

**UniRoyal**

# DATASHEET

**Product Name** Columnar Type Cement Fixed Resistors

**Part Name** QHO Series

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

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## 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: QHO0= 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 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 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 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 12th digit is to denote the Packaging Type with the following codes:

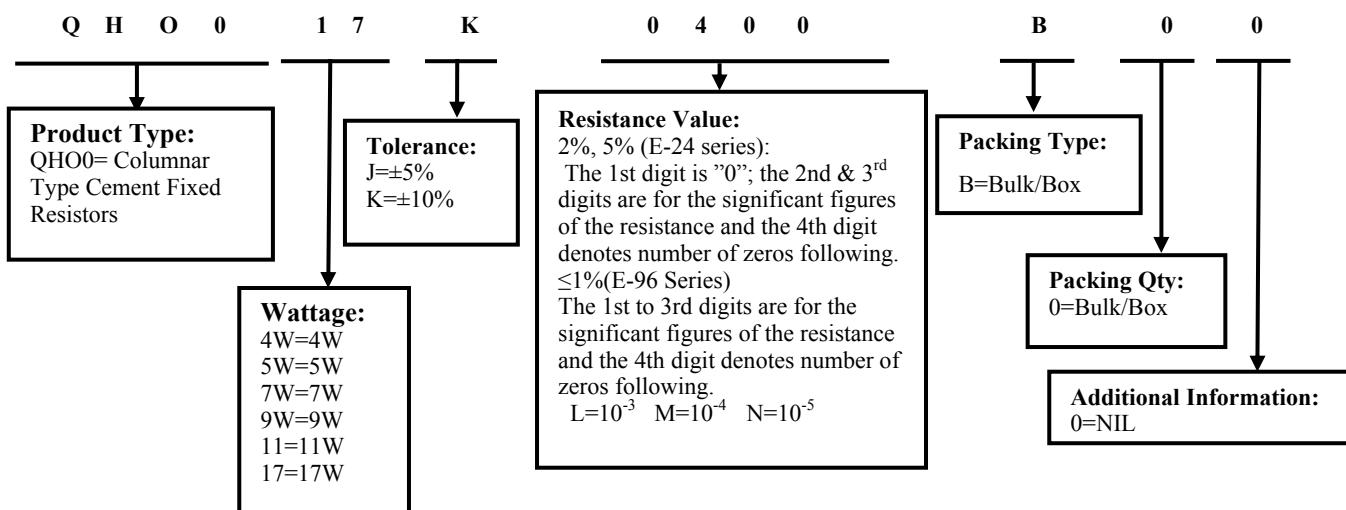
B=Bulk /Box

2.4.4 Current Sense Resistors, The 13th digit should be filled with "0"

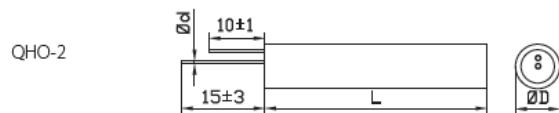
2.4.5 Current Sense Resistors, The 14th digit should be filled with "0"

## 3. Ordering Procedure

(Example: QHO 17W±10% 40Ω B/B)



## 4. Dimension

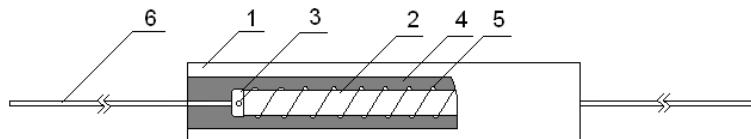


Unit: mm

Type	$L \pm 1$	$L1 \pm 3$	$\Phi D \pm 1$	$d \pm 0.05$
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	38	9	0.75

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

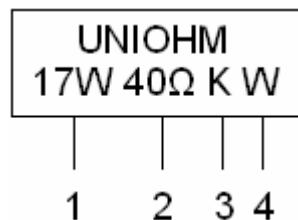
## 5. Construction



NO.	NAME	MATERIAL GENERIC NAME
1	CERAMIC CASE	STEATITE
2	CERAMIC ROD	$Al_2O_3$
3	CAP	IRON
4	FILLING MATERIALS	$SiO_2$
5	ALLOY	$NiCr\&CuNi$
6	LEAD	COPPER WIRE

## 4. Marking

Example:

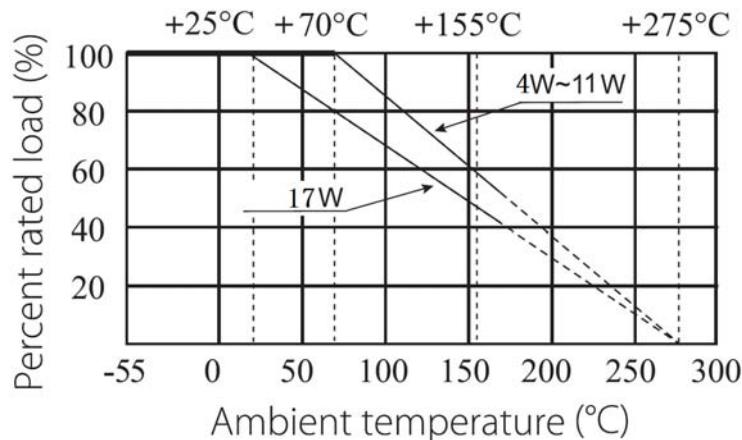


Code description and regulation:

1. Rating Power
2. Nominal resistance value
3. Resistance tolerance:  $k = \pm 10\%$   $J = \pm 5\%$
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 $\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (PPM/}^{\circ}\text{C)}$ $R_1$ : 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 overload	Resistance change rate is: $\pm(5\%+0.05\Omega)$ 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 Voltage 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: $245^{\circ}\text{C} \pm 3^{\circ}\text{C}$ Dwell time in solder: 2~3seconds.
Resistance to soldering heat	Resistance change rate is: $\pm (1\%+0.05\Omega)$ 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.
Rapid change of temperature	Resistance change rate is: $\pm(5\%+0.05\Omega)$ max. with no evidence of mechanical damage.	4.19 30 min at $-55^{\circ}\text{C}$ and 30 min at $155^{\circ}\text{C}$ ; 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: $\pm(5\%+0.05\Omega)$ Max. With no evidence of mechanical damage.	4.24 Temporary resistance change after 240 hours exposure in a humidity test chamber controlled at $40\pm2^\circ\text{C}$ and 90~95%RH relative humidity
Load life in humidity	$\Delta R/R \leq \pm (5\%+0.05\Omega)$	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 $40\pm2^\circ\text{C}$ and 93% $\pm3\%$ RH.
Load life	$\Delta R/R \leq \pm (5\%+0.05\Omega)$	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 $25\pm2^\circ\text{C}$ or $70\pm2^\circ\text{C}$ ambient.

#### 9. Note

- 9.1. UNI-ROYAL recommend products store in warehouse with temperature between 15 to  $35^\circ\text{C}$  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  $\text{Cl}_2$ ,  $\text{H}_2\text{S}$ ,  $\text{NH}_3$ ,  $\text{SO}_2$ ,  $\text{NO}_2$ ,  $\text{Br}$  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
4	Modify the size of the QHO 17W L1 dimension	3	Jul.24, 2025	Haiyan Chen	Yuhua Xu

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