

## Wirewound Resistors, Military/Established Reliability MIL-PRF-39009 Qualified, Type RER, R Level



### FEATURES

- Aluminum heat sink housing
- Molded construction for total environmental protection
- Qualified to MIL-PRF-39009
- Complete welded construction
- Available in non-inductive styles (type ENH) with Aryton-Perry winding for lowest reactive components
- Mounts on chassis to utilize heat-sink effect

### STANDARD ELECTRICAL SPECIFICATIONS

| MODEL  | MIL-PRF-39009 TYPE | POWER RATING<br>$P_{25\text{ }^\circ\text{C}}$<br>W |          | MILITARY RESISTANCE RANGE<br>$\pm 1\%$<br>$\Omega$ | WEIGHT (typical)<br>g |
|--------|--------------------|---|----------|--|-----------------------|
|        |                    | MOUNTED   | FREE AIR |  |                       |
| ENH-5  | RER40              | 5   | 3        | 1 - 1.65K  | 3.3                   |
| ENH-10 | RER45              | 10  | 6        | 1 - 2.8K   | 8.8                   |
| ENH-25 | RER50              | 20  | 8        | 1 - 6.04K  | 16.5                  |
| ENH-50 | RER55              | 30  | 10       | 1 - 4.99K  | 35                    |
| ERH-5  | RER60              | 5   | 3        | 0.10 - 3.32K                                       | 3                     |
| ERH-10 | RER65              | 10  | 6        | 0.10 - 5.62K                                       | 6                     |
| ERH-25 | RER70              | 20  | 8        | 0.10 - 12.1K                                       | 13                    |
| ERH-50 | RER75              | 30  | 10       | 0.10 - 39.2K                                       | 28                    |

### TECHNICAL SPECIFICATIONS

| PARAMETER                       | UNIT                  | ERH, ENH RESISTOR CHARACTERISTICS  |
|---------------------------------|-----------------------|--|
| Temperature Coefficient         | ppm/ $^\circ\text{C}$ | $\pm 100$ for $0.1\ \Omega$ to $0.99\ \Omega$ , $\pm 50$ for $1\ \Omega$ to $19.9\ \Omega$ , $\pm 20$ for $20\ \Omega$ and above |
| Dielectric Withstanding Voltage | $V_{AC}$              | 1000 for ERH-5, ERH-10 and ERH-25, 2000 for ERH-50   |
| Short Time Overload             | -                     | 5 x rated power for 5 s  |
| Maximum Working Voltage         | V                     | $(P \times R)^{1/2}$   |
| Insulation Resistance           | $\Omega$              | 10 000 M $\Omega$ minimum dry, 1000 M $\Omega$ minimum after moisture test   |
| Terminal Strength               | lb                    | 5 pull for ERH-5 and ERH-10, 10 pull for ERH-25 and ERH-50   |
| Solderability                   | -                     | Meets requirements of ANSI J-STD-002   |
| Operating Temperature Range     | $^\circ\text{C}$      | - 55 to + 250  |

### GLOBAL PART NUMBER INFORMATION

Global/Military Part Numbering: RER65F1001RC02

R
E
R
6
5
F
1
0
0
1
R
C
0
2

| MIL TYPE   |
|--|
| <b>RER40</b><br><b>RER45</b><br><b>RER50</b><br><b>RER55</b><br><b>RER60</b><br><b>RER65</b><br><b>RER70</b><br><b>RER75</b> |

| TOLERANCE CODE         |
|------------------------|
| <b>F</b> = $\pm 1.0\%$ |

| RESISTANCE VALUE                                     |
|--|
| 3 digit significant figure, followed by a multiplier |
| <b>49R9</b> = 49.9 $\Omega$                          |
| <b>1000</b> = 100 $\Omega$                           |
| <b>1001</b> = 1000 $\Omega$                          |

| FAILURE RATE             |
|--------------------------|
| <b>M</b> = 1.0 %/1000 h  |
| <b>P</b> = 0.1 %/1000 h  |
| <b>R</b> = 0.01 %/1000 h |

| PACKAGING CODE   |
|--|
| <b>C02</b> = Tin/lead, card pack                       |
| <b>CSL</b> = Tin/lead, card pack, single lot date code |

**DIMENSIONS**


| MODEL            | DIMENSIONS in inches [millimeters]      |   |   |   |   |   |   |  |  |  |  |  |  |   |
|------------------|---|---|---|---|---|---|---|--|--|--|--|--|--|---|
|                  | A                                       | B                                       | C                                       | D                                       | E                                       | F                                       | G                                       | H                                      | J                                      | K                                      | L                                      | M                                      | N                                      | P                                       |
| ERH-5<br>ENH-5   | 0.444<br>± 0.005<br>[11.280<br>± 0.127] | 0.490<br>± 0.005<br>[12.450<br>± 0.127] | 0.600<br>± 0.031<br>[15.240<br>± 0.787] | 1.125<br>± 0.062<br>[28.580<br>± 1.570] | 0.334<br>± 0.015<br>[8.480<br>± 0.381]  | 0.646<br>± 0.015<br>[16.410<br>± 0.381] | 0.320<br>± 0.015<br>[8.130<br>± 0.381]  | 0.065<br>± 0.010<br>[1.650<br>± 0.254] | 0.133<br>± 0.010<br>[3.380<br>± 0.254] | 0.078<br>± 0.010<br>[1.980<br>± 0.254] | 0.093<br>± 0.005<br>[2.360<br>± 0.127] | 0.078<br>± 0.015<br>[1.980<br>± 0.381] | 0.050<br>± 0.005<br>[1.270<br>± 0.127] | 0.266<br>± 0.062<br>[6.760<br>± 1.570]  |
| ERH-10<br>ENH-10 | 0.562<br>± 0.005<br>[14.270<br>± 0.127] | 0.625<br>± 0.005<br>[15.880<br>± 0.127] | 0.750<br>± 0.031<br>[19.050<br>± 0.787] | 1.375<br>± 0.062<br>[34.930<br>± 1.570] | 0.420<br>± 0.015<br>[10.670<br>± 0.381] | 0.800<br>± 0.015<br>[20.320<br>± 0.381] | 0.390<br>± 0.015<br>[9.910<br>± 0.381]  | 0.075<br>± 0.010<br>[1.900<br>± 0.254] | 0.165<br>± 0.010<br>[4.190<br>± 0.254] | 0.093<br>± 0.010<br>[2.360<br>± 0.254] | 0.094<br>± 0.005<br>[2.390<br>± 0.127] | 0.102<br>± 0.015<br>[2.590<br>± 0.381] | 0.085<br>± 0.005<br>[2.160<br>± 0.127] | 0.312<br>± 0.062<br>[7.920<br>± 1.570]  |
| ERH-25<br>ENH-25 | 0.719<br>± 0.005<br>[18.260<br>± 0.127] | 0.781<br>± 0.005<br>[19.840<br>± 0.127] | 1.062<br>± 0.031<br>[26.970<br>± 0.787] | 1.938<br>± 0.062<br>[49.230<br>± 1.570] | 0.550<br>± 0.015<br>[13.970<br>± 0.381] | 1.080<br>± 0.015<br>[27.430<br>± 0.381] | 0.546<br>± 0.015<br>[13.870<br>± 0.381] | 0.075<br>± 0.010<br>[1.900<br>± 0.254] | 0.231<br>± 0.010<br>[5.870<br>± 0.254] | 0.172<br>± 0.010<br>[4.370<br>± 0.254] | 0.125<br>± 0.005<br>[3.180<br>± 0.127] | 0.115<br>± 0.015<br>[2.920<br>± 0.381] | 0.085<br>± 0.005<br>[2.160<br>± 0.127] | 0.438<br>± 0.062<br>[11.130<br>± 1.570] |
| ERH-50<br>ENH-50 | 1.562<br>± 0.005<br>[39.670<br>± 0.127] | 0.844<br>± 0.005<br>[21.440<br>± 0.127] | 1.968<br>± 0.031<br>[49.990<br>± 0.787] | 2.781<br>± 0.062<br>[70.640<br>± 1.570] | 0.630<br>± 0.015<br>[16.000<br>± 0.381] | 1.140<br>± 0.015<br>[28.960<br>± 0.381] | 0.610<br>± 0.015<br>[15.490<br>± 0.381] | 0.088<br>± 0.010<br>[2.240<br>± 0.254] | 0.260<br>± 0.010<br>[6.600<br>± 0.254] | 0.196<br>± 0.010<br>[4.980<br>± 0.254] | 0.125<br>± 0.005<br>[3.180<br>± 0.127] | 0.107<br>± 0.015<br>[2.720<br>± 0.381] | 0.085<br>± 0.005<br>[2.160<br>± 0.127] | 0.438<br>± 0.062<br>[11.130<br>± 1.570] |

**MATERIAL SPECIFICATIONS**

**Element:** Copper-nickel alloy or nickel-chrome alloy, depending on resistance value

**Core:** Ceramic, steatite or alumina, depending on physical size

**Encapsulant:** Silicone molded construction

**Housing:** Aluminum with hard anodic coating

**End Caps:** Stainless steel

**Standard Terminals:** Tinned Copperweld®

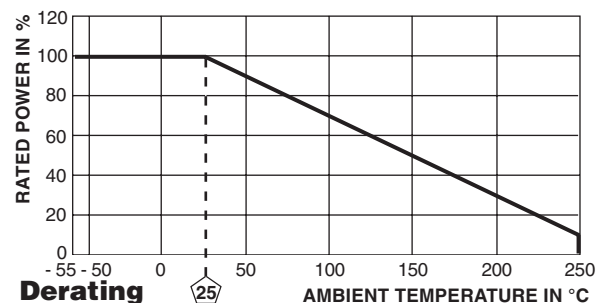
**Part Marking:** Source code, JAN, military PIN, date/lot code

**POWER RATING**

Vishay ERH and ENH resistor wattage ratings are based on mounting to the proper heat sink.

ERH-5 and ERH-10: 4" x 6" x 2" x 0.040" thick aluminum chassis

ERH-25 and ERH-50: 5" x 7" x 2" x 0.040" thick aluminum chassis


**APPLICABLE MIL SPECIFICATION**

**MIL-PRF-39009:** This is the military specification covering housed chassis mount established reliability power wirewound resistors. Vishay ERH and ENH resistors are listed as qualified on the MIL-PRF-39009 QPL.

| PERFORMANCE                     |  |                       |
|---------------------------------|--|-----------------------|
| TEST                            | CONDITIONS OF TEST   | TEST LIMITS           |
| Low Temperature Operation       | Apply rated power until thermal stability, remove power subject to air temperature of - 55 °C for 15 to 30 min | ± (0.5 % + 0.01 Ω) ΔR |
| Short Time Overload             | 5 x rated power for 5 s  | ± (0.3 % + 0.01 Ω) ΔR |
| Dielectric Withstanding Voltage | 1000 V <sub>rms</sub> (RER 40, 45, 50, 60, 65, 70), 2000 V <sub>rms</sub> (RER55 and 75), 1 min duration       | ± (0.2 % + 0.01 Ω) ΔR |
| Low Temperature Storage         | - 55 °C for 24 h   | ± (0.3 % + 0.01 Ω) ΔR |
| High Temperature Exposure       | 250 °C for 2000 h  | ± (1.0 % + 0.01 Ω) ΔR |
| Moisture Resistance             | MIL-STD-202, Method 106  | ± (0.5 % + 0.01 Ω) ΔR |
| Shock, Specified Pulse          | MIL-STD-202, Method 213, condition 1   | ± (0.2 % + 0.01 Ω) ΔR |
| Vibration, High Frequency       | MIL-STD-202, Method 204, condition D   | ± (0.2 % + 0.01 Ω) ΔR |
| Load Life                       | 2000 h at rated power, + 25 °C, 1.5 h "ON", 0.5 h "OFF"  | ± (1.0 % + 0.01 Ω) ΔR |
| Extended Life                   | 10 000 h at rated power, + 25 °C, 1.5 h "ON", 0.5 h "OFF"  | ± (2.0 % + 0.01 Ω) ΔR |
| Terminal Strength               | MIL-STD-202, Method 211, condition A<br>5 pound (RER40, 45, 60, 65), 10 pound (RER50, 55, 70, 75)              | ± (0.2 % + 0.01 Ω) ΔR |



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