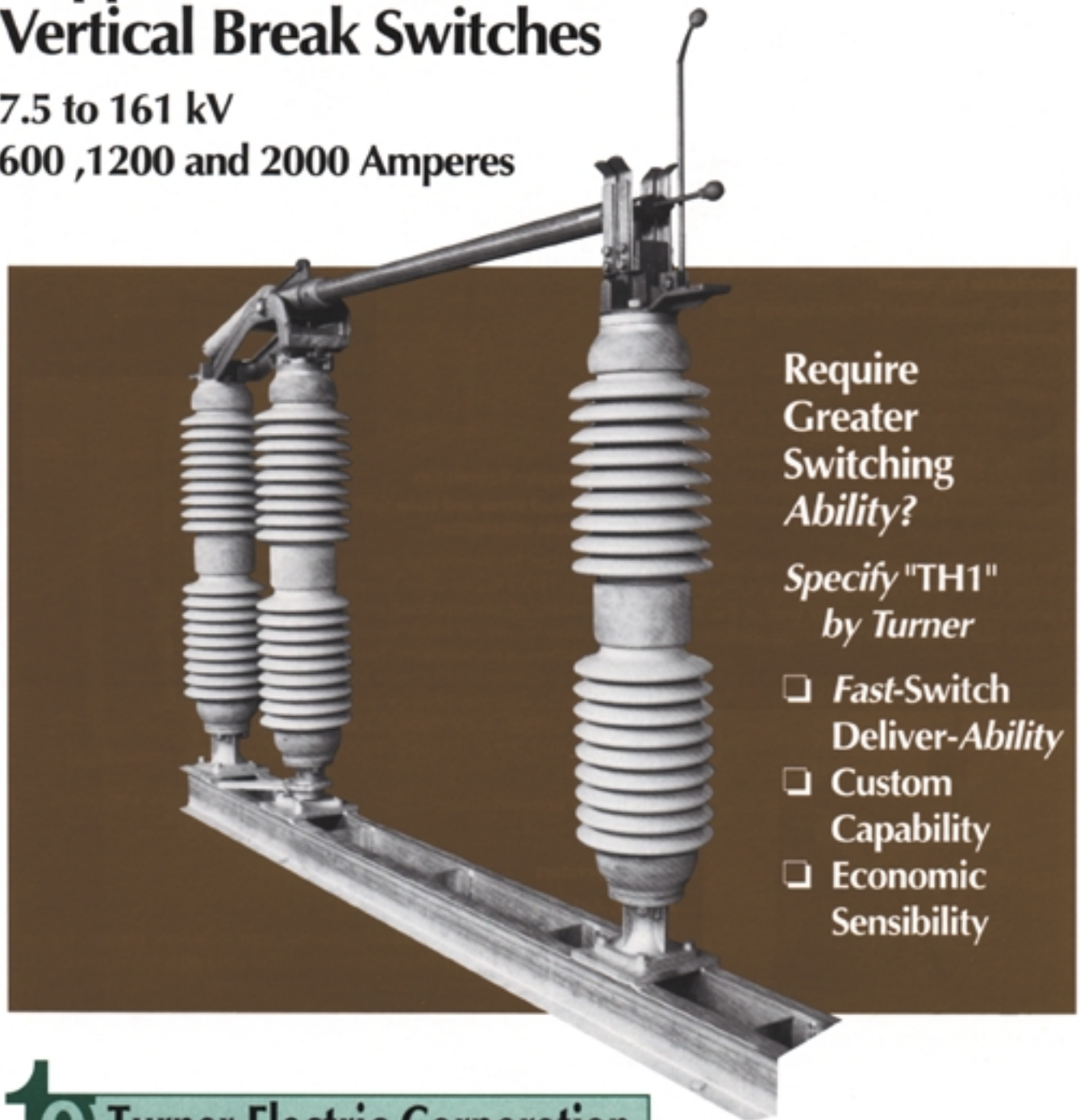


# Type "TH1" Heavy Duty Copper, 30° C Rise Vertical Break Switches

7.5 to 161 kV

600, 1200 and 2000 Amperes



Require  
Greater  
Switching  
*Ability?*

*Specify "TH1"  
by Turner*

- ☐ *Fast-Switch  
Deliver-Ability*
- ☐ *Custom  
Capability*
- ☐ *Economic  
Sensibility*

**te** Turner Electric Corporation

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

# Operating & Design Features

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### "TH1" = Switch-Ability!

The Type "TH1" is an all-copper, rotating-stack, vertical-break, group-operated, heavy-duty, air-break switch. Its all-copper, heavy-duty construction delivers a full 30° C temperature rise rating, not the 53° C temperature rise rating so prevalent today.

It's what we call Switch-Ability!

Turner's "TH1" switch has accumulated more than 37 years of successful field experience. That means you get an easily installed, easily operated heavy duty switch that provides maximum mechanical and electrical performance under all operating conditions.

Its heavy-duty construction, proven reliability and ease of op-

eration makes the "TH1" perfect for demanding substation and line operations such as bus transfer, by-passing and disconnecting breakers, sectionalizing, and isolating arrestors and other equipment.

Internal construction is both simple and functional. The three-moving-part mechanism, permanently lubricated bronze bearings on live parts, and greaseless ball bearing assembly for the rotating insulator provide smooth, easy operation. A highly conductive current path is provided by braidless, sealed continuous silver-to-copper hinge contacts and silver-to-copper jaw contacts (silver-to-silver jaw current transfer is also

available). All materials in the "TH1" have been specially selected for the application.

Installation is easy, and control mechanism connections are simple and positive. Whether installed in substations, or on poles (wood or steel), these switches can be mounted upright, vertical or underhung.

All switch adjustments are factory set, and, as an option, insulators can be factory installed on some ratings.

In short, the "TH1" switch has been designed to incorporate the features and benefits today's system designer needs in a heavy-duty switch of this type.

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

### Type "TH1" Operating Features

The simply designed blade-actuating mechanism has only three moving parts. It provides positive, all-position control of the blade throughout the complete opening-closing cycle. No auxiliary latches, cams or other mechanisms are employed. The switch operates smoothly and easily. Factory-set blade stops assure proper positioning of blades in the opened and closed positions.

The turning motion of the blade before entering or leaving contacts applies and releases contact pressure with a minimum of operating effort. This action also wipes contacts clean on closing, and breaks accumulations of ice out of the jaw on opening. Only two crank arms are used to achieve the lift-and-turn motion, providing a minimum of exposed mechanism while at the same time maintaining direct control of the blade in all positions. Blade response

is instantaneous and secure positioning is assured when opened and when closed.

The blade assembly is pivoted so that the longitudinal axis of the blade and the center of gravity of the assembly is considerably behind the pivot point when the blade is in the open position.

To facilitate smooth operation on switches 69 kV and above, each is provided with an enclosed blade counterbalancing spring.



## Blade Tips

Heat treated, Beryllium-copper blade tips are overlaid with coin silver. The tip design provides a high-pressure, silver-to-copper contact with the copper jaw surfaces when the tip rotates into the jaw.

## Insulators

NEMA Standard insulators of the same voltage rating as the switch will be furnished unless otherwise specified.

## Terminal Pads

Rigid Copper Blade

Arcing Horns

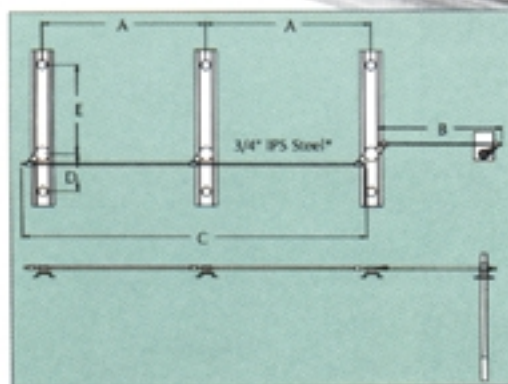
## Enclosed Hinge Mechanism

Turner's unique method of enclosing the hinge mechanism protects the contact surfaces from environmental concerns which minimizes maintenance requirements.

Counterbalancing Spring  
(69 kV and above only)

Greaseless Main Pivot Bearing Assembly

Closed Blade Stop



## Control Mechanisms

Type "TH1" Switches are operated with universal control mechanisms that adapt to any type of structure. Manual controls are furnished as standard equipment with each switch unit.

## Bases

Standard bases are hot-dipped galvanized, rigid, steel sections . . . which make them easily adaptable for mounting on steel or wood structures. No bearing plates are necessary.

# Design Features

## Hinge Mechanism

The current by-passes any moving bearings or moving threads. All parts in the current path are either copper or high-conductivity copper alloy and no current-carrying springs are employed. The Omega-shaped hinge shunt is a silver-plated strap encircling approximately 75 per cent of the blade. High pressure is applied to the shunt by a silver-plated, threaded trunnion, keeping the blade in continuous contact throughout the complete operating cycle. The entire hinge contact area is enclosed on the "TH1" switch, eliminating a possible maintenance area. Not only do the contacts have no chance to separate, they are protected from the environment, therefore they do not corrode or oxidize.

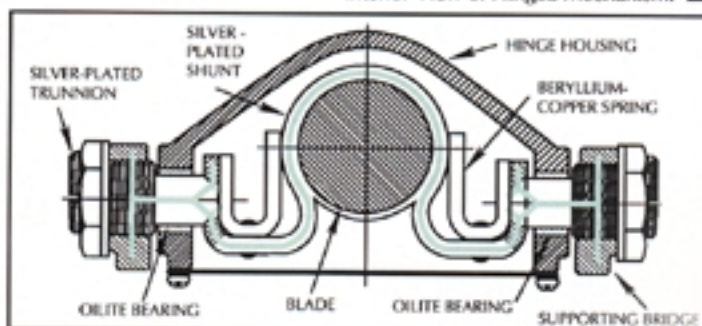
View of hinge mechanism with upper portion of housing cut away to show the simple, efficient manner in which current is transferred from the supporting bridge to the blade. ▶



Interior View of Hinged Mechanism. ▲

The current path is traced by the color line in the cross-sectional view shown (right).

Note that the hinge-end current transfer area is completely enclosed, eliminating a possible maintenance area.



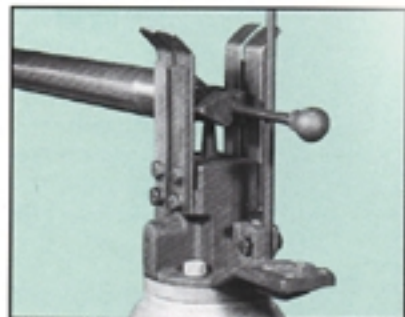
Cross Section of Hinged Mechanism. ▲

## Jaw Contacts - Blade

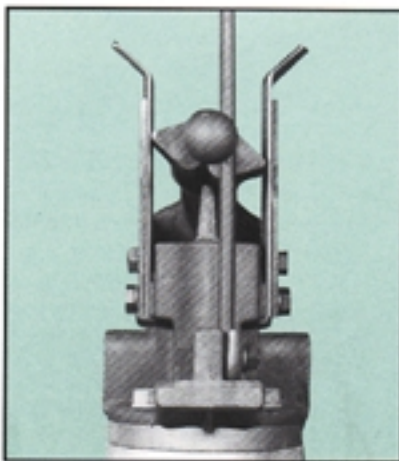
The high-pressure contact shoes are of hard-drawn, high-conductivity copper. Constant pressure is applied to the contact shoes by independent Beryllium-copper springs. Each contact shoe and back-up spring is attached with two silicon-bronze bolts. One bolt is self-locking, serving as an adjustment for the contact pressure. Although contact pressure is factory-adjusted, should field adjustment ever be necessary, it can easily be made with a standard wrench. 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 with coin silver overlays that provide high pressure, silver-to-copper contact with the copper jaw surfaces when the tip is rotated into the jaw. The 600 Ampere "TH1" has a single set of silver-to-copper contacts, while the 1200 Ampere version has a double set.

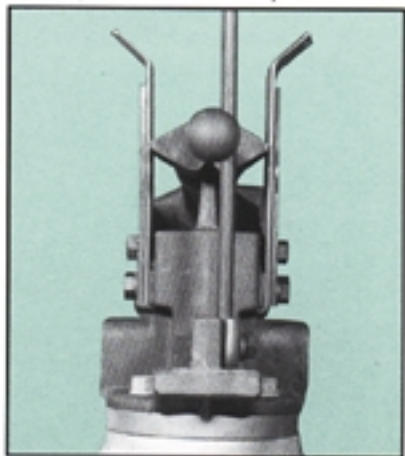
Blade twists into the jaw contacts to form a high-pressure contact, keeping the blades closed under the most punishing winter storms. They remain closed during temporary faults or high surge currents.



115 kV Jaw Contact Assembly Shown. ▲



Note blade rotation action. ▲



Note jaw contact deflection resulting in high pressure. ▲





Closed Position.



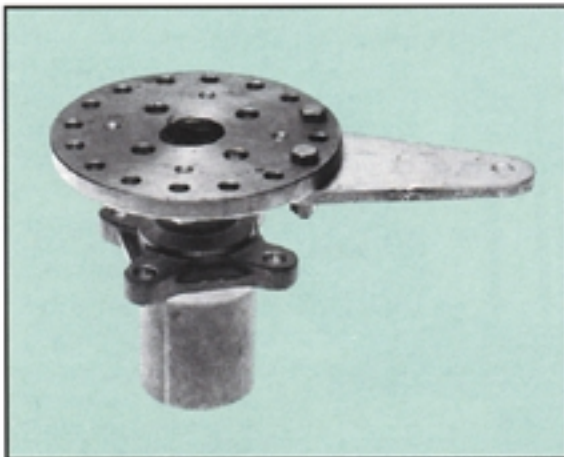
Open Position.

### Blade Stops

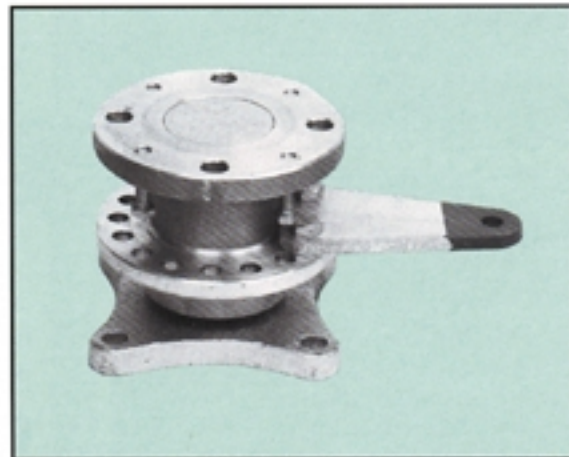
The full open and closed positions of the switch blade are determined by stops on the mechanism above the insulators. Factory-set, they can also be adjusted in the field.

Optional factory-set, field-adjustable base mounted bearing stops provide proper alignment of crank arms for quick, easy installation of control mechanisms.

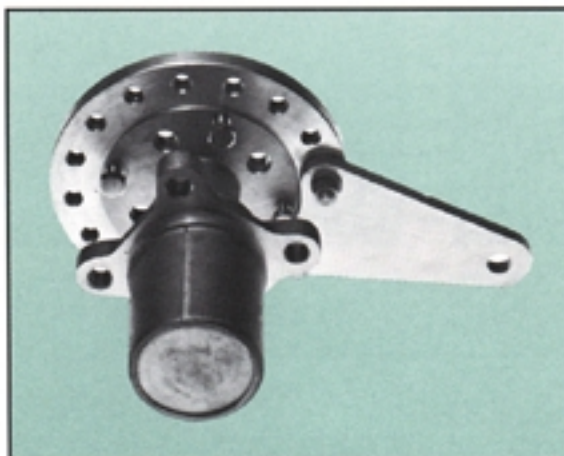
The picture at far left illustrates the closed-position stops; the picture at immediate left illustrates the open-position stop.



Main Bearing Assembly — 69kV & Below — 3° BC.



Main Bearing Assembly — 115kV & Above — 5° BC.



Permanently sealed bearing cavity — note stainless steel leveling screws.

### Main Bearing Assembly

The main pivot bearing 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 Welsh-type 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.

Tightening the insulator bolts holds the alignment fast.

Leveling screws are also provided on all stationary insulator pedestals.

## Design Features

### Full Load Vacuum Interrupters

The Turner TECO-Rupter is a vacuum circuit interrupter that is offered as an attachment to the Turner TH1/TH2 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.

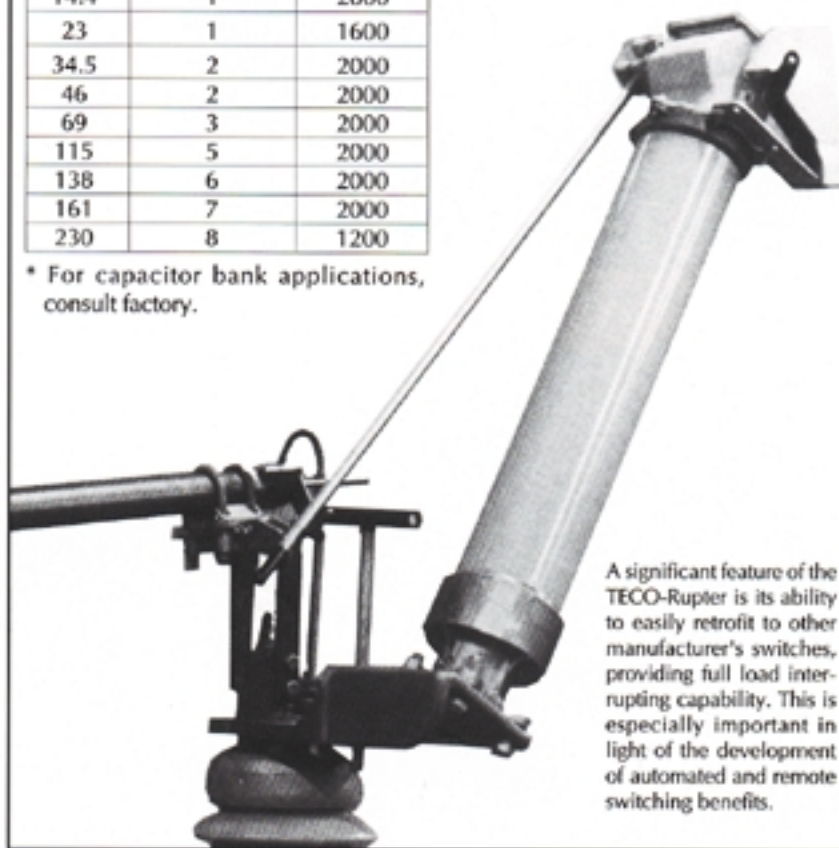
B) Line/bus charging/line section-alizing interruption/transformer magnetizing current interruption: A full voltage multiple stack interrupter may be utilized from 15 kV through 230 kV for interruption of line or bus charging currents and transformer magnetizing currents up to a value of 70 Amps at 0% 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.

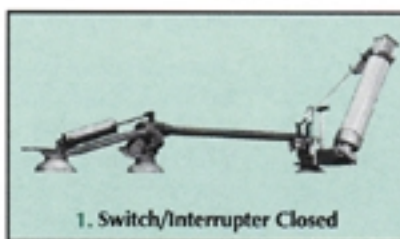
The TECO Rupter is only in the circuit during the opening sequence, (normally one (1) to two (2) seconds in duration.) Also, contact test studs on the exterior of the enclosure allow you to independently Hi-Pot each vacuum contact when the actuating arm is in the open position at 30 kV.

| kV Rating | Interrupter Contact/Phase | 70% F 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            |

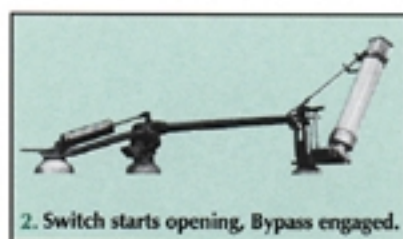
\* For capacitor bank applications, consult factory.



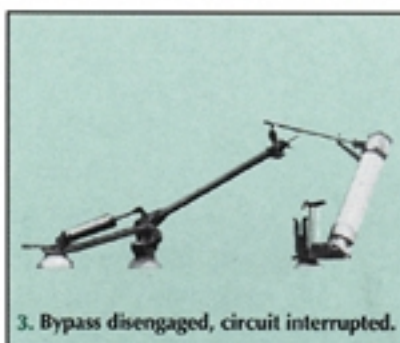
A significant feature of the TECO-Rupter is its ability to easily retrofit to other manufacturer's switches, providing full load interrupting capability. This is especially important in light of the development of automated and remote switching benefits.



1. Switch/Interrupter Closed



2. Switch starts opening, Bypass engaged.



3. Bypass disengaged, circuit interrupted.



4. Switch fully open.



## Turner's Fast-Switch Program Standard Substation Controls

7.5 kV to 34.5 kV - Pole Mounted

7.5 kV to 69 kV - Structure Mounted

Turner offers you the ability to choose your delivery schedule, based on your switch requirements. You can select from a variety of "Standard" switch, base and operating mechanism designs (through 69 kV) that will, in effect, save you many weeks of lead time, when compared to the time required to produce a "Custom Design."

These "Standard" Control Mechanisms are shown on pages 7 and 8. The "Standard" switch bases are shown on page 11 (Dimensions page), and the "Standard" switch Catalog Numbers are indicated below.

Custom configurations can be made to order by using the Ordering Information on page 10.

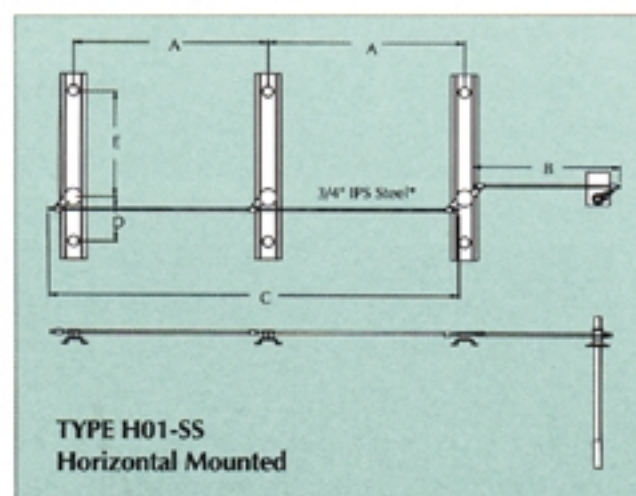
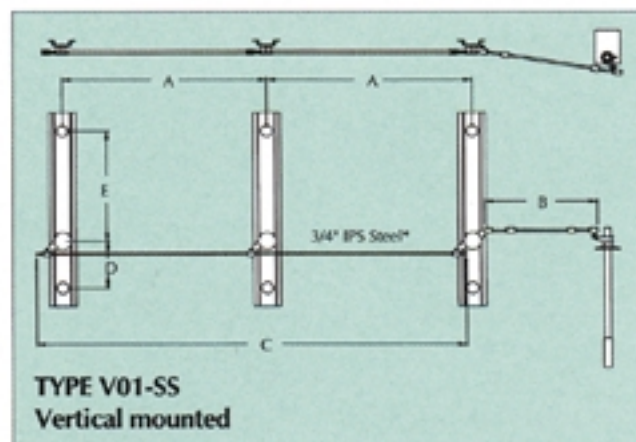
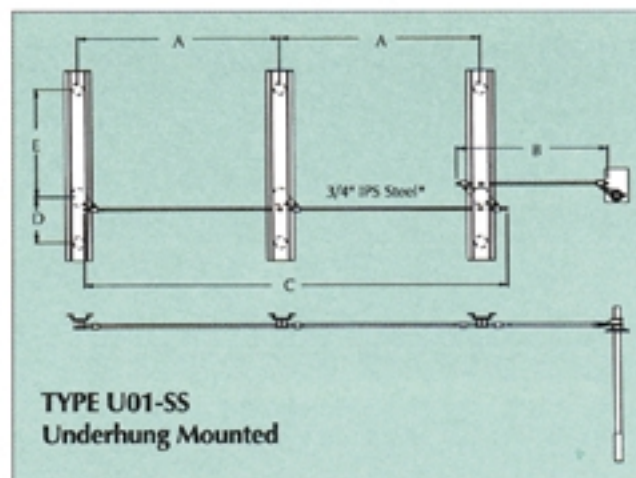
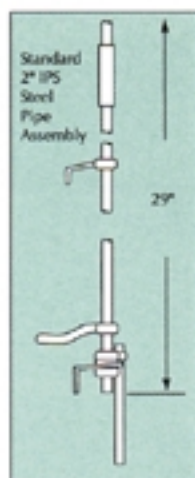
Control mechanisms are illustrated in the closed position. Controls can be supplied for clockwise or counterclockwise opening if requested, or may be changed in the field as necessary.

TECO's standard operating mechanism for vertical-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. An outboard bearing assembly to support the operating pipe is provided. Universal joints in vertical control pipe (when required on offset mountings), and a swing handle with ground shunt and padlock provision is standard. A worm gear operator is provided when required. Motor operators are also available.

### Fast-Switch Ordering Information

| kV   | Dimensions - Inches |     |     |    |    | Catalog Number |             |             |
|------|---------------------|-----|-----|----|----|----------------|-------------|-------------|
|      | A                   | B   | C   | D  | E  | Type H01-SS    | Type U01-SS | Type V01-SS |
| 7.5  | 36                  | 96  | 84  | 13 | 12 | 92800          | 92806       | 92812       |
| 15   | 36                  | 96  | 84  | 13 | 15 | 92801          | 92807       | 92813       |
| 23   | 48                  | 96  | 108 | 13 | 18 | 92802          | 92808       | 92814       |
| 34.5 | 60                  | 120 | 132 | 16 | 24 | 92803          | 92809       | 92815       |
| 46   | 72                  | 120 | 156 | 16 | 30 | 92804          | 92810       | 92816       |
| 69   | 84                  | 120 | 180 | 18 | 42 | 92805          | 92811       | 92817       |

## Standard Design Switches and Bases Improve Deliver-Ability.



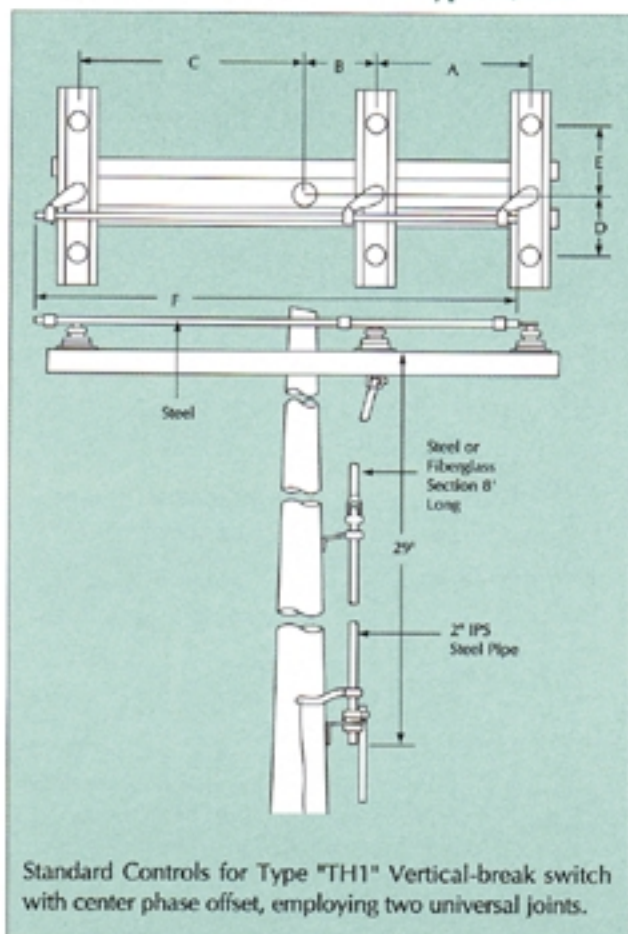
\* through 46 kV - 1" at 69 kV and Above



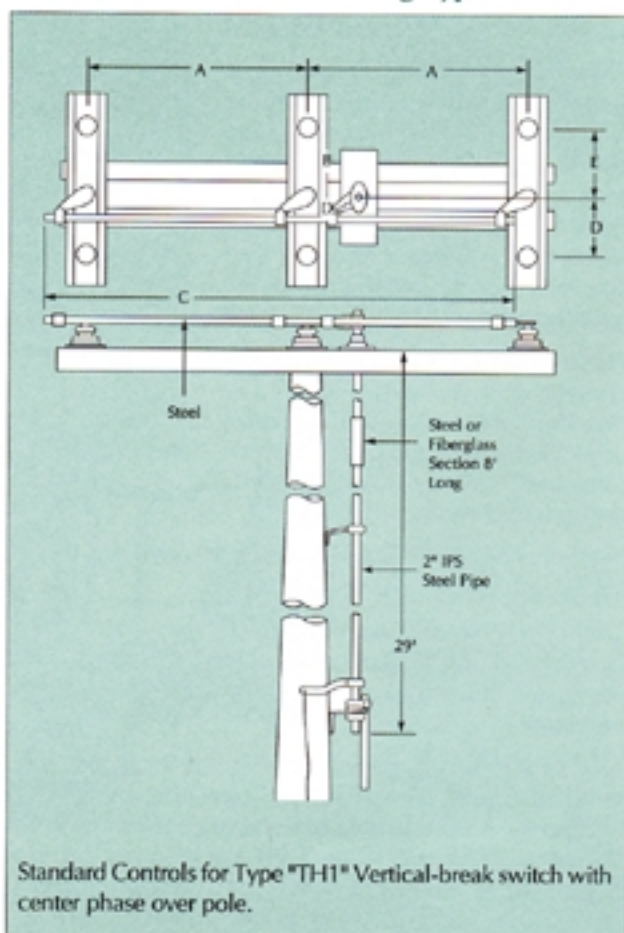
# Control Mechanism

## Fast-Switch Program Pole Mounted Controls

### Horizontal - Direct Drive Type HJ1-SS



### Horizontal - Thrust Bearing Type HT1-SS



When ordering a Pole Mounted *Fast-Switch*, use the two-digit suffix after the catalog number to specify operating mechanism requirements

### Control Type Definition:

**Type SS** - Steel interphase, steel vertical control pipe

**Type WS** - Fiberglass interphase, steel vertical control pipe

**Type WW** - Fiberglass interphase, 8 ft. fiberglass vertical control insert

**Type SW** - Steel interphase, 8 ft. fiberglass vertical control insert

| Kv   | Direct Drive Catalog Number |        |        |        | Dimensions-Inches |    |     |    | Thrust Bearing Drive Catalog Number |        |        |        | Dimensions-Inches |    |       |    |    |     |
|------|-----------------------------|--------|--------|--------|-------------------|----|-----|----|-------------------------------------|--------|--------|--------|-------------------|----|-------|----|----|-----|
|      | HJ1-SS                      | HJ1-SW | HJ1-WS | HJ1-WW | A                 | B  | C   | D  | HT1-SS                              | HT1-SW | HT1-WS | HT1-WW | A                 | B  | C     | D  | E  | F   |
| 7.5  | 92784                       | 92788  | 92792  | 92796  | 36                | 12 | 84  | 13 | 92768                               | 92772  | 92776  | 92770  | 18-36             | 12 | 30-48 | 13 | 12 | 108 |
| 15   | 92785                       | 92789  | 92793  | 92797  | 36                | 15 | 84  | 13 | 92769                               | 92773  | 92777  | 92781  | 24-36             | 12 | 36-48 | 13 | 15 | 108 |
| 23   | 92786                       | 92790  | 92794  | 92798  | 48                | 18 | 108 | 13 | 92770                               | 92774  | 92778  | 92782  | 30-48             | 18 | 48-66 | 13 | 18 | 144 |
| 34.5 | 92787                       | 92791  | 92795  | 92799  | 60                | 24 | 132 | 16 | 92771                               | 92775  | 92779  | 92783  | 36-60             | 18 | 54-78 | 16 | 24 | 168 |



## Fast-Switch Program

### Pole Top Mount Platforms

TECO manufactures a complete line of galvanized steel and aluminum switch mounting platforms for virtually any switch application. Examples of single, two and three pole platforms are listed. Also available are platforms for four and six pole structures. Turner Electric will also design and fabricate platforms for special applications.

Standard or custom switch mounting frames fabricated from either structural aluminum or hot galvanized steel can be supplied as optional items. Assembly bolts, excluding through-bolts, are furnished. Units are shipped coded for ease of assembly.

NOTE: All control dimensions shown are standard; for special dimension arrangements, refer to factory.

## Typical Pole Top Platform Mountings

### Fabricated Switch Frames for Single Pole Mounting

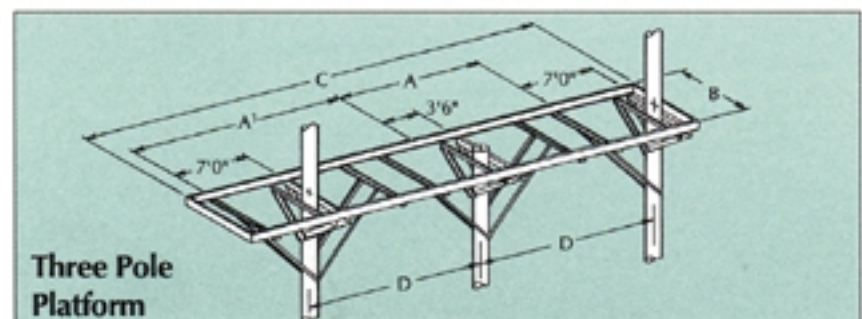
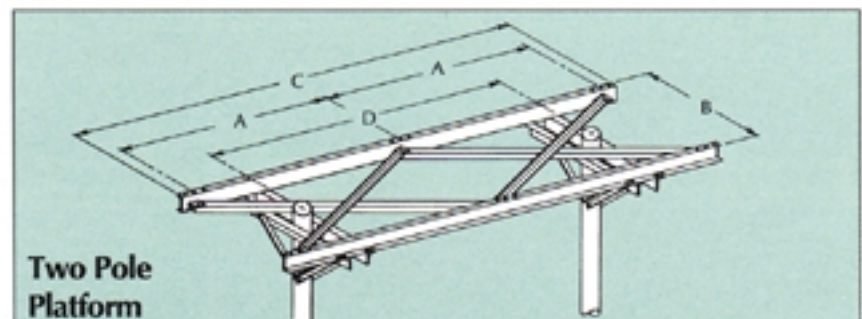
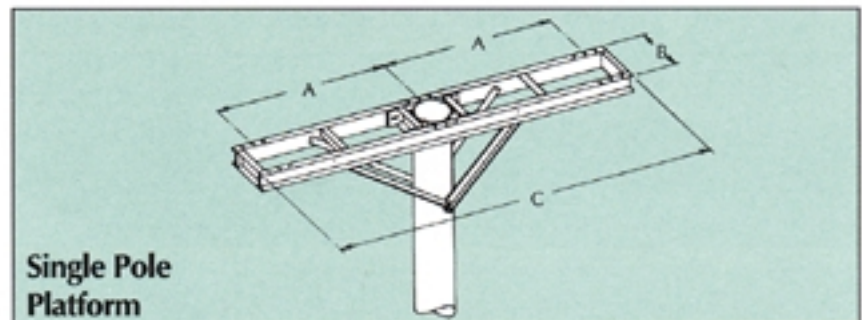
| Switch Rating | Cat. No. | A       | B       | C         |
|---------------|----------|---------|---------|-----------|
| 15 kV         | 1910     | 4' - 6" | 1' - 2" | 10'       |
| 23kV          | 1910     | 4' - 6" | 1' - 2" | 10'       |
| 34kV          | 2320     | 5'      | 1' - 8" | 10' - 9"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





# Ordering Data

Ordering information for Standard Type "TH1" Heavy Duty, Copper, 30° C Rise Vertical Break Switches - 7.5 kV through 161 kV.

In addition to the Standard Designs referenced below, Turner can custom design vertical break switches to your specific system requirements.

| Switch Rating Voltage | Amperes |         | Station Post Technical Ref. No. | Catalog Number - Three Pole Switch |                 |                | Approximate Weight in Pounds |                                      |
|-----------------------|---------|---------|---------------------------------|------------------------------------|-----------------|----------------|------------------------------|--------------------------------------|
|                       | Cont.   | Momen.  |                                 | Horizontal                         | Vertical        | Underhung      | Net per pole                 | Shipping 3-pole Inc crate & controls |
| 7.5 kV                | 600     | 40,000  | TR202                           | TH100706/8000T                     | TH1V00706/8100T | TH1U00706/8200 | 129                          | 770                                  |
| (95 BIL)              | 1200    | 61,000  |                                 | TH100712/8001T                     | TH1V00712/8101T | TH1U00712/8201 | 151                          | 850                                  |
|                       | 2000    | 100,000 |                                 | TH100720/8075T                     | TH1V00720/8175T | TH1U00720/8275 | 273                          | 1333                                 |
| 15 kV                 | 600     | 40,000  | TR205                           | TH101506/8002T                     | TH1V01506/8102T | TH1U01506/8202 | 141                          | 820                                  |
| (110 BIL)             | 1200    | 61,000  |                                 | TH101512/8003T                     | TH1V01512/8103T | TH1U01512/8203 | 162                          | 880                                  |
|                       | 2000    | 100,000 |                                 | TH101520/8076T                     | TH1V01520/8176T | TH1U01520/8276 | 291                          | 1370                                 |
| 23 kV                 | 600     | 40,000  | TR208                           | TH102306/8004T                     | TH1V02306/8104T | TH1U02306/8204 | 175                          | 940                                  |
| (150 BIL)             | 1200    | 61,000  |                                 | TH102312/8005T                     | TH1V02312/8105T | TH1U02312/8205 | 197                          | 1005                                 |
|                       | 2000    | 100,000 |                                 | TH102320/8077T                     | TH1V02320/8177T | TH1U02320/8277 | 333                          | 1502                                 |
| 34.5 kV               | 600     | 40,000  | TR210                           | TH103406/8006T                     | TH1V03406/8106T | TH1U03406/8206 | 244                          | 1102                                 |
| (200 BIL)             | 1200    | 61,000  |                                 | TH103412/8007T                     | TH1V03412/8107T | TH1U03412/8207 | 269                          | 1280                                 |
|                       | 2000    | 100,00  |                                 | TH103420/8078T                     | TH1V03420/8178T | TH1U03420/8278 | 418                          | 1790                                 |
| 46 kV                 | 600     | 40,000  | TR214                           | TH104606/8008T                     | TH1V04606/8108T | TH1U04606/8208 | 299                          | 1402                                 |
| (250 BIL)             | 1200    | 61,000  |                                 | TH104612/8009T                     | TH1V04612/8109T | TH1U04612/8209 | 325                          | 1480                                 |
|                       | 2000    | 100,000 |                                 | TH104620/8079T                     | TH1V04620/8179T | TH1U04620/8279 | 483                          | 1999                                 |
| 69 kV                 | 600     | 40,000  | TR216                           | TH106906/8041T                     | TH1V06906/8110T | TH1U06906/8210 | 476                          | 2216                                 |
| (350 BIL)             | 1200    | 61,000  |                                 | TH106912/8011T                     | TH1V06912/8111T | TH1U06912/8211 | 497                          | 2280                                 |
|                       | 2000    | 100,000 |                                 | TH106920/8080T                     | TH1V06920/8180T | TH1U06920/8280 | 677                          | 2821                                 |
| 115 kV                | 600     | 40,000  | TR286                           | TH111506/8012T                     | TH1V11506/8112T | TH1U11506/8212 | 970                          | 3210                                 |
| (550 BIL)             | 1200    | 61,000  |                                 | TH111512/8013T                     | TH1V11512/8113T | TH1U11512/8213 | 995                          | 3285                                 |
|                       | 2000    | 100,000 |                                 | TH111520/8081T                     | TH1V11520/8181T | TH1U11520/8281 | 1217                         | 3868                                 |
| 138 kV                | 600     | 40,000  | TR288                           | TH113806/8014T                     | TH1V13806/8114T | TH1U13806/8214 | 1075                         | 3575                                 |
| (650 BIL)             | 1200    | 61,000  |                                 | TH113812/8015T                     | TH1V13812/8115T | TH1U13812/8215 | 1097                         | 3641                                 |
|                       | 2000    | 100,000 |                                 | TH113820/8082T                     | TH1V13820/8182T | TH1U13820/8282 | 1341                         | 4246                                 |
| 161 kV                | 600     | 40,000  | TR291                           | TH116106/8016T                     |                 | TH1U16106/8216 | 1189                         | 4217                                 |
| (750 BIL)             | 1200    | 61,000  |                                 | TH116112/8017T                     |                 | TH1U16112/8217 | 1212                         | 4286                                 |
|                       | 2000    | 100,000 |                                 | TH116120/8083T                     |                 | TH1U16120/8283 | 1476                         | 4911                                 |
|                       | 600     | 40,000  | TR295                           |                                    | TH1V16106/8116T |                | 1339                         | 4667                                 |
|                       | 1200    | 61,000  |                                 |                                    | TH1V16112/8117T |                | 1362                         | 4736                                 |
|                       | 2000    | 100,000 |                                 |                                    | TH1V16120/8183T |                | 1626                         | 4886                                 |

NOTE: Shipping weights include insulators

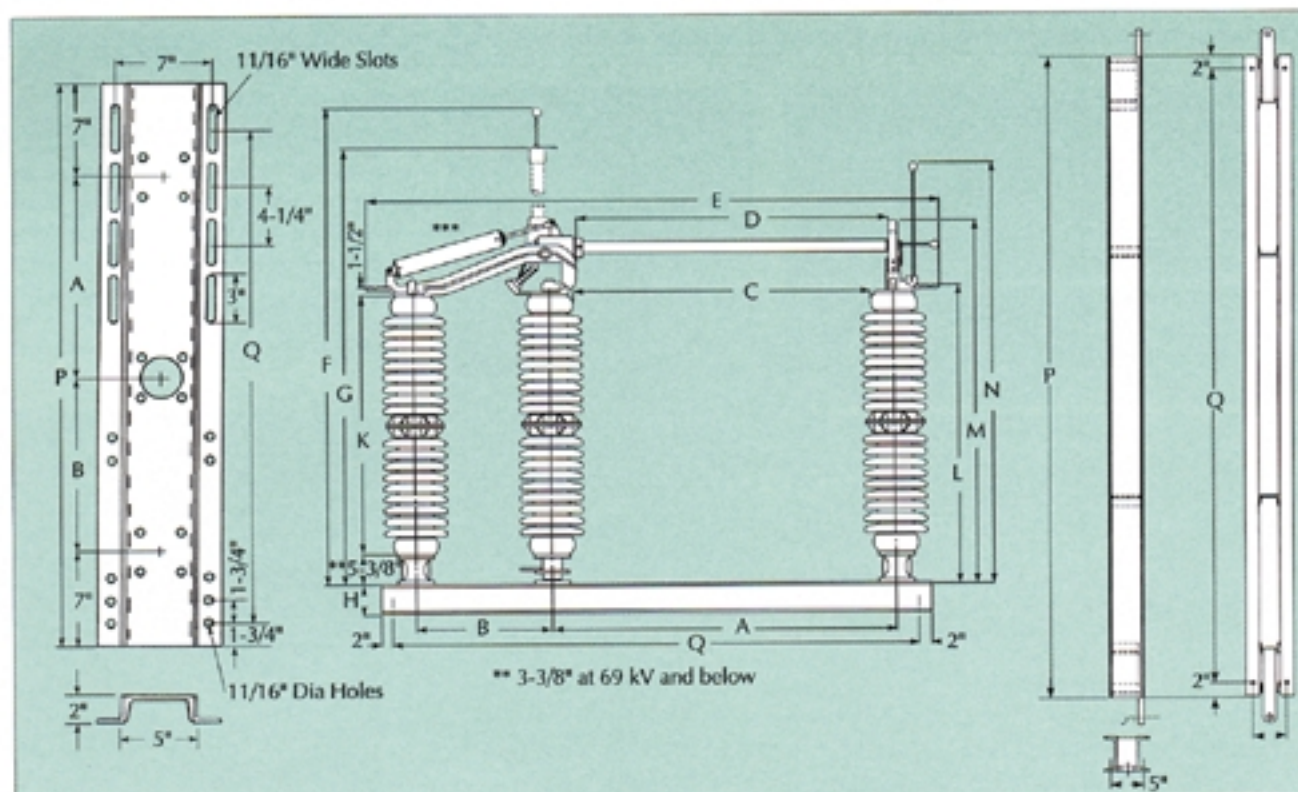


**Fast-Switch / Standard Switch 7.5 kV to 69 kV**

**Standard Switch 115 kV to 161 kV**

**Fast-Switch Base 7.5 kV to 69 kV**

**Standard Base 115 kV to 161 kV**



| Dimensions - Inches (With Post Insulators) |      |    |    |                                |                                |                                 |                                 |                                  |                               |                               |                                |                                |                                |     |     |
|--|------|----|----|--------------------------------|--------------------------------|---------------------------------|---------------------------------|----------------------------------|-------------------------------|-------------------------------|--------------------------------|--------------------------------|--------------------------------|-----|-----|
| kV   | AMP  | A  | B  | C                              | D                              | E                               | F                               | G                                | H                             | K                             | L                              | M                              | N                              | P   | Q   |
| 7.5  | 600  | 15 | 13 | 10 <sup>3</sup> / <sub>4</sub> | 10 <sup>1</sup> / <sub>4</sub> | 40 <sup>1</sup> / <sub>2</sub>  | 36 <sup>3</sup> / <sub>8</sub>  | 30 <sup>3</sup> / <sub>8</sub>   | 1 <sup>7</sup> / <sub>8</sub> | 7 <sup>1</sup> / <sub>2</sub> | 14 <sup>1</sup> / <sub>8</sub> | 22 <sup>1</sup> / <sub>2</sub> | 29 <sup>3</sup> / <sub>4</sub> | 42  | 34  |
|  | 1200 | 15 | 13 | 10 <sup>3</sup> / <sub>4</sub> | 10 <sup>1</sup> / <sub>4</sub> | 42 <sup>1</sup> / <sub>2</sub>  | 41 <sup>3</sup> / <sub>8</sub>  | 35 <sup>11</sup> / <sub>16</sub> | 1 <sup>7</sup> / <sub>8</sub> | 7 <sup>1</sup> / <sub>2</sub> | 14 <sup>3</sup> / <sub>8</sub> | 22 <sup>3</sup> / <sub>4</sub> | 30 <sup>7</sup> / <sub>8</sub> | 42  | 34  |
| 15   | 600  | 15 | 13 | 10 <sup>3</sup> / <sub>4</sub> | 10 <sup>1</sup> / <sub>4</sub> | 40 <sup>1</sup> / <sub>2</sub>  | 42 <sup>1</sup> / <sub>8</sub>  | 35 <sup>13</sup> / <sub>16</sub> | 1 <sup>7</sup> / <sub>8</sub> | 10                            | 16 <sup>3</sup> / <sub>8</sub> | 25                             | 32 <sup>1</sup> / <sub>4</sub> | 42  | 34  |
|  | 1200 | 15 | 13 | 10 <sup>3</sup> / <sub>4</sub> | 10 <sup>1</sup> / <sub>4</sub> | 42 <sup>1</sup> / <sub>2</sub>  | 44 <sup>1</sup> / <sub>8</sub>  | 38 <sup>13</sup> / <sub>16</sub> | 1 <sup>7</sup> / <sub>8</sub> | 10                            | 16 <sup>7</sup> / <sub>8</sub> | 24 <sup>3</sup> / <sub>4</sub> | 33 <sup>3</sup> / <sub>8</sub> | 42  | 34  |
| 23   | 600  | 18 | 13 | 13 <sup>1</sup> / <sub>4</sub> | 13 <sup>1</sup> / <sub>8</sub> | 43 <sup>1</sup> / <sub>2</sub>  | 49 <sup>1</sup> / <sub>8</sub>  | 42 <sup>13</sup> / <sub>16</sub> | 1 <sup>7</sup> / <sub>8</sub> | 14                            | 20 <sup>3</sup> / <sub>8</sub> | 29                             | 36 <sup>1</sup> / <sub>4</sub> | 45  | 37  |
|  | 1200 | 18 | 13 | 13 <sup>1</sup> / <sub>4</sub> | 13 <sup>1</sup> / <sub>8</sub> | 45 <sup>1</sup> / <sub>2</sub>  | 51 <sup>1</sup> / <sub>8</sub>  | 45 <sup>3</sup> / <sub>16</sub>  | 1 <sup>7</sup> / <sub>8</sub> | 14                            | 20 <sup>7</sup> / <sub>8</sub> | 28 <sup>3</sup> / <sub>4</sub> | 37 <sup>3</sup> / <sub>8</sub> | 45  | 37  |
| 34.5                                       | 600  | 24 | 16 | 18 <sup>3</sup> / <sub>8</sub> | 19 <sup>1</sup> / <sub>4</sub> | 52 <sup>1</sup> / <sub>2</sub>  | 59 <sup>3</sup> / <sub>8</sub>  | 52 <sup>3</sup> / <sub>16</sub>  | 1 <sup>7</sup> / <sub>8</sub> | 18                            | 24 <sup>3</sup> / <sub>8</sub> | 33                             | 40 <sup>1</sup> / <sub>4</sub> | 54  | 46  |
|  | 1200 | 24 | 16 | 18 <sup>3</sup> / <sub>8</sub> | 19 <sup>1</sup> / <sub>4</sub> | 54 <sup>1</sup> / <sub>2</sub>  | 61 <sup>1</sup> / <sub>8</sub>  | 55 <sup>3</sup> / <sub>16</sub>  | 1 <sup>7</sup> / <sub>8</sub> | 18                            | 24 <sup>7</sup> / <sub>8</sub> | 32 <sup>3</sup> / <sub>4</sub> | 41 <sup>3</sup> / <sub>8</sub> | 54  | 46  |
| 46   | 600  | 30 | 16 | 23                             | 25 <sup>1</sup> / <sub>4</sub> | 58 <sup>1</sup> / <sub>2</sub>  | 69 <sup>3</sup> / <sub>8</sub>  | 62 <sup>13</sup> / <sub>16</sub> | 1 <sup>7</sup> / <sub>8</sub> | 22                            | 28 <sup>3</sup> / <sub>8</sub> | 37                             | 44 <sup>1</sup> / <sub>4</sub> | 60  | 52  |
|  | 1200 | 30 | 16 | 23                             | 25 <sup>1</sup> / <sub>4</sub> | 60 <sup>1</sup> / <sub>2</sub>  | 71 <sup>1</sup> / <sub>8</sub>  | 65 <sup>3</sup> / <sub>16</sub>  | 1 <sup>7</sup> / <sub>8</sub> | 22                            | 28 <sup>7</sup> / <sub>8</sub> | 36 <sup>3</sup> / <sub>4</sub> | 45 <sup>3</sup> / <sub>8</sub> | 60  | 52  |
| 69   | 600  | 42 | 18 | 34 <sup>1</sup> / <sub>2</sub> | 37 <sup>1</sup> / <sub>4</sub> | 72 <sup>1</sup> / <sub>2</sub>  | 89 <sup>3</sup> / <sub>8</sub>  | 82 <sup>13</sup> / <sub>16</sub> | 1 <sup>7</sup> / <sub>8</sub> | 30                            | 36 <sup>3</sup> / <sub>8</sub> | 45                             | 51 <sup>1</sup> / <sub>4</sub> | 74  | 66  |
|  | 1200 | 42 | 18 | 34 <sup>1</sup> / <sub>2</sub> | 37 <sup>1</sup> / <sub>4</sub> | 74 <sup>1</sup> / <sub>2</sub>  | 91 <sup>1</sup> / <sub>8</sub>  | 85 <sup>13</sup> / <sub>16</sub> | 1 <sup>7</sup> / <sub>8</sub> | 30                            | 36 <sup>7</sup> / <sub>8</sub> | 44 <sup>3</sup> / <sub>4</sub> | 52 <sup>3</sup> / <sub>4</sub> | 74  | 66  |
| 115  | 600  | 60 | 24 | 51 <sup>1</sup> / <sub>2</sub> | 54 <sup>3</sup> / <sub>8</sub> | 100                             | 125 <sup>3</sup> / <sub>8</sub> | 116 <sup>3</sup> / <sub>8</sub>  | .5*                           | 45                            | 56 <sup>3</sup> / <sub>8</sub> | 68 <sup>3</sup> / <sub>8</sub> | 78 <sup>3</sup> / <sub>8</sub> | 96  | 92  |
|  | 1200 | 60 | 24 | 51 <sup>1</sup> / <sub>2</sub> | 53 <sup>3</sup> / <sub>8</sub> | 100 <sup>7</sup> / <sub>8</sub> | 126 <sup>3</sup> / <sub>8</sub> | 116 <sup>7</sup> / <sub>8</sub>  | .5*                           | 45                            | 56 <sup>7</sup> / <sub>8</sub> | 68 <sup>7</sup> / <sub>8</sub> | 78 <sup>7</sup> / <sub>8</sub> | 96  | 92  |
| 138  | 600  | 72 | 24 | 63 <sup>1</sup> / <sub>2</sub> | 66 <sup>3</sup> / <sub>8</sub> | 112                             | 146 <sup>3</sup> / <sub>8</sub> | 136 <sup>3</sup> / <sub>8</sub>  | .5*                           | 54                            | 65 <sup>3</sup> / <sub>8</sub> | 77 <sup>3</sup> / <sub>8</sub> | 87 <sup>3</sup> / <sub>8</sub> | 108 | 104 |
|  | 1200 | 72 | 24 | 63 <sup>1</sup> / <sub>2</sub> | 65 <sup>3</sup> / <sub>8</sub> | 112 <sup>7</sup> / <sub>8</sub> | 147 <sup>3</sup> / <sub>8</sub> | 136 <sup>7</sup> / <sub>8</sub>  | .5*                           | 54                            | 65 <sup>7</sup> / <sub>8</sub> | 77 <sup>7</sup> / <sub>8</sub> | 87 <sup>7</sup> / <sub>8</sub> | 108 | 104 |
| 161  | 600  | 84 | 24 | 75 <sup>1</sup> / <sub>2</sub> | 78 <sup>3</sup> / <sub>8</sub> | 124                             | 166 <sup>3</sup> / <sub>8</sub> | 155 <sup>3</sup> / <sub>8</sub>  | .5*                           | 62                            | 73 <sup>3</sup> / <sub>8</sub> | 85 <sup>3</sup> / <sub>8</sub> | 95 <sup>3</sup> / <sub>8</sub> | 120 | 116 |
|  | 1200 | 84 | 24 | 75 <sup>1</sup> / <sub>2</sub> | 77 <sup>3</sup> / <sub>8</sub> | 124 <sup>7</sup> / <sub>8</sub> | 167 <sup>3</sup> / <sub>8</sub> | 156 <sup>3</sup> / <sub>8</sub>  | .5*                           | 62                            | 73 <sup>7</sup> / <sub>8</sub> | 85 <sup>7</sup> / <sub>8</sub> | 95 <sup>7</sup> / <sub>8</sub> | 120 | 116 |

\* Typical, Base heights and widths vary according to customer's applications.

\*\*\* Counter balance - 69 kV and above only



For more than 40 years, Turner Electric has operated their business under one simple philosophy statement: "We will serve the electric utility industry by delivering innovative products possessing outstanding features and benefits, exhibiting the highest standards of quality in components and manufacture."

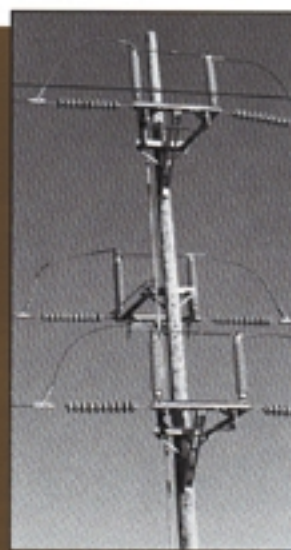
Our all-encompassing goal at Turner Electric is equally simple: achieve complete customer satisfaction.



#### **Distribution Equipment** **Switches, Transformer Cluster Mounts and** **Ground Mats**

From the U/D/S/I switch to our family of hookstick switches, Turner offers the same quality construction and superior engineering evident in our Transmission Switches. Whether operated manually or automatically, all Turner distribution switches are available in cost-effective standard designs as well as custom-engineered versions. A full complement of accessories are offered.

The same high-quality manufacturing facility that creates switch platforms produces a full range of Transformer Cluster Mounts, as well as the Turner Ground Mat for substation switching applications.



#### **Transmission Voltage Switches** **Pole, Platform and Crossarm Mounting**

Turner earned its reputation as a premier supplier of transmission voltage air break switches during its infancy in the 1950's. Innovative designs and a unique problem-solving attitude are evident in the thousands of custom applications Turner has been involved in during the last four decades.

One way, two way and three way switches can be configured for virtually any pole, platform or cross arm mounting.

#### **Interrupter Retrofit Kits** **Full Load Break and Loop Split** **Vacuum Interrupters**

In a class by themselves, the famous TECO Rupter offers the advantages of vacuum load interruption to any air break switch, regardless of manufacturer. Easily field installed, TECO Rupter kits come in a variety of stock sizes and ratings - 5 kV through 230 kV; 600 Amp through 2000 Amp.

Its a Turner exclusive!



#### **Motor Operators**

##### **Remote, Automatic and SCADA System**

Combining the latest electro-hydraulic actuators with solid-state circuits, Turner Models HS2, HS3 and HS4 Motor Operators offer field adjustable speed and torque output, torsional or reciprocal operating movement.

Unlike many other Motor Operators, Turner MO's can be retrofit to air break switches manufactured by other companies. Existing installations can be easily updated to today's operating technology.

**In addition to the products covered by this brochure, Turner manufactures sidebreak and centerbreak switches for substation applications.**

**Contact Turner for all your switching needs.**