

# WSS 550

General purpose wind sensor

## Data sheet



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# 1. Technology

DEIF Static Wind Sensor Technology uses ultrasound to determine horizontal wind speed and direction. The sensors have no moving parts and therefore not limited by the challenges conventional mechanical wind sensors encounter (for example, friction, inertia, time constant, over-speeding and starting threshold). The absence of moving parts not only contributes to making the sensors maintenance-free, but also removes the need for field calibration.

The unique triangular design of the sensor array assures accurate wind measurements from all directions.

The WSS 550 sensor is developed for cold climates and automatically heats-up when used in cold weather conditions.

## 1.1 Applications

The WSS 500-series sensors are classified for residential, commercial and light industry and industrial environments.

The WSS 500-series can be directly connected to the DEIF XDi-N indicator, forming a superb wind measurement and display system.

Finally, the WSS 500-series sensors can be used as precise stand-alone wind sensors in applications where wind data is used for information only, and where a short power outages due to extreme weather is not critical.

## 1.2 Housing

The unit is designed to withstand the hostile environment on-board a ship.

The 1-inch stainless steel mounting rod has a standard  $\frac{3}{4}$ -inch pipe thread for mounting the unit. The mounting rod secures good earth connection through the hull of the ship.

## 1.3 Interface

The unit has an RS-485 electrical interface that uses the NMEA 0183 communication protocol.

One opto-insulated NMEA port can be connected directly to the RS485 port. e.g. for connection to a VDR (voyage data recorder).

## 1.4 Cable

The unit is connected with a single  $4 \times 0.75 \text{ mm}^2$  shielded cable. This cable is used for to provide power to the unit and for data transfer.

A cable extension can be made from a standard  $4 \times 0.75 \text{ mm}^2$  shielded cable (if possible, use a twisted pair cable).

The maximum recommended cable length is 300 meters. When using long cable lengths, the capacity between each signal conductor should not exceed 70 nF.

## 1.5 Error flag

The unit continuously evaluates the wind measurements. If there are obstructions or incorrect measurements are detected, an invalid flag is set in the NMEA 0183 message to indicate that data is invalid and should not be used. The unit clears the error flag automatically when the obstruction is removed and valid measurements are detected.

## 1.6 Customised setup

The unit does not require any setup when it is used as part of a wind measurement system.

Some applications might require a custom setup for the unit. For example, to store data for automatic sensor alignment corrections. Often, the requirements for a custom setup are met by sending control commands to the sensor through the RS-485 interface.

Contact DEIF if you require a custom setup for the unit.

## 1.7 Protection from birds

Birds are known to damage ultrasonic wind sensors; Therefore, the bird avoidance kit is standard on all WSS 500-series sensors. The needle cap prevents birds from landing on the sensor.

## 2. Technical specifications

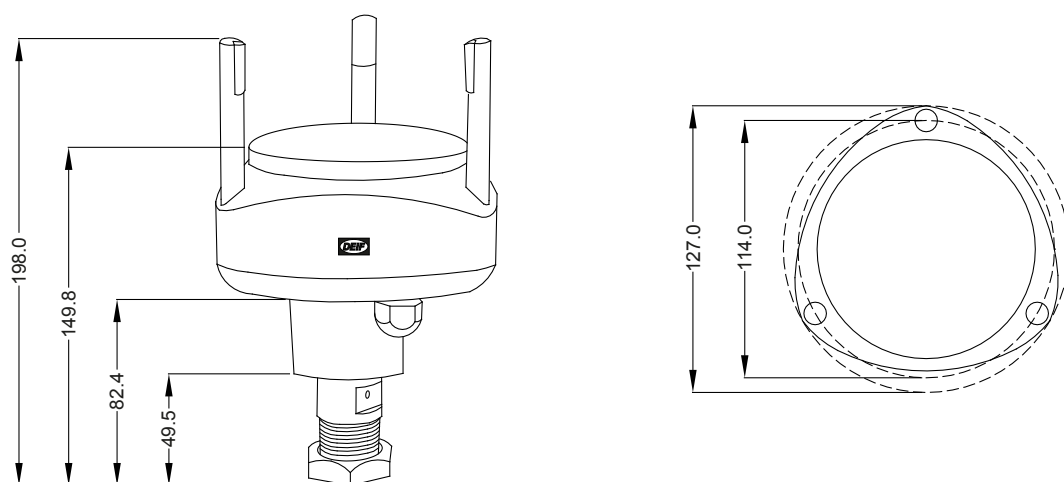
Sensors are designed according to the standards below		Standards
Power supply	Operation: 12 V or 24 V DC (min. 9 V and max. 31.2 V DC)	
Power consumption	Inactive heating: < 0.1 W Maximum heating < 15 W	
Interface	<p>RS485 bus (I/O) at 4800 bit/s. The bus should be terminated with 120 to 200 ohm for pure RS485 operation.</p> <p><u>Combined RS485 (I/O) and NMEA0183 (I) operation:</u> A combination of up to ten RS485 (I/O) and one NMEA0183 listeners can be connected to the unit's data interface at the same time.</p> <p>The data line must be terminated with a 200 to 250 ohm resistor to obtain <math>\leq \pm 2.1</math> V output necessary for a standard NMEA0183 input circuit to work.</p> <p>The NMEA0183 input load must be <math>\leq</math> or &lt; 2 mA @ <math>\pm 2</math> V.</p> <p><b>NOTE:</b> An NMEA-buffer is recommended if connection of more than one standard NMEA-input is needed.</p>	NMEA 0183 ver. 2.x-3.0
Data sentence	<p>NMEA0183: \$WIMWV - Wind speed and direction data \$WIXDR - Transducer Measurement Response \$WITXT - Error messaging For details, see the "WSS 500 series appendix to user's manual", document no. 4189350076</p>	NMEA 0183 ver. 3.0
Wind speed	<p>Range: 0...116 KTS (0...60 m/s) Resolution: 0.1 KTS Accuracy: 0 to 68 KTS: <math>\pm 0.6</math> KTS or <math>\pm 3</math> %, whichever is greater &gt; 68 KTS: <math>\pm 5</math> %</p>	
Wind direction	<p>Range: 0...360° continuously Resolution: 1° Accuracy: <math>\pm 3</math> % in relation to wind direction</p>	
Update interval	1 second	
Start-up time	< 5 s from power on to valid data output	
Connection	<p>2 m 4 × 0.75 mm<sup>2</sup> shielded cable, type UL2464 18AWG/4C+DW+AL/MY+Jacket The cable has open ends for screw terminal connection to an extension cable.</p>	
Mounting	<p><math>\frac{3}{4}</math>" pipe thread, 14 threads per inch Outer diameter: 26.4 mm (1.04 inches)</p>	
Compass safety distance	0.2 meter (8 inches)	IEC/EN 60945
Protection	IP66	IEC/EN 60529
Relative humidity	0 to 100 %	IEC/EN 60068-1/2
Pressure	600 to 1100 hPa	

Sensors are designed according to the standards below		Standards
Temperature	<p>Operating range: WSS 550 (heated): -40° to +55°C (class approved for -25 to +55 °C) WSS 550 (heated) can operate down to -50 °C, if the power supply supplies 30 V to the unit.</p> <p>Storage: -60° to +70°C</p>	IEC/EN 60068-2-1
Vibration test	<p>3 to 13.2 Hz: 2 mm (peak-peak) 13.2 to 100 Hz: 0.7 g</p>	IEC/EN 60945 IEC/EN 60068-2-6 DNV GL Class A
	<p>3 to 15 Hz: ±2.5 mm (peak) 15 to 50 Hz: 2.3 g</p>	DNV GL curve 4 for masts
Shock	30 g, 11 ms, half sine, in all 3 axes.	IEC/EN 60068-2-27
Safety	Cat. III, pollution degree 2, 550 V AC rms, 50 Hz, 1 minute	EN 61010-1
EMC	CE-marked for marine and industrial environment	IEC/EN 60945 IEC/EN 61000-2-2/4
Housing	<p>Wind sensor housing: Polycarbonate +10 % glass fibre Mounting tap: Corrosion-resistant stainless steel</p>	UL94 V0
Weight	0.8 kg	
Dimensions	<p>Width (diameter): 127 mm (5 inches) Height: 198 mm (7.8 inches) Shipping dimensions: 450 mm × 315 mm × 230 mm</p>	
Approvals	DNV-GL, CCS, RS and RRR approved.	
	Refer to <a href="http://www.deif.com">www.deif.com</a> for the most recent approvals.	

## 3. Dimensions and terminal connections

### 3.1 Unit dimensions

All dimensions in mm

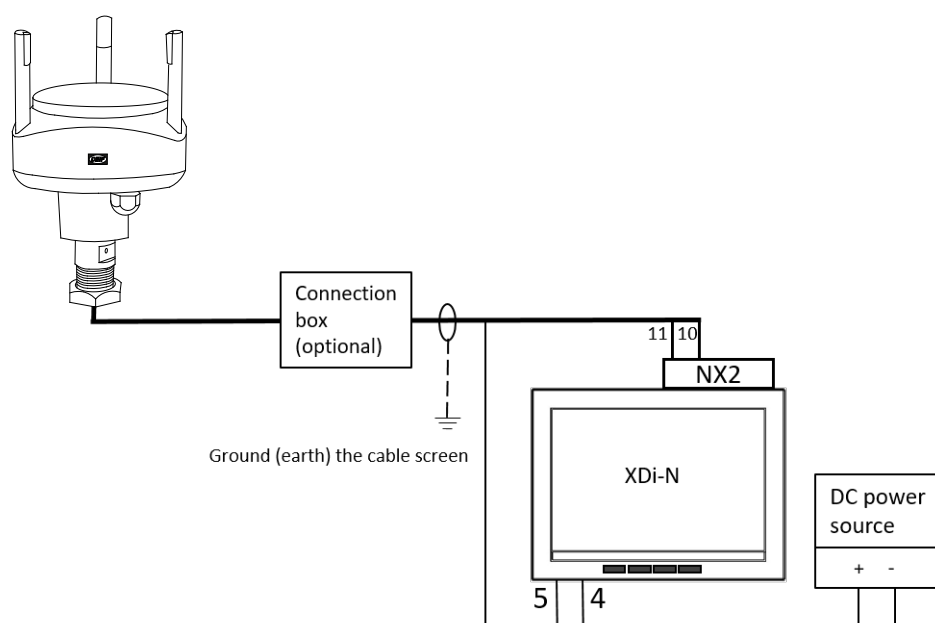


$\frac{3}{4}$ " pipe thread:

Outer diameter: 1.04 inch (26.4 mm), 14 threads per inch

### 3.2 Terminals, cable colours and function

Function	WSS cable colours	XDi-N Display terminal no.
0 V operation	Black	4
+24 V DC operation	Red	5
RS485 RX/TX A (COM2)	Orange	10 on NX2 module
RS485 RX/TX B (COM2)	Brown	11 on NX2 module
Cable shield	Shield	Ground



## 4. Variants and accessories

### 4.1 Available variants

Type	Variant no.	Description	Item no.
WSS 550	08	WSS 550 with heating	2958050060-08

### 4.2 Available accessories

Description	Note
Extension cable for WSS, 30 meters	
Extension cable for WSS, 40 meters	
Extension cable for WSS, 50 meters	
Extension cable for WSS, 100 meters	
IP66 connection box kit	IP 66 box, 2 x M20 cable glands for 5-13 mm cable and 5 position screw terminal block.
IP67 connection box kit with cable mounted	



## 5. Ordering form and disclaimer

### 5.1 Order specifications

Send your order specification to DEIF listing:

- Item number
- Description
- Amount
- List of accessories

#### Example of an order specification

Item no.	Description	Amount	Accessories
2958050060-08	WSS 550 with heating	2	Extension cable for WSS, 50 meters

### 5.2 Disclaimer

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The English version of this document always contains the most recent and up-to-date information about the product. DEIF does not take responsibility for the accuracy of translations, and translations might not be updated at the same time as the English document. If there is a discrepancy, the English version prevails.