

Cemented Wirewound Resistors with Lugs



FEATURES

- Complete welded construction
- Ceramic core
- Available in adjustable = "E" or non inductive design = "Ni"
- Lugs with various termination styles for soldering or bolt connection
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
GREEN
(5-2009)**

STANDARD ELECTRICAL SPECIFICATIONS						
MODEL	VARIANT/ TERMINAL	POWER RATING $P_{40^\circ\text{C}}$	LIMITING VOLTAGE	RESISTANCE RANGE ⁽¹⁾		TOLERANCE
				TCR - 10 ... - 80 ppm/K	TCR 100 ... 180 ppm/K	
ZWS6	SL	6 W	$\sqrt{P \times R}$	0.82 Ω to 5.1 k Ω	1.8 Ω to 13 k Ω	$\pm 10\%$, $\pm 5\%$
	E SL			2.7 Ω to 5.1 k Ω	-	$\pm 2\%$
	Ni SL			0.82 Ω to 130 Ω	1.8 Ω to 4.7 k Ω	$\pm 10\%$, $\pm 5\%$
				0.15 Ω to 910 Ω	0.33 Ω to 2.4 k Ω	$\pm 10\%$
ZWS8	SL, SS	8 W	$\sqrt{P \times R}$	1 Ω to 910 Ω	2 Ω to 2.4 k Ω	$\pm 5\%$
	E SL, E SS			0.68 Ω to 7.5 k Ω	1.8 Ω to 20 k Ω	$\pm 10\%$, $\pm 5\%$
	Ni SL, Ni SS			3.3 Ω to 7.5 k Ω	-	$\pm 2\%$
				0.62 Ω to 200 Ω	1.8 Ω to 6.8 k Ω	$\pm 10\%$, $\pm 5\%$
ZWS12	SL, SS	12 W	$\sqrt{P \times R}$	0.24 Ω to 1.3 k Ω	0.56 Ω to 3.6 k Ω	$\pm 10\%$
	E SL, E SS			1 Ω to 1.3 k Ω	2 Ω to 3.6 k Ω	$\pm 5\%$
	Ni SL, Ni SS			0.62 Ω to 10 k Ω	1.8 Ω to 27 k Ω	$\pm 10\%$, $\pm 5\%$
				3 Ω to 10 k Ω	-	$\pm 2\%$
ZWS15	SL, SS	15 W	$\sqrt{P \times R}$	0.56 Ω to 270 Ω	1.8 Ω to 9.1 k Ω	$\pm 10\%$, $\pm 5\%$
	E SL, E SS			0.33 Ω to 1.8 k Ω	0.75 Ω to 5.1 k Ω	$\pm 10\%$
	Ni SL, Ni SS			1 Ω to 1.8 k Ω	2 Ω to 5.1 k Ω	$\pm 5\%$
				0.68 Ω to 12 k Ω	2.2 Ω to 33 k Ω	$\pm 10\%$, $\pm 5\%$
ZWS20	SL, SS, SB, FST	20 W	$\sqrt{P \times R}$	2.2 Ω to 12 k Ω	-	$\pm 2\%$
	E SL, E SS, E SB, E FST			0.68 Ω to 330 Ω	2.2 Ω to 11 k Ω	$\pm 10\%$, $\pm 5\%$
	Ni SL, Ni SS, Ni SB, Ni FST			0.39 Ω to 2.2 k Ω	0.82 Ω to 6.2 k Ω	$\pm 10\%$
				1 Ω to 2.2 k Ω	2.0 Ω to 6.2 k Ω	$\pm 5\%$
ZWS35	SL, SS, SB, FST	35 W	$\sqrt{P \times R}$	0.62 Ω to 16 k Ω	1.3 Ω to 43 k Ω	$\pm 10\%$, $\pm 5\%$
	E SL, E SS, E SB, E FST			2.7 Ω to 16 k Ω	-	$\pm 2\%$
	Ni SL, Ni SS, Ni SB, Ni FST			0.62 Ω to 430 Ω	1.3 Ω to 15 k Ω	$\pm 10\%$, $\pm 5\%$
				0.47 Ω to 2.7 k Ω	1.1 Ω to 8.2 k Ω	$\pm 10\%$
ZWS50	SL, SS, SB, FST	50 W	$\sqrt{P \times R}$	1 Ω to 2.7 k Ω	2 Ω to 8.2 k Ω	$\pm 5\%$
	E SL, E SS, E SB, E FST			1.1 Ω to 30 k Ω	2.7 Ω to 82 k Ω	$\pm 10\%$, $\pm 5\%$
	Ni SL, Ni SS, Ni SB, Ni FST			1.3 Ω to 30 k Ω	-	$\pm 2\%$
				1.1 Ω to 750 Ω	2.7 Ω to 27 k Ω	$\pm 10\%$, $\pm 5\%$
ZWS100	SS, SSB, SB, FST	100 W	$\sqrt{P \times R}$	0.91 Ω to 5.1 k Ω	2 Ω to 15 k Ω	$\pm 10\%$, $\pm 5\%$
	E SS, E SSB, E SB, E FST			1.3 Ω to 33 k Ω	3 Ω to 91 k Ω	$\pm 10\%$, $\pm 5\%$
	Ni SS, Ni SSB, Ni SB, Ni FST			2.2 Ω to 33 k Ω	-	$\pm 2\%$
				1.3 Ω to 910 Ω	3 Ω to 33 k Ω	$\pm 10\%$, $\pm 5\%$
ZWS100	SS, SSB, SB, FST	100 W	$\sqrt{P \times R}$	1.1 Ω to 6.2 k Ω	2.4 Ω to 16 k Ω	$\pm 10\%$, $\pm 5\%$
	E SS, E SSB, E SB, E FST			2.7 Ω to 68 k Ω	6.2 Ω to 68 k Ω	$\pm 10\%$, $\pm 5\%$
	Ni SS, Ni SSB, Ni SB, Ni FST			2.7 Ω to 68 k Ω	-	$\pm 2\%$
				2.7 Ω to 1.8 k Ω	6.2 Ω to 68 k Ω	$\pm 10\%$, $\pm 5\%$
ZWS100	SS, SSB, SB, FST	100 W	$\sqrt{P \times R}$	2.2 Ω to 13 k Ω	4.7 Ω to 33 k Ω	$\pm 10\%$, $\pm 5\%$
	E SS, E SSB, E SB, E FST			2.2 Ω to 13 k Ω	4.7 Ω to 33 k Ω	$\pm 10\%$, $\pm 5\%$

Notes

⁽¹⁾ Resistance value to be selected for $\pm 10\%$ tolerance from E12 and for $\pm 5\%$ and $\pm 2\%$ from E24

- For available "Mounting Accessories for Resistors", please see: www.vishay.com/ppg?21015

** Please see document "Vishay Material Category Policy": www.vishay.com/doc?99902



STANDARD ELECTRICAL SPECIFICATIONS							
MODEL	VARIANT/ TERMINAL	POWER RATING $P_{40\text{ }^\circ\text{C}}$	LIMITING VOLTAGE	RESISTANCE RANGE ⁽¹⁾		TOLERANCE	
				TCR - 10 ... - 80 ppm/K	TCR 100 ... 180 ppm/K		
ZWS150	SS, SSB, SB, FST	150 W	$\sqrt{P \times R}$	4.7 Ω to 130 k Ω	11 Ω to 360 k Ω	$\pm 10\%$, $\pm 5\%$	
	E SS, E SSB, E SB, E FST				-	$\pm 2\%$	
	Ni SS, Ni SSB, Ni SB, Ni FST				4.7 Ω to 3.3 k Ω	11 Ω to 120 k Ω	$\pm 10\%$, $\pm 5\%$
ZWS250	SS, SSB, SB, FST	250 W	$\sqrt{P \times R}$	8.2 Ω to 220 k Ω	3.9 Ω to 22 k Ω	9.1 Ω to 62 k Ω	$\pm 10\%$, $\pm 5\%$
	E SS, E SSB, E SB, E FST				20 Ω to 620 k Ω	-	$\pm 2\%$
	Ni SS, Ni SSB, Ni SB, Ni FST				8.2 Ω to 6.2 k Ω	20 Ω to 220 k Ω	$\pm 10\%$, $\pm 5\%$
ZWS30/100	SS, SSB, SB, FST	75 W	$\sqrt{P \times R}$	2.4 Ω to 62 k Ω	6.8 Ω to 39 k Ω	15 Ω to 110 k Ω	$\pm 10\%$, $\pm 5\%$
	E SS, E SSB, E SB, E FST				2.4 Ω to 62 k Ω	5.1 Ω to 180 k Ω	$\pm 10\%$, $\pm 5\%$
	Ni SS, Ni SSB, Ni SB, Ni FST				3 Ω to 62 k Ω	-	$\pm 2\%$
ZWS30/133	SS, SSB, SB, FST	110 W	$\sqrt{P \times R}$	3.3 Ω to 91 k Ω	2 Ω to 11 k Ω	4.3 Ω to 30 k Ω	$\pm 10\%$, $\pm 5\%$
	E SS, E SSB, E SB, E FST				3.3 Ω to 2.4 k Ω	7.5 Ω to 240 k Ω	$\pm 10\%$, $\pm 5\%$
	Ni SS, Ni SSB, Ni SB, Ni FST				2.7 Ω to 16 k Ω	6.2 Ω to 43 k Ω	$\pm 10\%$, $\pm 5\%$

Notes

- (1) Resistance value to be selected for $\pm 10\%$ tolerance from E12 and for $\pm 5\%$ and $\pm 2\%$ from E24
- For available "Mounting Accessories for Resistors", please see: www.vishay.com/ppg?21010

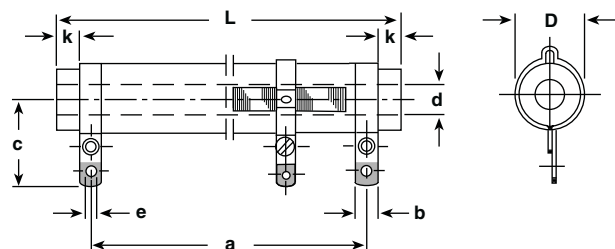
PART NUMBER AND PRODUCT DESCRIPTION																	
Part Number: ZWS006331001KLX000																	
Z	W	S	0	0	6	3	3	1	0	0	1	K	L	X	0	0	0
MODEL	VARIANT/ TERMINAL	TCR/MATERIAL	VALUE	TOLERANCE CODE	PACKAGING CODE	SPECIAL											
ZWS006 = ZWS6 ZWS008 = ZWS8 ZWS012 = ZWS12 ZWS015 = ZWS15 ZWS020 = ZWS20 ZWS035 = ZWS35 ZWS050 = ZWS50 ZWS100 = ZWS100 ZWS150 = ZWS150 ZWS250 = ZWS250 ZWSN68 = ZWS6/30 ZWSN84 = ZWS30/100 ZWSN91 = ZWS30/133 ZWSN94 = ZWS30/145 ZWSN97 = ZWS30/235 ZWSN98 = ZWS50/165 ZWSOSM = ZWS10/30 (Note: Ni is also known as SWI)	3 = SL 4 = SS 5 = SB 6 = SSB 7 = FST 8 = E SL 9 = E SS A = E SB B = E SSB C = E FST D = Ni SL E = Ni SS F = Ni SB G = Ni SSB H = Ni FST I = GSCH Z = Value overflow (BV)	1 = - 10 ... - 80 ppm/K WM 50 Class 1 3 = 100 ... 180 ppm/K WM 110 Class 3 0 = SWI	3 digit value 1 digit multiplier MULTIPLIER 7 = $*10^{-3}$ 8 = $*10^{-2}$ 9 = $*10^{-1}$ 0 = $*10^0$ 1 = $*10^1$ 2 = $*10^2$ 3 = $*10^3$	G = $\pm 2.0\%$ J = $\pm 5.0\%$ K = $\pm 10.0\%$ 0 = by BV	LX = Loose pack, without quantity ZX = Special pack (with BV #), without quantity	The 5 digit BV number will be encoded using a 36 character code. This code contains numbers 0...9 and letters A...Z (36 characters total) and allows to encode at least 46 655 five digit BV numbers. 000 = Standard											
Product Description: ZWS6 SL 3 1K0 10% LX																	
ZWS6	SL	3	1K0	10%	LX												
MODEL ⁽¹⁾	VARIANT/ TERMINAL ⁽¹⁾	TCR/MATERIAL ⁽¹⁾	VALUE ⁽¹⁾	TOLERANCE CODE ⁽¹⁾	PACKAGING DESCRIPTION ⁽²⁾												

Notes

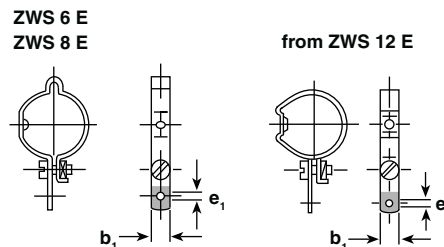
- (1) See "Part Number" above
- (2) See "Packaging Code" above

DIMENSIONS

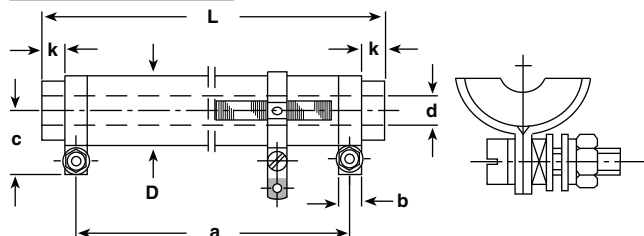
SL TERMINALS



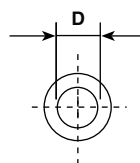
ADJUSTABLE LUGS



SS TERMINALS



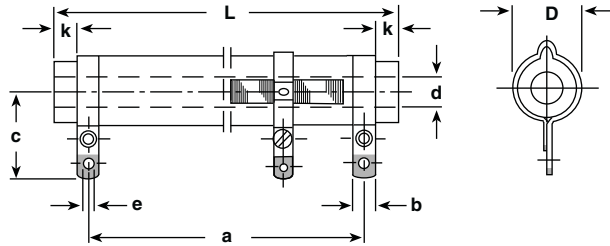
CORE SECTION



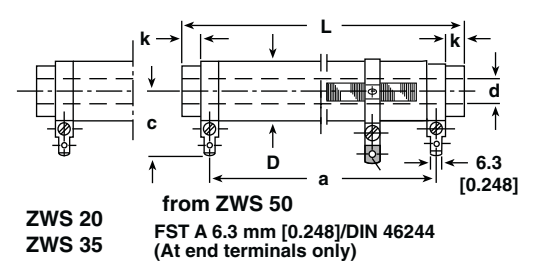
MODEL	DIMENSIONS in millimeters [inches]							
	ZWS 6 ZWS 6 E ZWS 6 Ni		ZWS 8 ZWS 8 E ZWS 8 Ni		ZWS 12 ZWS 12 E ZWS 12 Ni		ZWS 15 ZWS 15 E ZWS 15 Ni	
TERMINAL	SL		SL	SS	SL	SS	SL	SS
DIMENSION D	7.5 ± 0.5 [0.295 ± 0.020]		9.5 ± 0.5 [0.374 ± 0.020]		11.8 ± 0.8 [0.465 ± 0.031]		11.8 ± 0.8 [0.465 ± 0.031]	
L	45 ± 1.5 [1.772 ± 0.059]		50 ± 1.5 [1.969 ± 0.059]		55 ± 1.5 [2.165 ± 0.059]		62 ± 2 [2.441 ± 0.079]	
a	36 [1.417]	39 [1.535]	40 [1.575]	43 [1.693]	44 [1.732]	50 [1.969]	51 [2.008]	
b	4 [0.157]	4 [0.157]	5 [0.197]	4 [0.157]	5 [0.197]	4 [0.157]	5 [0.197]	
b ₁	4 [0.157]	4 [0.157]	4 [0.157]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	
c	15.5 [0.610]	18 [0.709]	10.5 [0.413]	19 [0.748]	11.5 [0.453]	19 [0.748]	11.5 [0.453]	
d	2.6 [0.102]	3.5 [0.138]	3.5 [0.138]	5.5 [0.217]	5.5 [0.217]	5.5 [0.217]	5.5 [0.217]	
e	1.5 [0.059]	2 [0.079]	M3 × 12	2 [0.079]	M3 × 12	2 [0.079]	M3 × 12	
e ₁	2.8 [0.110]	2.8 [0.110]	2.8 [0.110]	2.8 [0.110]	2.8 [0.110]	2.8 [0.110]	2.8 [0.110]	
k	2.5 [0.098]	3.5 [0.138]	2.5 [0.098]	4 [0.157]	3 [0.118]	4 [0.157]	3 [0.118]	
MASS (g)	5		6.5		11.5		12.5	

DIMENSIONS (continued)

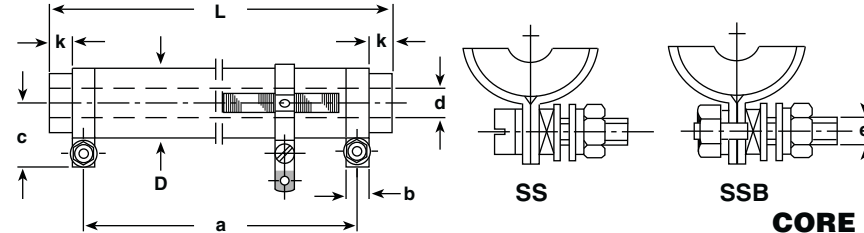
SL TERMINALS



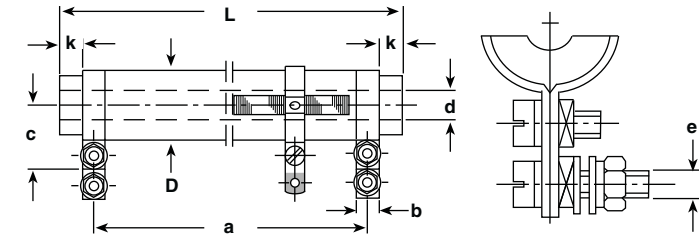
FST TERMINALS



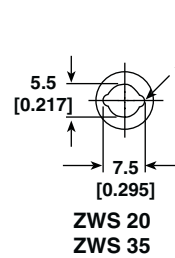
SS AND SSB TERMINALS



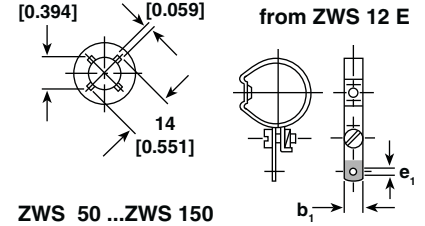
SB TERMINALS



CORE SECTION



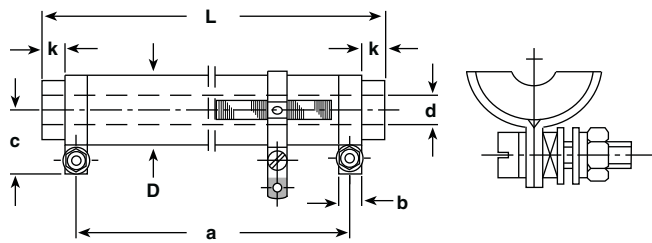
ADJUSTABLE LUGS



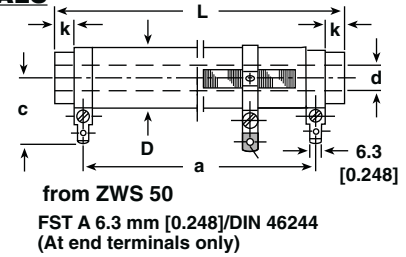
MODEL	DIMENSIONS in millimeters [inches]															
	ZWS 20 ZWS 20 E ZWS 20 Ni				ZWS 35 ZWS 35 E ZWS 35 Ni				ZWS 50 ZWS 50 E ZWS 50 Ni				ZWS 100 ZWS 100 E ZWS 100 Ni			
TERMINAL	SL	SS	SB	FST	SL	SS	SB	FST	SS	SSB	SB	FST	SS	SSB	SB	FST
DIMENSION D	14.8 ± 0.8 [0.583 ± 0.031]				14.8 ± 0.8 [0.583 ± 0.031]				22.3 ± 1.3 [0.878 ± 0.051]				22.3 ± 1.3 [0.878 ± 0.051]			
L	62 ± 2 [2.441 ± 0.079]				100 ± 2 [3.937 ± 0.079]				100 ± 2 [3.937 ± 0.079]				165 ± 2 [6.496 ± 0.079]			
a ± 2 [a ± 0.079]	50 [1.969]	51 [2.008]	51 [2.008]	48 [1.890]	86 [3.386]	87 [3.425]	87 [3.425]	84 [3.307]	71 [2.795]				136 [5.354]			
b	4 [0.157]	5 [0.197]	5 [0.197]	6.3 [0.248]	4 [0.157]	5 [0.197]	5 [0.197]	6.3 [0.248]	8 [0.315]	8 [0.315]	8 [0.315]	6.3 [0.248]	8 [0.315]	8 [0.315]	8 [0.315]	6.3 [0.248]
b₁	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]
c	20.5 [0.807]	13 [0.512]	23 [0.906]	23.5 [0.925]	20.5 [0.807]	13 [0.512]	23 [0.906]	23.5 [0.925]	18.5 [0.728]	18.5 [0.728]	29.5 [1.161]	27 [1.063]	18.5 [0.728]	18.5 [0.728]	29.5 [1.161]	27 [1.063]
d	5.5 [0.217]	5.5 [0.217]	5.5 [0.217]	5.5 [0.217]	5.5 [0.217]	5.5 [0.217]	5.5 [0.217]	5.5 [0.217]	10 [0.394]	10 [0.394]	10 [0.394]	10 [0.394]	10 [0.394]	10 [0.394]	10 [0.394]	10 [0.394]
e	2 [0.079]	M3 × 12	M3 × 12	-	2 [0.079]	M3 × 12	M3 × 12	-	M4 × 16	M4 × 18	M4 × 16	-	M4 × 16	M4 × 18	M4 × 16	-
e₁	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]
k	4 [0.157]	3 [0.118]	3 [0.118]	3 [0.118]	5 [0.197]	4 [0.157]	4 [0.157]	4 [0.157]	10.5 [0.413]	10.5 [0.413]	10.5 [0.413]	10.5 [0.413]	10.5 [0.413]	10.5 [0.413]	10.5 [0.413]	10.5 [0.413]
MASS (g)	25				33				80				113			

DIMENSIONS (continued)

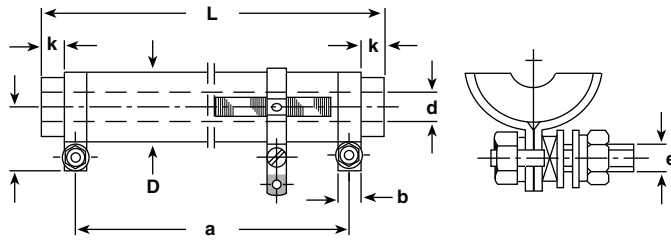
SS TERMINALS



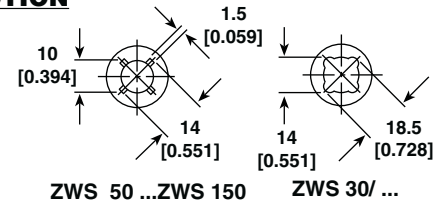
FST TERMINALS



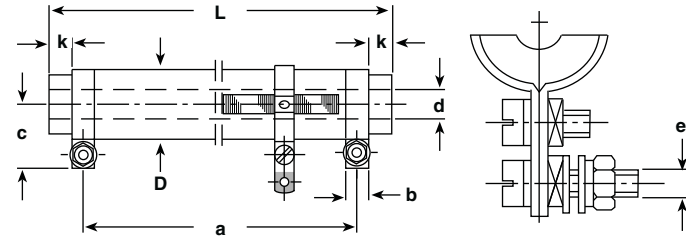
SSB TERMINALS



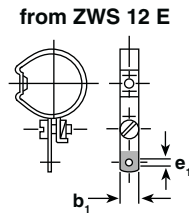
CORE SECTION



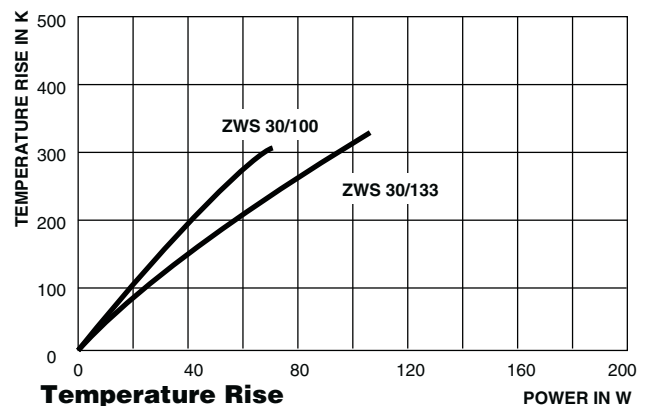
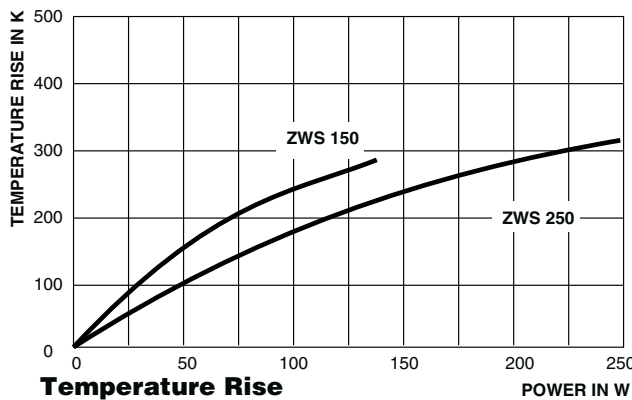
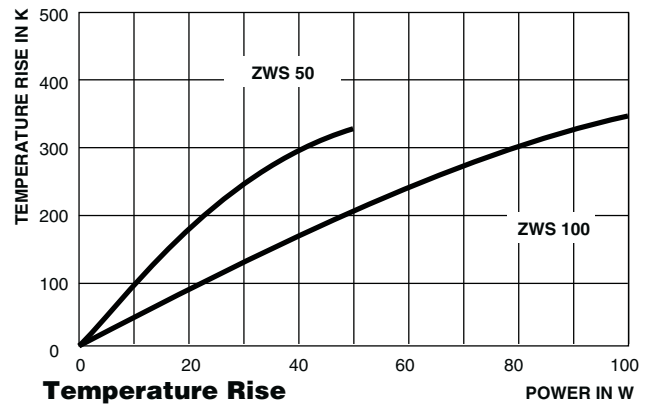
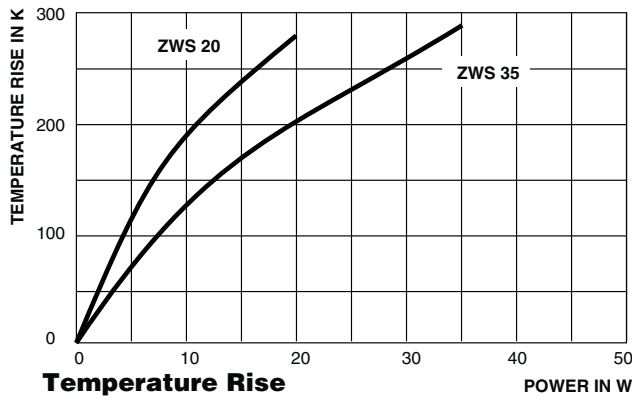
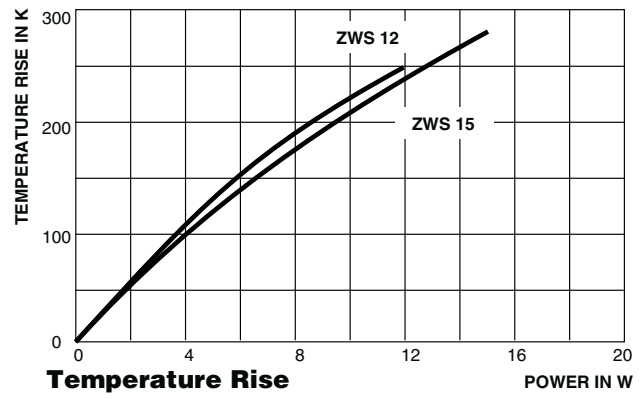
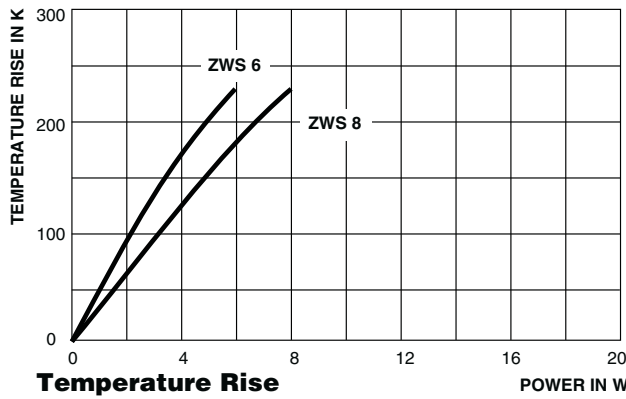
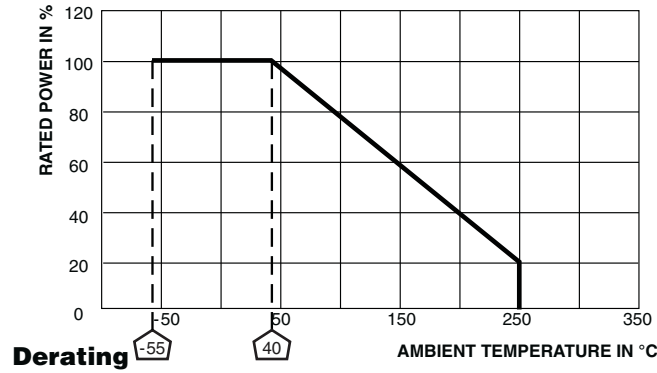
SB TERMINALS



ADJUSTABLE LUGS



MODEL	DIMENSIONS in millimeters [inches]															
	ZWS 150 ZWS 150 E ZWS 150 Ni				ZWS 250 ZWS 250 E ZWS 250 Ni				ZWS 30/100 ZWS 30/100 E ZWS 30/100 Ni				ZWS 30/133 ZWS 30/133 E ZWS 30/133 Ni			
TERMINAL	SS	SSB	SB	FST	SS	SSB	SB	FST	SS	SSB	SB	FST	SS	SSB	SB	FST
DIMENSION D	22.3 ± 1.3 [0.878 ± 0.051]				32.3 ± 1.5 [1.28 ± 0.059]				32.3 ± 1.5 [1.28 ± 0.059]				32.3 ± 1.5 [1.28 ± 0.059]			
L	265 ± 4 [10.433 ± 0.079]				330 ± 5 [12.992 ± 0.197]				100 ± 2.5 [3.937 ± 0.098]				133 ± 3 [5.236 ± 0.118]			
a	236 [9.291]				280 [11.024]				85 [3.346]				118 [4.646]			
b	8 [0.315]	8 [0.315]	8 [0.315]	6.3 [0.248]	8 [0.315]	8 [0.315]	8 [0.315]	6.3 [0.248]	8 [0.315]	8 [0.315]	8 [0.315]	6.3 [0.248]	8 [0.315]	8 [0.315]	8 [0.315]	6.3 [0.248]
b ₁	5 [0.197]	5 [0.197]	5 [0.197]	5 [0.197]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]	8 [0.315]
c	18.5 [0.728]	18.6 [0.732]	29.5 [1.161]	27 [1.063]	23.5 [0.925]	23.5 [0.925]	35 [1.378]	31.5 [1.24]	23.5 [0.925]	23.5 [0.925]	35 [1.378]	31.5 [1.24]	23.5 [0.925]	23.5 [0.925]	35 [1.378]	31.5 [1.24]
d	10 [0.394]	10 [0.394]	10 [0.394]	10 [0.394]	20 [0.787]	20 [0.787]	20 [0.787]	20 [0.787]	14 [0.551]	14 [0.551]	14 [0.551]	14 [0.551]	14 [0.551]	14 [0.551]	14 [0.551]	14 [0.551]
e	M4 × 16	M4 × 18	M4 × 16	-	M4 × 16	M4 × 18	M4 × 16	-	M4 × 16	M4 × 18	M4 × 16	-	M4 × 16	M4 × 18	M4 × 16	-
e ₁	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	3.2 [0.126]	4.2 [0.165]	4.2 [1.654]	4.2 [1.654]	4.2 [0.165]	4.2 [0.165]	4.2 [0.165]	4.2 [0.165]	4.2 [0.165]	4.2 [0.165]	4.2 [0.165]	4.2 [0.165]	4.2 [0.165]
k	10.5 [0.413]	10.5 [0.413]	10.5 [0.413]	10.5 [0.413]	21 [0.827]	21 [0.827]	21 [0.827]	21 [0.827]	3.5 [0.138]	3.5 [0.138]	3.5 [0.138]	3.5 [0.138]	3.5 [0.138]	3.5 [0.138]	3.5 [0.138]	3.5 [0.138]
MASS (g)	194				375				167				212			





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