



Uses:

- Provides WBGT-index Values
- Evaluates Heat Stress
- Measures Globe Temperature
- Measures Natural Wet Bulb Temperature
- Measures Actual Air Temperature

Features:

- Three separate sensors on a common base
- All sensors comply with ISO7243
- Uses extension cables without loss of accuracy

Introduction

The WBGT Transducer MM0030 comprises of three separate transducers. These provide the necessary parameters to calculate the WBGT-index. All three transducers are based on extremely accurate, platinum (Pt100) resistance temperature sensing elements.

The WBGT-index is the most widely used heat stress index and is standardized in ISO7243. The index is a single value which enables you to evaluate the level of heat stress caused by an environment, for example in foundries or glass factories.

The index can be used to establish or modify work/rest schedules that can alleviate heat stress problems and improve efficiency in such work places.

The WBGT transducer is used with Thermal Comfort Data Logger – INNOVA 1221.

Three Transducers

Natural Wet Bulb Temperature

Perspiration is one of the means the body controls its internal temperature. As the perspiration evaporates it has a cooling effect on the body. The natural wet bulb temperature simulates the effect evaporative heat loss has.

The sensor achieves this by having an unshielded bulb covered with a wet cotton sock or wick. A 40ml reservoir of distilled water ensures that the wick is kept moist. The evaporation from the wick cools the sensor in the same way that sweat cools the body. Because of this cooling effect the natural wet bulb temperature is normally lower than the air temperature.

Note that the natural wet bulb temperature is not the same as a the psychrometric wet bulb temperature.

The dimensions of the sensor are defined by ISO7243.

Globe Temperature

This temperature indicates the amount of heat exchanged by the body due to radiation.

The transducer consists of a Pt100 temperature sensing element situated at the centre of the globe (150mm in diameter), which is made of 0.4mm copper sheet coated with optically black lacquer that has an emission coefficient of 0.98.

The temperature measured at the centre is an equilibrium temperature caused by radiative and convective heat exchanges between the globe and the environment. As a result of this, the globe temperature is influenced by air velocity, air temperature and radiant temperature. Size and construction of the globe are defined by ISO7243.

Air Temperature

Because the globe over-estimates the influence of direct sunshine, it is necessary to provide the true air temperature as well. This is measured by a platinum (Pt100) sensor which is radiantly shielded.

The sensor is surround by an open ended aluminium-foil cylinder. This is highly polished to reduce the thermal radiation interference from any hot or cold bodies in close proximity of the transducer. The cylinder with its open ends enable a free flow of air to come in contact with the sensor.

WBGT Transducer – INNOVA MM0030

Pt100 Sensor

This is a resistor sensor (resistance of 100Ω at 0°C) made of platinum, which provides excellent stability and accuracy.

The actual sensors chosen for this transducer provide results within a narrow tolerance range. This enables the transducer to be moved around and connected to other instruments without requiring any pre-measurement adjustments to be made.

Although the transducer will operate without ever requiring recalibration, it should be checked regularly for possible physical damage, which may impair its functionality.

Data Inputs

The temperatures measured by the sensors are transferred to the measuring equipment through a single cable. All three values are available so that the Heat Stress index can be calculated.

Specifications – INNOVA MM0030

GLOBE TEMPERATURE TRANSDUCER:

Measurement Range:
5 to 100°C (+41 to +212°F)

Accuracy:

- 5 < t_g < 50°C range: better than ±0.5°C
- (41 < t_g < 122°F range: better than ±0.9°F)
- 50 < t_g < 100°C range: better than ±1.0°C
- (122 < t_g < 212°F range: better than ±1.8°F)

Response Time: 7 minutes to 90% of step change

WET BULB TEMPERATURE TRANSDUCER:

Measurement Range:
5 to 40°C (41 to 88°F) wet bulb temp.

Accuracy: better than ±0.5°C (±0.9°F)

Response Time: 5 minutes to 90% of step change

AIR TEMPERATURE TRANSDUCER:

Measurement Range: 10 to 60°C (50 - 140°F)

Accuracy: better than ±1.0°C (±1.8°F)

Response Time: 50s to 90% (in still air)

Integral Connection Cable: Length 2.5m; connected to associated equipment via a 11-pin DIN plug

DIMENSIONS:

Height: 175mm

Width: 295mm

Depth: 150mm

Weight (including cable): approx. 780g



COMPLIANCE WITH STANDARDS

CE-mark indicates compliance with EMC Directive and Low Voltage Directive.

Safety

EN 61010-1 (1993) & IEC 1010-1 (1990): Safety requirements for electrical equipment for measurement, control and laboratory use.

EMC Emission

EN 50081-1 (1992) : Generic emission standard. Part 1: Residential, commercial and light industry.
EN 50081-2 (1993): Generic emission standard. Part 2: Industrial environment.
CISPR22 (1993): Limits and methods of radio disturbance characteristics of information technology equipment. Class B Limits.
FCC Class B limits.

EMC Immunity

EN 50082-1 (1992): Generic immunity standard. Part 1: Residential, commercial and light industry.
EN 50082-2 (1995): Generic immunity standard. Part 2: Industrial environment.
Note: The above is guaranteed using accessories listed in this Product Data sheet only.

Temperature

IEC 68-2-1 & IEC 68-2-2: Environmental Testing. Cold and Dry Heat.
Operating Temperature: see ranges for individual transducers opposite
Storage Temperature: -25 to +70 °C (-13 to 158°F).

Humidity

IEC 68-2-3: 90% RH (non-condensing at 40°C).

Mechanical

IEC 68-2-6: Vibration: 0.3 mm, 20m/s², 10-500 Hz.
IEC 68-2-27: Shock: 1000 m/s².
IEC 68-2-29: Bump: 1000 bumps at 250m/s².

Ordering Information

MM0030 WBGT Transducer

Includes the following accessories:

UA0143: Cotton sock and thread

Optional Accessories

1221: Thermal Comfort Data Logger with UA1277 Heat Stress Module

AO0280/y: Extension cable (defineable length up to 100mm; where y is the length in meters)

UA0803: Tripod

KE0401: WBGT Carrying case

LumaSense Technologies reserves the right to change specifications and accessories without notice.

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