Abstract

This QA Report documents the quality assurance tests for the Safety Controller (SC) subsystem.
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SC-T01: McMaster Carr 24V LEDs

Preconditions
- Connect the terminals of the 24V LED to a 24V power supply

Test Procedure
1. Set the power supply to 24V
2. If criteria 1 not passed, turn off the power supply
3. Reverse the terminal connections
4. Set the power supply to 24V

Passing Criteria
1. After either step 2 or 4, the LED should turn on

Current Measurements: ________________________________

Other notes: ________________________________

Witness/Examiner Signature  Date  Pass/Fail
SC-T02: GIGAVAC GX14CAB

Preconditions
- Test 1.00 was met
- Red and Black leads from the Gigavac GX14 are connected to a power supply providing 24V and ground
- HV connections on the Gigavac GX14 are connected to a 24V LED in series with a 24V power supply
- The auxiliary (Blue and White) leads coming from the Gigavac GX14 are connected to a 10k resistor and a battery (3.3V or 9V) in series with an LED (0.7V)

Test Procedure
1. Turn on the power supply going to the LED.
2. Turn on the power supply going to the Gigavac red and black leads.
3. Turn off the same power supply as in Step 2.

Passing Criteria
1. After step 1, LED remains off
2. After step 2, LEDs should turn on

3. Step 3, LEDs should turn off

Other notes: 

Measured Value of Current: 

Witness/Examiner Signature: ___________________________ Date: ___________ Pass/Fail: ___________
SC-T03: Emergency Buttons

Preconditions

- Test 1.00 was met
- Connect a power supply providing 24V to one pole of the emergency button
- Connect the other pole of the emergency button to a 24V LED and then to ground in series

Test Procedure

1. Turn on the power supply
2. Push the button
3. Turn the button to its reset position

Passing Criteria

1. After step 1, the LED turns on
2. After step 2, the LED turns off
3. After step 3, the LED turns on

Other notes: ____________________________________________________________

Witness/Examiner Signature ___________  Date ___________  Pass/Fail ___________
SC-T04: 24V DIN Rail Relays DPDT

Preconditions
- Connect the terminals of the 24V LED to a 24V power supply
- Test 1.00 was met
- Connect a power supply providing 24V to the positive coil of one of poles of the 24V DIN rail relay
- Connect a power supply providing 24V to both throws of the coil that was connected above to the 24V DIN rail relay
- From the output of that switch attach a 24V RED LED to the off position and a 24V GREEN LED to the on position, both LEDs should then be attached to ground

Test Procedure
1. Turn on the power to both of the throws on the relay
2. Turn on the power to the coil of the relay

Passing Criteria
1. After step 1, the RED LED turns on
2. After step 2, the RED LED turns off and the GREEN LED should turn off

Other notes: 

Witness/Examiner Signature ____________________________________________________________________________
Date ____________________________________________________________________________________________
Pass/Fail ________________________________________________________________________________________
SC-T05: Insulation Monitoring Device

Preconditions
- Connect the power and ground connectors of the IMD to the GLV subsystem (or a 24V power supply)
- Connect the chassis connection on the IMD to a metal ground (GLV 24- should also be attached to this in the system)
- Connect the high voltage contacts to either the high voltage lines in the Load Controller or a power supply at 10V
- Connect the IMD to the safety box (or a multi-meter with a 2.2k resistor to ground)

Test Procedure
1. Turn on the power to the IMD
2. (If applicable) turn on the power supply to simulate high voltage
3. Connect the High Voltage ground to the chassis ground or 24-
4. Remove connection from number 3

Passing Criteria
1. After step 1, the GREEN LED indicating the IMD clear light should turn on
2. After step 2, the GREEN LED should remain on
3. After step 3, the GREEN LED should turn off and the RED LED indicating an IMD fault should turn on
4. After step 4, the RED LED should turn off and the GREEN LED should turn on

Other notes: ____________________________________________________________

Witness/Examiner Signature ________________ Date ___________ Pass/Fail ___________
SC-T06: Safety Controller Box

Preconditions

- All previous tests have been met
- The safety box is connected to the IMD Status Output from the Load Controller
  - If this connection cannot be made, attach to a power supply at 24V
- The safety box is then connected to the Tractive 24 from the GLV subsystem
  - If this connection cannot be made, attach to a power supply at 24V
- The safety box is connected according to the safety box circuit in the ICD

Test Procedure

1. Turn on the Tractive System Master Switch
   a. If this is not connected, turn on the associated power supply
2. Turn on the IMD (if not already connected to the TSMS)
   a. If this is not connected, turn on the associated power supply
3. Close the safety loop (either with the safety loop cap directly or through the other subsystems and then the cap)
4. Press the green reset button on the safety box

Passing Criteria

1. After step 1, the two RED LEDs should turn on indicating an IMD Fault State and an Open Safety Loop
2. After step 2 (or step 1 if the IMD is connected to the TSMS), the RED LED indicating an IMD Fault should turn off. The GREEN 24V LED indicating an IMD running state should turn on.
3. After step 3, the RED LED indicating an Open Safety Loop should remain on
4. After step 4, the RED LED indicating an open safety loop should turn off and the GREEN LED indicating a closed safety loop should turn on

Other notes: 

________________________________________________________

Witness/Examiner Signature  Date  Pass/Fail