



POWERSIDE®

PowerMVar & SynchroMVar

Medium Voltage Metal-Enclosed Capacitor
and Filter Banks

Fully Assembled.

Factory Tested.

Ready to Interconnect.

PowerMVar, Improving Your Power Quality

Value from Day One. Built to Last for Decades to Come.

When your capacitor bank performs, so does your investment. Powerside's medium voltage metal-enclosed capacitor and filter banks are built to perform, improving power quality generating exceptional value over the life of your system.

PowerMVar is a fully engineered system that includes all switching, protection, and controls in a ready to interconnect enclosure reducing field labor and improving your construction schedule. PowerMVar is a factory assembled and tested product yielding a faster and safer installation. The PowerMVar design features a compartmentalized, compact, architecture that increases equipment life cycle, and significantly reduces substation footprint when compared to open-rack structures.

Purpose Built to Improve Power Factor, Voltage Stability, and Distribution Capacity.

PowerMVar's are built for industrial, commercial, and utility networks. **They're the right choice to:**

- Improve power factor to reduce kVA demand
- Enhance system capacity
- Regulate network voltage
- Mitigate harmonics



The product featured is installed on a 34.5kV network with a capacity of 20MVAR which was specifically designed for a mining project in Canada. This solution meets the utility interconnection requirements by maintaining power factor and mitigating harmonics.

Complete Safety Protection.

Choose from a range of features:

- Key Interlock system
- Stage neutral voltage/current unbalance protection
- Over current protection in each stage
- Over/under voltage protection
- Harmonic THDv/THDi protection
- Distribution class arrestor (station class optional)
- Project specific protection via PLC/logic relay
- Complete ANSI protection alarms
- Arc Flash mitigation and protection
- Enclosure high temperature alarm
- Reactor over temperature alarm
- Control power transformer for auxiliary power
- Blown fuse indication

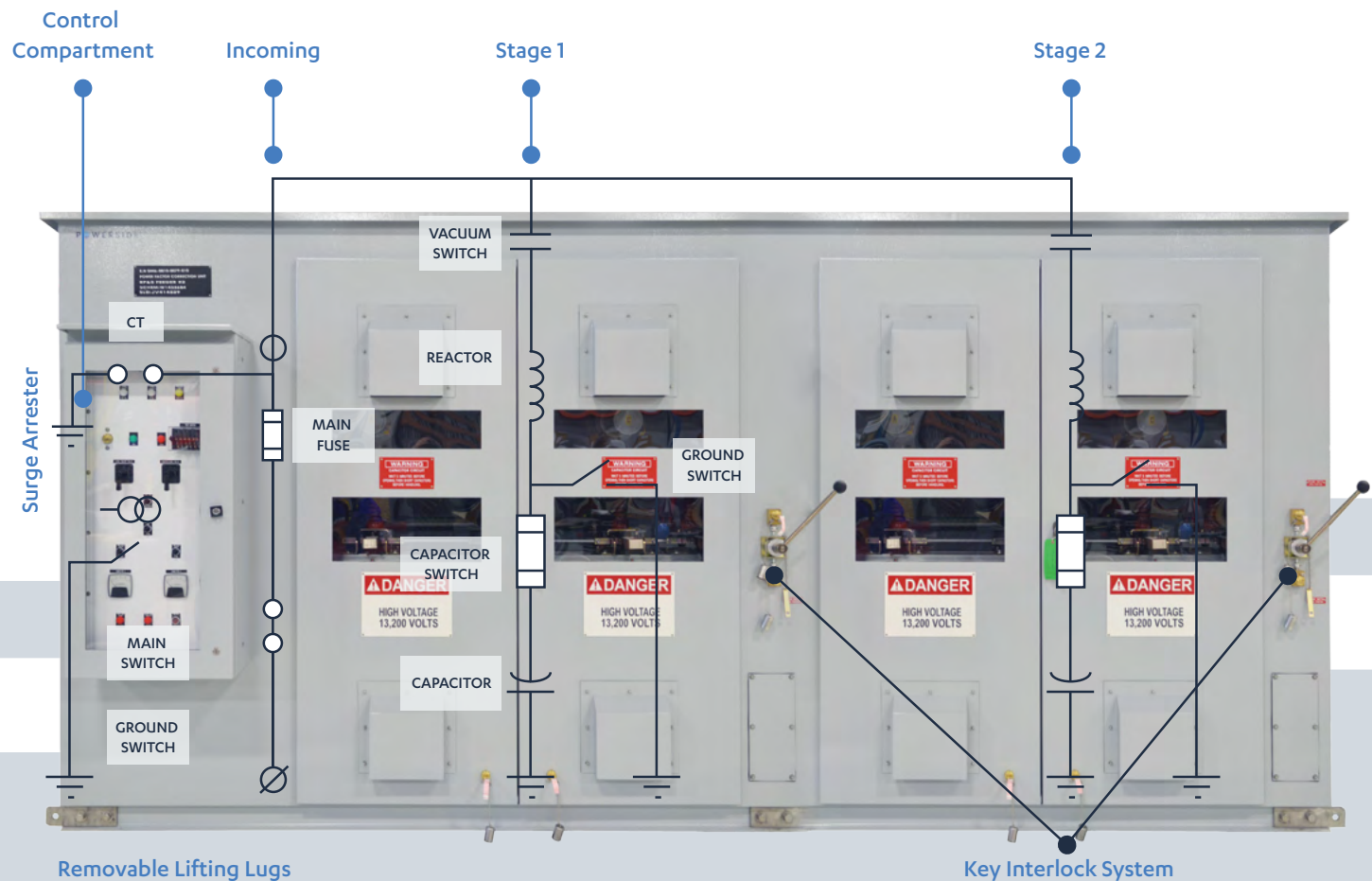
Built-In Smart Controller.

PowerMVar automatic banks are built with a smart controller that ensures the optimal level of reactive power is supplied. The controller prioritizes the sequencing to ensure each stage is operated equally maximizing the operating life of the switches and capacitors. Choose our intuitive HMI touch panel operator interface for easy local access or Modbus, Ethernet, and Profibus for remote monitoring.

Shipped Fully Assembled, Factory Tested, Ready to Interconnect.

- Operating voltages from 2.4 kV to 38 kV
- De-tuned to 3.78th for resonance free compensation or single tuned and multi-tuned models to specific frequencies
- Discrete control buttons and light indicators or HMI touch screen with advanced features
- Delta or Wye connected, low loss double bushing capacitors
- Cold rolled steel, with primer and powder coated paint
- Optional galvanneal and stainless steel available
- NEMA 1, 3R, or 4X rating options

Filter Bank		
	Typical Base Configuration	Options
Incoming Compartment	Main Lug Only/ Disconnect/Circuit Breaker	Main Fuse Ground Switch Lightning Arrester Measuring PT/CT CPT
Stage Compartment	(3) Cap Delta or Wye/ (6) Cap Wye/ (3) 1-ph Filter Reactor Cap Fuse/Stage Fuse 3-ph/(3) 1-ph Vacuum Contactor	Grounding Switch Neutral (1) PT/1-ph CT Stage 3-ph CT



SynchroMVar, Transient-Free Switching

When connecting compensation stages on a network, traditional switching capacitor banks produce current and voltage transients that shorten the life of these capacitors and their switching devices. **SynchroMVar uses an advanced point-on-wave control technology** that reduces these transients to acceptable levels, significantly prolonging the useful life of the components.

Soft connection and disconnection

Prolongs the life of capacitors and switches

Works with standard, single pole vacuum switches

High reliability, low replacement cost

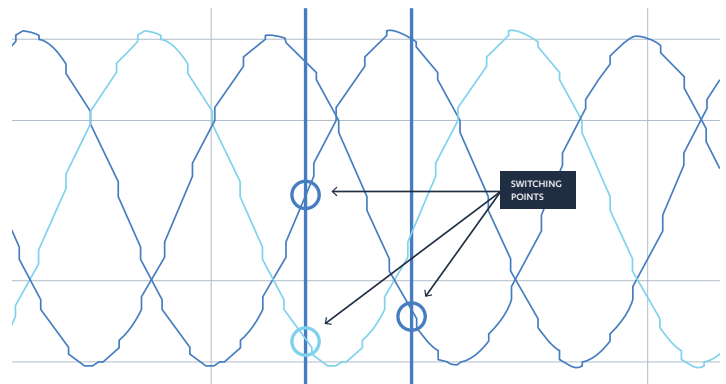
No need to discharge capacitors

Reduces capacitor wear and time between cycles

Self-calibrating controller

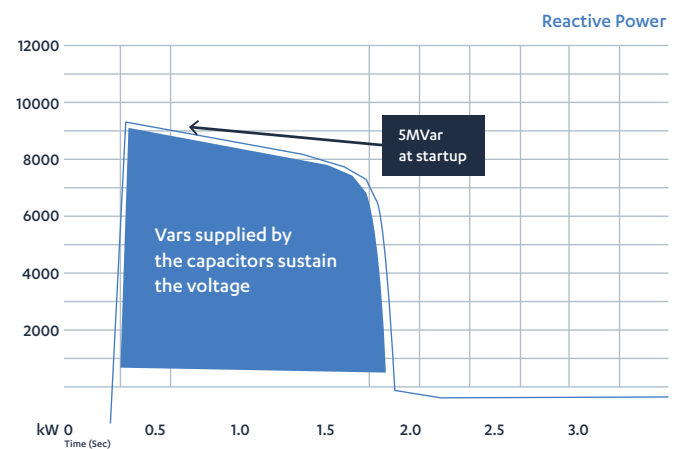
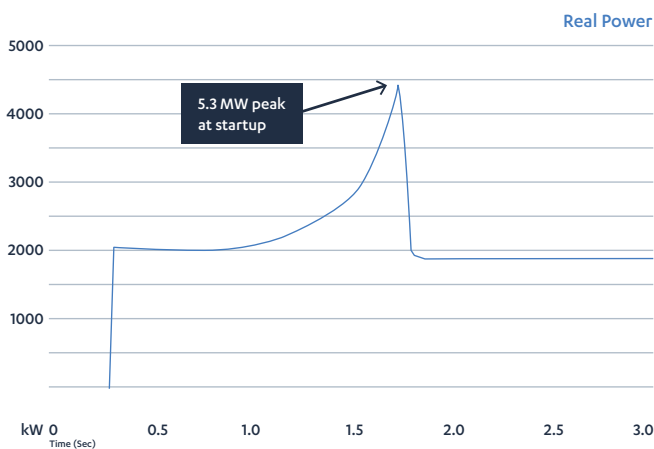
Optimizes the trigger point reducing aging effects

SynchroMVar can be used reliably in applications such as pumping stations and gas plants where Variable Frequency Drives (VFDs) or Reduced Voltage Soft Starters (RVSS) are used to start large motors. They can also be used as replacement or to complement complex and costly Statcom dynamic compensators in renewable energy or in highly voltage sensitive, low short circuit networks.

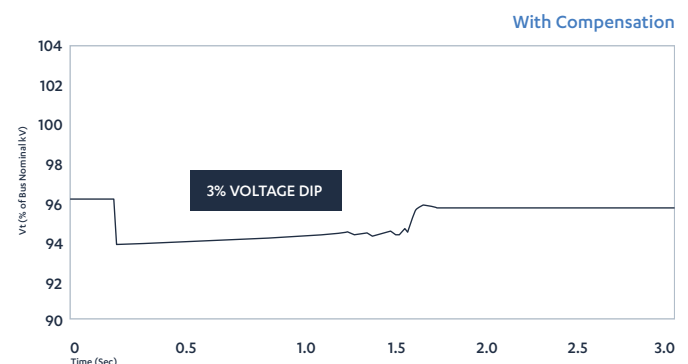
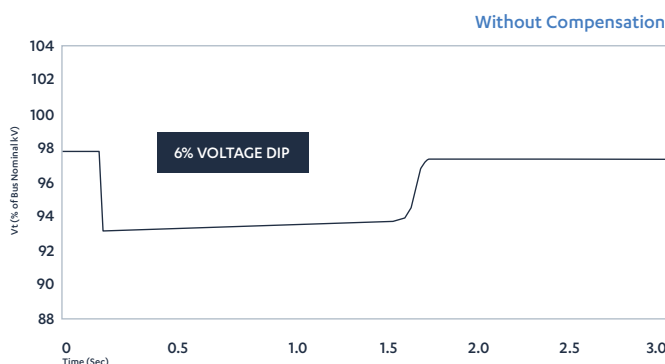


SynchroMVar Maintains Voltage During Motor Start.

2500 HP Motor Start Case

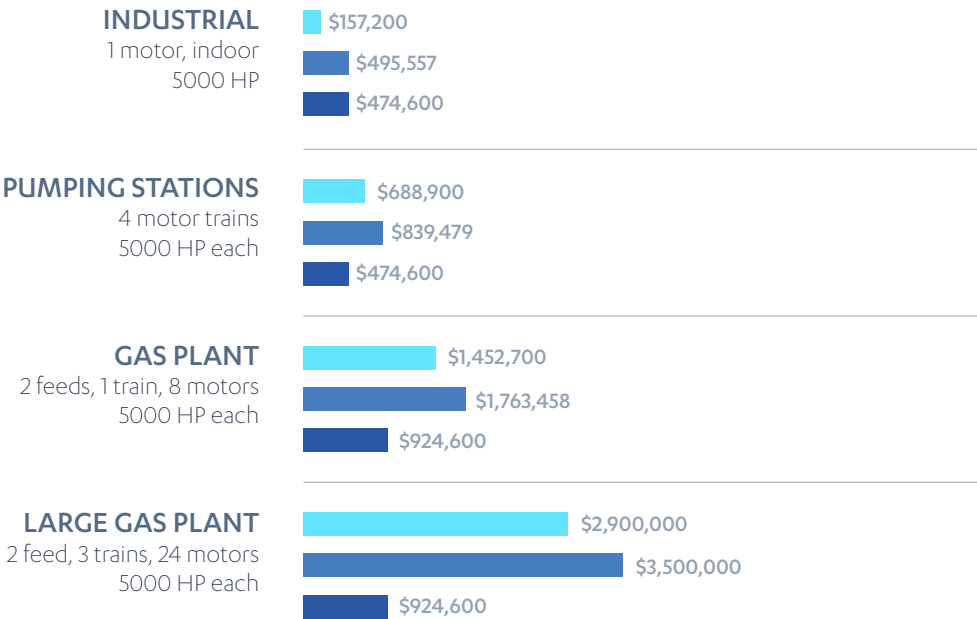


Var Compensation Impact on Voltage



SynchroMVar Saves Money Versus VFD and RVSS in Motor Train Applications.

Case examples 5000 HP ‘DOL’ motors



Equipment, protection, installation, and commissioning estimates included

Configurations

- RVSS**
one unit per motor,
e-house for cases 2 to 4
- VFD**
one unit and one
bypass/transfer system
per train, e-house for
cases 2 to 4
- SynchroMVar**
one NEMA 3R rated
metal-enclosed bank
for Cases 1 and 2, two
for Cases 3 and 4

SynchroMVar Improves Performance. Reduces Life Cycle Costs.

	RVSS	VFD	SynchroMVAR	
Energy efficiency	Low	Good	Best	Shunt connection, lower I²R losses
Starting torque	Limited	Good	Most	Holds voltage, keeps full start torque
Speed control (if required)	None	Yes	None	Applies where speed control is needed
PF compensation	None	Some	Best	Reduces kVA demand and penalties
Harmonic distortion	Good	Poor	Best	Includes harmonic filtering
Motor life	Good	Reduced	Best	Lowens harmonics
Installation costs	High Cost	High Cost	Lowest	Minimal installation requirements
Maintenance costs	Medium	High	Lowest	Basic maintenance only



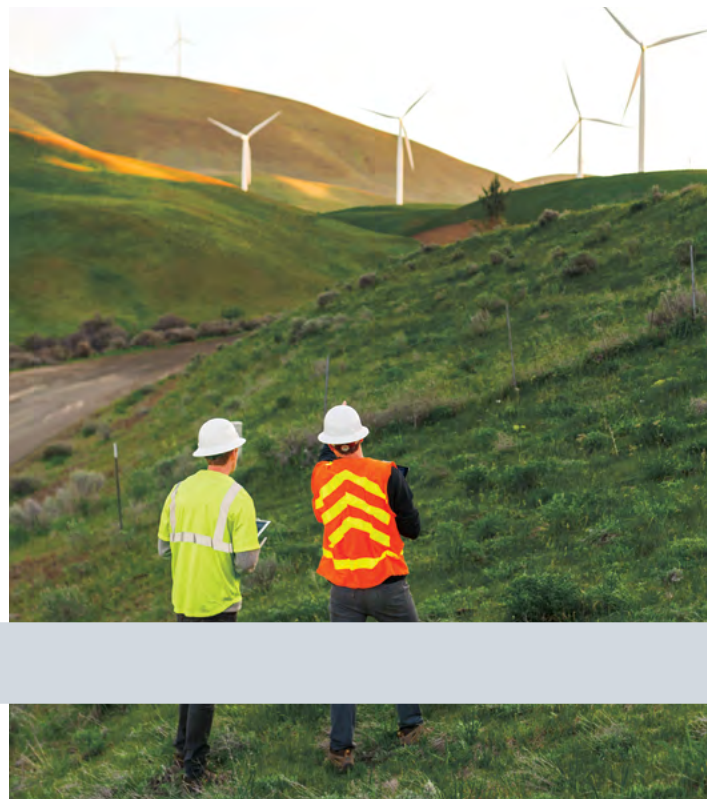
SynchroMVar — Well Suited to Renewable Energy.

Challenges

- VAR compensation is required to maximize the generation and transmission of power and to stabilize network voltage
- Uncontrolled generation from Renewables requires frequent adjustment of VAR compensation
- Traditional switching also reduces capacitor and switch life

SynchroMVar Benefits

- Improves the performance of switching devices and capacitors
- Stabilizes the voltage by optimizing power generation and transmission
- Ideal complement to lower the capacity and cost of Statcom



SynchroMVar, Stabilizes the Voltage Associated with Genset and Remote Locations.

Challenges

- Capacitor switching and large load variations cause voltage flickers on long, high impedance lines
- Frequent equipment faults, protection tripping, and erratic performance often results
- Higher distortion and operational risks under Genset operation

SynchroMVar Benefits

- Stabilizes voltage by supplying reactive power to large loads
- Limits switching currents which wear down capacitors and switches
- Corrects power factor to reduce kVA demand



Flexible Configurations. Reliable and Safe Architecture.

PowerMVar / SynchroMVar		
Voltage	2.4 - 35 kV (5 - 38 kV voltage class)	
Capacity	500 kVar - 50 MVar+	
Network harmonics	Low /High	
Load characteristics	Fixed/Variable	
Compensation type	Fixed/Auto, Unfiltered - Fixed/Auto Filtered	
Switching Type	PowerMVar None/Traditional switching - SynchroMVar Point on Wave (POW)	
Max. # of steps	12 (additional available on request)	
Power factor controller	Microprocessor based with harmonic over current protection	
Network connection	3-phase and single phase	
Short circuit level	12 kA-61 kA (Asymmetrical momentary)	
Impulse withstand voltage	60 kV-200 kV (Impulse)	
Short-time withstand voltage (HiPot)	19 kV-100 kV (1-minute 50/60 Hertz)	
Switching device	Vacuum Contactor Vacuum switch	SF6 breaker with inrush limiting resistor Vacuum Breaker (Capacitor Rated)
Filter type	De-Tuned Single tune Multi-tune	High-pass C-type
Protection	Over voltage 59 Under voltage 27 Overcurrent 50/51	Over temperature on reactor core Blown fuse indicator
Safety	KIRK Key interlock Discharge timer	Capacitor 4-pole earthing switch Isolation barrier
Control and timing	PLC control with optional local and remote HMI	
Maximum altitude (ASL)	3281 ft/1000 m without derating	
Operating temperature (F/C)	-40F to 122F / -40C to 50C (CSA 22.2 no.190 compliant)	
Enclosure rating	NEMA 1, 12, 3R (4X optional) / IEC IP20, IP42, IP54 /Arc Flash Mitigation: Passive & Active	
Communication	USB, Modbus, Ethernet, Profibus	



Call us today for a **free**
power factor analysis.

Contact Us

United States
Alameda, CA
1-888-736-4347

Canada
Montreal, QC
1-877-333-8392

sales@powerside.com
powerside.com

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