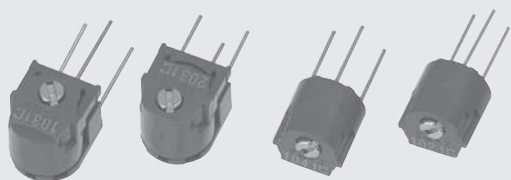


## 3 回転型だから微細な設定が簡単

# 3 回転型サーメットトリマ 3 TURNS CERMET TRIMMERS

# TM-7

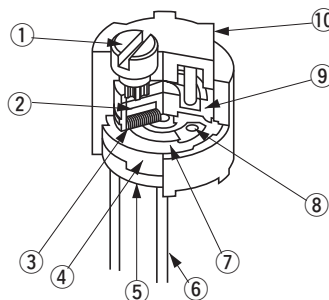
RoHS 指令対応 RoHS compliant



## 特長 FEATURES

- RoHS 指令対応
- 微細な設定が可能
- バックラッシュが最小 (当社比)
- RoHS compliant
- Fine setting is possible
- Extremely small backlash (In house comparison)

内部構造図 INTERNAL STRUCTURE



| 名称<br>Part name            | 材料<br>Material                                    | 燃焼性<br>Flammability |
|----------------------------|---------------------------------------------------|---------------------|
| ① シャフト<br>Shaft            | 亜鉛合金、ニッケルめっき<br>Zinc alloy, Nickel-plated         | —                   |
| ② ゴム板<br>Rubber cushion    | シリコンゴム<br>Silicone rubber                         |                     |
| ③ ワイパ (摺動子)<br>Wiper       | 多元合金<br>Multi metal alloy                         |                     |
| ④ ベースエレメント<br>Base element | セラミック<br>Ceramic                                  |                     |
| ⑤ 接着剤<br>Adhesive          | エポキシ<br>Epoxy                                     | UL94V-0             |
| ⑥ 端子<br>Terminal pin       | 銅、錫めっき<br>Copper, Tin-plated                      | —                   |
| ⑦ 抵抗体<br>Resistive element | RuO <sub>2</sub> サーメット<br>RuO <sub>2</sub> cermet |                     |
| ⑧ 電極体<br>Electrode         | Ag-Pd サーメット<br>Ag-Pd cermet                       |                     |
| ⑨ ロータギア<br>Rotor gear      | PA (ポリアミド)<br>Polyamide                           | UL94HB              |
| ⑩ ハウジング<br>Housing         | PBT (ポリブチレンテレフタレート)<br>Polybutyleneterephthalate  | UL94V-0             |

## 型式表示 PART NUMBER DESIGNATION

TM - 7 E P 50 k Ω ( 503 )

シリーズ名 Series name

抵抗値記号 Resistance code

端子 Terminal pin

E : 無鉛めっき品 (鉛フリー対応) Sn (Lead-free)

抵抗値 Resistance value

製品形状 Product shape

P : 上面調整 Top adjustment S : 側面調整 Side adjustment  
W : 上面調整 Top adjustment X : 側面調整 Side adjustment

※ご注文に際しては、型式一覧表をご確認ください。

Please refer to the LIST OF PART NUMBERS when placing orders.

## 型式一覧表 LIST OF PART NUMBERS

| 調整方向<br>Adjustment position                                                                                                                         | 端子形状 (上面図)<br>Shape of terminal (Top view)                                        | 包装形態<br>Form of packaging | 包装数量<br>Pieces in package |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------|---------------------------|
|                                                                                                                                                     |                                                                                   | ポリ袋<br>Plastic bag        |                           |
| 上面調整<br>Top adjustment<br>                                         |  | TM-7EP                    | 50 pcs./pack              |
|                                                                                                                                                     |  | TM-7EW                    |                           |
| 側面調整<br>Side adjustment<br>(↑ 調整面)<br>(↑ Adjustment direction)<br> |  | TM-7ES                    |                           |
|                                                                                                                                                     |  | TM-7EX                    |                           |

## 電気的特性 ELECTRICAL CHARACTERISTICS

|                                       |                                                                         |
|---------------------------------------|-------------------------------------------------------------------------|
| 公称抵抗値範囲<br>Nominal resistance range   | 50 Ω ~ 2 MΩ                                                             |
| 抵抗値許容差<br>Resistance tolerance        | ± 10 %                                                                  |
| 定格電力<br>Power ratings                 | 0.5 W (70 °C) 0 W (120 °C)                                              |
| 抵抗変化特性<br>Resistance law              | 直線性 (B)<br>Linear law                                                   |
| 最大入力電圧<br>Maximum input voltage       | DC300 V 又は定格電力の何れか小さい方<br>DC300 V or power rating, whichever is smaller |
| 最大ワイパ電流<br>Maximum wiper current      | 100 mA 又は定格電力の何れか小さい方<br>100 mA or power rating, whichever is smaller   |
| 有効電気的回転数<br>Effective electrical turn | 2.5 turns                                                               |
| 残留抵抗値<br>End resistance               | 1 % 又は 2 Ω の何れか大きい方以下<br>1 % or 2 Ω, whichever is greater               |
| 接触抵抗変化<br>C.R.V.                      | 1 % 又は 3 Ω の何れか大きい方以下<br>1 % or 3 Ω, whichever is greater               |
| 使用温度範囲<br>Operating temp. range       | -55 ~ 120 °C                                                            |
| 抵抗温度係数<br>Temp. coefficient           | ± 100 10 <sup>-6</sup> /°C maximum                                      |
| 絶縁抵抗<br>Insulation resistance         | 1000 MΩ minimum (DC500 V)                                               |
| 絶縁耐圧<br>Dielectric strength           | AC900 V, 60 s                                                           |
| 質量<br>Net weight                      | Approx. 0.50 g (TM-7EP, EW)<br>Approx. 0.69 g (TM-7ES, EX)              |

## <公称抵抗値> <Nominal resistance values>

|       |       |        |        |        |      |      |       |
|-------|-------|--------|--------|--------|------|------|-------|
| 50 Ω  | 100 Ω | 200 Ω  | 500 Ω  | 1 kΩ   | 2 kΩ | 5 kΩ | 10 kΩ |
| 20 kΩ | 50 kΩ | 100 kΩ | 200 kΩ | 500 kΩ | 1 MΩ | 2 MΩ |       |

Fig. 1

※ ご注文に際しては、〈公称抵抗値〉(Fig. 1)について上記すべての組み合わせが標準品として用意しています。

※ ご注文に際しては、上記型式をご確認ください。

※ The above part numbers are all available as the standard item respectively with the combination of <Nominal resistance values> (Fig. 1).

※ Verify the above part numbers when placing orders.

## 機械的特性 MECHANICAL CHARACTERISTICS

|                             |                                                     |
|-----------------------------|-----------------------------------------------------|
| 調整ネジ回転数<br>Mechanical turn  | 3 turns                                             |
| 回転トルク<br>Operating torque   | 20 mN·m {204 gf·cm} maximum                         |
| 回転止<br>Mechanical stop      | クラッチ動作<br>Clutch action                             |
| 回転寿命<br>Rotational life     | 200 cycles ΔR/R ≤ ± (2 Ω + 3 %)                     |
| 端子強度<br>Terminal strength   | 10 N {1.02 kgf} minimum<br>(引張り強さ Tensile strength) |
| 操作部の押し強さ<br>Thrust to shaft | 10 N {1.02 kgf} minimum                             |
| はんだ付け性<br>Solderability     | 245 ± 3 °C, 2 ~ 3 s                                 |

{ } : 参考値 Reference only

## 環境特性 ENVIRONMENTAL CHARACTERISTICS

| 試験項目<br>Test item           | 試験条件<br>Test conditions                                                                                             | 仕様<br>Specifications                              |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 熱衝撃<br>Thermal shock        | -65 ~ 125 °C (0.5 h), 5 cycles                                                                                      | [ ΔR/R ≤ 1 %]<br>[S.S. ≤ 1 %]                     |
| 耐湿性<br>Humidity             | -10 ~ 65 °C (相対湿度 80 ~ 98 %),<br>10 cycles, 240 h                                                                   | [ ΔR/R ≤ 2 %]                                     |
| 耐衝撃性<br>Shock               | 981 m/s <sup>2</sup> , 6 ms<br>6 directions for 3 times each                                                        | [ ΔR/R ≤ 1 %]<br>[S.S. ≤ 1 %]                     |
| 耐振動性<br>Vibration           | 振幅 (Amplitude) 1.52 mm or<br>加速度 (Acceleration) 196 m/s <sup>2</sup> ,<br>10 ~ 2000 Hz, 3 directions, 12 times each |                                                   |
| 負荷寿命<br>Load life           | 70 °C, 0.5 W, 1000 h                                                                                                | [ ΔR/R ≤ 3 %]<br>[S.S. ≤ 1 %]                     |
| 低温動作<br>Low temp. operation | -55 °C, 2 h                                                                                                         | [ ΔR/R ≤ 2 %]<br>[S.S. ≤ 2 %]                     |
| 高温放置<br>High temp. exposure | 120 °C, 250 h                                                                                                       | [ ΔR/R ≤ 3 %]<br>[S.S. ≤ 2 %]                     |
| 耐水・密閉性<br>Immersion seal    | 85 °C, 60 s                                                                                                         | もれ無し (連続気泡無し)<br>No leaks (No continuous bubbles) |
| はんだ耐熱性<br>Soldering heat    | フロー : Flow soldering<br>260 ± 3 °C, 5 ~ 6 s, two times maximum<br>手はんだ : Manual soldering<br>380 ± 10 °C, 3 ~ 4 s   | [ ΔR/R ≤ 1 %]                                     |

Δ R/R : 全抵抗値変化  
S.S. : 設定安定度  
Change in total resistance  
Setting stability

# TM-7

## CERMET TRIMMERS

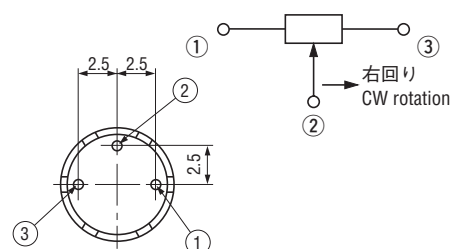
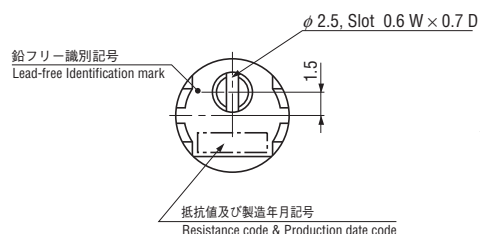
### ■最大入力定格 MAXIMUM INPUT RATINGS

| 公称抵抗値<br>Nominal resistance values (Ω)    | 抵抗値記号<br>Resistance code               | 最大入力電圧<br>Maximum input voltage (V)        | 最大ワイパ電流<br>Maximum wiper current (mA)        |
|-------------------------------------------|----------------------------------------|--------------------------------------------|----------------------------------------------|
| 50<br>100<br>200<br>500                   | 500<br>101<br>201<br>501               | 5.00<br>7.07<br>10.0<br>15.8               | 100<br>70.7<br>50.0<br>31.6                  |
| 1 k<br>2 k<br>5 k<br>10 k<br>20 k<br>50 k | 102<br>202<br>502<br>103<br>203<br>503 | 22.4<br>31.6<br>50.0<br>70.7<br>100<br>158 | 22.4<br>15.8<br>10.0<br>7.07<br>5.00<br>3.16 |
| 100 k<br>200 k<br>500 k<br>1 M<br>2 M     | 104<br>204<br>504<br>105<br>205        | 224<br>300<br>300<br>300<br>300            | 2.24<br>1.50<br>0.60<br>0.30<br>0.15         |

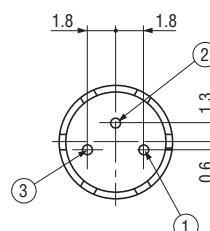
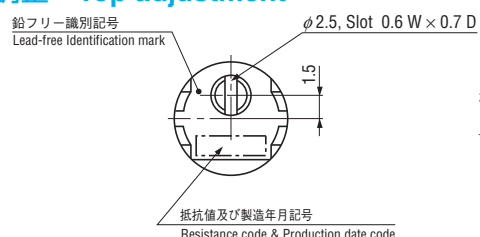
### ■外形寸法図 OUTLINE DIMENSIONS

Unless otherwise specified, tolerance:  $\pm 0.3$  (Unit: mm)

#### ● TM-7EP 上面調整 Top adjustment

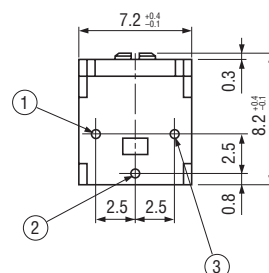
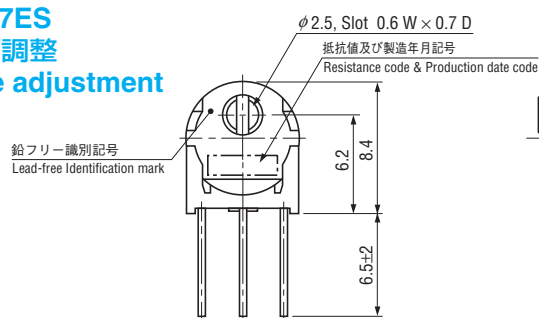


#### ● TM-7EW 上面調整 Top adjustment



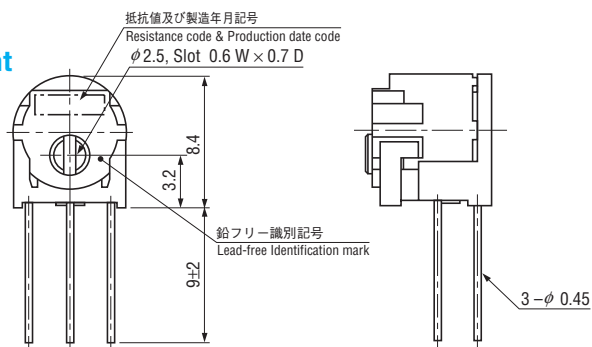
★ P 型とピンピッチが異なります。  
Pin pitch in W type is different from P type.

#### ● TM-7ES 側面調整 Side adjustment

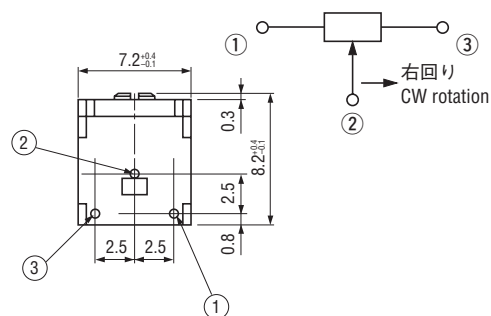


### ■外形寸法図 OUTLINE DIMENSIONS

#### ● TM-7EX 側面調整 Side adjustment



Unless otherwise specified, tolerance: ± 0.3 (Unit: mm)



★ S 型とピン位置及びシャフト位置が異なります。  
Pin position & shaft position of X type are different from S type.

### ■包装仕様

#### 〈ポリ袋の包装仕様〉

- ポリ袋での包装は、50 個 / 袋となります。
- ポリ袋の箱詰めは、200 個を製品箱に包装致します。

### ■ PACKAGING SPECIFICATIONS

#### <Bulk pack specifications>

- Unit of bulk in a plastic bag is 50 pcs. per pack.
- Boxing of bulk in a plastic bag is performed with 200 pcs. per box.