



**UNI-ROYAL**  
厚聲集團

# DATA SHEET

**Product Name** Radial Type Cement Fixed Resistors

**Part Name** PRM Series

**File No.** DIP-SP-029

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## 1. Scope

This datasheet is the characteristics of Radial Type Cement Fixed Resistors manufactured by UNI-ROYAL.

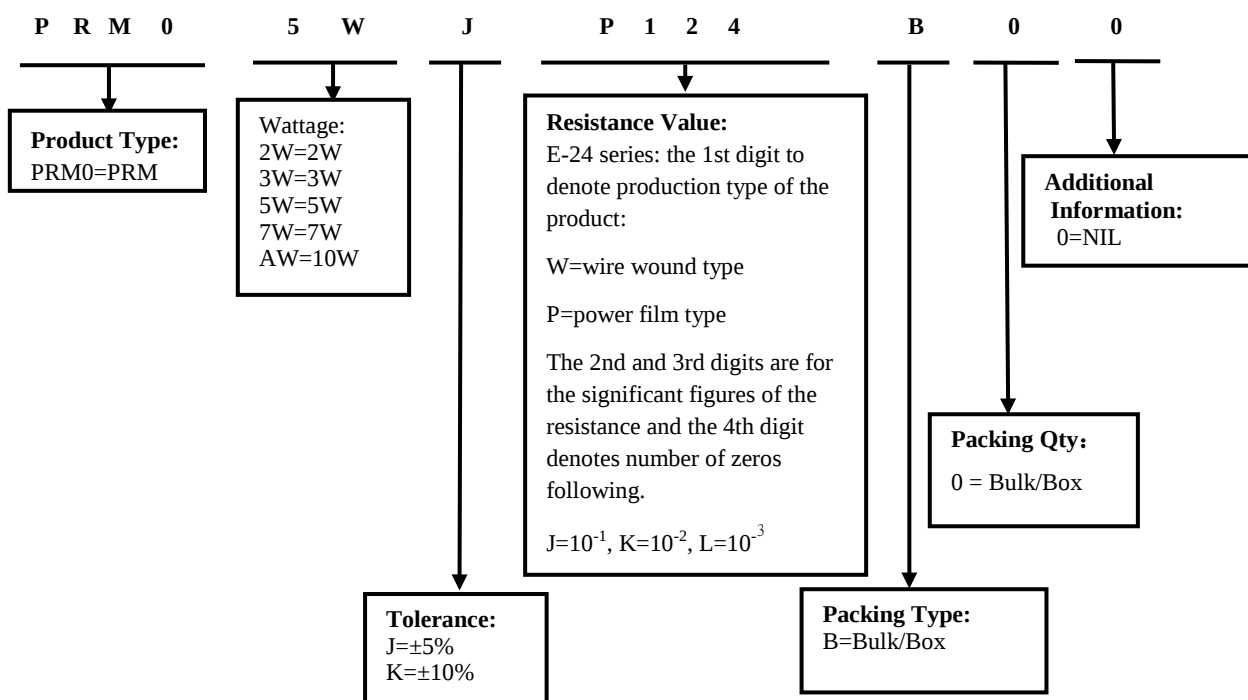
## 2. Part No. System

The standard Part No. includes 14 digits with the following explanation:

- 2.1 For Cement Fixed Resistors, these 4 digits are to indicate the product type but if the product type has only 3digits, the 4<sup>th</sup> digit will be "0"  
Example: PRM0=PRM- type
- 2.2 5<sup>th</sup>~6<sup>th</sup> digits:
  - 2.2.1 For power of 1 watt to 16 watt ,the 5th digit will be a number or a letter code and the 6th digit will be the letters of W.  
Example: 5W=5W; AW=10W;
  - 2.2.2 For power rating Between 20 watt to 99 watt, the 5<sup>th</sup> and the 6<sup>th</sup> digits will show the whole numbers of the power rating itself.  
Example: 20=20W 75=75W
- 2.3 The 7<sup>th</sup> digit is to denote the Resistance Tolerance. The following letter code is to be used for indicating the standard Resistance Tolerance.  
J=±5% K=±10%
- 2.4 The 8<sup>th</sup> to 11<sup>th</sup> digits is to denote the Resistance Value.
  - 2.4.1 For Cement Fixed Resistors the 8<sup>th</sup> digits will be coded with "W"or "P"to denote Wire-wound type or Power Film type respectively of the Cement Fixed Resistor product. the 9<sup>th</sup> & 10<sup>th</sup> digits are to denote the significant figures of the resistance and the 11<sup>th</sup> digit is the number of zeros following  
Example: W12J=1.2Ω W120=12Ω P273=27KΩ
- 2.5 The 12<sup>th</sup>, 13<sup>th</sup> & 14<sup>th</sup> digits.
  - 2.5.1 The 12th digit is to denote the Packaging Type with the following codes: B=Bulk/Box
  - 2.5.2 The 13<sup>th</sup> digit is normally to indicate the Packing Quantity, This digit should be filled with "0"for the Cement products with "Bulk/Box"packing requirements.
  - 2.5.3 For some items, the 14<sup>th</sup> digit alone can use to denote special features of additional information with the following codes or standard product  
Example: 0= standard product

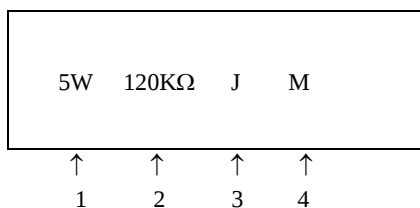
## 3. Ordering Procedure

(Example: PRM 5W ±5% 120KΩ B/B )



## 4. Marking

Example:



Code description and regulation:

1. Wattage Rating
2. Nominal Resistance Value
3. Resistance Tolerance. J:  $\pm 5\%$   
K:  $\pm 10\%$

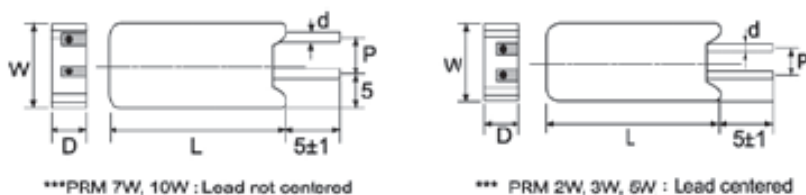
4. Pattern:

M: Power film

W: Wire wound

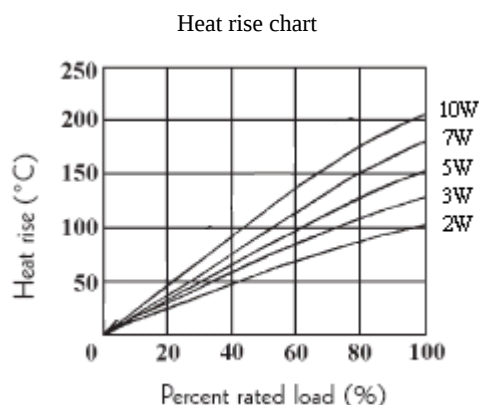
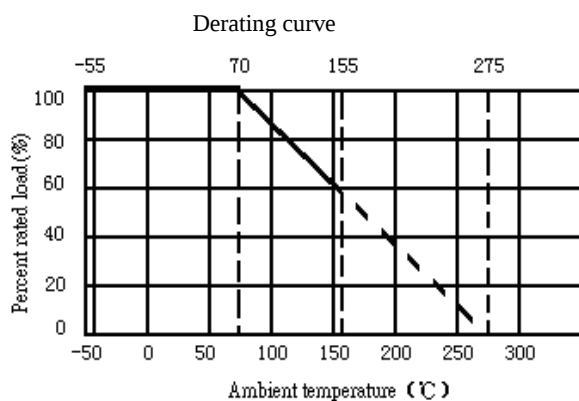
Color of marking: Black Ink

## 5. Ratings & Dimension



| Type   | Dimension(mm) |           |           |           |              | Max Working Voltage | Max Overload Voltage | Resistance Range           |                             |
|--------|---------------|-----------|-----------|-----------|--------------|---------------------|----------------------|----------------------------|-----------------------------|
|        | W $\pm 1$     | D $\pm 1$ | L $\pm 1$ | P $\pm 1$ | d $\pm 0.05$ |                     |                      | Wire Wound                 | Power Film                  |
| PRM 2W | 11.5          | 7.5       | 20        | 5         | 0.70         | 250V                | 500V                 | 0.1 $\Omega$ -27 $\Omega$  | 28 $\Omega$ -120K $\Omega$  |
| PRM 3W | 12.5          | 8.5       | 25        | 5         | 0.70         | 300V                | 600V                 | 0.1 $\Omega$ -39 $\Omega$  | 40 $\Omega$ -150K $\Omega$  |
| PRM 5W | 13            | 9         | 25        | 5         | 0.75         | 350V                | 700V                 | 0.1 $\Omega$ -47 $\Omega$  | 48 $\Omega$ -150K $\Omega$  |
| PRM 7W | 13            | 9         | 38        | 5         | 0.75         | 500V                | 1000V                | 0.1 $\Omega$ -680 $\Omega$ | 681 $\Omega$ -200K $\Omega$ |
| PRM10W | 13            | 9         | 50        | 5         | 0.75         | 700V                | 1400V                | 0.1 $\Omega$ -910 $\Omega$ | 911 $\Omega$ -200K $\Omega$ |

## 6. Derating Curve



## 6.1 Voltage rating:

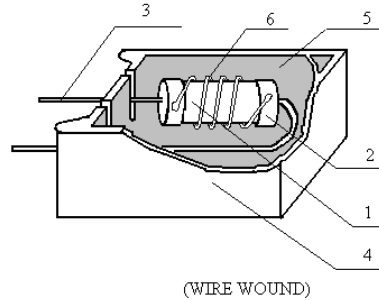
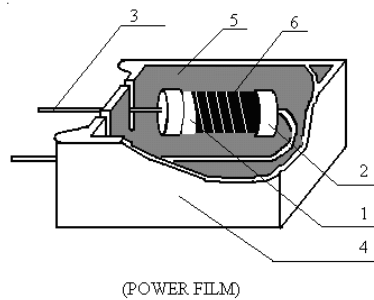
Resistors shall have a rated direct-current (DC) continuous working voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial-line frequency and waveform corresponding to the power rating, as determined from the following formula:

$$RCWV = \sqrt{P \times R}$$

Where: RCWV = rated dc or RMS ac continuous working voltage at commercial-line frequency and waveform (VOLT.)

P = power rating (WATT.)

R = nominal resistance (OHM)

7. Structure

| No. | Name               | Material Generic Name              |
|-----|--------------------|------------------------------------|
| 1   | Body               | Al <sub>2</sub> O <sub>3</sub>     |
| 2   | Cap                | Tin plated iron                    |
| 3   | Lead               | Copper wire                        |
| 4   | Ceramic case       | Al <sub>2</sub> O <sub>3</sub> CaO |
| 5   | Filling materials  | SiO <sub>2</sub>                   |
| 6   | Resistance element | Power film: Metal Oxide Film       |
|     |                    | Wire-wound: Ni-Cr alloys           |

8. Performance Specification

| Characteristic                  | Limits                                                                                                    | Test Methods<br>(GB/T5729&JIS-C-5201&IEC60115-1)                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature Coefficient         | $\geq 20\Omega$ : $\pm 350\text{PPM}/^\circ\text{C}$<br>$< 20\Omega$ : $\pm 400\text{PPM}/^\circ\text{C}$ | 4.8 Natural resistance changes per temp. Degree centigrade<br>$\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (PPM}/^\circ\text{C})$ R <sub>1</sub> : Resistance Value at room temperature (t <sub>1</sub> ) ;<br>R <sub>2</sub> : Resistance at test temperature (t <sub>2</sub> )<br>t <sub>1</sub> : +25°C or specified room temperature<br>t <sub>2</sub> : Test temperature (-55°C or 125°C) |
| Short-time overload             | Resistance change rate must be in $\pm(5\%+0.05\Omega)$ , and no mechanical damage.                       | 4.13 Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds.                                                                                                                                                                                                                                                                                                 |
| Dielectric withstanding voltage | No evidence of flashover mechanical damage, arcing or insulation break down.                              | 4.7 Resistors shall be clamped in the trough of a 90°metallic V-block and shall be tested at AC potential respectively specified in the above list for 60-70 seconds.for cement fixed resistors the testing voltage is 1000V.                                                                                                                                                                          |
| Resistance to soldering heat    | Resistance change rate must be in $\pm(1\%+0.05\Omega)$ , and no mechanical damage.                       | 4.18 Permanent resistance change when leads immersed to a point 2.0-2.5mm from the body in 260°C $\pm$ 5°C solder for 10 $\pm$ 1 seconds.                                                                                                                                                                                                                                                              |



|                           |                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Solderability             | 95% coverage Min.                                                                             | 4.17 The area covered with a new, smooth, clean, shiny and continuous surface free from concentrated pinholes.<br>Test temp. Of solder: 245°C ± 3°C<br>Dwell time in solder: 2~3seconds.                                                                                                                                                                                                     |
| Terminal strength         | No evidence of mechanical damage                                                              | 4.16 Direct load:<br>Resistance to a 2.5 kg direct load for 10 seconds in the direction of the longitudinal axis of the terminal leads.<br>Twist test:<br>Terminal leads shall be bent through 90° at a point of about 6mm from the body of the resistor and shall be rotated through 360° about the original axis of the bent terminal in alternating direction for a total of 3 rotations. |
| Humidity (Steady state)   | Resistance change rate must be in ±(5%+0.05Ω), and no mechanical damage.                      | 4.24 Temporary resistance change after 240 hours exposure in a humidity test chamber controlled at 40±2°C and 90~95%RH relative humidity                                                                                                                                                                                                                                                     |
| Load life in humidity     | For Wire-wound: ΔR/R: ±5%<br>For Power film range:<br>< 100KΩ ΔR/R: ±5%<br>≥ 100KΩ ΔR/R: ±10% | 7.9 Resistance change after 1,000 hours (1.5 hours "ON", 0.5 hour "OFF") at RCWV in a humidity test chamber controlled at 40°C ± 2°C and 90 to 95% relative humidity.                                                                                                                                                                                                                        |
| Load life                 | For Wire-wound: ΔR/R: ±5%<br>For Power film range:<br>< 100KΩ ΔR/R: ±5%<br>≥ 100KΩ ΔR/R: ±10% | 4.25.1 permanent resistance change after 1,000 hours operating at RCWV with duty cycle of 1.5 hours "ON", 0.5 hour "OFF" at 70°C ± 2°C ambient.                                                                                                                                                                                                                                              |
| Low Temperature Storage   | For Wire-wound: ΔR/R: ±5%<br>For Power film range:<br>< 100KΩ ΔR/R: ±5%<br>≥ 100KΩ ΔR/R: ±10% | IEC 60068-2-1 (Aa)<br>Lower limit temperature , for 2H.                                                                                                                                                                                                                                                                                                                                      |
| High Temperature Exposure | For Wire-wound: ΔR/R: ±5%<br>For Power film range:<br>< 100KΩ ΔR/R: ±5%<br>≥ 100KΩ ΔR/R: ±10% | MIL-STD-202 108A<br>Upper limit temperature , for 16H.                                                                                                                                                                                                                                                                                                                                       |

## 9. Note

9.1. UNI-ROYAL recommend products store in warehouse with temperature between 15 to 35°C under humidity between 25 to 75%RH.

Even under storage conditions recommended above, solder ability of products will be degraded stored over 1 year old.

9.2. Cartons must be placed in correct direction which indicated on carton, otherwise the reel or wire will be deformed.

9.3. Storage conditions as below are inappropriate:

- Stored in high electrostatic environment
- Stored in direct sunshine, rain, snow or condensation.
- Exposed to sea wind or corrosive gases, such as Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, NO<sub>2</sub>, etc.

## 10. Record

| Version | Description                                        | Page | Date         | Amended by  | Checked by |
|---------|----------------------------------------------------|------|--------------|-------------|------------|
| 1       | First version                                      | 1~5  | Mar.20, 2018 | Haiyan Chen | Nana Chen  |
| 2       | Modify characteristic                              | 4~5  | Feb.26, 2019 | Haiyan Chen | Yuhua Xu   |
| 3       | Modify characteristic                              | 5    | Nov.20,2020  | Song Nie    | Yuhua Xu   |
| 4       | Modify the temperature coefficient test conditions | 4    | Nov.07, 2022 | Haiyan Chen | Yuhua Xu   |

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