

## 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
- Non-inductive styles manufactured with Ayrton-Perry winding for lowest reactive components
- Mounts on chassis to utilize heat-sink effect

### STANDARD ELECTRICAL SPECIFICATIONS

| MILITARY MODEL | VISHAY REFERENCE MODEL | POWER RATING<br>$P_{25^{\circ}\text{C}}$<br>W | RESISTANCE RANGE<br>$\Omega$ | TOLERANCE<br>$\pm \%$ | WEIGHT<br>(typical)<br>g |
|----------------|------------------------|-----------------------------------------------|------------------------------|-----------------------|--------------------------|
| RER40          | ENH05                  | 5                                             | 1 to 1.65K                   | 1                     | 3.3                      |
| RER45          | ENH10                  | 10                                            | 1 to 2.8K                    | 1                     | 8.8                      |
| RER50          | ENH25                  | 20                                            | 1 to 6.04K                   | 1                     | 16.5                     |
| RER55          | ENH50                  | 30                                            | 1 to 4.99K                   | 1                     | 35                       |
| RER60          | ERH05                  | 5                                             | 0.10 to 3.32K                | 1                     | 3                        |
| RER65          | ERH10                  | 10                                            | 0.10 to 5.62K                | 1                     | 6                        |
| RER70          | ERH25                  | 20                                            | 0.10 to 12.1K                | 1                     | 13                       |
| RER75          | ERH50                  | 30                                            | 0.10 to 39.2K                | 1                     | 28                       |

### TECHNICAL SPECIFICATIONS

| PARAMETER                      | UNIT     | RER40/RER60                                                                                                                | RER45/RER65 | RER50/RER70 | RER55/RER75 |
|--------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-------------|
| Free Air Power Rating at 25 °C | W        | 3                                                                                                                          | 6           | 8           | 10          |
| Temperature Coefficient        | ppm/°C   | $\pm 20$ for 20 $\Omega$ and above; $\pm 50$ for 1 $\Omega$ to 19.9 $\Omega$ ; $\pm 100$ for 0.1 $\Omega$ to 0.99 $\Omega$ |             |             |             |
| 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                                                 |             |             |             |
| Solderability                  | -        | Meets requirements of ANSI J-STD-002                                                                                       |             |             |             |
| Operating Temperature Range    | °C       | -55 to +250                                                                                                                |             |             |             |

### MILITARY PART NUMBER INFORMATION

Military Part Numbering example: RER65F1001RC02

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

#### MIL TYPE

RER40  
RER45  
RER50  
RER55  
RER60  
RER65  
RER70  
RER75

#### TOLERANCE CODE

F =  $\pm 1.0 \%$

#### RESISTANCE VALUE

3 digit significant figure, followed by a multiplier

49R9 = 49.9  $\Omega$   
1000 = 100  $\Omega$   
1001 = 1000  $\Omega$

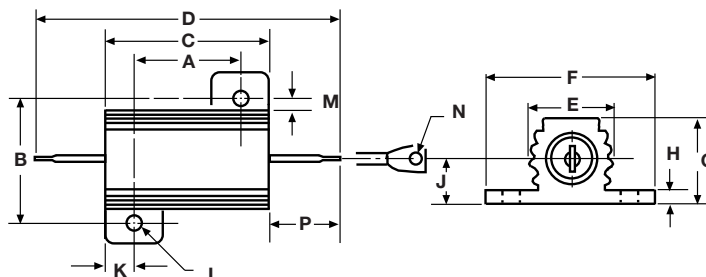
#### FAILURE RATE

M = 1.0 %/1000 h  
P = 0.1 %/1000 h  
R = 0.01 %/1000 h

#### PACKAGING CODE

C02 = tin/lead, card pack  
CSL = tin/lead, card pack, single lot date code

## DIMENSIONS



| MILITARY<br>MODEL | DIMENSIONS in inches [millimeters] |                     |                     |                     |                     |                     |                     |                    |                    |                    |                    |                    |                    |                     |
|-------------------|------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
|                   | A                                  | B                   | C                   | D                   | E                   | F                   | G                   | H                  | J                  | K                  | L                  | M                  | N                  | P                   |
| RER40<br>RER60    | 0.444                              | 0.490               | 0.600               | 1.125               | 0.334               | 0.646               | 0.320               | 0.065              | 0.133              | 0.078              | 0.093              | 0.078              | 0.050              | 0.266               |
|                   | ± 0.005                            | ± 0.005             | ± 0.031             | ± 0.062             | ± 0.015             | ± 0.015             | ± 0.015             | ± 0.010            | ± 0.010            | ± 0.010            | ± 0.005            | ± 0.015            | ± 0.005            | ± 0.062             |
|                   | [11.280<br>± 0.127]                | [12.450<br>± 0.127] | [15.240<br>± 0.787] | [28.580<br>± 1.570] | [8.480<br>± 0.381]  | [16.410<br>± 0.381] | [8.130<br>± 0.381]  | [1.650<br>± 0.254] | [3.380<br>± 0.254] | [1.980<br>± 0.254] | [2.360<br>± 0.127] | [1.980<br>± 0.381] | [1.270<br>± 0.127] | [6.760<br>± 1.570]  |
| RER45<br>RER65    | 0.562                              | 0.625               | 0.750               | 1.375               | 0.420               | 0.800               | 0.390               | 0.075              | 0.165              | 0.093              | 0.094              | 0.102              | 0.085              | 0.312               |
|                   | ± 0.005                            | ± 0.005             | ± 0.031             | ± 0.062             | ± 0.015             | ± 0.015             | ± 0.015             | ± 0.010            | ± 0.010            | ± 0.010            | ± 0.005            | ± 0.015            | ± 0.005            | ± 0.062             |
|                   | [14.270<br>± 0.127]                | [15.880<br>± 0.127] | [19.050<br>± 0.787] | [34.930<br>± 1.570] | [10.670<br>± 0.381] | [20.320<br>± 0.381] | [9.910<br>± 0.381]  | [1.900<br>± 0.254] | [4.190<br>± 0.254] | [2.360<br>± 0.254] | [2.390<br>± 0.127] | [2.590<br>± 0.381] | [2.160<br>± 0.127] | [7.920<br>± 1.570]  |
| RER50<br>RER70    | 0.719                              | 0.781               | 1.062               | 1.938               | 0.550               | 1.080               | 0.546               | 0.075              | 0.231              | 0.172              | 0.125              | 0.115              | 0.085              | 0.438               |
|                   | ± 0.005                            | ± 0.005             | ± 0.031             | ± 0.062             | ± 0.015             | ± 0.015             | ± 0.015             | ± 0.010            | ± 0.010            | ± 0.010            | ± 0.005            | ± 0.015            | ± 0.005            | ± 0.062             |
|                   | [18.260<br>± 0.127]                | [19.840<br>± 0.127] | [26.970<br>± 0.787] | [49.230<br>± 1.570] | [13.970<br>± 0.381] | [27.430<br>± 0.381] | [13.870<br>± 0.381] | [1.900<br>± 0.254] | [5.870<br>± 0.254] | [4.370<br>± 0.254] | [3.180<br>± 0.127] | [2.920<br>± 0.381] | [2.160<br>± 0.127] | [11.130<br>± 1.570] |
| RER55<br>RER75    | 1.562                              | 0.844               | 1.968               | 2.781               | 0.630               | 1.140               | 0.610               | 0.088              | 0.260              | 0.196              | 0.125              | 0.107              | 0.085              | 0.438               |
|                   | ± 0.005                            | ± 0.005             | ± 0.031             | ± 0.062             | ± 0.015             | ± 0.015             | ± 0.015             | ± 0.010            | ± 0.010            | ± 0.010            | ± 0.005            | ± 0.015            | ± 0.005            | ± 0.062             |
|                   | [39.670<br>± 0.127]                | [21.440<br>± 0.127] | [49.990<br>± 0.787] | [70.640<br>± 1.570] | [16.000<br>± 0.381] | [28.960<br>± 0.381] | [15.490<br>± 0.381] | [2.240<br>± 0.254] | [6.600<br>± 0.254] | [4.980<br>± 0.254] | [3.180<br>± 0.127] | [2.720<br>± 0.381] | [2.160<br>± 0.127] | [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 RER resistor wattage ratings are based on mounting to the proper heat sink.

RER40, RER45, RER60, RER65: 4" x 6" x 2" x 0.040" thick aluminum chassis

RER50, RER55, RER70, RER75: 5" x 7" x 2" x 0.040" thick aluminum chassis

## DERATING



| 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 min 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> (RER40, RER45, RER50, RER60, RER65, RER70), 2000 V <sub>RMS</sub> (RER55 and RER75), 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 I                                                                                      | ± (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, RER45, RER60, RER65),<br>10 pound (RER50, RER55, RER70, RER75)    | ± (0.2 % + 0.01 Ω) ΔR |



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