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Standards

- Standard of construction: VDE 0100
- Low voltage guideline: T2/23 EWG
- EMC: DIN EN 50081-1
VG 95373
IEC 610004-3, 6
IEC 610004-2, 4
- ESD / Burst: BV 0430, diagram 1,8,9
- Vibration: MIL STD 810 D
- Shock resistance: NMEA 0183
- Sulfur spray test: RS 422 (EIA standard)
- Class of protection: IP 68
- Message format: RS 422 (EIA standard)
- Interface: RS 422 (EIA standard)

1 General information

1.1 Sensor types

This manual describes the technical specifications of the compact wind sensors of the types QUATRO-NAV-C H and QUATRO-NAV-C (1642).

Varities Id.No.

QUATRO-NAV-C H 00.16420.310 006

Compact sensor with integrated heating for the top and the housing and for determination of wind speed, wind direction, air temperature, rel. humidity, air pressure and dew point temperature.

QUATRO-NAV-C 00.16420.300 006

as above, but without heating

2 Installation

2.1 Positioning conditions

For wind measurements on board of ships locations and heights of the wind sensor are important for representative and accurate measuring results. The sensors should be ideally located in the top of the mast, without any influences of obstacles. If this is not possible, the sensors should be installed at a mast traverse of min. 1.5 m length, on Port side of the ship.

Further the sensor must not be installed onto transmitting plants or antennas or close to them. A minimum distance of 2 m is to be kept for interference-free signal transfer.

2.2 Tools and installation aids

There are no special tools or materials required for the installation works. All work can be carried out with standard tools available in a regular workshop.

2.3 Unpacking

The sensor is packed in a separate carton, carefully protected against mechanical influences during transport.

When securely installed, the sensor can withstand the shock and vibration normally occurring on ships. Verify that the following parts and documents are enclosed:

- 1 sensor QUATRO-NAV-C or -NAV-C H
 - 1 operating manual
- Accessories: (depend on order size, in all cases separate packed)
Connecting cable with plug

2.4 Inspection

Visually inspect all parts to determine if any damage has occurred during shipping. You should report special damages immediately in writing.

2.5 Power supply

The sensor requires at the input connector a 24 volt nominal DC power source for operation. The power source must be capable of supplying a peak current of 1.5 A (unheated) resp. 4 A (heated) for 10 seconds during start-up.

1.2 Introduction

The static wind sensor QUATRO-NAV-C is a very robust, compact and extreme reliable meteorological weather station. The system measures and processes the following meteorological parameters: wind speed, wind direction, air temperature, rel. humidity, air pressure and dew point temperature (calculated value).

All measuring parts and the other system components are integrated in the sealed, water-proof housing.

The measuring electronics for determining measuring values and for processing signals is also able to carry out self-diagnostic tests and to send status information. The measuring data will be automatically transmitted via serial interface RS 422 in talker mode, when power supply is switched on.

1.3 Advantages of the static measuring principle

The sensor QUATRO-NAV-C is a modern system to carry out precise and reliable measurements under hardest application and environmental conditions. The wind measurements take place according to the principle "TAV" (thermal area field variation) i. e. static, without moving parts.

Static measuring principle for wind measurements means:

- The determination of data works without moving measuring elements, i. e. none abrasion, least maintenance and none recalibration because of this method.
- The wind parameter could be measured also in winter time accurate and precise, because of the electronic controlled heating (option) for the immovable measuring elements. This heating is particularly effective against ice and snow in all climatic zones.
- Lightweight mass and immovable measuring elements to enable very low starting values, distance- and attenuation constants as well as a very high repetition accuracy.
- The sensor can be installed rapidly. Due to the special measuring principle minor changes from the angle of pitch can be disregarded.

Advantages of the sensor:

- The built-in test function of the station, enabled by the tight integration of the meteorological sensors into the enclosure, can perform cyclic self-testing and notify the user of erroneous data or failure.
- The compact design of this sensor is eliminating the traditional cabling and installation work significantly. Distribution boxes, power supply units and other accessories can be reduced to a minimum expense.

2.6 Installation procedure (short instruction)

- The installation of the sensor involves 3 steps:
- (1) mounting the cable at the sensor and if necessary draw the cable through the mast
 - (2) mounting the sensor at the mast, but before tightening the screws, you must align the sensor to the North
 - (3) attaching the cable to the power supply and computer equipment

2.7 Mounting

The sensor can be installed on a standard pipe of 50.9 mm diameter. Before you tighten the two 8 mm-socket screws and attaching the sensor you have to do following: drawing the cable through the pipe, alignment of the sensor into driving direction. For that at the housing is a accordingly mark (see drawing). Please pay attention to a firm seat of the sensor at the mast!

In addition the sensor has a pin for the North direction. This pin you can put into the nick at the mast (if available). Thus the sensor is safely attached. If needed you can turn into or unscrew the pin by means of socket wrench.

2.8 Power and signal connection

If the sensor is correct mounted and connected with the right cable (accessory), then you can attach the wires to power supply and signal outputs to data acquisition equipment (computer). The QUATRO-NAV-C sensor requires a 12-pole CONNIVERS plug connector of the series designation „TC“ (ordering no. TC-125IN128055). The cable shield should be connected with both ends at the ground wire (PE).

The external connection is realised via central connector, which is located in housing base. Further details about electrical connection you can find in chapter 6.

The sensor QUATRO-NAV-C's power supply requirements are 24 Volt/ 15 Watt. The input range is 18...32 V_{DC}. The variety with heating required 24 V_{DC}/18 Watt.

The serial digital output from the sensor uses differential line drivers with high common mode noise rejection. The signal levels and timings conform to the requirements of EIA RS-422 / Talker. The line drivers are capable of transmitting data over cable lengths up to 1,220 meters (4,000 feet). This maximum distance will vary depending upon the operational environment, the wire gauge used and the baud rate of the attached devices.

When the power supply of the sensor is switched on, it sends automatically cyclic data, see chapter 5.

Technical data

Professional Navet Line
(1642) Wind/Weather Sensor QUATRO-NAV-C H

Id.No. 00.16420.310 006

Range of application: temperature -40...+70°C heated / wind speed 0...100 m/s • 0...100% r. h.

Parameters:

Wind speed
Measuring range: 0...1.85 m/s
Accuracy (RMS): ± 0.5 m/s ± 5 % of the measuring value
Resolution: 0.1 m/s

Wind direction
Measuring range: 0...360°
Accuracy (RMS): ± 3°
Resolution: 1°

Temperature
Measuring range: -40°C...+70°C
Accuracy: ± 1°C at wind speed v > 2 m/s
Resolution: ± 0.1°C

Relative humidity
Measuring range: 0...100% RH
Accuracy: ± 3% at 20...80% r. h.
± 4% at 0...100% r. h.
at wind speed v > 2 m/s
Resolution: 1% r. h.

Barometric pressure
Measuring range: 600...1100 hPa
Accuracy: ± 1.5 hPa at 20°C
± 3 hPa at -40°C...+70°C

Resolution: 0.4 hPa

Protocol: NMEA 0183

Supply voltages: 18...32 V_{DC} / 15 W heating
24 V_{DC} / 18 W electr. controlled

Isolation voltages: 500 V_{DC}

Housing: Aluminium special-anodized / protective lacquer /RAL 9007 / IP 68

Dimensions: See dimensional drawing / mast adapter 69.5 mm for installation at assembly mast approx. 2 kg

Weight: approx. 2 kg

Interface: Serial RS 422 / Talker / baud rate 4800 / 1 Hz (at measuring cycle 10 Hz) • 8 N 1

Variety: (1642) Wind/Weather Sensor QUATRO-NAV-C without heating

Id.No. 00.16420.300 006

Range of application: -30...+70°C • heating

Accessories: (please order separately, other length possible)

(1642 U66) Sensor Cable, 10 m, 12-pole bayonet plug Id.No. 52.16420.065 100

Options:

(6337) Meas./eval. Software „MeteoWare QUATRO-LOG“ Id.No. 36.06337.000 000

(85668) Meteo LAN Communicator MLC Id.No. 00.85668.400 000

For integration of QUATRO into the house-internal network (LAN), incl. visualization software

as well as Indicator units e.g. (14742) Meteo-LED NAV Data logger e.g. (66684) SYMNET-NAV Meas./evaluation software „MeteoWare CS“ (clients/server)

Masts and power supply units (80 W NAV/ resp. 150 W NAV-C/H)

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Measuring range: 0...360°
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Temperature
Measuring range: -40°C...+70°C
Accuracy: ± 1°C at wind speed v > 2 m/s
Resolution: ± 0.1°C

Relative humidity
Measuring range: 0...100% RH
Accuracy: ± 3% at 20...80% r. h.
± 4% at 0...100% r. h.
at wind speed v > 2 m/s
Resolution: 1% r. h.

Barometric pressure
Measuring range: 600...1100 hPa
Accuracy: ± 1.5 hPa at 20°C
± 3 hPa at -40°C...+70°C

Resolution: 0.4 hPa

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