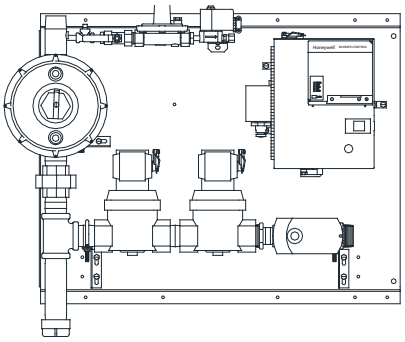
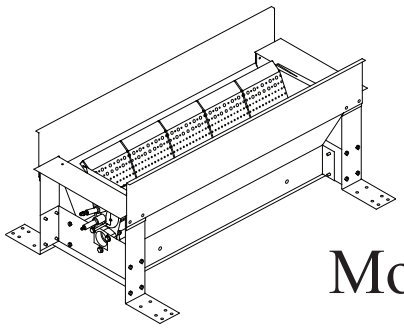
Installation & Service Instructions & Parts





HMA 2A Direct Fired Burner Insert Model DF-1500

- In the United States, installation must conform with local codes or in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1-latest edition available from American National Standard Institute. Further reference should be made to the recommendation of your fuel supplier.
- In Canada, installation must conform with local codes or in the absence of local codes, with Installation Codes for Gas Burning Appliances and Equipment, CGA Standard CAN/CGA 1-B-149.1 or 2.
- **⚠ WARNING: Additions, changes, conversions and service must be performed by an authorized Midco representative, service agency or the fuel supplier. Use only MIDCO specified and approved parts.**
- INSTALLER: Inform and demonstrate to the user the correct operation and maintenance of the gas utilization equipment. Inform the user of the hazards of storing flammable liquids and vapors in the vicinity of this gas utilization equipment and remove such hazards. Affix this manual and associated literature to the burner.

  CODE COMPLIANCE IS THE SOLE RESPONSIBILITY OF THE INSTALLER.
- USER: Retain this manual for future reference. If other than routine service or maintenance as described in this manual and associated literature is required, contact a qualified service agency. DO NOT ATTEMPT REPAIRS. An inadvertent service error could result in a dangerous condition.

AVOID ERROR IN PARTS SELECTION. When ordering use complete MIDCO Part Number and Description. Furnish Burner Model Number, Bill of Material Number and Serial Number (if available) from the specification plate found on the product.

IMPORTANT: Availability of parts as well as specifications are subject to change without notice. Please consult factory for item availability.

⚠ WARNING: If the information in these instructions is 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 switch; do not use any phone in your building.
- Immediately phone your gas supplier from another building. Follow the gas supplier's instructions. If you cannot reach your gas supplier call the fire department.

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

BURNER MODEL: _____

BILL OF MATERIAL NUMBER: _____

SERIAL NUMBER #: _____

WIRING DIAGRAM: _____

FOR SERVICE CONTACT

Name: _____

Address: _____

_____

Phone: _____

Date of Installation: _____

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SAFETY INFORMATION TERMS: The following terms are used to identify hazards, safety precaution of special notations and have standard meanings throughout this manual. They are printed in all capital letters using a bold type face as shown below, and preceded by the exclamation mark symbol. When you see the safety alert symbol and one of the safety information terms as shown below, be aware of the hazard potential.

⚠

DANGER: Identifies the most serious hazards which will result in severe personal injury or death.
WARNING: Signifies a hazard that could result in personal injury or death.
CAUTION: Identifies unsafe practices which would result in minor personal injury or product and property damage.

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Specifications and Installation

Specifications

	Natural	Propane
Firing Rate [3]	1.60 MBH [1]	1.3 MBH [1]
Min. Supply Pressure	11.5″ W.C.	3.0″ W.C.
Max. Supply Pressure	5 PSI	5 PSI
Manifold Pressure	6.7″ W.C.	1.8″ W.C.
Pilot Capacity	18,500 Btu/Hr	
Pilot Pressure	3.5″ W.C.	3.6″ W.C. [2]
Gas Train Size	1-1/4″	
Operation Mode	Full Modulation	

Table 1.
1300700 / 1300710 Direct Fired Burner Specifications

[1] 1 MBH = 1,000 BTU/hr. , Min MBH depends on system velocity
[2] With 4957-07 orifice
[3] All Ratings Based on 1000 BTU/Cu. Ft. NATURAL gas, at sea level

I Installation

The installation shall conform with local codes, or in the absence of local codes, in accordance with the National Fuel Gas Code, ANSI Z223.1/NFPA 54, or the Natural Gas and Propane Installation Codes, CAN/CSA B149.1.

⚠ WARNING: DO NOT INSTALL THE GAS IGNITION CONTROL WHERE IT IS DIRECTLY EXPOSED TO WATER SPRAY, RAIN, OR DRIPPING WATER.

1. Install the Valve Train/Control Panel in the location specified in the booth manufacturer's instructions.
2. Install natural gas or propane piping from source to inlet manual valve.
3. Install natural gas or propane piping from the valve train/control panel to the burner.

NOTE: A MANUAL SHUTOFF VALVE MUST BE INSTALLED IN AN APPROPRIATE LOCATION SO THAT THE FUEL CAN BE SHUT OFF IN THE CASE OF AN EMERGENCY.

4. High gas pressure supply lines require the proper pressure reducing regulator. See Table 1 for the maximum inlet supply pressure.
5. Use the punch outs on the control box to install the modulation control wires and power supply lines as shown in wiring diagram #1345-55 (Figure #1). You will need to install a 500 Ohm resistor across terminals 17 and 19 for control systems using 4-20 mA signal (Figure #1) you will not need one for 0-10 V control signal. An electric disconnect switch having adequate amps (see rating plate on the heater for voltage and amps) shall be installed in accordance with the National Electric Code, ANSI/NFPA 70.

NOTE: INSTALLATION OF THIS HEATER IN AIRPLANE HANGARS MUST BE IN ACCORDANCE WITH THE STANDARD AIRCRAFT HANGARS, ANSI/NFPA 409. INSTALLATION OF THIS HEATER IN PUBLIC GARAGES MUST BE IN ACCORDANCE WITH THE STANDARD FOR PARKING STRUCTURES, ANSI/NFPA 88A OR THE STANDARD FOR REPAIR GARAGES, ANSI/NFPA 30A AND WITH THE NATIONAL GAS AND PROPANE INSTALLATION CODES, CAN/CSA B149.1.

II Burner Start Up and Adjustment

A. Startup
   1. Close the inlet manual valve and outlet manual valve on the valve train.
   2. Before the supply line is to be put into service it must be tested to insure that it is gas tight. Pressurize the line with air or inert gas and test with soap and water or other appropriate liquid to locate leaks. The valve to the burner must be closed during this test.
   3. Before gas is introduced to the system, a check must be made to see that there are no open fittings and to make sure the burner main and pilot valves are closed. After the check has been made, purge the gas line of air up to the valve train control panel.

II Burner Start Up and Adjustment Continued

Warning: Purge outside the building. Do not purge into the combustion chamber.

4. Remove the plugs from the 1/8″ tees for the inlet and pilot pressure taps and install necessary fittings to connect a manometer.
5. Turn on the blowers and set the heater selector switch to the “Spray” mode.
6. Turn the pilot manual valve to the open position. Observe that the pilot ignites.
7. Due to the possibility of air trapped in the piping, it may be necessary to reset the Honeywell burner controller until the pilot ignites.
8. Adjust the pilot gas pressure with the pilot regulator to achieve the highest possible flame signal. Reset the burner controller and allow the unit to re-establish the pilot several times. Install the necessary fittings to connect a manometer to the manifold pressure tap near the outlet ball valve.
9. Ensure that the system shuts off properly by turning off the switch on the spray booth control panel.

B. Setting the Firing Rate
1. Disconnect power to the control box.
2. Disconnect power to the Siemens actuator by disconnecting the red wire from terminal #17.
3. Reconnect power to the control box.
4. To open the 1-1/4″ gas outlet ball valve to the fully open position.
5. Hold down the orange manual release switch on the side of the actuator. This will allow you to open the valve manually by rotating the actuator U-bolt bracket on the Belimo. Push it clockwise until you see the main flame turn on. Observe the low fire flame. Continue opening the valve until it is all the way open.
6. Allow the burner to run to the maximum firing rate. Adjust the main regulator to achieve the manifold pressure specified on the rating plate. If you do not have enough pressure to get to rated pressure, set it as high as possible. The burner will still operate correctly but you may not be able to reach the rated temperature.
7. While the burner is at its maximum firing rate, recheck for gas leaks.
8. Observe the high-fire flame. It should be blue with some yellow/orange tips.

C. Adjusting the Low Fire Setting
1. Hold down the red manual release button and close the actuated ball valve.
2. Use a small screwdriver to turn the auxiliary switch adjustment counterclockwise until it stops.
3. Use the manual release button to open the actuated ball valve until you start to see a flame in the throat of the burner. Adjust it until the flame is as small as it can be without having any sections of the burner without flame. To put it another way, as low as possible while still having flame propagation across the entire burner.
4. When you have found this spot, use a hex wrench to loosen the set screw that attaches the actuator to the ball valve shaft.
5. Now use the manual release button and move the actuator counterclockwise until it clicks and the flame goes out. It is right at that point where it clicks that you want to retighten the set screw.
6. Use the manual release button to inspect that when the flame “clicks” on, it already has enough gas for the flame to propagate all the way across the burner.
7. Readjust the manifold pressure at high fire if necessary.

D. Check the Modulation
1. Disconnect power to the control box.
2. Reconnect the red wire from the Siemens actuator to terminal #18.
3. Reconnect power to the control box.
4. Recycle the ignition sequence on the heater control panel by turning the “Spray” mode off and on again. Allow the burner to ignite.
5. Use the control panel to adjust the temperature set point. Check that the burner modulates properly and the booth achieves the desired temperature. Do this for several different temperatures, including the maximum and minimum.
6. Shut the system off at the control panel. Close the 1-1/4 inlet manual valve.
7. Remove all temporary manometer fittings. Re-install all plugs.
8. Fully open the 1-1/4 inlet ball valve.
9. Re-start the system in the “Heated Spray” or “Bake” mode as needed..

III Direct Gas-Fired Heater Burner Maintenance

Proper burner maintenance consists of five tasks:

1. Cleaning the burner plates
2. Clearing the burner gas and air ports
3. Changing the spark rod igniter
4. Insuring the flame sensor is in good condition.
5. Checking for gas tightness.

To clean the burner plates you'll need a stiff wire brush. Scrub both sides of the stainless steel burner plates to remove any soot or other material which may be on the burner. All of the burner plate holes must be clear so air can pass through them unrestricted. The holes in the burner plate allow air to mix with the gas in increasing amounts, as the flame gets longer. After you've cleaned the burner plates, inspect them for cracking. Cracks occurring between one or two holes are normal and should be of no concern. If the cracking is more extensive, the affected plates should be replaced. While you have the brush in your hand, scrub the rust, soot and other foreign material from the gas orifice area.

Clean the burner gas and air ports using a drill bit or piece of wire of the appropriate size. See the chart below for drill size. After the orifices are drilled to the correct size and using compressed air or a vacuum, remove any debris from the manifold. Debris left in the manifold will prematurely clog the orifices in the future.

Burner Sections	Gas Port	Drill Size	Air Port	Drill Size
HMA-2A (Nat/LP)	1/8″	(.125)	42	(.093)

After you've cleaned the burner plates and orifices you should inspect the spark rod. The tip should be clean and free of dirt and carbon. The porcelain must be intact. If it's cracked, replace it. While you have the spark rod out you should pull the flame rod or ultraviolet scanner as well. If your flame sensor is a scanner, clean the lens with a clean damp soft rag. A flame rod's metal rod should be clean and free of dirt and carbon. Like the spark rod igniter, the porcelain on the flame rod must be intact as well. Replace it if it's cracked.

Burners should be checked for proper operation throughout their firing range including high and low fire. At low fire, you should be checking for propagation across the length of the burner. At high fire, observe the flame to see that it is mostly blue with some yellow/orange tips. While checking high fire, check for gas leaks in the valve train.

IV Wiring Diagram

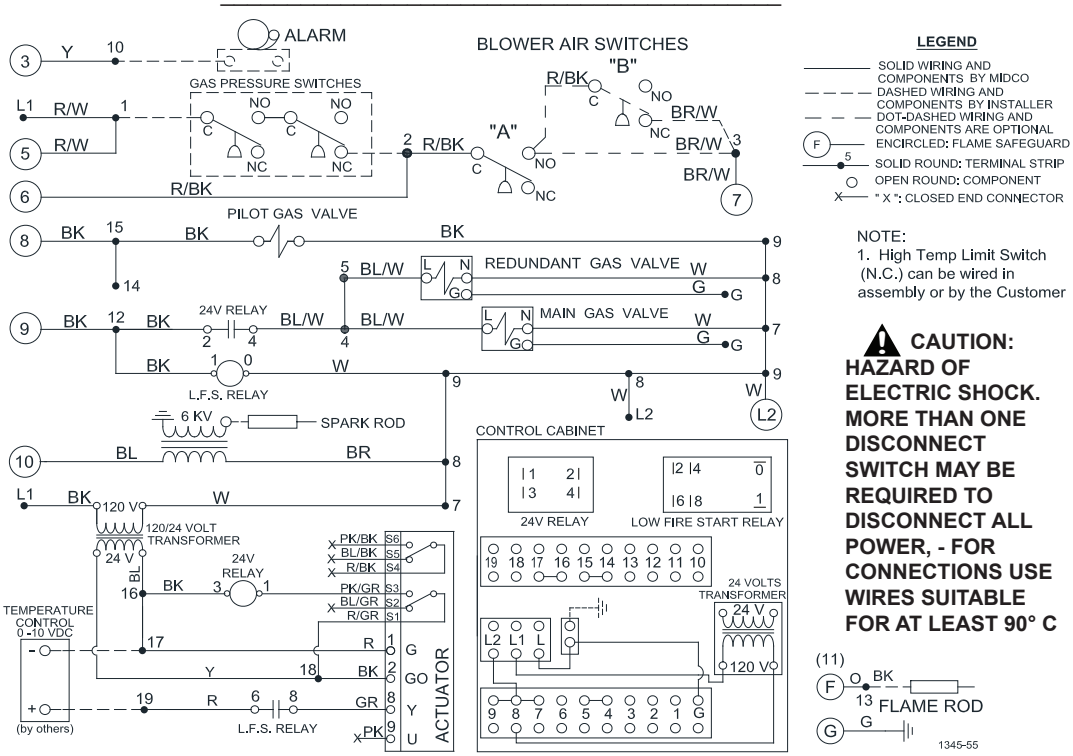

Figure 1 - *Wiring Diagram - 500 ohm Resistor Optional with a 4-20 mA System*

V Inlet Pressure Data

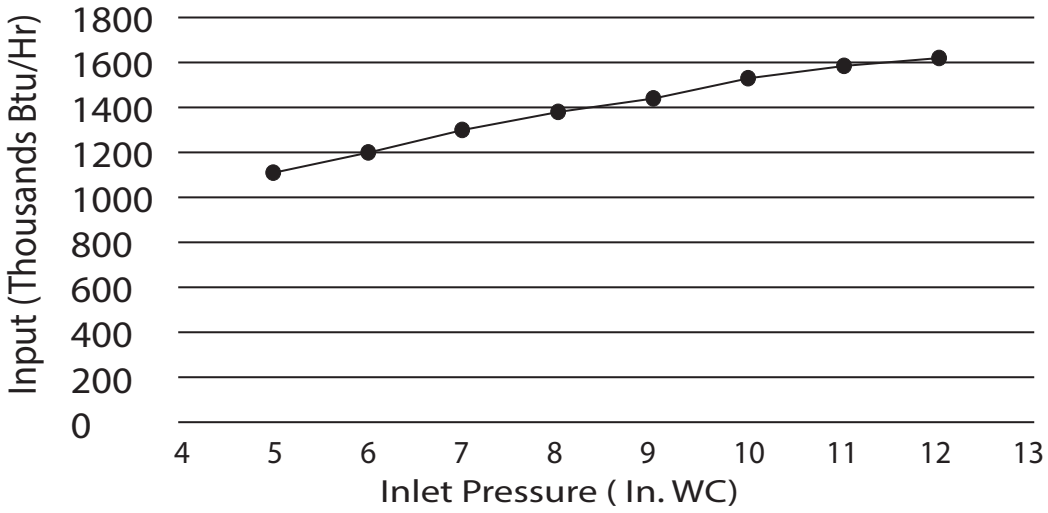

Table 2A.
Inlet Pressure vs. Input Rate

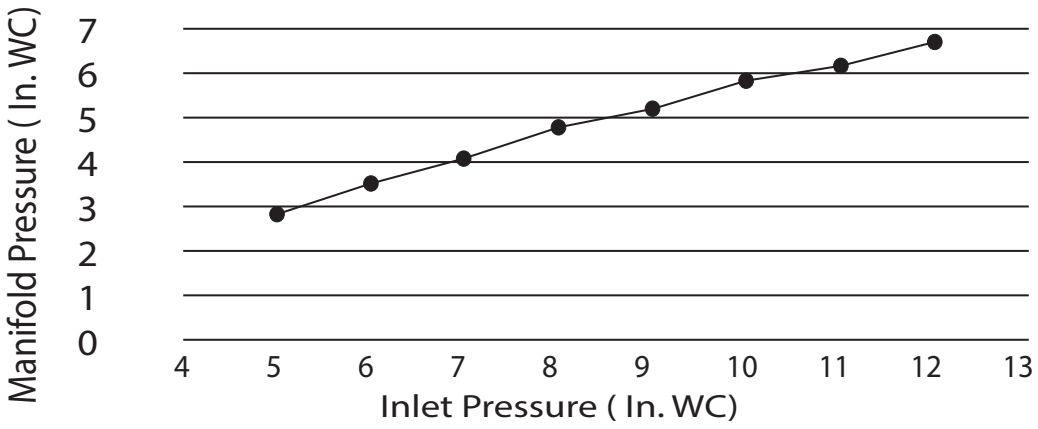

Table 2B.
Inlet Pressure vs. Manifold Pressure

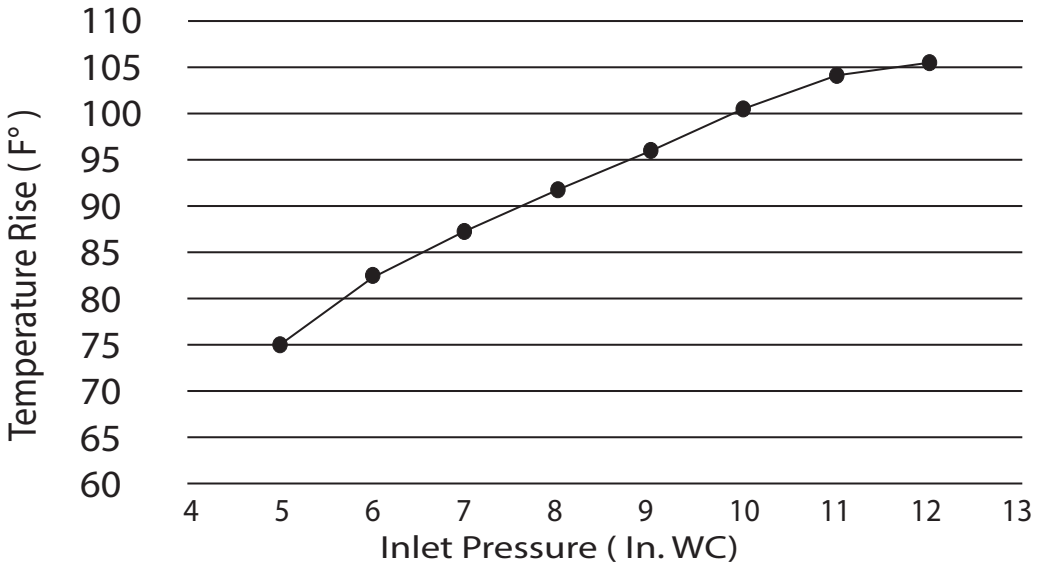

Table 2C.
Inlet Pressure vs. Temperature Rise

VI Burner Replacement Parts - Valve Train and Insert

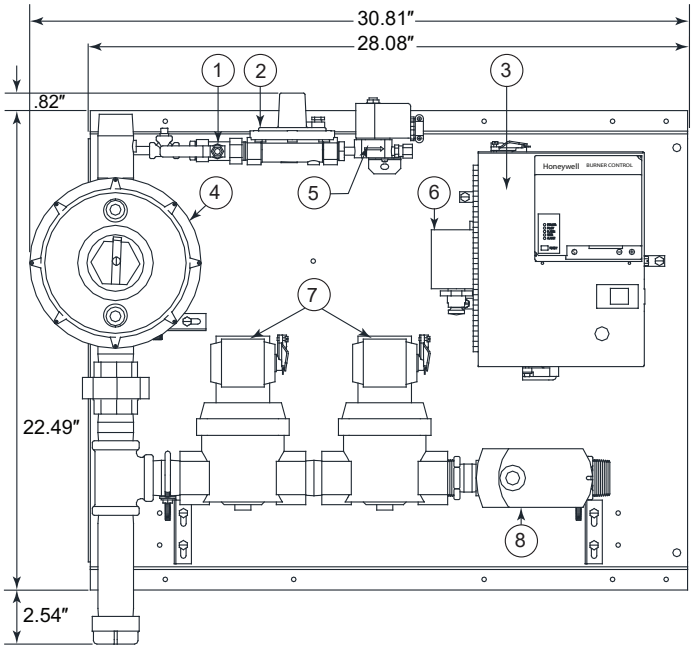

Figure 2A -
1-1/4" Valve Train
Direct Fired Burner Insert
Control Panel

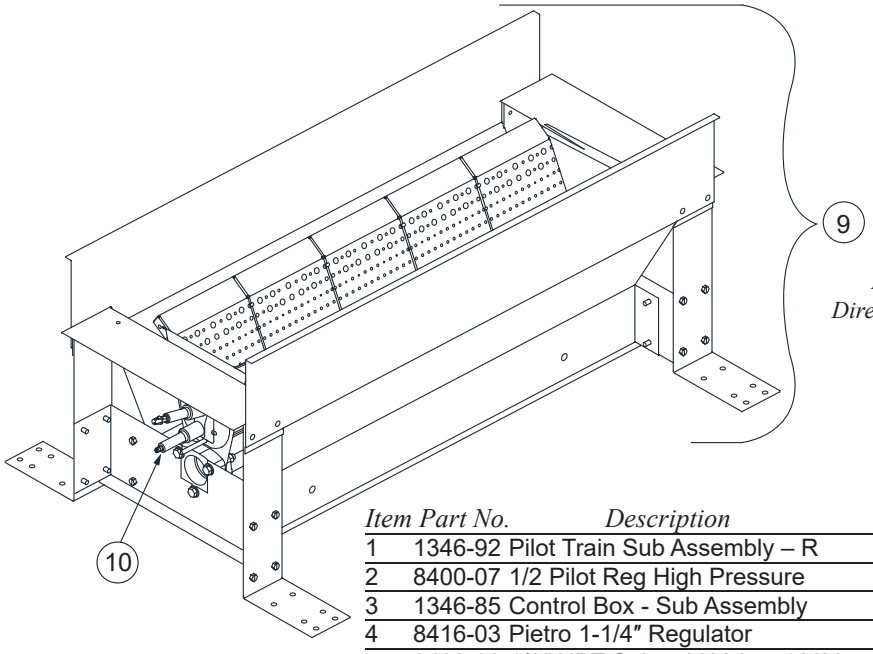

Figure 2B -
Direct Fired Burner
with Pilot

Item	*Part No.*	*Description*	*Qty*
1	1346-92	Pilot Train Sub Assembly – R	1
2	8400-07	1/2 Pilot Reg High Pressure	1
3	1346-85	Control Box - Sub Assembly	1
4	8416-03	Pietro 1-1/4″ Regulator	1
5	8402-00	1/8″ NPT Solenoid Valve, 120V	1
6	8447-22	Ignitor Spark Generator	1
7	8402-06	1-1/4″ Solenoid Gas Valve 120V	2
8	8419-94	Siemens Actuator 44 LB-IN, 90 Sec. @60 hz	1
9	1346-80	HMA-2A 2.5 Foot Burner	1
10	1190850	HMA-2A Pilot with Spark & Flame Rod	1

Not Shown

	8409-37	SP Relay - 24V / 25 Amps (Inside Control Box)	1
	8406-68	Dpts Relay 120V (Inside Control Box)	1
	8425-19	Air Switch (Ships Loose)	
	8429-20	R7847A Rect Flame Amplifier (Inside Controller)	1
	8447-28	120 - 24V 40VA Transformer (Inside Control Box)	1

No Longer Available - call the Factory
8429-19 RM7895A Controller

1. The Midco HMA-2 Burner is only a component of the complete system. For trouble shooting of the equipment contact the OEM (Original Equipment Manufacturer) or the component manufacturer.

2. **If the pilot fails to light:** install a manometer on the pilot pressure tap and check for 3.5″ WC for natural gas or 2″ WC for propane. If no gas, check for voltage to the pilot solenoid valve. If no voltage check operating controls or primary flame safeguard. If voltage to pilot solenoid valve is present and if there is 3.5″ WC gas pressure at the pilot pressure tap then check for spark or flame rod settings. If there is no voltage to pilot solenoid valve, refer to flame safety control specifications or contact the original equipment manufacturer.

3. **If main burner fails:** if no main flame check manifold pressure, if no manifold pressure check for voltage to the gas solenoid valve and check if main manual valve is open. If no voltage to the gas valve, refer to the flame safety control specifications or contact the original equipment manufacturer.

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