



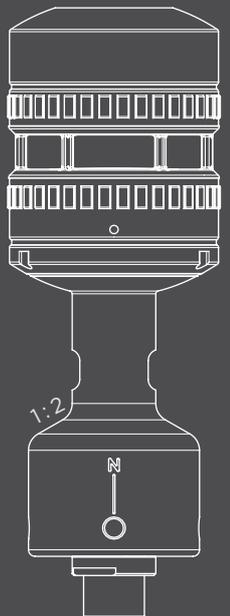
FT TECHNOLOGIES

FT742 DATASHEET

NEW



DIRECT MOUNT DESIGNED FOR METEOROLOGY



THE WORLD'S
TOUGHEST
WIND SENSORS

WWW.FTTECHNOLOGIES.COM

POWERED BY
**acur
res**
TECHNOLOGY

PROVEN

IT LOOKS DIFFERENT BECAUSE IT IS DIFFERENT

The FT742-DM (Direct Mount) ultrasonic anemometer is the latest addition to FT Technologies' FT7 Series - the world's toughest wind sensors. Measuring wind speeds up to 75 m/s, the FT742-DM has been specifically designed for use in meteorological applications and to meet the WMO standards for wind sensors.

Powered by our Acu-Res® Technology the FT742-DM is unique in the market. Extremely small, with no moving parts to degrade, the FT742-DM is a very rugged wind sensor that is maintenance-free and delivers 99.9% data availability, for years on end, even in the harshest of conditions.

NEW DESIGN DELIVERS IMPROVED ACCURACY

The FT742-DM mounts directly onto a 33.7mm pipe. Its innovative design* 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 FT742-DM delivers 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, solar radiation and bird attack. The sensor is sealed to IP67 standard and inherently compensates for changes in air temperature, pressure and humidity.

MOBILE, COMPACT, LIGHTWEIGHT

The FT742-DM is small, only 162mm high, and weighs only 380g. This makes it suitable for portable equipment. The sensor can be supplied with either RS485 or analogue 4-20mA output, and can be specified to output data in m/s, km/h or knots.

RUGGED AND SHOCK-RESISTANT

With no moving parts to degrade or damage, and resistant to shock and vibration, the FT742-DM is suitable for all mobile applications.

POWERFUL DE-ICING

The FT742-DM is 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.

LOW POWER USAGE

In standard format the heaters draw a maximum of 99W. With the heaters switched off the FT742-DM draws only 30mA at 24 volts DC. However it can also run at 12 volts making it ideal for use with batteries.

USED EVERYWHERE

FT anemometers have been used in meteorological applications all over the world including at both poles. Customers have used FT sensors in weather stations, hurricane research, cold climate weather oceanographic research and maritime navigation. For more information read the case studies on our website: 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 FT742-DM 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 FT742-DM has been 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. Shock resistant: EN 60068-2-27 (2009) to a force of 50g.



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 airflow 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.



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

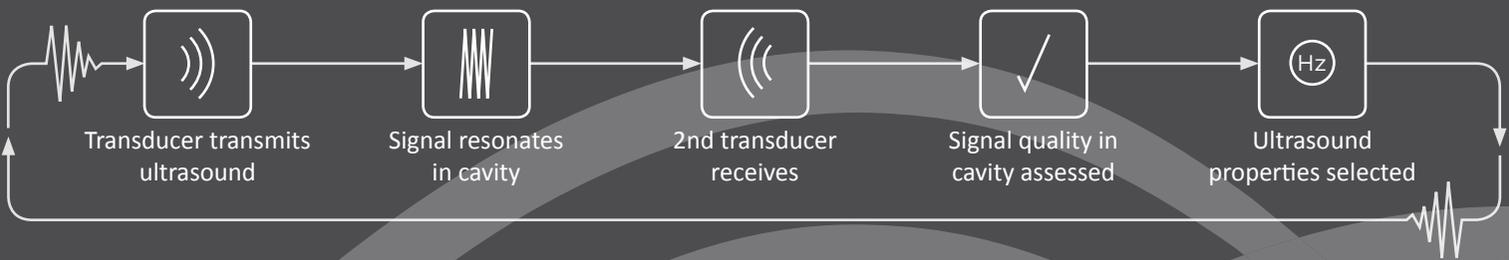
TECHNOLOGY



This is FT Technologies' 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.

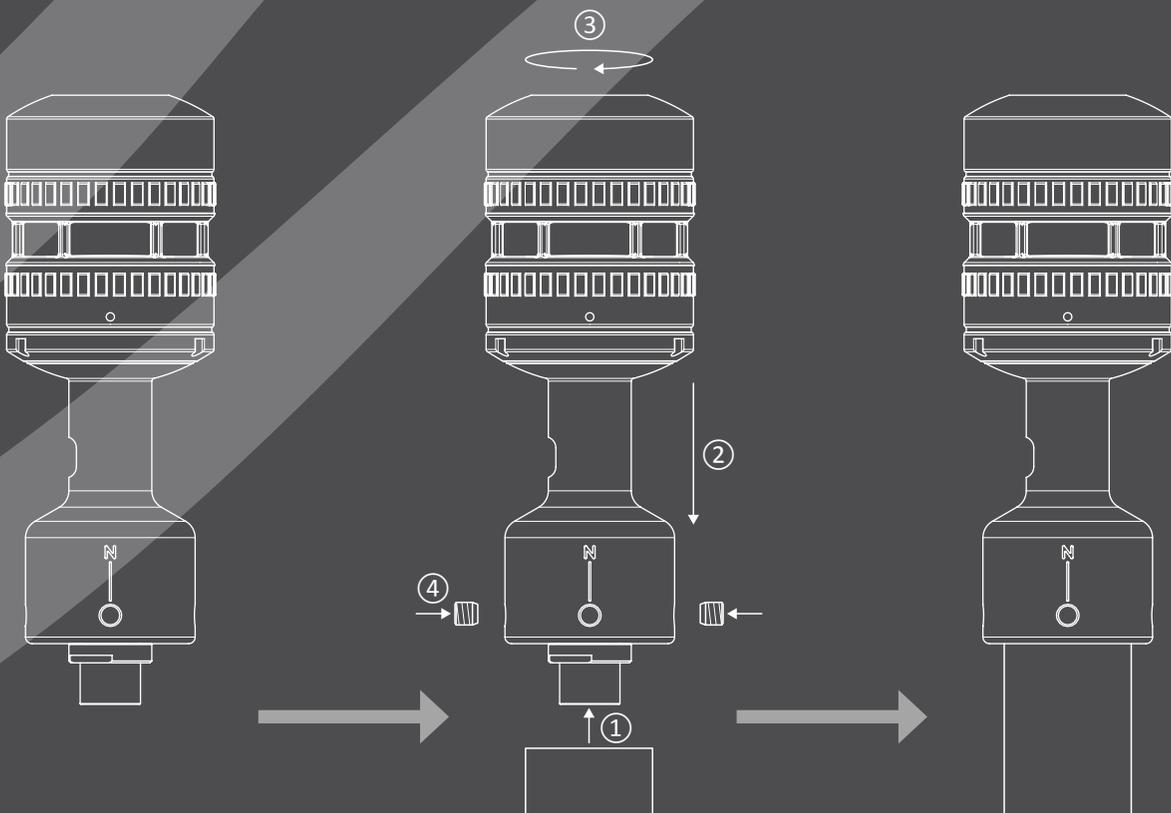
These vectors are combined to give the overall speed and direction. The sensor uses complex signal processing and data analysis taking a sequence of multiple measurements to calculate regular wind readings.



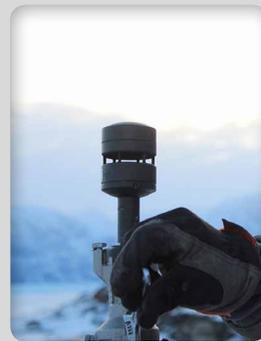
The sensor inherently compensates for changes in air temperature, pressure or humidity. A strong resonating sound wave in a small space provides a large signal that is easy to measure. Acu-Res has a signal to noise ratio more than 40db stronger than other ultrasonic technologies.

EASY INSTALLATION

- 1 - Pass the cable through the pipe and attach it to the sensor.
- 2 - Slide the sensor down over the pipe until it sits firmly on top.
- 3 - Rotate the sensor to align the datum (N).
- 4 - Tighten the grub screws one at a time to ensure there is an even distribution of pressure.



SPECIFICATION



WIND SPEED

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

WIND DIRECTION

Range.....	0 to 360°
Resolution.....	1°
Accuracy.....	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.....	IP66, 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.....	380g

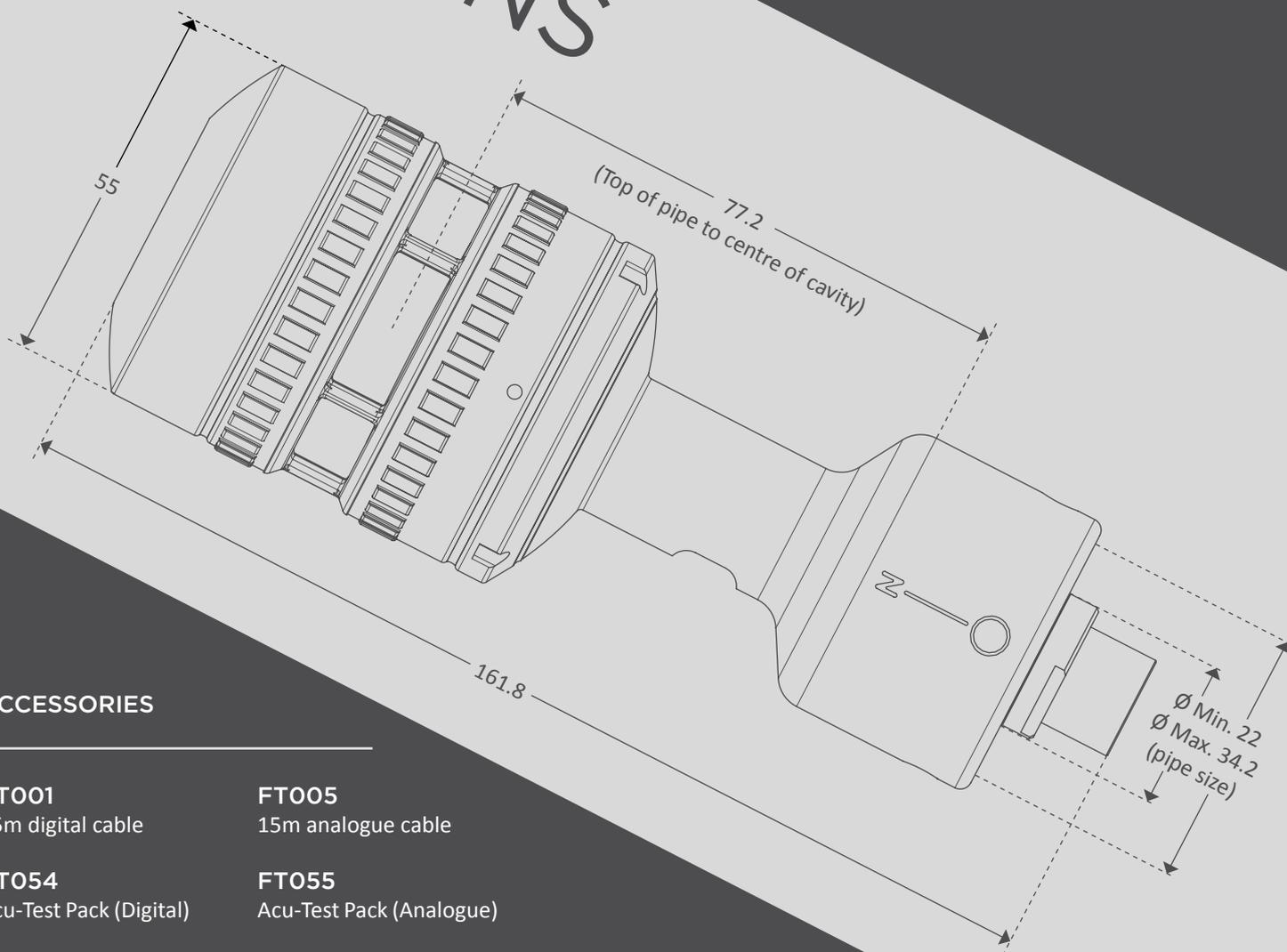
DIGITAL SENSOR

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

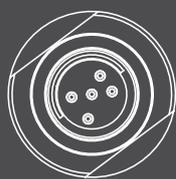
Interface.....	4-20mA, galvanically isolated from power supply lines and case.
Format.....	One 4-20mA current loop for wind speed (different scaling factors are available). One 4-20mA current loop for wind direction (datum value configurable as 4mA or 12mA). Both analogue channels are updated ten times 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

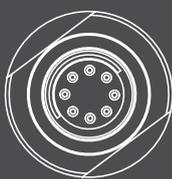


ACCESSORIES

- | | |
|---|--|
| FT001
15m digital cable | FT005
15m analogue cable |
| FT054
Acu-Test Pack (Digital) | FT055
Acu-Test Pack (Analogue) |



DIGITAL SENSOR
FT742-D-DM
RS485
5 pin
Connector image left



ANALOGUE SENSOR
FT742-A-DM
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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