

**MORPAC**  
INDUSTRIES, INC.

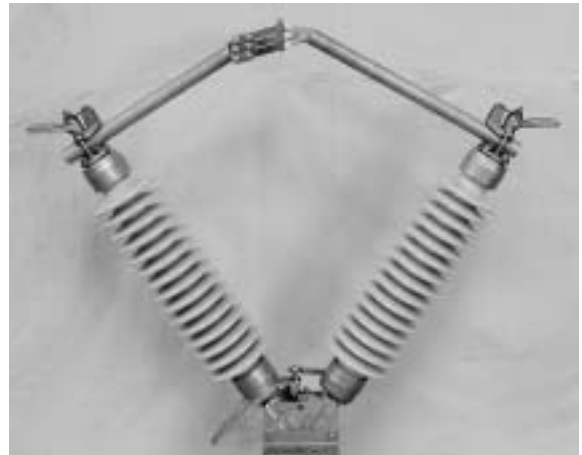
**MEMCO**  
POWER PRODUCTS DIVISION

**TYPE EE and EEB CENTER-  
SIDE-BREAK SWITCH**  
**TYPE VEE and CBV CENTER  
BREAK "V" SWITCH**  
*1200, 1600, 2000 & 3000 Amperes*  
*7.5 through 362 kV*

TYPE EE



TYPE CBV



# Type EE

## GENERAL DESIGN FEATURES

The EE center-side-break switch is a two insulator switch with both insulator stacks rotating for operation. The design of the live parts is essentially aluminum with properly treated copper utilized where necessary to achieve MEMCO's time proven concept of **silver-to-copper** at all moving contacts.

The EE center-side-break when furnished with arcing horns or quick-break attachment can be used for line sectionalizing, by passing circuit breakers or opening magnetizing current of transformers. Without arcing horns it can be used for isolating breakers or as a disconnecting switch.

## ADVANTAGES

**Economical** – The EE center-side-break is more economical than a vertical-break or a double-side-break switch because it requires one less insulator per phase or three per switch.

**Self-balancing** – Inherent self-balancing design eliminates the need for counter-balancing springs except in special applications.

**Low operating effort** – Inherent design requires less operating effort for a given rating than an equivalent vertical-break or side-break switch.

**Contact engagement** – Full contact engagement easily seen from ground position.

## INDUSTRY STANDARDS

The EE center-side-break switch is designed in accordance with latest industry standards. It is also available when specified based upon past industry standards which limit temperature rise to 30°C over an ambient of 40° C.

## SWITCH OPERATION

Opening and closing of the EE switch is accomplished by rotation of the vertical control pipe.

This rotary motion results in a push-pull motion of the interphase of the insulator stack. Both insulators of each phase are rotated simultaneously in opposite directions by the connecting rod between them. When in the open position each blade has moved 90°.

# Type EE

## DETAILS

High-strength, high-conductivity aluminum is used where practical throughout the live parts. Wherever copper-to-aluminum transitions are made the copper is tinned and an oxide inhibitor compound is used to provide an efficient transition.

## CONTACTS

The male contact has a tinned copper bar securely bolted to the aluminum casting welded to the tubular blade. The tinned copper bar has a silver overlay brazed along each make-break surface.

The female contact has special, high temperature resistant, copper alloy reverse-loop contact fingers which are bolted to a rugged aluminum jaw casting. Because of the excellent mechanical, electrical and thermal properties of the reverse-loop material there is no need for back-up springs or other pressure compensating devices commonly found on other switches.

The reverse loop configuration utilizes the magnetic forces produced during fault conditions to increase contact pressure.



**1200 Ampere Jaw - Partially Open**

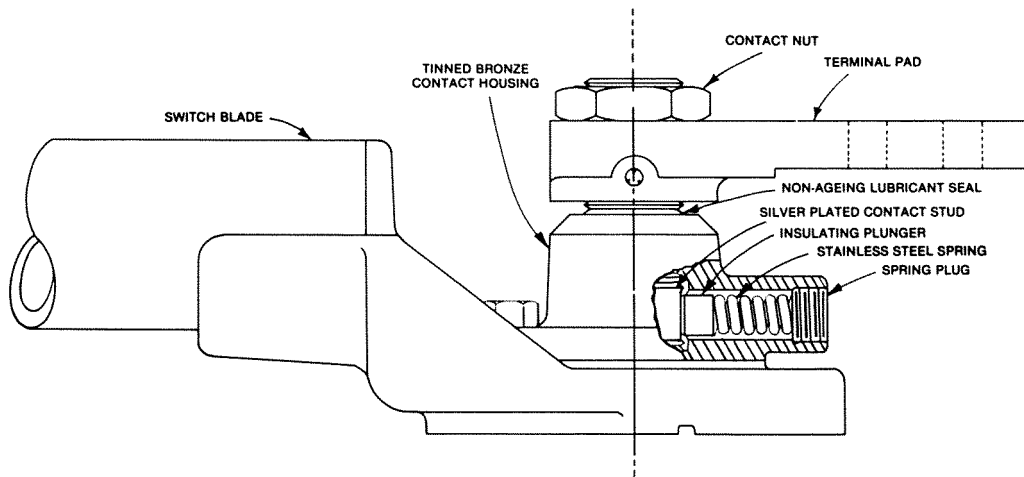


**2000 Ampere Jaw - Closed Position**



**2000 Ampere Jaw - Partially Open**

# Type EE



## HINGE ARRANGEMENT

### HINGE

The hinge contact is sealed with a non-ageing lubricant. Current transfer is through the threaded contact surfaces of a silver plated copper stud and its mating tinny bronze contact housing. High pressure is established and maintained by a stainless steel spring, electrically isolated from the current path. This time proven arrangement has been used by MEMCO since the mid 1950's.

### TERMINAL PADS

All ratings of the EE switch have 4" x 4" aluminum terminal pads with NEMA standard 1<sup>3</sup>/<sub>4</sub>" x 1<sup>3</sup>/<sub>4</sub>" drilling for four (4) 1/2" bolts.



*Terminal Pad Arrangement*

# Type EE



## LEVELING BOLTS

All switches are furnished with four leveling bolts per bearing to provide fast, effective means of aligning insulator stacks in the field.

## SWITCH BASES

Rigid double-channel galvanized steel bases are normally provided on all EE switches. The rigid trussed construction of the bases assures perfect alignment of the insulators and smooth operation of the switch. An equivalent aluminum base is available when specified.

## INSULATORS

Industry standard station post or cap and pin insulators are normally provided. Others are available when specified.

## BEARINGS

Maintenance free stainless steel bearings with stainless steel races within a galvanized housing are provided at the base of each insulator.

## OPERATING MECHANISM

Each three pole, group operated type EE switch is furnished complete with an operating mechanism for either manual or motor operation depending on customer specification. Unless otherwise specified by customer, manually operated switches are furnished with a swing handle at 169 kV and below. AT 242 kV a worm-gear mechanism replaces the swing handle.

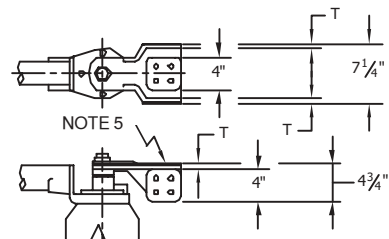
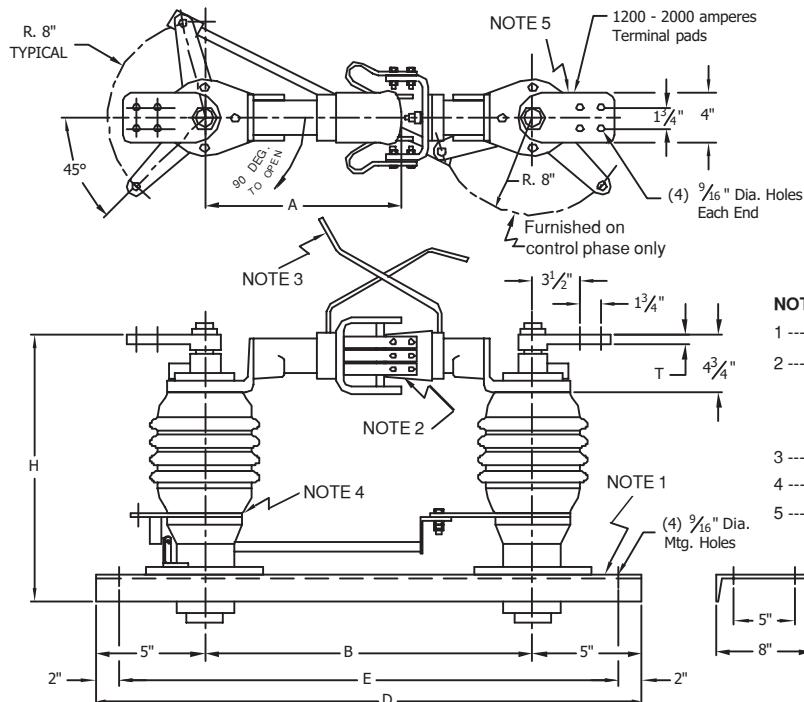
Each operating mechanism is designed to fit the customer's support structure. Included with the operating mechanism are vertical pipe, connecting rods, interphase rods, out-board bearing, open-close position indicator, flexible ground strap and provision for customer's padlock. Other accessories such as auxiliary switches and interlocks can be provided at an added cost.

## FIELD INSTALLATION

The simplicity of the EE center-side-break switch design assures ease of installation and years of trouble-free service.

## ACCESSORIES

Ground switches, quick break attachments, outriggers, spill gaps, along with terminal connectors, motor mechanisms and pole top frames are available on request.



**3000 AMP  
TERMINAL PADS**

(12) 9/16\" DIA. HOLES AT 1-3/4\" CENTERS EA. END

**NOTES**

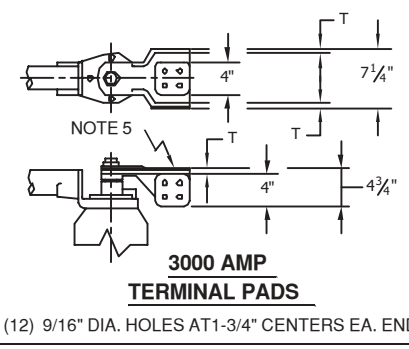
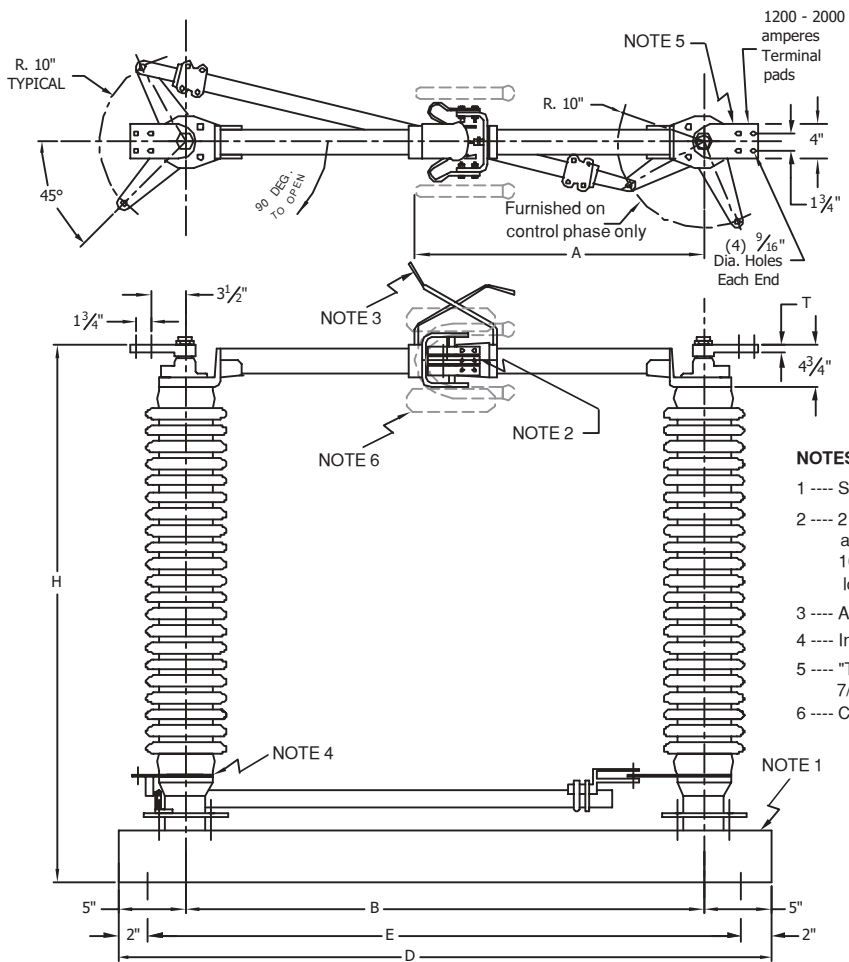
- 1 --- Standard base shown, others available.
- 2 --- 2 pair contact loops furnished for 1200 ampere as shown. 3 pair contact loops furnished for 1600 ampere and 2000 ampere; 4 pair contact loops for 3000 ampere.
- 3 --- Arcing horns furnished only when specified.
- 4 --- Insulator leveling screws provided at 69 kV only.
- 5 --- "T" = terminal pad thickness's are 5/8" for 1200 amperes, 7/8" for 1600 and 2000 amperes; 5/8" for 3000 amperes.

Voltage Rating kV		CATALOG NUMBER (1) (2) (3)	Insul. Tech. Ref. No.	Approximate Dimensions (Refer to Factory for Certified Prints)				
Max.	BIL			A	B	D	E	H
8.2	95	7EE-12HP5	222	16 <sup>1</sup> / <sub>4</sub> "	27"	37"	33"	21 <sup>1</sup> / <sub>2</sub> "
15.5	110	15EE-12HP5	225	16 <sup>1</sup> / <sub>4</sub> "	27"	37"	33"	23 <sup>1</sup> / <sub>2</sub> "
25.8	150	23EE-12HP5	227	16 <sup>1</sup> / <sub>4</sub> "	27"	37"	33"	26 <sup>1</sup> / <sub>2</sub> "
38	200	34EE-12HP5	231	16 <sup>1</sup> / <sub>4</sub> "	27"	37"	33"	31 <sup>1</sup> / <sub>2</sub> "
48.3	250	46EE-12HP5	267	19 <sup>1</sup> / <sub>4</sub> "	33"	43"	39"	35 <sup>1</sup> / <sub>2</sub> "
72.5	350	69EE-12HP5	278	25 <sup>5</sup> / <sub>8</sub> "	45"	55"	51"	42 <sup>1</sup> / <sub>2</sub> "

- (1) Catalog numbers shown are with station post insulators. If cap and pin insulators are required, change the P to C in the catalog number (eg.: 7EE-12HC5).
- (2) When 30° temperature rise unit is required, omit the H in the catalog number (eg.: 7EE-12P5).
- (3) Catalog numbers shown are for 1200 amps. For 1600, 2000, or 3000 amps, change 12 to 16, 20 or 30 in the catalog number as required (eg.: 8.2 kV-2000 A: Cat. No. 7EE-20HP5).

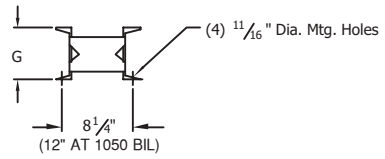
Ampere Rating	Momentary Rating
1200A	61 KA
1600A	70 KA
2000A	100 KA
3000A	120 KA

**Type EE    8.2 kV - 72.5 kV 1200 thru 3000 Ampere**



**NOTES**

- 1 ---- Standard base shown, others available.
- 2 ---- 2 pair contact loops furnished for 1200 ampere as shown. 3 pair contact loops furnished for 1600 ampere and 2000 ampere; 4 pair contact loops for 3000 ampere.
- 3 ---- Arcing horns furnished only when specified.
- 4 ---- Insulator leveling screws provided at 69 kV only.
- 5 ---- "T" = terminal pad thickness's are 5/8" for 1200 amperes, 7/8" for 1600 and 2000 amperes; 5/8" for 3000 amperes.
- 6 ---- Corona rings furnished for 230 and 345 kV only.



Voltage Rating kV		CATALOG NUMBER	Insul. Tech. Ref. No.	Approximate Dimensions in Inches (Refer to Factory for Certified Prints)							
Max.	BIL			(1)	(2)	(3)	A	B	D	E	G
72.5	350	69EE-12HP5	278	25 5/8"	45"	55"	51"	6"	46 3/8"		
121	550	115EE-12HP5	286	33 1/8"	60"	76"	72"	6"	60 7/8"		
145	650	138EE-12HP5	288	39 1/8"	72"	88"	84"	6"	66 3/8"		
169	750	161EE-12HP5	291	45 1/8"	84"	100"	96"	6"	75 3/8"		
242	900	230EE-12HP5	304	53 1/8"	96"	108"	104"	6"	89 7/8"		
242	1050	230EE-12HP5	316	60 1/8"	114"	126"	122"	8"	111 3/8"		
362	1300	345EE-12HP5	367	62 3/8"	136"	152"	148"	8"	113 3/8"		

- (1) Catalog numbers shown are with station post insulators. If cap and pin insulators are required, change the P to C in the catalog number (eg.: 7EE-12HC5).
- (2) When 30° temperature rise unit is required, omit the H in the catalog number (eg.: 7EE-12P5).
- (3) Catalog numbers shown are for 1200 amps. For 1600, 2000, or 3000 amps, change 12 to 16, 20 or 30 in the catalog number as required (eg.: 8.2 kV-2000 A: Cat. No. 7EE-20HP5).

Ampere Rating	Momentary Rating
1200A	61 KA
1600A	70 KA
2000A	100 KA
3000A	120 KA

**Type EE 72.5 kV - 362 kV 1200 thru 3000 Ampere**