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Vishay Dale

Wirewound Resistors, Industrial Power, **Tubular (HL), Non-Inductive Tubular (NHL)**



Note

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

- · High temperature silicon coating
- Complete welded construction
- Available in non-inductive styles (model NHL) with Ayrton-Perry winding
- Tight tolerance of 5 % for values above 1 W
- Excellent stability in operation (< 3 % change in resistance)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

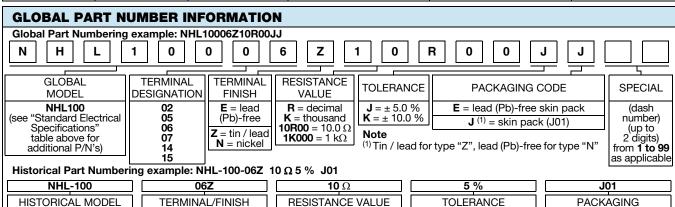




HALOGEN FREE

GREEN (5-2008)

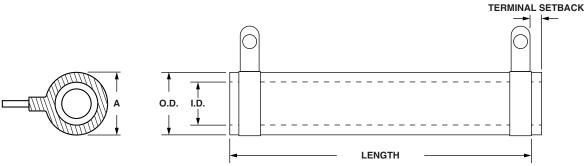
STANDARD ELECTRICAL SPECIFICATIONS							
GLOBAL	HISTORICAL	POWER RATING	RESISTANCE RANGE Ω	RESISTANCE RANGE Ω	WEIGHT (typical)		
MODEL	MODEL	<i>P</i> _{25 °C} W	± 5 %	± 10 %	g`´´		
HL011 NHL011	HL-11 NHL-11	11	1.0 to 70K 1.0 to 4.7K	0.10 to 70K 1.0 to 4.7K	10.50		
HL012 NHL012	HL-12 NHL-12	12	1.0 to 58K 1.0 to 3.9K	0.10 to 58K 1.0 to 3.9K	6.69		
HL015 NHL015	HL-15 NHL-15	15	1.0 to 60K 1.0 to 4.3K	0.10 to 60K 1.0 to 4.3K	8.64		
HL020 NHL020	HL-20 NHL-20	20	1.0 to 95K 1.0 to 6.8K	0.10 to 95K 1.0 to 6.8K	12.57		
HL025 NHL025	HL-25 NHL-25	25	1.0 to 115K 1.0 to 8.8K	0.10 to 115K 1.0 to 8.8K	20.72		
HL026 NHL026	HL-26 NHL-26	26	1.0 to 170K 1.0 to 11.8K	0.10 to 170K 1.0 to 11.8K	15.34		
HL050 NHL050	HL-50 NHL-50	50	1.0 to 112K 1.0 to 21.5K	0.10 to 112K 1.0 to 21.5K	42.08		
HL051 NHL051	HL-51 NHL-51	51	1.0 to 124K 1.0 to 22.9K	0.10 to 124K 1.0 to 22.9K	51.96		
HL060 NHL060	HL-60 NHL-60	60	1.0 to 145K 1.0 to 27.2K	0.10 to 145K 1.0 to 27.2K	65.64		
HL065 NHL065	HL-65 NHL-65	65	1.0 to 170K 1.0 to 31.4K	0.10 to 170K 1.0 to 31.4K	64.82		
HL080 NHL080	HL-80 NHL-80	80	1.0 to 190K 1.0 to 38.3K	0.10 to 190K 1.0 to 38.3K	121.58		
HL100 NHL100	HL-100 NHL-100	100	1.0 to 260K 1.0 to 48.5K	0.10 to 260K 1.0 to 48.5K	91.37		
HL120 NHL120	HL-120 NHL-120	120	1.0 to 330K 1.0 to 64.1K	0.10 to 330K 1.0 to 64.1K	183.82		
HL130 NHL130	HL-130 NHL-130	130	1.0 to 380K 1.0 to 70.2K	0.10 to 380K 1.0 to 70.2K	192.36		
HL160 NHL160	HL-160 NHL-160	160	1.0 to 470K 1.0 to 105K	0.10 to 470K 1.0 to 105K	245.86		
HL175 NHL175	HL-175 NHL-175	175	1.0 to 500K 1.0 to 112K	0.10 to 500K 1.0 to 112K	250.80		
HL225 NHL225	HL-225 NHL-225	225	1.0 to 645K 1.0 to 121K	0.10 to 645K 1.0 to 121K	309.97		



HL, NHL

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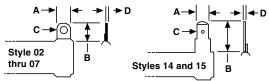
DIMENSIONS in inches [millimeters]



(Includes Coating and Terminal Band)

DIMENSIONS in inches [millimeters]									
GLOBAL		COF	CORE DIMENSIONS			DISTANCE	TÉRMINAL D	ESIGNATION	
MODEL	A (MAX.)	LENGTH ± 0.062 [± 1.59]	O.D.	I.D. ± 0.031 [± 0.79]	TERMINAL SETBACK ± 0.31 [± 0.79]	BETWEEN TERMINALS (REF.)	STANDARD	OPTIONAL	BRACKET TYPES (1)
HL011 NHL011	0.469 [11.91]	1.750 [44.45]	0.375 [9.53]	0.188 [4.76]	0.094 [2.38]	1.187	02	-	101, 204, 301
HL012 NHL012	0.406	1.750 [44.45]	0.313 [7.94]	0.188 [4.76]	0.094 [2.38]	1.187	05	14	101, 204, 301
HL015 NHL015	0.563	1.500	0.438	0.313 [7.94]	0.094 [2.38)	0.937	02	14	101, 203, 301
HL020 NHL020	0.563	2.000 [50.8]	0.438	0.313 [7.94]	0.094 [2.38]	1.437	02	14	101, 203, 301
HL025 NHL025	0.688	2.000 [50.8]	0.563 [14.29]	0.313 [7.94]	0.094 [2.38]	1.312	06	15	101, 203, 301
HL026 NHL026	0.563	3.000 [76.2]	0.438 [11.11]	0.313 [7.94]	0.094 [2.38]	2.437	02	14	101, 203, 301
HL050 NHL050	0.688	4.000 [101.6]	0.563	0.313	0.094 [2.38]	3.312	06	15	101, 203, 301
HL051 NHL051	0.906	3.500 [88.9]	0.750 [19.05]	0.500	0.125 [3.18]	2.75	06	15	102, 206, 303
HL060 NHL060	0.906	4.000 [101.6]	0.750 [19.05]	0.500 [12.70]	0.125 [3.18]	3.250	06	15	102, 206, 303
HL065 NHL065	0.906 [23.02]	4.500 [114.3]	0.750 [19.05]	0.500 [12.70]	0.125 [3.18]	3.750	06	15	102, 206, 303
HL080 NHL080	1.313	4.000 [101.6]	1.125	0.750 [19.05]	0.219 [5.56]	2.812	07	15	103, 205, 303
HL100 NHL100	0.906	6.500 [165.1]	0.750 [19.05]	0.500 [12.70]	0.125 [3.18]	5.750	06	15	102, 206, 303
HL120 NHL120	1.313	6.000 [152.4]	1.125	0.750 [19.05]	0.219 [5.56]	4.812	07	15	103, 205, 303
HL130 NHL130	1.313	6.500 [165.1]	1.125 [28.58]	0.750 [19.05]	0.219 [5.56]	5.312	07	15	103, 205, 303
HL160 NHL160	1.313	8.000 [203.2]	1.125 [28.58]	0.750 [19.05]	0.219 [5.56]	6.812	07	15	103, 205, 303
HL175 NHL175	1.313	8.500 [215.9]	1.125 [28.58]	0.750 [19.05]	0.219 [5.56]	7.312	07	15	103, 205, 303
HL225 NHL225	1.313	10.500	1.125 [28.58]	0.750 [19.05]	0.219 [5.56]	9.312	07	15	103, 205, 303

TERMINAL DIMENSIONS



TERMINAL FINISH

"E" Finish - 100 % Sn coated steel. "Z" Finish - 60/40 SnPb coated steel. "N" Finish - Nickel coated steel. Finish for terminal style 14 and 15 limited to nickel plated steel (N).

	DIMENSION	TERMINAL STYLE						
	DIMENSION	02	05	06	07	14	15	
	۸	0.188	0.188	0.250	0.375	0.188	0.250	
A	A	[4.76]	[4.76]	[6.35]	[9.53]	[4.76]	[6.35]	
	В	0.406	0.438	0.563	0.625	0.563	0.594	
P	ь	[10.32]	[11.11]	[14.29]	[15.88]	[14.29]	[15.08]	
С	C	0.093	0.104	0.166	0.173	0.050	0.065	
	C	[2.36]	[2.64]	[4.22]	[4.39]	[1.27]	[1.65]	
	D	0.020	0.020	0.020	0.020	0.020	0.031	
	<u> </u>	[0.51]	[0.51]	[0.51]	[0.51]	[0.51]	[0.79]	

Note

(1) Brackets are available for mounting HL series resistors - see Mounting Hardware section.

HL, NHL

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MOUNTING HARDWARE

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Mounting hardware is available for HL resistors, see HL Brackets and Sliders datasheet for more information: www.vishay.com/doc?30279

TECHNICAL SPECIFICATIONS					
PARAMETER	UNIT	HL, NHL RESISTOR CHARACTERISTICS			
Temperature Coefficient	ppm/°C	\pm 30 for 10 Ω and above; \pm 50 for 1 Ω to 9.9 Ω ; \pm 90 for 0.1 Ω to 0.99 Ω			
Short Time Overload	-	10 x rated power for 5 s			
Dielectric Withstanding Voltage	V_{AC}	1000, from terminal to mounting hardware			
Maximum Working Voltage	V	$(P \times R)^{1/2}$			
Insulation Resistance	Ω	1000 M Ω minimum dry, 100 M Ω minimum after moisture test			
Operating Temperature Range	°C	-55 to +350			

MATERIAL SPECIFICATIONS

Element: copper-nickel alloy of nickel-chrome alloy,

depending on resistance value

Coating: special high temperature silicone

Standard Terminals: model "E" terminals are tinned steel

Terminal Bands: steel

Core: ceramic, steatite

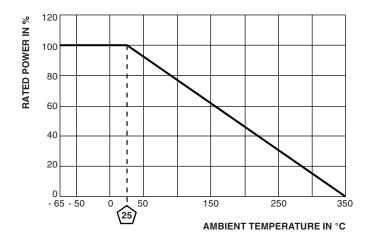
Part Marking: Vishay Dale, model, wattage, value,

tolerance, date code

NHL NON-INDUCTIVE

Models of equivalent physical and electrical specifications are available with non-inductive (Ayrton-Perry) winding. They are identified by adding the letter N to the front of the HL type designation (NHL225 for example). For NHL models maximum resistance values are lower, see Standard Electrical Specifications table.

DERATING



PERFORMANCE						
TEST	CONDITIONS OF TEST	TEST LIMITS				
Thermal Shock	Rated power applied until thermally stable, then a minimum of 15 min at -55 °C	± (2.0 % + 0.05 Ω) ΔR				
Short Time Overload	10x rated power for 5 s	\pm (2.0 % + 0.05 Ω) ΔR				
Dielectric Withstanding Voltage	1000 V _{RMS} for 1 min	± (0.1 % + 0.05 Ω) ΔR				
Low Temperature Storage	-55 °C for 24 h	\pm (2.0 % + 0.05 Ω) ΔR				
High Temperature Exposure	250 h at + 350 °C	\pm (2.0 % + 0.05 Ω) ΔR				
Humidity	75 °C, 90 % to 100 % RH, 240 h	± (5.0 % + 0.05 Ω) ΔR				
Load Life	1000 h at rated power, + 25 °C, 1.5 h "ON", 0.5 h "OFF"	\pm (3.0 % + 0.05 Ω) ΔR				
Moisture Resistance	MIL-STD-202 Method 106, 7b not applicable	\pm (2.0 % + 0.05 Ω) ΔR				
Shock, Specified Pulse	MIL-STD-202 Method 213, 100 g's for 6 ms, 10 shocks	$\pm (0.2 \% + 0.05 \Omega) \Delta R$				
Vibration, High Frequency	Frequency varied 10 Hz to 2000 Hz, 20 g peak, 2 directions 6 h each	± (0.2 % + 0.05 Ω) ΔR				



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