

OPERATION AND MAINTENANCE MANUAL

MODEL 346 FEF FRONT END FILTER UNIT

Part Number 346/366000
Issue 3

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Issue	Date	Comments
1	22/09/2008	First Issue
2	06/02/2009	Clarifications Issue
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1 **SPECIFICATION**

Mains Supply (front panel)

230Vac \pm 15%, 50/60Hz, 6.3A,

Pre-set at factory and stamped on rear-panel serial number plate

Fuses

6.3A HBC (Qty: 2)

Control Valves

24 v DC 10w each valve

Oven Temperature

190 °C

Front-panel adjustable temperature controllers

Hot Inlet (rear panel)

Max inlet temp 200 deg.C

Bulkhead fitting 3/8" tube compression fitting

Heated Filter (front panel)

A disposable particulate 0.7 micron filter fitted, removable from front panel.
(1 micron reusable stainless steel filter available on request)

Hot Outlet (front panel)

Max outlet temp 200 deg.C

Bulkhead fitting 3/8" tube compression fitting

Purge Inlet (front panel)

Bulkhead fitting 1/4" tube compression fitting

Cal Gas Inlet (front panel)

Bulkhead fitting 3/8" tube compression fitting

Actuator Control Air Inlet (front panel)

Bulkhead fitting 1/4" tube compression fitting

Gas Wetted Parts

316 Stainless Steel, PFA &. PTFE

Environmental conditions

40°C max ambient temperature

Dimensions

260mm(h) x 240mm(w) x 440mm(d)

Weight

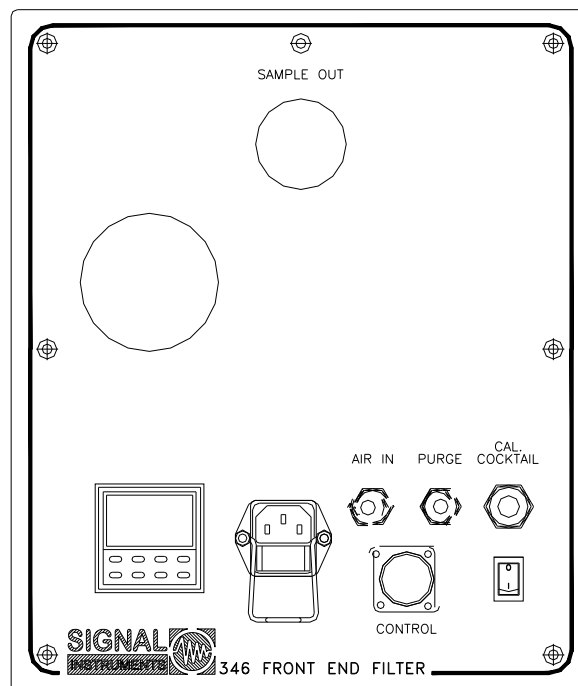
20Kg

2 INTRODUCTION

The Model 346 is a single point portable heated FEF (front end filtration) unit that filters in-coming hot sample gas (rear panel bulkhead fitting) and distributes it to a single sample outlet port (front panel bulkhead fitting).

Provision is made for purge gas and calibration/check gas introduction.

2.1 Front Panel Layout



Gas connections

Compressed Air: This is used to operate the ball valve inside the unit and should be set to 3 bars.

Purge If probe purge is required connect purge gas (normally air) to this port.

Set pressure to achieve desired purge flow rate, not to exceed 3 bars.

Cal/Cocktail: If system check gas is required connect gas to this port. Pressure not to exceed 1 bar.

Connect the incoming hot sample to the INLET bulkhead fitting.

Connect hot outlet SAMPLE OUT,

3 INSTALLATION

CAUTION

THIS INSTRUMENT MUST NOT BE USED WITHOUT A SAFETY EARTH CONNECTION

**The connection ports will become hot
TAKE PRECAUTIONS AGAINST BURNS**

Installation requires the use of a tool set compatible with electrical and pneumatic skills.

A suitable set of tools for a minimum installation consists of and electricians flat bladed screwdriver for the mains connections, a sharp knife for cutting PTFE tubing, a $\frac{9}{16}$ " A/F spanner for $\frac{1}{4}$ " fittings and $\frac{11}{16}$ " A/F spanner for $\frac{3}{8}$ " fittings.

Plumbing in stainless steel will require the use of pipe cutters and benders. We, or our local agents, can offer an installation service if you do not have the necessary skills.

3.1 Mains Power Connection

Check your local mains voltage. It must fall inside the $\pm 15\%$ limits of the nominal voltage setting of the unit. *Check the serial number plate for the voltage rating. Power rating 850VA*

The mains lead supplied with the oven is colour coded and must be connected according to the following instructions.

- Connect the BROWN wire to the LIVE (L) pin of the mains plug.
- Connect the BLUE wire to the NEUTRAL (N) pin of the mains plug.
- Connect the GREEN/YELLOW wire to the EARTH (E) pin of the mains plug.

If the local mains supply does not provide an earth connection, you must supply an independent earth connection. Consult a qualified electrician.

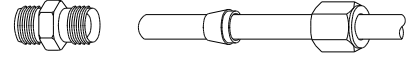
3.2 Gas Connections

All pipe fittings have the same assembly method.

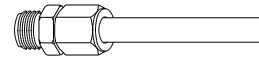
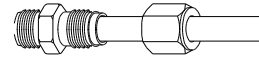
Cut the tubing to length ensuring that the ends are cut square.



Slide the nut and ferrule over the tube.



Insert the tube into the end of the fitting and hold it firmly against the internal shoulder.



Slide the nut and ferrule to the fitting and tighten the nut until it is "finger tight".

Tighten the nut a further $1\frac{1}{4}$ turns with a suitable spanner.

When connections are remade, it is only necessary to tighten the nut slightly with the spanner after making it "finger tight".

4 OPERATION

4.1 Control connections

Control: Connect valve control signal cable (24v DC) to the front panel 19 way multi-pole connector.

Sample/Purge: When no control signal is applied, Sample valve stays closed and purge gas is open to back-purge the sample probe. When control 24v is applied the sample ball valve opens and purge is shut off.

Cal: When 24v control is applied the Cal valve opens. This is normally applied with the unit is in purge mode so Cal gas flows down the sample line under pressure. If opened in sample mode the Cal gas also flows out to sample (EPA overflow method) and sample pressure stays at atmospheric but Cal gas flow may be much higher.

4.2 Initial Setting Up

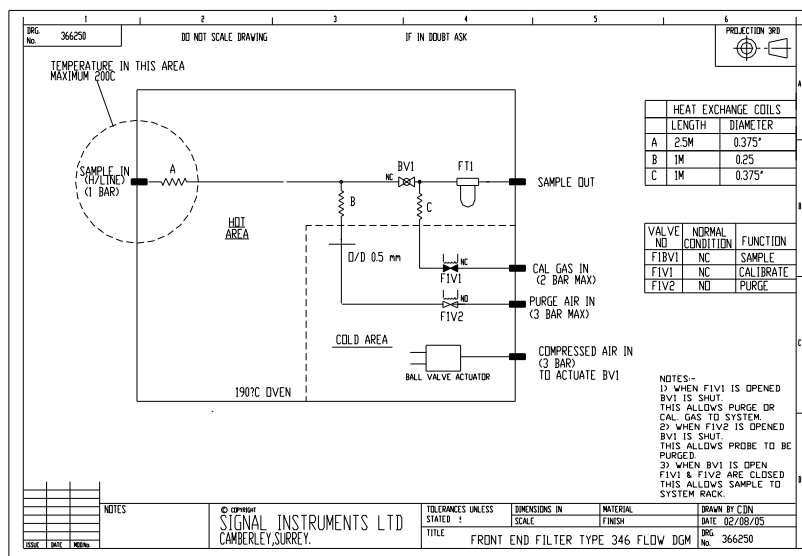
Adjust the set-point on the temperature controller to 190degC. Within 30 minutes the oven should reach temperature.

At this time the control indicators should flash with a regular on/off cycle of approximately 10 seconds. Allow warm-up time and to prevent condensation, do not introduce hot sample gas until the oven is at temperature. On power-down, purge out sample gas, to prevent condensation.

Sampling: Energise 'Sample' to enable sampling.

Monitor: Oven temperature can be monitored from a 'K' type thermocouple connection at the control socket.

4.3 Flow Schematic



5 MAINTENANCE

The filter is the only item requiring periodic inspection and replacement.

This specially designed filter system has been proven to last many hours on continuous sampling of over-rich engines and cold start diesels.

To ensure satisfactory performance, the filter element should be replaced with Signal part number FILT/028 (disposable type).

If stainless filter is used this can be cleaned with proprietary non hydrocarbon based cleaner in an ultrasonic bath.

5.1 Replacement of filter cartridge



Note:

- **Internal surfaces of the filter will be very hot.**
- **Ensure the system is in pause mode (i.e. no gas flowing) before changing the elements.**

1. Turn off sample pump
2. Rotate the handle 1/4 turns anti clockwise to release the bayonet studs. Carefully pull the filter assembly straight out of the panel.
3. Remove the cartridge from the holder by sliding it off.
4. Ensure the filter holder is clean.
5. Slide the replacement cartridge over the hook shaped guide and locate it on the boss.
6. Carefully reinsert the assembly into the body then turn the handle 1/4 turn clockwise.
7. The spring retainer ensures a correct seal, indicated by the green button emerging slightly proud of the holder centre.
8. If the button remains depressed indicates a poor fitting or damaged cartridge.

5.2 Replacement of Prefilter 'O-rings'

This operation should be carried out when the filter handle is at room temperature

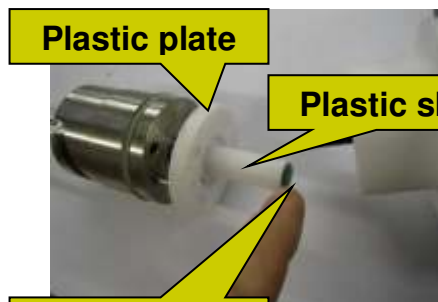
1. Remove Plastic caps
2. Remove 2 off 5 mm Hex bolts
3. Unplug Position sensor
4. Remove 4 off 4mm hex screws
5. Remove green cap, Plastic plate and plastic shaft
6. Remove circlip
7. Slide out filter holder inner
8. Replace seals and filter
9. Lubricate seals with silicon grease



Plastic caps



2 off 5mm hex bolts



Plastic plate

Plastic shaft

Green cap



Filter holder inner



6 **WARRENTY**

For a period of 24 months from the date on which an instrument is delivered to the Purchaser, Signal Group Ltd. (the 'Company') will exchange or repair at the Company's option any part or parts requiring replacement or repair by reason of defective workmanship or material.

This warranty applies to all new instrumentation manufactured by and purchased from Signal Group Ltd. subject to these conditions of sale:

The Company's obligations are conditional upon the goods being properly packed and despatched by the Purchaser to the Company's Works with transportation, insurance and other charges prepaid by the Purchaser.

There is no charge to the Purchaser for the cost of the materials or labour time expended by the Company in discharge of its warranties.

If a site visit is requested a charge will be made to cover the travelling and at the Company's discretion, subsistence expenses.

The Company shall not be responsible for any defect which, in the opinion of the Company, was attributable to:

Wear and tear:

Certain components are, by their nature, consumables, and are excluded from warranty. Such items include catalyst material, lamps, filters etc.

Any form whatsoever of improper use or maladjustment or damage caused by the Purchaser, his employees or anyone other than the Company's personnel.

Abnormal corrosive or abrasive conditions:

Lack of regular servicing and maintenance of the instrument by Signal Group Ltd. or an authorised representative: Regular servicing is required according to the relevant maintenance schedule or every six months after delivery to validate warranty, and will be chargeable at current rates.

Non-compliance with any instructions issued by the Company concerning the use and fitting of the instrument; Damage arising from installation or use of the goods in unsuitable environmental conditions. Faulty or irregular supply of electricity, air, water, gas or other site services:

Modifications by unauthorised personnel:

The Company shall not be responsible for any expense which the Purchaser may incur in removing, replacing or fitting any part. Every other form of liability, including consequential loss, damage or cost, howsoever caused, is hereby expressly excluded except where such loss or damage arises from negligence of the Company or its servants.

This warranty is given in addition to your statutory rights.