

# INSTRUCTION MANUAL

For installation, use and maintenance for the



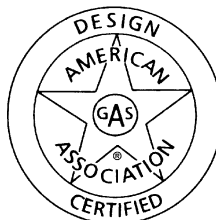
*SERIES*

## Ambassador★

**MODELS: BMS & BTS**

**Direct Vent  
Space / Water Heater**

**Combined Appliance  
For Heating and Domestic Hot Water**



These instructions **MUST** be read prior to installation and left near the appliance when the installation is completed.

Text complies with minimum size requirements.

# SAFETY INSTRUCTIONS

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**WARNING:** If the information in this manual 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 vapors 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 neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

— Installation and service must be performed by a qualified installer, service agency or the gas supplier.

## FOR YOUR SAFETY

Do not store or use gasoline or other flammable, combustible, or corrosive vapors and liquids in the vicinity of this or any other appliance.

# SAFETY INSTRUCTIONS

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These instructions must be read prior to installation. If the information in these instructions is not followed exactly, a fire or explosion may result, causing property damage, personal injury, or death.

## ***Hazards and Your Safety - Hot Water Can Scald!***

Water temperature over **125°F** can cause severe burns instantly, or death from scalds. Children, disabled, and elderly are at highest risk of being scalded; see instruction manual before setting temperature at water heater! Feel water before bathing or showering. Temperature limiting valves are available, see manual.

## ***If there is a smell of gas:***

-Turn the gas cock off - Air the room - Do not try to light any appliances - Do not use any phone in your building - Do not touch any electrical switch - Extinguish any flames - Call immediately a licensed authorized technician or your local gas company - Follow the gas supplier's instructions - If you cannot reach your gas supplier, call the fire department.

## ***If there is a smell of combustion products:***

-Turn the unit off - Air the room - Call a licensed authorized technician.

## ***Installation, alterations***

Licensed authorized personnel must carry out the installation, calibration or alteration of the gas apparatus. Flue gas ducts must **not** be modified in any way. Any replaced part or packaging parts should never be left within reach of children.

## ***Explosive products or easily inflammable products***

Do not keep, use or store explosive materials or easily inflammable materials such as Gasoline, Adhesives, Solvents, Paint Thinner, Butane, Liquefied Propane, paper, etc., near the heater.

## ***Maintenance***

The user, according to the heater's operating instructions, has to keep the installation in good condition and guarantee the reliable, safe operation of the heater. At least once a year the user must call in a licensed authorized technician for routine maintenance, before using it for central heating.

## ***Servicing Manual***

When the installation and commissioning of the system has been completed, the installer should instruct the homeowner to save the installation manual near the heater so that service technicians may refer to it in the future.

Caution: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. **VERIFY PROPER OPERATION AFTER SERVICING.**

**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.**

# GENERAL INFORMATION

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This instruction manual refers to two types of heaters, the BMS and the BTS.

**BMS** - this appliance is a wall mounted, direct vent space/water heater

**BTS** - this appliance is a self standing floor model, direct vent space/water heater

Each type of heater can be of two different input power rating; a 10/20 or 15/29;

**10/20** has an input power rating of 87,000 (31.6) Btu/hr (kW)

**15/29** has an input power rating of 107,000 (26) Btu/hr (kW)

## **BMS 10/20 or BMS 15/29 or BTS 10/20 or BTS 15/29**

When referring to this instruction manual, be sure of which type of heater you are working with. This can be verified by referring to the data plate marked "Space water heater model". This data plate is located on the bottom side of the BMS, or on the inside of the front door (internal side) of the BTS.

Also verify the type of gas for which the heater is set. A label in the front of your heater states "NATURAL GAS", for heaters set to natural gas, or "LP GAS" for heaters set to LP gas.

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# GENERAL LAYOUT of the main components of model BMS

A = Flue discharge  
B = Air intake

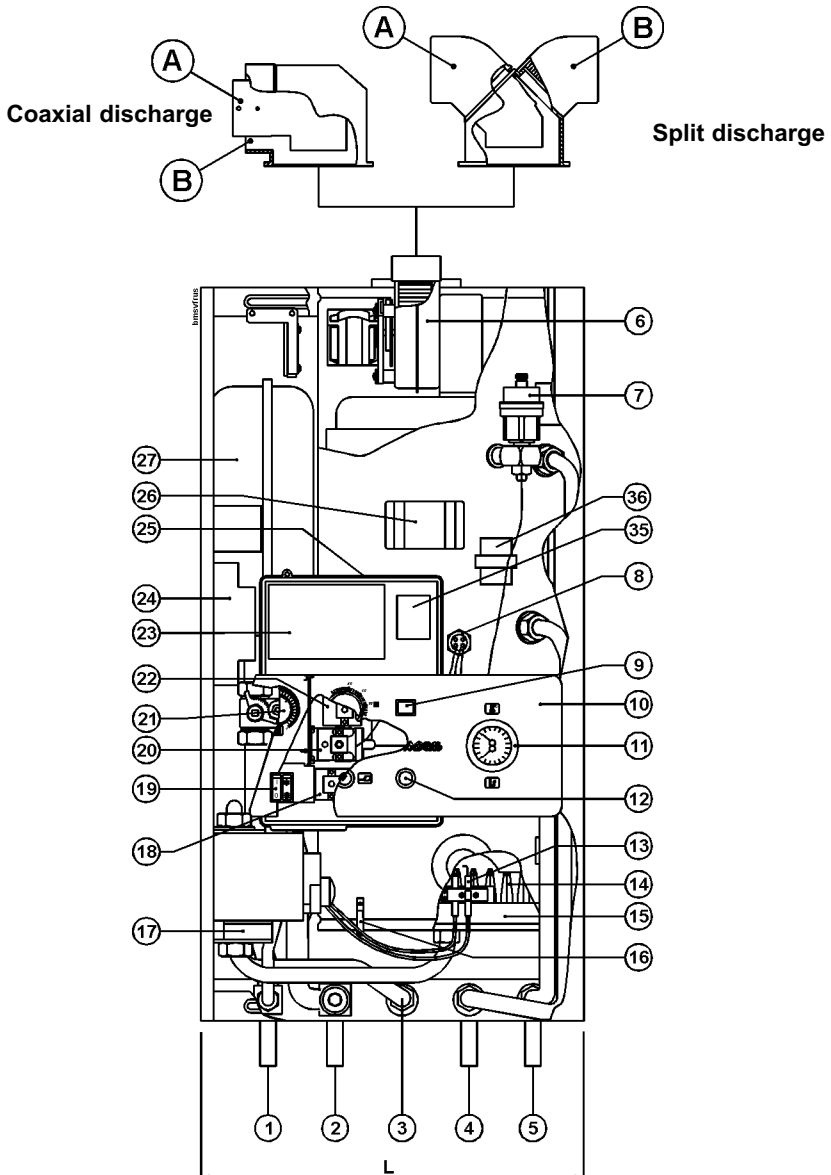
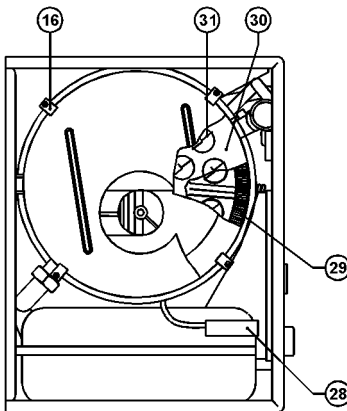
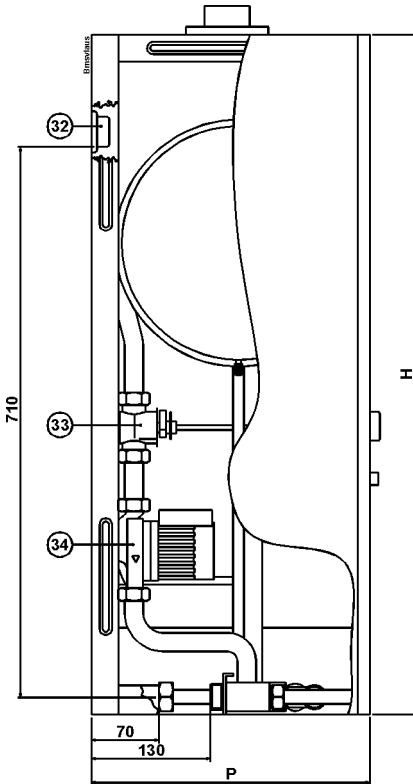


Figure 1 - BMS Front view

# GENERAL LAYOUT of the main components of model BMS



- 1 Central heating supply
- 2 Central heating return
- 3 Gas inlet
- 4 Domestic hot water outlet
- 5 Cold water inlet
- 6 Flue gas discharge fan
- 7 Automatic air vent
- 8 Thermostat bulb pocket
- 9 Gas valve service switch
- 10 Instrument panel
- 11 Temperature-pressure gauge
- 12 Failure lamp indicator
- 13 Ignition and detection electrodes
- 14 Burner
- 15 Gas manifold
- 16 Exchanger shell clamps
- 17 Gas valve
- 18 High limit thermostat
- 19 Power and circulator pump switches
- 20 Domestic hot water priority thermostat
- 21 Central heating regulation knob
- 22 Heater temperature control
- 23 Electrical control board
- 24 Ignition module
- 25 Electrical plastic cover
- 26 Electrical junction box
- 27 Expansion tank
- 28 Pressure switch
- 29 Domestic water heat exchanger
- 30 Heat exchanger
- 31 Turbulator
- 32 Support bracket
- 33 Central heating regulation valve
- 34 Circulator pump
- 35 Transformer

Figure 2 - BMS Side and top views

# GENERAL LAYOUT of the main components of model BTS

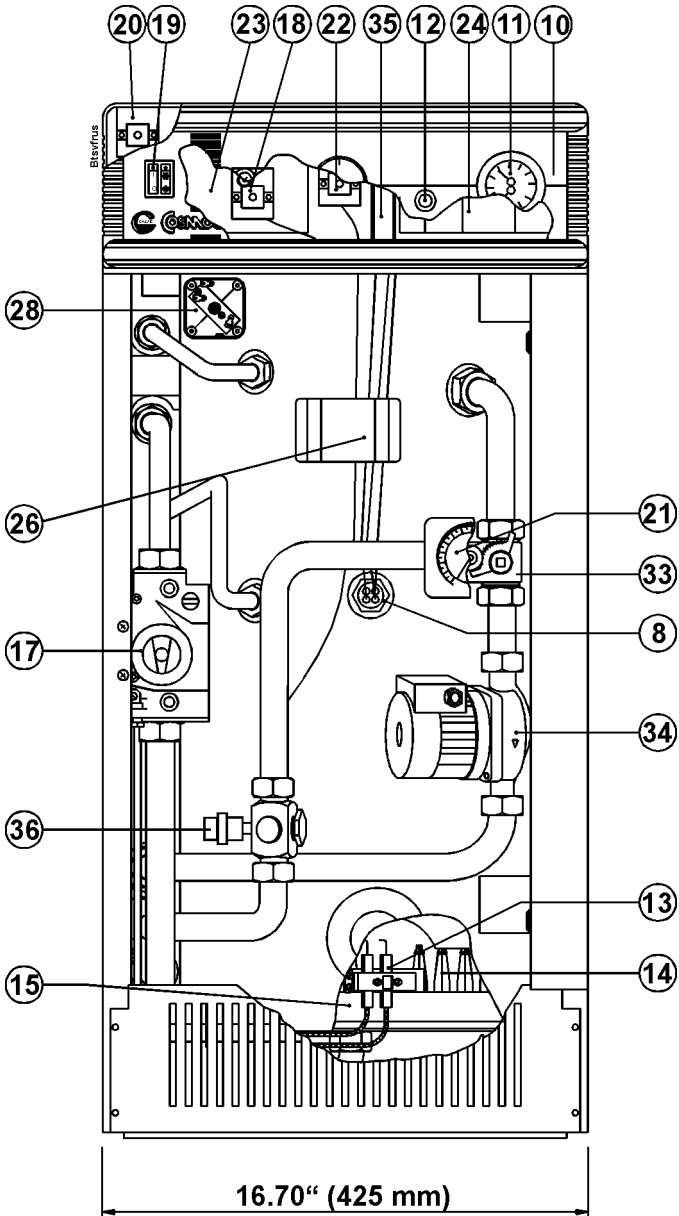
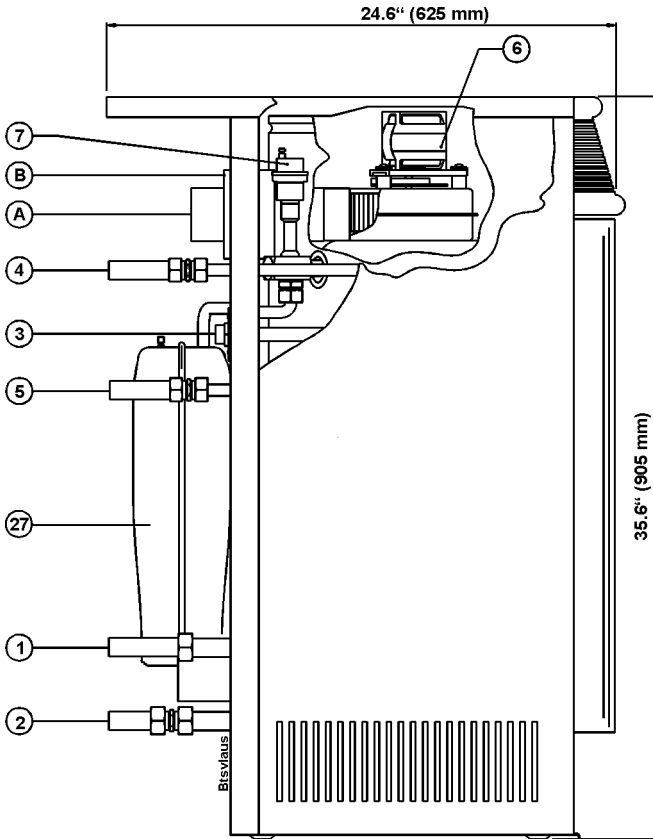


Figure 3 - BTS Front view



# GENERAL LAYOUT of the main components of model BTS



- |                                       |   |
|---------------------------------------|---|
| 1 Central heating supply              | 20 Domestic hot water priority thermostat |
| 2 Central heating return              | 21 Central heating regulation knob        |
| 3 Gas inlet                           | 22 Heater temperature control             |
| 4 Domestic hot water outlet           | 23 Electrical control board               |
| 5 Cold water inlet                    | 24 Ignition module                        |
| 6 Flue gas discharge fan              | 25 --                                     |
| 7 Automatic air vent                  | 26 Electrical junction box                |
| 8 Thermostat bulb pocket              | 27 Expansion tank                         |
| 9 --                                  | 28 Pressure switch                        |
| 10 Instrument panel                   | 29 --                                     |
| 11 Temperature-pressure gauge         | 30 --                                     |
| 12 Failure lamp indicator             | 31 --                                     |
| 13 Ignition and detection electrodes  | 32 --                                     |
| 14 Burner                             | 33 Central heating regulation valve       |
| 15 Gas manifold                       | 34 Circulator pump                        |
| 16 --                                 | 35 Transformer                            |
| 17 Gas valve                          | 36 Low water cut-off                      |
| 18 High limit thermostat              | A Flue discharge                          |
| 19 Power and circulator pump switches | B Air intake                              |

Figure 4 - BTS side view

# A INSTALLATION INSTRUCTIONS

## 1 Operating and adjusting the output to the radiation system

The COSMOGAS heater can be installed in any domestic or light commercial building where the maximum BTU/H required is not greater than 84,000 BTU/H.

The unit has an internal mixing valve (heating side only) that can be adjusted to regulate the supply water temperature delivered to the heating system. The heating system will not receive any water unless the water temperature inside of the heater is at a minimum of 140°F. The heater built-in domestic hot water priority thermostat will cease the power to the circulator until the temperature is greater than 140°F.

## 2 Location

This space/water heater unit is not intended for outdoor installation. Choose a location centralized to the piping system along with consideration to the vent pipe length. Additionally, you will need to place the space/water heater so that the controls, drain, inlet/outlet, and gas valve are easily accessed. Also, care must be exercised when choosing the location of this appliance, where leakage from the safety relief valves, leakage from related piping, or connections, will not result in damage to the surrounding areas, or to the lower floor of the building.

No valve is to be placed between the safety relief valves and the heater. The discharge from the temperature and pressure relief valve must be conducted to a suitable place for disposal. No reducing coupling or other restriction shall be installed in the discharge line. The discharge line should allow complete drainage of both valve and line.

## 3 Installation

The installation must conform to local codes and ordinances or, in the absence of local codes, the **National Fuel Gas Code ANSI Z 223.1/NFPA 54 - 1984**. When installed the appliance must be electrically grounded in accordance with the **National Electrical Code, ANSI/NFPA No.70 - 1987**.

For Canada, the installation should conform to **CGA B149.1 INSTALLATION CODES** and/or local installation codes.

The gas supply piping system should be tested before the heater is connected.

The heater, (complete with all its parts: external jacket, intake and discharge flue pipes, etc.), must be installed leaving a distance of at least 10 cm, (4"), from sidewalls and ceiling.

Installation of the **BTS** combi directly on combustible flooring such as carpeting shall be

installed on a metal or wood panel extending behind the full width and depth of the appliance by at least 3", (76.2 mm), in any direction or, if the appliance is installed in an alcove or closet, the entire floor shall be covered by the panel.

## 3.1 Installation Template

ONLY model BMS is provided with an installation

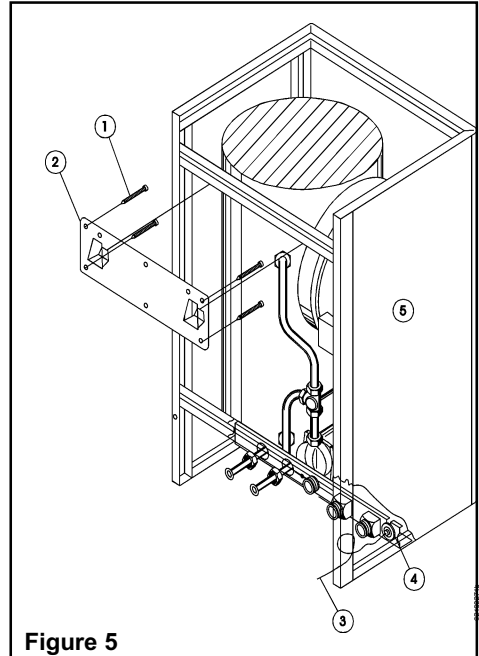


Figure 5

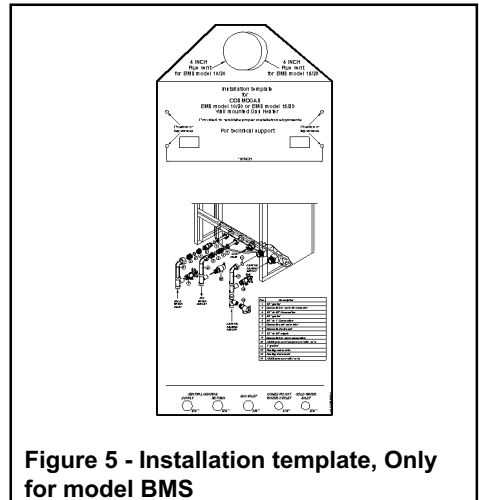


Figure 5 - Installation template, Only for model BMS

# A INSTALLATION INSTRUCTIONS

template to facilitate proper installation alignments (See figure 5 below).

## Clearances for installation

The figures 5A and 5B show the proper distances to keep from any obstacle pertaining to the support bracket (2) or to the wall.

The procedure for installing the BMS is as follow:

1) - Take the support bracket (2) and choose a position with proper clearances, as per Figures 5A & 5B. A minimum clearance of 40" (100mm) is required from the front of the heater.

**WARNING:** Please take caution when choosing a mounting surface for the heater. The weight of the heater with water is approximately 165 lbs. Make certain that the wall can support such weight.

2) Screw the bracket to the wall. The screws **MUST** be screwed in correspondence of the 16" vertical studs.

3) Place the template onto the support bracket and make all rough-in holes for the piping to the heater. The hole for the coaxial flue vent kit discharge may also be cut at this time.

4) Install the heater on the support bracket and secure all of the connections.

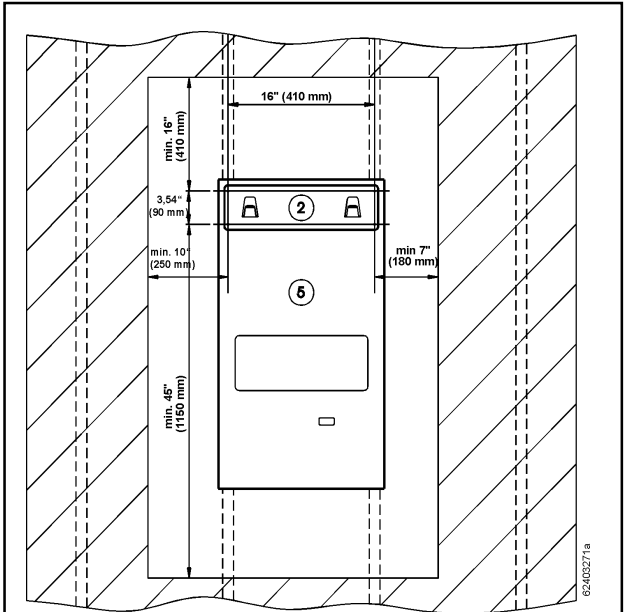


Figure 5A - Clearances for model BMS

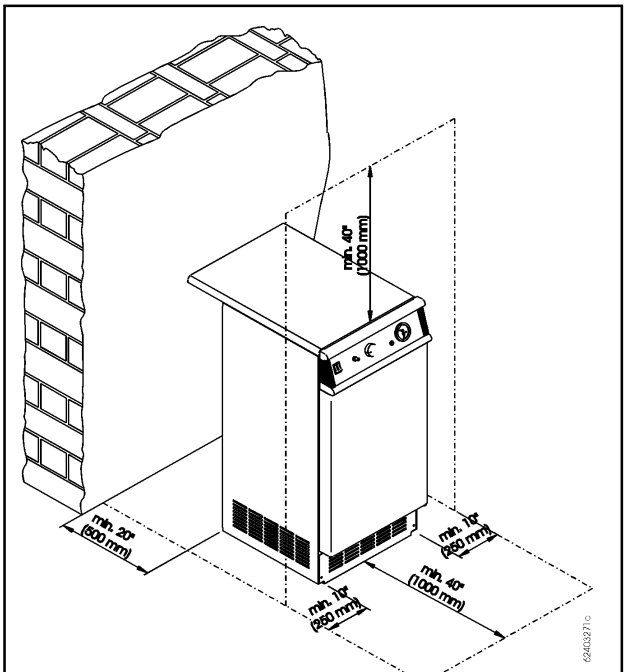


Figure 5B - Clearances for model BTS

# A INSTALLATION INSTRUCTIONS

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## 3.2 Safety Relief Valve

An **ASME** approved safety relief valve, (set at **30 psi**), must be installed in a vertical position on the outlet side of the central heating system, and as close as possible to the heater. There must be no valves between the safety relief valve and the heater.

Manually operate the safety relief valve at least once a year to ensure proper operation. Precaution must be taken prior to operating the safety relief valve, to avoid contact with hot water coming out of the safety relief valve and to prevent water damage.

If the safety relief valve discharges periodically, this may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct this situation. Do not plug the safety relief valve.

## 3.3 Heating Supply and Return

The central heating supply and return pipes are marked with different colored caps, (supply red and return blue).

If there are any heating elements above heater level, it is advisable to install a check valve on the supply pipe to prevent “natural circulation” phenomena from occurring.

If the heater is to be connected to an existing system it is advisable to wash out and remove any deposits from inside the existing pipes, and install a filter at the lowest point to trap any additional impurities when it is running. This equipment is designed for use in a closed loop system.

Installation schematics are found in figures 23 to 28.

**WARNING !!!** All the schematics in figures 23 to 28 are only samples!. Safety apparatus, pipe diameters, and auxiliary accessories, must be verified by a qualified personnel only and in accordance with the national and/or local codes.

### 3.3.1 Installation of two heaters

Installing two heaters in parallel. Follow the schema in the figure 23

### 3.3.2 Installation of three or more heaters

Installing three or more heaters in parallel. Follow the schema in the figure 24

### 3.3.3 Radiant heating installation

When the heater is used in conjunction with radiant heating, it is imperative that the tubing contains an oxygen diffusion barrier. If you are unsure whether or not the tubing has a barrier, a heat exchanger must be used to protect the heater from oxygen corrosion (See figure 25). This situation will also occur if the heater is used on an open-loop system where new, cold-fill water is introduced into the system. The oxygen will remove itself from solution and react chemically with the ferrous components (i.e. steel), causing them to rust and corrode. **THIS TYPE OF FAILURE IS NOT COVERED BY THE WARRANTY!**

### 3.3.4 Used of glycol

If glycol is used with the heater, the glycol must be recognized as safe or approved by the United States Food and Drug Administration for food contact as listed in Code of Federal Regulations, title 21, part 182 of the Food Additive Regulations. Any additives introduced into the heating system **must** be recognized as safe by the United States Food and Drug Administration. **If a non-approved additive is used, it can cause serious health problems or possibly death.** The pressure of the heating system side of the heater must be fitted with devices (automatic water feed/pressure reducing valve not to exceed 30 psi) arranged to function automatically in order to maintain the pressure of the heating side at a level below that of the potable water leaving the heat exchanger.

### 3.4 Domestic Hot and Cold water

The domestic hot water flow restrictor must be installed on the cold water inlet, (Refer to figure 25, 26, 27 and 28).

For servicing purposes, install a shut-off valve upstream from the cold water inlet.

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The heater's thermostat can be regulated to provide domestic hot water between **100°F** and **180°F**. Water temperature over **125°F** can cause severe burns instantly. Since it is required that the heater water temperature reach above **140°F** in order for the heating system side of the unit to operate, **it is imperative that a mixing valve be installed external of the heater to further regulate the temperature of the domestic hot water (See figures 23, 25, 26, 27 and 28). Failure to install a domestic side mixing valve will result in severe burns!**

Piping and components connected to the water heater for space heating shall be suitable for use with potable water, and shall not be connected to any heating system or components previously used with a non-potable water heating appliance.

The domestic hot water circuit needs an **ASME** approved temperature and pressure P-T relief valve, set at **150 psi** and **210°F**, installed as close as possible to the heater. **There must be no valves between the P-T relief valve and the heater. The P-T relief valve discharge pipe must not be restricted or plugged.**

### 3.5 Water Hardness

In hard water areas (above **150 p.p.m**), it is recommended that a suitable water treatment device (softener with filters) be installed. Excessive buildup of minerals in the heat exchanger can cause a non-warranty failure. Water hardness can be determined by using the standard test or by checking with your local water authority.

Toxic chemicals, such as used for heater treatment, should not be introduced into the potable water used for space heating.

### 3.6 Gas Supply

Before making any gas connections, verify that the heater is being supplied with same gas type as indicated on the rating plate. The rating plate is located on the front of the BMS, and is located on the front door of the BTS.

This heater has orifices which will operate at an altitude of up to **2,000** feet. For installations in higher elevations, down-rate the heater by **10%**.

Install a manual gas cock outside of the heater. Refer to Figures 1 and 3, item 3, for the gas inlet location of the heater.

Gas piping to the heater must be sufficient to guarantee a supply of gas to meet maximum requirements. See Table 1 for max. and min. values of gas pressure (Back of manual).

**All piping must comply with local codes and ordinances or with the National Fuel Gas Code, (ANSI Z223.1 NFPA No. 54), whichever applies.**

**The appliance and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of ½ psig, (3.5 kPa).**

**The appliance must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than ½ psig, (3.5 kPa).**

# A INSTALLATION INSTRUCTIONS

## 3.6 Gas Supply (cont.)

| Length of Gas Pipe  | Capacity of Gas Pipe Size in MBTUH |      |      |        |
|---|------------------------------------|------|------|--------|
|   | 1/2"                               | 3/4" | 1"   | 1 1/4" |
| 10'   | 132                                | 278  | 520  | 1050   |
| 20'   | 92                                 | 190  | 350  | 730    |
| 30'   | 73                                 | 152  | 285  | 590    |
| 40'   | 63                                 | 130  | 245  | 500    |
| 50'   |                                    | 115  | 215  | 440    |
| 75'   |                                    | 93   | 175  | 360    |
| 100'  |                                    | 79   | 150  | 305    |
| 150'  |                                    | 64   | 120  | 250    |
| <b>Additional length<br/>to be added for<br/>each bend or tee</b> | 1.3'                               | 1.7' | 2.2' | 2.7'   |

## 3.7 Room Thermostat Connection

This is installed by removing the electrical junction box cover indicated in fig.6, (see fig.1 and 3, item 26), and connecting the two wires of the room thermostat, or zone valve control thermostat, to the low voltage terminals, (figure 6, item B). **NOTE: first remove factory installed jumper from terminals.** The room thermostat must always be located in a point of the house where the temperature is not subject to sudden changes.

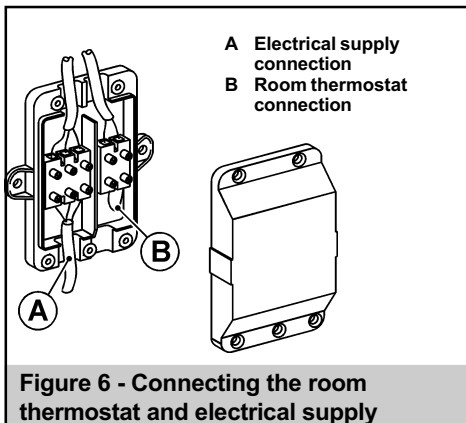


Figure 6 - Connecting the room thermostat and electrical supply

## 3.8 Electrical Supply Connection

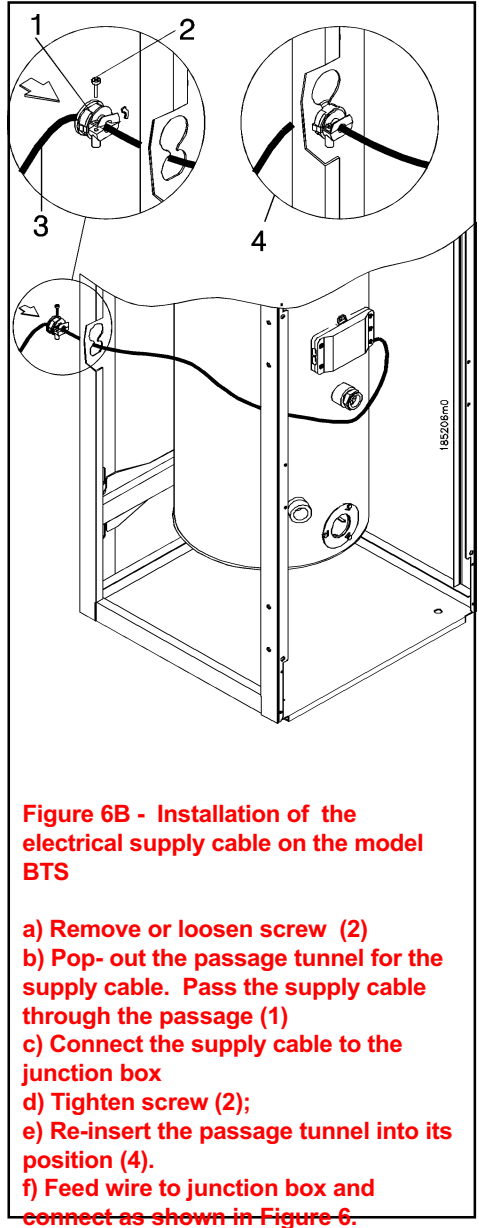
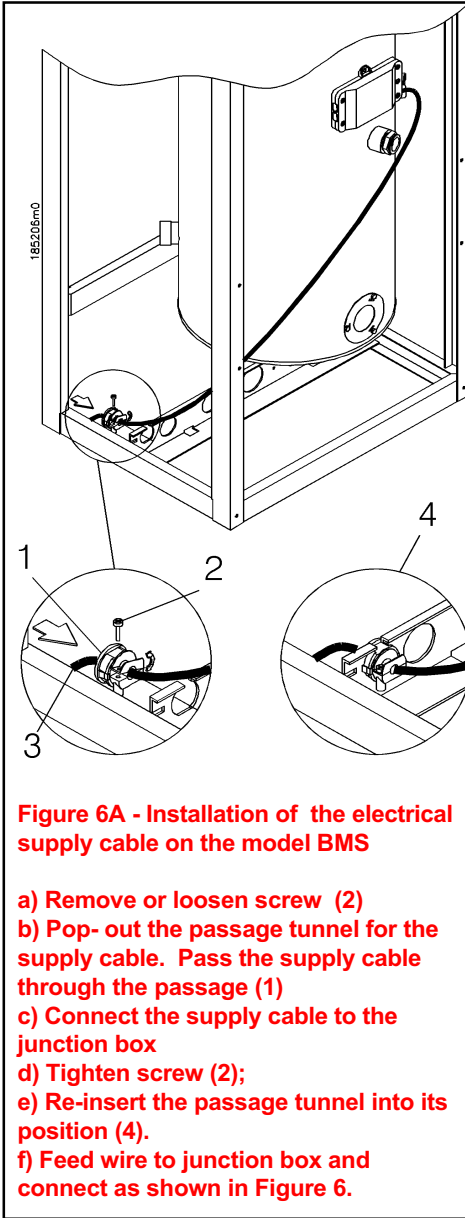
The heater must be connected to a **115V 60Hz, single phase electrical** supply fused to **15 amps**,

**Grounding is required as well as the installation of a main emergency switch immediately upstream from the heater.**

**An electrical junction box (see figures 1 and 3, item 26) is provided for connections for both the line voltage of 115V 60 Hz (See figure 6 item A), and the room thermostat at low voltage of 24Vac (See figure 6 item B).**

**The cable wire of the line voltage must be inserted into the heater, through the pass-cable positioned in the side of the idraulic connections (see figure 7 and 8).**

# A INSTALLATION INSTRUCTIONS



# A INSTALLATION INSTRUCTIONS

## 4 VENTING SYSTEMS

This heater can be fitted with either a concentric or split type venting system. Particular attention must be taken when installing the vent pipes that go through the wall to the outside. It must always be possible to carry out routine maintenance operations of the flue. The vent pipe must be installed in such a way that it can be removed, if needed, in the future. Hence, a suitable sheath should be prepared in which to insert the vent pipe. Both venting systems are suitable for venting through a wall 1" to 24" thick.

The connection of the vent air intake system to the heater can turn 360°, which means in all directions, making installation extremely easy. To turn it just loosen the securing screws on the base of the vent elbow where it attaches to the heater, turn to desired position, then tighten the screws without forcing them.

You must place the terminal in an open area, and follow the following guidelines:

- Make certain that exhaust gas does not re-circulate back into the intake pipe.
- Never vent into a walkway or patio area, or an alley, or otherwise public area less than 7ft from the ground level. This is to prevent anyone from walking into the vent;
- Never vent over or under a window or over a doorway;
- Never install a heat saver or similar product to capture waste heat from exhaust;
- Always have vent 1ft above ground level, away from shrubs and bushes.
- Follow local gas codes in your region or refer to **National Fuel Gas Code, or Can B149.1 INSTALLATION CODES.**
- Always have vent at least 3ft from an inside corner of outside walls.
- Maintain at least 4ft clearance to electric, gas meters and exhaust fans.
- Always place screens in all openings in intake and exhaust to prevent foreign matter from entering the heater.
- The vent terminals, (concentric, split type exhaust), must be a minimum of 1ft above the ground level.
- If split type vent will be venting into a chimney, make certain that no other appliances are vented into it. This power-

vented heater must not share a chimney. Vent exhaust terminal should be inserted into, but not beyond, inner wall of chimney. Do not vent into transient pipe. Warranty will be void.

**CAUTION!** - Take all precautionary measures to allow the angle of the flue to run down slightly to the outside, NEVER rising. Anticipate for all horizontal pipes, an inclination of **1/4" per foot** toward the discharge. If a vertical pipe follows a horizontal one, place a condensation discharge fitting in the lowest part of the vertical pipe. A condensation discharge pipefitting must also be used for vertical discharge pipe installations directly from the heater with a pipe whose length is more than 10".

During normal operating conditions, the heater will have exhaust gases exiting from the flue pipe. The smoke will be heavier on some days than on others. This is due to the outdoor weather conditions (the temperature, humidity, etc.), and is extremely common.

### 4.1 Concentric Flue (Coaxial)

The (Coaxial) concentric vent, (air inlet and flue outlet), system consists of 2 pipes: the outer one for fresh air intake, the inner pipe for flue exhaust discharge.

With optional pipe, it is possible to increase the overall length up to 15ft (4.5 m).

There are also 90° concentric elbows available, if they are installed, there will be a loss of draught equal to that caused by 3ft, (1 m), of straight pipe.

Connections between the various parts must be secured by using self-tapping screws, (see fig.9). The vents stainless steel end terminal must always come completely out of the outer pipe. If for any reason the intake grid is



# A INSTALLATION INSTRUCTIONS

blocked, the heater will not receive enough air for combustion and the burner would fail to ignite.

## ATTENTION !!!

We want to remember that all accessories in the line of the air intake and in the line of flue discharge **MUST** be secured with screws between them, and **MUST** be sealed from flue or air leakage

## PRECAUTION TO BE TAKEN WHEN INSTALLING COAXIAL VENTING

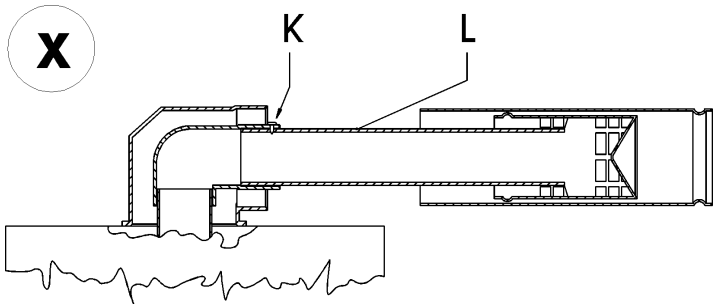
Proper assembly and installation of venting elbows and tubing must include the use of self-tapping screws to permanently secure in place the internal discharge tube. Self-tapping

screws are used to insure that the discharge vent tube remains in place and not allow discharge gases to re-enter the heater. Failure to secure the internal discharge tube may result in the heater backfiring and causing permanent damage to the heat exchanger. Heaters which have been damaged for this reason are not covered in our limited warranty.

The stainless steel (End terminal) wind guard must fit properly and inter-lock into slip joint of intake pipe.

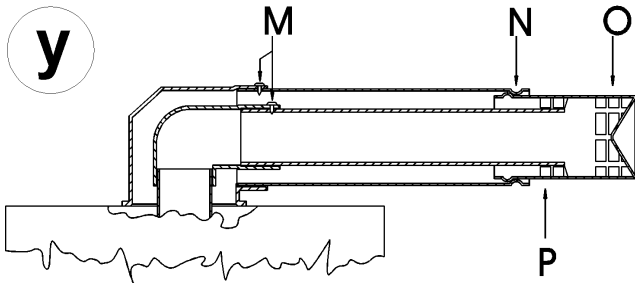
It is imperative that the internal discharge pipe first be secured in place with self-tapping screws before attaching and securing the external vent pipe. Also, ensure that the two grids of the end terminal come completely out of the outer pipe. If the intake grid is hidden the heater will not receive enough air for combustion and would fail to ignite.

Picture # X: First, insert the vent inner pipe into the vent elbow and tighten using self-tapping screws



Picture # Y: Second, fit the outer pipe and secure it with proper screws  
See drawings below.

K = Screws provided  
L = Inner pipe  
M = Screws provided



ATTENTION

# A INSTALLATION INSTRUCTIONS

N = This position shall be respected

O = Discharge grid

P = Intake grid

## 4.2 Split Flue

The split flue vent system (two separate pipes) can be extended (on the discharge side only) up to a total length of 20 ft (6 m). Changes in direction can be obtained by using **90°** and **45°** elbows. If they are installed, there will be a loss of draught equal to **3ft** (1 m) and **1 1/2ft** (0.5 m) of straight pipe, respectively. This is valid only for pipes and elbows manufactured by Cosmogas s.r.l..

If the heater is installed in a large open area such as a full basement or alcove, the combustion air could also be supplied without the intake pipe, (For model BMS see figures **8**, **11**, **12**, **13** and **14** or for model BTS see figures 16, 18, 19 and 20 for model BTS). **NOTE:** The heater will draw all air for combustion through the top of the unit from the space around the heater. Ventilation should be adequate to provide sufficient air to properly support combustion. Air for combustion and room ventilation must be obtained from spaces freely communicating with the outdoors. Air openings to the room should not be obstructed.

For heaters in confined rooms, two permanent openings must be provided - one within 12" of the ceiling and one within 12" of the floor. Each opening must be at least one square inch per 1,000 BTU/H heater input, but not less than 100 square inches. These openings must freely connect with areas having adequate infiltration to the outside.

When all air provided is supplied from the outdoors, the openings, as described above, shall be of the size listed below for each particular arrangement:

- All ducting shall be the same size as the opening which it is to be connected.
- One square inch of free area per 4,000 BTU/H of heater input for direct outdoor air supply through an outside wall or vertical duct directly outside.
- One square inch of free area for every 2,000 BTU/H of heater input for direct outdoor air

through horizontal ducting.

### Caution!

**The discharge pipe temperature is above 250°F while functioning, therefore it is essential that a thermal insulation protection sheath be used in the wall opening.**

## 4.3 Chimney Venting

If split type vent will be venting into a chimney, make certain that no other appliances are vented into it. This power-vented heater must not share a chimney. Vent exhaust terminal should be inserted into, but not beyond, inner wall of chimney.

**Do not vent into transient pipe. Warranty will be void.**

## 4.5 Venting Locations - Outside Walls (Direct Venting)

The center line of the vent opening must be at least 16 1/2" above grade, outside, and at least 12" from any other building openings (doors, windows, etc.).

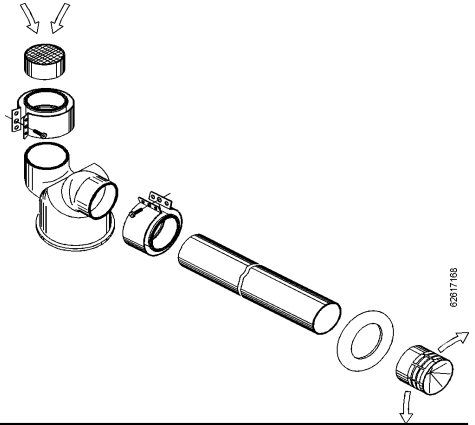
Make sure that vent pipe is pitched down from the unit toward the outside wall 1/4" per foot. This will prevent any water from running back into the heater.

**4.6 Kit for air intake/flue discharge**  
Do not direct the terminal where flue discharge should strike against building materials and cause corrosion.

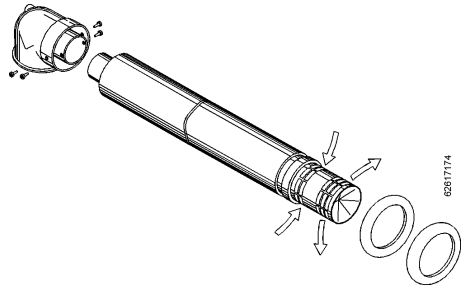
For comfort for the installer, COSMOGAS has created some flue kit, complete of all the necessary components for flue discharge and air intake. The four kits available are as follows:

# A INSTALLATION INSTRUCTIONS

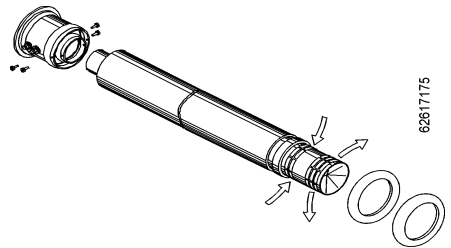
**P/N 62617168. Split vent kit.** This kit is for take the air from the room where the heater is installed, and discharge the flue outside from the building. The pipe of discharge is length 2.5ft.. If you need extensions or elbows or other accessories, refer to figures R, S and T. This kit can be used for heaters model BMS and BTS.



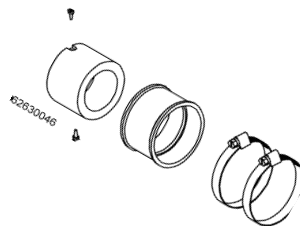
**P/N 62617174. Coaxial Vent & Elbow Kit.** This kit is for taking and discharging air from/ to the outside of the building. The pipe of discharge length is 3ft. If you need extensions, elbows or other accessories, refer to figures O, P and Q. This kit can be used for heaters model BM and BTS. To discharge the flue in vertical position you must use a roof vent terminal 62617070, (see figure P)



**P/N 62617175. Coaxial Vent & Straight Adapter Kit.** This kit is for taking and discharging air from/to the outside of the building. The pipe of discharge length is 3ft. If you need extensions, elbows or other accessories, refer to figures O, P and Q. This kit can be used for heaters model BM and BTS. To discharge the flue in vertical position you must use a roof vent terminal 62617070, (see figure P)



**P/N 62630046. Vent Adaptor for 3" Discharge pipe.** This kit is for to connect only the flue discharge to a commercial 3" pipe. This kit must be used together with a heater mounted adapter P/N 62617124 or 62617060. With this configuration, the installer is responsible for the materials used and for the installation. In any case follow the national or local codes..



# A INSTALLATION INSTRUCTIONS

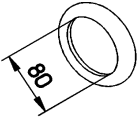
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Besides the kits COSMOGAS has a series of accessories, that in conjunction with the kits, give the installer the possibility of many configuration of flue discharge and/or air intake. See examples to the figures O, P, Q, R, S, T, U and V. Please remember that these configurations are only examples, and that many other possibilities exist.

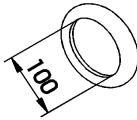
| Reference | P/N           | Description                                    |
|-----------|---------------|--|
| 1         | 60702011      | Washer for split                               |
| 2         | 60702012      | Washer for coaxial                             |
| 3         | 61302011      | Split system Roof terminal D. 80               |
| 4         | 62617010      | Plug for flue test                             |
| 5         | 62617049      | 3ft coaxial Extension                          |
| 6         | 62617053      | Split system Roof terminal D. 80               |
| 7         | 62617056      | Split system In-Line Elbow FF 90°              |
| 8         | 62617058      | Split system In-Line Elbow MF 90°              |
| 9         | 62617060      | Coaxial elbow (Heater Mounted Only)            |
| 10        | 62617062      | Split system "Viking"                          |
| 11        | 62617063      | Silicone Coupling + clamp                      |
| 12        | 62617070      | Coaxial Roof Terminal                          |
| 13        | 62617077      | In-Line Elbow 90° M/F (Coaxial)                |
| 14        | 62617086      | 3ft Extension for split system                 |
| 15        | 62617087      | Coaxial 3 ft vent, (End-Terminal only)         |
| 16        | 62617124      | Straight coaxial Adapter (Heater mounted only) |
| 17        | 62617159      | In-Line Elbow 45° M/F (Coaxial)                |
| 18        | 62617168      | Split vent kit                                 |
| 19        | 62617172      | Coaxial 60/100 condensing trap                 |
| 20        | 62617173      | Split-vent D.80 condensing trap                |
| 21        | 62617174      | Coaxial Vent & Elbow Kit                       |
| 22        | 62617175      | Coaxial Vent & Straight Adapter Kit            |
| 23        | 62630046      | Vent Adaptor for 3" Discharge pipe             |
| 24        | 61302003      | Intake grid D.80                               |
| 25        | 61302004      | Terminal vent D.80                             |
| 26        | 62617059      | In-Line elbow 45° M/F (for split)              |
| A         | not available | Flat for roof                                  |
| B         | not available | Condensate discharge                           |
| C         | not available | Terminal vent for roof (3" diameter)           |
| D         | not available | Extension (3" diameter)                        |
| E         | not available | Tee raccord (3" diameter)                      |
| F         | not available | Condensate discharge with siphon (3" diameter) |
| G         | not available | In-Line Elbow 90° (3" diameter)                |

In the following pictures, the P/N 62617062 is repeated 4 times to show all of the possibilities that has this accessory has. It can be rotated 360° under the heater, and its elbows can also be rotated 360° to direct air intake and flue discharge in all orientations.

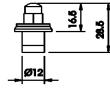
# A INSTALLATION INSTRUCTIONS



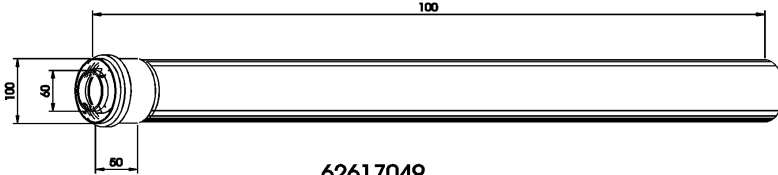
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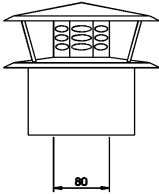
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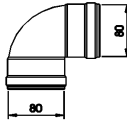
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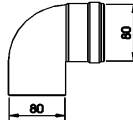
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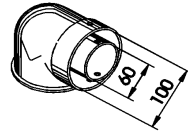
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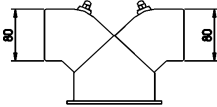
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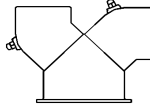
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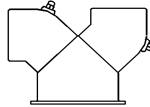
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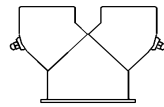
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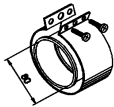
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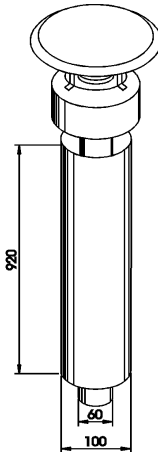
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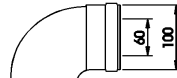
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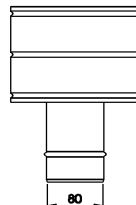
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62617070

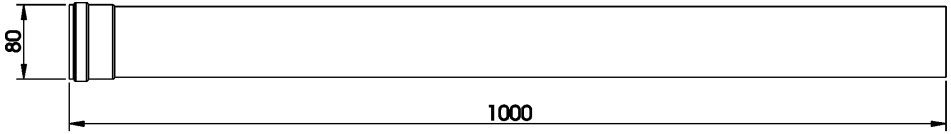


62617077

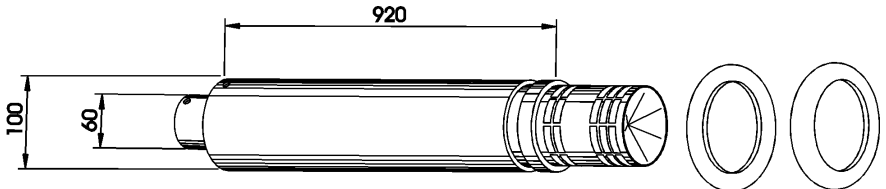


61302011

# A INSTALLATION INSTRUCTIONS

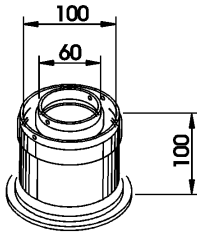


62617086

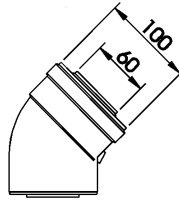


62617087

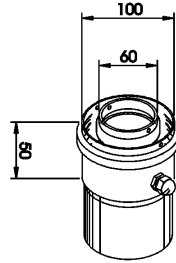
22



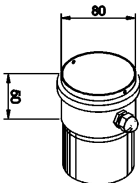
62617124



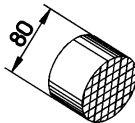
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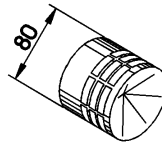
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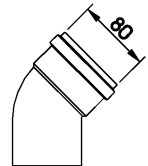
62617173



61302003



61302004

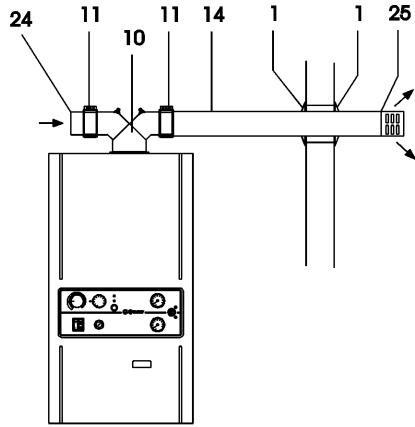


6267059

# A INSTALLATION INSTRUCTIONS

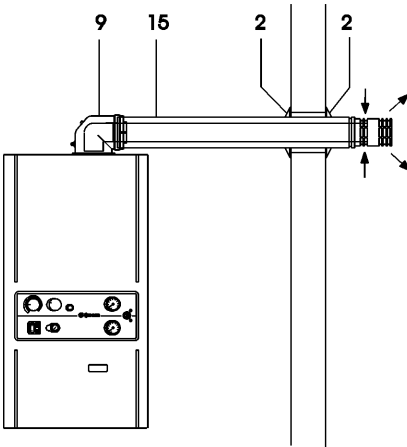
Some examples of vent make with the kits predisposed by COSMOGAS P/N 62617168, P/N 62617174 e P/N 62617175.

## Figure L



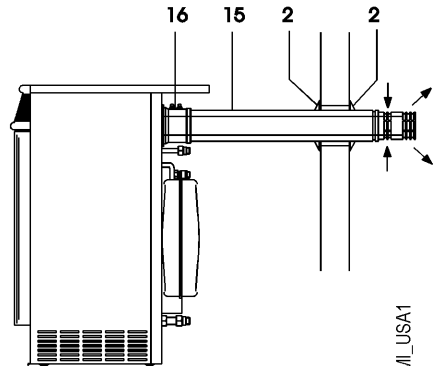
62617168

## Figure M



62617174

## Figure N



62617175

# A INSTALLATION INSTRUCTIONS

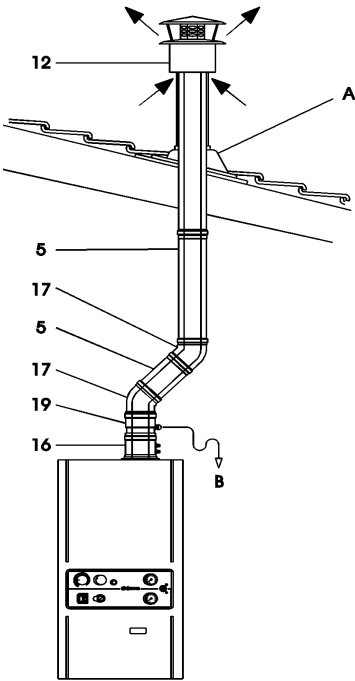


Figure O

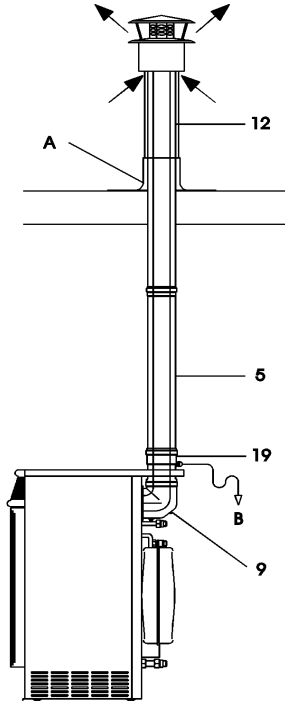


Figure P

SCA\_FUMI\_USA2.

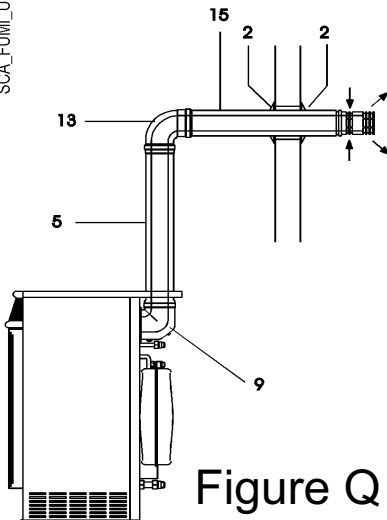


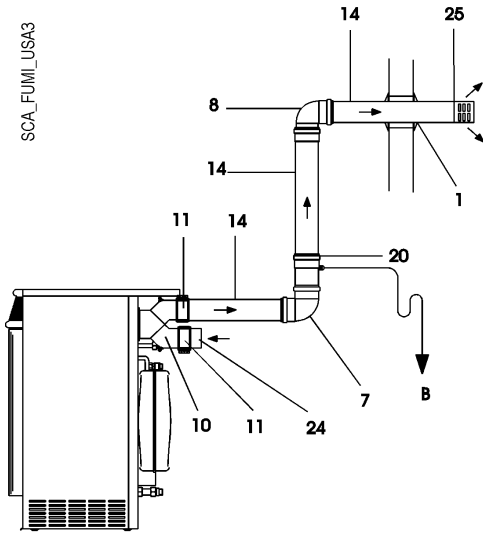
Figure Q

Some examples of vent make with some accessories (Figure O and P) or with the combination of a kit P/N 62617174 and some accessories #13 and #5 (Figure Q).



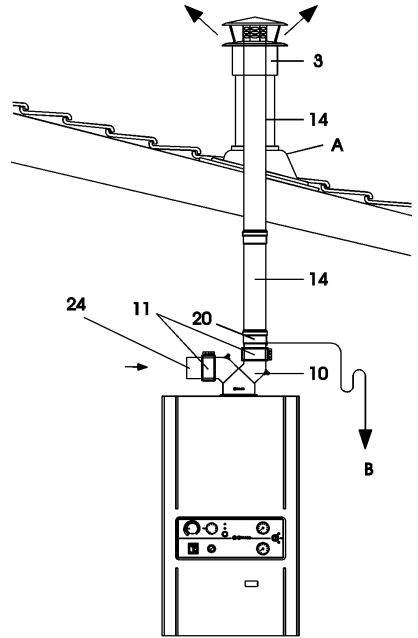
# A INSTALLATION INSTRUCTIONS

## Figure R

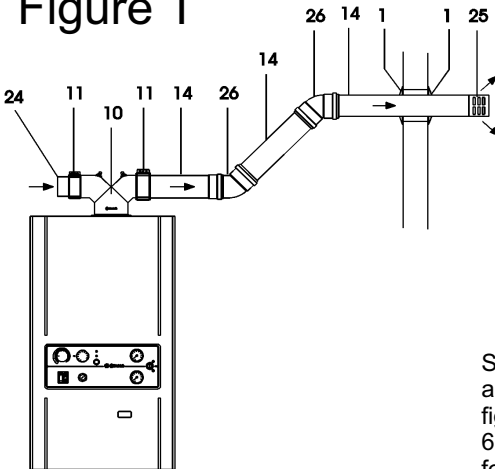


SCA\_FUMI\_USA3

## Figure S



## Figure T



Some examples of vent make with some accessories for split and a kit for split. In all figures (R, S and T) we have used a kit 62617168 in combination with accessories for split system.

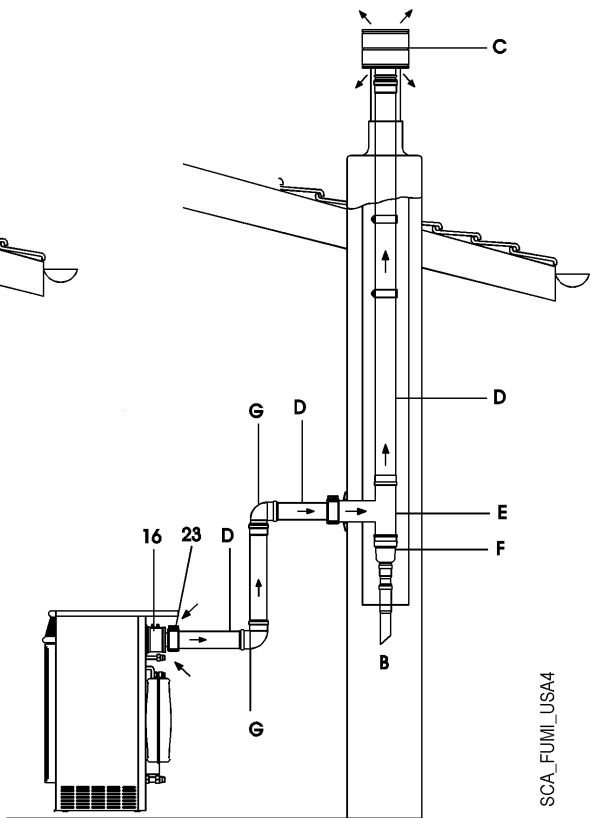
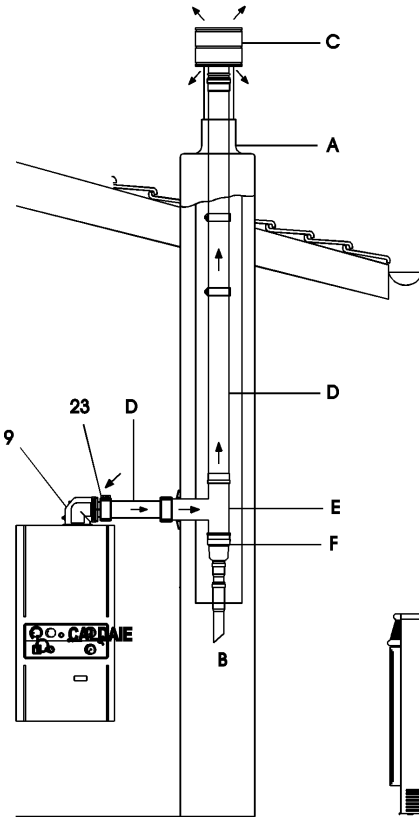
# A INSTALLATION INSTRUCTIONS

Some examples of vent make with a 3" commercial pipe. In the figure U we have a BMS heater, with elbow raccord #9, and with a kit #23 for to connect your 3" pipe. In the figure V, we have a BTS heater with with an straight raccord #16 and with a kit #23 for to connect your 3" pipe.

## Figure U

## Figure V

26



# A INSTALLATION INSTRUCTIONS

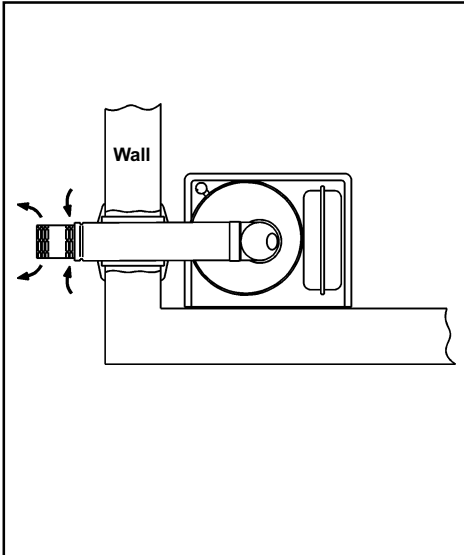


Figure 7 - Top view of BMS heater

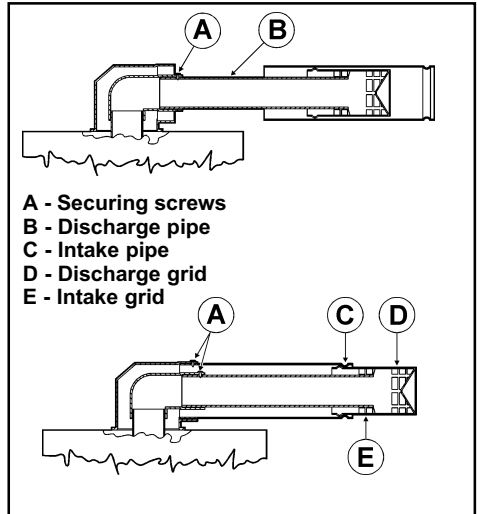


Figure 9 -Concentric flue (Coaxial) pipe position. For BMS model

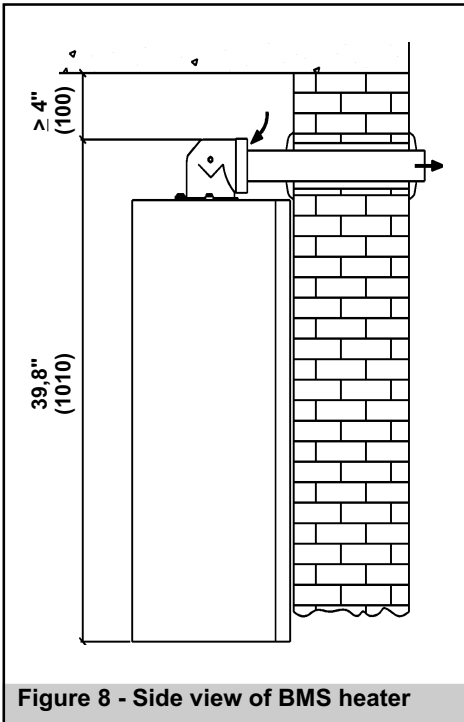
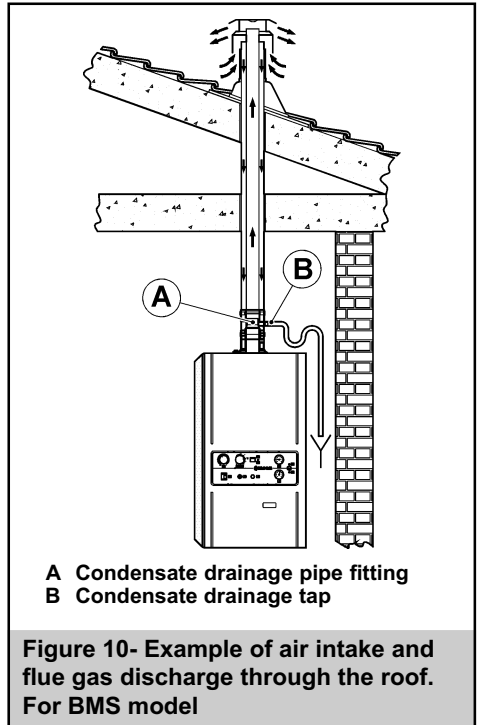


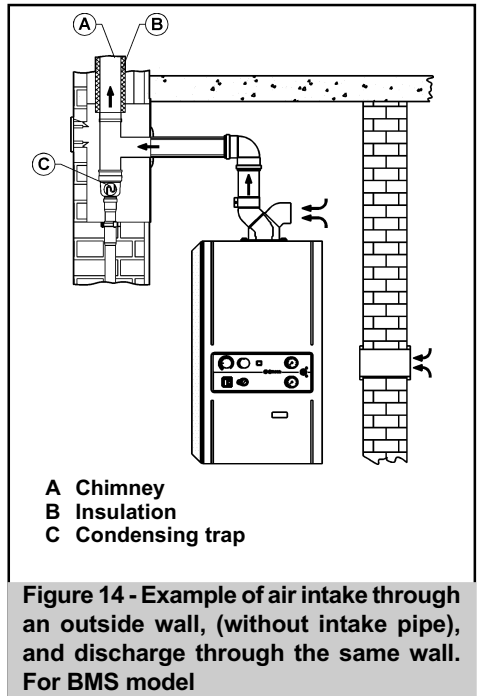
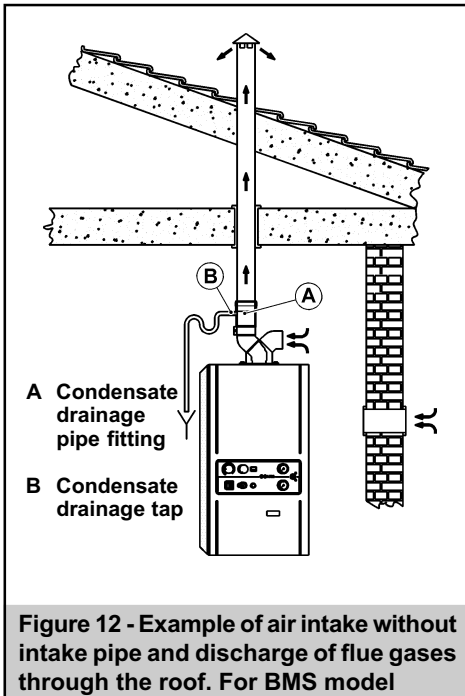
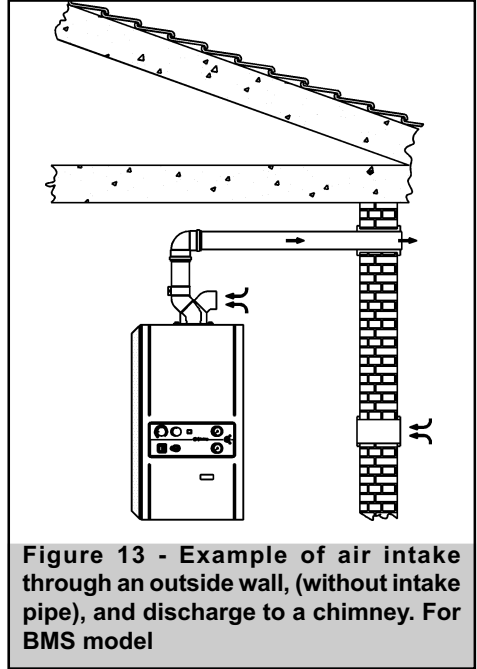
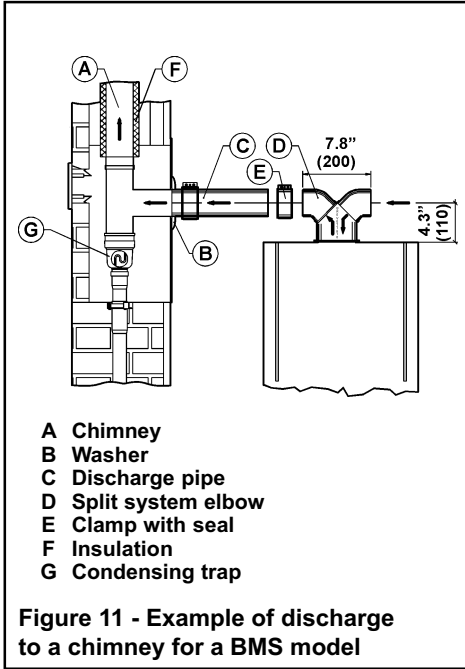
Figure 8 - Side view of BMS heater



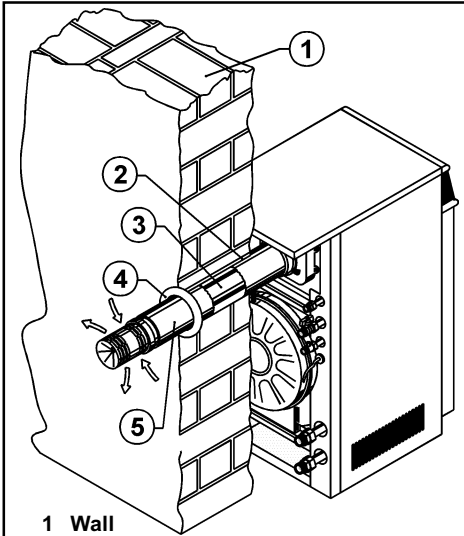
A Condensate drainage pipe fitting  
B Condensate drainage tap

Figure 10- Example of air intake and flue gas discharge through the roof. For BMS model

# A INSTALLATION INSTRUCTIONS

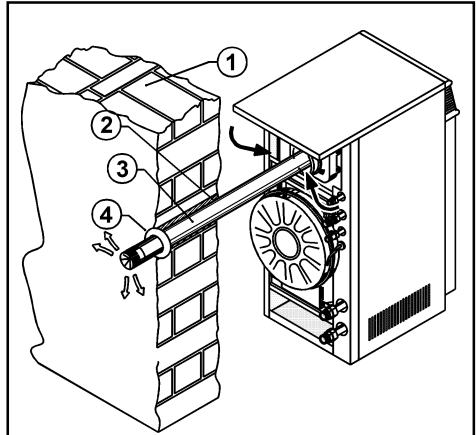


# A INSTALLATION INSTRUCTIONS



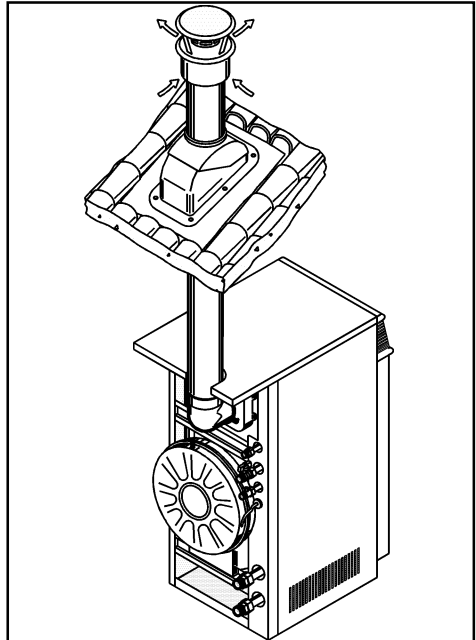
- 1 Wall
- 2 Sheat
- 3 Discharge pipe
- 4 Washer
- 5 Intake pipe

**Figure 15 - Discharge with coaxial flue for BTS model**



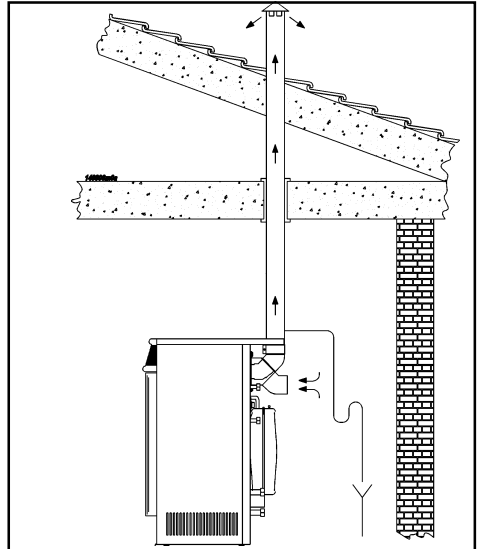
- 1 Wall
- 2 Sheat
- 3 Discharge pipe
- 4 Washer

**Figure 16 - Discharge with coaxial flue without intake pipe. For BTS model**

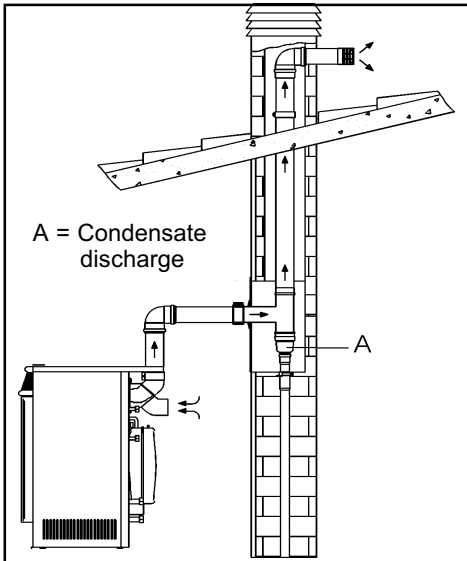


**Figure 17 - Example of air intake and flue gas discharge through the roof. For BTS model**

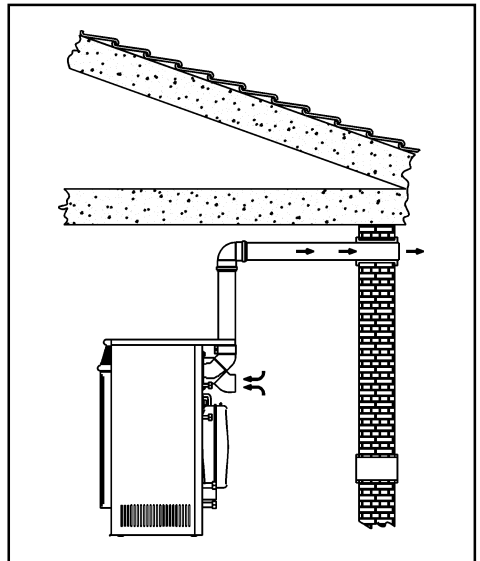
# A INSTALLATION INSTRUCTIONS



**Figure 19 - Example of air intake without intake pipe and discharge of flue gases through the roof. For model BTS.**



**Figure 18 - Example of air intake through an outside wall, (without intake pipe), and discharge to a chimney. For model BTS.**

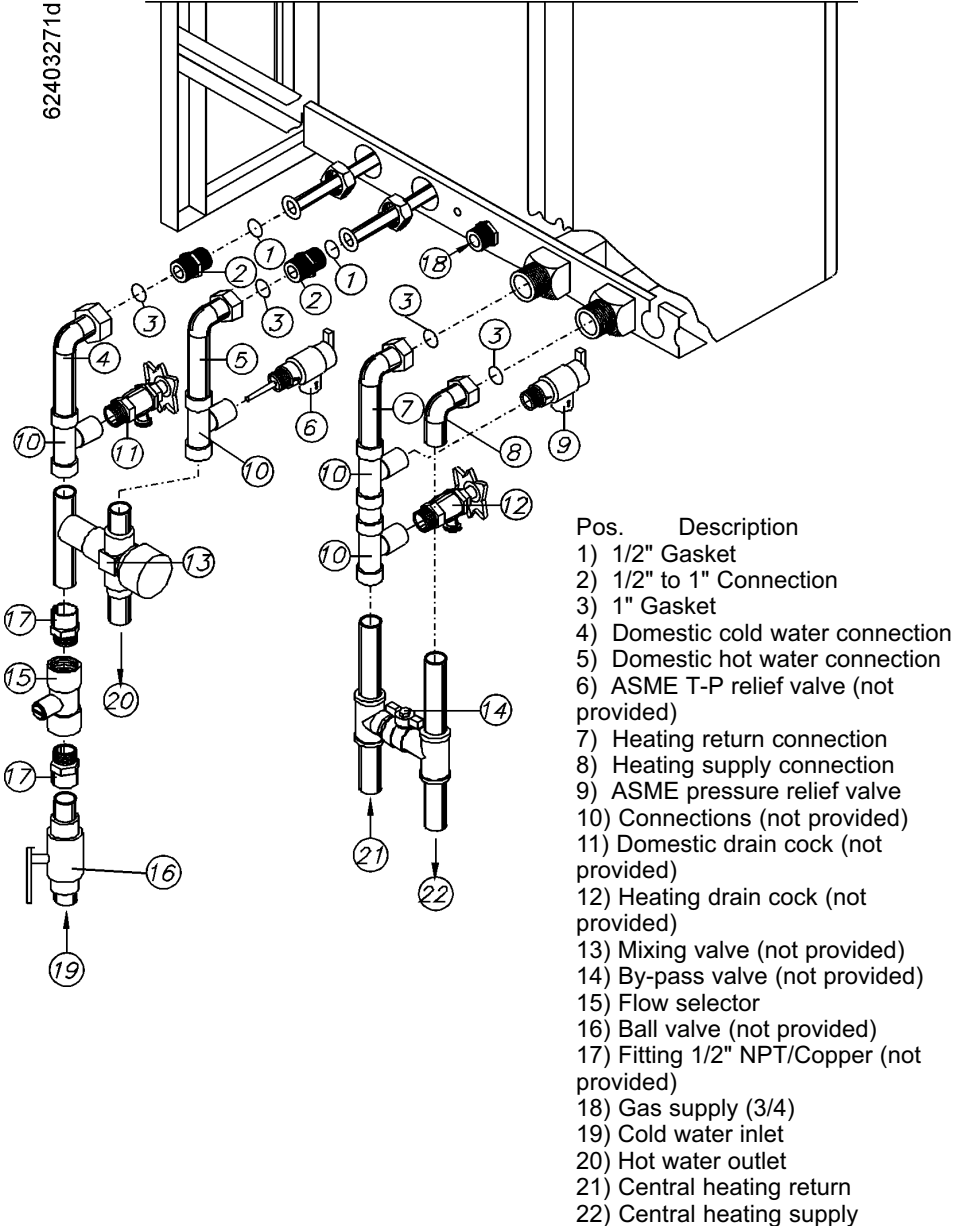


**Figure 20 - Example of air intake through an outside wall, (without intake pipe), and discharge through the same wall. For model BTS.**

# A INSTALLATION INSTRUCTIONS

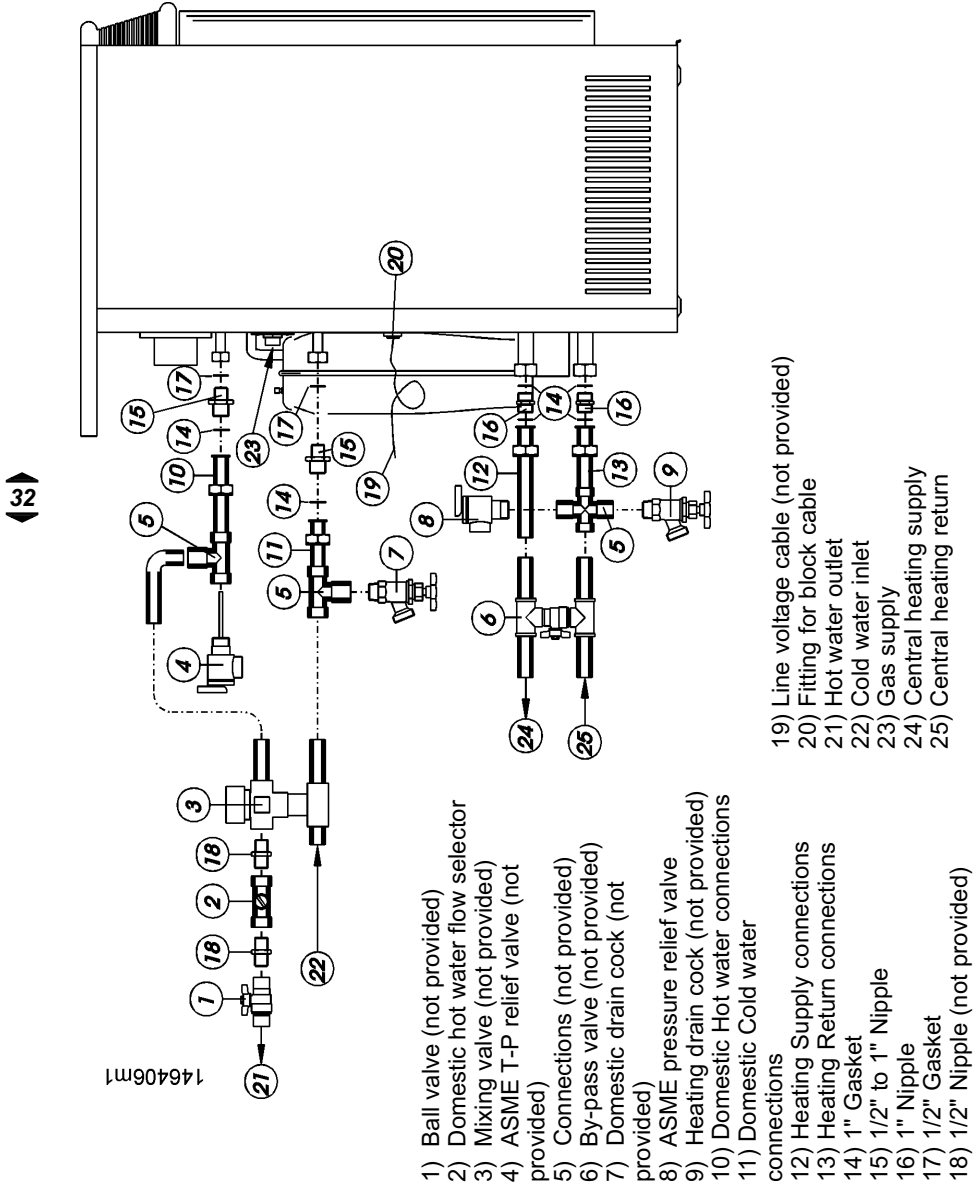
## 4.7 Water Connections for Model BMS

Each heater contains a kit of accessories to help the installer make the water connections. An example of these connections and all the accessories supplied with the heater is shown on the drawing below:



## 4.8 Water Connections for Model BTS

Each heater contains a kit of accessories to help the installer make the water connections. An example of these connections and all the accessories supplied with the heater is shown on the drawing below:





# A INSTALLATION INSTRUCTIONS

- 1 Cosmogas combi
- 2 Heating drain cock
- 3 Sanitary drain cock
- 4 Gas cock
- 5 Safety relief valve
- 6 By-pass valve- 7 Domestic relief valve
- 8 Radiator
- 9 Automatic feed
- 10 Back-flow preventer
- 11 Gas inlet
- 12 Mixing valve
- 13 Cold water inlet
- 14 Recirculating pump
- 15 Recirculating thermostat or timer
- 16 Recirculating return line
- 17 Hot water outlet
- 18 Cold water outlet

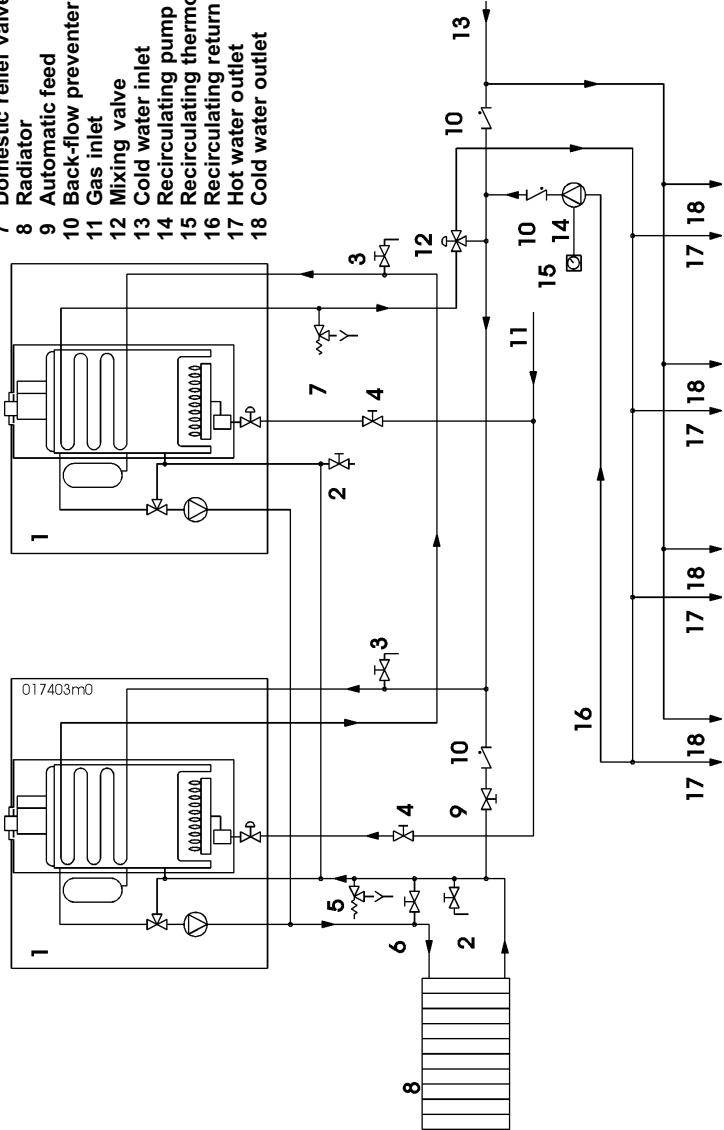
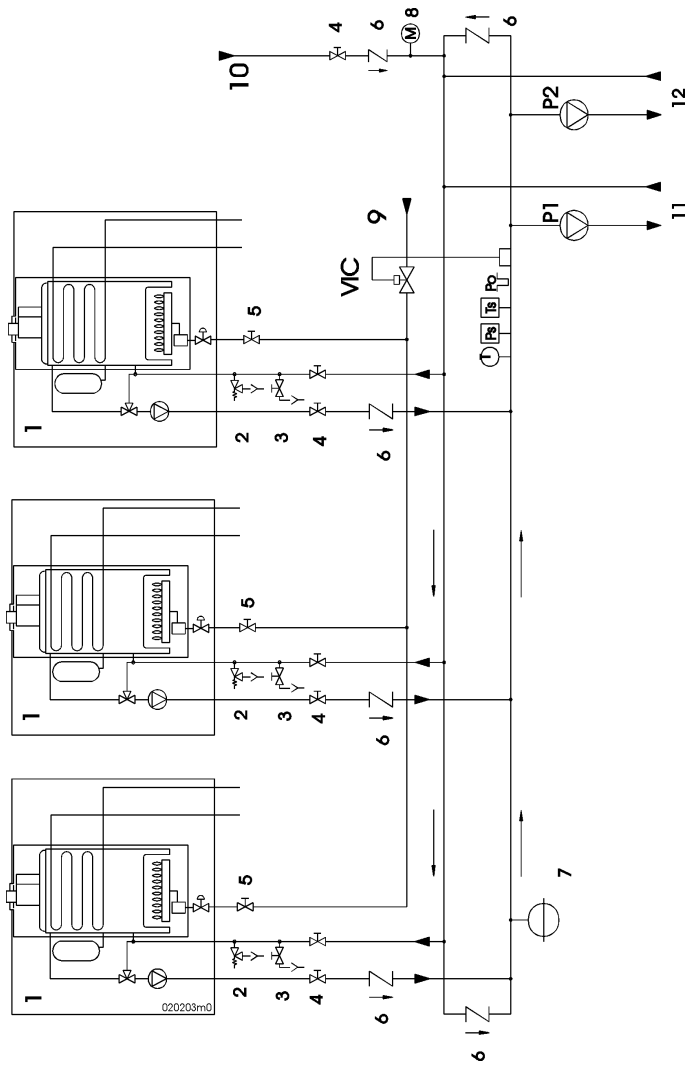


Figure 23 - Two (BMS or BTS model) heaters installation with domestic hot water recirculating system

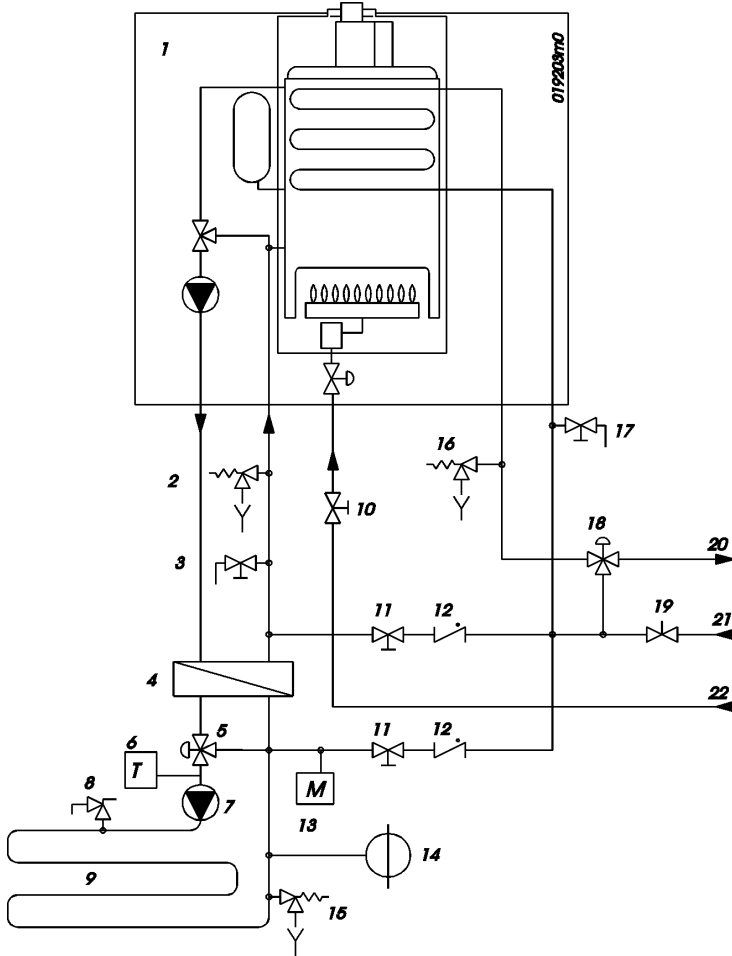
# A INSTALLATION INSTRUCTIONS



- 1 Ambassador
- 2 Safety relief valves
- 3 Heating drain cocks
- 4 Ball valves
- 5 Gas cocks
- 6 Back-flow preventer
- 7 Supplementary expansion tank
- 8 Manometer
- 9 Gas supply
- 10 Cold water inlet
- 11 Supply and return for central heating
- 12 Supply and return for eventual indirect water heater
- P1 Pump for central heating
- P2 General automatic gas valve
- VIC General automatic gas valve

Figure 24 - Three or more (BMS or BTS models) heaters installation with connection for indirect water heater

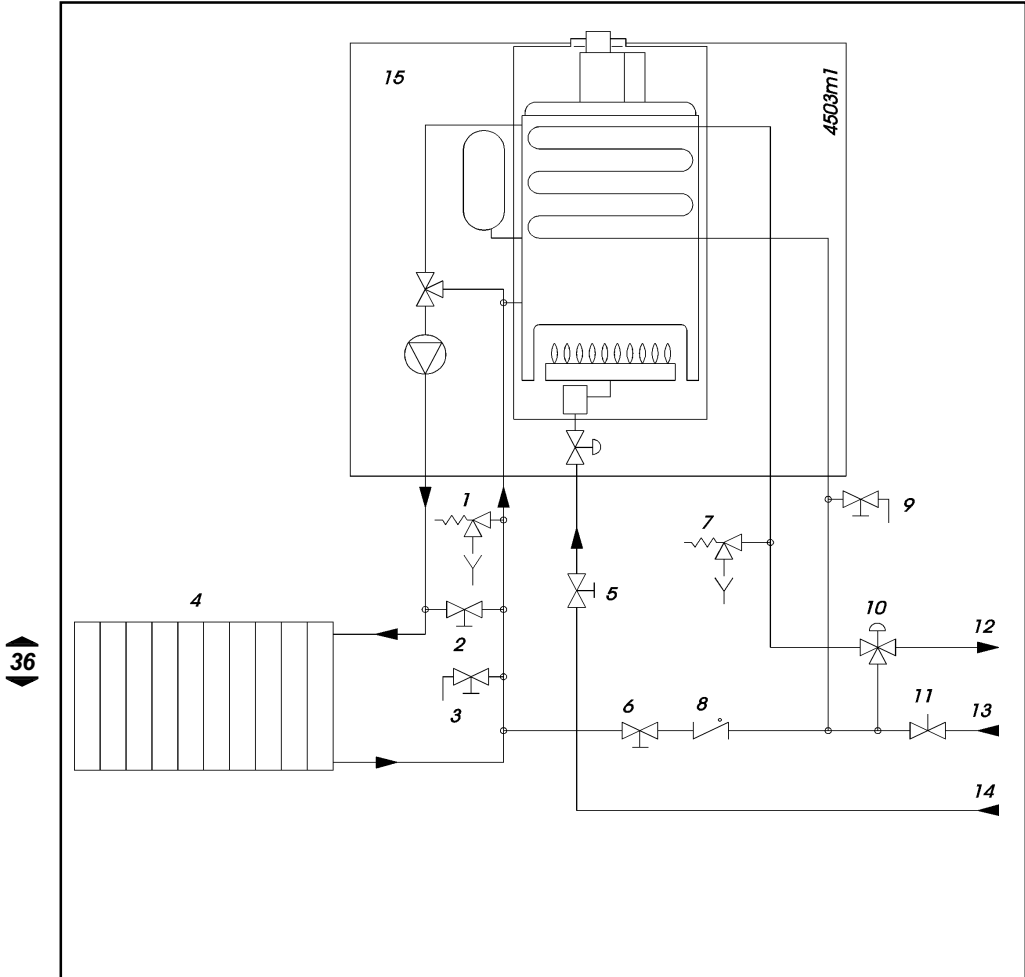
# A INSTALLATION INSTRUCTIONS



- |   |                              |
|---|------------------------------|
| 1 Ambassador                                      | 13 Pressure gauge            |
| 2 Safety relief valves                            | 14 Additional expansion tank |
| 3 Heating Drain cock                              | 15 Relief valve              |
| 4 Plate heat exchanger                            | 16 Domestic relief valve     |
| 5 Three ways valve                                | 17 Sanitari drain cock       |
| 6 Floor protection thermostat set to 104°F (40°C) | 18 Mixing valve              |
| 7 Supplementary pump                              | 19 Flow restrictor           |
| 8 Air vent  | 20 Hot water outlet          |
| 9 Radiant heating                                 | 21 Cold water inlet          |
| 10 Gas cock                                       | 22 Gas inlet                 |
| 11 Automatic feed                                 |                              |
| 12 Back flow preventer                            |                              |

Figure 25 - Example of (BMS or BTS model) heater installation for radiant heating

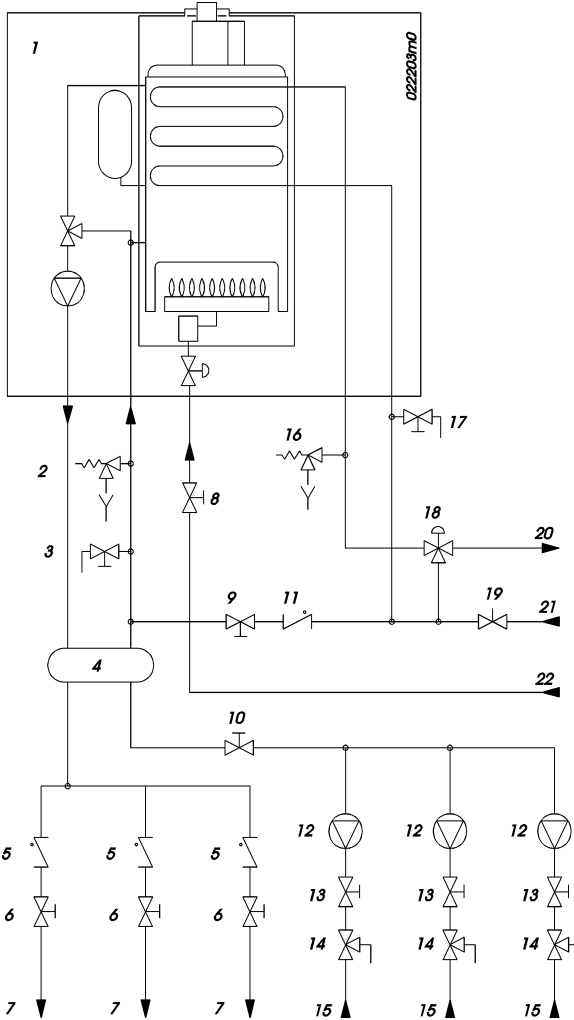
# A INSTALLATION INSTRUCTIONS



- |                         |                       |
|-------------------------|-----------------------|
| 1 Safety relief valve   | 8 Back-flow preventer |
| 2 By-pass valve         | 9 Sanitary drain cock |
| 3 Heating drain cock    | 10 Mixing valve       |
| 4 Radiators             | 11 Flow restrictor    |
| 5 Gas cock              | 12 Hot water outlet   |
| 6 Automatic feed        | 13 Cold water inlet   |
| 7 Domestic relief valve | 14 Gas supply         |

Figure 26 - Example of (BMS or BTS model) heater installation for radiators

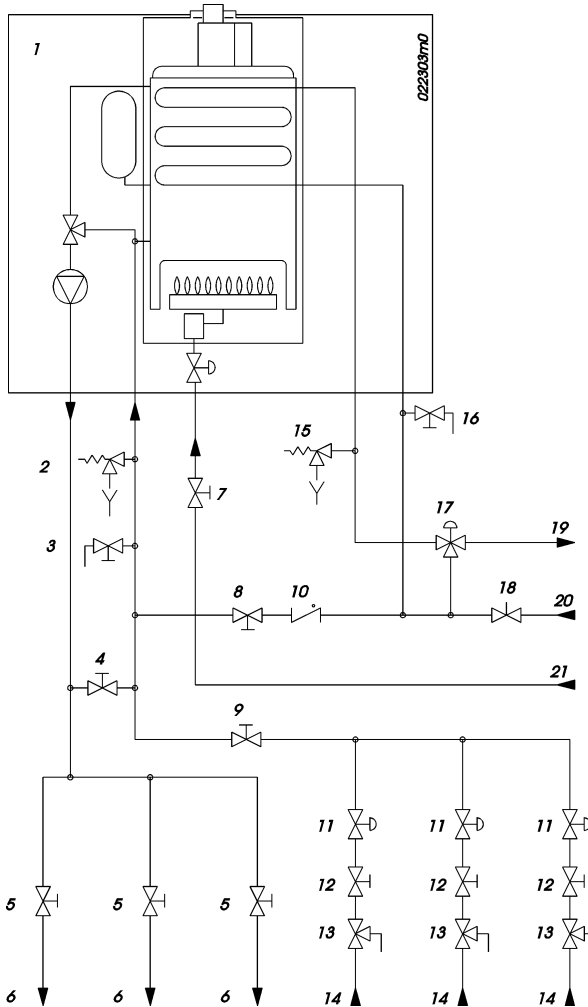
# A INSTALLATION INSTRUCTIONS



- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>1 Ambassador</li> <li>2 Safety relief valve</li> <li>3 Heating drain cock</li> <li>4 Pressure disconnector</li> <li>5 Flow checks</li> <li>6 Optional ball valve to isolate heater</li> <li>7 Supply piping to zones</li> <li>8 Gas cock</li> <li>9 Automatic feed</li> <li>10 Optional ball valve</li> <li>11 Back-flow preventer</li> </ul> | <ul style="list-style-type: none"> <li>12 Added system pump</li> <li>13 Optional ball valve</li> <li>14 Tees with drains to bleed zones</li> <li>15 Return piping from zones</li> <li>16 Domestic relief valve</li> <li>17 Sanitary drain cock</li> <li>18 Mixing valve</li> <li>19 Flow restrictor</li> <li>20 Hot water outlet</li> <li>21 Cold water inlet</li> <li>22 Gas inlet</li> </ul> |
|--|--|

**Figure 27 - Zoning with pumps - Multizone hydronic piping. For BMS or BTS model**

# A INSTALLATION INSTRUCTIONS



- 1 Ambassador
- 2 Safety relief valve
- 3 Heating drain cock
- 4 By-pass valve
- 5 Optional ball valve to isolate heater
- 6 Supply piping to zones
- 7 Gas cock
- 8 Automatic feed
- 9 Ball valve
- 10 Back-flow preventer

- 11 Zone valves
- 12 Optional ball valve
- 13 Tees with drains to bleed zones
- 14 Return piping from zones
- 15 Domestic relief valve
- 16 Sanitary drain cock
- 17 Mixing valve
- 18 Flow restrictor
- 19 Hot water outlet
- 20 Cold water inlet
- 21 Gas inlet

Figure 28 - Zoning with zone valves - Multizone hydronic piping. For BMS or BTS model.



# A INSTALLATION INSTRUCTIONS

## 7 WIRING DIAGRAMS

If any of the original wire as supplied with the appliance must be replaced, it must be replaced with **18 AWG** wire or its equivalent.

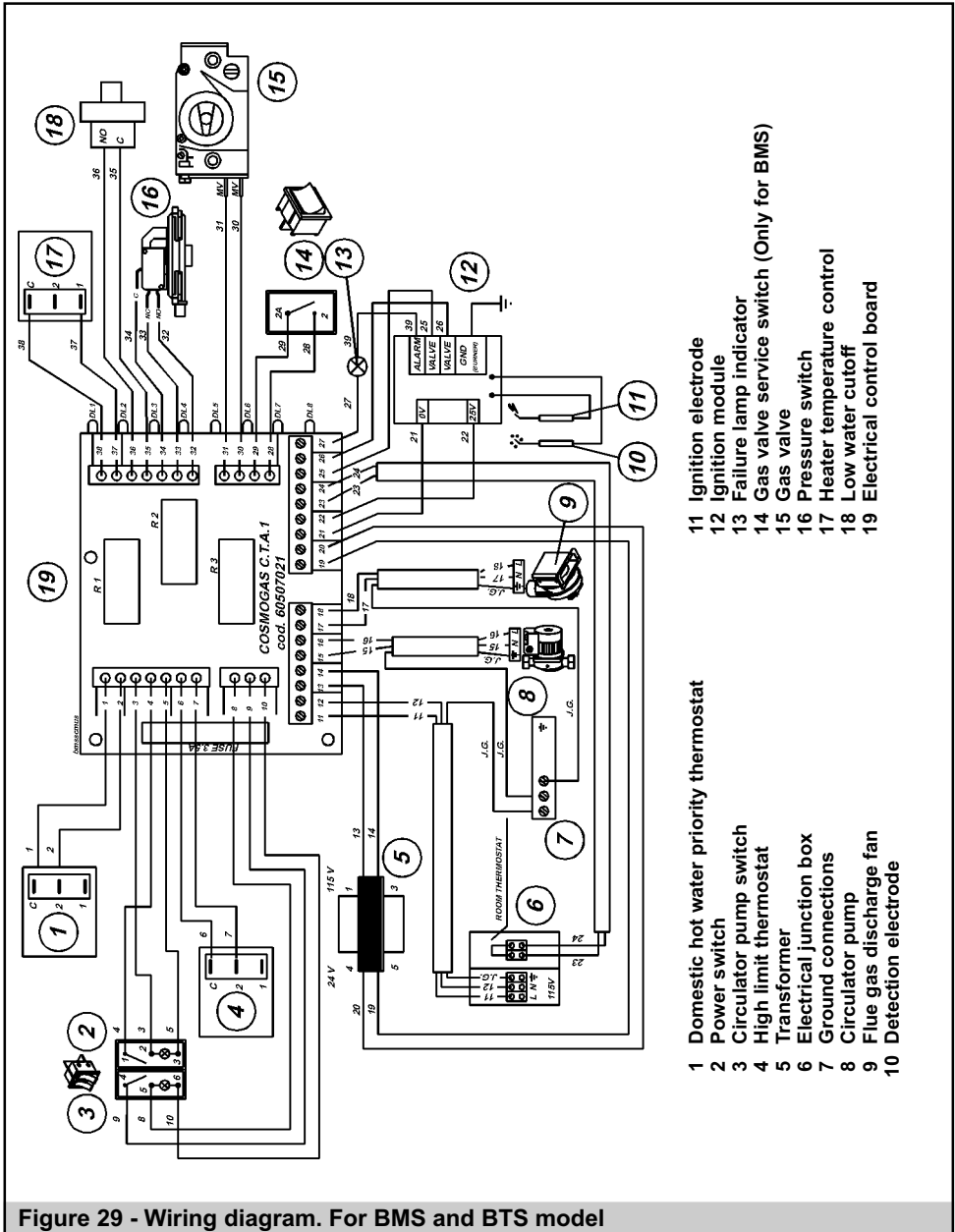
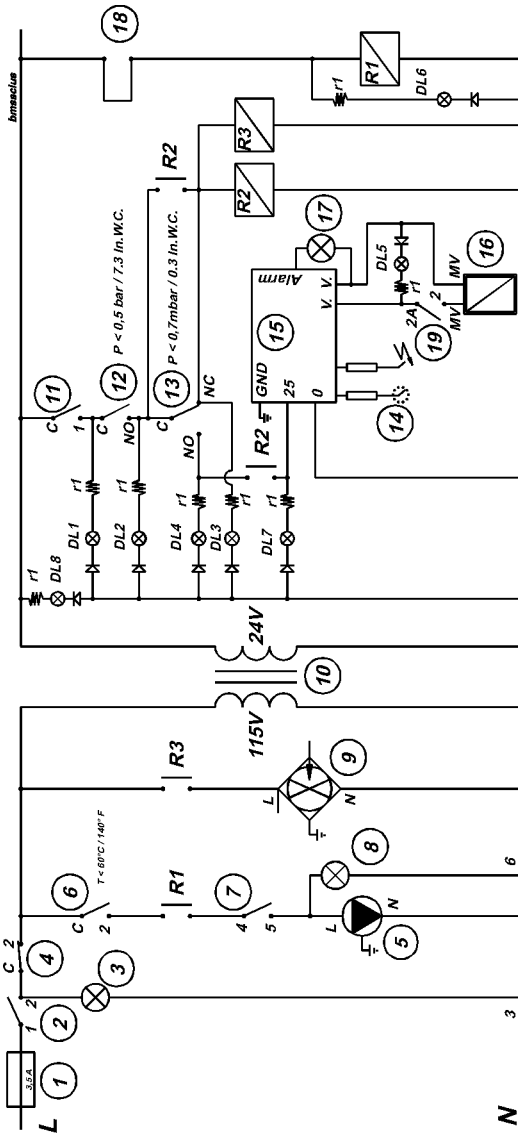


Figure 29 - Wiring diagram. For BMS and BTS model



# A INSTALLATION INSTRUCTIONS



- |     |  |    |   |
|-----|--|----|---|
| DL1 | Heater temperature lamp control                  | 6  | Domestic hot water priority thermostat  |
| DL2 | Low water cutoff lamp control                    | 7  | Circulator pump switch                  |
| DL3 | NC (Normally Close) pressure switch lamp control | 8  | Circulator pump switch light            |
| DL4 | NO (Normally Open) pressure switch lamp control  | 9  | Flue gas discharge fan                  |
| DL5 | Gas valve lamp control                           | 10 | Transformer                             |
| DL6 | Room thermostat lamp control                     | 11 | Heater temperature control              |
| DL7 | Ignition module lamp control                     | 12 | Low water cutoff                        |
| DL8 | Transformer lamp control                         | 13 | Pressure switch                         |
| r1  | Resistor 780 Ohm                                 | 14 | Ignition and detection electrodes       |
| 1   | Fuse   | 15 | Ignition module                         |
| 2   | Power switch                                     | 16 | Gas valve                               |
| 3   | Pilot light of power switch                      | 17 | Failure lamp indicator                  |
| 4   | High limit thermostat                            | 18 | Room thermostat connection              |
| 5   | Circulator pump                                  | 19 | Gas valve service switch (only for BMS) |

Figure 30 - Functional wiring diagram. For BMS and BTS model

# A INSTALLATION INSTRUCTIONS

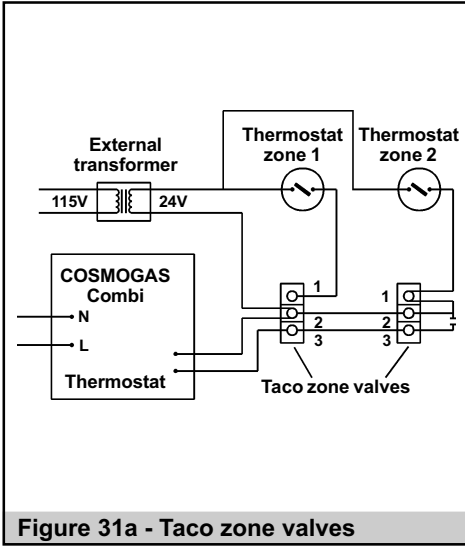


Figure 31a - Taco zone valves

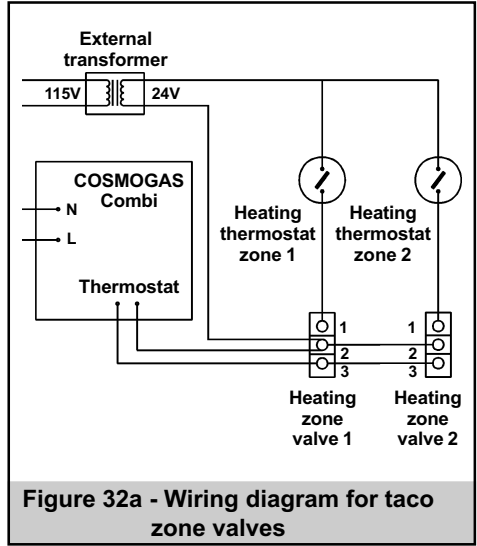


Figure 32a - Wiring diagram for taco zone valves

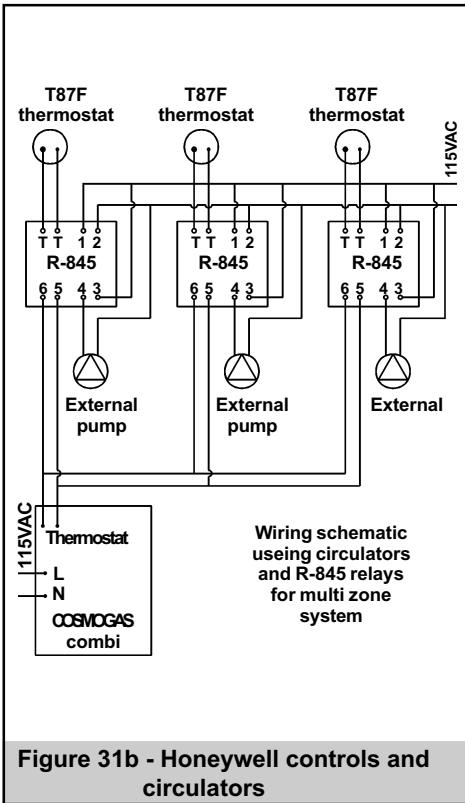


Figure 31b - Honeywell controls and circulators

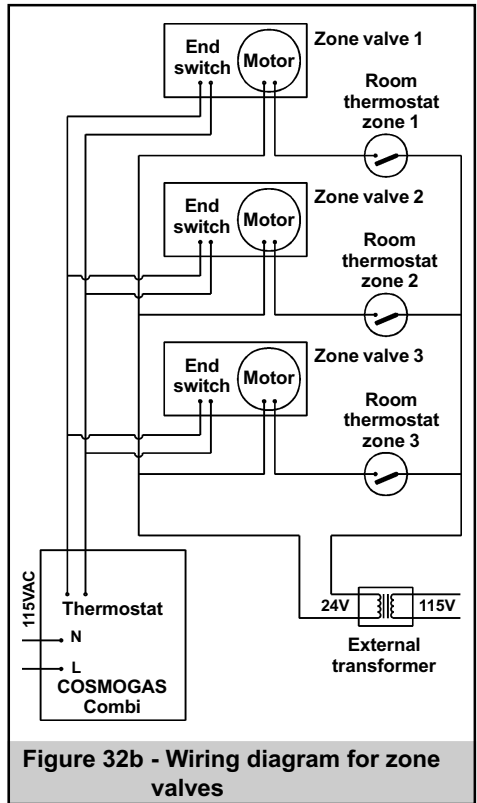
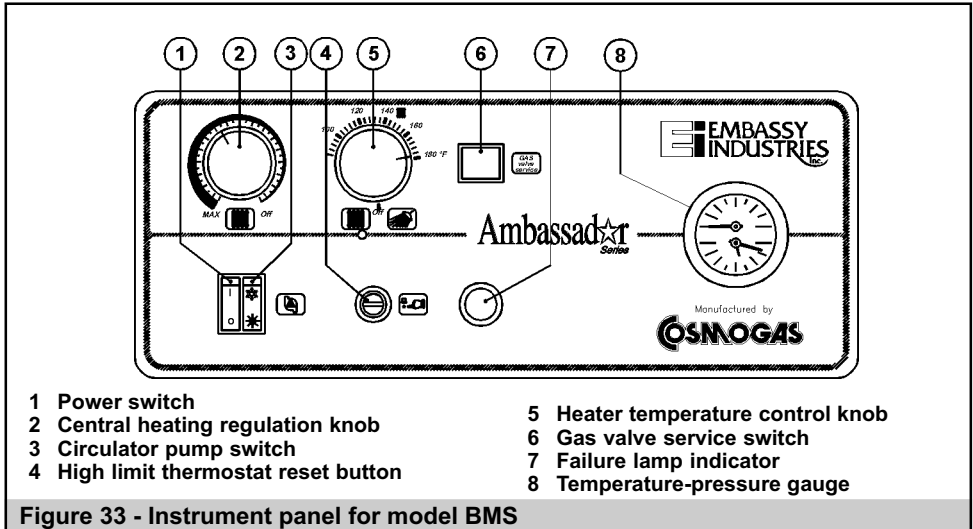


Figure 32b - Wiring diagram for zone valves

# B OPERATING AND MAINTENANCE INSTRUCTIONS for BMS

Qualified personnel must carry out installation, calibration or alterations to the gas apparatus, or to convert it from one gas type to another. Conversion kits are available, (optional).

## 9 - BMS model - INSTRUCTIONS FOR USE



### 9.1 Start-Up Instructions

Check that the system has been filled and purged. The indicator on the pressure gauge “8”, (fig.33), should show **15-25 psi**. To properly purge the heater and system of air it is imperative that these basic instructions be followed.

The automatic feed should have a fast fill feature. There must be an isolation valve installed so that when it is closed it will direct the incoming water flow through the system and heater in the normal flow pattern and out a drain cock installed at the end of the loop.

- Attach a hose to the heating drain cock and run the hose to a suitable drain.
- Open heating drain cock.
- Open the automatic feed using the fast fill feature and allow the system to fill purge. On multi-zone systems, each zone must be purged separately with the other zones shut off.

### 9.2 Checks Prior to Ignition

Prior to ignition, it is necessary to carry out a few checks.

- Check that the appliance is electrically connected to a voltage of **115V 60Hz**. Grounding is compulsory likewise the installation of a switch with fuse immediately upstream from

the heater.

- Check that the heater is connected properly to the flue, it must not be clogged. The height and cross section must both be adequate.

### 9.3 Ignition Procedure

- Open the gas cock.
- Turn the power switch on, (fig.33, item 1).
- Position the heater temperature control knob “5” (fig.33) on **120°F**. The ignition module will provoke sparks for burner ignition for about **11** seconds. If, during this length of time it does not start up because there is still air in the gas line, the heater will shutdown and the indicator light of the failure lamp indicator “7” (fig.33) signaling the state, will come on.

Turn the heater temperature control knob “5” (fig.33) to position “0” and repeat operation c). The ignition module will attempt a new ignition automatically. Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the appliance.

It is important, especially in the heating season, to keep the heater temperature control knob “5” (fig.33) on **150°F** seeing as the circulator pump starts working at **140°F**. During the summer season, if the water is hot enough, this knob can be adjusted to a lower temperature.

## 9.4 Summer-Winter Mode

By means of the circulator pump switch, (fig.33, item 3), you can change over from the summer to the winter mode, as explained below.

In the **summer**, the switch is turned **off**, allowing the production of **domestic hot water only**.

In the **winter** or whenever central heating is required, the circulator pump switch must be turned **on**.

## 9.5 Adjusting Central Heating

This is done by turning the central heating regulation knob "2" (fig.33) which optimizes the central heating system, controlling radiator temperature. It is advisable, during the in-between seasons, (spring and autumn), when you want only warm radiators, to turn the knob to minimum. In the winter you will have to turn it to maximum, leaving the heater temperature control knob "5" (fig.33) on 150°F.

If you want hotter central heating, adjust the above knob by turning it to a higher temperature setting. It is however advisable to install a room thermostat well away from heating elements, doors and windows.

## 9.6 Manual Reset High-Limit Thermostat

This device acts on the heater, turning the burner off completely if heater temperature exceeds 210°F. The user can see this because the burner does not turn on any more even if heater temperature is low.

To restore the heater to its normal functioning condition, unscrew and remove the protection cap of high limit thermostat reset button "4", (fig.33). Then press it. Use a pen or a skinny object to manually reset (the high limit thermostat will not reset unless the button is completely pressed). If the high limit thermostat continues to trigger, call a licensed authorized personnel.

## 9.7 Resetting the Ignition Module

The ignition module, (fig.1, item 24), carries out numerous checks on heater functioning: on the burner and on the flame detection system. When the ignition module detects that one of these components is malfunctioning, it stops the heater. To restart, Turn the heater temperature control knob "5" (fig.33) to position "0" and reposition it on 150°F.

Once this operation has been done and if the heater does not start up or if this situation repeats often, call a licensed authorized personnel.

## 9.8 Heating Circulator Pump

The circulator pump will **only** start working when heater the temperature reaches approximately 140°F and the circulator pump switch, (fig.33, item 3), is in the winter position (on position).

Initially, the circulator pump could make noises, which are due to pockets of air left inside the water circuit; they will disappear soon without having to do anything. In any case, check that the cap on the automatic air vent, (fig. 1, item 7) is open.

## 9.9 Shut-Down Procedure

To stop the supply of gas and consequently turn the system off, turn heater temperature control knob "5" (fig.33) to position 0.

Turn power switch "1" (fig.33) off and close the gas cock.

## 9.10 Maintenance

The heater requires no specific maintenance; to keep it in good working order, however, it is advisable to have the flue pipe into the heat exchanger and burner cleaned at the beginning of each season.

To clean proceed in this order:

- a) Remove the heater jacket, the burner, the flue gas discharge fan and the turbulators.
- b) With a plastic-bristled cylindrical brush, brush the insides of the flue gas pipes and the turbulators.
- c) Vacuum away the burnt deposits from the burner and from the ignition and detection electrodes.

However, for this cleaning job it is necessary to call a licensed authorized technician.

## 9.11 Draining water from the heater

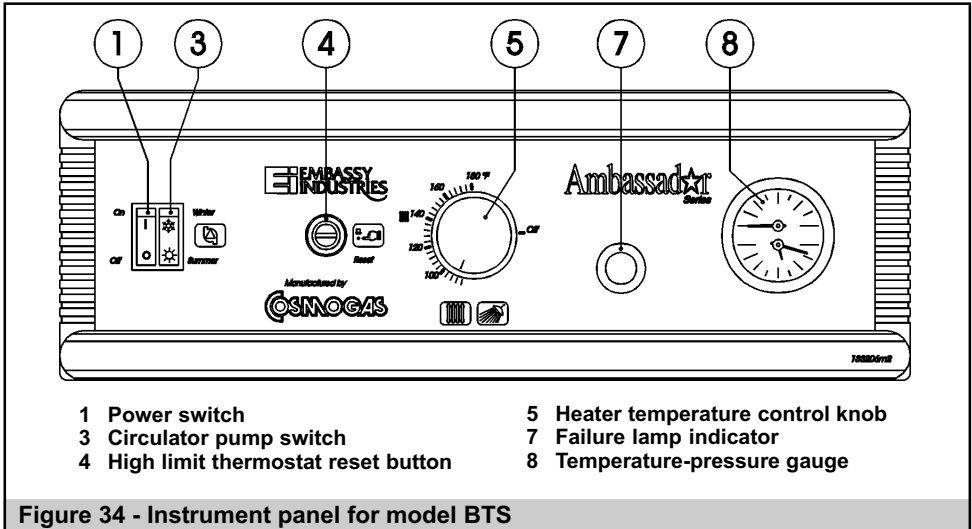
- a) Turn off the main cold water supply valve.
- b) Open the heating drain cock.
- c) Open heating air vents.
- d) Open the sanitary drain cock.
- e) Open all hot water faucets to allow air to enter into the pipes.

The heater holds approximately 4 gallons of water, not including the water capacity of the other system components and piping.

# C OPERATING AND MAINTENANCE INSTRUCTIONS for BTS

Qualified personnel must carry out installation, calibration or alterations to the gas apparatus, or to convert it from one gas type to another. Conversion kits are available, (optional).

## 10 - BTS model - INSTRUCTIONS FOR USE



### 10.1 Start-Up Instructions

Check that the system has been filled and purged. The indicator on the pressure gauge “8”, (fig.34), should show **15-25 psi**. To properly purge the heater and system of air it is imperative that these basic instructions be followed.

The automatic feed should have a fast fill feature. There must be an isolation valve installed so that when it is closed it will direct the incoming water flow through the system and heater in the normal flow pattern and out a drain cock installed at the end of the loop.

a) Attach a hose to the heating drain cock and run the hose to a suitable drain.

b) Open heating drain cock.

c) Open the automatic feed using the fast fill feature and allow the system to fill purge. On multi-zone systems, each zone must be purged separately with the other zones shut off.

### 10.2 Checks Prior to Ignition

Prior to ignition, it is necessary to carry out a few checks.

a) Check that the appliance is electrically connected to a voltage of **115V 60Hz**. Grounding is compulsory likewise the installation of a switch with fuse immediately upstream from

the heater.

b) Check that the heater is connected properly to the flue, it must not be clogged. The height and cross section must both be adequate.

### 10.3 Ignition Procedure

a) Open the gas cock.

b) Turn the power switch on, (fig.34, item 1).

c) Position the heater temperature control knob “5” (fig.34) on **120°F**. The ignition module will provoke sparks for burner ignition for about **11** seconds. If, during this length of time it does not start up because there is still air in the gas line, the heater will shutdown and the indicator light of the failure lamp indicator “7” (fig.34) signaling the state, will come on.

Turn the heater temperature control knob “5” (fig.34) to position “0” and repeat operation c). The ignition module will attempt a new ignition automatically. Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the appliance.

It is important, especially in the heating season, to keep the heater temperature control knob “5” (fig.34) on **150°F** seeing as the circulator pump starts working at **140°F**. During the summer season, if the water is hot enough, this knob can be adjusted to a lower temperature.

## 10.4 Summer-Winter Mode

By means of the circulator pump switch, (fig.34, item 3), you can change over from the summer to the winter mode, as explained below.

In the **summer**, the switch is turned **off**, allowing the production of **domestic hot water only**.

In the **winter** or whenever central heating is required, the circulator pump switch must be turned **on**.

## 10.5 Adjusting Central Heating

This is done by turning the central heating regulation knob “21” (fig.34) which optimizes the central heating system, controlling radiator temperature. It is advisable, during the in-between seasons, (spring and autumn), when you want only warm radiators, to turn the knob to minimum. In the winter you will have to turn it to maximum, leaving the heater temperature control knob “5” (fig.34) on 150°F.

If you want hotter central heating, adjust the above knob by turning it to a higher temperature setting. It is however advisable to install a room thermostat well away from heating elements, doors and windows.

## 10.6 Manual Reset High-Limit Thermostat

This device acts on the heater, turning the burner off completely if heater temperature exceeds 210°F. The user can see this because the burner does not turn on any more even if heater temperature is low.

To restore the heater to its normal functioning condition, unscrew and remove the protection cap of high limit thermostat reset button “4”, (fig.34). Then press it. Use a pen or a skinny object to manually reset (the high limit thermostat will not reset unless the button is completely pressed). If the high limit thermostat continues to trigger, call a licensed authorized personnel.

## 10.7 Resetting the Ignition Module

The ignition module, (fig.3, item 24), carries out numerous checks on heater functioning: on the burner and on the flame detection system. When the ignition module detects that one of these components is malfunctioning, it stops the heater. To restart, Turn the heater temperature control knob “5” (fig.34) to position “0” and reposition it on 150°F.

Once this operation has been done and if the heater does not start up or if this situation repeats often, call a licensed authorized personnel.

## 10.8 Heating Circulator Pump

The circulator pump will **only** start working when heater the temperature reaches approximately 140°F and the circulator pump switch, (fig.34, item 3), is in the winter position (on position).

Initially, the circulator pump could make noises, which are due to pockets of air left inside the water circuit; they will disappear soon without having to do anything. In any case, check that the cap on the automatic air vent, (fig. 4, item 7) is open.

## 10.9 Shut-Down Procedure

To stop the supply of gas and consequently turn the system off, turn heater temperature control knob “5” (fig.34) to position 0.

Turn power switch “1” (fig.34) off and close the gas cock.

## 10.10 Maintenance

The heater requires no specific maintenance; to keep it in good working order, however, it is advisable to have the flue pipe into the heat exchanger and burner cleaned at the beginning of each season.

To clean proceed in this order:

- a) Remove the upper heater jacket, the burner, the flue gas discharge fan and the turbulators.
  - b) With a plastic-bristled cylindrical brush, brush the insides of the flue gas pipes and the turbulators.
  - c) Vacuum away the burnt deposits from the burner and from the ignition and detection electrodes.
- However, for this cleaning job it is necessary to call a licensed authorized technician.

## 10.11 Draining water from the heater

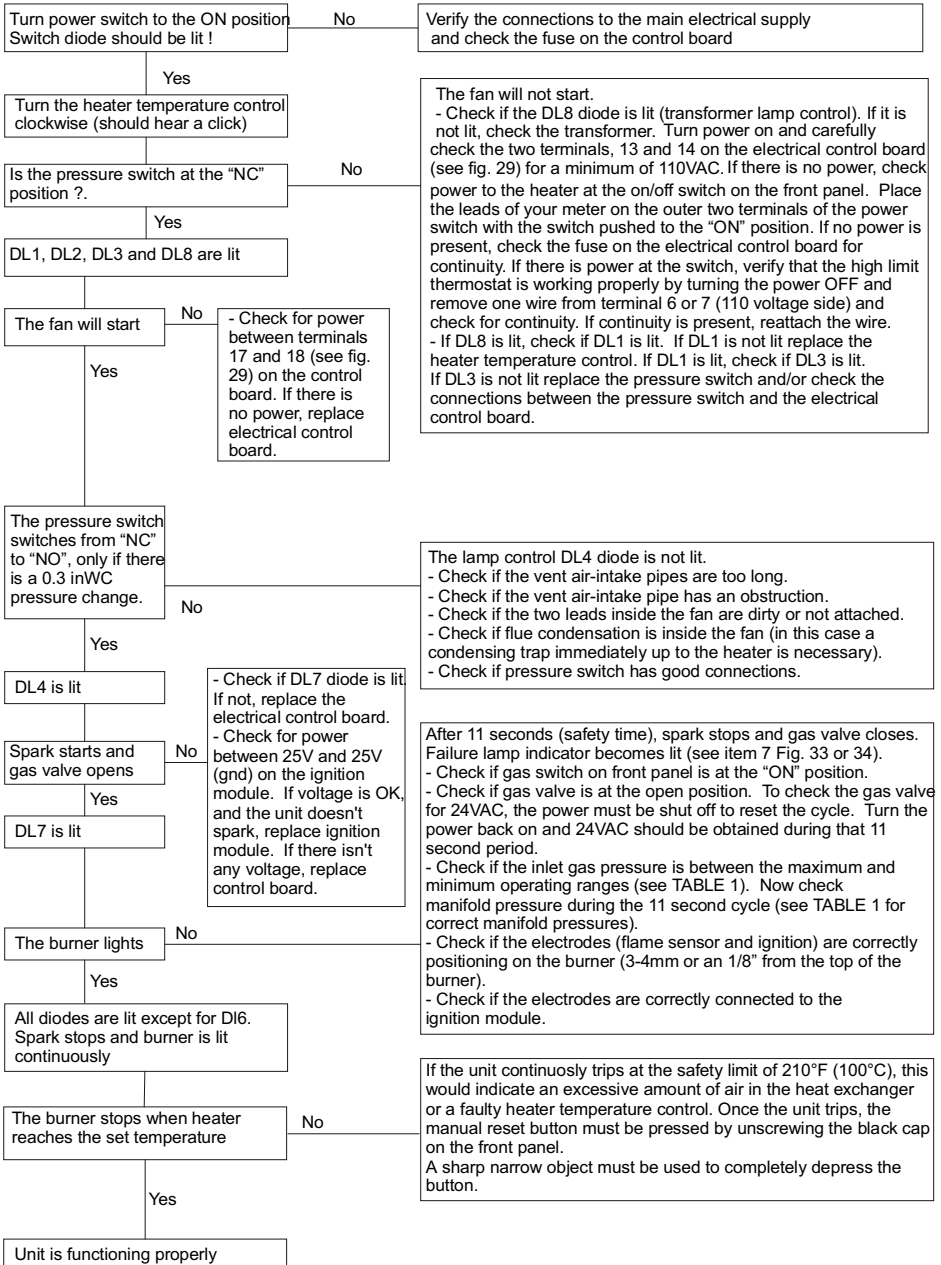
- a) Turn off the main cold water supply valve.
- b) Open the heating drain cock.
- c) Open heating air vents.
- d) Open the sanitary drain cock.
- e) Open all hot water faucets to allow air to enter into the pipes.

The heater holds approximately 4 gallons of water, not including the water capacity of the other system components and piping.

# D TROUBLESHOOTING

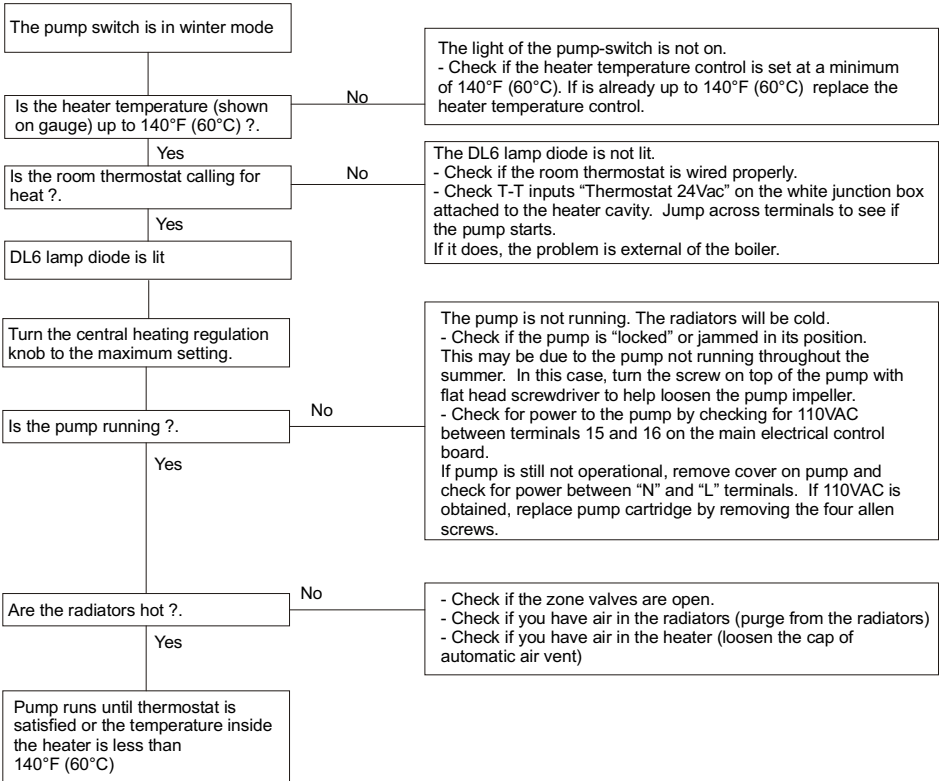
## Troubleshooting Sequence of Operation to Light the Burner

### Start



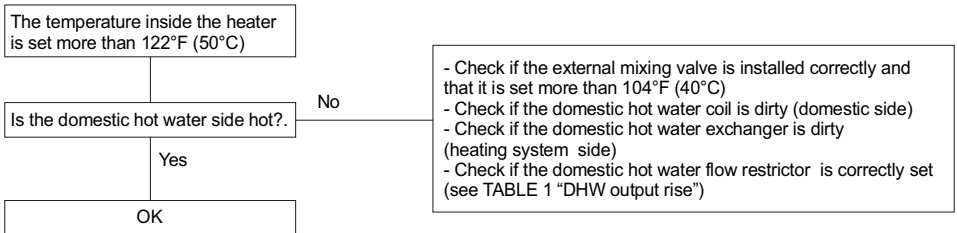
# D TROUBLESHOOTING

## Troubleshooting Sequence of Operation for a Call for Heat



## Troubleshooting Sequence of Operation for Domestic Hot Water

### Start





# D TROUBLESHOOTING

| PROBLEMS   | CAUSES   | CHECKS (IF NECESSARY)  | REMEDIES (IF NECESSARY)                           |
|--|--|--|---|
| the pilot light of power switch is off             | there isn't electrical supply                                | check the electrical supply level                            | restore the electrical supply                     |
|  | the fuse doesn't work  | check the fuse   | replace the fuse                                  |
|  | the power switch is off                                      | check that the power switch is on                            | turn the power switch on                          |
|  | the power switch doesn't work                                | check the power switch operating                             | replace the power switch                          |
|  | pilot light of power switch doesn't work                     | check the pilot light of power switch operating              | replace the power switch                          |
| the transformer lamp control, (DL8), is off        | 115V isn't reaching the transformer input                    | check the transformer has 115V input                         | restore the electrical supply                     |
|  | the transformer doesn't work                                 | check the transformer has 24V output                         | replace the transformer                           |
|  | the DL8 doesn't work   | check DL8 operating  | replace the electrical control board              |
| the heater temperature lamp control, (DL1) is off  | the heater temperature control contacts are open             | check that the heater has the required temperature           | increase the heater temperature set               |
|  | 24V isn't reaching "C" contact of heater temperature control | check 24V presence on "C" heater temperature control contact | restore the electrical connection                 |
|  | the heater temperature control doesn't work                  | check heater temperature control operating                   | replace the heater temperature control            |
|  | the DL1 doesn't work   | check DL1 operating  | replace the electrical control board              |
| the low water cutoff lamp control, (DL2), is off   | there isn't enough water in the heater                       | check there's enough water in the heater                     | restore the water right level in the heater       |
|  | low water cutoff doesn't work                                | check the low water cut-off operating                        | replace the low water cut-off                     |
|  | DL2 doesn't work   | check DL2 operating  | replace the electrical control board              |
| the NC pressure switch lamp control, is off        | 24V isn't reaching the "C" contact of pressure switch        | check there's 24V on the "C" contact of pressure switch      | restore 24V on the "C" contact of pressure switch |
|  | pressure switch contact is on "NO"                           | check the flue gas discharge fan is off                      | replace pressure switch                           |
|  | DL3 doesn't work   | check DL3 operating  | replace electrical control board                  |
| the NO pressure switch lamp control, (DL4), is off | flue gas discharge fan is off                                | check the flue gas discharge fan is on                       | replace the flue gas discharge fan                |
|  | 115V isn't reaching the flue gas discharge fan               | check 115V is reaching the flue gas discharge fan contacts   | restore the electrical supply                     |
|  | pressure switch contact is on "NC"                           | check the pressure switch operating                          | replace the pressure switch                       |
|  | DL4 doesn't work   | check DL4 operating  | replace the electrical control board              |
| the ignition module lamp control, (DL7), is off    | 24V isn't reaching ignition module                           | check 24V is reaching ignition module contacts               | restore 24V                                       |
|  | DL7 doesn't work   | check DL7 operating  | replace the electrical control board              |
| the gas valve lamp control, (DL5), is off          | 24V isn't reaching gas valve                                 | check 24V is reaching gas valve contacts                     | replace ignition module                           |
|  | DL5 doesn't work   | check DL5 operating  | replace the electrical control board              |
| the room thermostat lamp control, (DL6), is off    | room thermostat contacts are open, (if any)                  | check room thermostat operating                              | replace the room thermostat                       |
|  | room thermostat doesn't work, (if any)                       | check room thermostat operating                              | replace the room thermostat                       |
|  | DL6 doesn't work   | check DL6 operating  | replace the electrical control board              |
| the circulator pump switch light is off            | circulator pump switch is off                                | check heater temperature is higher than 140°F                | check heater temperature is higher than 140°F     |
|  | dhw priority thermostat contacts are open                    | check heater temperature is higher than 140°F                | increase the heater temperature, (if necessary)   |
|  | room thermostat contacts are open                            | check room thermostat operating                              | replace the room thermostat                       |
|  | circulator pump switch light doesn't work                    | check circulator pump switch light operating                 | replace the circulator pump switch                |

## E IMPORTANT INFORMATION FOR THE CUSTOMER

---

- The technician will explain to the customer how the heater works and how to operate it.
- The customer must neither replace nor repair any parts.
- The user must call in a licensed authorized technician to carry out necessary routine maintenance on the heater at least once a year, before it is used for central heating.
- A routine maintenance contract, with a licensed authorized technician, will guarantee the heater works properly as well as ensuring a longer life.

### **Controlling Heater Operation**

The customer must know how to fill and drain the circuit; he must also know how to control and correct if necessary the pressure in the central heating system.

### ***What to do when:***

#### ***the smell of gas is present-***

Turn the gas cock off and ventilate the room. Call a licensed authorized technician and, if necessary your local gas company.  
Follow the gas supplier's instructions - If you cannot reach your gas supplier; call the fire department.

#### ***the heater is heating up but the system stays cold-***

Open the radiator taps and make sure that the heater temperature control knob is on the **150°F** position. If the system still does not warm up and the circulator pump is not working, turn the heater off and call a licensed authorized technician.

#### ***water is leaking from the domestic water side-***

Turn off the main cold water supply valve. Call a licensed authorized technician.

### **Cleaning the heater jacket**

Use a damp cloth. Do **not** use any abrasive detergents.

# F SPARE PARTS

| Ref. to fig. 1, 2, 3, and 4 | Descriptions                              | P/N for BMS 10/20 | P/N for BMS 15/29 | P/N for BTS 10/20 | P/N for BTS 15/29 |
|-----------------------------|---|-------------------|-------------------|-------------------|-------------------|
| 6                           | Flue gas discharge fan                    | 61901018          | 61901019          | 61901018          | 61901019          |
| 7                           | Automatic air vent                        | 61206002          | 61206002          | 61206001          | 61206001          |
| 8                           | Thermostat bulb pocket                    | 60108005          | 60108005          | 60108005          | 60108005          |
| 9                           | Gas valve service switch                  | 60506019          | 60506019          | -                 | -                 |
| 10                          | Instrument panel                          | 62630021          | 62630021          | 62630022          | 62630022          |
| 11                          | Temperature-pressure gauge                | 62115002          | 62115002          | 62115002          | 62115002          |
| 12                          | Failure lamp indicator                    | 62116003          | 62116003          | 62116003          | 62116003          |
| 13                          | Ignition electrode                        | 60505004          | 60505004          | 60505004          | 60505004          |
| 13a                         | Detection electrode                       | 60505004          | 60505004          | 60505004          | 60505004          |
| 14                          | Burner                                    | 62604005          | 62604006          | 62604005          | 62604006          |
| 15                          | Gas manifold                              | 62613018          | 62613017          | 62613018          | 62613017          |
| 17                          | Gas valve                                 | 61201025          | 61201025          | 61201025          | 61201025          |
| 18                          | High limit thermostat                     | 62101029          | 62101029          | 62101029          | 62101029          |
| 19                          | Power and circulator pump switches        | 60506005          | 60506005          | 60506005          | 60506005          |
| 20                          | Domestic hot water priority thermostat    | 62101030          | 62101030          | 62101030          | 62101030          |
| 22                          | Heater temperature control                | 62101031          | 62101031          | 62101031          | 62101031          |
| 23                          | Electrical control board                  | 60507021          | 60507021          | 60507021          | 60507021          |
| 24                          | Ignition module                           | 62110026          | 62110026          | 62110026          | 62110026          |
| 26                          | Electrical Junction box                   | 61101018          | 61101018          | 61101018          | 61101018          |
| 27                          | Expansion tank                            | 62202001          | 62202001          | 62202002          | 62203001          |
| 28                          | Pressure switch                           | 62113017          | 62113018          | 62113017          | 62113018          |
| 31                          | Turbulator                                | 60416012          | 60416012          | 60416012          | 60416012          |
| 33                          | Central heating regulation valve          | 62607047          | 62607047          | 62607042          | 62607042          |
| 34                          | Circulator pump                           | 62301025          | 62301025          | 62301025          | 62301025          |
| 35                          | Transformer                               | 60510004          | 60510004          | 60510004          | 60510004          |
| 36                          | Low water cut-off                         | 62113016          | 62113016          | 62113016          | 62113016          |
| -                           | Conversion kit from natural gas to LP gas | 62616401          | 62616402          | 62616401          | 62616402          |
| -                           | Conversion kit from LP gas to natural gas | 62616403          | 62616404          | 62616403          | 62616404          |
| -                           | Safety relief valve                       | 61205010          | 61205010          | 61205010          | 61205010          |
| -                           | Heat exchanger                            | 62602281          | 62602282          | 62602283          | 62602284          |

Spare parts are available from your local authorized wholesale distributor.  
 For a location of the one nearest you call Embassy Industries, Inc. at 631-694-1800.

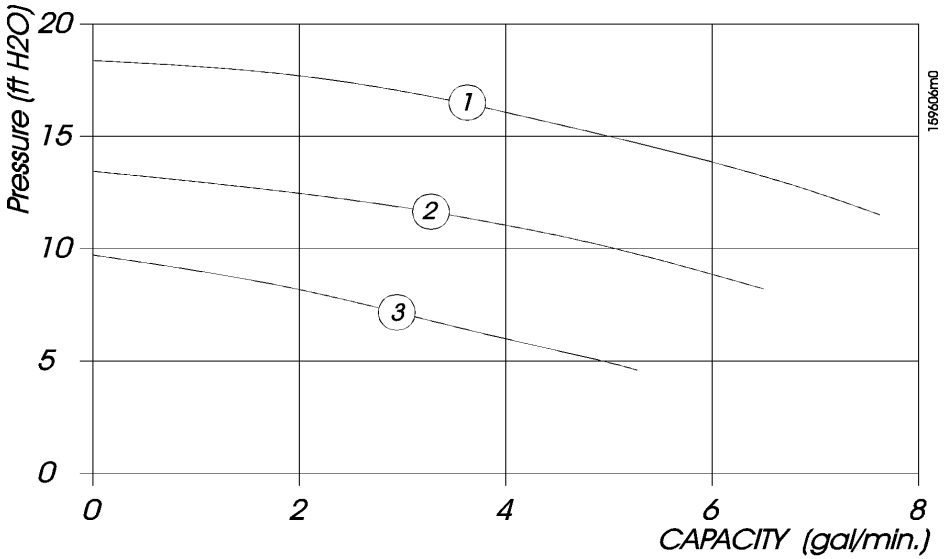
# G TECHNICAL FEATURES

**TABLE 1**

|  |                    | BMS 10/20       | BMS 15/29      | BTS 10/20     | BTS 15/29      |
|--|--------------------|-----------------|----------------|---------------|----------------|
| Country of destination   |                    | U.S. and Canada |                |               |                |
| AGA and CSA certification number                                       |                    | 114696-01       |                |               |                |
| Heating and Domestic nominal input rating                              | Btu/hr (kW)        | 87,000 (25.5)   | 107,000 (31.6) | 87,000 (25.5) | 107,000 (31.6) |
| Heating and Domestic nominal output heat                               | Btu/hr (kW)        | 72,220 (21.1)   | 88,800 (26)    | 72,220 (21.1) | 88,800 (26)    |
| AFUE ratings   | %                  | 84              |                |               |                |
| Supply natural gas pressure  | in W.C. (mbar)     | 7 (17.4)        |                |               |                |
| Minimum supply natural gas pressure                                    | in W.C. (mbar)     | 3.5 (8.7)       |                |               |                |
| Maximum supply natural gas pressure                                    | in W.C. (mbar)     | 10.5 (24.9)     |                |               |                |
| Supply LP gas pressure   | in W.C. (mbar)     | 11 (24.4)       |                |               |                |
| Minimum supply LP gas pressure   | in W.C. (mbar)     | 8 (19.9)        |                |               |                |
| Maximum supply LP gas pressure   | in W.C. (mbar)     | 13 (32.4)       |                |               |                |
| Manifold natural gas pressure  | in W.C. (mbar)     | 3.5 (8.7)       |                |               |                |
| Manifold LP gas pressure   | in W.C. (mbar)     | 8 (19.9)        |                |               |                |
| Burner natural gas flow rate at 59°F, 406 in W.C. (at 15°C, 1013 mbar) | gal/hr (m3/h)      | 602 (2.28)      | 747 (2.83)     | 602 (2.28)    | 747 (2.83)     |
| Burner LP gas flow rate at 59°F, 406 in W.C. (at 15°C, 1013 mbar)      | gal/hr (m3/h)      | 258 (0.98)      | 322 (1.22)     | 258 (0.98)    | 322 (1.22)     |
| Unit burner number (injectors)   | [n°]               | 10              | 11             | 10            | 11             |
| Injectors natural gas diameter   | [mm/100]           | 140             | 150            | 140           | 150            |
| Injectors LP gas diameter  | [mm/100]           | 105             | 115            | 105           | 115            |
| Maximum heating temperature  | °F (°C)            | 176 (80)        |                |               |                |
| Minimum heating temperature  | °F (°C)            | 140 (60)        |                |               |                |
| Maximum heating pressure   | PSI (bar)          | 45 (3.1)        |                |               |                |
| Minimum heating pressure   | PSI (bar)          | 7.3 (0.5)       |                |               |                |
| Expansion tank   | gal (lit.)         | 2.64 (10)       | 2.64 (10)      | 2.64 (10)     | 3.17 (12)      |
| Maximum domestic temperature   | °F (°C)            | 176 (80)        |                |               |                |
| Minimum domestic temperature   | °F (°C)            | 104 (40)        |                |               |                |
| Maximum domestic pressure  | PSI (bar)          | 150 (10.3)      |                |               |                |
| Minimum domestic pressure  | PSI (bar)          | 1 (0.07)        |                |               |                |
| DHW output rise at 75°F (42°C)   | gal/min (lit./min) | 1.92 (7.3)      |                |               |                |
| Electrical supply  |                    | 115 V, 60 Hz    |                |               |                |
| Amperes less than  | A                  | 2               |                |               |                |
| <b>Split vent air intake features</b>                                  |                    |                 |                |               |                |
| Diameter   | in (mm)            | 3.15 (80)       |                |               |                |
| Maximum length   | ft (m)             | 20 (6)          |                |               |                |
| Minimum length   | ft (m)             | 3 (0.9)         |                |               |                |
| Equivalent length of one 90° elbow                                     | ft (m)             | 3 (0.9)         |                |               |                |
| <b>Concentric vent air intake features</b>                             |                    |                 |                |               |                |
| Diameter air-intake tube   | in (mm)            | 3.94 (100)      |                |               |                |
| Diameter flue discharge tube   | in (mm)            | 2.36 (60)       |                |               |                |
| Maximum length coaxial tube  | ft (m)             | 15 (4.5)        |                |               |                |
| Minimum length coaxial tube  | ft (m)             | 3 (0.9)         |                |               |                |
| Equivalent length of one 90° elbow                                     | ft (m)             | 3 (0.9)         |                |               |                |
| Flue temperature   | °F (°C)            | 266 (130)       |                |               |                |
| <b>Dimensions</b>  |                    |                 |                |               |                |
| Height (H)   | in (mm)            | 34.6 (880)      | 34.6 (880)     | 35.6 (905)    | 35.6 (905)     |
| Width (L)  | in (mm)            | 18.1 (460)      | 19.3 (490)     | 16.7 (425)    | 16.7 (425)     |
| Depth (P)  | in (mm)            | 15 (380)        | 16.1 (410)     | 24.6 (625)    | 24.6 (625)     |
| Weight   | lb (kg)            | 140 (67)        | 158 (72)       | 154 (70)      | 165 (75)       |

# G TECHNICAL FEATURES

Curves of residual head for central heating system



- ① *First speed*
- ② *Second speed*
- ③ *Third speed*





**FOR TECHNICAL SUPPORT CALL:**



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**Farmingdale, NY 11735**

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**Fax - 631-694-1832**

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(For emergencies after 5 pm please call 413-348-7822)

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