

FT722+  
FT742  
DATASHEET

NEW

DESIGNED FOR TURBINE CONTROL

THE WORLD'S  
**TOUGHEST**  
WIND SENSORS

[WWW.FTTECHNOLOGIES.COM](http://WWW.FTTECHNOLOGIES.COM)

# PROVEN

## NEW LOOK, NEW SPEED, SAME STRENGTH

The FT722 and the FT742 ultrasonic anemometers are the latest additions to FT Technologies' FT7 Series - the world's toughest wind sensors. Measuring wind speeds up to 75 m/s, the FT7 Series has been redesigned inside and out with these two new products on the range.

Powered by our patented Acu-Res® Technology the FT7 Series is unique in the market. Extremely small, with no moving parts to degrade, the FT722 and FT742 are very rugged wind sensors that are maintenance-free and deliver 99.9% data availability, for years on end, even in the harshest of conditions on top of a wind turbine.

## NEW DESIGN DELIVERS IMPROVED ACCURACY

The innovative design\* of the FT722 and FT742 sensors incorporates a series of "turbulators" which condition the air flow and improve the accuracy.

Along with improved software, and calibration in our new state-of-the-art wind tunnel, the FT722 and FT742 deliver our highest levels of accuracy in wind speed and direction measurement.

## MAINTENANCE-FREE

The aluminium hard anodised body is highly resistant to corrosion, sand, dust, ice and solar radiation. The sensor is sealed to IP67 standard and inherently compensates for changes in the air's temperature, pressure and humidity.

## INSTALLATION FLEXIBILITY

The FT702LT series has two physical mounting options. The flat front mounting for fitment to a bar or the pipe mount system for fitment to a pipe. The pipe mount system gives improved environmental protection as the communication and power cable is kept fully protected inside the pipe.

## POWERFUL DE-ICING

All FT7 Series sensors are fitted with a thermostatically controlled heating system. The sensor maintains its temperature at a user specified heater set point of between 0° and 55°C.

## PROVEN LIGHTNING PROTECTION

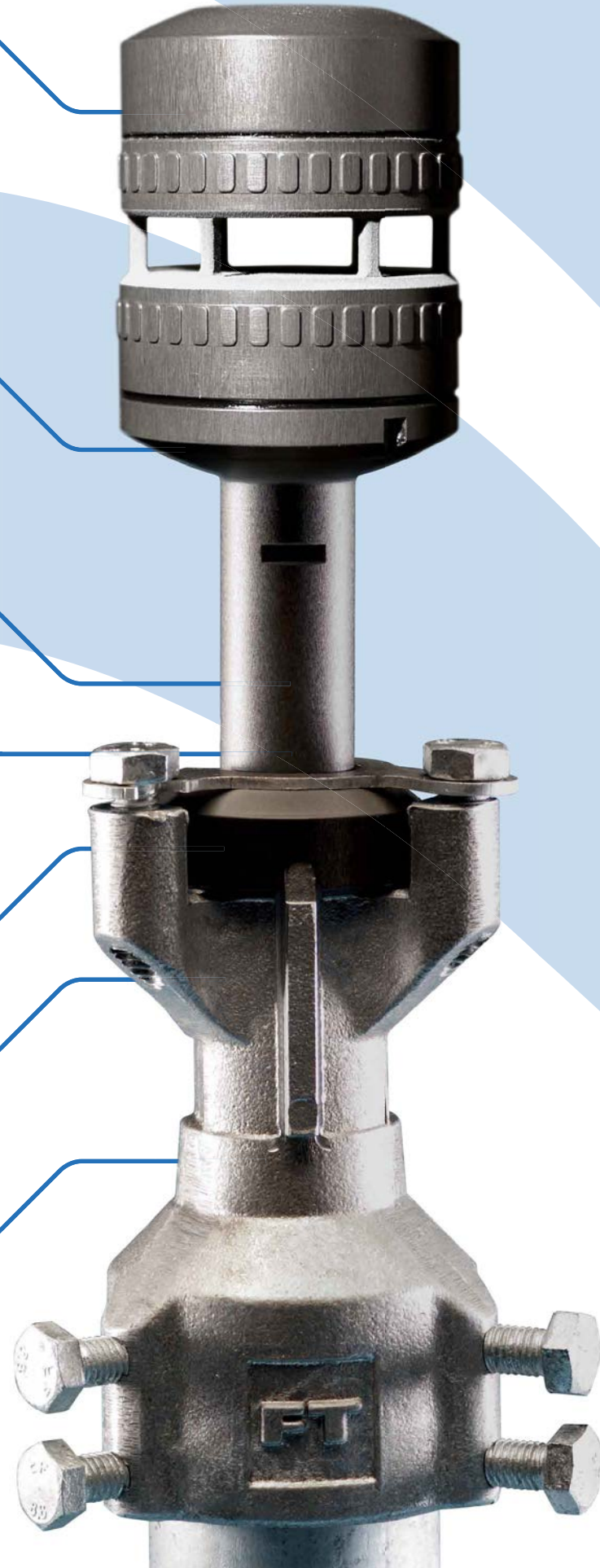
Wind sensors are exposed to high levels of electromagnetic interference from static discharges and nearby lightning strikes. The sonic FT7 Series incorporates robust protection circuitry to shield it against these effects. The sensor will survive undamaged lightning induced surges in excess of 4kA 8/20µs.

## USED EVERYWHERE

The FT702LT series has been used on wind turbines for over 10 years. In that time sensors have been installed all over the world from Mongolia to Alaska.

For more information read the case studies on our website: [www.fttechnologies.com](http://www.fttechnologies.com)

\*patent pending



# RELIABLE

## ENVIRONMENTAL PROTECTION SYSTEM

The Acu-Res EPS means the sensor works reliably in the most extreme conditions and helps to guarantee high data availability. As part of the development programme the FT722 and FT742 passed the FT Technologies HALT test. The sensor is heated to 125°C and cooled to -90°C whilst being vibrated at 30G. It continued to work throughout the test.

Like all FT7 Series sensors the FT722 and FT742 will be externally certified to the following standards:

### ROBUST, COMPACT FORM

**Designed for:** Impact



**Tested and Proven:** Drop resistant: EN 60068-2-31 (2008) dropped 6 times at different angles from 1 metre onto steel faced concrete.

**Tested and Proven:**

Hail resistant: EN 61215 (2005) 10 hail stones, 7.5 grams each shot at the sensor at 23 m/s.



### HARD ANODISED ALLOY BODY

**Designed for:** Salt, sand and water

**Tested and Proven:**

Corrosion resistant: ISO 9227 (2006) & IEC12944 (1998) corrosion class C5M High corrosion test in Neutral salt spray atmosphere for 1440 hours.



**Tested and Proven:**

Sand and Dust resistant: DEF STAN 00-35 CL25 (2006) sand particles for 3 hours and dust particles for 3 hours, at 29 m/s air velocity, concentration 1.1g/m3.



### THREE HEATERS: TOTAL TEMPERATURE CONTROL

**Designed for:** Harsh winters

**Tested and Proven:** Ice resistant MIL-STD-810G: Sensor remains ice free when freezing rain applied in a chamber with temperature -14°C wind speed 15m/s.



**Tested and Proven:**

De-icing MIL-STD-810G: Sensor exposed to freezing rain in air flow of 15m/s and -14°C. Ice built up to 45mm. Heaters switched on. Airflow and temperature unchanged. The sensor was ice free in under 15 minutes.



### SURGE PROTECTION ELECTRONICS

**Designed for:** Lightning

**Tested and Proven:**

- > Immunity for industrial environments EN 61000-6-2.
- > Electrostatic discharge immunity test EN 61000-4-2.
- > Electrical fast transient/burst immunity test EN 61000-4-4.
- > Surge immunity test EN 61000-4-5.
- > Pulse magnetic field immunity test EN 61000-4-9.
- > Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests EN 61000-4-29.



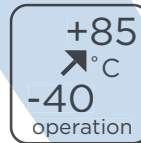
### Solar Radiation

24 hours of UV radiation with an ambient temperature of 55°C, irradiance of 1120 W/m2.  
Passed: EN 60068-2-5 (2000)



### Altitude

4 hours at a constant low pressure typical to 3000 metres above sea level. Additional tests in a dedicated altitude wind tunnel have shown that the sensor measures accurately up to 4000m  
Passed: EN60068-2-13 (1999)



### Heat and Cold

16 hours of cold air at -40°C. 16 hours dry heat at +85°C. 74 hours of heat and cold, 16 temperature cycles from -40°C to +70°C.  
Passed: EN 60068-2-1 (2007), EN 60068-2-2 (2007), EN 60068-2-14 (2009)



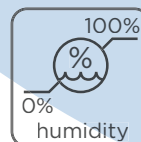
### 3 axis Sinusoidal & Random Vibration

5-500 Hz, 1 octave/min sweep range for sinusoidal 5-500 Hz, 90 mins per axis, 0.0075g2/Hz for random.  
Passed: EN 60068-2-6 (2008), EN 60068-2-64 (2008)



### Water and Dust Protection

Exposed to a dust chamber for 8 hours. Submerged in 1 metre depth of water for 30 mins.  
Passed: EN 60529 (2000) - Sealed to IP67



### Stationary & Cyclic Humidity

Stationary relative humidity +93% for 240 hours. Six 24 hour cycles, upper temperature 55°C.  
Passed: EN 60068-2-78 (2002), EN 60068-2-30 (2005)



### Fog and Rain

Fog intensity of 1 to 2 ml/80cm2 for 1 hour. Rain at 200 ±50 mm for 1 hour.  
Passed: DEF STAN 00-35 Test CL26, DEF STAN 00-35 Test CL27

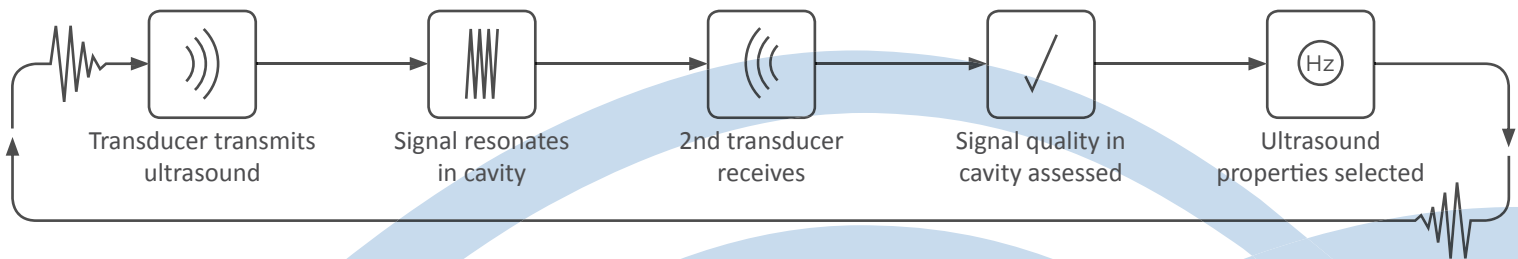
# TECHNOLOGY



This is FT Technologies' patented Acoustic Resonance technology. Acu-Res enables our sensors to take accurate measurements in a small space. This means our sensors are small, easy to heat, durable and strong. Acu-Res sets FT sensors apart from mechanical and other ultrasonic wind sensing technologies to give a more robust and reliable measurement solution.

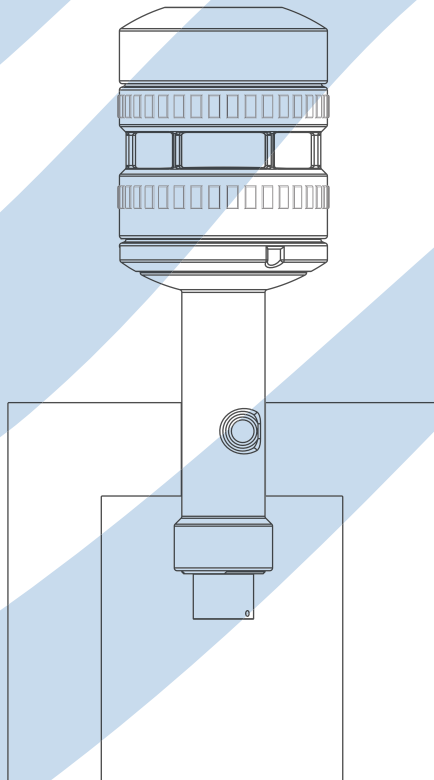
The sensor works by creating a resonating ultrasonic signal inside the sensor's measurement cavity. The motion of air is sensed by measuring the phase change in the ultrasonic signal caused by the wind as it passes through the cavity. The sensor has three transducers arranged in an equilateral triangle. The net phase difference between a transmitting and receiving transducer pair is indicative of the airflow along the axis of the pair. Therefore by measuring all three pairs the component vectors of the airflow along the sides of the triangle are determined.

These vectors are combined to give the overall speed and direction. The sensor uses complex signal processing and data analysis taking a sequence of multiple measurements to calculate regular wind readings.



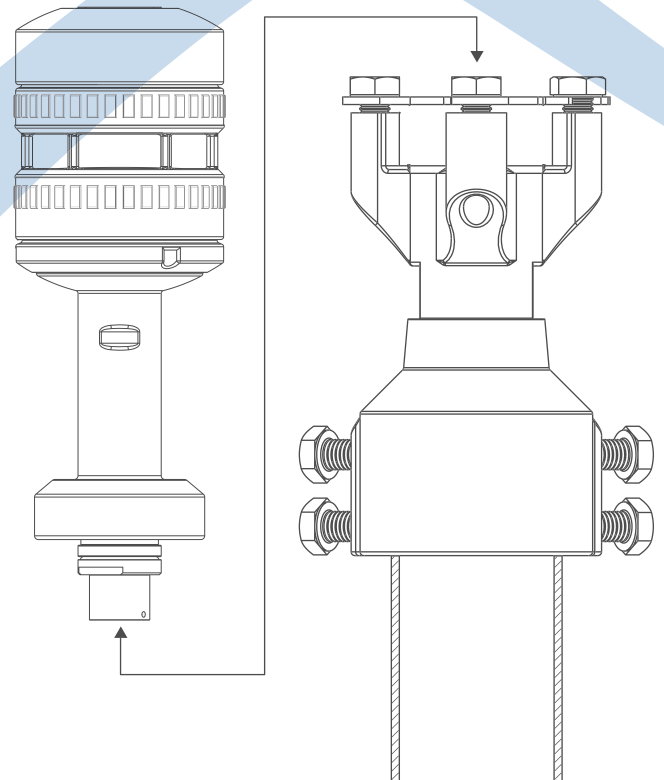
The sensor inherently compensates for changes in the air's temperature, pressure or humidity. A strong resonating sound wave in a small space provides a large signal that is easy to measure. Acu-Res has a signal to noise ratio more than 40db stronger than other ultrasonic technologies.

## MOUNTING OPTIONS



### FLAT FRONT

The Flat Front wind sensor is designed for quick and easy installation against a metal bar. We recommend a rubber boot (FT909) is used for the protection of the signal cable and connector.



### PIPE MOUNT

The FT Pipe Mount wind sensor is designed for installation on top of a pipe or post. The sensor-connecting cable is run inside the pipe giving added lightning and environmental protection.

# SPECIFICATION



## WIND SPEED

	FT742	FT722
Range.....	0-75m/s.....	0-50m/s
Resolution.....	0.1m/s.....	0.1m/s
Accuracy.....	±0.3m/s (0-16m/s) ±2% (16-40m/s) ±4% (40-75m/s)	±0.3m/s (0-16m/s) ±2% (16-40m/s) ±4% (40-50m/s)

## WIND DIRECTION

Range.....	0 to 360°
Resolution.....	1°
Accuracy (within ±10° datum).....	±2° RMS
Accuracy (outside ±10° datum).....	±4° RMS

## SENSOR PERFORMANCE

Measurement principle.....	Acoustic Resonance (automatically compensates for variations in temperature, pressure & humidity).
Units of measure.....	metres per second, kilometres per hour or knots
Altitude.....	0-4000m operating range
Temperature range.....	-40° to +85°C (operating and storage)
Humidity.....	0-100%
Ingress protection.....	IP67, EN 60529 (2000)
Heater settings.....	0° to 55°C. The heater set point can be configured.

## POWER REQUIREMENTS

Supply voltage.....	20V to 30V DC (24V DC nominal). Supports 12V battery operation with reduced heater capacity.
Supply current (heater off).....	31mA typical
Supply current (heater on).....	Limited to 4A (default), 6A (max) – configurable in software in 0.1A increments. Heater power consumption will depend on the energy required to keep the sensor's temperature at the user determined set point. The heater and sensor power consumption is limited by default to 99W.

## PHYSICAL

I/O connector.....	5-way (RS485 option), 8-way (4-20mA option) multipole connector.
Sensor weight.....	320g, Flat Front (sensor only). 350g, Pipe Mount (sensor only).

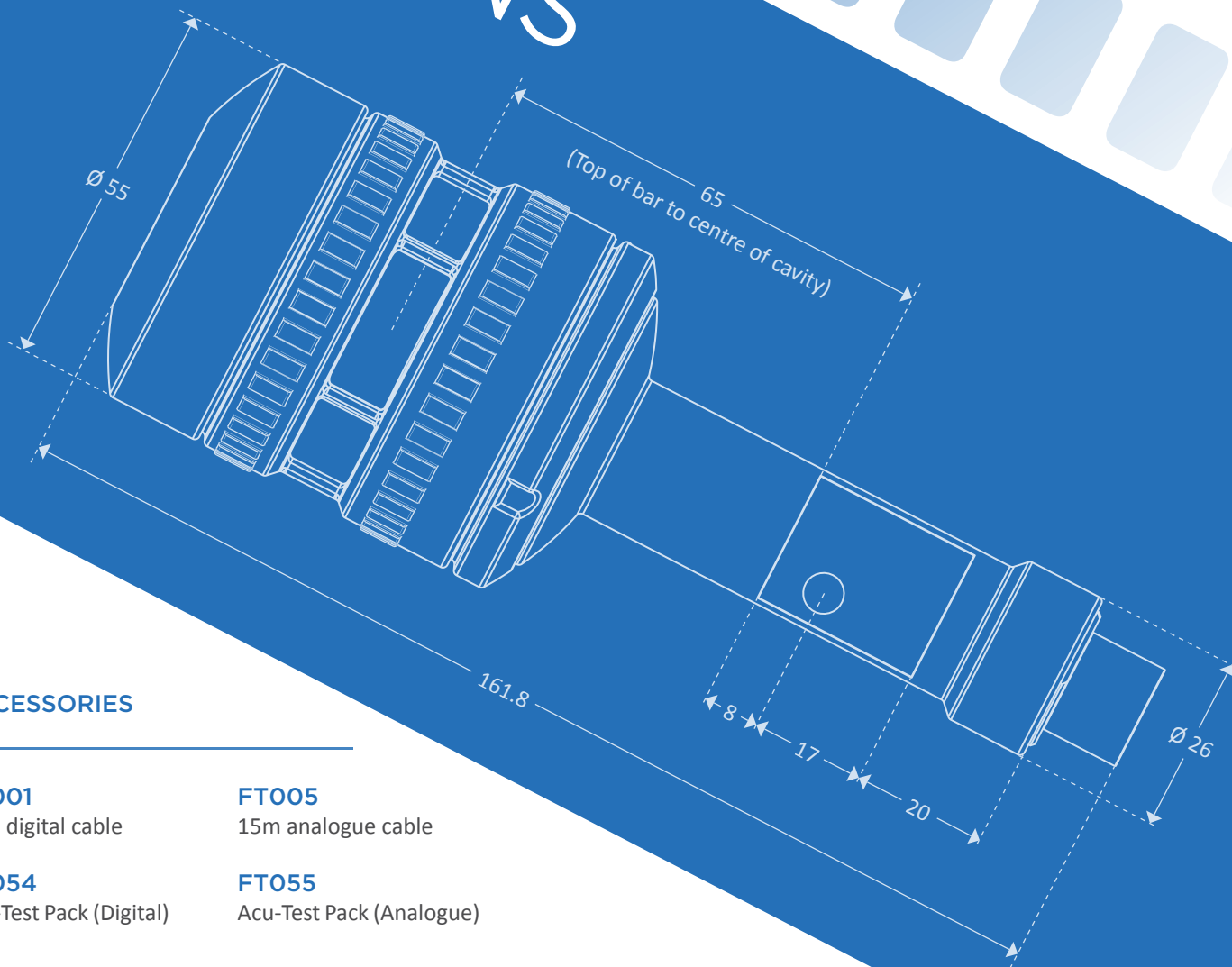
## DIGITAL SENSOR

Interface.....	RS485, galvanically isolated from power supply lines and case.
Format.....	ASCII data, polled or continuous output modes, NMEA 0183.
Data update rate.....	Maximum 10 measurements per second.
Error handling.....	When the sensor detects an invalid reading a character is set in the wind velocity output message. This error flag character is 1.

## ANALOGUE SENSOR

Interface.....	4-20mA, galvanically isolated from power supply lines and case.
Format.....	One 4-20mA current loop for wind speed (different scaling factors are available). One 4-20mA current loop for wind direction (datum value configurable as 4mA or 12mA). Both analogue channels are updated ten times per second.
4-20mA configuration port.....	This port is for the user to change the internal settings of analogue sensors and to perform diagnostic testing. This interface is not intended for permanent connection to a data logger or other device.
Error handling.....	When the sensor detects an invalid reading then both speed and direction current loops will drop to a default value of 1.4mA (configurable up to 3.9mA).

# DIMENSIONS



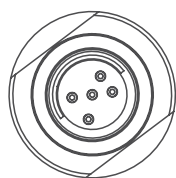
## ACCESSORIES

**FT001**  
15m digital cable

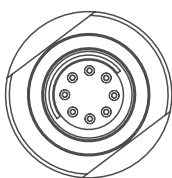
**FT005**  
15m analogue cable

**FT054**  
Acu-Test Pack (Digital)

**FT055**  
Acu-Test Pack (Analogue)



**DIGITAL SENSOR**  
FT7(22/42)-D-(FF/PM)  
RS485  
5 pin  
Connector image left



**ANALOGUE SENSOR**  
FT7(22/42)-A-(FF/PM)  
4-20mA  
8 pin  
Connector image left

All dimensions shown in mm

## ACU-TEST PACKS

These comprise Acu-Vis software and a specially developed cable which allows connection to a Windows PC and to a power supply. For the analogue sensor the software allows the functioning of the sensor to be checked and configuration changes to be made. For the digital sensor the software displays the sensor's settings and shows wind speed and direction in real time.

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