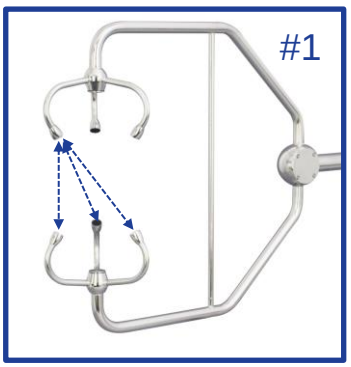
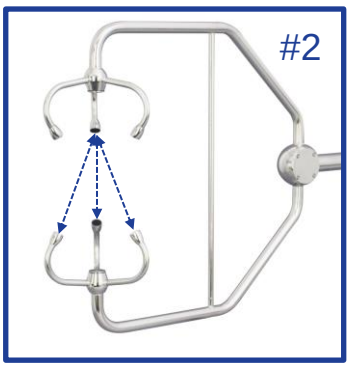
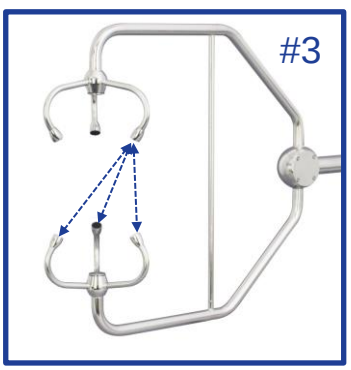
Ultrasonic Wind Sensor

uSonic-3 Class A *MP*







- **Innovative approach in 3D wind and turbulence sensing**
- **Patented "Multi-Path" measuring technique**
- **3 x 3D sonic arrays in one sensor head**
- **3 x 3 Radial wind components**
- **3 Directly measured vertical wind component**
- **3 x 3 Acoustic temperatures**
- **Minimum flow distortion by optimized design of sensor head and sonic transducers**
- **Effective signal control and data validation**
- **Efficient sensor head heating (option)**
- **Embedded 2-axis inclination sensor (option)**
- **Internal mass data storage on SD card**
- **Convenient communication and data output by RS422 and Ethernet ports**
- **Remote control of system performance**
- **Optional analog input channels with synchronized sampling**
- **High quality measurements in routine and scientific applications (e.g. at eddy covariance sites)**

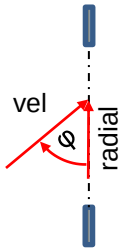
METEK

METEK Meteorologische Messtechnik GmbH

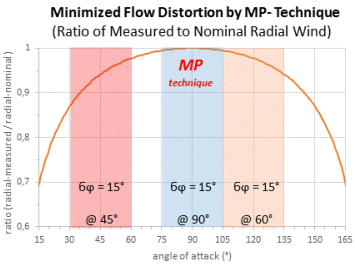
Ultrasonic Wind Sensor uSonic-3 Class A *MP*

Typical instrumental applications

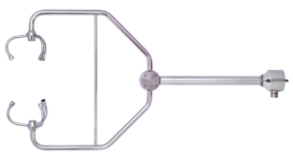
- Determination of eddy covariance fluxes
- Studies in atmospheric turbulence
- Air quality studies
- Sites with low turbulence (e.g. arctic / antarctic areas)
- Remote research stations
- Boom instrumentation on masts



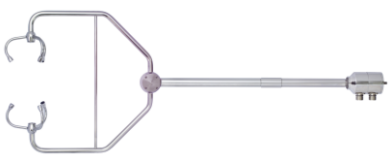
The ultrasonic anemometer **uSonic-3 Class A *MP*** uses an innovative patented method to provide highest performance in atmospheric wind and turbulence sounding. Based on the well proven METEK ultrasonic sensor family uSonic-3 the sensor head enables the user to perform three independent measurements of the air flow quasi-simultaneously by arranging each transmitting transducer opposite to three receiving transducers. This approach allows redundant measurements along the 3 x 3 signal paths, an automatic selection of the most advantageously positioned transmitter-receiver couples and three directly measured vertical wind components.
The sensor outputs 9 radial components, 9 temper measures and 3 optimally derived Cartesian wind components (x, y, z) as raw data and/or as averaged data with adjustable averaging intervals.
An embedded 2-axis inclination sensor (option) provides tilt angles of the sensor head thus allowing remote control of correct instrumental set-up.
The directional sensor head of the **uSonic-3 Class A *MP*** is the optimum solution for boom type installations.



Ambient conditions	- 40 … + 60 °C, 5 … 100 % rH, 0 … 50 m/s
Average time / number	1 … 3600 s / 1 ... 65365 samples
Sampling rate	Max. 30 Hz (→ max. 3 x 30 = 90 Hz sampling)
Measuring ranges	Max. 40 m/s, - 40 … + 60 °C
Accuracy wind component - max. dev. - rms - resolution	Acceptance angles ± 170 ° ± 1 % @ 5 m/s, 0 ° ... 10 ° inclination ± 2 % @ 5 m/s, 10 ° ... 20 ° inclination 0.5 % @ 5 m/s, 0 ° ... 10 ° inclination 1 % @ 5 m/s, 10 ° ... 20 ° inclintion 0.006 m/s (vertical), 0.01 (horizontal)
Accuracy wind direction - max. dev. - rms	Acceptance angles ± 170 ° ± 1 ° @ 5 m/s, 0 ° ... 20 ° inclination 0.5 ° @ 5 m/s, 0 ° ... 20 ° inclination
Accuracy temperature - resolution	 0.01 K
Output data set	9 radial components (incl. 3 x vertical), 9 temperatures, x, y, z, T, vel, dir, system status, signal quality
Output protocols	Async, checksum, NMEA, FTP (ethernet)
Synchronisation	1 x digital in, 1 x digital out, ntp, ptp on request
Turbulence module (option)	Online calculation of means, variances, covariances, heat flux, momentum flux, Monin-Obukhov length, etc.
Internal memory (option)	SD card 8 GB (optionally 64 GB)
Power supply	10 ... 36 VDC / 2.5 W (without options)
Sensor head heating (option)	10 ... 24 VDC / max. 100 W, incl. smart energy saving mode
Communication	RS422 (300 ... 115200), Ethernet, SD-card, all ASCII
Analog output (option)	4 x 16/14 bit nom./eff. resolution, 0 … 5/10 VDC or - 5/-10 … 5/10 VDC or 0/4 … 20 mA, adjustable ranges (x, y, z, T)
Analog input (option)	8 analog input channels, 20/17 bit nom./eff. resolution
Measuring paths	6 x 53.2 ° / 3 x 90 °, L = 6 x 165 mm / 3 x 135 mm
Inclinometer (option)	2 axis, resolution 0.1 °, response time ≈ 1 s



Standard sensor head



Extended sensor head (+200 mm) and optional 2-axis inclinometer

Sensor electronic

*all specifications are subject to change.

METEK GmbH, Fritz-Strassmann-Str. 4, 25337 Elmshorn, Germany
Phone: +49 4121 43590, Fax: +49 4121 4359 20
E-mail: info@metek.de, Internet: http://www.metek.de

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