

PS Range Capacitor Vacuum Switches

Introduction



ABB introduces the latest range of PS capacitor vacuum switches. The PS15, PS17 and PS25 make up the single phase switch range, while the PS36 is a complete three phase switch. The PS vacuum switch is a solid dielectric vacuum switch suitable for use in distribution systems up to 38 kV ungrounded (and 66 kV grounded). The switch has been specifically designed and tested in accordance with ANSI C37.66 for heavy-duty operation in capacitor-switching applications for the harshest climatic conditions.

The PS capacitor vacuum switch is designed to reduce lifecycle costs and offer customers true value.

1. Range-taking connection clamp

#8 solid to 2/0 AWG stranded or up to 70 mm².

2. Sleek compact design

Up to 200 kV BIL insulators offers high creepage distances in relatively small overall dimensions.

3. Embedded vacuum interrupter

Unmatched protection from external influences.

4. Durable insulator

Advanced hydrophobic cycloaliphatic resin (HCEP) insulator has silicone-like water resistant properties with specially designed sheds engineered for durability.

5. Mounting flexibility

Insulator capable of 330° rotation to ease connection and maintain clearances.

6. Interchangeability

Mounting brackets suit interchangeability with other brands.

7. Long-life metal housing

The main housing and trip lever mechanism is made from stainless steel to provide superior corrosion resistance and durability. The colour is RAL 7035 (ASA 70) light grey.

8. Protection for outdoor components

The trip lever and control cable connector have protective weather covers.

9. High visibility

The yellow position indicator provides easy identification of switch status. It doubles as a manual hookstick trip level for isolation. All stainless steel components.

10. Control cable connection point

Control cable connection point to suit 5 or 7-pin Amphenol connection.

Environmentally friendly

Free from any oil, gas or foam insulating mediums.



Benefits	Features
Economy	Maintenance free Standard features <ul style="list-style-type: none"> - High visibility position indicator - Manual trip lever - Up to 200 kV BIL - Wildlife protectors
Flexibility	Mounting flexibility, rotatable 330° (single phase switches only) Lightweight Compact design Operable with most capacitor controllers Interchangeable with other makes of switches
Reliability	Vacuum technology guarantees over 50,000 paired fault-free mechanical operations Compliant to the highest restrike category in accordance to IEEE 37.66 Simplicity in design Type tested to IEEE 37.66 Manufactured in an ISO9001 and ISO14001 environment
Easy to use	Visual indication Wide control voltage range Low power solenoid mechanism Over 50,000 paired maintenance-free mechanical operations
Durability	Few moving parts Stainless steel external components Stainless steel 304 housing Advanced hydrophobic cycloaliphatic resin (HCEP) insulator
Environmentally friendly	Dry type design Oil, gas and foam free
Safety	Trip lever for emergency operation

Vacuum technology



A vacuum is an ideal switching medium. A vacuum provides the dielectric strength required for capacitor switching and an environmentally friendly insulating medium.

ABB's range of PS switches utilises ABB's proven vacuum technology, with over 25 years of experience in developing and manufacturing vacuum interrupters. ABB vacuum interrupters have found applications in other ABB products including automatic circuit reclosers, circuit breakers and contactors.

The PS switches have been designed with vacuum interrupters that have been especially designed for capacitor switching applications. The vacuum interrupter consists of copper chromium (CuCr) contacts or tungsten copper (WCu) contacts for higher voltages. This provides superior interrupting capabilities and a capacity to withstand high temperatures, guaranteeing a long switching life.

ABB vacuum interrupters are renowned for their operational reliability and robust construction. The PS vacuum switch is capable of over 50,000 paired fault-free and maintenance-free mechanical switching operations.

Magnetic actuator technology

The magnetic actuator naturally provides force-travel characteristics ideal for vacuum switching. The solenoid also reduces the number of parts and the need for maintenance.

The design of the PS vacuum switch incorporates a fast-acting solenoid mechanism, which eliminates prestrike and restriking of switch contacts. The solenoid is a bi-stable magnetic system. Switching operation is achieved by bi-polar excitation of the coil until the retaining force of the permanent magnets are exceeded. Even on power failure, the PS switch can be manually disconnected by a manual trip lever.

The magnetic circuit is designed in such a way that the armature acts directly via an insulating push rod on the moving contact of the vacuum interrupter. This design, having fewer parts, reduces the overall cost while increasing reliability.

The design of the magnetic actuator offers flexibility through its capacity to operate under a wide range of control voltages.

The magnetic actuator is designed with power efficiency in mind. The mechanism draws a 10A 'single shot' current pulse (100 msec) only during a close or trip operation at 120 V. At all other times, it remains in stand-by, with virtually no current draw.



Insulator technology



The PS switch insulator uses advanced 'hydrophobic cycloaliphatic epoxy' (HCEP) resin. HCEP resin adds hydrophobic properties similar to silicones, to the already advantageous property profile of traditional cycloaliphatic epoxies. Increased hydrophobicity leads to less surface wetting, which in turn provides better reliability and improved life expectancy. Cycloaliphatic epoxies are widely used in the electrical field and they are well known for their insulating properties, in particular their very high resistance to electrical tracking. In summary, HCEP is stronger than porcelain (chip and crack resistant) yet electrically similar to silicone.

The PS switch insulator is manufactured by automatic pressure gelation. In this process, the HCEP resin is fed into a preheated mould where gelation occurs under pressurised conditions. ABB has invested significant resources in perfecting this manufacturing process to guarantee the structural and electrical integrity of its insulators.

In all PS switches, the vacuum interrupter is protected from external influences through encapsulation. The insulator offers durability and resistance to harsh environments, while maintaining high dielectric properties.

The range of available PS switches offers greater value with a BIL range of 125 kV to 200 kV as standard.

Accessories



Terminal types [options]

The PS vacuum switch comes with several cable termination options including:

- 200 A standard termination
- 200 A / 400 A NEMA type termination
- 400 A termination

The terminals can be located either on the top of the switch (location A), side of the switch (location B), or both locations.

The different terminal configurations and types are available on the entire PS vacuum switch range.



200 A / 400 A
NEMA TYPE
TERMINATION



400 A
TERMINATION



200 A
STANDARD
TERMINATION

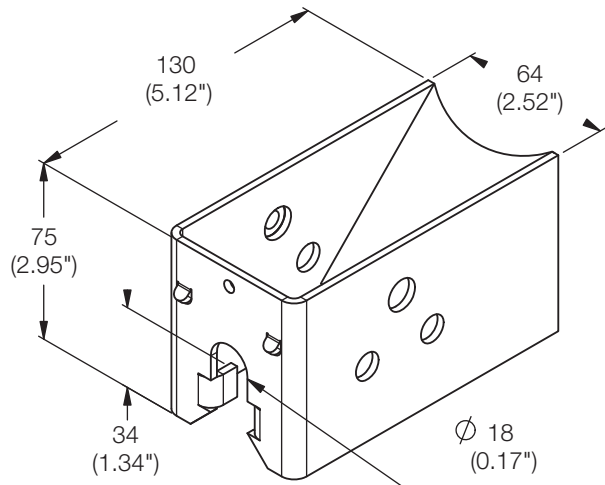
PS switch selection table

Switch selection table	PS	15	1A	M	BC	212	1	S
Switch rating: 15. 15.5 kV (1-phase only) 17. 17.5 kV (1-phase only) 25. 25.0 kV (1-phase only) 36. 38.0 kV (3-phase only)								
Control voltage: 1A. 120 VAC 1D. 120 VDC 2A. 240 VAC 4D. 48 VDC								
Latching options: M. Mechanically latched E. Electrically held								
Limit switch (auxiliary contacts): AO. N/O "A" contact (5-pin plug) BC. N/C "B" contact (5-pin plug) AB. N/O and N/C "A" and "B" contacts (7-pin plug)								
Current rating / BIL: 212. 200 A, 125 kV BIL (PS15 and PS25 only) 412. 400 A, 125 kV BIL (PS15 only) 215. 200 A, 150 kV BIL (PS25 only) 415. 400 A, 150 kV BIL (PS17 only) 320. 300 A, 200 kV BIL (PS36 only)								
Switch type: 1. Single phase switch 3. Three phase switch								
Terminal palm: S. Standard terminal 1. One hole terminal 2. Two hole terminal (NEMA type)								

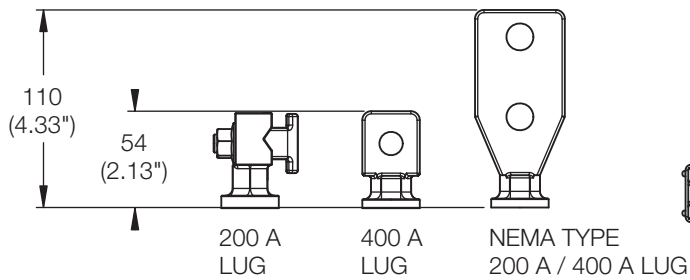
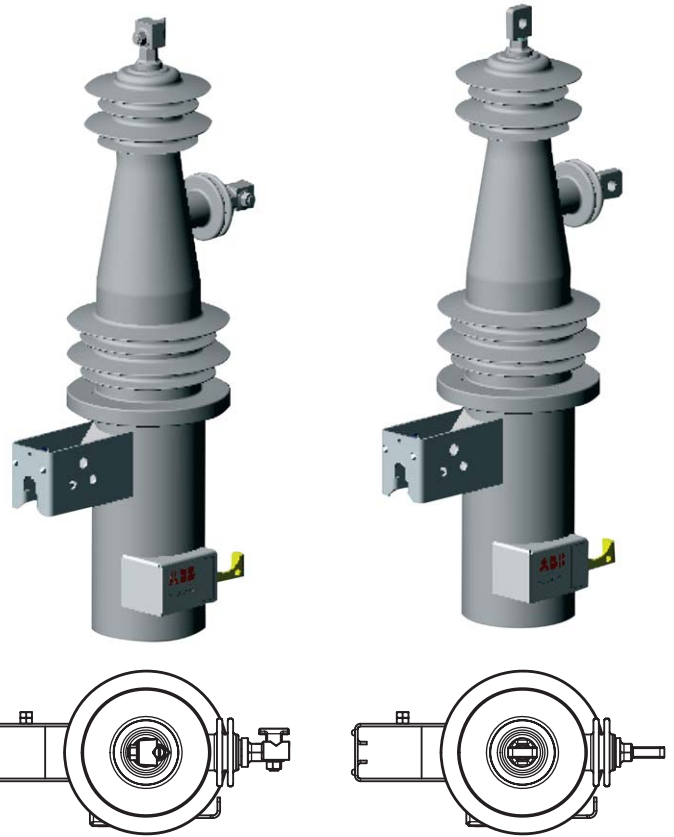
Capacitor switch standards

304 stainless steel tank
 Two bird guards
 Manual trip handle

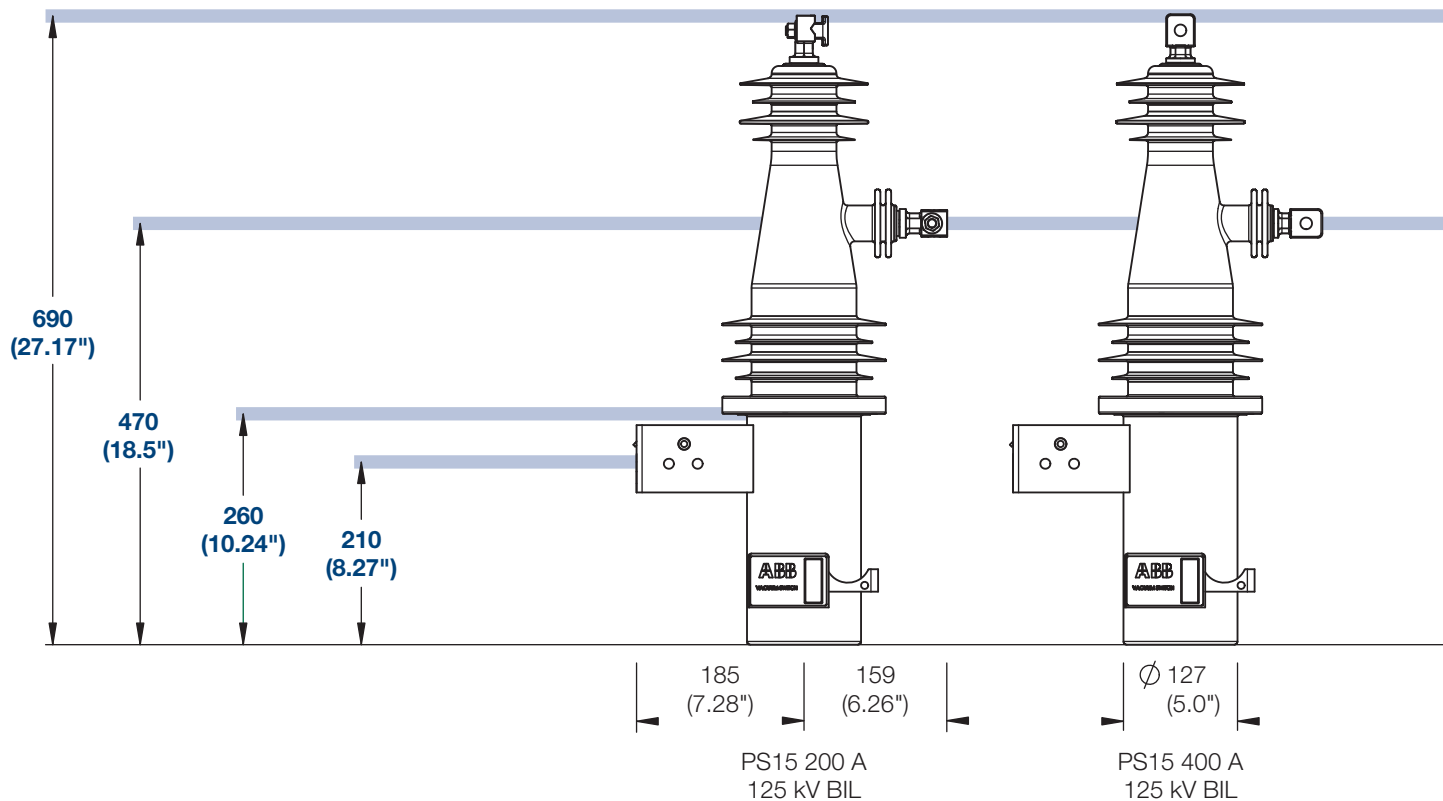
Dimensions (mm)

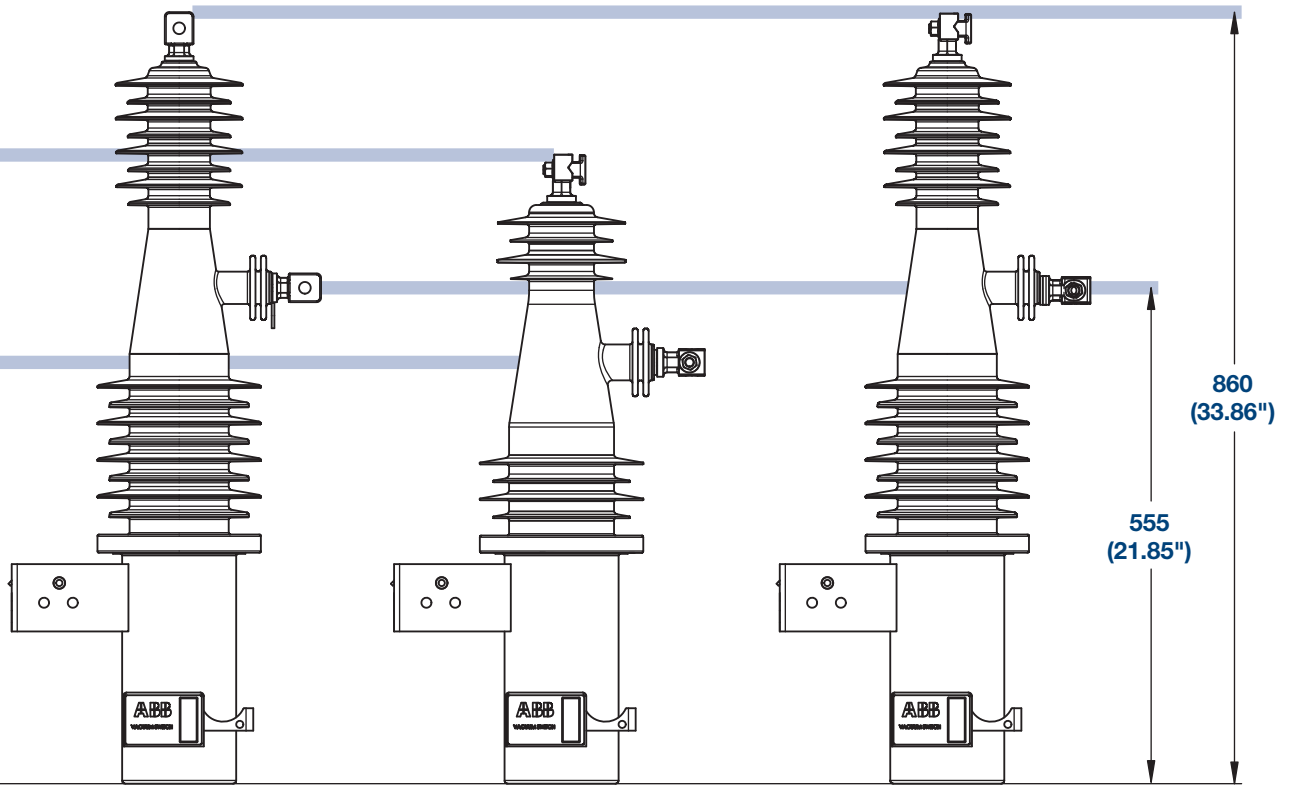
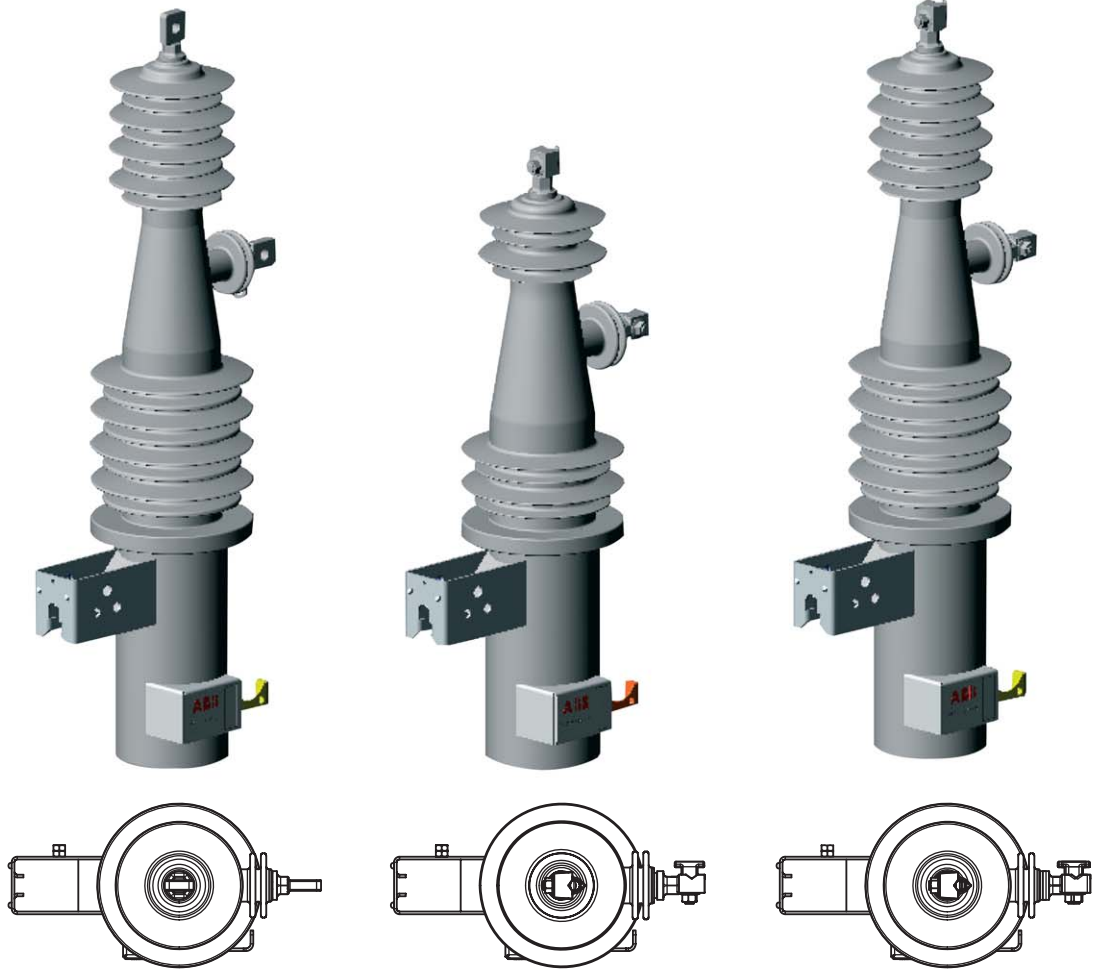


MOUNTING BRACKET



LUG OPTIONS



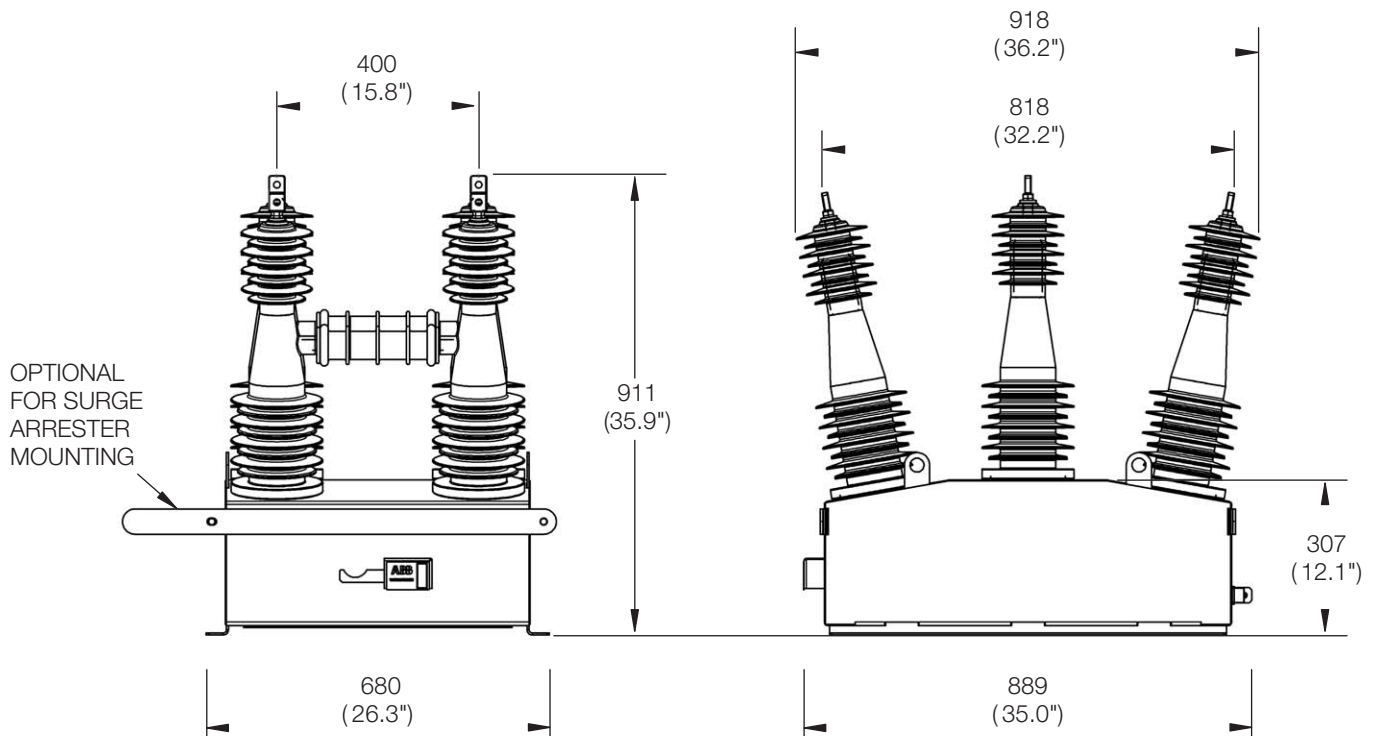
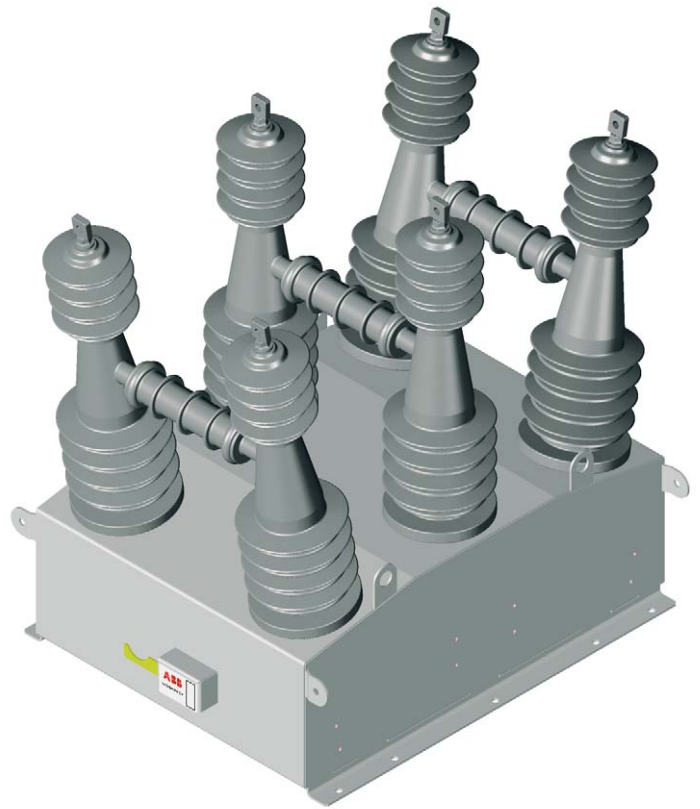
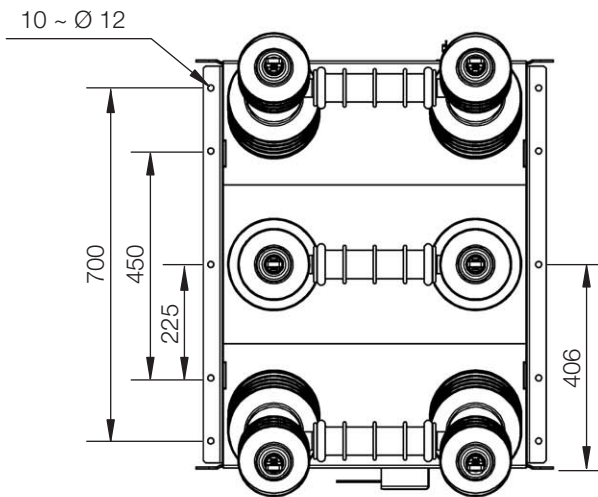


PS17 400 A
150 kV BIL

PS25 200 A
125 kV BIL

PS25 200 A
150 kV BIL

Dimensions (mm)



PS36 300A
200 kV BIL

Technical data

Electrical		PS15	PS17	PS25	PS36		
Rated maximum voltage, 50 / 60 Hz							
Ungrounded capacitor banks, line-to-line	kV rms	15.5	17.5	25	38		
Grounded capacitors banks, line-to-line	kV rms	27	30	43	66		
Impulse withstand voltage							
Line to ground	kV BIL	125	125	150	125	150	200
Open contact	kV BIL	95	125	125	125	125	200
Withstand voltage, 60 Hz							
Dry, 1.0 minutes	kV	50	60	60	70		
Wet, 10 seconds	kV	40	50	60	60		
Continuous current 50/60 Hz	A	200	400	400	200	300	
Capacitive switching current (50/60 Hz)	A	200	400	400	200	300	
Loading interrupting current	A	5,000	5,000	5,000	5,000	5,000	
Short time symmetrical withstand current							
1.0 Second	A	4,500	5,000	5,000	4,500	4,500	5,000
High frequency peak							
Transient making current	A	12,000	12,000	12,000	12,000	15,000	
Transient in-rush frequency	Hz	3,000	6,000	6,000	6,000	6,000	
Operating voltage range *							
110/120 Vac (50 / 60 Hz) or Vdc	V	90...130	90...130	90...130	90...130		
240 Vac (50 / 60 Hz)	V	205...265	205...265	205...265	205...265		
Nominal control current for 100 msec	A	10	10	10	30		
Nominal open/close time	msec	100	100	100	100		
Continuous current (electronically held)	mA	100	100	100	N/A		
Creepage distance							
Terminal to terminal	mm	518	805	518	805	1,600	
	inches	20.4	31.7	20.4	31.7	62.99	
Terminal to ground	mm	498	757	498	757	1350	
	inches	19.2	29.8	19.2	29.8	53.15	
General							
Weight							
	kg	13	16	16	≈ 110		
	lbs	28	35	35	≈ 243		
Operating temperature range †							
	°C	-40 to +65	-40 to +65	-40 to +65	-40 to +65		
	°F	-40 to +149	-40 to +149	-40 to +149	-40 to +149		
Mechanical endurance		50,000	50,000	50,000	20,000		
Restrike category in accordance to IEEE 37.66		Class	C2	C1	C2	C2	

Type test certificates from independent testing facilities are available upon request

* 48 Vdc special order upon request

† For operating temperatures below -20°C (-4°F), please specify at order stage

Accessories

Auxiliary limit switch for switch status

Connection cables (including connectors)

Power Factor Controller (ABB CQ900R, CQ900L)

Junction box

Wildlife protective covers (fitted as standard)

Remote power supplies

Contact us

**Please contact your local sales representative
for further information**

www.abb.com/powercapacitors
www.abbaustralia.com.au

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