



(SE 94 07 25)



(SE 90 06 38)

Features

- Automatic high speed or delayed breaker reclosing initiated by protective relay trip
- Allows sequential reclosing of breakers in 1½ breaker or multibreaker arrangements
- Breaker position memory included
- Microprocessor based design
- Reclaim time adjustable 10-180 s
- Allows extended shot 1 dead time when line protection communication link is out of service
- Prepared for coordination with synchronism and dead line check relay
- External "Auto-reclosing On/Off" control
- Three built-in operation counters
- User friendly human-machine-communication by means of three position numerical display, LEDs, push-buttons and selector switches
- Continuous self-supervision
- Auto test function
- Available with or without test switch RTXP 18
- Two versions available:
 - REXA 101 for maximum two shots, single or three phase auto-reclosure
 - REXA 103 for maximum four shots, three phase auto-reclosure

Application

The REXA 101 reclosing relay is intended for transmission or subtransmission lines to restore service when a circuit breaker is tripped single- or three-phase, due to a line fault. The reclosing relay requires a reclosing initiating signal from the line protection. The breaker is reclosed when the recloser dead time delay has elapsed.

Three separate time delays permit different settings for dead time of the first single-phase, the first three-phase and the second three-phase reclosing. The reclaim time is adjustable by a separate time delay.

REXA 101 provides six built-in alternative re-closing programs which can easily be changed after installation in case the operating requirements of the power system change:

- One shot, single-phase reclosing
- One shot, single- or three-phase reclosing depending on fault type and protection tripping
- One shot, three-phase reclosing
- One shot, three-phase reclosing at multi-phase faults, or two shots, single- and three-phase reclosing at single-phase faults

Application (cont'd)

- Two shots, single- or three-phase and three-phase reclosing
- Two shots, three-phase and three-phase reclosing

The REXA 103 reclosing relay is intended for transmission or subtransmission lines to restore service if a circuit breaker is tripped three-phase, due to a line fault. The reclosing relay requires an initiating signal from the line protection. Reclosure occurs when the recloser dead time delay has elapsed.

Three separate time delays permit different settings for dead time of shot 1, shot 2 and shot 3 plus 4. The wide range, shot 1 dead time setting allows both "High Speed" or "Delayed" auto-reclosing. The reclaim time is adjustable by means of a separate time delay.

REXA 103 provides four built-in reclosing alternatives, easily changeable after installation if the operating requirements of the power system change:

- One shot, three-phase reclosing
- Two shots, three-phase reclosing
- Three shots, three-phase reclosing
- Four shots, three-phase reclosing

REXA can be switched on and off from a station control panel or from a control centre by means of a special input, which works together with the on/off toggle switch on the front of the relay. This input is enabled when the toggle switch is set to the "ON" position and disabled when the switch is in "OFF" position.

The reclosing cycle can be interrupted and temporarily blocked by external contacts of back-up relays, breaker condition, breaker failure relays, etc. The blocking state will remain for five seconds after the blocking signal has been removed.

In order to prevent reclosing after a manual circuit breaker closing into a fault, an auxiliary contact of the circuit breaker can be connected to REXA and the reclosing relay will check that the breaker has been closed for more than 5 s, to allow a new reclosing cycle to be started. It can be disabled in case blocking of auto-reclosing at manual circuit breaker closing is preferred to be done

through the normal block input. This function is also necessary in multi-breaker arrangements to ensure that when the fault occurs, only that circuit breaker which was closed prior to the fault is reclosed.

REXA is prepared for operation with external "Synchronism" or "Dead Line Check" relays. The reclosing cycle is interrupted if the synchronism or dead line check conditions are not satisfied within 5 seconds.

For multiple circuit breaker arrangements, such as 1½ breaker, two breaker or ring bus systems, a line terminal is switched by two breakers. In these cases it is recommended to use one REXA per breaker. A "Priority Release" function can then be introduced and interconnecting circuits will allow sequential reclosing of the two breakers after a line fault. Therefore, at permanent faults, only one breaker is reclosed and retripped.

As a particular feature, REXA has the possibility to extend automatically the first shot dead time when the distance protection communication link is out of service. In this case, due to the non-simultaneous tripping and reclosing at the two line ends, the effective line dead time could be too short for successful high speed auto-reclosing. This difficulty is overcome with REXA by the use of a contact from the communication equipment, informing that the link is out of service. This will cause REXA to add an extra 0.4 s to the reclosing dead time.

REXA, used with single-phase reclosing, assumes that the line protection relays are provided with logic to handle evolving faults.

Self-supervision is performed continuously by the "watchdog" function of the microprocessor. A self-check program is automatically initiated when auxiliary power is connected or when a "Test" push-button on the front of the relay is pressed. Test of the LEDs and output relays can also be performed after the self-check program test.

The means for indications, setting and test functions are provided by a three position numerical display, LEDs, push-buttons and selector switches, located on the front of the relay.

Design

The REXA reclosing relay consists of a plug-in unit mounted in a cassette. This cassette is intended for mounting in a rack and occupies 6 U-modules height (267 mm) and 21 TE-modules width (107 mm) of system RL. The cassette of REXA, including the test switch, occupies 35 TE-modules width (178 mm).

The cassette is mounted in the rack through card guides located at positions 01 and 21 TE-modules (without test switch) or 03, 15 and 35 TE-modules (with test switch).

The REXA is also available mounted without cassette in the same rack as distance relay, RELZ 100. In such case the REXA has to be ordered together with the distance relay.

The auto-reclosing function is performed by use of a pre-programmed single-chip micro-computer (MCU). The program is stored in the programmable read only memory (PROM) of the MCU. The timer settings, program and the counter's content are stored in a nonvolatile memory (NOVRAM). Galvanically separated contacts with interference suppression are used in the output circuits and optocouplers are used in the input circuits. A built-in dc/dc converter provides the power supply to the internal electronic circuits.

Technical data

Table 1: General

Auxiliary dc voltage Power supply (EL) Permissible variation	48-60 110-250 V dc 80-120%
Power consumption in normal operation	≤ 7 W
Inputs rated volt. (RL) Permissible variation	48-60 110-125, 220-250 V dc 80-120%
Reclaim time setting	10-180 s (steps of 1 s)
Fixed settings Reclosing pulse Reset time of block input Conditions "CB closed" min. time Extra dead time with "Communication link out"	0,2 s (interrupted a new trip but with min. duration 50 ms) 5 s 5 s 0,4 s
Limit wait time for "Synchro-check" signal	5 s
Limit wait time for "Priority Release	5 min

Table 2: REXA 101

Type of reclosing	Single- or three-phase
No. of selectable programs	6
No. of reclosing shots	1 or 2
Dead time settings: Single-phase, shot 1 Three-phase, shot 1 Three-phase, shot 2	0,4-1,9 s (steps of 0,05 s) 0,25-60 s (steps of 0,05 to 1 s) 2-240 s (steps of 1 s)

Technical data (cont'd)

Table 3: REXA 103

Type of reclosing	Three-phase
No. of selectable shots	1, 2, 3 or 4
Dead time settings:	
Shot 1	0,25-60 s (steps of 0,05 s)
Shot 2	2-240 s (steps of 0,05 to 1 s)
Shot 2 and 4	2-240 s (steps of 1 s)

Table 4: Contact data

Max. system voltage ac/dc	250 V
Max. continuous current carrying capacity:	4 A (General outputs) 5 A (CB closing output)
Making and conducting capacity in 1 s, inductive dc, L/R \geq 10 ms	10 A
Breaking capacity:	
at ac, PF \geq 0,4	5 A (General outputs) 10 A (CB closing output)
at dc, L/R \leq 40 ms	
40 V	0,5 A
110 V	0,25 A
220 V	0,15 A
Insulation test	
Dielectric test	(IEC Publ. 255-5)
Between circuits and to earth	2 kV, 50 Hz, 1 min
Across open contact	1 kV, 50 Hz, 1 min (General outputs) 1,5 kV, 50 Hz, 1 min (CB closing output)
Impulse test voltage	5 kV, 1,2/50 μ s, 0,5 J (IEC Publ. 255-5)
Interference tests	IEC Publ. 255-4, class III

Diagrams (cont'd)

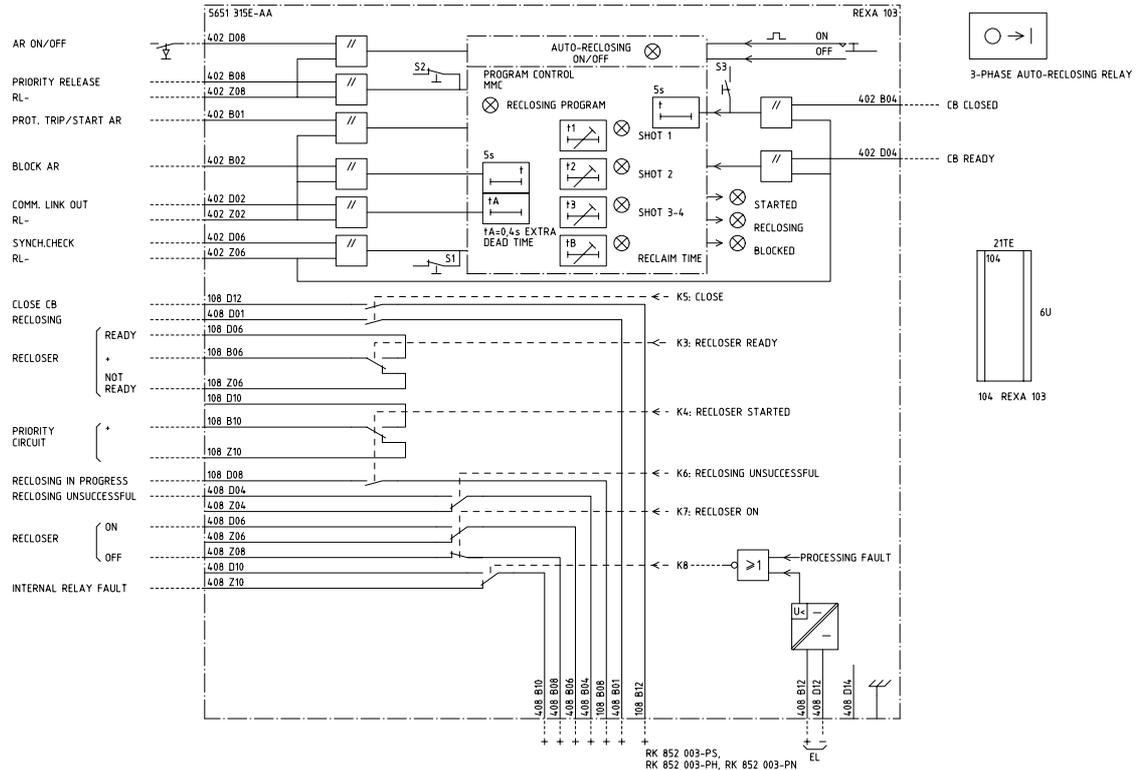


Fig. 3 Circuit and terminal diagram for REXA 103 without test switch, Diagram No. 5651 315E-AA

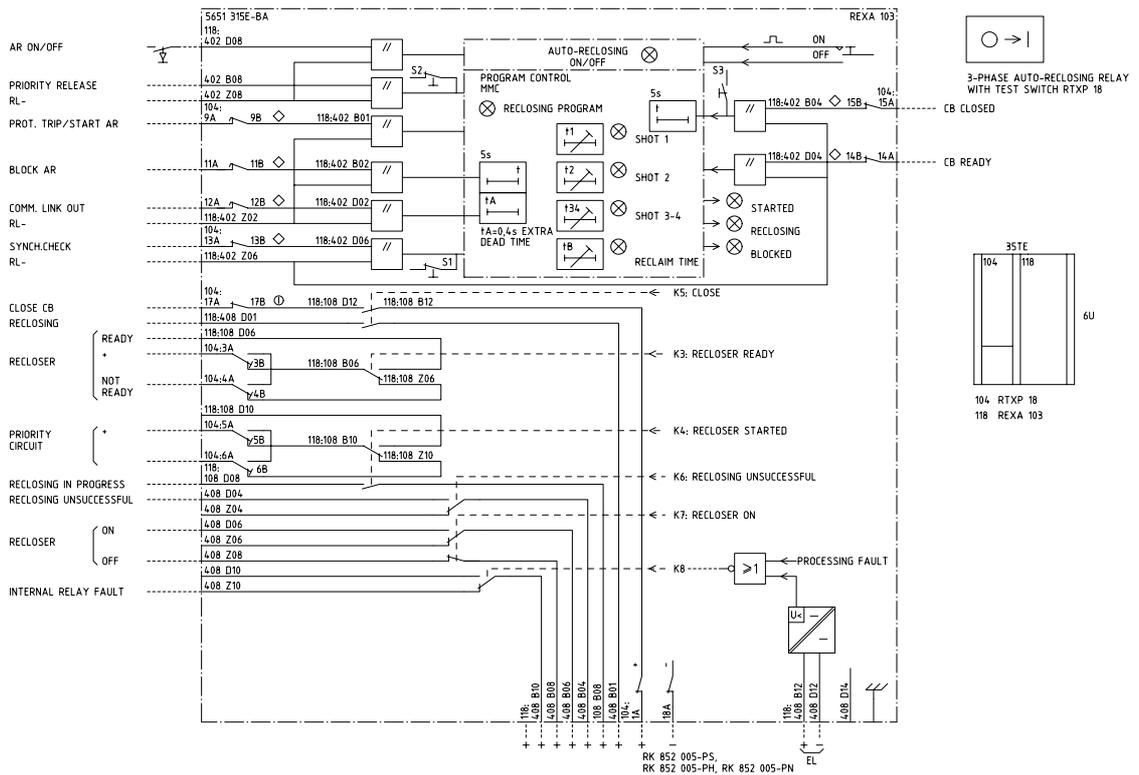


Fig. 4 Circuit and terminal diagram for REXA 103 with test switch, Diagram No. 5651 315E-BA

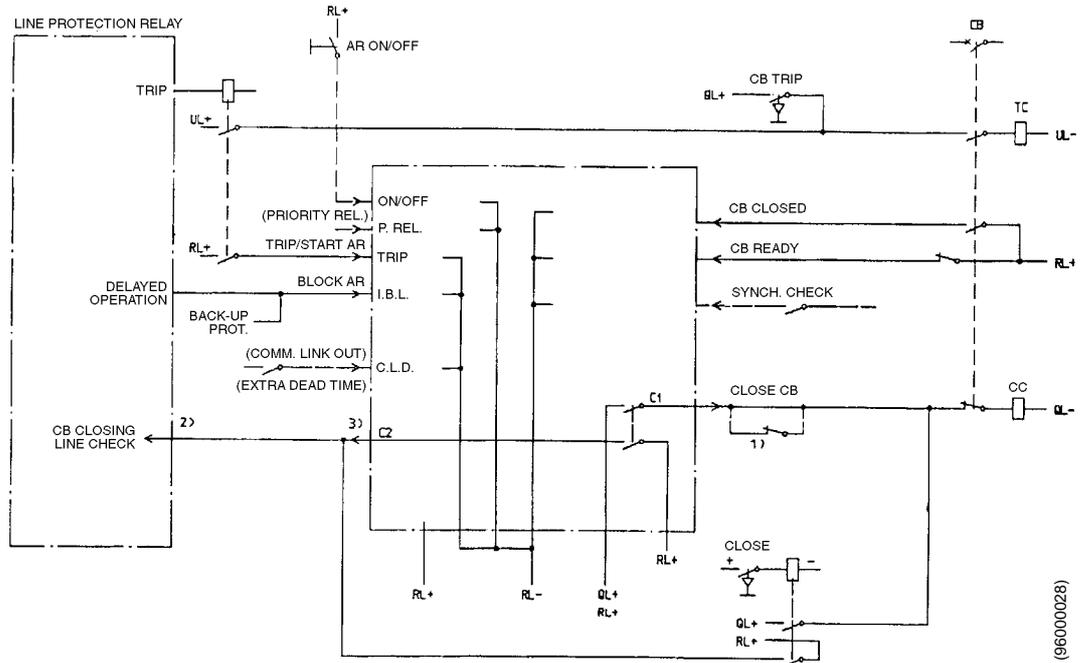


Fig. 5 Typical Interconnection REXA 103 – Line Protection – CB

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Ordering

Specify:

- Quantity
- Ordering No. (see table below)

- Desired wording on the lower half of the test switch face plate max. 13 lines with 14 characters per line.

	Auxiliary dc voltage		
EL	48-60 V	110-250 V	110-250 V
RL	48-60 V	110-125 V	220-250 V
REXA 101 unit mounted in cassette	RK 852 002-PH	RK 852 002-PN	RK 852 002-PS
REXA 101 unit mounted in cassette with test switch	RK 852 004-PH	RK 852 004-PN	RK 852 004-PS
REXA 103 unit mounted in cassette	RK 852 003-PH	RK 852 003-PN	RK 852 003-PS
REXA 103 unit mounted in cassette with test switch	RK 852 005-PH	RK 852 005-PN	RK 852 005-PS

References

REXA 101, User's Guide	UG03-8018E
REXA 103, User's Guide	UG03-8019E
REL 100/RELZ 100	1MRK 506 007-BEN
REL 170/REZ 1	1MRK 506 008-BENzx

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