

Product Data

Thermal Manikin "Flatman" & Thermal Comfort Data Logger

USES:

- Up to 8 Dry Heat Loss Transducers MM0057 can be connected to one Thermal Comfort Data Logger 1221
- "Flatman" supports up to 10 Dry Heat Loss Transducers MM0057 for measurement of Equivalent Temperatures

FEATURES:

- Complies with ISO/DIS-14505, Part 2
- Measures Segmental Equivalent Temperature which can be integrated to Whole Body Equivalent Temperature
- Cuts in "Flatman" allows airflow around individual transducers
- Easy to mount and position individual transducers using the transducer mounting



Introduction

A new standard ISO/DIS 14505 Part 2, deals with the assessment of the thermal environment in vehicles, based on the equivalent temperature. The standard defines the omnidirectional equivalent temperature, measured with an ellipsoid shaped sensor, as one of the methods approved for the assessment of the thermal environment.

The equivalent temperature integrates the combined effect of the air temperature, mean radiant temperature and air velocity. The term "Equivalent Temperature" is often used instead of "Dry Heat Loss". Equivalent temperature, which can be calculated from dry heat loss, is by definition *the uniform temperature of a radiant black enclosure with zero air velocity in which an occupant would have the same dry heat loss as in the actual environment.*

The Dry Heat Loss Transducer is an ellipsoidal device with a surface temperature sensor and surface heating element. The power to this element is adjusted automatically to bring the surface to a temperature similar to that of a human clothed person. The size has been carefully chosen so that the ratio between heat loss by radiation and by convection is similar to that of the human body.

Description and function

The 1221 instrument is built up modularly, allowing installation of up to four Dry Heat Loss Modules type UA1278. This module enables two Dry Heat Loss Transducers MM0057 to be connected. With four modules 8 transducers can be connected to one 1221.

The transducers are operated in

a heated mode where it measures the dry heat loss and equivalent temperature corresponding to pre-set values of clothing (Clo) and metabolic rate (Met).

Due to the high power consumption of the Dry Heat Loss Transducer, especially in cold environments or at low Clo-values, it is recommended that the number of transducers is limited to six, when the instrument is operated on Mains Power Supply ZG0342.

A special power supply ZG0304 for 12 V DC allows the use of up to eight transducers. If conditions are outside of the dry heat loss transducers direct measurement range, the module will set up a warning flag and predict the result from the measured parameter.

Thermal Manekin "Flatman"

The Thermal Comfort Manager 7701 has a dedicated Flatman setup. By using a number of MM0057 transducers (between 3 and 8) each transducer represents a certain part of the body area and measures the segmental equivalent temperature. By weighting the segmental equivalent temperature with the relative area it represents, the total weighted equivalent temperature can be calculated and used for the evaluation. The Clo-value for each transducer is set and the total weighted Clo-value is calculated based on the relative area each transducer represents. Together with the activity level and dew point temperature the Equivalent temperature for each transducer is measured and stored in the database.

Fig.1 Example of Flatman setup in Thermal Comfort Manager 7701 using three transducers with Clo, Met and area settings for each transducer

Specifications

Flatman is made of 10 mm aluminum with cuts in body parts to reduce weight and allow air flow around the transducers. Adjustable joints in shoulders, elbows, hips and knees secures correct positioning of "Flatman" and transducers.	Thermal Comfort Data Logger 1221 See separate Product Data Sheet BP1613	Dry Heat Loss Transducer MM0057 See separate Product Data Sheet BP1525
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Ordering Information

EA 6020: Flatman UA 0588: Transducer Mounting Adapter 1221: Thermal Comfort Data Logger UA 1278*: Dry Heat Loss Module MM 0057*: Dry Heat Loss Transducer incl. 2 metre cable *):One or more	WL 0945: RS-232 Cable (25- to 9 pin) WL 0946: RS-232 Cable (25- to 25 pin) Optional Accessories ZG 0342: 90-230 V AC mains supply. Support up to 6 transducers	ZG 0403: 12 V DC to 12 V DC power supply. Supports up to 8 transducers AO 0285: Extension cable in standard lengths of 6, 10, 15, 20 & 25 metres
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