CONNECTION AND SETTING GUIDE

Rated current of the relay, \( I_r \) (available variants: 1 A or 5 A)

LED indicators:
- In serv. (green): indicates relay in service.
- Z2 Start (yellow): indicates operation of Z2< Start or operation of Z2<α< Start (no time delay).
- Z1< Trip (red): indicates operation of Z1< (no time delay).
- Z2< Trip (red): indicates operation of Z2< after the set time delay \( t_{Z2<} \).

Potentiometer (P1) for setting of the reactive reach X1 for Zone 1.

Potentiometer (P2) for setting of the reactive reach X2 for Zone 2.

10-pole programming switch (S1) for setting of scale-constant and functions.
- S1:1-3 switches set the scale constant \( I_s \) for calculation of X. \( I_s \) affects reach of both zones.
- S1:4-6 switches set the scale constant \( k \), the multiplier for R1 and R2.
- S1: 7 switch determines the operation of the output relay 3. Z2< Start non-directional or Z2<α< Start directional.
- S1:8-9 switches set the \( \beta \) angle for load discrimination of Z2< operation.
- S1:10 switch determines the binary input Bin 1 function. Blocking of all functions except Z2<α< or acceleration of Z2<.

Potentiometer (P3) determines the setting of the characteristic angle \( \alpha^\circ \).

Potentiometer (P4) for setting of the time delay \( t_{Z2<} \) for the function Z2<.

Reset push-button for LED. Also used to check the LED operation.

CONNECTION:
The RXZK 22H relay requires a dc-dc converter type RXTUG for auxiliary voltage supply ±24 V. Connection of the voltage RL shall be made only when the binary input is used.

The relay is delivered with a short-circuiting connector RTXK for mounting on the rear of the terminal base. This connector will automatically short-circuit the current input when the relay is removed from its terminal base.

NOTE! The auxiliary voltage supply should be interrupted or the output circuits should be blocked to avoid the risk of unwanted alarm or tripping, before the relay is plugged into or withdrawn from its terminal base.
SETTINGS:
All settings can be changed while the relay is in normal service. The relay needs a voltage above 10V for proper polarization of the directional function, maximum 250V. Rated voltage is 100V. The relay uses memory voltage in case the input voltage is below 10V during faults (short-circuits). Upon closing into a fault without prior voltage, the relay uses a non-directional circular characteristic. See type test documents 1MRK 509 006-TEN or User’s Guide 1MRK509 006-UEH for further information. The characteristic of the relay is shown in fig. 3.

1. Setting of the scale-constant \( I_s \).
The scale constant \( I_s \) is equal to the rated current \( I_r \) times the sum of the set value of the switches S1:1, S1:2 and S1:3 plus 0.1. The setting range is from 0.1 to 1.0 \( \times \) the rated current \( I_r \).

2. Setting of the zone 1 under-impedance function (Z1<)
The setting range of the under-impedance function is expressed as \( Z1 = jX1 + R1 \) where X1 and R1 are set as follows:

2.1 Setting of the reactive reach (X1).
The operate value is set with potentiometer P1 according to the formula \( X1 = P1 \times 1/I_s \ (\Omega) \).
The setting range of P1 is 2-10, corresponding to 2-100 \( \Omega \), for \( I_r = 1 \, A \) and 0.4 - 20 \( \Omega \) for \( I_r = 5 \, A \).

2.2 Setting of the resistive reach (R1).
The operate value is set with the switches S1:4-6 according to the formula \( R1 = k \times X1 \ (\Omega) \), where \( k \) is the sum of the switches S1:4, S1:5 and S1:6 plus 0.6 (range 0.6 to 2.0), corresponding to 1.2-200 \( \Omega \) for \( I_r = 1 \, A \) and 0.24 - 40 \( \Omega \) for \( I_r = 5 \, A \).

3. Setting of the zone 2 under-impedance function (Z2<).
The setting range of the under-impedance function is expressed as \( Z2 = jX2 + R2 \). Both X2 and R2 must be larger than X1 and R1.

3.1 Setting of the reactive reach (X2).
The operate value is set with potentiometer P2 according to the formula \( X2 = P2 \times 1/I_s \ (\Omega) \).
The setting range of P1 is 2-10, corresponding to 2-100 \( \Omega \), for \( I_r = 1 \, A \) and 0.4 - 20 \( \Omega \) for \( I_r = 5 \, A \).

3.2 Setting of the resistive reach (R2).
The operate value is set according to the formula \( R2 = k \times X2 \ (\Omega) \), where \( k \) is the same as for R1, corresponding to 1.2-200 \( \Omega \), for \( I_r = 1 \, A \) and 0.24 - 40 \( \Omega \) for \( I_r = 5 \, A \). Thus, zone 2 receives the same ratio between the X and R setting as for zone 1.

4. Setting of the directional function Z2<.
Set the programming switch S1:7 to “Z2<” for non-directional function or to “Z2<” for directional function.

5. Setting of the load discrimination area of Z2<.
The angle \( \beta \) is settable by the sum of switches S1:8 and S1:9 to 0°, 15°, 30° and 45°.

Bin 1 is used for blocking or acceleration functions according to the setting of switch S1:10
1. Blocking S1:10 in left position blocks all functions except Z2<.
2. Acceleration Z2< S1:10 in right position enables instantaneous operation of Z2<.

7. Setting of the characteristic angle.
The characteristic angle, \( \alpha \), is settable between 0° to 120°. The angle is adjusted with potentiometer P3.

8. Setting of the time delay \( t_{Z2<} \).
The time delay \( t_{Z2<} \) for zone 2 has definite-time characteristic. The setting is done with potentiometer P4. The setting range is 0 - 5 s.

9. The binary inputs.
There are two binary inputs (Bin 1 and Bin 2) on the relay. Bin 1 (terminals 111/112-113) is used for external blocking of all functions except Z2< or acceleration of the Z2< function to an instantaneous function on contact 317. Bin 2 (terminals 121/122-123) is used for resetting of the LED indicators. The functions are activated when a voltage RL is applied to the binary inputs.

INDICATION
There are four LED indicators. The trip indicators seal-in and are reset manually by the “Reset” push-button or electrically via the binary input, while the start indicator resets automatically when the relay resets. When the “Reset” push-button is depressed during normal operating conditions, all LEDs except "In serv." will light up. When connecting RXZK 22H to the auxiliary voltage, the relay performs a self test. The “In serv.” LED is on, after performing the self test and when the relay is ready for operation. In case of a fault, the LEDs will start flashing.

TRIPPING AND START OUTPUTS
The RXZK 22H relay has two tripping outputs for the under-impedance functions (Z1< and Z2<) and one output for the start Z2< function (non-directional or directional). Each output is provided with one change-over contact. All outputs reset automatically when the impedance increases to a value over the resetting level of the relay.

ESD
The relay contains electronic circuits which can be damaged if exposed to static electricity. Always avoid to touch the circuit board when the relay cover is removed during the setting procedure.