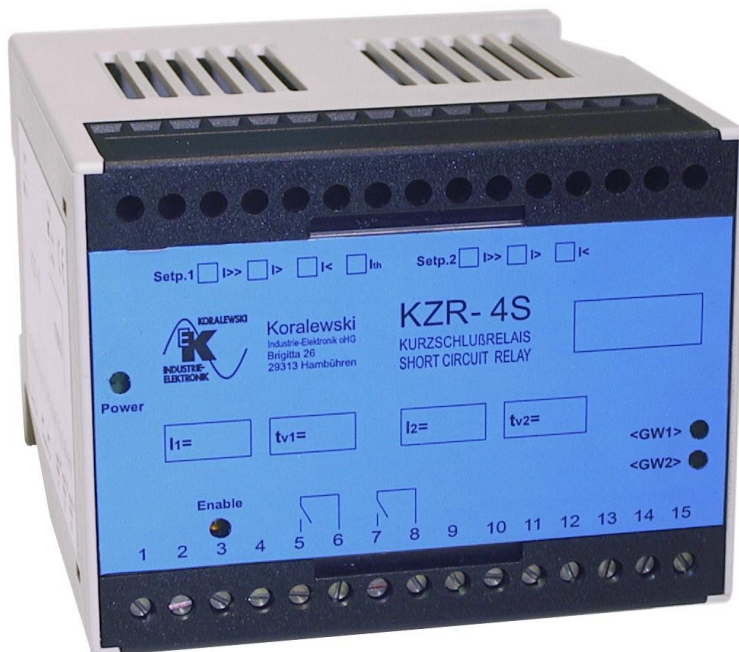


Short Circuit Relay KZR-4S for 5A – Transformer / 1A – Transformer



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1 General Remarks

The KZR-4S Short Circuit Relay monitors the current in three-phase networks. It is 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 (normally energised or normally de-energised), and set for over- or undercurrent detection.

Current is measured via current transformers. The current measurement circuits are galvanically separated from each other and from the measurement electronics.

Suitable current transformers are to be provided for adapting to the measurement circuits. The auxiliary voltage and release input are galvanically separated from the measurement circuits.



Special feature: The threshold relay 1 can operate as a current-dependent delayed overload relay. This behaviour is modelled on the thermal - temporal overload triggering of motor circuit breakers. The KZR-4S 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!*

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-4S is a microcontroller - controlled measuring device. The current measuring takes place as a simultaneous 3-phase sampling and is a true RMS value measurement. The KZR-4S 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 is greater than 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.

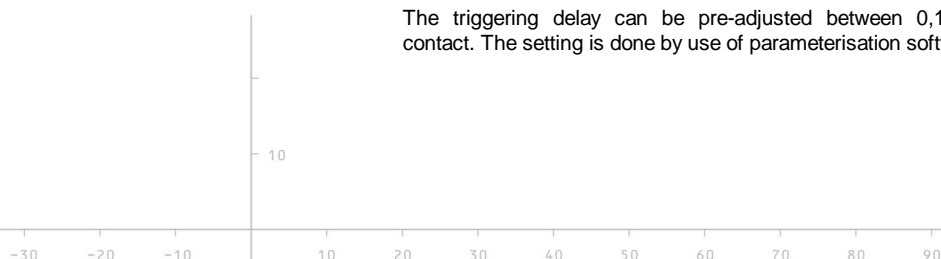
The relay function (normally energised or normally de-energised) can be set separately for each of the switching contacts by use of the parameterisation software. Even the switching behaviour 'over-current detection' or 'under-current detection' is adjustable using the parameterisation software.



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).

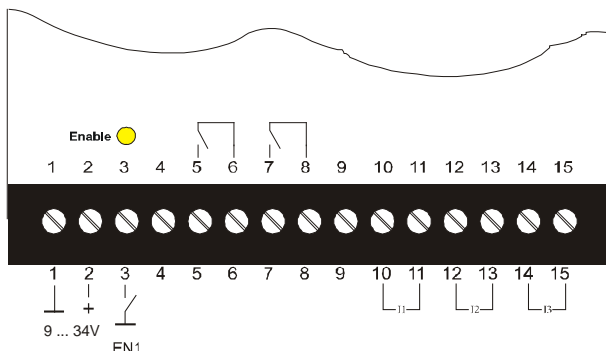


Figure 1: release-input terminal 3 (for limit value relay 1)

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 $I \cdot t$ characteristic. Thereby, the measured current value is on-integrated over the time, and upon reaching the overload range, the relay is triggered instantaneously.

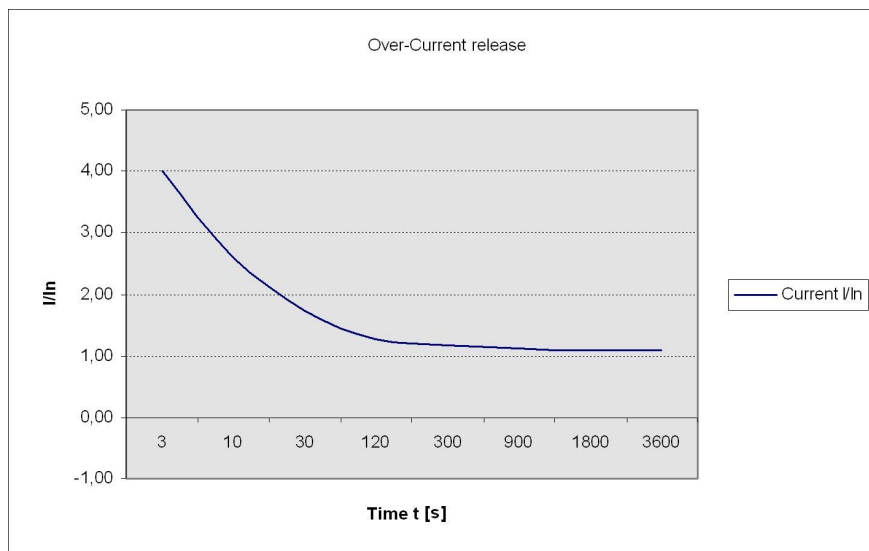


Figure 2: current-dependent overload release

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.

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3.1 110 % Overload Triggering

The KZR-4S 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-4S 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 (device manager). The software is available in its latest version for downloading on our homepage – www.koralewski.de –.

Minimum requirements:

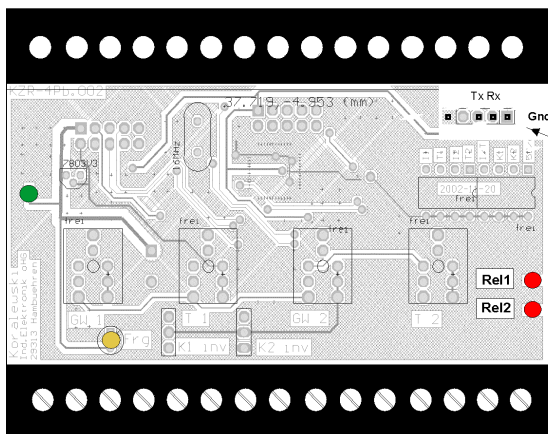
- processor: 486 / Pentium 75 MHz
- main memory: 8 MB
- CD-ROM drive: 4x
- hard disk: min 30 MB free memory
- graphics card / monitor: min. resolution 1280 x 1024
- operating system: Windows NT 4 or later
(tested with: Windows 2000, Windows XP, Windows 7)

Hardware preparation:

The KZR-4S is to connect to the COM-interface of the PC, using the special programming cable (Order No. KC0034).



Attention: To plug the cable on the programming-conector of the KZR-4S, the front cover of the device has to be removed. Touches of the circuit board, which is located beneath the cover, are to be prevented!



programming-conector

Position of the programming connector at the device (after front cover is removed)

Start of the program:

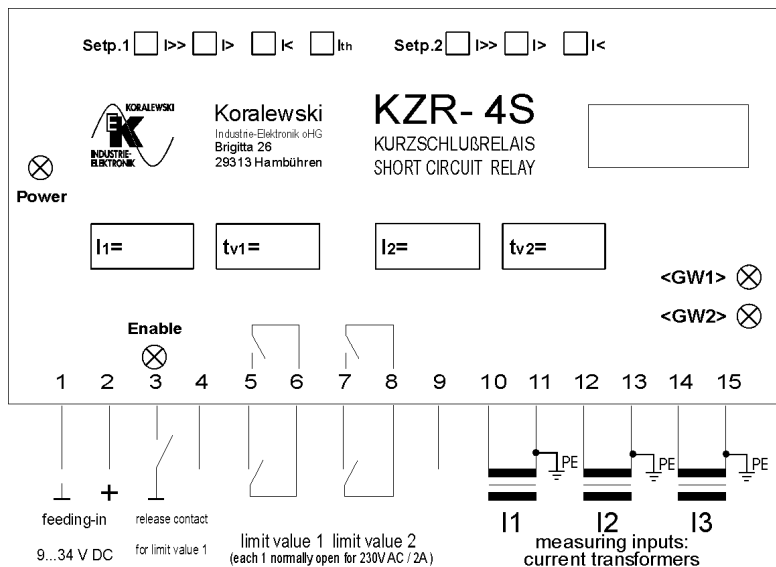
Once the connection between the PC and the KZR-4S is made, the parameterisation can be started.





5 Connection Diagram

Terminal assignment of KZR-4S:



To maintain the accuracy of measurement:

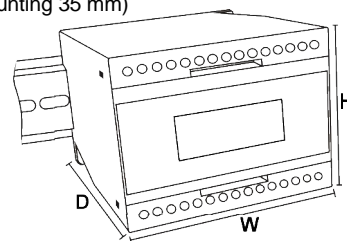
- It is recommend to connect the k-terminal to the PE.
- If a false triggering as result of a measuring error occurs, it is imperative to connect the k-terminal to the PE.

6 Technical Data



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

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



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-30 -20 -10

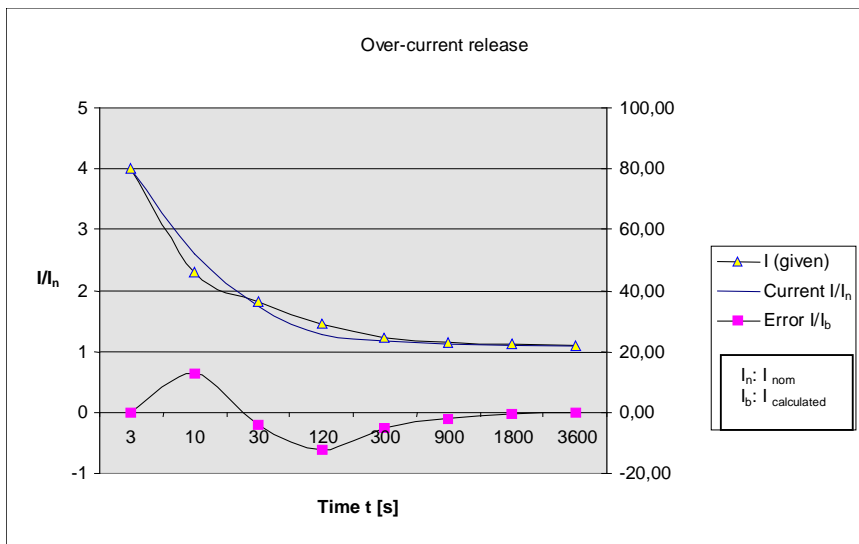
10 20 30 40 50 60 70 80 90



Limit values

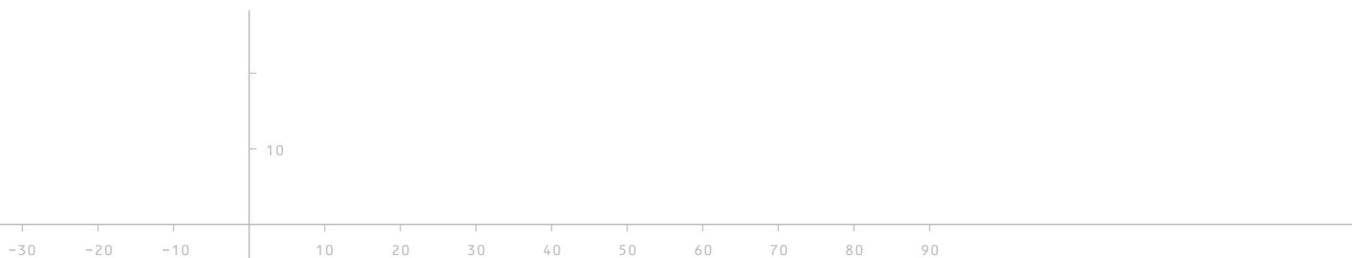
	5A-version	1A-version
Limit value 1 + 2	0 ... 400 % of I_{Nom} (0.....20A)	0 ... 400 % of I_{Nom} (0 4 A)
Range of nominal current	$I_{Nom} = 5A$	$I_{Nom} = 1A$

Error curve thermal-temporal overload release



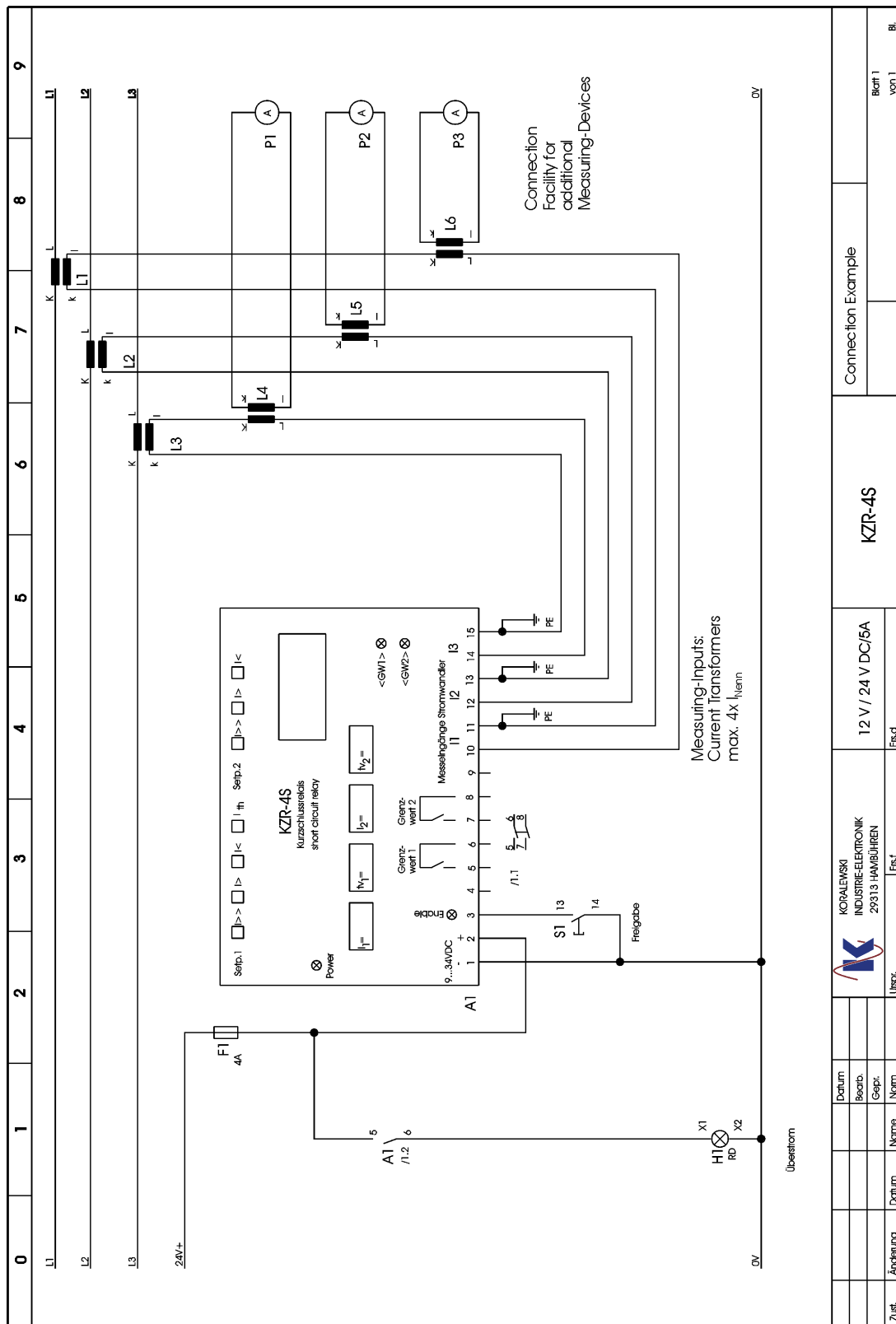
6.1 Ordering Information

Short Circuit Relay KZR-4S	Part number
1 A – version (12 V / 24 V):	E1279
5 A – version (12 V / 24 V):	E1272
<i>Note:</i> On demand the device is also available with automatic frequency-tracking in the range of 40 ... 400 Hz.	
Accessory	
Programming cable	KC0034





7 Connection Example KZR-4S / 5A



Zust.		Änderung		Datum		Name		Urspr.		KORALEWSKI INDUSTRIE-ELEKTRONIK 29313-HAMBÜHREN		12 V / 24 V DC/5A		KZR-4S		Connection Example		Blatt 1 von 1		Bl.	