



## Manual for: SU-5 & SU-6 Gas Burner

<b>SU-5 Gas Burner</b> <b>400 MBH to 800MBH (U.S.A.)</b> <b>400 MBH to 730 MBH (Canada)</b>	<b>SU-6 Gas Burner</b> <b>750 MBH to 1,400 MBH</b> <b>(U.S.A. and Canada)</b>
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The burner shall be used only with NATURAL GAS or PROPANE as specified on the nameplate.

**Warning: If the following instructions are not followed exactly, a fire or explosion may result, causing property damage, personal injury or death.**

- **Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.**

### - WHAT TO DO IF YOU SMELL GAS? -

- Do not try to light any appliance.
- Do not touch any electrical appliance.
- Do not use any telephone in your building.
- Immediately call your gas supplier from an outside phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.
- **A qualified installer, service agency or the gas supplier must perform installation and service.**
- **At least once per year, a qualified service agency needs to be contracted for other than routine maintenance.**
- All installations must be made in accordance with all state and local codes, which may differ from instructions in this manual.
- The installer should inform and demonstrate to the user the correct operation and maintenance of the appliance.
- The installer shall also inform the user of hazards of flammable liquids and vapors and shall remove such liquids and vapors from the vicinity of the burner.
- The installation adjustment data trap (or label) supplied shall be filled in and affixed to the burner or the covered appliance.

These instructions should be affixed to the burner or adjacent to the heating appliance.



Massachusetts Plumbing Board G1-0903-40:09/03/2004  
 New York City Department of Buildings MEA # 334-03-E

**Manufactured by Heat Wise, Inc.**  
**1528 Rocky Point Rd, Middle Island, NY 11953**

**CAUTION:** Before installing the SU-5 or SU-6 Gas Burner, the burner should be visually checked for damage and loose components. These conditions can occur during shipment, through improper handling, tampering, or through improper care and storage at the job site.

Check for:

1. Obvious damage to the housing, air inlet and components mounted thereon.
2. Tightness of fasteners, tube fittings, plugs, etc.
3. Tightness of electrical terminals and connections.
4. Accumulations of oil, dust, dirt, water and other foreign matter on, in or near the burner.

In accordance with applicable standards, all equipment, machines and processes shall be locked out prior to servicing.

**General:** The burner has been carefully checked at the factory, thus missing or damaged parts must be reported at once in order that appropriate action may be taken to replace them. Give the burner model number and serial number when ordering parts.

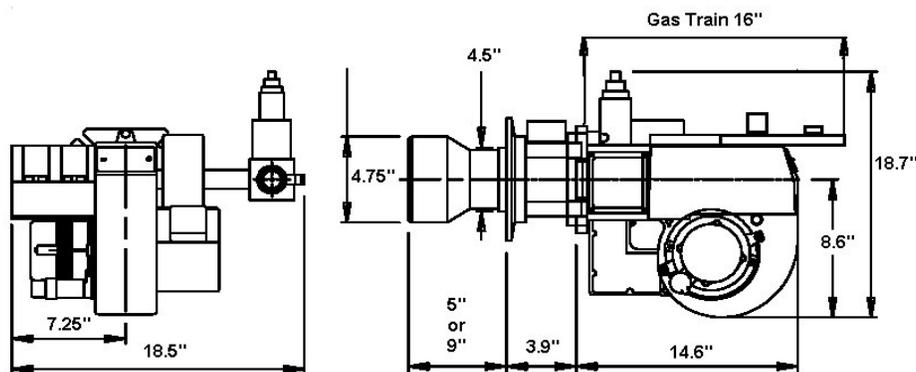
If not installed vented, operated and maintained with the manufacturer's instructions this product could expose you to substances in fuel or fuel combustion which can be hazardous to your health and can cause serious illness or death.

*Fully trained and qualified personnel must do any servicing.*

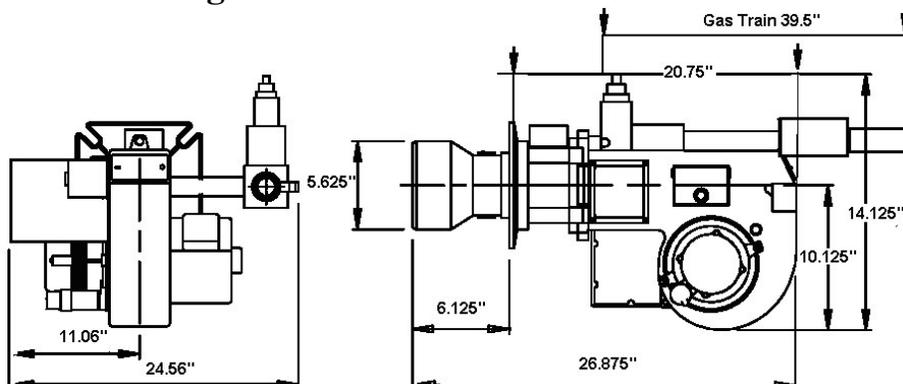
*Improper servicing of this equipment may create a potential hazard to equipment and operators.*

*Installation requirements and instructions should always be covered in appropriate engineering drawings and specifications, which detail the applicable building codes, etc. The information contained herein is to be used as a guide ONLY and not as the final authority.*

**Fig. 1 SU-5 Gas Burner Dimensions**



**Fig. 2 SU-6 Gas Burner Dimensions**



The Heat Wise SU-5 and SU-6 Gas Burners are fully automatic, flame retention burners and are suitable for combustion of natural gas and LP. The SU-5 and SU-6 have distinct model numbers, which reflect the listing agency, OEM standard, the fuel, BTU range of the gas train and type of safety control originally supplied with the burner. Check the model number on the label located on the cover of the control box for the specifications of the burner.

Model	Fuel	Listing	Capacity MBH	Gas Conn.	Model	Fuel	Listing	Capacity MBH	Gas Conn.
SU-5N U.S.A.	Nat. Gas		Min. 400	1"	SU-6	Nat. Gas		Min. 800	1 ¼"
			Max. 800	1"				Max. 1,400	1 ¼"
SU-5P U.S.A.	Propane (LP)		Min. 400	1"	SU-6	Propane (LP)		Min. 800	1 ¼"
			Max. 800	1"				Max. 1,400	1 ¼"
SU-5N Canada	Natural Gas		Min. 400	1"	<ul style="list-style-type: none"> <li>• Input capacities based on 1,000' above sea level. Capacities decrease 4% for each additional 1,000'.</li> <li>• Gas input ratings are based on 1,000 BTU/Cubic Foot and .64 specific gravity.</li> <li>• The SU-5 and SU-6 are rated to handle -0.02 to +0.50 "W.C. furnace pressure. Consult factory for details on 4-pass boilers and furnace applications with higher draft losses.</li> </ul>				
			Max. 730	1"					
SU-5P Canada	Propane (LP)		Min. 400	1"					
			Max. 730	1"					

**Warning: Should overheating occur, 1) shut off the manual gas shut off valve to control the appliance; 2) DO NOT shut off the control switch to the pump or blower**

**Note: Gas trains supplied with these burners are for specific firing ranges, as covered by various codes and listing agencies. Firing the SU-5 or SU-6 above the allowed firing rate will void the warranty, and may result in a fire or explosion, causing property damage, personal injury or death.**

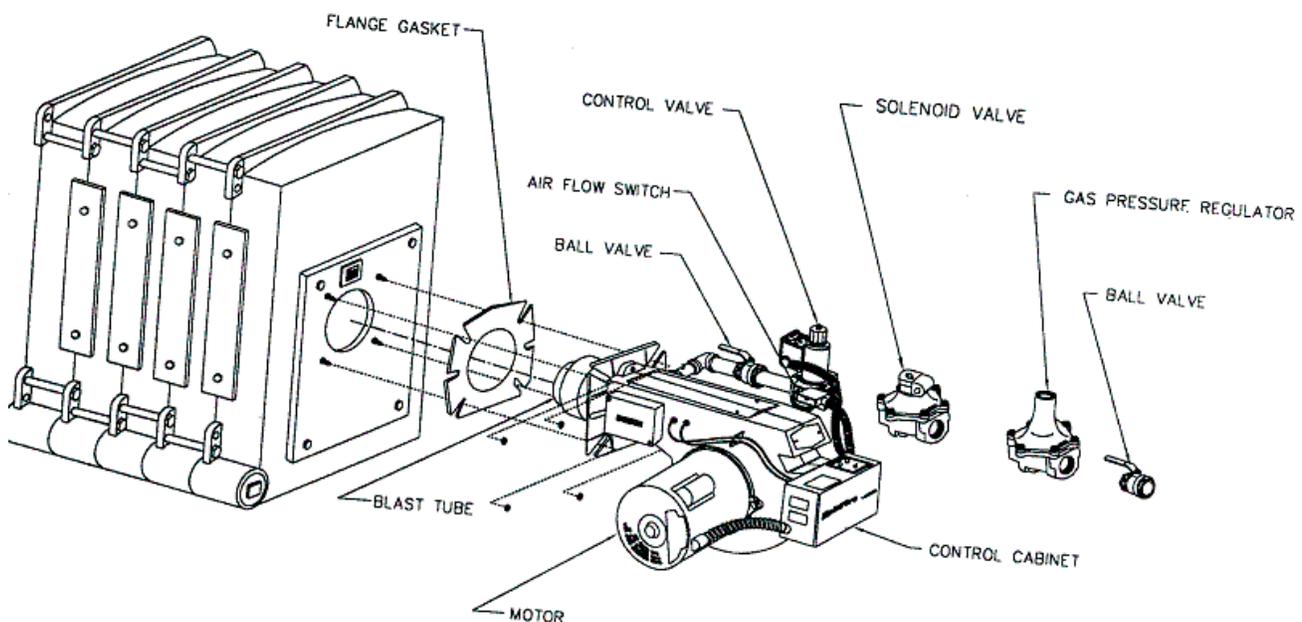
- **Fuel:** The SU-5 and SU-6 burners will fire natural gas or LP. The maximum inlet pressure at the test port is 10" W.C. for both natural and LP gas.
- **Firing System:** The SU-5 burner operates as ON – OFF with a fixed air inlet shutter. The SU-6 is available ON – OFF, Two-Stage and Fully Modulating.
- **Blower Motor:** SU-5: 1/6 HP, 120 Volt/ 60 Hz/1 Ph PSC; SU-6: ½ HP, 120 Volt/ 60 Hz/ 1 PH
- **Flame tube:** Available as with 5" or optional 9" on SU-5; SU-6 is available with only 6.25" tube.
- **Gas Train:** Gas manifolds are equipped with Gas Pressure switches standard to conform: UL 795, CSD-1 and NFPA-86. See gas valve and pressure switch manuals for more details. See below for sample gas trains {Fig. 3 to Fig. 13}.
- **Burner Ignition:** A separate external high voltage ignition transformer provides interrupted ignition with a minimum 4 second safety timing to establish the flame.
- **Air Flow Safety Switch:** Diaphragm switch closes when the burner blower develops adequate air pressure. Loss of air pressure causes the fuel valves to close immediately.
- **Pre-Purge:** Minimum 30 seconds is standard on burners; can be as low as 15 seconds. (See control manual for further details).
- **Control Panel:** ON/OFF switch, Power On and Fuel On lights are standard on all burners.
- **Limit and Operating Controls:** Not included with the burner. Must be rated and wired for 115 Volts. Limit controls should be manual reset type.
- **Thermostat Control:** May be operated with 24V thermostat control. Jumper T1 to T2 is not used.
- **Electrodes:** The SU-5 and SU-6 each have two electrodes: one acts as a sparkner and the other acts as a flame rod (See Fig. 14 and Fig. 15). Flame rectification by this flame rod monitors the continued presence of the burner flame, which ensures safe firing of the burner.

## Burner Installation Instructions

Installation requirements and instructions should always be covered in appropriate engineering drawings and specifications that detail the applicable building codes, etc. Information contained herein is to be used as a guide only and not as the final authority.

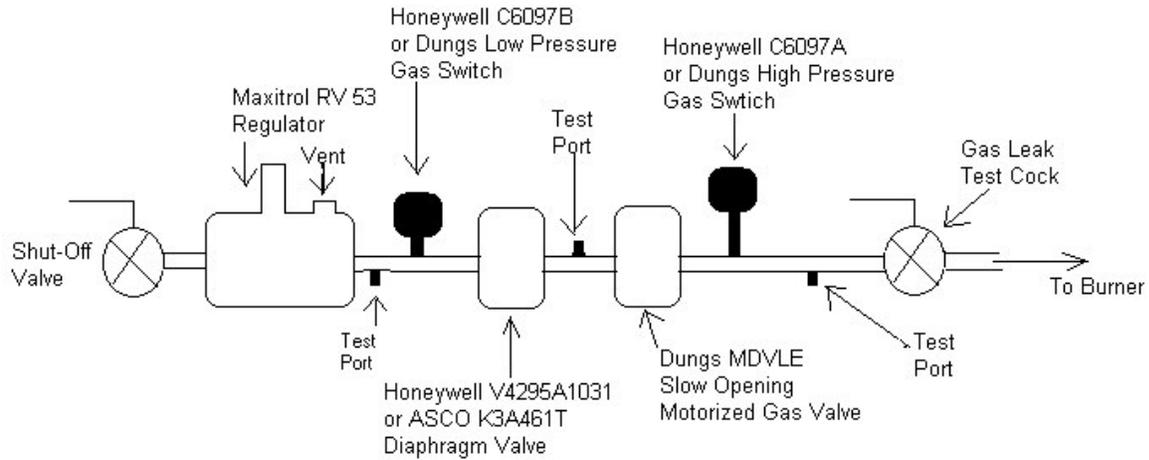
- The heat transfer surfaces of the furnace or boiler should be cleaned before the burner is mounted. Consult your local gas utility company regarding any special requirements in the preparation of the furnace or boiler.
- **Venting Requirements:** Flue pipes, barometric damper, draft hood, or vent should not be smaller than recommended by the furnace or boiler manufacturer. The size is typically represented by the dimension of the flue outlet.
- **Gas Requirements:** Maximum inlet pressure to gas train must not exceed 10" w.c. for both natural and LP gas. See charts for required pressures and inlet sizes.
- **Combustion Air Supply:** The boiler room in which the burner is located must be provided with an adequate fresh air supply to assure proper combustion. The American National Standard Z223.1 specifies that a permanent opening or openings having a total free area of not less than **one square inch per 5000 BTU** per hour total input rating of all appliances shall be required.
- **Diffuser (Combustion Head) Adjustment:** Must be set according to appropriate chart prior to installation.
- **Wiring:** The burner is pre-wired at the factory as far as practical. Refer to burner wiring diagram for complete wiring information and study thoroughly before making any connections. Make sure that all connections on the flame safeguard are tight, as they may have loosened during shipment. Power to the burner must be 120 Volts. All wiring, including electrical ground, must be done in accordance with local code requirements or, in the absence of local codes, with the National Electrical Code, ANSI/NFPA 70-1990. Burner electric power should be provided from a separate fused disconnect switch located in the boiler room.
- **Burner Gasket:** Attach provided gasket to the burner-mounting flange to prevent leakage.
- **Burner Mounting:** Attach burner to the boiler frontplate by firmly tightening nuts on the mounting studs or clamps so that a rigid installation is accomplished. Make sure that the burner is level before tightening clamps. Provide adequate clearances for servicing and proper operation of the burner.

**Fig. 3 Burner Mounting**

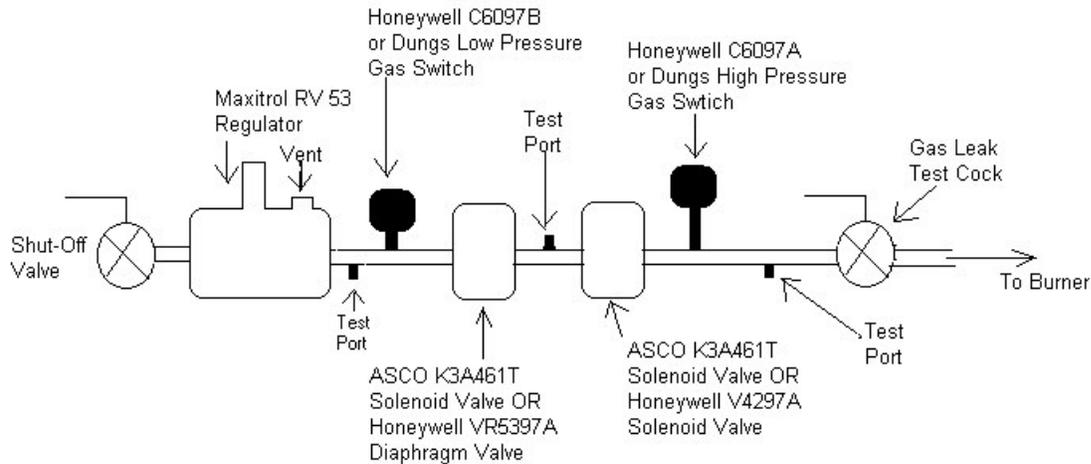


## Gas Trains

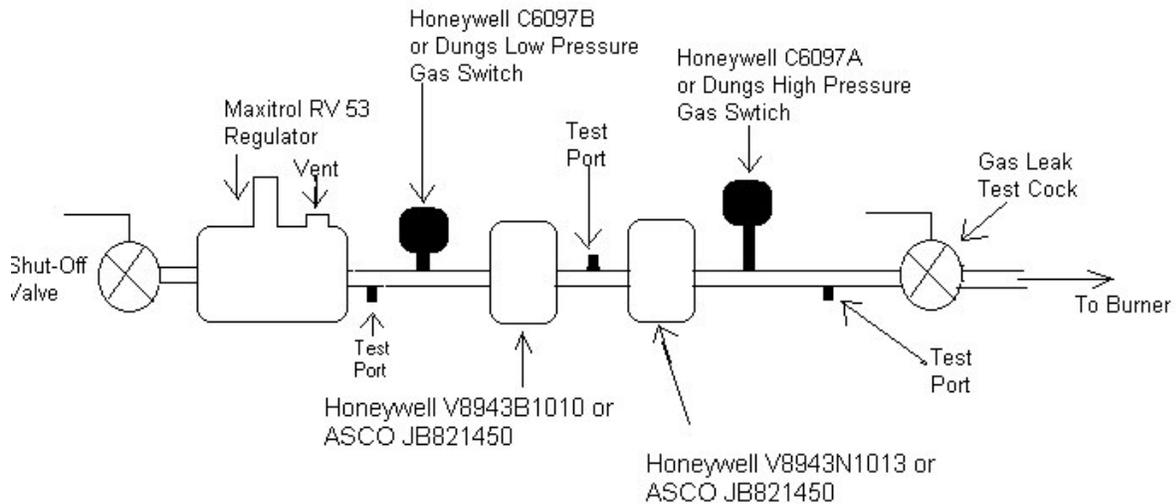
**Fig 4: SU-5 Gas Train 1**

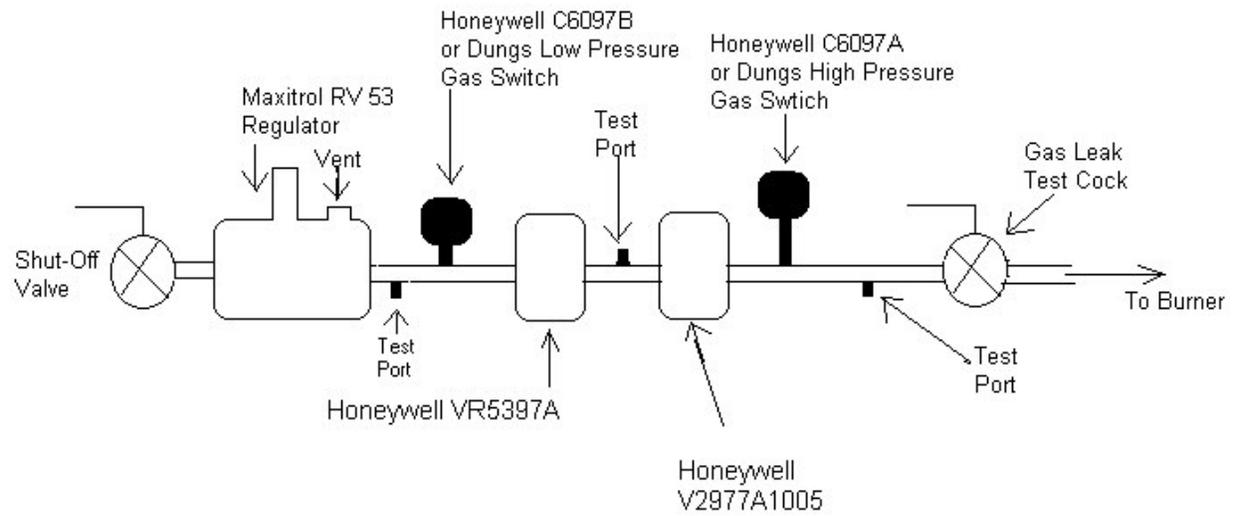
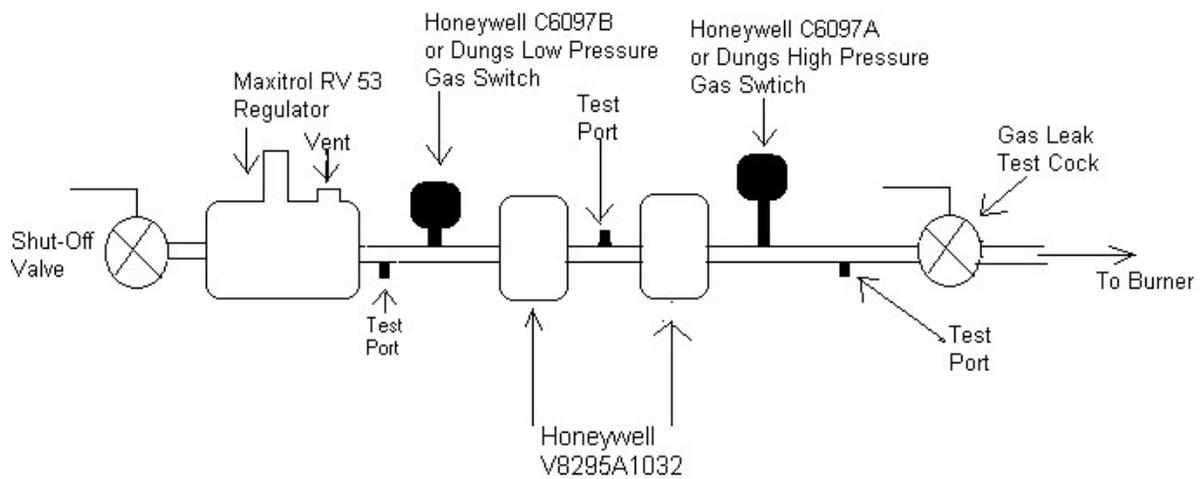
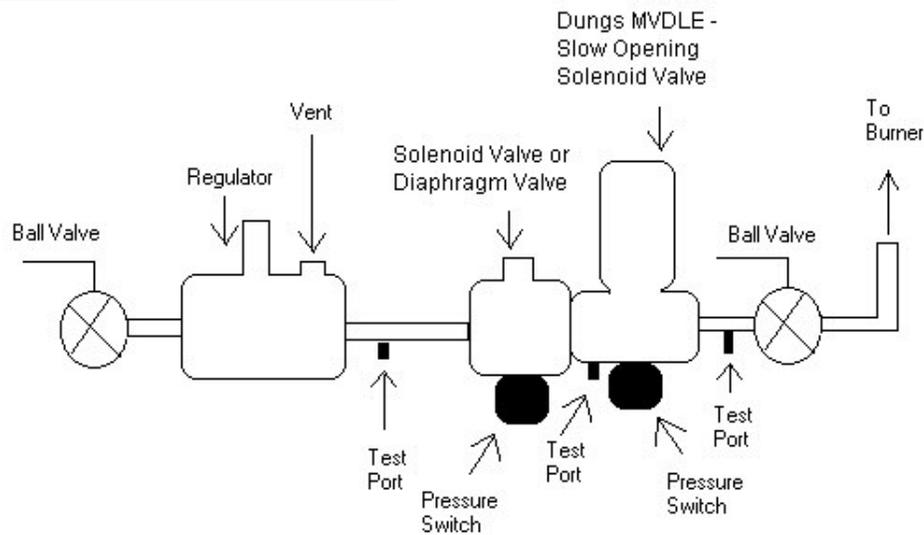


**Fig. 5: SU-5 Gas Train 2**

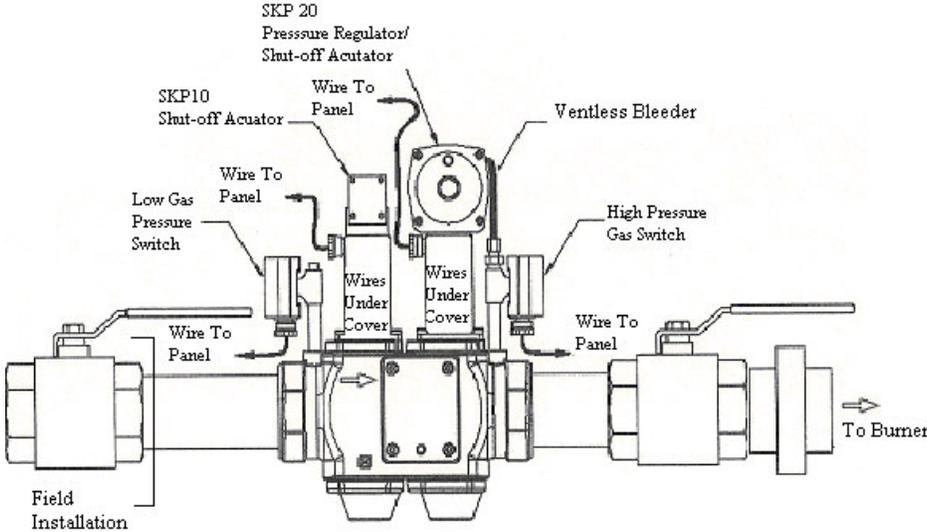


**Fig. 6: SU-5 Gas Train 3**

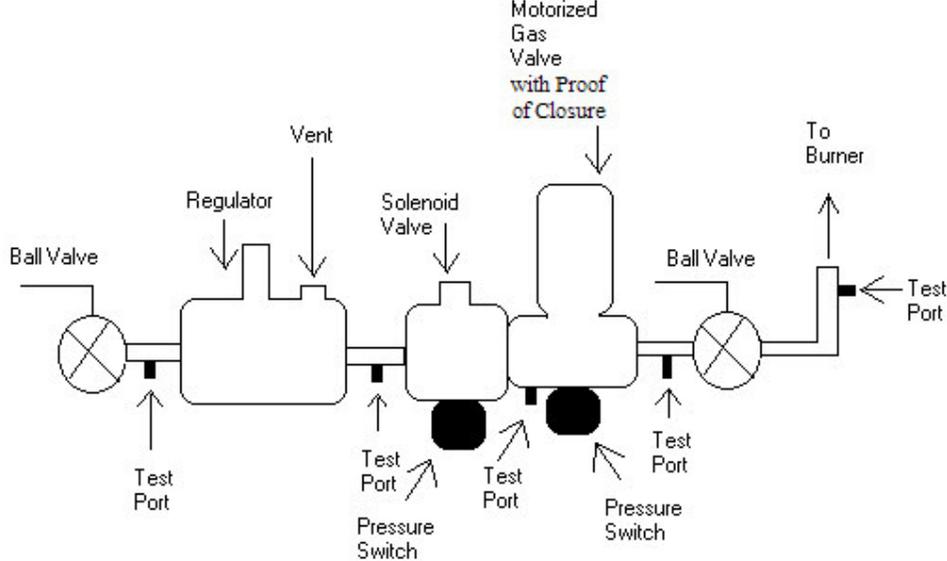


**Fig. 7: SU-5 Gas Train 4****Fig. 8: SU-5 Gas Train 5****Fig. 9: SU-6 Gas Train 1 (Dungs Gas Train)**

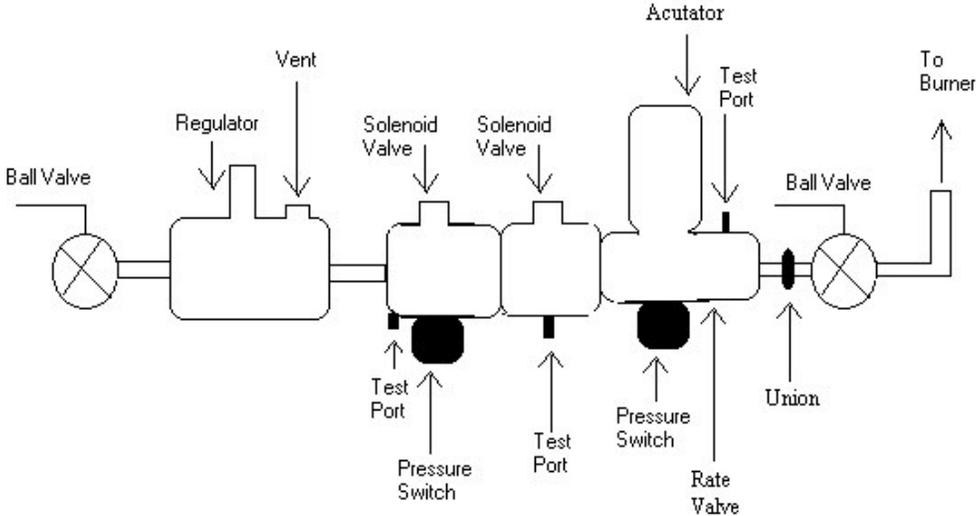
**Fig. 10: SU-6 Gas Train 2 (Siemens Vent-less Gas Train)**



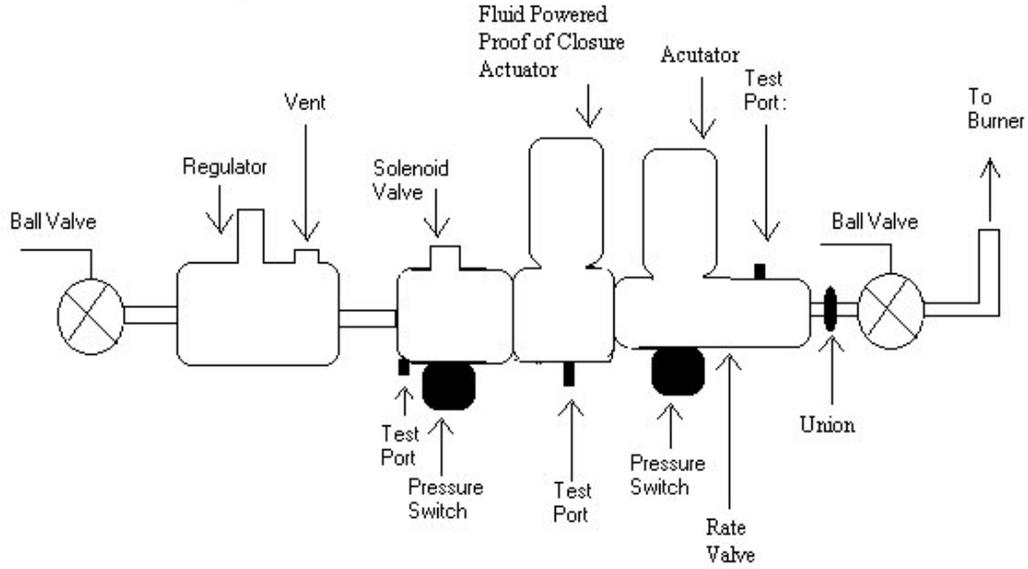
**Fig. 11: SU-6 Gas Train 3 (Honeywell Gas Train)**



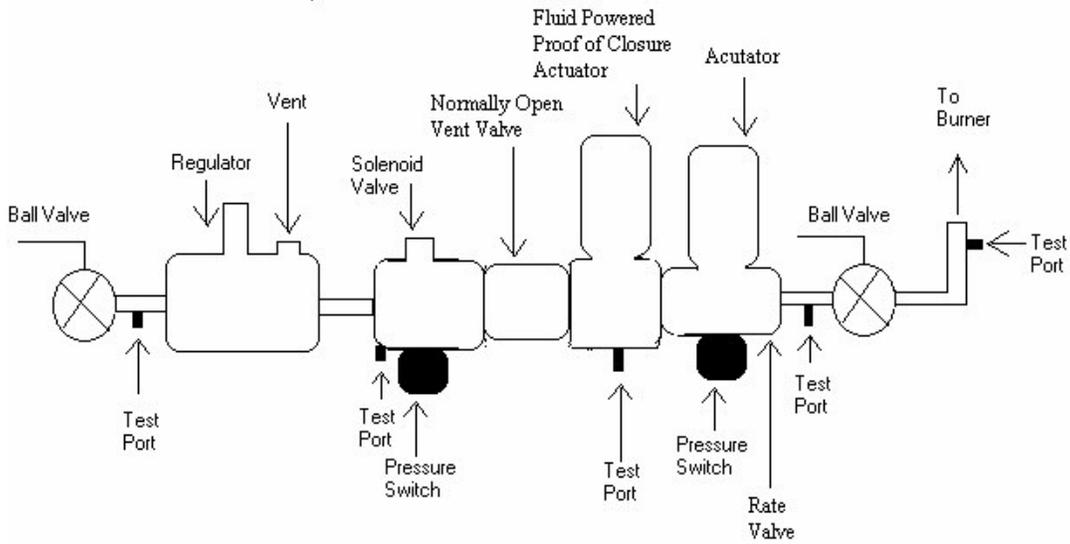
**Fig. 12: SU-5 Gas Train 4 (Modulating Gas Train #1)**



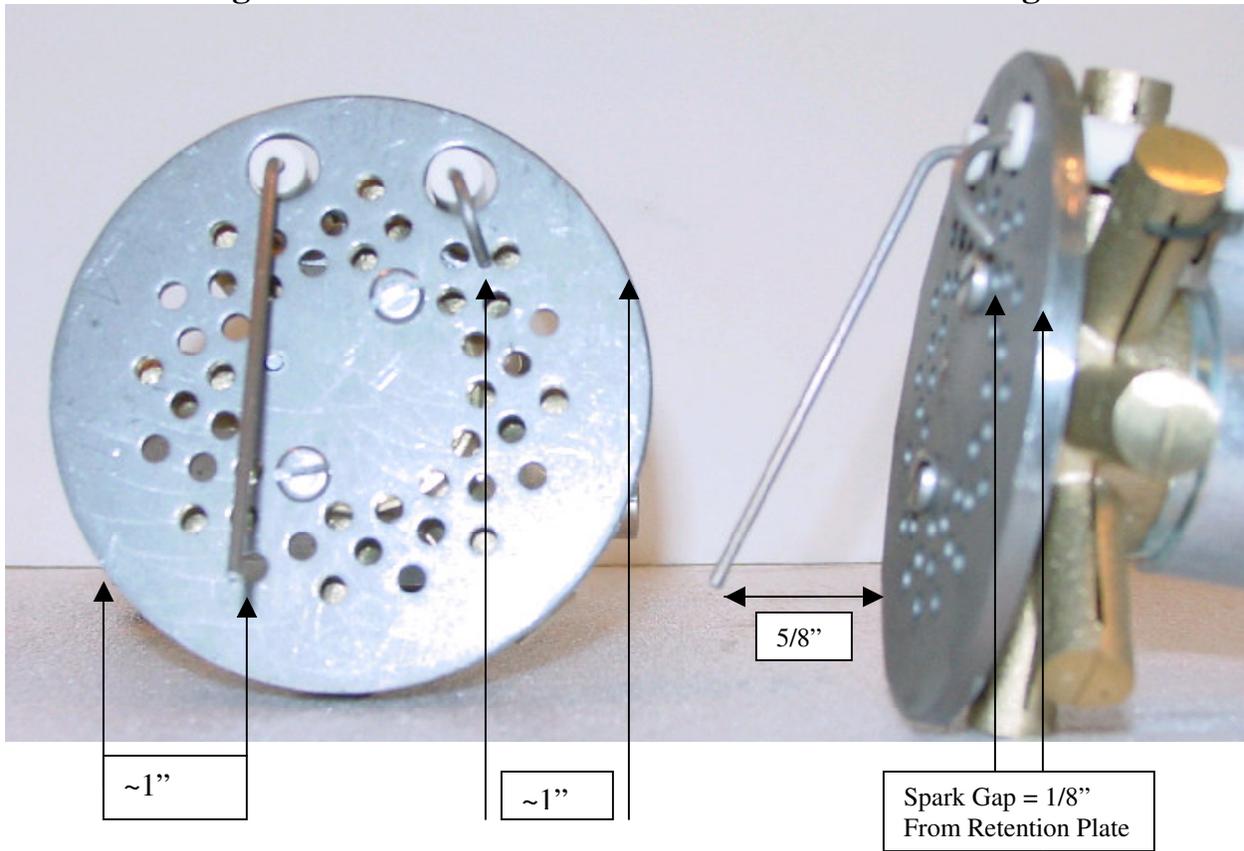
**Fig. 13: SU-6 Gas Train 5 (Modulating Gas Train #2, with Proof of Closure)**



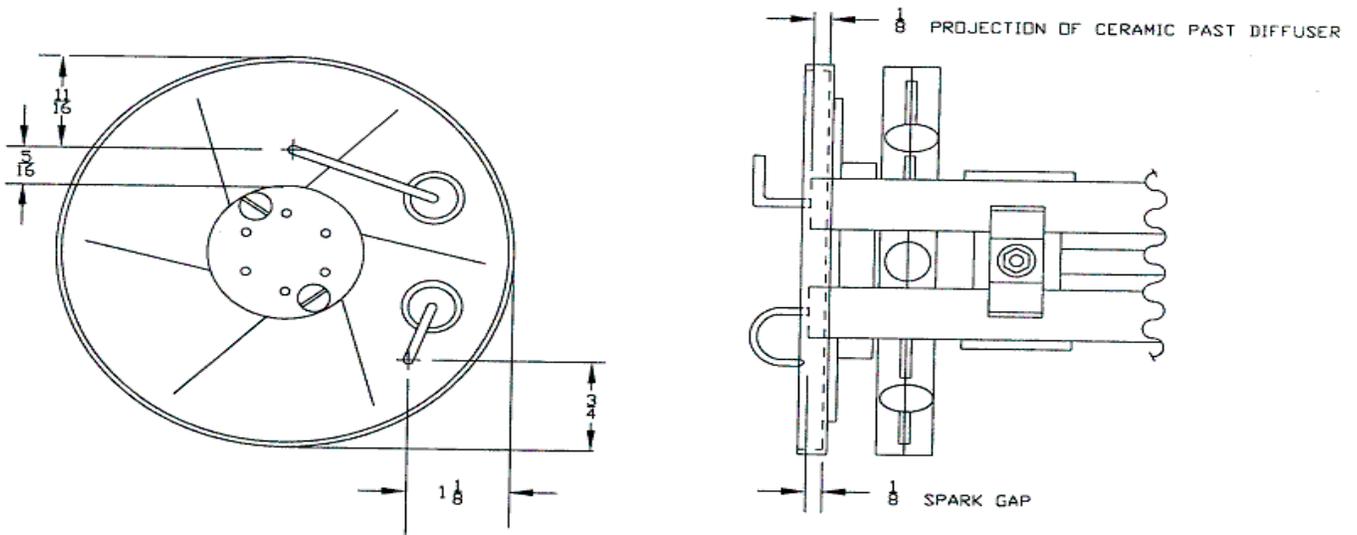
**Fig. 14: SU-6 Gas Train 6 (Modulating Gas Train #3 IRI)**



**Fig. 15 SU-5 Electrode and Flame Sensor Positioning**



**Fig. 16 SU-6 Electrode and Flame Sensor Positioning**



## Gas Service and Pipe Capacity

Before connecting the burner to the gas supply, insure that the gas pipes and service meter are large enough to permit the additional load of the gas burner (see Table 2).

<b>Table 2: Pipe Capacity* (x 1,000 BTU's)</b>					
Pipe Length**	Nominal Pipe Diameter				
	1-1/2"	2"	2-1/2"	3"	3-1/2"
<b>20'</b>	800	1700	3000	4500	7000
<b>30'</b>	690	1400	2500	3800	5500
<b>40'</b>	560	1200	2100	3300	5000
<b>50'</b>	500	1100	1900	2900	4500
<b>60'</b>	480	1000	1800	2700	4100
<b>80'</b>	410	850	1550	2300	3500
<b>100'</b>		750	1375	2100	3200
<b>150'</b>		600	1100	1700	2500
<b>200'</b>		540	950	1500	2200

\* Using 0.6 Specific Gravity and a pressure drop of 0.3" of Water Column

\*\* Each 90 elbow counts as 3'

## Gas Piping to Burner

It is advisable to run a separate gas line from the meter to the gas burner to avoid pressure drops. Refer to the above Pipe Capacity table for the correct sizes. **ALL PIPING MUST CONFORM WITH LOCAL CODES.** Use black steel pipe and malleable fittings (**do not use cast iron parts**) with a suitable pipe dope that is resistant to liquefied petroleum gases.

Piping should consist of:

1. A shut off valve approximately 6' away from the unit.
2. A 1/8" plugged NPT tapping for gas pressure measurement preferably on the manual shut off valve (as shown or anywhere between the gas valve and the shut off valve).

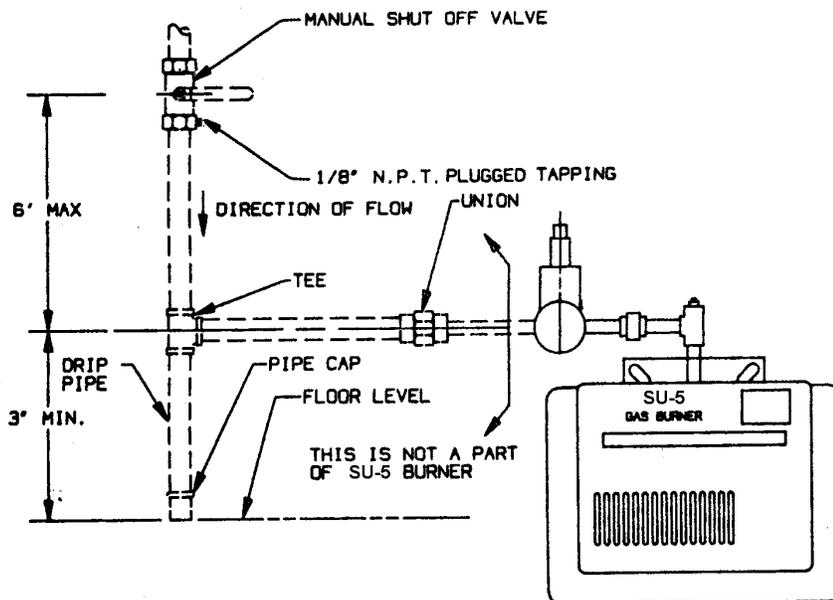
*Note: The manual shut off valve and tapping are NOT part of the SU-5 Gas Burner. Please make sure you conform to local and state codes.*

3. A gas union.
4. A drip pipe.

**Caution: The gas valve should not be subjected to more than 1/2" PSIG. Therefore, the burner should be isolated during high-pressure gas leak tests.** The appliance and its individual shut off 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. The appliance must be isolated from the gas supply piping by closing its individual manual shut off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psig.

The below dotted lines represent field installation.

**Fig. 17 Gas Burner Piping\***



\*The dotted lines represent field installation.

### Pressure Switch Settings

The high and low gas pressure switches must be set during installation (refer to Table 3 and Table 4). To determine the setting of the low pressure gas switch (LPS), measure the manifold pressure (MP), inlet pressure (IP) and the pressure between the valve (BV):

#### Initial setting of the High Gas Pressure Switch:

After the firing rate is determined, refer to the charts Table 3 or Table 4 on page 12 of this manual. Multiply the manifold pressure necessary by 1.5 and set the High Gas Pressure Switch to reflect that calculation.

#### Initial setting of the Low Gas Pressure Switch:

Divide the manifold pressure by 2 and add the pressure drop across the valve.

Example: Natural Gas at 340 MBH

Required Manifold Pressure= 2.7"

Pressure drop across Honeywell valve=1.0"

$$\text{HPS} = 1.5 * 2.7'' = 4.0''$$

$$\text{LPS} = (2.7'' / 2) + 1.0'' = 2.35''$$

For other valves, refer to the manual for that specific valve for the pressure drop.

**Warning:** After the burner has been adjusted so that the burner is operating properly, the pressure switches must be readjusted.

- Using a monometer, measure the manifold pressure that was necessary to achieve the exact firing rate necessary. Multiply the manifold pressure by 1.5. With the burner firing, use an analyzer and slowly increase the gas pressure up to the new calculated high pressure cutoff point. If the CO level reaches 400 ppm **before the newly calculated setting**, then at the point just before 400 ppm CO is reached is where the high gas pressure switch must be set.

- Reset the manifold pressure back to the correct setting.
- After the High Gas Pressure Switch is set, the recalculate the low gas pressure switch setting by dividing the actual manifold pressure by 2 and adding the pressure drop across the valve. With the burner firing use an analyzer and slowly decrease the gas pressure **into the valve** to the new calculated low pressure cutoff point. If the CO reaches 400 ppm before the newly calculated setting, then at the point just before 400 ppm CO is reached is where the low gas pressure switch must be set.
- Reset the incoming pressure back to the correct setting.

If the combustion does not reach the 400 ppm mark at the set points, the burner can be left at those settings. **IMPORTANT:** Any switch can be adjusted, as long as it meets both sets of criteria: Not greater than 400 ppm CO and meets the appropriate calculation for the switch.

**Table 3: Sample Pressure Switch Settings: SU-5**

Main Inlet Pressure Tap				Manifold Pressure Tap		
Fuel	Firing Rate MBH	Flame Tube	Inlet Pressure (IP)	Manifold Pressure (MP)	MP > 50% + Δ V * Low Pressure Switch (LPS)	<1.5 x MP High Pressure Switch (HPS)
Nat. Gas	400	5" or 9"	10"	0.95"	0.5+1=1.5"	0.95x1.5=1.4"
Nat. Gas	750	5" or 9"	10"	3.1"	1.6 + 1=2.6"	3.1x1.5=4.7"
LP	400	5" or 9"	10"	0.72"	0.4+1=1.4"	0.72x1.5=1.1"
LP	700	5" or 9"	10"	2.3"	1.2+1=2.2"	2.3x1.5=3.5"

**Table 4: Sample Pressure Switch Settings: SU-6**

Main Inlet Pressure Tap				Manifold Pressure Tap		
Fuel	Firing Rate MBH	Flame Tube	Inlet Pressure (IP)	Manifold Pressure (MP)	MP > 50% + Δ V * Low Pressure Switch (LPS)	<1.5 x MP High Pressure Switch (HPS)
Nat. Gas	750	6.25"	10"	1.2"	0.6+1=1.6"	1.2*1.5=1.8"
Nat. Gas	1400	6.25"	10"	3.8"	1.9+1=2.9"	3.8*1.5=5.7"
LP	750	6.25"	10"	1.4"	0.7+1=1.7"	1.4*1.5=2.1"
LP	1400	6.25"	10"	2.6"	1.3+1=2.3"	2.6*1.5=3.9"

\*Note: Δ V = Pressure drop (of gas valve) which in this example is 1". Refer to valve literature for gas valve pressure drops. The above readings are actual readings, which may differ in the field. By keeping the gas pressure and air shutter openings the same and by simply moving the head, the firing rate can vary nearly 100 MBH.

## Installing the Chimney Liner, Draft Regulator and Vent Pipe

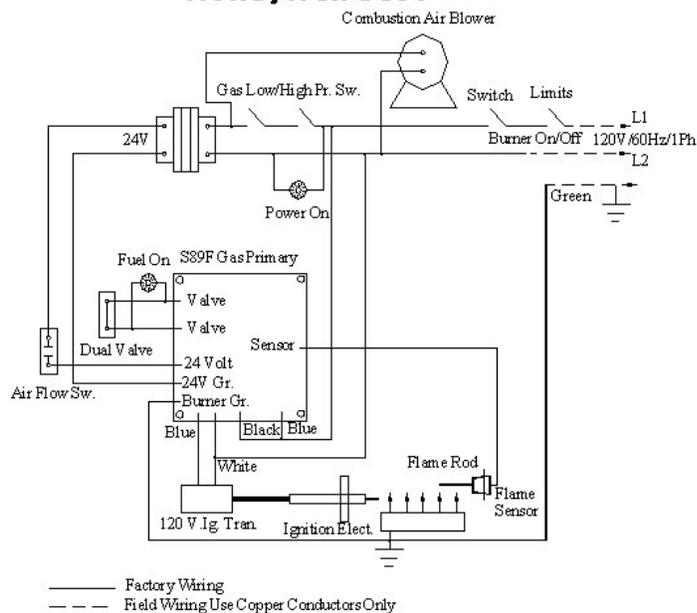
Some utilities require new chimney liners for all gas installations. Use a corrosion resistant chimney liner (approved for gas service) of the same size as the vent pipe. Use an CSA or U.L. listed draft regulator only if you can maintain draft over fire. Otherwise, it is better to use a double swing draft regulator, listed by CSA or U.L. When the burner is used as a conversion burner, draft over fire should be maintained as  $-0.02''$  to  $+0.02''$  W.C. by adjusting the regulator when the burner is fired; the burner can generally handle up to  $+0.50''$  W.C.; consult the factory for further information. The installer should follow the barometric draft regulator manufacturer's instructions for complete details for installations and adjustments. The vent pipe should extend only to (but not beyond) the inside wall of the chimney.

## Electric Wiring

These gas burners are manufactured for use with 120 volt, 60 cycle, single-phase electric current. The installation must comply and be grounded in accordance with the National Board of Fire Underwriters and National Electric Code ANSI/NFPA No. 70-1987 (or the latest addition). All applicable local codes should be followed as well.

Installation wiring should be wired through each limit control or interlock, while operating controls (like the thermostat) should be treated as 24-Volt wiring. The burner has its own 24 Volt AC power supply. Do not add a 24 Volt AC transformer for the burner wiring. Do not use the 24 Volt transformer found on the burner to power other items in the heating system, such as thermostats, spill switches, etc. **For further details, consult the wiring addendum included with the burner information pack.** See the sample wiring diagram provided below:

**Fig. 18 Wiring Diagram**  
**Honeywell S89F**



### SEQUENCE OF OPERATIONS Honeywell S89F

1. Limits close.
2. Gas Pressure Switches close.
3. Blower motor starts as the 24 Volt transformer powers the airflow switch.
4. Power from the airflow switch to the S89F control initiates 34 second pre-purge.
5. At the end of the pre-purge, the spark is energized for 4 seconds. At the same time, the 24 Volt transformer powers the gas valve, allowing the fuel to flow.
6. Within 4 seconds, the flame should be established and proved. The spark will shut off and the control will hold power to the gas valve until the limits open and the burner stops firing.
7. If the flame is not established, the blower motor continuously runs.
8. To restart, power should be interrupted for five minutes. Turn on the power to restart this sequence.

**Note: Alternate safety controls are listed with the SU-5 and SU-6 gas burners. Please consult the safety control manual and the control addendums for further details.**

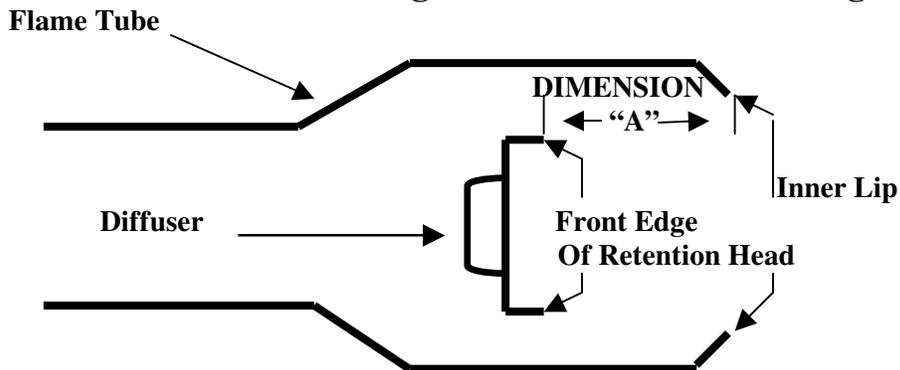
## Burner Head Adjustment

You must check and adjust diffuser, electrode/flame rod settings prior to installation. Dimension "A" should be set as shown for the following burner configurations:

**Standard Dimension "A" for SU-5 (Natural and LP Gas) = 2"**

**Standard Dimension "A" for SU-6 (Natural and LP Gas) = 2 5/8"**

**Fig. 19 Retention Head Settings**



**Fig. 20 Retention Head Adjustment**

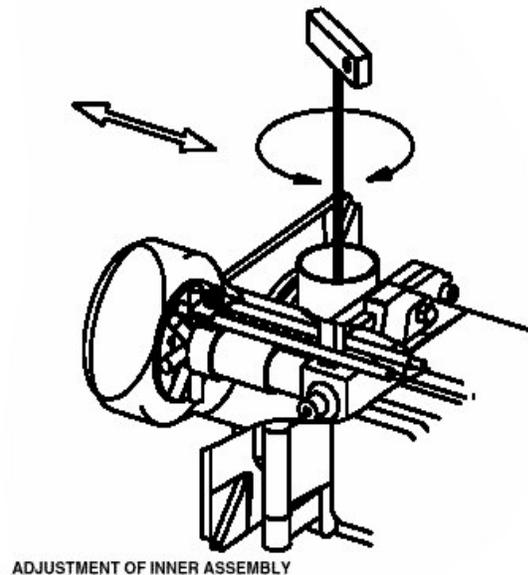
### O.E.M. Application Only

The retention head is pre-set at the factory. Occasionally, it may be necessary to adjust the head to compensate for different back pressures.

### Adjustment of the Retention Head

- Loosen the screw on the adjustment device
- To move the head forward, turn the knob counter-clockwise
- To move the head back, turn the head clockwise

The adjustment of the retention head affects the airflow. Therefore, it is always necessary to make a fine adjustment of the air by means of the air shutter.



## Alternate Adjustment of the Retention Head: SU-6

There are SU-6 burners that are shipped with an alternate construction; i.e., there is no swing door service assembly on the front. To adjust the diffuser on these units, slide the wing plate at the back of the burner that covers the flame view port. Using a **4 mm** allen key, adjust the head – counterclockwise moves the head forward, clockwise moves the head back. The SU-6 burner is set at the factory at 2 5/8". OEM specifications may vary.

## Main Gas Valve Adjustment: SU-5 & SU-6

The SU-6 burner comes standard with a Karl Dungs gas valve. Refer to the gas valve manual for further details.

**Main Flow Adjustment:** To adjust the gas flow, refer to Fig. 21 when performing the following steps:

1. Loosen the pan head screw until you can manually rotate the flow adjustment cap for 1-1/2 to 2 turns.
2. While holding the valve body, turn the flow adjustment cap clockwise for less gas (-) or counterclockwise for more gas (+), referring to the “V max” diagram on top of the flow adjustment cap base.
3. Check the flame at the gas burner with an orifice or flow meter until you have achieved the desired flow. Manifold pressures may be taken from the nipple-tee (see above).
4. Tighten the pan head screw on the flow adjustment cap.

**Initial Lift Adjustment:** To adjust the stroke, refer to Fig. 21 performing the following steps: (initial stroke should be set to 0%, fully (-) prior to start-up.)

1. Unscrew the sealing cap to expose the initial lift adjustment knob.
2. The sealing cap also serves as a tool. Turn the cap over and insert into the corresponding slot on top of the adjustment knob. Turn the knob clockwise (-) for a shorter rapid stroke or counterclockwise for a longer rapid stroke (+), referring to the “V start” diagram on top of the adjustment cap.
3. Once the initial lift has been achieved, turn the sealing cap back over and reinstall.

**Fig. 21 Gas Valve Adjustment**

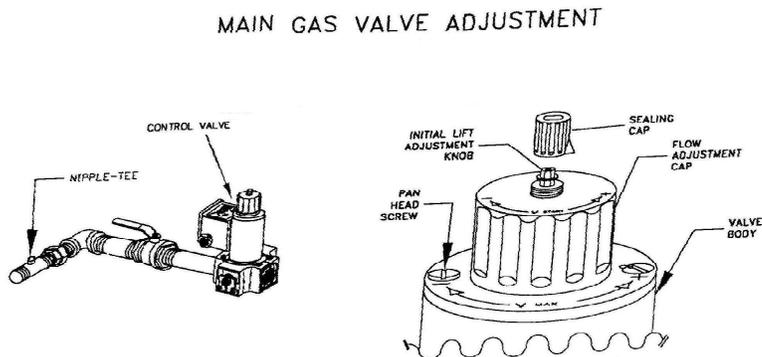


Table 5: Firing Rates at various settings SU-5 w/ 1" Gas Train All Furnace Pressure at 0" W.C.*							
Natural Gas				LPG			
Head	Air	Manifold Pressure	MBH	Head	Air	Manifold Pressure	MBH
				2"	4.5	0.72	400
2"	5	0.95	400	2"	5	0.77	435
2"	6	1.00	440	2"	6	1.00	475
2"	7	1.60	515	2"	7	1.30	525
2"	8	2.40	615	2"	8	1.9	630
2"	9	2.80	685	2"	9	2.1	670
2"	10	3.10	750	2"	10	2.3	700

<b>Table 6: SU-6 W/1" Gas Train – Natural Gas</b>					
<b>Diffuser Dimension "A" = 2 5/8"</b>					
<b>All Furnace Pressure at 0" W.C.*</b>					
Firing Rate MBH	Combustion Air Shutter Setting	O <sub>2</sub> (%)	Manifold Pressure " W.C.	Inlet Pressure to Main Regulator " W.C.	Gas Flow Rate CFH (1000 BTU/CF)
1400	7.50	3.9	3.80	8.80	1400
1300	7.00	3.9	3.40	7.80	1300
1200	6.50	3.9	2.70	6.40	1200
1100	6.00	3.9	2.52	5.20	1100
1000	5.25	3.9	2.00	4.40	1000
900	5.00	3.9	1.68	3.60	900
800	4.75	3.9	1.30	2.80	800
750	4.25	3.9	1.16	2.50	750
<b>Gas Inlet Piping 1-1/4"</b>					

<b>Table 7: SU-6 W/3/4" GAS TRAIN – Propane (LP)</b>					
<b>Diffuser Dimension "A" = 2 5/8"</b>					
<b>All Furnace Pressure at 0" W.C.*</b>					
Firing Rate MBH	Combustion Air Shutter Setting	O <sub>2</sub> (%)	Manifold Pressure " W.C.	Inlet Pressure to Main Regulator " W.C.	Gas Flow Rate CFH (2500 BTU/CF)
1400	8.00	3.9	2.56	7.60	560
1300	7.50	3.9	2.00	6.60	520
1200	7.00	3.9	1.96	5.80	480
1100	6.50	3.9	1.62	4.80	440
1000	6.00	3.9	1.36	4.10	400
900	5.50	3.9	1.16	3.50	360
800	5.00	3.9	0.90	2.80	320
750	4.75	3.9	0.78	2.40	300
<b>Gas Inlet Piping 1"</b>					

\*At different furnace settings, adjustments need to be made. Please contact the factory.

## Maintenance Instructions

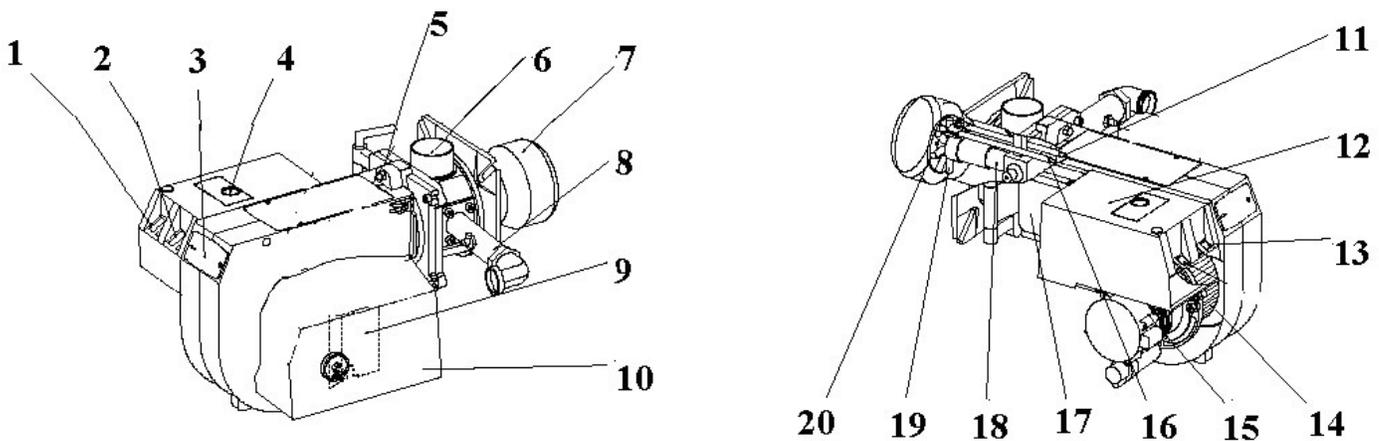
Maintenance Instructions: **TO BE FIXED/ATTACHED NEAR BURNER**

At least once a year, a qualified service agency needs to be contracted for yearly servicing.

1. The blower motor is the only moving part. It does not require lubrication, since the ball bearings have been permanently lubricated.
2. The user should do periodic visual checks of the burner and the flame.
3. Laundry lint or dog and/or cat hairs should not go inside the blower. If they are seen, they should be removed after disconnecting the power to the burner and cover parts should be installed before starting the burner.
4. Keep the area around the burner clear and free from combustible materials, gasoline, and other flammable vapors and liquids.
5. There should be no obstruction to the flow of combustion and ventilating air.

**Note: Gas trains supplied with the SU-5 and SU-6 are for specific firing ranges, as covered by various codes and listing agencies. Firing these burners above the allowed firing rate will void the warranty, and may result in a fire or explosion, causing property damage, personal injury or death.**

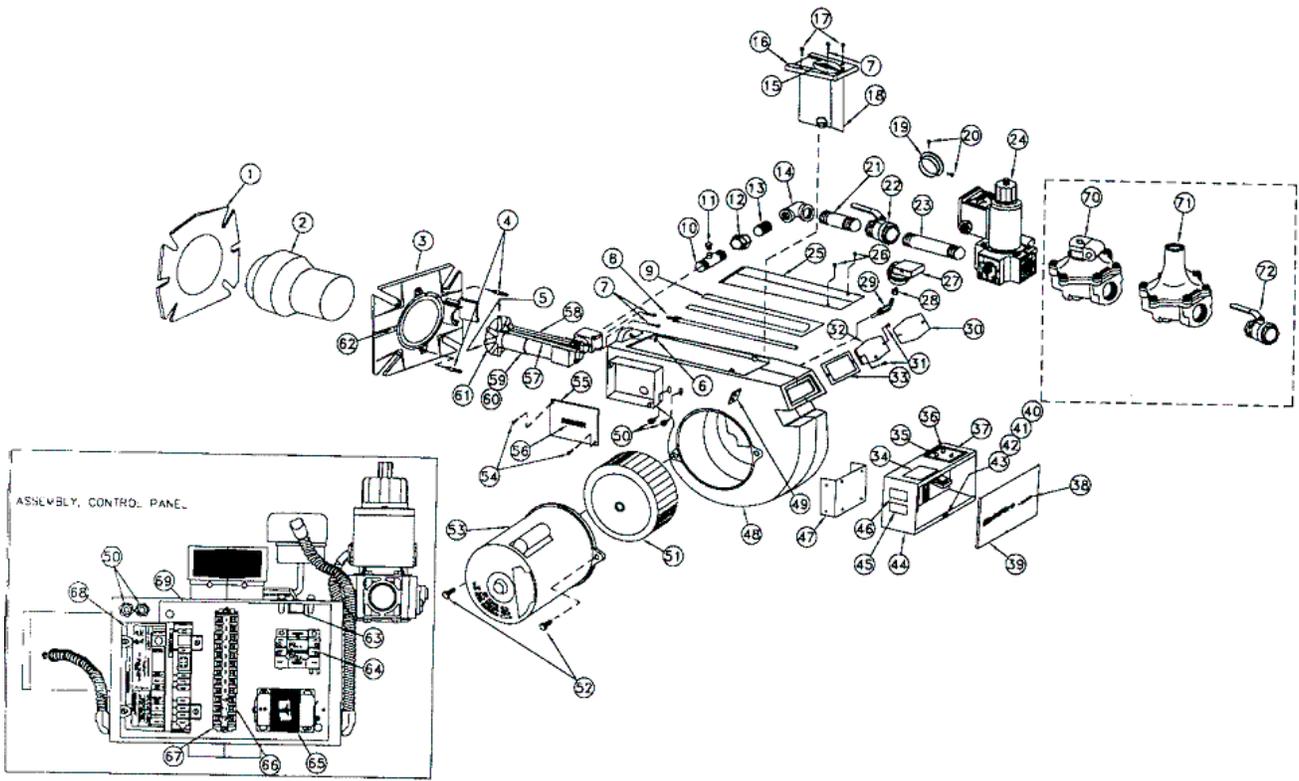
**Fig. 22 Parts Diagram: SU-5**



**Table 8 Parts List: SU-5**

1. Switch On/Off	1202002	11. Ignition electrode	11534704
2. Power On Light	1152001	12. Control Box	
3. Name Plate		13. Fuel On Light	1242001
4. Reset Button for 7800 series only		14. Fan Wheel	11872601
5. Swing Flange Unit	11752201	15. Motor	D82132
6. Inner Assembly Adjustment		16. Flame Rod	11534703
7. Blast Tube	1175180105	17. Transformer	AT175A1008
8. Connection Gas Fittings	11943001	18. Inner Assembly	11804403
9. Air Damper	11701701	19. Nozzle	117968
10. Housing	1713200	20. Retention Plate	37307

Fig. 23 Parts Diagram: SU-6



**Table 9: SU-6 Standard Parts List**

Item	P/N	Description	Item	P/N	Description
1	092302	Mounting Flange Gasket	58	28170	Flame Rod
2	11751801	Blast Tube	59	11828701	Nozzle, Complete Assembly
3	11752201	Mounting Flange	60	011316801	Gasket, O-Ring (2) Per Nozzle
8	11891002	Screw, Fixing F/Nozzle Assembly	63	205RVBH	Rocker Switch
9	11778301	Gasket, Fan Housing Cover	65	AT175A1008	Transformer, 120/24 Volt Stepdown
15	11701501	Knob, Air Control Adjustment	68	791042	Control, S89F Flame Safety
18	11819602	Damper, Air Blade		RM7895	Optional 7800 Series Control w/ Wiring Base
24	MDVLE	Dungs Gas Valve, 1" 24V		R7847A1025	Flame Rectification Amplifier
25	1189750105	Cover, Fan Housing		R7849A1023	UV Amplifier
27	6041A	Switch, Air Flow		ST7800A1039	30 Second Pre-Purge Timer
30	11708001	Cover, Inspection Glass		C7035A1064	U.V. Sensor
32	11708101	Glass, Inspection Lens W/Hole	70	JB8214060	ASCO Valve, 1-1/4" N.C. 24V
33	11778401	Gasket, Inspection Lens		JB8214050	ASCO Valve 1", N.C. 24V
35	1152001	Power Light 120 Volt Green	71	RV61	Gas Pressure Regulator Natural Gas 1-1/4" (may be supplied by others)
36	1242001	Fuel On Light, Amber 24 Volt		RV53	Gas Pressure Regulator L.P. 1" (may be supplied by others)
49	040412	Bracket, C.A. Ignition/Flame Rod		(Honeywell) <b>C6097B</b> or (Dungs) <b>GML-A4-4-4</b>	Low Pressure Gas Switch
50	774011	Connector, Flex U/O Ignition Cable		(Honeywell) <b>C6097A</b> or (Dungs) <b>GMH-A4-4-4</b>	High Pressure Gas Switch
51	11277621	Blower Wheel , 160MMx75MMx1/2		V4297A1005	Solenoid Valve
53	775079	Motor, 1/2 HP 3450 RPM		V4055D1001	Gas Valve
57	28087	Electrode, Ignition		V5099C1000	Gas Actuator

## Trouble Shooting Guide

The basis for trouble free operation can only be ensured by the correct combined effect of the three factors: electricity, gas flow and combustion air. Should any of these factors change troubles may arise.

It has been proved that many troubles have rather simple causes. Before calling the serviceman the following checks should be made:

1. Are the gas cocks of the installation open?
2. Are the fuses in order and the current switched on?
3. Are the controls (room thermostat, boiler thermostat etc.) correctly adjusted?
4. Is the gas pressure to the burner sufficient?
5. Is the gas relay of the burner ready for start and not locked out?
6. Is the air supply to the burner sufficient?

To facilitate trouble shooting we have drawn up a scheme showing the most frequent faults in a gas burner installation and the remedies.

CAUSE	REMEDY
<b>The burner does not start:</b>	
No gas	Check that all gas cocks are open
No voltage	Check fuses, thermostats and electrical connections.
The burner motor fails to start	The thermal protection has locked out. Motor defective.
The gas relay is defective	Replace
<b>Burner motor is running but no ignition after the pre-purge time has elapsed:</b>	
No voltage on the terminals	Check the contact. Replace faulty relay
The ignition electrodes in contact with each other or with earth	Adjust
The porcelain of the electrodes is broken	Replace the electrodes
The cable shoes have bad contact	Improve the contact
The ignition cables are damaged	Replace
The ignition transformer is damaged, no voltage on the secondary side	Replace the transformer
The ignition cable and the ionization cable have been transposed.	Change
<b>No flame establishment in spite of a trouble free start:</b>	
The gas solenoid valve defective	Replace

The gas solenoid valve does not open in spite of its obtaining voltage	Replace whole valve if necessary.
No voltage to the solenoid valve.	Check the contact
No electrical connection through the air pressure switch	Test the adjustment and the function of switch.
The starting load is not correctly adjusted	Reduce or increase the gas supply, reduce the quantity of air.
Gas relay defective	Replace
<b>The burner locks out after the safety time has elapsed in spite of flame establishment:</b>	
No ionization current.	Adjust the ionization electrode, examine cables and connections.
The supervision part of the gas relay is defective	Replace the relay
The ignition electrodes are disturbing the ionization current	Adjust the ignition electrodes, repole the ignition transformer if necessary.
Bad grounding	Arrange for proper earthing
Phase and neutral transposed	See wiring diagram and change
<b>The burner locks out during pre-purge:</b>	
Air pressure switch defective or incorrectly adjusted.	Check air pressure switch and correct it.
The starting load is not correctly adjusted	Reduce or increase the gas supply. Reduce the quantity of air.
The gas pressure is too low	Increase the pressure. Contact the gas supply company if necessary.
<b>Pulsations at start:</b>	
The ignition electrodes are wrongly adjusted	Readjust.
The gas pressure is too high	Check and adjust by means of a pressure gauge and a pressure adjustment valve.
The flue gas side is blocked	Check the chimney flue
<b>Pulsations during operation:</b>	
The burner is not correctly adjusted	Readjust
The burner is dirty	Clean the burner
Defective chimney	Check and change the dimensions if necessary.
<b>The burner is operating correctly but locking out now and then:</b>	
The ionization current is too low	Check. Must be at least 0.8 $\mu$ A according to the relay manufacturer but should be 3-5 $\mu$ A.

Voltage drop at certain times	Must not drop more than 15% of the rated current. Contact the electricity authorities if necessary.
Air pressure switch defective or incorrectly adjusted	Correct it.
Spark-over in ignition electrodes	Replace the electrodes
The ambient temperature of the gas relay is too high	Heat insulate, max.130° F.
The ignition spark is too weak	Check the transformer
<b>Bad combustion:</b> Bad draft conditions	Check the chimney
The flue gas temperature is too high	The boiler is overloaded. Reduce the quantity of gas.
The CO <sub>2</sub> -content is too low	Check the boiler with regard to leaks. Choke the draft if it is too high.
<b>The CO-content is too high:</b> Excess air when using natural gas and propane. Choke the air	
Air shortage	Open the air supply. Check the flue gas damper.
The holes in the gas nozzle are clogged	Clean
The fresh air intake is too small	Check and enlarge
The flame is not burning straight because the burner head is out of position	Check the burner head and readjust.
<b>Condensation in boiler and chimney:</b> The flow gas temperature is too low or the quantity of gas is not sufficient.	Increase the flue gas temperature by increasing the gas supply. Insulate the chimney

<b>BURNER OPERATION: Record the Readings at Steady State</b>	
Draft over fire at steady state (should be -0.02 "W.C. to +0.50 "W.C.)	
Draft in the Breech at steady state (refer to heat exchanger manual for details)	
Natural Gas CO <sub>2</sub> % = (9% to 9.8%) or O <sub>2</sub> % = (5.0% to 3.5%)	
LP Gas CO <sub>2</sub> % = (10.5% to 11.5%) or O <sub>2</sub> % = (5.0% to 3.5%)	
Stack Temperature – Gross °F (300° F minimum, 550°F maximum)	
Room Temperature °F	
Carbon Monoxide (CO) in PPM	
NOx in PPM (If necessary)	
Incoming Gas/LP pressure = "W.C. (minimum 5")	
Natural Gas manifold gas pressure = "W.C. minimum 2.2", max 4.0"	
LP Gas manifold gas pressure = "W.C. minimum 1.8" max 4.0"	
Carbon Monoxide in flue ( less than 100 PPM ideal; should not exceed 400PPM)	
High Gas Pressure Switch Setting	
Low Gas Pressure Switch Setting	
Head Setting	
Air Shutter Setting	
Running Motor Amps and Volts	
Water Temp. °F / Steam Pressure	

**\* NOTE: This may vary for OEM application. Refer to heat exchanger manual for further instructions.**

**Fig. 24 Flange and Bolt Pattern**

