



Wet bulb temperature sensor (Tnw)

User manual



Revisions list

<i>Issue</i>	<i>Date</i>	<i>Description of changes</i>
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About this manual

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1 Introduction

The thermometer probe with wet bulb and natural ventilation (Tnw) is used for the calculation of the WBGT (ISO7243) heat stress index assessment.

The Pt100 element is closed inside a wet cotton sock from a water tank. The water tank has a high reflection factor to avoid water temperature increase due to radiant sources.

Designed as described in the ISO7726 standard for the “Wet bulb Temperature”.

2 Technical features

PN	DMA122	DMA122.1
Water tank capacity	1 l	
Water refill (25 °C, 60% RH)	About every 60 days	
Connector	Free wires (4-wires)	Male connector for DWA5nn cables
Cable	L=5 m	L=5 m + connector

Common technical specifications

Wet bulb temperature	Principle	Pt100 DIN-A (Class A EN60751)
	Type	RTD 4 wires
	Measuring range	0÷80 °C
	Accuracy	0.15 °C (@0 °C)
	Output	Pt100 DIN-IEC 751 table (EN 60751)
	Resolution	0.01 °C
	Response time (T90 Air)	10 min (air flow 0.2 m/s)
General information	Standard	ISO7726
	Protection	IP66
	Power consumption	None
	Operative temperature	0÷80 °C
	Mounting	On DYA049
	Data logger compatibility	E-Log, A-Log

3 Installation

3.1 General safety rules

Please read the following general safety rules in order to avoid injuries to people and prevent damages to the product or to possible other products connected with it. In order to avoid any damages, use this product exclusively according to the instructions herein contained.

The installation and maintenance procedures must be carried-out only by authorized and skilled service personnel.

Power the instrument in a suitable manner. Pay attention and observe the power supplies like indicated for the model in your possession.

Carry-out all connections in a suitable manner. Pay strict attention to the connection diagrams supplied with the instrument.

Do not use the product in case of suspected malfunctions. In case of suspected malfunction, do not power the instrument and contact authorized technical support immediately.

Before you carry-out any operation on electrical connections, power supply system, sensors and communication apparatus:

- Disconnect the power supply.
- Discharge the accumulated electrostatic discharges touching an earthed conductor or apparatus.

For safety regulations please refer to manual INSTUM_05290.

3.2 Mechanical installation

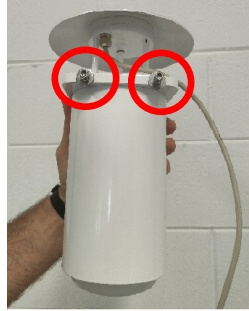
3.2.1 Mechanical installation on pole (using DYA032.1 arm)

Perform the installation on pole using a DYA049 collar and DYA032.1 support. Follow these steps:

1. Fix the DYA032.1 support to the DYA049 collar and mount them on pole.



2. Remove the two screws from the sensor.



3. Insert the two screws in the DYA032.1 holes and tight them.



4. Unscrew the water tank from the sensor.



5. Fill in distilled water (PH: 5..7) inside the bottle and fix the bottle inside the sensor again.



Reliable measurements will be available after 3-5 minutes. To confirm that the water has reached the temperature sensor, wrap the bulb in a thin layer of paper tissue and apply light pressure. If the tissue becomes wet, it indicates that the water has successfully contacted the sensor.

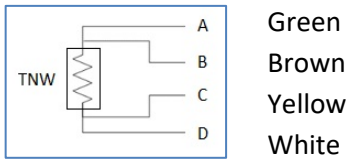
3.2.2 Mechanical installation on tripod (using BVA320 stand)

Sensor can be fixed to the BVA320 stand as well using the M5 knob provided with the BVA320 stand.



3.3 Electrical connection

Wiring connections must be performed as a 4-wires Pt100, as indicated below:



Read also ANNEX 1.

3.4 Use with LSI LASTEM data logger

If the sensor is used with an LSI LASTEM data logger, proceed with the configuration of the data logger using the 3DOM software:

- Open the data logger configuration.
- Add the sensor by selecting its code (eg DMA122) from the *3DOM Sensor Library*.
- Check the acquisition parameters (input, rate, etc.)
- Save the configuration and send it to the data logger.

For more information about the configuration, refer to the manual of the data logger in use.

4 Operational check

To check the sensor output it is necessary to have a multimeter.

1. Set the multimeter to measure signals in resistance and 200 Ω scale.
2. Disconnect the wires from the data logger.
3. Connect A to one test lead of the multimeter and D to the other one. Read the resistance value on the multimeter and obtain the corresponding temperature value indicated in Tab. 1. For example, if the resistance value is 109 Ω , the corresponding temperature is approximately 23 $^{\circ}\text{C}$.
4. Repeat the previous step with wires B and C. The value read should be the one found between wires A and D.

$^{\circ}\text{C}$	0	1	2	3	4	5	6	7	8	9
0	100,000	100,391	100,781	101,172	101,562	101,953	102,343	102,733	103,123	103,513
10	103,902	104,292	104,681	105,071	105,460	105,849	106,238	106,627	107,016	107,404
20	107,793	108,181	108,570	108,958	109,346	109,734	110,122	110,509	110,897	111,284
30	111,672	112,059	112,446	112,833	113,220	113,607	113,994	114,380	114,767	115,153
40	115,539	115,925	116,311	116,697	117,083	117,469	117,854	118,240	118,625	119,010
50	119,395	119,780	120,165	120,550	120,934	121,319	121,703	122,087	122,471	122,855
60	123,239	123,623	124,007	124,390	124,774	125,157	125,540	125,923	126,306	126,689
70	127,072	127,454	127,837	128,219	128,602	128,984	129,366	129,748	130,130	130,511
80	130,893	131,274	131,656	132,037	132,418	132,799	133,180	133,561	133,941	134,322

Tab. 1 - Correspondence table $^{\circ}\text{C}$ -> Ω .

After check, reconnect the wires to the data logger.

5 Maintenance

Check the water level in the bottle. The autonomy varies according to the sensor model and according to the weather conditions. Windy and dry environments will require more frequent refills.

The lack of water can also be verified by analyzing the measurements generated by the sensor. In the absence of water, the air temperature (Ta) and the wet bulb temperature (Tnw) have constantly similar values.

In addition, the condition of the hydrophilic sock must be checked. If it has impurities, it must be replaced or regenerated (§5.1)

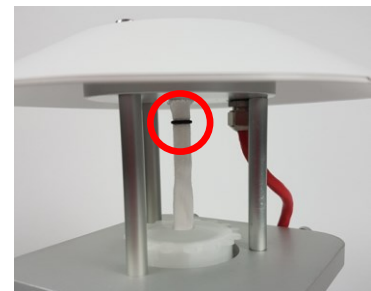
The calibration of the sensor is recommended to recalibrate the sensor every two years.

5.1 Sock replacement and cleanses

The cotton sock can be replaced with a new or regenerated one.

For the replacement proceed as follows:

1. Remove the cotton sock from the wet temperature bulb.
2. Replace the cotton sock with a new spare unit (MM3103.R).



Alternatively, for cleanses:

1. Place the cotton sock in a pan with boiling distilled water for 5 minutes.
2. Remove the cotton sock from the water and replace the water in the pan with fresh distilled water.
3. Repeat the boiling process for an additional 5 minutes.
4. Place the wet cotton sock in a ventilated area until it is completely dry.
5. Ensure the final result is a soft, white, and dry cotton sock.



Reinserting the cotton sock

When performing the operation of reinserting the cotton sock into the bottle and then performing the fixing of the sock on the wet bulb, make sure that the sock touches the bottom of the bottle

6 Handling

Avoid the introduction of electrostatic discharge (ESD). The product, or part of it, is fragile, avoid mechanical shocks, abrasions or scratches on the surface and dome.

7 Storage, packaging, preservation, delivery

For storage, respect the humidity (10÷100% non-condensing) and temperature (0÷80 °C) limits. Avoid direct sun exposure. For delivery and storage, use the packaging supplied with the product. For preservation, it is recommended to respect the environmental limits of temperature (0÷80 °C). Upon receipt of the material, visually check the package for signs of crushing or perforation; in the presence of these signs, check the integrity of the product inside.

8 Disposal

This product is a device with high electronic content. In accordance with the standards of environmental protection and collection, LSI LASTEM recommends handling the product as waste of electrical and electronic equipment (RAEE). For this reason, at the end of its life, the instrument must be kept apart from other wastes.

LSI LASTEM is liable for the compliance of the production, sales and disposal lines of this product, safeguarding the rights of the consumer. Unauthorized disposal of this product will be punished by the law.



Recycle or dispose of the packaging material according to local regulations.

9 Accessories and spare parts

Code	Description
DYA032.1	Arm for fixing DMA121A and DMA122 sensors on DYA049 collar
DYA049	Mast-mounting collar for Ø 45÷65 mm pipe
DWA505A	Cable L=5 m for DMA122.1
DWA510A	Cable L=10 m for DMA122.1
DWA525A	Cable L=25 m for DMA122.1
SVICA0103	ISO9001 type calibration certificate
SVACA0105	ISO17025 type calibration certificate
DEA420.1	Converter: Output: 4÷20 mA. Power supply: 10÷30 V AC/DC More information on MW9008-ENG-04-Sensors-conditioningCatalogue
MDMMA1010.1	Same feature as DEA420.1 (except the output that is RS-485 Modbus-RTU)
MM3018	1000 cc. water tank (spare part)
MM3103.R	Cotton sock (spare part)

10 How to contact LSI LASTEM

In case of problem, contact the technical support of LSI LASTEM sending an e-mail to support@lsi-lastem.com or compiling the technical support request module at www.lsi-lastem.com.

For further information refer to addresses and numbers below:

- Phone number +39 02 95.414.1 (switchboard)
- Address: Via ex S.P. 161 – Dosso n. 9 - 20049 Settala Premenugo, Milano (Italy)
- Web site: www.lsi-lastem.com
- Commercial service: info@lsi-lastem.com
- After-sales service: support@lsi-lastem.com, Repairs: riparazioni@lsi-lastem.com

11.2 DMA122.1 sensor schematic drawing

