

# PM BOWLE

## Heating Equipment

### Manufacturer

588 rue Adanac,  
Québec (Québec) G1C 7B7  
Tel. : (418) 527-3547  
Fax : (418) 527-3547

**Warning:** If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

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 instruction.
- If you cannot reach your gas supplier, call the fire department.

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

## Installation, Operation, And Maintenance Guide

for a

## Gas Fired Wall-Mounted External Heating Unit

## Applications

Commercial, industrial, institutional and residential



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Centre des technologies  
du gaz naturel

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## **Warnings**

All installation and maintenance for this unit must be made by competent workers in accordance with the latest versions of the acts, codes, and regulations currently in effect in each Canadian province, as the :

- Quebec Building Act;
- Quebec health and Safety on Building Yards Act;
- Canadian Electrical Code;
- National Gas Code.

All installation and maintenance for this unit and its accessories must be completed by qualified pipe fitters (gas). This in accordance with the latest policies or local requirements and/or ANSI Z223.1/NFPA 54 or CAN/CGA-B149.

### **Important**

The installer must get in touch with his gas supplier to :

- Get the authorization to install this unit;
- To check all gas lines and fittings before authorizing the unit operation.

### **Unit start-up**

The installer must make sure that the user has an understanding of this unit secure operation and maintenance.

### **Warranty**

The manufacturer warranty will not apply to an incorrectly installed heating unit nor if it has been modified or misused.

### **Guide**

Read this guide before proceeding with the installation of the unit. If you have questions, you can call our technical support service by :

Tel. : (418) 527-3547                      Fax. : (418) 683-6114

### **Warnings**

Electrical components, driving mechanisms and combustible gas can cause injuries. To protect yourself from these inherent risks during installation or maintenance, the electric power supply must be turned off and the gas feeding valve must closed. Anyone involved in installing or maintaining this unit must abide by the health and safety standards in the workplace.

## Technical Features

This section describes the Natural Gas External Wallmount Heating Unit technical features.

### Models and capacity :

CEB-100-AB	100,000 Btu/hour
CEB-150-AB	150,000 Btu/hour
CEB-200-AB	200,000 Btu/hour

Common features of this unit :

- Heating unit working with natural gas or propane;
- External wall mounted;
- Electrical rating 120 volts a.c., 60 Hz, 1 phase, less than 12 amp.

### Required clearances :

- Up : 30 inches;
- Down : 12 inches;
- Side : 36 inches;\*
- Front : 30 inches;
- Back : none.

\* When two (2) units are installed side by side, the minimum between them is 36 inches.

The following pages give more detail about the wall mounted PM Bowle Heating Unit.



XXXXXXXX

Certified to /Certifié à : CSA Std.4.9a-2002  
Conforms to: ANSI Std. Z21.13a-2002

**LISTED GAS-FIRED HOT WATER BOILER**

**BOUILLOIRE À GAZ HOMOLOGUÉE**

No. Série  Serial No.

THIS BOILER HAS BEEN ALSO TESTED TO CGA P.2-1991 "TESTING METHOD FOR MEASURING ANNUAL FUEL UTILIZATION EFFICIENCIES OF RESIDENTIAL FURNACES AND BOILERS", AND RESPECTS THE REQUIREMENTS OF THE CANADA'S ENERGY EFFICIENCY REGULATION.  
CETTE CHAUDIÈRE A AUSSI ÉTÉ TESTÉE SELON LA NORME CGA P.2-1991 "MÉTHODE D'ESSAIS POUR L'EFFICACITÉ SAISONNIÈRE ANNUELLE SUR LES FOURNAISES ET CHAUDIÈRES RÉSIDENIELLES" ET RESPECTENT LES REQUIS DE LA RÉGLEMENTATION CANADIENNE SUR L'EFFICACITÉ ÉNERGITIQUE.

MODEL MANUFACTURED / MODÈLE FABRIQUÉ (✓)	CEB-100-AB		CEB-150-AB		CEB-200-AB	
	Natural Naturel	Propane	Natural Naturel	Propane	Natural Naturel	Propane
	( )	( )	( )	( )	( )	( )
INPUT CAPACITY / CAPACITÉ D'ENTRÉE ( 0-2000' / 0-610 m) - BTUH (kW)	100 000 (29.3)	100 000 (29.3)	150 000 (44)	150 000 (44)	200 000 (58.6)	200 000 (58.6)
INLET PRESSURE / PRESSION D'ALIMENTATION - "w.c. (kPa)	3.5 (0.87)	10.0 (2.49)	3.5 (0.87)	10.0 (2.49)	3.5 (0.87)	10.0 (2.49)
OPERATING PRESSURE / PRESSION D'OPÉRATION - "w.c. (kPa)	-0.40 (-0.1)	0.00 (0.00)	-0.65 (-0.16)	-0.25 (-0.06)	-0.85 (-0.21)	-0.68 (-0.17)
OUTPUT CAPACITY / CAPACITÉ DE SORTIE - BTUH (kW)	84 400 (24.7)	82 000 (24.0)	126 150 (36.9)	123 300 (36.1)	168 800 (49.5)	166 000 (48.6)

**\*CANADA - FOR HIGH ALTITUDE / HAUTE ALTITUDE 2000' - 4500' (610 - 1372 m)**

INPUT CAPACITY / CAPACITÉ D'ENTRÉE - BTUH (kW)	96 000 (28.1)	96 000 (28.1)	150 000 (44)	141 600 (41.5)	200 000 (58.6)	192 000 (56.3)
OPERATING PRESSURE / PRESSION D'OPÉRATION - "w.c. (kPa)	-0.60 (-0.15)	-0.60 (-0.15)	-0.65 (-0.16)	-0.66 (-0.16)	-0.85 (-0.21)	-0.85 (-0.21)

\*: IN USA, FOR INSTALLATION IN ALTITUDE OVER 2000', REFER TO THE NATIONAL FUEL GAS CODE Z223.1/NFPA54 FOR DERATING.

**DIRECT VENT BOILER**

- . For use with water or glycol / water mixture.
- . For wallmount outdoor installation only.
- . Minimal ambient temperature of - 40°F (-40°C).
- . Minimum relief valve capacity: 650 lbs/hr (295 kg/hr).
- . Hot water temperature limit control cut-out: 205°F (96°C).

**CHAUDIÈRE À ÉVENT DIRECT**

- . Pour utilisation avec de l'eau ou un mélange eau / glycol.
- . Pour installation murale à l'extérieur seulement.
- . Température de fonctionnement minimale de -40°F (-40°C).
- . Capacité minimale de la soupape de sécurité: 650 lbs/hre (295 kg/hre).
- . Coupure de la limite de haute température sur l'eau chaude: 205°F (96°C).

**WARNING**

IMPROPER INSTALLATION, ADJUSTMENT, ALTERATION, SERVICE OR MAINTENANCE CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR LOST OF LIFE. REFER TO THE USER'S INFORMATION MANUAL PROVIDED WITH THIS BOILER. INSTALLATION AND SERVICE MUST BE PERFORMED BY A QUALIFIED INSTALLER, SERVICE AGENCY OR THE GAS SUPPLIER (WHO MUST READ AND FOLLOW THE SUPPLIED INSTRUCTIONS BEFORE INSTALLING, SERVICING, OR REMOVING THIS BOILER.

**AVERTISSEMENT**

UNE INSTALLATION, UN AJUSTEMENT, UNE ALTÉRATION, UN RÉGLAGE, UNE MODIFICATION, UNE RÉPARATION OU UN ENTRETIEN NON CONFORME AUX NORMES PEUT ENTRAÎNER DES DOMMAGES MATÉRIELS, DES BLESSURES OU LA MORT. LISEZ ATTENTIVEMENT LE MODE D'EMPLOI FOURNI AVEC LA CHAUDIÈRE. L'INSTALLATION ET L'ENTRETIEN DOIVENT ÊTRE EFFECTUÉS PAR UN INSTALLATEUR OU UN SERVICE D'ENTRETIEN QUALIFIÉ OU LE FOURNISSEUR DE GAZ (QUI DOIVENT AVOIR LU LES INSTRUCTIONS FOURNIES AVANT DE FAIRE L'INSTALLATION, L'ENTRETIEN OU L'ENLÈVEMENT DE LA CHAUDIÈRE ET LES RESPECTER).

THIS BOILER MUST BE INSTALLED IN ACCORDANCE WITH LOCAL CODES, IF ANY; IF NONE, FOLLOW ANSI Z223.1/NFPA54 or CAN/CSA B149, INSTALLATION CODES, AS APPLICABLE.

CETTE CHAUDIÈRE DOIT ÊTRE INSTALLÉE SELON LES CODES OU RÈGLEMENTS LOCAUX, OU, EN L'ABSENCE DE TELS RÈGLEMENTS, SE CONFORMER AUX CODES D'INSTALLATION ANSI Z223.1 / NFPA54, OU CAN/CSA-B149 SELON LE CAS.

**FOR YOUR SAFETY:** DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN VICINITY OF THIS OR ANY OTHER APPLIANCE

**POUR VOTRE SÉCURITÉ:** NE PAS ENTREPOSER NI UTILISER D'ESSENCE NI D'AUTRES VAPEURS OU LIQUIDES INFLAMMABLES À PROXIMITÉ DE CET APPAREIL OU DE TOUT AUTRE APPAREIL.

**Electrical rating / Caractéristiques Électriques**  
115 Volts / 60 HZ / 1 Phase / Less than / Moins que: 12A

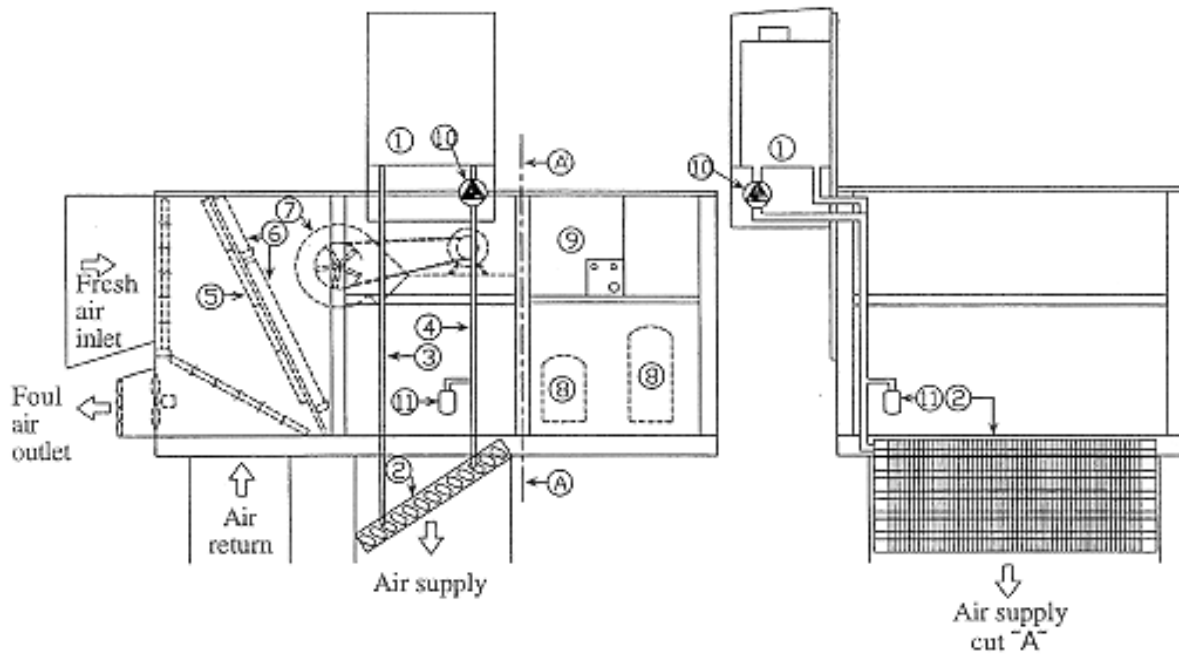
**Clearance to Combustibles /  
Dégagement des Matériaux Combustibles**  
Dessus: 30" (76 mm) : Top  
Dessous: 12" (305mm) : Underneath  
Côtés: 36" (914mm) : Sides  
Avant: 30" (76 mm) : Front  
Arrière: 0" (0mm) : Back

**LOGO P.M. BOWLE**

Fabriqué au Canada

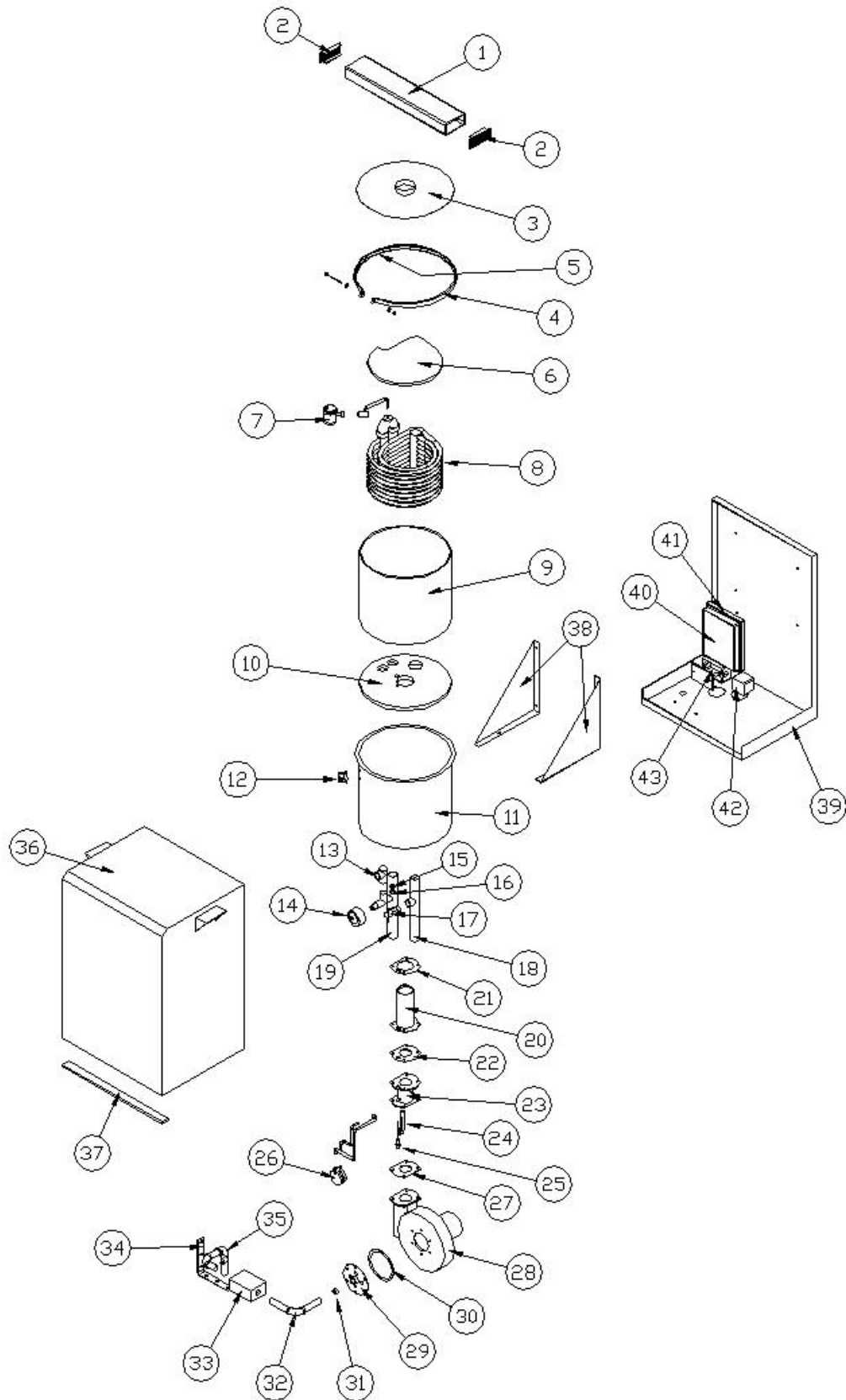
Made in Canada

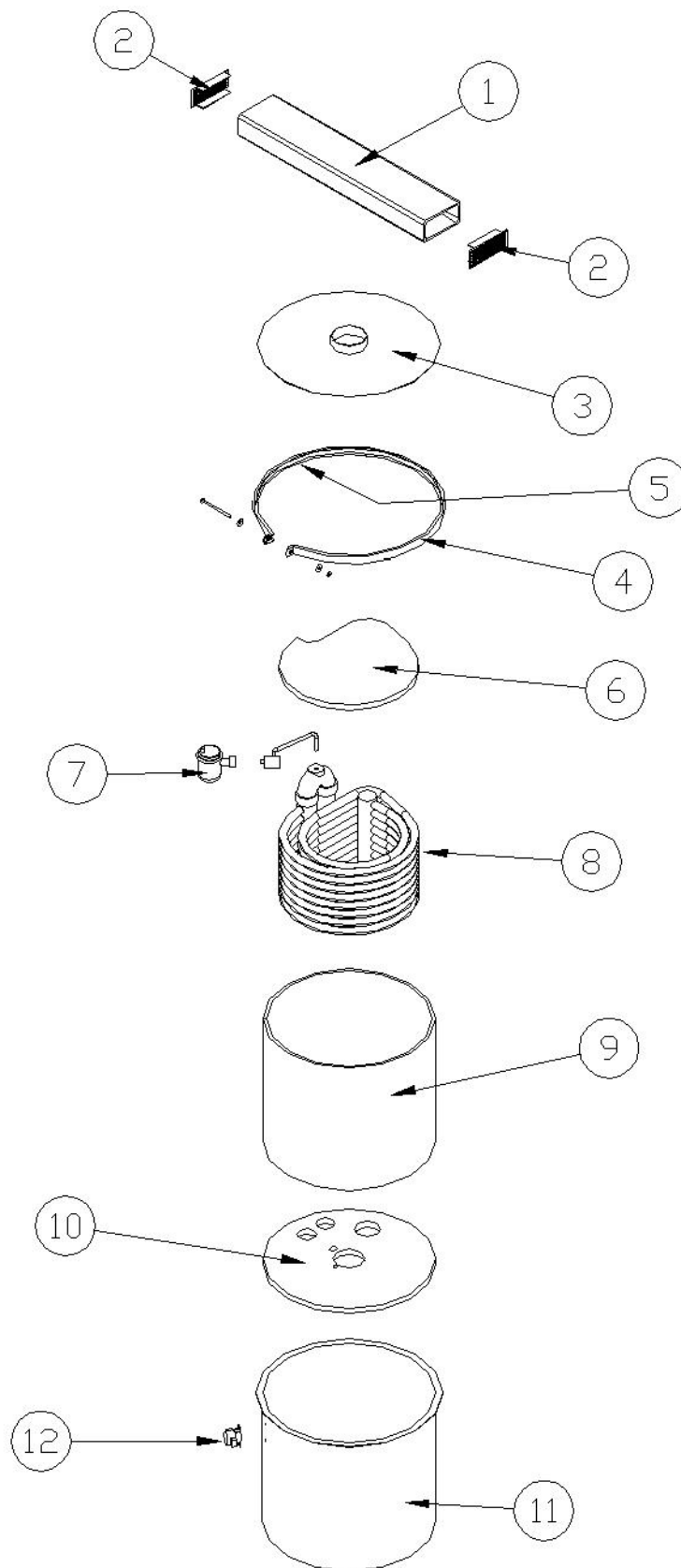
View of the external heating unit and inside vent unit

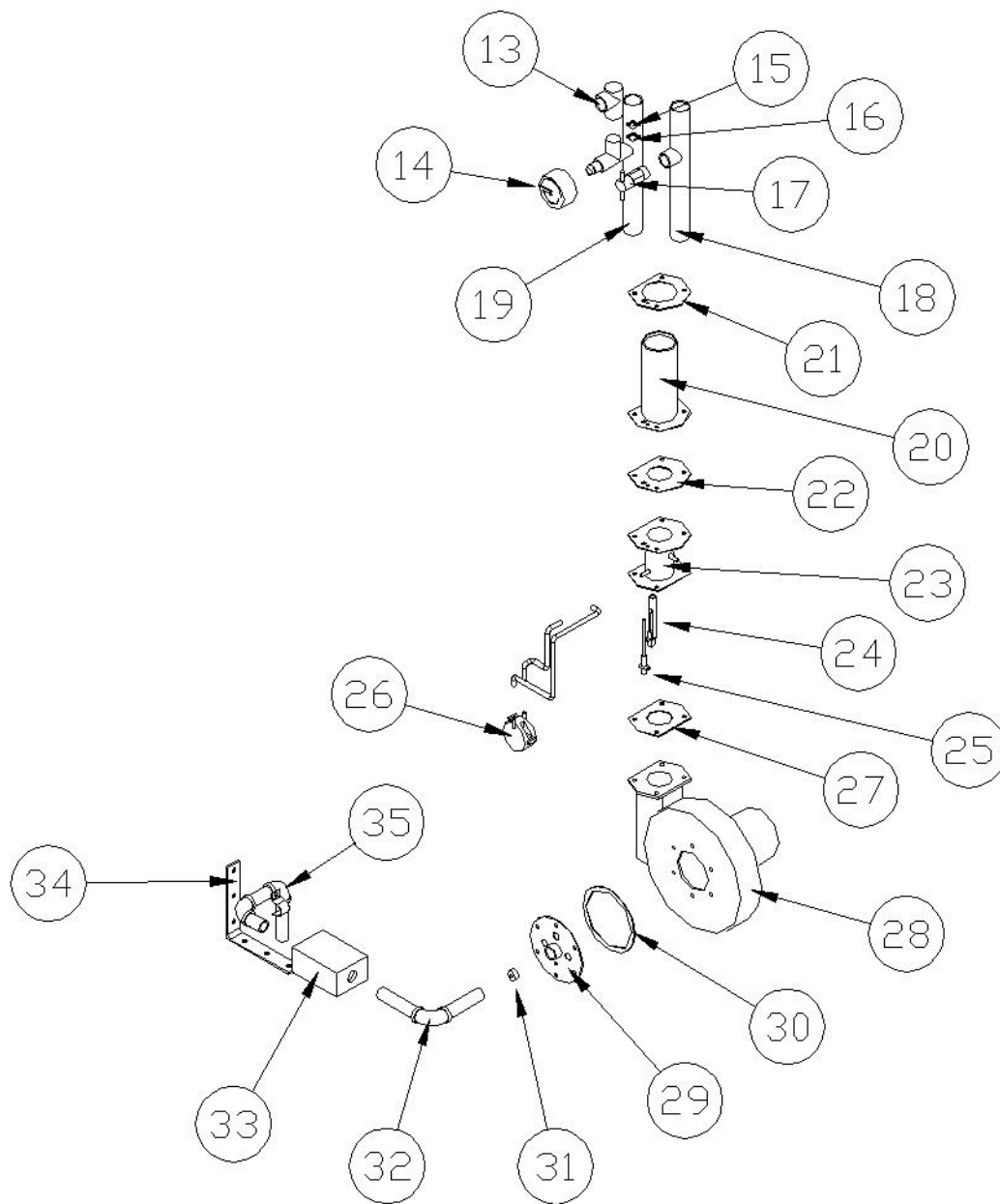


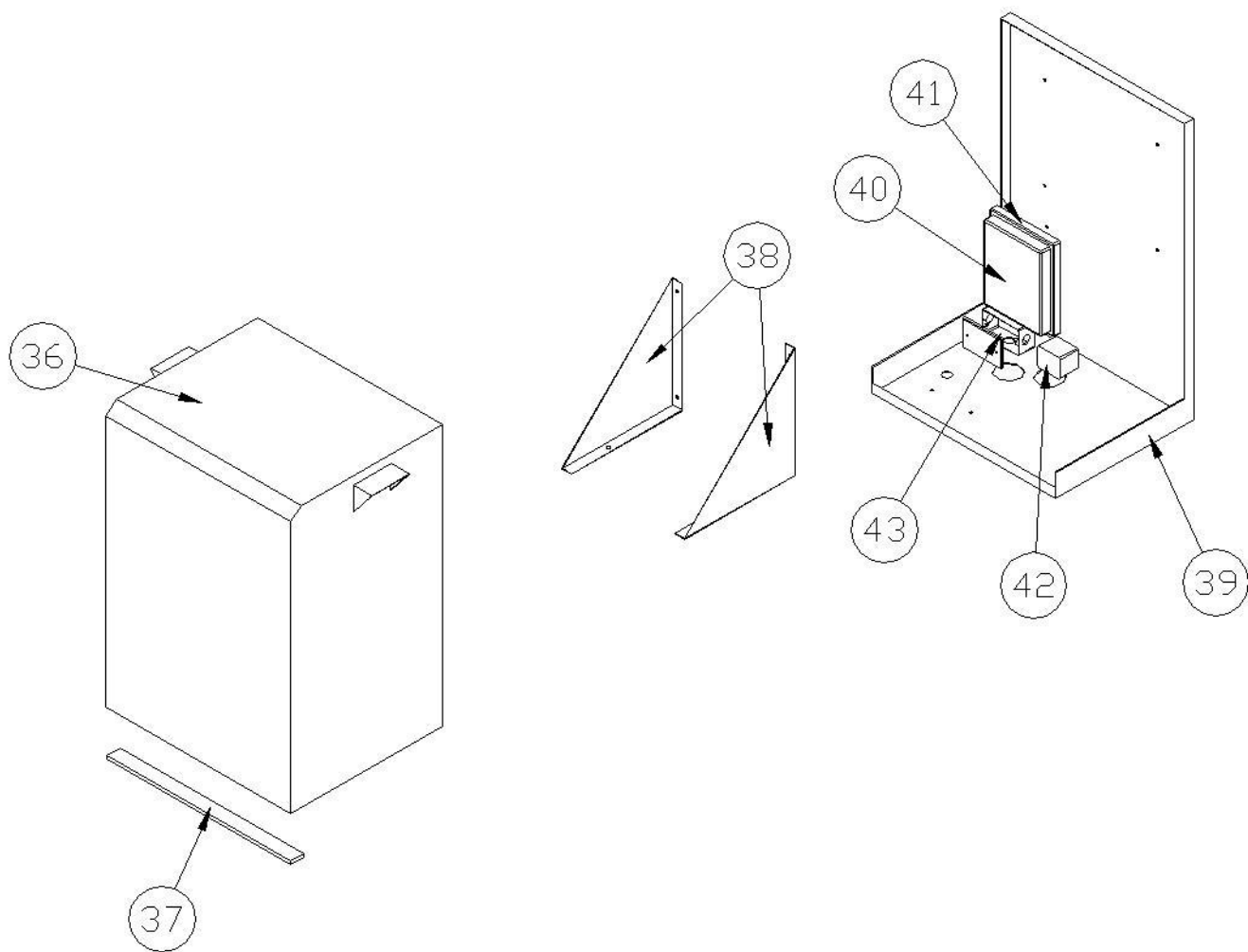
**Legend**

1. Natural Gas External Heating Unit
2. Glycol heating coil
3. Glycol inlet
4. Glycol return
5. Filters
6. Cooling coil
7. Fan
8. Compressors
9. Electrical and control panel
10. Circulator
11. Overflow tank









### **External heating boiler components description**

1. Stack
2. Stack's end
3. Combustion chamber cover
4. Cover latch
5. Cover latch gasket
6. Top refractory
7. Air vent
8. Heat exchanger
9. Combustion chamber wall refractory
10. Bottom refractory
11. Combustion chamber
12. Flue gases high temperature limit safety switch
13. Safety valve
14. Thermo-manometer
15. Liquid high temperature limit switch
16. Liquid operation temperature switch
17. Liquid flow switch
18. Liquid inlet manifold
19. Liquid return manifold
20. Burner
21. Burner gasket
22. Premix tube gasket
23. Premix tube
24. Hot surface igniters
25. Flame probe
26. Air flow switch
27. Premix blower gasket
28. Premix blower
29. Combustion air orifices plate
30. Combustion air orifice plate gasket
31. Gas nozzle
32. Premix blower gas supply line
33. Gas valve
34. Gas valve support
35. Gas valve gas supply line
36. Heating boiler cover
37. Air filter
38. Combustion chamber supports
39. Heating boiler frame
40. Electronic control board
41. Electronic control board enclosure
42. Electrical transformer
43. Electrical junction box

---

## Installing the Unit on a Roof

This section describes how to install a Natural Gas External Heating Unit.

### 1 Before you start

Make sure to :

- 
- 1.1 Conform to the laws, codes, rules and required clearance :

---

  - 1.2 Contact your gas distribution company to :
    - Get the authorizations to install the unit;
    - Check all pipes and gas tubing before authorizing the unit start-up.

---

  - 1.3 Install gas pipes of sufficient diameter as prescribed by the standards;

---

  - 1.4 Never install a unit inside a building or a room;

---

  - 1.5 Use the wall mounting brackets provided;

---

  - 1.6 See that the unit surrounding are exempt of combustible products, smoke, chemical or flammable fumes.
- 

### 2 During installation

Make sure to :

- 
- 2.1 The boiler must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of gas supply piping system at test pressure equal to or less than ½ psi (3,5 kPa).

---

  - 2.2 Check if the air pressure inside the expansion tank is adjusted to 5 psig before filling up the system;

---

  - 2.3 Always use the same brand of glycol for glycol levelling;

**\*\*Note**

- 
- 2.4 Purge (remove air) glycol circuit before unit start-up;

---

  - 2.5 To set glycol circuit pressure to 5 psig. Before unit start-up;

---

  - 2.6 To check glycol circuit operating pressure to keep a 10 psig maximum pressure.
- \*\*** Use the ethylene glycol at 40% with clear water.

### 3 During Start-up

Make sure to :

- 
- 3.1 Set the gas valve pressure at its outlet; according to table 1
- 
- 3.2 Proceed to a conform combustion test;
- 
- 3.3 Have a minimum temperature of 140°F for glycol return.
- 

**Table 1**

Model	Natural gas	Propane gas
CEB-100-AB	- 0,40" W.C.	- 0,00" W.C.
CEB-150-AB	- 0,65" W.C.	- 0,25" W.C.
CEB-200-AB	- 0,85" W.C.	- 0,68" W.C.

### 4 Safety rules for electrical wiring

Check for the minimum capacity on the unit control panel and for the protection system (fuses or breakers) maximum capacity

Estimate the size of the wire depending on the distance and use sealed and insulated conducts. The unit must be electrically grounded as stated in the electrical code.

The appliance must be electrically grounded in accordance with the requirements of the authority having jurisdiction, or in the absence of such requirements, in accordance with the National Electrical Code ANSI/NFPA 70 and/or Canadian Electrical Code Part 1, CSA C22.1"Electrical Code"

#### Warnings :

- Do not use gas pipes to ground the electrical circuit;

Check microprocessor control (control board) by connecting the transformer ground wire to heating unit case.

## 5 Safety rules in case of gas odor

### FOR YOU SAFETY READ BEFORE OPERATING

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

- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
- B. **BEFORE OPERATING** smell all around the appliance the appliance area for gas. Be sure to smell next to the floor if supplied with propane.

#### WHAT TO DO IF YOU SMELL GAS :

- Do not try to light any appliance;
- Do not touch any electric switch, do not use any phone in your building;

- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions;
  - If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if defective immediately call a qualified service technician to inspect the appliance and to repair or replace any part of the system.

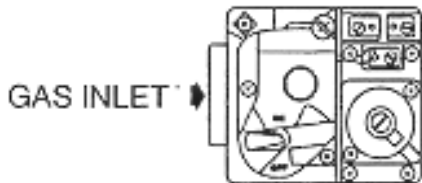
#### **WARNING:**

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

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

## OPERATING INSTRUCTIONS

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



5. Shut off the manual gas valve of the appliance.
6. Remove the front access panel.

7. Close gas control valve by turning the knob to « OFF » position.

NOTE : Knob can be turned to « OFF » clockwise or counter clockwise.

8. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP.

Follow "B" in the safety information above on this label. If you don't smell gas go to the next step.

9. Turn gas control knob to « ON » position.
10. Turn on all electric power to appliance.
11. Replace front access panel.
12. Set thermostat to desired setting.
13. If the appliance will not operate, follow the instructions « To Turn Off Gas To Appliance » and call your service technician or gas supplier.

## TO TURN OFF GAS TO APPLIANCE

1. Set the thermostats to lowest setting.
2. Turn off the outside manual shut-off gas valve.
3. Remove front access panel.
4. Turn off all electric power to appliance if service is to be performed.

5. Turn gas control knob any direction to « OFF ». Do not force.
6. Replace front access panel.

# OPERATION

## Electric Control Operation

This controller has an adaptive algorithm that reduces the ignitor temperature to slightly greater than the minimum temperature required for ignition. The control measures the line voltage and determines an initial ignitor temperature. After each successful ignition, the control lowers the ignitor temperature. After each successful ignition, the control lowers the ignitor temperature for the next ignition attempt. When ignition does not occur, and the control goes into retry mode, the control increases the ignitor temperature to the value it was on the third previous successful ignition. After ignition is successful, the control repeats the adaptive algorithm. The control is constantly making adjustments to the ignitor temperature to compensate for changes in the line voltage.

## Unit Functional Operation Modes

This section describes the functional operation modes of a Natural Gas External Heating Unit.

### 1 Heat Mode

1.1	On a call for heat, the thermostat contacts close signaling the control module.
1.2	The microprocessor runs its self-check routine.
1.3	The circulator is energized.
1.4	The control module checks the high limit circuit and air flow switch to ensure for normally closed.
1.5	The system will energize the premix fan (40 seconds).
1.6	The ignitor warm up period begins after the inducer prepurge time has expired (20 seconds).
1.7	After completion of the ignitor warm up period : -Trial for ignition begins; -The gas valve is energized for 7 seconds; -Flame failure response is set for 8 seconds.
1.8	The ignitor is de-energized when flame is sensed or at the conclusion of the ignition activation period.
1.9	When the thermostat is satisfied (i.e., when set temperature is reached), the gas valve is de-energized.*
1.10	The premix fan is de-energized following postpurge (5 seconds).
1.11	The circulator relay is de-energized after a 30 seconds delay.

\*Note : The operation disk (TC1) can also stop the combustion cycle by setting the GAS valve to Off in order to keep the glycol temperature between 160°F and 181°F, even if the thermostat is not satisfied. The circulator is kept energized.

## 2 Retry

- 
- 2.1 If the first ignition attempt fails during a normal heating cycle sequence, the control will :
- De-energize the main gas valve;
  - The premix fan remains energized and the system is purged for inter purge time (30 seconds);
  - Normal ignition sequence is started.
- 
- 2.2 Three ignition retries are attempted before System lockout.
- 
- 2.3 After system lockout, the automatic reset feature is activated providing an additional trial for ignition sequence every one hour, provided a call for heat exists.
- 

## 3 Recycle

- 
- 3.1 If during the trial for ignition period the flame is established and then lost :
- The main gas valve is de-energized;
  - The normal ignition sequence is started.
- 
- 3.2 The number of recycles is 5 before system lockout.
- 
- 3.3 After system lockout, the automatic reset feature is activated providing an additional trial for ignition sequence every one hour, provided a call for heat exists.
- 

## 4 Normal operation

- 
- 4.1 If flame exists 10 seconds after the completion of the ignition activation period :
- The retry counter is set to zero;
  - The control enters its normal operating loop where all inputs are continuously checked.
- 

## 5 Premix fan operation

- 
- 5.1 If during the start-up of a normal cycle, the pressure switch is sensed closed prior to energizing the premix fan, the control module will await the opening of the pressure switch before continuing.
- 
- 5.2 If after the premix fan is energized, the pressure switch does not close during the heating cycle, the control module will keep the inducer energized and await the closing of the pressure switch.
- 
- 5.3 If the premix fan has been on for 60 seconds and the pressure switch fails to close, the inducer will be turned off for 5 minutes.
-

## 6 System Lockout

---

6.1 When system lockout occurs :

- The gas valve and the ignitor are de-energized;
- The circulation is energized and will remain on as long as the following error conditions are detected;
  - a) High limit switches are opened;
  - b) Flame is present. (see Section 7.2, Safety Features);
  - c) When the error is no longer detected, the premix fan will run through the postpurge time and the circulator will be de-energized after a 30 second delay;
  - d) If the high limit switches close after being detected open, the control will reset once the circulator is de-energized;
- System lockout will never override any of the safety features mentioned in Section 7, **Safety Features**

---

6.2 To reset the control, refer to section 8, Resetting the control.

---

## 7 Safety Features

---

7.1 If at any time the high temperature limit, air flow switch open, the gas valve and ignitor will be de-energized.

---

7.2 If at any time a flame is sensed when the gas valve is de-energized, the circulator and the premix fan are energized. The ignition sequence will go into system lockout.

---

7.3 If at any time during a call for heat the high limit circuit open, the circulator and premix fan are energized. When the circuit close, the circulator will run through the heat off delay and the premix fan through postpurge. Afterwards, the control will resume normal operation.

---

## 8 Resetting the Control

The control can be reset by 3 means :

---

8.1 System reset

Removal of the 24 V.A.C. power to the control for a period of time than 1 second will reset the control;

---

8.2 Thermostat reset

Interruption of the call for heat from the thermostat for a period of time greater than 1 second but less than 20 seconds will reset the control. If flame is sensed with the gas valve de-energized, interrupting the call for heat at the thermostat will no reset the control .

---

8.3 Automatic reset

After one hour in lockout mode, the control will automatically reset itself.

---

## **9 Servicing**

It is recommended that the appliance be serviced by a certified technician at least once a year. Combustion air supply and venting should be inspected seasonally for obstruction and debris:

---

9.1 Combustion air filter should be cleaned with soapy warm water regularly.

---

9.2 Venting system, should be tested for proper operation regularly.

---

9.3 Stack's end should be regularly inspected for obstruction. In winter, perform regular inspection of the venting system to insure that the flue gas outlets are not blocked by snow.

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9.4 Appliance area should be kept clear and free from combustible materials, gasoline and other flammable liquids

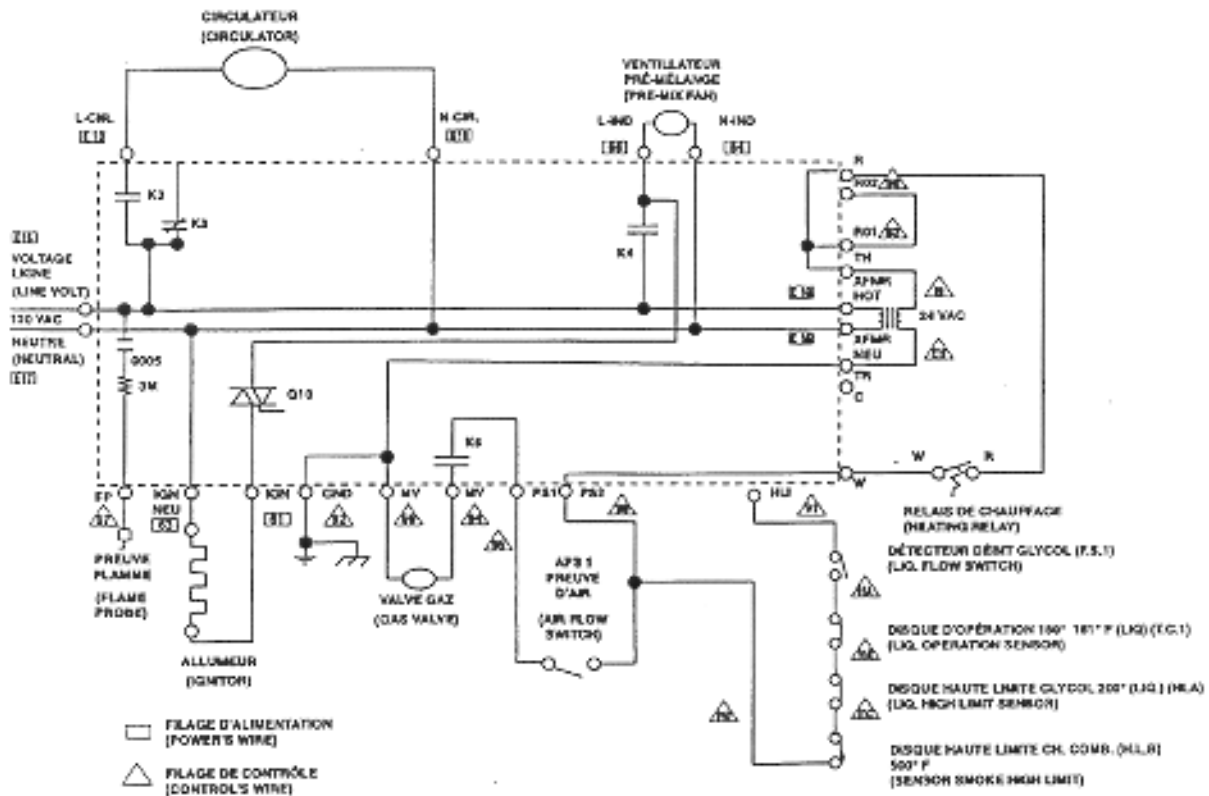
---

9.5 Air inlet should be inspect regularly for obstructions and debris

---



## 11 Control Diagram (Processor)



## 12 Processor Control Electrical Characteristics

Input: 25 VAC, 60 Hz

XFMR Sec. Current: 405 m.a. + MV

Gas valve output (MV): 1,5 amp. @ 24 VAC

Ignitor output: 2.0 amp @ 120 VAC

Inducer blower output: 2,2 FLA, 3,5 LRA, 120 VAC

Circulator output: 10 FLA, 20 LRA, 120 VAC

Prepurge period: 40 sec. Interpurge period: 30 sec. Postpurge period: 5 sec.

Ignitor warmup period: 20 sec.

Ignition activation period: 7 sec.

Trial for ignition: 8 sec.

Automatic restart: 60 min.

Retries: 3 times.

Recycles: 5 times.

## REFERENCES

- Gas Installation Code

Approved by le Canadian Standards Association(CSA)

Prepared et published by the Canadian Gas Association (CGA)

- Directions for use

Major revisions to the Gas Installation Code

Ministry of Labor, produced with help from Gaz Métropolitain and the Corporation des maîtres mécaniciens en tuyauterie du Québec

### **Others information about the Appliance Installation**

#### **Accessibility :**

An appliance shall not be installed on a roof :

- a) exceeding 13 ft. (4 m) in height from grade to roof elevation unless fixed access to the roof is provided (figure A); and
- b) exceeding 26 ft. (8 m) in height from grade to roof elevation unless permanent fixed access to the roof by means of either a stairway, or a stairway leading to a ladder not exceeding 13 ft. (4 m) in height, is provided (figure B).

When an appliance is installed on a roof , the clearance between the appliance and the edge of the roof or other hazard shall be at least 6 ft. (2 m);

An appliance installed at a distance of 10 ft. (3 m) or more from the floor, as measured from the lowest point of the appliance, shall be provided with either.

- a) a permanent accessible service platform which permits access to all parts of the appliance requiring service; or
- b) other approved means of service access

An appliance installed outdoors shall be located so as to prevent circulation of flue gases into the combustion air inlet or circulating air stream of an adjacent appliance.

### Event of regulators

The outdoor vent termination of regulators and line relief devices shall be equipped with a means to prevent the entry of water, insects or foreign material.

The discharge from a regulator vent or line relief device shall terminate outdoors and be located :

- a) So that the gas can escape freely and away from building openings; and
- b) Not less than 10 ft (3 m) in any direction, from air operation into a direct vent appliance, mechanical air intake, or from a source of ignition;

### Piping system

Nesting of bushings is prohibited.

A pipe fitting containing both left and right hand threads, thread protector or running threads shall not be used.

A close ripple, a street elbow or a street tee shall not be used in a piping system.

Outdoor piping or indoor piping and tubing, when exposed to atmospheres that are corrosive to the piping or tubing shall be protected by either painting or coating.

A readily accessible manual shut-off valve for each appliance shall be installed in either the drop or riser as close as possible to the valve train of a commercial and industrial type appliance

Piping may be supported with treated wood blocks and the support spacing shall comply with Table 5.8.3 and Clause 5.27.2.

Tubing shall be supported continuously with treated wood and planks when it is laid on the roof-top.

Piping and tubing shall be installed in accordance with appropriate code and means for expansion shall be provided

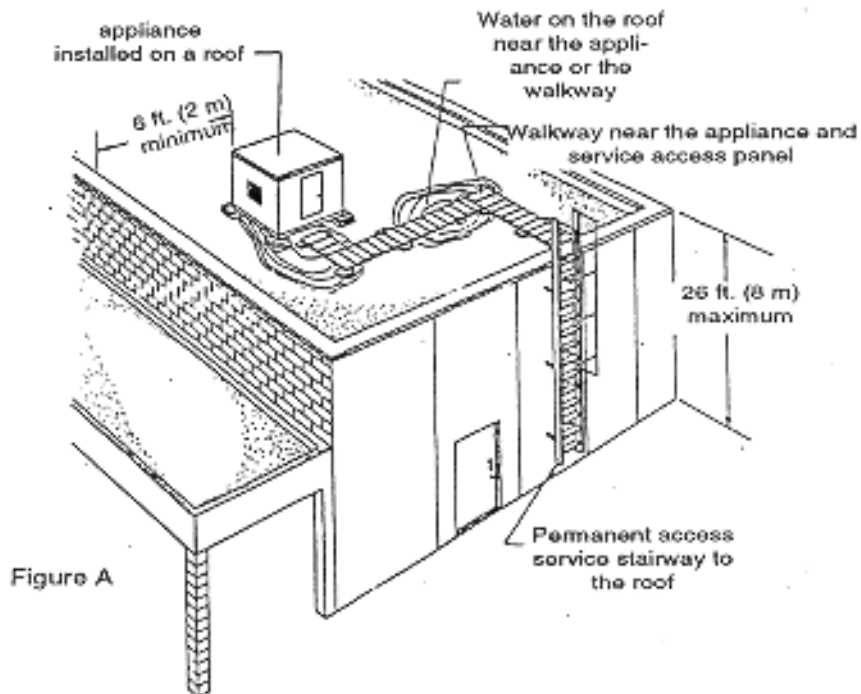
- The appliance, when used in connection with a refrigerator system, must be installed so the chilled medium is piped in parallel with the appliance with appropriate valves to prevent the chilled medium from entering the appliance.
- The appliance piping system of a hot water boiler connected to heating coils located in air handling units where they may be exposed to refrigerated air circulation must be equipped with flow control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.

### Vent

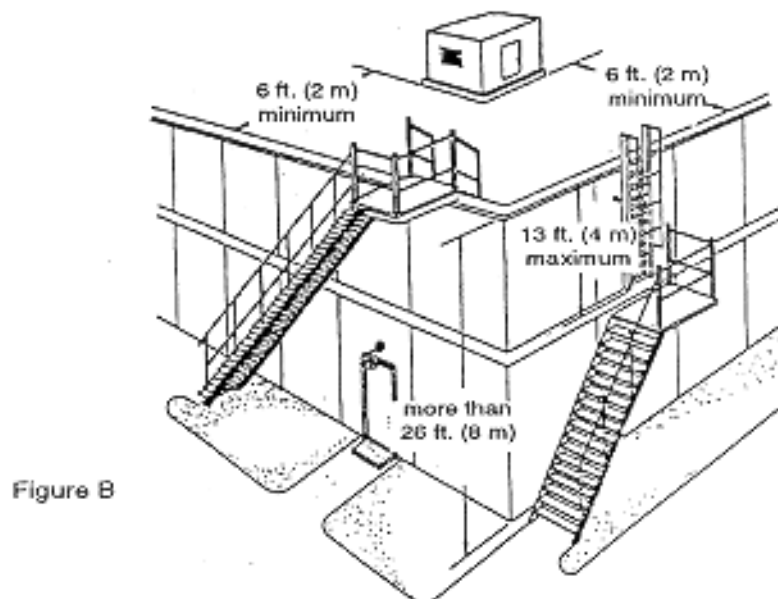
A vent shall not terminate :

- within 6 ft (1.8 m) of a mechanical air supply inlet to any building;
- Within the following distances of a window or door which can be opened in any building, any non-mechanical air supply inlet to any building or the combustion air inlet of any other appliance :
  - i) 12 inches (300 mm) for inputs up to and including 100 000 Btu/h (30 kW);
  - ii) 3 ft (1 m) for inputs exceeding 100 000 Btu/h (30 kW);

**View of an appliance installed on a roof with a height between 13 to 26 ft.**



**View of an appliance installed on a roof with a height exceeding 26 ft. (8 m)**



## *P.M. Bowle* Gas Heater Unit Warranty

*P.M. Bowle* guarantees that its products are exempt of any manufacturing fault when they are used and maintained in normal conditions.

- Heat exchanger copper tubing carries a five (5) year warranty from the date of purchase against defects in material, workmanship and thermal shocks.
- All others parts carry a one (1) year warranty from the date of purchase against defects in materials and workmanship.

*P.M. Bowle* will replace the defective parts as stated in the warranty.

The warranty will apply only when the installation is done following the information provided in the guide supplied with the *P.M. Bowle* heating unit.

Warranty is void if the installation, the operation, or the maintenance of the unit does not comply to this manual contents, codes, or regulations that rules this unit.

*P.M. Bowle* responsibility does not exceed at any time the replacement or repair of the defective parts, F.O.B. factory, Québec (Québec) Canada.

Ship inoperative parts or complete heater together with Serial Number and purchase date, transportation prepaid, directly to the address below.

### **Important**

The user must complete the registration form and return it in the five (5) days following the heating unit installation.



## GAS HEATER UNIT LIST OF PARTS

<b>Parts no.</b>	<b>DESCRIPTION</b>	<b>applicable model</b>
B1001	Heating boiler cover	all
B0002	Heating boiler frame	all
B1003	Stack	all
B1113	Stack's end	all
B1004	Combustion chamber cover	CEB-100-AB
B1504	Combustion chamber cover	CEB-150-AB
B2004	Combustion chamber cover	CEB-200-AB
B1005	Combustion chamber	all
B1015	Combustion chamber cover latch	all
B1025	Cover latch gasket	all
B0006	Flame probe	all
B1007	Premix tube	all
B0008	Combustion chamber supports	all
B0009	Gas valve support	all
B1010	Combustion air orifice plate	CEB-100-AB
B1510	Combustion air orifice plate	CEB-150-AB
B2010	Combustion air orifice plate	CEB-200-AB
B0011	Heating boiler support	all
A0012	Electrical junction box cover	all
C1050	Heat exchanger	CEB-100-AB
C1550	Heat exchanger	CEB-150-AB
C2050	Heat exchanger	CEB-200-AB
B1013	Liquid inlet manifold	CEB-100-AB
B1513	Liquid inlet manifold	CEB-150-AB
B2013	Liquid inlet manifold	CEB-200-AB
B1014	Liquid return manifold	CEB-100-AB
B1514	Liquid return manifold	CEB-150-AB
B2014	Liquid return manifold	CEB-200-AB
B0015	Safety valve	all
B0016	Thermo-manometer	all
B0017	Air vent	all
C0018	Gas valve supply line	all
C0019	Premix blower gas supply line	all
C1020	Natural gas nozzle	CEB-100-AB
C1520	Natural gas nozzle	CEB-150-AB
C2020	Natural gas nozzle	CEB-200-AB
C1021	Propane gas nozzle	CEB-100-AB
C1521	Propane gas nozzle	CEB-150-AB
C2021	Propane gas nozzle	CEB-200-AB
C0021	Hot surface igniters	all
C0022	Flame probe	all

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<b>Parts no.</b>	<b>DESCRIPTION</b>	<b>applicable model</b>
C0023	Flue gases high temperature limit safety switch	all
C0024	Gas valve	all
C0025	Premix blower	all
C0026	Liquid flow switch	all
C0027	Liquid high temperature limit switch	all
C0028	Liquid operation temperature switch	all
C1029	Air flow switch	CEB-100-AB
C1529	Air flow switch	CEB-150-AB
C2029	Air flow switch	CEB-200-AB
C0030	Electronic control board	all
C0031	Electrical wiring harness	all
C0032	Electrical transformer	all
D1033	Burner	CEB-100-AB
D1533	Burner	CEB-150-AB
D2033	Burner	CEB-200-AB

