# Platinum Temperature Sensor **FMA- 2145**

## Technical Data

| | |
|---|---|
| Resistance at 0°C ($R_0$) | 1000 Ω |
| Temperature coefficient (0°C up to +100°C) | 3.85 · $10^{-3}$ $K^{-1}$ |
| Tolerance classes according to DIN EN 60751 | • F 0,1 (0°C - +150°C)<br>• F 0,15 (-30°C - +300°C)<br>• F 0,3 (-50°C - +500°C)<br>• F 0,6 (-50°C - +600°C) |
| Operating temperature range depending on lead material: | |
| AgPd5, Au-coated Ni-wire | -50 °C up to +400 °C |
| Pt-coated Ni-wire | -50 °C up to +500 °C (short-time up to +550 °C) |
| Pt | -50 °C up to +600 °C |
| Measurement current (DC) at 25 °C | 0.1 mA |
| Maximal permissible peak current (DC) at 25 °C | 0.3 mA |
| Insulation resistance | > 10 MΩ |
| Self-heating at 0 °C | < 0.5 K / mW |
| Thermal response time | |
| Flowing water (v = 0.2 m/s) | $T_{0.5}$ = 0.07s, $T_{0.9}$ = 0.2s |
| Flowing air (v = 1 m/s) | $T_{0.5}$ = 4 s, $T_{0.9}$ = 10 s |

Resistance value $R_t$ [Ω] at temperature t

| | Tolerance class | | | |
|---|---|---|---|---|
| t | F 0,1 [Ω] | F 0,15 [Ω] | F 0,3 [Ω] | F 0,6 [Ω] |
| 0 °C | 1000±0.4 | 1000±0.6 | 1000±1.2 | 1000±2.4 |
| +100 °C | 1385.1±1 | 1385.1±1.3 | 1385.1±3 | 1385.1±6 |

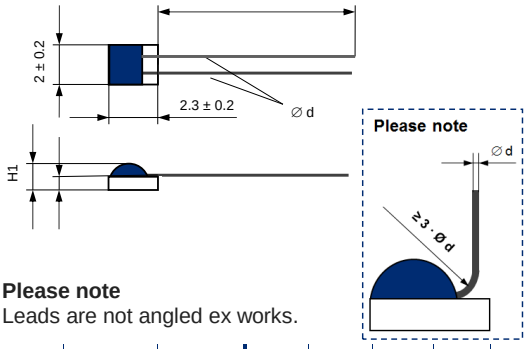
| | |
|---|---|
| $R_t$ measuring point | 2 mm from wire end |
| Maximal Resistance Change at UCT 250 h | < 0.1 % |
| Specification | DIN EN 60751 |
| Type | Film sensor |

**Technology:** Advanced thin-film-technology (ceramic carrier with a structured platinum layer, covered with a passivation layer)

**Operating conditions:** Unprotected application only in dry environments without any contamination

**Conformity:** 2011/65/EU Restriction of the use of Hazardous Substances Directive (RoHS)

Dimensions [mm]

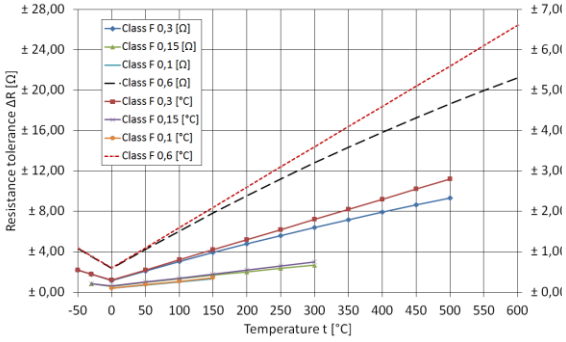



**Please note**
Leads are not angled ex works.

| | FMA- 2145 2x2.3x1.3 | FMA- 2145 2x2.3x1.0 | Leads | AgPd5 | NiAu | NiPt | Pt |
|---|---|---|---|---|---|---|---|
| H1 [mm] | 1.3 ± 0.2 | 1± 0.2 | l [mm] | 15 ± 1 | 15 ± 1 | 10 ± 1 | 7 ± 1 |
| H2 [mm] | 0.65 | 0.4 | d [mm] | 0,25 | 0,2 | 0,2 | 0,2 |

## Functional performance

according to DIN EN 60751




Picture 1: Resistance and temperature tolerances of Pt1000 (Please note - the operating temperature range depends on lead material!)

Temperature range from -50 °C up to 0 °C:

$R_t = R_o \cdot (1 + A \cdot t + B \cdot t^2 + C \cdot (t - 100\ °C) \cdot t^3)$

Temperature range from 0°C up to +600°C:

$R_t = R_o \cdot (1 + A \cdot t + B \cdot t^2)$

Tolerance classes according to DIN EN 60751:

Class F 0,1 (0°C - +150°C): $\Delta t = \pm (0.1 + 0.0017 \cdot |t|)$

Class F 0,15 (-30°C - +300°C): $\Delta t = \pm (0.15 + 0.002 \cdot |t|)$

Class F 0,3 (-50°C - +500°C): $\Delta t = \pm (0.3 + 0.005 \cdot |t|)$

Class F 0,6 (-50°C - +600°C): $\Delta t = \pm (0.6 + 0.01 \cdot |t|)$

Whereby:

$R_t$ … Resistance [Ω] at temperature t

$R_o$ … Resistance [Ω] at 0 °C

t … Temperature [°C]

Δt … Permissible temperature deviation at t [°C]

A = 3.9083 · $10^{-3}$ $°C^{-1}$

B = - 5.775 · $10^{-7}$ $°C^{-2}$

C = - 4.183 · $10^{-12}$ $°C^{-4}$

## Fields of application

- Industrial electronics
- Building automation
- Automotive electronics
- Energy and environmental engineering
- Safety and medical engineering

## Ordering examples

| Construction | Class of accuracy | Leads (ø d x l [mm] lead material) | Operating temperature range [°C] |
|---|---|---|---|
| **FMA- 2145 2x2,3x1.3** | **F 0,15** | **0.25x15 AgPd5** | **-50/+400** |
| **FMA- 2145 2x2,3x1.0** | **F 0,3** | **0.2x10 NiAu** | **-50/+400** |
| **FMA- 2145 2x2,3x1.0** | **F 0,6** | **0.25x15 AgPd5** | **-50/+400** |

Other classes of accuracy and wire lengths are available on request.

UST Umweltsensortechnik GmbH is certified according to


Revision 16/01

© UST Umweltsensortechnik GmbH, 2016
Errors excepted. Subject to alterations for this information and technological changes.


Made in Germany


UST Umweltsensortechnik GmbH
Dieselstr. 2 und 4, 98716 Geschwenda, Germany
Phone +49 36205 713-0
Fax +49 36205 713-10
info@umweltsensortechnik.de
www.umweltsensortechnik.de