

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 1st to 4th digits are to indicate the product type.

Example: QHO0= Columnar 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	11W	17W

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 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 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 N=10⁻⁵ P=10⁻⁶

2.4.3 The 12th, 13th & 14th digits.

The 12th digit is to denote the Packaging Type with the following codes:

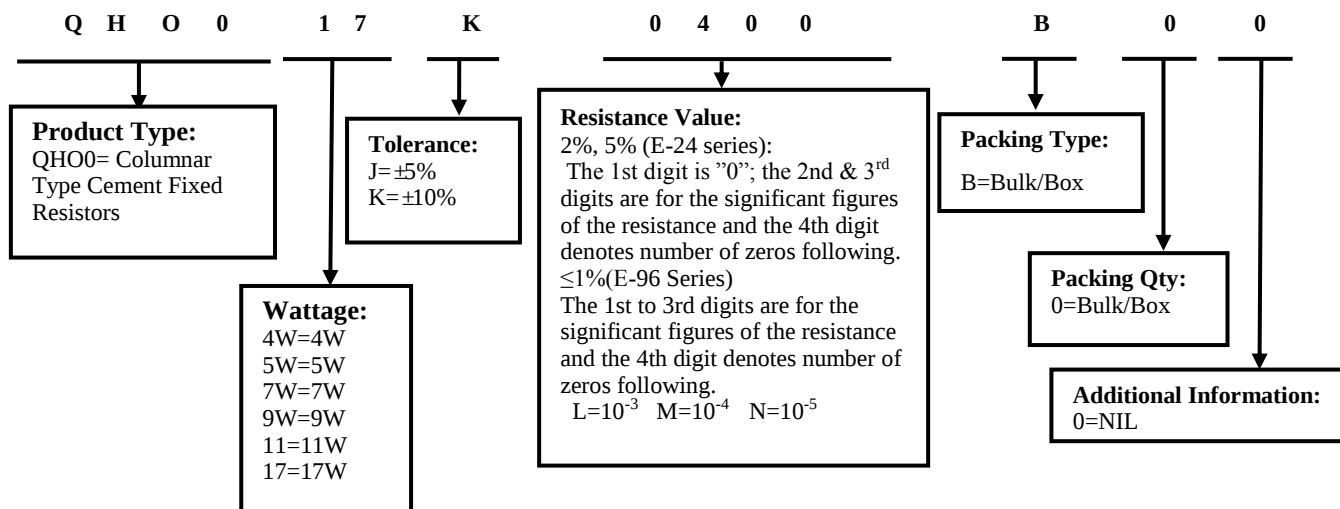
B=Bulk /Box

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

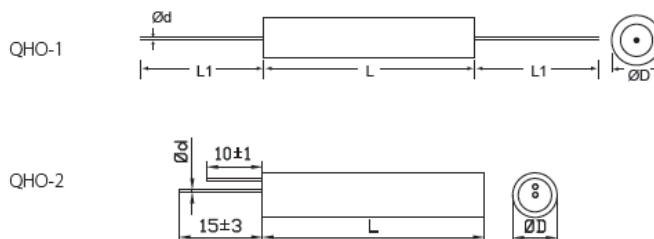
2.4.5 Current Sense Resistors, The 14th digit should be filled with "0"

3. Ordering Procedure

(Example: QHO 17W ±10% 40Ω B/B)



4. Dimension

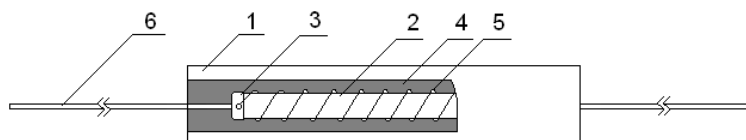


Unit: mm

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.

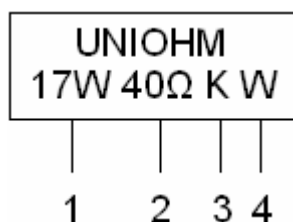
5. Construction



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:

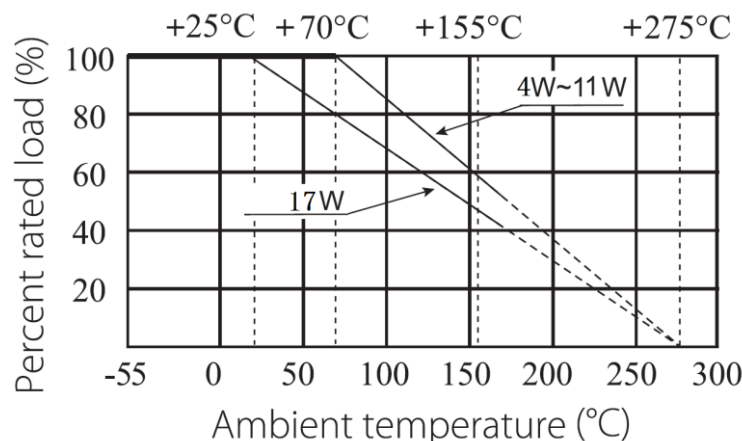


Code description and regulation:

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: $\pm(5\% + 0.05\Omega)\text{Max.}$ 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 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 °C $\pm 3^\circ\text{C}$ Dwell time in solder: 2~3 seconds.
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 ± 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 $40\pm2^{\circ}\text{C}$ 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% $\pm$ 3% 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℃ 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:
- Stored in high electrostatic environment
 - Stored in direct sunshine, rain, snow or condensation.
 - Exposed to sea wind or corrosive gases, such as Cl₂, H₂S, NH₃, SO₂, NO₂, 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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