

Station DC Supply vs Float Voltage Verification In PRC-005

In PRC-005 at the 4 monthly inspections the requirement is to verify The Station DC Supply Voltage. Then at the 18-month inspection it calls for the Battery Charger Float voltage to be verified, the question often asked is what the difference between the two voltages is, and how do we measure them.

The only indication within the standard as to an acceptable methodology is in Table 1-4(f) Exclusions for Protection System Station DC Supply Monitoring Devices and Systems.

Table 1-4(f) details the acceptable methods of remote monitoring, by which the individual elements of the onsite inspections can be eliminated.

With respect to Verification of the Station DC supply the requirement is as follows:

“Any station dc supply with high and low voltage monitoring and alarming of the battery charger voltage to detect charger overvoltage and charger failure (See Table 2).”

As the majority of chargers have internal monitoring to detect both high and low output voltages, plus charger fail and these will be typically be part of the existing SCADA reporting scheme this will comply with the requirement to verify the Station DC supply.

With respect to the verification of the Battery Charger Float Voltage the requirement is as follows:

“Any station dc supply with charger float voltage monitoring and alarming to ensure correct float voltage is being applied on the station dc supply (See Table 2).”

Depending on the age and model of the charger the High and low limit alarms may be user adjustable and can be set to match the battery manufacturers specified voltage limits. If that is the case, then the same alarms can be used for both requirements.

As the verification of these two voltages are only part of the requirements listed in Table 1-4(a-f) the use of a battery monitor as an independent method of remote data collection and analysis is the logical progression with regard to automated compliance with the standard.

When using a monitor then the measurement of the battery voltage at the battery terminals clearly meets the voltage measurement requirements for the 18-month inspection. For the 4 monthly inspection depending on the electrical configuration of the Charger, Battery and DC distribution there may be a very small difference between the battery voltage and the voltage at the charger or DC distribution. But as the voltage measured at the battery is determined by the setting of the charger if that is within the Float Charge Limits then the Station Voltage is also correct.

Whether or not measuring the battery voltage will meet the requirement to identify charger failure will be determined by whether the DC power system has a static load that draws current from the power system on a continuous basis as is the case of a substation, or the battery is in standby mode and current is only drawn when an emergency occurs such as a battery supporting the emergency lube pumps at a generating station. The key will be, is the change in the battery voltage when the charger fails sufficient to trigger an alarm within the alarm reporting requirements .listed in Table 2 of the standard.

Table 2 which was mentioned in the extracts from Table 1-4(f) above actually specifies a time by which the alarm must be reported.

“Any alarm path through which alarms in Tables 1-1 through 1-5, Table 3, Tables 4-1 through 4-3, and Table 5 are conveyed from the alarm origin to the location where corrective action can be initiated, and not having all the attributes of the “Alarm Path with monitoring” category below. Alarms are reported within 24 hours of detection to a location where corrective action can be initiated”

Any battery with a static load will report both the drop, in voltage and the fact that the battery has gone into discharge almost immediately which will be well within the 24 hrs. allowed within the standard.

For the battery with no standing load, the drop in voltage will be much slower as it will be based on the capacity of the battery and the rate of self-discharge and will probably not drop sufficiently to cause a low voltage alarm. In this case the Charger Fail Alarm on the charger can be extended to one of the external alarm inputs on the monitor to ensure that the failure is recognized almost immediately.