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# Instruction for Use

021814/10/17

## *Wind Transmitter "First Class" Advanced X*

***Classified according to IEC 61400-12-1 EDITION 2.0 (2017-03)***

**4.3352.00.400**

**4.3352.10.400**


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## Safety Instructions

- Before operating with or at the device/product, read through the operating instructions.
  This manual contains instructions which should be followed on mounting, start-up, and operation.
  A non-observance might cause:
  - failure of important functions
  - endangerment of persons by electrical or mechanical effect
  - damage to objects
- Mounting, electrical connection and wiring of the device/product must be carried out only by a qualified technician who is familiar with and observes the engineering regulations, provisions and standards applicable in each case.
- Repairs and maintenance may only be carried out by trained staff or **Adolf Thies GmbH & Co. KG**. Only components and spare parts supplied and/or recommended by **Adolf Thies GmbH & Co. KG** should be used for repairs.
- Electrical devices/products must be mounted and wired only in a voltage-free state.
- **Adolf Thies GmbH & Co KG** guarantees proper functioning of the device/products provided that no modifications have been made to the mechanics, electronics or software, and that the following points are observed:
- All information, warnings and instructions for use included in these operating instructions must be taken into account and observed as this is essential to ensure trouble-free operation and a safe condition of the measuring system / device / product.
- The device / product is designed for a specific application as described in these operating instructions.
- The device / product should be operated with the accessories and consumables supplied and/or recommended by **Adolf Thies GmbH & Co KG** .
- Recommendation: As it is possible that each measuring system / device / product may, under certain conditions, and in rare cases, may also output erroneous measuring values, it is recommended using redundant systems with plausibility checks for **security-relevant applications**.

## Environment

- As a longstanding manufacturer of sensors Adolf Thies GmbH & Co KG is committed to the objectives of environmental protection and is therefore willing to take back all supplied products governed by the provisions of "*ElektroG*" (German Electrical and Electronic Equipment Act) and to perform environmentally compatible disposal and recycling. We are prepared to take back all Thies products concerned free of charge if returned to Thies by our customers carriage-paid.

- Make sure you retain packaging for storage or transport of products. Should packaging however no longer be required, please arrange for recycling as the packaging materials are designed to be recycled.

## Documentation

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- Although these operating instructions have been drawn up with due care, **Adolf Thies GmbH & Co KG** can accept no liability whatsoever for any technical and typographical errors or omissions in this document that might remain.
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# Table of contents

## Patent

This device is protected by patents.

Patent no.: EP 1 398 637

Patent no.: DE 103 27 632

Patent no.: EP 1 489 427

# 1 Device versions

| Order no. | Measuring range | Output Frequency | Supply | Heater |
|---|---|---|---|---|
| 4.3352.00.400 | 0.3...75m/s | 1082Hz @ 50m/s | 3.7…42V DC | 24V AC/DC, 25W |
| 4.3352.10.400 | 0.3...75m/s | 1082Hz @ 50m/s | 3.7…42V DC | without |

The following parts are included in the scope of delivery:
1 x wind transmitter
1 x connection plug
1 x instructions for use

# 2 Application

The wind transmitter is intended for use in the wind energy, meteorology and environmental measuring technology. Primarily developed for position evaluation and measurement of power curves of wind turbines, the anemometer gathers the following measured variables:

- Horizontal component of the wind speed
- Absolute and relative air pressure
- Inclination angle between the Z-axis and the vertical
- Inclination angle between the X-axis and the horizontal
- Inclination angle between the Y-axis and the horizontal
- Frequency and amplitude of the vibration measurement in the X-, Y- and Z-axis
- Housing interior temperature

Further characteristics include a defined and optimized dynamic behavior even at highly intense turbulences, minimal overspeeding, a low starting value and an optimized oblique inflow behavior.

An integrated temperature compensation as function of the friction torque and a

compensation of the effect of the air density, distinguish this sensor in its characteristics.

There is a digital interface to the device in form of an RS485 interface in half-duplex mode. Together with the ID-based communication, the interface enables the operation of the wind transmitter in a bus. Tow data protocols are available:

- ASCII (THIES format)
- Binary (MODBUS-RTU)

For operation in winter, the device can be equipped optionally with an electronically controlled heater which provides a hardly measurable friction moment of the ball bearings in low temperatures and provides any ice build-up on shaft and on the gap.

# 3 Setup and mode of operation

The wind transmitter can be supplied with direct voltages from 3.7V up to 42V at very low power consumption. Supply of the optional heater is provided separately with a direct or alternate voltage of 24V. The heater will most probably prevent the wind transmitter First Class even under extreme meteorological icing conditions.

The external parts of the device are made from corrosion resistant anodized aluminum. Highly efficient labyrinth seals and O-rings protect the sensitive parts on the inside of the device from humidity and dust influences. It is assembled on a mast pipe, the electric connection is in the lower part of the sensor.

### Wind speed:

A cup star with ball bearing and low inertia and 3 cups from carbon fiber reinforced plastic is rotated by the wind. The speed is sensed optoelectronically, translated into a square signal with frequency proportional to the speed and measured 4 times per second. The measured frequency is converted into a wind speed with the standard curve. An adaptation of this standard curve can be done with a programmable calibration table (**Standard curve and calibration tables).**

### Air pressure:

A highly precise digital pressure sensor (piezoresistive) is used to measure the absolute air pressure with a resolution of 0.01hPa. The wind transmitter will calculate the relative air pressure from that and the set altitude (**Command SH**).

### Inclination/vibration:

The measurement of the acceleration in space is done via a 3-axis acceleration sensor based on MEMS. Based on this, the wind transmitter will calculate the inclination angle and vibrations (frequency and amplitude).

### Housing interior temperature

An integrated digital temperature sensor measures the housing interior temperature.

# 4 Standard curve and calibration tables

The measured frequency is converted into a wind speed (in proportion to the speed of the cup star) with the standard curve:

$y = 0{,}0462 \bullet f + 0{,}21$

y: Wind speed in [m/s]

f: Frequency in [Hz]

The standard curve can be corrected via a programmable calibration table with 32 entries.

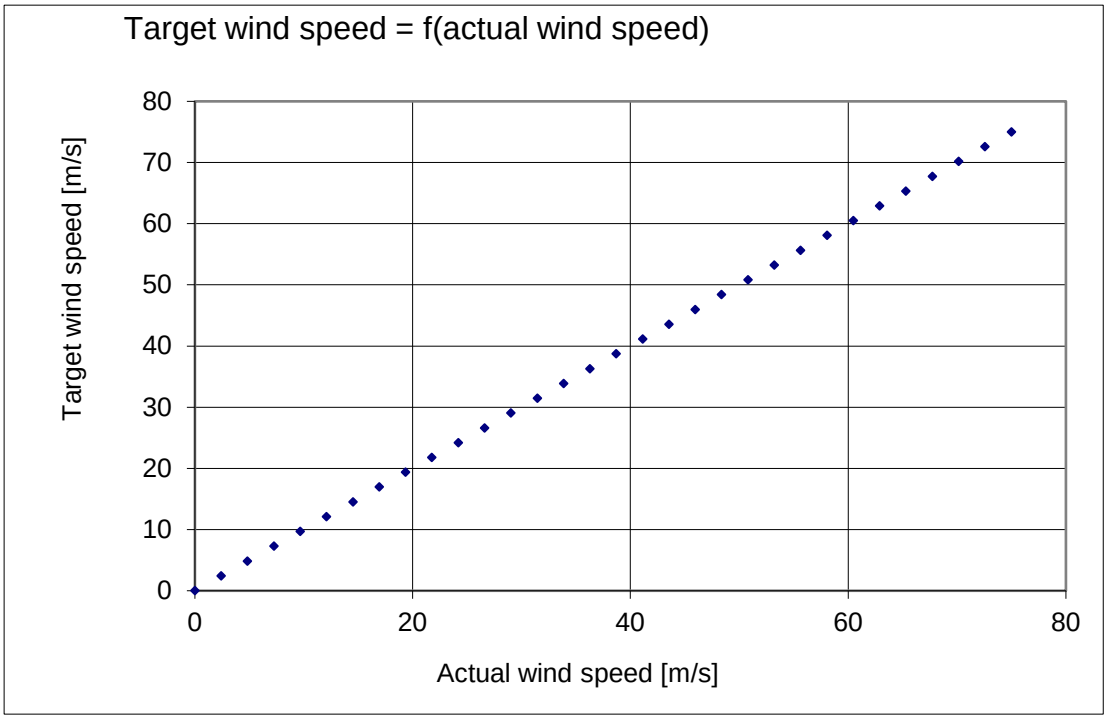
The wind transmitter can save up to 10 calibration tables, including calibration certificate number, user string, date and time of the calibration.

The entries within the calibration table are in form of X/Y value pairs. The X-values correspond to the actual wind speed in m/s with 2 decimal places and the Y-values correspond to the related target wind speed, also in m/s with 2 decimal places.

All entries of a non-programmed, i.e. unfilled table, are set on 0xffff.

It s not required to fill all 32 places in the table. If i.e. only the lower measured range of the curve is stored, the standard curve is used for the upper curve range.

The following figure shows the progress of a calibration table with 32 entries.




**Curve of a calibration table**

If the measured actual wind speed is between 2 entries of the table, the wanted target wind speed is determined by linear interpolation.

If the measured actual wind speed outside the table range, the Bit2 is set in the status word and the standard curve is used.

For the calculation of the corrected wind speed, the calibration table last created is used.

***Remark:***
*After setting the time stamp, the calibration table can no longer changed*.

## 4.1 Determine occupied calibration tables

In order to query the free and the already occupied calibration tables, the **Command RC** can be used with parameter 99. In the response string for the command “RC99”, the wind transmitter will output the time stamp of all 10 calibration tables. The time stamps are divided by the semicolon.

Example:

01RC99\r

2016.04.12;11:12:00;2010.00.00;00:00:00;2010.00.00;00:00:00;2010.00.00;00:00:00;2010.00.00;00:00:00;2010.00.00;00:00:00;2010.00.00;00:00:00;2010.00.00;00:00:00;2010.00.00;00:00:00;2010.00.00;00:00:00;

## 4.2 Read calibration table

Reading the data from the calibration tables is done with the **Command RC**. The parameter will indicate the calibration table to be read (0: standard curve, 1..10: Calibration tables). In the response string for the command “RC<parameter>”, the wind transmitter will output all 32 table entries and calibration certificate number, user string and time stamp of the table.

Example:

01RC1\r

00000;00000;00242;00242;00484;00484;00726;00726;00968;00968;01210;01210;01452;01452;01694;01694;01936;01936;02178;02178;02420;02420;02662;02662;02904;02904;03146;03146;03388;03388;03630;03630;03872;03872;04114;04114;04356;04356;04598;04598;04840;04840;05082;05082;05324;05324;05566;05566;05808;05808;06050;06050;06292;06292;06534;06534;06776;06776;07018;07018;07260;07260;07502;07502;0000001234;Test ;2016.04.12;11:12:00

## 4.3 Write calibration table

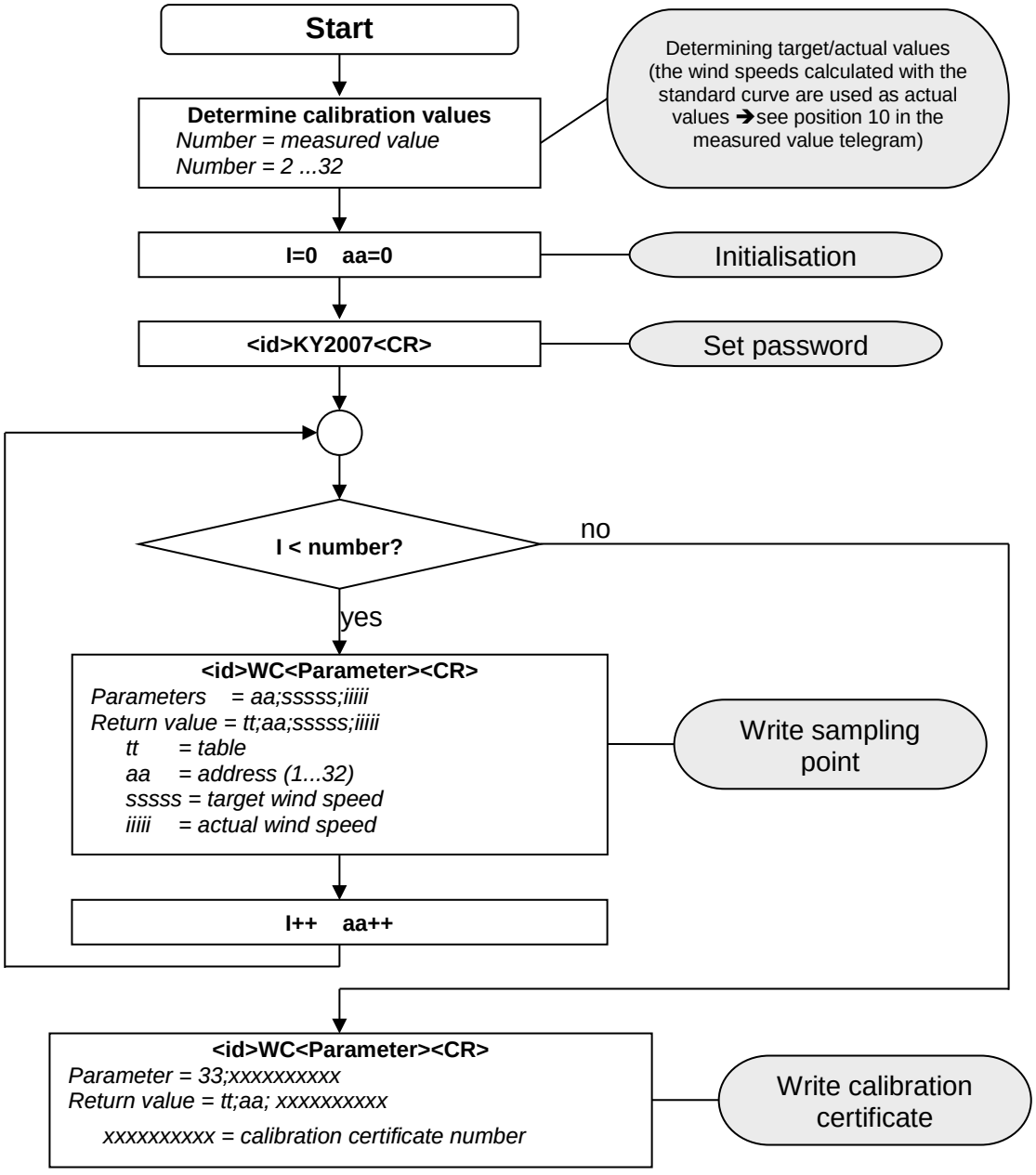
Writing a calibration table is done with the **command WC**. With the parameter, the address to be written, and target and actual value of the sampling point (or calibration certificate number or user string or date/time) will be specified.

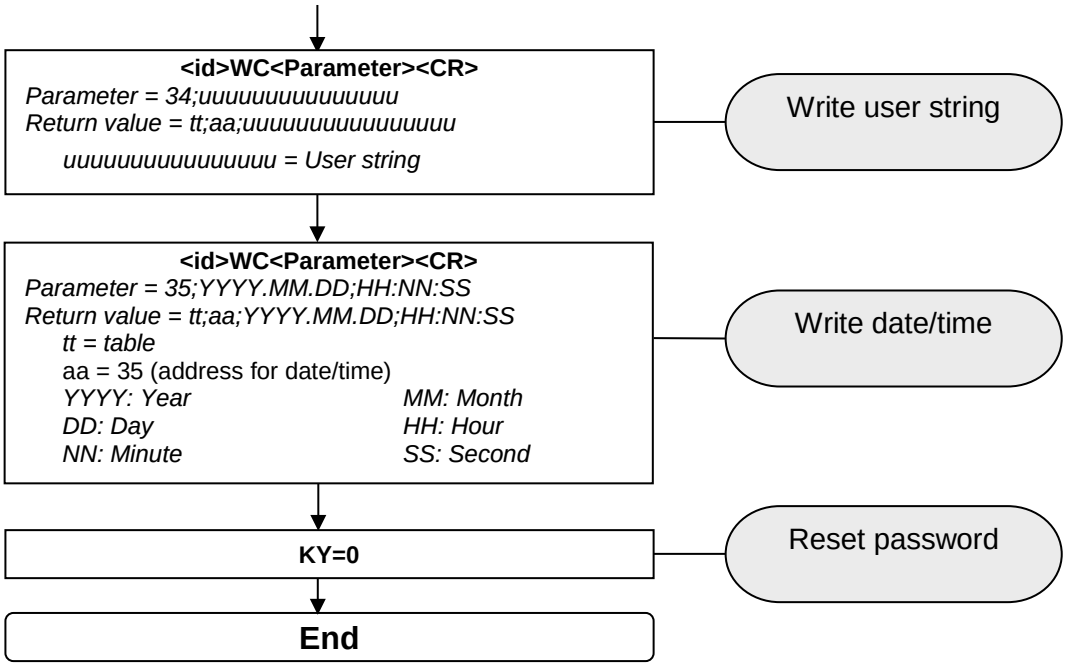
The written table entry is delivered back with the response telegram.

When writing in a calibration table, the next free table is always used. Writing into the memory of a table can be repeated as often as required as long as the memory for date/time is still empty.

A table is only used for the calculations if it has been completed with the date/time information.

The following flow diagram shows the process of writing a calibration table:






# 5 Integrated corrections

The measured values for wind speed and air pressure are corrected in the transmitter and can be queried with the measured value telegram 3.

The following corrections are implemented:

- Correction of the wind speed depending on the air pressure.
- Correction of the wind speed depending on the air temperature.

## 5.1 Correction of the wind speed depending on the air pressure

The rotational speed of the cup star depends on the air density and thus on the air pressure. The correction of this dependency is done in a pressure range of 700hPa to 1100hPa.

## 5.2 Correction of the wind speed depending on the air temperature

The viscosity of the oil in the ball bearing depends on the ambient air temperature and influences the running behavior of the cup star. For air temperatures below 10C and disabled housing heater (see Command HT), the corrected wind speed value will show only a small deviation.

# 6 Recommendation Side Selection / Standard Installation

In general, wind measuring instruments are supposed to record wind conditions over a large area. According to international regulations, the surface wind should be measured at a height of 10m above even open terrain, in order to achieve comparable values. An open terrain is defined as terrain where the distance between the wind-measuring instrument and the next obstacle is at least ten times the height of this obstacle (acc. to VDI 3786 sheet 2 as well as Guide to Meteorological Instruments and Methods of Observation, Sixth Edition, WMO-No. 8). If this regulation cannot be fulfilled, the measuring instrument should be installed at a height at where the measurement values are not influenced by any local obstacles. In any case, the measuring instruments should be installed at a height of 6 to 10m above the mean height of the buildings or trees in the vicinity. If it is necessary to install the instrument on a roof, it should be installed in the center of the roof in order to avoid any preferential directions.

# 7 Installation

***Attention:***

***Storing, mounting, and operation under weather conditions is permissible only in vertical position, as otherwise water can get into the instrument.***

***Remark:***

*When using fastening adapters (angle, traverses, etc) please take a possible effect to the measuring values by shading into consideration.*

***Caution:***

***The device may only be supplied with a power supply of the "Class 2, limited power".***

## 7.1 Mechanical Mounting

The wind transmitter must be mounted on an instrument carrier, which is suited for the measurement. For dimensions of wind direction transmitter please refer to chapter 8.

**Tools:**

Hexagon socket wrench SW3
(Allen key)

**Procedure:**

1. Push cable/ plug connector of the wind transmitter through the bore-hole of the mast, tube, arm etc.
2. Put wind transmitter on mast, tube, arm etc.
3. Safeguard the wind transmitter by two M6-Allen head screws

**Remark:**

Suitable instrument carriers are masts, tubes, traverses, arms, adapters, adapters of POM for isolated mounting, which correspond to the mounting dimensions of the wind transmitter, and to the static requirements.

The inner diameter of the instrument carrier should be ≥ 20mm based on plug- and cable feed-through.

## 7.2 Electrical Mounting

### 7.2.1 Cable

Solder a shielded cable with diameter 7-8mm and a core cross-section of 0.5...0.75mm² to the enclosed coupling socket.

- The number of necessary wires is given in the connection diagram (chapter 5.3).

#### 7.2.1.1 Cable Recommendation

| **No. of wires/ diameter / type / cable diameter** |
|---|
| CABLE 8x0.5mm² LIYCY BLACK, UV- resistant, Ø 7.6mm |

### 7.2.2 Cable Shield

The connection of the cable shield between sensor and data acquisition device should be selected in way, that in case of over-voltages no equalizing currents will flow that might destroy the electronic components.

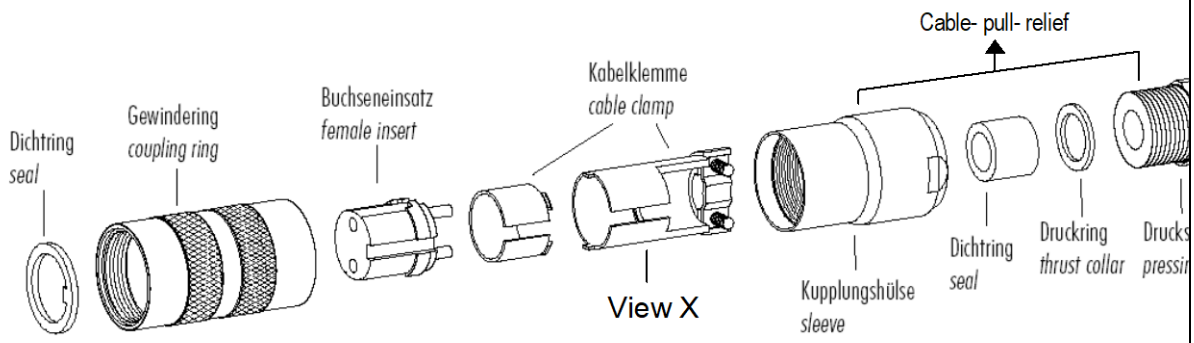
The connection of the cable shield should depend on the selected isolated, or respectively, non-isolated mounting of the sensors.

#### 7.2.2.1 Connection recommendation for the cable shield

| | Sensor Carrier | Sensor | Shielding / Ground | Lightning Protection |
|---|---|---|---|---|
| 1. | Metallic measurement mast, grounded | **Isolated** mounting at the measuring mast (e.g. by non-metallic brackets, holder etc. or by metallic brackets, holder etc. with isolated plastic adaptors). | Apply the cable shield between sensor and data acquisition device (e.g. datalogger) both-sided.<br>Ground data acquisition device. | Mount metallic lightning protection rod on the mast.<br>Alternatively:<br>Install separate lightning protection rod beside the measurement mast. |
| 2. | Metallic measurement mast, grounded | **Non-isolated** mounting at the measurement mast<br>(e.g. by metallic brackets, holders etc.). | Apply cable shield between sensor and data acquisition device (e.g. datalogger) only one-sided at the acquisition device.<br>Ground data acquisition device. | Mount metallic lightning protection rod on the mast in **isolated condition**, and ground lightning protection rod.<br>Alternatively:<br>Install separate lightning protection rod beside the measurement mast. |
| 3. | Metallic measurement mast, not grounded (mounted in isolated condition, e.g. on the attic) | **Non-isolated** mounting at the measurement mast<br>(e.g. by metallic brackets, holders etc.). | Apply the cable shield between sensor and data acquisition device (e.g. datalogger) both-sided.<br>Ground data acquisition device. | Mount metallic lightning protection rod on the mast in **isolated condition**, and ground lightning protection rod.<br>Alternatively:<br>Install separate lightning protection rod beside the measurement mast. |
| 4. | Non-metallic measuring mast (=isolated) | Mounting at the measurement mast (e.g. by metallic brackets, holders etc.). | Apply the cable shield between sensor and data acquisition device (e.g. datalogger) both-sided.<br>Ground data acquisition device. | Mount metallic lightning protection rod on the mast, and ground lightning protection rod.<br>Alternatively:<br>Install separate lightning protection rod beside the measurement mast. |

### 7.2.3 Plug and cable mounting

Coupling socket, Type: Binder, Serial 423, EMC with cable clamp




Cable connection: **with** cable shield

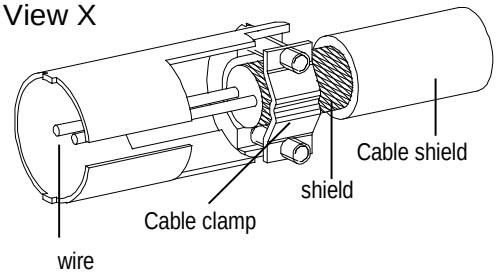
1. Stringing parts on cable acc. to plan given above.
2. Stripping cable sheath 20mm
   Cutting uncovered shield 15mm
   Stripping wire 5mm.

   *Cable mounting 1*
   Putting shrink hose or insolating tape between wire and shield.

   *Cable mounting 2*
   If cable diameter permits, put the shield backward on the cable sheath.
3. Soldering wire to the insert, positioning shield in cable clamp.
4. Screwing-on cable clamp.
5. Assembling remaining parts acc. to upper plan.
6. Tightening pull-relief of cable by screw-wrench (SW16 und 17).

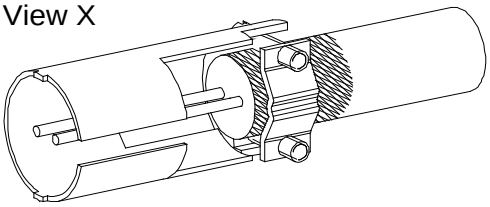
*Cable mounting 1*

View X



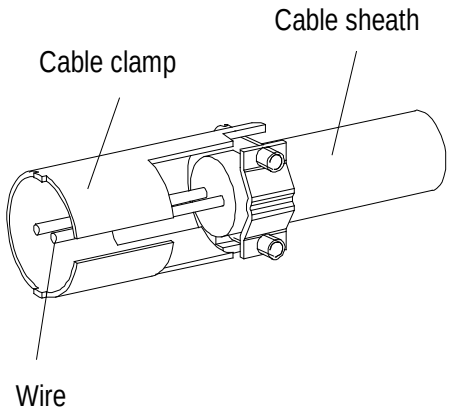

*Cable mounting 2*

View X



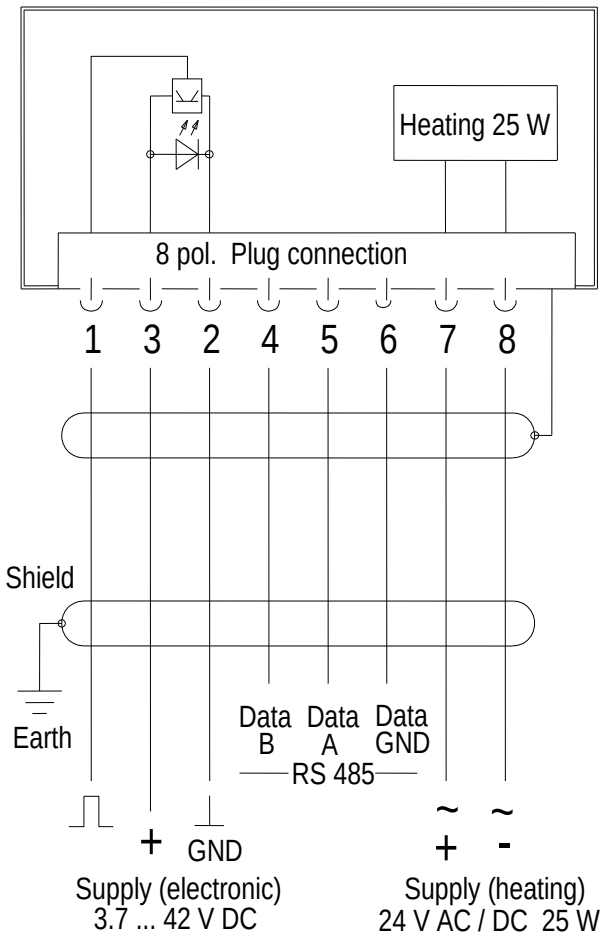
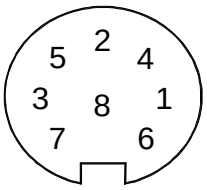
Cable connection: **without** cable shield

1. Stringing parts on cable acc. to plan given above.
2. Stripping cable sheath 20mm
3. Cutting uncovered shield 20mm
4. Stripping wire 5mm.
5. Soldering wire to the insert.
6. Positioning shield in cable clamp.
7. Screwing-on cable clamp.
8. Assembling remaining parts acc. to upper plan.
9. Tightening pull-relief of cable by screw-wrench (SW16 und 17).



## 7.3 Connecting Diagram

Connection diagram acc. to chapter 5.2.2.1 no.1, 3 and 4:

| Order– No. | | View on the soldered joint of the counter plug |
|---|---|---|
| 4.3352.00.400<br>4.3352.10.400* |  |  |
| *Order-No. 4.3352.**10**.. (without heating) Pin 7 u. 8 are not connected | | |

| Contact | Name | Function |
|---|---|---|
| 1 | SIG | Signal (rectangle) |
| 2 | GND | Ground |
| 3 | +Us | Supply 3.7 ... 42V DC |
| 4 | Data- | RS485 Data - |
| 5 | Data+ | RS485 Data + |
| 6 | Data GND | RS485 GND |
| 7 | HZG | Heating supply:<br>voltage: 24V AC/DC<br>power: 25W |
| 8 | HZG | |

# 8 Interface

The interface to the wind transmitter consists of an RS485 connection (half duplex mode) with the following data format:

- 9600 baud (the baud rate can be set with the **Command BR**).
- 8 data bits.
- No parity.
- 1 stop bit.
- Data in ASCII format (command interpreter: THIES).
- Data in binary format (command interpreter: MODBUS RTU).

The behavior (configuration) of the wind transmitter can be changed with the commands available (see **Commands and description**). For the command interpreter of the type THIES, the query of the measured values is done with the **Command TR.**

For the start of the wind transmitter, the character string “WG, software version and serial number” is output.

Example: WG THIES ADV X
v01.09
0007140006

## 8.1 Command interpreter THIES

The wind transmitter is equipped with the command interpreter from the type THIES that can change the behavior of the device. E.g. the averaging period for the wind speed can be changed. Basically, the command has the following structure:

- <id><Command><CR> (No parameter: is used for querying the set parameter).
- <id><Command><Parameter><CR> (With parameter: is used to set a new parameter).

id: identification number (“00” to “99”)
Command: command with 2 characters (see command list)
Parameter: parameter value with 1 to 10 characters (decimal value in ASCII representation)
<CR>: Carriage Return ($13_{dec}$; 0x0D)

With the identification number ‘id’, several devices can be operated together with a bus. For this purpose, each device receives an individual ‘id’ (see **Command ID**).

A sent command is acknowledged with a corresponding echo telegram. The echo telegram starts wit a “!”, followed by the id, the command and the set value. In the end, there are the characters “carriage return” and “new line”.

Commands can either be sent with or without parameters. When no parameter is entered, the set value is output.

*Example:* 00BR<CR>
!00BR00005<CR>

If a command is sent with parameter, the parameter is checked. If the parameter is valid, it is saved and indicated in the “echo telegram”. If the parameter is invalid, the parameter is ignored and the set value is output in the “echo telegram”.

*Examples*:

| | |
|---|---|
| 00BR00005<CR> | sending command. |
| !00BR00005<CR> | Echo telegram (parameter valid and password OK). |
| 00BR00004<CR> | sending command. |
| !00BR00005<CR> | Echo telegram (Parameter valid but wrong key). |

***Remark:***

***With the command TR, the measured sensor values can be queried.***
***Then, the wind transmitter will not respond with the echo telegram***
***but with the queried data telegram!***

In order to avoid an accidental parameter setting, some commands (see command list) are protected by a password. This password must be sent prior to the actual command.

*Example: Change of the baud rate*

| | |
|---|---|
| 00KY234<CR> | enable commands of the user level |
| 00BR4<CR> | set baud rate to 4800 |
| !00BR00004<CR> | baud rate set to 4800 |

The wind transmitter supports 3 different password levels.

- User level (password: “234”).
- Calibration value level.
- Administrator level.

***Attention:***

***The commands protected by a password are enabled until one of the following conditions is fulfilled:***
***- switching of the supply voltage***
***- the command 00KY0<CR> is sent***
***- no new command is sent for at least 120s***

### 8.1.1 Data telegrams

Data is output on request by the command TR. The following telegrams can be selected:

- Measured value telegram (parameter = 1).
- Measured value telegram 2 (parameter = 2).
- Measured value memory telegram (parameter = 30).

The calculation of the check sum, the composition of the status word and the control / separation characters used in the telegrams are listed below:

**Control characters:**

CR – Carriage Return ($13_{dec}$; 0x0D)
LF – Line Feed ($10_{dec}$; 0x0A)
STX – Start of Text ($2_{dec}$; 0x02)
ETX – End of Text ($3_{dec}$; 0x03)

**Separation characters:**

Separation character between the single measured values in the string is the semicolon ';'.
The check sum separation character is the asterisk '*'.

**Check sum:**

The check sum is the XOR link of all characters between <XTX> and the byte <*>.
The asterisk is the separation character of the check sum and is not contained in the check sum.

**Status:**

Within the wind transmitter, the status word (32bit) is available which provides information about the condition of the transmitter. The measured values are submitted to a plausibility check and shown in the status word.

| Bit number | Function | Description |
|---|---|---|
| Bit 0 | Wind speed jump | = 1 if the difference between the wind speed between 2 subsequent measured values in the second interval exceeds 10m/s. |
| Bit 1 | Calm | = 1 if the wind speed remains for at least 3 hours at 0m/s without interruption. |
| Bit 2 | Measured value correction | = 1 if the measured wind speed is outside the defined table range. |
| Bit 3 | Watchdog Reset | = 1 after a reset conditioned by the watchdog |
| Bit 4 | Filling level averaging buffer < 100% | = 1, averaging buffer has not yet filled completely. After a restart of the wind transmitter, this bit remains set until the averaging buffer has been filled completely. |

| Bit number | Function | Description |
|---|---|---|
| Bit 5..8 | Calibration table | Bits 5 to 8 show the calibration table used for the calculation of the wind speed.<br>0000 : Standard curve<br>0001 : Calibration table 1<br>0010 : Calibration table 2<br>0011 : Calibration table 3<br>0100 : Calibration table 4<br>0101 : Calibration table 5<br>0110 : Calibration table 6<br>0111 : Calibration table 7<br>1000 : Calibration table 8<br>1001 : Calibration table 9<br>1010 : Calibration table 10 |
| Bit 9 | Vcc voltage | =1, Vcc voltage outside admissible range |
| Bit 10 | 3V voltage | =1, 3V voltage outside admissible range |
| Bit 11 | Pressure sensor | =1, measured values from the pressure sensor are faulty |
| Bit 12 | Acceleration sensor | =1, measured values from the acceleration sensor are faulty |
| Bit 13 | EEPROM parameter | =1, internal EEPROM parameters invalid. |
| Bit 14 | EEPROM parameter | =1, internal EEPROM parameters contain the standard values. |
| Bit 15 | New FW | =1, last restart was done with new firmware. |
| Bit 16...31 | - | - |

**Table 1 : Status word**

#### 8.1.1.1 Measured value telegram

The wind transmitter responds with the measured value telegram to the command “00TR1\r”. The table below shows the telegram structure:

| Position | Length | Example | Description |
|---|---|---|---|
| 1 | 1 | STX | Start character (start of text) |
| 2 | 2 | xx | Identification number (ID)<br>xx: 0..99 |
| 4 | 1 | ; | Separation character (';') |
| 5 | 4 | xx.x | Momentary value of the wind speed, calculated with the current calibration table; unit: m/s; resolution: 0.1m/s |
| 9 | 1 | ; | Separation character (';') |
| 10 | 4 | xx.x | Momentary value of the wind speed, calculated with the standard curve; unit: m/s; resolution: 0.1m/s |
| 14 | 1 | ; | Separation character (';') |
| 15 | 6 | xxxx.x | Measured frequency; unit: Hz; resolution 0.1Hz |
| 21 | 1 | ; | Separation character (';') |
| 22 | 4 | xx.x | Current gust of the wind speed of the last 1min., calculated with the current calibration table; unit: m/s; resolution: 0.1m/s |
| 26 | 1 | ; | Separation character (';') |
| 27 | 4 | xx.x | Current minimum value of the wind speed of the last 1min., calculated with the current calibration table; unit: m/s; resolution: 0.1m/s |
| 31 | 1 | ; | Separation character (';') |
| 32 | 4 | xx.x | Current average value of the wind speed, calculated with the current calibration table; unit: m/s; resolution: 0.1m/s; period: Averaging interval (➔Command MI) |

| Position | Length | Example | Description |
|---|---|---|---|
| 36 | 1 | ; | Separation character (';') |
| 37 | 4 | xx.x | Current standard deviation of the wind speed, calculated with the current calibration table; unit: m/s; resolution: 0.1m/s; period: Averaging interval (➔Command MI). |
| 41 | 1 | ; | Separation character (';') |
| 42 | 5 | xx.xx | Momentary value of the wind speed, calculated with the current calibration table; unit: without dimension; resolution: 0.01 |
| 47 | 1 | ; | Separation character (';') |
| 48 | 5 | yxx.x | Housing interior temperature of the wind transmitter (unit: °C)<br>y: Sign (+ or -)<br>xx.x: Temperature value; resolution: 0.1°C |
| 53 | 1 | ; | Separation character (';') |
| 54 | 5 | yxx.x | Temperature of pressure and acceleration sensor (unit: °C)<br>y: Sign (+ or -)<br>xx.x: Temperature value; resolution: 0.1°C |
| 59 | 1 | ; | Separation character (';') |
| 60 | 6 | xxxx.x | Absolute air pressure (unit: hPa)<br>xxxx.x: Pressure value; resolution: 0.1hPa |
| 66 | 1 | ; | Separation character (';') |
| 67 | 6 | xxxx.x | Relative air pressure (unit: hPa)<br>xxxx.x: Pressure value; resolution: 0.1hPa |
| 73 | 1 | ; | Separation character (';') |
| 74 | 6 | yxxx.x | Inclination value $\theta$<br>Angle between the Z-axis and the vertical, unit: °<br>y: Sign (+ or -)<br>xxx.x: Angle; resolution: 0.1 |
| 80 | 1 | ; | Separation character (';') |
| 81 | 6 | yxxx.x | Inclination value $\rho$<br>Angle between the X-axis and the horizontal, unit: °<br>y: Sign (+ or -)<br>xxx.x: Angle; resolution: 0.1° |
| 87 | 1 | ; | Separation character (';') |
| 88 | 6 | yxxx.x | Inclination value $\phi$<br>Angle between the Y-axis and the horizontal, unit: °<br>y: Sign (+ or -)<br>xxx.x: Angle; resolution: 0.1° |
| 94 | 1 | ; | Separation character (';') |
| 95 | 5 | xxx.x | Frequency vibration measurement, X-axis (unit: Hz)<br>xxx.x: Frequency; resolution: 0.1Hz |
| 100 | 1 | ; | Separation character (';') |
| 101 | 4 | xxxx | Amplitude vibration measurement, X-axis (unit: mg, 1g=9.81m/s^2)<br>xxxx: Amplitude; resolution: 1mg |
| 105 | 1 | ; | Separation character (';') |
| 106 | 5 | xxx.x | Frequency vibration measurement, Y-axis (unit: Hz)<br>xxx.x: Frequency; resolution: 0.1Hz |
| 111 | 1 | ; | Separation character (';') |
| 112 | 4 | xxxx | Amplitude vibration measurement, Y-axis (unit: mg, 1g=9.81m/s^2)<br>xxxx: Amplitude; resolution: 1mg |

| Position | Length | Example | Description |
|---|---|---|---|
| 116 | 1 | ; | Separation character (';') |
| 117 | 5 | xxx.x | Frequency vibration measurement, Z-axis (unit: Hz)<br>xxx.x: Frequency; resolution: 0.1Hz |
| 122 | 1 | ; | Separation character (';') |
| 123 | 4 | xxxx | Amplitude vibration measurement, Z-axis (unit: mg, 1g=9.81m/s^2)<br>xxxx: Amplitude; resolution: 1mg |
| 127 | 1 | ; | Separation character (';') |
| 128 | 8 | abcdefgh | 32-bit sensor status in hexadecimal representation<br>a: high nibble in high byte in HEX<br>b: low nibble in high byte in HEX<br>c: high nibble in byte 2 in HEX<br>d: low nibble in byte 2 in HEX<br>e: high nibble in byte 3 in HEX<br>f: low nibble in byte 3 in HEX<br>g: high nibble in low byte in HEX<br>h: low nibble in low byte in HEX |
| 136 | 1 | * | Separation character ('*') |
| 137 | 2 | xy | Exclusive or linked check sum in hexadecimal representation<br>x: high nibble check sum in HEX<br>y: low nibble check sum in HEX |
| 139 | 1 | ETX | End character (end of text) |
| 140 | 1 | CR | Carriage Return |
| 141 | 1 | LF | Line feed |

**Table 2 : Measured value telegram**

Pressure and acceleration sensors are thermally coupled

### Measured values

If the wind speed exceeds the measured range specified by the calibration table, the standard curve will be used for the further calculation and the corresponding bit is set in the status word.

#### 8.1.1.2 Measured value telegram 2

The wind transmitter responds with the measured value telegram 2 to the command “00TR2\r”. The table below shows the telegram structure:

| Position | Length | Example | Description |
|---|---|---|---|
| 1 | 1 | STX | Start character (start of text). |
| 2 | 2 | xx | Identification number (ID)<br>xx: 0..99 |
| 4 | 1 | ; | Separation character (';') |
| 5 | 5 | xx.xx | Momentary value of the wind speed, calculated with the current calibration table; unit: m/s; resolution: 0.01m/s. |
| 10 | 1 | ; | Separation character (';') |
| 11 | 5 | xx.xx | Momentary value of the wind speed, calculated with the standard curve; unit: m/s; resolution: 0.01m/s. |
| 16 | 1 | ; | Separation character (';') |
| 17 | 5 | xx.xx | Momentary value of the wind speed, corrected depending on the air pressure (wind speed calculated with the current calibration table) unit: m/s; resolution: 0.01m/s. |
| 22 | 1 | ; | Separation character (';') |
| 23 | 5 | xx.xx | Momentary value of the wind speed, corrected depending on the temperature / consideration of the viscosity of the oil in the bearing (wind speed calculated with the current calibration table) unit: m/s; resolution: 0.01m/s. |
| 28 | 1 | ; | Separation character (';') |
| 29 | 5 | yxx.x | Housing interior temperature of the wind transmitter (unit: °C)<br>y: Sign (+ or -)<br>xx.x: Temperature value; resolution: 0.1°C |
| 34 | 1 | ; | Separation character (';') |
| 35 | 5 | yxx.x | Temperature of pressure and acceleration sensor (unit: °C)<br>y: Sign (+ or -)<br>xx.x: Temperature value; resolution: 0.1°C |
| 40 | 1 | ; | Separation character (';') |
| 41 | 6 | xxxx.x | Absolute air pressure (unit: hPa)<br>xxxx.x: Pressure value; resolution: 0.1hPa |
| 47 | 1 | ; | Separation character (';') |
| 48 | 6 | xxxx.x | Absolute air pressure, corrected depending on the wind speed (unit: hPa)<br>xxxx.x: Pressure value; resolution: 0.1hPa |
| 54 | 1 | ; | Separation character (';') |
| 55 | 6 | xxxx.x | Relative air pressure (unit: hPa)<br>xxxx.x: Pressure value; resolution: 0.1hPa |
| 61 | 1 | ; | Separation character (';') |
| 62 | 8 | abcdefgh | 32-bit sensor status in hexadecimal representation<br>a: high nibble in high byte in HEX<br>b: low nibble in high byte in HEX<br>c: high nibble in byte 2 in HEX<br>d: low nibble in byte 2 in HEX<br>e: high nibble in byte 3 in HEX<br>f: low nibble in byte 3 in HEX<br>g: high nibble in low byte in HEX<br>h: low nibble in low byte in HEX |

| Position | Length | Example | Description |
|---|---|---|---|
| 70 | 1 | * | Separation character (‘*’) |
| 71 | 2 | xy | Exclusive or linked check sum in hexadecimal representation<br>x: high nibble check sum in HEX<br>y: low nibble check sum in HEX |
| 73 | 1 | ETX | End character (end of text) |
| 74 | 1 | CR | Carriage Return |
| 75 | 1 | LF | Line feed |

**Table 3 : Measured value telegram 2**

Pressure and acceleration sensors are thermally coupled

#### 8.1.1.3 Measured value memory telegram

The measured values of the wind speed are buffered in a ring buffer containing 16 values. The wind transmitter responds with the measured value memory telegram to the command “00TR30\r”. The table below shows the telegram structure:

| Position | Length | Example | Description |
|---|---|---|---|
| 1 | 1 | STX | Start character (start of text) |
| 2 | 5 | xxxxx | Time since the last query in (unit: ms) |
| 7 | 1 | ; | Separation character (’;’) |
| 8 | 5 | xxx.x | Most recent measured value (0); unit: m/s; resolution: 0.1m/s |
| 13 | 1 | ; | Separation character (’;’) |
| 14 | 5 | xxx.x | Measured value (1); unit: m/s; resolution: 0.1m/s |
| 19 | 1 | ; | Separation character (’;’) |
| 20 | 5 | xxx.x | Measured value (2); unit: m/s; resolution: 0.1m/s |
| 25 | 1 | ; | Separation character (’;’) |
| 26 | 5 | xxx.x | Measured value (3); unit: m/s; resolution: 0.1m/s |
| 31 | 1 | ; | Separation character (’;’) |
| 32 | 5 | xxx.x | Measured value (4); unit: m/s; resolution: 0.1m/s |
| 37 | 1 | ; | Separation character (’;’) |
| 38 | 5 | xxx.x | Measured value (5); unit: m/s; resolution: 0.1m/s |
| 43 | 1 | ; | Separation character (’;’) |
| 44 | 5 | xxx.x | Measured value (6); unit: m/s; resolution: 0.1m/s |
| 49 | 1 | ; | Separation character (’;’) |
| 50 | 5 | xxx.x | Measured value (7); unit: m/s; resolution: 0.1m/s |
| 55 | 1 | ; | Separation character (’;’) |
| 56 | 5 | xxx.x | Measured value (8); unit: m/s; resolution: 0.1m/s |
| 61 | 1 | ; | Separation character (’;’) |
| 62 | 5 | xxx.x | Measured value (9); unit: m/s; resolution: 0.1m/s |
| 67 | 1 | ; | Separation character (’;’) |
| 68 | 5 | xxx.x | Measured value (10); unit: m/s; resolution: 0.1m/s |
| 73 | 1 | ; | Separation character (’;’) |
| 74 | 5 | xxx.x | Measured value (11); unit: m/s; resolution: 0.1m/s |
| 79 | 1 | ; | Separation character (’;’) |
| 80 | 5 | xxx.x | Measured value (12); unit: m/s; resolution: 0.1m/s |
| 85 | 1 | ; | Separation character (’;’) |

| Position | Length | Example | Description |
|---|---|---|---|
| 86 | 5 | xxx.x | Measured value (13); unit: m/s; resolution: 0.1m/s |
| 91 | 1 | ; | Separation character (';') |
| 92 | 5 | xxx.x | Measured value (14); unit: m/s; resolution: 0.1m/s |
| 97 | 1 | ; | Separation character (';') |
| 98 | 5 | xxx.x | Measured value (15); unit: m/s; resolution: 0.1m/s |
| 103 | 1 | ; | Separation character (';') |
| 104 | 1 | * | Separation character ('*') |
| 105 | 2 | xy | Exclusive or linked check sum in hexadecimal representation<br>x: high nibble check sum in HEX<br>y: low nibble check sum in HEX |
| 107 | 1 | ETX | End character (end of text) |
| 108 | 1 | CR | Carriage Return |
| 109 | 1 | LF | Line feed |

**Table 4 : Measured value memory telegram**

In the order interpreter "MODBUS RTU", the ring buffer is readable via one of the following addresses:

| Register address | Description |
|---|---|
| 35100 | Time since the last measured value query in ms |
| 35102 | Most recent measured value (0) |
| 35103 | Measured value (1) |
| 35104 | Measured value (2) |
| 35105 | Measured value (3) |
| 35106 | Measured value (4) |
| 35107 | Measured value (5) |
| 35108 | Measured value (6) |
| 35109 | Measured value (7) |
| 35110 | Measured value (8) |
| 35111 | Measured value (9) |
| 35112 | Measured value (10) |
| 35113 | Measured value (11) |
| 35114 | Measured value (12) |
| 35115 | Measured value (I13) |
| 35116 | Measured value (I14) |
| 35117 | Oldest measured value (15) |

After reading the ring buffer, independent from the number of the read measured values, all 16 memory cells are set to 0xffff.

Deleted measured values or not yet recorded measured values are initialized with 0xffff.

***Remark:***

*With each reading of the ring buffer, it will be cleared*.

## 8.2 Command interpreter MODBUS RTU

If the command interpreter MODBUS RTU is selected, the transferred bytes are interpreted according to the MODBUS specification (http://www.modbus.org/). In this case, the wind transmitter represents a MODBUS slave.

The data is transferred in packages in so called frames with max. 256 bytes. Each package contains a 16bit CRC check sum (initial value: 0xffff).

| Slave address | Functional code | Data | CRC | |
|---|---|---|---|---|
| 1byte | 1byte | 0...252byte(s) | 2Bytes | |
| | | | CRC low-byte | CRC high-byte |

**Table 5 : MODBUS Frame**

The following MODBUS functions are supported:

- 0x04 (Read Input Register)
- 0x03 (Read Holding Registers)
- 0x10 (Write Multiple Registers)
- 0x2B (Read Device Identification with MEI-Type 0x0E)

The wind transmitter supports writing accesses for the slave address 0 (“broadcast”).

All received MODBUS requirements are checked for their validity before execution. In case of an error, the wind transmitter responds with one of the following exceptions (➔MODBUS Exception Responses).

| Code | Name | Meaning |
|---|---|---|
| 0x01 | ILLEGAL FUNCTION | The functional code in the request is not admissible for the register address. |
| 0x02 | ILLEGAL DATA ADDRESS | The register address in the request is not valid. |
| 0x03 | ILLEGAL DATA VALUE | The specified data in the request is not admissible. |

**Table 6 : MODBUS Exceptions**

### 8.2.1 Measured values (Input Register)

All measured values of the wind transmitter occupy 32bit, i.e. 2 MODBUS register addresses. The table below shows the assignment of measured value to register address, whereby the measured values are sorted as follows:

- According to measured value type (30001 to 34999).
- In uninterrupted sequence (35001 to 39999).

| Register address | Parameter name | Unit | Multiplica-tor | Explanation | Data type |
|---|---|---|---|---|---|
| 30001 | Wind speed | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U32 |
| 30003 | Average wind speed | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U32 |
| 30005 | Wind speed uncor-rected | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U32 |
| 30007 | Standard deviation wind speed | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U32 |
| 30009 | Minimum value wind speed | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U32 |
| 30011 | Maximum value wind speed (gust) | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U32 |
| | | | | | |
| 30403 | Housing interior tem-perature | °C | 10 | Value / 10 (1 decimal place, e.g. 355=35.5°C) | S32 |
| | | | | | |
| 30801 | Absolute air pressure | hPa | 100 | Wert / 100 (2 decimal places e.g. 105000=1050.00hPa) | U32 |
| 30803 | Relative air pressure based on the sea level | hPa | 100 | Wert / 100 (2 decimal places e.g. 105000=1050.00hPa) | U32 |
| | | | | | |
| 34811 | Sensor status | | 1 | Value (no decimal place, bit coded, depending on sen-sor) | U32 |
| 34813 | Main loop run per 1s | 1/s | 1 | Value (no decimal place, e.g. 2550=2550 1/s) | U32 |
| 34815 | Operating time | s | 1 | Value (no decimal place, e.g. 255=255s) | U32 |
| 34819 | Inclination value $\theta$ | ° | 10 | Value / 10 (1 decimal place, e.g. 240=24.0°) | S32 |

| Register address | Parameter name | Unit | Multiplica-tor | Explanation | Data type |
|---|---|---|---|---|---|
| 34821 | Inclination value $\rho$ | ° | 10 | Value / 10 (1 decimal place, e.g. 240=24.0°) | S32 |
| 34823 | Inclination value $\phi$ | ° | 10 | Value / 10 (1 decimal place, e.g. 240=24.0°) | S32 |
| 34825 | Frequency vibration measurement, X-axis | Hz | 100 | Wert / 100 (2 decimal places e.g. 2400=24.00Hz) | U32 |
| 34827 | Amplitude vibration measurement, X-axis | mg (1g=9.81m/s^2) | 1 | Value (no decimal place, e.g. 24=24mg) | U32 |
| 34829 | Frequency vibration measurement, Y-axis | Hz | 100 | Wert / 100 (2 decimal places e.g. 2400=24.00Hz) | U32 |
| 34831 | Amplitude vibration measurement, Y-axis | mg (1g=9.81m/s^2) | 1 | Value (no decimal place, e.g. 24=24mg) | U32 |
| 34833 | Frequency vibration measurement, Z-axis | Hz | 100 | Wert / 100 (2 decimal places e.g. 2400=24.00Hz) | U32 |
| 34835 | Amplitude vibration measurement, Z-axis | mg (1g=9.81m/s^2) | 1 | Value (no decimal place, e.g. 24=24mg) | U32 |
| | | | | | |
| 35001 | Wind speed (30001)[1] | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U32 |
| 35003 | Average wind speed (floating) (30003) [1] | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U32 |
| 35005 | Wind speed uncor-rected (30005) [1] | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U32 |
| 35007 | Standard deviation wind speed (30007) [1] | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U32 |
| 35009 | Minimum value wind speed (30009) [1] | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U32 |
| 35011 | Maximum value wind speed / gust (30011) [1] | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U32 |
| 35013 | Housing interior tem-perature (30403) 1 | °C | 10 | Value / 10 (1 decimal place, e.g. 355=35.5°C) | S32 |
| 35015 | Absolute air pressure | hPa | 100 | Wert / 100 (2 decimal places e.g. 105000=1050.00hPa) | U32 |
| 35017 | relative air pressure based on the sea level | hPa | 100 | Wert / 100 (2 decimal places e.g. 105000=1050.00hPa) | U32 |
| 35019 | Sensor status (34811) [1] | | 1 | Value | U32 |

| Register address | Parameter name | Unit | Multiplica-tor | Explanation | Data type |
|---|---|---|---|---|---|
| | | | | (no decimal place, bit coded, depending on sen-sor) | |
| 35021 | Main loop run per 1s | 1/s | 1 | Value (no decimal place, e.g. 2550=2550 1/s) | U32 |
| 35023 | Operating time after reset (34815) [1] | s | 1 | Value (no decimal place, e.g. 255=255s) | U32 |
| 35025 | Inclination value $\theta$ (Angle between the Z-axis and the vertical) (34819) [1] | ° | 10 | Value / 10 (1 decimal place, e.g. 240=24.0°) | S32 |
| 35027 | Inclination value $\rho$ (Angle between the X-axis and the horizon-tal) (34821) [1] | ° | 10 | Value / 10 (1 decimal place, e.g. 240=24.0°) | S32 |
| 35029 | Inclination value $\phi$ (Angle between the Y-axis and the horizon-tal) (34823) [1] | ° | 10 | Value / 10 (1 decimal place, e.g. 240=24.0°) | S32 |
| 35031 | Frequency vibration measurement, X-axis (34825) [1] | Hz | 10 | Value / 10 (1 decimal place, e.g. 240=24.0Hz) | U32 |
| 35033 | Amplitude vibration measurement, X-Axis (34827) [1], (1g=9.81m/s^2) | mg | 1 | Value (no decimal place, e.g. 24=24mg) | U32 |
| 35035 | Frequency vibration measurement, Y-axis (34829) [1] | Hz | 10 | Value / 10 (1 decimal place, e.g. 240=24.0Hz) | U32 |
| 35037 | Amplitude vibration measurement, Y-axis (34831) [1], (1g=9.81m/s^2) | mg | 1 | Value (no decimal place, e.g. 24=24mg) | U32 |
| 35039 | Frequency vibration measurement, Z-axis (34833) [1] | Hz | 10 | Value / 10 (1 decimal place, e.g. 240=24.0Hz) | U32 |
| 35041 | Amplitude vibration measurement, Z-axis (34835) [1], (1g=9.81m/s^2) | mg | 1 | Value (no decimal place, e.g. 24=24mg) | U32 |
| 35043 | Measured frequency | Hz | 10 | Value (no decimal place, e.g. 255=25.5Hz) | U32 |
| 35045 | Number of revolutions of the cup star | | 1 | Value (no decimal place, e.g. 255=255) | U64 |
| 35049 | Operating hours | h | 1 | Value (no decimal place, e.g. 255=255h) | U32 |

| Register address | Parameter name | Unit | Multiplica-tor | Explanation | Data type |
|---|---|---|---|---|---|
| 35051 | Degree of turbulence | - | 100 | Value (2 decimal places e.g. 255=2,55) | U32 |
| 35053 | Temperature of the pressure sensor | °C | 10 | Value / 10 (1 decimal place, e.g. 355=35.5°C) | S32 |
| 35100 | Time since the last measured value query | ms | 1 | Value (no decimal place, e.g. 2550=2550ms) | U32 |
| 35102 | Measured value [0] (most recent) accord-ing to UC | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U16 |
| 35103 | Measured value [1] ac-cording to UC | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U16 |
| 35104 | Measured value [2] ac-cording to UC | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U16 |
| 35105 | Measured value [3] according to UC | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U16 |
| 35106 | Measured value [4] according to UC | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U16 |
| 35107 | Measured value [5] according to UC | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U16 |
| 35108 | Measured value [6] according to UC | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U16 |
| 35109 | Measured value [7] according to UC | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U16 |
| 35110 | Measured value [8] according to UC | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U16 |
| 35111 | Measured value [9] according to UC | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U16 |
| 35112 | Measured value [10] according to UC | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U16 |
| 35113 | Measured value [11] according to UC | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U16 |
| 35114 | Measured value [12] according to UC | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U16 |
| 35115 | Measured value [13] according to UC | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U16 |
| 35116 | Measured value [14] according to UC | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U16 |

| Register address | Parameter name | Unit | Multiplica-tor | Explanation | Data type |
|---|---|---|---|---|---|
| 35117 | Measured value [15] (oldest) according to UC | m/s | 10 | Value / 10 (1 decimal place, e.g. 101=10.1m/s) | U16 |

**Table 7 : MODBUS Input Register**

[1]: The numbers in brackets designate the register addresses which represent the same measured values. For example, the wind speed is on address 30001 and on address 35001.

***Remark:***

***Due to the uninterrupted sequence of the measured values from address 35001, the MODBUS Master can read all measured values with one request!***

### 8.2.2 Commands (Holding Register)

All commands of the wind transmitter occupy 32bit, i.e. 2 MODBUS register addresses and represent unsigned integers. The following example shows the change of the baud rate to 19200 baud.

1. Set password for the user level (KY=234)

| Slave address | Functional code | Start address | Number register | Number byte(s) | Data | CRC | |
|---|---|---|---|---|---|---|---|
| 0x01 | 0x10 | 0x9C 49 | 0x00 02 | 0x04 | 0x00 00 00 EA | 0x4F 7C | |
| | | | | | | CRC low-byte | CRC high-byte |

2. Set command baud rate to 19200 baud (BR=6)

| Slave address | Functional code | Start address | Number register | Number byte(s) | Data | CRC | |
|---|---|---|---|---|---|---|---|
| 0x01 | 0x10 | 0x9C 45 | 0x00 02 | 0x04 | 0x00 00 00 06 | 0x4E A4 | |
| | | | | | | CRC low-byte | CRC high-byte |

### 8.2.3 Device identification (Read Device Identification)

The wind transmitter supports the MODBUS function 0x2B (Read Device Identification) with the MEI type 0x0E. This enables the MODBUS Master to recognize the wind transmitter.

Function: 0x2B / 0x0E (Read Device Identification)

MEI type: 0x0E

Read Device ID code: 1, 2, 3 (stream access)

Supported objects:

| Object Id | Object name / description | Type | Category | Value[1, 2] |
|---|---|---|---|---|
| 0x00 | VendorName | ASCII string | Basic | "Adolf Thies GmbH &CO. KG" |
| 0x01 | ProductCode | ASCII string | | "4.3352.00.400" |
| 0x02 | MajorMinorRevision | ASCII string | | "V01.04" |
| 0x03 | VendorUrl | ASCII string | Regular | "www.thiesclima.com" |
| 0x04 | ProductName | ASCII string | | "WIND SPEED TRANSMITTER" |
| 0x05 | ModelName | ASCII string | | "WIND TRANSMITTER FIRST CLASS ADVANCED X" |
| 0x80 | HW-ID | ASCII string | Extended | "304A37393634110B000700"[3] |

[1]: The maximum length of a value is 32 bytes.

[2]: The quotation marks are not part of the character string.

[3]: The HW-ID (object id: 0x80) consists of 22 bytes which represent 11 binary bytes.

## 8.3 Commands and description

The following table lists the available commands and the corresponding password for reading and writing:

| Command | Initial value Factory setting | MODBUS Register address | Description | Password Reading[1] / Writing[2] | |
|---|---|---|---|---|---|
| **Command BR** | 576 | 40001 | Baud rate | Without | User |
| **Command BT** | 0 | 40019 | Bus termination | Without | User |
| **Command CI** | 0 | 40013 | Command interpreter | Without | User |
| **Command CK** | 0 | - | Password for writing access to calibration tables | Without | User or CK |
| **Command FB** | 0 | 40001 | Quick start mode | Without | User |
| **Command FO** | 1 | 40025 | Frequency output | Without | User |
| **Command HP** | 0 | 40041 | Target value for the temperature control unit | Without | User |
| **Command HT** | 0 | 40017 | Mode of the heater control | Without | User |
| **Command ID** | 0 | 40003 | ID number | Without | User |
| **Command KY** | 0 | 40009 | Key/password | Without | Without |
| **Command MI** | 10 | 40027 | Averaging interval | Without | User |
| **Command OH** | - | 40021 | Read operating parameters | Without | Without |

| Command | Initial value Factory setting | MODBUS Register address | Description | Password Reading[1] / Writing[2] | |
|---|---|---|---|---|---|
| **Command RC** | - | 40033 | Read entry from calibration table | Without | Without |
| **Command SH** | 0 | 40039 | Station height | Without | User |
| **Command SM** | 0 | - | Power saving mode | Without | User |
| **Command SN** | - | 40007 | Read serial number | Without | Without |
| **Command SR** | 0 | 40029 | Scanning rate (1s, 1/2s, 1/4s) | Without | User |
| **Command SV** | - | 45005 | SW version | Without | Without |
| **Command TR** | - | - | Telegram query | Without | Without |
| **Command UC** | 0 | 40031 | Selection calibration table | Without | User |
| **Command WC** | - | - | Write entry into calibration table | Without | Calibration data or CK |

**Table 8 : Command list**

[1]: Command without parameter (is used for reading the set parameter).
[2]: Command with parameter (is used for writing a new parameter).

### 8.3.1 Command BR

<id>BR<parameter><CR> Setting the baud rate

Access: reading / writing

Description: With the command BR, the desired baud rate is set.

Parameter type: unsigned integer

Parameter:

| Parameter | Description |
|---|---|
| 12 | 1200baud (8n1) |
| 24 | 2400baud (8n1) |
| 48 | 4800baud (8n1) |
| 96 | 9600baud (8n1) |
| 192 | 19200baud (8n1) |
| 384 | 38400baud (8n1) |
| 576 | 57600baud (8n1) |

Type return value: unsigned integer

Return value: see parameter

Value range: 12 / 24 / 48 / 96 / 192 / 384 / 576

Initial value: 576

### 8.3.2 Command BT

| | |
|---|---|
| <id>BT<parameter><CR> | Bus termination |
| Access: | reading / writing |
| Description: | With the command, the RS485 interface can be interconnected with a 120 Ohm wave terminating resistor (bus termination). |
| Parameter type: | unsigned integer |
| Parameter: | 0: Termination off<br>1: Termination enabled (120 Ohm) |
| Type return value: | unsigned integer |
| Return value: | see parameter |
| Value range: | 0 / 1 |
| Initial value: | 0 |

### 8.3.3 Command CI

| | |
|---|---|
| <id>CI<parameter><CR> | Selection of the command interpreter |
| Access: | reading / writing |
| Description: | With the command CI, the desired command interpreter is set. |

***Remark:***

***If the identification number (ID) is bigger than 98, it is automatically set to 0 when switching over into the THIES interpreter!***

***Remark:***

***If the identification number (ID) equals 0, a switch-over into the MODBUS-RTU interpreter is not possible!***

Parameter description:

| Parameter | Description |
|---|---|
| 0 | THIES |
| 1 | MODBUS RTU |

| | |
|---|---|
| Value range: | 0 to 1 |
| Initial value: | 0 |

### 8.3.4 Command CK

| | |
|---|---|
| <id>CK<parameter><CR> | Password for writing access to calibration tables |
| Access: | writing |
| Description: | With the command, the password is set for writing access to the calibration tables (see command WC). The password must be set 2 consecutive times within a time frame of 60 seconds.<br>If the password has been changed once, the current password must be set before changing it again. |
| Parameter type: | unsigned integer |
| Parameter: | 1…4294967295 |
| Type return value: | unsigned integer |
| Return value: | see parameter |
| Value range: | 1…4294967295 |
| Initial value: | 137 |

### 8.3.5 Command FB

| | |
|---|---|
| <id>FB<parameter><CR> | Quick start mode |
| Access: | reading / writing |
| Description: | The command selects the quick start mode or the set mode is queried. |
| Parameter type: | unsigned integer |
| Parameter: | 0: Quick start mode off<br>1: Quick start mode on |
| Type return value: | unsigned integer |
| Return value: | see parameter |
| Value range: | 0...1 |
| Initial value: | 1 |

### 8.3.6 Command FO

| | |
|---|---|
| <id>FO<parameter><CR> | Frequency output |
| Access: | reading / writing |
| Description: | The command enables or disables the frequency output. When no parameter is entered, the set value is queried. |
| Parameter type: | unsigned integer |
| Parameter: | 0: Disable frequency output<br>1: Output of the measured frequency (via µC)<br>2: Output of the wind speed with one decimal place by using the most recent calibration table ($f_a = f_{meas} * 10$)<br>3: Output of the measured frequency (without µC) |

| | |
|---|---|
| Type return value: | unsigned integer |
| Return value: | see parameter |
| Value range: | 0...3 |
| Initial value: | 0 |

### 8.3.7 Command HP

| | |
|---|---|
| <id>HP<parameter><CR> | Reference variable temperature control unit |
| Access: | reading / writing |
| Description: | The pressure and acceleration sensors are thermally coupled and can be heated. The "HP" command sets the setpoint for the temperature controller<br>The information is given in °C with one decimal place. |
| Parameter type: | unsigned integer |
| Parameter: | 0...600: Reference variable 0...60.0°C<br>65535: Temperature control unit disabled |
| Type return value: | unsigned integer |
| Return value: | see parameter |
| Value range: | 0…600 / 65535 |
| Initial value: | 500 |

### 8.3.8 Command HT

| | |
|---|---|
| <id>HT<parameter><CR> | Mode of the heater control |
| Access: | reading / writing |
| Description: | The command sets the mode for the housing heater<br>(only possible at 4.3352.00.400) |
| Parameter type: | unsigned integer |
| Parameter: | 0: Heater off<br>1: Heater on (controlled to ~ 4°C) |
| Type return value: | unsigned integer |
| Return value: | see parameter |
| Value range: | 0...1 |
| Initial value: | 0 |

### 8.3.9 Command ID

| | |
|---|---|
| <id>ID<parameter><CR> | Identification number |
| Access: | reading / writing |
| Description: | This command sets the identification number (THIES interpreter) or the slave address (MODBUS RTU interpreter). Only if the id included in the command corresponds to the one set in the wind transmitter, a response telegram is sent. One exception is the generic 'id' where all wind transmitters respond (THIES interpreter). After changing the 'id', the device responds immediately with the new 'id'. |
| Parameter type: | unsigned integer |
| Parameter: | 99 generic 'id' (THIES interpreter)<br>0 Broadcast slave address (MODBUS RTU interpreter) |
| Type return value: | unsigned integer |
| Return value: | see parameter |
| Value range: | 0 to 99 (THIES interpreter)<br>1 to 247 (MODBUS RTU Interpreter) |
| Initial value: | 0 (THIES interpreter)<br>1 (MODBUS RTU Interpreter) |

### 8.3.10 Command KY

| | |
|---|---|
| <id>KY<parameter><CR> | Key/password |
| Access: | reading / writing |
| Description: | With this command, the value for the key (password) is set. The following 3 password levels are possible:<br>User (only reading access)<br>Settings (general settings)<br>Calibration data (access to the calibration data sets)<br>Administrator (access to the factory and commissioning parameters) |
| Parameter type: | unsigned integer |
| Parameter: | |

| Parameter | Description |
|---|---|
| 0 | Query |
| 234 | User |
| 137 | Calibration data (see command CK) |

| | |
|---|---|
| Type return value: | unsigned integer |
| Return value: | see parameter |
| Value range: | 0, 137, 234 |
| Initial value: | 0 |

### 8.3.11 Command MI

| | |
|---|---|
| <id>MI<parameter><CR> | Averaging interval |
| Access: | reading / writing |
| Description: | With this command, the averaging interval for floating averaging of the wind speed is set in seconds (see Bit4 in the sensor status). Wind speed values are logged 4 times per second (4 Hz) for averaging. |
| Parameter type: | unsigned integer |
| Parameter: | e.g. 60 ➔ 60[s] |
| Type return value: | unsigned integer |
| Return value: | see parameter |
| Value range: | 0...600 |
| Initial value: | 0 |

### 8.3.12 Command OH

<id>OH<CR> Read operating parameters

Access: reading

Description: With this command, the following operating parameters can be read:

- Number of the operating hours
- Number of revolutions
- Operating time since the last reset

Parameter type: unsigned integer

Parameter:

| Parameter | Description |
|---|---|
| 1 | Number of the operating hours. |
| 2 | Query of the number of revolutions. |
| 3 | Query of the operating time in seconds since the last reset. |

Type return value: unsigned integer / character string

Return value:

| Return value | Type | Description |
|---|---|---|
| xxxxxxxxxx | unsigned integer | Operating hours. |
| xxxxxxxxxxxxxxxx | Character string | Number of revolutions (64bit value in hexadecimal representation. |
| xxxxxxxxxx | unsigned integer | Operating time in seconds since the last reset. |

Value range: -

Initial value: -

Example: 00OH1
!00OH0000003987 (=3978 hours)

00OH2
!00OH000000000000A43B (=42043 revolutions)

00OH3
!00OH0000123887 (=123887 seconds)

### 8.3.13 Command RC

<id>RC<parameter><CR> Read calibration table

Access: reading

Description: With the command, the table indicated in the parameter is read. The value returned by the command RC depends on the parameter:

Parameter type: unsigned integer

Parameter:

| Parameter | Description |
|---|---|
| 0...10 | Table (0..10)<br>0: Standard curve<br>1: Table 1<br>2: Table 2<br>...<br>9: Table 9<br>10: Table 10 |
| 99 | Time stamp (date/time) of all tables<br>(empty tables, i.e. unfilled tables give the following time stamp: tt;2010.00.00;00:00:00;) |

Type return value: Character string

Return value:

| Transfer parameter | Return value | |
|---|---|---|
| | ASCII representation | Description |
| 1...10 | <STX><br>sssss[1];iiiii[1];<br>sssss[2];iiiii[1];<br>...<br>sssss[32];iiiii[32];<br>xxxxxxxxxx;<br>uuuuuuuuuuuuuuuu;<br>YYYY.MM.DD;HH:NN:SS<br><ETX> | 32 sampling points in the table + calibration certificate number + date/time<br>sssss: Target value in 0.01 [m/s]<br>iiiii: Actual value in 0.01 [m/s]<br>xxxxxxxxxx: Calibration certificate number<br>uuuuuuuuuuuuuuuu: User string with 16 characters<br>YYYY: Year<br>MM: Month<br>DD: Day<br>HH: Hour<br>NN: Minute<br>SS: Second |

| Transfer parame-ter | Return value | |
|---|---|---|
| | ASCII representation | Description |
| 99 | <STX><br>tt;YYYY.MM.DD;HH:NN:SS;<br>tt;YYYY.MM.DD;HH:NN:SS;<br>tt;YYYY.MM.DD;HH:NN:SS;<br>tt;YYYY.MM.DD;HH:NN:SS;<br>tt;YYYY.MM.DD;HH:NN:SS;<br>tt;YYYY.MM.DD;HH:NN:SS;<br>tt;YYYY.MM.DD;HH:NN:SS;<br>tt;YYYY.MM.DD;HH:NN:SS;<br>tt;YYYY.MM.DD;HH:NN:SS;<br><ETX> | Date/time of all tables (1...10)<br><br>tt: Table<br>YYYY: Year<br>MM: Month<br>DD: Day<br>HH: Hour<br>NN: Minute<br>SS: Second |
| unequal 1...10 / 99 | <STX>error<ETX> | |

Value range: -

Initial value: -

Example: 00RC01

<STX>0000;0000;0242;0242;0484;0484;0726;0726;0968;0968;
1210;1210;
1452;1452;1694;1694;1936;1936;2178;2178;2420;2420;
2662;2662;2904;2904;3146;3146;3388;3388;3630;3630;3872;3872;
4114;4114;4356;4356;4598;4598;4840;4840;5082;5082;5324;5324;
5566;5566;5808;5808;6050;6050;6292;6292;6534;6534;6776;6776; 7018;7018;
7260;7260;7502;7502 ;0000022228;2013.09.03;16:00:00
<ETX>

00RC99

<STX>2013.09.09;12:00:00;2010.00.00;00:00:00;2010.00.00;00:00:00;2010.00.00;00:00:00;2010.00.00;00:00:00;2010.00.00;00:00:00;2010.00.00;00:00:00;2010.00.00;00:00:00;2010.00.00;00:00:00;2010.00.00;00:00:00;<ETX>

### 8.3.14 Command SH

<id>SH<parameter><CR> Station height

Access: reading / writing

Description: With the command, the station height on the site is set on the site of the anemometer.
This value is used for the calculation of the relative air pressure.
The information of the height is given in meter.

Parameter type: unsigned integer

Parameter: Height above sea level in meters
0...3000: Station height in meters (basis for the calculation of the relative air pressure)

| | |
|---|---|
| Type return value: | unsigned integer |
| Return value: | see parameter |
| Value range: | 0...3000 |
| Initial value: | 0 |

### 8.3.15 Command SM

| | |
|---|---|
| <id>SM<parameter><CR> | Power saving mode |
| Access: | reading / writing |
| Description: | The command enables reading and setting the power saving mode. |
| Parameter type: | unsigned integer |
| Parameter: | 0: all modules active<br>1: µC and interfaces disabled<br>2: 3D acceleration sensor disabled |
| Type return value: | unsigned integer |
| Return value: | see parameter |
| Value range: | 0...2 |
| Initial value: | 0 |

### 8.3.16 Command SN

| | |
|---|---|
| <id>SN<parameter><CR> | Serial number |
| Access: | reading |
| Description: | The command enables reading the serial number. |
| Parameter type: | - |
| Parameter: | - |
| Type return value: | unsigned integer |
| Return value: | xxxxxxxxxx: Serial number |
| Value range: | xxxxxxxxxx |
| Initial value: | - |

### 8.3.17 Command SR

| | |
|---|---|
| <id>SR<CR> | Scanning rate |
| Access: | reading / writing |
| Description: | With the command SR, the scanning rate for the measured value logging is read or set. |
| Parameter type: | unsigned integer |
| Parameter: | 0: 1s<br>1: 0.5s<br>2: 0.25s |
| Type return value: | unsigned integer |
| Return value: | see parameter |
| Value range: | 0...2 |
| Initial value: | 0 |

### 8.3.18 Command SV

| | |
|---|---|
| <id>SV<CR> | SW version |
| Access: | reading |
| Description: | With the command SV, the software version number can be read. |
| Parameter type: | - |
| Parameter: | - |
| Type return value: | unsigned integer |
| Return value: | xxyy (xx: main version number, yy: Secondary version number) |
| Value range: | - |
| Initial value: | - |

### 8.3.19 Command TR

| | |
|---|---|
| <id>TR<parameter><CR> | Measured value request |
| Access: | reading |
| Description: | The command activates the one-time transfer of the current data telegram. |
| Parameter type: | unsigned integer |
| Parameter: | 1: Query measured value telegram 1<br>2: Query measured value telegram 2<br>30: Query measured value memory telegram |
| Type return value: | Character string |
| Return value: | Character string (see**Data telegrams**) |
| Value range: | 1 / 2 / 30 |
| Initial value: | - |

### 8.3.20 Command UC

| | |
|---|---|
| <id>UC<parameter><CR> | Selection calibration table |
| Access: | reading / writing |
| Description: | The command selects between the standard curve and the (most recent) calibration table with the highest value. |
| Parameter type: | unsigned integer |
| Parameter: | 0: Standard curve<br>1: (most recent) calibration table with the highest value |
| Type return value: | unsigned integer |
| Return value: | see parameter |
| Value range: | 0 / 1 |
| Initial value: | 0 |

### 8.3.21 Command WC

| | |
|---|---|
| <id>WC<parameter><CR> | Describe calibration table |
| Access: | writing |
| Description: | With the command, the memories of the next free table are written.<br>After writing date/time (address 35), the table is complete and no longer be changed.<br>The table is selected automatically for writing access, in ascending order from table 1 to table 10. |
| Parameter type: | Character string |
| Parameter: | |

| **Transfer parameter** | **Return value** | |
|---|---|---|
| | ASCII representation | Description |
| aa;sssss;iiiii**;**<br>(aa: 1...32) | tt;aa;sssss;iiiii | Sampling points of the table<br>tt: Table<br>aa: Address<br>sssss: Target value in 0.01 [m/s]<br>iiiii: Actual value in 0.01 [m/s] |
| 33;xxxxxxxxxx**;** | tt;aa;xxxxxxxxxx | Calibration certificate number<br>tt: Table<br>aa: Address<br>xxxxxxxxxx: Calibration certificate number |

| Transfer parameter | Return value | |
|---|---|---|
| | ASCII representation | Description |
| 34;uuuuuuuuuuuuuuu**;** | tt;aa;uuuuuuuuuuuuuuuu | Date/time<br>tt: Table<br>aa: Address<br>uuuuuuuuuuuuuuuu<br>: User string with 16 characters |
| 35;YYYY.MM.DD;HH:NN:SS**;** | tt;aa;YYYY.MM.DD;HH:NN:SS | Date/time<br>tt: Table<br>aa: Address<br>YYYY: Year<br>MM: Month<br>DD: Day<br>HH: Hour<br>NN: Minute<br>SS: Second |

Type return value: Character string

Return value: see parameter

Value range: -

Initial value: -

Example: 00WC35;2013.09.02;11:24:00
!00WC01; 35;2013.09.02;11:24:00

# 9 Maintenance

If properly installed, the instrument requires no maintenance. Heavy pollution can lead to blockage of the slot between the rotating and the stable parts of the transmitter. Thus, it is advisable to remove the accumulated dirt from the instrument.

**Cleaning**
For the cleaning of the device should use a damp cloth without chemical cleaning agents are used.

Certain symptoms of wear and tear can appear on the ball bearings after years of use. These symptoms are expressed in a lowered sensitivity of response, standstill or run-noises of the ball bearings. In case that such disturbances might occur, we recommend to return the instrument - in original package - to the factory for maintenance work.

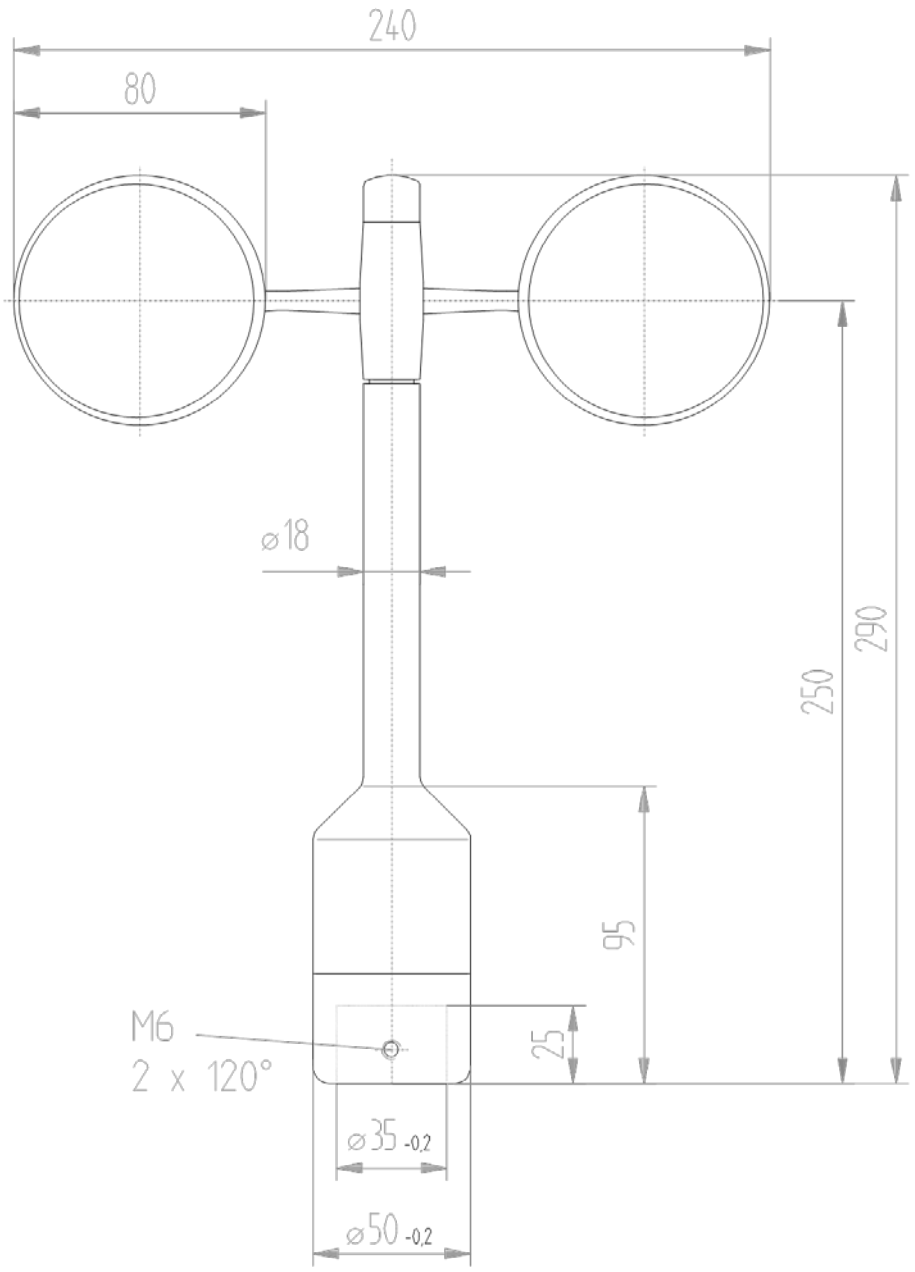
***Remark:***
*For transport of instrument please use original packing.*

# 10 Specifications

| Characteristics | Description |
|---|---|
| Measurement range | 0.3 ... 75m/s |
| Measurement uncertainty | ±1% from the measured value or < ±0,2m/s @ 0,3 ... 50m/s |
| Survival speed | 80m/s (min. 30 minutes) |
| Admissible environmental conditions | -40...+80°C<br>0 ... 100% relative humidity, including condensation |
| Housing inside temperature measurement | Measurement range: -40 … +80°C<br>Precision: ±1°C |
| Air pressure measurement | Measurement range: 300 … 1100hPa<br>Precision: ±1.0hPa @ 20°C |
| Inclination measurement (X, Y, Z)<br><br>Vibration (X, Y, Z)<br><br><br>Acceleration | Measurement range: -89.9 ... +89.9°<br>Precision: +/-1 °<br><br>Measurement range: 0 … 50Hz<br>Precision: ±0.4Hz<br><br>Measurement range: ±8g<br>Precision: ±30mg |
| Temperature control | Heated components: Air pressure sensor, acceleration sensor,<br>Precision: ±0.5K<br>Setting range: 0 ... +60°C<br>The target temperature is set with a command with a resolution of 0.1K |
| Frequency output | Type open-drain or push-pull<br>Form rectangle<br>Frequency 1082Hz @ 50m/s without using calibration data<br>Amplitude corresponds to supply voltage, max. 15V<br>Load Ra > 1kΩ (Push-pull output with 200Ω in series)<br>Approx. < 200nF (corresponds to a cable length ~ 1km) |
| Serial interface | Type RS485<br>Operating mode Half duplex mode<br>Data format 8N1<br>Baud rate 2400, 4800, 9600, 19200, 38400, 57600 |
| Linearity | Correlation factor r between frequency and wind speed<br>r > 0.999 99 (4 … 20m/s) |
| Start-up speed | <0.3m/s |
| Resolution | 0.05m wind travel |
| Distance constant | <3m (according to ASTM D 5096 – 96), 3m according to ISO 17713-1 |
| Turbulent flow into cups | Deviation Δv turbulent compared to stationary horizontal flow<br>-0.5% < Δv < +2%<br>Frequency < 2Hz |
| Classification | <br>According to IEC 61400-12-1 edition 2.0<br>Wind Turbine Power Performance Testing 2017-03 |
| Wind load | Approx. 100N @ 75m/s |
| Heater | Surface temperature of the housing neck >0°C<br>at 20m/s to -10°C air temperature, at 10m/s to -20°C<br>Use of the Thies icing standard 012002 on the housing neck |

| | |
|---|---|
| | Heater controlled with temperature sensor. |
| Electric supply for electronic | Voltage: 3.7 ... 42V DC (galvanically separated from the housing)<br>Current: 40mA typ.<br>100mA max.<br>approx. 4mA in power saving mode |
| Electric supply for Heater | Voltage: 24V AC/DC, 45 ... 65Hz (galvanically separated from the housing)<br>Open circuit voltage: max. 30V AC, max. 42V DC<br>Wattage: 25W<br><br>Proportional control, control temperature: 5°C,<br>Heater can be enabled disabled via interface,<br>galvanically separated to the housing and the measured value logging |
| Type of connection | 8-pin connector for shielded conductor in shaft<br>(see connection diagram) |
| Mounting | Mounting on mast R 1", e.g. DIN 2441<br>1½ " with separate adapter (option) |
| Dimensions | see dimensional drawing |
| Weight | approx. 0.5kg |
| Type of protection | IP 55 (DIN 40050) |

# 11 Dimensional Drawing



# 12 Accessories (optional)

| | | |
|---|---|---|
| Traverse 0.6 m<br>For mounting the wind speed and wind direction transmitter jointly onto a mast. | 4.3174.00.000 | Horizontal sensor distance: 0.6m<br>Vertical sensor distance: 0.2m<br>Mast receptacle: 48 … 50mm<br>Material: Aluminum, anodized<br>Dimensions: tube Ø 34x4mm, 668mm long, 756mm high |
| Hanger<br>–FIRST CLASS- 1m<br>For the lateral mounting of a wind speed and wind direction transmitter onto a mast tube. | 4.3184.01.000 | Sensor distance to mast: 1m<br>Mast clamp: 40 … 80mm<br>Tube diameter: 34mm<br>Material: Aluminum |
| Lightning rod<br>For mounting the a/m traverse or hanger. | 4.3100.98.000 | Dimension: Ø 12mm, 500mm long, 1050mm high<br>Material: Aluminum |
| Adaptor<br>For isolated mounting of each wind transmitter and wind direction transmitter on the traverse (4.3174.0.000). | 509077 | Dimension: A:Ø 34mm, outside 25mm high<br>B:Ø 35mm, inside 45 mm high<br>Material: POM |

Please contact us for other accessories such as cables, power supply units, masts, as well as for additional mast- or system-constructions.

Example: Wind transmitter with traverse 4.3174.00.000 and lightning rod 4.3100.98.000

# 13 EC-Declaration of Conformity

**Document-No.: 001575** **Month: 10 Year: 17**

Manufacturer: **A D O L F T H I E S G m b H & C o. K G**
Hauptstr. 76
D-37083 Göttingen
Tel.: (0551) 79001-0
Fax: (0551) 79001-65
email: Info@ThiesClima.com

This declaration of conformity is issued under the sole responsibility of the manufacturer

Description of Product: **Windsensor First Class Advanced II, Windsensor First Class Advanced X**

| Article No. | **4.3352.00.000** | **4.3352.10.000** | **4.3352.00.400** | **4.3352.10.400** |
|---|---|---|---|---|

specified technical data in the document: **021813/10/17, 021818/10/17**

The indicated products correspond to the essential requirement of the following European Directives and Regulations:

| | |
|---|---|
| 2014/30/EU | DIRECTIVE 2014/30/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility |
| 2014/35/EU | DIRECTIVE 2014/35/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits |
| 552/2004/EC | Regulation (EC) No 552/2004 of the European Parliament and the Council of 10 March 2004 on the interoperability of the European Air Traffic Management network (the interoperability Regulation) |
| 2011/65/EU | DIRECTIVE 2011/65/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment |
| 2012/19/EU | DIRECTIVE 2012/19/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 on waste electrical and electronic equipment (WEEE) |

The indicated products comply with the regulations of the directives. This is proved by the compliance with the following standards:

| | |
|---|---|
| EN 61000-6-2 | Electromagnetic compatibility<br>Immunity for industrial environment |
| EN 61000-6-3 | Electromagnetic compatibility<br>Emission standard for residential, commercial and light industrial environments |
| EN 61010-1 | Safety requirements for electrical equipment for measurement, control, and laboratory use. Part 1: General requirements |
| EN 50581 | Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances |

Place: Göttingen Date: 24.10.2017

Signed for and on behalf of:

Legally binding signature: issuer:

Thomas Stadie, General Manager Sales

Joachim Beinhorn, Development Manager

This declaration certificates the compliance with the mentioned directives, however does not include any warranty of characteristics.
Please pay attention to the security advises of the provided instructions for use.

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