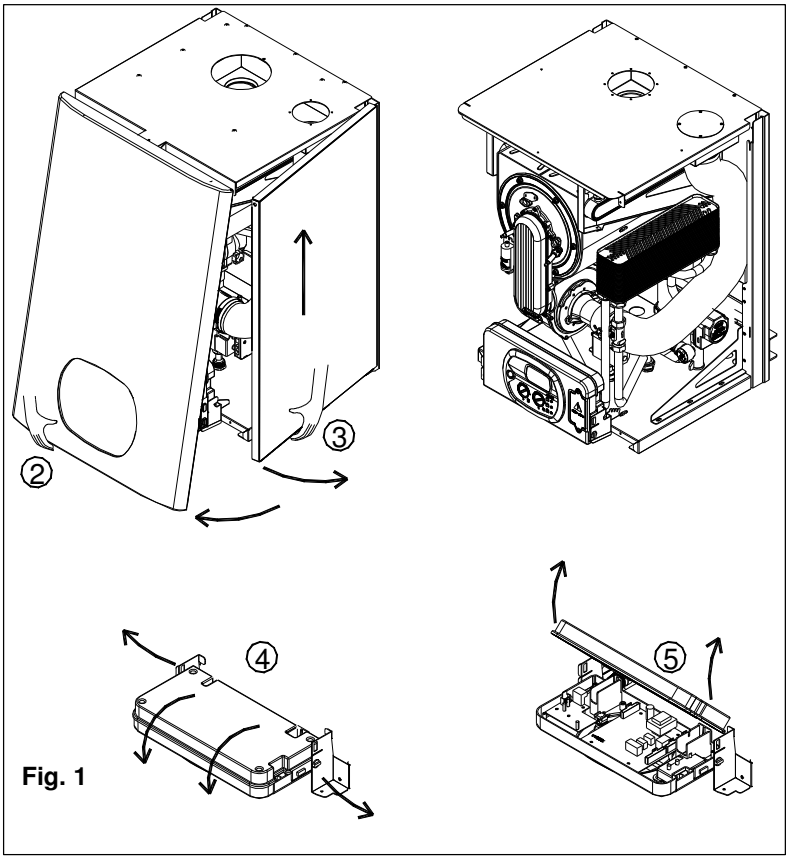



**Fig. 1**

## 6.5 Flushing out the primary side

- Fill the water heater as per the filling instructions.
- Using a drain off cock on the lowest point of the system allow the water to drain from the system and water heater.
- In order to flush the system correctly, turn off all radiators or fan coils. Open the filling loop and drain cock simultaneously and allow the water to flow through the water heater.
- Open each individual radiator or fan coil, allowing water to flow through. Then turn that radiator or fan coil off and repeat for all radiators or fan coil on the system.
- Turn off the filling loop and close the drain cock open all radiators and open the filling to fill the system.
- Continue to fill the system until the pressure gauge reaches 14.5 psi (1.0 bar).

## 6.6 Draining the central heating system

If the need arises to drain the system, this can be done as follows:

- Switch the system to “WINTER” mode and ignite the water heater.
- Switch off the power supply to the water heater.
- Wait for the water heater to cool down.
- Connect a hosepipe to the system drain point **R** and locate the other end of the hose in a suitable drainage system.
- Open the system drain valve (fig. 1).
- Open the air vents on the radiators, starting with the highest and moving down the system to the lowest.
- When the system has been drained, close the radiator breather valves and the drain valve.
- **If only the water heater needs to be drained, close the flow/return isolating valves on the heating circuit and open the drain valve R located at the bottom of the water heater on the pump manifold (see fig. 1 );**

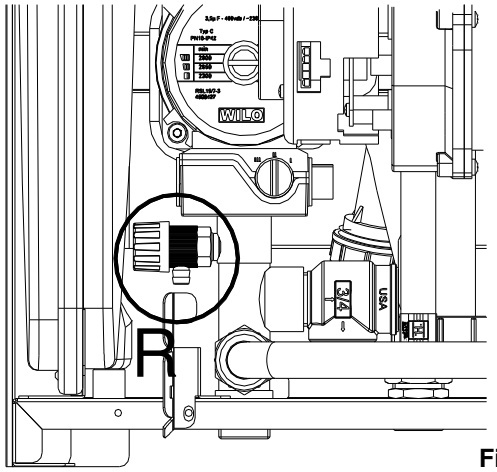



**Fig. 1**

### Draining the domestic hot water system

If there is a danger of freezing, the domestic hot water system should be drained. This can be done as follows:

- Close the mains water supply valve.
- Open all the hot and cold water taps.
- **On completion, close all the previously opened taps.**

## 6.7 Maintenance operations

⚠ **Before carrying out any cleaning or part replacement operations, ALWAYS turn off the ELECTRICITY, WATER and GAS supplies to the water heater.**

**FLOWMAX will not be held responsible for damage to any of the water heater's components caused by non-compliance with this instruction.**

For all maintenance operations requiring removal of the water heater casing, refer to the procedures described in paragraph *6.3 "Accessing the water heater"*.

**Cleaning the main exchanger module and combustion unit** (fig. 1)

- Disconnect the electrical connections of the electric fan.
- Disconnect the joint and remove the pipe linking the gas valve to the injector unit (venturi).
- Disconnect the joint and remove the gas feed pipe from the gas valve.
- Un-plug the ignition electrode and flame detection wires from the ignition control unit.
- Unscrew the ring-nut at the bottom of the room-sealed chamber and remove the gas valve.
- Unscrew the nuts securing the burner unit (consisting of a fan, manifold and burner) to the primary heat exchanger.
- Remove the burner unit, paying particular attention not to remove the ceramic fibre protection from the bottom of the heat exchanger.
- Check that the burner is not affected by deposits, scaling or excessive oxidation. Check that all the holes in the burner are free.
- Clean the electrodes carefully without altering their positions with respect to the burner.
- Clean the burner cylinder using a non-metal brush and without damaging the ceramic fibre.
- Check the integrity of the gasket on the cover of the burner.
- Clean the heat exchanger using a recommended detergent from FLOWMAX Technologies for stainless steel, distributing the product on the spirals of the exchanger using a brush. Do not wet the ceramic fibre coating. Wait a few minutes then remove the deposits using a non-metal brush. Then remove the residues under running water.
- Remove the pipe clip, remove the condensate drainpipe and clean under running water.
- Unscrew the joint to the condensate trap, remove the trap and wash under running water.
- With the cleaning completed, re-assemble the components following the above procedure in reverse order.

Finally, check the water heater to make sure that all gas and exhaust joints are tight.

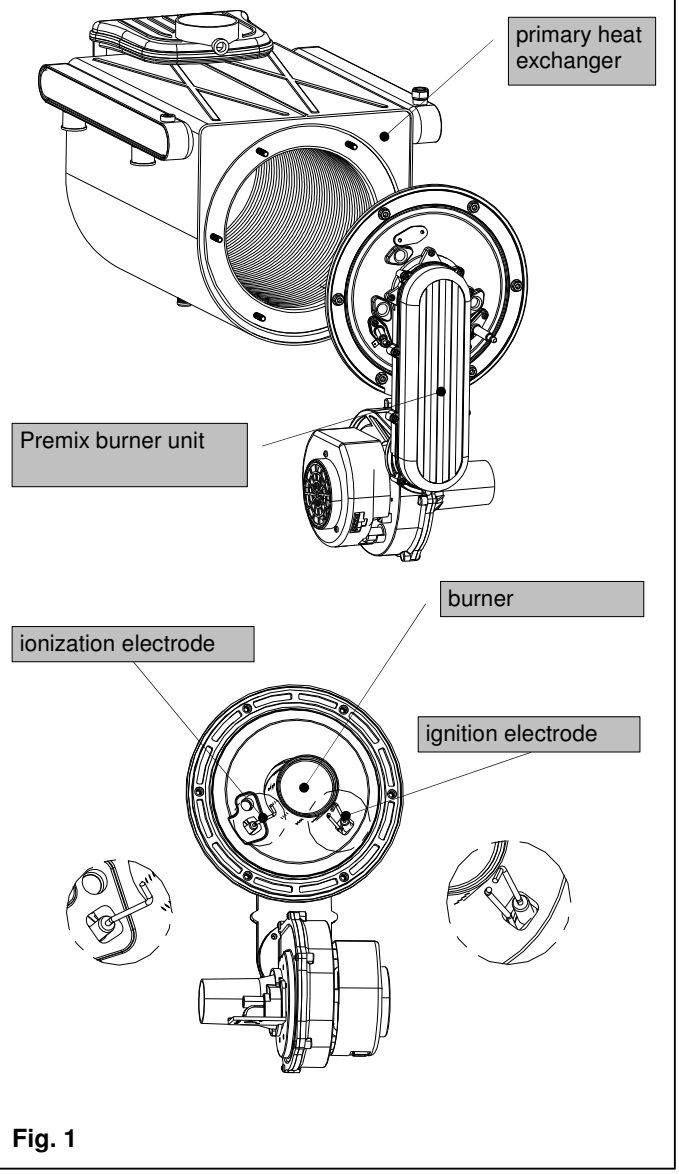



**Fig. 1**

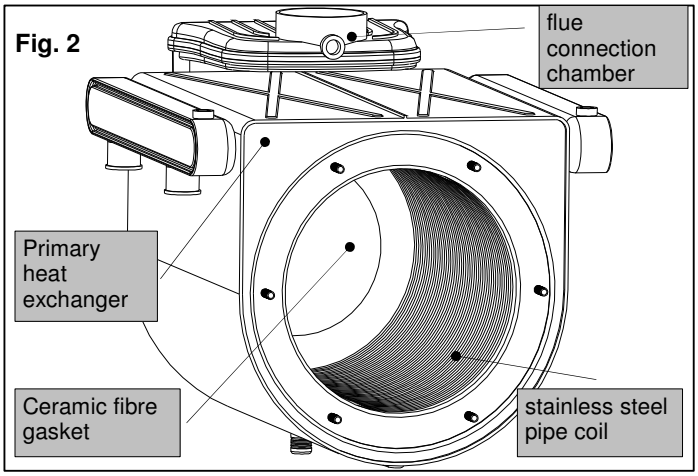



**Fig. 2**

## Cleaning the D.H.W heat exchanger

(see fig. 1)

- Close the shut-off valve and drain the domestic hot water circuit and central heating circuit of the water heater;
- Disconnect the joints securing the heat exchanger to the pipes;
- Unscrew the screws joining heat exchanger fixing bracket to its support and remove it;
- Remove the heat exchanger;
- De-scale the heat exchanger by chemically washing the plates;
- Fit new washers;
- Re-assemble the heat exchanger and components following the above procedure in reverse order;
- Fill the system with water and check for any leaks from the joints.

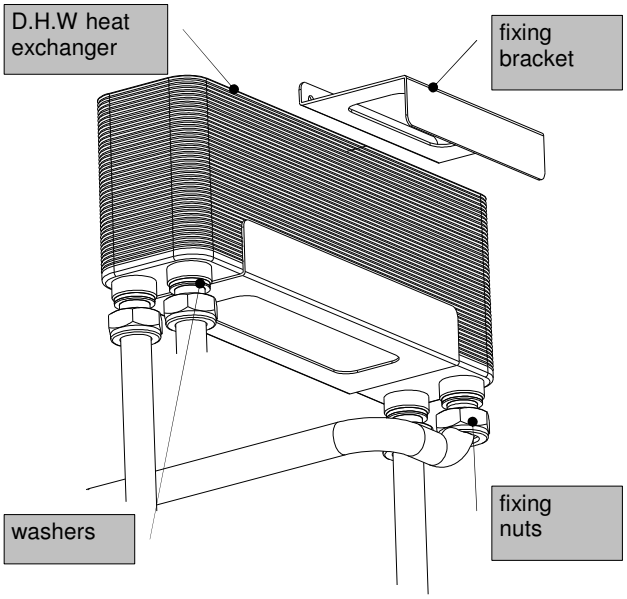



**Fig. 1**

## Part replacement:

### Ignition and/or flame ionization electrodes

(see fig. 2)

- Un-Plug the electrode wires;
- Slacken the fixing screws;
- Remove the electrodes. When fitting the new ones, check that the seals are not damaged. Replace if necessary;
- Reconnect the wires and re-assemble the components following the above procedure in reverse order;
- Switch on the power supply and restart the appliance;

⚠ *If the water heater does not restart, check the positions of the electrodes (especially the ignition electrode). Make sure that original position and distances between the electrodes and the burner are respected to avoid a water heater malfunction).*

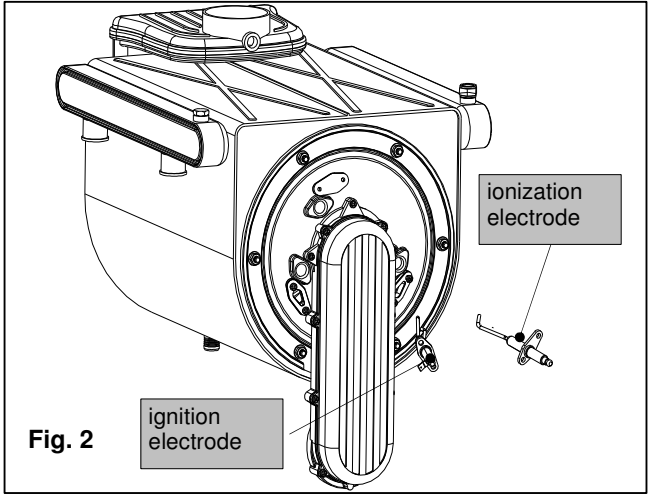



**Fig. 2**

**Safety thermostat** (see fig. 1)

- Disconnect the connecting wire;
- Unscrew the fixing screws and remove the thermostat;
- Replace the thermostat and re-assemble the components following the above procedure in reverse order;
- Switch on the electricity, water and gas supplies and restart the appliance.

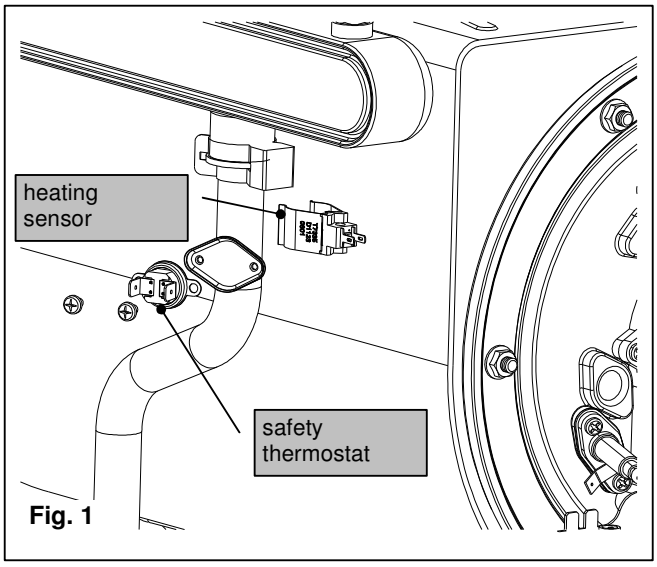



**Fig. 1**

**Heating sensor** (see fig. 1)

- Un-Plug the connecting wire;
- Replace the sensor and re-assemble the components following the above procedure in reverse order;
- Switch on the electricity, water and gas supplies, open the shut-off valves and fill the central heating circuit. Then restart the appliance, remembering to discharge any air that may be trapped in the system;

**Gas valve** (see fig. 2)

- Unscrew the screws connecting the gas valve to the venturi.
- Disconnect the gas feed pipe and valve ring-nut at the bottom of the room-sealed chamber.
- Remove the flanged elbow coupling of the existing valve and fit it to the new valve; also fit a new cork washer and a new rubber gasket.
- Replace the gas valve and re-assemble the components following the above procedure in reverse order.
- Replace all the gas seals.
- Fully tighten the gas connections.
- Switch on the electricity, water and gas supplies and check for any gas leaks using a soapy solution or leak detector spray;

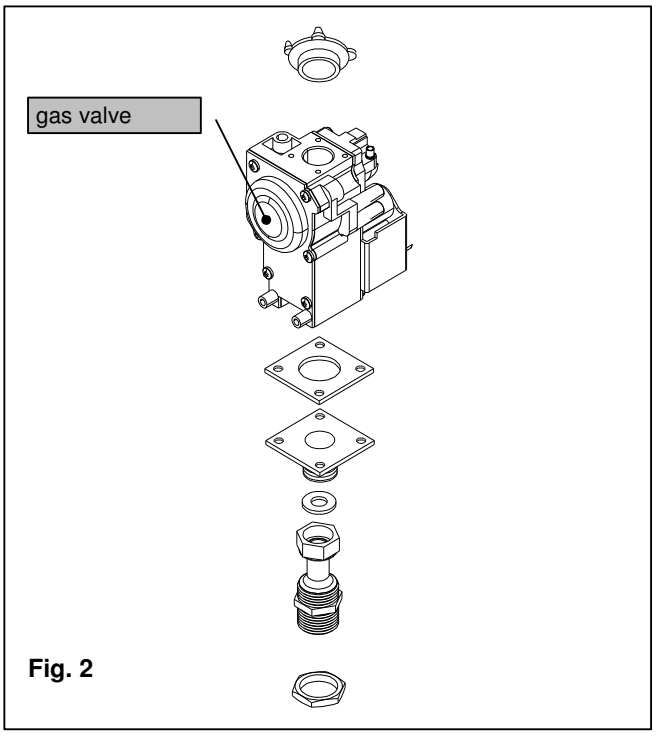



**Fig. 2**

**Electric fan** (see fig. 1)

- Remove and dismantle the entire burner unit *(see "Cleaning the burner unit")*.
- Use an 8 mm wrench to unscrew the four nuts securing the electric fan to the gas manifold and then remove the electric fan, noting the positions of the washer.
- Remove the air intake duct, unscrew the two fixing screws from the venturi and remove the electric fan, paying particular attention not to damage the cork gasket.
- Replace the electric fan and re-assemble the components following the above procedure in reverse order.
- Switch on the electricity, water and gas supplies and check the soundness of the joint by measuring the $CO_2$ levels;

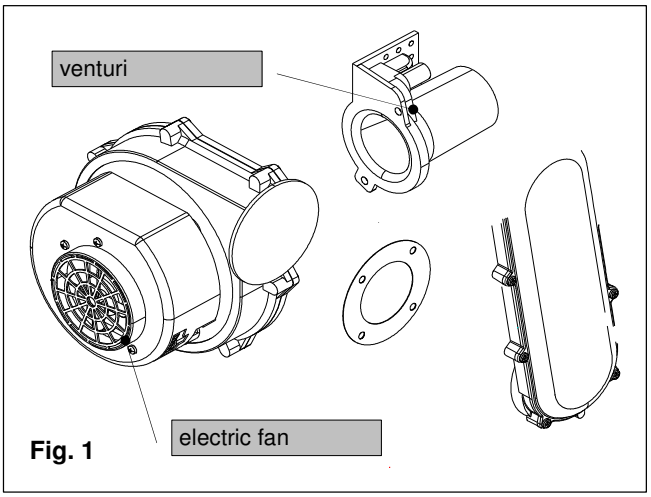


**Fig. 1**

**D.H.W heat exchanger** (see fig. 2)

- Close the shut-off valve and drain the domestic hot water circuit and central heating circuit of the water heater.
- Disconnect the joints securing the heat exchanger to the pipes.
- Unscrew the screws joining heat exchanger fixing bracket to its support and remove it.
- Remove the heat exchanger.
- Fit new washers.
- Replace the heat exchanger and re-assemble the components following the above procedure in reverse order.
- Switch on the electricity, water and gas supplies, fill the system with water and check for any leaks from the joints.

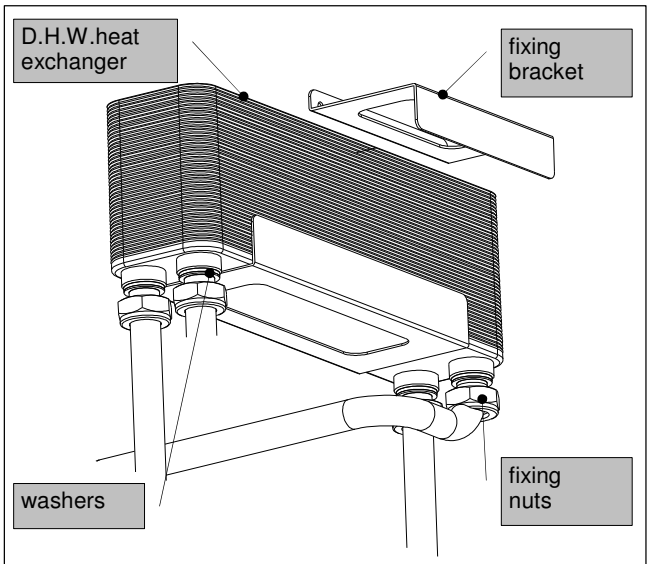


**Fig. 2**

**Circulating pump** (motor body) (see fig. 3)

- Close the shut-off valves and drain the central heating circuit of the water heater;
- Use a 5 mm Allen key to unscrew the four screws securing the motor body to the impeller body;
- Remove the motor body and check the condition of the washer. If necessary, replace the washer;
- Replace the circulation pump and re-assemble the components following the above procedure in reverse order;
- Switch on the electricity, water and gas supplies and fill the system with water. Check for any leaks from the joints and bleed off any air from the circuit. Restart the water heater.

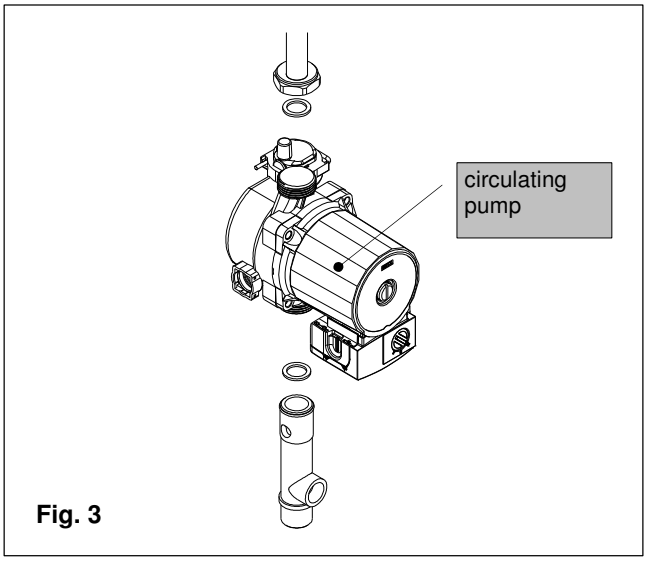


**Fig. 3**

## Diverter valve (see fig. 1)

***Replacing the motor***

- Unscrew the fixing screws securing the transparent cover of the diverter valve and remove the cover;
- Unscrew the two motor fixing screws and disconnect the wires;
- Replace the motor and re-assemble the components following the above procedure in reverse order;
- Replace the motor and re-assemble the components following the above procedure in reverse order;

***Replacing the diverter valve***

- Close the shut-off valves and drain the central heating circuit of the water heater;
- Disconnect the joints securing the valve to the pipes;
- Replace the valve body and re-assemble the components following the above procedure in reverse order;
- Switch on the electricity, water and gas supplies and fill the system with water. Check for any leaks from the joints and bleed off any air from the circuit. Restart the water heater.

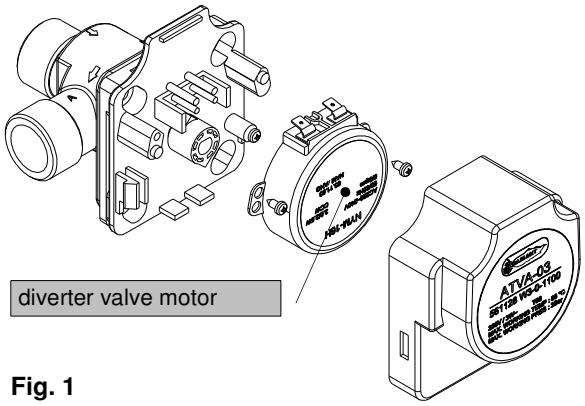



**Fig. 1**

## Modulation circuit board (see fig. 2-3)

- Open the control panel *(see 6.4 "Accessing the water heater");*
- Disconnect all the connectors, remove the regulating knobs, unscrew the four fixing screws and remove the modulation circuit board;
- Replace the circuit board and re-assemble the components following the above procedure in reverse order;
- Switch on the electricity, water and gas supplies and regulate the water heater *(see 5.3 "Gas data")*;

> ⚠ *The preset parameters of the printed circuit board correspond to an instantaneous type water heater fed by natural gas. When replacing the modulation circuit board, check the "Minimum heating flow rate" – Parameter 19 and "Max Heating power" – Parameter 20.*

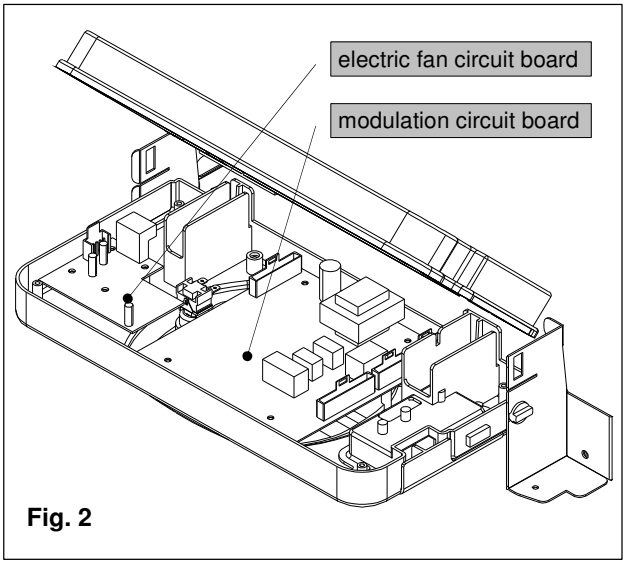



**Fig. 2**

## Electric fan circuit board (see figs. 2-3)

- Open the control panel *(see 6.4 "Accessing the water heater")*;
- Disconnect the two connectors from the circuit board, unscrew the two fixing screws and remove the board;
- Replace the circuit board and re-assemble the components following the above procedure in reverse order;
- Switch on the electricity, water and gas supplies.

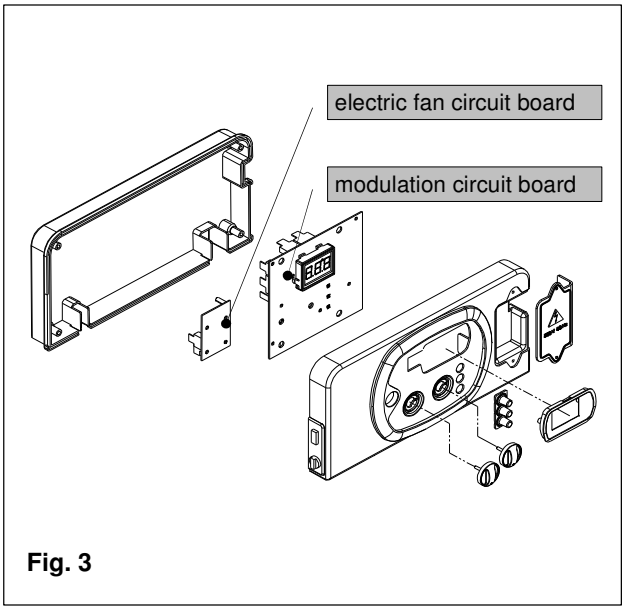



**Fig. 3**

## Primary heat exchanger (see fig. 1)

- Close the shut-off valves and drain the central heating circuit of the water heater;
- Switch off the power and gas supply to the water heater;
- Remove and dismantle the entire burner unit *(see "Cleaning the condensation module and burner unit");*
- Remove the gas valve;
- Remove the spring and then the condensate drainpipe;
- Remove the fixing springs and then the delivery and return pipes;
- Remove the support brackets and pull out the heat exchanger;
- Remove the regulation sensor from the old heat exchanger and refit it together with the two condensate drainpipes to the new one;
- Replace the heat exchanger and re-assemble the components following the above procedure in reverse order;
- Switch on the electricity, water and gas supplies and fill the system with water. Check for any leaks from the joints and bleed off any air from the circuit. Restart the water heater, making sure that there are no gas leaks;

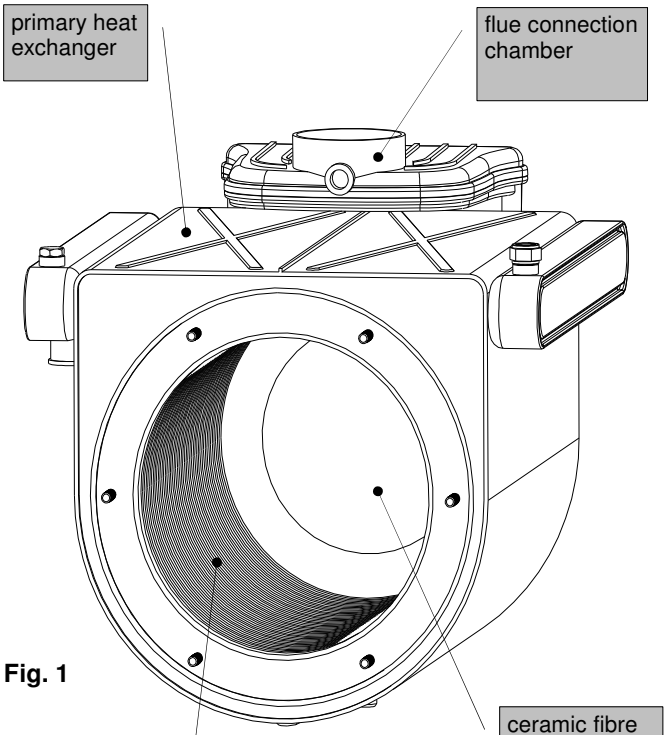



**Fig. 1**

## Expansion vessel (see fig. 2)

- Close the shut-off valves and drain the central heating circuit of the boiler.
- Use a 19 mm spanner to unscrew the pipe coupling to the vessel.
- Unscrew the fixing screws and remove the upper mounting bracket. Remove the expansion vessel from the left side of the boiler.
- Replace the expansion vessel and re-assemble the components following the above procedure in reverse order.
- Switch on the electricity, water and gas supplies and fill the system with water. Check for any leaks from the joints and bleed off any air from the circuit;

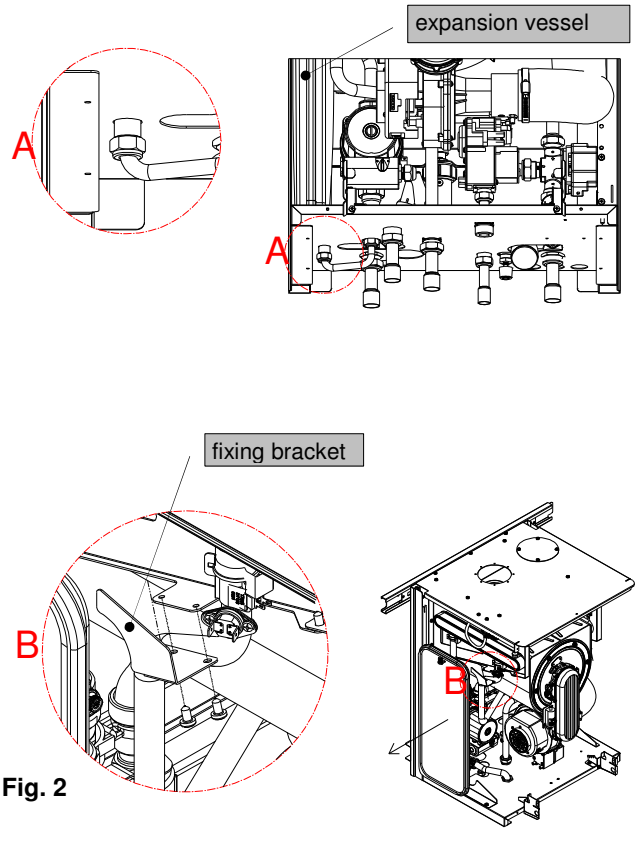
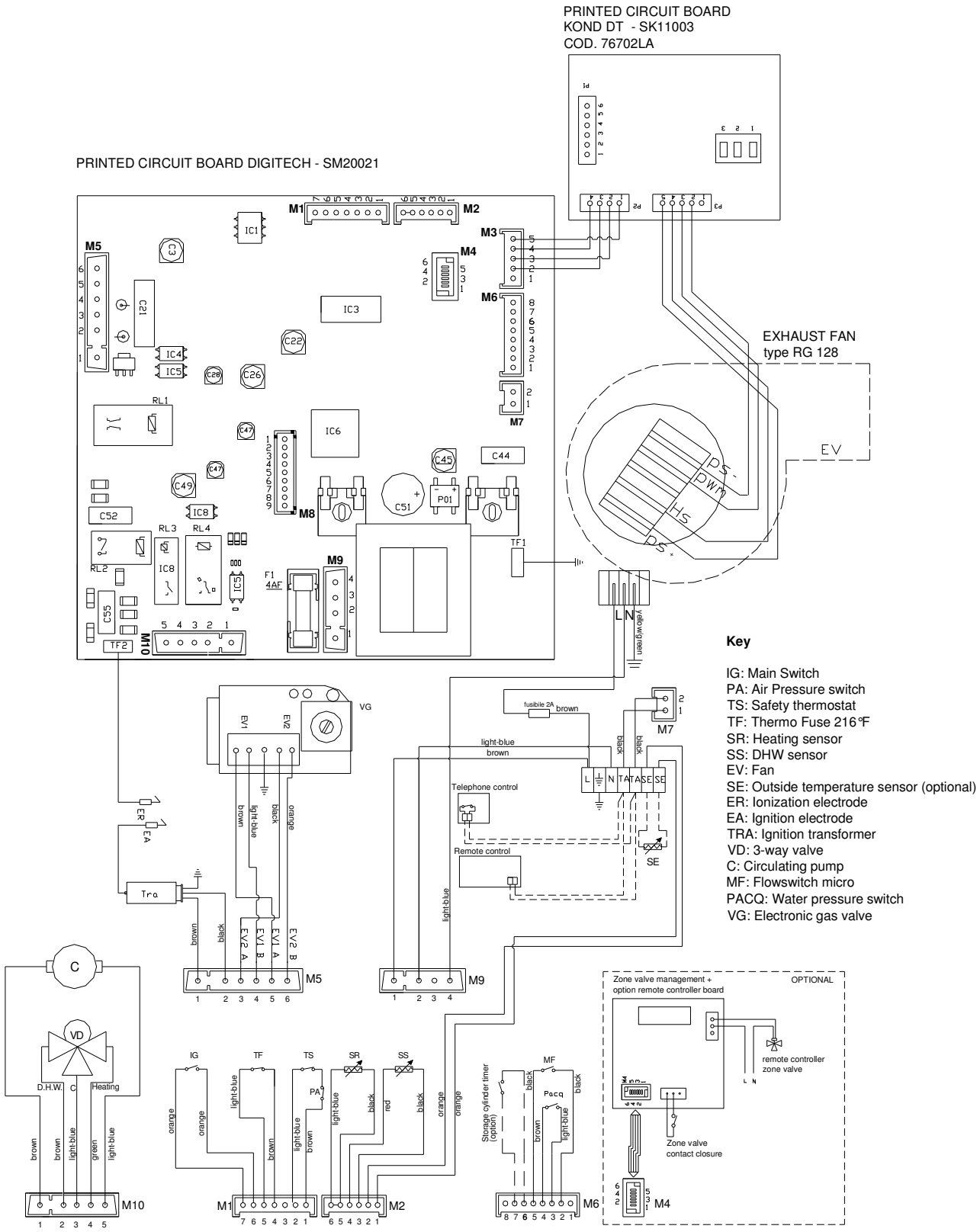



**Fig. 2**

# 6.8 Wiring diagrams



## Connecting the room thermostat (Option)

***Connect the wires to the terminal board inside the instrument panel as follows:***

*(Example with WEEK digital weekly chronostat):*

**a.** switch off the power supply at the main switch.
**b.** remove the front case panel of the water heater.
**c.** slacken the screws and remove plate A (see fig.1).
**d.** remove jumper TA -TA from the terminal board B;
**e.** connect the room thermostat/chronostat wires;

When the wires have been connected, place plate "**A**" back to position and then the front case panel.

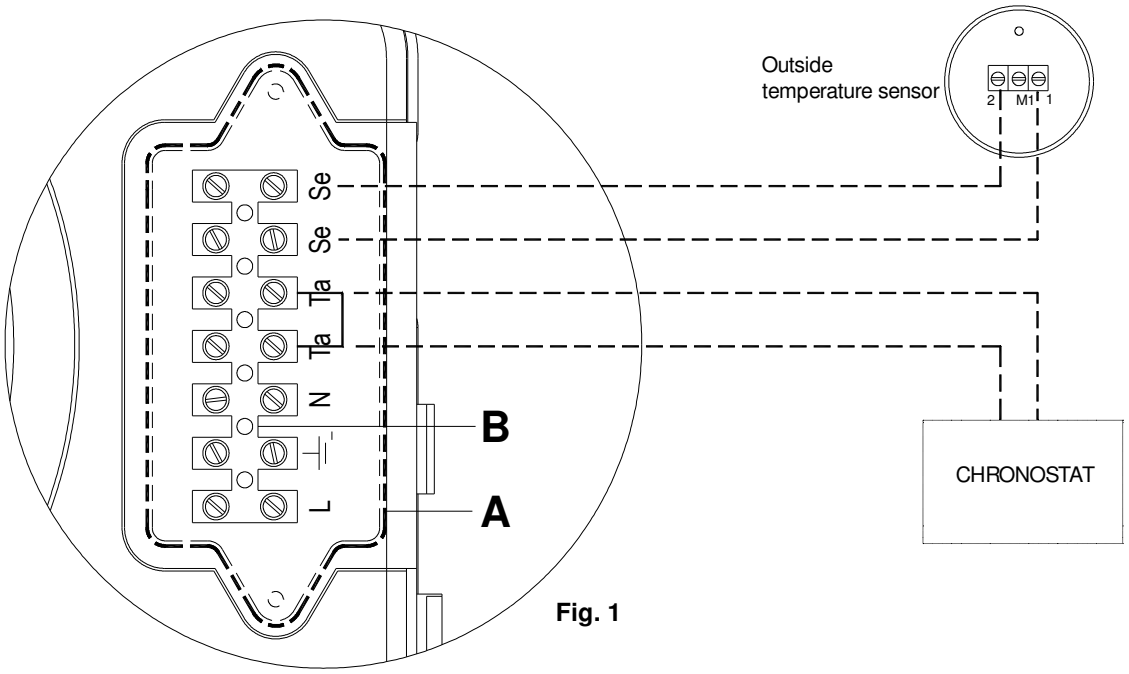



**Fig. 1**

## Connecting the outside temperature sensor (Option)

***Connect the wires to the terminal board inside the instrument panel as follows:***

**a.** switch off the power supply at the main switch.
**b.** remove the front case panel of the water heater.
**c.** slacken the screws and remove plate A (see fig.1).
**d.** connect the outside temperature sensor on contacts marked as SE-SE on the terminal board B ;

When the wires have been connected, place plate "**A**" back to position and then the front case panel.

## Connecting the remote controller the outside temperature sensor (option)

***Connect the wires to the terminal board inside the instrument panel as follows:***

**a.** switch off the power supply at the main switch.
**b.** remove the front case panel of the water heater.
**c.** slacken the screws and remove plate A (see fig.1).
**d.** remove jumper TA-TA from the terminal board B;
**e.** connect the remote controller wires;
**f.** connect the outside temperature sensor on contacts marked as SE-SE on the terminal board B.

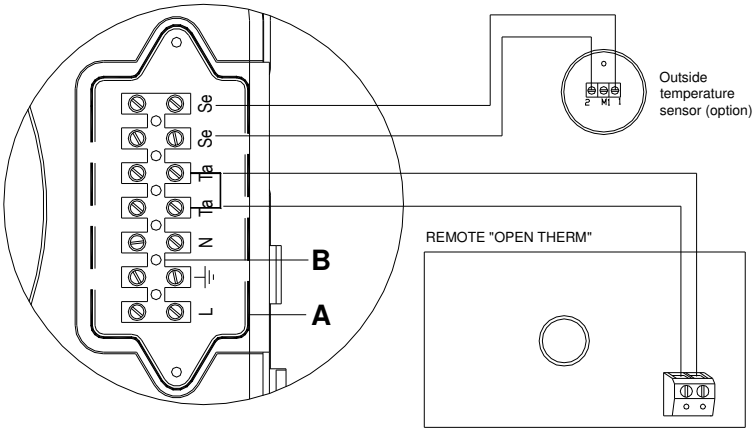



**Fig. 1**

When the wires have been connected, place plate "**A**" back to position and then the front case panel.

## Connecting the remote controller and the telephone control (option)

***Connect the wires to the terminal board inside the instrument panel as follows:***

**a.** switch off the power supply at the main switch.
**b.** remove the front case panel of the water heater.
**c.** slacken the screws and remove plate A (see fig.1).
**d.** remove jumper TA-TA from the terminal board B;
**e.** connect the remote controller and the telephone control wires;
**f.** Active the telephone control through the parameter no.16 *(see 5.1 "Parameters Table")*

When the wires have been connected, place plate "**A**" back to position and then the front case panel.

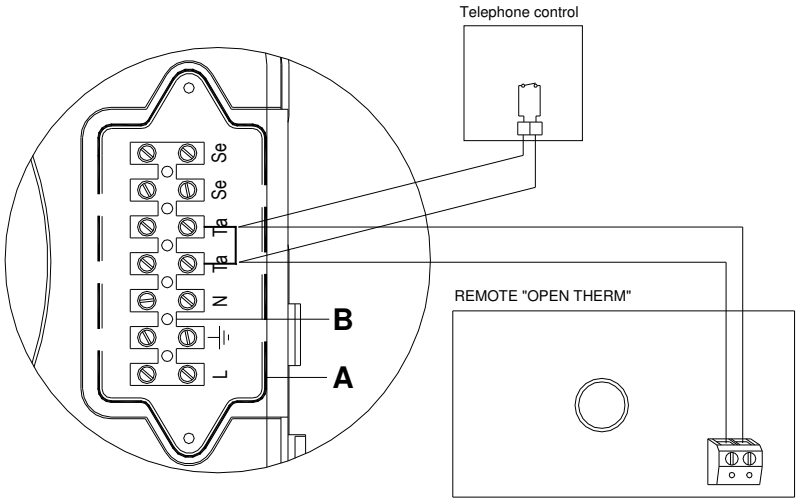
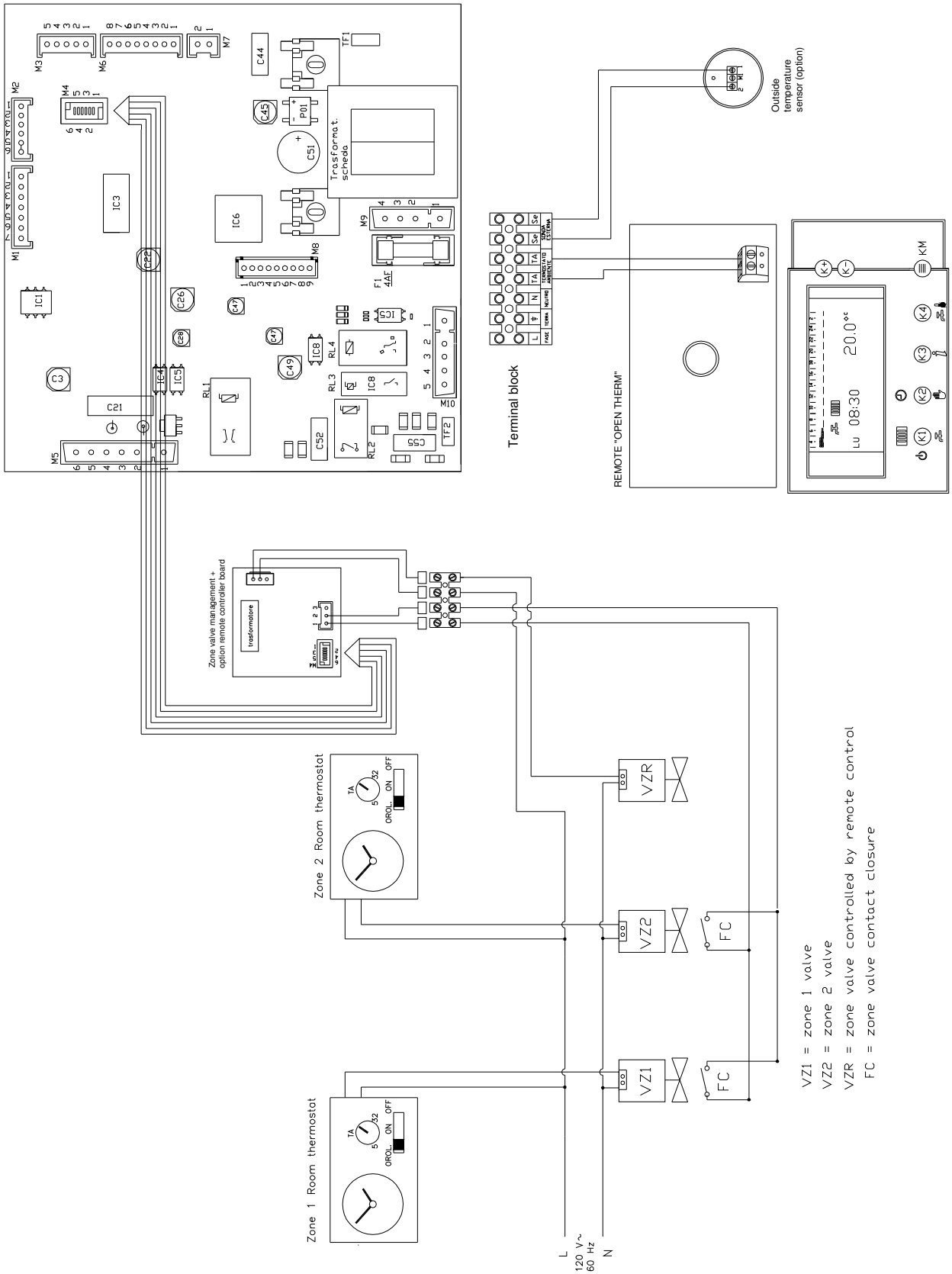


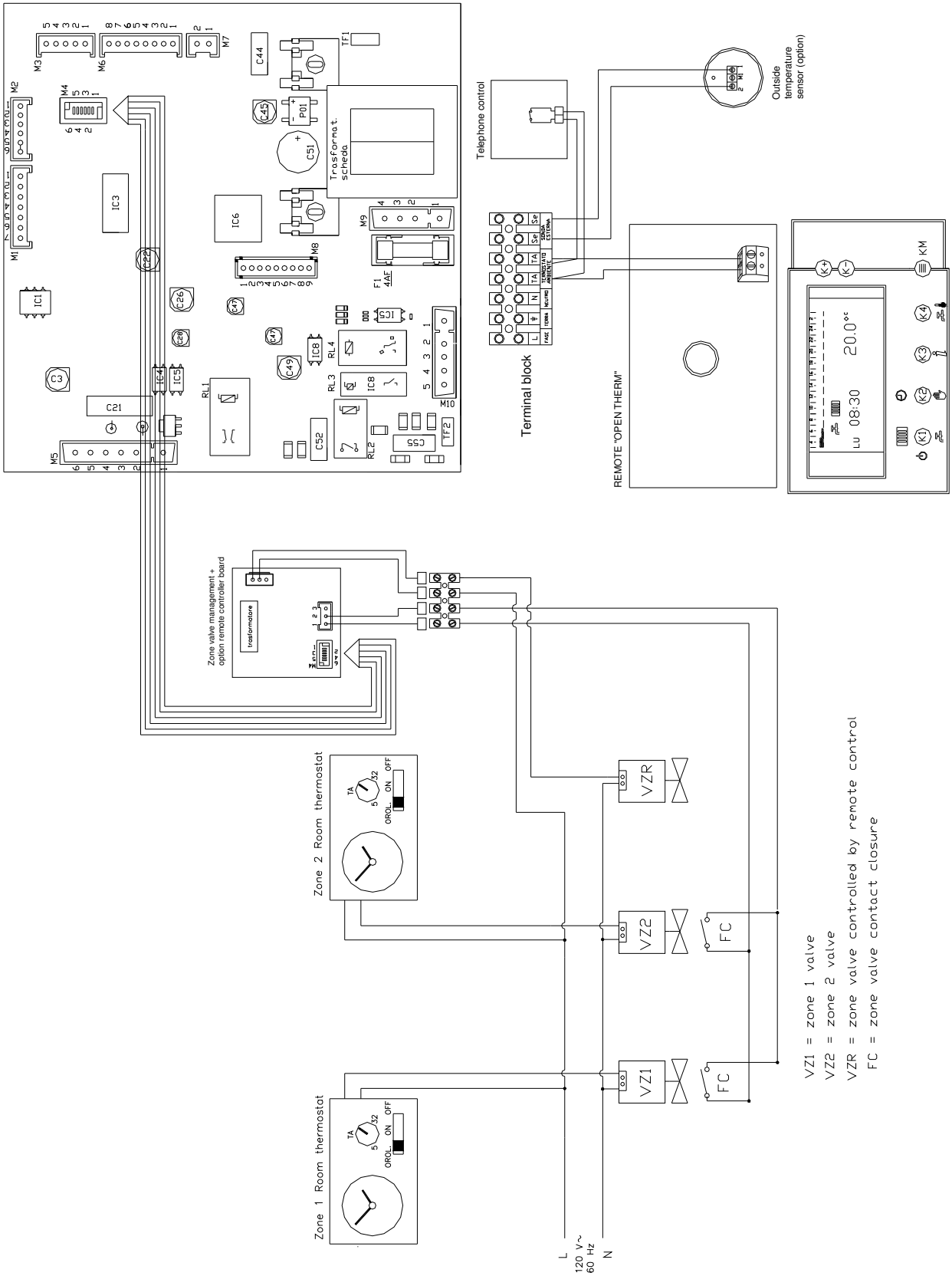

**Fig. 2**

## Remote control and zone valves wiring

For the installation of a zone valve p.c.b, it is necessary to access the main p.c.b for electrical connection *(see 6.3 "Accessing the water heater")* and to activate the parameter no. 16 (see 5.1 "Parameters table").



## Remote control, zone valves and telephone control wirings



## Regulating the Flow temperature in accordance with the outdoor temperature

The outdoor sensor has to be connected directly to circuit board SM 20021. The sensor can thus be managed in one of two ways:

- In case of remote controller + outdoor temperature sensor installation, the climatic compensation curve is set by the remote itself (see remote control installation and operating manual).
- In case of outdoor temperature sensor only installation, the climatic compensation curve is set using the central heating control knob. As the knob (see fig. 2) is rotated, the numbers corresponding to the curve shown in figure 1 are displayed

The factors governing the correction are reported in figure 1.

The selection of the compensation curve is determined by the maximum delivery temperature Tm and the minimum outdoor temperature Te.

**N.B.** *The y-axis values of the delivery temperature Tm refer to standard 176-86 °F appliances or 104-77 °F floor-mounted appliances. The type of appliance can be programmed using parameter 3 (see 5.1 "Parameter programming").*

**OUTDOOR SENSOR**
DELIVERY TEMPERATURE CORRECTION AS A FUNCTION OF OUTSIDE TEMPERATURE WITH RESPECT TO THE POSITION OF THE HEATING TEMPERATURE CONTROL SET BY THE USER

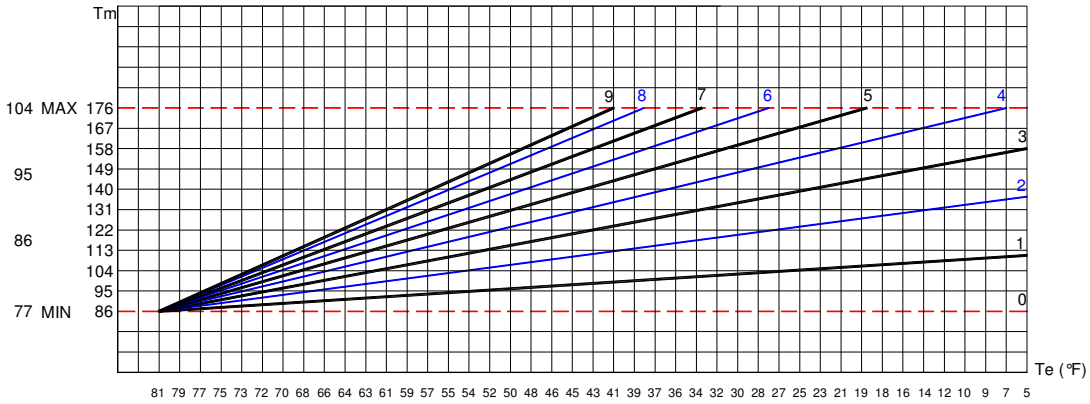



**Fig. 1**

TM-MAX/MIN = delivery temperature range selected

Te = Outdoor temperature Tm = delivery temperature

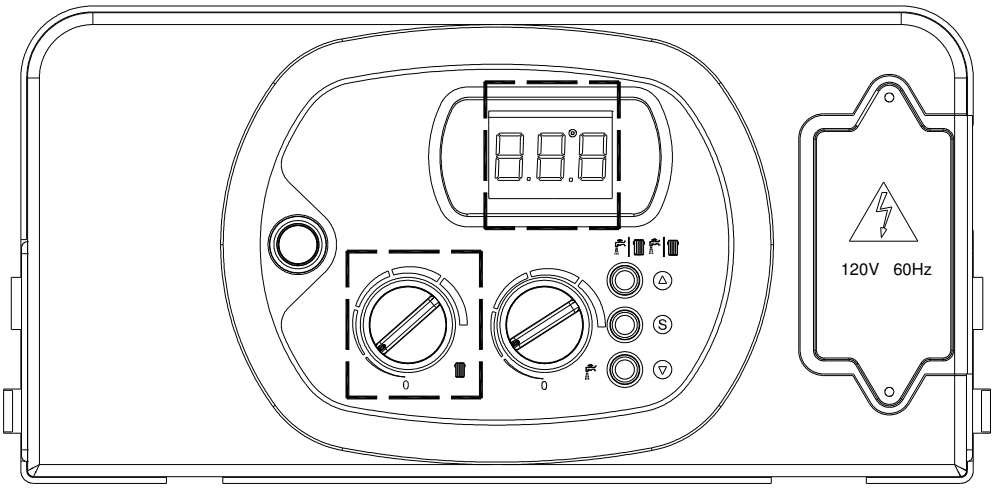



**Fig. 2**

## 6.9 D.H.W. Sensor connection

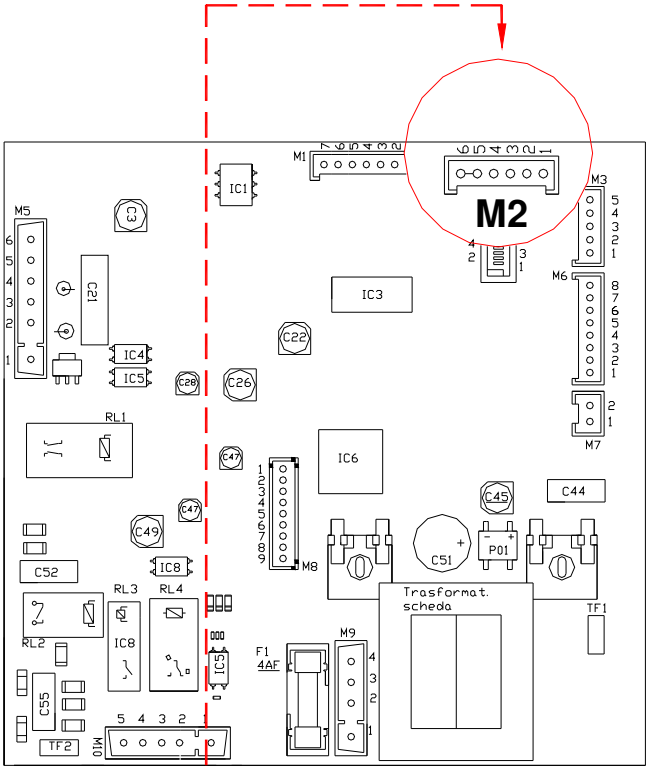
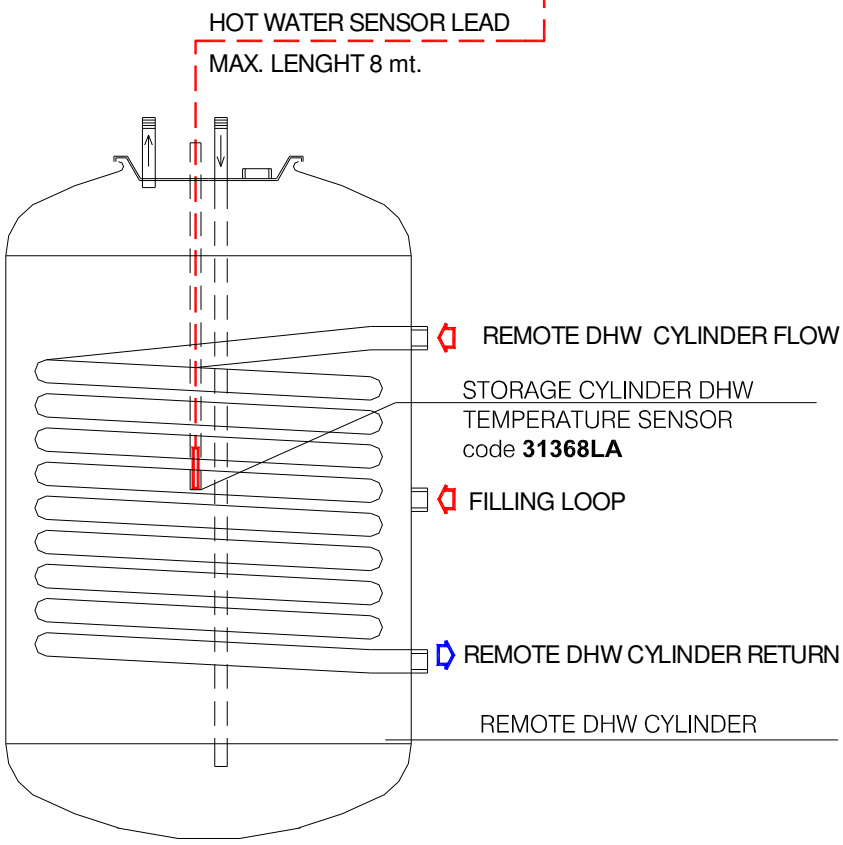



Fig. 1

PRINTED CIRCUIT BOARD CVI-M SM20021



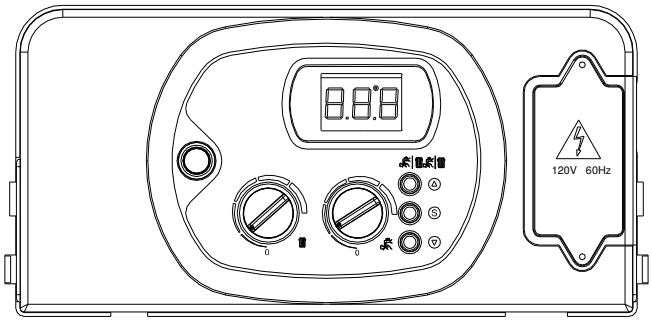
## 6.10 Troubleshooting

| ERROR CODE | PROBLEM | POSSIBLE CAUSE | REMEDY |
|---|---|---|---|
| **E01** | NO FLAME | *WITH NO IGNITION*<br>**a.** NO GAS.<br>**b.** IGNITION ELECTRODE BROKEN OR GROUNDED.<br>**c.** GAS VALVE MALFUNCTION<br>**d.** MECHANICAL MINIMUM ADJUSTMENT (ON GAS VALVE) SET TOO LOW OR SLOW IGNITION ADJUSTMENT SET TOO LOW.<br>**e.** GAS VALVE INLET PRESSURE TOO HIGH (FOR PROPANE WATER HEATERS ONLY );<br>*WITH IGNITION*<br>**f.** POWER SUPPLY LIVE AND NEUTRAL WIRES INVERTED.<br>**g.** IONIZATION ELECTRODE MALFUNCTION.<br>**h.** IONIZATION ELECTRODE CABLE DISCONNECTED. | **a.** CHECK MAINS SUPPLY.<br>**b.** REPLACE PART.<br>**c.** REPLACE PART<br>**d.** REGULATE MECHANICAL MINIMUM OR SLOW IGNITION.<br>**e.** CHECK THE MAXIMUM PRESSURE SETTING.<br>**f.** CONNECT THE POWER SUPPLY WIRES CORRECTLY.<br>**g.** REPLACE PART.<br>**h.** CONNECT THE IONIZATION ELECTRODE WIRE. |
| **E02** | SAFETY THERMOSTAT TRIPPED (203°F) | **i.** THERMOSTAT MALFUNCTION OR OUT OF CALIBRATION.<br>**j.** THERMOSTAT CABLE DISCONNECTED. | **i.** REPLACE PART.<br>**j.** CHECK THE WIRING ; |
| **E03** | FLUE SAFETY THERMOFUSE | **k.** THERMOFUSE BROKEN;<br>**l.** THERMOFUSE CABLE DICONNECTED;<br>**m.** THERMOFUSE LOCK OUT. (HIGH FLUE TEMPERATURE) | **k.** REPLACE PART;<br>**l.** CHECK THE ELECTRICAL CONNECTION;<br>**m.** RESTART AND CHECK THE THERMOFUSE |
| **H20** | NO WATER IN THE SYSTEM | **n.** INSUFFICIENT WATER PRESSURE IN THE SYSTEM (STOPS AT 4.5 PSI (0.3 BAR)).<br>**o.** WATER PRESSURE SWITCH CABLE DISCONNECTED.<br>**p.** WATER PRESSURE SWITCH MALFUNCTION. | **n.** FILL THE SYSTEM;<br>**o.** CHECK THE WIRING;<br>**p.** REPLACE PART; |
| **E05** | HEATING SENSOR | **q.** SENSOR MALFUNCTION OR OUT OF CALIBRATION (RESISTANCE VALUE 10 kOhms AT 77 °F).<br>**r.** SENSOR CABLE DISCONNECTED OR WET. | **q.** REPLACE PART;<br>**r.** CHECK THE ELECTRICAL CONNECTION; |
| **E06** | D.H.W SENSOR | **s.** SENSOR MALFUNCTION OR INCORRECT (RESISTANCE VALUE 10 kOhms AT 77 °F).<br>**t.** SENSOR CABLE DISCONNECTED OR WET. | **s.** REPLACE PART;<br>**t.** CHECK THE ELECTRICAL CONNECTION ; |
| **E16** | FAN | **u.** BURNT FAN | **u.** REPLACE PART |
| **E22** | PARAMETER PROGRAMMING REQUEST | **v.** LOSS OF MICROPROCESSOR MEMORY; | **v.** REPROGRAM PARAMETERS; |
| **E35** | FLAME DETECTION MALFUNCTION | **w.** IONIZATION ELECTRODE MALFUNCTION<br>**x.** IONIZATION ELECTRODE CABLE MALFUNCTION<br>**y.** PRINTED CIRCUIT BOARD MALFUNCTION | **w.** CLEAN IT OR REPLACE PART<br>**x.** REPLACE PART<br>**y.** REPLACE PART |
| **E42** | FAN PRINTED CIRCUIT BOARD | **z.** FAN PRINTED CIRCUIT BOARD MALFUNCTION | **z.** REPLACE PART |

## 6.11 Diagnostics

### ■ Error codes:

E01 Ionization Lock Out
E02 Safety Thermostat Tripped
E03 Flue Gas Thermofuse Tripped
H2O Low Water Pressure Alarm
E05 Heating Sensor Malfunction
E06 D.H.W Sensor Malfunction
E16 Electric Fan Malfunction
E22 Parameter Programming Request
E35 Flame Detection Malfunction
E42 Fan Speed P.C.B. Malfunction




### ■ Function codes :

| Code | Function | Description |
|---|---|---|
| 07 | Flue test function active (Chimney-Sweeper) | Pressing the “service” button for 7 seconds activates the Flue test function. Pressing the water heater off button deactivates the function. The Flue test function operates the water heater at the maximum heating pressure for 15 minutes without any modulation. The function is useful for combustion testing. |
| 08 | Frost Protection Central heating circuit | The function is activated when the heating sensor senses a temperature of 41 °F. The water heater operates at minimum gas pressure with the 3-way diverter valve in the winter position. The function is deactivated when the temperature detected by the sensor reaches 86°F. |
| 09 | Frost Protection D.H.W. circuit | The function is activated when the sensor senses a temperature of 40°F. The water heater operates at minimum gas pressure. The 3-way diverter valve closes in the summer position and heats the D.H.W. circuit. The function is deactivated when the D.H.W. sensor detects a temperature of 46°F. |
| 31 | Incompatible Remote Control | Function active when the remote control connected is not compatible with the printed circuit board. |

## 6.12 Parts List / Available from FLOWMAX

### Main components

| CODE | DESCRIPTION |
|---|---|
| 20094-LA | CONDENSING EXCHANGER |
| 20079LA | PLATE EXCHANGER 40P. |
| 24060LA | PUMP STAR S 21 KU RSL-PL6 UL/CSA |
| 25-00045 | EXPANSION VESSEL 6 lt. – 1,58 gal |
| 25-00050 | SAFETY VALVE 3/4"M - 3/4"F |
| 27044LA | CONDENSATE TRAP |
| 35031LA | IGNITION ELECTRODE |
| 35032LA | IONISTATION ELECTRODE |
| 36072LA | VENTURI MINIFOLD |
| 36075LA | GAS VALVE UL/CSA |
| 37033LA | FAN RG 128 / 1300 UL/CSA |
| 59015LA | WATER PRESSURE SWITCH PC 5411 BRASS |
| 59021LA | AIR PRESSURE SWITCH 3.28 UL/CSA |
| 73516LA | HTG CLIP SENSOR FOR PIPE 17/18 mm BLUE-T7335D1123B |
| 73517LA | THERMO FUSE 102°C RED ISOTHERM. 1/4" 4X45 |
| 76702LA | PRINTED CIRCUIT BOARD KOND DT - SK11003 (FAN) |
| 76719LA | MAIN PRINTED CIRCUIT BOARD UL/CSA - SM20021 |
| 86006LA | SAFETY THERMOSTAT 95°C |
| 86014LA | WATER PRESSURE GAUGE |
| 88022LA | TRANSFORMER UL/CSA |
| 96007LP | FLOWSWITCH |
| 96018LA | NO-RETURN VALVE |
| 96055LA | AIR VENT VALVE 1/4 |
| 96093LA | DIVERTER ACTUATOR VALVE UL/CSA |

Warranty:

Warranty period is twelve (12) months from date of purchase. Warranty includes parts and labour (check with FLOWMAX Technologies Inc. for labour allowance rates). An extended twelve (12) month warranty is available, where applicable on parts; please consult FLOWMAX Technologies Inc. Cost of returning the goods to FLOWMAX Technologies Inc. is by others. All warranty parts are to be prepaid by the customer. No warranty will be in effect until the equipment is paid for in full. Warranty on all equipment sold to customer may be suspended, at FLOWMAX Technologies Inc.'s discretion, until the customer's account is in good standing. Warranty covers defective components only. Normal wear and abuse is not covered. The customer's account will be credited only after the defective part has been examined by FLOWMAX Technologies Inc. or the vendor and determined to be defective.

**All Energy Star approved Models have 5 year warranty on parts**

## FIRST YEAR

Limited Warranty for Condensing Water Heater
(All Residential Water Heaters)
(Includes Space Heating Domestic Water 'Combo' Heating Applications)
FLOWMAX warrants that its combo water heaters are free from defects in materials and workmanship for one (1) year from the date of installation. If any parts are found to be defective in manufacture, FLOWMAX will provide replacement of such defective parts.

## SECOND THROUGH THE TENTH YEAR

**Limited Warranty for Primary Heat Exchangers on all Energy Star approved models**
(Residential Water Heaters)
(Space Heating Applications Only)
FLOWMAX warrants that the stainless steel tube (primary) heat exchanger of its residential condensing gas water heater is free from defects in material and workmanship from the date of installation for the second through the tenth year to the original purchaser only. If during such time period, any part of the stainless steel tube heat exchanger is found to be defective, FLOWMAX will provide replacement for the original heat exchanger.

## SPECIAL FIVE YEAR WARRANTY

**Limited Warranty for Flat Plate Heat Exchangers**
(Domestic Hot Water Heat Exchangers-Residential Use Only)
FLOWMAX warrants that the stainless steel, flat plate heat exchanger (used for the production of domestic hot water) is free from defects in material and workmanship for five (5) years from the date of installation. Any coagulation or blockage of the normal water flow through the heat exchanger, due to trapped sediment, heavy calcification, lime deposits minerals and or other waterborne build-up in the plate heat exchanger, or corrosion due to chemical anti-freeze additive is not considered *defects in workmanship* and therefore any malfunction or damage to other parts or components resulting from these build-ups in the plate heat exchanger is not covered under the terms of this warranty.

Limitations on Liability

## This Warranty Does Not Cover

1. Installations by other than licensed plumber, gas installer or heating contractor.
2. Installations of equipment for other purposes than those intended by the instructions supplied with this equipment.
3. Installations of equipment for purposes other than residential space heating and domestic hot water production.
4. Any product which is improperly installed or moved from its original place of installation.
5. Any product which has been repaired or replaced with other than FLOWMAX factory parts.
6. Any product modified in any way, misused or damaged or which has been used contrary to warrantor's written instructions.
7. Introduction of liquids other than potable water or potable water/glycol mixtures into this product.
8. Any damage to the product caused by failure to maintain the unit properly, improper voltage, improper gas pressure, improper water pressure, flood, freezing, electrical surges, fire, lightning, or Acts of God.
9. Nicks, scratches or discoloration of decorative finishes.
10. Installation, plumbing, gas piping and wiring not integral to the product.
11. Any FLOWMAX product installed in an improper environment (e.g. Corrosive, dusty, and or chemically contaminated).
12. Condensate damage due to improperly installed or lack of a condensate trap (drain).
13. Damages due to accidents, abuse, misuse, improper installations, misapplication or incorrect sizing and lack of regular recommended maintenance.
14. The water heater is installed outdoors.
15. Failures not reported to FLOWMAX Technologies Inc. within the time period specified above.
16. Products damaged in shipment or storage or otherwise without fault of FLOWMAX Technologies Inc.
17. The water heater has not been installed in accordance with all applicable local plumbing and/or building code and/or regulations or in their absence with the latest edition of the natural gas and propane installation code and/or the National Electrical Code or Canadian Electrical code.
18. This warranty does not cover any expenses related to the removal or re-installation process. The homeowner will be responsible for the cost of removing and re-installing the alleged defective part or its replacement and all labor and material connected therewith, and transportation to and from FLOWMAX.

19. The warranty cannot be considered as a guarantee of workmanship of an installer connected with the installation of the condensing water heater or as imposing a liability of any nature for unsatisfactory performance as a result of faulty workmanship in the installation, which liability is expressly disclaimed.

## Exclusion of Incidental and Consequential Damages/ Disclaimers

FLOWMAX will not pay in contract or in tort, consequential or incidental damages under this warranty, both of which are specifically excluded. This means we shall not be responsible for any loss, expense or damage caused by any defect in the water heater, other than the water heater itself. The maximum liability of FLOWMAX in connection with this limited warranty shall not in any case exceed price of the part claimed to be defective, or price of the water heater if the entire water heater is claimed to be defective. “Incidental” damages include expenses of inspection, obtaining substitute goods, transportation, etc.
“Consequential” damages include injury to persons or property inconvenience or other consequential damage resulting from a breach of warranty.

## Owner’s Responsibilities

This Warranty is issued to the original purchaser only. This product must be used and cared for in accordance with the instruction manual. You are responsible for required periodic maintenance or service. See your instruction manual for details. You must be able to verify the installation date of the product against which you make and warranty claim. The original bill of sale, installer’s invoice or other similar document is required to verify warranty. If you cannot show evidence of the actual date of installation, warranty coverage will be considered to start on the date the product is shipped from our distributor. The attached Warranty Registration Form must be filled out completely and returned to FLOWMAX. Failure to do so will prevent or delay our being able to contact you (or the person residing at this address) in case of a recall or important product safety alert.
Your warranty information will be held strictly confidential.

FLOWMAX™ TECHNOLOGIES

# Warranty Registration Form

**E-mail:** info@flowmaxtechnologies.com

**PLEASE COMPLETE THE FOLLOWING INFORMATION AND RETURN WITHIN 30 DAYS OF COMMISSIONING THE APPLIANCE (HOT WATER HEATER)**

**Please Print Clearly**

**Sold To:**

Company Name_____

Contact Name_____

Address_____

City_____State/Province_____ Zip/Postal Code_____

Phone No. _____ Fax_____

**Item Purchased:**

Unit Model_____Serial No. _____

Date of Purchase _____ Date of Start up_____

Installers Gas Certification Number and Name_____

**Purchased From:**

Company Name_____

Contact Name_____

Signature_____ Date_____

To ensure your warranty protection, please complete and return this form to FLOWMAX Technologies Inc. attention Product Registration.

FLOWMAX™
TECHNOLOGIES

# Warranty Parts Request Form

**E-mail:** info@flowmaxtechnologies.com

Please complete the following information and return it with the part request

| | | | |
|---|---|---|---|
| Sold To: | | | |
| Address | | | |
| Phone # | | Fax # | |

| | |
|---|---|
| Item Requested | |

| | |
|---|---|
| Water Heater Model No. | |
| Water Heater Serial No. | |

| | |
|---|---|
| Date of Purchase | |
| Date of Start-Up | |

| | |
|---|---|
| Comments | |
| | |
| | |

Credit will be issued upon receipt of completed form and inspection of defective part. Issues related to improper maintenance or installation are not considered to be warranty


**FLOWMAX Technologies**

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