AFA 500 BSC

BSC AIRFLOW MONITOR

Operating and Instruction Manual

Model AFA 500 / BSC – Mk2

- Built-in or Remote sensor
- 2 Relay inputs
- 1 Relay output
- Com port

Used for alarm indication and monitoring on Fume Hoods

Issue : Jan 08

OPERATOR DISPLAY PANEL

Built-in AIRFLOW SENSOR

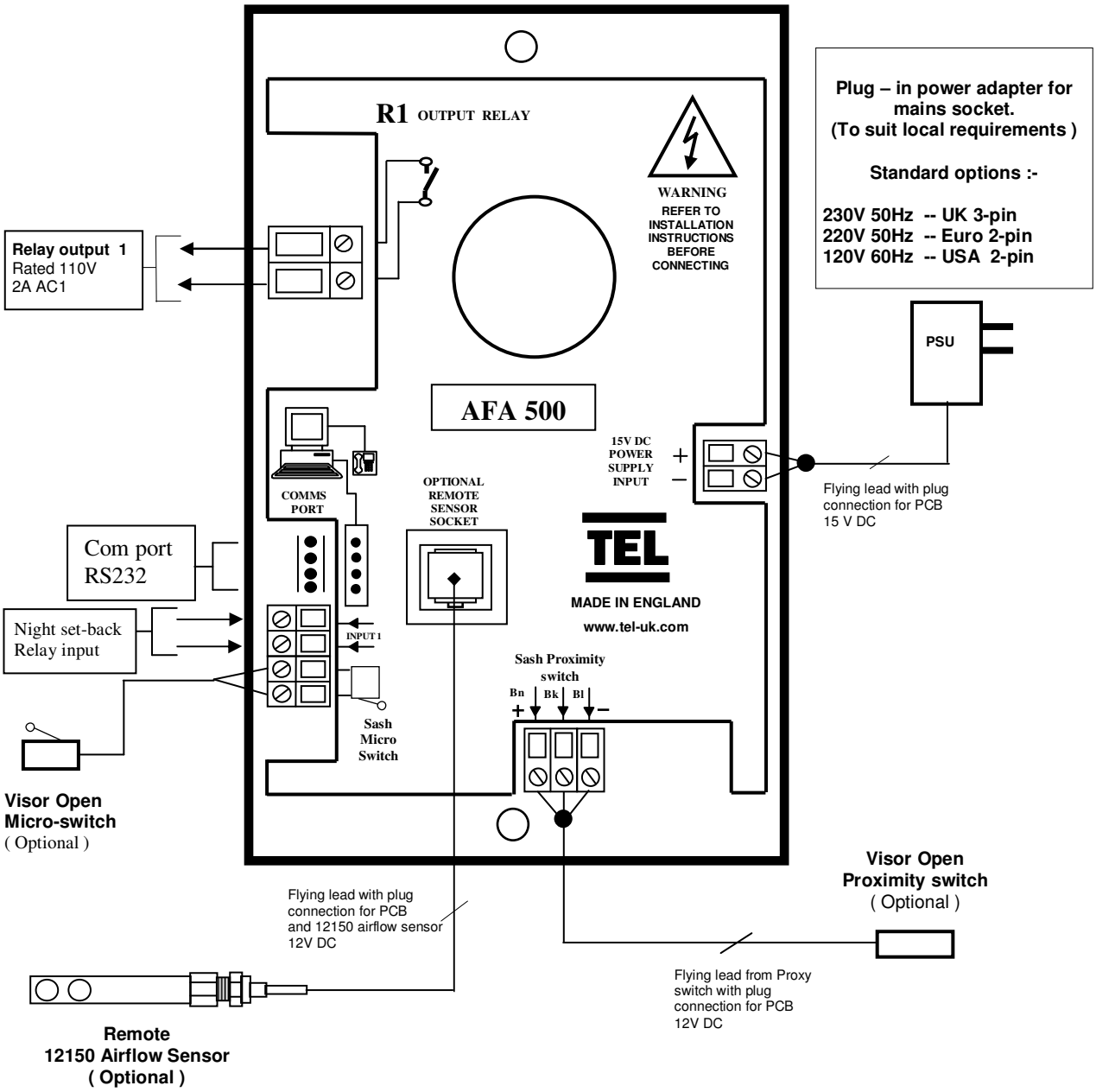
Not visible when Remote AIRFLOW SENSOR is used

LED indicators

Function buttons Calibration.

ENTER – also used as
Mute button for audible alarm

Connection details :-



Notes:-

1. The socket for the remote SM6 Airflow Sensor is not provided as standard but is available on request. The unit operates with the in-built sensor **OR** the remote sensor.
2. The Sash High alarm can operate with the Micro switch **OR** the Proximity Switch. Both connection points are available as standard.

1.1 General Description

All systems comprise of the following components :-

1 – AFA 500 Alarm unit,
1 – DC power supply
1 – Solid state switch

If the Sash Alarm System option is ordered there will also be a sash micro switch or proximity switch.
If the Remote Airflow Sensor is ordered there will be remote sensor provided

Operator Features --- the alarm has the following operator features :-

Safe LED - **Green LED (**Not flashing**)** will be displayed if the airflow is greater than the Low air alarm point.

Alarm LED - **Red LED (**Not flashing**)** will be displayed if the airflow is lower than the Low air alarm point.

Visor Open - **Red LED** (Flashing**)** will be displayed when the Visor is opened

Audible Alarm -- the Audible alarm will sound (can be muted) in the Air Fail and the Visor Open alarm condition

Night Set-back -- when the Night Setback input is activated the Audible alarm will be muted and the **Green LED will flash on/off**

ENTER --- the alarm has an Enter button -- this is multi-functional as follows :-

Press **Enter** momentarily when Low Air alarm is sounding will mute the alarm

Press **Enter** momentarily when Sash High alarm is sounding will mute the alarm and initiate a repeat timer that will re-sound the alarm if the Sash is not lowered to a safe position before the end of the time period

Press **Enter** for 5 secs will gain access to **Calibration** mode

SET -- used during the airflow Calibration of the alarm

External Connections -- the alarm unit will have the following connection points :-

Input 1 --- volt free relay input – (close contact to activate the input)

This input is configured as :-

NIGHT SETBACK

Output R1 --- volt free relay output - (contact closes on activation)

This input is configured as :-

LOW AIR ALARM

Sash High Input --- a. Connection point for **Visor open micro switch**. (Switch contact to close and remain closed in Visor open condition)

b. Connection point for **Visor proximity switch**. (Switch contact to close and remain closed in Visor Open condition)

Note:- Use input a. OR input b. for the Visor Open alarm

Remote Airflow Sensor -- Plug in connection for airflow sensor

Note:- The remote Airflow Sensor socket will only be available for units ordered without the built-in Airflow Sensor

Com Port --- to enable connection to Laptop or PC.

Power supply --- low voltage DC power supply 15V DC

1.2 Alarm Configuration / Calibration

The alarm is supplied with a factory configuration.
The only part of the configuration that can be changed is the setting for the Visor Open repeat timer time delay and the percentage figure for the Low Air alarm point when using the two point calibration mode-- if required these can be changed by connection to a Laptop or PC via the RS232 com port.

The alarm has **two modes for the calibration of the airflow alarm point**. These two modes are selectable via a **'jumper connection'** on the back of the alarm PCB. The jumper is labelled as **CAL** and is situated on the edge of the PCB above the Com port.
The two calibration modes are :-

a. Single Point Calibration (with the Jumper connected) - The airflow is reduced mechanically (using balance damper or slowing down the extract fan) to the Low Air alarm point and this airflow is 'captured' by the alarm. The airflow is then restored to the normal operating value and the Low Air alarm will activate if the airflow subsequently falls to the alarm point

b. Two Point Calibration (with the Jumper not connected) - This is a two point calibration method. The airflow is set to the normal operating value and this value is 'captured' by the alarm and taken to be 100%. The airflow is then increased to one and a half times the normal operating value and this value is 'captured' by the alarm and taken to be 150%. The Low Air alarm will then activate if the airflow subsequently falls to 80% of the normal operating value.

See 'Quick Start Installation' below for details of the Calibration procedures

1.3 Start up

When unit is powered up the following sequence of events occur :-

1. The 12V DC power is applied to the airflow sensor and the alarm then performs a self test on the functions , LEDs and audible alarm (approx 2 sec) and then initiates a delay timer to allow the airflow sensor to stabilise.

2. During the whole of thedelay period all alarms and relay outputs are inhibited and the Red & Green LEDs will be permanently ON.

3. At the end of the delay period the unit performs one of two options :-

   a. If the alarm calibration has been previously completed – the unit goes to normal operating mode (Run)

   b. If the unit has not been calibrated -- the Red & Green LEDs will flash on/off and the audible alarm will be muted. It is then possible to press the Enter button for 5 secs and go into the calibration mode – (See 'Quick Start Installation' below for details of the Calibration procedures)

1.4 Events / actions

Safe airflow

- Airflow above alarm level (eg > 80 fpm)
- Green LED on

Low airflow

- Airflow below alarm level for longer than the low air delay time (5 secs)
- Red LED on (Not flashing)
- Audible alarm sounds ('Beep' on/off every 1 sec) -- can be muted via Enter pushbutton
- Low air relay R1 operates.

Reset : -- when airflow rises above Low air level for longer than the low air to safe air delay time (2 secs) the Low air alarm resets automatically

Visor Open

- When the input configured as Visor Open is activated (Micro switch or Proximity switch)
- Red LED on (Flashing)
- Audible alarm sounds ('Beep' on/off every 1 sec)
- Audible can be muted via Enter pushbutton -- this silences the alarm and initiates a repeat timer (factory set to 5 mins) After the delay time the alarm re-sounds (and can be re-muted). During this time the Red LED flashes on / off.

Reset: -- when Visor closed and input de-activated.

Night set-back

- When input configured as Night set-back is activated
- Green LED on (Flashing)
- Audible alarm muted

Airflow Sensor Error

- The connection and each element of the airflow sensor are monitored at all times. In the event of a problem with the sensor the audible alarm will sound using a different and distinctive tone best described as ' a modulating siren effect'
- The audible alarm can only be silenced by re-connecting the sensor (if a remote sensor is being used) or switching the power to the unit off.

2.1 Quick Start Installation

Follow the instructions below for installing and commissioning the unit. :-

1. Fit the alarm to the Safety Cabinet using the cut-out details provided with the unit --- see page 11

2. Fit the airflow sensor to the Safety Cabinet using the installation details provided --- see page 13,14 & 15

3. Connect the 'telephone style' airflow sensor plug-in cable to the sensor and the back of the alarm unit --- see typical connection diagram on page 14

4. Plug in the power adapter to a Mains AC power socket and connect the flying lead to the alarm unit --- see typical connection diagram on page 13.

Power up the unit and wait at least 30 secs while the sensor temperature stabilises.

Calibration :-

Alarm Point Capture (With CAL jumper on pcb **connected)**

a. Set the exhaust Fan speed to the alarm point level.

b. Press and hold the Enter button for 5 secs to go into the calibration mode. This is indicated by both Red and Green LEDs flashing on/off together with the audible alarm sounding ('Beep on/off 4 times every 1 sec).

c. To initiate the alarm point calibration press and hold the ENTER and the SET buttons at the same time. The unit will then sample the airflow for a 5 sec period during which time the GREEN LED goes off and the RED LED flashes on/off. The audible alarm continues to sound during this period and if the sampling is successful will give a two tone beep at the end of the period and the unit will then go automatically into the RUN mode.
If the buttons are released during the sampling period or if the airflow is fluctuating more than the pre-set value the audible alarm will give a lower frequency buzzing sound for a short period and then go back into the calibration mode. If this occurs re- press the ENTER and SET buttons to repeat the airflow sampling.

d. When complete re-set the airflow to the normal value and the unit will go to the Safe running condition with the GREEN LED on.

The unit will now function and go into the alarm condition if the Safety Cabinet air velocity falls below the alarm value.

Calibration continued:-

Two Point Capture (With CAL jumper on PCB **not connected**)

a. Set the exhaust fan to the normal airflow level..

b. Press and hold the Enter button for 5 secs to go into the Calibration mode. This is indicated by both Red and Green LEDS flashing on/off together with the audible alarm sounding ('Beep' on/off 4 times every 1 sec).

c. To initiate the normal airflow (100%) calibration press and hold the ENTER and the SET button at the same time. The unit will then sample the normal airflow for a 5 sec period during which time the Green LED goes off and the Red LED flashes on/off. The audible alarm continues to sound during this period and if the sampling is successful will give a two tone beep at the end of the period and the unit will then go automatically into the higher airflow calibration mode.
If the buttons are released during the sampling period or if the airflow is fluctuating more than the pre-set value the audible alarm will give a lower frequency buzzing sound for a short period and then go back into the calibration mode. If this occurs re-press the ENTER and SET buttons to repeat the airflow sampling.

d. The higher airflow calibration mode is indicated by both Red and Green LEDS flashing on/off together with the audible alarm sounding ('Beep' on/off for 2 secs every 10 secs).
Adjust the fan speed until the face velocity rises to one and a half times the normal operating value used in a. above using a calibrated instrument to check the value
To initiate the higher airflow (150%) calibration press and hold the ENTER and the SET button at the same time. The unit will then sample the higher airflow for a 5 sec period during which time the Green LED goes off and the Red LED flashes on/off. The audible alarm continues to sound during this period and if the sampling is successful will give a two tone beep at the end of the period and the unit will then go automatically into the Run mode.
If the buttons are released during the sampling period or if the airflow is fluctuating more than the pre-set value the audible alarm will give a lower frequency buzzing sound for a short period and then go back into the calibration mode. If this occurs re-press the ENTER and SET buttons to repeat the airflow sampling.

The unit will now function and go into the ALARM condition if the Safety Cabinet air velocity falls below 80% of the normal operating value.

2.2 Calibration Notes :-

1. When using a standard Safety Cabinet with the airflow sensor in the exhaust duct it is important to position the sensor in a stable and representative position within the duct.

2. The two calibration methods are intended to give the installer two options for calibrating the alarm.

   Using the alarm point capture method it is necessary to adjust the air velocity on the safety cabinet using a mechanical damper (or fan speed controller) to the desired alarm point and this is sampled by the unit. It is necessary to re-adjust the air velocity back to the normal operating value. This method produces a very accurate alarm point at a fixed value. This method of calibration is ideal when the fan speed can be adjusted to the low air alarm value.

   The second method of two point capture is slightly more involved but does not require the fan speed to be adjusted to the alarm point level, however the fan speed will need to be adjusted to give a higher value sample.

   For fan fail alarm point calibration single point calibration is ideal. It is recommended that the fan is set to give an alarm velocity of 0.3 m/sec (60 fpm) minimum and 0.5 m/sec (100 fpm) maximum. This considers a normal operating velocity of approximately 0.75 m/sec (150 fpm).

   Using the two point capture method is ideal for low air alarm calibration where the alarm point is required to indicate a low operating velocity – typically 80% of the normal operating velocity. The normal velocity calibration point should be the normal operating velocity and the high velocity calibration point should be 150% of the normal operating velocity. For example - a normal operating velocity of 150 fpm would give a low calibration point of 150 fpm and a high calibration point of 225 fpm.
   This would give a low air alarm point of 120 fpm.

Take time when measuring the air velocities for the calibration procedure to allow for the velocities across the airflow sensor to stabilise. If the velocities are changing or are turbulent during the sampling period the alarm will detect this and ask you to repeat the sample.

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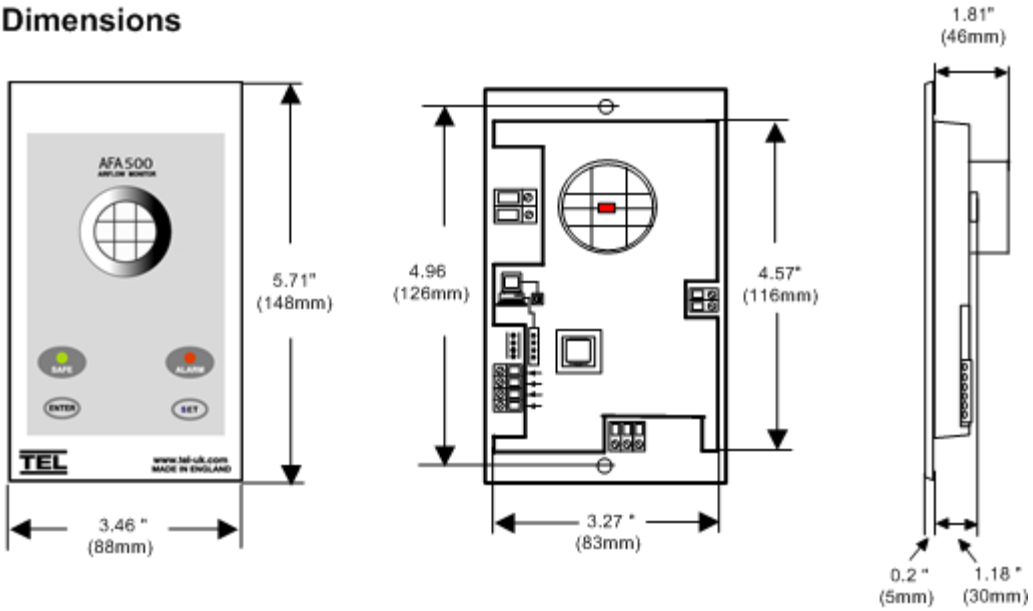
3.0 Dimensions

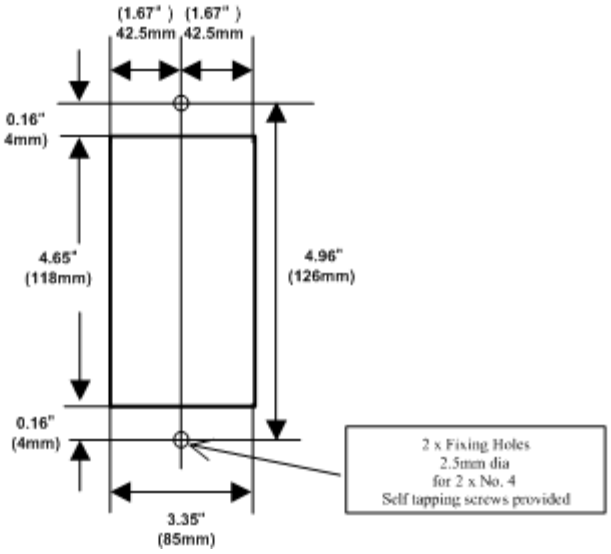
Alarm Panel Dimensions



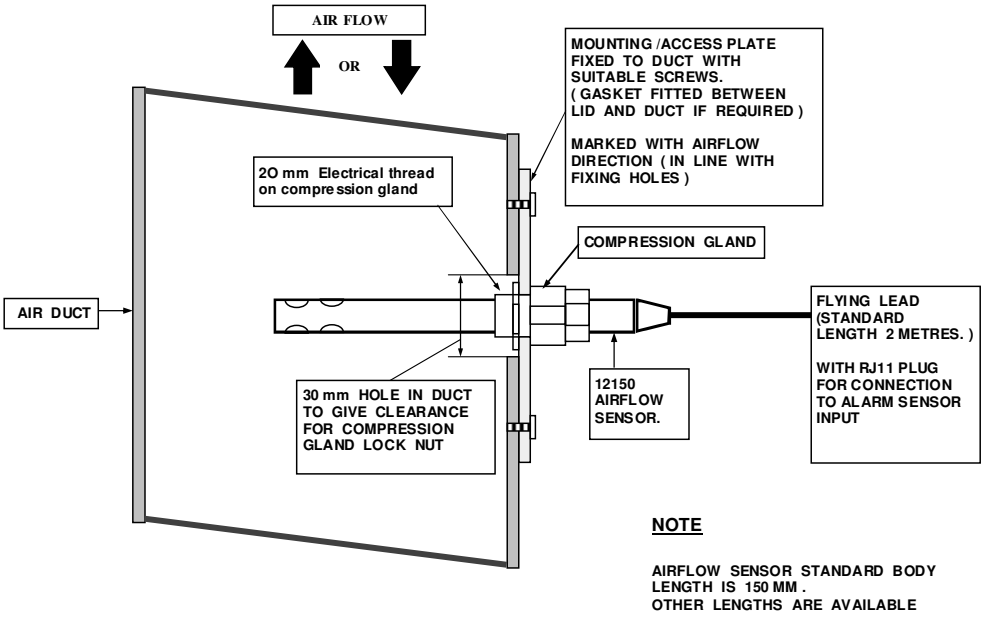
Front View | **Rear View** | **Side View**

AFA 500 Mk 2

Panel Cutout Dimensions
4.65" x 3.35"
(118mm x 85mm)



4.0 Dimensions



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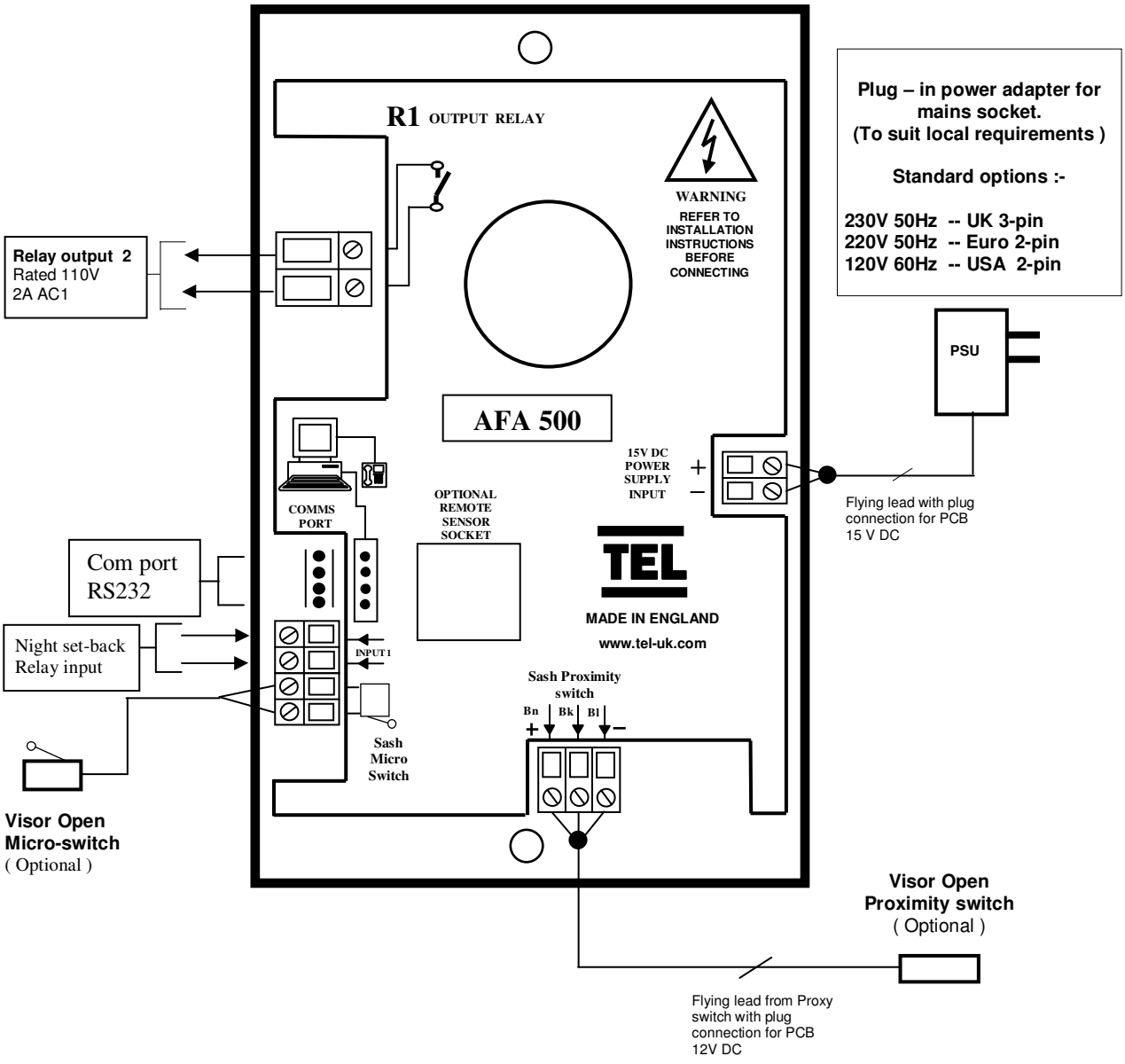
DUCT
AIRFLOW SENSOR

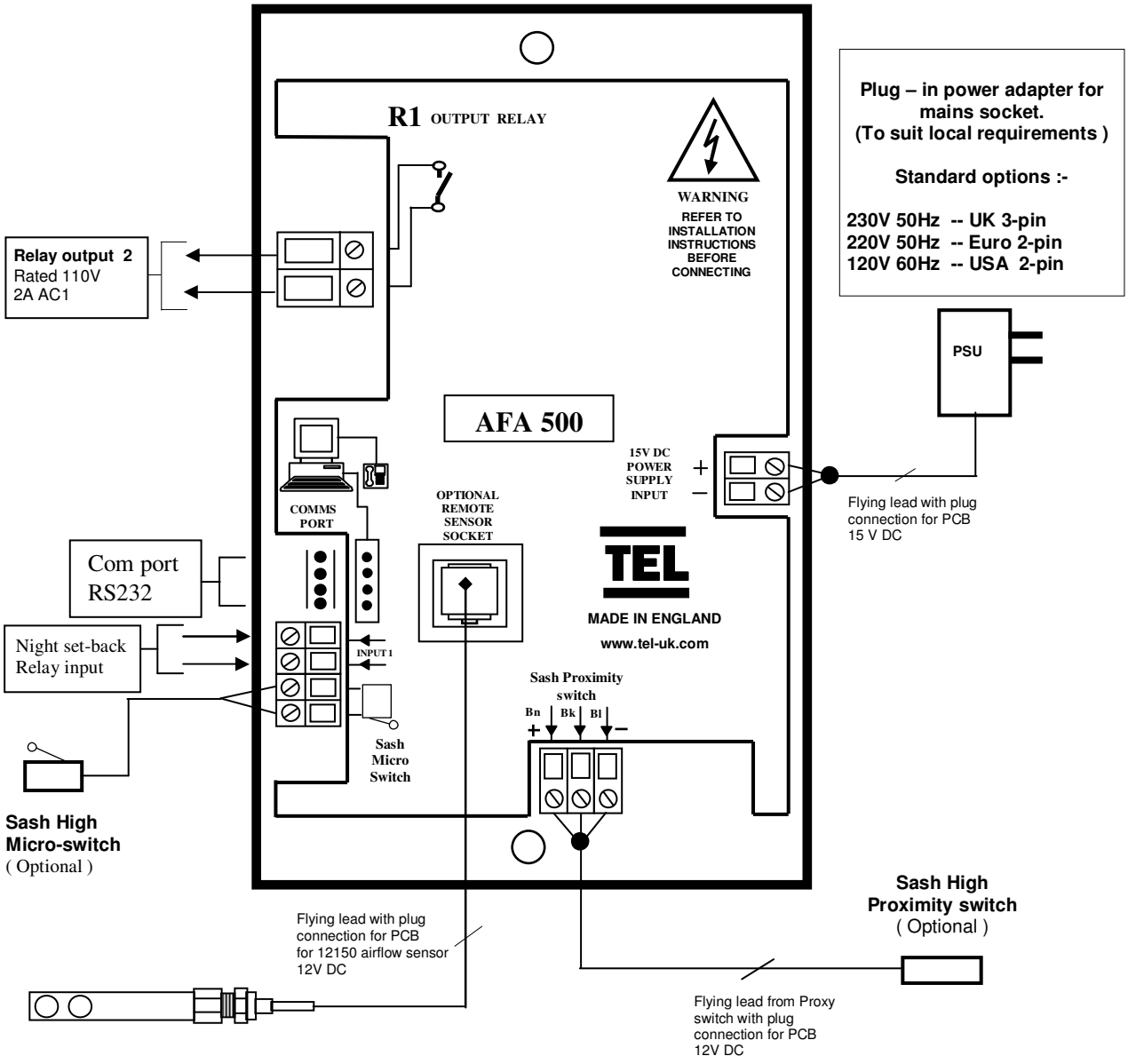
5.0 Typical Wiring Diagram

Standard Alarm with built-in Airflow Sensor



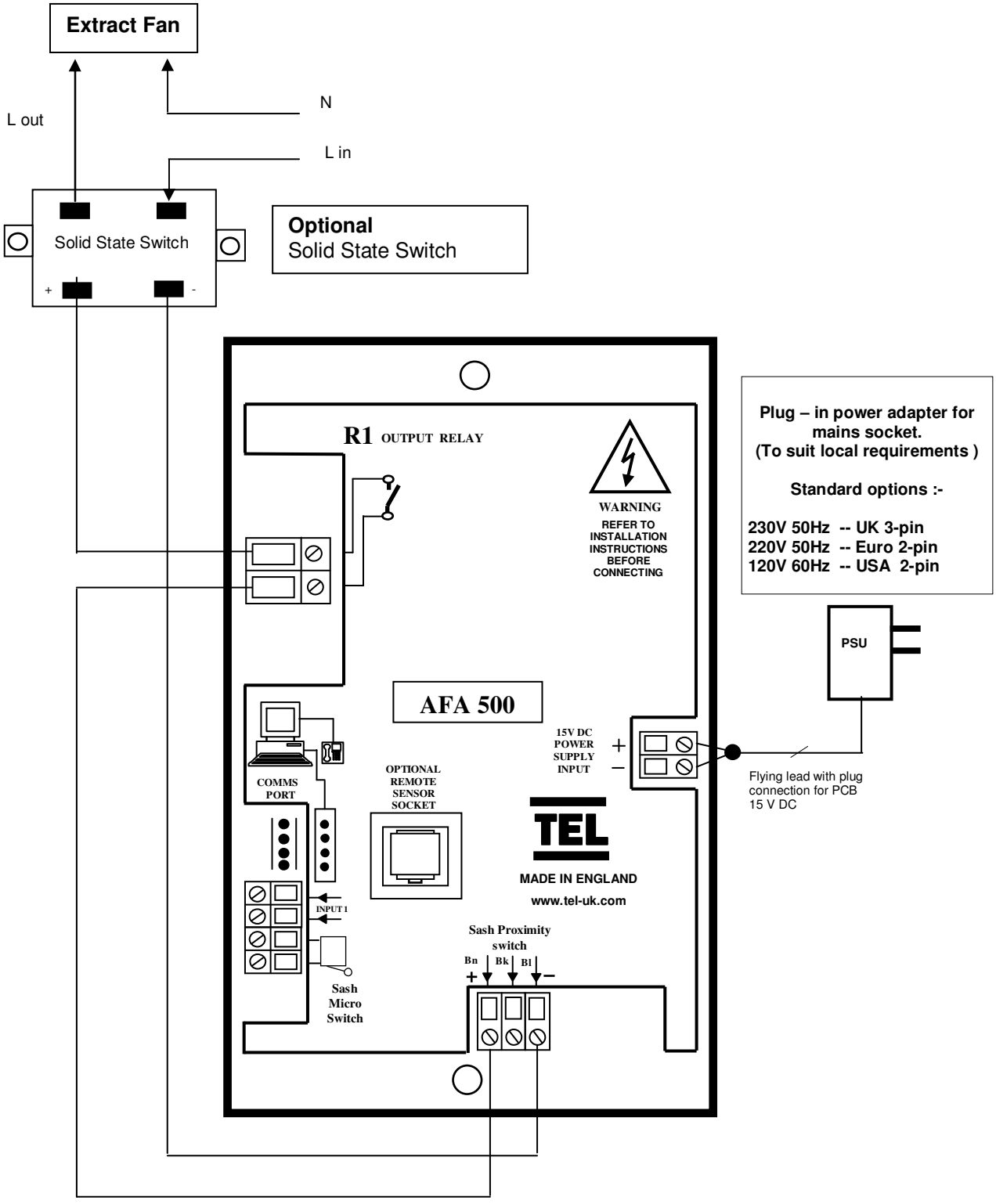
5.1 Typical Wiring Diagram

Alarm with REMOTE Airflow Sensor



5.3 Typical Wiring Diagram

Connecting the Optional Solid State Fan Switch



6.0 Limitation of Warranty and Liability

Seller warrants that this product, under normal use and service as described in the operator's manual shall be free from defects in workmanship and material for a period of twelve (12) months, or the length of time specified in the operator's manual, from the date of shipment to the customer. This limited warranty is subject to the following exclusion :-

a. Batteries and certain other components when indicated in specifications are warranted for a period of 90 days from the date of shipment to the customer.
b. With respect to any repair services rendered, Seller warrants that the parts repaired or replaced will be free from defects in workmanship and material, under normal use, for a period of 90 days from the date of shipment to the customer
c. Seller does not provide any warranty on finished goods manufactured by others. Only the original manufacturer's warranty applies.
d. Unless specifically authorised in a separate writing by Seller, Seller makes no warranty with respect to, and shall have no liability in connection with, any goods which are incorporated into other products or equipment by the Buyer. All goods returned under warranty shall be at the Buyer's risk of loss, Seller's factory prepaid, and will be returned at Seller's risk of loss, Buyer's factory prepaid.

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7.0 Contact us :-

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HSE

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