MANUAL

Short Circuit Relay KIW 3xx

Inhaltsverzeichnis

1 Amendments

Date	Modification	Name
2017-11-20	Creation	Halbauer, Twesten

2   General Remarks

The KIW 3xx* Short Circuit Relay is available in the variants KIW 341 and KIW 345. The KIW 3xx 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 KIW 3xx in this document is substitutionally used for the KIW341 and KIW 345.

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 overload relay. This behaviour is modelled on the thermal - temporal overload triggering of motor circuit breakers. The KIW 3xx 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.kuhse.de, to adjust the settings of the device.

3   Operating Principle

The KIW 3xx 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 KIW 3xx 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.

3.1 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.

> **i** 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.

3.2 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.

3.3 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.

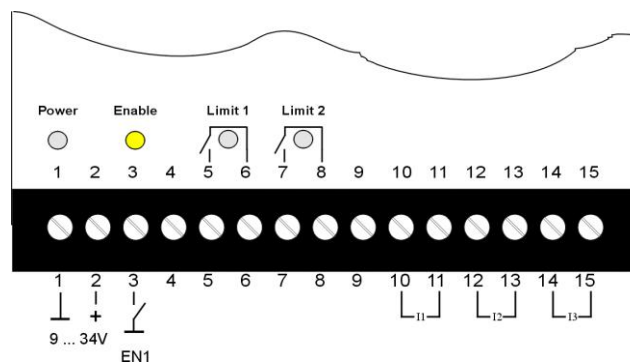The (to ground) closed release-input is indicated by the yellow LED (Enable).

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

4 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.
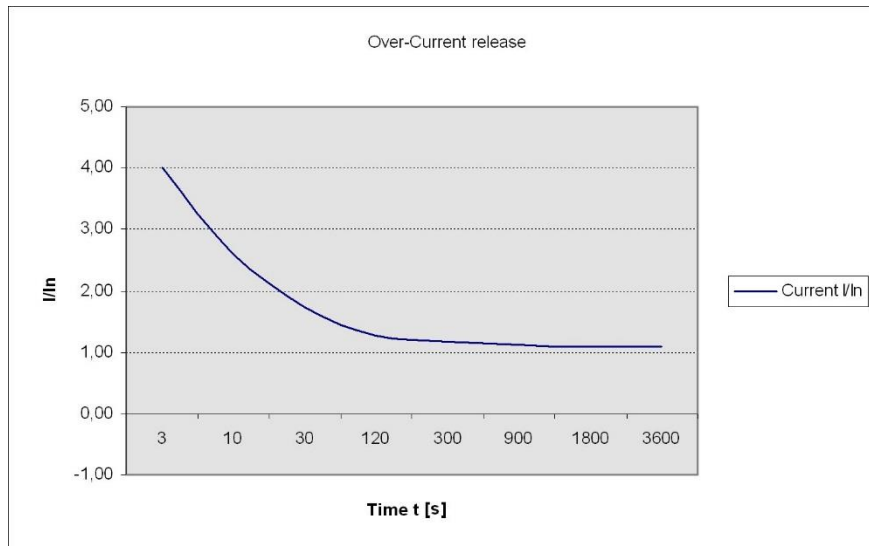

Figure 2: current-dependent overload release

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.

4.1 110 % Overload Triggering

The KIW 3xx 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 KIW 3xx 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.

This values are deleted on switching off the auxiliary voltage!

5   Configuration of Device

The setting of the device's parameters is done by data transfer from a PC, using the parameterisation-software KuPa010. The software is available in its latest version for downloading on our homepage www.kuhse.de . For details on installation and usage of KuPa010, please refer to the related manual, which is as well available for downloading.

Hardware preparation:

Connect the KIW 3xx to the USB interface of the PC, using a standard USB cable (USB-A to USB-B Miniature - can also be ordered on demand).

For configuration of the KIW 3xx 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 KIW 3xx, 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!
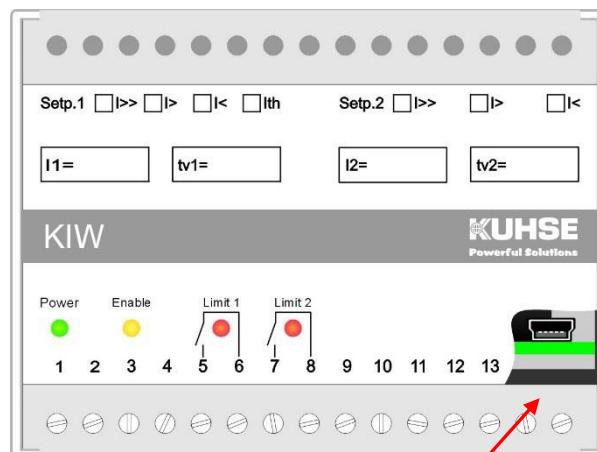

Figure 3: position of the USB interface at the device

Start of the program:

Once the connection between the PC and the KIW 3xx is made, the parameterisation can be started.
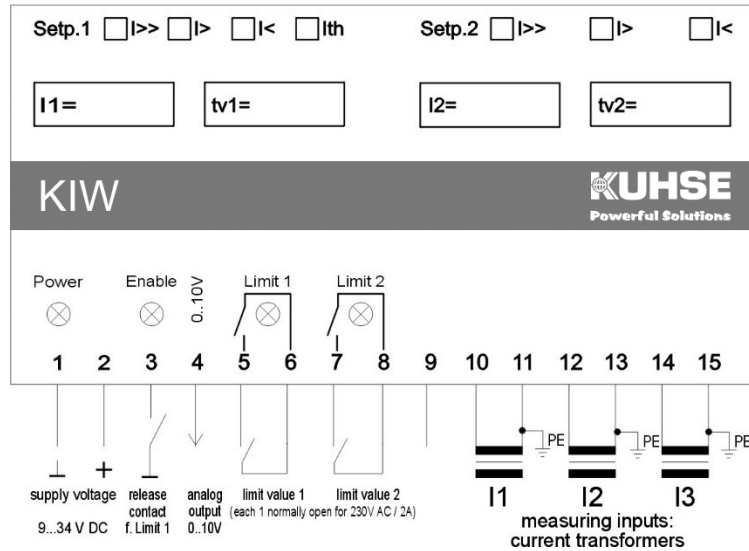
6   Connection Diagram

Figure 5: Terminal assignment of the short circuit relay, exemplary shown for KIW 3xx

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.

7 Technical Data

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

7.1 KIW 3xx

|	
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 KIW 3xx of the short circuit relay:
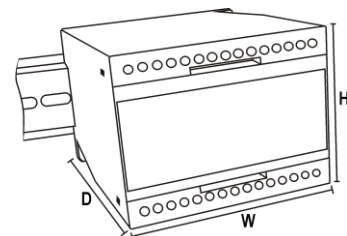
Limit values

	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
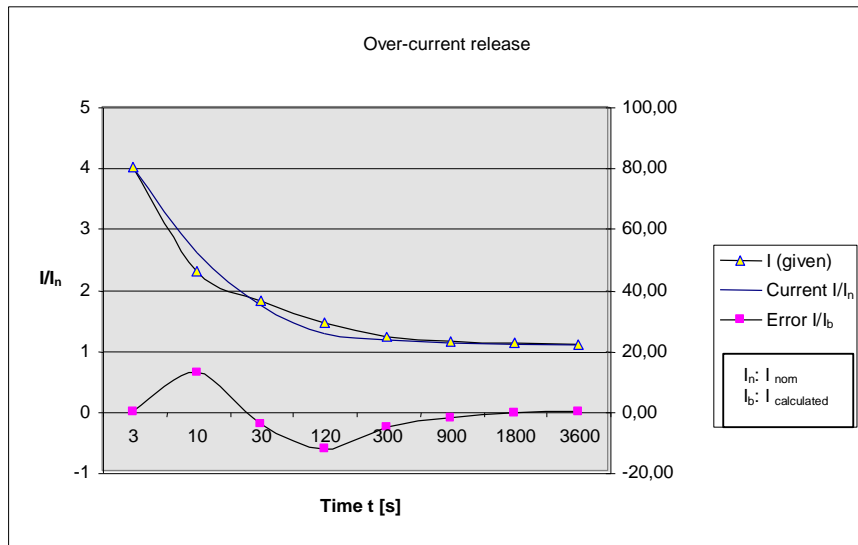
7.2   Ordering Information

Short Circuit Relay KIW 3xx	**Part number**
KIW 345 / 5A / 12 V – 24 V	2W345I0000
KIW 341 / 1A / 12 V – 24 V	2W341I0000

Accessory	
USB cable (USB-A to USB-B miniature)	on demand

8   Connection Example KIW 345 / 5A