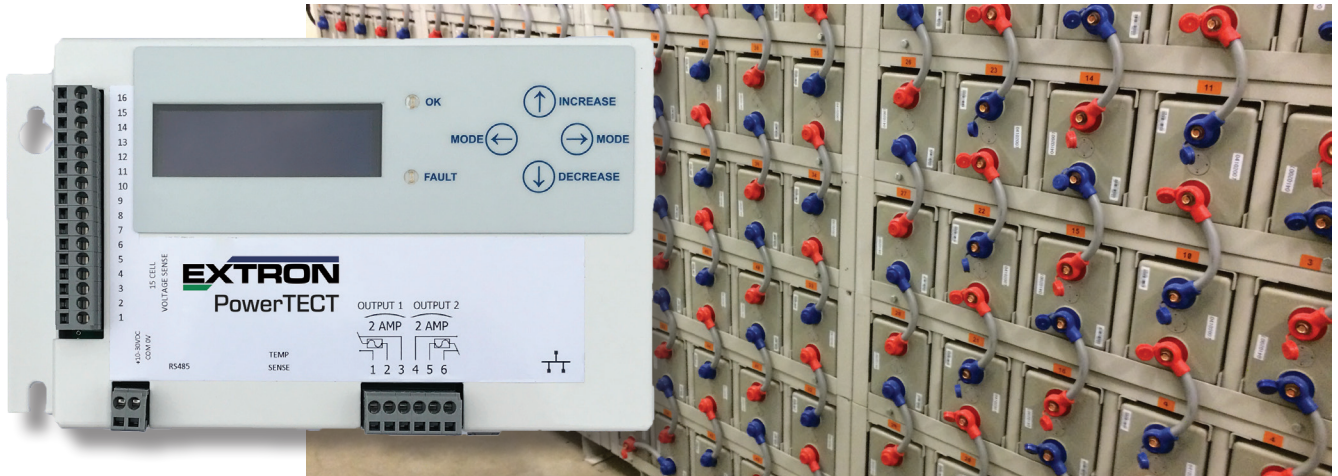


POWERTECT BATTERY MONITORING SYSTEM NERC COMPLIANT



The EXTRON PowerTECT Battery Monitoring System satisfies the requirements of NERC PRC-005-6. This is a summary of the system and the pertinent passages from the PRC 005-6 document.

The EXTRON PowerTECT Battery Monitoring System consists of five basic parts. An example of a typical setup for a 60-cell flooded lead acid setup would look like:

1. Master Battery Monitor: measures voltage and resistance (both internal and intercell). The master can measure 15 cells.
2. 3 Sub Monitors: measures voltage and resistance and can measure 15 cells each and communicate in series to the Master via RS485.
3. Electrolyte monitoring package:
 - 60 electrolyte sensors linked in series ending in 1 Electrolyte node.
 - 1 Electrolyte node: the terminus in the electrolyte portion. This node communicates to the Master in series with the sub-monitors via RS485.
4. Voltage to ground node: connected to the battery bank and ground. This communicates in series with the Master via RS485.
5. 2 Current coils: one for current from charger to batteries and one for current between batteries and load. These current coils communicate in series by RS485.

The 3 sub-monitors and 2 nodes may be in any order that works best in the physical space as long as they are in a daisy chain terminating in the master monitor.

Information can be delivered in a variety of ways that best suit the system requirements. The master monitor will communicate through a local network, directly to the SCADA system via Modbus ethernet, or to a converter box that converts it to DNP3 and communicates to the SCADA system. Additional Cloud connectivity is also available.

NERC COMPLIANCE

The pertinent passages to the NERC compliance can be located in the Standard PRC-005-6 document.

“Voltage and Current Sensing devices connected to microprocessor relays with AC measurements that are continuously verified by comparison of sensing input value, as measured by the microprocessor relay, to an independent ac measurement source with alarming for unacceptable error or failure.” Requiring no periodic maintenance/No Maintenance activities.

• NERC COMPLIANCE

- Any station dc supply with high and low voltage monitoring and alarming of the battery charger voltage to detect charger overvoltage and charger failure.
- Any battery-based station dc supply with electrolyte level monitoring & alarming in every cell.
- Any station dc supply with unintentional dc ground monitoring and alarming.
- Any station dc supply with charger float voltage monitoring and alarming to ensure correct float voltage is being applied on the station dc supply).
- Any battery-based station dc supply with monitoring and alarming of battery string continuity.
- Any battery-based station dc supply with monitoring and alarming of the intercell and/or terminal connection detail resistance of the entire battery.
- Any Valve Regulated Lead-Acid (VRLA) or Vented Lead-Acid (VLA) station battery with internal ohmic value or float current monitoring and alarming and evaluating present values relative to baseline internal ohmic values for every cell/unit.
- Any Valve Regulated Lead-Acid (VRLA) or Vented Lead-Acid (VLA) station battery with monitoring and alarming of each cell/unit internal ohmic value.

All bulleted above have “no periodic maintenance specified”

Alarm Path with monitoring:

“The location where corrective action is taken receives an alarm within 24 hours for failure of any portion of the alarming path from the alarm origin to the location where corrective action can be initiated. No periodic maintenance specified.”

The EXTRON PowerTECT BMS fulfills all NERC PRC 005-6 requirements.