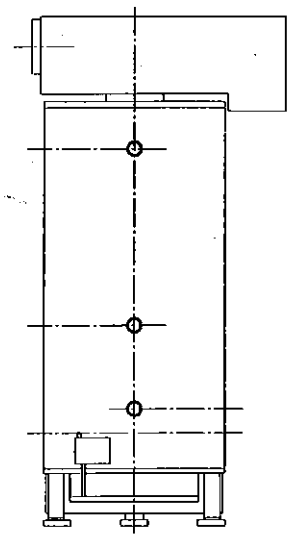

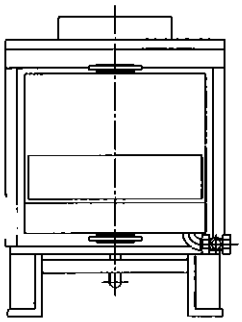

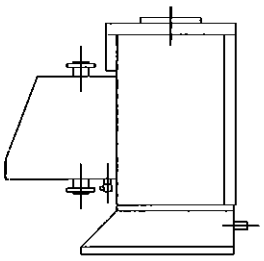

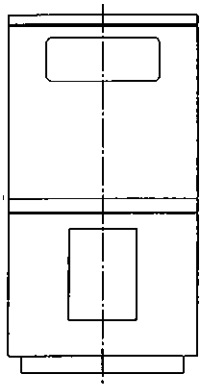

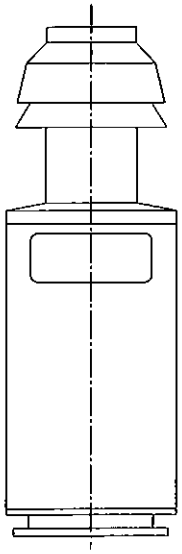

Installation, Commissioning and Servicing Instructions

Forston 200 & 300

Fan Dilution Systems

IMPORTANT NOTE
THESE INSTRUCTIONS MUST BE READ AND UNDERSTOOD BEFORE INSTALLING, COMMISSIONING, OPERATING OR SERVICING EQUIPMENT.

BS EN ISO 9002:1994
Certificate No. FM 34121

HAMWORTHY
flue products

Customer Services

TECHNICAL ENQUIRIES ☎ 01202 662527 / 662528

To supplement the detailed technical brochures, technical advice on the application and use of products in the Hamworthy Heating range is available from our technical team in Poole and our accredited agents.

SITE ASSEMBLY ☎ 01202 662555

Specialist teams are available for on site assembly of the full range of Hamworthy boilers (excluding Lulworth). Boiler sections for site assembly must be positioned within the boiler house prior to the arrival of the assembly team and provide sufficient space for safe working. Handling sections into boiler houses other than at ground level may be subject to additional charges.

The normal assembly price does not include for the fitting of boiler casings or the burner, however this can be carried out at the time of build at additional cost.

Providing the facilities are available on site, a hydraulic test will be carried out within the terms of BS779. Upon completion a certificate of assembly and test will be issued.

COMMISSIONING ☎ 01202 662555

Commissioning of equipment by Hamworthy Heating's own engineers, accredited agents or specialist sub-contractors will ensure that the equipment is operating safely and efficiently. Hamworthy commissioning reports provide a detailed record of the original status of the plant, which is essential for future routine maintenance and trouble free operation.

Standard warranty terms provide for the free of charge replacement of defective parts, but does not include labour. When the equipment is commissioned and routinely maintained by Hamworthy Heating under a Service Maintenance Agreement then the warranty terms will cover both parts and labour.

MAINTENANCE AGREEMENTS ☎ 01202 662555

Regular routine servicing by Hamworthy Heating's engineers ensures trouble free operation and optimum efficiency. The frequency of visits required is variable, dependent upon the equipment type and usage. Annual service agreements are available on all Hamworthy products to meet individual requirements.

Planned maintenance of equipment by routine servicing reduces operational costs considerably below that associated with repair or breakdown approach.

BREAKDOWN SERVICE, REPAIR, REPLACEMENT ☎ 01202 662555

Even when the commissioning and routine servicing has been carried out to the highest standard there are always occasions when the unexpected breakdowns occur. Hamworthy provide a rapid response breakdown, repair or replacement service through head office at Poole and accredited agents located throughout the UK.

SPARE PARTS ☎ 01202 662525

A comprehensive spare parts service is operated from our factory in Poole, providing replacement parts for both current and discontinued products. In some instances spares may be available from accredited agents.

Delivery of parts and components is normally from stock within 7 days. However, a 24 hour delivery service is available for breakdowns and emergencies for the additional cost of the courier. Please contact our spares team, providing details of product type, serial number, model or any other identifying marks or codes to determine part requirements wherever possible.

FORSTON 200 & 300

FAN DILUTION SYSTEM FOR USE WITH GAS FIRED BOILERS UP TO

200kW OUTPUT FOR THE FORSTON 200
&
300kW OUTPUT FOR THE FORSTON 300

INSTALLATION, COMMISSIONING AND SERVICING INSTRUCTIONS

NOTE: THESE INSTRUCTIONS SHOULD BE READ AND UNDERSTOOD BEFORE ATTEMPTING TO INSTALL, COMMISSION OR OPERATE THIS SYSTEM!

THE SYSTEM IS INTENDED FOR USE ONLY IN COMMERCIAL/LIGHT INDUSTRIAL APPLICATIONS

THIS SYSTEM COMPLIES WITH THE ESSENTIAL REQUIREMENTS OF THE MACHINERY DIRECTIVE 89/392/EEC AMENDED BY 91/368/EEC, THE LOW VOLTAGE DIRECTIVE 73/23/EEC AMENDED BY 93/68/EEC AND THE ELECTROMAGNETIC COMPATIBILITY DIRECTIVE 89/336/EEC AMENDED BY 91/263/EEC AND 92/31/EEC.

PUBLICATION NO. 500001092
ISSUE 'A'
NOVEMBER 1999

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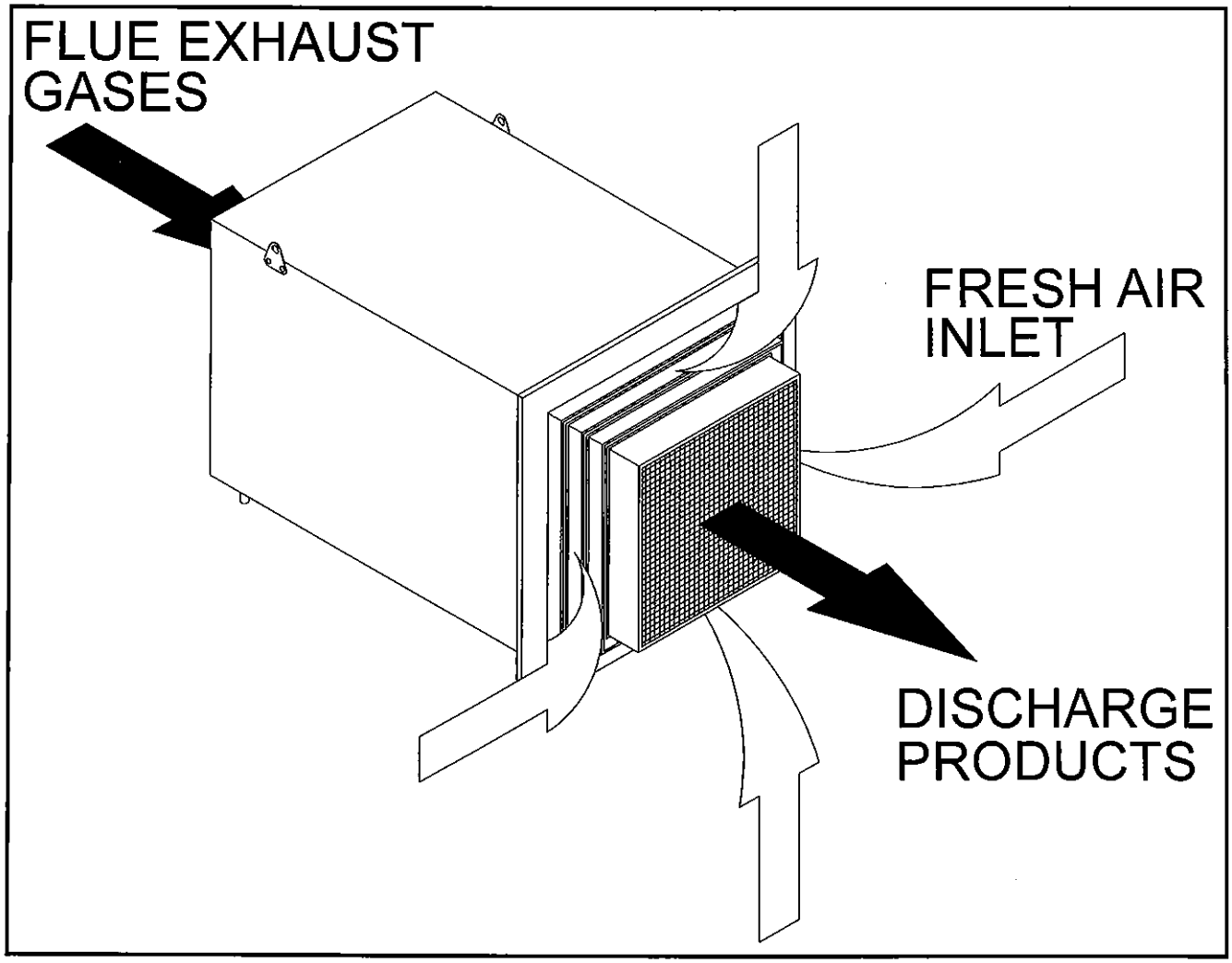
FIGURES:

FORSTON 200 & 300
FAN DILUTION SYSTEMS

Figure No. 1 - Overview



1.0 INTRODUCTION

1.1 Description

The Forston 200 & 300 are packaged fan dilution systems. They are designed to mix the products of combustion from connected gas appliances with air drawn from outside the building, discharge the mixed gasses at a velocity of over 7.6m/s, and ensure that the diluted CO_2 content is less than 1%. Figure No. 1 shows the gas flow paths.

These Forston units incorporate an inlet/outlet louvre/grille, an internal axial flow fan, a casing assembly incorporating a circular discharge duct and mixing chamber, and an airflow proving interlock control for the connected gas appliance(s), monitoring discharge airflow. Visual indication of operation is given via two neon lamps - amber for 'power on' and green for 'airflow proved'.

A single flue connection is required from the gas appliance(s) to the Forston units.

All components in contact with the flue gasses are constructed in stainless steel (or aluminium).

The Forston units are designed to operate with 2nd family gas appliances, with a maximum attached load of 200kW output for the Forston 200 and 300kW output for the Forston 300. They may also be suitable for use with 3rd family gas appliances please consult Hamworthy Heating Ltd. for performance details.

1.2 Construction

The Forston 200 & 300 units are constructed from basic items comprising:
(a) main casing assembly
(b) external louvre/grille
(c) internal axial-flow fan
(d) mounting frame
(e) control box
(f) air pressure switch
(g) airflow sensing device
(h) 22mm dia condense drain
(i) support eyes (2 off)
(j) optional inner closure plate (not shown)
(k) acoustic pod (Forston 300 only)

See Figure Nos. 2, 3a & 3b.

Figure No. 2 - Exploded View

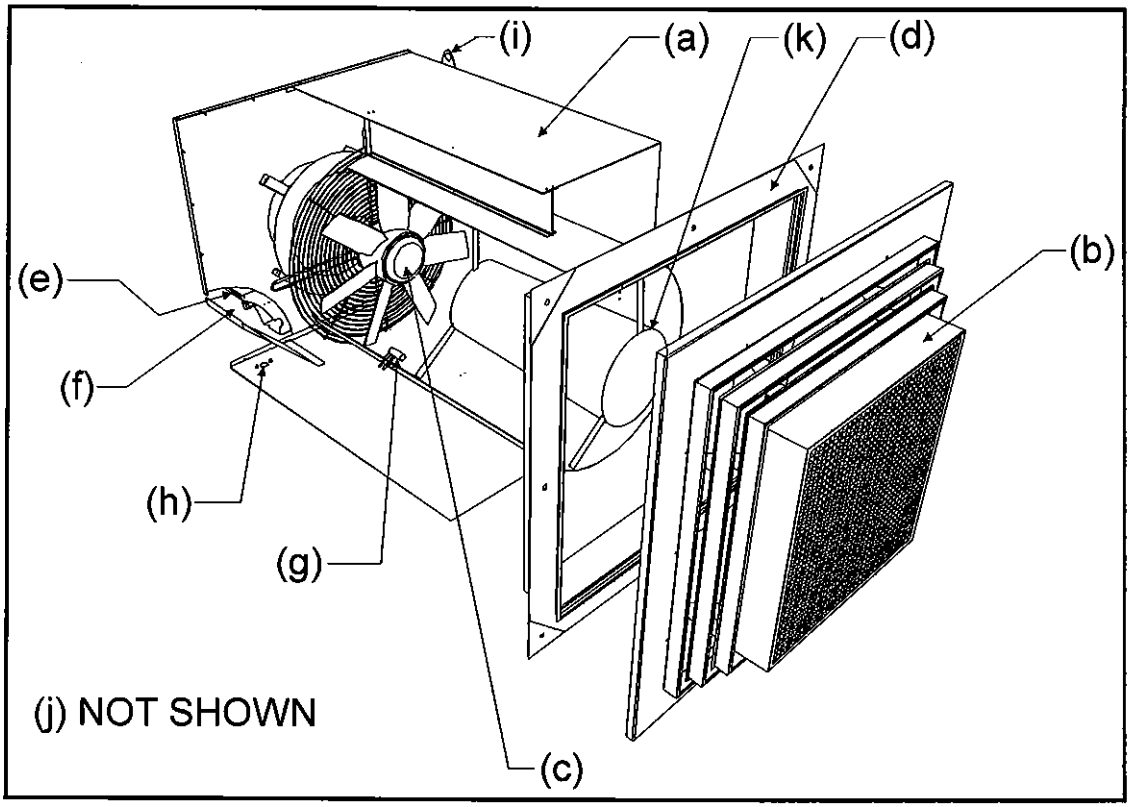


Figure No. 3a - External Dimensions – Forston 200

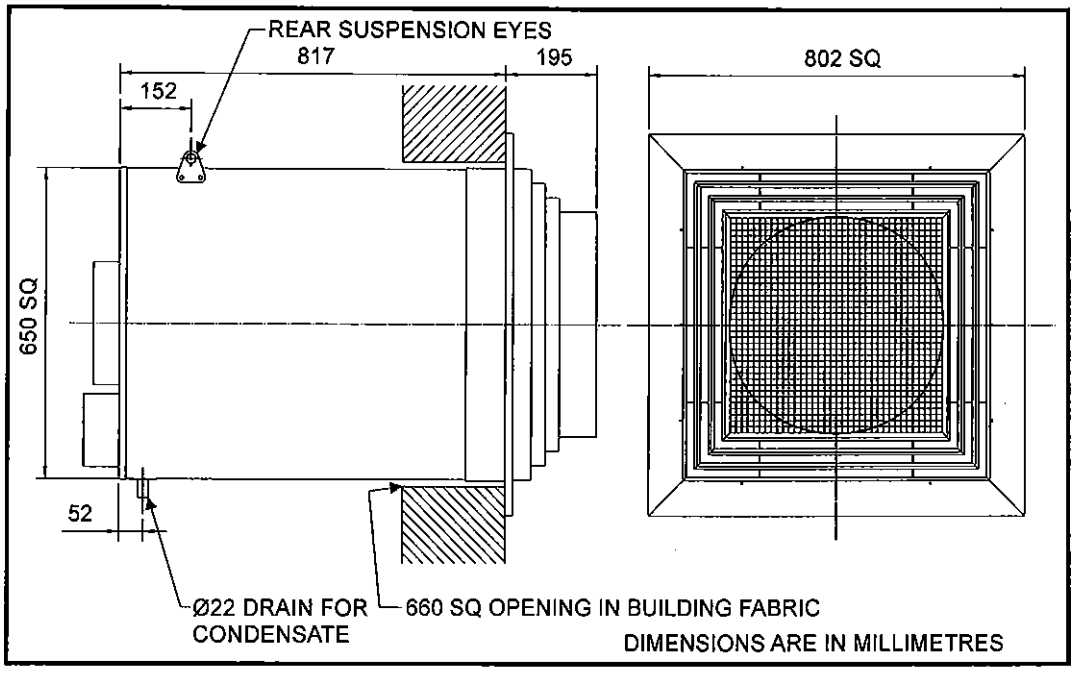


Figure No. 3b - External Dimensions – Forston 300

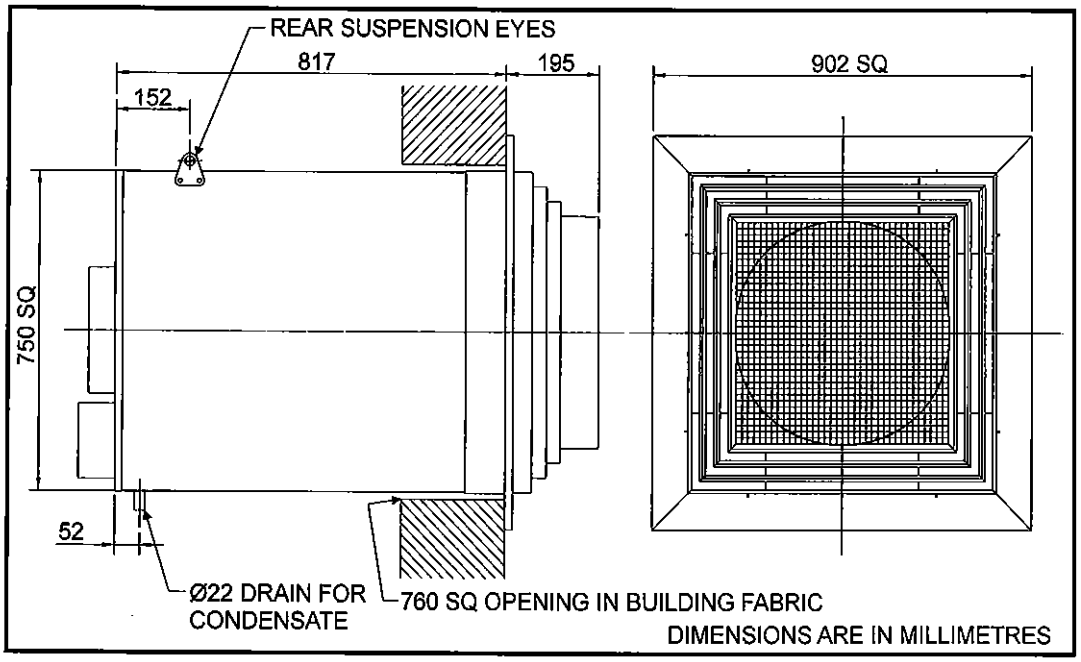


Table No. 1 - Technical Data

DESCRIPTION	FORSTON 200	FORSTON 300
ELECTRICAL SUPPLY	230V AC SINGLE PHASE 50Hz	
CURRENT START/RUN	7.0/2.9 AMPS	7.4/3.4 AMPS
INTERNAL FUSE	T5A	
CO_2 LEVEL AT DISCHARGE	<1%	
DISCHARGE VELOCITY	APPROX 7.6m/s	APPROX 8.7m/s
SOUND PRESSURE LEVEL @ 2m FREE FIELD	<67dBA	
MAX BOILER OUTPUT	200kW	300kW
SUCTION AT OPEN FLUE SPIGOT	0.07mbar	0.09mbar
OVERALL WEIGHT (EXCLUDING PACKING)	65kg	86kg
LIFTING WEIGHT (EXCLUDING LOUVRE & MOUNTING FRAME)	50.5kg	68kg

1.3 Testing

Each unit is electrically and functionally tested prior to despatch.

1.4 Delivery/Extent of Supply

The unit is delivered fully assembled with the louvre/grille and mounting frame packed separately.

Support eyes, condense drain, fasteners, sealant and instructions are also packed separately.

2.0 TECHNICAL DATA

2.1 General

For technical details of the Forston 200 & 300 units refer to Table No. 1.

3.0 GENERAL REQUIREMENTS

3.1 Related Documents - Gas Safety (Installations and Use) Regulations 1994 (as amended).

It is Law that competent persons in accordance with the above regulations install all gas appliances. Failure to install appliances correctly could lead to prosecution. It is in your own interest, and that of safety, to ensure that this law is complied with.

The installation of the fan dilution system **MUST** be in accordance with the relevant requirements of the Gas Safety Regulations, Building Regulations, IEE Regulations and the byelaws of the local water undertaking.

It should also be in accordance with any relevant requirements of the HSE, the local gas region authority and the relevant recommendations of the following documents:

Legislation and Codes of Practice

ıe Clean Air Memorandum (1956) Third Edition: Chimney Heights.

British Standard Codes of Practice

BS 6644: Installation of Gas Fired Hot Water Boilers - 60kW to 2MW.

BS 6880, Part 2: Code of practice for low temperature hot water heating systems of output greater than 45kW.

BS 5854: Code of Practice for Flues and Flue Structures in Buildings.

BS EN 60335, Part 1. Safety of Household and Similar Appliances. **BS 3456, Part 201:** Electrical Standards.

ɪitish Gas Publications

IM/11: Flues for commercial and industrial gas fired boilers and air heaters.

CIBSE Publications

CIBSE Guide

It is impractical in this document to specify all relevant information, but the following extracts from the above references are emphasized since failure to comply with these requirements will almost certainly result in an unsatisfactory installation.

3.2 Location

The location of the Forston 200 & 300 units must satisfy the requirements of a flue system that complies with the regulations and the appliance manufacturer's recommendations (see relevant installer's guides) with particular reference to the inlet and discharge positioning and the interconnecting flue systems between the boiler system and the unit.

It is recommended that the bottom of the discharge louvre should be a minimum of 3 metres from the ground, but in any event this **MUST NOT** be less than 2 metres (see Figure No. 4).

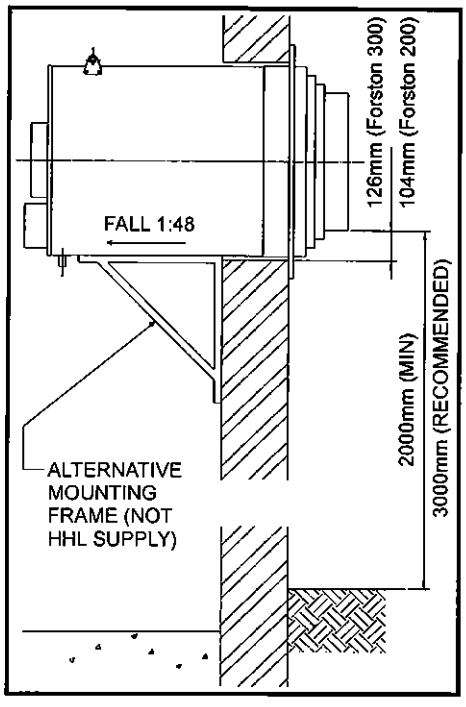
Table No. 2 - Minimum Distances

PARAMETER	FORSTON 200	FORSTON 300
MINIMUM DISTANCE TO OTHER FAN ASSISTED AIR INLETS	2.95m	3.3m
MINIMUM DISTANCE TO OPENABLE WINDOWS	1.18m	1.32m
MINIMUM DISTANCE TO NEAREST BUILDING	3.54m	3.96m

Other siting requirements are given in Table No. 2.

Discharge products **MUST NOT** be emitted into an enclosed, or almost totally enclosed, 'well' or courtyard.

Figure No. 4 - Mounting Heights

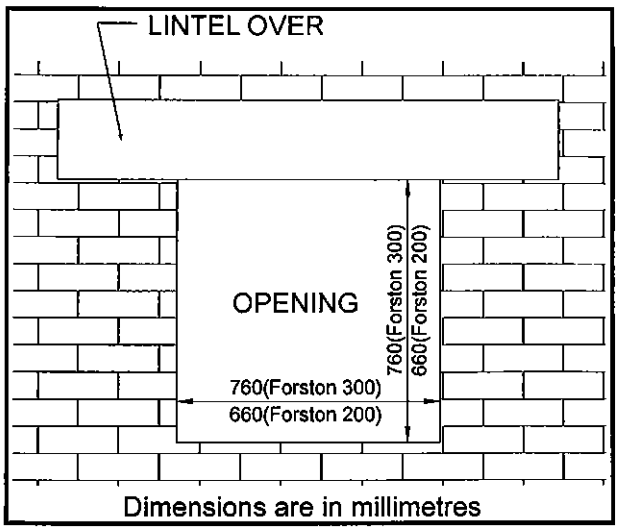


3.3 Building Works (not HHL supply)

Prior to installation, one hole 660mm square for the Forston 200 unit and 760mm square for the Forston 300 unit must be provided through the external wall, the top edge being supported by a suitable lintel (see Figure No. 5).

To aid positioning of the hole, the mounting frame supplied with the unit may be used as a template.

Figure No. 5 - Mounting Hole in Building Fabric



4.0 CONNECTIONS

4.1 Flue

The rear access plate is provided with a 256mm OD spigot to allow connection to the gas appliance(s).

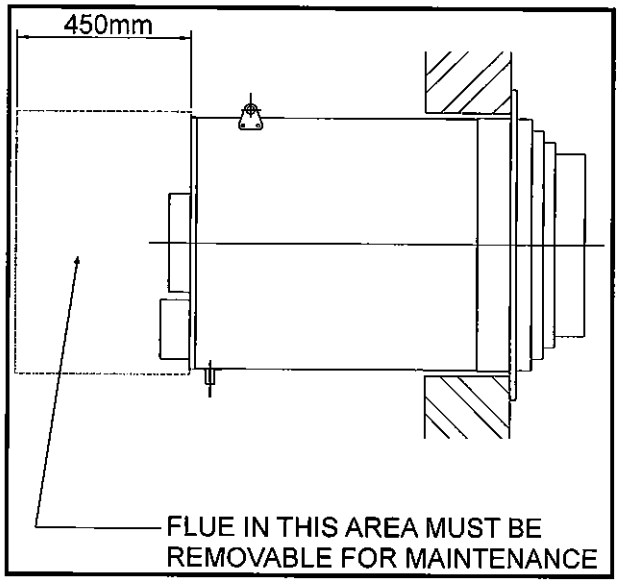
It is recommended that the connecting duct be constructed from single or double wall stainless steel flue, which may also be supplied by Hamworthy Heating Ltd.

The flue system must be designed to ensure that the draught requirements of the gas appliance(s) connected are met. This may require the fitting of a draught stabiliser or damper. Any transition between differing diameter flue outlets and the spigot on the Forston unit should be made smoothly.

The connecting flue must be self-supporting and contain a maintenance joint at the Forston end which will allow disconnection and removal of a sufficient length of flue to permit the rear access plate to be removed for maintenance (see Figure No. 6).

NOTE: - It is possible that a maintenance joint will also be required at the gas appliance connection for servicing of the gas appliance - see manufacturer's instructions.

Figure No. 6 - Clearance for Maintenance



4.2 External Louvre/Grille

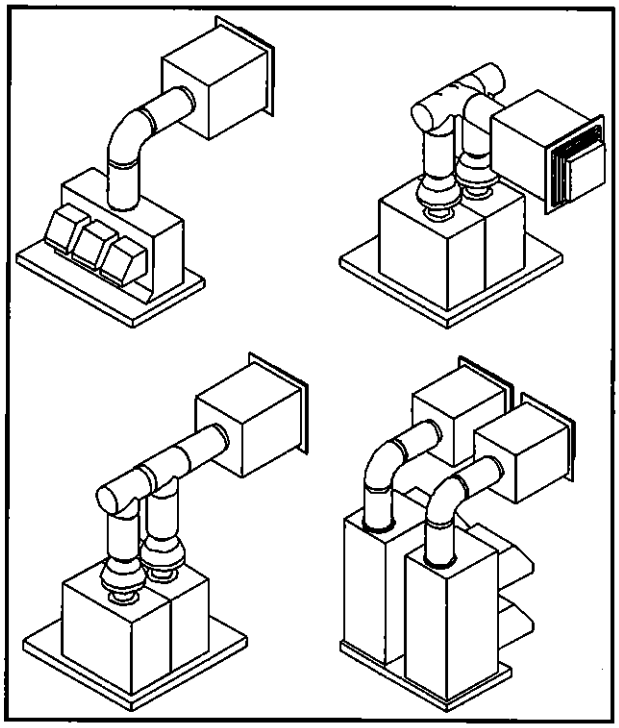
The louvre/grille is purpose designed to operate as part of the complete unit and must not be substituted with other proprietary louvres, nor bolted against other louvres or obstructions.

The louvre/grille is intended for installation on a vertical surface only.

4.3 Typical Installations

Figure No. 7 shows some typical installations of the Forston 200 & 300 units.

Figure No. 7 – Some Typical Installations



4.4 Electrical

Warning: This appliance must be earthed and wiring checked by a competent person

The unit is supplied with a pre-wired control box. The supply required is 230 volts AC single phase 50Hz from the boiler control system.

The Forston 200 or 300 **MUST** be connected via a double-pole isolator with minimum 3mm contact separation in all poles correctly fused 10 amps sited locally to the unit.

All wiring **MUST** be in accordance with current IEE Regulations.

Access to the terminals is by removal of the terminal box cover, and the supply cable should enter through the gland provided.

In addition, the airflow proving interlock control is also pre-wired to the terminal box giving common and normally open contacts for connection to the gas appliance control circuit. This interlock **MUST** be utilised to ensure the gas appliance(s) cannot fire if the fan is not running.

NOTE: - These Forston units are NOT suitable for use with electronic circuit breakers.

5.0 INSTALLATION

1 Mounting Frame

On the external face of the wall onto which the Forston 200 or 300 is to be mounted, align the mounting frame over the hole in the brickwork and mark the wall where necessary for drilling holes suitable for the selected fixings (not HHL supply). To facilitate this 8 no. 4.2mm dia holes are provided.

Mount the frame to the wall (see Figure No. 9) using a proprietary sealant (not HHL supply) as required.

Figure No. 9 - Mounting Frame Installation

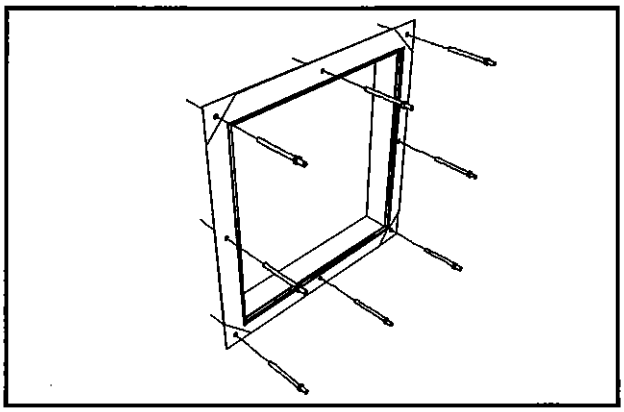
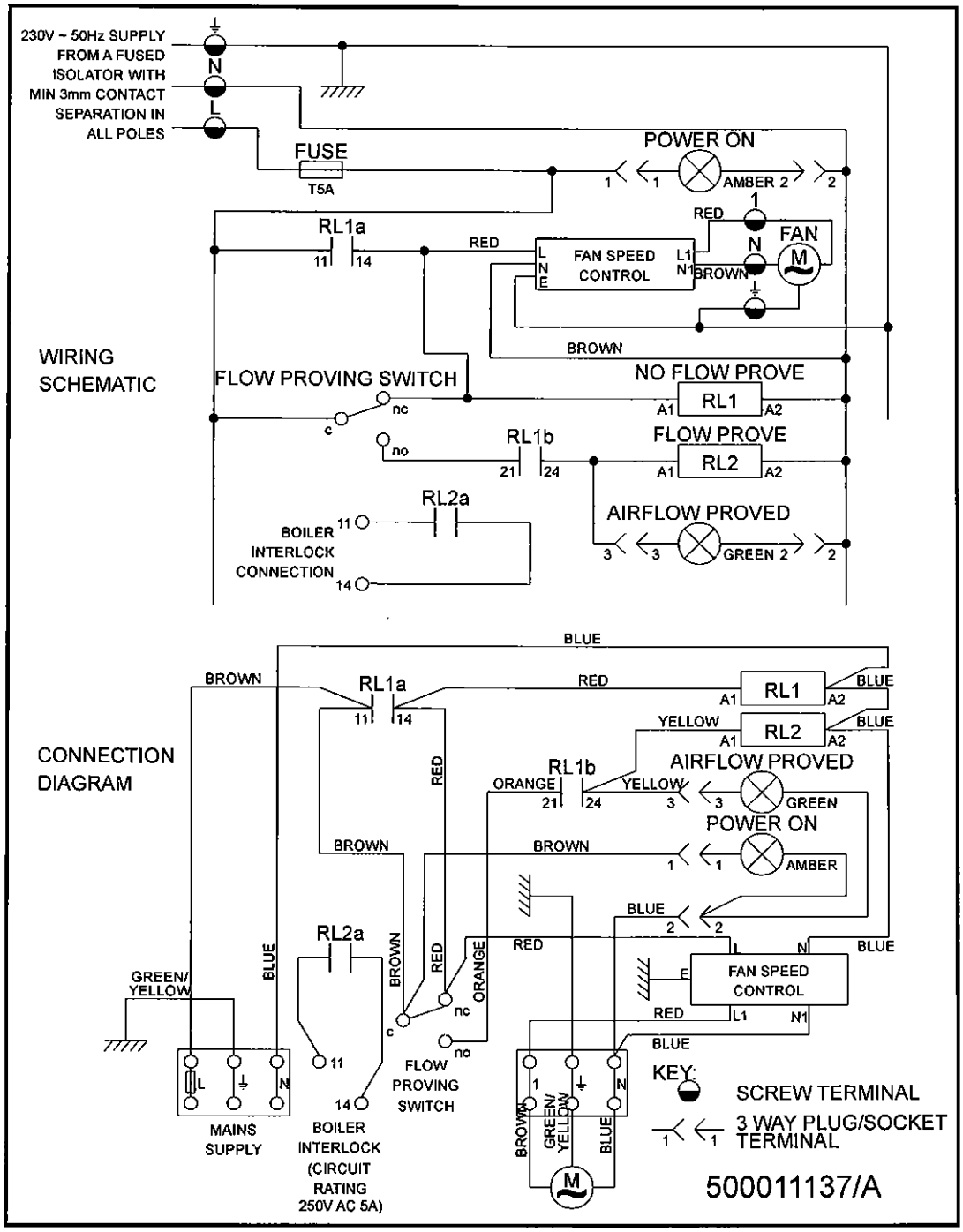


Figure No. 8 - Forston 200 & 300 Wiring Schematic



5.2 Mounting Main Casing

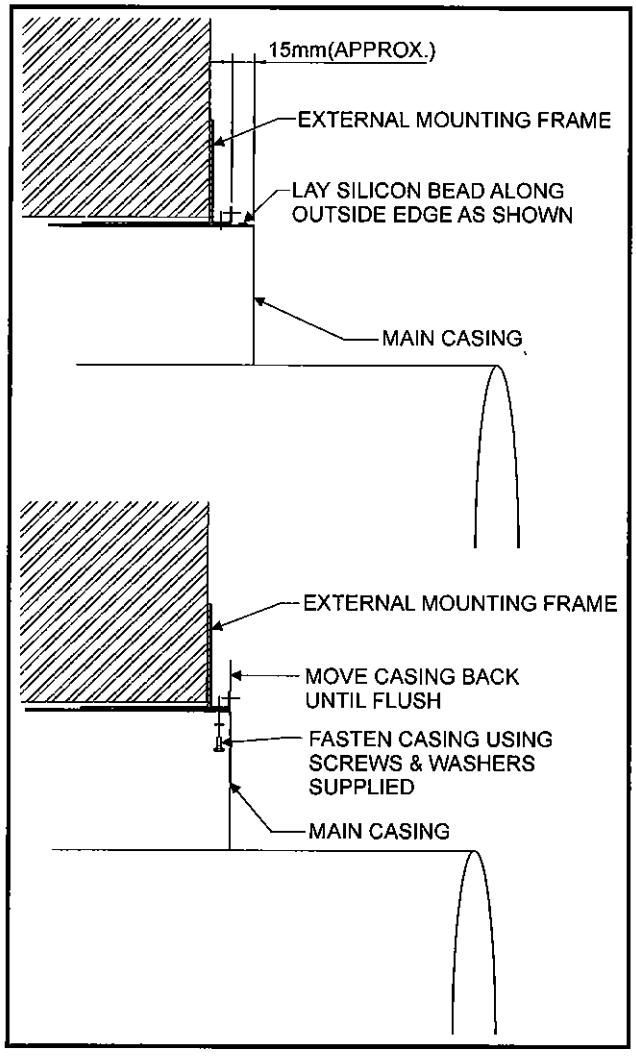
The main casing may be installed either from inside or outside the building.

Should the main casing be installed from the outside, then the rear access plate **MUST** first be removed as Section 8.2 (a)-(d), (it may also be desirable to remove the fan unit to reduce weight see Section 8.2 (e)).

If the main casing is to be installed from inside the building and the optional inner closure plate is to be used, the latter should be located around the casing prior to installation.

Insert the main casing such that the exposed inside circular duct is outside, and the outer edge of the square duct is approximately 15mm proud of the mounting frame, supporting the rear of the casing on the inside of the building, (drain connection will be on the bottom surface, whilst the support eye connections will be at the top of the sides).

Figure No. 10 - Main Casing Installation

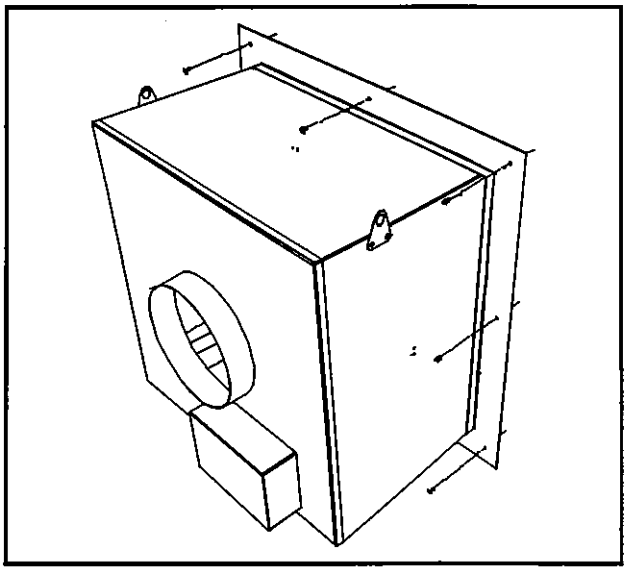


Lay a bead of silicon sealant all round the exposed edge of the casing.

Adjust the casing back until it is aligned with the outer edge of the mounting frame, and fix in place with the screws provided (see Figure No. 10).

If the optional inner closure plate is to be used it should be fitted now by sliding the entire section over the main casing, if not already in place, and fixing to the wall in a suitable manner using the 4mm dia holes provided, fixings not HHL supply (see Figure No. 11).

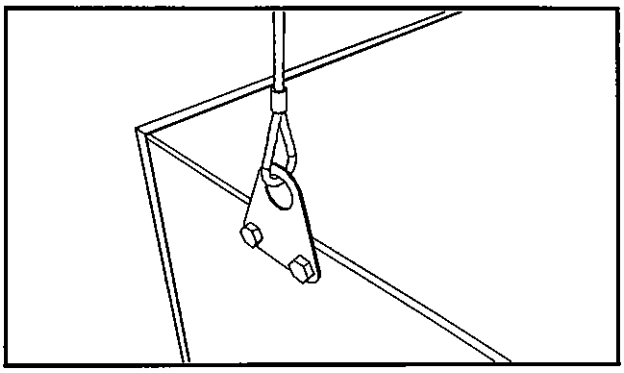
Figure No. 11 - Inner Closure Plate Installation (optional)



A proprietary sealant may be used if required (not HHL supply).

Fit the support brackets to the rear of the unit using the M8 Bolts supplied. Support the rear of the unit with either rods, chains or wires (not HHL supply) (see Figure No. 12).

Figure No. 12 - Rear Suspension



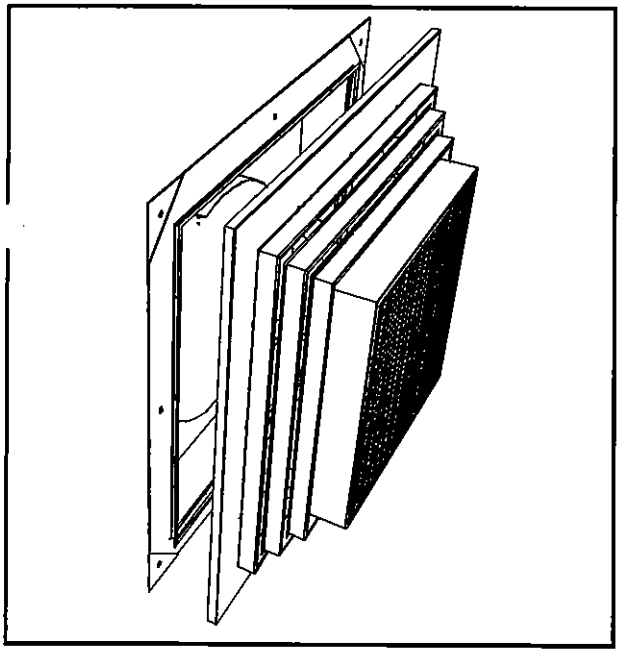
Alternatively, a support bracket (not HHL supply) may be manufactured and fitted to the inside of the wall (see Figure No. 4 for suggested location).

5.3 Mounting Louvre/Grille

. installing a Forston 300 unit, insert the sound absorbing pod into the discharge duct so that the three support legs are located in the gaps of the discharge nozzle on the outer lip of the duct.

From the outside of the building place the louvre/grille over the central duct until the outer flange is in contact with the wall around the outside edge of the mounting frame. Secure in place with the pop-rivets provided (see Figure No. 13).

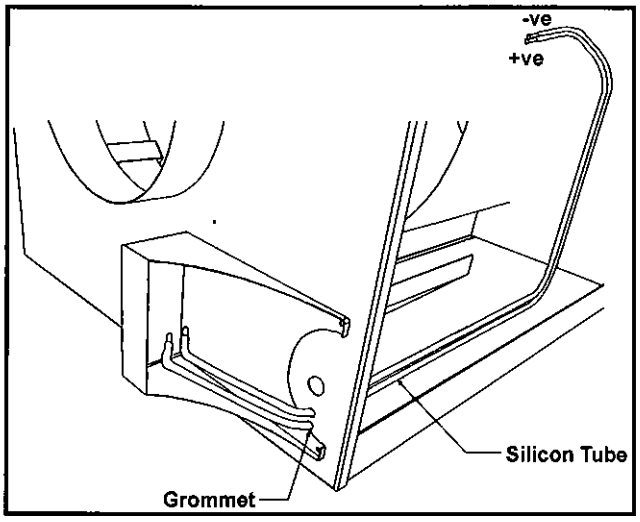
Figure No. 13 - External Louvre/Grille Installation



5.4 Interlocks

If the rear access plate has been removed, locate the differential pressure switch and the two sensing ;ints on the airflow sensor (venturi) fitted to the central duct and ensure the silicon plastic tube provided is connected. Positive and negative **MUST** be connected correctly (see Figure No. 14).

Figure No. 14 - Differential Pressure Sensing

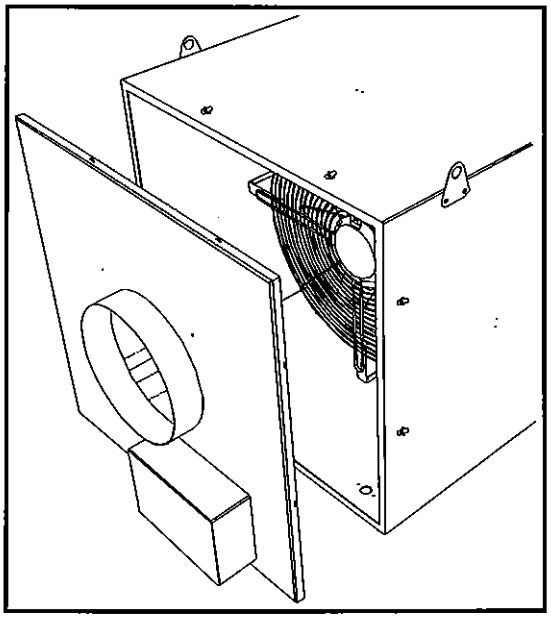


5.5 Rear Access Plate

If the rear access plate has been removed feed the fan cable through the cable gland and tighten the cable gland. Fit the rear access plate in place using the latch and strikers provided, ensuring a tight seal with the gasket (see Figure No. 15). If the gasket is damaged it **MUST** be replaced.

Wire the fan unit to the terminal box.

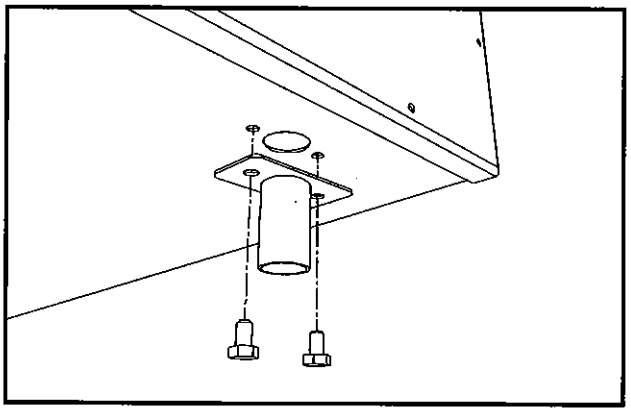
Figure No. 15 - Rear Access Plate Installation



5.6 Condense Drain

Fit the drain stub pipe to the opening on the base of the main casing using the bolts and silicon sealant provided (see Figure No. 16).

Figure No. 16 - Drain Stub Pipe Installation



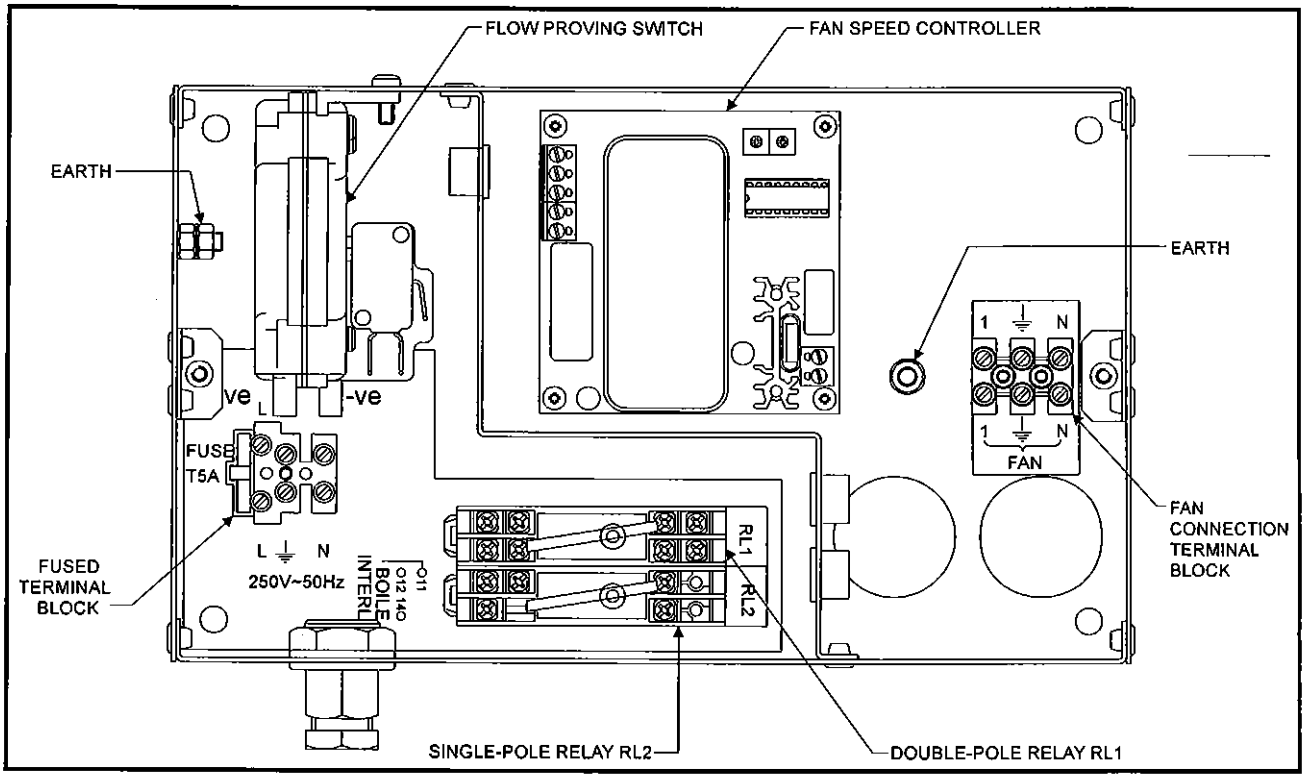
Connect the drain stub to drain via trap (not HHL supply).

5.7 Final Connections

Connect the electrical supply and the interlock circuit to the unit via the terminal block (see Figure Nos. 8 & 17) and connect the unit to the gas appliance(s) using the interconnecting flue system.

Fit locking wire or split-pins to the eight no. latches securing the rear access panel.

Figure No. 17 - Terminal Block Layout



6.0 COMMISSIONING

NOTE: - Once the Forston 200 or 300 is connected to the gas appliance(s), it forms part of the gas installation. Commissioning and Servicing Engineers **MUST** be CORGI Registered, ACOPS Approved.

6.1 Preliminary Checks

Before attempting to commission the unit, ensure that personnel involved are aware of what action is about to be taken and begin by making the following checks: -

(a) Louvres are installed correctly and are clear.
(b) All joints are tight and sealed.
(c) Electrical supply is connected correctly.
(d) Airflow sensor (venturi) is correctly located and connected (i.e. positive to positive [+] and negative to negative [-]), and the interlock system is correctly wired.
(e) Connecting flue is in position and sealed.
(f) The rear access panel latches are secured with either locking wire or split-pins.

6.2 Operation

With gas appliance(s) off, switch on electrical supply, amber neon will illuminate and the fan will run up to speed. Allow to run for a few minutes and

then check airflow proving switch is made and that the green neon is illuminated. Switch fan off and check pressure switch contacts open. Switch fan on. Commission gas appliance(s) to instructions supplied by manufacturer and adjust draught in connecting flue with damper or stabiliser if fitted, to meet gas appliance requirements.

Isolate power to the Forston unit and check that the gas appliance(s) are prevented from firing.

NOTE: - The surface temperature of the rear of the casing will become hot during operation. Care **MUST** be taken not to touch the surfaces until they have cooled.

7.0 FAULT FINDING

If problems should occur with the Forston 200 or 300 system, check the items listed in Table No. 3. If the problem can still not be identified consult Hamworthy Heating Limited for assistance.

NOTE: - Before carrying out any rectification work on the Forston 200 or 300 ensure that it is electrically isolated.

If in any doubt consult Hamworthy Heating Ltd.

Table No. 3 - Fault Finding

Symptom	Possible Cause	Remedy
Unit does not operate	No power supply to Forston unit	Check and rectify control circuit
	Internal fuse blown	Replace fuse/trace fault & rectify
	Pressure switch stuck in normally open position	Free up or replace pressure switch
	Fan speed controller PCB faulty	Replace speed controller
	Fan start capacitor faulty	Replace capacitor
	Fan faulty	Replace fan
Unit operates but gas appliance(s) inoperative	Pressure switch stuck in normally closed position	Free up or replace pressure switch
	Pressure sensing tubes kinked or trapped	Adjust, trim or free-up tubes
	Fan speed controller PCB setting incorrect	Readjust to manufacture specification
	Pressure sensing tubes blocked with moisture	Blow moisture out of tubes
	Relay RL2 faulty	Replace relay
Fan runs up and down constantly, gas appliances inoperative	Relay RL1 faulty	Replace relay

8.0 SERVICING

NOTE: - Once the Forston 200 or 300 is connected to the gas appliance(s), it forms part of the gas installation. Commissioning and Servicing Engineers **MUST** be CORGI Registered, ACOPS Approved.

8.1 General

Periodic maintenance should only be required to ensure louvre blades are kept clean and free from obstruction, that all joints remain sealed and that the condense drain is clear.

8.2 Fan Unit

NOTE: - If the unit has been run recently, wait until the casing has cooled to a safe working temperature.

It is recommended that the fan unit be removed annually to inspect and clean the fan blades and motor. To gain access to the fan proceed as follows: -

(1) Switch off and isolate the electrical supply to the unit and to the interlock connections from the appliance(s). It may also be necessary to disconnect the supplies to allow removal of the rear access panel.
(2) Disconnect and remove the flue system from the inlet to the unit.
(3) Remove the control box cover and disconnect the fan electrical cable, and the pressure sensing tubing from the pressure switch. Loosen the

cable gland and insert the loose fan cable through it into the casing. Carefully push the grommets on the tubing through into the casing.

(4) Remove the locking wire or split-pins from the latches securing the rear access plate to the casing, and remove the rear access plate.

(5) Remove the fan securing bolts and extract the fan and its mounting frame, taking care to avoid impact of the fan blades against the internal circular duct.

(6) Clean the fan and blades of all dirt and grease. Ensure that the drain is un-blocked and free of any debris (N.B. The acoustic pod on the Forston 300 should also be inspected and replaced if necessary).

(7) Following cleaning or replacement of the fan, inspect the gasket on the rear of the main casing and replace if necessary.

(8) Refit the components in the reverse order. Ensure that the fan electrical cable and pressure sensing tubing are reconnected to the control box before replacing the rear access panel. Ensure correct connection of the tubing to the pressure switch. Ensure all bolts are tight and joints are sealed. Replace the locking wire or split-pins to ALL the latches.

9.0 REPLACEMENT OF PARTS

Before carrying out any work on the Forston units ensure that the gas appliance(s) connected to it are switched off, and that the Forston is isolated from all electrical supplies connected to it. If in any doubt consult Hamworthy Heating Limited.

On reassembly ensure that all electrical connections are correct, and that any flue components that were disturbed are correctly refitted and sealed.

A full list of recommended spares items is given in section 10.

10.0 RECOMMENDED SPARES

Please Note! To ensure the correct spare parts are despatched by our spares department, it is imperative that the complete product serial number is given. The serial no. is located on the rating label on the bottom of the rear access plate, adjacent to the control box. This number **MUST** be quoted when ordering spare parts.

SPARES ITEM	PART NO.
Fan unit (Forston 200)	533704001
Fan unit (Forston 300)	533704002
Pressure switch	533901357
Airflow Sensor (Venturi)	532495003
Silicon tubing c/w grommet	532407001
Rear gasket (3m)	531299017
Single Pole Relay (RL1)	533901204
Double Pole Relay (RL2)	533901206
Fuse T5A	533901218
Fan Speed Controller (PCB)	563901270
Acoustic Pod	533001017
Control Panel Assembly	563901272

Hamworthy Heating Accredited Agents

■ **Central & South West England**

Driver Engineering Limited
778 Wimborne Road, Moordown
Bournemouth BH9 2DX
Tel: 01202 525140
Fax: 01202 536442

■ **North West England**

Gillies Modular Services
210-218 New Chester Road
Birkenhead
Merseyside L41 9BG
Tel: 0151 666 1030
Fax: 0151 647 8101

■ **North East England**

Allison Heating Products
17 Beach Road
South Shields
Tyne & Wear NE33 2QH
Tel: 0191 455 7898
Fax: 0191 455 7899

■ **Scotland**

McDowall Modular Services
97a Hawthorn Street
Glasgow G22 6JD
Tel: 0141 336 8795
Fax: 0141 336 8954

■ **Northern Ireland**

McCaig Collim Limited
92-94 Dargan Crescent
Duncrue Industrial Estate
Belfast BT3 9JP
Tel: 028 9077 7788
Fax: 028 9077 6865

■ **Southern Ireland**

HEVAC Limited
70-72 Lower Dorset Street
Dublin 1, Ireland
Tel: 003531 830 1211
Fax: 003531 830 1990

For all other areas, or for further advice, please contact Hamworthy Heating head office service department in Poole, telephone 01202 662500.

Performance

The Forston 200 & 300 are designed to mix the products of combustion from connected boilers or water heaters with air drawn from outside the building, discharging the diluted gases at a velocity greater than 7.5 metres/sec.

The diluted waste flue products are discharged such that the CO_2 content is less than 1%, complying with the requirements of the Clean Air Memorandum.

Low Noise

Always aware that plant rooms are often a source of noise and cause for complaint from nearby building occupants, our engineers have designed both the Forston 200 & 300 to achieve a low noise performance.

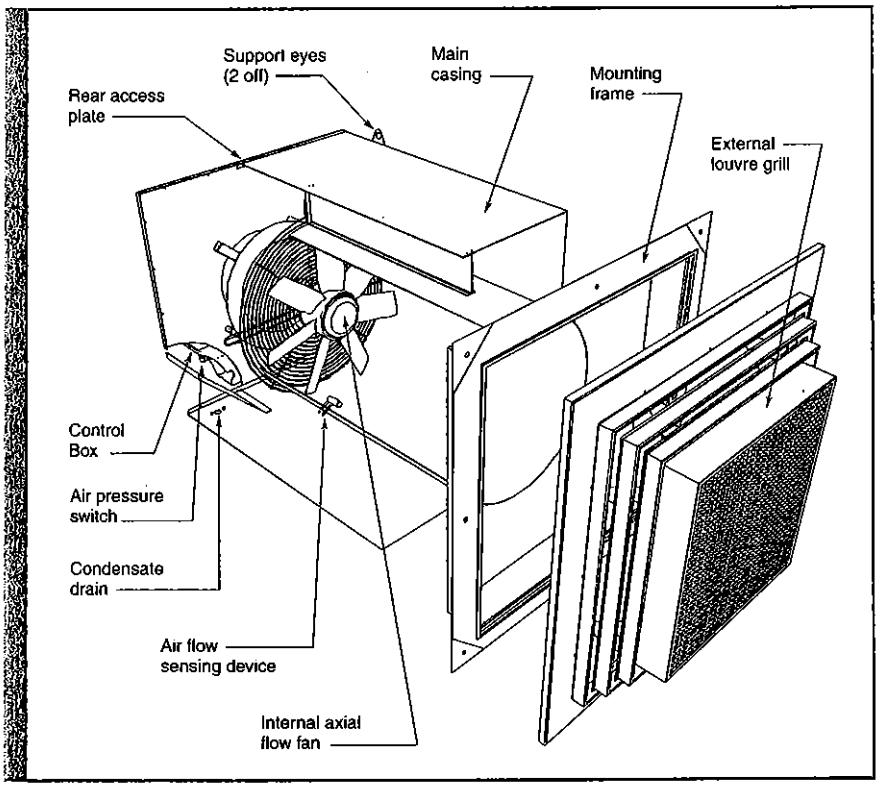
In reducing the noise levels to an absolute minimum the units incorporate an axial fan with speed control which is factory preset.

Our in house test facilities are equipped with the latest technology, enabling our engineers to produce a fan dilution system with predictable noise levels that are below Environmental Health levels.

System Noise

Improved airflow reduces turbulence through the unit and subsequently noise levels are reduced to less than 67 dBA at 2 metres*. The design of the louvres are a crucial element in attempting to achieve overall lower noise levels. The Forston louvre grilles are fabricated to a tried and tested gradient minimising air turbulence and subsequent noise pollution.

*See page 7 for further details on noise performance.



Specification

Construction

The Forston 200 & 300 are designed with louvres on the edge of the external face, enabling incoming dilution air to enter through the louvres, discharging diluted gases out through the central grill.

Internally there is an axial flow fan and casing assembly which incorporates a circular discharge duct and mixing chamber. Sickle-shaped fan blades help to reduce the blade passing frequency, minimising noise levels and improving energy efficiency.

All components in contact with the flue gases are corrosion resistant, constructed in either stainless steel or aluminium.

Control

An airflow proving interlock provides system safety, monitoring discharge airflow and preventing the connected boiler or water heater from firing, if the fan is not running.

Visual indication of operation is achieved with two neon lamps fitted on the control box, an amber lamp indicates 'power on' and a green lamp indicates 'airflow proved'.

Flue Connection

The connection to the Forston is on the rear access plate and is designed to take a single flue on a spigot 256mm O/D.

It is recommended that the connecting flue is constructed from single skin or twin wall stainless steel.

The connecting flue must be self-supporting and contain a maintenance joint to allow disconnection and removal of a sufficient length of flue, to enable the rear access plate on the Forston to be removed for maintenance.

The flue system must be designed to ensure that the draught requirements of the connected boiler or water heater are achieved.

Dilution Mixing System

The Forston 200 & 300 both incorporate a patented mixing design which improves the flow of the incoming dilution air that mixes with the flue outlet gases overcoming stratification, to dilute waste flue products to less than 1% CO_2, complying with the requirements of the Clean Air Memorandum.

Hamworthy Heating offer a flue system design and installation service. For further details tel: 0121 360 7000.

Typical Applications

Traditionally, fan dilution systems have always routed large dilution ductwork down to the boiler and then back to the outside wall.

This traditional method consumes more energy, generates higher noise levels and takes up valuable plant room space.

Careful consideration has gone into the Forstons' design to eliminate such problems.

The Forston is a pre-assembled unit which requires less flue ductwork, reducing associated noise levels and minimising the amount of energy used.

As an extremely compact unit, the Forston can be used in single or multiple configurations, depending on the output of the plant.

Modular boilers, single Forston

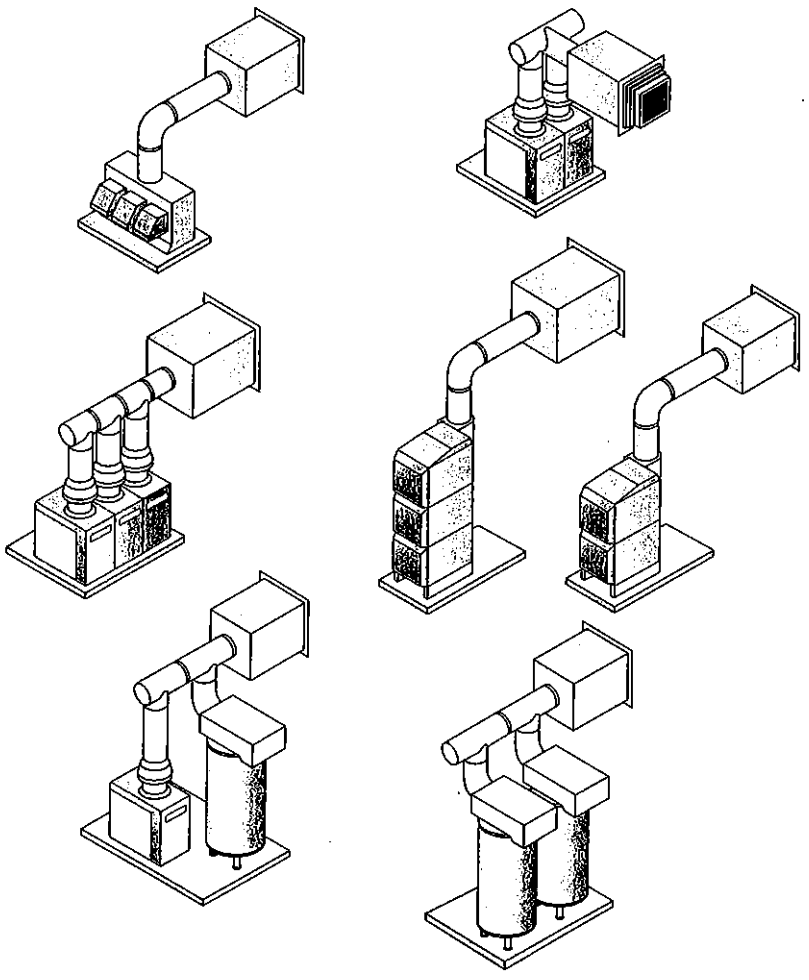
The Forston 200 & 300 can be used on single flue systems serving modular boilers with a combined output up to 200kW or 300kW respectively.

Modular boilers, multiple Forston

The Forston is equally suited to applications using larger boilers, where each Forston serves a single boiler.

This provides a flexible option in terms of system maintenance, whereby individual fan dilution systems and boilers can be shut down without losing complete heating output.

Typical Arrangement for Forston 200/300 with Multiple Boiler/Water Heaters



Boilers and/or Water Heaters

The Forston can be used to provide fan dilution for a combination of boilers and/or water heaters.

The flue system must be designed to ensure that the draught requirements of the boiler and/or water heater are met. This may require the fitting of a draught stabiliser or damper.

Any transition between differing diameter flue sections and the spigot on the Forston should be made smoothly.

General requirements

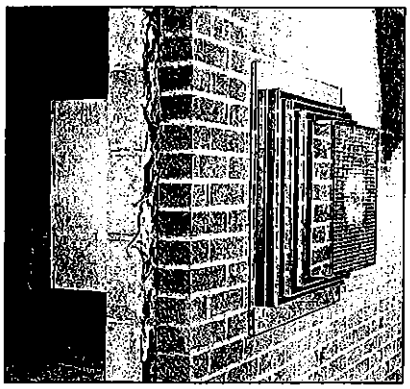
The installation of the fan dilution system must be in accordance with the relevant requirements of the Gas Safety Regulations, Building Regulations, IEE Regulations and the bye-laws of the local water undertaking.

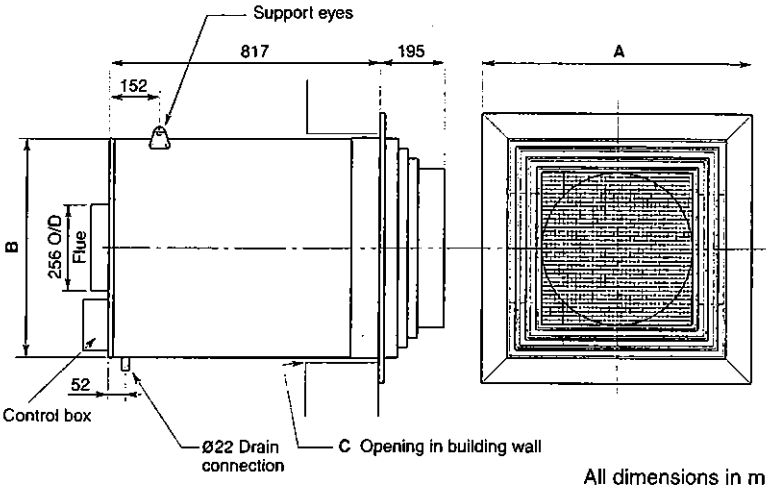
It should also be in accordance with any relevant requirements of the Health and Safety Executive, the local gas region authority and the relevant recommendations of the following documents:

Legislation and Codes of Practice

- **The Clean Air Memorandum (1956) Third Edition:** Chimney Heights
- **British Standard Codes of Practice**
- **BS 6644:** Installation of Gas Fired Hot Water Boilers - 60kW to 2MW.
- **BS 6880, Part 2:** Code of Practice for low temperature hot water heating systems of output greater than 45kW.
- **BS 5854:** Code of Practice for Flues and Flue Structures in Buildings.
- **BS EN 60335, Part 1:** Safety of Household and Similar Appliances.
- **BS 3456, Part 201:** Electrical Standards.
- **British Gas Publications**
- **IM/11:** Flues for commercial and industrial gas fired boilers and air heaters.

Dimensional Details





All dimensions in mm

Model	A	B	C
Forston 200	802 Square	650 Square	660 Square
Forston 300	902 Square	750 Square	760 Square

Installation Details

Location

The location of the Forston must satisfy the requirements of a flue system that complies with the regulations and the equipment manufacturer's flue recommendations. Particular attention must be paid to the inlet and discharge positioning, and the interconnecting flue system between the boiler and the unit.

It is recommended that the bottom of the discharge grill should be a minimum of 3 metres high from the ground level outside the building.

Discharged products must not be directed into an enclosed or almost totally enclosed well or courtyard.

Minimum Discharge Distances

Parameter	Distance (m)
Other fan assisted air inlets	2.95
Opening Windows	1.18
Nearest Building	3.54

Ease of Installation

The Forston is installed through the wall, from either inside or outside the building.

The unit requires only a single opening in the wall. Brick or block construction walls will require a suitable lintel over the opening, to support the brickwork above.

Prior to installing the unit, the mounting frame is fixed to the wall. The mounting plate may be used as a template to prepare the opening to size.

The main casing assembly is installed through the mounting plate and is equipped with fixing points which enable a flexible approach to the installation, accommodating a variety of site conditions.

The casing can be supported using either mounting brackets, tie rods or suspension cables.

In view of the wide range of differing installation requirements, these items are not supplied by Hamworthy Heating Limited.

The mounting frame also serves as an exterior closure plate around the unit to cover the opening, finishing the opening without the need for further building work.

Inner Closure Plate

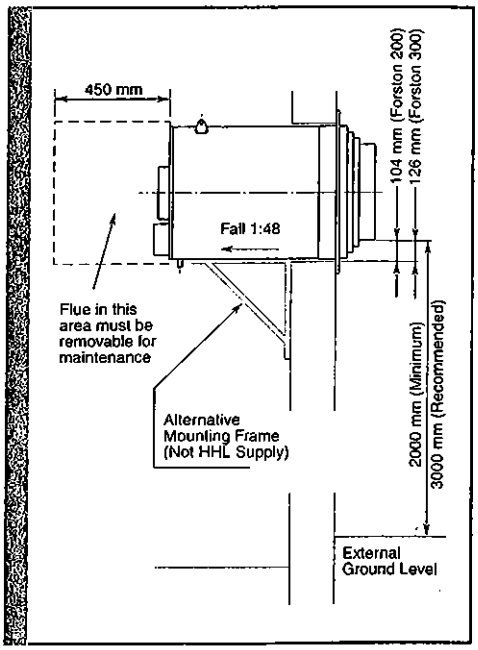
To complete the installation from inside the building, an optional closure plate is available. This fits around the unit in a similar manner to the mounting frame.

External Louvre/Grill

The external louvre/grill finishes the unit on the outside, fitting over the central duct which discharges the flue gases.

Condensate Drain

The unit is supplied with a 22mm diameter drain stub connection. This should be connected and run to a suitable drain outlet. Due to the acidity of the condensate formed, copper pipework is not recommended for this application.



Electrical Connections

The unit is supplied with a pre-wired control box. The supply required is 230 volts AC single phase 50Hz from the boiler control system.

The Forston must be connected via a double-pole isolator with minimum 3mm contact separation in all poles, correctly fused at 6 amps sited locally to the unit.

All wiring must be in accordance with current IEE Regulations.

Access to the terminals is by removal of the terminal box cover, and the supply cable should enter through the gland provided.

In addition, the airflow proving interlock control is also pre-wired to the terminal box giving common and normally open contacts for connection to the boiler control circuit. This interlock must be utilised to ensure the boiler cannot fire if the fan is not running.

The controls incorporate a fan speed controller which is factory set for design speed operation, and must not be altered. Any unauthorised adjustment may lead to incorrect operation and failure to meet design criteria.

Delivery

The Forston 200 & 300 are supplied with the casing components pre-assembled. The external louvre/grill and mounting frame will be supplied loose.

All items will be wrapped/packaged to provide protection during transportation.

Delivery will be made to a convenient accessible location on site.

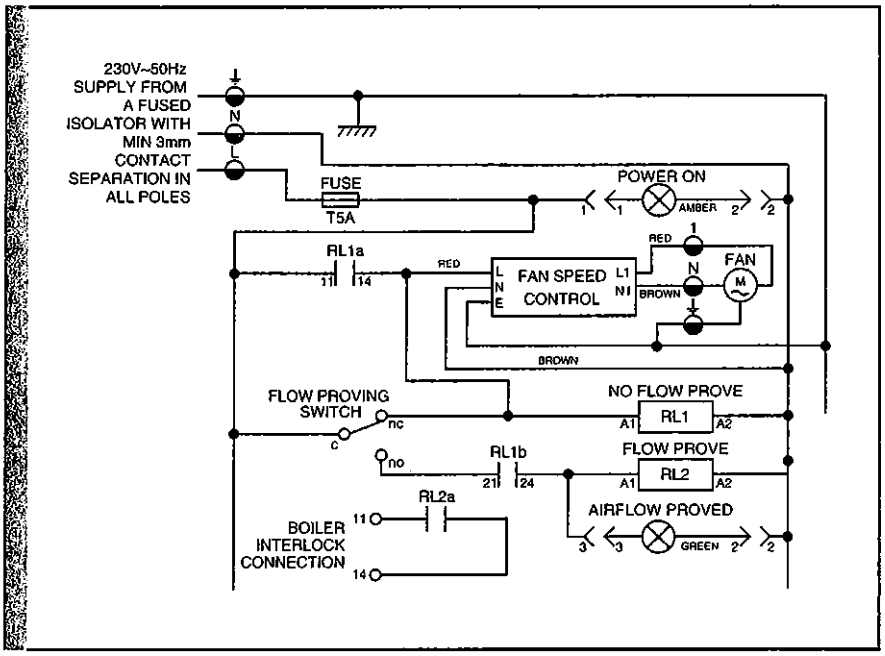
Maintenance

The Forston 200 & 300 have been designed for ease of maintenance, with access gained from the rear panel.

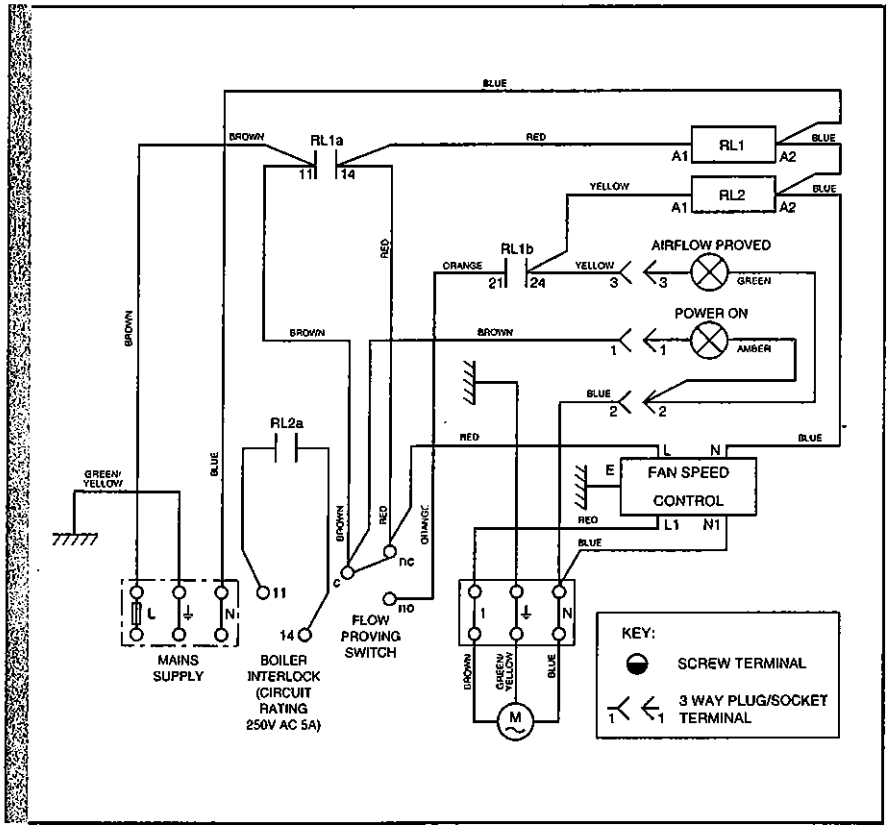
The fan blades and electrical motor can be easily accessed for general maintenance purposes or system breakdown.

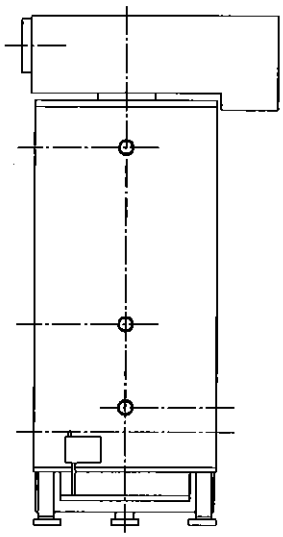
Once the Forston unit has been connected to the gas boiler it forms part of the gas installation. Commissioning and service engineers must be CORGI registered, ACOPS approved.

Wiring Schematic Forston 200 & 300



Connection Diagram





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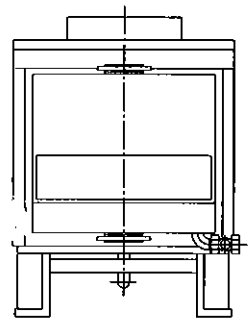

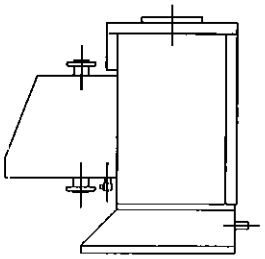

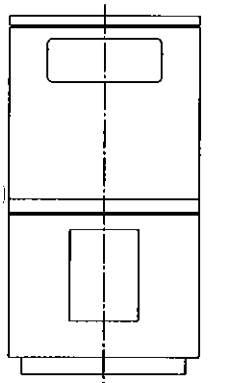

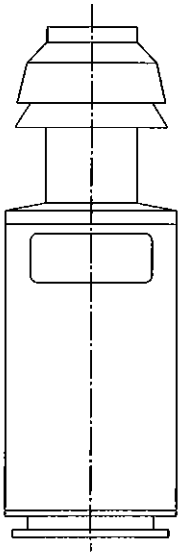

POOLE OFFICE

HAMWORTHY
heating products

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QUOTATIONS ..... ☎ **01202 662552**
Hamworthy Heating provide an efficient pricing and quotation service. Our Customer Liaison staff will also be pleased to arrange for one of our Sales Engineers or Authorised Sales Agents, to visit you to discuss your needs in person, and offer expert technical and commercial advice on heating, flue and water systems.

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For an efficient response to order acknowledgement and administrative queries, contact our order processing team.

DELIVERY ENQUIRIES ..... ☎ **01202 662515/662504**
Deliveries from Hamworthy Heating arrive direct from the factory on a vehicle equipped with a tail-lift for ease of off-loading to ground level. Our contracts team will progress despatch and liaise individual delivery arrangements.

SPARE PARTS ..... ☎ **01202 662525**
A comprehensive spare parts service is operated from our factory in Poole, providing replacement parts for both current and discontinued products. Please contact our spares team, providing details of product type, serial number, model and part requirements wherever possible.

SERVICE DEPARTMENT ..... ☎ **01202 662555**
At Hamworthy Heating we employ our own skilled service engineers who are trained to work on all of our products. Our National coverage of all UK mainland sites is supported by a network of Authorised Service Agents who can provide the same high level of service and product expertise.

EXPORT ..... ☎ **+44 (0)1202 662514**
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