

Sensor-Interface

Type: Airport

9.3099.00.104

9.3099.01.104

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Preamble

This instruction manual describes the factory-setting of the sensor interface for application of a certain measuring device configuration.

In case of deviations to the system configuration or customer requirements an additional separate description is delivered along with this standardized instruction manual.

1 Models available

Order-No.	Operating Voltage	Electrical output	Configuration
9.3099.00.104	230V / 50Hz	Online telegram output	Interface pc-board with connection box and power supply
9.3099.01.104	115V / 50-60Hz	Online telegram output	

2 Application

The sensor interface (SENSOR-IF) provides a disturbance-free acquisition and remote transmission of measuring values via a 4/5-wire cable RS232/RS422.

It serves for the acquisition of analogue measuring values. It is used for the direct connection/further processing to a PC or weather display via RS232/RS422.

Fields of application are, for example:

- Addition of systems available by distal measuring sensors, without re-cabling
- Sensor connection to systems (pc/logger) via digital/serial interface.
- Controlling of weather displays for the visualisation of instantaneous values.

The sensor interface pc-board is integrated in a connection box, which serves for the power supply of the pc-board, for the connection of measuring value transmitters and their power supply.

3 Installation



Attention

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

The sensor interface must be mounted and wired only in de-energised condition.

The connection box of the sensor interface must be opened only in dry environment.

3.1 Mechanical Mounting

The sensor interface with connection box is designed for wall mounting. For fixing see dimension drawing (chapter 11).

The connection box can be mounted onto a mast, stand support or tube by means of an optional installation kit.

Attention:

The screwed cable glands must point downward.

3.2 Electrical Mounting

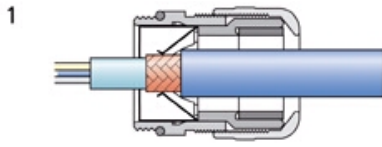
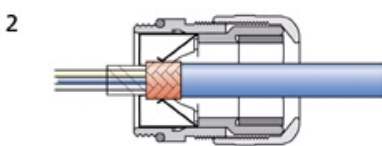
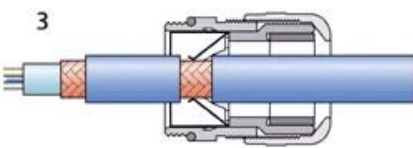
For connecting the measuring value transmitters remove the cover by loosening the screws on the front. The terminal clamps are now freely accessible.

Remark
The electrical connection is carried out according to the additional connection diagram of the complete measuring system.

The cables are guided through the screwed cable glands, located in the housing, and are connected to the terminal clamps. Please attend to the cable diameter.

After wiring work is done the nuts of the cable glands and the screws of the cover are to be evenly screwed tightly to the housing.

3.2.1 Cable Mounting

<p>In order to carry out an EMC-compatible installation the cable screen/shielding (except the supply cable, which, in general, is not shielded) is to be connected to the contact spring of the screwed cable gland (see figure).</p> <p>1. With the Standard Contacting (see 1)</p> <ul style="list-style-type: none"> - Strip back the outer sheath and screen (shielding) - Make a round cut in the outer sheath approx. 15 mm along but do not remove the sheath - Guide the cable through the cable gland - Pull off the outer sheath - Pull back the cable until the connection is made between the cable screen and contact spring - Turn shut... and it is ready for use! 	
<p>2. With thin Wires without an Inner Sheath (see 2)</p> <ul style="list-style-type: none"> - Strip back the outer sheath - Pull back the screen braid approx. 15-20mm over the outer sheath - Insert the cables into the cable gland until the contact is made between the cable screen and contact spring - Turn shutand it is ready for use! 	
<p>3. When Routing the Cable Screen to another Connection (see 3)</p> <ul style="list-style-type: none"> - Expose the screen braid approx. 10 mm - Guide the cable through the cable gland until the connection is made between the cable screen and contact spring - Turn shut...and it is ready for use! 	

4 Mode of Operation

The sensor interface processes the digital counter (wind velocity, precipitation sum) in second cycle and measures the analogue values within 1...2s (acc. to the number of channels to be measured).

The temperature is generally measured in 3s-cycle.

For the direct data acquisition by PC without datalogger the automatic telegram output is selected via COM1. In this mode a telegram is output every 1-2 seconds (depending on the number of measured channels and the interface velocity).

4.1 Format of Data Telegram „mm“ via COMx

No.	Character	Description	Value	Range
1...4	XXXX	Number of measurements since start of SENSOR-IF (after 9999 continuation with 0100!)	4x ASCII	0001 to 9999
5		Separator (SPACE)	Hex 20	
6...9	XX.X	Instantaneous value of wind velocity	unit m/s	0.0 to 75.0
10		Separator (SPACE)	Hex 20	
11...13	XXX	Instantaneous value of wind direction	unit °	0 to 359
14		Separator (SPACE)	Hex 20	
15...19	vXX.X	Instantaneous value of temperature	unit °C	-99.0 to 99.0
20		Separator (SPACE)	Hex 20	
21...25	XXX.X	Instantaneous value of rel. humidity	unit %	0.2 to 100.0
26		Separator (SPACE)	Hex 20	
27...31	vXX.X	Instantaneous value of dew point temperature	unit °C	-99.0 to 99.0
32		Separator (SPACE)	Hex 20	
33...38	XXXX.X	Instantaneous value of air pressure QFE	unit hPa	800.3 to 1060.0
39		Separator (SPACE)	Hex 20	
40...45	XXXX.X	Instantaneous value of air pressure QNH	unit hPa	800.3 to 1060.0
46		Star	Hex 2A	
47...48	XX	Checksum in HEX, bitwise XOR over 1. character to the „*(“ (exclusive)	Hex-Format	00 to FF
49	CR	Carriage return	Hex 0D	
50	LF	Line feed	Hex 0A	

Example telegram (mm):

```
1170 50.0 293 24.0 8.9 -10.9 930.0 943.3*2F<CRLF>
```

Remarks to data telegram „mm“:

- All characters are displayed in ASCII -code.
- The telegram has a constant line length of a total of 50 characters incl. CR,LF.
- Leading zeros of the measuring values are replaced by “spaces” (20 HEX).
- Negative values are marked by a sign, which is right-justified at the date, se “v” in the table. That means, for example with the temperature in °C: „-1.0“ and not „- 1.0“.
- All points and colons have fixed position.
- Erroneous measuring values (for ex caused by measuring range overflow) are replaces by one or several ?, depending on the position, point inclusive:

for ex. „???.?“ for an erroneous temperature

and „????“ for a defective or non-connected wind direction transmitter (Thies-serial)

- A carriage return „CR“ (0D hex) and a line feed „LF“ (0A hex) are carried out always at the end of a data telegram.
- The individual measuring values are separated by space character „SPACE“ (20 Hex).
- Baud rate COM1 for operation and for online telegram output(RS232): 9600Bd 8N1 unless otherwise set!

4.2 Format of Data Telegram „mma“ for Meteo-Online

- The telegram has a constant line length of a total of 68 characters incl. CR,LF
 - For compatibility with the „DL15 Airport“ telegram, this telegram was extended at the beginning by „10.“ and at the end by the fixed date „18.09.07 10:24:48“.
- Example telegram: **10.2216 49.9 146 24.5 10.0 -9.0 930.0 930.0 18.09.07 10:24:48**

5 Pin Assignment Operation Interface COM1

5.1 Assignment for standard operation

Sensor Interface	PC
2 _____	2
3 _____	3
5 _____	5

5.2 Assignment for a firmware-update

SENSOR-IF	PC
2 _____	2
3 _____	3
4 _____	4
5 _____	5 (bridge between 5 & 9)
6 _____	6
7 _____	7
8 _____	8
9 _____	9

Remark:

In case of busy interface cable, the SENSOR-IF can be kept in reset-mode at the PC by handshake-lines. Therefore, the assignment under 5.1 is compulsory for standard operation.

6 Operation

6.1 Power up message

Connect the Pc with the sensor interface by means of a serial extension cable (1:!), see chapt. 5. Open an adequate terminal program (for ex. TeraTerm or Hyper-Terminal), select the interface and set to the parameters 9600Bd 8N1 (default).

At power-up of the sensor interface the following message is output at the COM1 (RS232 SUB-D):

```
-----  
SENSOR-INTERFACE DL  
Device: 9.3099.00.104  
Version: 0.49c  
Release: Dec 05 2007  
-----  
Help: <Strg-B>HH<Strg-C>  
-----
```

6.2 Set of Commands

The operation and calibration of the sensor interface is possible only via a rudimental set of commands, and only via the COM1 (RS232 SUB-D). All commands are initiated by <Strg-B> and are terminated by <Strg-C> !

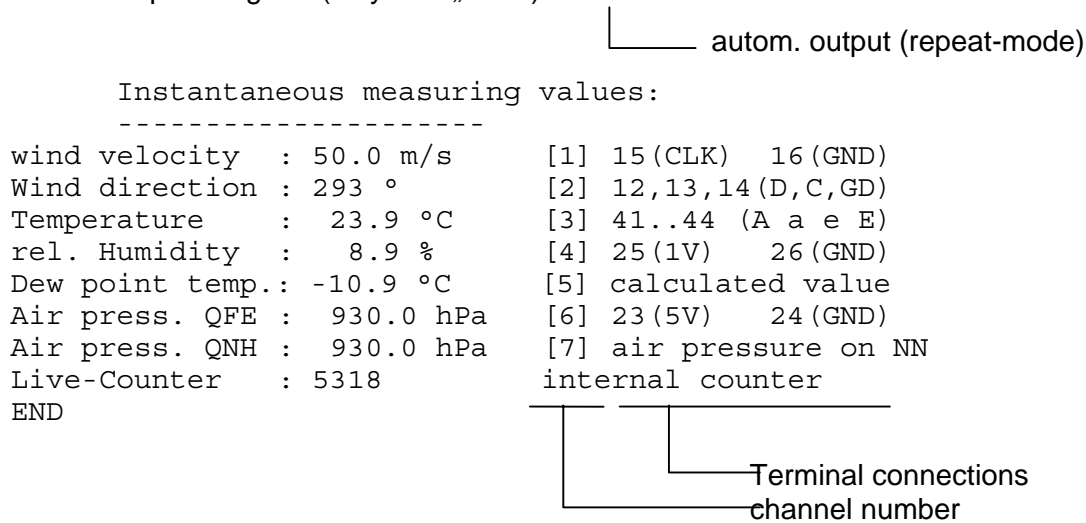
After entering the command „HH“ in the form <Strg-B>HH<Strg-C> the following help is output:

```
List of commands:  
-----  
HH           : this help  
<...>       : optional parameters (no space characters)  
MM|mm<r>    : telegram output with description(MM)/short form(mm), r: autom.  
mma<2|3>    : autom. telegram DL15 Airport  
mml<2|3>    : autom. telegram for LED-display, output port 2:COM2 or 3:COM3  
mmo<2|3>    : autom. telegram online + LED, output port 2:COM2 or 3:COM3  
ST<a>       : stops autom. Telegram output (a: on all interfaces)  
KK<CH, FUNC> : channel configuration CH:channel(1-14), CH:all|none|d(default),  
              FUNC:0|1  
SE<CH><X>   : CH: input which is scaled (abbrev./channel number)  
              X: Index/factor of scaling for ex. SEWG1(WG-STD),  
              SEWG2(WD-COMPACT)..  
SH<N:KONST> : N: elevation for l=QNH calculation, CONST: 0...4000[m]  
CT<h|l|d>   : calibration of inputs via PT100-1  
              h: upper temperature (default:+65°C)  
              l: lower temperature (default:-50°C)  
              d: set default  
CI<CH><c|d>  : CH: analogue channel which is calibrated  
              c: calculated Gain and Offset, d: default Gain  
BR<N:BAUD [P]> : N: 1=COM1(SUB-D), 2=COM2(232-KL:11+14), 3=COM3(422-X2)  
              : BAUD: 1=1200, 2=2400, 3=4800, 4=9600, 5=19200  
              : P: 7=7E1 (only COM3)  
WC<w|r|a>   : w/r saves/reads the configuration  
              a: saves also the automatic telegram output  
XX<v>       : v: version info  
END
```

6.3 Application and Configuration

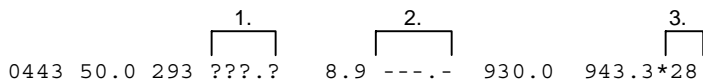
Through `<Strg-B>MMr<Strg-C>` all shown measuring values are displayed cyclically in clear text. The output stops after entering `<Strg-B>ST<Strg-C>` or on power-up/down.

Detailed output telegram (only with „MMr“):



The telegram output „mm“ (`<Strg-B>mm<Strg-C>`) would respectively look like this:

0175 50.0 293 23.9 8.9 -10.9 930.0 930.0*22 (Format s. tab. S3, chap. 3.1)



- 1. Sensor not connected or defective
- 2. Channel masked out
- 3. Check sum (bitwise XOR conjunction from first character to the „*“exclusive)

6.3.1 Input of Station Height:

For calculation of air pressue QNH the height of the installation site must be entered. Therefore, the following command is entered: `<Strg-B>SH1:xxxx<Strg-C>` For „xxxx“ the respective height is input in mm.

6.3.2 Adjustment to Telegram Format für Meteo- Online an „COM3“

The baud rate of the „COM3“ is set to 9600Bd 7E1 with : `<Strg-B>BR3:47<Strg-C>` The output telegram of the „COM3“ is defined to Airport with: `<Strg-B>mma3<Strg-C>`.

6.3.3 Channel Configuration

For powering-down the dew point temperature the following command is entered:

`<Strg-B>KK5,0<Strg-C>`

Response from SESNSOR-IF: channel-config.(IF): 1111 011

For re-starting please enter the following:

`<Strg-B>KK5,1<Strg-C>`

6.4 Saving the Configuration

For saving of a modified configuration permanently (beyond a restart of the „SENSOR-IF“) please enter: <Strg-B>**WCw**<Strg-C>.

Automatic telegram outputs which are temporarily set are not considered there!

If the automatic telegram output shall be retained, as well, please save with:

<Strg-B>**WCa**<Strg-C> .

6.5 Calibration

of the analogue inputs:

1. Set the output telegram „MMr“ (s. chap. 6.3.).
2. the input to be calibrated must be switched on (s. channel configuration chap. 6.3.).
3. connect an adjusted voltage-/power source to the respective terminal
4. Set the source to final value (s. value in brackets with terminal connections)
5. calibrate respective channel through: <strg-B>**CI**<channel number >**c**<strg-C>
6. check the calibration by means of the half-measuring value – if without success, there is the following option:
 - a.) factory-scaling (not calibrated) through: load <strg-B>**CI**<channel-number>**d**<strg-C> and repeat the procedure starting from item 4.
 - b.) Power-off the sensor interface for a short time and start with item 1.
7. Save the new calibration with: <strg-B>**WCw**<strg-C>

of the temperature:

1. Set the PT100 simulator to 65°C
2. <strg-B>**CTh**<strg-C> calibrates the upper value
3. Set the PT100 simulator to -50°C
4. <strg-B>**CTl**<strg-C> calibrates the lower value.
5. For controlling, set any interim value at the PT100 simulator and control it.
6. Save the new calibration with: <strg-B>**WCw**<strg-C>

Remarks:

Calibration of inputs must be carried out only by an authorised service engineer with respective calibration sources.

The powering-off and re-starting of the sensor interface causes a reset to the last updated calibration; therefore, a saving after every effectively calibrated input is recommendable.

This is done with: <strg-B>WCw<strg-C>

7 Firmware Update

Firmware updates are to be carried out only by authorized service engineers, as the changing of input sensitivity or scaling of new sensors require an adjustment of the inputs.

The firmware update can be carried out only via the interface COM1 (RS232 SUB-D).

For pin assignment between sensor interface and PC refer to page 6, chapt. 5.2.

For updating the PC software „TI-DOWNLOADER“ is required (only Windows 95/98 or higher).

8 General Function Remarks

Using a standard cable (serial extension) at the COM1 (X15) might result in the fact, that the sensor interface is kept in “RESET”-mode, when the levels (DTR/RTS) are on “LOW” on PC-side (for ex.: no terminal program started). (see page.5, chapt. 4.1)

Corrective: A short break of power supply.

The green LED must flash in standard operation at 0,3 to 0,5 Hz.

In case the red LED flashes, the Thies serial connection to the wind direction transmitter On re-start of the sensor- IF a power-up message is output via the COM1 also with automatic telegram output (s. page 7, chapt. 6.1). Afterwards, „?“ ... „???.?“ is output for all measured channels in the first four telegrams..

9 Connection Diagram (Example)

Remark:

In case of deviations to the system configuration an additional separate connection diagram is enclosed.

- Standard connection diagram 6150 (see page 11)

10 Technical Data

Sensor-Interface	
Connection box	
Supply voltage	
9.3099.00.102	Primary: 230 V AC 50 Hz
9.3099.01.102	Primary: 115 V AC 50 Hz
:	Secondary: 24 V AC 90 W 24 V AC 27,5 W 24 V AC 12,5 W 12 V DC 2,5 W/210mA 5 V DC 0,5 W / 100mA 24 V AC 110 W
Dimension	160 x 560 x 90 mm
Weight	5,5 kg
Protection	IP 65 acc. to DIN 40050
Wall mounting	Drilling template 110 x 540 mm
Housing	ALSi12 DIN 1725, varnished
Sensor interface pc-board	
Supply voltage	8...24V AC/DC
Power consumption	<20mA@12V DC (16mA typical)
Connections	Terminal strip pluggable
Operating temperature	-40°C to +85°C
Electromagnetic compatibility (EMC)	acc. to EN 61326 in conjunction with EN 61000-4-3
Telegram output rate	<3s (depending on number of connected measuring channels)
Analogue inputs unipolar	1 x 0...10V (max.25V) 1 x 0...1V (max. 2,5V) 2 x 0(4)...20mA 1 x 0...1°
Accuracy	voltage-/power inputs +/- 0,1% FS
Temperature inputs PT100	1 x -50.0°C...+65.0°C (max. -99.0°C...+99.0°C)
Accuracy	PT100 inputs +/- 0,1K
Digital inputs	1 x 16 bit counter (Wind velocity) 1 x 8 bit counter (precipitation sum) 1 x 8 bit counter (Pp-Status) 1 x serial-synchron (Thies wind direction transmitter: 11,25°/2.5°)
Serial interfaces	1 x RS232 for operation, calibration, and telegram output baud rates: 1200,2400,4800,9600(default),19200,57600Bd 8N1 1 x RS422 for telegram output and sensor input Baud rates: 1200,2400,4800,9600(default),19200Bd 8N1

<p>Lockable Sensors (Standard model)</p>	<ol style="list-style-type: none"> 1. Wind velocity transmitter: 4.3303.22.018 754Hz@75m/s (Type:STANDARD) 4.3519.00.000 947Hz@75m/s (Type:COMPACT) 4.3303.22.007 1042Hz@50m/s (Type:CLASSIC) 2. Wind direction transmitter 4.3129.00.000 5Bit:11,25° 4.3125.32.100 8Bit: 2,5° 3. Temperature 1 PT100 (-99.0°C...+99.0°C) 4. Rel. humidity (0...1V = 0...100% r.F.) 5. Air pressure (0...5V = 800.0...1060.0hPa)
--	--

11 Dimensional Drawing

Outside dimensions: B x L x H 160 x 560 x 90mm



- Bore dimensions: please refer to backside of instrument

12 Accessories (optional)

Installation kit compact serves for mounting the connection box (sensor interface) onto a mast. The installation kit consists of mounting holder and tensioning straps.	506 614	Techn. data: clamping range: Ø 48 ... 102 mm Material: stainless steel
Meteo- Online The software Meteo- Online is a WINDOWS program, functional under WINDOWS 98/2000/XP/2003. It serves for the visualization and filing of meteorological measuring values.	9.1700.98.000	Lockable data provider: for ex. sensor interface 9.3099.00.104

13 EC-Declaration of Conformity

Document-No.: **000293**

Month: 01 Year: 09

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Description of Product: **Sensor- Interface**

Article No.	9.3099.00.102	9.3099.01.102
	9.3099.00.113	9.3099.01.113
	9.3099.00.104	9.3099.01.104

specified technical data in the document: **021553/01/09; 021554/01/09; 021556/01/09**

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: 27.01.2009

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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