LONGEVITY
ROBUST
Al
METAL MATERIAL
SEAWATER RESISTENT
NAVAL
NMEA
DATA PROTOCOL
RS485
DIGITAL OUTPUT
35W
HEATED
24VDC
POWER SUPPLY

Please note the loss of warranty and non-liability by unauthorised manipulation of the system. You need a written permission of the LAMBRECHT meteo GmbH for changes of system components. These activities must be operated by a qualified technician.

The warranty does not cover:

1. Mechanical damages caused by external impacts (e. g. icefall, rockfall, vandalism).
2. Impacts or damages caused by over-voltages or electromagnetic fields which are beyond the standards and specifications in the technical data.
3. Damages caused by improper handling, e. g. by wrong tools, incorrect installation, incorrect electrical installation (false polarity) etc.
4. Damages which are caused by using the device beyond the specified operation conditions.

List of contents

1.0 Description

1.1 General

The sensor (24513-NMEA) is specifically designed for the operating on ships, oil rigs and other applications on sea. The housing and the measuring elements are made of a seawater resistant aluminium alloys. Housing, cup-rotor and wind vane are anodized.

Due to the special construction with a watertight connector and splash proof traps for the bearings and due to the shock and vibration proof construction the sensor is fully qualified for a long service life on ships.

An electronically controlled sensor heating device (option) allows operating the sensor over the wide range from -35 up to 70 °C.

1.2 Function

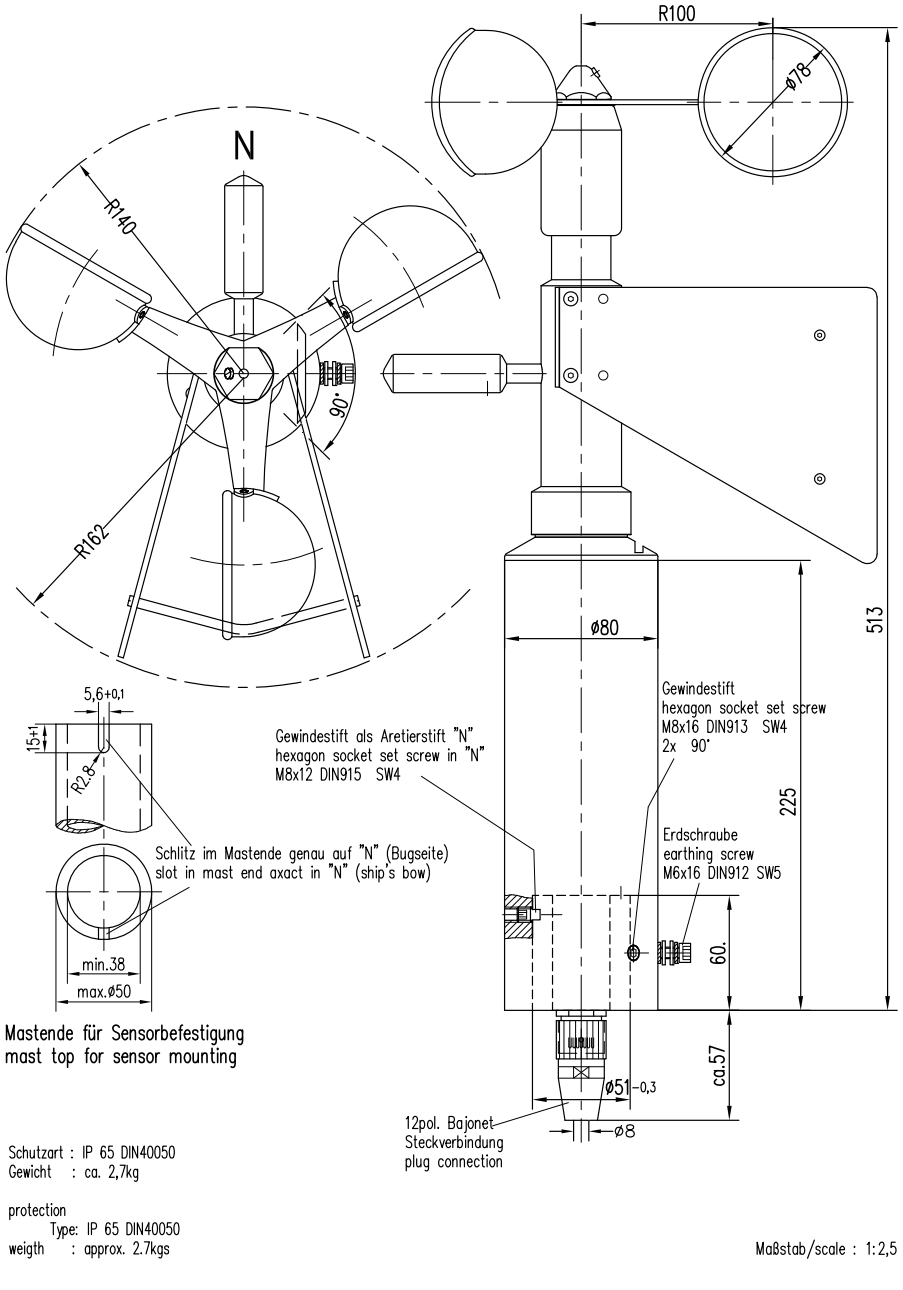
The sensor (24513-NMEA) has two different measuring elements to measure wind speed and wind direction.

The three-armed cup rotor will rotate from the wind. The number of revolutions of the cup rotor is proportional to the wind speed.

The wind direction is measured with a wedge wind vane with two fins.

The wind vane axis and the rotor cup axis are coaxial, running independently of each other on ball bearings.

1.3 Dimensional drawing



1.4 Message string WIMWV at 24513-NMEA

Wind direction and wind speed

Example of data sequence with comma separated fields: $WIMWV,357.0,R,5.2,M,A*CS<CR><LF>
field delimiter: , (comma)
header: $WIMWV
wind direction: 0.0 to 360.0
R: relative wind direction
wind speed: 0.4 to 60.0
M: metric units m/s
status A (valid) / V (not valid)
stop delimiters: <CR> <LF>
error code: WD 999.9
error code: WS 999.9

Important! Please note:

Field length

The development of a NMEA decoder should not be proceeded from firm field lengths. The NMEA definition proceeds from a variable field length. The comma character (“,”) serves as field disconnecting switch. Numeric values in a field can be presented differently. In case a field is not sent, it has a length of 0 characters (,,) [comma-comma].

Check sum

The check sum “CS” is covered to two ASCII characters hexadecimal value. “CS” calculated by XOR operation of each character in the sentence between “$” and “*”, but excluding “$” and “*”.

Error code

In case, that the sensor cannot generate a measuring value because e.g. a sensor element is defect or implausible (raw) values are collected the sensor outputs in the corresponding data protocol the above mentioned error code (e.g. 999.9) and sets the status from “A” (valid) to “V” (not valid).

Example: $WIMWV,999.9,R,999.9,M,V*37<CR><LF>

Particular characteristics wind direction value

Theoretically the value for the wind direction can take any value between 0.0° and 360.0°. It should be noted, that in a full circle the values “0.0” and “360.0” are describing the same direction. According to the international valid recommendations of the WMO (World Meteorological Organization) in the “Guide to Meteorological Instruments and Methods of Observation” (WMO-No.8) the wind direction value 0.0° just has to be output at calm. The EOLOS follows the recommendation of the WMO and outputs at wind from the north the value “360.0” respectively “0.0” at calm (lull).

Norms:

Emission
EN 60945:2002
CISPR 16-1 :1999 Part 1

Immunity
EN 60945:2002
includes:
EN 61000-4-6:1996 Injected RF currents
EN 61000-4-3:2002 Radiated RF fields
EN 61000-4-4:1995 Burst
EN 61000-4-2:1995 ESD
EN 61000-4-5:1995 Surge
EN 61000-4-11:1994 Voltage variations

2.0 Setting into operation

2.1 Unpacking

When removing the sensor from the original cardbox take care not to damage the cup rotor and the wind vane.

The measuring elements must not be used as a handle.

2.2 Choice of the installation place

For representative wind measuring the sensor should not be installed under the lee of large obstacles. The distance between obstacle and sensor should be at least 10 times the height of the obstacle. Furthermore the sensor should be at least 5 meter higher than the height of the obstacle.

For operation on ships you should select a mounting place with little interferences of obstacles such as masts, antennas, and chimneys. In most cases the users mount the sensor on a crossarm on the ship's highest mast.

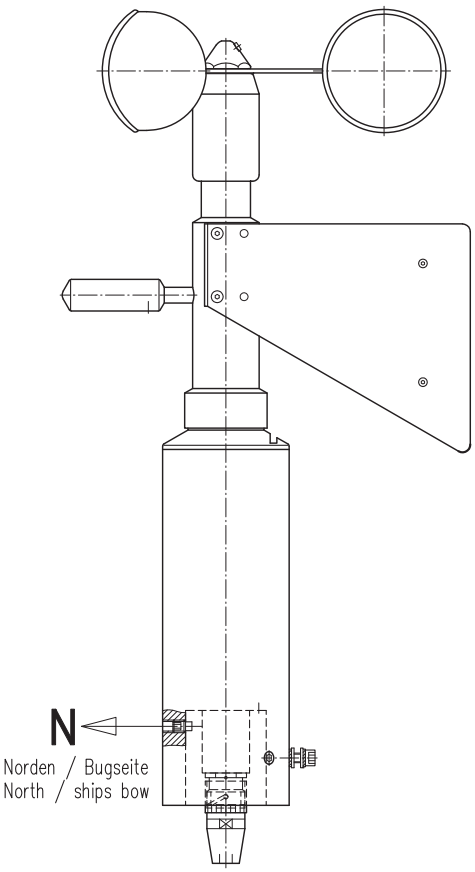
2.3 Mounting

After inserting the plug connector into the socket at the bottom of the sensor shaft, the sensor is mounted on a fitting tube with an outer diameter of 50 mm and an inner diameter at least 40 mm. If a traverse is supplied for the sensor (24513-NMEA) then the fitting tube is a part of the traverse. Before the screws of the sensor are tightened, the sensor is adjusted to north.

In order to install the wind sensor fast and correct regarding the north-adjustment this item is equipped with an integrated mounting aid. Inside the inner bottom of the sensor a small bolt pointing to the north is integrated to be set into a corresponding slot of the mounting pipe. Therefore the mast piece has to be designed with a corresponding slot as illustrated in the dimensional drawing.

Alternatively the correct north setting can be carried out by searching a point outside the vessel in the landscape which is located in the ship ahead direction respectively in the bow-stern line or a parallel line in case of the sensor is mounted far away from the middle line. The sensor finally can be fastened by means of the two hexagonal screws when the selected point in the outer terrain is in the view-finder (groove) of the sensor which is located on the top of its housing. Finally the earth screw has to be connected to the ship's ground. An acid-free contact grease is recommended to protect contact surfaces against corrosion.

Note: Obey all safety instructions while setting up the sensor onto a mast.

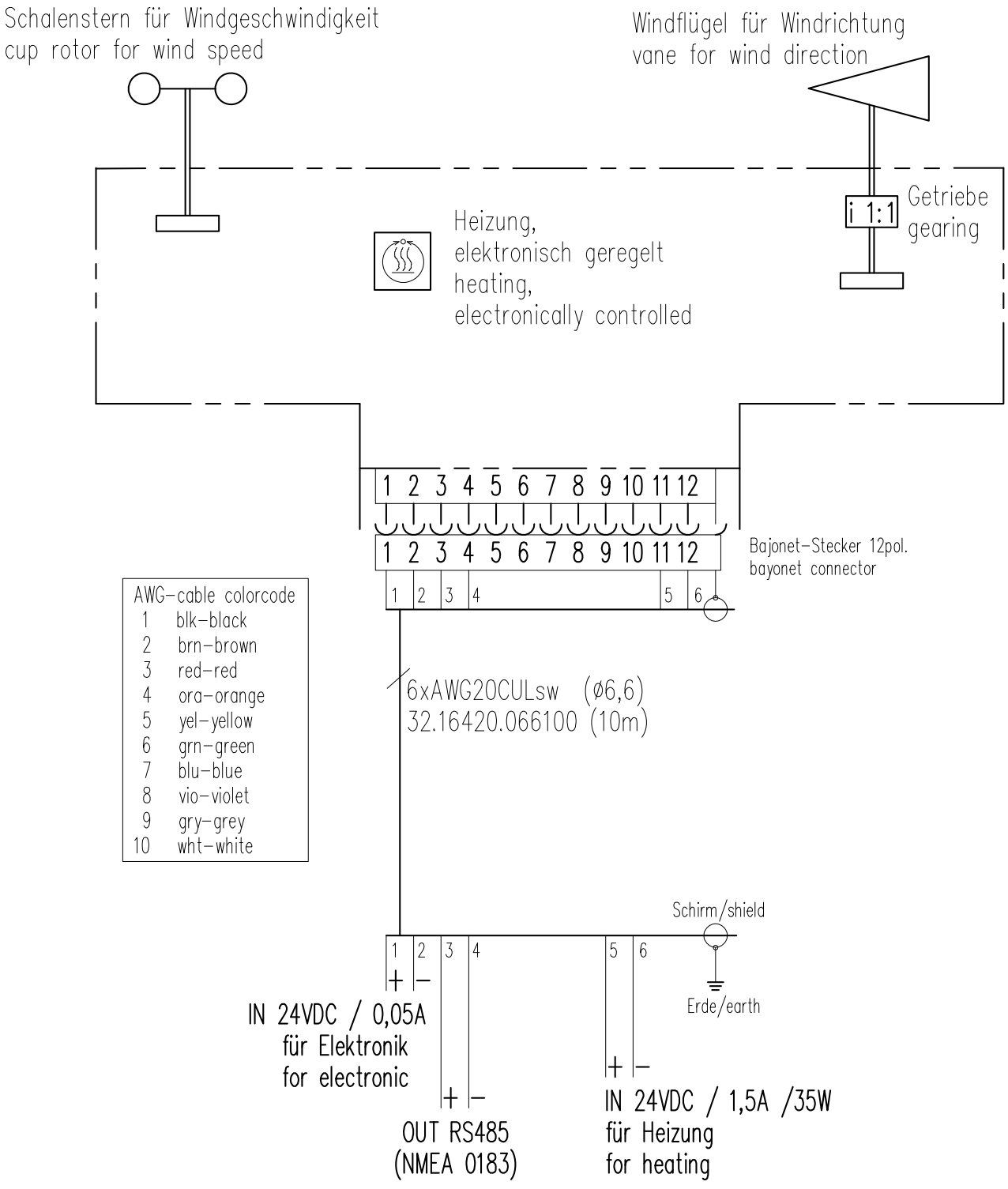


2.4 Electrical connection

The cable is connected to the sensor by means of a splash-proof plug connection in the shaft of the sensor. Before mounting the sensor on the fitting tube, the cable with the plug connector has to be passed through the tube.

The electrical connection of the different models can be found in the wiring diagram.

Attention: Wrong connection may cause a destruction of this or other connected components.



2.5 Cable entries

If the sensor is mounted in correct manner and connected with the right cable (accessory), you can attach the wires to power supply and signal outputs to data acquisition equipment (computer).

The sensor requires a 12-pole CONINVERS plug connector of the series designation „TC“ (Ordering No.: TC-12S1N128055). The cable shield should be connected with both ends at the ground wire (PE).

To reduce the risk of inductive interference the sensor must be properly grounded (screening on both sides).

2.6 Setting into operation

After having finished the electrical and mechanical installation work of this item as mentioned in this manual and other related instructions the wiring should be checked once again before switching on the mains for the whole measuring system.

When the power supply of the sensor is switched on, the sensor automatically sends cyclic data.

2.7 Performance check

When the system installation is completed a simple performance check as mentioned here can be carried out:

► To check the sensor for wind direction the wind vane is set in the directions NORTH-EAST-SOUTH-WEST and fixed in these positions for a while. Accordingly to this directions the following values must be displayed: N or 0° (360°), E or 90°, S or 180°, W or 270°.

If the display does not correspond to the actual positions of the wind vane, the sensor must be aligned again and the cable connections checked.

► When stopping the cup rotor carefully by hand at its axis, the displays must indicate a value of 0 knots (m/s).

3.0 Service and maintenance

3.1 Change of spare parts

Interchanging of outer parts

When working under harsh conditions it may be necessary that the following consumables have to be changed:

Cup Rotor: After bending away the washer, the hexagonal screw can be loosened with a wrench size SW 27. The faulty cup rotor can be removed together with the washer.

The new cup rotor has to be mounted in such way that the concave parts of the cups are always on the right side (see figure 1.3) enabling an anticlockwise rotation.

After replacement of a cup rotor it will always be necessary to use a new washer in order to fix the rotor safely. New balancing will not be required.

Wind Vane: The wind vane blades can be removed after loosening the three screws of each blade.

After mounting of the new parts the wind vane has to be balanced.

For this purpose the sensor must be held in a horizontal position (90° shifted from the position during normal operation).

If the balancing is correct, the vane will be stable in every position. The adjustment can be made with the weight at the end opposite of the vane. It can be moved after loosening the threaded pin.

Please be sure that all screws are fixed before mounting the sensor on the mast again.

3.2 Repair procedures

The fault tracing and service work only should be carried out by skilled maintainers having passed a factory training at our facilities or a similar course.

All spares of the sensor mentioned here which cannot be repaired have to be disposed appropriately according to the local instructions of the waste management. For all other repairs which cannot be carried out by own staff the sensor has to be returned to our factory .

The full shipping address of our company is mentioned in this operating instructions.

3.3 Ordering of spares

In case that the mentioned spares are required for replacement or to be put on stock, please pass us the following information in order to send the right spare parts:

- ordering number/parts number
- required quantity
- related component or name of higher assembly

A detailed inquiry containing these information will be appreciated by us for the safe identification of the required item(s) and to prevent wrong deliveries. Above mentioned data can be obtained from the designation label.

4.0 Setting out of operation

4.1 Storage

The wind sensor (24513-NMEA) has to be stored in a clean and dust free room with temperatures between -40 and 60 °C (not condensing) in the original cardbox or a similar packing.

4.2 Dispatching

For shipping the sensor we recommend to use the original cardbox or a similar packing. To prevent damages during transport it is necessary to protect the wind vane and the cup rotor.

5.0 Remarks

This manual describes the standard design as well as possible options. The respective performance will be stated in the specification and/or the commercial documents of the contract.

Our products are subject to continuous developments. Technical alterations for the technical progress are reserved.

6.0 Technical data

Professional Naval-Line	**(24513-NMEA) Combined Naval Wind Sensor**	**Id-No. 00.24513.205010**
	Wind direction	**Wind speed**
Measuring element:	wedge-shaped wind vane	3-armed cup rotor
Measuring range:	0...360°	0.4...60 m/s
Accuracy:	± 2.5°	± 2 % FS
Resolution:	< 1°	0.1 m/s
Starting value:	< 0.8 m/s related to a deflection of the wind vane of 90°	≤ 0.4 m/s
Range of application:	temperatures -35..+70 °C heated · wind speed 0...60 m/s	
Protocol:	NMEA 0183 · WIMWV	
Interface:	Serial RS 485 / Talker Baud rate 4800 · 1 Hz (at measuring cycle 4 Hz) · 8 N 1	
Supply voltage:	24 VDC / 50 mA · heating 24 VDC / 1.5 A / max. 35 VA / electr. controlled	
Housing:	seawater resistant aluminium	
Dimensions/ Weight:	cup rotor Ø 280 mm · H 520 mm · for mounting pipe Ø 50 mm · 2.7 kg	
Accessory:		
(please order separately)		
32.16420.066100	**Sensor cable** · 10 m (other lengths possible) · 12-pole bayonet plug	
Options:		
36.09340.000000	Visualization and evaluation software MeteoWare-CS3	
00.95800.010000	Data logger met[LOG]	
00.14742.301002	Display unit METEO-LCD/NAV	

LAMBRECHT meteo GmbH
Friedländer Weg 65-67
37085 Göttingen
Germany

Tel +49-(0)551-4958-0
Fax +49-(0)551-4958-312
E-Mail info@lambrecht.net
Internet www.lambrecht.net