

OHP30C AND OHP31C OIL BURNERS

I - INTRODUCTION

The oil burner provides an atomized oil vapor mixed with the correct proportion of air to the combustion chamber where it is ignited. Oil burners are rated at a minimum and maximum value as listed on the unit nameplate. An air control assembly allows proper air adjustment for these ratings.

The OHP burners were produced in several styles. Table 1 identifies the burners used in current OF7 and OS7 production.

TABLE 1

FURNACE	BURNER MODEL NO.
OF7-105-4	OHP30C-8
OF7-140-4	OHP31C-7
OS7-105-3	OHP30C-8
OS7-140-3	OHP31C-10

II - COMPONENTS

Figure 1 shows an exploded view of a typical OHP30C or OHP31C oil burner.

A - Burner Motor

The burner is powered by the primary control and is protected by a 15 amp fuse. A combination combustion air blower and pulley assembly mounts on motor shaft. A "V" belt connects this fan pulley to a pump pulley which is mounted on the oil pump shaft. The burner motor turns both the combustion air blower and the oil pump. The motor is 1/10 H.P. and runs at 3450 RPM.

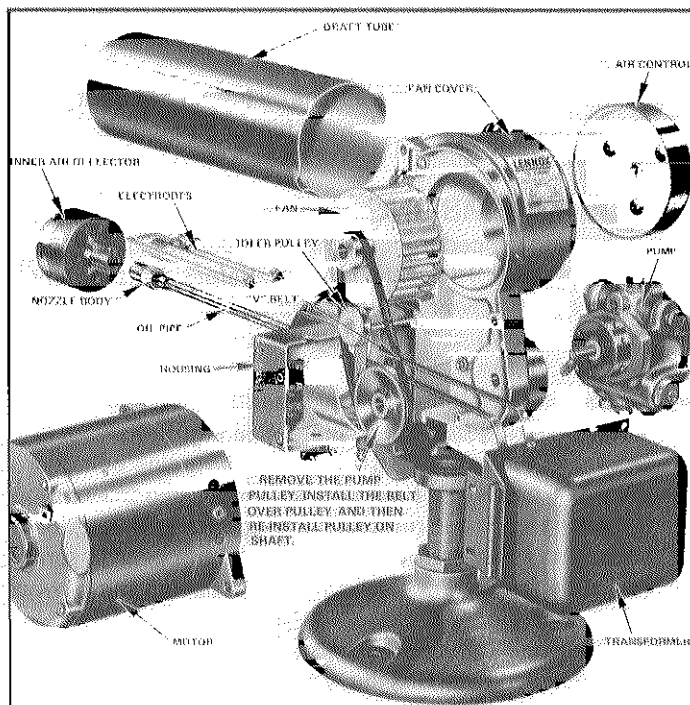


FIGURE 1

Burner motors are equipped with overload protection. In the event of excessive motor temperature or current, the overload opens to de-energize motor. The push button must be manually reset after motor temperature has dropped to normal. See Figure 2.

All burner motors are split phase with a centrifugal starting switch. Keep motor clean to prevent starting switch from sticking. If switch sticks open the motor will not run, and if it sticks closed the start windings will burn out. Do not over lubricate motor. Follow lubrication instructions on burner motor.

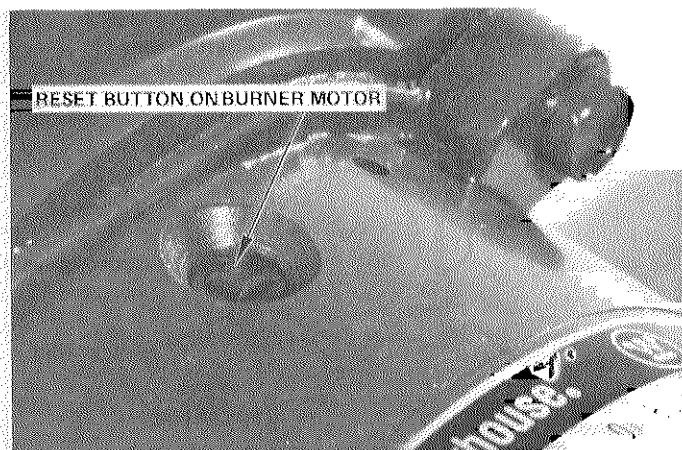


FIGURE 2

B - Oil Pump

Either a Sunstrand or Webster pump is used. Figure 3 identifies the ports for both models. As the oil burner is shipped from factory, it is set up for a single line system. To convert to a two line system, follow the instructions packaged in attached bag assembly.

1 - **Air Bleed** — On single line applications the oil line must be initially bled to prime the pump. Open air bleed port and start burner. A hose may be attached to direct oil into a container. Bleed pump for 15 seconds after last bubble is seen. Hurried bleeding will impair efficient unit operation. Close port to stop bleeding. Single line installations must be absolutely air tight or leaks or loss of prime may result.

On two line applications, air bleeding is automatic. Opening air bleed port allows a faster bleed if desired. The return line back to tank must run to within 3 inches of bottom. Failure to do this may introduce air into the system and could result in loss of prime.

2 - **Vacuum Check** — Insert vacuum gage in unused intake port. See Figure 4. Vacuum should not exceed 10" hg. vacuum or be less than 5" hg. vacuum.

3 - **Pressure Check** — Use the gauge port or nozzle port to check operating pressure. The pump is factory set at 100 psig but is adjustable. See Figure 3. Never exceed 110 psig operation.

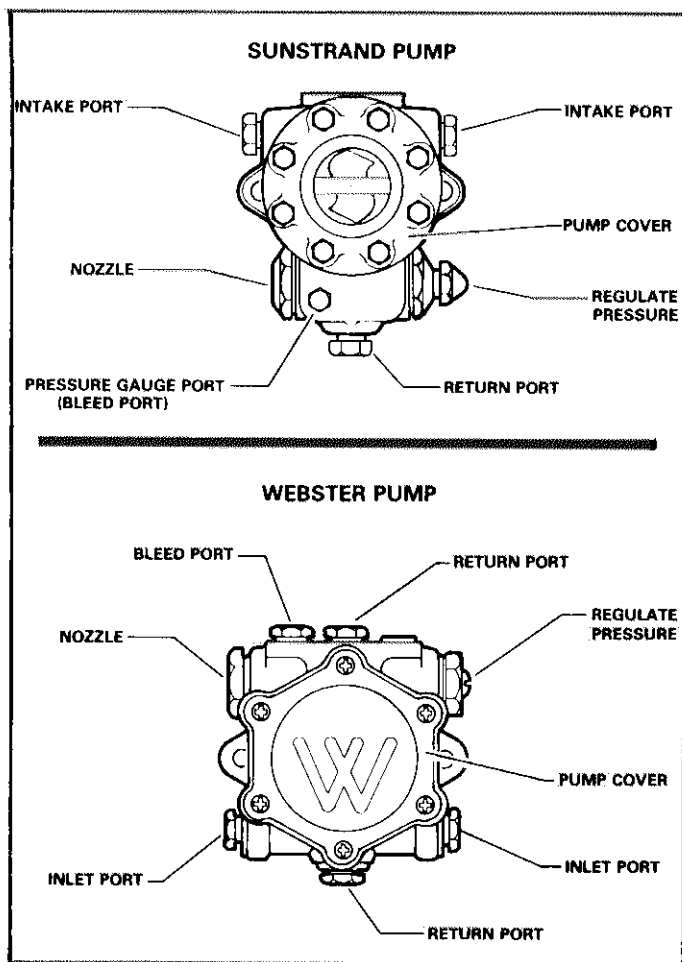


FIGURE 3

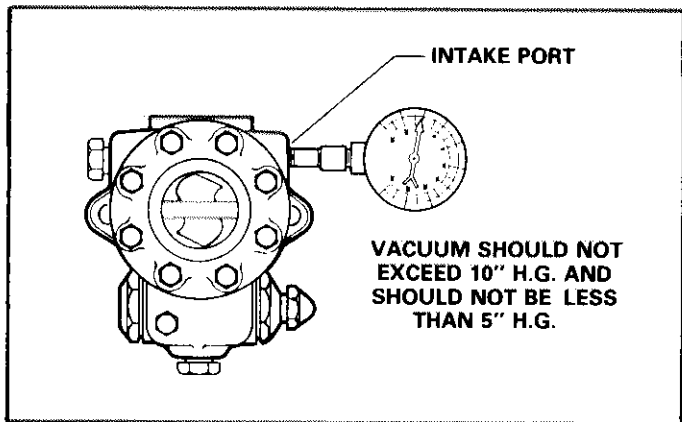


FIGURE 4

Average nozzle cutoff pressure is 80 psig. To check cutoff pressure, install pressure gauge in nozzle port. Run burner for a short period and then turn off. Gauge shows cutoff pressure. See Figure 5.

- 4 - **Strainer Access** — An internal strainer removes any sediment or foreign material from oil before it reaches pump. Remove screws securing pump cover for access. See Figure 3.

C - Ignition Transformer

The ignition transformer provides the needed hot spark at

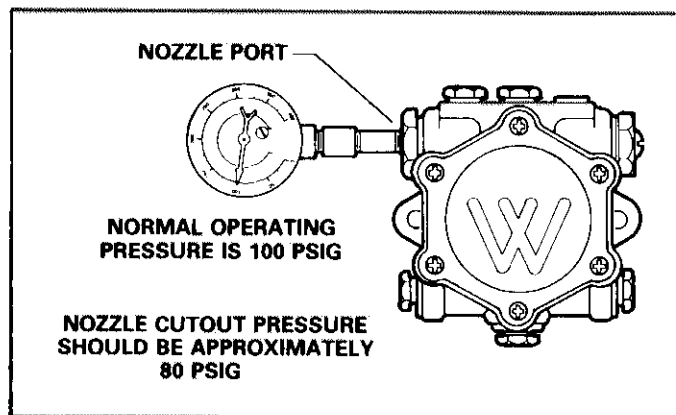


FIGURE 5

the electrodes to ignite the fuel mixture. The transformer has 120V primary and 10,000V secondary windings. The center of the secondary winding is grounded. Each secondary terminal is 5000V and the total voltage between the electrodes is 10,000V. The hinged transformer closes against a set of electrode buss bars.

The transformer is powered by the primary control and is protected by a 15 amp fuse.

D - Cad Cell

Together the cad cell and primary control prove the burner flame. The cad cell senses the presence of burner light to close a circuit to primary control. A White Rodgers style cad cell is used.

E - Gun Assembly

The gun assembly receives the oil from oil pump and feeds it to the nozzle. The nozzle converts liquid oil into a coned shape, fog like mist that is discharged into the combustion chamber. When combustion takes place, the flame will be cone shaped as a result.

F - Burner Fuse Box

Although not shown in Figure 1, the oil burner has a fuse box. A 15 amp fuse protects the burner motor and ignition transformer circuits.

III - DISASSEMBLING BURNER

The following procedure explains how to disassemble both the OHP30C and OHP31C oil burners. Before disassembling burner, turn off power and oil supply to unit.

- 1 - Loosen locking screw, swing latch up and transformer out. See Figure 6.
- 2 - For belt inspection and adjustment, remove mounting screw securing belt guard plate. See Figure 7.
- 3 - On OHP30C and OHP31C-7 burners, removing belt guard plate also exposes the cad cell. To remove cad cell, unplug the wiring leads and remove securing screw. See Figure 8.
- 4 - Loosen the two screws securing the fan cover (3 turns) and slide fan cover off to the right exposing the blower wheel. See Figure 9.
- 5 - Remove belt by slipping belt off the pump pulley and idler. Then disconnect motor wires from the terminal board (pull off). Remove motor screws, turn motor

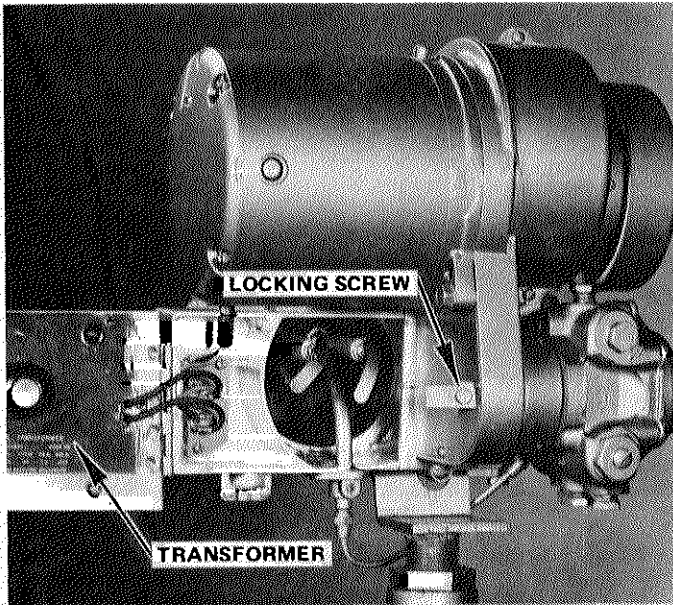


FIGURE 6

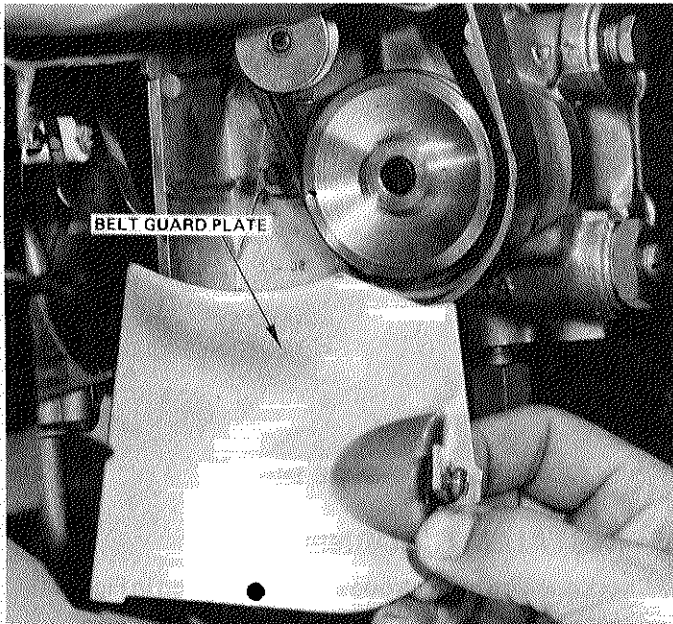


FIGURE 7

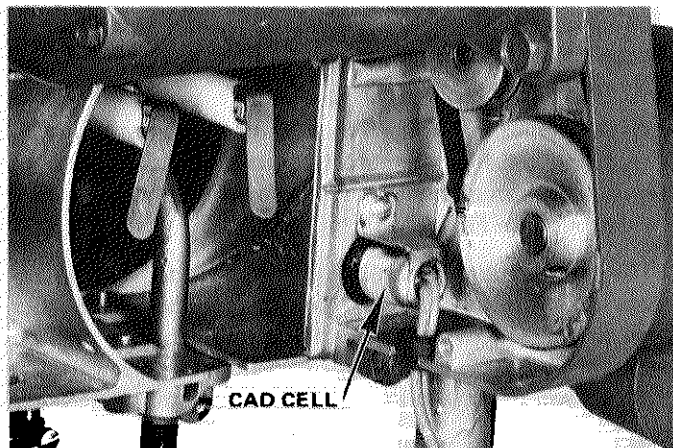


FIGURE 8

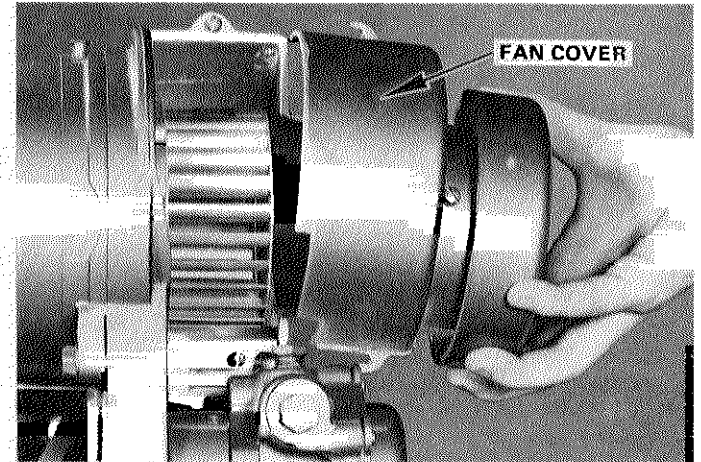


FIGURE 9

slightly to remove lead cord from groove to housing and remove motor. Belt will come out with motor and fan. Slip belt over fan blade and replace. When reinstalling new belt, hold belt down as shown in Figure 10 to keep from jamming between motor and housing.

CAUTION – Do not loosen or change position of oil pipe stop on OHP31C burners. If stop is loose, or its position changed, the burner must be removed from the furnace and positions of the air deflectors checked against the burner illustrations shown in Figures 18 and 19.

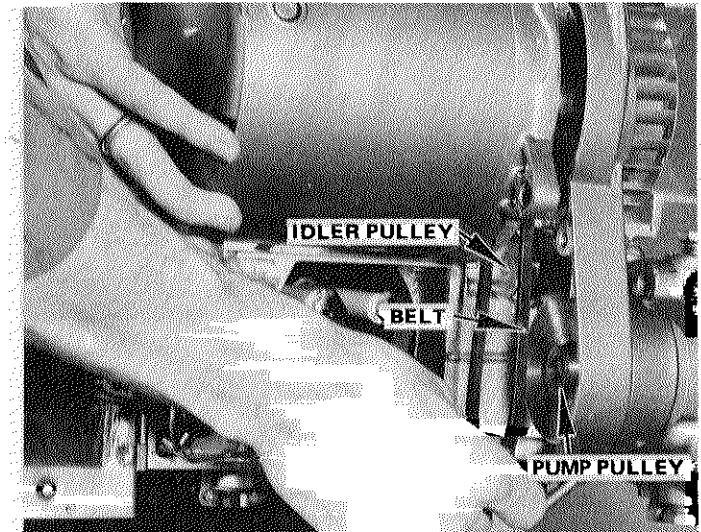


FIGURE 10

6 - To remove gun assembly, disconnect oil line from oil pipe. In addition on OHP30C burners, loosen and remove the long screw (A) on the oil pipe bearing. Then loosen screw (B) securing oil pipe bearing to the burner housing. See Figure 11. Remove cad cell leads from primary control. Remove gun assembly as shown in Figure 12. On OHP31-10 burners, remove cad cell from holder on oil pipe as shown in Figure 13.

7 - To remove the fuel pump loosen and remove the Allen set screw using a 1/8" Allen wrench that secures the fuel pump pulley. See Figure 14. Using a 1/8" Allen wrench, loosen the two Allen set screws on the fuel pump bracket. Remove fuel pump as shown in Figure 14.

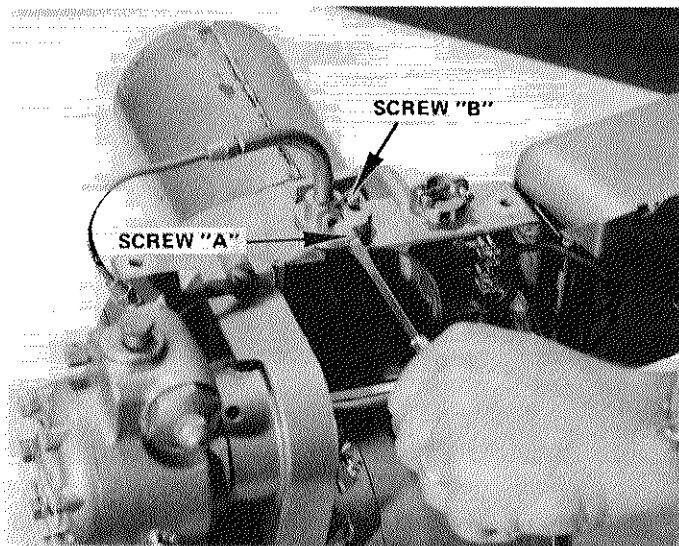


FIGURE 11

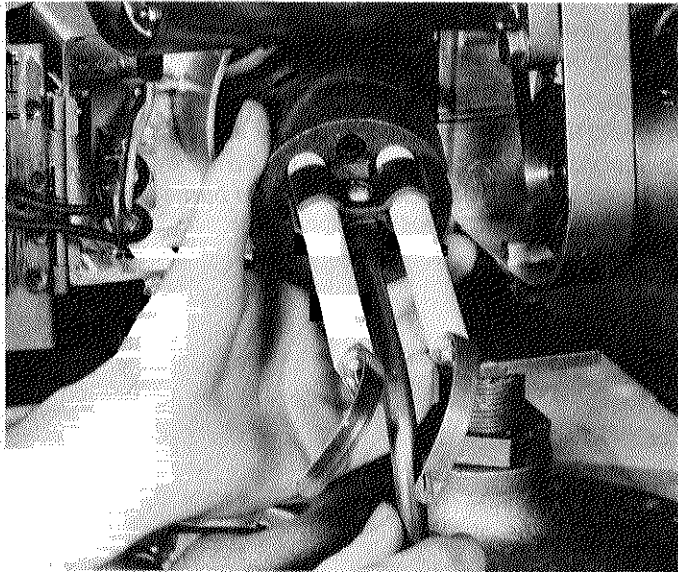


FIGURE 12

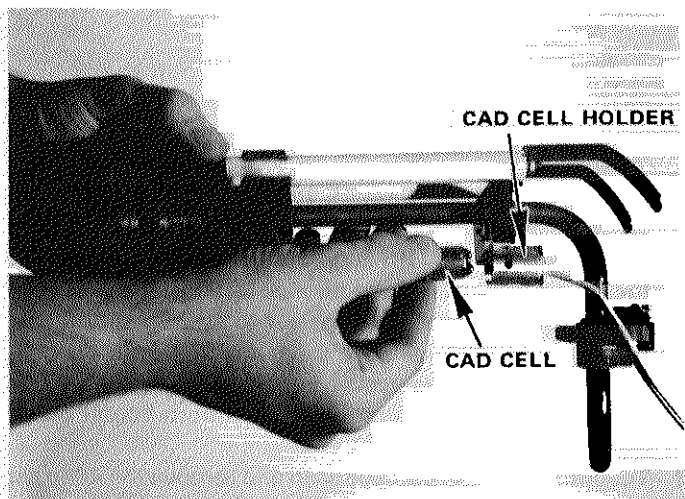


FIGURE 13

8 - To remove burner motor, use the same procedure outlined in step 5 and shown in Figure 10.

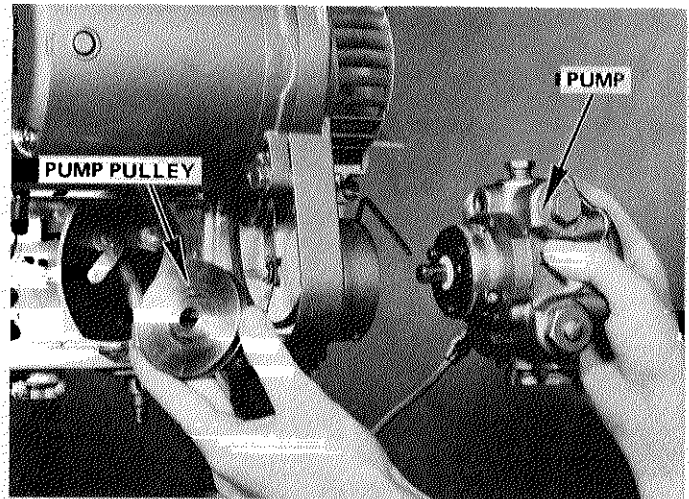


FIGURE 14

9 - To remove the burner tube, loosen the two securing bolts. Turn the tube and remove. See Figure 15.

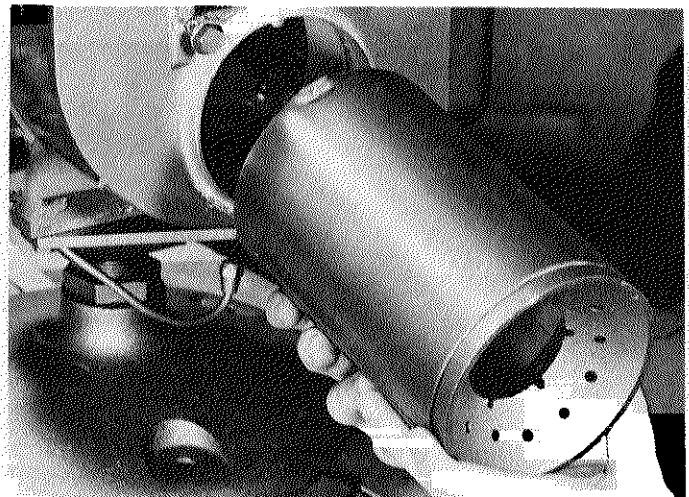
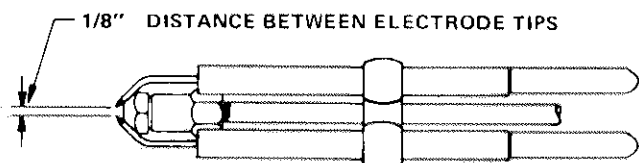


FIGURE 15

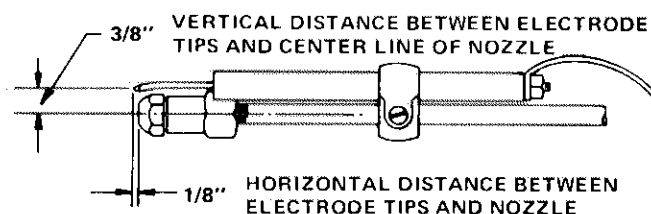
IV - INSTALLING BURNER

- 1 - Check position of electrode tips as illustrated in Figure 16.
- 2 - Check position of gun assembly and air deflectors in comparison to Figures 17, 18 & 19. Adjust the oil pipe bearing and oil pipe stop if necessary. On OHP30C burners, check that inner deflector is tight against and concentric to firing head.
- 3 - Install burner in furnace. To prevent damage to furnace receiving tube or damage to burner tube, the end of burner tube must be flush with the inside of combustion chamber. See Figure 20.
- 4 - The burner tube must slope one to two degrees downward toward the chamber. If necessary shim the burner up with washers at the cushion connectors to provide proper slope. Oil which may occasionally drip from the nozzle will drain into the combustion chamber.
- 5 - Be sure ground wire is installed between burner and burner mount.

ELECTRODE TIPS



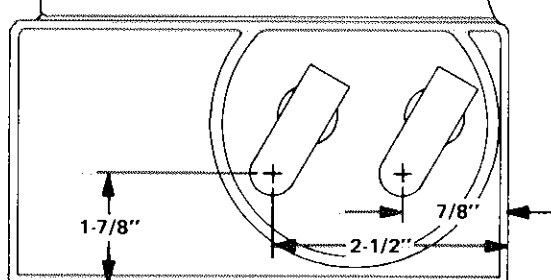
TOP VIEW



SIDE VIEW

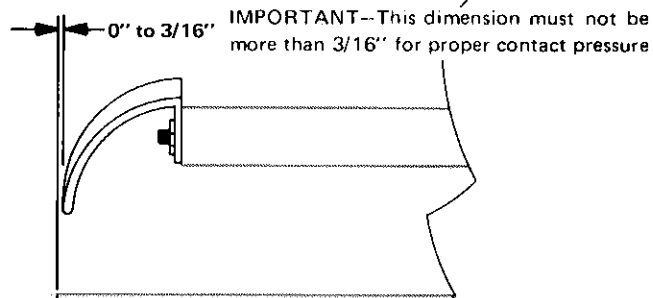
BUSS CONNECTIONS

NOTE—These dimensions are approximate since contact at any point on the transformer terminals will provide a good contact



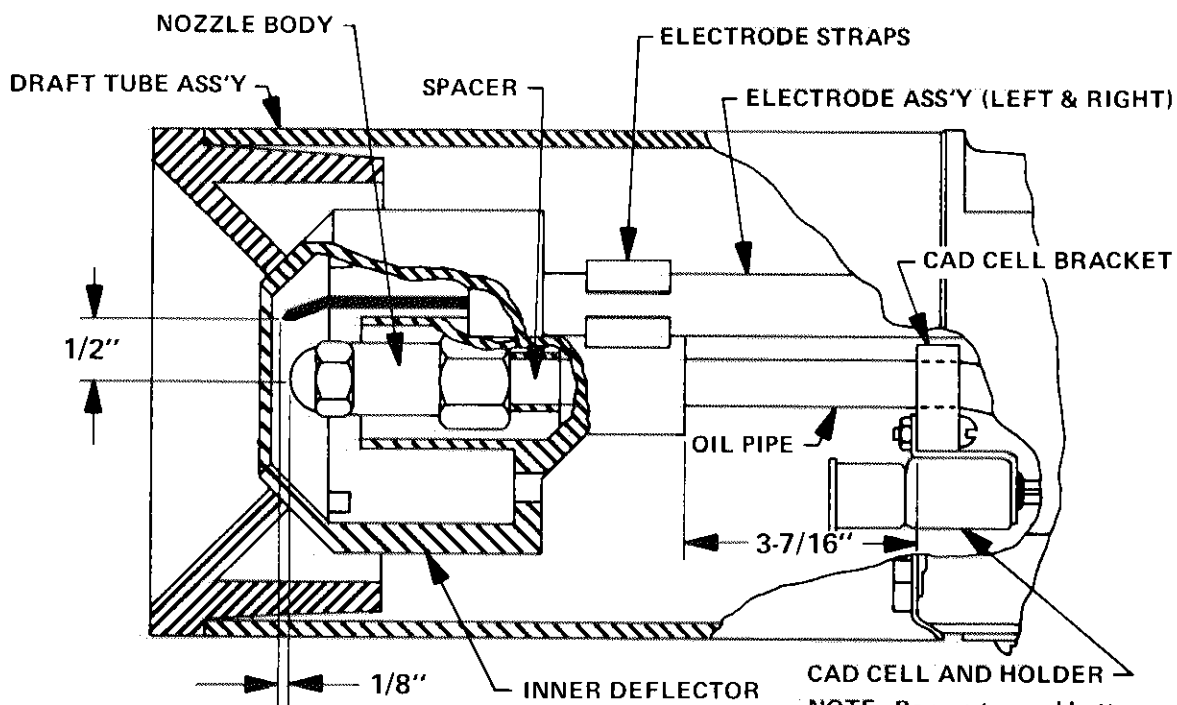
FRONT VIEW

BURNER TUBE



SIDE VIEW

FIGURE 16



OHP30C-8

FIGURE 17

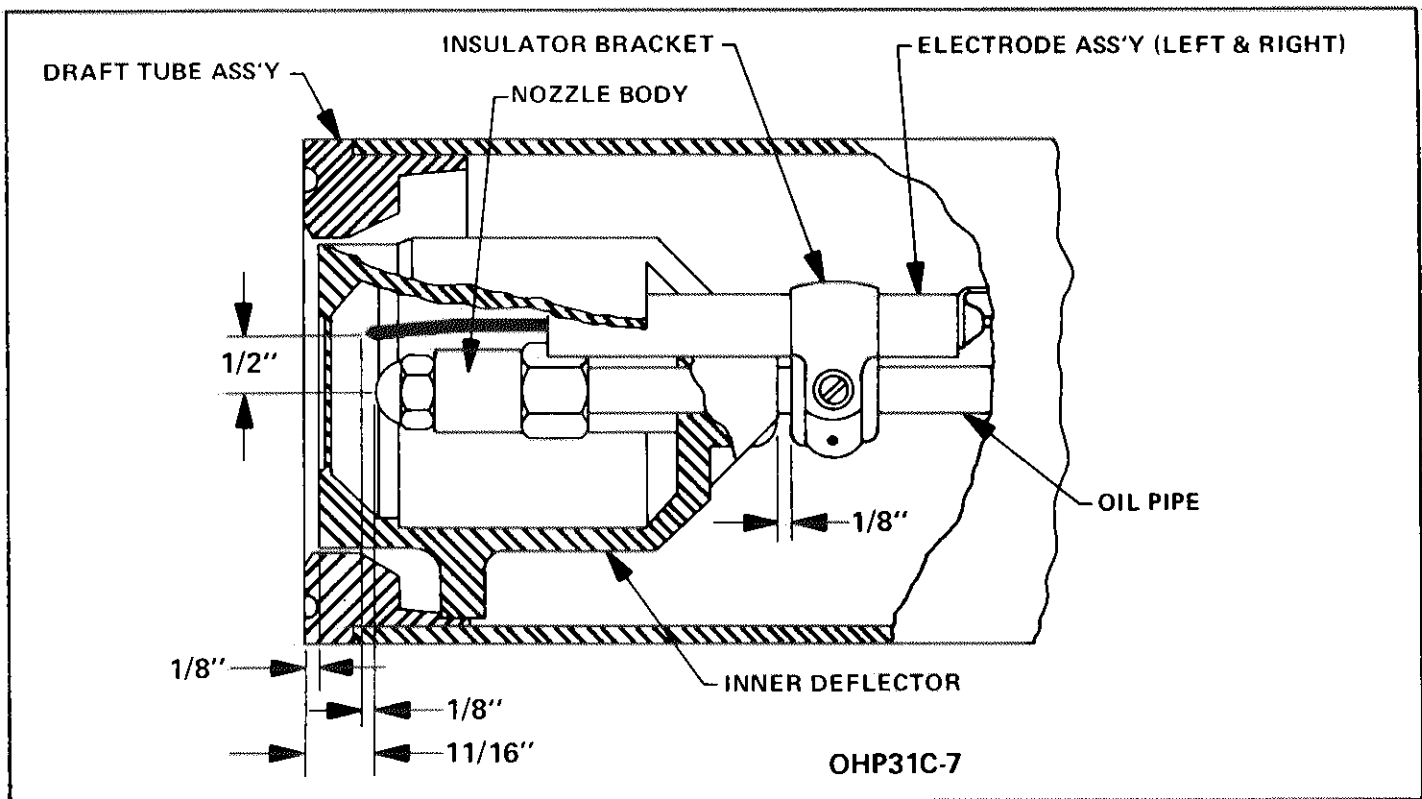


FIGURE 18

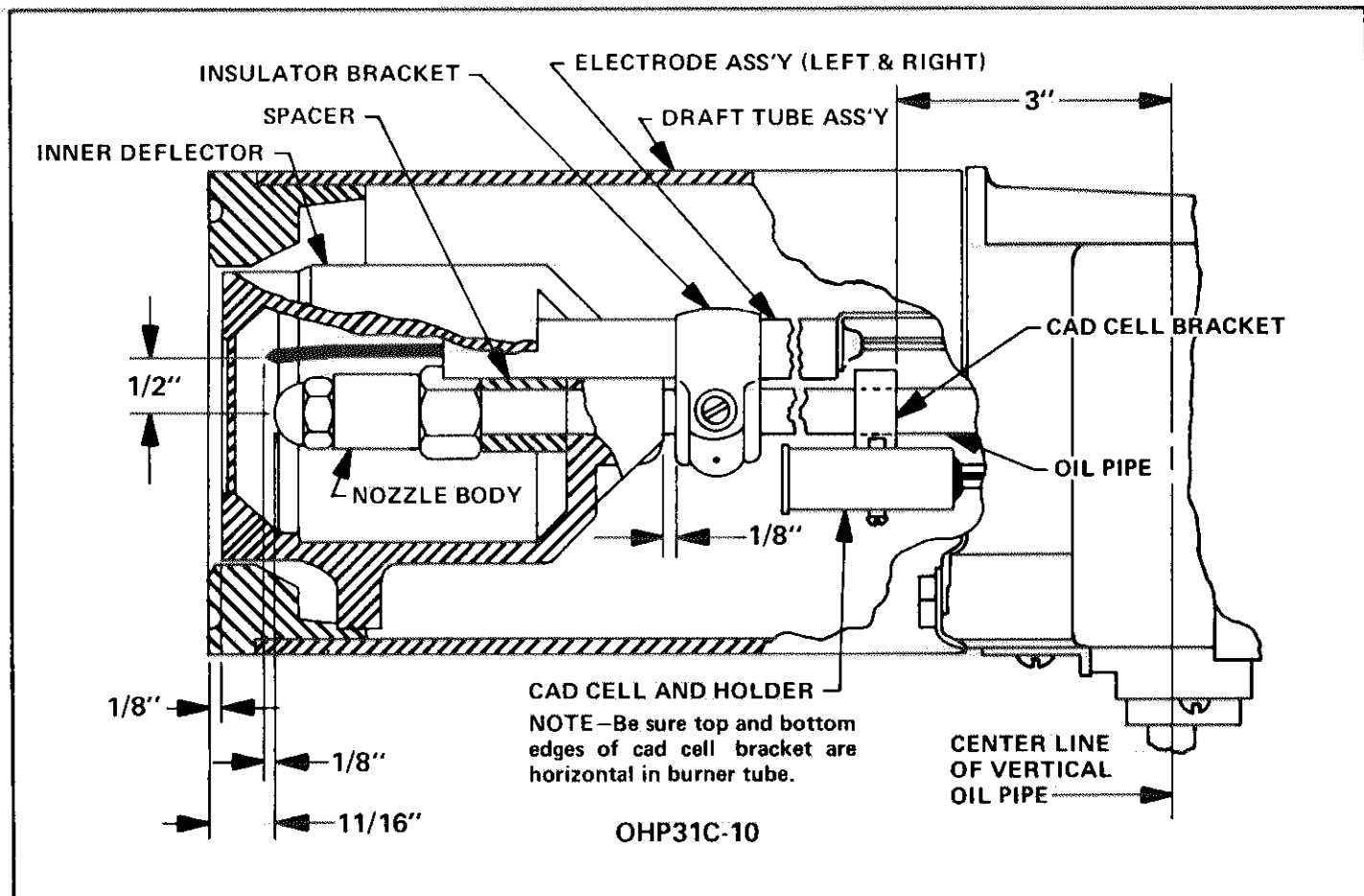


FIGURE 19

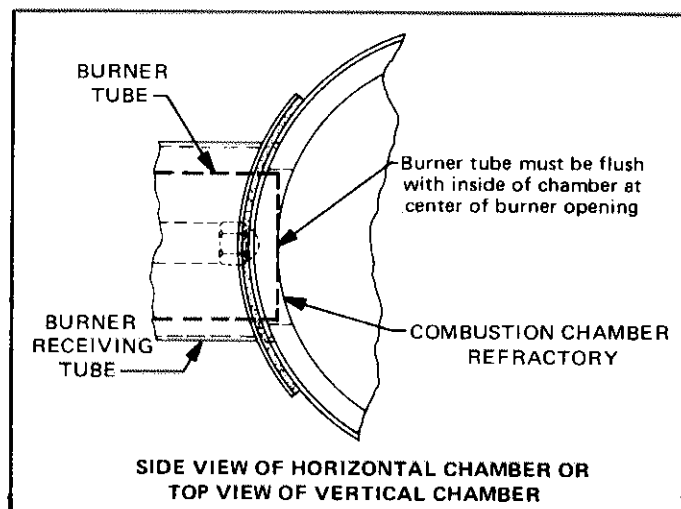


FIGURE 20

V - BURNER ADJUSTMENTS

To properly set the burner, a CO₂ analyzer and smoke gun must be used. It must not be set by eye or estimation. Unless instruments are used, the tendency is to set the burner at too high of CO₂ and smoke which can result in a noisy fire and carbon buildup in the heat exchanger. A proper setting with instruments will result in quiet and clean fire at 8 to 10 percent CO₂ with zero to a trace of smoke.

Before making final burner adjustment, allow burner to operate continuously for five to ten minutes. This will purge the fuel lines and level out combustion. Take readings and make adjustments as follows:

- 1 - Make sure inspection door is closed tightly and any fitting joints between furnace and point where the CO₂ and smoke readings are taken are tightly sealed or taped. An air leak at the inspection door or fitting will cause false CO₂ readings because of diluting the flue gases with air.
- 2 - Punch a 5/16 diameter service hole in flue outlet between the furnace and the draft control. Draft readings, CO₂ and smoke test should be taken from this point.
- 3 - Adjust the barometric draft control (See Figure 21) in the stack for correct draft. Draft should be measured with a draft gauge at service hole in stack and set for .03" to .035" w.c. draft. See Figure 22.



FIGURE 21



FIGURE 22

- 4 - Loosen Air Control locking screw and rotate the air control cover until the fire appears clean. Refer to Figure 23.

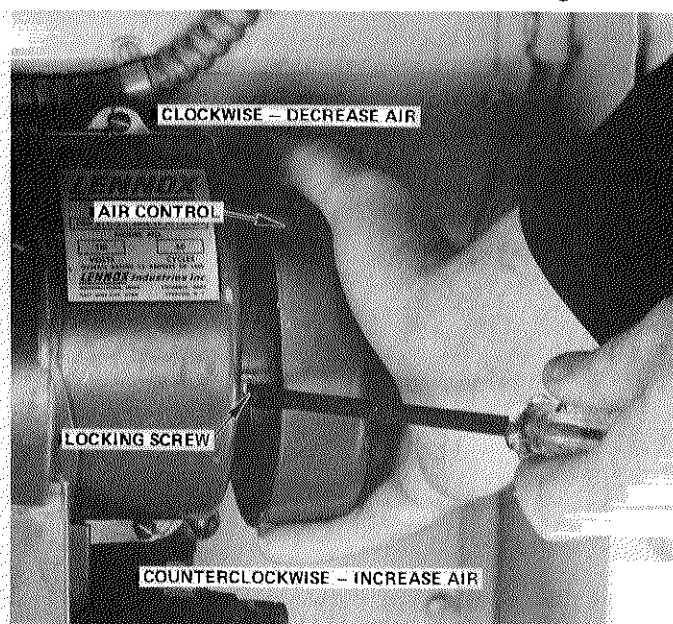


FIGURE 23

- 5 - Take a CO₂ reading at the service opening in stack using a Fyrite CO₂ indicator or other standard CO₂ analyzers. Refer to Figure 24. Instructions for operating the analyzer are packed with it and should be carefully followed. If the CO₂ reading is between 8 to 10 percent, the setting is correct. If not, rotate the air control cover and recheck until CO₂ readings fall within the 8 to 10 percent range. Tighten the air control locking screw.
- 6 - Take a smoke reading in the same sampling hole used for the CO₂ reading. Refer to Figure 25. Use a standard smoke tester such as the Bacharach true spot tester. The smoke reading at 8 to 10 percent CO₂ will generally be a zero to No. 1 spot. In no case should the smoke reading be

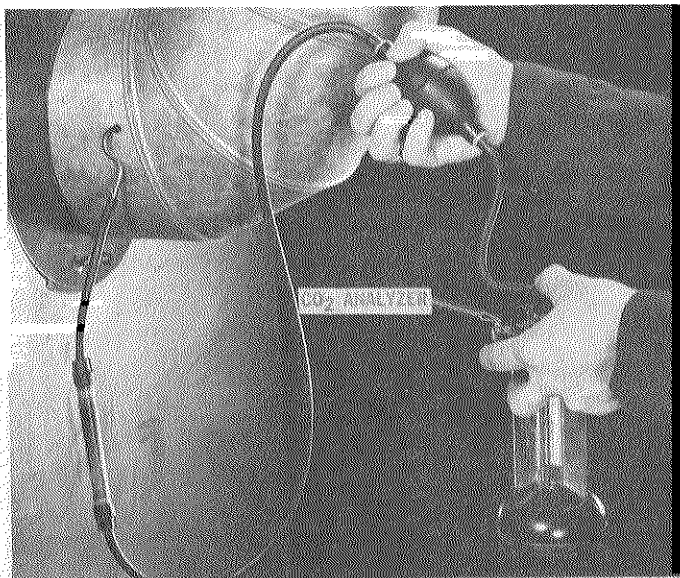


FIGURE 24

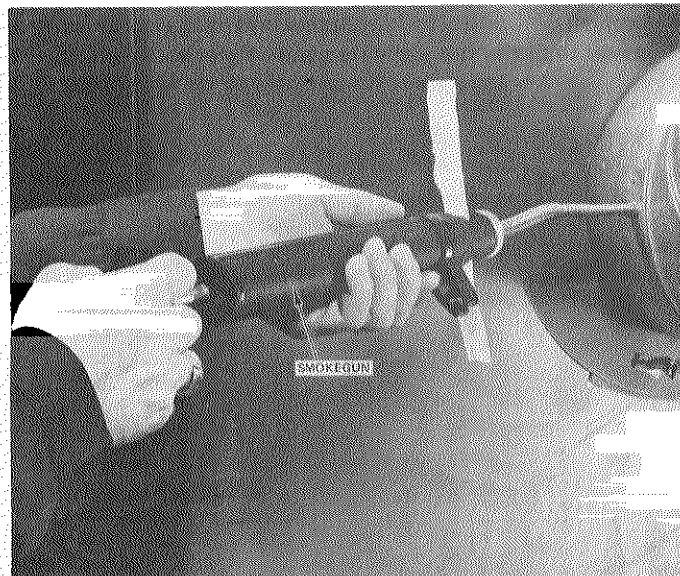


FIGURE 25

more than a No. 1 spot. If the smoke is more than No. 1 spot, it could be caused by a poor nozzle or leakage at the inspection door or fitting. Occasionally it may be caused by a difference in oil or some unusual condition of the installation. Rotate the combustion air control cover until a No. 1 or less spot is obtained, then recheck the CO₂ to make sure it is 8 percent or more. If the CO₂ is less than 8 percent, look for air leakage or a bad nozzle or improper settings of the burner gun assembly. Air leakage can often be determined by taking a CO₂ reading at both the stack and over the fire.

If the stack CO₂ is more than 1/2 percent below the over-fire CO₂ reading, it is an indication of access air leakage. Such air leakage will lower furnace efficiency and should be found and corrected.

VI - SERVICING BURNER

- 1 - As a routine performance check, check the fuel line filter and oil pump strainer. Remove the pump cover and clean the strainer using a brush and clean fuel oil or kerosene. Replace or clean the cartridge in the line filter if necessary.
- 2 - Check for abnormally high intake vacuum. Also check operating pressure and nozzle cutout pressure. Normal operating pressure should be 100 psig and must never exceed 110 psig.
- 3 - Fire burner and check test readings according to "Burner Adjustments." Also observe fire. This check may reveal a plugged or bad nozzle, poor ignition because of bad or improperly set electrodes, pump whine, etc. Note these items for special attention while servicing burner.
- 4 - Turn off power and oil supplies to unit. Remove gun assembly.
- 5 - Remove cad cell and check surface of cell for an accumulation of dust or soot. If cell is dirty, clean carefully with a soft cloth, then resecure in place. See Figure 26.

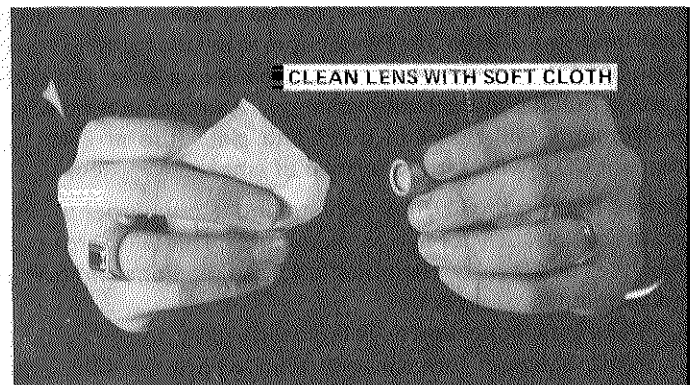


FIGURE 26

- 6 - Clean gun assembly being extremely careful not to wipe dirt or line into nozzle orifice. Clean electrode insulators and make sure buss bars on end of electrodes make good contact with ignition transformer terminals. Check electrode setting as shown in Figure 16. Refer to Figures 17, 18 & 19 for proper nozzle dimensions.
- 7 - Wipe inside of draft tube. Inspect nose casting by shining flashlight down the burner tube. Clean any carbon formation from holes or slots with brush or length of wire.
- 8 - Clean blower wheel. Lint or dirt on blades cut down the efficiency of the blower.
- 9 - Inspect belt and wipe belt and pulleys clean. If belt is worn or frayed replace it with a Lennox DV-1049 V-belt.
Check the belt pulley and idler alignment. Make sure idler is engaged with belt and riding on inside of belt.
- 10 - Check electrical wiring for damage to insulation and proper routing.
- 11 - Inspect combustion chamber carefully. If cracks are noticeable, replacement combustion chamber kits are available.
- 12 - Inspect heat exchanger for soot and clean if necessary.
- 13 - Reassemble burner and return unit into working condition.

VII - TROUBLESHOOTING

If burner fails to start, push reset button on primary control. See Figure 27. Also push the burner motor reset button. Check 15 amp fuse in burner fuse box.

Burner failure or improper unit operation can be caused by various problems. Often the problem can be pin-pointed by observing the type of failure and giving some thought before attacking the problem. Other times the cause can only be determined by a process of elimination. Table 2 lists specific oil pump troubleshooting procedures while Table 3 lists general oil burner procedures. Check the simplest and more obvious items before progressing to the other checks.

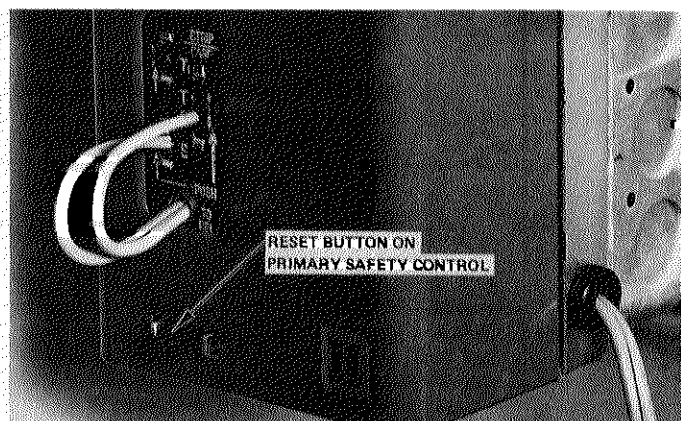


FIGURE 27

TABLE 1

OIL PUMP TROUBLESHOOTING		
CONDITION	CAUSE	REMEDY
NO OIL FLOW AT NOZZLE	Oil level below intake line in supply tank	Fill tank with oil.
	Clogged strainer or filter	Remove and clean strainer. Replace filter element.
	Clogged nozzle	Replace nozzle.
	Air leak in intake line	Tighten all fittings in intake line. Tighten unused intake port plug. Check filter cover and gasket.
	Restricted intake line (High vacuum reading)	Replace any kinked tubing and check any valves in intake line.
	A two-pipe system that becomes air bound	Check for and insert by-pass plug. Make sure return line is below oil level in tank.
	A single-pipe system that becomes airbound	Loosen gage port plug or easy flow valve and bleed oil for 15 seconds after foam is gone in bleed hose. Check intake line fittings for tightness. Check all pump plugs for tightness.
	Slipping or broken coupling	Tighten or replace coupling.
OIL LEAK	Frozen pump shaft	Replace pump.
	Loose plugs or fittings	Dope with good quality thread sealer. Retighten.
	Leak at pressure adj. screw or nozzle plug	Washer may be damaged. Replace the washer or O-Ring.
	Blown seal (single-pipe system)	Check to see if by-pass plug has been left in unit. Replace oil pump.
	Blown seal (two-pipe system)	Check for kinked tubing or other obstructions in return line. Replace oil pump.
	Seal leaking	Replace oil pump.
NOISY OPERATION	Cover	Tighten cover screws or replace damaged gasket.
	Bad coupling alignment	Loosen fuel unit mounting screws slightly and shift fuel unit in different positions until noise is eliminated. Retighten mounting screws.
	Air in inlet line	Check all connections. Use only good flare fittings.
	Tank hum on two-pipe system and inside tank	Install return line hum eliminator in return line.
PULSATING PRESSURE	Partially clogged strainer or filter	Remove and clean strainer. Replace filter element.
	Air leak in intake line	Tighten all fittings.
	Air leaking around cover	Be sure strainer cover screws are tightened securely. Check for damaged cover gasket.
IMPROPER NOZZLE CUT-OFF	To determine the cause of improper cut-off, insert a pressure gage in the nozzle port of the fuel unit. After a minute of operation shut burner down. If the pressure drops from normal operating pressure and stabilizes, the fuel unit is operating properly and air is the cause of improper cut-off. If, however, the pressure drops below 80 psid, oil pump should be replaced.	
	Filter leaks	Check face of cover and gasket for damage.
	Strainer cover loose	Tighten 4 screws on cover.
	Air pocket between cut-off valve and nozzle	Run burner, stopping and starting unit, until smoke and after-fire disappears.
	Air leak in intake line	Tighten intake fittings. Tighten unused intake port and return plug.
	Partially clogged nozzle strainer	Clean strainer or change nozzle.
	Leak at nozzle adaptor	Change nozzle and adaptor.

TABLE 2

TROUBLE	SOURCE	PROCEDURE	CAUSES	CORRECTION
BURNER FAILS TO START	Thermostat	Check thermostat settings	Thermostat in "Off" or "Cool"	Switch to "Heat"
			Thermostat set too low	Turn thermostat to higher temp.
	Safety Overload	Check burner motor and furnace primary control safety switches	Burner motor overload tripped	Push motor overload reset button
			Primary control tripped on safety	Reset safety switch lever
	Power	Check furnace disconnect switch and main disconnect switch	Switch open	Close switch
			Blown fuse or tripped breaker	Replace fuse or reset breaker
	Thermostat	Touch jumper wire across thermostat terminals on primary control. If burner starts then fault is in thermostat circuit	Broken or loose thermostat wires	Repair or replace wires
			Loose thermostat screw connection	Tighten connection
			Dirty thermostat contacts	Clean contacts
			Thermostat not level	Level thermostat
			Faulty thermostat	Replace thermostat
	Flame Detector (Cad Cell)	Disconnect flame detector wires at primary control. If burner starts fault is in detector circuit	Flame detector leads shorted	Separate leads
			Flame detector exposed to light	Seal off false source of light
			Short circuit in flame detector	Replace detector
	Flame Detector (Stack Control)	Place control in step. If burner does not start, jumper across cold contact terminals. If burner starts the problem is in bi-metal actuated contacts	Cold contacts dirty	Clean contacts
			Bi-metal carboned	Clean bi-metal
			Loose connection or broken wire	Tighten connection or replace wire
			Friction clutch faulty	Replace element or control
			Hot contacts welded	
	Primary Control	Place a 120V trouble light between the black and white leads. No light indicates no power to the control	Limit control switch open	Check dial adjustment (set at 200°F)
			Open circuit between disconnect switch and limit control	Jumper terminals. If burner starts switch is faulty. Replace control
			Low line voltage or power failure	Trace wiring and repair or replace
	Cad Cell	Place a 120V trouble light between orange and white leads. No light indicates control faulty	Defective internal control circuit	Call power company
	Stack	Place a 120V trouble light across burner terminals of primary control. No light indicates control faulty	Dirty burner relay contacts	Replace control
			Defective internal control circuit	Clean contacts
	Burner	Place a 120V trouble light between the black and white leads to burner motor. Light indicates power to motor and a burner fault	Binding burner blower wheel	Turn off power and rotate blower wheel by hand. If seized free wheel from binding or replace fuel pump
			Seized fuel pump	Replace motor
			Defective burner motor	
BURNER STARTS BUT NO FLAME IS ESTABLISHED	Oil Supply	Check tank gauge or use dip stick	No oil in tank	Fill tank
		Coat dip stick with litmus paste and insert to bottom of tank	Water in oil tank	If water depth exceeds 1" pump out water or drain out
		Listen for pump whine	Tank shut-off valve closed	Open valve
	Oil Filter and Oil Line	Listen for pump whine	Oil line filter plugged	Replace filter cartridge
			Kinks or restriction in oil line	Repair or replace oil line
			Plugged fuel pump strainer	Clean strainer or replace pump
		Open bleed valve or gauge port. Start burner. No oil or milky oil indicates loss of prime	Air leak in oil supply line	Locate and correct leak
				Tighten all connections
	Combustion	Check combustion air and draft	Excessive combustion air	Reduce air
			Excessive draft	Reduce draft to .03"-.035" w.c.
	Oil Pump	Install pressure gauge on pump and read pressure. Should be 100 psig.	Pump partially or completely frozen -No pressure and motor locks out on overload	Replace pump
			Belt or coupling disengaged or broken—No pressure	Reengage or replace belt or coupling
			Fuel pressure too low	Adjust pressure to 100 psig.
	Nozzle	Disconnect ignition leads. Observe oil spray (gun assembly must be removed from unit). Inspect nozzle for plugged orifice or carbon build-up around orifice	Nozzle orifice plugged	Replace nozzle with same size, spray angle and spray type
			Nozzle strainer plugged	
			Poor or off center spray	

TABLE 2 CONTINUED

TROUBLE	SOURCE	PROCEDURE		CAUSES	CORRECTION
CONTINUED BURNER STARTS BUT NO FLAME IS ESTABLISHED	Ignition Electrodes	Remove gun assembly and inspect electrodes and leads		Fouled or shorted electrodes	Clean electrodes and leads
				Dirty electrodes and leads	
				Eroded electrode tips	
				Improper electrode gap spacing	Dress up electrode tips and reset gap to 1/8" and correctly position tips
				Improper position of electrode tips	
				Loose or disconnected leads	Reconnect, tighten or replace leads
				Cracked or chipped insulators	Replace electrodes
				Cracked or burned lead insulators	Replace electrode leads
	Ignition Transformer	Connect ignition leads to transformer. Start burner and observe spark. Check line voltage to transformer primary		Low line voltage: less than 105V to transformer primary	Check voltage at power source. Correct cause of voltage drop or call power company
				Burned out transformer windings	Replace transformer
				No spark or weak spark	Properly ground transformer case
Burner Motor	Motor does not come up to speed and trips out on overload. Turn off power and rotate blower wheel by hand to check for binding or excessive drag		Low line voltage: less than 105V to motor leads	Check voltage at power source. Correct cause of voltage drop or call power company	
			Pump or blower overloading motor	Correct cause of overloading	
			Faulty motor	Replace motor	
BURNER STARTS AND FIRES BUT THEN LOCKS OUT ON SAFETY	Poor Fire	After burner fires	If burner continues to run. Fault may be due to poor fire. Inspect fire	Unbalanced fire	Replace nozzle
				Too much air - lean short fire	Reduce combustion air
				Too little air - long dirty fire	Check combustion
				Excessive draft	Increase combustion air-- Check combustion
				Too little draft or restriction	Adjust barometric damper for correct draft
	Flame Detector (Cad Cell)	immediately jumper across flame detector terminals at primary control	If fire is good fault is in flame detector. Check detector circuit	Dirty cad cell face	Correct draft or remove restriction
				Faulty cad cell - exceeds 1500 Ohms	Clean cad cell face
				Loose or defective cad cell wires	Replace cad cell
	Flame Detector (Stack Control)			Dirty bi-metal element	Secure connections or replace cad cell holder and wire leads
				Air leaks into flue pipe or around detector mount	Clean bi-metal element
				Faulty friction clutch	Seal air leaks
				Welded or shorted cold contacts	Replace control
	Primary Control		If burner locks out on safety fault is in primary control	Primary control circuit defective	Replace primary control
	BURNER STARTS, FIRES BUT THEN LOOSES FLAME AND LOCKS OUT ON SAFETY	Poor Fire	After burner fires	If burner continues to run (does not lock out on safety). Fault may be due to poor fire (marginal). Inspect fire	Unbalanced fire
Too much air - lean short fire					Reduce combustion air
Too little air--long dirty fire					Check combustion
Excessive draft					Increase combustion air Check combustion
Too little draft or restriction					Adjust barometric damper for correct draft
Flame Detector (Cad Cell)		immediately jumper across flame detector terminals at primary control	If fire is good fault is in flame detector. Check detector circuit	Dirty cad cell face	Correct draft or remove restriction
				Faulty cad cell-- exceeds 1500 Ohms	Clean cad cell face
				Loose or defective cad cell wires	Replace cad cell
Flame Detector (Stack Control)				Secure connections or replace cad cell holder and wire leads	Secure connections or replace cad cell holder and wire leads
				Dirty bi-metal element	Clean bi-metal element
				Air leaks into flue pipe or around detector mount	Seal air leaks
				Faulty friction clutch	Replace control
				Welded or shorted cold contacts	

TABLE 2 CONTINUED

TROUBLE	SOURCE	PROCEDURE		CAUSE	CORRECTION
CONTINUED BURNER STARTS, FIRES BUT LOOSES FLAME AND LOCKS OUT ON SAFETY	Oil Supply	After burner fires immediately jumper across flame detector terminals at primary control	If burner loses flame (does not lock out on safety). Fault is in fuel system	Pump loses prime- air slug	Prime pump at bleed port
				Pump loses prime- air leak in supply line	Check supply line for loose connection and tighten fitting
				Water slug in line	Check oil tank for water (over 1") pump out water or drain out
				Partially plugged nozzle or nozzle strainer	Replace nozzle
		Listen for pump whine		Restriction in oil line	Clear restriction
				Plugged fuel pump strainer	Clean strainer or replace pump
				Cold oil outdoor tank	Change to number 1 oil
BURNER STARTS AND FIRES BUT SHORT CYCLES	Thermostat	Check thermostat		Heat anticipator set too low	Correct heat anticipator setting
				Vibration at thermostat	Correct source of vibration
				Thermostat in warm air draft	Shield thermostat from draft or relocate
	Limit Control	Connect voltmeter between line voltage connections to primary control (black and white leads). If burner cycles due to power interruption it is cycling off limit		Dirty air filter (furnace)	Replace or clean filters
				Blower running too slow (furnace)	Speed up blower for 85° to 95°F temperature rise
				Restrictions in return air or supply air system (furnace)	Correct cause of restriction
				Adjustable limit control set too low	Reset limit control to 200°F
	Power	If voltage is less than 105V or fluctuates then fault is in power source. Recheck voltage at power source		Loose wiring connection	Locate and secure connection
			Low or fluctuating line voltage	Call power company	
BURNER STARTS AND FIRES BUT SHORT CYCLES (TOO LITTLE HEAT)	Thermostat	Check thermostat		Heat anticipator set too low	Correct heat anticipator setting
				Vibration at thermostat	Correct source of vibration
				Thermostat in warm air draft	Shield thermostat from draft or relocate thermostat
	Limit Control	Connect voltmeter between line voltage connections to primary control (black and white leads). If burner cycles due to power interruption it is cycling off limit		Dirty air filter (furnace)	Clean or replace filters
				Blower running too slow	Speed up blower for 85° to 95°F temperature rise
				Blower motor seized or burned out	Replace motor
				Blower bearings seized	Replace bearings and shaft
				Blower wheel dirty	Clean blower wheel
				Blower wheel in backwards	Reverse blower wheel
				Wrong motor rotation	Replace with motor of correct rotation
				Restrictions in return air or supply air system	Correct cause of restriction
				Adjustable limit control set too low	Reset limit control to 200°F
	Power	If voltage is less than 105V or fluctuates then fault is in power source. Recheck voltage at power source		Loose wiring connection	Locate and secure connection
				Low or fluctuating line voltage	Call power company
BURNER RUNS CONTINUOUSLY (TOO MUCH HEAT)	Thermostat	Disconnect thermostat wires at primary control	If burner turns off fault is in thermostat circuit	Shorted or welded thermostat contacts	Repair or replace thermostat
				Stuck thermostat bi-metal	Clear obstruction or replace thermostat
				Thermostat not level	Level thermostat
				Shorted thermostat wires	Repair short or replace wires
				Thermostat out of calibration	Replace thermostat
				Thermostat in cold draft	Correct cause of draft or relocate thermostat
	Primary Control		If burner does not turn off fault is in primary control	Defective primary control	Replace primary control

TABLE 2 CONTINUED

TROUBLE	SOURCE	PROCEDURE		CAUSE	CORRECTION
BURNER RUNS CONTINUOUSLY (TO LITTLE HEAT)	Combustion	Check burner combustion for CO ₂ , stack temperature and smoke	Low CO ₂ less than 8%	Too much combustion air	Reduce combustion air
				Air leaks into heat exchanger around inspection door, etc.	Correct cause of air leak
				Excessive draft	Adjust barometric damper for correct draft
				Incorrect burner head adjustment	Correct burner head setting
			High smoke reading more than No. 1 smoke	Dirty or plugged heat exchanger	Clean heat exchanger
				Insufficient draft	Readjust burner
				Increase draft	
				Incorrect burner head adjustment	Correct burner head setting
			High stack temperature more than 550°F Net.	Too little combustion air	Increase combustion air
				Too little blower air	Speed up blower for 85° to 95°F temperature rise
				Blower belt too loose and slipping	Tighten blower belt
				Dirty or plugged heat exchanger	Clean heat exchanger
	Nozzle and Oil Pressure	Inspect line, check nozzle size and check oil pressure	Dirty blower wheel	Clean blower wheel	
			Dirty air filter (furnace)	Clean or replace filters	
Restricted or closed registers or dampers	Readjust registers or dampers				
Nozzle and Oil Pressure	Inspect line, check nozzle size and check oil pressure	Partially plugged or defective nozzle	Replace nozzle		
		Nozzle too small	Increase nozzle size		
		Oil pressure too low (less than 100 psig)	Increase oil pressure to 100 psig.		