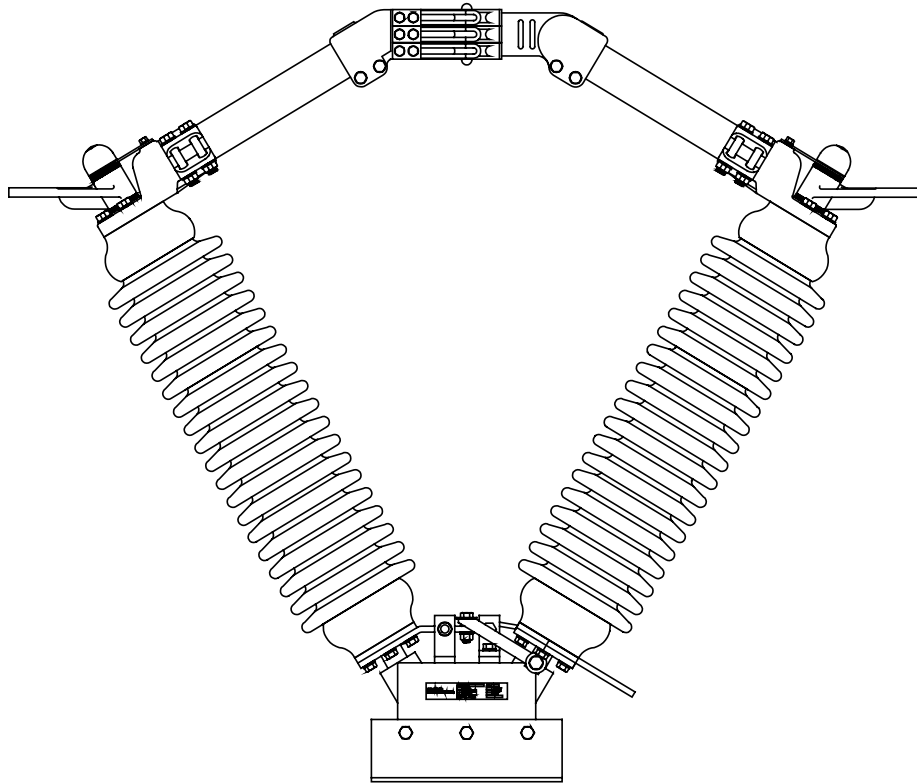


TYPE V CENTER BREAK SWITCH

Bulletin No. 40-0109

3-PHASE, GROUP OPERATED (SUBSTATION AND TRANSMISSION APPLICATIONS)



- HORIZONTAL UPRIGHT, VERTICAL, UNDERHUNG OR DIRECT POLE MOUNTING
- 15kV THROUGH 230kV
- 600A THROUGH 3000A
- MANUAL OR MOTOR OPERATED CONTROL MECHANISM

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FEATURES OF TYPE V SWITCH

- Tubular or flat truss type blade
- Silver contact surfaces
- Assembled and adjusted at the factory
- Switch controls available for manual (swing handle or gear), or motor driven operation
- Available with various current interrupting devices
- Ratings from 15kV to 230kV --- 600A to 3000A

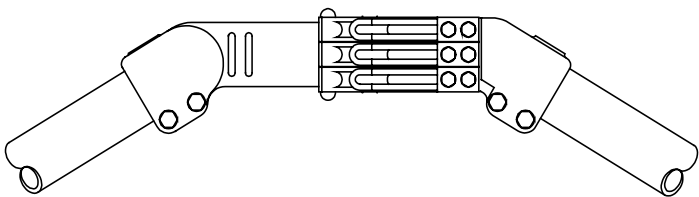
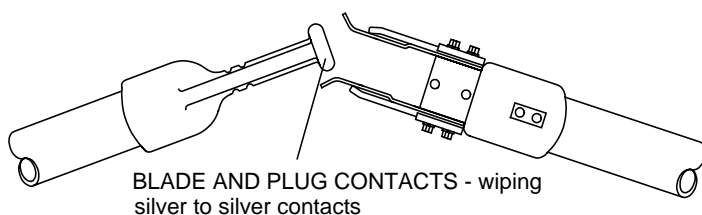


Fig. 1 - Tubular blade contacts

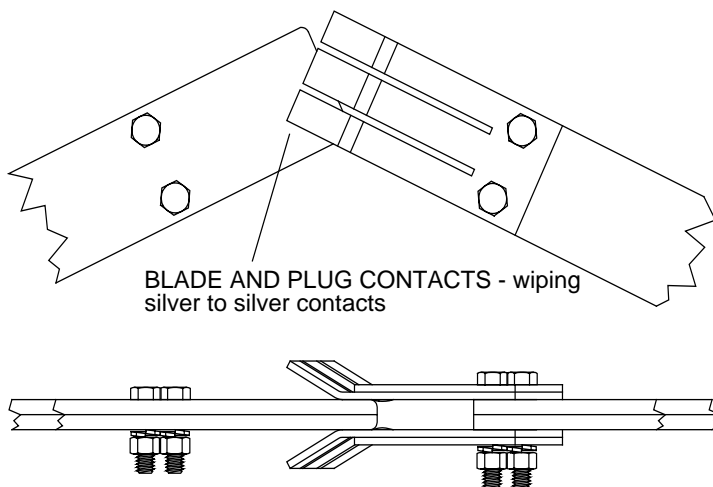


Fig. 2 - Truss blade contacts

A 3-phase, group operated, center break, air break switch for substations and transmission lines.

Since 1961, components of this design have proven their adaptability to system requirements and the validity of the philosophy "simplicity means reliability."

Positive Contact Assembly

Current transfer points are independent contact shoes with silver to silver contact surfaces (heavy plating, inserts or flame spray metallizing as the application requires). Individual stainless steel backup springs on each shoe assures high pressure contact wiping on the tubular blade switch (Fig. 1). Phosphor bronze backup springs perform the same function on the flat blade switch (Fig. 2).

Maintenance Free Bearing Design and Positive Linkage Tie

Each insulator stack is supported by double ball bearings permanently lubricated and sealed for the life of the switch. The two rotating insulators are locked together through a maintenance-free tie rod which assures proper alignment at the switch contacts. The base assembly has open position and close position stops for a 90° full throw of the switch. Galvanized steel mounting angles are engineered to the customers structure.

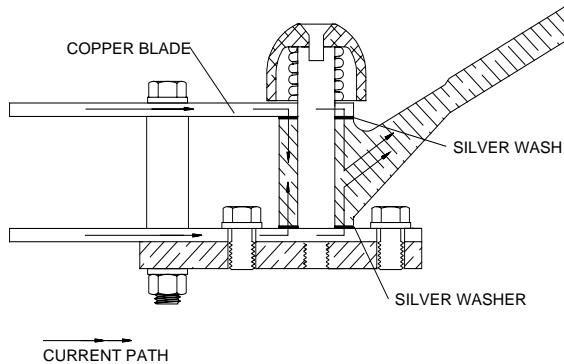


Fig. 3 - (Copper truss blade) hinge contact

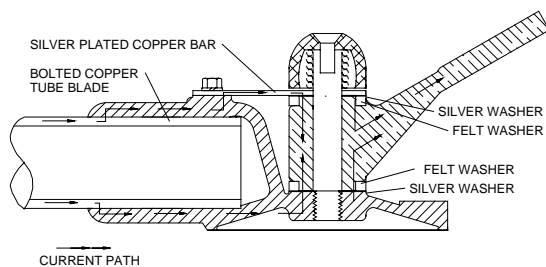


Fig. 4 - (Copper tubular blade) hinge contact

Positive Hinge Contact

The hinge swivels on a stainless steel bearing rod. A high pressure stainless steel spring, outside the current path, applies pressure to the silver to silver current transfer points.

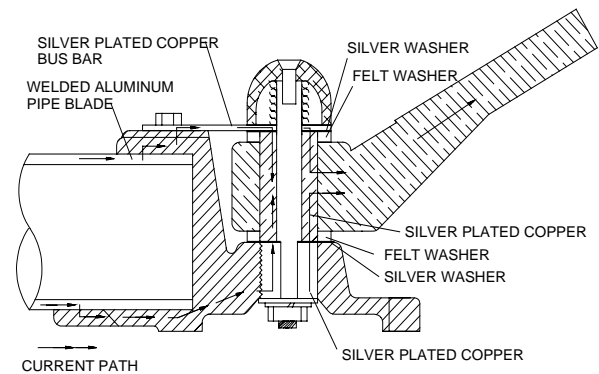


Fig. 5 - (Aluminum tubular blade) hinge contact

OPERATING CONTROL MECHANISM

The standard control mechanism is the torsional type using galvanized steel pipe. This control includes a toggle arrangement to assure mechanical locking of the switch poles in the open and closed positions. This arrangement gives the V switch maximum mechanical capability for ease of operation under normal and icing conditions. The manual swing handle or optional gear operator can be padlocked in either the open or closed position. The torsional control can be converted to power operation.

CURRENT INTERRUPTING DEVICES

Arcing Horns

Arcing horns are designed to prevent arcing at the main switch contacts. They have no interrupting rating, however, they are commonly used to interrupt small values of current such as transformer magnetizing current, or the charging current of a short length of line.

Quick-Break

The quick-break circuit interrupter is capable of interrupting a limited amount of line charging or transformer magnetizing current. It provides high speed contact separation by the means of a spring loaded whip.

Vacuum Interrupter

The vacuum interrupter will permit currents up to 2000 amperes to be interrupted and loop splitting or parallel switching up to 161kV, if peak recovery voltage does not exceed 30kV. It is in the power circuit for only a few seconds during the opening operation, and is not in the circuit while the switch is closed or closing. Continuous, momentary and impulse ratings of the switch are unaffected.

TYPE V SWITCH SPECIFICATIONS

kV Nom. (kV Max.)	Amps Cont. (kAmps Mom.)	Insulator T.R. No.	B.I.L.	Catalog Number	A	B	C	D	E	F	G	H	Approx. Ship Weight (Lbs.)
COPPER TRUSS BLADE SWITCHES													
15 (15.5)	600 (40) 1200 (61)	205	110	VF156 VF1512	16 1/8	4 5/8	25	33 1/4	20 1/2	13 3/8	20 3/8	24 5/8	920 960
23 (25.8)	600 (40) 1200 (61)	208	150	VF236 VF2312	19 5/8	6	29 7/8	38 1/8	24 5/8	15 7/8	22 7/8	27 1/8	960 1020
34.5 (38)	600 (40) 1200 (61)	210	200	VF346 VF3412	23 1/4	6 3/16	33 11/16	42 7/16	28 3/4	19 1/2	26 3/4	30 13/16	1000 1070
46 (48.3)	600 (40) 1200 (61)	214	250	VF466 VF4612	26 5/8	8 3/4	39 5/8	48 3/8	32 1/2	22	29 1/4	37 1/2	1150 1250
69 (72.5)	600 (40) 1200 (61)	216	350	VF696 VF6912	33 1/2	9 7/8	47 5/8	56 3/8	41	26 3/4	34	42 3/16	1300 1500
COPPER TUBULAR BLADE SWITCHES													
23 (25.8)	600 (40) 1200 (61) 1600 (80)	208	150	V236 V2312 V2316	20 1/4	5 3/4	30 1/2	39 1/4	24 9/16	15 7/8	22 7/8	27 1/8	1044 1094 1094
34.5 (38)	600 (40) 1200 (61) 1600 (80)	210	200	V346 V3412 V3416	23 1/4	6 3/16	33 11/16	42 7/16	28 3/4	19 1/2	26 3/4	30 13/16	1125 1225 1400
46 (48.3)	600 (40) 1200 (61) 1600 (80)	214	250	V466 V4612 V4616	26 5/8	8 3/4	39 5/8	48 3/8	32 1/2	22	29 1/4	37 1/2	1300 1425 1600
69 (72.5)	600 (40) 1200 (61) 1600 (80)	216	350	V696 V6912 V6916	33 1/2	9 7/8	47 5/8	56 3/8	41	26 3/4	34	42 3/16	1500 1700 1850
115 (121)	600 (40) 1200 (61) 1600 (80)	286	550	V1156 V11512 V11516	49 1/2	16 1/4	70	78 3/4	61 1/2	38 1/2	45 3/4	63 3/8	2000 2680 2860
138 (145)	600 (40) 1200 (61) 1600 (80)	288	650	V1386 V13812 V13816	57 1/4	19 1/8	80 5/8	89 3/8	71	44	51 1/4	74	3100 3300 3500
161 (169)	600 (40) 1200 (61) 1600 (80)	291	750	V1616 V16112 V16116	64 1/8	21 1/2	89 7/8	98 5/8	79	49 1/2	56 3/4	79 1/2	3300 3450 3600
230 (242)	600 (40) 1200 (61) 1600 (80)	304	900	V23012 V23020 V23025	79 7/8	28 7/8	113	121 5/8	97 1/4	59	66 1/4	89	4024 4044 4044
ALUMINUM TUBULAR BLADES													
15 (15.5)	1200 (61) 2000 (100) 2500 (100)	205	110	AV1512 AV1520 AV1525	16 7/8	5	26 1/8	34 7/8	20 7/16	13 3/8	20 3/8	24 5/8	1026 1074 1074
23 (25.8)	1200 (61) 2000 (100) 2500 (100)	208	150	AV2312 AV2320 AV2325	20 1/4	5 3/4	30 1/2	39 1/4	24 9/16	15 7/8	22 7/8	27 1/8	1044 1094 1094
34.5 (38)	1200 (61) 2000 (100) 2500 (100)	210	200	AV3412 AV3420 AV3425	23 1/4	6 3/16	33 11/16	42 7/16	28 3/4	19 1/2	26 3/4	30 13/16	1125 1200 1200
46 (48.3)	1200 (61) 2000 (100) 2500 (100)	214	250	AV4612 AV4620 AV4625	26 5/8	8 3/4	39 5/8	48 3/8	32 1/2	22	29 1/4	37 1/2	1275 1350 1350
69 (72.5)	1200 (61) 2000 (100) 2500 (100)	216	350	AV6912 AV6920 AV6925	33 1/2	9 7/8	47 5/8	56 3/8	41	26 3/4	34	42 3/16	1500 1625 1625
115 (121)	1200 (61) 2000 (100) 2500 (100)	286	550	AV11512 AV11520 AV11525	49 1/2	16 1/4	70	78 3/4	61 1/2	38 1/2	45 3/4	63 3/8	2440 2585 2585
138 (145)	1200 (61) 2000 (100) 2500 (100)	288	650	AV13812 AV13820 AV13825	57 1/4	19 1/8	80 5/8	89 3/8	71	44	51 1/4	74	3040 3200 3200
161 (169)	1200 (61) 2000 (100) 2500 (100)	291	750	AV16112 AV16120 AV16125	64 1/8	21 1/2	89 7/8	98 5/8	79	49 1/2	56 3/4	79 1/2	3175 3325 3325
230 (242)	1200 (61) 2000 (100) 2500 (100)	304	900	AV23012 AV23020 AV23025	79 7/8	28 7/8	113	121 5/8	97 1/4	59	66 1/4	89	4024 4044 4044

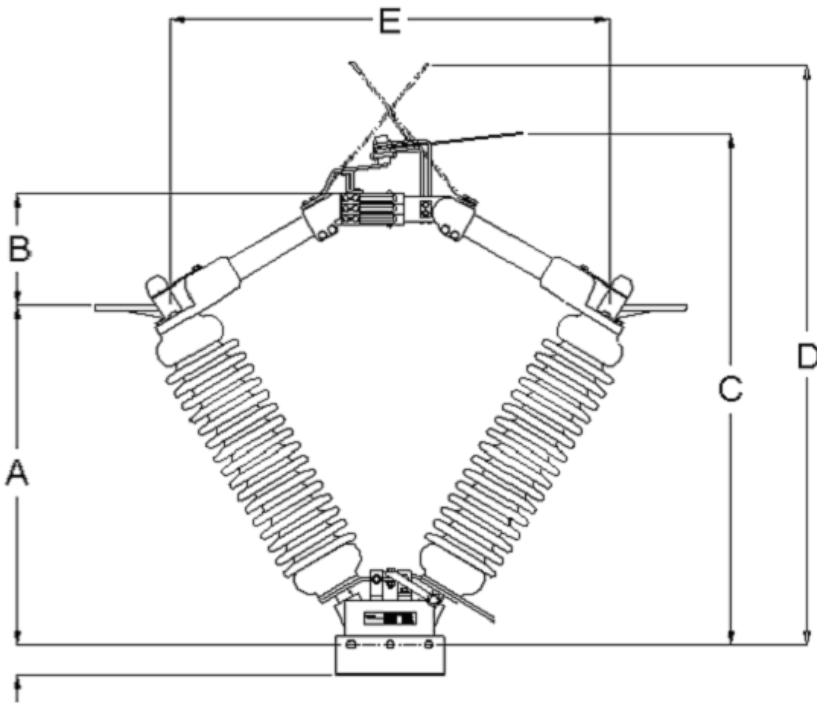
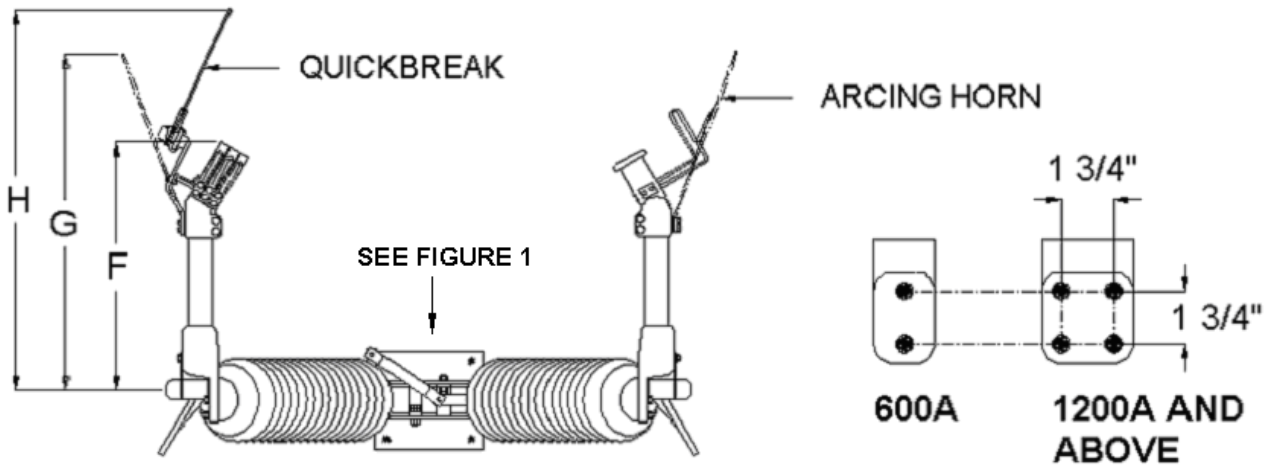
NOTES

1. Dimensions are in inches and are for NEMA standard station post insulators.
2. Counterbalance supplied as required at higher voltage ratings.
3. Grounding switches available - consult factory.
4. Polymer insulators available on aluminum tubular Type V switches up to 138kV.
5. Non-standard insulators are available upon request.

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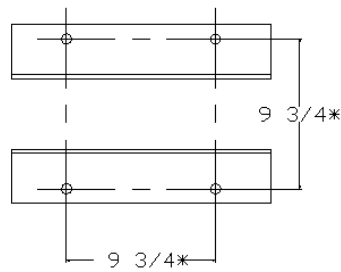
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TYPE V SWITCH SPECIFICATIONS



THIS DIMENSION WILL VARY FOR DIFFERENT PAD HEIGHTS REQUIREMENTS – MINIMUM 1 3/4"

FIGURE 1

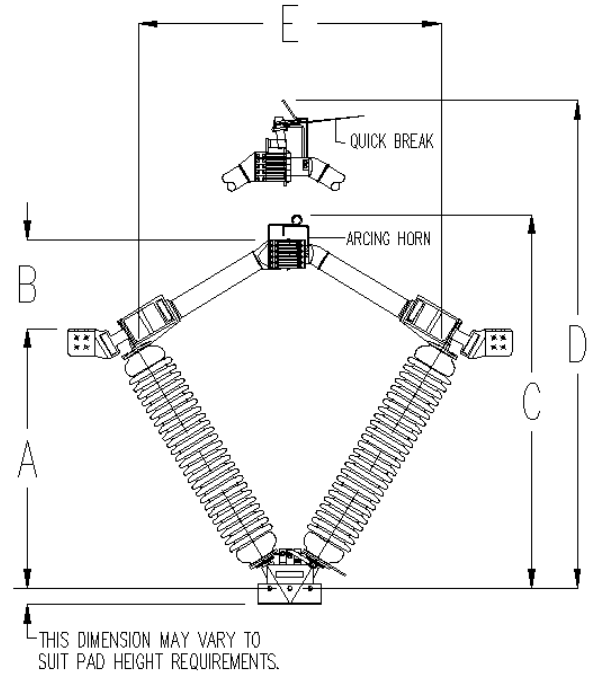
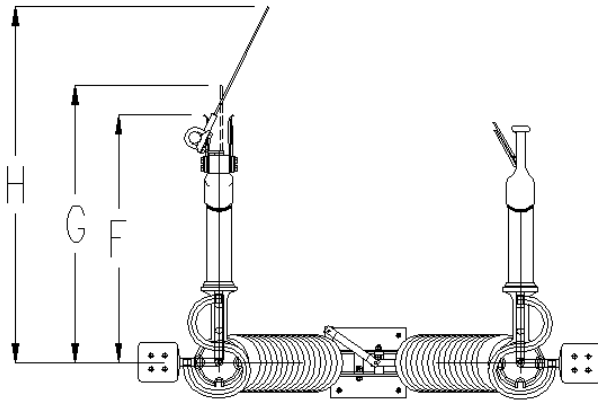


* Base mounting can be customized to meet customer requirements.

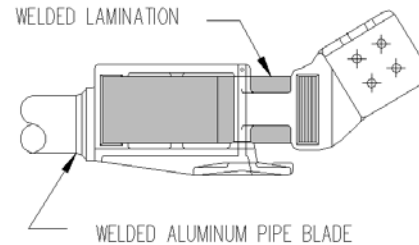
TYPE V CENTER BREAK SWITCH

3-PHASE, GROUP OPERATED (SUBSTATION AND TRANSMISSION APPLICATIONS)

- Horizontal Upright, Vertical, Underhung or Direct Pole Mounting
- Manual or Motor Operated Control Mechanism
- 34KV through 230kV



- Terminals are three sided with NEMA Standard four hole drilling
- Hinge utilizes a welded lamination design to carry the current



kV Nom. (kV Max.)	Amps Cont. (kAmps Mom.)	Insulator T.R. No.	B.I.L.	Catalog Number	A	B	C	D	E	F	G	H	Approx. Ship Weight (Lbs.)
ALUMINUM TUBULAR BLADE SWITCHES													
34 (38)	3000 (100)	210	200	AV3430	26 1/2	9	33 11/16	42 7/16	29 1/2	19 1/2	26 3/4	30 13/16	1325
46 (48.3)	3000 (100)	214	250	AV4630	29 1/4	9 15/16	39 3/16	48 3/8	33 1/2	22	29 1/4	37 1/2	1550
69 (72.5)	3000 (100)	216	350	AV6930	35 1/2	7 7/8	47 5/8	56 3/8	41	26 3/4	34	42 3/16	1750
115 (121)	3000 (100)	286	550	AV11530	52 3/16	13 9/16	70	78 3/4	61 1/2	38 1/2	45 3/4	63 3/8	2725
138 (145)	3000 (100)	288	650	AV13830	59 3/16	17 3/16	80 5/8	89 3/8	71	44	51 1/4	74	3360
161 (169)	3000 (100)	291	750	AV16130	66 1/4	19 3/8	89 7/8	98 5/8	79	49 1/2	56 3/4	79 1/2	3500
230 (242)	3000 (100)	304	900	AV23030	82 7/8	25 1/8	112 1/4	121	95 3/8	55	62 1/4	85	3475

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