



**UNI-ROYAL**  
厚聲集團

# DATA SHEET

**Product Name** Lead Type Cement Fixed Resistors

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**Part Name** PRWI Series

**File No.** DIP-SP-047

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## 1. Scope

- 1.1 This datasheet is the characteristics of Lead Type Cement Fixed Resistors manufactured by UNI-ROYAL.
- 1.2 Square porcelain tube
- 1.3 Excellent insulation and moisture resistance
- 1.4 Winding process, good resistance to load
- 1.5 Application : power supply of frequency converter

## 2. Part No. System

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

- 2.1 Coated type, the 1<sup>st</sup> to 3<sup>rd</sup> digits are to indicate the product type and 4th digit is the special feature.

Example: PRWI

- 2.2 5<sup>th</sup>~6<sup>th</sup> digits:

- 2.2.1 This is to indicate the wattage or power rating. To dieting the size and the numbers,

The following codes are used; and please refer to the following chart for detail:

Wattage	4	5	7	9	11	17
Normal Size	4W	5W	7W	9W	BW	HW

- 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 the standard resistance values of E-24 series, the 8<sup>th</sup> digit is “0”, the 9<sup>th</sup> & 10th digits are to denote the significant figures of the resistance and the 11<sup>th</sup> digit is the number of zeros following;

For the standard resistance values of E-96 series, the 8th digit to the 10th digits is to denote the significant figures of the resistance and the 11th digit is the 11<sup>th</sup> digit is the zeros following.

- 2.4.2 The following number s and the letter codes are to be used to indicate the number of zeros in the 11th digit:

0=10<sup>0</sup>    1=10<sup>1</sup>    2=10<sup>2</sup>    3=10<sup>3</sup>    4=10<sup>4</sup>    5=10<sup>5</sup>

6=10<sup>6</sup>    J=10<sup>-1</sup>    K=10<sup>-2</sup>    L=10<sup>-3</sup>    M=10<sup>-4</sup>

- 2.4.3 The 12<sup>th</sup>, 13<sup>th</sup> & 14<sup>th</sup> digits.

The 12<sup>th</sup> digit is to denote the Packaging Type with the following codes:

A=Tape/Box (Ammo pack)    B=Bulk/Box

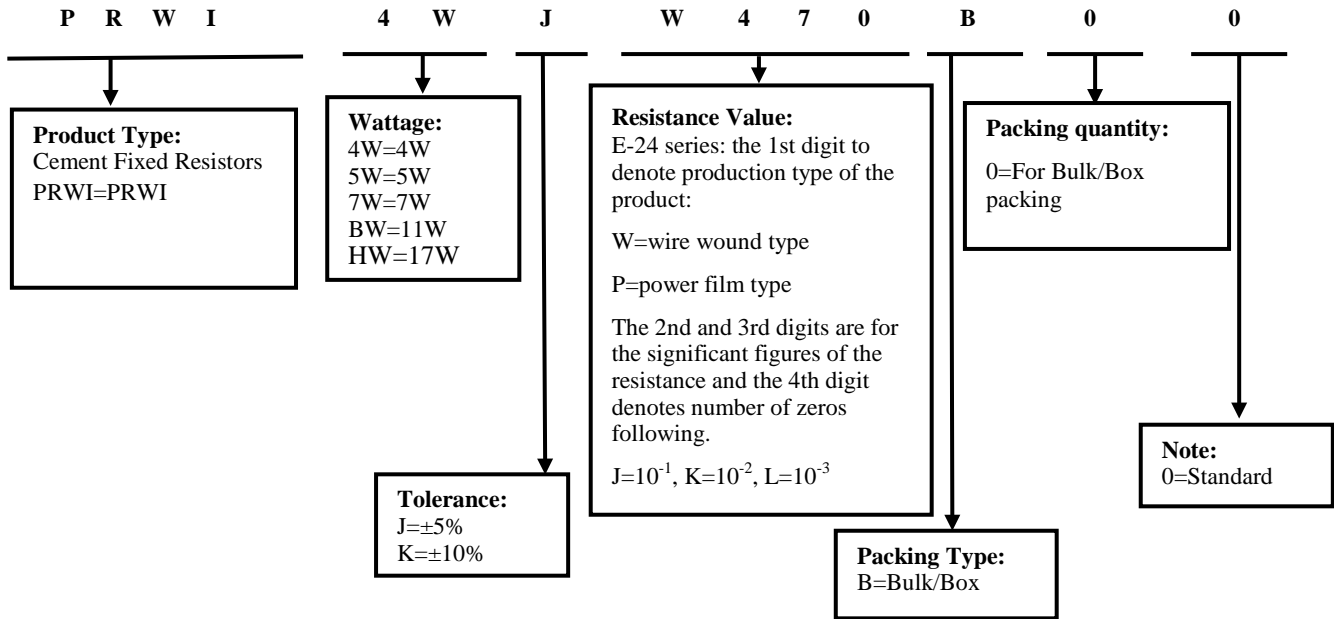
T=Tape/Reel                      P=Tape/Box of PT-26 products

- 2.4.4 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.

- 2.4.5 For some items, the 14<sup>th</sup> digit alone can use to denote special features of additional information with the following codes: 0=NIL

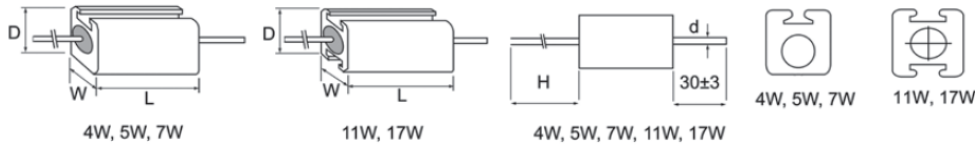
**3. Ordering Procedure**

(Example: PRW1 4W ±5% 47Ω B/B )



**4. Ratings & Dimension**

4.1 Dimension



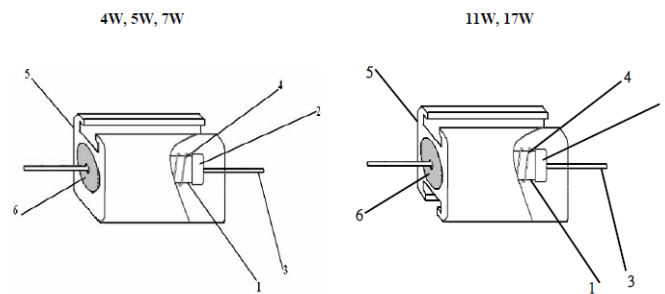
Unit: mm

Type	W±1	D	L±1	H±1	d±0.05	Resistance Range
PRW1 4W	7.0	8±1	20	56	0.75	0.1Ω~6.8KΩ
PRW1 5W	7.5	8.5±1	25	60	0.75	0.1Ω~6.8KΩ
PRW1 7W	7.0	8±1	38	70	0.75	0.33Ω~22KΩ
PRW1 11W	9.0	10±1.5	50	85	0.75	0.33Ω~22KΩ
PRW1 17W	9.0	10±1.5	75	110	0.75	1Ω~39KΩ

4.2 Ratings

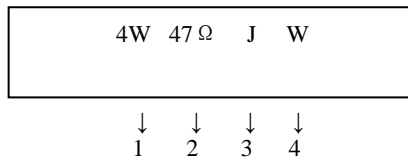
Type	PRW1
Rated Power (at 70℃)	4W, 5W, 7W, 11W, 17W
Max. Working Voltage	500 V
Max. Overload Voltage	1,000 V
Dielectric withstanding Voltage	2,000 V
Rated Ambient Temp.	70℃
Operating Temp. Range	-55℃ --- +155℃
Resistance Tolerance	± 5 %

**5. Construction**



No.	Subpart Name	Material	Material Generic Name
1	Ceramic Rod	Rod Type Ceramics	Al <sub>2</sub> O <sub>3</sub> , SiO <sub>2</sub>
2	Ceramic Cap	Steel(Tin plated iron surface)	Tin : 5%, Iron : 95%
3	Lead Wire	Annealed copper wire plated with tin	Tin-Plated Copper wire
4	Resistance Wire	ISA-CHROME	NiCr8020
5	Ceramic Case	Ceramic	Al <sub>2</sub> O <sub>3</sub> , SiO <sub>2</sub>
6	Filling Materials	Quartz mixed sand	SiO <sub>2</sub>

**6. Marking**

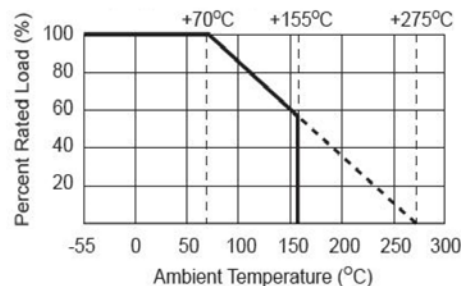


Code description and regulation:

1. Wattage rating
2. Nominal resistance value
3. Resistance tolerance. J: ± 5%  
K: ± 10%
4. 4. Pattern:  
M: Power film W: Wire wound  
Code marking with black ink

**7. Derating Curve**

Resistors shall have a power rating based on continuous full load operation at an ambient temperature of 70°C. For temperature in excess of 70 °C, the load shall be derated as shown in the figure 1.



**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)

In no case shall the rated dc or RMS ac continuous working voltage be greater than the applicable maximum value.

## 8. Performance Specification

Characteristic	Limits	Test Methods (GB/T5729&JIS-C-5201&IEC60115-1)
Temperature Coefficient	$<20\Omega: \pm 400\text{PPM}/^\circ\text{C}$ $\cong 20\Omega: \pm 350\text{PPM}/^\circ\text{C}$	4.8 Natural resistance changes per temp. Degree centigrade $\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (PPM}/^\circ\text{C)}$ R <sub>1</sub> : Resistance Value at room temperature (t <sub>1</sub> ) ; R <sub>2</sub> : Resistance at test temperature (t <sub>2</sub> ) t <sub>1</sub> : +25°C or specified room temperature t <sub>2</sub> : Test temperature (-55°C or 125°C)
Short-time Over load	Resistance change rate is: $\pm(5\%+0.05\Omega)\text{max.}$ With no evidence of mechanical damage.	4.13 permanent resistance changes after the application of a potential of 2.5 times RCWV or the max. Overload voltage respectively specified in the above list, whichever less for 5 seconds.
Dielectric withstanding voltage	No evidence of flashover, mechanical damage, arcing or insulation breaks down.	4.7 resistors shall be clamped in the trough of a 90°metallic v-block and shall be tested at ac potential respectively for 60+10/-0 seconds. Voltage:2000V
Terminal strength	No evidence of mechanical damage	4.16 Direct load: Resistance to a 2.5 kg direct load for 10 seconds in the direction of the longitudinal axis of the terminal leads. Twist test: 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.
Resistance to soldering heat	Resistance change rate is: $\pm(1\%+0.05\Omega)\text{Max.}$ With no evidence of mechanical damage	4.18 Permanent resistance change when leads immersed to a point 2.0-2.5mm from the body in 260°C±5°C solder for 10±1 seconds.
Load life	Resistance change rate is: $\pm(5\%+0.05\Omega)\text{max.}$ With no evidence of mechanical damage.	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	Resistance change rate is: $\pm(5\%+0.05\Omega)\text{max.}$ With no evidence of mechanical damage.	IEC 60068-2-1 (Aa) Lower limit temperature , for 2H.
High Temperature Exposure	Resistance change rate is: $\pm(5\%+0.05\Omega)\text{max.}$ With no evidence of mechanical damage.	MIL-STD-202 108A 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:
- a. Stored in high electrostatic environment
  - b. Stored in direct sunshine, rain, snow or condensation.
  - c. 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>, Br etc.

## 10. Record

Version	Description	Page	Date	Amended by	Checked by
1	First version	1~6	Feb.26, 2019	Haiyan Chen	Yuhua Xu
2	Modify characteristic	5	Nov.20,2020	Song Nie	Yuhua Xu
3	Modify the temperature coefficient test conditions	4	Nov.07, 2022	Haiyan Chen	Yuhua Xu

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