

DATA SHEET

iProbe

PRODUCT NAME

iProbe

TYPE

5-hole probe with integrated air data system



Fig. 1 iProbe with included USB cable



Fig. 2 Probe head in close view

DESCRIPTION

The *iProbe* is a compact plug & play solution for flow measurements. It is a 5-hole probe with sensors and microcontroller for data processing and direct output of digital engineering units. The setup can be used with any laptop, in field or laboratory environments. Optionally, the *iProbe* can be purchased along with VectoVis Pro, which allows the user to monitor and record engineering data in real time.

The *iProbe* is also available with optical trackers, making it compatible with the ProCap System from Streamwise.

GEOMETRY & DESIGN

Probe head shape	L-shaped
Probe tip geometry	Regular: spherical head Micro: conical head
Probe head type	5-hole (regular or micro)
Mass	~400 g (regular) ~300 g (micro)
Extension tube dimensions	258 mm x Ø 20 mm
Head dimensions	200 mm x 21 mm (regular), 100 mm x 10 mm (micro)
Probe tip diameter	4 mm (regular) 2 mm (micro)
Fastening	One-sided flattened cylinder
Reference	Reference surface normal to Z axis
Temperature sensor	Pt100
Material	Stainless steel

OPERATING CONDITIONS

Operating temperature	-20 ... 70 °C (-4 ... 158 °F)
Operating medium	Air and other non-corrosive gases
Humidity	0 ... 95 %, non-condensing

PROBE HEAD OPTIONS

The *iProbe* is configurable in two head options: a “regular” 5-hole head and a “micro” 5-hole head. The pressure distribution across the probe tip is correlated with individual wind tunnel calibration data to determine the static and total pressures, the flow angle of attack, and the components of the flow velocity.

SENSORS AND ELECTRONICS

The *iProbe* is equipped with five calibrated differential pressure sensors which measure the pressures at the probe tip. The reference for these differential measurements is provided by an onboard barometric/absolute pressure sensor. Temperature measurements are provided by means of an integrated Pt100 sensor.

All pressure sensors are temperature-compensated and feature high accuracy and minimal offset drift. They offer a high proof pressure, providing sufficient protection against accidental overloads. The pressure sensor range is configurable based on the customer application.

PRESSURE ACQUISITION

Pressure acquisition	5 differential pressure sensors with customizable pressure ranges
Absolute pressure acquisition	On-board barometric / absolute pressure sensor
Pressure sensor accuracy¹	Max. ±0.25% full scale Typ. ±0.1% full scale

¹ All pressure sensors are calibrated to improve overall accuracy. Uncalibrated sensors would have a full-scale accuracy of max. ±2.0%.

SENSOR OPTIONS

Differential pressure range (kPa)	Max. Mach number
0.25	0.06
0.50	0.08
1.00	0.12
2.50	0.18
5.00	0.25
10.00	–

MEASUREMENT ERRORS

Flow angles	< 1°
Velocities	< 1.0 m/s or < 1.0 %, whichever is greater
Temperature	< 1 K

INTERFACES

Communication	USB for communication with host PC (setup and data acquisition)
Power	5 V via USB
Pressure reference port	Metal tube for reference pressure with Ø 1.6 mm
Probe end connector	LEMO (EGG.0B.307)
Cable (included)	5 m (FGG.0B.307 to USB)
Sampling rate	up to 50 Hz

PC COMMUNICATION

Data can be read from the *iProbe* via USB at a transmission rate of up to 50 Hz. The *iProbe* is also powered using the same USB connection.

When connected via USB, the *iProbe* identifies itself to the host PC as a virtual COM port. Thus, any software supporting serial protocols can be used for communication. Data may also be acquired with VectoVis Pro, where e.g., a live view of all data is available and can be recorded in readable file formats such as *.csv.

OUTPUTS²

Name	Unit
P _{1...P₅} (differential pressure)	Pa
P _{abs} (absolute pressure)	Pa
T _{tc} (temperature of Pt100)	°C
Theta (cone angle)	°
Phi (roll angle)	°
Alpha (angle of attack)	°
Beta (yaw angle)	°
V _{mag} (velocity magnitude)	m/s
u (x-component of velocity)	m/s
v (y-component of velocity)	m/s
w (z-component of velocity)	m/s
P _d (dynamic pressure)	Pa
P _s (static pressure)	Pa
ρ (air density)	kg/m ³
T _{tot} (total temperature)	°C
T _s (static temperature)	°C
M (Mach number)	–
Alt (baro altitude)	m
AltAbs (absolute altitude)	m
Num (counter)	–
Error	–

² Details see Manual