

EPCOS Product Brief 2016

Energy Varistors

for the Protection of Power Distribution Systems

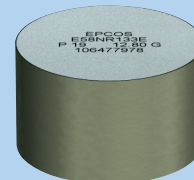
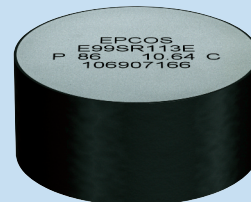
SIOV metal oxide varistors in the E series are designed to be used as active elements in gap-less surge arresters for protection of medium and high voltage AC power utility distribution systems against overvoltages. Glass collar passivation makes this series suitable for a broad range of arrester designs such as porcelain housed arresters, or polymer housed arresters with a hollow insulator as well as for molded polymer arresters. The broad range of diameters supports the different class requirements according IEC and ANSI.

Construction

- Glass passivated collar
- Aluminum termination for pressure contact

Features

- Disk diameter of 32 to 99 mm
- Disk height up to 44 mm
- Stackable for higher voltage ratings
- Based on IEC 60099-4 and ANSI/IEEE C62.11
- Arrester blocks for distribution class
- Arrester blocks for station class



Energy Varistors: Distribution Class

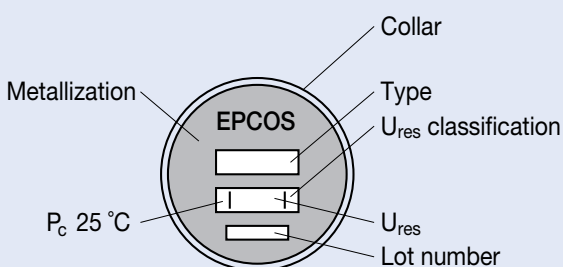


Technical data

Type	E32VR302S	E32VR502S	E32VR602S	E41NR302E	E41NR502E	E41VR602		
Ordering code	B72232 E0302R078	B72232 E0502R078	B72232 E0602R078	B72241 E0302R026	B72241 E0502R026	B72241 E0602R018	Unit	
Dimensions								
Diameter	Ø	32 ± 1	32 ± 1	32 ± 1	41.9 ± 0.7	41.9 ± 0.7	41.9 ± 0.7	mm
Height	h	17.7 ± 0.6	29.6 ± 0.6	39.5 ± 0.6	19.5 ± 0.6	29.4 ± 0.6	41.0 ± 0.6	mm
Arresters classification								
Suggested usage in gapless arrester constructions based on IEC 60099-4		5	5	5	10	10	10	kA
Line discharge class								
Suggested usage in gapless arrester constructions based on IEC 60099-4		-	-	-	1	1	1	-
Characteristics								
Suggested rated voltage (max.)	U_r	3	5	6	3	5	6	kV
Continuous operating voltage (max.)	U_c	2.45	4.1	4.9	2.45	4.1	4.9	kV
Reference current	I_{ref}	1	1	1	2	2	2	mA
Reference voltage (min.)	U_{ref}	3	5	6	2.75	4.6	6	kV
Residual voltage at I_n	U_{res}	7.55 ... 8.55	12.55 ... 14.25	15.05 ... 17.05	7.35 ... 8.25	12.25 ... 13.75	15.05 ... 17.05	kV
Nominal discharge current (8/20 µs)	I_n	5	5	5	10	10	10	kA
High current impulse (4/10 µs) ¹		65	65	65	100	100	100	kA
Long duration current impulse (2 ms)		150	150	150	400	400	325	A
Max. resistive power dissipation at U_c	P_c	0.18	0.3	0.35	0.27	0.45	0.5	W
Approx. weight/pcs.		80	130	180	150	225	310	g
Packing unit		50	25	25	20	20	20	pcs.

¹ Secondary insulation required for E32/E41 types

Marking



Explanation example for Type E41NR302E

P_c	Resistive power dissipation at maximum continuous operating voltage and 25 °C in 10^{-2} W e.g. $P_{09} = P_c = 9 \cdot 10^{-2} \text{ W} = 0.09 \text{ W}$
$U_{res}(I_n)$	Measured residual voltage at nominal discharge current $I_n = 10 \text{ kA}$ in kV e.g. $7.42 = 7.42 \text{ kV}$
$U_{res}(I_n)$ classification	Residual voltage is classified in 100 V steps and identified by a letter e.g. A

Energy Varistors: Station Class

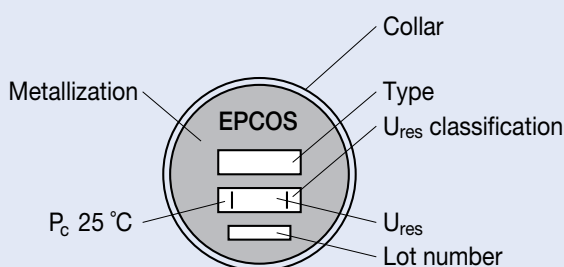


Technical data



Type	E48NR113E	E48NR133E	E58NR133E	
Ordering code	B72248 E0113S072	B72248 E0133S072	B72258 E0133S072	Unit
Dimensions				
Diameter	Ø 48 ± 1	48 ± 1	59.7 ± 1	mm
Height	h 30.5 ± 0.6	35.4 ± 0.6	35.4 ± 0.6	mm
Arresters classification				
Suggested usage in gapless arrester constructions based on IEC 60099-4	10	10	10	kA
Line discharge class				
Suggested usage in gapless arrester constructions based on IEC 60099-4	2	2	3	–
Characteristics				
Suggested rated voltage (max.)	U_r 0.385 x U_{res}	0.385 x U_{res}	0.415 x U_{res}	kV
Continuous operating voltage (max.)	U_c $U_{res}/3.2$	$U_{res}/3.2$	$U_{res}/3.0$	kV
Reference current	I_{ref} 2	2	3	mA
Reference voltage (min.)	U_{ref} 0.385 x U_{res}	0.385 x U_{res}	0.415 x U_{res}	kV
Residual voltage at I_n	U_{res} 10.65 ... 12.55	12.65 ... 14.25	12.15 ... 13.75	kV
Nominal discharge current (8/20 µs)	I_n 10	10	10	kA
High current impulse (4/10 µs)	100	100	100	kA
Long duration current impulse (2 ms)	680	680	1000	A
Max. resistive power dissipation at U_c	P_c 0.26	0.3	0.4	W
Approx. weight/pcs.	310	350	550	g
Packing unit	12	12	8	pcs.

Marking



Explanation example for Type E58NR133E

P_c	Resistive power dissipation at maximum continuous operating voltage and 25 °C in 10^{-2} W e.g. $P_{09} = P_c = 9 \cdot 10^{-2} \text{ W} = 0.09 \text{ W}$
$U_{res} (I_n)$	Measured residual voltage at nominal discharge current $I_n = 10 \text{ kA}$ in kV e.g. $12.19 = 12.19 \text{ kV}$
$U_{res} (I_n)$ classification	Residual voltage is classified in 100 V steps and identified by a letter e.g. A

Energy Varistors: Station Class



Technical data						
Type		E70NR133E	E78SR392E	E78SR123E	E99SR113E	
Ordering code		B72270 E0133S072	B72278 E0392S003	B72278 E0123S003	B72299 E0113S003	Unit
Dimensions						
Diameter	Ø	70 ± 1	78 ± 1	78 ± 1	98.8 ± 1.2	mm
Height	h	35.4 ± 0.6	14.5 ± 0.6	44 ± 0.6	44 ± 0.6	mm
Arresters classification						
Suggested usage in gapless arrester constructions based on IEC 60099-4		20	20	20	–	kA
Line discharge class						
Suggested usage in gapless arrester constructions based on IEC 60099-4		4	5	5	–	–
Characteristics						
Suggested rated voltage (max.) U_r		0.425 x U_{res} (10 kA)	0.423 x U_{res} (10 kA)	0.431 x U_{res} (10 kA)	0.444 x U_{res} (10 kA)	kV
Continuous operating voltage (max.) U_c		U_{res} (10 kA)/2.9	U_{res} (10 kA)/2.9	U_{res} (10 kA)/2.9	U_{res} (10 kA)/2.9	kV
Reference current I_{ref}		5	5	5	5	mA
Reference voltage (min.) U_{ref}		0.425 x U_{res} (10 kA)	0.423 x U_{res} (10 kA)	0.431 x U_{res} (10 kA)	0.444 x U_{res} (10 kA)	kV
Measured residual voltage U_{res} (10 kA)		11.85 ... 13.45	3.55 ... 4.15	10.65 ... 12.35	10.35 ... 12.05	kV
Residual voltage at I_n U_{res}		12.65 ... 14.55	3.83 ... 4.52	11.50 ... 13.45	11.10 ... 13.00	kV
Nominal discharge current (8/20 µs) I_n		20	20	20	20	kA
High current impulse (4/10 µs)		100	100	100	100	kA
Long duration current impulse (2 ms)		1500	1500	1500	2100	A
Max. resistive power dissipation at U_c P_c		0.5	0.35	0.95	1.5	W
Approx. weight/pcs.		760	390	1180	1890	g
Packing unit		5	15	5	4	pcs.

Marking	
	<p>Explanation example for Type E99SR113E</p> <p>P_c Resistive power dissipation at maximum continuous operating voltage and 25 °C in 10⁻² W, e.g. $P_{89} = P_c = 89 \cdot 10^{-2} \text{ W} = 0.89 \text{ W}$</p> <p>$U_{res}$ (10 kA) Measured residual voltage at discharge current $I = 10 \text{ kA}$ in kV, e.g. 10.64 = 10.64 kV</p> <p>U_{res} (10 kA) classification Residual voltage is classified in 100 V steps and identified by a letter, e.g. C</p>

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