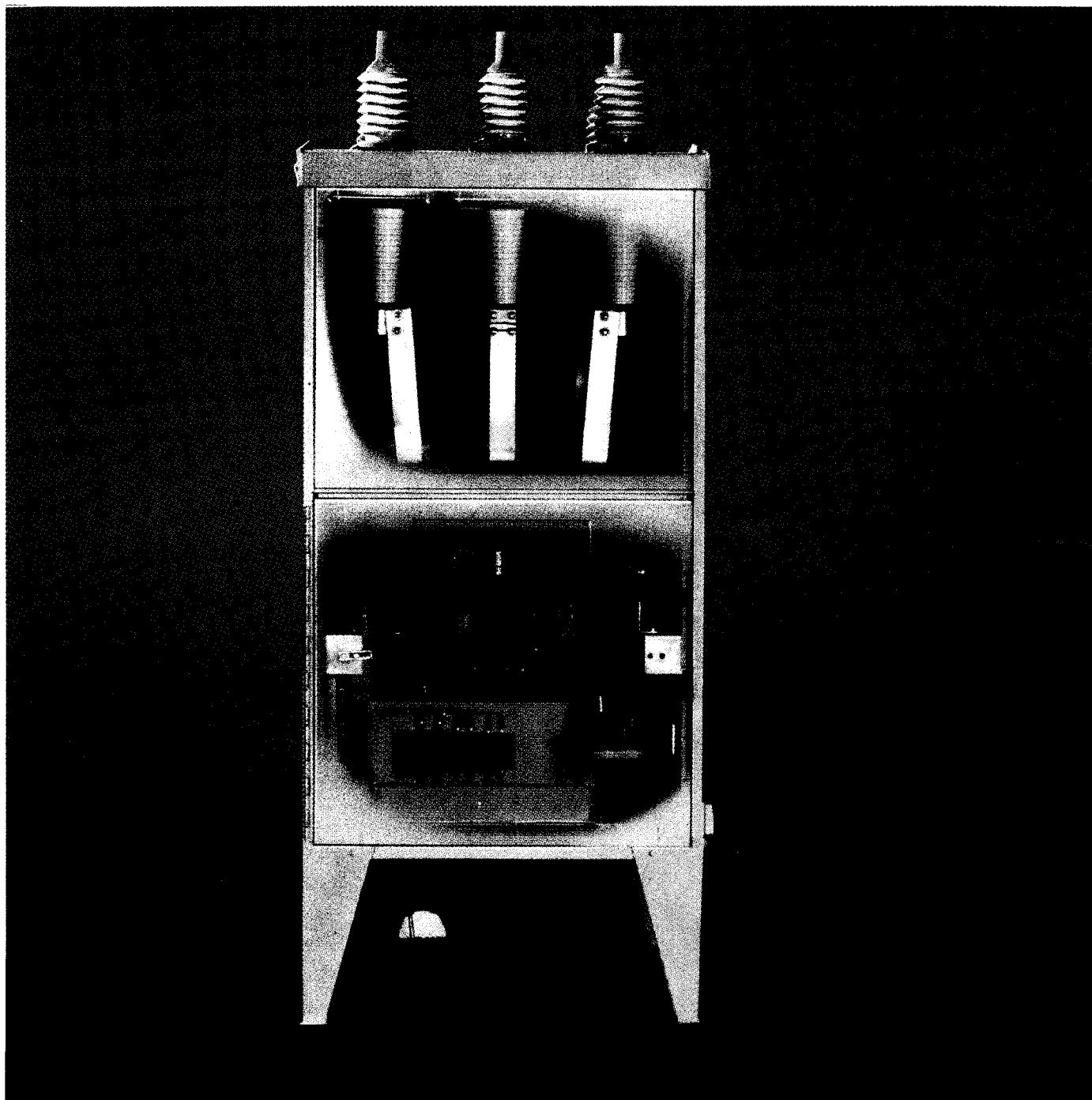




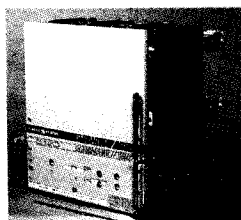
**GE Power/Vac<sup>®</sup>**

***15.5kV & 28.0kV Distribution Breaker***



# A logical extension of POWER/VAC® breaker technology

POWER/VAC® Distribution Breakers provide all the features required in outdoor switching, protection and control applications. They are rated 15.5 kV and 28.0 kV; 1200, 2000 and 3000 amperes, with symmetrical interrupting capacity of 12,000, 16,000, 20,000, 25,000, 40,000 amperes.



General Electric POWER/VAC Distribution Breakers incorporate the same POWER/VAC breaker element used in GE POWER/VAC Metalclad Switchgear. Thousands of these breaker elements are in service and have established a proven reliability record domestically and in over 30 countries. They are manufactured in the world's most sophisticated switchgear facility in Burlington, Iowa, where thousands are produced annually. This high volume allows the benefits of CAD/CAM, Class A tooling and stringent testing to be extended to the manufacture of POWER/VAC Distribution Breakers.

## Vacuum Interruption provides the most efficient protection

At the heart of the Distribution Breaker is the POWER/VAC metalclad vacuum interrupter. To date, this design has accumulated over 800,000 interrupter years of reliable field service experience.

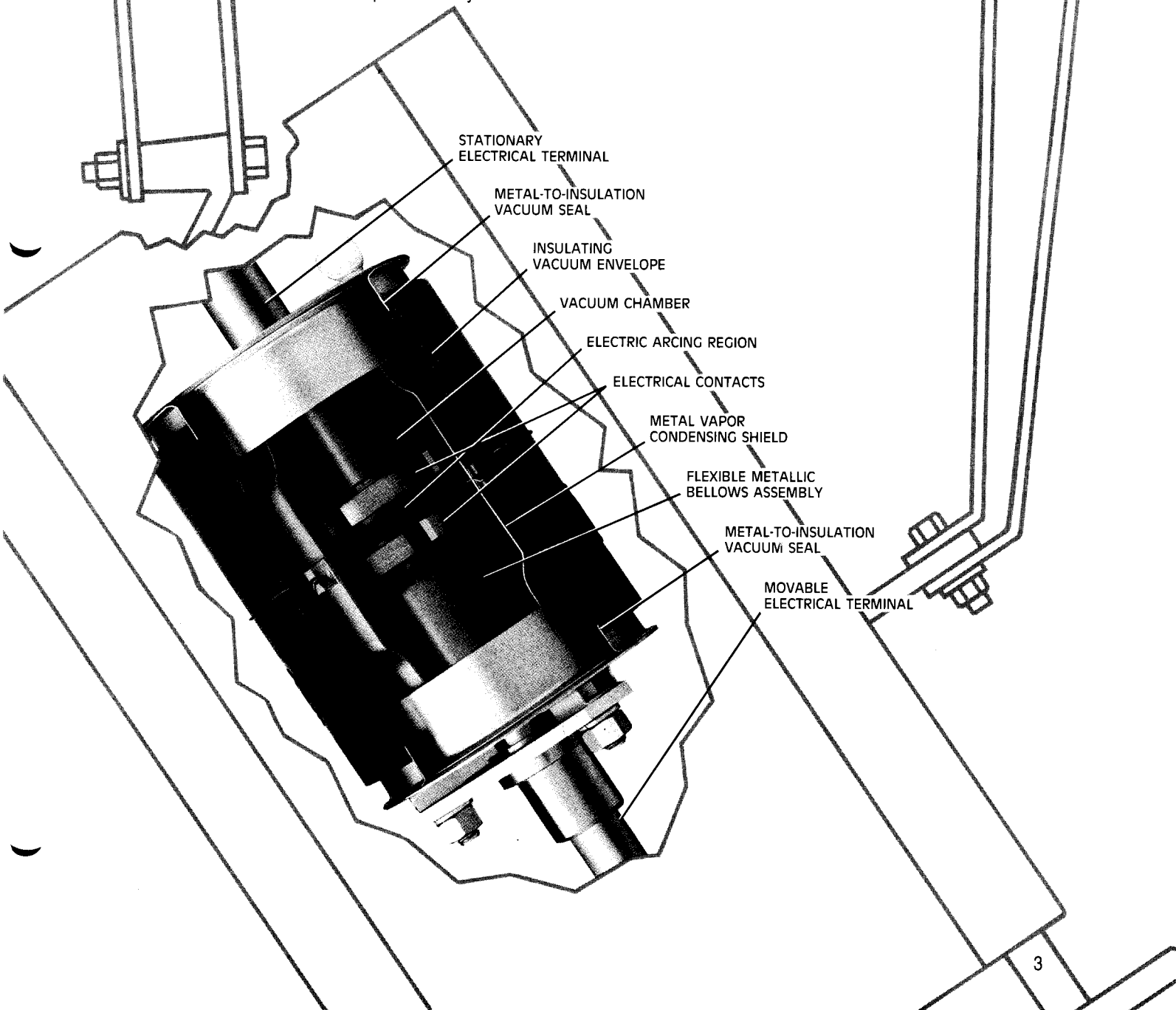
General Electric pioneered vacuum interruption technology in the 1920's; refined it with improved materials and new manufacturing techniques in the '30's and '40's; and introduced the world's first vacuum interrupter distribution breaker in the 1960's. With the development of the POWER/VAC breaker element in the 1970's, General Electric introduced the first medium voltage metalclad switchgear line to use vacuum exclusively. Today this same proven breaker element is incorporated in the POWER/VAC Distribution Breaker.



INTERRUPTER ASSEMBLY

The POWER/VAC® Distribution Breaker offers these important features:

- **NO CONTACT MAINTENANCE.** One set of contacts performs both main and arcing contact functions. Maintenance is eliminated because the high vacuum environment isolates contacts from exposure to dirt, moisture and other pollutants.
- **RELIABLE ARC INTERRUPTION.** Arc interruption typically occurs at the first current zero after contact separation. The high dielectric strength of the vacuum gap results in an extremely short clearing time. From a normal CLOSED position, the breaker can complete fault interruption in five cycles.
- **QUIET OPERATION.** Arc extinction is silent, and the sound level of the mechanism is low. Quiet operation is particularly desirable near hospitals, residential areas and shopping centers.
- **LONG SERVICE LIFE.** POWER/VAC interrupters experience no significant contact erosion during normal duty. They're designed and tested to meet or exceed performance requirements of applicable ANSI, IEEE and NEMA standards.



# Modular design provides easy installation and accessibility

**Easy Installation.** Distribution Breakers are shipped completely assembled ready for immediate installation, except for the legs which are available in selected lengths.

**Continuous steel frame** simplifies grounding and provides greater rigidity for added strength. This design has lower reaction forces during operation, and therefore a lighter foundation can be used.

**Pull-to-trip-lever** on the outside of the breaker trips the breaker and prevents reclosing from any source until manually reset by the operator.

**Viewing window** permits convenient visual check of operations counter, OPEN/CLOSE indication, spring charge indication, manual CLOSE and TRIP buttons and pull-to-trip lever.

**Modular breaker design** consists of three pole assemblies and the breaker mechanism to simplify maintenance. The entire module can be removed with a minimum of effort.

**Optional:** Stainless Steel construction is available.

**Table 1**  
**Current Transformer Ratings for**  
**1200 and 2000 Amp Breakers**

**Single-Ratio, Metering Accuracy**

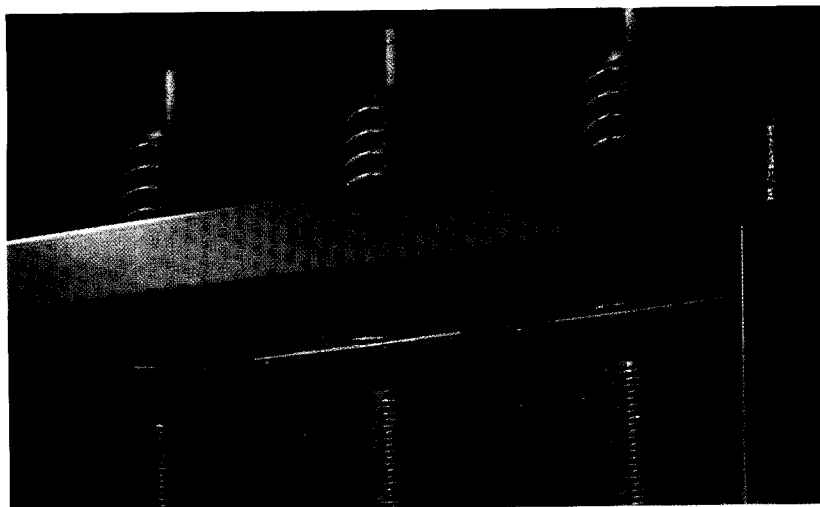
1200 Amp Breaker Only		1200 and 2000 Amp Breaker	
Full Turns Ratio	Class	Full Turns Ratio	Class
300:5	0.6B0.9	1200:5	0.3B1.8
400:5	0.6B1.8	1500:5	0.3B1.8
600:5	0.3B1.8	2000:5	0.3B1.8
800:5	0.3B1.8	3000:5	0.3B1.8

For Linear Couplers, Consult Factory

**Multi-Ratio, Relaying Accuracy**

Standard Accuracy		Double Accuracy*	
Full Turns Ratio	Class	Full Turns Ratio	Class
600:5	C100	600:5	C200
1200:5	C200	1200:5	C400
2000:5	C400	2000:5	C800
3000:5	C400	3000:5	C800

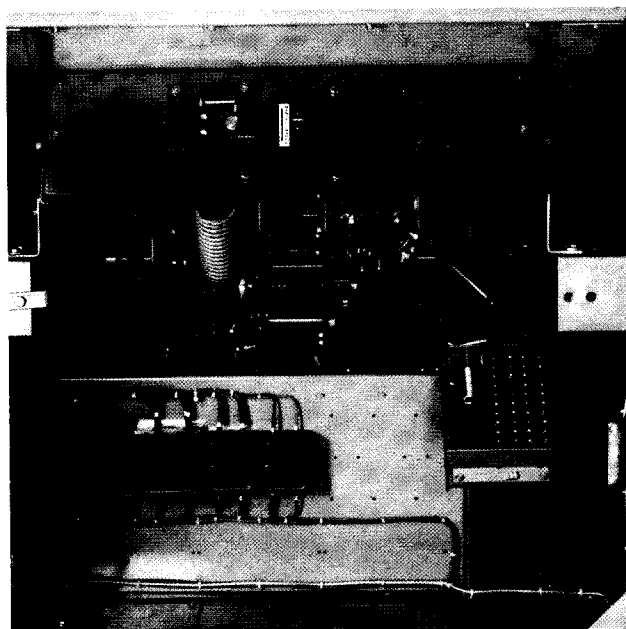
\*Maximum of 1 CT per Bushing



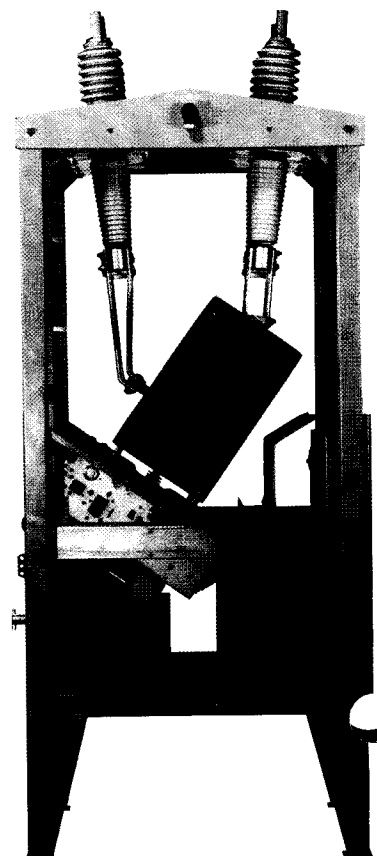
CURRENT TRANSFORMERS



VIEWING WINDOW AND PULL-TO-TRIP LEVER



INSIDE FRONT MECHANISM AND CONTROL COMPARTMENT



SIDEVIEW WITH PANELS REMOVED

# Rigid quality standards and thorough testing assure high reliability

POWER/VAC® Distribution Breaker quality begins with the basic materials- steel, copper, aluminum, fiberglass, reinforced polyester and porcelain - proven in both indoor and outdoor use. All breaker elements and purchased components are thoroughly inspected to assure they meet specifications. In addition, each breaker's insulation materials receive numerous production and laboratory test.

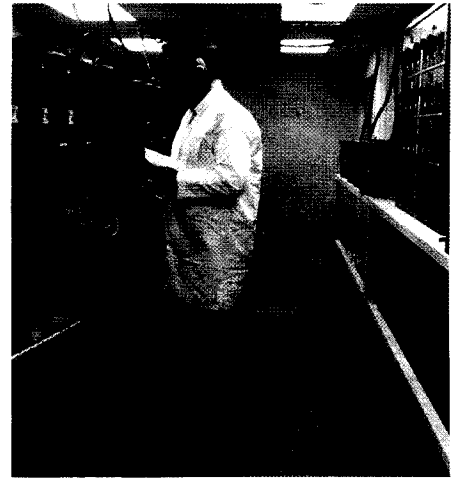
During manufacture, numerically controlled machines and high quality tooling produce accurate parts. This helps reduce assembly and alignment problems and improves reliability.

All breakers are designed tested to applicable industry standards. Some of the test procedures include:

1. Preliminary breaker adjustment assures that all components are within specifications.
2. Every breaker element undergoes a 300 operation CLOSE/OPEN mechanical run-in test, because most component failures occur within this period. Thus, this stress test catches nearly all problems in the factory before they can impact system integrity.

3. Vacuum interrupter wipe, gap and stroke are adjusted to precise tolerances.
4. High potential tests are made on primary and secondary circuits, and the resistance of each pole assembly is measured against specification.
5. The breaker element mechanism is operated at maximum, minimum and rated voltages, and speed/time checks are made to assure reliable operation.
6. A series of tests is conducted with the breaker element in the equipment to verify operation. Interlocks, auxiliary switches, wiring, relays and other components are tested for continuity and correctness.

**Bushings and current transformers** are GE designed and built to meet exacting ANSI standards. CT's are readily accessible; refer to Table 1 for ratings. This design features up to two current transformers per bushing, 12 per breaker. Linear couplers are available.



300 OPERATION TEST

**"E Coat" paint** is applied with the cathodic electrodeposition method which bonds the paint to all surfaces to resist adverse effects of harsh environments. A final exterior finish coat provides extra protection. ANSI 61 Grey is standard; other color options are available.

**Low maintenance.** The POWER/VAC Breaker ML-18 mechanism is designed for 10,000 no-load and 5000 full load operations prior to maintenance. After 18 full fault interruptions, it is recommended that the contact erosion indicator be checked to estimate remaining interrupter life.

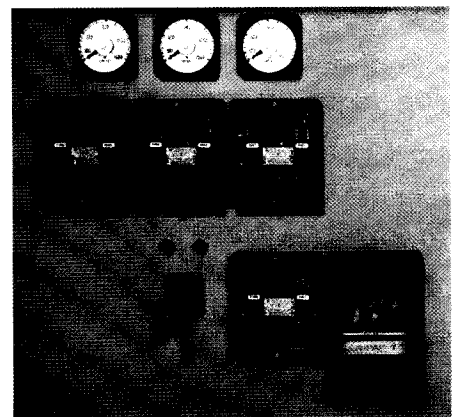
## Optional overcurrent protection assembly

The distribution breaker relay assembly is designed to accommodate all control protection and indication functions. Each relay panel assembly is engineered, assembled and tested as a unit to assure consistent, coordinate operation.

Features include:

- **All current transformer** secondary leads are continuous from the transformer to the short circuiting type terminal boards.

- **Terminal boards** are positioned for ease of access to facilitate connection of external leads.
- **Relays and controls** are mounted on a swinging panel for easy access.
- **Relays**, either electromechanical or digital, are provided with various protection functions and metering.
- **Circuit breaker control switch** and indicating lamps are positioned for ease of operation.
- **Indicating ammeters** are standard.
- **Other devices** are available.



RELAY PANEL

# 15.5kV Distribution Breaker

## Ratings and Dimensions

Table 2

	Symmetrical Basis of Rating												
Breaker Type	Rated Values								Related Required Capabilities				
	Voltage		Insulation Level		Current					Current Values			
	Max. kV, Rms	Range Factor K	Withstand Test Voltage		Continuous Current at 60 Hz Amp, Rms	Short-circuit Current (At Rated Max. kV) KA, Rms	Inter-rupting Time Cycles	Rated Permissible Tripping Delay Y-seconds	Max. kV Divided by K kV, Rms	Maximum Symmetrical Interrupting Capability	3-Sec. Short Time Current Carrying Capability	Closing and Latching Capability 1.6K Times	Shipping Wt. In Lbs.
			Low Frequency kV, Rms	Impulse kV, Crest						K Times Rated Short-circuit Current	Rated Short-circuit Current kA, Rms		
kA, Rms	kA, Rms												
PVDB1-15.5-12000	15.5	1.0	50	110	600	12	5	2	15.5	12	12	20	2000
PVDB1-15.5-16000	15.5	1.0	50	110	800	16	5	2	15.5	16	16	26	2000
PVDB1-15.5-16000	15.5	1.0	50	110	1200	16	5	2	15.5	16	16	26	2000
PVDB1-15.5-20000	15.5	1.0	50	110	1200	20	5	2	15.5	20	20	32	2000
PVDB1-15.5-20000	15.5	1.0	50	110	2000	20	5	2	15.5	20	20	32	2300
PVDB1-15.5-25000	15.5	1.0	50	110	1200	25	5	2	15.5	25	25	40	2000
PVDB1-15.5-25000	15.5	1.0	50	110	2000	25	5	2	15.5	25	25	40	2300
PVDB1-15.5-40000	15.5	1.0	50	110	1200	40*	5	2	15.5	40	40	64	2000
PVDB1-15.5-40000	15.5	1.0	50	110	2000	40*	5	2	15.5	40	40	64	2300
PVDB1-15.5-40000	15.5	1.0	50	110	3000	40*	5	2	15.5	40	40	64	2300

Note: Rating apply for 20 cycle reclosing time.

For Specification Guide see GIZ 3116

\*Burlington marketing must be consulted before quoting.

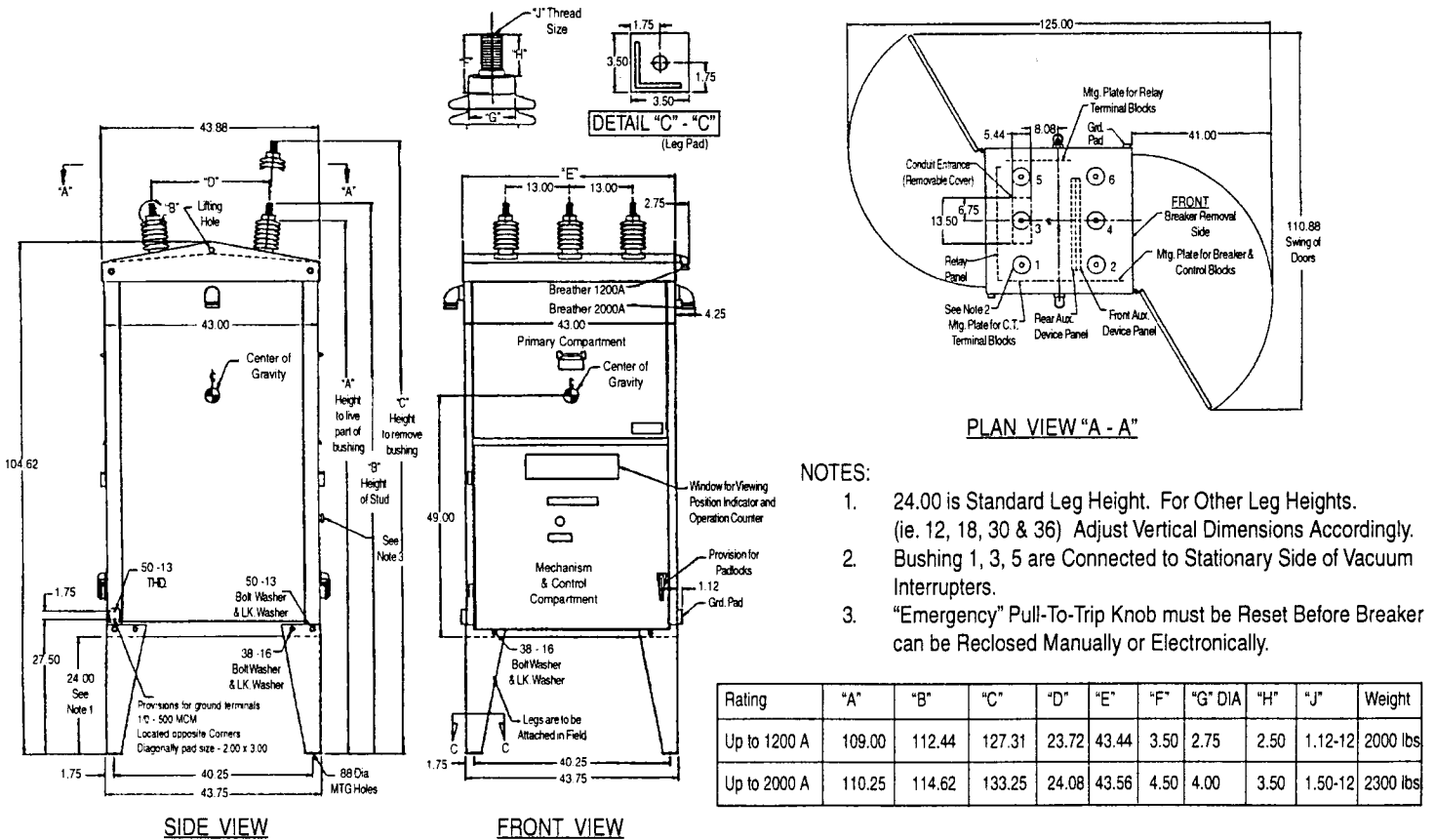


Figure 1

# 28.0kV Distribution Breaker

## Ratings and Dimensions

Table 3

Breaker Type	Symmetrical Basis of Rating												
	Rated Values								Related Required Capabilities				
	Voltage		Insulation Level		Current					Current Values			
	Max. kV, Rms	Range Factor K	Withstand Test Voltage		Continuous Current at 60 Hz Amp, Rms	Short-circuit Current (At Rated Max. kV) KA, Rms	Inter-rupting Time Cycles	Rated Permissible Tripping Delay Y-seconds	Max. kV Divided by K kV, Rms	Maximum Symmetrical Interrupting Capability	3-Sec. Short Time Current Carrying Capability	Closing and Latching Capability 1.6K Times	Shipping Wt. In Lbs.
			Low Frequency kV, Rms	Impulse kV, Crest						K Times Rated Short-circuit Current		Rated Short-circuit Current kA, Rms	
PVDB2-28.0-12000	28.0	1.0	60	125	1200	12	5	2	28.0	12	12	20	2200
PVDB-2-28.0-20000	28.0	1.0	60	125	1200	20	5	2	28.0	20	20	32	2200
PVDB-2-28.0-25000	28.0	1.0	60	125	1200	25	5	2	28.0	25	25	40	2200
PVDB-2-28.0-12000	28.0	1.0	60	125	2000	12	5	2	28.0	12	12	20	2500
PVDB-2-28.0-20000	28.0	1.0	60	125	2000	20	5	2	28.0	20	20	32	2500
PVDB-2-28.0-25000	28.0	1.0	60	125	2000	25	5	2	28.0	25	25	40	2500

Note: Rating apply for 20 cycle reclosing time. Breaker rated 28.0kV has optional bushings rated 150kV BIL  
For Specification Guide see GIZ 5002.

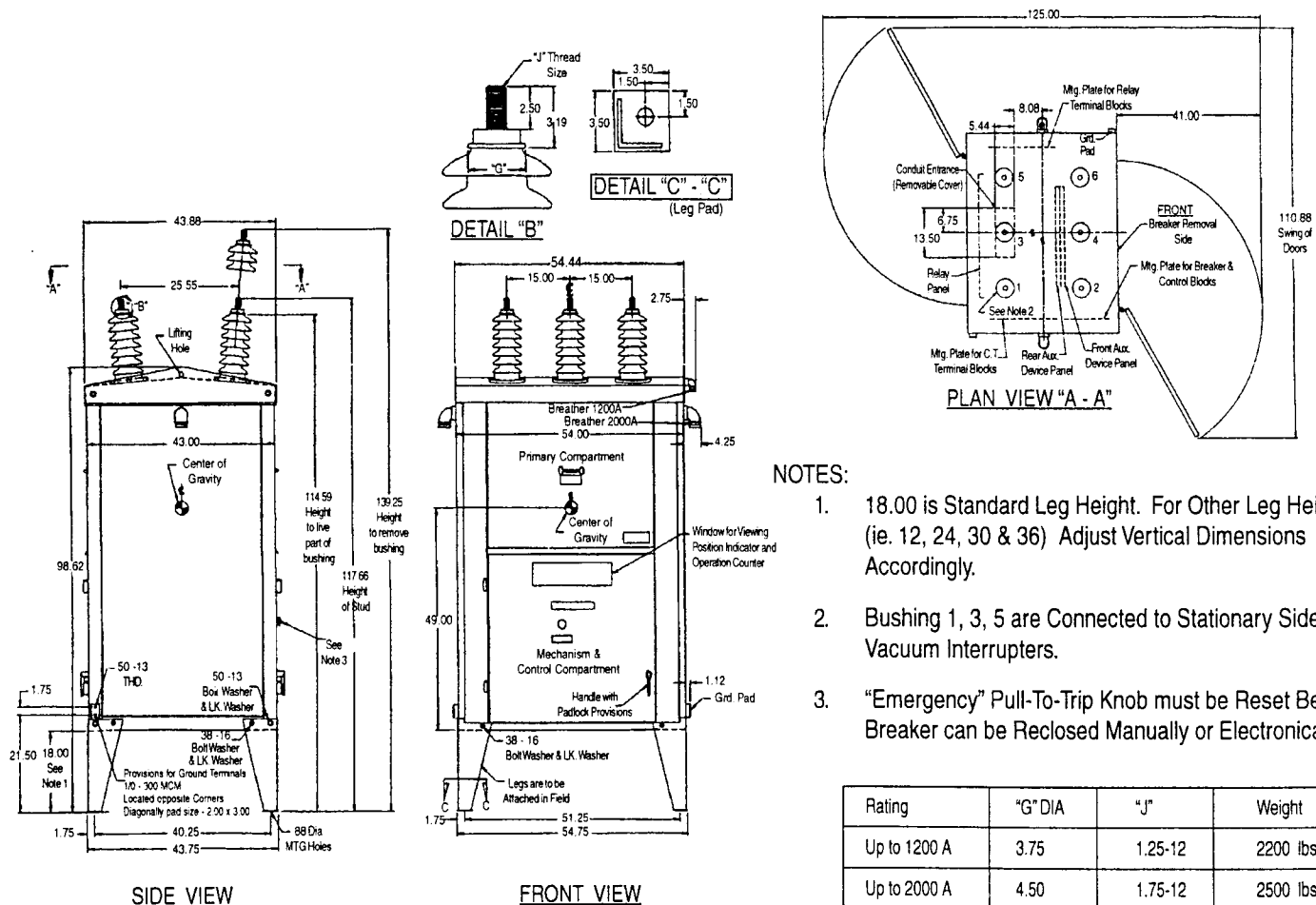
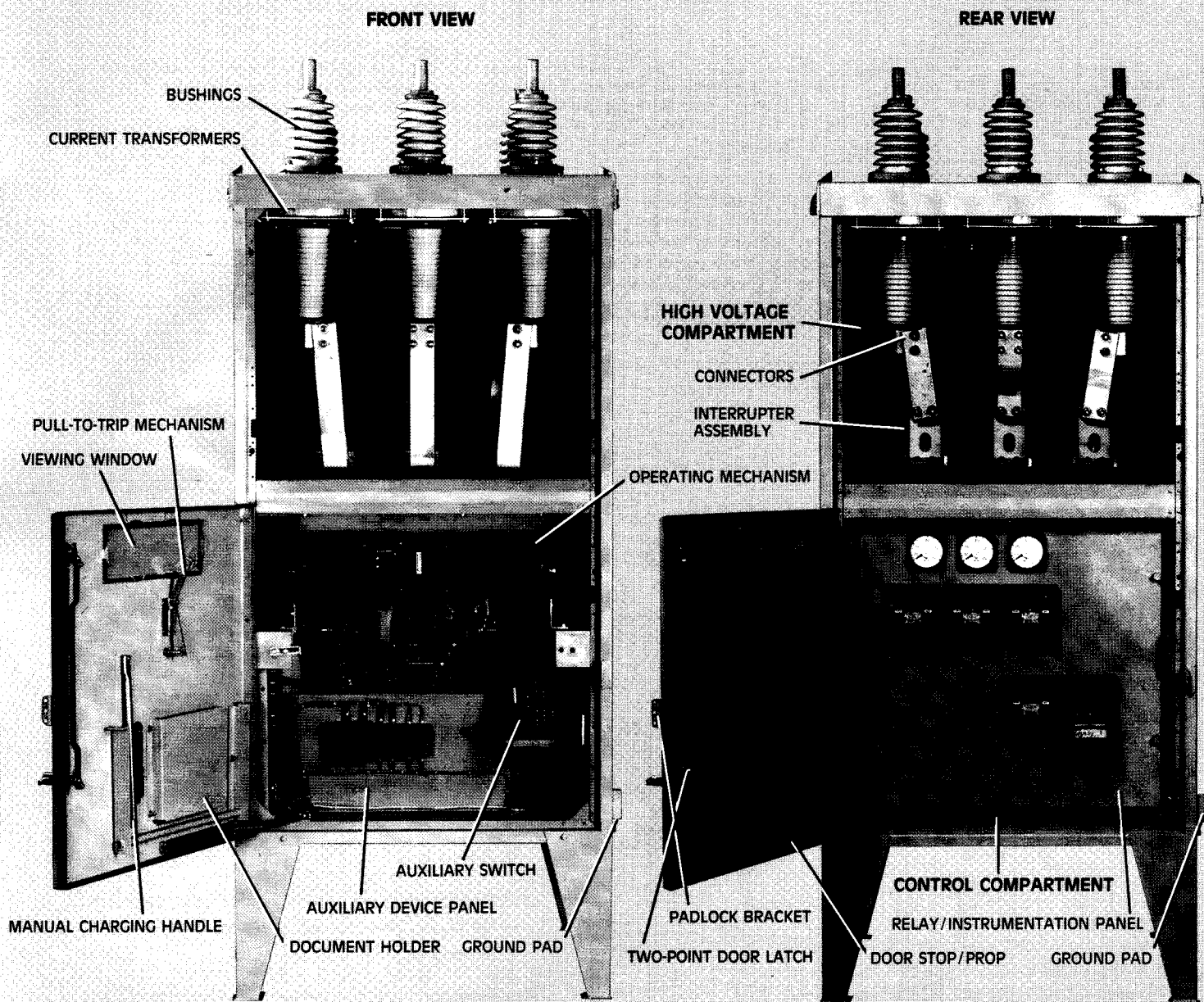


Figure 2

# Vacuum Distribution Breaker



**GE Electrical Distribution & Control**