

Bulletin DB-A06BH09

Type V2-CA  
**Aluminum  
Vertical Break Switch**

115 - 230 kV  
600 - 3000 A.



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# Designed for Simplicity

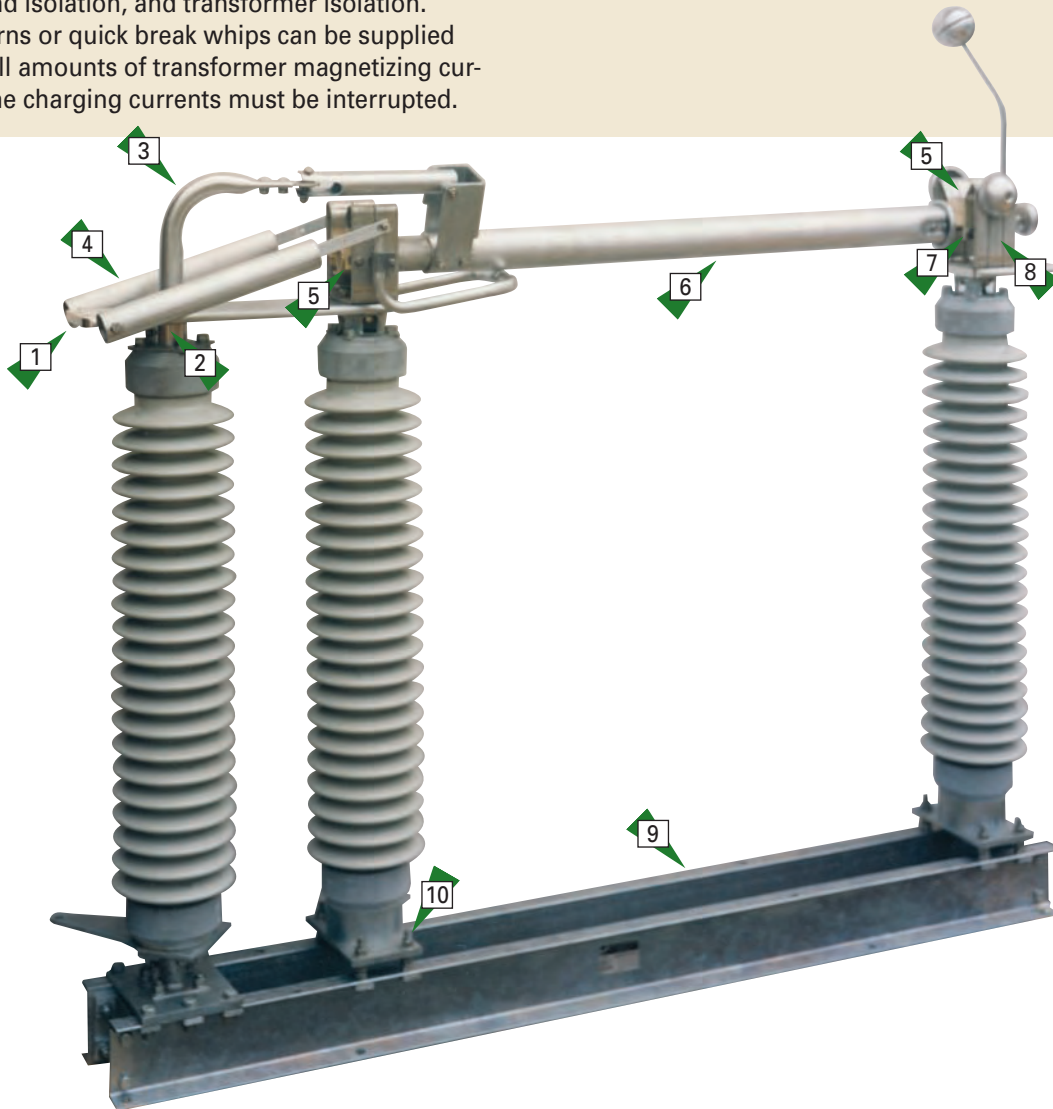
## V2-CA APPLICATION

The Cleaveland/Price V2-CA is a three pole, group operated, aluminum vertical break switch for installation in substation or transmission line locations. The switch can be mounted in the horizontal-upright, vertical, or horizontal-underhung position. The V2-CA is suitable for use in a variety of applications including line disconnecting and sectionalizing, circuit breaker by-pass and isolation, and transformer isolation.

Arc horns or quick break whips can be supplied when small amounts of transformer magnetizing currents or line charging currents must be interrupted.

Accessories and options needed to adapt the switch to a customer's particular requirements are available. The V2-CA may be manually operated by use of a swing handle or wormgear mechanism or electrically operated by use of a type TP-C2 motor operator.

The V2-CA meets NEMA and IEEE Standards and the rating requirements of applicable IEC Standards.



**1** Unbreakable, non-cast aluminum terminal pads with NEMA standard hole pattern

**2** Fully insulated journal bearing

**3** Unbreakable, non-cast operating crank

**4** Counterbalance springs are insulated from the current path as are the counterbalance ice shields. The springs are made of stainless steel for lifelong corrosion resistance.

**5** Silver-to-silver contacts at hinge and jaw

**6** Blade constructed of T-6063 aluminum or tin-plated copper

**7** Stainless steel contact springs insulated from the current path

**8** Tin-plated, hard-drawn, high conductivity copper contact fingers at hinge and jaw

**9** Hot-dip galvanized double channel base

**10** Insulator leveling screws

# Engineered for Performance

## THE CLEVELAND/PRICE APPROACH

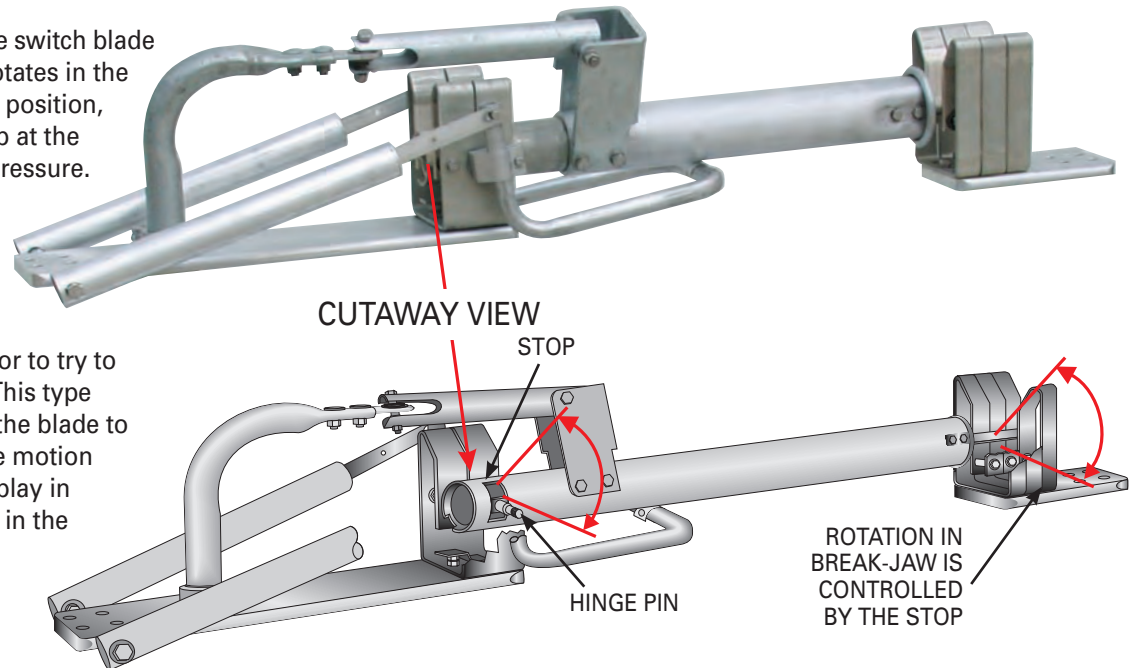
Cleveland/Price has a very basic approach to design . . . keep it simple. It is an approach that is employed from material selection to mechanical design.

All Cleveland/Price disconnect switch current carrying parts are manufactured from high strength, high conductivity aluminum or copper. All switches are of non-cast design for superior dependability of parts. Switch performance is not troubled by flaws that could occur in the casting process.

Contacts on the V2-CA are designed to take advantage of electromagnetic forces by using a reverse loop configuration at both the hinge and jaw of the switch. Current transfer points are kept to a minimum.

**PROBLEM:** When the switch blade on a conventional switch rotates in the break-jaw to the final blade position, it does not consistently stop at the point of optimum contact pressure. The resulting inadequate contact pressure may cause contact pitting and burning.

Many switches use a stop on the rotating insulator to try to set proper blade position. This type of stop is too remote from the blade to accurately control the blade motion because of the cumulative play in the linkage joints. Variation in the speed of the operator can actually affect the amount of blade turnover.



**SOLUTION:** On the Cleveland/Price V2-CA, the blade stop is on the blade itself instead of an intermediate linkage point (the rotating insulator). The V2-CA stop location assures that blade rotation in the break-jaw will accurately and consistently stop at the point of maximum contact pressure.

The cutaway view shows how the unique Cleveland/Price turnover stop allows the blade to rotate until the slot in the blade engages with the hinge pin. This sets the proper turnover angle.

The stop angle is factory-machined for built-in accuracy. No matter how fast or slow the blade moves, it doesn't stop moving until it has fully turned over.

## CLEVELAND/PRICE FEATURES FOR OUTSTANDING PERFORMANCE AND LONG LIFE

The V2-CA is made of the finest materials for dependable, trouble-free service. Knowledge gained from maintaining switches in the field for over 60 years has played a major part in refining the V2-CA. Significant design features include:

- Total non-cast copper, aluminum, and steel construction resulting in the superior dependability of parts.
- Live parts constructed from hard-drawn, high conductivity copper and extruded aluminum, producing stronger, more conductive components than parts made of cast materials.
- Open hinge contacts allow easy verification of contact condition without disassembly or infrared testing.
- Open construction of the hinge and smooth non-cast surfaces throughout, enabling the V2-CA to break ice with amazing ease.
- Wiping action on both the break-jaw and hinge keeps contacts clean for years of reliable service.
- Reverse loop electromagnetic design at hinge and break-jaw on all ratings gives outstanding performance under fault conditions.
- Bolted connections are aluminum to tin-plated copper. All bolted contact surfaces are prepared and treated with an oxide inhibitor. Moving contacts are silver-to-silver with a hard-drawn, high-conductivity copper base material.

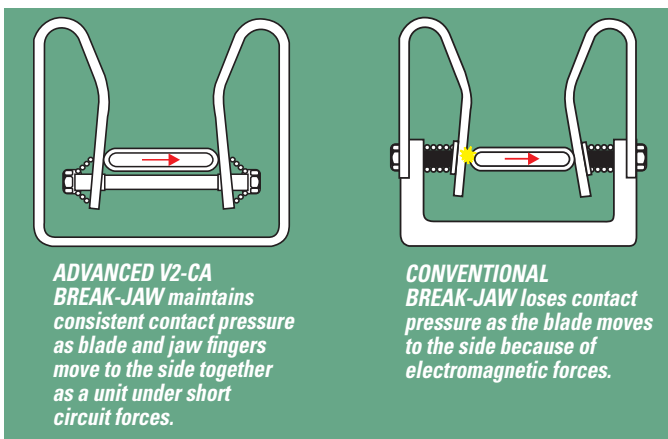
# Exclusive Cleaveland/Price V2-CA Features

The Cleaveland/Price V2-CA is an advanced design vertical break switch with features of genuine value to the customer. It incorporates several patented improvements:

1. Positive blade turnover stop is the key to consistent and complete contact pressure to prevent contact burning.
2. Insulating journal bearing prevents current flow through the live operating linkage.
3. Floating break-jaw contacts allow blade and break-jaw fingers to move together under short circuit and seismic duty to outperform conventional contact systems.

## UNIQUE BREAK-JAW DESIGN

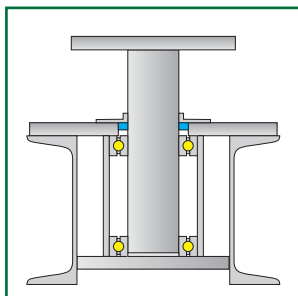
Short circuit tests prove that the V2-CA break-jaw is superior to conventional break-jaws. On the V2-CA, phase-to-phase electromagnetic forces that pull the blade side-to-side do not decrease the contact pressure since the fingers of the jaw are joined together to create a floating spring system that moves with the blade. Maximum contact pressure is maintained on all contact surfaces during short circuit and seismic events.



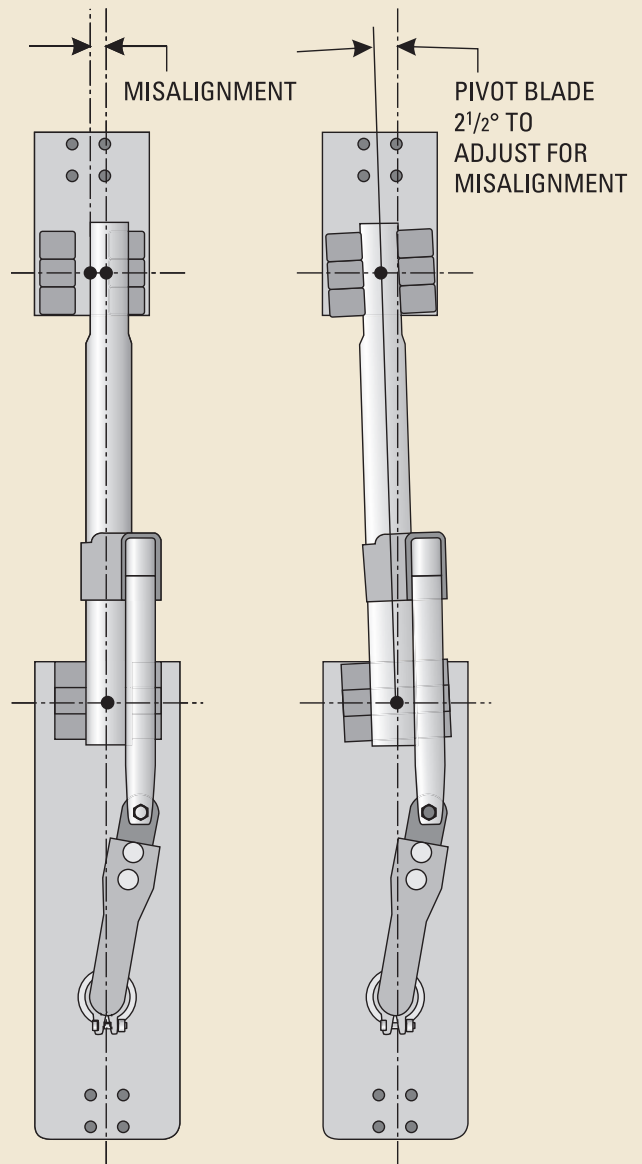
ANSI standards require that a switch pass the rated short circuit test only once. Standards also allow live parts to be changed for each test. The V2-CA gives greater confidence in short circuit performance as demonstrated by 12 consecutive test shots on a 2000 ampere switch using the same set of live parts.

## Superior Bearing Assembly

- High strength, non-cast, hot-dip galvanized steel shaft
- Special ozone and ultraviolet resistant seals outlast conventional seals and contain no metal parts which typically corrode
- Maintenance-free, permanently lubricated construction
- Individually sealed ball bearing assemblies in sealed, grease-packed housing
- Permanently adjusted bearing



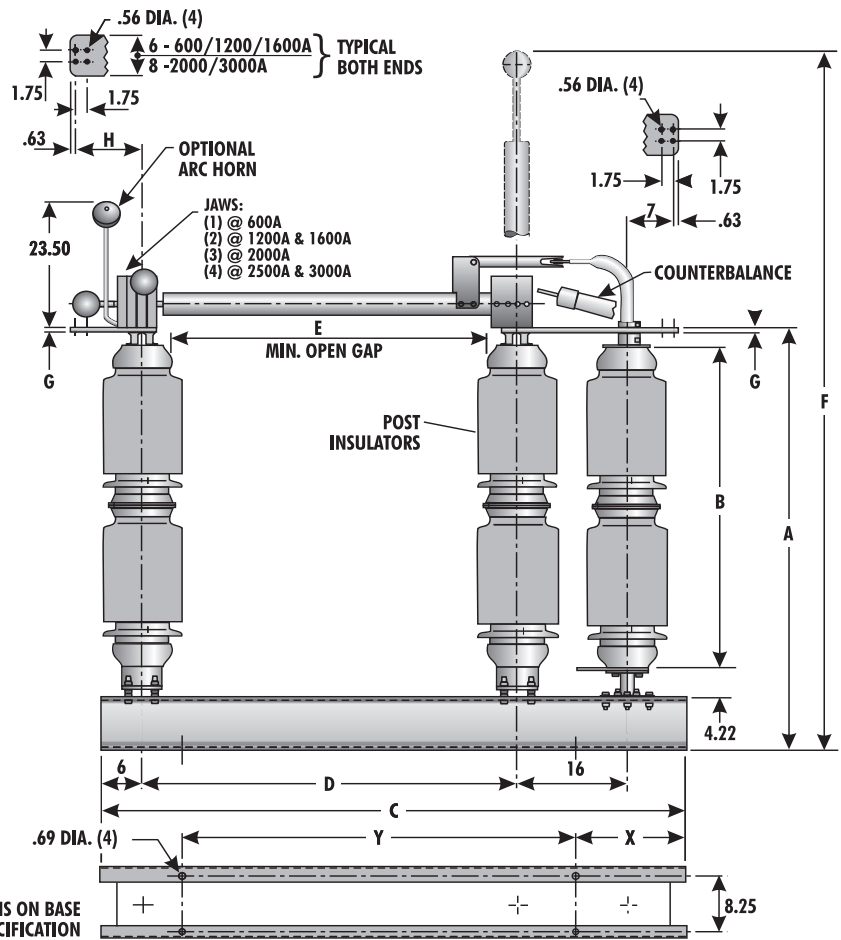
## FEATURE FOR EASY ADJUSTMENT



## PIVOTING HINGE

During installation, the blade may be misaligned with the break-jaw, requiring adjustment of the jacking bolts at the base of the insulators. However, it is often easier to pivot the blade to attain alignment with the jaw contact. This is particularly true when bus and ground blades have been installed at the jaw terminal and the blades are not perfectly adjusted. By loosening the bolts that attach the hinge and jaw to the stationary insulators and closing the switch, the blade and jaw automatically seat themselves in the proper alignment. Retighten the bolts and the adjustment is complete without having to realign the ground switch or bus.

# Type V2-CA Aluminum Vertical Break Switch



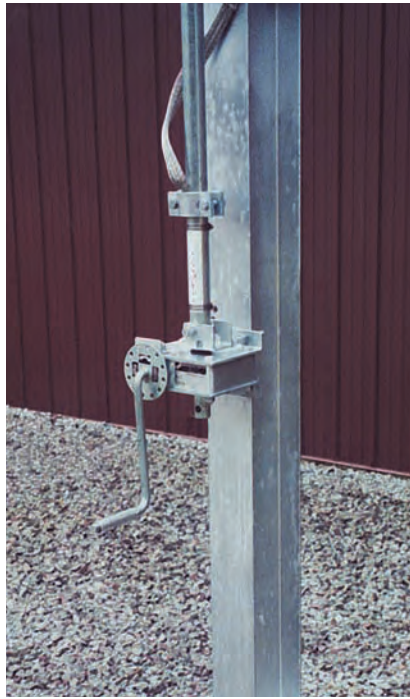
## BASE CONFIGURATION

	Nom. kV	Max. kV	kV BIL	Ins. TR#	Amp.	Mom. kA	Switch Style Number	A	B	C	D	E	F	G	H	Wt./ Pole				
	115	123	550	286	600	40	C06B033G01						126.84	.50	7	915				
					1200	61	C06B033G02	57.78											928	
					1600	70	C06B033G03		45	88	60	52								937
					2000	100	C06B033G04	58.03									128.53	.75		942
					2500	100	C06B033G05													967
					3000	120	C06B033G06	58.28									130.28	1.0	10	992
	138	145	650	288	600	40	C06B033G07						145.84	.50	7	1013				
					1200	61	C06B033G08	66.78											1025	
					1600	70	C06B033G09		54	98	70	62								1045
					2000	100	C06B033G10	67.03									147.53	.75		1050
					2500	100	C06B033G11													1075
					3000	120	C06B033G12	67.28									149.28	1.0	10	1091
	161	170	750	291	600	40	C06B033G13						161.84	.50	7	1112				
					1200	61	C06B033G14	74.78											1125	
					1600	70	C06B033G15		62	106	78	70								1140
					2000	100	C06B033G16	75.03									163.53	.75		1145
					2500	100	C06B033G17													1170
					3000	120	C06B033G18	75.28									165.28	1.0	10	1195
	230	245	900	304	600	40	C06B034G01						199.41	.05	10	1522				
					1200	61	C06B034G02	94.78											1538	
					1600	70	C06B034G03		80	124.5	94	86								1543
					2000	100	C06B034G04	95.03									201.16	.75		1550
					2500	100	C06B034G05													1575
					3000	120	C06B034G06	95.28									202.91	1.0		1608
	230	245	1050	312	600	40	C06B034G07						231.65	.50	10	1725				
					1200	61	C06B034G08	106.78											1744	
					1600	70	C06B034G09		92	144.5	114	106								1747
					2000	100	C06B034G10	107.03									233.41	.75		1756
					2500	100	C06B034G11													1781
					3000	120	C06B034G12	107.28									235.16	1.0		1817

# Operators/Accessories



Swing Handle Operator



Geared Handcrank Operator



Motor Operator Type TP-C2

## Standard Operator Features

- Swing handle or handcrank operator
- Padlock provision in both the open and closed positions
- Ground strap for vertical operating pipe
- Adjustable stops
- Clamp-on open/closed indicators
- Self-lubricating, maintenance-free outboard bearing
- 2" IPS galvanized steel vertical operating pipe
- Adjustable radius outboard bearing lever
- Threaded interphase and drive lever adjustment

## Ordering Information

### Furnish:

Switch type  
Voltage  
Amperage  
Momentary rating  
BIL level  
Mounting position  
Operator type  
Accessories required  
Base mounting holes  
Base mounting details

## Available Accessories

Arc horns  
Auxiliary switch  
Braidless ground contact  
Electrical interlock  
Extended operator  
Ground blades  
Ground blade mechanical interlock  
Insulated vertical pipe  
Interrupting device  
Key interlock  
Mounting hardware  
Operator grounding platform  
Outriggers  
Quick break whips  
Spill gaps  
Terminal connectors

*This brochure describes our standard product and does not show variations in design that may be available. Contact the factory for additional details.*

*Cleveland/Price reserves the right to make changes or improvements to the product shown in this brochure without notice or obligation.*

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