

# V. Design, Application, Maintenance & Operation

## Technical Requirements

### V.K PJM Design and Application of DC Station Service for Transmission Facilities

#### 1.0 Specification

- 1.1 As a minimum requirement, DC station service systems and equipment should be designed for the purpose intended and should support Chapter II-*Transmission System Design Criteria* and be specified to meet the requirements of all applicable industry standards, including but not limited to ANSI, IEEE, and NEMA.
- 1.2 This guide should be used in conjunction with Chapter V, Section J, *Stationary Batteries and Charges for Transmission Facilities*
- 1.3 The typical nominal rating for this application is 125 V.
- 1.4 The DC system design must take into consideration the voltage drop between the battery and the load terminals. 4% is typical for DC control systems.
- 1.5 The maximum load terminal voltage should not exceed the product of (the number of cells in battery) times (the maximum defined cell voltage).

#### 2.0 Application and Installation

- 2.1 When multiple battery and charger systems are provided to supply independent relay systems (often referred to as primary and backup or system one and system two), the DC distribution systems, including all associated wiring, should be kept physically and electrically separated to avoid problems with one system from affecting the other system, i.e. primary and backup system should not share the same cable.
- 2.2 DC station service system components should be installed in accordance with manufacturer's instructions and applicable industry standards.
- 2.3 All devices connected to the dc station service system should be capable of operating continuously and properly without malfunction or overheating in the voltage range specified. The DC station service system should be sized to be capable of handling continuous operation devices, and considering applicable intermittent loads.
- 2.4 The output cables from the battery to the first breaker or protective device should be kept as short as possible; should be separately routed to reduce the possibility of a short circuit between the positive and negative cables; should be installed in non-metallic conduit to avoid grounding; and should be sized in consideration of the available dc short-circuit current from the battery.
- 2.5 DC station service systems must be adequately monitored and alarmed to assure that improper operation and abnormal conditions are reported for immediate corrective action.

2.6 DC station service systems should be physically arranged to facilitate safe and effective inspection and maintenance.

### **3.0 Maintenance**

See section V.1.2.K for maintenance requirements.