

Side Panels Testing Memo 1

3/30/21 – Approx. 2:30pm

Tests conducted by Andrew Bachman and Ben Surman, supervised by Dr. Nadovich.

Tests Conducted:

1. Transmission of GLV power through side panel shutdown components and into voltmeter/ammeter. (Right BRB, Left BRB, GLVMS)
2. Transmission of GLV power through safety components (RSSOK, LSSOK, MRESET Relay) and latching behavior of MRESET Relay.
3. Testing of all safety loop components on the Side panels. (All components excluding IMD reset and AMS reset buttons)

Test Results:

1. With all connections along the safety loop after the voltmeter/ammeter disconnected, we were able to provide power through the Right BRB, Left BRB and GLV Master Switch such that the voltmeter/ammeter was only powered when all three components were in the closed position. This verifies all electrical connections within the safety loop until the loop first enters the carman enclosure.
2. After connecting the load elements past the ammeter, but leaving the connection to the AIRS disconnected, we were able to verify that GLV power was present at the output of the side panels directly before the AIRS once the TSV Master Switch was closed. In the process, we verified that the master reset relay closed when the master reset button was pressed (after the previous shutdown components were all in the closed position). This also illuminated both SSOK lamps, however the lamps were extremely dim. (We later found that the documentation was incorrect and the lamps we use require 24V not 12V.) After verifying that the relay closed, we tested that the relay would open if any of the shutdown components (Right BRB, Left BRB, and GLVMS) were opened, and the relay would remain open once those components were closed again, until the MRESET button was pressed again. Lastly, we verified that the opposite was true for the TSVMS, where the MRESET relay would remain closed no matter if the TSVMS was open or closed.
3. Once we connected the AIRS to the side panel components, we were able to verify that when enabling the TSVMS after closing the MRESET relay, the AIRS would close, functionally completing the safety loop through all the side mounted components. We performed the same set of tests as before to verify again that the MRESET relay would open, and thus so would the AIRS, when the Right BRB, Left BRB, or GLVMS were opened, and all relays would not close again until the MRESET button was pressed.

Notes:

What now remains to be tested are all other parts of the safety loop, namely the cockpit panel, CARMAN enclosure, dashboard, pedals, brake light, battery packs. In the meantime, we will investigate the phenomenon noted in testing, where the SSOKS would flicker each time the AIRS closed, likely caused by a system voltage drop as the amount of current drawn from the GLV battery to force the air closed is large, and influences the voltage through the rest of the safety loop.