KEYPAD CONTROLS:

⏻   On and Off.

▲   Scroll up in menu modes. Increase digits.
Toggle between displays in mode of operation.
The displays are arranged in loop formation as shown:

▲ Pressure Mode:	▲ Velocity Mode:
Pressure	Velocity
Temperature	Temperature
	Live Volume

▶   Scroll to the right in menu modes.
Toggle between units of measurement in mode of operation.
(model dependent) The units are arranged in loop formation as follows:
Pa ▶ KPa ▶ mbar ▶ mmH₂O ▶ inH₂O ▶ mmHg ▶ inHg ▶ PSI ▶ m/sec ▶ ft/min ▶ Pa

▼   Scroll down in menu modes. Decrease digits.
Toggle between displays in mode of operation.
The displays are arranged in loop formation as shown:

▲ Pressure Mode:	▼ Velocity Mode:
Temperature	Velocity
Pressure	Live Volume
	Temperature

◀   Scroll to the left in menu modes.
Toggle between units of measurement in mode of operation.
(model dependent) The units are arranged in loop formation as follows:

(menu)   Pa ◀ ft/min ◀ m/sec ◀ inHg ◀ mmHg ◀ inH₂O ◀ mmH₂O ◀ mbar ◀ KPa ◀ Pa

Used in conjunction with the ⏻ key to access the User Menu.
Access the option menu. Accept commands in the menu modes.

zero   Overrides the time period of the Auto Zero system.

units   Toggle between units in the measurement mode.
(model dependent) The units are arranged in loop formations as follows:
Pa → KPa → mbar → mmH₂O → inH₂O → mmHg → inHg → PSI → m/sec → ft/min → Pa

speed   Smoothes out the response to applied pressure changes.
Time constant: Fast = 0 sec   S1 = 5 sec   S2 = 10 sec   S3 = 15 sec   S4 = 20 sec

store   Store readings manually.

hold temp   Use with a temperature probe in order to hold the temperature reading.

In the interest of continuous product development and improvement DP Measurement reserve the right to amend specifications and to discontinue models, features and colours of the ST6 Series Micromanometers and the Ellipsoidal Pitot Tube at any time without prior notice.

Manufactured in UK

DP Measurement
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Buckingham, England. MK18 1TH
www.ttseries.com   email dpm@ttseries.com
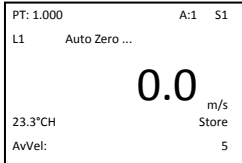Tel / Fax +44 (0)1280 817122

Instrument Serial Number:

VELOCITY MODE DISPLAY:

```
PT: 1.000              A:1   S1

L1          Auto Zero ...

              0.0
                     m/s
23.3°CH                Store
AvVel:                    5
```

PT: 1.000   Pitot Tube Factor. Up to 5 different Pitot Tube Factors can be stored.

A:1   Area Setting. Up to 5 different Area Settings can be stored.

S1   Speed. There are 5 different speed settings.
Use the 'speed' key to toggle between speed settings.

L1   Location number. Store data in up to nine different Locations.
The instrument will give an average value in the mode of operation for data that is stored in the same units of measurement and location.
When data is downloaded to a PC it will be listed under the Location in which it is stored.

Auto Zero . . .   Whenever the Auto Zero sequence is initiated manually or at preset 'Auto Zero. . .' will be displayed until the cycle is complete.

0.0 m/s   Unit of Measurement.
Use the 'units' key or the ◀ and ▶ keys to toggle between units of measurement.

23.3°C   Temperature Probe reading.
This is not displayed when the temperature probe is not attached.

H   When the 'hold temp' key is pressed 'H' will be displayed after the temperature reading, signalling that the temperature is being held.
The temperature will be held even if the probe is detached, until the 'hold temp' key is pressed a second time.
Pressing the 'hold temp' key a second time will release the temperature and if the probe is attached readings will continue to be taken as normal. If the probe is not attached, the instrument will use the default readings.

Store   Number of readings stored.
5   Up to 4000 readings can be stored.

AvVel: Average Velocity of the stored readings.
An Average Velocity is taken for each Unit of Measurement in each Location.
This is then displayed on the screen. Stored values can be viewed in 'Review Results'.

LIVE VOLUME DISPLAY:

To access the Live Volume Display press the ▼ key when in Velocity Mode.
To return to Velocity Mode press the ▲ key.

L/s   Unit of Measurement, the Live Volume is the Velocity multiplied by the Area.
For m/s the results are in L/s; for ft/min the results are in cfm. This cannot be changed.

AvVol: Average Volume of the stored readings.
The Average Volume a function of Velocity multiplied by Area.

Store   Number of readings stored. The stored readings will be in Velocity, not in Volume.
5   Up to 4000 readings can be stored.

TEMPERATURE MODE DISPLAY:

To access the Temperature Mode Display press the ▲ key while in Measurement Mode.
To return to Measurement Mode press the ▼ key.

```
Max: 22.8        Min: 22.3


     22.5 °C


```
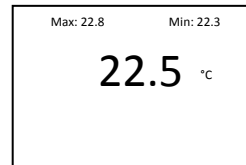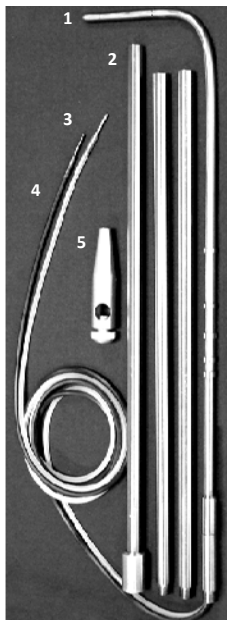
Max: 22.8   Maximum probe reading.

Min 22.3   Minimum probe reading.

°C   Unit of measurement.

```


  — — — — —


         Default =        16°C
```
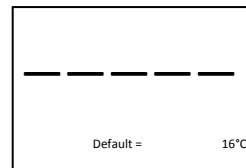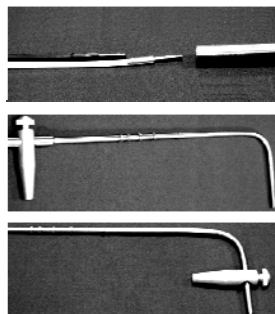
—————   No probe attached

Default = 16°C Instrument default temperature.

ITEMS INCLUDED WITH THE ELLIPSOIDAL PITOT TUBE:

1 Ellipsoidal Pitot Tube 300 mm long x 6 mm diameter

2 3 x Extension Poles 300 mm long x 10 mm diameter

3 Tubing Adaptors

4 Rubber Tubing clear and black

5 Directional Pointer

SETTING UP THE ELLIPSOIDAL PITOT TUBE:

- Take the first extension pole and insert the clear and black rubber tubing into the internally threaded end, staggering the tubing as shown (left). Screw the extension pole into place. Repeat this process for each extension pole.

- Take the directional pointer and unscrew the end. Slide it over the sensing end of the Ellipsoidal Pitot Tube and position as required.

- Align the directional pointer with the sensing end of the Ellipsoidal Pitot Tube and tighten the end of the directional pointer.
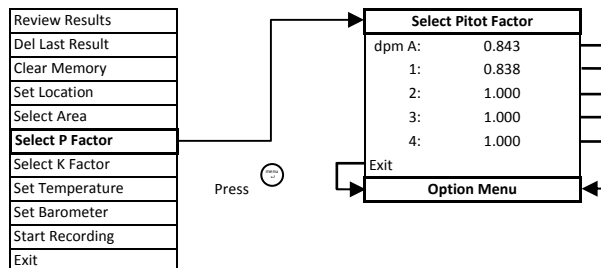
SETTING UP THE ELLIPSOIDAL PITOT TUBE:

- Take the Micromanometer and attach the clear tubing to **+** and blue tubing to **—**.

- Using the tubing adaptors from the Ellipsoidal Pitot Tube, join the clear tubing together and join the blue tubing to the black tubing.

- The Pitot Tube Factor for the Ellipsoidal Pitot Tube is 1.000.

- When in the velocity mode ensure that the correct PT Factor is displayed in the top left-hand corner of the display.

- See below how to select the correct PT Factor:

Selecting from a list: Use ▲ and ▼ to scroll. Press to select.

Entering a value: Use ▲ and ▼ to set each digit. Use ▶ to move on the next digit. Press ⊙ to confirm.

Review Results
Del Last Result
Clear Memory
Set Location
Select Area
Select P Factor
Select K Factor
Set Temperature
Set Barometer
Start Recording
Exit

Press ⊙

Select Pitot Factor	
dpm A:	0.843
1:	0.838
2:	1.000
3:	1.000
4:	1.000
Exit	
Option Menu	

USING THE Ellipsoidal PITOT TUBE:

- Ensure that the Micromanometer is in velocity mode and that the correct Pitot Tube Factor is displayed on the screen.

- Hold the Ellipsoidal Pitot Tube so that the Total Pressure hole is facing into the airstream.

- In case of fluctuating readings use the 'speed' key to dampen down the readings.

SPECIFICATIONS:

Models: **Range / Resolution:**

ST6 M	ST6 I					
		Pressure:				
●		Pa	± 0.4 to 999.9	± 1000 to 5000		
●		KPa	± 0.4 to 99.9 Pa	± 100 to 999 Pa	± 1.00 to 5.00 KPa	
●		mbar	± 0.000 to 0.999	± 1.00 to 9.99	± 10.0 to 50.0	
●		mmH$_2$O	± 0.000 to 0.999	± 1.00 to 9.99	± 10.0 to 99.9	± 100 to 510
	●	inH$_2$O	± 0.000 to 0.999	± 1.00 to 9.99	± 10.0 to 20.0	
●		mmHg	± 0.000 to 0.999	± 10.00 to 37.51		
	●	inHg	± 0.000 to 0.999	± 1.00 to 1.47		
	●	PSI	± 0.000 to 0.726			
		Velocity (with Ellipsoidal Pitot Tube):				
●		m/sec	2.00 to 90.0			
	●	ft/min	394 to 17730			
		Temperature (with K – type probe):				
●	●	°C	± 0.0 to 500.0			
●	●	°F	± 0 to 932			

Accuracy:

Pressure at 20°C, Velocity with Ellipsoidal type at 16°C, 1000 mbar:
Readings < 100 counts ± 2 counts. Readings > 100 counts ± 1% of reading ± 1 count.
Temperature (with K - type Probe) at 20°C:
± 2°C (36°F).

General Specification for ST6 Series Digital Pocket Manometer:

Recommended Operational Limits:	0° to 50°C (32° to 123°F)
Span Stability versus Temperature:	0.1% of range in use per °C (per 2°F)
Zero Drift:	Negligible due to Auto Zero system. When Auto Zero set at 60 sec intervals (2 minute warm up).
Zero System Accuracy:	± 0.05 Pascal typical
Orientation Effect:	(any 45° change) 0.1 Pascal typical
Output Socket:	Miniature USB port.
Data Logging:	Up to 4000 any units.
Software:	Download data to PC using DpmUsb software.
Power Source:	Dry cell (AA) or Rechargeable.
Battery Life:	7 hours (depending upon battery) With Auto Zero at 60 sec intervals, backlight permanently on.
System Air Leak:	0.01 ml/minute a 5Kpa (typical)
Safe Line / Differential Pressure:	15KPa
Storage Temperature Limits:	-5° to +50°C
Weight:	360 grammes with batteries and holster.
Dimensions:	145 x 85 x 50 mm with holster

MICROMANOMETER WITH OPTIONAL K - TYPE PROBE:

KEYPAD CONTROLS:

ENABLE Protects against accidental switching 'on' and 'off' of the instruments power source.

ON Used in conjunction with ENABLE to switch on the instrument.

OFF Used in conjunction with ENABLE to switch off the instrument.

FAST Smoothes out the response to applied pressure changes. Time constant:
SLOW Fast = 0 sec   Slow1 = 5 sec   Slow2 = 10 sec   Slow3 = 15 sec   Slow4 = 20 sec

UNITS Changes the unit of measurement.
(model dependent) The units are arranged in loop formation as follows:
Kpa → mmH$_2$O → inH$_2$O → mbar → m/sec → ft/min → Kpa

STORE Stores readings manually.

MENU Used to access the Option Menu from operation mode.

⬆ and ⬇ Operate the backlight.
Select an appropriate function during menu operation.
Set digits and values in menu operation.

ZERO Overrides the time period of the auto zero system.

↵ Backspace.

ENTER Accepts commands during menu operation.
Used in conjunction with ENABLE and ON to access the User Menu.

In the interest of continuous product development and improvement DP Measurement reserve the right to amend specifications and to discontinue models, features and colours of the TT Series Micromanometer and the Ellipsoidal Pitot Tube at any time without prior notice.

Manufactured in UK

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Tel / Fax +44 (0)1280 817122

Instrument Serial Number:

DISPLAY:

PT: 1.000		Area:1
	Auto Zero ...	Slow4
	3.19 m/s	
AvgVol	AvVel	Store
355	5.02	5
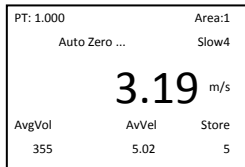
PT: 1.000 (model dependent) Pitot Tube Factor.

Area: 1 (model dependent) Area Setting.

Auto Zero . . . Whenever the auto zero sequence is initiated manually or at preset 'Auto Zero . . .' will be displayed until the cycle is complete. Being an auto ranging instrument, the resolution and decimal points will change according to the pressure being applied.

Slow4 Mode of the instrument.
Press the FAST SLOW key to change the mode.

3.19 m/s Unit of measurement.
Press UNITS to toggle between units of measurement.

AvgVol 355 (model dependent) Average volume of the readings stored in l/s or cfm.
The average volume is a function of velocity multiplied by area.

AvgVel 5.02 (model dependent) Average velocity of the readings stored.

Store 10 Number of readings stored.
Up to 2500 readings can be stored.

ACCURACY OF INSTRUMENT:

Pressure at 20°C and Velocity with Ellipsoidal type at 16°C, 1000 mbar:
Readings < 100 counts ± 2 counts.
Readings > 100 counts ± 1% of reading ± 1 count
Velocity with dpm Ane™ head at 16°C, 1000 mbar:
Readings up to 8 m/sec (1575 ft/min) ± 1% of reading ± 0.03 m/sec
Readings from 8 to 25 m/sec (1575 to 4921 ft/min) ± 1 m/sec (197 ft/min)
Volume with dpm Hood at 20°C:
With Adaptor Plate A and appropriate settings:
Flow < 40 l/sec (144 m^3/hr, 85 cfm) ± 3% of reading ± 2 l/sec (8 m^3/hr, 5 cfm)
With Adaptor Plate B and appropriate settings:
Flow > 40 l/sec (144 m^3/hr, 85 cfm) ± 3% of reading ± 4 l/sec (14 m^3/hr, 9 cfm)

SPECIFICATIONS:

Models: 570 SV / 570 MV / 570 AV / 570 BV / 570 CV / 570 DV		Range / Resolution:		
	Pa	± 0 to 99.9	± 100 to 999	± 1.00 to 7.50 Kpa
	mmH$_2$O	± 0 to 0.999	± 1.00 to 9.99	± 10.0 to 99.9 ± 100 to 750
	inH$_2$O	± 0 to 0.999	± 1.00 to 9.99	± 10.0 to 30.0
	mbar	± 0 to 0.999	1.00 to 9.99	10.0 to 75.0
		Ellipsoidal	dpm—i	dpm—Ane™
	m/sec	2.00 to 90.0	0.70 to 30.0	0.70 to 25.0
	ft/min	394 to 19930	138 to 5905	138 to 4921

Models: 550 S / 550 M / 550 A / 550 B / 550 C / 550 D		Range / Resolution (shown in high sensitivity mode):		
	Pa	± 0.06 to 99.99	± 100.0 to 999.9	± 1000 to 5000
	mmH$_2$O	± 0.004 to 9.999	± 10.00 to 99.99	± 100.0 to 510.0
	inH$_2$O	± 0.000 to 9.999	± 10.00 to 20.00	
	mbar	± 0.000 to 9.999	± 10.00 to 50.00	
		Ellipsoidal	dpm—i	dpm—Ane™
	m/sec	2.00 to 90.0	0.27 to 30.0	0.27 to 25.0
	ft/min	394 to 17730	53 to 5905	53 to 4921

Models (dpm Hood): 550 SV / 550 MV / 550 AV / 550 BV / 550 CV / 550 DV		Range / Resolution (shown in high sensitivity mode):		
	Pa	± 0.06 to 99.99	± 100.0 to 999.9	± 1000 to 5000
	mmH$_2$O	± 0.004 to 9.999	± 10.00 to 99.99	± 100.0 to 510.0
	inH$_2$O	± 0.000 to 9.999	± 10.00 to 20.00	
	mbar	± 0.000 to 9.999	± 10.00 to 50.00	
		Ellipsoidal	dpm—i	dpm—Ane™
	m/sec	2.00 to 90.0	0.27 to 30.0	0.27 to 25.0
	ft/min	394 to 17730	53 to 5905	53 to 4921
			Plate A	Plate B
	l/sec	Supply / Exhaust	5 to 100	15 to 555
	m^3/hr	Supply / Exhaust	18 to 360	50 to 1998
	cfm	Supply / Exhaust	11 to 212	32 to 1176

ITEMS INCLUDED WITH THE ELLIPSOIDAL PITOT TUBE:

1 Ellipsoidal Pitot Tube 300 mm long x 6 mm diameter

2 3 x Extension Poles 300 mm long x 10 mm diameter

3 Tubing Adaptors

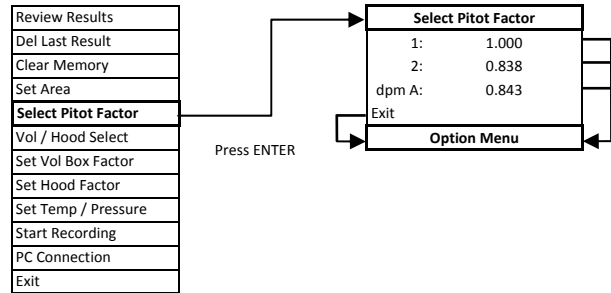**4** Rubber Tubing clear and black

5 Directional Pointer
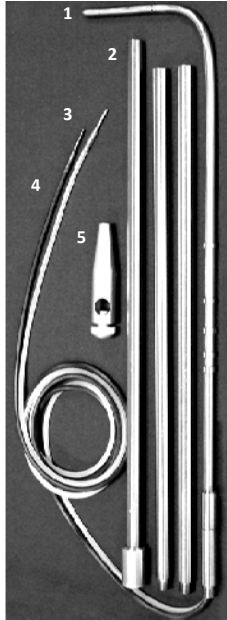
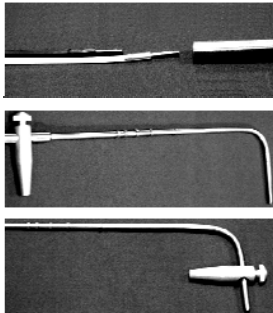## SETTING UP THE ELLIPSOIDAL PITOT TUBE:

- Take the Micromanometer and clear tubing to **Signal In** and blue tubing to **Reference**.

- Using the tubing adaptors from the Ellipsoidal Pitot Tube, joint the clear tubing together and join the blue tubing to the black tubing.

- The Pitot Tube Factor for the Ellipsoidal Pitot Tube is 1.000.

- When in the velocity mode ensure that the correct PT Factor is displayed in the top left-hand corner of the display.

- See below how to select the correct PT Factor:

Selecting from a list: Use ↟ and ↡ to scroll. Press ENTER to select.

Entering a value: Use ↟ and ↡ to set each digit or value then press ENTER.

Review Results
Del Last Result
Clear Memory
Set Area
Select Pitot Factor
Vol / Hood Select
Set Vol Box Factor
Set Hood Factor
Set Temp / Pressure
Start Recording
PC Connection
Exit

Press ENTER

| Select Pitot Factor	
1:	1.000
2:	0.838
dpm A:	0.843
Exit	
Option Menu	

SETTING UP THE ELLIPSOIDAL PITOT TUBE:

- Take the first extension pole and insert the clear and black rubber tubing into the internally threaded end, staggering the tubing as shown (left). Screw the extension pole into place. Repeat this process for each extension pole.

- Take the directional pointer and unscrew the end. Slide it over the sensing end of the Ellipsoidal Pitot Tube and position as required.

- Align the directional pointer with the sensing end of the Ellipsoidal Pitot Tube and tighten the end of the directional pointer.

USING THE ELLIPSOIAL PITOT TUBE:

- Ensure that the Micromanometer is in velocity mode and that the correct Pitot Tube Factor is displayed on the screen.

- Hold the Ellipsoidal Pitot Tube so that the Total Pressure hole is pointing into the airstream.

- In case of fluctuating readings use the FAST SLOW key to dampen down the readings.
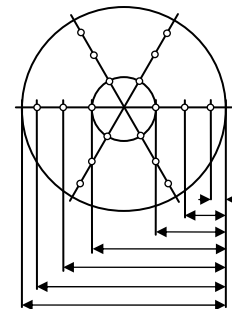
DUCT TRAVERSE POINTS:
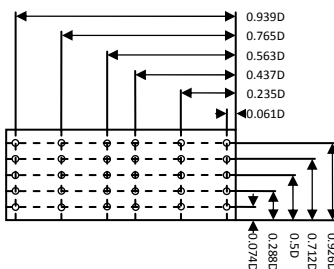
Principle of Operation:

Pitot Head
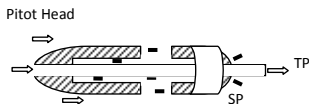
Velocity Pressure* = Total Pressure – Static Pressure

*Calculated by the Micromanometer

Log Linear Rule for Traverse Points on 3 Diameters in a Circular Duct:

0.032D
0.135D
0.321D
0.679D
0.865D
0.968D
D

The nose of the Pitot Tube should face directly into the airstream thus the Total Pressure flows down the inner tube which is connected to the Signal In port.
The static holes are positioned around the side of the Pitot Tube and lead into an outer tube. This is connected to the black tubing which in turn is connected to the Reference port.

Ideally traverse points should be at least six duct diameters away from any bend or obstruction in the system.
The Pitot Tube should be inserted at right angles to the walls of the ducts and measurements are taken in the positions shown in the diagrams (left).
The directional pointer can be used to ensure that the Pitot Tube head is parallel to the duct walls.

Alternative Measuring Points and Traverse Lines Relative to Side Lengths for Regular Ducts:

0.939D
0.765D
0.563D
0.437D
0.235D
0.061D

0.074D
0.288D
0.5D
0.712D
0.926D

CONVERSION TABLES:

Pressure:

	Pa	mbar	mmH₂O	inH₂O	mmHg	inHg	PSI
Pa	1	100.0	9.806	249.1	133.3	3385	6892
mbar	0.010	1	0.098	2.491	1.333	33.85	68.92
mmH₂O	0.102	10.20	1	25.40	13.60	345.42	702.8
inH₂O	0.004	0.402	0.039	1	0.535	13.51	27.67
mmHg	7.501×10^{-3}	0.750	0.074	1.868	1	25.64	51.70
inHg	2.953×10^{-4}	0.029	2.895×10^{-3}	0.074	0.039	1	2.305
PSI	1.451×10^{-4}	0.014	1.423×10^{-3}	0.036	0.019	0.4338	1

Volume:

	m³/sec	m³/hr	l/sec	cfm
m³/sec	1	0.0002	0.001	0.0004
m³/hr	3600	1	3.6	1.699
l/sec	999.97	0.2777	1	0.4719
cfm	2118.88	0.5885	2.1189	1

Velocity:

	m/sec	ft/min
m/sec	1	0.005
ft/min	196.85	1

AIR VELOCITY CALCULATIONS USING S.I SCALES:

For non-standard air conditions:

$$V = 1.291 \times PT \sqrt{\frac{1013.25}{B} \times \frac{T}{289} \times Pv}$$

V   = Velocity in m/sec

PT = Pitot Tube Factor (for Ellipsoidal type 1.000)

B   = Barometric pressure in mbar

T   = Absolute temperature in °K (= t in °C + 273 where t = airstream temperature)

Pv = Velocity pressure in Pa

AIR VELOCITY CALCULATIONS USING IMPERIAL SCALES:

For non-standard air conditions:

$$V = 4006 \times PT \sqrt{\frac{30}{B} \times \frac{T}{521} \times Pv}$$

V   = Velocity in ft/min

PT = Pitot Tube Factor (for Ellipsoidal type 1.000)

B   = Barometric pressure in inHg

T   = Absolute temperature in °R (= t in °F + 460 where t = airstream temperature)

Pv = Velocity pressure in wg