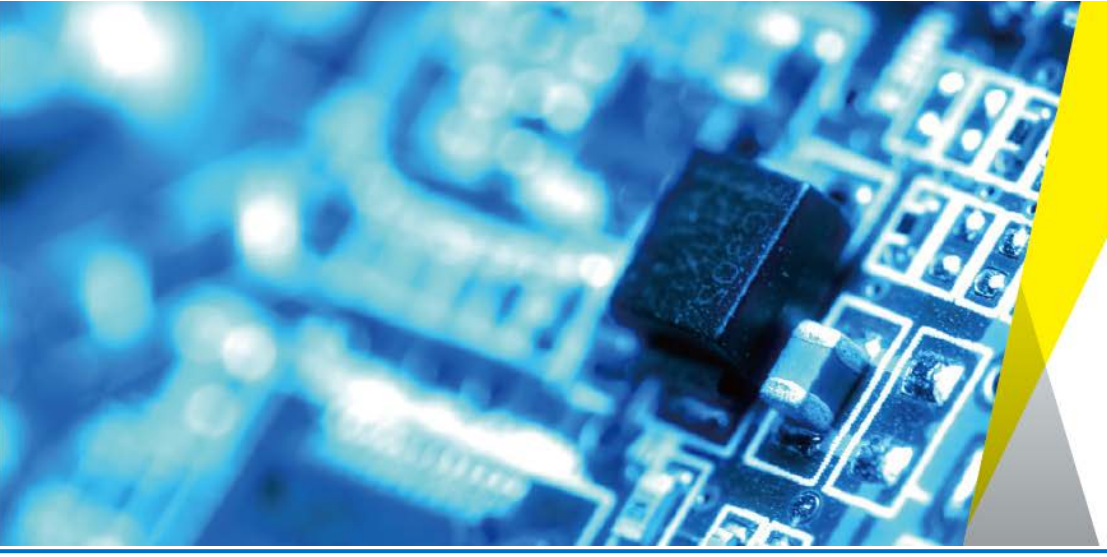


DATA SHEET

Product Name	**Lead Type Cement Fixed Resistors**
Part Name	**PRWI Series**
File No.	**DIP-SP-047**

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
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 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

1.5Application ： power supply of frequency converter

1.6 Compliant with RoHS directive.

1.7 Halogen free requirement.

2. Part No. System

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

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

Example: PRWI

2.2 5th~6th 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	17

2.3 The 7th 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 8th to 11th digits is to denote the Resistance Value.

2.4.1 For the standard resistance values of E-24 series, the 8th digit is “0”,the 9th & 10th digits are to denote the significant figures of the resistance and the 11th 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 11th 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:

$0=10^0$ $1=10^1$ $2=10^2$ $3=10^3$ $4=10^4$ $5=10^5$

$6=10^6$ $J=10^{-1}$ $K=10^{-2}$ $L=10^{-3}$ $M=10^{-4}$

2.4.3 The 12th, 13th & 14th digits.

The 12th digit is to denote the Packaging Type with the following codes:

A=Tape/Box (Ammo pack) B=Bulk/Box

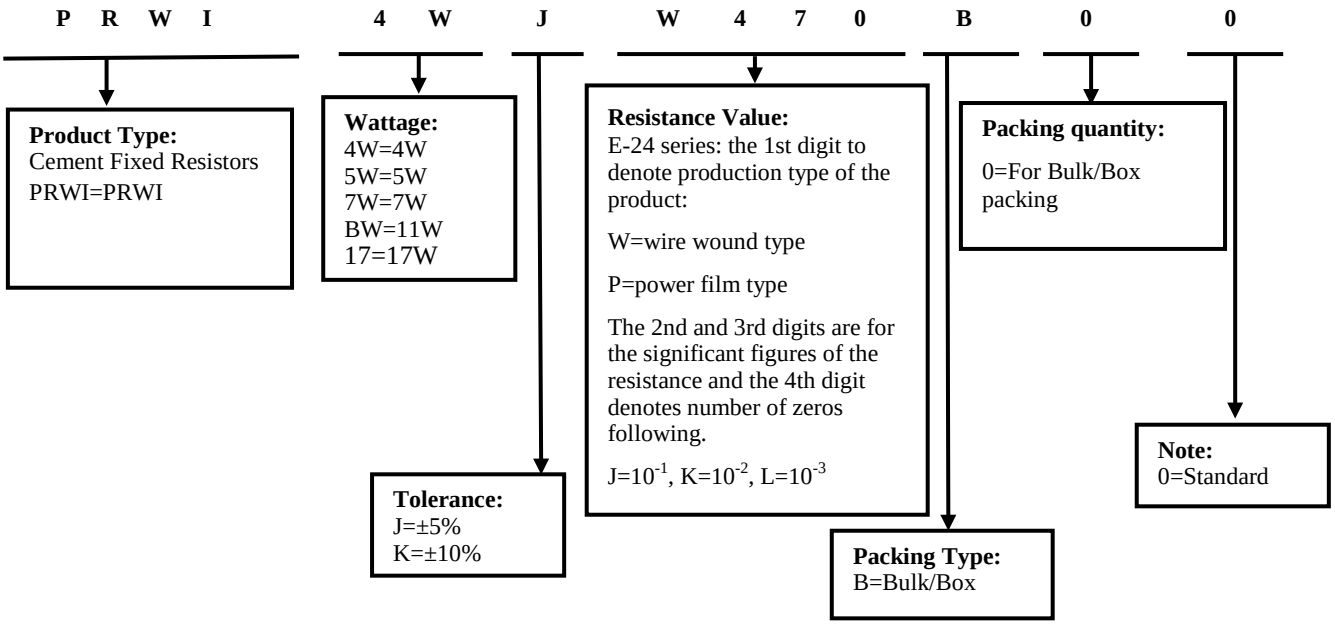
T=Tape/Reel P=Tape/Box of PT-26 products

2.4.4 The 13th 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 14th digit alone can use to denote special features of additional information with the following codes: 0=NIL

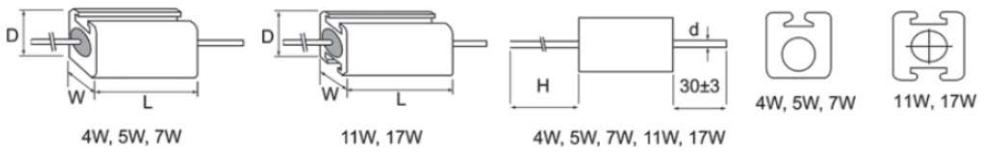
3. Ordering Procedure

(Example: PRW1 4W ±5% 47Ω B/B)



4. Ratings & Dimension

4.1 Dimension



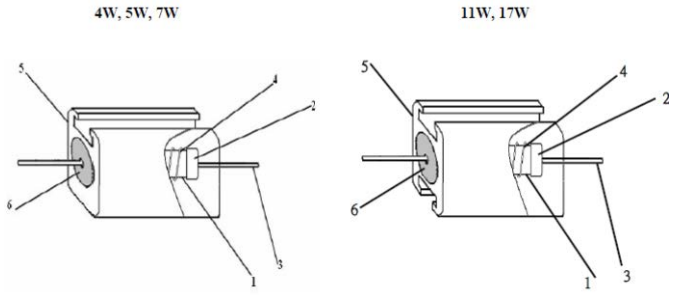
Unit: mm

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

4.2 Ratings

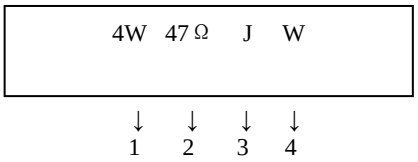
Type	PRWI
Rated Power (at 70℃)	4W, 5W, 7W, 11W, 17W
Max. Working Voltage	500 V
Max. Overload Voltage	1,000 V
Dielectric withstanding Voltage	2,000 V
Rated Ambient Temp.	70℃
Operating Temp. Range	-55℃ --- +155℃
Resistance Tolerance	± 5 %

5. Construction



No.	Subpart Name	Material	Material Generic Name
1	Ceramic Rod	Rod Type Ceramics	Al_2O_3, SiO_2
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	Alloy
5	Ceramic Case	Ceramic	Al_2O_3, SiO_2
6	Filling Materials	Quartz mixed sand	SiO_2

6. Marking



Code description and regulation:

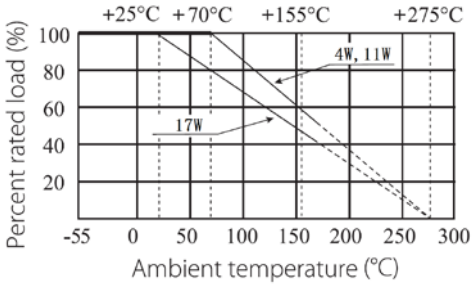
1. Wattage rating
2. Nominal resistance value
3. Resistance tolerance. J: ± 5%
   K: ± 10%
4. 4. Pattern:
   M: Power film W: Wire wound

Code marking with black ink

Note：The marking code shall be prevailed in kind!

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 ℃, 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	<20Ω: ±400PPM/℃ ≧20Ω:±350PPM/℃	4.8 Natural resistance changes per temp. Degree centigrade $\frac{R_2-R_1}{R_1(t_2-t_1)} \times 10^6$ (PPM/℃) R_1: Resistance Value at room temperature （t_1）; R_2: Resistance at test temperature （t_2） t_1: +25℃ or specified room temperature t_2: Test temperature（-55℃or 125℃）
Short-time Over load	Resistance change rate is: ±(5%+0.05Ω)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: ± (1%+0.05Ω) 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℃±5℃ solder for 10±1 seconds.
Load life	Resistance change rate is±(5%+0.05Ω)max. With no evidence of mechanical damage.	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 25±2℃ or 70±2℃ ambient.
Low Temperature Storage	Resistance change rate is±(5%+0.05Ω)max. With no evidence of mechanical damage.	IEC 60068-2-1 (Aa) Lower limit temperature，for 2H.
High Temperature Exposure	Resistance change rate is±(5%+0.05Ω)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℃ 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_2, H_2S, NH_3, SO_2, NO_2, 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
4	1.Modify derating curve 2.Modify the load life test conditions	4 5	Sep.28, 2024	Haiyan Chen	Yuhua Xu