# High Range Two Axes Ultrasonic Anemometer

## HD51.3D… series

Delta OHM
Member of GHM GROUP

### WIDE AVAILABILITY OF MODELS FOR ALL NEEDS

Basic models with **Wind Speed & Wind Direction** or 'All-in-One' with additional **Temperature, Relative Humidity, Atmospheric Pressure and Solar Radiation**

### HIGH RANGE WIND MEASUREMENT

Capable of measuring **wind speed up to 85** m/s without giving up

### HIGH PERFORMANCE FOR HARSH ENVIRONMENTS

**Heavy duty** mechanical design. Models with **integrated heating.** Ultrasonic sensor with **no moving parts.** Minimized maintenance.

### ACCURATE AND RELIABLE SYSTEM

All **sensors** are **factory-calibrated** and do not require additional interventions of the user.

### GREAT FLEXIBILITY IN OUTPUT CHOICE

**RS232, RS485** and **RS422** isolated serial outputs.

**NMEA** and **MODBUS-RTU** standard protocols and **ASCII** proprietary protocol.

**Two analog output** for wind speed and direction or for velocity U-V cartesian components.

*HD51.3DP147*
*High range multiparameter*

*HD51.3DR-AL for harsh environments*

### Main Application Fields

Wind farms monitoring

Remote weather stations

Buildings, constructions and bridges control

Ports, airports and heliports

Road and railway tunnels

### HIGH RANGE WIND SPEED? APPLICATIONS IN HARSH ENVIRONMENTS? HD51.3D SERIES IS DESIGNED FOR THE PURPOSE!

Measurements of wind speed and wind direction have become of very high importance in many fields. Automatic Weather Stations (AWS) are probably where we are mostly used to see anemometers in action but it is definitely not the only application for wind measurement. Let's think for example about the importance of accurately knowing wind gust, wind speed and wind direction when it comes to wind measurements on a port, a harbor or an off-shore application.

Delta OHM already boasts a wide range of wind measurement sensors. The **HD51.3D series** has been developed as a result of an increasing professional market demand for **higher ranges of measurements.** Worldwide, changes of climate and more extreme occurring situation have caused this movement toward higher ranges.

The HD51.3D series is **the result of our own R&D**. The **top model** of this series in anodized aluminium alloy can even **withstand an extreme wind speed of 100 m/s without giving up!**

A lot of attention has been paid to the mechanical design: thanks to a **heavy duty design and no moving parts**, maintenance is minimized. An **anti-corrosion coating** allows the aluminium versions to be used even in particularly aggressive atmosphere. An **enhanced heater** (or optional for the models with housing in technopolymer) grants rapid defrosting and accurate measurement in all environmental conditions.

The optional function of detecting the orientation (compass) and tilt angles allows the spatial orientation of the instrument to be determined at any time, allowing installation on mobile vehicles (e.g. boats) or, in the case of fixed installations, the automatic correction of both a possible misalignment with respect to the vertical axis and an imperfect orientation of the instrument towards the North.

The **high immunity to electromagnetic disturbances** makes the anemometer suitable for measurements in electrically noisy environments such as industrial environments or wind farms.

All models satisfy the requirements of the **MIL-STD-810G Method 509.6 and EN ISO 9227:2017** (salt fog anti-corrosion test). The versions with housing in anodized aluminium alloy also satisfy **MIL-STD-810F Method 521.2** (anti-icing/freezing rain test) and **EN 60945:2002 Sect. 8.7 / IEC 60068-2-6** (vibration resistance test).

## Technical Specifications

### *WIND SPEED*

| | |
|---|---|
| Sensor | Ultrasounds |
| Measuring range | 0…80 m/s (versions *'-AL'*)<br>0…85 m/s (versions without T/RH)<br>0…75 m/s (versions with T/RH) |
| Resolution | 0.01 m/s |
| Accuracy | ± 0.2 m/s or ± 2% of measure, the greatest (0…65 m/s),<br>± 3% (> 65 m/s) |

### *WIND DIRECTION*

| | |
|---|---|
| Sensor | Ultrasounds |
| Measuring range | 0…359.9° |
| Resolution | 0.1° |
| Accuracy | ± 2° RMSE wind speed > 2 m/s |

### *AIR TEMPERATURE* (option 17)*

| | |
|---|---|
| Sensor | Pt100 |
| Measuring range | -40…+70 °C |
| Resolution | 0.1 °C |
| Accuracy | ± 0.15 °C ± 0.1% of measure |

### *RELATIVE HUMIDITY* (option 17)*

| | |
|---|---|
| Sensor | Capacitive |
| Measuring range | 0…100 %RH |
| Resolution | 0.1 % |
| Accuracy<br>(@ T = 15…35 °C) | ± 1.5 %RH (0…90 %RH),<br>± 2 %RH (remaining range) |
| Accuracy<br>(@ T = -40…+70 °C) | ± (1.5 + 1.5 % of measure) %RH |

### *ATMOSPHERIC PRESSURE (option 4)*

| | |
|---|---|
| Sensor | Piezoresistive |
| Measuring range | 300…1100 hPa |
| Resolution | 0.1 hPa |
| Accuracy | ±0.5 hPa (700…1100 hPa) @ 20 °C<br>±1 hPa (500…1100 hPa) @T = 0…60 °C<br>±1.5 hPa (300…500 hPa) @T = 0…60 °C |

### *GLOBAL SOLAR RADIATION* (option P)*

| | |
|---|---|
| Sensor | Thermopile |
| Measuring range | 0…2000 W/m$^2$ |
| Resolution | 1 W/m$^2$ |
| Accuracy | Spectrally Flat Class C |

### *COMPASS + TILT ANGLES (option A)*

| | |
|---|---|
| Resolution | 0.05° |
| Accuracy | ± 1° |

### *HEATING (option R, always included in "-AL" models)*

| | |
|---|---|
| Heater power supply | 24 Vdc ± 10% |
| Heater power consumption | 15 W<br>80 W for *'-AL'* models |

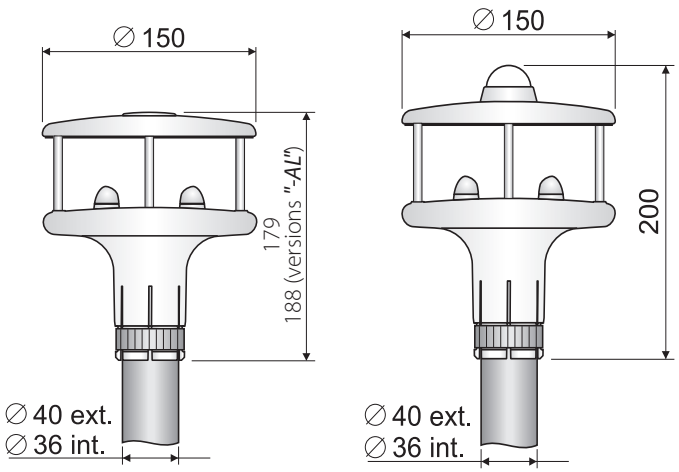
* These options are available only for models in technopolymer.

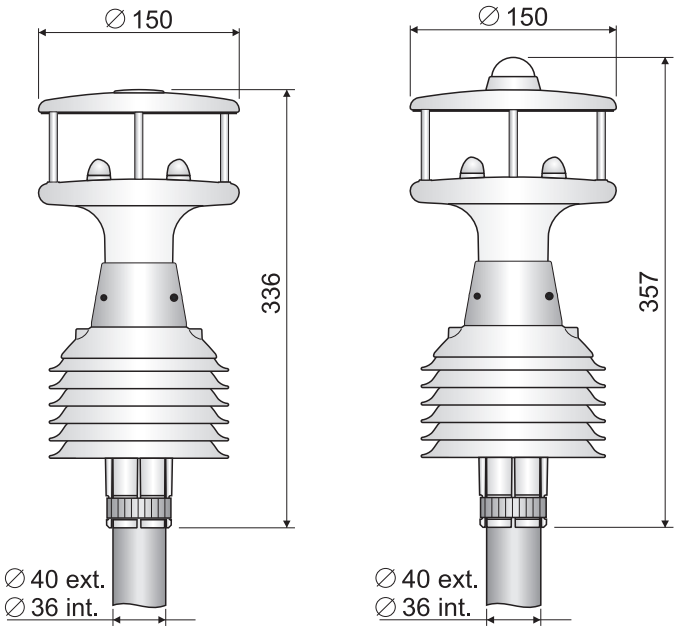
### GENEARAL FEATURES

| | |
|---|---|
| Power supply (without heater) | 12…30 Vdc |
| Power consumption (without heater) | 60 mA @ 24 Vdc |
| Serial outputs | Isolated RS232, RS485 and RS422 |
| Communication protocols | NMEA, MODBUS-RTU, ASCII proprietary |
| Analog outputs | 2 analog outputs, for wind speed and direction or for velocity U-V cartesian components.<br>Output at choice among 4…20 mA (standard), 0…1, 0…5 and 0…10 V |
| Measurement interval | From 250 ms to 1 s |
| Wind speed averaging interval | Configurable from 1 s to 10 min |
| Wind Gust calculation interval | Configurable from 1 s to 10 min |
| Electrical connection | 19-pole M23 male connector |
| Operating temperature | -40…+70 °C<br>-50…+70 °C** |
| Protection degree | IP 66 |
| Anti-corrosion test | MIL-STD-810G Method 509.6<br>(48 hours of exposure + 48 hours of drying)<br>EN ISO 9227:2017 |
| Vibration resistance test** | MIL-STD-810F Method 521.2 |
| Anti-icing/freezing rain test** | EN 60945:2002 Sect. 8.7<br>IEC 60068-2-6 |
| Survival speed | 90 m/s<br>100 m/s** |
| Weight | About 640 g (versions without T/RH)<br>About 1 kg (versions with T/RH)<br>About 1.4 kg (versions *'-AL'*) |
| Case | ASA with aluminium and AISI 316 metal parts<br>Anodized aluminium alloy and AISI 316** |
| Installation | on mast Ø 40 mm external and Ø 36 mm internal |

** Specifications refer only to models in anoized aluminium alloy.

## Dimensions (mm)




## PC Application Software

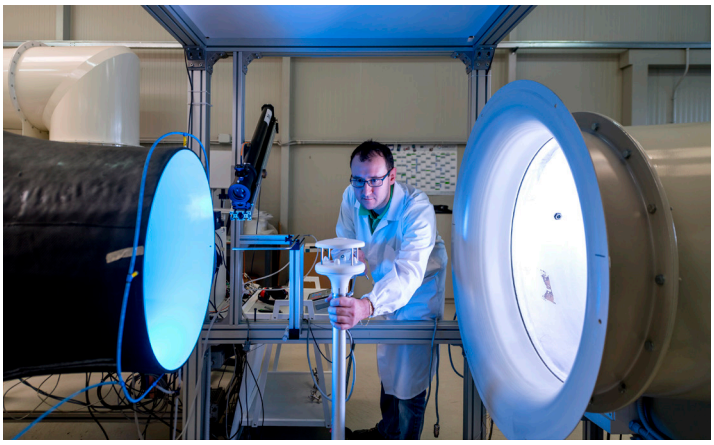
The PC software HD52.3D-S allows configuring the instrument, viewing the real time measurements both graphically and numerically, managing graphical presentation, printing and export in Excel® format of the data acquired with the Monitor function.


HD52.3D-S software: viewing the real time measurements

## ISO 17025 - Air Velocity Laboratory

Our **internal ISO 17025 accredited Air Velocity Laboratiry** is provided with two Göttinger-Type wind tunnels, in order to assure the best metrological performance (stability, uniformity). Each tunnel has a LDA (Laser Doppler anemometer) in order to assure the best reference standard available.

Air speed calibration ranges include low range wind tunnel operating in the range 0.15 m/s, 35 m/s with a circular test section of 320 mm and a high range 1 m/s, 60 m/s with a circular test section of 600 mm.



| MODEL | WIND SPEED & WIND DIRECTION | ATMOSPHERIC PRESSURE | RELATIVE HUMIDITY + TEMPERATURE | GLOBAL SOLAR RADIATION | COMPASS + TILT ANGLES | HEATING |
|---|---|---|---|---|---|---|
| Models with housing in technopolymer | | | | | | |
| HD51.3D [A][R] | ✓ | | | | With **option A** in the code | With **option R** in the code |
| HD51.3D4[A][R] | ✓ | ✓ | | | | |
| HD51.3DP[A][R] | ✓ | | | ✓ | | |
| HD51.3DP4[A][R] | ✓ | ✓ | | ✓ | | |
| HD51.3D17[A][R] | ✓ | | ✓ | | | |
| HD51.3D147[A][R] | ✓ | ✓ | ✓ | | | |
| HD51.3DP17[A][R] | ✓ | | ✓ | ✓ | | |
| HD51.3DP147[A][R] | ✓ | ✓ | ✓ | ✓ | | |
| Models with housing in anodized aluminium alloy | | | | | | |
| HD51.3D[A]R-AL | ✓ | | | | With **option A** in the code | ✓ |
| HD51.3D4[A]R-AL | ✓ | ✓ | | | | ✓ |

## Ordering Codes

HD51.3D

**Analog output**
**Blank** = 4…20 mA (default)
**V** = 0…10 V
**V1** = 0…1 V
**V5** = 0…5 V

**Heating**
**Blank** = without heating (default)
**R** = with heating option

**Compass + Tilt Angles**
**Blank** = without compass and tilt angles (default)
**A** = with compass and tilt angles

**Temperature**
**Blank** = without (default)
**7** = with Temperature *(option 1 'RH' required)*

**Atmospheric Pressure**
**Blank** = without (default)
**4** = with atmospheric pressure option

**Relative Humidity**
**Blank** = without (default)
**1** = with Relative Humidity *(option 7 'Temperature' required)*

**P** = pyranometer
**K** = bird spikes
**Blank** = without pyranometer and/or bird spike

*Versions in technopolymer*

*Ultrasonic sensors for wind speed and direction*

*Mast fixing clamp*

*Solar radiation sensor*

*Temperature and relative humidity sensors with solar radiations protection shield*

HD51.3D R -AL

**Analog output**
**Blank** = 4…20 mA (default)
**V** = 0…10 V
**V1** = 0…1 V
**V5** = 0…5 V

INTEGRATED HEATING

**Compass + Tilt Angles**
**Blank** = without compass and tilt angles (default)
**A** = with compass and tilt angles

**Atmospheric Pressure**
**Blank** = without (default)
**4** = with atmospheric pressure option

**Bird Dissuader**
**Blank** = without (default)
**K** = with bird spikes

*Version in anodized aluminium alloy*

## Accessories

| | |
|---|---|
| RS52 | Serial connection cable with built-in RS232/USB converter. USB connector for the PC and screw terminals on the instrument side. Useful for models measuring T and RH, which do not have the auxiliary RS485 serial output. |
| RS51K | Kit for connecting the anemometer RS485 auxiliary output to a PC (not for models measuring T and RH). It includes the SWD10 power supply and the RS485/USB adapter with screw terminals for the connection to the CP51… cable (not included), USB connector for the connection to the PC, jack connector for connecting the SWD10 power supply. |
| CP51.xx | Connecting cable with 19-pole M23 female connector on one side, open wires on the other side. Available lengths: 5 m, 10 m ,15 m, 20 m. For lenght over 20 m, contact our sales departement. |
| CP52.C | Additional 19-pole M23 female free connector. |
| HD2005.20 | Tripod with adjustable legs for installing environmental sensors. Material: anodized aluminum. Max. height 225 cm. It can be fixed on a flat base with screws or to the ground with pegs. |
| HD2005.20.1 | Tripod with adjustable legs for installing environmental sensors. Material: anodized aluminum. Max. height 335 cm. It can be fixed on a flat base with screws or to the ground with pegs. |

Member of GHM GROUP

In order to ensure the quality of our instruments, we are constantly re-evaluating our products. Improvements can imply changes in specification; we advise you to always check our website for the newest version of our documentation.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