ZWS

Vishay Draloric

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

Pb-free
RoHS COMPLIANT
GREEN (5-2008)**

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	VARIANT/ TERMINAL	POWER RATING $P_{40\,°C}$	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 kΩ	1.8 Ω to 13 kΩ	± 10 %, ± 5 %
				2.7 Ω to 5.1 kΩ	-	± 2 %
	E SL			0.82 Ω to 130 Ω	1.8 Ω to 4.7 kΩ	± 10 %, ± 5 %
	Ni SL			0.15 Ω to 910 Ω	0.33 Ω to 2.4 kΩ	± 10 %
				1 Ω to 910 Ω	2 Ω to 2.4 kΩ	± 5 %
ZWS8	SL, SS	8 W	$\sqrt{P \times R}$	0.68 Ω to 7.5 kΩ	1.8 Ω to 20 kΩ	± 10 %, ± 5 %
				3.3 Ω to 7.5 kΩ	-	± 2 %
	E SL, E SS			0.62 Ω to 200 Ω	1.8 Ω to 6.8 kΩ	± 10 %, ± 5 %
	Ni SL, Ni SS			0.24 Ω to 1.3 kΩ	0.56 Ω to 3.6 kΩ	± 10 %
				1 Ω to 1.3 kΩ	2 Ω to 3.6 kΩ	± 5 %
ZWS12	SL, SS	12 W	$\sqrt{P \times R}$	0.62 Ω to 10 kΩ	1.8 Ω to 27 kΩ	± 10 %, ± 5 %
				3 Ω to 10 kΩ	-	± 2 %
	E SL, E SS			0.56 Ω to 270 Ω	1.8 Ω to 9.1 kΩ	± 10 %, ± 5 %
	Ni SL, Ni SS			0.33 Ω to 1.8 kΩ	0.75 Ω to 5.1 kΩ	± 10 %
				1 Ω to 1.8 kΩ	2 Ω to 5.1 kΩ	± 5 %
ZWS15	SL, SS	15 W	$\sqrt{P \times R}$	0.68 Ω to 12 kΩ	2.2 Ω to 33 kΩ	± 10 %, ± 5 %
				2.2 Ω to 12 kΩ	-	± 2 %
	E SL, E SS			0.68 Ω to 330 Ω	2.2 Ω to 11 kΩ	± 10 %, ± 5 %
	Ni SL, Ni SS			0.39 Ω to 2.2 kΩ	0.82 Ω to 6.2 kΩ	± 10 %
				1 Ω to 2.2 kΩ	2.0 Ω to 6.2 kΩ	± 5 %
ZWS20	SL, SS, SB, FST	20 W	$\sqrt{P \times R}$	0.62 Ω to 16 kΩ	1.3 Ω to 43 kΩ	± 10 %, ± 5 %
				2.7 Ω to 16 kΩ	-	± 2 %
	E SL, E SS, E SB, E FST			0.62 Ω to 430 Ω	1.3 Ω to 15 kΩ	± 10 %, ± 5 %
	Ni SL, Ni SS, Ni SB, Ni FST			0.47 Ω to 2.7 kΩ	1.1 Ω to 8.2 kΩ	± 10 %
				1 Ω to 2.7 kΩ	2 Ω to 8.2 kΩ	± 5 %
ZWS35	SL, SS, SB, FST	35 W	$\sqrt{P \times R}$	1.1 Ω to 30 kΩ	2.7 Ω to 82 kΩ	± 10 %, ± 5 %
				1.3 Ω to 30 kΩ	-	± 2 %
	E SL, E SS, E SB, E FST			1.1 Ω to 750 Ω	2.7 Ω to 27 kΩ	± 10 %, ± 5 %
	Ni SL, Ni SS, Ni SB, Ni FST			0.91 Ω to 5.1 kΩ	2 Ω to 15 kΩ	± 10 %, ± 5 %
ZWS50	SS, SSB, SB, FST	50 W	$\sqrt{P \times R}$	1.3 Ω to 33 kΩ	3 Ω to 91 kΩ	± 10 %, ± 5 %
				2.2 Ω to 33 kΩ	-	± 2 %
	E SS, E SSB, E SB, E FST			1.3 Ω to 910 Ω	3 Ω to 33 kΩ	± 10 %, ± 5 %
	Ni SS, Ni SSB, Ni SB, Ni FST			1.1 Ω to 6.2 kΩ	2.4 Ω to 16 kΩ	± 10 %, ± 5 %
ZWS100	SS, SSB, SB, FST	100 W	$\sqrt{P \times R}$	2.7 Ω to 68 kΩ	6.2 Ω to 68 kΩ	± 10 %, ± 5 %
					-	± 2 %
	E SS, E SSB, E SB, E FST			2.7 Ω to 1.8 kΩ	6.2 Ω to 68 kΩ	± 10 %, ± 5 %
	Ni SS, Ni SSB, Ni SB, Ni FST			2.2 Ω to 13 kΩ	4.7 Ω to 33 kΩ	± 10 %, ± 5 %

Notes

(1) Resistance value to be selected for ± 10 % tolerance from E12 and for ± 5 % and ± 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

For technical questions, contact: ww1resistors@vishay.com

Document Number: 21010
Revision: 10-Mar-11

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	VARIANT/ TERMINAL	POWER RATING $P_{40\,°C}$	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 kΩ	11 Ω to 360 kΩ	± 10 %, ± 5 %
					-	± 2 %
	E SS, E SSB, E SB, E FST			4.7 Ω to 3.3 kΩ	11 Ω to 120 kΩ	± 10 %, ± 5 %
	Ni SS, Ni SSB, Ni SB, Ni FST			3.9 Ω to 22 kΩ	9.1 Ω to 62 kΩ	± 10 %, ± 5 %
ZWS250	SS, SSB, SB, FST	250 W	$\sqrt{P \times R}$	8.2 Ω to 220 kΩ	20 Ω to 620 kΩ	± 10 %, ± 5 %
					-	± 2 %
	E SS, E SSB, E SB, E FST			8.2 Ω to 6.2 kΩ	20 Ω to 220 kΩ	± 10 %, ± 5 %
	Ni SS, Ni SSB, Ni SB, Ni FST			6.8 Ω to 39 kΩ	15 Ω to 110 kΩ	± 10 %, ± 5 %
ZWS30/100	SS, SSB, SB, FST	75 W	$\sqrt{P \times R}$	2.4 Ω to 62 kΩ	5.1 Ω to 180 kΩ	± 10 %, ± 5 %
				3 Ω to 62 kΩ	-	± 2 %
	E SS, E SSB, E SB, E FST			2.4 Ω to 1.6 kΩ	5.1 Ω to 56 kΩ	± 10 %, ± 5 %
	Ni SS, Ni SSB, Ni SB, Ni FST			2 Ω to 11 kΩ	4.3 Ω to 30 kΩ	± 10 %, ± 5 %
ZWS30/133	SS, SSB, SB, FST	110 W	$\sqrt{P \times R}$	3.3 Ω to 91 kΩ	7.5 Ω to 240 kΩ	± 10 %, ± 5 %
					-	± 2 %
	E SS, E SSB, E SB, E FST			3.3 Ω to 2.4 kΩ	7.5 Ω to 82 kΩ	± 10 %, ± 5 %
	Ni SS, Ni SSB, Ni SB, Ni FST			2.7 Ω to 16 kΩ	6.2 Ω to 43 kΩ	± 10 %, ± 5 %

Notes

(1) Resistance value to be selected for ± 10 % tolerance from E12 and for ± 5 % and ± 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

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)

VARIANT/ TERMINAL

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)

TCR/MATERIAL

1 =
- 10 ... - 80 ppm/K
WM 50
Class 1
3 =
100 ... 180 ppm/K
WM 110
Class 3
0 = SWI

VALUE

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 = $*10^{3}$

TOLERANCE CODE

G = ± 2.0 %
J = ± 5.0 %
K = ± 10.0 %
0 = by BV

PACKAGING CODE

LX = Loose pack, without quantity
ZX = Special pack (with BV #), without quantity

SPECIAL

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

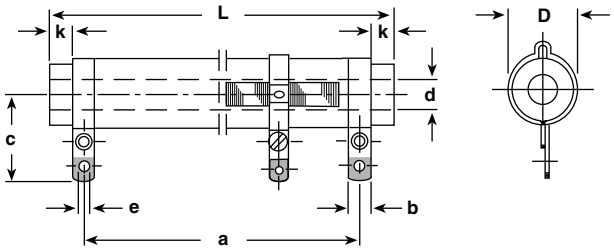
ZWS6	SL	3	1K0	10 %	LX
MODEL (1)	VARIANT/ TERMINAL (1)	TCR/MATERIAL (1)	VALUE (1)	TOLERANCE CODE (1)	PACKAGING DESCRIPTION (2)

Notes

(1) See “Part Number” above
(2) See “Packaging Code” above

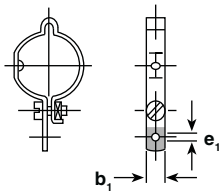
DIMENSIONS

SL TERMINALS

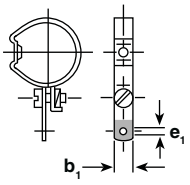


ADJUSTABLE LUGS

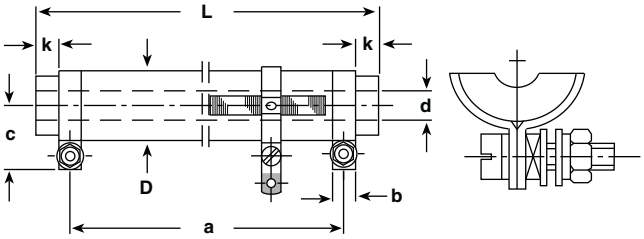
ZWS 6 E
ZWS 8 E



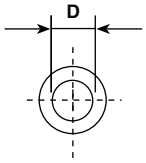
from ZWS 12 E



SS TERMINALS



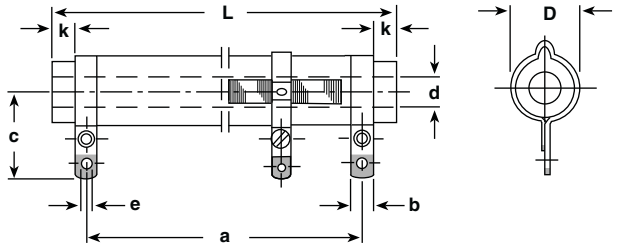
CORE SECTION



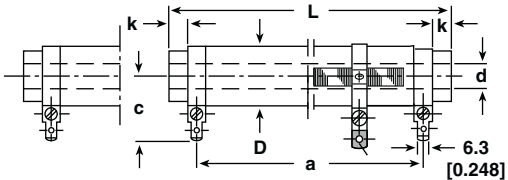
MODEL	DIMENSIONS in millimeters [inches]						
	ZWS 6 ZWS 6 E ZWS 6 Ni	ZWS 8 ZWS 8 E ZWS 8 Ni		ZWS 12 ZWS 12 E ZWS 12 Ni		ZWS 15 ZWS 15 E ZWS 15 Ni	
TERMINAL	SL	SL	SS	SL	SS	SL	SS
DIMENSION D	7.5 ± 0.5 [0.295 ± 0.020]	9.5 ± 0.5 [0.374 ± 0.020]		11.8 ± 0.8 [0.465 ± 0.031]		11.8 ± 0.8 [0.465 ± 0.031]	
L	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 x 12	2 [0.079]	M3 x 12	2 [0.079]	M3 x 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

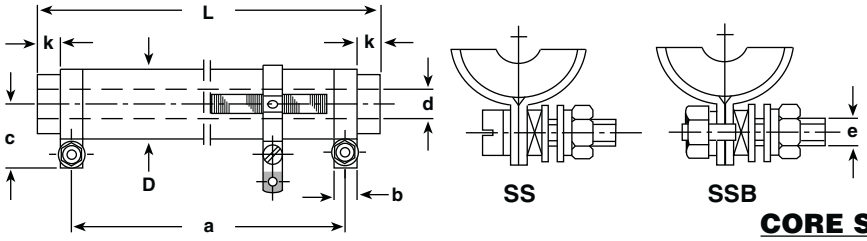


ZWS 20
ZWS 35

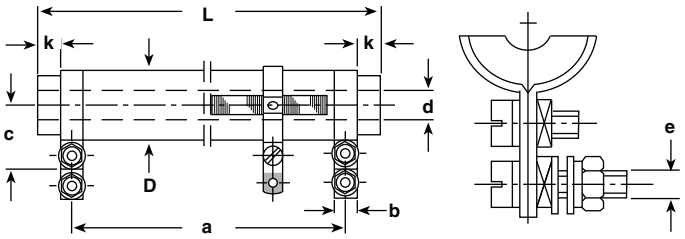
from ZWS 50

FST A 6.3 mm [0.248]/DIN 46244
(At end terminals only)

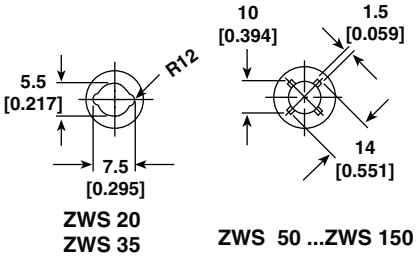
SS AND SSB TERMINALS



SB TERMINALS



CORE SECTION

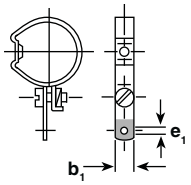


ZWS 20
ZWS 35

ZWS 50 ...ZWS 150

ADJUSTABLE LUGS

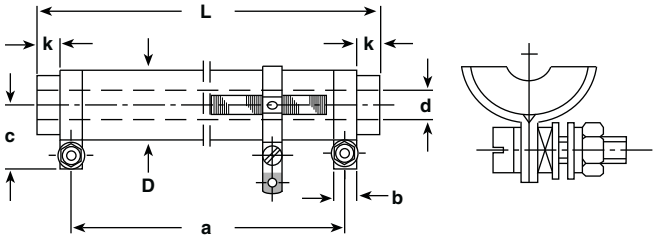
from ZWS 12 E



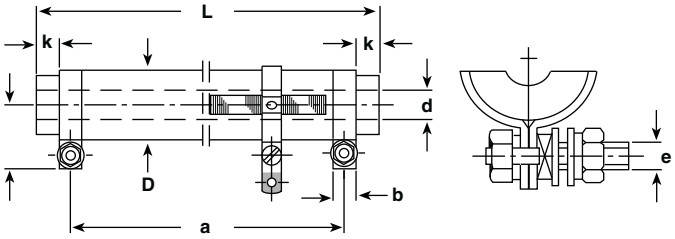
MODEL	DIMENSIONS in millimeters [inches]															
	ZWS 20 ZWS 20 E ZWS 20 Ni				ZWS 35 ZWS 35 E ZWS 35 Ni				ZWS 50 ZWS 50 E ZWS 50 Ni				ZWS 100 ZWS 100 E ZWS 100 Ni			
TERMINAL	SL	SS	SB	FST	SL	SS	SB	FST	SS	SSB	SB	FST	SS	SSB	SB	FST
DIMENSION D	14.8 ± 0.8 [0.583 ± 0.031]				14.8 ± 0.8 [0.583 ± 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]
b_1	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 x 12	M3 x 12	-	2 [0.079]	M3 x 12	M3 x 12	-	M4 x 16	M4 x 18	M4 x 16	-	M4 x 16	M4 x 18	M4 x 16	-
e_1	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)

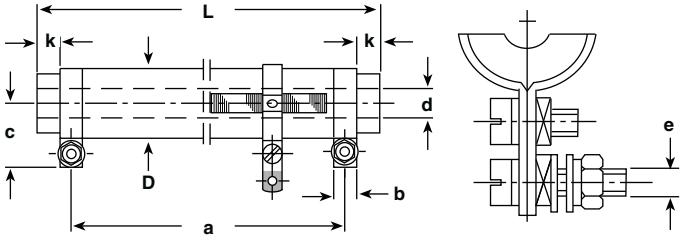
SS TERMINALS



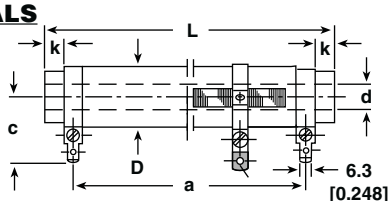
SSB TERMINALS



SB TERMINALS



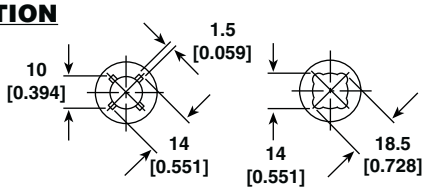
FST TERMINALS



from ZWS 50

FST A 6.3 mm [0.248]/DIN 46244
(At end terminals only)

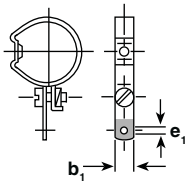
CORE SECTION



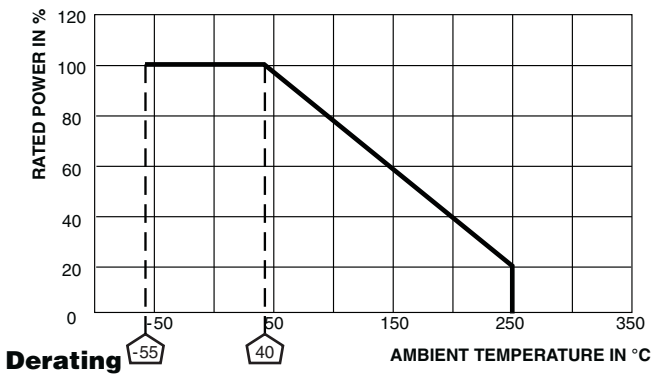
ZWS 50 ...ZWS 150 ZWS 30/ ...

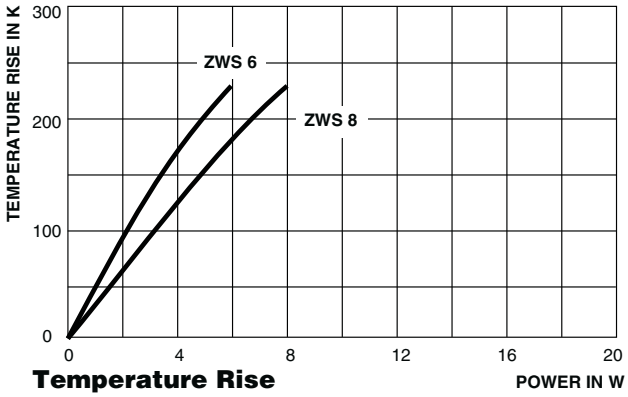
ADJUSTABLE LUGS

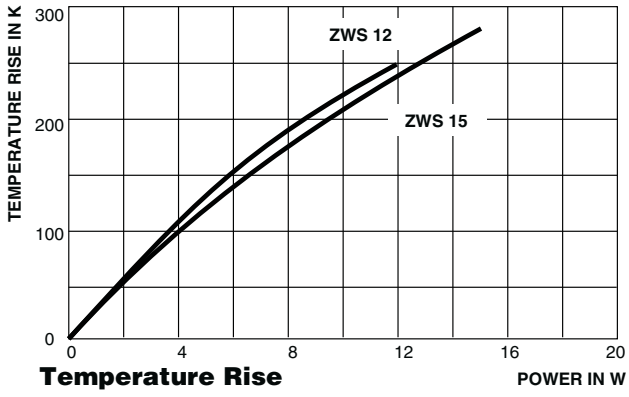
from ZWS 12 E

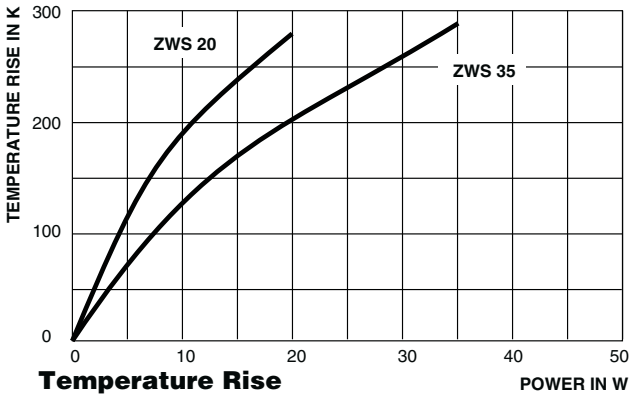


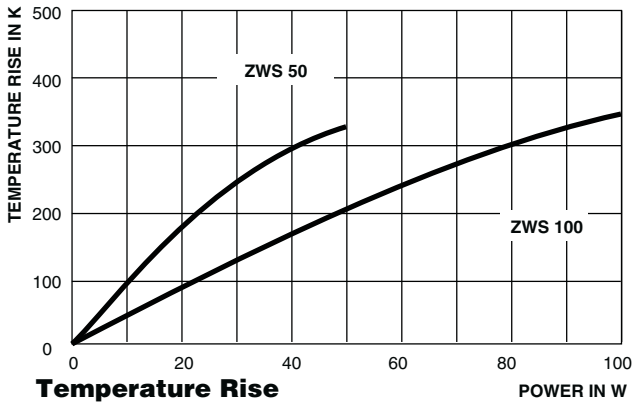
MODEL	DIMENSIONS in millimeters [inches]															
	ZWS 150 ZWS 150 E ZWS 150 Ni				ZWS 250 ZWS 250 E ZWS 250 Ni				ZWS 30/100 ZWS 30/100 E ZWS 30/100 Ni				ZWS 30/133 ZWS 30/133 E ZWS 30/133 Ni			
TERMINAL	SS	SSB	SB	FST	SS	SSB	SB	FST	SS	SSB	SB	FST	SS	SSB	SB	FST
DIMENSION D	22.3 ± 1.3 [0.878 ± 0.051]				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]	42 [1.654]	42 [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			

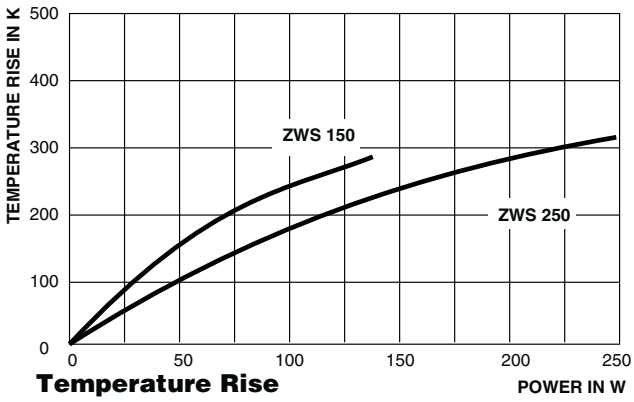


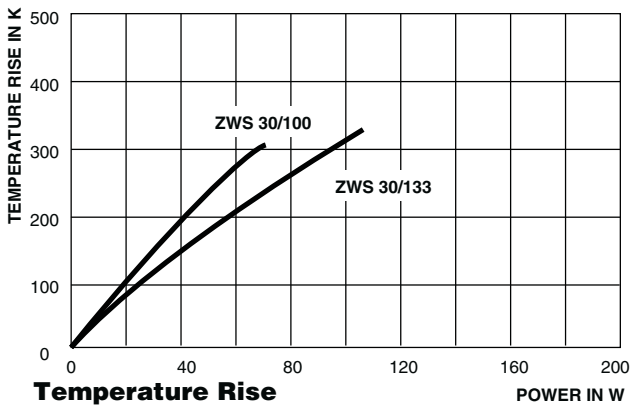












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