

# MG Set Control Power Cabinets

## The Westinghouse Solution

The MG Set Power Supply Control Cabinets are applicable for both Westinghouse and Combustion Engineering applications. In the Westinghouse system, the Rod Drive Power Supply (RDPS) provides reliable power to the Rod Control System through two Motor Generator (MG) sets and two control cabinets.

WPB Electrical Engineering looked at researching and developing a product to take the robust switching methodology of the original system and combine it with improvements identified in the AP1000 design to develop a replacement system. Our engineering team, working with an outside defense industry firm developed the new system as a direct replacement that maintains the original auctioneering switching technology and adds in new Man-Machine Interface with additional data capture with output to the plant Distributed Control System (DCS).

## Customer Benefits

Customers can replace the MG Control Power cabinets with or without replacing the MG Sets. With new MG sets features not available at original plant construction, can be added and monitored, such as MG vibration and temperature.

Customers may also elect to install this system at the time that they upgrade their Rod Control System from the original analog system with the new Westinghouse ARCH (Advanced Rod Control Hybrid) System. Arizona Public Service (APS) chose to perform both replacement scopes at the same time. The MG Control Power Cabinet and the Motor Generator are electrical, with the only interface being the ability to send a signal to the digital-based ARCH system. Therefore, the MG Control Power Cabinet can be installed with or without upgrading the Rod Control System.



Advanced Rod Control Hybrid (ARCH) Cabinets Installed

## Motor Generator Sets

While not required to be replaced with the control cabinets, replacement MG sets offer the following benefits:

- Adequately sized – a single MG set can carry full load
- Zig Zag Wye wound
- Contain stator and bearing temperature detectors and vibration sensors to allow for monitoring at the cabinet
- Used to trend MG sets and potentially increase time between maintenance intervals



Typical Cabinet Internals with safety shields removed

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## Westinghouse Parts Business

### Benefits



Westinghouse technology is fundamental to nearly 50% of the world's nuclear reactors. Now, that same trusted expertise is delivering the services and parts to meet the needs of 100% of the **nuclear plants across the globe.**

Every year, Westinghouse supplies more than **100,000 nuclear parts and products** - 24 hours a day, 7 days a week - to plants around the world dealing with planned replacements and emergent issues.

Westinghouse developed the original MG sets and control cabinets utilized in the existing PWR operating fleet. In order to maintain system functionality, our advanced control power cabinets are based on the original design but utilize modern, readily available components to improve reliability. These next-gen MG Set Control Power cabinets are applicable to all Westinghouse and CE-designed Pressurized Water Reactors (PWRs). These next generation cabinets are being supplied to operating plants in both the US and EMEA.



*Next Generation MG Control Power Cabinets Installed*

The control cabinet design features increase reliability, improved operation and can assist in troubleshooting.

- Eliminates obsolescence and age-related failures
- No sensitive mechanical relays
- Selective tripping ensuring only one MG set is tripped in the event of a failure allowing the plant to continue operating
- Digital Meters providing indication of: Volts, Amps, Frequency, VARs, KW, Exciter / Field Current
- VAR meter allows balancing voltages while synchronized
- Connections on outside of door to support taking independent voltage readings
- Enhanced diagnostic system to aid in trouble shooting
- All data availability locally is also capable of being transmitted to the plant DCS
- Ability to display motor temp / vibration if MG sets are equipped with sensors (new replacement MG sets will include RTDs and velometers on motor and generator)
- Replace obsolete components with readily available parts
- Electromagnetic compatibility (EMC) qualified
- Auto-synchronization capability
- Eliminated known SPVs (Single Point Vulnerabilities)
- Incorporated years of industry operating experience and lessons learned in the new design

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