MICRO AIR DATA SYSTEM 2.0 *DATA SHEET*

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**YOUR AIR DATA SOLUTIONS
JUST GOT A LOT SMALLER**
(AND LIGHTER)

FEATURES & CAPABILITIES

- Real time air data, angle of attack, angle of sideslip, velocity, altitude*
- Embedded thermocouple for true air temperature measurement*
- Integrated GPS/INS unit
- High speed: up to 100 Hz reporting rate*
- Low power: <2 watt power consumption*
- Embedded deicing heater
- Dual sensors that increase the velocity and alititude range
- Optional analog-to-digital channels for general purpose data acquisition
- Data logging
- Quick-start kit for bench-top demonstration or in-lab use
- COTS and custom hardware versions available

*Standard feature for all µADS. Other features are custom design or add-ons.

# PRODUCT SPECIFICATIONS

Table 1 - Micro Air Data System Specifications

|	
Minimum Measurable Airspeed	See Table 2
Maximum Measurable Airspeed	See Table 2
Airspeed Resolution	See Table 2
Airspeed Error (Max)	Greater of ±1% of the Maximum Calibrated Air Speed or ±1 m/s (refer to Figure 1 for details)
Flow Angle Ranges	±20° Angle of Attack (AoA) ±20° Angle of Sideslip (AoS)
Flow Angle Resolution	0.1°
Flow Angle Error (Max)	±1.0°
Altitude, Max (Relative to Sea Level)	18293m (60000 ft)
Altitude, Min (Relative to Sea Level)	Can be < 0 m for barometric pressures > 1 atmosphere
Altitude Resolution	1 m
Altitude Error [1]	±10 m
Operating Temperature Range	-40°C to 85°C
Sensor Compensated Temperature Range (Other ranges available, please contact factory.)	0-40°C
Frequency Response	Standard: <50 Hz Optional: Frequency Calibration Available

[1] Does not include error due to local barometric pressure variance.

Figure 1 - Air Data System Maximum Air Speed Error Standard Atmosphere, Sea Level
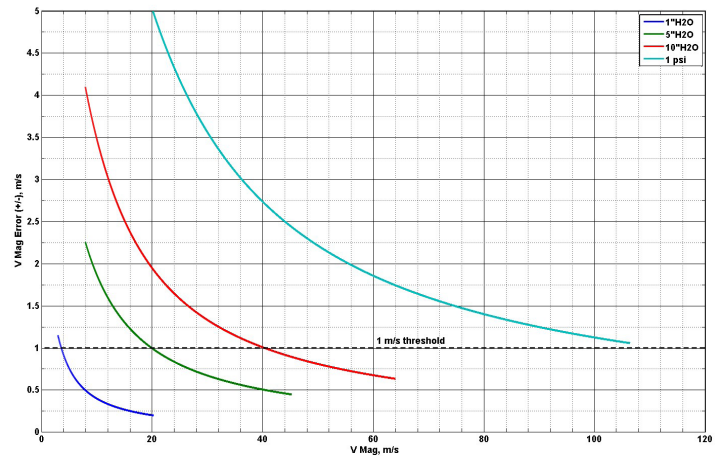
Figure 2 - Air Data System Maximum Air Speed Error Standard Atmosphere, 8000 ft
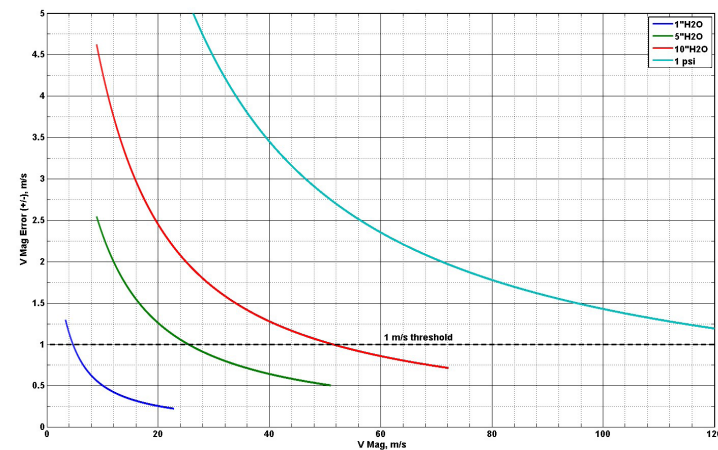
The stated velocity accuracy for Aeroprobe's standard air data system is ±1 m/s or ±1% of the measured velocity, whichever is larger. The graphs above illustrates the effect of sensor range on velocity accuracy. The graphs shows the allowable velocity error as a function of velocity for three different pressure sensor ranges, all with 0.5% full-scale span error. The calculated error assumes that the pressure measured by the sensor is the dynamic pressure and no system or reduction error is accounted for.

When using an air data system, it is important to consider the effect of pressure measurement error at the desired flow velocity. For example, the user should not expect accuracies of less than 1 m/s using the +/- 1 psi sensor with 0.5% FSS error for a measurements below approximately 60 m/s.

Table 2 - Model Options (Properties at Sea Level, 15 °C)

Pressure Range [1]	1" H20	5" H20	10" H20	20" H20	1 Psi	5 Psi
Maximum Calibrated Airspeed (m/s, Mach at Sea Level)	20 m/s, Mach 0.06	45 m/s, Mach 0.13	63 m/s, Mach 0.19	89 m/s, Mach 0.26	105 m/s, Mach 0.31	225 m/s, Mach 0.66
Minimum Reported Airspeed [2]	3 m/s	8 m/s	8 m/s	22 m/s	22 m/s	68 m/s
Airspeed Resolution [3]	0.11 m/s	0.25 m/s	0.36 m/s	0.50 m/s	0.59 m/s	1.32 m/s

[1] This is the specified calibrated pressure range for the model indicated. Pressure inputs greater than this range will cause accuracy degradation.
 Pressure inputs more than 20% over the indicated full scale range may cause damage to the internal pressure sensors.
[2] The minimum reported airspeed is dictated by the minimum dynamic pressure range that can accurately be measured for the given sensor range.
[3] Resolution is a function of airspeed. The listed value is the minimum resolution (i.e. minimum performance) across the range of flow speeds.

Micro Air Data Computer
Operational Specifications

Electrical

Input Voltage Range	7-30 VDC (12VDC Nominal)
Current Draw	< 110 mA @ 12VDC
Power	< 2 Watt
Output Data Rate Options, Hz	1, 10, 20, 25, 50, 100
Serial Specification Options	RS232, RS422, RS485
Serial Baud Rate	115200 bps
Analog to Digital Resolution	**16 Bit**

Mechanical

Size (µADC)	42 x 78 x 49 (mm) **1.62" x 3.07" x 1.92" (in)**
Weight (µADC)	98 g
with Air-Data Probe (3.2mm OD; SS; 6" Len.)	114 g (approximate)
with Air-Data Probe (6.35mm OD; SS; 8" Len.)	138 g (approximate)
with Air-Data Probe (7.9mm OD; SS; 12" Len.)	211 g (approximate)

Probe Geometry and Construction

Probe Geometry	Straight
Number of Holes	5 + Static Ring
Tip Geometry [1]	Standard: Hemispherical
Tip Diameter	Standard: 3.18 mm 6.35 mm, 7.94 mm
Material	300 Series Stainless Steel Construction, Including Shafts and Internal Tubing
Pneumatic Connection	Exit Tubing of 1.02 mm (0.040") OD with Tubulation
Mounting	Standard Optional: Rectangular Prism

Probe Model Number Structure:

P-A05C03S-SX-S-152

| | | | | | | | | | |
|1|2|3|4|5|6|7|8|9|I|

Multi-Hole Probe Model Number Definition

1	**P:** Standard Probe
2	**A:** Air Data
3	Number of Probe Ports (03, 05)
4	Tip Style (H = Hemispherical
5	Tip Diameter (03 = 3.18 mm, 06 = 6.35 mm, 08 = 7.94 mm)
6	Shaft Style (S = Straight)
7	Material Rating (S = Stainless)
8	Thermal Capability Enhancement (X = None, T = Thermocouple, H = Heater, B = Heated Probe*)
9	Customization (S = Standard, N = Near Standard, C = Custom)
I	Overall Length of Probe (mm)

Includes Thermocouple for heater temperature control.

- Standard probes are manufactured with 3.18 mm, 6.35 mm and 7.94 mm tip diameters, are made from stainless steel.
- Near-standard probes have standard geometry EXCEPT for the length of the shafts.
- Custom probes have variations from the standard that include non-standard tip sizes, non-standard probe or mount geometry, or non-standard materials.
- **Important:** Near-standard and custom probes require confirmation of probe drawing by customer, prior to manufacturing.

Complete system solutions to challenging and unique flow measurement problems.
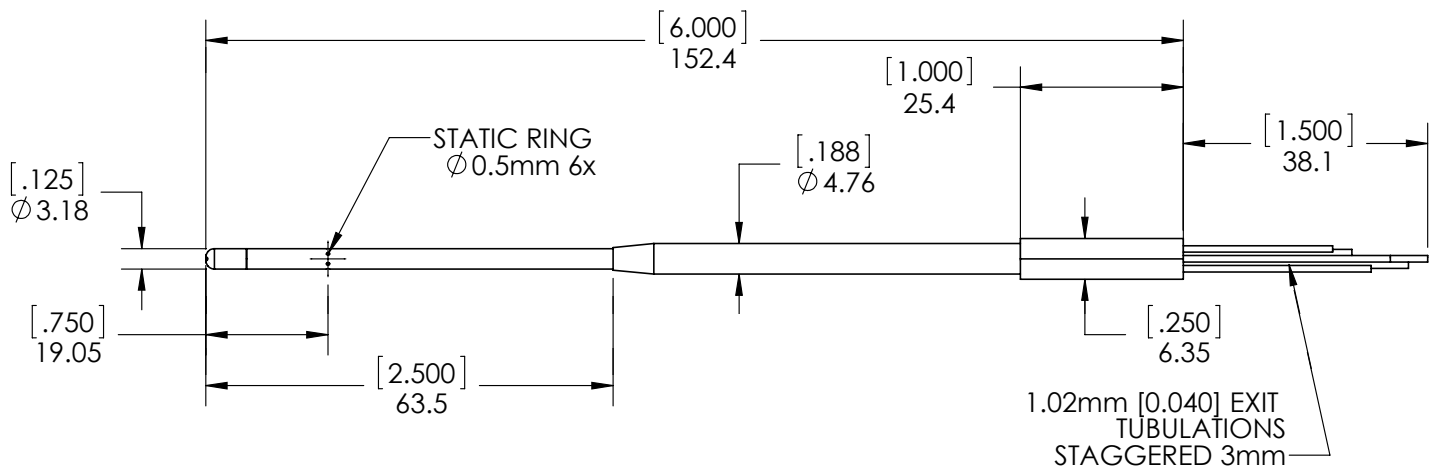

5-Hole Air Data Probe
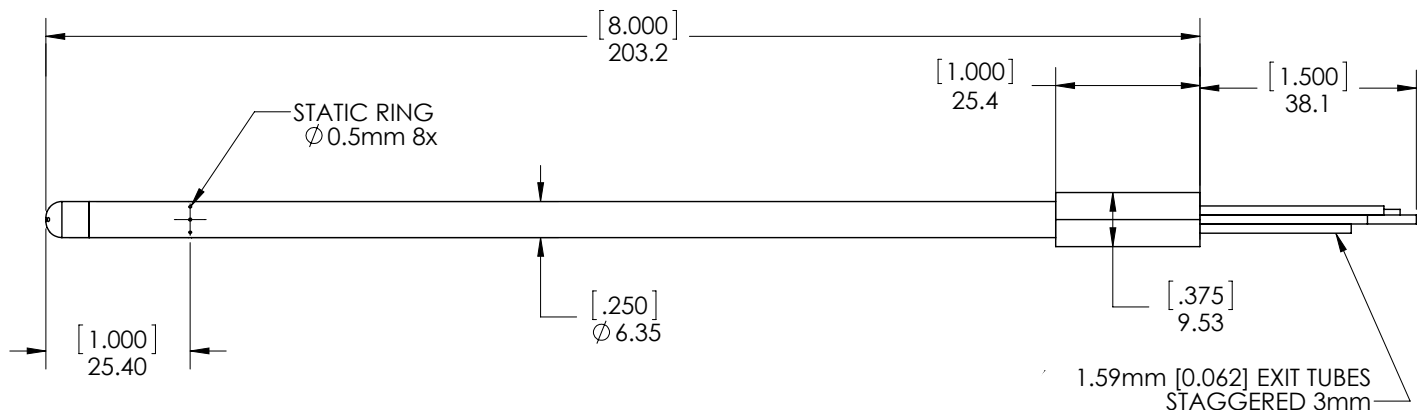

Micro Air Data System

STANDARD TECHNICAL DRAWINGS
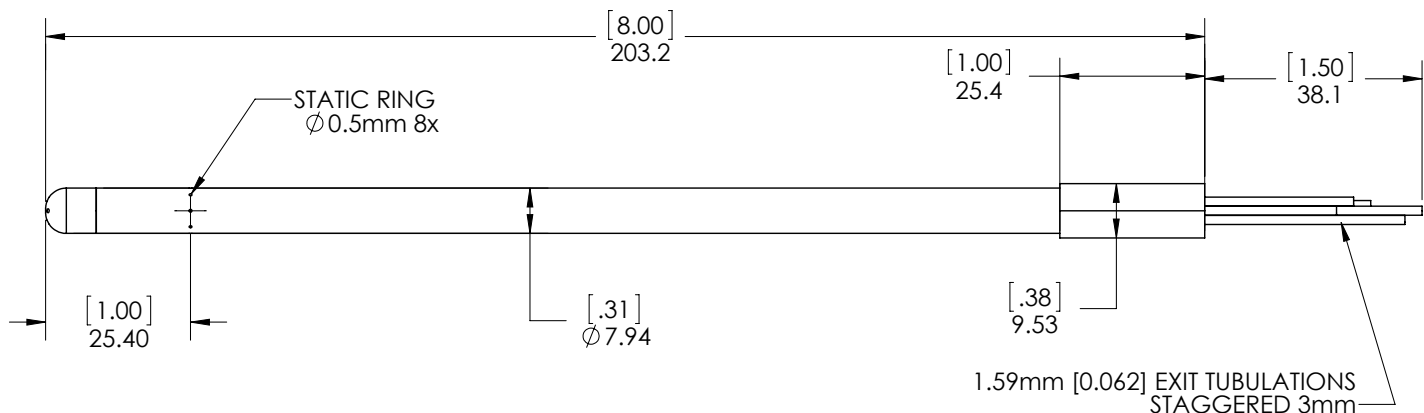
Air Data Probe

Model Number: P-A05H03S-SX-S-152

[6.000]
152.4

[1.000]
25.4

[1.500]
38.1

STATIC RING
⌀ 0.5mm 6x

[.188]
⌀ 4.76

[.125]
⌀ 3.18

[.750]
19.05

[2.500]
63.5

[.250]
6.35

1.02mm [0.040] EXIT
TUBULATIONS
STAGGERED 3mm

Air Data Probe

Model Number: P-A05H06S-SX-S-203

[8.000]
203.2

[1.000]
25.4

[1.500]
38.1

STATIC RING
⌀ 0.5mm 8x

[1.000]
25.40

[.250]
⌀ 6.35

[.375]
9.53

1.59mm [0.062] EXIT TUBES
STAGGERED 3mm

Air Data Probe

Model Number: P-A05H08S-SX-S-203

[8.00]
203.2

[1.00]
25.4

[1.50]
38.1

STATIC RING
⌀ 0.5mm 8x

[1.00]
25.40

[.31]
⌀ 7.94

[.38]
9.53

1.59mm [0.062] EXIT TUBULATIONS
STAGGERED 3mm

ONE SOURCE FOR A FULL SOLUTION

Calibration is essential to the proper operation of our probes. It defines the relationship between the measured probe port pressures and the actual velocity vector sensed by the probe and pressure transducers. The probe is placed in a known flowfield and rotated between 2000 and 6000 discrete points (depending on probe type). A calibration map is then generated for use with Aeroflow, our data acquisition and data reduction software.

Our calibration wind tunnels are thoroughly-characterized free jets, configured to allow continuous flow at 5 m/s to Mach 2.0. This configuration allows for recording of an extreme number of calibration points for each calibration. We can calibrate probes for other fluid flows via Reynolds number matching, and can recommend a calibration schedule for any probe and application.
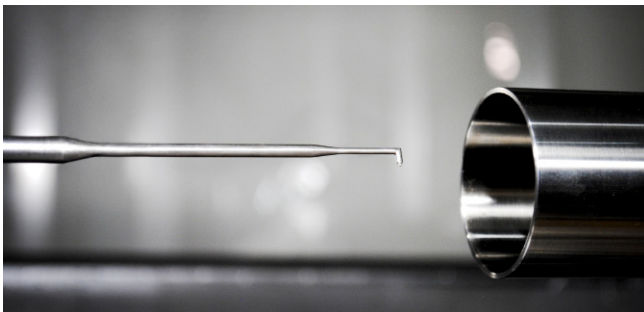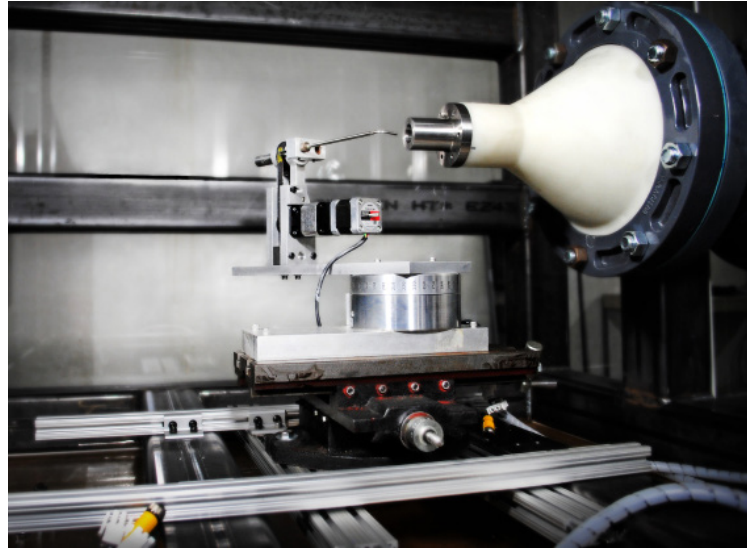
CAPABILITIES

Probe Calibrations from 5 m/s to Mach 2.0   NIST-Traceable Calibrations

Average Angular Accuracy of <1°   Specialized Calibrations Available

Average Measured Velocity Deviation   500 Calibration Points
of ±1% or ±1 m/s (whichever is larger)**

** Reported probe calibration accuracies are based on the measured error values for a comprehensive set of test points collected in Aeroprobe's laboratory wind tunnel facilities. Flow environments exist where expected errors could be larger. Contact Aeroprobe for more information.

SMALL. LIGHT. ACCURATE.

Our Micro Air Data System (µADS) is a complete solution for the acquisition and processing of air flow data with an unprecedented combination of size and accuracy. The µADS combines the functionality of our five hole probes with our micro air data computer to produce a fully integrated air data system that will greatly improve the stability and safety of unmanned aircraft used in research, commercial, or defense applications by delivering accurate air data to a flight controller or remote pilot in real-time.

The µADS incorporates our air data reduction algorithms into a compact, lightweight, micro air data computer. When paired with our air data probe (ADP), the airspeed, angle of attack, and angle of sideslip are measured with high accuracy while the integrated GPS/ INS unit produces real-time, synched data.

AEROPROBE corporation

Global Supplier of Air Data Measurement Systems