

# DATASHEET

**Product Name** Axial Leaded Type Cement Fixed Resistors

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**Part Name** PRWC-1 Series

**File No.** DIP-SP-027

## Uniroyal Electronics Global Co., Ltd.

88#, Longteng Road, Economic & Technical Development Zone, Kunshan, Jiangsu, China

Tel +86 512 5763 1411 / 22 /33

Email [marketing@uni-royal.cn](mailto:marketing@uni-royal.cn)

Manufacture Plant Uniroyal Electronics Industry Co., Ltd.

Aeon Technology Corporation

Royal Electronic Factory (Thailand) Co., Ltd.

Royal Technology (Thailand) Co., Ltd.

## 1. Scope

- 1.1 This datasheet is the characteristics of Axial Leaded Type Cement Fixed Resistors manufactured by UNI-ROYAL.
- 1.2 Self-extinguishing
- 1.3 Extremely small & sturdy mechanically safe
- 1.4 Non-inductive type available
- 1.5 Excellent flame & moisture resistance
- 1.6 Too low or too high values on Wire-wound& Power –film type can be supplied on a case to case basis
- 1.7 Compliant with RoHS directive.
- 1.8 Halogen free requirement.

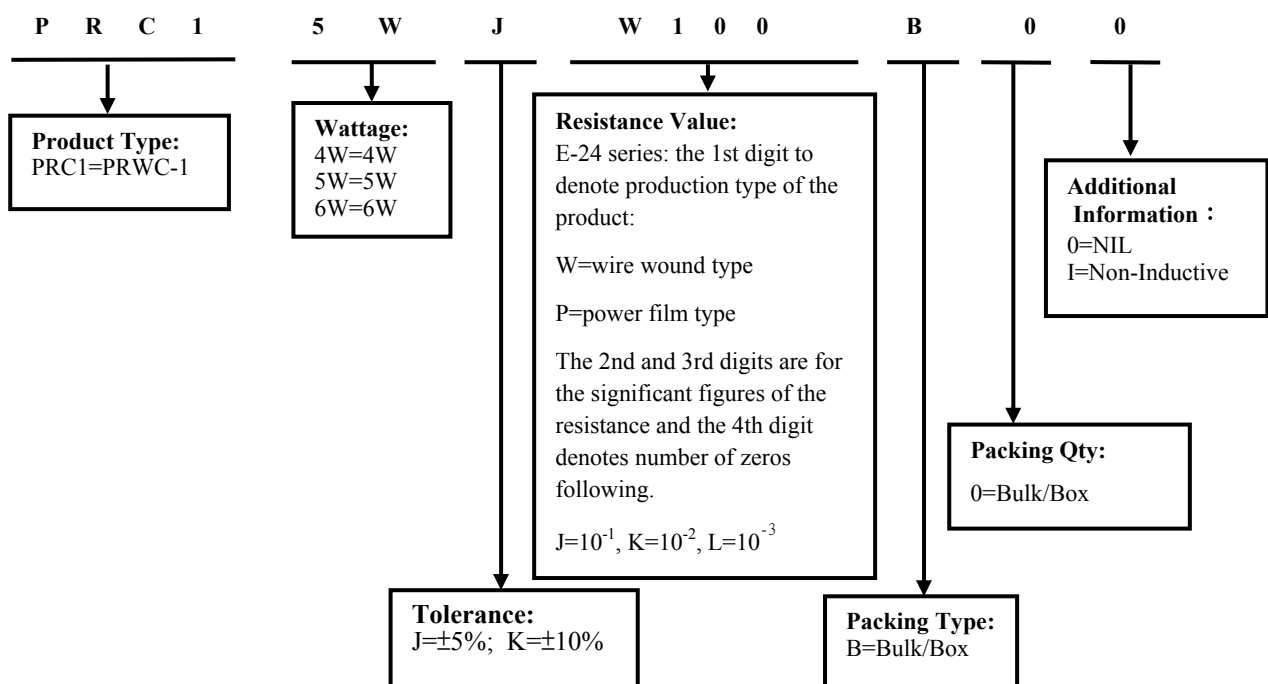
## 2. Part No. System

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 3 digits, the 4<sup>th</sup> digit will be “0”  
Example: PRC1 = PRWC-1 type
- 2.2 5<sup>th</sup>~6<sup>th</sup> digits:  
2.2.1 For power of 1 watt to 16 watt ,the 5<sup>th</sup> digit will be a number or a letter code and the 6<sup>th</sup> digit will be the letters of W.  
Example: 5W=5W
- 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.  
 $J=\pm 5\%$      $K=\pm 10\%$
- 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> to 11<sup>th</sup> please refer to point a ) of item 4.  
Example: W12J=1.2 $\Omega$     W120=12 $\Omega$     P273=27K $\Omega$
- 2.5 The 12<sup>th</sup>, 13<sup>th</sup> & 14<sup>th</sup> digits.  
2.5.1 The 12<sup>th</sup> 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; I=Non-Inductive

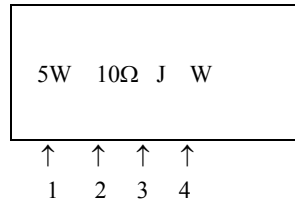
## 3. Ordering Procedure

(Example: PRWC-1 5W  $\pm 5\%$  10 $\Omega$  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:

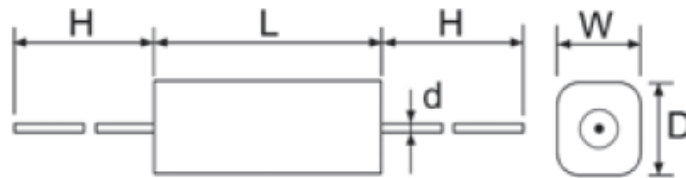
M: Power film

W: Wire wound

Color of marking: Black Ink

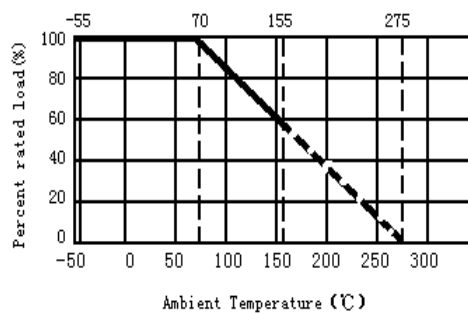
Note: The marking code shall be prevailed in kind!

## 5. Ratings & Dimension



Type	Dimension(mm)					Resistance Range	
	W $\pm 1$	D $\pm 1$	L $\pm 1$	H $\pm 5$	d $\pm 0.05$	Wire Wound	Power Film
PRC1 4W	6.4	6.4	20	28	0.70	1 $\Omega$ ~200 $\Omega$	201 $\Omega$ ~100K $\Omega$
PRC1 5W	6.4	6.4	25	28	0.70	1 $\Omega$ ~200 $\Omega$	201 $\Omega$ ~100K $\Omega$
PRC1 6W	6.4	6.4	38	35	0.75	1 $\Omega$ ~200 $\Omega$	201 $\Omega$ ~100K $\Omega$

## 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:

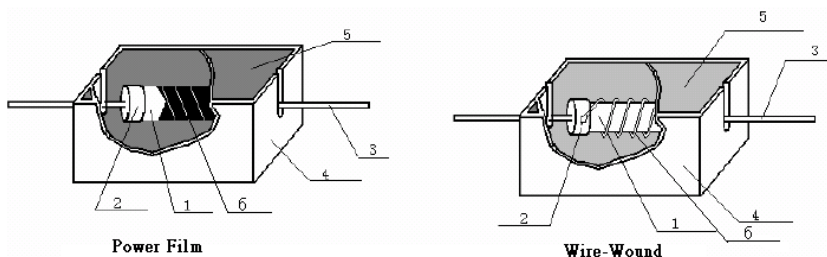
$$RCWV = \sqrt{P \times R}$$

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 Mixed film
		Wire-Wound: Alloy Wire

## 8. Performance Specification

Characteristic	Limits	Test Methods (GB/T5729&JIS-C-5201&IEC60115-1)
Temperature Coefficient	$\geq 20\Omega$ : $\pm 350\text{PPM}/^\circ\text{C max.}$ $< 20\Omega$ : $\pm 400\text{PPM}/^\circ\text{C max.}$	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 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 or Max.Overload Votage whichever less 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.
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 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. Test temp. Of solder:245°C $\pm$ 3°C Dwell time in solder: 2~3seconds.

Humidity (Steady state)	Resistance change rate must be in $\pm(5\%+0.05\Omega)$ ,and no mechanical damage.	4.24 Temporary resistance change after 240 hours exposure in a humidity test chamber controlled at $40\pm2^{\circ}\text{C}$ and 90~95%RH relative humidity
Load life in humidity	For Wire-wound: $\Delta R/R: \pm 5\%$ For Power film range: $< 100\text{K}\Omega \Delta R/R: \pm 5\%$ $\geq 100\text{K}\Omega \Delta R/R: \pm 10\%$	7.9 Resistance change after 1000 hours (1.5hours “ON” , 0.5hours “OFF” ) at RCWV or Max. Working Voltage whichever less in a humidity test chamber controlled at $40\pm2^{\circ}\text{C}$ and $93\%\pm 3\%$ RH.
Load life	For Wire-wound: $\Delta R/R: \pm 5\%$ For Power film range: $< 100\text{K}\Omega \Delta R/R: \pm 5\%$ $\geq 100\text{K}\Omega \Delta R/R: \pm 10\%$	4.25.1 Permanent Resistance change after 1000 hours operating at RCWV or Max. Working Voltage whichever less with duty cycle of 1.5 hours “ON” , 0.5 hour “OFF” at $70\pm 2^{\circ}\text{C}$ ambient.
Low Temperature Storage	For Wire-wound: $\Delta R/R: \pm 5\%$ For Power film range: $< 100\text{K}\Omega \Delta R/R: \pm 5\%$ $\geq 100\text{K}\Omega \Delta R/R: \pm 10\%$	IEC 60068-2-1 (Aa) Lower limit temperature , for 2H.
High Temperature Exposure	For Wire-wound: $\Delta R/R: \pm 5\%$ For Power film range: $< 100\text{K}\Omega \Delta R/R: \pm 5\%$ $\geq 100\text{K}\Omega \Delta R/R: \pm 10\%$	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  $35^{\circ}\text{C}$  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  $\text{Cl}_2$ ,  $\text{H}_2\text{S}$ ,  $\text{NH}_3$ ,  $\text{SO}_2$ ,  $\text{NO}_2$ , Br 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.14, 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
5	Modify Ordering Procedure	2	Nov.13, 2024	Junying Ye	Haiyan Chen

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