

▶ Wind direction (wind vane)

Technical features - MODELS



Compact wind vane

With compact size and high mechanical strength, these sensors are particularly suited for use in strong wind applications, where long term reliability without maintenance is required, as in wind farms and wind turbine surveys. Ideal also for portable and light AWS and for wind-alarm applications where wind speed and direction are both important issues. On this regard, LSI LASTEM data loggers can detect specific alarm conditions and open digital outputs when wind speed is over a programmable value and wind direction is coming from a defined angle.

Order numb.

DNA212

| | | |
|---------------------|----------------------------------|--|
| Wind speed | <i>Principle</i> | Hall effect sensor |
| | <i>Measuring range</i> | 0÷360° |
| | <i>Threshold</i> | 0,25 m/s |
| | <i>Accuracy</i> | 5° |
| General information | <i>Output</i> | 0÷1 V |
| | <i>Connector</i> | 4 pin IP65 watertight connector |
| | <i>Housing</i> | Anodized aluminum |
| | <i>Power supply</i> | 10÷14 Vdc |
| | <i>Power consumption</i> | 10 mA |
| | <i>Mounting</i> | Mast ø 48 ÷ 50 mm |
| | <i>Operative temperature</i> | -35÷70°C (without ice) |
| | <i>Data logger compatibility</i> | M-Log (ELO007-008), R-Log (ELR515), E/X-Log (all models) |

Accessories

Order numb.



| | |
|---------------|---|
| MN1071 | Cable each meter |
| DYA046 | Coupling bar For WS+WD sensors on ø 45 ÷ 65 mm pole |
| DNA218 | Spare part: vane |
| MM2001 | Spare part: bearing |



DYA046



following | Wind direction (wind vane)



Standard wind vane (direct output)

Wind direction sensor with direct signal output. These wind vanes are ideal when requirements calls for low thresholds and good accuracy even at very low wind speed. DNA310-311#C uses a Hall-effect encoding system. DNA314#C is equipped with a potentiometer to reduce power consumption in very low energy applications. DNA311#C is also equipped with heaters to avoid ice formation on its body in very cold environments.

| Order numb. | DNA310#C | DNA311#C | DNA314#C |
|------------------------------|--|--|--|
| Principle | Hall effect sensor | | Potentiometer, resistance proportional to wind direction |
| Output | 0÷1 V | | 0-2000 Ω |
| Power supply | 12 Vdc | 24 Vdc/ac (heater) 12 Vdc (direction) | - |
| Heater | NO | YES | NO |
| Heater operative temperature | - | >-20°C | - |
| Power consumption | 10 mA | 20 W | Max 2 mA |
| Calibration certificate | Included | | |
| Data logger compatibility | M-Log (ELO007-008), R-Log (ELR515), X/E-Log (all models) | | |



Standard wind vane (analog output)

Wind direction sensor with analog signal output. All models use a Hall-effect encoding system. DNA811-815 are equipped with heaters to avoid ice formation on its body in very cold environments.

| Order numb. | DNA810 | DNA811 | DNA814 | DNA815 | DNA816 |
|------------------------------|--------------------|-----------|--------------|-----------|--------------|
| Principle | Hall effect sensor | | | | |
| 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 | NO | YES | NO | YES | NO |
| Heater operative temperature | | >-20°C | | >-20°C | |
| Power consumption | 0,5 W | 20 W | 0,5 W | 20 W | 0,5 W |

Common features

| | | |
|---------------------|------------------------------|--|
| Wind direction | <i>Measuring range</i> | 0÷360° |
| | <i>Accuracy</i> | 3° |
| | <i>Threshold</i> | 0,15 m/s |
| | <i>Delay distance</i> | 1,2 m (at 10 m/s) According to VDI3786 and ASTM 5366-96 |
| | <i>Damping coeff.</i> | 0,21 (at 10 m/s). According to VDI3786 and ASTM 5096-96 |
| General information | <i>Connector</i> | 7 pin IP65 watertight connector |
| | <i>Housing</i> | Anodized aluminum |
| | <i>Operative temperature</i> | -35÷70°C (without ice) |
| | <i>Mounting</i> | Mast ø 48 ÷ 50 mm |





following | Wind direction (wind vane)

Accessories

Order numb.



| | |
|--------|--|
| DYA046 | Coupling bar for WS+WD sensors on \varnothing 45 ÷65 mm pole |
| DZC404 | Calibration certificate Included in DNA310-311-314#C |
| DNA110 | Cable for DNA31x#C L = 10 m |
| DNA125 | Cable for DNA31x#C L = 25 m |
| DNA126 | Cable for DNA31x#C L = 50 m |
| MG2252 | 7 pin free male connector for DNA31x#C |
| DWA505 | Cable for DNA81x L = 5 m |
| DWA510 | Cable for DNA81x L = 10 m |
| DWA525 | Cable for DNA81x L = 25 m |
| DWA526 | Cable for DNA81x L = 50 m |
| DWA527 | Cable for DNA81x L = 100 m |
| MG2251 | 7 pin free female connector for DNA81x sensors |
| DNA217 | Spare part: rotor |
| MM2025 | Spare part: bearings |



▶ Wind speed and direction (ultra-sonic)

Technical features - MODELS



Ultrasonic anemometer

2-axis ultrasonic anemometer without moving-parts. It is ideal for general meteorological applications requiring very low-maintenance or measurements with fast response even in low-range wind speed conditions. Model DNB104-106-146 (RS232 output) can be connected to COM2 of LSI LASTEM data logger using Modbus protocol.

| Order numb. | DNB104 (1) | DNB106 (1) | DNB105 (1) | DNB107 (1) | DNB146 (2) |
|-------------------|-----------------------------------|-----------------------------------|-----------------------|-----------------------|-----------------------------------|
| Output | RS232, RS485, RS422, SDI-12 | RS232, RS485, RS422, SDI-12 | 2x4-20 mA | 2x4-20 mA | RS232, RS485, RS422, SDI-12 |
| Type | Sonic 2-Axis (U-V) | Sonic 2-Axis (U-V) | Sonic 2-Axis (U-V) | Sonic 2-Axis (U-V) | Sonic 3-Axis |
| Heater | NO | YES | NO | YES | NO |
| Protocol | NMEA, Modbus-RTU, SD-12 | NMEA, Modbus-RTU, SD-12 | - | - | NMEA, Modbus-RTU, SD-12 |
| Power consumption | 26 mA @ 12 Vdc | 6 W | 26 mA @ 12 Vdc | 6 W | 26 mA @ 12 Vdc |

Common features

| | | |
|---------------------|--|---|
| Wind speed | <i>Measuring range</i> | 0÷60 m/s |
| | <i>Accuracy</i> | 0÷35 m/s: ±2% or ± 0.2 m/s >35 m/s: ±3% |
| | <i>Threshold</i> | 0,01 m/s |
| | <i>Resolution</i> | 0,01 m/s |
| Wind direction | <i>Measuring range</i> | 0÷360° |
| | <i>Accuracy</i> | ±2° |
| | <i>WS threshold for WD calculation</i> | 0,01÷1,00 m/s (default: 0,02 m/s) |
| | <i>Resolution</i> | 1° |
| Compass | <i>Principle</i> | Magnetic |
| | <i>Measuring range</i> | 0÷360° |
| | <i>Resolution</i> | 0,1° |
| | <i>Accuracy</i> | ±1° |
| General information | <i>Power supply</i> | 10÷30 Vdc |
| | <i>Protection</i> | IP66 |
| | <i>Connector</i> | IP65 watertight connector male connector M23, n.19 wires |
| | <i>Housing</i> | Luran, AISI316 |
| | <i>Mounting</i> | Mast ø 40 mm |
| | <i>Operative temperature</i> | -40÷+60°C |

Accessories

Order numb.

| | |
|---------------|--|
| DWA810 | Cable L = 10 m for DNB105-107 anemometer |
| DWA811 | Cable L = 10 m for DNB104-106 anemometer |
| DWA825 | Cable L = 25 m for DNB105-107 anemometer |
| DWA826 | Cable L = 50 m for DNB105-107 anemometer |
| MG2272 | Watertight connector for making DNB10X cable |
| DNB191 | Adapter for DNB sensors to pole Ø 50 mm |

Wind speed&direction (wind cup and vane)

Technical features - MODELS



Combined Wind speed and Direction sensors

Combined wind speed and wind direction sensor. Direct signal output for wind speed (Hz) and wind direction (0÷1 Vdc). This sensor range includes, in a single apparatus, transducers for both wind speed and wind direction measurement. Its use simplifies installation requirements, other than being smaller, lighter and cheaper than the general 2-sensor kit. Model DNA122#S is equipped with a potentiometer and its wind direction output is in Ω , with very low power consumption and it can be used in applications with limited energy availability. Data output of the DNA921 model is RS485 using Modbus RTU® or TTY-ASCII protocols.

| Order numb. | DNA121#C | DNA122#C | DNA821 | DNA827 | DNA921 |
|----------------------------|--|----------------------------|-----------------------|---------|--|
| Wind speed output | 0÷833 Hz | | 4÷20 mA | 0÷5 Vdc | RS485 |
| Wind speed measuring range | 0÷75 m/s (damage limit) | | 0÷60 m/s | | |
| Wind Direction output | 0÷1 Vdc | 0÷2000 Ω | 4÷20 mA | 0÷5 Vdc | RS485 |
| Protocol | - | - | - | - | Modbus RTU® TTY-ASCII |
| WS Programmable output | - | - | - | - | Instant, max., min., ave. (1÷3600 sec) |
| WD programmable output | - | - | - | - | Instant, Prevalent sector (1÷3600 sec) |
| Configuration | - | - | - | - | Hyperterminal |
| Protection | Tranzorb | | Tranzorb e Emifilters | | |
| RS485 protection | - | - | - | - | Galvanic insulation (3 kV, UL1577) |
| RS485 speed | - | - | - | - | 1200÷115 kbps |
| Power supply | 12 Vdc | | 10÷30 Vac/dc | | |
| Power consumption | 30 mA | 2 mA | 0,5 W | | |
| Wind direction principle | Hall effect system | 2 k Ω potentiom. | Hall effect system | | |
| Data logger compatibility | M-Log (ELO007-008) R-Log (ELR515) X/E-Log (all models) | | - | - | - |

Common features

| | | |
|------------|-----------------------|---|
| Wind speed | <i>Principle</i> | N.32 step optoelectronic disk |
| | <i>Accuracy</i> | 0÷3 m/s=1,5%, >3 m/s= 1% |
| | <i>Threshold</i> | 0,26 m/s |
| | <i>Delay distance</i> | 4,8 m (@ 10 m/s) According to VDI3786 and ASTM 5096-96 |
| | <i>Resolution</i> | 0,07 m/s |

continued 



| | | |
|---------------------|-------------------------------|---|
| Wind direction | <i>Principle</i> | See table above |
| | <i>Measuring range</i> | 0÷360° (0÷355° DNA122#C) |
| | <i>Accuracy</i> | 1% |
| | <i>Threshold</i> | 0,15 m/s |
| | <i>Resolution</i> | 0,3° |
| | <i>Delay distance</i> | 1,2 m (@ 10 m/s) According to VDI3786 and ASTM 5366-96 |
| | <i>Damping coeff.</i> | 0,21 (@ 10 m/s) According to VDI3786 and ASTM 5096-96 |
| General information | <i>Operative damage limit</i> | 75 m/s |
| | <i>Connector</i> | 7 pin IP65 watertight connector |
| | <i>Housing</i> | Anodized aluminum |
| | <i>Cup</i> | PA6 plastic and fiberglass |
| | <i>Vane</i> | Aluminum |
| | <i>Mounting</i> | Mast ø 48 ÷ 50 mm |
| | <i>Electric protections</i> | Tranzorb and Emifilters |
| | <i>Operative temperature</i> | >-30°C (without ice) |
| | <i>Mounting</i> | Mast ø 48÷50 mm |

Accessories

Order numb.

| | |
|---------------|--|
| DZC405 | Calibration certificate Includes in DNA121#C and DNA122#C |
| 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 | 7 pin free female connector |
| DNA124 | Spare part: rotor |
| DNA127 | Spare part: vane |
| MM2011 | Spare part: bearings for Wind direction (QT.2 required) |
| MM2020 | Spare part: bearing for Wind speed (QT.2 required) |



Wind speed (wind cup)

Technical features - MODELS



Compact anemometer

With compact size and high mechanical strength, these sensors are particularly suited for use in strong wind applications, where long term reliability without maintenance is required, as in wind farms and wind turbine surveys. These sensors are compatible with any LSI LASTEM data loggers, but they can be also easily integrated with third party systems, thanks to a high quality relay-generated linear pulse output.

Order numb.

DNA202

| | | |
|---------------------|----------------------------------|--|
| Wind speed | <i>Principle</i> | Relay Reed |
| | <i>Measuring range</i> | 0÷75 m/s (damage limit) |
| | <i>Accuracy</i> | 2,5% (calibration tested to 63 m/s) |
| | <i>Threshold</i> | 0,5 m/s |
| General information | <i>Output</i> | 2,65 Hz x m/s |
| | <i>Connector</i> | 4 pin IP65 watertight connector |
| | <i>Housing</i> | Anodized aluminum |
| | <i>Operative temperature</i> | -35÷70°C (without ice) |
| | <i>Mounting</i> | Mast ø 48 ÷ 50 mm |
| | <i>Data logger compatibility</i> | M-Log (ELO007-008) R-Log (ELR515) E/X-Log (all models) |

Accessories

Order numb.

| | | |
|---|---------------|---|
|  | MN1071 | Cable (per m) |
| | DYA046 | Coupling bar for WS+WD sensors on ø 45 ÷ 65 mm pole |
| | DNA207 | Spare part: rotor |
| | MM2001 | Spare part: Bearings |
| | |  |

**Standard anemometer (direct output)**

Wind speed sensor with direct signal output (Hz/m/s). These anemometers are ideal for when requirements call for low thresholds and good accuracy even at very low wind speed. The wind speed element is a tachometer with 32 steps ensuring very high resolution. DNA302#C is equipped with heater. DNA304#C, with its extreme-low power consumption, can be used in applications with very low energy availability.

| Order numb. | DNA301#C | DNA302#C | DNA304#C |
|--------------------------------|--|--------------------------|----------|
| Measuring range (damage limit) | 0÷75 m/s | | |
| Output | 0-883 Hz | | |
| Power supply | 5÷12 Vdc | 5÷12 Vdc (heater 24 Vac) | 5÷12 Vdc |
| Heater | NO | YES (-20°C) | NO |
| Power consumption | Max. 20 mA | 20 W | 2 mA |
| Calibration certificate | Included | | |
| Data logger compatibility | M-Log (ELO007-008), R-Log (ELR515), E/X-Log (all models) | | |

**Standard anemometer (analog output)**

Wind speed sensor with analog signal output. All models are based on microprocessor technology: Every sensor has, on the basis of its particular geometry, different response on each point of his measuring range; the microprocessor adjusts the signal linearity at any wind speed value, obtaining a precise and stable output. DNA802 and DNA806 are equipped with heaters.

| Order numb. | DNA801 | DNA802 | DNA805 | DNA806 | DNA807 |
|------------------------------|--------------|-------------|--------------|-------------|--------------|
| Output | 4÷20 mA | | 0÷20 mA | | 0÷5 Vdc |
| Measuring range | 0÷50 m/s | | | | |
| Power supply | 10÷30 Vac/dc | 24 Vac/dc | 10÷30 Vac/dc | 24 Vac/dc | 10÷30 Vac/dc |
| Heater | NO | YES (-20°C) | NO | YES (-20°C) | NO |
| 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

| | | |
|---------------------|-------------------------------|---|
| Wind speed | <i>Principle</i> | N.32 step optoelectronic disk, frequency proportional to wind speed |
| | <i>Threshold</i> | 0,3 m/s |
| | <i>Accuracy</i> | 0÷3 m/s=1,5%, >3 m/s= 1% |
| | <i>Resolution</i> | 0,06 m/s |
| | <i>Delay distance</i> | 4,8 m (at 10 m/s) According to VDI3786 and ASTM 5096-96 |
| General information | <i>Operative damage limit</i> | 75 m/s |
| | <i>Connector</i> | 7 pin IP65 watertight connector |
| | <i>Housing</i> | Anodized aluminum |
| | <i>Operative temperature</i> | -35÷ +70°C (without ice) |
| | <i>Mounting</i> | Mast ø 48 ÷ 50 mm |





Accessories

Order numb.



| | |
|---------------|---|
| DYA046 | Coupling bar for WS+WD sensors on ø 45 ÷ 65 mm pole |
| DZC405 | Calibration certificate Included in DNA301-302-304#C |
| DNA110 | Cable for DNA30x#C L = 10 m |
| DNA125 | Cable for DNA30x#C L = 25 m |
| DNA126 | Cable for DNA30x#C L = 50 m |
| DWA510 | Cable for DNA80x L = 10 m |
| DWA525 | Cable for DNA80x L = 25 m |
| DWA526 | Cable for DNA80x L = 50 m |
| DWA527 | Cable for DNA80x L = 100 m |
| MM2251 | Free connector without cable |
| DNA204 | Spare part: rotor |
| MM2015 | Spare part: bearing |

