



Reliable energy. Flexible approach.

INSTRUCTION MANUAL FOR OIL BURNER MODELS

BT14 24v DC

ONE STAGE, GAS OIL, KEROSENE AND B10 BIOFUEL BURNERS

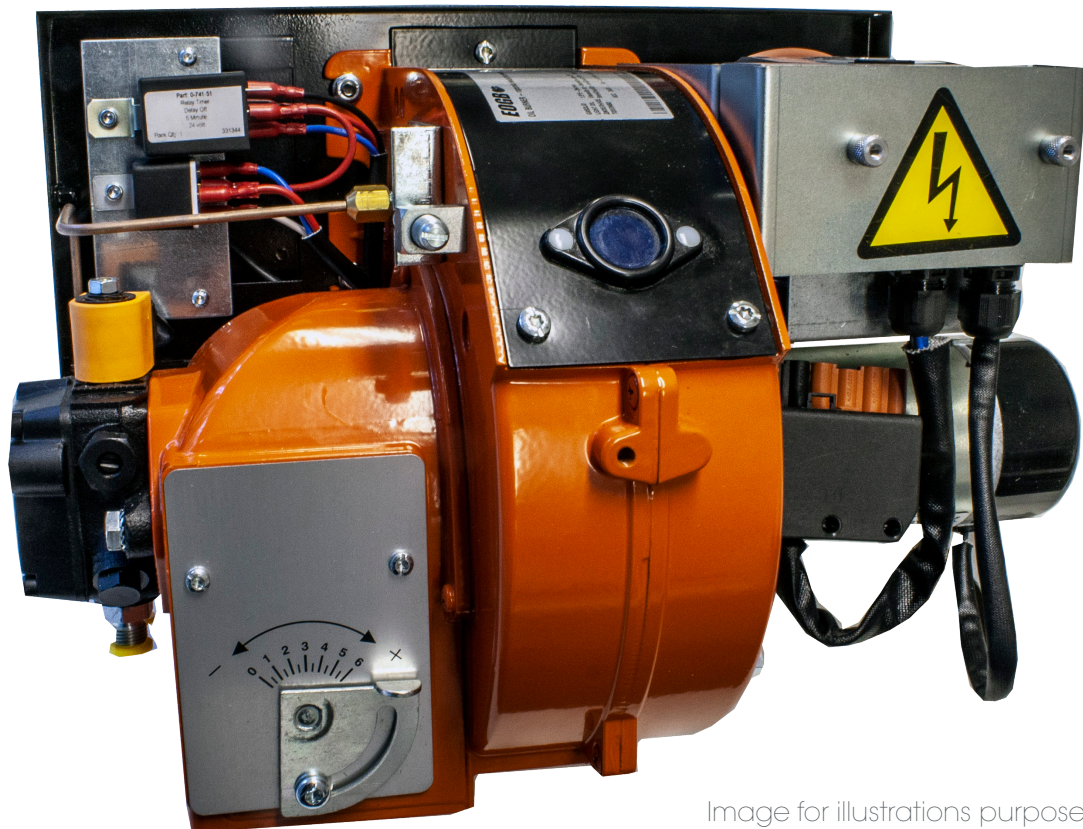


Image for illustrations purposes,

The BT14 is available in 24v DC, with outputs ranging from 85 to 170 kW,

CE UK UK
CA NI



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Declaration



DECLARATION OF CONFORMITY

We, EOGB Energy Products Ltd

Of, 5 Howard Road, Eaton Socon, St Neots, Cambs, PE19 8ET

Manufacture the following products;

Low Voltage 12VDC & 24vDC X400, X500 & X600 Oil fired burners

In accordance with the following Directives and Normative documents:

- Machines Directive 98/37/EEC
- Efficiency Directive 92/42/EEC
- Pressure Equipment Directive 97/23/EC
- Low Voltage Directive 2014/35/EU
- EMC Directives 2014/30/EU
- EN 267 2009+A1:2011
- RoHs (Regulation of hazardous substances) directive 2015/863 known as RoHs 3

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above standard and meets all essential requirements of the specified Directives.

Signed: Mr Martin Cooke

Signature

Position: Managing Director

Date

23rd June 2021

Location: St Neots, Cambs, UK

Information and general warnings

2 Information and general warnings

2.1 Information about this instruction manual and general warnings

2.1.1 Introduction

The instruction manual supplied with the burner:

- is an integral and essential part of the product and must not be separated from the burner. It must therefore be kept carefully for any necessary consultation and must accompany the burner even if it is transferred to another owner or user, or to another system. If the manual is lost or damaged, another copy can be requested from EOGB on request.
- is designed for use by qualified personnel.
- offers important indications and instructions relating to the installation safety, start-up, use and maintenance of the burner.

Symbols used in the manual

In some parts of the manual you will see triangular DANGER signs. Pay great attention to these, as they indicate a situation of potential danger.

2.1.2 General dangers

The dangers can be of 3 levels, as indicated below.

Maximum danger level!



This symbol indicates operations which, if not carried out correctly, cause serious injury, death or long-term health risks.



This symbol indicates operations which, if not carried out correctly, may cause serious injury, death or long-term health risks.



This symbol indicates operations which, if not carried out correctly, may cause damage to the machine and/or injury to people.

2.1.3 Danger: live components



This symbol indicates operations which, if not carried out correctly, lead to electric shocks with lethal consequences.

Other symbols



ENVIRONMENTAL PROTECTION

This symbol gives indications for the use of the machine with respect for the environment.

Delivery of the system and the instruction manual

When the system is delivered, it is important that the instruction manual is delivered to the user by the system manufacturer, with the recommendation to keep it in the room where the heat generator is to be installed.

- The system supplier must carefully inform the user about the use of the system;
- Any further tests that may be required before activating the system;
- Maintenance, and the need to have the system checked at least once a year by a representative of the manufacturer or suitably qualified technician.

To ensure a periodic check, the manufacturer recommends the drawing up of a Maintenance Contract.

Information and general warnings

2.2 Guarantee and responsibility

The manufacturer guarantees its new products from the installation date, in accordance with the regulations in force and/or the sales contract. At the moment of the first start-up, check that the burner is integral and complete.

Please note that EOGB's contract lies with the stockist/distributor from where the burner was purchased. Please check with the stockist /distributor regarding their returns policy.



Failure to observe the information given in this manual, operating negligence, incorrect installation and carrying out of non-authorised modifications will result in the annulment by the manufacturer of the guarantee that it supplies with the burner.

In particular, the rights to the guarantee and the responsibility will no longer be valid in the event of damage to things or injury to people, if such damage/injury was due to any of the following causes:

- incorrect installation, start-up, use and maintenance of the burner; improper, incorrect or unreasonable use of the burner;
- intervention of unqualified personnel;
- carrying out of unauthorised modifications on the equipment; use of the burner with safety devices that are faulty, incorrectly applied and/or not working;
- installation of untested supplementary components on the burner;
- powering of the burner with unsuitable fuels;
- faults in the fuel supply system;
- continuation of use of the burner when a fault has occurred; repairs and/or overhauls incorrectly carried out;
- modification of the combustion chamber with inserts that prevent the regular development of the structurally established flame;
- insufficient and inappropriate surveillance and care of those burner components most likely to be subject to wear and tear;
- the use of non-original components, including spare parts kits, accessories and optional;
- force majeure.

2.3 Guidance for the use of biofuel blends up to 10% where gas oil use is permitted by the appliance manufacture

Background

With increasing focus on renewable and sustainable energy requirements, Biofuel usage is set to increase. EOGB is committed to promoting energy conservation and the use of renewable energy from sustainable resources including liquid biofuels; however there are some technical aspects that must be considered at the planning stage of using such fuels to reduce the potential for equipment failure or the risks of fuel leakage.

Liquid biofuel is a generic description used for oil that can come from numerous feed stocks including recycled cooking oils. These types of oils have to be considered and treated differently from standard mineral or fossil fuels, as they are generally more acidic, hygroscopic and less stable.

Due to this, a holistic approach is needed from the specification of the liquid biofuel, the storage of the fuel, its oil supply line and ancillary equipment, and very importantly the oil filtration and the burner itself. The specification for FAME (Fatty Acids Methyl Ester) liquid biofuel is critical to reliable equipment operation.

It is a minimum requirement that the fuel blend (up to 10% bio) is obtained with gas oil in accordance with the relevant EN standards, regional regulations and FAME in accordance with EN 14214. It is also important that the fuel blends meet the requirements related to operational environment conditions within the relevant EN standards.

The manufacturer furthermore declines any and every responsibility for the failure to observe the contents of this manual.

The warranty is subject to correct burner, appliance & application matching and set-up in line with EOGB's instructions and guidelines. All components within the hydraulic circuit suitable for bio fuel use and supplied by EOGB will be identified as bio compatible. No warranty is given in relation to the use of components which are not so identified with biofuel blends. If in any doubt please contact EOGB for further advice.

If any EOGB burners are used with fuel with a bio content >10% then the components within the hydraulic circuit may be affected and are not covered under warranty.

The hydraulic circuit consists of:

- Pump
- Hydraulic ram (where applicable)
- Valve block
- Flexible oil lines (considered as a consumable component)

1 Irrespective of any warranty given by EOGB in relation to normal use and manufacturing defects, when fuels not meeting the relevant standards are used, or where fuel storage issues have not been addressed correctly, or the equipment used is not compatible, if failures occur which are directly or indirectly attributed to such issues and/or to the non-observance of this guidance, then no warranty or liability is implied or accepted by EOGB.

2 EOGB have carefully chosen the specification of the bio compatible components including the flexible oil lines to protect the pump, safety valve and nozzle. The EOGB warranty is dependent upon the use of EOGB genuine components, including the oil lines, being used.

3 EOGB warranty does not cover defects arising from incorrect commissioning or servicing by non-EOGB employed service engineers, and any issues impacting the burner arising from external site-related issues.

When choosing your EOGB oil products where you know biofuels will be in use, please make sure that a bio compatible burner and/or components have been supplied. If an existing burner is to be used with a liquid biofuel then a kit may be required to make it compatible and the guidance notes enclosed concerning oil storage and filtration must be adhered to. The end user is responsible for the thorough verification of the potential risks associated with the introduction of a bio fuel blend and the suitability of the appliances and installation applicable.

Irrespective of any warranty given by EOGB in relation to normal use and manufacturing defects, when fuels not meeting the relevant standards are used, or where fuel storage issues have not been addressed correctly, or the equipment used is not compatible, if failures occur which are directly or indirectly attributed to such issues and/or to the non-observance of this guidance, then no warranty or liability is implied or accepted by EOGB.

Information and general warnings

2.3.1 Information and general instructions

To ensure consistency, the supplier of the fuel must be able to demonstrate compliance with a recognised Quality Control and management system to ensure high standards are maintained within the storage, blending and delivery processes.

The installation of an oil storage tank and its ancillaries must also be prepared BEFORE liquid biofuel is introduced.

Checks and preparation should include:

- For new installations, make sure that all materials and seals in the oil storage and supply line to the burner are compatible with biofuels. For all installations, there must be a good quality bio compatible oil filter at the tank and then a secondary filter of 60 Microns protecting the burner from contamination.
- If an existing oil storage tank is to be used then in addition to the materials checks as detailed above, it will be essential that the tank is first inspected for condition and checked for water or other contamination. EOGB strongly recommends that the tank is cleaned and oil filters replaced prior to biofuel delivery. Due to the hygroscopic nature of biofuel, if this is not completed then it will effectively clean the tank and absorb water present which in turn will result in equipment failure that is not covered by the manufacturer's warranty.
- Depending on the capacity of the oil storage tank and oil usage, fuels may remain static within the tank for some considerable time and so EOGB recommends that the oil distributor is consulted regarding the use of additional Biocides within the fuel to prevent microbial growth from occurring within the tank. EOGB suggests that fuel suppliers and/or service companies are contacted for guidance on fuel filtration. Special attention should be applied to dual fuel applications where oil may be stored for long periods of time.
- The burner must be set according to the appliance application and commissioned checking that all combustion parameters are as recommended in the appliance technical manual.
- EOGB recommends that the in line and burner oil pump filters are inspected and if required replaced at least every 4 months during burner use, before the burner start-up following a long period of discontinue operation and even more frequently where contamination has occurred. Particular attention is needed when inspecting and checking for fuel leakages from seals, gaskets and hoses.

2.3.2 Product Disclaimer Statement

CAREFULLY READ THE FOLLOWING DISCLAIMER. YOU ACCEPT AND AGREE TO BE BOUND BY THIS DISCLAIMER BY PURCHASING EOGB BIO COMPATIBLE BURNERS AND/OR COMPONENTS.

Although the information and recommendations (hereinafter "Information") in this guidance is presented in good faith, believed to be correct and has been carefully checked, EOGB (and its subsidiaries) makes no representations or warranties as to the completeness or accuracy of the Information. Information is supplied upon the condition that the persons receiving will make their own determination as to its suitability for their purposes prior to use. In no event will EOGB (and its subsidiaries) be responsible for damages of any nature whatsoever resulting from the use of or reliance upon Information.

Other than set forth herein, EOGB (and its subsidiaries) makes no additional warranties with respect to the bio compatible burner, either express or implied, including that of merchantability or fitness for a particular purpose or use.

In no event shall EOGB (and its subsidiaries) be liable for any in-direct, incidental, special or consequential damages including, without limitation, loss of profits, damages for loss of business profits, business interruption, loss of business information, loss of equipment, or other pecuniary loss or compensation for services whether or not it is advised of the possibility of such damages.

With the exception of injuries to persons, EOGB's liability is limited to the customer's right to return defective/non-conforming products as provided by the relevant product warranty.

Safety and prevention

3 Safety and prevention

3.1 Introduction

The burners have been designed and built in compliance with current regulations and directives, applying the known technical rules of safety and envisaging all the potential danger situations. It is necessary, however, to bear in mind that the imprudent and clumsy use of the equipment may lead to situations of death risk for the user or third parties, as well as the damage to the burner or other items. Inattention, thoughtlessness and excessive confidence often cause accidents.

It is a good idea to remember the following:

- The burner must only be used as expressly described. Any other use should be considered improper and therefore dangerous.

In particular:

it can be applied to boilers operating with water, steam, thermic oil, and to other uses expressly named by the manufacturer,

the type and pressure of the fuel, the voltage and frequency of the electrical power supply, the minimum and maximum deliveries for which the burner has been regulated, the pressurisation of the combustion chamber, the dimensions of the combustion chamber and the room temperature must all be within the values indicated in the instruction manual.

- Modification of the burner to alter its performance and destinations is not allowed.
- The burner must be used in technically safe working conditions. Any disturbances that could compromise safety must be quickly eliminated.
- Opening or tampering with the burner components is not allowed, apart from the parts requiring maintenance.
- Only those parts detailed as available as spare parts by the manufacturer can be replaced.

3.2 Safety warnings

The dimension of the boiler's combustion chamber must respond to specific values in order to guarantee a combustion with the lowest polluting emissions rate.

The Technical Service Personnel will be glad to give you all the information for a correct matching of this burner to the boiler.

This burner must only be used for the application it was designed for.

The manufacturer accepts no liability within or without the contract for any damage caused to people, animals and property due to installation, adjustment and maintenance errors or to improper use.

3.3 Basic safety rules

- Children or inexpert persons must not use the appliance.
- Under no circumstances must the intake grids, dissipation grids and ventilation vents in the installation room be covered up with cloths, paper or any other material.
- Unauthorised persons must not attempt to repair the appliance.
- It is dangerous to pull or twist the electric leads.
- Cleaning operations must not be performed if the appliance is not disconnected from the main power supply.
- Do not clean the burner or its parts with inflammable substances (e.g. petrol, alcohol, etc.). The cover must be cleaned with soapy water.
- Do not place anything on the burner.
- Do not block or reduce the size of the ventilation vents in the installation room.
- Do not leave containers and inflammable products or combustible materials in the installation room.

3.4 Personnel training

The user is the person, body or company that has acquired the machine and intends to use it for the specific purpose. He is responsible for the machine and for the training of the people working around it.

The user:

- undertakes to entrust the machine exclusively to suitably trained and qualified personnel;
- must take all the measures necessary to prevent unauthorised people gaining access to the machine;
- undertakes to inform his personnel in a suitable way about the application and observance of the safety instructions. With that aim, he undertakes to ensure that everyone knows the use and safety instructions for his own duties;
- must inform the manufacturer if faults or malfunctioning of the accident prevention systems are noticed, along with any presumed danger situation.
- Personnel must always use the personal protective equipment envisaged by legislation and follow the indications given in this manual.
- Personnel must observe all the danger and caution indications shown on the machine.
- Personnel must not carry out, on their own initiative, operations or interventions that are not permitted within their local authority control.
- Personnel must inform their superiors of every problem or dangerous situation that may arise.
- The assembly of parts of other makes, or any modifications, can alter the characteristics of the machine and hence compromise operating safety. The manufacturer therefore declines any and every responsibility for any damage that may be caused by the use of non-original parts.

Technical description of the burner

4.1 Technical data

Burner information	Burner operation mode		One Stage
	Heat output	kW	85 - 170
		Kg/hr	7.17 - 14.35
	Working temperature	°C min./max.	0-40
Weight (boxed)	kg	16	

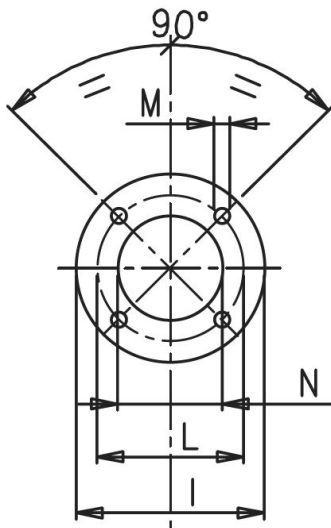
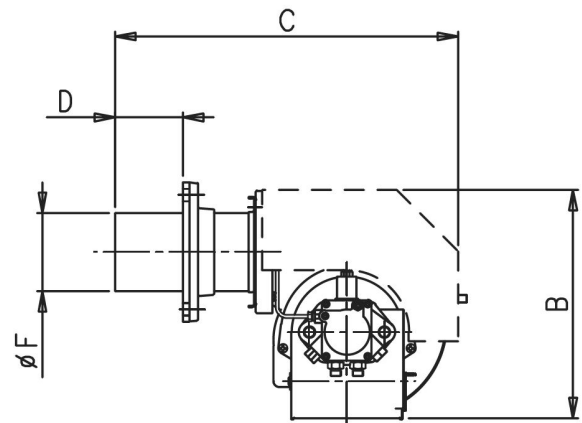
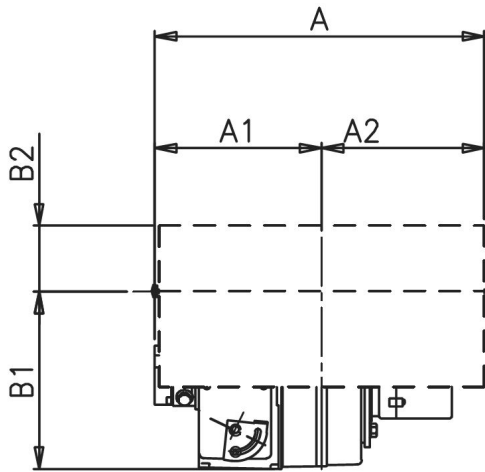
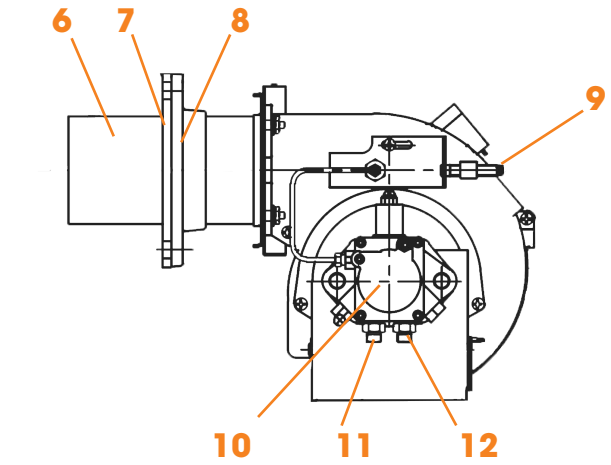
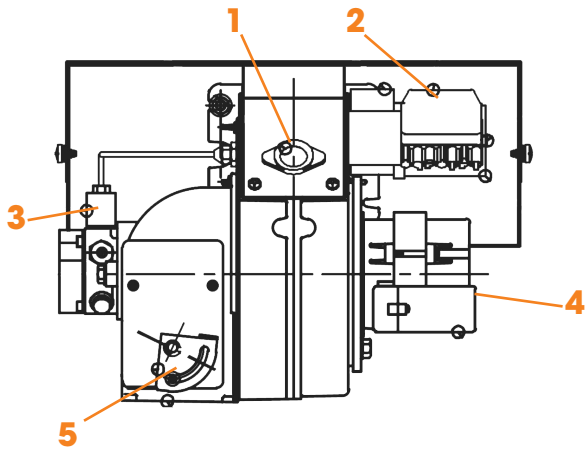
Fuel / Air information	Viscosity	Kerosene	Maximum viscosity 5.5 cst @ 20°C Suitable for bio blends < B10 4 - 6 (@ 20°C) for light oil models / 1.5 - 6 (@ 20°C) for kerosene models
		Gas Oil	
		mm ² /s (cSt)	
	Pump	Type	Suntec AS47A-7432 (24v DC)
		Pump Pressure range	7-14 bar
		Factory setting	9 bar
		Capacity	20 l/h
	Fuel temperature	Max °C	60 °C
	Fan	Type	Centrifugal, Counter clockwise
	Air temperature	Max °C	40

Electrical data	Electrical supply	Hz/V	50Hz/24DC (+20%/ -20%)
	Control box	Type	Brahma BT231O 24v DC
	Protection level	IP Rating	IP40
	Motor info	Wattage	120
		Voltage	24 VDC
	Ignition transformer	Type	Honeywell ZT930-24 or Caledonian HPI 24v
		Info	ZT930 = 24VDC (+20% / -25%) 25% E.D. in 3 Mins, Primary 2.0A, Ignition voltage 2 x 7 kV Secondary current 17 mA , / Frequency 20kHz HPI 24v = 24VDC 150% E.D. in 2 Mins, Primary 2.5A, Ignition voltage 2 x 4.7 kV Secondary current 2.5 mA, / Frequency 20kHz
	Operation	Intermittent (at least one stop every 24 hours)	
		Start current (amps)	10.5 A DC
		Run current (amps)	8.5 A DC

Reference conditions

Temperature 20 °C
Pressure 1013 mbar
Altitude 0 m a.s.l

Technical description of the burner



- 1 - Sight Glass
- 2 - Reset Button
- 3 - Solenoid Valve
- 4 - Motor
- 5 - Air Regulation
- 6 - Blast Tube
- 7 - Mounting Gasket
- 8 - Mounting Flange
- 9 - Flame Disk Adjustment
- 10 - Oil Pump
- 11 - Suction
- 12 - Return

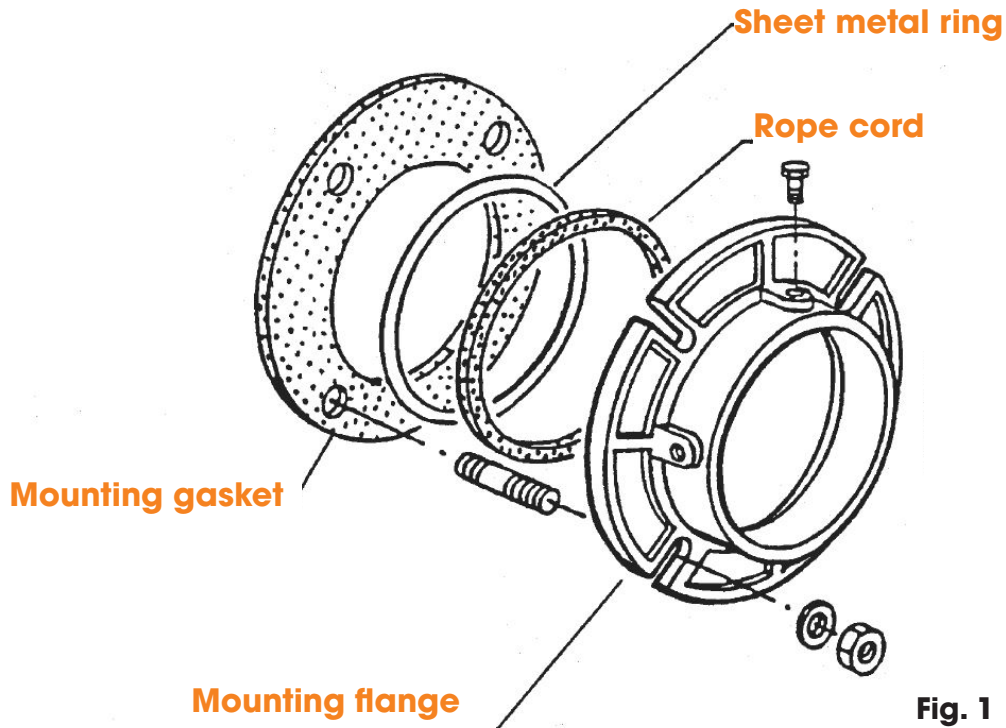
A	A1	A2	B	B1	B2	C	D min	D max	F ∅	I	L min	L max	M ∅	N
407	191	216	280	205	75	425	40	110	95	170	130	155	M8	105

Installation

4.3 Burner Mounting

Fitting The Burner to the Boiler/Application

The burner is fitted with a sliding attachment flange on the combustion head. All the components supplied must be mounted following the burner instructions



When the burner is being mounted on the boiler it is necessary to place this flange on the right position to have the combustion head enter the combustion chamber according to the boiler/application manufacturers requirements. Light oil pipes must be connected to the burner after it has been properly mounted.

4.4 Standard Accessories

Mounting flange	Qty 1
Mounting gasket	Qty 1
Insulation rope cord	Qty 1
Flexible hoses	Qty 2 x 890mm 1/4" F x 3/8" M
Sheet metal ring	Qty 1
Studs	Qty 4 - M8 x 12
Flat washer	Qty 4 - Ø8
Bolts	Qty 2 - M8 x 12
Nuts	Qty 4 - M8
Filter	Qty 1 3/8"
Nipples	Qty 2 - 1/4"
Nozzle	Qty 1 - (Fitted)

5.0 Hydraulic Connections

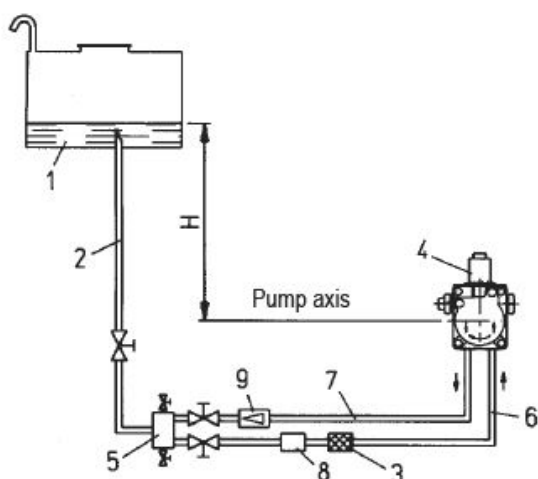
The pipes that connect the tank to the burner should be air tight. We recommend the use of copper or steel pipes of a adequate diameter (see charts below).

Isolation valves should be fitted at the end of rigid pipelines.

Fit the filter to the suction pipeline after the isolation valve. Connect the flexible oil line to this, which in turn should be connected to the suction of the burner pump.

Connect the other flexible oil line to the return pipe after the isolation valve and then connect it to the oil pump return.

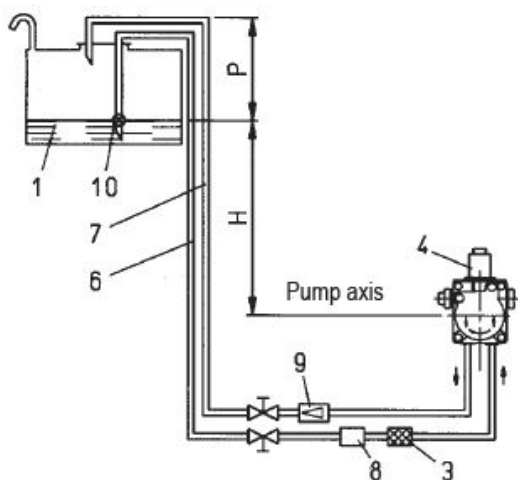
Flexible oil lines and relative connection nipples are standard burner accessories. The oil pump provided will have connection ports for pressure and vacuum gauges. To ensure reliable and silent operation conditions, the vacuum reading in the suction line should not exceed 0.45 bar max



GRAVITY FEED FROM THE BOTTOM OF OIL TANK

- 1 Oil tank
- 2 Feed line
- 3 Filter
- 4 Burner
- 5 Degasifier
- 6 Suction line
- 7 Return line
- 8 Fire valve
- 9 Non return valve

H meters	Total meters Ø i. 10mm
1	30
2	35
3	40
4	45

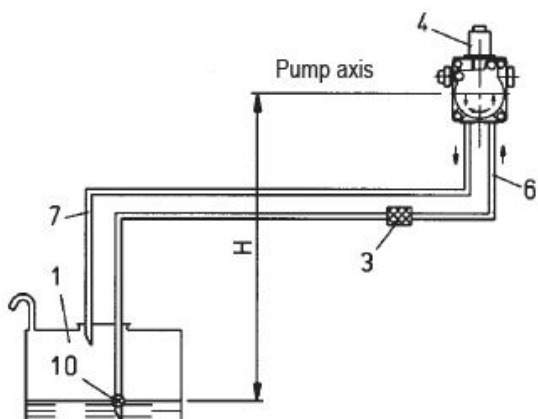


GRAVITY FEED OVER THE TOP OF OIL TANK

- 1 Oil tank
- 2 Feed line
- 3 Filter
- 4 Burner
- 6 Suction line
- 7 Return line
- 8 Fire valve
- 9 Non return valve
- 10 Foot valve

H meters	Total meters Ø i. 10mm
1	30
2	35
3	40
4	45

Quote P = 3,5 m (max)



SUCTION FEED

- 1 Oil tank
- 3 Filter
- 4 Burner
- 6 Suction line
- 7 Return line
- 10 Foot valve

H meters	Total meters	
	Øi. 10mm	Øi. 12mm
0,5	26	54
1	24	47
1,5	18	38
2	14	30
2,5	10	23
3	6	15
3,5	-	7

N.B. For any missing devices in the pipping, conform to existing regulations.

H Measurement between minimum oil level and pump axis
 L Max. length of suction line, including vertical lifts. For each bend of valve deduct 0,25 m.

Ø i Internal diameter of pipe

Fig. 2

Installation

5.1 Notes on safety for the installation

After carefully cleaning all around the area where the burner will be installed, and arranging the correct lighting of the environment, proceed with the installation operations.



The installation of the burner must be carried out by qualified personnel, as indicated in this manual and in compliance with the standards/regulations and local authority legislation.



All the installation, maintenance and disassembly operations must be carried out with the electricity supply disconnected.

5.2 Handling



The handling operations for the burner can be highly dangerous if not carried out with the greatest attention: keep any unauthorised people at a distance; check the integrity and suitability of the available means of handling.



After positioning the burner near the installation point, correctly dispose of all residual packaging, separating the various types of material. Before proceeding with the installation operations, carefully clean all around the area where the burner will be installed.

Check also that the area in which you are working is empty and that there is an adequate escape area (i.e. a free, safe area to which you can quickly move if the burner should fall).

5.3 Preliminary checks

Checking the consignment



After removing all the packaging, check the integrity of the contents. In the event of doubt, do not use the burner; contact the supplier.



The output of the burner must be within the boiler's firing rate.

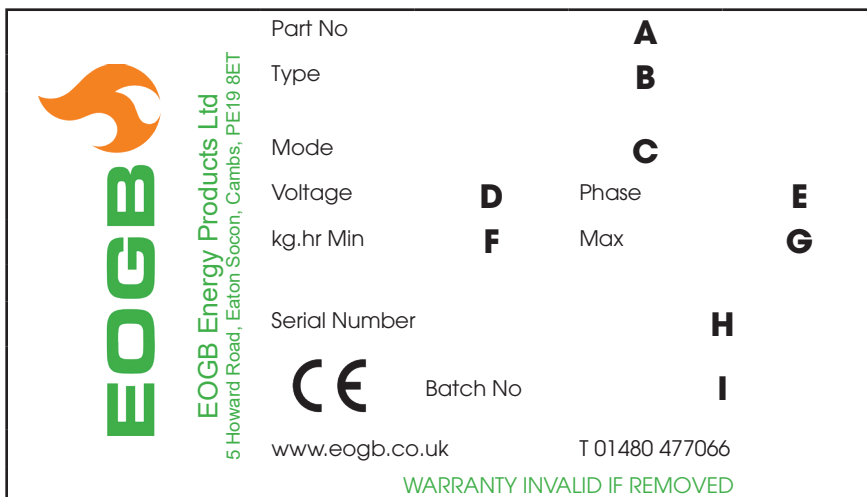


The packaging elements (wooden cage or cardboard box, nails, clips, plastic bags, etc.) must not be abandoned as they are potential sources of danger and pollution. They should be collected and disposed of in the appropriate manner and location.



A burner label that has been tampered with, removed or is missing, along with anything else that prevents the definite identification of the burner makes any installation or maintenance work difficult.

Checking the characteristics of the burner



Check the identification label of the burner showing

- A** - Part number
- B** - Burner type
- C** - Burner Mode
- D** - Burner Voltage
- E** - Motor Phase
- F & G** - Minimum & maximum flow rate
- H** - Serial number
- I** - Batch number

Fig. 4

Installation

5.4 Installer/service notes for the use of gas oil with bio blends up to 10% where gas oil use is permitted by the appliance manufacturer

- During the burner installation, check that the gas oil and biofuel blends are in accordance with EOGB's specifications (please refer to the chapters "Technical Data" and "Guidance for the use of biofuel blends up to 10%" within the burner technical manual).
- If a bio blend is in use the installer must seek information from the end user that their fuel supplier can evidence that the blends of fuel conform to the relevant standards.
- Check that the materials used in the construction of the oil tank and ancillary equipment are suitable for biofuels. If not these must be upgraded or replaced with bio compatible parts. (Please contact EOGB for more info on other biofuel compliant products)
- Particular attention should be given to the oil storage tank and supply to the burner. It is recommended that existing oil storage tanks are cleaned, inspected and any traces of water are removed BEFORE biofuel is introduced (contact the tank manufacturer or oil supplier for further advice). If these recommendations are not respected this will increase the risk of contamination and possible equipment failure.
- In line oil filters should be replaced making sure that they are bio compatible. It is recommended that a good quality bio compatible oil filter at the tank and a secondary 60 micron filter are used to protect the burner pump and nozzle from contamination.
- The burner hydraulic components and flexible oil lines must be suitable for biofuel use (check with EOGB if in doubt). EOGB have carefully chosen the specification of the bio compatible components including the flexible oil lines to protect the pump, safety valve and nozzle. The EOGB warranty is dependent upon the use of EOGB recommended components including the oil lines, being used. The burner must be commissioned and combustion parameters set to appliance manufacturer's recommendations.
- Regularly check visually for any signs of oil leakage from seals, gaskets and hoses.
- It is strongly recommended that with Biofuel use, oil filters are inspected and replaced every 4 months. More regularly where contamination is experienced.
- During extended periods of non operation and/or where burners are using oil as a standby fuel, it is strongly recommended that the burner is put into operation for short periods at least every three months.

5.5 Working position



The burner is designed to operate only in the positions **1**, **2**, **3** and **4** (Fig. 5).

WARNING

Installation **1**, **2** and **3** is preferable, as it is the only one that allows performing maintenance operations as described in this manual. Installation **4** allows for working operations but may incur maintenance issues as some adjustable settings may be obstructed



CAUTION

Any other position could compromise the correct operation of the appliance. Installation **5** is forbidden for safety reasons, unless the burner has been supplied to suit an upside down firing position or the burner has been modified so the oil pump has been rotated 90 degrees to prevent the solenoid coil firing in a downwards orientation (please seek further assistance from EOGB on this modification.)

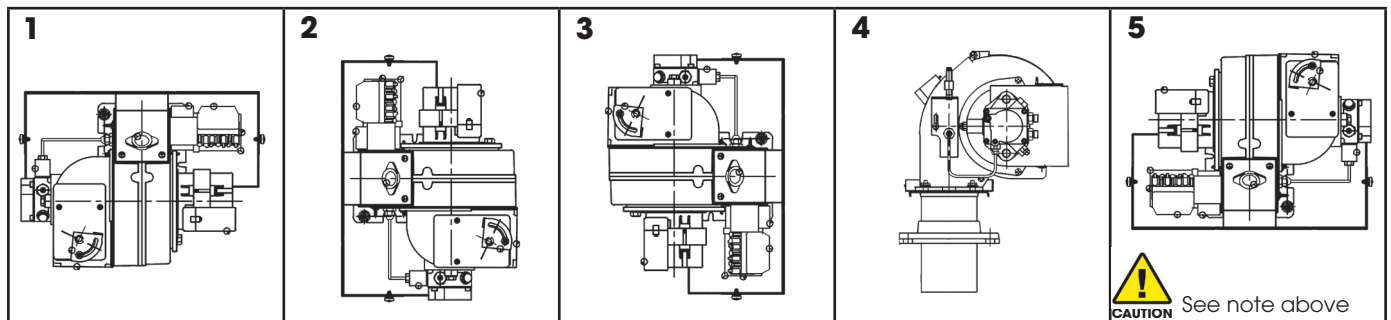


Fig. 5

Electrical System

6 Electrical system

6.1 Notes on safety for the electrical wiring



- The electrical wiring must be carried out with the electrical supply disconnected.
- Electrical wiring must be carried out by qualified personnel and in compliance with the regulations currently in force in the country of destination. Refer to the wiring diagrams.
- The manufacturer declines all responsibility for modifications or connections different from those shown in the wiring diagrams.
- Do not invert the neutral with the phase in the electrical supply line. Any inversion would cause a lockout due to firing failure.
- Check that the electrical supply of the burner corresponds to that shown on the identification label and in this manual.
- The burners have been set for intermittent operation. This means they should compulsorily be stopped at least once every 24 hours to enable the control box to perform checks of its own start-up efficiency. Normally the boiler's thermostat/pressure switch ensures the stopping of the burner. If this is not the case, it is necessary to apply an in series timer switch, that turns off the burner at least once every 24 hours. Refer to the wiring diagrams.
- The electrical safety of the device is obtained only when it is correctly connected to an efficient earthing system, made according to current standards. It is necessary to check this fundamental safety requirement. In the event of doubt, have the electrical system checked by qualified personnel.
- The electrical system must be suitable for the maximum input power of the device, as indicated on the label and in the manual, checking in particular that the section of the cables is suitable for the input power of the device.
- For the main power supply of the device from the electricity mains:
 - do not use adapters, multiple sockets or extensions;
 - use an omnipolar switch, as indicated by the current safety standards
- Do not touch the device with wet or damp body parts and/or in bare feet.
- Do not pull the electric cables.

Before carrying out any maintenance, cleaning or checking operations:



Disconnect the electrical supply from the burner by means of the main system switch;



Isolate the fuel supply

If the cover is still present, remove it and proceed with the electrical wiring according to the wiring diagrams.

Use flexible cables in compliance with the EN 60 335-1 standard.

Electrical System

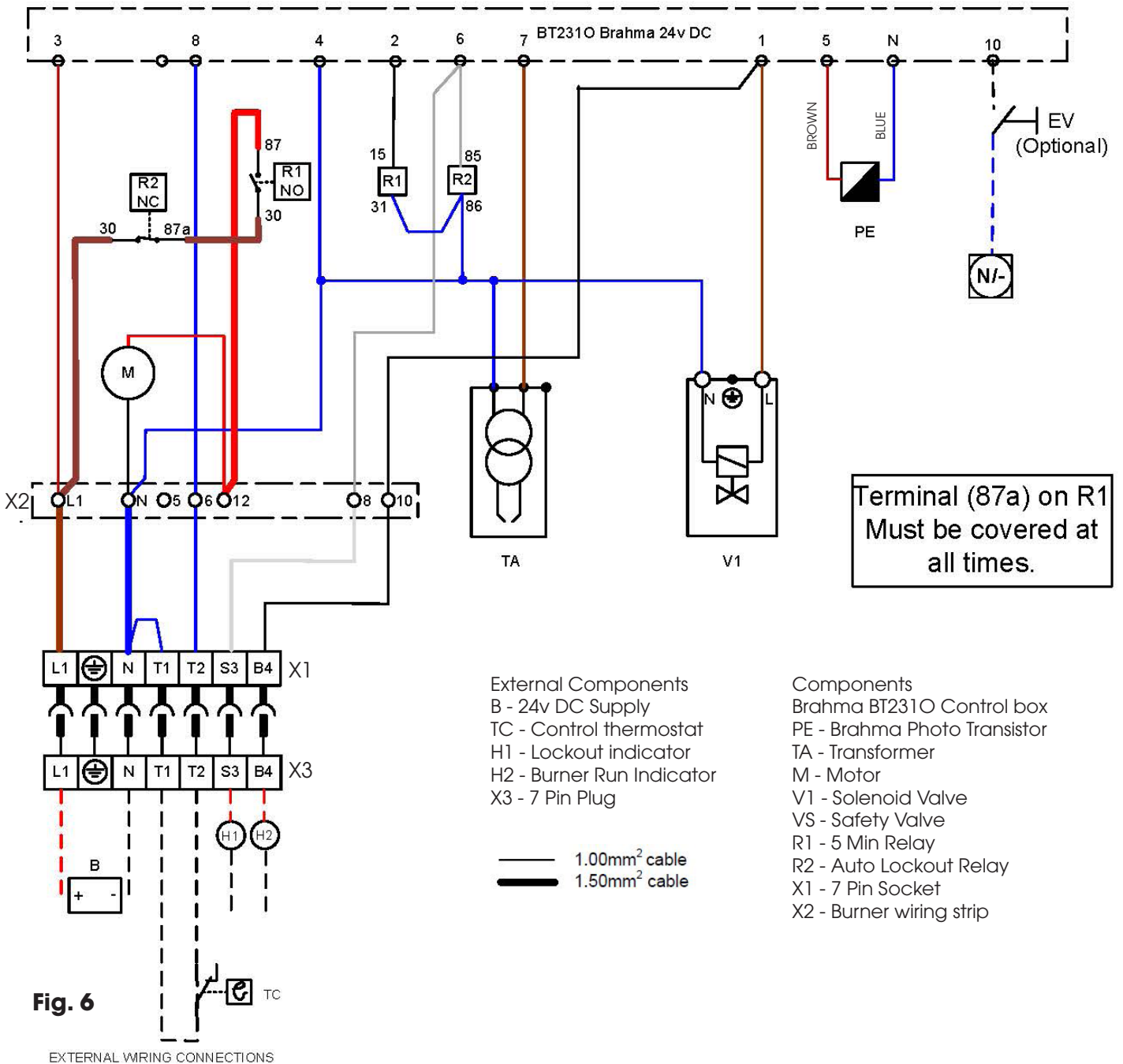
6.2 Electrical wiring



This operation must be performed by a qualified engineer with the boiler turned off and mains power disconnected.

Do not swap Positive and Negative over, follow the diagram shown carefully
The electrical wiring carried out by the installer must be in compliance with the rules in force in the country.
The section of the conductors must be at least 1mm² (unless requested otherwise by local standards and legislation).

Wiring Diagram for BT14 (7pin connection)



TESTING:
Check the shut-down of the burner by opening the thermostats and the lock-out by darkening the photo-resistance.



Burner Operation and Commissioning

7 Burner Operation and Commissioning

7.1 Notes on safety for the first start-up.



The first start-up of the burner must be carried out by qualified personnel, as indicated in this manual and in compliance with the standards/regulations and local authority legislation



Check the correct working of the adjustment, command and safety devices.

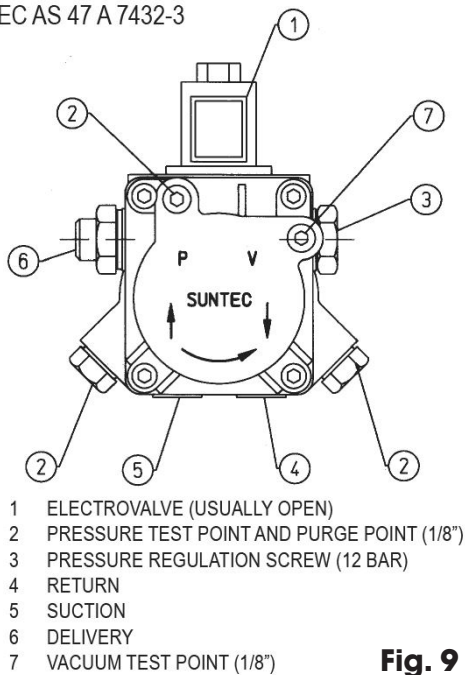
7.2 Preparations for Start up

Ensure that the correct size nozzle has been fitted for the application, The table below (**see fig 13**) shows the delivery rates in kg/hr of light oil against nozzle size and pump pressure (Normally 12 bar).

Ensure that the return oil line is not blocked or obstructed in anyway, **Failure to check will result in a pump shaft seal failure which will not be covered by warranty!**

Close the main switch/thermostat to enable the burner to start the pre-purge, Open Port "2" (**see fig 9**) to allow air to purge until oil is freely flowing, then tighten Port "2". The solenoid coils will activate and release the fuel to the nozzle for ignition after the pre-purge. During this phase the photocell will look for a light source given off by the flame. If the flame has established then the burner will continue to run, Failure of seeing this light signal will result in the control box locking out.

SUNTEC AS 47 A 7432-3



- 1 ELECTROVALVE (USUALLY OPEN)
- 2 PRESSURE TEST POINT AND PURGE POINT (1/8")
- 3 PRESSURE REGULATION SCREW (12 BAR)
- 4 RETURN
- 5 SUCTION
- 6 DELIVERY
- 7 VACUUM TEST POINT (1/8")

Fig. 9

7.3 Combustion adjustment

In conformity with the application of the burner on the boiler, adjustment and testing must be carried out observing the instruction manual of the boiler, including verification of the CO and CO₂ concentration in the flue gases, their temperatures and the average temperature of the water in the boiler.



Combustion air is drawn in from outside, meaning there may be notable changes in temperature, which can affect the percentage of CO₂. You are advised to adjust CO₂ in accordance with the graph featured.

Example: outside air temperature 10 °C, adjust CO₂ to 11.6% (± 0.2%).

A CO level should be kept to a minimum and ideally less than 100ppm but if in doubt then contact EOGB.

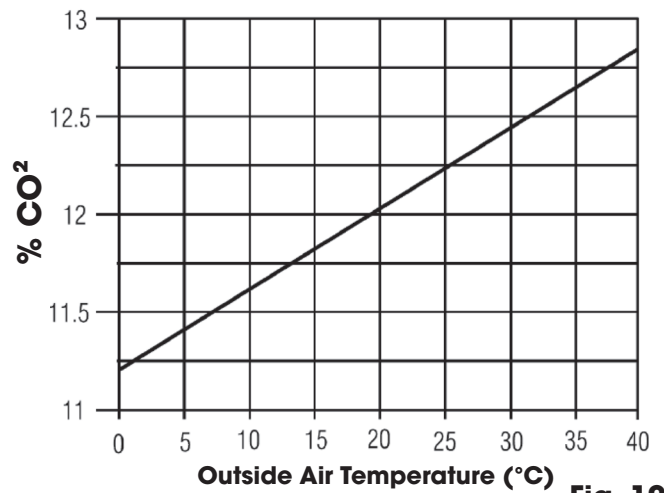


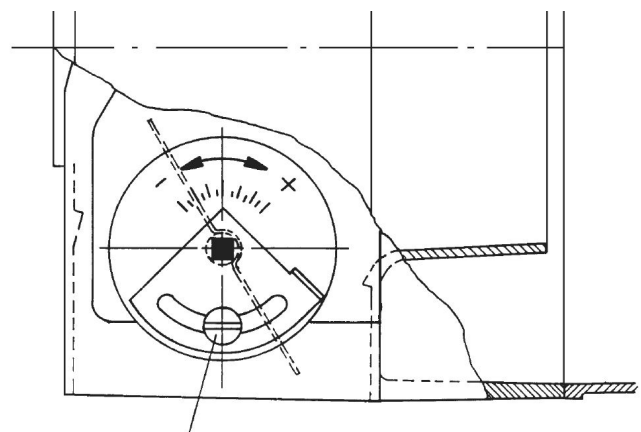
Fig. 10

7.4 Burner combustion adjustment

From a suitable test point on the boiler, or in the flue, a smoke reading should be taken to ensure clean smoke-free combustion.

With the aid of a flue gas analyser, and by making adjustments to the air adjuster, the combustion can be set for maximum efficiency (**see Fig 10**).

The air damper control rotates to adjust the amount of combustible air (**see Fig 11**) and is locked in place by tightening the air damper locking screw. (**see "A" Fig 11**)



A Screw blocking the air gate

Air control
Clockwise = MORE air
Anti-Clockwise = LESS air

Fig. 11

Burner Operation and Commissioning

7.5 Pump pressure

The pump pressure when it leaves the factory (unless otherwise specified) will be set to approx 9 bar. Pump pressure should then be set to appliance manufacturer's recommendations depending on what nozzle size is recommended.

7.6 Nozzles installation

In order to guarantee that emissions do not vary, recommended and/or alternative nozzles specified by the manufacturers in the instruction and warning booklet should be used. The information given in **FIG 13** should only be used as a guide where no information is provided by the boiler/application manufacturer's instructions/booklet.



It is advisable to replace nozzles every year during regular maintenance operations.



The use of nozzles other than those specified by the manufacturer may result in emissions that do not conform to the values set by the regulations in force, and in extremely serious cases, may cause potential hazards to people and objects.

The manufacturing company shall not be liable for any such damage arising from non-observance of the requirements contained in this manual.

7.7 Burner Head Adjustment

The burner is fitted with adjustable screw which regulates the flame disk position, this adjustment allows for fine tuning of the combustion by increasing or decreasing the air passage between the disk and head.

When operating with a reduced fuel delivery. This passage must be proportionately opened, turn Screw **"10"** (See Fig 12) in a anti clockwise direction to close.

When the burner is working with high fuel delivery, then screw **"10"** (see fig 12) would have to be turned in a clockwise direction to open the head up.

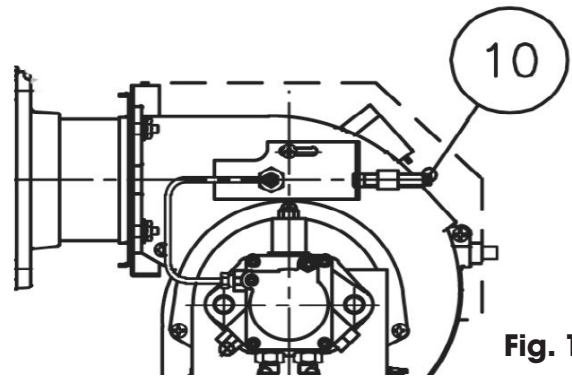


Fig. 12

7.6.1 Nozzles recommended

- Nozzles recommended
- Delavan type A - W;
 - Steinen type Q - S;
 - Danfoss type H - S

Angle 60° & 80° are advisable

Pump Pressure - bar

Gph	8			9			10			11			12			13			14			15		
	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h
0.40	1.33	16	13	1.41	17	14	1.49	18	15	1.56	18	16	1.63	19	17	1.70	20	17	1.76	21	18	1.82	21	18
0.50	1.66	20	17	1.76	21	18	1.86	22	19	1.95	23	20	2.04	24	21	2.12	25	22	2.20	26	22	2.28	27	23
0.60	2.00	24	20	2.12	25	22	2.23	26	23	2.34	28	24	2.45	29	25	2.55	30	26	2.64	31	27	2.73	32	28
0.65	2.16	26	22	2.29	27	23	2.42	29	25	2.54	30	26	2.65	31	27	2.75	33	28	2.86	34	29	2.96	35	30
0.75	2.49	29	25	2.65	31	27	2.79	33	28	2.93	35	30	3.08	36	31	3.18	38	32	3.30	39	34	3.42	40	35
0.85	2.83	33	29	3.00	36	31	3.16	37	32	3.32	39	34	3.47	41	35	3.61	43	37	3.74	44	38	3.87	46	39
1.00	3.33	39	34	3.53	42	36	3.72	44	38	3.90	46	40	4.08	48	42	4.24	50	43	4.40	52	45	4.56	54	46
1.10	3.66	43	37	3.88	46	39	4.09	48	42	4.29	51	44	4.48	53	46	4.67	55	48	4.84	57	49	5.01	59	51
1.20	3.99	47	41	4.24	50	43	4.47	53	46	4.68	55	48	4.89	58	50	5.09	60	52	5.29	63	54	5.47	65	56
1.25	4.16	49	42	4.40	52	45	4.65	55	47	4.88	58	50	5.10	60	52	5.30	63	54	5.51	65	56	5.70	68	58
1.35	4.49	53	46	4.76	56	48	5.02	59	51	5.27	62	54	5.50	65	56	5.73	68	58	5.95	70	61	6.15	73	63
1.50	4.98	59	51	5.29	63	54	5.58	66	57	5.85	69	60	6.11	72	62	6.36	75	65	6.60	78	67	6.83	81	70
1.65	5.49	65	56	5.82	69	59	6.14	73	63	6.44	76	66	6.73	80	69	7.00	83	71	7.27	86	74	7.52	89	77
1.75	5.82	69	59	6.18	73	63	6.51	77	66	6.83	81	70	7.14	85	73	7.42	88	76	7.71	91	79	7.97	94	81
2.00	6.65	79	68	7.06	84	72	7.45	88	76	7.81	93	80	8.18	97	83	8.49	101	86	8.81	104	90	9.12	108	93
2.25	7.49	89	76	7.94	94	81	8.38	99	85	8.78	104	89	9.18	109	94	9.55	113	97	9.91	117	101	10.26	122	105
2.50	8.32	99	85	8.82	105	90	9.31	110	95	9.76	116	99	10.19	121	104	10.61	126	108	11.01	130	112	11.39	135	116
2.75	9.15	108	93	9.71	115	99	10.24	121	104	10.73	127	109	11.21	133	114	11.67	138	119	12.11	144	123	12.53	148	128
3.00	9.98	118	102	10.59	126	108	11.16	132	114	11.71	139	119	12.23	145	125	12.73	151	130	13.21	157	135	13.67	162	139
3.50	11.65	138	119	12.35	146	126	13.03	154	133	13.66	162	139	14.27	169	145	14.85	176	151	15.42	183	157	15.95	189	163
4.00	13.31	158	136	14.12	167	144	14.89	176	152	15.62	185	159	16.31	193	166	16.97	201	173	17.62	209	180	18.23	216	186
4.50	14.97	177	153	15.88	188	162	16.75	198	171	17.57	208	179	18.35	217	187	19.10	226	195	19.82	235	202	20.51	243	209
5.00	16.64	197	170	17.65	209	180	18.62	221	190	19.52	231	199	20.39	242	208	21.22	251	216	22.03	261	225	22.79	270	232
5.50	18.30	217	187	19.42	230	198	20.48	243	209	21.47	255	219	22.43	266	229	23.34	277	238	24.23	287	247	25.07	297	256
6.00	19.97	237	204	21.18	251	216	22.34	265	228	23.42	278	239	24.47	290	249	25.46	302	260	26.43	313	269	27.49	326	280
6.50	21.63	256	220	22.94	272	234	24.20	287	247	25.37	301	259	26.51	314	270	27.58	327	281	28.63	339	292	29.63	351	302
7.00	23.29	276	237	24.71	293	252	26.06	309	266	27.33	324	279	28.55	338	291	29.70	353	303	30.84	366	314	31.91	378	325
7.50	24.96	296	254	26.47	314	270	27.92	331	285	29.29	347	298	30.59	363	312	31.83	377	324	33.04	392	337	34.19	405	349
8.00	26.62	316	271	28.24	335	288	29.79	353	304	31.23	370	318	32.63	387	333	33.95	403	346	35.25	418	359	36.47	432	372
8.50	28.28	335	288	30.00	356	306	31.65	375	323	33.18	393	338	34.66	411	353	36.07	428	368	37.45	444	382	38.74	459	395
9.00	29.95	355	305	31.77	377	324	33.59	398	342	35.14	417	358	36.71	435	374	38.19	453	389	39.65	470	404	41.02	486	418

Figures shown are for an oil of viscosity 4.4mm²/s (cSt), Density 830 kg/cm³

Fig. 13



The position of the electrodes can be critical to ensure the ignition spark is generated in the correct place. To ensure a safe reliable ignition of the fuel, please check your electrode settings using the below diagrams.

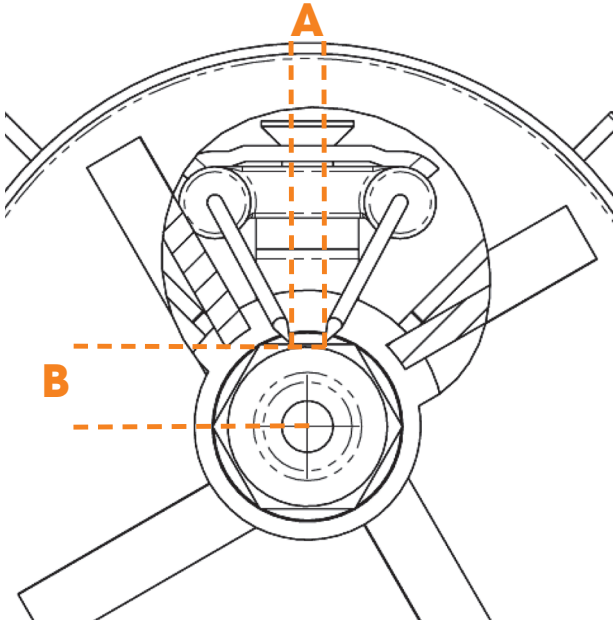


Fig. 14

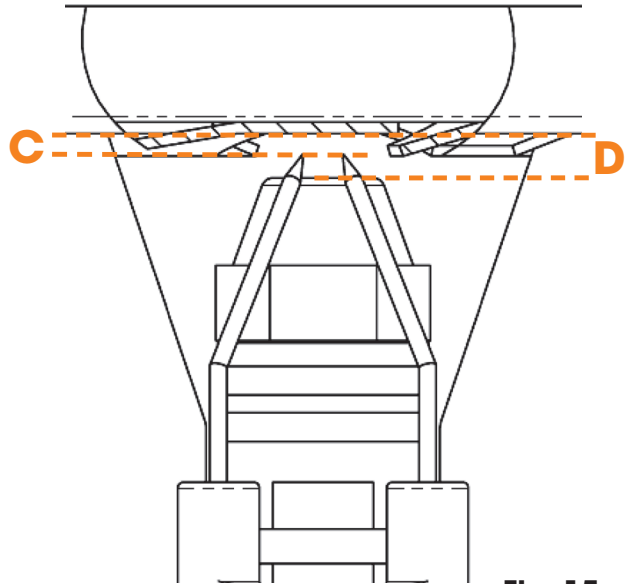


Fig. 15

Model	mm			
	A	B	C	D
BT14	2	7-8	2	4

8 Maintenance & Service

8.1 Notes on safety for the maintenance

Periodic maintenance is essential for the good operation, safety, yield and duration of the burner. It allows you to reduce consumption and polluting emissions and to keep the product in a reliable state over time.



The maintenance interventions and the calibration of the burner must only be carried out by qualified, authorised personnel, in accordance with the contents of this manual and in compliance with the standards and regulations of current laws.



Disconnect the electricity supply from the burner by means of the main switch of the system;



Isolate the fuel supply.

8.2 Maintenance programme

The combustion system should be checked ;

- at least **once a year** if **Kerosene** is being used by a representative of the manufacturer or another specialised technician.
- at least **every 6 months** if **Gas Oil** is being used by a representative of the manufacturer or another specialised technician.

8.2.2 Checking & cleaning

Combustion head

Open the burner and make sure that all components of the combustion head are in good condition, not deformed by the high temperatures, free of impurities from the surroundings and correctly positioned.

Clean the combustion head in the fuel exit area, on the diffuser disc.

Burner

Check for excess wear or loose screws and clean the outside of the burner.

Fan

Check to make sure that no dust has accumulated inside the fan or on its blades, as this condition will cause a reduction in the air flow rate and provoke polluting combustion.

Photo Transistor

Clean the photo transistor

Electrodes

Check the correct position of electrodes

Nozzles

It is advisable to replace nozzles every year or 6 months depending on what fuel is being used. (see 9.2.1)

Do not attempt to clean the nozzle

Filters

Check the filter elements in-line and at the nozzle. Clean or replace if necessary. If rust or other impurities are observed inside the pump, use a separate pump to lift any water and other impurities that may have deposited on the bottom of the tank.

Pump

Please check that the supply line and filters are clear. The use of a pump vacuum gauge will assist in this. This measure permits the cause of the anomaly to be traced to either the suction line or the pump.

If the problem lies in the suction line, check to make sure that the filter is clean and that air is not entering the piping.

Before carrying out any maintenance, cleaning or checking operations:

Flexible Hoses

- Check the condition of the flexible pipes periodically. They have to be replaced at least every 2 years.
- In case of use of gas oil and biofuel blends, it is strongly recommended to inspect even more frequently the hoses and replace them where contamination has occurred.
- Check to make sure that the hoses are still in good condition



The hose(s) supplied with this burner are suitable for use with Kerosene, Gas oil and Biofuel blends of FAME up to 100%

In case of use of a different Biofuel then please contact EOGB for further information (a fuel specification may be requested)

Fuel tank

If water or contamination is present within the fuel tank, it is essential that this is removed before the equipment is to be used. This is extremely important when gas oil containing Biodiesel is in use. If in doubt about how to achieve this then please contact the fuel or oil tank supplier.

Boiler

Clean the boiler as indicated in the appliance accompanying instructions in order to keep all the original combustion characteristics intact, especially the flue gas temperature and combustion chamber pressure.

Combustion

In case the combustion values found at the beginning of the intervention do not respect the standards in force or in any case, do not correspond to a proper combustion, contact the Technical Assistant and allow them to carry out the necessary adjustments.

Allow the burner to work for 10 minutes. and then check the combustion readings with the parameters indicated within the appliance instruction manual.

Then carry out a combustion check verifying:

- Flue gas temperature at the chimney;
- Content of CO₂ (%);
- Content of CO (ppm);
- Smoke value according to opacity smokes index according to Bacharach scale.



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