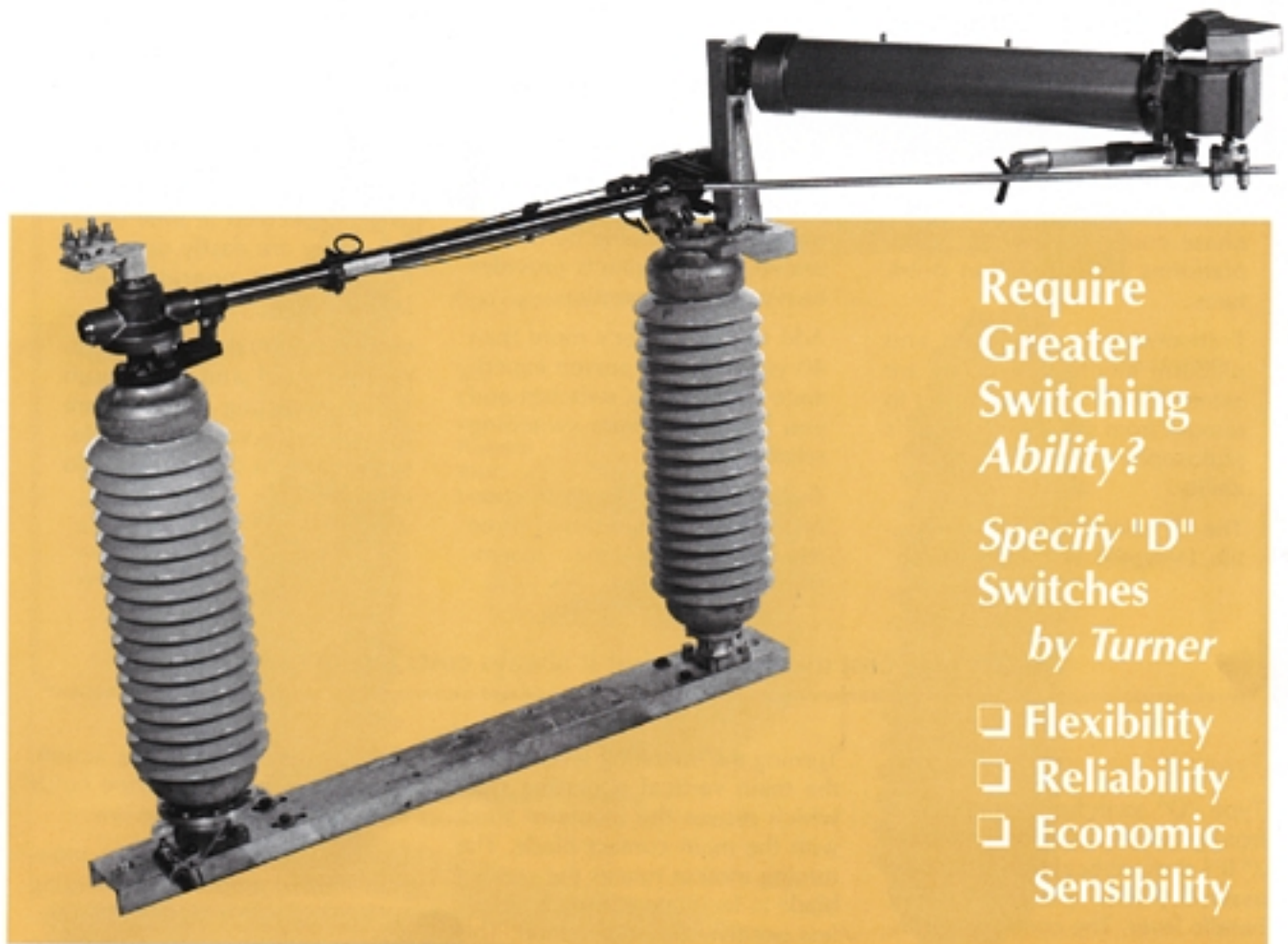


## Type "D" Side Break Switches

15 to 161 kV

600, 1200 and 2000 Amperes



Require  
Greater  
Switching  
*Ability?*

*Specify "D"  
Switches  
by Turner*

- ☐ Flexibility
- ☐ Reliability
- ☐ Economic  
Sensibility

**Turner Electric Corporation**  
40 Years of Customer Service 1953 - 1993

9510 St. Clair Avenue, Fairview Heights, IL 62208 • 618-397-1865

# Design and Operating Features

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### "D" = Switch-Ability!

With their heritage firmly entrenched in similar lines of Transmission switches, Turner "D" switches are one of the most versatile, severe-duty, crossarm-mounted switching products available.

Their flexible mounting ability makes it ideal in phase-over-phase, delta and phase-next-to-phase configurations on poles, platforms and substation structures.

Transmission, substation and platform mounted switches are extremely difficult and costly to remove from service, so Turner's philosophy is to design in reliability.

The "D" switch is the most versatile. Designed as a "stock switch"

suitable for almost any application, the conductor deadends right to the frame. Its simplistic, easily-mounted construction and flexible configurations makes it truly a Switch for all Reasons.

A rigid, hard drawn copper blade with patented locking device, silver-to-copper contacts, double spring arcing horns and sealed hinge contacts provides heavy-duty construction.

Add to this Turner's more than 40 years of field proven experience in air break switches and you have maximum switching reliability.

Two insulator stack construction instead of the traditional three reduces cost of materials, assembly and installation.

This all adds up to what we call Switch-Ability!

Turner Type "D" switches can be used for station isolating and bypassing, distribution and transmission line sectionalizing or isolating arrestors, metering equipment and other apparatus.

Right hand or left hand opening can be specified at time of order. They are easily upgraded for automatic operation and load breaking.

Several factory designs and fabricated steel and aluminum switch mounting platforms are available for various line designs. Custom designs are also available.

**Quality may cost more to buy, but it always costs less to own!**

### Type "D" Operating Features

Type "D" switches are operated from ground level with a standard 2" IPS steel vertical operating pipe assembly with a manual swing handle lever. The control lever incorporates a ground shunt, is padlockable and can be supplied for clockwise or counterclockwise operation. A steel shaft with self-piercing set screw clevises is used for coupling and pinning the switch. Electrohydraulic motor operators are available for remote, automatic or SCADA control.

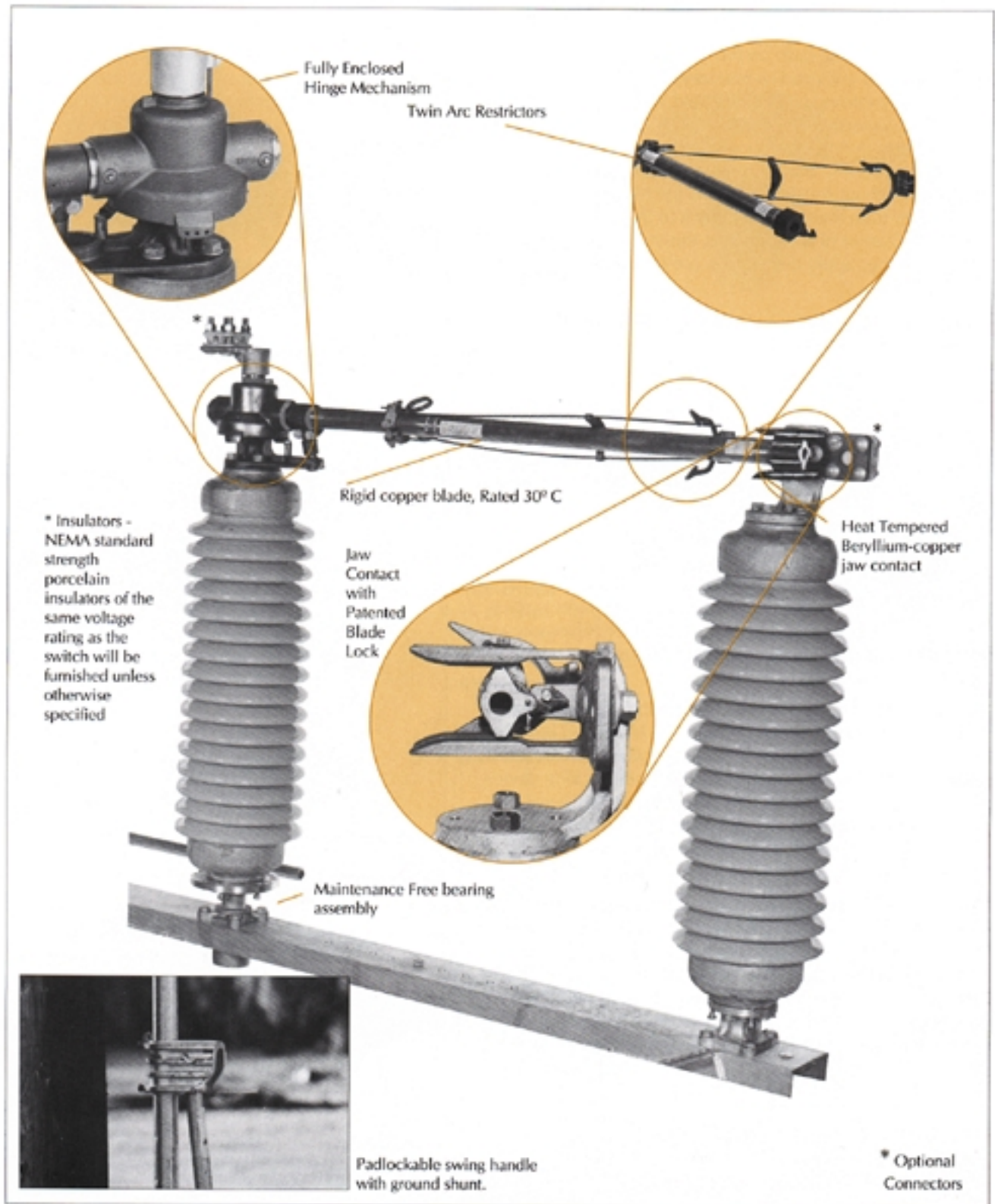
Turning the operating lever rotates the main vertical operating shaft which moves the insulator stack with the main contact blade. The turning motion rotates the contact blade to facilitate a smooth, effortless positive opening motion. This action releases contact pressure within the spring jaw assembly which helps maintain a clean contact surface, and enhance ice- or contamination-breaking action.

During closing, the main blade contacts remain in the straight or "cammed up" position, allowing

effective contact cleaning action. A patented locking device holds the blade securely in the jaw.

Double spring quick-whips interrupt limited amounts of charging or load currents when opening. Arcing is kept away from main contact surfaces. If the magnitude of the current exceeds the quick-whip capability, a TECOrupter full load break vacuum interrupter is available.





# Design and Operation

## Hinge Mechanism

The current carrying path on the hinge end of the switch is continuous and enclosed to permanently protect it from the elements. The terminal pad is threaded to a stationary contact block; the connection is spring loaded, silver to silver. As the switch rotates during the opening and closing cycle, the terminal pad is held in place by the conductor and the switch can move without restriction. Inside the hinge housing, current transfer from the stationary block to the moveable blade is through a series of silver contact fringes. Beryllium copper backing springs apply continuous pressure around the contact shoes.

This hinge configuration assures maximum service life and minimum maintenance.

## Jaw Contacts - Blade

The high constant pressure contact shoes are of cast, heat-treated, high-conductivity Beryllium-copper. Although contact pressure is factory-adjusted, should field adjustment ever be necessary, it can easily be made. In addition, contact changeout is fast and easy.

The tubular blade is designed of hard-drawn copper to provide the proper combination of current-carrying capacity and rigidity. The blade tip is Beryllium-copper, heat treated and strato-milled to provide a machined current transfer surface. The coin silver overlays provides high pressure, silver-to-copper contact with the Beryllium-copper jaw surfaces when the tip is in the jaw.

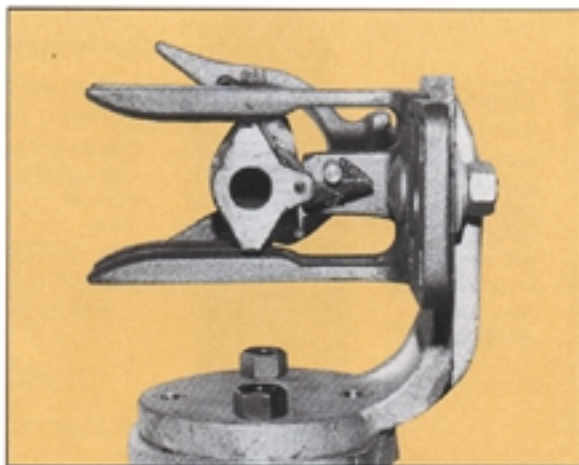
The blade tip engages the jaw contacts in an upright condition to form a high-pressure contact. The blade and jaw contacts are wiped clean during the closing action to assure a low resistance current transfer. A patented blade locking device keeps the blade closed despite temporary faults, surge currents, twisting structures or galloping conductors. Double spring type quick whips provide time-proven interruption of limited amounts of charging and load currents.

The opening action of the Turner Transmission switch is unique. Prior to the blade disengaging from the jaw contact, the blade contact rotates 22 degrees in the jaw. This exclusive Turner action releases all contact friction and breaks any ice or contamination in the jaw area which may impede an easy opening procedure. The Turner switch provides effortless switch opening regardless of environmental or time effects.

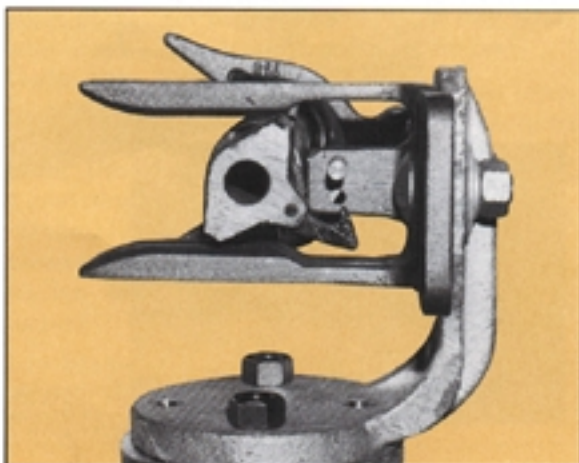
**The high pressure wiping action of Silver to Beryllium-copper during closing gives new equipment conductivity even after years of service.**



Enclosed Hinge Mechanism



Contacts spread when blade latches.



Contacts relax when blade disengages.



## Main Bearing Assembly

The main pivot bearing assembly consists of two tapered Timken roller bearings, which are adjusted and lubricated at the factory and require no further attention for the life of the switch. These bearings are protected with a Neoprene seal and permanently sealed at the bottom with a Welch-type expansion plug. This unit will accommodate cap-and-pin or post-type insulators without the use of an extra casting.

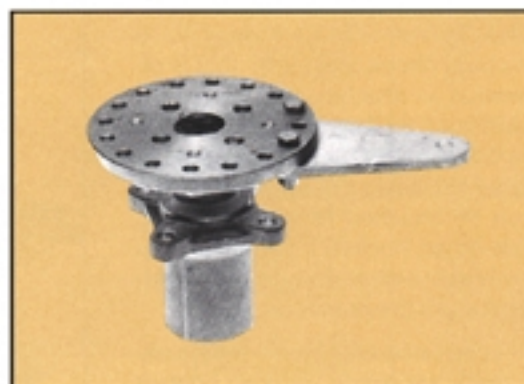
Four leveling screws are provided on the sub-base of each insulator stack, to facilitate easy alignment after assembling the insulators on the switch. Adjusting the screws raises or lowers the end of the switch blade and orients the blade to contact interface correctly.

Tightening the insulator bolts holds the alignment fast. Leveling screws are also provided on all stationary insulator pedestals.

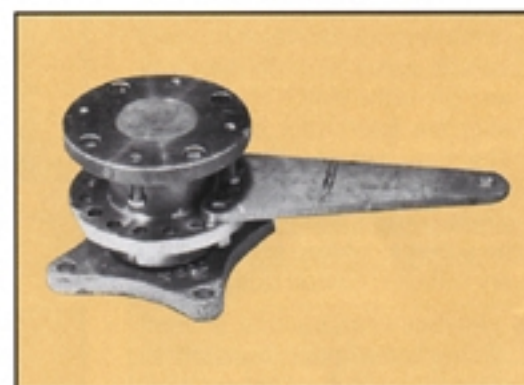
## Mounting Flexibility

To accommodate the variety of transmission structures and locations, Turner offers a similar variety of operating and mounting configurations. Controls can be supplied for clockwise or counterclockwise opening if requested, or may be changed in the field as necessary.

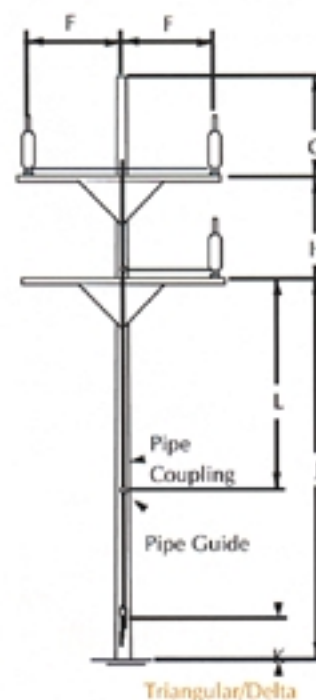
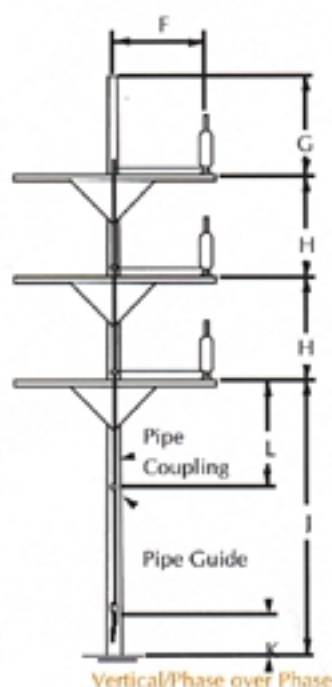
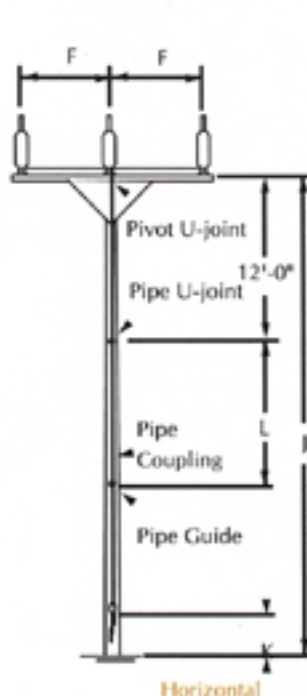
Turner's standard operating mechanisms for side-break switches consist of vertical steel operating pipe, with or without an 8-foot fiberglass insulating section; a steel or fiberglass interphase shaft, with self-piercing set screw clevises for coupling and pinning to switch crank arm and vertical pipe guides.



15-69 kV Bearing Assembly ▲



115 kV Bearing Assembly ▲



## Full Load Vacuum Interrupters

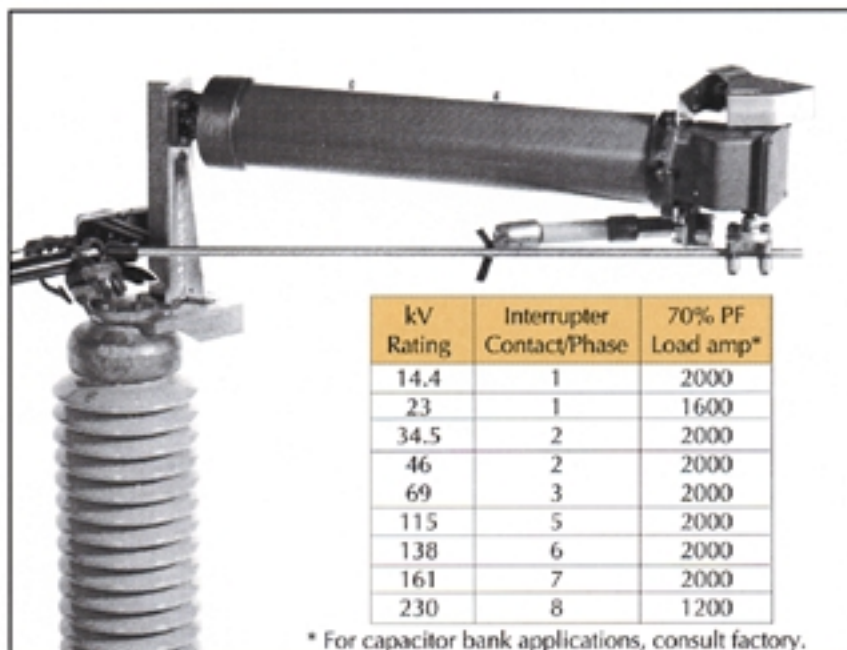
The Turner TECO-Rupter is a vacuum circuit interrupter that is offered as an attachment to the Turner switch as well as designs of other switch manufacturers. It is offered in three (3) basic configurations and can be attached to vertical break, side break, hookstick and some center break switch designs. The configurations are as follows:

**A) Loop or parallel break** - Normally these are single vacuum contact devices which can interrupt up to 2000 Amps, up to 230 kV, under paralleled conditions, (i.e., rated voltage exists on both the hinge and jaw of the switch immediately after the interrupter is opened.) The transient recovery voltage must not exceed 30 kV for the single contact. More contacts can be added to address higher recovery voltages; consult factory.

**B) Line/bus charging/line section-alizing interruption/transformer magnetizing current interruption:** A full voltage multiple stack interrupter may be utilized from 15 kV through 230 kV for interruption of line or bus charging currents and transformer magnetizing currents up to a value of 70 Amps at 0% power factor, capacitive or inductive. The nameplate operating current of the switch is not a factor in the application of this device.

**C) Load interruption** - A full voltage multiple stack interrupter may be applied from 15 kV through 230 kV for interruption of actual load current at 70% power factor.

The TECO Rupter is only in the circuit during the opening sequence, (normally one (1) to two (2) seconds in duration.) Also, contact test studs on the exterior of the enclosure allow you to independently Hi-Pot each vacuum contact when the actuating arm is in the open position at 30 kV.



kV Rating	Interrupter Contact/Phase	70% PF Load amp*
14.4	1	2000
23	1	1600
34.5	2	2000
46	2	2000
69	3	2000
115	5	2000
138	6	2000
161	7	2000
230	8	1200

\* For capacitor bank applications, consult factory.

A significant feature of the TECO-Rupter is its ability to easily retrofit to other manufacturer's switches, providing full load interrupting capability. This is especially important in light of the development of automated and remote switching benefits.



1. Switch/Interrupter Closed



2. Switch starts opening, Bypass engaged.



3. Bypass disengaged, circuit interrupted.



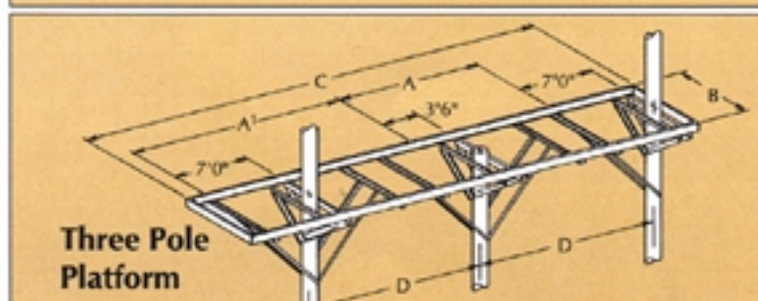
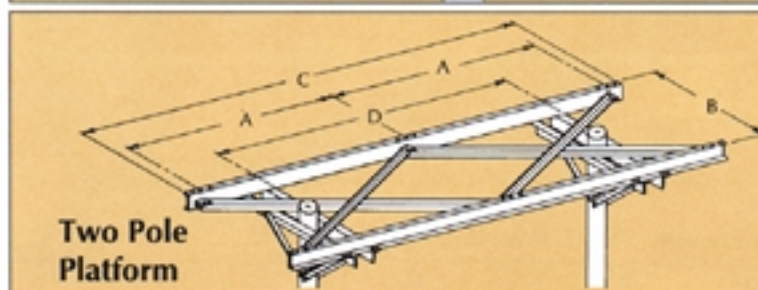
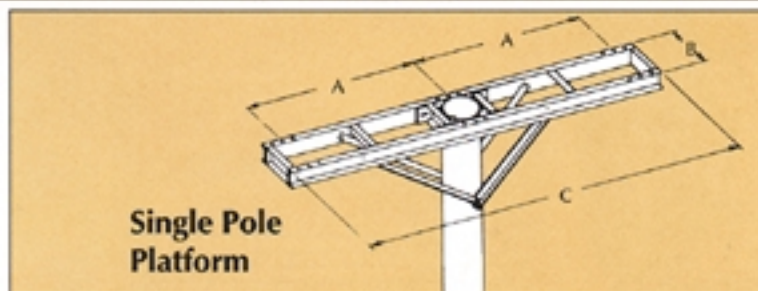
4. Switch fully open.



# Ordering Data and Typical Mounting

1AD 1 Way	Switch Rating			Station Post	Catalog Number		Approx. Wt. Lbs.
	Voltage	Cont.	Momen.		Horizontal	Vertical	
				Technical Ref. No.			Shipping Weight
	15kV	600	40,000	TR 205	1D01506/5001T	1DV01506/5001T	790
		1200	61,000		1D01512/5002T	1DV01512/5002T	815
		2000	100,000		1D01520/5113T	1DV01520/5113T	1295
	23kV	600	40,000	TR 208	1D02306/5003T	1DV02306/5003T	880
		1200	61,000		1D02312/5004T	1DV02312/5004T	905
		2000	100,000		1D02320/5114T	1DV02320/5114T	1295
	34kV	600	40,000	TR 210	1D03406/5005T	1DV03406/5005T	1060
		1200	61,000		1D03412/5006T	1DV03412/5006T	1080
		2000	100,000		1D03420/5107T	1DV03420/5107T	1470
	46kV	600	40,000	TR 214	1D04606/5007T	1DV04606/5007T	1125
		1200	61,000		1D04612/5008T	1DV04612/5008T	1140
		2000	100,000		1D04620/5115T	1DV04620/5115T	1530
	69kV	600	40,000	TR 216	1D06906/5009T	1DV06906/5009T	1725
		1200	61,000		1D06912/5010T	1DV06912/5010T	1755
		2000	100,000		1D06920/5051T	1DV06920/5051T	2142
	115kV	600	40,000	TR 286	1D11506/5011T	1DV11506/5011T	4410
		1200	61,000		1D11512/5012T	1DV11512/5012T	4455
		2000	100,000		1D11520/5052T	1DV11520/5052T	4695
	138kV	600	40,000	TR 288	1D13806/5013T	1DV13806/5013T	4890
		1200	61,000		1D13812/5014T	1DV13812/5014T	4955
		2000	100,000		1D13820/5053T	1DV13820/5053T	5195
	161kV	600	40,000	TR 291	1D16106/5015T	1DV16106/5015T	5390
		1200	61,000		1D16112/5016T	1DV16112/5016T	5455
		2000	100,000		1D16120/5054T	1DV16120/5054T	5695

## Typical Mounting



### Fabricated Switch Frames For Single Pole Mounting

Switch Rating	Cat. No.	A	B	C
15kV	1910	4'-6"	1'-2"	10'
23kV	1910	4'-6"	1'-2"	10'
34kV	2320	5'	1'-8"	10'-9"
46kV	1656	6'	3'-2"	12'-10"

### Fabricated Switch Frames For Two Pole Mounting

Switch Rating	Cat. No.	A	B	C	D
34kV	2326	5'	2'-3"	10'-9"	6'
46kV	2990	6'	3'-2"	12'-10"	10'
69kV	1647	7'	4'-2"	14'-10"	10'
115kV	1945	9'	4'-2"	18'-8"	12'

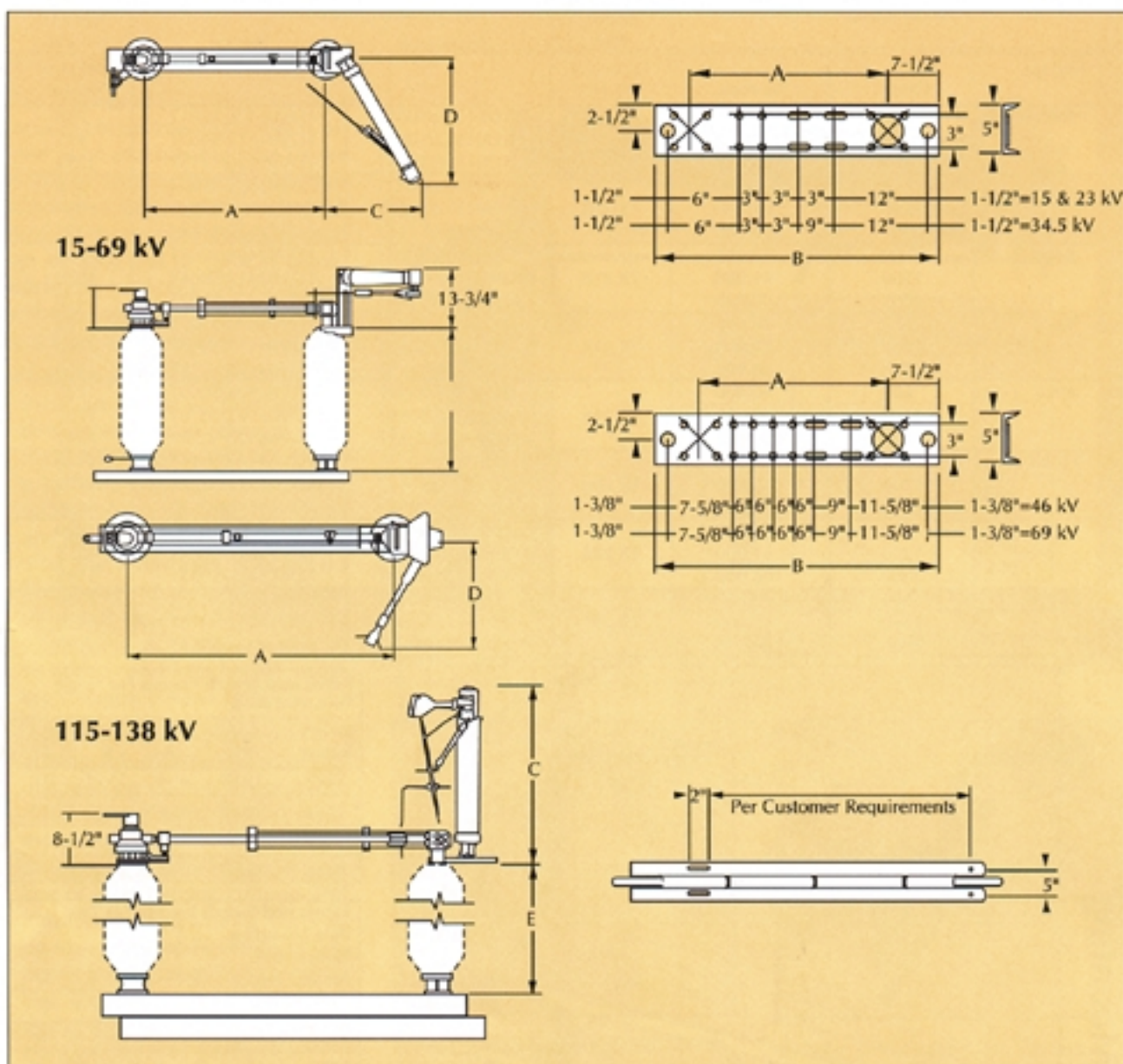
### Fabricated Switch Frames For Three Pole Mounting

Switch Rating	Cat. No.	A/A'	B	C	D
138/161kV	8756	13'/20"	7"	33'-1"	16'-3"

Switch mounting frames fabricated from either structural aluminum or hot galvanized steel can be supplied as optional items. Assembly bolts, excluding thru bolts, are furnished. Units are shipped coded for easy assembly.



# Dimensional Data



Dimensions (With Post Insulators)

kV	A	B	C	D	E	F	G	H	J	K	L
15	1'-6"	2'-6"	1'-5"	1'-10"	1'-1-1/4"	2'-9"	5'-0"	5'-0"	25'	3'-6"	10'-15'
23	1'-6"	2'-6"	1'-5"	1'-10"	1'-5-1/4"	3'-0"	5'-0"	5'-0"	26'	3'-6"	10'-15'
34	2'-0"	3'-0"	1'-7"	2'-0"	1'-9-1/4"	4'-0"	5'-0"	5'-0"	27'	3'-6"	10'-15'
46	2'-6"	3'-6"	1'-7"	2'-0"	2'-1-1/4"	5'-0"	6'-0"	6'-0"	28'	3'-6"	10'-15'
69	3'-6"	4'-6"	1'-11"	2'-6-1/2"	2'-9-1/4"	7'-0"	7'-0"	7'-0"	28'	3'-6"	10'-15'
115	5'-0"	6'-0"	4'-2-1/2"	3'-0"	4'-2-1/2"	9'-8"	9'-0"	9'-0"	30'	3'-6"	10'-15'
138	6'-0"	7'-0"	5'-0"	3'-0"	4'-11-1/2"	12'-3"	13'-0"	14'-0"	N/A	3'-6"	10'-15'
161	7'-0"	8'-0"	5'-10"	3'-0"	5'-5"	15'-0"	18'-0"	20'-0"	N/A	3'-6"	10'-15'



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