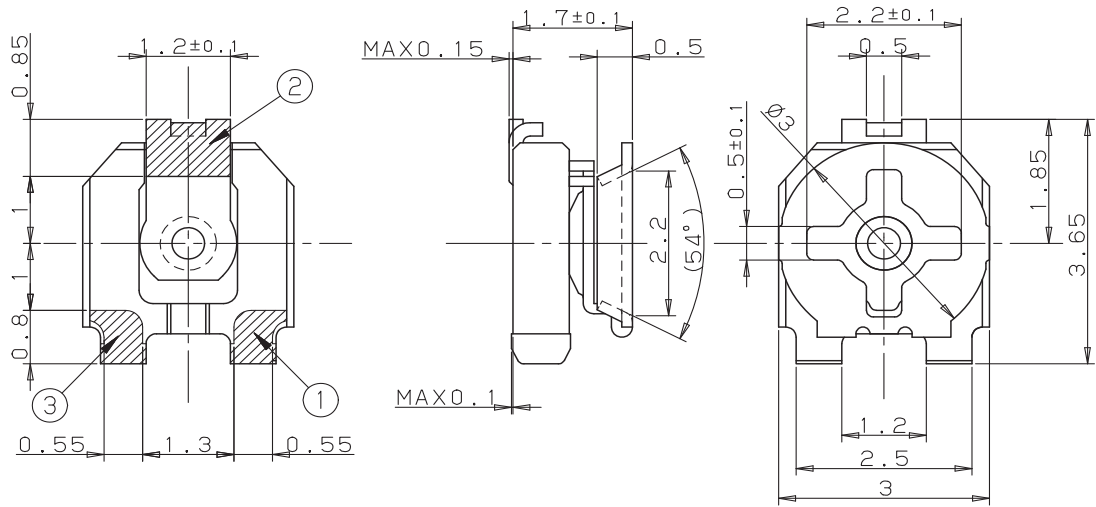


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| 会社(工場)名 CUSTOMER'S NAME | 部番(ストックNo.) CUSTOMER'S PART No. |
|-------------------------|---------------------------------|

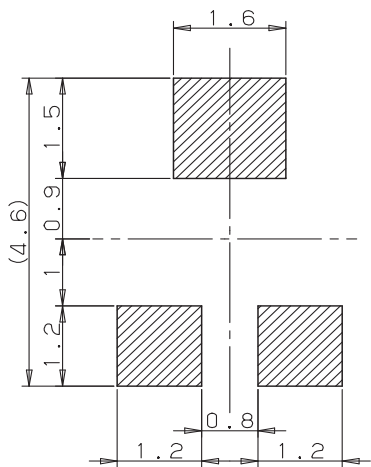
1. 外形寸法図

EXTERNAL DIMENSIONS



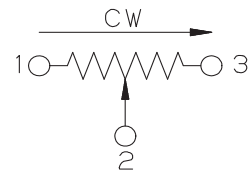
はんだパターン (リフロー用)
(参考寸法)

PATTERN (FOR REFLOW SOLDERING)
(REFERENCE)



参考図

回路図
CIRCUIT DIAGRAM



| | | | | | | | |
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| 設計 DESIGNED | 検図 CHECKED | 尺度 SCALE | 一般公差 TOL. UNLESS OTHERWISE STATED | 帝通名 NOBLE PART NAME | | | |
| 2007.2.21 | 2007.2.21 | 10 / 1 | less than 15 | ±0.3 | TMC3KJ-B□□-TR(/□) | | |
| | | | 15-less than 30 | ±0.5 | | | |
| | | | 30-less than 100 | ±1.0 | | | |
| | | | 100-less than 300 | ±1.5 | | | |
| 単位 UNIT | mm | 第三角法 THIRD ANGLE PROJECTION METHOD | 300-less than 1000 | ±2.0 | 帝通図番 DRAWING No. | 868-9007C(/□) | |
| | | | ANGLE | ±5 | | | |

2. 適用範囲 本仕様書は、主に民生機器に用いるTMC3KJ型について規定します。
 Scope : This specification is applied to Model TMC3KJ types mainly used for consumer products.

3. 形 名 TMC3KJ
 Model : TMC3KJ

4. 外形寸法
 Appearance

4.1 外形 目視によって確認した時、異常ありません。
 Appearance: There shall be no remarkable damage in the visual inspection.

4.2 寸法 外形寸法図に示します。
 Dimension: Please see the drawing attached.

5. 試験状態
 Test Conditions

この規格における基準状態は温度20℃、気圧101.3kPaとします。特に指定の無い限り、全ての試験は標準状態〔温度15～35℃、気圧86～106kPa、相対湿度25～85%〕により行います。但し、判定に疑義を生ずる場合、又は再現性を必要とする場合には、JIS C 60068-1:1993 によります。
 In this specification standard temperature and atmospheric pressure are 20 °C and 101.3 kPa respectively. Unless otherwise specified, all tests shall be done in a 15 to 35 °C at an atmospheric pressure of 86 to 106 kPa and a relative humidity 25 to 85%. In case there are any doubtful points in judgement or reproductivity is needed. They shall be in accordance with JIS C 60068-1:1993.

6. 定 格
 Rating

| 番号 No. | 項 目 Items | 仕 様 Testing Method and Condition | 規 格 Specification |
|-----------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| 6.1 | 使用温度範囲 Operating Temp. Range | 使用温度(湿度)範囲は、本仕様書に基づく評価で保証しており、使用温度範囲の上限または下限付近で永続的な使用を保証するものではありません。 Operating temperature(humidity) range is assumed by the evaluation criteria based on this specification. It does not guarantee a permanent use around upper or lower limit of operating temperature range. | -55～+125℃ |
| 6.2 | 保存温度範囲 Storage Temp. Range | | 9.2項、9.9項を満足します。 Para.9.2 Cold Resistance (Storage) and para.9.9 Resistance to Heat(Storage) shall be satisfied. |

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| 番号 No. | 項目 Items | 仕様 Testing Method and Condition | 規格 Specification |
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| 6.3 | 定格電力 Rated Power | <p>端子1と3の間に連続負荷することが出来る最大電力です。尚、周囲温度に対する定格電力の軽減曲線は下図によります。</p> <p>Rated power shall be based on continuous full load between terminals 1 and 3 at ambient temperature of 70 °C. In case of ambient temperature 70 to 125 °C, the power level shall be derated in accordance with the diagram below.</p> <div style="text-align: center;"> <p>Power Derating Ratio (%)</p> <p>Ambient temperature (°C)</p> </div> | 0.15W |
| 6.4 | 定格電圧 Rated Voltage | <p>定格電圧は定格電力に対応する直流、または交流(商用周波数実効値)の電圧とし、次の式によって求めます。但し、定格電圧が6.5項の最高使用電圧を超える場合は、この最高使用電圧を定格電圧とします。</p> <p>Rated voltage shall be continuous working voltage of DC or AC (r.m.s. value at power frequency) corresponding to the rated power, and be obtained from the following formula. When the obtained rated voltage exceeds the maximum working voltage of para.6.5, the maximum working voltage shall be the rated voltage.</p> $E = \sqrt{P \cdot R}$ <p>E: 定格電圧(V) Rated Voltage (V) P: 定格電力(W) Rated power (W) R: 公称全抵抗値(Ω) Nominal total resistance (Ω)</p> | 左記によります。 Rated voltage shall comply with the left. |
| 6.5 | 最高使用電圧 Max. Rated Voltage | | AC50V , DC50V |

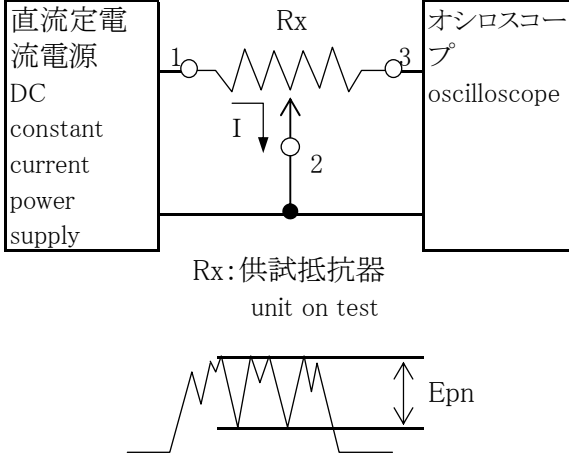
7. 電気的性能

Electrical Performance

| 番号 No. | 項目 Items | 仕様 Testing Method and Condition | 規格 Specification |
|-----------|------------------------------------|------------------------------------|---------------------------------------------------------------------------------------|
| 7.1 | 公称全抵抗値 Nominal Total Resistance | | 別表1の範囲とします。 Nominal total resistance shall comply with the table 1. |
| 7.2 | 全抵抗値 Total Resistance | | 公称全抵抗値の±25% Total resistance shall be within ±25% of the nominal total resistance. |
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| 番号 No. | 項目 Items | 仕様 Testing Method and Condition | 規格 Specification | | | | | | |
|-----------|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------|-----------|-------------------------|-----------|-------------------------------------------------------------|
| 7.3 | 抵抗変化特性 Resistance Taper | | 0B Taper B (Linear) | | | | | | |
| 7.4 | 残留抵抗値 Residual Resistance | 摺動子を有効回転角の終端に置いた時の端子1-2間及び2-3間の抵抗値を測定します。 The wiper shall be placed at the each end of the effective rotational angle and then the resistance between terminal 1-2 and 2-3 shall be measured. | 下表を満足します。 Residual resistance shall comply with the table below. | | | | | | |
| | | | <table border="1"> <tr> <th>公称全抵抗値 Nominal Total Resistance (R)</th> <th>残留抵抗値 Residual Resistance</th> </tr> <tr> <td>R < 300 Ω</td> <td>3 Ω 以下 Less than 3 Ω</td> </tr> <tr> <td>R ≥ 300 Ω</td> <td>公称全抵抗値の1%以下 Less than 1% of the nominal total resistance</td> </tr> </table> | 公称全抵抗値 Nominal Total Resistance (R) | 残留抵抗値 Residual Resistance | R < 300 Ω | 3 Ω 以下 Less than 3 Ω | R ≥ 300 Ω | 公称全抵抗値の1%以下 Less than 1% of the nominal total resistance |
| | | | 公称全抵抗値 Nominal Total Resistance (R) | 残留抵抗値 Residual Resistance | | | | | |
| | | | R < 300 Ω | 3 Ω 以下 Less than 3 Ω | | | | | |
| R ≥ 300 Ω | 公称全抵抗値の1%以下 Less than 1% of the nominal total resistance | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 7.5 | 集中接触抵抗 Concentration and Contact Resistance | 端子1-2間の抵抗値が全抵抗値の約1/2になるような位置に摺動子を置き、下記にて算出します。 The wiper shall be placed at the point so that the resistance between terminal 1-2 is almost 1/2 of the total resistance. The concentration and contact resistance shall be calculated by the following formula. $\frac{(R_{12} + R_{23}) - R_{13}}{2 \times R_{13}} \times 100 (\%)$ R ₁₂ : 端子1と2の間の抵抗値 (Ω) Resistance between terminals 1-2 (Ω) R ₂₃ : 端子2と3の間の抵抗値 (Ω) Resistance between terminals 2-3 (Ω) R ₁₃ : 端子1と3の間の抵抗値 (Ω) Resistance between terminals 1-3 (Ω) | 5%以内 Within ±5%. | | | | | | |

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| 番号 No. | 項目 Items | 仕様 Testing Method and Condition | 規格 Specification |
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| 7.6 | 摺動雑音 Rotational Noise | <p>下図の測定回路につなぎ、操作部を毎分約6往復の速さで、有効回転角度の約10~90%の範囲にわたり回転させます。</p> <p>The specimen shall be connected to the measuring circuit shown below. The operating knob shall be rotated through 10~90% of the effective rotational angle at a rate of 6 cycles per minute (one cycle is one turn clockwise, then one turn counter clockwise.)</p> <p>摺動雑音：$\frac{E_{pn}}{I \times R_n} \times 100(\%)$ Rotational noise : $I \times R_n$</p> <p>Epn: オシロスコープ上に現れる変動幅の最大値(V) Maximum deviation limit on the oscilloscope (V)</p> <p>I : 測定電流 (A) Measuring current (A)</p> <p>Rn: 供試抵抗器の公称全抵抗値(Ω) Nominal total resistance of the specimen (Ω)</p> <p>周波数特性: 直流~50kHz Frequency characteristic : DC ~ 50 kHz</p>  <p>オシロスコープの入力インピーダンスは供試抵抗器の10倍以上で、測定電流は定格電流を越えません。</p> <p>Input impedance of the oscilloscope must be more than 10 times as much as of the nominal total resistance of the specimen and measuring current must not exceed the rated current.</p> | 5%以内 Within ±5%. |

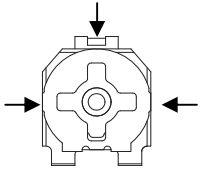
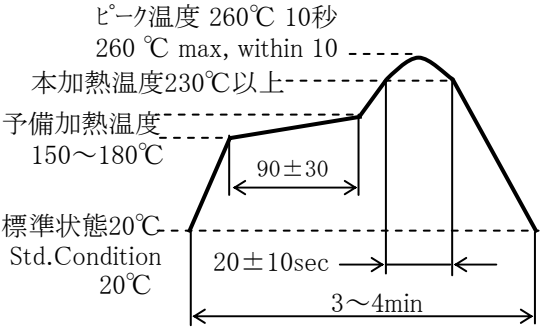
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| 番号 No. | 項目 Items | 仕様 Testing Method and Condition | 規格 Specification | | | | | | | | |
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| 7.7 | 抵抗温度特性 Resistance Temperature Characteristic | <p>供試抵抗器を下表の順序で、それぞれの規定温度に達してから30分間経過した後、全抵抗値を測定します。抵抗温度係数は順序2を基準温度とし、下式により算出します。</p> <p>Total resistance after being exposed in a test chamber at a specified table below for 30 minutes shall be measured. Temperature at order 2 shall be considered as the reference temperature when calculating temperature coefficient.</p> <table border="1"> <thead> <tr> <th>順序 Order</th> <th>温度 Temperature</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55±3℃</td> </tr> <tr> <td>2</td> <td>20±2℃</td> </tr> <tr> <td>3</td> <td>125±3℃</td> </tr> </tbody> </table> <p>抵抗温度係数(ppm/℃) $= \frac{(R - R_0) \times 1000000}{R_0 \times (t - t_0)}$ Temperature coefficient</p> <p>R: t℃における全抵抗実測値(Ω) Total resistance at t℃(Ω) R₀: t₀℃における全抵抗実測値(Ω) Total resistance at t₀℃(Ω) t: 試験温度の実測値(℃) Temperature of order 1 or 3(℃) t₀: 基準温度の実測値(℃) Temperature of order 2(℃)</p> | 順序 Order | 温度 Temperature | 1 | -55±3℃ | 2 | 20±2℃ | 3 | 125±3℃ | ±250ppm/℃以内 Within ±250 ppm/℃. |
| 順序 Order | 温度 Temperature | | | | | | | | | | |
| 1 | -55±3℃ | | | | | | | | | | |
| 2 | 20±2℃ | | | | | | | | | | |
| 3 | 125±3℃ | | | | | | | | | | |

8. 機械的特性

Mechanical Performance

| 番号 No. | 項目 Items | 仕様 Testing Method and Condition | 規格 Specification |
|-----------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| 8.1 | 全回転角度 Total Rotational angle | エンドレス(有効回転角度) Endless (effective rotational angle) | 250±20° |
| 8.2 | 回転トルク Rotational Torque | JIS C 5260-1:1999 により測定します。 Rotational torque shall be measured according to JIS C 5260-1:1999. | 1~20mN・m |
| 8.3 | 耐振性 Resistance to Vibration | <p>JIS C 60068-2-6:1995 により、摺動子を全抵抗値の約1/2に設定し、下記の振動を互いに直角な3方向に各2時間ずつ合計6時間加えます。周波数:10Hz→55Hz→10Hz 1サイクルを1分で直線に掃引します。振幅は1.5mmの正弦波振動とします。</p> <p>The wiper shall be placed at the point so that the resistance between terminal 1-2 is almost 1/2 of the total resistance, and 2 hours of vibration specified below shall be applied in each of three mutually perpendicular directions for a total of 6 hours. (In accordance with JIS C 60068-2-6:1995) 1 cycle : 10 Hz → 55 Hz → 10 Hz being swept linearly over 1 minute Amplitude : 1.5 mm sine wave</p> | 全抵抗値の変化率は初期値の±2%以内です。 Variation rate of total resistance shall be within ±2%. |
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| 番号 No. | 項目 Items | 仕様 Testing Method and Condition | 規格 Specification | | | |
|-----------|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------|--|
| 8.4 | はんだ付け強度 Robustness of Electrode | <p>8.5項によるはんだ付け後、下図に示す方向に静荷重 5Nを 10±1 秒間加えます。</p> <p>The specimen shall be soldered in a same manner as para.8.5, and then the static load 5 N shall be applied to the side of resistance element as shown in figure below.</p>  <p>はんだ付けは3/19頁 はんだパターン(リフロー用)によります。</p> <p>The soldering electrode pattern on circuit board is shown in 3/19 page.</p> | <p>はんだ付け部の割れ、欠け、ひび等の異常が無く、残留抵抗値7.4項、集中接触抵抗7.5項、摺動雑音7.6項及び回転トルク8.2項を満足します。</p> <p>There shall not be abnormality such as voids, breaks and cracks of soldering portions. Para.7.4 Residual Resistance, para.7.5 Concentration and Contact Resistance, para.7.6 Rotational Noise and para.8.2 Rotational Torque shall be satisfied.</p> | | | |
| 8.5 | はんだ耐熱性 Resistance to Reflow Soldering Heat | <p>下図に示すリフロープロファイルに基づいて、はんだ付けをします。(温度は、基板の端子はんだ付け部の最高温度を示します。)</p> <p>Resistance to reflow soldering heat shall be measured according to the figure next page. (Temperature shows the maximum value at the soldering portions of terminals.)</p>  <p>ピーク温度 260°C 10秒 260 °C max, within 10</p> <p>本加熱温度230°C以上</p> <p>予備加熱温度 150~180°C</p> <p>90±30</p> <p>標準状態20°C Std.Condition 20°C</p> <p>20±10sec</p> <p>3~4min</p> | <p>全抵抗値の変化率は初期値の±2%以内です。</p> <p>Variation rate of total resistance shall be within ±2%.</p> | | | |
| 8.6 | 衝撃 Shock | <p>JIS C 5260-1:1999 により、摺動子を全抵抗値の約1/2に設定し、最大加速度490m/ s²にて作用時間11msの正弦半波衝撃を互いに直角な6方向に各3回ずつ合計18回加えます。</p> <p>The wiper shall be placed at the point so that the resistance between terminal 1-2 is almost 1/2 of the total resistance, and maximum acceleration 490 m/ s², half-sine pulse waveform with duration 11ms shall be applied in each of 6 mutually perpendicular directions, 3 times for a total of 18, according to JIS C 5260-1:1999.</p> | <p>全抵抗値の変化率は初期値の±2%以内です。</p> <p>Variation rate of total resistance shall be within ±2%.</p> | | | |
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9. 耐候性能

Environmental and Endurance Characteristics

| 番号 No. | 項目 Items | 仕様 Testing Method and Condition | 規格 Specification | | | | | | | | | | | | | | | |
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| 9.1 | 耐寒性 Resistance to Cold | 温度 $-55\pm 3^{\circ}\text{C}$ 中に、無負荷で 48 ± 4 時間放置します。測定は標準状態で1~2時間放置後に行います。 The specimen shall be subjected in a test chamber at $-55\pm 3^{\circ}\text{C}$ at no load for 48 ± 4 hours, and then left to the standard conditions for 1 to 2 hours. | 全抵抗値の変化率は初期値の $\pm 5\%$ 以内です。 Variation rate of total resistance shall be within $\pm 5\%$. | | | | | | | | | | | | | | | |
| 9.2 | 保存耐寒性 Resistance to Cold (Storage) | 最小包装単位に包装した状態で、温度 $-5\pm 3^{\circ}\text{C}$ 中に、無負荷で 72 ± 2 時間放置します。規定の測定は、標準状態で1~2時間放置後に行います。 The specimens shall be packed in the minimum packing unit designated and subjected in a test chamber at $-5\pm 3^{\circ}\text{C}$ for 72 ± 2 hours, and then left to the standard conditions for 1 to 2 hours. | 全抵抗値の変化率は初期値の $\pm 5\%$ 以内です。摺動雑音7.6項、回転トルク8.2項、はんだ耐熱性8.5項を満足します。 Variation rate of total resistance shall be within $\pm 5\%$. Para.7.6 Rotational noise, para.8.2 Rotational Torque and para.8.5 Resistance to Reflow Soldering Heat shall be satisfied. | | | | | | | | | | | | | | | |
| 9.3 | 温度サイクル Temperature Cycle | 試料を下表に示した温度サイクルを無負荷で連続5サイクル行います。規定の測定は、標準状態で1~2時間放置後に行います。 The specimen shall be maintained at each temperature and duration specified in a table below for continuous 5 cycles, and then left to the standard conditions for 1 to 2 hours. | 全抵抗値の変化率は初期値の $\pm 2\%$ 以内です。 Variation rate of total resistance shall be within $\pm 2\%$. | | | | | | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th>順序 Order</th> <th>温度($^{\circ}\text{C}$) Temperature ($^{\circ}\text{C}$)</th> <th>時間(分) Time (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55 ± 3</td> <td>30~35</td> </tr> <tr> <td>2</td> <td>標準状態 Std. Condition</td> <td>10~15</td> </tr> <tr> <td>3</td> <td>125 ± 3</td> <td>30~35</td> </tr> <tr> <td>4</td> <td>標準状態 Std. Condition</td> <td>10~15</td> </tr> </tbody> </table> | 順序 Order | 温度($^{\circ}\text{C}$) Temperature ($^{\circ}\text{C}$) | 時間(分) Time (min) | 1 | -55 ± 3 | 30~35 | 2 | 標準状態 Std. Condition | 10~15 | 3 | 125 ± 3 | 30~35 | 4 | 標準状態 Std. Condition | 10~15 | |
| 順序 Order | 温度($^{\circ}\text{C}$) Temperature ($^{\circ}\text{C}$) | 時間(分) Time (min) | | | | | | | | | | | | | | | | |
| 1 | -55 ± 3 | 30~35 | | | | | | | | | | | | | | | | |
| 2 | 標準状態 Std. Condition | 10~15 | | | | | | | | | | | | | | | | |
| 3 | 125 ± 3 | 30~35 | | | | | | | | | | | | | | | | |
| 4 | 標準状態 Std. Condition | 10~15 | | | | | | | | | | | | | | | | |
| 9.4 | 耐湿性 (定常状態) Resistance to Damp (Steady State) | 温度 $40\pm 2^{\circ}\text{C}$ 、相対湿度90~95%槽中へ、摺動子を全抵抗値の約1/2に設定し、無負荷で 240 ± 8 時間放置します。規定の測定は、標準状態で1~2時間放置後に行います。 The specimen shall be subjected in a test chamber at $40\pm 2^{\circ}\text{C}$, 90~95% RH at no load for 240 ± 8 hours, and then left to the standard conditions for 1 to 2 hours. | 全抵抗値の変化率は初期値の $\pm 5\%$ 以内です。 Variation rate of total resistance shall be within $\pm 5\%$. | | | | | | | | | | | | | | | |

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| 番号 No. | 項目 Items | 仕様 Testing Method and Condition | 規格 Specification |
|-----------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9.5 | 耐久性 (耐湿負荷) Endurance (Damp Resistant Loading) | 温度40±2℃、相対湿度90～95%槽中へ、摺動子を全抵抗値の約1/2に設定し、端子1-3間に直流定格電圧を1時間30分加え、30分切るようなサイクルで合計1000±12時間加えます。規定の測定は、標準状態で1～2時間放置後行います。 The specimen shall be subjected in a test chamber at 40±2℃, 90～95%RH with a rated DC voltage applied across terminals 1-3 for 1,000±12 hours at a cycle consisting of an “ON” time 1.5 hours and an “OFF” time 0.5 hours, under the condition that the wiper shall be at the point so that the resistance between terminal 1-2 is almost 1/2 of the total resistance, and then left to the standard conditions for 1 to 2 hours. | 全抵抗値の変化率は初期値の±5%以内です。 Variation rate of total resistance shall be within ±5%. |
| 9.6 | 耐久性 (定格負荷) Endurance (Rated Load) | 温度70±3℃槽中へ摺動子を全抵抗値の約1/2に設定し、端子1-3間に直流定格電圧を1時間30分加え、30分切るようなサイクルで合計1000±12時間加えます。規定の測定は、標準状態で1～2時間放置後行います。 The specimen shall be subjected in a test chamber at 70±3℃, with a rated DC voltage applied across terminals 1-3 for 1,000±12 hours at a cycle consisting of an “ON” time 1.5 hours and an “OFF” time 0.5 hours, under the condition that the wiper shall be at the point so that the resistance between terminal 1-2 is almost 1/2 of the total resistance, and then left to the standard conditions for 1 to 2 hours. | 全抵抗値の変化率は初期値の±3%以内です。 Variation rate of total resistance shall be within ±3%. |
| 9.7 | 耐久性 (摺動) Endurance (Sliding) | JIS C 5260-1:1999 により操作部を毎分10～17回の速さで有効回転角の90%以上にわたり、無負荷で20往復します。 但し、公称抵抗値が200Ω未満は10往復とします。 The wiper shall be rotated for 20 cycles (one cycle is one turn clockwise, then one turn counter clockwise), at a rate of 10～17 cycles per minute, according to JIS C 5260-1:1999. In case nominal total resistance is less than 200Ω, the operating life is 10 cycles. | 全抵抗値の変化率は初期値の±10%以内です。 Variation rate of total resistance shall be within ±10%. |
| 9.8 | 耐熱性 Resistance to Heat | 温度125±3℃の槽中へ摺動子を全抵抗値の約1/2に設定し、無負荷で240±8時間放置します。規定の測定は、標準状態で1～2時間放置後行います。 The specimen shall be subjected in a test chamber at 125±3℃ at no load for 240±2 hours. Under the condition that the wiper shall be at the point so that the resistance between terminal 1-2 is almost 1/2 of the total resistance, and then left to the standard conditions for 1 to 2 hours. | 全抵抗値の変化率は初期値の±3%以内、集中接触抵抗は10%以内です。 Variation rate of total resistance shall be within ±3%. Concentration and contact resistance is within 5% before test and within 10% after test. |

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| 番号 No. | 項目 Items | 仕様 Testing Method and Condition | 規格 Specification |
|-----------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9.9 | 保存耐熱性 Resistance to Heat (Storage) | 最小包装単位に包装した状態で、温度40±2℃中に、無負荷で72±2時間放置します。規定の測定は、標準状態で1～2時間放置後行います。 The specimens shall be packed in the minimum packing unit designated and subjected in a test chamber at 40±2 °C for 72±2 hours, and then left to the standard conditions for 1 to 2 hours. | 全抵抗値の変化率は初期値の±3%以内です。摺動雑音7.6項、回転トルク8.2項、はんだ耐熱性8.5項を満足します。 Variation rate of total resistance shall be within ±3%. Para.7.6 Rotational noise, para.8.2 Rotational Torque and para.8.5 Resistance to Reflow Soldering Heat shall be satisfied. |

10. ご使用上の注意
Notice on usage

10.1 包装保管

Storage under being packed

貴社受け入れ後の保管は、弊社出荷時の包装状態で、温度5～35℃、相対湿度85%以内の範囲で結露及び、有害なガス発生の無い場所に保管し、6ヶ月以内にご使用下さい。

- After being received, the products packed shall be stored under 85 %RH max. at 5 to 35℃, but not in the place where dew and/or harmful gas are apt to occur.
- Please use the products within 6 months after the receipt.

10.2 RoHS対応

RoHS

当該製品はRoHS指令 (EU Directive2011/65/EU) に禁止されている化学物質(カドミウム、鉛、水銀、六価クロム、PBBs、PBDEs)を含んでいません。(法規制値未満である事)

This item does not contain the chemical element(Cd, Pb, Hg, Cr6+, PBBs, PBDEs,) prohibited by Rohs Directive. (EU Directive 2011/65/EU) (Less than the amount of Law Restricti)

10.3 本製品のご使用に際しては、本仕様書記載の最大定格や使用上の注意を遵守願います。なお、最大定格や使用上の注意を逸脱した使用に起因する損害に関して弊社はその責を負いません。

When using products, please use products in the range of the requirements and conditions described in the specification and not use products in excess of the maximum rating.

① 本製品は、下記の用途に使用する目的で製造された製品です

Products specified in the specification have been manufactured for applications listed below.

- 家電製品 •AV機器 •OA機器 •家庭用ゲーム機 •通信機[端末]
- Electric home appliances •Audio visual equipment •Office machines
- Home video game machines •Communications equipment [terminal]

下記等の 極めて高い信頼性、安全性が必要とされる用途にはご使用にならないで下さい。

Please do not use products in such as following equipment for applications requiring a high degree of safety or reliability.

- 例: •航空宇宙機器 •発電所機器 •通信機器[幹線] •ガス漏れ検知機等
- 交通信号機 •自動車列車等運送機器の走行系及び安全装置 •医療機器

Examples: •Aircraft equipment •Aerospace equipment •Power plant equipment
•Communications equipment[trunk] •Gas detect systems •Traffic signal equipment
•Driving control systems and safety device components of Transportation equipment
(vehicles, trains, etc.) •Medical equipment

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- ② 当該製品の品質には万全を尽くしていますが故障モードとして、ショート、オープン等の発生が皆無とは言えません。安全性が重視されるセットの設計に際しては、当該製品の単一故障に対してセットとしての影響を事前にご検討いただき、かつフェールセーフ設計により安全を確保していただきます様をお願い致します。

Although we are exerting our efforts to maintain the quality of products, we cannot guarantee that products will never cause short circuiting and open circuitry. Therefore, When designing an equipment or device with which the priority is given to the safety, please carefully study the influences to the whole equipment by a single function failure and achieve the safety of equipment by the fail-safe design.

10.4 使用温度範囲

Operating temperature range

使用温度(湿度)範囲で、標準状態以外での上限・下限付近で連続使用する場合は、別途ご相談下さい。

If products are operated continuously in upper and lower limit to the operating temperature (humidity) range other than standard condition, please contact us separately.

- 10.5 端子のはんだ付け作業を手はんだで実施する場合は、はんだコテ先温度350℃(20Wコテ)、5秒以下で手際良く済ませて下さい。

In case of soldering by a solder iron, it shall be finished within 5 seconds and the temperature of the tip of the soldering iron shall be 350 °C max.

- 10.6 本製品は、リフローはんだ付け後、洗浄無しでも使用できます。但し、フラックス上がりには充分ご注意ください。又、洗浄する場合には充分フラックスを除去して下さい。

After reflow-soldering operation, part may be used without rinsing, if flux is well controled. In case flux rinsing is done, flux shall be removed sufficiently.

- 10.7 本製品のドライバー調整時、調整圧力を 5N 以下にして下さい。

In case of adjustment of unit by driver, the push static force shall be less than 5 N.

11. その他

Others

- 11.1 推奨する調整ドライバー先端形状は下記の通りです。なお、ドライバーは出来るだけ硬い材質をお使い下さい。

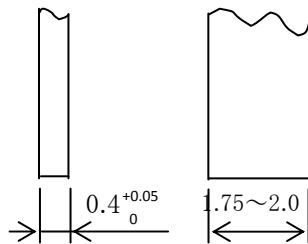
Recommendable shape of the driver tip shall be shown as figure below. (Please use as hard material as possible.)

推奨形状(単位:mm)

Recommendable shape (unit : mm)

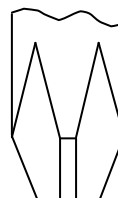
○マイナスイドライバー

・(-)Screw driver



○プラスドライバー

・(+)Screw driver



(株)ベッセル:No.9000 (+)1.7×30

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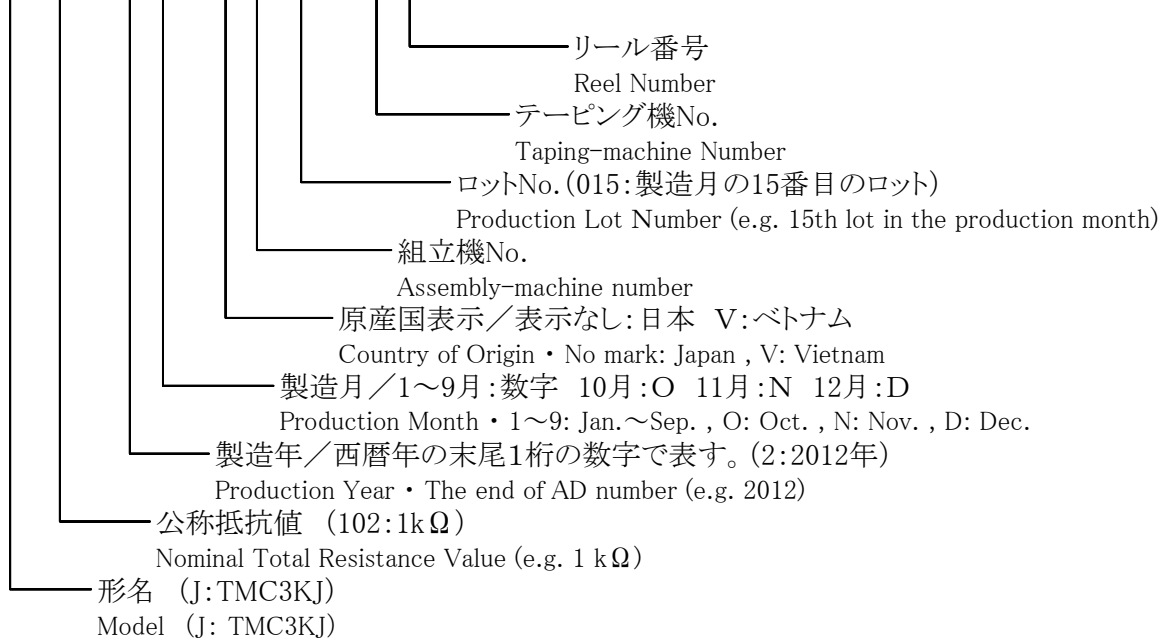
11.2 原産国表示

Country of origin

| | | |
|--------------------------|----------------------------|--------------------------|
| 帝通製品名 NOBLE PART NAME | 帝通図番 DRAWING No. | 原産国 Country of origin |
| TMC3KJ-B□□-TR | 868-9007C 868-1017C | 日本 JAPAN |
| TMC3KJ-B□□-TR/V | 868-9007C/V 868-1017C/V | ベトナム VIETNAM |

11.3 製造ロット表示方法

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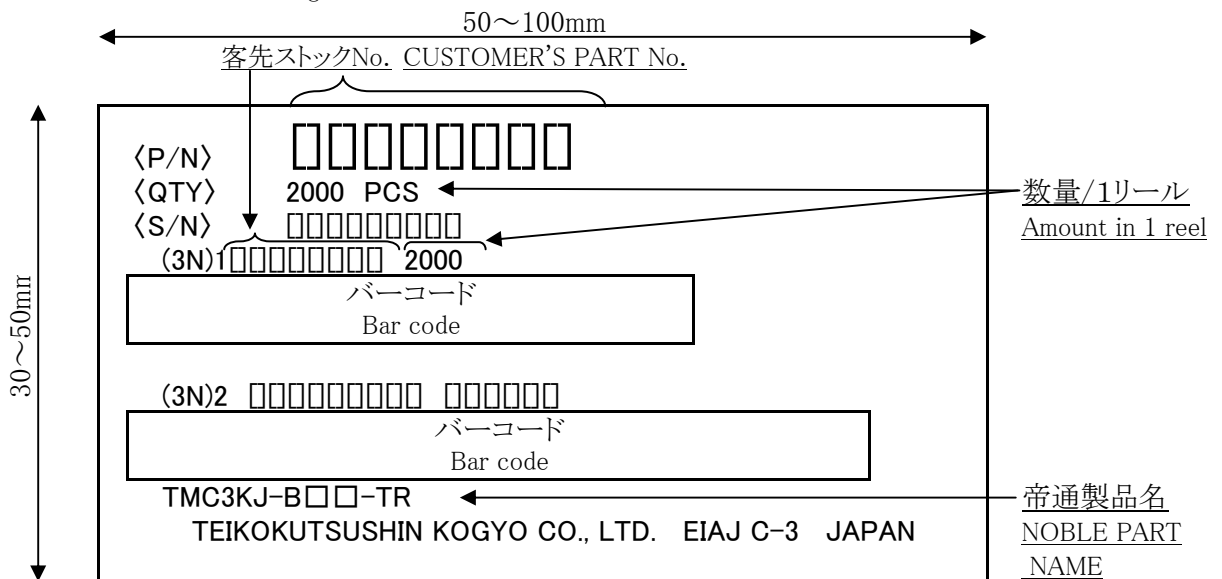


※表示箇所…リールに明記(19/19頁荷姿略図参照願います。)

※Marking position…On the taping reel. (Please see Page19/19 Packing specifications.)

11.4 現品票の記載内容

Actual article label Marking



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12. テーピング仕様
Tape packing

12.1 外形寸法
Appearance

12.1.1 外形 目視によって確認したとき、異常ありません。
Appearance: There shall be no remarkable damage in the visual inspection.

12.1.2 寸法 図1によります。
Dimension: Please see the figure 1.

12.1.3 表示 リール表面に製造社名、又は略号、型名、公称抵抗値、製造月略号、数量、貴社ストックNo.を容易に消えない方法で表示します。
Marking: The following information shall be clearly marked on the surface of the reel with a durable method.
(1) Manufacturer's name or Logo (2) Model name of the product (3) Nominal total resistance
(4) Production lot code (5) Quantity (6) Customer's part No.

12.2 テーピング方法
Packing method

12.2.1 テープは右巻(テープの端を手前に取り出した時、送り穴が右側になります。)とします。
The tape shall be wound clockwise (The feed holes shall be located at the right side of the tape, when its end is pulled out under the condition that the cover tape is at the upper side of the carrier tape).

12.2.2 カバーテープはキャリアテープの送り穴に、0.5mmを超えてかかりません。又、キャリアテープからはみだしません。
The cover tape shall neither cover the feed holes by more than 0.5 mm nor stick out of the carrier tape.

12.2.3 リーダー部のテープの長さは200mm以上、部品が入っていないキャリアテープは40mm以上とします(図2)。部品が入っていないキャリアテープはカバーテープでシールします。
The length of the leading portion at the outer end of the tape shall be more than 200 mm and the blank carrier tape of more than 40 mm. (Fig.2)

12.2.4 リールの芯巻付近の終端部テープは、部品が入っていないキャリアテープが40mm以上とします(図2)。
The blank carrier tape of more than 40 mm shall be provided at the inner end of the tape near the core of the reel (Fig.2), and it shall be also covered by a cover tape.

12.2.5 テープの巻き終わりは、接着テープ(80~120mm)でカバーテープのリーダー部をリールに貼り付けます。
The outer end of the leading portion of the cover tape shall be attached to the reel by an adhesive tape (80~120 mm).

12.2.6 カバーテープの剥離力
Force to peel the cover tape off :
図3に示すように、引き剥がし角度155~180°、引き剥がし速度300mm/分でカバーテープを引っ張った時、0.1~0.7Nで剥離します。
The cover tape shall be peeled off at a range of force 0.1~0.7 N when being pulled at an angle of 155~180° shown in Fig.3 and at a speed of 300 mm/min.

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- 12.2.7 ボリュウム向きは、一定とします(図2)。
The direction of the products shall be constant (Fig.2).
- 12.2.8 ボリュウムは、端数を除いて1リール2,000個収納とします。
2,000 pcs of the products shall be packed in a reel without any fraction.
- 12.3 テーピングの最小曲げ半径
Minimum bending-radius of tape packing
 - 12.3.1 テーピングの最小曲げ半径は、R30mmとし、φ60mmの丸棒へキャリアテープを巻き、10±1秒間放置した後、カバーテープは、キャリアテープより剥離が無く、部品の脱落もありません。なお、最少曲げは1回を限度とします。又、キャリアテープの表裏は問いません。
The minimum bending-radius of the tape packing shall be 30 mm, and when being bent along with a φ60 mm stick for 10±1 seconds, the cover tape shall not be peeled off and no products shall come off. This maximum bending shall be limited as only one time regardless of the side of the tape.
 - 12.3.2 R30mmにキャリアテープを曲げた時、キャビティ同士の当りはありません。
The cavities don't touch each other when the carrier tape is bent at R30 mm.

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図1
FIG.1

EIAJ規格品(参考寸法)
リール寸法
REEL DIMENSION

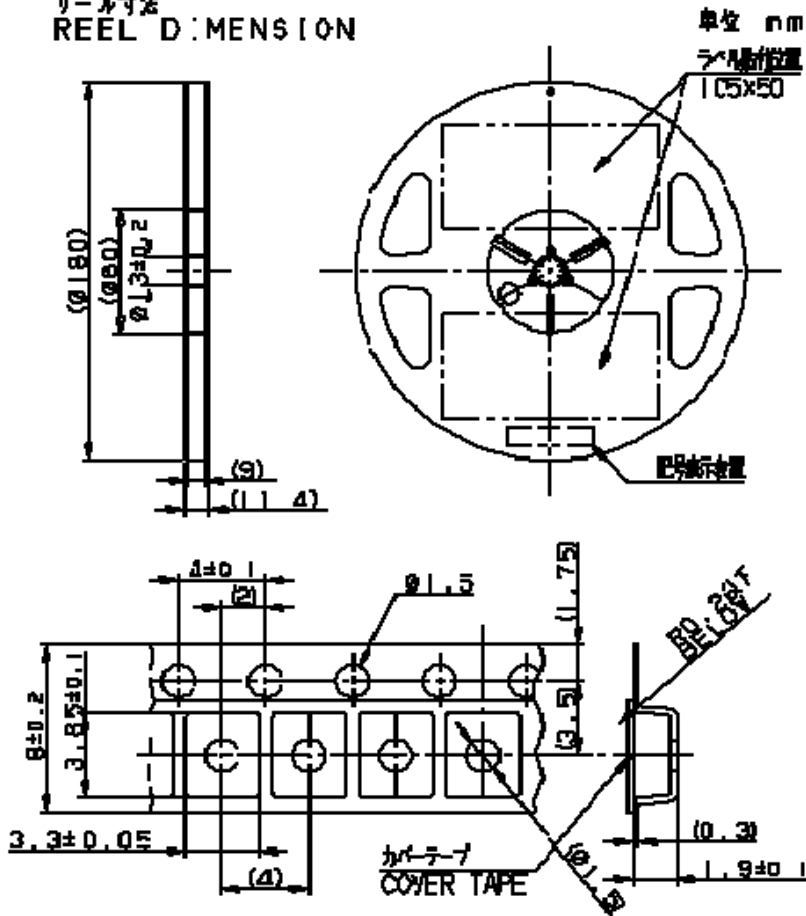


図3
FIG.3

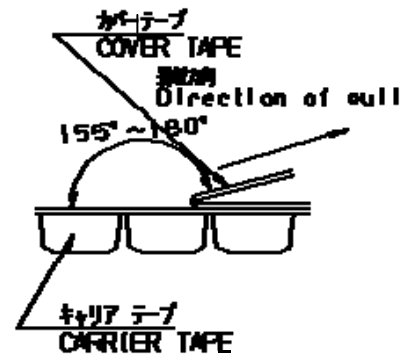
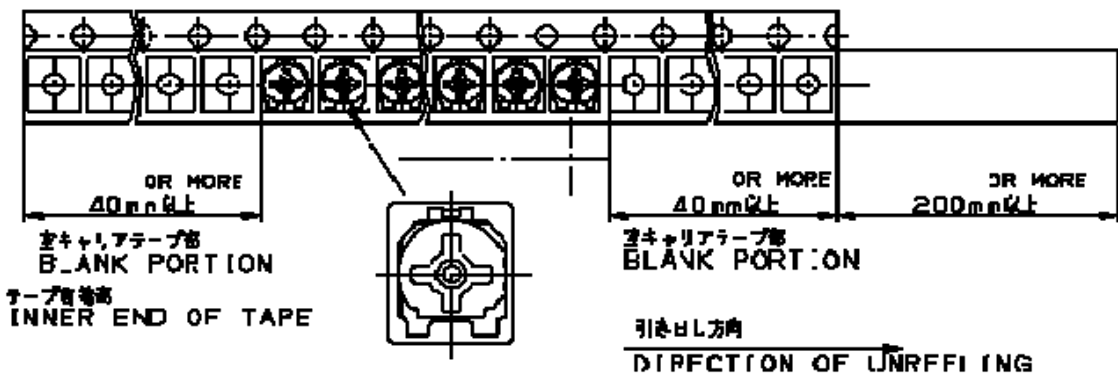


図2
FIG.2

EIAJ規格準拠



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表1 抵抗変化特性と公称全抵抗値表

table 1 RESISTANCE TAPER & NOMINAL TOTAL RESISTANCE

標準抵抗値/STANDARD RESISTANCE(E3 Series)

| 帝通図番 Drawing No | 御社部品番号 Your Part No. | 抵抗値変化特性 ResistanceTaper | 公称抵抗値 Nominal Total Resistance(Ω) | 備考 Reference |
|--------------------|-------------------------|----------------------------|-----------------------------------------|-----------------|
| 868-9007C-1(/□) | | (0) B | 100 | |
| 868-9007C-4(/□) | | (0) B | 220 | |
| 868-9007C-7(/□) | | (0) B | 470 | |
| 868-9007C-10(/□) | | (0) B | 1k | |
| 868-9007C-13(/□) | | (0) B | 2.2k | |
| 868-9007C-16(/□) | | (0) B | 4.7k | |
| 868-9007C-19(/□) | | (0) B | 10k | |
| 868-9007C-22(/□) | | (0) B | 22k | |
| 868-9007C-25(/□) | | (0) B | 47k | |
| 868-9007C-28(/□) | | (0) B | 100k | |
| 868-9007C-31(/□) | | (0) B | 220k | |
| 868-9007C-34(/□) | | (0) B | 470k | |
| 868-9007C-37(/□) | | (0) B | 1M | |
| 868-9007C-40(/□) | | (0) B | 2.2M | |

対応可能抵抗値/CUSTOM RESISTANCE

| 帝通図番 Drawing No | 御社部品番号 Your Part No. | 抵抗値変化特性 ResistanceTaper | 公称抵抗値 Nominal Total Resistance(Ω) | 備考 Reference |
|--------------------|-------------------------|----------------------------|-----------------------------------------|-----------------|
| 868-1017C-2(/□) | | (0) B | 150 | |
| 868-1017C-6(/□) | | (0) B | 330 | |
| 868-1017C-9(/□) | | (0) B | 680 | |
| 868-1017C-11(/□) | | (0) B | 1.5k | |
| 868-1017C-15(/□) | | (0) B | 3.3k | |
| 868-1017C-18(/□) | | (0) B | 6.8k | |
| 868-1017C-20(/□) | | (0) B | 15k | |
| 868-1017C-24(/□) | | (0) B | 33k | |
| 868-1017C-27(/□) | | (0) B | 68k | |
| 868-1017C-29(/□) | | (0) B | 150k | |
| 868-1017C-33(/□) | | (0) B | 330k | |
| 868-1017C-36(/□) | | (0) B | 680k | |
| 868-1017C-38(/□) | | (0) B | 1.5M | |

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包装仕様
Packing Specification

[1] 包装荷姿 (製品名:TMC3KJ TR)
Package (for:TMC3KJ TR)

- 1. 個装 : 1リール 2,000個詰める。
Package for each piece : Bulk pack, 2,000pcs in 1 reel.
- 2. 内装包装 シングルカートン(リール8個入れ)
Inner Carton Single carton(In 8 Reel)
外寸(単位mm) 180(L) × 180(W) × 95(D)
Outer dimension(mm)
最大数 1箱 16,000個 (2,000×8リール)
Maximums 1 Carton=16,000pcs (2,000×8Reel)

3. 外装包装 ダブルカートン(又は シングルカートン)
Outer Carton Double carton (or Single carton)

| 外装箱名 Outer Carton | 内装箱数 Inner Carton | 最大数 Maximums | 外寸 Outer dimension(mm) | | |
|----------------------|----------------------|-------------------------|------------------------|-----|-----|
| | | | W | L | D |
| H-1 | 12箱(Cartons) | 16,000×12 192,000PCS | 320 | 395 | 415 |
| H-2 | 8箱(Cartons) | 16,000×8 128,000PCS | 320 | 395 | 315 |
| H-3 | 6箱(Cartons) | 16,000×6 96,000PCS | 320 | 395 | 215 |
| H-4 | 2箱(Cartons) | 16,000×2 32,000PCS | 320 | 395 | 150 |

4. 表示 : 内装箱の側面に下記内容を表示したラベルを貼ります。
Marking : A packaging label indicating following information shall be attached to the side of the inner cartons.

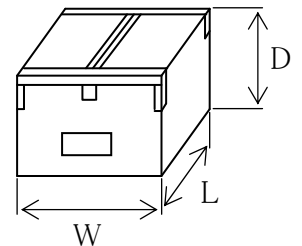
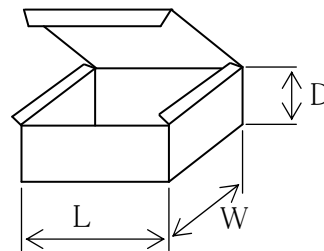
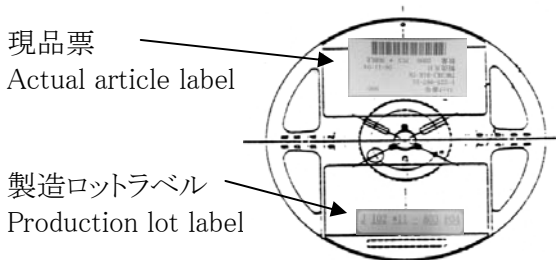
- ①CUSTOMER (お客様名称)
- ②PART NO. (お客様部品番号)
- ③ARRANGED NO. (弊社手配番号)
- ④QUANTITY (数量)
- ⑤NOBLE NAME (弊社製品名称)



5. 荷姿略図 (リール)
Rough sketches (Reel)
of each package

(内装)
(Inner carton)

(外装)
(Outer carton)



| | | | | | | | |
|---|------|----------|----------|---------------------|---|---------------|--|
| △ | ・ | | | △ | ・ | | |
| △ | ・ | | | △ | ・ | | |
| △ | ・ | | | 帝通図番 DRAWING No. | | 868-9007C(/□) | |
| | DATE | REVISION | APPROVED | | | | |