GridShield® outdoor vacuum reclosers
15-38 kV
Making distribution networks more reliable
# Table of contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Recloser technology</td>
<td>4</td>
</tr>
<tr>
<td>Magnetic actuators</td>
<td>4</td>
</tr>
<tr>
<td>Position switch</td>
<td>4</td>
</tr>
<tr>
<td>Trip handle</td>
<td>4</td>
</tr>
<tr>
<td>Vacuum interrupters</td>
<td>5</td>
</tr>
<tr>
<td>Pole assembly</td>
<td>5</td>
</tr>
<tr>
<td>HCEP insulating material</td>
<td>5</td>
</tr>
<tr>
<td>Recloser control</td>
<td>7</td>
</tr>
<tr>
<td>RER620 overview</td>
<td>7</td>
</tr>
<tr>
<td>RER620 advantages</td>
<td>7</td>
</tr>
<tr>
<td>RER620 hardware features</td>
<td>8</td>
</tr>
<tr>
<td>RER620 display</td>
<td>9</td>
</tr>
<tr>
<td>PCM600</td>
<td>10</td>
</tr>
<tr>
<td>Web HMI</td>
<td>11</td>
</tr>
<tr>
<td>Technical data</td>
<td>12</td>
</tr>
<tr>
<td>Ordering guide</td>
<td>14</td>
</tr>
<tr>
<td>GridShield</td>
<td>14</td>
</tr>
<tr>
<td>GridShield 3SP</td>
<td>16</td>
</tr>
<tr>
<td>GridShield dimensions</td>
<td>18</td>
</tr>
<tr>
<td>GridShield and GridShield 3SP control cabinet dimensions</td>
<td>19</td>
</tr>
<tr>
<td>GridShield 3SP dimensions</td>
<td>20</td>
</tr>
<tr>
<td>Accessories</td>
<td>22</td>
</tr>
<tr>
<td>Additional ABB devices</td>
<td>24</td>
</tr>
<tr>
<td>Service &amp; support</td>
<td>25</td>
</tr>
<tr>
<td>Notes</td>
<td>27</td>
</tr>
</tbody>
</table>
Introduction

GridShield® - making distribution networks more reliable

ABB’s drive to produce the most advanced feeder automation equipment and to exceed user expectations has led to the development of the new GridShield recloser. Paired with the industry’s most intelligent electronic device - the RER620 - the GridShield recloser is a product of extensive research and testing, creating the most reliable and technically adept recloser on the market. Whether performing single- or three-phase tripping, connecting distributed generation to the grid or communicating via IEC 61850 utilizing GOOSE messaging, the GridShield recloser is ready for any application.

Offering

- GridShield single tank three-phase recloser
- GridShield 3SP three pole mounted three-phase recloser for mounting flexibility
- GridShield control cabinet with RER620 control backwards compatible to support 15/27 kV OVR-3 and OVR-3SP reclosers

Features

- Ability to perform as a recloser, sectionalizer or automated load-break switch
- Recloser platforms for both single- and three-phase system applications for improved system reliability
- Proven modular design rated for 10,000 full load operations
- Hydrophobic Cycloaliphatic Epoxy (HCEP) insulation provides industry-leading reliability
- No maintenance required for the recloser unit
- Stainless steel used in both the recloser and control cabinets for durability in any environment
- Low profile control cabinet (LPCC) option is available for applications where a smaller footprint is required
- All electronics located inside control cabinet for easy and safe access, reducing maintenance costs as the electronic controls can be accessed without using bucket trucks or climbing poles (especially helpful at night or during restorations in bad weather)
- Operation of the recloser does not depend on batteries as battery power is only used for backup power when AC is lost
- Simple integration into Ethernet or serial-based communication networks with DNP3 Level 2, Modbus, IEC 61850, GOOSE, IEC 60870-5-101/104, and PG&E 2179
- Web browser interface for easy setting and record retrieval
- Advanced RER620 control with programmable pushbuttons and a fully customizable faceplate
- IEC 61850 compliant PCM600 tool suite for all ABB Relion® relays

1 15/27 kV GridShield recloser | 2 Standard profile control cabinet, closed | 3 Standard profile cabinet, open | 4 38 kV GridShield 3SP | 5 Low profile control cabinet, closed | 6 Low profile control cabinet, open
GridShield reclosers have proven field performance using innovative technologies and advanced expertise. ABB has created the most reliable, lowest maintenance solution for recloser applications by incorporating the latest magnetic actuation technology, high quality vacuum interrupters, and HCEP (Hydrophobic Cycloaliphatic Epoxy) solid dielectric insulation material. As a result, the ABB GridShield recloser is unparalleled in durability and value.

Magnetic actuators

ABB designed a simple, magnetically actuated operating mechanism that could dependably operate 10,000 times with minimal moving parts. OVR magnetic actuators have a black zinc oxide plating, making them more resistant to corrosion than older magnetic actuators that used traditional yellow zinc plating. Bi-stable operation was added to allow OVR reclosers to remain in either the open or closed position, even when power is lost. Three-phase models are equipped with one magnetic actuator per pole to allow for single-phase tripping, and to eliminate complicated linkages.

As a result of these capabilities, ABB is the leader in magnetic actuation technology.

Advantages

− 10,000 full load operations
− No lubrication, maintenance, or adjustments
− Up to 16 kA fault make and break capability
− Bi-stable - no power required to hold contacts open or closed
− Single phase tripping capability

Position switch

The ultra-durable position switch was selected for its ability to operate dependably for the 10,000 operation lifetime of all GridShield reclosers.

Advantages

− Determines pole open or closed positions
− Allows independent pole operation
− Provides positive pole position feedback to the GridShield control unit
− Double break, galvanically separate contacts
− Self-cleaning contacts through wiping action
− Contact position and internal mechanism easily viewed through the housing

Trip handle

Block close (69 function) is standard on all GridShield reclosers. The 69 switch is wired to a relay input and programmed to prevent a local or remote close.

− Few moving parts
− 10,000 full load operations without maintenance
− Single molded design guarantees the longest creepage distance in the industry
**Vacuum interrupters**
GridShield recloser HCEP poles have a modular design, each with its own embedded vacuum interrupter.

ABB has been developing and manufacturing vacuum interrupters since the early 1980s. Worldwide, more than two million ABB vacuum interrupters are in service. ABB’s vacuum interrupter facility uses the latest technologies in high quality mass production to produce the most advanced and reliable vacuum interrupters.

Vacuum technology fits well with the recloser requirements since it can easily handle frequent operations. Additionally, vacuum interrupters are capable of reclosing as soon as 100 msec.

Advantages
- Maximum reliability
- Superior contact wear
- Long life: 10,000 full load operations
- No maintenance
- Environmentally friendly

**Pole assembly**
- Modular assembly for easy replacement in the field
- Pole embedded 10,000:1 CVDs and 600:1 CTs
- UV protected for environmental durability
- Molded design reduces risk of tampering

**HCEP insulating material**
The pole insulating material is Hydrophobic Cycloaliphatic Epoxy (HCEP), the next generation of Cycloaliphatic Epoxy (CEP).

Hydrophobicity provides water resistance, preventing water from developing completely wetted, resistively conductive surfaces on outdoor insulation. As a result, leakage currents are reduced which increases reliability by minimizing the risk of insulation flashover. Furthermore, reducing discharge activity translates into decreased insulator erosion and increased insulator life expectancy.

**Why do we need hydrophobicity?**
- Improved water beading and runoff
- Lower leakage currents
- Less discharge activity
- Decreased flash-over probability
- Minimal erosion of insulation
- Better reliability
- Superior life expectancy

Advantages
- Excellent performance in heavily polluted areas
- Improved weatherability and outdoor aging
- Increased life expectancy
- Enhanced reliability
- Light weight for easy handling
- Exceptional mechanical strength attributed to epoxy based design

**IEC pollution levels**

<table>
<thead>
<tr>
<th>Pollution level</th>
<th>Required Creep ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>I - Light</td>
<td>0.63 in/kV (16 mm/kV)</td>
</tr>
<tr>
<td>II - Medium</td>
<td>0.79 in/kV (20 mm/kV)</td>
</tr>
<tr>
<td>III - Heavy</td>
<td>0.98 in/kV (25 mm/kV)</td>
</tr>
<tr>
<td>IV - Very Heavy</td>
<td>1.22 in/kV (31 mm/kV)</td>
</tr>
</tbody>
</table>

**HCEP does not become resistively conductive when exposed to moisture**
Contamination performance
Contamination performance is dependent on the amount of creepage/leakage distance available on a recloser bushing (pole). This is why all ABB GridShield reclosers come standard with HCEP insulation that exceeds IEC Level 4 requirements for environments with very heavy pollution\(^1\) - far more creep than required by equivalent ANSI standards, which focus mainly on BIL performance.

<table>
<thead>
<tr>
<th>IEC pollution levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pollution level</td>
</tr>
<tr>
<td>I - Light</td>
</tr>
<tr>
<td>II - Medium</td>
</tr>
<tr>
<td>III - Heavy</td>
</tr>
<tr>
<td>IV - Very Heavy</td>
</tr>
</tbody>
</table>

**Required creep vs GridShield creep (Phase to Ground)**

<table>
<thead>
<tr>
<th>Pollution Level</th>
<th>Required creep in (mm)</th>
<th>OVR creep in (mm)</th>
<th>Required creep in (mm)</th>
<th>OVR creep in (mm)</th>
<th>Required creep in (mm)</th>
<th>OVR creep in (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 kV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I - Light</td>
<td>9.8 (248)</td>
<td>17.0 (432)</td>
<td>23.9 (608)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II - Medium</td>
<td>12.2 (310)</td>
<td>21.3 (540)</td>
<td>30.0 (760)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III - Heavy</td>
<td>15.3 (388)</td>
<td>26.6 (675)</td>
<td>37.4 (950)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV - Very Heavy</td>
<td>18.9 (481)</td>
<td>38.0 (960)</td>
<td>38.0 (960)</td>
<td></td>
<td>46.4 (1178)</td>
<td>50.7 (1288)</td>
</tr>
<tr>
<td>27 kV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I - Light</td>
<td>9.8 (248)</td>
<td>17.0 (432)</td>
<td>23.9 (608)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II - Medium</td>
<td>12.2 (310)</td>
<td>21.3 (540)</td>
<td>30.0 (760)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III - Heavy</td>
<td>15.3 (388)</td>
<td>26.6 (675)</td>
<td>37.4 (950)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV - Very Heavy</td>
<td>18.9 (481)</td>
<td>38.0 (960)</td>
<td>38.0 (960)</td>
<td></td>
<td>46.4 (1178)</td>
<td>50.7 (1288)</td>
</tr>
<tr>
<td>38 kV(^2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I - Light</td>
<td>9.8 (248)</td>
<td>17.0 (432)</td>
<td>23.9 (608)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II - Medium</td>
<td>12.2 (310)</td>
<td>21.3 (540)</td>
<td>30.0 (760)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III - Heavy</td>
<td>15.3 (388)</td>
<td>26.6 (675)</td>
<td>37.4 (950)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV - Very Heavy</td>
<td>18.9 (481)</td>
<td>38.0 (960)</td>
<td>38.0 (960)</td>
<td></td>
<td>46.4 (1178)</td>
<td>50.7 (1288)</td>
</tr>
</tbody>
</table>

GridShield Severe Environment Test Results from KIPTS:\(^3\):
- **PASSED** - Testing for use in marine and industrial environments
- **PASSED** - No signs of material erosion, tracking, cracks, or punctures reported

For more information, please view the report on www.abb.com/mediumvoltage

\(^1\) as per applicable IEC standards

---

\(^2\) GridShield and GridShield 3SP only for 38 kV

\(^3\) Koeberg Insulator Pollution Test Station (KIPTS) is known internationally as a severe environmental testing facility run by ESKOM Electric Utility located approximately 17 miles (27 km) north of Cape Town, South Africa
**RER620 overview**
The RER620, part of the Relion® family of ABB controls, is a dedicated IED perfectly aligned for the protection, control, measurement and supervision of utility substations and industrial power systems. The RER620 is an ideal solution for radial, looped and meshed distribution networks with or without distributed power generation. The RER620 IED is characterized by its compact and drawout unit design.

Engineered from the ground up, the RER620 has been designed to unleash the full potential of the IEC 61850 standard for communication and interoperability. The RER620 provides main protection for overhead lines and cable feeders in distribution networks.

**RER620 advantages**
- One common PCM600 configuration tool for Relion family protection relays
- Web browser interface for operators and linemen, eliminated the need for software
- High Impedance Fault (HIZ) detects downed conductor for added safety around power lines
- Ethernet and serial-based communications with: DNP3, IEC 60870-5-101, IEC 60870-5-104, Modbus, IEC 61850
- Peer-to-peer GOOSE messaging for high-speed transfer switching, and Fault Detection Isolation and Restoration (FDIR) schemes
- Up to 20 binary inputs and 14 binary outputs
- Six setting groups for protection scheme flexibility
- Drawout design for quick and easy maintenance
- Environmentally friendly design with Restriction of Hazardous Substances Directive (RoHS) compliance
- 12-year relay warranty

**Integrated loop control as standard offering**
There are two loop control schemes that come with the GridShield recloser: The traditional loop control scheme is based on voltage, overcurrent, and reclosing sequence.

Additionally, there is the advanced 61850 (peer-to-peer) loop control scheme for fault detection isolation and restoration.

With the fast response from GOOSE messaging, the reclosers can communicate with each other and determine where the fault is, preventing unnecessary reclosing.

**Self-diagnostics**
- Built-in self-diagnostics continuously monitors the RER620 electronics and the operation of the relay software
- Any fault or malfunction will raise an alert
RER620 hardware features

Drawout case
ABB’s innovative design for the RER620 includes a drawout case, allowing for quick access to relay cards for easy field maintenance. Also included is an automatic function that shorts CT connections to the relay when removed from the case, making maintenance safer for the user.

Local HMI
- Large, 13x14 pixel, LCD screen displays ten rows, each capable of displaying 20 characters
- Simple controls for navigation and recloser open/close operation
- Normal, Pickup and Trip protection indicators for state identification
- Recloser open/close buttons let the user know current position
- 11 programmable alarm LEDs are designed for loss of phase and lockout indication
- 14 programmable push-buttons for user customization
- Customizable faceplate buttons and LEDs
- Front RJ-45 communication port for quick laptop connection

Communication
- Ethernet network communication via RJ-45 or LC fiber optic connectors
- Serial communications via RS-232, RS-485, or ST fiber optic connection
- IEC 61850, with GOOSE messaging (standard)
- DNP 3.0 Level 2+ or IEC 60870-5-101/104
- Modbus RTU/ASCII
- The event generation subsystem provides consistent timestamping across all protocols
- Simultaneously report events to five IEC 61850 clients
- Time sync using IRIG-B, DNP, or SNTP

Input and output ports
- Capable of up to 20 binary inputs and 14 binary outputs when fully configured
- 6 VT inputs for voltage sensing or external PTs
- 4 CT inputs
RER620 display
The relay's local HMI includes a large LCD screen as a standard. The large LCD display offers full front-panel user-interface functionality with menu navigation and menu views.

The large display offers increased front-panel usability with less menu scrolling and improved information overview than with smaller LCD screens. The large display is well-suited for all relay installations providing an easy viewing interface.
PCM600

PCM600 offers extensive relay configuration functions such as relay signal configuration and IEC61850 communication configuration with GOOSE horizontal relay-to-relay messaging.

Advantages

- One common software platform for the Relion family of relays
- Easy to navigate menu follows local HMI menu layout
- Tab structure for intuitive management of open tools
- Create settings ahead of time and load onto an RER620 via RJ-45 connection
- Save setting profiles and load onto other relays
- Customize recloser, sectionalizer, and automated load break switch modes with application configuration tool
- Integrated documentation for quick referencing of technical information and communication point lists
- Import and export GOOSE messages for advanced communication schemes

Graphical display editor

- Visually displays power system objects and their status
- Integrate online measurement in the IED HMI
- Set node attributes like name, name position and sort index
- Extensive ANSI and IEC symbol library included

Application configuration tool

- Function block-based programming for easy customization
- Search feature and “quick jump” function allows for easy navigation
- View existing logic for clear understanding of recloser functions
- Adapts to pre-configured applications
- Logic organized under I/O, Measurements, Control, and Protection tabs
- Allows users to document logic and changes in the programming
- Debugging for operation assurance

Disturbance handling

- Records up to 12 analog channels and 64 binary channels
- Can be triggered by analog/binary channels or manual/periodic commands
- Selectable sampling rate, 32/16/8 samples per cycle
- Events stored following COMTRADE standard
- Export and view using ABB’s WaveWin32 software or any other COMTRADE compliant software
- Records include current, voltage and angle values, and pickup times of the protection elements

ACT tool for logic programming

Change HMI screen with the Graphical Display Editor

Disturbance handling capabilities include signal charts for reviewing faults
Web HMI
The web HMI enables the user to access the RER620 via a web browser. This method of connecting to the RER620 does not require specialized relay software and can connect locally by connecting a computer to the RER620 via the front communication port or remotely over LAN/WAN. With a menu tree structure similar to the one on the local HMI, the user does not need to spend time relearning where every setting is located. With this easy to use interface, the user has a simple method for programming most of the recloser settings.

Overview
- Local and remote access
- User access level authentication
- On-line Help menu

Features
- View alarm LEDs, event lists, and measurements
- Monitor signals
- Read and download disturbance records
- Review phasor/tabular diagrams with various representations
  - Phase currents
  - Sequence currents
  - Phase voltages
  - Sequence voltages
- Zoom in phasor/tabular diagrams
- Freeze current and voltage measurements to obtain a snapshot view
- Set parameters
- Save event lists
- Print settings
- All settings can be opened and saved in CSV (Excel) format
## Technical data

| Nom. operating voltage: | 2.4-14.4 | 24.9 | 34.5 | kV  
|------------------------|---------|------|------|---  
| Rated max. voltage:    | 15.5    | 27   | 38   | kV  
| Rated power frequency: | 50/60   | 50/60| 50/60| Hz  
| Rated continuous current: | 800/1000/1250 | 800/1000/1250 | 800/1000/1250 | A  
| Rated symmetrical interrupting current: | 12.5/16 | 12.5/16 | 12.5/16 | kA  
| Rated lightning impulse withstand (BIL): | 110/125 | 125/150 | 150/170 | kV  
| Dry withstand 60 Hz 1 Min.: | 50 | 60 | 70 | kV  
| Wet withstand 60 Hz 10 Sec.: | 45 | 50 | 60 | kV  
| Phase spacing | 15.50 (394) | 15.50 (394) | 15.50 (394) | inches (mm)  
| External creep distance, H2-ground: | 38.00 (960) | 38.00 (960) | 50.70 (1288) | inches (mm)  
| External creep distance, H1-H2: | 45.00 (1160) | 45.00 (1160) | 49.80 (1260) | inches (mm)  
| Min. external strike distance: | 9.50 (240) | 9.50 (240) | 14.40 (367) | inches (mm)  
| Min. interrupting time: | 0.050 | 0.050 | 0.050 | sec max  
| Max. closing time: | 0.055 | 0.055 | 0.055 | sec max  
| Recloser unit weight (single tank): | 333 (150) | 333 (150) | 430 (195) | lbs (kg)  
| Recloser unit weight (3SP): | | | |  
| Small control cabinet weight: | 138 (63) | 138 (63) | 138 (63) | lbs (kg)  
| Large control cabinet weight: | 182 (83) | 182 (83) | 182 (83) | lbs (kg)  

Rated standard operating duty: O 0.2s CO 2s CO 5s CO lockout

Operating temperature: -40°C to +60°C (-40° F to +140°F)

Control voltage:
- 120 VAC UPS: 90-140 VAC / 109 - 144 VDC

Materials: Vacuum interrupter encapsulated in HCEP with stainless steel construction

Current sensors: One per phase encapsulated into the pole

Battery:
- Capable of up to 38 hours of carryover and multiple operations upon loss of power. Recloser operation does not rely on batteries when AC power is available.
- Four serially connected 12 V, 12 AH rechargeable, sealed, lead acid batteries
- Perform battery test locally or remotely

Meets all applicable recloser standards (Dual logo standard IEC 62271-111/IEEE C37.60 2005-11)

Control cabinet rated to IP65, high volt cabinet rated to IP54

Life Test: 10,000 mechanical operations without degradation

Note: Galvanized frames per ASTM 123A/123M standard
The GridShield recloser meets substation demands as an economical solution. The same recloser unit has the flexibility to be used in single or three-phase mode.
<table>
<thead>
<tr>
<th>Digit</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Recloser</td>
<td>S: GridShield recloser</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Voltage</td>
<td>1: 15 kV</td>
<td>2: 27 kV</td>
<td>3: 38 kV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) BIL</td>
<td>1: 110 kV</td>
<td>2: 125 kV</td>
<td>3: 150 kV</td>
<td>5: 170 kV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Continuous current</td>
<td>8: 800 A</td>
<td>1: 1000 A</td>
<td>2: 1250 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) Interrupting rating</td>
<td>1: 12.5 kA</td>
<td>2: 16 kA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6) Mounting frame</td>
<td>A: Pole w/ 6 arrester brackets, assembled</td>
<td>B: Pole w/ 6 arrester brackets, unassembled</td>
<td>C: Pole w/ 6 arrester brackets &amp; 3 PT C-channel mounting brackets, assembled</td>
<td>D: Pole w/ 6 arrester brackets &amp; 3 PT C-channel mounting brackets, unassembled</td>
<td>G: Pole w/ 6 arrester brackets &amp; 6 PT mounting brackets, galvanized, assembled</td>
<td>H: Pole w/ 6 arrester brackets &amp; flat PT mounting bracket, assembled</td>
<td>R: Pole w/ 6 arrester brackets &amp; flat PT mounting bracket, unassembled</td>
<td>S: Pole w/ 6 arrester brackets &amp; provisions for 3 voltage sensors</td>
</tr>
<tr>
<td>Note: 15/27 kV recloser ships with flat PT mounting bracket, 38 kV recloser ships with C-channel PT mounting bracket for three external PTs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7) 24-pin control cable</td>
<td>A: 10 feet [3 m]</td>
<td>B: 20 feet [6 m]</td>
<td>C: 30 feet [9 m]</td>
<td>D: 40 feet [12 m]</td>
<td>E: 50 feet [15.24 m]</td>
<td>F: 60 feet [18.29 m]</td>
<td>Z: Customized (Max. length 200 ft)</td>
<td>N: None</td>
</tr>
<tr>
<td>Note: Output of 3 embedded voltage and current sensors wired directly into relay through 24-pin control cable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8) Cable options for control power and external voltage inputs</td>
<td>A: (1) 2 pin connector with 20 ft cable</td>
<td>B: (1) 2 pin connector with 45 ft cable (Figure 4, Accessories)</td>
<td>C: (1) 5 pin connector with 45 ft cable (Figure 5, Accessories)</td>
<td>D: (2) 5 pin connector with 45 ft cable</td>
<td>E: (1) 2 pin connector with 45 ft cable and (1) 5 pin connector with 45 ft cable</td>
<td>Z: Custom</td>
<td>N: None</td>
<td></td>
</tr>
<tr>
<td>Note: 2-pin connector needed when using a dry type PT for control power, 5-pin connector needed when using three external PTs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Descriptive Bulletin

### GridShield 15

<table>
<thead>
<tr>
<th>Digit</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>3</td>
<td>E</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>S</td>
</tr>
</tbody>
</table>

### 9) Control power supply
- 1. 120 VAC with 120 VAC heaters (batteries included)
- 3. 240 VAC with 240 VAC heaters (batteries included)
- 4. 48 VDC with 120 VAC heaters (batteries not included)
- 5. 125 VDC with 120 VAC heaters (batteries not included)
- 6. 125 VDC with 240 VAC heater (batteries not included)
- Z: Custom

### 10) Binary I/O
- 3: 20 BI (binary Input) + 14 BO (binary output)
- Z: Custom

### 11) Control & faceplate
- E: RER620 with ANSI faceplate and three phase tripping (comes with ANSI indicating cups)
- F: RER620 with ANSI faceplate and single phase tripping (comes with ANSI indicating cups)
- D: RER620 with IEC faceplate and three phase tripping (comes with IEC indicating cups)
- C: RER620 with IEC faceplate and single phase tripping (comes with IEC indicating cups)

### 12) Language
- 1: English
- 3: 20 BI (binary Input) + 14 BO (binary output)
- Z: Custom

### 13) Communication ports and protocols
- 1: Ethernet 10/100BaseT (RJ45)
- 2: Ethernet 100FX (LC)
- 3: Ethernet 10/100BaseT (RJ45) + configurable RS232/RS485 + IRIG-B
- 4: Ethernet 10/100BaseT (RJ45) + configurable RS232/RS485 + IRIG-B + RS485 or serial fiber (ST)

### 14) Bushing terminal connectors
- S: Stud terminal (no connector) (Figure 11, Accessories)
- 2: NEMA 2-Hole Pad (Figure 12, Accessories)
- 4: NEMA 4-Hole Pad (Figure 13, Accessories)
- C: Clamp (Figure 14, Accessories)

### 15) LV cabinet
- S: Small - Low profile cabinet
- L: Large - Standard cabinet

### 16) Standard accessories
- A: 69 Switch Close Block function from yellow handle

#### Optional accessories

Provisions for mounting and powering radios (12 or 24 VDC, up to 24 Watts continuous)

- (1) PT mounted and wired on recloser frame
- (3) PT mounted and wired on recloser frame
- (6) PT mounted and wired on recloser frame
- PT animal guard with push pins (set of 3) (Figure 6, Accessories)
- 15/27 KV animal guard (straight) (set of 3) (Figure 7, Accessories)
- 15/27 KV animal guard (L-shaped) (set of 3) (Figure 8, Accessories)
- 38 KV animal guard (straight) (set of 3) (Figure 9, Accessories)

Animal guard for voltage sensors

- Cable guards (9 ft / 3 m per phase) (Figure 10, Accessories)
- Cable animal guard with straight pins
- 10 feet armored on the control cable (this armor will be on the control cable for the first 10 feet after LV cabinet)
- Transfer switch between source and load side PTs (Figure 3, Accessories)
- FT test switch (available only in standard cabinet) (Figure 2, Accessories)
## Ordering guide

**GridShield 3SP recloser**

<table>
<thead>
<tr>
<th>Digit</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Recloser ratings</td>
<td>F: GridShield 3SP recloser</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Voltage</td>
<td>1: 15 kV</td>
<td>2: 27 kV</td>
<td>3: 38 kV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) BIL</td>
<td>1: 110 kV</td>
<td>2: 125 kV</td>
<td>5: 150 kV</td>
<td>7: 170 kV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Continuous current</td>
<td>8: 800 A</td>
<td>1: 1000 A</td>
<td>2: 1250 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) Interrupting rating</td>
<td>1: 12.5 kA</td>
<td>2: 16 kA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6) Mounting frame</td>
<td>H: Phase over phase (vertical)</td>
<td>R: Wrap around frame</td>
<td>T: Cross arm frame</td>
<td>N: None</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7) Control cable</td>
<td>A: 10 feet [3 m] cable &amp; 12 ft (3.7 m) junction box cable</td>
<td>B: 20 feet [6 m] cable &amp; 12 ft (3.7 m) junction box cable</td>
<td>C: 30 feet [9 m] cable &amp; 12 ft (3.7 m) junction box cable</td>
<td>D: 40 feet [12 m] cable &amp; 12 ft (3.7 m) junction box cable</td>
<td>E: 50 feet [15.24 m] cable &amp; 12 ft (3.7 m) junction box cable</td>
<td>F: 60 feet [18.29 m] cable &amp; 12 ft (3.7 m) junction box cable</td>
<td>Z: Customized (Max. length 200 ft) cable &amp; 12 ft (3.7 m) junction box cable</td>
<td>N: None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8) PT cable</td>
<td>A: (1) 2 pin connector with 20 ft cable</td>
<td>B: (1) 2 pin connector with 45 ft cable</td>
<td>C: (1) 5 pin connector with 45 ft cable</td>
<td>D: (2) 5 pin connector with 45 ft cable</td>
<td>E: (1) 2 pin connector with 45 ft cable and (1) 5 pin connector with 45 ft cable</td>
<td>Z: Custom</td>
<td>N: None</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** 2-pin connector is needed when using a dry type PT for control power

5-pin connector is needed when using three external PTs

<p>| 9) Control power supply | 1: 120 VAC with 120 VAC heaters (batteries included) | 3: 240 VAC with 240 VAC heaters (batteries included) | 4: 48 VDC with 120 VAC heaters (batteries not included) | 5: 125 VDC with 120 VAC heaters (batteries not included) | 6: 125 VDC with 240 VAC heater (batteries not included) | Z: Custom |   |   |    |
| 10) Binary I/O | 3: 20 BI (binary Input) + 14 BO (binary output) |   |   |   |   |   |   |   |    |</p>
<table>
<thead>
<tr>
<th>Digit</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>11) Control &amp; face-plate</td>
<td>E: RER620 with ANSI faceplate and three phase tripping (comes with ANSI indicating cups)</td>
<td>F: RER620 with ANSI faceplate and single phase tripping (comes with ANSI indicating cups)</td>
<td>D: RER620 with IEC faceplate and three phase tripping (comes with IEC indicating cups)</td>
<td>C: RER620 with IEC faceplate and single phase tripping (comes with IEC indicating cups)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12) Language</td>
<td>1: English</td>
<td>2: English and Spanish</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14) Bushing terminal connectors</td>
<td>S: Stud terminal (no connector) (Figure 11, Accessories)</td>
<td>2: NEMA 2-Hole Pad (Figure 12, Accessories)</td>
<td>4: NEMA 4-Hole Pad (Figure 13, Accessories)</td>
<td>C: Clamp (Figure 14, Accessories)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15) LV cabinet</td>
<td>S: Small - Low profile cabinet</td>
<td>L: Large - Standard cabinet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16) Standard accessories</td>
<td>A: 69 Switch Close Block function from yellow handle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Optional accessories

Provisions for mounting and powering radios (12 or 24 VDC, up to 24 Watts continuous)

1. PT mounted and wired on recloser frame
2. PT mounted and wired on recloser frame
3. PT mounted and wired on recloser frame
4. PT animal guard with push pins (set of 3) (Figure 6, Accessories)
5. 15/27 KV animal guard (straight) (set of 3) (Figure 7, Accessories)
6. 15/27 KV animal guard (L-shaped) (set of 3) (Figure 8, Accessories)
7. 38 kV animal guard (straight) (set of 3) (Figure 9, Accessories)
8. Animal guard for voltage sensors
9. Cable guards (9 ft / 3 m per phase) (Figure 10, Accessories)
10. Cable animal guard with straight pins
11. 10 feet armored on the control cable (this armor will be on the control cable for the first 10 feet after LV cabinet)
12. Transfer switch between source and load side PTs (Figure 3, Accessories)
13. FT test switch (available only in standard cabinet) (Figure 2, Accessories)
GridShield dimensions

Pole mounting frame (15-38 kV)

Substation mounting frame (15-38 kV)
GridShield and GridShield 3SP control cabinet dimensions

Small control cabinet – low profile option (15-38 kV)

Large control cabinet - standard (15-38 kV)
GridShield 3SP dimensions

Cross arm frame (15-38 kV)

Frame weight (with junction box) - 65 lbs (30 kg)

Available with optional arrester mounting brackets

Each 15/27 kV pole weighs 100 lbs (45 kg)
Each 38 kV pole weighs 130 lbs (59 kg)
Wrap around frame (15-38 kV)

10 in (25.4 cm) DIAMETER POLE SHOWN. FRAME MOUNTS TO POLES 6.5 in (16.5 cm) TO 11.5 IN (29.2 CM) IN DIAMETER. OPTIONAL EXTENSION PLATE 1B09900H01 FRAME TO BE MOUNTED TO POLES UP TO 16.5 IN (41.0 CM) IN DIAMETER.

SHOWN WITH OPTIONAL ARRESTERs AND OPTIONAL ARRESTER MOUNTING BRACKETS

FRAME WEIGHT (WITH JUNCTION BOX) - 30 LBS (14 KG)

EACH 15/27 KV POLE WEIGHS 100 LBS (45 KG)

EACH 38 KV POLE WEIGHS 130 LBS (59 KG)
## Accessories

### Recloser simulator assembly
Test relay schemes or verify your protection settings with an ABB Recloser Simulator Card without having the recloser unit connected. This is ideal for protection engineers to verify the relay functionality independent of the recloser.

- Easy, cost effective method for testing relay schemes and the operational health of an RER620, without operating the recloser
- Simulate fault conditions – by injecting secondary currents up to 5 A (to simulate primary currents up to 3,000 A)
- Software can collect oscillographic records of fault simulations
- Comes with wiring harness and power adapter for RER620
- Compatible with PCM600 software

### Transfer switch
Quickly transfer control power between the source and load sides of a GridShield recloser. Potential transformers (PTs) must be connected on both the load and source sides of a GridShield recloser.

Dimensions:
Width: 2.5 in (64 mm) x height: 3.0 in (76 mm) x depth: 2.25 in (57 mm)

### FT Flexitest™ switch
- Perform secondary current and voltage injection directly into the RER620 (ABB FT-1 option allows easy access for testing using secondary current and voltage injection test equipment)
- Use the FT-1 to test the health of the recloser PTs and CTs
- No need to disconnect the 24-pin control cable or relay terminal blocks
- Use the FT-1 to test the GridShield contacts and programmable I/O

1 Recloser simulator card (separate harness included in kit) | 2 FT Flexitest switch | 3 Transfer switch | 4 2-pin connector | 5 5-pin connector
**Animal guards**  
GridShield animal guards provide easy-to-install protection that reduces on animal related interruptions.

**Bushing terminal accessories**  
All GridShield reclosers come with a 1 in (25.4 mm) diameter stud (12 threads) on all source and load terminals.

6 PT guard | 7 Straight bushing guard for 15 - 27 kV applications | 8 L-shape bushing guard 15 - 27 kV applications | 9 Straight bushing guard for 38 kV applications | 10 Cable guard for 15 - 38 kV applications (36" long – 1" dia.) | 11 Standard terminal | 12 NEMA connector 2-hole pad | 13 NEMA connector 4-hole pad | 14 Clamp connector
Additional ABB devices
Designed for improved reliability and feeder performance

**Single-phase by-pass switch**
- Provides a means for bypassing and disconnecting reclosers or voltage regulators, allowing maintenance on equipment without service interruption
- Porcelain or silicone insulators
- Mounting configurations: vertical, underhung, pole mount, or crossarm
- Available ratings:
  - 15-38 kV
  - 600/900 A
  - 40 kA Momentary rating
  - 110-150 kV BIL

**AutoLink electronic sectionalizer**
- Works as sectionalizer in conjunction with an upstream recloser or circuit breaker
- Prevents unnecessary supply outages
- Reduces replacement of fuses
- Both actuating current and count can be reset as many times as needed, making it unmatched in the industry
- Detects inrush current
- Available for both single and three-phase applications
- Wireless single-phase version is available for simplified installation and event logging
- Loadbreak unit option eliminates the need for a loadbuster tool making operation easier
- Compatible with ABB, S&C and AB Chance interchangeable cutout bodies
- Ideal for lateral feeders

**COM600 substation automation device**
The substation automation device of ABB, COM600, is an all-in-one communication gateway, providing connectivity between substation IEDs and network-level control and management systems. Additionally, it is capable of automatic fault isolation and restoration using an ABB patented algorithm.

The COM600 adds distributed intelligence to the feeders and is ideal for automation of rural lines or when a user has SCADA IDMS limitations. It is a completely configurable solution capable of providing all logic for fault detection isolation and restoration.
Service & support

Product warranty
- 3-year warranty on the recloser
- 12-year warranty on the RER620 relay

Recloser customer support
- Free 24/7 technical support line 1-800-929-7947 ext. 5 or outside the U.S. +1 407-732-2000 ext. 2510, e-mail customer.service.group@us.abb.com

Training
Factory based training: three-day training designed for participants to become proficient in application, installation, operation, maintenance, testing, and commissioning of RER620 relays and GridShield reclosers.

Day 1 topics
- GridShield with RER620 relay
- GridShield recloser unit
- GridShield control cabinet
- RER620 relay
- WebHMI operator interface
- Protection and Control IED Manager, PCM600 tool

Day 2 topics
- Graphical display editor
- Parameter setting tool
- Application configuration tool for logic programming
- Recloser settings

Day 3 topics
- DNP3 settings
- Configuration management tool for point remapping
- DNP3 objects, classes, events, deadbands, and variation
- Feeder application using loop control, GOOSE messaging with a mid-point, sectionalizing and normally open tie point recloser

Registration
- Visit us on the web: new.abb.com/medium-voltage/service/training/
- Click Scheduled classroom trainings
- Click Recloser and recloser control training in Lake Mary, FL USA (published training dates appear here)
- Click Register now under GSR001

On-site training, commissioning assistance, and migration training
On-site training sessions are offered upon request and can be arranged at the customer facility. Arrangements may be made by contacting ABB in Lake Mary, Florida.

ABB can provide assistance during installation and commissioning of the recloser, including migration support for the development of relay settings and logic.
The GridShield recloser is the safest recloser in the industry. No electronics in the recloser unit protects operators and linemen from working near energized lines, reducing exposure to live equipment.
The information contained in this document is for general information purposes only. While ABB strives to keep the information up to date and correct, it makes no representations or warranties of any kind, express or implied, about the completeness, accuracy, reliability, suitability or availability with respect to the information, products, services, or related graphics contained in the document for any purpose. Any reliance placed on such information is therefore strictly at your own risk. ABB reserves the right to discontinue any product or service at any time.

© Copyright 2016 ABB. All rights reserved.