

Instruction for Use

021587/02/09

Wind Direction Transmitter

- Output: 8 bit serial synchron

4.3125.33.100 / 101



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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
 - Endangering 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 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 under certain conditions, and in rare cases, may also output erroneous measuring values, it is recommended using redundant systems with plausibility checks with **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, arrange for recycling as the packaging materials are designed to be recycled.



Documentation

- © Copyright **Adolf Thies GmbH & Co KG**, Göttingen / Germany
- Although this operating instruction has 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.
- We can accept no liability whatsoever for any losses arising from the information contained in this document.
- Subject to modification in terms of content.
- The device / product should not be passed on without the/these operating instructions.

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1 Models

Order-No.	Meas. Range Wind direction	Electrical Output	Model
4.3125.33.100	0 ... 360°	8 bit serial- synchron	Standard
4.3125.33.101	0 ... 360°	8 bit serial- synchron	“Ship version” * - short wind vane - special ball bearing

* Wind Direction Transmitter for heavy mechanical load, for ex. on ships, wind power plants or the like.

The Wind Direction Transmitters are shipped in semi-mounted state, in order to avoid transport damages and to keep the package small.

The following parts are included in delivery:

- 1 x wind direction transmitter, pre-mounted
- 1 x wind vane
- 1 x connecting plug

2 Range of application

The wind direction transmitter serves for the acquisition of the horizontal components of the wind direction. The measuring values is available at the outputs digital signals. They can be output to THIES-display instruments, and systems or for further processing.

For winter operation the instruments are equipped with an electronically regulated heating in order to guarantee a smooth running of the ball bearings, and to avoid ice-formation at the slot of the outer rotation parts. The electrical supply of wind transmitter heating is carried out, for ex., by our power supply unit, order-no. 9.3388.00.000.

3 Construction and Mode of Operation

The housing and wind vane are made of aluminum, die the surfaces are anodized. Labyrinth seals and o-rings protect the sensitive internal parts from precipitation. The instrument is designed for mounting to a mast tube; the electrical plug connection is situated in the transmitter shaft.

The wind direction is acquired by means of an inertia-free wind vane.

The axis of the wind vane is running in ball bearings and carries a diametrically magnetized magnet at the inner end.

The angle position of the axis is scanned contact-free by a TMR- Sensor (Tunnel Magneto Resistance) through the position of the magnet field.

As signal this sensor outputs two cosine- and sinus-depending voltages.

The connected micro-controller calculates from this voltages the wind direction and provides the respective result as **serial-synchronous output signal**.

The measurement output is done on request via a serial-synchronous interface. Appropriate interfaces are integrated in THIES systems such as wind display LED, wind interface and dataloggers.

3.1 Description: Serial-Synchronous Interface

The serial-synchronous interface is a unidirectional 2-wire-interface. When no data query is effected the wind transmitter is in the state of stand-by. On receiving the first clock signal the 8-bit measuring value of the wind direction is recorded in a shift register, and the LSB is connected to the data output. In parallel, a new measuring procedure is starting. After 8 clock pulses the wind direction code is output, and the transmission of the inverse wind direction code (see table 2) is done by further 8 clock pulses. The inverse wind direction code can be taken as basis for the transmission error control. The simultaneous data output, and the starting of measuring procedure mean that always the last measuring value is output (see figure 2).

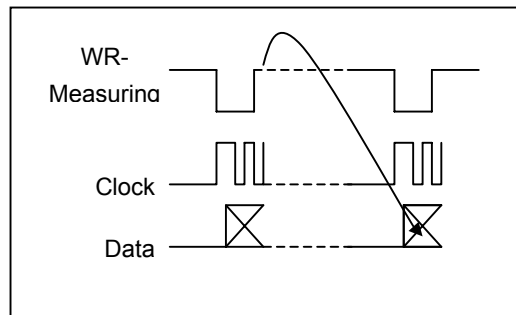


Figure 1: Wind Direction Code

*:

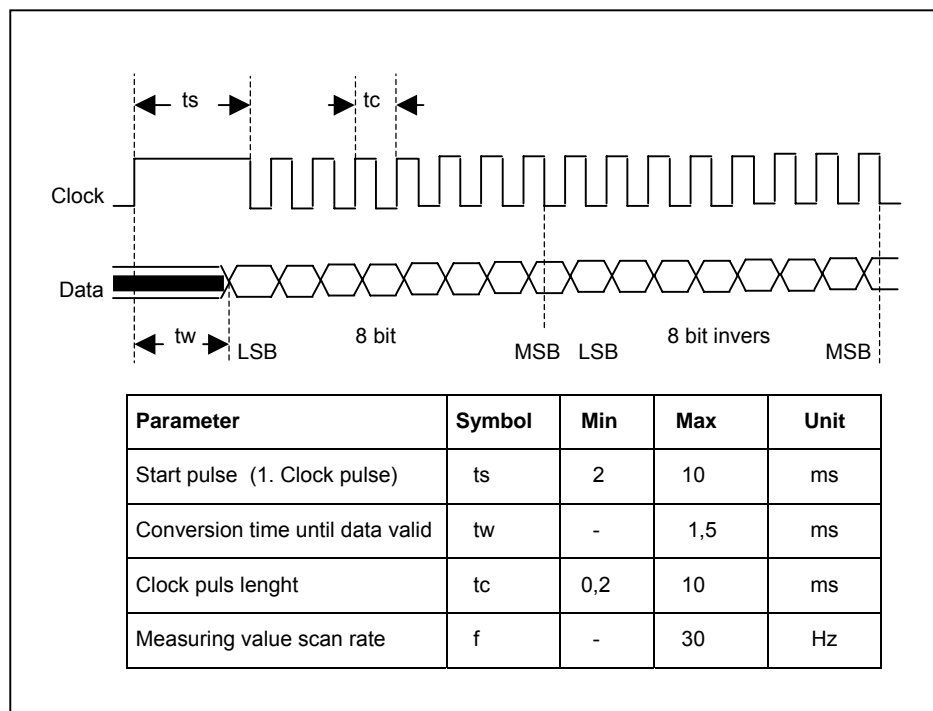


Figure 2: Interface Specification „serial synchron“

4 Recommendation Site Selection / Standard Installation

In general, wind measurement instruments should be able to detect wind conditions over a broad range. In order to obtain comparative values of the surface wind, measurements should be taken at a height of 10m above a flat, open terrain. Open terrain means that the distance between the wind transmitter and an obstacle is at least 10 times greater than the height of the obstacle itself. If this requirement cannot be fulfilled, then set the wind transmitter up at a height where the influence of local obstacles on the measured values is minimal (about 6 - 10 m above the level of the obstacle). If the wind transmitter is set up on a flat roof, then place it in the center of the roof and not at the edge in order to avoid privileged directions.

5 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, hangers etc.) please take a possible effect by turbulences into consideration.

Remark:

*A **Lightning Rod** Order-No. **4.3100.99.000** is recommended if the instrument is to be used in areas with considerable lightning activity.*

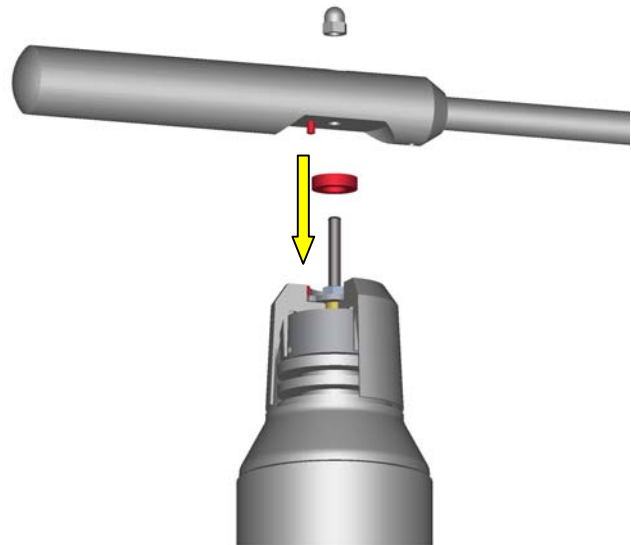
5.1 Mounting the wind vane

Tools

- Screw wrench SW 8

Mounting of wind vane

1. Remove wind transmitter housing and wind vane from the packing.
2. Screw off cap nut (SW 8)
The gasket remains in the protective cap
3. Mounting of wind vane acc. to figure.
The dowel at the wind vane must catch the notch of the protective cap. The cap nut is to be screwed tightly.



5.2 Mounting the Wind Direction Transmitter

The Wind Direction Transmitter can be mounted onto a tube of R 1 1/2" (\varnothing 48,3 mm), \geq 50 mm long. The internal diameter of the mounting tube must be at \geq 40 mm since the transmitter will be plugged into an electrical system from below. Solder a cable onto the enclosed plug (see chapter 5.4). After electrical connection, set the wind transmitter onto the tube. North marking and bow shall indicate to the North.

5.3 North Alignment

Rotate the case markings (north marking) on the shaft and on the protective cap until they are aligned. Then select an obvious point in a northerly direction in the surroundings (a tree, a building etc.) with the aid of a compass. Take a bearing on this point over the wind vane and the counter weight of the wind direction transmitter, and when these coincide screw the wind transmitter into place. (the north marking must indicate to the geographic north). The instrument is fixed on the shaft by means of the two hexagon head screws.

Alignment of the comb. Wind Direction Transmitter on a Ship

- The reference point for the wind transmitter is the roll-axis of the ship, whereat "0°" is related to the **ship bow**.

Rotate the case markings (north marking) on the shaft and on the protective cap until they are aligned. Take a bearing on ship bow over the wind vane and the counter weight of the wind direction transmitter, and when these coincide screw the wind transmitter into place. (the north marking must indicate to the geographic north).

- When aligning the comb. wind transmitter on other mobile objects (for ex. vehicles, wind power plants etc.) this procedure can be adopted

5.4 Electrical Mounting

A shielded cable with a diameter of 6..8 mm and a core section of 0,5...0,75 mm² must be soldered on to the enclosed coupling socket.

The number of required cores, and the PIN assignment is stated in the connection diagram (chapter 7).

- Cable recommendation: Type LIYCY 6 x 0.5 mm², Ø 7 mm

5.4.1 Plug Mounting, Cable Mounting

Coupling socket 211 194, 7-pol., (Binder, Serial 423), EMC with cable clamp

<ol style="list-style-type: none"> 1. Stringing parts on cable acc. to plan given above. 2. Stripping cable sheath 20 mm Cutting uncovered shield 15 mm Stripping wire 5mm. <p><i>Cable mounting 1</i> Putting shrink hose or insulating tape between wire and shield.</p> <p><i>Cable mounting 2</i> If cable diameter permits, put the shield backward on the cable sheath.</p> <ol style="list-style-type: none"> 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). 	<p><i>Cable mounting 1</i> View X</p> <p><i>Cable mounting 2</i> View X</p>

5.4 Starting-Up

As given in the connection diagram, please connect the wind direction transmitter to a power supply source and to a serial-synchronous interface (for ex. wind display LED, wind interface, datalogger). After connecting the supply voltage, and after a delay time of $t(v) = 5$ sec the wind direction data can be recalled via the interface.

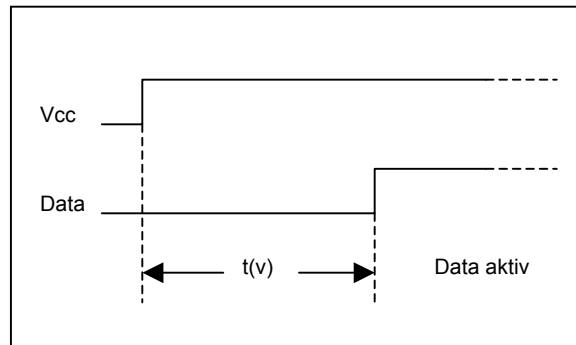


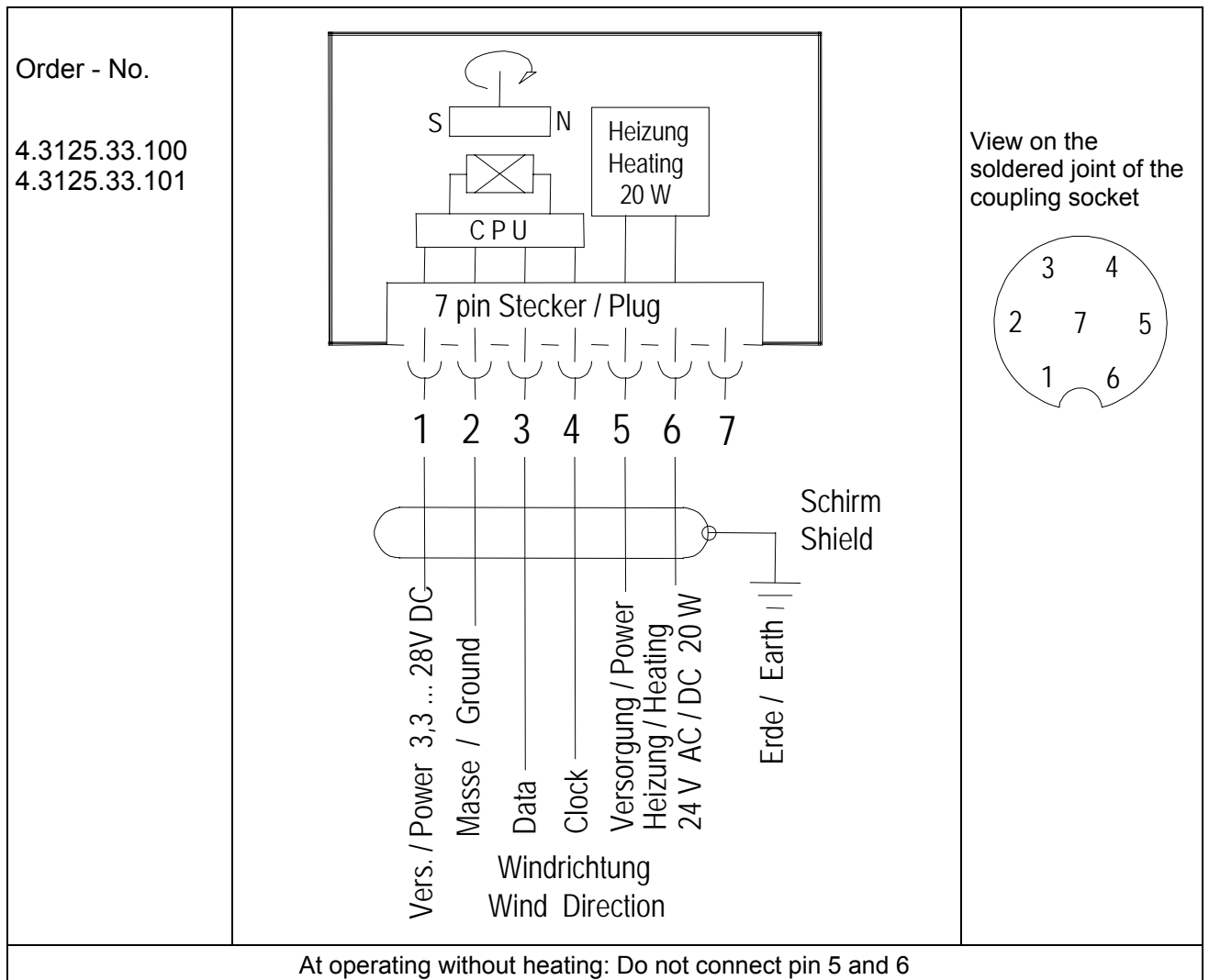
Figure 3: Dataout Aktivierung

6 Maintenance

If the instrument has been properly mounted, no maintenance is required. Heavy pollution can clog the slits between the rotating and stationary parts of the instrument. These slits must always be clean and unclogged.

After years of use, the ball bearings can suffer from wear and tear. This is expressed in a higher starting torque respectively in the fact that the Wind Direction Transmitter does not start rotating. If such a defect occurs, we recommend that you return the instrument to the factory for repair.

7 Wiring diagram



Remark:

- The cable shield should be connected on both sides (to the plug of the wind transmitter and to the data logging) in case the data logging or the like is on the same electrical potential.
- The cable shield should be connected on one side (only to the data logging) in case there are potential differences between wind transmitter and data logging.

8 Technical Data

	4.3125.33.100	4.3125.33.101
Meas. range	0... 360°	0... 360°
Start-up	<0.5 m/s at 30° vane move	<1 m/s at 90° wind vane deflection
Accuracy	1.5°	1.5°
Resolution	2.5°	2.5°
Damping ratio acc. to ASTM D 5366-96	> 0.3	-----
Max. wind load	60 m/s	60 m/s
Interface Output- Data (Amplitude) Input- Clock (Amplitude)	8 Bit serial-synchron (without Offset) U = Vcc (max. 12V) 3,3 - Vcc	8 Bit serial-synchron (without Offset) U = Vc (max. 12V) 3,3 - Vcc
Operating voltage (Vcc) Electronic Current Heating	3,3...28 V DC /24 V AC < 1mA (@ U _B = 5 V) 24 V DC/AC, approx. 20 W, electronically regulated	3.3...28 V DC /24 V AC < 1mA (@ U _B = 5 V) 24 V DC/AC, approx. 20 W, electronically regulated
Ambient temperature	-35...+80°C	-35...+80°C
Protection	IP 55 (general purpose)	IP 55 (general purpose)
Mounting	onto mast tube 1 ½", for ex. DIN 2441	onto mast tube 1 ½", for ex. DIN 2441
Connection	7-pole plug connection in the shaft	7-pole plug connection in the shaft
Weight	1.8 kg	1.8 kg
Model	Standard	"Ship version" * - short wind vane - special ball bearing

9 Dimensions

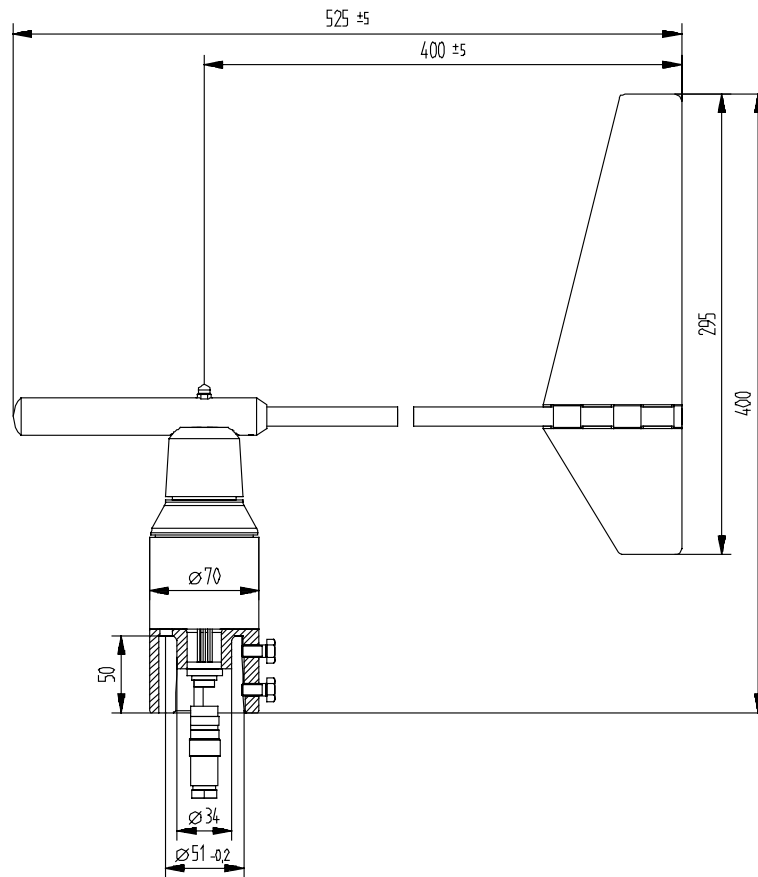


Figure 4: Dimension 4.3125.32.100

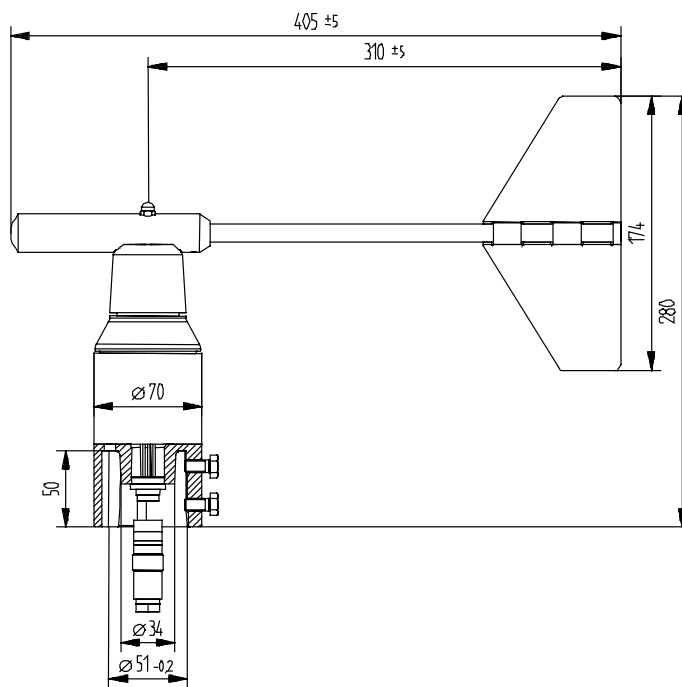


Figure 5: Dimension 4.3125.32.101

10 EC-Declaration of Conformity

Document-No.: **000440**

Month: 02 Year: 09

Manufacturer: **ADOLF THIES GmbH & Co. KG**

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Description of Product: **Wind Transmitter**

Article No. **4.3121.33.000** **4.3121.33.075** **4.3125.33.100** **4.3125.33.101**

specified technical data in the document: **021582/02/09; 021584/02/09; 021586/02/09;**

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

- | | |
|-------------|--|
| 2004/108/EC | DIRECTIVE 2004/108/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC |
| 2006/95/EC | DIRECTIVE 2006/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 December 2006 on the harmonisation of the laws of Member States relating to 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) |

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

Reference number	Specification
IEC 61000-6-2: 2005	Electromagnetic compatibility Immunity for industrial environment
IEC 61000-6-3: 2006	Electromagnetic compatibility Emission standard for residential, commercial and light industrial environments
IEC 61010-1: 2001	Safety requirements for electrical equipment for measurement, control and laboratory use. Part 1: General requirements

Place: Göttingen

Date: 12.02.2009

Legally binding signature:

issuer:

.....
Wolfgang Behrens, General Manager

.....
Joachim Beinhorn, Development Manager

This declaration certifies 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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