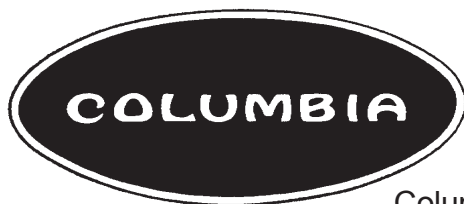
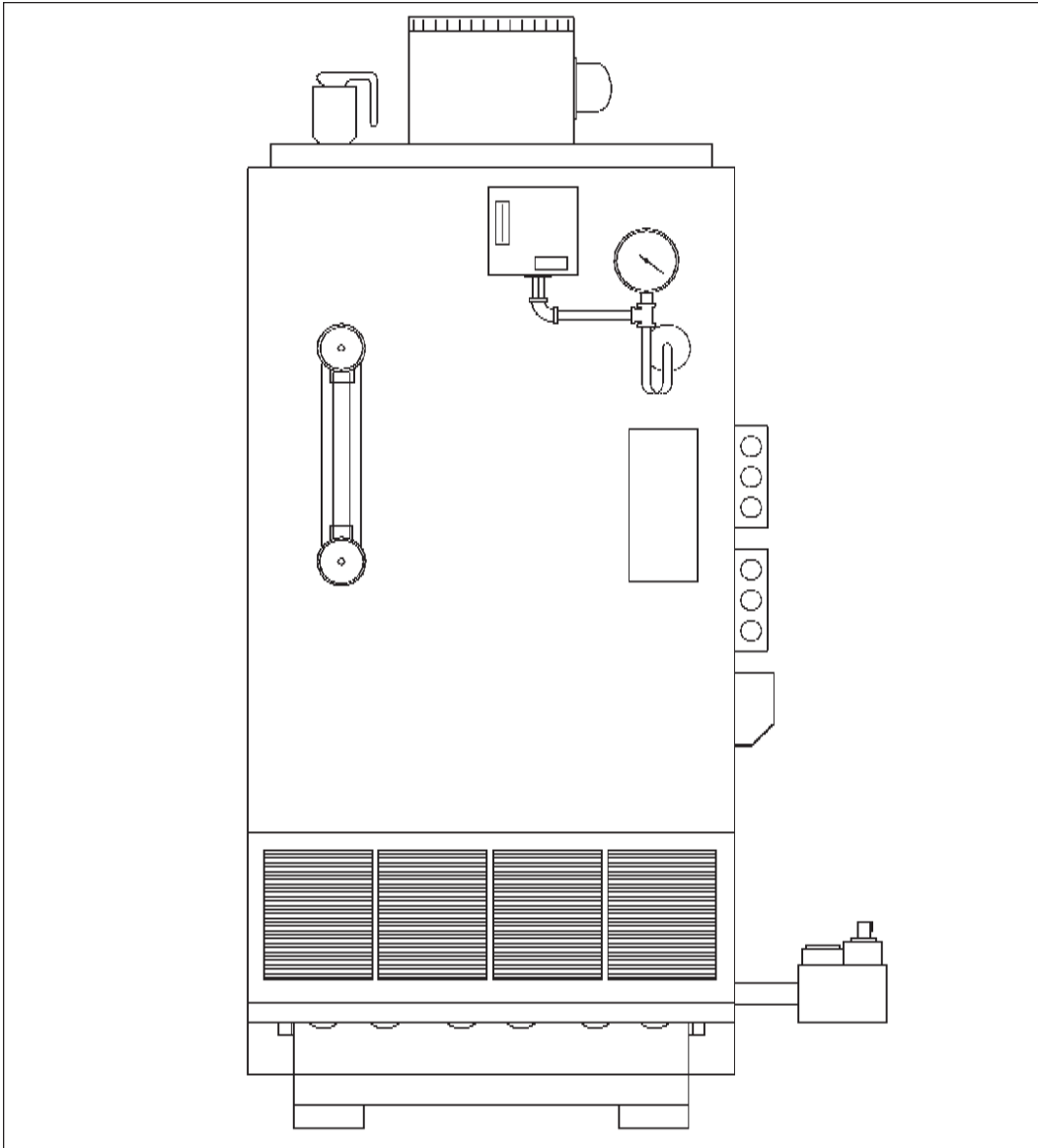


CEG-C

GAS FIRED BOILERS
FOR STEAM HEATING



Columbia Boiler Company
Main Offices and Factory: Pottstown, PA

INSTALLATION MANUAL AND OPERATING INSTRUCTIONS

TABLE OF CONTENTS

Safety Symbols & Warnings	Page 1
Installation Procedure	Page 2
Ventilation and Combustion Air	Pages 3-4
Connecting Supply and Return Piping	Page 5-6
Vent Installation	Page 7
Vent System Modification	Page 8
Vent Damper Installation and Instructions	Page 9
Connecting Gas Service	Page 10
Electrical Wiring	Page 10
Thermostat Installation	Page 11
Lighting Instructions	Pages 11-13
Normal Sequence of Operation	Page 14
Connecting Supply And Return Piping Water-Chilled Medium	Page 15
General Instructions	Pages 16-20
Replacement Parts Lists	Pages 20-25
Ratings, Data and Dimensions	Page 26

KEEP THIS MANUAL NEAR BOILER
RETAIN FOR FUTURE REFERENCE

SERIES CEG-C
CAST IRON
GAS FIRED BOILERS

INSTALLATION MANUAL AND
OPERATING INSTRUCTIONS

Published April 1997
Printed in USA
Made in USA



A.G.A. Certified
for Natural gas
or Propane



Tested for 100 lbs.
ASME Working
Pressure

Safety Symbols

The following defined symbols are used throughout this manual to notify the reader of potential hazards of varying risk levels.

DANGER

DANGER - Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

WARNING

WARNING - Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury


CAUTION

CAUTION - Indicates a potential hazardous situation which, if not avoided, MAY result in minor or moderate injury. It may also be used to alert against unsafe practices.

IMPORTANT! READ ALL INSTRUCTIONS BEFORE INSTALLING.

WARNING:

1. Keep boiler area clear and free from combustible materials, gasoline and other flammable vapors and liquids.
2. **DO NOT** obstruct air openings to the boiler room.
3. Modification, substitution or elimination of factory equipped, supplied or specified components may result in property damage, personal injury or the loss of life.
4. To the owner: Installation and service of this boiler must be performed by a qualified installer.
5. To the installer: Leave all instructions with the boiler for future reference.

 **WARNING:** **ALL INSTALLATIONS OF BOILERS AND VENTING SHOULD BE DONE ONLY BY A QUALIFIED EXPERT AND IN ACCORDANCE WITH THE APPROPRIATE COLUMBIA BOILERS MANUAL. INSTALLING OR VENTING A BOILER OR ANY OTHER GAS APPLIANCE WITH IMPROPER METHODS OR MATERIALS MAY RESULT IN SERIOUS INJURY OR DEATH DUE TO FIRE OR TO ASPHYXIATION FROM POISONOUS GASES SUCH AS CARBON MONOXIDE WHICH IS ODORLESS AND INVISIBLE.**

INSTALLATION PROCEDURE



WARNING:

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.

1. The installation must conform to the requirements of the authority having jurisdiction or, in absence of such requirements, to the latest revision of the National Fuel Gas Code, ANSI Z223.1. (Available from the American Gas Association, Pleasant Valley Road, Cleveland, Ohio 44134.) Reference should also be made to local gas utility regulations and other codes in effect in the area that the installation is to be made.

2. Where required by the authority having jurisdiction, the installation must conform to American Society of Mechanical Engineers Safety Code for Controls and Safety Devices For Automatically Fired Boilers, No.CSD-1.

3. This boiler is classified as a Category 1 appliance and the vent installation shall be in accordance with Part 7 & 11 of the latest revision of the National Fuel Gas Code noted above or applicable provisions of the local building codes. See Vent Installation on page 7.

4. This boiler meets safe lighting and other preference criteria with the gas manifold and control assembly provided on the boiler per the latest revision of ANSI Z21.13b.

5. This boiler shall be installed such that the gas ignition system components are protected from water (dripping, spraying, rain, etc.) during appliance operation and service, (circulator replacement, condensate trap, control replacement, etc.).

6. LOCATE BOILER on level, solid base as near chimney as possible and centrally located with respect to the heat distribution system as practical.

7. ALLOW 24 inches at the front and right side for servicing and cleaning.

8. When installing in a utility room, the door should be wide enough to allow the largest boiler part to enter, or to permit replacement of another appliance such as a water heater.

9. FOR INSTALLATION ON NONCOMBUSTIBLE FLOORS ONLY. *The boiler must not be installed on carpeting. Minimum clearances to combustible construction are:

TOP	24 IN.
FRONT	ALCOVE
FLUE COLLECTOR	6 IN.
REAR	8 IN.
SIDES	6 IN.

NOTE: GREATER CLEARANCES FOR ACCESS SHOULD SUPERSEDE FIRE PROTECTION CLEARANCE.

VENTILATION & COMBUSTION AIR

! WARNING: AIR OPENINGS TO COMBUSTION AREA MUST NOT BE OBSTRUCTED. BY FOLLOWING THE INSTRUCTIONS BELOW, ADEQUATE COMBUSTION AIR CAN BE MAINTAINED

* Unconfined area: A space whose volume is not less than 50 cubic feet per 1000 BTU per hour of all appliances installed in that space (cubic feet of space = height x width x length).

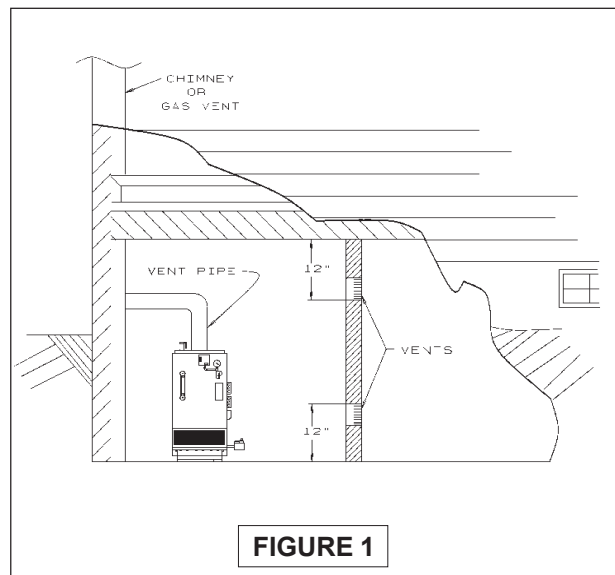
** Confined area: A space whose volume is less than 50 cubic feet per 1000 BTU per hour of all appliances installed in that space (cubic feet of space = height x width x length).

1. Ventilation of the boiler room must be adequate to provide sufficient air to properly support combustion per the latest revision of the National Fuel Gas Code, ANSI Z223.1 section 5.3.

2. When a boiler is located in an unconfined space in a building or conventional construction frame, masonry or metal building, infiltration normally is adequate to provide air for combustion and ventilation. However, if the equipment is located in a building of unusually tight construction (See the national Fuel Gas Code, Ansi Z223.1 section 1.7), the boiler area should be considered as a confined space. In this case air for combustion and ventilation shall be provided according to part 5 below. If there is any doubt, install air supply provisions in accordance with the latest revision of the National Fuel Gas Code.

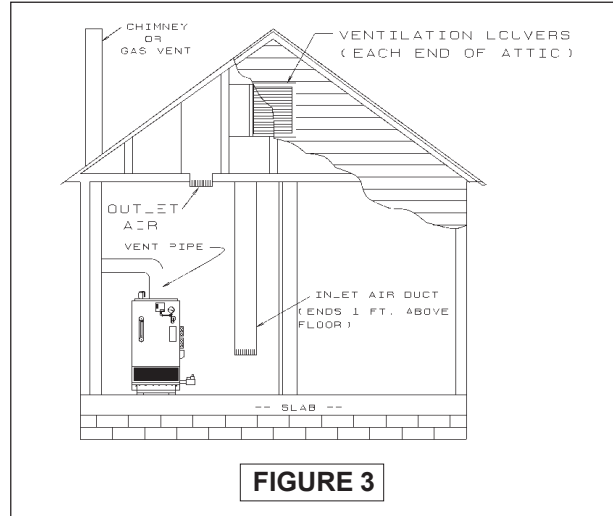
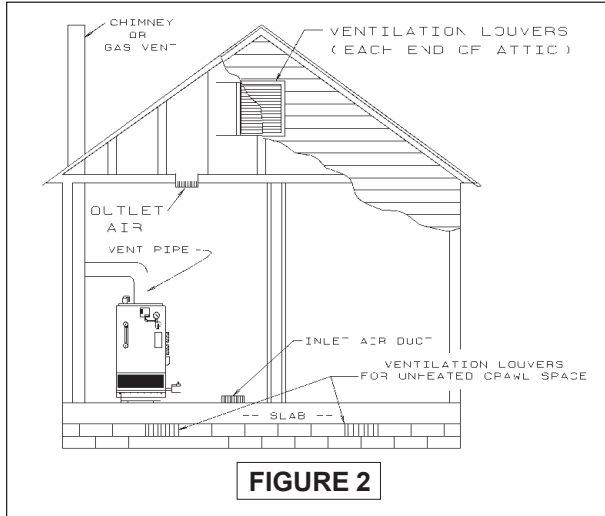
3. When a boiler is installed in an unconfined space, in a building of unusually tight construction, air for combustion and ventilation must be obtained from outdoors or from spaces freely communicating with the outdoors. A permanent opening or openings having a total free area of not less than 1 square inch per 5,000 BTU per hour of total input rating of all appliances shall be provided. Ducts may be used to convey makeup air from the outdoors and shall have the same cross-sectional area of the openings to which they are connected.

4. When air for combustion and ventilation is from inside buildings, the confined space shall be provided with two permanent openings, one starting 12 inches from the top and one 12 inches from the bottom of the enclosed space. Each opening shall have a minimum free area of 1 square inch per one thousand (1000) BTU per hour of the total input rating of all appliances in the enclosed space, but must not be less than one hundred (100) square inches. These openings must freely communicate directly with other spaces of sufficient volume so that the combined volume of all spaces meets the criteria for an unconfined space.



5. When the boiler is installed in a confined space and all air is provided from the outdoors the confined space shall be provided with one or two permanent openings according to methods A or B. When ducts are used, they shall be of the same cross sectional area as the free area of the area of the openings to which they connect. The minimum dimension of rectangular air ducts shall be not less than 3 x 3 inches or 9 square inches.

A. When installing two openings, one must commence within 12 inches from the top and

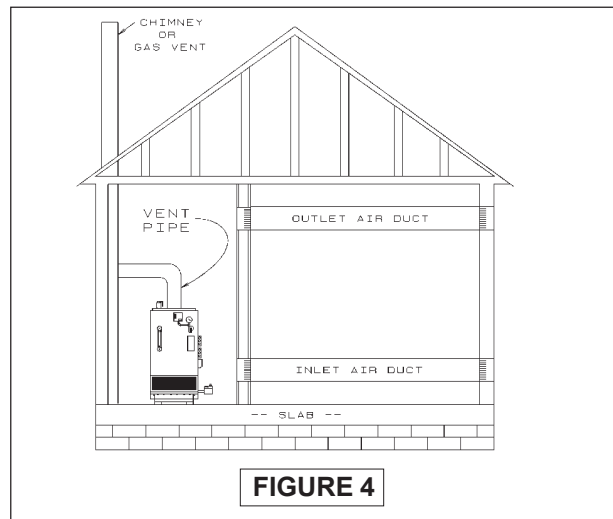


the other within 12 inches from the bottom of the enclosure. The openings shall communicate directly, or by ducts, with the outdoors or spaces (crawl or attic) that freely communicate with the outdoors. One of the following methods must be used to provide adequate air for ventilation and combustion.

1. When directly communicating with the outdoors, each opening shall have a minimum free area of 1 square inch per 4,000 BTU per hour of total input rating of all equipment in the enclosure. See figure 2 below.

2. When communicating with the outdoors by means of vertical ducts, each opening shall have a minimum free area 1 square inch per 4,000 BTU per hour of total input rating of all appliances in the enclosed space. See figure 3 above.

3. If horizontal ducts are used, each opening and duct shall have a minimum free area 1 square inch per 2,000 BTU per hour of total input rating of all appliances in the enclosed space. See figure 4 at right.



B. One permanent opening, commencing within 12 inches of the top of the enclosure, shall be permitted where the equipment has clearances of at least 1 inch from the sides, 1 inch from the back, and 6 inches from the front of the boiler. The opening shall directly communicate with the outdoors or shall communicate through a vertical or horizontal duct to the outdoors or spaces (crawl or attic) that freely communicate with the outdoors. The openings must have a minimum free area of 1 square inch per 3000 Btu per hour of the total

input rating of all equipment located in the enclosure. The free area must be no less than the sum of the areas of all vent connectors in the confined space.

6. In calculating free area using louvers, grilles or screens for the above, consideration shall be given to their blocking effect. Screens used shall not be smaller than 1/4 inch mesh. If the free area through a design of louver or grill is known, it should be used in calculating the size opening required to provide the free area specified. If the design and free area is not known, it may be assumed that wood louvers will have 20-25% free area and metal louvers and grilles will have 60-75% free area. Louvers and grilles should be fixed in the open position or interlocked with the boiler so they are opened automatically during the boiler operation.

CONNECTING SUPPLY AND RETURN PIPING

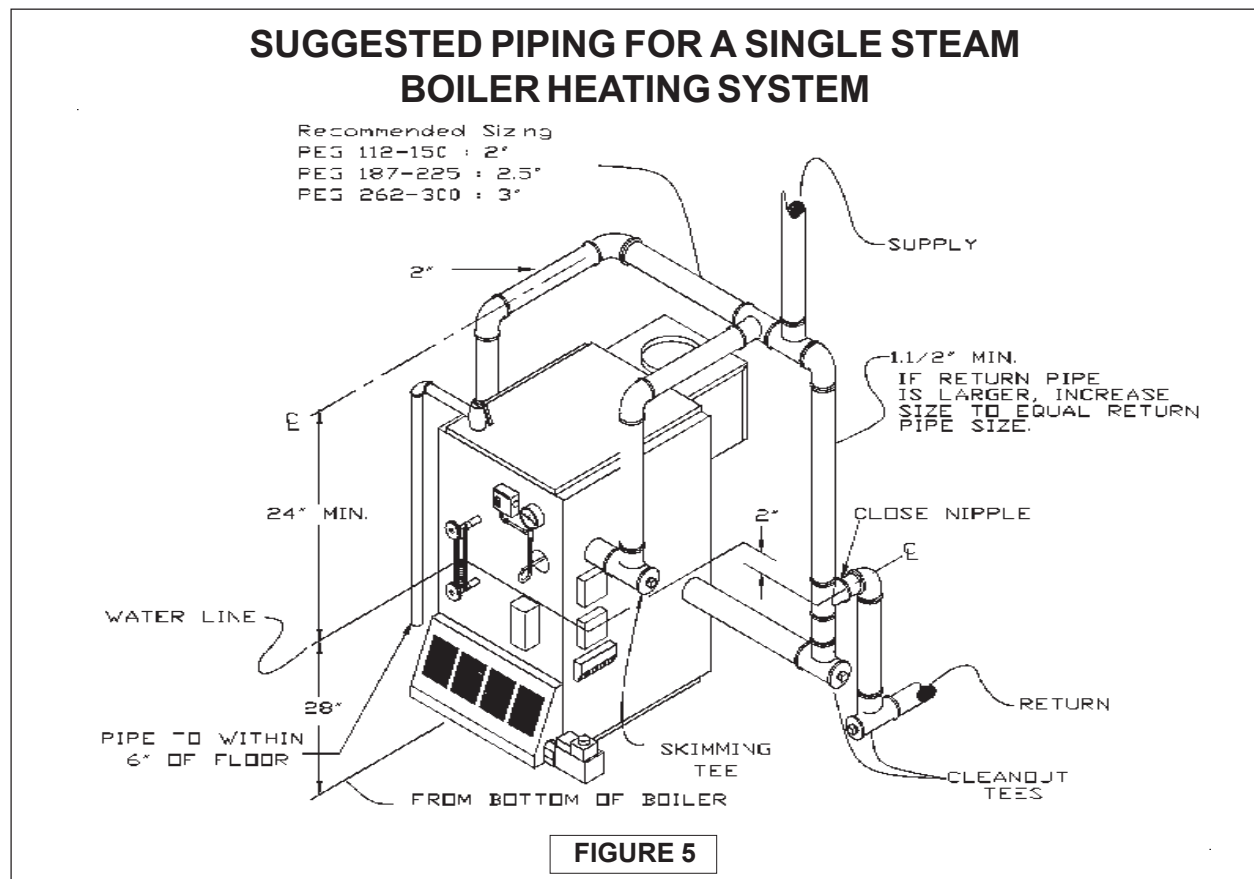
1. Suggested piping for steam heating system can be seen in figure 5 below. Actual piping may vary based on system design and local conditions.

2. Suggested piping for a modular steam boiler using pumped returns may be seen in figures 6a and 6b on page 6. Actual piping may vary based on system design and local conditions.

3. Refer to pages 17 & 18 for procedures on cleaning and skimming off impurities.

4. "Near Boiler Piping" is crucial for proper performance of a replacement steam boiler and should always be considered as part of the boiler installation. Always be sure to include cleanout and skimming tees in the near boiler piping. These "Tees" are necessary for proper cleaning and servicing of the boiler.

5. For further piping information refer to the I=B=R installation piping guide.



SUGGESTED PIPING FOR A MODULAR STEAM BOILERS

PUMPED RETURNS

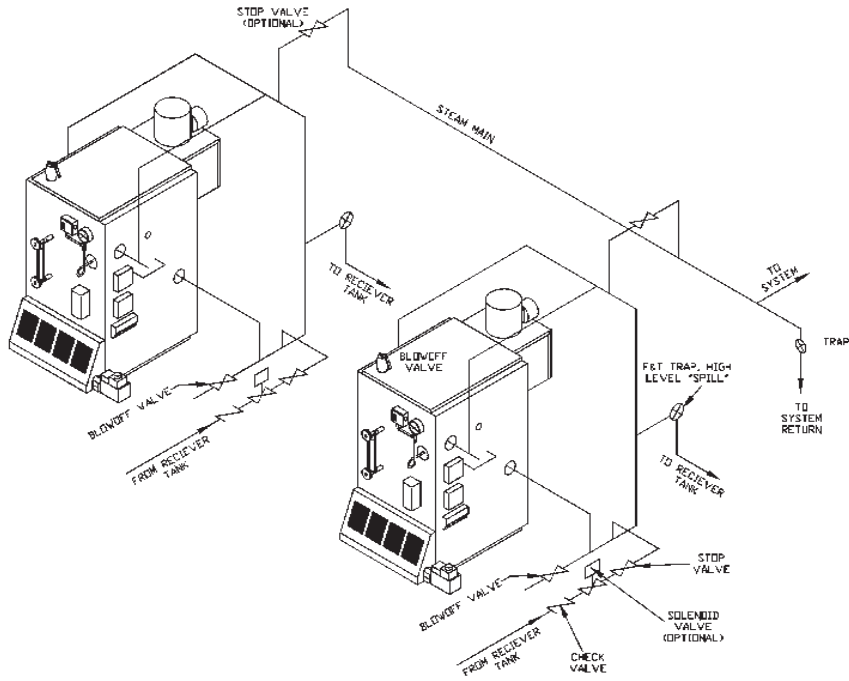


FIGURE 6a

GRAVITY RETURNS

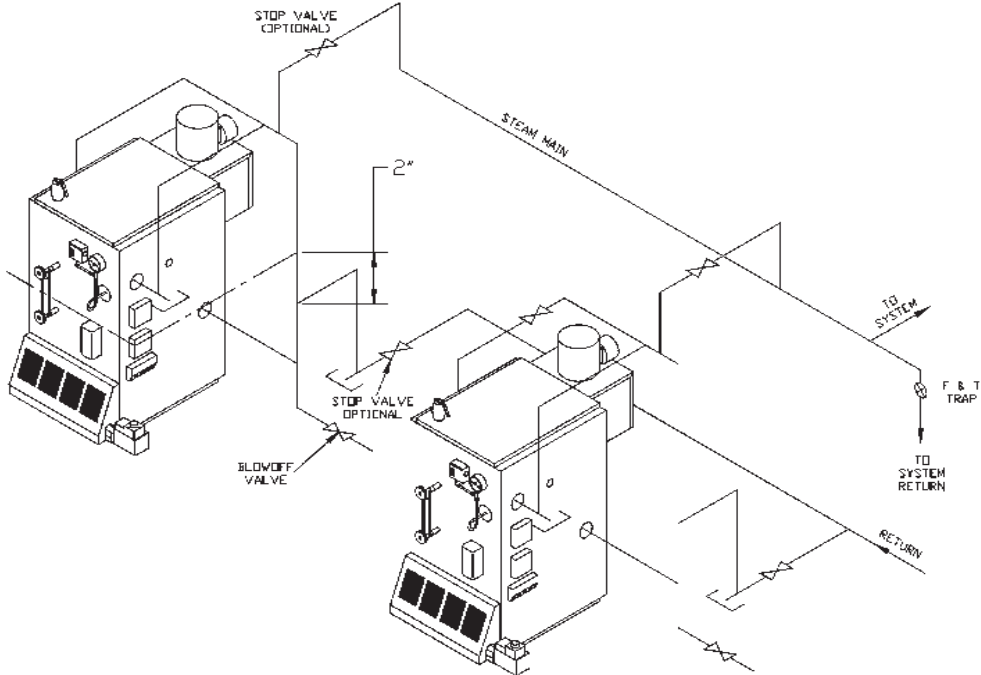


FIGURE 6b

VENT INSTALLATION



WARNING:

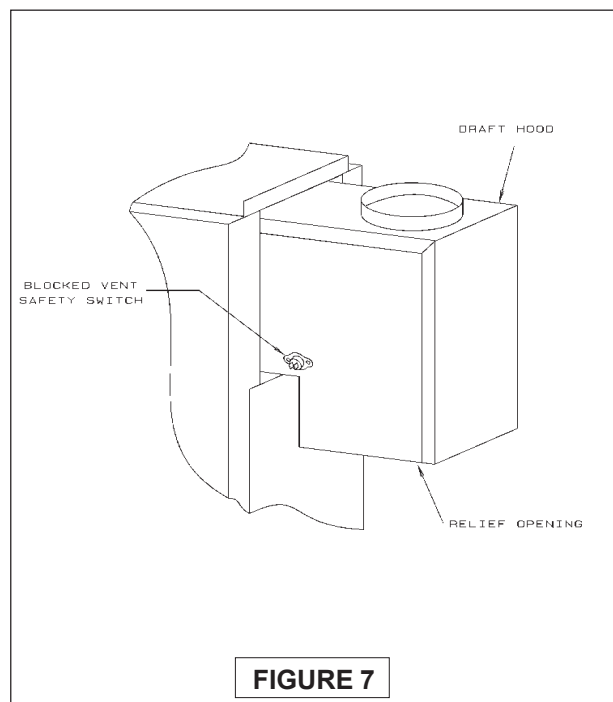
This boiler shall not be connected to any portion of a mechanical draft system operating under positive pressure.

1. The vent pipe must slope upward from the boiler not less than 1/4 inch for every 1 foot to the vent terminal.
2. Horizontal portions of the venting system shall be supported rigidly every 5 feet and at elbows. No portion of the vent pipe should have dips or sags.
3. This boiler series is classified as a Category 1 appliance and the vent installation shall be in accordance with Part 7 & 11 of the latest revision of the National Fuel Gas Code or applicable provisions of the local building codes.
4. Inspect chimney to make certain it is constructed according to National Board of Fire Underwriters.
5. Attach draft hood to flue collector at rear of boiler, (See figure 7, below), with sheet metal screw(s) through hole(s) provided. The vent or vent collector shall be Type B or metal pipe having resistance to heat and corrosion not less than that of galvanized sheet steel or aluminum not less than 0.016 inch thick (No. 28 GA).
6. Connect flue pipe same as draft hood to chimney. Bolt or screw joints together to avoid sag. Flue pipe should not extend beyond inside wall of chimney. Do not install manual damper in flue pipe or reduce size of flue outlet except as provided by the latest revision of ANSI Z223.1. Protect combustible ceiling and walls near flue pipe with fireproof insulation. Where two or more appliances vent into a common flue, the area of the common flue must be at least equal to the area of the largest flue plus 50 percent of the areas of each additional flue.



WARNING:

ALL INSTALLATIONS OF BOILERS AND VENTING SHOULD BE DONE ONLY BY A QUALIFIED EXPERT AND IN ACCORDANCE WITH THE APPROPRIATE COLUMBIA BOILERS MANUAL. INSTALLING OR VENTING A BOILER OR ANY OTHER GAS APPLIANCE WITH IMPROPER METHODS OR MATERIALS MAY RESULT IN SERIOUS INJURY OR DEATH DUE TO FIRE OR TO ASPHYXIATION FROM POISONOUS GASES SUCH AS CARBON MONOXIDE WHICH IS ODORLESS AND INVISIBLE.



VENT SYSTEM MODIFICATION

When an existing boiler is removed from a common venting system, the common venting system is likely to be too large for the proper venting of the appliances remained connected to it. If this situation occurs, the following test procedure must be followed:

At the time of removal of an existing boiler, the following steps shall be followed with each appliance remaining connected to the common venting system placed in operation, while the other appliances remaining connected to the common venting system are not in operation.

A. Seal any unused openings in the common venting system.

B. Visually inspect the venting system for proper size and horizontal pitch and determine there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.

C. Insofar as is practical, close all building doors and windows and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces in the building. Turn on clothes dryers and any appliance not connected to the common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace damper.

D. Place in operation the appliance being inspected. Follow the lighting instructions. Adjust thermostat so appliance will operate continuously.

E. Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle, or smoke from a cigarette, cigar or pipe.

F. After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas burning appliance to their previous conditions of use.

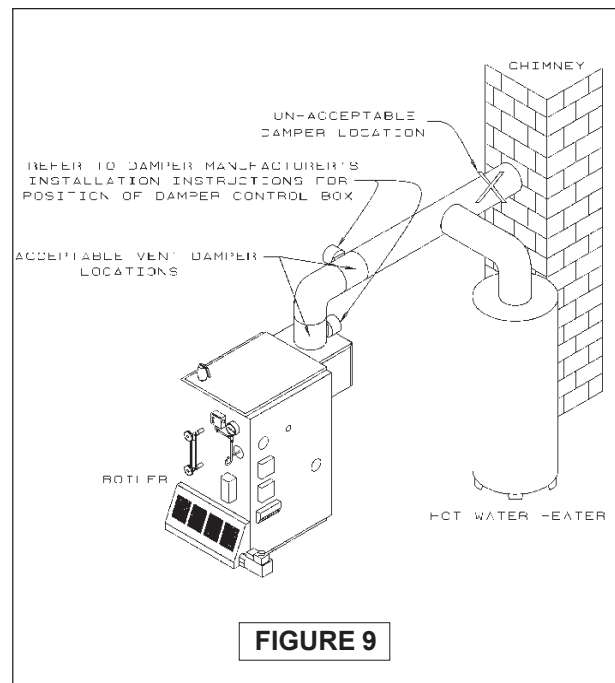
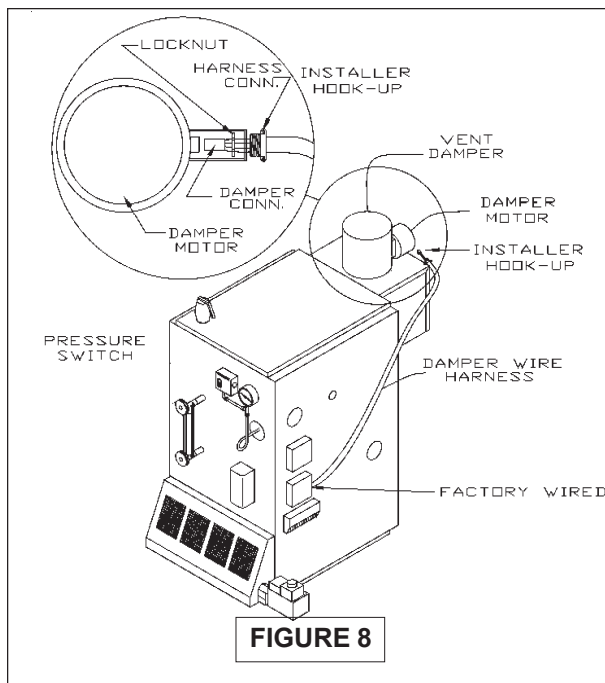
G. Any improper operation of the common venting system should be corrected so the installation conforms with the latest revision of the National Fuel Gas Code, ANSI Z223.1. When resizing any portion of the common venting system, the common venting system should be resized to approach the minimum size as determined using the appropriate tables in appendix G in the latest revision of the National Gas Fuel Code, ANSI Z223.1.

VENT DAMPER INSTALLATION AND INSTRUCTIONS INSTALLATION

NOTE: REFER TO FIGURE 8 BELOW FOR STEPS 1-7

1. Place Vent Damper on or as close to vent outlet of boiler as possible.
2. Remove Locknut from connector at the free end of the Damper wire harness.
3. Feed Damper connector and Damper wire harness through bracket hole on Damper Motor frame.
4. Replace and tighten locknut onto Damper wire harness connector.
5. Plug Damper connector into socket on Damper Motor frame.

INSTRUCTIONS



1. Ensure that only the boiler is serviced by the Vent Damper. See figure 9 above.
2. Clearance of not less than 6 inches between Vent Damper and combustible construction must be maintained. Additional clearance should be allowed for service of the Vent Damper.
3. Vent Damper must be in open position when appliance main burners are operating.
4. The Vent Damper position indicator must be in a visible location following installation.
5. The thermostats heat anticipator must be adjusted to match the total current draw of all controls associated with the boiler during a heating cycle.
6. The Vent Damper wire harness may be removed and installed in flexible metal conduit if local codes or jurisdiction requires. If this is necessary, the flexible metal conduit must be mounted to a J-box and all appropriate connections must be made to this J-box.

CONNECTING GAS SERVICE

Connect gas service meter to control assembly in accordance with the latest revision of ANSI Z223.1 and local codes or utility. A ground joint union should be installed for easy removal of gas control for servicing. A drip or trap must be installed at the bottom of a vertical section of piping at the inlet to the gas valve. A pipe compound resistant to the action of liquefied petroleum gases must be used on all threaded pipe connections. Check with the local utility for location of manual shutoff valve if required. See figure 10 below.

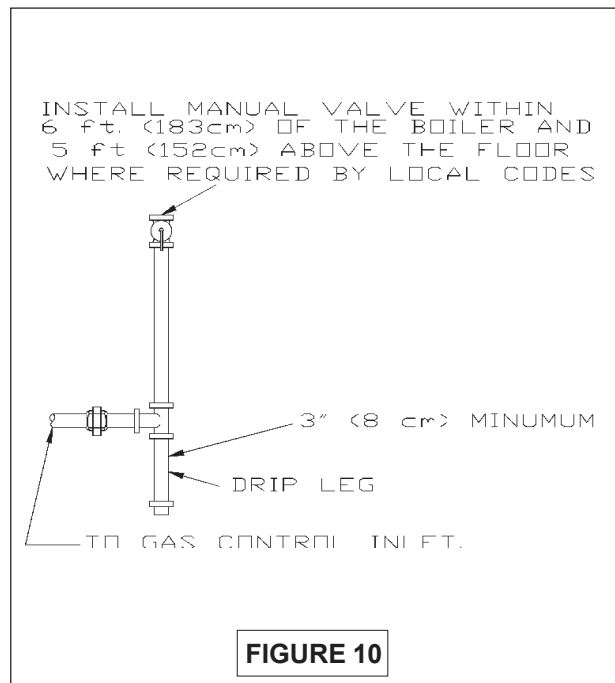
1. The gas line should be of adequate size to prevent undue pressure drop and never smaller than the pipe size of the main gas control valve.

2. The boiler and its gas connection must be leak tested before placing the boiler in operation. To check for leaks in gas piping, use a soap and water solution or other approved method.

 **WARNING:** DO NOT USE

AN OPEN FLAME.


3. The boiler 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 1/2 psi (3.5 kPa). The boiler 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 1/2 psig (3.5 kPa).



ELECTRICAL WIRING

SEE ADDENDUM "A" FOR WIRING DIAGRAMS AND COMPONENT CODING

Electrical wiring must conform with the latest revision of the National Electrical Code, ANSI/NFPA No. 70 and/or local authority having jurisdiction.

 **WARNING:** 1. The boiler, when installed, **MUST BE** electrically grounded in accordance with these requirements.

2. Install a fused disconnect switch between boiler and meter at a convenient location.

THERMOSTAT INSTALLATION

1. Thermostat should be installed on an inside wall at least two feet from an uninsulated or outside wall, approximately four feet above the floor.
2. **NEVER** install a thermostat on an outside wall.
3. Do not install a thermostat where it will be affected by:
 - A. Drafts
 - B. Hot or cold pipes
 - C. Sun light
 - D. Lighting fixtures
 - E. Television
 - F. Fireplace or chimneys
4. Check thermostat operation by raising and lowering thermostat as required to start and stop the burners.
5. Instructions for the final adjustment of the thermostat are packaged with the thermostat (adjusting heating anticipator, calibration, etc.).

LIGHTING INSTRUCTIONS



WARNING:

IF YOU DO NOT FOLLOW THESE INSTRUCTIONS EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.

Before any procedures are attempted on this appliance, it is necessary to determine if the ignition system is intermittent or continuous pilot system. If you are uncertain, contact the manufacturer before proceeding.



CAUTION:

Before operating, make certain steam boiler is full of water to water line and system is vented of air. See the operating lighting instructions.

LIGHTING PROCEDURE FOR BOILER WITH INTERMITTENT PILOT SYSTEM.

FOR YOUR SAFETY READ BEFORE OPERATING.

- A. This appliance is equipped with an ignition system which automatically lights the pilot. Do not try to light the pilot by hand.
- B. Before operating smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.



CAUTION:

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 your 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 gas control knob. **NEVER USE TOOLS.** If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

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

OPERATING INSTRUCTIONS FOR INTERMITTENT PILOT SYSTEMS

1. **STOP!** Read the safety information in the user's information manual.
2. Set 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 pilot. **DO NOT** try to light the pilot by hand. See figure 11, below.

5. Remove access panel (if present)

6. Push in gas control knob slightly and turn clockwise  to "OFF."

7. Wait five (5) minutes to clear out any gas. If you then smell gas, **STOP**, Follow "B" in the safety information "What To Do IF You Smell Gas". If you don't smell gas, go to the next step.

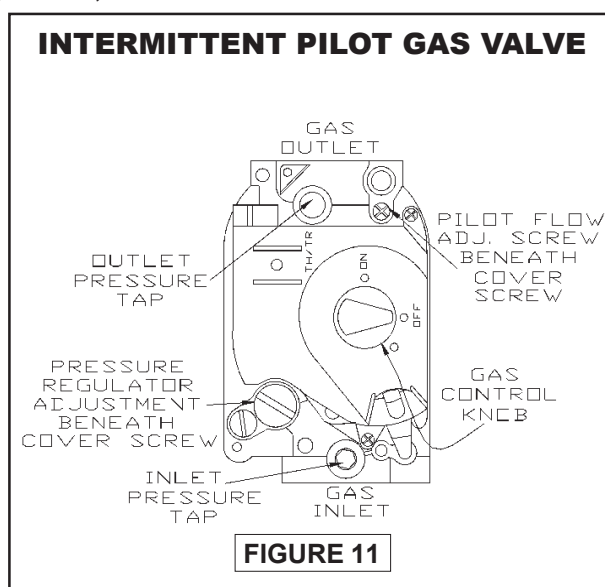
8. Turn gas control knob counterclockwise  to "ON."

9. Replace control access panel (IF PRESENT).

10. Turn on all electric power to the appliance.

11. Set thermostat to desired setting.

12. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call a qualified service technician or your gas supplier.



LIGHTING PROCEDURE FOR BOILER WITH CONTINUOUS PILOT.

FOR YOUR SAFETY READ BEFORE LIGHTING

- A. Read warning at the beginning of this instruction.
- B. This appliance has a pilot which must be lighted by hand. When lighting the pilot, follow these instructions exactly.
- C. Before lighting, smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor. Follow "B" in the lighting instructions for safety information for what to do if you smell gas on page 10.

D. Use only your hand to push in or turn the gas control knob or reset button. Never use tools. If the knob or reset button will not push in or the knob will not turn by hand, don't try to repair it. Call a qualified service technician. Force or attempted repair may result in fire or explosion. See figure 12, on page 13.

E. Do not use this appliance if any part has been underwater. 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.

LIGHTING INSTRUCTIONS FOR CONTINUOUS PILOT SYSTEM

1. Stop! Read the safety information at the beginning of this manual.
2. Set thermostat to lowest setting.
3. Turn off all electric power to the appliance.
4. Remove manifold cover and burner door, (figures 13 & 15 on pages 14 & 16).

5. Turn gas control knob clockwise  to "off" (See Note #1).

NOTE #1: Some gas control knobs cannot be turned from "pilot" to "off" unless knob is pushed in slightly. Do not force.

6. Wait (5) minutes to clear out any gas. If you smell gas, **stop!** Follow safety information "What to do if you smell gas," located on page 10 of this manual. If you don't smell gas, go to the next step.

7. Find pilot. Follow metal tube from gas control. Depending on the model of the boiler, pilot is mounted on the base or on one of the burner tubes.

8. Turn gas control knob counterclockwise  to "pilot".

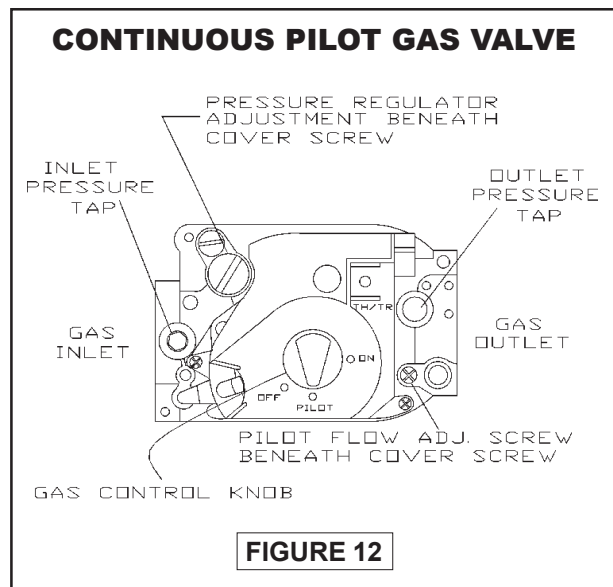
9. Push in gas control knob, or reset button if so equipped, all the way in and hold. Immediately Light the pilot with a match. Continue to hold the gas control knob or reset button for about one (1) minute after the pilot is lit. Release knob or button and it will pop back up. Pilot should remain lit. If it goes out, repeat steps 5 through 10.

* If knob or button does not pop up when released, stop and immediately call your service technician or gas supplier.


* If the pilot will not stay lit after several tries, turn the gas control knob clockwise to "off" (see note #1 above) and call a service technician or gas supplier.

10. Replace burner door and manifold cover, (figures 13 & 15 on pages 14 & 16).

11. Turn gas control knob counterclockwise  to "on".



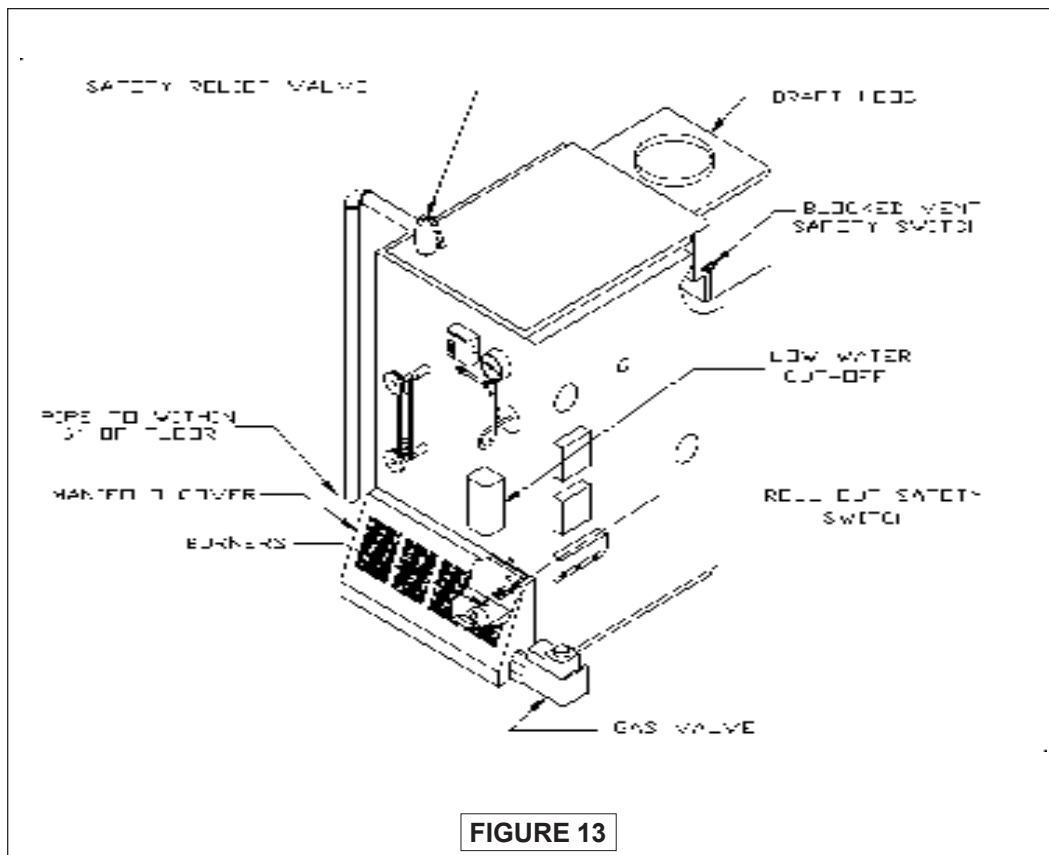
TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to the lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Remove access panel (if present)
4. Turn gas control knob clockwise  to "off". (See note #1) in the lighting instructions. **Do not force.**

NORMAL SEQUENCE OF OPERATION

On a call for heat:

- 1.) The thermostat will actuate completing the circuit between T and T.
- 2.) The damper will then open thus closing the end switch completing the circuit, and ignition will begin.
- 3.) In the event that the boiler steam pressure exceeds the pressure control setting, the pressure control will interrupt the circuit to the boiler ignition system. The power will remain off until the steam pressure drops below the pressure control setting.
- 4.) In the event a low water condition occurs, an automatic low water cut-off device will interrupt the circuit to the ignition system until the low water condition is satisfied, (i.e., manually restore the water or utilize an electric water feeding device which will automatically restore boiler water to its normal operating level).
- 5.) In the event the flow of combustion products through the boiler venting system becomes blocked, a blocked vent safety switch will shut the main burner gas off (See figure 13 below).
- 6.) In the event the flow of combustion products through the flueways becomes blocked a flame rollout switch will shut the main burner gas off (See figure 13 below).



CONNECTING SUPPLY AND RETURN PIPING, WATER CHILLED MEDIUM

1. When the boiler is used in connection with refrigerated system, connect supply and return piping as suggested in figure 14 below.

A. The chilled medium MUST BE IN PARALLEL with the boiler.

B. Use appropriate valves to prevent the chilled medium from entering the heating boiler.

a. During heating cycle open valves A and B. Close valves C and D.

b. During cooling cycle open valves C and D. Close valves A and B.

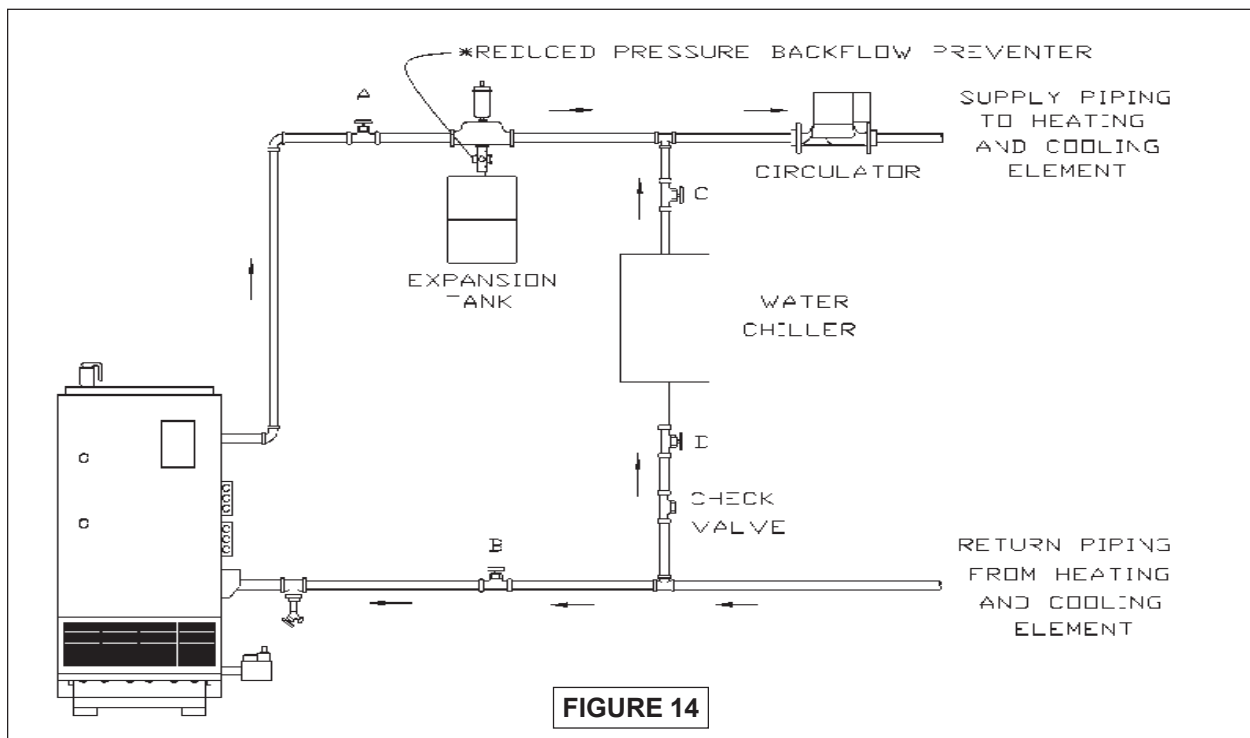
C. Maintain a minimum clearance of one inch between combustible materials and hot water pipes.

* Reduced pressure backflow preventer must be present under provisions required by the Environmental Protection Agency, (EPA).

2. When the boiler is connected to heating coils located in air handling units where they may be exposed to refrigerated air circulation, the boiler piping system MUST be supplied with flow control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.

3. A hot water boiler installed above radiation level must be provided with a low water cutoff device either as a part of the boiler or at the time of boiler installation.

4. Suggested piping for steam heating system can be seen in figure 5 on page 5. Actual piping may vary based on system design and local conditions.



GENERAL INSTRUCTIONS

Before seasonal start up it is advisable to have a competent service agency check the boiler for soot and scale in the flues, clean the burners, and check the gas input rate to maintain high operating efficiency.

On steam boilers make certain the boiler is filled to the water line as indicated in figure 15. The gauge cocks should be normally open. To remove dirt from the gauge glass the petcock may be opened to flush out the glass.

! WARNING: DISCHARGE WILL BE BOILING HOT WATER.

The radiator valves on a one-pipe steam system must be either wide open or tightly shut. Do not attempt to regulate room temperature by partially closing the radiator valve.

Air vents on steam radiators and the supply main release air from the system. If radiators do not heat satisfactorily, make sure the air vents are clean and operational.

The lever of the safety valve, shown in figure 15 below, on the boiler should be operated periodically to make sure that it is functioning properly.

! WARNING: DISCHARGE WILL BE BOILING HOT WATER AND STEAM.

The safety valve should open before the steam pressure exceeds the 15 lb. reading on the gauge, (figure 15 to right). If this pressure is exceeded and the safety valve does not open, it must be replaced. If the safety valve leaks steam when the boiler is operating at normal pressures, it should be immediately replaced. Corrosion can build up rapidly at the valve seat and prevent its functioning as a safety device.

During the heating season the drain cock, on the bottom rear of the boiler, should be opened once a month to flush out the boiler so the device will be free to function properly. Use a pail to catch the discharge.

! WARNING: DISCHARGE

WILL BE BOILING HOT WATER.

If the water in a steam boiler appears to be dirty or oily, or the water level in the gauge glass fluctuates considerably, the boiler should be cleaned and skimmed (See page 18 for instructions). A competent service person will use approved cleaning compounds and properly clean and flush out the boiler. He/she should also clean or replace air vents and traps, clean flue passages and check for proper operation of all controls and safety devices.

The venting system should be inspected at the start of each heating season. Check the vent pipe from the boiler to the chimney for signs of deterioration by rust or sagging joints. Repair if necessary. Remove the vent pipe at the base of the chimney or flue and, using a mirror, check for obstruction.

The boiler flue gas passageways may be inspected by a light and mirror. Remove the burner access door, (figure 15 above). Place a trouble lamp in the flue collector through the draft-hood relief opening. With the mirror positioned above the burners, the flue gas passageways can be checked for soot or scale.

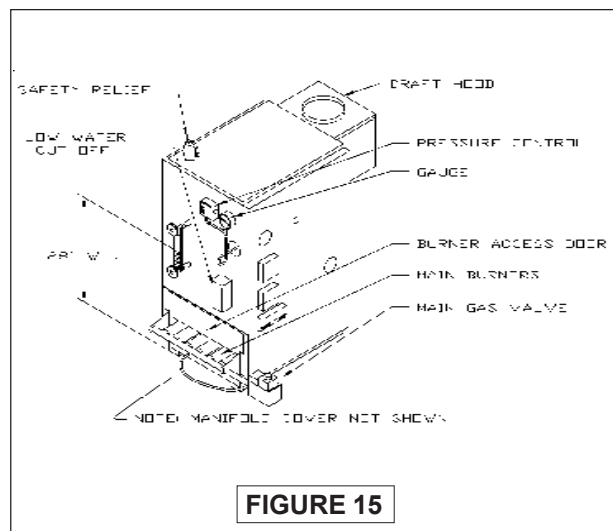


FIGURE 15

TO CLEAN THE BOILER FLUEWAYS:

1. Remove the burners from the combustion chamber by raising the burners upward from the manifold orifices and pulling toward the front of the boiler. To remove the burner with the pilot burner attached, first disconnect the pilot line tubing and thermocouple or pilot generator leads at the main electric gas valve. Do not remove the pilot line tubing at the pilot as the pilot burner orifice may drop out and become damaged or lost.

2. Disconnect the vent pipe from the draft hood.

3. Remove the draft hood. The draft hood is attached to the flue collector at the top by sheet metal screw(s).

4. Remove the top jacket panel. It is attached to the jacket by sheet metal screws.

5. Remove the flue collector from the boiler casting by loosening the nuts on the "J" bolts at either side of the flue collector.

6. Place a sheet of heavy paper or similar material over the bottom of the combustion chamber and brush down the flue passageways. The soot and scale will collect on the paper and is easily removed with the paper.

7. With the paper still in place in the combustion chamber, clean the top of the boiler castings of the boiler putty or silicone used to seal between the castings and the flue collector. Make certain chips are not lodged in the flueways.

When the cleaning process is completed, restore the boiler components to their original position. Use boiler putty or GE IS-808 silicone to seal around the flue collector and castings. Make certain the burner ends are inserted in the slots at the back of the combustion chamber and well down in position over the burner orifices. Follow the lighting instructions on the boiler to put the burners back in operation.

CHECK SAFETY CONTROL CIRCUIT, after burner adjustments are made, for satisfactory operation.



CAUTION:

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

Verify proper operation after service.

1. Pilot: with main burner operating turn the pilot gas adjusting screw clockwise until pilot gas is turned off. See figures 11 and 12 on pages 12 & 13. Within 90 seconds the main gas control should close, shutting off the gas to the main burner. After, check pilot operation. Relight following lighting instructions on pages 10-12.

2. Pressure control - on steam boilers - remove cover and note pressure setting. With the boiler operating, decrease the setting. When setting is lower than boiler pressure, the control will open, closing the automatic main gas valve. After checking pressure control, reset control to original setting.

3. Mechanical Low water cut-off: Operation may be checked by opening the blow-off valve located in the lower portion of the body. This will drain water quickly from the cut-off body and break circuit to automatic main gas valve. Owner should blow off this control at least once each month of the heating season.



WARNING:

WATER WILL BE BOILING HOT.

4. Electronic Low Water Cut-off: Operation may be checked by opening the drain valve in the back side of the boiler. This will drain the water from the boiler and break the electronic circuit to the automatic gas valve.

IMPURITIES IN BOILER WATER of a steam boiler may cause foaming and an unsteady water line, or prevent steam generation. They may result in objectionable odors escaping from the vents on water boilers. This condition is caused by oil, grease, and sediment from pipe fittings collecting within the boiler and can be remedied only by giving the boiler a thorough cleaning.

BOILERS CAN BE CLEANED by skimming or blowing down.



CAUTION:

The boiler should not be left unattended during the cleaning process.

SKIMMING OFF IMPURITIES

Some of the impurities in the boiler water will float on the water and must be skimmed off. With the boiler empty and cool, slowly begin to add water. After water has entered boiler - never before - turn “on” main gas burners and adjust flame at main manual shut-off valve so that the water being added is kept just below boiling point. Avoid boiling and turbulence. Gradually raise hot water level to skimming tee, see figure 5 on page 5, installed at the supply outlet piping of the boiler being careful not to raise it above the opening of the tee. Skim until there are no impurities. Repeat the process if necessary.

Water may be checked to make sure it is free from oil by drawing off a sample at the skimming tee. If the sample is reasonably free from oil, it will not froth when boiled on stove. This test does not indicate the amount of sediment which may lay in the bottom of the boiler. It is therefore necessary that the boiler be further cleaned by “blowing down”.

BLOWING DOWN BOILER

Before blowing down the boiler, fill it to the water line. Light burners and allow five pounds of steam pressure to build up. Run a temporary connection from one of the drain valves to a nearby sewer. Connect to a drain valve on the opposite end of the boiler from feed water inlet, if possible. Shut off the gas burners, open drain valve and blow down the entire contents of boiler.

Allow boiler to thoroughly cool and slowly refill to water line. Repeat step 2 as many times as required until blow off water is clear. Owner should blow down boiler at least once each month of the heating season.



WARNING:



WATER WILL BE BOILING HOT.

USING CLEANING COMPOUND

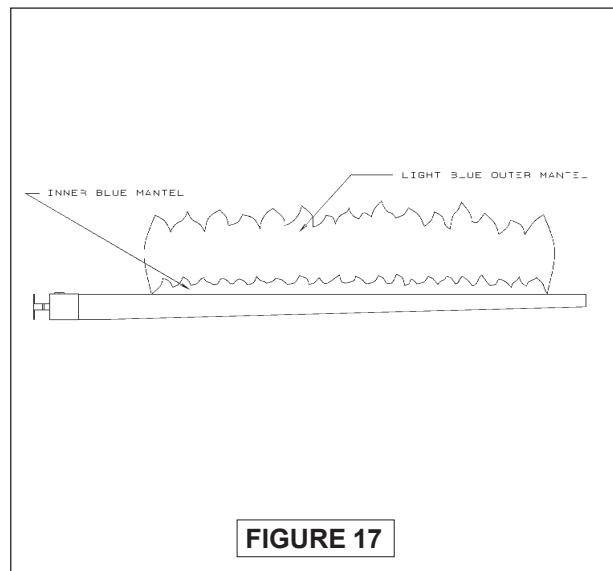
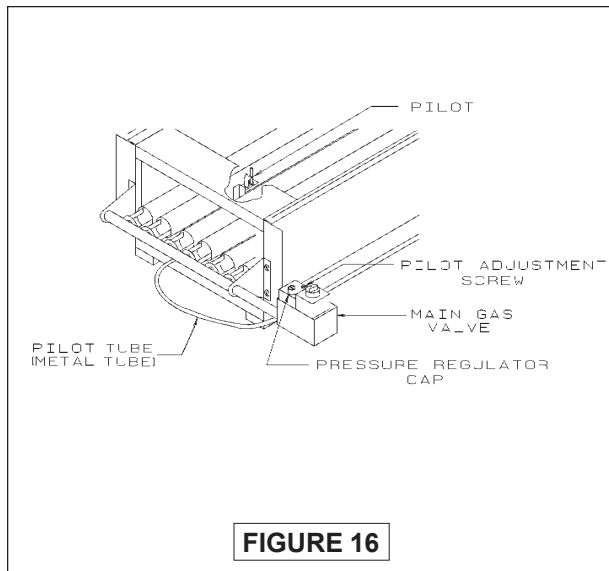
If an exceptional amount of dirt or sludge seems to be present in the boiler, a boiler cleaning compound made by a reputable manufacturer may be used according to the instructions of the manufacturer of the compound. When any type of cleaning compound is used, care must be taken to thoroughly flush all traces of the compound out of the boiler.

Following blow down allow the boiler to cool. Add fresh water slowly. Be certain to blow enough times as required to remove compounds from system.

CHECKING AND ADJUSTING THE GAS IGNITION COMPONENTS

The gas input to the boiler can be adjusted by removing the protective cap on the pressure regulator, see figure 16 on page 19, and turning screw clockwise  to increase input and counterclockwise  to decrease input. Natural gas manifold pressure should be set at approximately 3.5 inches water column. Propane gas manifold pressure should be set at approximately 10 inches water column. Manifold pressure is taken at the pressure tap on the outlet side of the gas valve, see figures 11 and 12 on pages 12 and 13. Burner orifices should be changed if the final manifold pressure varies more than plus or minus 0.3 inch water column from the specified pressure.

To check for proper flow of natural gas to boiler divide the input rate on the rating plate by heating value of the gas as obtained from the local gas company. This will determine the number of cubic feet of gas required per hour. With all other gas appliances off, determine





the flow of gas through the meter for two minutes and multiply by 30 to get the hourly rate. Make minor adjustments to the gas input as described above.

Primary air adjustment is not necessary, therefore air shutters are not furnished as standard equipment. Air shutters can be furnished on request when required by local codes or conditions.

A visual check of the main burners and pilot flames should be made at the start of the heating season and again at mid-season.

The main burner flame should have a well defined inner blue mantle with a lighter blue outer mantle. If the flame does not appear this way, check the burner throats and burner orifices for lint or dust obstruction. See figure 17 above.

The pilot flame should envelop 3/8 to 1/2 inch of the tip of the pilot sensor. See figure 18 on page 20. To adjust the pilot flame, remove the pilot adjustment screw and turn the inner adjustment screw clockwise  to decrease or counterclockwise  to increase pilot flame. See figures 11 and 12 on pages 12 & 13. Be sure to replace cover screw after adjustment to prevent possible gas leakage.

The burners and pilot should be checked for signs of corrosion, rust or scale build-up. The area around the boiler should be kept clear and free of combustible materials, gasoline and other flammable vapors and liquids.

The free flow of combustion and ventilation air to the boiler and boiler room should not be restricted or blocked.

It is suggested that a qualified service agency be employed to make an annual inspection of the boiler and heating system. They are experienced in making the inspections outlined above and, in the event repairs or corrections are necessary, can make the proper changes for safe operation of the boiler.

Optional parts

- WC-001.00 # 67 - U LWCO
- WC-004.01 # 101 Water Feeder
- WC-005.00 # 47-2 LWCO & Feeder

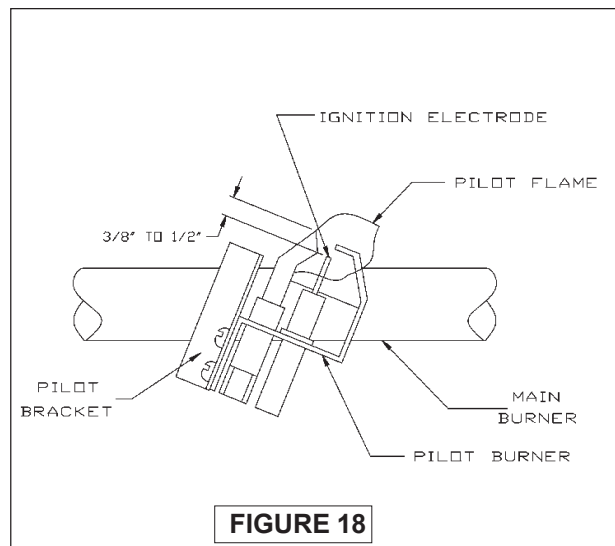


FIGURE 18

CEG-C REPLACEMENT PARTS - PILOT

24 VOLT

ITEM #	PART #	DESCRIPTION	QTY.
1	PB01301	PILOT-Q350A 24 VOLT	1
2	HW-024.01	SCREW#10-32X3/16	2
3	MS-003.05	PILOT TUBE 1/4"X24.1/4"	1
4	1520001	THERMOCOUPLE Q309A	

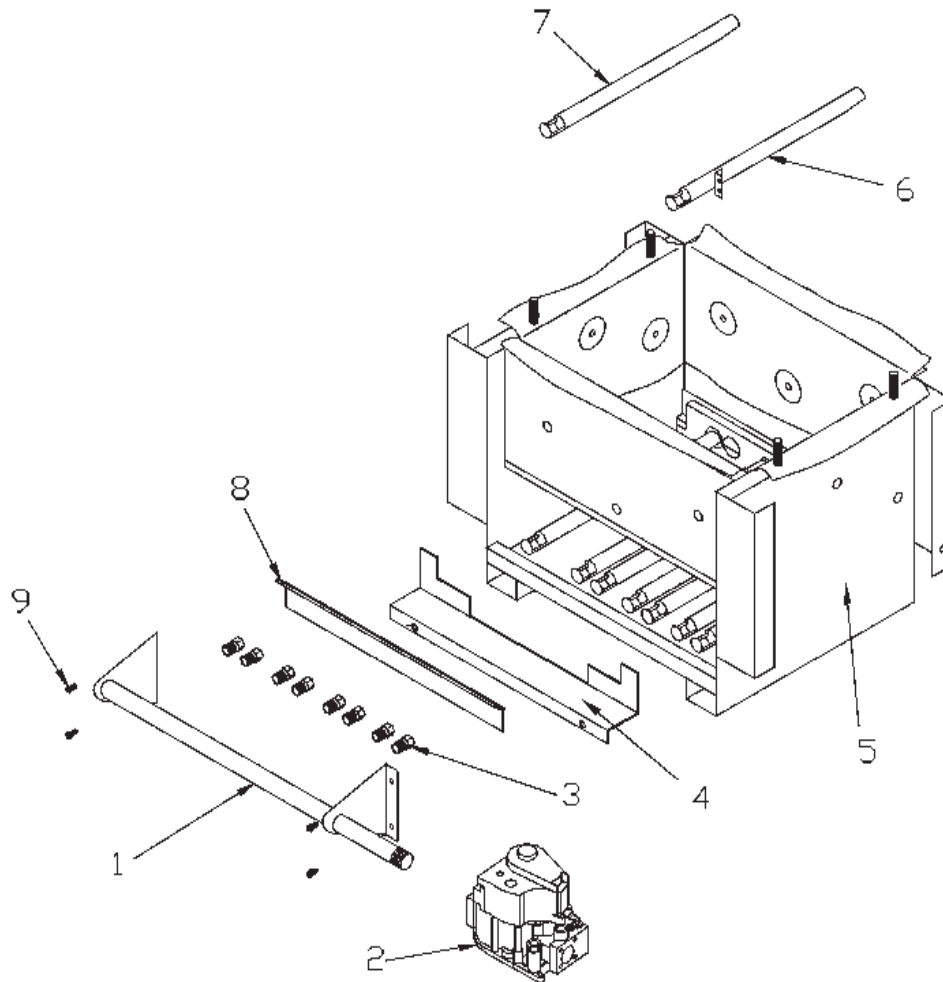
FIGURE 19

SPARK

ITEM #	PART #	DESCRIPTION	QTY.
1	PB-001.02	PILOT-Q345A SPARK	1
2	HW-024.01	SCREW#10-32X3/16	2
3	MS-003.05	PILOT TUBE 1/4"X24.1/4"	1
4	PB00702	PILOT IGNITION CABLE	1

FIGURE 20

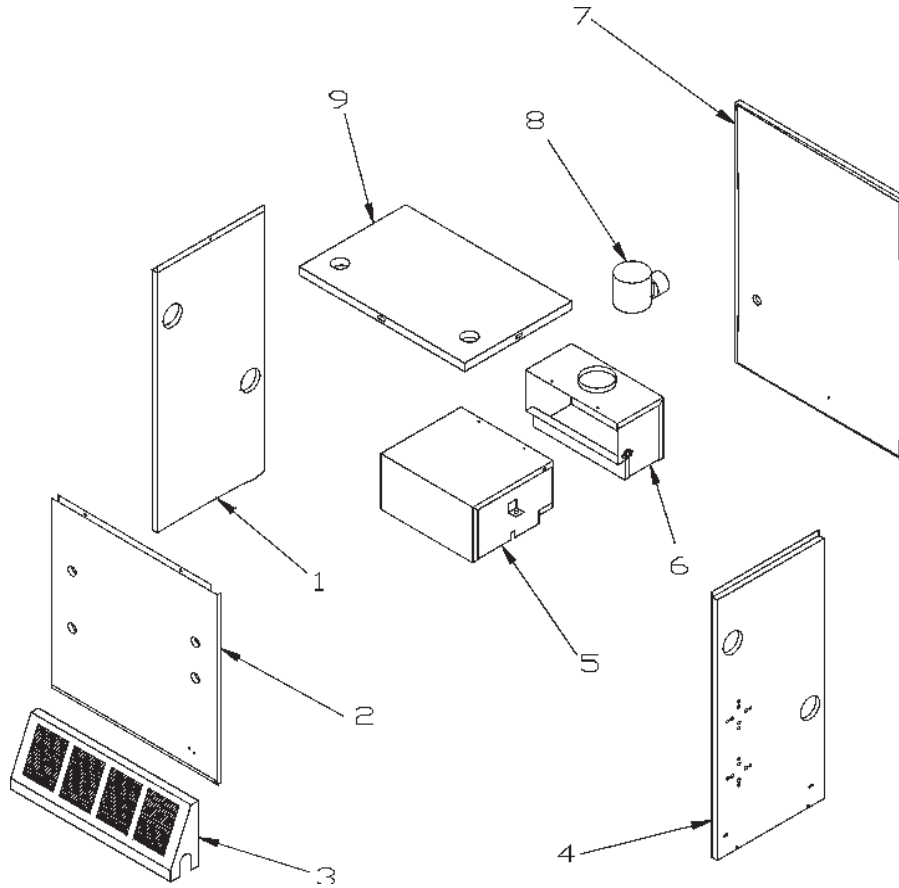
CEG-C REPLACEMENT PARTS - BASE



ITEM #	PART #	DESCRIPTION	QTY.	ITEM #	PART #	DESCRIPTION	QTY.
1	3542202	MANIFOLD CEG112C	1		32425304	BASE PLATE CEG225C	
	3542203	MANIFOLD CEG150C			32425305	BASE PLATE CEG262C	
	3542204	MANIFOLD CEG187C			32425306	BASE PLATE CEG300C	
	3542205	MANIFOLD CEG225C		5	5612501	BASE WITH INSUL CEG112C	1
	3542206	MANIFOLD CEG262C			5612502	BASE WITH INSUL CEG150C	
	3542207	MANIFOLD CEG300C			5612503	BASE WITH INSUL CEG187C	
2	VG-008.07	GAS VALVE VR8200H-3000 CEG112 & 150 24V	1		5612504	BASE WITH INSUL CEG225C	
	VG01102	GAS VALVE VR8204-3010 CEG112&150 SPARK			5612505	BASE WITH INSUL CEG262C	
	VG01103	GAS VALVE VR8304H4206 CEG187 - 300 SPARK		6	3342701	BURNER ASSY. W/PILOT BRACKET AND SHUTTER	1
	VG01201	VR8300H4006 CEG262C CEG187 - 300 24V		7	3342601	BURNER ASSY. W/SHUTTER	
3	352-1-1.03	GAS ORIFICE #47-NATURAL				CEG112C - (5), CEG150 - (7), CEG187 - (9), CEG225 - (11), CEG262 - (13), CEG300 - (15)	
	352-1-1.04	GAS ORIFICE #56-LP		8	32411302	BRN ACCESS DOOR CEG112C	1
		CEG112C - (6), CEG150 - (8), CEG187 - (10), CEG225 - (12), CEG262 - (14), CEG300 - (16)			32411303	BRN ACCESS DOOR CEG150C	
4	32425301	BASE PLATE CEG112C			32411304	BRN ACCESS DOOR CEG187C	
	32425302	BASE PLATE CEG150C			32411305	BRN ACCESS DOOR CEG225C	
	32425303	BASE PLATE CEG187C			32411306	BRN ACCESS DOOR CEG262C	
					32411307	BRN ACCESS DOOR CEG300C	
				9	HW-005.01	SCREW 1/4-20X1/2 SELF TAP	

FIGURE 21

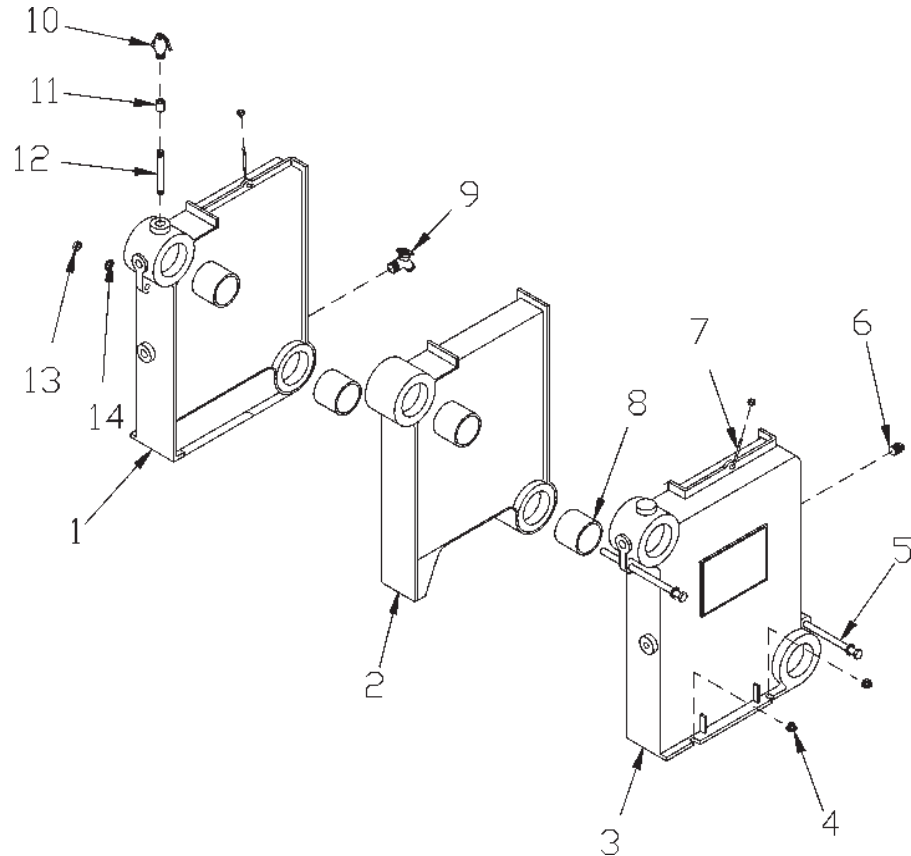
CEG-C REPLACEMENT PARTS - JACKETS



ITEM #	PART NUMBER	DESCRIPTION	QTY.	ITEM #	PART NUMBER	DESCRIPTION	QTY.
1	31423001	SIDE PANEL LEFT (ALL)	1	6	344-2-1.02	DRAFT HOOD CEG112C	1
2	31422802	FRONT PANEL CEG112C	1		344-2-1.03	DRAFT HOOD CEG150C	
	31422803	FRONT PANEL CEG150C			344-2-1.04	DRAFT HOOD CEG187C	
	31422804	FRONT PANEL CEG187C			344-2-1.05	DRAFT HOOD CEG225C	
	31422805	FRONT PANEL CEG225C			344-2-1.06	DRAFT HOOD CEG262C	
	31422806	FRONT PANEL CEG262C			344-2-1.07	DRAFT HOOD CEG300C	
	31422807	FRONT PANEL CEG300C		7	31423302	REAR PANEL CEG112C	1
3	31421002	MANIFOLD COVER CEG112C	1		31423303	REAR PANEL CEG150C	
	31421003	MANIFOLD COVER CEG150C			31423304	REAR PANEL CEG187C	
	31421004	MANIFOLD COVER CEG187C			31423305	REAR PANEL CEG225C	
	31421005	MANIFOLD COVER CEG225C			31423306	REAR PANEL CEG262C	
	31421006	MANIFOLD COVER CEG262C			31423307	REAR PANEL CEG300C	
	31421007	MANIFOLD COVER CEG300C		8	1182005	DAMPER CEG112C 5"	1
4	31423002	SIDE PANEL RIGHT (ALL)	1		1182006	DAMPER CEG150C 6"	
5	3442702	FLUE COLLECTOR CEG112C	1		1182007	DAMPER CEG187C 7"	
	3442703	FLUE COLLECTOR CEG150C			1182008	DAMPER CEG225C&262C 8"	
	3442704	FLUE COLLECTOR CEG187C			1182009	DAMPER CEG300C 9"	
	3442705	FLUE COLLECTOR CEG225C		9	31423502	TOP PANEL CEG112C	1
	3442706	FLUE COLLECTOR CEG262C			31423503	TOP PANEL CEG150C	
	3442707	FLUE COLLECTOR CEG300C			31423504	TOP PANEL CEG187C	
					31423505	TOP PANEL CEG225C	
					31423506	TOP PANEL CEG262C	
					31423507	TOP PANEL CEG300C	

FIGURE 22

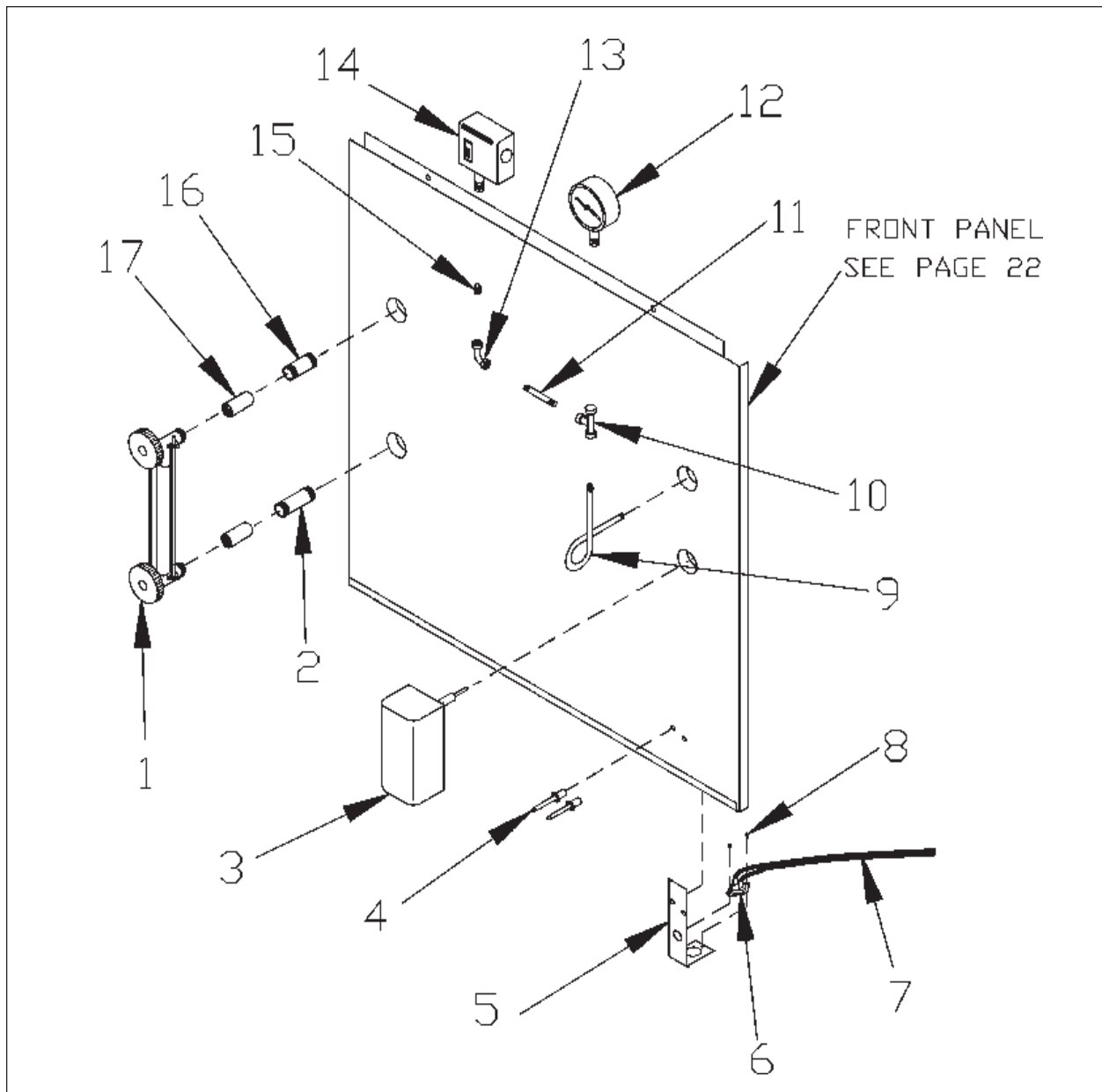
CEG-C REPLACEMENT PARTS - HEAT EXCHANGER



ITEM #	PART NUMBER	DESCRIPTION	QTY.	ITEM #	PART NUMBER	DESCRIPTION	QTY.			
1	100-2-15.01	E-Left Hand Section	1	13	HW-003.02	NUT-1/4-20 HEX SLT	4			
2	100-2-14.01	E-Center Section	1	14	HW-008.01	WASH 5/16 FLAT STL ZP	2			
CEG112C - (2), CEG150 - (3), CEG187 - (4), CEG 225 - (5), CEG262 - (6), CEG300 - (7)										
3	100-2-13.02	E-Right Hand Section	1	(Fully assembled heat exchangers.)						
4	HW06901	NUT-5/16-18 WISLOCK	4							
5	HW-011.10	TIE ROD 1/4X10.25 CEG112	2							
	HW-011.02	TIE ROD 1/4X13 CEG150								
	HW-011.04	TIE ROD 1/4X17 CEG187								
	HW-011.05	TIE ROD 1/4X19 CEG225								
	HW-011.07	TIE ROD 1/4X23 CEG262								
	HW-011.08	TIE ROD 1/4X25 CEG300								
6	PF-007.02	PIPE FIT PLG 2"	1					10022802	4 SECTION CEG112C	1
7	251-1-2.00	J-BOLT 1/4-20X3.5/16	2					10022803	5 SECTION CEG150C	1
8	100-1-1.01	PUSH NIPPLE #3 MACH.		10022804	6 SECTION CEG187C	1				
CEG112C - (4), CEG150 - (6), CEG187 - (8), CEG 225 - (10), CEG262 - (12), CEG300 - (14)				10022805	7 SECTION CEG225C	1				
9	HW-016.02	DRAIN LONG	1	10022806	8 SECTION CEG262C	1				
10	1570001	VALVE, POP SAFETY 3/4"	1	10022807	9 SECTION CEG300C	1				
11	1150001	COUPLING 3/4"	1							
12	PF-005.10	PIPE FIT NPL 3/4"X 6"	1							

FIGURE 23

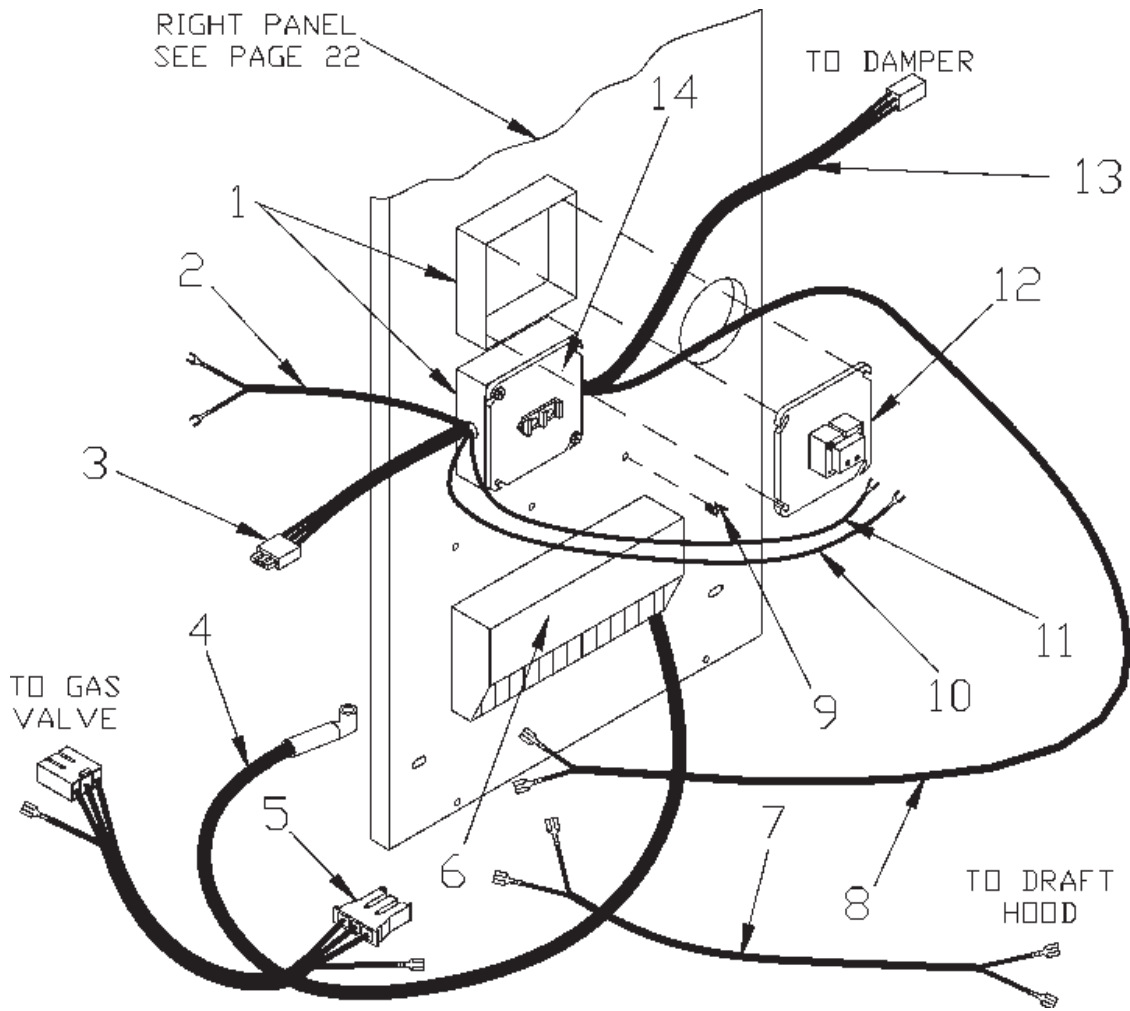
CEG-C REPLACEMENT PARTS - FRONT PANEL CONTROLS



ITEM #	PART NUMBER	DESCRIPTION	QTY.	ITEM #	PART NUMBER	DESCRIPTION	QTY.
1	GA-004.00	GAUGE WTR LEVEL	1	9	753-1-3.00	90° SYPHON	1
2	PF-033.02	PIPE FIT NPL 1/2"X4"	1	10	PF-025.01	1/4" TEE	1
3	WCO1901	ELWCOPS-802U-24 WITH PROBE	1	11	PF-026.05	1/4" X 3" NIPPLE	1
4	HW-006.02	POP RIVIT FLUE 3/16"	2	12	GA-003.00	PRESSURE GAUGE	1
5	32421901	SENSOR BRACKET	1	13	PF-027.01	1/4" ELBOW 90°	1
6	AQ02101	CONTROL FIXED TEMP (ONE ON DRAFT HOOD)	2	14	SS-001.01	PRESSURE SWITCH	1
7	37513301	WIRE - ROLL OUT	1	15	PF-026.01	CLOSE NIPPLE 1/4" NPL	1
8	HW06501	SCR 6X1/4" SLOT	2	16	PF05601	PIPE FIT NPL 1/2"X3"	1
				17	PF-034.01	1/2" BRASS COUPLING	2

FIGURE 24

CEG-C REPLACEMENT PARTS - ELECTRICAL



ITEM NUMBER	PART NUMBER	DESCRIPTION	QTY.
1	EF-013.01	ELEC. J-BOX 4X4X1/2	2
2	37414401	WIRE PRES. SWITCH TO J-BOX 34"	1
3	37424501	HARNESS-ELWCO TO J-BOX 18"	1
4	PB00702	IGN WIRE 30" CIDE MODELS ONLY	1
5	37413602	HARNESS IGN. MOD. TO GAS VALVE 12"	1
6	PB00604	SPK CTL S8600M1013	1
7	37413201	WIRE SPILL SWITCH 47"	1
8	37413801	WIRE J-BOX TO CONTROLS 27"	1
9	EF03601	WIRE CLAMP #3600 WHITE	1
10	37413002	WIRE TRANSFORMER (WHITE) 15"	1
11	37413001	WIRE TRANSFORMER (BROWN) 15"	1
12	3641601	TRANSFORMER ASSEMBLY 24V	1
13	37413101	DAMPER CABLE 53"	1
14	3641501	ELEC 4"X4" COVER/TERM STRIP	1

FIGURE 25

RATINGS, DATA, AND DIMENSIONS

NATURAL GAS STEAM BOILERS

Boiler Number & Damper	*A.G.A Input Btu/Hr. & Damper	Heating Capacity Btu/Hr.	Net I=B=R** Steam Rating Btu/Hr. Sq. Ft.	Gas Inlet Size	Dimensions						WATER CONTENT (GALLON CAPACITY)		Annual Fuel Utilization Efficiency (AFUE)			
					A	B	C	D	E	F	G	To Water Line	To LWCO Line	Elect Ign	Std. Pilot	
CEG112C	112,500	90,000	67,500	281	1/2	14.1/4	27.5/8	24.1/8	5	3.1/2	6	44.3/4	4.8	3.0	81.0	78
CEG150C	150,000	120,000	90,000	375	1/2	17.1/8	28.5/8	24.5/8	6	4	6.1/2	45.1/4	6.0	3.7	81.0	78
CEG187C	187,000	151,000	113,300	472	1/2	20	29.5/8	25.1/8	7	4.1/2	7	45.3/4	7.0	4.4	81.0	78
CEG225C	225,000	181,000	135,800	556	3/4	22.13/16	30.5/8	25.5/8	8	5	8	46.3/4	8.4	5.0	81.0	78
CEG262C	262,500	212,000	159,000	663	3/4	25.5/8	30.5/8	25.5/8	8	5	8	46.3/4	9.5	5.8	81.0	78
CEG300C	299,999	243,000	182,300	760	3/4	28.1/8	31.5/8	26.1/8	9	5.1/2	10	48.3/4	10.7	6.4	81.0	78

NOTE: For altitudes above 2,000 ft. ratings should be reduced at the rate of 4% for each 1,000 ft. above sea level.

The MEA number for the CEG series is 17-79.

Electrical service to be 120 Volts, 15 Amps, 60 Hz.

**For equivalent square feet of radiation, divide I=B=R output by 240.

STANDARD EQUIPMENT: Crafted Boiler, Drafthood, Low Water Cut-off (Probe Type), Deluxe Jacket, Wiring, Automatic Vent Damper, Ported Stainless Steel Burners.

Blocked Vent and Roll-Out Safety Switches, Gas Valve, Pilot, Pressure High Limit Control, 2-2" Supply Tapping-L.H. Plugged, 2-2" Return Tappings-L.H. Plugged.

Packed in Separate Carton: Pop Safety Valve and Boiler Drain.

OPTIONAL EQUIPMENT: Electronic water feeder

The Ratings marked "Net I=B=R" indicate the amount of equivalent direct cast iron radiation each boiler will take care of under normal conditions and thermostatic control. The Net I=B=R Steam Ratings shown are based on a piping and pickup allowance of 1.333. Proper allowance has been made for piping and pickup in accordance with the factors shown in the I=B=R Standard as published by The Hydronics Institute.

Selection of boiler size should be based upon Net BTU per Hour of the connected radiation and piping.

The manufacturer should be consulted before selecting a boiler for installations having unusual piping and pickup requirements.

In line with it's policy of product improvement, Columbia Boilers reserves the right to make changes without notice.

