



AIR ALERT 300

FUME HOOD VELOCITY ALARM

Installation and Operating Manual

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1. SAFETY

1.1 Safety Practices

This document describes the general safety practices and precautions that must be observed when operating the Airflow Monitor.


This advice is intended to supplement, not supersede, the normal safety codes in the user's country. The information provided does not cover every safety procedure that should be followed. Ultimately, maintenance of a safe laboratory environment is the responsibility of the user and the user's organisation.

Please consult all documentation supplied with the Airflow Monitor before starting to work. Carefully read the safety information in this document and in the other documentation supplied. When setting up the equipment or performing analysis or maintenance procedures, strictly follow the instructions provided.

1.2 Warning Notices

Within this User Guide WARNINGS are used to highlight information or instructions that **must** be followed in order to avoid personal injury to yourself or other people in the vicinity, eg. switch off the mains voltage before any maintenance.

WARNINGS appear as below:

 WARNING	Switch off the mains voltage and remove the power supply before maintenance.
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1.3 Precautions

The following precautions must be observed when using the Airflow Monitor and associated systems:

- Be sure that the voltage of the Airflow Monitor equipment corresponds to the voltage available where it is to be installed.
- Never remove the side or back panels of the Airflow Monitor without first shutting down the equipment and disconnecting the power supply.

1.4 General Operating Conditions

The Airflow Monitor and equipment have been designed and tested in accordance with the safety requirements of the International Electrotechnical Commission (IEC). The Airflow Monitor conforms to IEC61010-1 (Safety Requirements for electrical equipment for measurement, control and laboratory use) as it applies to IEC Class 1 (earthed) appliances, and therefore meets the requirements of EC directive 73/23/EEC.

If possible, avoid any adjustment, maintenance or repair to the equipment whilst covers are open or it is operative. However, if any adjustment, maintenance or repair is necessary while the covers are open, this must be done by a skilled person who is aware of the hazards involved.


Whenever circumstances arise that mean an Airflow Monitor may be unsafe, make it inoperative. In particular, an Airflow Monitor may be unsafe if it:

- Shows visible damage.
- Fails to perform correctly.
- Has been subjected to severe transport stresses.
- Has been subjected to prolonged storage in unfavorable conditions.

1.5 Environmental Conditions


The Airflow Monitor should only be used under the following conditions:

- Indoors.
- In ambient temperatures between 5°C and 40°C.
- With relative humidity below 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C.
- Electrical supply fluctuations not exceeding +10% of the nominal voltage.


 WARNING	The protection provided by the equipment may be impaired if the environmental conditions do not lie within these parameters.
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1.6 Electrical Safety


The Airflow Monitor and associated equipment are designed to protect the user from potential electrical hazards. This section describes some recommended electrical safety practices.

 <p>WARNING</p>	<p>Lethal voltages are present at certain points within the equipment.</p> <p>When the equipment is connected to mains power, removing the equipment covers is likely to expose live parts.</p> <p>Even when the power switch is off, high voltages can still be present - capacitors within the equipment may still be charged even if the equipment has been disconnected from all live voltage sources.</p>
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The Airflow Monitor and associated equipment must be correctly connected to a suitable electrical supply. The supply must have a correctly installed protective conductor (earth or ground) and must be installed and checked by a qualified electrician before initial power up.

 <p>WARNING</p>	<p>Any interruption of the protective conductor inside or outside the Airflow Monitor, or disconnection of the protective conductor terminal is likely to make the equipment dangerous.</p> <p>Intentional interruption of the protective conductor is prohibited.</p>
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 <p>WARNING</p>	<p>If the mains power supply has to be replaced, ensure that the replacement power supply is appropriately rated and approved for the intended use.</p>
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 <p>WARNING</p>	<p>To prevent potential personal injury and damage to the equipment, switch OFF all components in the system and disconnect them from the mains power supply before altering, or making any new electrical connections.</p>
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When working with the Airflow Monitor System:

- Connect the equipment to a correctly installed mains power outlet that has a protective conductor connection.
- Do not operate the equipment with any covers or internal parts removed.
- Disconnect the equipment from all live voltage sources before opening it to make any adjustments, replacements, maintenance or repair. If the opened equipment must be operated for further adjustment, maintenance or repair, this must only be done by a supplier's Service Engineer.

If it is possible that the equipment is no longer electrically safe for use, make the equipment inoperative and secure it against any unauthorised or unintentional operation.

The electrical safety of the equipment is likely to be impaired if:

- It has any signs of visible damage.
- If it has been subjected to prolonged storage in unfavourable conditions.
- If it has been subjected to severe stress during transportation.

1.7 Electrical Protection

Observe the following electrical protection precautions:

- **Insulation:** Class I rating for external circuits. Only connect equipment that meets the requirements of IEC 61010-1, IEC 60950 or equivalent standards.
- **Installation Category:** The equipment is able to withstand transient over-voltages typically present on the mains supply. The normal level of transient over-voltages is impulse withstand (overvoltage) Category II of IEC 60364-4-443.
- **Pollution Degree 2:** Normally only non-conductive pollution occurs. Occasionally, however, temporary conductivity caused by condensation must be expected.

1.8 EMC Compliance

EC Directive

The Airflow Monitor System is designed and tested to meet the requirements of the EC directive 89/336/EEC and 93/68/EEC and complies with the EMC standard EN61326 (EMC standard for electrical equipment for measurement, control and laboratory use) and EN55011 (ISM) Class A (RF emissions).

FCC Rules and Regulations

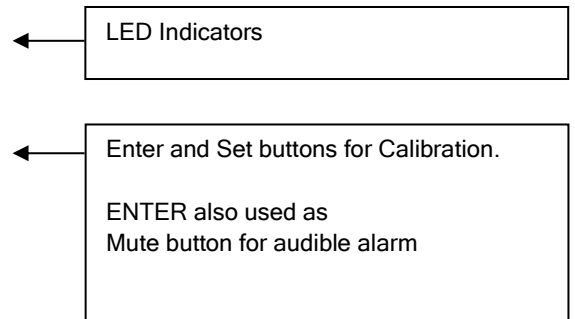
The Airflow Monitor System is classified as a digital device used exclusively as industrial, commercial or medical test equipment. It is exempt from the technical standards specified in Part 15 of the FCC Rules and Regulations based on Section 15.103 (c).

1.9 Warning Labels

Warning labels attached to the equipment draw attention to specific hazards - refer to this guide and other documentation provided with the equipment for more details concerning potential hazards and any precautions or other actions that must be taken.

2. Overview of the Airflow Monitor

2.1 Operator Display Panel



2.2 General Description

All systems comprise of the following components :-

- 1 - AA300 Airflow Monitor,
- 1 - AC power supply

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 open.

Audible Alarm -- the Audible alarm will sound (can be muted) in the Air Fail and the Sash High 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 Visor Open alarm is sounding will mute the alarm and initiate a repeat timer that will re-sound the alarm if the Visor is not closed 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

Note - The Audible Alarm can be permanently disabled or re-enabled by pressing and holding the SET button for approximately 10 seconds, the monitor will give 3 rapid beeps to confirm the alarm has been disabled or re-enabled. When the audible alarm is disabled the Green LED will flash when the Airflow is safe to indicate that the alarm is permanently muted.

2.3 External Connections

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

Visor Open Input --- a. Connection point for Visor 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 alarm

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

3. Functions & Operation

3.1 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 -- if required this can be factory changed prior to ordering the monitor.

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 selection calibration modes are :-

a. With Jumper J2 connected - The airflow is reduced to the alarm point mechanically 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. With Jumper J2 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

3.2 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 of 30 secs to allow the airflow sensor to stabilize.
2. During the whole of the 30 sec period all alarms and relay outputs are inhibited and the Red & Green LEDs will be permanently ON.
3. At the end of the 30 sec delay 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

3.3 Events / Actions

Safe airflow

- Airflow above alarm level (e.g. > 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 to safe position 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

3.4 Quick Start Installation

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

Before connecting the unit, it is important to decide on the type of calibration that is to be used on the installation. The two methods are described in section 1.2 Alarm Configuration / Calibration above.

1. Fit the alarm to the Fume Hood using the cut-out details provided with the unit
--- see page 11
2. 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 & 14
3. Power up the unit and wait at least 30 secs while the sensor temperature stabilizes.
During this time the Red & Green LEDs will both be on (not flashing)
If the unit has not been previously calibrated the Red & Green LEDs will begin to flash on/off at the end of the 30 sec start up time delay but the audible alarm will not sound.
If the alarm has been calibrated it will go into normal operation.

5. Calibration :-

Alarm Point Capture (With jumper J2 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 Fume Hood air velocity falls below the alarm value.

Calibration continued:-

Two Point Capture (With jumper J2 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 Fume Hood air velocity falls below 80% of the normal operating value.

3.5 Calibration Notes

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 Fume Hood 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).

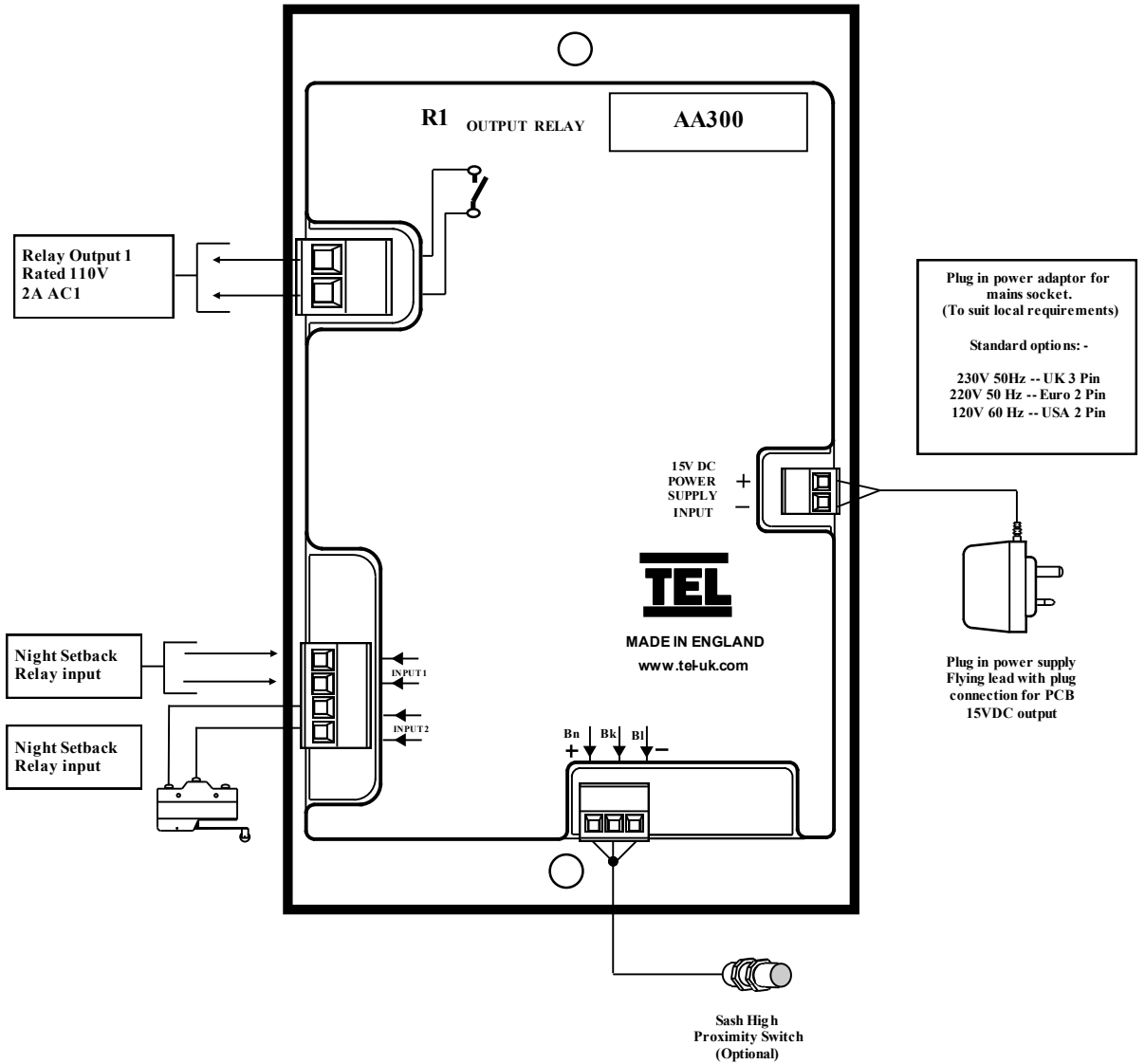
Using the two point capture method is ideal for low air alarm calibration where the alarm point is required to indicate a low operating velocity - typically 80% of the normal operating velocity. The normal velocity calibration point should be the normal operating velocity and the high velocity calibration 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 120 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 stabilize. If the velocities are changing or are turbulent during the sampling period the alarm will detect this and ask you to repeat the sample.

4. Components

4.1 Airflow Monitor components

- 1 - Air Alert AA300 Airflow Monitor
- 1 - Plug in type low voltage power supply with 5M Cable



5. Installation

5.1 Installation of standard components

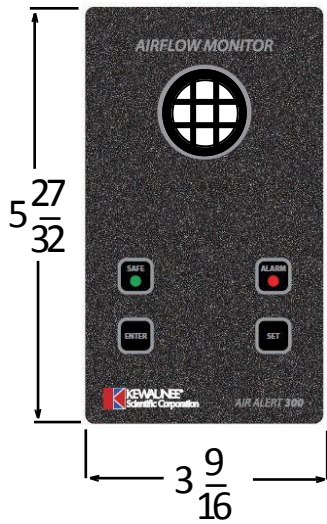
The following section outlines the installation of the various components of the Airflow monitor.

As the size and format of individual Fume Hoods varies considerably, specific instructions are not possible, though the principles outlined below should remain valid in all cases.

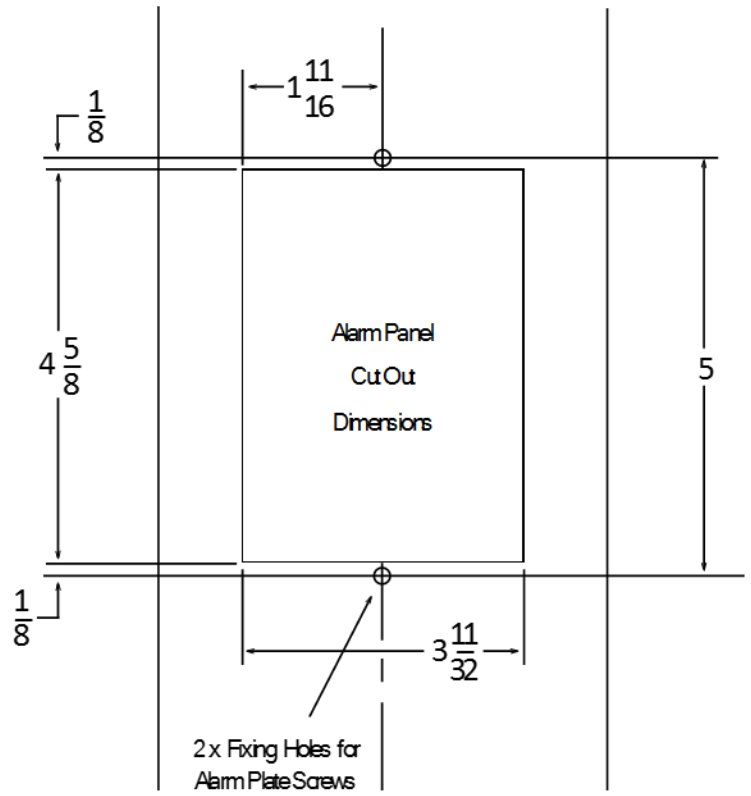
The airflow monitor can be mounted on either side of the Fume Hood

1. Fit the AA300 monitor to the Fume Hood using the cut-out details provided with the unit. Ensure that the monitor fits into the cut out before securing with the fixing screws.
2. Fit the airflow sensor hose to the Fume Hood using the cut out and installation details provided.

5.2 Airflow Monitor Installation.



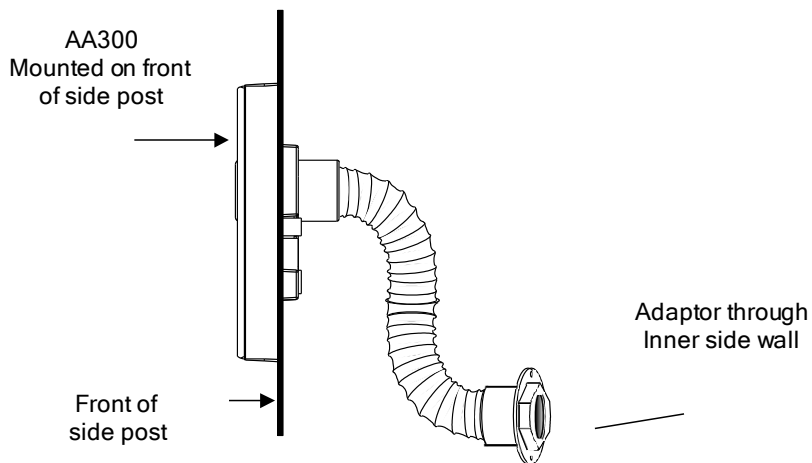
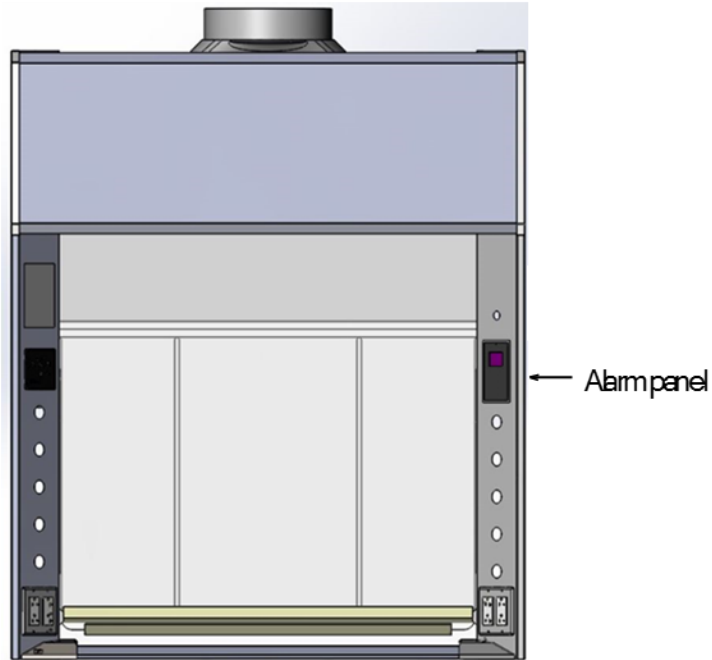
Alarm Panel Dimensions



Fume Hood Side Airfoil
(Front View)

Alarm Panel Cut Out

5.3 Airflow Sensor installation.

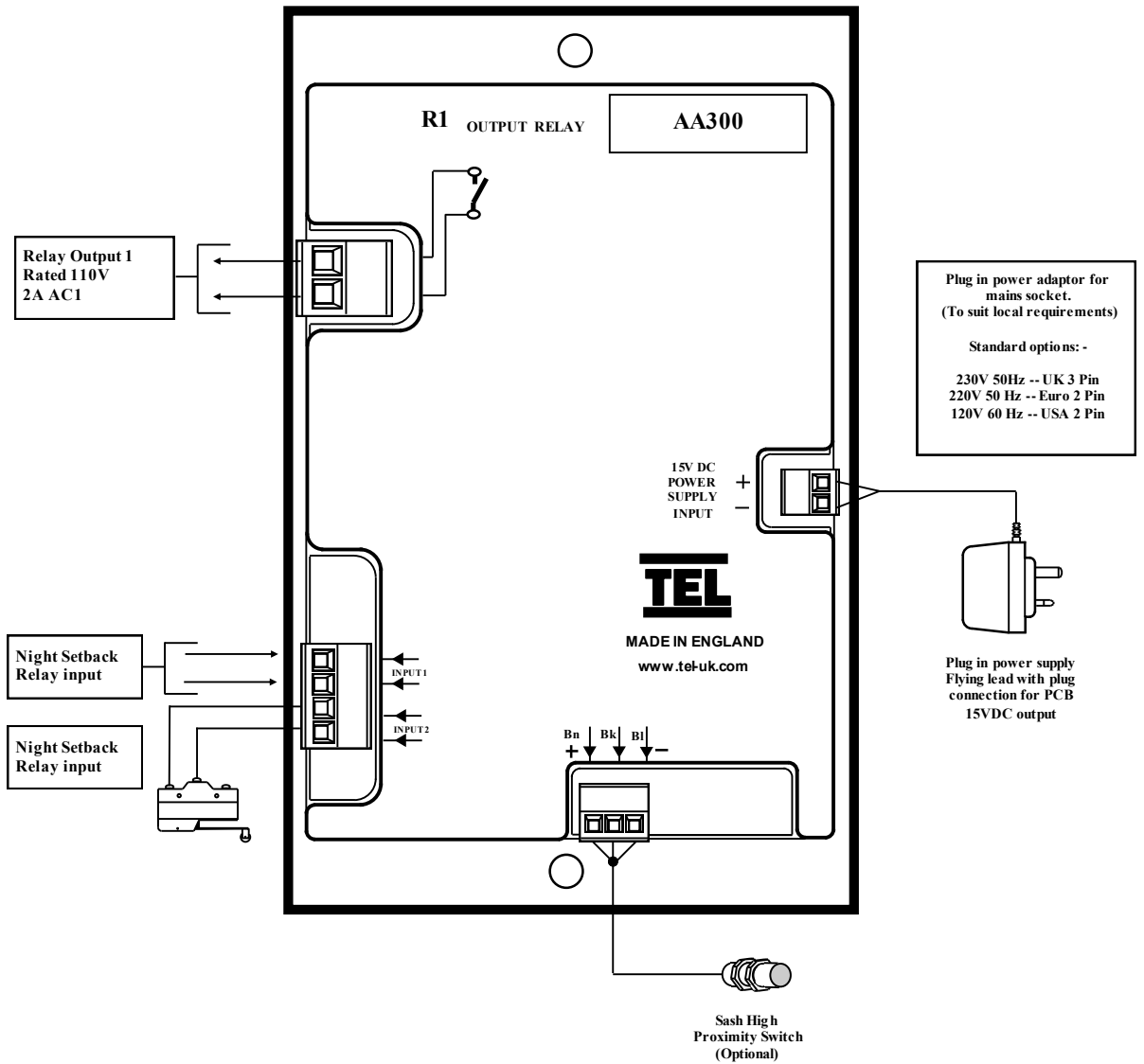


INSTALLATION NOTES :-

The back connection spigot of the sensor is designed to accept a 1" OD tube which should be connected to the inner chamber of the fume hood. (This tube and fittings is known as the " vent kit ")

The **ideal position** for the end of the 1" tube for most fume hoods is 4" back from the sash glass and 4" higher than the normal sash opening height through the inner side

5.4 Typical connection diagram



6. Warranty



6.1 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 authorized 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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