

UniOhm

C O N F I D E N T I A L D O C U M E N T

SPECIFICATION FOR APPROVAL

DACHS

Description : Cement Fixed Resistors

UniOhm Part no.:

PRWC1WxxxxxB00 (PRWC 1W +/-5%, +/-10% B/B)
PRWC2WxxxxxB00 (PRWC 2W +/-5%, +/-10% B/B)
PRWC3WxxxxxB00 (PRWC 3W +/-5%, +/-10% B/B)
PRWC5WxxxxxB00 (PRWC 5W +/-5%, +/-10% B/B)
PRWC7WxxxxxB00 (PRWC 7W +/-5%, +/-10% B/B)

Approved by

Parts corresponding to RoHS Compliant: 2005-Apr.-1

Approved	Checked	Prepared
Mr. Jack Lin	Mr.S. Polthanasan	Ms.P. Supatta

Issued Date: 2018/03/12

Customer: DACHS

Part No.: PRWCxxxxxxxB00

1. Scope:

This specification for approval relates to Cement Fixed Resistors manufactured by UniOhm 's specifications.

2. Type designation:

The type designation shall be in the following form:

(Ex.) $\frac{\text{PRWC}}{\text{Type}}$ $\frac{3\text{W}}{\text{Power Rating}}$ $\frac{\text{J,K}}{\text{Resistance Tolerance}}$ $\frac{10\Omega}{\text{Nominal Resistance}}$

3. Ratings:

Ratings shall be shown in the table 1.

Table 1

Type	PRWC				
Rated Power (at 70°C)	1W	2W	3W	5W	7W
Rated Ambient Temp.	70 °C				
Operating Temp. Range	-55°C --- +155°C				
Resistance Tolerance	± 5%, ± 10%				
Wire-wound Resistance Range	1Ω ~ 27Ω			1Ω ~ 200Ω	
Power Film Resistance Range	28Ω ~ 33KΩ			201Ω ~ 100KΩ	

3.1 Power rating:

Resistors shall have a power rating based on continuous full load operation at an ambient temperature of 70 °C

3.2 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:

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

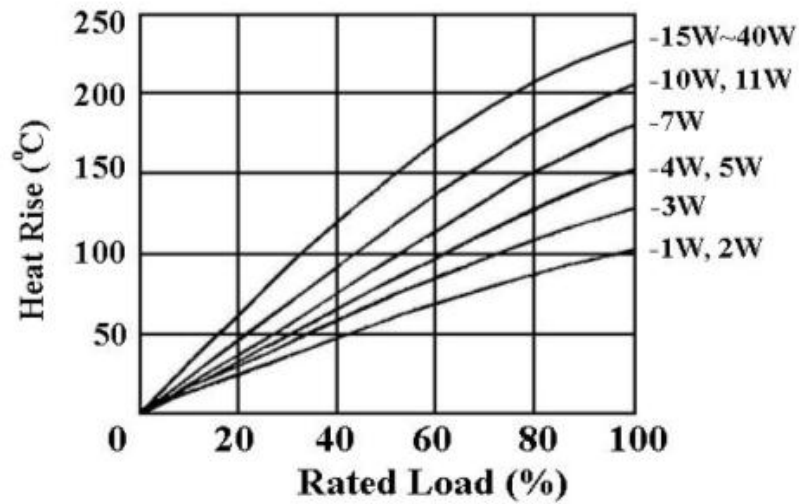
Were : RCWV = Rated DC or RMS AC continuous working voltage at commercial-line frequency and waveform (volt)

P = Power Rating (watt)

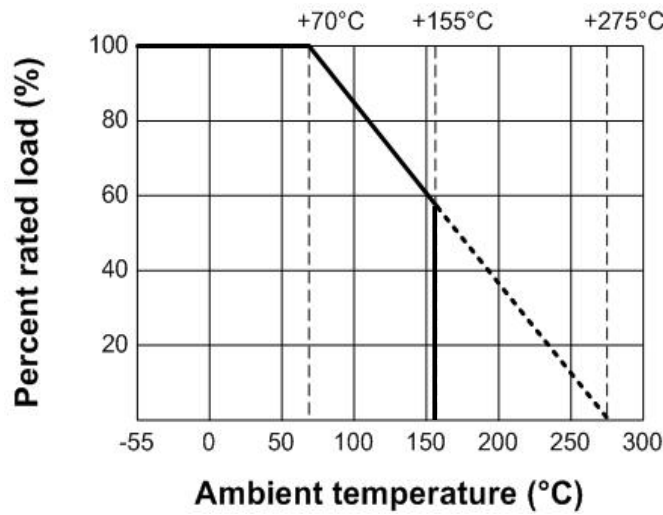
R = Nominal Resistance (ohm)

Cement Fixed Resistors

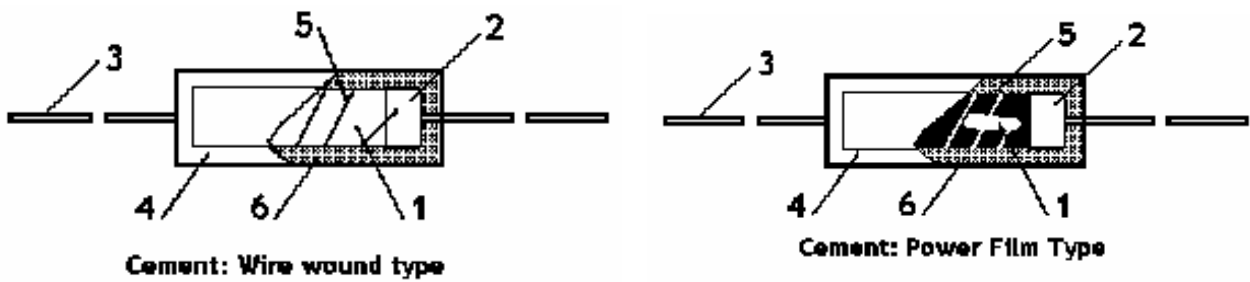
Heat Rise Chart



Derating Curve



4. Construction:



Confirmation List of Material

No.	Subpart Name	Material	Material Generic Name	Remark
1	Body	Rod Type Ceramics	Al ₂ O ₃ , SiO ₂	
2	End Cap	Tin plated iron surface	Tin : 5%, Iron : 95%	
3	Lead	Annealed copper wire	Tin-Plated Copper wire	
4	Ceramic Case	Ceramic	Al ₂ O ₃ , SiO ₂	
5	Resistance wire	Cu-Ni Alloy / Ni-Cr Alloy	Cu-Ni Alloy / Ni-Cr Alloy	
	Resistance film	Metal Oxide Film	Metal Oxide Film	
6	Filling Materials	Quartz mixed sand	SiO ₂	

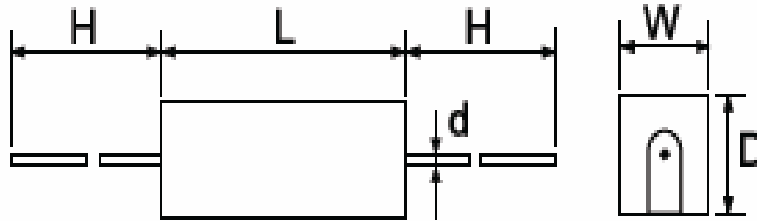
Cement Fixed Resistors		
5. Characteristic :		
Characteristics	Limits	Test Methods (JIS C 5201-1)
Dielectric withstanding voltage	No evidence of flashover, mechanical damage, arcing or insulation break down	Resistors shall be clamped in the trough of a 90° metallic V-block and shall be tested at AC potential respectively for 60 +10/ -0 secs. (Sub-clause 4.7)
Temperature coefficient	< 20 Ω ± 400 PPM/°C ≥ 20 Ω ± 350 PPM/°C	Natural resistance change per temp. degree centigrade. $\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \quad (\text{PPM}/^\circ\text{C})$ R1: Resistance value at room temperature (t1) R2: Resistance value at room temp. plus 100 °C (t2) (Sub-clause 4.8)
Short time overload	Resistance change rate is ± (5% + 0.05Ω) Max. with no evidence of mechanical damage	Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds (Sub-clause 4.13)
Terminal strength	No evidence of mechanical damage	Direct load : Resistance to a 2.5 kgs direct load for 10 secs. 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 (Sub-clause 4.16)
Solderability	95 % coverage Min.	The area covered with a new , smooth clean , shiny and continuous surface free from concentrated pinholes. Test temp. of solder : 245°C ± 5°C Dwell time in solder : 2 to 3 secs. (Sub-clause 4.17)
Soldering temp. reference	Electrical characteristics shall be satisfied. Without distinct deformation in appearance. (95 % coverage Min.)	The leads immersed into solder bath to 3.2 to 4.8 mm. from the body. Permanent resistance change shall be checked. <u>Wave soldering condition: (2 cycles Max.)</u> Pre-heat : 100 ~ 120 °C, 30 ± 5 sec. Suggestion solder temp.: 235 ~ 255 °C, 10 sec. (Max.) Peak temp.: 260 °C <u>Hand soldering condition:</u> Hand Soldering bit temp. : 380 ± 10 °C Dwell time in solder : 3 +1/-0 sec.

Cement Fixed Resistors																		
Characteristics	Limits		Test Methods (JIS C 5201-1)															
Resistance to soldering heat	Resistance change rate is $\pm (1\% + 0.05\Omega)$ Max. with no evidence of mechanical damage		Permanent resistance change when leads immersed to 3.2 to 4.8 mm from the body in $350^{\circ}\text{C} \pm 10^{\circ}\text{C}$ solder for 3 ± 0.5 secs. (Sub-clause 4.18)															
Temperature cycling	Resistance change rate is $\pm (2\% + 0.05\Omega)$ Max. with no evidence of mechanical damage		Resistance change after continuous 5 cycles for duty shown below: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Step</th> <th style="text-align: center;">Temperature</th> <th style="text-align: center;">Time</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">$-55^{\circ}\text{C} \pm 3^{\circ}\text{C}$</td> <td style="text-align: center;">30 mins</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Room temp.</td> <td style="text-align: center;">10~15 mins</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">$+155^{\circ}\text{C} \pm 2^{\circ}\text{C}$</td> <td style="text-align: center;">30 mins</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">Room temp.</td> <td style="text-align: center;">10~15 mins</td> </tr> </tbody> </table> (Sub-clause 4.19)	Step	Temperature	Time	1	$-55^{\circ}\text{C} \pm 3^{\circ}\text{C}$	30 mins	2	Room temp.	10~15 mins	3	$+155^{\circ}\text{C} \pm 2^{\circ}\text{C}$	30 mins	4	Room temp.	10~15 mins
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Resistance value	$\Delta R/R$																	
Wire-wound	$\pm 5\%$																	
Power film :	$< 100\text{K}\Omega$																	
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Cement Fixed Resistors

6. Dimension :

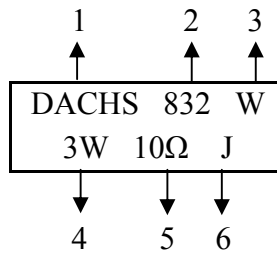
Unit : mm



Type	Rating Wattage	W ± 1	D ± 1	L ± 1	d ± 0.05	H ± 5
PRWC	1W	5.5	5.5	12	0.7	25
PRWC	2W	6	6	18	0.75	28
PRWC	3W	6	6	20	0.75	28
PRWC	5W	6	6	25	0.75	35
PRWC	7W	9	9	25	0.75	35

7. Marking :

Ex.



Code description and regulation

1. Company mark or customer designated mark. Company mark : DACHS
2. Date manufactured.

- | | | | |
|---------------|---|--|--|
| First code : | 1 : The year 2011
2 : The year 2012
3 : The year 2013
4 : The year 2014 | 5 : The year 2015
6 : The year 2016
7 : The year 2017
8 : The year 2018 | |
| Second code : | 1 : January
2 : February
3 : March
4 : April | 5 : May
6 : June
7 : July
8 : August | 9 : September
O : October
N : November
D : December |
| Third code : | 1 : First 10 days of a month
2 : Second 10 days of a month
3 : Third 10 days of a month | | |

3. W marking for Wire wound type

P marking for Power film type

4. Wattage rating.
5. Nominal resistance value.
6. Resistance Tolerance.

J : ± 5 %
K : ± 10 %

Color of marking: Black ink

Part Number System

Explanation of Part Number System (Cement Fixed Resistors)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
P	R	W	C	3	W	J	W	1	0	0	B	0	0

Resistor Type:

PRW0 = PRW
 PRWA = PRWA
 PRWC = PRWC
 PWC1 = PRWC-1
 PRM0 = PRM
 PRMA = PRMA
 PRMB = PRMB
 PRS0 = PRS
 PRT0 = PRT
 PRU0 = PRU
 PZ1A = PRZA-1
 PZ2A = PRZA-2
 PZ3A = PRZA-3
 PRZC = PRZC
 PRZD = PRZD
 PRVA = PRVA
 PRVB = PRVB

Wattage:

1W = 1W
 2W = 2W
 3W = 3W
 4W = 4W
 5W = 5W
 6W = 6W
 7W = 7W
 AW = 10W
 BW = 11W
 FW = 15W
 HW = 17W
 20 = 20W
 25 = 25W
 30 = 30W
 40 = 40W

Tolerance:

J ~ ± 5%
 K ~ ± 10%

Resistance Value:

E-24 series: the 1st digit to denote production type of the product:

W = Wire wound type
P = Power film type

The 2nd and 3rd digits are for the significant figures of the resistance and the 4th digit denote number of zeros following

Decimal point is expressed by:

"J" ~ 0.1, "K" ~ 0.01
 Ex.: 4.7Ω ~ 47J, 4.7KΩ ~ 472

Packing Quantity:

A = 500pcs
 0 = Bulk/Box

Packing Type:

A = Tape/Box
 B = Bulk/Box

Special Feature:

0 = Standard product
 I = Non-Inductive

Sample: PRWC 3W +/- 5% 10Ω (Wire wound) B/B → PRWC3WJW100B00

Cement Fixed Resistor

Environment Related Substance

This product complies to EU RoHS directive, EU PAHs directive, EU PFOS directive and Halogen free.

Ozone layer depleting substances.

Ozone depleting substances are not used in our manufacturing process of this product.

This product is not manufactured using Chloro fluorocarbons (CFCs), Hydrochlorofluorocarbons (HCFCs), Hydrobromofluorocarbons (HBFCs) or other ozone depleting substances in any phase of the manufacturing process.

Storage Condition

The performance of these products, including the solderability, is guaranteed for a year from the date of arrival at your company, provided that they remain packed as they were when delivered and stored at a temperature of $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ and a relative humidity of $60\% \text{RH} \pm 10\% \text{RH}$, chemical and dust free atmosphere

Even within the above guarantee periods, do not store these products in the following conditions. Otherwise, their electrical performance and/or solderability may be deteriorated, and the packaging materials (e.g. taping materials) may be deformed or deteriorated, resulting in mounting failures.

1. In salty air or in air with a high concentration of corrosive gas, such as Cl_2 , H_2S , NH_3 , SO_2 , or NO_2
2. In direct sunlight