# Displacement Sensor, Ultra Flat

## FEATURES

- Sealed
- Infinite resolution
- High integration capacity
- Durability
- Rectilinear: UFPMA type
- Circular: UFPMC type
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

## LINKS TO ADDITIONAL RESOURCES

3D Models | Videos | Application Notes

| QUICK REFERENCE DATA | |
|---|---|
| Sensor type | LINEAR or ROTATIONAL, conductive plastic |
| Output type | Output by wires or connector |
| Market appliance | Industrial, avionics |
| Dimensions | 4 mm (thickness max.) |

| ELECTRICAL SPECIFICATIONS | | |
|---|---|---|
| **PARAMETER** | **UFPMA** | **UFPMC** |
| Total resistance ($R_n$) | 4.7 kΩ | |
| Tolerance on $R_n$ | ± 20 % | |
| Dissipation | ≤ 0.1 W/cm of travel (1) | ≤ 1 W to 70 °C |
| Theoretical electrical travel (TET) | 20 mm to 250 mm (1) | 270° |
| Tolerance on TET | ± 1 mm | ± 3° |
| Electrical continuity travel | TET + 4 mm | 310° |
| Linearity | ± 2 % | ± 1.5 % |
| Temperature coefficient | -300 ppm/°C ± 300 ppm/°C | |
| Collector / track current ($I_c$) | ≤ 1 mA | |
| Recommended current $I_c$ | ≤ 100 µA | |
| Recommended load impedance | ≥ 100 $R_n$ | |
| Output smoothness | < 0.1 % (NFC 93 255) | |

**Note**

(1) See “Specific UFPMA Characteristics” table

| MECHANICAL SPECIFICATIONS | | |
|---|---|---|
| **PARAMETER** | **UFPMA** | **UFPMC** |
| Design | Flexible insulating films | Flexible insulating films on FR4 substrate |
| Mechanical travel | = Electrical continuity travel | = Electrical continuity travel (customer stops) |
| Backlash | < 0.1 mm | < 0.3° |
| Mounting | With double-sided adhesive on flat, clean, and dry support | |
| Speed displacement | ≤ 1.5 m/s | |
| Drive | Force ≥ 0.3 N | Torque ≥ 1 N cm |
| Protection class (NFC 20 010) | IP 66 | |
| Maximum alignment fault | ± 1 mm | - |

| PERFORMANCE | | |
|---|---|---|
| **PARAMETER** | **UFPMA** | **UFPMC** |
| Life | 25M operations for TET < 200 mm<br>15M operations for TET ≥ 200 mm | > 10M cycles |
| Operating temperature range | -30 °C to +80 °C | |
| Storage temperature range | -40 °C to +90 °C | |
| Support | Flat, clean, and dry | |

**Note**

- Nothing stated herein shall be construed as a guarantee of quality or durability

## SAP PART NUMBERING GUIDELINES - UFPMA

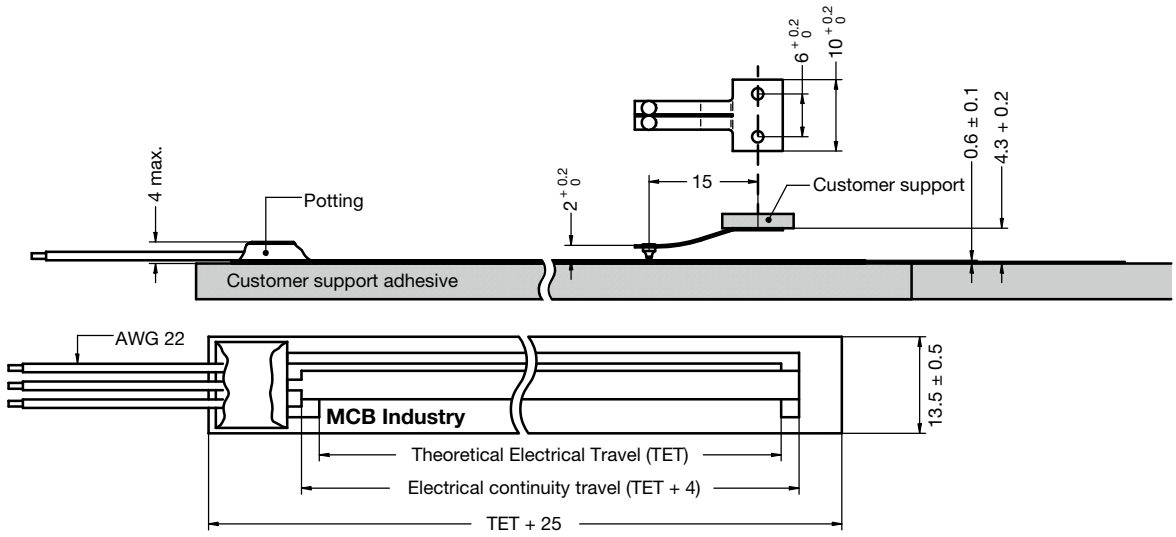
| MODEL | TYPE | THEORETICAL ELECTRICAL TRAVEL (mm) | TYPE | VALUE | LINEARITY | LEADS | PACKAGING |
|---|---|---|---|---|---|---|---|
| UFPM | A = linear | 060<br>100<br>150<br>200<br>250 | A = aeronautic, off-road, or medical | 472 = 4K7 | X = ± 2 % (UFPMA) | W = wires | B = bulk |

## CONNECTIONS

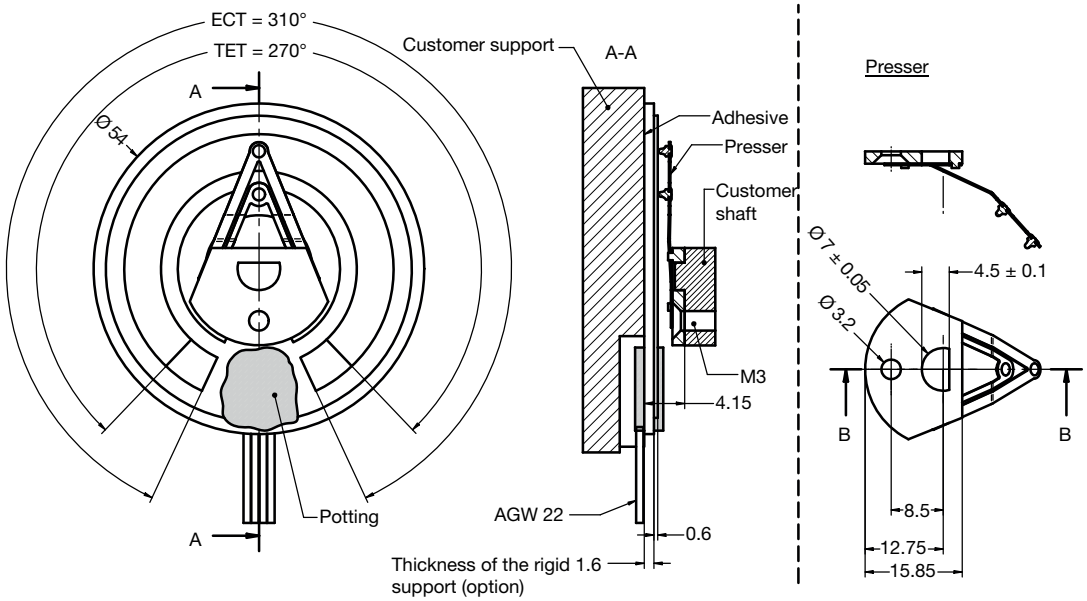
3 x AWG 22 color wires length 300 mm

## DIMENSIONS in millimeters

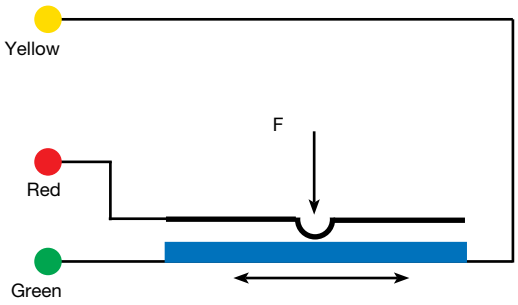
**UFPMA**




**UFPMC (ON REQUEST)**



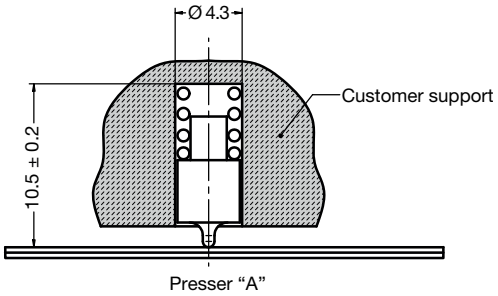
## ELECTRICAL DIAGRAM




The voltage varies according to the position of the presser on the deformable membrane.

## OPTIONS (on request)

- Other presser

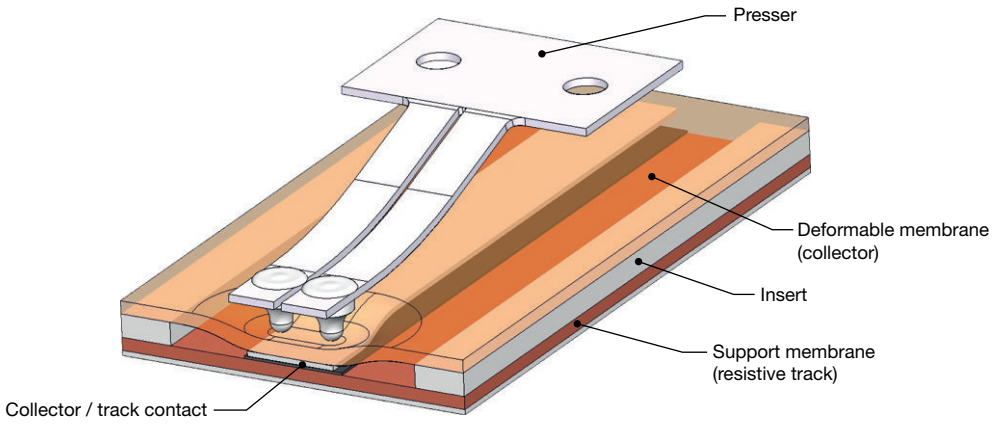



## SPECIFIC VERSIONS (on request)

- Other electrical or mechanical characteristics
- Other bases
- Integration in equipment
- Other versions: outdoor design, ...
- Integration in equipment
  (flat flex cable, contacts, connector, ...)

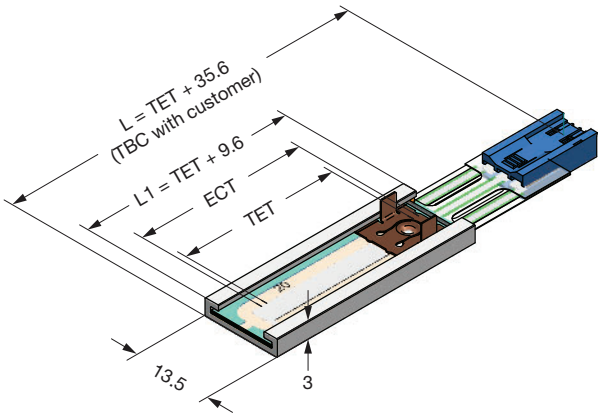
| SPECIFIC UFPMA CHARACTERISTICS | | | |
|---|---|---|---|
| THEORETICAL ELECTRICAL TRAVEL (TET) (mm) | DISSIPATION AT +40 °C (W) | ELECTRICAL CONTINUITY TRAVEL (ECT) (mm) | FILM LENGTH (mm) |
| 50 | ≤ 0.5 | 54 | 75 |
| 100 | ≤ 1.0 | 104 | 125 |
| 150 | ≤ 1.5 | 154 | 175 |
| 200 | ≤ 2.0 | 204 | 225 |
| 250 | ≤ 2.5 | 254 | 275 |

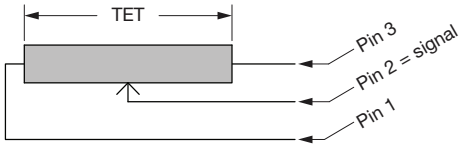
## OPERATING DESCRIPTION



## ON REQUEST

**KITPMA**: **KIT P**otentiometer **M**embrane **A**ssembled with flat flex cable output
(active track and wiper mounted inside a metal profile for easier assembling inside customer equipment: no need to manage the distance between wiper and track)




Electrical diagram

## ELECTRICAL CHARACTERISTICS

| PARAMETER | |
|---|---|
| Resistance ($R_n$) | 4700 Ω ± 30 %<br>(for TET = 27.4 mm, other values on request) |
| Theoretical electrical travel (TET) | 27.4 mm<br>(other values on request) |
| Electrical continuity travel (ECT) | TET + 2 mm |
| Maximum using electrical travel | TET - 2 mm |
| Recommended load impedance on the wiper | ≥ 1000 $R_n$ |
| Wiper current | < 1 mA |
| Maximum dissipation up to +85 °C | 0.025 W/mm |

## ENVIRONMENTAL CHARACTERISTICS

| PARAMETER | |
|---|---|
| Operating temperature | -30 °C / +80 °C |
| Non operating temperature | -40 °C / +90 °C |

**Feasible Variants:**

- TET: from 27.4 mm to 2000 mm
- Linearity:
  - standard 2 % (1 % on request) for TET 27.4 mm
  - 0.25 % for TET 2000 mm
- Customizable profile: the shape of metal profile (shape and outer dimensions: width, height) can be adapted to customer request. Comment: width of 13.5 mm + thickness of 3 mm are only for small length (to consult us to define dimensions)
- Interfacing: the wiper drive interface can be customized
- Output: by flat flex cable or wires
- Temperature range (on request): -55 °C to +100 °C

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