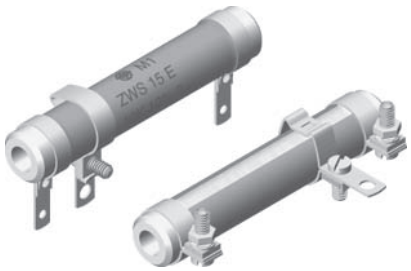
Cemented Wirewound Resistors with Lugs



FEATURES

- Complete welded construction
- Ceramic core
- Available in adjustable or non-inductive design
- Lugs with various termination styles for soldering or bolt connection

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	TERMINAL	POWER RATING $P_{40°C}$ W	LIMITING VOLTAGE V	RESISTANCE RANGE Ω		TOLERANCE ± %	E-SERIES
				TC-10...-80ppm/K	TC 100...180ppm/K		
ZWS 6	SL	6	$\sqrt{P \times R}$	R82 - 5K1 R82 - 5K1 2R7 - 5K1	1R8 - 13K 1R8 - 13K –	10 5 2	E 12 E 24 E 24
ZWS 6 E				R82 - 130R R82 - 130R	1R8 - 4K7 1R8 - 4K7	10 5	E 12 E 24
ZWS 6 Ni				R15 - 910R 1R0 - 910R	R33 - 2K4 2R0 - 2K4	10 5	E 12 E 24
ZWS 8	SL SS	8	$\sqrt{P \times R}$	R68 - 7K5 R68 - 7K5 3R3 - 7K5	1R8 - 20K 1R8 - 20K —	10 5 2	E 12 E 24 E 24
ZWS 8 E				R62 - 200K R62 - 200K	1R8 - 6K8 1R8 - 6K8	10 5	E 12 E 24
ZWS 8 Ni				R24 - 1K3 1R0 - 1K3	R56 - 3K6 2R0 - 3K6	10 5	E 12 E 24
ZWS 12	SL SS	12	$\sqrt{P \times R}$	R62 - 10K R62 - 10K 3R0 - 10K	1R8 - 27K 1R8 - 27K –	10 5 2	E 12 E 24 E 24
ZWS 12 E				R56 - 270R R56 - 270R	1R8 - 9K1 1R8 - 9K1	10 5	E 12 E 24
ZWS 12 Ni				R33 - 1K8 1R0 - 1K8	R75 - 5K1 2R0 - 5K1	10 5	E 12 E 24
ZWS 15	SL SS	15	$\sqrt{P \times R}$	R68 - 12K R68 - 12K 2R2 - 12K	2R2 - 33K 2R2 - 33K —	10 5 2	E 12 E 24 E 24
ZWS 15 E				R68 - 330R R68 - 330R	2R2 - 11K 2R2 - 11K	10 5	E 12 E 24
ZWS 15 Ni				R39 - 2K2 1R0 - 2K2	R82 - 6K2 2R0 - 6K2	10 5	E 12 E 24
ZWS 20	SL SS SB FST	20	$\sqrt{P \times R}$	R62 - 16K R62 - 16K 2R7 - 16K	1R3 - 43K 1R3 - 43K –	10 5 2	E 12 E 24 E 24
ZWS 20 E				R62 - 430K R62 - 430K	1R3 - 15K 1R3 - 15K	10 5	E 12 E 24
ZWS 20 Ni				R47 - 2K7 1R0 - 2K7	1R1 - 8K2 2R0 - 8K2	10 5	E 12 E 24

For technical questions, contact ww1resistors@vishay.com
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STANDARD ELECTRICAL SPECIFICATIONS (CONTINUED)

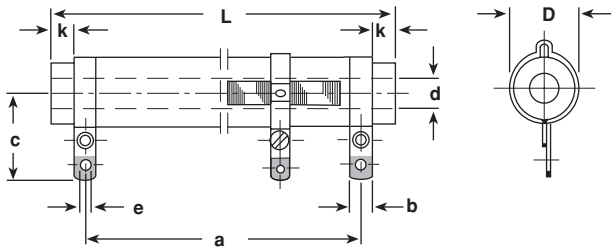
MODEL	TERMINAL	POWER RATING $P_{40°C}$ W	LIMITING VOLTAGE V	RESISTANCE RANGE Ω		TOLERANCE ± %	E-SERIES
				TC-10...-80ppm/K	TC 100...180ppm/K		
ZWS 35	SL SS SB FST	35	$\sqrt{P \times R}$	1R1 - 30K 1R1 - 30K 1R3 - 30K	2R7 - 82K 2R7 - 82K –	10 5 2	E 12 E 24 E 24
ZWS 35 E				1R1 - 750R 1R1 - 750R	2R7 - 27K 2R7 - 27K	10 5	E 12 E 24
ZWS 35 Ni				R91 - 5K1 R91 - 5K1	2R - 15K 2R - 15K	10 5	E 12 E 24
ZWS 50	SS SSB SB FST	50	$\sqrt{P \times R}$	1R3 - 33K 1R3 - 33K 2R2 - 33K	3R0 - 91K 3R0 - 91K —	10 5 2	E 12 E 24 E 24
ZWS 50 E				1R3 - 910R 1R3 - 910R	3R0 - 33K 3R0 - 33K	10 5	E 12 E 24
ZWS 50 Ni				1R1 - 6K2 1R1 - 6K2	2R4 - 16K 2R4 - 16K	10 5	E 12 E 24
ZWS 100	SS SSB SB FST	100	$\sqrt{P \times R}$	2R7 - 68K 2R7 - 68K 2R7 - 68K	6R2 - 200K 6R2 - 200K –	10 5 2	E 12 E 24 E 24
ZWS 100 E				2R7 - 1K8 2R7 - 1K8	6R2 - 68K 6R2 - 68K	10 5	E 12 E 24
ZWS 100 Ni				2R2 - 13K 2R2 - 13K	4R7 - 33K 4R7 - 33K	10 5	E 12 E 24
ZWS 150	SS SSB SB FST	150	$\sqrt{P \times R}$	4R7 - 130K 4R7 - 130K 4R7 - 130K	11R - 360K 11R - 360K —	10 5 2	E 12 E 24 E 24
ZWS 150 E				4R7 - 3K3 4R7 - 3K3	11R - 120K 11R - 120K	10 5	E 12 E 24
ZWS 150 Ni				3R9 - 22K 3R9 - 22K	9R1 - 62K 9R1 - 62K	10 5	E 12 E 24
ZWS 250	SS SSB SB FST	250	$\sqrt{P \times R}$	8R2 - 220K 8R2 - 220K 8R2 - 220K	20R - 620K 20R - 620K –	10 5 2	E 12 E 24 E 24
ZWS 250 E				8R2 - 6K2 8R2 - 6K2	20R - 220K 20R - 220K	10 5	E 12 E 24
ZWS 250 Ni				6R8 - 39K 6R8 - 39K	15R - 110K 15R - 110K	10 5	E 12 E 24
ZWS 30/100	SS SSB SB FST	75	$\sqrt{P \times R}$	2R4 - 62K 2R4 - 62K 3R0 - 62K	5R1 - 180K 5R1 - 180K –	10 5 2	E 12 E 24
ZWS 30/100 E				2R4 - 1K6 2R4 - 1K6	5R1 - 56K 5R1 - 56K	10 5	E 12 E 24
ZWS 30/100 Ni				2R0 - 11K 2R0 - 11K	4R3 - 30K 4R3 - 30K	10 5	E 12 E 24
ZWS 30/133	SS SSB SB FST	110	$\sqrt{P \times R}$	3R3 - 91K 3R3 - 91K 3R3 - 91K	7R5 - 240K 7R5 - 240K –	10 5 2	E 12 E 24
ZWS 30/133 E				3R3 - 2K4 3R3 - 2K4	7R5 - 82K 7R5 - 82K	10 5	E 12 E 24
ZWS 30/133 Ni				2R7 - 16K 2R7 - 16K	6R2 - 43K 6R2 - 43K	10 5	E 12 E 24

ORDERING INFORMATION

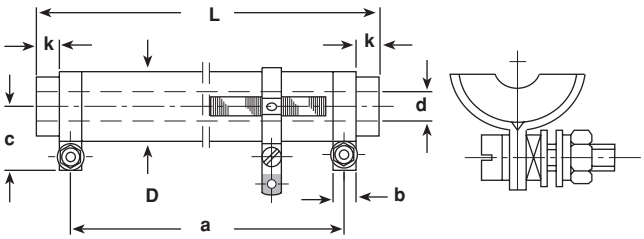
ZWS	100	SS	3	100R	±5%
MODEL	SIZE	TERMINAL	CLASS	RESISTANCE VALUE Ω	TOLERANCE ± %

DIMENSIONS

SL TERMINALS

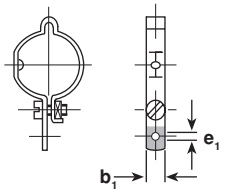


SS TERMINALS

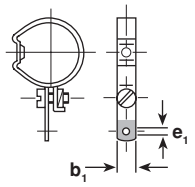


ADJUSTABLE LUGS

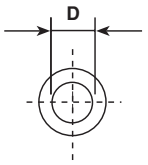
ZWS 6 E
ZWS 8 E



from ZWS 12 E



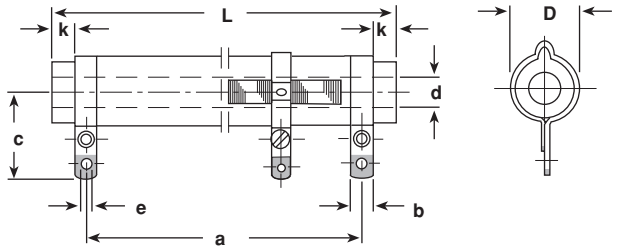
CORE SECTION



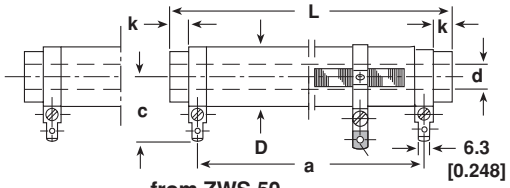
MODEL	DIMENSIONS in millimeters [inches]						
	ZWS 6 ZWS 6 E ZWS 6 Ni	ZWS 8 ZWS 8 E ZWS 8 Ni		ZWS 12 ZWS 12 E ZWS 12 Ni		ZWS 15 ZWS 15 E ZWS 15 Ni	
TERMINAL	**SL**	**SL**	**SS**	**SL**	**SS**	**SL**	**SS**
DIMENSION D	7.5 ± 0.5 [0.295 ± 0.020]	9.5 ± 0.5 [0.374 ± 0.020]		11.8 ± 0.8 [0.465 ± 0.031]		11.8 ± 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]
WEIGHT (Grams)	5	6.5		11.5		12.5	

DIMENSIONS (CONTINUED)

SL TERMINALS



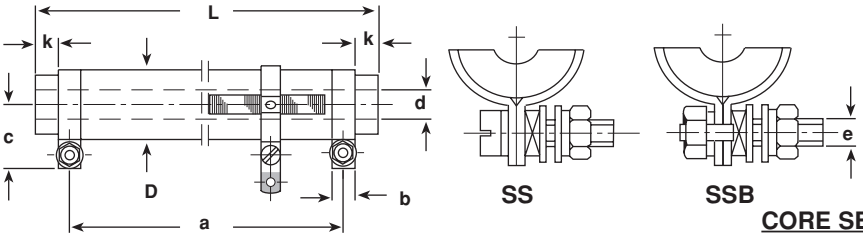
FST TERMINALS



ZWS 20
ZWS 35

from ZWS 50
FST A 6.3mm [0.248]/DIN 46244
(at end terminals only)

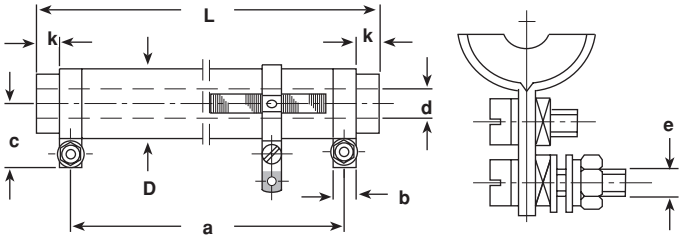
SS AND SSB TERMINALS



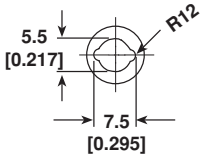
SS

SSB

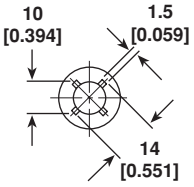
SB TERMINALS



CORE SECTION



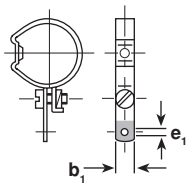
ZWS 20
ZWS 35



ZWS 50 ...ZWS 150

ADJUSTABLE LUGS

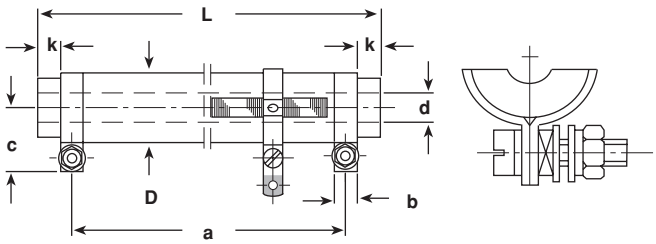
from ZWS 12 E



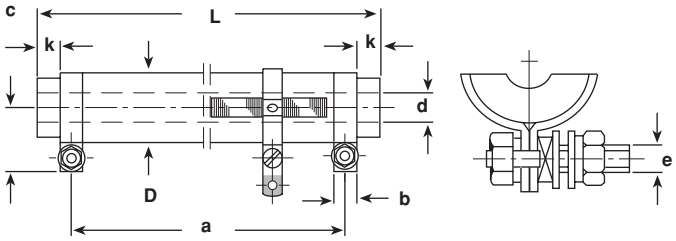
MODEL	DIMENSIONS in millimeters [inches]															
	ZWS 20 ZWS 20 E ZWS 20 Ni				ZWS 35 ZWS 35 E ZWS 35 Ni				ZWS 50 ZWS 50 E ZWS 50 Ni				ZWS 100 ZWS 100 E ZWS 100 Ni			
TERMINAL	**SL**	**SS**	**SB**	**FST**	**SL**	**SS**	**SB**	**FST**	**SS**	**SSB**	**SB**	**FST**	**SS**	**SSB**	**SB**	**FST**
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]
WEIGHT (Grams)	25				33				80				113			

DIMENSIONS (CONTINUED)

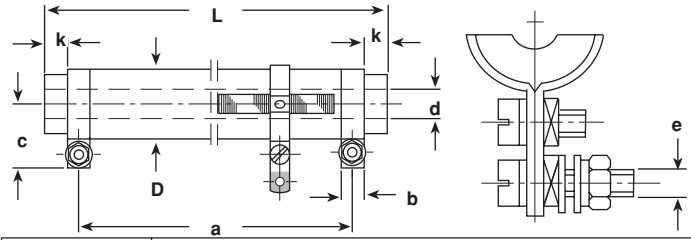
SS TERMINALS



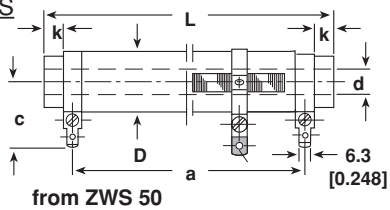
SSB TERMINALS



SB TERMINALS



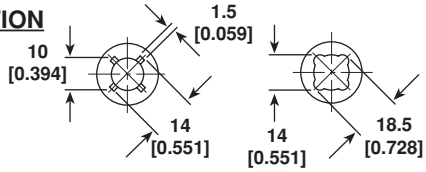
FST TERMINALS



from ZWS 50

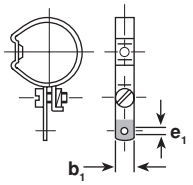
FST A 6.3mm [0.248]/DIN 46244 (at end terminals only)

CORE SECTION

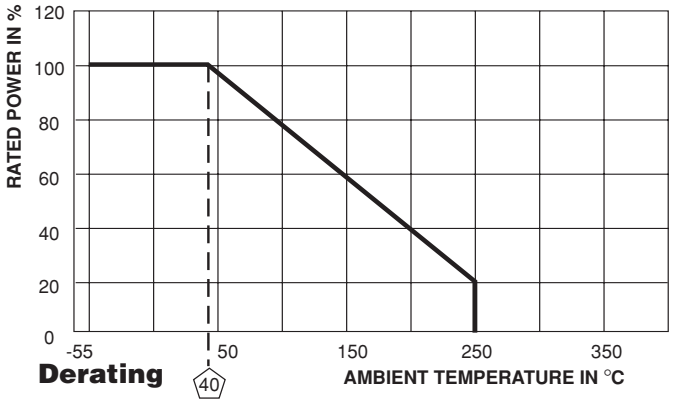


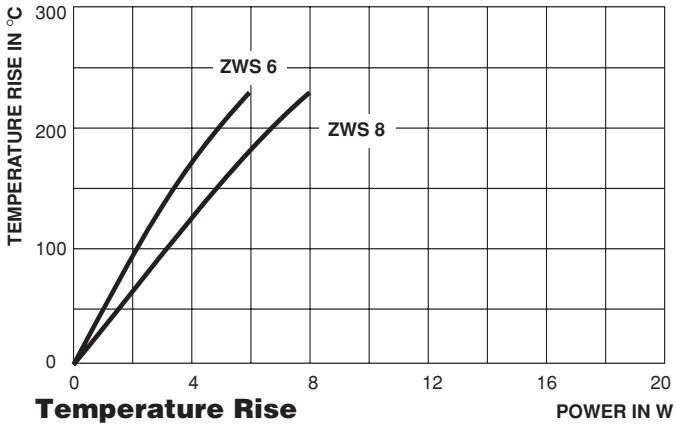
ZWS 50 ...ZWS 150 **ZWS 30/ ...**

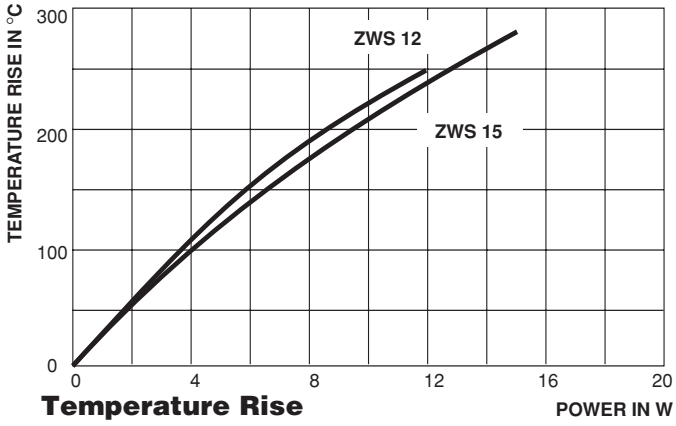
ADJUSTABLE LUGS **from ZWS 12 E**

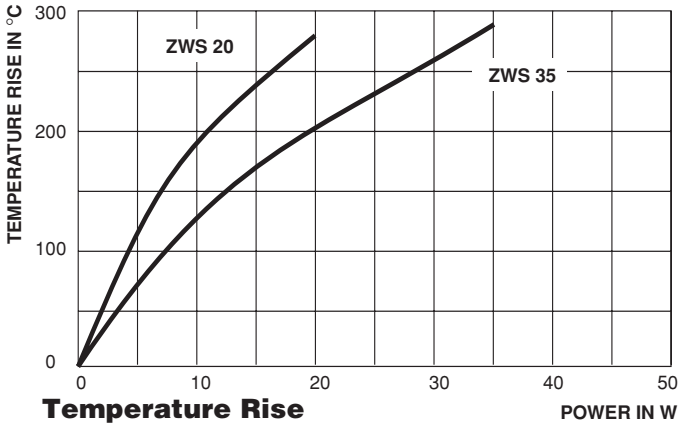


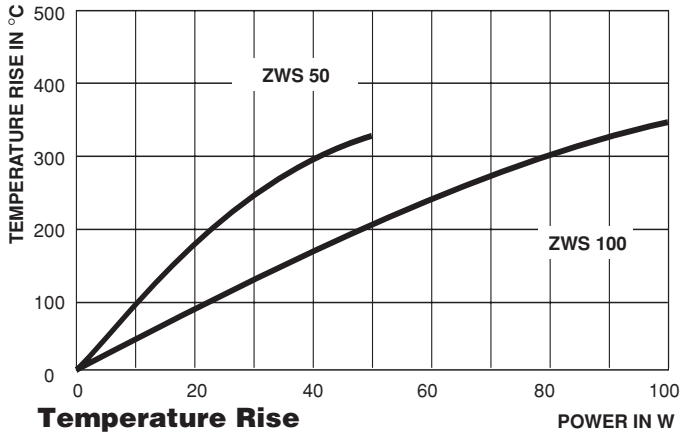
MODEL	DIMENSIONS in millimeters [inches]															
	ZWS 150 ZWS 150 E ZWS 150 Ni				ZWS 250 ZWS 250 E ZWS 250 Ni				ZWS 30/100 ZWS 30/100 E ZWS 30/100 Ni				ZWS 30/133 ZWS 30/133 E ZWS 30/133 Ni			
TERMINAL	**SS**	**SSB**	**SB**	**FST**	**SS**	**SSB**	**SB**	**FST**	**SS**	**SSB**	**SB**	**FST**	**SS**	**SSB**	**SB**	**FST**
DIMENSION D	22.3 ± 1.3 [0.878 ± 0.051]				32.5 ± 1.5 [1.28 ± 0.059]				32.5 ± 1.5 [1.28 ± 0.059]				32.5 ± 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 x 16	M4 x 18	M4 x 16	–	M4 x 16	M4 x 18	M4 x 16	–	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]	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]
WEIGHT (Grams)	194				375				167				212			

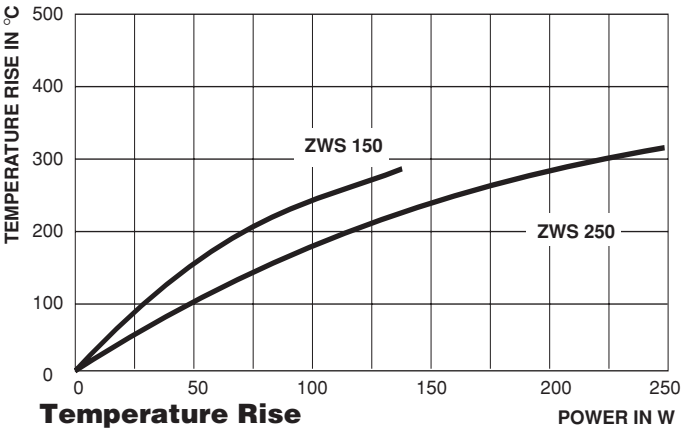

RATED POWER IN %
120
100
80
60
40
20
0
-55
50
150
250
350
Derating
40
AMBIENT TEMPERATURE IN °C

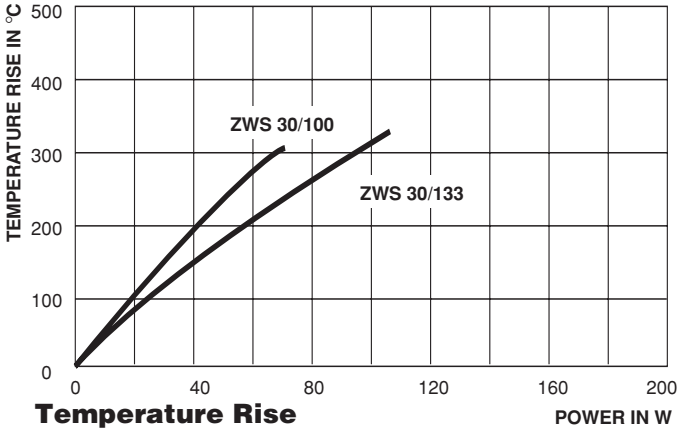

TEMPERATURE RISE IN °C
300
200
100
0
ZWS 6
ZWS 8
0
4
8
12
16
20
Temperature Rise
POWER IN W


TEMPERATURE RISE IN °C
300
200
100
0
ZWS 12
ZWS 15
0
4
8
12
16
20
Temperature Rise
POWER IN W


TEMPERATURE RISE IN °C
300
200
100
0
ZWS 20
ZWS 35
0
10
20
30
40
50
Temperature Rise
POWER IN W


TEMPERATURE RISE IN °C
500
400
300
200
100
0
ZWS 50
ZWS 100
0
20
40
60
80
100
Temperature Rise
POWER IN W


TEMPERATURE RISE IN °C
500
400
300
200
100
0
ZWS 150
ZWS 250
0
50
100
150
200
250
Temperature Rise
POWER IN W


TEMPERATURE RISE IN °C
500
400
300
200
100
0
ZWS 30/100
ZWS 30/133
0
40
80
120
160
200
Temperature Rise
POWER IN W