ABB OY DISTRIBUTION SOLUTIONS

Protection and control REX640

Product presentation

1MRS758995 E

Protection and control REX640

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Introduction

Introduction

All-in-one protection for any power distribution application

Protection and control REX640

Powerful all-in-one protection and control relay for advanced power distribution and generation applications

Fully modular hardware and software for maximum flexibility and easy adaption to changing network protection requirements

Continuous access to the latest software and hardware developments

Application-driven human-machine interface (HMI) for increased situational awareness and optimal usability

Designed to support the increasing digitalization of substations with support for a variety of digital switchgear solutions

Member of the Relion® protection and control family of relays

Customer values

Customer values

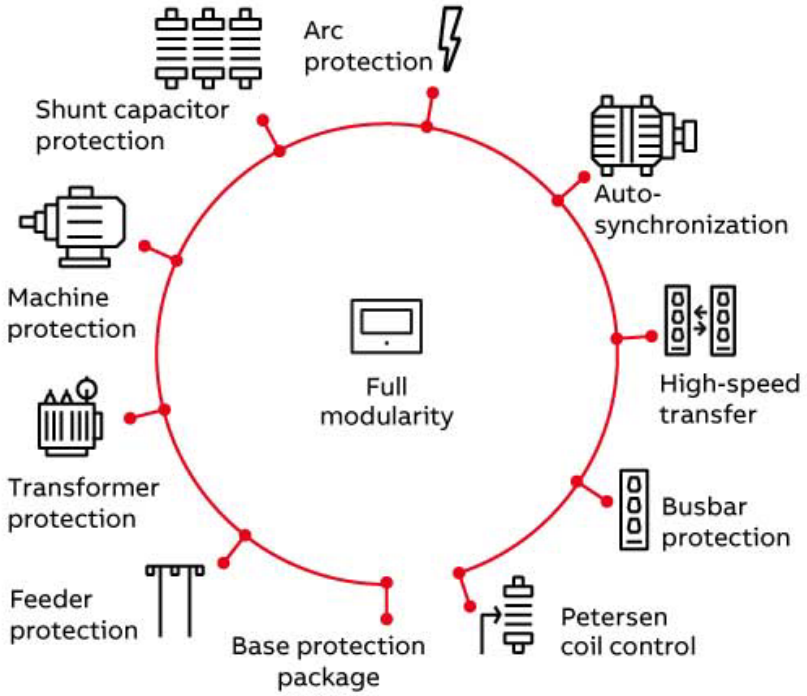
Complete coverage with innovative design

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

Customer values

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

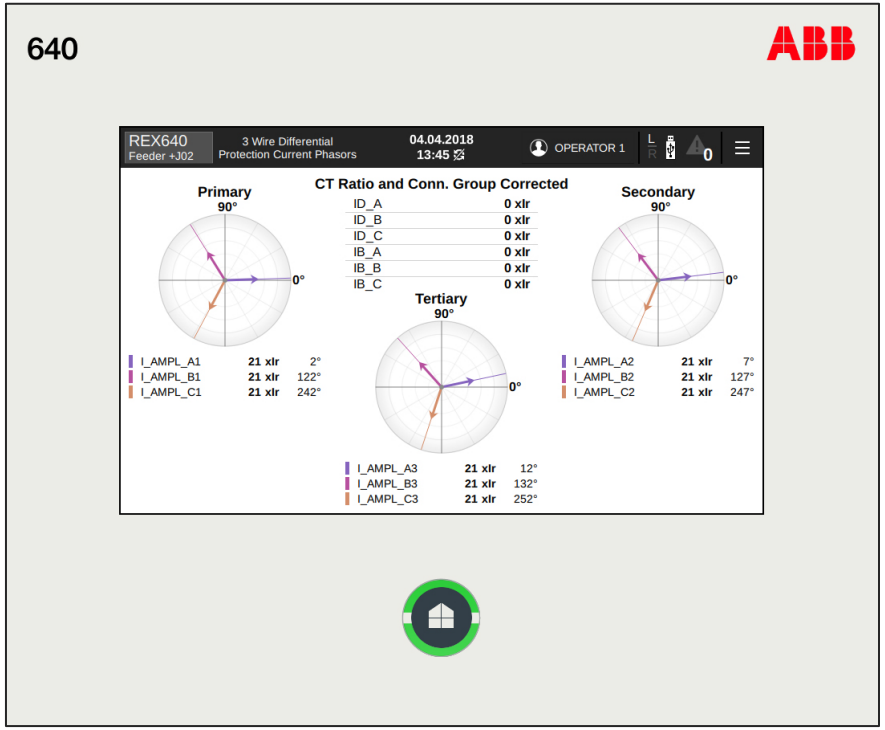
Customer values

Long-awaited ease of use with intuitive human-machine interface

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

Application coverage

Overview

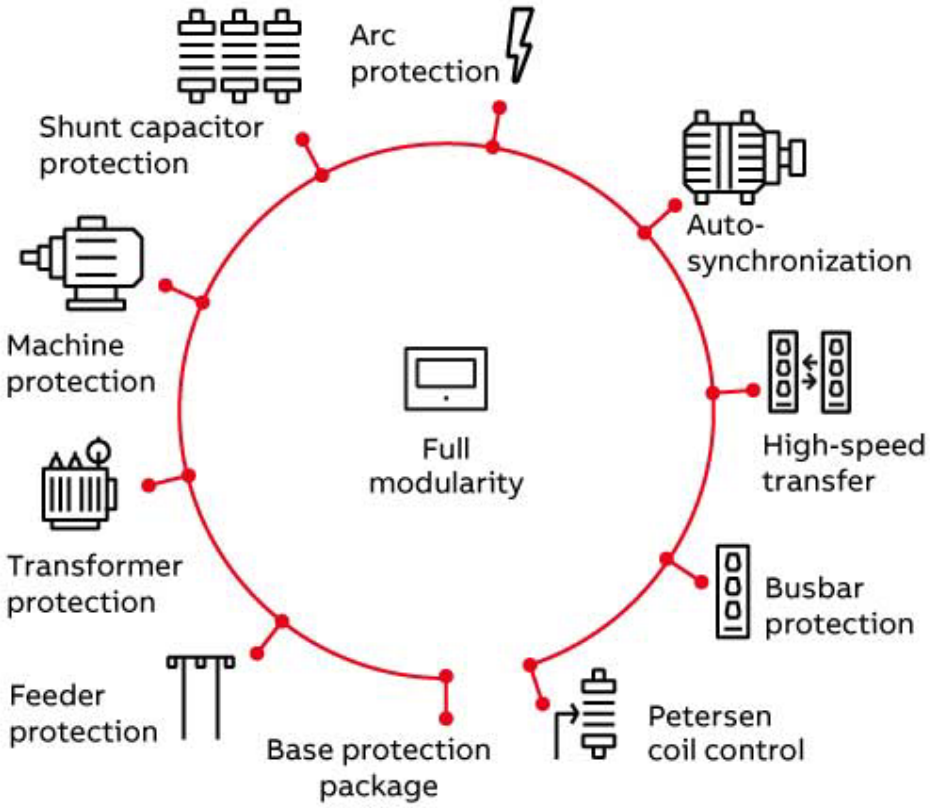
Application coverage

Application package concept – for maximum convenience and flexibility

Wide selection of convenient, ready-made application packages to choose from

Possibility to flexibly combine the application packages to meet application-specific requirements

Possibility to flexibly combine the protection and control functions within the application packages to meet unique protection requirements



Application coverage

Areas of application

Supported applications

Base functionality*

- Overcurrent protection
- Earth-fault protection
- Voltage protection
- Frequency protection
- Load-shedding

Power transformer protection and control

- Protection for two and three-winding power transformers
- On-load tap-changer control
- Automatic voltage regulation

Machine protection

- Protection of synchronous and asynchronous machines
- Monitoring of diesel generator sets running in parallel

Interconnection protection

- Protection of interconnection points of distributed generation units

Shunt capacitor protection

- Protection of single Y, double Y and H-bridge-connected capacitor banks
- Protection of harmonic filter circuits

Busbar protection

- High impedance-based busbar protection

Feeder / line protection

- Extensive earth-fault protection
- Fault locator
- Line distance protection
- Line differential protection

High-speed transfer

- 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

- Automatic, semi-automatic and manual generator synchronization
- Fully visualized process with LHMI/SHMI

Network auto-synchronizer

- Synchronized closing of non-generator CB by actively adjusting selected generators
- Fully visualized process with LHMI/SHMI

Petersen coil control

- Automatic control of Petersen coil
- Control of additional fixed parallel coil
- Control of parallel resistor

Arc protection

- Four lens or loop-type sensors supported in any combination
- Both sensor types supervised

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* Always included

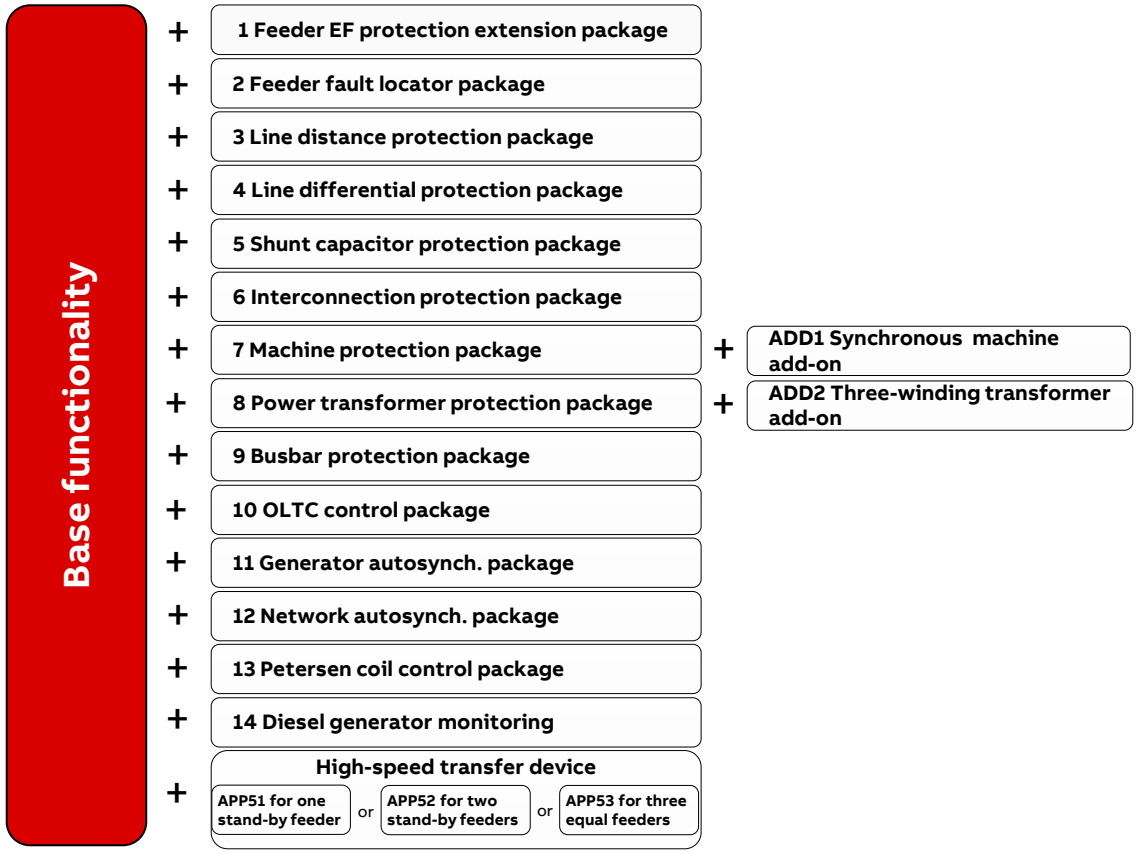
Application coverage

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
LHMI/SHMI/WHMI
Control and condition monitoring of primary devices
Measurements_3I/3V/In/Vn/f/…
Fault recorder
Disturbance (oscillograph) recorder
IEC61850-9-2LE SMV receiving
IEC61850-8-1 GOOSE
Advanced logics and equations
Alarms, events and audit log
IEC 61850 Ed. 1 and 2.1
IEC 60870-5-103/104, DNP3, Modbus
Time synchronization with IEEE 1588 v2
PRP/HSR redundant communication
Dedicated optical protection communication link
Auto-reclosing (79)
Power quality
Synchronism and energizing check (25)

Protection functions
Dir. and non-dir. overcurrent protection (50P, 51P, 67P)
Dir. and non-dir. earth-fault protection (50N, 51N, 67G)
Dir. and non-dir. negative-seq. overc. prot. (67Q, 46M)
Phase discontinuity protection (46PD)
Voltage protection (27, 59, 59G. 59N)
Frequency protection (81)
Load-shedding and restoration (1LSH)
Voltage-dependent overcurrent protection (51V)
Thermal protection for lines and cables (49F)
Multipurpose protection (MAP)
Inrush detection (68HB)
Circuit breaker failure protection (50BF)
Restricted earth-fault protection (87N)
Switch onto fault (SOTF)
Load blinder (21LB)
Arc protection (AFD)
Loss of phase, undercurrent protection (37)
Dir. negative-sequence impedance protection (Z2Q)

Feeder earth-fault extension package APP1
Neutral power directional element (67N-TC)
Admittance-based earth-fault prot. (21NY)
Multi-frequency admittance-based. earth-fault protection (67_NYH)
Wattmetric-based earth-fault prot. (32N)
Transient-based earth-fault prot. (67NTEF)
Harmonics-based earth-fault prot. (51NH)
High-impedance earth-fault detection (HIZ)
Touch voltage-based earth-fault protection (46SNQ, 59N)

Feeder fault locator package APP2
Fault locator (FLOC)

Line distance protection package APP3
Distance protection (21P, 21N)
Local acceleration logic (21LAL)
Scheme communication logic (85 21SCHLGC)
Current reversal, weak infeed (85 21CREV, WEI)
Communication logic for residual overcurrent (85 67G/N SCHLGC)
Current reversal, weak infeed for residual overcurrent (85 67G/N CREV, WEI)
Binary signal transfer (BST)
Out-of-step protection (78PS)
Power swing detection (68)

Line differential protection package APP4
Line differential protection (87L)
Binary signal transfer (BST)

Shunt capacitor protection package APP5
Overload protection (51,37,86C)
Current unbalance protection (60N)
3-phase current unbalance protection (60P)
Switching resonance protection (55ITHD)
Neutral unbalance protection (59NU)

Interconnection protection package APP6
Power directional element (67P-TC)
Overvoltage variation protection (59.S1)
Low-voltage ride-through protection (27RT)
Voltage vector shift protection (78VS)
Dir. reactive power undervolt. prot. (32Q,27)
Dir. overpower protection (32R/32O)
Under power factor protection (55U)

Application coverage

Application package content (2/3)

Base functionality (always Included)

General functions and features
LHMI/SHMI/WHMI
Control and condition monitoring of primary devices
Measurements_3I/3V/In/Vn/f/…
Fault recorder
Disturbance (oscillograph) recorder
IEC61850-9-2LE SMV receiving
IEC61850-8-1 GOOSE
Advanced logics and equations
Alarms, events and audit log
IEC 61850 Ed. 1 and 2.1
IEC 60870-5-103/104, DNP3, Modbus
Time synchronization with IEEE 1588 v2
PRP/HSR redundant communication
Dedicated optical protection communication link
Auto-reclosing (79)
Power quality
Synchronism and energizing check (25)

Protection functions
Dir. and non-dir. overcurrent protection (50P, 51P, 67P)
Dir. and non-dir. earth-fault protection (50N, 51N, 67G)
Dir. and non-dir. negative-seq. overc. prot. (67Q, 46M)
Phase discontinuity protection (46PD)
Voltage protection (27, 59, 59G. 59N)
Frequency protection (81)
Load-shedding and restoration (1LSH)
Voltage-dependent overcurrent protection (51V)
Thermal protection for lines and cables (49F)
Multipurpose protection (MAP)
Inrush detection (68HB)
Circuit breaker failure protection (50BF)
Restricted earth-fault protection (87N)
Switch onto fault (SOTF)
Load blinder (21LB)
Arc protection (AFD)
Loss of phase, undercurrent protection (37)
Dir. negative-sequence impedance protection (Z2Q)

Machine protection package APP7
Reverse power protection (32R/32O)
Flux-balance based differential prot. (87HIM)
Negative-seq. overcurrent protection (46M)
Loss-of-load supervision (37)
Load jam protection (50TDJAM)
Start-up supervision (49, 66, 48, 50TDLR)
Start-up counter (66)
Phase reversal protection (46R)
Thermal overload protection (49M)
Rotor thermal overload protection (49R)
Stabilized differential protection (87M, 87G)
High-impedance differential protection (87)
Emergency start-up (EST, 62)

Synchronous machine add-on ADD1
Overexcitation protection (24)
Thermal overload protection with two time constants (49T/G/C)
Underpower protection (32U)
Underimpedance protection (21G)
Underexcitation protection (40)
Harmonic-based stator earth-fault prot. (64TN)
Injection-based rotor earth-fault prot. (64R)
Out-of-step protection (78PS)
Shaft current leakage protection (38, 51)
Under power factor protection (55U)
Accidental energization protection (27, 50)

Power transformer protection package APP8
Overexcitation protection (24)
Thermal overload protection with two time constants (49T/G/C)
Directional overpower protection (32R/32O)
Underpower protection (32U)
Underimpedance protection (21G)
Stabilized differential protection for 2-winding transformers (87T)
High-impedance differential protection (87)
Hotspot and ageing monitoring (26/49HS)
Tap-changer position indication (84T)

Application coverage

Application package content (3/3)

Base functionality (always Included)

General functions and features
LHMI/SHMI/WHMI
Control and condition monitoring of primary devices
Measurements_3I/3V/In/Vn/f/…
Fault recorder
Disturbance (oscillograph) recorder
IEC61850-9-2LE SMV receiving
IEC61850-8-1 GOOSE
Advanced logics and equations
Alarms, events and audit log
IEC 61850 Ed. 1 and 2.1
IEC 60870-5-103/104, DNP3, Modbus
Time synchronization with IEEE 1588 v2
PRP/HSR redundant communication
Dedicated optical protection communication link
Auto-reclosing (79)
Power quality
Synchronism and energizing check (25)

Protection functions
Dir. and non-dir. overcurrent protection (50P, 51P, 67P)
Dir. and non-dir. earth-fault protection (50N, 51N, 67G)
Dir. and non-dir. negative-seq. overc. prot. (67Q, 46M)
Phase discontinuity protection (46PD)
Voltage protection (27, 59, 59G. 59N)
Frequency protection (81)
Load-shedding and restoration (1LSH)
Voltage-dependent overcurrent protection (51V)
Thermal protection for lines and cables (49F)
Multipurpose protection (MAP)
Inrush detection (68HB)
Circuit breaker failure protection (50BF)
Restricted earth-fault protection (87N)
Switch onto fault (SOTF)
Load blinder (21LB)
Arc protection (AFD)
Loss of phase, undercurrent protection (37)
Dir. negative-sequence impedance protection (Z2Q)

Three-winding transformer add-on ADD2
Stabilized differential protection for 3-winding transformers (87T3)

Busbar protection package APP9
High-impedance differential protection (87)
Current transformer supervision (CCM)

Tap-changer control package APP10
Power directional element (67P-TC)
Voltage regulator (90V)
Tap-changer position indication (84T)

Generator autosynchronizer package APP11
Autosynchronizer for generator circuit breaker (25AUTOSYNCG)

Network autosynchronizer package APP12
Autosynchronizer for network circuit breaker (25AUTOSYNCBT/T)

Petersen coil control package APP13
Petersen coil controller (90)

Diesel generator monitoring package APP14
Diesel generator monitoring (32/40G)

High-speed transfer device package APP51
High-speed bus transfer for one stand-by feeder (I<-->O BT)

High-speed transfer device package APP52
High-speed bus transfer for two stand-by feeders (I<-->O BT)

High-speed transfer device package APP53
High-speed bus transfer for three equal feeders (I<-->O BT)

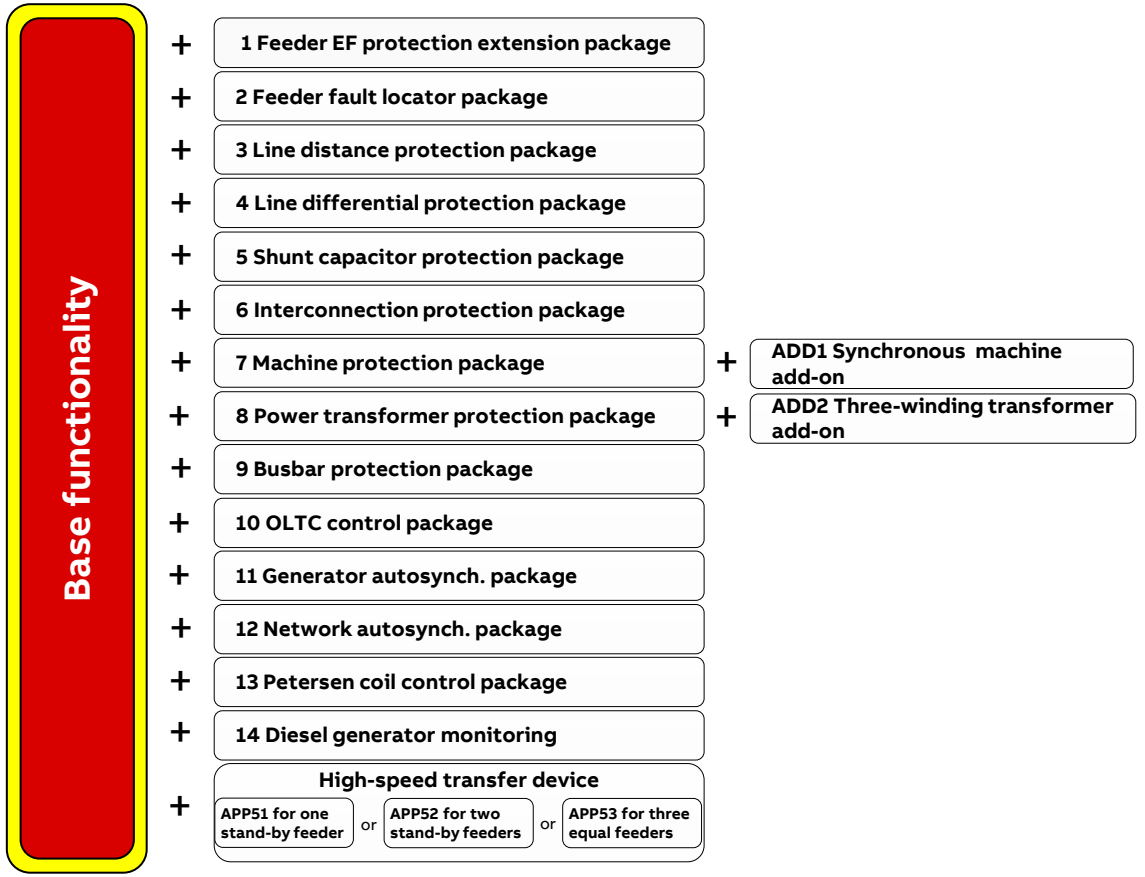
Application packages

Application packages

Base functionality

The base functionality is always included and contains:

- **All basic protection functionality[1)]**
  - Directional and non-directional overcurrent protection (50P, 51P, 67P)
  - Directional and non-directional earth-fault protection (50N, 51N, 50G, 51G, 67N, 67G)
  - Restricted earth-fault protection (87NLI, 87NHI)
  - Voltage protection (59, 27)
  - Frequency protection (81)
  - Load-shedding and restoration (81LSH)
  - Arc flash protection (AFD) – requires sensor interface module in the relay
- **All supervision and measurement functions**
- **Control functions for circuit breakers and disconnectors**



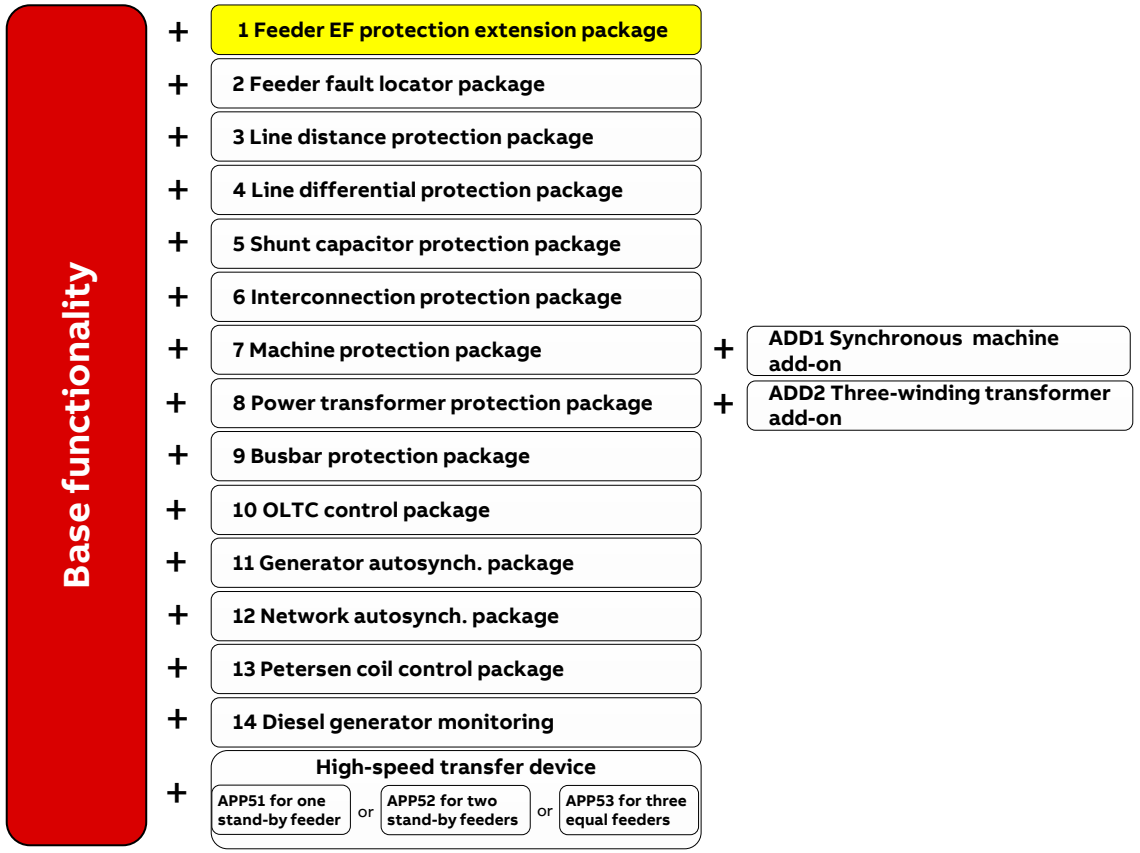
[1)] The listed functionalities are the ones most commonly used.

Application packages

Feeder EF protection extension package (APP1)

The functionality includes:

- Admittance-based earth-fault protection (67NYH)
- Multifrequency admittance-based earth-fault protection (67NYH)
- Touch voltage-based earth-fault protection (46SNQ, 59N)
- Wattmetric-based earth-fault protection (32N)
- Transient/intermittent earth-fault protection (67NTEF, 67NIEF)
- Harmonics-based earth-fault protection (51NH)
- Neutral power directional element (67N-TC)

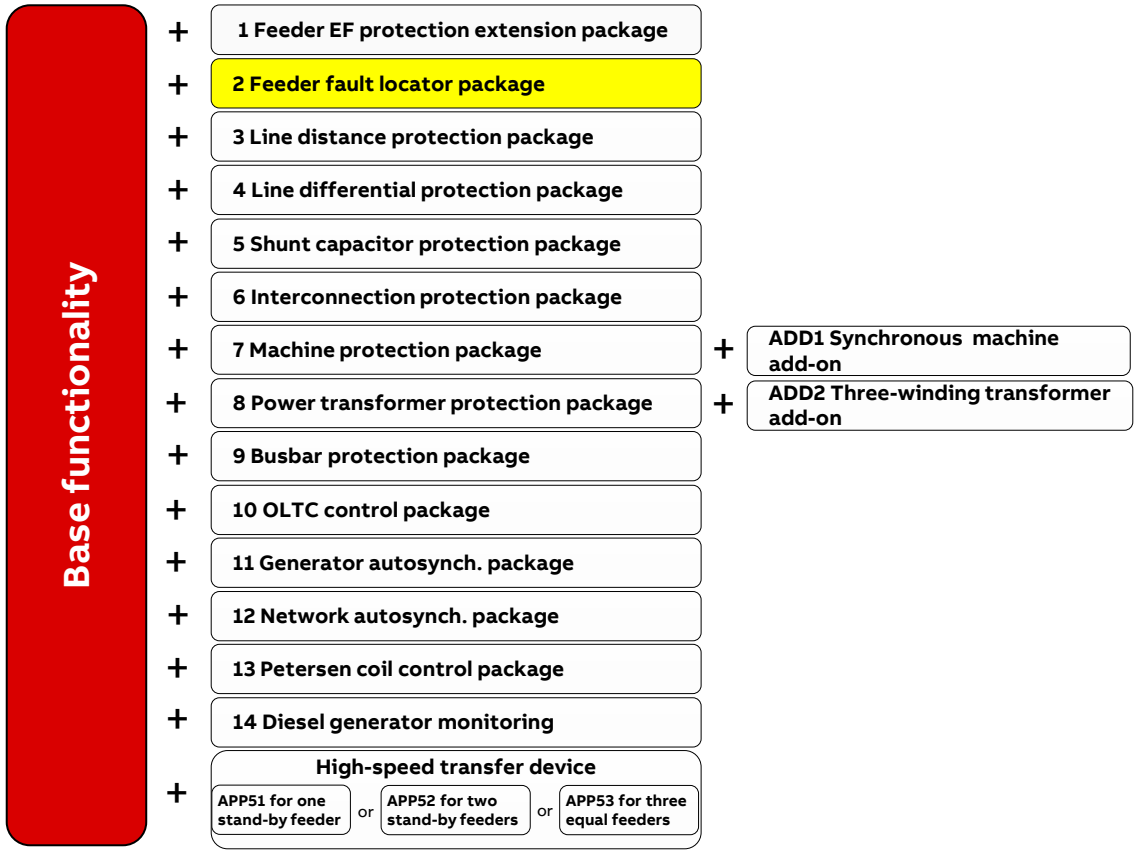


Application packages

Feeder fault locator package (APP2)

The functionality includes:

– Location of earth faults irrespective of the type of network, including compensated and isolated neutral networks (FLOC)



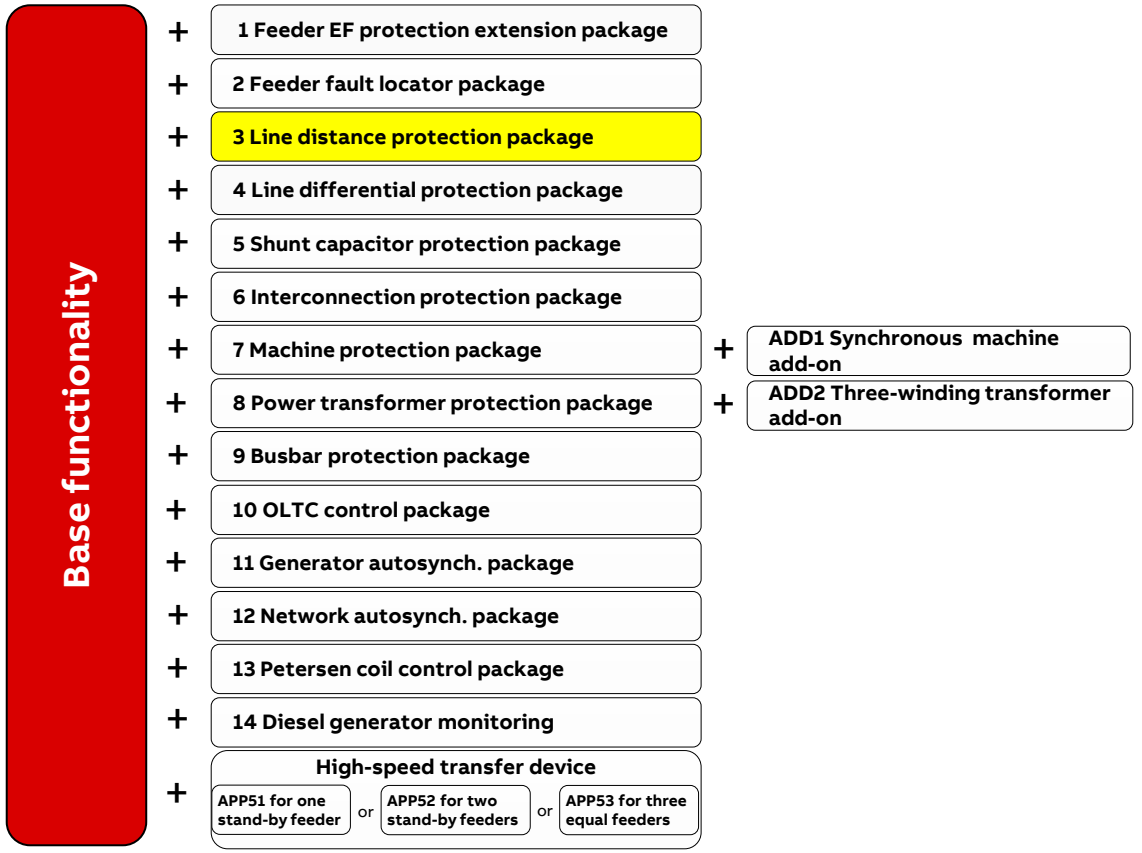
Application packages

Line distance protection package (APP3)

The functionality includes:

- Five-zone full scheme distance protection (21P, 21N)
- Power swing blocking (68)
- Scheme communication logic (85 21SCHLGC)
- Weak infeed and current reversal logic (85 21CREV, WEI)
- Local acceleration logic (21LAL)
- Scheme communication logic for residual overcurrent (85 67G/N SCHLGC)
- Weak infeed and current reversal logic for residual overcurrent (85 67G/N CREV, WEI)

The relay includes a dedicated optical protection communication channel for distances up to 50 kilometers that allows transferring up to 16 binary signals between the line ends.



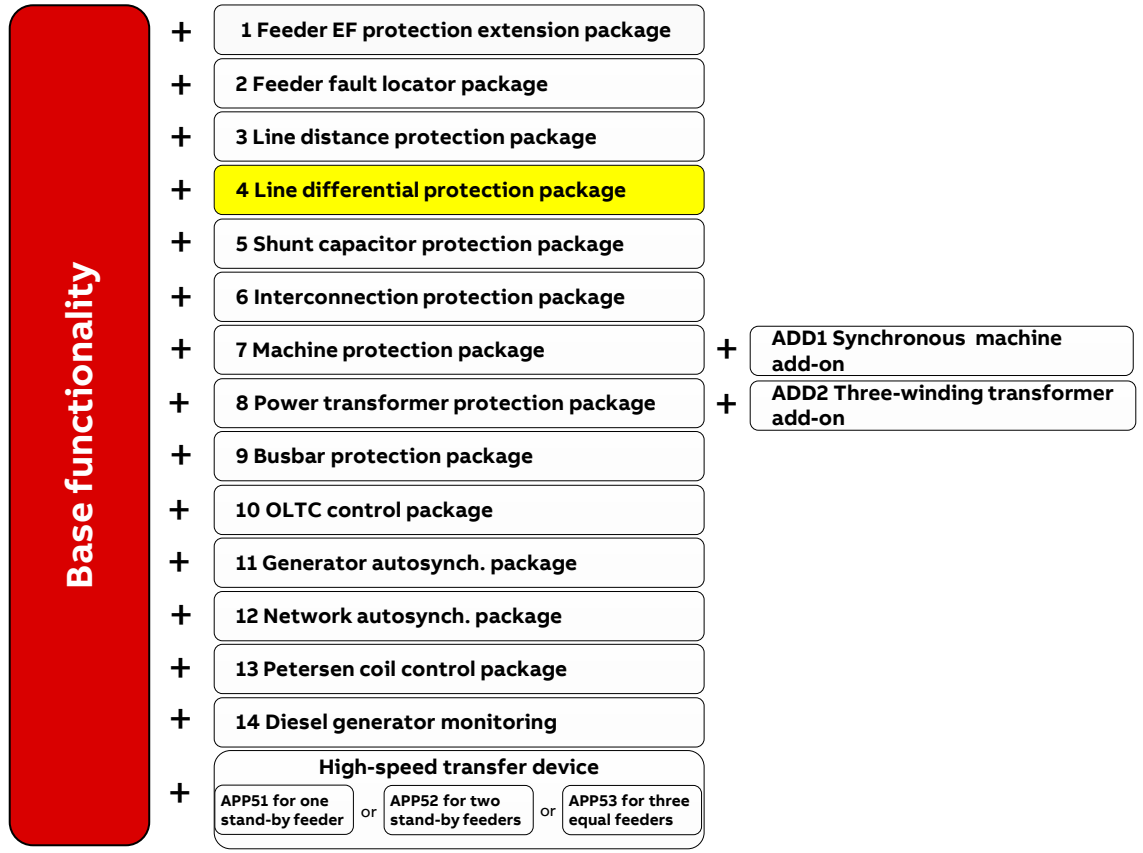
Application packages

Line differential protection package (APP4)

The functionality includes:

- Phase-segregated line differential protection (87L)
  - Biased low-set stage and unbiased high-set stage
  - Support for applications with an in-zone transformer
- Protection communication via an inbuilt dedicated optical link
  - Maximum distance with optical link: 50 km

The protection communication channel allows transferring up to 16 binary signals between the line ends (BST).

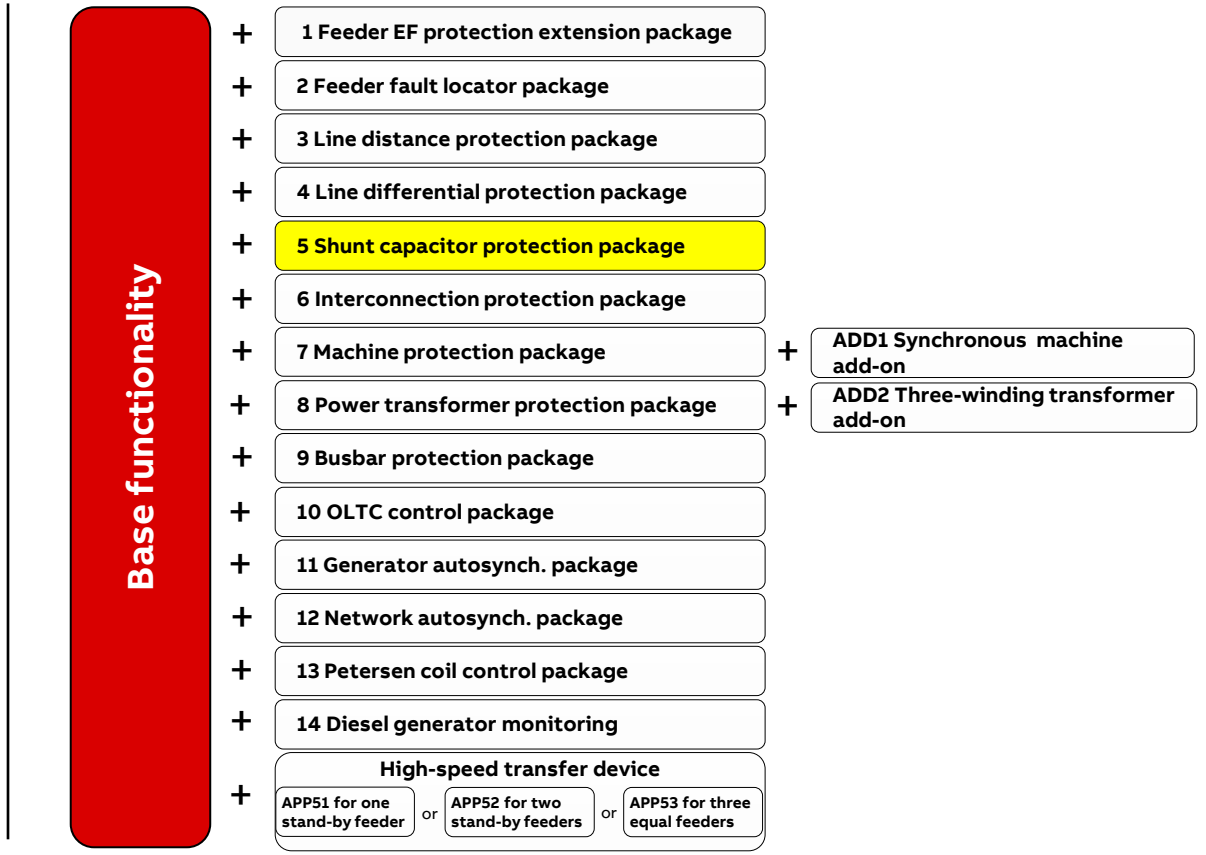


Application packages

Shunt capacitor protection package (APP5)

The functionality includes:

- Thermal overload protection (51, 37, 86C)
- Unbalance protection (60N, 60P)
- Switching resonance protection (55ITHD)
- Compensated neutral unbalance voltage protection (59NU)
- Single Y, double Y and H-bridge banks
- Filter circuits
- Earthed and unearthed installations

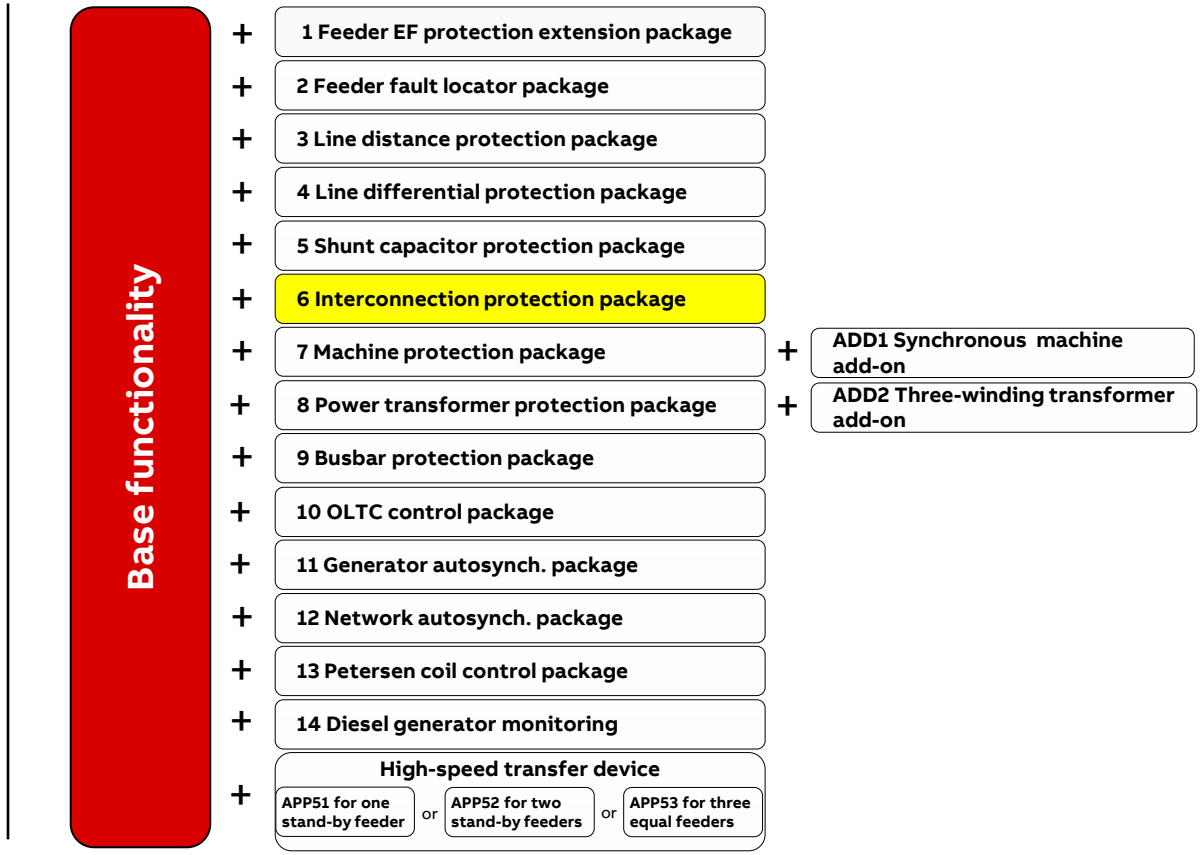


Application packages

Interconnection protection package (APP6)

The functionality includes:

- Directional power protection (67P-TC)
- Overvoltage variation protection (59.S1)
- Low-voltage ride-through protection (27RT)
- Vector shift protection (78VS)
- Directional reactive power undervoltage protection (32Q, 27)
- Reverse power/directional overpower protection (32R/32O)
- Under power factor protection (55U)



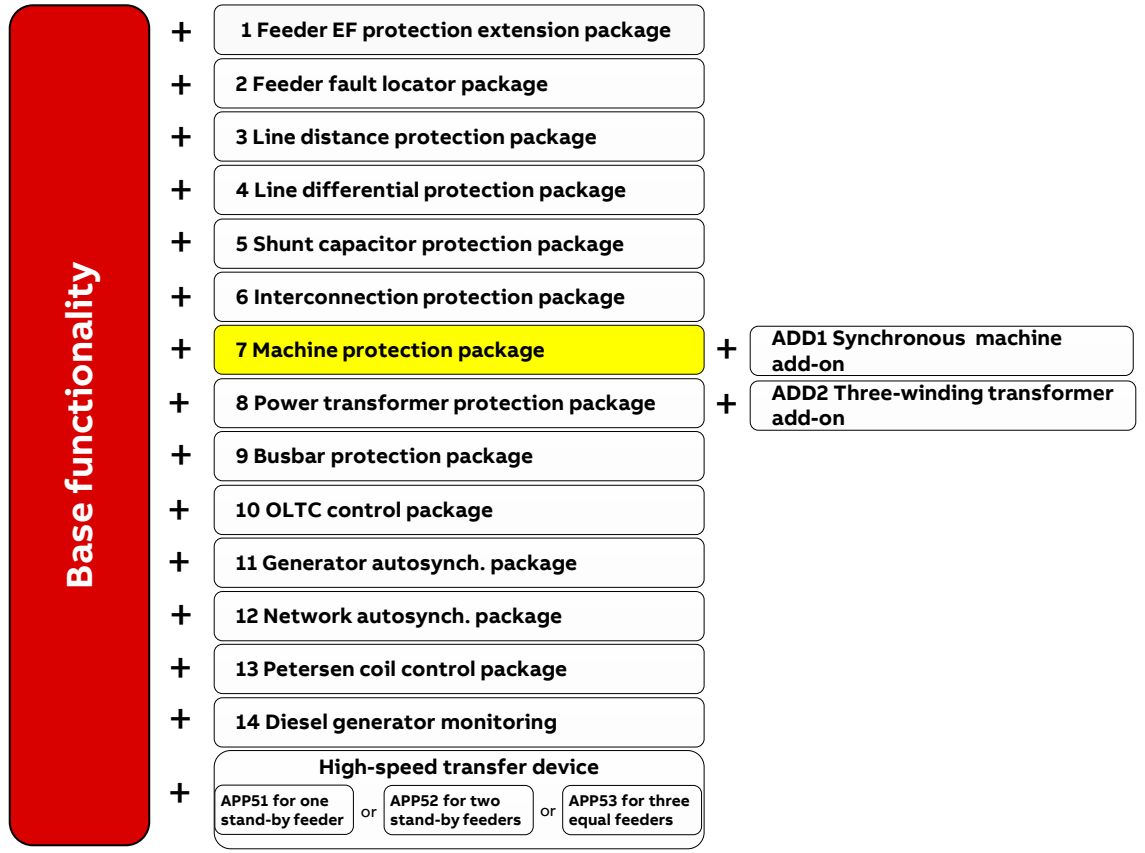
Application packages

Machine protection package (APP7)

The functionality includes:

- Thermal overload protection (49M)
- Rotor thermal overload protection (49R)
- Reverse power/directional overpower protection (32R/32O)
- Low-impedance differential protection (87M, 87G)
- High-impedance differential protection (87)
- Flux-balance differential protection (87HIM)
- Negative-sequence overcurrent protection (46M)
- Loss of load protection (37)
- Load jam protection (50TDJAM)
- Start-up supervision (49, 66, 48, 50TDLR)
- Phase reversal protection (46R)
- Emergency start-up (EST, 62)
- Start-up counter (66)

Note! Additional functionality is available in the add-on package.

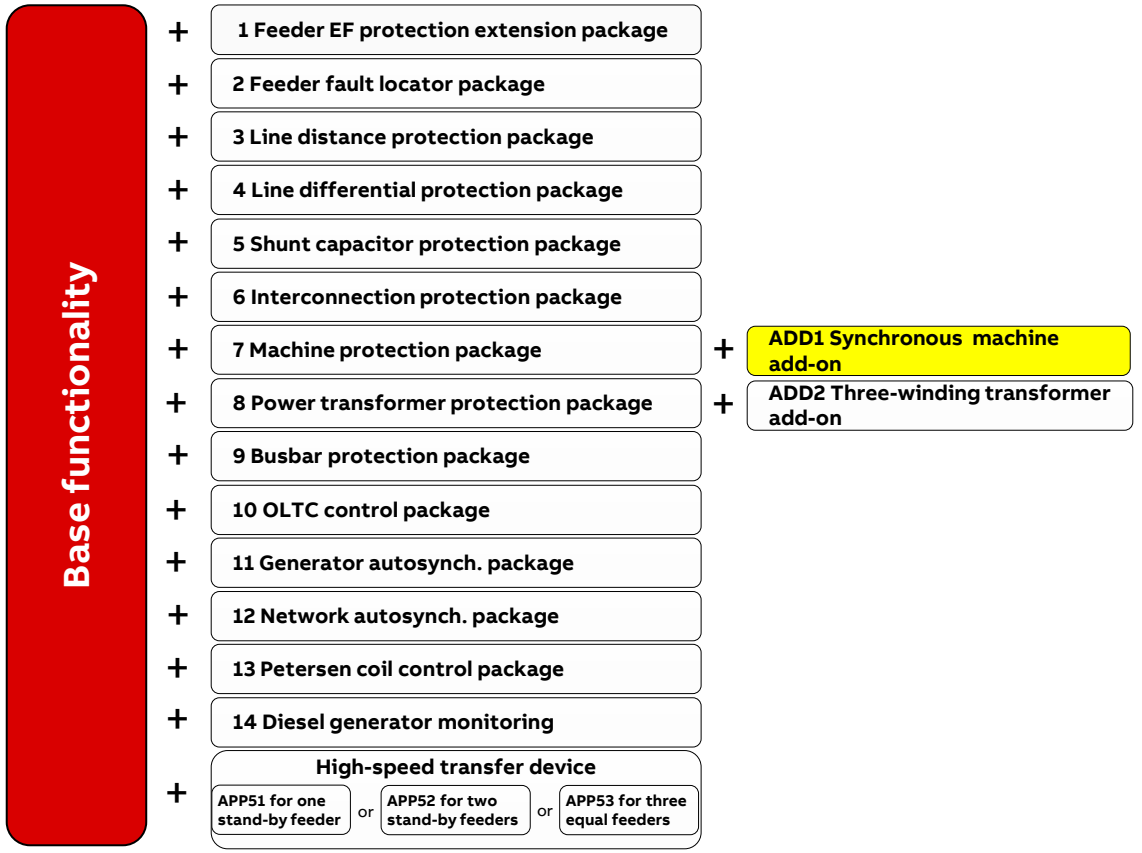


Application packages

Synchronous machine add-on (ADD1)

The functionality includes:

- Overexcitation (V/Hz) protection (24)
- Underpower protection (32U)
- Underimpedance protection (21G)
- Underexcitation protection (40)
- 100% stator earth-fault protection, third harmonic-based (64TN)
- 100% rotor earth-fault protection, injection-based (64R)
- Out-of-step protection (78PS)
- Generator shaft current leakage protection (38, 51)
- Accidental energization protection (27, 50)
- Thermal overload protection with two time constants (49T/G/C)



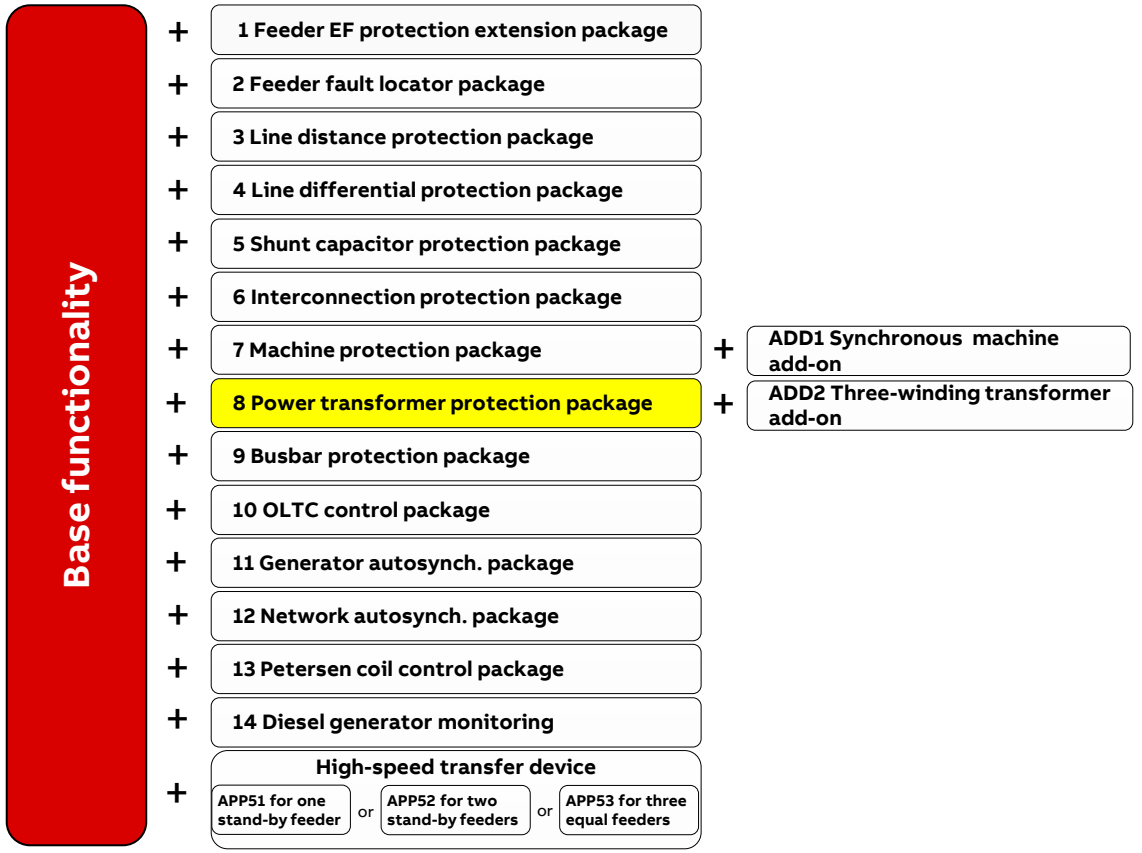
Application packages

Power transformer protection package (APP8)

The functionality includes:

- Low-impedance differential protection for two-winding transformers (87T)
- High-impedance differential protection (87)
- Overexcitation (V/Hz) protection (24)
- Thermal overload protection with two time constants (49T/G/C)
- Directional overpower protection (32O)
- Directional underpower protection (32U)
- Underimpedance protection (21G)
- Tap changer position indication (84T)
- Hotspot and ageing monitoring (26/49HS)

Note! Additional functionality is available in the add-on package.

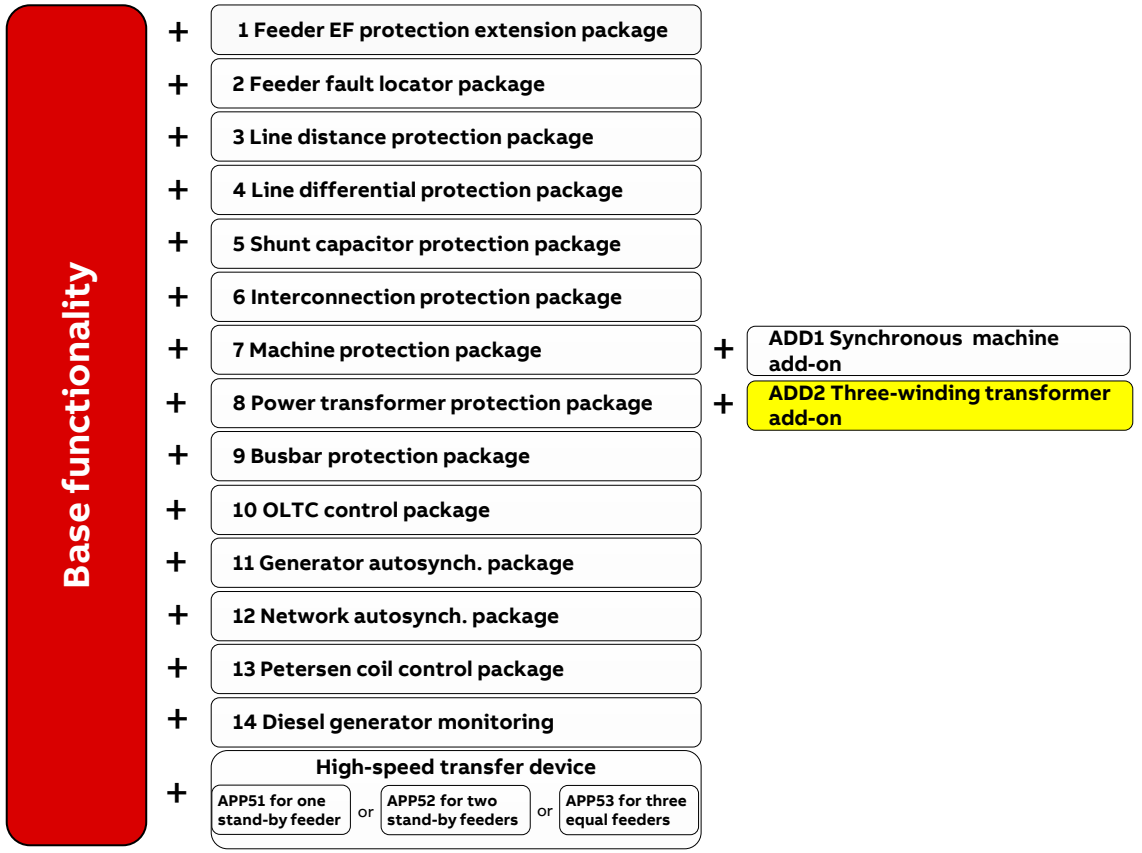


Application packages

Three-winding transformer add-on (ADD2)

The functionality includes:

– Low-impedance differential protection for two or three-winding transformers (87T3)

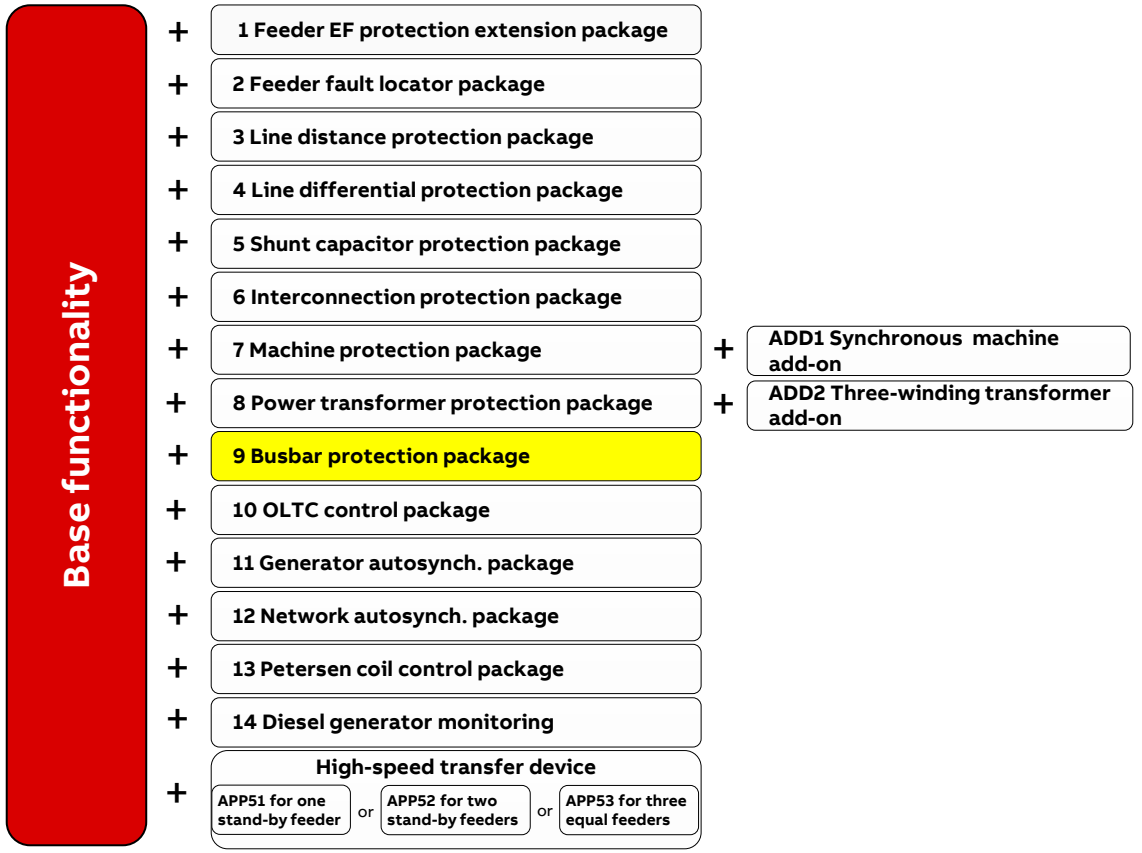


Application packages

Busbar protection package (APP9)

The functionality includes:

- High-impedance differential protection (87)
- Zone A + Zone B + Check zone
- Current circuit supervision for all zones (CCM)

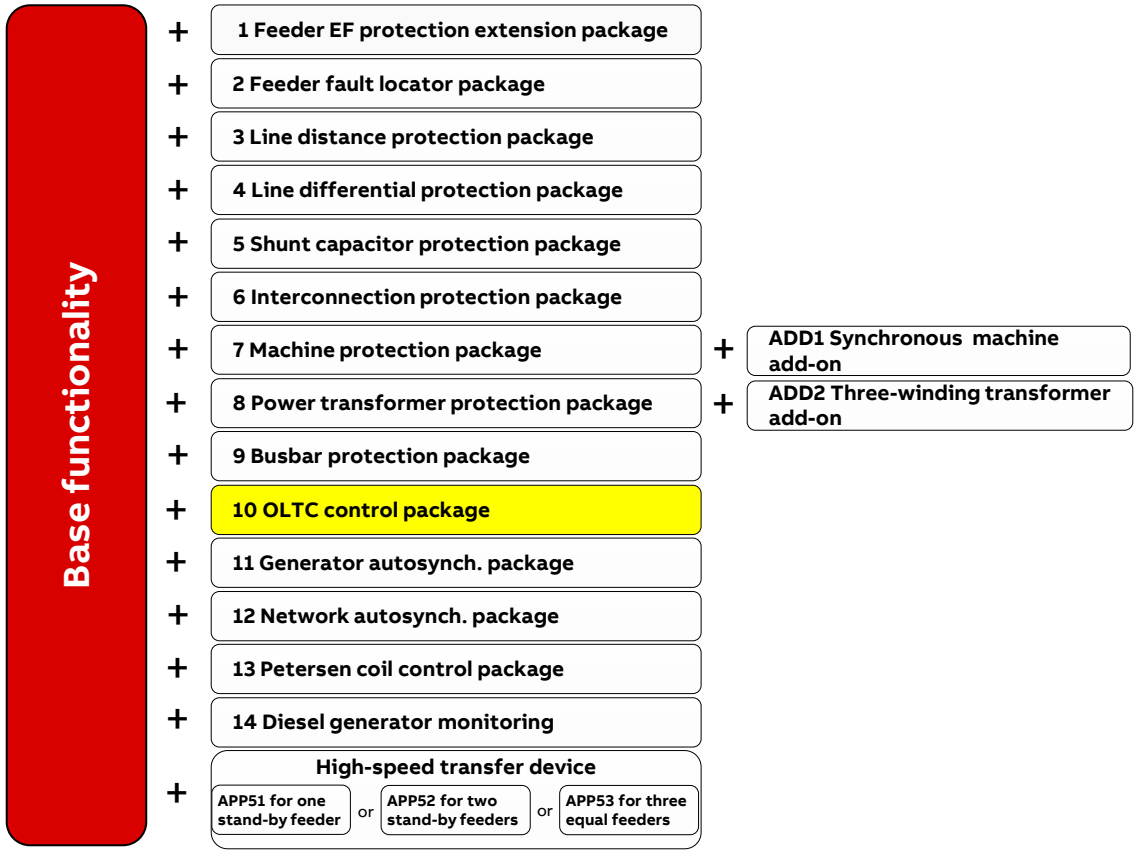


Application packages

OLTC control package (APP10)

The functionality includes:

- Automatic voltage regulator (90V)
  - Also during changes in the power flow direction
- Tap-changer position indication (84T)
- Three-phase power directional element (67P-TC)
- Up to 6 parallel running power transformers with the following schemes:
  - Master/Follower
  - Minimizing circulating current

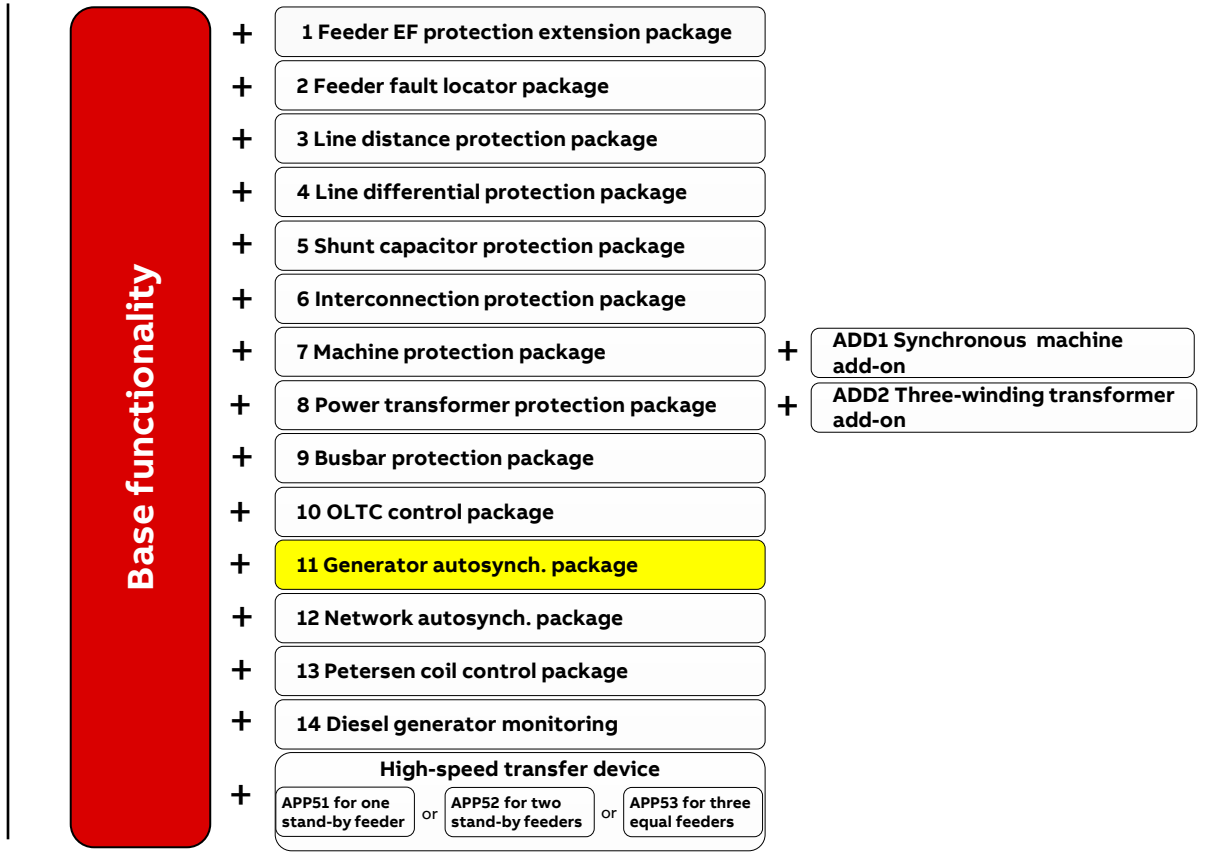


Application packages

Generator autosynchronizer package (APP11)

The functionality includes:

- Synchronized closing of a generator circuit breaker (25AUTOSYNCG)
- Inbuilt synchrocheck functionality
- Automatic, semiautomatic and manual operation modes
- Remote control via DCS/SCADA
- Features enabled via the LHMI/SHMI:
  - Start of synchronization process
  - Selection of operation mode
  - Synchroscope
  - Double voltage and frequency meters
  - Control points for generator voltage and frequency
  - Manual “Close”-command for manual and semiautomatic modes

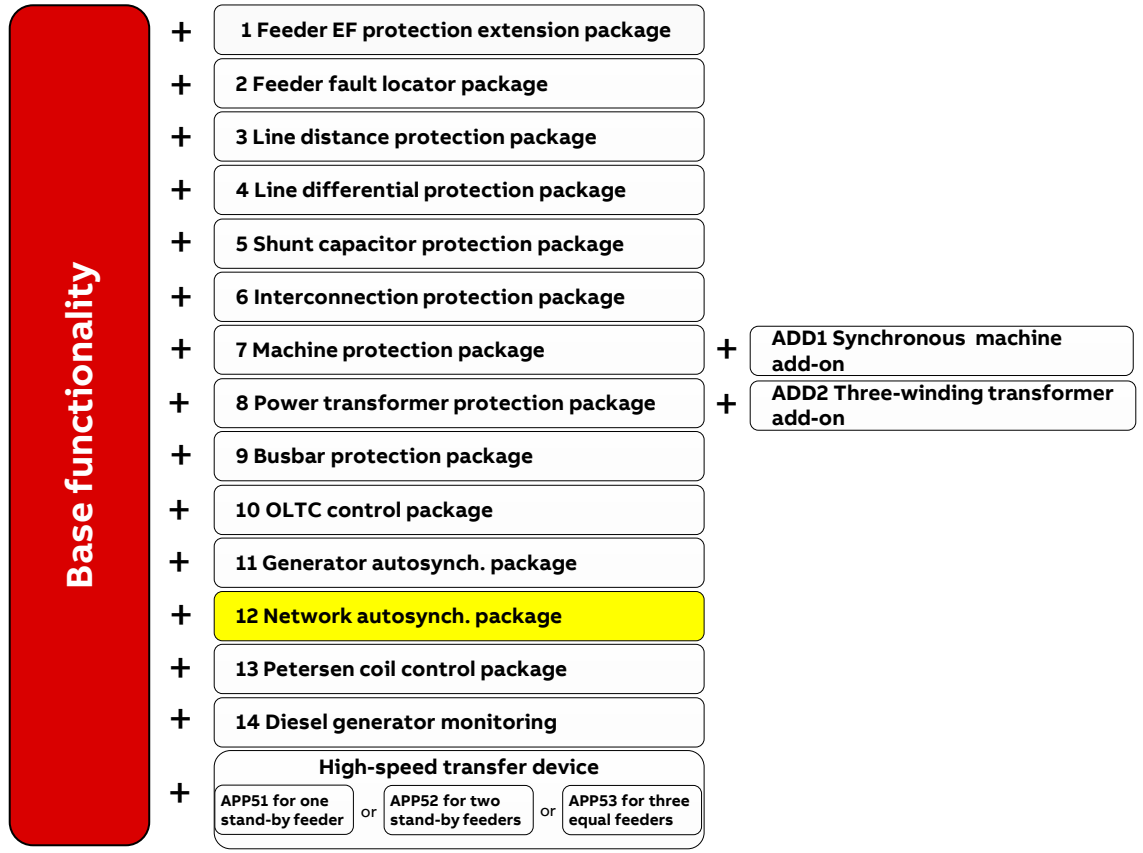


Application packages

Network autosynchronizer package (APP12)

The functionality includes:

- Synchronized closing of a non-generator circuit breaker (25AUTOSYNCBT/T)
- A maximum of 8 generator circuit breakers and 17 non-generator circuit breakers
- Modeling of the network switching status to ensure engaging the right generators of the available ones
- Controls and measurements for the synchronization process accessible via the LHMI/SHMI

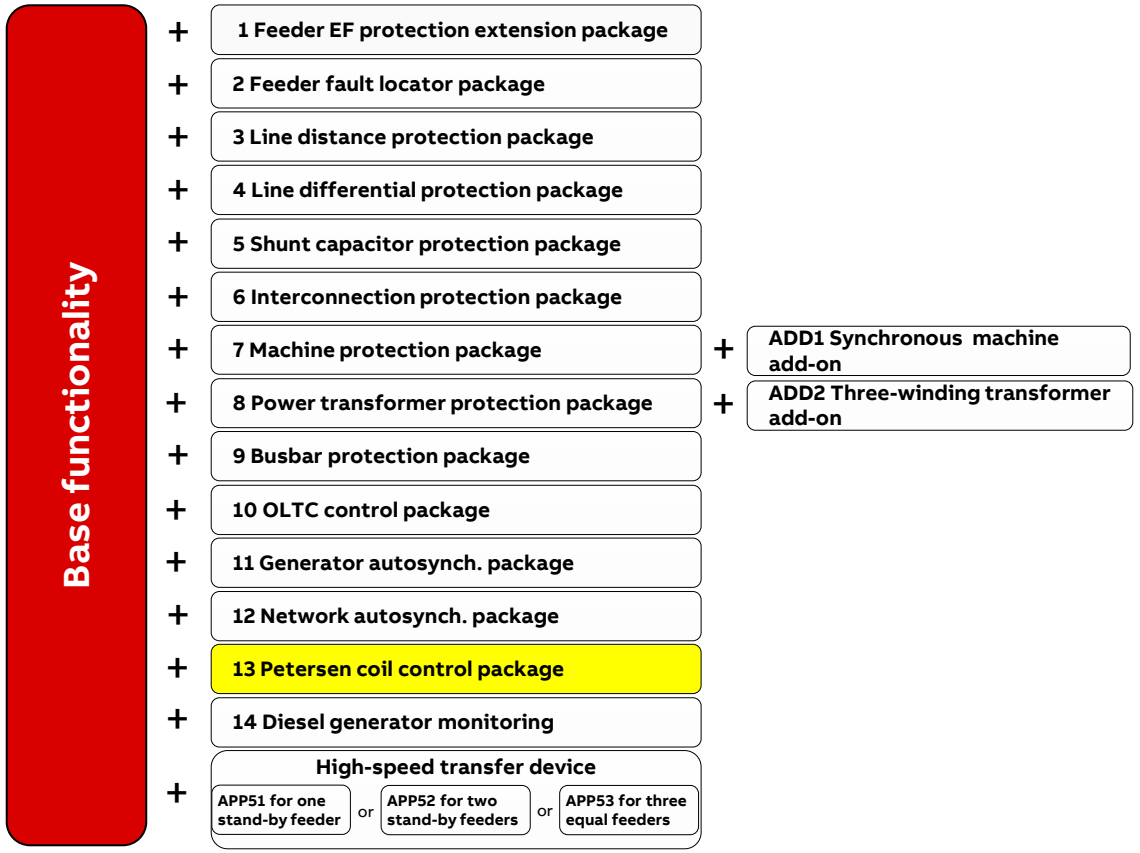


Application packages

Petersen coil control package (APP13)

The functionality includes:

- Petersen coil controller (90)
  - Control based on the healthy-state residual voltage
  - Control enhanced by the measured coil current
  - User-defined parameters for connecting and disconnecting the coil's parallel resistance
  - Control for an additional fixed-type parallel coil
- LHMI/SHMI as a manual control point and visualizing control-related measurements, such as the V-curve



Application packages

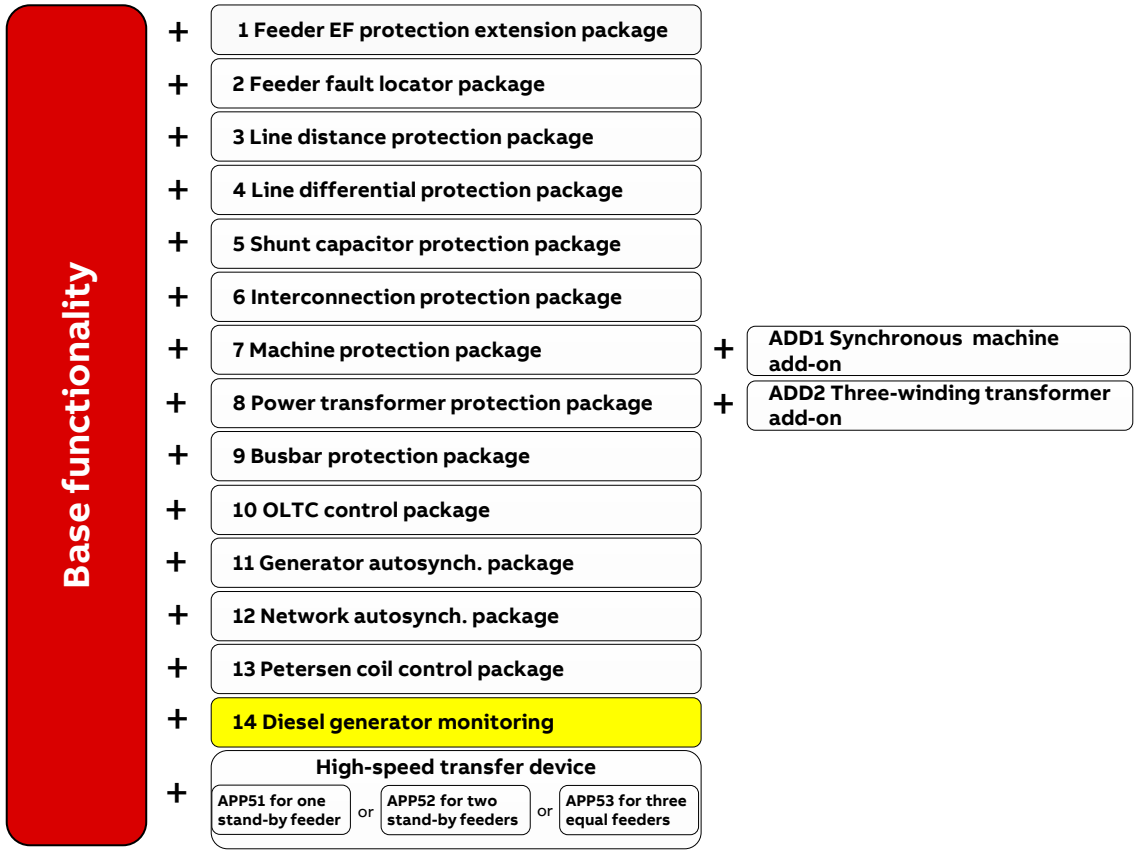
Diesel generator monitoring (APP14)

Identify and disconnect an oddly behaving diesel generator set before the fault cascades into the neighboring units and causes a complete shutdown

The functionality includes:

- Diesel generator monitoring (32/40G)
  - Detection of under/over fueling of the engine
  - Detection of under/over excitation of the generator
- Support for up to 8 diesel generator sets running in parallel
- GOOSE (General Object Oriented Substation Event) required for communication between the diesel generator sets

Note! APP14 is required for each diesel generator set.

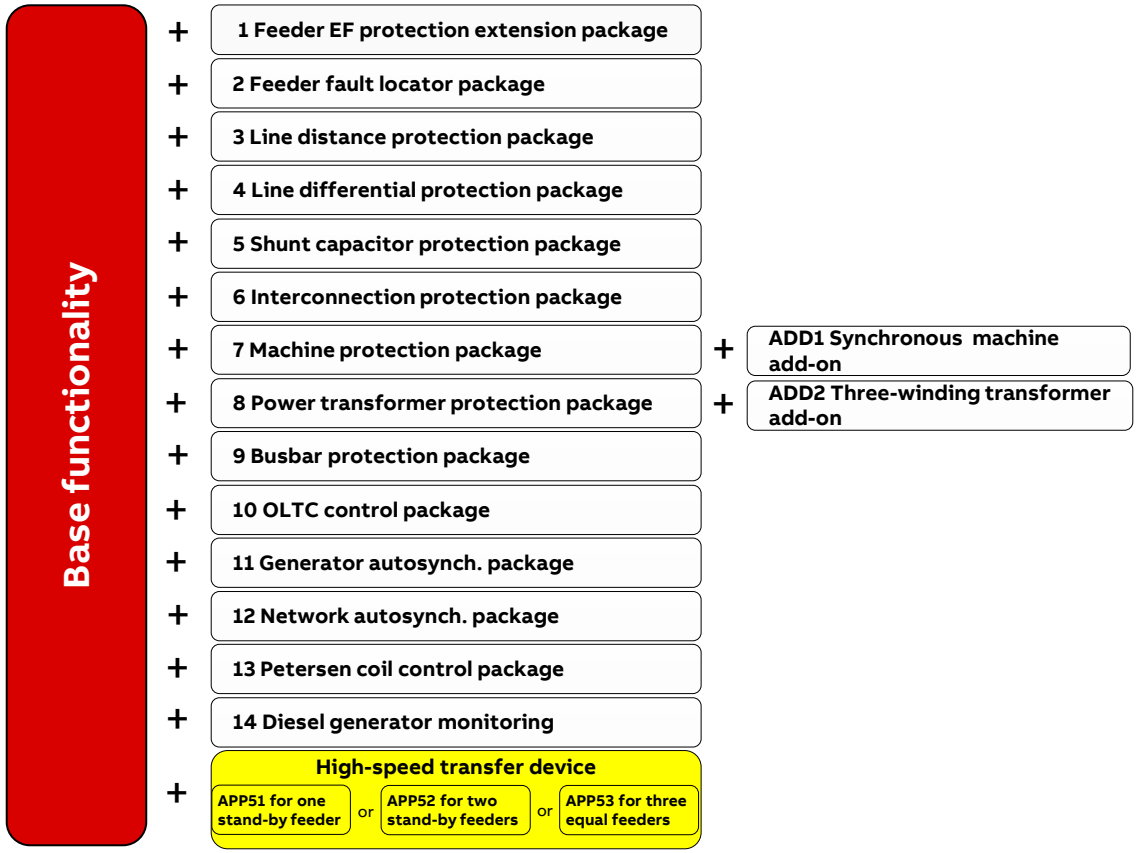


Application packages

High-speed transfer device (HSTD)

REX640 features three alternative application packages offering high-speed bus transfer functionality (I<-->O BT):

- APP51 for one stand-by feeder
- APP52 for two stand-by feeders
- APP53 for three equal feeders



Software and hardware modularity

Software and hardware modularity

Freedom of modification to support changing requirements

Modular and scalable software and hardware for maximum flexibility throughout the relay's entire life cycle

Customer-oriented license-based relay modification concept for adding software and/or hardware as requirements change

Modifications can be done by:

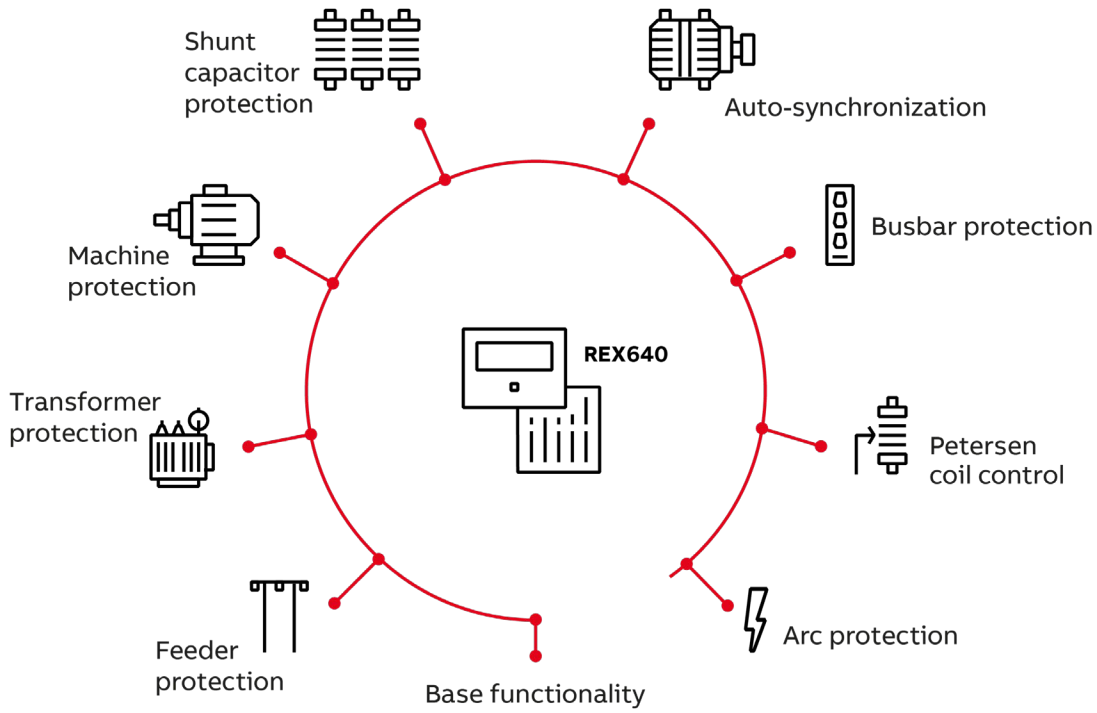
- ABB service channels
- Third-party service providers
- End users on-site – with or without network or cloud access

Continuous and easy access to the latest software and hardware developments

Draw-out type design for easy addition and replacement of modules

Swift replacement of modules – shortened Mean Time to Repair (MTTR)

Conformal coating available for outstanding performance also in the most extreme environments



Software and hardware modularity

Hardware highlights

Up to 20 measurement channels for currents and voltages

Ability to receive four streams of sampled measured values (SMV) via IEC 61850-9-2 LE-based process bus communication

Support for both conventional instrument transformers and sensors

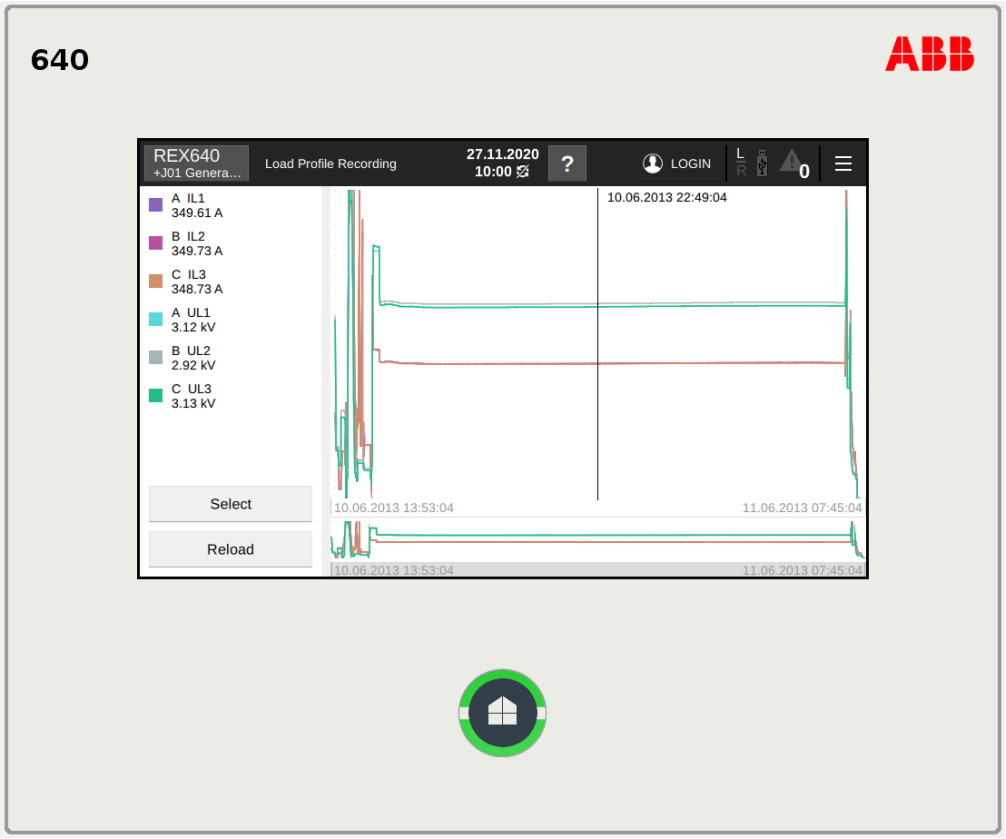
One or two optional RTD modules

- 10 RTD inputs and 2 mA channels (inputs/outputs)
- 3 RTD inputs, 6 mA channels (inputs/outputs) and 12 binary inputs

Settable binary input threshold and hysteresis level for each BIO module

Optional BIO modules with high-speed static power outputs (SPO)

Four arc flash sensor inputs (both loop and lens-type) – all supervised



Human-machine interface (HMI)

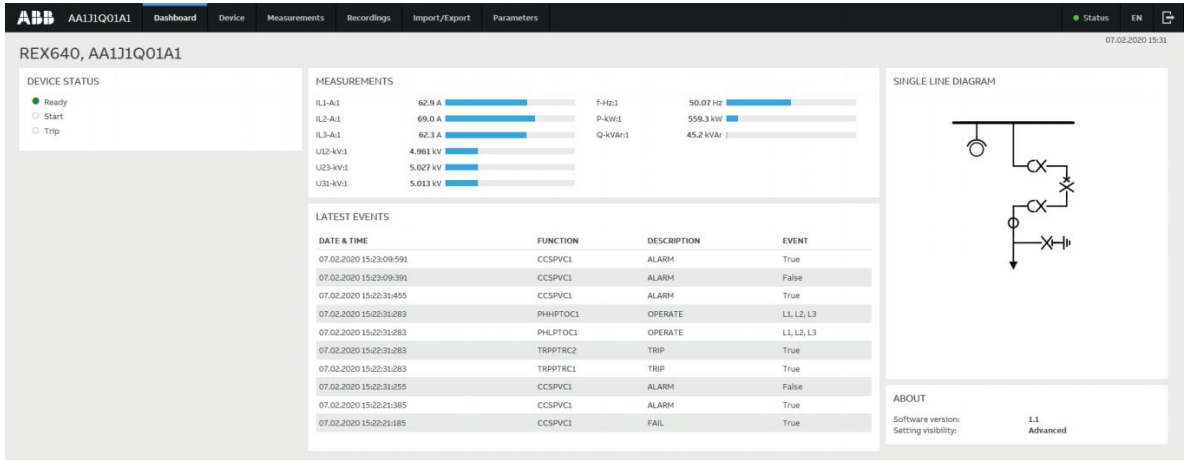
Human machine interface (HMI)

HMI options (1/3)

REX640 offers three HMI options:

– Web HMI (WHMI) only (always included) and no physical HMI
  - Reduced installation costs
  - REX640 fully operational but no control operations possible

– Panel/Bay-level local HMI (LHMI)
  - Increased situational awareness and ease of use with visualized detailed power distribution process information
  - Possibility to connect the LHMI either to the relay or station communication network for increased operator safety

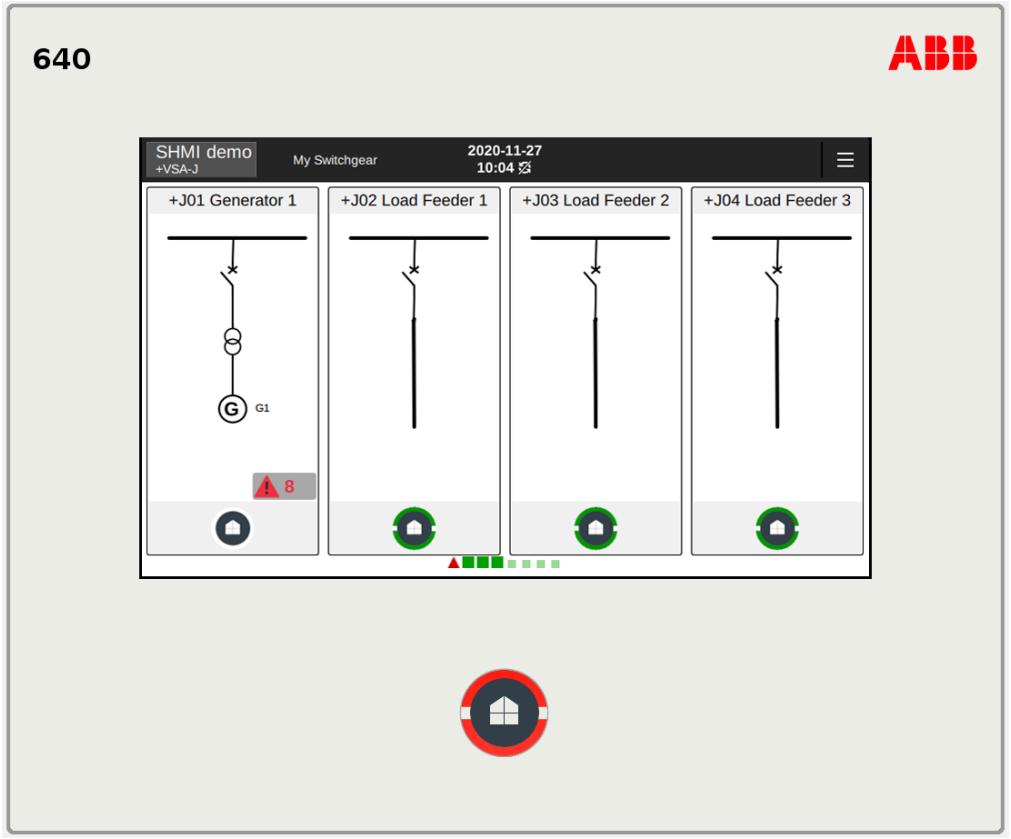


Human machine interface (HMI)

HMI options (2/3)

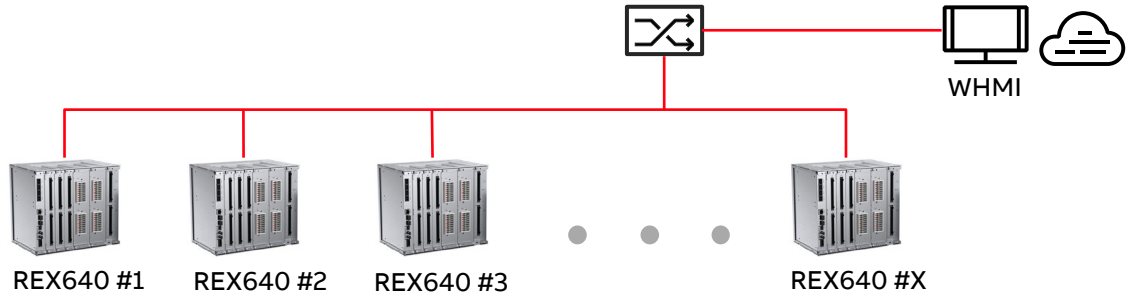
– Switchgear HMI (SHMI)
  - Complete lineup status for optimal switchgear visibility
  - Ability to cover up to 20 REX640 relays with one SHMI
  - Full LHMI functionality available on bay/panel level – by selecting one at a time – such as alarms, events and disturbance records
  - Always connected to the station communication network to allow installation away from the switchgear for increased operator safety
  - Automatic storing of configuration backups for relays connected to the SHMI
  - Relay costs reduced by up to 15% with SHMI instead of LHMI
  - Optimal and cost-efficient option especially when site visits are rare but the intuitive HMI is appreciated

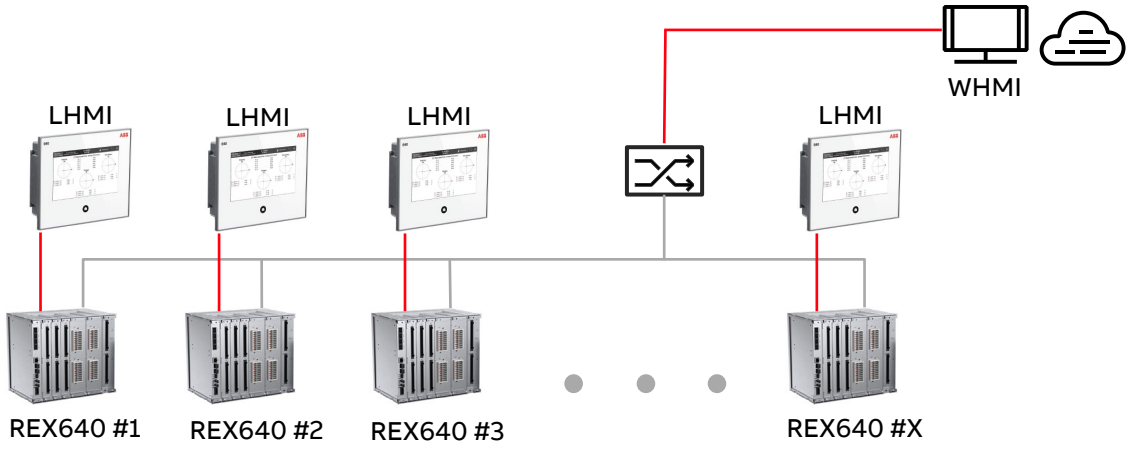
Note! The relay can be connected either to an LHMI or an SHMI but not to both at the same time.

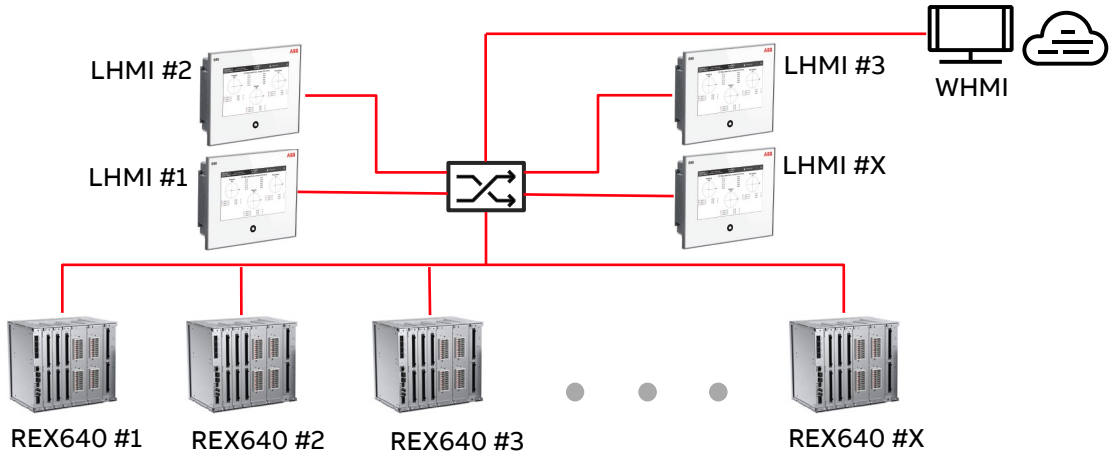


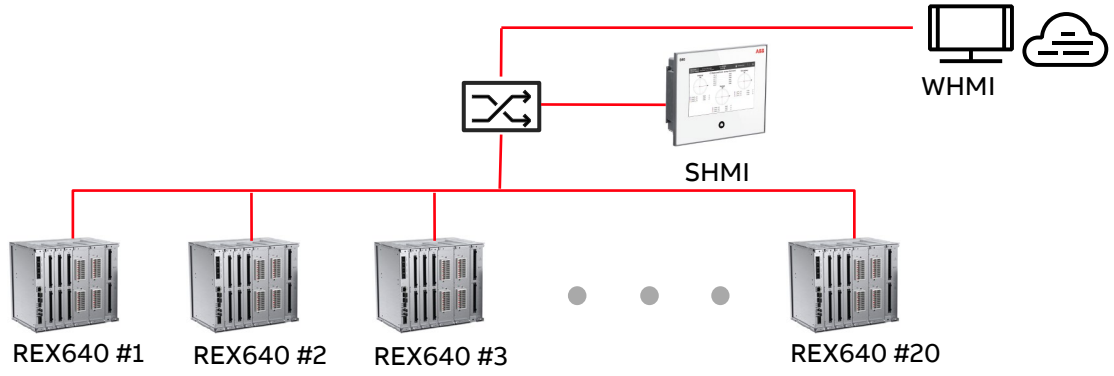
Human machine interface (HMI)

HMI options (3/3)









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Human machine interface (HMI)

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.

Human machine interface (HMI)

Easy operation and engineering

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

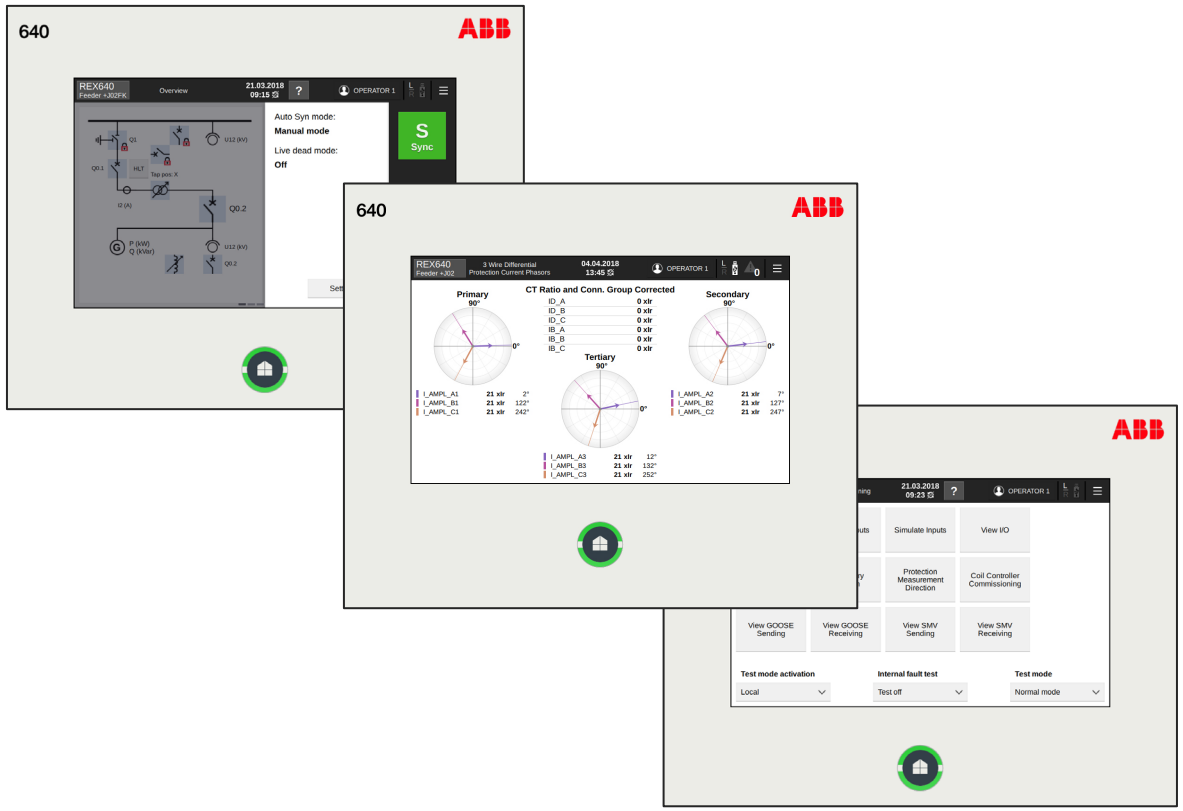
Ready-made application-based pages, symbol libraries and widgets for less graphical engineering – saving both time and efforts

Possibility to customize symbols and pages, if necessary, using ABB's relay setting and configuration tool – PCM600

Clear and sharp visualization of complex single line diagrams (SLDs) and power distribution process information

A rugged 7-inch industrial-grade color touch screen suitable for demanding (IP54) environments

Home button with color indication of relay and process statuses



Product features

Product features

Arc protection

Four optical arc flash sensor inputs

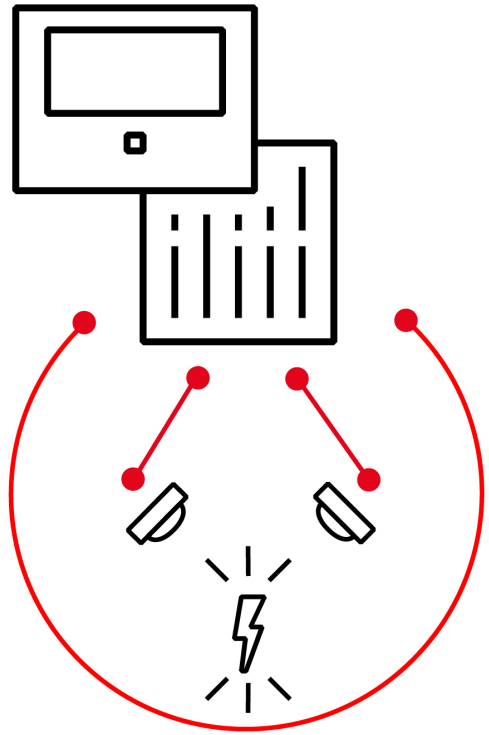
Free mixture of loop and lens-type sensors

All sensor types supervised

Optional shielded loop-type sensor (blind) extensions to limit the arc detection area (prevent accidental operation) – two meters from the relay*)

Free allocation of trip signals for cost-efficient and selective protection schemes

GOOSE signaling and high-speed SPOs for enhanced scheme performance



*) Available only for plastic loop-type sensors (≤30 m)

Product features

Communication

Ethernet communication

Optical or galvanic Ethernet ports

- HSR or PRP
- IEEE 1588 v2 time synchronization

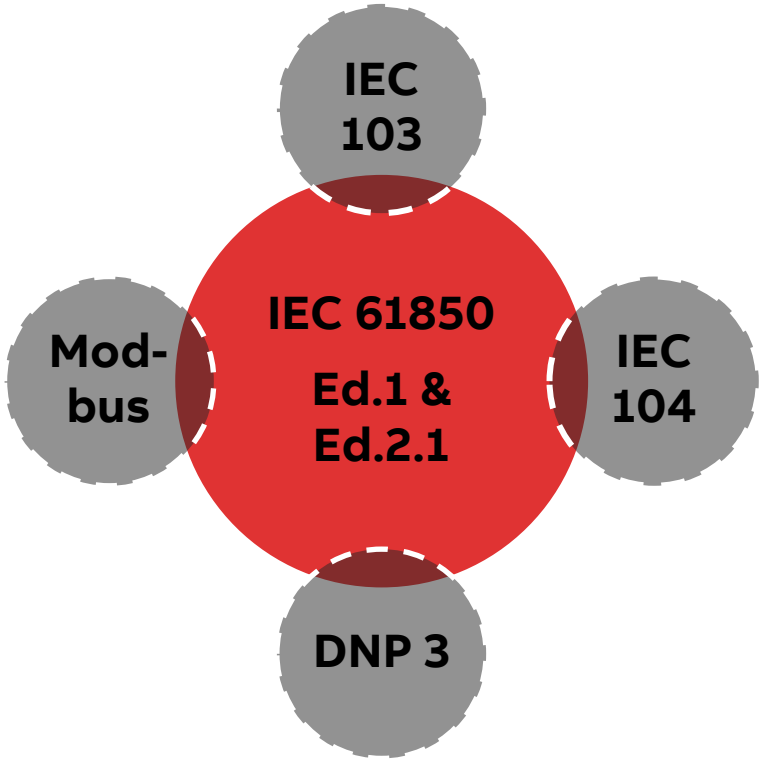
Optical or galvanic interlink port

- Remote I/O
- Tool connection

Double IP address for configuring a second network (horizontal and vertical communication) – only available when serial communication is not required

Flexible product naming (FPN) to facilitate the mapping of the relay's IEC 61850 data model to that of the customer

Secure communication as an option for DNP3 and IEC 60870-5-104



Serial communication

Optical and galvanic serial ports

- IRIG-B time synchronization

Additional optical or galvanic Ethernet ports

- HSR or PRP
- IEEE 1588 v2 time synchronization

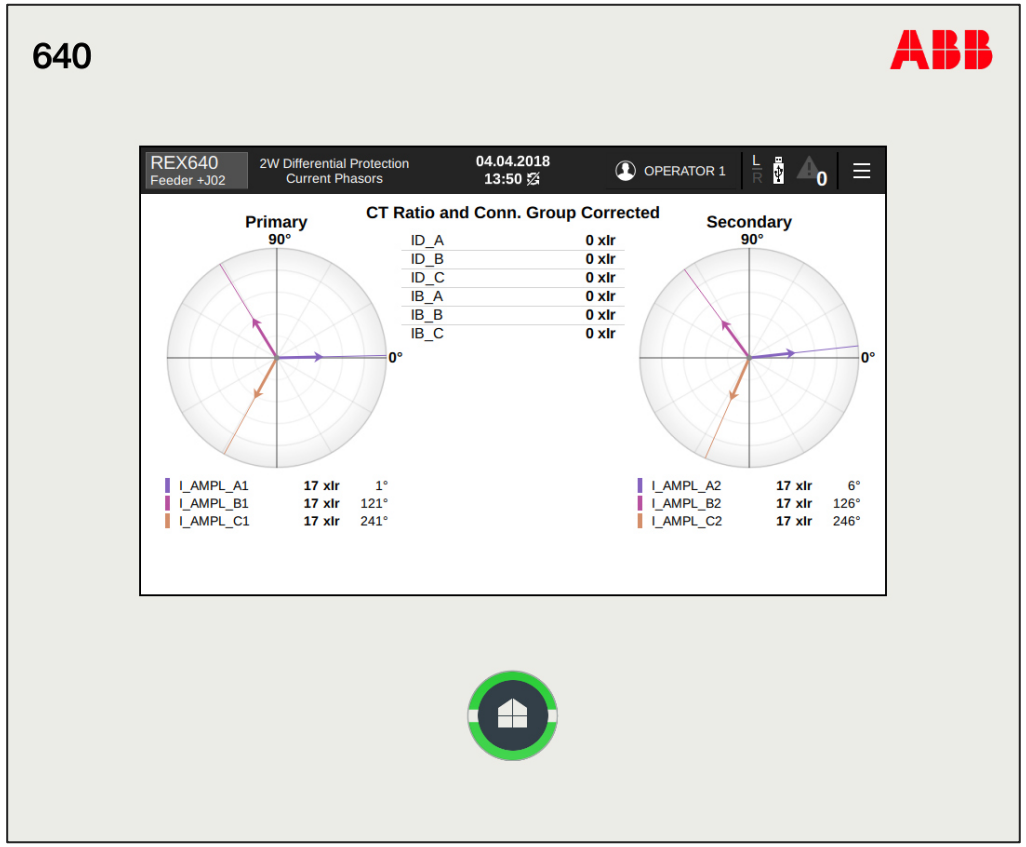
Product features

Protection communication

REX640 offers dedicated optical point-to-point communication between line ends:

- Line differential protection
  - Measured current values per phase
  - Inter-trip signals
  - Freely configurable binary signals
- Line distance protection
  - Binary signals for scheme communication
  - Freely configurable binary signals
- Directional earth-fault protection
  - Binary signals for scheme communication

Note! Communication distances of up to 50 kilometers are possible – with full supervision.



Product features

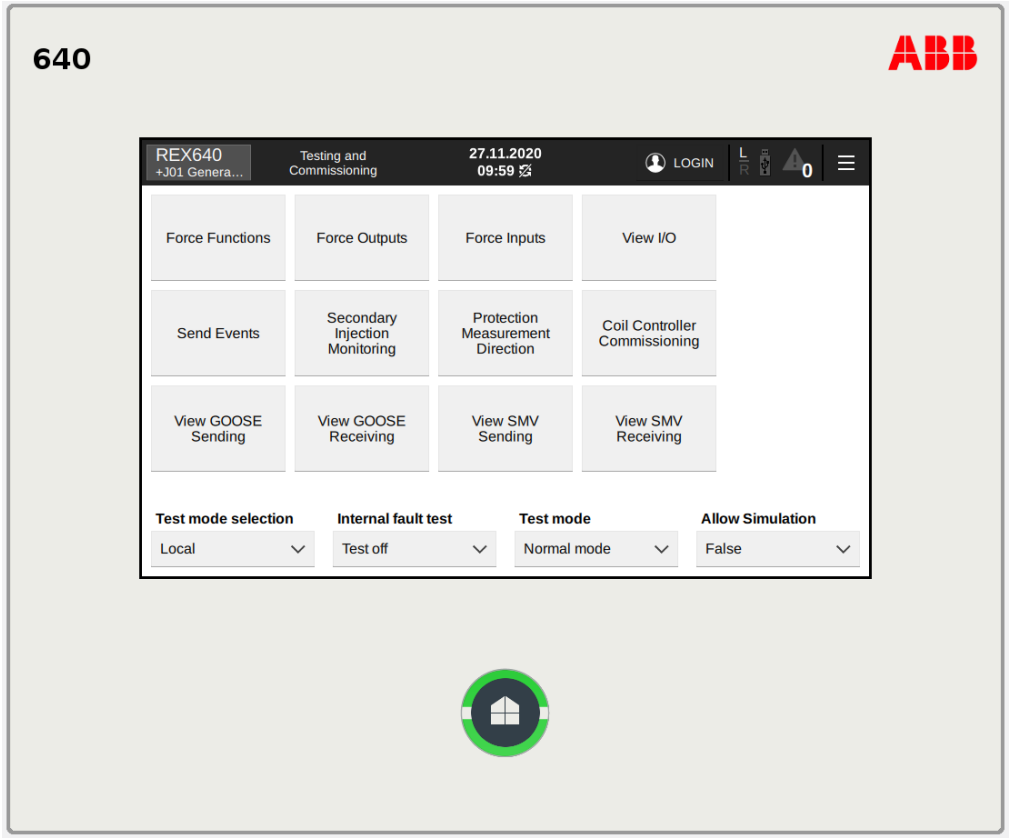
IEC 61850 GOOSE and SMV

IEC 61850-8-1 GOOSE

- Full support for both binary and analog data
  - Enhancing performance
  - Enabler for new applications
- Support for receiving simulated GOOSE messages to facilitate the testing of digitalized protection and control schemes in substations

IEC 61850-9-2 LE SMV

- Current and voltage samples
- Sending one stream
- Receiving up to four full streams
- Automatic switching between received streams
  - Bus voltage change-over in double busbar switchgears
  - Main and backup measurement



Product features

Analog measurements

Directly connected measurements:

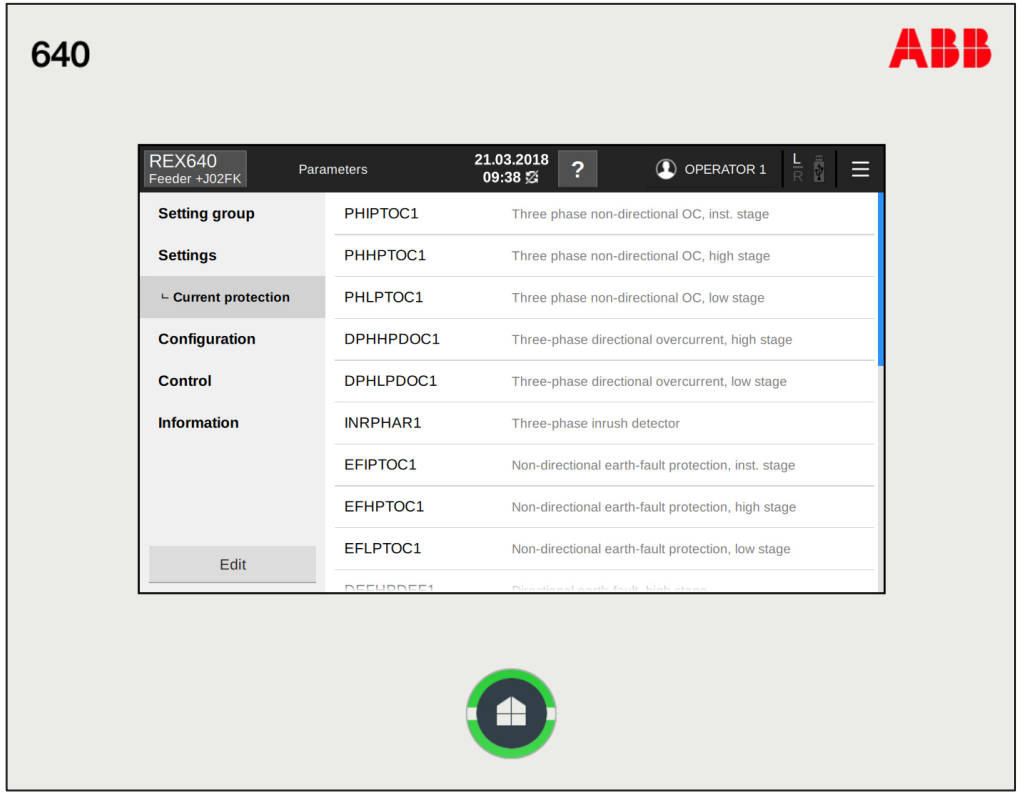
- Conventional instrument transformers
- Non-conventional instrument transformers
- Relay's internally calculated values
- RTD-based temperature measurements
- mA-based process measurements

Measurements via communication:

- IEC 61850-8-1 analog GOOSE
- IEC 61850-9-2 LE SMV

Freely connectable channels to the application

- PCM600 ACT functionality (Application Configuration Tool)



Product features

Autosynchronization

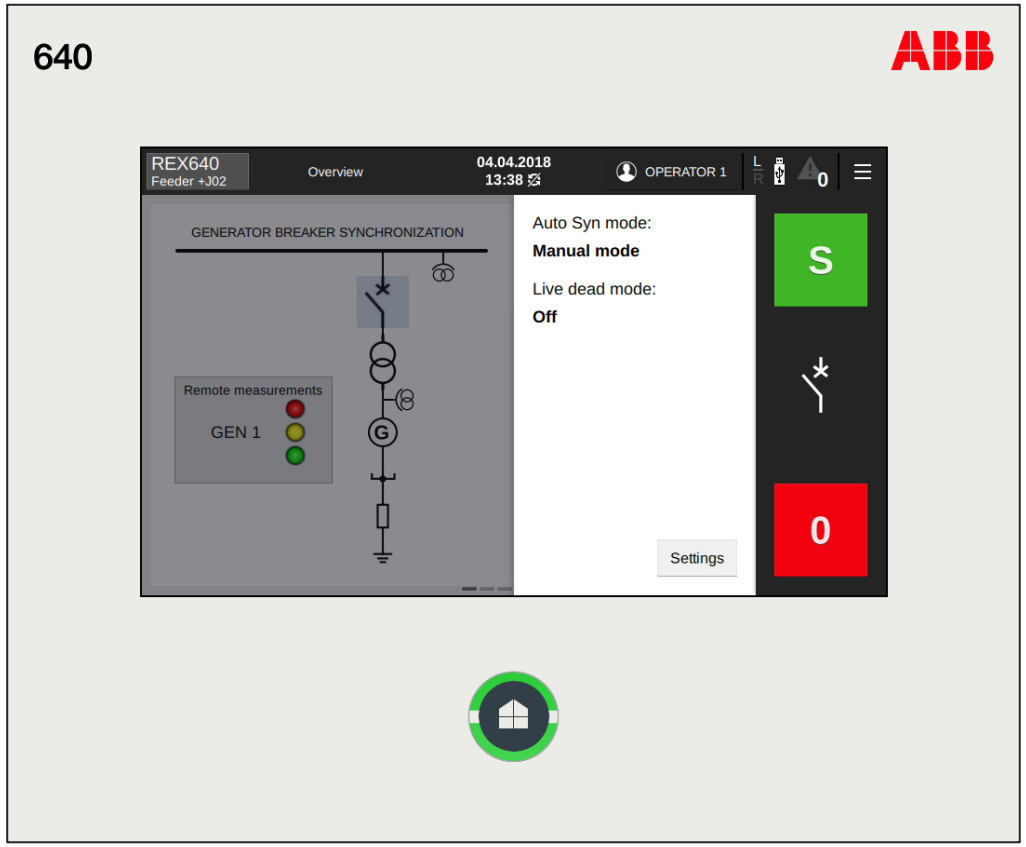
Autosynchronization of both generator and non-generator circuit breakers

Reduced engineering costs

Separate synchronizer for each circuit breaker within the autosynchronization solution

Fast, redundant and supervised GOOSE communication between the REX640 relays to ensure a secure and dependable autosynchronization solution

No need for a dedicated centralized synchronization panel with the LHMI/SHMI of REX640 serving as a local synchronization interface



Product features

High-speed transfer device (1/2)

REX640 supports the following solutions as a high-speed transfer device (HSTD):

- High-speed bus transfer (HSBT)
- Motor bus transfer (MBT)
- High-speed motor bus transfer (HSMBT)
- Automatic bus transfer (ABT)

High-speed transfer is typically required in processes where electrical supply for critical parts of a system must be secured by connecting alternative (stand-by) feeders online, such as in:

- Petrochemical industry
- Pharmaceutical industry
- Semiconductor manufacturing industries
- Electrical power generation plants

Product features

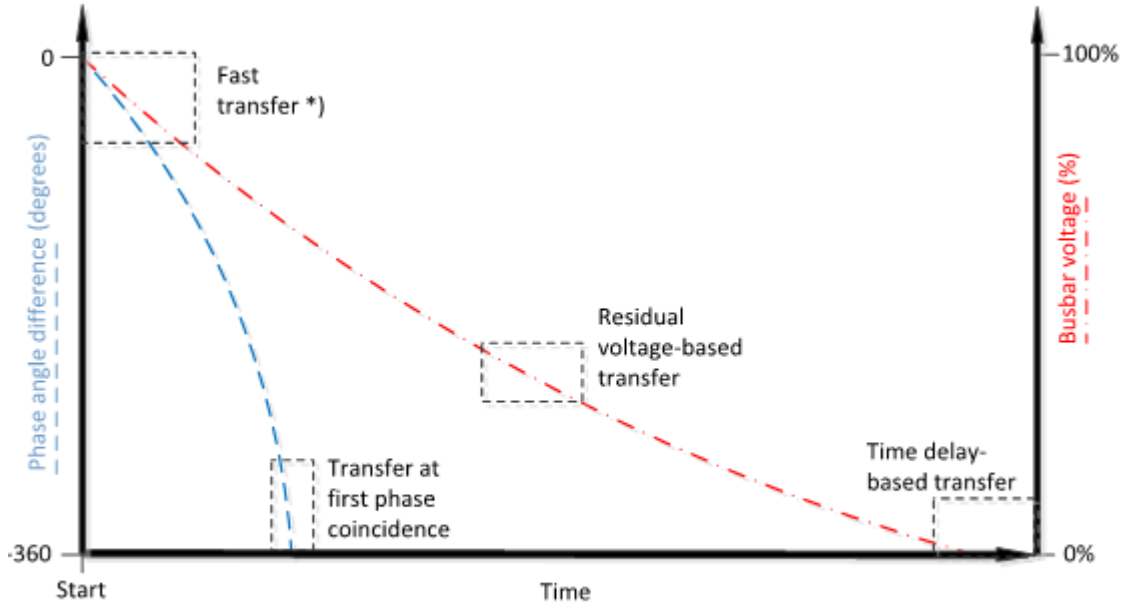
High-speed transfer device (2/2)

Supported transfer modes:

- Fast transfer (simultaneous or sequential circuit breaker control schemes)
- Transfer at first phase coincidence
- Residual voltage-based transfer
- Time delay-based transfer

Transfer triggering options:

- Internal voltage or frequency-based triggering
- External protection-based triggering
- Manual triggering

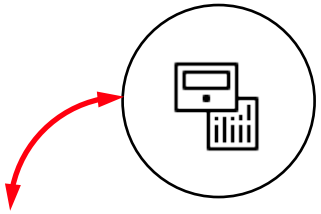


*) The fast transfer mode offers two circuit breaker control schemes; simultaneous and sequential (break-before-make).

Secure device management

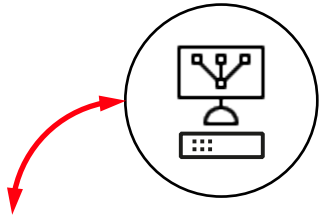
Secure device management

Cyber security at the fore in power distribution



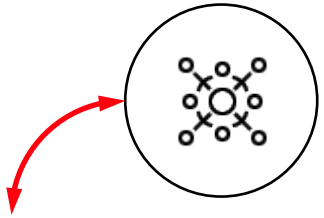
Relay

- Hardened software configuration allowing only necessary services and protocols
- Intelligent network load monitoring including denial of service protection
- Supervised services, protocols and communication ports
- Role-based access control for individual users



Engineering and operation

- Secure web browser-based human-machine interface
- Encrypted communication between the engineering tool and the relay
- Chronological audit trail including security related events
- Easy firmware updates for improved reliability and cyber security



System

- Centralized management of individual user accounts and roles
- Centralized viewing of security-related events
- Chronological audit trail including security related events
- Centralized cyber security certificate management with public key infrastructure

Ordering and modification

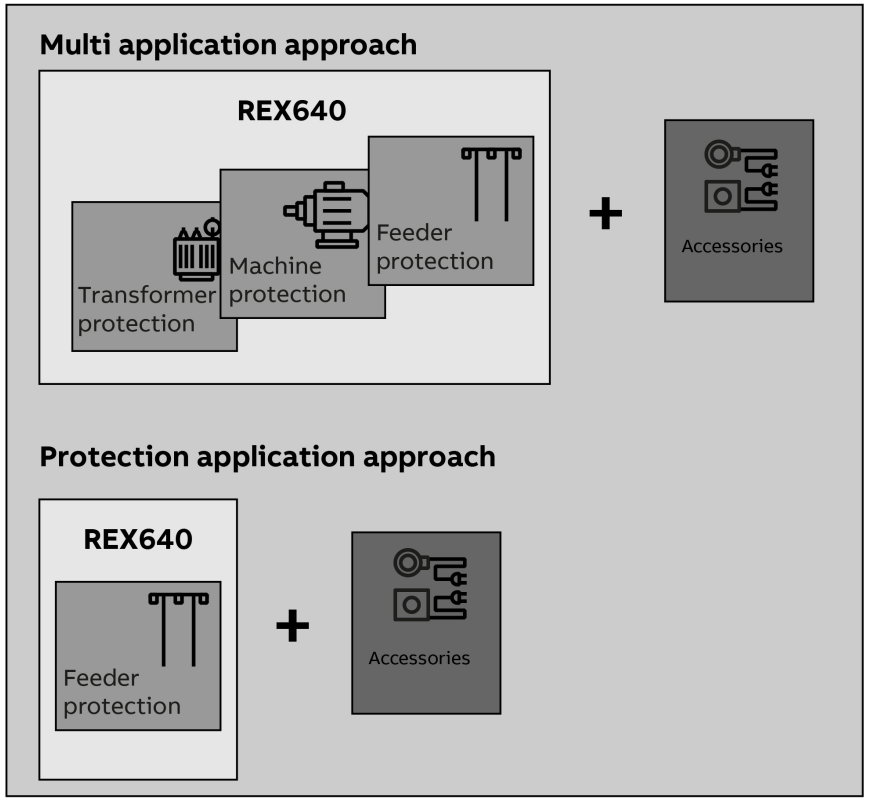
Ordering and modification

Defining the relay variant for ordering

Relay hardware and software functionalities can be selected independently from each other in two ways:

- **Multiapplication approach**
  - Select required hardware
  - Select required software application(s)
  - Select required accessories
- **Protection application approach**
  - Select required protection application
  - Approve or modify proposed hardware combination
  - Select required accessories

Note! Relay components are selected and ordering codes created using ABB's intuitive online ABB Relays-Online.



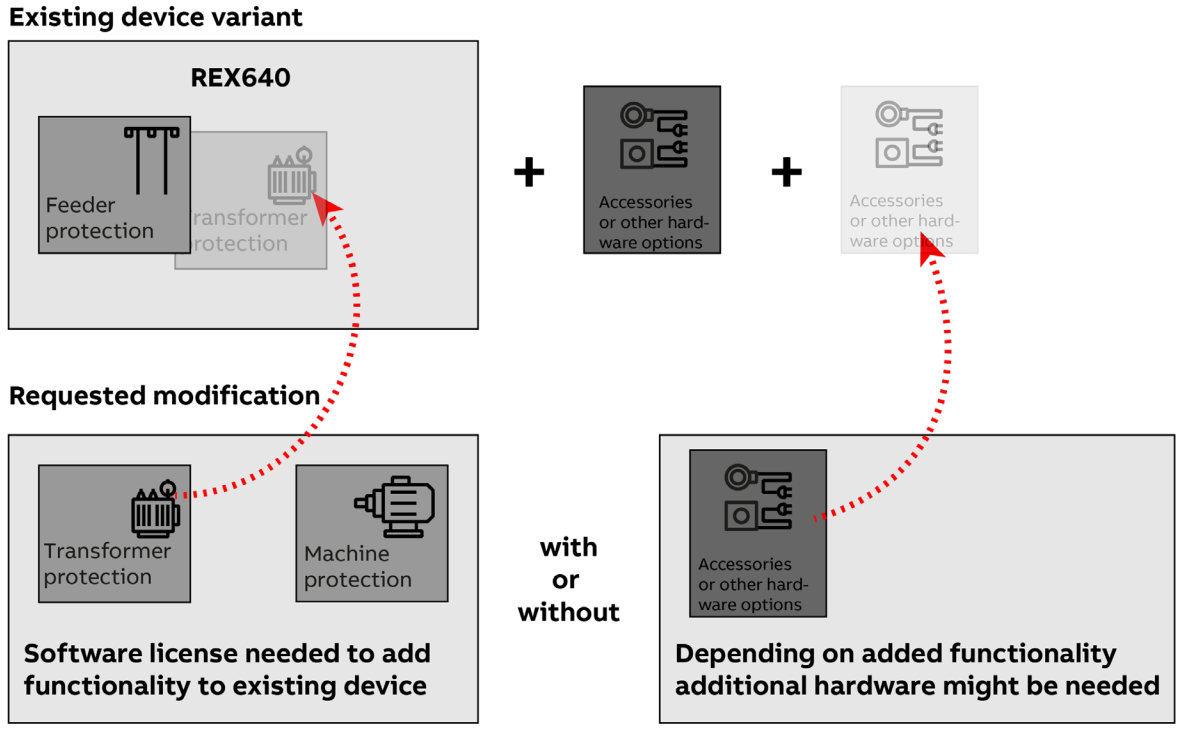
Ordering and modification

Modifying the delivered relay – Modification Sales

REX640 hardware and software functionalities can be modified anytime – throughout the relay's entire life cycle:

- **Software**
  - Adding optional application package(s) or add-on(s)
  - Changing communication protocol
  - Adding a language
- **Hardware**
  - Adding a module
  - Replacing a module with another

- Similar possibilities as at the time of the initial order
- License-based concept: Modification Sales



Ordering and modification

Working with spare parts and spare units

The following faulty components can be replaced:

- **LHMI/SHMI**
  - Replacement possible without software tools – backup of the LHMI/SHMI configuration available in the relay/relays
- **Complete relay**
  - Replacement possible without software tools – backup of the relay configuration and settings available in the LHMI/SHMI
- **Faulty module in the relay**
  - Replacement possible without software tools
  - Detachable terminals and withdrawable modules for individual replacements

Note! Adding or changing modules is supported by Modification Sales.

Ordering and modification

BIO-Tester Relion® REX640 – easy simulation and testing

Specifically developed for testing the binary inputs and outputs of REX640

Fast and easy simulation throughout the relay's entire life cycle – from design and commissioning, through periodic maintenance, to modifications and replacement

- Simulation during the engineering of the application configuration, including troubleshooting
- Testing the operation of inputs and outputs during routine maintenance and testing

Summary

Summary

All-in-one protection for any advanced power generation and distribution application

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