

Descriptive bulletin

# OVR outdoor vacuum reclosers 15-38 kV

## Innovative designs ensure system reliability

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# Introduction

## Overview

ABB strives to bring our customers the latest technology. Combined with superior performance, competitive pricing, and unparalleled service aimed at total customer satisfaction, our products are the natural choice for you. This is especially true of our feeder automation products, where years of knowledge and modular manufacturing techniques allow our OVR outdoor vacuum reclosers to meet any need and schedule.

## Offering

- **OVR-3:** Compact, three-phase recloser
- **OVR-3SP:** Single pole mounted three-phase recloser for mounting flexibility
- **OVR-1:** Cost effective, single-phase recloser
- **Recloser controls:** 15/27 kV OVR-3 , OVR-3SP available with SEL-651R controller or PCD controller; OVR-1 and 38 kV OVR-3, OVR-3SP available with PCD controller

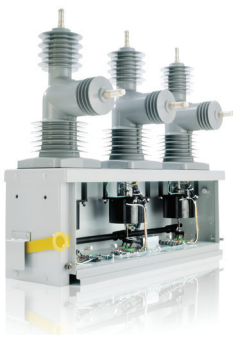
## Features

- Recloser platforms for both single-phase and three-phase system applications
- Flexible mounting options, such as the OVR-3SP with individually mounted poles

- Recloser ratings, substation frame, and compact design suitable for substation installation
- Reclosers tested and rated for 10,000 full load operations
- Magnetic actuator requires no maintenance
- All OVR reclosers come standard with insulation that exceeds IEC Level 4 very heavy contamination requirements for creepage/leakage, exceeding the ANSI standard requirements
- Stainless steel recloser cabinet (OVR-3) or cast aluminum bucket (OVR-1 and OVR-3SP) ensure the best weathering and corrosion resistance
- All electronics located inside control cabinet for quick and safe access, reducing maintenance costs
- For added safety, separately housed 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
- Low profile control cabinet (LPCC) available where compact, lightweight control cabinets are required

1 15-38 kV OVR-3 meets present recloser demands, plus offers advanced protection and control capabilities | 2 PCD relay | 3 Recloser pole installation | 4 OVR-3SP wrap-around frame | 5 Recloser substation installation | 6 OVR-1 single-phase recloser installation

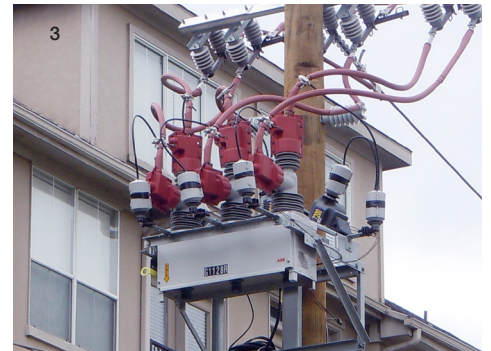
1



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3



4



5



6



# Technology review

## Recloser technology

OVR 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 OVR 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 platings. 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

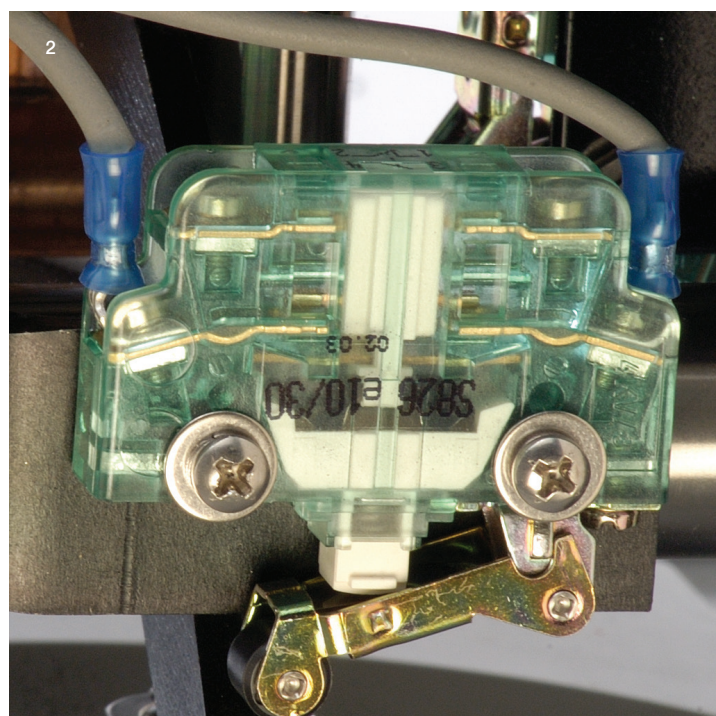
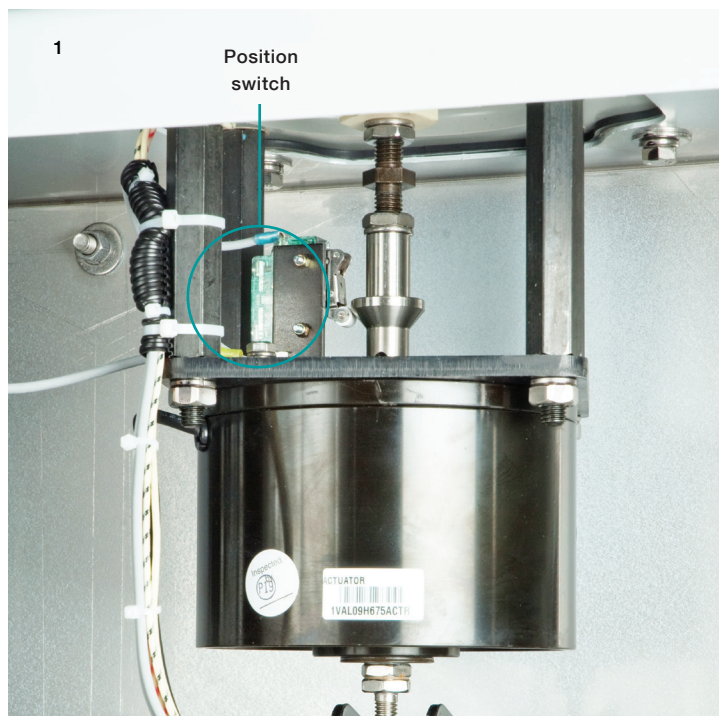
### Position switch

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

### Advantages

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

1 Magnetic actuation eliminates the need to adjust, lubricate, or perform any maintenance on OVR reclosers | 2 One position switch per pole



## Vacuum interrupters

OVR 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

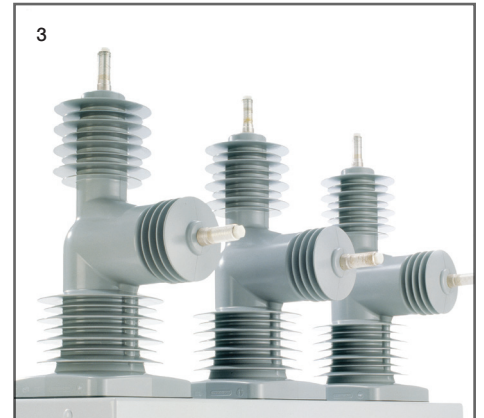
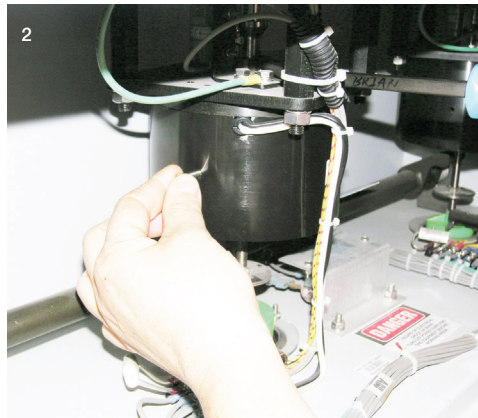
## Pole assembly

ABB pole assemblies are constructed of UV resistant HCEP encapsulating material and are designed to provide a rated 10,000 full load operations without maintenance. Each pole includes an individual magnetic actuator, vacuum interrupter, and embedded current and voltage sensors. The embedded sensors in the OVR provide protection class accuracy for challenging environmental conditions.

### Advantages

- Resistant to vandalism
- Maintenance free: tested to 10,000 full load operations without degradation
- Few moving parts

1 ABB vacuum interrupter clean room | 2 Wear indicators provide simple go / no go indication when interrupters need replacement, eliminating maintenance | 3 Integrated sensors provide required voltage and current signals for protective relaying and metering.



### HCEP Insulating Material

The OVR insulating material is HCEP. HCEP is the most advanced outdoor solid dielectric material available.

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



With hydrophobicity (HCEP) - HCEP does not become resistively conductive when exposed to moisture

From CEP to HCEP	CEP	HCEP
Design versatility	+	+
Manufacturing process	+	+
Number of interfaces	+	+
Animal attack	+	+
Hydrophobicity	-	+
Thermal shock resistance	-	+
Low flash-over probability	-	+

+ = positive  
- = negative

## Contamination performance

Contamination performance is dependent on the amount of creepage/leakage distance available on a recloser bushing (pole). This is why all ABB OVRs come standard with HCEP insulation that exceeds IEC Level 4 requirements for environments with very heavy pollution<sup>1</sup> - far more creep than required by equivalent ANSI standards, which focus mainly on BIL performance.

### IEC pollution levels

Pollution level	Required Creep ratio
I - Light	0.63 in/kV (16 mm/kV)
II - Medium	0.79 in/kV (20 mm/kV)
III - Heavy	0.98 in/kV (25 mm/kV)
IV - Very Heavy	1.22 in/kV (31 mm/kV)

### Required Creep vs OVR Creep (Phase to Ground)

Pollution Level	Rated Maximum Voltage					
	15 kV		27 kV		38 kV <sup>2</sup>	
	Required creep in (mm)	OVR creep in (mm)	Required creep in (mm)	OVR creep in (mm)	Required creep in (mm)	OVR creep in (mm)
I - Light	9.8 (248)		17.0 (432)		23.9 (608)	
II - Medium	12.2 (310)		21.3 (540)		30.0 (760)	
III - Heavy	15.3 (388)		26.6 (675)		37.4 (950)	
IV - Very Heavy	18.9 (481)	38.0 (960)	33.0 (837)	38.0 (960)	46.4 (1178)	50.7 (1288)

### OVR-3 Severe Environment Test Results from KIPTS<sup>3</sup>:

- **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](http://www.abb.com/mediumvoltage)

<sup>1</sup> as per applicable IEC standards

<sup>2</sup> OVR-3 and OVR-3SP only for 38 kV

<sup>3</sup> 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

KIPTS test site in South Africa



OVR-3 at KIPTS test site



# Product review

## OVR-3 & OVR-3SP three-phase reclosers



1 OVR-3 three-phase recloser | 2 OVR-3SP adds the functionality of three individually housed poles | 3 Mounting frame with brackets includes sensors, surge arrestors, and potential transformers | 4 OVR-3 with substation frame | 5 OVR-3SP substation installation | 6 Substation rack mount

The OVR-3 and OVR-3SP reclosers are able to meet and exceed recloser application demands with advanced capabilities such as single- or three-phase tripping, fault location, load profile, power quality, communications, loop control, and stable current and voltage measurement spanning the rated temperature range.

The OVR-3 and OVR-3SP reclosers are available in 15 kV, 27 kV, and 38 kV and are rated for continuous currents up to 1200 A. The symmetrical interrupting current capability is up to 16 kA. Please see the full ratings capabilities on the technical data page.

### Benefits

- Compact design is easy to install, maneuver, and transport
- Cast aluminum or stainless steel protects recloser and control cabinets from the elements
- Variety of mounting frames offers maximum flexibility
- Absence of electronics in recloser cabinet results in a highly reliable recloser, while maximizing operator safety and significantly reducing maintenance time
- Multiple controller options provide flexible integration for any grid application
- Control cabinet provides power and mounting requirements for communications equipment
- RUS certified
- 24 hour / 7 day dependable customer support



## OVR-3 and OVR-3SP 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:	630/800/1000/1200*	630/800/1000/1200*	630/800/1200	A
Rated symmetrical interrupting current:	8/10/12.5/16*	10/12.5/16*	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)
Max. interrupting time:	0.030	0.030	0.030	sec max
Max. closing time:	0.055	0.055	0.044	sec max
Materials: Vacuum interrupter encapsulated in hydrophobic cycloaliphatic epoxy with cast aluminum/stainless steel construction				
Current sensors:	One per phase encapsulated into the pole			
Operating temperature:	-40° C to +70° C (-40° F to +158° F)			
Control voltage:	90-265 VAC / 125 VDC			
OVR-3 recloser unit weight:	333 (150)	333 (150)	430 (195)	lbs (kg)
OVR-3SP recloser unit weight (each):	100 (45)	100 (45)	130 (60)	lbs (kg)
Standard PCD control cabinet weight:	165 (75)	165 (75)	175 (80)	lbs (kg)
Four series connected 12 VDC, 12 AH batteries, with 48 hours (15/27kV PCD cabinet) or 38 hours (38kV PCD cabinet) carryover and multiple operations upon loss of power				
OVR testing:				
Meets all applicable recloser standards (IEC 62271-111 (E):2005, IEEE Std. C3760 (E):2003)				
Life test: 10,000 full load mechanical operations without degradation				
PCD testing: surge withstand capability: SWC and fast transient tests per ANSI C37.90.1 and IEC 255-22-1 class III and 255-22-4 class IV for all connections except comm ports				
Isolated comm ports per ANSI 37.90.1 using oscillatory SWC Test Wave only, & per IEC 255-22-1 class III				
EMI test per ANSI C37.90.2				

\* Refer to 38 kV specifications for OVRs with 1200 A continuous current rating, 16 kA interrupting rating or BILs of 150 kV or greater.

## PCD Control Unit

1

### Local human-machine interface

- Large LCD (1 in (25 mm) x 5 in (127 mm)) with large characters (two lines of 20 characters)
- Simple menu-driven programming using large six-button keypad
- Backlit display indicates metering values, fault information and location
- Temperature compensated - operating temperature range: -40 °F (-40 °C) to +158 °F (+70 °C)
- Two levels of password-protected settings and controls

2

### Indicator lights

- Continual self-checking with status indication
- Pickup and lockout indication
- User programmable LEDs for alarms, additional targets, etc.

3

### Front panel pushbuttons

- Up to six protection groups available
- Remote Blocked, Ground Blocked, and Reclose Blocked pushbuttons
- Easy to change settings using Alt 1 Settings pushbutton
- Use Counters pushbutton to access overcurrent trip information and number of operations
- Expanded PROG 1 modes:
  - Battery Test (Default): Pass/fail load test with red light indicating failure of automatic test
  - Enable or disable Sensitive Earth Fault (SEF) via HMI
  - PROG 1 can mapped for advanced logic-based functions through programmable I/O
- Expanded PROG 2 modes:
  - Disabled (Default)
  - Enable or disable single-phase tripping functionality
  - Switch Mode Enable can be used to inhibit overcurrent protection and allow the recloser to be used as a simple switch
  - PROG 2 can mapped for advanced logic-based functions through programmable I/O

4

### Hot line tagging feature

- On faceplate for simpler and safer operation
- Can be mapped for multiple applications

5

### Front mounted RS-232 port

- Independent from rear mounted RS-232 port
- Easy to download and upload data on-site using AFSuite™

6

### Separate open and close pushbuttons

- Separate indicator light for easier viewing
- ANSI- or IEC-compliant coloring

7

### Faceplate available in English, Spanish, or French



The PCD faceplate is easy to use, program, and read (ANSI faceplate shown).

## PCD control cabinet

### Communication & I/O ports

- Isolated RS-232 and RS-485 ports
- ST fiber optic ports
- Modbus ASCII and RTU, and DNP 3.0™ protocols included with all units
- DNP 3.0™ is compliant to Level 2
- Rear port can be configured for DNP/Modbus auto detect
- IEC 60870-5-101
- Programmable I/O ports: 6 inputs, 4 outputs available with UPS
- Programmable I/O ports: 10 inputs, 7 outputs available with PS

### Single-phase tripping (optional)

- Reduces unnecessary three-phase interruptions and outages due to single-phase faults
- Single-phase tripping options for only picked up phases (OPUP) or one or all phases (OOAP)
- For optimal coordination, each step of the reclose cycle can be individually configured for single-phase trip, three-phase trip, or lockout

### Oscillographic data

- Storage capacity of 64 cycles of monitored waveform data at 32 samples per cycle
- All data can be downloaded on-site or remotely through communication interfaces

### Operation recording

- Stores 1024 operation records

### Fault recording

Records last 128 operations of:

- phase and ground fault amperes
- phase and ground voltage
- tripping element
- reclose time
- distance to fault
- estimated fault resistance
- time stamp

### Fault location

- Patented algorithm estimates fault impedance and computes apparent distance to fault
- Works in background mode to maintain protection integrity



OVR control cabinet

### Power quality

- Records voltage sags, swells and interruptions
- Implemented per ANSI/IEEE Std. 1159 and includes programmable voltage thresholds
- Triggers oscillographic capture

### Metering

- Meters current and voltage to  $\pm 1\%$  accuracy
- Measures kW and kVARh, power factor, demand Watts and VARs, and frequency to  $\pm 2\%$  accuracy
- User-selectable load profile data sampling 5, 15, 30, 60 minute time interval which will contain 13.3, 40, 80 or 160 days of information
- All data can be downloaded locally or remotely through communications interface
- Includes assignable phases for easy phase selection and selectable power flow

## Protective functions

- Phase time overcurrent protection (ANSI 51P; IEC 3I>)
- Phase instantaneous overcurrent protection (ANSI 50P-1; IEC 3I>>1)
- Two definite time overcurrent settings (ANSI 50P-2, 50P-3; IEC 3I>>2, 3I>>3)
- Ground overcurrent protection (ANSI 51N; IEC IN>)
- Ground instantaneous overcurrent protection (ANSI 50N-1; IEC IN>>1)
- Two definite time ground overcurrent settings (ANSI 50N-2, 50N-3; IEC IN>>2, IN>>3)
- Negative sequence overcurrent protection (ANSI 46; IEC Insc>)
- Phase and ground directional overcurrent protection (ANSI 67P, 67N; IEC 3I>→, IN>→)
- Two independent steps for load shed, restoration, and over-frequency (ANSI 81S, 81R, 81O, 81V; IEC f)
- Undervoltage and overvoltage control and alarm (ANSI 27, 59; IEC U<, U>)
- Up to four reclose cycles (define a recloser cycle ANSI 79-1 → 79-5; IEC O → I) close four times / trip five
- Adaptive reclosing shots: each reclose sequence allows independent programming of protective functions
- Sensitive Earth Fault protection with directional features (optional)
- Available with up to 42 recloser curves, 9 ANSI curves, 5 IEC curves, and 3 user programmable curves

## Adaptive protection

- Up to six protection groups
- Zone sequence coordination
- Cold load pick-up
- Reverse power reconfiguration (ANSI 32P, 32N; IEC I1g, I2g)

## Control cabinets

- Choose from standard cabinet or low profile control cabinet (LPCC)
- Select a LPCC for 15 / 27 kV applications where compact control cabinets are required
- Ample space for mounting communications equipment
- Three-point latching with padlockable handle
- Vented design
- Ground fault receptacle provides AC power for a laptop

## SEL-651R control and cabinet

The 15 kV and 27 kV OVR-3 reclosers are also available with the SEL-651R control cabinet from SEL Inc. (Schweitzer Engineering Laboratories).

The features, dimensional drawings, AcSELeator user interface software, and latest firmware of the SEL-651R relay and control cabinet are available on [www.selinc.com](http://www.selinc.com).



# Ordering guide

## OVR-3 recloser

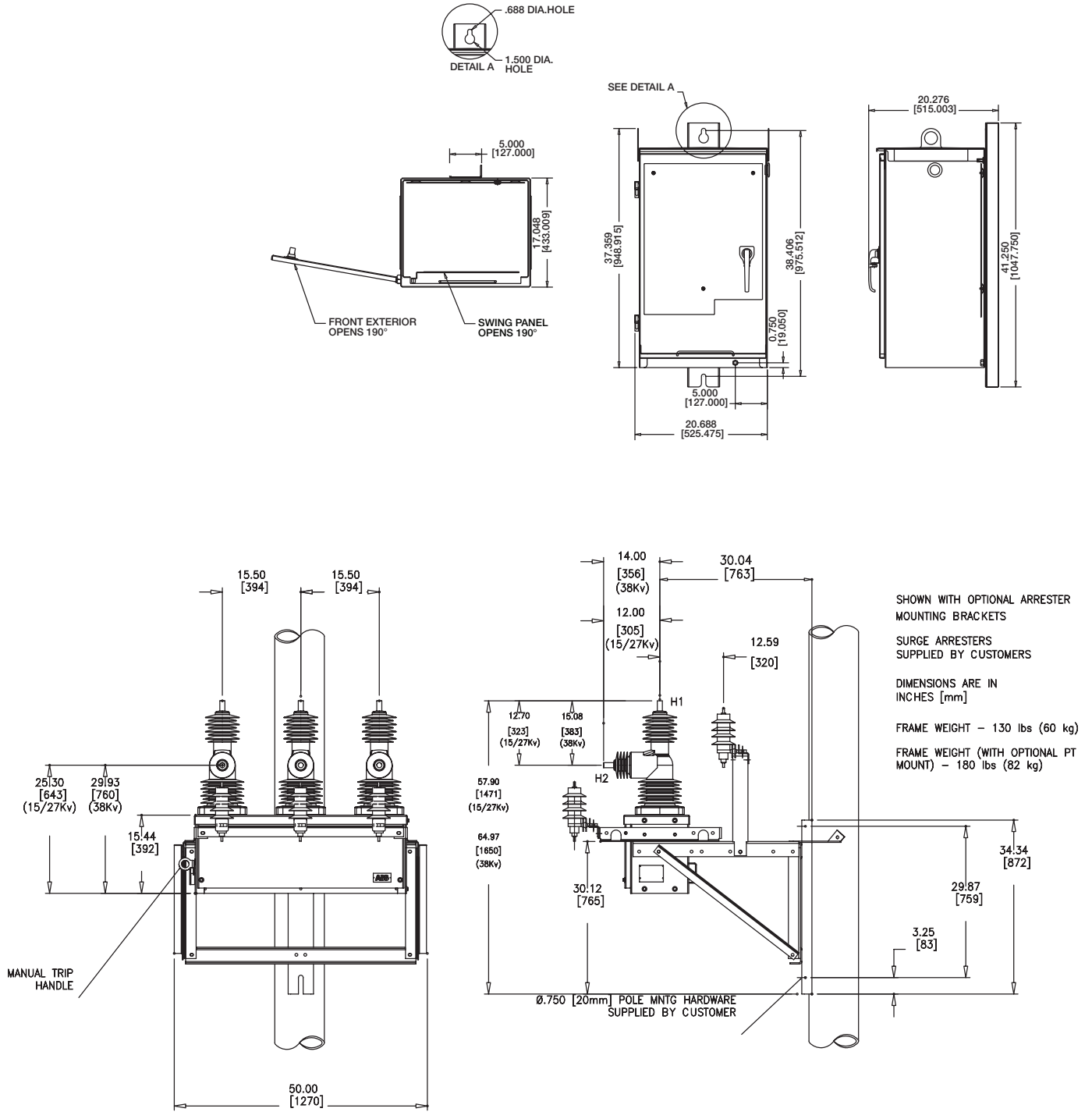
Digit		1	2	3	4	5	6	7	8
		R	1	1	8	1	C	D	E
<b>1) Recloser</b>	R: OVR-3 recloser								
<b>2) Voltage</b>	1: 15 kV 2: 27 kV 3: 38 kV (not available with SEL-651R control)								
<b>3) BIL</b>	1: 110 kV 2: 125 kV 5: 150 kV 7: 170 kV (not available with SEL-651R control)								
<b>4) Continuous current</b>	5: 630 A 8: 800 A 1: 1000 A 2: 1200 A (not available with SEL-651R control)								
<b>5) Interrupting rating</b>	1: 12.5 kA 2: 16 kA (not available with SEL-651R control)								
<b>6) Mounting frame</b>	A: Pole w/ 6 arrester brackets, assembled B: Pole w/ 6 arrester brackets, unassembled C: Pole w/ 6 arrester brackets & 3 PT C-channel mounting brackets, assembled D: Pole w/ 6 arrester brackets & 3 PT C-channel mounting brackets, unassembled G: Pole w/ 6 arrester brackets & 6 PT mounting brackets, galvanized, assembled H: Pole w/ 6 arrester brackets & flat PT mounting bracket, assembled R: Pole w/ 6 arrester brackets & flat PT mounting bracket, unassembled S: Pole w/ 6 arrester brackets & provisions for 3 voltage sensors V: Substation, assembled W: Substation, unassembled X: Substation w/ 3 PT mounting brackets, assembled Y: Substation w/ 3 PT mounting brackets, unassembled Z: Custom N: None <b>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</b>								
<b>7) Control cable</b>	A: 10 feet [3 m] B: 20 feet [6 m] C: 30 feet [9 m] D: 40 feet [12 m] E: 50 feet [15.24 m] F: 60 feet [18.29 m] Z: Customized (Max. length 200 ft) N: None <b>Note: Output of 3 embedded voltage and current sensors wired directly into relay through 24-pin control cable</b>								
<b>8) PT cable</b>	A: One 2 pin connector with 20 ft cable B: One 2 pin connector with 45 ft cable ( <a href="#">Figure 3, Accessories</a> ) C: One 5 pin connector with 45 ft cable ( <a href="#">Figure 4, Accessories</a> ) D: Two 5 pin connector with 45 ft cable E: One 2 pin connector with 45 ft cable and (1) 5 pin connector with 45 ft cable F: Control cabinet floorplate with provisions for 3 external voltage sensors G: Control cabinet floorplate with provisions for 3 external voltage sensors & (1) 2 pin connector with 45 ft cable Z: Custom N: None <b>Note: 2-pin connector needed when using a PT for control power, 5-pin connector needed when using three external PTs</b>								

Digit																																							
	9	10	11	12	13	14	15	16	17-18																														
	1	4	1	F	6	4	1	N	00																														
<b>9, 10) Control power voltage and I/O</b>	120/240 VAC (90-250 VAC / 125 VDC) options (batteries included) 10: 15/27 kV no inputs, outputs, or alarms 14: 15/27 kV six inputs, four outputs, and alarms 31: 38 kV no inputs, outputs, or alarms 32: 38 kV six inputs, four outputs, and alarms SS: SEL-651R control cabinet (style code specified separately) <b>Note: 2-pin connector needed when using a PT for control power, 5-pin connector needed when using three external PTs</b>																																						
<b>11) Control &amp; faceplate</b>	3: PCD ANSI faceplate, red close & green trip buttons, front RS-232 port, large LCD screen, & integral tagging function. Includes Firmware. Includes Oscillography, P Qual, and Prog Curves 1: Includes above and adds single-phase tripping S: SEL-651R control cabinet (style code specified separately)																																						
<b>12) Voltage sensing and pickup settings</b>	<table border="1"> <thead> <tr> <th colspan="2">External PT voltage sensing (120 VAC input)</th> <th colspan="2">Pole-embedded voltage sensing (H2 terminals only)</th> <th rowspan="2">PCD (SEF - Sensitive Earth Fault)</th> </tr> <tr> <th>NO SEF</th> <th>SEF</th> <th>NO SEF</th> <th>SEF</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>B</td> <td>-</td> <td>H</td> <td>10-160 A (Gnd) / 20-320 A (Phase)</td> </tr> <tr> <td>X</td> <td>Y</td> <td>-</td> <td>K</td> <td>10-160 A (Gnd) / 100-1600 A (Phase)</td> </tr> <tr> <td>C</td> <td>D</td> <td>-</td> <td>M</td> <td>50-800 A (Gnd) / 20-320 A (Phase)</td> </tr> <tr> <td>E</td> <td>F</td> <td>-</td> <td>Q</td> <td>50-800 A (Gnd) / 100-1600 A (Phase)</td> </tr> </tbody> </table> S: SEL-651R control cabinet (style code specified separately)										External PT voltage sensing (120 VAC input)		Pole-embedded voltage sensing (H2 terminals only)		PCD (SEF - Sensitive Earth Fault)	NO SEF	SEF	NO SEF	SEF	A	B	-	H	10-160 A (Gnd) / 20-320 A (Phase)	X	Y	-	K	10-160 A (Gnd) / 100-1600 A (Phase)	C	D	-	M	50-800 A (Gnd) / 20-320 A (Phase)	E	F	-	Q	50-800 A (Gnd) / 100-1600 A (Phase)
External PT voltage sensing (120 VAC input)		Pole-embedded voltage sensing (H2 terminals only)		PCD (SEF - Sensitive Earth Fault)																																			
NO SEF	SEF	NO SEF	SEF																																				
A	B	-	H	10-160 A (Gnd) / 20-320 A (Phase)																																			
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C	D	-	M	50-800 A (Gnd) / 20-320 A (Phase)																																			
E	F	-	Q	50-800 A (Gnd) / 100-1600 A (Phase)																																			
<b>13) Communication ports and protocols</b>	0: No PCD com module (RS-232 on CPU only) 2: PCD com 2a module (RS-232 & RS-485; fiber) 6: PCD com 5 module w/LCM (RS-232 isolated; RS-485 isolated) S: SEL-651R control cabinet (style code specified separately)																																						
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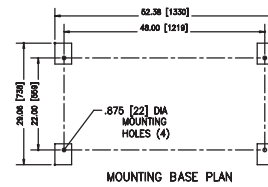
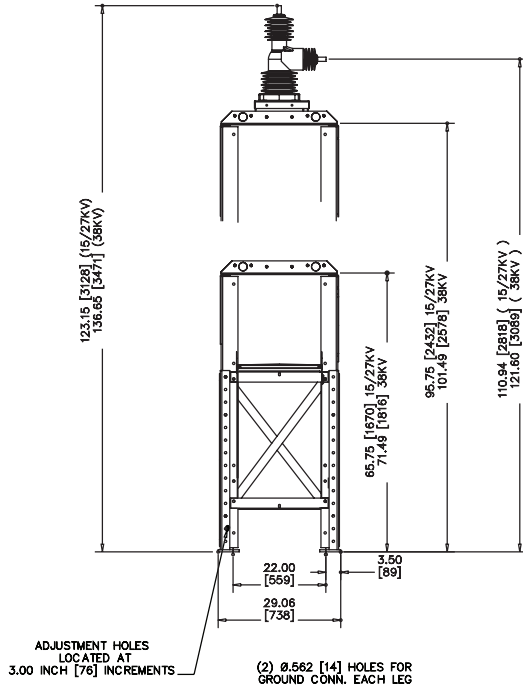
# OVR-3 dimensional drawings

## Pole frame (15-38 kV)





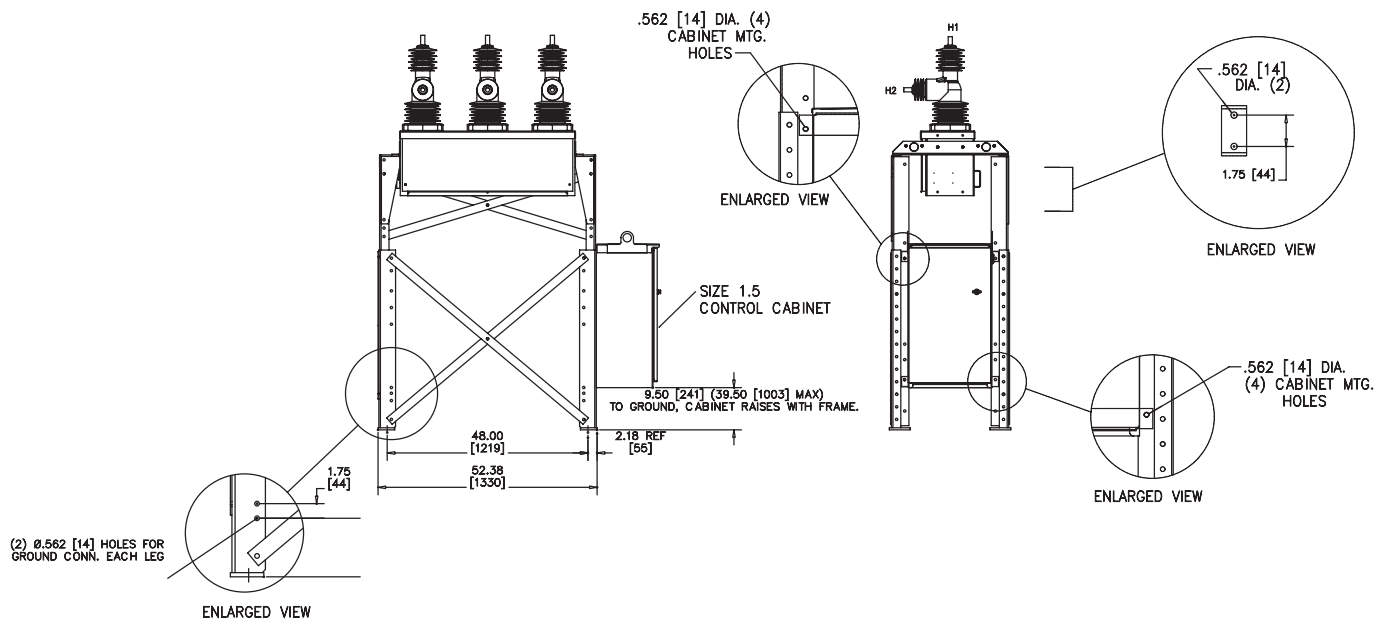
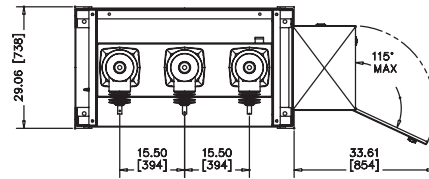
OVR-3 dimensional drawings  
 Substation frame (15-38 kV)



AVAILABLE WITH OPTIONAL ARRESTER MOUNTING BRACKETS

DIMENSIONS ARE IN INCHES [mm]

FRAME WEIGHT – 225 lbs (100 kg)



# Ordering guide

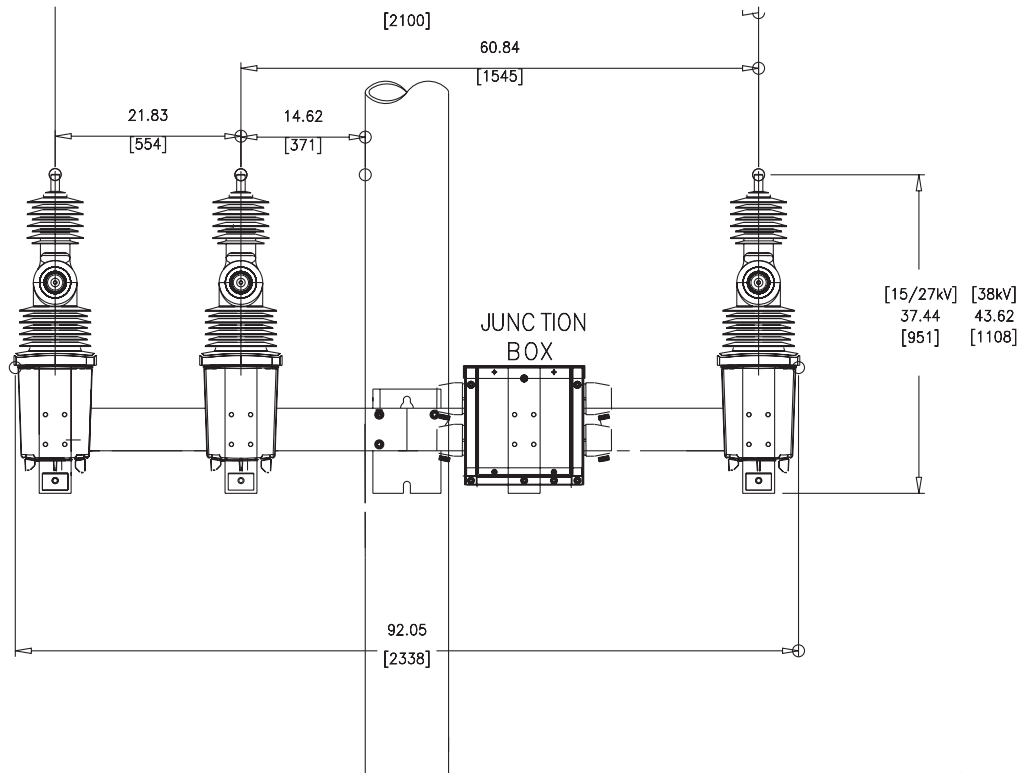
## OVR-3SP recloser

Digit		1	2	3	4	5	6	7	8
		P	1	1	8	1	R	D	E
<b>1) Recloser</b>	P: OVR-3SP recloser								
<b>2) Voltage</b>	1: 15 kV 2: 27 kV 3: 38 kV (not available with SEL-651R control)								
<b>3) BIL</b>	1: 110 kV 2: 125 kV 5: 150 kV 7: 170 kV (not available with SEL-651R control)								
<b>4) Con- tinuous current</b>	5: 630 A 8: 800 A 1: 1000 A 2: 1200 A (not available with SEL-651R control)								
<b>5) Interrup- ting rating</b>	1: 12.5 kA 2: 16 kA (not available with SEL-651R control)								
<b>6) Moun- ting frame</b>	H: Phase over phase (vertical) R: Wrap-around frame T: Cross arm frame N: None								
<b>7) Control cable</b>	G: 30 ft (9 m) V & I (24-pin) cable & 12 ft (3.7 m) junction box cable Z: Customized (Max. length 200 ft) N: None								
<b>8) PT cable</b>	A: One 2 pin connector with 20 ft cable B: One 2 pin connector with 45 ft cable ( <a href="#">Figure 3, Accessories</a> ) C: One 5 pin connector with 45 ft cable ( <a href="#">Figure 4, Accessories</a> ) D: Two 5 pin connector with 45 ft cable E: One 2 pin connector with 45 ft cable and (1) 5 pin connector with 45 ft cable F: Control cabinet floorplate with provisions for 3 external voltage sensors Z: Custom N: None <b>Note: 2-pin connector needed when using a PT for control power, 5-pin connector needed when using three external PTs</b>								

Digit																																							
	9	10	11	12	13	14	15	16	17-18																														
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<b>11) Control &amp; faceplate</b>	3: PCD ANSI faceplate, red close & green trip buttons, front RS-232 port, large LCD screen, & integral tagging function. Includes Firmware. Includes Oscillography, P Qual, and Prog Curves 1: Includes above and adds single-phase tripping S: SEL-651R control cabinet (style code specified separately)																																						
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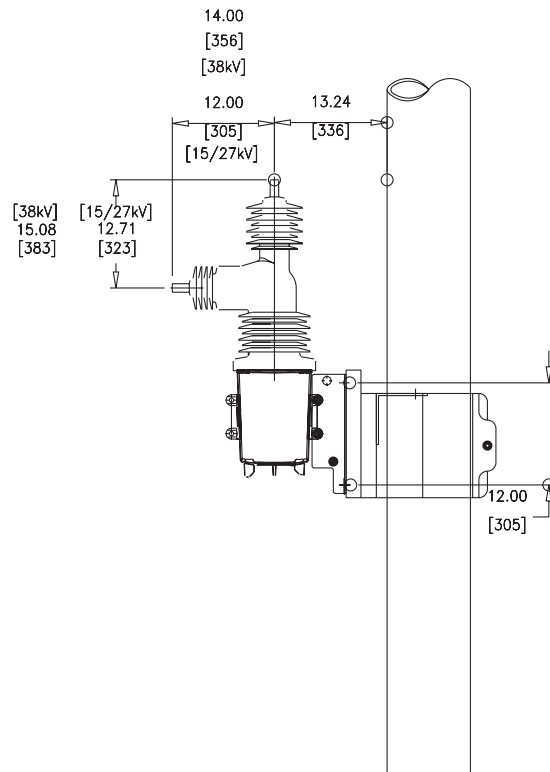
**OVR-3SP dimensional drawings**  
**Cross arm frame (15 - 38 kV)**



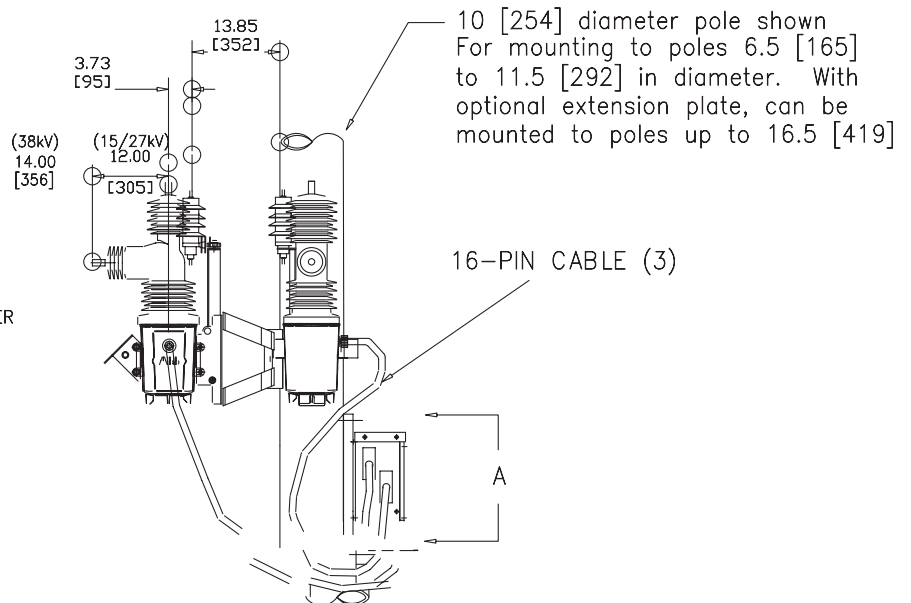
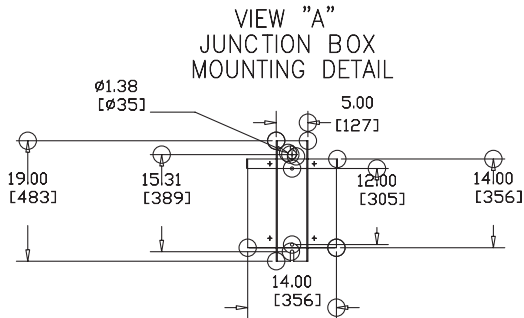
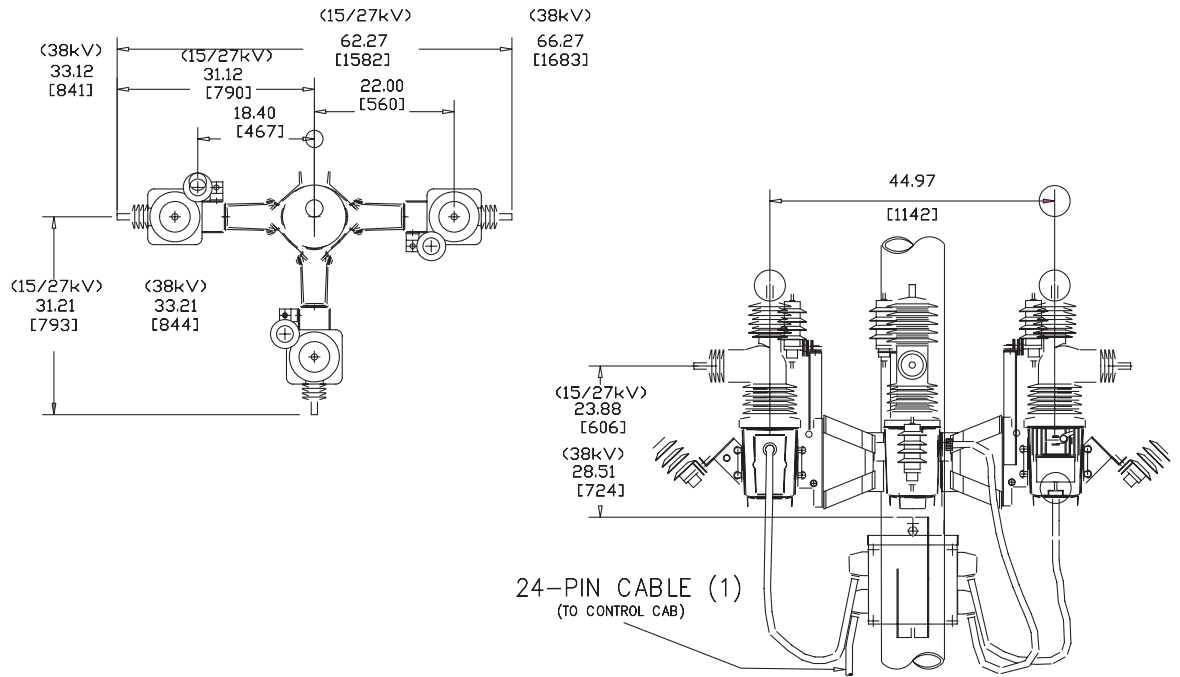
AVAILABLE WITH OPTIONAL ARRESTER MOUNTING BRACKETS

DIMENSIONS ARE IN INCHES [mm]

FRAME WEIGHT (WITH JUNCTION BOX) - 65 lbs (30 kg)



**OVR-3SP dimensional drawings**  
**Wrap-around frame (15 - 38 kV)**



SHOWN WITH OPTIONAL ARRESTER  
MOUNTING BRACKETS  
SURGE ARRESTERS  
SUPPLIED BY CUSTOMERS  
DIMENSIONS ARE IN  
INCHES [mm]  
FRAME WEIGHT (WITH JUNCTION  
BOX) - 30 lbs (14 kg)

# Product review

## OVR-1 single-phase recloser

The OVR-1 is a solid dielectric, vacuum interruption recloser that works with the PCD and does not require batteries for operation, eliminating the need for maintenance.

The OVR-1's innovative pole design provides excellent reliability through the use of ABB vacuum interrupters, advanced design technology, and HCEP solid dielectric insulator bushings. The OVR-1 is accompanied by a fully functional, easy-to-program PCD control. All the appropriate time-current curves for single-phase applications are included, as well as functional controls programmable through user-friendly software.

The OVR-1 is available in 15 and 27 kV ratings. The maximum continuous current is up to 800 A; the maximum interrupting current is 10 kA; and the BIL is up to 150 kV. Please see the full ratings capabilities on the technical data page.

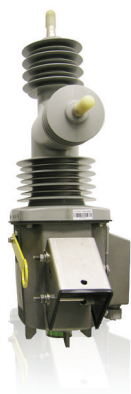
The OVR-1 is available with the PCD control cabinet. When coupled with the OVR-1, the PCD control cabinet comes standard with a 16-pin interface. When the battery backup is not present, the OVR-1 single-phase recloser becomes a maintenance-free component of the modern grid.

### Benefits

- Compact, lightweight design is easy to install, maneuver, and transport
- Accurate coordination of down-line devices
- Simple-to-program controller for easy training and maintenance
- AC powered, eliminating the need for batteries
- Recloser works with or without battery back-up
- No electronics in recloser cabinet simplifies maintenance
- Allows for seamless DNP3 communication integration with SCADA, modem, and radio systems
- Available undervoltage trip/restore function reduces the effects of cold load pick-ups
- Hot line tag available
- Easily adaptable with surge arresters
- RUS certified
- 24 hour / 7 day dependable customer support

1 OVR-1 | 2 Magnetic actuator utilizes black zinc oxide plating, more corrosion resistant than older yellow zinc technologies | 3 Highly visible, yellow pull-down handle (69 switch standard) allows manual tripping with a hookstick

1



3



OVR-1 technical data

Nom. operating voltage:	2.4-14.4	24.9	kV
Rated Max. voltage:	15.5	27	kV
Rated power frequency	50/60	50/60	Hz
Rated continuous current:	630/800	630/800	A
Rated symmetrical interrupting current:	10	10	kA
Rated lightning impulse withstand (BIL):	110	125	kV
Dry withstand 60 Hz 1 Min.:	50	60	kV
Wet withstand 60 Hz 10 Sec.:	45	50	kV
External creep distance, H2-ground:	38.00 (960)	38.00 (960)	inches (mm)
External creep distance, H1-H2:	45.00 (1160)	45.00 (1160)	inches (mm)
Min. external strike distance:	9.50 (240)	9.50 (240)	inches (mm)
Max. interrupting time:	0.04	0.04	sec max
Max. closing time:	0.06	0.06	sec max
Materials: Vacuum interrupter encapsulated in hydrophobic cycloaliphatic epoxy with cast aluminum recloser cabinet; stainless steel control cabinet			
Current sensors:	One per phase encapsulated into the pole		
Operating temperature:	-40° C to +70° C (-40° F to +158° F)		
Control voltage:	120/240 VAC		
Recloser unit weight:	100 (45)	100 (45)	lbs (kg)
Control cabinet weight:	55 (25)	55 (25)	lbs (kg)
Four series connected 12 VDC, 12 AH batteries, with 48 hours (15/27kV PCD cabinet) or 38 hours (38kV PCD cabinet)			
Sealed lead acid rechargeable battery pack			
Up to 48 hours for 15 and 27 kV units and 38 hours or 38 kV units of			
OVR testing:			
Meets all applicable recloser standards (IEC 62271-111 (E):2005, IEEE Std. C3760 (E):2003)			
Life test: 10,000 full load mechanical operations without degradation			
PCD testing: surge withstand capability: SWC and fast transient tests per ANSI C37.90.1 and IEC 255-22-1 class III and 255-22-4 class IV for all connections except comm ports			
Isolated comm ports per ANSI 37.90.1 using oscillatory SWC Test Wave only, and per IEC 255-22-1 class III			
EMI test per ANSI C37.90.2			

# Ordering guide

## OVR-1 single-phase recloser

Digit		1	2	3	4	5	6	7	8
		L	1	1	8	1	P	D	E
1) Recloser	L: OVR-1 single-phase recloser								
2) Voltage	1: 15 kV 2: 27 kV								
3) BIL	1: 110 kV 2: 125 kV 5: 150 kV								
4) Continuous current	4: 400 A 8: 800 A								
5) Interrupting rating	6: 6 kA 1: 12.5 kA								
6) Mounting frame	P: SS Pole mount frame w/ line & load side arrester brackets								
7) Control cable	A: 10 feet [3 m] B: 20 feet [6 m] C: 30 feet [9 m] D: 40 feet [12 m] N: None <b>Note: Control cable for OVR-1 is 16-pin</b>								
8) PT cable	A: One 2 pin connector with 20 ft cable B: One 2 pin connector with 45 ft cable ( <a href="#">Figure 3, Accessories</a> ) Z: Custom N: None <b>Note: 2-pin connector needed when using a PT for control power</b>								

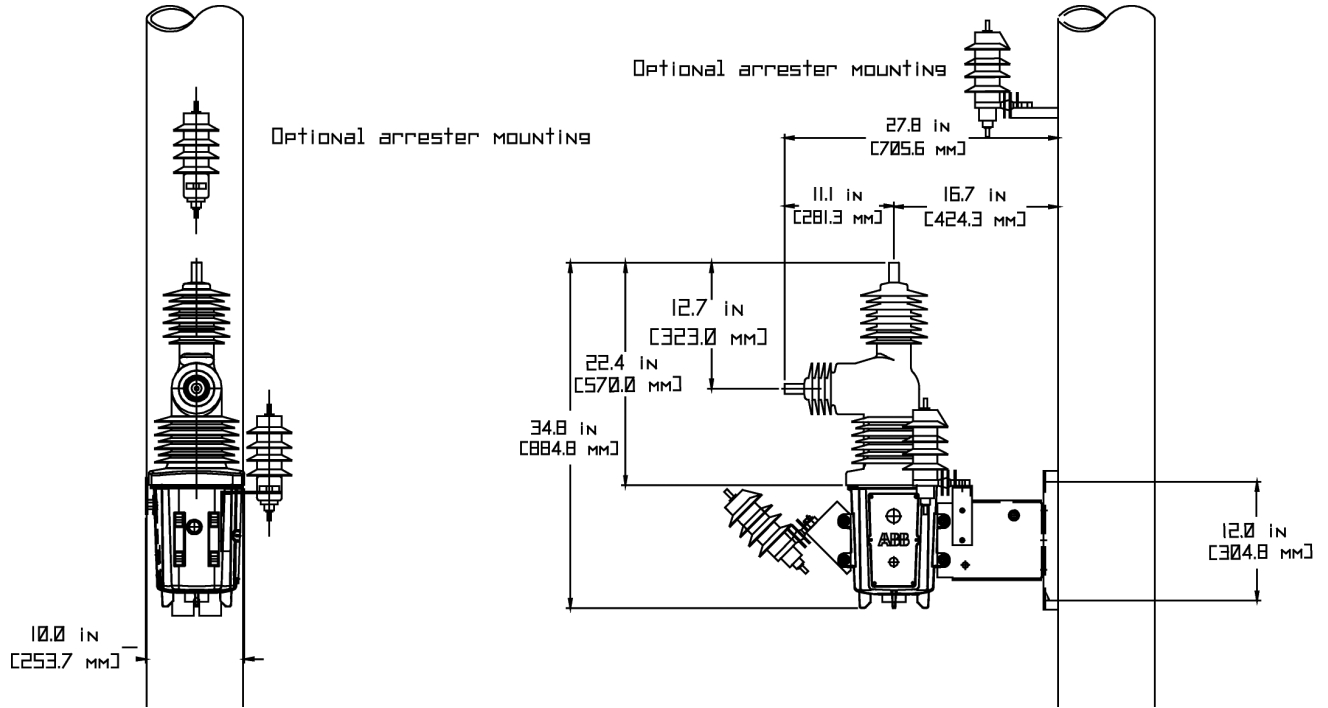


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\* Please consult your ABB sales representative for additional options.

# OVR-1 pole mount dimensional drawings

Pole mount (15-27 kV)



For control cabinet dimensions, refer to OVR-3 dimensional drawings

Frame weight is 10 lbs (4.5 kg)

Compact pole mounting bracket weight: 16 lbs (7.2 kg)

Front surge arrester bracket weight: 4 lbs (1.8 kg)

\* Please consult your ABB sales representative for additional options.

# Accessories

## Communications Packages

ABB can package OVR reclosers with communications packages for a variety of protocols and transfer methods.

ABB supported protocols include:

- DNP 3.0 Level 2
- MODBUS ASCII
- MODBUS RTU
- IEC 60870-5-101

## Bluetooth

Stay out of the weather with the RN-220XP adapter for communication with your OVR-3 and OVR-3SP reclosers.

- Provides wireless connection to PCD
- Supports DNP 3.0 and MODBUS protocols
- Built-in lithium ion battery (1.1AH) provides up to 32 hours of continuous operation
- Secure Spread Spectrum Communication
- Adapter available for laptops without Bluetooth

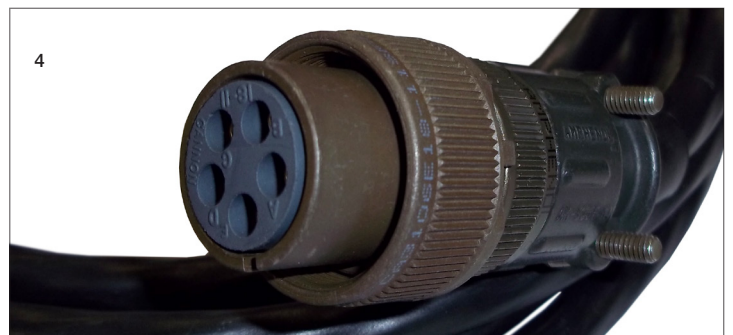
## Ethernet Hub

Effortlessly multiplex up to 16 reclosers from one location. The 12A03054H01 ethernet hub has many benefits and features:

- Ideal for substation applications
- Does not require much space or complicated rack mounts
- Supports DNP 3.0 and MODBUS protocols
- Supports a variety of TCP/IP features
- Supports one RS-232 and four RS-485 ports
- 40 MHz processor
- 512 KB of SRAM
- 512 KB of flash memory
- 2 KB EEPROM
- Data retention > 100 years

Supported communications include:  
Wi-Fi, cellular, radio, ethernet, SCADA,  
and 900 MHz spread spectrum

1 ABB offers Wi-Fi wireless communication options for its reclosers, such as Bluetooth technology | 2 ABB can provide Ethernet connectivity with a serial to Ethernet converter that plugs into the PCD control | 3 Two-pin connector | 4 Five-pin connector



### Animal guards

Animal guards provide easy-to-install protection that reduces animal related interruptions.

### Bushing terminal accessories

All reclosers come with a 1-inch (25.4 mm) diameter stud (12 threads) on all source and load terminals.

5 PT guard | 6 Straight bushing guard for 15 - 27 kV applications | 7 L-shape bushing guard 15 - 27 kV applications | 8 Straight bushing guard for 38 kV applications | 9 Cable guard for 15 - 38 kV applications (36" long – 1" dia.) | 10 Standard terminal | 11 NEMA connector 2-hole pad | 12 NEMA connector 4-hole pad | 13 Clamp connector



## Transfer Switch

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

### Dimensions:

Width: 2.5 in (64 mm) x Height: 3.0 in (76 mm) x Depth: 2.25 in (57 mm)

## Loop Control Module

Cut down on system interruptions with the Loop Control Module (LCM) for use on OVR-3 or OVR-3SP reclosers. The LCM coordinates multiple reclosers to sectionalize or remove faulted sections from a distribution system. Combined with single-phase tripping, a loop controlled system can reduce yearly outage times by up to 45 % (compared to a 30 % decrease for OVRs utilizing ONLY single-phase tripping)!

- Further reduces the number of customers affected by an outage
- Fully compatible with the PCD controller
- Isolates the faulted section
- Sectionalizes or removes the faulted section from the distribution system
- Algorithm detects loss and restoration of voltage
- Works in single and three-phase mode
- Includes direct access to alternate 2 settings
- Ability to monitor/accept six voltage inputs
- Allows an OVR recloser to act as a sectionalizer, midpoint, or tie without physical connections to other reclosers

- When equipped with a PCD, the LCM can be used on any competitive recloser product
- Two options (standard and enhanced) available to meet individual needs

## Recloser Simulator Card

Test out relay schemes or verify the operational integrity of a PCD controller with an ABB Recloser Simulator Card.

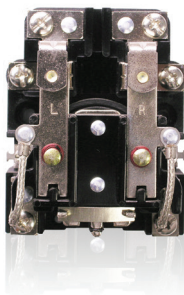
- Test relay schemes
- Simulate fault conditions
- Plug and play
- Inject secondary currents up to 5 A (to simulate primary currents up to 3000 A)
- Plugs into DIO Type 2 card found on the back of the PCD controller
- Compatible with AFSuite™ software
- Optional software can collect oscillographic records of fault simulations
- Easy, cost effective method for testing relay schemes and the operational health of a PCD, without operating a recloser

## Block Close

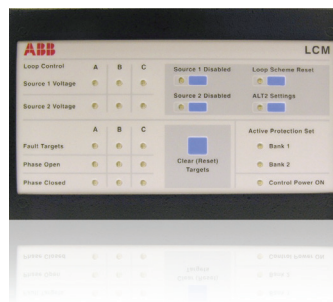
Block close (69 function) is standard on all OVR reclosers. The 69 switch is wired to a relay input and programmed to prevent a local or remote close. In addition to the 69 switch, the OVR-3SP and OVR-1 reclosers provide a mechanical interlock that prevents a close when the yellow trip handle is engaged.

14 Transfer switch | 15 LCM speeds restoration on distribution power systems | 16 Enhanced LCM adds individual phase targets, recloser position, and displays both banks of protection groups | 17 Recloser simulator emulates a recloser by allowing the user to operate the PCD, without being connected to an actual recloser (Part No. 620262-T1) | 18 OVR-1/OVR-3SP yellow handle down blocks electrical close | 19 OVR-3 block close

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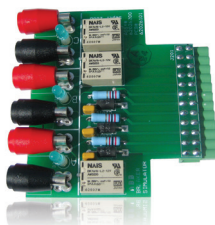
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### Laptop Stand

Effortlessly program and access OVR-3 and OVR-3SP controls from the field with a laptop stand. This lightweight accessory fits all OVR-3 and OVR-3SP control cabinets. Made of painted, stainless steel, the laptop stand fits into your laptop carrying case, making transportation easy. It attaches effortlessly and can be installed securely to the cabinet in seconds. You can remove it just as quickly, so you can bring it with you to other recloser units. Order part number 12A01810G01.

### Low Profile Control Cabinet (LPCC)

The low profile control cabinet is available with the OVR-3 and OVR-3SP. Select a low profile control cabinet for applications where compact, lightweight control cabinets are required.

#### Dimensions:

- Width: 24.0 in (610 mm), height: 16.0 in (406 mm), depth: 10.5 in (267 mm), weight: 95 lbs (45 kg)

### Rack Mount Panel

Consolidate 15 kV and 27 kV OVR-3 and OVR-3SP PCD controls at your substation control room with the ABB rack mount panel. No need to run out to the recloser. The rack mount provides all the functionality of the standard OVR control cabinet, packed into a standard 19.0 in (48 cm) rack. The rack mount panel can be located up to 150 feet (46 m) from the recloser.

### Flexitest switch

- Perform Secondary Current and Voltage Injection Directly into the PCD (FT-1 option allows easy access for testing using secondary current injection and coltage with virtually any type of test equipment)

- Use the FT-1 to test the health of the recloser PTs and CTs
- No need to disconnect the 24 pin cable
- No need to disconnect phoenix plugs
- Use the FT-1F to mount and interface to your LCM to perform sectionalizing tests
- Use the FT-1 to test the OVR (actuator coils), contacts and programmable I/O

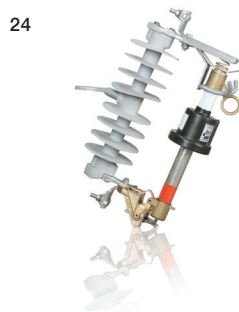
### Autolink single-phase electronic sectionalizer

- 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
- Compatible with ABB, S&C and AB Chance interchangeable cutout bodies

### 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

20 Laptop stand provides a resting spot for your laptop while you program your PCD | 21 LPCC | 22 The rack mount panel replaces the standard PCD control cabinet in substation applications | 23 Flexitest switch | 24 Autolink single-phase electronic sectionalizer | 25 RBD bypass switch



# Service & support

## Recloser Customer Support

- Free 24-7 technical support line 1-800-929-7947 ext. 5 or international +1-407-732-2000 ext. 5
- Standard three year warranty

## Training

- Factory based training: two-day training course designed for participants to become proficient in application, installation, operation, maintenance, testing, and commissioning of PCD relays and OVR reclosers
- Multi-track, on-site field training available
- Mobile training aids: unique tool incorporates a complete recloser and PCD with the LCM and simulates loop schemes using four PCDs with LCMs to demonstrate the schemes. Simulation can be tailored to customer specific schemes to provide the greatest benefit.
- PCD training aids with simulators includes a PCD with a simulator card and enables tabletop practice and simulation of the PCD

## Distribution Automation and Protection Studies

### Short-circuit and Protection Coordination Studies

Installing additional reclosers or other protection devices requires updated short-circuit and protection studies to ensure

proper protection system operation. ABB engineers can develop or modify models of your feeders, perform short-circuit analysis, and coordinate your feeder's protection.

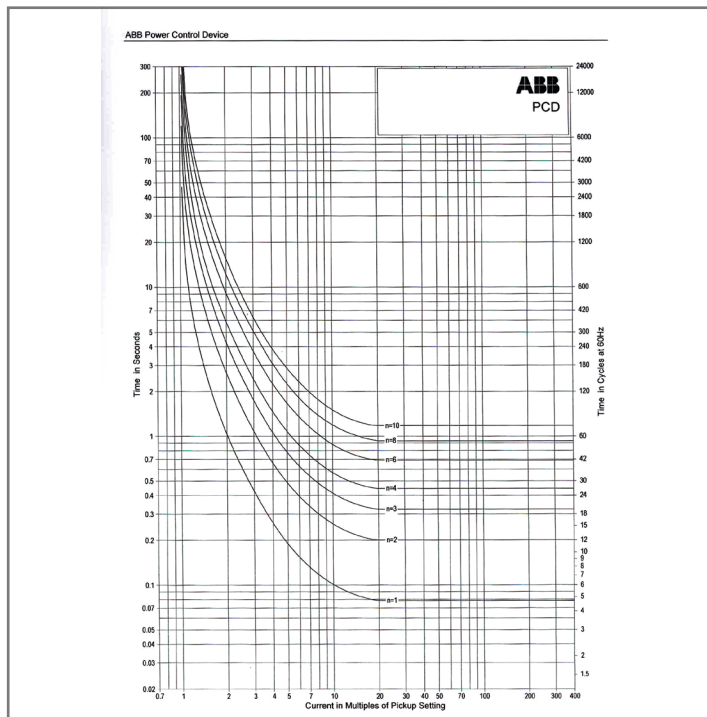
### Protective Device Studies

After performing short-circuit analysis and protection coordination studies, ABB can program your ABB PCD with the proper settings.

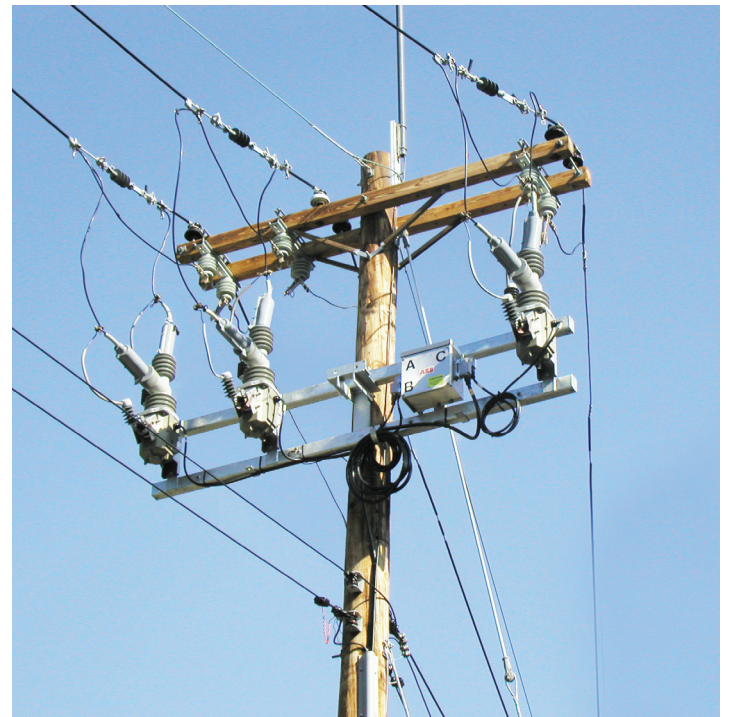
### Distribution Automation Strategies

ABB can help you achieve your organization's goals by analyzing the performance of existing distribution lines to provide a cost-benefit analysis of the different technologies and strategies that can improve your system reliability.

Coordination studies



Optimized reliability



# Contact us

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