

# DATA SHEET

**Product Name** High Power Wire-wound Aluminum Shell Resistance

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**Part Name** HAWR Series

**File No.** DIP-SP-060

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## 1. Scope:

- 1.1 This datasheet is the characteristics of High Power Wire-wound Aluminum Shell Resistance manufactured by UNI-ROYAL.
- 1.2 Anti-vibration, high stability.
- 1.3 Excellent transient current impact capability, suitable for the start of the inverter under harsh conditions.
- 1.4 Application: Frequency Conversion Equipment, such as Elevator, Freezer, Crane, Lift etc.
- 1.5 Compliant with RoHS directive.
- 1.6 Halogen free requirement.

## 2. Part No. System

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

2.1 High Power Wire-wound Aluminum Shell Resistance the 1<sup>st</sup> to 4<sup>th</sup> digits are to indicate the product type.

Example: HAWR= High Power Wire-wound Aluminum Shell Resistance

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:

W=Normal Size; S=Small Size; U=Extra Small Size; “1”~“G”to denotes“1”~“16”as Hexadecimal:

1/16W~1/2W (< 1W)

Wattage	1/2	1/3	1/4	1/5	1/6	1/8	1/10	1/16
Normal Size	W2	W3	W4	W5	W6	W8	WA	WG
Small Size	S2	S3	S4	S5	S6	S8	SA	SG

1W~16W (≥ 1W)

Wattage	1	2	3	5	7	8	9	10	15
Normal Size	1W	2W	3W	5W	7W	8W	9W	AW	FW
Small Size	1S	2S	3S	5S	7S	8S	9S	AS	FS

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 8<sup>th</sup> 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 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 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 11<sup>th</sup> 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> N=10<sup>-5</sup> P=10<sup>-6</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:

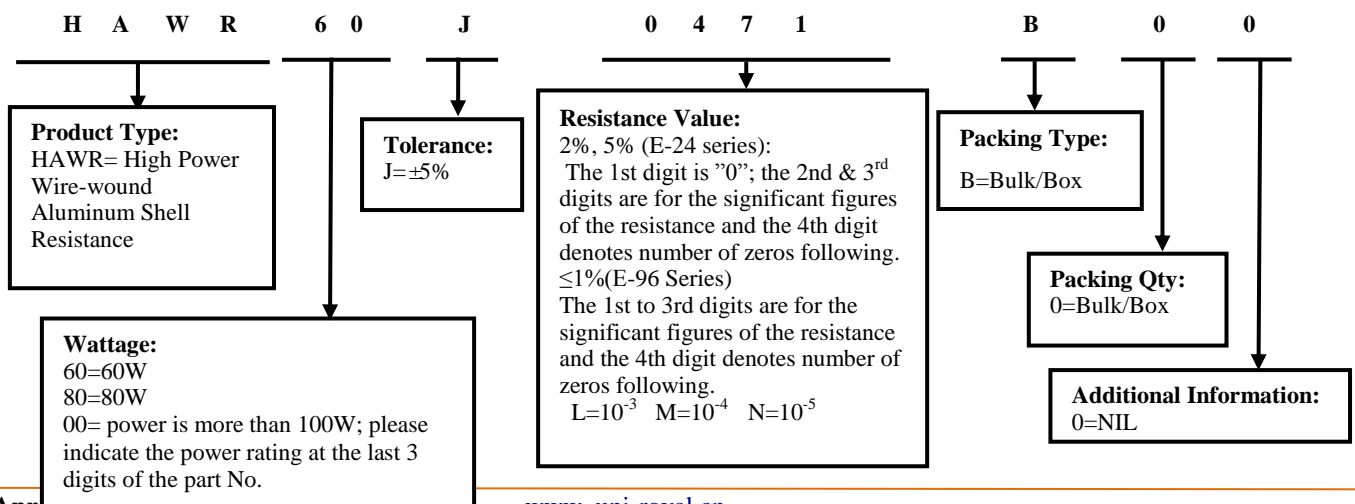
B=Bulk /Box

2.4.4 Current Sense Resistors, The 13<sup>th</sup> digit should be filled with “0”

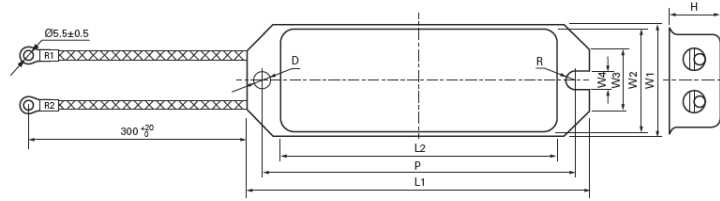
2.4.5 Current Sense Resistors, The 14<sup>th</sup> digit should be filled with “0”

## 3. Ordering Procedure

(Example: HAWR 60W ±5% 470 Ω B/B)



4. Dimension

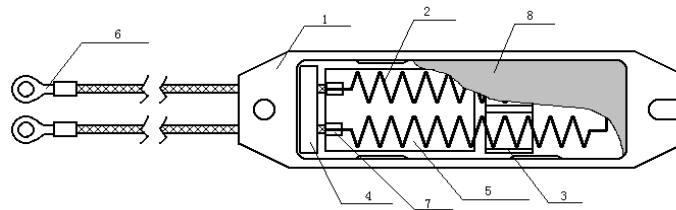


Unit:mm

Type	L1±1	L2±2	P±1	W1±1	W2±1	W3±0.5	W4±0.2	D±0.2	H±1
HAWR60W	100	75.5	90	30	28	16.5	4.5	4.6	16.5
HAWR80W	130.5	104.5	117.5	43	38.5	22	6.0	6.0	21
HAWR100W	130	110	118	42	39	22.5	6.0	6.0	20

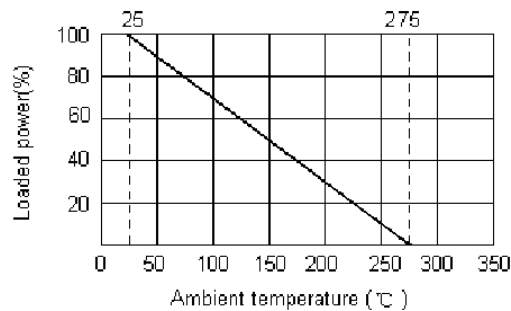
\*Remark: For further information, please contact our sales team.

5. Structure



No.	Name	Material Generic Name	Remark
1	Aluminous crust	Aluminum	
2	Alloy wire	Ni Cr	
3	Pedestal	Al <sub>2</sub> O <sub>3</sub> CaO	
4	Ceramic parts	Al <sub>2</sub> O <sub>3</sub> CaO	
5	Mica	Si Al	
6	Terminal	Cu Sn	
7	Terminal	Cu Sn	
8	Filling Materials	SiO <sub>2</sub>	

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. Performance Specification

Characteristic	Limits	Test method (GB/T 5729&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 (Upper limit temperature or Lower limit temperature) t <sub>1</sub> : +25 °C or specified room temperature t <sub>2</sub> : Upper limit temperature or Lower limit temperature test temperature
Short-time overload	Resistance change rate is: ±(5%+0.05Ω)max. With no evidence of mechanical damage.	4.13 Permanent resistance change 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.
Humidity (Steady State)	Resistance change rate is: ±(5%+0.05Ω)max. With no evidence of mechanical damage.	7.9 Resistance change after 240 hours without load in a humidity test chamber controlled at 40°C ±2°C and 90 to 95% relative humidity.
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 70±2°C ambient.
Rapid change of temperature	Resistance change rate is: ±(5%+0.05Ω)max. With no evidence of mechanical damage.	4.19 30 min at -55 °C and 30 min at 155 °C; 100 cycles.

## 8. Note

8.1. 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.

8.2. Cartons must be placed in correct direction which indicated on carton, otherwise the reel or wire will be deformed.

8.3. 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<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, NO<sub>2</sub>, etc.

## 9. Record

Version	Description	Page	Date	Amended by	Checked by
1	First version	1~4	Apr.16, 2019	Haiyan Chen	Yuhua Xu

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