Wind Display LED

Instruction for Use

4.3250.0x.000 with Digital IF

4.3250.0x.xxx with Analogue IF

From Software version V2.2

Dok. No. 021387/12/22

THE WORLD OF WEATHER DATA

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 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.

Contents

Figures

Tables

1 Models available

Designation	Order-No.	Meas. value input	Meas. value output	Operating Voltage
Wind Display LED	4.3250.00.000	- WV: Pulse - WD: Serial synchron or - Serial data protocol	Serial data protocol	230V AC; 24V AC; 12…35V DC
Wind Display LED	4.3250.01.000			115V AC; 24V AC; 12…35V DC
Wind Display LED	4.3250.00.040	- WV: Pulse - WD: Serial synchron or - Serial data protocol	- 0... 20mA - Serial data protocol	230V AC; 24V AC; 12…35V DC
Wind Display LED	4.3250.00.041		- 4... 20mA - Serial data protocol	
Wind Display LED	4.3250.00.061		- 0... 10V - Serial data protocol	
Wind Display LED	4.3250.01.041		- 0... 20mA - Serial data protocol	115V AC; 24V AC; 12…35V DC
Wind Display LED	4.3250.00.140	0... 20mA	Serial data protocol	230V AC; 24V AC; 12…35V DC
Wind Display LED	4.3250.00.141	4... 20mA		
Wind Display LED	4.3250.00.161	0... 10V*		
Wind Display LED	4.3250.01.141	4... 20mA		

Table 1: Models

*Attention: The wind transmitters must be supplied externally by voltage > 13V.

2 Application

With the Wind display LED you are in possession of a modern display device designed for the display of the parameters wind direction and wind velocity. It offers a high level of reliability and flexibility as well as the optimum display of wind parameters.

For the display, coloured light-diodes (LED's) are used, allowing a good readability with various lighting conditions and distances. The brightness is adjustable.

Thanks to an extended dimming function, two different values can be stored as brightness level. This means that individual settings for daytime and night time brightness levels can be called up quickly.

Variants for Processing and Display

- Instantaneous value (ref. chapter 4.1).
- Gliding mean value (ref. chapter 4.2).
- Extreme values (ref. chapter 4.1).

Information:

*The calculation is carried out according to the "International Civil Aviation Organisation" (**ICAO**, Annex 3* - Meteorological Service for International Air Navigation*, 1/7/93, chapter 4.5:* Observing and reporting of surface wind*).*

Equipment:

- RS422 / RS 485 interface for the receipt and output for different data protocols (with 4.3250.0x.000 / 040 / 041 / 061 / 073).
  In the „Master / Slave“ – operation up to 10 other wind display LED can be connected via a distance up to 1000m.
- Wind interface for the connection of different wind transmitters with digital output (with 4.3250.0x.00).
- Analogue interface for the connection of wind transmitter with analogue output (with 4.3250.0x.1xx).
- Analogue outputs for the parameter wind velocity and wind direction (with 4.3250.0x.040 / 041 / 061 / 073).
- Selectable power supply for the wind display of 230VAC (optionally 115VAC) or 24VAC / 12 - 35V DC (with 4.3250.0x.000 / 1xx / 0xx).
- Supply voltage for wind transmitter with analogue output (with 4.3250.0x.1xx).
- Operation via key button on the front side (with 4.3250.0x.000 / 1xx / 0xx).
  Via a terminal clamp on the back side an external key button can be connected for remote operation.

3 Mode of Operation

Calculation of the gliding mean value.

Wind Speed (WS)

The gliding mean values are calculated from the number of second-values in a memory. The oldest value is subtracted from the gliding sum and the new value is added. Afterwards, the gliding sum is divided by the number of values.

$$WS_{avg} = \frac{1}{n} \cdot \left(\sum_{i=1}^{n} WS_i - WS_{old} + WS_{new} \right).$$

n = 120 (2min)
or
n=600 (10min)

Wind Direction (WD)

The mean value of the wind direction is calculated vectorally by dividing it into X- and Y-components, as the values of the wind directions refer to a circle (0…359°), and the “discontinuity” (the discontinuity between 359° and 0° and vice versa) must be taken into consideration.

The following method serves for the calculation of the gliding vectorial mean value of the wind direction:

The instantaneous values of the wind direction (WD) are transformed from polar coordinates (vector with uniform length 1) into Cartesian coordinates X and Y:

$$\boxed{\begin{aligned} X_i &= \sin\left(WD_i\right) \\ Y_i &= \cos\left(WD_i\right) \end{aligned}}$$

The gliding mean values of both coordinates are formed from the number of the calculated values. The oldest value is subtracted from the gliding sum, the new value is added. Then, this sum is divided by the number of values per mean-value-time.

$$\boxed{\begin{aligned} X_{avg} &= \frac{1}{n} \cdot \left(\sum_{i=1}^{n} X_i - X_{old} + X_{new} \right) \\ Y_{avg} &= \frac{1}{n} \cdot \left(\sum_{i=1}^{n} Y_i - Y_{old} + Y_{new} \right) \end{aligned}}$$

n = 120 (2min)

or

After the calculation of the mean value the values are transformed into the polar-coordinate-system.

$$\boxed{WD_{avg} = \arctan\left(\frac{X_{avg}}{Y_{avg}}\right)}$$

Calculation of the Extreme Values

The gliding extreme values are calculated every second for both wind parameters. Extreme values are both the lowest and highest instantaneous values within a period of measurement. The period of measurement is either 2 minutes or 10 minutes. The values of both measurement periods are calculated constantly, and can be displayed immediately after selection of display mode (ref. chapter 4.2).

Discontinuity

The discontinuity is taken into consideration when calculating the 10-minutes-mean values and the 10-minutes-extreme values. The calculation is based on the recommendation of the "International Civil Aviation Organisation" (ICAO, Annex 3 - *Meteorological Service for International Air Navigation*, 1/7/93, section 4.5: *Observing and reporting of surface wind*).

Determination of Discontinuity:

1. The difference between the 2-minutes-mean values and 10-minutes mean values is higher than 30° in case that, at least, one of both mean values of the wind speed (2-minutes value or 10-minutes value) is higher than 5.5m/s (≈20 km/h).

2. The difference between both mean values (2-minutes value and 10-minutes value) of the wind speed is higher than 5.5m/s (≈20km/h).

In case of discontinuity, the 10-minutes-mean values, and the 10-minutes-extreme values are re-calculated, starting from the moment when the discontinuity occurs. First, the 10-minutes values correspond to the 2-minutes value until , after 8 minutes, the 10-minutes values can be calculated again over the total period.

4 Display

Wind speed (WS):
The wind speed is indicated as instantaneous value/mean value on the red 3-digits-LED-display.

Two additional LED-displays indicate the extreme values (WS-max., and WS-min.) of the wind speed.

The units of measurements are m/s, km/h, kn and Beaufort. A red lighting LED indicates the selected unit of measurement.

Wind direction (WD):
72 rectangular LED's are arranged in a circle to display the wind direction and its variation.

The wind direction is displayed by a red LED in a range from 0…355 ° in steps of 5 increments.

The variation of the wind direction is displayed by a green LED-band.

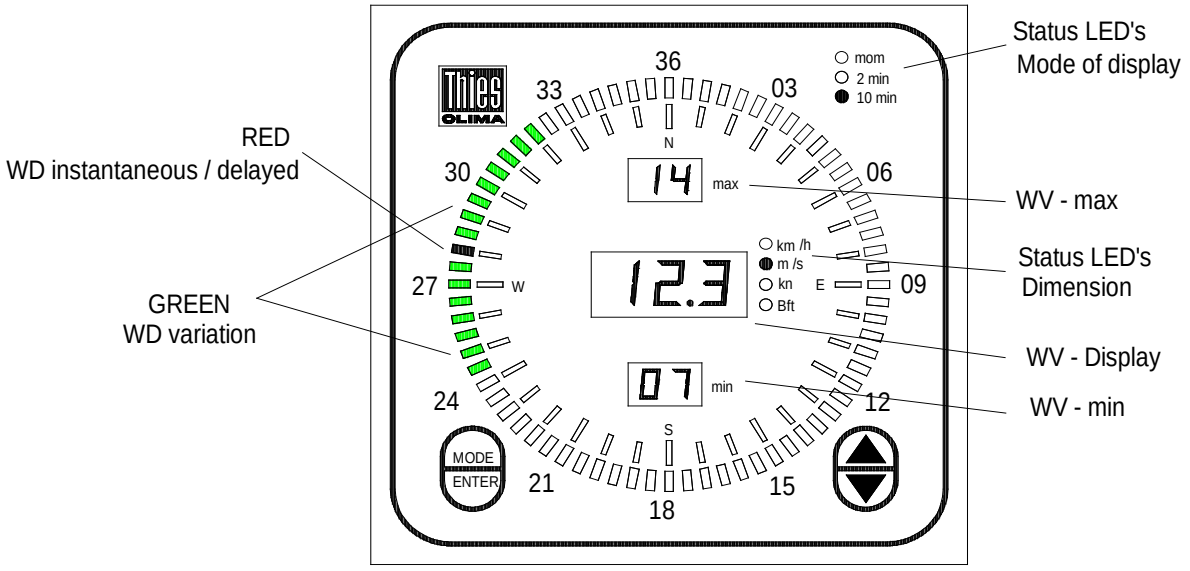


Figure 1: display

4.1 Wind – Diplay 1

The status LED “mom” lights up. The wind speed is displayed as instantaneous value, and the wind direction as delayed value (factory setting).

Displaying the wind direction is possible in four different variants by selecting another operating mode (ref. chapter 7.1).

1. Setting „WD instantaneous“ displays the instantaneous wind direction.
2. Setting “WD delayed” displays the delayed wind direction: The delay is based on an e-function (τ= 6sec).
3. Setting “WD instantaneous & variation” displays the instantaneous wind direction as well as the variation. Here, the band of variation ascends in accordance with the instantaneous value of the wind direction. The descending of the variation band is done in a time interval of 1 second in 5°-increments.
4. Setting “WD delayed & variation” displays the delayed wind direction as well as the variation. Here, the band of variation ascends in accordance with the delayed wind direction. The descending of the “variation band” is done in a time interval of 1 second in 5°-increments.

The LED-displays WS-min and WS-max indicate the extreme values of the wind speed since the last reset.

The reset, and consequently the start of a new extreme-value-acquisition is carried out by pressing the ENTER-button.

4.2 Wind – Display 2 or 3

The status LED „2min“ or „10min“ lights up. The available wind values are displayed as gliding mean values, and extreme values of 2min. or 10min.

The gliding mean values are calculated every second in consideration of the discontinuity. By this, both mean values are constantly available, and can be displayed on request by respective selection.

5 Recommendation Side Selection

The device is designed for inside installation. If used outside, an additional external housing including the appropriate type of protection is necessary.

Remark:

*Please pay attention to the recommended temperature range when selecting a side (see **chapter 7**).*

6 Installation

Attention:

The instrument must be mounted and wired only by a qualified expert, who knows and observes the generalities of technics, and applicable regulations and norms.

Comment:

*Before installation, the settings of the instrument are possibly to be changed (ref. **chapter 7**).*

6.1 Mechanical Mounting

The Wind display LED is designed for installation in a control panel. The necessary control panel opening must be 138 x 138 mm in size. The scope of supply includes two fixing brackets. After the device has been inserted in the control panel, the fixing brackets are slid into the housing at the rear and screwed into place.

6.2 Electrical Mounting

All connections are on the back side (ref. figure 2 and 3).

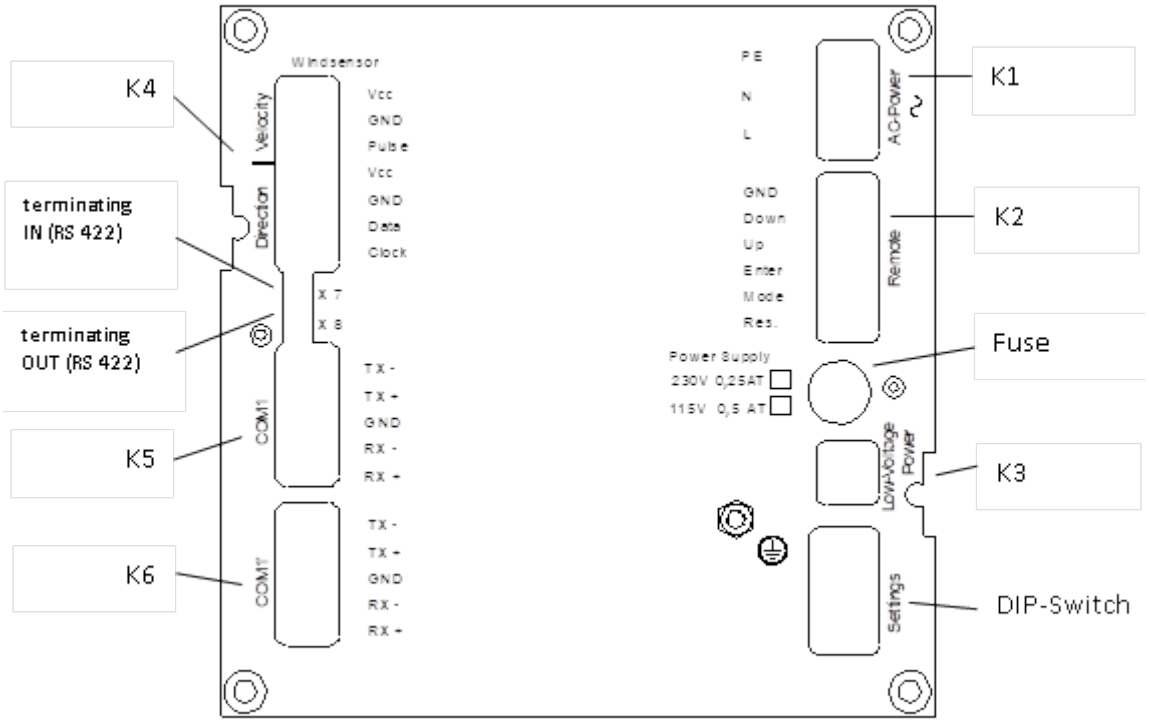
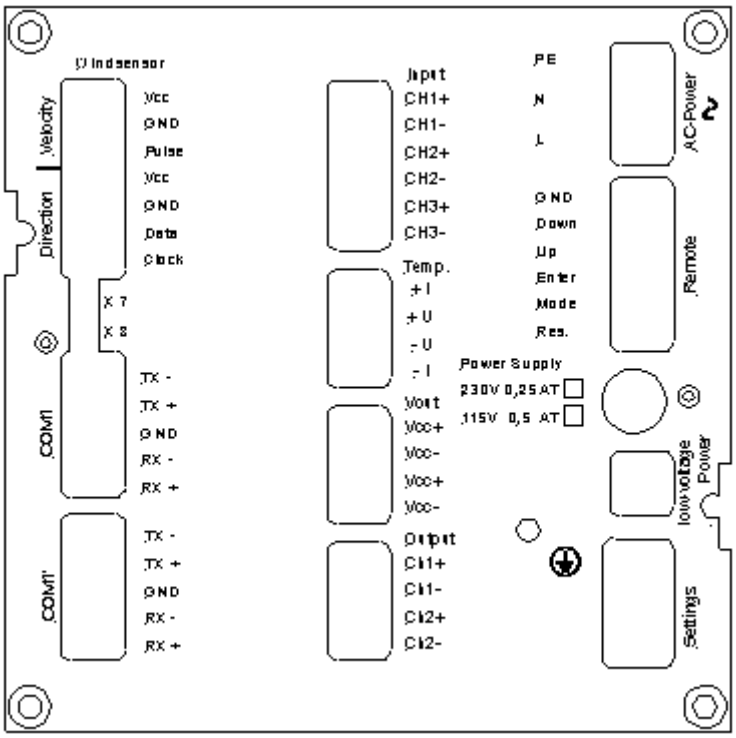


Figure 2: Back side 4.3250.0x.000



- na = not active at 4.3250.0x.1xx

Figure 2: Back side 4.3250.0x.1xx / 0xx

6.2.1 Connection of Wind Transmitters with digital Output

For connection of wind transmitters: Type Classic, Compact, First-Class (ref. **Table 2**).

Transmitter	**Signal / PIN**						
	Vcc (WS)	GND	Pulse (WS)	Vcc (WD)	GND	DATA (WD)	CLOCK (WD)
4.3336.21.000 4.3336.31.000 4.3336.21.001 4.3336.21.008 4.3336.31.008	1	2	3	4	---	6	5
4.3336.22.000 4.3336.22.001 4.3336.22.008 4.3336.32.000 4.3336.32.001 4.3336.32.008	1	2	3	4	---	6	5
4.3129.00.000 4.3129.60.000	---	---	---	1	2	3	4
4.3519.00.000 4.3619.00.000	1	2	3	---	---	---	---
4.3303.22.000 4.3303.22.007 4.3303.22.008 4.3303.22.018	1	2	3	---	---	---	---
4.3125.32.100 4.3125.32.101	---	---	---	1	2	3	4
4.3125.33.100 4.3125.33.101	---	---	---	1	2	3	4
4.3351.00.000 4.3351.10.000	3	2	1	---	---	---	---
4.3150.00.000 4.3150.10.000 4.3150.00.001 4.3150.10.001 4.3151.00.000 4.3151.10.000 4.3151.00.001 4.3151.10.001	---	---	---	3	2	5	4

Table 2: Wind transmitter connection table

6.2.1.1 Pin Assignment for Wind Transmitter with digital output

The wind transmitters are connected to the clamping plug “Windsensor” (K4). When performing connection make sure that pairing of the wind transmitter types (direction and speed) is carried out according to chapter 7.2 (Wind transmitter type).

Description	Clamping Plug (K4): Windsensor
Vcc	Velocity
GND	
Pulse	
Vcc	Direction
GND	
Data	
Clock	

Table 3: Pin Assignment digtial output

6.2.2 Connection of Wind Transmitters with analogue Output

There are diverse current and voltage inputs available (see **Model** chapter 1) for the connection of wind transmitters with analogue output.

The wind transmitters must be connected always by pairs, and have to deliver the same output (for ex. wind velocity: 4…20mA, wind direction: 4…20mA)

Activation of the analogue inputs is done via the MODE button on the front side, and the menu “**Setting the analogue in/output**” (see chapter 9)

The selection of measuring range (for ex. 50m/s = 20mA) is carried out on the front side via the MODE-button and the menu “WV measuring range selection“ (see **Operation** chapter 9).

The following inputs measuring ranges are available (adjustable at Mode 4):

Meas. range
40m/s
50m/s
60m/s
75m/s

Remark:

The analogue outputs are active 10 sec after turning on the wind display or after pressing the reset button.

The error detection for the analogue inputs is carried out acc. To the following criterions:

- Voltage input:
  Exceeding of measuring range causes error message (for ex. U(in) > 10V).
- Input not connected causes error message.
- Current input:
  Exceeding of measuring range causes error message (for ex. 4mA < I (in) > 20mA).

6.2.2.1 Pin Assignment for analogue Measuring variable

Description	Clamp connector: Input (K7) (WV. WD)
CH1+	Wind velocity
CH1-	Wind velocity
CH2+	Wind direction
CH2-	Wind direction
CH3+	----------
CH3-	----------

Table 4: Pin Assignment for analogue

6.2.2.2 Pin Assignment for Voltage Supply of analogue Wind Transmitter

Description	Clamp connector: Vout (K9) Vcc (Wind transmitter)
Vcc+	12V Wind direction
Vcc-	12V Wind direction
Vcc+	12V Wind velocity
Vcc-	12V Wind velocity

Table 5: Pin Assignment for Voltage Supply

6.2.3 Analogue output for the Parameters Wind Velocity and Wind Direction

Depending on the model (see **Model** chapter 1). The wind display has power- and voltage outputs in pairs.

Activation of the analogue inputs is done via the MODE button on the front side, and the menu "**Setting the analogue in/output**" (see chapter 9)

The scaling of the output measuring range of the wind velocity is carried out individually via the MODE button on the front side and the menu „WV measuring range selection" (see **Operation** chapter 9).

The following output measuring ranges are available (adjustable in mode 4):

40, 50 , 60 or 75m/s

The following measuring ranges are available (selectable in Mode 4):

Measuring range
40m/s
50m/s
60m/s
75m/s

In case of error the respective output is set to minimum.

6.2.3.1 Pin Assignment for analogue Output

Description	Clamping plug: Output (K10) (WV. WD)
CH1+	Wind velocity
CH1-	Wind velocity
CH2+	Wind direction
CH2-	Wind direction

Table 6: Pin Assignment for analogue Output

6.2.4 Connecting Serial Interface RS422 / RS485

- For wind transmitters with serial data transmission (Ultrasonic- Anemometer 4.38xx...., Wind Direction Transmitter First Class 4.3150.x0.400) or data acquisition or transmission systems.

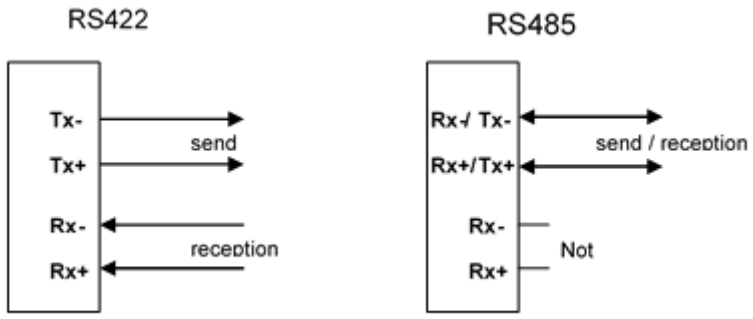
6.2.4.1 Pin Assignment RS422 / RS485

The clamping plugs “COM1/COM1’ “ (K5/K6) are used for connection. The two interface clamping plugs are connected in parallel.

Des.	Clamping plug (K5) COM1	Clamping plug (K6) COM1’
TX - (RX-)	transmitter (receiver)	transmitter (receiver)
TX+ (RX+)		
GND	ground	ground
RX-	receiver	receiver
RX+		

Table 7: Pin Assignment RS422 / RS485

6.2.4.2 Interface configuration



The selection of the interface configuration is carried out via the key mode (see **9** „operation“). In the operation mode RS485 the output of the requirement protocol is carried out cyclically for the VDT-telegram from the ultrasonic.

6.2.4.3 Termination

For termination using long cables the rear of the wind display is equipped with contact pins X7, which can be bridged from outside using a jumper if required (ref. figure 5).

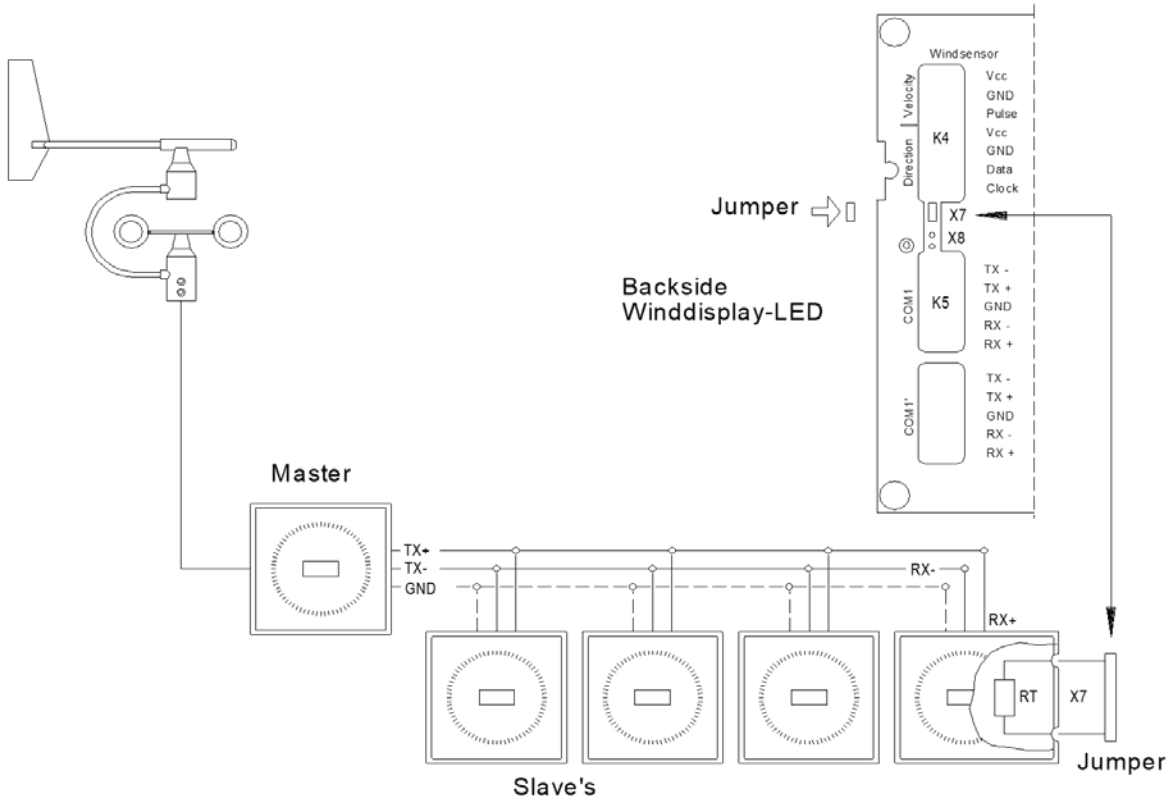


Figure 3: Example for connection

Notes for RS422 / RS485:

Faults on long cables may affect serial transmission, with the serial interface even being destroyed by over-voltages. We therefore recommend:

- The transmission line should be shielded. The shield must be connected to a central earth potential.
- With cable connections longer than 100 m twisted pairs should be used for the signal lines +RX/-RX and +TX/-TX.
- The ground pins (GND) should also be connected in addition to the twisted signal lines. If major differences in potential between the transmitter and receiver result in excessive compensating currents, isolating interface adapters have to be used.
- The cable must always be terminated with its surge impedance. An impedance of 100Ω to 600Ω at the receiver is suitable for this purpose (depending on the cable). With more than one receiving Winddisplay LEDs (Slaves) the resistor must be located at the receiver furthest from the transmitter.
- When a jumper (X7) is inserted at the receiver (Slave) the integrated termination resistor (RT=200Ω) is activated (ref. figure 4).

6.2.5 Connecting Supply Voltage

Connection Wind Display **4.3250.00.xxx**

Designation	**Clamping Plug (K1) AC Power**
PE	Protective conductor
N	230V AC
L	230V AC

or

Des.	**Clamping Plug (K3) low voltage Power**
1	24V AC/DC*
2	24V AC/DC*

Connection Wind Display **4.3250.01.xxx**

Designation	**Clamping Plug (K1) AC Power**
PE	Protective conductor
N	115V AC
L	115V AC

or

Des.	**Clamping Plug (K3) low voltage Power**
1	24V AC/DC*
2	24V AC/DC*

* ref. chapter 13

7 Settings

On the rear of the device there is a **8-fold DIP switch (S1...S8)** for the basic setting of different parameters (ref. **Figure 2 / Figure 3**)

Remark:

A restart has to be carried out after any change in the switch position. Restart is performed by activating the "Info Reset" button or interrupting the power supply.

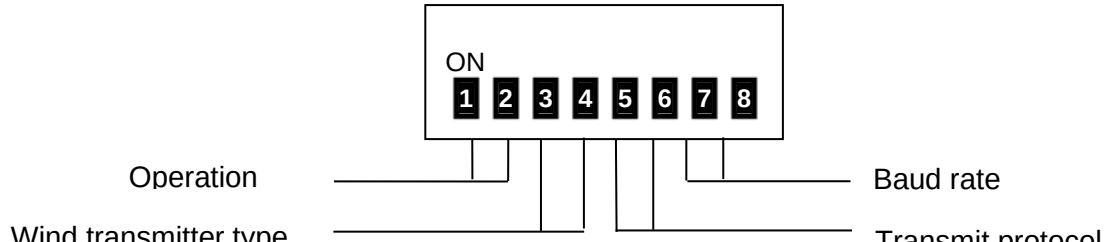
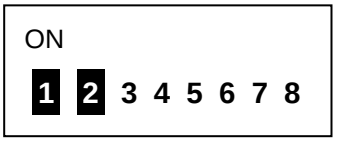


Figure 4: DIP-switch

7.1 Setting Mode of Operation

Remark:

The settings of the operation modes are possible only in the display 1 ***„mom"*** *(ref.* ***chapter 3.1)****.*



Mode of Operation	S1	S2
WD instantaneous	On	On
WD delayed	Off	On
WD instant. & variation	On	Off
WD delayed & variation*	Off	Off

*Delivery state: S1 = Off, S2 = Off

7.2 Setting Wind Transmitter Type

Remark:

Applies only for model no. 4.3250.0x.000

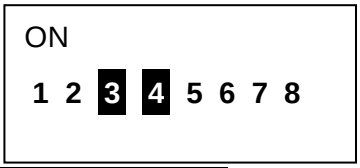
The wind transmitter and wind transmitter pairings are assigned using switches S3 and S4 and via mode setting (mode 6 +7: setting see **chapter 9**).

Mode 6-0: Wind direction 5Bit or 8Bit

Mode 6-1: Wind direction 10Bit (e.g. 4.3150.x0.001, 4.3151.x0.001)

Mode 7-0: Wind speed Classic or FirstClass
Mode 7-1: Wind speed Compact1 (4.3519.00.000)

Mode 7-2: Wind speed Compact2 (4.3619.00.000)

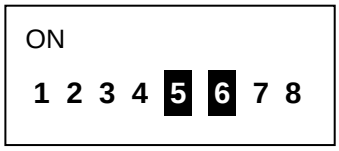


Wind transmitter / Wind transmitter pairing	S3	S4	MODE6	MODE7
Wind transmitter type „Classic” 4.3336.21.000 / 001 4.3336.31.000 / 001 4.3336.22.000 / 001 4.3336.32.000 / 001 4.3303.22.000 with 4.3125.32.100 / 101 4.3303.22.007 with 4.3125.32.100 / 101 4.3303.22.000 with 4.3125.33.100 / 101 4.3303.22.007 with 4.3125.33.100 / 101	On	On	0	0
Wind transmitter type „Compact1“ 4.3519.00.000 with 4.3129.00.000 4.3519.00.000 with 4.3129.60.000				1
Wind transmitter type „Compact2“ 4.3619.00.000 with 4.3129.00.000 4.3619.00.000 with 4.3129.60.000				2
Wind transmitter type „Classic” 4.3336.21.008 4.3336.31.008 4.3336.22.008 4.3336.32.008 4.3303.22.008 with 4.3125.32.100 4.3303.22.018 with 4.3125.32.100	Off	On	0	0
Wind transmitter type „First-Class” 4.3351.x0.000 with 4.3150.x0.00x 4.3351.x0.000 with 4.3151.x0.00x	On	Off	0	0
Wind transmitter type „WD-First-Class” with Wv-signal acquisition 4.3150.x0.400 4.3151.x0.400 **Note:** Is valid only with supply from the Wind display LED	Off	Off	0	0

Table 8: Setting Wind Transmitter Type

7.3 Setting Data Protocol

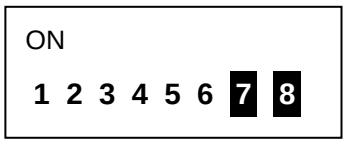
For the serial communication four protocols are available for selection in Master / Slave – operation (ref. chapter 8.).



Telegram Type	S5	S6
Pn0*	On	On
Pn1	Off	On
Pn2	On	Off
Pn3	Off	Off

*Delivery state: S5 = On, S6 = On

7.4 Setting Baud rate



Baud rate	S7	S8
1200	On	On
2400	Off	On
4800	On	Off
9600*	Off	Off

*Delivery state: S7 = Off, S8 = Off

8 Data Protocol

Sending:
For the data output four protocols are available for selection (Pn 0..3). They can be selected through the 8-fold DIP-switch (ref. chapter 7.3)

Type	Protocol	Format	Specification
Pn0	LED-Standard	<STX>XXX.X XXX*hh<CR><ETX>	7E1
Pn1	Ultrasonic	<STX>XX.X XXX xxx.x xx*hh<CR><ETX>	8N1
Pn2	NMEA0	$WIMWV,xxx.x,a,xx.x,a,A*hh<CR><LF>	8N1
Pn3	NMEA1	$WIMWV,xxx.x,a,xxx.x,a,A*hh<CR><LF>	8N1

Table 9: Data Protocol

*Note: <**STX**> = 0x02, <**ETX**> = 0x03, <**CR**> = 0x0D, <**LF**> = 0x0A*
*Note: **X** → number 0...9 or F (error)*
*Note: **x** → number 0...9*
*Note: „***** “ = check sum identification*
*Note: **hh** h_1 = High-Byte, h_2 = Low-Byte*

Protocol specification

Pn0

<STX>xxx.x xxx*hh<CR><ETX>

- check sum
- wind direction [°]
- wind speed [m/s]

Pn1

<STX>xx.x xxx xxx.x xx*hh<CR><ETX>

- check sum
- wind direction [°]
- wind speed [m/s]

Pn3(Pn2)

$WIMWV,xxx.x,a,xxx.x,a,A*hh<CR><LF>

- check sum
- status A=data valid, V=data void
- units of wind speed K=km/h, M=m/s, N=kn
- wind speed
- reference, R=relative, T=true
- wind direction [°]

VDT (Ultrasonic) Request log (sent every second if mode 3-2 is activated, see chapter 9)

00TR00002<CR>

- (VDT) telegram no.
- Command identific.
- Identification no.

Receiving

The protocols given in table 3 can be received automatically ***without selecting*** the protocol.

For this, it is only necessary to set the respective baud rate (ref. chapter 7.4).

In addition, the mode 3-1 must be set (ref. chapter 8).

NMEA MWV:

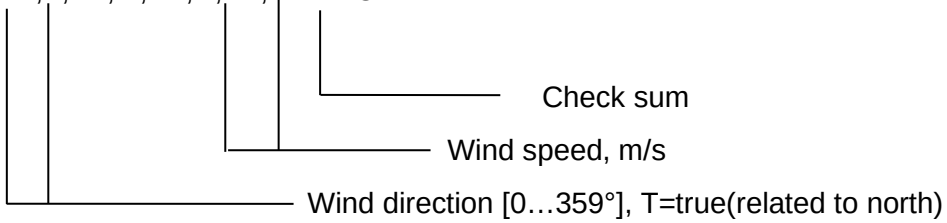
„a“ in the status of one of the received MWV-telegrams (instead of „A“) forces the indication of the respective wind values in the display (Remark: does not meet the NMEA standard).

The Talker ID ignored on receipt. („$--MWV,,,,,,“)

NMEA MWD: NMEA 0183 V4.0

Instead of MWV telegram („$--MWV,x.x,T,,,,,,,“) the true wind can be, alternatively, received through MWD telegram:

$--MWD,x.x,T,x.x,M,x.x,N,x.x,M*hh<CR><LF>



NMEA DDC: NMEA 0183 V4.0

With this telegram the brightness of the display can be adjusted in 4 steps.

Note: After receiving a valid DDC telegram, the normal brightness setting via the buttons (mode 0) is blocked.

$--DDC, a ,,,C*hh <CR> <LF>

a: Display brightness level **D** = Daytime (day)

K = Dusk (Dawn)

N = Night Time (night)

O = backlighting off

The brightness of the DDC stages can be programmed either via the following telegram or via modes 8 to b (**ref**. **chapter 8**).

Checksum in the Protocol

The calculation of the check sum in the different protocols is carried out between the characters <STX> resp. ‚$' and ‚*'. The check sum consists of the XOR-relation of all characters between the separator STX> resp. ‚$' and ‚*'.

Two ASCII-characters (High and Low nibble) with a value range from 0…F (hexadecimal) are generated from the check sum. The character with the highest value is transmitted first.

Example standard telegram:	Wind speed:5.2m/s	
	Wind direction:	125°
	Telegram:	"(STX) 5.2 125*1F(CR)(ETX)"

9 Operation

Operation of the Wind display LED is performed from the front. 5 buttons are available for operation as can be seen from the figure below. Whenever a button is pressed, this is acknowledged by a short beep.

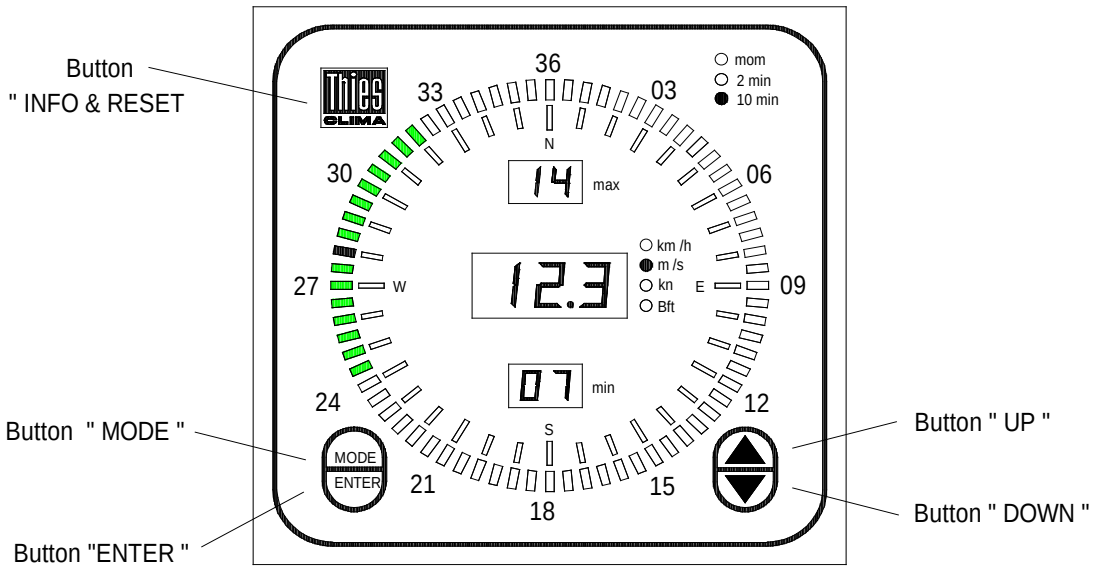


Figure 5: Operation

Button functions:

Button "▲"(UP) and Button "▼" (DOWN):

The buttons ▲ and ▼ are used to select the functions for entering **MODE 0,1 and 2.**

Button „ENTER" :

The button **ENTER** is used to accept the respective setting into **MODE (n)**. Afterwards, the display enters automatically **MODE 0.**

Button „ MODE":

The **button MODE** is used to advance to the next MODE setting functions. The associated Status LED flashes.

Remark:

*After a restart the display automatically enters mode **MODE 0***

MODE	MENU
MODE 0 [1]	**Setting the brightness:** The buttons ▲ & ▼ are used to dim the **brightness level** of the LED display in 18 steps. **Setting the Max- and MIN- brightness:** If the buttons ▲ or ▼ and the "Enter button" are pressed simultaneously, the brightness level previously selected can be stored as a MAX and MIN value. **Calling up the Max- und MIN- brightness:** The stored brightness values can be called up by pressing either the button ▲ or ▼ for 3 seconds.
MODE 1	**Setting the Wind Speed- Dimension:** The buttons ▲ & ▼ are used to select the **WS-Dimension** (km/h, m/s, kn and Beaufort).
MODE 2	**Setting the Wind Display / Resetting of Extreme Values:** The buttons ▲ & ▼ are used to select the display “instant.”, or “2min, 10min”-mean value. Wind - display 1 „instantaneous“ Wind - display 2 „2min“ Wind - display 3 „10min“ Resetting of Extreme Values (possible with Figure1 Display): Activate the button „ENTER“.
MODE 3	**Setting of the COM1 (RS422 / RS485)** Function is set by buttons ▲ & ▼ 3 – 0 :COM1 = RS422 (Full duplex) standard 3 – 1 :COM1 = RS422 (Full duplex) Only reception of $WIMWV..Rel / True 3 – 2 :COM1 = RS485 (Half duplex) Request of VDT – Telegram from Ultrasonic Examples for serial wind sensors: see chapter 13
MODE 4 [2]	**WV- Measuring range selection (analogue wind transmitter or analogue output)** With buttons ▲ & ▼ measuring range is selected 4 – 0 : 40m/s 4 – 1 : 50m/s 4 – 2 : 60m/s 4 – 3 : 75m/s
MODE 5 [2]	**Setting of the analogue in/output** In/output function is set via buttons ▲ & ▼. 5 – 0 : analogue input ON, analogue output OFF 5 – 1 : analogue input OFF, analogue output ON
MODE 6	**Setting the serial synchronous wind direction input** 6 – 0 : 5- or 8-Bit 6 – 1 : 10-Bit (z.B. 4.3150.x0.001, 4.3151.x0.001)

MODE 7 [3]	**Setting the characteristic of the wind speed sensor** **7 – 0** : NO Windspeed Compact **7 – 1** : Windspeed Compact1 **7 – 2** : Windspeed Compact2
MODE 8 [4] **MODE 9** **MODE A** **MODE B**	**Setting the brightness of the 4 levels of the DDC telegram** [4] **Mode 8**: O Backlighting **O**ff **Mode 9**: D **D**aytime **Mode A**: K Dus**K** **Mode b**: N **N**ighttime

Table 10: Operation

[1)] Setting only possible as long as **no** NMEA DDC command (ref. chapter 8) has been received after switching on (or pressing the info button).
[2)] MODE 4 and MODE 5 are only for wind display LED with analogue input or analogue output significant.
[3)] MODE 7: please ref. chapter 6.2
[4)] DDC telegram: please ref. chapter 7

Button „INFO & RESET“:

When the button **INFO & RESET** is pressed, a LED test starts.

- All LED’s light up
- Display of device parameters (ref. **Table 4**)
- Restart of wind display LED.

Example

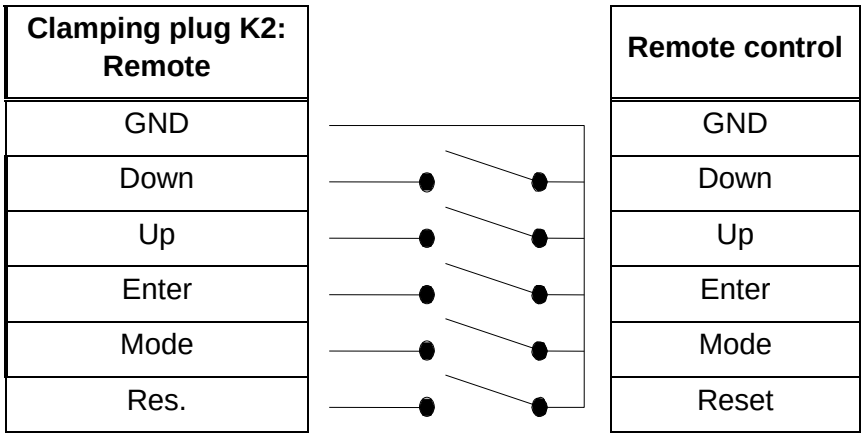
Device parameter	**Display**
Software	
Version No. (e.g.)	r 1.7
Input type	
Wind transmitter input	AL0
COM interface	AL1
Wind transmitter type	
Classic	CL1
Classic	CL2
Compact1	Co5
Compact2	Co6
First-Class	F-C
Input telegram	
NMEA REL/TRUE	Pr1
Output telegram	
LED Standard	Pn0
Ultrasonic	Pn1
NMEA0	Pn2
NMEA1	Pn3
Baud rate	
1200	b12
2400	b24
4800	b48
9600	b96
***analogue inputs**	
0..5V/0..10V	u5
0..20mA	i20
4..20mA	i42
***analogue output**	
0..20mA	Au1
4..20mA	Au2
0..5V	Au3
0..10V	Au4
Serial synchronous input WD	
5- or 8-Bit	58b
10Bit	10b

Table 11: Instrument parameter

***Display only when analogue inputs and analogue outputs are available**

External Operation

In addition to operation from the front remote control of the wind display LED is also possible using the rear clamping plug “Remote” (K2), and external buttons for remote control. The buttons for remote control are not included in the scope of supply.



10 Functional Test

On restarting or activating the button **INFO & RESET** (ref. chapter 9) the wind display LED carries out a number of test procedures. In case of an error the display shows an error-code (ref. chapter 11). To run a full test on the wind interface no wind transmitter should be connected.

11 Error Message

If an error is detected while a program is running, the display will show the relevant error code for min. 3 seconds or as long as the error is present.

Error-Code	Error	Comment/Action
E01	Internal Vcc 5V	Instrument defect: send in for checking.
E02	Vcc Wind transmitter	Disconnect wind transmitter, restart instrument. If error is still indicated, send instrument in for checking. Otherwise connect wind transmitters one after the other, and detect the defect wind transmitter.
E03	Icc WS	Check cables and connections of wind speed transmitter. If error message is still existing, wind transmitter is probably defect.
E04	Icc WD	Check cables and connections of wind transmitter. If error message is still existing, wind transmitter is probably defect.
E05	WS-Interface	Instrument defect: send in for checking.

E06	WD-Interface	Instrument defect: send in for checking.
E07	WD-Serial	Data- connection/line from the wind direction sensor setting or check mode6. Check data-connection/-cable of the wind direction transmitter. If error message is still existing, wind transmitter is probably defect.
E08	WS-Overflow	1. Check setting of wind transmitter type. 2. Check connection and cable. If error message is still existing, wind transmitter is probably defect.
E09	Timeout (COM)	1. Check setting of Baud rate. 2. Check R422 connections/cables Rx+ & Rx-. 3. If error message is still existing, connect Rx+ & Rx- to Tx+ & Tx- at the terminal strip. 4. If no error message is existing, the transmitter is defect. 5. If error message is still existing, send instrument in for checking.
E10	SIN-Buffer overflow	Check transmitted protocol.
E11	Protocol format	Check transmitted protocol.
E12	Check sum	Check transmitted protocol.
E13	WS & WD error	Failure of wind transmitter at “Master” wind transmitter LED.
E14	WS “FF.F”	Failure of wind speed transmitter at “Master” wind transmitter LED.
E15	WD “FFF”	Failure of wind direction transmitter at “Master” wind transmitter LED.
E16	REL/TRUE error	Check transmitted protocol (error twice „a“ in the telegram).
E17	VDT protocol	No reception from Ultrasonic. - check connection (RS485 half duplex).
E20	WV U/I Range	WV Analogue input: U/I measuring range exceeded.
E21	WD U/I Range	WD Analogue input: U/I measuring range exceeded.
E50	Syntax-Error	Instrument defect, restart possibly.
E99	Watchdog	Temporary failure if error message is displayed once for 3sec. If error message occur oftentimes, instrument is defect.

Table 12: Error Message

12 Maintenance

The wind display LED is maintenance-free

Cleaning
To clean the face plate and housing a damp cloth should be used without chemical cleaning agents.

Storage
The wind display LED should be stored in a dry dust-free room at temperatures between -20.. + 50°C. We recommend storing the device in a box.

Fuse
There is a mains fuse on the rear of the wind display LED. The fuse holder can be opened using a screwdriver.

Attention:

In case of a defect only the following fuses should be used:

230V: 0.25AT (time-lag) for wind display 4.3250.00.xxx
115V: 0.5AT (time-lag) for wind display 4.3250.01.xxx

13 Technical Data

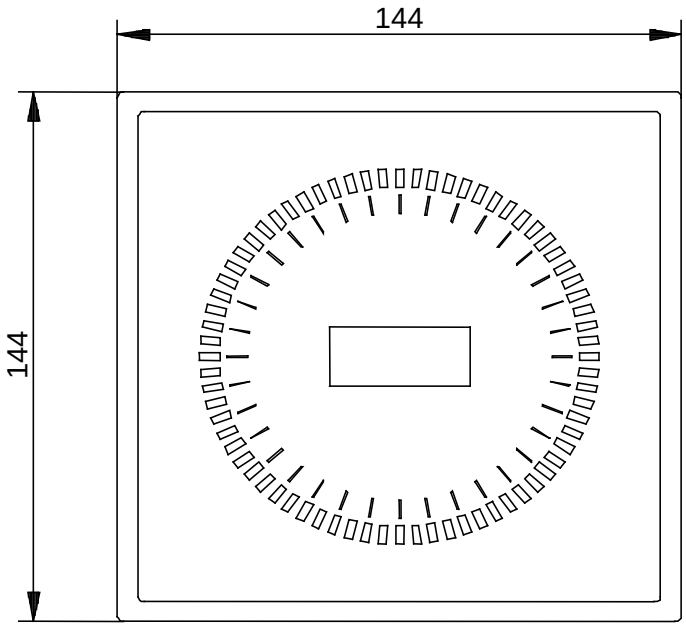
Wind transmitter inputs (digital)		
Wind direction	Input	Thies Serial Synchronous
	Type	Compact 4.3129.00.000 / 4.3129.60.000 Classic 4.3125.x2.100 / 101 Classic 4.3336.x1.00x / 4.3336.x2.00x First Class 4.3150.x0.000 (8Bit: Mode 6-0) First Class 4.3150.x0.001 (10Bit: Mode 6-1) First Class 4.3151.x0.000 (8Bit: Mode 6-0) First Class 4.3151.x0.001 (10Bit: Mode 6-1)
	Sampling rate	10Hz
Wind velocity	Input	Frequency
	level (Ua)	Ua ≤ 1V , Ua ≥ 3.3V
	Frequency (max)	Compact 1000Hz Classic 1550Hz Classic 850Hz First Class 1600Hz
	Type	Compact1 4.3519.00.000 Compact 2 4.3619.00.000 Classic 4.3303.22.000/007/008/018/4.3336.x1.00x 4.3336.x2.00x First-Class 4.3351.x0.000
	Sampling rate	1Hz
Wind transmitter supply	Vcc WR / WG	5.1... 5.7V
	Icc max	60mA
	Icc min	0.25mA
Serielle Windgeber	Sample	
Fullduplex (Mode 3 - 0)	Ultrasonic Anemometer 2D	4.3820.xx.260
	Ultrasonic Anemometer 2D Compact	4.3875.xx.260
Halfduplex (Mode 3 - 2)	Ultrasonic Anemometer 2D	4.3820.01.310
	Ultrasonic Anemometer 2D Compact	4.3875.01.310
Wind transmitter input (analogue)		
Wind velocity	Input	0..5V / 0..10V / 0..20mA / 4..20mA
	Measuring range	40m/s, 50m/s, 60m/s, 75m/s selectable
Wind direction	Input	0.. 2V, 0..5, 0.. 10V, 0.. 20mA, 4.. 20mA
	Measuring range	0..360°
WV / WD	Resolution	0.06% @ 2V, 0.025% @ 5V, 0.049% @ 10V

		0.049% @ 0..20mA, 0.06% @ 4..20mA
	Load	125Ω (input 0/4..20mA)
	Input resistance	>1MΩ (input 2V,5V); 20kΩ (input 10V)
Wind transmitter supply (only with 4.3250.0x.1xx)	Vcc WV/WD	12 V
	Icc max	80mA
	Icc min	0.25mA
Output (analogue)		
Wind velocity	Output	0..5V / 0..10V / 0..20mA / 4..20mA
	Meas. range	40m/s, 50m/s, 60m/s, 75m/s adjustable
Wind direction	Output	0..5, 0.. 10V, 0.. 20mA, 4.. 20mA
	Meas. range	360 Grad
WV / WD	Resolution	0.05% @ 5V, 0.03% @ 10V 0.1% @ 0..20mA, 0.1% @ 4..20mA
	Accuracy	U(V) = ±0,3% I(mA) = ±0,3%
	Load (I)	≤ 400Ω
	Load (U)	>50kΩ (output 0..10V), >1kΩ (output 0...5V)
Interface		
Digital Interface		EN 61162-1
	Type	RS422 / RS485
Data format	Output	7E1, 8N1
	Input	7E1, 8N1, 7O1
	Baud rate	1200, 2400, 4800, 9600 Bd
Operating Voltage	Mains	230V AC (with 4.3250.00.000)
		115V AC (with 4.3250.01.000)
	Mains fuse	0.25AT (time-lag) resp. 0.5AT (time-lag)
	Low voltage	18 ... 28V AC
		12 ... 35V DC
	Current consumption	Max. 1000mA at 12V DC
Display		
Wind speed	Dimension	m/s, kn, km/h, Bft
	WS - Display	3 digit LED, height 15mm
	Resolution	0,1m/s 0,1kn from 100kn 1kn 1km/h 1Bft
	WS-max/min Display	2 digit LED, height 8mm
	Resolution	1m/s / 1kn / 1km/h / 1Bft
Wind direction	Resolution	5 °
	LED's	72; 2 x 4mm, colour: red, green
	Tracking time of variation	1 increment /sec
	WD-delay	T = 6sec.

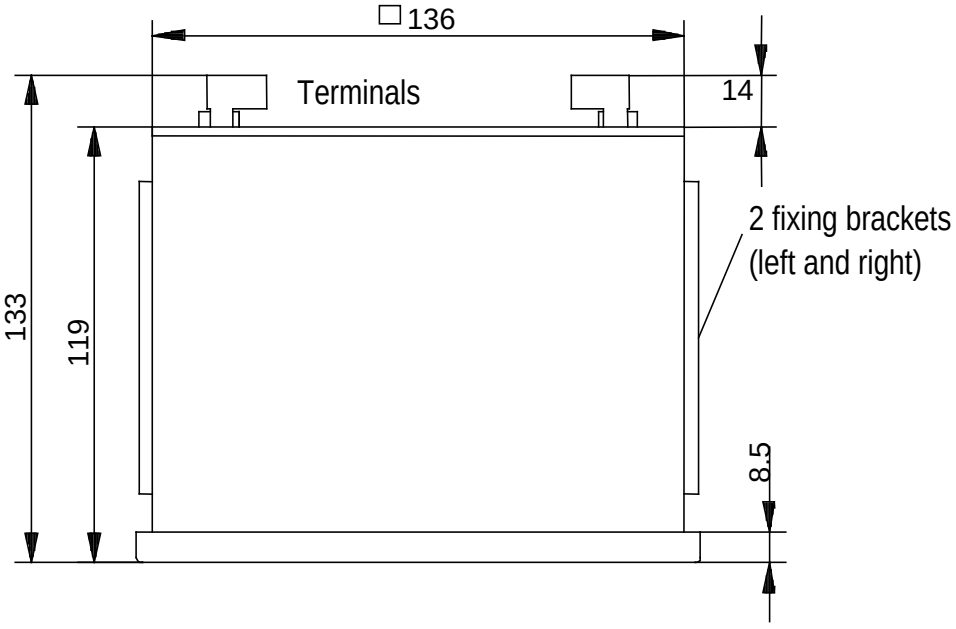
General		
	Temperature range	-10 ... +50 °C
	Humidity range	Non-condensing
	EMC	EN 60945, EN 61000-6-2, EN 61000-6-3
	Vibration	EN 60945, IEC 60068-2-6
	Environmental test	EN 60945
	Guard band of compass	EN 60945 Safe distance to the Standard- Magnetic- compass 0.50m Steering- Magnetic- compass 0.35m
Housing		
	Material	Aluminium
	Dimensions	144 x 144mm Depth: 119mm
	Weight	1,5kg
	Protection	IP23; EN 60529

Table 13: Technical Data

14 Dimension Drawing



Control panel opening
as per DIN 43700
138^{+1} x 138^{+1}



15 EC-Declaration of Conformity

Manufacturer: Adolf Thies GmbH & Co. KG
Hauptstraße 76
37083 Göttingen, Germany
http://www.thiesclima.com

Product: Wind Display LED

Doc. Nr. 2003-44749_CE

Article Overview:

4.3250.00.000	4.3250.00.040	4.3250.00.041	4.3250.00.061	4.3250.00.140	4.3250.00.141	4.3250.00.161	4.3250.00.900	4.3251.00.000	4.3251.00.001
4.3251.00.002	4.3251.00.141	4.3251.00.900	4.3251.00.902	4.3251.01.000	4.3251.01.001	4.3251.01.002	4.3250.01.041	4.3250.01.141	

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

2014/30/EU	26.02.2014	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.
2017/2102/EU	15.11.2017	DIRECTIVE (EU) 2017/2102 of the European Parliament and of the Council of November 15, 2017 amending Directive 2011/65 / EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment.
2012/19/EU	13.08.2012	DIRECTIVE 2012/19/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 on waste electrical and electronic equipment (WEEE).
2014/90/EU	23.07.2014	DIRECTIVE 2014/90 / EU of the European Parliament and of the Council of 23 July 2014 on marine equipment and repealing Council Directive 96/98 / EC Text with EEA relevance.

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

DIN EN 60945	2003-07	Maritime navigation and radiocommunication equipment and systems. General requirements. Methods of testing and required test results
DIN EN 61000-6-2	2019-11	Electromagnetic compatibility Immunity for industrial environment
DIN EN 61000-6-3:2007 + A1:2011	2011-09	Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments
DIN EN 61010-1	2020-03	Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements
DIN EN 63000	2019-05	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Legally binding signature:

General Manager - Dr. Christoph Peper

Legally binding signature:

Development Manager - ppa. Jörg Petereit

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.

16 UK-CA Declaration of Conformity

Manufacturer: Adolf Thies GmbH & Co. KG
Hauptstraße 76
37083 Göttingen, Germany
http://www.thiesclima.com

Product: Wind Display LED

Doc. Nr. 2003-44749_CA

Article Overview:

4.3250.00.000	4.3250.00.040	4.3250.00.041	4.3250.00.061	4.3250.00.140	4.3250.00.141	4.3250.00.161	4.3250.00.900	4.3251.00.000	4.3251.00.001
4.3251.00.002	4.3251.00.141	4.3251.00.900	4.3251.00.902	4.3251.01.000	4.3251.01.001	4.3251.01.002	4.3250.01.041	4.3250.01.141	

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

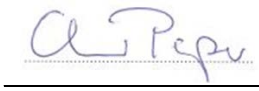
1091	08.12.2016	The Electromagnetic Compatibility Regulations 2016
RoHS Regulations 2012	01.01.2021	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
3113	01.01.2021	Regulations: waste electrical and electronic equipment (WEEE)
2014/90/EU	23.07.2014	DIRECTIVE 2014/90 / EU of the European Parliament and of the Council of 23 July 2014 on marine equipment and repealing Council Directive 96/98 / EC Text with EEA relevance.

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

BS EN 60945	15.04.2003	Maritime navigation and radiocommunication equipment and systems. General requirements. Methods of testing and required test results
BS EN IEC 61000-6-2	25.02.2019	Electromagnetic compatibility (EMC). Generic standards. Immunity standard for industrial environments
BS EN IEC 61000-6-3	30.03.2021	Electromagnetic compatibility (EMC). Generic standards. Emission standard for equipment in residential environments
BS EN 61010-1+A1	31.03.2017	Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements
BS EN IEC 63000	10.12.2018	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

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

Legally binding signature:



General Manager - Dr. Christoph Peper

Legally binding signature:

Development Manager - ppa. Jörg Petereit

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.

Please contact us for your system requirements.
We advise you gladly.

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