FUEL MASTER
C SERIES BURNER

Installation and Service Instructions

Type CG Series

Forced Draft Gas Burner

Designed and built by Canadians for Canadian Winters

By

PENDELL BURNERS

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Chart #1

Specifications and Capacities – "C" Series Gas Burners

Boiler Model Number	Ratings at 0.5" W.C Furnace Pressure			Ratings at 0.06" W.C Furnace Draft			Gas Train Size at Press. Listed	Min. Gas Press. At Regul.	Blower Motor H.P	Approx. Crated Weight LBS.
	M.B.H Gas Input		Max Boiler H.P	M.B.H Gas Input		Max Boiler H.P				
	Min.	Max.		Min.	Max.					
CG-25	350	1120	26.8	350	1260	30.0	1 – ¼"	7"	1/3	205
CG-45	364	1820	43.6	420	2100	50.0	1 – ½"	7"	½	255
CG-60	504	2800	66.6	580	3080	73.3	2"	7"	¾	270
CG-100	840	4200	100.0	924	4620	110.0	2 – ½"	7"	2	370
CG-125	1050	5250	125	1200	5460	130	2 ½	7"	3	400
CG-165	1400	7000	167.0	1568	7840	186.7	3"	7"	3	560
CG-230	1700	8500	200.0	1960	9800	233.0	3"	8"	5	570
CG-300	2500	12600	300	3000	13600	325	3"	2 PSI	7 ½	700
CG-350	2800	16800	400	3000	17500	425	3"	5 PSI	10	760

Note: Ratings based on 2000 ft. above sea level. De-rate burner 4% for each additional 1000ft. altitude.

H.P. Ratings based on 80% combustion efficiency and Maximum burner capacity firing natural gas @ 1000 BTU.

Note: Literature –2 or –S designates increased blower capacity and motor horsepower to meet site conditions.

Higher turn down requires higher manifold and supply pressures.

1.0 - INSTALLATION AND SERVICE MANUAL

This FUEL MASTER CG Series Gas Burner must be installed by qualified licensed personnel, in accordance with Provincial and Local code requirements, or in their absence, the CSA B-149.1 or B-149.2 gas burner installation codes will prevail. Authorities having jurisdiction shall be consulted before installations are made.

Study the manual before assembling or installing the burner and be familiar with the burner. It is important to keep all instructions clean and intact and to deliver them to the owner for future use.

The combustion chamber sizes in Chart #2 are based on boiler and furnace capacities. The correct input and combustion chamber dimensions are determined either from the gross or standing load. Check the standing load and BTU loss to be sure that the boiler or furnace is adequate in size.

1.1 – BURNER DESCRIPTION

The FUEL MASTER CG Series gas burner has been designed to fire boilers or furnaces incorporating a fire brick combustion chamber below the furnace area, (firebox or cast iron sectional). The flame pattern is designed to recirculate in front of the burner rather than blast away at the rear of the chamber. This provides a very high radiant heat release for the full length of the combustion chamber, giving excellent heat transfer to the primary heat exchange surfaces.

The CG Series gas burner is robustly constructed using an all welded housing and blast tube. The burner end cone is of stainless steel to withstand high temperatures.

The CG Series gas burner has been designed for a 10 second trial for ignition, during which the ignition transformer and pilot gas valve are powered. During that trial, the flame must be proven such that the main gas valve has begun to open and establish a main flame which will continue to be sensed after the 10 second pilot ceases.

1.2 – UNPACKING THE BURNER

All burners have been completely assembled, checked and inspected under actual firing conditions, and crated at the factory. They are delivered to the carrier in perfect condition. Promptly notify the carrier of any damage.

Carefully uncrate the burner and check all parts received. Component parts and accessories may be shipped in separate boxes within the crate. Make sure all the boxes are empty before discarding.

2.0 - BOILER OR FURANCE ROOM VENTILATION

To insure complete combustion, the proper amount of fresh air must be supplied to the room through an inlet near the floor line or ground level. Building exhaust fans must not affect the fresh air supply to the burner.

2.1 – COMBUSTION AIR REQUIRED

To ensure that good clean combustion and a reasonable burner room temperature can be maintained, a source of fresh air is required. The usual practice is to provide a grill or louvre in an outside wall with sufficient area to pass the volume of air required. Two methods are used to calculate the free area of these openings (See Chart #2):

X) When the burner is installed in a forced draft unit without a barometric draft regulator or draft hood and unit is sealed, the free area of the opening shall provide at least one square inch for each 30,000 BTUH. If movable dampers or fans are used to provide make up air, then an electrical interlock is required to prove airflow before the burner can operate.

Y) On installations where the burner is operating at a negative draft and a barometric draft regulator or draft hood is used, the natural ventilation free area shall provide, not less than 100 square inches for the first 400,000 BTUH plus one square inch for each additional 14,000 BTUH.

For applications such as bake ovens, incinerators or other types of boiler or furnaces, please consult the factory.

Note: A free opening is clear and unobstructed, and openings with grills or louvers should be increased in overall size so that the manufacturer's free rating is adequate. The charted dimensions do not provide necessary additional air for other venting devices. Ventilation must meet the requirements of local authorities. Chart #2 indicates the minimum free area required for the burner only.

2.2.0 – BOILER OR FURNANCE PREPARATION

A) Clean the boiler or furnace thoroughly and remove all grates and obstructions. Check the entire boiler or furnace assembly, including the flue and breeching and repair all leaks.

B) If the burner is operating against positive firebox pressure, the entire installation including cleanout doors, flue connection and inspection doors must be air tight. If the firebox pressure is negative, such extreme care can be omitted, but the tighter the boiler, the better the combustion efficiency.

C) Check the size of the flue. Flue dimensions must conform to the boiler or furnace manufacturer's recommendations. The breeching must slope upward toward the flue at a minimum rate of 1/4 "per linear foot.

D) Cover the bottom of the boiler or furnace with sufficient amount of insulation material (refer to Drawing #1 to #4) – such as Rockwool Mirco fill, or equivalent. Lay the combustion chamber

floor using #1 fire brick. All brick must be bonded together with a quality grade of refractory cement, such as Sairset, Setcold, Laytite, or equivalent.

E) Refer to Chart #2 for recommended combustion chamber dimensions. Erect the side back walls according to the selected chart dimensions. The walls should be at least 4" higher than the water legs of the boiler or the return inlet of the furnace. When a Scotch Marine, Packaged Firebox Boiler or Firedoor installation is used, no refractory chamber is needed. In this case, refractory is used only around the perimeter of the burner as shown in Drawings #1 and #2. Consult the boiler manufacturer's recommendations for any other refractory that may be needed.

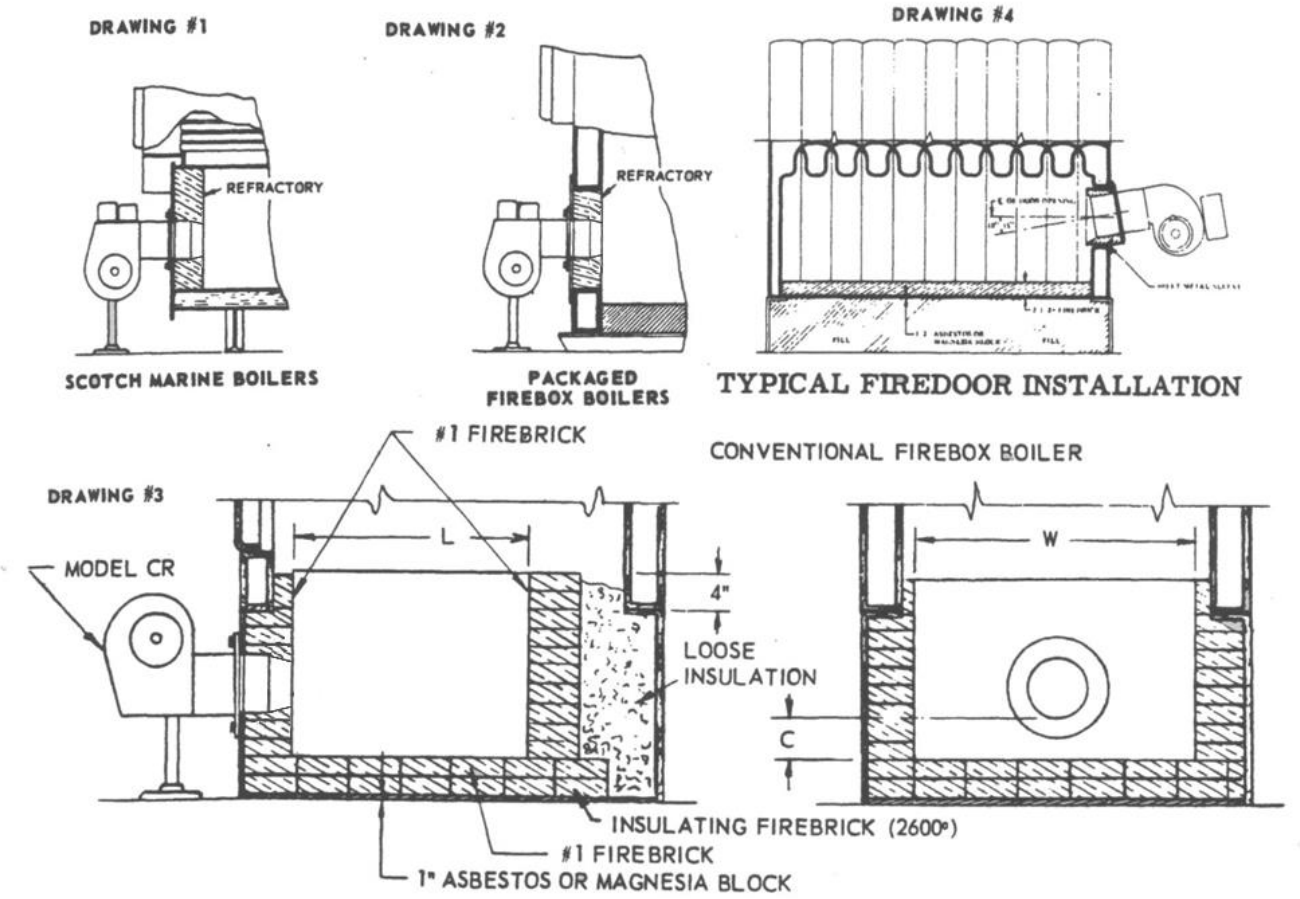


Chart #2
Typical Combustion Chamber Sizing

Burner Model Number	Input Natural Gas M.B.H	Firebox Combustion Chamber Dimension			Scotch Marine Furnace		Combustion Air Opening Sq. In. Free Area At Max. Firing Rate	
		Width INS (W)	Length INS (L)	Min. Blastube Height (C)	ID	L	(x)	(y)
CG-25	980	21	27	4				
	1260	23	32	5	15	50	42	160
CG-45	950	21	28	4				
	1400	24	34	5				
	2100	26	41	5	17	60	70	220
CG-60	1820	25	39	5				
	2240	26	43	6				
	3080	32	52	6	19	70	97	278
CG-100	2520	29	47	6				
	3500	33	53	8				
	4620	37	62	10	22	85	154	400
CG-125	5460	38	65	11	24	90	180	460
CG-165	4060	36	60	10				
	5600	42	70	11				
	7840	49	78	12	28	113	261	630
CG-230	6300	44	74	12				
	8400	52	80	12				
	9800	58	86	12	32	125	300	714
CG-300	13600	56	106	18	36	150	460	1050
CG-350	17500	62	124	22	42	170	590	1330

(x) : Pressure fired installations without draft hood or barometric draft control.
(y) : Natural draft installation with barometric draft control.
Note: Ratings are based on 2000 ft. above sea level with a 20% piping and pick-up allowance. De-rate 4% for each additional 1000 ft. altitude.
Note: This is a guide only, providing approximate chamber dimensions to accommodate the flame shape and provide combustion volume.

2.2.1 - GAS PIPING

The gas piping must be sized to supply the gas to the burner at the required pressure to operate at rating. Determine from the rating plate the gas volume required in cubic feet per hour, the pressure required at the inlet to the pressure regulator, and from the gas company the available pressure at the meter outlet; calculate the length of piping from the meter to the burner. From this information determine the correct diameter of pipe required using Chart #3 & #4. For other gas pressures consult your Gas Company or code manual.

The gas pipe must not be supported from any other pipe. The pipe supports should be spaced as follows:

PIPE SIZE	*½*	*¾ - 1*	*1 ¼ - 2 ½*	*3 - 4*	*5 - 8*
SPACING IN FT.	*6*	*8*	*10*	*15*	*20*

On vertical piping, the supports must be at each floor level. All Gas piping must be tested after assembly in accordance with at least one of the following methods. Before connecting the appliances, systems shall be tested to a pressure as shown on the following table:

Working Pressure P.S.I.G.	Test Pressure P.S.I.G.	Duration
0 to less than ½	3	10 Minutes
½ to less than 5	15	12 Hours
5 to less than 33	50	24 Hours
33 and over	1 ½ times	24 Hours

Before pressure testing the supply piping upstream from the burner, close the main gas shut off valve to avoid damage to the pressure regulator and gas train.

After appliances have been connected, gas piping may be tested by marking the location of the meter test dial. If, after a period of ten minutes, the dial has not moved, the test may be considered satisfactory.

When a meter is not available, a manometer calibrated in increments of 0.1" W.C can be connected to the gas piping and the system pressure indicated. The source of pressure is he turned off and the reading on the manometer must remain the same for at least ten minutes.

Chart #3

Maximum Capacity of Pipe in Cubic Feet of Gas per Hour

(Pressure Drop of 0.5 inch water column and 0.6 specific gravity gas)

Pipe Size Schedule 40 Std Pipe	Total Equivalent Length of Pipe* (Feet)											
	10	20	30	40	50	75	100	125	150	175	200	250
½	120	85	70	60	54	44	38	34	31	29	27	24
¾	272	193	157	136	115	99	82	76	67	65	58	52
1	545	385	315	272	244	198	173	154	141	130	122	109
1 ¼	1201	848	693	600	537	439	380	340	310	287	268	240
1 ½	1862	1316	1074	931	832	680	588	527	480	445	416	372
2	3766	2663	2174	1884	1680	1373	1190	1065	971	900	841	753
2 ½	6165	4358	3559	3082	2752	2254	1950	1743	1593	1473	1379	1233
3	10502	7426	7073	5250	5015	3841	3549	3106	2895	2682	2598	2242
4	22031	15577	12718	11015	10510	8158	7430	6548	6060	5066	5250	4700

Chart #4

Maximum Capacity of Pipe in Cubic Feet of Gas Per Hour
(Available pressure 5 P.S.I.G 10% pressure drop and 0.6 specific gravity gas)

Pipe Size of Schedule 40 Standard Iron Pipe	Total Equivalent Length of Pipe* (feet)										
	50	100	150	200	250	300	400	500	1000	1500	2000
1	1863	1320	1074	931	832	760	658	584	416	341	293
1 ¼	3880	2744	2240	1938	1732	1580	1370	1218	866	708	609
1 ½	5860	4140	3375	2920	2620	2384	2065	1835	1310	1070	918
2	11360	8060	6560	5680	5080	4640	4025	3570	2540	2080	1792
2 ½	18280	12933	10540	9140	8180	7460	6460	5740	4090	3390	2875
3	32620	23100	18800	16300	14500	13310	11520	10250	7290	5960	5125
4	67400	47600	38840	33650	30160	27550	23800	21140	15080	12330	10620
5	122900	86900	71000	61400	55000	50200	43450	38600	27500	22570	19400
6	201000	142700	115000	100300	89800	82100	71800	63000	44900	36700	31590
8	418000	295000	240800	208500	186800	170800	14800	131200	93400	73400	65600

* Equivalent length includes additions for elbows, valves, etc.

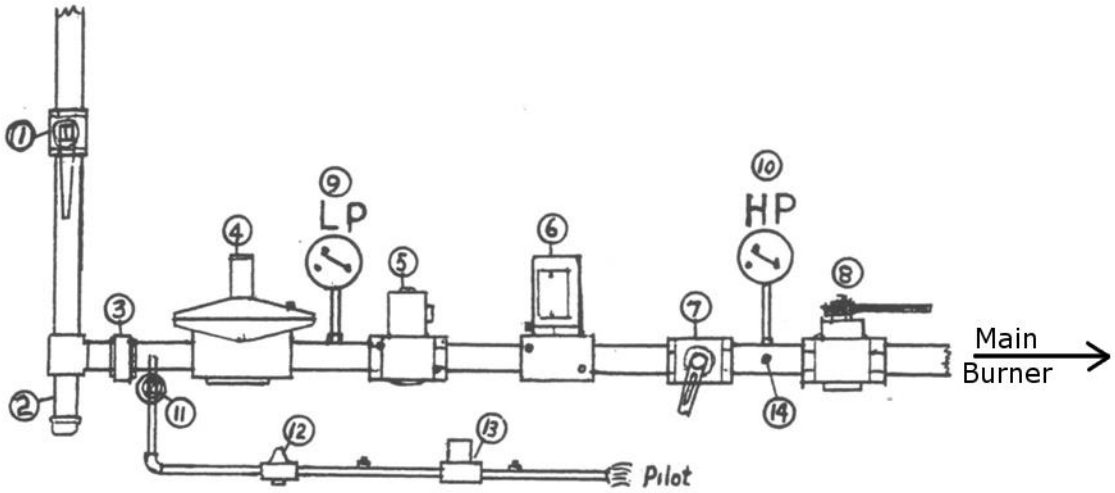
NOTE: Before turning the gas into the system, make sure that all openings from which gas might leak out are closed.

2.2.2 - GAS VENTS AND BLEEDS

Gas vents must be piped to the outside of the building. The pipe size required to vent the valves and regulators on a burner can be determined by adding the area of each of the vent connections and then multiplying by two (2). The following table, Chart #5, can be used to calculate the areas:

Chart #5

Internal Area of Pipes, Sched. 40 Blk. ASA-B-36-10	
1/8 : 0.057 sq. inches	¾ : 0.533 sq. inches
¼ : 0.104 sq. inches	1 : 0.864 sq. inches
3/8 : 0.191 sq. inches	1 – ¼ : 1.496 sq. inches
½ : 0.304 sq. inches	1 – ½ : 2.036 sq. inches



TYPICAL FUEL MASTER BURNER GAS TRAIN FOR PRESSURE GAS.

(1) Manual main gas shut off valve installed in drop line.
(2) Drip pocket with cap at lowest point in drop line.
(3) Ground joint type union.
(4) Main gas pressure regulator (lock up type over ½ psi inlet pressure).
(5) Auxilliary automatic main gas valve (when required).
(6) Main gas safety shut-off and input control valve.
(7) Butterfly type input control valve on modulating burners.
(8) Lubricated type ¼ turn test firing valve with handle.
(9) Low gas pressure switch to be set at 50% of regulator outlet pressure.
(10) High gas pressure switch to be set at 125% of manifold pressure.
(11) Pilot manual ¼ turn shut off valve with handle.
(12) Pilot gas pressure regulator (lock up type over ½ psi inlet pressure.
(13) Pilot gas automatic safety shut-off valve.
(14) Manifold pressure test opening.

2.2.3 - WIRING

To protect the motor and electrical equipment and prevent nuisance lock-outs, by the voltage-sensitive fame safeguard system, an adequate, stable dependable, and properly fused electrical supply must be provided.

A wiring diagram which outlines the power supply and other external connects, is furnished with each burner. The installer should familiarize himself with each diagram and follow it closely.

A – Connect main power supply and safety controls to the panel. All wiring must comply with local electrical codes and regulations.

B – With the power supply switch in the OFF position, check all fuses and all terminals for loose wiring connections.

C – It is good practice to the wire the operating controls right back to the burner, in a separate loop from the safety limit controls, to obtain maximum protection from the limit circuit.

3.0 - TEST AND START UP PROCEDURE

Before pressure testing the supply piping upstream from the burner, close the main gas shut off valve to avoid damage to the pressure regulator and gas train.

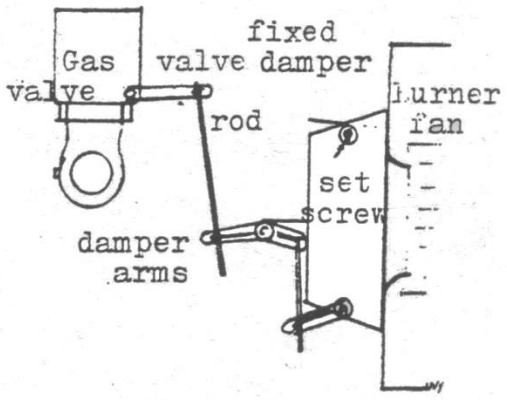
When the installation has been completed, the gas piping should be purged before attempting to start the burner. This may be done by using an approved purge burner or by connecting a hose to the gas pipe near the burner and expelling the gas outside the building.

(1) Close the main gas shut-off valve, test firing valve and pilot shut-off valve.

(2) Turn on-off switch on the burner to the off position

(3) Turn on the main electrical supply and the power-on indicator light should glow. Turn burner switch on momentarily to check the motor rotation.

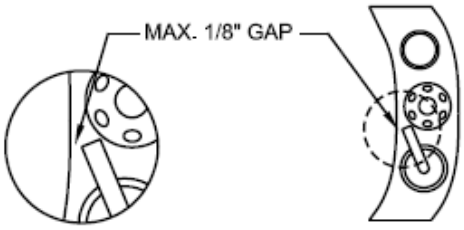
(4) Install your gas analyzer and at the manifold test port install your pressure gauge.



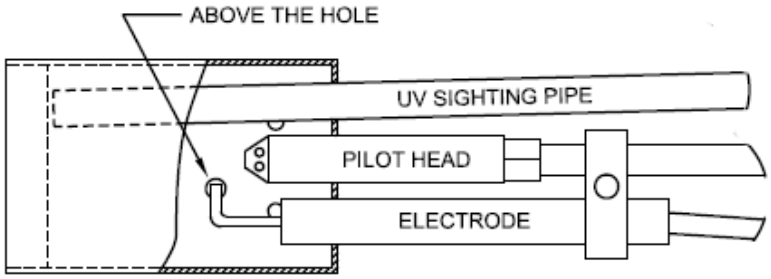
Air control damper arrangement for ON-OFF or HIGH - LOW gas burners.

(5) Check that the air dampers will provide some air with the test firing valve closed; turn on the main gas shut-off valve. Check gas pressure switches if used.

(6) Start the burner. The program control will allow the fan to pre-purge the combustion chamber before attempting to energize the pilot circuit. Check the air proving switch setting if the pilot circuit is not energized within 90 seconds. The burner should go through a complete start cycle and then lock out on safety, since there is no gas at the pilot. In the event that the pilot indicator light comes on and then it is followed by the main fuel light, check the UV scanner to see that it is in its proper mounting position.



FRONT VIEW



CROSS SECTION

(7) Open the pilot shut-off valve and proceed through the same sequence. The pilot should light and be proven by the flame detector. The main fuel circuit will be energized and the main gas valve(s) will open. At this time observe the pilot flame for size and stability. Check the flame signal on the combustion control and make sure the reading is within the acceptable limits for the control being used.

(8) From the burner rating plate, note the manifold pressure required at the test port. Re-cycle the burner and open the test firing valve when the main fuel light comes on. Observe the main burner flame to check the combustion, if the flame is yellow or sooty turn the burner off and adjust the air damper to allow more air into the burner.

(9) When the flame appears to be reasonably good, go to high fire if not already there. Now the gas pressure regulator can be adjusted to provide the high fire manifold pressure indicated on the rating plate and required on the gauge at the test port.

(10) On a high-low fire burner, set the switch to low fire. Follow the instructions of the actuator manufacturer to adjust the gas valve to produce 1" pressure on the gauge at the test port. Loosen the damper rod and close the high fire damper. Adjust the low fire damper stop for O_2 between 5% and 5.7%, and CO_2 approximately 8.5% and fasten the lock where provided.

(11) Return to high fire and adjust the damper rod and arms to provide O_2 between 4.0% and 4.5%, and CO_2 approximately 9.2%.

(12) Recheck analyzer settings at Low and High fire.

(13) Check the operating control settings and make sure that the burner shuts off at the temperature indicated. Also check the safety limit and low water cut-offs. Set all the damper linkage arms and balls joints and check for locknut tightness.

(14) Instruct the owner or user in the correct operation of the burner and how to reset the flame safeguard. Mark emergency shut-off valves and switches and explain the shut-down procedure. Leave the burner wiring sheets and instruction sheets in the burner panel box for future reference.

3.1 - GAS BURNER: FULL MODULATION

A modulating burner requires proportioned control of fuel & air at all firing levels. Fuel-Master Burners offer systems employing:

A) A modulating motor - gas valve - damper
B) A modulating gas valve - damper
C) A computer programmed individual drives for fuel, air and if necessary recirculated flue gas.

3.2 - SETUP

The check-out procedure on a modulating burner is the same as shown on the previous page covering gas-burner start-up; the only difference will be the damper open pre-purge and the low fire start interlock. When the burner has a manual potentiometer, it is used to control the amount of travel of the damper motor arms, allowing you to adjust the fuel/air ratio over the complete range of the burner.

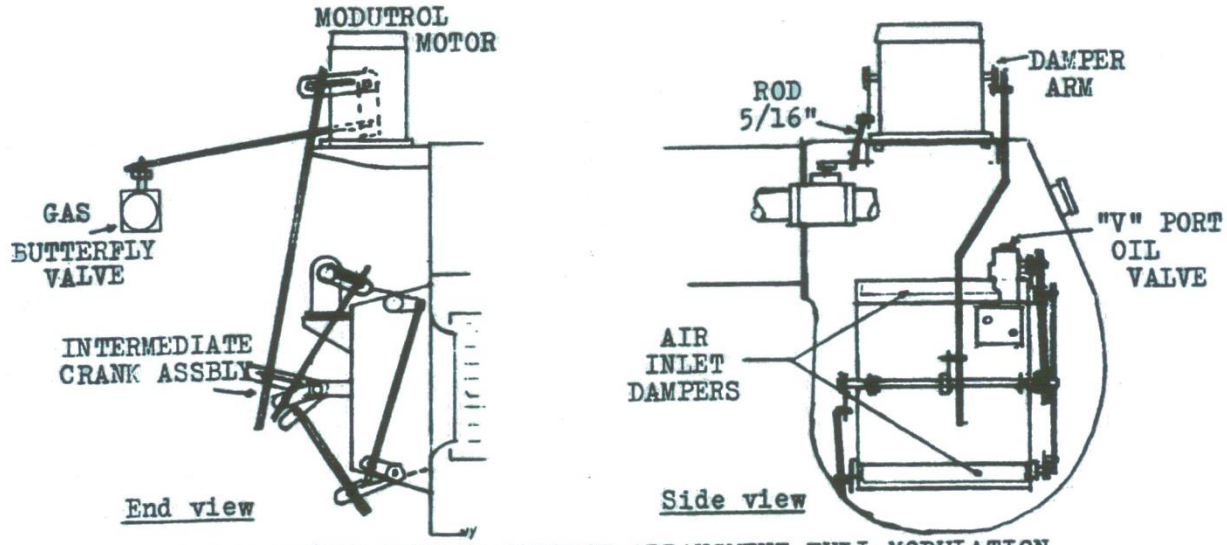
Set the switch to Manual and turn the manual pot control fully counterclockwise. When the burner is at low fire (leave the control switch on low) adjust the minimum input to suit the load or to maintain a stack temperature of at least 300 degree F.

Slowly turn the control knob, about ten degrees at a time, checking the fire at each set point to see if the air is maintaining a proper ratio. The damper linkage is installed so that each control point can be adjusted separately. By moving the ball joint linkage away from the pivot point of the arm, the travel will increase, or towards the pivot point will shorten the travel. At each ten degrees of travel on the modutrol arm, the correct air fuel ratio should be adjusted. The flue gas can be checked with a CO_2 or O_2 tester to determine whether more or less air is needed. The CO_2 should be adjusted to a maximum of 9.5% and the O2 between 5.0% and 5.7%.

If there is not a manual potentiometer on the burner, remove the top cover on the modulating motor and loosen one of the wires on the T & T terminals. By making momentary contact with this wire after

the main flame has been established, you can advance the modulating motor in the same manner as the manual pot.

The Analyzer's readings should be checked when the burner is going from low to high fire and again while going from high to low fire. After the correct air fuel ratio has been established, connect the wire back on the terminal; and switch the burner to AUTO. Run the burner through a complete cycle with the modulating controller and set the controller to the required temperature or pressure to suit the load conditions.



COMBINATION GAS/OIL BURNER LINKAGE ARRANGMENT FULL MODULATION

4.0 - SERVICE INSTRUCTIONS

In order to obtain maximum performance from any fuel burning equipment, it must be properly adjusted. The only accurate way to determine the efficiency of the burner is through the use of test instruments. We strongly recommend that you use the following instruments:

1. Flue gas analyzer.
2. Stack thermometer
3. Draft gauge.
4. Gas pressure gauge.
5. Combination Voltmeter and Ammeter

All FUEL-MASTER burners are test fired at the factory and all controls checked for operation. Before assuming that a part is defective, test it thoroughly and check the field wiring and controls for possible defects.

Burner will not start with disconnect and service switches in the "ON" position

1. Check power supply at burner, term. 1 & 2, check circuit control fuse.
2. Test limit circuit, jumper each control to find if circuit is open, check air pressure switch starting interlock circuit. Check gas pressure switches.
3. With power through the limit circuit, the program control should pull in; if not, re-set the combustion control. Check wiring terminals on combustion control for loose connections, or faulty wiring. Replace control.
4. Combustion control load relay pulls in but burner motor does not start; Re-set motor overload, be sure heaters have been installed, check power to motor starter coil circuit. Replace coil. If starter pulls in but motor does not start, check load terminals for correct voltage, check wiring connections to motor. If overloads trip out, check to see if correct size heaters are installed, change ambient compensation setting, check for jammed fan or shaft. Test supply voltage for correct current reading.

Burner motor starts but pilot does not attempt to light

1. Check low fire start interlock for correct switch position. Check combustion air switch circuit to be sure switch is made.
2. At this point the air switch can be checked by turning its adjusting screw clockwise only enough to stop the motor. Turn off the burner and reset the air switch by turning the adjusting screw counter-clockwise only two full turns. Turning further can nullify the function of the air switch.

Burner motor starts, Pilot circuit energized, No pilot

1. Check gas supply to pilot. Test supply voltage (low voltage will give a poor flame signal). Check ignition transformer, electrode setting, and ignition circuit for correct wiring and terminals and ignition transformer.

Pilot lights, But flame relay does not pull in.

1. Voltage under minimum requirements. Flame relay will not pull in, scanner is not sighting properly or is obstructed, or scanner is aimed at wrong part of flame for type of detector used. For best results the first third of the flame is high in UV; the center third is good for photo-cell application, and the last third is good for infra-red.
2. With some controls, it is possible to have too much UV detected, and the signal may appear low; loosen the scanner and move away from the UV source while watching your test meter. If the signal increases, then try putting an extension pipe on the scanner mount or use an orifice to blank out some of the scanner cell.

Pilot lights, Flame replay pulls in, but main flame does not light.

1. Check the test firing valve to be sure it is open.
2. Check wiring connections to main gas valve circuit for correct connection and terminals.
3. Check gas pressure to regulator, excess pressure may have caused a lock-up. Too little pressure may not give a combustible mixture.
4. Check wiring to gas valve, if high-low valve, wiring may be crossed. Check low fire position, it may be set too low for valve to open.
5. If all the above checks out, replace the valve.

Main burner operates, but will not go to high fire.

1. Be sure low auto switch is in correct position and in working order.
2. If burner has manual potentiometer, be sure switch is in auto position.
3. High fire or modulating control not set high enough or not wired correctly.
4. If power is supplied to the control and on correct terminals, check end switches, if any, and replace control.

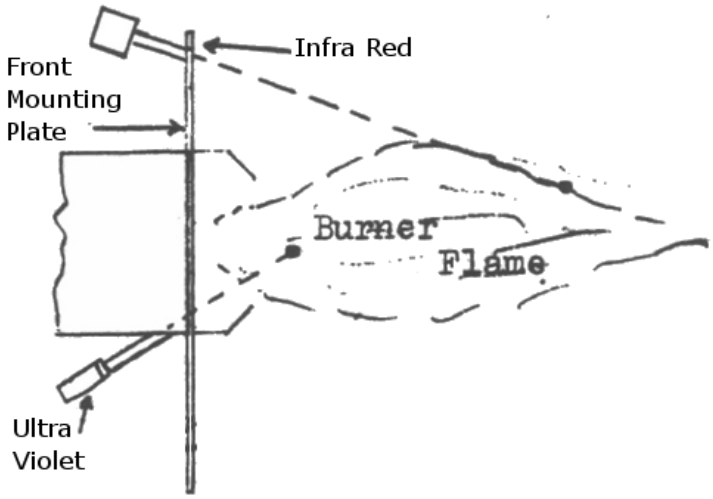
Burner operates but will not meet load requirements.

1. Check main gas for sufficient pressure to meet burner rating on nameplate.
2. Test pressure, downstream of each regulator to be sure of correct settings and increase if necessary.
3. Test pressure downstream of each gas valve to be sure valve is opening fully.
4. Check gas pressure at the test point on the gas train before the firing cock and after the firing cock to be sure the port is not obstructed.
5. Check furnace back pressure to see it does not exceed rating on nameplate.
6. Check load with burner rating to be sure burner is sized properly.

4.1 - CAUTIONS WITH SCANNER APPLICATIONS

Ultra Violet Detector: Extreme care must be taken to avoid sighting the ignition or any reflection of it. Signal strength can be too strong, if so, restrict scanner opening or move detector away from source. UV will not penetrate glass; protective lenses must be made of quartz.

Intra-Red Detector: Locate scanner where it will not sight hot refractory.



Scanner locations for remote mounting field application

4.2 - MAINTENCE AND CARE OF BURNER

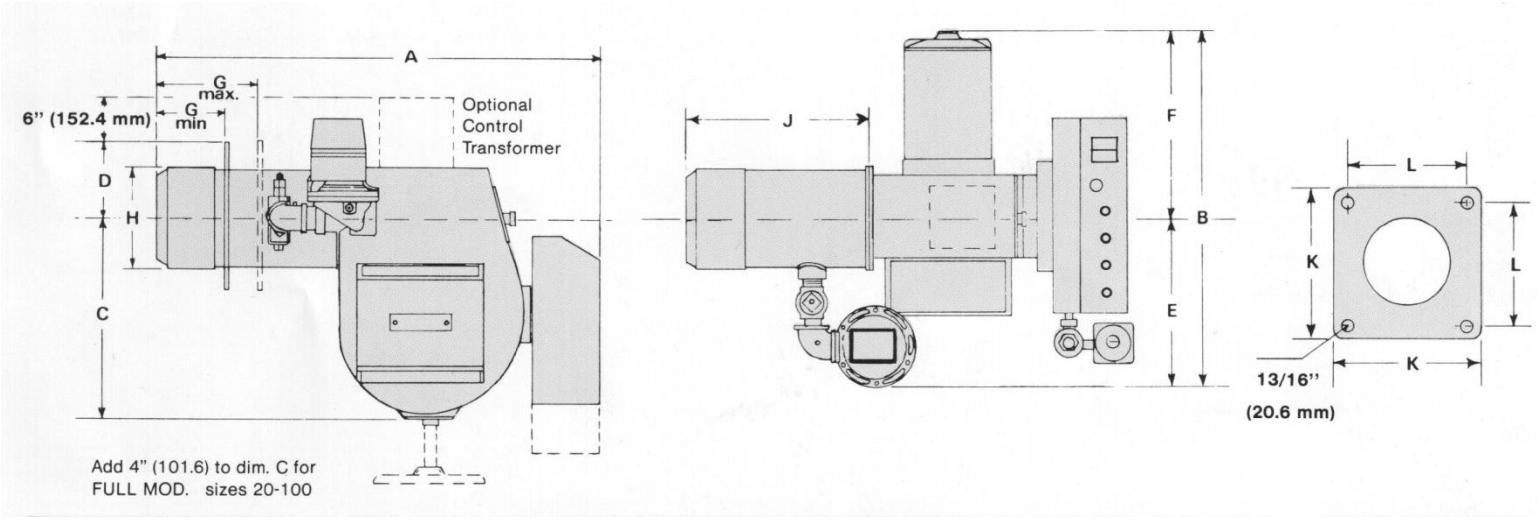
A – The burner motor is permanently lubricated. Oil is required only if the ambient temperature is high.

B – The floor area around the burner should be kept clean. Excessive dust and lint can accumulate on the fan blades and restrict performance. The fan should be cleaned at least once a year.

C – The contact points of the controls should be cleaned periodically. NEVER USE ABRASIVE. Contact spray cleaner or stiff paper can be used to wipe the surface area of the points.

D – The gas train should be checked at least once a year to make sure the gas valves are seating properly. Close the lubricated plug cock #8 on the gas train drawing, install a pressure gauge in the test port #14 and with the power off open the main gas shut-off cock. If the gas valves are leaking the gauge will indicate the upstream pressure in a matter of minutes. If the burner has two gas valves the test should be taken with the gauge immediately downstream of each valve, this will indicate if either valve is leaking. Replace all defective valves before putting the gas burner into operation. Replace the test opening plugs.

E – The area adjacent to the burner or appliance must be kept free from any combustible materials.



Model	Dimensions in Inches Standard Models											
	A	**B**	**C**	**D** ○	**E**	**F**	**G** **Min** □	**G** **Max** **	**H**	**J**	**K**	**L**
CG-20	34	28	12	4 ½	16 ¼	11 ¾	3 ¼	3 ¼	7 ⅜	12 ⅜	9	7 ½
CG-25	34	28	12	4 ½	16 ¼	11 ¾	3 ¼	3 ¼	7 ⅜	12 ⅜	9	7 ½
CG-45	35	32	14	5 ½	19 ¾	12 ¼	3 ½	3 ½	9	12 ¾	11	8 ½
CG-60	35	32	14	5 ½	19 ¾	12 ¼	3 ½	3 ½	9	12 ¾	11	8 ½
CG-100	39	37	15 ¼	6	23	14	4 ½	5	10 ⅜	15 ½	12	10
CG-125	39	37	15 ¼	6	23	14	4 ½	5	10 ⅜	15 ½	12	10
CG-165	45	41	18	8	25 ½	15 ½	6 ½	8 ½	12 ⅜	19	16	13
CG-230	45	41	18	8	25 ½	15 ½	6 ½	8 ½	12 ⅜	19	16	13
CG-300*	56	⌂	18	9	⌂	22 ½	7 ½	9	14 ½	30	18	15
CG-350*	56	⌂	18	9	⌂	22 ½	7 ½	9	14 ½	30	18	15

* Add ¼" (6.4 mm) to H dimension for size of opening in boiler front.

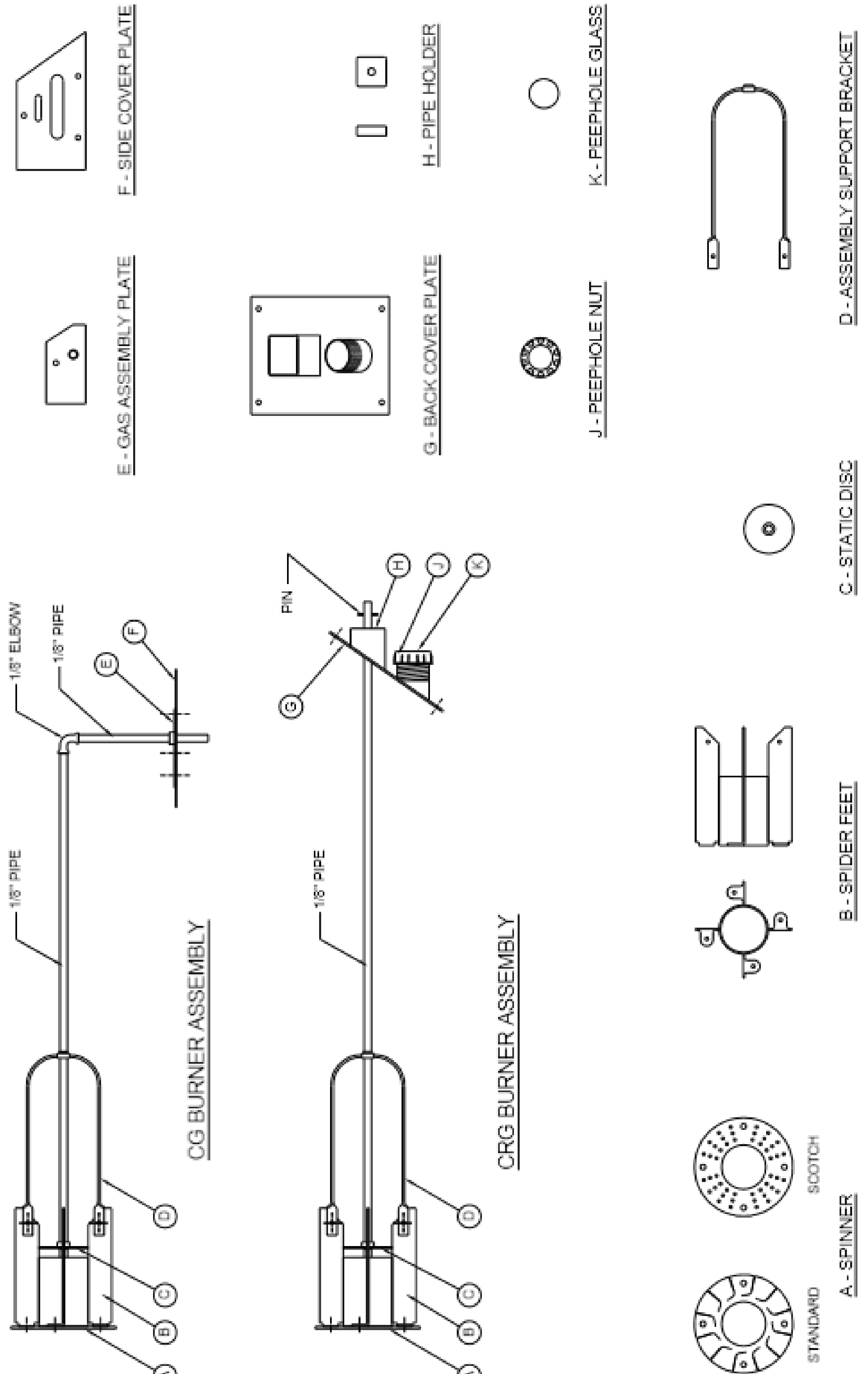
** Max. G dimension is shown with standard blat tube (Consult factory for longer insert lengths).

⌂ Varies to suit gas train layout.

□ Unless otherwise specified, flange will be set at minimum dimension.

○ Inverted model CR – Minimum height from ash pit floor to blast tube center line is dimension D.

Note: Dimensions and appearance may vary depending on components used.


F - SIDE COVER PLATE
E - GAS ASSEMBLY PLATE
H - PIPE HOLDER
G - BACK COVER PLATE
K - PEEPHOLE GLASS
J - PEEPHOLE NUT
D - ASSEMBLY SUPPORT BRACKET
C - STATIC DISC
B - SPIDER FEET
A - SPINNER
STANDARD
SCOTCH
CG BURNER ASSEMBLY
CRG BURNER ASSEMBLY
1/8" ELBOW
1/8" PIPE
PIN
A
B
C
D
E
F
G
H
J
K