



**UNI-ROYAL**  
厚聲集團

# DATA SHEET

**Product Name**    **Lead Type Cement Fixed Resistors**

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**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

## 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: PHF= Lead Type Cement Fixed Resistors

- 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 8th digit is “0”, the 9<sup>th</sup> & 10<sup>th</sup> 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 8<sup>th</sup> digit to the 10<sup>th</sup> 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:

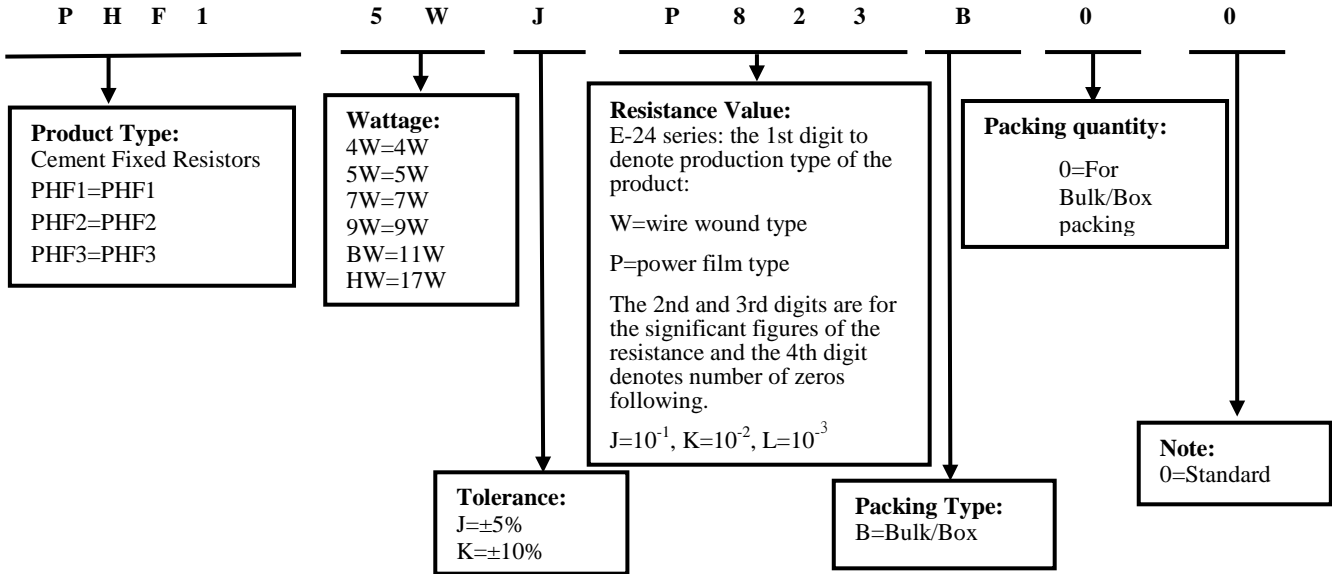
B=Bulk/Box

- 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.

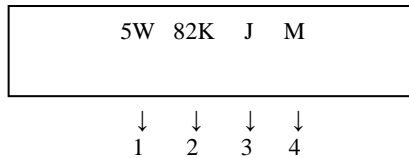
- 2.4.5 For some items, the 14<sup>th</sup> digit alone can use to denote special features of additional information with the following codes: 0=NIL

3. Ordering Procedure

(Example: PHF1 5W ±5% 82KΩ B/B )



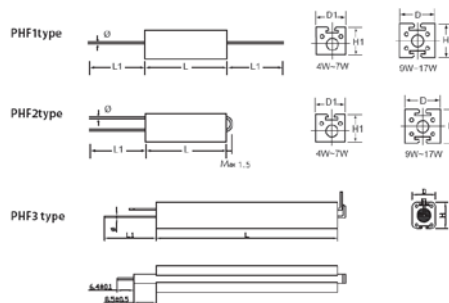
4. Marking



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

5. Ratings & Dimension

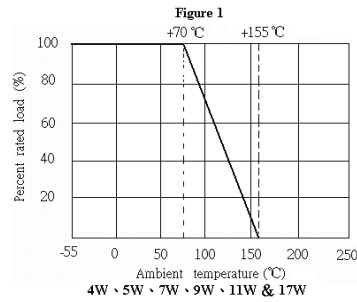


Unit: mm

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 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.

## 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 <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: ±(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 $10\pm 1$ 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 1,000 hours operating at RCWV with duty cycle of 1.5 hours "on", 0.5 hour "off" at $70^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 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 , 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 , 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  $\text{Cl}_2$ ,  $\text{H}_2\text{S}$ ,  $\text{NH}_3$ ,  $\text{SO}_2$ ,  $\text{NO}_2$ , 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.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

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