

# DATA SHEET

**Product Name** Columnar Type Cement Fixed Resistors

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**Part Name** QHO Series

**File No.** DIP-SP-054

## 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](mailto: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 Columnar Type Cement Fixed Resistors manufactured by UNI-ROYAL.
- 1.2 Circular ceramic
- 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 Columnar Type Cement Fixed Resistors the 1<sup>st</sup> to 4<sup>th</sup> digits are to indicate the product type.

Example: QH00= Columnar 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	11W	17W

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:

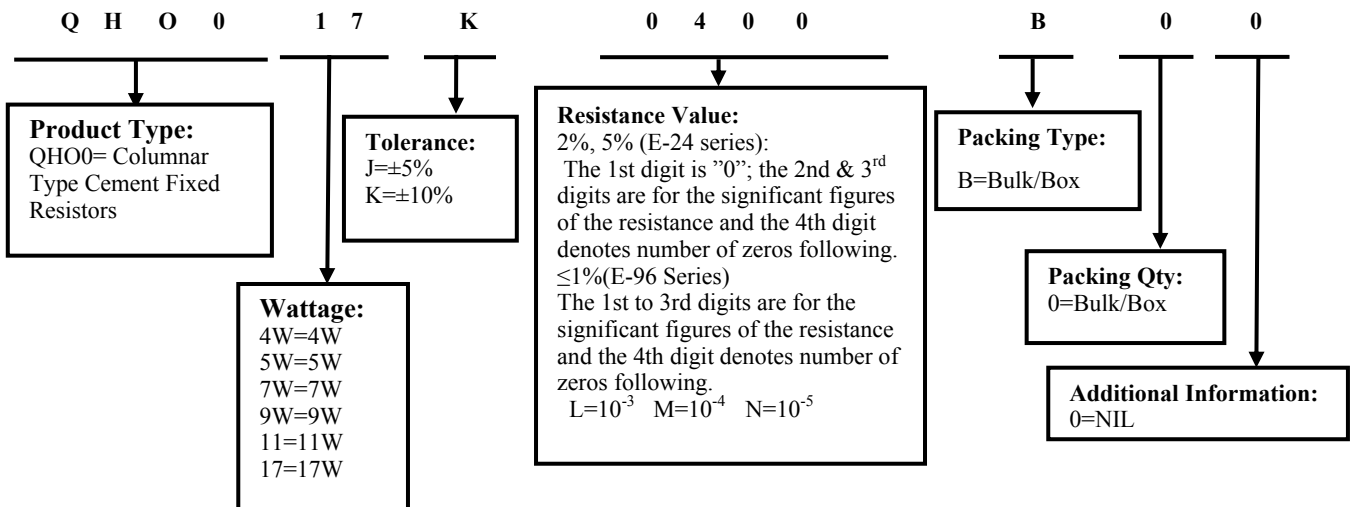
B=Bulk /Box

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

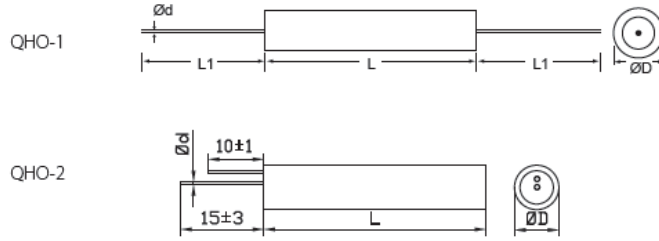
2.4.5 Current Sense Resistors, The 14<sup>th</sup> digit should be filled with "0"

## 3. Ordering Procedure

(Example: QH0 17W±10% 40Ω B/B)



4. Dimension

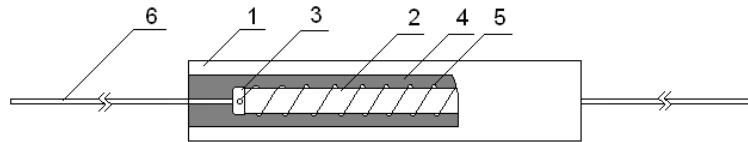


Unit: mm

Type	L±1	L1±3	ΦD±1	d±0.05
QHO 4W	43	30	8	0.75
QHO 5W	45	30	8	0.75
QHO 7W	50	30	9	0.75
QHO 9W	60	30	9	0.75
QHO 11W	65	30	9	0.75
QHO 17W	75	30	9	0.75

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

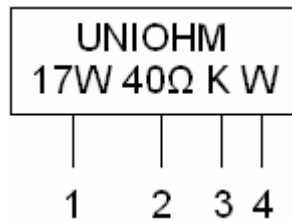
5. Construction



NO.	NAME	MATERIAL GENERIC NAME
1	CERAMIC CASE	STEATITE
2	CERAMIC ROD	Al <sub>2</sub> O <sub>3</sub>
3	CAP	IRON
4	FILLING MATERIALS	SiO <sub>2</sub>
5	ALLOY	NiCr&CuNi
6	LEAD	COPPER WIRE

4. Marking

Example:

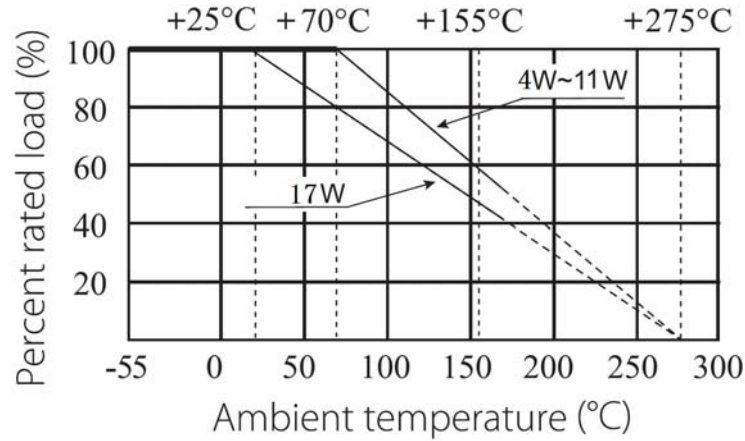


Code description and regulation:

1. Rating Power
2. Nominal resistance value
3. Resistance tolerance: k=±10% J=±5%
4. Wire-wound type

Note : The marking code shall be prevailed in kind!

7. Derating Curve



7.1 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)

8. Performance Specification

Characteristic	Limits	Test Method (GB/T 5729&JIS-C-5201&IEC60115-1)
Temperature Coefficient	$\geq 20\Omega$ : $\pm 300\text{PPM}/^\circ\text{C}$ $< 20\Omega$ : $\pm 400\text{PPM}/^\circ\text{C}$	4.8 Natural resistance changes per temp. Degree centigrade $\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (PPM}/^\circ\text{C)}$ 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 overload	Resistance change rate is: $\pm(5\%+0.05\Omega)\text{Max.}$ With no evidence of mechanical damage.	4.13 Permanent resistance change after the application of a potential of 2.5 times RCWV or Max.Overload Votage whichever less for 5 seconds.
Solderability	95% Coverage Min.	4.17 The area covered with a new, smooth, clean, shiny and continuous surface free from concentrated pinholes. Test temp. Of solder: 245°C $\pm 3^\circ\text{C}$ Dwell time in solder: 2~3seconds.
Resistance to soldering heat	Resistance change rate is: $\pm(1\%+0.05\Omega)\text{Max.}$ 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°C $\pm 5^\circ\text{C}$ solder for 10 $\pm 1$ seconds.
Rapid change of temperature	Resistance change rate is: $\pm(5\%+0.05\Omega)\text{max.}$ with no evidence of mechanical damage.	4.19 30 min at -55 °C and 30 min at 155°C; 100 cycles.

Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation break down.	4.7 Resistors shall be clamped in the trough of a 90°metallic V-block and shall be tested at AC potential respectively specified in the above list for 60-70 seconds.for cement fixed resistors the testing voltage is 1000V.
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.
Humidity (Steady state)	Resistance change rate is: $\pm(5\%+0.05\Omega)\text{Max.}$ With no evidence of mechanical damage.	4.24 Temporary resistance change after 240 hours exposure in a humidity test chamber controlled at $40\pm 2^{\circ}\text{C}$ and 90~95%RH relative humidity
Load life in humidity	For Wire-wound: $\Delta R/R: \pm 5\%$	7.9 Resistance change after 1000 hours (1.5 hours “ON” , 0.5 hours “OFF” ) at RCWV or Max.Working Voltage whichever less in a humidity test chamber controlled at $40\pm 2^{\circ}\text{C}$ and $93\%\pm 3\% \text{RH}$ .
Load life	For Wire-wound: $\Delta R/R: \pm 5\%$	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.

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

## 10. Record

Version	Description	Page	Date	Amended by	Checked by
1	First version	1~5	Apr.15, 2019	Haiyan Chen	Yuhua Xu
2	Modify the temperature coefficient test conditions	4	Nov.07, 2022	Haiyan Chen	Yuhua Xu
3	1.Modify derating curve 2.Modify the load life test conditions	4 5	Sep.28, 2024	Haiyan Chen	Yuhua Xu

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