

DATA SHEET

Product Name **Lead Type Cement Fixed Resistors**

Part Name **PHF Series**

File No. **DIP-SP-046**

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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
- 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: PHF= Lead Type Cement Fixed Resistors

- 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	HW

- 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=10⁰ 1=10¹ 2=10² 3=10³ 4=10⁴ 5=10⁵

6=10⁶ 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:

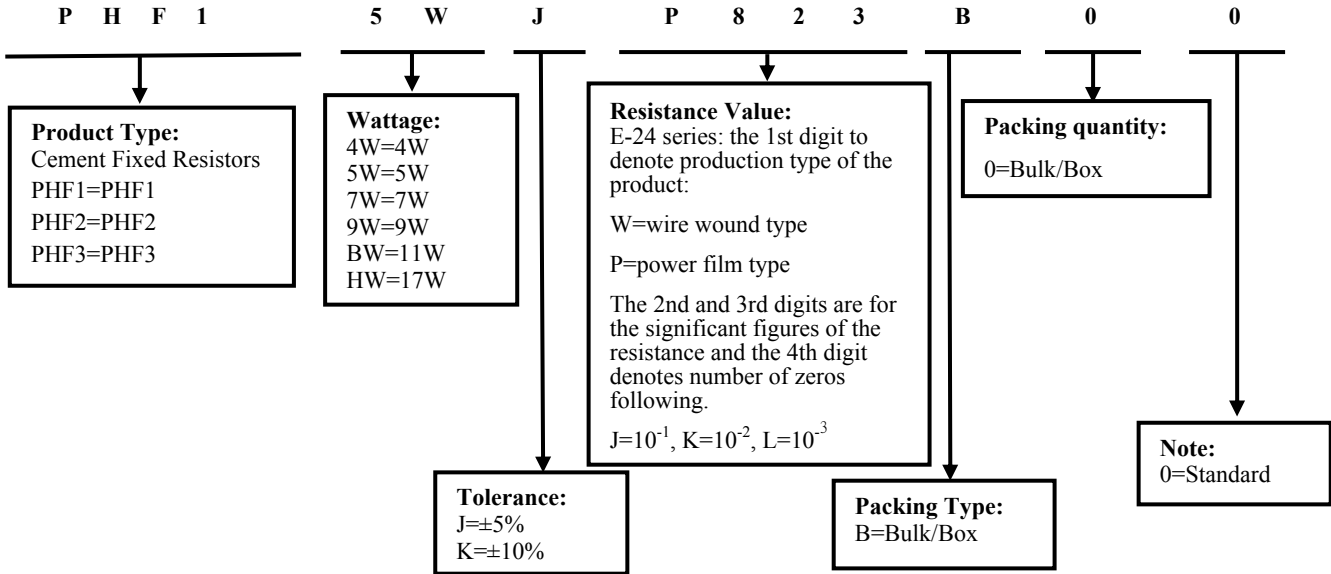
B=Bulk/Box

- 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.

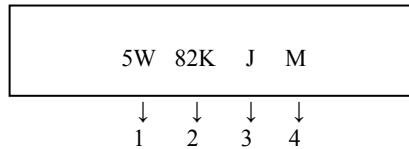
- 2.4.5 For some items, the 14th digit alone can use to denote special features of additional information with the following codes: 0=NIL

3. Ordering Procedure

(Example: PHF1 5W ±5% 82KΩ B/B)



4. Marking



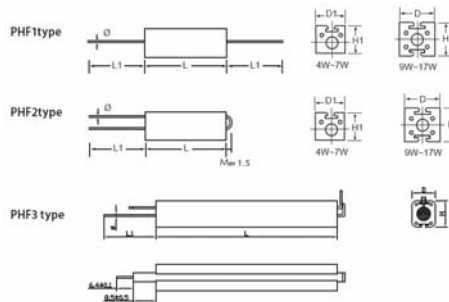
Code description and regulation:

1. Wattage Rating
2. Nominal Resistance Value
3. Resistance Tolerance. J: ± 5%
K: ± 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

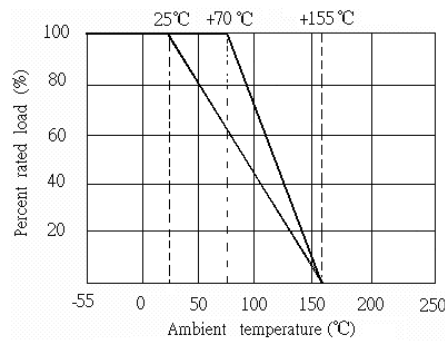


Unit: mm

Type	H±1.5	H1±0.5	D±0.5	D1±0.5	L	Resistance Range
PHF1/PHF2 4W	-	8.5	-	7.5	20±1	1Ω~1KΩ
PHF1/PHF2 5W	-	8.5	-	7.5	25±1	1Ω~2.2KΩ
PHF1/PHF2 7W	-	9.5	-	7.5	38±1	1Ω~6.2KΩ
PHF1/PHF2 9W	10	/	9	-	38±1	1Ω~6.2KΩ
PHF1/PHF2/ PHF3 11W	10	/	9	-	50±1	1Ω~6.2KΩ
PHF1/PHF2/ PHF3 17W	10	/	9	-	75±2	1Ω~10KΩ

6. Derating Curve

Resistors shall have a power rating based on continuous full load operation at an ambient temperature of 25°C or 70°C. For temperature in excess of 25°C or 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.

7. Type Designation

The type designation shall be in the following form:

Example:

PHF1	5W	J	82KΩ
Type	Style	Resistance Tolerance	Nominal Resistance

8. Performance Specification

Characteristic	Limits	Test Methods (GB/T5729&JIS-C-5201&IEC60115-1)
Temperature Coefficient	±350 PPM/°C	4.8 Natural resistance changes per temp. Degree centigrade $\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (PPM/°C)}$ R ₁ : Resistance Value at room temperature (t ₁) ; R ₂ : Resistance at test temperature (t ₂) t ₁ : +25°C or specified room temperature t ₂ : Test temperature (-55°C or 125°C)
Short-time Over load	Resistance change rate is: ±(3%+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: $\pm (1\%+0.05\Omega)$ 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 $260^{\circ}\text{C}\pm 5^{\circ}\text{C}$ solder for 10 ± 1 seconds.
Load life	Resistance change rate is $\pm(5\%+0.05\Omega)$ 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 $25\pm 2^{\circ}\text{C}$ or $70\pm 2^{\circ}\text{C}$ ambient.
Low Temperature Storage	Resistance change rate is $\pm(5\%+0.05\Omega)$ max. With no evidence of mechanical damage.	IEC 60068-2-1 (Aa) Lower limit temperature \cdot for 2H.
High Temperature Exposure	Resistance change rate is $\pm(5\%+0.05\Omega)$ max. With no evidence of mechanical damage.	MIL-STD-202 108A Upper limit temperature \cdot 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_2 , H_2S , NH_3 , SO_2 , NO_2 , Br etc.

10. Record

Version	Description	Page	Date	Amended by	Checked by
1	First version	1~5	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
5	1.Modify derating curve 2.Modify the load life test conditions	4 5	Sep.28, 2024	Haiyan Chen	Yuhua Xu

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