Panasonic INDUSTRY

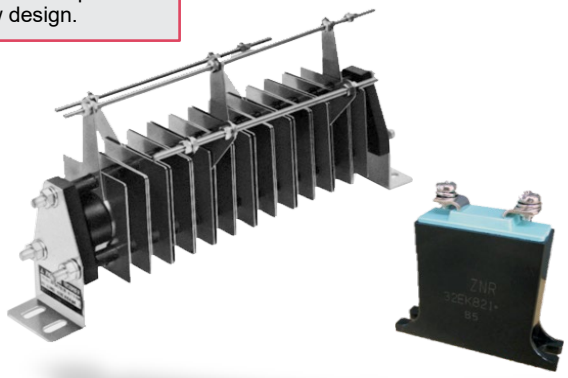
⚠ This series is not a recommended product.
Not recommended for new design.

Varistors (ZNR Surge Absorber)

For thyristor protection

E type

J type



Varistors (ZNR Surge Absorber) for thyristors is especially designed to protect Thyristor power controllers and Thyristor power sources from high energy transient over voltages.
The ZNR is smaller in size and excellent in the clamping voltage characteristics as compared with a conventional selenium surge absorber.
Type E is for relatively low handling capacity of trans-former and Type J is for heavy duty use.

Features

- RoHS compliant

Recommended applications

- Surge protection of thyristor power controllers
- Surge protection of thyristor power sources

Note : Ask our factory for product specification before use.

■ As for handling precautions and minimum quantity / Packing unit please see related information.

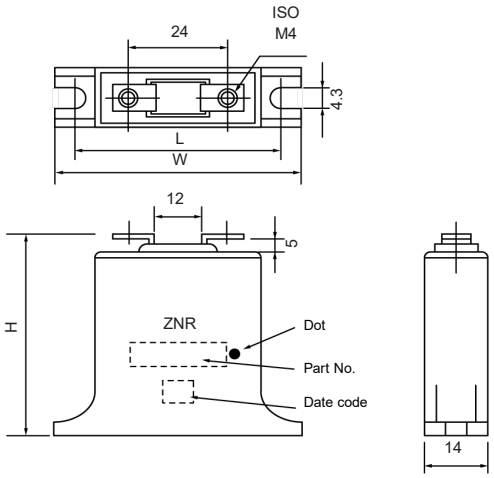
Ratings and characteristics (E type)

- Operating temperature range : -40 to 85 ℃
- Storage temperature range : -40 to 110 ℃

Part No.	Varistor voltage at 1 mA	Maximum allowable voltage		Maximum clamping voltage		Impulse life (2 ms, 10^4 times)	Commutation surge ratio
	(V)	ACrms(V)	DC (V)	V_{Ip} (V)	Ip (A)	(A)	
ERZC20EK511P	498 to 542	242	342	760	10	10	1.45
ERZC20EK541P	523 to 560	264	373	785			1.40
ERZC20EK681P	630 to 678	330	467	950			1.35
ERZC20EK821P	788 to 848	412	583	1185			1.35
ERZC20EK911P	840 to 904	440	622	1265			1.35
ERZC20EK102P	945 to 1017	495	700	1425			1.35
ERZC20EK112P	1051 to 1181	550	775	1655			1.35
ERZC32EK511P	498 to 542	242	342	760	20	20	1.45
ERZC32EK541P	523 to 560	264	373	785			1.40
ERZC32EK681P	630 to 678	330	467	950			1.35
ERZC32EK821P	788 to 848	412	583	1185			1.35
ERZC32EK911P	840 to 904	440	622	1265			1.35
ERZC32EK102P	945 to 1017	495	700	1425			1.35
ERZC32EK112P	1051 to 1181	550	775	1655			1.35

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

Dimensions in mm (not to scale) (E type)



Unit : mm

Part No.	W	H	L
ERZC20EK□□□P	48±1	42±1	39±1
ERZC32EK□□□P	60±1	55±1	51±1

Ratings and characteristics (J type)

● Operating temperature range : -40 to 70 ℃ ● Storage temperature range : -40 to 110 ℃

Part No.	Connection	Maximum allowable voltage		Maximum clamping voltage		Impulse life (2 ms, 10^4 times)	Commutation surge ratio	Dimensions in mm			
		ACrms (V)	DC (V)	V_{Ip} (V)	Ip (A)	(A)		Style	A	B	C
ERZU11JP511	Single	242	342	760	40	40	1.45	(1)	88	108	20
ERZU12JP511					70	70			104	124	
ERZU13JP511					95	95			121	141	
ERZU14JP511					125	125			138	158	
ERZU15JP511					150	150			155	175	
ERZU16JP511					180	180			172	192	
ERZU17JP511					210	210			189	209	
ERZU11JP511B	Delta	242	—	760	40	40	1.45	(2)	120	140	20
ERZU12JP511B					70	70			169	189	
ERZU13JP511B					95	95			219	239	
ERZU14JP511B					125	125			260	280	
ERZU11JP541	Single	264	373	785	40	40	1.40	(1)	88	108	20
ERZU12JP541					70	70			105	125	
ERZU13JP541					95	95			122	142	
ERZU14JP541					125	125			139	159	
ERZU15JP541					150	150			156	176	
ERZU16JP541					180	180			172	192	
ERZU17JP541					210	210			189	209	
ERZU11JP541B	Delta	264	—	785	40	40	1.40	(2)	121	141	20
ERZU12JP541B					70	70			171	191	
ERZU13JP541B					95	95			221	241	
ERZU14JP541B					125	125			270	290	

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Ratings and characteristics (J type)

● Operating temperature range : -40 to 70 ℃ ● Storage temperature range : -40 to 110 ℃

Part No.	Connection	Maximum allowable voltage		Maximum clamping voltage		Impulse life (2 ms, 10^4 times)	Commutation surge ratio	Dimensions in mm			
		ACrms (V)	DC (V)	V_{Ip} (V)	Ip (A)	(A)		Style	A	B	C
ERZU21JP102	Single	484	684	1520	40	40	1.45	(1)	102	122	20
ERZU22JP102					70	70			135	155	
ERZU23JP102					95	95			168	188	
ERZU24JP102					125	125			199	219	
ERZU25JP102					150	150			230	250	
ERZU26JP102					180	180			261	281	
ERZU21JP102B	Delta	484	—	1520	40	40	1.45	(2)	166	186	20
ERZU22JP102B					70	70			261	281	
ERZU21JP112	Single	528	746	1570	40	40	1.40	(1)	103	123	20
ERZU22JP112					70	70			136	156	
ERZU23JP112					95	95			169	189	
ERZU24JP112					125	125			200	220	
ERZU25JP112					150	150			232	252	
ERZU26JP112					180	180			264	284	
ERZU21JP112B	Delta	528	—	1570	40	40	1.40	(2)	168	188	20
ERZU22JP112B					70	70			264	284	
ERZU21JP132F	Single	660	933	1900	40	40	1.35	(1)	149	169	40
ERZU22JP132F					70	70			182	202	
ERZU23JP132F					95	95			214	234	
ERZU24JP132F					125	125			246	266	
ERZU25JP132F					150	150			278	298	
ERZU26JP132F					180	180			310	330	
ERZU21JP132H	Delta	660	—	1900	40	40	1.35	(2)	213	233	40
ERZU22JP132H					70	70			309	329	
ERZU21JP162F	Single	825	1167	2375	40	40	1.35	(1)	150	170	40
ERZU22JP162F					70	70			184	204	
ERZU23JP162F					95	95			218	238	
ERZU24JP162F					125	125			252	272	
ERZU25JP162F					150	150			286	306	
ERZU26JP162F					180	180			320	340	
ERZU21JP162H	Delta	825	—	2375	40	40	1.35	(2)	217	237	40
ERZU22JP162H					70	70			317	337	
ERZU21JP192F	Single	990	1400	2850	40	40	1.35	(1)	152	172	40
ERZU22JP192F					70	70			187	207	
ERZU23JP192F					95	95			222	242	
ERZU24JP192F					125	125			257	277	
ERZU25JP192F					150	150			292	312	
ERZU26JP192F					180	180			327	347	
ERZU21JP192H	Delta	990	—	2850	40	40	1.35	(2)	222	242	40
ERZU22JP192H					70	70			327	347	
ERZU21JP222F	Single	1100	1550	3325	40	40	1.35	(1)	154	174	40
ERZU22JP222F					70	70			190	210	
ERZU23JP222F					95	95			227	247	
ERZU24JP222F					125	125			264	284	
ERZU21JP222H	Delta	1100	—	3325	40	40	1.35	(2)	227	247	40
ERZU31JP252F	Single	1320	1867	3800	40	40	1.35	(1)	167	187	40
ERZU32JP252F					70	70			218	238	
ERZU33JP252F					95	95			269	289	
ERZU34JP252F					125	125			320	340	
ERZU31JP252H	Delta	1320	—	3800	40	40	1.35	(2)	266	288	40

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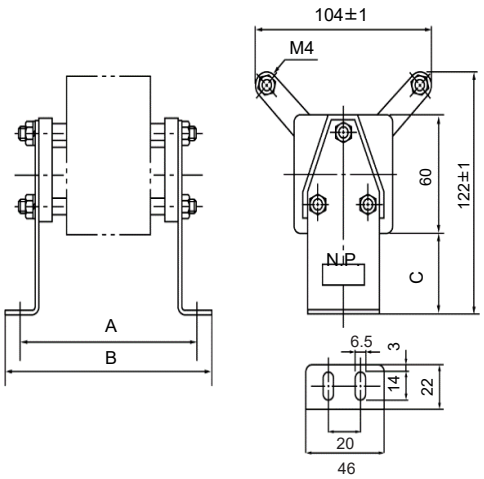
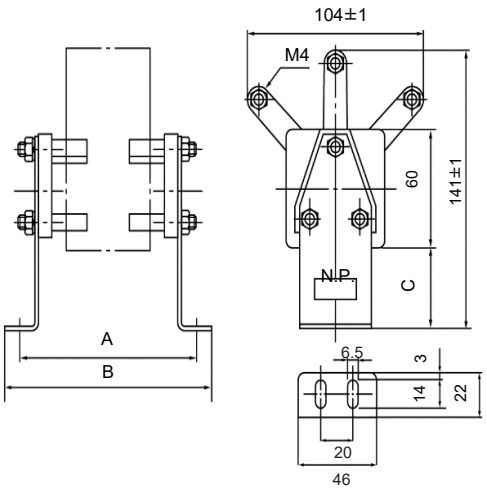
Dimensions in mm (not to scale) (J type)

Style (1)



Style (2)



Unit : mm

Minimum quantity / Packing unit

Product	Series / Type		Part number	Minimum quantity / Packing unit	Packing quantity in carton	Carton (about) L×W×H (mm)
"ZNR" Transient/surge absorbers	For tyristor protection	E type	ERZC□□EK□□□P	5	100	300×355×65
		J type	ERZU□□JP□□□	1	—	160×420×185

Part No., quantity and country of origin are designated on outer packages in English.
※ Please contact local sales office about packing specifications.

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Should a safety concern arise regarding this product, please be sure to contact us immediately.

Safety and Legal Matters to Be Observed

Product specifications and applications

■ Please be advised that this product and product specifications are subject to change without notice for improvement purposes. Therefore, please request and confirm the latest delivery specifications that explain the specifications in detail before the final design, or purchase or use of the product, regardless of the application. In addition, do not use this product in any way that deviates from the contents of the company's delivery specifications.

■ Unless otherwise specified in this catalog or the product specifications, this product is intended for use in general electronic equipment (AV products, home appliances, commercial equipment, office equipment, information and communication equipment, etc.).
When this product is used for the following special cases, the specification document suited to each application shall be signed/sealed (with Panasonic Industry and the user) in advance..These include applications requiring special quality and reliability, wherein their failures or malfunctions may directly threaten human life or cause harm to the human body (e.g.: space/aircraft equipment, transportation/traffic equipment, combustion equipment, medical equipment, disaster prevention/crime prevention equipment, safety equipment, etc.).

Safety design and product evaluation

■ Please ensure safety through protection circuits, redundant circuits, etc., in the customer's system design so that a defect in our company's product will not endanger human life or cause other serious damage.

■ This catalog shows the quality and performance of individual parts. The durability of parts varies depending on the usage environment and conditions. Therefore, please ensure to evaluate and confirm the state of each part after it has been mounted in your product in the actual operating environment before use.
If you have any doubts about the safety of this product, then please notify us immediately, and be sure to conduct a technical review including the above protection circuits and redundant circuits at your company.

Laws / Regulations / Intellectual property

■ The transportation of dangerous goods as designated by UN numbers, UN classifications, etc., does not apply to this product. In addition, when exporting products, product specifications, and technical information described in this catalog, please comply with the laws and regulations of the countries to which the products are exported, especially those concerning security export control.

■ Each model of this product complies with the RoHS Directive (Restriction of the use of hazardous substances in electrical and electronic equipment) (2011/65/EU and (EU) 2015/863). The date of compliance with the RoHS Directive and REACH Regulation varies depending on the product model.
Further, if you are using product models in stock and are not sure whether or not they comply with the RoHS Directive or REACH Regulation, please contact us by selecting "Sales Inquiry" from the inquiry form.

■ During the manufacturing process of this product and any of its components and materials to be used, Panasonic Industry does not intentionally use ozone-depleting substances stipulated in the Montreal Protocol and specific bromine-based flame retardants such as PBBs (Poly-Brominated Biphenyls) / PBDEs (Poly-Brominated Diphenyl Ethers). In addition, the materials used in this product are all listed as existing chemical substances based on the Act on the Regulation of Manufacture and Evaluation of Chemical Substances.

■ With regard to the disposal of this product, please confirm the disposal method in each country and region where it is incorporated into your company's product and used.

■ The technical information contained in this catalog is intended to show only typical operation and application circuit examples of this product. This catalog does not guarantee that such information does not infringe upon the intellectual property rights of Panasonic Industry or any third party, nor imply that the license of such rights has been granted.

■ Design, materials, or process related to technical owned by Panasonic Industry are subject to change without notice.

Panasonic Industry will assume no liability whatsoever if the use of our company's products deviates from the contents of this catalog or does not comply with the precautions. Please be advised of these restrictions.

Matters to Be Observed When Using This Product

(P, J, G-type / Arrestor box / E, J-type for thyristor)

Safety measures

An abnormal state for varistors (ZNR surge absorbers) of P-type, J-type, G-type, an arrestor box, and varistors for thyristors (hereinafter "the product" or "the surge absorber") that results from a problem with service conditions (materials used, the surrounding environment, power conditions, circuit conditions, etc.) may cause a fire accident, electric shock accident, burn accident, or product failure. Matters to note when handling this product will hereinafter be described. What is described below should be checked sufficiently before the product is used.

■ Confirming rated capabilities

Use the surge absorber within the range of its rated capabilities. Each type of surge absorber has specified rated capabilities including a maximum allowable circuit voltage, a surge current tolerance, an energy tolerance, an impulse lifespan (surge lifespan), average pulse power, and a service temperature. Using the surge absorber under severe service conditions that are beyond the rated capabilities causes degraded performance of the surge absorber or destruction of a circuit element, which may lead to smoke generation, ignition, etc.

■ Take the following measures in order to avoid an accident caused by expected phenomenon.

(1) Destruction of the surge absorber may scatter its fractured pieces around. To protect other elements from these pieces, set product in a case or shield it with a cover.
(2) Do not place the surge absorber near combustible materials (vinyl cable, resin mold, etc.). If avoiding the vicinity of combustible materials is difficult, protect the combustible material with an incombustible cover.
(3) Surge absorber placed between lines
① When the surge absorber is placed between lines, connect a normal type current fuse in series with the surge absorber.
② The P-type surge absorber has a built-in temperature fuse but its breaking capacity is low (0.3 A). For this reason, a current fuse needs to be connected in series with the surge absorber.
(4) Surge absorber placed between a line and the ground
① When the surge absorber is placed between a line and the ground, even if the surge absorber short-circuits, ground resistance will remain in the section between the line and the ground, leaving a possibility that the current fuse won't blow, in which case the outer sheath resin of the surge absorber may generate smoke or ignite due to current flow. To prevent such a case, place an earth leakage breaker in a location closer to the power supply than the surge absorber. When not using an earth leakage breaker, use a current fuse and temperature fuse in series with each other.
* See Table 1 in the "Circuit design and circuit board design" section.
② When the surge absorber is placed between a live part and a metal case, it may cause electric shock if the surge absorber short-circuits. To avoid this, ground the metal case or shield it to prevent direct contact with the metal case.

■ Do not touch a live part of the surge absorber. You may get an electric shock when touching it. In case the surge absorber should short-circuit and generate smoke or ignite, immediately cut off current flow to the surge absorber.

■ An unexpected sharp rise in the working voltage, an incoming excessive surge, etc., may cause the surge absorber to generate smoke or ignite.

In such a case, fire spreading through the device should be prevented to avoid expanded damage. To achieve this, take a multi-protection measure, such as adopting fire-resistant materials that make up the outer shell components and structural materials.

Use environments and cleaning conditions

■ Do not use the surge absorber in an outdoor environment where the surge absorber is exposed to sunlight.

■ Do not use the surge absorber in which direct sunlight hits the surge absorber or near a heating element where the temperature of the surge absorber would rise above its working temperature.

■ Do not use the surge absorber in a place where the surge absorber is exposed to wind or rain or a highly humid place where steam is emitted or dew concentrates.

■ Do not use the surge absorber in a place filled with dust or salt, in an atmosphere contaminated with a corrosive gas, etc., or in liquids such as water, oil, chemical, or organic solvents.

■ Do not wash the surge absorber with a solvent (thinner, acetone, etc.) that damages the outer sheath resin.

Response to anomalies and handling conditions

Be careful not to drop the surge absorber on the floor, etc. The product is likely to suffer mechanical or electrical damage when dropped on the floor. Avoid using such a product.

Reliability and product life

■ To know the detailed specifications of individual products or specific evaluation test scores, please contact us.

■ We recommend you to carry out a maintenance check of the varistor to measure its varistor voltage once every two years. The varistor should be replaced when a difference between the current varistor voltage (1 mA V) and the initial varistor voltage exceeds ±10%.

Circuit design and circuit board design

Meet the following requirements. Not following the requirements can result in a shorter lifespan of the surge absorber or its failure.

■ Choose a surge absorber whose maximum allowable circuit voltage has a margin relative to the maximum voltage range including source voltage fluctuations.

■ When surges are applied intermittently to the surge absorber at short intervals (when pulses of voltages are applied in a noise simulator test, etc.), make sure that the surge power does not exceed the maximum average pulse power of the surge absorber.

■ Use an arrestor box with the specified power distribution layout.

Processing conditions

■ Do not apply vibration, impact (drop impact, etc.), or pressure strong enough to crack the outer sheath resin or absorber body of the surge absorber.

■ When coating the surge absorber with a resin or embedding it in a resin mold, avoid using a resin that degrades the surge absorber.

■ Do not bend the surge absorber or apply force thereto close to the insulation cover of the lead terminal.

■ Make the wire as short and straight as possible.

Mounting and storage conditions

■ Do not melt solder or the insulation material making up the surge absorber when soldering the lead terminal.

■ Do not keep the product in a high-temperature or high-humidity condition. Keep the surge absorber in a room with a temperature of 40 °C or lower and a relative humidity of 75% or lower and use the surge absorber within two years of storage.

■ Keep the surge absorber in a place where no corrosive gas atmosphere (hydrogen sulfide, sulfurous acid, chlorine, ammonia, etc.) is present.

■ Keep the surge absorber in a place where the surge absorber is protected from direct sunlight, dew concentration, etc.