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Please note the loss of warranty and non-liability by unauthorised manipulation of the system. You need a written permission from 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.

1.4 Technical data

Professional Naval-Line	(1455 HGN18) Combined Naval Wind Sensor		Id-No. 00.14550.120 400		
	<table><tr><th>Wind direction</th><th>Wind speed</th></tr></table>	Wind direction	Wind speed		
Wind direction	Wind speed				
Measuring element:	wedge-shaped wind vane with precision ring potentiometer	3-armed cup rotor with precision DC measuring generator			
Measuring range:	0...360°	1...120 kn (60 m/s)			
Accuracy:	± 1%	± 2% FS			
Resolution:	0.1°	0.1 m/s			
Starting value:	0.6 m/s related to a deflection of the wind vane of 90°	0.6 m/s			
Range of application:	temperatures -35..+70°C heated · wind speed 0...60 m/s				
Output:	5.2 mA at 120 kn · R _a = 4255 Ω				
Supply voltage:	heating 24 V _{DC} / 35 VA · bimetal controlled				
Housing:	brass · IP 53 · RAL 7000 (grey) · other colours on request · measuring elements made of aluminium · anodized				
Dimensions/ Weight:	cup rotor Ø 320 mm · H 460 mm · for mounting pipe Ø 75 mm, min. inner Ø 65 mm · 4 kg				
Included in delivery:	1 plug · 10-pole, spraywater tight · when a cable is ordered, then the plug is assembled at this cable				
<u>Accessories:</u>	Indicator units e. g. (1476 Q144SBN18) · (1477 Q144SB) · (14763 Q144SBN18)				
32.14550.065 040	(1455 U65d) Cable · 4 m · with 10-pole plug · ready-made				

Measuring element for the wind speed

Model G with generator: A coupled DC generator (G) converts the number of revolutions into a direct voltage. This voltage is transmitted to further devices.

The output function is:

$$v[\text{knots}] = (597/26) \cdot I + 0.6$$

with

I = generator current in mA at $R_a = 4255 \Omega$

and additional condition $I = 0 \rightarrow v[\text{knots}] = 0$

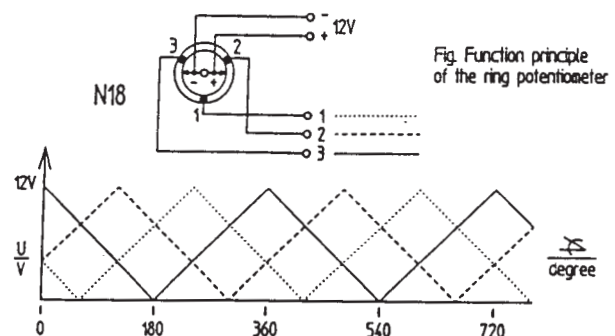
$v[\text{knots}]$ = wind speed in knots

Measuring element for Wind Direction

In operation its top points in the direction the wind comes from; this direction is defined as the wind direction.

Model N: The wind vane is connected to a precision ring potentiometer. The potentiometer is a tripple tapped resistor. The potentiometer is designed as an endless wound resistor with three tappings each of which is 120 degrees away from the others. Two sliders placed opposite each other, i.e. in an angle of 180 degrees and connected to the wind vane feed a 10...12 V_{DC} voltage into the potentiometer. The three output voltages at the tappings and depending on the angle of the vane are shown in the figure below.

Model H: The sensor is supplied with an electrical shaft heating and can be operated in a wide temperature range from -35 to +70 °C.



2.0 Setting into operation

2.1 Unpacking



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

The measuring elements must not be used as a handle.

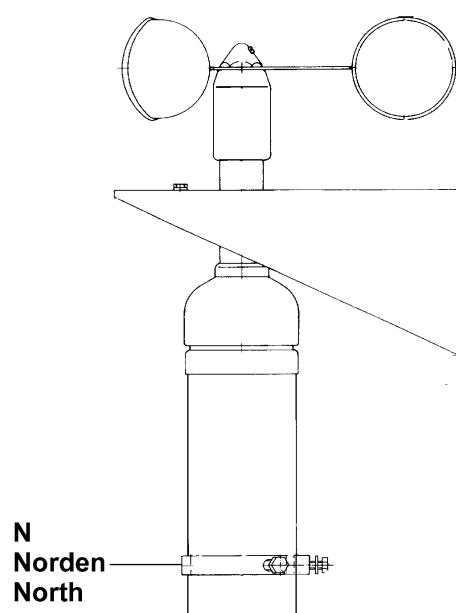
2.2 Choice of the installation place

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 75 mm and an inner diameter at least 65 mm. If a traverse is supplied for the sensor (1455) then the fitting tube is a part of the traverse. Before the screws of the sensor are tightened, the sensor is adjusted to north.



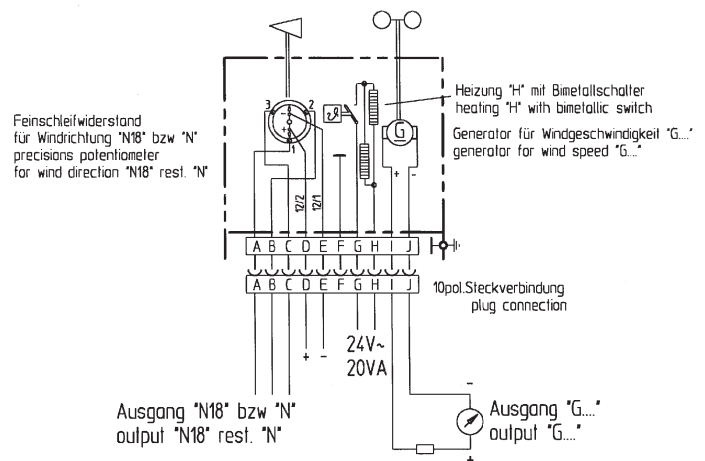
In order to install the wind sensor fast and correct regarding the north-adjustment this item is equipped with an integrated mounting aid. Inside the inner bottom of the sensor a small bolt pointing to the north is integrated to be set into a corresponding slot of the mounting pipe. Therefore the mast 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 is pass through the tube. See the wiring diagram for the wiring of the separated models. To facilitate the installation we recommend to use a short, flexible sensor connection cable between the sensor and a mast distribution box e. g. our model FL 0185. The connection cable is available as a accessory.



2.5 Cable entries

Type of cable: LiYCY 10*0,75 mm²
or: 10*AWG 20 CUL sw

After completely wiring the sensor is ready for operation.

After finishing the installation the earthing screw must be connected to the ship's ground. It should be protected against corrosion using a special acid-free contact grease.

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. As the main interface system of the device will start all functions and routines automatically by means of a micro-controller circuit no further operating handling is required.

2.7 Performance check

For a quick and safe check of the sensor functions we recommend our wind sensor system test equipment Sch 463. The test procedures are described in a separate manual which will be delivered together with this instrument.

Model with G4 generator: A simple test can be carried out with a multimeter. When it is connected to the generator pins, it must display a positive value corresponding to the current wind speed.

The potentiometer can be checked in the resistance range:

- measuring at both slider pins the indication might be approx. 220 ohms, ± 50 Ohms independent of the wind direction.
- the three values at the tapings 1/2, 2/3 and 1/3 must be nearly identical. Their values might be around 200 ohms, ± 50 Ohms. Since the relationship of the three output signals is relevant, the absolute values can be neglected.

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.

3.0 Service and maintenance

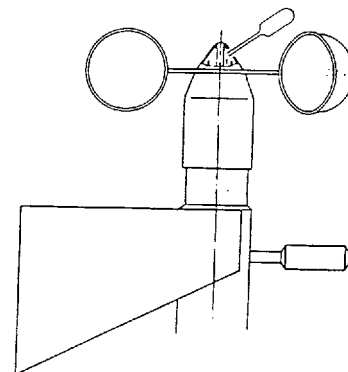
3.1 Periodical works

As wind sensors are generally installed at sites which are difficult to reach, they are constructed such a way that they require very little servicing.

Only when you observe a significant increase of the instrument's starting value - or in case of uninterrupted operation for approximately four years - the ball bearing should be reoiled. For this purpose it is necessary to screw off, after carefully cleaning its surroundings, the screw marked with red colour which closes the oil hole.

A cold-resistant clock oil should be pressed into the oil hole by means of a pipette with plastic or metal hollow needle. Pipettes with glass tips are not suitable for oiling, since the ball bearings might be destroyed by penetrating glass splinters, if the glass breaks. A quantity of about 0.2 cm³ of oil must be pressed slowly into the oil hole. After closing the oil hole, the transmitter should stand vertically in service position for some hours - if possible with moving measuring elements - to allow the oil to spread in the bearings. The wind sensors' oil screw is on top of the cover cap which rotates together with the measuring element.

Illustration: Oiling of the ball bearings



3.2 Change of spare parts

Interchanging of outer parts

As the wind transmitter is working under harsh conditions it may be necessary that the following consumables 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 such that the concave parts of the cups are always on the right side (cf. previous page) 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 the mounting 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 to the vane. It can be moved after loosening the threaded pin.

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

Interchanging of inner parts

Opening the housing

To keep dust, humidity and seawater away from the inner parts of the sensor this work is recommended to be made only in a clean workshop. The position numbers mentioned below correspond to the numbers in the spare part drawing.

- Put the sensor in a horizontal position and remove the three screws around the connector.
- Remove the screw (14) at the upper part of the sensor
- Fix the sensor in a vice or similar instrument. To avoid damages to the housing it must be protected with suitable material.
- Put a flat bladed chisel (20 x 4 mm) to the slot of the housing and turn it to the left.
- Change of spare parts as described below.
- Assemble the housing in reverse order.

Change of the N18 Ring Potentiometer

After opening the sensor according to the steps described above the potentiometer can be changed:

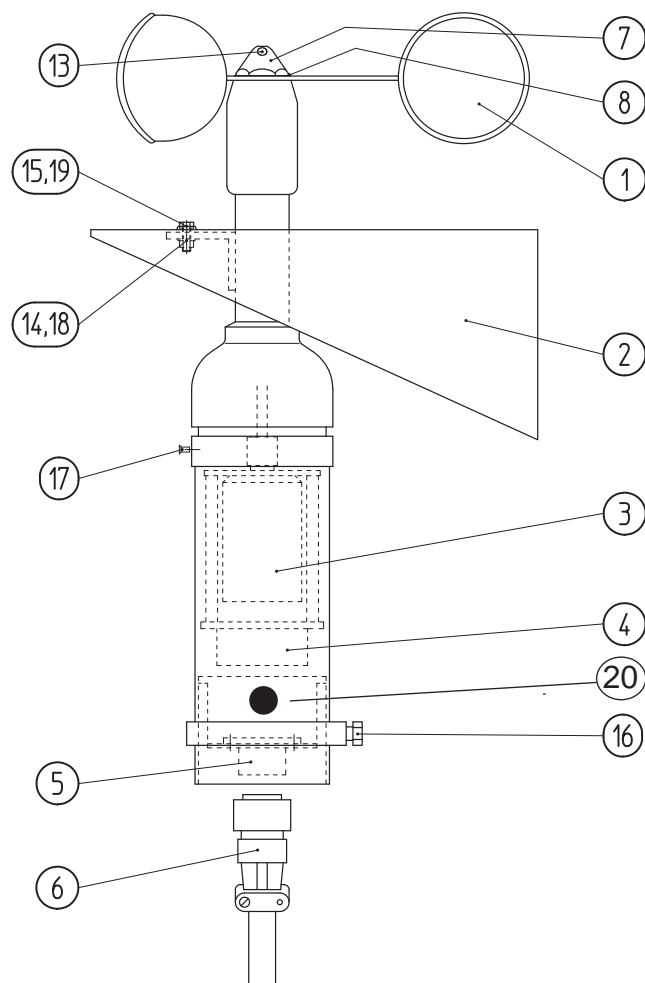
- Loosen the screws and remove the clamps on the base plate and the cogwheel.
- Make a sketch of the electrical connection of the potentiometer.
- Replace the potentiometer.
- Assemble the sensor in reverse order. Before tightening the fixing screws check that there is enough backlash for the cogwheels.
- Fix the wind vane with a piece of tape at the housing.
- Connect an ohmmeter between the pins "8a1" and "12/2 (+)" of the potentiometer and turn the potentiometer until it indicates 0 W.
- Fix the screws at the clamps and secure them with lacquer.

Change of the DC Generator

To exchange the DC generator the sensor and the potentiometer have to be dismantled as described above. Furthermore the following steps have to be carried out:

- Remove the mounting plate of the potentiometer.
- Remove the two hexagonal bolts of the generator plate.
- Replace the generator.
- Assemble the sensor as described in the above sections.

3.3 Spare parts drawing



3.4 Spare parts list

No.	Description	Id-No.
1	cup rotor	32.14676.003 000
2	wind vane	32.14550.006 000
3	DC-generator „G“	64.19020.010 000
4	potentiometer	63.15010.040 000
5	socket connector	65.53040. 020 000
6	cable plug	65.53040.010 000
7	cap	33.14676.015 000
8	locking washer	33.14676.017 000
13	oil screw M 3x4, DIN 84	35.00842.418 201
14	disc 5,3, DIN 125	35.01251.500 531
15	hexagon screw M5x16, DIN 933	35.09331.530 500
16	hexagon screw M8x20, DIN 933	35.09331.540 300
17	countersunk screw M3x6, DIN 963	35.09631.518 400
18	hexagon nut M5, DIN 985	35.09851.500 500
19	DUBO-nut lock for M5	69.12010.030 000
20	thermostat	68.45010.050 000

3.5 Repair procedures

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

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

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

3.6 Ordering of spares

In case of spares as mentioned here are required are required for replacements or to be put on stock the following information are required to forward the right spare parts to the customer:

- name of item and type number
- ordering number/parts number
- required quantity
- related component or name of higher assembly
- type of vessel and country of origin
- reference number of LAMBRECHT wiring diagram (marked by bold letters SKF or SWF, followed by 3 or 4 numbers)

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 and from the spares list of this system component.

4.0 Setting out of operation

4.1 Storage

The wind sensor (1455 HGN18) be stored in a clean and dustfree 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.

4.3 Remarks

This operating instruction 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.

Ordering Help

Model	(1455 HGN18)
Id-No.	00 .14550. 120 400



Quality System certified by DQS according to
DIN EN ISO 9001:2008 Reg.No. 003748 QM08

Subject to change without notice.

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