Trusted TMR System

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Safety Manual Original Instructions

Step 2 - Disconnect the field device at an appropriate termination point and connect a calibrated current simulation device in its place.

Step 3 – Follow the general calibration check procedure.

Step 4 – Return the field device into service, verify that it is operating correctly before removing the Lock/Force.

Method 2 – Use the field device to provide the current source, measuring the current with a suitably calibrated current meter.

Step 1 - If performing this test on a live system, Lock (using the SIS Workstation Software or Trusted Toolset Suite) or Bypass (using specific application method applied) the selected channel. If not, proceed to Step 2.

Step 2 - Disconnect the field device at an appropriate termination point and connect a calibrated current meter in series to measure the field device current.

Step 3 – Follow the general calibration check procedure.

Step 4 – Return the field device into service, verify that it is operating correctly before removing the Lock/Force.

Calibration check procedure:

Step A - Set the current to the AI channel 4 mA, verify that the input value is in the range -41 to +41 counts.

Step B - Set the current to the AI channel 12 mA, verify that the input value is in the range 2007 to 2089 counts.

Step C - Set the current to the AI channel 20 mA, verify that the input value is in the range 4055 to 4137 counts.

Step D – Return to Specific Method.

24V DC digital outputs

This test is required for all 24V DC DO modules or DC powered NO Contact where Normally De-energized (Energize to Trip) channels (T8850 when used with the T8451, T8461, or T8891 when used with the T8842) are used for Safety-Related Outputs used where the Proof Test frequency >> frequency of Demands.

The purpose of this test is to verify that the diodes used for OR'ing the two Field Power sources are not Open circuit, therefore does not constitute a potential undetected dangerous failure.

The method described here is the recommended method to verify that neither of the diodes used to OR the 24V DC field supply to a specific T8850 FTA, or the DC supply feeding NO Contact outputs is open circuit. It is assumed that this methodology will be incorporated into a Proof Test procedure that

includes other elements of Proof Testing and general proof test requirements as defined in IEC61511.

Method:

Step 1 - If performing this test on a live system, it may be necessary to employ a method external to the Trusted logic solver to mechanically or electrically force any Normally Energized (De Energize to Trip) outputs associated with final elements on the FTA under test into their normal operating state. If not, proceed to Step 2.

Step 2 – Turn off the 'A' field supply at an appropriate isolation or termination point and verify that the diode related to 'B' supply is correctly providing 24V DC to each power group on the FTA under test.

NOTE: Although strictly NOT required from a Proof Test perspective, a secondary test can be performed while the 'A' Power source is turned off (disconnected) to verify that the diode associated with the 'A' supply is not 'Short Circuit'. With 1k ohm resistor connected in series with the meter, measure the current (in mA) from the supply side of the diode to 0V and the current should be << 24 mA if the diode is correctly preventing backfeed of the 'B' supply (there will be a small leakage current, so it may not be 0 mA).

Step 3 – Return the 'A' field supply into service.

Step 4 – Turn off the 'B' field supply at an appropriate isolation or termination point and verify that the diode related to 'A' supply is correctly providing 24V DC to each power group on the FTA under test.

Note: Although strictly NOT required from a Proof Test perspective, a secondary test can be performed while the 'B' Power source is turned off (disconnected) to verify that the diode associated with the 'B' supply is not 'Short Circuit'. With 1k ohm resistor connected in series with the meter, measure the current (in mA) from the supply side of the diode to 0V and the current should be << 24 mA if the diode is correctly preventing backfeed of the 'A' supply (there will be a small leakage current, so it may not be 0 mA).

Step 5 – Return the 'A' field supply into service.

Step 6 – If required under Step 1, return any Normally Energized final element forces/bypasses back into normal service.

120V AC digital outputs

This test is required for all 120V AC DO modules that Normally De Energized (Energize to Trip) channels (T8871 when used with the T8472) used for Safety-Related Outputs used where the Proof Test frequency >> frequency of Demands.

The purpose of this test is to verify that the varistors (V1/V2) are not Short Circuit, therefore do not constitute a potential undetected dangerous failure.

The method described here is the recommended method to verify that neither of the varistors, which are across the output, have failed Short Circuit. It is assumed that this methodology will be incorporated into a Proof Test

procedure that includes other elements of Proof Testing and general proof test requirements as defined in IEC61511.

Method:

Step 1 - If performing this test on a live system, it will be necessary to disconnect the final element associated with the channel under test, this is to help prevent a spurious action occurring due to the Proof test. If not, proceed to Step 2.

Step 2 – Disconnect the switched output to final element, but with the 120V AC supply remaining connected and energized, verify that the output being tested reports a STATE value of 3 (No Load). Energize the output channel and verify that the channel STATE remains at STATE 3 (No Load), if the output, when energized reports either a STATE 4 (Output Energized) or a STATE 5 (Field Short Circuit) then the output channel likely has a failed varistor, so the FTA will need to be replaced.

Step 4 – De-energize the output, then reconnect the final element field connection and verify that the output is reporting a STATE 2 (Output De-energized).