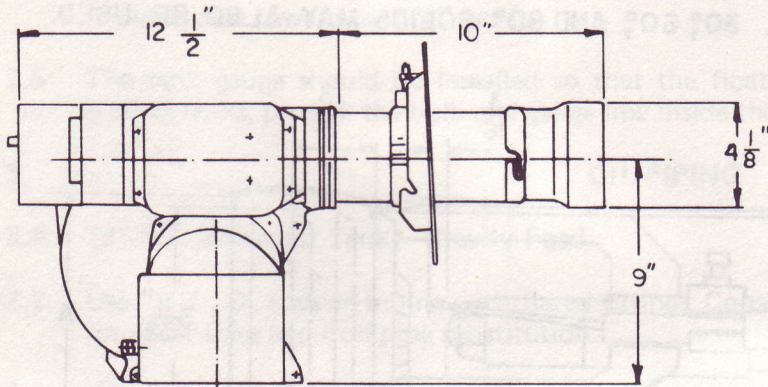


INSTALLATION SERVICE AND OPERATING MANUAL

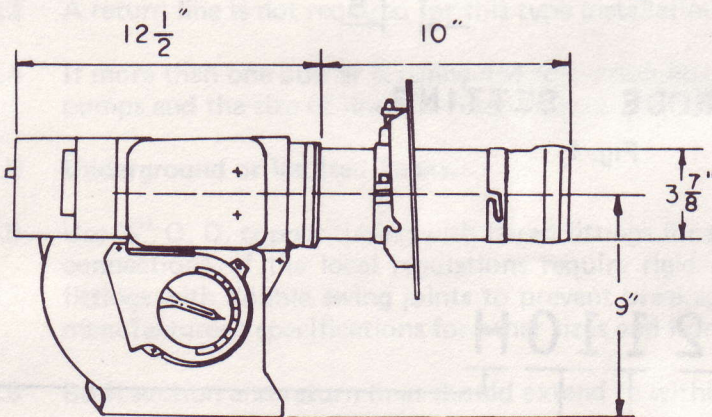
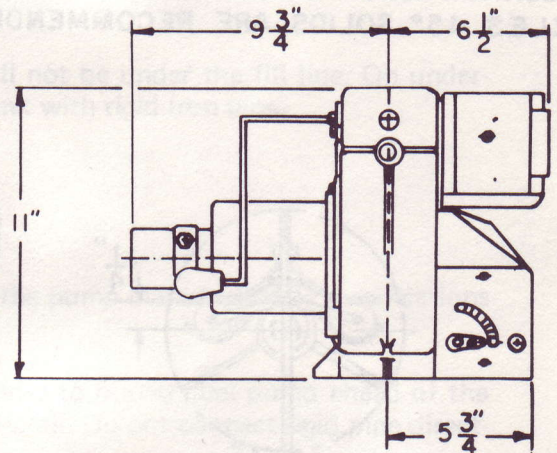
ERTLI AMERICAN

OIL BURNER

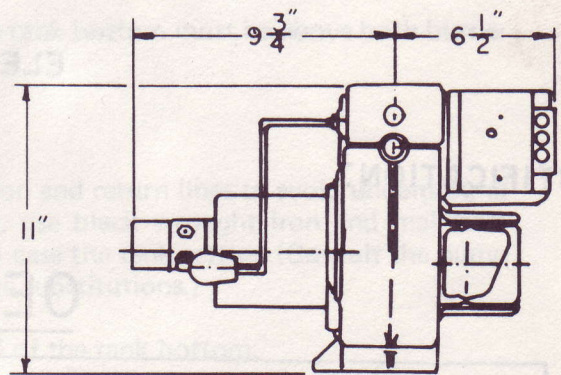
MODEL OE-2



OE-22



OE-21



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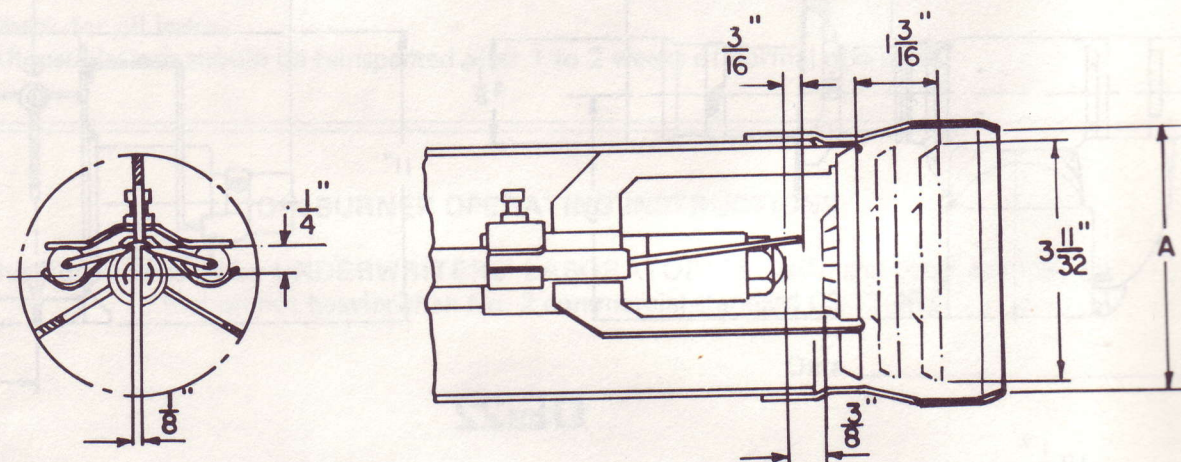
ABC SUNRAY CORP., 85 AUSTIN BLVD., COMMACK, N.Y. 11725

INSTALLATION, SERVICE AND OPERATING MANUAL MODEL OE-2 OIL BURNER

TECHNICAL DESCRIPTION BURNER DATA

TYPE	COMBUSTION		RATING GPH.	PRIMARY CONTROL	MOTOR	AIR BOX	IGNITION TRANSFORMER	FUEL UNIT	WEIGHT
	HEAD	OPENING "A"							
OE-2	1	3 ⁷ / ₈ "	1.65 - 3.5	CAD CELL CONTROL WITH INTERRUPTED IGNITION	110 V 60 HZ 1 PH 240 W CAPACITOR START	SIDE AIR DAMPER	PRIMARY 110 V SECONDARY 12,000 V	U.L. LISTED CAPABLE OF 200 P.S.I.	43 LB
OE-2	2	4 ¹ / ₈ "	3.25 - 6.0			BOTTOM AIR SHUTTERS			45 LB

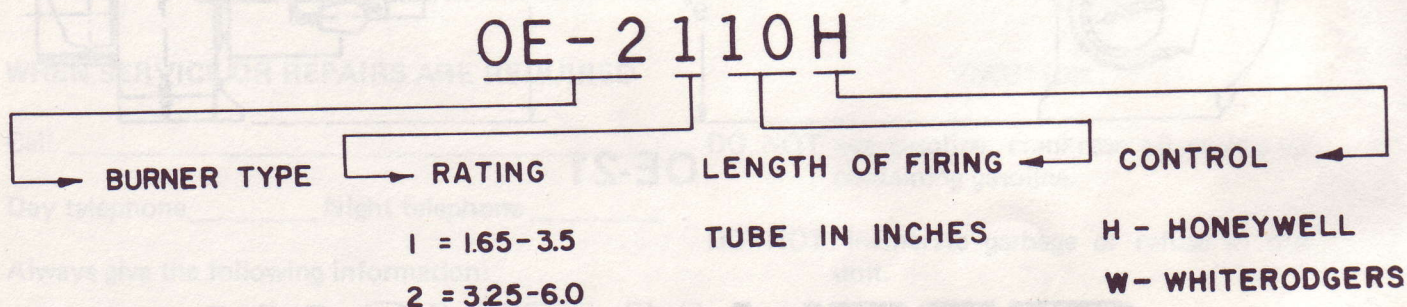
THE BURNER MUST BE MATCHED TO THE PRECISE BOILER BACK PRESSURE.
NOZZLES 45° SOLIDS ARE RECOMMENDED. 30°, 60°, AND 80° SOLIDS MAY ALSO BE USED.



ELECTRODE SETTING

Fig. 1

IDENTIFICATION:



INSTALLATION INSTRUCTIONS # 2 FUEL OIL BURNERS

1. UNPACKING

- 1.1 When unpacking the burner, be sure all loose packages are inspected for contents. Check the packing list, electrical rating (voltage, hertz) and for concealed damage.

2. FUEL TANK

- 2.1 All oil storage tanks must be U. L. listed and installed according to the National Board of Fire Underwriters or local ordinances, whichever has precedence.
- 2.2 All pipe connections on underground buried tanks must have swing joints except the sounding well (stick well).
- 2.3 The fill line must pitch toward $\frac{1}{4}$ " per ft.
- 2.4 The vent pipe should not be less than $1\frac{1}{4}$ " I. P. S. and equipped with an approved vent cap. Pitch the vent pipe toward tank $\frac{1}{4}$ " per ft.
- 2.5 The tank gauge should be installed so that the float will not be under the fill line. On underground tanks, protect the bulb and gauge line inside the tank with rigid iron pipe.

3. OIL PIPING

3.A 275-Gal. Basement Tanks—Gravity Feed.

- 3.1 Use $\frac{1}{2}$ " O. D. copper tubing with flared fittings. Consult the pump manufacturer's specifications for other sizes and iron pipe substitution.
- 3.2 Install an approved hand valve in the tank outlet and close to burner fuel pump ahead of the filter. Connect the filter to the pump with a copper tube pigtail. Do not connect rigid pipe directly to the pump.
- 3.3 A return line is not required for this type installation.
- 3.4 If more than one burner is connected to suction line, the tank bottom must be above both burner pumps and the size of line and filter must be increased.

3.B Underground or Vaulted Tanks.

- 3.5 Use $\frac{1}{2}$ " O. D. copper tubing with flared fittings for suction and return lines to avoid underground connections. If the local regulations require rigid pipe, use black wrought iron and malleable fittings with double swing joints to prevent breakage in case the tank settles. (Consult the pump manufacturer's specifications for other sizes and iron pipe substitutions.)
- 3.6 Both suction and return lines should extend to within 4" of the tank bottom.
- 3.7 Slip fittings should be used on the tank for copper suction and return lines. Double-tapped bushings can be used with wrought-iron pipe; however, a bushing welded to the dip tube is preferred.
- 3.8 Install, in the suction line at an outside wall, an approved hand valve and spring loaded ball check. When the tank is vaulted and the bottom of the tank is on the same level as the burner, install a vertical check valve as close to the top of the tank as practical.

- 3.9 If the bottom of the tank is above the level of the burner, an anti-siphon valve is usually required at the highest point.
- 3.10 Install an approved hand valve close to the burner pump, ahead of the filter, and connect the filter to the pump with a copper tube pigtail.
- 3.11 Install a copper tube pigtail between the pump and spring-loaded ball check in the return line.
- 3.12 Avoid fastening suction and return lines to floor beams. If necessary to do so, use loose fitting hangers with soft rubber lining to prevent noise transmission.
- 3.13 A separate suction line should be used for each burner. A common return line may be used, provided a spring-loaded ball check is installed in the return pipe from each fuel unit.

4. FUEL OIL FILTER

- 4.1 A filter is recommended in the suction line.
- 4.2 Size the filter according to GPH of the nozzle on single pipe installations.
- 4.3 Use larger filters on 2-pipe systems (20 to 30 GPH filter rating).

5. INSTALLATION

- 5.1 Use a base or flange mounting, whichever is the most practical for the installation. Follow the heating appliance manufacturer's recommendations where applicable.
- 5.2 Make sure the burner is level side to side.
- 5.3 Pitch the air tube down approximately 2° toward the nozzle end.
- 5.4 The end of the air tube should be $\frac{1}{4}"$ back to flush with inside of the chamber wall. Improper insertion will distort the fire. See Fig. 2.

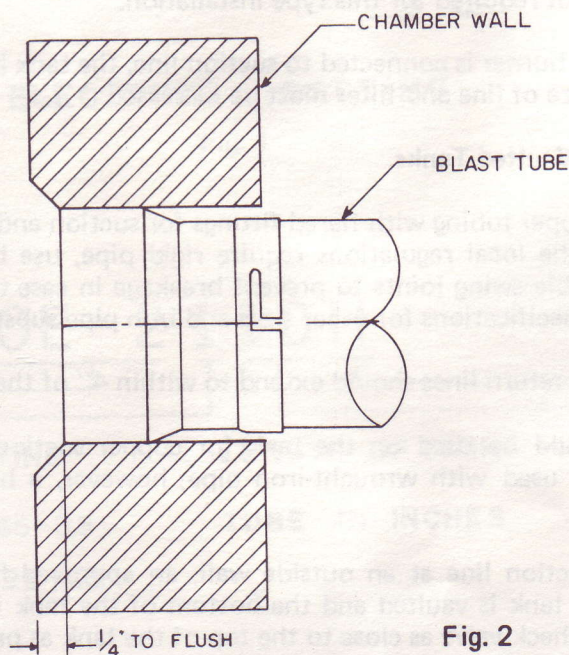


Fig. 2

NOZZLES

6.

- 6.1 Use a nozzle of the proper size, type and spray pattern as indicated for the burner model. 45° solids are recommended; 60° solids may also be used (Ref. Page 2).
- 6.2 Always remove the nozzle assembly to install or replace the nozzle.
- 6.3 The nozzle assembly can be removed step by step as follows:

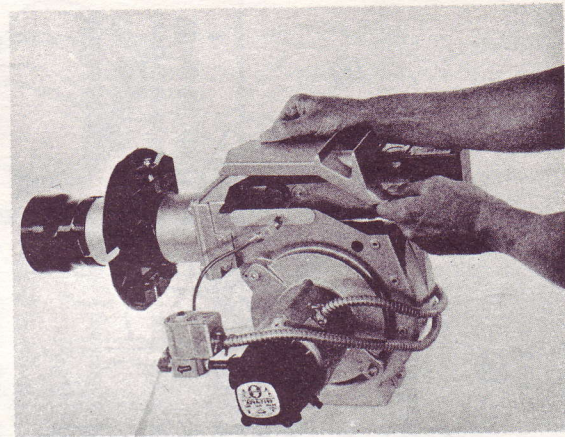


Fig. 3

- a) Open up the cover by removing the cover screws. See Fig. 3.
- b) Disconnect the oil line to the nozzle assembly. See Fig. 4.
- c) Disconnect the ignition cables at transformer.
- d) Turn assembly to 90° clockwise.
- e) Then pull assembly straight backwards slowly.

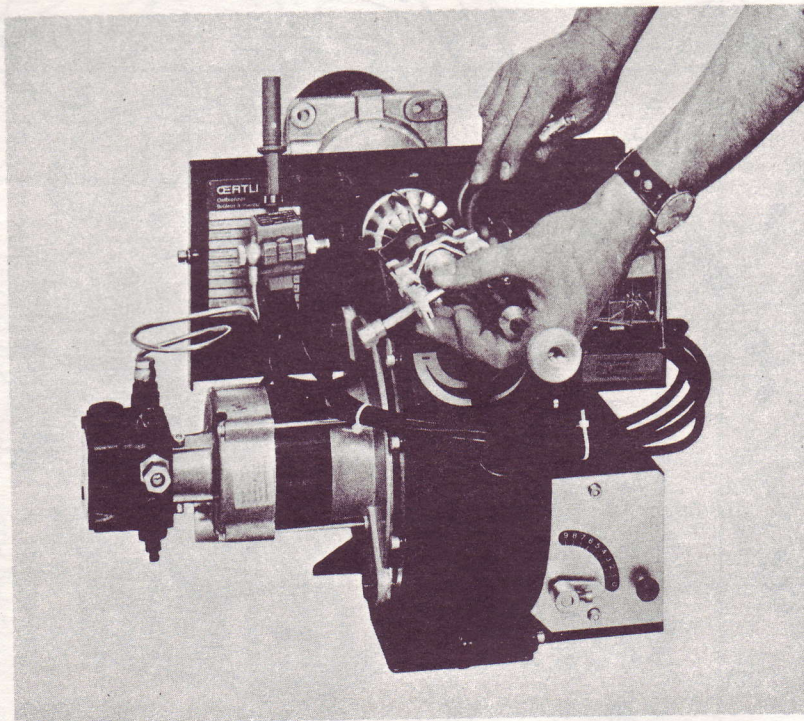
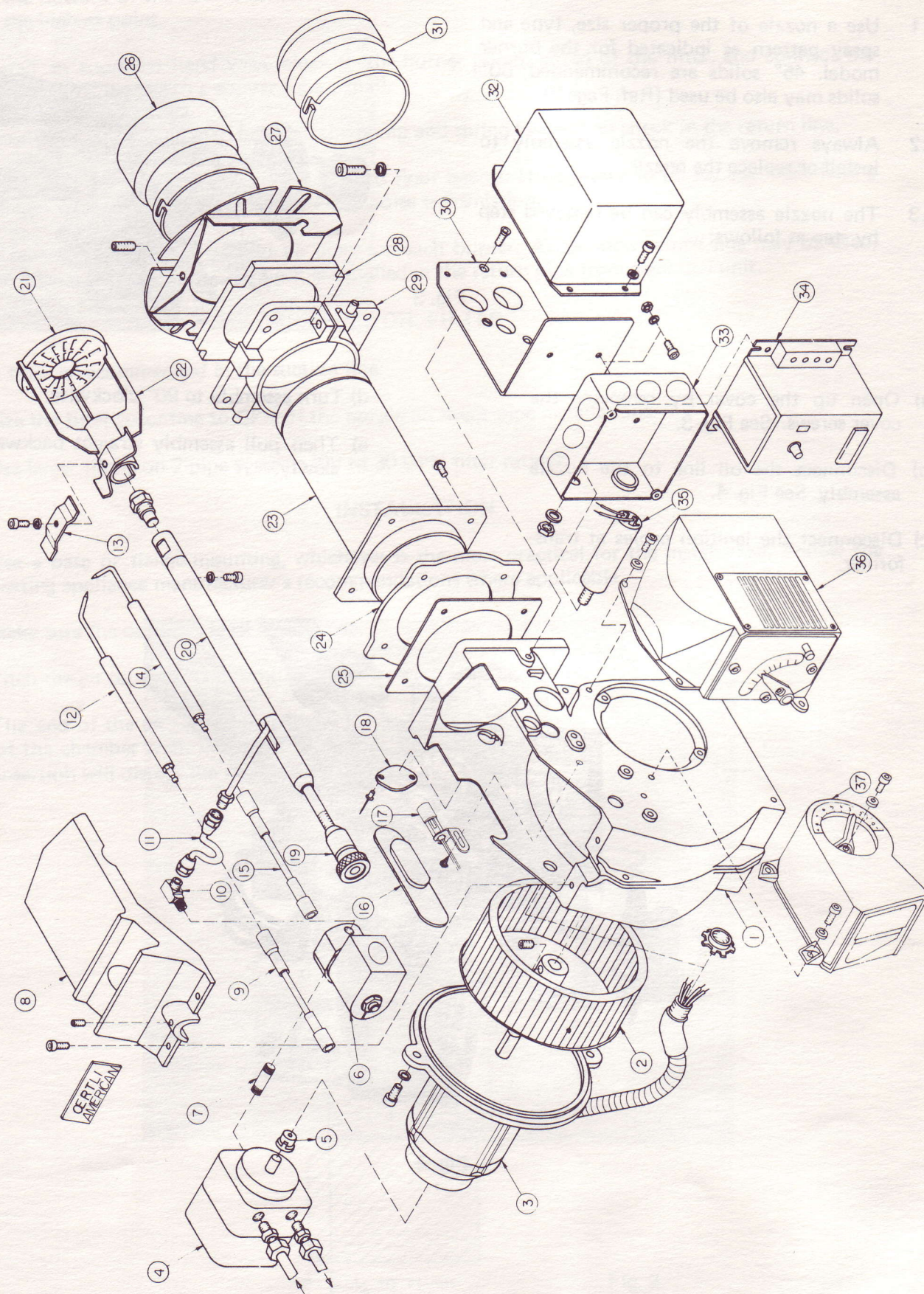


Fig. 4

OE-2 PARTS & ASSEMBLY



MODEL OE-2

ITEM	PART NO.	DESCRIPTION	QUANTITY	ITEM	PART NO.	DESCRIPTION	QUANTITY
1	11179037/3	Housing Assy.	1	20	14279043/4	Nozzle Rod	1
2	12479032/3	Fan Wheel	1	21	16171889/3	Flame Retention Disc	1
3	12179072/2	OE-2 Motor	1	22	16179033/3	Flame Retention Holder Assy.	1
4	PA46761	Oil Pump 200 PSI	1	23	16371897/3A	Air Tube	1
5	12378572/4	Coupling (Oil Pump to Motor)	1	24	19679065/4	Asbestos Flange (Housing To Tube)	1
6	EA41221	Solenoid Valve 300 PSI Honeywell or Equiv.	1	25		And Front Plate Flange Assy.	1
7	TA46007	1/8" x 1 1/2 Black Nipple	1	26	16271870/4	Flame Tube OE-2-2	Choose One
8	11379036/2	Housing Plate	1			Item 26 or 31	
9	EA46153	Left Ignition Cable Assy.	1	27	AB46057	Boiler Mounting Flange Assy.	1
10	TA46001	90° Elbows 1/8-27 N.P.T. x 3/16 Flare	1	28	71915/4B	Asbestos Gasket For Mounting	1
11	AA46109	Oil Line From Valve To Nozzle Rod Assy.	1	29	79060	Sliding Flange	1
12	EA46146-1	Electrode Left	1	30	78707/2	Transformer Bracket	1
13	14268225/4	Top Bracket	1	31	16379649/3	Flame Tube OE-2-1	Choose One
14	EA46146-1	Electrode Right	1			Item 26 or 31	
15	EA46152	Right Ignition Cable Assy.	1	32	MA46201	Allianson 12,000 Volt Transformer	1
16	14279040/4	Slide Assy.	1	33	SA41553	J Box 4" x 4" x 2"	1
17	EA41253	Cad Cell—White Rodgers	1	34	EA41291-1	Control—White Rodgers 669	1
18	17528638/4A	Cover Plate	1	35	17378573/4	Capacitor Assy.	1
19	16271894/4	Regulating Sleeve (Dial A Flame)	1	36	11278754/2	Air Inlet Housing OE-2-2	Choose One
						Item 36 or 37	
				37	11278584/3	Air Inlet Box Assy. OE-2-1	Choose One
						Item 36 or 37	
				38	16271870/4	Air Inlet Diaphragm	1

IN ALL COMMUNICATIONS STATE BURNER MODEL AND SERIAL NUMBERS

- 6.4 Flame retention cup can be removed from the bracket using a screwdriver as shown in the Fig. 4A.
- 6.5 Similarly, flame retention cup can be installed by forcing it as shown in the Fig. 4B, first by matching two notches, and then by forcing for the third notch.

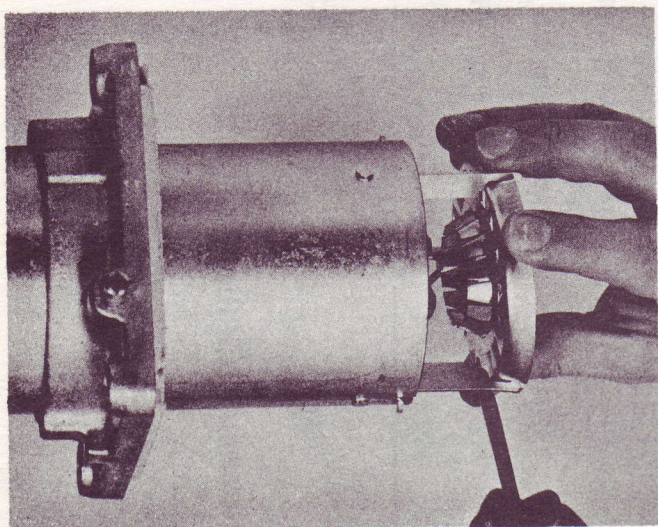


Fig. 4A

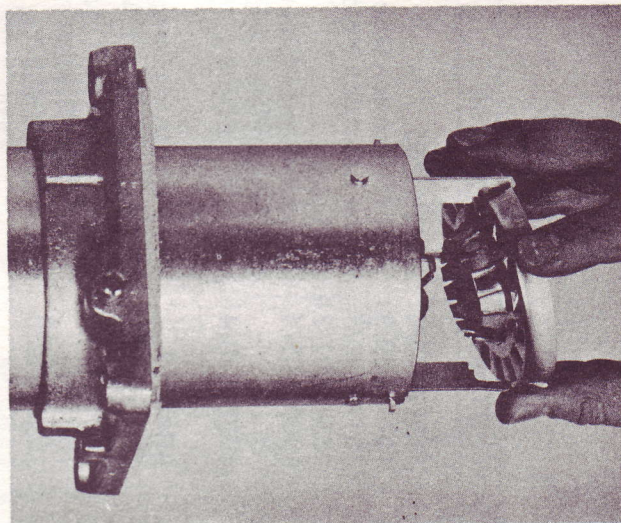


Fig. 4B

7.

CHIMNEY

- 7.1 Follow the recommendations of the heating appliance manufacturer.
- 7.2 The chimney should extend above the roof line and above or away from surrounding objects. It should be tile-lined, with no obstructions and be in a good state of repair, with no leaks.
- 7.3 The smoke pipe should be inserted flush with the inside of the chimney tile, and sealed in place.
- 7.4 All cleanout doors should be sealed.

8.

DRAFT REGULATORS

- 8.1 The use of a draft regulator is recommended and should preferably be mounted in the smoke pipe.
- 8.2 Use a draft gauge to adjust to the proper opening. See "draft" 13.1.
- 8.3 The above may not apply to pressurized fire box boilers: Follow instructions furnished with boilers.

9.

AIR FOR COMBUSTION

- 9.1 A separate fresh air inlet to the boiler room is required for proper combustion.
- 9.2 An opening of one square inch per 1,000 BTUH input is recommended.
- 9.3 If the opening is screened, the area should be increased by as much as 50%.
- 9.4 The boiler room must be closed off from any area where supply or exhaust fans are installed.

10.

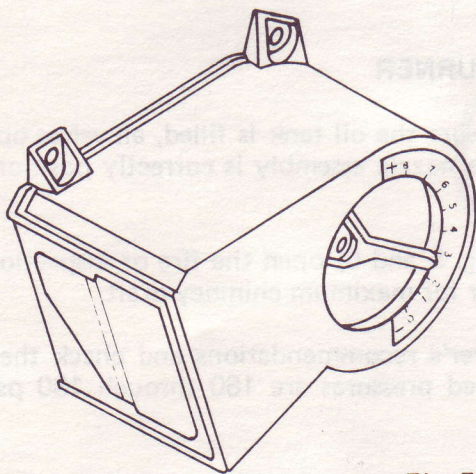
COMBUSTION CHAMBERS

THIS DOES NOT APPLY TO PACKAGED UNITS WHERE THE CHAMBER IS SUPPLIED

- 10.1 Refer to the chart for the correct chamber dimensions. Chambers may vary slightly but should maintain the floor area shown in Table 1.

**TABLE I
MINIMUM COMBUSTION AREA**

FIRING RATE	MINIMUM COMBUSTION AREA					RADIATION		
	G.P.H.	Length	Width	Height	Boiler Crown Sheet To Center Of Nozzle	Floor To Center Of Nozzle	Steam Sq. Ft.	Air BTU X 1000
1.65	13	12	12	7	7	660	1056	185
1.75	13	13	13	7	7	700	1120	196
2.00	15	13	13	7	7	800	1280	224
2.50	16	14	14	7	7	1000	1600	280
3.00	17	15	15	7½	7½	1200	1920	336
3.50	20	15	15	7½	7½	1400	2240	392
4.00	21	16	16	8	8	1600	2560	448
4.50	24	16	16	8	8	1800	2880	504
5.00	25	17	17	8½	8½	2000	3200	560
5.50	27	17	17	8½	8½	2200	3520	616
6.00	27	18	18	9	9	2400	3840	672
6.50	27	19	19	9½	9½	2600	4160	728
7.00	29	19	19	9½	9½	2800	4480	784



OE - 2 1

Fig. 5

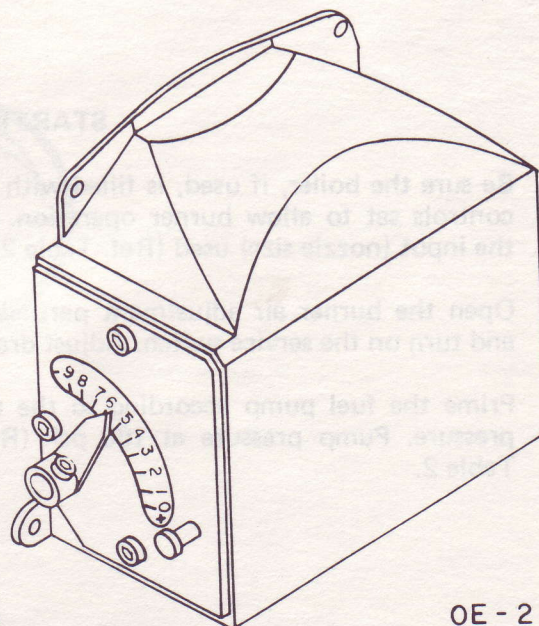
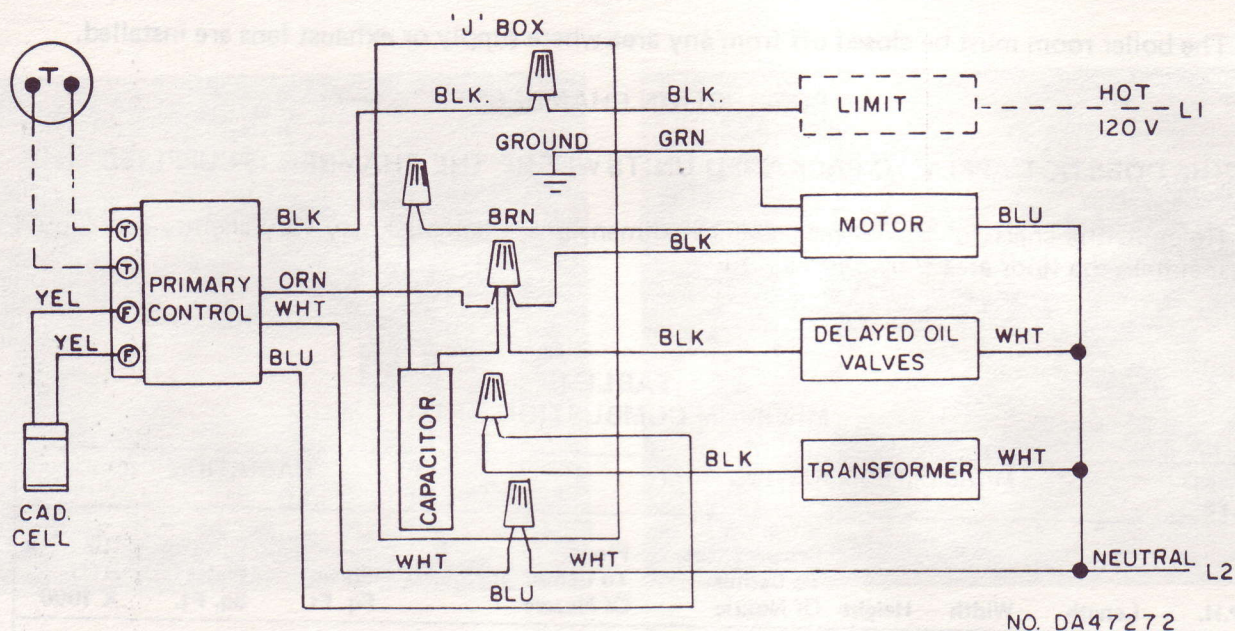


Fig. 6

OE - 2 2

WIRING

- 11.1 All wiring must comply with the National Electric Code and local ordinances.
- 11.2 Refer to the diagram supplied with the burner or controls. A typical wiring schematic is enclosed for intermittent ignition. See Fig. 7.



NOTE:

1. Set room thermostat for 0.38 AMP. (24 volts)
2. Place jumper on T-T terminals if room thermostat is not used.
3. Factory wiring _____ Field wiring - - - - -

Fig. 7

- 11.3 Use a 105°C thermoplastic wire—Do not use less than #14 AWG wire.
- 11.4 Do not fasten conduit or BX cable to hot surfaces.

12.

STARTING THE BURNER

- 12.1 Be sure the boiler, if used, is filled with water. Be sure the oil tank is filled, all valves open and controls set to allow burner operation. Be sure the nozzle assembly is correctly positioned for the input (nozzle size) used (Ref. Table 2).
- 12.2 Open the burner air adjustment partially, (Ref. Fig. 5 and 6) open the fire or inspection door and turn on the service switch. Adjust draft regulator for maximum chimney draft.
- 12.3 Prime the fuel pump according to the manufacturer's recommendations and check the pump pressure. Pump pressure at 180 psi. (Recommended pressures are 160 through 180 psi.) See Table 2.

- 12.4 If a safety lockout occurs, reset after 1 to 2 minutes.
- 12.5 Do not run the fuel unit dry for more than 5 minutes.

TABLE NO. 2
CALCULATED DELIVERY RATES OF NOZZLES AT VARIOUS PRESSURES
(Pump Pressure In PSIG)

NOMINAL NOZZLE SIZE	100	150	155	160	165	170	175	180	185	190	195	200
	1.35	1.65	1.18	1.71	1.73	1.76	1.78	1.81	1.84	1.86	1.89	1.91
1.5	1.84	1.87	1.90	1.93	1.95	1.98	2.01	2.04	2.07	2.09	2.12	2.12
1.65	2.02	2.05	2.09	2.12	2.15	2.18	2.21	2.24	2.27	2.30	2.33	2.33
1.75	2.14	2.18	2.21	2.25	2.28	2.31	2.35	2.38	2.41	2.44	2.47	2.47
1.85	2.26	2.30	2.34	2.38	2.41	2.45	2.48	2.52	2.55	2.58	2.62	2.62
2.0	2.45	2.49	2.53	2.57	2.61	2.64	2.68	2.72	2.76	2.79	2.83	2.83
2.25	2.75	2.80	2.85	2.89	2.93	2.98	3.02	3.06	3.10	3.14	3.18	3.18
2.5	3.06	3.11	3.16	3.21	3.26	3.31	3.35	3.40	3.45	3.49	3.53	3.53
2.75	3.37	3.42	3.48	3.53	3.59	3.64	3.69	3.74	3.79	3.84	3.89	3.89
3.00	3.67	3.73	3.79	3.85	3.91	3.97	4.02	4.08	4.13	4.19	4.24	4.24
3.50	4.29	4.36	4.43	4.49	4.56	4.63	4.69	4.76	4.82	4.89	4.95	4.95
4.00	4.90	4.98	5.06	5.14	5.21	5.29	5.37	5.44	5.51	5.58	5.66	5.66
4.5	5.51	5.60	5.69	5.78	5.87	5.95	6.04	6.12	6.20	6.28	6.36	6.36

- 12.6 Prime the pump with oil on long suction lines.
- 12.7 When the fire is established, make a temporary air adjustment to clear any smoke. Leave the fire door open until the combustion chamber is dry. Modern chambers contain organic binder which must be baked out before final burner adjustments can be made. Allow at least 15 minutes firing to "dry" the chamber. When normal temperatures are reached, close the inspection (fire) door, adjust the draft and the air shutter for a clean fire. See Fig. 5 for OE-21 series. For OE-22 series, see Fig. 6 to adjust the air and lock it with side nut. Extra fine tuning can be achieved by dialing the knob (See Fig. 8).

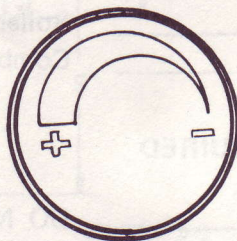


Fig. 8

13.

DRAFT

- 13.1 After the appliance and chamber are up to normal operating temperature, set the draft regulator to get $-.02''$ W. C. over the fire. Use a draft gauge.

14.

FINAL CHECKOUT

- 14.1 Use a smoke tester and set the burner air adjustment for not more than a #1 smoke (Bacharach scale).
- 14.2 Recheck the draft and take a CO_2 reading over the fire and in the breeching. The CO_2 reading should be between 11% and 13%.
- 14.3 If #1 smoke is measured, and CO_2 is less than 11%, while firing into a suitable firebox, check for air leaks into the firebox and flues. Seal all leaks found, using non-asbestos furnace cement, and recheck CO_2 .
- 14.4 Open the fire door, turn off the oil valve and check out the safety timing of the combustion control.
- 14.5 Check the operation of the limit controls and the thermostat.
- 14.6 Check for oil leaks.
All installations should be reinspected after 1 to 2 weeks of normal operation.

OIL BURNER OPERATING INSTRUCTIONS

This Burner is listed by UNDERWRITERS' LABORATORIES, INC., and other agencies for fuel oil not heavier than No. 2 commercial standard CS-12-48.

Date _____

DATA

Stack $CO_2\%$ _____	Over fire $CO_2\%$ _____
Air Shutter Setting _____	Smoke Spot No. _____
Stack Temp. F° _____	Room Temp F° _____
Net Stack Temp. F° _____	Stack Draft In. W. C. _____
Overfire Draft In. W. C. _____	Nozzle Installed gal./hr. _____
Spray Angle $^\circ$ _____	Boiler Mfg. _____
Chamber Size _____	Combustion Efficiency _____

WHEN SERVICE OR REPAIRS ARE REQUIRED

Call _____

Day telephone _____ Night telephone _____

Always give the following information:

Burner Model _____ Serial No. _____

Date installed _____

CAUTION

DO NOT use gasoline, crankcase oil or any oil containing gasoline.

DO NOT incinerate garbage or refuse in this unit.

DO NOT tamper with burner or controls—
CALL YOUR SERVICEMAN.**HANG NEAR BURNER**