KORALEWSKI
INDUSTRIE - ELEKTRONIK

Short Circuit Relay KZR-8Sxx
for 5A – Transformer / 1A – Transformer

CE

TÜV CERT

DIN EN ISO 9001:2000
Zertifikat: 01 100 000628

1   General Remarks

The KZR-8Sxx* Short Circuit Relay is available in the variants KZR-8S and KZR-8SA. The KZR-8Sxx Short Circuit Relays monitor the current in three-phase networks. They are equipped with 2 limit value relays, whose response values can be set independently of each other, ranging from 0.2 A to 20 A for the 5 A variant and from 0.04 A to 4 A for the 1 A variant. Each limit value has its own adjustable time delay. The switching behaviour of the limit value relays can be selected as closed or open circuit (normally energised or normally de-energised), and set for over- or undercurrent detection.

* *The designation KZR-8Sxx in this document is substitutionally used for all available variants of the short circuit relay KZR-8S.*

For the current measurement, which is done via transformers, current transformers, suitable for the adapting to the measurement circuits, are to be provided. The auxiliary voltage and release input (terminals 1 - 3) are galvanically separated from the measurement circuits. The current measurement circuits (terminals 10 - 15) are galvanically separated from each other and from the other electronics.

Special feature: The limit value relay 1 can operate as a current-depended delayed over-load relay. This behaviour is modelled on the thermal - temporal overload triggering of motor circuit breakers. The KZR-8Sxx meets the VDE 0108 requirement with 110 % nominal current within a 12-hour interval. This current-dependent overload trigger can be switched off, resp. combined. Note the connecting instructions in *chap. 5* !

The variant KZR-8SA of the short cicuit relay is equipped with an analogues output.

Use the parameterisation-software, which is included in delivery, respectively available as download in its latest version on our homepage www.koralewski.de, to adjust the settings of the device.

2   Operating Principle

The KZR-8Sxx is a microcontroller - controlled protective device. The current measuring takes place as a simultaneous 3-phase sampling and is a true RMS value measurement. The KZR-8Sxx can be used in 50 Hz and 60 Hz systems. The respective frequency must be selected by means of parameterisation software.

As soon as the current in one of the three phases exceeds the pre-selected limit value, the response delay time begins to count down. This is evident from the fact that the assigned LED flashes every second. After expiry of the delay time a relay will switch and the LED is permanently on.

If the limit is no longer exceeded, the switching contact tilts without hysteresis after 2 seconds back to the idle position.

2.1   Switching Behaviour

Each of the two available switching contacts Limit 1 and Limit 2 is equipped with a relay with normally open contact.

In addition, the switching contact 1 provides a connector for external releases.

The relay function (normally energised or normally de-energised) can be set separately for each of the switching contacts by use of the parameterisation software. Even the switching behaviour 'over-current detection' or 'under-current detection' is adjustable using the para-meterisation software.

Note: Relay 2 can always operate as over- or under-current relay. If current-dependent overload release or combination is chosen for relay 1, it operates always with the function over-current detection.

2.2 Triggering Delay

The triggering delay can be pre-adjusted between 0,1 s and 100 s for each switching contact. The setting is done by use of parameterisation software in 1/10 s - steps.

2.3 Release of Limit Value 1

The function of limit value relay 1 is activated by the release-input (terminal 3). As long as no release is granted, the relay 1 remains in its pre-specified rest position.

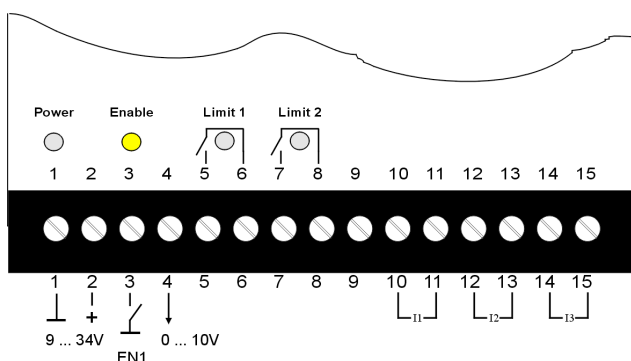The (to ground) closed release-input is indicated by the yellow LED (Enable).

Figure 1:   release-input   terminal 3 (for limit value relay 1)

2.4 Analogue Output

The short circuit relay KZR-8S is available as variant with analogues output. The analogue output (terminal 4) operates as 0(2) … 10 V - output against minus input of the supply voltage (terminal 1). The following output functions are available:

- current L1 in % of the nominal current (ex-works setting);
- current L2 in % of the nominal current;
- current L3 in % of the nominal current;
- average L1 / L2 / L3 in % of the nominal current;

The output can optionally be configured as a 0 ... 10 V or 2 ... 10 V output. At the 2 … 10 V configuration, the minimum of output voltage amounts 2 volt. This value will not be undershot. Start value as well as final value can be adjusted in the range of 0 … 250 % of the nominal current.
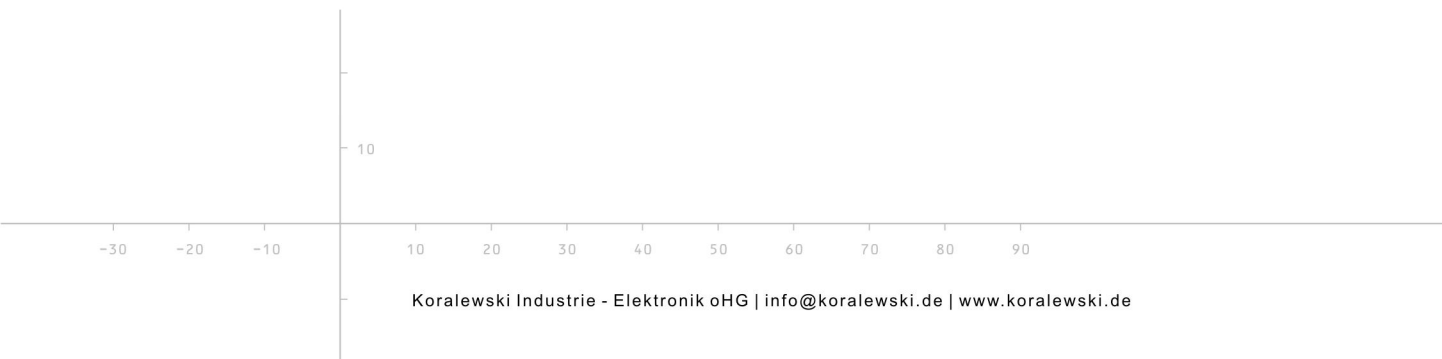
3   Current-dependent Overload Release

The limit relay 1 can operate as a current-dependent overload trigger with the characteristic of a thermal motor protection circuit-breaker.

If the current-dependent overload release is activated, the limit relay 1 operates as over-current relay according to a $I_* t$ characteristic. Thereby, the measured current value is on-integrated over the time, and upon reaching the overload range, the relay is triggered instantaneously.
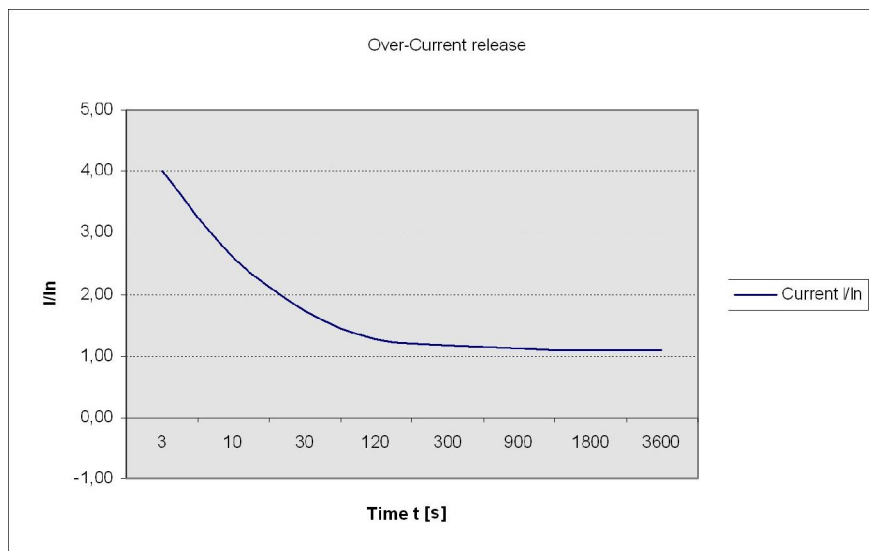

Figure 2: current-dependent overload release

The triggering characteristic is modelled on a motor protection switch. As the basis for the limit value, the adjusted nominal current is used.

According to the curve shown above, the triggering takes place at 110 % I_{Nom} after 3600 s (1 hour) or 400 % I_{Nom} after 3 s. The intermediate values are calculated with a value table.

It is possible to combine the thermal and magnetic trip-characteristic.

3.1   110 % Overload Triggering

The KZR-8Sxx meets the requirement of VDE 0108, after which the current output over a 12 - hour interval shall not exceed 60 minutes at 110% of nominal current. For the respectively last 12 hours, the KZR-8Sxx integrates the current values and triggers the limit value relay 1, when 60 minutes at 110% nominal current are reached. Precondition is the selection of the thermal temporal tripping behaviour and a granted release at the enable input.

Note: **This values are deleted on switching off the auxiliary voltage!**

4   Configuration of Device

The setting of the device's parameters is done by data transfer from a PC, using the parameterisation-software GV_2 (Devicemanagement 2). The software is available in its latest version for downloading on our homepage www.koralewski.de . For details on installation and usage of GV_2, please refer to the related manual, which is as well available for downloading.

Hardware preparation:

Connect the KZR-8Sxx to the USB interface of the PC, using a standard USB cable (USB-A to USB-B Miniature - can also be ordered under order number KC0215).

Note: For configuration of the KZR-8Sxx by means of the parameterisation-software device-management, the installation of an USB driver is required. This driver can separately be downloaded from:

http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx

(*direct download link*: http://www.silabs.com/Support%20Documents/Software/CP210x_VCP_Windows.zip)

Attention: To plug the USB cable on to the USB interface of the KZR-8Sxx, the front cover of the device has to be removed. Touches of the circuit board, which is located behind the cover, are to be prevented!
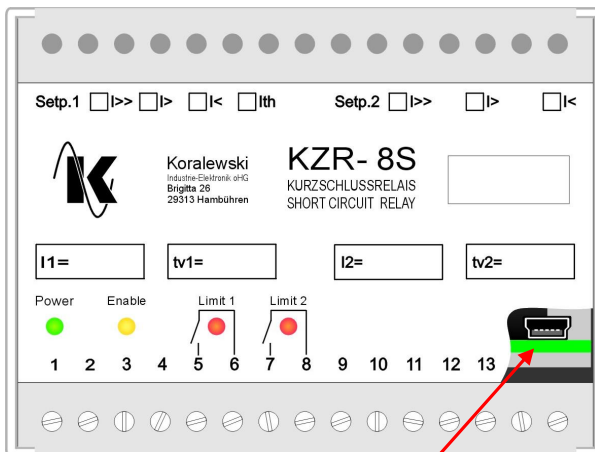

Figure 3: position of the USB interface at the device

Start of the program:

Once the connection between the PC and the KZR-8S is made, the parameterisation can be started.
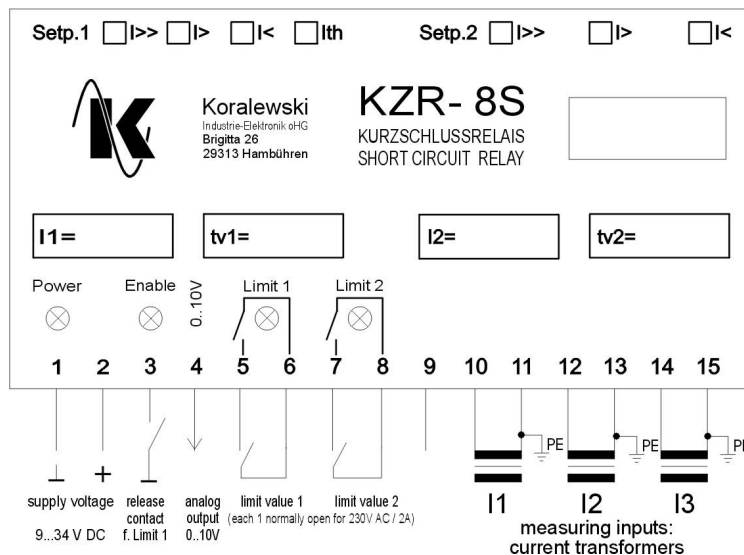
5 Connection Diagram

Figure 5: Terminal assignment of the short circuit relay, exemplary shown for KZR-8SFA

To maintain the accuracy of measurement:

- It is recommend to connect the k-terminal to the PE.
- If a false triggering as result of a measuring error occurs, it is imperative to connect the k-terminal to the PE.

6   Technical Data

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**Only properly trained personnel may be deployed for assembly and starting up.
Connection in compliance with VDE 0160.**

6.1   KZR-8S

Auxiliary voltage	9 ... 34 V DC	
Power consumption	approx. 3 VA (auxiliary voltage)	
Delay time $_v$	adjustable:	0,1 ... 100 s
	systemic:	50 ms + t_x ± 50 ms for t > 0
Burden	< 0,01 Ohm	
Relay outputs	230 V / 50 Hz / 2 A	
Measuring error	nominal frequency:	< 1 %
	nominal freq. +/- 10 %:	< 2 %
Overload resistance	4 * I_{Nom} constantly	
Measuring inputs	10 * I_{Nom} 1 ms	
Type of protection	IP20	
Ambient temperature	-20 ... 55 ºC	
Housing dimensions	W / H / D : 100 x 75 x 110 mm	
	(DIN top-hat rail mounting 35 mm)	

In addition to the above data, the following technical data applies for the versions KZR-8SA of the short circuit relay:
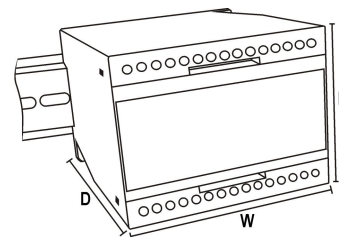
6.2   KZR-8SA (*additionally*)

Analogue Output: 12 Bit digital to analogue converter (*no galvanic isolation*)

Burden	≥ 1 kOhm
Internal resolution	better than 0,5 %
Refresh rate	approx. 200 per second (0,05 s)
Output voltage	maximum of 10,7 V

Limit values

	5A-version	1A-version
Limit value 1 + 2	0 ... 400 % of I_{Nom} (0.....20A)	0 ... 400 % of I_{Nom} (0 ..... 4 A)
Range of nominal current	I_{Nom} = 5A	I_{Nom} = 1A

Error curve thermal-temporal overload release
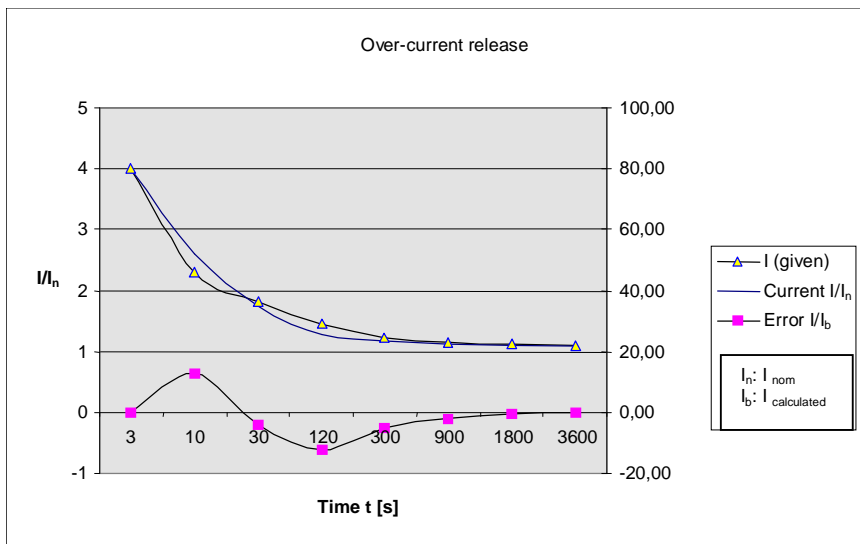
6.3 Ordering Information

Short Circuit Relay KZR-8Sxx	Part number
KZR-8S / 5A / 12 V – 24 V	**E1463**
KZR-8S / 1A / 12 V – 24 V	**E1464**
KZR-8SA / 5A / 12 V – 24 V	**E1465**
KZR-8SA / 1A / 12 V – 24 V	**E1466**
Accessory	
USB cable (USB-A to USB-B miniature)	**KC0215**

7 Connection Example KZR-8S / 5A