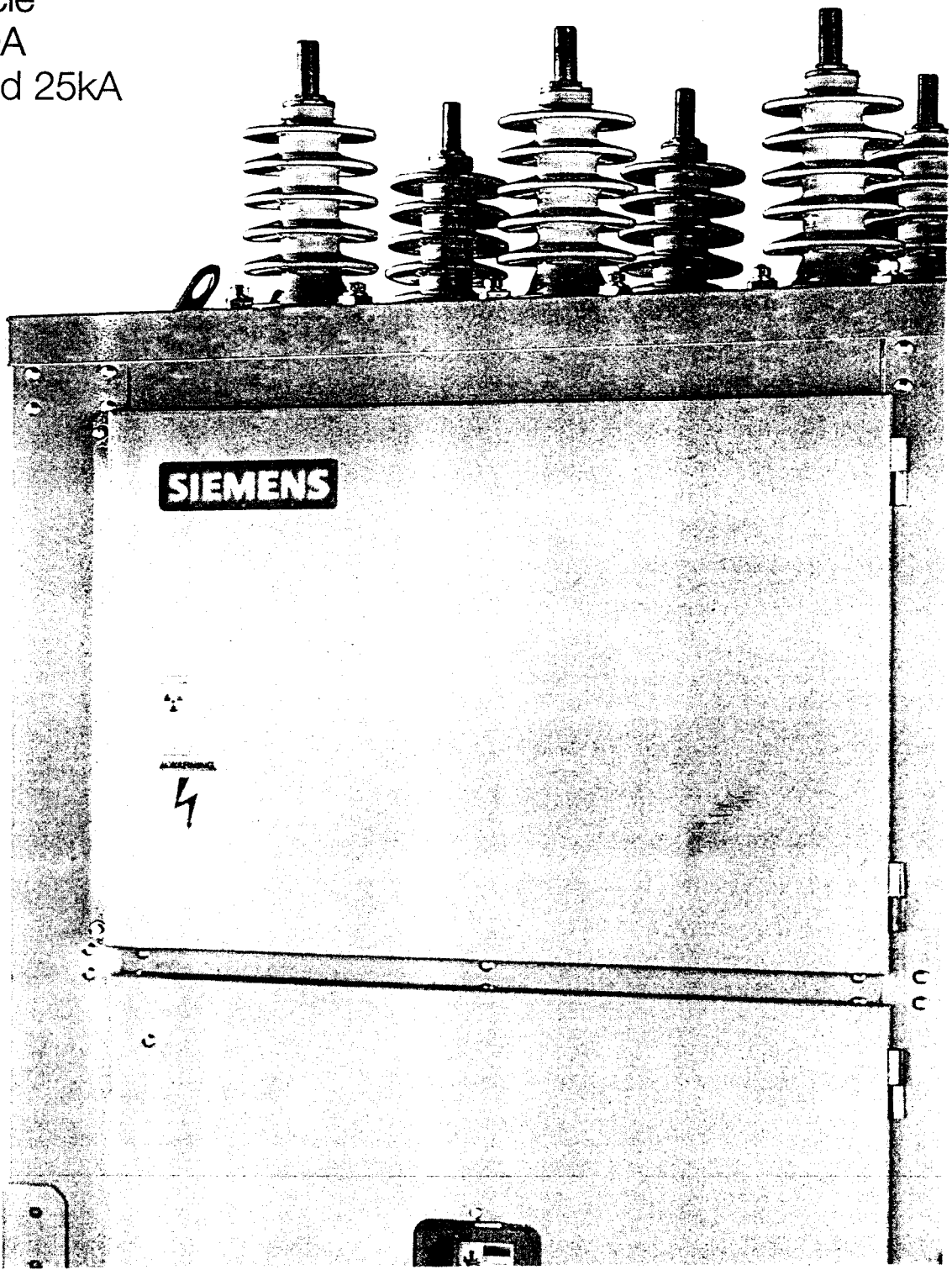
SIEMENS

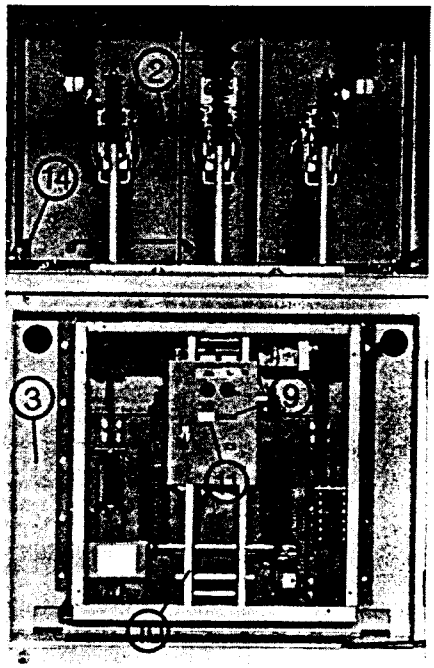
Type SDV4 Vacuum Circuit Breakers

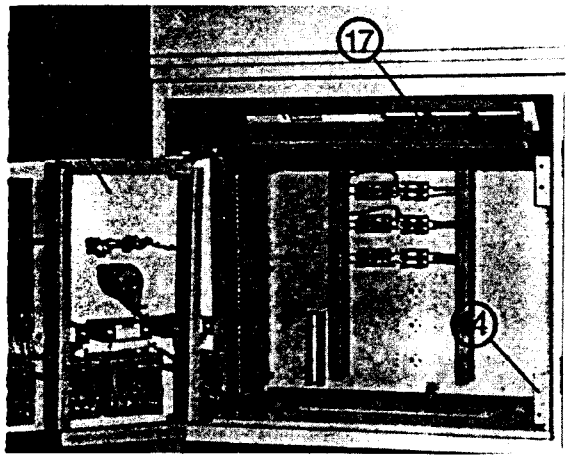
15.5 kV - 3 Cycle
1200 and 2000A
12.5, 16, 20 and 25kA

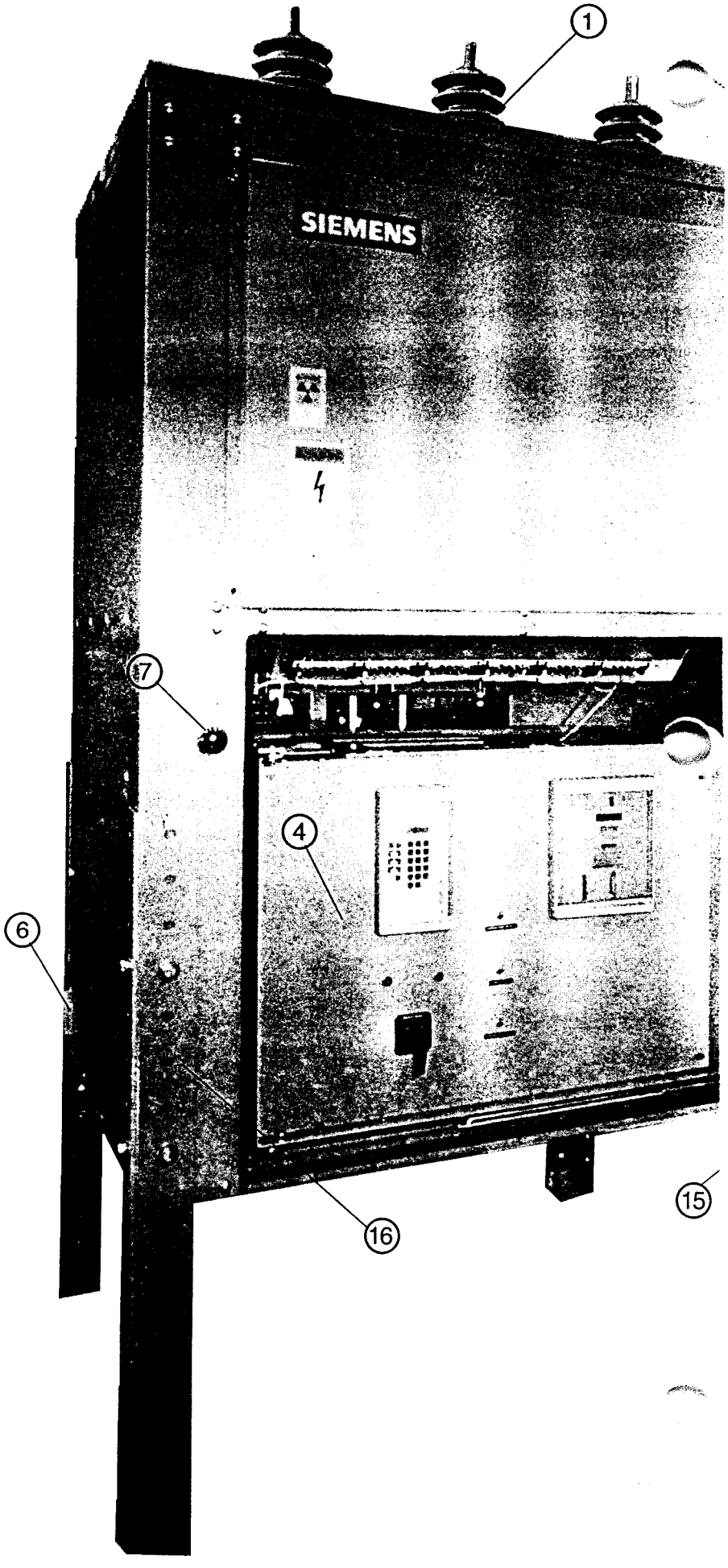


Bulletin PB3746

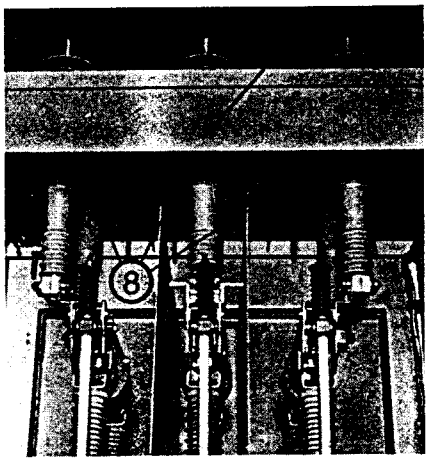
Construction Features



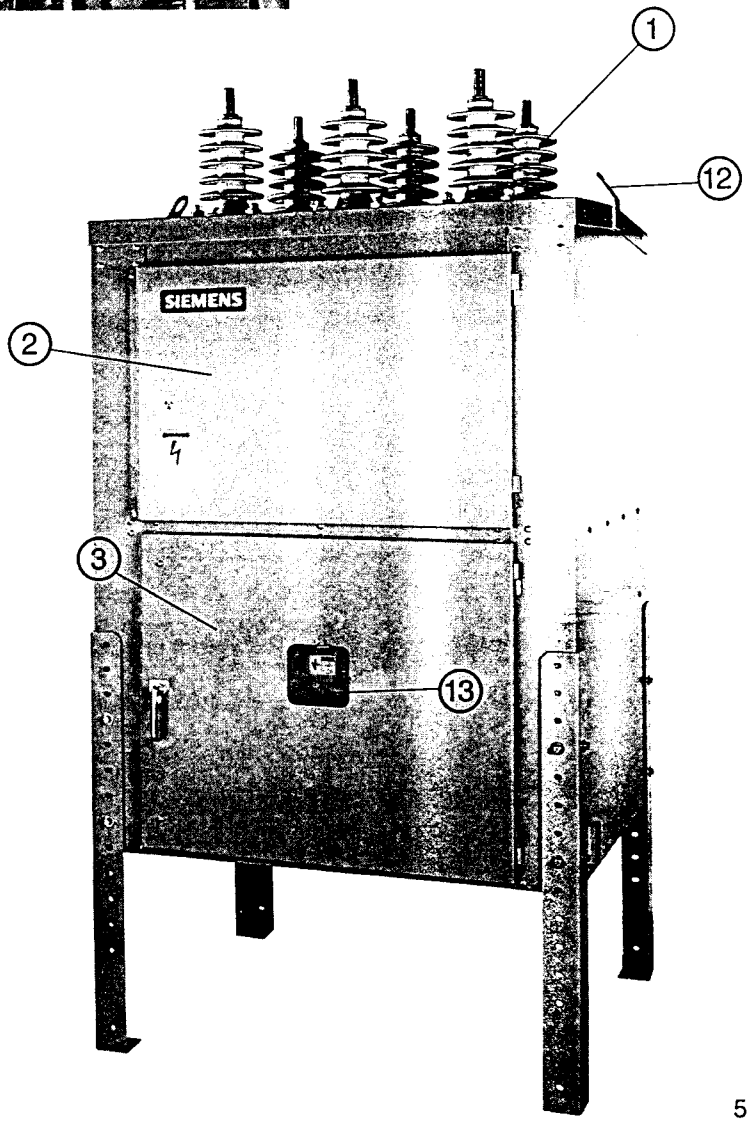




1. High Voltage bushings
2. High Voltage compartment
3. Low Voltage compartment (operator compartment)
4. Low Voltage compartment (control relay compartment)
5. Swingout panel (optional)
6. Ground pad (2)
7. External manual pull-to-trip handle (optional)



8. Bushing current transformers
9. Position indicator
10. Operating mechanism
11. Closing spring charge indicator
12. Lifting eyes (2)
13. Position indicator window
14. Heaters
15. Instruction book pocket
16. Adjustable legs
17. CT terminal blocks



Breaker Construction

The SDV4 breaker consists of three vacuum interrupter tubes, their supports and the operating mechanism.

When the contacts separate, the current to be interrupted initiates a metal vapor arc discharge and flows through this plasma until the next current zero. The arc is then extinguished and the conductive metal vapor condenses on the metal surfaces within microseconds. As a result, the dielectric strength in the break builds up very rapidly.

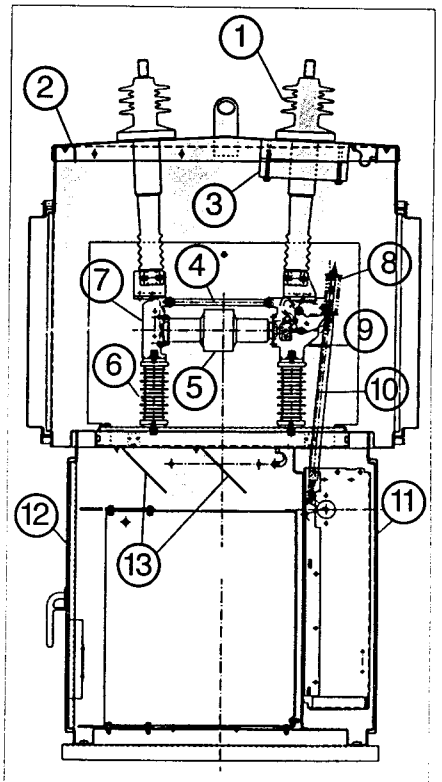
The contacts are designed so that the self-generated field causes the arc root to travel. This prevents overheating when interrupting large currents.

The metal vapor arc discharge can only be maintained if a certain minimum current flows. A current that does not attain this level is chopped prior to current zero. This chopping current must be kept to a minimum in order to prevent unduly high overvoltages building up when inductive circuits are switched.

The use of a special contact material ensures that current chopping is limited to 4-5 amperes.

The rapid build-up of the dielectric strength in the break enables the arc to be extinguished even if contact separation occurs immediately prior to current zero. The maximum arcing time for the last-pole-to-clear is therefore only 11 ms.

The purpose of the arc-quenching device of ac breakers is to deionize the break immediately after current zero. For all conventional arc-quenching methods this means that the arc has to be cooled even before the contacts have reached the minimum quenching distance and before the next current zero, a fact which automatically increases the arc energy. The arc drawn in the vacuum breaker, on the other hand, is not cooled since the metal vapor plasma is highly conductive and the resulting arc voltage only attains values between 20 and 200 volts. For this reason, and because of the short arcing times. the arc energy developed in the break is very small. This also accounts for the long electrical life of the vacuum breaker. For instance, it has been tested and has interrupted the rated short-circuit current 50 times and the rated normal current 10,000 times.

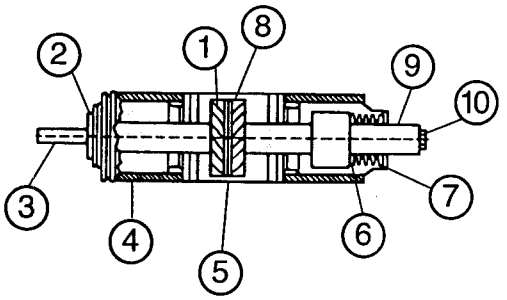


Pole Unit Detail

1. Entrance Bushing
2. High Voltage Cabinet
3. Bushing Current Transformer
4. Insulating Strut
5. Vacuum Interrupter
6. Support Insulator
7. Interruptor Support
8. Contact Pressure Spring
9. Belcrank Lever Assembly
10. Insulated Coupler
11. Operator Mechanism
12. Control Compartment Door
13. CT Terminal Block Panels

Vacuum Interrupter Detail

1. Fixed Contact
2. Washer
3. Terminal Post
4. Insulator
5. Arcing Chamber
6. Metal Bellows
7. Guide
8. Moving Contact
9. Terminal
10. Mechanical Coupling



Operating Mechanism

Type SDV vacuum breakers are equipped with a spring stored energy mechanism.

In the closed state of the breaker, spring energy for open-close-open duty is stored.

Charging Of The Closing Spring
The closing spring of the motor mechanism is automatically recharged after closing, but it can also be recharged by hand in the event of a supply failure. The switching sequence referred to above can then be carried out.

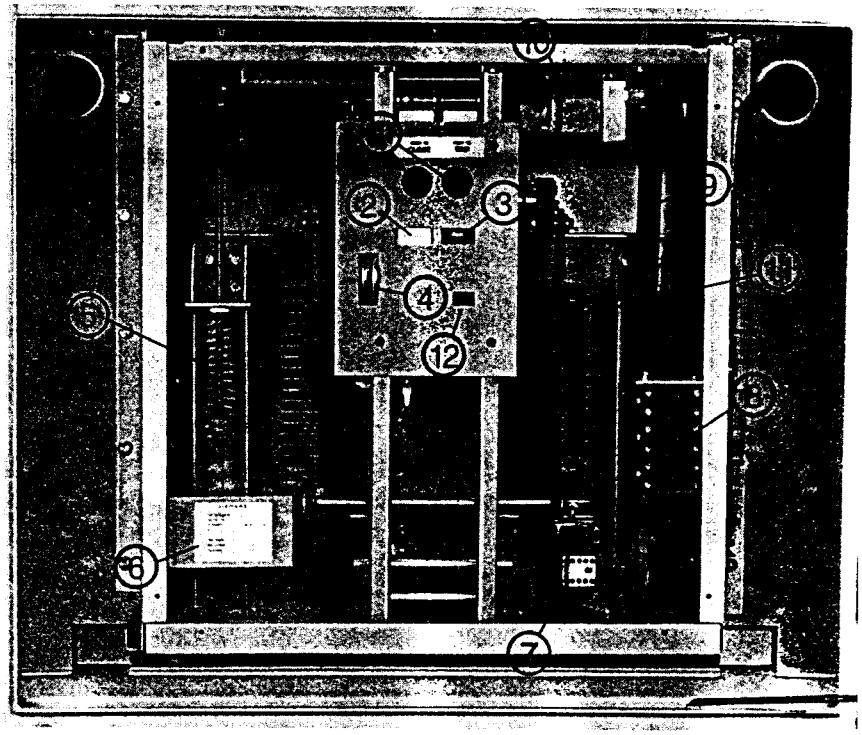
Maintenance
Only the operating mechanism need be lubricated. The vacuum interrupters and their supports are maintenance-free.

The contact wear can be easily checked by a simple measurement using calipers.

A routine inspection should be made after 500 operations or a service time of 10 years.

The inspection requires only a small amount of time and can be carried out by the customer's personnel.

Vacuum Tube Life
The vacuum interrupters have to be replaced after 10,000 mechanical operations or after the rated short-circuit current has been interrupted 50 times or the rated normal current 10,000 times.



1. Pushbuttons for Manual Close and Trip
2. Spring Charged Indicator
3. Open-Closed Position Indicator
4. Manual Charge Lever Socket
5. Opening Spring
6. Operator Nameplate
7. Control Relay
8. Auxiliary Switches
9. Shock Absorber
10. Spring Charging Motor
11. Closing Spring
12. Operations Counter

Control Power Requirements

	Volts DC (Amps)				Volts AC (Amps)	
Rated Voltage	24	48	125	250	120	240
Trip Coil	27	23	4	3	Capacitor Trip	
Closing Coil	27	23	4	3	4	3

*Voltage range in accordance with ANSI.

SIEMENS

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Ordering Information

When ordering a Type SDV4 vacuum circuit breaker, specify the following:

1. Breaker Type and Rating.
2. Trip Voltage; refer to page 5.
3. Close Voltage; refer to page 5.
4. Motor Voltage;
   48 Volts dc,
   115 Volts ac/125 Volts dc, or
   230 Volts ac/250 Volts dc.
5. Heater Voltage:
   115, 230 Volts ac.
6. BCT's; type, ratio, number, location.
7. Terminals; specify in detail if desired.
8. Relays; specify in detail if desired.
9. Include specifications covering special equipment, accessories, tests, etc.

Standard Breaker

1. Three pole power circuit breaker.
2. Painted steel, adjustable underframe.
3. Light gray standard color.
4. Three relaying accuracy BCT's mounted on the left hand side of the breaker.
5. Trip-free, motor charged, spring stored energy operating mechanism.
6. Trip coil and close unit.
7. 10 stage auxiliary switch; 7 stages for customer use.
8. Heaters; one 100 watt and one 200 watt.
9. Maintenance closing device and spring charging handle for manual operation.
10. Necessary terminal blocks and wiring.
11. Operations counter.
12. Fused pull-outs.
13. Six, light gray, bushings.
14. Provision for travel recorder attachment.
15. Grounding pad.

Optional Modifications

1. Extra BCT's. (Up to 12 per breaker).
2. Metering accuracy BCT's.
3. Extra creepage bushings.
4. Capacitor trip.
5. Relays for reclosing or non-reclosing breaker application.
6. External manual pull to trip handle.
7. Dual trip coils.

Refer to your Siemens representative for other modifications.

Ratings

Identification	Voltage			Ratings Insulation Level Rated Withstand Test Voltage		Current - Amperes			Related Capabilities Current Values - Amperes		
Type	Nominal kV Class	Rated Maximum kV	Rated Voltage Range Factor K	Low Frequency (kV RMS)	Impulse (kV Crest)	Rated Continuous at 60 Cycles	Rated S.C. Current at Rated Max. kV	Interrupting Time (Cycles)	Maximum Symmetrical Interrupting Capability RMS	3-Sec. Short Time Current Carrying Capability RMS	Closing and Latching Capability RMS
SDV-15.5-12.5	14.4	15.5	1.0	50	110	1200/2000	12,500	3	12,500	12,500	20,000
SDV-15.5-16	14.4	15.5	1.0	50	110	1200/2000	16,000	3	16,000	16,000	25,600
SDV-15.5-20	14.4	15.5	1.0	50	110	1200/2000	20,000	3	20,000	20,000	32,000
SDV-15.5-25	14.4	15.5	1.0	50	110	1200/2000	25,000	3	25,000	25,000	40,000

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