

Wind Indicator LED

Instruction for Use 4.3225.xx.x00, 4.3225.10.x08, 4.3225.xx.10



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1. General Information

The airport version of the Wind Indicator LED is a state-of-the art indicator unit which displays both the wind direction and the wind speed parameters. It is extremely reliable, flexible and offers optimal display.

Thanks to its compact construction and a system of integrated self-test functions, the Wind Indicator unit is very reliable - an important quality. Moreover, its flexibility is guaranteed owing to the versatile connection possibilities available on it to transmit the wind parameters; different wind transmitters can be connected or the wind parameters can be transmitted over a serial interface.

The 2-minute mean values and the 10-minute mean values of the wind parameters are calculated and displayed. Calculation is carried out in line with the recommendations of 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*). Moreover, the instantaneous value can also be displayed to test the connected transmitter,

Three different units are available for wind speed: m/s, kt, km/h.

You can control the brightness of the displays manually or automatically in a wide range.

1.1 Versions of the Indicator

The Wind Indicator LED was designed in different versions for different purposes with the following numbers:

4.3225.xx.100

In this version the Wind Indicator LED is equipped with a serial interface RS232 to receive or send the wind speed and direction signals as a serial data telegram by selecting a DIP-switch on the back panel. (see chapter 3 Setting the Wind Indicator LED on page 6 and option 1 in figure 2 on page 4).

4.3225.xx.200

In this version the Wind Indicator LED is equipped with a serial interface RS422 to receive or send the wind speed and direction signals as a serial data telegram by selecting a DIP-switch on the back panel. (see chapter 3 Setting the Wind Indicator LED on page 6 and option 1 in figure 2 on page 4).

4.3225.x0.x00

In this version of the Wind Indicator LED the power supply is 230 VAC 50/60 Hz as well as 115 VAC Hz,selectable by switch. Factory setting: 230 VAC 50/60 Hz.

4.3225.x4.x00

In this version of the Wind Indicator LED the power supply is 115 VAC 50/60 Hz.

4.3225.1x.x00

In this version the Wind Indicator LED is equipped with one terminal strip for wind transmitters (see figure 2 on page 4).

4.3225.2x.x00

In this version the Wind Indicator LED is equipped with two terminal strips for one wind transmitters and additional Wind Indicators LED (Slave indicator, see chapter 3 Setting the Wind Indicator LED on page 6 and option 2 in figure 2 on page 4).

4.3225.10.008

In this version the Wind Indicator LED is equipped with a modified input-characteristic for the Wind Speed Transmitter 4.3303.22.008 / 4.3336.31.008 (0...75 m/s → 0...754 Hz).

4.3225.10.208

version equipped with a modified input-characteristic for the Wind Speed Transmitter 4.3303.22.008 / 4.3336.31.008 (0...75 m/s → 0...754 Hz) and a serial interface RS422 (see model 4.3225.xx.200).

4.3225.xx.x10

Serial Communication: 9600 Baud

1.2 Elements of the Indicator

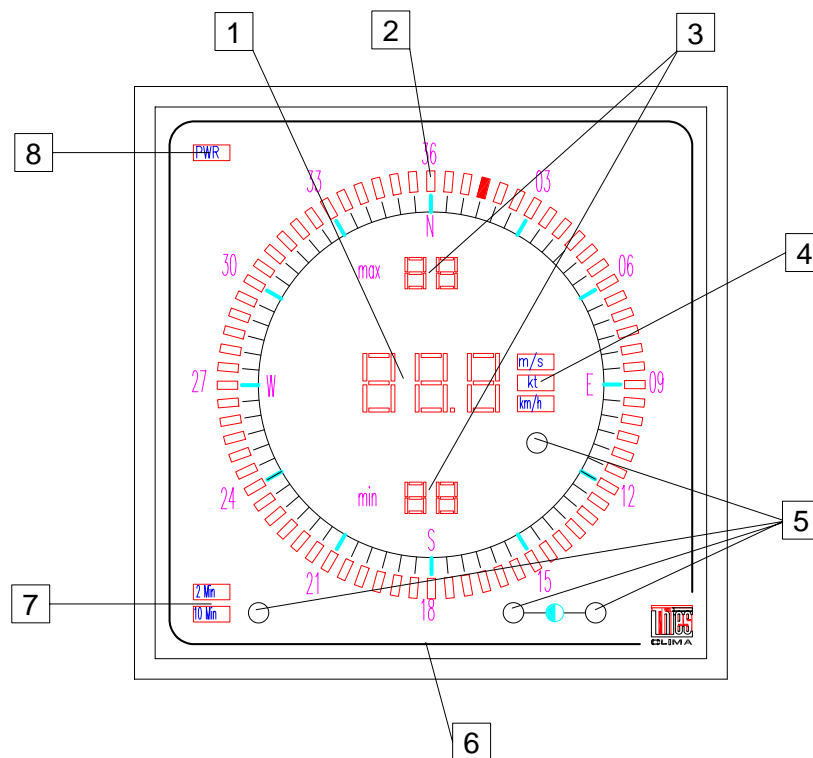


figure 1

The following numbers in brackets refer to the legends in the above figure 1:

- (1) The large (h=15 mm) 3-digit red display of the wind speed can be read from a considerable distance. The wind speed can be displayed in several units depending on the version of the indicator. The display can be dimmed.
 - (2) The rectangular illuminated fields (size 2x5 mm) of 72 two colour (red, green and mixed) LED's to display wind direction together with the illuminated scale contribute to optimal readability and orientation even in the most difficult circumstances. The display can be dimmed.
- There are 3 different ways of displaying the wind direction selectable with a DIP-switch on the back panel of the instrument (see chapter 3 *Setting the Wind Indicator LED* on page 6).
- (3) Two 2-digit displays (8 mm high) for both the minimum value and the maximum value of the wind speed. The display can be dimmed.
 - (4) A display for the 3 units of wind speed. The display can be dimmed.
 - (5) 4 optical sensors (keys) to operate the display respectively to dim the display automatically (see chapter 4 *Operating the Wind Indicator LED* on page 8).
 - (6) An illuminated scale for the wind direction ring shows the scale and its legend in the dark. This illumination cannot be dimmed.
 - (7) Display of the operating mode (mean value time period 2 minutes, 10 minutes, instantaneous values)
 - (8) Display of the power supply status (PWR).

2. Installation

The electrical connections are located on the back panel of the display

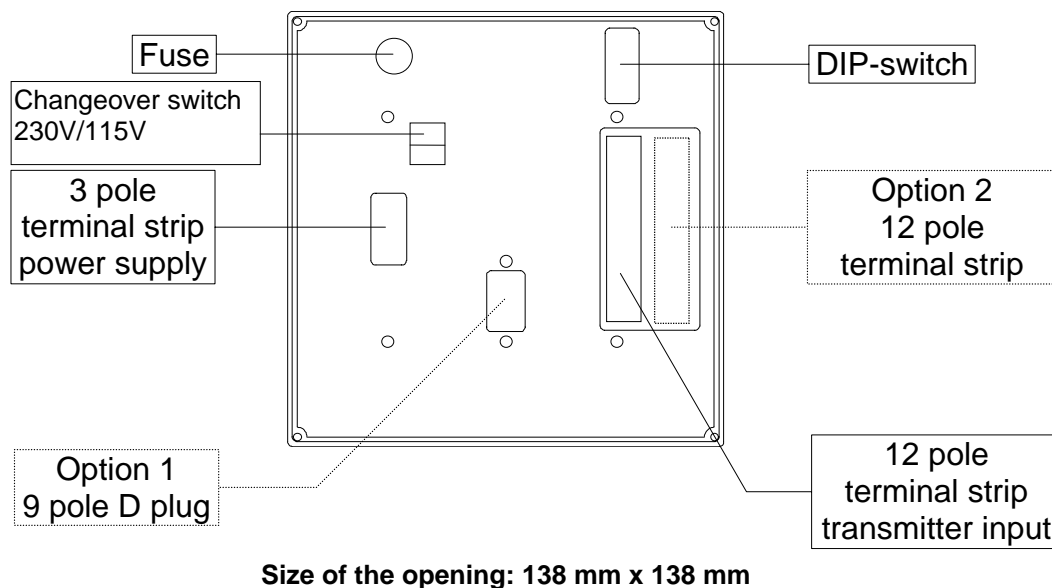


figure 2

- **Remove the plug-in terminals from the terminal contacts,**

Set the DIP switch to the desired mode (see chapter 3 *Setting the Wind Indicator LED* on page 6),

- Place the instrument into the opening (138 mm x 138 mm) of the provided front panel and mount it with the enclosed holders,
- Switch off your power supply
- Connect the mains cable to the 3-pole plug terminal (see 2.1 *Power supply* below),
- Connect the transmitter cable to the 12-pole plug terminal (see 2.2 *Wind transmitter input* below),
- Optionally connect the serial interface cable to the 9-pole D-plug (see 2.3 *Serial interface (4.3225.xx.100 or 4.3225.xx.200)* below),
- Connect the plugs to their counterpart on the wind display unit,
- Switch on your power supply.

CAUTION: *Before removing the cover, disconnect the power supply!*

2.1 Power supply

Terminal Strip:

Pin	mark	Function
1	L1	phase
2	N	null
3	PE	not connected

The Wind Indicator LED 4.3225.x0.000 operates from a 230 VAC as well as 115 VAC 50 Hz or 60 Hz mains supply. The setting take place at a changeover switch. Factory setting: 230 VAC. The Wind Indicator LED 4.3225.x4.000 operates from a 115 V ac 50 Hz or 60 Hz mains supply. The max. required power is 20 VA.

2.2 Wind transmitter input

The wind transmitter input is a 12 pole terminal strip. This strip, depending on what wind data input has been set (see chapter 3 Setting the Wind Indicator LED on page 5) , has the following functions:

12 pole terminal strip

pin	pin	function parallel wind transmitter 8 Bit S7=ON, S8=ON	function parallel wind transmitter 6 Bit S7=ON, S8=OFF	function serial wind transmitter (8/5 Bit) S7=OFF, S8=ON	function serial interface S7=OFF, S8=OFF
13	1	+15V	+15V	+5V	+5V
14	2	ground	ground	ground	ground
15	3	WS pulse	WS pulse	WS pulse	free
16	4	track A	V _{CC}	clock	free
17	5	track B	V _{CC} *	data (in)	free
18	6	track C	track C	WS characteristic **	free
19	7	track D	track D	free	free
20	8	track E	track E	dimmer (bright)	dimmer (bright)
21	9	track F	track F	dimmer (dark)	dimmer (dark)
22	10	track G	track G	dimension selecting	dimension selecting
23	11	track H	track H	free	free
24	12	Shield	Shield	Shield	Shield

R = 10 kΩ

* automatic selection

** see chapter 4.7

As an option (4.3225.2x.x00), the display can be equipped with a second 12 pole terminal strip (dashed in the above table). This terminal allows to connect up to 5 Wind Indicators LED parallel to one transmitter with 8 or 6 Bit wind direction code. The max. cable length over all is about 500 m. If the heating of the transmitter is supplied via the same cable, the max. cable length is about 50 m.

2.3 Serial interface (4.3225.xx.100 or 4.3225.xx.200)

For the different versions of the Wind Indicator LED with a serial interface (see chapter 1.1 Versions of the Indicator on page 2).

The electrical connection for the serial interface is a 9-pole D-plug (male, see figure 2 on page 4):

Pin	Function
2	RX (RS232)
3	TX (RS232)
5	GND (RS232, RS422)
8	+ RX / TX (RS422)
9	- RX / TX (RS422)

The RS232 interface is suitable for distances up to 15 m.

The RS422 interface is suitable for longer distances, depending on the type of cable, the quality of the cable and the termination of the cable (possible up to 5000 m).

The function of the interface is determined by the DIP-switches S6, S7 and S8 (see chapter 3 *Setting the Wind Indicator LED* on page 6).

Note for RS422:

Disturbances on long lines may influence or overvoltages may even damage the interface of the Wind Indicator LED. We recommend:

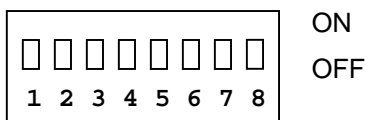
- Use a shielded cable and connect the shield to a central earth potential. An experienced possibility is to connect at least one side of the cable shield to the ground of the display or the displays (Pin 5 of the 9-pole D-plug).
- At least for cables longer than 100 m, use a twisted pair for the signals + RX and - RX and another pair for +TX and - TX.
- Connect the GND pin of the Wind Indicator LED with the GND pin of the counterpart interface with an additional wire (pair) of the cable and connect it to a central earth potential. If great differences between the potentials of the transmitter and the receiver lead to great compensating currents, use an interface adapter, that separates the potentials of the transmitter and the receiver.
- Use an appropriate termination resistor for the cable (100 Ω to 600 Ω); place it to that indicator which is farthest away from the driver, if there is more than one indicator.

We cannot accept warranty claims for any damage caused by overvoltages!

3. Setting the Wind Indicator LED

The Wind Indicator LED has a number of different routine functions and different instrument versions which can be set on the back panel of the instrument by means of a DIP-switch.

DIP-switch:



switches S1 - S8

S1	Wind Indicator version
ON	instantaneous display
OFF	Airport version (2 min, 10 min, instantaneous)

*

* The 0SK4 key (see chapter 4 *Operating the Wind Indicator LED* on page 8 for key definition) to change the operating mode has no function. No extreme values are displayed.

S2	S3	Basic Setting of the Wind Speed Dimension
ON	ON	m/s
OFF	ON	kt
ON	OFF	km/h
OFF	OFF	-----

The setting is only valid after the instrument is switched on (hard-reset) or after the LED test (soft reset) and can be changed by means of key operation (see chapter 4 *Operating the Wind Indicator* LED on page 8 for key definition).

S4	Dimming mode (Display brightness control)
ON	automatic dimming via the brightness sensors
OFF	manual dimming via the sensor keys

S5	Basic setting of the mean value period
ON	2 minutes
OFF	10 minutes

The setting is only valid when S1=OFF (Airport version) and after the instrument has been switched on (hard reset) or after the LED test (soft reset) and can be changed by means with the key (see chapter 4 *Operating the Wind Indicator* LED on page 8 for key definition).

When S1=ON (only instantaneous display), this switch setting is invalid!

S6 switches two functions: the master/slave modus and the serial output ON/OFF

S6	Master / slave modus
ON	Slave (2 - 5 indicators connected to 1 parallel transmitter) serial output is OFF
OFF	Master (1 indicator connected to 1 parallel transmitter) serial output is ON

In consequence on switch S6=ON note the following:

- The output of the instantaneous wind data on the serial interface (RS232 or RS422) is switched off.
- The test for the supply current of the wind transmitter (error „E06“) is switched off (see chapter 6 *Troubleshooting* on page 16). This is necessary if you connect 2 to 5 indicators to one parallel wind direction transmitter to prevent an error message.

In consequence on switch S6=OFF note the following:

- The output of the instantaneous wind data on the serial interface (RS232 or RS422) is switched on.
- The test for the supply current of the wind transmitter (error „E06“) is switched on (see chapter 6 *Troubleshooting* on page 16). Only one indicator should be connected in this case to one parallel wind direction transmitter to allow a correct error message, if the supply current of that wind direction transmitter fails.

S7	S8	Wind data input selection	V _{CC}
ON	ON	Wind direction: 8 bit parallel wind transmitter	15 V
OFF	ON	Wind direction: serial wind transmitter	5V *
ON	OFF	Wind direction: 6 bit parallel wind transmitter	15 V *
OFF	OFF	Serial interface (RS232, RS422)	---

* If you select a 6 bit parallel wind direction transmitter or compact wind direction transmitter, there is no test for the life-zero signal of the wind speed transmitter. In consequence, there will be no error message „E04“ or „E05“ (see chapter 6 *Troubleshooting* on page 16).

4. Operating the Wind Indicator LED

The Wind Indicator LED is operated from the front with optical sensor keys. These keys are located behind the front pane. This pane of glass protects the instrument from dust.

The sensor keys respond to the contrast between the reflected and the direct radiation resulting when the surface of the sensor is touched. For this reason, care must be taken that when the sensor surface is touched, no direct sunlight falls onto the wind display (otherwise the sensor will not work). One way to protect the instrument from direct sunlight is for the user to simply cast his shadow onto the wind display instrument. Also, it is very important to make sure that the sensor surfaces are not dirty.

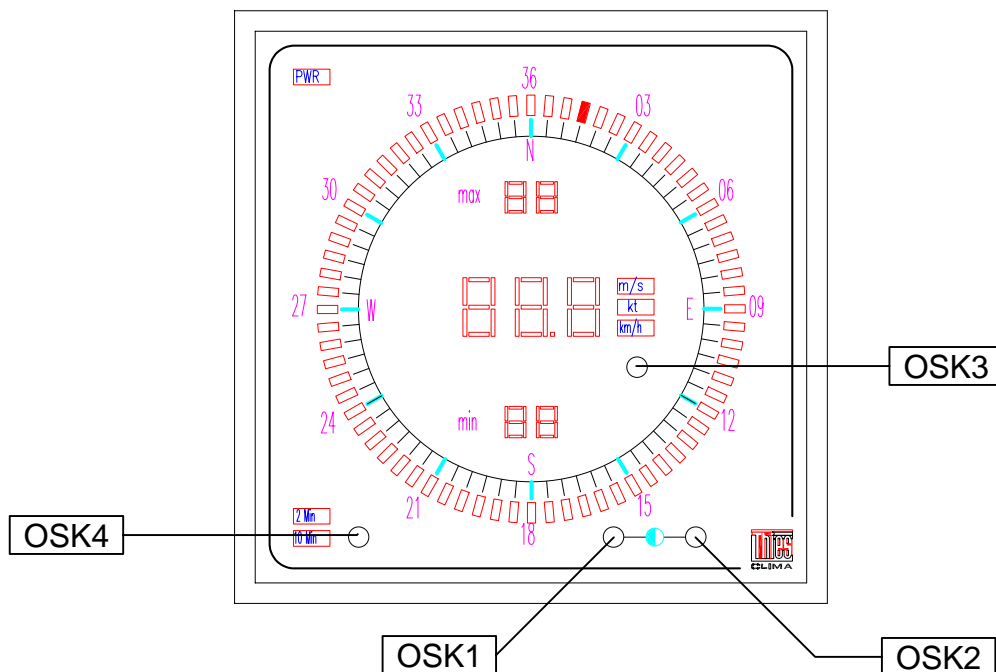


figure 3

Optical Sensor Key	Function
OSK1 ("bright")	brightness +
OSK2 ("dark")	brightness -
OSK1 + OSK2	LED test
OSK3	units
OSK4	operating mode

4.1 Selecting the units

The units can be changed by touching the optical sensor (OSK3) for about 7 seconds. When the instrument is switched on (hard-reset) or after the LED-test (soft-reset), the unit set with the programming switch (DIP-switch) appears (see chapter 3 *Setting the Wind Indicator LED* on page 6, switch S2 and S3)

4.2 Controlling the brightness

The brightness of the displays, with the exception of the PWR display and the scale illumination, can be modified in fine gradations with the "bright" (OSK1) and "dark" (OSK2) optical sensor keys (see *figure 3* on page 8). To do so, activate the indicator with one of the two keys to switch it to the dimming mode in about 14 seconds. In the dimming mode, the left half of the wind direction ring (180°...355°), proceeding from 180°, displays in yellow the brightness which has been set on the display.

Please note:

As long as the dimming mode is switched on, no measurements or calculations will be carried out!

If the dimmer of the indicator is set to automatic, (see chapter 3 *Setting the Wind Indicator LED* on page 6, switch S4), then the "bright" and "dark" sensor keys serve as brightness sensors.

The brightness of the displays adapts automatically to the brightness of the surroundings.

4.3 Testing the LED's (Soft reset)

The LED test is a test function which can be activated at any time. It triggers a complete initialisation of the indicator. This soft reset does the same as the hard reset by switching on the power supply.

The LED test is switched on by activating the sensor keys of the dimmer function "bright" (OSK1) and "dark" (OSK2, see *figure 3* on page 8) simultaneously for approximately 14 seconds.

This switches on all the illumination elements on the displays.

The wind direction ring first lights up red and, a few seconds later, switches to green. Then a complete self-test is carried out and recognised errors are displayed by means of an error code in the wind speed display (see chapter 5 on page 14).

Finally the software version used is output in the 3-digit display. Sub-versions are displayed in the minimum display and in the maximum display.

4.4 Changing the operating mode

There are three operating modes available to display the wind speed and direction.

1. 2 minute value
2. 10 minute value
3. Instantaneous value

The operating mode can be changed by touching (or covering) the optical sensor key OSK4 (see *figure 3* on page 8) for approximately 7 seconds.

When the instrument is switched on (hard reset) or after the LED test (soft reset), the operating mode set with the DIP switch is set. (see chapter 3 *Setting the Wind Indicator LED*, Switch S1 and S5, on page 6).

Display of Operating Mode

Two text fields with yellow background light are used to display the operating mode (see *figure 1* on page 3). Either only one text field lights up, or neither light up.

The operating mode is valid for all wind values output on the display.

When the text field flashes once a second, this means that the mean value period is not yet completed.

This is the case for 2 minute settings during the first 2 minutes of operation (hard reset) or during the LED test (soft reset). When the 10 min setting has been selected, the display flashes during the first 10 minutes of operation as well as for at least 8 minutes when a "discontinuity" occurs (see chapter 5.3 *Discontinuity* on page 15).

The following table shows the different features of the displays in the different modes. The number of the displays in the first column refer to *figure 1* on page 3

display mode:		2 min value	10 min value	instantaneous value
display	text field:	2 min	10 min	neither
	parameter:			
1	wind speed	3-digit, 7-segment, red	3-digit, 7-segment, red	3-digit, 7-segment, red
		2 min gliding mean value	10 min gliding mean value note "discontinuity"	instantaneous value
	missing telegram			"EEE"
2	wind direction	one of the 72 red LED's on the ring	one of the 72 red LED's on the ring	one of the 72 red LED's on the ring
		2 min gliding mean value	10 min gliding mean value note "discontinuity"	instantaneous value
	missing value	4 red LED's flashing once a second: E/90, S/180, W/270, N/360		
2	variation of wind direction	one sector of the 72 green LED's on the ring	one sector of the 72 green LED's on the ring	none
		extreme values of the last 2 minutes	extreme values of the last 10 minutes note "discontinuity"	none
3	extreme values of wind speed	2-digit, 7-segment, red min and max	2-digit, 7-segment, red min and max	none
		extreme values of the last 2 minutes	extreme values of the last 10 minutes note "discontinuity"	none
	value > 99	"EE"	"EE"	none
	missing value	"--"	"--"	none

If no wind direction value is available, the four red LED's of the four main directions flash once a second (E/90°, S/180°, W/270°, N/360°).

The instantaneous and mean values (3-digit display) are always displayed to one decimal place unless the value is greater than "99.9", then there is no decimal point in the display.

Example: Mean value = 67.7 km display "67.7" kt
 Mean value = 108.4 kt display "108" kt

The extreme values (2-digit display) are always given without a decimal point.

When the output value is too large for the respective display (for example maximum > 99 km/h), "EE" appears on the display. If no calculated value is available, "--" appears.

In SLAVE operation (see chapter 3 *Setting the Wind Indicator LED* on page 6) and for setting the operating mode to instantaneous values, if no telegram has been received., "EEE" will appear in the 3-digit display.

Rounding of the Extreme Values

The minimum values of the wind parameters are rounded off:

- wind speed: rounded off to integral values
(example: minimum value 1.8 kt display 1 kt)
- wind direction: rounded off to 5° steps
(example: minimum value 144° display 140°)

The maximum values of the wind parameters are rounded off;

- wind speed: rounded off to integral values
(example: maximum value 9.1 kt display 10 kt)
- wind direction: rounded off to 5° steps
(example: maximum value 241° display 245°)

4.5 Remote control

The Wind Indicator LED can be operated from an external point. The precondition for this is that no 8 bit or 6 bit parallel wind transmitter is connected (see chapter 3 *Setting the Wind Indicator LED* on page 6). The following pins the terminal strip can be used for the operation:

Terminal Strip	Function
Pin 1	+ V _{CC}
Pin 8	Dimmer (bright)
Pin 9	Dimmer (dark)
Pin 10	Units switch

To activate a function the corresponding pin must be connected with pin 1 on the terminal strip. This can be done with a push button.

Example: Unit switch Pin 1
of the dimension
wind speed Pin 10

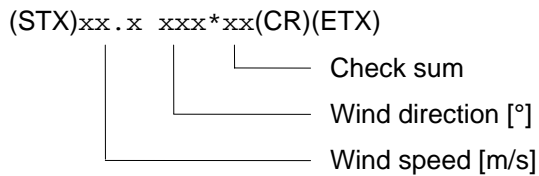


4.6 Serial protocol (4.3225.xx.100 or 4.3225.xx.200)

The interfaces are set as follows:

Baud rate 1200 (optional 300 - 4800)
Data bits 7
Parity-bit 1
Parity even
Stop bit 1

The incoming data telegram must have the following format:



character No.	function
1	STX (HEX 02)
2	10 ¹ wind speed
3	10 ⁰ wind speed
4	"." decimal point
5	10 ⁻¹ wind speed
6	space (HEX 20)
7	10 ² wind direction
8	10 ¹ wind direction
9	10 ⁰ wind direction
10	"*" check sum identifier
11	check sum (hex high nibble)
12	check sum (hex low nibble)
13	CR (Hex 0D)
14	ETX (Hex 03)

The check sum is formed by the XOR function of characters 2...9 (beginning with Hex 00). Then the 8 bit checksum is divided into two ASCII characters (high and low nibble) with a value ranging from 0...F (Hex).

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

4.7 Setting the wind speed transmitter – characteristic

The characteristic of the wind speed can be switched between "classic" and "compact" wind speed transmitter by following constellation :

„compact“

S7	S8
OFF	ON

wind direction: serial wind transmitter

Terminal strip : connect pin 1 and pin 6

Note : When the LED indicator has selected the compact wind transmitter, the 3 character display shows "CoP".

5. Calculating the values

5.1 Calculating the mean values

Gliding mean values for both wind parameters are calculated once a second.

The time period is either over 2 minutes or over 10 minutes (taking discontinuity into consideration, see chapter 5.3 Discontinuity on page 15). The values of both these time periods are continuously calculated and can be displayed immediately by changing the operating mode (see chapter 4.4 Changing the operating mode on page 10).

Calculating the gliding mean value:

Wind speed (WS)

The gliding mean values for wind speed are formed from the number of measured values (1 second instantaneous values) in a memory which subtracts the oldest value from a gliding sum and adds the new value. Then the value is divided by the number of values corresponding to the total memory period:

$$WS_{avg} = \frac{1}{n} \cdot \left(\sum_{i=1}^n WS_i - WS_{old} + WS_{new} \right) \begin{array}{l} n = 120 \text{ (2 min)} \\ \text{or} \\ n = 600 \text{ (10 min)} \end{array}$$

Wind direction (WD)

It is not quite as easy to calculate the gliding mean value of wind direction as it is to calculate the gliding mean values of wind speed. The mean value of wind direction is calculated vectorially by splitting it into x components and y components as the wind direction values are relative to a circle (0 to 359°) and the so-called "north jump" (the jump from 359° to 0° and vice versa) has to be considered.

The following method is used to determine the gliding vectorial wind direction mean value:

The one-second instantaneous wind direction values are transformed from polar co-ordinates (vector with uniform length 1) into Cartesian co-ordinates X and Y:

$$\begin{array}{l} X_i = \sin(WD_i) \\ Y_i = \cos(WD_i) \end{array}$$

The gliding mean values of both co-ordinates are formed from the number of measured values (1 second instantaneous values), each formed in its own memory, by subtracting the oldest value from a gliding sum and adding the new value. Then the value is divided by the number of values corresponding to the entire memory period.

$$\begin{array}{l} X_{avg} = \frac{1}{n} \cdot \left(\sum_{i=1}^n X_i - X_{old} + X_{new} \right) \\ Y_{avg} = \frac{1}{n} \cdot \left(\sum_{i=1}^n Y_i - Y_{old} + Y_{new} \right) \end{array} \begin{array}{l} n = 120 \text{ (2 min)} \\ \text{or} \\ n = 600 \text{ (10 min)} \end{array}$$

The gliding mean value of wind direction is obtained by retransforming the values back into polar co-ordinates.

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

5.2 Calculating Extreme Values

Gliding extreme values are calculated once a second for both wind parameters. The extreme values are the smallest and the greatest instantaneous values within a period of measurement. The measurement period is either 2 minutes or 10 minutes (allowing for discontinuity, see chapter 5.3 Discontinuity on page 15). The values from both measuring periods are continuously calculated and can be displayed immediately after changing the operating mode (see chapter 4.4 *Changing the operating mode* on page 10).

5.3 Discontinuity

The so-called discontinuity is taken into consideration for the 10 minute mean values and 10 minute extreme values. The determination is based on the recommendations of 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*).

The 2-minute mean values of the wind parameters and the 10 minute mean values are compared. There are two ways to determine the discontinuity:

- The difference between the 2 minute mean values and 10 minute mean values of the wind direction is greater than 30° and when at least one of the two mean values (2 minute value or 10 minute value) of wind speed is greater than 5.5 m/s (≈20 km/h).
- The difference between both mean values (2 minute value and 10 minute value) of wind speed is greater than 5.5 m/s (≈20 km/h).

If a discontinuity is determined, then the 10 minute mean values and 10 minute extreme values from the time point of the discontinuity will be calculated a new. The 10 minute values first correspond to the 2 minute values, until after 8 minutes the 10 minute values can again be calculated over the entire period of time.

6. Troubleshooting

The Wind Indicator LED has a number of error control routines which are automatically carried out during the switch on phase of the instrument i.e. while the instrument is in operation. If an error occurs, this is indicated on the wind speed display in the form of an error code. If several errors occur simultaneously, the error with the highest priority is displayed.

Table of the error codes sorted according to priority:

(E51 low priority E99 highest priority)

Error code	Error	Cause / Remedy	Remark
Optical sensor keys:			
E51	optical sensor OSK1 defect	surface may be dirty	1
E52	optical sensor OSK2 defect	surface may be dirty	1
E53	optical sensor OSK3 defect	surface may be dirty	1
E54	optical sensor OSK4 defect	surface may be dirty	1
Wind speed or direction transmitter:			
E01	WS > cut-off frequency (1300 Hz)	check input signal	
E02	WD transmission error	check serial WD-transmitter	
E03	WD U-level error (life-zero)	perhaps a „break in cable“	
E04	WS U-level error (life-zero)	perhaps a „break in cable“	2
E05	E03 and E04	perhaps a „break in cable“	2
E06	I _{CC} error (transmitter supply current)	perhaps wind transmitter not connected	3
Serial interfaces:			
E10	time out serial interface	no signal (not connected)	4
E11	check sum error serial interface	check route to sender	
E12	parity error	check route to sender	
E13	WD error (FFF)	transmitted WD error	5
E14	WS error (FF.F)	transmitted WS error	5
E15	E13 and E14	transmitted error	5
Internal hardware:			
E60	WS input error	internal error (return instrument)	
E61	WD-CLK error	internal error (return instrument)	
E7x	track A,B,C,D (x=1,2,4,8)	internal error (return instrument)	
E8x	track E,F,G,H (x=1,2,4,8)	internal error (return instrument)	
E90	V _{CC} (wind transmitter) error	internal error (return instrument)	
E91	U _{ref} error	internal error (return instrument)	
E99	watch-dog error	internal error (return instrument)	6

WD = Wind direction

WS = Wind speed

Remarks:

1. Definitions for the optical sensor keys OSK1 to OSK3 (see chapter 4 *Operating the Wind Indicator LED* on page 8).
2. If you select a 6 bit parallel wind direction transmitter and compact wind transmitter, there is no test for the life-zero signal of the wind speed transmitter. In consequence, there will be no error message „E04“ or „E05“.
3. Only possible if the DIP-switch is set to S6=OFF (see chapter 3 *Setting the Wind Indicator LED* on page 6).
4. If no telegram was received since more than 10 s
5. Check the transmitter connected to the sender of the telegram
6. Watch-dog errors occur after system break down by external or internal troubles. This error occurs regularly only after a hard or soft reset.

7. Technical Data

Display:	<ul style="list-style-type: none"> – two colour LED's (red, green) for the wind direction size of LED 2 x 5 mm – 3-digit 7-segment display for the wind speed height of digits 15 mm – two 2-digit 7-segment displays for the extreme values of wind speed height of digits 8 mm – text fields for the units (m/s, kt, km/h) – text fields for the display of the operating mode (mean value period) (2 minutes, 10 minutes, instantaneous values) – text field to display the status of the supply voltage (power LED, PWR)
Brightness	– dimming manually or automatically
Resolution	<ul style="list-style-type: none"> – wind direction: 5 degrees – wind speed (WS): – 0.1 m/s – 0.1 kt (WS ≤ 99.9 kt), res. 1 kt (WS > 99.9 kt) – 0.1 km/h (WS ≤ 99.9 km/h), res. 1 km/h (WS > 99.9 km/h)
Operating mode	<ul style="list-style-type: none"> – 2-minute gliding mean value and extreme value – 10-minute gliding mean value and extreme value allowing for so-called "discontinuity" (see chapter 5.3 <i>Discontinuity</i> on page 15) – instantaneous value
Scanning rate	– the wind parameters are measured, processed and displayed once a second
Wind transmitter input:	
Wind speed	<ul style="list-style-type: none"> – Pulse input – Amplitude 5...15V – Error message at low level < 0.7V (with appropriate wind speed transmitter) – Input frequency range 0...1300 Hz
Characteristic	“classic” –wind transmitter : 0,3 ... 50 m/s (3 ... 1042 Hz)

4.3303.22.008 (4.3336.31.008) : 0 ... 75 m/s (0 ... 745 Hz)
"compact" wind transmitter : 0,5 ... 50 m/s (2 ... 630 Hz) (4.3519.x0.000)

- Wind direction
- 8 or 6 bit parallel wind direction transmitter
 - serial wind direction transmitter (5 or 6 bit , automatically selection)
 - Error message at low level < 0.7V (only parallel wind direction transmitter)
- Power supply
- power from the display unit
 - +15V (parallel wind direction transmitter)
 - + 5V (serial wind direction transmitter)**Serial interface (4.3225.xx.100 or 4.3225.xx.200):**
- Type
- RS 232 (V.24) bi-directional, max. distance 15 m (4.3225.xx.100)
 - RS 422 (V.11) unidirectional, max. distance up to 5 km (4.3225.xx.200)
- Format
- Baud rate 1200 Bd
 - 7 data bits
 - 1 start and stop bit
 - 1 parity bit (even)
- Test functions:**
- identification of a break in the supply line by measurement of the supply current of the wind transmitters,
 - identification of a break in the line for parallel wind direction transmitters by "life-zero" signal
 - identification of a break in the line for synchronous-serial wind direction transmitters by software
 - serial communication (wind data telegrams) with check sum test and parity test.
 - watch-dog for self-testing the program run of the instrument and for re-start when an error is identified.
 - instrument self-testing after switch on (hard reset) or by a "LED-test" (soft reset).
- Power Supply:**
- 230 VAC / 50 to 60 Hz (4.3225.x0.x00)
 - 115 V AC / 50 to 60 Hz (4.3225.x4.x00)
 - max. 20 VA
- Operating Temperature:**
- 0...40°C
- Physical Dimensions:**
- 144mm x 144mm x 170mm (with connector)
 - 138x138 mm (size of the opening)
- Weight**
- 1.4 kg



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