MV VACUUM CONTACTOR

AKANKSHA

VACUUM CONTACTOR VC

A **vacuum contactor** is an electrical switching device used primarily for switching high-voltage circuits, especially in motor control and capacitor switching applications. It operates by making and breaking the circuit in a **vacuum** environment, which eliminates arcing and allows for compact design and longer life.

Construction:

A vacuum contactor consists of:

1. **Vacuum Interrupter**
   - Core part with fixed and moving contacts sealed in a vacuum.
   - Ensures arc-free switching and long life.
2. **Moving Mechanism**
   - Spring or electromagnetic system that opens/closes contacts.
3. **Electromagnet / Coil**
   - Energizes to move contacts.
4. **Bellows**
   - Flexible metal seal allowing contact movement while maintaining vacuum.
5. **Arc Shield**
   - Protects vacuum envelope from arc metal vapours.
6. **Insulated Frame & Terminals**
   - Provides structure, insulation, and external connections.

Features:

1. **Arc-Free Switching**
   - Arc is extinguished quickly in vacuum → minimal contact wear.
2. **Long Electrical Life**
   - Can handle thousands of operations without failure.
3. **High Dielectric Strength**
   - Vacuum offers excellent insulation between contacts.
4. **Low Power Consumption**
   - Coil requires less energy to operate.
5. **Fast Operation**
   - Quick opening and closing of contacts.
6. **Low Maintenance**
   - No arc chutes, no oil or gas → minimal service needed.
7. **Quiet Operation**
   - Reduced noise during switching.

Typical applications:

Used for: Safe, arc-free switching in medium-voltage systems.

1. **Motor Control** – For medium-voltage motors
2. **Capacitor Switching** – In power factor correction.
3. **Transformer Switching** – Load switching of transformers.
4. **Lighting Control** – For large industrial lighting.
5. **Heater Control** – Electric furnaces and heating loads.
6. **Mining & Industry** – Rugged control in tough environments.
7. **Renewable Energy** – Switching in solar/wind systems.

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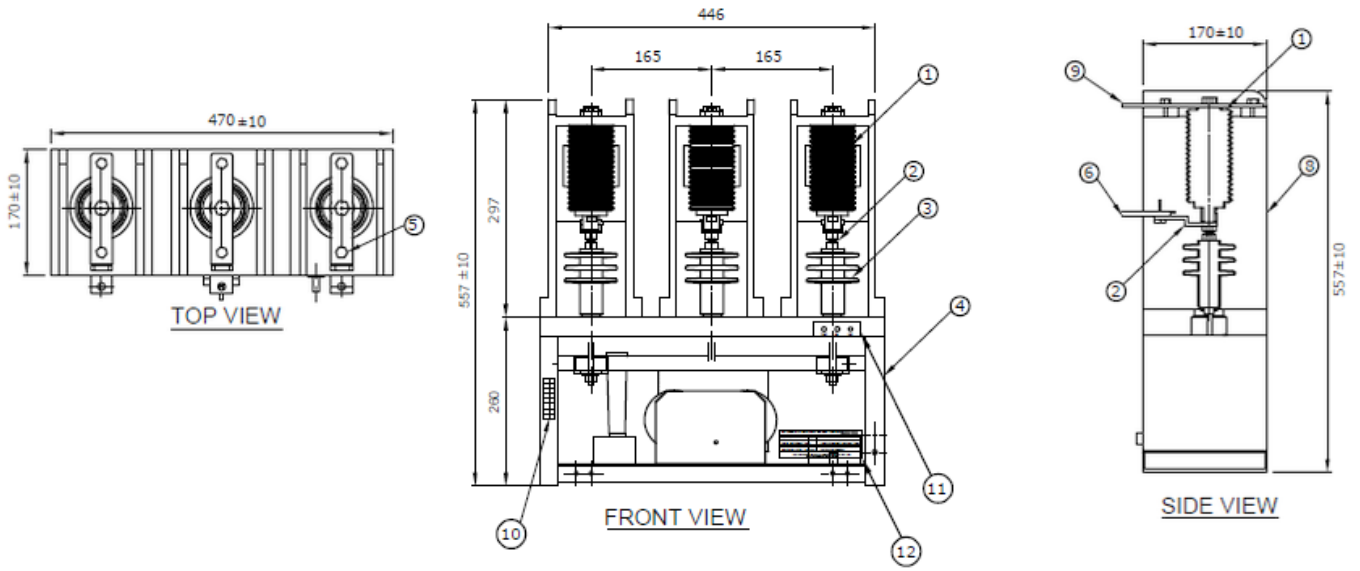
Technical data and specifications:		
Parameter	**11 kV**	**33 kV**
Rated service voltage	11 kV	33 kV
Rated highest system voltage	12 kV	36 kV
Rated current	200A/ 400A	600A / 800A / 1000A / 1250A
Rated Frequency	50 Hz	50 Hz
Rated power frequency with voltage for 60 sec	28 kV rms	70 kV rms
Rated lightning impulse withstand voltage	75 kV peak	170 kV peak
Rated short time current	10 kA	26.3 kA
Rated short time current duration	1 sec	3 sec
Rated short circuit peak withstand current	26 kA	65.75 kA
Rated capacitor switching current	200 A	800 A
Rated cable charging current	25 A	25 A
Rated out of phase switching	4.5 kA	6.25 kA
Number of poles	3	6
Number of break/ phase	1	2
Type of switching medium	Vacuum	Vacuum
Type of main and arching contacts	Butt	Butt
Material of main contact	Copper - Chromium	Copper - Chromium
Closing time	115 ms	< 50 ms at rated aux voltage
Opening time	50ms	< 40 ms at rated aux voltage
Contact stroke	5 mm (+1mm)	18 mm (+1mm)
Operating sequence	O-300ms-CO-15s-CO	O-300ms-CO-15s-CO
Electrical life of VI at rated current	20,000 operations	20,000 operations
Electrical life of VI at full fault current	100 operations	100 operations
Mechanical life of VI & Mechanism	10,000 operations	10,000 operations
Minimum clearance between live parts	125 mm	320 mm
Minimum clearance between live parts to earth	125 mm	300 mm
Type of operating mechanism	Electromagnetic	Electromagnetic
Method of closing	Electrically Latching	Electrically stored energy
Method of opening	Electrically Latching	Electrically stored energy
Method of latching	Electromagnetic	High power permanent magnet
Power required for closing	1200 W	1200 W
Power required for opening	1200 W	1200 W
Aux supply	220 V AC/DC	220 V DC
Busbar materials	Copper	Aluminum / Copper
Earthed System	Solidly Earthed	Solidly Earthed
Degree of protection	IP 55	IP 65
Applicable standard	IS 9920 (Part IV) & IEC 62271-103	IEC-62271-100 / IEC-62271-200

Routine test on Vacuum contactor:		
Test description	**Cl.**	**Test details**
Design & Visual Checks	7.5	The Switchgear & Control gear shall be Checked to verify with the purchase specification
Tightness Test	7.4	Routine test shall be performed at normal ambient air temperature.
Dielectric test on the main circuit	7.1	28 KV rms applied between phase & earth across open contacts for 1 minute
Test to prove satisfactory operation functional test	7.2.2	Five (open & close) operations checked at upper & lower limit of control voltage.
Test on auxiliary and control circuit	7.2.4	2 KV rms applied between auxiliary circuit & earth for 1min.
Measurement of the resistance of the main circuit	7.3	Resistance of each pole In (μΩ) measured.

Maximum rating:	
Parameter	**Maximum Rating**
Rated Voltage	Up to 11 kV
Rated Current	Up to 400 A
Short-Time Withstand Current	Up to 10 kA for 1 sec
Impulse with stand voltage (1.2/50 micro sec. wave, crest)	Up to 75 kA peak
Breaking Capacity	Up to 16 kA
Power Frequency Withstand	36 kV for 1 min
Installation Location	Indoor

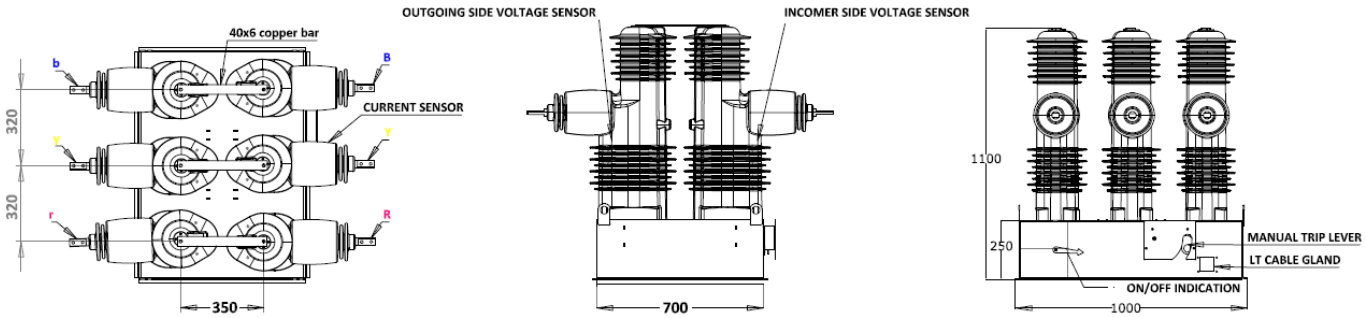
3.6/7.3/12 kV 3 Pole, Single Break, Indoor Type Vacuum Contractor VC

Dimensional drawing – 11 kV



24/36 kV Double Break Outdoor Type Vacuum Contractor VC

Dimensional drawing – 33 kV



- ✓ Gang operated mechanism
- ✓ On/Off indication
- ✓ Manual trip
- ✓ With both incoming and outgoing CT,PT sensors

Note: - Please refer the specific data sheet for specific capacitors.

VACUUM CONTACTOR	VC

Rating Plate

VACUUM CONTACTOR		
1) Serial Number		
2) Reference Standarded		
3) Rated Voltage		KV
4) Rated Frequency		Hz
5) Number of Poles		
6) Maximum Rated Current		Amp
7) Rated Normal Current		Amp
8) Rated Capacitive Switching Current		Amp
9) Rated Short-Time Current (STC) for 1 sec		Amp
10) Rated Making Current		kAp
11) Rated Short-Time Current (STC) for 1 sec		kV/kVp
12) Type		

Manufactured By:
AKANKSHA POWER AND INFRASTRUCTURE LTD.
87/4,MIDC,SATPUR,NASHIK 422007

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