

# "On-Air"!

**Y**our automatic voltage regulator is a critical component of the transmitter system; and more than likely a Staco Energy AVR is located at your site. To assure your viewers continued high quality broadcasting and preserving your stations bottom line, we recommend a proper maintenance program.



Electrical equipment maintenance should be part of your broadcasting facility's operational plan and always include voltage regulation equipment. When little or no servicing occurs over extended time periods, the potential for reduced performance, loss of transmitter and disruption in power and business operations is greatly increased. Further, unplanned costs for repairs may also be incurred, stretching already tight budgets.

Voltage regulation systems are "hard-working" and contain both mechanical and electrical components, subject to wear, over time from constant use.

Preventative maintenance is intended to optimize the performance, reliability and proper operation of your voltage regulator. If your AVR has been in service for three years or longer, PM should be scheduled. Our programs will economically help you achieve maximum performance, 24x7.

Staco specializes in providing choice and flexibility by developing tailored solutions for preventive and remedial maintenance services, with the best repair, refurbishment, and upgrade opportunities available.



## **An example of our SERV-BR-PM-01 Program:**

- A PM of a "typical" voltage regulator will require a full day at your site. However, this will vary depending upon the rating of the equipment and number of units.
- During the visit, a Staco technician will initially provide a comprehensive, overall preventive maintenance inspection. This inspection includes detailed examination and audit of the regulator's internal and external operating parameters and conditions, inspection and replacement (if required) of commutation brushes, clean and dust particulate matter from critical points and an examination of interfaces to other power train equipment. A report listing current condition of the AVR and recommendations toward any necessary corrective actions is provided. This type of service is conducted during normal business hours (Mon-Fri 8AM-5PM). This one day service also includes travel to your location.
- Repair, reconditioning, and spare parts kits, plus other services can be outlined during the PM, along with annual service agreements.

**To help potentially reduce PM costs, multiple equipment at your facility can be accommodated during the same site visit.**

**Another method to reduce PM costs is to contact other stations in your local market, allowing Staco to schedule an extended visit, and servicing a greater installed base of voltage regulation systems.**

**Staco will also review your UPS, power factor correction and harmonic mitigation installations or the potential need for such power quality equipment.**

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### Typical Preventive Maintenance Service Provided for Voltage Regulation Systems:

- Survey the physical location of the system (accessibility, lighting, cleanliness, ventilation, etc.)
- Survey additional customer equipment present (TVSS, Generator, PFC)
- Check for physical signs of damage to the system cabinets
- Record target and displayed output data.
- Survey options attached to unit and verify operation of each.
- Coordinate with site contact and place unit in maintenance Bypass and lock-out tag-out all energy sources.
- Test that unit no longer operates, deactivate all switches, and verify all energy sources are not active.
- Verify all internal connections are properly secured and free of corrosion. List problems, correct as necessary if possible or report as Action Items on customer service report. If aluminum hardware requires service a suitable electrical compound must be used on the threaded section as an anti-oxidant.
- Inspect for carbon build-up below brush (through range of travel) possibly deposited on coil base from brush wear. Note location of any build-up for further inspection.
- Clean interior cabinet of dust and debris.
- Perform inspection of fuses. Mark each fuse with circuit location, remove fuse from circuit, and test conductivity of each fuse. Circuits with open fuses must be recorded.
- Perform a complete visual inspection of electrical components. Use previous notes that may identify circuits needing additional areas of concern. Inspect internal components for damage such as the following: terminal-block, wiring, transformer, motor-plate, chain, coils, brush-track, rotor, flex-wire, brush-block, brush-braid, and brush. Record damaged or notable conditions.
- Terminal-block; check for cracks, broken, or over-heated terminal
- Wiring; check for cracks, broken insulation, worn, or over-heated wire.
- Transformer; check laminations, windings, connections, and insulation.
- Motor-plate; check uniform functionality, motor/gear head operation, hardware tightness, limit switch actuation, limit switch setting for pre-end of travel, and rust in or moving from the bearing location. Dragging, stalling, un-uniform, or non-functioning requires torque measurement of variable assembly or motor/gear head replacement.
- Chain; check for wear, alignment, rust, and lubrication.
- Coils; check for broken mounting, overheated winding, and foreign material.
- Brush-track; check for bar damage, carbon buildup, high wire, gold plating condition, and foreign material.
- Rotor; check for loose, non-level, tight hardware and interference at contact arm.
- Flex-wire; check for cracks, terminations, broken weld, broken insulation, worn, or over-heated wire.
- Brush-block; check for parallel to brush track, tight hardware, and damage.
- Brush-braid; check for float through mounting plate, frayed, and discolored.
- Brush; check for excessive wiper action, contact with brush track, easily lifted from track, and spring action back to track.
- Circuit breakers including auxiliary contacts; operate to open, reset, reclose, open circuits, and close circuits.
- Contactors; operate to open, reclose, open circuits, and close circuits.
- Relays; operate to open, reclose, open circuits, and close circuits.
- Control lamps; indicate properly only at correct time.
- Control switches; operate to open, reclose, open circuits, and close circuits.
- Communications port; functional.
- Inspect variable transformer gold plated brush track for foreign material deposits. Lubricate each motor-plate chain.
- Record all front panel indications.
- Record input and output voltage measurements.
- Record input and output current measurements.
- Record input and output frequency measurements.
- Record input and output waveform measurements.
- Record input and output harmonic measurements.
- Record input and output transient measurements.
- Record revision of installed firmware.
- Ensure that the unit performs properly in all modes of operation.
- Verify unit operates with site generator if present.
- Fill in the final disposition on service form and list recommendations as necessary.
- Check notes and record Action Items and state when next service needs to be scheduled. Possibly immediately or at the time of the next yearly PM service.
- Complete Staco service form and list recommendations as necessary.
- Review equipment operation with customer representative.
- Provide basic operational training to customer representative.

## About Staco Energy Products Company

Since 1937, customers worldwide have been relying on Staco Energy Products Company to deliver voltage control and power quality solutions tailored to their needs.

As a leading power quality resource, we offer our customers world-class support; from our thorough applications assessment, to our ability to design and deliver a solution that is tailored to the specific needs of our customers; through delivery and commissioning.

Our professional, factory trained service team is in place to ensure that our customers' revenues are protected, and their investment provides them with many years of trouble free operation.

- **Uninterruptible Power Supplies**
- **Power Conditioners**
- **Voltage Regulators**
- **Power Factor Correction and Harmonic Mitigation**
- **Active Harmonic Filters**
- **Variable Transformers**
- **Custom Engineered Test Sets**



### Contact Us:

US Toll Free: 866-261-1191

Phone: 937-253-1191

E-mail: [sales@stacoenergy.com](mailto:sales@stacoenergy.com)

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