



Reliable energy. Flexible approach.

INSTRUCTION MANUAL FOR OIL BURNER MODELS

X400 / X500 12v & 24v DC



*Burner images for illustration only, Burners may differ

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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

Technical description of the burner

Burner information	Burner Model		X400 12v DC	X400 24v DC	X500 12v DC	X500 24v DC
	Burner operation mode		One Stage			
	Heat output	kW	14-36	14-36	34-65	34-65
		Kg/hr	1.08 - 2.77	1.08 - 2.77	2.62 - 5.00	2.62 - 5.00
	Working temperature	°C min./max.	0-40			
Weight	kg	8.1	8.1	10	10	

Fuel / Air information	Viscosity	Gas Oil	Maximum viscosity 5.5 cst @ 20°C Suitable for bio blends < B10		
		mm ² /s (cSt)	4 - 6 (@ 20°C) for light oil models		
	Pump	Type	Danfoss BFP21 R3 24v DC		
		Pump Pressure range	8-12 bar		
		Factory setting	10 bar (+/- 1)		
Fuel temperature	Max °C	60 °C			
Fan	Type	Centrifugal, Counter clockwise			
Air temperature	Max °C	40			

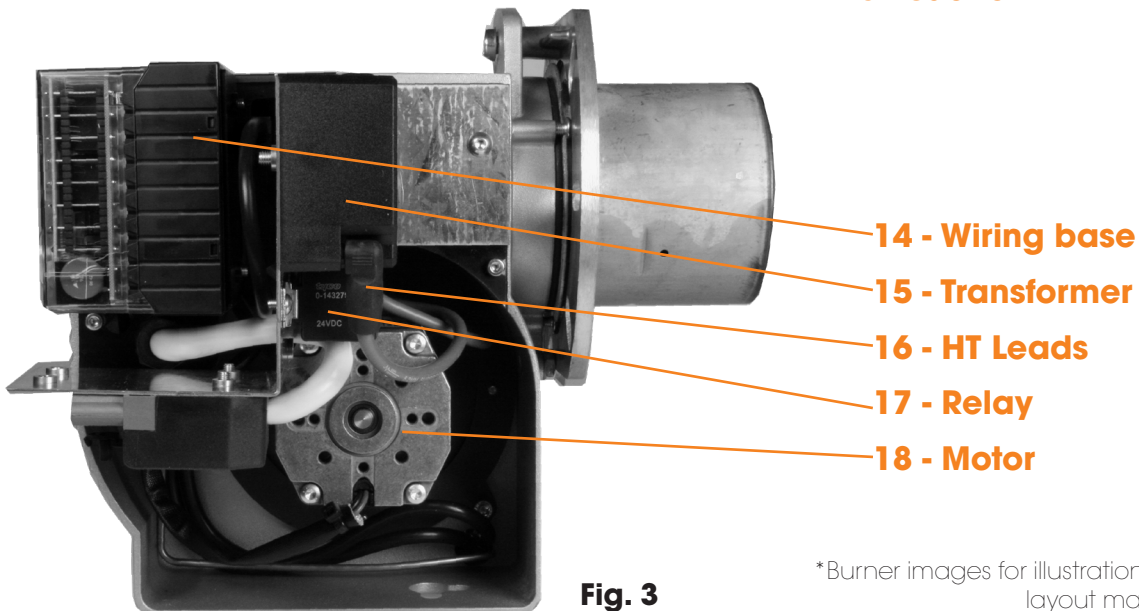
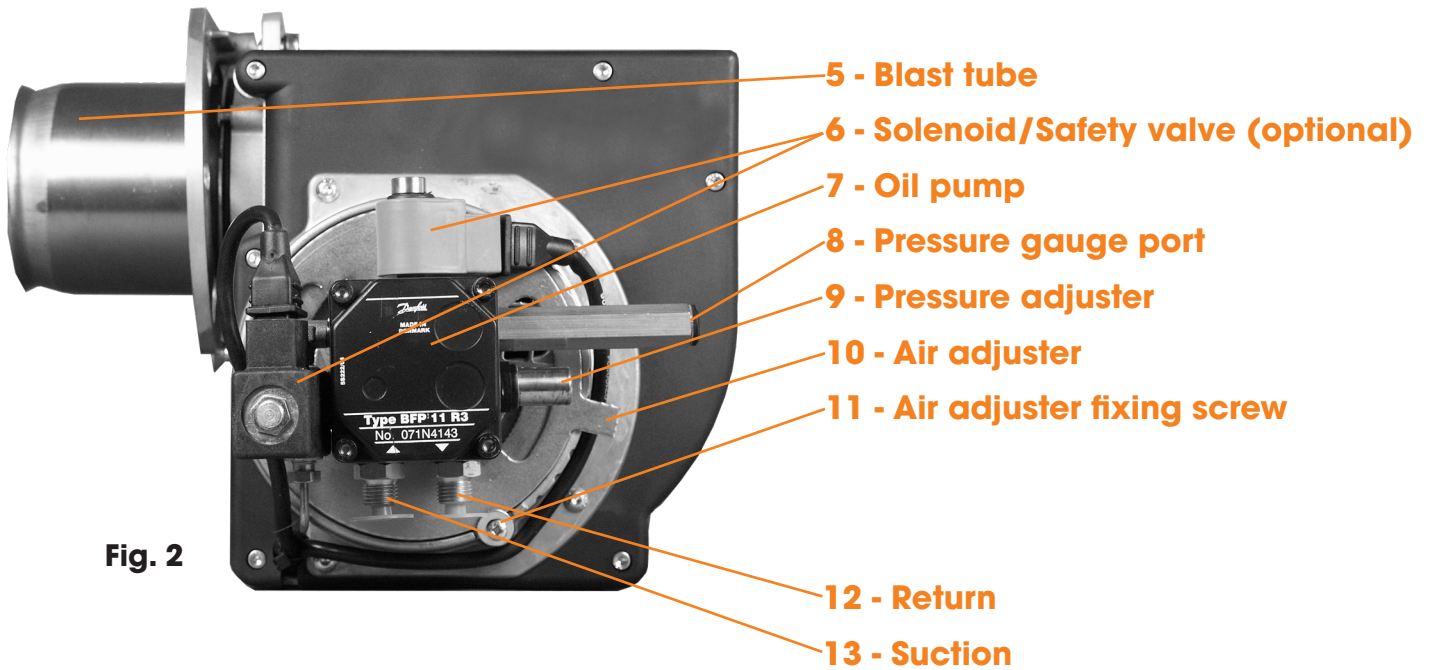
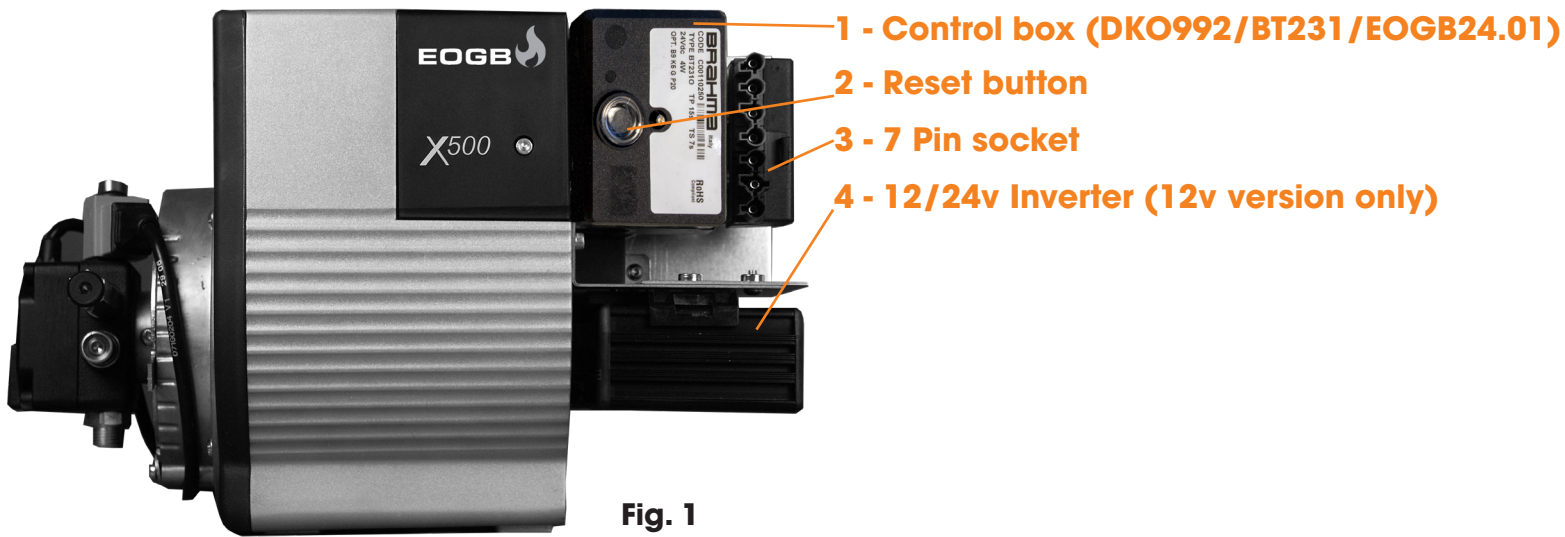
Electrical data	Electrical supply	Ph/Hz/V	12V DC (10V - 15V)	24V DC (+20%/ -10%) - DKO992 24V DC (+20%/ -20%) - BT231O 24V DC (+20%/ -10%) - EOGB24.01	12V DC (10V - 15V)	24V DC (+20%/ -10%) - DKO992 24V DC (+20%/ -20%) - BT231O 24V DC (+20%/ -10%) - EOGB24.01
	Control box	Type	DKO992-24VDC / Brahma BT231O 24v / EOGB24.01 24v DC			
	Protection level	IP Rating	IP40			
	Motor info	Wattage	65w (Brushed)	50w or 100W (Brushless)	65w (Brushed)	50w or 100w (Brushless)
		Voltage	12 VDC	24 VDC	12 VDC	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)		18A	10 A	18 A	11.5A	
Run current (amps)	15 A	8.3 A	15 A	7.7A		

Reference conditions

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

Technical description of the burner

2.1. Burner Components



*Burner images for illustration only, Burner component layout may differ

Technical description of the burner

2.2 Burner Dimensions

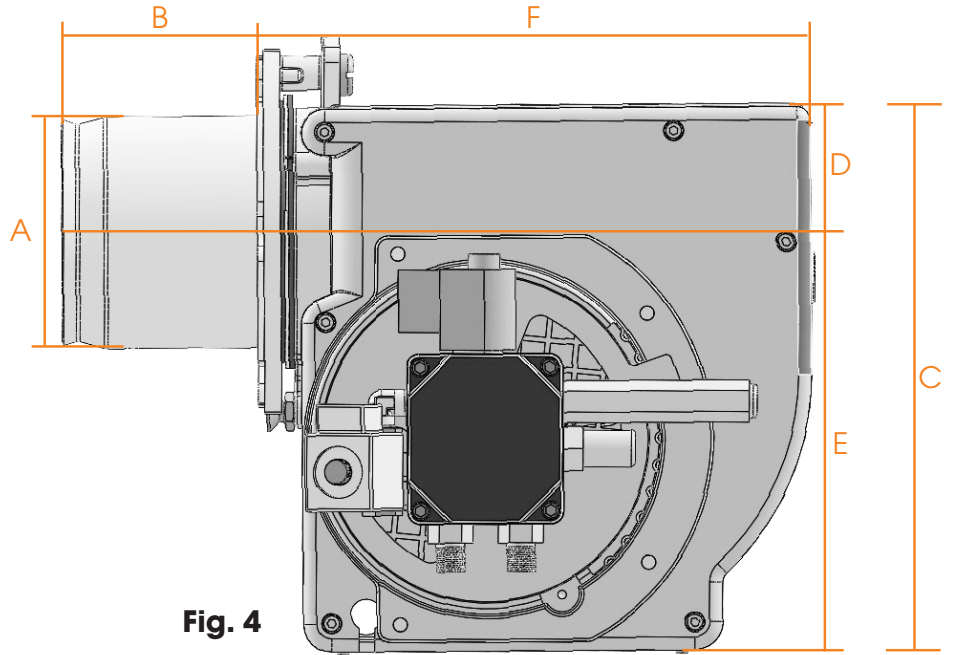


Fig. 4

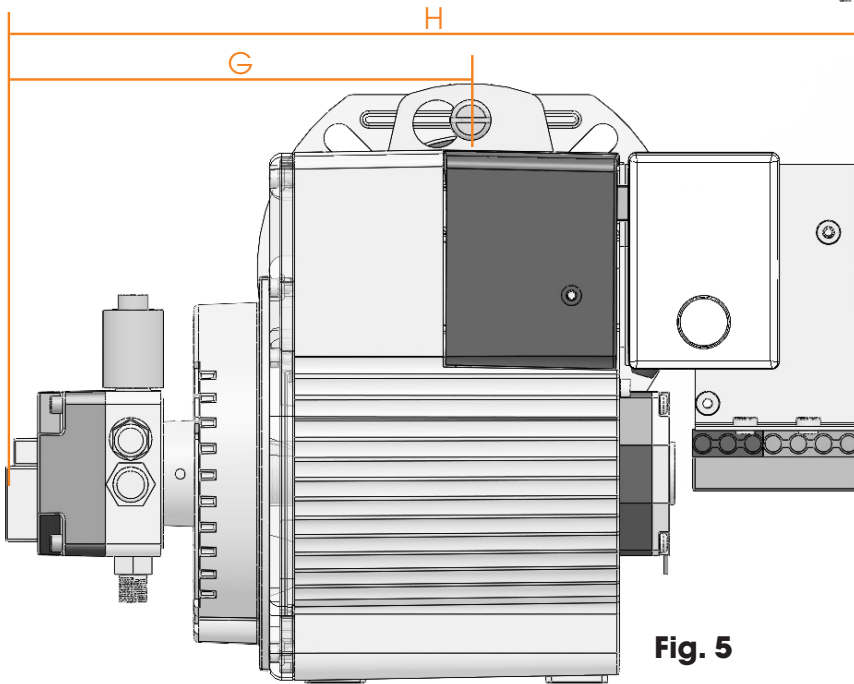


Fig. 5

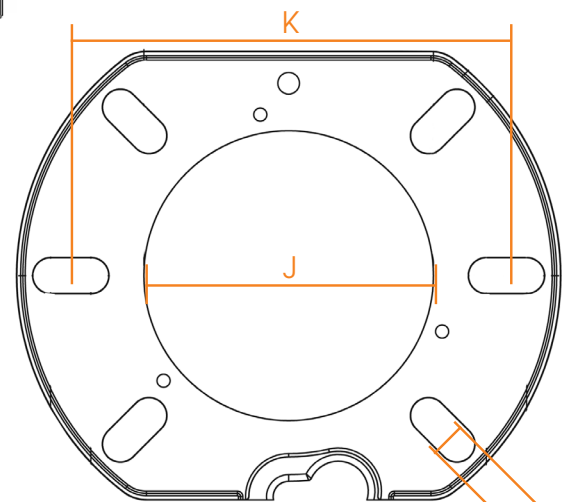


Fig. 6

Burner dimensions (mm)

	Aø root	Aø max	B*	C	D	E	F	G	H BT231	H DKO992/EOGB24	Jø	Kø	L
X400 12v	89	89	73	231	50	161	194	195	355	365	90	125-150	10
X400 24v	89	89	73	231	50	161	194	195	350	365	90	125-150	10
X500 12v	89	89	80	231	50	161	212	183	355	360	90	125-150	10
X500 24v	89	89	80	231	50	161	212	163	350	360	90	125-150	10

* Guidance only - other tube lengths are available

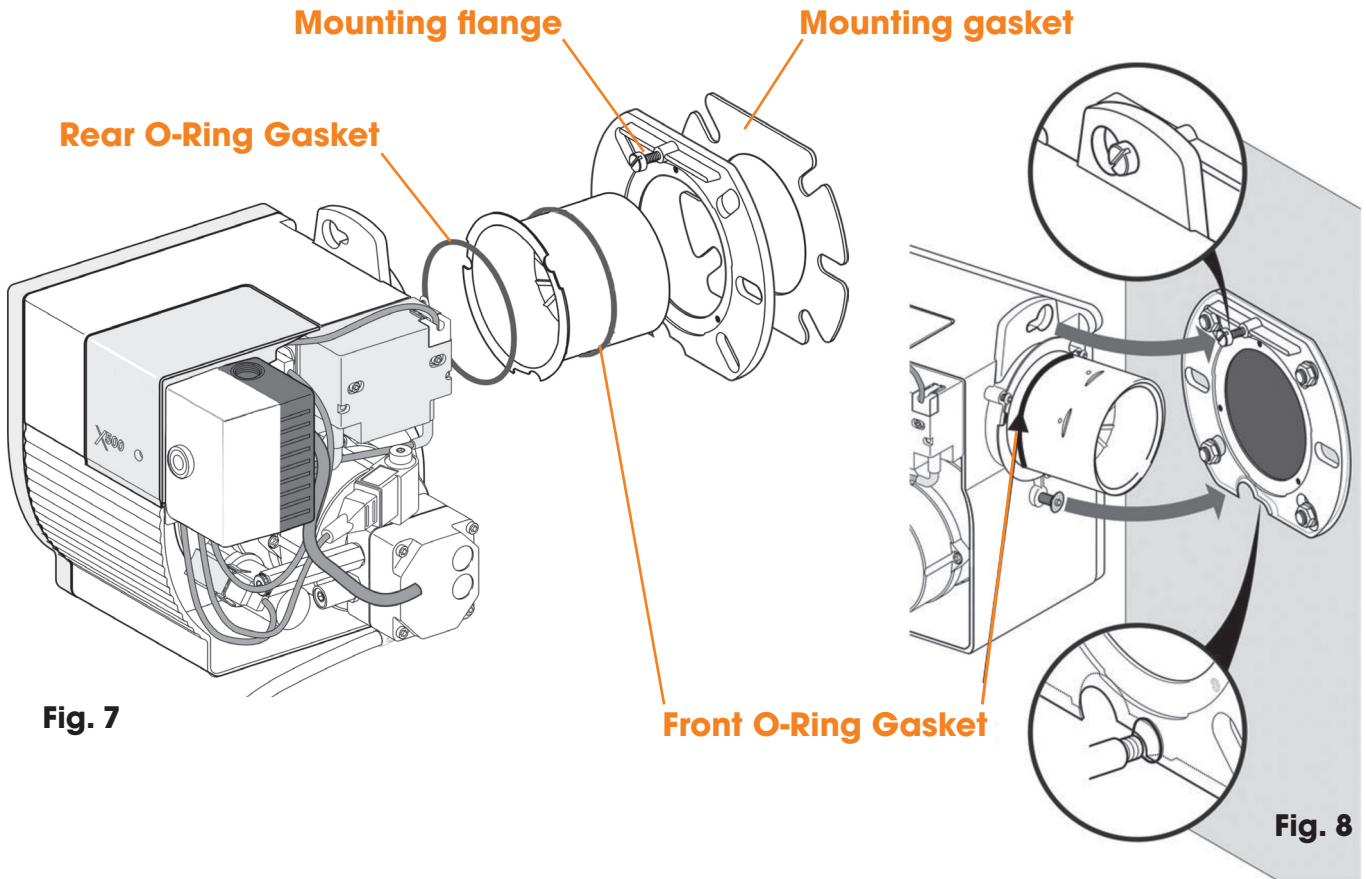
Installation

3.0 Burner Mounting

Fitting The Burner to the Boiler/Application

Before the burner is mounted on to the application, it is necessary to fix the mounting flange and gasket in the correct order **(see Fig 7)**. Once the mounting flange and gasket are mounted, insert burner into the mounting flange (ensure that the Front O ring sealing gasket is fitted) then twist burner into position then tighten the locking screw. **(see Fig 8)**

Light oil pipes must be connected to the burner after it has been properly mounted.



3.1 Standard Accessories

Mounting flange	Qty 1
Mounting gasket	Qty 1
Front O-ring sealing gasket	Qty 1
Flexible hoses	Qty 2 x 0890mm 1/4" F x 1/4"F
7 Pin Wieland plug	Qty 1
Flat washer	Qty 4 - Ø8
Bolts	Qty 4 - M8 x 12
Nuts	Qty 4 - M8
Nipples	Qty 2 - 1/4" (fitted to pump)
Nozzle (Factory size)	Qty 1 - (Fitted)

Installation

3.2 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 Fig 9 / 9.1 below).

- Fit the filter to the supply pipeline between two isolation valves before the fire valve and de-aerator. Connect the flexible oil lines from the de-aerator, to the burner pump (ensure that the flow and return and connected onto the pump correctly. (see Fig 9.2 below).

- 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

2 Pipe Suction Lift With De-Aerator (Gas Oil/Diesel)

Flue Flow-rate	Maximum Allowable Pipe Run From Tank To De-Aerator (metres)						
	2.5 (kg/h)		5.0 (kg/h)			10 (kg/h)	
	4mm inside diameter	6mm inside diameter	4mm inside diameter	5mm inside diameter	6mm inside diameter	5mm inside diameter	6mm inside diameter
HEAD (metres)	Max pipe length in m						
0	73	100	37	90	100	45	93
-0.5	65	100	32	79	100	40	82
-1.0	56	100	28	69	100	34	71
-1.5	48	100	24	58	100	29	60
-2.0	39	95	20	48	99	24	49
-2.5	30	74	15	37	77	19	39
-3.0	22	53	11	27	55	13	28
-3.5	13	32	7	16	34	8	17
-4.0	5	11	2	6	12	3	6

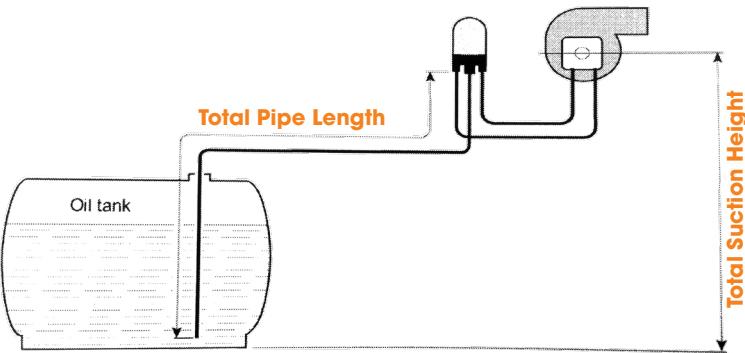


Fig. 9

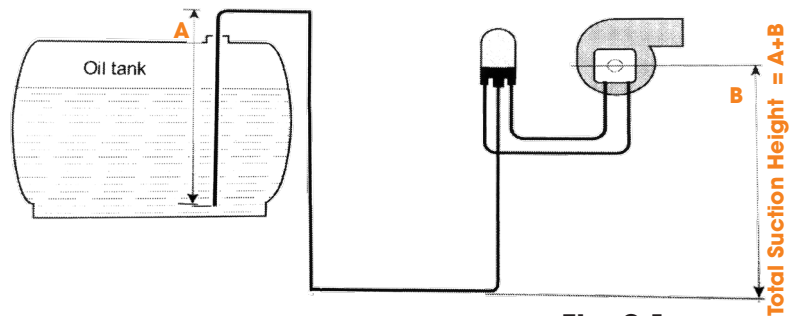


Fig. 9.1

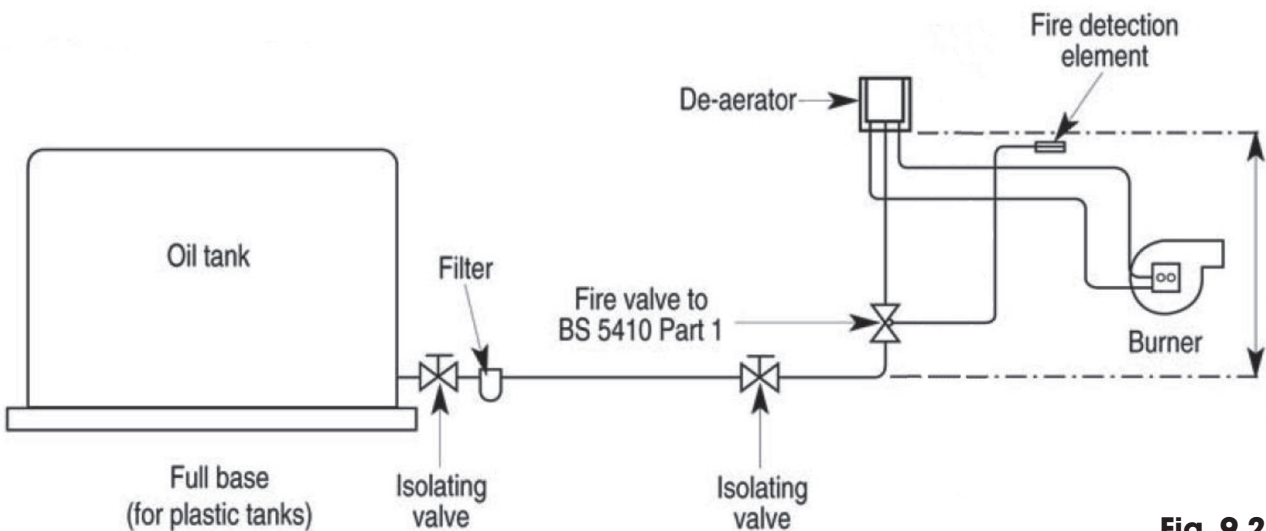


Fig. 9.2

Electrical System

4.0 12V DC Electrical wiring - DKO992-24v Control Box



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 X-Series 12v DC - DKO992/EOGB24.01

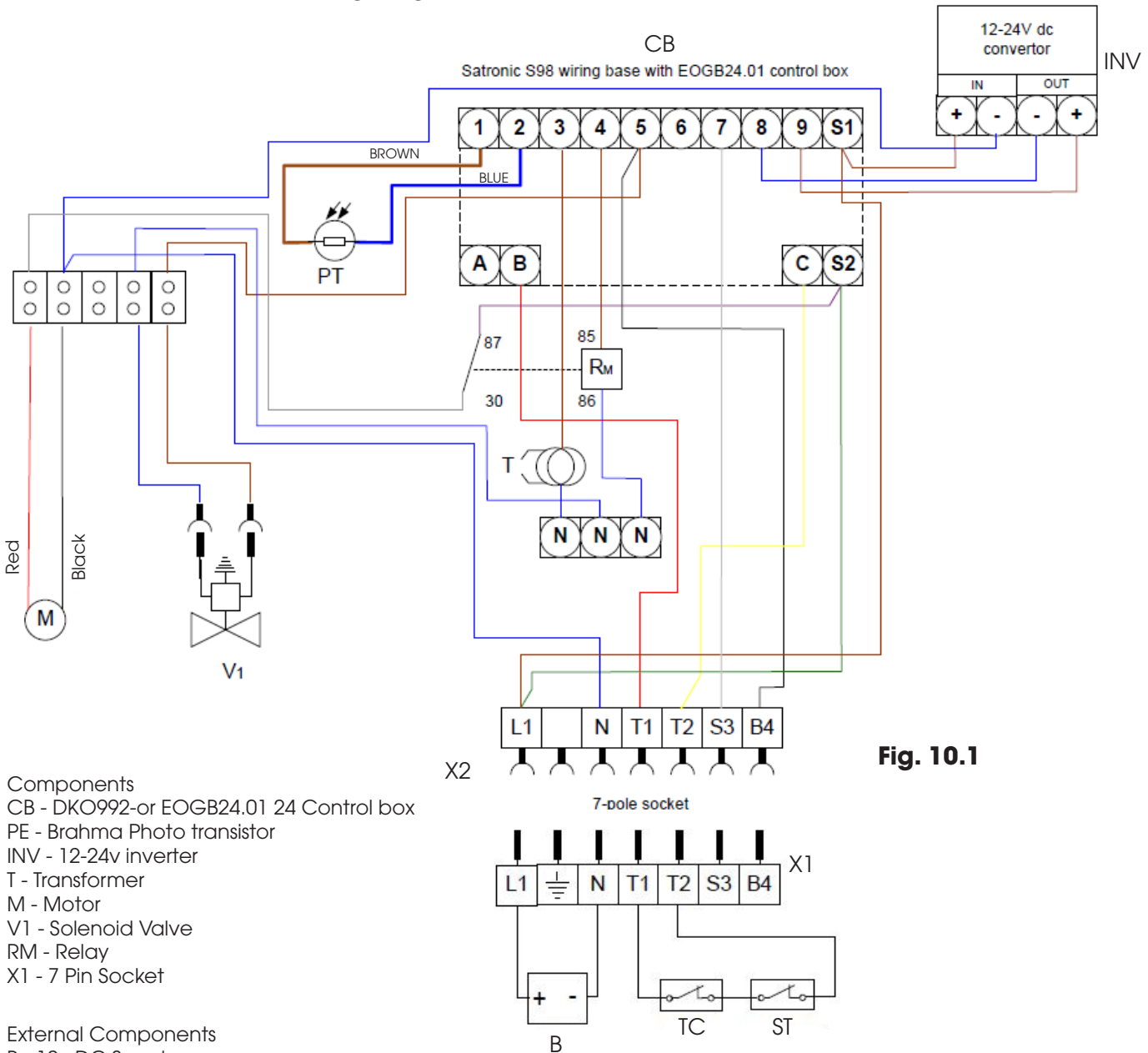


Fig. 10.1

Components

- CB - DKO992-or EOGB24.01 24 Control box
- PE - Brahma Photo transistor
- INV - 12-24v inverter
- T - Transformer
- M - Motor
- V1 - Solenoid Valve
- RM - Relay
- X1 - 7 Pin Socket

External Components

- B - 12v DC Supply
- TC - Control thermostat
- ST - Safety thermostat
- X2 - 7 Pin Plug



TESTING:

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

Electrical System

4.1 24V DC Electrical wiring - DKO992-24v Control Box



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 X-Series 24v DC - DKO992/EOGB24.01

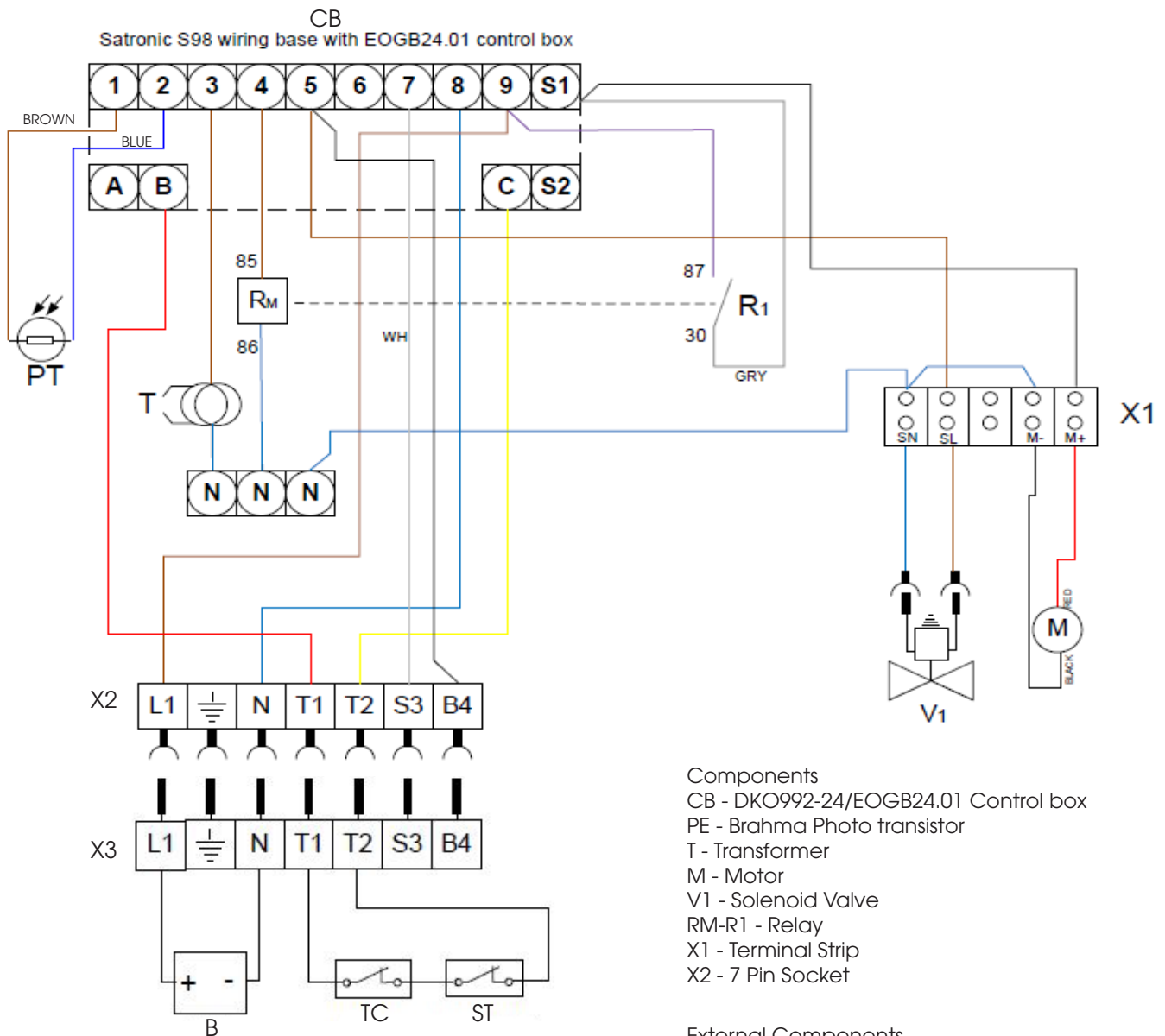


Fig. 10.2



TESTING:

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

Electrical System

4.3 12V DC Electrical wiring - Brahma BT231O-24v Control Box



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 X-Series 12v DC - BT231O

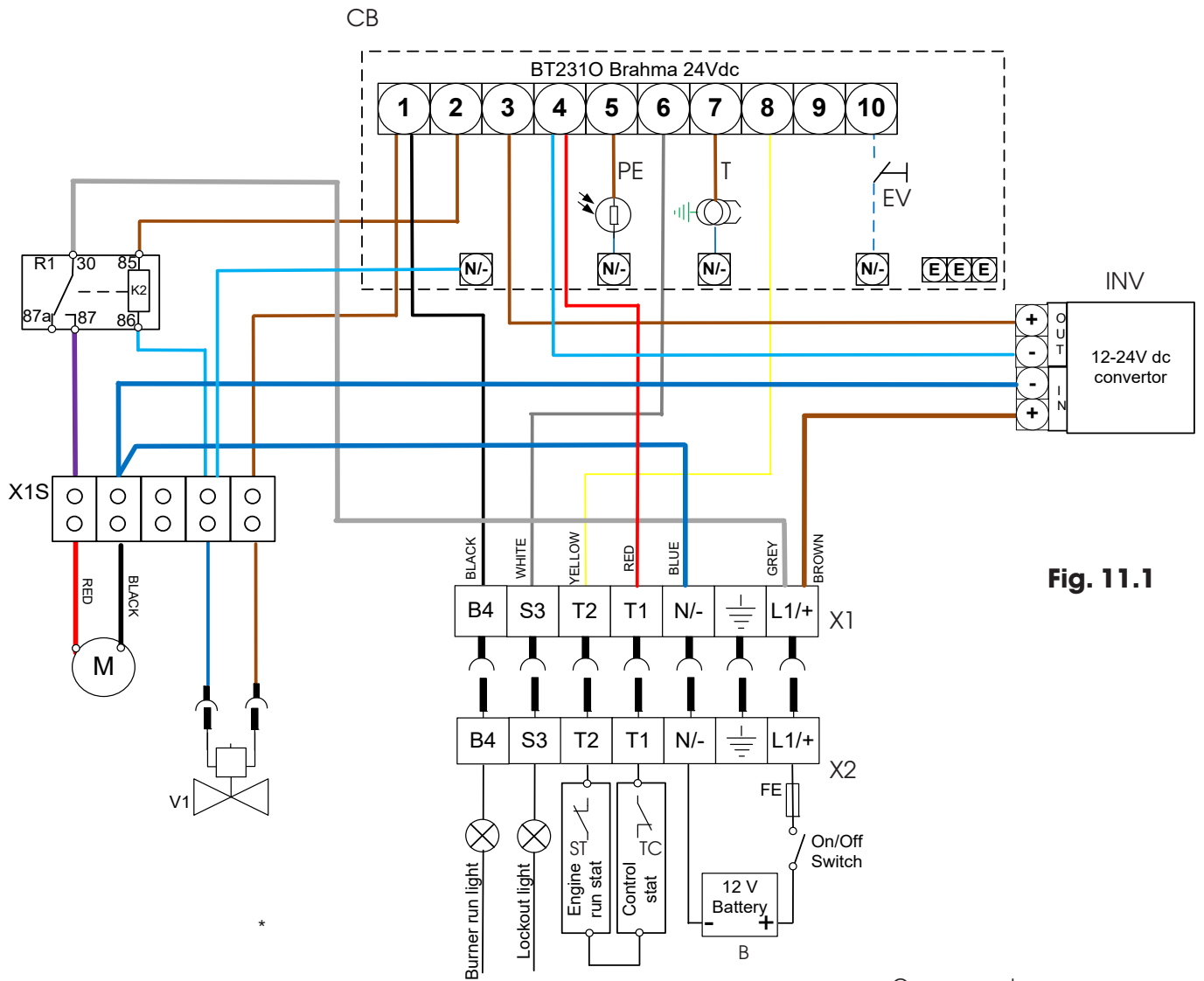


Fig. 11.1

- Components
- CB - Brahma BT231O Control box
 - PE - Brahma Photo transistor
 - INV - 12-24v inverter
 - T - Transformer
 - M - Motor
 - V1 - Solenoid Valve
 - *VS - Safety Valve (Optional)
 - R1 - Relay
 - X1 - 7 Pin Socket
 - EV - Remote Reset (Optional)

- External Components
- B - 12v DC Supply
 - TC - Control thermostat
 - ST - Safety thermostat
 - X2 - 7 Pin Plug
 - FE - Fuse



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

Electrical System

4.4 24V DC Electrical wiring -- Brahma BT231O-24v Control Box



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 X-Series 24v DC - BT231O

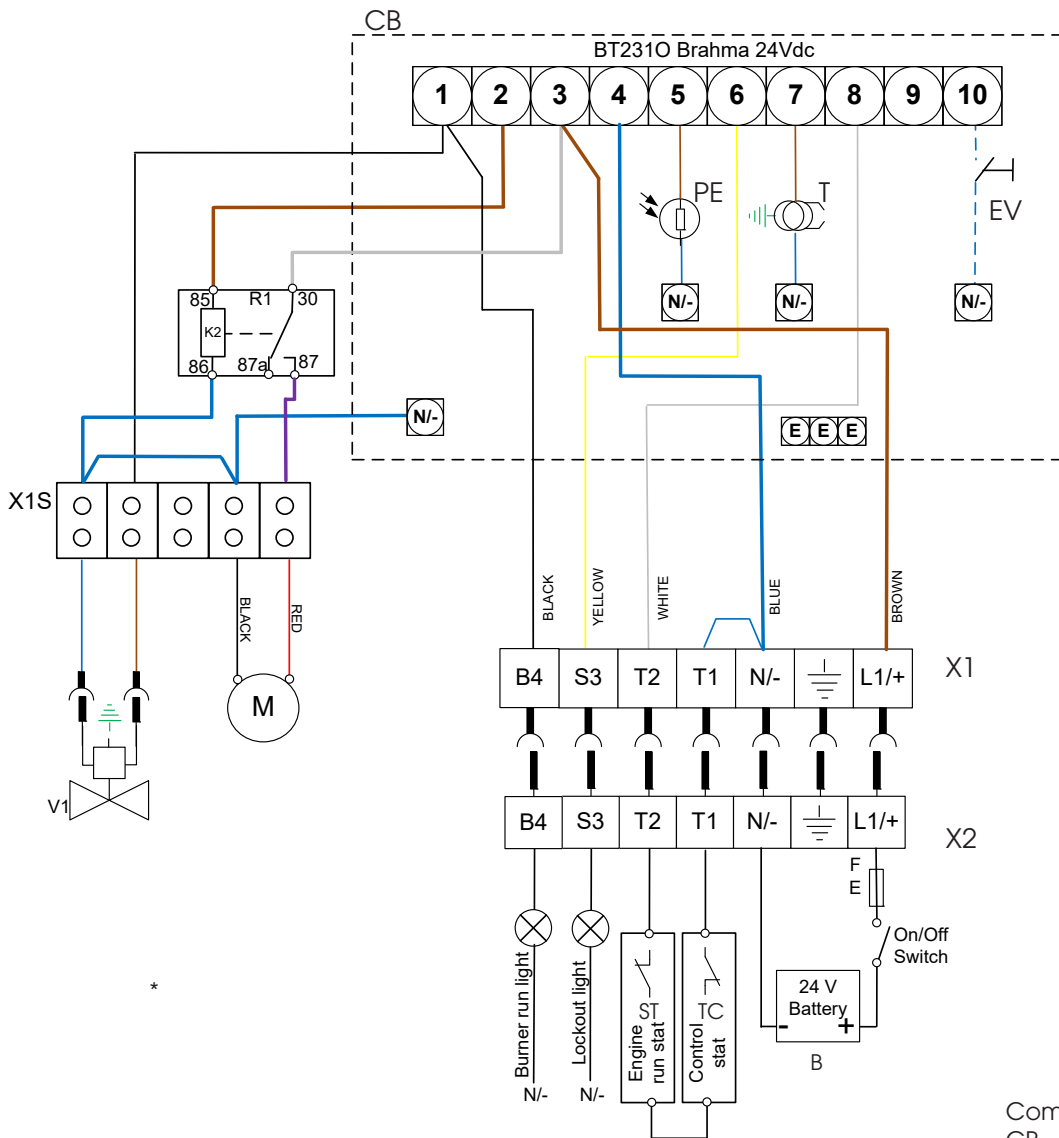


Fig. 11.2

- Components
- CB - Brahma BT231O Control box
 - PE - Brahma Photo transistor
 - T - Transformer
 - M - Motor
 - V1 - Solenoid Valve
 - *VS - Saffey Valve (Optional)
 - RM-R1 - Relay
 - X1 - Terminal Strip
 - X2 - 7 Pin Socket
 - EV - Remote Reset (Optional)

- External Components
- B - 24v DC Supply
 - TC - Control thermostat
 - ST - Safety thermostat
 - X3 - 7 Pin Plug
 - FE - Fuse



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

5.0 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



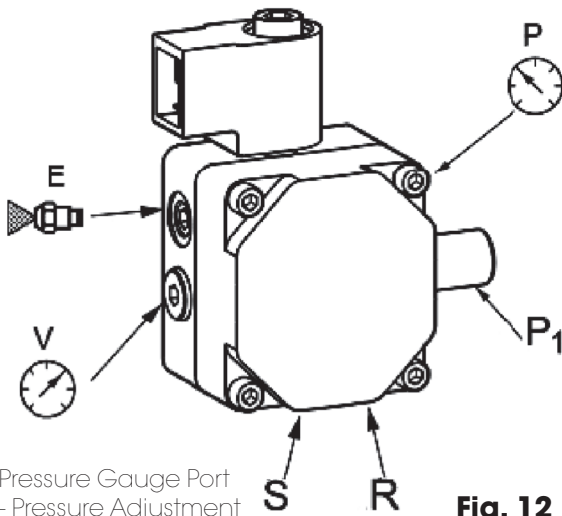
Check the correct working of the adjustment, command and safety devices.

5.1 Preparations for Start up

Ensure that the correct size nozzle has been fitted for the application, The table below (see fig 14) shows the delivery rates in kg/hr of light oil against nozzle size and pump pressure.

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 "P" (see fig 12) to allow air to purge until oil is freely flowing, then tighten Port "P". 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.



P - Pressure Gauge Port
 P1 - Pressure Adjustment
 V - Vacuum Gauge Port
 E - Nozzle Port
 S - Suction
 R - Return

Fig. 12

5.2 Combustion adjustment



On the initial burner start up, the burner may not ignite first time due to an incorrect air setting or you may find the burner has established a flame but the air adjustment is set incorrectly and the burner is producing smoke in the exhaust. It is in this instance the air adjustment damper be adjusted to ensure the correct amount of air for combustion.

5.3 Burner combustion adjustment

If the burner is producing **BLACK** smoke then the burner requires **MORE** air. Loosen the air adjustment fixing screw (see fig 13) and rotate the air damper **ANTI-CLOCKWISE** to increase air flow.

we advise to move the adjustment in small increments and wait for approximately 30 seconds to allow time for the combustion gasses to pass through the application. Keep adjusting until the smoke clears.

If the burner is producing **WHITE** smoke then the burner requires **LESS** air. Loosen the air adjustment fixing screw and rotate the air damper **CLOCKWISE** to decrease air flow.

we advise to move the adjustment in small increments and wait for approximately 30 seconds to allow time for the combustion gasses to pass through the application. Keep adjusting until the smoke clears.

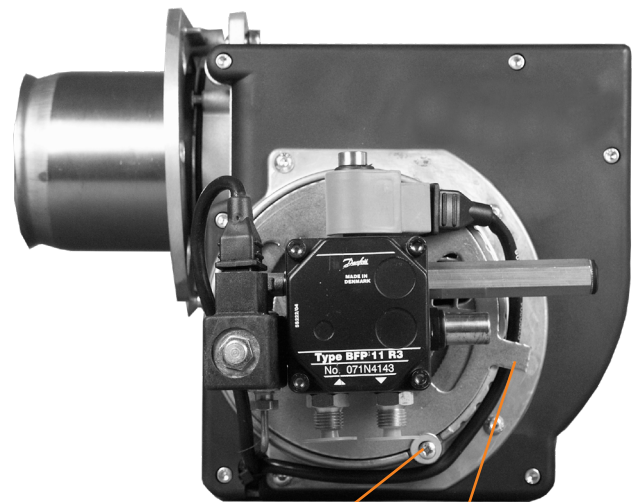


Fig. 13

Air adjustment fixing screw

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

Burner Operation and Commissioning

5.4 Pump pressure

The pump pressure when it leaves the factory (unless otherwise specified) will be set to approx 10 bar if 24v version or 8 bar if 12v version. Pump pressure should then be set to appliance manufacturer's recommendations depending on what nozzle size is used.

5.5 Nozzles installation

In order to guarantee that emissions do not vary, it is recommended to use the nozzles specified by the manufacturers instructions. The information given in **FIG 14** should only be used as a guide where no information is provided by the boiler/application manufacturer's instructions.



WARNING

It is advisable to replace nozzles every 6 months during regular maintenance operations.



CAUTION

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.

5.6 Nozzles recommended

Nozzles recommended

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

Angle 60° & 80° are advisable

		Pump Pressure									
		8		9		10		11		12	
Nozzle Capacity - usg/h	GPH	kg/h (Input)	kW (Input)	kg/h (Input)	kW (Input)	kg/h (Input)	kW (Input)	kg/h (Input)	kW (Input)	kg/h (Input)	kW (Input)
	0.30			1.09	14.17	1.15	14.94	1.21	15.67	1.26	16.36
	0.35	1.21	15.69	1.28	16.64	1.35	17.54	1.42	18.39	1.48	19.21
	0.40	1.31	16.96	1.39	17.99	1.46	18.97	1.53	19.89	1.60	20.78
	0.45	1.48	19.29	1.57	20.46	1.66	21.56	1.74	22.62	1.82	23.62
	0.50	1.67	21.73	1.77	23.04	1.87	24.29	1.96	25.48	2.05	26.61
	0.55	1.89	24.52	2.00	26.00	2.11	27.41	2.21	28.75	2.31	30.02
	0.60	2.12	24.78	2.25	29.21	2.37	30.79	2.49	32.29	2.60	33.72
	0.65	2.39	31.02	2.53	32.90	2.67	34.68	2.80	36.38		
	0.75	2.63	34.16	2.79	36.23						
Recommended for X400 12v Versions				Recommended for X400 24v Versions							

The above figures are based on 1 litre of Class D fuel with a CV of 10.85 kWh having density of 0.835 which would equate to 12.99kW/hr per 1kg

		Pump Pressure									
		8		9		10		11		12	
Nozzle Capacity - usg/h	GPH	kg/h (Input)	kW (Input)	kg/h (Input)	kW (Input)	kg/h (Input)	kW (Input)	kg/h (Input)	kW (Input)	kg/h (Input)	kW (Input)
	0.65					2.67	34.68	2.80	36.38	2.92	37.99
	0.75	2.63	34.16	2.79	36.23	2.94	38.19	3.08	40.05	3.22	41.84
	0.85	2.96	38.46	3.14	40.79	3.31	43.00	3.47	45.10	3.63	47.10
	1.00	3.33	43.22	3.53	45.84	3.72	48.32	3.90	50.68	4.08	52.93
	1.10	3.79	49.26	4.02	52.25	4.24	55.08	4.45	57.77	4.64	60.33
	1.20	3.98	51.7	4.22	54.84	4.45	57.81	4.67	60.63	4.87	63.32
	1.25	4.21	54.72	4.47	58.04	4.71	61.18	4.94	64.17	5.16	67.02
	1.35	4.62	60.07	4.90	63.71	5.17	67.16				
Recommended for X500 12v Versions				Recommended for X500 24v Versions							

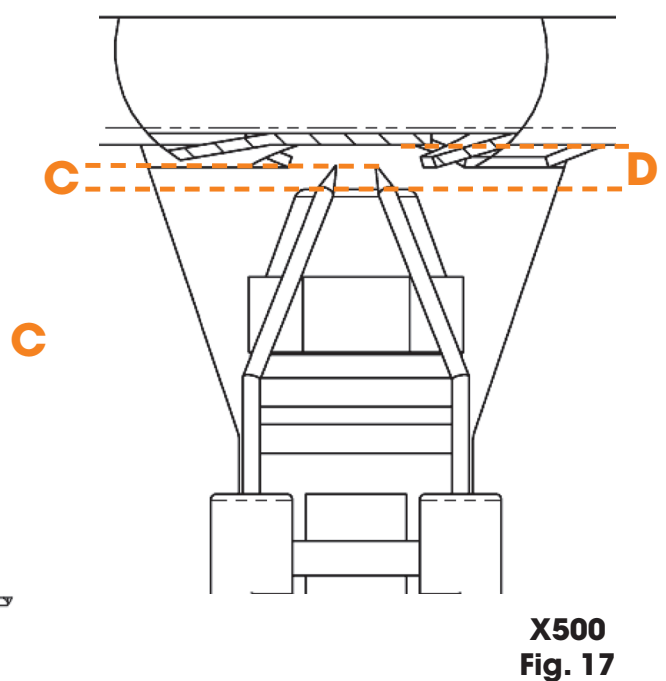
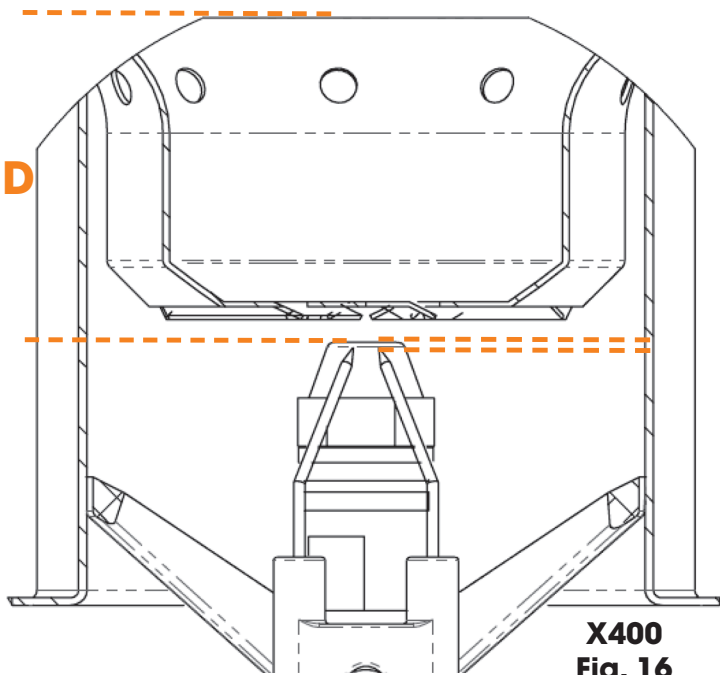
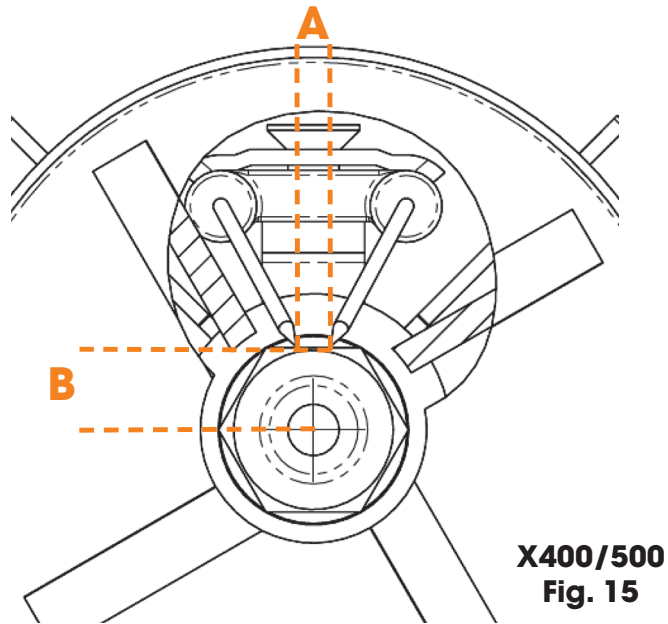
The above figures are based on 1 litre of Class D fuel with a CV of 10.85 kWh having density of 0.835 which would equate to 12.99kW/hr per 1kg

Fig. 14

Burner Operation and Commissioning



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 diagrams below.



Model	mm			
	A	B	C	D
X400 (12 & 24v)	3.5	9	-1	43
X500 (12 & 24v)	3.5	6	+2	4.5

Maintenance / Service

6.0 Notes on safety for the maintenance

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



The maintenance 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.

Before carrying out any maintenance, cleaning or checking operations:



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



Isolate the fuel supply.

6.1 Maintenance programme

The combustion system should be checked ;

- at least **every 6 months** if **Diesel** is being used by a representative of the manufacturer or another specialised technician.

6.2 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 condition and correct position of electrodes

Nozzles

It is advisable to replace nozzles 6 months.

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 system.

Flexible Hoses

- Check the condition of the flexible pipes periodically and replace where necessary
- In case of use of biofuel blends, it is strongly recommended to inspect more frequently and replace them where contamination has occurred.
- Check to make sure that the hoses are still in good condition

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 diesel containing Bio fuel is in use.

Application

Clean the application as indicated in the appliance accompanying instructions in order to keep all the original combustion characteristics intact.

Combustion

In the case of combustion problems (smoking) refer back to section **5.2 / 5.3**



Do not keep resetting the lockout reset button as this will overheat the ignition unit. Allow 2 minutes between reset attempts to allow sufficient cooling.

Please note: The information given above is provided to assist the engineer with any problems they may encounter. This is not a definitive list.

The manufacturer cannot accept responsibility for any damage to persons, animals or property due to error in installation or in the burner adjustment, or due to improper or unreasonable use or non observance of the technical instruction enclosed with the burner, or due to the intervention of unqualified personnel.

Diagnostic and Lockout Codes (DKO992-24v)

7.0 Signals during operation (DKO992-24v)

The information system is microprocessor based and reports on all aspects of burner control box operation and flame supervision. It informs continuously about the actual programming sequence the unit is just performing. Besides monitoring of the programming sequence it also allows to identify errors during start-up of operation without any additional testing devices. The automatically performed diagnoses is a valuable tool which facilitates service/ maintenance work and therefore saves costs. The analyses of the error cause can be done directly on stage or if not possible afterwards as the lock out reason is stored in a non volatile lock out mode memory.

The information system communicates with the outside world using a LED (the used Flash-Code is similar to the Morse-Code). The messages are optically transmitted by flashing appropriately a LED. Using an (optional) additional terminal the messages can be recorded and displayed in easily readable form.

The built-in microprocessor controls not only the programming sequence but the information system as well. The individual phases of the programming sequence are displayed as Flash-Code.

The following messages can be distinguished:

Message	Flash-Code
waiting for RT	■ _
pre-ignition tv1	.
safety time ts	■ .
post ignition tn	■ .
delay time to valve V2 tv2	■ .
running	_
post-purge	■ ■ _

low mains voltage	■ ■ _
Internal fuse defect	■ _
> control box defect	

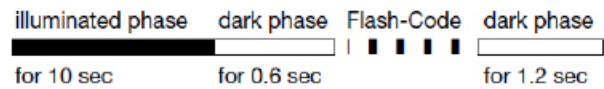
Description

- | = short pulse
- = long pulse
- . = short pause
- _ = long pause

7.1 Diagnostics (DKO992-24v)

In case of a failure the LED is permanently illuminated. Every 10 seconds the illumination is interrupted by a flash code, which indicates the cause of the error. Therefore the following sequence is performed which is repeated as long as the unit is not reset.

Sequence:



Error diagnosis

Error message	Flash-Code	Possible fault
lockout	■ ■ ■ ■	within lock out safety time no flame establishment
stray light	■ ■ ■	stray light during monitored phase, detector may be faulty
flame-off-test	■ ■ ■	flame signal during post-purge

Flash-Code for manual lock out

manual/external lock out	■ ■ ■ ■ ■ ■ ■ ■
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7.2 Lockout and reset (DKO992-24v)

The unit can be reset or brought into lock out mode in two different ways:

Internal

In the lock out case the unit can be reset by pushing the built-in button meaning a new start-up cycle is performed.

External

Instead of using the built-in lock out button the same function can be achieved by using an external button which connects terminal 9 with A (see also circuit and block diagram).

If the push-button (internal or external) is pressed during normal operation or during the start sequence for more than 3 sec. and afterwards released, the control box will go into lockout mode.

Lockout Codes (BT231O 24v)

7.3 Signals during operation (BT231O-24v)







In the various operation conditions the device is able to signal the operation state through a multi-coloured LED located in the reset button (on board of the device). The colours legend is as follows:

LED SIGNALS	MEANING
Slow green blink	Device is in idle position (1 blink every 2 sec.).
Slow orange blink	Device is in idle position for cooling of ignition transformer (only with XP option 1 blink every 2 sec.).
Slow red blink	BTX3XG device is in waiting of air pressure (1 blink every 2 sec.). BTX3XO device is in waiting of pre-heater thermostat (1 blink every 2 sec.).
Stable green	Device is in working position with good flame signal.
Stable orange	Device is in ignition position (TS) without flame signal.
Stable red	Device is in lockout position
Fast orange blink	Device is in ignition position (TS) with good flame signal.
Fast green blink	Device is in working position (TS) with bad flame signal.
Red-orange blink	Power supply is under or over allowed voltage.
Green-orange blink	Device is in ignition position (TS) with bad flame signal.
Fast red blink	Parasite flame during start-up.

7.4 Diagnostics (BT231O-24v)

In lockout condition with the pushing of the unlock button for more than 5 sec., the diagnostic routine is activated (alarm signal with blinks). The alarm signal is turned off for a number of times that depends on the lockout type with a pause of 2sec. between a series of blinks and the next. The table below shows the lockout type or the malfunctioning with the number of blinks.

Error Code Table

Code of Alarm signal (red led)	Potential Cause
2 shut off 	Flame failure at the end of safety time «TS»: - Defective or soiled fuel valves - Defective or soiled flame detector - Poor adjustment of burner or no fuel - Defective ignition equipment
3 shut off 	Air pressure switch failure to close or the Revolutions Per Minute are below the minimum set value (BTX3XG). Preheater thermostat failure to close (BTXXXO).
4 shut off 	Extraneous light/Flame simulation at start-up
5 shut off 	Air pressure switch failure to open or the Revolutions Per Minute are more than the minimum set value (BTX3XG)
6 shut off 	Air pressure switch failure or the Revolutions Per Minute, in running position, are below the minimum value (BTX3XG).
7 shut off 	Flame failure in running position.
8-14 shut off	Generic internal failure

During the time cause of fault diagnosed, the control output are deactivated (the burner remains shut down, lockout condition). Diagnostics of the cause of fault is quit and the burner is switched on again by resetting the burner control. Press the lockout reset button for about 1 sec. (< 3 seconds)

7.5 Lockout and reset (BT231O-24v)

Non-volatile lockout (manual reset)

When the controller goes to a non-volatile lockout, in order to reset the system the reset button must be pressed till the lockout signal is shut off.

Volatile lockout (electrical reset)

In case of a volatile lockout the controller can be reset by interrupting and then restoring the power supply. It's not possible to reset the system by shutting off the heating demand device.

Lockout Codes (EOGB24.01)

7.6 Signals during operation (EOGB24.01)

The information system is microprocessor based and reports on all aspects of burner control box operation and flame supervision. It informs continuously about the actual programming sequence the unit is just performing. Besides monitoring of the programming sequence it also allows to identify errors during start-up of operation without any additional testing devices. The automatically performed diagnoses is a valuable tool which facilitates service/ maintenance work and therefore saves costs. The analyses of the error cause can be done directly on stage or if not possible afterwards as the lock out reason is stored in a non volatile lock out mode memory.

The information system communicates with the outside world using a LED (the used Flash-Code is similar to the Morse-Code). The messages are optically transmitted by flashing appropriately a LED. Using an (optional) additional terminal the messages can be recorded and displayed in easily readable form.

The built-in microprocessor controls not only the programming sequence but the information system as well. The individual phases of the programming sequence are displayed as Flash-Code.

The following messages can be distinguished:

Message	Number Code
Power Up	01
Ready To Start	02
Pre-purge	03
Stray Light Monitoring	04
Ignition	05
Wait Post Ignition Time	06
Burner Running	07
Post Purge	08

7.7 Diagnostics (EOGB24.01)

In case of a failure the LED is permanently illuminated. Every 10 seconds the illumination is interrupted by a flash code, which indicates the cause of the error. Therefore the following sequence is performed which is repeated as long as the unit is not reset.

Sequence:

Lock-Out Codes		
Message	Number Code	Possible Fault/Solution
Low Supply Voltage	10	- Check supply voltage
Manual Lock Out	11	- Hold for 3 seconds
Flame Off Test	12	- Photocell sensing light on post purge
Stray Light Test	13	- Photocell sensing light on start up
No Flame	14	- Check air - Photocell not reading light - Fuel solenoid not energising - No Ignition Spark - No Fuel

Ready To Reset Codes	
Message	Number Code
Low Supply Voltage	20
Manual Lock Out	21
Flame Off Test	22
Stray Light Test	23
No Flame	24

7.8 Lockout and reset (EOGB24.01)

The unit can be reset or brought into lock out mode in two different ways:

Internal

In the lock out case the unit can be reset by pushing the built-in button meaning a new start-up cycle is performed.

External

Instead of using the built-in lock out button the same function can be achieved by using an external button which connects terminal 9 with A (see also circuit and block diagram).

If the push-button (internal or external) is pressed during normal operation or during the start sequence for more than 3 sec. and afterwards released, the control box will go into lockout mode.



EOGB Energy Products Ltd, 5 Howard Road, Eaton Socon, St Neots, Cambridgeshire PE19 8ET

Tel: 01480 477066 Fax: 01480 477022 Email: sales@eogb.co.uk www.eogb.co.uk



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