LSI Wind Direction Sensors User Manual

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LSI Wind Direction Sensors

Description

Main features

Wind direction sensors with analogue output are ideal when integration with third-party acquisition systems is required. The DNA301.1 and DNA311.1 sensors, thanks to the 0-1 V output, are also ideal for being connected to LSI-LASTEM acquisition systems. Low delay path and precision encoder make these sensors very suitable for speed measurements even at low wind speeds. DNA311.1, DNA811 and DNA815 are equipped with heaters to prevent the formation of ice on its body in very cold environments.
The DNA212.1 sensor is particularly suitable for use in high-wind applications, where long-term reliability without maintenance is required, such as in wind farms and wind turbine surveys. Also ideal for portable and light weather stations and for wind alarm applications where wind speed and direction are both important aspects; in this regard, the LSI LASTEM data loggers can identify specific wind alarm conditions and open digital outputs when the wind speed exceeds a certain threshold and the wind direction comes from a defined angle.

Models and technical specifications

Standard sensor

Order numb.	**DNA310.1**	**DNA311.1**
Principle	Magnetic encoder	
Output	0÷1 V	
Power supply	10÷30 V	10÷30 V (24 V heater)
Heater	–	YES
Heater operative temperature		-20÷4 °C
Power consumption	0.5 W	0.5 + 20 W heater
Data logger compatibility	M-Log (ELO008), R-Log (ELR515), E-Log, A-Log	

Order numb.	**DNA810**	**DNA811**	**DNA814**	**DNA815**	**DNA816**
Principle	Magnetic encoder				
Output	4÷20 mA		0÷20 mA		0÷5 Vdc
Power supply	10÷30 Vac/dc	24 V heater	10÷30 Vac/Vdc	24 V heater	10÷30 Vac/dc
Heater	–	YES	–	YES	–
Heater operative temperature	–	-20÷4 °C	–	-20÷4 °C	–
Power consumption	0.5 W	0.5+20 W hea.	0.5 W	0.5+20 W hea.	0.5 W

Common features		
Wind direction	Measuring range	0÷360°
	Uncertainty	3°
	Threshold	0.15 m/s
	Delay distance	1.2 m (@ 10 m/s). According to VDI3786 and ASTM 5366-96
	Damping coeff.	0.21 (@ 10 m/s). According to VDI3786 and ASTM 5096-96
General Information	Connector	7 pin IP65 watertight connector
	Housing	Anodized aluminum
	EMC	EN 61326-1: 2013
	Protection	IP66
	Operative temperature	-35÷70 °C (without ice)
	Mounting	Mast ø 48 ÷ 50 mm

Compact sensor

DNA212.1		
Wind direction	Principle	Magnetic encoder
	Measuring range	0÷360°
	Threshold	0.4 m/s
	Accuracy	3°
General Informatio n	Output	0÷1 V
	Connector	7 pin IP65 watertight connector
	Housing	Anodized aluminum
	Power supply	10÷30 Vdc
	Power consumption	0.4 W
	EMC	EN 6132-1 2013
	Protection	IP66
	Mounting	Mast ø 48 ÷ 50 mm
	Operative temperature	-48÷ +60°C (without ice)
	Data logger compatibilit y	M-Log (ELO008), R-Log (ELR515), E-Log, A-Log

Assembly instructions

The gonio-anemometer can be assembled either alone or coupled with the tacho-anemometer by mean of the coupling bar DYA046.
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.

Mounting standard sensor (DNA31x, DNA81x)

- Unscrew the nut and washer from the shaft thread.
- Insert the DNA127 wind vane on the sensor’s body.

  Keep the shank in a steady position and insert the vane until it goes until 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 win vane 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 Part 3: Connections

Mounting compact sensor (DNA212.1)

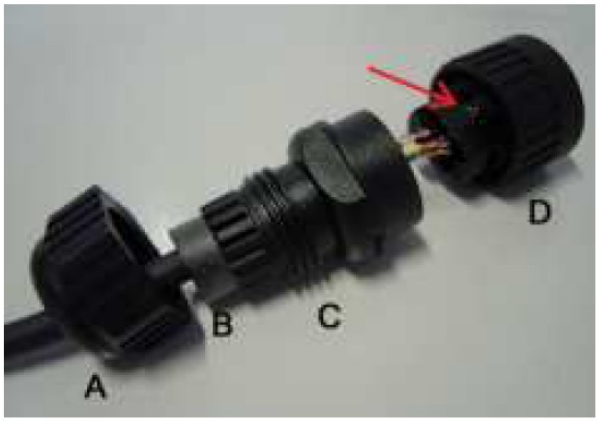
- Unscrew the screw from the shaft thread.
- Insert the DNA218 wind vane on the sensor’s body. Take care to center the wind vane’s notch with the tooth on the sensor body’s rotating cone.

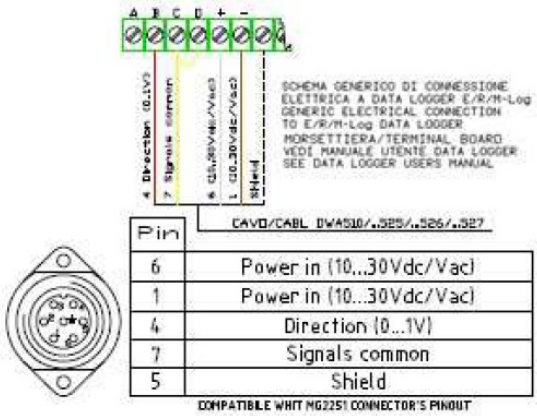

- Fix the screw and tighten it.
- Connect the DWA5xx cable to the sensor.

  If you do not have the DWA5xx cable but the MG2251 connector, build the cable as indicated below.


- Open the MG2251 free connector. Pass the cable as in the picture above, select the rubber ring B (ø 6 or 9 according to the cable dimension).
- Fix the cable (n.5 wires) on the connector D: screw each wire (indicated by the arrow) on the correspondent connector pin as in the above drawing.

  Attention to the color of the wires when connecting the sensor to the data logger.





- If instead the DNA212.1 sensor replaces the DNA212 sensor, connect the existing cable to the new sensor using the CCDCA0004 adapter.

Finally, mount the sensor on the mast, orient the red nose to NORTH and tighten the screws (indicated by the arrow).

Connections

Connections must be performed following the drawings:

- DNA212.1 DISACC 200006
- DNA310.1 DISACC 07032
- DNA311.1 DISACC 07046
- DNA810 DISACC 07024
- DNA811 DISACC 5860
- DNA814 DISACC 7023
- DNA815 DISACC 07025
- DNA816 DISACC 7030
- DWA5xx (cable) DISACC 3217

Maintenance

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
- vane is not broken or deformed

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

Output operational check – DNA81x, DNA310.x, DNA311.x, DNA212.1
Connect the system (power on the power supply) to the signal output reader and measure the wind direction with the following results:

Cardinal point	**0¸1 V**	**4¸20 mA**	**0¸20 mA**	**0¸5 Vdc**
NORTH	1 – 0	20 – 4	20 – 0	5 – 0
EAST	0.25	8	5	1.25
SOUTH	0.5	12	10	2.50
WEST	0.75	16	15	3.75

Heater check (for heated sensor only):

- Check that the heater is in good working order;
- Remove the vane 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 DNA311.1 or 1-Brown 6-White for others;
- Under these conditions, the resistance recorded should be approx. 40 Ω.

Periodic maintenance

LSI LASTEM advises don't leave the sensor in outdoor operation without its rotor/vane. Routine checks should be carried out on the wind direction sensors.

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

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

Accessories / Spare parts

Sensor DNA212.1

Codice	Descrizione
DYA046	Coupling bar for WS+WD sensors on ø 45 ÷65 mm pole
DWA505	Cable L = 5 m
DWA510	Cable L = 10 m
DWA525	Cable L = 25 m
DWA526	Cable L = 50 m
MG2251	Free female 7 pin watertight connector
DNA218	Spare part: vane
MM2001	Spare part: bearing
SVICA2304	Calibration certificate according to ISO9000 (wind direction)
CCDCA0004	Adapter to connect the DNA212's cable to the DNA212.1 sensor

Sensory DNA31x.1, DNA81x

Codice	Descrizione
DYA046	Coupling bar for WS+WD sensors on ø 45 ÷65 mm pole
DWA505	Cable L = 5 m
DWA510	Cable L = 10 m
DWA525	Cable L = 25 m
DWA526	Cable L = 50 m
DWA527	Cable L = 100 m
MG2251	Free female 7 pin watertight connector
DNA217	Spare part: vane
MM2025	Spare part: bearing
SVICA2304	Calibration certificate according to ISO9000

Declarations of conformity

DICHIARAZIONE DI CONFORMITA' CE CE
Conformity Declaration Produtores Applicant LSI LASTEM s.r.l. Via Ex S.P. 161 We hereby declare that all the products of the following series:
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-DNAS14-DNA815-DNA8I16-

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 following the provisions of the Directive 89/336/EEC, 2004/108/CE La
The present declaration covers all the options derived by the specified product

Dichiarazione di conformità / *Declaration of conformity*

Oggetto / *Subject*
Codice prodotto / Product code: DNA212.1

Descrizione / *Description*
Sensore Anemometrico direzione vento compatto / Compact anemometer Wind direction sensor

Fabbricante / *Manufacturer*
LSI LASTEM Srl

Via ex S.P. 161 loc. Dosso 9

20049 Settala (MI) – Italy

Dichiarazione / *Declaration*
Dichiariamo che i prodotti oggetto di questo documento sono stati progettati in accordo e compatibilmente alle seguenti Direttive Europee e norme armonizzate / *We declare that the products covered by this document have been designed in compliance with the following European Directives and harmonized standards:*

2014/30/EU – Direttiva sulla compatibilità elettromagnetica EMC / *EMC electromagnetic compatibility directive.*

EN 61000-6-1: 2007, EN 61000-6-2: 2005– Norme generiche relative all'immunità elettromagnetica riferita ad ambienti residenziali ed industriali / Generic standards for electromagnetic immunity in residential and industrial environments.

EN 61000-6-3: 2007+A1:2011+AC:2012, EN 61000-6-4: 2007+A1:2011 – Norme generiche relative alle emissioni elettromagnetiche riferite ad ambienti residenziali ed industriali / Generic standards for electromagnetic emissions in residential and industriel environments.

2011/65/EU – Direttiva sulla restrizione dell'uso di determinate sostanze pericolose nelle apparecchiature elettriche ed elettroniche. Il nostri prodotti non contengono sostanze definite altamente preoccupanti come definito nell'Art. 33) / *The Restriction of Hazardous Substances Directive. (Our products don't contain the "substances" & "preparations" (Article 33) or release any substances.*

EN 61326-1:2013 – Apparecchi elettrici di misura, controllo e laboratorio – Prescrizioni di compatibilità elettromagnetica – Parte 1: Prescrizioni generali / *Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements*

Il Legale Rappresentante / *Legal Representative*
Andrea Certo

15/01/2021

Documents / Resources

	LSI Wind Direction Sensors [pdf] User Manual Wind Direction Sensors, Wind Direction, Direction Sensors, Sensors