



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:** PCD used with OVR-3 and OVR-3SP; ICD used with OVR-1

## Features

- Three recloser platforms to cover system applications ranging from single-phase to three-phase customers
- Flexible mounting options, such as the OVR-3SP with individually mounted poles

- Compact designs provide easy installation in substations
- Magnetic actuators and superior design allow ABB reclosers to operate for a rated 10,000 full load operations
- Less moving parts = less maintenance
- Magnetic actuator = no mechanically charged components for added safety
- No maintenance in high voltage cabinet
- 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)
- Low profile control cabinet (LPCC) available where compact, lightweight control cabinets are required
- No oil or gas insulation = environmentally friendly products
- All OVR reclosers come standard with insulation that exceeds IEC Level 4 very heavy contamination requirements for creepage/leakage - much more than required by ANSI standards that focus mainly on BIL performance
- Cast aluminum (OVR-1 and OVR-3SP) and stainless steel (OVR-3) high voltage ensure the best weathering/corrosion performance

1 The 15-38 kV OVR-3 meets present recloser demands, plus offers advanced protection and control capabilities. | 2 Substation rack mount | 3 PCD relay | 4 Available in 15-38 kV, the OVR-3SP utilizes three individual single-phase recloser poles for flexible mounting options | 5 & 6 The 15-27 kV OVR-1 single-phase recloser and ICD control's compact, lightweight design makes it easy to install and handle.

1



2



3



4



5



6



# Technology review

## Recloser technology

As part of our initiative to stay a generation ahead, ABB has assembled the latest magnetic actuation technology, highest quality vacuum interrupters, and most durable HCEP insulating material into the most dependable, cost effective, and lowest maintenance solution for recloser products. The OVR-1, OVR-3, and OVR-3SP all function using the advanced technology created by ABB's worldwide chain of suppliers, researchers, and engineers.

### Magnetic Actuators

OVR reclosers were designed to have a lifetime of 10,000 full load operations. ABB designed a simple, magnetically actuated operating mechanism that could dependably operate 10,000 times with only one moving part, unlike ordinary spring charged mechanisms.

OVR magnetic actuators also 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 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
- Simple design
- Bi-stable - no power required to hold contacts open or closed
- Single phase tripping capability

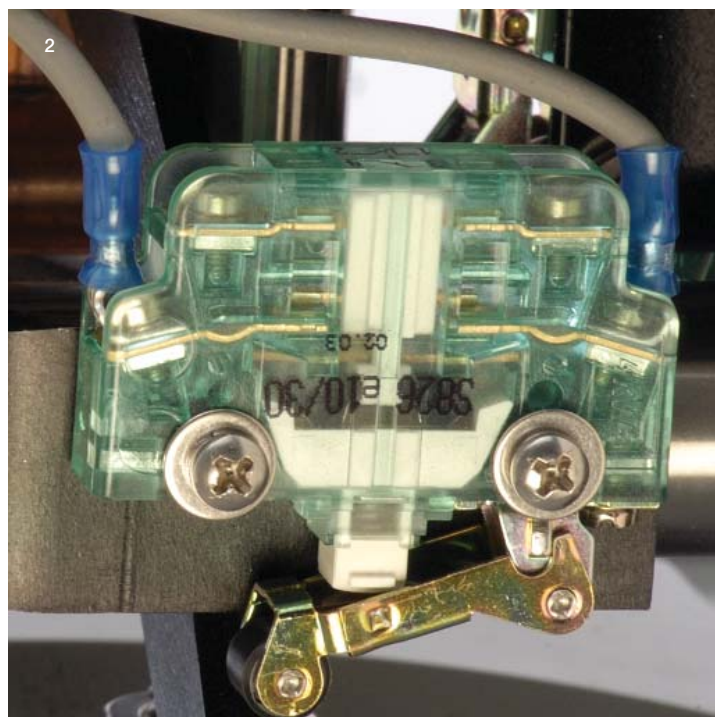
### Position Switch

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 Only one moving part eliminates the need to adjust, lubricate, or perform any maintenance on OVR reclosers | 2 One position switch per pole



## Vacuum Interrupters

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 next generation of vacuum interrupters. This new generation vacuum interrupter is robust for universal application.

Vacuum technology fits very well with recloser requirements since it can easily handle frequent operations. Additionally, vacuum interrupters do not need any extra time to recover, so even the first reclosing operation (after 100-300 msec) is not a problem.

### Advantages

- Maximum reliability
- Superior contact wear
- Long life: 10,000 full load operations
- Minimal maintenance
- Environmentally friendly

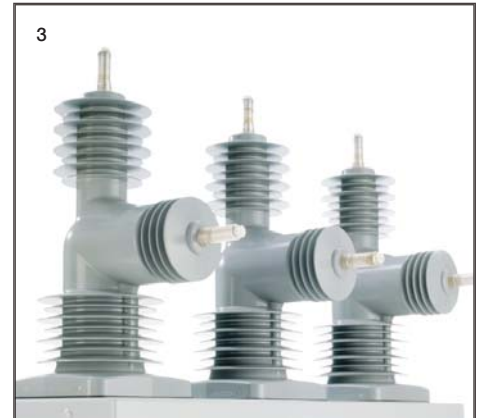
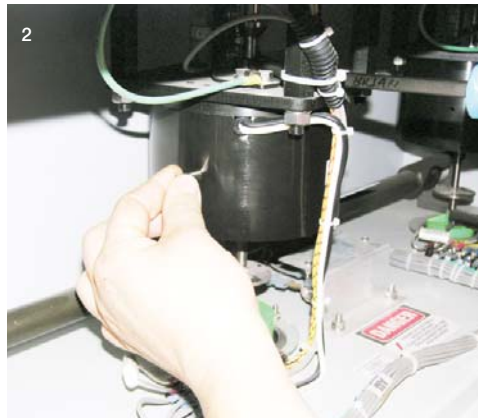
## Pole Assembly

ABB pole assemblies are constructed of UV resistant HCEP encapsulating material and are design to provide a rated 10,000 full load operations without maintenance.

### Advantages

- Resistant to vandalization
- 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 Hydrophobic Cycloaliphatic Epoxy (HCEP). HCEP is the next generation of Cycloaliphatic Epoxy (CEP).

Hydrophobic means resistant to water. This capability is advantageous because it prevents 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
- Lower flash-over probability
- Less erosion of insulation
- Better reliability
- Improved life expectancy
- 

#### Advantages

- Improved 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)	ABB Standard Creep in (mm)	Required Creep in (mm)	ABB Standard creep in (mm)	Required Creep in (mm)	ABB Standard Creep in (mm)
I - Light	9.8 (248)	N/A	17.0 (432)	N/A	23.9 (608)	N/A
II - Medium	12.2 (310)	N/A	21.3 (540)	N/A	30.0 (760)	N/A
III - Heavy	15.3 (388)	N/A	26.6 (675)	N/A	37.4 (950)	N/A
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 compact three-phase recloser | 2 The OVR-3SP adds the functionality of three individually housed poles. | 3 Surge arresters and potential transformers are easily adaptable with our brackets on the mounting frame. | 4 OVR-3 | 5 OVR-3SP | 6 Substation rack mount

The OVR-3 and OVR-3SP have all the same great features as the OVR-1, plus three-phase fault interruption capability and additional recloser control functionality from the PCD. The ABB OVR-3 and OVR-3SP reclosers are able to meet present recloser demands, plus offer advanced capabilities such as fault location, adaptive protection, control monitoring, power quality, communications, single-phase tripping, and loop control for tomorrow's needs. The OVR-3 and OVR-3SP reclosers are available in 15 kV, 27 kV, and 38 kV ratings and are rated for continuous currents up to 1200 A. The rated symmetrical interrupting current capability is up to 16 kA. Please see the full ratings capabilities on the technical data page.

### Benefits

- Compact, lightweight design is easy to install, maneuver, and transport
- Cast aluminum or 304 stainless steel protects high and low voltage cabinets from the elements
- Variety of mounting frames offers maximum flexibility
- No electronics in high voltage cabinet protects controls from thermal overload and reduces maintenance costs
- Simple-to-operate controller for easy logic based programming, training, and maintenance
- Front panel of PCD allows direct access to system currents, recloser status, and settings
- Up to four individually programmable reclose cycles (up to five shots to lockout)
- Communications equipment fits right in control cabinet
- 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 high voltage unit weight:	333 (150)	333 (150)	430 (195)	lbs (kg)
OVR-3SP high voltage unit weight (each):	100 (45)	100 (45)	130 (60)	lbs (kg)
Standard control cabinet weight:	165 (75)	165 (75)	175 (80)	lbs (kg)
Battery (contact factory for other options)				
48 VDC, 12 AH battery bank (Std. Cabinet) or 48 VDC, 7.2 AH battery bank (LPCC)				
Sealed lead acid rechargeable battery pack				
Monitor locally and remotely				
Easily accessible in low voltage control cabinet				
Allows up to 48 hours (15-27 kV) / 24 hours (38 kV or with LPCC) carryover and multiple operations upon loss of power				
Includes capacitor backup in case of discharged or disconnected battery				
Summary Specifications				
Load profile data (requires voltage input): kWh and kVARh ( $\pm 2\%$ accuracy) (with PT voltage input); Power Factor;				
Demand Watts and VARs; Frequency				
OVR Testing				
ANSI: Meets all applicable recloser standards (ANSI 37.60 2003, IEEE, and IEC)				
Life test: 10,000 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

- Enlarged 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
- Easily 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 download and upload of data on-site using AFSuite™

6

### Separate open and close pushbuttons

- Separate indicator light for easier viewing
- ANSI or IEC coloring for individual practices

7

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



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

## PCD Control and 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 of only picked up phases (OPUP) or one or all phases (OOAP)
- Each step of reclose cycle can be individually configured to single or three-phase trip or lockout for optimum coordination

### 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



Low voltage 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 (with PT voltage input supplied) 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 on-site or remotely through communications interface
- Includes assignable phases for easy phase selection and selectable power flow

<sup>1</sup> requires homogeneous distribution line, three-phase voltage source, and doesn't apply in single-phase tripping mode

<sup>2</sup> three-phase voltage source required

### 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)

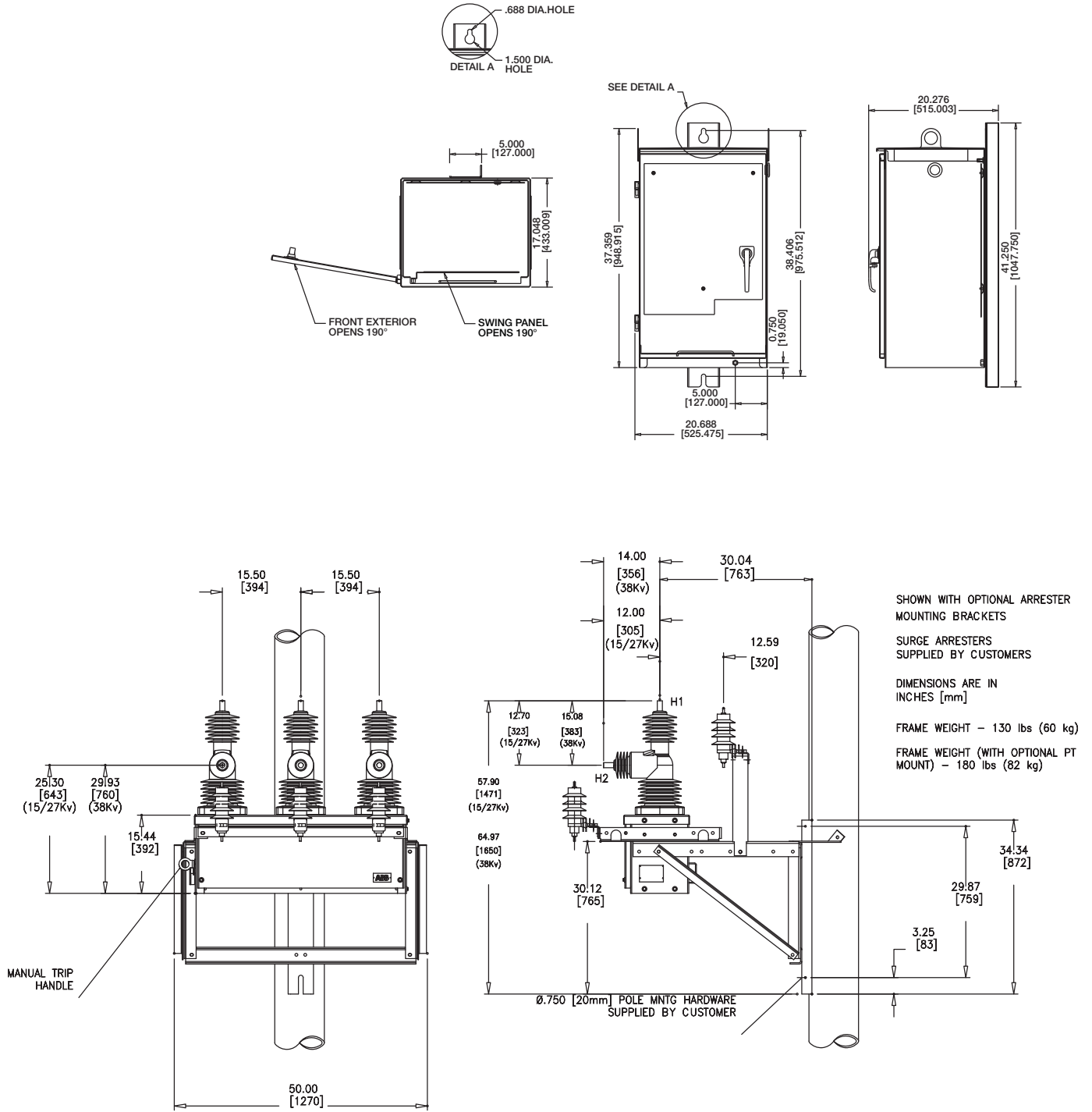
### Control Cabinets

- Choose from standard cabinet or low profile control cabinet (LPCC)
- Select a LPCC for 15 / 27 kV applications where compact, lightweight 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



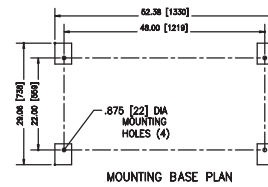
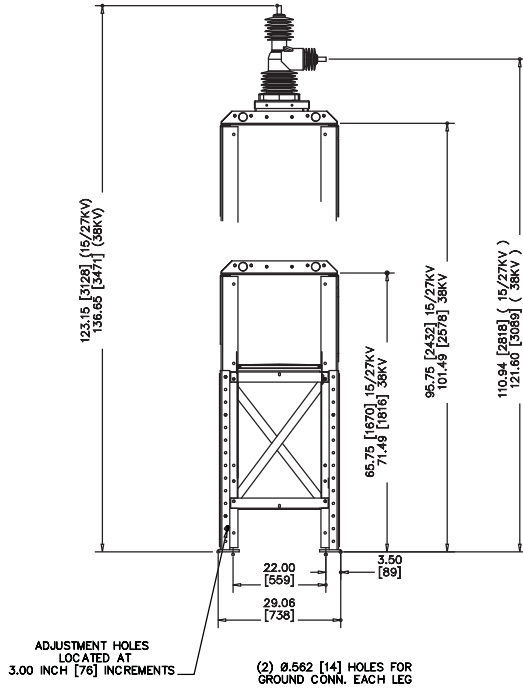
# OVR-3SP dimensional drawings

## Pole mount



# OVR-3SP dimensional drawings

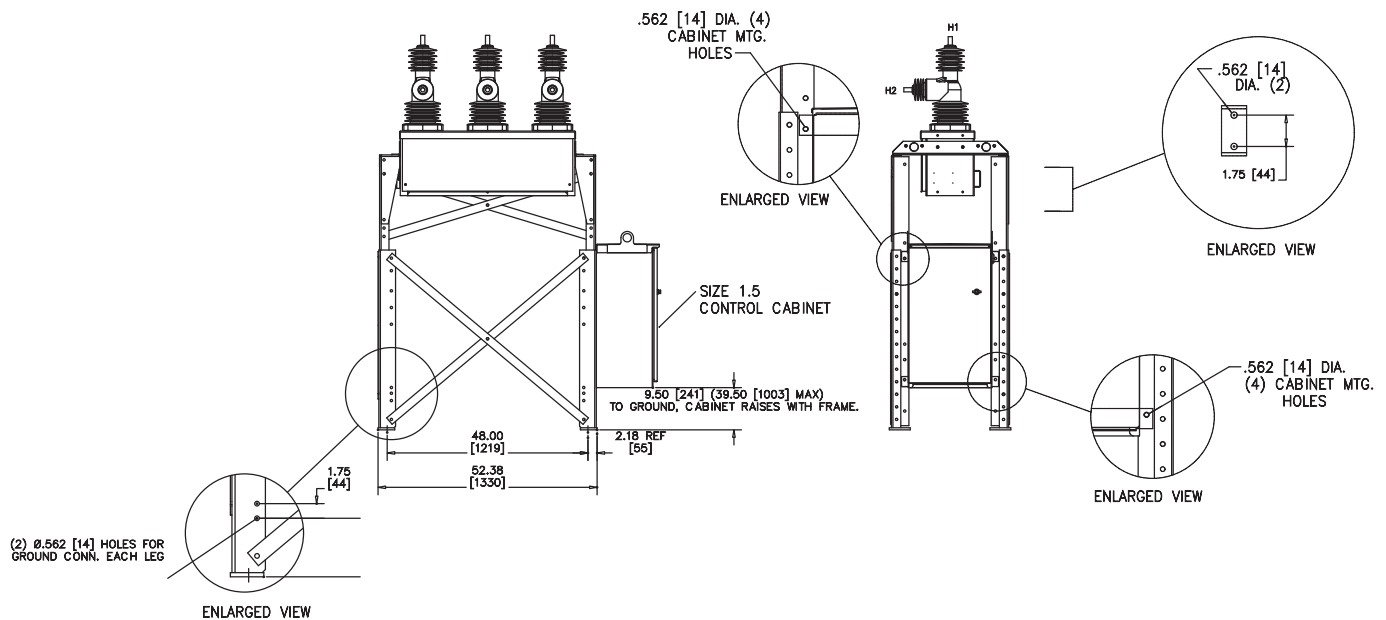
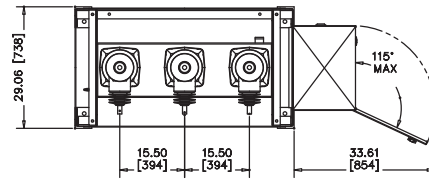
## Substation mount



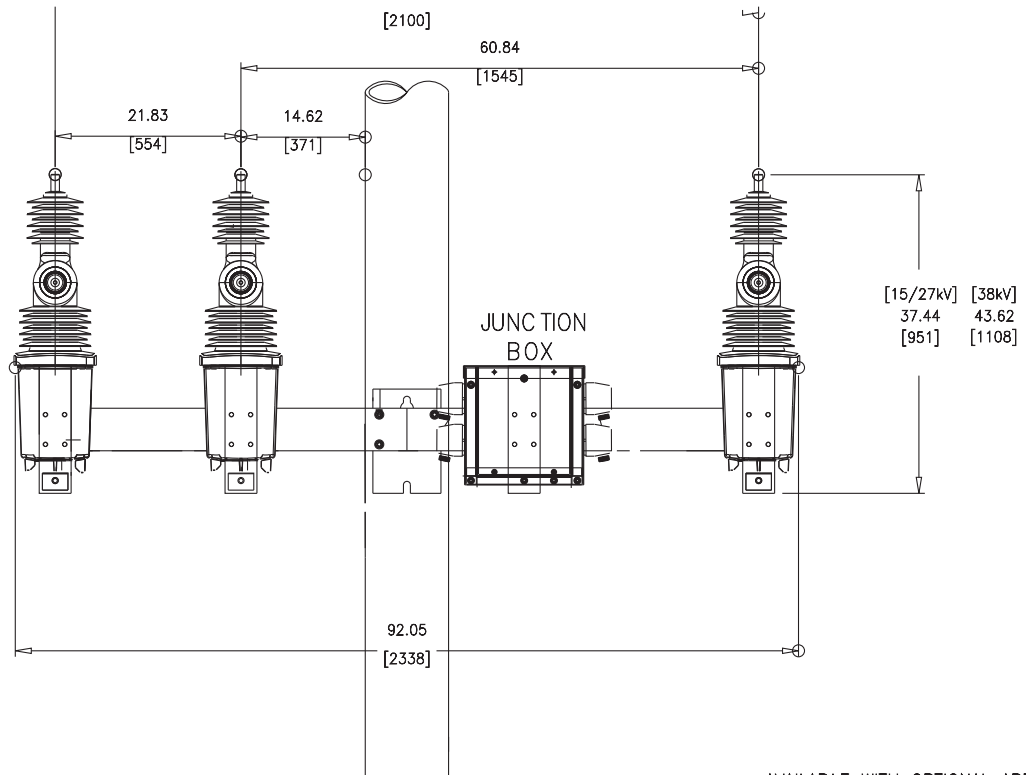
AVAILABLE WITH OPTIONAL ARRESTER MOUNTING BRACKETS

DIMENSIONS ARE IN INCHES [mm]

FRAME WEIGHT - 225 lbs (100 kg)



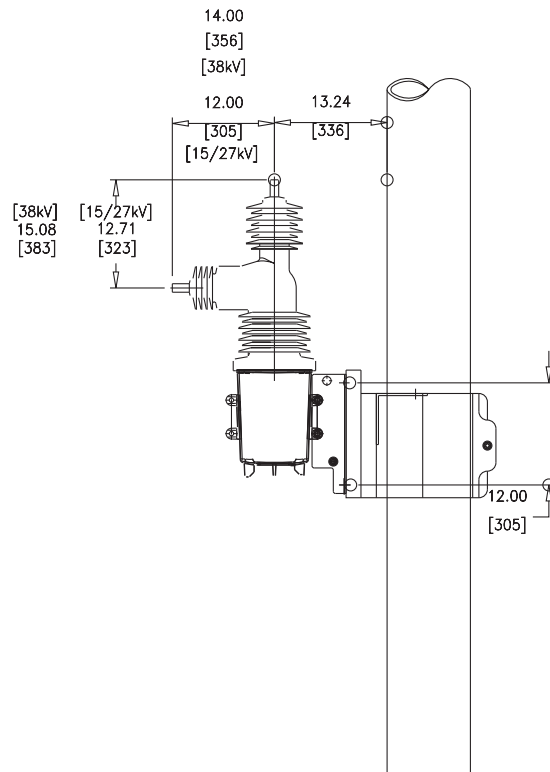
OVR-3SP dimensional drawings  
 Cross Arm Mount (15 - 38 kV)



AVAILABLE WITH OPTIONAL ARRESTER MOUNTING BRACKETS

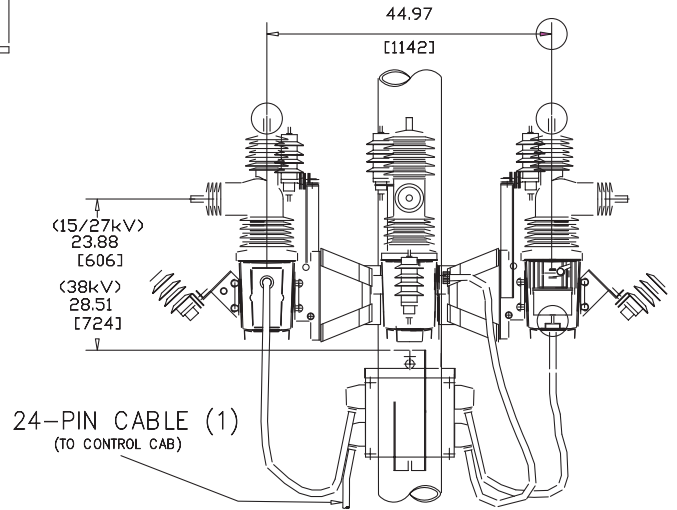
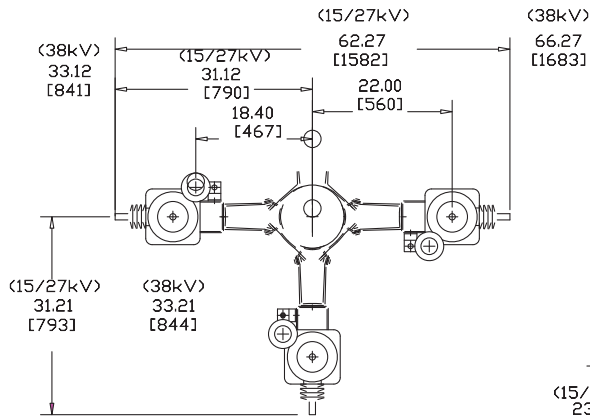
DIMENSIONS ARE IN INCHES [mm]

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

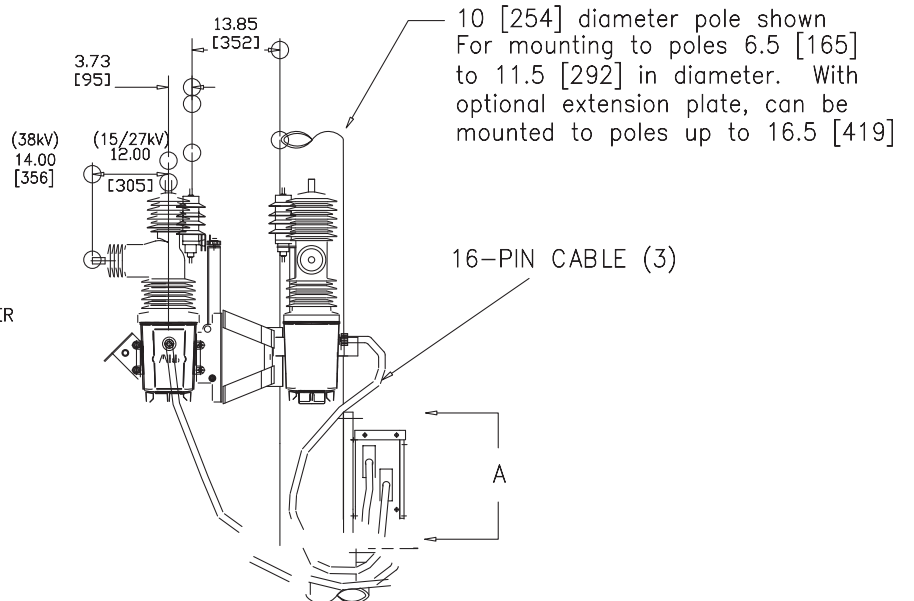
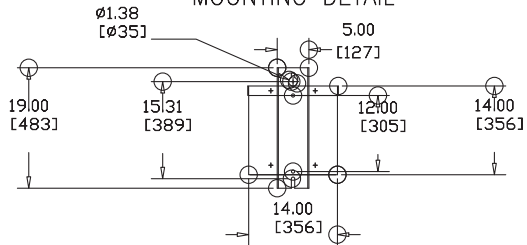




**OVR-3SP dimensional drawings**  
**Wrap Around Mount (15 - 38 kV)**



**VIEW "A"**  
**JUNCTION BOX**  
**MOUNTING DETAIL**



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)

OVR-3 ordering guide\*

Style Code	R	2	2	5	1	B	C	N	14	1	F	6	S	1	N	0	0
Style Digit	1	2	3	4	5	6	7	8	9, 10	11	12	13	14	15	16	17	18

Example shown is for a 27 kV OVR-3 with 125 kV BIL, 630 A continuous current, 12.5 kA interrupting current, and single-phase tripping. All options are not shown. Please contact your local ABB representative to verify all selections, and to discuss all available options and details.

Selections	Style code		Style Digit
	Sample	Actual	
OVR-3 Designator:	R	R	1
Rated Maximum Voltage:			
15.5 kV - 1	2		2
27.0 kV - 2			
38.0 kV - 3			
BIL:			
110 kV (Standard for 15.5 kV) - 1			
125 kV (Standard for 27.0 kV) - 2	2		3
150 kV (27.0 kV / 38.0 kV) - 5			
170 kV (38.0 kV Opt.) - 7			
Rated Continuous Current:			
630 A - 5			
800 A - 8	5		4
1000 A - 1			
1200 A - 2			
Rated Symmetrical Interrupting Current:			
12.5 kA - 1	1		5
16.0 kA - 2			
Mounting Frame:			
Pole & 6 Arrestor Brkt (Assy'd) - A			
Pole & 6 Arrestor Brkt (Not Assy'd) - B	B		6
Sub Frame (Fits Cooper footprint; Assy'd) - V			
Sub Frame (Fits Cooper footprint; Not assy'd) - W			
Control Cable:	C		7
30 ft (9 m) V and I (24-pin) cable - C			
Cable Options for Control Power & PT Input:	N		8
No connector provided - N			
Control Power Voltage & I/O:			
120/240 VAC (90-250 VAC / 125 VDC) Options			
15.5/27.0 kV Only (Batteries Included):			
No Inputs, Outputs, or Alarms - 10	14		9 & 10
6 Inputs, 4 Outputs, & Alarms - 14			
38.0 kV Only (Batteries Included):			
No Inputs, Outputs, or Alarms - 31			
6 Inputs, 4 Outputs, & Alarms - 32			

Selections	Style code		Style Digit																														
	Sample	Actual																															
Control and Faceplate Options: PCD ANSI faceplate, red close & green trip buttons, front RS-232 port, large LCD screen, & integral tagging function. Includes Firmware. Includes Oscillography, P Qual, & Prog Curves - 3 Includes above and adds single-phase tripping - 1	1		11																														
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Factory Preset for Heater Voltage: 120 VAC heater in cabinets - 1 240 VAC heater in cabinets - 2	1		15																														
Accessories: None - N Special Requirements - Z	N		16																														
ABB designation based on internal numbering: This number is based on the selection of additional dynamic accessories.	00		17 - 18																														

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

## OVR-3SP ordering guide

### OVR-3SP ordering guide

Style Code	P	1	1	5	8	R	G	N	14	1	F	6	4	1	N	0	0
Style Digit	1	2	3	4	5	6	7	8	9, 10	11	12	13	14	15	16	17	18

Example shown is for a 15 kV OVR-3SP with 110 kV BIL, 630 A continuous current, 8 kA interrupting current, single-phase tripping, and 4 hole pads. All options are not shown. Please contact your local ABB representative to verify all selections, and to discuss all available options and details.

Selections	Style Code		Style Digit
	Sample	Actual	
OVR-3SP Designator:	P	P	1
Rated Maximum Voltage:			
15.5 kV - 1	1		2
27.0 kV - 2			
38.0 kV - 3			
BIL:			
110 kV (Standard for 15.5 kV) - 1			
125 kV (Standard for 27.0 kV) - 2	1		3
150 kV (27.0 kV / 38.0 kV) - 5			
170 kV (38.0 kV Opt.) - 7			
Rated Continuous Current:			
630 A - 5			
800 A - 8	5		4
1000 A - 1			
1200 A - 2			
Rated Symmetrical Interrupting Current:			
8.0 kA - 8			
10.0 kA - 0	8		5
12.5 kA - 1			
16.0 kA - 2			
Mounting Frame:			
No Frame Supplied - N			
Phase over Phase (vertical) - H	R		6
Wrap Around Frame - R			
Cross Arm Frame - T			
Control Cable:	G		7
30 ft (9 m) V & I (24-pin) cable & 12 ft (3.7 m) junction box cable - G			
Cable Options for Control Power & PT Input:	N		8
No connector provided - N			
Control Power Voltage & I/O:			
120/240 VAC (90-250 VAC / 125 VDC) Options			
15.5/27.0 kV Only (Batteries Included):			
No Inputs, Outputs, or Alarms - 10	14		9 & 10
6 Inputs, 4 Outputs, & Alarms - 14			
38.0 kV Only (Batteries Included):			
No Inputs, Outputs, or Alarms - 31			
6 Inputs, 4 Outputs, & Alarms - 32			

Selections	Style Code		Style Digit																														
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Accessories: None - N Special Requirements - Z	N		16																														
ABB designation based on internal numbering: This number is based on the selection of additional dynamic accessories.	00		17 - 18																														

# Product review

## OVR-1 single-phase recloser

The OVR-1 demonstrates ABB's commitment to modular technology utilizing the same recloser technology as our OVR-3 three-phase recloser that provides the power industry with reliable service.

The OVR-1's innovative pole design lends itself to improved reliability, through the use of ABB vacuum interrupters, advanced design technology, and cutting edge HCEP insulator bushings. The OVR-1 is accompanied by a fully functional, easy to program control for single-phase recloser applications. 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 kV 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 125 kV. Please see the full ratings capabilities on the technical data page.

### 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 and does not require batteries
- Optional battery back-up available
- No electronics in high voltage cabinet protects controls from thermal overload
- Allows for seamless communication integration with SCADA, modem, and radio systems
- Available undervoltage trip/restore function - reduces the effects of cold load pick-ups
- Zone sequence
- Electromechanical counter comes standard
- Hot line tag available
- Easily adaptable with surge arresters
- 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 The highly visible, yellow pull-down handle (69-switch standard) allows manual tripping with a hookstick

1



2

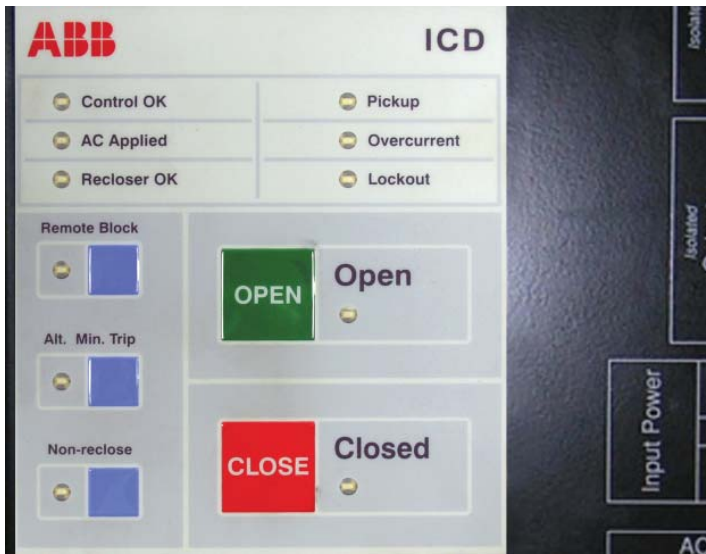


3



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 high voltage cabinet; stainless steel low voltage 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		
High voltage unit weight:	100 (45)	100 (45)	lbs (kg)
Control cabinet weight:	55 (25)	55 (25)	lbs (kg)
Battery (optional)			
48 VDC 7.2 AH battery bank			
Sealed lead acid rechargeable battery pack			
Easily accessible in low voltage control cabinet			
Allows for up to 24 hour carryover and multiple operations upon loss of power			
Includes capacitor backup for battery assistance			
Summary Specifications			
Voltage: ±1% accuracy (with PT voltage input)			
Accuracy:	Current: ±2% of measured value from 0.1x to 1x nominal (20 A to 600 A)		
	±5 % of measured value from 1x to 20x nominal (600 A to 10 kA)		
OVR Testing			
ANSI: Meets all applicable recloser standards (ANSI 37.60, IEEE, and IEC)			
Life test: 10,000 mechanical operations without degradation			
ICD Transient Immunity 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			



The ICD HMI has large indicator buttons that are easy to read, see, and use



The compact, light weight design of the cabinet is easy to mount and handle

## ICD control, software and cabinet

### ICD control

- All basic recloser functions
- Built in discrete I/O
- Cold load pickup
- Fault current indication
- Up to four shots to lockout
- Remote Block setting/indication to block any remote signal, other than the buttons on the panel, from operating the pole mechanism
- Alternate Minimum Trip setting/indication, higher or lower value, for seasonal or other alternate pickup applications
- Minimum phase trip value ranging from 20 A to 2000 A
- Non-reclose (one shot to lockout) setting/indication to prevent a close operation following the unit being opened (tripped)
- 19 Time-Current curves for superior coordination
- 13 recloser curves: A, B, C, D, E, F, N, R, EF, KF, TF, Y, T
- 6 ANSI curves: Extremely Inverse, Very Inverse, Inverse, Short Time Inverse, Standard Instantaneous, Inverse Instantaneous
- Optional battery back-up power for control capable of providing 24 hours of carryover upon loss of AC source power (at least 100 open and close operations) and integrated capacitor assist for operating when battery discharged
- AC or DC powered for flexibility
- Fully integrated magnetic actuator-based control, including energy storage capacitors
- Automatic actuator coil continuity check and continuous self-diagnostics of power supply, memory elements and microprocessors
- Remote control via RS-232 serial communication port and Modbus ASCII protocol with available DNP converter

### WinICD Software

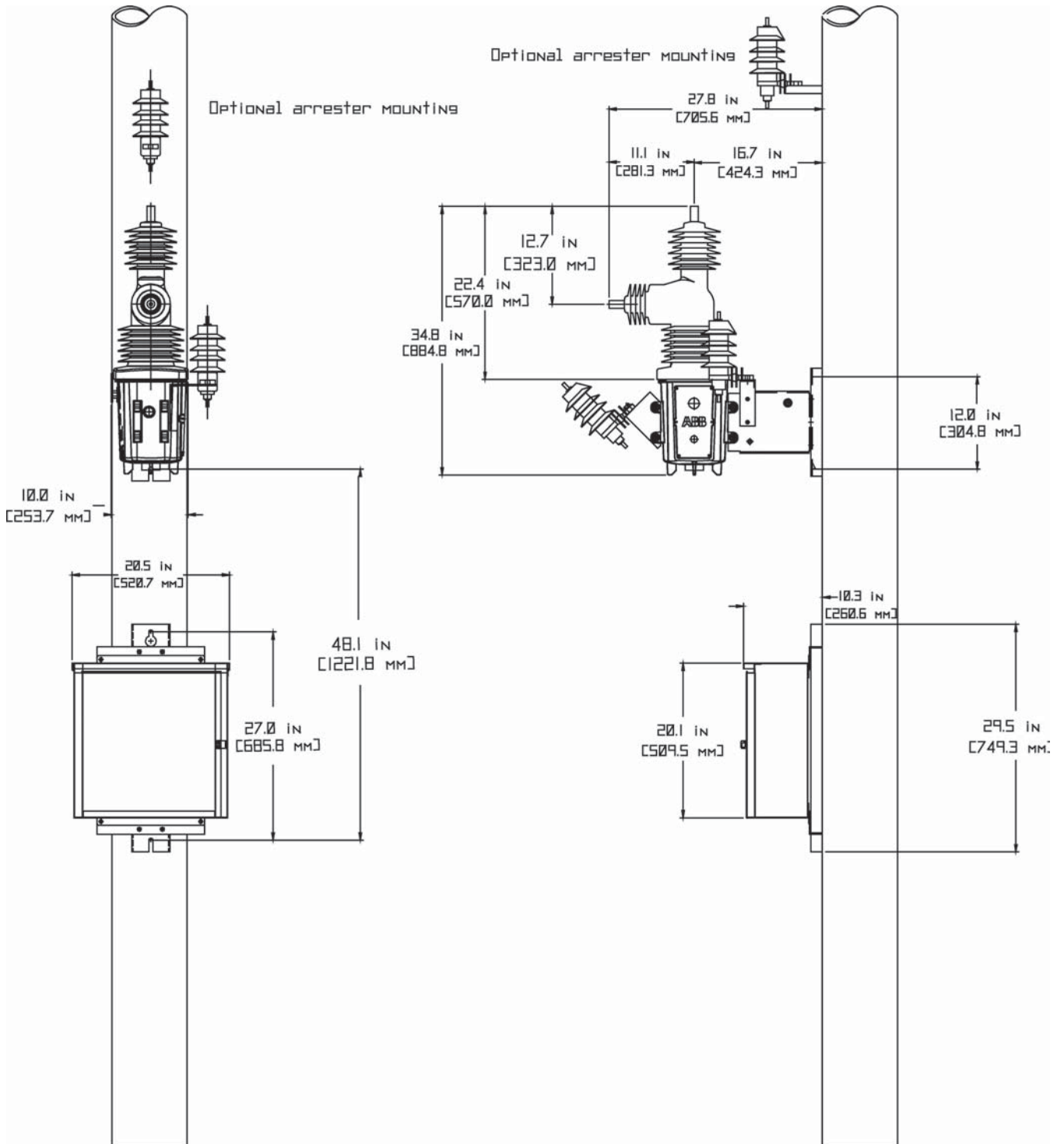
- Simple to program, easy to use
- Included free with recloser
- Receive/transmit settings
- Setup for all overcurrent protection and reclosing parameters
- Curve modifiers increase flexibility for coordination
- Test software built-in for cycling unit
- Test communications
- Displays alarm messages
- Maintains counter
- Available programmable undervoltage trip/restore feature

### Low Voltage Control Cabinet

- Small footprint to save space
- Stainless steel cabinet for better corrosion resistance
- Integrated high energy surge protection in accordance with ANSI/IEEE C37.90.1 – 2002
- 120/240 VAC input standard
- Amber colored indication light on the bottom of control cabinet to indicate lockout
- Electromechanical counter comes standard
- Heater



OVR-1 pole mount dimensional drawings  
Substation mount



Digit #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Style Number	R	S	1	4	6	--	P	L	B	N	--	S	N	C	N	--	0	0
<b>Type</b>	Recloser																	
<b>Function</b>	Single-phase																	
<b>Voltage</b>	15 kV 110 kV BIL 27 kV 125 kV BIL																	
<b>Continuous Current</b>	400 A 800 A																	
<b>Interrupting Rating</b>	6 kA 10 kA																	
<b>None</b>	---																	
<b>High voltage mounting frame</b>	SS Pole mount frame w/ line & load side arrester brackets																	
<b>Low voltage cabinet mounting</b>	SS low voltage control w/mechanical counter mounted to pole below																	
<b>Control cable length</b>	10 ft [3 m] cable assembly 20 ft [6 m] cable assembly 30 ft [9 m] cable assembly 40 ft [12 m] cable assembly																	
<b>Control Power</b>	120 VAC Input from external source 120 VAC Input with 48 VDC battery backup with 24 hr carryover 240 VAC Input from external source 240 VAC Input with 48 VDC battery backup with 24 hr carryover																	
<b>None</b>	---																	
<b>ICD Control (Firmware &amp; Software)</b>	Standard ICD control with WinICD software																	
<b>Communication ports and protocols</b>	MODBUS ASCII, one non-isolated RS-232 port MODBUS ASCII with DNP 3.0 level 2 converter																	
<b>Bushing terminal connectors</b>	Threaded stud - 1 in (25 mm), 12 threads per inch (0.5 threads per mm) NEMA 2-hole pad (2 included) NEMA 4-hole pad (2 included) Small clamp-type connector (#6-800 MCM) (2 included)																	
<b>Tamper resistance</b>	16-pin cable locking sleeve																	
<b>None</b>	---																	
Numbering for specials and dynamic accessories																		0
Numbering for specials and dynamic accessories																		0

\* 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



### Animal Guards

OVR animal guards provide easy-to-install protection that cuts down on animal related interruptions.

### Bushing Terminal Accessories

All OVRs come standard with a 1 inch (25.4 mm) diameter stud (12 threads) on all source and load terminals. Consider the following terminal connectors.

#### Bushing Terminal Options

OVR Platform	NEMA Connectors		Clamp Connector
	2-Hole Pad	4-Hole Pad	#6-800 MCM (kcmil)
	Part # 12A00199H02	Part # 12A00198H02	Part # 12A00897H01
OVR-1	2 included	2 included	2 included
OVR-3	6 included	6 included	6 included
OVR-3SP	6 included	6 included	6 included

1 Straight bushing guard for 15 kV - 27 kV applications | 2 Straight bushing guard for 38 kV applications | 3 L-shape bushing guard 15 kV - 27 kV applications | 4 Cable guard for 15 kV - 38 kV applications (36" long - 1" dia.) | 5 Standard terminal | 6 NEMA connector 2-hole pad | 7 NEMA connector 4-hole pad | 8 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

Optional block close (69-function) is available on the OVR-3. This feature is standard on the OVR-1 and OVR-3SP. All OVR reclosers come standard with the yellow handle for mechanical tripping.

1 Transfer switch | 2 The LCM speeds restoration on distribution power systems | 3 The enhanced LCM adds individual phase targets, recloser position, and displays both banks of protection groups | 4 The recloser simulator emulates a recloser by allowing the user to operate the PCD, without being connected to an actual recloser (Part No. 620262-T1) | 5 OVR-1/OVR-3SP block close | 6 OVR-3 block close |

1



2



3



4



5



6



### 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 low voltage 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
  - 600/900A
  - 40 kA Momentary rating
  - 110 – 150 kV BIL

1 The laptop stand provides a resting spot for your laptop while you program your PCD | 2 LPCC | 3 The rack mount panel replaces the standard PCD control cabinet in substation applications | 4 Flexitest switch | 5 Autolink single-phase electronic sectionalizer | 6 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
- Feeder Automation Users website featuring news, FAQs, discussion board, technical information, product brochures, software downloads, contact information, instruction manuals, programming shortcuts, drawings
- 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.

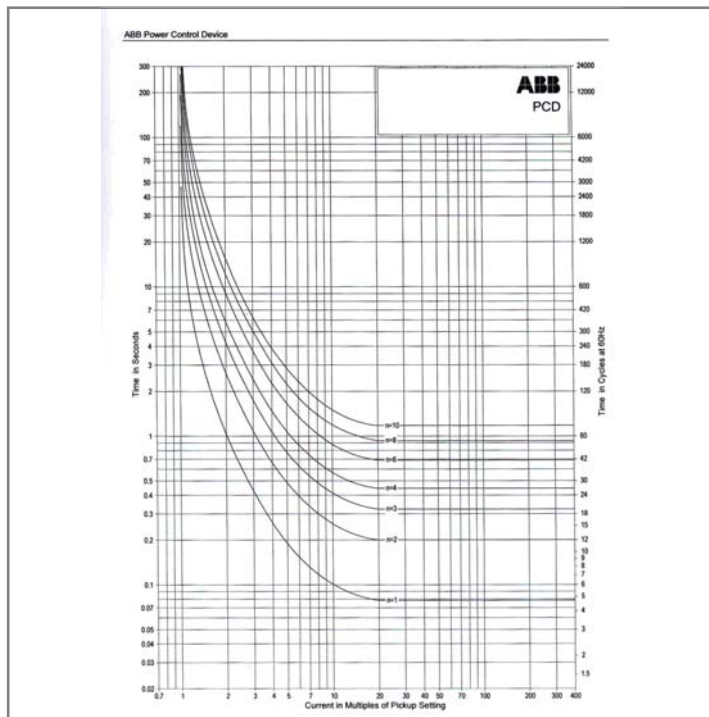
### Cost/Benefit Analysis of Recloser Applications

Using ABB ReliNet™ software, ABB can perform a reliability analysis of your system. This analysis calculates improvements in reliability indices, such as SAIDI and SAIFI, when reclosers are applied in different configurations.

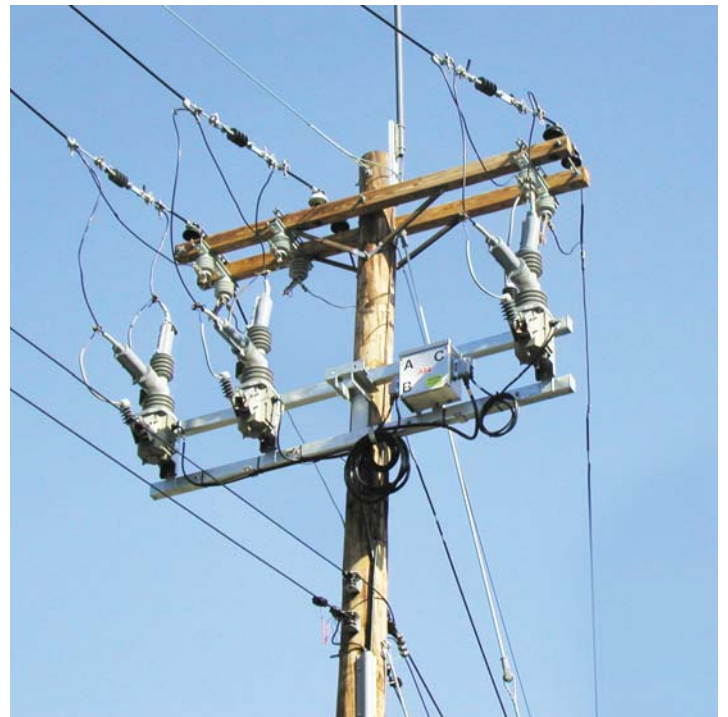
### Distribution Automation Strategies

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



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