AIRFLOW™

SPECIALISTS IN AIR MOVEMENT TECHNOLOGY

AV6 Digital Handheld Vane Anemometer.
Operating Instructions.

CONTENTS.

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

1. INTRODUCTION.

The AV6 is a handheld instrument with digital LCD display which measures air velocity and airstream temperature and has the following features:-

* Calibrated for use with 35mm and 100mm diameter heads to enable measurements to be made on a wide range of ducts and grilles.
* AV6 Anemometer heads allow simultaneous monitoring of both air flow and temperature.
* Measurements may be displayed in either Metric or Imperial units.
* Manual or automatic logging of measurements for later analysis.
* Duct/grille areas may be either entered directly, or indirectly, by entering the linear dimensions of rectangular, round or oval duct shapes.
* An RS232 output is provided to enable data to be downloaded to a printer, data logger or computer.
* Auxilliary analogue outputs of Velocity and Temperature.
* The unit is battery powered for portability, but a battery eliminator can be provided.

2. SUPPLY INFORMATION.

2.1 **Batteries:** are included but not fitted to the AV6 instrument. Due to their limited shelf life these are not included under the standard Airflow warranty. For replacement purposes, four 1.5 volt AA size cells are required which may be disposable or rechargeable types. Either 'Standard' or 'Alkaline' disposable cells may be used, but the 'Standard' type will exhibit a relatively short life and, therefore, are not recommended.

Low battery condition is indicated by 'LOBAT' appearing on the instrument display. The cells must be replaced as soon as possible to maintain optimum accuracy.

The battery cells are accessed by means of a slide and 'snap in' cover at the rear of the instrument case. To remove the battery cover, press firmly on the cover and slide it in the direction of the arrow. The batteries may now be removed by pulling on the tape fitted in the battery compartment.

When replacing the batteries ensure that the tape is fitted underneath and that each cell is replaced with the correct polarity as indicated. Rotate to ensure that each cell is properly seated.

Stored readings are held in an EEPROM enabling stored data to be 'remembered' during a battery change.

2.2 **Battery eliminator:** connects via the 2.5mm jack socket (item ref. 3.8 FIG.2). Supply requirements are 6 volt d.c. at a minimum current of 100mA with the jack tip being supply +ve. Airflow can supply a suitable unit under Part No's 9020897 (for 3-pin UK version) or 9020855 (for 2-pin European version).
Warnings: 1. Ensure that the output voltage and polarity switches are set correctly.
2. Switch the AV6 instrument OFF <u>before</u> plugging in the battery eliminator.

3. DESCRIPTION OF THE INSTRUMENT (refer to diagram FIG.2).

Item 3.1: Instrument case.

Item 3.2: Keypad (refer to FIG.3).
This acts as a decimal keypad for entering data and the keys also have specific functions. For keypad functions refer to Section 4.

Item 3.3: Display.
This is a custom Liquid Crystal Display (LCD) and FIG.1 shows the display's principle features.
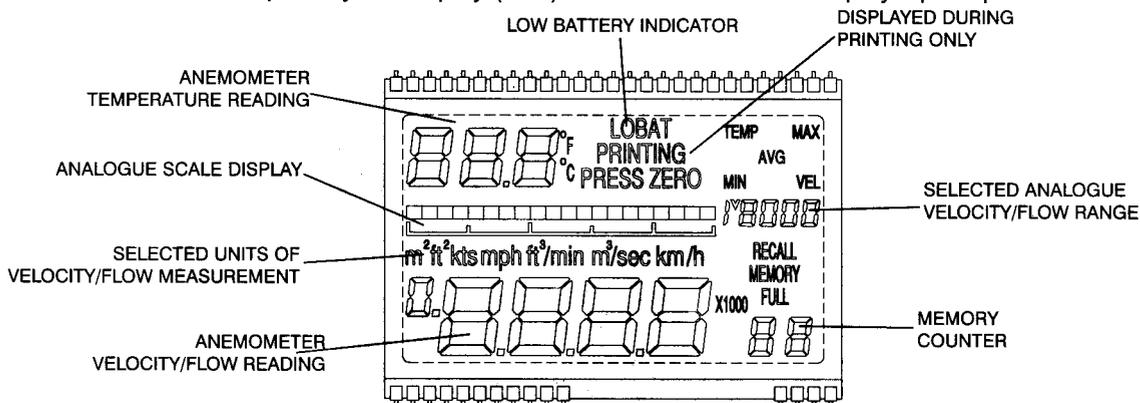

FIG 1

Note: FIG.1 shows the display with all the segments illuminated, this is a condition which will not occur in normal use but only during the display test (see section 8.1).
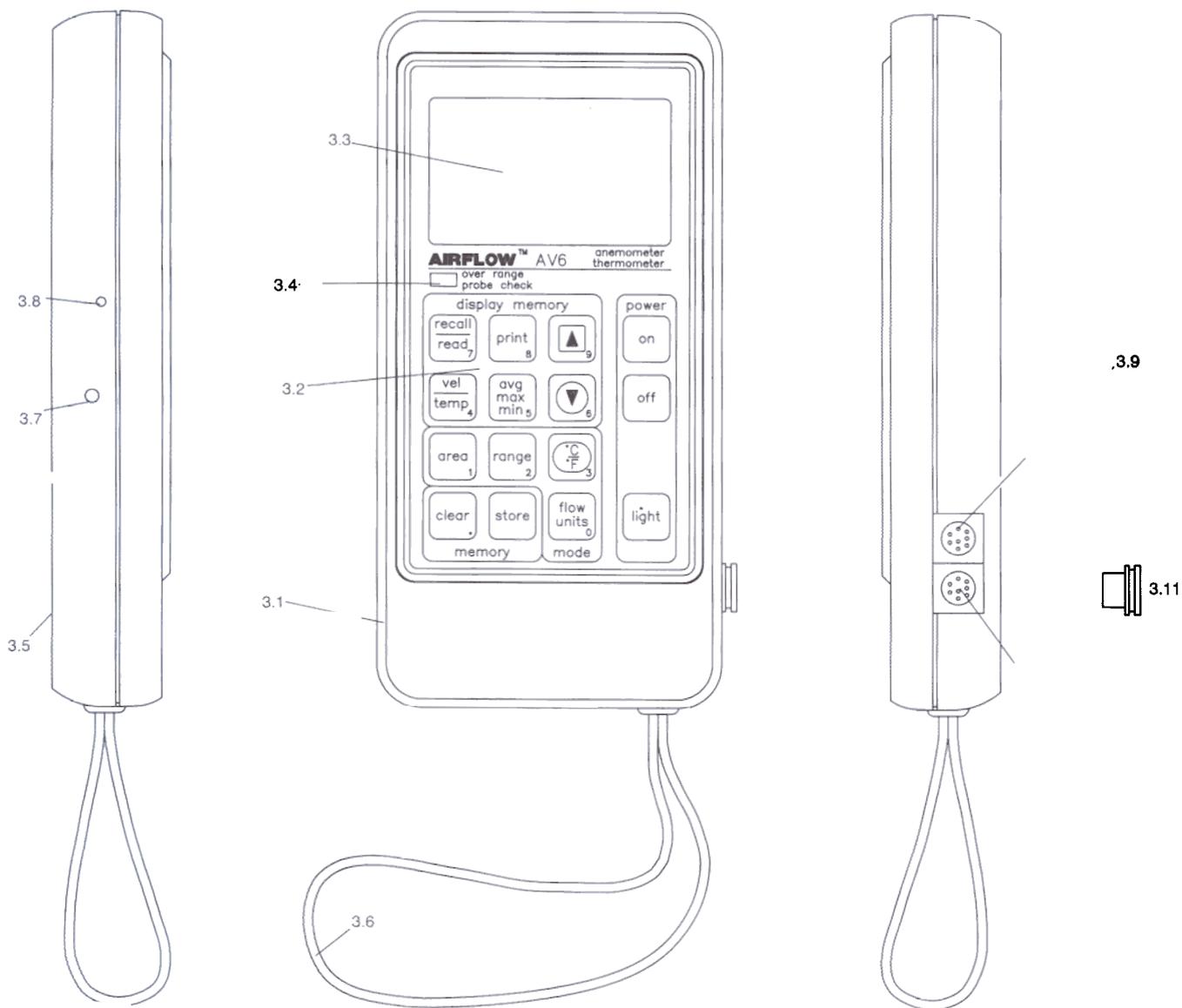
2

FIG 2 - AV6 INSTRUMENT

Item 3.4: **Probe over range check.**
This is a red LED which will illuminate if the measured air velocity or temperature exceeds the pre-selected range or if the anemometer head is not attached.

Item 3.5: **Battery cover.**
This slides and 'snaps in' at the underside of the case.

Item 3.6: **Wrist strap.**

Item 3.7: 3.5mm 2-pole jack socket for analogue outputs of Air Flow and Temperature. (see section 6).

Item 3.8: 2.5mm jack socket for connection of battery eliminator.

Item 3.9: 8-pin mini-DIN socket for connection of anemometer head.

Item 3.10: 8-pin mini-DIN socket RS232 port for connection of printer. This connector MUST be fitted with the supplied socket cap (item 3.11) whenever a printer is not connected, in order to fully comply with EMC requirements.

Item 3.11 Mini-DIN socket cap to protect the RS232 port (item 3.10) when not in use.

4. KEYPAD FUNCTIONS.

4.1 Press to turn the instrument power on. The instrument will remain on until either

is pressed or if the unit is not used for a period of 3 minutes **(for 'auto-off':see section 5.1).**

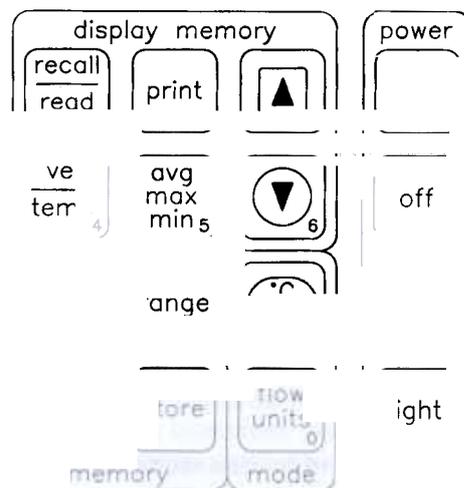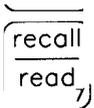off   **4.2** Turns the power off to the instrument

FIG 3 - KEYPAD

light   **4.3** Press to operate the backlight.

recall / read ₇   **4.4** Switches the unit between read mode and memory recall mode.

vel / temp ₄   **4.5 When in recall mode:** allows sequential selection of either velocity or temperature readings when examining maximum or minimum stored values **(see section 5.5.6).**

avg max min ₅   **4.6 When in recall mode:** allows sequential selection of the average, maximum or the minimum of the readings held in memory **(see section 5.5.6).**

print ₈   **4.7 When in read or recall modes:** press once to print current displayed value. **In recall mode only:** use the

▲ ₉ or

▼ ₆ keys to select a required memory location and press twice to print out all the stored values from the selected location onwards.
(See section 5.6 for full details on printing).

▲ ₉   **4.8 When in recall mode:** a single key press will increase the memory location by one. Holding this key down will continuously increment the memory location with rollover from the top memory location to location 01.
When in area mode: press to select a rectangular duct shape.

▼ ₆   **4.9 When in recall mode:** a single key press will decrease the memory location by one. Holding this key down will continuously decrement the memory location with rollover from location 01 to the top memory location.
When in area mode: press to select a circular duct shape.

area ₁   **4.10** Selects area mode. The first press cycles the display through the current duct dimensions and will then display the current duct area. Press

store key if acceptable, or a second

area ₁ press will allow entry of a new duct area, using the keypad.

When acceptable, press the **store** key.

area ₁   To change the duct dimensions: press the key, select the duct shape key required and enter the new dimensions, using the keypad, as prompted on the display.
When acceptable, press the **store** key.
(See section 5.4 for full procedure on how to enter a duct area).

flow units ₀   **4.11** Each press allows the sequential selection of the following velocity/volumetric units:- m/sec, m³/sec, km/h, kts (knots), mph, ft/min, ft³/min.

range ₂   **4.12 When in read or recall mode:** allows the full scale value of the analogue velocity/volume flow scale and analogue outputs to be changed.**(see sections 5.3 (3) or 5.4.2 (6)).**

°C °F ₃   **4.13** Changes temperature display between Celsius and Fahrenheit scales. When in area mode: selects an oval duct shape.

clear   **4.14** Operates only in recall mode. Clears all readings from memory.

store   **4.15 In read mode:** stores current reading in memory.
(See section 5.5 for storing data into memory).

5. USER GUIDE.

5.1 Powering the instrument on/off.

(1) Connect the Vane Anemometer to its socket (FIG 2 item 3.9). **Ensure that plug is orientated correctly.**

Note: if the Vane Anemometer is not connected, the 'overrange probe check' LED will flash when the unit is powered up and there will be no response from the keyboard.

(2) Press the

`on` key to turn the instrument on. The unit will remain on until either switched off manually using the

`off` key, or automatically by means of the unit's 'auto-off' function.

'Auto-off' function: the AV6 senses when the unit has not been used, either from the keyboard or not receiving a flow input, for a period of 3 minutes and is programmed to turn the unit off automatically to conserve battery life.

The 'Auto-off' may be disabled as follows:-

`avg max min 5` Hold down the key while simultaneously pressing the

`on` key. The analogue scale line on the display (see FIG.1) will flash three times to show that this command has been accepted before the display illuminates. Subsequently, the analogue scale line will continue to pulse as a reminder that the 'auto off' facility has been disabled.

`off` The instrument can now be turned off only by use of the key. When the unit is powered up again, the 'Auto-off' function will be re-enabled.

5.2 Temperature Measurement.

For air temperature measurement the AV6 Vane Anemometer Head (having an integral temperature probe fitted) must be used.

(1) Power the unit up (see section 5.1).

(2) Select the measurement units by pressing the

`°C °F 3` key. The temperature in the selected units will be displayed on the three digit display in the top left hand corner of the display area (see FIG.1).

The instrument is now ready to take air temperature measurements.

5.3 Velocity Measurement.

(1) Power the instrument up (see section 5.1).

(2) Select the units for velocity measurement; either m/s, km/h, kts (knots), mph or ft/min by pressing the

`flow units 0` key.

(3) Select the required analogue scale display range (see FIG.1) by pressing the

`range 2` key. The scale range will depend upon the velocity units previously selected in (2), as shown in the following table:-

Velocity units selected	Analogue scale range selected					
	Lowest		Medium		Highest	
	Displayed	Actual	Displayed	Actual	Diplayed	Actual
m/s	2	2	15	15	30	30
km/h	L	7.2	M	54	H	108
kts	L	13.3	M	100	H	200
mph	L	4.47	M	33.6	H	67.1
ft/min	400	400	3,000	3,000	6,000	6,000

The instrument is now ready to take flow velocity measurements.

5.4 Volume flow rate measurement.

To enable volumetric flow rate measurements to be made, it is necessary to programme the instrument with the duct or grille cross sectional free area. If this area is known, then it can be programmed into the instrument directly as an area. If the area is unknown, the linear dimensions of the duct can be programmed into the instrument, which will then compute the area automatically.

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The units used for duct area and duct dimensions **MUST** be consistent with those selected for volume flow rate as in the following table:-

Selected volume flow rate units	Duct area	Duct linear dimensions
Metric cubic metres per sec. (m³/s)	square metres (m²) * Allowable input range:- 0.004 to 99.99 m²	metres (m) Input range:- 0.0001 to 9999 m **Input values are subject to minimum/maximum area limitations.**
Imperial. cubic feet per minute (ft³/min)	square feet (ft²) * Allowable input range:- 0.0431 to 999.9 ft²	1) Up to 9ft 11 & ⁷/₈ inches:dimensions may be entered in feet,inches and eighths of an inch. 2)Up to 99ft 11 inches: dimensions may be entered in feet and inches. 3)Up to 9999 ft: dimensions may be entered in feet only. 4)Up to 99⁷/₈ inches:dimensions may be entered in inches and eighths of an inch. 5)Up to 999 inches: dimensions in inches only. **Input values are subject to minimum/ maximum area limitations.**

Notes:-

1) Metric dimensions are keyed in as metres using the decimal point as required. For dimensions less than one metre, it is permissable to start with a decimal point and then key in up to four digits (i.e. up to four decimal places).

2) Imperial dimensions can be entered either in:- feet, inches and eighths of an inch
   feet and inches only
   feet only
   inches and eights of an inch
   inches only.

Subject to the limitations stated in the above table. The decimal point on the key is used to separate the feet, inches and eighths of an inch inputs.

If the decimal point is input first, then this allows inches only to be input up to a maximum of either 99⁷/₈ or 999 inches. Inch dimensions are then converted to feet by the instrument for subsequent display and computation.

*3) If an area is input outside of these limits, the overrange LED will illuminate, the display will flash and will then display the previously entered value (i.e. the out of range value will not be accepted).

Examples:-

For a dimension of 7ft 9⁵/₈ inches use the decimal keypad to key in: **(7) (.) (9) (.) (5)**

For a dimension of 23½ inches use the decimal keypad to key in: **(.) (2) (3) (.) (4) (note: ½ = ⁴/₈).**

5.4.1 **Programming a known duct area directly.**

1) Power the instrument up (see section 5.1).

2) Select the units for volumetric flow measurement, either m³/s or ft³/min by pressing the [flow units] key until the selected units are displayed beneath the analogue scale.

3) Press the [ ] key. **The instrument response will depend upon how it was previously programmed as follows:-**

a) Instrument previously programmed directly with an area.

The instrument will display the previously programmed duct area with a flashing 'A' in the top LH corner of the display.

b) Instrument previously programmed with an area indirectly (using the linear dimensions of the duct).

The display will, firstly, scroll through the previously programmed duct dimensions as follows:-

for **circular** ducts: 'dia' (diameter of duct).
for **rectangular** ducts: 'L1' width and 'L2' height.
for **oval** ducts: 'd1' major axis dimension and 'd2' minor axis dimension.

The instrument will then display the computed duct area with the units above the top left hand corner of the computed area and a letter **'A'** flashing in the top left hand corner of the display.

4) **If the displayed area value is acceptable,** press the [ ] key. The 'A' will stop flashing and the instrument will return to its normal 'read' mode.

If the duct area is required to be changed, then press the [area] key. The letter 'A' will stop flashing to indicate that a new value of area may be entered. Key in the new value of the duct area including any decimal points, then press the [ ] key and the instrument will return to its normal **'read'** mode.

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Programming a duct area by entering the linear dimensions of the duct. (indirect).

1) Power the instrument up (see section 5.1).
2) Select the units for volumetric flow measurement; either m³/s or ft³/min by pressing the

flow
units
0

key until the selected units are displayed beneath the analogue scale.

3) Press the

area
1

key. **The instrument response will depend upon how it was previously programmed as follows:-**
a) Instrument previously programmed directly with an area.
The instrument will display the previously programmed duct area with a flashing 'A' in the top LH corner of the display.
b) Instrument previously programmed with an area indirectly (using the linear dimensions of the duct).
The display will, firstly, scroll through the previously programmed duct dimensions as follows:-
 for circular ducts: 'dia' (diameter of duct).
 for rectangular ducts: 'L1' width and 'L2' height.
 for oval ducts: 'd1' major axis dimension and 'd2' minor axis dimension.
The instrument will then display the computed duct area with the units above the top left hand corner of the computed area and a letter **'A'** flashing in the top left hand corner of the display.

4) **If the displayed information is acceptable without further change,** then press the

key. The displayed letter 'A' will stop flashing to indicate that the existing information has been accepted, and the instrument will then return to its normal **'read'** mode.

If new values are required, the procedure will depend upon the shape of the duct as follows:-
a) For a circular duct:
Press the

(▼)

key. The instrument will display 'dia' together with the current area value. Key in the new duct diameter and then press the

key.

b) For a rectangular duct:
Press the

▲
9

key. The instrument will display 'L1' together with its current value. Enter the new value for the duct width and then press the

key. The instrument will then display 'L2' together with its current value. Enter the new value for the duct height and then press the

store

key again.

c) For a flat or oval duct:
Press the

key. The instrument will display 'd1' together with its current value. Enter the new value for the duct major axis dimension and then press the

key.The instrument will then display 'd2' together with its current value.
Enter the new value for the duct minor axis and then press the

key again.
The instrument will then display the new computed value for the duct area and return immediately to the **'read'** mode.

area

The settings may be checked by pressing the
key, and confirmed by pressing the

key.

5) If at any point it is decided to abandon the programming area function, then press the
key (repeatedly, if necessary) until the instrument returns to the normal read mode and the previous area value.

6) Select the required analogue scale range by pressing the
key. The analogue scale range will depend upon the volumetric units previously selected in operation No. (2) as shown in the following table:-

Volume flow units selected	Analogue scale range selected					
	Lowest		Medium		Highest	
	Displayed	Actual	Displayed	Actual	Displayed	Actual
m³/s	L	2 x duct area	M	15 x duct area	H	30 x duct area
ft³/min	L	400 x duct area	M	3000 x duct area	H	6000 x duct area

5.5 Logging measurements to memory.

Concurrent readings of flow and temperature can be logged to memory either manually or automatically at a preset time interval.

Note 1: If the memory has not been cleared (see section 5.5.4), data will be sent to the next available memory location.

Note 2: All flow data is stored as a velocity. The instrument will compute Volume Flow using the programmed area and will display volume flow in the preselected units.

Note 3: The memory will store a maximum of 99 sets of temperature/flow readings, when this occurs 'MEMORY FULL' will be displayed above the memory counter reading.

Manual logging of readings to memory.

Press the

key when a reading is to be logged to memory. Note that the memory counter, in the bottom RH corner of the display, increments each time a reading is stored.

Automatic logging of readings to memory.

Readings may be sequentially stored into memory at a preset time interval. The sequence time interval may be set between a minimum of 5 seconds and a maximum of 99 minutes 59 seconds as follows:-

print 8

1) In 'read' mode, double press the

key. The instrument will display four digits representing the auto-logging time in minutes and seconds. The first (left hand) digit will be flashing.

2) **Either:**

a) **If the displayed time interval is acceptable,** press the

store

key. The word 'PRINTING' and four dashes will momentarily appear on the display followed by the re-appearance of the required time interval.

Or:

b) **If the time interval is to be changed,** key in the new time in minutes and seconds by entering the required number for each digit when it flashes. When the required time interval has been correctly entered, press the

store

key. The word 'printing' and four dashes will momentarily appear on the display followed by the appearance of the entered time interval.

3) When the automatic logging is to commence, press the

store

key again. The instrument will display the current reading and memory counter reading. The word 'PRINTING' will be displayed, the current displayed reading will be logged and the memory counter will increment each time a reading is logged into memory. **Note:** during automatic logging the power 'auto-off' feature (see section 5.1) is disabled.

5.5.3 Stopping automatic logging of readings to memory.

print 8

1) Double press the

key. The auto-logging time interval will be displayed.

clear

2) Double press the

key. The instrument will revert to the normal read mode.

Clearing the memory of stored readings (valid in 'recall' mode only).

recall read

1) From 'read' mode, enter 'recall' mode by pressing the

key. The instrument will display the data held in memory location 1.

cle

2) Press the

key to erase all the data held in memory.

5.5.5 To Review data held in memory (valid in 'recall' mode only).

recall read

1) From 'read' mode, enter **'recall'** mode by pressing the

key. The instrument will display the data held in memory location 1

▲ 9

2) Index through the memory locations using the

key and

8

[▼ / 6] key. The instrument will display the data held in each location.

[flow units / 0] 3) At any memory location the
key

[°C/°F / 3] and the
key can be pressed to index through all the different units of measurement. The instrument will display the data in the units selected.

[recall / read / 7] 4) Press the
key to revert back to normal 'read' mode.

5.5.6 **The display of Average, maximum and minimum values of data held in memory (valid in 'recall' mode only).**

[recall / read / 7] 1) From **'read'** mode, enter **'recall'** mode by pressing the
key.The instrument will display the the data held in memory location 1.

[avg max min / 5] 2) Press the
key. The instrument will display the average values of the stored temperature and velocity readings. The memory location will display the number of readings stored.

[flow units / 0] The
key

[°C/°F / 3] and the
key may be pressed to change the units of the values displayed.

[avg max min / 5] 3) Press the
key again. The instrument will display the maximum stored velocity value, its memory location and the corresponding temperature *.

[vel temp / 4] Press the
key. The instrument will display the maximum value of stored temperature, its memory location and the corresponding velocity *.

[avg max min / 5] 4) Press the
key again. The instrument will display the minimum stored temperature value, its memory location and the corresponding velocity *.

[vel temp / 4] Press the
key. The instrument will display the minimum stored velocity value, its memory location and the corresponding temperature *

[recall / read / 7] 5) Press the
key to revert back to normal read mode.

*note: multiple maximum or minimums will be indicated by either 'min' or 'max' flashing in the top RH corner of the display. The lowest memory location is initially displayed, the other locations may be viewed using the

[▲ / 9] **key**

and

[▼ / 6] **key.**

5.6 **PRINTING.**
Airflow can provide a compatible mini-printer and cable, please contact Airflow Sales Department for details.
1) Attach the printer to the RS232 socket (see Fig.2 item 3.10 page 3) **ensuring that the plug is orientated correctly**. Set the printer to the following transmission protocol:-
2400 Baud rate
8 bit, no parity, 2 stop bits (this allows compatibility with printers that expect either 1 or 2 stop bits).
2) Turn on the printer.
Note: during the time that the printer is actually printing, the keypad will be disabled and key presses will not be recognised.

5.6.1 Printing in read mode.

When a printout of a reading is required, press the `print 8` key. The word 'PRINTING' will appear at the top of the display and the current temperature and flowrate readings will be printed in the units previously selected.

Auto Printing.

Readings may be sequentially printed at a presettable time interval by following the procedure detailed in section 5.5.2. The printout will continue until stopped by following the procedure detailed in section 5.5.3.

5.6.2 Printing a single set of stored readings (valid in 'recall' mode only).

1) From 'read' mode, select 'recall' mode by pressing the `recall read 7` key. 'RECALL MEMORY' will be displayed above the memory counter reading and the instrument will display the readings from memory location 01.

2) Index the memory counter to the required location by means of the `▲ 9` key

and

`▼ 6` keys.

3) Press the `print 8` key to obtain the required printout.

4) Press the `recall read` key to revert back to the normal 'read' mode.

5.6.3 Printing a complete set of stored readings (valid in 'recall' mode only).

1) From 'read' mode, select 'recall' mode by pressing the `recall read 7` key. The instrument will display the readings from memory location 01

2) Double press the `print 8` key to obtain the printout of all readings which have been stored

3) Press the `recall read 7` key to return to the normal **read** mode.

5.6.4 Printing a sequential block of stored readings (valid in 'recall' mode only).

1) From 'read' mode select **recall** mode by pressing the `recall read 7` key. The instrument will display the readings from memory location 01.

2) Use the `▲ 9` key to select the initial memory location.

3) Double press the `print 8` key. The printer will print out from the selected initial memory location and will continue to print until either it reaches the highest memory location or is commanded to stop printing (refer to 5.6.6).
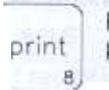
4) Press the `recall read 7` key to return to normal 'read' mode.

5.6.5 Printing Average, maximum or minimum values of stored readings (valid in 'recall' mode only).
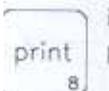
Display the required average, maximum or minimum of either the velocity or temperature stored readings as detailed in section 5.5.6. Press the `print 8` key to obtain the required printout.

5.6.6 To stop a printout.

Press and momentarily hold down the `print 8` key and then press it again (key presses will not be recognised during the actual printing process)

6. ANALOGUE/DIGITAL OUTPUTS.

0 to 1 volt full scale analogue d.c. outputs of velocity/volume and temperature are accessed via a 3.5mm 2-pole jack socket on the LH side of the unit (FIG.2 item 3.7), to allow the data to be output to a chart recorder or a data logger. Airflow can provide a compatible data logger, please contact Airflow Sales Department for details.

The outputs may be factory set to between 0 - 0.5v minimum and 0 - 2.0v maximum on request.

The velocity/volume analogue output is connected to the tip of the jack plug.

The temperature analogue output is connected to the barrel of the jack plug.

The range of the analogue velocity/volume output is selected by altering the analogue scale range, see section 5.3 (3).

6.2   RS232

In order to conserve battery power the RS232 Output will only operate during the print command. This is effective; in a single reading use when in read mode, all printing commands in memory recall mode, and during auto logging to memory mode. Using the auto logging mode of operation, a periodic output can be obtained on a time interval settable between 5 seconds and 99 minutes 59 seconds. See section 5.5.2

7. CALIBRATION.

The instrument and associated vane anemometer head (or heads) are calibrated to either British Maritime Technology or National Institute of Standards and Technology (NIST) standards.

It is possible to modify the calibration to suit alternative standards. However, this MUST ONLY BE UNDERTAKEN BY SKILLED PERSONNEL USING A STABLE SOURCE OF AIR FLOW WITH THE REQUIRED CALIBRATION ACCURACY.

AN INCORRECT ATTEMPT TO RECALIBRATE THE AV6 WILL DESTROY THE ORIGINAL CALIBRATION AND WILL INVALIDATE THE WARRANTY.

The calibration is linearised by means of software and, therefore, requires only a single point (at full scale) to recalibrate. **To recalibrate the instrument:-**

store

1) Hold down the key whilst turning the instrument on by pressing the

on

key. 'CA' will be displayed in the bottom RH corner of the display.

2) Press the following keys in sequence: clear vel/temp4 area
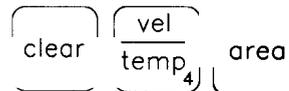
If, at any stage of this key sequence, a pause in excess of 5 seconds or an incorrect key entry is detected, the instrument will automatically return to its normal **'read'** mode. After successful entry into the **'calibration'** mode, the instrument display will function normally but will have **'CA'** displayed in the bottom RH corner of the display.

3) The instrument will recognise the size of the head which is connected from the inbuilt head identification components and will now accept recalibration data associated with that size of head.

4) Place the head into a **stable, uniform air flow of known velocity which is set to approximately the full scale value and having a cross-sectional area larger than that of the anemometer head.**

5) Use the key

▲9

and

▼6

keys to adjust the displayed velocity until it equals the value of the known air flow velocity.

Note: there is a relatively long time for the display to respond to adjustments from the keyboard and sufficient time should be allowed between key presses to ensure that the unit has fully responded.

Because of the long time requirement, this procedure demands a very stable air flow such as is achieved with the AIRFLOW Open Jet Wind Tunnel.

off

6) *Press the key to accept the recalibrated value.

off

*Note1: If, prior to pressing the keypad, it is wished to retain the original calibrated value, this can be achieved by removing the batteries instead of switching the unit 'off'.

Note 2: Entry into the calibration mode will always reset the 100mm head calibration back to the original factory calibration.

The calibration may be checked by comparing the displayed readings against various settings of the air flow.

8. TEST FEATURES.

8.1   Display Integrity.

To establish that all the display annunciators are functioning, hold down the `range 2` key whilst simultaneously pressing the

`on` key.
This will illuminate all the display segments as shown in FIG.1, followed by displaying the software version. The unit will then enter its normal operating mode.

8.2   Instrument Set Up.

A printout of the instrument's set up may be obtained as follows:-

1)   Connect a printer (set up as in section 5.6) to the RS232 socket (item 3.10 on Fig.2 page 3).
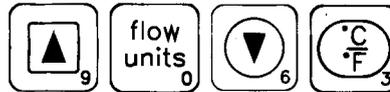2)   Hold down the `range` key whilst simultaneously pressing the

`on` key. All the display segments will illuminate, followed by the software version.

`range 2` 3)   Whilst the software version is displayed, hold down the key again until 'ts' is displayed.

4)   Press the following keys in sequence:-   `▲ 9` `flow units 0` `▼ 6` `°C °F 3`

Allow a maximum time of 5 seconds between key presses. A '-' bar will be displayed for each successful key entry. If the maximum key press response time of 5 seconds is exceeded or a wrong key is pressed, the unit will revert to its normal 'read' mode.

5)   When the correct code is entered (as indicated by four '-' bars being displayed), the unit will print out details of the oscillator frequency, baud rate setting, vane head type and calibration factor.

9. TROUBLE SHOOTING.

9.1   No display on switch on.

No batteries fitted.
Batteries inserted with incorrect polarity.
Batteries exhausted.

9.2   The overrange/ probe check light illuminates on switch on.

This indicates that the anemometer head is either not plugged in or has been plugged in incorrectly.

9.3   The overrange/ probe check light illuminates during measurement.

This indicates that measured values are exceeding the pre-selected range; change the range as detailed in sections 5.3 (3) or 5.4.2 (6).

9.4   The overrange/ probe check light illuminates during recall.

This indicates that the stored values are exceeding the preselected range; change the range as detailed in sections 5.3 (3) or 5.4.2 (6).

9.5   Memory.

Stored values will not be lost upon removal of the batteries or switching the instrument off.
Should a fault occur that cannot be resolved by any of the above, then contact either your distributor or Airflow Developments Ltd to discuss the fault and/or make arrangements to return the unit stating full details of the fault.

10. SPECIFICATION.

10.1   Anemometer with 100mm Vane Sensor.

PARAMETER	METRIC MODE	IMPERIAL MODE
Velocity Range	0.25 - 30 m/sec	50 - 6,000 ft/min
Volume Range	0.002 - 3,000 m³/sec	3.6 - 9,999 ft³/min
Accuracy @ 20°C and 1013Mb	+/- 1% of reading +/- 1 digit	
Velocity Resolution	0.01 m/sec	2 ft/min
Temperature measurement range	0 - 80°C	32 - 176°F
Temperature Accuracy	1°C +/- 1 Digit	2°F +/- 1 Digit
Temperature Resolution	0.1°C	1°F
Area Input range	0.004 - 99.99 m²	0.0431 - 999.9 ft²
Linear Dimension input range (subject to area max/min constraints)	0.0001 - 9,999 m	⅛ inch to 9,999 ft
Memory Size	99 readings of velocity and temperature (Note: flow data is always stored as a velocity)	
Auto Logging variable time base	5 seconds to 99 minutes 59 seconds	
Analogue Output	O - 1 volt standard (0 - 0.5v and 0 - 2v available on request)	
Digital Output	Serial RS232	
Power Supply	4 x 1.5 volt AA cells (rechargeable, zinc carbon or alkaline)	
Battery Life	Approximately 40 hours normal operating use with new alkaline disposable cells.	
Overall Dimensions	92 x 32 x 188 mm	3.6 x 1.2 x 7.4 inches
Instrument Operating Ambient temperature range	-10°C to +50°C	14 - 122°F
Instrument Storage temperature range	-20°C to +60°C	-4°F to +140°F
Vane Sensor Operating Ambient temperature range	0 - 80°C	32 - 176°F
Weight (less battery cells)	310g	0.68lb
Standard Kit	AV6 Anemometer 100mm dia rotating vane sensor Handle and telescopic extension rod (0.4 to 1.1 m) with swivelling joint Executive carry case Calibration certificate	
Optional Accessories	*35mm dia rotating vane sensor Battery eliminator for mains supply operation APU 10 Mini Printer Flowcone kit	

* Note: the accuracy of velocity readings using the 35mm vane sensor = +/- 2 % of reading +/- 1 Digit at ambient conditions of 20°C and 1013Mb (68°F and 30 in Hg).

10.2   Analogue scale display.

Bargraph Scaling							
Parameter		Range selected					
		Lowest		Medium		Highest	
		Displayed	Actual	Displayed	Actual	Displayed	Actual
Velocity	m/s	2	2	15	15	30	30
	km/h	L	7.2	M	54	H	108
	kts	L	13.3	M	100	H	200
	mph	L	4.47	M	33.6	H	67.1
	ft/min	400	400	3,000	3,000	6,000	6,000
Volume flow	m³/s	L	2 x duct area	M	15 x duct area	H	30 x duct area
	ft³/min	L	400 x duct area	M	3000 x duct area	H	6000 x duct area

10.3 Analogue Flow Output.

Output on tip of jack plug = 0 to 1 volt (but 0 to 0.5v or 0 to 2.0 volt can be supplied on request).
Range selection as per the analogue scale display in table in section 10.2 with the exception of the Imperial velocity range as follows:-

Parameter	Range Selected					
	Lowest		Medium		Highest	
Velocity ft/min	Displayed	Actual	Displayed	Actual	Displayed	Actual
	400	394	3,000	2,952	6,000	5,904

Accuracy at 20°C ambient	within +/- 10 millivolts of displayed reading.
Output drift	I millivolt maximum per °C ambient
Resolution	5 millivolts

10.4 Analogue Temperature Output.

Output on barrel of jack plug = 0 to   volt (but 0 to 0.5v or 0 to 2.0v can be supplied on request).

Accuracy at 20°C ambient	within +/- 10 millivolts of displayed reading.
Output drift	I millivolt maximum per °C ambient
Resolution	5 millivolts

10.5 RS232 Output.

1) This provides a serial data ouput for sending to a printer (or other compatible device), via an 8 pin mini DIN, non latching socket (FIG.2 item 3.10). The attached device must conform to the following protocol:-

Emulation: DTE emulation as per IBM PC

| Lines:	'TDX' Transmit data	pin 3	
	'CTS'	Clear to send	pin 8
	'SG'	Signal ground	pin 5

CTS time out: 3 seconds

Baud rate: preset to 2400 Baud

Transmission protocol: 8 bit, no parity, 2 stop bits. (this allows compatibility with printers that expect either 1 or 2 stop bits)

Output voltages: RS232 compatible   +10v nominal for logic low

-10v nominal for logic high

input +/- 3v minimum sensitivity

2) The mating mini DIN 8-pin plug (Airflow Part No. 9040180) connector pin number identification is shown in the following diagram:-

EXTERNAL VIEW
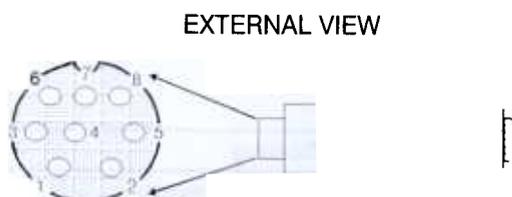
3) Inter-connections to Airflow APU 10 Printer.   <u>Airflow Cable (2m long) Part No.</u>

AV6 8-pin   APU 10 Printer   UK/European - 72329605
Mini-DIN socket   (with 9-way D socket)   USA   - 72329606
TX pin 3 (●----   --------------- ●) pin 3 DATA   (Cables are supplied with the printer)
SG pin 5 (●----   --------------- ●) pin 5 SG
CTS pin 8 (●----   --------------- ●) pin 8 BUSY

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AV6 8-pin   PC or typical Printer
Mini-DIN socket   with 9 way D connector

TX pin 3 (●------------------------------x pin 2 RD   x - cable terminating in a 9 way D plug - 72329601
SG pin 5 (●------------------------------x pin 5 SG   x - cable terminating in a 9 way D socket - 72329602
CTS pin 8 (●------------------------------x pin 4 DTR

AV6 8-pin   PC or typical Printer
Mini-DIN socket   with 25-way D connector

TX   pin 3 (●-----------------------------x pin 3 RD   x - cable terminating in a 25-way D plug - 72329603
SG pin 5 (●------------------------------x pin 7 SG   x - cable terminating in a 25-way D socket - 72329604
CTS pin 8 (●------------------------------x pin 20 DTR

10.6   CE Marking.

The unit complies with the EEC Directive on Electromagnetic Compatibility (EMC) 89/336/EEC, applied
Harmonised Standards: EN50081-1Radiated Emmissions and EN50082-1 Radiated and ESD immunities.
Note: for full immunity to ESD, the instrument printer socket (FIG.2 item 3.10) MUST have the supplied
plastic plug fitted whenever a printer is not connected.

11. SERVICE AND RECALIBRATION.

If a fault or the instrument's calibration is suspected, it should be returned to Airflow Developments for repair or
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 the Airflow U.K.
Service Department on High Wycombe (01494) 525252 (International: +44 1494 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.

12. SPARES LIST.

The following is a list of recommended spares:-

Description.	Part No.
100mm Anemometer head assembly	72343601
35mm Anemometer head assembly	72343701
Battery cover	82372601
Mini - DIN Socket Cap	82345201
Mini - DIN 8-pin plug	9040180