

Uses:

- Measures Radiant Temperature Asymmetry
- Measures Plane Radiant Temperature
- Evaluates discomfort due to thermal radiation asymmetry

Features:

- Measurements are stable and accurate
- Reacts quickly to temperature changes
- Simultaneously measures on 2 sides
- Insensitive to influence from air velocity
- Complies with ISO7726

Introduction

The Radiant Temperature Asymmetry Transducer – INNOVA MM0036 consists of two identical faces (A and B), see diagram below, that independently measure net incident radiation on each plane surface.

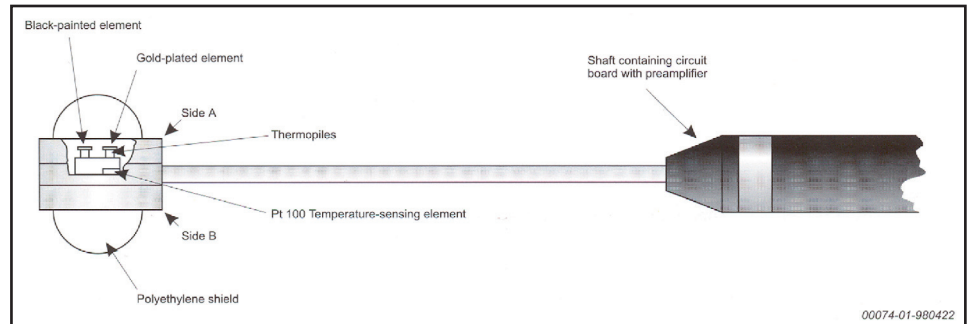
Measurement results from the transducer are used to evaluate radiant asymmetry discomfort from hot and cold surfaces, according to ISO7730.

By measuring plane radiant temperature (t_{pr}) in several directions the mean radiant temperature can also be calculated.

The transducer is designed for use with Thermal Comfort Data Logger – INNOVA 1221.

Radiant Temperature Asymmetry

Radiant temperature asymmetry (Δt_{pr}) is defined as the difference between the plane radiant temperature (t_{pr}) on two opposite sides of a small black element. The parameter t_{pr} describes the heat radiation in one direction. It is defined as the uniform surface temperature of a half-room that produces the same incident radiation on a black surface as the actual environment.



Transducer Design

Each face of the transducer consists of a reflective gold-plated element and a black-painted element of the same size. Both elements are connected to a centre block via thermopiles. When either heated or cooled by the environment, the gold-plated element gains or loses heat entirely by convection whereas the black element loses or gains heat both by convection and radiation. Thus, as both elements have essentially the same temperature, the resultant difference voltage produced across the thermo-piles is a function of the net heat transfer by radiation between the black element and the environment. The t_{pr} is calculated from this measurement and from the temperature inside the centre block, which is measured using a Pt100 temperature-sensitive resistor.

Both sets of elements are covered with polyethylene shields. These prevent air velocity from influencing the results.

Specifications – INNOVA MM0036

RADIANT TEMPERATURE ASYMMETRY TRANSDUCER:

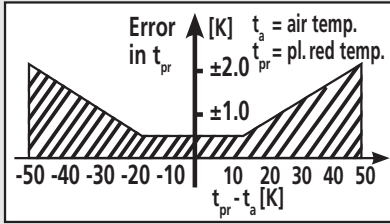
Measurement Range:

$t_{\text{ambient}} \pm 50^{\circ}\text{C}$ ($\pm 90^{\circ}\text{F}$)

Response Time:

15s to 50% of step change, 60s to 90%

Accuracy:



Integral Connection Cable:

Length 2.5m; connected to associated equipment via a 12-pin DIN plug JP1205

WEIGHT:

Approx. 160g (including cable)

DIMENSIONS:

Length: 255mm



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.
CISPR 22 (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: $5 \leq t_a \leq 40^{\circ}\text{C}$ ($41 \leq t_a \leq 104^{\circ}\text{F}$)
Storage Temperature: -25 to $+70^{\circ}\text{C}$ (-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/s^2 , 10-500 Hz.
IEC 68-2-27: Shock: 1000 m/s^2 .
IEC 68-2-29: Bump: 1000 bumps at 250m/s^2 .

Ordering Information

MM0036 Radiant Temperature Asymmetry Transducer

Includes following accessories:

UA0851 Windshields (16)

Optional Accessories

1221 Thermal Comfort Data Logger with UA1277 Heat Stress Module
DH0492 Tripod Mounting Adaptor for 3 Transducers
UA1347 Tripod Mounting Adaptor for 4 Transducers
KE0357 Transducer Carrying Case
UA0803 Tripod

UA1348 Tripod Extension Rods (3)
UA0588 Transducer Mounting Adaptor
UA0851 Radiation Transparent Windshields
WL0691 Extension Cable (std. length 6m)
WL0691/y Extension Cable (definable length up to 100m; y is length in meters)

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