



ABB OY DISTRIBUTION SOLUTIONS

Protection and control REX640

Product introduction presentation

1MRS758996 D



Protection and control REX640

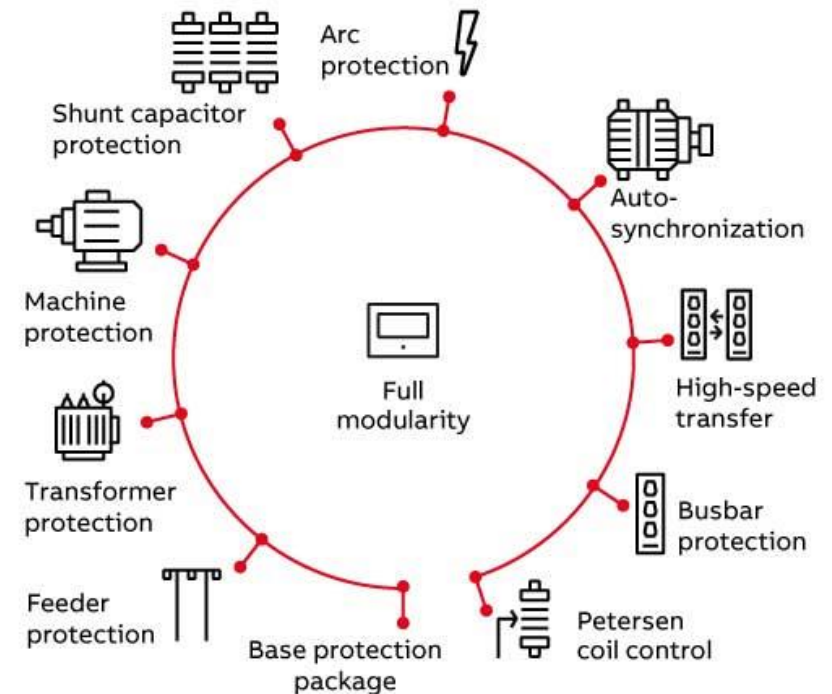
Complete coverage for advanced power distribution and generation applications

Complete application coverage with one device for optimal flexibility and cost-effectiveness

Application package concept for maximum convenience and flexibility

Designed to support the increasing digitalization of substations

- Supports a variety of digital switchgear solutions
- Suitable for both single and double-busbar applications



Innovative design – setting a new standard for what is possible with a single protection and control device

Protection and control REX640

Unmatched flexibility with fully modular hardware and software

Fully modular and scalable hardware and software for maximum flexibility throughout the entire relay life cycle

- Freedom of customization to meet specific protection requirements
- Easy adaptation to changing protection requirements
- Continuous access to the latest software and hardware developments

Smooth and easy ordering with ready-made application packages



Unmatched flexibility – helping customers stay ahead of the evolving power network requirements

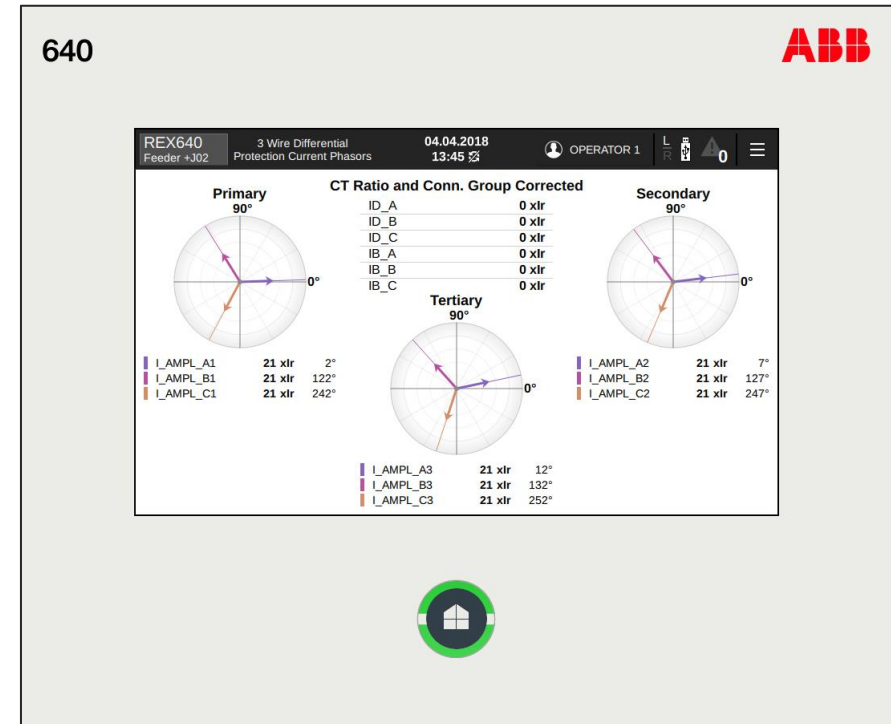
Protection and control REX640

Long-awaited ease of use with intuitive human-machine interface (HMI)

Increased situational awareness and optimal usability with application-driven local HMI (LHMI)/switchgear HMI (SHMI)

Novel 7-inch color touch screen for visualization of power distribution process information in an entirely new way

Ready-made application-based LHMI pages – saving both time and efforts



Long-awaited ease of use – supporting customers to make sense of complexities in evolving distribution networks

Protection and control REX640

Application coverage

Supported applications

Base functionality* <ul style="list-style-type: none">- Overcurrent protection- Earth-fault protection- Voltage protection- Frequency protection- Load-shedding	Power transformer protection and control <ul style="list-style-type: none">- Protection for two and three-winding power transformers- On-load tap-changer control- Automatic voltage regulation	Machine protection <ul style="list-style-type: none">- Protection of synchronous and asynchronous machines- Monitoring of diesel generator sets running in parallel	Interconnection protection <ul style="list-style-type: none">- Protection of interconnection points of distributed generation units	Shunt capacitor protection <ul style="list-style-type: none">- Protection of single Y, double Y and H-bridge-connected capacitor banks- Protection of harmonic filter circuits	Busbar protection <ul style="list-style-type: none">- High impedance-based busbar protection
Feeder / line protection <ul style="list-style-type: none">- Extensive earth-fault protection- Fault locator- Line distance protection- Line differential protection	High-speed transfer <ul style="list-style-type: none">- Automatic high-speed transfer between main and alternative feeder(s)- 4 transfer modes: fast, first coincidence, residual voltage-based and time delay-based	Generator auto-synchronizer <ul style="list-style-type: none">- Automatic, semi-automatic and manual generator synchronization- Fully visualized process with LHMI/SHMI	Network auto-synchronizer <ul style="list-style-type: none">- Synchronized closing of non-generator CB by actively adjusting selected generators- Fully visualized process with LHMI/SHMI	Petersen coil control <ul style="list-style-type: none">- Automatic control of Petersen coil- Control of additional fixed parallel coil- Control of parallel resistor	Arc protection <ul style="list-style-type: none">- Four lens or loop-type sensors supported in any combination- Both sensor types supervised

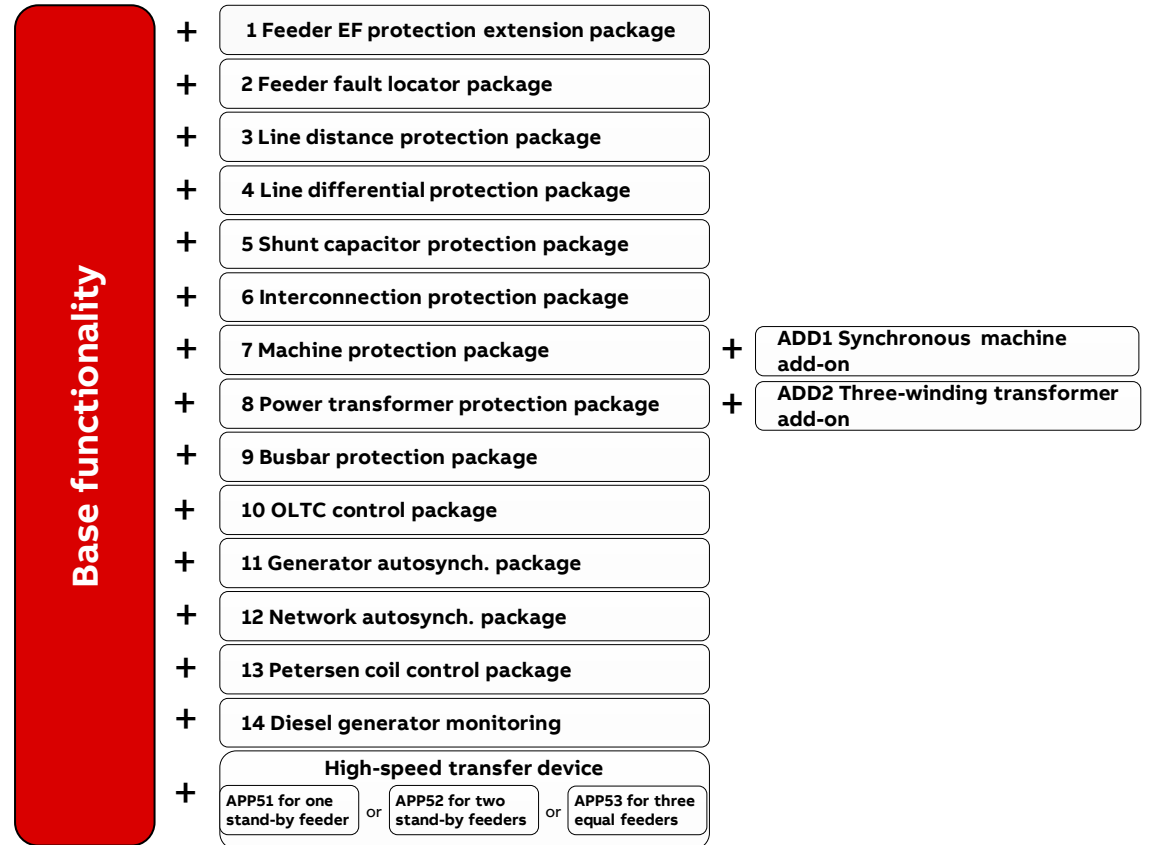
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Application packages

The functionality is divided into:

- **Comprehensive base functionality** – always included
- **17 application packages** (optional) – freely selected as required by the intended application (none, some or all)
- **2 additional protection add-ons** (for selected application packages) – the add-on packages offer even more functionality on top of the selected application package

Note! The software options can be customized, modified and added at a later stage, even on site after installation.



Application coverage

Application package content (1/3)

Base functionality (always Included)

General functions and features	Protection functions	Feeder earth-fault extension package APP1	Line distance protection package APP3	Shunt capacitor protection package APP5
LHMI/SHMI/WHMI	Dir. and non-dir. overcurrent protection (50P, 51P, 67P)	Neutral power directional element (67N-TC)	Distance protection (21P, 21N)	Overload protection (51,37,86C)
Control and condition monitoring of primary devices	Dir. and non-dir. earth-fault protection (50N, 51N, 67G)	Admittance-based earth-fault prot. (21NY)	Local acceleration logic (21LAL)	Current unbalance protection (60N)
Measurements_3I/3V/In/Vn/f/...	Dir. and non-dir. negative-seq. overc. prot. (67Q, 46M)	Multi-frequency admittance-based earth-fault protection (67_NYH)	Scheme communication logic (85 21SCHLGC)	3-phase current unbalance protection (60P)
Fault recorder	Phase discontinuity protection (46PD)	Wattmetric-based earth-fault prot. (32N)	Current reversal, weak infeed (85 21CREV, WEI)	Switching resonance protection (55ITHD)
Disturbance (oscillograph) recorder	Voltage protection (27, 59, 59G, 59N)	Transient-based earth-fault prot. (67NTEF)	Communication logic for residual overcurrent (85 67G/N SCHLGC)	Neutral unbalance protection (59NU)
IEC61850-9-2LE SMV receiving	Frequency protection (81)	Harmonics-based earth-fault prot. (51NH)	Current reversal, weak infeed for residual overcurrent (85 67G/N CREV, WEI)	
IEC61850-8-1 GOOSE	Load-shedding and restoration (1LSH)	High-impedance earth-fault detection (HIZ)	Binary signal transfer (BST)	
Advanced logics and equations	Voltage-dependent overcurrent protection (51V)	Touch voltage-based earth-fault protection (46SNQ, 59N)	Out-of-step protection (78PS)	
Alarms, events and audit log	Thermal protection for lines and cables (49F)		Power swing detection (68)	
IEC 61850 Ed. 1 and 2.1	Multipurpose protection (MAP)	Feeder fault locator package APP2	Line differential protection package APP4	Interconnection protection package APP6
IEC 60870-5-103/104, DNP3, Modbus	Inrush detection (68HB)	Fault locator (FLOC)	Line differential protection (87L)	Power directional element (67P-TC)
Time synchronization with IEEE 1588 v2	Circuit breaker failure protection (50BF)		Binary signal transfer (BST)	Overvoltage variation protection (59.S1)
PRP/HSR redundant communication	Restricted earth-fault protection (87N)			Low-voltage ride-through protection (27RT)
Dedicated optical protection communication link	Switch onto fault (SOTF)			Voltage vector shift protection (78VS)
Auto-reclosing (79)	Load blinder (21LB)			Dir. reactive power undervolt. prot. (32Q,27)
Power quality	Arc protection (AFD)			Dir. overpower protection (32R/32O)
Synchronism and energizing check (25)	Loss of phase, undercurrent protection (37)			Under power factor protection (55U)
	Dir. negative-sequence impedance protection (Z2Q)			

Application coverage

Application package content (2/3)

Base functionality (always Included)

General functions and features	Protection functions	Machine protection package APP7	Synchronous machine add-on ADD1	Power transformer protection package APP8
LHMI/SHMI/WHMI	Dir. and non-dir. overcurrent protection (50P, 51P, 67P)	Reverse power protection (32R/32O)	Overexcitation protection (24)	Overexcitation protection (24)
Control and condition monitoring of primary devices	Dir. and non-dir. earth-fault protection (50N, 51N, 67G)	Flux-balance based differential prot. (87HIM)	Thermal overload protection with two time constants (49T/G/C)	Thermal overload protection with two time constants (49T/G/C)
Measurements_3I/3V/In/Vn/f/...	Dir. and non-dir. negative-seq. overc. prot. (67Q, 46M)	Negative-seq. overcurrent protection (46M)		
Fault recorder	Phase discontinuity protection (46PD)	Loss-of-load supervision (37)	Underpower protection (32U)	Directional overpower protection (32R/32O)
Disturbance (oscillograph) recorder	Voltage protection (27, 59, 59G, 59N)	Load jam protection (50TDJAM)	Underimpedance protection (21G)	Underpower protection (32U)
IEC61850-9-2LE SMV receiving	Frequency protection (81)	Start-up supervision (49, 66, 48, 50TDLR)	Underexcitation protection (40)	Underimpedance protection (21G)
IEC61850-8-1 GOOSE	Load-shedding and restoration (1LSH)	Start-up counter (66)	Harmonic-based stator earth-fault prot. (64TN)	Stabilized differential protection for 2-winding transformers (87T)
Advanced logics and equations	Voltage-dependent overcurrent protection (51V)	Phase reversal protection (46R)	Injection-based rotor earth-fault prot. (64R)	
Alarms, events and audit log	Thermal protection for lines and cables (49F)	Thermal overload protection (49M)	Out-of-step protection (78PS)	High-impedance differential protection (87)
IEC 61850 Ed. 1 and 2.1	Multipurpose protection (MAP)	Rotor thermal overload protection (49R)	Shaft current leakage protection (38, 51)	Hotspot and ageing monitoring (26/49HS)
IEC 60870-5-103/104, DNP3, Modbus	Inrush detection (68HB)	Stabilized differential protection (87M, 87G)	Under power factor protection (55U)	Tap-changer position indication (84T)
Time synchronization with IEEE 1588 v2	Circuit breaker failure protection (50BF)	High-impedance differential protection (87)	Accidental energization protection (27, 50)	
PRP/HSR redundant communication	Restricted earth-fault protection (87N)	Emergency start-up (EST, 62)		
Dedicated optical protection communication link	Switch onto fault (SOTF)			
Auto-reclosing (79)	Load blinder (21LB)			
Power quality	Arc protection (AFD)			
Synchronism and energizing check (25)	Loss of phase, undercurrent protection (37)			
	Dir. negative-sequence impedance protection (Z2Q)			

Application coverage

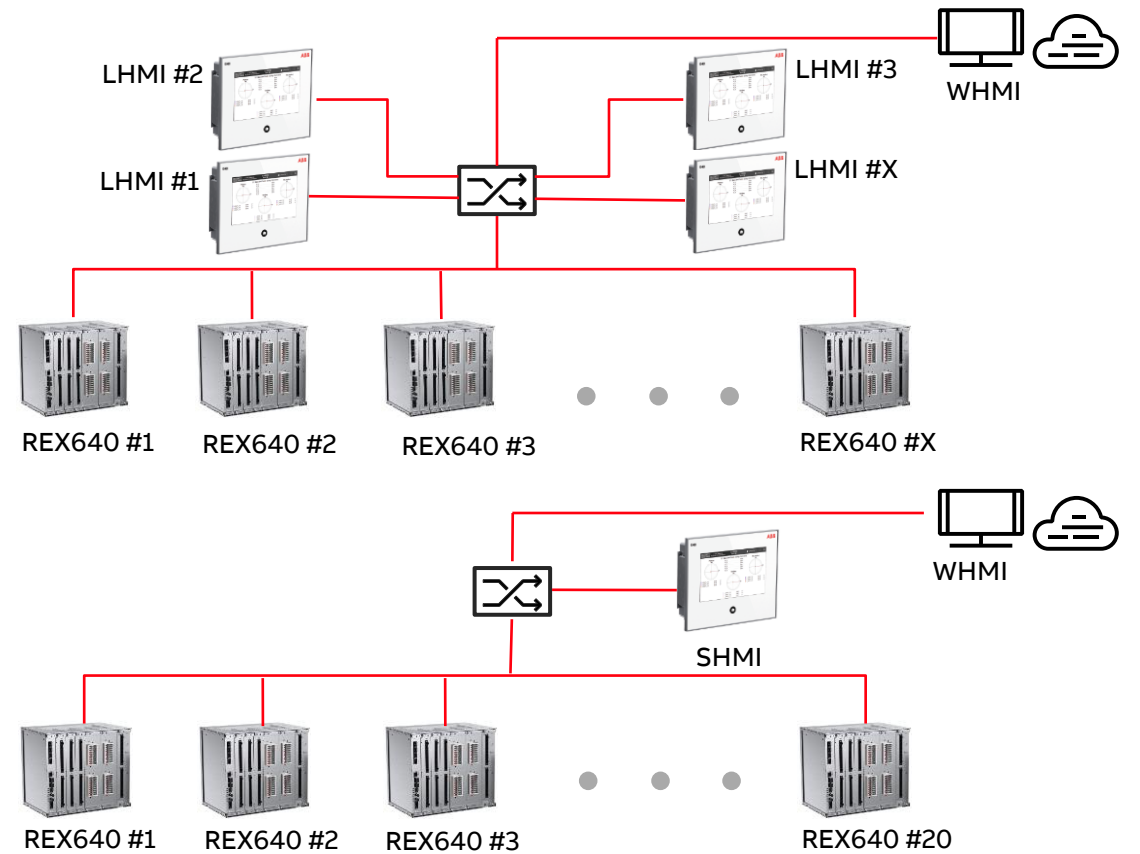
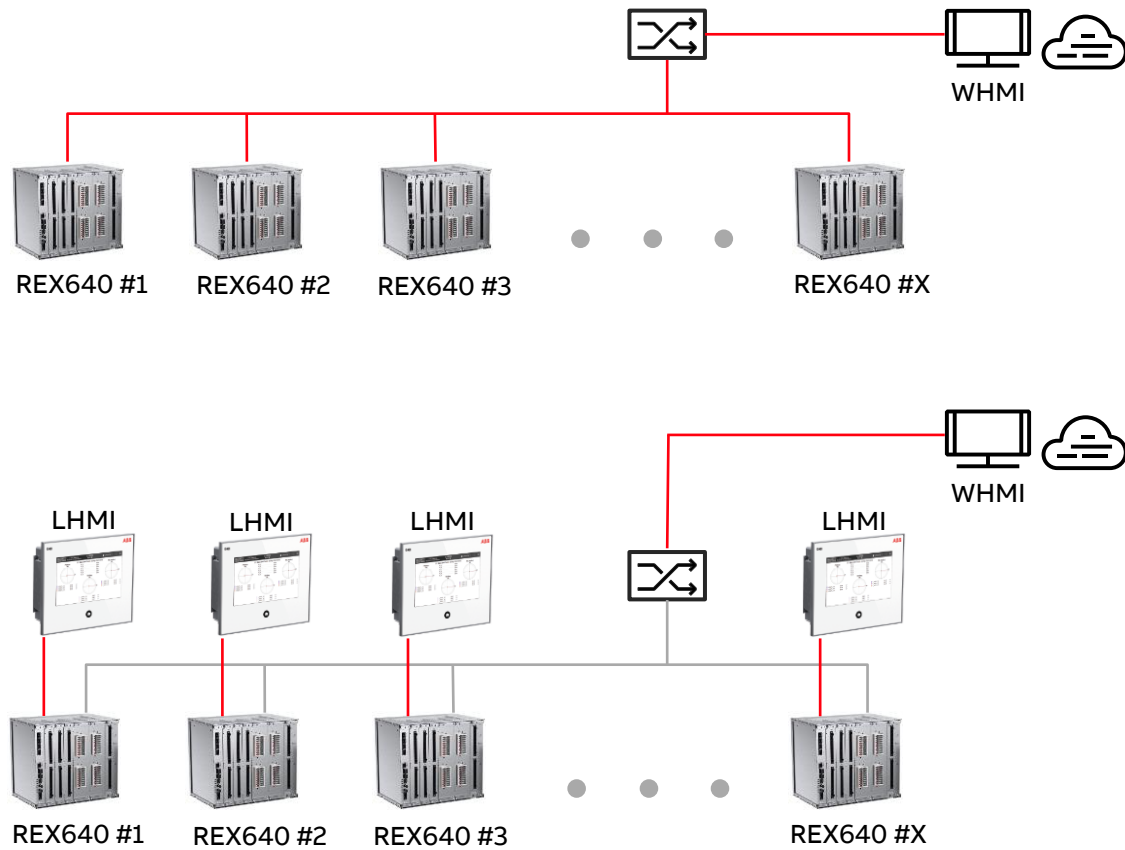
Application package content (3/3)

Base functionality (always Included)

General functions and features	Protection functions	Three-winding transformer add-on ADD2	Network autosynchronizer package APP12	High-speed transfer device package APP51
LHMI/SHMI/WHMI	Dir. and non-dir. overcurrent protection (50P, 51P, 67P)	Stabilized differential protection for 3-winding transformers (87T3)	Autosynchronizer for network circuit breaker (25AUTOSYNCBT/T)	High-speed bus transfer for one stand-by feeder (I<-->O BT)
Control and condition monitoring of primary devices	Dir. and non-dir. earth-fault protection (50N, 51N, 67G)			
Measurements_3I/3V/In/Vn/f/...	Dir. and non-dir. negative-seq. overc. prot. (67Q, 46M)	Busbar protection package APP9	Petersen coil control package APP13	High-speed transfer device package APP52
Fault recorder	Phase discontinuity protection (46PD)	High-impedance differential protection (87)	Petersen coil controller (90)	High-speed bus transfer for two stand-by feeders (I<-->O BT)
Disturbance (oscillograph) recorder	Voltage protection (27, 59, 59G, 59N)	Current transformer supervision (CCM)		
IEC61850-9-2LE SMV receiving	Frequency protection (81)		Diesel generator monitoring package APP14	High-speed transfer device package APP53
IEC61850-8-1 GOOSE	Load-shedding and restoration (1LSH)	Tap-changer control package APP10	Diesel generator monitoring (32/40G)	High-speed bus transfer for three equal feeders (I<-->O BT)
Advanced logics and equations	Voltage-dependent overcurrent protection (51V)	Power directional element (67P-TC)		
Alarms, events and audit log	Thermal protection for lines and cables (49F)	Voltage regulator (90V)		
IEC 61850 Ed. 1 and 2.1	Multipurpose protection (MAP)	Tap-changer position indication (84T)		
IEC 60870-5-103/104, DNP3, Modbus	Inrush detection (68HB)	Generator autosynchronizer package APP11		
Time synchronization with IEEE 1588 v2	Circuit breaker failure protection (50BF)	Autosynchronizer for generator circuit breaker (25AUTOSYNCG)		
PRP/HSR redundant communication	Restricted earth-fault protection (87N)			
Dedicated optical protection communication link	Switch onto fault (SOTF)			
Auto-reclosing (79)	Load blinder (21LB)			
Power quality	Arc protection (AFD)			
Synchronism and energizing check (25)	Loss of phase, undercurrent protection (37)			
	Dir. negative-sequence impedance protection (Z2Q)			

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HMI options



Protection and control REX640

Switchgear HMI (SHMI)

Switchgear level

- Switchgear primary object position statuses
- Alarm status indications
- Internal status indications
- Backups of relay configurations and settings



SHMI

Single panel/bay level

- Bay primary object control
- Bay primary object position status
- Measurements
- Alarm indication
- Alarm listing
- Relay status indication
- Event listing
- Fault records
- Disturbance records
- Settings
- Commissioning and testing support
- Backup of relay configuration and settings



SHMI



The complete switchgear lineup status is visible via the SHMI – in addition to all LHMI functionality.

Protection and control REX640

Summary

REX640 – innovative, flexible and easy to use

The outcome of a long-standing evolution – building on ABB's strong heritage of freely configurable multifunctional relays

Complete application coverage with one device for optimal flexibility and cost-effectiveness

Designed to support the increasing digitalization of substations

Fully modular and scalable hardware and software for maximum flexibility throughout the entire relay life cycle – from customizing your relay to adapting to changing protection requirements

Continuous access to the latest software and hardware developments

Increased situational awareness and optimal usability with application-driven LHMI/SHMI

Member of ABB's Relion® protection and control family of relays – reinforcing Relion's position as the family of relays to rely on



ABB