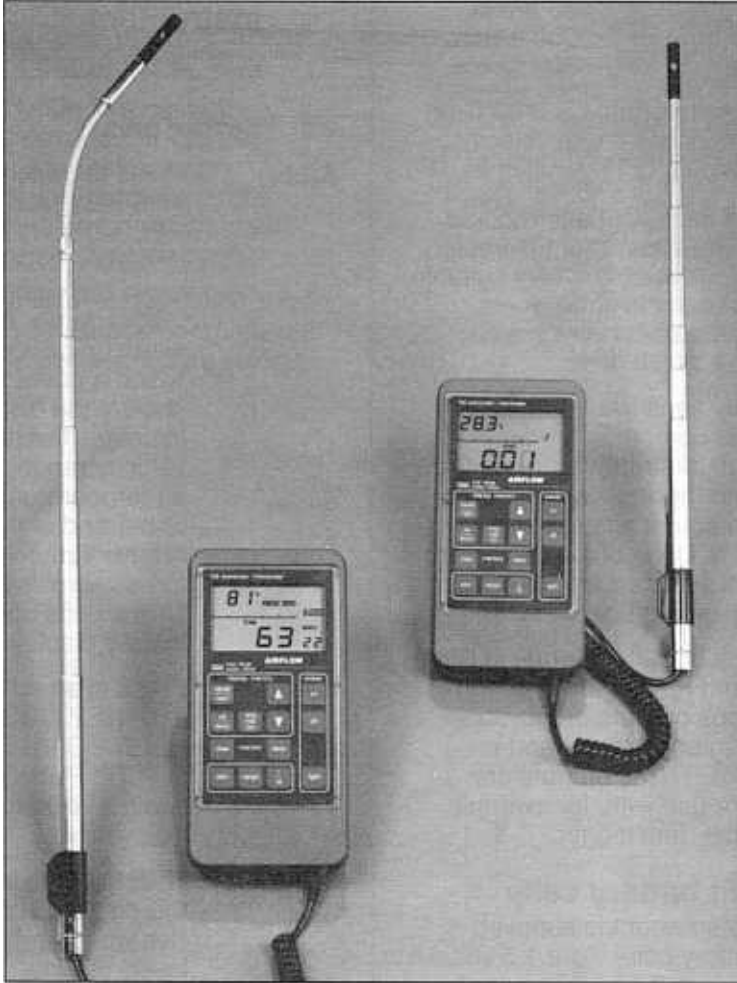


# AIRFLOW™

SPECIALISTS IN AIR MOVEMENT TECHNOLOGY

## TA-5 Thermal Anemometers

OPERATING INSTRUCTIONS 9020758/E/899



**Please read these instructions carefully before using the instrument.  
Shortform instructions are on the back of the instrument.**

## 1. Introduction

The TA-5 functions in two modes, real time and recall. In real time the display concurrently indicates air velocity and temperature as sensed by the probe. In recall previously stored values can be recalled and displayed.

Each TA-5 has a choice of three velocity ranges in both metric and Imperial units:

0-2 m/s or 0-400 ft/min  
0-15 m/s or 0-3000 ft/min  
0-30 m/s or 0-6000 ft/min

The temperature range is 0-80°C or 32-176°F, consistent with velocity ranges in Metric or Imperial units.

The TA-5 is fitted with a telescopic probe tip with a maximum diameter of 8mm and is therefore very suitable for measurement in small ducts where large access holes are not acceptable.

The velocity sensitive thermistor in the probe is compensated for variations in airstream temperatures by a second thermistor which also senses the actual airstream temperature. Units of measurement and ranges selected are shown on the display during use.

The 0-1 volt outputs operate in both real time and recall modes giving simultaneous outputs proportional to velocity in each range and to temperature. These outputs are intended for use with, for example, a compatible data logger.

## 2. To fit battery cells

The TA-5 instrument is supplied without battery cells. Four 1.5 volt AA size cells are required. 'Standard', Alkaline or rechargeable cells may be used, though 'standard' cells exhibit a relatively short life.


The battery cells are accessible through the slide and 'snap in' cover in the underside of the instrument.

Low battery condition is indicated by 'LOBAT' appearing on the instrument display. Replace cells as soon as possible if this occurs to maintain optimum accuracy.


## 3. Description of the instrument


### 3.1 Instrument case

### 3.2 Keypad area

**3.2.1**  Press to switch on. THE KEY MUST BE HELD DOWN FOR A SHORT PERIOD, to avoid switching on inadvertently. After a warm up period, during which a countdown is shown, the display indicates the maximum velocity range, and the air temperature sensed at the end of the probe. After a further second, 'press zero' is indicated. Metric units are always initially displayed.

**3.2.2**  Press to switch off. THE KEY MUST BE HELD DOWN FOR A SHORT PERIOD, to avoid switching off inadvertently.

**3.2.3**  Hold down to illuminate the display. This is for use when ambient light levels are low.

**3.2.4**  Press to switch between current 'read' mode and memory 'recall' mode.

**3.2.5** vel  
temp When in 'recall' mode, press to switch between maximum and minimum velocity and temperature readings. Use in conjunction with avg/max/min key, section 3.2.6.

**3.2.6** avg  
max  
min When in 'recall' mode, press once to display average of velocity and temperature readings in the memory. Press again to display maximum reading:

If in 'velocity' mode, maximum velocity, corresponding temperature, and memory location will be displayed.

If in 'temperature' mode, maximum temperature, corresponding velocity,

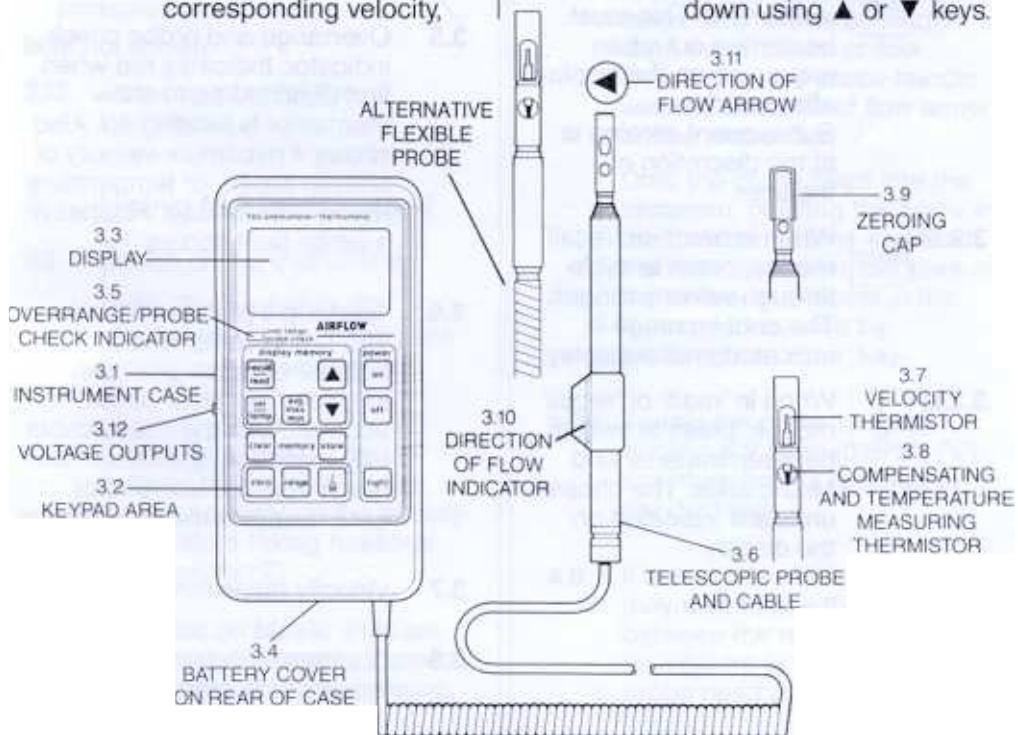
and memory location will be displayed.








Press again to display minimum reading:

If in 'velocity' mode, minimum velocity, corresponding temperature, and memory location will be displayed.

If in 'temperature' mode, minimum temperature, corresponding velocity, and memory location will be displayed.

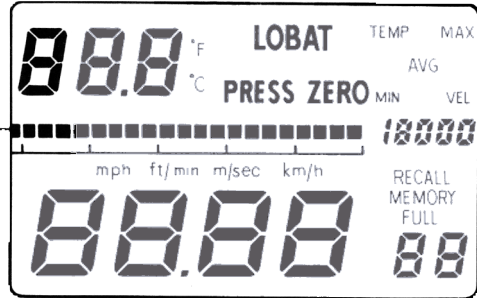
**Note:** If 'max' or 'min' stored values occur more than once, 'max' or 'min' will flash, and the first stored value will be displayed. Other occurrences can be viewed by ramping up or down using ▲ or ▼ keys.



- 3.2.7  When in 'recall' mode, press to ramp up memory location.
- 3.2.8  When in 'recall' mode, press to ramp down memory location.
- 3.2.9  Press to clear all readings from the memory.
- 3.2.10  When in 'read' mode, press to store current velocity and temperature readings in the memory. The first store operation initiates 'memory' on the display.
- The memory contains 99 locations. When these are full, 'memory full' is indicated on the display.
- 3.2.11  Press to zero instrument. This must be carried out when requested on the display after switch on. Subsequent zeroing is at the discretion of the user.
- 3.2.12  When in 'read' or 'recall' modes, press to cycle through velocity ranges. The chosen range is indicated on the display.
- 3.2.13  When in 'read' or 'recall' modes, press to switch between Imperial and Metric units. The chosen units are indicated on the display.

### 3.3 Display

To check that all characters are illuminated, hold down 'range' key and switch on.



20 segment bar graph to give analogue display of velocity and indicate turbulence – in 'read' mode only

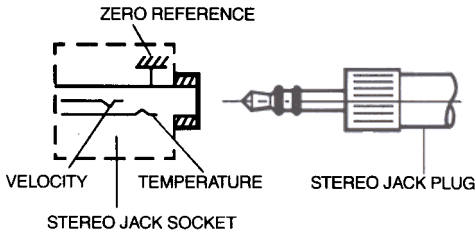
- 3.4 **Battery cover.** This slides and 'snaps in' at the rear of the instrument case.
- 3.5 **Overrange and probe check indicator.** Indicates red when first switched on to show thermistor is heating up. Also shows if maximum velocity of chosen range, or temperature range is exceeded. Flashes if a probe fault occurs.
- 3.6 **Telescopic probe and cable.** The probe comprises a number of tubes giving an extended length of about 900mm. With the coiled cable fully extended, the maximum reach from the instrument case is approximately 2 metres.
- 3.7 **Velocity measuring thermistor.**
- 3.8 **Compensating and temperature measuring thermistor.**

### 3.9 Zeroing cap (refer to 4.5)

Direction of flow indicator.  
Align with arrow head on  
probe cap.

### 3.11 Direction of flow arrow head.

3.12 Voltage output 3 pole, stereo,  
jack socket. For use with the  
compatible stereo plug as  
supplied. This socket gives  
analogue outputs of between 0  
and 1 volt proportional to  
velocity in each range and  
temperature. The output  
impedance is 30 ohms.



Item not shown.

### 3.13 Carrying case for the instrument.

## 4. Using the instrument

### 4.1 Switch on the instrument.

**Note:** To check that all  
characters on the display are  
correctly illuminated see  
section 3.3.

4.2 Check for LOBAT (Low  
battery) on the display. If  
necessary change the battery  
cells before taking readings.  
(See section 2).

4.3 At switch on Metric units are  
displayed. Change to Imperial  
units, if required, by pressing  
' $\frac{1}{M}$ ' key.

4.4 Choose velocity range  
required by pressing 'range'  
key.

4.5 With the zeroing cap covering  
the velocity thermistor to  
isolate it from any air  
movement, press 'zero'.

For optimum accuracy it is  
necessary for the instrument to  
be rezeroed with the probe at  
the operating temperature and  
zero velocity.

4.6 Extend the telescopic probe  
by pulling gently on the end.  
Ensure that the cable can slide  
freely into the handle end of  
the probe. It is only necessary  
to extend the probe to a length  
sufficient for the readings to be  
taken. Remove the zeroing  
cap. If the probe head is out  
of sight when a reading is  
taken, (e.g. inside ducting),  
align the direction of flow  
indicator on the probe handle  
with the direction of flow arrow  
on the probe cap.

Offer the probe head into the  
airstream, pointing the arrow in  
the direction of flow and read  
the velocity and temperature of  
the airstream. Record in the  
memory if required by  
pressing the 'store' key.

4.7 To use the probe inside  
ducting a 9.5mm (0.375") ( $\frac{3}{8}$ " )  
minimum hole is required in  
the duct wall.

4.8 If a duct traverse is required, it  
may help to use the joints  
between the telescopic tubes  
as markers to determine the  
probe head position.

4.9 When closing down the telescopic probe care must be taken to allow the cable to slide freely through the probe.

4.10 Always switch off when not in use to extend battery life.

## 5. Where to use the instrument

5.1 Checking the air velocity over large areas.

When measuring velocity over large areas a number of readings must be taken, spaced to give even coverage of the whole area. The average of these readings gives the average velocity. It should be noted that quite large variations may be observed between individual readings. In general, the larger the number of readings taken, the more accurate the result will be.

5.2 Use on grilles.

**Note:** See comments under 5.3. "Volume Flowrate Calculations" regarding limitations of this method.

Avoid intrusion of the arm and hand into the face area of the grille. The blockage effect created by this would cause artificially high velocity over the remainder of the grille, leading to additional errors. The telescopic probe can be useful in avoiding this problem. Better measuring conditions can be obtained on grilles with adjustable direction vanes if the vanes are temporarily straightened before taking measurements. This should not significantly affect the

flowrate so long as any built-in dampers are not accidentally disturbed. The instrument is suitable for both supply and extract grilles, and the procedure is the same for both.

5.3 Volume Flow rate calculations.

Volume flow-rate through airways or apertures may be calculated if the cross-sectional area of the airstream and its average velocity are known. The principal units of measurement in use at present are:

Cubic metres per second

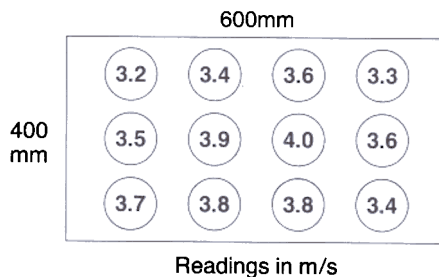
Cubic metres per hour

Litres per second

Cubic feet per minute

To arrive at Volume Flow Rate, the cross-sectional area of the airstream is multiplied by the average airstream velocity, using the same units of linear measurement throughout the calculation.

**Example:** Air velocity has been measured in a 600mm × 400mm rectangular duct at 12 different positions as shown in the diagram below.



The readings are recorded in the memory and averaged using the avg/max/min key (see section 3.2.6). In this example the average velocity is 3.6 metres per second.

After finding the average velocity find the duct cross-sectional area  $0.6 \times 0.4 = 0.24$  metres<sup>2</sup>.

Therefore the volume Flow Rate is  $0.24 \times 3.6 = 0.864$  cubic metres per second.

This figure should be multiplied by 3600 to arrive at cubic metres per hour or by 1000 to give the answer in litres per second  $0.864 \times 3600 = 3110.4$  m<sup>3</sup>/h or  $0.864 \times 1000 = 864$  litres/s.

The procedure is the same when working in English units, but the velocity readings will be in ft/min, the duct area should be calculated in square feet, and the answer will be in cubic ft/min.

## 6. Possible sources of error

The above method ignores the effects of the reduced velocity at the duct walls. A more precise method is shown in BS1042 Part 2 – Log Tchebycheff method. The above procedure is satisfactory for use in ducts, and at unobstructed apertures. Significant errors may occur if the aperture is covered by a grille, particularly if this is of the type having adjustable direction vanes and/or dampers. The airstream issuing from such a grille is invariably very disturbed, consisting of many small areas of high velocity interspersed with areas of low velocity. The transitions between these areas are highly turbulent and there may even be some reversed flow. If maximum accuracy is required, it is advisable to make up a short length of test ducting which is just larger than the overall dimensions of the grille. This duct can be of any convenient rigid

material (e.g. stiff cardboard) and should have a length about twice the diagonal measurement of the grille. The duct should be placed over the grille, and sealed to the wall with adhesive tape. Measurements of flow can now be conducted, as already described at the unobstructed end of the test duct. Use a cross-sectional area of the duct (not the grille) for the calculations.

## 7. Service and Recalibration

If an instrument's calibration becomes suspect, it should be returned to Airflow Developments for recalibration to original standards. In any event, it is good practice to have the instrument checked at least once a year. If an instrument is not working correctly or requires recalibration contact your nearest Airflow Agent or U.K. Service Department on High Wycombe (01494) 525252. Airflow Developments operate an Instrument Hire Service for the convenience of customers having equipment repaired or recalibrated. If you intend to take advantage of this facility please contact our Service Department to make arrangements prior to returning your instrument.

## 8. Specification

| Parameter  | Metric mode  | Imperial mode                                    |
|--|--|--|
| Velocity ranges  | 0 - 30 m/s<br>0 - 15 m/s<br>0 - 2 m/s  | 0-6000 ft/min<br>0-3000 ft/min<br>0 - 400 ft/min |
| Resolution of velocity readings                            | 0.01 m/s   | 1 ft/min   |
| Working temperature range                                  | 0 - 80°C   | 32 - 176°F                                       |
| Storage temperature range                                  | -10 - 50°C   | 14 - 122°F                                       |
| Resolution of temperature readings                         | 0.1°C  | 1°F  |
| Velocity accuracy at 20°C and 1013 mb (68°F and 30 in Hg.) | +/-2% of F.S.D. ON ALL RANGES  |  |
| Temperature accuracy                                       | ±1°C ±1 digit  | ±1°F ±1 digit                                    |
| Accuracy of 0 - 1V output                                  | ±1% of display f.s.d.<br>It is recommended that the output cable should not exceed 3m (10ft) |  |
| 0-1 volt output impedance                                  | 30 ohms  |  |
| Memory size  | 99 concurrent velocity and temperature readings  |  |
| Dimensions of instrument                                   | 185 x 92 x 30mm  | 7.25 x 3.62 x 1.25in.                            |
| Weight of instrument (less battery cells)                  | 414 gms  | 14.6 oz.   |
| Battery cells  | Four type AA 1.5 volt cells. Alkaline, Standard or rechargeable                              |  |
| Battery life   | Approximately 15 hours using Alkaline battery cells  |  |

NOTE:- When subjected to strong electro magnetic radiated emissions in the ranges of 36, 53, 138 and 175 MHz this instrument may exhibit readings outside the stated tolerances.

# AIRFLOW™



Certificate No. FM 152  
BSI EN 1551 9001

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