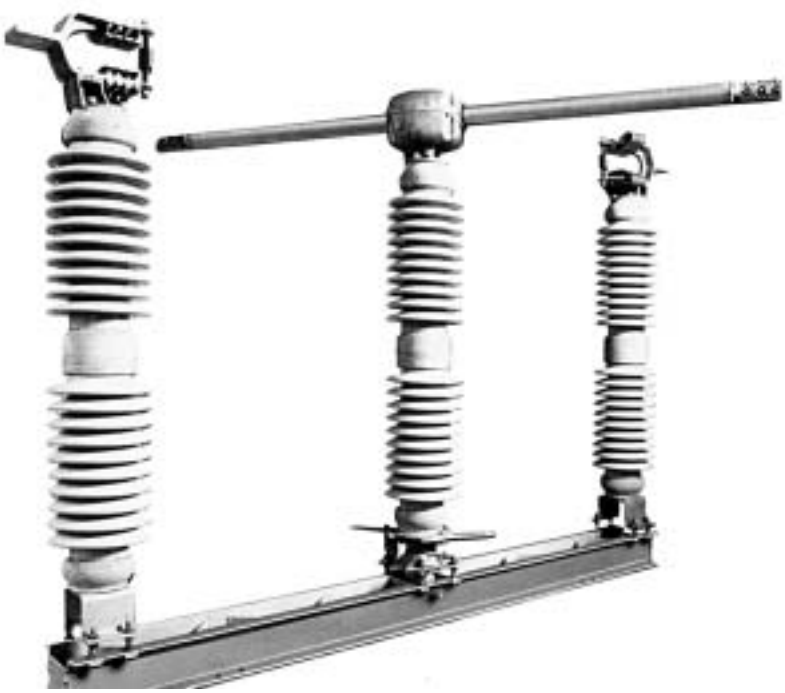
MORPAC INDUSTRIES, INC.

MEMCO POWER PRODUCTS DIVISION

*Type EB, EBB, EBF and VEB*

# DOUBLE SIDE BREAK SWITCHES

## *38 kV through 362 kV*
## *600 to 3000 Ampere*



**TYPE EB**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# Type EB, EBB (VEB)

## GENERAL DESIGN FEATURES

### *Type EB – Aluminum Double Side Break Switch*

***72 kV through 362 kV***
***1200, 1600, and 3000 Ampere***

The EB rotating center insulator, double side break switch embodies all of the rugged physical characteristics of the Memco product line. The design utilizes the best features of both copper and aluminum in the live parts, maintaining the time proven concept of silver to copper at all moving contacts. The result is a truly high performance switch.

**APPLICATION:** With arcing horns, it can be used for line sectionalizing, by-passing circuit breakers, or opening magnetizing current of transformer primary connections. Without arcing horns, it can be used for isolating breakers or as a disconnecting switch.

## FEATURES

### • Current Carrying Parts

High strength, high conductivity aluminum is used where practical throughout the live parts. The blade is a one piece aluminum tube with aluminum castings welded to each end. A tinned copper contact piece having a silver strip brazed to each edge is bolted between the two halves of each weldment and the joint is effectively sealed with an inhibiting compound to prevent the entrance of moisture. The switch is designed in accordance with latest ANSI 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.

### • Jaw Contacts

The jaw contacts employ special high temperature resistant, copper alloy contact fingers. This material, possessing excellent spring characteristics and high conductivity, makes an ideal self contained contact. There is no need for back-up springs or other pressure compensating devices commonly found on other switches. The end result is a cleaner and better contact arrangement.

The reverse loop contact takes advantage of the magnetic forces found under fault conditions to increase the contact pressure of the fingers and to force the blade against the closed position blade stop.

***2000 Ampere jaw.***

***Switch blade in jaw contact against blade stop.***

# Type EB, EBB (VEB)

## • Wiping Action & Operation

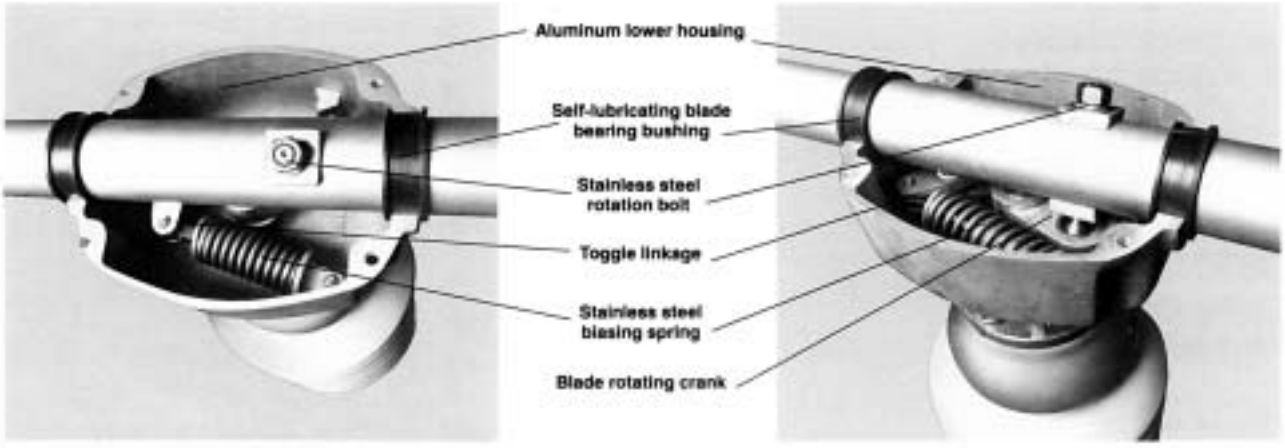
The switch is operated by rotation of the center insulator stack. During closing the initial 70˚ of the insulator rotation swings the blade into the contact jaws, where the blade tips engage stops that limit the swinging action. Continued insulator rotation overcomes a biasing spring and toggle linkage causing the blade to roll 45˚ on its axis, applying contact pressure and latching into the jaw contact. During opening the first 45˚ of insulator rotation allows the compressed spring to return to its original position, and working through the toggle linkage, causes the blade to roll and relieve the pressure on the jaw contact loops. Continued insulator rotation swings the blade to the fully open position.

## • Bases

Rigid galvanized structural steel double channel bases are furnished. Aluminum bases are available when specified.

## • Bearings

Bearings in live parts are constructed of self-lubricating low friction materials and require no lubrication or maintenance. Main bearing at the base of the rotating insulator is of heavy duty shielded ball bearing construction, providing the necessary strength and rigidity. No field servicing required.




*Switch closed.* *Switch open.*

## • Leveling Bolts

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

***Rigid welded base showing bearing and leveling bolts.***

## • Mounting Position

The inherent balance of the blade allows the EB switch to be mounted in any position with no need for counterbalancing. Field conversion to another position requires no modification.

## • Insulators

NEMA standard station post or cap and pin insulators are available as specified.

## • Field Installation

The simplicity of design assures ease of installation and years of trouble-free service.

# Type EB, EBB, EBF and VEB

## Type EBB, Copper Double Side Break Switch

- The EBB, double side break switch is a copper version of the aluminum EB switch. High conductivity copper and copper alloy castings are used in the live, conducting parts.
- The center hinge housing, which is not part of the current path, is made of aluminum to minimize weight of the switch.
- Blade end transitions, or separate blade tips, as described in the EB section are not necessary on the EBB since silver strips are brazed directly to the copper blade tip on the EBB.
- Available ratings are the same as the EB's. Refer to the rating sheets at the front of this catalog.

## Type EBF, Copper Double Side Break Switch

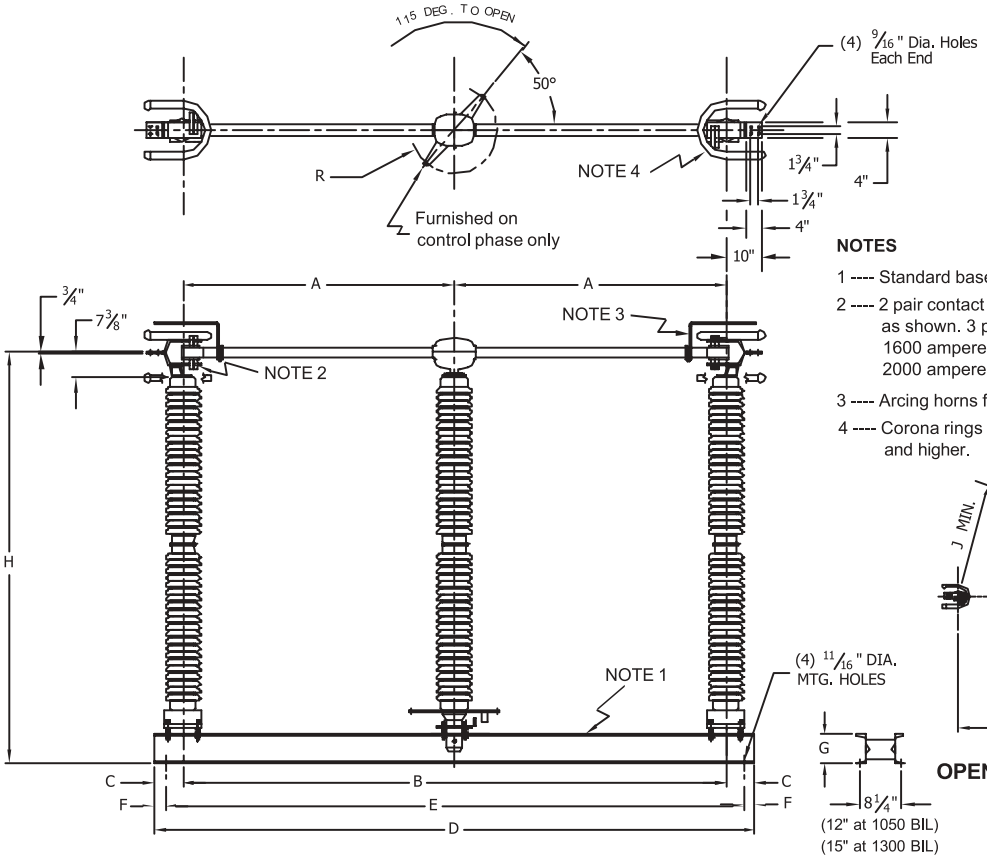
- Blade construction is identical to that of the R14-C. (See R14-C section).
- Jaw construction is also identical to that of the R14-C, except that there are two jaws on the EBF.
- As with the R14-C, 69 kV switches have an articulated blade
- EBF design is simple, time proven and economical
- Ratings up to 72.5 kV at 600 and 1200A.

## Type VEB, Aluminum Double Side Break "V" Switch

- The VEB utilizes the same live parts and hinge mechanism as the EB.
- All of the standard features and options for the EB apply as well the VEB
- Refer to the EB section of this catalog for live part construction details
- The "V" configuration offers a smaller footprint for those applications where structure space is at a premium. See tabulated drawing in this section
- Ratings, like the EB, are up to 345 kV, 1200, 2000 and 3000A.

## Accessories and Options for EB, EBB, EBF and VEB switches

- Ground switches for either or both ends are available.
- Motorized operation
- Outriggers for copper or aluminum conductor
- Auxiliary switches
- Key interlocks
- Customized operating mechanisms (May be available at no additional cost. Consult factory.)



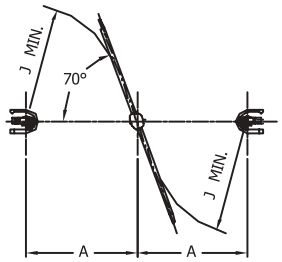

**NOTES**

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 4 pair contact loops for 2000 ampere.

3 ---- Arcing horns furnished only when specified.

4 ---- Corona rings furnished for 230 kV rating and higher.




**OPEN GAP CLEARANCE**

| 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 | C | D | E | F | G | H J | | R |
| 72.5 | 350 | 69EB-12HP5 | 278 | 34" | 68" | 4 1/2" | 78" | 74" | 2" | 2" | 50" | 22" | 10" |
| 121 | 550 | 115EB-12HP5 | 286 | 42" | 84" | 4 1/2" | 93" | 89" | 2" | 6" | 65" | 32" | 10" |
| 145 | 650 | 138EB-12HP5 | 288 | 48" | 96" | 4 1/2" | 105" | 101" | 2" | 6" | 74" | 38" | 10" |
| 169 | 750 | 161EB-12HP5 | 291 | 54" | 108" | 4 1/2" | 117" | 113" | 2" | 6" | 82" | 44" | 12" |
| 242 | 900 | 230EB-12HP5 | 304 | 68" | 136" | 6 | 148" | 142" | 3" | 6" | 102" | 50" | 12" |
| 242 | 1050 | 230EB-12HP5 | 316 | 75" | 150" | 6 | 162" | 156" | 3" | 8" | 114" | 57" | 12" |
| 362 | 1300 | 345EB-12HP5 | 324 | 84" | 168" | 6 | 180" | 174" | 3" | 8" | 128" | 66" | 12" |

(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.: 69EB-12HC5).

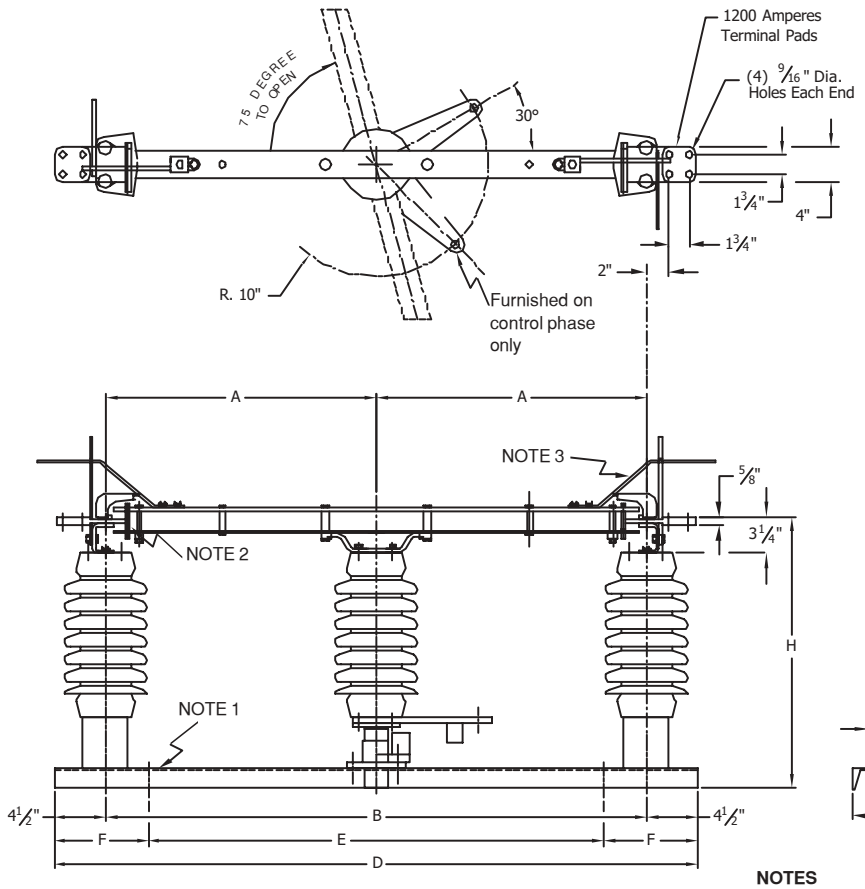
(2) When 30∞temperature rise unit is required, omit the H in the catalog number (eg.: 69EB-12P5).

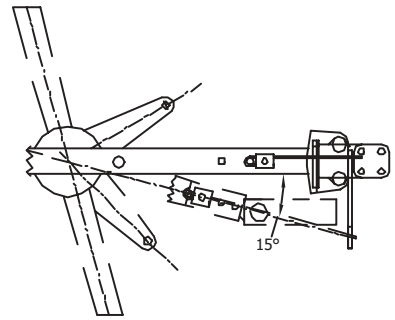
(3) Catalog numbers shown are for 1200 amps. For 1600, 2000, or 3000 amps, change 12 to 16, 20, or 30 in the catalog number as required (eg.: 161 kV-2000 A: Cat. No. 161EB-20HP5).

(4) For 3000 amp. switch refer to factory for dimensions.

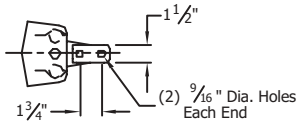
| Ampere Rating | Momentary Rating |
|---|---|
| 1200A | 61 KA |
| 1600A | 70 KA |
| 2000A | 100 KA |
| (4) 3000A | 100 KA |

**Type EB 72.5 kV - 362 kV 1200 thru 2000 Ampere (3000 ampere)** (4)

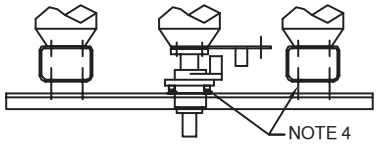


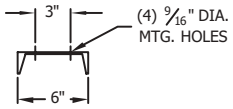

**TOGGLE-ACTION BLADE TIP FOR 69 kV ONLY**




**600 Amperes Terminal Pads**




**69 kV Amperes Only**




**NOTES**

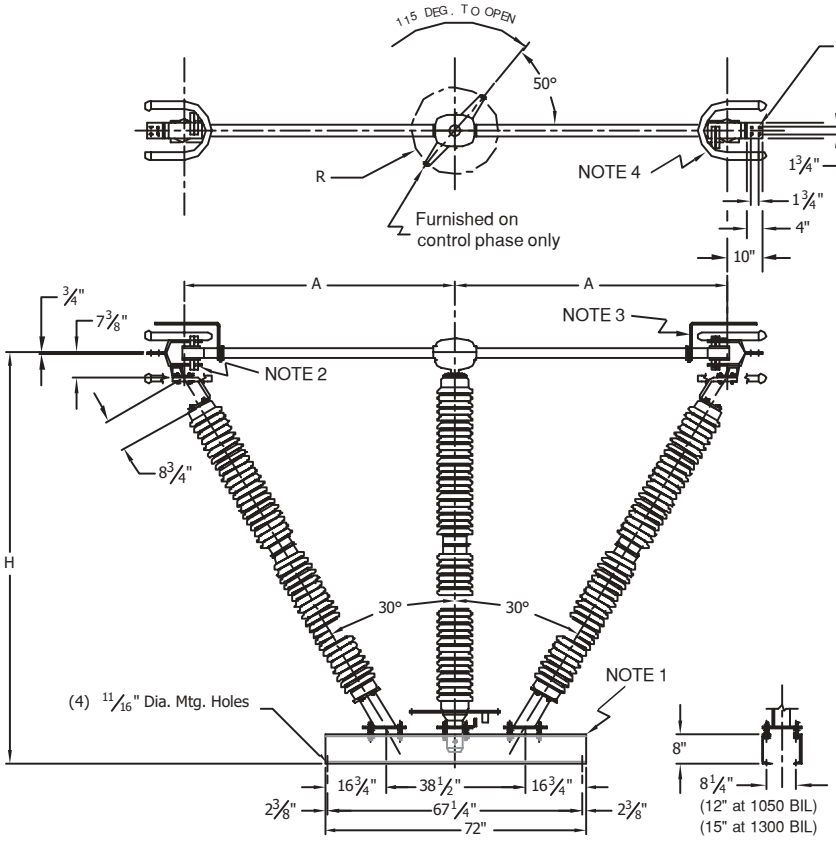
1 ---- Standard base shown, others available.
2 ---- Silver-to-copper contacts furnished unless otherwise specified.
3 ---- Arcing horns furnished only when specified.
4 ---- Leveling screws provided for 69 kV rating.

| 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 | F | H |
| 15.5 | 110 | 15EBF-6P3 | 205 | 14" | 28" | 37" | 24" | 6 1/2" | 19 3/4" |
| 25.8 | 150 | 23EBF-6P3 | 208 | 14" | 28" | 37" | 24" | 6 1/2" | 23 3/4" |
| 38.0 | 200 | 34EBF-6P3 | 210 | 18" | 36" | 45" | 33" | 6" | 27 3/4" |
| 48.3 | 250 | 46EBF-6P3 | 214 | 23" | 46" | 55" | 39" | 8" | 31 3/4" |
| 72.5 | 350 | 69EBF-6P3 | 216 | 30" | 60" | 69" | 51" | 9" | 40 3/4" |

(1) Catalog numbers shown are with station post insulators.
(2) Catalog numbers shown are for 30° rise ANSI-C37.37 ACCC designation A01.
(3) Catalog numbers shown are for 600 amps. For 1200 amps, change 6 to 12 in the catalog number as required (eg.: 15 kV-1200 A: Cat. No. 15EBF-12P3).

| Ampere Rating | Momentary Rating |
|---|---|
| 600A | 40 KA |
| 1200A | 61 KA |

**Type EBF 15.5 kV - 72.5 kV 600 and 1200 Ampere**



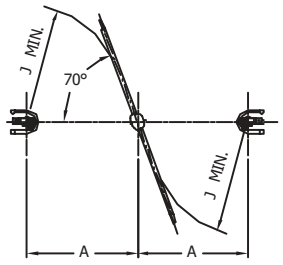

**NOTES**

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 4 pair contact loops for 2000 ampere.

3 ---- Arcing horns furnished only when specified.

4 ---- Corona rings furnished for 230 kV rating and higher.




**OPEN GAP CLEARANCE**

| Voltage Rating kV | | CATALOG NUMBER | Insul. Tech. Ref. No. | Approximate Dimensions (Refer to Factory for Certified Prints) | | | |
|---|---|---|---|---|---|---|---|
| Max. | BIL | (1) (2) (3) | | A | H | J | R |
| 72.5 | 350 | 69VEB-12HP5 | 278 | 40" | 56" | 22" | 10" |
| 121 | 550 | 115VEB-12HP5 | 286 | 44" | 67" | 32" | 10" |
| 145 | 650 | 138VEB-12HP5 | 288 | 50" | 76" | 38" | 10" |
| 169 | 750 | 161VEB-12HP5 | 291 | 56" | 84" | 44" | 12" |
| 242 | 900 | 230VEB-12HP5 | 304 | 70" | 104" | 50" | 12" |
| 242 | 1050 | 230VEB-12HP5 | 316 | 75" | 114" | 57" | 12" |
| 362 | 1300 | 345VEB-12HP5 | 324 | 84" | 128" | 66" | 12" |

(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.: 69VEB-12HC5).

(2) When 30° temperature rise unit is required, omit the H in the catalog number (eg.: 69VEB-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.: 161 kV-2000 A: Cat. No. 161VEB-20HP5).

(4) For 3000 amp. switch refer to factory for dimensions.

| Ampere Rating | Momentary Rating |
|---|---|
| 1200A | 61 KA |
| 1600A | 70 KA |
| 2000A | 100 KA |
| (4) 3000A | 100 KA |

## Type VEB 72.5 kV - 362 kV 1200 thru 2000 Ampere (3000 ampere) (4)