



KwikHEAT



**WATKINS
HIRE LTD**

**TECHNICAL MANUAL
WHL KwikHEAT™ MH60**

FREEPHONE 0500 526696



WHL KwikHEAT™ MH60 INDIRECT OIL FIRED HEATER

CONTENTS

- 1. INTRODUCTION**
- 2. KEY FEATURES**
- 3. COMPLIANCE NOTICES**
- 4. GENERAL DESCRIPTION**
- 5. GENERAL CONSTRUCTION**
- 6. PRINCIPAL OF OPERATION**
- 7. DUCTING**
- 8. THERMOSTAT AND TIME SWITCH**
- 9. LOCATION/POSITIONING**
- 10. HEATER SITING**
- 11. AIR SUPPLY**
- 12. FUEL SUPPLY - GENERAL**
- 13. FUEL**
- 14. FUEL CONNECTION TWO PIPE SYSTEM**
- 15. ELECTRICAL SUPPLY DUAL VOLTAGE**
- 16. FLUE INSTALLATION**
- 17. COMMISSIONING**
- 18. COMMISSIONING - PRETEST**
- 19. COMMISSIONING – IGNITION**
- 20. COMMISSIONING - AIR DELIVERY SYSTEM**
- 21. SERVICING**
- 22. PLANNED SERVICING**
- 23. SERVICING PROCEDURE – MAJOR COMPONENT PARTS**
- 24. TECHNICAL DATA**
- 25. DIMENSIONS**
- 26. REFERENCE INFORMATION**
- 27. WIRING DIAGRAMS**

1. INTRODUCTION

The WHL KwikHEAT™ MH60 is an indirect fired portable heater, which is designed, manufactured, assembled for Watkins Hire, inspected, and tested by Watkins Hire with safety, quality, efficiency and reliability in mind for the rental market. The heater will only operate at maximum efficiency if the correct sequences are followed and proper attention is given to cleaning and maintenance procedures. The MH60 model has an output of 60kW.

The MH60 units can suit either ducted applications, or be used as free blowing units, each heater must be connected to its own individual open flue.

Each heater is fitted with a forced draught burner which has been test fired and pre-set prior to dispatch. The safety functions of the burner are by way of a fully sequential control box fitted to the burner.

The WHL KwikHEAT™ MH60 provides 100% fume free, dry air economically with large volumes. Heat is created by "**Convection**" flames heat up the heat exchanger so that the surrounding air is heated as it passes over the chamber, creating hot dry 100% fume-free clean air. Twin duct outlets provide heated air too hard to reach places up to 30 metres away.

The WHL KwikHEAT™ MH60 has been robustly constructed the heater housing remains cool to the touch, and is rated to IP44 for weather protection, the heater is fitted with a re-cycling thermostat to reduce nuisance lockouts and allow the appliance to continue to function within safe operational limits.

The WHL KwikHEAT™ MH60 is designed to be used with a single phase electric supply of either 230V 50Hz or 110V 50Hz.

The WHL KwikHEAT™ MH60 utilises the latest Rectus environmental oil couplings are fitted with a valve. The valves close automatically when disconnected, which prevents any oil from leaking.

WATKINS HIRE Ltd. has a commitment to continuous improvement, and reserves the right to amend or change the specification of the WHL KwikHEAT™ KWIKHEAT MH60 Heater subject to compliance with the appropriate European, national, and local regulations.

Typical Heated Area

- 1500 m³
- 52965 ft³



Typical Applications

- Construction projects
- Warehousing
- Horticultural
- Schools and universities
- Supermarkets and retail
- Exhibition halls
- Events Marquees(festivals)
- Showrooms
- Garages
- Ships
- Temporary accommodation
- Manufacturers
- Food preparation
- Oil refineries
- Sports Halls and Leisure centres
- Factories
- Industrial painting
- Churches
- Equipment pre-heating
- Pest and moisture control

2. KEY FEATURES

- 60kw output
- Highly efficient
- Reliable
- Portable to inaccessible areas
- Quiet in operation @ 68dbA @ 3m
- Safe and Easy to Use
- Robust construction
- Clean dry heat essential in applications for accelerated drying and curing
- Ideal for areas with limited ventilation
- 100% Fume free
- Housing remains cool to the touch
- Fuel 35 sec Class D (diesel/kerosene)
- Automatic operation
- High air displacement 3060 m³/hr
- Maximum duct length 30m
- Overheat switch protect
- Summer switch for ventilation
- Operate on either 110v or 240v single phase 50 Hz
- Rectus Double Shut off Oil connection
- Length 1220mm x Width 775mm x Height 1500mm
- Pneumatic Tyres
- Weight 220kg

3. COMPLIANCE NOTICES

The KWIKHEAT MH60 oil fired Heater detailed herewith is manufactured for WATKINS HIRE Ltd. within a strictly controlled quality environment within the parameters of ISO 9001.

The KWIKHEAT MH60 has been tested and assessed for compliance with the following European Directives.

Machinery Directive (89/392/EEC)

Low Voltage Directive (73/23/EEC & 93/68/EEC)

Electromagnetic Compatibility Directive (89/336/EEC & 91/31/EEC)

Product Liability Directive (65/374/EEC)

The manufacturer has taken reasonable and practical steps to ensure that KWIKHEAT MH60 Heaters are safe and without risk when properly used. These heaters should therefore only be used in the manner and purpose for which they were intended, and in accordance with the recommendations detailed herewith.

The heaters have been designed, manufactured, assembled, inspected, and tested, with safety and quality in mind, there are certain basic precautions which the installer and user should be aware of, and they are strongly advised to read the appropriate sections of the information pack accompanying the heater, prior to installation or use.

It is the responsibility of the installer, user, or hirer, of such products supplied by WATKINS HIRE Ltd. to ensure that they are familiar with the appropriate information/manuals, supplied by the manufacturer, and that they are suitably aware of the purpose of the manuals and the safety instructions. In addition, operators must be suitably trained in the use of the appliance so as to ensure its continued safe and efficient use.

WATKINS HIRE Ltd. has a commitment to continuous improvement, and therefore reserves the right to amend or change the specification of the KWIKHEAT MH60 Heater subject to compliance with the appropriate European, national, and local regulations.

Contained within the text of the manual, the words '**Caution**' and '**Warning**' are used to highlight certain points.

Caution is used when failure to follow or implement the instruction(s) can lead to premature failure or damage to the heater or its component parts.

Warning is used when failure to heed or implement the instruction(s) can lead to not only component damage, but also to a hazardous situation being created where there is a risk of personal injury.

The KWIKHEAT MH60 Oil fired heaters conform to the following harmonized standards;

BS EN 292 - Part 1 : 1991 Safety of Machinery - Basic Concepts, General Principles for Design
Basic terminology, methodology

BS EN 292 - Part 2 : 1991 Safety of Machinery - Basic Concepts, General Principles for
Design Technical Principles and Specifications

BS EN 60204 - Part 1 : 1993 Safety of Machinery - Electrical Equipment for Machines
Specification for General Requirements

BS EN 60335 - Part 1 : 1988 Safety of Household and Similar Electrical Appliances General
Requirements

BS EN 55014 – 1993 Limits and methods of measurement of radio disturbance characteristics of
electrical motor operated and thermal appliances for household and similar purposes, electrical
tools and similar electric apparatus

EN 50165 – 1995 Electrical Equipment of non-electric heating appliances for household and
similar purposes, safety requirements

4. GENERAL DESCRIPTION

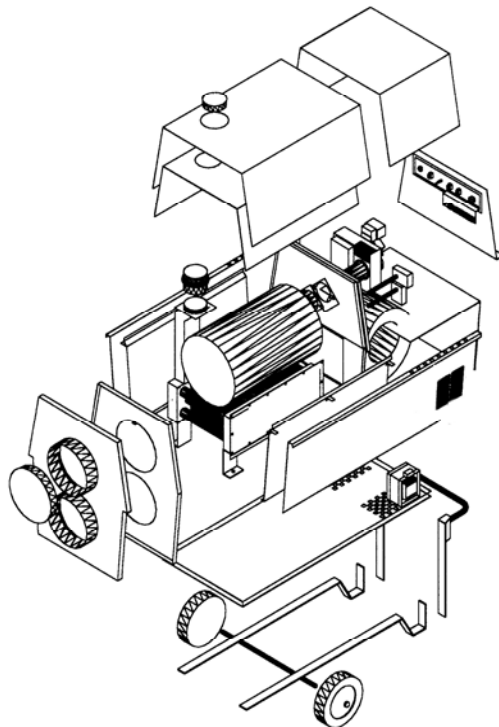
The model MH60 is fitted with an internal pressure jet oil burner suitable for the following fuel oil:
Please only use the following fuel types only

Gas Oil Class D to BS2869

5. GENERAL CONSTRUCTION

The model MH60 is mainly constructed as follows:-

- | | | |
|--------------------------|---------------------------|---|
| <input type="checkbox"/> | Outer panels | 1.2mm Zintec , Powder Coated |
| <input type="checkbox"/> | Inner Panels/ Heatshields | Self Colour 1.2mm Zintec |
| <input type="checkbox"/> | Combustion Chamber | Stainless Steel |
| <input type="checkbox"/> | Wheels | Steel Rimmed, Pneumatic (Max Pressure 47 psi) |
| <input type="checkbox"/> | Oil Line Connections | Rectus Double Shut off Quick Release type |



Note

Neither asbestos nor soft soldered joints are used in the construction or manufacture of the WATKINS HIRE Ltd. range of Heaters.

The materials selected for use can withstand the mechanical, chemical, and thermal stresses which they will be subject to during foreseen normal use when installed in accordance with the manufacturers recommendations.

General requirements

Caution

Ensure that the fuel supply is in accordance with the manufacturer's recommendations and is as stated in the manual. Installation, commissioning, and servicing must only be carried out by appropriately qualified and competent persons.

Warning

Unauthorised modifications to the appliance, or departure from the manufacturers guidance on intended use, or, installation contrary to the manufacturers recommendations may constitute a hazard.

Note

To ignore the warning and caution notices, and to ignore the advice from the manufacturer on installation, commissioning, servicing, or use, will jeopardise any applicable warranty, moreover, such a situation could also compromise the safe and efficient running of the appliance itself, and thereby constitute a hazard.

The installation of the appliance must meet all the relevant European, National, and Local criteria.

Caution

The heater must not be installed where high wind velocities may affect burner operation. Suitable protection should be provided for the appliance when it is located in a position where it may be susceptible to external mechanical damage from; for example, fork lift trucks.

6. PRINCIPAL OF OPERATION

Fuel oil is drawn through a pipe from a fuel tank into the fuel filter and to the fuel pump. Oil under pressure then passes through the solenoid oil valve to the pressure jet burner head. Surplus oil and any air in the system returns to the fuel tank through the return pipe.

Ignition is by high voltage spark controlled by a fully automatic safety system complying with BS 799 Part 3 utilising a photo-electric cell to monitor flame failure. A separate socket is provided on the electrical panel for connecting a time switch and thermostat to give fully automatic control.

The main fan supplies the airflow and provides a large volume of heated air.

When the burner is stopped, either manually or automatically, the fan/limit thermostat allows the main fan to run on until the heater is cool; the fan will then stop automatically.

A safety overheat limit thermostat is also fitted. This will shut the heater down if the normal maximum working temperature is exceeded due to restricted airflow or excessive fuel input.

The heater will restart when the unit cools down to normal working temperature, should the maximum working temperature be severely exceeded then a second limit thermostat will shut down the heater which will not restart until a manual reset button has been depressed.

7. DUCTING

The unit is supplied with twin 300mm Diameter outlets which can each have up to a maximum of 30 metres of ducting fitted.

Should there be a requirement to use only one outlet, then an optional insulated Duct Cover can be obtained to fit the top outlet.

Caution

Restrictions and bends within the duct should be kept to a minimum so as to ensure an unrestricted flow of heated air and prevent nuisance lockouts and overheat situations. It is recommended that the first section of ducting is validated to 150°C

8. THERMOSTAT AND TIME SWITCH

A socket is fitted to the heater control panel for use when automatic control is required.

9. LOCATION/POSITIONING

Warning

All of the basic criteria must be satisfied prior to commencing installation and commissioning, additionally, the Heater must be positioned and installed so as to comply with all the relevant standards and guide lines contained within this manual, as well as meeting national and local fire regulations and insurance criteria, especially if it is proposed that the heater is to be installed within a special risk area (e.g. proximity to where petrol engine vehicles are stored or parked, where cellulose spraying takes place, where woodworking machinery is operated, etc.).

Indirect fired heaters must not be located in hazardous areas, however, it is permissible for the heater to supply air to such areas. The heater must not be installed within an environment where there is a high concentration of chlorides, fluorides, salts, or other aggressive or volatile chemicals/compounds.

The location must also allow for adequate clearance for the air supply, return air circulation, oil supply, electrical supply, whilst also providing good and safe working access.

Any combustible material adjacent to the heater or flue system must be so placed or shielded so that its surface temperature does not exceed 65°C.

Warning

TRANSPORTATION The heater should be kept in a HORIZONTAL position at all times when being transported by fork lift truck , crane, hiab or other mechanical devices. Care should be taken when loading/unloading and positioning the MH60 so as to ensure it is not dropped or subject to adverse impacts or loads.

Any damage to the MH60 must be reported to the Service Department at Watkins Hire Limited.

10. HEATER SITING

The heater must be installed on a level surface capable of supporting the weight of the heater and any ancillary equipment.

11. AIR SUPPLY

When the appliance is used within a building or enclosed area provision must be made for the existence of an air supply for both combustion and ventilation. It is a requirement that the area where the air heater is located must have a permanent air vent of negligible resistance direct to the outside air.

Such air vents must be positioned so as not to become blocked or flooded, nor should they be placed so as to introduce undesirable matter (e.g. flammable, volatile, or aggressive chemicals/compounds or potentially hazardous or harmful substances) either direct from the outside, or through their proximity to an adjacent extraction system.

12. FUEL SUPPLY - GENERAL

The MH60 oil fired heater is manufactured and pre-set for use with 35 second gas oil delivered to the burner via a suitable piped system from the oil storage tank.

The constraints of the application will, to a large extent, determine whether it is preferable to use a single pipe gravity feed system, or whether the two pipe pumped system is more appropriate.

All pipe work must be constructed and installed so that it does not permit the ingress of air.

The construction, size, and position of the oil storage tank must take account of the current regulations, as well as suiting the requirements of the installation.

13. FUEL

In order to promote trouble free operating it is necessary that the oil within the storage tank and oil line does not fall below the cold filter plugging point (cfpp), in this country and with class D fuel (also referred to as gas oil).

The critical temperature is -4°C for this summer grade.

The cfpp critical temperature for the winter grade is -12°C .

If summer grade fuel is stored for winter use in areas prone to severe frosts and low temperatures it will be necessary to insulate or even heat the supply tank and pipe work.

Warning

The pump pressure must not exceed a maximum of 0.4 bar, this is because beyond this point gas is liberated from the oil.

14. FUEL CONNECTION TWO PIPE SYSTEM

This is used where the oil storage tank is lower than the pump. Access for the fuel feed to the burner should be via a suitable tapping made in the top of the tank, and the fuel feed pipe should extend to not less than 100mm above the bottom of the tank.

A non return valve with a metal to metal seat should be fitted, especially if the return pipe work is terminated at a level above the draw off tube.

The non return valve must be removable for service and maintenance purposes, and the return pipe from the pump must therefore be extended down into the tank to the same level as the suction pipe.

The presence of a tamper proof isolating valve fitted within the return pipe is only required if there is a risk that oil will siphon out of the tank if the return pipe is disconnected at the pump during maintenance or servicing and if the non return valve has been omitted.

15. ELECTRICAL SUPPLY DUAL VOLTAGE

The MH60 is designed to be used with a single phase electric supply of either 230V 50Hz or 110V 50Hz. The voltage selection switch should be set accordingly and the correct plug must be fitted to the electrical supply cable.

Wiring external to the cabinet heater must be installed in accordance with any local, national, and European regulations, as well as meeting the appropriate requirements of IEE regulations. The

MH60 is a dual voltage appliance and will function satisfactorily when provided with either a 230V or 110V electrical supply. The appropriate plug should be fitted and the voltage selection switch set accordingly.

The electrical supply cable to the MH60 must be regularly checked to ensure it is in good condition and without damage. The same applies in respect of any extension leads.

The means of connection to the main electrical supply must allow for complete electrical isolation of the heater.

Warning

Ensure that the electric and oil supplies are turned off before any electrical work is carried out on the heater. Ensure that wiring cannot make contact with any surfaces liable to be subject to high temperatures or where the insulation of the wiring could be impaired as a result of such contact.

All MH60 heaters must be earthed.

Caution

The main electrical supply must not be switched off or disconnected as a method for stopping or shutting down the heater. The exception to this is in an emergency, or during servicing, when the heat exchanger has been allowed to cool sufficiently to prevent any damage from occurring.

Claims for damage will be charged to the user or hirer if the damage resulted from incorrect wiring or the incorrect use of the heater.

16. FLUE INSTALLATION

An integral flue spigot is fitted to all MH60 heaters thereby allowing the flue to connect directly to the heater. The minimum length of flue is 1m the maximum length of flue is XXm. The flue must always be fitted with an approved terminal.

Where the MH60 is used within a building or enclosed structure the design of the flue should be such that it can be disconnected to allow for cleaning and servicing. Furthermore, all of the flue section joint sockets must face upwards, and the seal between the sections achieved through mechanical joints or through the use of approved caulking string and grout. It is strongly advised that BS 5854 and BS 5440 parts 1 and 2 are referred to.

Warning

Always ensure that the appropriate personal protective equipment is used.

17. COMMISSIONING

Note

It is a requirement that only suitably qualified and competent personnel are allowed to carry out the commissioning of the heater.

It is also strongly recommended that prior to commissioning the engineer familiarises himself with; the information contained within the information pack that accompanies the heater, the heater itself, and with the specific requirements of the installation/application.

The following checks should be carried out after the familiarisation process.

Warning

All Heaters undergo a rigorous test programme prior to being dispatched, whilst such a programme does involve pre-commissioning and setting up the heater to operate efficiently and well within its designed operational limits, this does not mean that on site commissioning is less important than might otherwise be the case, this is particularly so when the MH60 is fitted with additional flue lengths. The idiosyncrasies of each installation can only ever be allowed for through the use of thorough on site commissioning carried out by trained and experienced personnel equipped with the correct tools and apparatus.

Note

It is strongly recommended that equipment used for the sampling and analysis of flue gases is accurate to within +/- 0.1% and maintained so that it is regularly calibrated.

18. COMMISSIONING - PRETEST

Check to ensure electrical safety, and inspect and check the oil installation, testing for leaks.

- (a) Ensure that the electrical supply is turned off.
- (b) Ensure that the oil supply is turned off.
- (c) Check that all panels and fasteners are secure and in place.
- (d) Check that the heater is installed so that it is square and that the support is adequate.
- (e) Ensure that warm air delivery outlets are open and that ducting is adequately secured.
- (f) Ensure that if filter assemblies are fitted that they are secure and correctly located.
- (g) Check that air inlets are clear and that return air paths are adequate.
- (h) Ensure that the flue is secure, adequately supported, and that the various joints are properly sealed.
- (i) Check that condensate trap and drain facilities are adequate (if fitted).
- (j) Check that there is provision for flue gas sampling and that this sample point can be plugged and sealed after commissioning.
- (k) Check that fan and limit stat settings have not been disturbed and are as follows
 - Fan on - 60oC
 - Overheat limit - 100oC

Fan off - 30°C

Manual overheat setting 120°C

Also check that the white button (automatic) is pulled outward and that the red button (reset) is pushed inwards to the reset position.

(l) Ensure that the burner is securely attached to the heater.

(m) Test for electrical earth continuity between the heater, oil pipe work, and mains supply.

Check correct supply voltage and voltage selection switch is in the correct position. Select appropriate voltage and set switch accordingly and replace tamperproof cover to the voltage selection switch.

(n) Turn on main electrical supply, select the following switch settings

On/Off - On

Heat/Ventilation - Ventilation

Manual/Automatic - Manual

The fan will start enabling fan direction etc to be verified. Reset on/off switch to off position.

(p) Turn mains electrical supply to off.

(q) Set thermostat to 'demand' position (or install thermostat/timer link).

19. Commissioning - Ignition

Warning

Do not proceed with commissioning unless all the above criteria have been satisfied.

(a) Ensure that the electrical supply is turned off.

(b) Ensure that the oil supply is turned off.

(c) Select the following switch settings on the heater

On/Off - off

Heat/Ventilation - heat

Manual/Automatic - automatic

(d) Turn on main electrical supply.

(e) Select 'on' position for heater on/off switch.

(f) Check for the following burner sequence

Interval Operand

1 <5s Combustion air damper actuated, burner fan motor initiates purge cycle.

2 <15s Solenoid valve opens ignition transformer provides spark for burner ignition...

E I T H E R -----

3 >15s Ignition failure caused by oil starvation resulting in burner lockout/shut-down.

(g) Set heater on/off switch to off position

(h) Attach oil manifold (bleed screw and pressure gauge)

(i) Open oil supply valves and bleed air from pipe work and adjust burner oil pressure as per detailed in burner manual.

----- O R -----

- 4 >15s Burner ignition. flame detection...
- 5 <20s Burner ignition cycle complete

Note

It is strongly recommended that the separate manual concerning the operational details of the burner supplied with the heater as part of the information package is studied prior to commissioning.

Time intervals within the ignition sequence will vary slightly from one model to another.

Warning

If burner ignition is not satisfactorily accomplished, commissioning must not proceed until the reason or fault has been identified and rectified, if necessary by reference to the separate burner information.

- (k) Repeat steps c,a,
- (l) Repeat steps d,e,f, allowing the heater to reach thermal equilibrium.
- (m) Adjust thermostat to its highest setting, and allow the heater to continue to fire.
- (n) Gradually reduce the temperature setting on the thermostat until the burner shuts down, (@ < ambient and then gradually increase the temperature setting on the thermostat until heat is called for, (@ > ambient) and the burner automatically re-fires.
- (o) Check fan and limit stat by depressing and holding in the fan motor overload re-set button, located on the heater electrical panel. The time between the fan stopping and burner shut down should be noted, once the burner has shut down the overload on the motor should be released.

If the time interval between fan stop and burner shut down is greater than 90 seconds further checks should be made. These are as follows

- (i) Check settings on fan and limit stat are correct, ie, fan on 60oC, fan off 30oC, limit 100oC.
- (ii) Check that the position of the unit is correct, ie, equi-distant between heat exchanger body and heat shield panel.
- (iii) Check integrity of unit, ensuring that neither the bi-metallic strip nor its casing is damaged.

(p) Undertake flue gas analysis using approved and calibrated analysing equipment recording data on the commissioning card, ie, CO, CO2, net and gross flue temperatures.

Record burner oil pump pressure, ambient temperature, barometric pressure, and smoke reading (0 - 1 Baccarach scale).

Note (i)

The burner air and oil pressure settings should be only very finely adjusted to achieve a CO2

reading of 12.5% (+/- 0.5%).

Note (ii)

The gross efficiency must be approximately 80%.

Note (iii)

All Heaters are test fired and pre commissioned as part of the manufacturing process, if however, during on site commissioning the data are found to be not in accordance with the manufacturers data, then the following action is recommended.

* Re-check all readings and calculations.

* Adjust burner as per manufacturers instructions.

* Consult WATKINS HIRE Ltd. Technical Department.

(q) Complete commissioning card and provide operating instructions for the user, high-light the fact that the manufacturer recommends that in the interests of safety and efficiency the heater is serviced on a regular basis only by qualified and competent persons.

(s) Set all controls to the requirements of the user.

20.Commissioning - air delivery system

Caution

On ducted applications it is necessary that the system is balanced in order to optimize the efficiency of the heater and the air distribution and delivery system.

Failure to balance the system can result in fan motor overloading and premature component failure, it can also result in an inefficient heating/ventilation system.

(a) Check that the amount of fan produced air volume is in accordance with the heater specification, if the volume is too great the fan can be overloaded.

Ensure that the running current is as per that stated on the heater data plate.

Alternatively, the static pressure should be measured at the start of the ductwork to confirm that it is within the permissible tolerance.

(b) If the current drawn is greater than the stated running current, in most probability this will be caused by insufficient static pressure within the ductwork, in which case system resistance should be increased through the introduction of a damper placed as close to the start of the ductwork as possible, thereby resulting in a reduction in drawn current.

The damper should be adjusted until the current is in accordance with that stated on the data plate.

(c) If the current drawn is too low the duct outlet grilles will require opening to reduce static pressure and increase air volume, if this is not the case overheat cut outs can be caused.

21. Commissioning - hand over

(a) Upon full and satisfactory completion of commissioning, a record of commissioning information (contact, date, etc) should be left with the heater.

(b) The commissioning engineer must ensure that the user is familiar with the safe and efficient use of the heater, detailing the function of all controls, and main components.

(c) The user should be made aware of the following in particular

(i) Lighting, shutdown, and operational information.

(ii) Safety features, data plate, and labeling.

(iii) The requirement for regular inspection - especially if the heater is within a more demanding environment - and the need for regular servicing carried out by competent and qualified persons.

21. SERVICING

Warning

Servicing must be carried out on a regular basis, the maximum interval between services being 1 year. It is a requirement that only suitably qualified and competent persons are allowed to undertake servicing.

Before any maintenance or servicing work is carried out the heater must be shut down and allowed to cool, and have the oil and electric supplies to it turned off at the supply valve and isolator respectively.

Caution

Certain components parts are factory sealed and are designed so as to be tamper proof. Usually such items do not require servicing, and therefore should not be tampered with.

Failure to comply with this can invalidate any warranty, and can also lead to premature failure.

The following parts fall within this category:
thermostat, fan and motor.

Additionally, the fan and limit stat has been factory set, and must not be re-set without formal consent from the manufacturer.

Reference should be made to the separate information covering the operational details of the burner and timer.

Only approved spare/replacement parts can be fitted, failure to comply with this can compromise the safe and efficient running of the heater, and can also invalidate any warranty claim.

22. Planned Servicing

In order to maintain the efficient operation of the heater it is recommended that the following planned servicing and preventative maintenance programme is adopted by the user.

Quarterly Inspection

- (a) Visual inspection of the burner
- (b) Clean and check spark electrode
- (c) Clean and check photocell
- (d) Check overheat safety is operational

Bi-Annual Inspection

- (a) As per quarterly inspection, plus...
- (b) Combustion check
- (c) Smoke test

Annual Inspection

- (a) As per half year inspection, plus...
- (b) Heat exchanger and cleaning
- (c) Electrical connections
- (d) Main fan motor
- (e) Main fan assembly
- (f) Oil supply including filter
- (g) Burner
- (h) Air delivery system
- (i) Flue
- (j) Report

23. Servicing Procedure – Major Component Parts

Flue

A visual inspection should be carried out to ensure that the flue remains adequately supported, both internally as well as externally, and that the various joints are effectively sealed.

Inspection covers, where fitted, should be removed and the flue checked to see whether cleaning is required. If inspection covers are not fitted the flue gas exit duct and flue spigot will provide not only an indication of the cleanliness of the flue, but will also enable access for cleaning.

The presence of the flue terminal should be checked.

If a condensate trap and drain facility is fitted this should be checked to ensure that it continues to function correctly, and the drainage of condensates is not impaired.

Main Fan Motor

Remove access panel. Dust and other foreign matter should be cleaned by blowing over with compressed air and through the use of a soft bristle brush and cloth.

Solvent wipes may be used to remove heavy soiling from the motor casing.

Traces of surplus lubricants spreading from the bearings should also be cleaned away.

Where motors are fitted with grease nipples bearings should be lubricated with the correct grade of lubricant. Motors which do not have grease nipples feature sealed bearings which are lubricated during manufacture for their life.

The electrical connections should be checked as follows.

The burner top cover should be removed by undoing the screws which secure it.

Check electrical connections for signs of corrosion, tightness, and ensure that there are no stray strands which could form a short circuit.

Clean, tighten, and replace as necessary.

Replace cover and secure.

Main Fan & Motor

Remove dust and other foreign matter by blowing off with compressed air or through the use of a soft bristle brush.

Check that the bearings do not show signs of excessive wear.

It should be noted that these bearings do not require lubricating.

If the bearings require replacing, replace the Motor

Heat Exchanger

The heat exchanger requires a visual inspection at least once per year, this should be accompanied by cleaning. It is recommended that a flue brush and vacuum cleaner be used to facilitate this. Access to the heat exchanger is gained through the removal of the Top Front panel and heat shield.

Servicing and cleaning should be performed as follows.

(a) Remove brass nuts and cover from heat exchanger end assembly to expose heat exchanger tubes.

(b) Remove any accumulated deposits from the tubes by pushing through the full length with a flue brush.

(c) The flue brush should be withdrawn so as to pull any deposits back into the bottom of the flue box where they can then be removed by using a vacuum cleaner.

(d) Particular attention should be paid to the upper internal surfaces of the tubes, where through convection heavier deposition is likely to occur.

(e) Any deposits which may have accumulated within the combustion chamber can be removed with a vacuum cleaner once the burner is removed.

Note

It is most important that a build up of deposits is not allowed to occur as this can have an adverse effect upon the efficiency of the heater and reduce the life of the heat exchanger.

(f) The heat exchanger and combustion chamber should be visually inspected for signs of splits, cracks, and distortion.

(g) All gaskets should be checked to ensure that they continue to provide a gas tight seal, if there is an element of doubt then they should be replaced.

If the condition of the heat exchanger gives cause for concern the Service Department at WATKINS HIRE Ltd should be advised pending a more detailed examination.

Electrical Supply

All connections must be checked to ensure that they are secure, and free from corrosion.

Terminals and connections should also be checked to ensure that no stray strands are bridging terminals.

Electrical continuity should also be checked.

Oil Supply

The oil supply pipe work, tank, and fittings should all be inspected to ensure that they are free from corrosion, and to ensure that where brackets have been fitted these remain secure and offer adequate support.

The oil filter should be replaced with a new one, and the system should be checked for leaks.

If the oil level is such to allow removal of any sludge or other contaminants from the tank this too should be undertaken, particularly if there have been problems of poor firing associated with contaminants reaching the burner.

Note

Any waste oil or sludge must be disposed of correctly. Never dispose of it by dumping or tipping it down drains or into water courses where ground water can become polluted and environmental damage caused.

Burner

Service requirements for the burner fitted to the heater are covered in the separate manual prepared by the burner manual.

24. TECHNICAL DATA

Heat input full load	kW/btu	71 / 242,252
Heat output full load	kW/btu	60 / 204,720
Net efficiency full load	%	86.5
Gross efficiency full load	%	81.1
Fuel consumption full load	l/hour	6.98
Running Hours 120 litre fuel tank	hours	17
Running Hours 959 litre fuel tank	hours	137
Oil pressure full load	P.S.I.	200
Air volume full load (m3/s)	m ³ /s	0.85
Air volume full load (m3/h)	m ³ /h	3060
Air volume full load (CFM)	CFM	1800
Temperature rise full load	°C	55
Static pressure full load	Pa	140
Appliance discharge velocity full load	m/s	6.0
Noise level full load	DbA @ 1m	73.30
Noise level full load	DbA @ 3m	67
Typical Area Heated	m ³	1500.00
Typical Area Heated	ft ³	52965
Full Load Δt (oC)		60
Duct diameter	Mm	2 x 300
Maximum duct length	M	30.00 per outlet
Burner model/type	EOGB	EOGB X500
Burner control		Single Stage
Nozzle specification	US gall/hour	1.25 x 60°S
Oil connection size		Rectus Double Shut off Quick Release type
Fuel specification		35 second
Electrical Supply (switch selectable)	V-Hz-Phase	110 v or 230v/50/1
Fuse size	Amp	16
Running Current	Amp/h	110v-15A, 230v - 6.5A
Power consumption	Watts/hr	14.90
Flue diameter	Mm	127
Minimum flue height	Mm	600
Maximum flue height	Mm	3
Overheat thermostat setting	°C	100
Fan over-run setting	°F	ON 150° F, OFF 80° F
Damper setting full load		No.3
Flue gas temperature full load	°C	320
CO2 maximum full load	%	11.5
O2 maximum full load	%	5.4
CO maximum full load	ppm	0
Appliance IP rating		44
On Wheels		Yes

25. DIMENSIONS

Weight	Kg	220
Height	mm	1500
Width	mm	775
Length	mm	1220

26. REFERENCE INFORMATION

Doc/Ref Title/Subject

BS 5410 Part 1 ; 1977 and Part 2 ; 1978 Code of Practice for oil firing

BS EN 292 Parts 1 and 2; 1992 Safety of Machinery

BS EN 60204 Part 1; 1993 Safety of Machinery - Electrical

BS EN 60335 Part 1; 1988 Safety of Electrical Appliances

BS EN 55014 1993 Electromagnetic Compatibility

BS EN 50165 1995 Safety of Electrical Equipment

BS 5854 1980 Code of Practice - Flues/Flue Structures

BS 799 Part 5 ; 1987 Oil Burning Equipment - oil tanks

OFTEC OFS T-100 Polyethylene oil storage tanks

BS 715 1993 Metal Flue Pipes and Fittings

BS 5440 Part 1 ; 1990 Specification/Installation of Flues

BS 5440 Part 2 ; 1989 Ventilation Requirements Gas Appliances

BS 779 Part 2 ; 1991 Oil burning equipment - burners

ISO 228/1 See also BS 2779 and BS 5380) Pipe Threads Seals and Couplings

27. DIAGRAMS

