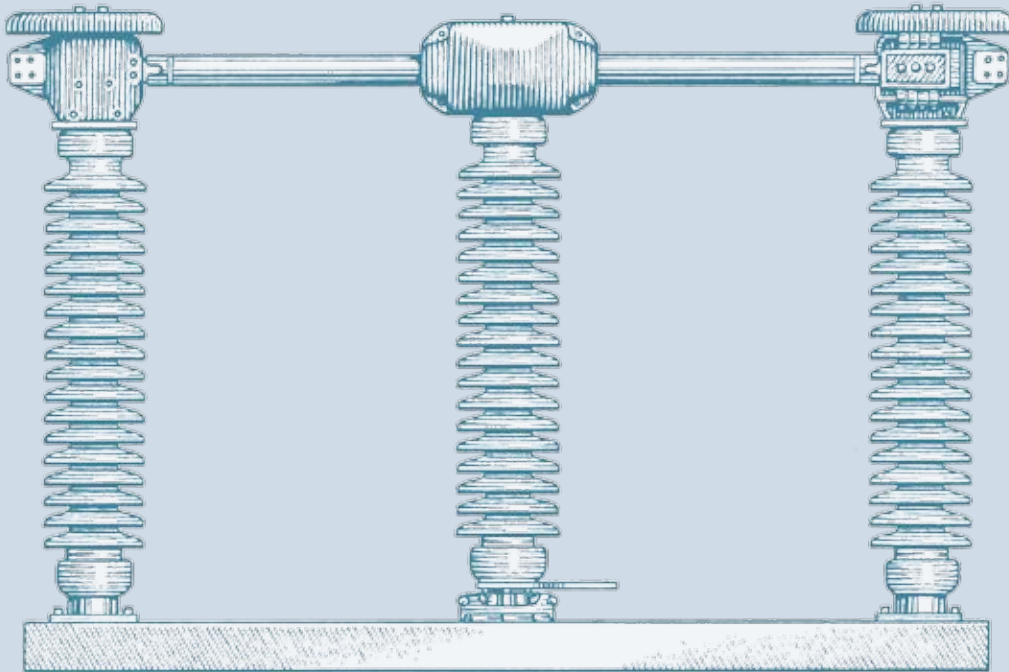


# TTT7



INTRODUCTION & TYPE TEST DATE : 1974	ANNUAL UNITS PRODUCED : 425
UNITS IN SERVICE : >13000	CONTINUOUS CURRENT : 1200-5000 AMPS
SHORT CIRCUIT : 99-195 kA PEAK (38-75 kA 3 SECOND)	VOLTAGE : 72.5-500 kV
BIL : 350-1800 kV	INSULATOR : LAPP -----

The TTT7 double end break switch is a three insulator side break switch. Operation of the switch is accomplished through rotation of the center insulator. Current transfer from terminal pad to terminal pad involves no pivoting transfer points. Both jaw end insulators are fixed which allows higher terminal loads to be applied to the switch. The TTT7 double end break switch design allows for mounting at minimum recommended phase spacing and requires minimum overhead clearance. The shielding makes this an excellent solution for heavy ice conditions.

## TTT7 VALUE-ADDED FEATURES

Pascor Atlantic's TTT7 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 TTT7:  
Arc Restrictors thru 145 kV (Quick Whips)  
Auxiliary Switches  
Cable Guides (Outriggers)  
Spill Gaps  
Leveling Screws (Jacking Bolts)  
Position Indicators  
Arcing Horn  
Silver-to-Silver Open Air Contacts Swing handle coupling  
Circuit breakers  
Local-Remote selector switch

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 TTT7 can be operated either manually or by a motor mechanism. Below is a list of operators which can be supplied:

Worm Gear  
MO-10 Motor Operator

## GROUNDING SWITCH

For grounding during inspection, maintenance, or repair, a threepole grounding switch can be mounted on either jaw end of the TTT7. 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 TTT7. 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 TTT7 Double End-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)

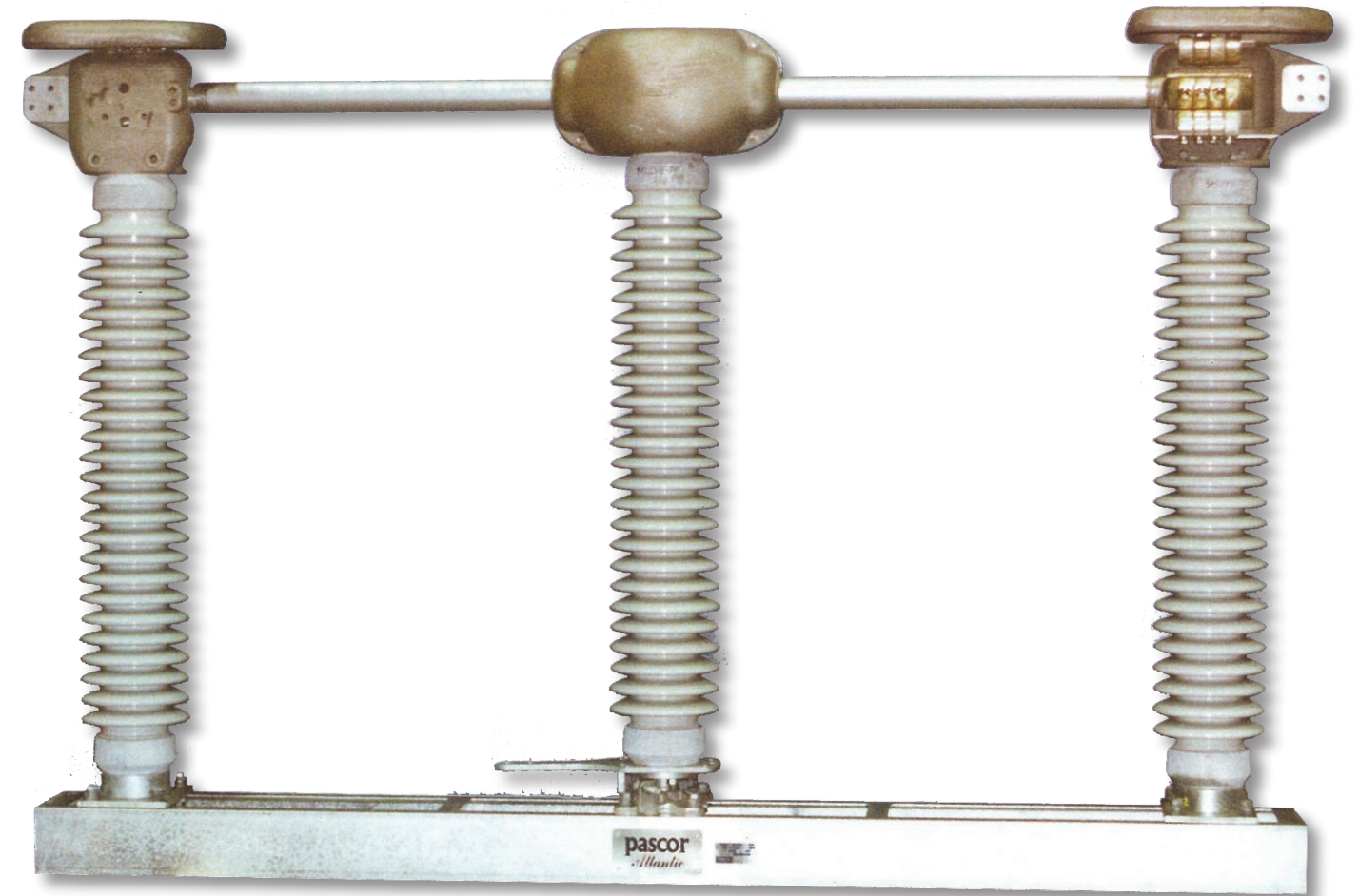
Insulator specification including:

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



# Type TTT7

**72.5 THRU 550 kV**  
**1200-5000A**  
**61-120 KA MOMENTARY**



*Double End-Break Outdoor Air Disconnect Switch*

## Description

The TTT7 switch is a modern and reliable three-insulator, Double End-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.

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. 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 TTT7 Double End-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 TTT7 switches can be mounted in upright, inverted or vertical positions.

## TTT7 DESIGN FEATURES AND BENEFITS

### Sealed Pressure Hinge Contacts

The TTT7 switch is backed by years of a solid reputation and proven dependable service life in all types of climates and conditions. The center insulator of the TTT7 rotates to open and close the switch. A desirable feature of the TTT7 is that both terminal pads are rigid and well supported. The TTT7 blades are extra heavy, one-piece, tubular aluminum with replaceable copper contacts at each end. Silver-surfaced edges of the contact ends engage with tinned copper jaw fingers to provide a field-proven make-and-break silver to tinned copper contact. The aluminum blade is attached to the top of the center rotating insulator stack by four bolts. A well-covered pivot and a set of driving bevel gears produce the blade rotation. A heavy helical spring, coiled around the blade, hold the blade contact ends in an angular position preventing any interference, as the contacts enter the jaw.

### 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 deeper into 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 swaged 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 rotating insulator moves the blade from the fully open position into the stop in the jaw, free of any jaw contact pressure. As the rotating insulator continues its travel, the bevel gears rotate the blade around its own axis producing a wiping-pressure contact. Thus contact pressure is not exerted until the blade fully enters the jaw, and pressure is released before the blade begins opening travel. The complete insulator rotation---swinging and rotating the blade---is a continuous, uninterrupted motion.

### Blade Operation

The aluminum blade is attached to the top of the center rotating insulator stack by four bolts. A well-covered pivot and a set of driving bevel gears produce the blade rotation. A heavy helical spring, coiled around the blade, holds the blade contact ends in an angular position preventing any interference, as the contacts enter the jaw. The rotating insulator moves the blade from fully open position into the stop in the jaw, free of any jaw contact pressure. As the rotating insulator continues its travel the bevel gears rotate the blade around its own axis producing a wiping-pressure contact. Thus contact pressure is not exerted until the blade fully enters the jaw, and pressure is released before the blade begins opening travel. The complete insulator rotation – swinging and rotating the blade – is a continuous, uninterrupted motion.

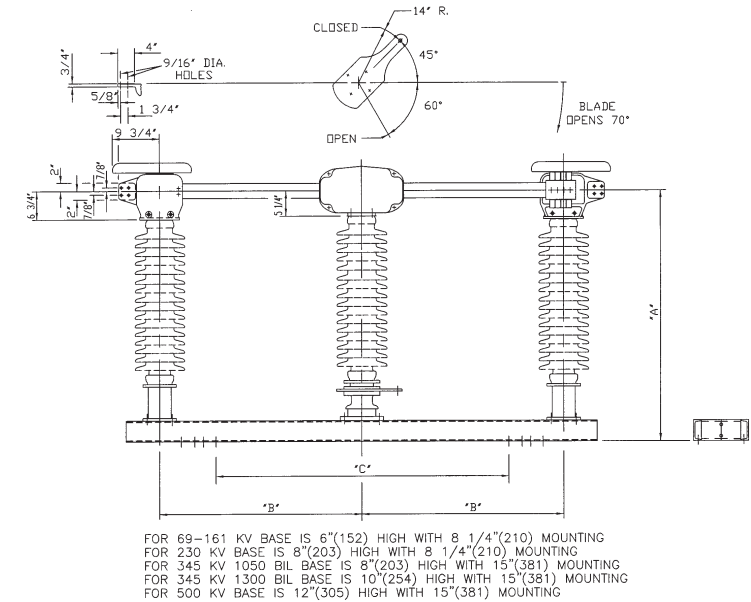
### Rotor Bearings

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 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.

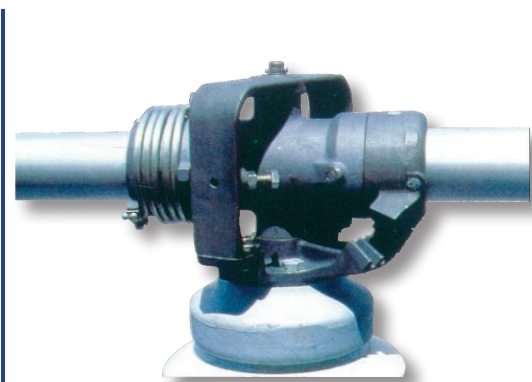
### Switch Bases

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.

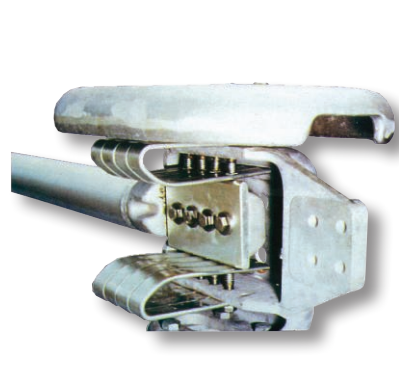
## TTT7 SPECIFICATIONS



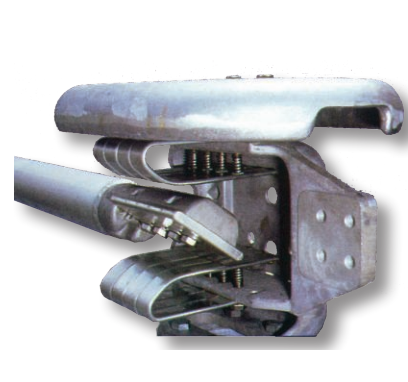
KV	*INS*	*A*		*B*		*C*		APPROX. EMPTY POLE WEIGHT WITH INSULATOR		
		IN.	MM	IN.	MM	IN.	MM	LBS.	KG.	
69	TR-216	45	3/8"	1153	34"	864	44"	1118	573	260
115	TR-286	60	3/8"	1534	42"	1067	44"	1118	874	396
138	TR-288	69	3/8"	1762	48"	1219	56"	1422	981	445
161	TR-291	77	3/8"	1965	54"	1372	68"	1727	1091	495
230/900	TR-304	97	3/8"	2499	68"	1727	104"	2642	1895	860
230/1050	TR-312	109	3/8"	2778	75"	1905	128"	3251	2133	968
345/1050	TR-312	110"		2794	75"	1905	128"	3251	2212	1003
345/1300	TR-324	126"		3200	84"	2134	140"	3556	2903	1317
500/1550	TR-379	156	1/2"	3975	116"	2946	176"	4470	4348	1972



**HINGE ASSEMBLY**

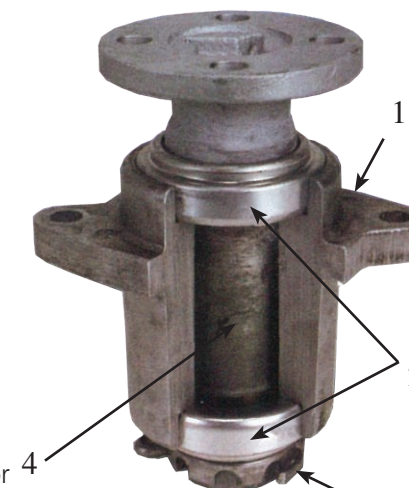


**BLADE FULLY CLOSED**

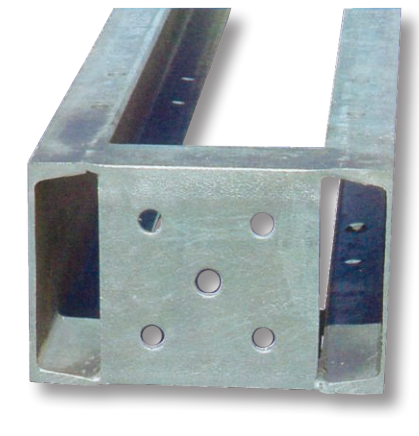


**BLADE IN JAW (ROTATED)**

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



**ROTOR BEARINGS**



**SWITCH BASES**