

## Wirewound Resistors, Industrial Power, Silicone Coated, Fixed Edgewound Tubular


**FEATURES**

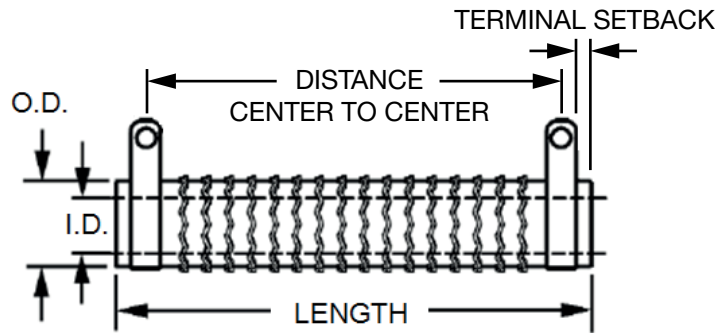
- High temperature silicone coating
- Complete welded construction
- Excellent stability in operation (< 3 % change in resistance)
- Material categorization:  
for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



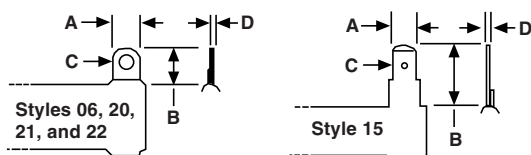
**RoHS**  
COMPLIANT  
**HALOGEN**  
**FREE**  
**GREEN**  
(5-2008)

STANDARD ELECTRICAL SPECIFICATIONS					
GLOBAL MODEL	HISTORICAL MODEL	POWER RATING $P_{25^{\circ}\text{C}}$ W	RESISTANCE RANGE $\Omega$ $\pm 5\%$	RESISTANCE RANGE $\Omega$ $\pm 10\%$	WEIGHT (typical) g
FSE0050	FSE-50	50	1.0 to 3.8	1.0 to 3.8	18
FSE0090	FSE-90	90	0.10 to 5.7	0.10 to 5.7	36
FSE0100	FSE-100	100	1.0 to 6.1	0.15 to 6.1	41
FSE0110	FSE-110	110	1.0 to 7.4	0.20 to 7.4	49
FSE0120	FSE-120	120	1.0 to 8.6	0.1 to 8.6	54
FSE0140	HLZ-140	140	0.08 to 9.0	0.08 to 9.0	109
FSE0155	FSE-155	155	1.0 to 12.5	0.1 to 12.5	129
FSE0165	HLZ-165	165	0.35 to 13.0	0.35 to 13.0	91
FSE0180	HLZ-165	165	0.35 to 13.0	0.35 to 13.0	91
FSE0240	FSE-240	240	1.0 to 18	0.1 to 18	186
FSE0300	FSE-300	300	1.0 to 25	0.15 to 25	236
FSE0375	FSE-375	375	1.0 to 32	0.20 to 32	286
FSE0420	FSE-420	420	1.0 to 35.8	0.25 to 35.8	320
FSE0500	FSE-500	500	1.0 to 46.2	0.30 to 46.2	381
FSE0750	FSE-750	750	1.0 to 81.3	0.35 to 81.3	654
FSE1000	FSE-1000	1000	1.0 to 101.6	0.40 to 101.6	817
FSE1500	FSE-1500	1500	1.0 to 135.5	0.15 to 135.5	1090

GLOBAL PART NUMBER INFORMATION																	
Global Part Numbering example: <b>FSE050021E15R0JE</b> (visit <a href="http://www.vishay.net">www.vishay.net</a> Vishay Dale parts numbering manual for all options)																	
F	S	E	0	5	0	0	2	1	E	1	5	R	0	J	E		
GLOBAL MODEL (7 digits)	TERMINAL DESIGNATION (2 digits)	TERMINAL FINISH (1 digit)	VALUE (4 digits)	TOLERANCE (1 digit)	PACKAGING CODE (1 digit)	SPECIAL (up to 2 digits)											
(see Standard Electrical Specifications Global Model column for options)	<b>06</b> <b>15</b> <b>20</b> <b>21</b> <b>22</b>	<b>E</b> = lead (Pb)-free	<b>R</b> = decimal <b>1R50</b> = 1.5 $\Omega$	<b>J</b> = $\pm 5\%$ <b>K</b> = $\pm 10\%$	<b>E</b> = lead (Pb)-free bulk pack	(dash number) from <b>1</b> to <b>99</b> as applicable <b>91</b> = 100 style BKT <b>92</b> = 200 style BKT <b>93</b> = 300 style BKT <b>CT</b> = center tap											
Historical Part Number example: <b>FSE-500-15-5 %</b>																	
FSE-500	15 $\Omega$	5 %															
HISTORICAL MODEL	RESISTANCE VALUE	TOLERANCE					SPECIAL										

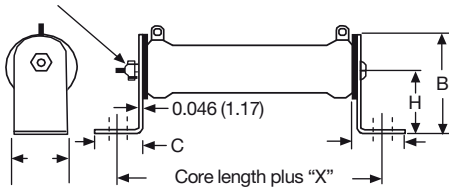
**DIMENSIONS** in inches (millimeters)


MODEL	CORE DIMENSIONS			TERMINAL SETBACK	DISTANCE CENTER TO CENTER (REF.)	TERMINAL DESIGNATION	
	LENGTH	O.D. ± 0.031 (± 0.79)	I.D. ± 0.031 (± 0.79)			STANDARD	OPTIONAL (QUICK CONNECT)
FSE0050	2.000 (50.8)	0.750 (19.05)	0.500 (12.70)	0.094 (2.39)	1.562 (39.67)	06	15
FSE0090	4.000 (101.6)	0.563 (14.30)	0.313 (7.95)	0.094 (2.39)	3.562 (90.47)	06	15
FSE0100	3.500 (88.90)	0.750 (19.05)	0.500 (12.70)	0.079 (2.01)	3.092 (78.54)	06	15
FSE0110	4.000 (101.6)	0.750 (19.05)	0.500 (12.70)	0.125 (3.18)	3.500 (88.90)	06	15
FSE0120	4.500 (114.3)	0.750 (19.05)	0.547 (13.89)	0.125 (3.18)	4.000 (101.60)	06	15
FSE0140	4.000 (101.6)	1.125 (28.58)	0.750 (19.05)	0.219 (5.56)	2.812 (71.42)	20	15
FSE0155	4.250 (114.3)	1.125 (28.58)	0.750 (19.05)	0.282 (7.16)	3.311 (84.10)	20	15
FSE0165	6.500 (165.1)	0.750 (19.05)	0.750 (19.05)	0.125 (3.18)	5.75 (146.05)	20	15
FSE0180	6.500 (165.1)	0.750 (19.05)	0.750 (19.05)	0.125 (3.18)	5.75 (146.05)	20	15
FSE0240	6.500 (165.1)	1.125 (28.58)	0.750 (19.05)	0.250 (6.35)	5.561 (141.25)	20	15
FSE0300	8.500 (215.9)	1.125 (28.58)	0.750 (19.05)	0.267 (6.78)	7.591 (192.81)	20	15
FSE0375	10.500 (266.7)	1.125 (28.58)	0.750 (19.05)	0.266 (6.76)	9.591 (243.61)	20	15
FSE0420	11.750 (288.9)	1.125 (28.58)	0.750 (19.05)	0.266 (6.76)	10.843 (275.41)	20	15
FSE0500	10.500 (266.7)	1.625 (41.275)	1.125 (28.58)	0.266 (6.76)	9.468 (240.49)	21	-
FSE0750	12.000 (304.8)	2.500 (63.50)	1.750 (44.45)	0.508 (12.90)	10.484 (266.29)	22	-
FSE1000	15.000 (381.0)	2.500 (63.50)	1.750 (44.45)	0.508 (12.90)	13.484 (342.49)	22	-
FSE1500	20.000 (508.0)	2.500 (63.50)	1.750 (44.45)	0.508 (12.90)	18.484 (469.49)	22	-

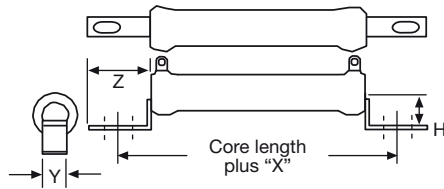
**TERMINAL DIMENSIONS** in inches (millimeters)


DIMENSIONS	TERMINAL STYLE				
	06	15	20	21	22
A	0.250 (6.35)	0.250 (6.35)	0.375 (9.53)	0.500 (12.70)	0.500 (12.70)
B	0.500 (12.70)	0.594 (15.08)	0.5625 (14.28)	0.625 (15.87)	0.925 (23.49)
C (HOLE DIAMETER)	0.173 (4.39)	0.065 (1.65)	0.204 (5.18)	0.264 (6.70)	0.264 (6.70)
D	0.020 (0.51)	0.031 (0.79)	0.032 (0.812)	0.025 (0.64)	0.025 (0.64)

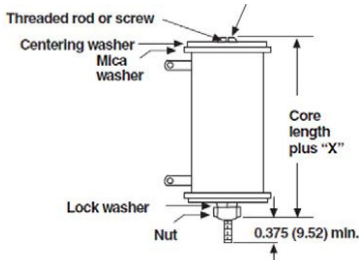
**MOUNTING HARDWARE FOR FSE PRODUCTS** - Dimensions in inches (millimeters)

**91 = 100 Style Horizontal 1 High Bracket**


BRACKET TYPE	X	Y	Z	H	MOUNTING SLOT	C	B
102	1.063 (26.99)	0.750 (19.05)	0.859 (21.83)	1.250 (31.75)	0.219 x 0.438 (5.56 x 11.11)	0.750 (19.05)	1.750 (44.75)
103	1.063 (26.99)	1.250 (31.75)	1.000 (25.40)	1.500 (38.10)	0.281 x 0.563 (7.14 x 14.29)	0.927 (23.55)	2.125 (53.98)
104	1.952 (49.58)	2.500 (63.50)	1.478 (37.54)	3.000 (76.20)	open slot x 0.406 (10.31)	1.375 (34.93)	4.25 (107.25)

**92 = 200 Style Push-In Bracket**


BRACKET TYPE	X	H	Y	Z	HOLE (DIA.)
204	0.700 (17.78)	0.578 (14.68)	0.250 (6.35)	0.500 (12.70)	0.156 (3.96)
206	0.846 (21.49)	0.800 (20.62)	0.375 (9.53)	0.600 (15.24)	0.343 x 0.213 (8.71 x 5.46)
207	0.700 (17.78)	1.125 (28.58)	0.500 (12.70)	0.687 (17.45)	0.250 x 0.188 (6.35 x 4.78)

**93 = 300 Style Thru-Bolt Bracket**


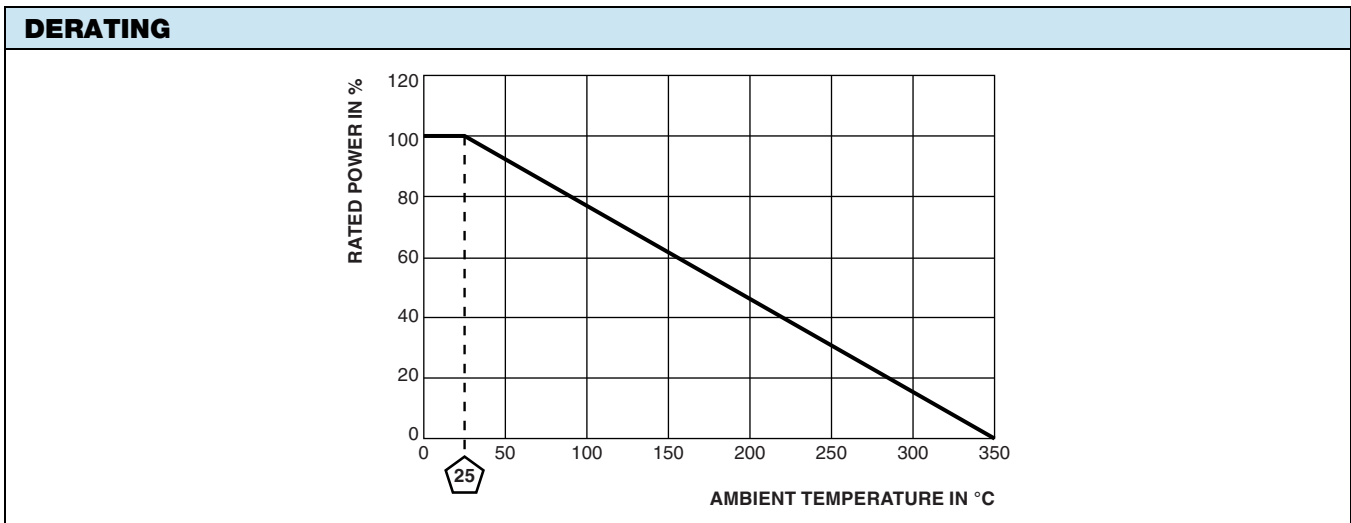
BRACKET TYPE	X (APPROXIMATE)	THREAD
302	0.271 (6.88)	10-32
303	0.463 (11.76)	1/4-20

MOUNTING HARDWARE			
GLOBAL MODEL	AVAILABLE BRACKET TYPES BY MODEL		
	91 = 100 STYLE HORIZONTAL 1 HIGH BRACKET	92 = 200 STYLE PUSH-IN BRACKET	93 = 300 STYLE THRU-BOLT BRACKET
FSE0050	102	206	302
FSE0090	102	204	302
FSE0100	102	206	302
FSE0110	102	206	302
FSE0120	102	206	302
FSE0140	103	205	303
FSE0155	103	207	302
FSE0165	102	206	303
FSE0180	102	206	303
FSE0240	103	207	302
FSE0300	103	207	303
FSE0375	103	207	303
FSE0420	103	207	303
FSE0500	103	-	302
FSE0750	104	-	302
FSE1000	104	-	302
FSE1500	104	-	303



TECHNICAL SPECIFICATIONS		
PARAMETER	UNIT	RESISTOR CHARACTERISTICS
Power Rating	W	50 to 1500
Resistance Range	$\Omega$	0.10 to 135.5
Resistance Tolerance	%	10
Temperature Coefficient	ppm/ $^{\circ}$ C	$\pm 260$ for 20 $\Omega$ and above, $\pm 400$ for 1 $\Omega$ to 19.99 $\Omega$
Operating Temperature	$^{\circ}$ C	-55 $^{\circ}$ C to 350 $^{\circ}$ C
Temperature Rise	$^{\circ}$ C	325 $^{\circ}$ C above an ambient of 25 $^{\circ}$ C
Maximum Altitude	f.a.s.l.	10 000
Short-Term Overload	-	10x rated power for 5 s
Surge Windings	-	Available
Maximum Working Voltage	-	$(P \times R)^{0.5}$
Insulation Resistance	$\Omega$	1M
Dielectric Voltage	V <sub>RMS</sub>	1000 V <sub>AC</sub>
Creepage	-	Varies by wattage, see "Terminal Setback" in Dimensions table
Terminal Sleeves	-	n/a
Inductance	$\mu$ H	Varies by wattage and resistance
Non-Inductive Winding	-	n/a
Terminal Strength	lb	10 lbs
Electrical or Mechanical Customization	-	Contact factory: <a href="mailto:ww2dresistors@vishay.com">ww2dresistors@vishay.com</a>

MATERIAL SPECIFICATIONS	
Element	Copper-nickel alloy or nickel-chrome alloy, depending on resistance value
Core	Cordierite, steatite
Coating	Special high temperature silicone
Standard Terminals	Tinned alloy 42
Optional Terminals	Alloy 42
Terminal Bands	Alloy 42
Part Marking	HEI, model, wattage, value, tolerance, date code





## **Disclaimer**

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.