

## Wirewound Resistors, Industrial Power, Aluminum Housed, Chassis Mount


**DESIGN SUPPORT TOOLS**
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**Note**

\* This datasheet provides information about parts that are RoHS-compliant and/or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

**FEATURES**

- Molded construction for total environmental protection
- Complete welded construction
- Meets applicable requirements of MIL-PRF-18546
- Available in non-inductive styles (type NH) with Ayrton-Perry winding for lowest reactive components
- Mounts on chassis to utilize heat-sink effect
- Excellent stability in operation (< 1 % change in resistance)
- MIL-PRF-18546 qualified, type RE resistors can be found at: [www.vishay.com/doc?30282](http://www.vishay.com/doc?30282)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**STANDARD ELECTRICAL SPECIFICATIONS**

GLOBAL MODEL	HISTORICAL MODEL	POWER RATING $P_{25^{\circ}\text{C}}$ W	RESISTANCE RANGE $\Omega$ $\pm 0.05\%$ , $\pm 0.1\%$	RESISTANCE RANGE $\Omega$ $\pm 0.25\%$	RESISTANCE RANGE $\Omega$ $\pm 0.5\%$	RESISTANCE RANGE $\Omega$ $\pm 1\%$ , $\pm 3\%$ , $\pm 5\%$	WEIGHT (typical) g
RH005	RH-5	7.5	0.5 to 6.75K	0.1 to 8.6K	0.05 to 8.6K	0.02 to 24.5K	3
NH005	NH-5	7.5	0.5 to 2.32K	0.1 to 3.27K	0.05 to 3.27K	0.05 to 12.75K	3
RH010	RH-10	12.5	0.5 to 12.7K	0.1 to 16.69K	0.05 to 16.69K	0.01 to 47.1K	5
NH010	NH-10	12.5	0.5 to 4.45K	0.1 to 5.54K	0.05 to 5.54K	0.05 to 23.5K	5
RH025	RH-25	25	0.5 to 25.7K	0.1 to 32.99K	0.05 to 32.99K	0.01 to 95.2K	12
NH025	NH-25	25	0.5 to 9.09K	0.1 to 12.8K	0.05 to 12.8K	0.05 to 47.6K	12
RH050	RH-50	50	0.5 to 73.4K	0.1 to 96K	0.05 to 96K	0.01 to 273K	28
NH050	NH-50	50	0.5 to 26K	0.1 to 36.7K	0.05 to 36.7K	0.05 to 136K	28
RH100	RH-100	100	0.5 to 90K	0.1 to 90K	0.05 to 90K	0.05 to 90K	353
NH100	NH-100	100	0.5 to 37.5K	0.1 to 37.5K	0.05 to 37.5K	0.05 to 37.5K	353
RH250	RH-250	250	0.5 to 116K	0.1 to 116K	0.05 to 116K	0.05 to 116K	637
NH250	NH-250	250	0.5 to 48.5K	0.1 to 48.5K	0.05 to 48.5K	0.05 to 48.5K	637

**Note**

- RH005 and NH005 printed with 5 W power rating. RH010 and NH010 printed with 10 W power rating. New construction allows these resistors to be rated at higher wattage but will only be printed with the higher wattage upon customer request

**TECHNICAL SPECIFICATIONS**

PARAMETER	UNIT	RH RESISTOR CHARACTERISTICS
Temperature Coefficient	ppm/ $^{\circ}\text{C}$	$\pm 20$ for 10 $\Omega$ and above; $\pm 50$ for 1 $\Omega$ to 9.9 $\Omega$ , $\pm 100$ 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	$^{\circ}\text{C}$	-55 to +250

**GLOBAL PART NUMBER INFORMATION**

Global Part Numbering example: RH0054R125FC02

R	H	0	0	5	4	R	1	2	5	F	C	0	2			
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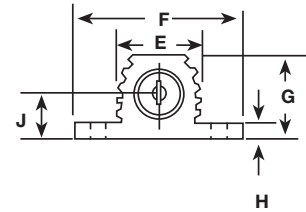
GLOBAL MODEL	RESISTANCE VALUE	TOLERANCE CODE	PACKAGING	SPECIAL
<b>RH005</b> (see Standard Electrical Specifications Global Model column for options)	<b>R</b> = decimal <b>K</b> = thousand <b>15R00</b> = 15 $\Omega$ <b>10K00</b> = 10 k $\Omega$	<b>A</b> = 0.05 % <b>B</b> = 0.1 % <b>C</b> = 0.25 % <b>D</b> = 0.5 % <b>F</b> = 1.0 % <b>H</b> = 3.0 % <b>J</b> = 5.0 %	<b>E02</b> = lead (Pb)-free, card pack (RH005 - RH050) <b>E01</b> = lead (Pb)-free, skin pack (RH100 and RH250)  <b>C02</b> = tin / lead, card pack (RH005 - RH050) <b>J01</b> = tin / lead, skin pack (RH100 and RH250)	(dash number) (up to 3 digits) from <b>1 to 999</b> as applicable

 Historical Part Numbering example: RH-5 4.125  $\Omega$  1 % C02

RH-5	4.125 $\Omega$	1 %	C02
HISTORICAL MODEL	RESISTANCE VALUE	TOLERANCE CODE	PACKAGING

**DIMENSIONS** in inches [millimeters]

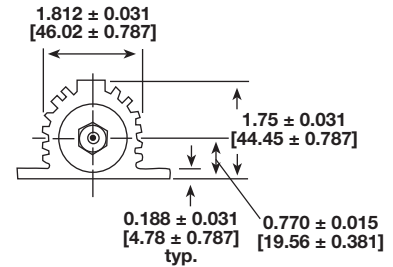
RH005, 010, 025, 050  
NH005, 010, 025, 050



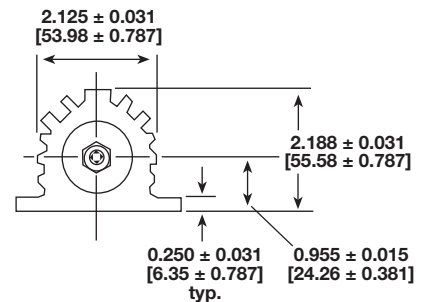
GLOBAL MODEL	DIMENSIONS in inches [millimeters]													
	A	B	C	D	E	F	G	H	J	K	L	M	N	P
RH005 NH005	0.444 ± 0.005 [11.28 ± 0.127]	0.490 ± 0.005 [12.45 ± 0.127]	0.600 ± 0.030 [15.24 ± 0.787]	1.125 ± 0.062 [28.58 ± 1.57]	0.334 ± 0.015 [8.48 ± 0.381]	0.646 ± 0.015 [16.41 ± 0.381]	0.320 ± 0.015 [8.13 ± 0.381]	0.065 ± 0.010 [1.65 ± 0.254]	0.133 ± 0.010 [3.38 ± 0.254]	0.078 ± 0.010 [1.98 ± 0.254]	0.093 ± 0.005 [2.36 ± 0.127]	0.078 ± 0.015 [1.98 ± 0.381]	0.050 ± 0.005 [1.27 ± 0.127]	0.266 ± 0.062 [6.76 ± 1.57]
RH010 NH010	0.562 ± 0.005 [14.27 ± 0.127]	0.625 ± 0.005 [15.88 ± 0.127]	0.750 ± 0.031 [19.05 ± 0.787]	1.375 ± 0.062 [34.93 ± 1.57]	0.420 ± 0.015 [10.67 ± 0.381]	0.800 ± 0.015 [20.32 ± 0.381]	0.390 ± 0.015 [9.91 ± 0.381]	0.075 ± 0.010 [1.91 ± 0.254]	0.165 ± 0.010 [4.19 ± 0.254]	0.093 ± 0.010 [2.36 ± 0.254]	0.094 ± 0.005 [2.39 ± 0.127]	0.102 ± 0.015 [2.59 ± 0.381]	0.085 ± 0.005 [2.16 ± 0.127]	0.312 ± 0.062 [7.92 ± 1.57]
RH025 NH025	0.719 ± 0.005 [18.26 ± 0.127]	0.781 ± 0.005 [19.84 ± 0.127]	1.062 ± 0.031 [26.97 ± 0.787]	1.938 ± 0.062 [49.23 ± 1.57]	0.550 ± 0.015 [13.97 ± 0.381]	1.080 ± 0.015 [27.43 ± 0.381]	0.546 ± 0.015 [13.87 ± 0.381]	0.075 ± 0.010 [1.91 ± 0.254]	0.231 ± 0.010 [5.87 ± 0.254]	0.172 ± 0.010 [4.37 ± 0.254]	0.125 ± 0.005 [3.18 ± 0.127]	0.115 ± 0.015 [2.92 ± 0.381]	0.085 ± 0.005 [2.16 ± 0.127]	0.438 ± 0.062 [11.13 ± 1.57]
RH050 NH050	1.562 ± 0.005 [39.67 ± 0.127]	0.844 ± 0.005 [21.44 ± 0.127]	1.968 ± 0.031 [49.99 ± 0.787]	2.781 ± 0.062 [70.64 ± 1.57]	0.630 ± 0.015 [16.00 ± 0.381]	1.140 ± 0.015 [28.96 ± 0.381]	0.610 ± 0.015 [15.49 ± 0.381]	0.088 ± 0.010 [2.24 ± 0.254]	0.260 ± 0.010 [6.60 ± 0.254]	0.196 ± 0.010 [4.98 ± 0.254]	0.125 ± 0.005 [3.18 ± 0.127]	0.107 ± 0.015 [2.72 ± 0.381]	0.085 ± 0.005 [2.16 ± 0.127]	0.438 ± 0.062 [11.13 ± 1.57]

**DIMENSIONS** in inches [millimeters]

RH100, NH100



RH250, NH250





**POWER RATING**

Vishay RH resistor wattage ratings are based on mounting to the following heat sink:

- RH005 and RH010: 4" x 6" x 2" x 0.040" thick aluminum chassis (129 sq. in. surface area)
- RH025: 5" x 7" x 2" x 0.040" thick aluminum chassis (167 sq. in. surface area)
- RH050: 12" x 12" x 0.059" thick aluminum panel (291 sq. in. surface area)
- RH100 and RH250: 12" x 12" x 0.125" thick aluminum panel (294 sq. in. surface area)

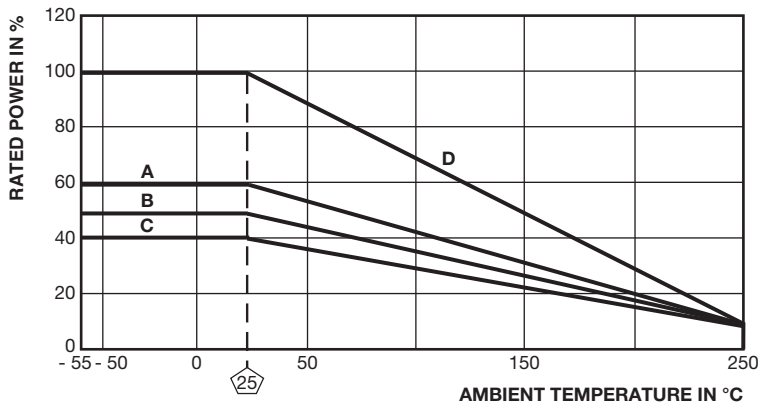
FREE AIR POWER RATING						
GLOBAL MODEL	RH005 NH005	RH010 NH010	RH025 NH025	RH050 NH050	RH100 NH100	RH250 NH250
W at 25 °C	4.5	7.5	12.5	20	40	100

**AMBIENT TEMPERATURE DERATING**

Derating is required for ambient temperatures above 25 °C, see the following graph.

Curves A, B, C apply to operation of unmounted resistors. Curve D applies to all types when mounted to specified heat sink.

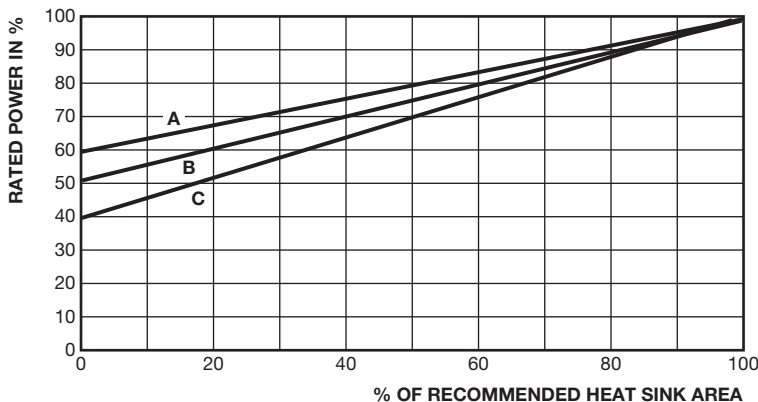
- A = RH005 and RH010 size resistor, unmounted
- B = RH025 size resistor, unmounted
- C = RH050, RH100 and RH250 size resistor, unmounted
- D = All types mounted to recommended aluminum heat sink



**REDUCED HEAT SINK DERATING**

Derating is also required when recommended heat sink area is reduced.

- A = RH005 and RH010 size resistor
- B = RH025 size resistor
- C = RH050, RH100 and RH250 size resistor





**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:** For RH005 through RH050 size terminal finish - tin / lead is 60/40 Sn/Pb w/Nickel underplate and lead (Pb)-free is Ni/Pd/Au, finish is on copper clad steel core terminal. For RH100 and RH250 terminals are threaded stainless steel.

**Part Marking:** Dale, model, wattage, value, tolerance, date code

**NH NON-INDUCTIVE**

Models of equivalent physical and electrical specifications are available with non-inductive (Ayrton-Perry) winding. They are identified by substituting the letter N for R in the model number (NH005, for example).

**SPECIAL MODIFICATIONS**

A number of special modifications to the aluminum housed resistor style are available upon request. Special modifications include:

- Terminal configurations and materials
- Resistance values and tolerances
- Low resistance temperature coefficient (RTC)
- Housing configuration
- Threaded mounting holes
- Preconditioning and other additional testing

**APPLICABLE MIL SPECIFICATIONS**

Vishay RH and NH resistors are listed as qualified on the MIL-PRF-18546 QPL. MIL-PRF-18546 qualified, type RE resistors can be found at: [www.vishay.com/doc?30282](http://www.vishay.com/doc?30282)

PERFORMANCE		
TEST	CONDITIONS OF TEST	TEST LIMITS
Thermal Shock	Rated power applied until thermally stable, then a minimum of 15 min at -55 °C	± (0.5 % + 0.05 Ω) ΔR
Short Time Overload	5x rated power for 5 s	± (0.5 % + 0.05 Ω) ΔR
Dielectric Withstanding Voltage	1000 V <sub>RMS</sub> for RH005, RH010 and RH025; 2000 V <sub>RMS</sub> for RH050; 4500 V <sub>RMS</sub> for RH100 and RH250; duration 1 min	± (0.2 % + 0.05 Ω) ΔR
Temperature	250 °C for 2 h	± (0.5 % + 0.05 Ω) ΔR
Moisture Resistance	MIL-STD-202 Method 106, 7b not applicable	± (1.0 % + 0.05 Ω) ΔR
Shock, Specified Pulse	MIL-STD-202 Method 213, 100 g's for 6 ms, 10 shocks	± (0.2 % + 0.05 Ω) ΔR
Vibration, High Frequency	Frequency varied 10 Hz to 2000 Hz, 20 g peak, 2 directions 6 h each	± (0.2 % + 0.05 Ω) ΔR
Load Life	1000 h at rated power, +25 °C, 1.5 h "ON", 0.5 h "OFF"	± (1.0 % + 0.05 Ω) ΔR
Terminal Strength	30 s, 5 pound pull test for RH005 and RH010, 10 pound pull test for other sizes; torque test - 24 pound inch for RH100 and 32 pound inch for RH250	± (0.2 % + 0.05 Ω) ΔR



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