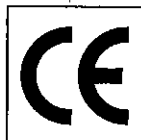


# Forston 400

Packaged Fan  
Dilution System



BS EN ISO 9001:1994  
Certificate No. FM10082



**HAMWORTHY**  
heating products

## Ease of Installation

The Forston has been purposely designed to assist the installer/contractor for on site positioning.

- The mild steel framework can be positioned onto the wall indicating the exact sizing of brickwork to be removed defining the wall openings. It also illustrates the type of holes required for wall fitting.
- In accordance with the Clean Air Act, the base of the outlet should be positioned two metres from the ground.
- Once the framework is fitted to the wall, the supporting connections can then be joined.
- The louvres should be placed into wall openings and secured with a mastic seal.
- The stainless steel flue ducting is then fitted to the supporting connections ready for secondary flue fittings to the boiler.
- The Forston is a simple, easy to install unit, saving on-site installation time and generating considerable reductions in labour costs.

## Ease of Inspection

The centre of the Forston is removable providing ease of maintenance for the end user. The fan and electrical motor can be easily accessed for inspection. By loosening some of the bolted connections, the centre section can operate as a hinged mechanism which is ideal for plantrooms where access is limited.

## Forston 400 Specification

### Construction

The Forston ductwork is a standard construction made of stainless steel (grade 304) supported by a coated mild steel frame to provide solid assembly. The frame design incorporates drilled hole connections which locate the Forston to the wall and louvres. This can also be used as an installation template to indicate the positioning of inlet and extract louvres.

The louvre grilles are specifically designed so that flue discharge is directed upwards from the air inlet grilles in accordance with the Clean Air Act. The louvres are manufactured as square components enabling the Forston to be installed either vertically or horizontally allowing smaller lintels to be used on brick constructed walls.

### Fan

A stainless steel propeller bladed fan is located in the centre section of the ductwork ensuring that the products of combustion are mixing with air from the air inlet such that achieved dilution is less than 1% CO<sub>2</sub>.

### Operating Details

Electrical supply	-	230v AC, 50Hz, single phase.
Starting current	-	4.6 amps
Full Load	-	1.5 amps
Motor Power	-	190 Watts
Speed	-	900 rpm

### Terminal Box

Manufactured as standard enabling on site connections to electrical power supply.

### Pressure switch

Fixed to the Forston outer skin the pressure switch proves that the fan is running, then permitting the boilers to fire.

### Layout

The Forston allows conventional flue sizes to be used from the boilers allowing more room for other plant equipment.

The unit can be installed either vertically or horizontally depending on the type of plantroom and the space available. It is also suitable for individual boiler fan dilution systems.

### Delivery

The Forston can be supplied as ex-stock delivery comprising pre-assembled ductwork, with framework and louvres as loose fittings for final site location.

### Maintenance

The centre section of the Forston is removable providing ease of inspection for the end user. The fans and electrical motor can be easily accessed for general maintenance purposes or system breakdown.

### Weight

The entire weight of the Forston unit including louvres and supporting framework is 150 kg approx.



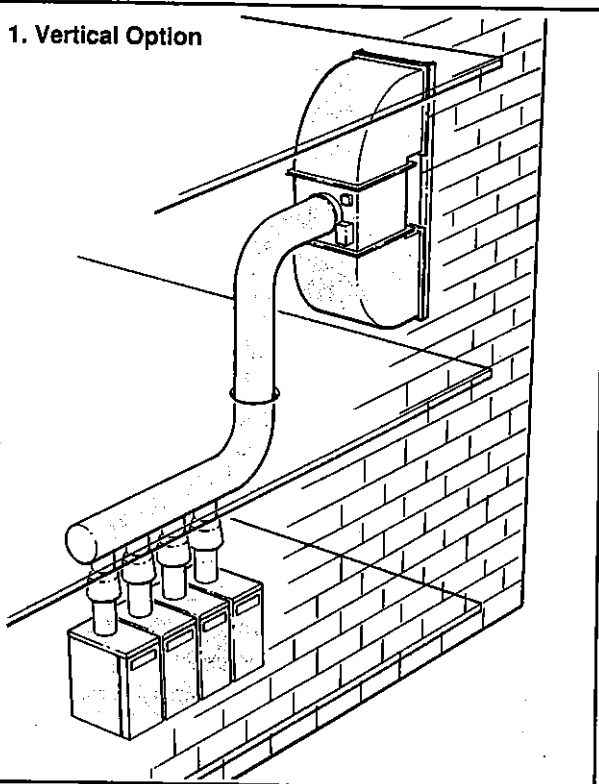


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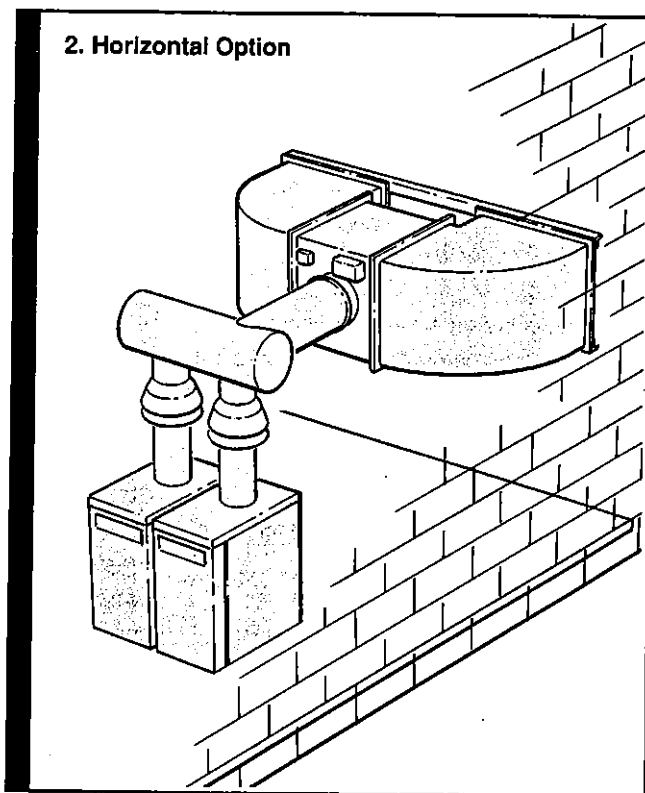
# Forston 400

## Fan Dilution Variations

1. Vertical Option



2. Horizontal Option



Traditionally, fan dilution systems have always routed large dilution ductwork down to the boiler and then back to the outside wall. This method uses up more energy, generates greater noise levels and can consume valuable plantroom space.

Careful consideration has gone into the Forston design to eliminate such problems. Its pre-assembled format requires less flue ductwork, reducing noise levels created, thus minimising the amount of energy used.

### 1. Vertical Option

Requiring less wall space than a typical doorway, the Forston construction allows the use of standard lintels in a wall opening.

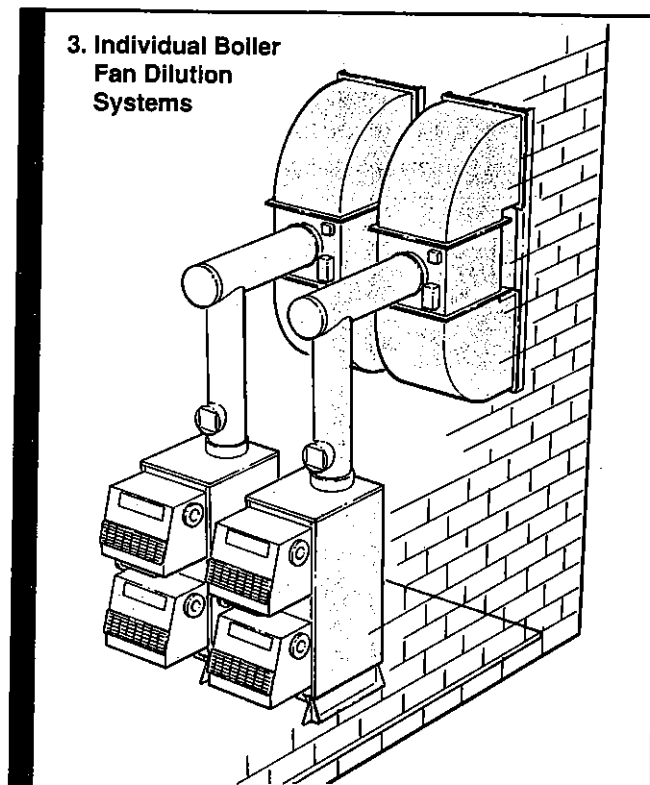
### 2. Horizontal Option

In application, the Forston construction enables two lintels to be used which avoids the need for heavier beams. The discharge louvres can be repositioned through 90°.

### 3. Individual Boiler Fan Dilution Systems

For much larger modular applications, the Forston is ideal for individual boiler fan dilution systems providing the end user with ease of maintenance. Individual fan dilution systems can be isolated avoiding the problem of complete boiler plant shutdown.

3. Individual Boiler Fan Dilution Systems

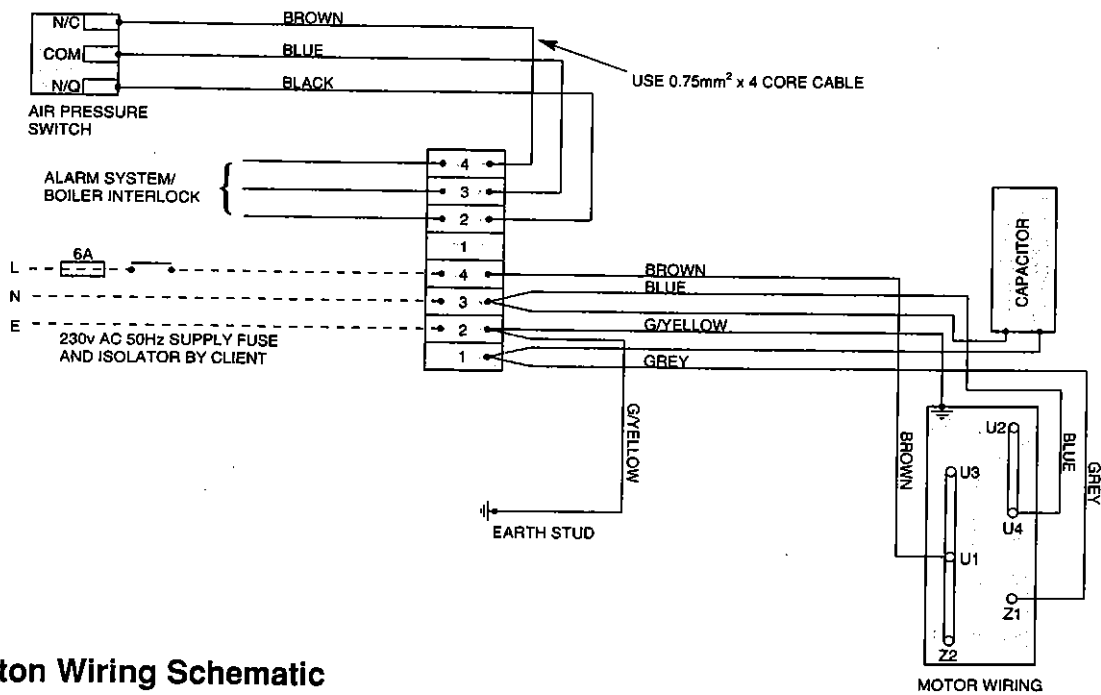
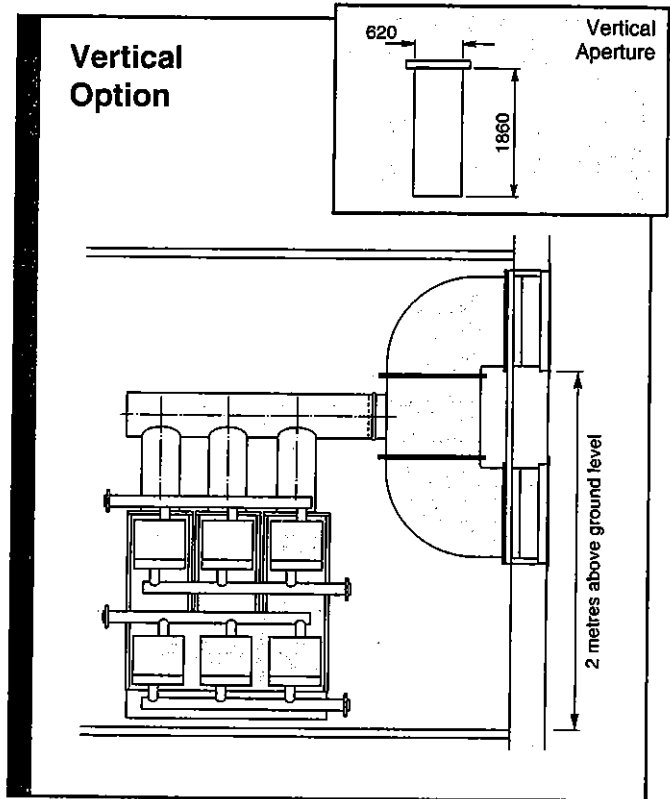
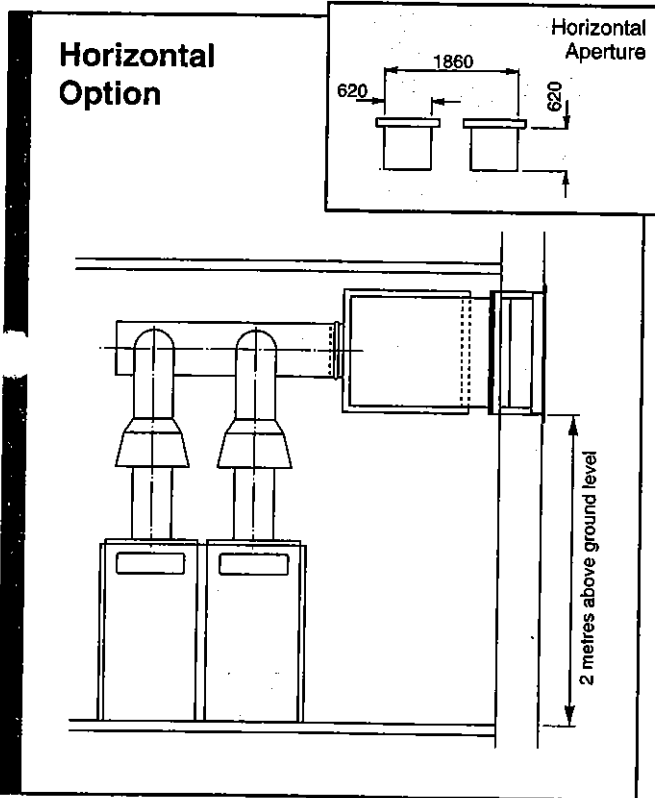




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# Typical Schematics

## Installation & Wiring Diagrams





## Low Noise Performance Details

### The Problem

From the design stage of a fan dilution system noise levels are often difficult to predict. Yet in practise the consequences and implications of noise can be quite serious causing unnecessary complications.

### Complaints

A noisy plantroom can generate potential complaints. Prime areas of concern are hospitals, houses for the elderly, or residential property where 'noise' can be somewhat disruptive.

### Environmental Health Concern

Local Authority Officers have sufficient jurisdiction to record actual levels. Should the noise complaint be termed a general nuisance, they have the power to shutdown equipment until such time that noise levels are acceptable.

### The Solution

The design of the Forston takes into consideration the vital requirements of reducing noise levels to an absolute minimum. Our in-house test facilities are equipped with the latest in advanced technology, enabling Hamworthy to produce a fan dilution system with predictable noise levels that are below Environmental Health measurements.

### Predictable Noise Level

#### Fan Noise - 57 dBA

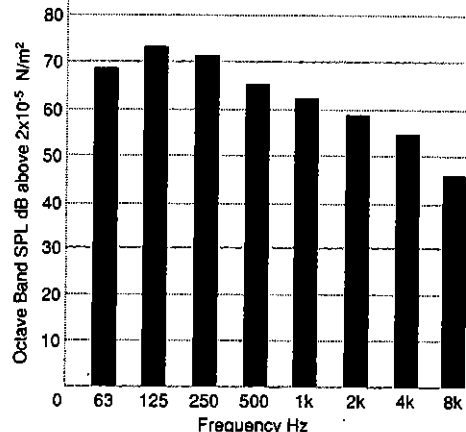
A Propeller bladed fan is accommodated as opposed to a centrifugal fan which is more commonly associated with high noise levels. The centrifugal fan can generate 66 dBA some 9 dBA more than the supplied Forston fan. The fan only uses 190 Watts of power which reduces noise readings quite considerably. Less flue ductwork is involved providing capacity for a quieter smaller fan that discharges dilution at a velocity in accordance with the Clean Air Act 1956.

#### Complete System - 67 dBA

The design of the louvres are a crucial element in attempting to achieve overall lower noise levels. The Forston louver grilles are fabricated to a tried and tested gradient minimising air turbulence and subsequent noise pollution.

### Noise Analysis of Complete System

Measurements taken from 2 metres away from the centreline of the outlet grill.



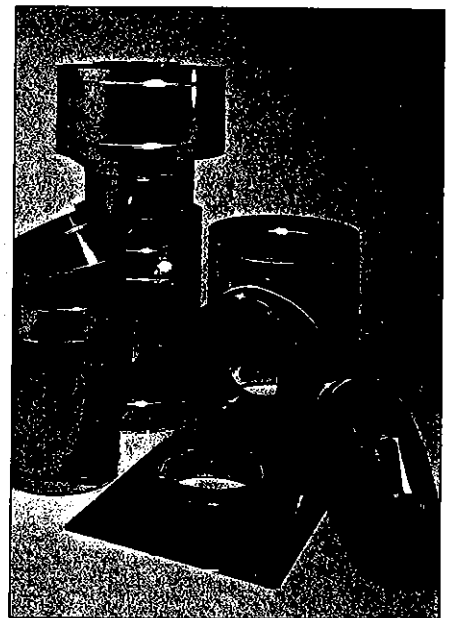
## Fan Diluted Guidance Notes

Taken from the Clean Air Act. For natural gas and fuels with sulphur of less than 0.04%

1. An air flow switch must be installed which will shut down the heating equipment in the event of failure or blockage.
2. Ideally, the inlet and outlet louvres of the duct should be positioned on the same wall to provide a balancing effect against wind pressure. Alternatively, a side wall intake with a vertical discharge may be provided.
3. It is important that the louvres for boilerhouse ventilation should be located away from the flue discharge point, preferably on another building face of the boilerhouse.
4. The position of the flue outlet must be chosen so that the diluted products do not accumulate in the vicinity of the terminal. Sheltered positions should be avoided and louvres should divert the products away from other air inlet systems and prevent ingress of rain.
5. For installations below 1000kW it is suggested that the base of the outlet should be at least 2 metres from the ground. Local authority approval of the outlet position should be obtained.
6. Outlets are not to be sited within 4 metres of an openable window, or within 10 metres of a fan intake for installations below 1000KW. This is based on the minimum heights of outlet in BS 6644.

### Refer also to:

- British Gas Publication IM/11.
- Flues for Commercial and Industrial gas fired Boilers and Air Heaters (May 1979).
- BS 6644 Installation of Gas fired Hot Water Boilers rated outputs 60KW to 2 MW.
- Clean Air Act Memorandum (1956).



Boiler Flue Systems

Hamworthy Heating manufacture a comprehensive range of flue components, specialist product variations and ancillary items.

Hamworthy also provide a complete design and specification service comprising sizing, site surveys and submission of drawings for approval where necessary.

For further details and technical information refer to brochure 500002009.