

# Feeder Protection Relay REX 521



- Improves operational and personnel safety
- Supports your target of supplying high-quality power
- Enables preventive maintenance and shorter outage times, adding value to your asset management
- Large display for comfortable local operations
- Selectable IEC and ANSI symbols
- Flexible connectivity and IEC 61850 support



## The REX 521

is the ultimate feeder protection relay for your distribution network. The relay is also a multifunction motor protection relay, a transformer protection relay and a constituent of your substation's busbar protection system. The smoothly communicating REX 521 relay integrates smoothly with the control and management system of your distribution network.

### Enhanced feeder protection

The REX 521 relay is primarily employed in distribution substations to provide short-circuit, overcurrent and earth-fault protection as well as auto-reclosing of substation feeders. The relay can be used in isolated neutral, resonant earthed, solidly earthed and resistively earthed distribution networks. The sophisticated thermal overload function, the start-up supervision function and the undervoltage function also make the relay an ideal choice for the protection of medium-sized and large circuit-breaker controlled AC motors. Further, the inrush current stabilization function allows the relay to be used for back-up protection of power transformers and for main protection of distribution transformers. The REX 521 relay has also been further developed to provide cost-effective busbar protection.

### Complete solution

REX 521 complements ABB's solution for power system protection, control, measurement and supervision, now ranging from basic protection relays to advanced feeder

protection and bay control terminals. The REX 521 relay offers a comprehensive set of feeder protection functions enhanced with supervision functions such as, for instance, power quality supervision. Support for current sensors type Rogowski coils and voltage dividers are also available. Advanced data collection and analysis functions contribute to improving the efficiency of your network control, maintenance and management operations.

### Improved system availability and safety

The REX 521 relay features condition monitoring of both primary and secondary systems of the substation as well as of the device itself. The monitoring adds to the operational reliability of the protection, which considerably improves personnel safety. Personnel safety has also been improved by enabling delayed circuit breaker closing when the circuit breaker is controlled locally via the HMI. The CB closing delay is adjustable but can also be set to zero for immediate CB control response.

## A step into intelligent substation automation

The REX 521 relays are fully integrated into ABB's distribution automation and network management systems. The support for all major communication protocols and standards, including the new IEC 60850 standard, makes the relay a perfect fit for your network control and management system. In addition to protection, REX offers extensive measurements including phase currents, neutral current, line voltages, residual voltage, system frequency, power factor, active and reactive power, total harmonic distortion (THD) and power quality. Any doubtful event in the power system can be recorded by the built-in high-sampling-frequency disturbance recorder for subsequent disturbance or fault analysis.

## Condition monitoring and self-supervision

The REX 521 relay incorporates a large number of supervision functions for constant monitoring of the relay's operational preparedness. On the relay input side both voltage and current measuring circuits are continuously supervised. On the relay output side the trip circuits, including the CB trip coils, are constantly supervised for loss of control voltage or trip circuit discontinuity. Further, the condition of the circuit breaker can be monitored for mechanical wear on the main contact. The auxiliary supply of the relay and the internal relay voltages are supervised by the relay's integrated self-supervision system, which also incorporates watchdog functions supervising the operation of the relay.



## Innovative technology

The REX 521 feeder protection relays are part of ABB's substation automation concept and the RE500 product series. The support for a wide range of communication protocols and standards, including the novel IEC 60850, makes the relay an attractive choice for your power system protection, control and management environment. The flexible connectivity caters for any communication needs you may

have and helps cover future demands. The relays' common configuration, setting and monitoring tools offer you yet another benefit: you just need to learn how to handle one relay, as all RE500 series protection and control devices use the same interface technology.



You can download the connectivity package from [www.abb.com/substationautomation](http://www.abb.com/substationautomation)

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## Technical Data REX 521

Protection functions	ANSI number
• $3I_>$ , $3I_>>$ , $3I_>>>$	50/51
3-phase non-directional overcurrent protection, 3 stages	
• $3I_>->$ , $3I_>>->$	67
3-phase directional overcurrent protection, 2 stages	
• $3I_<$	37
3-phase undercurrent protection	
• $I_0>$ , $I_0>>$ , $I_0>>>$	50N/51N
Non-directional earth-fault protection, 3 stages	
• $I_0>->$ , $I_0>>->$ , $I_0>>>->$	67N
Directional earth-fault protection, 3 stages	
• $U_0>$ , $U_0>>$ , $U_0>>>$	59N
Residual overvoltage protection, 3 stages	
• $3U_>$ , $3U_>>$	59
3-phase overvoltage protection, 2 stages	
• $3U_<$ , $3U_<<$	27
3-phase undervoltage protection, 2 stages	
• $3I_{2>}$	68
3-phase transformer inrush and motor start-up current detector	
• $\Delta I_>$	46
Phase discontinuity protection	
• $3I_>$	49F
3-phase thermal overload protection	
• $0 \rightarrow 1$	79
Auto-reclose function (5 shots)	
• $f</f_>$ , $df/dt$	81U/81O
Underfrequency/overfrequency protection	
• SYNC	25
Synchro-check/voltage-check function	
• $3I_>$	49M/49G/49T
Three-phase thermal overload protection for devices	
• $I_s^2 t n<$	48/14/66
Three-phase motor start-up supervision	
• $3I_<$ , $3I_<->$ , $3I_<->$	46R
Phase reversal protection	
• $I_2>$ , $I_2>>$	46
Negative phase sequence protection with two stages	
• $U_1<$ , $U_2>$ , $U_1>$	27/47/59
Phase sequence voltage protection	
• FUSEF	60
Fuse failure protection	
• CBFP	62BF
Circuit-breaker failure protection	
Included into every protection function	

### Control Functions:

I<->O CB1	Circuit breaker control & indication with adjustable closing delay
I<->O IND1-3	Object Indication
I<->O POS	Logic control position selection
ALARM1-8	Alarm LEDs 1-8

### Monitoring and supervision:

CB wear	Circuit-breaker condition monitoring
TCS1	Trip-circuit supervision
MCS 3I	Energizing current circuit supervision
MCS 3U	Energizing current circuit supervision
TIME1	Operation time counter

### Measurements:

Primary and unit values	
$3I$	3-phase current measurement
$I_0$	Neutral current measurement
$U_0$	Residual voltage measurement
$3U$	3-phase voltage measurement
$f$	System frequency measurement
E, P, Q, pf	3-phase power and energy (incl. cos $\phi$ )
DREC	Transient disturbance recorder
AI1	Analog measuring function

### Power Quality:

THD	Current and voltage distortion measurements (1-13 <sup>th</sup> harmonics)
PQ3Inf	Current waveform distortion measurement
PQ3Unf	Voltage waveform distortion measurement

### GENERAL:

- Non-volatile memory
- Nine digital inputs
- Four power outputs
- Two signalling outputs
- User-configurable Alarm LEDs
- Internal relay fault output

### Communication and connectivity

- IEC 60870-5-103, LON<sup>®</sup>, SPA, Modbus<sup>®</sup>, RTU/ASCII, DNP 3.0, Profibus-DPV1, IEC 61850 (with interface adapter)
- Connectivity package

### Dimensions:

Width 148.8 mm (1/3 of a 19" rack),  
Height frame 265.9 mm (6U)  
Box 249.8 mm  
Depth 235 mm