

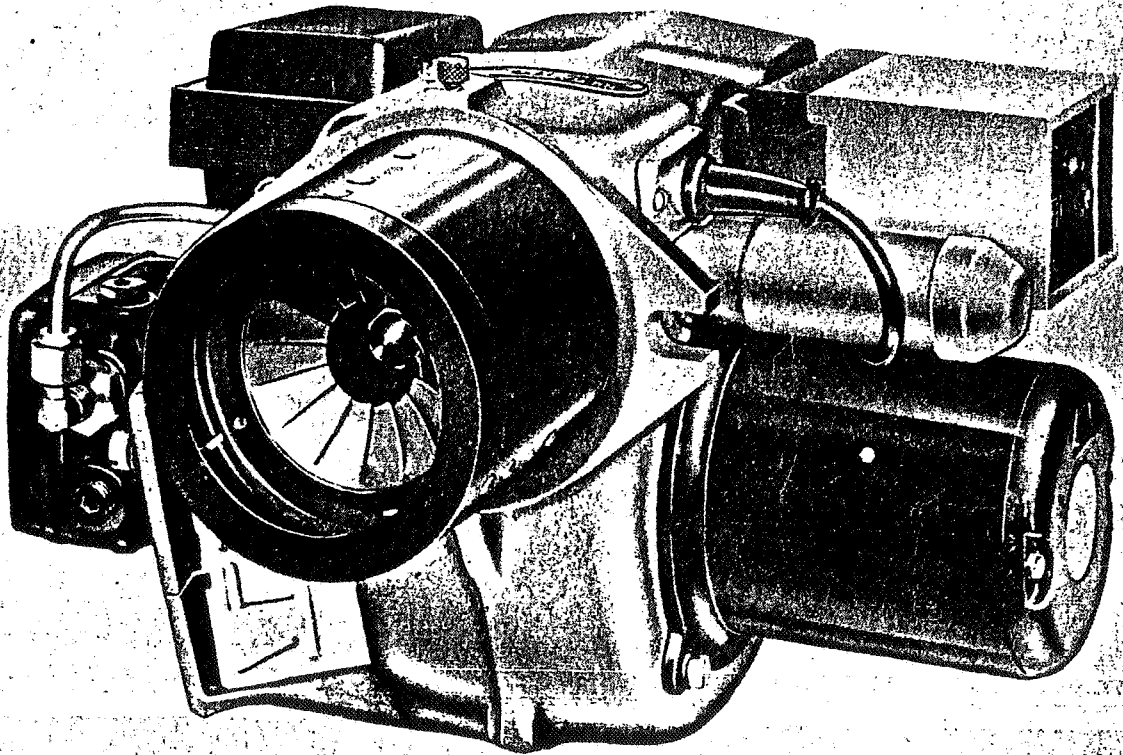
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# INSTALLATION & SERVICE MANUAL

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FOR THE  
MODEL ZLO LIGHT OIL BURNER



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**NU-WAY HEATING PLANTS LTD.**

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DROITWICH,  
WORCS.



# OIL BURNER INSTALLATION AND OPERATING INSTRUCTIONS

## MODEL ZLO BURNER INSTALLATION INSTRUCTIONS

### INTRODUCTION

Where the unit is being applied to an existing heating system, arrange for the flue passages and heat transfer surfaces to be cleaned and for the chimney to be thoroughly swept.

Check boiler doors for fit and seal any cracks and other unwanted openings in the boiler, flue system and chimney brickwork.

The top of the chimney should be above all roofs within a radius of 30 feet.

If a cowl is fitted it should be removed.

See that the flue pipe from the boiler or heater finishes flush with the inside wall of the chimney and does not protrude beyond this point.

No solid fuel-fired boiler or heater must be allowed to discharge into the same flue as the oil-fired unit.

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### OIL SUPPLY SYSTEM & STORAGE TANK

Use single-pipe gravity feed oil supply system whenever possible.

Use single-pipe system on all installations where bottom of storage tank is not less than 6 inches above the oil inlet on the burner fuel pump. When using gravity feed the internal by-pass within the pump must be open (see instructions packed with the burner pump).

When the pump inlet is higher than the bottom of the fuel tank a two-pipe "suction-lift" oil supply system must be used. (See instructions with burner pump).

When using a two-pipe suction lift supply system, the internal by-pass port in the pump is self adjusting.

Keep oil pipes out of the way but run them by the most direct path.

Copper tube is easier to work than steel pipe. Iron fittings and steel pipes should be hammered before installation to remove loose scale.

**Galvanised Pipe and Fittings must not be used.**

DO NOT join copper tubes with soldered joints or capillary fittings.

For screwed pipe connections use mastic-type jointing compound or plastic tape, not hard-setting paste. When oil is fed to the burner by gravity use  $\frac{3}{8}$ " pipe (or larger).  $\frac{1}{2}$ " pipe should be used on suction-lift systems when the burner is not more than 20 feet from the tank. Incline all pipe runs slightly to avoid air traps. Fit a tee-piece and plug at any point where air trapping is likely, i.e. at highest point in any run.

Best tank position is outside the building. If not possible and the tank must be mounted indoors, check local fire regulations, if any. Place indoor tank in separate fire-resisting chamber or, if this is not possible, within brick catch-pit having capacity at least 10% greater than tank capacity.

Do not mount tank on a roof except as very last resort.

Mount tank with  $\frac{1}{4}$ " —  $\frac{1}{2}$ " fall per foot of length away from oil outlet and towards sludge cock.

Fit fill and vent lines of same size in accordance with oil suppliers recommendations.

Fit fusible-link type fire-valve as near tank outlet as possible. Fit extra fusible links near the tank (if indoors) and in any closed passage through which oil pipes run.

### ELECTRICAL WIRING

For wiring details see diagram supplied with heater unit or enclosed herewith.

Wiring diagrams showing electrical connections for all Nu-Way burner/control combinations

available upon request from Electrical Department, Nu-Way Heating Plants Limited.

Wire in P.V.C. cable except near hot surfaces. For runs in these areas use asbestos-covered cable.

Leads to photo-cells must be screened or run in separate conduit.

Use flexible conduit for final connections to burner, thermostats and flue thermostat (if used).

Ensure good bonding by running separate earth wire or strip along each flexible conduit to the fitting at either end.

Flexible conduit to flue thermostat must be long enough to permit easy withdrawal of the instrument for cleaning.

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#### FRONT PLATE

See special fire-box or relevant burner "Leading Dimensions" drawing for front plate drilling details.

#### DAMPER

Lock the flue damper fully open on single-boiler jobs. If occasional closing of damper necessary, as on multi-boiler or heater installations, arrange flue damper so that closing is impossible without removal of some locking device (e.g. padlock).

If draught exceeds 0.08" w.g. over the fire a draught stabiliser should be fitted in position recommended by the makers. Draught over the fire when the burner is running should be between 0.02"—0.05" w.g.

#### HINTS FOR SILENT OPERATION

Final connection of fuel supply to burner unit should be through a flexible oil pipe.

Insulate pipes in clips, through walls, from building joists and from each other.

Burner draught tube should not touch boiler frontplate. Fill gap between frontplate and tube with asbestos string.

#### TESTING THE INSTALLATION

Bleed oil line free of air up to burner. Bleed pump free of air by slackening off plug in pressure gauge port and briefly running burner motor. (See makers' instructions). Remove burner inner assembly and check that electrodes are set in the correct position (see diagram). Replace inner assembly.

If flue thermostat fitted, set to start position (see instructions enclosed with control) and close main wall switch. The burner should start and be left running for approximately 30 minutes to dry out the fire-box.

Check all pipework and connections for oil leaks.

Test electrical control circuits (see test list instruction sheet packed with control). Fit oil pressure gauge (scale 0—200 p.s.i.) into pump pressure gauge port and check that oil atomising pressure is correct.

Correct Atomising Pressure—125 p.s.i.

If adjustments required follow instructions enclosed with fuel pump.

When heating plant is warm check combustion efficiency with CO<sub>2</sub> sampling instrument, if available. Adjust burner air supply to give acceptable reading (suggested minimum—10% CO<sub>2</sub>).

If CO<sub>2</sub> indicator not available adjust air setting to give slight haze at the top of the chimney.

#### INSTRUCTING USER

Show completed installation to user and demonstrate starting and stopping of burner, both normal stop and "emergency stop".

Also demonstrate re-setting of combustion control and indicate correct thermostat settings.

Demonstrate procedure for de-sludging fuel tank before each fuel delivery.

Urge user to conclude service agreement with the installer.

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# MAINTENANCE INSTRUCTIONS

**BEFORE DOING ANY WORK ON THE BURNER TAKE CARE TO SEE THAT THE MAIN ISOLATING SWITCH IS IN THE "OFF" POSITION.**

## FUEL PUMP

For maintenance and service instructions see the leaflet sent with the burner.

## NOZZLE AND ELECTRODES

1. Remove the two hexagon nuts holding the burner flange to the boiler frontplate.
2. Withdraw the burner from the boiler.
3. Loosen the knurled nut on top of the burner flange, sufficient to allow the removal of the draught tube.
4. Loosen the flared nut at the burner casing to release the pump/nozzle fuel line.
5. Remove the allen screw on the casing 'boss'.
6. Withdraw the runner assembly enough to allow the H.T. (High Tension) leads to be disconnected, then remove the inner assembly completely.
7. Use nozzle spanner to unscrew nozzle from inner assembly. Unscrew inner core and clean the nozzle body, swirler and core separately. Take great care not to scratch the nozzle. Flush oil away with a solvent or under a running tap or with an air line. Scrape only when dirt is visible and then with cardboard or paper rather than with a wooden scraper.

**Never use a Metal Scraper.**

Re-assemble the nozzle taking care to see

that all parts are kept very clean.

Take care to ensure that no dirt enters the oil pipes while the burner is dismantled.

Replace nozzle and check electrode setting (see diagram). Clean spark electrodes and insulators as necessary, before re-checking electrode spark-gap setting.

**N.B.** When replacing the burner draught tube, ensure that the knurled screw locates in the hole provided in the draught tube.

Switch on the burner and check for normal operation.

## MOTOR

Keep motor clean and dry. Any deposits of dust or dirt should be blown out occasionally. Surplus lubricant spreading from the bearing should be wiped away.

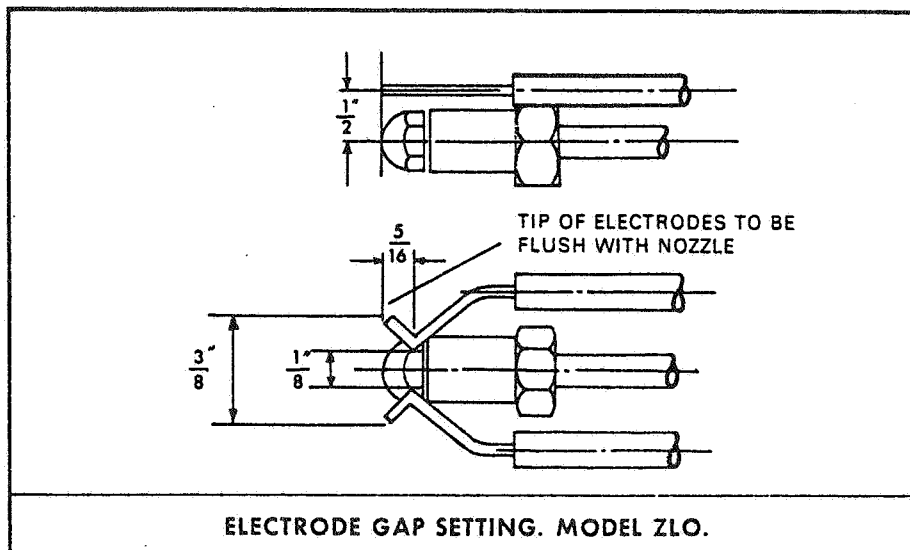
Lubricate burner motor as necessary. Burner motor is fitted with sleeve bearings which are primed with sufficient oil to last for six months operation. Replenish with best quality SAE 20 oil (half a teaspoonful to each bearing) every three months.

## OIL FILTER

If filter has disposable element renew element cartridge each year.

If filter has permanent element this should be washed in paraffin every six months. This operation may necessitate bleeding of the pump after re-assembly in order to remove air from the supply pipe.

Exceptionally dirty fuel may necessitate cleaning at more frequent intervals.



## OIL TANK

Check tank has been kept free from sludge by opening sludge cock and drawing off small quantity of oil.

Check that vent pipe is clear.

## CONTROLS

Clean flue thermostat or photo-cell viewing head as per makers' instructions.

## FAN RUNNER

Keep fan blades clean and free from oil.

# FAULT FINDING

### **Burner fails to start at all.**

One of the instruments in the control circuit not making contact (i.e. not "calling for heat"). Check control or limit thermostat, pressure switch, time switch, low water cut-out or room thermostats.

Flue thermostat (where fitted) stuck in the "hot" position—re-set per makers' instructions.

P.E. Cell (where fitted) incorrectly energised by daylight.

Red warning light showing in controller.

### **Burner starts up but fails to light and then locks out showing red warning.**

No spark at points; check that the H.T. connectors between transformer and bus-bars are making contact.

Spark does not ignite oil; check electrode setting (see diagram). Partly blocked or damaged nozzle causing uneven spray. Low oil pressure causing coarse narrow spray. (See under low oil pressure).

No oil in tank or fuel level below outlet pipe.

Oil supply line restricted. Check stop valves, filters, fire-valve, foot valve (if any), anti-syphon valve (if any). Blocked nozzle.

Motor/pump rubber coupling failed through overload. Loose driving dog. Faulty pump.

Air leaking into supply pipe (particularly on suction-lift), probably indicated by noisy pump. Check all joints at filters, valve glands, pump glands, pump cover and pipe joints. Gravity head insufficient for single-pipe system or if already on two-pipe system, suction lift too great or by-pass plug not fitted in pump. (N.B. it is essential to have a return oil line back to the tank when internal by-pass plug fitted to pump).

Flue thermostat (if fitted), sluggish in operation. This may be due to dirty stem or large air leak into flue before flue thermostat position.

Instrument may be mounted too far from the boiler or may be faulty.

Photo-electric cell (if fitted) may be faulty and remaining on its "Dark" contact. This may be due to a faulty cell or amplifier valve or faulty

wiring. Where the p.e. cell controller is wall-mounted the leads to the p.e. cell must be screened or wired in separate conduit. The p.e. cell may be dirty.

### **Small sparky flame**

Partly blocked nozzle (producing uneven flame).

Too much air.

### **Smoky flame**

High oil pressure.

Swirler loose in nozzle or whole nozzle loose in adaptor. (Producing large flame).

Worn nozzle (producing very large flame).

Insufficient air.

Inadequate draught. Check boiler flues and chimney, look for air leaks everywhere. If chimney pot fitted, remove it. Is chimney being subject to down-draughts.

### **Blow-back on lighting—Fumes in boilerhouse—Oil and soot on combustion head and in draught tube.**

Delayed ignition. Check electrodes etc.

Restriction in flue and chimney.

### **Low oil pressure**

Pressure regulating valve on pump required adjustment or is sticking. Free the p.r. valve and set to correct operating pressure.

### **High oil pressure**

Pump p.r. valve incorrectly set or sticking. Free the valve and set to correct pressure.

Restriction in return line to tank (two-pipe systems).

Internal by-pass plug fitted in pump but no return line run to tank. (Restriction or lack of return line can cause much damage to pump, motor or coupling).

### **Noisy burner**

Restriction in oil supply or air leaks into supply pipeline causing pump noise. Suction-lift too great, causing pump noise.

Loose fan runner.

Worn or dry motor bearings.