THP[pro]NAV

Temperature-Humidity-Pressure Sensor

aem | LAMBRECHT meteo

Content

1   Features

- Combined measuring device for demanding applications

- Capacitive humidity measuring element

- Low maintenance

- For use in all climatic zones

- Appropriate sensor sensor shelter type 8141.62 optionally available

2   Function

PROVEN ENVIRONMENTAL MEASUREMENT TECHNOLOGY

The sensor THP[pro]NAV is a combined measuring instrument for measuring relative humidity, air temperature, and air pressure. The sensor is characterized by high reliability and energy-saving electronics. If the device is handled properly the perfect function and long-term stability as well as high accuracy are ensured.

3   Warranty

Please note the loss of warranty and non-liability by unauthorized 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.

4   Start-up

For climatic measurements the sensor should be mounted at a representative place. The sensor can be installed in any position. The sensor must be protected against water splashes and rain. As a suitable weather and protection screen we recommend the sensor shelter 8141.62.

Dew formation and splashes do not damage the sensor, although corrupted measurement readings are recorded until all the moisture on the filter has dried up. Inside a room you should avoid a place near heatings, windows, and cold outer walls.

The protective filters should only be screwed off carefully to check functioning with the humidity standard. It is important not to touch the highly sensitive sensor element in the process.

When you screw them back on, bear in mind that sensors will not measure accurately again until they are completely dry.

5 Mounting

First of all the protective screen has to be mounted without the incorporated sensor at a selected installation place as mentioned before. When having inserted the sensor THP[pro] bottom-up into the big support of sensor shelter 8141.62, the plastic nut must be fastened carefully with a wrench.
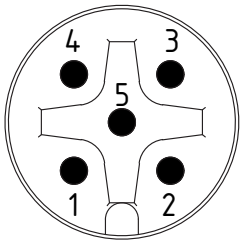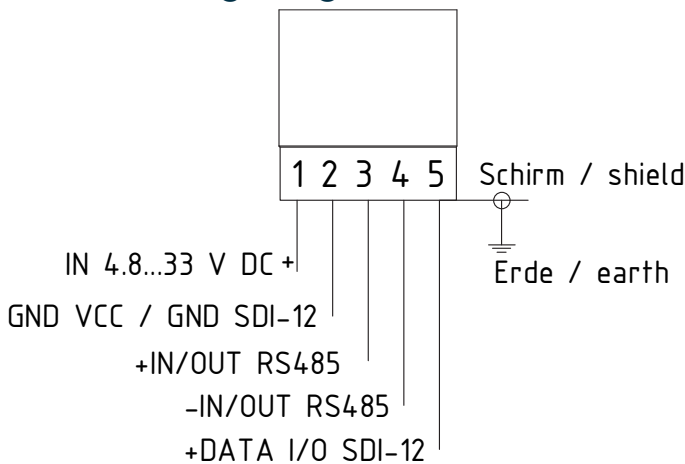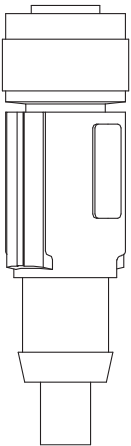
6 Electrical connection

⚠ **Incorrect voltage supplies and overloading of the outputs can destroy the sensor!**

The sensor THP[pro]NAV has to be connected with the end of the cable to an external power supply and signal evaluation (see figure).

7 Wiring diagram

```
1 2 3 4 5    Schirm / shield

IN 4.8...33 V DC +
GND VCC / GND SDI-12                    Erde / earth
        +IN/OUT RS485
        -IN/OUT RS485
        +DATA I/O SDI-12
```

Ansicht Stiftseite
View male side

Kabel / cable
32.05005.000500 (5m)
32.05005.001500 (15m)

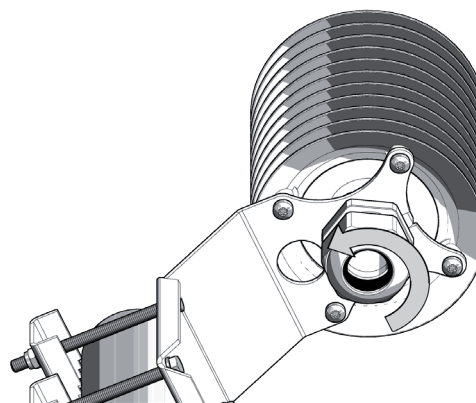| PIN	Color	Farbe
1	br	br
2	wh	ws
3	bu	bl
4	bk	sw
5	gy	gr

8   Dimensioned drawing

140

125

∅20

M12–Steckverbinder
M12 connector
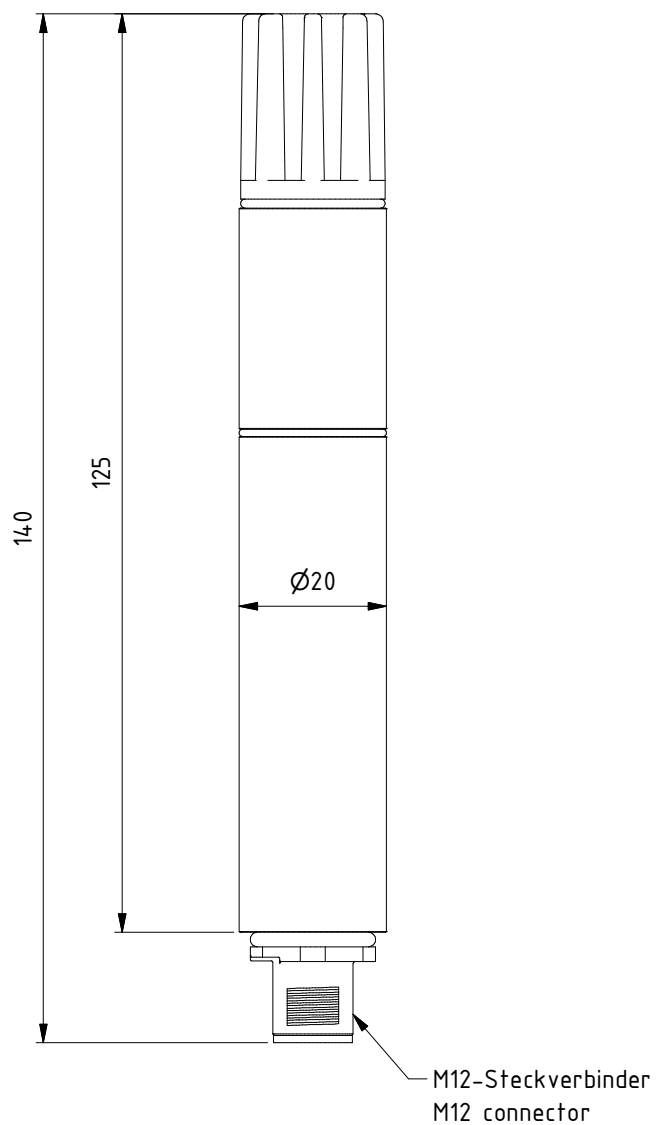
9   Mounting of the sensor into the sensor shelter
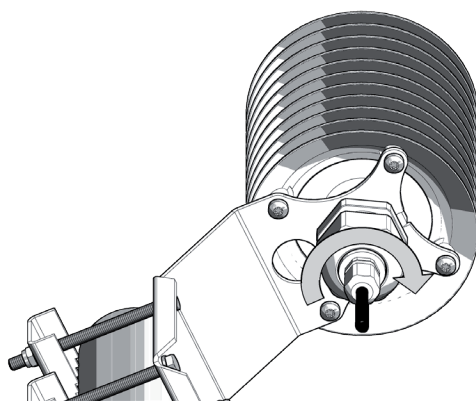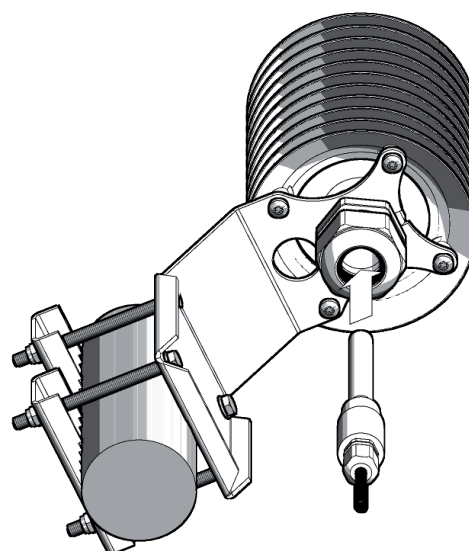
10 Data protocols THP

MESSAGE STRING WIMTA AIR TEMPERATURE

Example of data sequence with comma separated
fields: $WIMTA,-25.0,C*CS<CR><LF>
field delimiter: , (comma)
header: $WIMTA
temperature: -40.0...+70.0
C: °C
stop limiters: <CR> <LF>
error code: 999.9

MESSAGE STRING WIMMB BAROMETRIC PRESSURE

Example of data sequence with comma separated
fields: $WIMMB,,,1050.0,B*CS<CR><LF>
field delimiter: , (comma)
header: $WIMMB
barometric pressure: 600.0...1100.0
B: air pressure in hPa
stop limiters: <CR> <LF>
error code: 9999.9

MESSAGE STRING WIMHU RELATIVE HUMIDITY

Example of data sequence with comma separated
fields: $WIMHU,100.0,,-40.0,C*CS<CR><LF>
field delimiter: , (comma)
header: $WIMHU
rel. humidity: 000.0...100.0
dew point temp.: -40.0...+70.0
C: °C
stop limiters: <CR> <LF>
error code: 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>

11 Perform measurements

The measuring probe is adjusted by delivery. For putting into operating another readjustment is not required. The probe is ready for use five seconds after being switched on and sends its first data protocol.

⚠️ **Before a reliable measurement can be made, the measuring probe and medium to be measured must be in temperature and humidity equilibrium.**

The necessary adjustment time, which can last up to 30 minutes, depends upon several factors:

- Size of the humidity and temperature deviation of probe and medium before start of measurement
- Change of the measured values during the adjustment time

The humidity measurement provides a better picture of the progress of acclimatization since it reacts much more quickly and more sensitively than the temperature measurement. The 1/10 percent display is therefore very suitable as a trend display. If the display oscillates about mean value, then adjustment is completed.

12 General sources of error

Humidity measurements are very sensitive to various influences:

TEMPERATURE ERROR

Due to too short adjustment time, sunshine during the measurement, heating, cold outer wall, air draft (e.g. fans), radiating hand, and/or body heat etc..

HUMIDITY ERROR

Due to steam, water splashes dripping water or condensation on the sensor etc.. Repeatability and long-term stability in operation are not impaired by this even if the probe has been exposed to high humidity or saturation with water vapor over a lengthy period.

STAINING

Staining of the humidity sensor can be largely avoided by using a corresponding filter. The filters must be cleaned or replaced periodically depending upon the degree of contamination of the measuring site.

⚠️ **The sensor is insensitive to chemicals, when they occur in normal concentrations (MAK values = maximum workplace exposure). At higher concentrations or possibilities of contact with liquid chemicals, the manufacturer must always be consulted!**

13 Maintenance and service

DEFINITIONS

Calibration =   Control measurement with a humidity standard.

Adjustment =   Calibration and additional readjustment of the probe to the setpoint value.

TEMPERATURE

The sensor is adjusted before delivery. A temperature readjustment is usually not necessary. If there is any doubt about the correct adjustment, please contact the manufacturer.

HUMIDITY

The sensor is adjusted before delivery so that the results are in optimum accuracy over the full measuring range. We recommend testing the sensor **at least once a year** to maintain this accuracy.

CLEANING

Dirty filters can cause measurement errors and extend the adjustment time. Depending on the degree of contamination of the filters, they must be cleaned periodically or replaced if necessary.

(!) **To avoid damaging the measuring elements, unscrew the filter element for cleaning.**

Clean the filter with soapy water, alcohol or a cleaning agent suitable for removing contamination and rinse thoroughly with water.

Do not screw the filter back onto the probe until it is completely dry.

⚠ **Troubleshooting or maintenance and repair work may only be carried out by trained maintenance personnel who have completed appropriate training by the manufacturer.**

14 Maintenance and care

REGULAR VISUAL INSPECTIONS

The producer recommends periodical visual checks of the sensor and shelter housing regarding outer damages, watertightness, and the fixing of the mounting screws, at intervals of **four weeks**.

REPLACEMENT OF SPARE PARTS

All spare parts or alternate devices can be replaced with regular tools such as wrenches, screw drivers etc.

ACCESSORIES AND SPARE PARTS LIST

ID	Description
00.08141.620000	Sensor shelter NAV To avoid the effects of radiation and to protect the sensor from dirt, wind, and precipitation, and for mounting on the mast
32.14567.060010	Cable 15 m
37.08095.100001	Sinter filter as sensor protection

Sinter filter

ORDER SPARE PARTS

For a quick and correct replacement or exchange delivery, please provide the following data to the manufacturer:

- Name and type number of the device
- Ident no., serial or article number
- Quantity needed

<u>OPTIONAL (IF AVAILABLE)</u>

- Respective description of the connected system components (e.g. data logger variant)
- Type of vessel and country of origin, if applicable
- Reference number of LAMBRECHT wiring diagram designated with the bold letters SKF.... or SWF.... and a 3- or 4-digits running number.

The above mentioned data can be found on the nameplates of the devices, in the order-related circuit diagrams or in the documentation of the complete system.

STORAGE AND DISPATCH

The sensor should be stored in a clean and dust-free area between -40...+70 °C (not condensing) in a cardboard box or similar container. Alternative packing material should be adequate to the standard of the original packing of LAMBRECHT meteo. It must ensure an optimal protection against mechanical or electrical influences as well as against other transport damages caused by liquids or by the weather.

15   Safety instructions

This system is designed according to the state-of-the-art accepted safety regulations. However, please note the following rules:

1. Before set into operation, please read all appropriate manuals!
2. Please take notice of internal and state-specific guidelines and/or rules for the prevention of accidents (e.g. the professional association). If necessary ask your responsible safety representative.
3. Use the system according to the manual's regulations only.
4. Always leave the manual at hand at the place of work of the system.
5. Use the system in technically correct conditions only! You have to eliminate influences immediately, which impair the security .
6. Prevent the ingress of liquids into the devices .
7. Make sure that the system is free of power before cleaning of the devices. Do not use noxious or flammable detergents.

16   Disposal

LAMBRECHT meteo GmbH is listed and registered at the Stiftung Elektro-Altgeräte Register ear under:

WEEE-Reg.-Nr. DE 45445814

In the category of monitoring and control instruments, device type: "Monitoring and control instruments for exclusively commercial use".

Within the EU

The device has to be disposed according to the European Directives 2002/96/EC and 2003/108/EC (Waste Electrical and Electronic Equipment). Do not dispose the old device in the household waste! For an environmentally friendly recycling and disposal of your old device, contact a certified disposal company for electronic waste.

Outside the EU

Please follow the regulations in your country regarding the appropriate disposal of waste electronic equipment.

17   Technical data

THP[pro]NAV	
ID	**00.08095.201000**
Temperature	
Measuring range	-40...+70 °C
Resolution	0.1 °C
Accuracy	± 0.1 K (0...60 °C); ± 0.2 K (-40...0 °C); ± 0.2 K (60...70 °C) [1]
Relative humidity	
Measuring range	0...100 % r. h.
Resolution	0.1 % r. h.
Accuracy	typically at 25 °C: ±1 % (20...70 %) r. F. ; ± 1.5 % (0...20 %) r. F.; ± 1.5 % (70...90 %) r. F.; ± 3 % (90...100 %) r. F. [1] Response time rel. humidity (at v = 1.5 m/s): 30 s [2]
Barometric pressure	
Measuring range	500...1100 hPa
Resolution	0.1 hPa
Accuracy	typically 0.38 hPa (700...1100 hPa) (15...55 °C)
Further specifications	
Supply voltage	4.8...33 VDC
Power consumption [3]	4 mA at 24 VDC; 6 mA at 12 VDC; 11 mA at 4,8 VDC
Housing	Aluminum specially coated; IP 65 (housing); M12 plug connector (4-pole)
Weight	approx. 80 g
Dimensions	H 140 mm x Ø 20 mm
Interface	Serial RS 422 / Talker; Baud rate 4800; 1 Hz; 8N1; SDI-12 *)
Protocol	NMEA 0183; WIMHU; WIMMB; WIMTA
Accessories (please order separately)	
ID 00.08141.620000	Sensor shelter NAV

[1] ventilated sensor shelter recommended [2] with filter membrane [3] without terminating resistor