# Resistors

# Aluminium Housed Wirewound Resistors

### **WH Series**

- High power dissipation up to 300W
- All welded construction
- Suitable for severe environments
- Designed for excellent thermal conductivity to heatsink
- Spade terminal option
- RoHS compliant

All Pb-free parts comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

# **Electrical Data**

10						
10	15	25 <sup>2</sup>	50 <sup>1, 2</sup>	On standard heatsink		
ORO1 to 10K	0R01 to 20K	0R01 to 44K	0R015 to 120K			
<10R:	<10R: ±75 ≥10R to <100R: ±50 ≥100R: ±25					
	1(F), 2(G), 5(J) and 10(K)					
1R at 1%	1R at 1% OR5 at 2% OR05 at 5% OR01 at 10%					
1500	1500	3000	3000	DC or AC peak		
	<10R 1R at 1% 1500	<10R: ±75 ≥10R to < 1(F), 2(G), 5 1R at 1% 0R5 at 2% 1500 1500	<10R: ±75 ≥10R to <100R: ±50 ≥100F 1(F), 2(G), 5(J) and 10(K) 1R at 1% 0R5 at 2% 0R05 at 5% 0R0 1500 1500 3000	<10R: ±75 ≥10R to <100R: ±50 ≥100R: ±25   1(F), 2(G), 5(J) and 10(K) 1R at 1% 0R5 at 2% 0R05 at 5% 0R01 at 10%   1500 1500 3000 3000		

Note 1: For load at full rating mount on aluminium heatsink 30.5cm x 30.5cm x 1.5mm Note 2: WH25T & WH50T are additionally rated at 15A

CECC 40203-006 Requirements *	AA	BA	CA	DA	Notes			
Power rating at 25°C watts	10	15	25	40	On standard heatsink			
Resistance range ohms	0R05 to 3K4	0R05 to 15K	0R05 to 33K	0R05 to 82K				
TCR (-55° to 200°C) ppm/°C		≥5R to ≤10R: ± 100 >10R: ±50						
Resistance tolerance %		1(F), 2(G)	, and 5(J)					
Low value limits ohms		1R at 1% OR5 at 2% OR05 at 5%						
Isolation voltage volts	1000	1000	2000	2000	DC or AC peak			
This table indicates the CECC specification requirements which are met or exceeded by the corresponding WH series products								

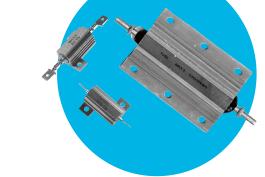
Limiting element voltage	volts	150	250	500	1250	DC or AC rms			
Standard values			E24 preferred range						
Thermal impedance	°C/watt	16.0	16.0 10.0 6.0 3.5						
Ambient temperature range	°C		-55 to 200						

		WH100	WH200	WH300	Notes			
Power rating at 25°C	watts	100	100 200		On standard heatsink			
Resistance range	ohms	ORO1 to 70K	ORO1 to 70K ORO1 to 50K					
TCR (-55° to 200°C)	ppm/°C		≤1K0: ±100 >1K0: ±25					
Resistance tolerance	%	Standard 5(J)	Standard 5(J) and 10(K). Also available: 1(F) and 2(G)					
Low value limits	ohms	Typical	ly ≥0R05: ±5% ≤0R047	:±10%				
Isolation voltage	volts	6360	7070	7070	DC or AC peak			
Limiting element voltage	volts	1900	1900	2500	DC or AC rms			
Standard values			Other values to order					
Thermal impedance	°C/watt	1	On standard heatsink					
Ambient temperature range	°C		-55 to 200					

#### General Note

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**WH Series** 



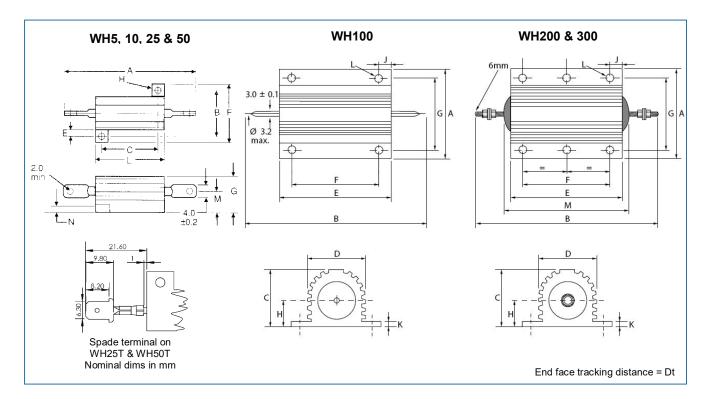
# **Physical Data**

Dimensions	s (mm) & We	eight (g)												
WH5, 10, 2	5 & 50													
Туре	A Max	В ±0.3	c ±0	.3 ľ	E Vlin	F Max	G Max	H Dia ±0.2	L Max	N ±0	-	N Max	Dt Min	Wt Nom
WH5	30	12.4	11	.3	1.9	17	9	2.4	17.0	4.	3	1.8	2.5	3.6
WH10	36.5	15.9	14	.3	1.9	21	11	2.4	21.0	5.	2	2.2	2.9	5.6
WH25	51 <sup>1</sup>	19.8	18	.3	2.8	28	15	3.3	29.0	7.	2	2.6	4.3	13
WH50	72.5 <sup>2</sup>	21.4	39	.7	2.8	30	16	3.3	51.0	7.	9	2.6	5.1	29
WH100, 20	0 & 300													
	A Max	B Max	C Max	D Max	E Max	F ±0.3	G ±0.3	H Max	J Max	K Max	L Nom <sup>3</sup>	M Max	Dt Min	Wt. Nom
WH100	47.5	88	24.1	27.3	65.2	35	37	11.8	15.4	3.7	4.4	-	7.0	115
WH200	72.5	145.7	41.8	45.5	89.7	70	57.2	20.5	10.4	5.5	5.1	103.4	15	475
WH300	72.5	184.4	41.8	45.5	127.7	104	59	20.5	12.4	5.5	6.6	141.4	15	700
lote 1: A	for WH25T is	71.3		Note 2: A	for WH	50T is 95.5	5	Note 3	3: WH100	: ±0.25. V	/H200 & 3	300: ±0.45		

Note 1: A<sub>max</sub> for WH25T is 71.3

Note 2: A<sub>max</sub> for WH50T is 95.5

Note 3: WH100: ±0.25, WH200 & 300: ±0.45



## Construction

Cap and lead assemblies are fitted to a high purity ceramic substrate. The resistive element is wound onto the substrate and welded to the caps. The wound rod is then moulded and fitted into aluminium housing to give optimum stability and reliability.

## Marking

The resistors are legend marked with type reference, resistance value and tolerance which will withstand all accepted industrial cleaning fluids. Values are marked in accordance with IEC 62.

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## **WH Series**

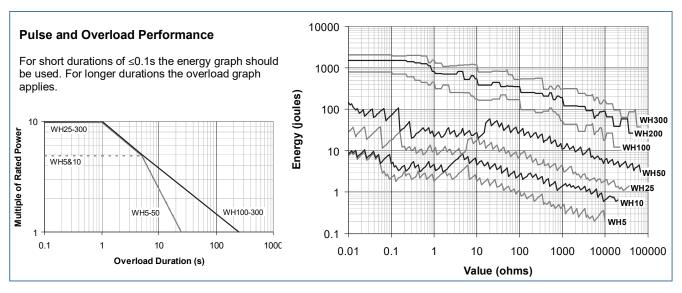


Terminations	6		
WH5-100		WH25T & 50T	6.35mm (¼") spade terminal
Material	Pb-free solder dipped, copper clad steel		
Strength	The terminations meet the requirements	WH200 & 300	
	of IEC 68.2.21	Material	M6 threaded steel terminal with a
Solderability	The terminations meet the requirements		set of four nuts and washers
	of IEC 115-1, clause 4.17.3.2	Strength	Termination robustness 50N max
			Tightening torque 5Nm max

# **Performance Data**

			WH100, 200 & 300					
		CECC 40203-006	Act	ual	B.4			
		Requirements	Maximum	Typical	Maximum			
Load at commercial rating: 1000hrs at 25°C	ΔR%	1	1	0.4	2			
Load at CECC rating: 1000hrs at 25°C	ΔR%	1	1	0.4	N/A			
Dry heat: 1000hrs at 200°C	ΔR%	1	1	0.4	2			
Derating from 25°C		Zero at 200°C, see derating graph						
Short-term overload	ΔR%	1	1	0.2				
Climatic sequence	ΔR%	1	1	0.4				
Climatic category			55/200/56					
Long-term damp heat	ΔR%	1	0.5	0.2				
Temperature rapid change	ΔR%	0.25	0.25	0.1	0.25			
Resistance to solder heat	ΔR%	0.25	0.25	0.05	WH100: 0.5			
Vibration and bump	ΔR%	0.25	0.25	0.025				
Noise (in decade of frequency)	μ٧/٧	Not specified	0	0	0			
Insulation resistance	ohms	1G min	10G min					
Pulse and overload performance		Not specified		See graphs				

Note: A 0.05 ohm addition is to be added to the performance of all resistors < 10 ohms.



## **Application Notes**

After soldering, care should be taken to ensure that there are no flux residues on the end faces of the moulding compound, otherwise insulation resistance will be reduced. The minimum surface tracking distances from termination to casing are shown in the Physical Data tables as dimension Dt.

It is recommended that the resistor base should be coated thinly with heatsink compound before mounting to obtain the stated operating characteristics. The heatsink compound increases thermal conductivity to the heatsink.

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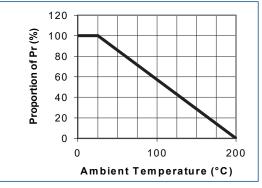
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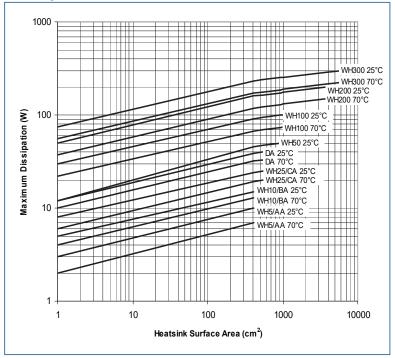
The standard aluminium heatsinks are defined in the table below. If smaller heatsinks are used then derating should be applied as indicated in the graph below. If no heatsink is employed, use the ratings for 1cm<sup>2</sup>.

Derating for reduced heatsink dimensions

Reference heatsink dimensions							
Type (CECC)	Thickness (mm)	Area (cm²)					
WH5 (AA)	1	410					
WH10 (BA)	1	410					
WH25 (CA)	1	544					
WH50 (DA)	1	544					
WH50 @ 50W	1.5	930					
WH100	3	1000					
WH200	3	3800					
WH300	3	5800					

#### Derating for ambient temperature



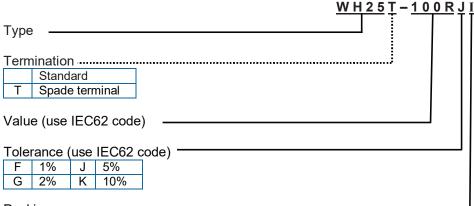


## Packaging

WH resistors are packed in plastic bags and boxed.

# **Ordering Procedure**

Example: WH25 with spade terminals at 100 ohms with a 5% tolerance:



### Packing

	WH5, 10		250/box	
	WH25, 50	Bulk	200/box	Standard
'	WH100		45/box	otandard
	WH200, 300		10/box	

The following options apply toWH5, 10, 25 & 50 only:

For CECC released product state on order the CECC number and style. Example: WH25-3K3JI CECC40203-006 CA For SnPb finish instead of Pb-free replace the packing suffix with PB. Example: WH25-3K3JPB

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