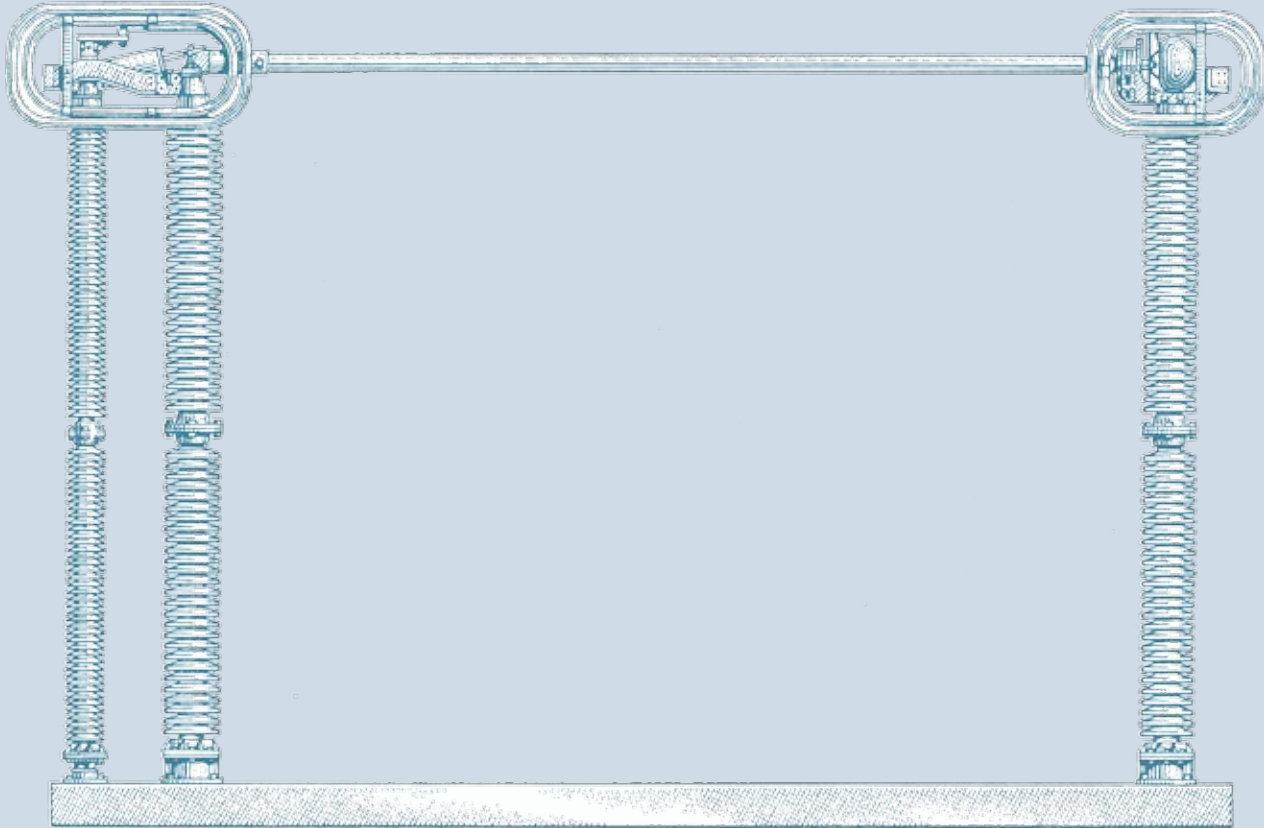


TTR6



INTRODUCTION & TYPE TEST DATE : 1973	ANNUAL UNITS PRODUCED : 105	
UNITS IN SERVICE : > 25000	SEISMIC QUALIFICATION BY SHAKE TABLE : 230 & 500 kV	
VOLTAGE : 8.3-765 kV	BIL : 95-2050 kV	CONTINUOUS CURRENT : 1200-5000 AMPS
SHORT CIRCUIT : 99-232 kA PEAK (38-89 kA 3 SECOND)	INSULATOR : LAPP	

The TTR6 switch is a heavy duty solution for vertical break design applications. Operation of the switch is accomplished through rotation of the outside hinge insulator. 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. A torsional gear drive is utilized for EHV ratings to minimize the required torque that is transferred through the linkage. A worm gear is employed at the rotating insulator to ensure consistent switch operation. The TTR6 vertical break switch design allows for mounting at minimum recommended phase spacing. Additional clearance is required for the open blade position.

TTR6 VALUE-ADDED FEATURES

Pascor Atlantic's TTR6 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:

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

Engineering:

Universal base and control fit most structures
All parts designed to resist corrosion
Adaptability to meet special requirements
Availability of AutoCAD format drawings
Manual and motor operation
Arcing horn supplied as standard

Installation:

Interphase and vertical operating pipes in pre-engineered or customized lengths
Adjustable threaded clevis for ease of fine adjustment of threepole switches
Open-close stops on each switch pole
Service technicians available for assistance
On-time deliveries

Maintenance:

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 coupling applied in torsion
Replaceable copper moving contacts

Accessories:

The following accessories can be provided for the TTR6:
Arc Restrictors thru 145 kV (Quick Whips)
Vacuum Interrupters
Auxiliary Switches
Cable Guides (Outriggers)
Spill Gaps
Leveling Screws (Jacking Bolts)
Position Indicators
Silver-to-Silver Open Air Contacts

OPERATORS

The TTR6 can be operated either manually or by a motor mechanism. Below is a list of operators which can be supplied:

Swing Handle
Worm Gear
MO-10 Motor Operator

GROUNDING SWITCH

For grounding during inspection, maintenance, or repair, a threepole grounding switch can be mounted on the hinge and/or jaw end of the TTR6. 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).

High speed grounding switches for fault initiating can also be mounted on the TTR6. High speed grounding switches can be reset by using a hookstick or one of the operators listed above.

ORDERING INFORMATION:

The following information is the minimum required when ordering TTR6 vertical-break switches:

Voltage, BIL rating, continuous current, momentary rating
Mounting positions (upright, vertical, or inverted)

If grounding switches are specified:

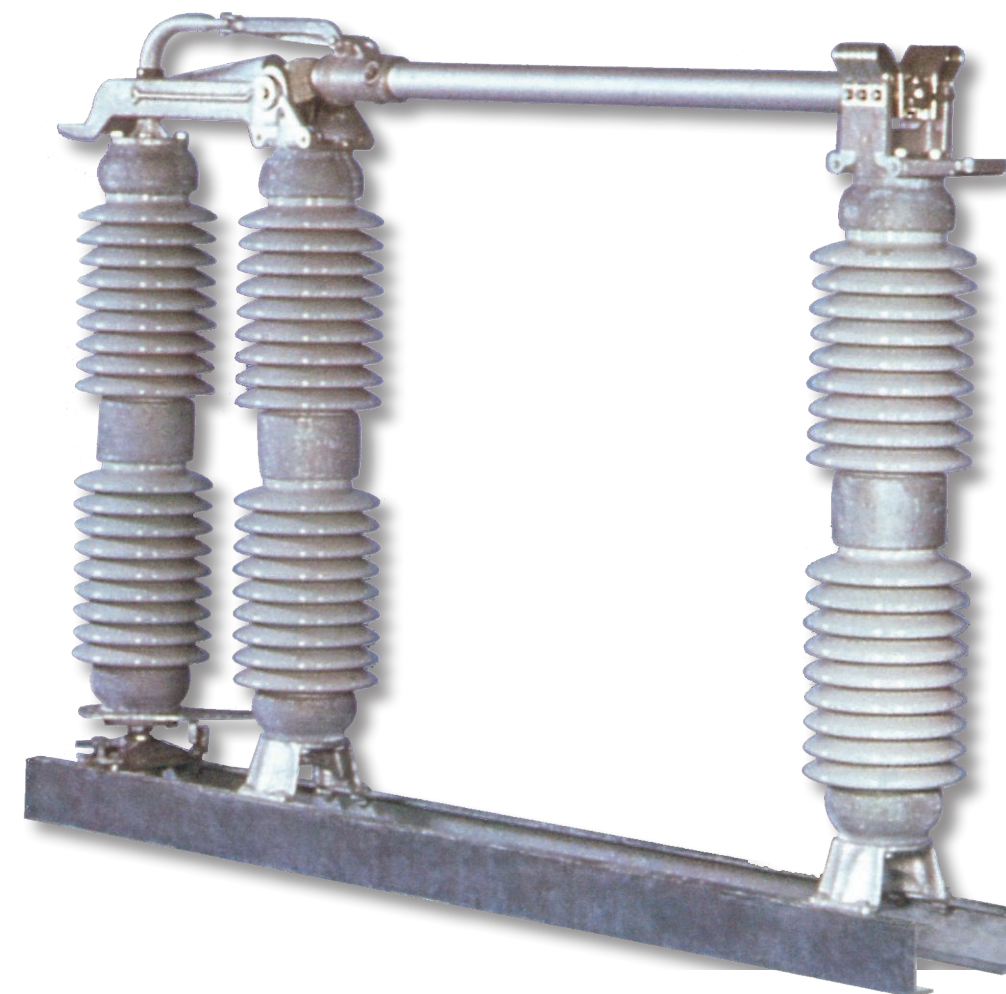
- momentary rating
 - location and position
 - coil voltage (for HSG only)
- Operators required (main and ground switches)
Insulator specification including:

- BIL rating
 - technical reference (TR #)
 - bolt circle diameter
- Mounting information
Structure and detail drawings
Fixed terminal pad height if applicable

Type TTR6

8.25 THRU 800 kV
600-5000A
40-142 KA MOMENTARY

PASCOR ATLANTIC
Delivering More. Delivering Service.



Vertical-Break Outdoor Air Disconnect Switch

Description

The TTR6 switch is a modern and reliable three-insulator, vertical break, outdoor air switch using a variety of materials in its design selected to do a specific job according to the function required.

Optimum mechanical and electrical characteristics of the current carrying parts are assured through the use of high-conductivity, high-strength aluminum alloys combined with transfer contacts utilizing the time proven high-pressure, silver-to-copper construction. There are only three moving current transfer contacts and of these only one is an exposed separable contact subject to environmental conditions.

Throughout the current path all bolts, nuts, and pins are stainless steel, minimizing the possibility of corrosion. 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.

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254 Industry Dr. • Bland, Virginia 24315-9709
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PASCOR ATLANTIC

This bulletin describes our standard product and does not show variations in design which may be available. If additional details are required, contact your local Pascor Atlantic representative. Pascor Atlantic reserves the right to make changes or improvements to the product shown in this bulletin without notice or obligation.

SEPTEMBER 2009 DB-TTR6-A

APPLICATION

Type TTR6 vertical-break switches meet or exceed ANSI C37 and IEC 129 standards and are adaptable to substation and line applications. They may be applied for any conventional requirements such as main line disconnecting, bus sectionalizing, breaker isolating and by-passing, or transformer disconnecting. They are also capable of interrupting line-charging and transformer-magnetizing current when equipped with interrupting attachments.

MOUNTING

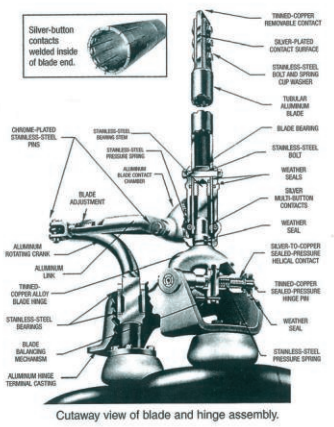
Type TTR6 switches can be mounted in upright, inverted or vertical positions.

TTR6 DESIGN FEATURES AND BENEFITS

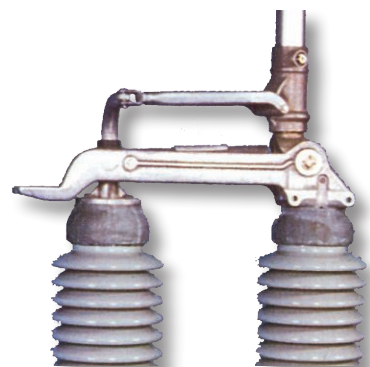
Sealed Pressure Hinge Contacts

The TTR6 design is backed by years of a solid reputation and proven, dependable service life in all types of climates and conditions. The transfer of the current from the copper hinge to the aluminum hinge terminal casting is through two spring-loaded helical contact hinge-pin assemblies in parallel. The hinge pins are silver-plated copper with silver plated threads. A stainless steel pressure spring provides positive continuous contact between the threads. A specially designed stainless-steel insert expands the slotted hinge pin, applying a radial force to engage the silvered surface of the hinge terminal casting, thus providing a reliable current transfer. Neoprene O-ring seals protect the contacts from dust, dirt and moisture. The seal-in lubrication is effective for the life of the switch.

The rugged hinge assembly features a cast aluminum die casting, cast copper alloy hinge and blade clamp, and copper alloy hinge pins. This sturdy construction assures years of reliable, long-lasting performance and durability in all climates, even in the toughest environmental conditions.



CUTAWAY VIEW OF BLADE AND HINGE ASSEMBLY.



HINGE ASSEMBLY



JAW ASSEMBLY

Jaw Contacts

The jaw consists of tinned, hard drawn reverse loop copper jaw 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. The reverse loop finger design of the jaw contact assures that the contacts will stay engaged under fault conditions. Magnetic forces from the fault current tend to push the blade downward in the jaw rather than up, out of the jaw. Consequently, the blade will not be driven from the jaw due to magnetic forces from fault conditions, preventing damage to the switch and any adjacent construction. The blade contact end consists of a replaceable silver-plated copper bar bolted directly to the blade end, minimizing current connections and welded joints to promote better current carrying performance. The contact end is easily replaced in the field by removing a few bolts thereby reducing the amount of downtime.

The blade rotates 24 degrees on its own axis before it begins its open gap travel. The blade rotation breaks ice and removes caked dirt both externally and internally from the jaw contact fingers. All operating effort is applied to releasing pressure and breaking debris before the blade lifts from the jaw. The rotation of the blade also cleans dirt and ice from the jaw contact finger surfaces when the switch is closed. This rotation ensures definite contact pressure with each operation helping to reduce losses resulting from poor contact pressure. All other dynamic contact joints are permanently lubricated and sealed by O-rings. This design assures reliable operation over the course of many years in all types of weather conditions and environments.

Blade Counterbalance

Where required, blade counterbalances are provided to assure ease of operation. The counterbalance consists of an aluminum tubular housing, steel compression spring protected with a tough flexible coating and a stainless steel plunger rod.

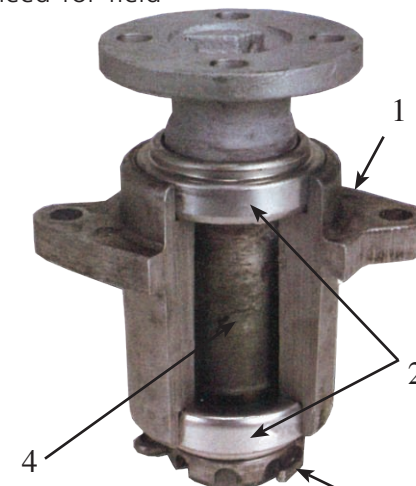
Three counterbalance connections are located on the blade hinge for upright, vertical or inverted mounting. These connections can easily be changed in the field to accommodate a change in mounting position.

Rotor Bearings

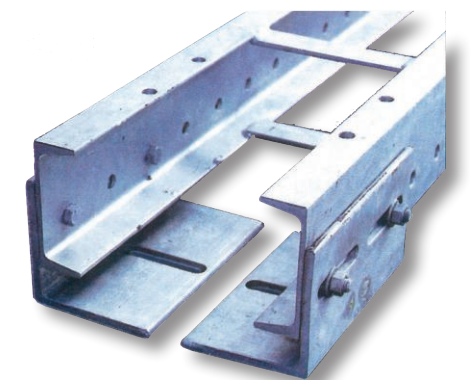
The drive insulator stack rotates on a greaseless rotor bearing that contains two sets of stainless steel ball bearings. Weather seals prevent moisture and foreign matter from entering the rotor bearings. The ball bearing sets are spaced far enough apart to provide sufficient support to withstand cantilever 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.



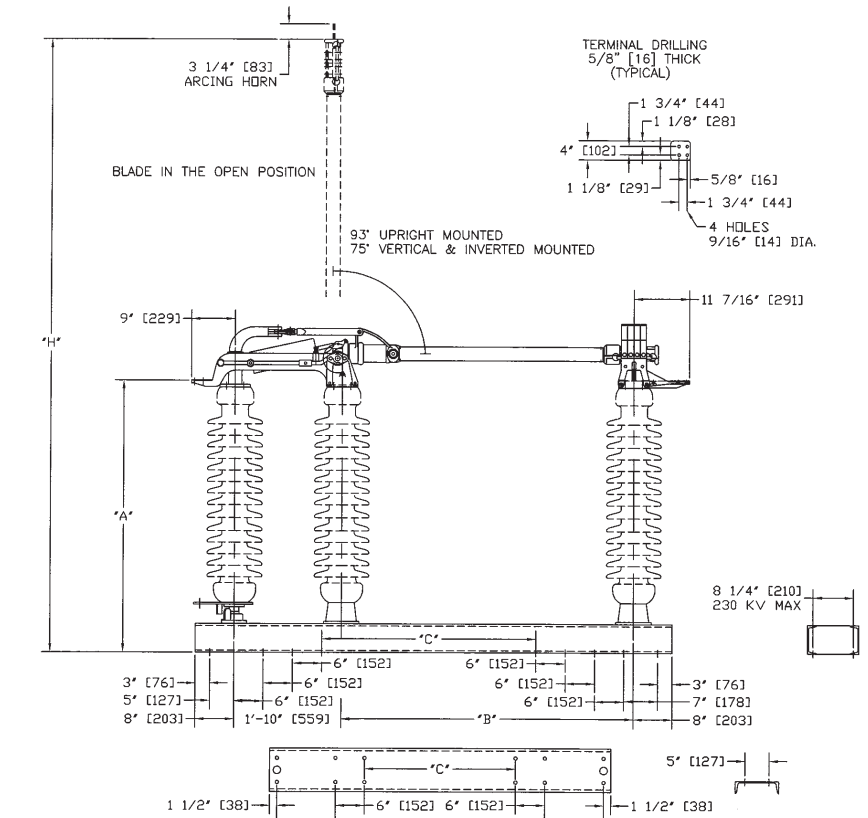
ROTOR BEARINGS



SWITCH BASES

1. One-piece, high-strength, cast aluminum alloy housing
2. Type 18-8 stainless steel ball bearings
3. Adjusting and take-up nut
4. Galvanized forged-steel rotor

TTR6 SPECIFICATIONS



KV	"INS"	"H"		"A"		"B"		"C"		APPROX. SINGLE POLE WEIGHT WITH INSULATOR					
		IN.	MM	IN.	MM	IN.	MM	SINGLE	DOUBLE	IN.	MM	LBS.	KG.		
7.5	TR-202	53	1 1/4"	1353	15	3/4"	400	27"	686	25"	635	318	145		
15	TR-205	55	3/4"	1416	18	1/4"	464	27"	686	25"	635	328	149		
23	TR-208	59	3/4"	1518	22	1/4"	565	27"	686	25"	635	363	165		
34.5	TR-210	63	3/4"	1619	26	1/4"	667	27"	686	25"	635	397	180		
46	TR-214	73	3/4"	1873	30	1/4"	768	33"	838	31"	787	457	207		
69	TR-216	97	3/8"	2473	41	7/8"	1064	45"	1143			29"	737	600	272
115	TR-286	127	3/8"	3235	56	7/8"	1445	60"	1524			44"	1118	898	407
138	TR-288	148	3/8"	3767	65	7/8"	1673	72"	1829			56"	1422	999	453
161	TR-291	168	3/8"	4277	73	7/8"	1876	84"	2134			68"	1727	1109	503
230/900	TR-304	205	3/4"	5226	93	7/8"	2384	96"	2438			82"	2083	1447	656
345/1300	TR-324	273	5/16"	6942	122	1/4"	3105	135"	3429			NA	NA	2206	1001
500/1800	TR-391	395	1/16"	10035	178		4521	207	5258			NA	NA	5268	2390