
Handbook

Series NOL automatic oil burners Models NOL5/NOL8

BURNER CAPACITY

NOL5: 59 kW to 183 kW
200,000 Btu/h to 624,500
Btu/h

NOL8: 183.1 kW to 256 kW
625,000 Btu/h to 875,000
Btu/h

The Nu-way NOL5 and NOL8 pressure jet burners are all designed to meet the requirements of all international markets, having a range of output from 59-256 kW (50,400-220,550 kcal/h: 200,000-875,000 Btu/h). Available for off operation, they are able to fire, at reduced thermal output, appliances having resistances as listed under the burner selection chart. Burners can also fire appliances having a maximum draught in the combustion chamber of 10.0 Pa (1 mm wg: 0.04 in wg) at full appliance rating.

AIR REGULATION

An adjustable disc type device for accurate and efficient control of combustion conditions. A patented air control device is fitted to ensure smooth start conditions.

CONTROLS

Flame supervision by photo electric cell with sequence controller. The burner may be controlled by suitable thermostats, time switches, etc.

FUEL

Light distillate oil Class D (1.5-5.5 cSt @ 40°C).

FUEL SYSTEM

Suitable for single pipe gravity feed or two pipe suction lift oil supply systems. A fuel filter and flexible oil pipe is provided; fuel connection 1/4" BSP female thread.

For fuel storage and handling temperature requirements please see Burner Manual.

CONSTRUCTION

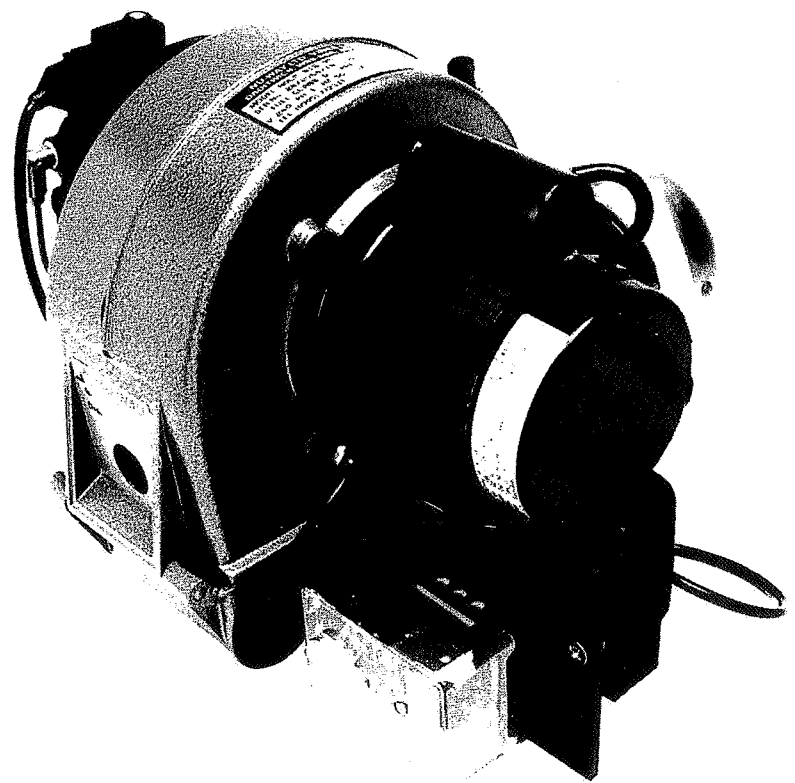
Monobloc metric design using fasteners to ISO standards. Body hinged for access to fan and inner assembly. Adjustable burner head maintains high air velocity and gives maximum combustion efficiency throughout burner range.

APPROX. WEIGHT

13.5 kg.

OPTIONAL EXTRAS

Models to burn Class C2 (1.1-2.0 cSt @ 40°C) are available on request.



BURNER DATA

Burner Model	Minimum Burner capacity†			Maximum Burner capacity†			Diffuser diameter mm	Minimum Burner Throughput*		Maximum Burner Throughput*		Nozzle Spray Angle ††
	kW	kcal/h x 10 ³	Btu/h x 10 ³	kW	kcal/h x 10 ³	Btu/h x 10 ³		Litres/h	USgal/h	Litres/h	USgal/h	
NOL5	59	50.4	200	183	157.4	624.5	85	5.49	1.45	17.18	4.54	60°
NOL8	183.1	157.5	625	256	220.5	875	70	17.22	4.55	24.07	6.36	60°

Notes:

Pump pressure of 965 kPa (9.8 Kg/cm²: = 140psi) is factory-set standard.

† Ratings are based on negative draught over flame of 0.005 kPa (0.5mm wg = 0.02 in wg)

†† Nozzles: A size — Steinen Q up to 11.4 Litres/h (3.0 US gph) and Monarch PLP or AR above; B size — Monarch PLP or Steinen SS.

* Based on calorific value of 10.6 kW/litre (137500 Btu's/US gal).

INSTALLATION

Flue. The top of the chimney should be above all roofs within a radius of 10 m.

Ensure that the flue pipe from the appliance finishes flush with the inside wall of the chimney.

Draught over the fire exceeds 0.02 kPa (2 mm wg; 0.08 in wg) draught stabiliser should be fitted in a position recommended by the appliance maker. Draught over the fire when the burner is operating should be between 0.012 and 0.05 kPa (1.25 - 5 mm wg; 0.05 - 0.2 in wg).

FUEL STORAGE AND HANDLING

The provisions of BS.2869 will normally ensure that the fuel will be of adequate performance when stored and handled without heating. However, some users may need to provide a bulk storage installation to a higher standard in order to prevent the fuel waxing under sustained cold and exposed conditions. Class D winter grade fuel is susceptible to waxing at temperatures below -9°C and Class D summer grade at temperatures below 0°C.

Fuel suppliers recommendations should be followed to suit site conditions.

Fuel supply (and, where fitted, return) pipes should consist of metal tube (NEVER galvanised steel), the final connection to the burner pump inlet port being made with the length of flexible pipe supplied with the burner.

When gravity feed is used (the most common), the maximum head should not exceed 4 m (equivalent to a pressure of 35 kPa).

On installations where the fuel tank is situated below the level of the burner the maximum suction permitted is 40 kPa (300 mm Hg) and a two-pipe (supply and return) fuel supply system MUST be used.

Note that the pump is factory set for single pipe installation.

When using a two-pipe system refer to the pump details for pump modification.

If installation is a two-pipe system, it is essential to ensure that the return pipe is not obstructed in any way, eg by a plug, closed valve, etc. Any obstruction will damage the pump.

Pump priming. Loosen the vent plug. Connect purge port to suitable container.

On single pipe (gravity fed) systems, the pump should be primed under gravity from the tank. If a two-pipe system is used, the suction line will require priming before energising the pump mechanically.

The pump may need priming also, if the oil storage tank is allowed to drain completely.

Electricity supply. Connect suitable electrical supply to burner, thermostats, time switches, etc., as appropriate.

AIR CONTROL

The NOL5 & 8 incorporate an externally adjustable diffuser plate (flame stabilising disc), which can be moved by approximately 20 mm, and gives a partial air control against the expanding cone of the draught tube. This enables air pressure over the burner head to be maintained throughout the burner range, with improved combustion results.

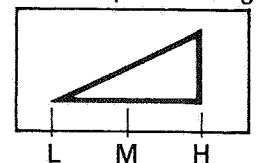
The rotary air damper is used as a trimming device to set final combustion requirements.

A diffuser plate of 85 mm diameter is used up to 183 kW (NOL5) with a 70 mm diameter diffuser plate up to 256 kW (NOL8).

PRE-FIRING CHECK & INITIAL SETTINGS

1. Remove nozzle assembly and carry out instructions shown in maintenance photographs.
2. Check or fit nozzle of correct size/angle for appliance (if already fitted check for tightness).
3. Ensure electrode setting is correct (drawing in maintenance section) and diffuser is in appropriate position (following notes and sketch).
4. Replace nozzle assembly.
5. The setting of the burner diffuser plate (adjustment 20 mm) is carried out by loosening the two screws (first remove plastic insets) retaining the inner assembly adjustment plate. The position is indicated by a triangular red marker and when the nozzle pipe is opposite apex, the diffuser is fully back giving highest resistance to air flow. When the nozzle pipe is opposite the base of the triangle there is least resistance at the diffuser and consequently higher air throughput.

Diffuser plate setting



NOTE: L M H shown for illustration purposes only

To determine setting the following instructions should be carried out:

NOL5

- a) 59—103 kW (50400—89000 kCal/H = 200000—350000 Btu/hr) adjust to position 'L' in sketch (diffuser fully back). The rotary air damper should be approximately 6 mm open.
- b) 104—146 kW (89500—126000 kCal/h = 355000—500000 Btu/hr) adjust to position 'M' in sketch (diffuser mid-position). The rotary air damper should be approximately 12 mm open.
- c) 147-183 kW (127000—157500 kCal/h = 502000—625000 Btu/h) adjust to position 'H' in sketch (diffuser fully forward). The rotary air damper should be in the fully open position.

NOL8

- 184–220 kW (158000–189000 kCal/h = 626000–750000 Btu/h) adjust to position 'M' in sketch (diffuser mid-position). The rotary air damper should be 20 mm open.
- 221–256 kW (190000–220500 kCal/h = 754000–875000 Btu/h) adjust to position 'H' in sketch (diffuser fully forward). The rotary air damper should be in the fully open position.

GENERAL

The rotary air damper should be used as a final adjustment with the diffuser set in the appropriate position. Obviously variation of both settings are necessary to cater for all appliances. Optimum combustion results are obtained by using the maximum air pressure available across the diffuser plate and adjusting air damper to obtain acceptable CO₂ and smoke values.

OIL PUMP AND LINE DETAILS

Installation

Pumps with the letter "P" in the pump code are usually supplied for 2-pipe operation (the by-pass plug is fitted in the return port).

For 1-pipe operation this plug must be removed with a 5/32" allen key and the return port sealed by steel plug and washer.

Pumps identified by an "M" in the pump code are supplied for 1-pipe operation (without by-pass plug, and with return plugged).

Pumps may be mounted in any position except with the shaft upwards, but the shaft should not be submitted to any axial or radial forces.

The maximum inlet and return pressures must not exceed 2 bar.

The maximum vacuum must not be more than 0,45 bar to prevent air separation from oil.

It is recommended to use a separate filter upstream of the pump.

The pump is intended to be used with cylindrical fittings and sealing washers, other sealants are not recommended.

Start Up

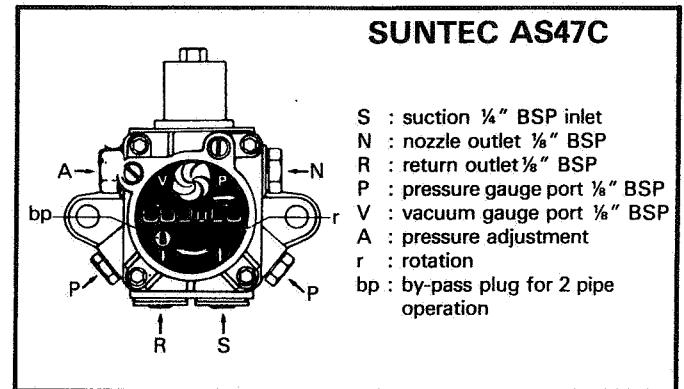
Check that sense of rotation for pump and motor are the same.

In order to purge pumps used on 1 pipe systems, loosen one of the high pressure connections, 'P', on 2 pipe systems, purging is automatic.

Do not activate the solenoid when it is not fitted on the pump.

Pressure Regulation

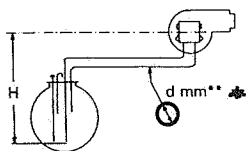
With all models the pressure is increased by turning the regulator screw clockwise and vice versa. Care should be taken not to overtighten the screw in the tube, as this may eliminate the lower pressure range.



Systematic Maintenance

- Check stop valve and in line filter.**
- Check pump filter.**
This filter should be cleaned with a soft brush and clean fuel oil. Each time, the cover gasket and 'o' ring for Rev. 3 models should be changed.
- Check tightnes of all couplings and unused plugs.**
- Check shaft coupling.**
- Check pump pressure.**
Fit a pressure gauge in the fitting provided and run the pump in the normal manner. If the pressure required cannot be obtained, check that the pump is completely purged. If air bubbles are found in the fuel, check all connections for tightness.
- Check pump vacuum.**
Fit a vacuum gauge in the fitting provided and run the pump in the normal manner, making sure to fully purge the pump. The vacuum should not exceed 0,45 bar. If this is the case, check condition of all components (non return valve, stop valves, filters. . .).
If the pump does not suck correctly, check for air leaks in the line by retightening all fittings.

Two pipe lift system

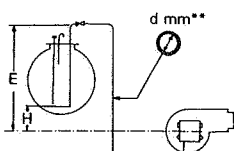


H max. = 4,5 m

Pump	45/47			
	60			
Q*(l/h)	6	8	10	12
H(m) \ d(mm)**				
0	14	49	123	150
0,5	12	43	109	150
1	10	37	94	150
2	7	26	65	138
3	3	14	37	78
4	0	2	8	18

DETERMINATION OF CORRECT PIPE SIZE A47C PUMP

One pipe siphon feed system



E max. = 20 m
 (E - H) max. = 4,5 m

Nozzle (US GPH)	0,6		1		1,25		2		3		4		5		10																			
	d(mm)**	H(m)	d(mm)**	H(m)	d(mm)**	H(m)	d(mm)**	H(m)	d(mm)**	H(m)	d(mm)**	H(m)	d(mm)**	H(m)	d(mm)**	H(m)																		
0	4	74	4	44	4	35	6	150	4	22	6	113	4	14	6	75	8	150	4	10	6	56	4	6	37	4	118	4	3	21	6	70	8	150
0,5	4	82	4	49	4	39	6	150	4	24	6	126	4	16	6	83	8	150	4	11	6	62	4	7	41	4	132	4	3	23	6	78	8	150
1	4	91	4	55	4	44	6	150	4	27	6	139	4	18	6	92	8	150	4	13	6	69	4	8	45	4	146	4	4	26	6	87	8	150
2	4	19	4	65	4	52	6	150	4	32	6	150	4	21	6	110	8	150	4	15	6	82	4	10	54	4	150	4	5	31	6	103	8	150
3	4	126	4	75	4	60	6	150	4	37	6	150	4	24	6	127	8	150	4	18	6	95	4	11	63	4	150	4	6	37	6	120	8	150
4	4	143	4	86	4	68	6	150	4	42	6	150	4	28	6	145	8	150	4	21	6	108	4	13	72	4	150	4	7	42	6	136	8	150

OPERATION

To start burner turn main electricity isolating switch and, where fitted, separate burner switch, to ON.

burner can be stopped in an emergency by opening the electrical switch provided in the line between the burner and the electricity supply.

There is a pre-purge period during which the ignition is switched on, and the motor runs.

At the end of this period, pump solenoid valve is energised allowing oil flow to nozzle, burner lights.

After a further period the ignition is switched off and the burner continues to run until it is switched off by:-

- (a) the control thermostat contacts opening upon the room or water temperature being reached
- or (b) safety or limit thermostat contacts opening
- or (c) burner is switched off manually.

If, during start up, the flame fails to be established the photo cell will detect this and will shut down the burner and the 'lock out' lamp in the sequence control box is automatically lit.

If, during normal running, the flame is extinguished, the ignition spark is restored within 1 second. If burner fails to re-light it goes to 'lock out' after 15 seconds.

manual reset button, also on the sequence control box, should not be operated until at least 30 seconds after the burner has been 'locked out'.

When appliance has reached its normal working temperature, final adjustments may be necessary to obtain optimum firing conditions.

During normal operation photo cell should NOT be removed.

FAULT FINDING

Motor fails to start. Check that power is available to the burner. Check all fuses in the supply to the burner. Check that the contacts of both control and safety limit thermostats on the appliance or in the room are closed and therefore 'calling for heat'. If these thermostat contacts are not closed check the thermostat settings.

Motor starts but burner will not light. If the flame is not established the burner will be stopped and 'locked out' after a safety period of 15 seconds: the warning lamp is illuminated on the sequence control box. The manual reset button, also mounted on the sequence controller should not be operated until at least 30 seconds after the burner has been 'locked out'.

Ascertain whether oil is being sprayed by the nozzle.

If oil is passing through nozzle, check that there is a spark at the electrodes. Check all connections including high voltage leads.

Check electrode gap and correct if necessary.

Ensure that electrodes are not short circuited and that their insulators are not cracked.

If there is no oil spray check that there is an oil supply to the burner and that all valves are open. Check that nozzle is not blocked. Ensure that all filters are able to pass oil. Check that the solenoid valve is operative. Check that fuel pressure delivered by the pump is correct.

Unstable pump pressure. Check that the pump has been correctly primed by disconnecting return pipe from pump (on two-pipe systems); air-free fuel should flow when the pump is run. On single pipe systems open the vent plug to ascertain that air-free oil flows out.

On installations where the burner pump has to lift fuel from the tank check that all pipework and connections on the suction side are free of leaks and that there are no blockages.

Burner fires then stops after a short time. Check that photo-cell is clean and correctly located. Check air damper setting and readjust as necessary.

Flame unstable, burner stops. Check for fuel supply fault, eg partial blockage of fuel supply pipe. Check nozzle atomisation, etc.

Burner stops after satisfactory running period. If flame fails during normal running period, the ignition will be switched on again. If the flame is not re-established after a period the burner is stopped and 'locked out', and a warning (lock out) light illuminated on the sequence control box.

If the flame is re-established during this period the ignition is switched off and the burner will continue to operate normally.

MAINTENANCE

Before carrying out any work on the burner ensure that the electricity is switched OFF, and isolate oil supply.

Filters. Withdraw filter and clean it in paraffin, or other solvent, using a stiff brush.

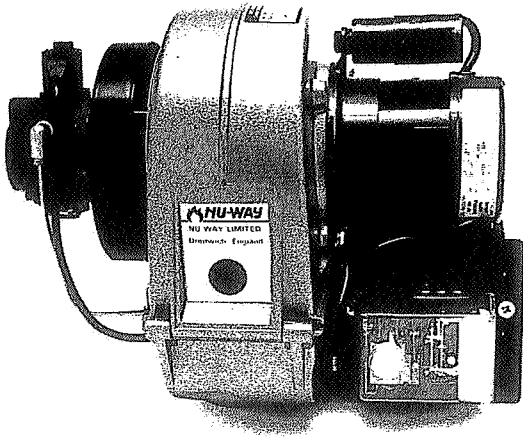
Replace filter and pump end-plate.

A filter should also be fitted in the fuel supply pipe. If fitted with a disposable element this should be replaced at least once per year, the frequency depending on the needs of the installation and cleanliness of the fuel.

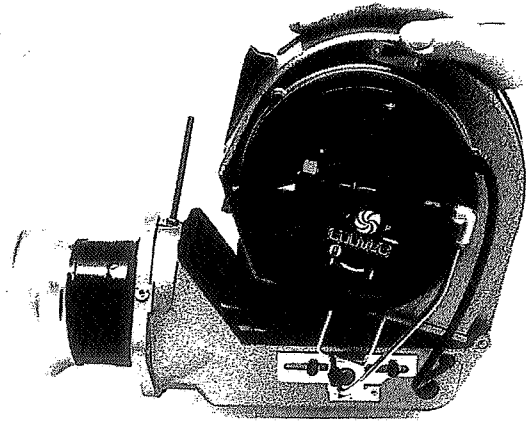
If the filter has a cleanable element this should be cleaned, at suitable intervals, in exactly the same way as has been described for the pump filter.

Motor. The motor requires no maintenance: it has bearings which are factory lubricated for the life of the motor.

Fan. If fan is damaged or becomes loose on the motor shaft the motor must be removed (4 screws) from the burner casing. Correct position of fan is such that a 3 mm gap exists between the end of the scoop and the inside of fan backplate (motor side).



General view of the burner. On the extreme left is the pump and solenoid valve. Top right is the motor with the control box beneath and transformer to the rear.



To hinge open the burner casting, FIRST disconnect oil feed pipe from union which then releases retaining catch. Then undo locknut from stud at front of casing and gently hinge open.

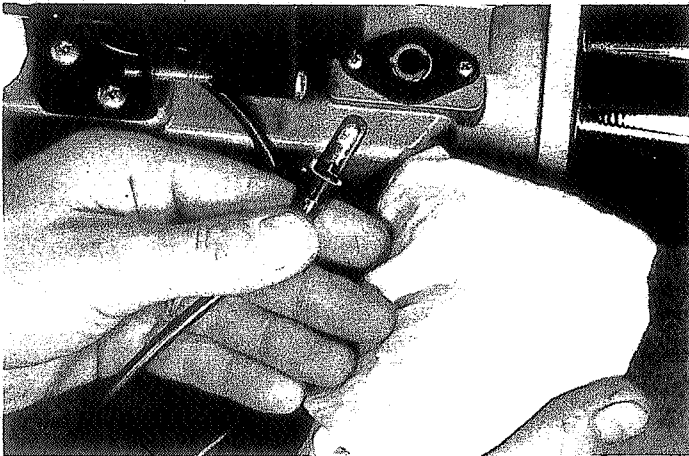
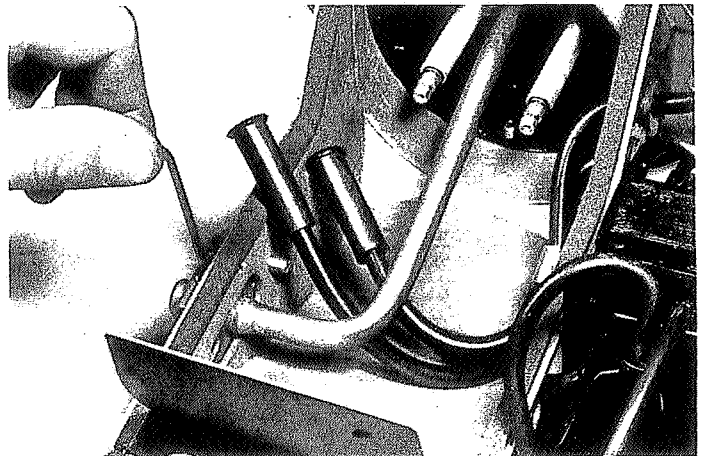
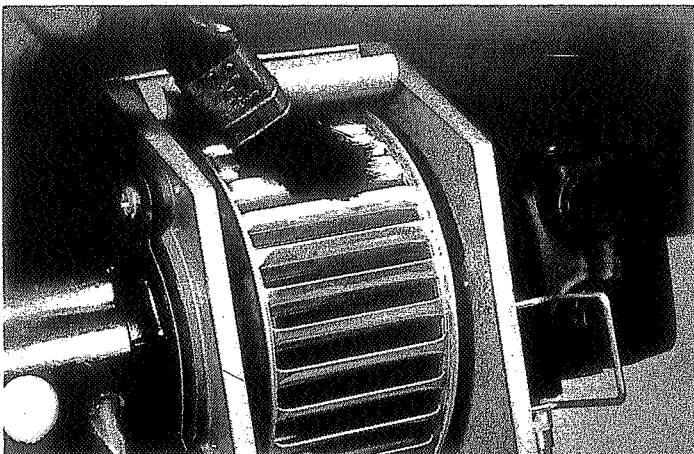


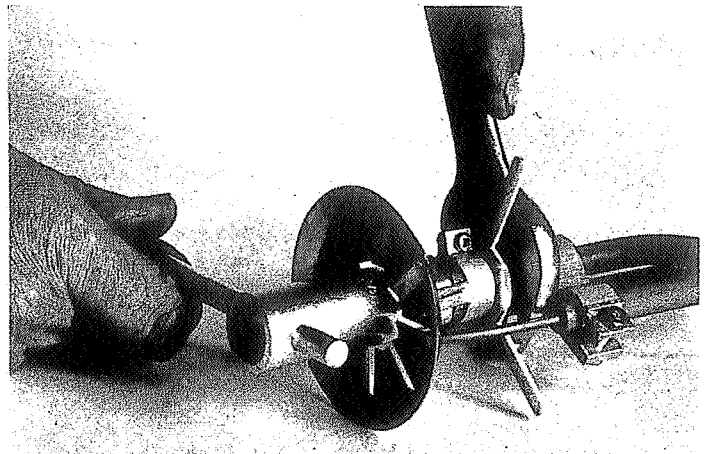
Photo-cell is removed from burner for cleaning. Do not touch cell with the fingers; use only a clean, dry cloth for cleaning. For burners fitted with Satronic TF830N control box you should ensure the 'M.Z.' photo-cell is positioned as indicated by the position label.



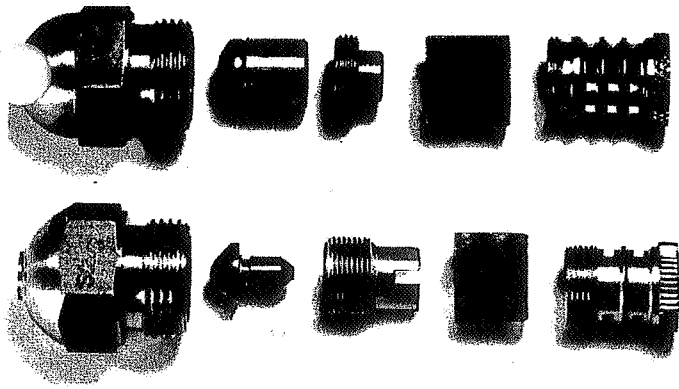
Before attempting to remove inner assembly, withdraw photo-cell from its housing. Assembly is removed by releasing retaining grub screw, disconnecting H.T. leads to electrodes, and gently withdraw.



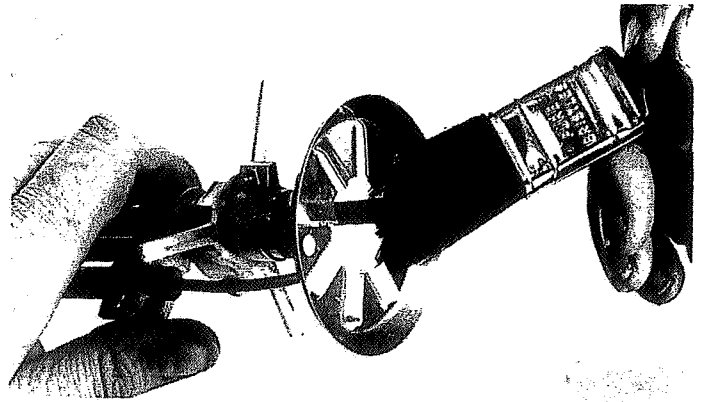
Cleaning the fan runner: use a stiff brush.



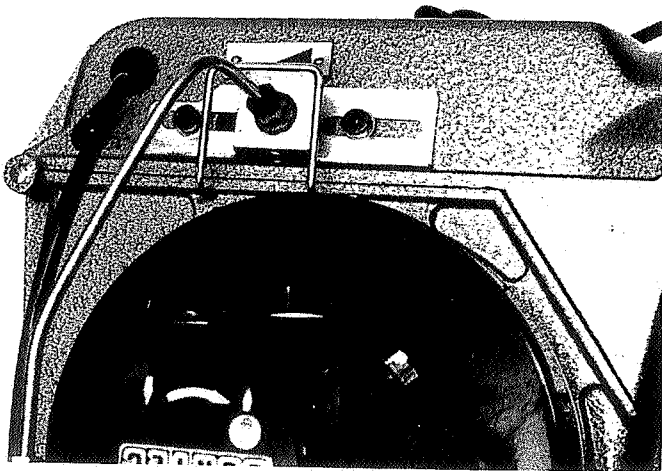
Nozzle is removed from inner assembly using a tube spanner. Take care not to damage diffuser or alter electrode setting. Fit nozzle to burner inner assembly by hand, use spanner only for final tightening.



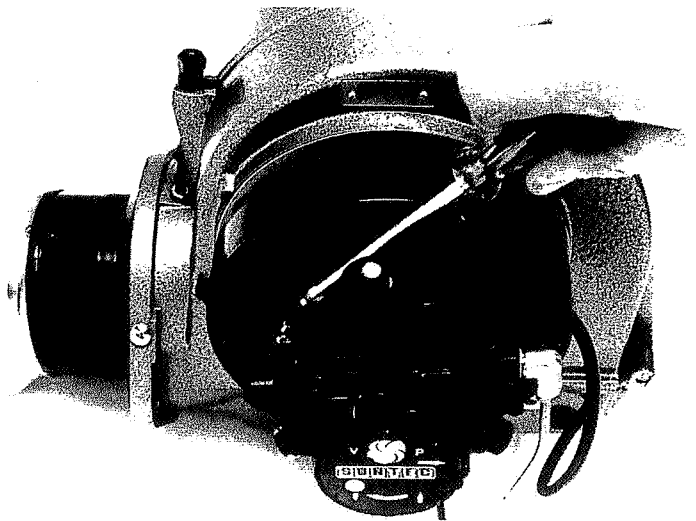
Dismantle nozzle itself to enable internal filter to be cleaned. Do not use any metal or wood to remove deposits. Wash in solvent. Wipe off any remaining dust using a clean, lint-free rag. Illustration shows correct assembly sequence for (above) Monarch and (below) Steinen nozzles. Replace after 2000 operations or 1 normal heating season.



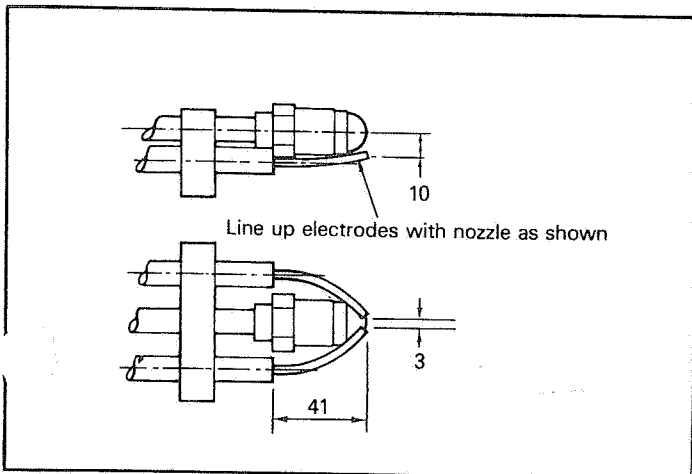
Air diffuser should be cleaned using a stiff brush.



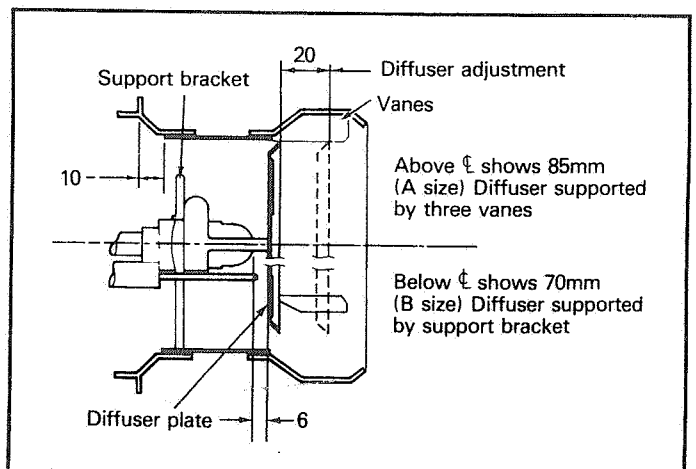
Stable burner head screws shown with plastic covers removed.



Set rotary air damper by undoing screw and turning circular damper section to required position (see pre-firing check).



Electrodes should be set to these dimensions to ensure trouble free



Adjustable head arrangement for both NOL5 and NOL8 burners.

BOILERHOUSE INSTRUCTIONS

NOL5 NOL8

These instructions are provided for the benefit of the operator and are intended to be of assistance in making minor adjustments and providing the burner with proper maintenance, cleaning and lubrication. Additional information can be obtained through your installer or from the manufacturer.

FUEL

The unit is designed to burn light distillate oil (28-40 secs Redwood No 1 at 38°C: 1.4-5.7 cSt at 38°C). Do not attempt to use petrol, or any oil which may contain traces of petrol.

BOILERHOUSE VENTILATION

It is most important that the boilerhouse has an adequate supply of fresh air for both ventilation and combustion purposes.

PUMP BLEEDING

If the fuel tank is allowed to drain completely it will be necessary to bleed the oil pump free of air by slackening the plug in the pressure gauge port allowing oil to run through until air free. (See pump instructions.)

OIL FILTRATION - SEDIMENT REMOVAL

There is an oil strainer inside the body of the fuel pump and a separate oil filter between the oil pipe from the tank and the oil burner. The oil strainer should be removed and cleaned with paraffin during the pre-season check-up. At the same time the oil filter cartridge should be replaced or cleaned, as appropriate for the type fitted. Bleed fuel pump free of air, as described above, to remove any trapped air.

Draw off any accumulation of water or sediment in the fuel tank by opening the sludge cock in the tank bottom, immediately before any new delivery of fuel. Do not run the burner while the tank is being refilled and, if possible, do not restart for one hour after refilling is concluded.

NOZZLE CLEANING

Nozzles cleaned as required see maintenance photographs. Replace after 2000 hours service.

STARTING AND STOPPING

Start the burner by setting the thermostat pointer to a figure which is higher than the room or water temperature. Stop the burner by setting the thermostat to a point below this temperature.

The burner may set itself in the 'Safety Lockout' position — this will occur if the burner stops for any reason other than the action of the thermostat — and must then be restarted by pressing the reset button on the flameguard/sequence control. Ask your installer to

instruct you in the proper method of resetting. If frequent resetting becomes necessary, call the service engineer whose name and address should be inserted below.

Do not attempt to start the burner when the fire-box may be full of oil vapour. It is desirable to allow the furnace to cool for about 15 minutes before resetting the control to restart the burner from the 'Lock-out' position.

EMERGENCY STOP

The burner can be stopped in emergency by opening the wall switch provided on the line between the burner and the electric supply. The installer must identify this switch.

CHECKING BURNER OPERATION

Inspect burner flame periodically. If it becomes lopsided or smokey, call a service engineer.

When cleaning the room housing the heater unit, always switch off the burner to reduce the amount of dust and lint drawn in through the air inlet.

SUMMER CARE, AUTUMN RESTART

During the summer months, or whenever heat is not required over a considerable period, the wall switch may be opened. To restart the burner it is only necessary to close this switch.

At the close of the heating season have the furnace cleaned and flues swept. See that the complete burner plant, especially the electric ignition system, nozzle, oil filter etc., is checked over and cleaned by a competent service engineer.

PREVENTIVE MAINTENANCE

Consult your heating engineer for advice on regular preventive maintenance intervals. It is not possible to recommend a service interval for universal use since operating conditions vary widely from installation to installation.

CAUTION

Never burn rubbish or refuse in the heater fire-box. Never leave waste paper or rags lying around near the burner or the heater.

NOTES

Nu-way oil burner training courses are available — for details of specific courses contact the training officer at head office.

SAFETY

The burner must be operated and serviced in accordance with the procedures detailed within this handbook.

SPARES

IMPORTANT: It is essential when ordering spare parts that model number, serial number and specification number are quoted.



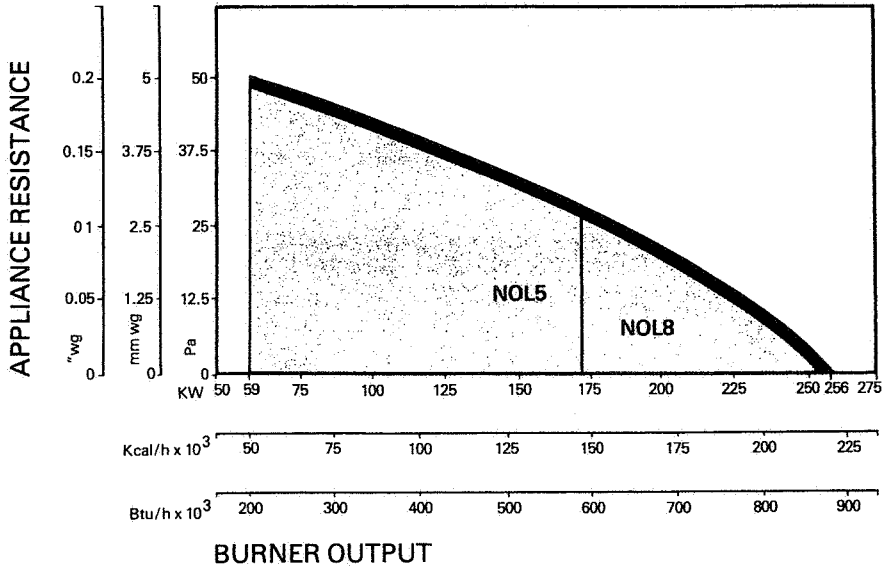
MODEL

**NOL5
NOL8**

ELECTRICAL DATA

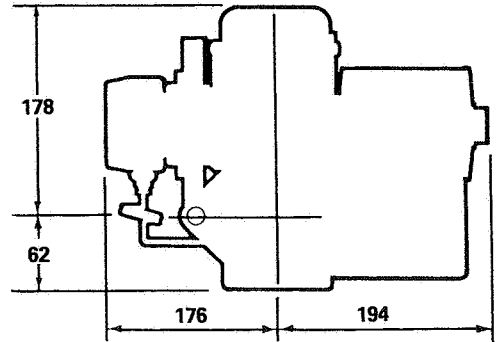
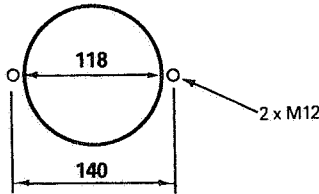
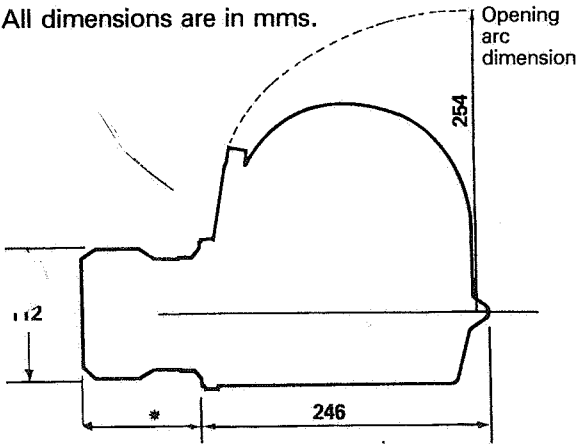
Mains Supply (V) 230+10% - 15%
Single phase
Frequency (Hz) 50
Burner Motor (W) 150 (1/5 hp)
2700 rev/min,
capacitor start
Burner Start Current (A) 1.5
Burner Run Current (A) 0.94
Main Fuse (A) 6.0 HRC
Ignition direct spark from 10 kV
18 mA transformer, centre tap earthed
recommended minimum mains cable
size 1 mm². HRC fuse 6 amp.

BURNER SELECTION



DIMENSIONS

All dimensions are in mms.



* Standard projections 85 & 152

FULL BURNER DESIGNATION NOL5-NOL8

BURNER TYPE	NO	(L)	(5/8)	(S)	(1)	(D/L/S)	9/152
OIL TYPE							
NOMINAL OUTPUT (in 100,000's Btu/hr)							
OPERATION							
ELECT. SUPPLY (1PH)							
CONTROL MAKE							
PROJECTION							

TYPICAL BURNER DESIGNATION NOL 8 S1D 152



Nu-way Limited, P.O. Box 1 Vines Lane, Droitwich,
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CERT No. FM00921

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