BZ952 24 VDC

Monitor for Primary Voltages in Accordance with EN 50163

* Device may look differently

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Application / Function

The device is connected directly to a DC high-voltage source of up to 3 kV nominal voltage and outputs a potential-free analog signal between 0 and 10.0 V proportional to the measured primary voltage. In addition two forcefully guided relay contacts indicate if the primary voltage is below or above the allowed continuous voltage level defined in EN 50163 for the given nominal voltage. The device is powered by 24 VDC in accordance with EN 50155.

Device Variants

In accordance with the nominal DC voltage levels defined in EN 50163:2004 the BZ952 is available in four standard variants. We also offer device variants for non-standard nominal voltages (*). Table 1 lists the currently existing variants with their respective properties and article numbers. Please contact us in case you require a device for a different nominal DC voltage, or you need a device built for AC.

Nominal voltage / VDC	Device designation	Art. no.	U_1 / VDC	U_2 / VDC	U_R / VDC	U_{max} / VDC	U_{min} / VDC	R_{in} / MΩ
600	BZ952-600	939	400	720	900	1350	200	0.5
750	BZ952-750	940	500	900	1100	1350	250	0.5
1350*	BZ952-1350	936	900	1650	2000	2700	450	1.0
1500	BZ952-1500	937	1000	1800	2300	2700	500	1.0
3000	BZ952-3000	938	2000	3600	4500	5400	1000	2.0

Table 1: Existing variants for BZ952 with their respective relay turn-on voltages (U_1, U_2), reference voltage for analog output (U_R), peak primary voltage for $t < 5$ s (U_{max}) and the minimal primary voltage (U_{min}).

Technical Data

Supply Voltage

Nominal voltage:	24 VDC
Nominal current:	~75 mA
Protective measures:	Reverse power and transient protection

Environment

Operational temperature:	-25 to +70 °C (OT3 with ST1)
Condensation and humidity:	Device: Potted Connector: 320 V nominal voltage at pollution level 2
Vibration and shock:	EN 61373, category 1, class B

High-voltage input

The high-voltage input is realized using two permanently attached cables of type 9 GKW-AX plus with a cross section of 1.5 mm^2 (test voltage 11 kV). Each cable is two meters long (other lengths available upon request). The input resistance (R_{in}) and maximum peak voltage (U_{max}) are shown in Table 1. U_{max} may be present for not more than 5 seconds once per minute. Exceeding this limitation could potentially damage the high-voltage components. Short-term overvoltage as described by EN 50163:2004 Appendix A according to the device's nominal voltage is always tolerated.

Signal Output

The device outputs a continuous voltage between 0 and 10.0 V which changes proportionally to the primary voltage. A low-pass filter with a cut-off frequency of 0.5 Hz prevents transient disturbances to influence the output significantly. U_R in Table 1 shows at which primary voltage the output signal reaches 10.0 V. The output is potential-free, permanently resistant to shorting, and can be loaded with up to 20 mA. The attached wires may not exceed 5 m in length and shall be shielded.

In case the primary voltage permanently exceeds U_R, the output signal will rise above 10.0 V. This may lead to errors in connected AD-converter equipment. Selecting the correct device variant for your operating conditions is thus crucial.

EN 50163:2004 defines the level for the highest non-permanent voltage U_{max2} to be at 133% of the nominal voltage. U_R is therefore set at 150%. Together with the aforementioned low-pass filtering this ensures that short-term overvoltage U_{max3} according to EN 50163 Appendix A will not cause the output signal to exceed 10.0 V.

For primary voltages $U_{min} \leq U \leq U_R$ the measurement inaccuracy is bounded by ±5 % over the entire operational temperature and voltage range.

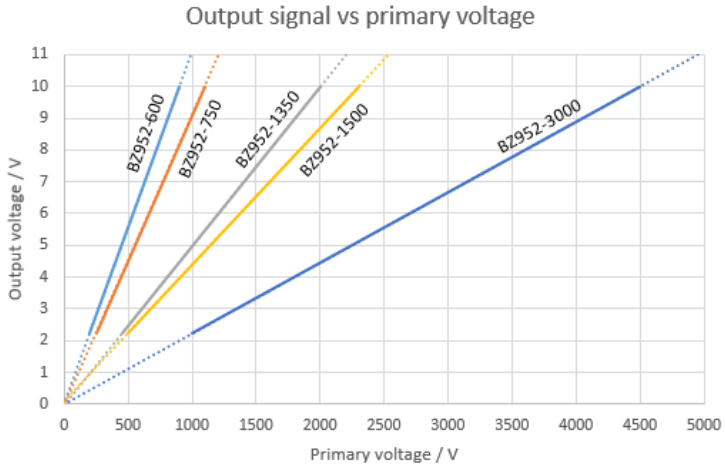


Figure 1: Relationship between primary- and output voltage for different device variants of the BZ952

Relay Contacts

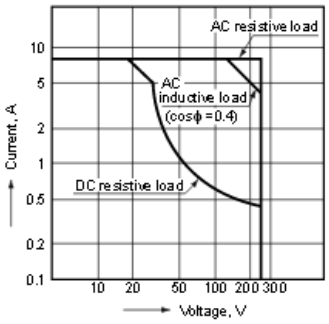
Two switching relay connectors (K1 and K2) indicate, whether the primary voltage currently is within the continuous voltage limits as defined by EN 50163:2004. The switching values U_1 and U_2 are shown in Table 1. Below U_1 both relays are turned off. Above U_1 relay K1 turns on. K2 remains turned off, until U_2 is exceeded. At U_2 relay K1 turns off, and K2 turns on. The switching contacts are forcefully guided.

Number of contacts:	2 switching contacts
Relay type:	A, after EN 50205
Contact load:	resistive = 50 V / 1 A, inductive = 50 V / 0.8 A
Minimal current through contact:	10 mA

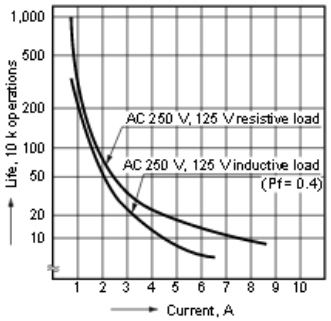
Initial contact resistance, max.			30 mΩ	
Rating (resistive)	Max. switching power		2,000 VA, 150 W	
	Max. switching voltage		380 V AC, 30 V DC	
	Max. switching current		8 A	
HP rating			1/4 HP 125, 250 V AC	
Inrush current capability			51 A (TV-3 equivalence) for 1a1b 35 A (TV-1 equivalence) for 2a	
Expected life (min. operations)	Mechanical (at 180 cpm)		10^7	
	Electrical	8 A 250 V AC (resistive)	10^5	
		5 A 30 V DC (resistive)	2×10^5	
		3 A 100 V AC (lamp)	3×10^4	—
		1 A 100 V AC (lamp)	—	3×10^4

REFERENCE DATA

1. Max. switching power

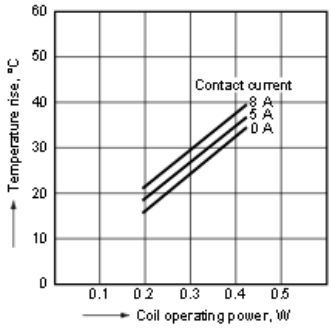


2. Life curve



3. Coil temperature rise

Sample: ST1-DC24V



Standards and Norms

The device is manufactured according to the following standards:

ISO 9001:2015
Electronic equipment used on rolling stock: EN 50155
EMC: EN 50121-3-2
Isolation: EN 50124-1
Fire protection: EN 45545

The standards applicable to this product are dependent on the version available at the time of development.

Mechanical Data

Dimensions

Size over all:	120x120x110 mm (L x W x H)
Weight :	about 1950g

Enclosure

Form :	completely enclosed, standing plastic enclosure for screw-on mounting

Materials

Enclosure:	Plastic, black, glass-fibre reinforced
Potting compound:	Plastic
PCB:	FR-4

Mounting

Upright
Mount points: two screws of type M6

Front edge connector

14-pin edge connector:	WAGO (codeable)

Counter connector (optional)

14-pin female connector:	WAGO 721-114/037-047/035-000

Other

Test of Isolation / Hi-Pot

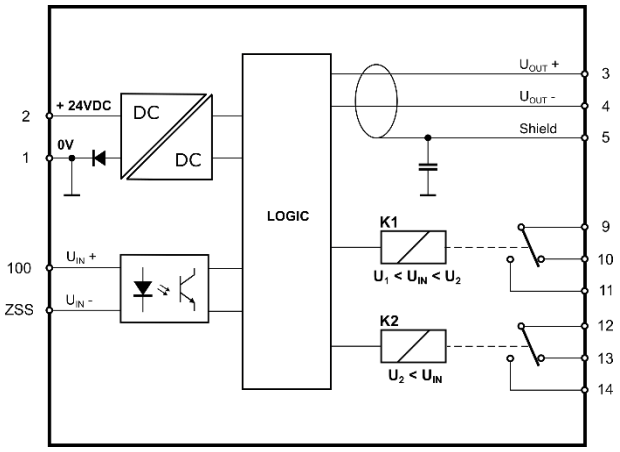
10 kV DC over a period of 10 seconds

1. Measurement: From High-voltage input to signal out, relay contacts and supply
2. Measurement: All connections to mounting plate

Disposal

According to local regulations

Block Schematic



Measures / Mounting Diagram