

# HVF

Vacuum Circuit Breaker  
ANSI 38Kv 31.5Ka 1200-3000A

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# Controlled Power HVF series vacuum circuit breakers: Three pole drawout units for use in 38Kv switchgear.

Controlled Power has manufactured 38Kv switchgear since 1982. Hundreds of 38Kv circuit breakers are in reliable operation in transit, utility, and industrial applications.

The breakers, including vacuum interrupters, are designed and manufactured with advanced vacuum technology and have been tested according to the latest version of ANSI Standards in ISO 9001 certified facilities.

The circuit breakers are available in 1200A, 2000A, 2500A, and 3000A continuous ratings. No fan cooling is required for high continuous current ratings. The breakers are constantly being improved to satisfy all demands of the market.

## HIGH RELIABILITY DURING LONG LIFE TIME

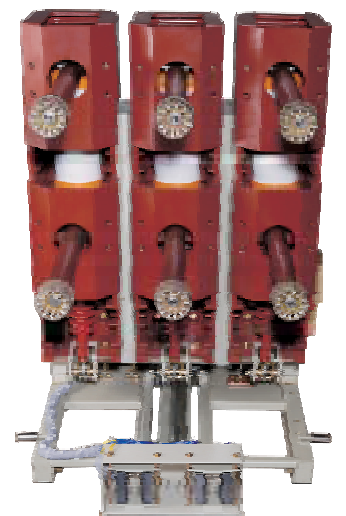
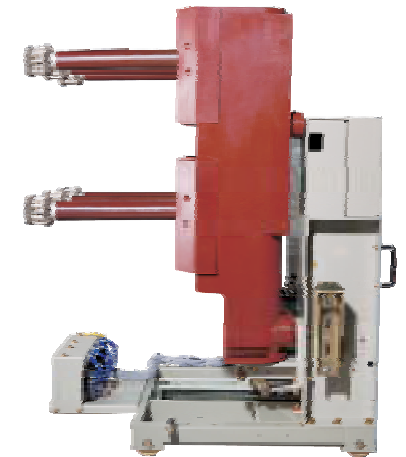
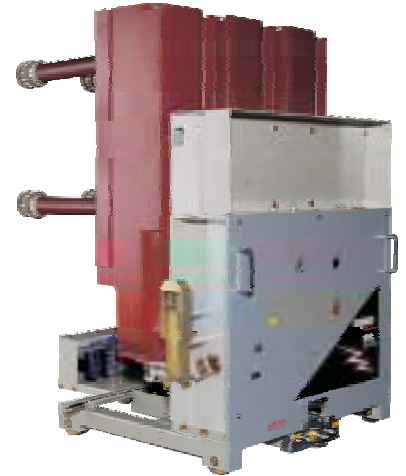
- Rugged in construction and employing a minimum of moving parts, the breaker operating mechanism features reduced maintenance requirements while providing high mechanical reliability and long life time.
- Designed with advanced vacuum technology, the vacuum interrupters retain high and reliable switching capability and high dielectric strength with only a small contact gap.
- The contact resistance is not affected significantly by switching operations and remains constant with the help of the contact pressure applied.

## MAINTENANCE FREE

- The circuit breakers require little maintenance. In fact, only the parts subject to normal wear and aging need be serviced to ensure fully reliable operation. This involves simple jobs to be carried out by the customer's personnel, short servicing times and corresponding downtimes, and also long operation periods between services.
- Normal maintenance is confined to lubricating the operating mechanism. The vacuum interrupters and their supports need not be serviced.

## VERSATILE

- The drawout vacuum breaker has a precision racking mechanism to assure proper alignment during the insertion operation. ANSI standard safety interlocks are provided. The circuit breaker utilizes self-aligning, direct coupling secondary disconnect blocks. The cubicle includes grounded metal shutters.
- Several types of optional parts such as undervoltage release, second trip coil and electrical lockout are available upon request.
- Optional 40 Ka rating is available.

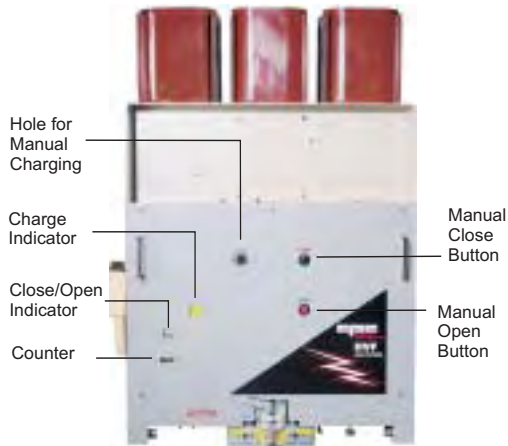


## Ratings & Additional Products Description

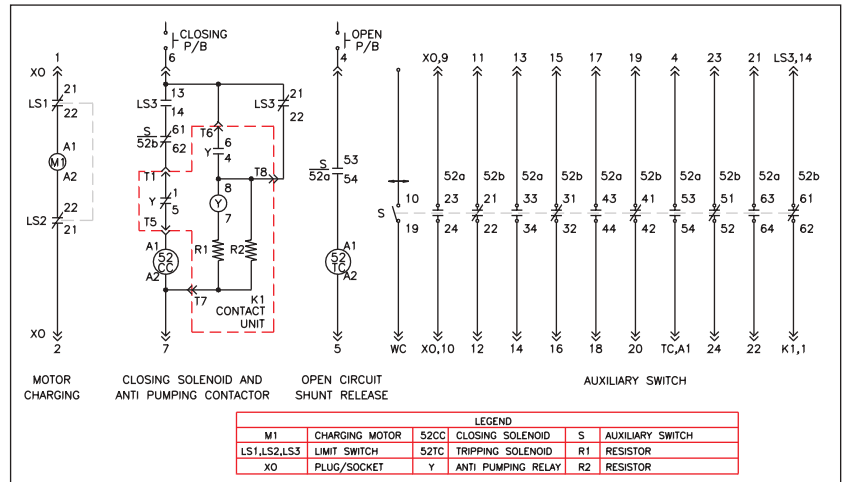
Type No.	HV705 □	
Application standard	ANSI C37.06 / ANSI C37.09	
Rated voltage (Kv)	38	
Rated current (A)	□2	1200
	□4	2000
	□6	2500
	□7	3000
Rated short circuit breaking current (Ka)	31.5	
Rated short circuit Making current (Ka, peak)	82	
Frequency (Hz)	60	
Power frequency withstand Current for 3 sec (Ka)	80	
Impulse withstand voltage (Kv,B.I.L.)	150	
Closing charge time (sec)	15	
Closing time (ms)	75	
Opening time (ms)	50	
Breaking time (cycles)	5	
Operating duty	0 -0.3s-CO-3min-CO	
Operating life at rated current (times)	20,000	
Closing operation	Operation system	Motor Spring Stored Energy
	Control voltage	DC 48, 60, 110, 125, 220 / AC 120, 240
Closing & tripping control (V)	Control voltage	DC 48, 60, 110, 125, 220 / AC 120, 240
Auxiliary contacts	4NO + 4NC ( Max. 10NO + 10NC )	
Weight of breaker Mainbody (Lbs.)	1200a- 748	
	2000a- 800	
	2500a- 5500	
	3000a- 5500	

\*. Type No. Suffix in the square "□", Shall be listed as shown in the line of rated current.

## Typical Breaker Elements



## Typical Circuit Diagram

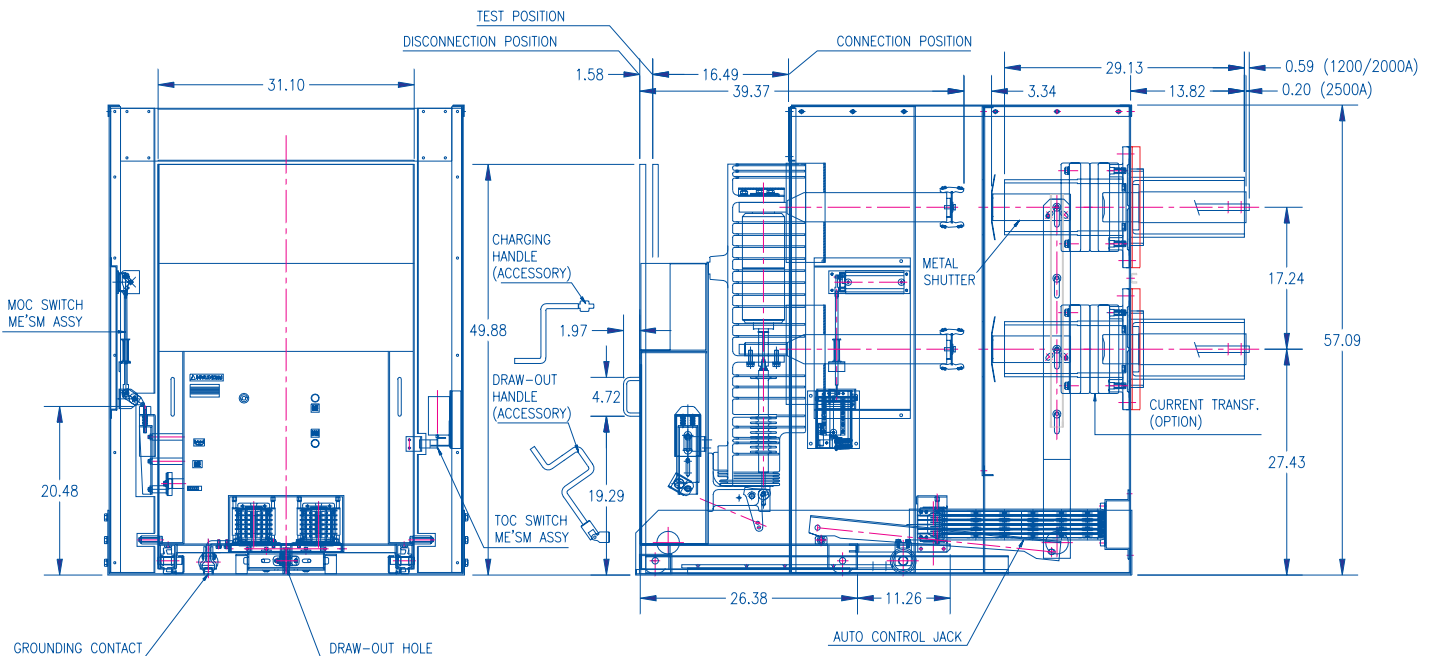
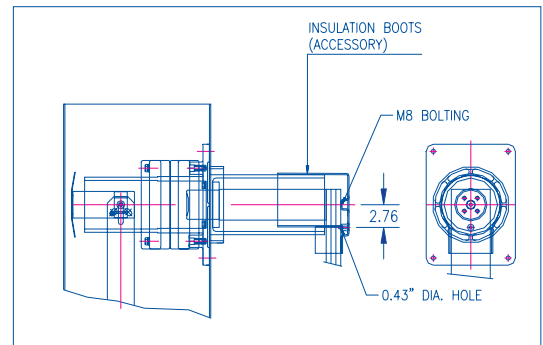


## Dimensions: HVF Draw-out Type VCB (38Kv)

Dimensions in mm

MAIN CIRCUIT TERMINAL(A)			
RATED CURRENT	1200A	2000A	2500A
DETAIL (A)			
THICKNESS	T=0.59"	T=0.78"	3.74" DIA.

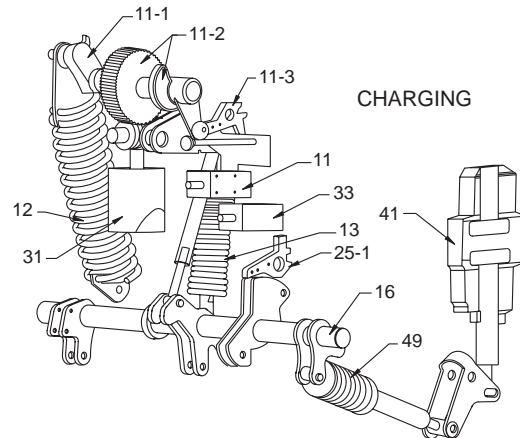
### INSULATION BOOTS INSTALL METHOD



# Summary of Operation

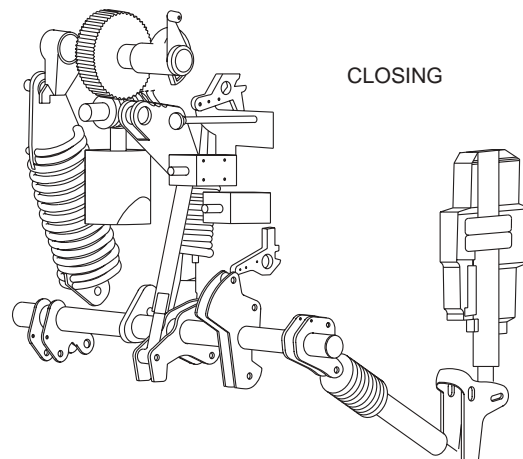
## 1. Charging

When the charging mechanism (11) is activated by hand or a motor(31), the charging shaft(11-1) of the mechanism turns by the gears and the driver(11-2) so that the closing spring is tensioned. When the closing spring is fully tensioned, the closing pawl(11-3) causes the closing spring to be latched.



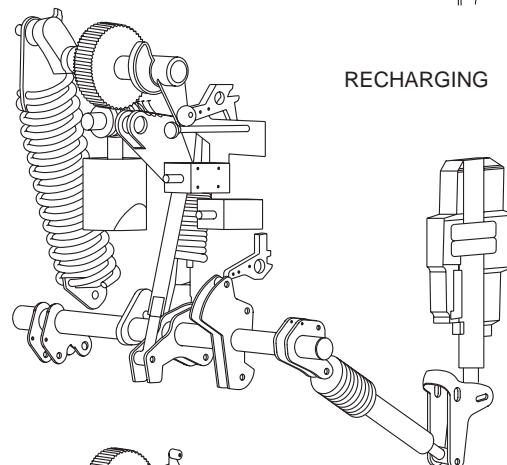
## 2. Closing

When the closing signal is applied, the closing spring is unlatched by the activation of the closing pawl. Energy is released from the discharging of the closing spring and the coupling bar is powerfully pushed down via the charging shaft and the cam (11-1). Consequently, the breaker shaft is turned until the moving contact is fully closed and latched by the trip pawl (25-1). At the same time, the contact pressure spring is compressed to insure sufficient contact pressure on the moving contact while the breaker is in the closed position, and the tripping spring (12) is compressed for the consequent opening operation.



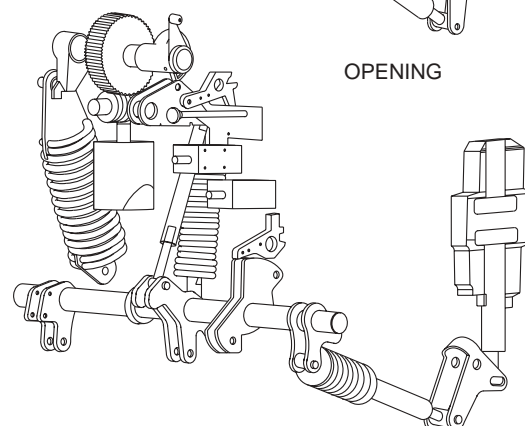
## 3. Recharging

After the closing operation, the closing spring can be immediately recharged by a motor or by hand so that the breaker will immediately reclose if the closing signal is applied.



## 4. Opening

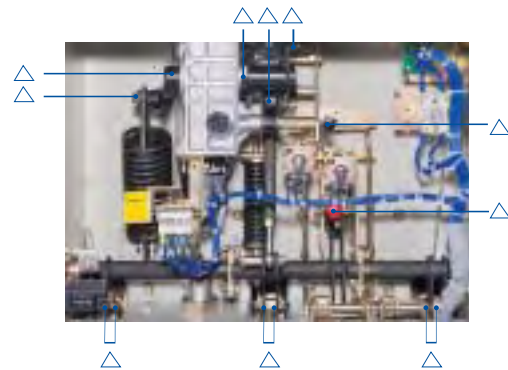
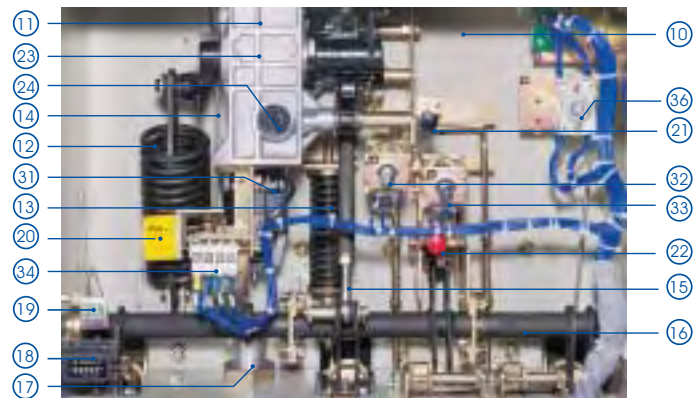
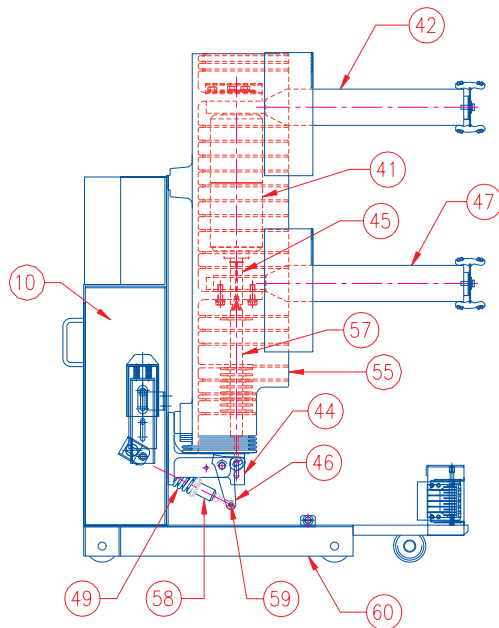
When opening signal is applied, the tripping spring is unlatched by activation of the trip pawl, and the breaker shaft is returned to the open position.



# Current Consumption

Rated Voltage (V)	Current Consumption (A)		
	Motor	Closing Solenoid	Open Solenoid
24DC	21	4	4
48DC	10.5	2.7	2.7
60DC	8	1.7	1.7
110DC	4.5	1.3	1.3
125DC	4.5	1.5	1.5
220DC	2.3	0.65	0.65
120AC	6.4	1.3	1.3
240AC	3.2	0.65	0.65

# Description of HVF VCB



- | NO | ITEM                          |
|----|-------------------------------|
| 10 | Operating Mechanism Enclosure |
| 11 | Gear Box                      |
| 12 | Closing Spring                |
| 13 | Tripping Spring               |
| 14 | Link                          |
| 15 | Coupling Bar                  |
| 16 | Breaker Shaft                 |
| 17 | Dash Pot                      |
| 18 | Counter                       |
| 19 | ON/OFF Indicator              |
| 20 | Spring Charged Indicator      |
| 21 | Closing Button                |
| 22 | Tripping Button               |
| 23 | Name Plate                    |
| 24 | Hole for Manual Charging      |
| 31 | Motor                         |
| 32 | Closing Solenoid (Y9)         |

- |    |                             |
|----|-----------------------------|
| 33 | Tripping Solenoid (Y1)      |
| 34 | Limit Switch (S21, S22, S3) |
| 35 | AntiPumping Contactor       |
| 36 | Auxiliary Switch (S1)       |
| 41 | Vacuum Interrupter          |
| 42 | Upper Terminal              |
| 44 | Lower Pole Support          |
| 45 | Ring Contact                |
| 46 | Lever                       |
| 47 | Lower Terminal              |
| 49 | Contact Pressure Spring     |
| 55 | Insulation Frame            |
| 57 | Insulation Rod              |
| 58 | Spring Guide                |
| 59 | Eye Bolt                    |
| 60 | Truck                       |
| △  | Lubrication Points          |

## Inspection Points

INSPECTION ITEMS	DESCRIPTION	INTERVAL
• General Check	<ol style="list-style-type: none"><li>1. Clean the insulated surface with dry cloth to remove dust and moisture.</li><li>2. Check the exterior for damage.</li><li>3. Check for loose bolts and nuts of the operating mechanism.</li><li>4. Check stop ring and stop retainer for damage.</li><li>5. Check terminals for loose connection or correction.</li></ol>	3 years
• Operation Test	<ol style="list-style-type: none"><li>1. Operate a few times manually and electrically. Check each part for proper function.</li><li>2. Check ON/OFF indicator and counter for proper function.</li></ol>	3 years
• Insulation Resistance	<ol style="list-style-type: none"><li>1. Measure insulation resistance between phase and between pole and ground with a 1000V megger. If the measured value is less than 500M<math>\Omega</math> check the cause.</li><li>2. Check the insulation resistance between control circuit and ground using a 500V megger. If the measured value is less than 2M<math>\Omega</math>, check the cause.</li></ol>	3 years
• Lubrication	<ol style="list-style-type: none"><li>1. Lubricate each part of operating mechanism.</li><li>2. Clean disconnection unit with a dry cloth and a small amount of grease. (lithium soapbased grease)</li></ol>	10 years or 5,000 operations
• Vacuum Interrupter	<ol style="list-style-type: none"><li>1. Check the contact erosion limit.</li><li>2. Operating the circuit, check the vacuum degree of vacuum bottle.</li></ol>	10,000 operations

## 38Kv CIRCUIT BREAKER RETROFITS

Controlled Power can retrofit any of your existing **Minimum Oil, Vacuum, SF-6, Air Magnetic or Air Blast** circuit breakers with our modern **Type HVF Vacuum Breaker** and extend the life of your equipment. Call us today for more information.



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