

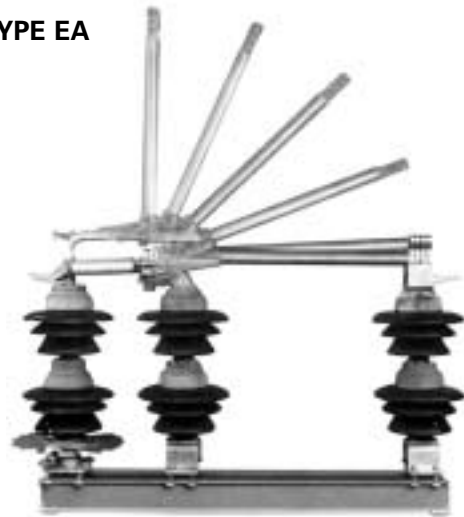
**Type EA, EA1, EA2
EAB, EA1S and VBV
VERTICAL BREAK
SWITCHES**

***8.25 KV through 800 kV
600 to 4000 Ampere***

TYPE VBV



TYPE EA



Type EA and EAB

GENERAL DESIGN FEATURES

Type EA – Aluminum Vertical Break Switch

**8.25 kV through 362 kV
600-4000 Amps**

Type EAB - Copper Vertical Break Switch

**8.25 kV through 242 kV
600-4000 Amps**

The EA rotating rear insulator, vertical 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 or quick break attachment it can be used for line sectionalizing, bypassing 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

• **Jaw & Hinge Contacts**

Both the jaw and hinge employ similar types of 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 cleaner and better contact arrangement. The reverse loop contact as used on the jaw 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.

The hinge contact fingers are in continuous contact with the switch blade throughout the complete opening and closing operation of the switch.

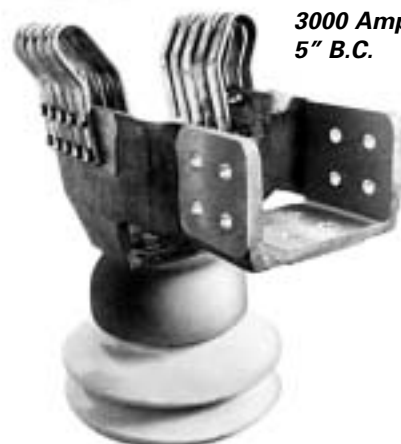
TYPICAL JAW CONTACT ARRANGEMENTS



2000 Ampere
5" B.C.



3000 Ampere,
5" B.C.



Type EA and EAB

• Current Carrying Parts

High strength, high conductivity aluminum is used where practical throughout the live parts. Blade end transitions are made by either bolted aluminum to copper or threaded copper to aluminum depending upon the blade diameter. In either case, all copper or bronze transition pieces are tinned and the current interchange points between the tinned copper and aluminum are effectively sealed to prevent the entrance of moisture.

All bearings and counterbalancing springs are isolated from the main current path by insulating bushings. The switch is designed in accordance with the 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.

• Wiping Action & Operation

The rolling action of the blade when opening and closing the switch provides a positive wiping and cleaning action of the jaw and hinge contacts. The jaw contact pressure is relieved by the blade rotation prior to lift out.

In the closed position the blade mechanism is mechanically locked over center thereby locking the blade closed. In the open position the blade center of gravity is located well behind the pivot point thereby preventing the blade from falling closed.



3000 Ampere, 5" B.C. hinge assembly

• Blade Height Adjustment

Blade height adjustment is provided by a very convenient arrangement located in the linkage between the top of the rotating insulator and the blade.

• Mounting Position

The type EA switch may be mounted in horizontal, upright, vertical, or underhung position. Counterbalancing is provided, where required, by compression type spring assemblies. Conversion in the field from one mounting position to another can be made with a minimum of difficulty.

• Bearings

Maintenance free bearings are used at the base of the rotating insulator of all switches. Switches through 72.5 kV are furnished with sleeve or ball bearings. At 121kV and above, ball bearings are used. All bearings are enclosed in weatherproof housings and are free of maintenance.

Live part bearings consist of teflon, nylon, or roller type, depending upon the application. No field servicing is required.

• Bases

Rigid galvanized structural steel channel bases are furnished on all switches. Switches rated 72.5kV, 1200 ampere and below are normally furnished on flat channel bases. Double channel bases are furnished at 121 kV and above. Aluminum bases are available when specified.

• Leveling Bolts

All switches 121 kV and above 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.



Type EA and EAB

- **Factory Assembled & Adjusted**

Switches 48.3 kV and below are pre-assembled and adjusted on insulators at the factory. Switches 72.5 kV and above are assembled and adjusted, less insulators. Only minor adjustments, if any, are required at installation.

- **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 EAB - Copper Vertical Break Switch

FEATURES

The type EAB vertical break switch utilizes copper and bronze for all current carrying parts. In all other respects it is identical with the type EA, described previously. Aluminum is used for corona rings and counterbalancing spring housing. Blade end transitions, as described under "EA Carrying Parts" are unnecessary. Silver contact material is silver brazed directly to the copper blade tip. The resulting contact is time proven silver to copper. Not all ratings are available in copper, refer to factory.

EA & EAB SWITCH ACCESSORIES

- **Ground Switches**

Ground switches of the same or lower momentary ratings as the main switches can be installed on either the jaw or hinge end of the switch. Standard practice is to operate the ground blade 90° to the main blade. However, ground blades parallel to the main blade are available. Both braid and braidless ground switches are available.

- **Quick Break Attachments**

Quick break attachments having the following interrupting ratings can be furnished on all EA switches.

Switch Rating kV	Magnetizing Current Bank kVA	Line Charging Current Amps.	Dropping Equivalent Lines - Miles
8.25	20,000	22	*
15.5	30,000	20	*
25.8	40,000	18	*
38.0	50,000	16	*
48.3	60,000	14	75
72.5	80,000	12	50
121	100,000	9	25
145	100,000	7.5	18
169	100,000	6	12

- **Outriggers**

Outriggers of various designs are available for copper or aluminum conductors.

- **Terminal Connectors**

When specified terminal connectors can be furnished.

Refer to factory for outline drawings.

TYPICAL EA SWITCHES



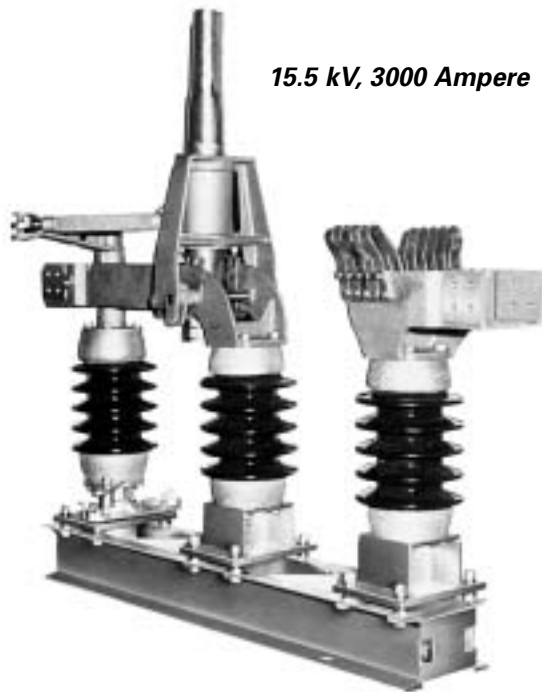
15.5 kV, 600 Ampere



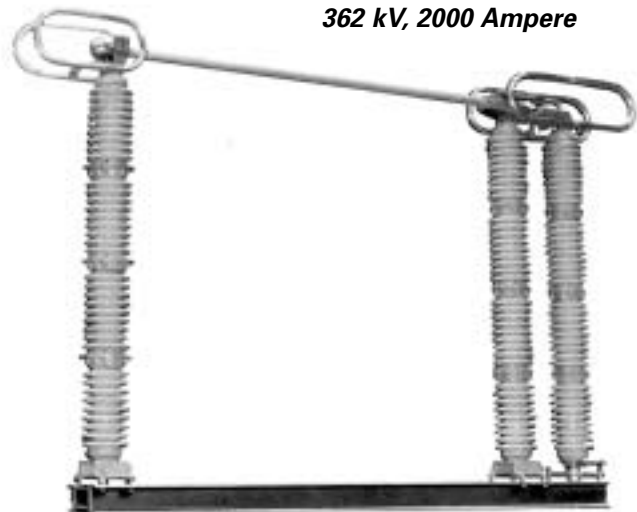
38 kV, 1200 Ampere



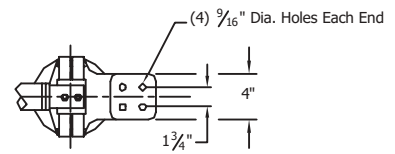
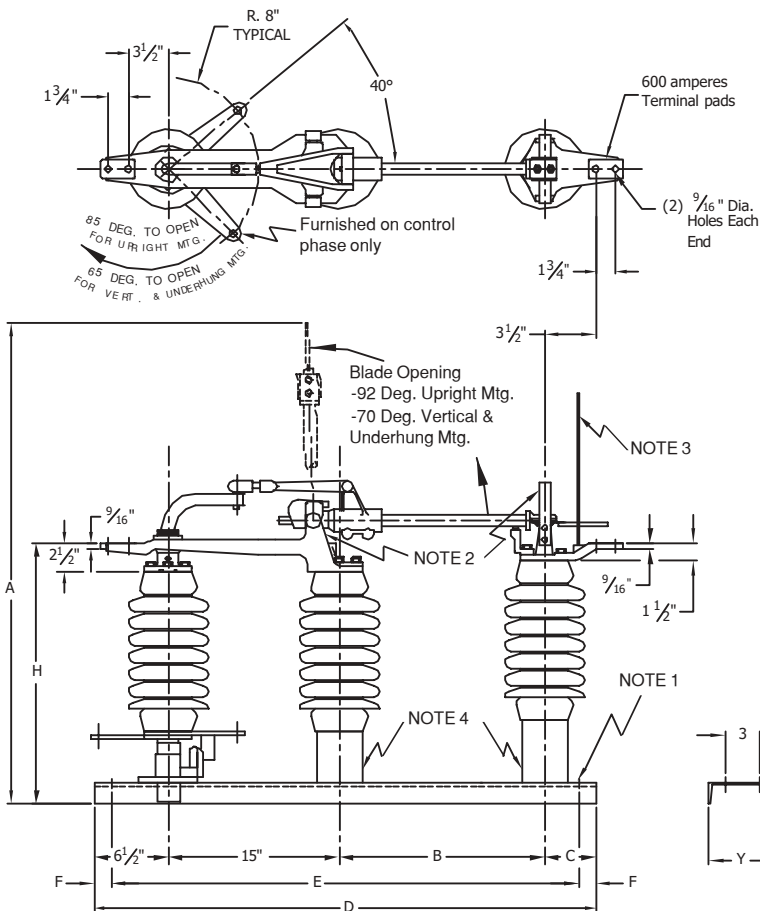
145 kV, 3000 Ampere



15.5 kV, 3000 Ampere



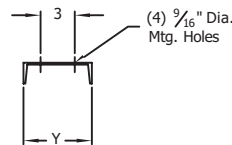
362 kV, 2000 Ampere



**1200 AMPERES
TERMINAL PADS**

NOTES

- 1 ---- Standard base shown, others available.
- 2 ---- 1 pair contact loops furnished for 600 ampere as shown. 2 pair contact loops furnished for 1200 ampere. Silver-to-copper contacts furnished unless otherwise specified.
- 3 ---- Arcing horns furnished only when specified.
- 4 ---- Adjustable insulator adapter provided for 69 kV only.

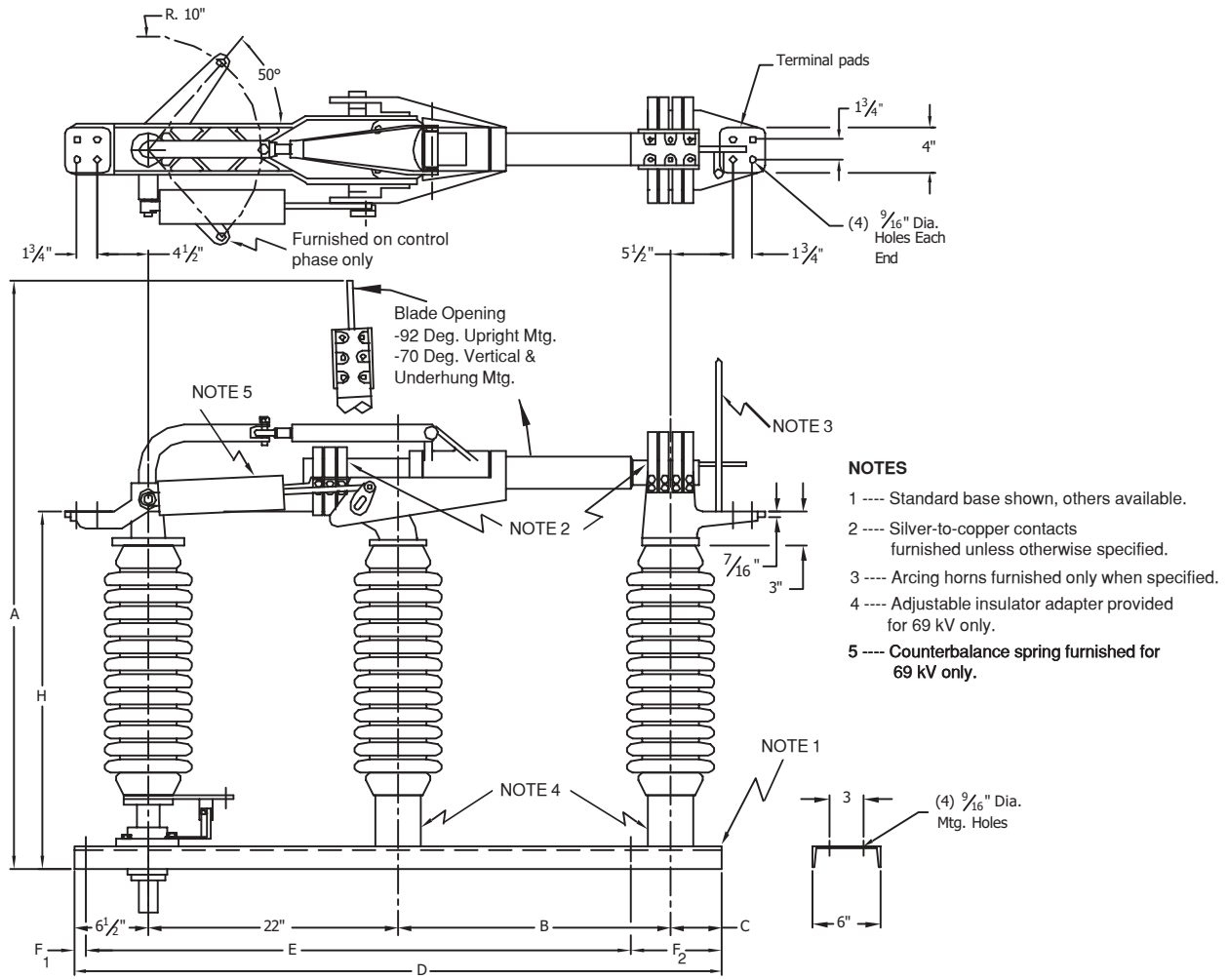


Voltage Rating kV		CATALOG NUMBER (1) (2) (3)	Insul. Tech. Ref. No.	Approximate Dimensions (Refer to Factory for Certified Prints)							
Max.	BIL			A	B	C	D	E	F	H	Y
8.2	95	7EA-6HP3	202	38 ³ / ₄ "	15"	4 ¹ / ₂ "	41"	36"	2 ¹ / ₂ "	16 ¹ / ₄ "	5"
15.5	110	15EA-6HP3	205	41 ¹ / ₄ "	15"	4 ¹ / ₂ "	41"	36"	2 ¹ / ₂ "	18 ³ / ₄ "	5"
25.8	150	23EA-6HP3	208	48 ¹ / ₄ "	18"	4 ¹ / ₂ "	44"	39"	2 ¹ / ₂ "	22 ³ / ₄ "	5"
38	200	34EA-6HP3	210	58 ¹ / ₂ "	24"	4 ¹ / ₂ "	50"	48"	1"	27"	6"
48.3	250	46EA-6HP3	214	68 ¹ / ₂ "	30"	4 ¹ / ₂ "	56"	54"	1"	31"	6"
72.5	350	69EA-6HP3	216	88 ¹ / ₂ "	42"	7 ¹ / ₂ "	71"	69"	1"	39"	6"

- (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.: 7EA-6HC3).
- (2) When 30° temperature rise unit is required, omit the H in the catalog number (eg.: 7EA-6P3).
- (3) Catalog numbers shown are for 600 amps. For 1200 amps, change 6 to 12 in the catalog number as required (eg.: 8.2 kV-1200 A: Cat. No. 7EA-12HP3).

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

Type EA 8.2 kV - 72.5 kV 600 and 1200 Ampere



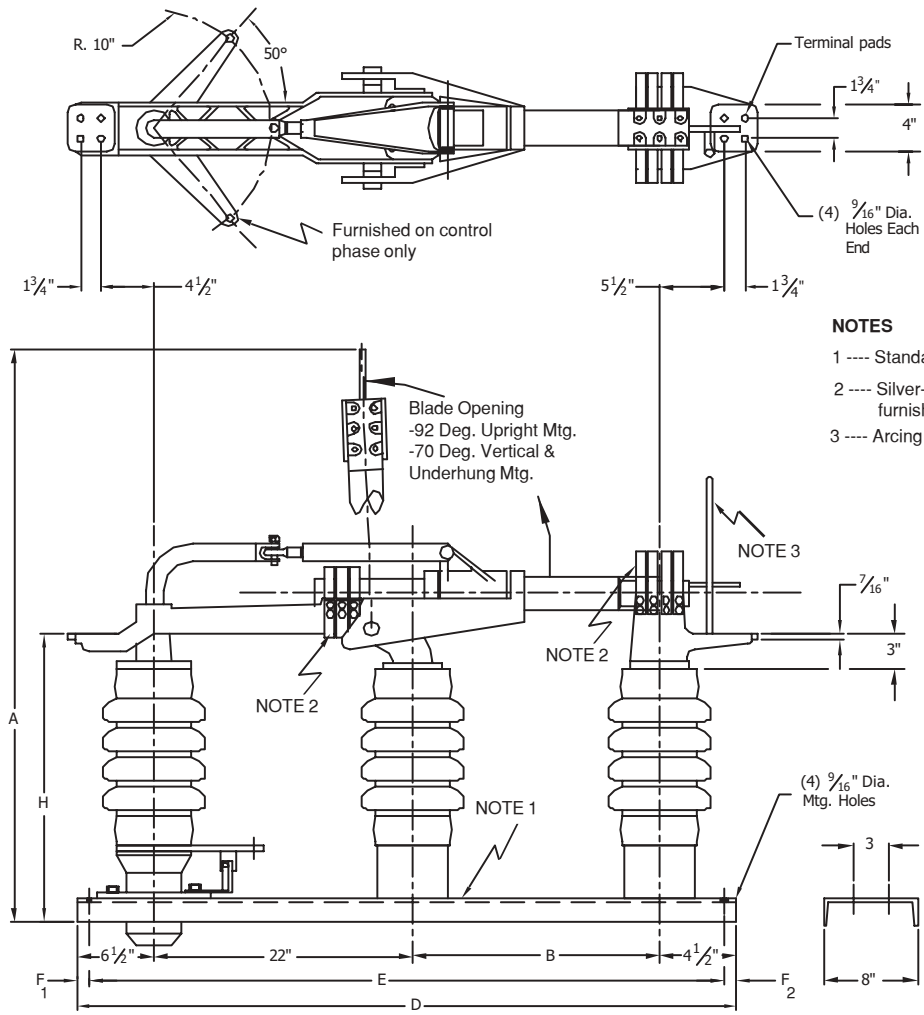
- NOTES**
- 1 ---- Standard base shown, others available.
 - 2 ---- Silver-to-copper contacts furnished unless otherwise specified.
 - 3 ---- Arcing horns furnished only when specified.
 - 4 ---- Adjustable insulator adapter provided for 69 kV only.
 - 5 ---- Counterbalance spring furnished for 69 kV only.

Voltage Rating kV		CATALOG NUMBER (1) (2)	Insul. Tech. Ref. No.	Approximate Dimensions (Refer to Factory for Certified Prints)							
Max.	BIL			A	B	C	D	E	F ₁	F ₂	H
8.2	95	7EA-20HP3	202	47"	15"	4 1/2"	48"	36"	2 1/2"	9 1/2"	17"
15.5	110	15EA-20HP3	205	49 1/2"	15"	4 1/2"	48"	36"	2 1/2"	9 1/2"	19 1/2"
25.8	150	23EA-20HP3	208	53 1/2"	18"	4 1/2"	51"	39"	2 1/2"	9 1/2"	23 1/2"
38	200	34EA-20HP3	210	63 1/2"	24"	4 1/2"	57"	48"	1"	8"	27 1/2"
48.3	250	46EA-20HP3	214	73 1/2"	30"	4 1/2"	63"	54"	1"	8"	31 1/2"
72.5	350	69EA-20HP3	216	81 1/2"	42"	7 1/2"	71"	69"	1"	8"	39 1/2"

(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.: 7EA-20HC3).
 (2) When 30° temperature rise unit is required, omit the H in the catalog number (eg.: 7EA-20P3).

Ampere Rating	Momentary Rating
2000A	100 KA

Type EA 8.2 kV - 72.5 kV 2000 Ampere



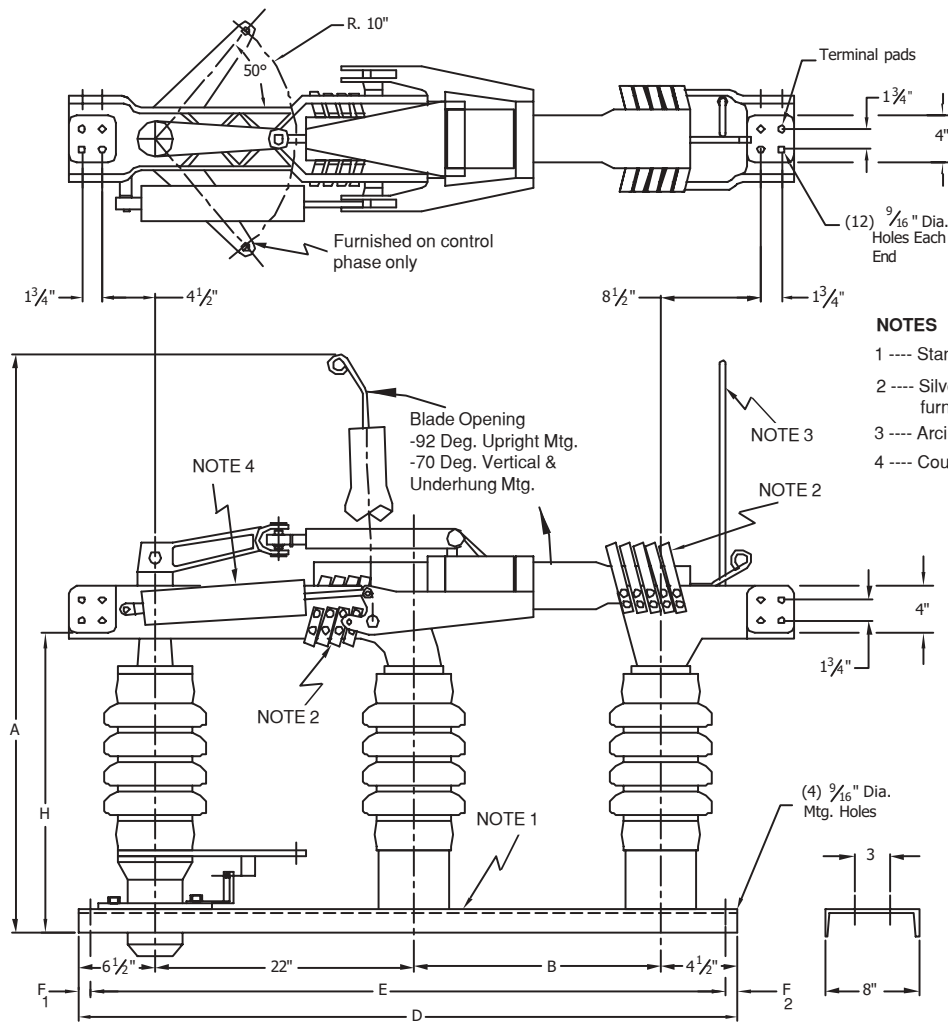
- NOTES**
- 1 ---- Standard base shown, others available.
 - 2 ---- Silver-to-copper contacts furnished unless otherwise specified.
 - 3 ---- Arcing horns furnished only when specified.

Voltage Rating kV		CATALOG NUMBER (1) (2)	Insul. Tech. Ref. No.	Approximate Dimensions (Refer to Factory for Certified Prints)						
Max.	BIL			A	B	D	E	F ₁	F ₂	H
8.2	95	7EA-20HP5	222	49 3/4"	21"	54"	36"	1"	17"	19 3/4"
15.5	110	15EA-20HP5	225	51 3/4"	21"	54"	36"	1"	17"	21 3/4"
25.8	150	23EA-20HP5	227	54 3/4"	21"	54"	36"	1"	17"	24 3/4"
38	200	34EA-20HP5	231	65 3/4"	27"	60"	48"	1"	11"	29 3/4"
48.3	250	46EA-20HP5	267	75 3/4"	33"	66"	54"	1"	11"	33 3/4"

(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.: 7EA-20HC5).
 (2) When 30° temperature rise unit is required, omit the H in the catalog number (eg.: 7EA-20P5).

Ampere Rating	Momentary Rating
2000A	100 KA

Type EA 8.2 kV - 48.3 kV 2000 Ampere



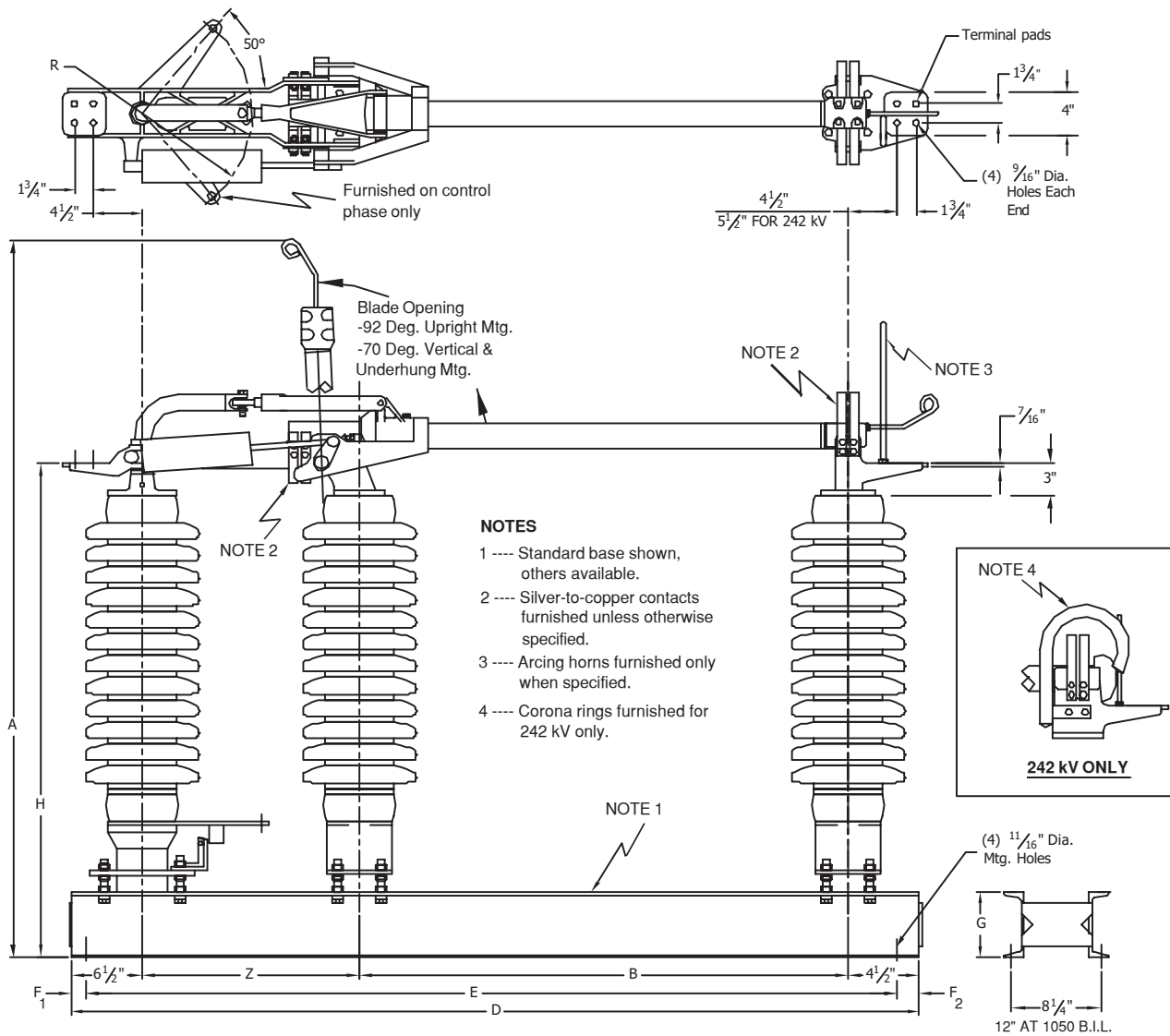
- NOTES**
- 1 ---- Standard base shown, others available.
 - 2 ---- Silver-to-copper contacts furnished unless otherwise specified.
 - 3 ---- Arcing horns furnished only when specified.
 - 4 ---- Counterbalance spring furnished as required.

Voltage Rating kV		CATALOG NUMBER (1) (2)	Insul. Tech. Ref. No.	Approximate Dimensions (Refer to Factory for Certified Prints)						
Max.	BIL			A	B	D	E	F ₁	F ₂	H
8.2	95	7EA-30HP5	222	53 3/4"	21"	54"	36"	1"	17"	20 1/4"
15.5	110	15EA-30HP5	225	55 3/4"	21"	54"	36"	1"	17"	22 1/4"
25.8	150	23EA-30HP5	227	58 3/4"	21"	54"	36"	1"	17"	25 1/4"
38	200	34EA-30HP5	231	63 3/4"	27"	60"	48"	1"	11"	30 1/4"
48.3	250	46EA-30HP5	267	67 3/4"	33"	66"	54"	1"	11"	34 1/4"

(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.: 7EA-30HC5).
 (2) When 30° temperature rise unit is required, omit the H in the catalog number (eg.: 7EA-30P5).

Ampere Rating	Momentary Rating
3000A	120 KA

Type EA 8.2 kV - 48.3 kV 3000 Ampere



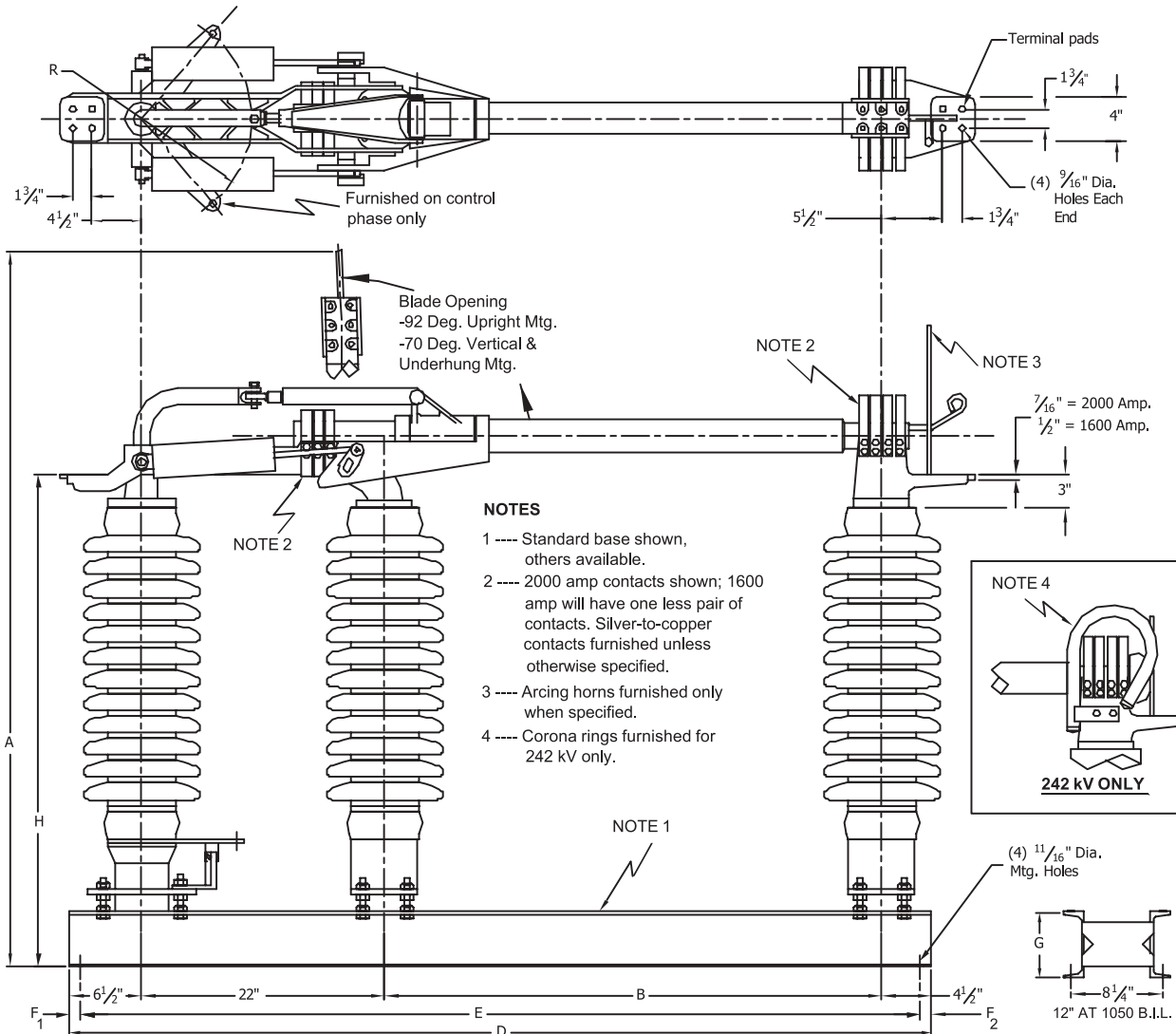
- NOTES**
- 1 ---- Standard base shown, others available.
 - 2 ---- Silver-to-copper contacts furnished unless otherwise specified.
 - 3 ---- Arcing horns furnished only when specified.
 - 4 ---- Corona rings furnished for 242 kV only.

Voltage Rating kV		CATALOG NUMBER (1) (2)	Insul. Tech. Ref. No.	Approximate Dimensions (Refer to Factory for Certified Prints)									
Max.	BIL			A	B	D	E	F ₁	F ₂	G	H	R	Z
72.5	350	69EA-12HP5	278	99 5/8"	45"	76"	69"	3 1/2"	3 1/2"	5"	44 5/8"	10"	20"
121	550	115EA-12HP5	286	128 5/8"	60"	91"	87"	2"	2"	5"	59 5/8"	10"	20"
145	650	138EA-12HP5	288	149 5/8"	72"	103"	99"	2"	2"	5"	68 5/8"	10"	20"
169	750	161EA-12HP5	291	170 5/8"	84"	115"	111"	2"	2"	6"	77 5/8"	10"	20"
242	900	230EA-12HP5	REFER TO FACTORY	195 1/8"	96"	129"	123"	3"	3"	6"	95 5/8"	12"	22"
242	1050	230EA-12HP5	312	225 1/8"	114"	147"	123"	3"	21"	6"	107 5/8"	12"	22"

- (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.: 69EA-12HC5).
- (2) When 30° temperature rise unit is required, omit the H in the catalog number (eg.: 69EA-12P5).

Ampere Rating	Momentary Rating
1200A	61 KA

Type EA 72.5 kV - 242 kV 1200 Ampere

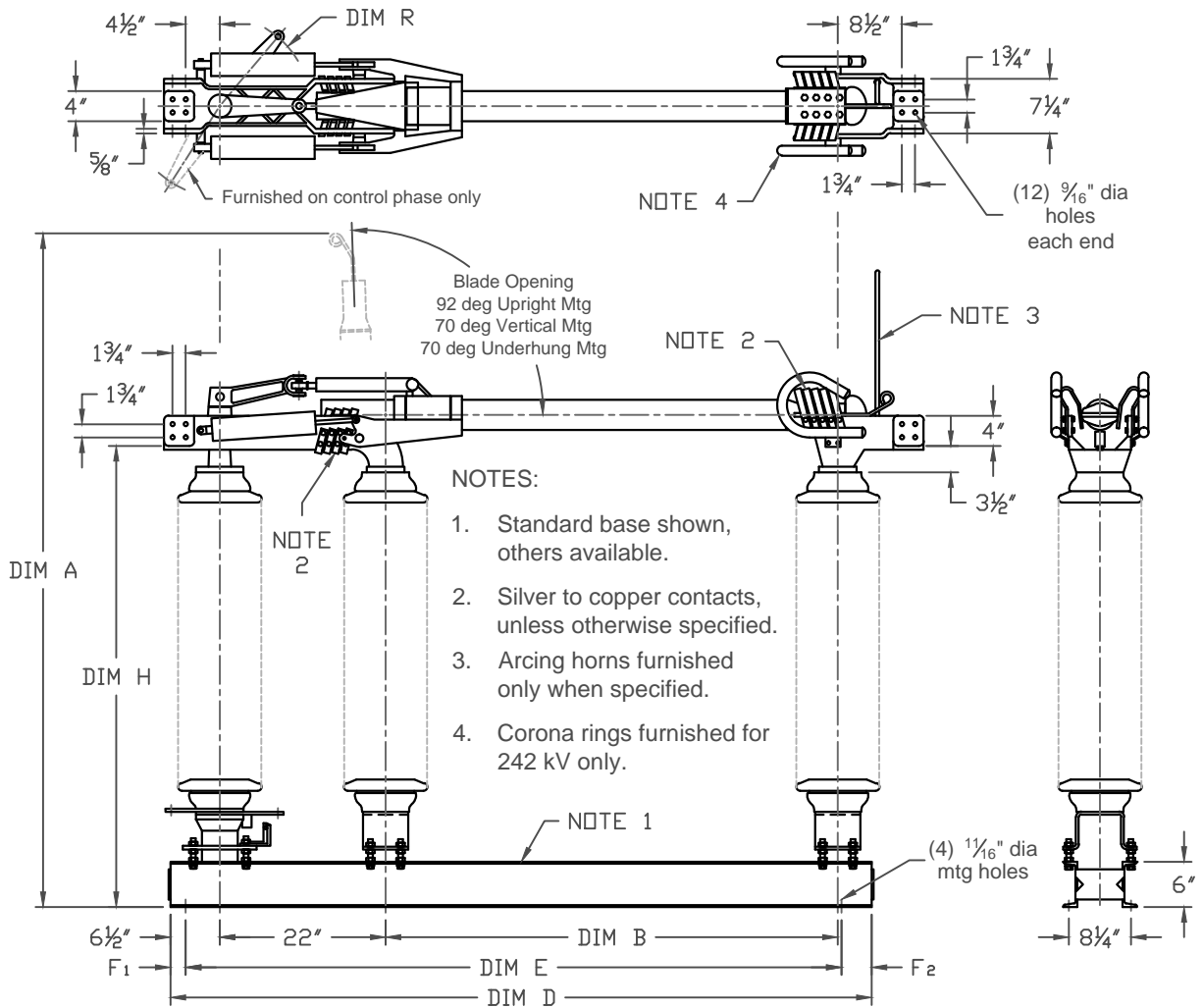


Voltage Rating kV		CATALOG NUMBER (1) (2) (3)	Insul. Tech. Ref. No.	Approximate Dimensions (Refer to Factory for Certified Prints)								
Max.	BIL			A	B	D	E	F ₁	F ₂	G	H	R
72.5	350	69EA-20HP5	278	109 1/8"	45"	78"	69"	4 1/2"	4 1/2"	5"	44 5/8"	10"
121	550	115EA-20HP5	286	129 5/8"	60"	93"	87"	3"	3"	5"	59 5/8"	10"
145	650	138EA-20HP5	288	150 1/8"	72"	105"	99"	3"	3"	5"	68 5/8"	10"
169	750	161EA-20HP5	291	171 1/8"	84"	117"	111"	3"	3"	6"	77 5/8"	12"
242	900	230EA-20HP5	REFER TO FACTORY	195 5/8"	96"	129"	123"	3"	3"	6"	95 5/8"	12"
242	1050	230EA-20HP5	312	255 5/8"	114"	147"	123"	3"	21"	6"	107 5/8"	12"

- 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.: 69EA-20HC5).
- When 30° temperature rise unit is required, omit the H in the catalog number (eg.: 69EA-20P5).
- Catalog numbers shown are for 2000 amps. For 1600 amps, change 20 to 16 in the catalog number as required (eg.: 72.5 kV-1600 A: Cat No. 69EA-16HP5).

Ampere Rating	Momentary Rating
1600A	70 KA
2000A	100 KA

Type EA 72.5 kV - 242 kV 1600 and 2000 Ampere



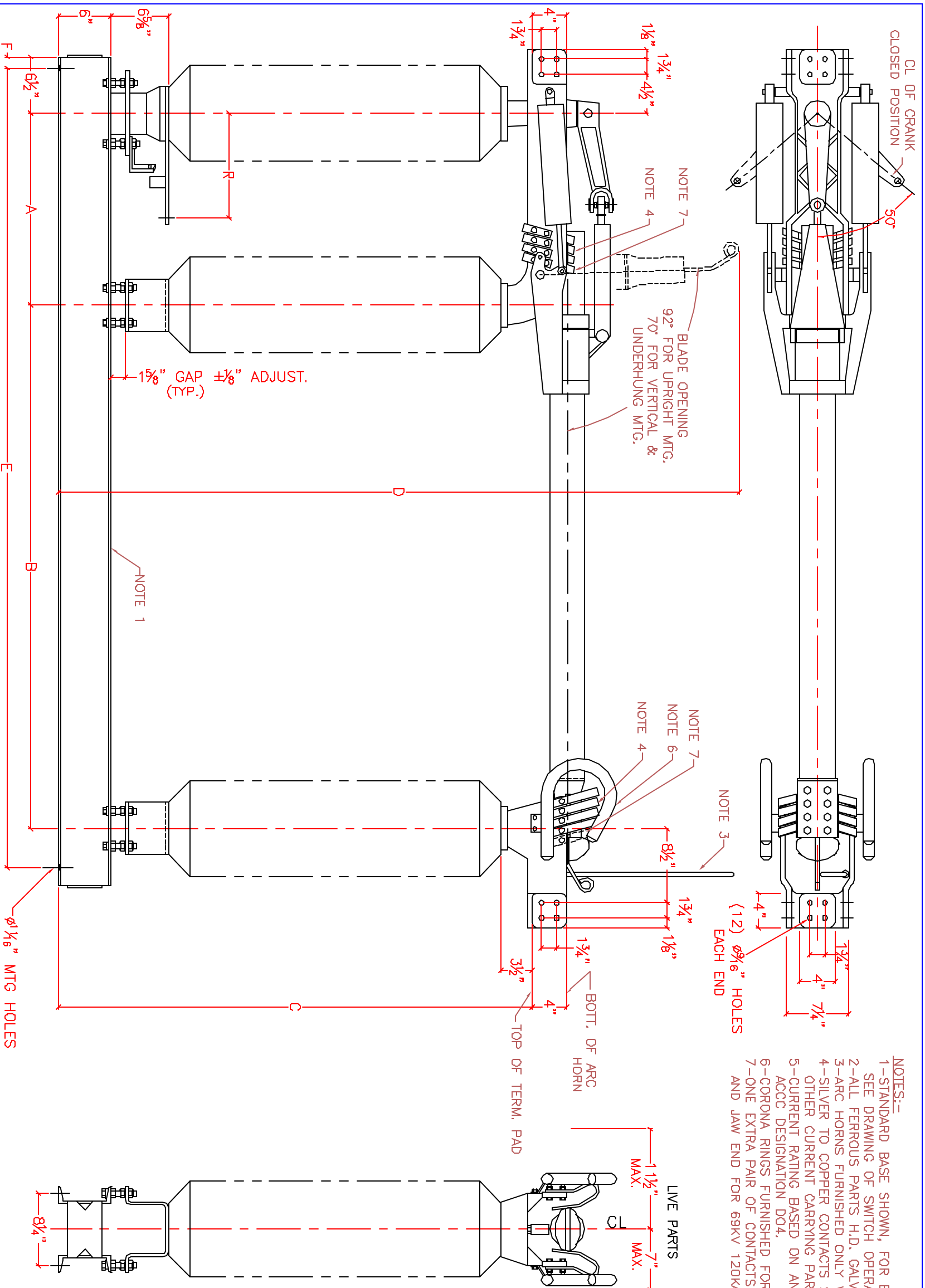
- NOTES:
1. Standard base shown, others available.
 2. Silver to copper contacts, unless otherwise specified.
 3. Arcing horns furnished only when specified.
 4. Corona rings furnished for 242 kV only.

Voltage Rating (kV)		Catalog Number notes 1 & 2	Insulator (TR No.)	Approximate Dimensions (Refer to factory for certified prints)							
MAX	BIL			A	B	D	E	F ₁	F ₂	H	R
72.5	350	69EA-30HP5	278	103 3/4"	45"	78"	69"	3 1/2"	5 1/2"	46 1/8"	10"
121	550	115EA-30HP5	286	133 3/4"	60"	93"	87"	2"	4"	61 1/8"	12"
145	650	138EA-30HP5	288	154 3/4"	72"	105"	99"	2"	4"	70 1/8"	12"
169	750	161EA-30HP5	note 3	174 3/4"	84"	117"	111"	2"	4"	78 1/8"	12"
242	900	230EA-30HP5	note 3	204 3/4"	96"	129"	123"	3"	3"	96 1/8"	12"

1. Switches have station post insulators. When copper switch is required, add a B in the catalog number (eg.: 69EAB-30HP5).
2. When 30 degree temperature rise is required, omit the H in the catalog number (eg.: 69EA-30P5).
3. Refer to factory.
4. When 120 KA momentary amperage is required for 115 kV through 230 kV, add an S to the end of the catalog number (eg.: 69EA-30HP5S).

Ampere Rating	Momentary Rating	
	3000A to 4000A	69 kV
115-230 kV		100 KA
115-230 kV		120 KA note 4

Type EA & EAB
72.5 kV - 242 kV 3000A 242 kV 3500A 72.5 - 169 kV 4000A



- NOTES:--
- 1-STANDARD BASE SHOWN, FOR BASE FURNISHED SEE DRAWING OF SWITCH OPERATING MECH.
 - 2-ALL FERROUS PARTS H.D. GALVANIZED.
 - 3-ARC HORNS FURNISHED ONLY WHEN SPECIFIED.
 - 4-SILVER TO COPPER CONTACTS STANDARD. ALL OTHER CURRENT CARRYING PARTS ALUMINIUM.
 - 5-CURRENT RATING BASED ON ANSI-C37.37 ACCC DESIGNATION DO4.
 - 6-CORONA RINGS FURNISHED FOR 230KV ONLY.
 - 7-ONE EXTRA PAIR OF CONTACTS FURNISHED HINGE AND JAW END FOR 69KV 120KA MOMENTARY.

ITEM NO.	KV. RATING		POST INSULATORS				DIMENSIONS IN INCHES					
	MAX.	IMP.	SWITCH CAT.	TR NO	C	D	A	B	E	F	R	
1	72.5	350	69EA-30HP5	278	46 1/8	103 3/4	22	45	69	3 1/2	10	
2	121	550	115EA-30HP5	286	61 1/8	133 3/4	22	60	87	2	12	
3	145	650	138EA-30HP5	288	70 1/8	154 3/4	22	72	99	2	12	
4	169	750	161EA-30HP5	291	78 1/8	174 3/4	22	84	111	2	12	
5	169	750	161EA-30HP5	295	78 1/8	174 3/4	22	84	111	2	12	
6	242	900	230EA-30HP5	304	96 1/8	204 3/4	22	96	123	3	12	
7	242	900	230EA-30HP5	308	96 1/8	204 3/4	22	96	123	3	12	

REVISION DATE

REVISE ON CAD SYSTEM ONLY

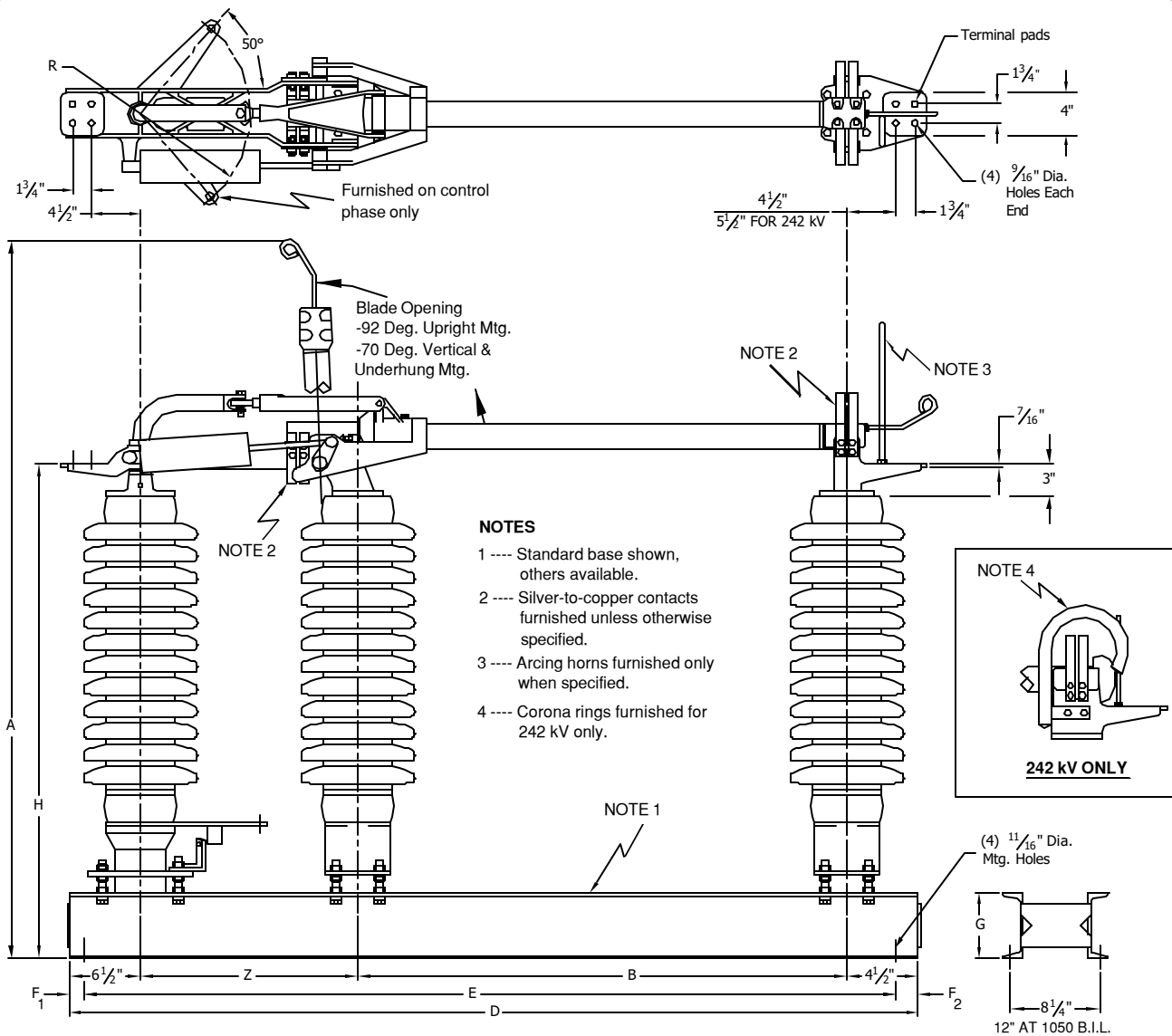
memco manufacturing Inc.

OUTLINE-TYPE "EA" VERTICAL BREAK SWITCH
69KV 120KA MOMENTARY, 115-230KV 100KA
MOMENTARY 3000AMP - 5"BC INSULATORS

DMN TK QXD DLG
DATE: 03-11-83
SCALE: NTS
PLOT SCALE: 1-B

FILE NO. C1837905
DWG NO. C-18379
REV 5

CATALOG FURNISHED:



Voltage Rating kV		CATALOG NUMBER (1) (2)	Insul. Tech. Ref. No.	Approximate Dimensions (Refer to Factory for Certified Prints)									
Max.	BIL			A	B	D	E	F ₁	F ₂	G	H	R	Z
72.5	350	69EAB-12HP5	278	99 5/8"	45"	76"	69"	3 1/2"	3 1/2"	5"	44 5/8"	10"	20"
121	550	115EAB-12HP5	286	128 5/8"	60"	91"	87"	2"	2"	5"	59 5/8"	10"	20"
145	650	138EAB-12HP5	288	149 5/8"	72"	103"	99"	2"	2"	5"	68 5/8"	10"	20"
169	750	161EAB-12HP5	291	170 5/8"	84"	115"	111"	2"	2"	6"	77 5/8"	10"	20"
242	900	230EAB-12HP5	REFER TO FACTORY	195 1/8"	96"	129"	123"	3"	3"	6"	95 5/8"	12"	22"
242	1050	230EAB-12HP5	312	225 1/8"	114"	147"	123"	3"	21"	6"	107 5/8"	12"	22"

- (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.: 69EAB-12HC5).
- (2) When 30° temperature rise unit is required, omit the H in the catalog number (eg.: 69EAB-12P5).

Ampere Rating	Momentary Rating
1200A	61 KA

Type EAB 72.5 kV - 242 kV 1200 Ampere