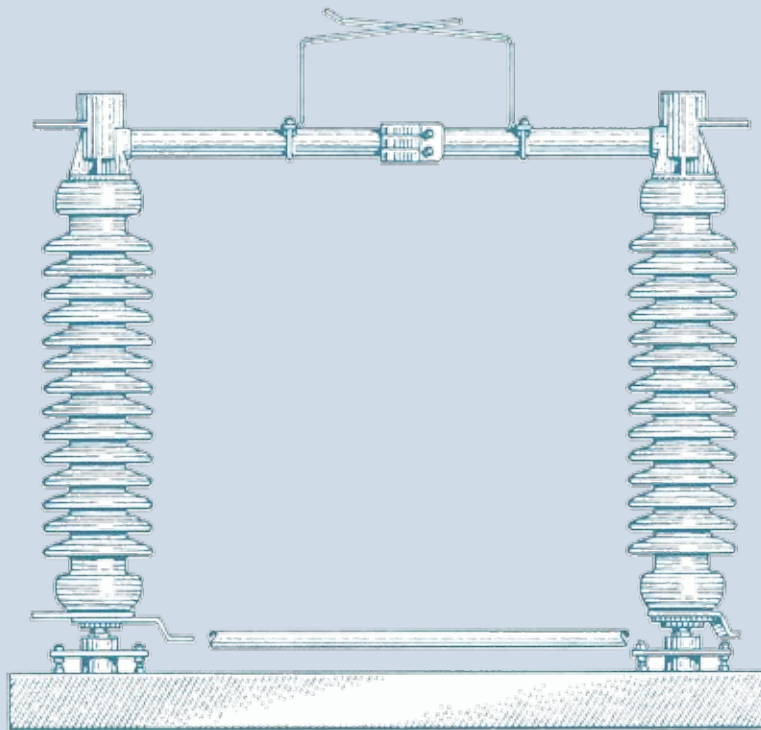


# DR9



INTRODUCTION & TYPE TEST DATE : 1994		ANNUAL UNITS PRODUCED : 110	
UNITS IN SERVICE : > 2000	SEISMIC QUALIFICATION BY SHAKE TABLE : 230 kV		
VOLTAGE : 8.3-362 kV	BIL : 95-1300 kV	CONTINUOUS CURRENT : 1200-2000 AMPS	
SHORT CIRCUIT : 99-164 kA PEAK (38-63 kA 3 SECOND)		INSULATOR : LAPP	

The DR9 switch is a two insulator center break design. Operation of the switch is accomplished through rotation of both insulators mounted on two maintenance free rotor bearings. Aluminum components are utilized throughout the design except in critical current transfer areas where copper and copper alloy castings are employed. Sealed high pressure current transfer joints in the blade hinge assure trouble free operation. Switch bases are constructed from galvanized structural steel channel. The DR9 switch design requires minimum overhead clearance. Additional clearance is required between phases.

## DR9 VALUE-ADDED FEATURES

Pascor Atlantic's DR9 switch is the result of 100 years' experience in developing and supplying power equipment to the electric utility industry. Pascor Atlantic has continuously pioneered the research, design, testing and the manufacture of outdoor disconnect switches. We maintain this leadership because of our continued innovative efforts to provide maximum value in acquisition, installation, maintenance and operating reliability.

### Procurement:

- Pre-Engineered
- Local sales representatives and expertise
- Controls available for quick delivery
- ISO 9002 certified
- ISO 14000 compliant
- On-time shipment
- Industry's shortest lead times

### Engineering:

- Universal bases and controls fit most structures
- All parts designed to resist corrosion
- Adaptable to meet special requirements
- Availability of AutoCAD format drawings
- Manual or motor operation

### Installation:

- Interphase and horizontal operating pipes in pre-engineered or customized lengths
- Open-close stops on each switch pole
- Custom-engineered controls reduce installation time
- Adjustable threaded clevis for ease of fine adjustment of three-pole switches
- Service technicians available for assistance
- On time deliveries
- Greaseless rotor bearings with stainless steel ball bearings on switch bases
- Weather-sealed, grease-filled enclosed switch hinge contacts
- Corrosion-free gears in all operators
- No threaded couplings applied in torsion
- Replaceable copper moving contacts

### Accessories:

The following accessories can be provided for the DR9:

- Arcing Horns
- Arc Restrictors thru 145 kV (Quick Whips)
- Auxiliary Switches
- Cable Guides (Outriggers)
- Spill Gaps
- Position Indicators
- Silver-to-Silver Open Air Contacts

Pascor Atlantic  
Air Switch Division • State Route 42  
254 Industry Dr. • Bland, Virginia 24315-9709  
Phone: 276-688-3328 • Fax: 276-688-2228 or 2229  
www.pascoratlantic.com

## OPERATORS

The DR9 can be operated either manually or by a motor mechanism. The following operators can be supplied:

- Swing Handle (3-feet or 5-feet)
- Worm Gear
- MO-10 Motor Operator

## GROUNDING SWITCH

For grounding during inspection, maintenance, or repair, a three-pole grounding switch can be mounted on either end of the DR9 switch for voltages of 69 kV and above. Interlocking to prevent the main and ground switches from being closed at the same time can be accomplished via Kirk key interlocks, mechanical interlocks, or electrical interlocks (where electrical operators are used).

## ORDERING INFORMATION:

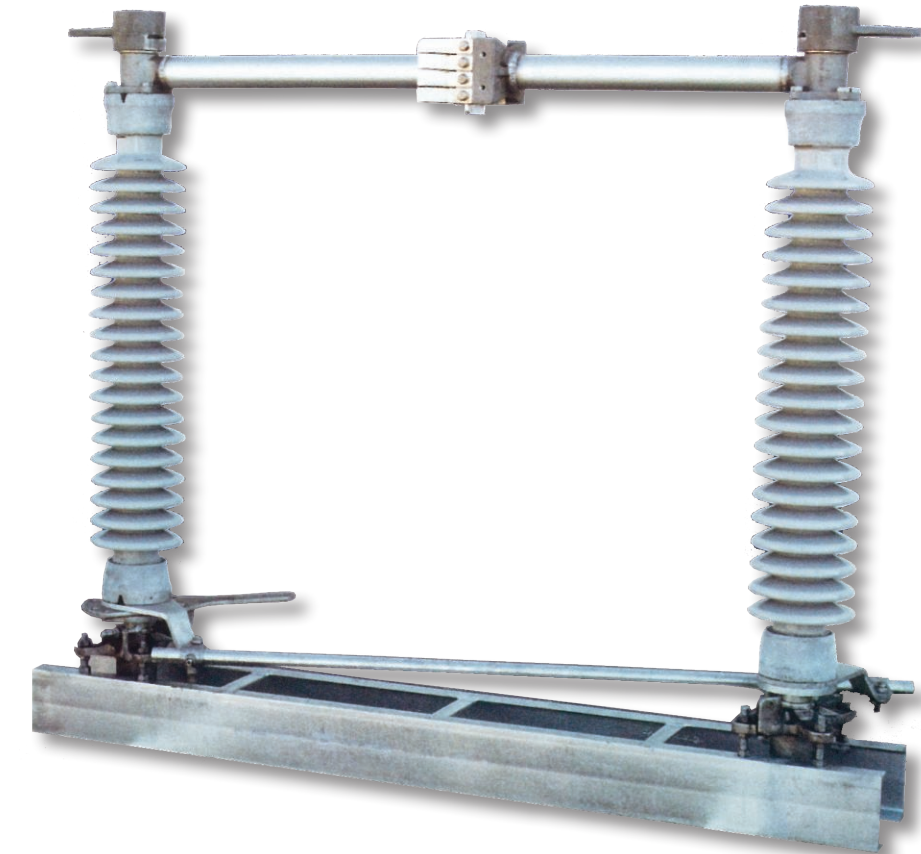
The following information is the minimum required when ordering DR9 switches:

- Voltage, BIL rating, continuous current, momentary rating
- Mounting positions (upright or vertical)
- If grounding switches are specified:
  - momentary rating
  - location and position
- Operators required (main and ground switches)
- Insulator specification including:
  - BIL rating
  - technical reference (TR #)
  - bolt circle diameter
- Mounting information
- Structure and detail drawings
- Fixed terminal pad height if applicable



# Type DR9

8.25 THRU 420 kV  
600-2000A  
40-100 KA Momentary



*Center-Break, Gang-Operated Outdoor Air Disconnect Switch*

## Description

The DR9 switch is a modern and reliable two-insulator, center-break outdoor disconnect switch rated for applications from 8.25 kV to 420 kV maximum voltage and 600A to 2000A. The three-pole units are gang-operated through interconnecting rods coupled to a single motorized or manual drive system. Each pole of the DR9 Switch has:

- Two opposing blades with contacts on the blade ends that meet in the middle.
- Two insulator stacks joined by a connecting rod.
- Jaw assembly.
- Two uniquely designed hinge assemblies which include fully weather-sealed, silverplated-to-copper transfer contacts.

The contacts of each pole of the DR9 switch meet in the middle. When a switch pole unit either opens or closes, the connecting rod between the insulator stacks rotates the stacks in opposite directions.

As the insulator stacks rotate, the blades, connected to the top of the insulator stacks, are simultaneously opened or closed.

A galvanized structural steel channel base supports the insulators and live parts. The switch is designed to enhance the electrical and mechanical characteristics of current carrying parts. The mechanical parts and rotor bearings are designed for durability to withstand cantilever stresses, ensuring long-lasting service in all types of environments. All parts have been designed to be uniform across the product line. As a result, parts are easier to stock and are more readily available from the factory.

## APPLICATION

Type DR9 center-break disconnect switches meet or exceed ANSI C37 and IEC 129 standards and are adaptable to substation and line applications. This switch is recommended or gang-operated, center-break outdoor, disconnect applications from 8.25 kV through 420 kV maximum voltage, 600A through 2000A. They may be applied for any conventional requirement such as main line disconnecting, bus sectionalizing, breaker isolation and bypassing, or transformer disconnecting. They are also capable of interrupting linecharging and transformer-magnetizing current when equipped with interrupting attachments.

## MOUNTING

The DR9 switch can be mounted in the standard upright position for its entire voltage range or it can be mounted vertically for voltages up to 245 kV.

## DR9 DESIGN FEATURES AND BENEFITS

The basic DR9 switch design is backed by years of a solid reputation and proven, dependable service life in all type of climates and conditions. The refined hinge contact assembly is an added enhancement to an already proven design.

## Hinge Assemblies

The unique hinge assemblies use a two-part aluminum casting design. The aluminum castings function both as a hinge and a housing to fully enclose the silverplated-to-copper transfer contacts, effectively protecting the contacts from the environment and ensuring long, dependable life. The contacts are permanently lubricated and sealed by O-rings, requiring no routine maintenance.

Current transfers through the hinge assembly from a silverplated copper plug to a copper tube with cut-in fingers. The cut-in fingers of the tube maintain consistent contact pressure with the plug. The plug and tube are knurled and pressed into the two aluminum castings. The bottom casting, bolted directly on the insulator stack, holds the copper tube. The top casting holds the copper plug and rests on the bottom casting. The two aluminum castings are held together by a snap ring and are sealed by an O-ring. Since the castings are not bolted together, the lower casting and copper tube rotate as the insulator stack rotates. As the blade opens and the jaw contacts separate, the top casting and terminal remain stationary, fixed in place by line connection. Bearings in the hinge assembly assure smooth, reliable operation as the aluminum castings rotate.

## Jaw Contacts

The jaw consists of tinned, hard drawn reverse loop copper fingers backed by stainless steel springs to provide excellent current carrying capability and resistance to corrosion. The stainless steel springs are insulated at one end to eliminate current flow through the spring and thus prevent annealing. This design prolongs the life of the spring and ensures consistent contact pressure.

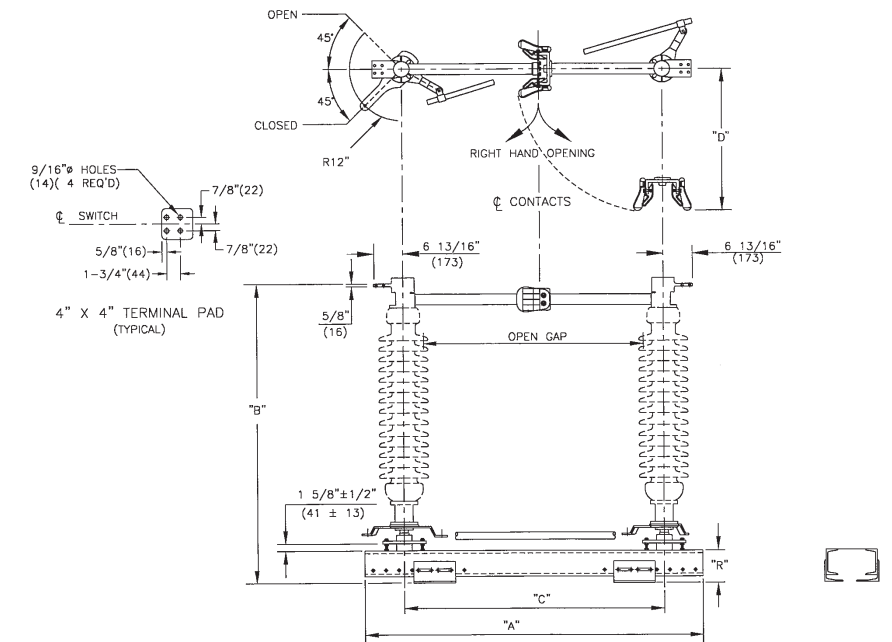
## Rotor Bearings

The insulator stacks rotate on greaseless rotor bearings that contain two sets of stainless steel ball bearings. Weather seals prevent moisture and foreign matter from entering the rotor bearing. The ball bearing sets are spaced far enough apart to provide sufficient support to withstand cantilever stresses and to allow the ball races to take thrust loading as well as radial loading. This design assures smooth operation and minimized operating effort. Because of this design, no maintenance is required, ever.

## Switch Bases

Switch bases of galvanized structural steel channel are designed and tested to be rigid under all operating conditions. Heavy galvanizing is applied after punching to assure long corrosion-free life. Universal bases are available for all switch types. This base allows for infinite mounting bracket location which assures mounting holes will match without the need for field modification.

## DR9 SPECIFICATIONS



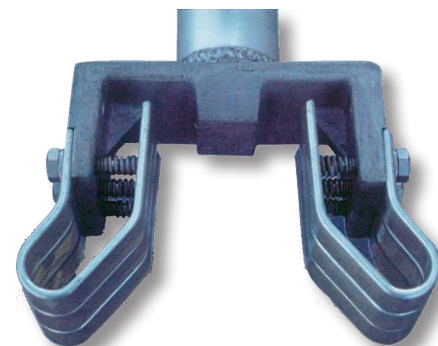
KV	*INS*	*A*		*B*		*C*		*D*		APPROX. SINGLE POLE WEIGHT WITH INSULATOR	
		IN.	MM	IN.	MM	IN.	MM	IN.	MM	LBS.	KG.
7.5	TR-202	46"	1168	31 5/8"	803	30"	762	15 5/8"	397	201	91
15	TR-205	46"	1168	34 1/8"	867	30"	762	15 5/8"	397	208	94
23	TR-208	46"	1168	38 1/8"	968	30"	762	15 5/8"	397	231	105
34.5	TR-210	46"	1168	42 1/8"	1070	30"	762	15 5/8"	397	254	115
46	TR-214	46"	1168	46 1/8"	1172	30"	762	15 5/8"	397	288	131
69	TR-216	58"	1473	54 1/8"	1375	42"	1067	21 1/8"	537	405	184
115	TR-286	76"	1930	69 1/8"	1756	60"	1524	31 5/8"	803	616	279
138	TR-288	88"	2235	78 1/8"	1987	72"	1829	38 5/8"	981	696	316
161	TR-291	100"	2540	86 1/8"	2188	84"	2134	44 5/8"	1133	775	352
230/900	TR-304	112"	2845	107 1/8"	2721	96"	2438	52 5/8"	1337	1028	466
230/1050	TR-312	138"	3505	119 1/8"	3026	122"	3098	63 5/8"	1616	1184	537
345/1300	TR-324	160"	4064	128 3/4"	3270	144"	3658	72 5/8"	1845	1596	724



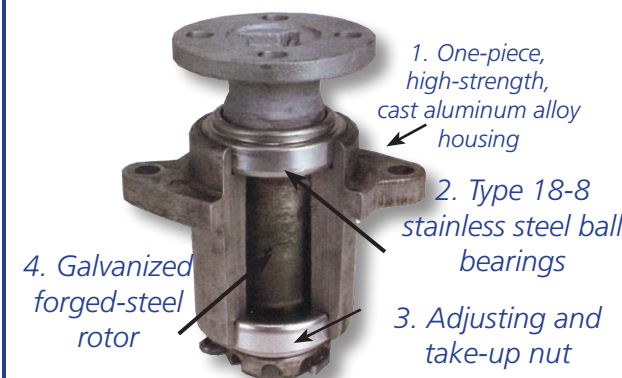
HINGE CAP



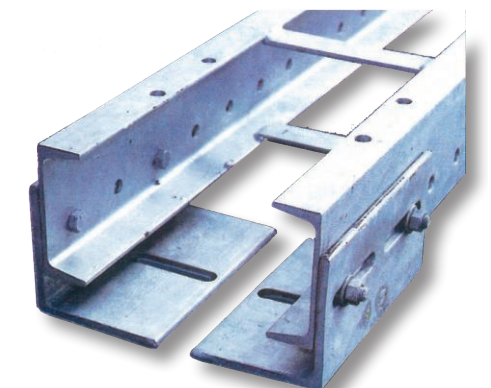
HINGE CONTACTS



JAW CONTACTS



ROTOR BEARINGS



SWITCH BASES