



Cod. MW6015



Combined wind speed and wind direction sensors

User's manual

Updated 14/07/2022



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1 Description

1.1 Main features

This sensor includes, in a single apparatus, the transducers for measuring wind speed and direction. Its use simplifies the installation and the plant design in respect of the systems with separate units plus giving some other advantages being smaller, lighter and cheaper.

The measurement system is made up of a sensor, the rotors DNA124 and DNA127 and the cable of DWA type. For more information about the models of the sensors see §1.2 instead for the accessories and the spare parts see §6.

The connector MG2251 is used when the user desire to realize its own cable.

1.2 Models

Power supply	12 Vdc	10÷30 Vdc/Vca	10÷30 Vdc/Vca	10÷30 Vdc/Vca
Output WS	Hz	4÷20 mA	0÷5 V	RS485
Output WD	0÷1 V	4÷20 mA	0÷5 V	RS485
<i>Direct output wind speed/direction sensor</i>	DNA121			
<i>Direct output and low energy consumption wind speed/direction sensor</i>				
<i>Microprocessor based wind speed-direction sensor with normalized output.</i>		DNA821 DNA821.1 DNA821.2	DNA827	
<i>Speed-direction sensor with RS485 output.</i>				DNA921

Tab. 1 – Combined sensor models.

1.3 Technical specifications

Specifications: VDI 3786 Part 2 and ASTM D 5096-96.

1.3.1 Mechanical and electrical specifications

(Calibrated by CETIAT (France))

PN	DNA121	DNA821 DNA821.1 DNA821.2	DNA827	DNA921
Wind speed output	0÷833 Hz	4÷20 mA	0÷5 Vdc	RS485
Wind speed range	0÷75 m/s (damage limit)	DNA821: 0÷60 m/s DNA821.1: 0÷50 m/s DNA821.2: 0÷75 m/s	0÷60 m/s	0÷60 m/s
Wind direction output	0÷1 Vdc	4÷20 mA	0÷5 Vdc	RS485
Protocol	-	-	-	Modbus RTU®, TTY-ASCII
Configuration	-	-	-	Hyperterminal
EMC	EN61326-1 2013	EN61326-1 2013	EN61326-1 2013	EN61326-1 2013
RS485 protection	-	-	-	Galvanic insulation (3 kV, UL1577)
RS485 speed	-	-	-	1.2÷115 kbps
Poer supply	10÷30 Vac/dc	10÷30 Vac/dc	10÷30 Vac/dc	10÷30 Vac/dc
Power consumption	0.5 W	0.5 W	0.5 W	0.5 W
Data logger compatibility	M-Log (ELO008), E-Log, A-Log using ALIEM modem	M-Log (ELO008), E-Log, A-Log using ALIEM modem	-	E-Log using RS485->232 converter, Alpha-Log.

Velocità del vento	Principle	N. 32 step optoelectronic disk
	Accuracy	0÷25 m/s: ± 0.25 m/s or 3% >25 m/s: 2%
	Threshold	0.26 m/s
	Delay distance	4.8 m @ 10 m/s, according to VDI3786 and ASTM 5096-96
	Resolution	0.06 m/s
Direzione del vento	Principle	Hall effect
	Range	0÷360°
	Accuracy	1%
	Threshold	0.15 m/s
	Delay distance	1.2 m @ 10 m/s, according to VDI3786 and ASTM 5366-96
	Resolution	0.3°
	Damping coeff.	0.21 @ 10 m/s, according to VDI3786 and ASTM 5096-96
Informazioni Generali	Damage limit	75 m/s
	Connector	7 pin IP65 watertight connector
	Housing	Anodized aluminium
	Cups	PA6 plastic and fiberglass
	Vane	Aluminium
	Protection	IP66
	Mounting	Mast Ø 48÷50 mm
	Operative temperature	>-30 °C (without ice)

2 Assembly instructions

Select a well-exposed spot for the instrument. The WMO (World Meteorological Organisation) suggests that the instrument is assembled 10 m off the ground; in a place where the distance of the gauge from surrounding obstacles which might disturb the measurements, it 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 is assembled in a spot which is reasonably uninfluenced by local obstructions; where the measurements taken will be as equal as possible to those taken from an ideal spot.

2.1 Mounting



Unscrew the nut and washer from the shaft thread.



Mount the DNA124 rotor on the combi sensor's body.



Tighten the screw of the rotor (indicated by the arrow).



Insert the DNA127 wind vane on the sensor's body. Keep the shank in a steady position and insert the vane until it goes to the nut adjustment.



Insert the washer and nut on the threaded shaft; then tighten with a wrench while holding the shaft with the screwdriver. **ATTENTION! Do not tighten the nut by holding the windvane with your hand to prevent that the sensor loses its setting.**



Tighten the protective cover.



Connect the cable to the sensor.



Mount the sensor on the mast and tighten the screw.



When fixing the sensor in its position on the pole, point the "red nose" to NORTH for orientation.

Read IST_00764 "Instructions for the use of DNA121-DNA122 sensors with LSI LASTEM data logger" to connect these sensors to LSI LASTEM data loggers.

3 Connections

Connections must be performed following the drawings:

DNA821	DISACC 5830e
DNA827	DISACC 07021
DNA921	DISACC 6095
DNA121	DISACC 5828c

FUNZIONE DI TRASFERIMENTO
IN FORMA TABELLARE
TRANSFER FUNCTION TABLE

Velocita' Speed m/s	Frequenza Frequency Hz
0	0
1.001	12.31
3.011	41.12
5.02	70.51
10.026	143.17
20.08	295.04
29.99	435.28
37.71	556.82
50	734.72
60	882.19

Transfer function table for DNA121.

4 Operation check

For the verification you need the drawing (DISACC) of the sensor and a multimeter or a PC, depending on whether the output is analog (current, voltage, resistance) or digital (RS485).

For mechanical verification of the sensor see chapter 5.

4.1 Check operation of wind speed measurement

Verification of the analog output of the measurement takes place by means of a multimeter.

Identify the sensor output according to its code (§Tab. 1) and proceed as follows:

- For sensors with frequency output signal:
 1. Set the multimeter to measure frequency signals (Hz).
 2. Connect the multimeter leads to the two sensor wires (it is not necessary to disconnect it from the data logger.)
 3. With the rotor stopped, the multimeter should measure 0 Hz.
 4. With the rotor moving, read a value greater than 0 Hz on the multimeter.
- For sensors with current output signal:
 1. Set the multimeter to measure direct current (DC) signals and 20 mA scale.

2. Disconnect the wire corresponding to the negative signal (- Sig) and connect it to the test lead + (red) of the multimeter. The lead - (black) fix it instead of the disconnected wire.
 3. With the rotor stopped, the multimeter should measure approximately 4 mA.
 4. With the rotor moving, the multimeter should measure a value greater than 4 mA.
- For sensors with voltage output signal:
1. Set the multimeter to measure DC signals and scale 0 ÷ 20 V.
 2. Connect the multimeter leads to the two sensor wires (it is not necessary to disconnect it from the data logger.)
 3. With the rotor stopped, the multimeter should measure approximately 0 V.
 4. With the rotor moving, the multimeter should measure a value greater than 0 V.

Verification of the digital output (RS485) can be done using a PC, equipped with an RS232 serial port and in which the third-party program *modpoll* (<https://www.modbusdriver.com/modpoll.html>) is installed.

1. Connect the sensor serial cable to the PC serial port.
2. Open a DOS Prompt window and type the following command (it is assumed that the transmission parameters are set as follows: *Baudrate: 9600 bps, Parity: Even* and that the PC serial port used is COM1):

```
modpoll -a 1 -r 1 -c 2 -t 4:float -p even -b 9600 com1 [Enter]
```

For the list of available commands, type the command *modpoll /help*.

3. With the rotor stopped you should read 0 as the first value displayed by the program.
4. With the rotor moving, a value greater than 0 should be read as the first value displayed by the program.

4.2 Check operation of wind direction measurement

Verification of the analog output of the measurement takes place by means of a multimeter. Identify the sensor output according to its code (§Tab. 1) and proceed as follows:

- For sensors with resistance output signal:
1. Set the multimeter to measure resistance with a 2000 Ω scale.
 2. Disconnect the terminal with the direction wires and connect a multimeter lead to wire B (6 - cursor) and the other lead to wire C (7 - common).
 3. Rotate the vane as shown in the table and check the respective values.

Vane tip position	Resistance value (ohm)	Direction (°N)
North (above the red hake)	About 0/2000	About 0/360
East	About 500	About 90
South	About 1000	About 180
West	About 1500	About 270

- For sensors with current output signal:
 1. Set the multimeter for direct current (DC) measurements with a 20 mA scale.
 2. Disconnect the wire corresponding to the negative signal (- Sig) and connect it to the test lead + (red) of the multimeter. The lead - (black) fix it instead of the disconnected wire.
 3. Rotate the vane as shown in the table and check the respective values.

Vane tip position	Current value (mA)	Direction (°N)
North (above the red hake)	About 4/20	About 0/360
East	About 8	About 90
South	About 12	About 180
West	About 16	About 270

- For sensors with voltage output signal (0÷1 and 0÷5 V):
 1. Set the multimeter for direct voltage (DC) measurements with a 20 V scale.
 2. Connect the multimeter leads to the two sensor wires (it is not necessary to disconnect it from the data logger.)
 3. Rotate the vane as shown in the table and check the respective values.

Vane tip position	Voltage value (V)		Direction (°N)
	0÷1 V output	0÷5 V output	
North (above the red hake)	About 0/1	About 0/5	About 0/360
East	About 0,25	About 1,25	About 90
South	About 0,5	About 2,5	About 180
West	About 0,75	About 3,75	About 270

Verification of the digital output (RS485) can be performed as for speed measurement. The modpoll command parameters to be executed are the same. The values to be checked are those relating to the second measurement displayed by the program.

Rotate the vane as shown in the table and check the respective values.

Vane tip position	Direction (°N)
North (above the red hake)	About 0/360
East	About 90
South	About 180
West	About 270

5 Maintenance

Routine checks should be carried out on the combi sensor at least once a year, to ensure that:

- the rotor and flag are not in any way deformed;
- the conical pin on which the rotor rotates moves freely;
- the sensor is clean and in good condition; attention to the space between the transducer and the rotor.

It is recommended to check the sensor calibration every two years.

6 Accessories / Spare parts

Code	Description
DNA124	Rotor with cups for speed section
DNA127	Weather vane rotor for directional section
DWA510	7-wire shielded cable L = 10 m with connector
DWA525	7-wire shielded cable L = 25 m with connector
DWA526	7-wire shielded cable L = 50 m with connector
DWA527	7-wire shielded cable L = 100 m with connector
MG2251	Trailing connector
MC1040	Screws for fixing rotor and vane.
MM2011 + MM2020	Set of 2+2 spare bearings

7 Conformity declarations



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DICHIARAZIONE DI CONFORMITA' CE *CE Conformity Declaration*

Produttore: **LSI LASTEM s.r.l.**
Applicant: Via Ex S.P. 161 Dosso, n.9 – 20090 Settala Premenugo (MI) – Italia

Con la presente si dichiara che i sensori di Velocità e Direzione del vento DNA121 e DNA122 per loro natura non contengono componenti elettrici/elettronici tali da generare o contribuire a generare emissioni elettromagnetiche e pertanto non sono soggetti alla Direttiva Europea:

We hereby declare that the Speed and Direction wind DNA121 and DNA122 sensors for its nature don't contain electric/electronic components to produce or to contribute to produce electromagnetic issues and therefore they aren't subject to the European Directive:

EMC Directive 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, febbraio 2012



Dr. Giulio Certo
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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**

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