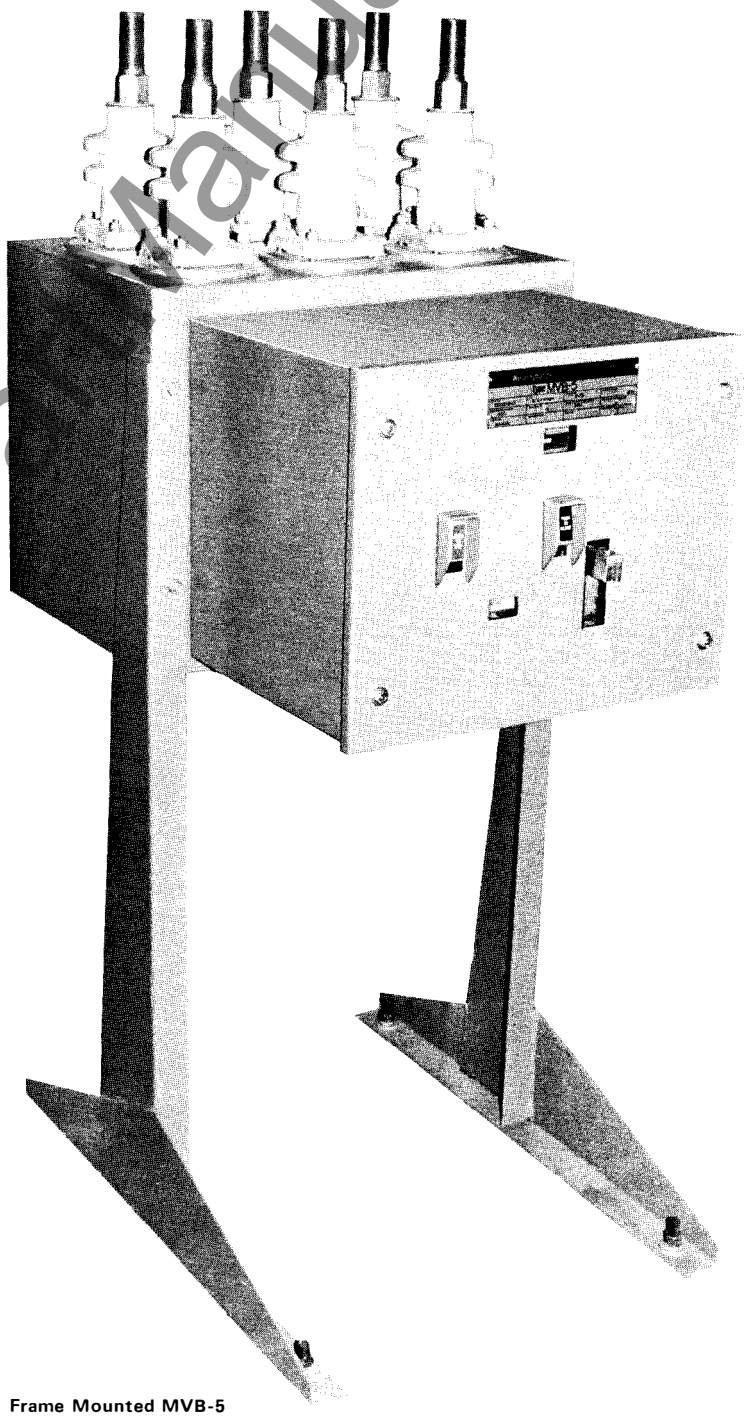
Westinghouse Electric Corporation
Distribution Apparatus Division
Bloomington, Indiana 47401

March, 1977
New Information
E, D, C/1879, 1937, 1949, 1951, 1986,
1994, 1995, 1996, 2001/DB

5KV, 60KV BIL
500 and 600 Amperes Continuous
2000 and 7000 Amperes Symmetrical
Interrupting Capacity

Indoor Vacuum Circuit Breaker Type MVB



Frame Mounted MVB-5

Available Ratings

The MVB-5 is an indoor vacuum breaker rated as shown in the following table with a minimum interrupting time of 3 cycles.

MVB-5 Ratings

Voltage KV	Continuous Current Amperes	BIL KV	Interrupting Capacity Symmetrical Amperes	Type
5.0	500	60	2000	MVB-552
5.0	600①	60	2000	MVB-562
5.0	500	60	7000	MVB-557
5.0	600①	60	7000	MVB-567

① With filtered vents in HV cabinet removable panel.

Application

The MVB-5 vacuum circuit breaker is designed for a variety of new industrial and utility applications.

The MVB-5 breaker can also be used as a replacement for old manually or solenoid operated indoor oil circuit breakers, such as the Westinghouse Type F-122, the F-124A or competitive breakers of similar ratings.

For comparison purposes, the ratings of the F-122 and F-124A series of breakers are shown in this table.

Type	Rated KV	BIL KV	Continuous Current Amperes	Rated MVA 3ϕ	Interrupting Capacity Amperes Symmetrical At Rated Voltage
F-122	4.16	60	600	25	3500
F-124A	4.16	60	1200	50	7000

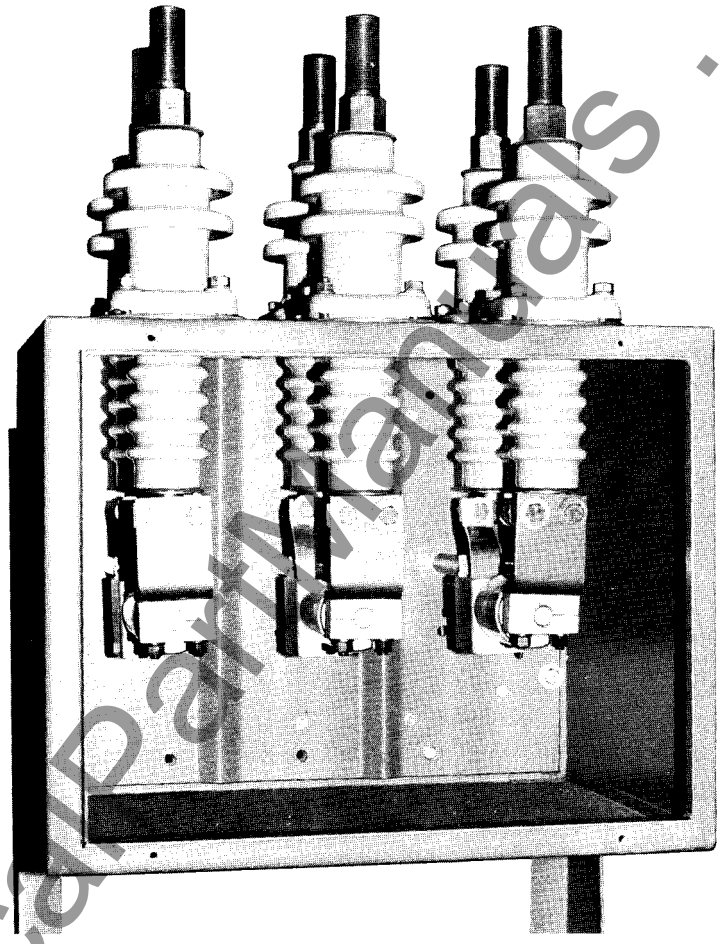
When considering the MVB-5 as a replacement for the 1200A, F-124-A, it should be noted that the maximum MVB-5 current rating is 600 amperes.

Since all old solenoid operated indoor oil breakers of this type required external current transformers and remote relays for tripping, the MVB-5 can be installed as a replacement with minimum modification to the existing enclosure or mounting structure.

General Description

The MVB-5 is a self-contained, 5KV vacuum circuit breaker with six porcelain bushings. The mechanism is a stored energy mechanism with manual trip and close features.

The MVB-5 breaker is normally tripped by a low voltage shunt trip coil that receives its signal from over current relays connected to current transformers. The current transformers and overcurrent relays are remotely mounted which is typical of low voltage indoor installations.



HV Compartment with Door Open

The following voltage combinations can be specified:

Shunt Trip Stored Energy Mechanism Voltage Combinations

Close Voltage	Trip Voltage	Stored Energy Charging Motor
115 VAC	115 VAC	115 VAC
230 VAC	230 VAC	230 VAC
115 VAC	24, 48 or 125 VDC	115 VAC
230 VAC	24, 48 or 125 VDC	230 VAC
125 VDC	125 VDC	115 VAC
125 VDC	125 VDC	230 VAC
48 VDC	48 VDC	115 VAC
48 VDC	48 VDC	230 VAC
125 VDC	125 VDC	125 VDC

Manually operated breakers are also available. The stored energy mechanism is modified to include only the position indicator, close and trip buttons and the manual spring charging device.

The MVB-5 uses vacuum interrupters and an air dielectric. This design minimizes the maintenance and servicing required since no oil is used.

The forces generated during interruption are only those of the operating mechanism which simplifies the foundation or mounting requirements.

The use of air as the insulation medium minimizes the hazard from fire or explosion.

Basic Construction

The MVB-5 breaker consists of the following major components:

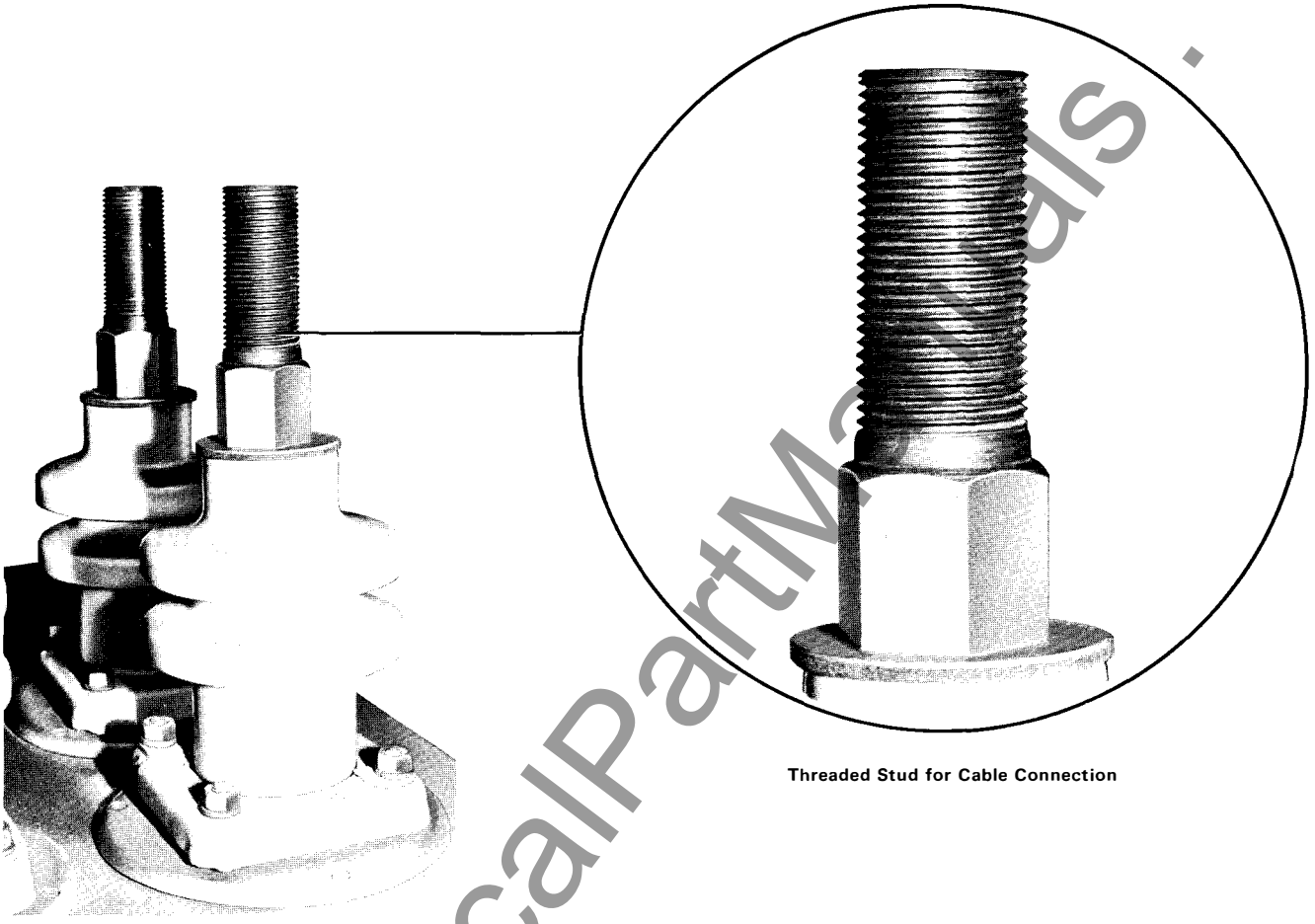
- High Voltage Compartment
- Mechanism Compartment
- Mounting Equipment
- Accessories

Each unit is completely assembled at the factory minimizing the time required for field installation.

Factory testing of opening speed, contact travel, contact resistance, and power factor help to assure the user of a reliable device.

High Voltage Compartment

All components at line potential are contained in this compartment.



Threaded Stud for Cable Connection

Close-Up of HV Bushing Showing One Piece Construction

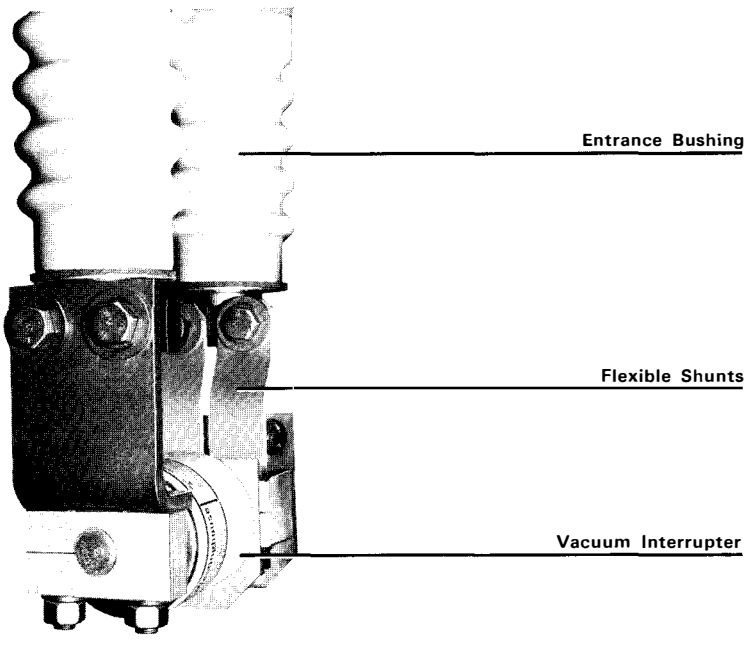
One piece porcelain entrance bushings with 7¾ inches of creep are attached to the roof assembly by bolts and compression type clamps.

As an optional arrangement, three bushings can be mounted underneath the high voltage compartment as shown in Dimension Sheet 38-932, Figure 4, Page 2, to accommodate special cable connections.

The line and load connections to the bushings are made to threaded stud terminals. The studs are 2.5 inches long with a 1.125-12 Class 2A thread. These studs can be taped for improved strike and safety.

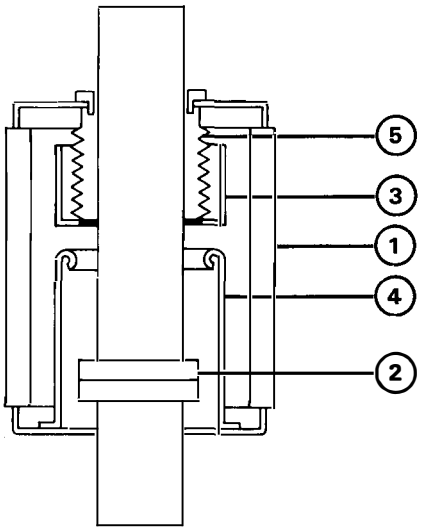
The vacuum interrupters utilize a ceramic envelope that provides excellent thermal properties as well as high strength characteristics.

The interrupters are supported from the entrance bushings. Flexible shunts provide the connection between the moving contact and the bushing.



Close-Up of Vacuum Interrupter Support

Internally the interrupter design is as shown.



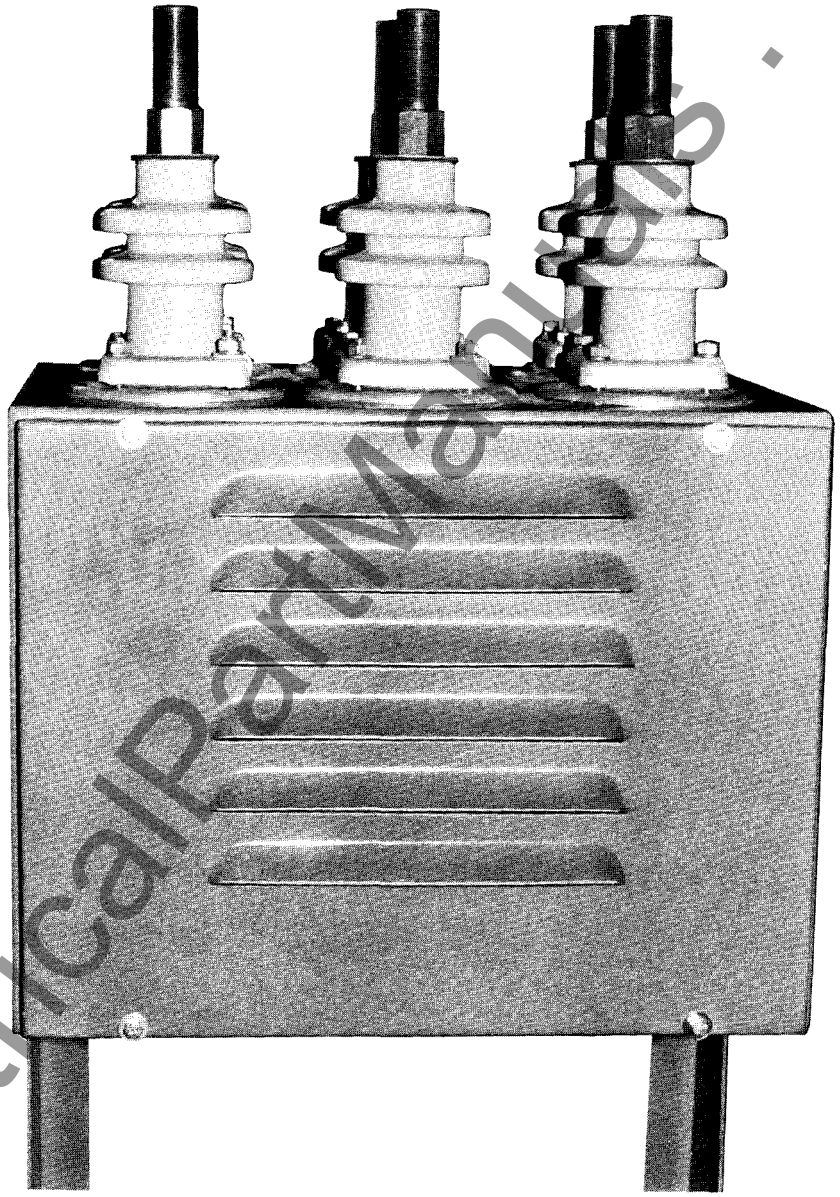
(1) Single Piece Ceramic Envelope

(2) Butt Type Contacts

(3) Bellows Shield

(4) Main Shield—provides a condensing surface for the vaporized contact material generated during the arcing period which prevents contamination of the internal ceramic surface.

(5) Bellows—brazed to the moving contact stem and end plate, the flexible stainless steel bellows allows the contact to move during operation while maintaining a perfect seal.



Removable HV Panel With Vents

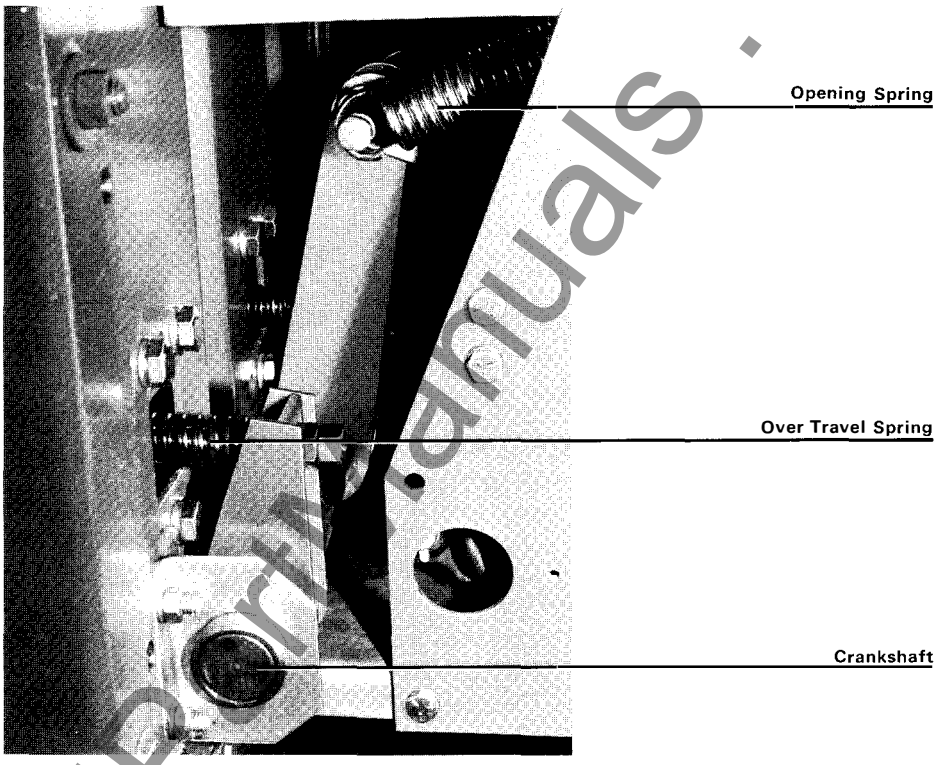
Access to the high voltage compartment is through a removable panel. A filtered vent is part of the removable panel on breakers rated 600 amperes continuous in order to meet the applicable temperature rise standards.

Mechanism Compartment
Stored energy makes the operating speed independent of operating personnel. This feature benefits the user in that the breaker can be closed into an energized circuit for load pickup.

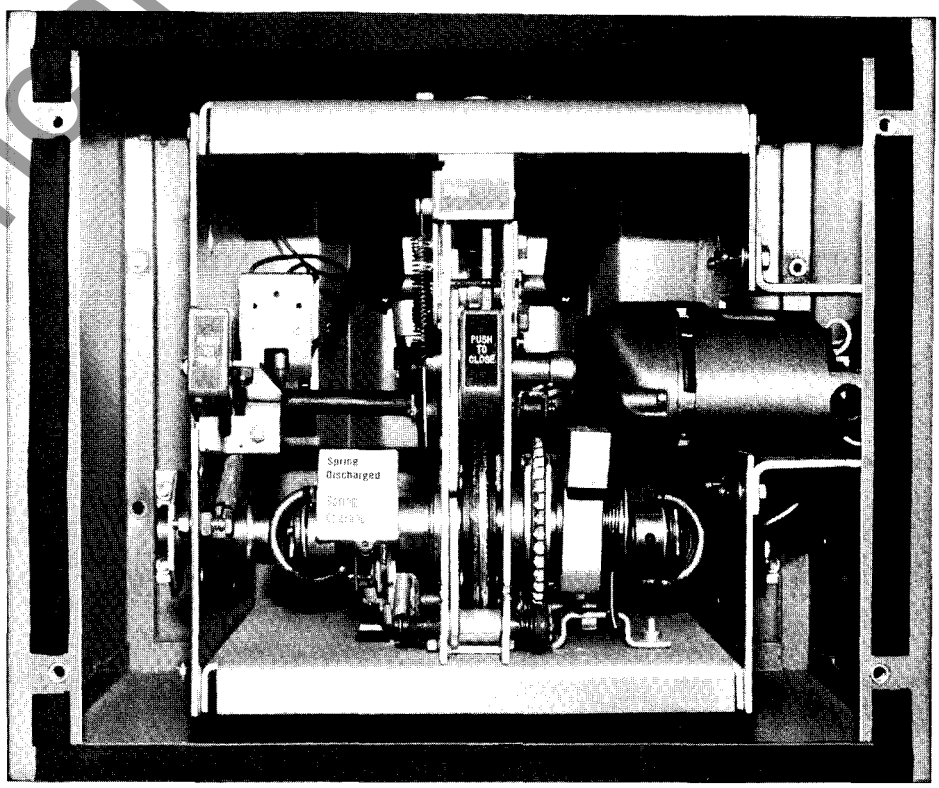
The mechanism operates the breaker contacts by supplying a spring close driving force to the crankshaft operating all three phases simultaneously. The closing action stores energy in the trip spring allowing the user one close-trip operation after the closing spring has been charged since the closing spring is charged by a motor driving through a ratchet after the breaker has been tripped.

To prevent the release of stored energy into a preloaded mechanism linkage which could result in excessive stress, a mechanical safety interlock device is provided so that the closing spring cannot be manually discharged when the breaker is in the "closed" position.

A visible flag on the mechanism front cover plate indicates the spring condition as "SPRING CHARGED" or "SPRING DISCHARGED." This positive indication tells operating personnel whether the mechanism has properly stored the energy required to close the breaker.



Closeup of Crankshaft, Closing Springs, and Overtravel Springs.

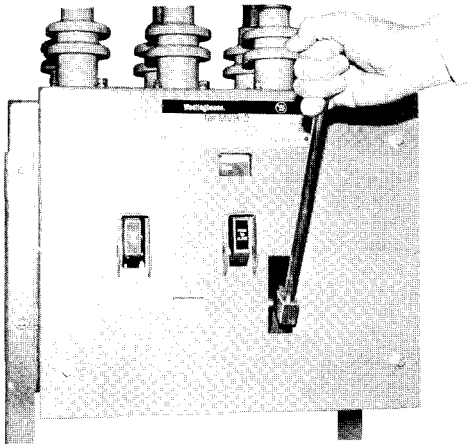


Mechanism Compartment Open Showing Stored Energy Mechanism

Buttons can be used to initiate manual tripping and closing.

A 25 watt space heater is included in the mechanism compartment on all breakers.

The closing springs can be manually charged by inserting the recharge lever into the manual charge device and ratcheting the lever approximately 9 times as the following photo shows.

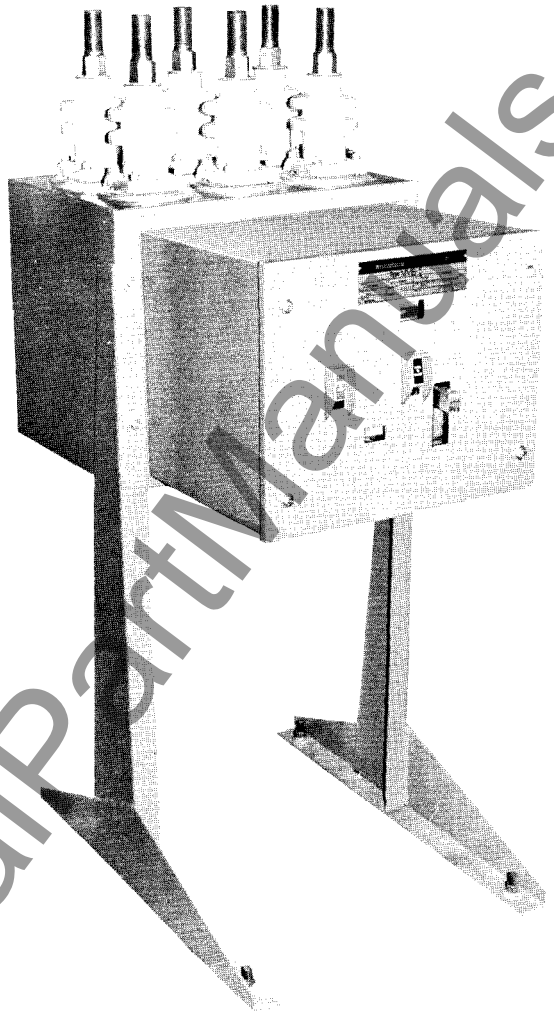


Manual Charging of Closing Springs

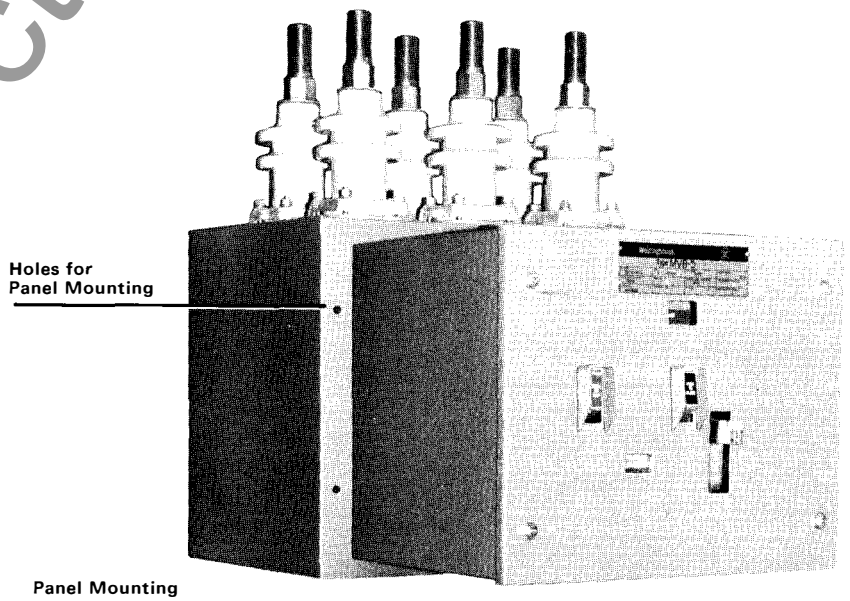
Mounting Equipment

The MVB-5 breaker can be mounted on a frame resulting in an overall height of 42 inches as shown on Page 1 of dimension sheet 38-932.

The breaker can also be panel mounted using the holes on the front of the breaker next to the operating mechanism compartment to add a panel mounting adapter. This adapter increases the spacing between the panel and the bushings to a minimum of 6 inches as described in dimension sheet 38-932, Page 2, Figures 3 and 5.



Frame Mounting



Panel Mounting

Manually Operated Breakers

For applications where shunt tripping is not required, the breaker can be manually tripped and closed by pushbuttons as the photo shows.

In this instance a motor is not supplied and the closing springs can only be charged manually. In addition, the following material normally supplied with a shunt trip breaker is not supplied:

- Close and Trip Coils
- Latch Check Device
- Motor Cutoff Switch
- Four Pole Auxiliary Switch

If it is desirable to add any of these items for control purposes, options are available from price list 38-930.

Modifications

The MVB-5 can also be furnished as a single pole, two-pole, four-pole or a five-pole breaker for special applications such as starting contactors for reduced voltage motor starting.

Accessories

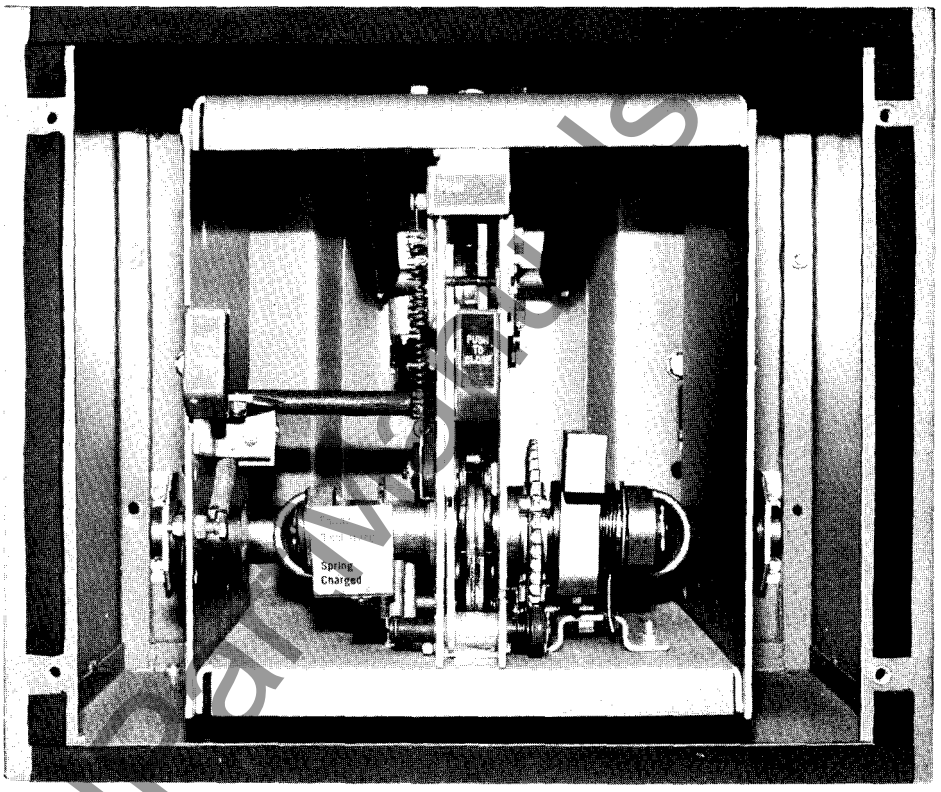
These accessories normally apply to shunt tripped breakers only; however, they can be used on manually operated breakers if they are equipped with coils or auxiliary contacts as necessary.

- A control switch for electric trip and close can be furnished for remote mounting.

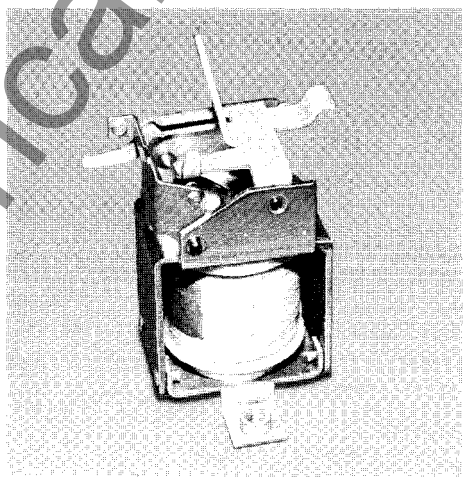
- Indicating lights showing the breaker position can be furnished for remote mounting.

- A 230 VAC capacitor trip device for shunt trip breakers can be supplied for remote mounting.

- An undervoltage release device can be supplied to trip the MVB-5 breaker on low voltage. The solenoid of the device is mechanically reset by the mechanism and is sealed in if voltage is present. This device is mounted in the rear of the mechanism compartment and is set to trip between 30 and 60 percent of nominal voltage. Operation can be from 115, 208, or 230 VAC or from 48 or 125 VDC with or without a time delay. This photo shows the device in the sealed-in normal position.



Mechanism Without Motor



Mechanical Undervoltage Release Device, Automatically Reset, Shown in Normal Operating Position

Further Information

PL 38-930
DS 38-932

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