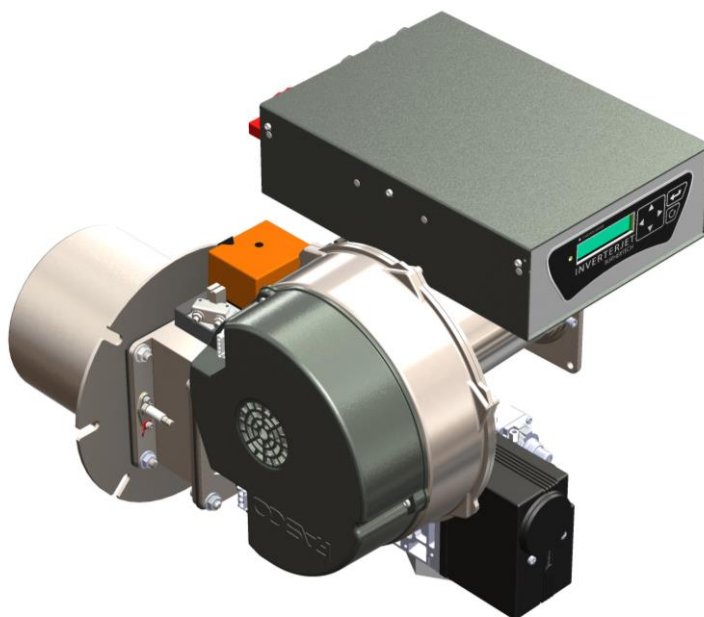


INSTALLATION / SERVICE / USER MANUAL



INVERTERJET HM SERIES

MODEL	PRODUCT CODE	CLASS
INVERTERJET 50HM	91324	HIGH MODULATING PREMIX BURNER
INVERTERJET 90HM	91325	HIGH MODULATING PREMIX BURNER
INVERTERJET 150HM	91370	HIGH MODULATING PREMIX BURNER
INVERTERJET 200HM	91369	HIGH MODULATING PREMIX BURNER
INVERTERJET 250HM	91371	HIGH MODULATING PREMIX BURNER
INVERTERJET 300HM	91321	HIGH MODULATING PREMIX BURNER

99056 (1) 14/05/2020, Subject to Modifications.

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1 Declaration

The Inverterjet burners are state of the art burner system.

Designed with imagination and passion. It utilises the very latest technology to provide a reliable, hot, clean and compact gas heating solution.

A truly market leading product which is quite simply;

‘Taking Burner Technology into the 21st Century’.

Please read this manual before Unpacking and Installing the Burner.

For Burner Installation/ Operation advise please contact Burnertech

To ensure maximum product reliability, we advise and request that a Burnertech Approved Engineer who has attended our product course conducts the 1st burner commissioning.

For Training, Service or Commissioning information please contact Burnertech

This manual is provided as an integral part of the equipment and its delivery to the end user is essential.

Please keep this manual for future reference, more copies of this manual are available upon request. It is possible to download this Manual and Technical Datasheet from the www.burnertech.co.uk Burnertech Website.

CONTACT / SERVICE:



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SPECIAL ATTENTION BOXES

The following defined terms are used throughout this manual to bring attention to the presence of hazards of various risk levels, or to important product information



DANGER

DANGER indicates an imminently hazardous situation which if not avoided will result in death or serious injury.



WARNING

WARNING indicates a potentially hazardous situation which if not avoided, could result in death or serious injury.



CAUTION

CAUTION indicates a potentially hazardous situation which if not avoided, could result in minor or moderate injury.

CAUTION

CAUTION used without a safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

NOTICE

NOTICE is used to address practices not related to personal injury

SAFETY INSTRUCTIONS

SAFETY INSTRUCTIONS (or equivalent) signs indicate specific safety related instructions or procedures

NOTE: Contains additional information important to a procedure

2 Technical Information

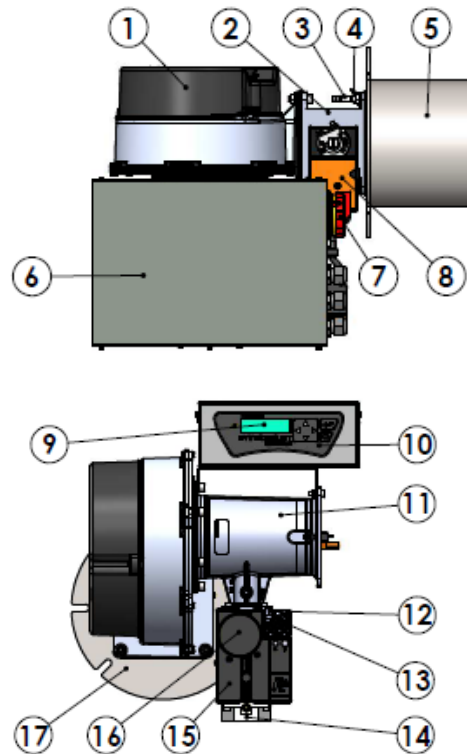
2.1 Technical Data

INVERTERJET MODEL			50HM	90HM	150HM	200HM	250HM	300HM
Burner Type			Pre-Mix	Pre-Mix	Pre-Mix	Pre-Mix	Pre-Mix	Pre-Mix
Fuel Type			LPG/NG	LPG/NG	LPG/NG	LPG/NG	LPG / NG	LPG / NG
Power	Min	kW	5.4	9.6	15.5	21	26	32
	Max	kW	54	96	155	210	260	320
Modulation Range			10:1	10:1	10:1	10:1	10:1	10:1
Nominal Voltage		VAC	230..250	230..250	230..250	230..250	230..250	230..250
Frequency		Hz	50/60	50/60	50/60	50/60	50/60	50/60
Phase			1 ~	1 ~	1 ~	1 ~	1 ~	1 ~
Gas Connection Flange Size			1/2 "BSP	1/2 "BSP	1 "BSP	1 "BSP	1 "BSP	1 "BSP
Gas Inlet Pressure	Min	mbar	10	10	17	17	17	17
	Max	mbar	50	50	75	75	75	75

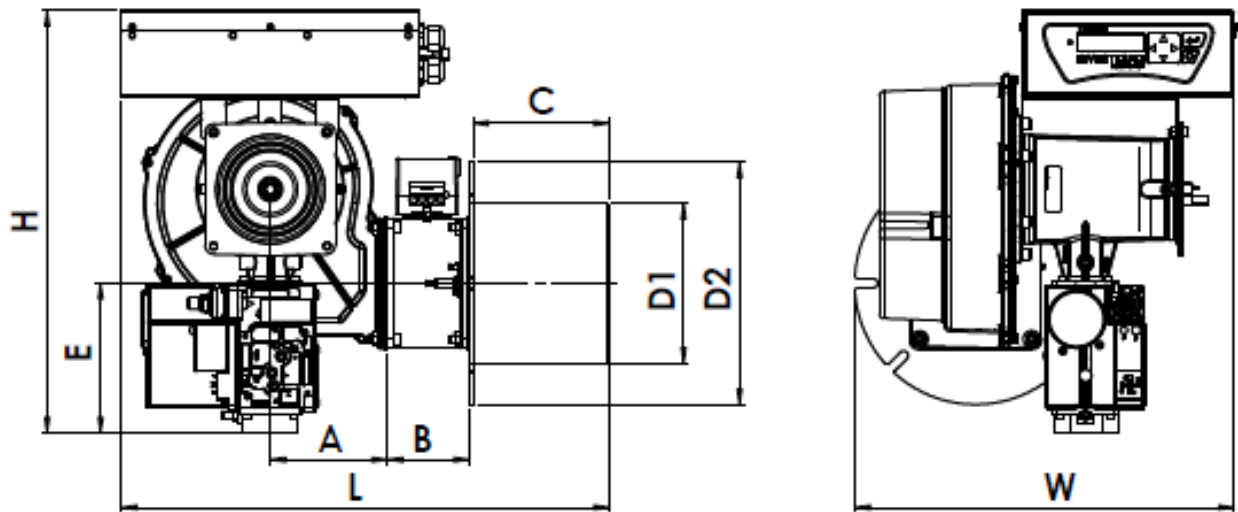
2.2 Technical Description of the Burner Parts

The Burners in the Inverterjet HM series have the following technical description of the parts.

- (1) Fan Housing
- (2) Damper
- (3) Flame Detection Probe
- (4) Burner Head Earth Connector
- (5) Burner Head
- (6) Burner Management Unit
- (7) Power switch
- (8) Actuator
- (9) Display
- (10) Control Panel
- (11) Venturi
- (12) Pressure Feedback Connector
- (13) Throttle adjustment screw
- (14) Gas Connection Flange
- (15) Gas Valve
- (16) Offset Adjustment Screw Cap
- (17) Burner Mounting Plate
- (18) Ignition Electrode (Not shown)



2.3 Burner dimensions and weight



MODELS	A	B	C	D1	D2	E	H	L	W	Weight
	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
Inverterjet 50HM	90	65	82	Ø140	Ø220	167	277	483	378	8
Inverterjet 90HM	90	65	82	Ø140	Ø220	167	277	483	378	8
Inverterjet 150HM	126	88	147	Ø171	Ø260	161	453	525	408	22
Inverterjet 200HM	126	88	147	Ø171	Ø260	161	453	525	408	22
Inverterjet 250HM	126	88	147	Ø171	Ø260	161	453	525	408	22
Inverterjet 300HM	126	88	147	Ø171	Ø260	161	453	525	408	22

CAUTION

When installing the burner ensure adequate clearance around the burner and any boiler to which the burner is installed.

2.1 Burner operation

2.1.1 Control operation

The burner has a Burner Management Unit which houses the dual microprocessor control. The control not only provides ignition but controls the safety and functionality of the burner whilst monitoring the appliance performance and integrating the burner with any other system controls.

Basic operation and functionality of the burner is achieved using the six (6) button control panel pad with a backlit L.E.D display. The display allows the current burner status to be displayed fully for ease of use.

The control will allow the burner to be controlled externally by any BMS, accepting either a 0-10vdc or 4-20mA signals to force burner modulation. Volt free contact is available as standard to facilitate indication of General Fault condition.

Full Cascade control of up to 16 appliances in a multiple boiler installation using RS485 bus connections is also a standard feature of the burner control.

Other standard features include programmable service due alerts and step modulation in addition to hours run, gas consumption, outside temperature compensation, full on-board fault diagnosis, on board data logging facilities and 2 x modulating pump outputs.

2.1.2 Basic sequence of operation

When the appliance is in the 'On' condition a demand for heat will start the following sequence of operation:

The fan will always run for approximately 30 seconds to clear the combustion chamber of any residual gases at the beginning of each demand for heat and before attempting ignition.

After the purge period, the ignition spark will start for 2 seconds before the gas valve(s) open.

If the burner ignites satisfactorily the flame will be detected by the ionisation probe, the spark will stop, and the burner will begin to modulate up or down dependent on the system temperature.

When the system demand is satisfied, controlled shutdown will occur, and the burner will remain in standby condition until demand is restored.

Each heat demand will start the burner fan to purge the combustion chamber.

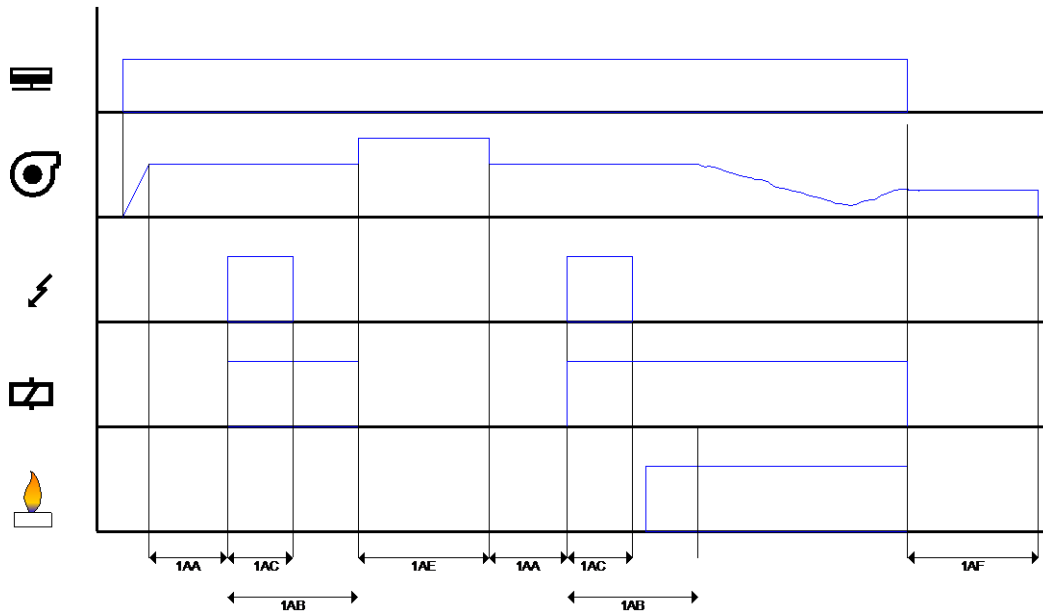
If the burner fails to ignite satisfactorily and the ionisation electrode does not detect the flame, the spark will stop, the gas valve(s) will close, and the burner will recycle.

It will attempt re-ignition twice before non-volatile burner lockout occurs.

NOTE: Any/All burner lockouts will require manual reset of the burner by pressing the **Menu Escape** (reset) button

The current burner status can always be seen displayed in text form on the L.E.D display on the control panel of the burner management unit.

2.1.2.1 Burner Program



ANNOTATION	MEANING
1AA	Pre – purge time
1AB	Safety time
1AC	Ignition – on time
1AE	Purge time after failed ignition attempt
1AF	Purge time after normal ending

SYMBOLS	MEANING
	Heat Demand
	Fan
	Ignition
	Gas Valve
	Flame

3 Installation

3.1 General Installation Information



WARNING

The burner **MUST** be installed by competent personnel such as a Gas safe/ACS registered gas installer in compliance with **ALL** current local Regulations, including any National or International Standards that may apply and according to the manufacturer's instructions as detailed in this manual.

CAUTION

The burners are of the pre-mix type and must be installed in a purpose-designed room with sufficient ventilation openings to comply with the current local Regulations, including any National or International Standards that may apply.

Please ensure the opening in the appliance front is large enough to prevent damage to any of the burner parts during fitting.

IF YOU SUSPECT THE BURNER IS DAMAGED, DO NOT USE. You must report any damage to your supplier immediately and seek further advice.

Before connecting the burner, make sure that the burner rating matches the appliance requirements and that both gas and electrical services are adequately rated.

CAUTION

The Maximum operating conditions for the Gas Valve and Electronic Control are 60°C and 90% RH at 40°C non-condensing

SAFETY INSTRUCTIONS

All packing materials should be stored or disposed of with care, as they may prove harmful to children, animals and the environment.

NOTICE

The manufacturer cannot be held liable for injury to people and animals, or damage to property as a result of improper installation.



WARNING

During installation, the burner **MUST** be firmly secured to the appliance using the burner mounting gasket supplied.

The burner **MUST** be connected to an adequately sized gas supply.

The pipe work **MUST** ensure the minimum required dynamic gas supply pressure is achieved when all appliances are operating.

The gas supply **MUST** have an approved isolation valve adjacent to the burner and appropriate means of disconnection for removal of the burner for service and repair.

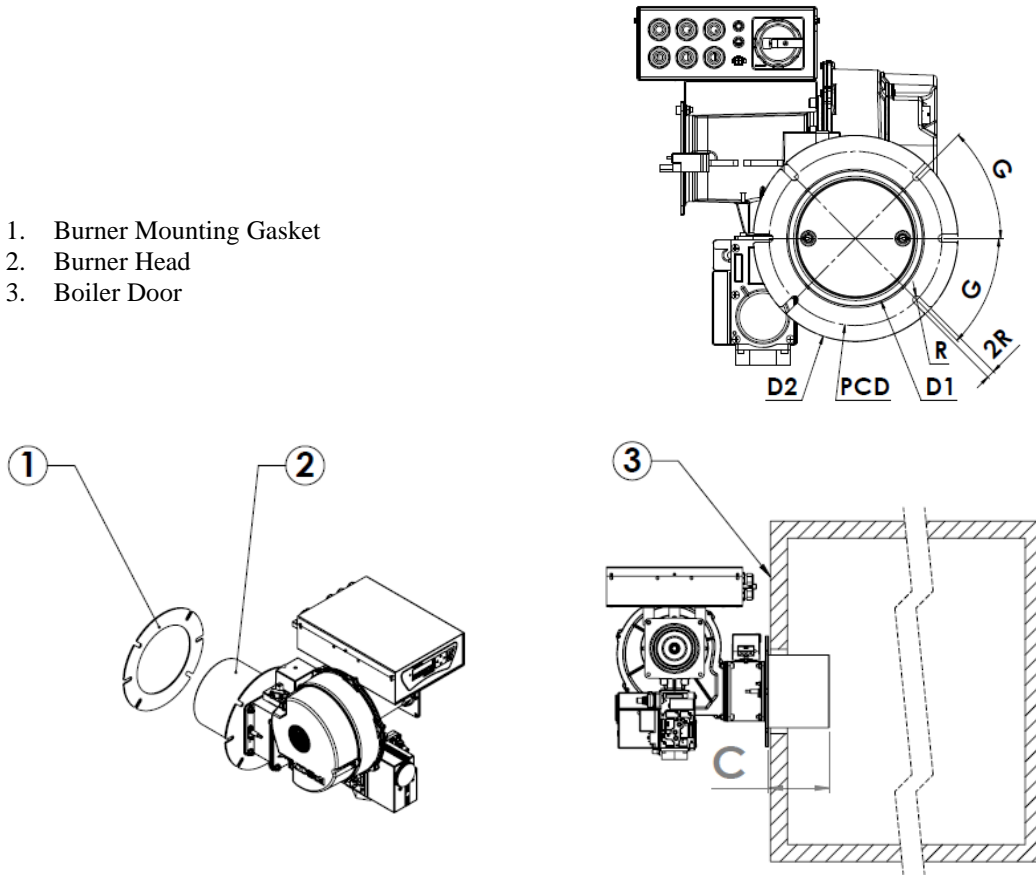
The electrical supply to the burner **MUST** have a suitable electrical isolation switch. This is required to have a contact separation of at least 3mm in all poles. The burner **MUST** be adequately earthed and installed as required by the current local Safety and Electrical Regulations, and any National or International Standards that apply.

3.2 Burner Mounting

To mount the burner, suitable mounting studs or threads for bolts need to be provided for the burner Mounting Plate. Appropriate dimensions are shown below. When installing the burner, please be sure to use the gasket provided for sealing and insulating between the Mounting Plate and the bearing wall of the appliance.

3.2.1 Standard Burner Mounting Detail

1. Burner Mounting Gasket
2. Burner Head
3. Boiler Door



Model	C	D1	D2	G	PCD	R	2R
	mm	mm	mm	Deg.	mm	mm	mm
Inverterjet 50HM	82	140	220	45°	Ø 180	5	10
Inverterjet 90HM	82	140	220	45°	Ø 180	5	10
Inverterjet 150HM	147	171	260	45°	Ø 220	5	10
Inverterjet 200HM	147	171	260	45°	Ø 220	5	10
Inverterjet 250HM	147	171	260	45°	Ø 220	5	10
Inverterjet 300HM	147	171	260	45°	Ø 220	5	10

CAUTION

If the appliance is of the 'Reverse Flame' type, we strongly recommend that high temperature ceramic insulation is used to back fill between the burner head and appliance door front to prevent overheating around the burner mounting plate. A dedicated mounting plate can be provided upon request.

3.3 Gas Installation



WARNING

Before commencing the installation, ensure that the gas supply is turned off and that all electrical supplies to the burner are also disconnected.

When connecting a pipe to the Gas Valve inlet always use a sound taper fitting with thread according to ISO 7-1 or a piece of new, properly reamed pipe, free from swarf, dirt or debris.

The burner **MUST** be connected to an adequately sized gas supply. The pipe work must ensure the minimum required dynamic gas supply pressure is achieved when all appliances are operating.

The gas supply **MUST** have an approved isolation valve adjacent to the burner and appropriate means of disconnection for removal of the burner for service and repair.

To Install the Gas supply to the Burner, follow the instruction below:

1. Remove the seal in front of the Gas connection flange at the rear of the burner
2. Check the thread on the flange and ensure that there is no debris in the threads
3. Connect the corresponding gas pipe/fittings to the Gas connection flange in the Burner.
4. Tighten the gas pipe/fittings and the Gas connection flange securely, ensuring that there is no possibility for gas leakage.

CAUTION

DO NOT over-tighten gas pipe/ fittings on to the burner as this can cause damage and may affect the gas soundness of the burner.

ALWAYS clean off excess pipe thread cutting oil from gas pipe work before connection to the gas valve. Thread cutting oil will damage the gas valve and will void the warranty supplied with the burner.

ALL gas pipe work installations/ connections to the burner **MUST** be purged and tested for gas soundness by suitably qualified personnel such as a Gas safe/ACS Registered Engineer and **MUST** comply with all Local and National Standards and Regulations before the burner is operated.

3.4 Electrical Installation



WARNING

Suitably qualified and competent personnel must carry out the electrical installation.

Before commencing the installation, ensure that all electrical supplies to the burner are disconnected and that the gas supply is turned **OFF**.

A means of disconnection from the supply having a separation of at least 3mm in all poles **MUST** be provided.

The electrical wiring diagram for the Burners are shown in the following page.

CAUTION

The burner **MUST** be connected as shown on the burner wiring diagram and **NOT** as shown on any other wiring diagrams.

NOTICE

You **MUST** always comply with the basic safety and electrical regulations that are in force when carrying out the electrical installation of the burner. This includes Statutory Regulations and National and International Standards where they apply.

3.5 Basic Electrical Safety



WARNING

Do not allow children or inexperienced people to use the burner.

Do not touch the burner with any wet or damp parts of the body.

Do not pull or strain electrical cables.

Do not leave the burner exposed to the weather unless expressly required to do so.

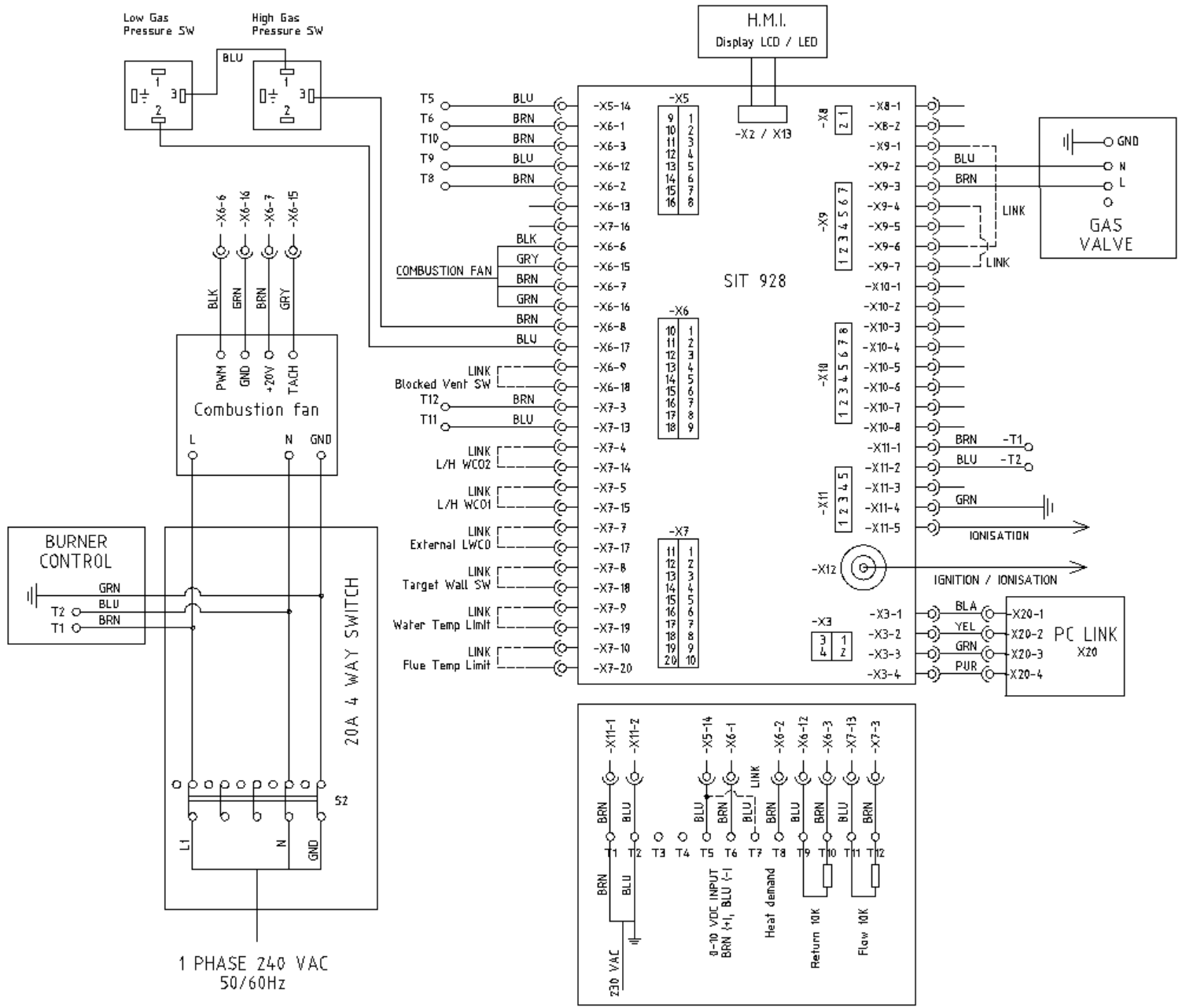
The burner must be adequately earthed and installed as required by current safety and electrical regulations. Earthing must not be made to any gas carrying components.

Ensure the supply input cable is adequate for the power demand of the burner.

The use of adaptors, multiple outlet or extension cables to connect the burner to the electrical supply is **NOT** permitted.

The burner input cable must not be replaced by the user. In case of damage to the cable, isolate the burner and contact suitably qualified personnel to perform the replacement.

3.5.1 Burner Wiring Diagrams – Inverterjet HM Series



4 Commissioning

NOTICE

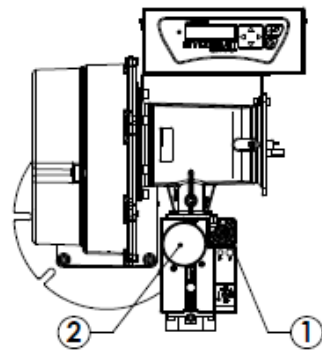
All Inverterjet premix burners are test fired in the factory prior to despatch to the customer. Whenever possible, Burnertech prefer to pre-set the maximum and minimum fan speed to assist the commissioning process

In order to ensure maximum product reliability, we advise and request that a Burnertech approved engineer conduct the 1st burner commissioning. Failure to comply with this requirement may result to inappropriate burner setting which can lead to damage to property and injuries to personnel.

4.1 Commissioning procedure

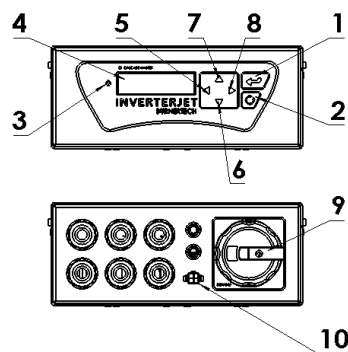
To start the commissioning procedure, follow the steps below:

1. Connect a manometer to the gas inlet pressure test nipple on the burner gas inlet connection.
2. Locate CO/CO₂ combustion analyser into flue pipe as close as possible to the appliance outlet.
3. Confirm and record that adequate ventilation is available for the safe operation of the burners.
4. Establish that the system pipe work is complete, fully purged and adequate system load and circulation exists to facilitate firing of the burners.
5. Turn 'On' the gas supply and ensure adequate static gas pressure is available at the burner inlet.
6. Locate the position of the throttle adjustment screw (If present)
7. Locate the position of the offset adjustment screw



- 1 Offset Adjustment Screw
- 2 Throttle Adjustment Screw Cap

4.1.1 Inverterjet control panel (Burner Management Unit)



1. Menu Enter
2. Menu Escape (Reset Button)
3. Lock-out Indicator
4. Display
5. Arrow Left (Previous Button)
6. Arrow Down (- button)
7. Arrow Up (+ button)
8. Arrow Right (Next button)
9. Power Switch
10. PC Connection Port

4.1.2 Turning on the Burner



WARNING

FIRE AND/OR EXPLOSION HAZARD

DO NOT Ignite the Burner until all supply and Installation checks have been made and the test equipment is ready and connected in order to conduct the commissioning procedure.

Turn 'On' the main electrical supply and turn "On" the power switch. The burner fan will start and pre-purge. The burner control will then drive the fan to a pre-set ignition speed. The ignition spark is generated at this point and the burner will ignite. The burner will then modulate to the pre-set fan speed.

NOTE: If there is no heat demand, the burner will go to "standby mode (READY)".

4.1.3 Service mode

To enter service mode, press and hold the **Arrow Up** button and the **Menu Enter** button at the same time for **2 seconds**. The display will show the "**Status**" of the burner as well as fan speed (rpm). After successful ignition, the burner will maintain the ignition speed. By quickly alternating between the **Arrow Up** button and the **Arrow Down** button, you can reach a desired speed (one click=50rpm).

To exit service mode, press and hold the **Arrow Up** and **Arrow Down** buttons at the same time for **1 second**.

4.1.4 Fan speed adjustment

NOTE: During the burner commissioning, the maximum and minimum fan speeds can be adjusted if required. The fan speed can also be adjusted using the dedicated PC software.

Adjustment of the ignition speed is not recommended as this may affect the reliability of operation and can only be done using the dedicated PC software.

The maximum fan speed can be accessed and adjusted as detailed below. To access the code menu. Press and Hold the **Menu Enter** button for **5 seconds**, then enter the installer code by using the **Arrow** buttons. The installer code is **925**. When this code has been inserted, press the **Menu Enter** button. The Burner will display the installer menu. Several items can be changed in this menu. navigate to option (22). This will be a % figure of maximum fan speed (maximum fan speed is 100%). When this option is shown, push the **Menu Enter** button. The display will blink, then by using the **Arrow Up** and **Down** button, change the fan speed to the desired percentage (%) value. To accept the change, press the **Menu Enter** button.

To bring the display back to normal operating mode, Press the **Menu Escape** button.

4.1.5 Commissioning operation

NOTE: Since the inverterjet can be used in a multitude of different applications, then the CO₂ should be adjusted to suit the application to which the burner is fitted.

4.1.5.1 Maximum rate CO₂

The maximum CO₂ may be adjusted by use of the throttle screw. turning clockwise decreases the value and anti-clockwise will increase the value.

- 1 Adjust the burner output to high fire by increasing the fan speed
- 2 Measure the flue CO₂ level and adjust the throttle screw to bring the level to between 9 and 9.5%.

CAUTION

Generally, the CO₂ should not normally exceed 9.5% on NG or 11% on LPG. We recommend that the operating CO₂ is between 0% to +0.5 % higher at maximum fan speed than at minimum.

4.1.5.2 Minimum rate CO₂

Minimum CO₂ should be adjusted using the offset adjustment screw.

Remove the T40 Torx cap (if present) and turn the screw anti-clockwise to decrease the CO₂ and clockwise to increase the CO₂. This adjustment should ideally be made with the use of a micromanometer to help ensure that it is set accurately as this is a sensitive adjustment

- 3 Adjust the burner output to low fire.
- 4 adjust the offset adjustment screw to bring the CO₂ level to between 8.5 and 9%.
- 5 Changing the high fire setting will affect the low setting but changing the low setting will have minimal effect on the high setting. It may therefore be necessary to repeat step 1 to 4 several times in order to achieve the acceptable level of CO₂ at both firing rates.
- 6 Analyse the flue products on both high and low fire. In both cases, ensure that all readings (CO₂, CO, O₂, and NOx) are within acceptable figures.

4.1.5.3 Burner Heat Input

- 7 With an appropriate gas meter, conduct a heat input measurement whilst operating at maximum rate. Ensure the rate is within $\pm 5\%$ of that required for the appliance. If the heat input is outside the required $\pm 5\%$ tolerance, adjust the fan speed until a satisfactory input is achieved.
- 8 Record all combustion input and working gas pressures and return the burner to normal run condition.

4.1.6 Multiple boiler installations:

Turn off the burner under test and repeat the commissioning procedure for each burner in turn. Upon completion you must operate all burners simultaneously at maximum firing rate checking adequate working gas pressure is available and ignition quality is not impaired by any combination of burners operation.

4.1.7 Advanced Mode

Advanced mode can be accessed by pressing and holding **Menu Enter** button for **5 seconds**, and then by using the **Arrow** buttons, insert code **925**. Press **Menu Enter** for **1 second**. The parameters in the advanced mode can be changed by pressing **Menu Enter** and using **Arrow Up** and **Arrow Down** buttons, some of the parameters are:

- The Maximum supply temperature: Option (9)
- The Minimum supply temperature: Option (11)
- Optional Input: Option (16)
- Adjustment Boiler Output: Option (22)
- Service Schedule: Option (32)
- MODBUS Mode: Option (3)

4.1.8 Test Mode

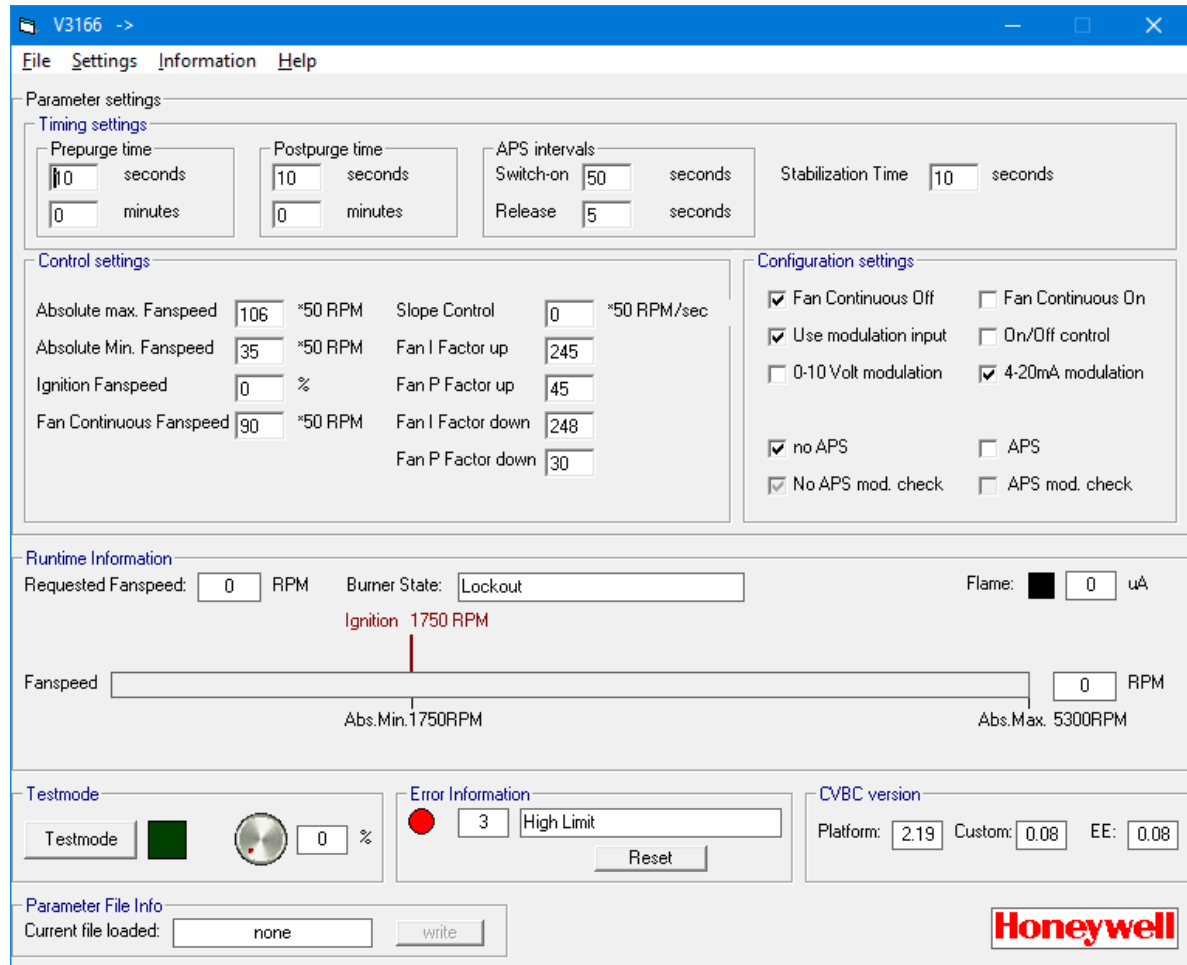
The test mode can be used to manually control the burner with external communication.

4.1.8.1 PC USB Interface

If required, a windows-based software along with a dedicated USB cable and driver is available to enable programming of certain parameters in the control and also to read fault codes, etc.

NOTE: Please contact Burnertech for more information relating to this option.

An example screenshot is shown below.



5 User Instructions

5.1 Limitations on use of Burner



CAUTION

The burner **MUST** not be operated before a suitably qualified Burnertech Approved Engineer has conducted a 1st Commissioning. Failure to comply with this requirement may result to improper burner settings which can lead to damage to property and injuries to personnel

The burner **MUST** only be operated when installed into an appliance connected to a suitable flue system. All other uses are improper and therefore dangerous.

The burner **MUST** be electrically connected as described and shown in this manual. The regulating and safety equipment of the burner and associated appliance, which ensure the safe and proper operation of the burner, are of great importance.

CAUTION

Burnertech recommend a 12-month Service Interval for the burner.

If the appliance is of the **Reverse flame** type, we **strongly** recommend that high temperature ceramic insulation is used to back fill between the burner head and door of the appliance.

On-Site' modification of burner components or internal wiring is **strictly forbidden**.

Never dismantle any part of the burner or installation unless professionally qualified to do so. Improper handling can lead to damage of the burner.

The burners are not suitable for dusty process applications without prior modification by Burnertech and/or air filter protection.

DO NOT operate the burner in dusty environments for long periods of time or whilst sweeping the boiler plant room. Dust ingress can cause blocking of the burner combustion head leading to reduced heat input and a significant increase in the chance of premature burner failure.

CAUTION

The Maximum operating conditions for the Gas Valve and Electronic Control are 60°C and 90% RH at 40°C non-condensing

5.2 Using the control display panel

Using the **Arrow Left** or **Arrow Right** buttons of the display panel during normal operation or standby mode, the user may view any of the following without affecting the operation of the burner:

Boiler and Circulation Pump Status
Supply and Return Temperature
Analog fire rate control signal if applicable

When in supply and return temperature menu, Using the **Arrow Up** or **Arrow Down** buttons of the control panel, the user may view the following:

SUPPLY (Supply Temperature)
RETURN SEN (Return Temperature)

CH SET (Central heating Set Temperature)
BURNER

CH demand (Central heating demand status)
BOILER

DHW set (Domestic hot water set Temperature)
DHW status (Domestic hot water status)

OUTDOOR STATUS
BOILER

FLAME (Flame Signal in uA)
FAN SPEED (revolution per minute)

0-10V (Driving Voltage)
BOILER

BUS COMM STATUS

POWER STATUS (hours)
CH STATUS (Central Heating Status, Hours)

DHW STATUS (Domestic Hot Water Status, Hours)
GOOD IGNIT (Good number of Ignitions)

FAULT HISTORY (Fault History 1 – 10)

Blocking History (1-10)

5.3 Using the Burner

To start the Burner, Turn on the **power switch**. This puts the burner into the standby mode (READY). This means that it can now be turned **ON/OFF** by external controls.

To turn the burner off and prevent external controls operating the burner simply turn off the power switch; the burner will go off.

When there is heat demand, the Burner fan will start to run, and the display will indicate '**Fan Pre-Purge**'.

After approximately **30 seconds** the Ignition spark will commence, and the display will indicate '**Ignition**' and the gas valves will open to attempt ignition and the display will show 'Gas Valve On'.

If satisfactory ignition takes place, the burner will remain alight and the fan speed will modulate up and down to maintain the required set point for the system temperature.

If the temperature set point is exceeded, the burner will go into a controlled shut down. The burner will remain in this state until the system temperature falls.

When the system temperature falls and provided there is still a call for heat by the system, the burner will always begin to run in '**Pre-purge**' mode before any attempt at re-ignition.

If however satisfactory ignition does not take place, the burner will go through '**Post-purge**' and '**Pre-purge**' before re-attempting '**Ignition**'.

This re-cycling will take place three times (depending on the settings) before the burner will enter a Lock-Out condition which will require manual reset by the user by depressing the **Menu Escape** button to restart the burner ignition sequence.

5.3.1 User Mode

User mode can be accessed by pressing and holding **Menu Enter** button for **5 seconds**, and then by pressing **Up, Down, Left** and **Right** buttons, insert code 600. Press the **Menu enter** button for **1 second**. The following parameters can be changed in this mode by pressing the **Menu enter** button and using **Arrow Up** and **Arrow Down** buttons:

CENTRAL HEAT
CENTRAL DIFF SET (Central Differential Setting)
TEMP DISPLAY (Celsius of Fahrenheit)
CLOCK MODE
CLOCK HOUR
CLOCK MINUTE
CLOCK DAY OF THE WEEK
CLOCK DATE MODE
CLOCK YEAR
CLOCK MONTH
CLOCK DATE

To exit the user mode, press the **Menu Escape** button. The display will indicate 'READY'

6 Servicing

NOTICE

We recommend that a Bumertech Approved Engineer, who will have the specific product knowledge and genuine spare parts carry out service and repair operations to ensure continued reliability of the burner system.

A suitably qualified and competent engineer such as a Gas safe/ACS Registered Installer must carry out all the maintenance operations discussed in this section at least once a year. In the case of seasonal servicing, it is recommended that the service operations be carried out at the end of each heating season. In the case of continuous operation, the service operations should be carried out every six months.



WARNING

Isolate all gas and electrical supply before carrying out any service or repair on the burner.

Before removing the burner from the appliance:

1. Ensure you have a replacement burner mounting gasket for re-fitting the burner afterwards.
2. Prepare an appropriately sized and relatively clean and tidy work area to conduct the maintenance operation.

6.1 Service Inspection

Isolate and disconnect both the gas and electrical supplies from the burner. Supporting the weight of the burner, carefully remove the fixings securing it to the appliance and withdraw it from the chamber.

6.1.1 The condition of the burner head

some discolouration of the burner material is normal, but the material should not be cracked or open. Under no circumstances should any of the perforated holes in the burner tube beneath the material be visible. Inspect the flange of the burner for any signs of cracking or severe overheating, which may indicate leakage.

Any serious burner head defect would constitute an '**Immediate Danger**' and the burner system **SHOULD NOT** be put back into operation until adequately repaired.

6.1.2 The condition of the electrodes

Check the ceramics are not cracked or damaged and check that the wire head is still approximately 4mm gap between the Ignition electrode and the burner surface.

NOTICE

The electrode wires are manufactured from a special metal specifically designed to remove the need for cleaning and withstand very high operating temperatures without movement. However, this special metal can become brittle.

DO NOT clean the electrodes and if adjustment is required always try and adjust the wires near to the ceramic and preferably using a blowtorch to pre-heat the wire.

6.1.3 The condition of the electrical circuits

Check the condition and integrity of the internal burner wiring harness and plugs, ensuring that all connections are secure. Check that both the ignition and detection leads are in good condition.

6.2 Service operation



WARNING

To commence a service operation of the burner, the gas and electrical supply must be turned off and completely isolated from the burner.

Burner head

The burner head should be examined carefully for cracks and/or damage. If there are signs that there has been over heating of the material or dust on the burner face, the burner head must be removed from the burner. Close examination of the silver foil at the rear of the inside of the burner head should be done and if all is okay, the inside of the Inverterjet burner head should be blown out using compressed air.

If the inside of the burner head is found to be severely blocked with dust and dirt please examine the burner material more closely. It is likely that the burner head material will have overheated due to the blockage and will be blackened in appearance and may need replacing. If so, the customer must be advised to protect the burner from dust ingress and/or increase the service intervals.

CAUTION

CAUTION Do not use abrasive brushes on the burner combustion head

Electrodes

Inspect the ignition and flame electrodes, if extensive signs of damage are detected, they must then be removed and replaced.

Fan

The fan is not a serviceable component. Simply ensure it is positively secured and sealed. The gasket material, electrical plug connections and cover must be secure and in good condition. The fan case has gas tight seals and the fan casing must never be opened. Due to the 1:1 gas/ air ratio operating principle of the burner a reduction in fan performance (i.e. dust build up) will not result in unsafe burner performance.

The gas flow is directly proportional to the air flow therefore any reduction in fan flow would simply result in a gradual reduction of the appliance heat input.

Venturi Unit

Examine and clean the Venturi unit checking that it is securely attached, and that any gasket is in good condition. Ensure that any Air Pressure Sensing point is secure and unobstructed (if fitted).

Cleaning: Using a cloth, soft brush and vacuum, carefully remove any dust and grime from the whole burner assembly taking care not to disturb electrical connections.



DANGER

NEVER use water on or around any of the burner electrical connections.

6.2.1 Re-assembly

Using a new replacement gasket, carefully and securely slide it to the burner head up until the gasket and the mounting plate are in contact. Carefully refit the burner system into the appliance combustion chamber and secure using the fixings.

Re-connect gas and electrical connections.

Check for gas soundness as detailed by Local, National Standards and Regulations and turn 'ON' the Gas and Electrical supplies.

Finally check and record the combustion and ventilation performance of the burner. Check the basic operation/control of appliance before restoring automatic control to any Boiler Management System (if applicable).

6.3 Fault Finding

6.3.1 Lockouts/Blockings

If the flame is lost more than three times during a single heat demand, the control goes into lock-out. The control also goes into lock-out if after the fourth ignition attempt the flame is not sensed. Should this happen, there is an auto-reset function that releases the control after 1 hour. When in lock-out, the control activates the fan for 1 minute. The flame is considered present when the ionization level exceeds 0.6 μ A. The air pressure switch is only tested at the beginning of the pre-purge time when the fan is running at maximum fan speed.

Lock-out codes:

CODE	DESCRIPTION
LOCK-OUT ERROR	
F 00	ECO 1 open
F 01	ECO 2 open
F 02	NTC supply not connected or shorted
F 03	NTC return not connected or shorted
F 04	NTC flue not connected or shorted
F 05	Supply temperature too high (par 2AA)
F 06	Return temperature too high (par 2AA)
F 09	No flame signal after ignition attempts (auto reset after 1 hour, par 1AH)
F 10	No flame while running (auto reset after 1 hour, par 1AH)
F 11	False flame signal
F 13	Combustion fan speed not ok (par 1AR 1AP 1AQ) if on
F 14	Combustion fan speed too high (par 1AR 1AP 1AQ) if off
F 15	APS stuck open // Flapper-valve feedback stuck open
F16	APS stuck closed // Flapper-valve feedback stuck closed
F17	Flue temperature too high
F 20	LWCO / HWCO 1
F21	LWCO / HWCO 2
F 22	External LWCO
F 24	Target Wall switch
F 26	Gas pressure switch
F 31	Parameter memory error, reprogramming needed
F41/F42	Hardware fault LWCO/HWCO
F43	Ad Error Safety sensors
PP	Parameters programmed

If the burner control detects a serious fault, it will go into lock-out mode. In this situation the control is secured and will not respond to any heat demands, nor will it respond to the display unit buttons except for the **Reset** button. During the first minute of a lock-out situation, the burner control drives the fan at maximum fan speed when there is a temperature lock-out (ECO's or temperature sensors too high) or ignition fault. In other cases, the fan does not switch on. The central heating pump is powered during lock-out. The DHW pump is switched off.

If there is a power failure during a lock-out situation, the burner control returns to lock-out when the power is applied again. The lock-out situation can only be resolved by pressing the **Menu Escape (Reset)** button on the display or in case of flame and over-temperature faults, the burner exit lock-out mode automatically after 1 hour. The alarm relay closes in the event of a lock-out situation. During normal operation the relay is opened.

When the control is in Lock-out, the pumps are switched on (if the water pressure switch input is closed). To reset the control, the **Menu Escape** button must be pressed for a minimum of **1 second**.

If the flame level is running low (<1.5* minimum programmed level), the minimum fan speed increases by 10% for 10 seconds. This is necessary to prevent unnecessary blockings

Blocking codes:

CODE	DESCRIPTION
BLOCK-OUT	
E07	ECS board missing Phoenix/voyager Low radiant mode
E08	Pump flow error Phoenix/voyager Low radiant mode
E09	ECS Sensor fail Phoenix Low radiant mode
E03	System sensor fail (emergency program cascade.)
FOU	Outside shorted or lower than -40 °C
E10	ECS Pump fail Solar
E11	ECS Solar Panel sensor fail
E12	ECS Solar Tank sensor fail
E13	ECS Solar Storage sensor fail
E14	ECS Solar Storage high temperature reached
E16	Common flue blocking because of not matching number off boilers or flapper-valve feedback failure
E19	Line frequency out of range
LE0	Low Water Cut Off 1 / 2 activated
HI0	High Water Cut Off 1 / 2 activated
Pr 0	Water pressure too low
Flu	Flue pressure too high blocking
FI0	Water flow switch not closed
FI	Flow Switch not closed



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