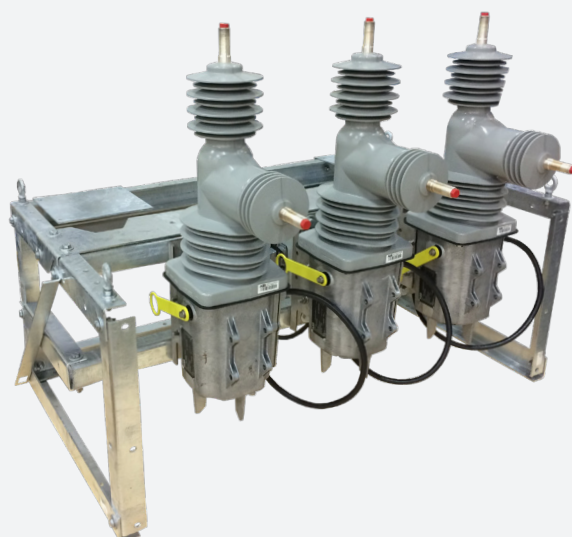
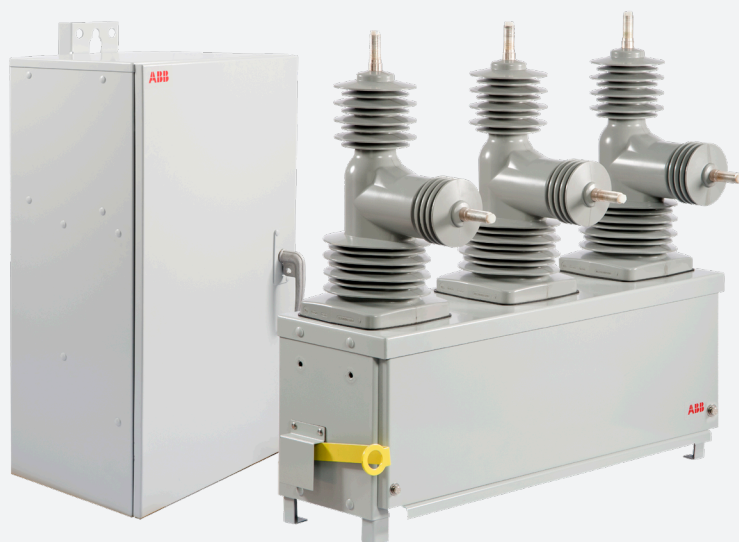


DESCRIPTIVE BULLETIN

GridShield® 3P/3SP

15/27/38 kV Vacuum Recloser



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.

Table of contents

04	Introduction
06	Features
07–10	Recloser Technology
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GridShield® 3P/3SP

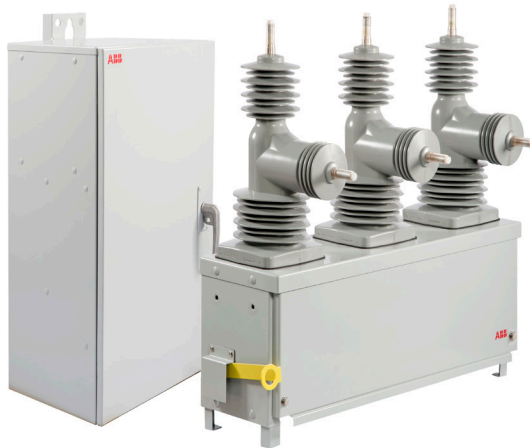
ABB's drive to produce the most advanced feeder automation equipment and to exceed user expectations has led to the development of the new GridShield recloser.

- 01 GridShield® 3P
- 02 GridShield® 3SP

Paired with the industry's most intelligent family of Relion® recloser relays, the GridShield recloser is a product of extensive research and testing, creating the most reliable and technically adept recloser on the market. The GridShield recloser can also be paired with the SEL 651R recloser controller, or it can be used in a relay independent platform where it can use control relays such as Beckwith M-7679, ABB RER615, and others. 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.

Recloser Offering

Both GridShield 3P and GridShield 3SP are capable of single-phase tripping and available with embedded single voltage sensing (3VS) or embedded dual voltage sensing (6VS).



01



02

Recloser Control Offering

ABB offers the standard ABB control cabinet with RER620 relay or a relay independent control cabinet with Beckwith M-7679 or ABB RER615 relay. EL-651R control cabinet is also compatible with the recloser units.

- 03 ABB RER620
- 04 ABB RER615
- 05 Beckwith M-7679
- 06 SEL-651R



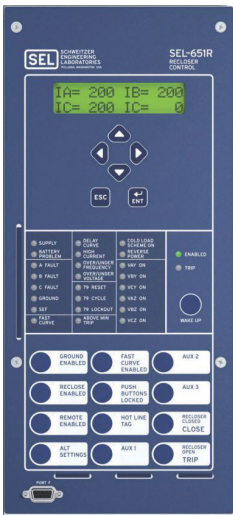
03



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Features

- Ability to perform as a recloser, sectionalizer, or automated loadbreak switch
- Recloser platforms for both single- and three-phase system applications for improved system reliability
- Embedded dual voltage sensing (6VS) capability for tie-point and renewable applications
- Multiple trip and lockout modes:
 - Three-phase trip with three-phase lockout
 - Single-phase trip with three-phase lockout
 - Single-phase trip with single-phase lockout
- Proven modular design rated for 10,000 full load operations
- Hydrophobic cycloaliphatic epoxy (HCEP) insulation provides industry-leading reliability
- Embedded pole with void-free construction and fully tested for partial discharge
- No routine maintenance required for the recloser unit
- Stainless steel available 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 are located inside the 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
- Compatible with multiple recloser controllers (ABB, SEL, Beckwith)
- Simple integration into Ethernet or serial-based communication networks with DNP3 Level 2, Modbus, and IEC 61850
- Web browser interface for easy setting and record retrieval from RER620/RER615
- Advanced RER620/RER615 control with programmable pushbuttons and a fully customizable faceplate
- IEC 61850 compliant PCM600 tool suite for all ABB Relion® relays

Recloser Technology

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 solid dielectric insulation material. As a result, the GridShield recloser is unparalleled in durability and value.

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07 Embedded Single
Voltage Sensing (3VS)

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08 Embedded Dual
Voltage Sensing (6VS)

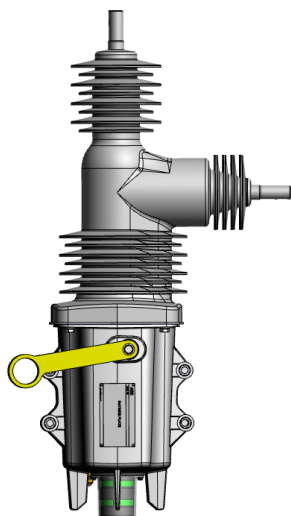
—
09 Integrated Dual
Voltage Sensing
(Integrated DVS)

Dual Voltage Sensing (DVS) and Dual Ratio Current Transformer

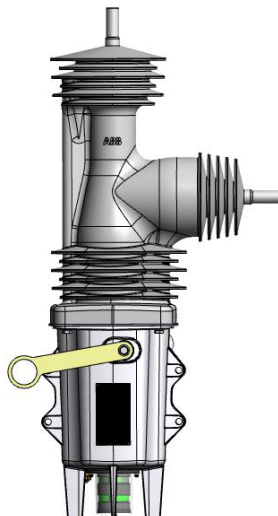
The GridShield recloser comes with three standard voltage sensors on the horizontal bushings (3VS). The embedded dual voltage sensing (6VS) units are also available where each pole has two CVD voltage sensors embedded in the bushings.

Alternatively, a set of external/integrated sensors can also be used with 3VS units. The standard current transformer (CT) ratio is 600:1 on 3VS units. There is an option for 600:1 or a 300:1 ratio CT on the 6VS units for higher sensitivity on lightly loaded circuits.

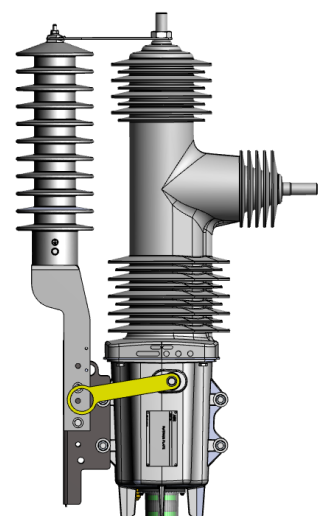
High sensing accuracy ensures that the recloser measurements are accurate regardless of temperature and humidity changes.



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07



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08



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09

Magnetic Actuators

ABB has designed a simple, magnetically actuated operating mechanism that can dependably operate 10,000 times with minimal moving parts. GridShield magnetic actuators are nickel-plated and 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 allows GridShield reclosers to remain in either the open or closed position, even when power is lost. The reclosers are equipped with one magnetic actuator per pole to allow for single-phase tripping and to eliminate complicated linkages. Because 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 Switches

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
- Gold-plated contacts for minimum contact resistance
- Contact position and internal mechanism is easily viewed through the housing

Trip Handle

The yellow trip handle turns a full 90 degrees from a horizontal to vertical position for a very clear and visible indication. 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. For single tank reclosers, the yellow handle mechanically blocks the closing until it is reset.

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 five 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.

Advantages

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

Pole Assembly

GridShield® recloser HCEP poles have the vacuum interrupter and sensors embedded completely in the epoxy without any voids, offering reliable operation and no partial discharge.

Advantages

- Modular assembly for easy replacement in the field
- Pole embedded 10,000:1 CVD sensors 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 to decreased insulator erosion and increased insulator life expectancy. HCEP does not become resistively conductive when exposed to moisture.

HCEP Properties

- Improved water beading and runoff
- Lower leakage currents
- Less discharge activity
- Decreased flashover probability
- Minimal erosion of insulation
- Better reliability
- Superior life expectancy

Advantages

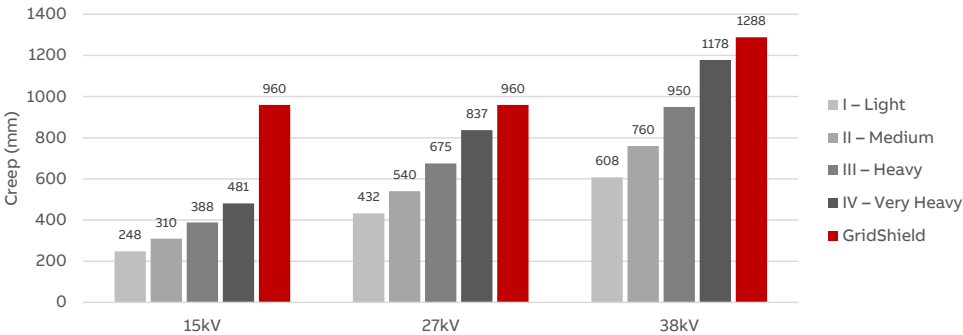
- Excellent performance in heavily polluted areas
- Improved weatherability and outdoor aging
- Increased life expectancy
- Enhanced reliability
- Light weight for easy handling
- Exceptional mechanical strength attributed to epoxy-based design



Environmental Performance

Environmental performance is dependent on the amount of creepage/leakage distance available on a recloser bushing (pole). Because of this, all GridShield reclosers come standard with HCEP insulation that exceeds IEC Level 4 requirements for environments with very heavy pollution – far more creep than required by equivalent ANSI standards that mainly focus on BIL performance.

Creep distances (mm)					
Voltage	I - Light	II - Medium	III - Heavy	IV - Very Heavy	GridShield
15 kV	248	310	388	481	960
27 kV	432	540	675	837	960
38 kV	608	760	950	1,178	1,288



Environmental Testing at KIPTS

The GridShield recloser passed the severe environment natural aging tests at the Koeberg Insulator Pollution Test Station (KIPTS) in South Africa, where it was exposed to dry summers, high winds, UV radiation, rainfall, and heavy industrial pollution.

- Testing for use in marine and industrial environments – **PASSED**
- No signs of material erosion, tracking, cracks, or punctures reported – **PASSED**



Compatible Recloser Controllers



12



13



14

12 ABB ACM Cabinet with Beckwith M-7679/RER615 relay

13 ABB Control Cabinet with ABB RER620 relay

14 SEL Control Cabinet with SEL651R relay

GridShield 3P and 3SP reclosers work directly with the following controls:

ABB Interchangeable Relay Control Cabinet

ABB's new control cabinet architecture includes the Actuator Control Module (ACM) that houses all the actuator driving electronics. This allows flexibility to select different recloser relay types without having to complete a full certification/type test each time. Upgrades can be made to take advantage of new relay models during the life of the recloser without having to replace the complete control cabinet. The control cabinet currently supports ABB RER615 for three-phase reclosing and Beckwith M-7679 relay for both three-phase and single-phase reclosing.

- 32-pin, 42-pin, and 24-pin control cable options (24-pin for retrofitting PCD controllers only)
- Provisions for 2/3/5/8-pin potential transformer (PT) cables
- Two 12V, 12Ah, rechargeable, sealed, lead-acid batteries
- One 250Vdc, 30,000 microfarad capacitors for voltage boost
- One GFCI outlet for convenient 120V AC access
- Rated for IP65 ingress protection
- Transfer switch for switching between power sources
- Provision for 3-pin heater connection
- Thermostat controlled 50W heater in the control cabinet
- Door switch
- Refer to RER615 literature or Beckwith's website for more information on M-7679 relay

ABB Control Cabinet with ABB RER620 relay

- Available in standard or low-profile versions
- Provisions for 2-pin or 5-pin PT cables
- Four 12V, 12Ah rechargeable, sealed, lead acid batteries
- Two 250Vdc, 30,000 Microfarad capacitors for voltage boost
- One GFCI outlet for convenient 120V AC access
- Rated for IP65 ingress protection
- Transfer switch for switching between power sources
- Thermostat-controlled 50W heater in the control cabinet
- Door switch
- Refer to RER620 literature for more information

SEL Control Cabinet with SEL-651R2 Relay

- The GridShield Recloser is compatible with multiple variants of SEL 651R2 recloser controllers:
 - SEL651R22 (32 pin interface)
 - SEL651R2A (42 pin interface)
 - SEL651R23 (24 pin interface)
- Refer to SEL website for more information

Control Connections

- PTs can be connected through a 2-pin or 3-pin cable for single/control power PT and a 5-pin or 8-pin cable for three-phase PTs.
- External sensor signals come directly through the bottom of the cabinet. With integrated or embedded voltage sensing however, all voltage signals come through the control cable.
- Male connectors on recloser unit and control cabinet. Female connectors on the control cables.

Controller pin compatibility				
	ABB RER620	ABB ACM with ABB RER615	ABB ACM with Beckwith M7679	SEL-651R
24 pin compatible	✓	✓	✓	✓
32 pin compatible		✓	✓	✓
42 pin compatible			✓	✓

Technical Data

Rated max. voltage	15.5	27.7	38	kV
Rated power frequency	50/60	50/60	50/60	Hz
Rated continuous current	1000	1000	1250	A
Rated symmetrical interrupting current	12.5	12.5	16	kA
Rated lightning impulse withstand (BIL) for SVS	150	150	170	kV
Rated lightning impulse withstand (BIL) for DVS	125	125		kV
Dry withstand 60 Hz 1 Min.	50	60	70	kV
Wet withstand 60 Hz 1 Min.	50	60	70	kV
Phase spacing	15.50 (394)	15.50 (394)	15.50 (394)	inches (mm)
External creep distance, H2-ground (SVS)	38.00 (960)	38.00 (960)	50.70 (1288)	inches (mm)
External creep distance, H2-ground (DVS)	38.00 (963)	38.00 (963)		inches (mm)
External creep distance, H1-H2 (SVS)	45.00 (1160)	45.00 (1160)	49.80 (1260)	inches (mm)
External creep distance, H1-H2 (DVS)	42.64 (1083)	42.64 (1083)		inches (mm)
Min. external strike distance (SVS)	9.50 (240)	9.50 (240)	14.40 (367)	inches (mm)
Min. external strike distance (DVS)	9.72 (247)	9.72 (247)		inches (mm)
Min. interrupting time		0.05		sec max
Max. closing time		0.055		sec max
Recloser unit weight (single tank)	333 (150)	333 (150)	430 (195)	lbs (kg)
Recloser unit weight (3SP)	300 (136)	300 (136)	390 (177)	lbs (kg)
Small ABB control cabinet weight		< 150 (68)		lbs (kg)
Standard ABB control cabinet weight		< 200 (91)		lbs (kg)
Rated standard operating duty	O 0.2s CO 2s CO 5s CO Lockout		O 0.2s CO 2s CO 2s CO Lockout	

Operating temperature	-40°C to +60°C (-40° F to +140°F)
Storage temperature	Indoor at 5°C to 40°C
Materials:	Stainless steel HV and LV enclosure
Current sensors: 600:1 or 300:1 CTs. One per phase encapsulated into the horizontal bushing of the pole	±0.5% accuracy
Voltage sensors: Up to six CVD sensors. One or two per phase encapsulated into the horizontal and vertical bushings	±1% accuracy for full temperature range on vertical bushings
	±1% accuracy from -10°C to +40°C and ±3% otherwise on horizontal bushings
	±1° phase angle accuracy
	No drift due to change in humidity levels
Battery	ABB cabinet: four serially connected 12 V, 12 Ah rechargeable, sealed, lead acid batteries ABB interchangeable relay cabinet: two serially connected 12 V, 12Ah rechargeable, sealed, lead acid batteries
Compliance	Meets all applicable recloser standards (dual logo standard IEC 62271-111/IEEE C37.60)
Ingress Protection	Control cabinet rated to IP65 High voltage cabinet rated to IP65
Life Test	10,000 full load operations without degradation
Note	Galvanized frames per ASTM 123A/123M standard. Stainless steel options are also available.

Comparison Chart

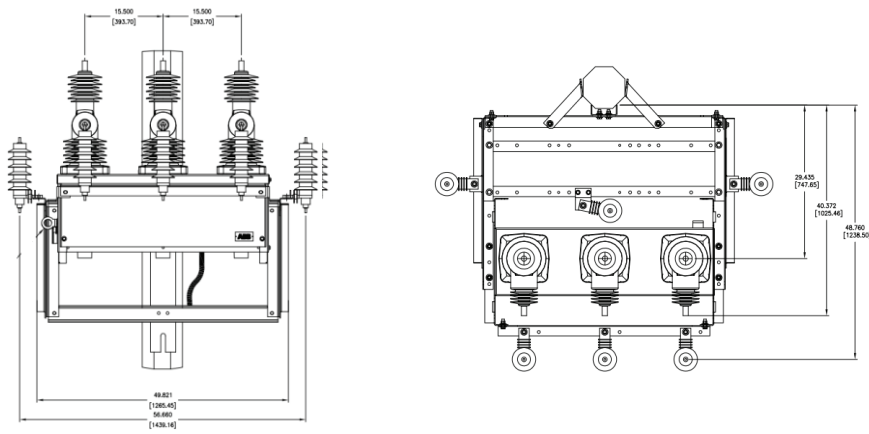
Category	Feature	OVR-15/27/38	GridShield® 3P	GridShield® 3SP
Construction and Operation	Mechanically Ganged Operation	•		
	Individual Phase Operation		•	•
	Single Tank Body	•	•	
	Magnetic Actuation	•	•	•
	HCEP Hydrophobic Insulators	•	•	•
	Bi-Stable Magnetic Actuation	•	•	•
	Trip/Lockout Handle	•	•	•
	Operation Counter	°	°	
	Deadline Operation	•	•	•
Sensing	Indicator Cups for Each Phase		•	•
	Dual Voltage Sensing Capability	°	°	°
	3 Embedded 10,000:1 Voltage Sensors	•	•	•
	6 Embedded 10,000:1 Voltage Sensors		°	°
	3 Embedded 600:1 CTs	•	•	•
Control Cable	3 Embedded 300:1 CTs		°	°
	24-pin Control Cable	•	•	•
	32-pin Control Cable		•	•
Frame Options	42-pin Control Cable		•	•
	Standard Pole-mount Frames	•	•	•
	Pole top Side-mount Frame	•	•	•
	Compact Frame			•
	Crossarm Frame			•
	Wrap-around Frame			•
	Phase Over Phase (Vertical) Mount			•
	Substation Frame	•	•	•
	Custom Frame		•	•
Recloser Control	Site Ready Options	•	•	•
	No Serviceable Electronics in HV Unit	•	•	•
	Recloser Control: RER620		•	•
	Recloser Control: RER615 (3-ph only)	•	•	•
	Recloser Control: Beckwith M-7679		•	•
	Recloser Control: SEL-651R		•	•

Legend: • = Yes
° = Option



Dimensions and Mounting

Pole Mounting Frame

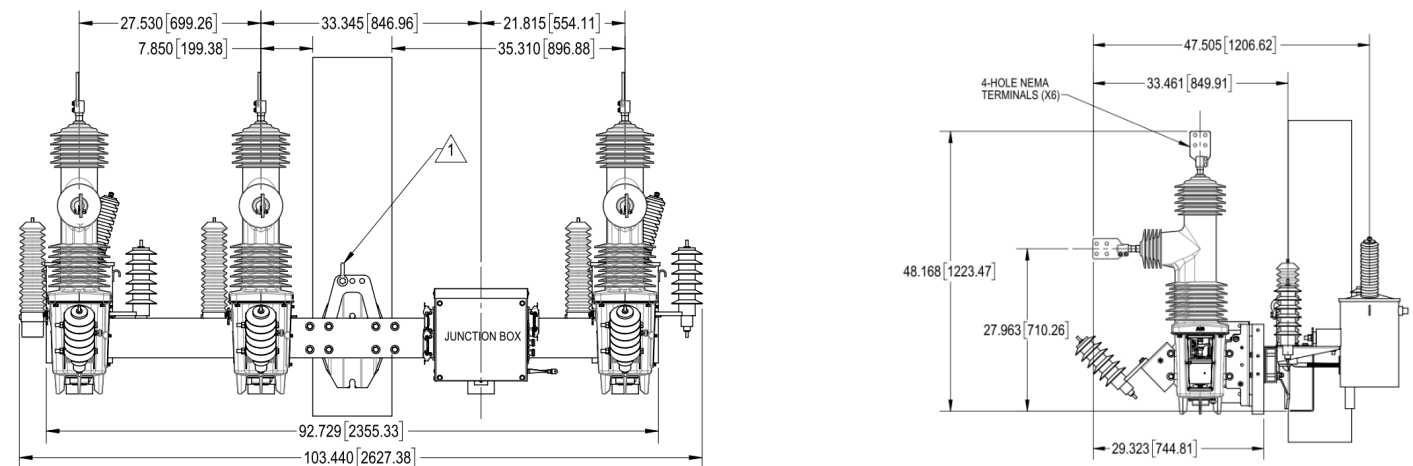


Front View

Top View

Side View

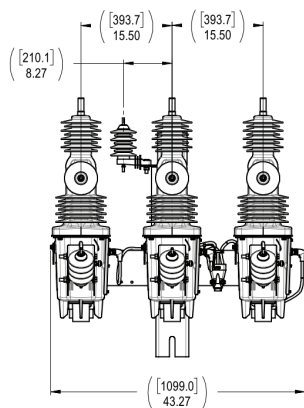
Cross Arm Frame



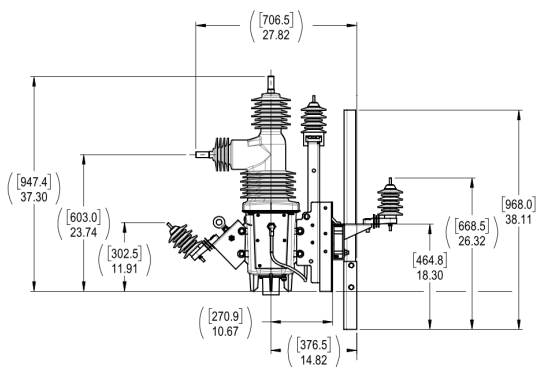
Front View

Side View

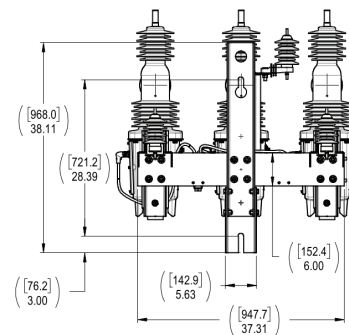
Compact Cross Arm Mounting Frame



Front View

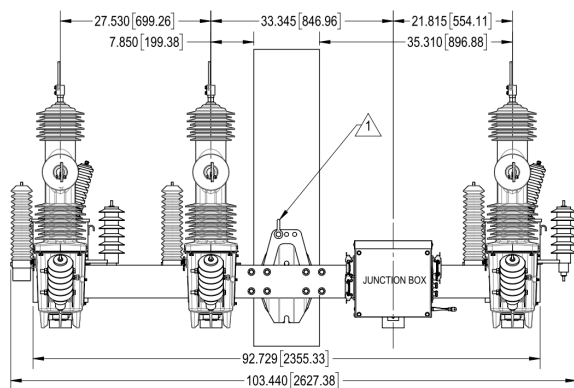


Side View

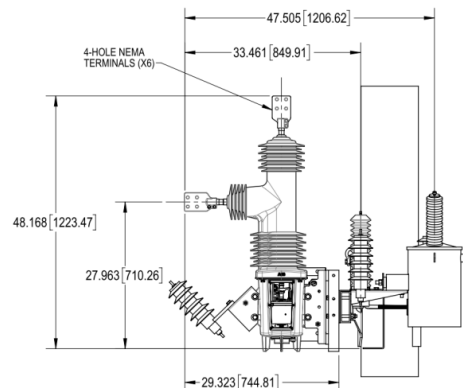


Back View

Side Mount / Alley Arm Mounting Frame

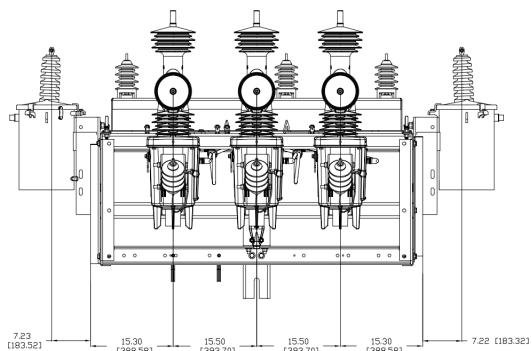


Front View

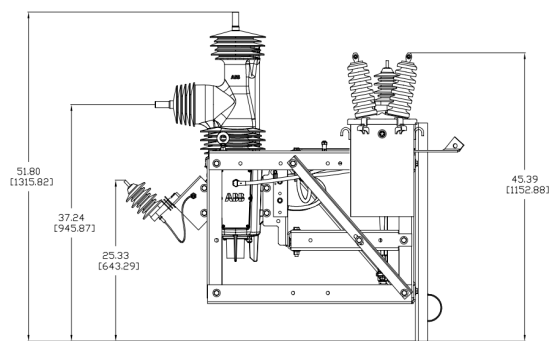


Top View

Compact Frame (with embedded dual voltage sensing)

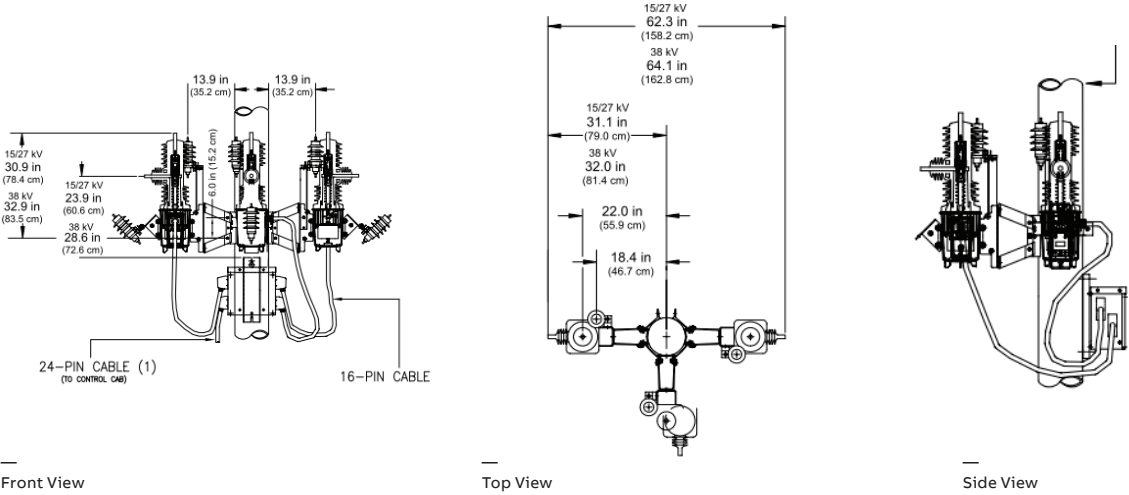


Front View



Top View

Wrap Around Frame



Substation Frame

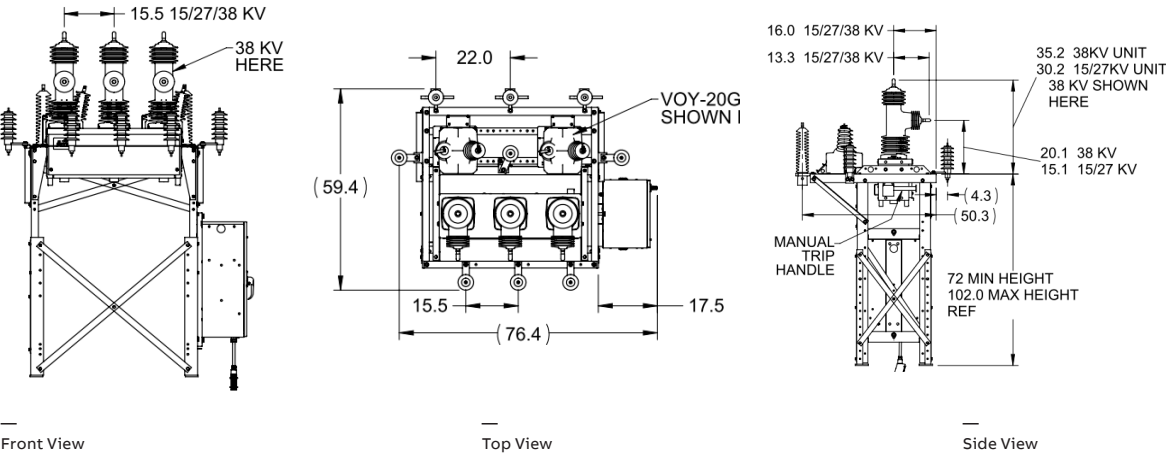
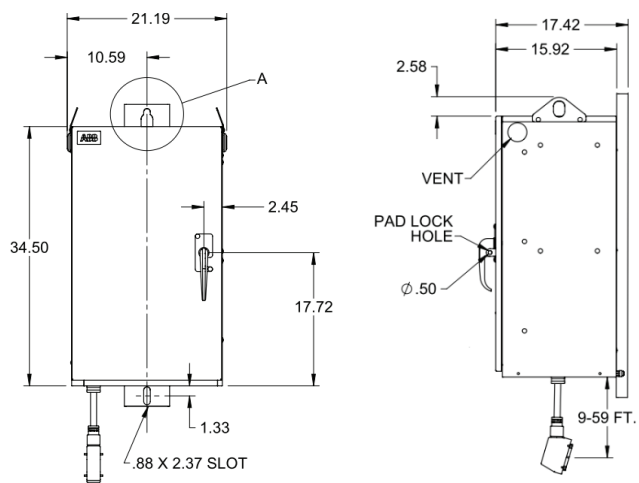
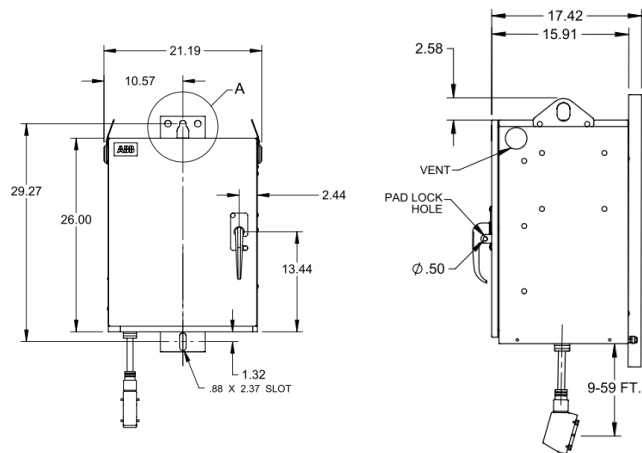


ABB Control Cabinet with RER620

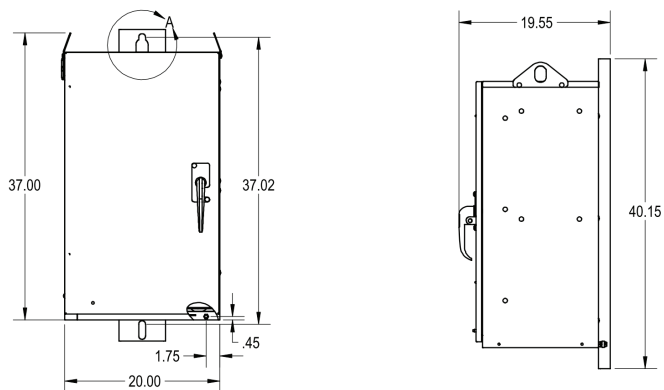
Front View

Side View

ABB Low Profile Control Cabinet with RER620

Front View

Side View

ABB Interchangeable Relay Cabinet with RER615, RER620 or Beckwith M-7679

Front View

Side View

Note: For dimensions on control cabinet with SEL-651R, refer to the SEL website.

Accessories



VOG-11



VOG-20B



VOG-15R



Oil PTs



VLS-110



Cable Guard



PT Guard

Horizontal or Vertical
Bushing Guard for 15-27kVHorizontal or Vertical
Bushing Guard for 38kVArrester Animal
Guard

VLS-150



VLS-200



Stud Terminal



NEMA 2-Hole



NEMA 4-Hole



Clamp Connector

High Voltage Unit Accessories

- Surge arresters (9kV, 10kV, 12kV, 15kV, 18kV, 21kV, 24kV, 27kV, 30kV, 36kV)
- PT mounted and wired on recloser frame (ordered in sets of 1, 2, 3, 6)
 - 7200/12470GY VOG-11
 - 8400/14560GY VOG-11
 - 12000/20780GY VOG-15R
 - 13200/22860GY VOG-15R
 - 14400/24940GY VOG-15R
 - 19920/34500 VOG-20B
 - 20125/34500GY VOG-20B
- Cables available with 2-pin or 5-pin connectors in 20 ft or 45 ft lengths
- Oil PT options available
- All PTs available with optional Resivolt™ technology for added protection against very fast transients
- Voltage sensors mounted on recloser frame or integrated with the pole
 - VLS-110 (7.2kV 60:1, 7.62kV 63.5:1, 8.4kV 70.1:1)
 - VLS-150 (12kV 100:1, 13.2kV 110:1, 14.4kV 120:1, 12-14.4kV 2200:1)
 - VLS-200 (16.092kV 134.1:1, 16.8kV 140:1, 19.92kV 166:1, 20.125V 167.7:1, 16-20kV 5000:1)
- Animal guards
 - Cable guard with straight pins
 - PT animal guard with push pins (set of 3)
 - Tyco 15/27 kV Straight or L-shaped (set of 6)

- Cables available in 5m, 10m, and 15m lengths
- Tyco 38 kV Straight or L-shaped (set of 6)
- Voltage sensor animal guards (set of 3)
- Arrester animal guards (set of 6)
- Bushing terminal connectors
 - Stud terminal
 - NEMA 2-hole
 - NEMA 4-hole
 - Clamp connector
 - Special terminal
 - Standard terminal comes with 1" diameter stud (12 threads) on source and load terminals
 - Special terminals can also be ordered

Low Voltage Cabinet Accessories

- Provisions for mounting and powering radios (12 or 24 VDC, up to 24 watts continuous)
- Cable guards (9 ft/3m per phase)
- 10 ft armored on the control cable (this armor will be on the control cable for the first 10 feet after LV cabinet)
- Cable locking sleeves
- Transfer switch between source and load side PTs
- FT test switch

Note: For SEL-651R control cabinet accessories; refer to SEL website.

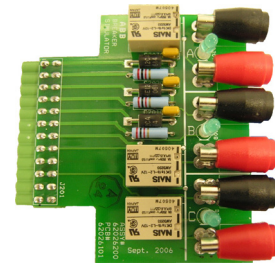


- 15 Recloser simulator assembly for RER620
- 16 FT Flexitest™ Switch
- 17 Transfer switch
- 18 PT cable connectors

Recloser Simulator Assembly for RER620

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 5A (to simulate primary currents up to 3,000A)
- Software can collect oscillographic records of fault simulations
- Comes with wiring harness and power adapter for RER620
- Compatible with PCM600 software



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15

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



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16

Transfer Switch

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



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17

PT Cable Connectors

- 2-pin connector
- 3-pin connector
- 5-pin connector
- 8-pin connector



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18

Additional ABB Devices

—
19 RBD Single-Phase
By-Pass Switch

—
20 AutoLink
Electronic Sectionalizer

—
21 COM600 Substation
Automation Device

RBD 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 a 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 loadbreak tool, for ease of operation
- Compatible with ABB, S&C, and AB Chance interchangeable cutout bodies
- Ideal for lateral feeders

COM600 Substation Automation Device

The substation automation device COM600 is an all-in-one communication gateway that provides connectivity between substation IEDs and network-level control and management systems. In addition, 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 and Support

Product warranty

- Three-year warranty on the recloser and control cabinet
- Twelve-year warranty on the RER620 and RER615 relays
- Non-ABB relays and control cabinets carry their own manufacturer's warranty

Recloser customer support

- Free 24/7 technical support line:
 - US: (800) 929-7947 ext. 5
 - Outside the US: +1 407-732-2000 ext. 2510
 - E-mail: customer.service.group@us.abb.com

Training

- For factory-based training, contact ABB customer service.

On-site training, commissioning assistance, and migration training

- On-site training sessions are offered upon request and can be arranged at the customer facility.
- ABB can provide assistance during installation and commissioning of the recloser, including migration support for the development of relay settings and logic.

Ordering Guide

Digit	Option	Description
Recloser Type	A	GridShield 3P Single Tank (Single Phase Tripping Capable)
	B	GridShield 3SP Individual Poles with Junction Box (Single Phase Tripping Capable)
	C	GridShield 3SP Individual Poles with Splitter (Single Phase Tripping Capable)
	D	GridShield 1SP Single Phase Recloser
Rated Voltage	1	15kV, 1000A Continuous, 125kV BIL, 12.5kA Interrupting Rating (ANSI)
	2	27kV, 1000A Continuous, 150kV BIL, 12.5kA Interrupting Rating (ANSI)
	3	38kV, 1250A Continuous, 170kV BIL, 16kA Interrupting Rating (ANSI)
	4	27kV, 1000A Continuous, 150kV BIL, 10kA Interrupting Rating (ANSI)
	6	15kV, 1000A Continuous, 125kV BIL, 12.5kA Interrupting Rating (IEC)
	7	27kV, 1000A Continuous, 150kV BIL, 12.5kA Interrupting Rating (IEC)
	8	38kV, 1250A Continuous, 170kV BIL, 16kA Interrupting Rating (IEC)
Voltage Sensing	1	Single (3VS) - 3 CVD Voltage Sensors (10000:1) embedded in the horizontal bushings
	2	Dual (6VS) - 6 CVD Voltage Sensors (10000:1) embedded in the bushings
	3	Single (3VS) + 3 External - 3 CVD Sensors (10000:1) embedded in the horizontal bushings and 3 external voltage sensors for vertical bushings
	4	Single (3VS) + 3 Integrated - 3 CVD Sensors (10000:1) embedded in the horizontal bushings and 3 integrated RVD voltage sensors for vertical bushings
Current Sensing	3	Embedded current sensing (300:1) - 3 CTs (300:1) embedded in the horizontal bushings
	6	Embedded current sensing (600:1) - 3 CTs (600:1) embedded in the horizontal bushings
Mounting Frame	1A	Pole mount w/6 arrester brackets
	1B	Pole mount w/6 arrester brackets and flat PT mounting bracket
	1C	Pole mount w/6 arrester brackets and 3 PT C-Channel mounting bracket
	1D	Pole mount w/6 arrester brackets and 6 PT mounting brackets
	1E	Pole mount w/6 arrester brackets and provision for 3 external voltage sensors
	1F	Pole Side Mount w/6 arrester brackets and 6 PT mounting brackets - galvanized steel
	1G	Pole Side Mount w/6 arrester brackets and 6 PT mounting brackets - stainless steel
	2A	Substation mount
	2B	Substation mount w/3 PT mounting brackets
	2C	3SP Substation Mount
	3A	3SP Phase over phase (vertical) mount
	4A	3SP Wrap around frame w/6 arrester brackets
	5A	3SP Cross arm frame w/6 arrester brackets
	5B	3SP Cross arm frame w/6 arrester brackets, up to 2 PT brackets, and provision for 3 ext. voltage sensors
	5C	3SP cross arm frame (compact) w/6 arrester brackets
	5D	3SP Cross arm frame w/6 arresters and up to 2 side PTs
	6A	3SP Side mount
	6B	3SP Side mount (left,right) frame w/6 arrester brackets and 2 PT brackets

Digit	Option	Description
	7A	3SP Compact frame w/6 arresters, 2 PT brackets, and provision for 3 ext. voltage sensors (Galv. Steel)
	7B	3SP Compact frame w/6 arresters, 2 PT brackets, and provision for 3 ext. voltage sensors (Stainless Steel)
	7C	3SP Compact w/6 arresters, 3 voltage sensors and 2 Oil PTs
Frame Assembly	A	Assembled Frame
	U	Unassembled Frame
	S	Site-Ready - Frame assembled, primary connections made, grounding ready
Bushing Terminal	2	NEMA 2 Hole Pad
	4	NEMA 4 Hole Pad
	C	Clamp Connector
	S	Stud Terminal
	Z	Special Terminal
Heater Voltage	A	120VAC Heater in HV Unit
	B	240VAC Heater in HV Unit
Controller Type	A	ABB RER620
	B	Beckwith M-7679
	K	SEL-351RS Kestrel (Only available for GridShield® 1SP Single Phase Recloser)
	R	ABB RER615 (3-phase reclosing only)
	S	SEL-651R
LV Cabinet Size	A	ABB Standard
	B	ABB Low Profile
	S	SEL Standard
Control Cable Type	1	32 pin to 32 pin
	2	32 pin to 42 pin
	3	24 pin to 24 pin
	4	42 pin to 42 pin
	5	10 pin
Control Cable Length	A	10 ft
	B	20 ft
	C	30 ft
	D	40 ft
	E	50 ft
	Z	Custom Length
Control Power Supply	1	120 VAC
	2	240 VAC
	3	48 VDC
	4	125 VDC
	5	250 VDC
Control Power Cable	A	(1) 2 pin / 20 ft
	B	(2) 2 pin / 45 ft
	C	(1) 5 pin / 45 ft
	D	(2) 5 pin / 45 ft
	E	(1) 2 pin / 45 ft + (1) 5 pin / 45 ft
	F	(1) 3 pin / 20 ft
	G	(1) 3 pin / 50 ft
	H	(2) 3 pin / 50 ft
	J	(1) 3 pin / 50 ft + (1) 5 pin / 45 ft
	K	(1) 2 pin / 45 ft
	L	(1) 2 pin to 5 pin / 30ft for ABB Micropole PTs
	M	(1) 8 pin / 50 ft
Reserved	N	None

Note: Not all combinations are valid. To verify the validity of the selections or to select a customized list of options, please contact your ABB sales representative.



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