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MSR & MSR-DC Oil Burners

Manual 22019-003 | Revision E | Publication Date: //2013



MSR Oil Burner



MSR-DC Oil Burner

SPECIFICATIONS

Firing Capacities:

Model MSR & MSR-DC

0.50 – 2.75 Gallons per Hour
70,000 – 385,000 BTU/hr Input

Fuel Pumps

Suntec or Danfoss – Single Stage Standard

Mounting:

Rigid Flange, Adjustable Flange, or Base Mount

Electrical (MSR, for MSR-DC see page 3)

Power Supply115V / 60HZ / 1 PH

Motor3450 RPM, N.E.M.A. Flange, Manual Reset Overload Protection

Ignition10,000 V / 23 MA secondary, Continuous Duty-Shielded Interrupted

Fuels:

Use No.1 or No.2 heating oil (ASTM D-396)

Dimensions (MSR):

Height11 7/8"

Width13 7/8"

Depth6 7/8"

Dimensions (MSR-DC):

Height.....12 1/2"

Width.....13"

Depth.....6 7/8"

INSTALLATION OF BURNER

INSTALLATION OF THE BURNER MUST BE DONE BY A QUALIFIED INSTALLER IN ACCORDANCE WITH REGULATIONS OF THE NATIONAL FIRE PROTECTION STANDARD FOR OIL-BURNING EQUIPMENT, NFPA NO. 31, AND IN COMPLETE ACCORDANCE WITH ALL LOCAL CODES AND AUTHORITIES HAVING JURISDICTION.

INCORRECT INSTALLATION, ADJUSTMENT, OR MISUSE OF THIS BURNER COULD RESULT IN DEATH, SEVERE PERSONAL INJURY, OR SUBSTANTIAL PROPERTY DAMAGE AND WILL VOID THE WARRANTY. A QUALIFIED INSTALLER IS THE PERSON WHO IS RESPONSIBLE FOR THE INSTALLATION AND ADJUSTMENT OF THE EQUIPMENT AND WHO IS LICENSED TO INSTALL OIL-BURNING EQUIPMENT IN ACCORDANCE WITH ALL CODES AND ORDINANCES.

THESE INSTRUCTIONS SHOULD BE AFFIXED TO THE BURNER
OR ADJACENT TO THE HEATING APPLIANCE.

Burner / Appliance Service Log

[illegible]

GENERAL INFORMATION

Additional MSR-DC Specifications

Electrical MSR-DC

Power Supply13.0 VDC Minimum (at Battery)
Motor 4500 RPM (Std) or 3950 RPM (low RPM), Ball Bearing, Permanent Magnet
Ignition20,000 V / 28 MA / 50 VA Secondary, Intermittent Duty Electronic Ignitor

DC Oil Burner Considerations

- Not all generators are equally capable. A minimum of 13.0 volts must be provided at the battery.
- Generators should be operated at the maximum rated RPM during burner operation.
- Good quality batteries are strongly suggested. Batteries with higher Cold Crank Amp (CCA) rating and deep draw/marine type batteries are recommended.
- Use automotive rated battery cabling. All other wiring should be OEM suggested wire type and gauge.
- Protect all wiring connection points with dielectric grease.
- Ambient temperature impacts electrical requirements. Higher temperatures will result in higher amp draws.
- Increased pump operating pressure settings will increase amp draw.
- Higher gallon rate nozzles and accompanying wide air band openings will increase amp draw.

Approvals

This burner is U/L listed for use with Group I or Group II primary safety controls. State and local approvals are shown on burner rating label. All burners should be installed in accordance with the National Fire Protection Association, and in complete accordance with all local codes and authorities having jurisdiction. Regulation of these authorities takes precedence over the general instructions provided in this manual.

General Installation Information

Heating Plant - Before installing this burner in a conversion installation, try to provide adequate space to service the burner properly. The heating system should be carefully inspected for defects and cleanliness, so proper performance is obtained. An oil burner is only a means of supplying heat to the firebox and from there the heating system must absorb and circulate the heat. The flue passages and heat absorbing surfaces must be clean to assure maximum heat transfer to the furnace or boiler. Soot and fly ash act as insulators, retarding the transfer of heat. All doors, openings, and cracks should be cemented air-tight to eliminate air infiltration into the heating plant, causing heating losses. Inspect smoke pipe and chimney for elimination of leaks and obstructions. Be sure of adequate chimney size and height. Install a mechanical draft adjuster, if needed same size as smoke pipe (see column under draft regulators).

Overview of Safety Warning System and Your Responsibilities

The safety of you and others depends upon you thoroughly reading and understanding this manual. If you have questions or do not understand the information presented in this manual, **please call Wayne Combustion System or see www.waynecombustion.com.**



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. The meaning of this safety alert symbol is as follows: **Attention! Become alert! Your safety may be at risk.** The message that appears next to the warning describes the hazard, which can be either written or pictorially presented. **NEVER** remove or tamper with the warning labels, safety devices or guards fitted on the unit.

Wayne Combustion Systems is **NOT** responsible for any bodily injury and/or property damage that may result from operation outside of the stated operating conditions for which this unit was intended.

Hazard Definitions:



Indicates a hazardous situation, which, if not avoided, will result in **death or serious bodily injury**.











Indicates a hazardous situation, which, if not avoided, could result in **death or serious bodily injury**.



Indicates a hazardous situation, which, if not avoided may result in **minor or moderate bodily injury**.



Indicates a situation that may result in equipment-related damage.

Hazard Level	Pictogram	Type	Hazard Explanation
 WARNING		Fire or Explosion	<p>Failure to follow safety warnings exactly could result in serious injury, death or property damage.</p> <p>Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.</p> <p>Never attempt to use gasoline as a fuel for this burner, as it is more combustible and could result in a serious explosion.</p>
 WARNING		Electric Shock or Burn	<p>High voltages are present in this equipment. Follow these rules to avoid electric shock:</p> <ul style="list-style-type: none"> • Use only a properly grounded circuit. A ground fault interrupter is recommended. • Do not spray water directly on burner. • Turn off power before servicing. • Read the owner's manual before using.
 WARNING		Overheating	<p>Should overheating occur:</p> <ul style="list-style-type: none"> • Shut off the manual oil valve to the appliance. • Do not shut off the control switch to the pump or blower.
 WARNING		Carbon Monoxide Poisoning	<p>Carbon monoxide is a colorless, odorless gas that can kill. Follow these rules to control carbon monoxide:</p> <ul style="list-style-type: none"> • Do not use this burner if 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. • Read the burner manual before using. <p>CARBON MONOXIDE POISONING: Early signs of carbon monoxide poisoning are similar to the flu with headaches, dizziness, weakness, nausea, vomiting, sleepiness, and confusion. If you suspect carbon monoxide poisoning, get outside to fresh air immediately, and then call 911. Some people are more affected by carbon monoxide than others. These include pregnant women, people with heart or lung disease or anemia, those under the influence of alcohol, and those at high altitudes. Propane/LP gas and natural gas are both odorless. An odor-making agent is added to each of these gases. The odor helps you detect a gas leak. However, the odor added to these gases can fade. Gas may be present even though no odor exists.</p>
 WARNING		Proposition 65 material	<p>This product can expose you to chemicals, including lead, nickel, carbon monoxide and sulfur dioxide, which are known to the State of California to cause cancer or birth defects or other reproductive harm. For more information, go to www.p65Warnings.ca.gov.</p>

Combustion Chamber

The purpose of a combustion chamber is to maintain a high flame temperature by reflecting the heat back into the flame. A high temperature assures greater combustion efficiency and lower stack losses. An insulating refractory or a Fiber Fax type chamber can be used with this burner. It is important to select and install, if necessary, the correct size chamber on the conversion job (see chart). On the Flamelock conversion burners the atomized oil burns just off the Flamelock. On all oil burners the atomized oil must not touch the sides or bottom of chamber, or smoke will result. To eliminate the smoke, excess air will be required, resulting in high stack temperature and lower combustion efficiency. Install burner so the face of air cone of burner is set 1/8" to 1/4" behind the inside front wall of the chamber (see diagram).

NOTICE

Use care when installing Flamelock burners in stainless steel chambers because of the higher temperature levels produced by high performance flame retention burners. The temperatures may exceed the temperature ratings of the stainless steel chamber and can result in chamber burn outs. When you are replacing a standard burner with a flame retention burner, take the following precautions: (1) use pliable Ceramic Liner to line the inside of the chamber, (2) adjust burner (See column under "Final Adjustments").

Fuel Pumps and Oil Lines

Conversion Burners are provided with single stage 3450 RPM fuel units with the by-pass plug removed for single pipe installations. This is satisfactory where the fuel supply is on the same level or above burner permitting gravity flow of oil. Never exceed over 8 PSI pressure to the suction side of fuel unit. A pressure of over 8 PSI may cause damage to the shaft seal and allow it to leak oil. When it is necessary to lift the oil to the burner, a return line should be run between fuel unit and oil supply. (If lift exceeds 10 feet, a two-stage fuel unit must be used with a return line). When a two-line system is used the by-pass plug must be installed. This plug is supplied along with the burner attached to fuel unit along with an information pump data sheet in a plastic bag. When oil lines are installed, continuous runs of heavy wall copper tubing are recommended. Be sure that all connections are absolutely airtight. Check all connections and joints. Flared fittings are recommended. **Do not use compression fittings.** See pump data sheet for sizing, lift and length for tubing recommendations. Use an oil filter of adequate size for all installations. Install filters inside the building between the tank shut off valve and the burner. For ease of servicing, locate the shut-off valve and filter near the burner.

The model MSR-DC oil burner is provided with a single stage 3450 RPM fuel unit with by-pass plug removed for a single pipe installation; the by-pass plug for two pipe (inlet and return) is provided in the plastic bag attached to the fuel unit.

The installation of fuel filters is recommended. Check supply tank for sludge accumulation and leakage. Use only flare fittings on all piping and connections since compression fittings will eventually leak. With the system running, the vacuum should not exceed 12" mercury for single stage units. For ease of servicing, install a shut off valve near burner.

Tanks and Piping

Local codes and regulations must be followed regarding tank and burner installation. Check existing tanks for water and sludge accumulation, clean if necessary. Also clean or replace existing piping.

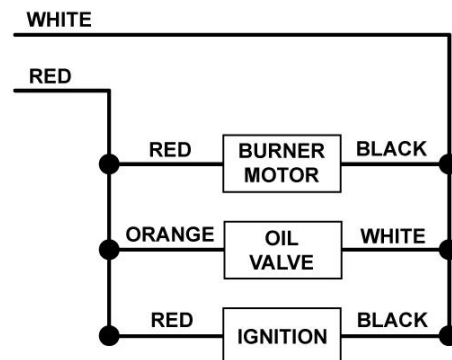
Chimney

Follow the recommendations of the heating unit manufacturer. It must be properly designed and of adequate size and should be above the surrounding objects, tile-lined, with no obstructions and be in good state of repair. The smoke pipe should set flush with the inside of the tile and cemented in place. All cleanout doors should be sealed.

Wiring

All wiring must comply with the National Electric Code and local ordinances. Refer to diagram supplied with burner or controls, making sure the burner and controls are wired correctly and that the line switch is properly fused to burner.

The MSR-DC oil burner must be electrically wired and GROUNDED in accordance with local codes or in their absence, with National Electric Code ANS/NFPA No. 70-latest edition. This oil burner requires a 12-volt DC power source. Use copper wire only not lighter than #12 awg. If a fused disconnect is used, it should be fused for a minimum of 20 amps. Refer to the wiring diagram in this manual or cleaning equipment manufacturer's manual making sure the burner and controls are wired correctly.



Air Supply for Combustion

Do not install in rooms with insufficient air to support combustion. Occasionally it is necessary to install windows or cut holes in a door to these rooms to obtain sufficient air and to prevent less than atmospheric air pressure in the room. If there is a lack of combustion air in the room, the burner flame will be yellow and formation of soot will occur in the heating unit. In buildings of conventional frame, brick or stone construction without utility rooms, basement windows, or stair doors, infiltration is normally adequate to provide air for combustion and for operation of the barometric draft control. For installation in an enclosed utility room without an outside wall, a fresh air opening to the outside with a free cross section area of 20 square inches per each gallon per hour firing is recommended. For each 1,000 feet above sea level, increase the fresh air opening by at least four (4) per cent. The room should be isolated from any area served by exhaust fans. Do not install an exhaust fan in this room.

The oil burner fired hot water pressure washer shall not be installed in an area where facilities for normal air circulation or infiltration are so limited as to interfere with ready attainment of all necessary for proper combustion and venting. When the heating appliance is installed in a confined space, two permanent openings shall be provided. One near the top of the enclosure and one near the bottom. Each opening shall have a free area of not less than one square inch per 1000 BTU per hour (140 square inch per gph) of the total input rating of all the appliances in the enclosure. When the building is of unusually tight construction, has an air ventilating system, exhaust fans, process dryer or vented fireplaces, it is recommended that combustion air be supplied through two permanent openings. The openings shall communicate directly, or by means of ducts, with outdoors or such spaces (attic or crawl) that freely communicate with outdoors. Avoid linty environments. For additional venting information, refer to the regulations of the National Fire Protection Standard for oil burning equipment, ANSI/NFPA N0. 31-latest edition, or the cleaning equipment manufacturers recommendations.

Draft Regulators

The use of a draft regulator is recommended and should preferably be mounted in the smoke pipe. Use a draft gauge to adjust to proper opening. When the burner air supply is properly adjusted, the combustion chamber draft will be approximately -.01 to -.02 WC and the stack draft will be -.02 to -.04 WC. The larger the installation, the greater the draft will be required at the stack to obtain the -.01, to -.02 WC at the combustion chamber.

Nozzles

Use the proper size, type and spray pattern that heater manufacturers recommend; in some cases of upgrading or conversion installations, the use of an 80 Hollow or Solid Nozzle are the best to start with.

Nozzle and Air Handling Parts Selection

IMPORTANT: Thorough combustion and performance testing was done to establish the correct nozzle type and air handling parts on this MSR-DC oil burner. Under circumstance attempt to replace or alter the oil burner nozzle type or air handling parts (stainless steel Flamelock, air cone, electrode support style static disc, blower wheel or slotted air circumstances attempt to fire the MSR-DC oil burner under its 1.00 gph minimum or over its 2.75 gph maximum input rating.

To remove the gun assembly once the burner has been installed on the appliance remove the ignitor/housing cover screw and loosen the screw in the hold-down clip and swing open the transformer. Next, disconnect the copper oil line where it attaches with a 7/16" hex flare nut on the gun assembly oil line adapter fitting and remove the 9/16" hex gun assembly locknut. Now, grasp the rear of the gun assembly where the oil line fitting adapter exits through the housing and pull oil line fitting adapter to the right out of the housing slot and slot plate cover. Gently lift, do not force, the rear of the gun assembly, rotating the oil line fitting adapter up a 45 degrees pulling the entire gun assembly out of the air tube and housing opening.

The recommended can be installed into the nozzle body adapter using the following steps. With the gun assembly removed from the burner, loosen the electrode clamp screw and rotate the electrodes up, out of the way of a nozzle wrench. Now, thread the nozzle into the adapter finger tight then tighten securely with a nozzle wrench. **CAUTION:** Do not over tighten. Next, reposition the electrodes as shown in figure 1. At this time reinstall the gun assembly into the burner using the preceding steps in reverse order. Position the nozzle face forward to a 5/16" setting behind the stainless steel air cone as shown in figure 1. Once in the required position, replace the 9/16" hex lock nut and the 7/16" hex flare nut on the gun assembly and tighten the slot cover screw (see figure 2).

NOTICE

Close the ignitor and observe for spring contact with the brass buss bars, taking care not to pinch the ignition transformer lead wires between the housing and cover plate. Reinstall the ignitor/housing cover screw and tighten the screw in the hold down clip (see figure 2).

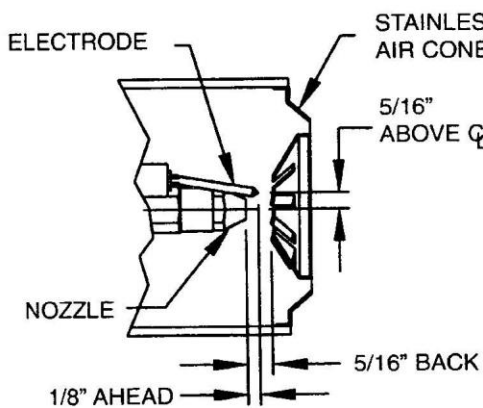


FIGURE 1

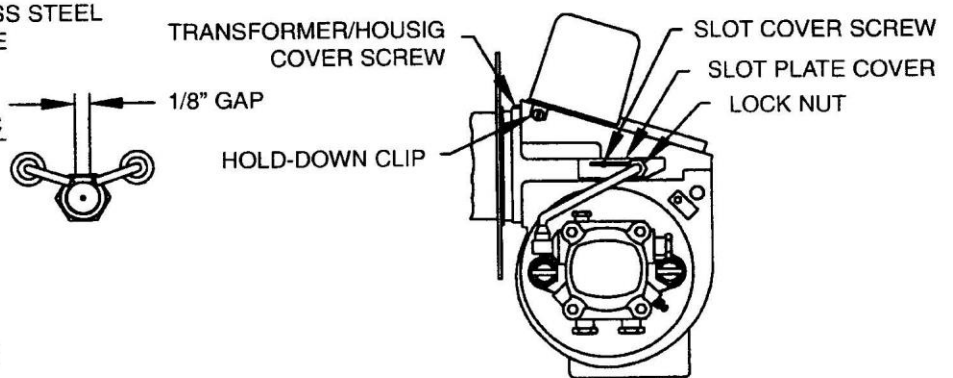


FIGURE 2

STARTING PROCEDURE

Preparation Steps

1. Calibrate and check operation of combustion analysis equipment, CO₂ (carbon dioxide) or O₂ (Oxygen) analyzer, smoke tester, fuel gas thermometer and oil pressure/vacuum gages. Follow the manufacture recommendation for proper calibration and check out.
2. Install oil pressure gage and vacuum gage in the outlet pressure and inlet ports of the fuel unit.
3. Set oil burner slotted air band shutter 25% open.

Starting Burner

Be sure main switch is in "off" position and be sure thermostat is substantially above room temperature, the oil tank is filled, all valves are open and controls set for operation. Adjust air supply on burner by loosening the locking screw on outer air band, and open partially. Open the inspection door and turn on switch. Prime pump according to the pump manufacturer's recommendations and check pressure. If safety lockout occurs reset after 1 or 2 minutes (caution). Do not run fuel unit dry for more than 5 minutes. When fire is established make a temporary air adjustment for a clean combustion flame, reduce air supply until flame tips appear slightly smoky, then readjust so flame tips are clean looking. Leave inspection door open until chamber is dry. When normal temperatures are reached, close inspection door and adjust draft regulator, see column under "DRAFT REGULATIONS".

1. Turn off the main power switch to the burner and appliance.
2. Be sure the main fuel tank is filled and all manual valves are open between the fuel tank and the burner.
3. Turn on the main power switch to the burner and appliance.
4. Prime the fuel pump per its manufactures recommendations, check fuel unit for 100 psi delivery pressure and check system vacuum (see paragraph under Fuel Units and Oil Lines).

NOTICE

Do not run fuel unit dry for more than five minutes. Damage to the fuel unit could result.

5. Once the fuel unit is primed (no signs or air in oil bleeder port discharge), close the bleed port. Burner will ignite.
6. When flame is established, make a temporary air adjustment to the slotted air band for a visually clean combustion smoke observed from the appliance vent. Allow the appliance to warm up approximately five minutes or until the water temperature reaches that recommended by the cleaning equipment manufacture.
7. Adjust the slotted air band shutter until a #1 to #2 smoke (Shell Bacharach scale) is obtained at the appliance vent.
8. Check CO₂ (carbon dioxide) and/or O₂ (Oxygen) percentages and smoke in the flue gas at the appliance vent. In general, CO₂ readings should be in the 10% to 12% range and O₂ readings in the 4.7% to 7.4% range.
9. Once the desired combustion results are attained, securely tighten slotted air band screw and check that controls on the appliance are adjusted per the cleaning equipment manufactures instruction sheets, Remove oil pressure and vacuum gages from the fuel unit and reinstall pipe plug fittings.
10. Check burner lighting with hot chamber, then allow burner and appliance to sufficiently cool. Then check burner lighting with a cold chamber.

It is suggested that all new installations be re-inspected after one or two weeks of normal operation.

Final Adjustments

At this point a final adjustment should be used by the use of a COMBUSTION TEST KIT. After operating 10 minutes to warm up unit, a smoke tester should be used to take a smoke reading. We are wanting no greater than a #1; (Shell Bacharach Scale). And less than a #1 smoke is desired. Sometimes a new heating unit requires more time than this to burn clean due to the oil film on the new heater unit surfaces. Recheck draft and take a CO₂ reading over the fire and in the stack. If a larger differential between CO₂ readings is noted, air leakage is the most common cause (see column under HEATING PLANT). CO₂ readings must all be taken ahead of draft control. The CO₂ measured in the stack should be at least 9% for oil rates 1.00 G. P. H. or below, and at least 10% for oil rates over 1.00 G.P.H. Unit should be started and stopped several times to assure good operation. Open inspection door, turn off oil valve and check out safety timing of combustion control. Check operation of limit controls and thermostat. Check for oil leaks. Note: All installations should be re-inspected after 1 or 2 weeks of normal operation.

Final Checks

Be sure all screws are locked and the controls on heating unit are adjusted in accordance with the heater and control manufacturer's instruction sheets.

Maintenance



Before beginning any maintenance work on the burner, be sure that gas and electrical power to the burner are disconnected.

The following routine maintenance operations should be performed on the burner at the prescribed intervals.

- **Oiling Motor:** Proper lubrication of the motor will prolong its service life. Oil sleeve bearing motors with 6 drops of SAE 20 oil once a year. DO NOT OVER OIL. The MSR-DC oil burner is provided with a ball-bearing motor. Ball-bearing motors do not require oiling under normal service conditions. The bearing type is printed on the motor nameplate.
- **Filter:** The oil filter cartridge should be replaced once a year so the fuel oil will not become contaminated and plug up fuel pump and nozzle of oil burner.
- **Nozzle:** The nozzle should be changed at least once a year before the startup of the heating season. Replace with proper nozzle. Handle nozzles by hex only. Oil from the fingers on the face or filter of nozzle adversely affect spray characteristics.
- **Components:** If for any reason any of the burner parts have to be replaced, always use parts recommended by the manufacturer. Specify part numbers and description when ordering. (In all communications, state burner model, serial numbers, and appliance manufacturers and appliance model designation).
- **Electrode Settings:** This is very important for reliable ignition of the oil; check these once a year in accordance with the instructions provided in this manual. Replace electrodes if worn excessively or if porcelain insulator is oil soaked or cracked.
- **Fan and Blower Housing:** This must be kept clean, free of dirt and lint; open transformer to check fan blades from above.
 - Oil pump pressure.
 - Oil nozzle is correctly sized for this application.
 - Check cad cell location and photo eye is clean.

EFFICIENCY CHART FOR NO.2 FUEL OIL

NET STACK TEMPERATURE (DEGREES °F)

	300°	350°	400°	450°	500°	550°	600°	650°	700°	750°	800°	850°	900°
<u>15</u>	87.50	86.50	85.25	84.25	83.25	82.00	81.00	79.75	78.75	77.50	76.25	75.50	74.25
<u>14.5</u>	87.50	86.25	85.00	84.00	83.00	81.75	80.75	79.25	78.50	77.25	76.00	75.00	73.75
<u>14</u>	87.50	86.00	84.75	82.75	82.75	81.50	80.25	79.00	78.00	76.75	75.50	74.50	73.00
<u>13.5</u>	87.00	85.75	84.50	82.50	83.50	81.25	80.00	78.75	77.50	76.25	75.25	74.00	72.25
<u>13</u>	86.75	85.50	84.25	83.25	82.00	80.75	79.50	78.25	77.00	75.75	74.50	73.50	71.75
<u>12.5</u>	86.50	85.25	84.00	83.25	81.50	80.25	79.00	77.75	76.50	75.25	73.75	72.75	71.00
<u>12</u>	86.25	85.00	83.75	82.50	81.50	79.75	78.50	77.25	75.75	74.50	73.00	71.50	70.25
<u>11.5</u>	86.00	84.75	83.50	82.00	80.75	79.25	78.00	76.25	75.25	73.75	72.25	70.75	69.50
<u>11</u>	85.75	84.50	83.00	81.50	80.25	78.75	77.25	75.75	74.50	73.00	71.50	70.00	68.50
<u>10.5</u>	85.50	84.00	82.50	81.00	79.50	78.00	76.50	75.00	73.75	72.00	70.50	69.00	67.50
<u>10</u>	85.00	83.50	82.00	80.50	78.75	77.25	75.75	74.25	72.75	71.00	69.50	68.00	66.25
<u>9.5</u>	84.50	83.00	81.50	79.75	78.00	76.50	75.00	73.25	71.75	70.00	68.25	66.75	65.00
<u>9</u>	84.00	82.25	80.75	79.00	77.25	75.75	74.00	72.25	70.75	68.75	67.00	65.25	63.50
<u>8.5</u>	83.50	81.75	80.00	78.25	76.50	74.75	73.00	71.25	69.25	67.50	65.50	63.75	62.00
<u>8</u>	83.00	81.00	79.25	77.50	75.50	73.75	71.75	70.00	68.00	66.00	64.00	62.00	60.00
<u>7.5</u>	82.25	80.25	78.50	76.50	74.50	72.50	70.50	68.50	66.50	64.25	62.25	60.00	58.00
<u>7</u>	81.50	79.50	77.25	75.25	73.25	71.00	69.00	67.00	64.75	62.50	60.25	57.75	55.50
<u>6.5</u>	80.75	78.50	76.25	74.00	71.75	69.50	67.25	65.00	62.75	60.25	57.75	55.50	53.00
<u>6</u>	79.75	77.25	75.00	72.50	70.00	67.75	65.25	62.75	60.25	57.50	55.50	52.50	50.00
<u>5.5</u>	78.50	76.00	73.50	71.00	68.00	65.50	63.00	60.25	57.50	54.50	51.75	49.00	46.50
<u>5</u>	77.25	74.50	71.75	69.00	65.75	63.00	60.00	57.00	54.00	51.00	48.00	45.50	42.50
<u>4.5</u>	75.50	72.50	69.00	66.25	63.00	60.00	56.75	53.50	50.25	47.00	43.50	40.25	36.75
<u>4</u>	73.25	69.75	66.25	62.75	59.25	55.75	52.00	48.50	45.00	41.25	37.50	33.75	30.00

ATTACHING AIR TUBE COMBINATIONS FOR CHASSIS PLAN ONLY

When the Oil Burner Chassis and the Air Tube combination are packed separately, the burner must be assembled as follows:

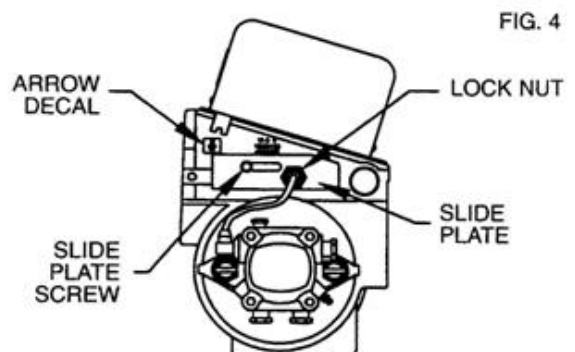
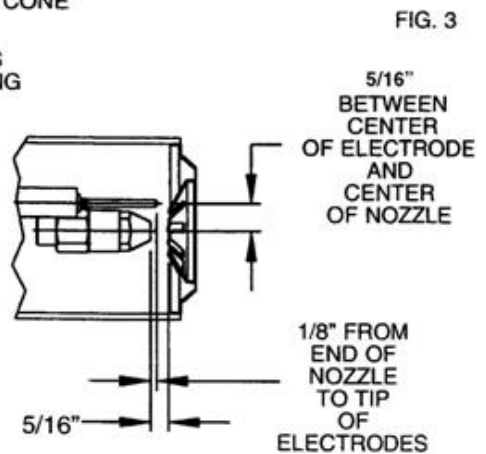
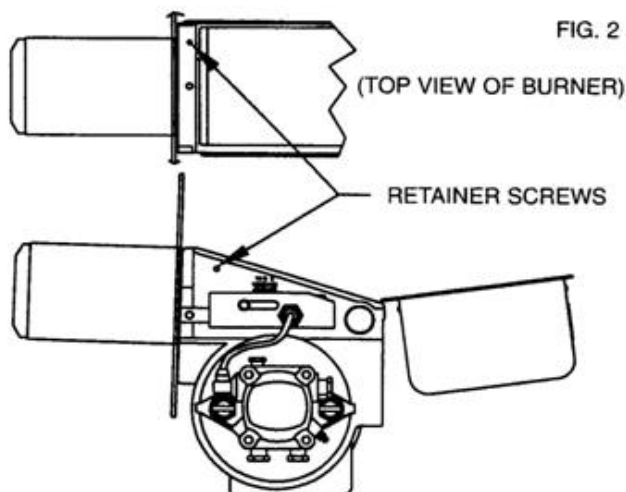
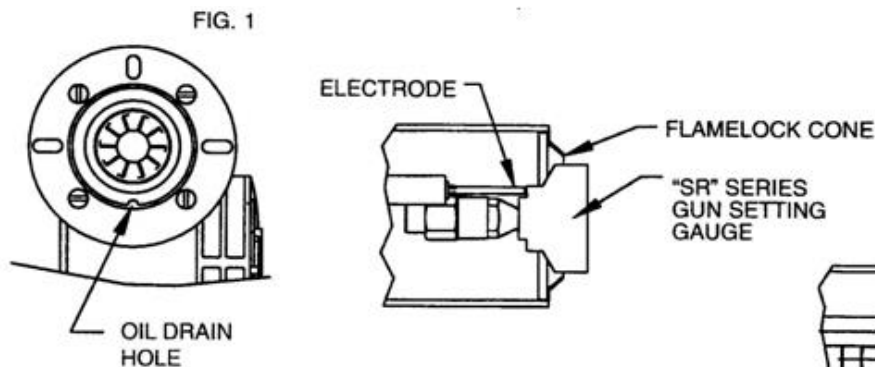
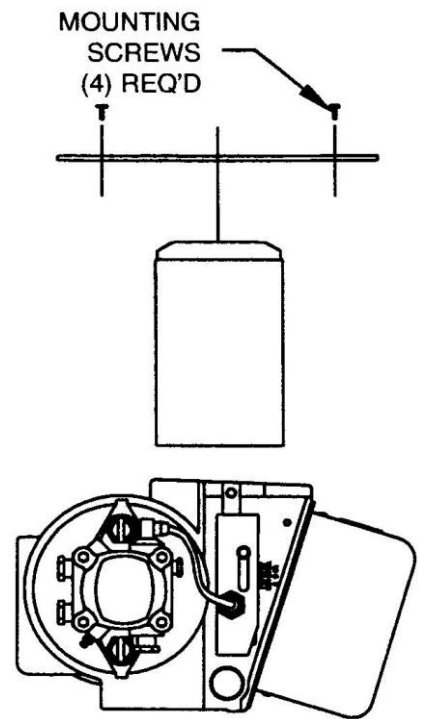
1 – Install the Air Tube Assembly to the Burner Chassis as shown. This can be done by setting the Burner Chassis on its back and placing the assembled Air Tube on the Chassis. (IMPORTANT: Make sure the Oil Drip hole in Air cone (see Fig. 1) is at the six o'clock position.) Secure air tube to chassis with 3 HEX HEAD SCREWS.

2 – Install proper nozzle in Drawer Assembly. Loosen the Transformer retainer Screws and swing open to insert the Drawer Assembly (See Fig. 2.) into the air tube to position nozzle. Once installed and adapter fitting is in position in Burner Chassis slot and slide place hole, adjust gun assembly, either back or forward to position nozzle from head. For correct positioning (See Fig. 3). Secure the slide plate by tightening screw at side of housing. Secure the drawer assembly with the locknut provided. Attach flared nut of Oil Line Assembly, (Copper Oil Line) to the end of this adapter fitting as shown.

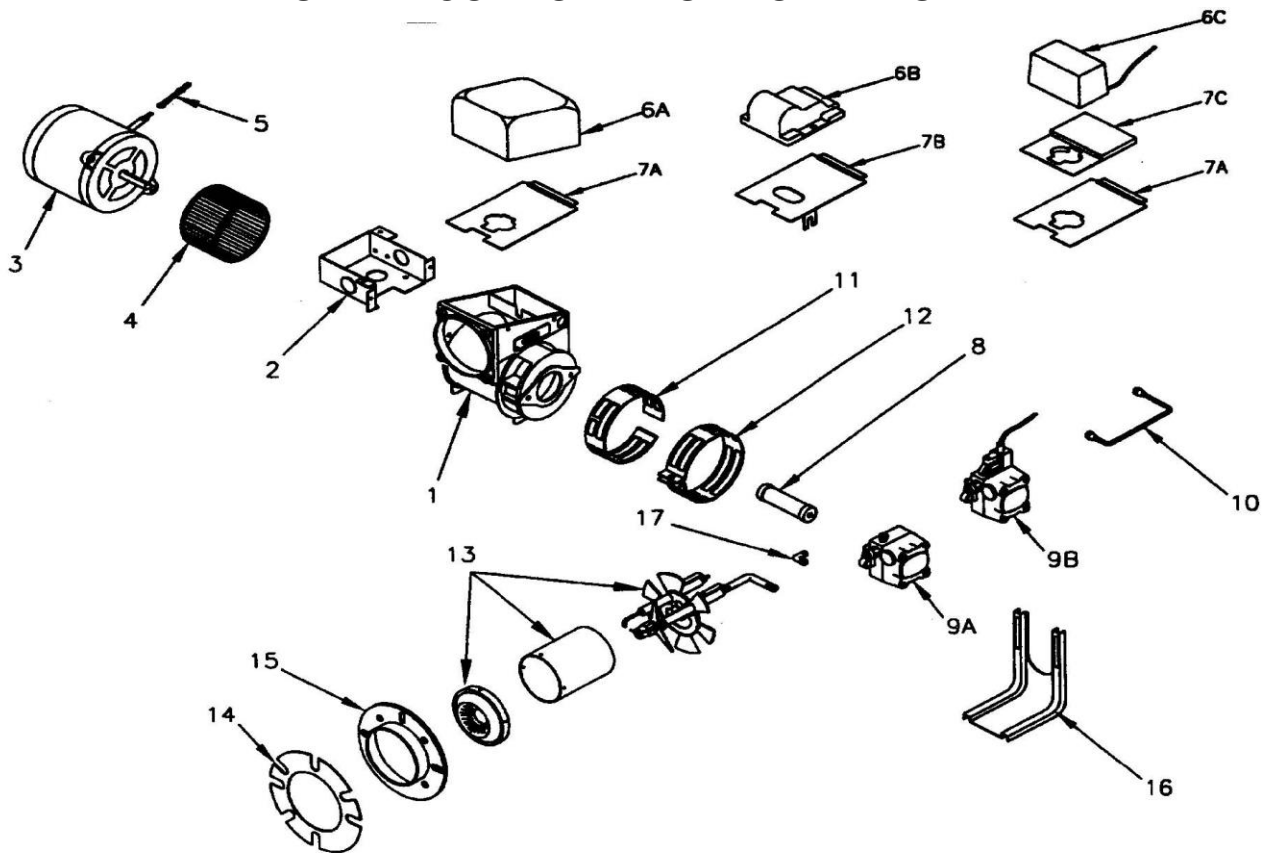
Install arrow decal as shown so position of Drawer Assembly is always known. (See Fig. 4)

Recheck for nozzle centering before burner is installed (See Fig. 1). Make sure electrode tips clear retention head.

INSERT "SR" SERIES GUN SETTING GAUGE (AS SHOWN BELOW to CHECK NOZZLE POSITION AND ELECTRODE SETTING)



BURNER COMPONENTS - MODEL MSR



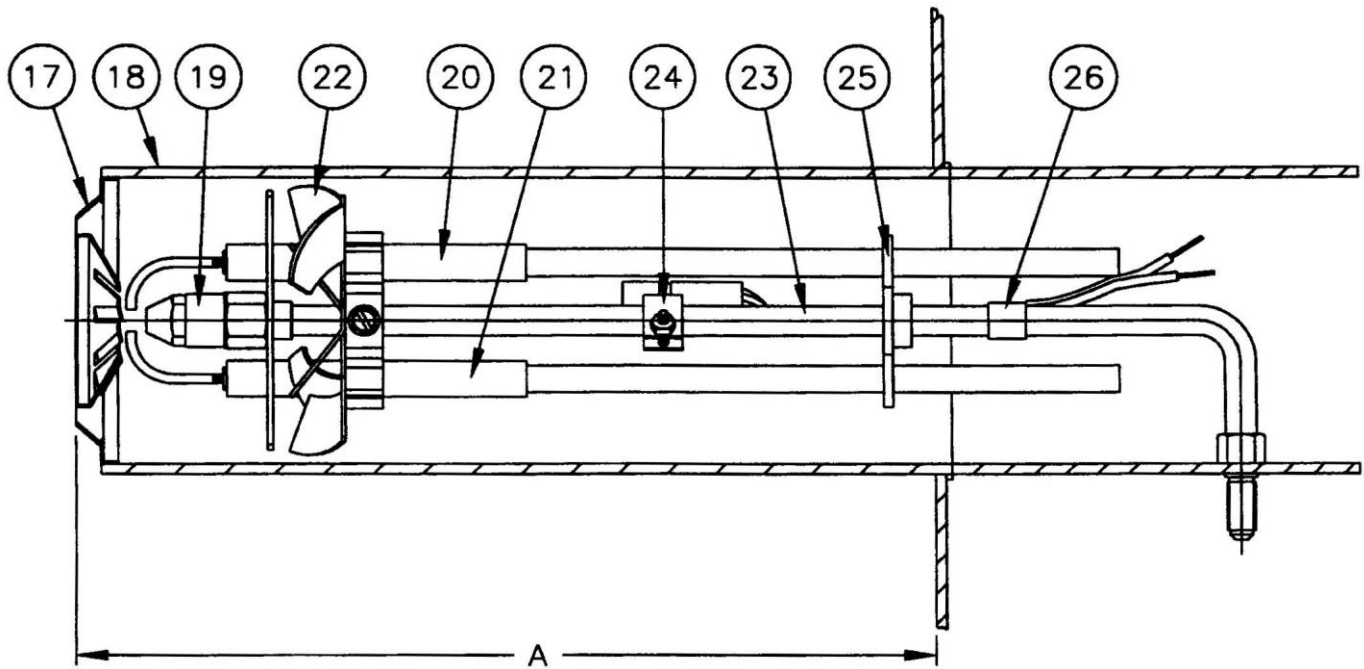
NO	DESCRIPTION	PART NO
1	BURNER HOUSING	31841-036
2	JUNCTION BOX ASM	21319
3	MOTOR 1/8 H.P.	20627
4	BLOWER WHEEL 3 1/8 X 4 1/4	20673
	BLOWER WHEEL 3 1/2 X 4 1/4	21427
5	MOTOR CORD COVER	13029
6A	TRANSFORMER 115V	23101-M
	TRANSFORMER 230V	23103-M
6B	FRANCE IGNITOR 115V	101050-001
6C	CARLIN IGNITOR 230V	31812-002
7A	COVER	21723-002
7B	COVER	21723-003
7C	COVER	31812-002
8	COUPLING	13424
9A	FUEL UNIT MODEL A	13495
9B	FUEL UNIT MODEL B	13634
9C	SUNTEC COMBO UNIT 115V	101128-001
	SUNTEC COMBO UNIT 230V	101128-002
10	6" OIL LINE ASSEMBLY	14451
	8" OIL LINE ASSEMBLY	14452
11	INNER AIR BAND	20601-002
12	OUTER AIR BAND	20602-002

NO	DESCRIPTION	PART NO
13	AIR TUBE & GUN ASSM	*
14	GASKET	12484
15	ADJUSTABLE FLANGE	2689-011
16	PEDESTAL MOUNT	21760-011
17	ELBOW	13494

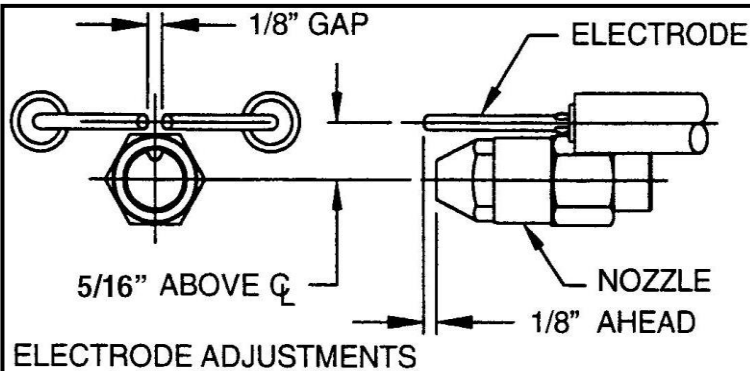
*PART NUMBER SEE PAGE 7

Suggested Combustion Chamber Dimensions Conversion or Upgrading Chamber Dimensions (In Inches)					
Firing Rate (G.H.P)	Square Width Length		Round	Height	Floor to Nozzle
0.85	8.5	8.5	9	12	5-6
1.00	9	9	10 1/8	12 1/2	5-6
1.25	10	10	11 1/4	12 1/2	5-6
1.35	10 1/2	10 1/2	11 3/4	12 3/4	5-6
1.50	11	11	12 3/8	13	5-6
1.65	11 1/2	11 1/2	13	13 1/4	5-6
2.00	12 5/8	12 5/8	14 1/4	13 1/2	5-6
2.50	14 1/4	14 1/4	16	14	7-8
3.00	15 1/2	15 1/2	17 1/2	15	7-8

AIR TUBE & GUN ASSEMBLY DETAILS MODEL MSR

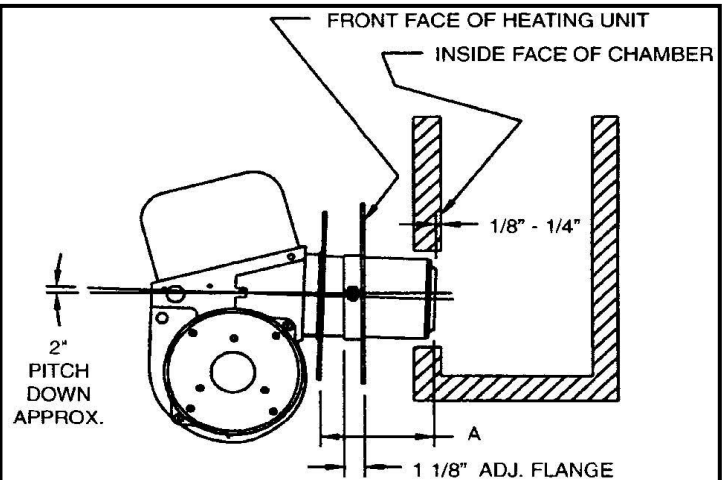


NOTE: Backside of Flamelock to Nozzle Face



No.	Description	Part No.
17	Head 0.85 – 0.75 #SC	10060
	0.75 – 1.00 #1A	14157
	1.00 – 1.35 #2A	14158
	2.00 – 2.25 #4A	14160
18	Air Tube	See Note
19	Nozzle Adapter	21913-SER
20	Right Electrode Assembly	See Note
21	Left Electrode Assembly	See Note
22	Electrode Support Assembly	See Note
23	Oil Pipe Assembly	See Note
24	CAD Cell Bracket	13078
25	Buss Bar Support	13276-002
26	CAD Cell Zip Tie	100850-001

To Determine Air Tube Length

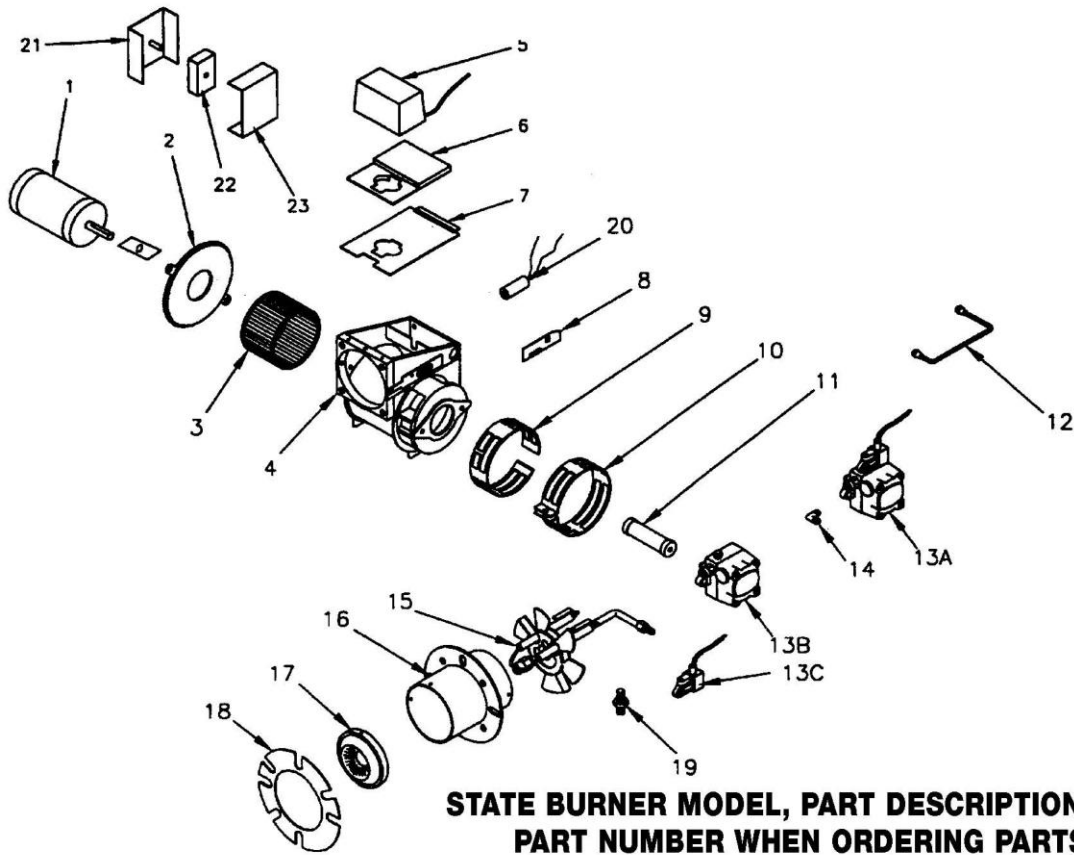


Standard Air Tube Dimensions

Dim "A"	0.75-1.00	1.00-1.50	1.50-2.00	2.00-2.75
4"	31844-005	31845-005	31846-005	31847-005
6"	31844-021	31845-021	31846-021	31847-021
9"	31844-045	31845-045	31846-045	31847-045
12"	31844-069	31845-069	31846-069	31847-069
15"	31844-093	31845-093	31846-093	31847-093
18"	31844-117	31845-117	31846-117	31847-117

NOTE: WHEN ORDERING STATE BURNER MODEL MSR, SPEC #, PART DESCRIPTION, AIR TUBE COMBINATION, WHAT USABLE AIR TUBE LENGTH, (DIMENSION A), AND FIRING RATE

BURNER COMPONENTS MODEL MSR-DC



STATE BURNER MODEL, PART DESCRIPTION AND PART NUMBER WHEN ORDERING PARTS

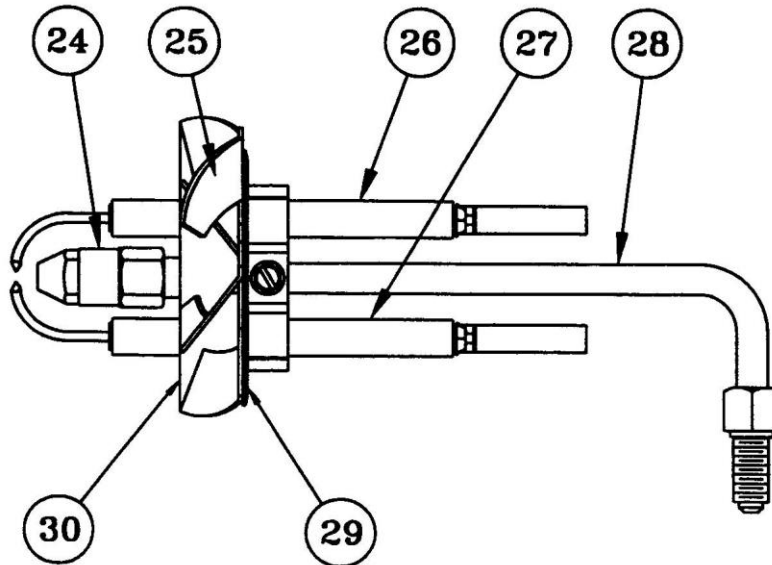
No.	Description	Part No.
1	Motor 1/8 Standard	21993-005
	Motor 1/8 Low Amp	21993-006
2	Motor Adapter	100761-001
3	Blower Wheel 3 1/2 x 4 1/4	21427
4	Burner Housing	See Note
5	Ignitor-12VDC	31812-003
6	Mounting Base	100730-001
7	Housing Cover	21723-002
8	Slot Cover Plate	13392
9	Inner Air Band	20601-002
10	Outer Air Band	20602-002
11	Coupling	101119-001
12	Oil Line Assembly 6"	14451
	Oil Line Assembly 8"	14452
13A	Fuel Unit: Suntec Combo	101128-005
13B	Fuel Unit: Suntec	13494
13C	Fuel Solenoid	100610-005
14	Elbow (use with 13A)	13494
15	Gun Assembly	See Note
16	Air Tube/Flange Assembly	See Note
17	Air Cone - #3A	14159
	Air Cone - #4A	14160

18	Gasket	12484
19	Connector (Use with 13B, 13C)	14222
20	CAD Cell	14289
21	Control Box	63355-001
22	Timer, Drop Out	100889-002
23	Cover, Control Box	62899

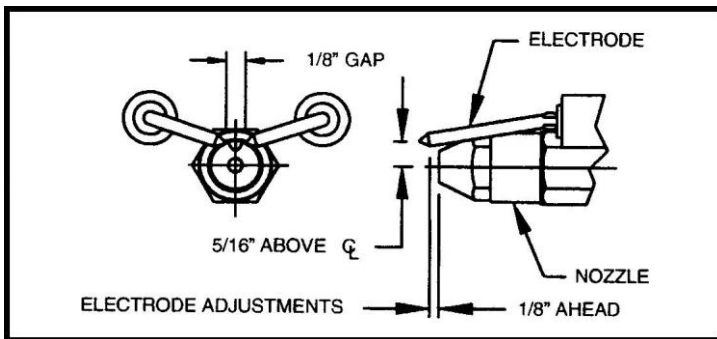
Suggested Combustion Chamber Dimensions Conversion or Upgrading Chamber Dimensions (in Inches)

Firing Rate (GHP)	Width	Length	Round	Height	Floor to Nozzle
0.85	8.5	8.5	8.5	8.5	8.5
1.00	9	9	10.125	12.5	5-6
1.25	10	10	11.25	12.5	5-6
1.35	10.5	10.5	11.75	12.75	5-6
1.50	11	11	12.375	13	5-6
1.65	11.5	11.5	13	13.25	5-6
2.00	12.625	12.625	14.25	13.75	6-7
2.50	14.25	14.25	16	14	7-8
3.00	15.5	15.5	17.5	15	7-8

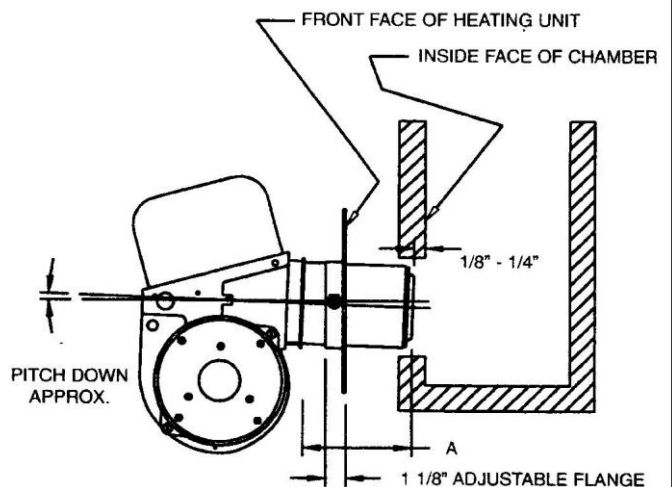
AIR TUBE & GUN ASSEMBLY DETAILS MODEL MSR-DC



NO.	DESCRIPTION	PART NO.
24	ADAPTOR, NOZZLE SUPPORT	21913-001
25	ELECTRODE SUPPORT ASM	SEE NOTE
26	ELECTRODE (RH)	SEE NOTE
27	ELECTRODE (LH)	SEE NOTE
28	OIL PIPE/FITTING	SEE NOTE
29	DISC/BAFFLE PLATE	SEE NOTE
30	CAST STABILIZER	21408-SER
	STAMPED STABILIZER	100704-001



TO DETERMINE THE AIR TUBE LENGTH



THE AIR TUBE LENGTH (DIM A) IS THE DISTANCE FROM THE FRONT OF AIR TUBE RETAINER FLANGE TO FACE OF AIR CONE. NOTE ADJUSTABLE FLANGE WIDTH.



LIMITED WARRANTIES FOR OIL AND GAS BURNERS, MADE BY WAYNE AND USED IN RESIDENTIAL INSTALLATIONS

WAYNE COMBUSTION SYSTEMS ("WAYNE") warrants to those who purchase its **Oil Burner Models** for resale or for incorporation into a product of resale, that its burner is free from defects in material and workmanship under normal use and service for thirty-six (36) months from the date of manufacture. **ALL GAS BURNERS** manufactured by "WAYNE" will be similarly warranted for eighteen(18) months from date of manufacture except where original manufacture offers a greater warranty. (Reference #6 below) **THESE LIMITED WARRANTIES DO NOT APPLY UNLESS THE BURNER COVERED BY IT IS PROPERLY INSTALLED BY A QUALIFIED, COMPETENT TECHNICIAN, WHO IS LICENSED WHERE STATE AND/OR LOCAL CODES PREVAIL, AND WHO IS EXPERIENCED IN MAKING SUCH INSTALLATIONS,** in accordance with NFPA #31 of the national fire protection association and in accordance with all local, state and national codes.

Any **IN-WARRANTY** burner component which is defective in material or workmanship will be either repaired or replaced as follows:

1. Fuel pumps, motors, transformers, gas valves, and controls should be returned to an authorized service station or distributor of WAYNE for determination of applicability of this LIMITED WARRANTY as to either repair or replacement, where said service station or distributor is reasonably available in the customer's locality. The manufacturers of burner components regularly publish and distribute listings showing the locations of their network of service stations. Where such local service is NOT available for the burner components described above or other burner parts are involved, these items should be returned, freight prepaid, to WAYNE Service Department, 801 Glasgow Ave, Fort Wayne, Indiana 46803.
2. Burners and/or component(s) determined to be covered under this LIMITED WARRANTY by WAYNE shall be repaired or replaced at WAYNE's sole option.
3. WAYNE is not responsible for any labor cost for the removal and replacement of said burner or burner components and equipment associated therewith.

4. A burner so repaired will then carry the LIMITED WARRANTY equal to the unexpired portion of the original burner LIMITED WARRANTY.
5. If inspection by WAYNE does **NOT** disclose any defect covered by this LIMITED WARRANTY, the burner or burner component(s) will be either repaired or replaced at the expense of the customer and WAYNE'S regular charges will apply.
6. If the original manufacturer of a burner component offers a warranty greater than either of our LIMITED WARRANTIES described above, then this portion will be added to our LIMITED WARRANTY.

This LIMITED WARRANTY does **NOT** cover products which have been damaged as the result of accident, abuse, misuse, neglect, improper installations, improper maintenance or failure to operate in accordance with WAYNE's written instructions.

These LIMITED WARRANTIES do not extend to anyone except the first purchaser at retail and only when the burner is in the original installation site.

IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE SHALL BE LIMITED TO THE DURATION OF THE LIMITED EXPRESS WARRANTIES CONTAINED HEREIN. WAYNE EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES OF ANY NATURE FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY.

Some states do not allow limitation on how long an implied warranty lasts, so the above limitation may not apply to you. Also, some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. WAYNE neither assumes or authorizes any person to assume for WAYNE any other liability or obligation in connection with the sale of these products. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Wayne Fuel Blend
CAUTION
COMBUSTIBLE LIQUID
Contains Kerosene



Vapor harmful. May cause respiratory tract irritation, central nervous system depression, skin and eye irritation. Avoid breathing vapor or contact with skin or eyes. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Aspiration hazard if swallowed, can enter lungs and cause damage. Keep away from extreme heat, sparks, open flame, and strongly oxidizing conditions.

INHALATION: If adversely affected by vapors, get to fresh air. If not breathing, give artificial respiration. If breathing is difficult, administer oxygen. Get medical attention.

SKIN CONTACT: Wash exposed skin with soap and water. Remove contaminated clothes/shoes and wash before reuse. If persistent irritation occurs, get medical attention.

EYE CONTACT: Immediately flush with plenty of water for at least 15 minutes, lifting upper and lower eyelids frequently. If irritation or burning persists, seek medical attention.

INGESTION: Do **NOT** induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention immediately.

If spilled, contain spilled material and remove with inert absorbent. Dispose of contaminated absorbent, empty containers, and unused contents in accordance with state, local, and federal regulations.

See MATERIAL SAFETY DATA SHEET For More Information.

R-65: Harmful: may cause lung damage if swallowed.

S-23: Do not breathe vapor.

S-24: Avoid contact with skin.

S-62: If swallowed, do **NOT** induce vomiting. Seek immediate medical attention.

Wayne Combustion Systems
801 Glasgow Avenue
Fort Wayne, Indiana 46803

NOTES

