

ADAMS

SPEEDFLAME®

POWER GAS BURNERS

Certified for Natural & LP Gases

Installation, Operation, Maintenance Manual



G2T Series

WARNING !

If the information in these instructions are not followed exactly a fire or explosion may result, causing property damage, personal injury or death.
Code compliance is the sole responsibility of the installer.

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

CAUTION !

Do not store gasoline flammable liquids or vapors in the vicinity of this or any other fuel burning appliance.

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



Installer: Affix this manual adjacent to the burner!

Inform and demonstrate the correct operation and maintenance of the burner.

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SERIES • Power Gas Conversion Burners

MODELS G2T AND G2SD

The Adams Model G2 direct spark ignition conversion burner is adjustable to most heating appliances that have a suitable combustion chamber. Do not use in sectional type heating appliances or on revertible (diving) flue design applications.

This design series of gas conversion burners are certified by the CTL Test Laboratories the ANS Z21.17/CSA 2.7-1998 Gas Conversion Burner Standards.

The installation must conform with local codes or, in the absence of local codes, with the Standard for the Installation of Domestic Gas Conversion Burners, ANSI Z21.8, the National Fuel Gas Code, ANSI Z223.1, or the CAN/CGA-B149, Installation Codes.

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

These publications are available from the Canadian Standards Association or from the National Fireprotection Association.



⚠ WARNING

**CARBON MONOXIDE
POISONING HAZARD**

CARBON MONOXIDE IS A COLORLESS, ODORLESS GAS THAT CAN KILL. FOLLOW THESE RULES TO CONTROL CARBON MONOXIDE.

- ▲ Do not use this burner in an unvented, enclosed area. Carbon monoxide may accumulate.
- ▲ Do not adjust the pressure regulator. High pressures produce carbon monoxide.
- ▲ Check flue gases for carbon monoxide. This check requires specialized equipment.
- ▲ Allow only qualified burner service persons to adjust the burner. Special instruments and training are required.



⚠ WARNING

OVERHEATING HAZARD

SHOULD OVERHEATING OCCUR:

- (1) Shut off the manual gas control to the appliance.
- (2) Do not shut off the control switch to the pump or blower.

SPECIFICATIONS G-2 SERIES

MODEL	G2T	G2SD
Max. Input BTU/Hr.	240,000	255,000
Min. Input BTU/Hr.	50,000	70,000
Burner Head Dia. over screws	3-7/16" (8.73cm)	3-7/16" (8.73cm)
Inlet Press. Nat. LPG	5.0 - 13" W.C. 1.24 - 3.23 kPa. 11.0 - 13" W.C. 2.74 - 3.23 kPa.	5.0 - 13" W.C. 1.24 - 3.23 kPa. 11.0 - 13" W.C. 2.74 - 3.23 kPa.
Standard Voltage	120V 60 HZ	120V 60 HZ
Ignition System	Direct Spark Ignition	Direct Spark Ignition
Flame Safety	Electronic	Electronic

STANDARD EQUIPMENT

- Precision balanced centrifugal blower.
- Motor with integral end switch to prove rotation.
- Stainless steel combustion head(s) and flame shield.
- Low voltage automatic gas valve.
- Low voltage motor relay and transformer for 2 wire control system.
- Adjustable pedestal or air tube flange
- Usable air tube lengths 5.24", 8" and 11".
(13.3cm, 20.32cm & 27.9cm)

I. VENTILATION

The area in which the heating system is located must have an adequate supply of air for both combustion and draft diverter dilution. Open basements and below grade utility rooms or crawl spaces without storm windows or tight doors will generally permit adequate air infiltration.

If the heating system is located in a separate room with a tight door, ventilation must be provided to an open area within the building or to the outside. If the openings are within the building two open grills must be installed, one near the floor and one close to the ceiling. The open (non-adjustable) grills must have a free area of at least one square inch (6.45cm) per 1,000 BTU of burner input.

If the building is of unusually tight construction or has a large exhaust fan installed, on a basement, crawl space or slab construction home, provisions must be made for an outside air supply that is ducted into the furnace room. It must have a permanent (non-adjustable) opening of at least one square inch (6.45cm) of free area per 1,000 BTU input. Consult the National Fuel Gas Code latest edition, or the CAN/CGA-B149 Installation Codes, for more detailed information.

With direct spark ignition system the burner performs well under slight or momentary back draft conditions. However, it is not intended for operation under sustained reverse draft conditions. This condition is fairly common in buildings with large ventilating fans. The fans can create a sub-atmospheric pressure in the building causing a down draft in the chimney. This will cause hazardous flue gas products to be drawn into the building from the draft diverter. The conditions must be corrected promptly.

II. PREPARATION OF THE HEATING APPLIANCE

- The heating appliance must be in good repair and have adequate capacity to heat the structure.
- Keep all materials, combustible or otherwise, at least two feet (.61m) from the heating appliance.

- Thoroughly clean the heat exchanger and inspect for cracks or other defects - the installer must determine if the appliance is safe to upgrade.

- The combustion chamber must be free from deterioration and adequately sized.
- Stainless steel chambers must be lined with ceramic fiber material to prevent deterioration.

Coal Fired Units

To convert an appliance that was coal fired, the following consideration need to be observed:

- Select feed door or ash-pit door for burner mounting.
- **Ash-pit:** Remove grates and install combustion chamber.
- **Feed Door:** Fill bottom with suitable material (vermiculite, etc.), secure door.

Warm Air Furnaces

- If combustion chamber upgrade is necessary, do not reduce the original height or outlet configuration.

Boilers, Cast Iron & Steel, Steam or Hot Water

Inspect for leaks and repair any that are found. Check the ceramic or fire brick combustion chambers. Replace if not in good condition.
NOTE - Do not remove the chamber from a dry base boiler. Clean the gauge glass on steam boilers so that all safety devices and controls are operating according to the manufacturer's specifications.

See Table 1 and figure 1 for set-ups.

TABLE 1- RECOMMENDED MINIMUM INSIDE DIMENSIONS OF REFRACTORY COMBUSTION CHAMBERS

Input BTU/Hr.	Length (L)		Width (W)		Dimension (C)		Suggested Height (H)		Min. Dia. Vertical Cyl.	
	in.	cm	in.	cm	in.	cm	in.	cm	in.	cm
50,000	7	17.8	6	19.2	3.5	8.90	7	17.8	7	17.8
70,000	8	20.3	7	17.8	4.0	10.2	8	20.3	8	20.3
90,000	8	20.3	7	17.8	4.5	11.4	9	22.9	8	20.3
110,000	9	22.9	8	20.3	4.5	11.4	9	22.9	9	22.9
140,000	10	25.4	9	22.9	5.0	12.7	10	25.4	10	25.4
165,000	11	27.9	10	25.4	5.0	12.7	10	25.4	11	27.9
180,000	11	27.9	10	25.4	5.0	12.7	10	25.4	11	27.9
210,000	12	30.5	11	27.9	5.5	14.0	11	27.9	12	30.5
240,000	14	35.6	11	27.9	5.5	14.0	11	27.9	13	33.0
270,000	15	38.1	12	30.5	5.5	14.0	11	27.9	14	35.6
300,000	16	40.6	12	30.5	6.0	15.2	12	30.5	15	38.1
340,000	18	45.7	13	33.0	6.0	15.2	12	30.5	17	43.2

See Figure 1 for chamber sectional view and burner head setback note.

Figure 1

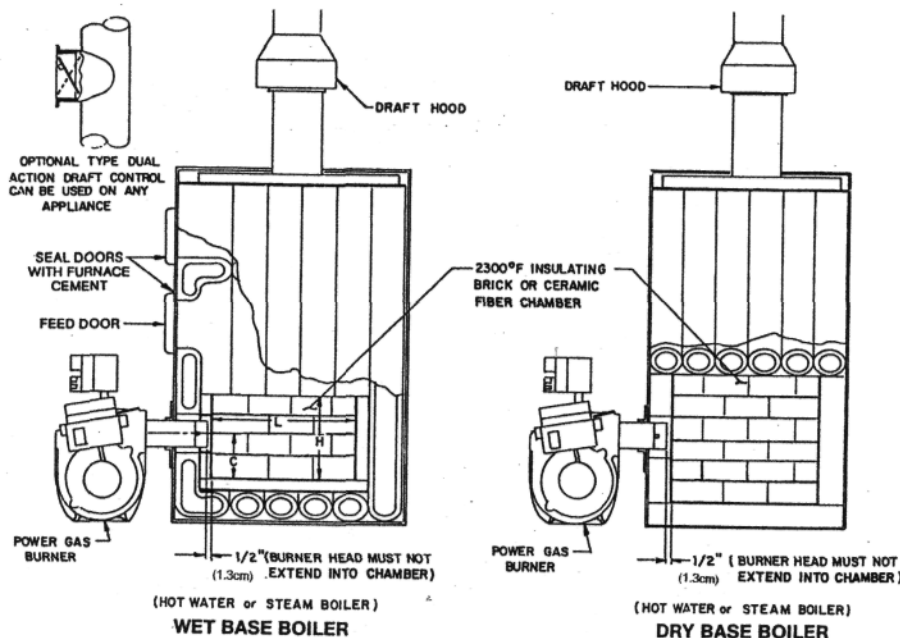
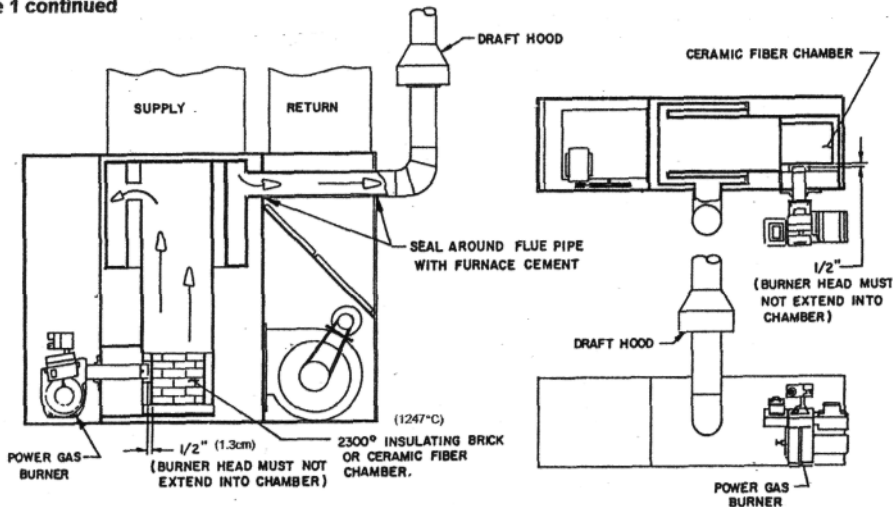
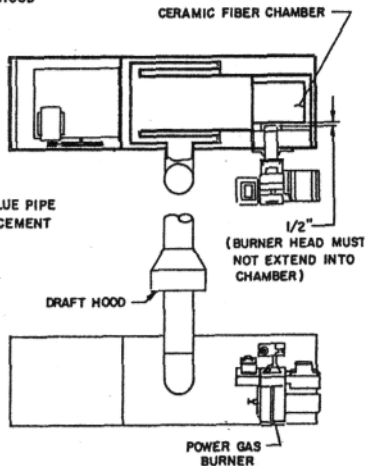


Figure 1 continued



FORCED AIR FURNACE



HORIZONTAL FURNACE

III. FLUE PIPE, DRAFT DIVERTER/ DOUBLE ACTING BAROMETRIC DAMPER

Method 1 - Reduction of flue pipe size.

Select the proper size of galvanized flue pipe and draft diverter from the chart.

Burner Input BTU/Hr.	Draft Diverter & Flue Pipe Dia.
Up to 120,000	5" (12.7cm)
120,000 to 175,000	6" (15.2cm)
175,000 to 250,000	7" (17.8cm)
250,000 to 325,000	8" (20.3cm)

NOTE - If the flue pipe length exceeds 10' (3.04m) or contains more than two elbows, use the next size larger flue pipe and draft diverter.

NOTE - Any reduction in the flue pipe diameter must be made at heating appliance flue outlet by use of a fixed collar reducer. Flue pipe must be 24 ga. or heavier steel.

NOTE - Where local codes permit, install a double acting barometric damper, rather than a draft diverter. Less heated air is lost up the chimney with a barometric damper than with a draft diverter.

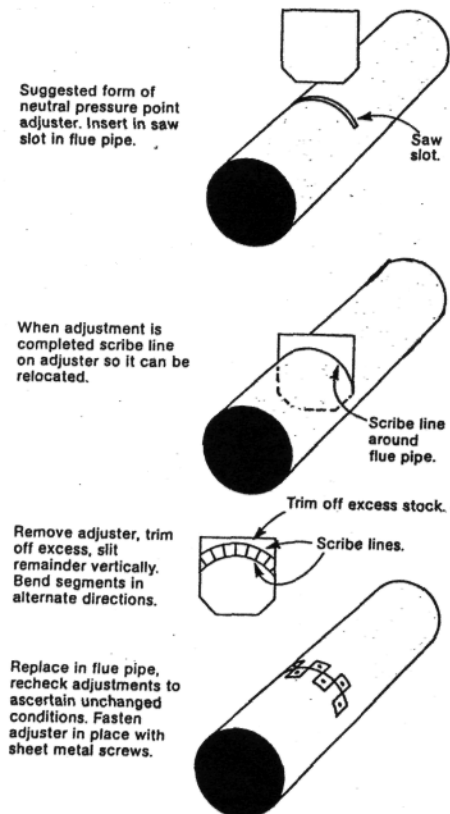
WARNING: SPILL SWITCH

A device which will automatically shut off gas to the burner in the event of sustained backdraft is required. It shall be of the listed manual reset type and installed and adjusted by a qualified service technician in accordance with the manufacturer's instructions.

Method 2 - Same diameter pipe as the appliance flue collar and a neutral pressure adjuster. If diameter of the flue pipe is greater than the diameters shown in Method 1 a neutral pressure point adjuster shall be installed between the flue collar of the appliance and the relief opening of the draft diverter. It shall be constructed so that it is permanently locked in the adjusted position and cannot be changed accidentally in a manner that will interfere with the normal operation of the burner.

Figure 2 illustrates a suggested method for constructing this device. The neutral pressure point adjuster shall then be left in the fully open position until after the burner rating has been established.

Figure 2



No manually adjusted flue pipe damper shall be installed on any Gas Conversion Installation. The horizontal run of flue pipe shall be pitched upward 1/4" (.64cm) per foot or more. Number of elbows must be kept to a minimum to avoid excessive resistance to flue gas flow. Secure all joints with sheet metal screws to avoid sagging or displacement. The flue pipe must be spaced at least 6" (14.2cm) from combustible materials, 12" (30.5cm) if uninsulated. Flue pipe must be firmly cemented into the chimney opening. It must not extend beyond the inner wall. Where two or more appliances use the same chimney, be sure not to enter the chimney with both flues at the same level. Under no circumstances should the flue pipe be connected to the flue of any open fireplace. A draft Diverter must be CSA Certified (or one approved by the local gas company) and installed in the flue pipe. The draft diverter should be the same size as the flue pipe and located higher than the highest part of the heating appliance.

Vertical draft diverters should have two flue pipe diameters between the skirt and any surface under it. This distance may be reduced to one diameter on the horizontal or horizontal to vertical diverters.

Where the flue pipe passes through a combustible partition a ventilated thimble must be used. The draft diverter must be located in the same room as the heating appliance.

On forced warm air furnaces where the flue outlet is located on the suction side if the circulating air blower, make certain the flue pipe connection is fully sealed to prevent flue products from being drawn into the circulating air.

IV. CHIMNEYS

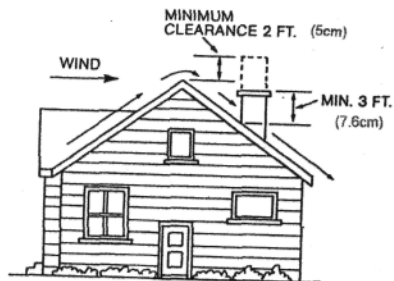
The chimney height is determined by the building roof line and surrounding trees and buildings. It should be at least two feet (5.1cm) higher than the roof ridge with no obstructions from adjacent trees and buildings. When two flues enter the same chimney, it is recommended that the higher BTU input appliance flue enter at a lower point.

The internal construction of the chimney should be corrosion resistant tile, stainless steel or some other material that will withstand flue gas products. If the chimney is unlined, consult the local gas company for their recommendations. Refer to figure 4 on page 8 for chimney instructions.

Many prefabricated chimneys on either slab construction or basement homes, terminate near the ceiling level. During rainstorms it is common for water to run down the heating appliance flue pipe. Many warm air heating appliances have a flue outlet directly above the burner. There is always a possibility that the water from the flue pipe will drain out upon the burner and its controls. This condition must be corrected by installing a cap or rain shield on top of the chimney.

TYPICAL CHIMNEY CONDITIONS APT TO RESULT IN BACK-DRAFTS

Figure 3



V. ELECTRICAL

All wiring should conform to the National Electrical Code ANSI/NFPA 70 or, the Canadian Electrical Code CSA C22.1, or the legally authorized code in your area. Use multiple conductor wiring not lighter than 14 gauge for line voltage wiring. The conversion burner must be grounded. A ground terminal is provided in the 4 x 4 (10.2cm x 10.2cm) field wiring box, maximum amperage draw 5.7 amperes. See figure 5 on page 9 for wiring diagram.

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

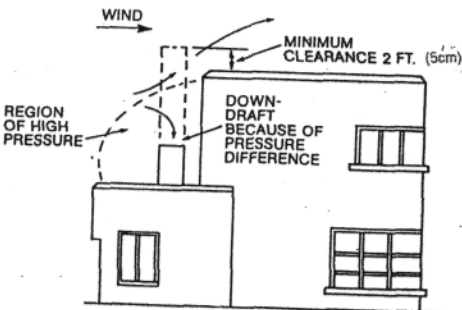
CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

Each burner has its own 30VA, 24 volt control transformer. Under no circumstances should any other electrical equipment be operated from this transformer.

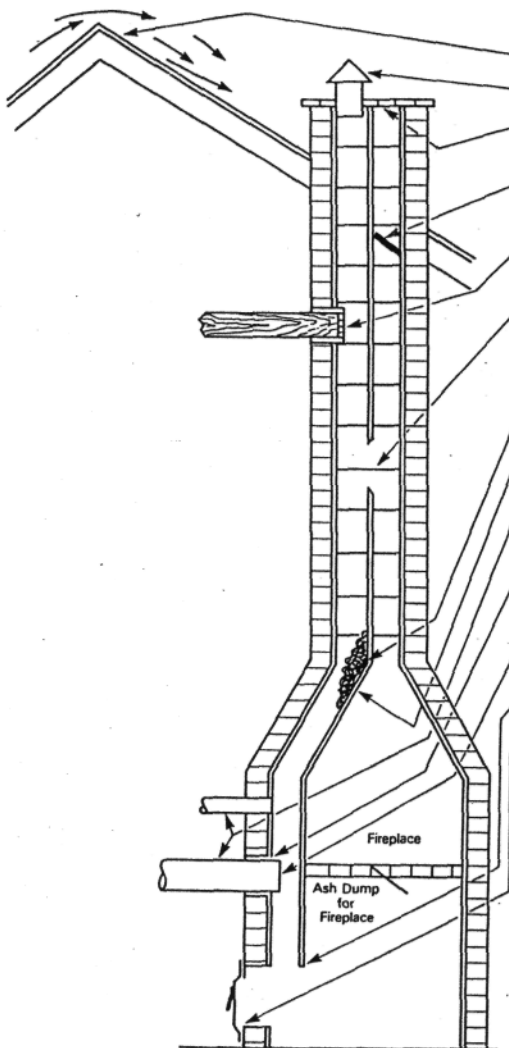
Locate the thermostat where it will sense the natural air circulation within the building. Do not place it in a location where it will be subjected to cold drafts from doors or windows or where it can sense the warm air from registers or radiators. It is not recommended that a thermostat be installed on an outside wall, in front of a fireplace or at the base of an open stairwell.

In addition to the thermostat each installation must include an operating and/or high limit control as shown in the wiring diagram

NOTE: When the thermostat wires terminate on the G2 primary control box "T" terminals, the heat anticipator setting for the G2 burners is determined by adding the primary control current to the gas valve current. The result is the anticipator setting. (Example: .2 + .6 = .8 amps.)



COMMON CHIMNEY TROUBLES AND THEIR CORRECTIONS



Troubles	Examination	Corrections
Top of chimney lower than surrounding objects.	Observation.	Extend chimney above all objects within 30 feet.
Chimney cap or ventilator.	Observation.	Remove.
Coping restricts opening.	Observation.	Make opening as large as inside of chimney.
Obstruction in chimney.	Can be found by light and mirror reflecting conditions in chimney.	Use weight to break and dislodge.
Joist projecting into chimney.	Lowering a light on extension cord.	Must be handled by a competent brick contractor.
Break in chimney lining	Smoke test-build smudge fire blocking off other opening, watching for smoke to escape.	Must be handled by a competent brick contractor.
Collection of soot at narrow space in flue opening.	Lower light on extension cord.	Clean out with weighted brush or bag of loose gravel on end of line.
Offset.	Lower light on extension.	Change to straight or to long offset.
Two or more openings into same chimney.	Found by inspection from basement.	The least important opening must be closed, using some other chimney flue.
Loose-sealed pipe in flue opening.	Smoke test.	Leaks should be eliminated by cementing all pipe openings.
Smoke pipe extends into chimney.	Measurement of pipe from within or observation of pipe by means of a lowered light.	Length of pipe must be reduced to allow end of pipe to be flush with inside of tile.
Failure to extend the length of flue partition down to the floor.	By inspection or smoke test.	Extend partition to floor level.
Loose-fitted clean-out door.	Smoke test.	Close all leaks with cement.
Severe down draft condition.	By draft meter test.	Install a Bridert type vent cap.

If the thermostat wires are **not** terminated on the burner box "T" terminals, and these terminals are **JUMPED**, you must then determine what the controlling device at the point where the thermostat wires terminate. Typically, this information can be found on the body or cover of the controlling device.

When the current draw cannot be determined accurately by the above method, measure the current with an ampere meter using the 1 AMP scale. Connect the meter leads in series with one of the thermostat leads for the accurate reading.

Steam and vapor systems must also be protected with a low water cutoff to prevent firing a dry boiler.

The usual temperature and pressure settings for heating appliances are shown below.

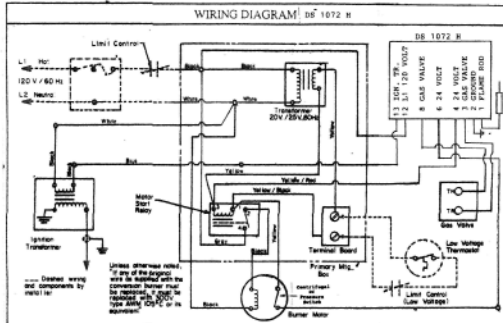
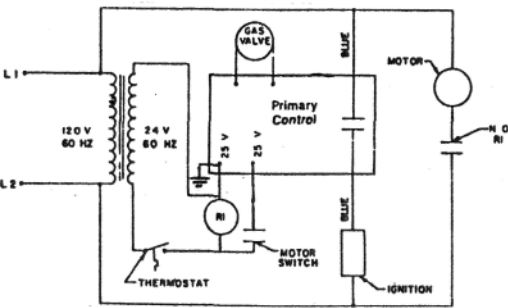
Gravity Hot Water	140 - 212° F (59 - 99°C)
Forced Hot Water	140 - 240° F (59 - 114°C)
Gravity Warm Air	250° F (120°C)
Forced Warm Air	200° F (92°C) limit, blower "on" 115° (46°C), blower "off" 100°F (37°C)
Steam	"off" 3 lbs.(1.3kg), "on" 1 lb.(.44kg) "differential" 2 lbs.(.87kg)
Vapor	"off" 4 oz.(12.4kg), "on" 2 oz. (62gr) "differential" 2 oz.(62gr)

NOTE: Each burner installation "MUST" have a safety limit wired in series with the burner.

NOTE: Should overheating of any appliance occur:

(1) shut off the manual gas control to the appliance, (2) **DO NOT** shut off the control switch to the pump or blower.

Figure 5 & 5A



*Unless otherwise noted: If any of the original wire as supplied with the conversion burner must be replaced, it must be replaced with type 105° C (600V)AWM wire or its equivalent.

VI. GAS PIPING

It is recommended that a separate gas line be run from the meter to the burner. Size the pipe in accordance with the following chart:

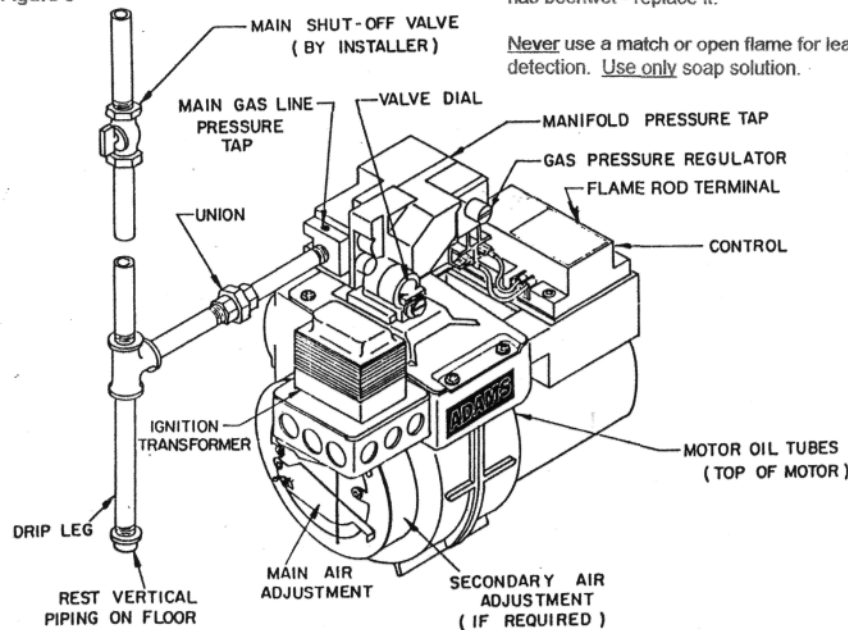
STEEL PIPE SIZE FOR NATURAL GAS

Burner Firing Rate BTU/Hr.	Feet (cm) of pipe from Meter to Burner				
	10 (3m)	20 (6m)	30 (9.1m)	40 (12.2m)	50 (15.2m)
50,000	.5 (1.3cm)	.5 (1.3cm)	.75 (1.9cm)	.75 (1.9cm)	.75 (1.9cm)
100,000	.75 (1.9cm)	.75 (1.9cm)	.75 (1.9cm)	.75 (1.9cm)	1 (2.5cm)
150,000	.75 (1.9cm)	1 (2.5cm)	1 (2.5cm)	1 (2.5cm)	1.25 (3.2cm)
200,000	.75 (1.9cm)	1 (2.5cm)	1 (2.5cm)	1 (2.5cm)	1.25 (3.2cm)
250,000	1 (2.5cm)	1 (2.5cm)	1.25 (3.2cm)	1.25 (3.2cm)	1.25 (3.2cm)
300,000	1 (2.5cm)	1 (2.5cm)	1.25 (3.2cm)	1.25 (3.2cm)	1.25 (3.2cm)
350,000	1 (2.5cm)	1.25 (3.2cm)	1.25 (3.2cm)	1.25 (3.2cm)	1.25 (3.2cm)
400,000	1 (2.5cm)	1.25 (3.2cm)	1.25 (3.2cm)	1.25 (3.2cm)	1.25 (3.2cm)

The pipe diameter may be reduced one size if LPG gas is used. Use steel pipe and Malleable iron fittings for gas service lines. Provide rigid supports for the pipe. If the pipe size must be reduced use reducing couplings only. Avoid the use of reducing bushings. Remove all burrs and inspect the pipe for dirt or other foreign material.

A main manual gas cock is to be installed approximately 5' (1.5m) above the floor level. A tee is located on the vertical drop at an appropriate level to attach the burner gas valve. The gas line extends down to the floor with a cap on the end. This extension provides the required drip leg. See figure 6. If the gas pipe passes through a jacketed enclosure the union must be located inside the jacket so that the burner can be removed for service. The manual gas cock is located outside the jacket. The gas valve used on all G2 burners have a main line pressure tap on the inlet side of the gas valve.

Figure 6



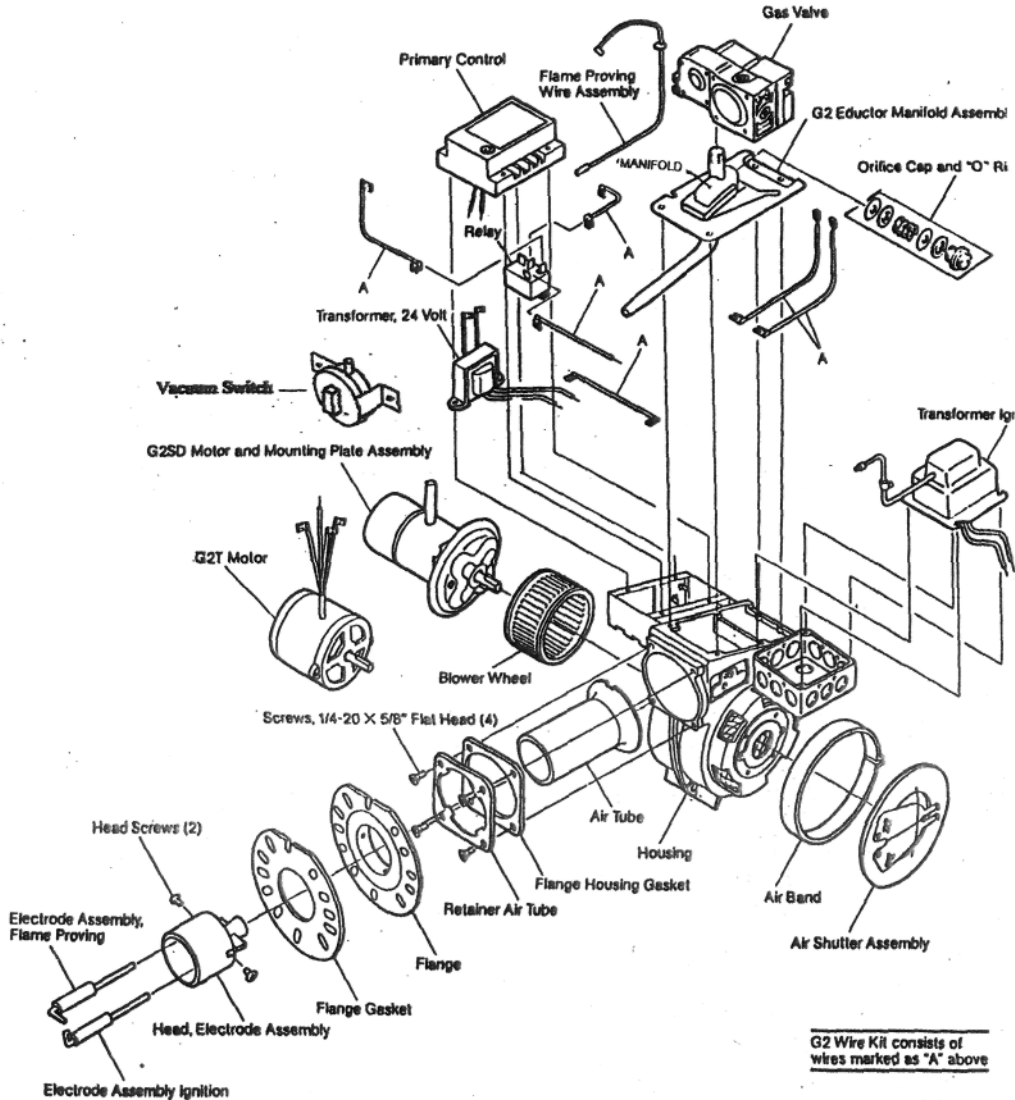
The appliance and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 PSIG (3.45kPa).

The appliance must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping at tests pressures equal to or less than 1/2 PSIG (3.45kPa).

A 1/8-inch (.32cm) NPT plugged tapping, accessible for test gage connection, must be provided immediately upstream of the gas supply connection to the conversion burner.

WARNING: Explosion Hazard! The control can malfunction if it gets wet. Never try to use one that has been wet - replace it.

Never use a match or open flame for leak detection. Use only soap solution.



MODEL G2 PARTS LIST

PART NUMBER	DESCRIPTION	PART NUMBER	DESCRIPTION
3884	Air Band	HT110A	Head Elec. Assy. G2T (GT2)
51084-A	Air Shutter Assembly	HT110B	Head Elec. Assy. G2T (GT4)
51076036BK	Air Tube, 5.25" (13.3cm)	HT110D	Head Elec. Assy. G2T (GT6)
51076064BK	Air Tube, 8" (20.3cm)	HT110F	Head Elec. Assy. G2T (GT8)
51076094BK	Air Tube, 11" (27.9cm)	HA110A	Head Elec. Assy. G2SD (G0)
21002	Blower Wheel, G2SD, 5.25" x 2.47" (13.3cm x 6.27cm)	HA110B	Head Elec. Assy. G2SD (G2)
2383	Blower Wheel, G2T, 6.25" x 3.44" (15.9cm x 8.74cm)	HA110C	Head Elec. Assy. G2SD (G3)
511980503	G2 Educator Tube Manifold Assy. Fits 5.25" (13.3cm) Air tube	HA110D	Head Elec. Assy. G2SD (G4)
511980715	Fits 8" (20.3cm) Air tube	HA110E	Head Elec. Assy. G2SD (G5)
511981015	Fits 11" (27.9cm) Air tube	HA110F	Head Elec. Assy. G2SD (G6)
51096050	Electrode Assy. Flame Prvg. 11" (27.9cm)	51074	Housing Assembly
51067050	Electrode Assy. Ignition 11" (27.9cm)	31182	Manifold Mounting Plate Gasket
31191	Electrode Clamp	51195	Motor Mounting Plate Assy. G2SD
3493	Escutcheon Plate	21065	Motor G2SD
51197	Flame Proving Connecting Wire Assy.	21082-A	Motor G2T
3380	Flange/Housing, Gasket	51194	Orifice Cap & "O" Ring Kit
71019	Gas Valve	See Table	Orifice
51196	G2 Wire Kit	See Table	Orifice Auxiliary
3885	Flange Gasket	71025US	Primary Control
51082	Al. Manifold	71011	Relay
		3892	Retainer, 3.125" (7.9cm) Air Tube
		499	Screw, .25"-20 x .625" (.64cm-20 x 1.6cm)
			Flat Hd.
		21066	Transformer (24volts)
		21067	Transformer, Ignition
		RSS.495078	Air Proving Switch

ORIFICE PART NUMBER TABLE

FIRING RATE IN BTU'S/HOUR

BURNER FUEL	70,000	80,000	90,000	100,000	125,000	150,000	175,000	200,000	225,000	250,000
G2SD										
3.5" (.87kPa)NGas	31194187	31194189	31194213	31194221	31194250	31194261	31194285	31194323	31194348	31194375
3.5" (.87kPa) LPG	31194156	31194166	31194177	31194187	31194203	31194221	31194242	31194257	31194272	31194285
G2T										
3.5" (.87kPa)NGas	31194186	31194213	31194221	31194235	31194257	31194285	31194312	31194350	31194375	31194413
3.5" (.87kPa) LPG	31194144	31194156	31194166	31194187	31194213	31194242	31194260	31194281	31194300	31194316

NOTE: The last three digits of the part number reflect the diameter of the orifice in inches. To convert the last three numbers to centimeters multiply by 2.54.

WHEN ORDERING BURNER PARTS, ALWAYS SPECIFY- BURNER MODEL NO., PART NO., AIR TUBE LENGTH & FIRING RATE.

VII. GAS ORIFICE SIZING AND BURNER HEAD SELECTION

The gas input rate should be set to the rate determined by the building heat loss calculations or by the heating appliance labeled input rating. Do not exceed the maximum input of the heating appliance or the burner head firing range.

The input rate and the type of gas to be used must be determined by the installer. Once this has been determined, the proper burner head and orifice can be obtained from your Adams distributor.

Whenever the precise orifice is not known at the time of purchase, the burner will be equipped and tested at the factory to fire natural gas at the minimum input range of the installed burner head.

On the opposite end of the orifice spring inside the gas manifold will be the orifice that delivers the minimum rate for LP gas with the burner head selected. See figure 8 page 14 for installation details. The orifice that is inserted into the manifold first is the one that determines the input rate with the gas being used.

The burner is designed for use with either Natural or LP gases at 3.5" W.C. (.87kPa) manifold pressure. The only burner adjustment that is required, in order to convert from one type of gas to the other, is the selection of the proper orifice for the burner head range and the type of gas being used. The following charts outline the head firing ranges and orifice rates in thousands of BTU's per hour for the respective gas types at 3.5" W.C. (.87kPa) manifold pressure.

The inside diameter of the orifice can be enlarged with a taper reamer to obtain a higher rate within the burner head firing range, or the desired orifice can be obtained from your Adams distributor.

All orifice sizes in the chart are approximate, the actual burner input rate will vary slightly with local heating values supplied. It is recommended that inquiry be made of the gas supplier for the correct heating value. The actual firing rate can then be determined by following the instructions outlined in Section IX item 11.

G2T HEAD SELECTION

HOW TO SELECT THE BURNER HEAD	
Desired Firing Rate BTU/HR	Use Head
50,000 to 110,000	GT2
110,000 to 180,000	GT4
180,000 to 210,000	GT6
210,000 to 240,000	GT8

TOTAL CERTIFIED RANGES FOR NATURAL AND LP GASES	
Head	Minimum - Maximum BTU/HR
GT2	50,000 - 120,000
GT4	70,000 - 180,000
GT5	90,000 - 200,000
GT6	100,000 - 210,000
GT7	110,000 - 230,000
GT8	120,000 - 240,000

For G2T Model

G2T GAS ORIFICE SIZING CHART

Firing Rate BTU/HR	Manifold Press. 3.5" W.C. (.87kPa) for Both Gases			
	Natural Gas		LP Gas	
	Drill Size	Hole Size In. (cm)	Drill Size	Hole Size In. (cm)
50,000	5/32	.156 (.40)	#32	.116 (.29)
60,000	#16	.176 (.45)	1/8	.125 (.32)
70,000	#9	.196 (.50)	#27	.144 (.36)
80,000	#3	.213 (.54)	5/32	.156 (.40)
90,000	#2	.221 (.56)	#19	.166 (.42)
100,000	15/64	.235 (.60)	3/16	.187 (.47)
110,000	D	.246 (.62)	#9	.196 (.50)
120,000	F	.257 (.65)	#3	.213 (.54)
130,000	I	.272 (.69)	#	.221 (.56)
140,000	K	.281 (.71)	15/64	.235 (.60)
150,000	M	.295 (.76)	C	.242 (.61)
160,000	N	.300 (.76)	1/4	.250 (.64)
170,000	5/16	.312 (.79)	G	.260 (.66)
180,000	P	.323 (.82)	I	.272 (.69)
190,000	O	.332 (.84)	J	.277 (.70)
200,000	S	.350 (.89)	K	.281 (.71)
210,000	23/64	.360 (.91)	M	.295 (.75)
220,000	3/8	.375 (.95)	N	.300 (.76)
230,000	25/64	.391 (.99)	5/16	.312 (.79)
240,000	Z	.413 (1.05)	O	.316 (.80)

The orifice chart above all rates were calculated using the following heating values: 1000 BTU's per cubic foot of natural gas and 2500 BTU's per cubic foot of LPG.

G2SD HEAD SELECTION

HOW TO SELECT THE BURNER HEAD	
Desired Firing Rate BTU/HR	Use Head
70,000 to 110,000	G0
80,000 to 180,000	G2
120,000 to 200,000	G3
150,000 to 240,000	G4
170,000 to 250,000	G5
190,000 to 255,000	G6

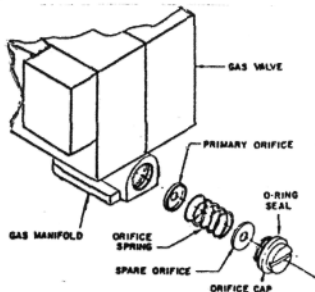
G2SD GAS ORIFICE SIZING CHART

Firing Rate BTU/HR	Manifold Pressure 3.5"W.C. (.87cm) for Both Gases			
	Natural Gas		LP Gas	
	Drill Size	Hole Size In. (cm)	Drill Size	Hole Size In. (cm)
70,000	3/16	.187 (.47)	5/32	.156 (.40)
80,000	#6	.199 (.50)	#19	.166 (.42)
90,000	#3	.213 (.54)	#16	.177 (.45)
100,000	#2	.221 (.56)	3/16	.187 (.47)
125,000	1/4	.250 (.64)	13/64	.203 (.52)
150,000	9/32	.281 (.71)	#2	.221 (.56)
175,000	M	.295 (.75)	C	.242 (.61)
200,000	P	.323 (.82)	F	.257 (.65)
225,000	S	.348 (.88)	I	.272 (.69)
250,000	3/8	.375 (.95)	M	.295 (.75)

VIII. ORIFICE CHANGE OUT PROCEDURE

It is not necessary to disassemble the burner to change gas orifices. Figure 8 shows a detailed view of the change procedure. Simply remove the orifice cap and install the proper primary orifice on the spring. Insert the spring assembly into the manifold and tighten the orifice cap. Do not over-tighten.

Figure 8



IX. INITIAL START UP AND ADJUSTMENT

1. Check all joints for gas leaks. Reference Section IV Gas Piping for suggested methods.

NOTE: Care must be taken to prevent wetting the electronic components during the leak test.

WARNING: Explosion Hazard! The control can malfunction if it gets wet. Never try to use one that has been wet - replace it.

2. It is important to purge the gas line on long supply lines. Loosen the union figure 6 on page 10 and allow the air to escape into the atmosphere until the gas starts flowing, then tighten the union. **CAUTION** - Purging excessive amounts of gas into the atmosphere can be dangerous, particularly with LPG, which is heavier than air.

3. Apply a few drops of #20 SAE Oil to the motor bearings.

4. Make certain that the gas valve dial is turned to on. Air band if used should be set at zero and air shutter open to position 2 or less.

5. Turn on the burner power supply switch and set the room thermostat above room temperature. Let the burner run until flame is established or the control locks out (45 seconds).

6. If the control locks out turn the main line power supply switch off and back on. This action resets the control and another purge cycle can be performed if desired.

7. Burner should now light off if gas line has been purged. **NOTE:** There is a 4 second trial for ignition. If burner does not light off reset the control by repeating step # 6.

8. The gas input for natural gas can be determined by timing the gas meter. To vary the gas input install the nearest size orifice then adjust the pressure regulator up or down for exact input desired. The manifold pressure is to be measured at the pressure tap on the gas valve. **NOTE:** Do not exceed the gas valve manufacturers recommended pressure adjustment range.

9. Adjust the combustion air shutters (and band when required) until good combustion is obtained. **NOTE:** Always use combustion test equipment when setting the burner. It is impossible to optimized combustion with the "eyeball" method. Check the CO₂ and the CO with instruments in order to obtain the following recommended values:

GAS	MIN. CO ₂ /O ₂ %	MAX. CO ₂ /O ₂ %	CO MAX. PPM
Natural	8.5/6.0	10.5/2.5	100
LPG	10.5/5.1	12.0/2.8	100

After the final air adjustment is made lock the settings to prevent tampering.

10. Gross Flue Gas Temperatures: 350°F (175°C) minimum for an outside chimney with three exposed walls. 300°F (147°C) minimum for a chimney centrally located within the structure. If the gross stack temperatures exceeds 550°F (285°C) to 600°F (312°C) the appliance may be over-fired or the heat exchanger surfaces may be partially blocked. Recheck the input and inspect the appliance.

NOTE: Make certain all other gas appliances in the home are turned off before clocking the gas meter.

11. To determine the firing rate accurately, measure the time required for 1 cu. ft. of gas to be

consumed. Use the following formula to calculate BTU/HR input.

$3600 \times \text{BTU/Cu. Ft.} \div \text{No. seconds for 1 cu. ft.} = \text{BTU/HR.}$

EXAMPLE: $3600 \times 1000 \div 20 = 180,000 \text{ BTU/HR.}$
(Nat. Gas)

For subsequent normal starting and shutdown procedure refer to instruction plate mounted on the burner.

X. BURNER CONTROL SYSTEM SEQUENCE OF OPERATION

1. Thermostat contacts close.

2. Step down transformer (120V to 24V) energizes coil in motor relay and motor starts.

3. When motor approaches full RPM, the centrifugal switch contacts on the motor close supplying 24 volts to the primary control.

4. After 45 seconds time delay 20 or more volts are supplied to the primary control.

5. The contacts in relay, close supplying 120 volts to the Ignition Transformer.

6. Arc is immediately established and 20 or more volts supplied to the gas valve.

7. The gas valve opens and flame is immediately established.

8. As soon as flame is established and 3 or more microamp signal is sent back to the Primary Control, the ignition relay drops out killing the ignition arc. If the flame cannot be proven by the signal strength in 4 seconds the control goes to lock out and turns both the ignition and gas valve off. The burner motor will continue to operate during lockout, if the thermostat or controlling circuit is calling for burner operation.

9. The primary control is either turning off the power to the burner or turning down the thermostat below room temperature and resetting it back again above room temperature.

10. If during a firing cycle the burner loses flame for any reason, other than power failure, the ignition arc is re-established in 0.8 seconds or less and the 4 second trial for ignition is initiated.

XI. THE GAS VALVE MOUNTING ASSEMBLY

The gas valve mounting plate assembly includes the combination gas valve, gas manifold, eductor tube and the valve mounting plate. This assembly is removed as a unit by removing four screw in the mounting plate and withdrawing the assembly from the blower housing. The 24 volt combination gas valve serves these functions; manual main gas shutoff, main gas pressure regulation, automatic electric gas shutoff. A redundant gas valve has two automatic electric gas shut off valves in the same body for additional safety. The automatic shut off function is controlled by the motor relay which switches power through the motor centrifugal switch.

NOTE: If it is necessary to replace a defective gas valve, it can be done with a Honeywell 24 volt valve. This valve is available with either a fast or step opening regulation. DO NOT replace with a slow opening valve. Make sure that the replacement valve is designed for use with Direct Spark Ignition Systems.

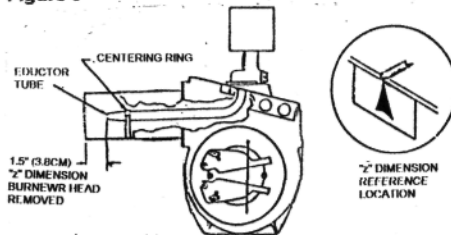
If the gas line pressure to the burner exceeds the maximum rated inlet pressure of 13" W.C. (3.2 kPa), install an auxiliary gas pressure regulator, rated for main burner service, ahead of the gas valve on the burner. Reduce the incoming gas pressure to between 5" W.C. (1.2kPa) to 10" W.C. (2.5kPa) for natural gas and 11" W.C. (2.7kPa) to 13" W.C. (3.2kPa) for LPG.

The gas valve regulator is factory set for 3.5" W.C. (.87kPa) manifold pressure. If the rate must be slightly adjusted, remove the regulator cap and turn the screw either clockwise or counterclockwise to increase or decrease the manifold pressure not more than +/- 0.3" W.C. (.07kPa).

The "Z" dimension is determined by removing the burner head assembly during servicing, care must be taken to relocate the "Z" dimension. This is accomplished by aligning the arrow on the affixed label to the "Z" locator notch cut in the gas mounting plate, as outline in figure 9.

The "Z" dimension is determined by removing the burner head assembly and measuring the distance from the eductor tube to the face of the air tube. This should be 1.5" (3.81cm).

Figure 9



NOTE: When reinstalling the gas valve mounting plate assembly, be sure to insert the eductor tube into the centering ring located in the air tube. This can be easily accomplished by looking under the rear edge of the mounting plate. You can observe the entry of the eductor tube into the centering ring.

XII. THE BLOWER MOTOR ASSEMBLY

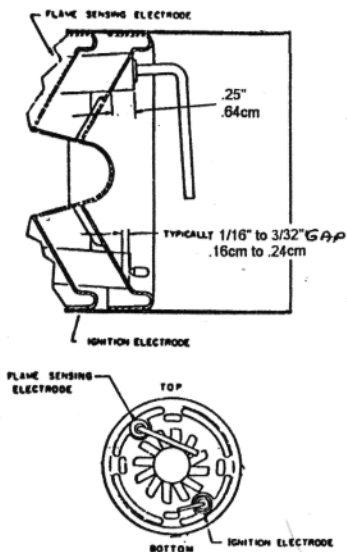
The blower motor assembly includes the motor and the blower wheel.

Occasional cleaning of the blower wheel and inlet air damper may be required. Accumulation of lint and dirt around the shutters and band may indicate cleaning is necessary. The appearance of the flame can also indicate a lack of combustion air.

If the motor fails to operate, first check the motor relay and determine if it is functioning and that electrical power is available to the motor before determining the motor is defective.

XIII. ELECTRODE SETTING SPECIFICATIONS

Figure 10 - G2T

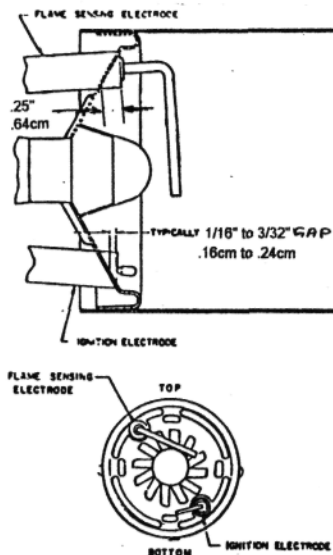


NOTE: Install the burner head assembly into the air tube in this position only. The ignition electrode will always be in the lower right hand area, as shown.

XIV. MAINTENANCE INSTRUCTIONS

1. A qualified gas service agency must be contacted for service for malfunction of the burner or appliance.
2. The burner motor bearings require lubrication once annually. Apply a few drops of #20 weight non-detergent oil to each bearing lubrication tube.
3. Observe the burner flame occasionally. If yellow smoky tips are noticed call your service agency and have the burner adjusted.

Figure 11 - G2SD



NOTE: Install the burner head assembly into the air tube in this position only. The ignition electrode will always be in the lower right hand area, as shown.

4. Keep all materials, combustible or otherwise, at least two feet (12.7 cm) away from the heating appliance. Do not store gasoline or other flammable vapors or liquids in the room where the heating appliance is located.
5. Combustion and ventilating air openings must not be blocked off for any reason or obstructed by materials. During the routine servicing of the burner, the service agency should make sure that all lint, dust or other foreign materials thoroughly cleaned from the burner head assembly and the blower wheel.

BURNER IDENTIFICATION SYSTEM - G2SD/G2T

1. Basic Model - Identified by G2SD or G2T.
2. Burner Head - Identified by the numbers 0 thru 6 (G2SD), or 2 thru 8 (G2T). The firing rate range of each head is shown in the block adjacent to the head identification.
3. Air Tube Length - The number to the right show the useable air tube length in 1/8" (.32 cm) increments. The number to the left shows the length in 1" (2.54 cm) increments. Example: "52", the 2 means two eights or 1/4" (.64 cm). The five means 5" (12.7 cm). The two numbers mean that the useable air tube length is 5.25" (13.3cm).
4. Blower Wheel & Air Band
1st Letter - B, identifies a 5.25" (13.3cm) dia. Blower Wheel
2nd Letter - D, Identifies a blank air band.
2nd Letter, - C, Identifies a 10 slot air band.

For example: The complete Model Number - G2SD052BD identifies a G2SD burner with G0 combustion head, (firing range 70,000-110,000 BTUH), a 5.25" (13.3cm) useable air tube and a 5.25" (13.3cm) diameter blower wheel with blank air band.

5. Serial Numbers - Will be sequential.

1 2 3 4 5

"CONVERSION BURNER"

ADAMS POWER GAS CLEVELAND OHIO, U.S.A.

MODEL	G2SD	0-52 BD	120V, 60 Hz LESS THAN 12 A
SERIAL NO.			AIR TUBE LENGTH 5.25 TO 11"
MAX. BTU/HR.	255,000	HD-0	70,000-110,000
MIN. BTU/HR.	70,000	HD-2	80,000-180,000
FOR USE WITH	NAT. & LP	HD-3	120,000-200,000
REG. PRESS.	3.5" W.C. BOTH GAS	HD-4	150,000-240,000
INLET PRESS.	5"-13" W.C. NAT.	HD-5	170,000-250,000
	11"-13" W.C. LP	HD-6	190,000-255,000

LIGHTING AND SHUTDOWN INSTRUCTIONS

To Light Burner

1. Turn "ON" gas valve in supply line.
2. Rotate knob on the gas valve counterclockwise to "ON" position.
3. If combustion air has been previously adjusted do not re-adjust. If not, open the air shutter to position "2" or less.

NOTE: Final settings must be determined by test instruments.

4. Turn "ON" switch for burner power.

5. Set thermostat above room temperature.
6. Burner motor will now start and run for 45 seconds. The gas valve then opens, ignition transformer provides spark and the burner will light off.
7. If burner fails to light off in 4 seconds the safety control will lock out and shut the gas valve off.
8. Reset the safety control by turning room thermostat below room temperature and back up again or turning off power supply to the burner and back on again.

The burner will start again and repeat step "6".
NOTE: If burner fails to light off and sustain flame after three or four tries turn "OFF" main shut off valve and call a qualified burner service agency.

To Shut Down Burner

1. Rotate knob on gas valve clockwise to the "OFF" position.
2. Turn "OFF" the switch for the burner power supply.

G - 2 TROUBLE SHOOTING GUIDE

Before beginning these trouble shooting procedures, **ALWAYS** observe the following basic guidelines:

1. Check the electrical line voltage at the burner wiring box connections for a nominal 120 volts AC.
CAUTION: When testing electrical equipment **ALWAYS** follow standard electrical safety procedures.

2. Make sure the thermostat or other controlling device is calling for burner operation.

3. Check the inlet gas pressure to verify that you have adequate pressure at the gas valve. Make sure there are no "air locks" or gas leaks in the piping system. Turn the manual valve to the "ON" position.

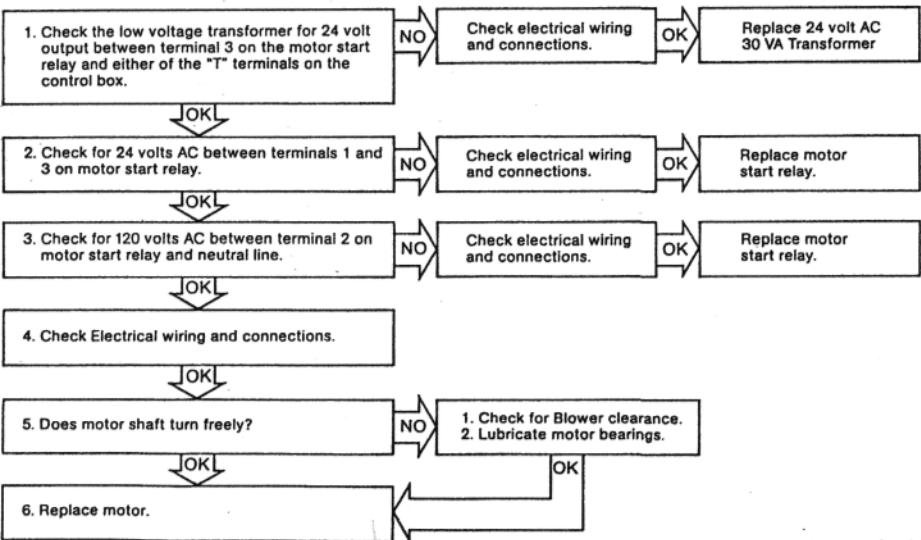
4. To successfully service the G-2 power gas burner, you need these test instruments:

- a. An Oxygen or Carbon Dioxide analyzer.
- b. A CO (Carbon Monoxide) test kit.
- c. A flue gas stack thermometer.
- d. A draft gauge. Scale should read $+.10"$ to $-.25"$ W.C. ($+.02$ kPa to $-.06$ kPa).
- e. A volt/ohm/milliampere multimeter that is capable of reading 24 volts AC, 120 volts AC and up to 20 microamperes DC.
- f. A manometer capable of reading up $15"$ W.C. (3.7kPa).

5. Be familiar with the G-2 Installation Manual. Wiring diagrams and burner operation data are found in the Manual as well as on the burner control box and nameplate.

CAUTION: Be certain that the manual gas valve and the burner power supply switch are turned off before removing any part for servicing.

MOTOR DOES NOT START



IGNITION ARC ESTABLISHED - NO FLAME

1. Reset Control - Motor starts - Completes 35-45 second prepurge cycle. Ignition arcs for four seconds. No flame is established. Control locks out after four second trial for ignition period.
NOTE: The burner motor will continue to operate during the lock out mode when the thermostat circuit is calling for burner operation.

2. Check for correct orifice/air setting relationship.

↓
JOKL

In order for the following functional tests to be made, the control must be reset and the tests monitored during the four second trial for ignition period that occurs at the END of the prepurge cycle.

3. Check for 24 volts AC at gas valve terminals.

NO

Check electrical wiring and connections. Be sure leads are on correct gas valve terminals.

OK

Replace electronic primary control.

4. Make sure leads are on the correct gas valve terminals.

↓
JOKL

5. Check for correct manifold regulated pressure.

↓
JNOL

6. Replace gas valve.

NO IGNITION ARC ESTABLISHED

1. Reset Control • Motor starts - Completes 35-45 second prepurge cycle.
• Gas valve opens, regulating adequate gas pressure.
• No flame established - Primary control locks out after (4) four seconds trial for ignition period.

In order for the following functional tests to be made, the control must be reset and the tests monitored during the 4 second trial for ignition that occurs at the end of the prepurge cycle.

2. Check for 120 volts AC between the neutral line and the junction of the blue primary control lead and the black ignition transformer lead.

NO

Check electrical wiring and connections.

↓
JOKL

3. Check electrical wiring and connections.

↓
JOKL

4. Check high voltage lead and connection to ignition electrode rod.

↓
JOKL

5. Inspect ignition electrode for cracked insulator and correct spark gap. (Typically 3/32" (.24cm).

↓
JOKL

6. Replace ignition transformer.

Check the flame sensing circuit for (1) grounded flamerod. (2) Damage to flamerod lead insulation.
NOTE: Make sure that the flamerod circuit and/or primary control is moisture-free.

↓
JOKL

Replace electronic primary control.

NO IGNITION - NO GAS VALVE OPERATION

1. Reset Control - Motor starts - After 35-45 second prepurge cycle, motor continues to run but flame is not established.

In order to perform the following functional tests, the primary control must be reset and the tests monitored during the 4 second trial for ignition period that occurs at the end of the prepurge cycle.

2. Check for 24 volts AC at the 25 volt primary control input terminals.

INOL

3. Check for 24 volts AC between the yellow centrifugal switch lead at the timer terminal and the yellow/red-striped lead at the primary control input terminal.

INOL

4. Check electrical wiring and connections.

OK

Replace motor - The centrifugal switch is defective.

LOSES FLAME DURING CYCLE - CONTROL LOCKS OUT ON SAFETY

1. Reset Control • Completes 35-45 second prepurge cycle.
• Flame is established
• Sometimes the control locks out before the thermostat or controlling circuit is satisfied.

2. Disconnect flamerod lead from primary control. Connect (+) positive lead (DC Microampere Meter) to the primary control terminal. Connect the (-) negative microampere meter lead to the flamerod lead terminal.

3. Reset control, after prepurge cycle, flame is established. A stable microampere current of 3 or more is required for dependable operation.

NO

4. Microampere reading is less than 3 or unstable.

Probable cause of erratic lockout:

1. Flame proving circuit grounded by moisture.
2. Damaged insulation on flamerod lead or loose terminal.
3. Flamerod improperly positioned in flame.
4. Poor ground path to primary control.
5. Defective primary control.

Probable causes:

1. Extremely poor combustion level.
2. Flamerod improperly positioned in flame.
3. Defective primary control.

BURNER CYCLES ERRATICALLY

1. Check for proper thermostat installation and location.

OK

2. Check thermostat heat anticipator for correct setting.

OK

3. Check low voltage circuit for bad wiring, electrical connections and/or switches.

OK

4. Check line voltage circuit for bad wiring, electrical connections and/or switches.

NO

Set anticipator to correct value if adjustable type. If proper setting cannot be made, replace with compatible thermostat.

If the thermostat wires are not terminated on the burner control box "T" terminals, and these terminals are JUMPED, you must then determine what the correct anticipator setting is by inspecting the controlling device at the point where the thermostat wires terminate. Typically, this information can be found on the body or cover of the controlling device.

When the current draw cannot be determined accurately by the above method, measure the current with an ampere meter using the 1 amp scale. Connect the meter leads in series with one of the thermostat leads for the accurate reading.

NOTE: When the thermostat wires terminate on the G2 primary control box "T" terminal, the heat anticipator setting value for the G2 burner is determined by adding the primary control current to the gas valve current. The result is the anticipator setting. (Example: $.2 + .6 = .8$ amps.)

HOW TO OBTAIN WARRANTY

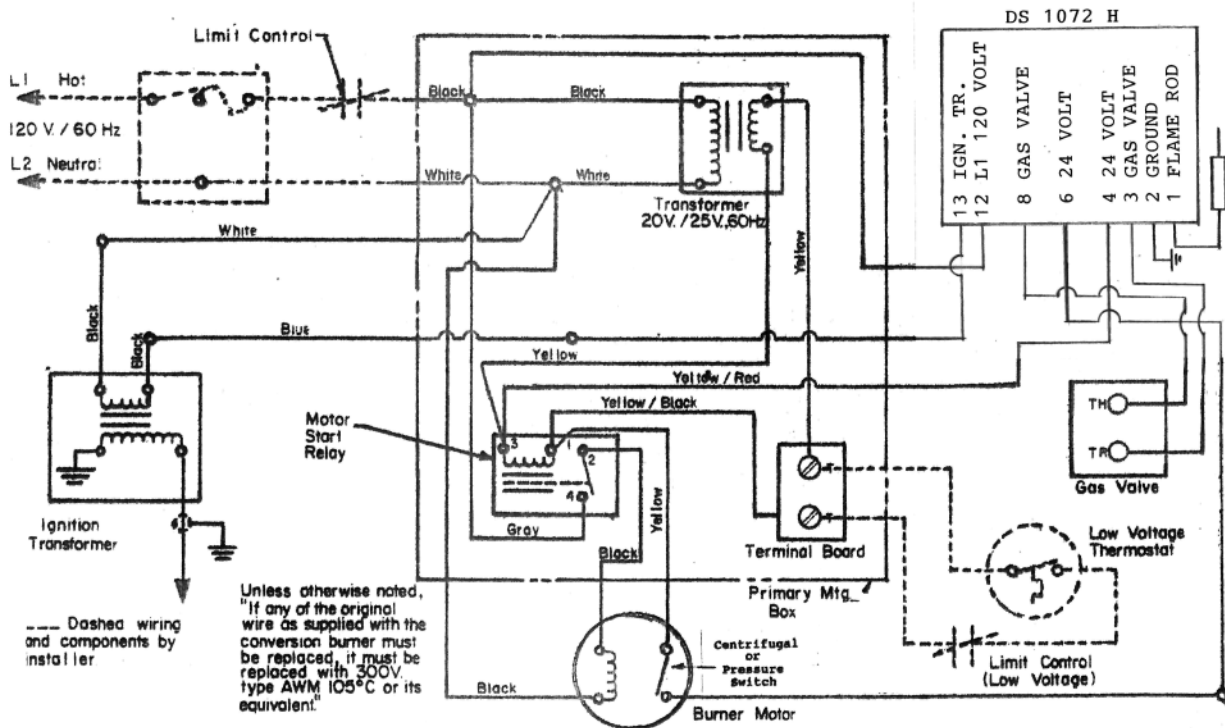
The Adams statement of burner warranty is outlined below. Warranty on the component parts (motors, gas valves, transformers and controls) is determined by the specific manufacturer's date code covering the component.

The manufacturers of component parts used on the burner have established service agencies and distributors for handling warranty for their manufacture. The use of these local agencies offers a convenient source of parts and also saves the cost and delay of returning defective parts to us.

When local agencies are not available, however, defective parts may be returned directly to Adams.

WIRING DIAGRAM

DS 1072 H



LIMITED WARRANTY

Adams Manufacturing Co. (Adams) warrants its products and components to be free from defects due to faulty workmanship or defective materials at the time of shipment and under normal use and service for twelve (12) months from date of installation by a qualified installer or eighteen (18) months from date of manufacturing, whichever date occurs first. This LIMITED WARRANTY does not extend or apply to Adams products, or any component thereof, which has been misused, neglected, improperly installed or otherwise abused. Equipment which is defective in material or workmanship and which is removed within the specific time period will be repaired or replaced as follows:

- (1) Components, controls, motors & transformers should be returned to an authorized distributor.
- (2) Products determined to be covered under this LIMITED WARRANTY by Adams shall be either repaired or replaced at Adams' sole option.
- (3) Adams is not responsible for any labor cost for removal and replacement of said products and equipment associated therewith.
- (4) Controls, motors & transformers, other components which are so repaired will carry this limited warranty equal to the unexpired portion of the original products LIMITED WARRANTY.
- (5) If inspection by Adams does not disclose any defects covered by this LIMITED WARRANTY, the product will be repaired or replaced at the expense of the customer and Adams' regular charges will apply.

THE FORGOING STATES THE SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY OR FOR ANY OTHER CLAIM BASED ON ANY DEFECT IN, OR NON-PERFORMANCE OF, THE PRODUCTS, WHETHER SOUNDING IN CONTRACT, WARRANTY OR NEGLIGENCE. NO OTHER WARRANTY, WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, SHALL EXIST IN CONNECTION WITH THE SALE OR USE OF SUCH PRODUCTS AND IN NO EVENT WILL ADAMS BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE. Adams neither assumes nor authorizes any persons to assume for Adams any other liability or obligation in connection with the sale of these products.