



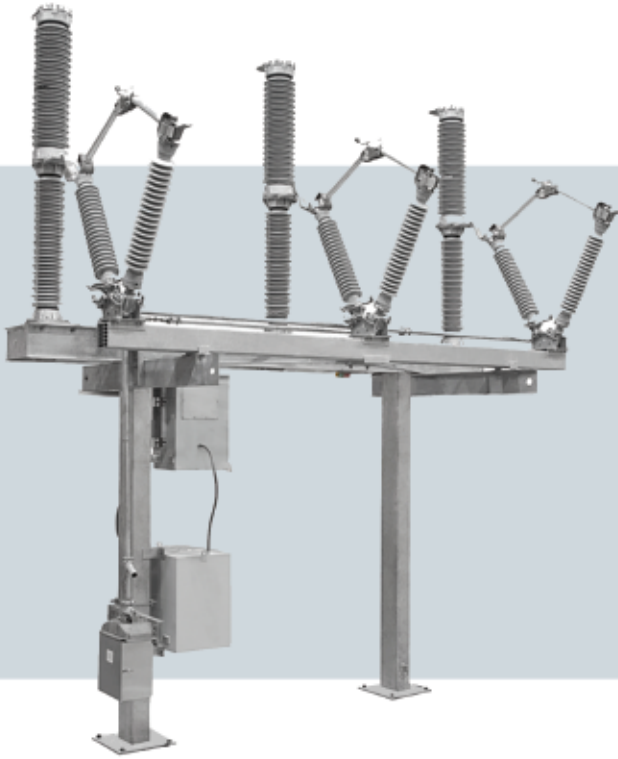
# Circuit Switcher Type CPV2

72.5 - 245kV

Power Transmission & Distribution

**SIEMENS**

# Type CPV2 Circuit Switchers



## Siemens CPV2 Circuit Switchers

Siemens Type CPV2 (Circuit Protector Vertical) circuit switchers are ideal for applications that require 3 cycle circuit interruption and requires limited space. The CPV2 model provides space-saving, fast protection at an economical cost.

Operation of the CPV2 is controlled by a FA2 spring operator which is same as the operating mechanism used in the SPS2 SF6 Circuit Breakers worldwide. There are several reasons to specify and install the CPV2 Circuit Switcher: field proven design, robust construction, simple installation, minimal maintenance and low installed cost. The Siemens CPV2 can switch and protect transformers, cables, shunt capacitor banks and shunt reactors. It also provides a low cost, low temperature, high fault interrupting device. It has a consistent and fast operating time of 3 cycles with a high interrupting capability of up to 40kA.

The Siemens type CPV2 Circuit Switcher is ideal for space limited applications. In new or existing substations where sufficient room is not available to install a horizontal circuit switcher or a conventional SF6 dead tank circuit breaker. The vertical type CPV2 is also the preferred model for retrofit installations where a circuit switcher is recommended to replace an existing fault interrupting device.

## Gas Monitoring

Each pole unit is equipped with a manifold which incorporates a fill valve, a pressure gauge and rupture disc. This manifold is located at the lower end of the pole unit, connected to the cover assembly by a union coupling. The coupling allows the pressure gauge to be rotated by the user to provide the most satisfactory view from the ground.

The pressure gauge has a color coded face for ease of reading from a distance. A label showing a picture of the gauge and an operating pressure range versus ambient temperature is located on the door of the control cabinet.

For specific applications of the Siemens Type CPV2 Circuit Switcher, contact the nearest Siemens sales office.

## Siemens exclusive!

As an option, the Siemens CPV2 Circuit Switcher can be equipped with a temperature compensated pressure switch to automatically monitor the SF6 gas status in the pole units. This switch with gauge is located inside the control cabinet and is connected to the pole units by stainless steel tubing. It has two sets of contacts. One set of contacts provides an alarm indication when the gas pressure approaches within 5 psi of the lockout value. The other set prevents operation if gas pressure falls to a level at which current interruption is not assured. The temperature compensating feature of the switch avoids alarms and lockouts due to normal pressure variations associated with local temperature changes.

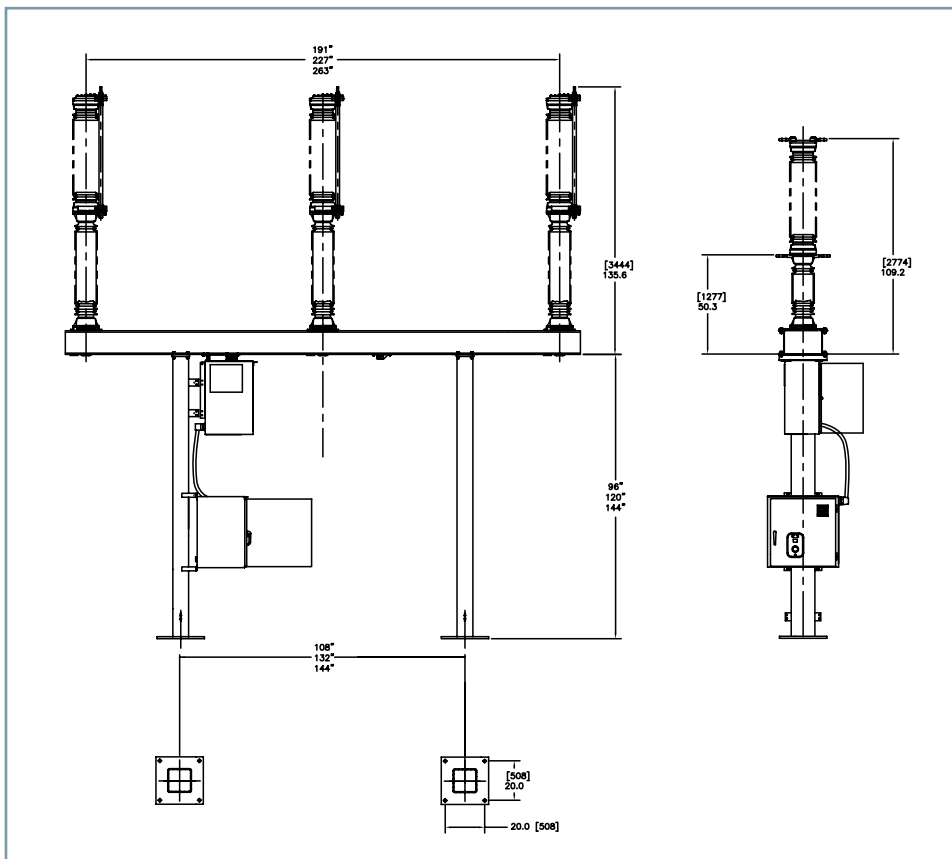
# Features and Ratings

## Key Features

- 72.5 thru 169kV Shipped Assembled.
- 245kV Shipped in Sub-Assemblies.
  - Factory timed and tested to save installation time and cost.
  - Pre-engineered designs facilitate reduced approval times and allow quicker delivery times.
- Vertical Interrupter Design.
  - Requires minimum installation space. Ideal for retrofit applications.
- Increased Interrupting Ratings.
  - 20kA, 25kA, 31.5kA, 40kA Primary Fault Ratings Available
  - Ratings based on TRV parameters defined in Table 2 of ANSI C37.06.
- Fast 3 CYCLE Interrupting Speed.
  - Significantly reduces system disturbances and minimizes damage to key system components.
- Full Strength Interrupter Insulation.
  - Maintains full BIL insulation across open contacts and permits use of non-disconnect models.
- Proven Spring Operator Mechanism.
  - FA2 Spring Operator offers simple stored energy mechanism.
  - Same operator used on 10,000 SPS2 SF6 Gas Circuit Breakers.
- Color-coded PSI Gauge
  - Permits easy gas pressure readings for each pole from a distance
- Rupture Disk on each Interrupter
  - Protection for over-pressure conditions in any pole unit

## CPV2 Ratings

- Maximum Design Voltages ---  
72.5, 121, 145, 169 and 245 kV
- BIL of SF6 Interrupter ---  
350, 550, 650, 750 and 900KV
- Continuous Currents ---  
1200, 1600, 2000 and 3000 amperes
- Short Circuit Interrupting Capacity ---  
20, 25, 31.5 and 40 Kv
- Transformer Thru-fault ---  
4 KA rms symmetrical
- Close and Latch (fault closing, multiple duty) ---  
108 KA rms crest
- Thru-Fault Withstand (10 cycles Momentary) ---  
108 KA rms crest
- 3-Second Short Time Current ---  
40 KA rms symmetrical



## Operation Current Ratings

| Device Description    | 48VDC (Amps) | 125VDC (Amps) |
|-----------------------|--------------|---------------|
| Motor Inrush Current  | 75           | 33            |
| Motor Running Current | 17.4         | 9.8           |
| Trip Coil Currents    | 16           | 12            |
| Anti-Pump Relay Coil  | 0.2          | 0.1           |
| Time Delay Relay Coil | 0.2          | 0.1           |
| Motor Fuses           | 30           | 15            |
| Heater Fuses          | 30           | 15            |

# Type FA2 Operating Mechanism

The type FA2 operator and necessary control and monitoring equipment are housed in a common cabinet. Large doors located on either side of cabinet are easily lifted from their hinges for unobstructed access to the cabinet interior.

The FA2 operating mechanism stores energy for use in closing the circuit switcher. This energy is stored by compressing a powerful spring. An electrical motor with an integral gear reduction set (called a gearmotor) is used to compress the operator spring. The purpose of storing the motor-supplied energy in the spring is to allow a rapid closing operation of the circuit switcher. It takes about ten seconds for the gearmotor to

compress the spring, but the spring can discharge and close the switcher in less than 0.1 seconds.

With the circuit switcher open, a close operation is initiated by energizing the gearmotor. The closing spring becomes fully compressed, and then discharges, closing the switcher and charging the opening spring. The gearmotor is automatically de-energized.

The switcher is maintained in the closed position by a latch system in the operator. A trip operation is initiated by energizing a solenoid which releases the trip latch and allows the switcher to open.

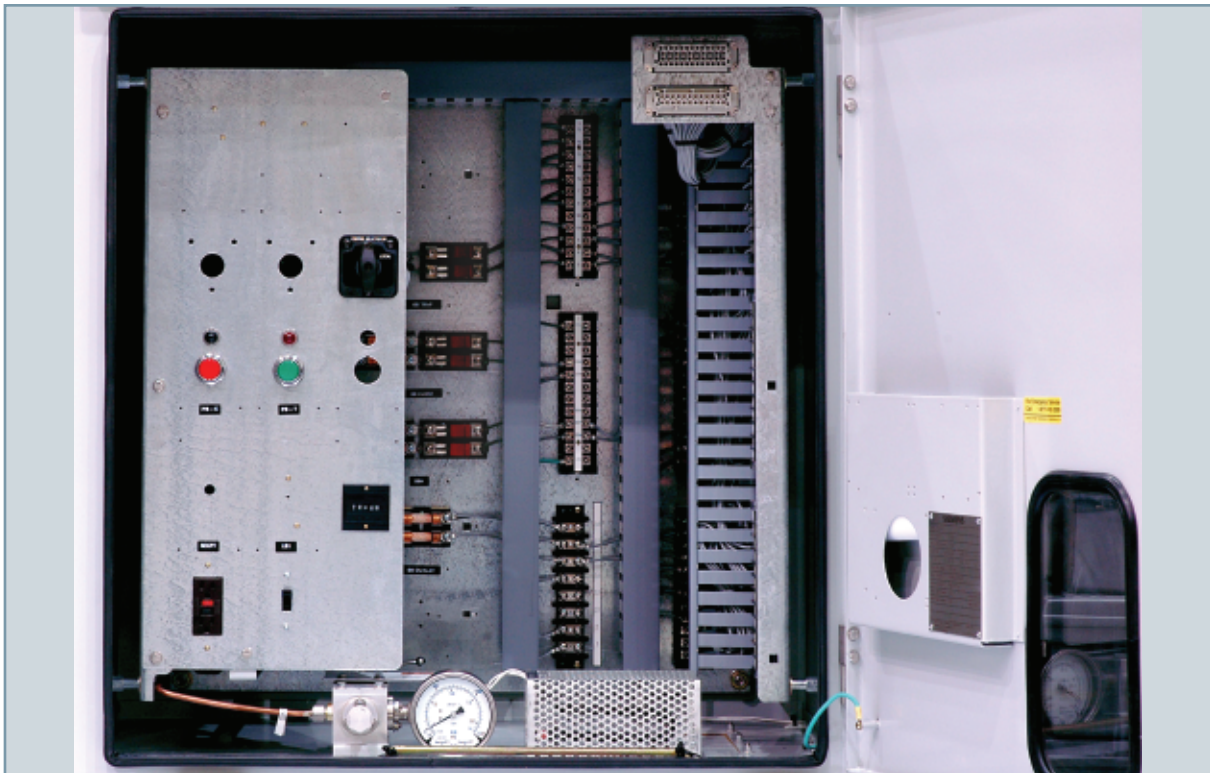
## Standard and Optional Features (Shown)

- A FA-4 Spring Operator Mechanism
- B Two Cabinets, Painted ANSI Gray #70
- C Close Coil/ Dual Trip Coils
- D Control Terminal Blocks
- E Red/Green Indicating Lights
- F Trip/Close Pushbuttons
- G Non-Reset Operations Counter
- H 14-Stage Adjustable Auxiliary Switch (8 Stages for Customer)
- I 120 or 240 VAC Heater
- J Fused Pull-Outs for DC Control and Heater Circuits
- K Open/Close Position Indicator (Interrupter)
- L Internal Cabinet Lights (2) with Toggle Switch (1)
- M Duplex Receptacle (GFI)
- N 125 VDC Motor

- O View Window in Front Door
- P Local/Remote Selector Switch (Optional)
- Q Gas Monitor with Lock-Out (Optional)
- R Control Relay(s) (Optional)
- S Auxiliary Switch Stages to 28 Max. – 24 Stages for Customer (Optional)
- T Pressure Gauge (Optional with Gas Monitor System)
- U Gas Fill Port (Optional with Gas Monitor System)

## Other Optional Features (Not Shown)

- Internal Cabinet Light with Door Actuated Switch
- Fused Knife Switches
- Molded Case Circuit Breakers
- 120/240 VAC Cabinet Heater with Thermostat Control
- 48 VDC Motor



# SF6 Gas Density Monitor

The circuit switcher can be equipped with a temperature compensated pressure switch to automatically monitor the status of the SF6 gas in the pole units. The pole unit gas systems will then be connected to the density switch, which is located inside the control cabinet. The switch has two contacts, one for an alarm indicating low gas, and the second will prevent operation at a level at which current interruption is not recommended.

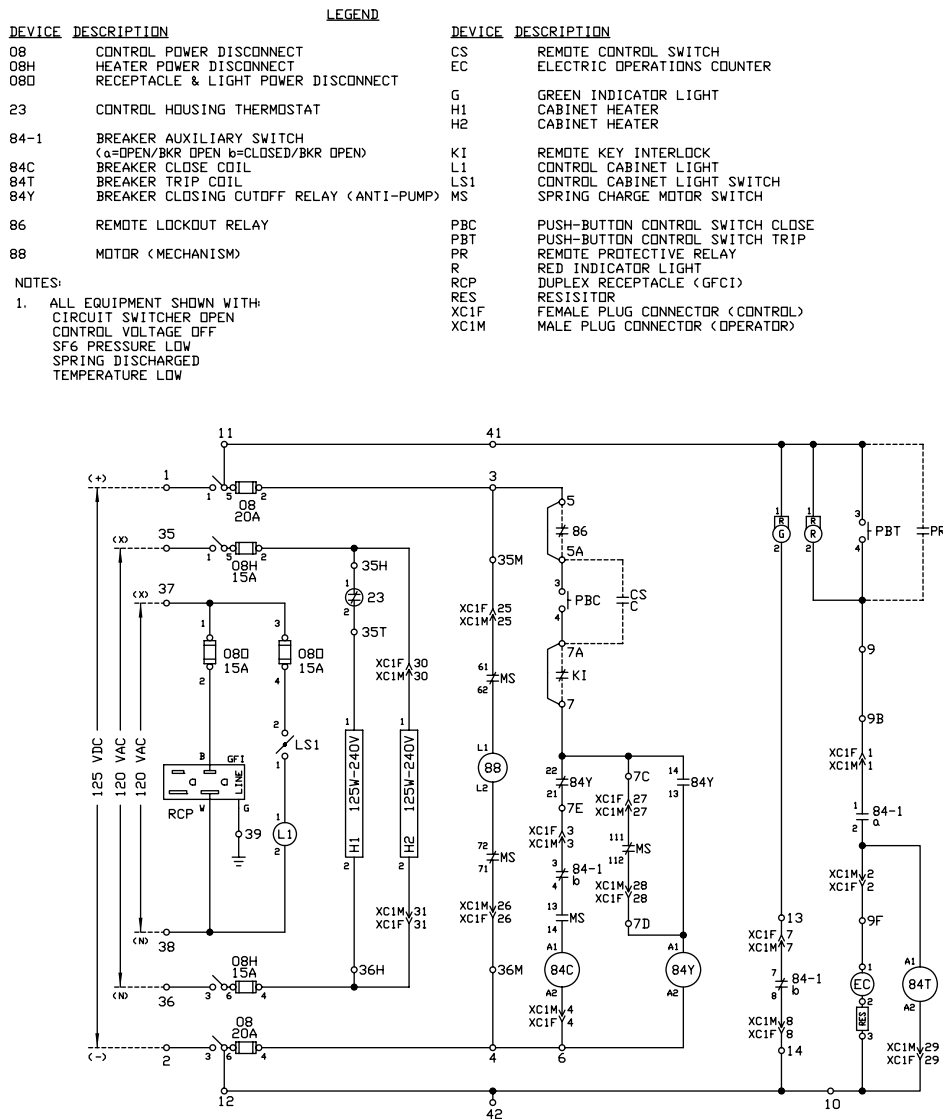
The system incorporates a fill port and pressure gauge with easy access located inside the control cabinet. The gauge is located by the cabinet window for ease of viewing, without opening the door.

## Low Temperature Operation

If specified, the circuit switcher is suitable for operation in temperatures ranging from -40F (-40C) to +104F (40C). The maximum interrupting current is 31.5 kA.

## Additional Options

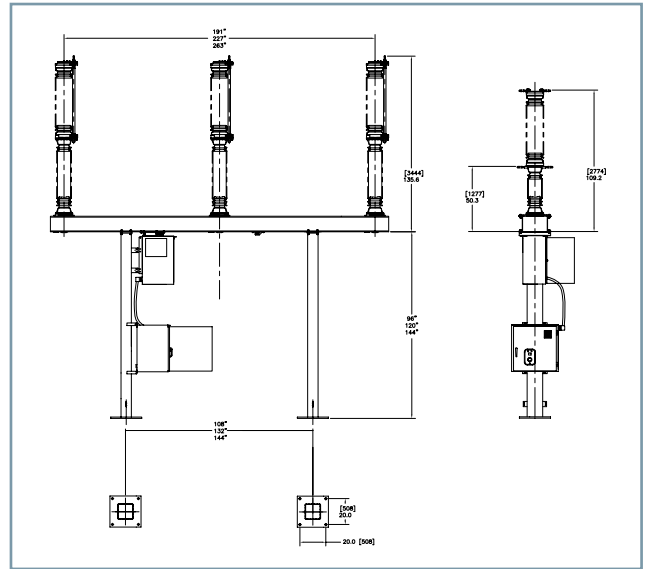
External Manual Trip  
Additional Auxiliary Switch Contacts (12)  
Thermostat for the Control Cabinet Heater  
Control Switch, with pistol grip handle  
Local remote switch  
Bypass switch  
Center Break Disconnect switch  
Ground switch  
Seismic Design per IEEE 693



# Dimension Data

Siemens has designed the CPV2 With our customers' needs in mind:

- Three-cycle operation
- Greater interrupting capabilities of 20, 25, 31.5, and 40kA
- Greater continuous current ratings of 1200, 1600, 2000
- Continuous gas monitoring for EPA compliance
- State-of-the-art arc-assist technology
- Anchor bolts and column spacing designed to accommodate existing 12" x 12" or 20" x 20" foundations
- Two cabinet design for ease of shipping and installation and long-term access and inspection
- Optional accessories include grounding switch, by-pass switch and disconnect switch (motorized option)

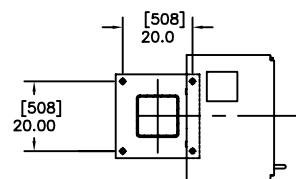
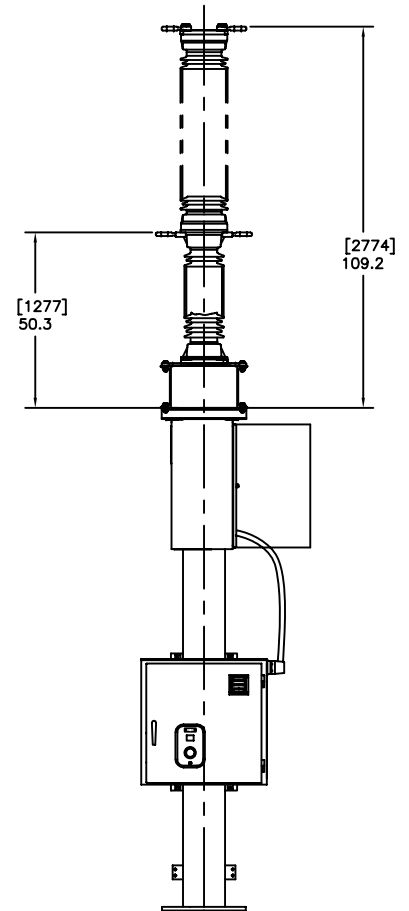
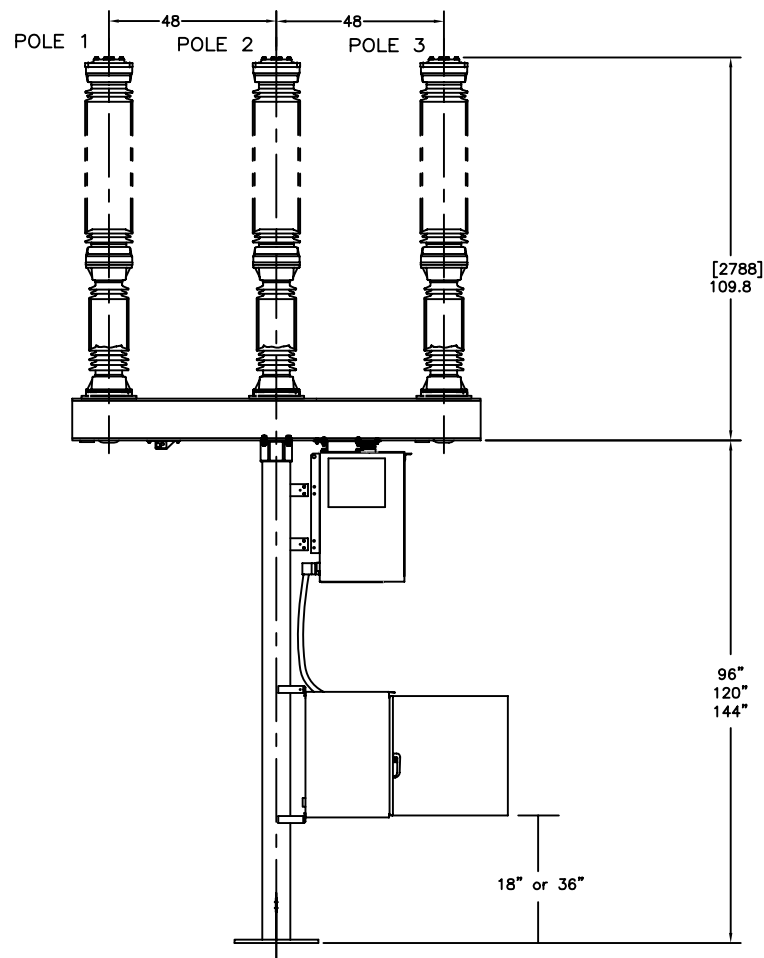


| Dimensional Data  |              |       |     |       |      |                |       |     |       |      |                |       |     |       |      |
|-------------------|--------------|-------|-----|-------|------|----------------|-------|-----|-------|------|----------------|-------|-----|-------|------|
| Structure Height  | 8'0" (96.0") |       |     |       |      | 10'0" (120.0") |       |     |       |      | 12'0" (144.0") |       |     |       |      |
| kV Rating         | 72.5         | 121   | 145 | 170   | 245  | 72.5           | 121   | 145 | 170   | 245  | 72.5           | 121   | 145 | 170   | 245  |
| Internal kV BIL   | 350          | 550   | 650 | 750   | 900  | 350            | 550   | 650 | 750   | 900  | 350            | 550   | 650 | 750   | 900  |
| Insulator kV      | 72.5         | 121   | 145 | 170   | 245  | 72.5           | 121   | 145 | 170   | 245  | 72.5           | 121   | 145 | 170   | 245  |
| Phase Spacing     | 48           | 84    |     | 102   | 110  | 48             | 84    |     | 102   | 110  | 48             | 84    |     | 102   | 110  |
|                   | 84           | 102   |     | 120   | --   | 84             | 102   |     | 120   | --   | 84             | 102   |     | 120   | --   |
| "A" Dim. (In.)    | 109.2        | 130.8 |     | 148.5 | 186  | 109.2          | 130.8 |     | 148.5 | 186  | 109.2          | 130.8 |     | 148.5 | 186  |
| "B" Dim. (In.)    | 50.3         | 71.9  |     | 81.8  | 100  | 50.3           | 71.9  |     | 81.8  | 100  | 50.3           | 71.9  |     | 81.8  | 100  |
| Net Weight (lbs.) | 4450         | 4750  |     | 5100  | 8800 | 4550           | 4850  |     | 5200  | 8900 | 4650           | 4950  |     | 5300  | 9000 |

| Ratings Chart  |                  |              |                            |                     |                     |                                      |                                             |                          |                                             |                                               |                                 |
|----------------|------------------|--------------|----------------------------|---------------------|---------------------|--------------------------------------|---------------------------------------------|--------------------------|---------------------------------------------|-----------------------------------------------|---------------------------------|
| Identification | Ratings          |              |                            |                     |                     |                                      |                                             |                          | Related Capabilities                        |                                               |                                 |
| Type           | Nominal kV Class | Voltage      |                            | Insulation          |                     | Current                              |                                             | Interrupting Time Cycles | Current Values - Amps                       |                                               |                                 |
|                |                  | Rated Max kV | Rated Voltage Range Factor | Low Freq. (kV, rms) | Impulse (kV, crest) | Rated Continuous Current (Amps. rms) | Rated Short Circuit Current at Rated Max kV |                          | Maximum Symmetrical Interrupting Capability | 3 sec. Short Time Current Carrying Capability | Closing and Latching Capability |
| CPV2-72.5-20   | 69.0             | 72.5         | 1.0                        | 160                 | 350                 | 1200 thru 3000                       | 20,000                                      | 3                        | 20,000                                      | 40,000                                        | 108,000                         |
| CPV2-72.5-25   | 69.0             | 72.5         | 1.0                        | 160                 | 350                 | 1200 thru 3000                       | 25,000                                      | 3                        | 25,000                                      | 40,000                                        | 108,000                         |
| CPV2-72.5-31.5 | 69.0             | 72.5         | 1.0                        | 160                 | 350                 | 1200 thru 3000                       | 31,500                                      | 3                        | 31,500                                      | 40,000                                        | 108,000                         |
| CPV2-72.5-40   | 69.0             | 72.5         | 1.0                        | 160                 | 350                 | 1200 thru 3000                       | 40,000                                      | 3                        | 40,000                                      | 40,000                                        | 108,000                         |
| CPV2-121-20    | 115              | 121          | 1.0                        | 260                 | 550                 | 1200 thru 3000                       | 20,000                                      | 3                        | 20,000                                      | 40,000                                        | 108,000                         |
| CPV2-121-25    | 115              | 121          | 1.0                        | 260                 | 550                 | 1200 thru 3000                       | 25,000                                      | 3                        | 25,000                                      | 40,000                                        | 108,000                         |
| CPV2-121-31.5  | 115              | 121          | 1.0                        | 260                 | 550                 | 1200 thru 3000                       | 31,500                                      | 3                        | 31,500                                      | 40,000                                        | 108,000                         |
| CPV2-121-40    | 115              | 121          | 1.0                        | 260                 | 550                 | 1200 thru 3000                       | 40,000                                      | 3                        | 40,000                                      | 40,000                                        | 108,000                         |
| CPV2-145-20    | 138              | 145          | 1.0                        | 310                 | 650                 | 1200 thru 3000                       | 20,000                                      | 3                        | 20,000                                      | 40,000                                        | 108,000                         |
| CPV2-145-25    | 138              | 145          | 1.0                        | 310                 | 650                 | 1200 thru 3000                       | 25,000                                      | 3                        | 25,000                                      | 40,000                                        | 108,000                         |
| CPV2-145-31.5  | 138              | 145          | 1.0                        | 310                 | 650                 | 1200 thru 3000                       | 31,500                                      | 3                        | 31,500                                      | 40,000                                        | 108,000                         |
| CPV2-145-40    | 138              | 145          | 1.0                        | 310                 | 650                 | 1200 thru 3000                       | 40,000                                      | 3                        | 40,000                                      | 40,000                                        | 108,000                         |
| CPV2-170-20    | 161              | 170          | 1.0                        | 365                 | 750                 | 1200 thru 3000                       | 20,000                                      | 3                        | 20,000                                      | 40,000                                        | 108,000                         |
| CPV2-170-25    | 161              | 170          | 1.0                        | 365                 | 750                 | 1200 thru 3000                       | 25,000                                      | 3                        | 25,000                                      | 40,000                                        | 108,000                         |
| CPV2-170-31.5  | 161              | 170          | 1.0                        | 365                 | 750                 | 1200 thru 3000                       | 31,500                                      | 3                        | 31,500                                      | 40,000                                        | 108,000                         |
| CPV2-170-40    | 161              | 170          | 1.0                        | 365                 | 750                 | 1200 thru 3000                       | 40,000                                      | 3                        | 40,000                                      | 40,000                                        | 108,000                         |
| CPV2-245-20    | 230              | 245          | 1.0                        | 425                 | 900                 | 1200 thru 3000                       | 20,000                                      | 3                        | 40,000                                      | 40,000                                        | 108,000                         |
| CPV2-245-25    | 230              | 245          | 1.0                        | 425                 | 900                 | 1200 thru 3000                       | 25,000                                      | 3                        | 40,000                                      | 40,000                                        | 108,000                         |
| CPV2-245-31.5  | 230              | 245          | 1.0                        | 425                 | 900                 | 1200 thru 3000                       | 31,500                                      | 3                        | 40,000                                      | 40,000                                        | 108,000                         |
| CPV2-245-40    | 230              | 245          | 1.0                        | 425                 | 900                 | 1200 thru 3000                       | 40,000                                      | 3                        | 40,000                                      | 40,000                                        | 108,000                         |

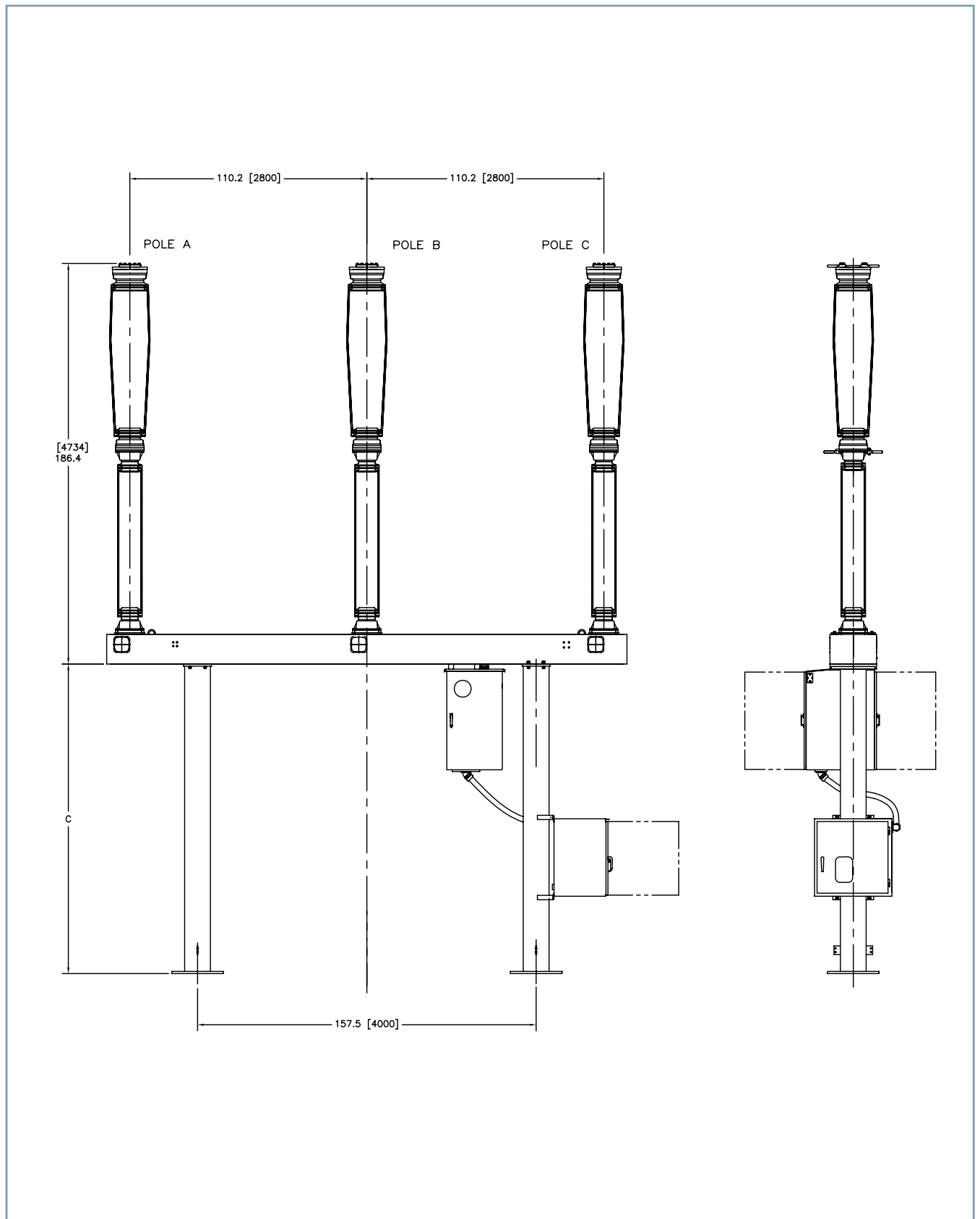
# Type CPV2 - 72.5 kV

## Low Profile

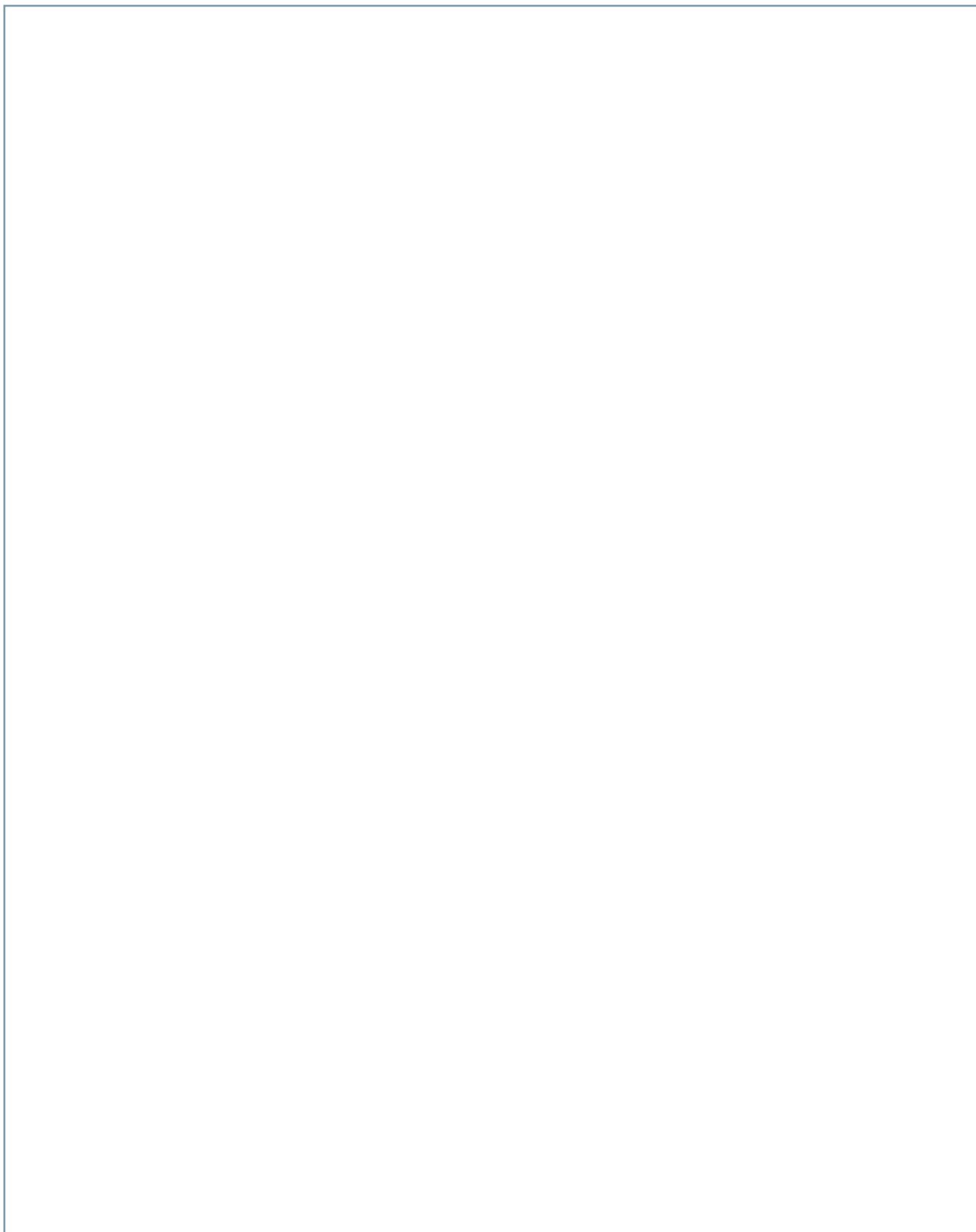


FOUNDATION PLAN VIEW

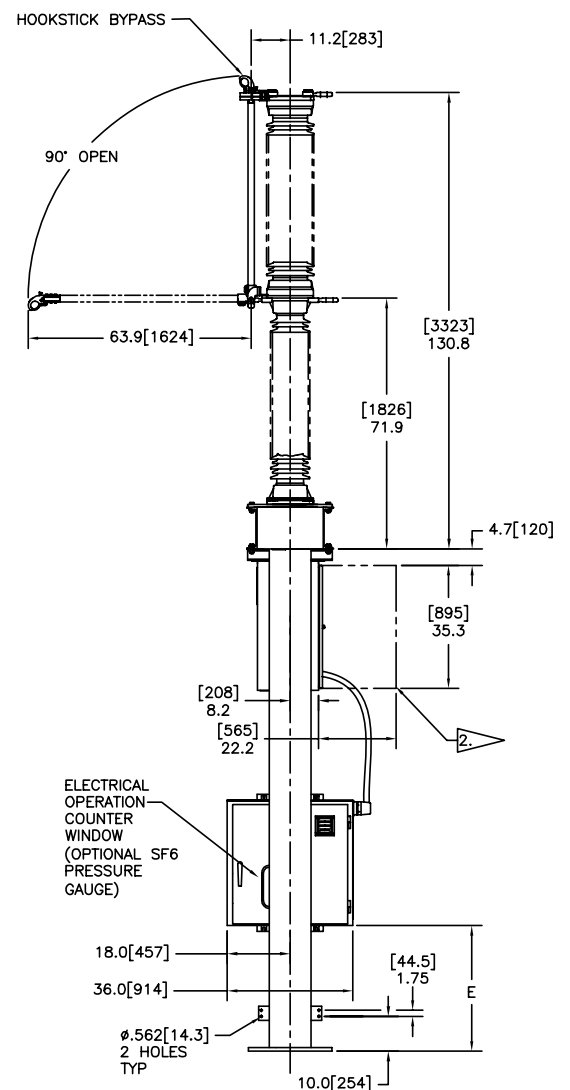
# Type CPV2 - 245 kV FG



# Type CPV2 - 245 kV FI



## By-pass Switch (right)



# Application Guide

## CPV2 Circuit Switcher

| Application             |                                                                                                         | Qualification                                                                         | Maximum Current <sup>a</sup>              |
|-------------------------|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------|
| Transformer             |                                                                                                         |                                                                                       |                                           |
| Protection              | Fault Interrupting                                                                                      | Primary Faults<br>Secondary Faults                                                    | 40,000 <sup>c</sup><br>6,000 <sup>d</sup> |
| Switching               | Parallel Switching<br>Load Dropping <sup>b</sup>                                                        | --<br>--                                                                              | 4,000<br>4,000                            |
| Line or Cable           |                                                                                                         |                                                                                       |                                           |
| Protection              | Fault Interrupting                                                                                      | --                                                                                    | 40,000                                    |
| Switching               | Load Splitting (parallel or loop switching)<br>Load Dropping<br>Line, Cable Dropping (charging current) | --<br>--<br>--                                                                        | 4,000<br>4,000<br>400                     |
| Single Shunt Capacitor  |                                                                                                         |                                                                                       |                                           |
| Protection              | Fault Interrupting                                                                                      | --                                                                                    | 40,000 <sup>c</sup>                       |
| Switching               | Bank Current Switching                                                                                  | Grounded capacitor banks through 170kV<br>Undergrounded capacitor banks through 123kV | 400 <sup>e</sup><br>400 <sup>f</sup>      |
| Series Reactor          |                                                                                                         |                                                                                       |                                           |
| Switching               |                                                                                                         | Refer to local Siemens PT&D sales representative                                      |                                           |
| Shunt Reactor Switching |                                                                                                         |                                                                                       |                                           |
| Protection              | Fault Interrupting                                                                                      | --                                                                                    | 40,000                                    |
| Switching               | Reactor Current Switching                                                                               | Grounded reactor applied on solidly grounded systems through 170kV                    | 4,000 (but not less than 250)             |

- a** Maximum switching/interrupting current (amperes) RMS symmetrical. Tripping of the CPV2 circuit switcher need not be coordinated with source side breakers for short circuit faults up to 40kA RMS symmetrical. Ratings are per ANSI temperature range of -30°C (-22°F) to +40°C (+104°F).
- b** Siemens circuit switchers can close, carry, and interrupt the magnetizing current of the protected transformer.
- c** Rating is based on transient-recovery-voltage parameters defined in Table 2A of ANSI standard C37.06-1997 for Siemens circuit Switchers rated 72.5kV and Table 3A for 123kV through 245kV.
- d** Siemens circuit switchers are suitable for transformer-primary applications where the inherent secondary-side of the transformer does not exceed 6000 amperes. The inherent secondary fault current is defined as secondary-side fault current as reflected through to the primary side of the transformer and may be calculated as follows.

$$I = \frac{100}{\sqrt{3}} \times \frac{KVA}{E \times Z} \text{ where}$$

$I$  = Inherent Secondary Fault Current  
 $KVA$  = Transformer Self-cooled 3-phase Rating  
 $E$  = System Voltage kV  
 $Z$  = Impedance Primary-to-Secondary in Percent

For applications where the inherent secondary-fault current exceeds the above limits, but where the maximum expected fault current, Based on transformer impedance plus source impedance is within these limits, refer to your local Siemens sales representative.

- e** Grounded capacitor banks applied on solidly grounded systems at a maximum line-to-ground voltage of  $1.0 \times \frac{E}{\sqrt{3}}$
- f** Ungrounded capacitor banks at a maximum line-to-ground voltage of  $1.5 \times \frac{E}{\sqrt{3}}$

# Interrupter Unit

## Arc-assist interrupter

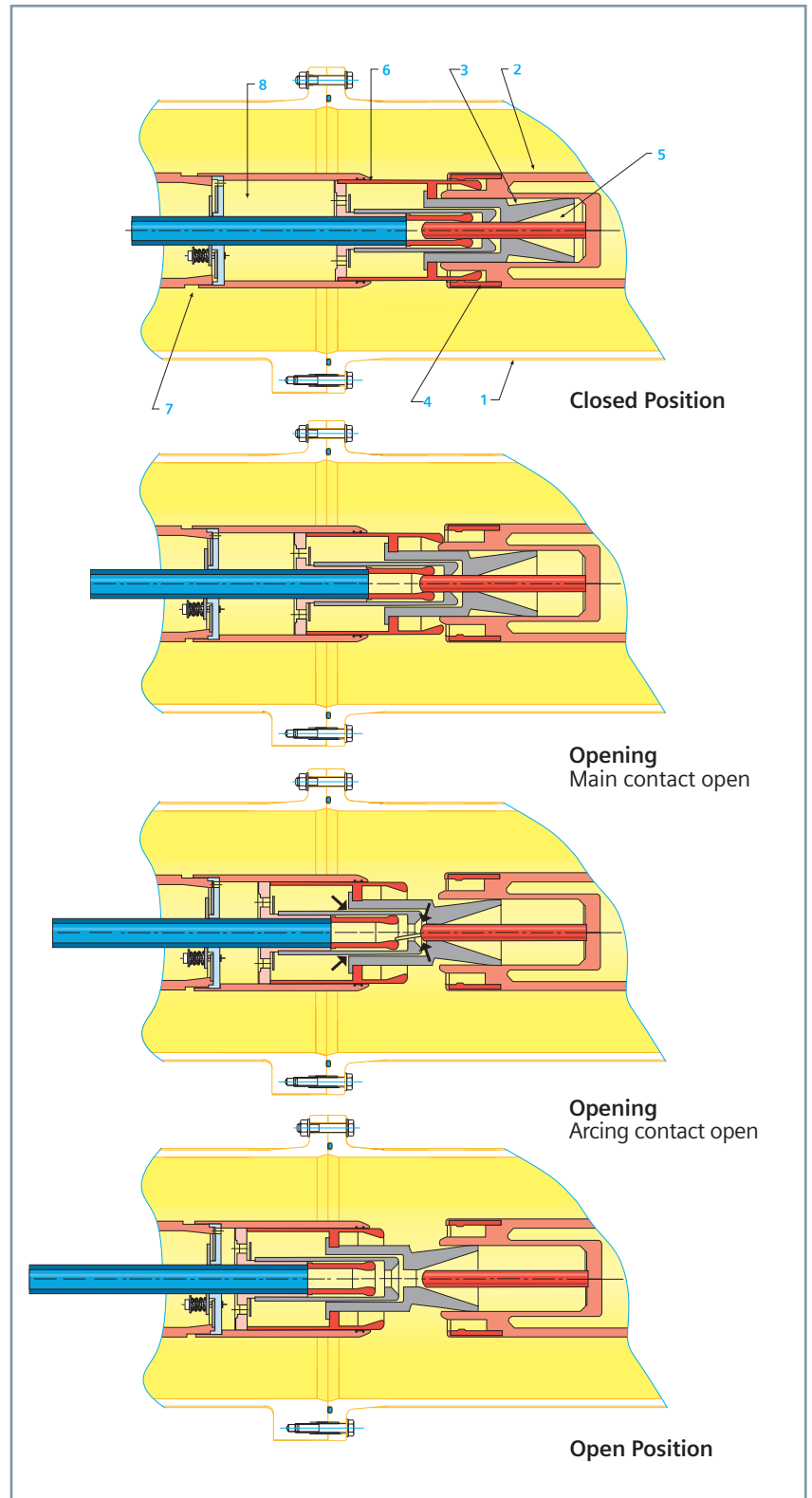
The durable construction of the SPS2 circuit breaker includes the field proven 3AP arc-assist interrupter. Each interrupter consists of a stationary contact assembly and a moving contact assembly mounted inside a pole unit housing.

During the opening operation, the puffer action in the compression cylinder of the 3AP interrupter is sufficient for low current faults and switching operations. During high current interruptions, heat from the arc causes the pressure to rise in the heating volume chamber. The resulting high pressure gas from the heating volume extinguishes the arc.

This arc-assist technology, coupled with our FA2 up to 170kV, 40kA, FA4 for 50/63kA and all 245kV spring-stored, and FA5 on 550kV energy operator, assures that the components are subjected to less stress which results in optimal operating reliability.

### KEY:

1. Aluminum Housing
2. Stationary Contact Support
3. Nozzle
4. Main Contact
5. Arcing Contact
6. Heating Volume
7. Moving Contact Support Base
8. Compression Cylinder



# Live-tank and Dead-tank Circuit Breakers

Same technology for every application in two designs

## Special technical features of live-tank design

On live-tank circuit breakers, the interrupter chamber is arranged in the insulator, which can be either porcelain or of a composite material, and is at high potential with the voltage level determining the length of the insulators for the interrupter chamber and the insulator column.

For higher voltage levels, several interrupter chambers series-connected on live-tank circuit breakers and installed on the insulator column. The current transformers are arranged separately either in front of or behind the live-tank circuit breakers. As in live-tank circuit breakers, no fault currents can occur between the interrupter unit and the housing; only one current transformer per pole assembly is necessary.

A further feature of live-tank circuit breakers are the comparatively small gas compartments. The advantage of the low gas volume is that there is a reduction in the amount of gas maintenance work.

To ensure the safe operation of live-tank circuit breakers in seismic regions, the breakers can be mounted on anti-friction structures, a solution that has been tested up to 800kV and has proved its worth many times.



## Special technical features of dead-tank design

The distinguishing feature of dead-tank technology is that the interrupter chamber is accommodated in an earthed metal housing. With this arrangement, the SF<sub>6</sub> gas filling insulates the high voltage live parts of the contact assembly from the housing. The connection to the high voltage is via a SF<sub>6</sub> outdoor bushing.

The current transformers are mounted directly on the bushing, which eliminates the fastening devices and cabling required in the case of exterior mounting.

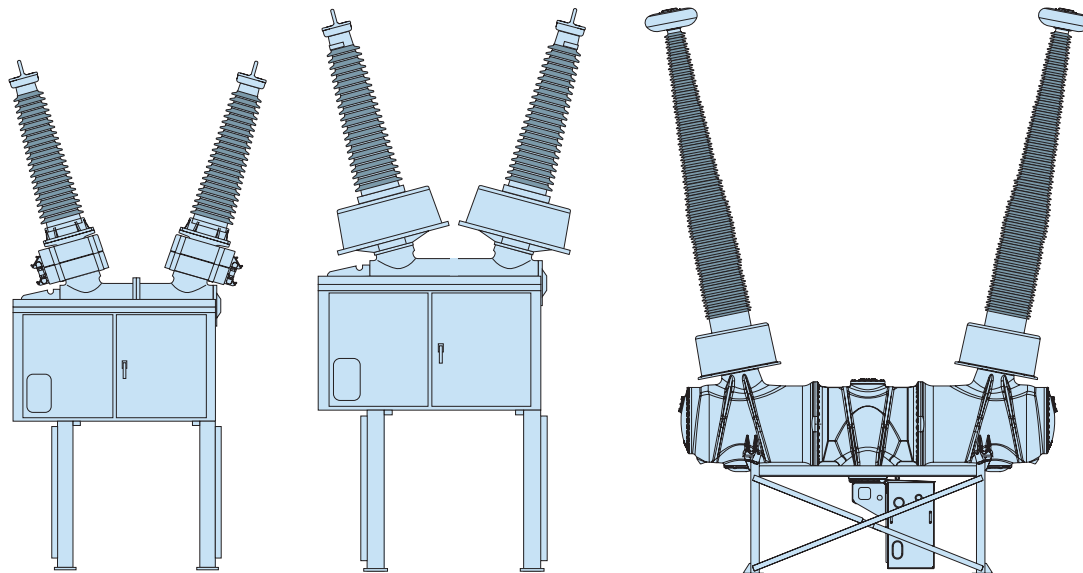
Dead-tank circuit breakers offer particular advantages if the protection design requires the use of several current transformers per pole assembly, such as for a typical American system. The possibility of being able to arrange current transformers in front of and behind the circuit breaker enables protection schemes to be met in a particularly cost-saving manner. Furthermore, it is relatively simple to retrofit the current transformers in the field.

As an additional advantage, dead-tank circuit breakers are particularly resistant to earthquakes due to their compact design and low center of gravity.



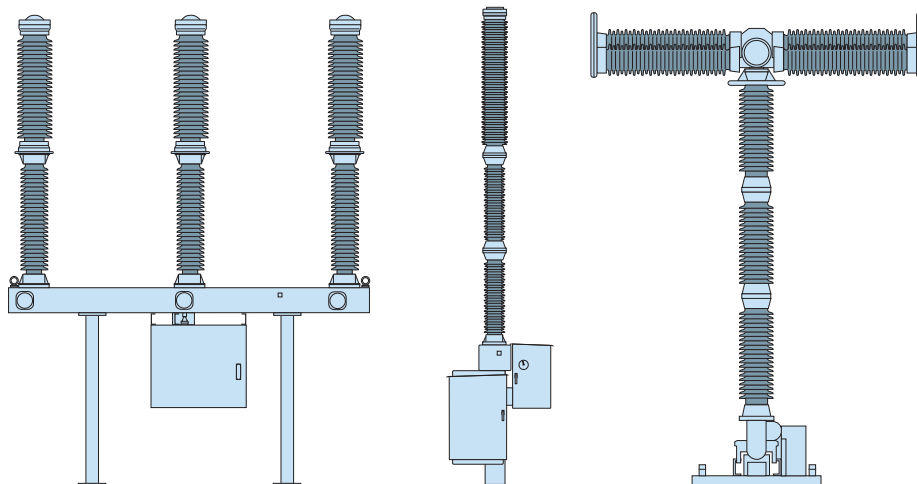
Both the live-tank and the dead-tank designs possess their own special features, and each design has its own particular advantages.

## Dead-Tank



| Type                                      |    | SPS2    |      |      |      |      |      |          |         |  |  |
|-------------------------------------------|----|---------|------|------|------|------|------|----------|---------|--|--|
| Electrical data                           |    | 3 cycle |      |      |      |      |      |          | 2 cycle |  |  |
| Rated voltage                             | kV | 38      | 48.3 | 72.5 | 123  | 145  | 170  | 245      | 550     |  |  |
| Rated power-frequency withstand voltage   | kV | 80      | 105  | 160  | 260  | 310  | 365  | 425/460  | 860     |  |  |
| Rated lightning impulse withstand voltage | kV | 200     | 250  | 350  | 550  | 650  | 750  | 900/1050 | 1800    |  |  |
| Rated nominal current up to               | A  | 4000    | 4000 | 4000 | 4000 | 4000 | 4000 | 4000     | 4000    |  |  |
| Rated breaking current up to              | kA | 40      | 40   | 40   | 63   | 63   | 63   | 63       | 63      |  |  |

## Live-Tank



| Type                                      |    | 3AP1    |      |      |      |         |      | 3AP2/3  |      |      |  |
|-------------------------------------------|----|---------|------|------|------|---------|------|---------|------|------|--|
| Electrical data                           |    | 3 cycle |      |      |      |         |      | 2 cycle |      |      |  |
| Rated voltage                             | kV | 72.5    | 123  | 145  | 170  | 245/300 | 145  | 245     | 362  | 550  |  |
| Rated power-frequency withstand voltage   | kV | 160     | 260  | 310  | 365  | 460     | 310  | 460     | 555  | 860  |  |
| Rated lightning impulse withstand voltage | kV | 325     | 550  | 650  | 750  | 1050    | 650  | 1050    | 1300 | 1800 |  |
| Rated nominal current up to               | A  | 4000    | 4000 | 4000 | 4000 | 4000    | 4000 | 4000    | 4000 | 4000 |  |
| Rated breaking current up to              | kA | 40      | 40   | 40   | 50   | 50      | 80   | 80      | 63   | 63   |  |

# CPV2 Specification

## Longer operating life – Lower maintenance costs

In considering any circuit switcher, today's utilities must be concerned not only with initial price and installation, but also with the ongoing costs of ownership. The Siemens CPV2 wins in every category. Its relatively low price tag, simple installation and easy maintenance will continue to pay dividends decades into the future.

In addition to the reliable performance you can expect from your CPV2 switcher, you'll also find it can handle a number of special requirements, such as:

- Switching capacitors, cables and reactors
- Environmentally restricted sites requiring oil sumps
- System stability problems requiring three-cycle interrupting
- Reclosing duty without derating interrupting capability
- High contamination zones that require extra creep and low contamination weather shields
- High altitude application up to 10,000 feet without derating

### Getting the Best Switcher for your Needs

#### How to Order

When ordering a Type CPV2 switcher, specify the following:

1. Switcher type and rating
2. Trip voltage (see Ratings Section)
3. Close voltage (see Ratings Section)
4. Motor voltage: 120VAC/125VDC, 240VAC/250VDC, 48VDC
5. Heater voltage: 115, 230 VAC
6. Terminals: specify in detail if desired
7. Include customer specifications covering special equipment, accessories, test, etc.

#### Basic Switcher

The Standard basic switcher includes:

1. Three-pole SF<sub>6</sub>-filled outdoor power circuit switcher with three SF<sub>6</sub> interrupters
2. Galvanized base with four galvanized pedestals
3. Light gray standard color
4. Six light gray ANSI #70 SF<sub>6</sub>-filled porcelains
5. Six relaying accuracy bushing current transformers
6. Trip-free spring operating mechanism
7. Instrumentation to monitor SF<sub>6</sub> gas pressure and provide low pressure alarm
8. Twelve stage auxiliary switch; Eight stages for customer use
9. Trip coil and close coil
10. Cabinet heater to prevent condensation
11. Necessary terminal blocks and wiring
12. Operations counter
13. Fused knife switches (3)
14. Grounding pads (3)
15. Mechanical position indicator
16. Provision for travel recorder attachment
17. SF<sub>6</sub> gas for initial filling
18. Set of tools required for installation

#### Operational modifications

1. Capacitor trip
2. Relays for reclosing or non-reclosing switcher application
3. External pull to trip handle
4. Cabinet light and convenience outlet
5. Special heaters and cabinet insulation for operation down to -50°C
6. Two additional 12-pole auxiliary switches
7. Dual trip coils
8. Control switch
9. Local/remote switch
10. Thermostat for cabinet heater

All statements, technical information and recommendations contained herein are based on information and tests we believe to be reliable. The accuracy or completeness hereof is not guaranteed. Since conditions of use are outside our control, the user should determine the suitability of the product for its intended use and assumes all risk and liability whatsoever in connection herewith.

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