MODULAR DIGITAL PITOT PROBE SYSTEM

This robust and high-fidelity fluid speed measurement system provides an all-in-one solution for flow measurement or process monitoring. Ideal for use in wind-tunnel, UAV and motorsport applications, this probe offers industry-leading functionality in a highly compact and versatile package.

The modular structure enables probe stings to be interchanged, for fast replacement in case of damage and the option of using a variety of sting architectures with a single sensor package.

- Flow speed ranges possible from 1.1 m/s – 100 m/s at standard conditions
- 24-bit differential pressure sensor accurate to +/- 0.1% full-scale[1], with internal temperature compensation
- Modular structure enables sting to be easily removed for cleaning or replacement
- Local fluid temperature, humidity and absolute static pressure also measured
- Inertial positioning sensor for automatic alignment and vibration warning
- Low-profile, in-line sensor package measuring under 20 mm in diameter
- Configurable with either a static pressure ring in the probe sting, or independent static pressure port
- Powered and driven by USB for simple plug-and-play operation
- Dynamic calibration to 800 Hz available

Specification

Standard sensor specifications (custom available on request)	Differential pressure sensor			Static pressure sensor
Product code	FD2HP-160P	FD2HP-1K0	FD2HP-6K9	
Standard pressure ranges	160 Pa FS	1 kPa FS	6.9 kPa FS	1 atm.
Maximum overpressure	33.5 kPa	37.5 kPa	69 kPa	400 kPa
Sensor accuracy[1]	± 0.1 % FS			
Total error band after auto-zero[2]	± 0.5 % FS	± 0.25 % FS	± 0.25 % FS	± 0.25 % FS
Compensated temperature range (extended ranges available)	-40° to +65° C	0° to +50° C	0° to +50° C	-40° to +65° C
Operating temperature range	-40° to +65° C non-condensing			
Storage temperature range	-40° to +65° C non-condensing			

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Vibration	Sensors rated to 15 g, 10 Hz to 2 Hz
Maximum relative humidity	95 %
Relative ambient humidity sensor specification	0 % to 100 % RH, +/- 3%
Ambient temperature sensor specification[3]	0°C - 65°C ± 0.5°C
Ambient absolute pressure sensor specification	30-110 kPa FS, +/- 0.1kPa
Fluid temperature sensor	-40°C - 150°C ± 0.5°C
Absolute pressure limits	0.2 - 1.5 atm
Total weight	min. 30 g
Voltage	6-24 Vdc or via USB
Power	min. 290 mW
Communications interface	USB2.0, UART or Ethernet (with adaptor)
Data acquisition rate	1 kHz (equivalent)
Digital resolution	24-bit pressure, 16-bit environmental and IMU
System requirements	Windows 7 or later, minimum 3GHz & 4Gb RAM
IMU specification	3 axis gyro, 125 °/s FS, ± 3.9 x10^{-3} °/s 3 axis accelerometer, 2g FS, ± 0.061 mg

Standard probe specifications (custom available on request)	
Reference pressure	Available either with static pressure ring on sting or connection to laboratory reference
Sting geometry (laboratory)	3.7 mm OD, hemispherical tip, 316 stainless steel construction, max 240 mm long
Sting geometry (flight)	12 mm OD, hemispherical tip, carbon fibre & aluminium or 316 stainless steel construction, max 970 mm long
Enclosure material	316 stainless steel or PA12
Absolute temperature limits	5° to +65° C non-condensing

[1] Includes errors due to pressure non-linearity, pressure hysteresis, non-repeatability and calibration uncertainty.
[2] Total residual error after auto-zero, excluding residual temperature sensitivity.
[3] Temperature recorded at the location of the PCB. Waste heat from electronic components may distort temperature readings.

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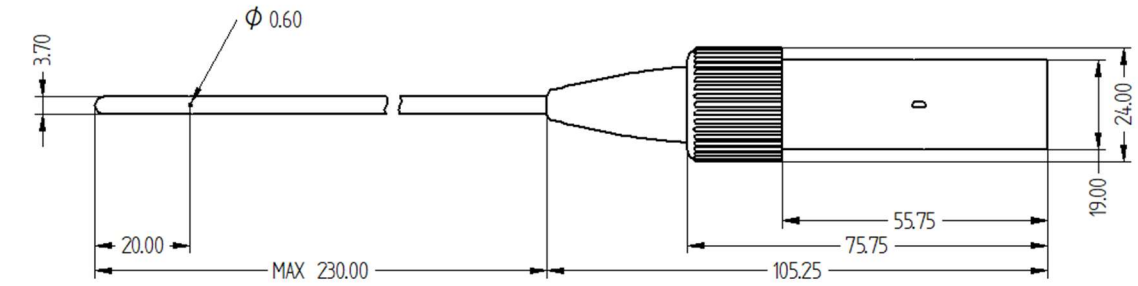
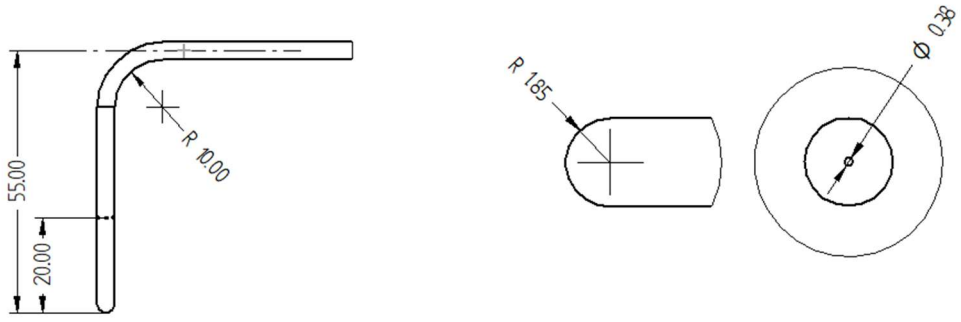
Additional custom modifications available:

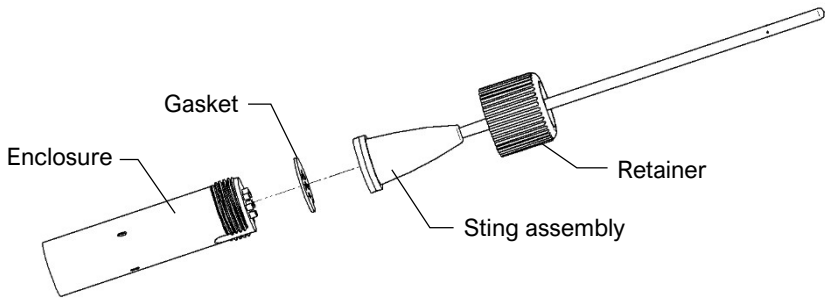
- Variety of probe geometries available
- Probe diameters down to <1 mm
- 12 mm OD heated carbon-fibre flight stings available
- Custom enclosure design service
- Custom software and driver development service
- Calibration service
- Extended product support and warranty
- External trigger/synch configuration

Dimensions

Laboratory configuration







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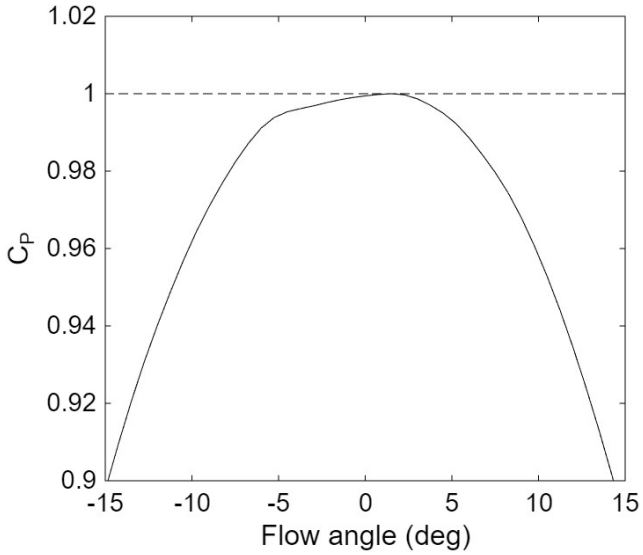
Sensitivity to flow angle

Pressure coefficient

$$C_P = \frac{P - P_{ref}}{\frac{1}{2}\rho U^2}$$



Recovery factor

$$R = \frac{\left(P - P_{ref}\right) + P_{atm}}{P_0}$$