

VERTICAL LIFT METAL-CLAD SWITCHGEAR

PC 260 – 7/01

with GE PowerVac[®] VL Power Circuit Breakers



For New Construction and/or Match & Lineup
Including upgrades in MVA & Amperes



1551 Florida Ave., Severn; Maryland, 21144, Phone: 410-551-6500, Fax: 410-551-8451,
www.powerconcorp.com

Since 1928 when General Electric introduced its vertical lift metal-clad switchgear, a steady stream of technological improvements has provided a consistently high quality, durable, product with superior performance. Many units over 50 years old are still in service and performing well.

Even today, as aging is taking its toll, Powercon's *3 R's of Switchgear Economics - Remanufacture - Rehabilitate - Repair* - will add many more years of dependable service to those rugged structures so long in service.

Powercon has been building new **Vertical Lift Metal-clad Switchgear** along with new **PowerVac^â** VL breakers that can **match and line up** with existing gear, or new units as a separate line-up, all with interchangeable circuit breakers. Readily expand present vertical lift line-ups. Add on to either ends; indoor, outdoor, common aisle or protected aisle.

In addition to improvements over the original products - brought about by Powercon's 40 years experience with vertical lift switchgear and newer available technologies, we offer you the opportunity to **upgrade** your existing or new vertical lift switchgear. This is generally brought about by requirements for **higher continuous current** requirements in existing units or **higher short circuit** requirements that can be introduced into those units.

Existing units that can be upgraded for either higher current or higher MVA or both are detailed in Table 1 on page 3.



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OUTDOOR, METAL-CLAD POWERCON SWITCHGEAR

**TABLE 1
VERTICAL LIFT SWITCHGEAR UPGRADE AVAILABILITY RATINGS**

EXISTING		CAN BE UPGRRADED TO:	
MVA	AMPERE	MVA and/or	AMPERES
500	1200	750 1000	
500	2000	750 1000	2500
750	1200	1000	
750	2000	1000	2500
1000	2000 3000	—	2500 4000 5000*

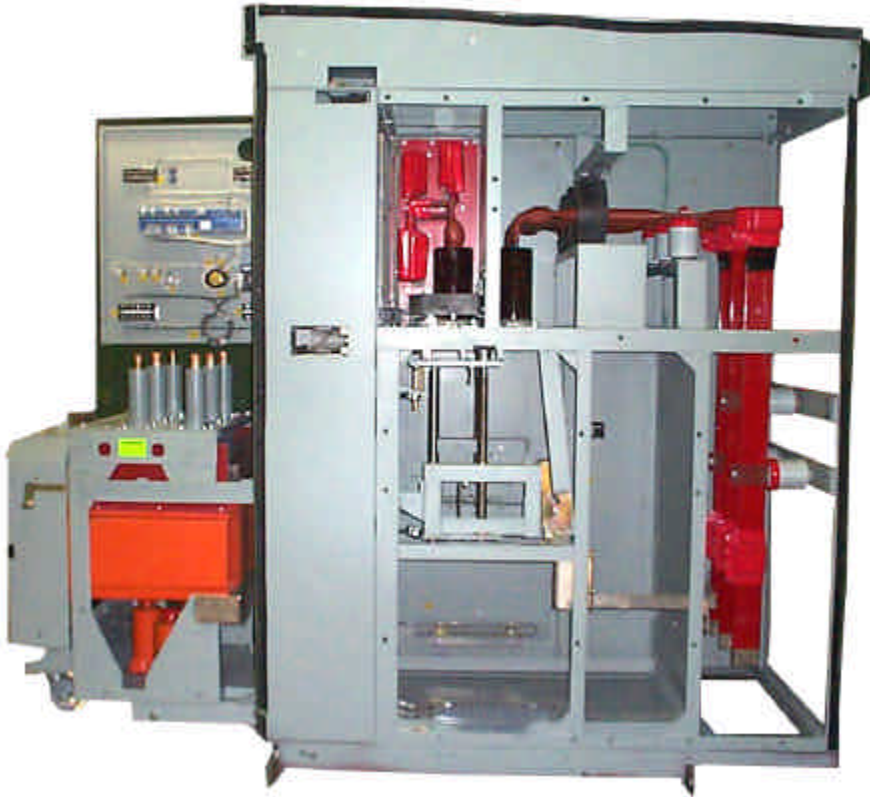
Note:

1. Bus systems must be examined to verify if they should be changed to support ampere loading.
2. Some MVA upgrades may require additional switchgear bracing.

* - Self contained, fan cooled.

POWERCON'S VERTICAL LIFT SWITCHGEAR:

Perplexed with the availability of critical parts to maintain GE magne-blast switchgear? Unable to maintain asbestos in arc chutes? Concerned about the reliability of renewal and upgrading options being offered by others? Contemplating tearing out the cubicles and starting anew? Don't! There is a practical solution.



Powercon is a committed engineering company that has vast experience enabling cost-effective expansion, upgrading and modernization of medium voltage power systems or switchgear. Completely compatible for match and line up with switchgear using GE vertical lift magne-blast breakers, Powercon equipment provides a level of protection not previously available. Among the benefits:

❖ Adaptability

Readily expand present GE line-ups. Add on to either end; indoor, outdoor, common aisle, protected aisle.

Unlike some modernization approaches, Powercon switchgear does not require the expense or floor space needed for transition compartments. Bus pass-throughs and connections are at the same level. Just remove the side panels and bolt up.

❖ Up – To – Date Equipment and Technology

There are no remanufactured or previously used breakers, structures or component parts employed. Powercon switchgear is all new, and backed up by new equipment warranties and service.

❖ Interchangeable

Key parts of Powercon switchgear are interchangeable with original GE vertical lift line-ups. For example, GE magne-blast breakers with ML-13 stored energy mechanisms are directly interchangeable – electrically and mechanically – with modern GE PowerVac® VL Vacuum Circuit Breakers. As a result, you gain an important safety margin for system availability and reliability.

❖ Quality Assurance From Original Designs

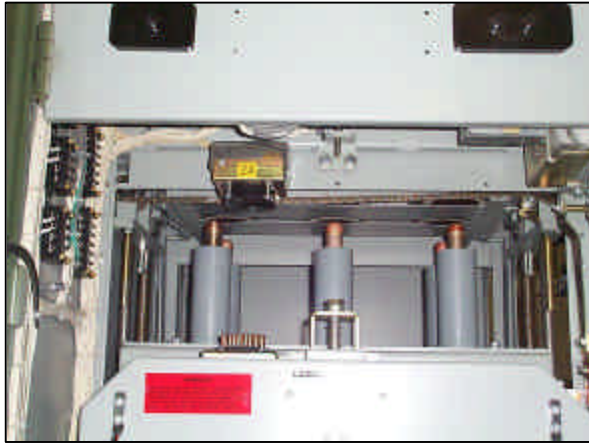
Powercon switchgear units are built from available original engineering documentation which have been maintained on vertical-lift installations since the early 1950's – added assurance the new equipment will deliver durability, reliability and performance experienced with the original installation. PowerVac® VL breakers are completely design tested to ANSI C37.06 and C37.59

❖ Cycloaliphatic Insulation – Superior to Porcelain

Cycloaliphatic bus supports and/or thru-bushings are used on all live conductors – main bus, run-backs and PT connections. Cycloaliphatic is the material that has proven best for severe environments of high humidity, and contamination such as encountered in refineries, paper mills and coastal locations. Of course Porcelain is still available.

❖ Vacuum Interruption

For power switching, the new equipment relies on Vacuum Circuit Breakers. Among their advantages, the breakers perform numerous full-load switching operations with little deterioration to interrupting contacts – a major reason for critical breaker maintenance. On average, the breaker can be routinely maintained in one-third the time required for magne-blast breakers.



CURRENT TRANSFORMERS

Readily accessible toroidal CT's are standard. Bar type CT's with additional metering or relaying accuracy can be substituted up to 1000 amps.

GE POWERVAC[®] VL VACUUM CIRCUIT BREAKERS

Interchangeable with existing breakers, PowerVac[®] VL Vacuum Circuit Breakers will meet the same performance requirements using modern vacuum technology, but with fewer parts and considerable less maintenance. Type ML-18 operating mechanisms are used for all ratings.

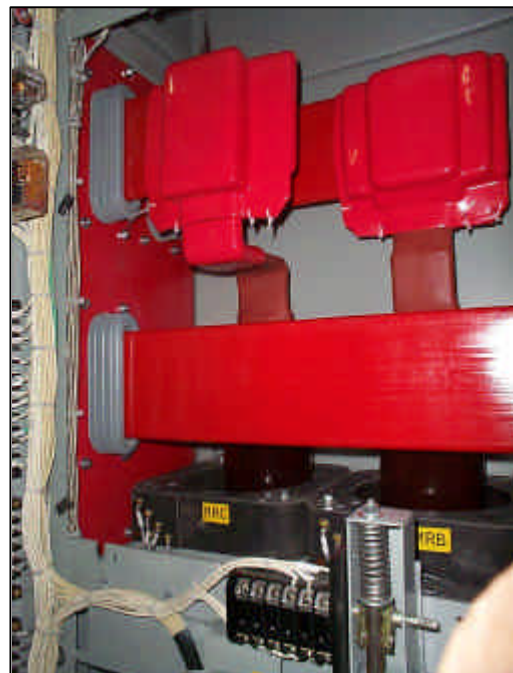


INSULATING SYSTEMS

Main bus and other live conductor supports are cycloaliphatic epoxy for an increased creepage path to ground, and high resistance to environmental deterioration. Insulating boots are provided for inspection of bus joints.

PROTECTION OPERATOR CAN SEE

When lowering a breaker, the operator has complete control. Safety shutters automatically move into place to cover energized parts.



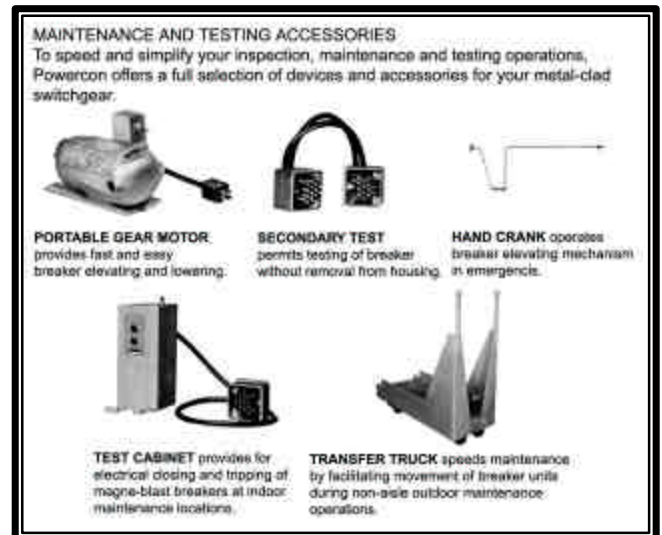
**Use Powercon Corporation's Extensive Facilities & Experience in Design & Production
And the Ability to Minimize Operating Uncertainties**



Typical 13,200 Volt Switchgear Rehabilitated to Better than New Condition

Process Included:

- ❖ Total inspection.
- ❖ Replacing main bus and insulation.
- ❖ Replacing bus and high voltage switchgear supports with cycloaliphatic epoxy or porcelain.
- ❖ Checking – replacing (where needed) all devices including relays, instruments, current transformers, potential transformers, circuit breakers, etc.
- ❖ Upgrading – including changing current transformers, instrumentation, adding automation and Scada, telemetering and relaying.
- ❖ Replacement of worn or damaged parts.
- ❖ Adding new warning signs and labels.
- ❖ Adding or deleting circuits and equipment.
- ❖ Replacing obsolete GE AM Magne Blast Breakers with GE PowerVac® VL Breakers.



**POWERVAC[®] VL
REPLACEMENT
BREAKERS FOR GE
MAGNE-BLAST TYPE AM**

No kits...no guessing...no used parts. Just the high performance, reliability and safety you need and expect from the original manufacturer.

FEATURES:

- ❖ Complete roll-in vacuum breaker assembly ready for immediate insertion into existing equipment – minimize downtime
- ❖ All new components – frame, interlock mechanisms, bushings and secondary disconnects
- ❖ ANSI/IEEE tested – interface/interlocks, dielectric, momentary, temperature rise and mechanical life
- ❖ Standard production testing – 300 mechanical operations, high potential, min./max. control voltage and timing/travel curves
- ❖ Long life with low maintenance – proven Power/Vac breaker has front accessible mechanism
- ❖ Easy MVA rating upgrades – most equipment requires little or no modification beyond new interference plate
- ❖ Direct mechanical and electrical inter-changeability with existing units – complete documentation provided

**TYPICAL POWERVAC[®] VL
15KV CIRCUIT BREAKER**
(For complete line see rear cover)



1200, 2000 or 2500A – 500 – 750MVA – 1000MVA



1200, 2000 or 2500A – 500 – 750MVA – 1000MVA



3000, 4000 or 5000A* - 1000MVA

Note:

1. The photos above are typical. E.g. a 1200A 1000MVA breaker can be inserted into a 1200, 500MVA cell with certain cell modifications. Many other combinations are also available. Consult Powercon Corporation Sales for further information.
2. *Fan Cooled.

WHY YOU SHOULD UPGRADE YOUR MAGNE-BLAST EQUIPMENT WITH GE POWERVAC[®] VL BREAKERS

- ❖ Extend the useful life of your Magne-Blast equipment.
- ❖ Normal wear and aging of contact, mechanisms, insulation and arc chutes can lead to failures.
- ❖ Electrical distribution systems may have grown over the years, leaving equipment under-protected.
- ❖ Eliminate asbestos arc chutes issues with proven PowerVac[®] vacuum breaker.
- ❖ Save up to 50 % on breaker maintenance costs.
- ❖ Avoid costly downtime.

PowerVac[®] VL vacuum replacement breakers are available in the ratings shown below for insertion into Magne-Blast Type AM breaker compartments:

Symmetrical Rating Basis ANSI C37.06 (Note – 3000A – 4000A – 5000A(FC) Available)

Ratings shown below are based on old breaker ratings. For new rating standards consult factory.

Nominal RMS Voltage Class (kV)	Nominal 3-Phase Class (MVA)	Rated Values								Related Required Capabilities			
		Voltage		Insulation Level		Current		Rated Inter – rupting Time (Cycles)	Rated Permissible Tripping Delay, Y (Seconds)	Rated Max. RMS Voltage Divided by K (kV)	Current Values		
		Rated Max. RMS Voltage (kV)	Rated Voltage Range Factor K	Rated Withstand Test Voltage		Continuous RMS Current Rating at 60 Hz (A)	Short circuit RMS Current Rating (at Rated max. kV) (kA)				Max. Symmetrical Interrupting Capability (kA)	3 Sec Short-time Current Carrying Capability (kA)	Closing and Latching Capability RMS Current (kA)
				Low Frequency RMS Voltage (kV)	Crest Impulse Voltage (kV)								
7.2	500	8.25	1.25	36	95	1200	33	5	2	6.6	41	41	66
7.2	500	8.25	1.25	36	95	2000	33	5	2	6.6	41	41	66
7.2	500	8.25	1.25	36	95	2500	33	5	2	6.6	41	41	66
13.8	500	15	1.30	36	95	1200	18	5	2	11.5	23	23	37
13.8	500	15	1.30	36	95	2000	18	5	2	11.5	23	23	37
13.8	500	15	1.30	36	95	2500	18	5	2	11.5	23	23	37
13.8	750	15	1.30	36	95	1200	28	5	2	11.5	36	36	58
13.8	750	15	1.30	36	95	2000	28	5	2	11.5	36	36	58
13.8	750	15	1.30	36	95	2500	28	5	2	11.5	36	36	58
13.8	1000	15	1.30	36	95	1200	37	5	2	11.5	48	48	77
13.8	1000	15	1.30	36	95	2000	37	5	2	11.5	48	48	77
13.8	1000	15	1.30	36	95	3000	37	5	2	11.5	48	48	77
13.8	1000	15	1.30	36	95	4000	37	5	2	11.5	48	48	77
13.8	1000	15	1.30	36	95	5000	37	5	2	11.5	48	48	77

Complete information required for quotation/order entry. Please forward to Powercon’s Sales Team at (410) 551-8451 by fax, or call (410) 551-6500, Breaker Sales.

Customer Name _____	Location _____
Type AM _____	Serial No. _____
Mechanism Type _____	Model No. _____

_____ 1200A _____ 2000A _____ 3000A _____ 4000A _____ 5000A

_____ Normal (37kA) _____ (58 kA) momentary for 500MVA applications
 _____ Normal (58 kA) _____ (77 kA) momentary for 750MVA applications
 _____ (77 kA) momentary for 1000MVA applications

Trip Voltage: _____ 48Vdc _____ 125Vdc _____ 250Vdc _____ Capacitor Trip
 Close Voltage: _____ 48Vdc _____ 125Vdc _____ 250Vdc _____ 115Vac _____ 230Vac
 Charge Voltage: _____ 48Vdc _____ 125Vdc _____ 250Vdc _____ 115Vac _____ 230Vac

Consult factory for approval to use for back to back capacitor switch and arc furnace applications.



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