



# Wind speed sensors

## User's manual

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## 1 Description

### 1.1 Main features

The tacho-anemometer is a sensor for measuring wind speed. The tachymetric system consists of a 32 notch rotating disc with optoelectronic reading. The electrical signal is made up of a series of pulses with frequencies that are proportional to the speed of the rotor mounted on the sensor transducer. In the heated versions, a thermostat controls a heater that keeps the rotor moving effectively in case of freezing.

The sensor range includes versions with "normalised" output (4÷20 mA, 0÷20 mA, 0÷5 Vdc) and with direct output (Hz). Sensor with direct output can be connected to LSI LASTEM acquisition systems, or any other device using such kind of input.

The sensor is made up by the transducer and rotor. Connection cable (DWAxxx) should be included in the supply (see §0).

### 1.2 Models and technical specifications

#### 1.2.1 Standard sensor

Order numb.	DNA301#C	DNA302#C	DNA304#C
Output	0-883 Hz		
Power supply	5÷12 Vdc	5÷12Vdc (heater.:24 Vca)	5÷12 Vdc
Heater	-	YES	-
Heater operative temperature	-	> -20°C	-
Power consumption	20 mA	20 W	2 mA
Calibration certificate	Included		
Data logger compatibility	M-Log (ELO007-008), R-Log (ELR515), E-Log (all models)		

Order numb.	DNA801	DNA802	DNA805	DNA806	DNA807
Output	4÷20 mA		0÷20 mA		0÷5 Vdc
Power supply	10÷30 Vac/dc	24 Vac/dc	10÷30 Vac/dc	24 Vac/dc	10÷30 Vac/dc
Heater	-	YES	-	YES	-
Heater operative temperature	-	> -20°C	-	> -20°C	-
Power consumption	0.5 W	20 W	0.5 W	20 W	0,5 W
Microprocessor	PIC 18F2620				

Common features		
<b>Wind speed</b>	Principle	Optoelectronic with 32 step disk
	Measuring range	0÷50 m/s
	Threshold	0.36 m/s
	Uncertainty	0÷3 m/s=1.5%, >3 m/s= 1%
	Resolution	0.06 m/s
	Delay distance	4.8 m (at 10 m/s). Acc to VDI3786 and ASTM 5366-96
<b>General</b>	Connector	7 pin IP65 watertight connector
	Housing	Anodized aluminum
	Operative temperature	-35÷70°C (without ice)
	Mounting	Mast ø 48 ÷ 50 mm

### 1.2.2 Compact sensor

<b>DNA202</b>		
<b>Wind speed</b>	Principle	Relay Reed
	Measuring range	0÷75 m/s
	Uncertainty	2.5% (calibration tested to 63 m/s)
	Threshold	0.5 m/s
<b>General</b>	Output	2.65 Hz x m/s
	Connector	4 pin IP65 watertight connector
	Housing	Anodized aluminum
	Mounting	Mast $\varnothing$ 48 ÷ 50 mm
	Operative temperature	-35÷ +70°C (without ice)
	Data logger compatibility	M-Log (ELO007-008), R-Log (ELR515), E-Log (all models)

## 2 Assembly instructions



The tachometer can be assembled either alone or coupled with the goniometer by means of the DYA046 coupling bar.

Select a well-exposed spot for the instrument. The WMO (World Meteorological Organization) suggests that the instrument should be assembled 10 m off the ground; in a place where the distance between the sensor and surrounding obstacles which might disturb the measurements is at least 10 times the height of those objects from the ground. As such a position is difficult to find, the WMO suggests that the instrument should be assembled in a spot which is reasonably uninfluenced by local obstructions.

## 2.1 Mounting standard sensor (DNA80x, DNA30x#C)



Unscrew the nut and washer from the shaft thread.



Mount the DNA204 wind rotor on the sensor's body. Keep the shank in a steady position and insert the rotor until it goes to the nut adjustment.



Tighten the screw of the rotor (indicated by the arrow) and the cover. Attention: don't leave the sensor in outdoor operation without its rotor



Connect the cable to the sensor.



Mount the sensor on the mast and tighten the screw (indicated by the arrow).

See Part 3. Connections

## 2.2 Mounting compact sensor (DNA202)



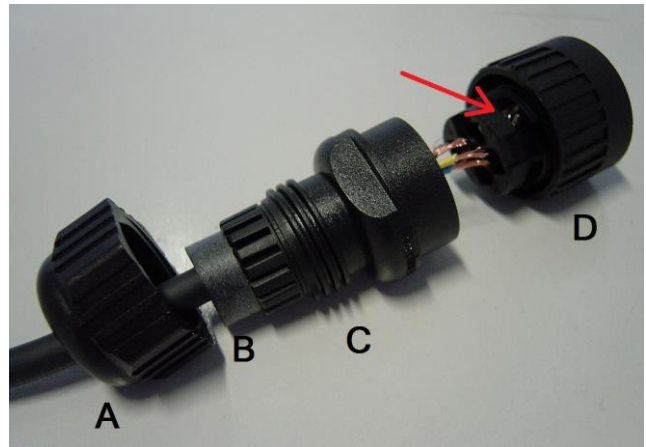
Unscrew the screw from the shaft thread.



Mount the DNA207 rotor on the sensor's body.



Tighten the screw of the rotor. Attention: don't leave the sensor in outdoor operation without its rotor.



DNA202 comes with MG2257 free connector. Pass the cable as in the picture above, select the rubber ring B ( $\varnothing$  6 or 9 according to the cable dimension). Then fix the wires to the connector D.

	Pin	
	1	SEGNALE IMPULSIVO/Pulse Signal
	2	SEGNALE IMPULSIVO/Pulse Signal
	3	N.C.
		Contenitore/Armature

Fix the cable (n.3 wires) on the connector: screw each wire (indicated by the arrow) on the correspondent connector pin: pins 1, 2 and ground as in the above drawing. Attention to the colour of the wires when connecting the sensor to the data logger.



Connect the cable to the sensor.



Mount the sensor on the mast and tighten the screws (indicated by the arrows).

### 3 Connections

For the wiring connection, read the following drawings:

- |                              |                           |
|------------------------------|---------------------------|
| DNA202                       | DISACC 5634               |
| DNA301#C, DNA302#C, DNA304#C | DISACC 5856 + DISACC 4238 |
| DNA80x                       | DISACC 5859 + DISACC 3217 |

FUNZIONE DI TRASFERIMENTO IN FORMA TABELLARE TRANSFER FUNCTION TABLE	
Velocita' Speed m/s	Frequenza Frequency Hz
0	0
1.08	2.85
4.87	13.01
10.59	28.41
21.69	56.72
32.15	84.14
36.97	97.15
43.05	114.37
53.71	141.36
63.62	168.9

Transfer function table for DNA202 sensor.

FUNZIONE DI TRASFERIMENTO IN FORMA TABELLARE TRANSFER FUNCTION TABLE	
Velocita' Speed m/s	Frequenza Frequency Hz
0	0
1.002	13
3.002	40.5
5.015	69.25
10.041	141
20.04	286
30.1	431.25
37.5	545
50	722.20
60	867.10

Transfer function table for direct output sensors.

## 4 Maintenance

### 4.1 Testing

This type of testing is only required if the user wishes to verify the well functioning of each part of the instrument. Please note that these tests are not intended to establish the operational limitations of the instruments.

#### Visual check

- body of the sensor is in a level position.
- Rotor is not broken or deformed.

#### Mechanical check

Having removed the rotor, check that the conical pin (Compact version) or the shaft thread (Standard version) on which the rotor rotates moves freely and perfectly smoothly. If not bearings replacement is needed.

#### Output operational check (only for instruments with analogue output)

Connect the system (power on the power supply) to the signal output reader and measure the wind speed with the following results:

Sensor output	Speed (m/s)	N. rounds/s	Output
4÷20 mA	2.37	1	4.76 mA
0÷20 mA	2.37	1	0.95 mA
0÷5 Vcc	2.37	1	237 mV

#### Heater check (for heated sensor only):

- Remove the cup from the body of the sensor;
- Leave the sensor in a freezer for 3/4 hours at a temperature below 2 °C;
- Connect a multimeter to the ends of cables 6-Red 5-White for DNA302 or 1-Brown 6-White for others;
- Under these conditions, the resistance recorded should be approx. 40 Ω.

### 4.2 Periodic maintenance

- Clean the sensor, attention to the space between the transducer and the cup.

LSI LASTEM suggests to check the instrument calibration at least every 2 years.



## 5 Accessories / Spare parts

Code	Description
DYA046	Coupling bar For WS+WD sensors on $\varnothing$ 45 ÷65 mm pole
DZC405	Calibration certificate Included in DNA301-302-304#C
DNA110	Cable for DNA30x#C L.=10 m with connector
DNA125	Cable for DNA30x#C L.=25 m with connector
DNA126	Cable for DNA30x#C L.=50 m with connector
DWA510	Cable for DNA30x#C L.=10 m with connector
DWA525	Cable for DNA80x. L.=25 m with connector
DWA526	Cable for DNA80x. L.=50 m with connector
DWA527	Cable for DNA80x L.=100 m with connector
MG2251	Free connector without cable (DNA80x only)
MG2252	Free connector without cable (DNA30x#C only)
MG2257	Free connector without cable (DNA202)
DNA204	Spare part: vane (DNA80x, DNA30x#C only)
DNA208	Spare part: vane (DNA202 only)
MM2015	Spare part: bearing (DNA80x, DNA30x#C only)
MM2001	Spare part: bearing (for DNA202)
MN1071	Cable each m (for DNA202)

## 6 Conformity declarations



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### DICHIARAZIONE DI CONFORMITA' CE

#### CE Conformity Declaration

Produttore: **LSI LASTEM s.r.l.**  
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**Con la presente si dichiara che tutti i prodotti delle seguenti serie:**  
*We hereby declare that all the products of the following series:*

**Velocità e direzione del vento per applicazioni ambientali**  
*Speed and Direction wind for environmental applications*

- **DNA701-DNA702-DNA705-DNA706-DNA707-DNA708-DNA709-DNA710-DNA711-DNA714-DNA715-DNA716-DNA717-DNA719-DNA721-DNA722-DNA727-DNA728**
- **DNA801-DNA802-DNA805-DNA806-DNA807-DNA810-DNA811-DNA814-DNA815-DNA816-DNA821-DNA827**

a cui questa dichiarazione si riferisce, è conforme ai requisiti essenziali dei seguenti standard e documenti normativi:  
*to which this declaration relates, is in conformity with the relevant provisions of the following standard and other normative documents:*

**EN – 61326 2006 Industrial Location**

**che rispettano le direttive:**  
*following the provisions of the Directive:*

**89/336/EEC, 2004/108/CE**

**La presente dichiarazione copre tutti i modelli derivanti dai prodotti sopra citati.**  
*The present declaration covers all the options derived by the specified product.*

Settala, aprile 2012



**Dr. Giulio Certo**  
Direttore Generale e Legale Rappresentante

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Thank you for reading this data sheet.

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Please note - Product designs and specifications are subject to change without notice. The user is responsible for determining the suitability of this product.