TÜV America Inc.
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Salt Spray Test
DP Block

TEST REPORT

PREPARED FOR:

Shi Xiang Lim

Data Panel
181 Cheshire Lane, Suite 300
Plymouth, MN 55441
llim@datapanel.com
P: 515-735-6881

October 22, 2019
TÜV Job Number: 72153088
PO Number: 33914

TABLE OF CONTENTS

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REVISION HISTORY

Date:	***Comment:***
22 October 2019	Original release of test report 72153088.

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Salt Spray Test

Shi Xiang Lim
Data Panel
181 Cheshire Lane, Suite 300
Plymouth, MN 55441

PURCHASE ORDER: 33914 **TÜV JOB#: 72153088**

PRODUCTS TESTED:

Three (3) DP Blocks were received in good condition and were identified as Samples 11A, 52A, and 53A.

DATES TESTED:

Salt Spray Testing was performed on 10/03/2019 through 10/14/2019.

TEST PROCEDURE:

Salt Spray Test
DSGN-3010-E Validation Testing, Section 5.5.2
IEC 60068-2-52 Kb Severity Level 3

- Perform Pre-Test functional checks on samples prior to starting test.
  - Using customer provided harnesses
    - Red cable plugs into Port P1
    - Black cable plugs into Port G1
    - Power to 24VDC
    - Verify all lights illuminate (with the exception of E1, E2, D1, D2, D3, and D4) turn red momentarily before turning green. All lights will than turn off with the exception of E3, E4, Power, Comm, and Stat which will remain illuminated.
  - Clean Samples with SD-20 prior to Salt Spray exposure

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TEST PROCEDURE (CONT):

- Subject Samples to Salt Spray Test using 5% salt solution to the following:
  - Samples are non-powered for duration of test
- **Step 1:** Salt Application (Fog)
  - Temperature: 25˚C ± 10˚C
  - Duration: 2 Hours
- **Step 2:** Temperature & Humidity
  - Temperature: 40˚C ± 2˚C
  - Relative Humidity: 93% +2%/-3%
  - Duration: 22 Hours
- **Step 3:** Repeat Steps 1 and 2 Three Times
- **Step 4:** Storage
  - Temperature: 23˚C ± 2˚C
  - Humidity: 50% ± 5%
  - Duration: 72 Hours
- Upon completion of Salt Spray
- Rinse samples with DI water for 5 minutes
- Heat samples in chamber for 1 hour at 55˚C
- Followed by Storage at 24˚C for 74% for 1 Hour
- Perform Post-Test functional checks on samples prior to starting test.
  - Using customer provided harnesses
    - Red cable plugs into Port P1
    - Black cable plugs into Port G1
    - Power to 24VDC
    - Verify all lights illuminate (with the exception of E1, E2, D1, D2, D3, and D4) turn red momentarily before turning green. All lights will than turn off with the exception of E3, E4, Power, Comm, and Stat which will remain illuminated.
  - Clean Samples with SD-20 prior to Salt Spray exposure

DATA AND OBSERVATIONS:

- The pH of the salt solution was measured before and after testing
  - Pre-Test: 6.84
  - Post-Test: 6.87
- A post-test visual evaluation showed no visible evidence of any damage to the exterior of the samples as a result of Sat Spray Testing.
- Sample 11A had an abnormality during Post-Test Functional Testing. **See Figure A40.**

ACCEPTANCE LEVEL:

No acceptance criteria were provided for by the customer

TEST RESULTS:

TÜV SÜD America shall make no pass / fail conclusions regarding this test. Any and all such determinations shall be made solely by the customer.

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TEST EQUIPMENT:

Equipment Identification Number	Manufacturer and/or Description	Model No.	Serial No.	Calibration Due Date
ZE 1386	RUSSELLS Chamber Temp/Humidity	GD-32-3-3	10921147	06/05/2020
ZE 161	WATLOW Control Ramping	Series F4	2560	06/05/2020
ZE 1387	HONEYWELL Chart Recorder	DR45AT	9839Y83833800001	06/05/2020
ZE 1385	WATLOW Control Limit	SD4L-HJAA-AARG	18930	06/05/2020
ZE 724	Fluke DMM/Process Meter	787	7697044	09/16/2020
ZE 1397	B&K Programmable DC Power Supply	BK9115	600422010687320027	Reference Only
ZE 1423	ERA pH 4.0 Buffer Solution	pH 4.0	050218	02/28/2020
ZE 1424	ERA pH 7.0 Buffer Solution	pH 7.0	240818	08/24/2020
ZE 1425	Oakton Electrode Storage Solution	N/A	623490	05/30/2020
ZE 1429	ERA pH 10.00 Buffer Solution	pH 10.00	030918	09/09/2020
ZE 1506	Vaisala Humidity Transmitter	HMM100	K2010009	06/05/2020
ZE 1749	Oakton pH Meter	pH 150	2429163	08/06/2020
ZE 1814	Ascott Cyclic Corrosion Chamber - Mediterranean	2600L	2629	10/14/2020
ZE 1982	H-B Instrument Company Hydrometer	08299-70	4264358	01/03/2020

APPROVAL SIGNATURE:

Josh Truselo, TUV Technician

October 22, 2019

Stan Radomski, TUV Program Manager

October 22, 2019

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APPENDIX A: TEST PHOTOGRAPH(S)

Figure A1: Sample 11A Pre-Test (Front)

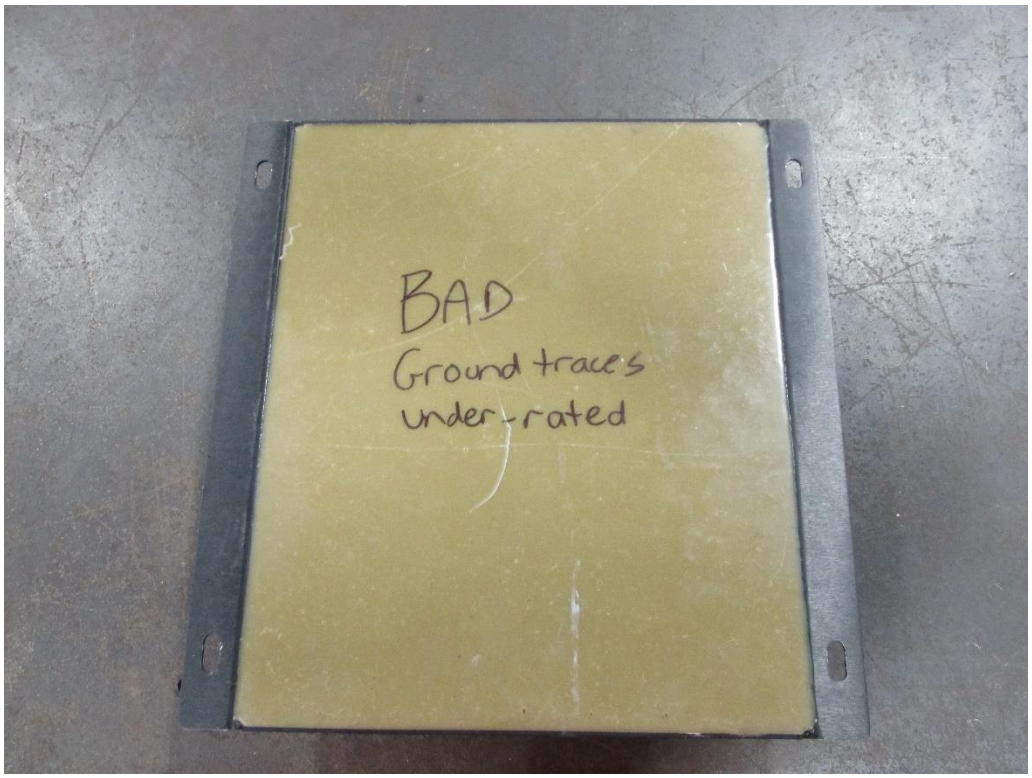

Figure A2: Sample 11A Pre-Test (Back)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

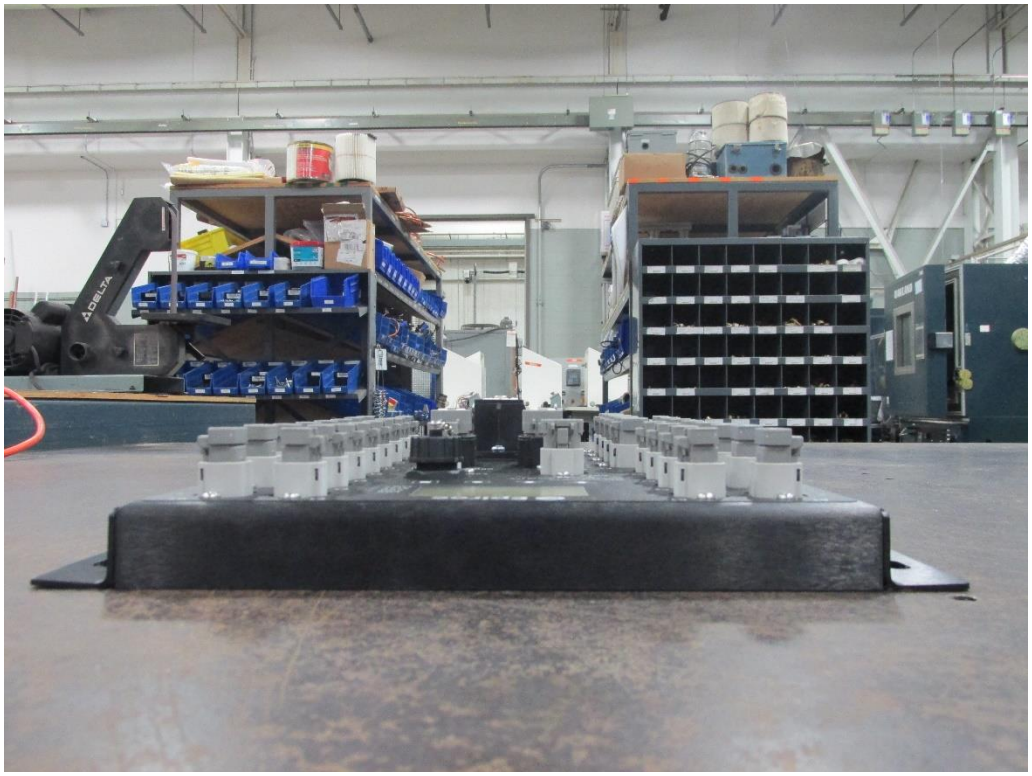

Figure A3: Sample 11A Pre-Test (Top)

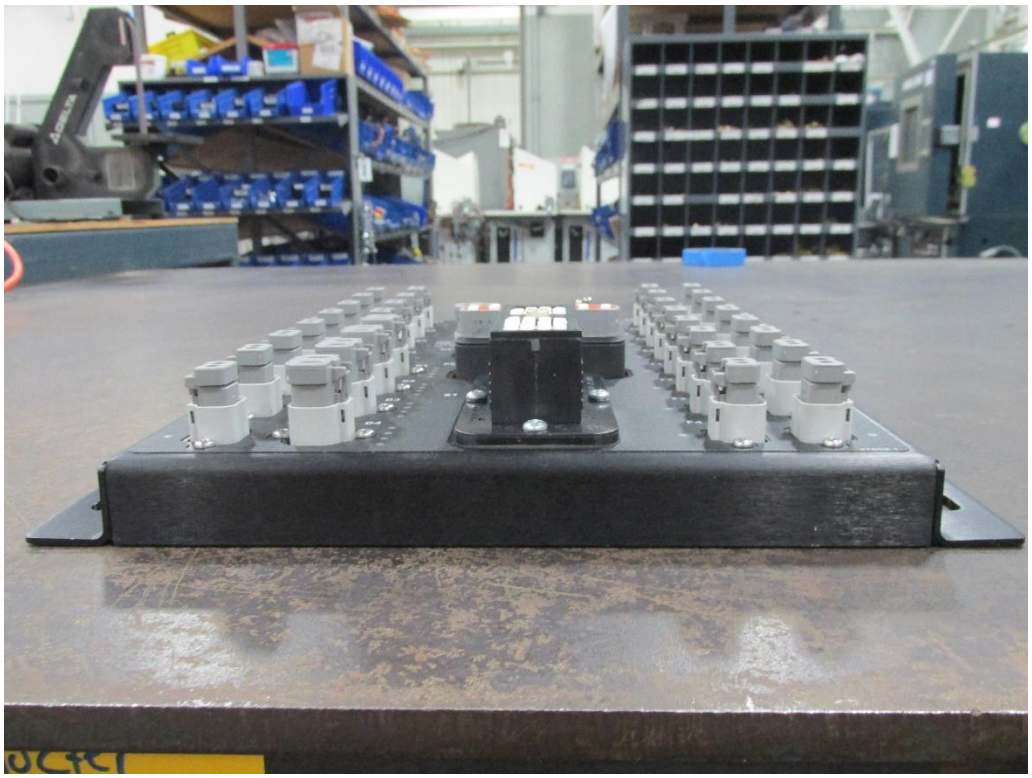

Figure A4: Sample 11A Pre-Test (Bottom)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

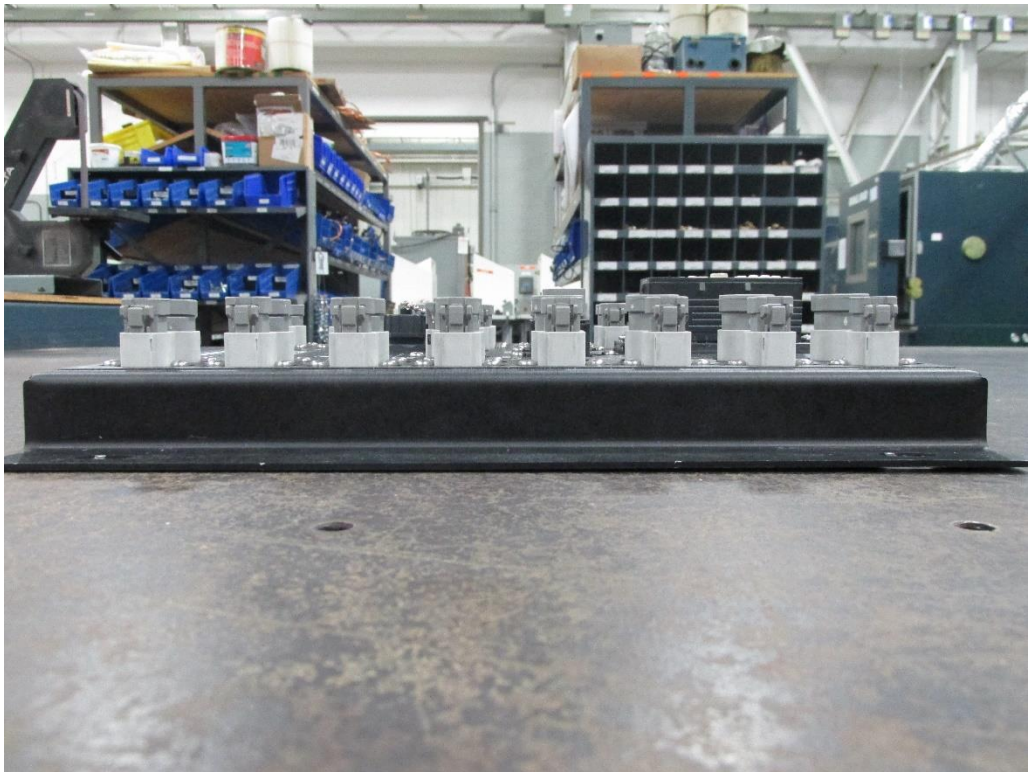

Figure A5: Sample 11A Pre-Test (Left)

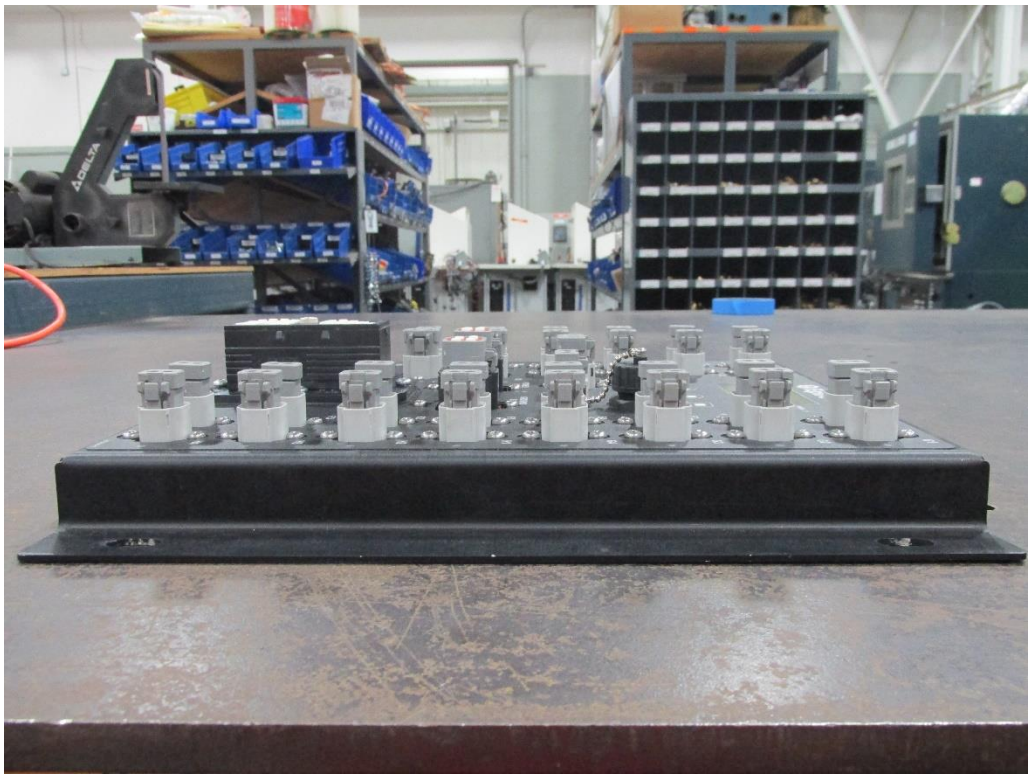

Figure A6: Sample 11A Pre-Test (Right)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

Figure A7: Sample 52A Pre-Test (Front)

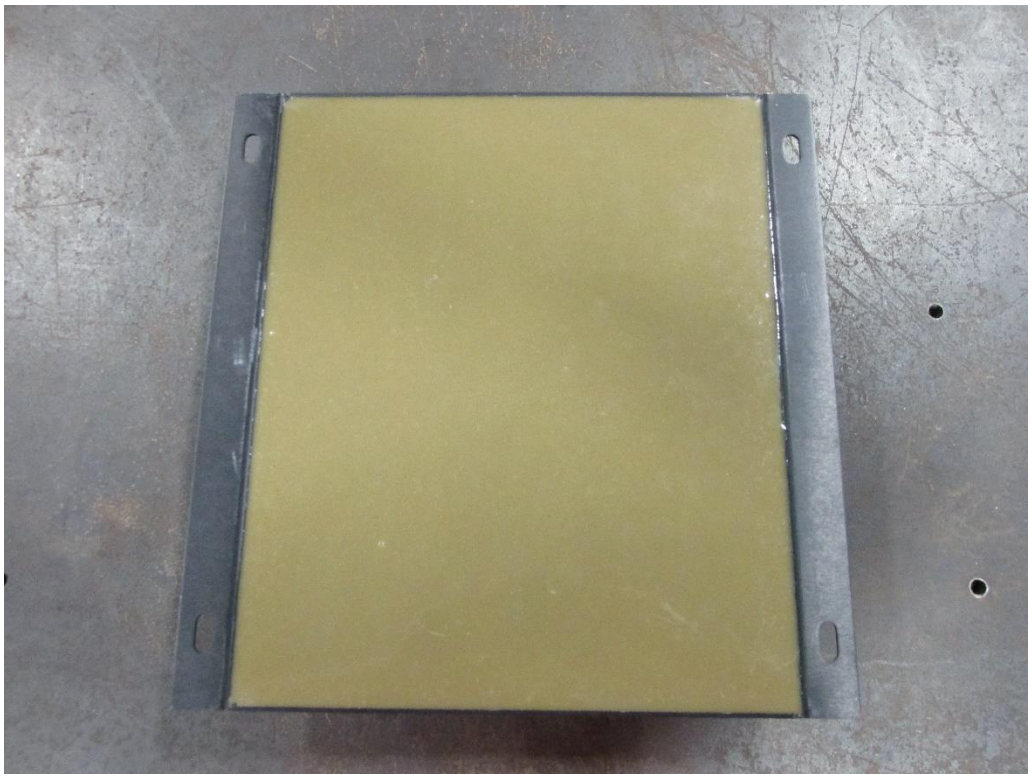

Figure A8: Sample 52A Pre-Test (Back)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

Figure A9: Sample 52A Pre-Test (Top)

Figure A10: Sample 52A Pre-Test (Bottom)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

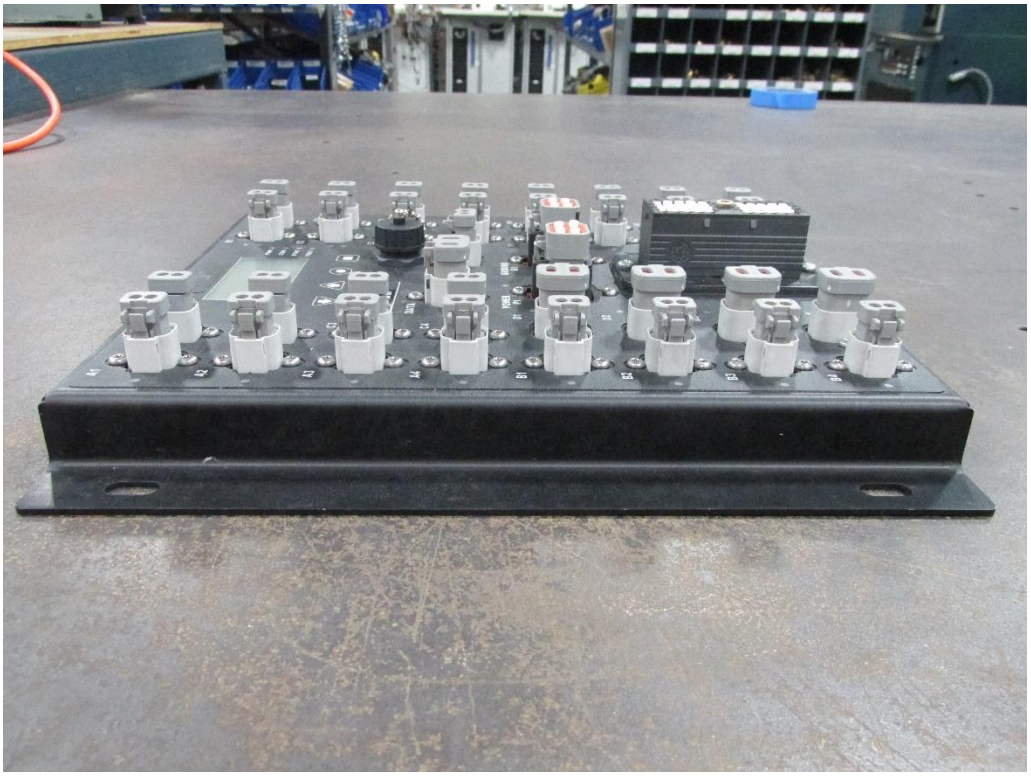

Figure A11: Sample 52A Pre-Test (Left)

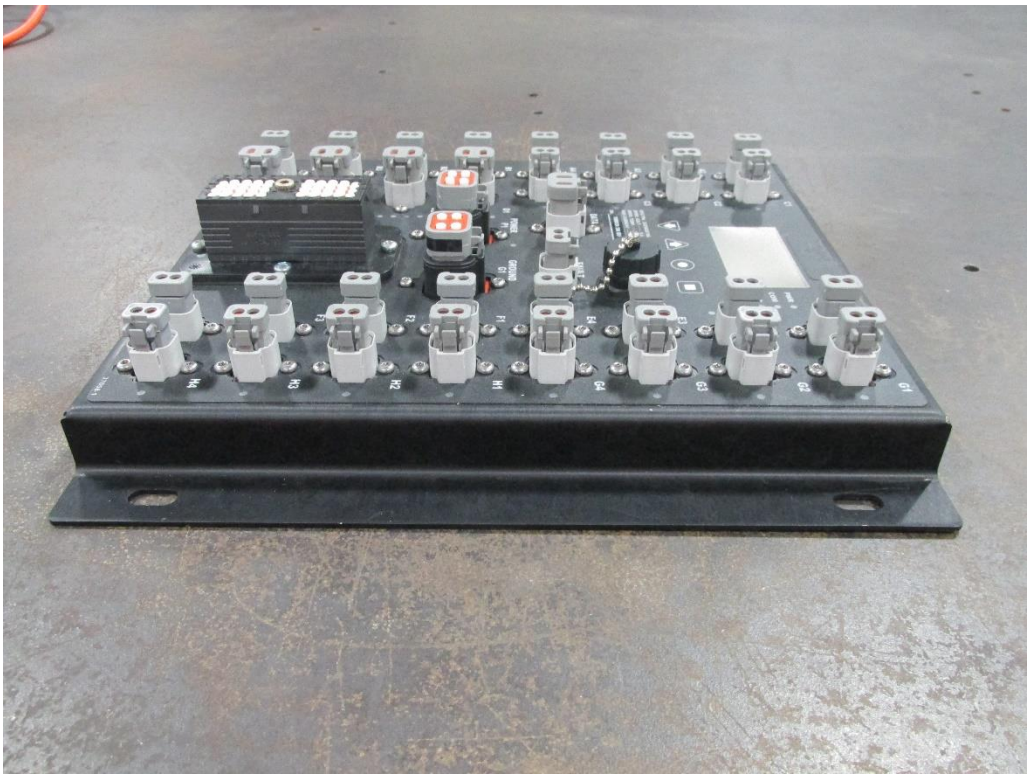

Figure A12: Sample 52A Pre-Test (Right)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

Figure A13: Sample 53A Pre-Test (Front)

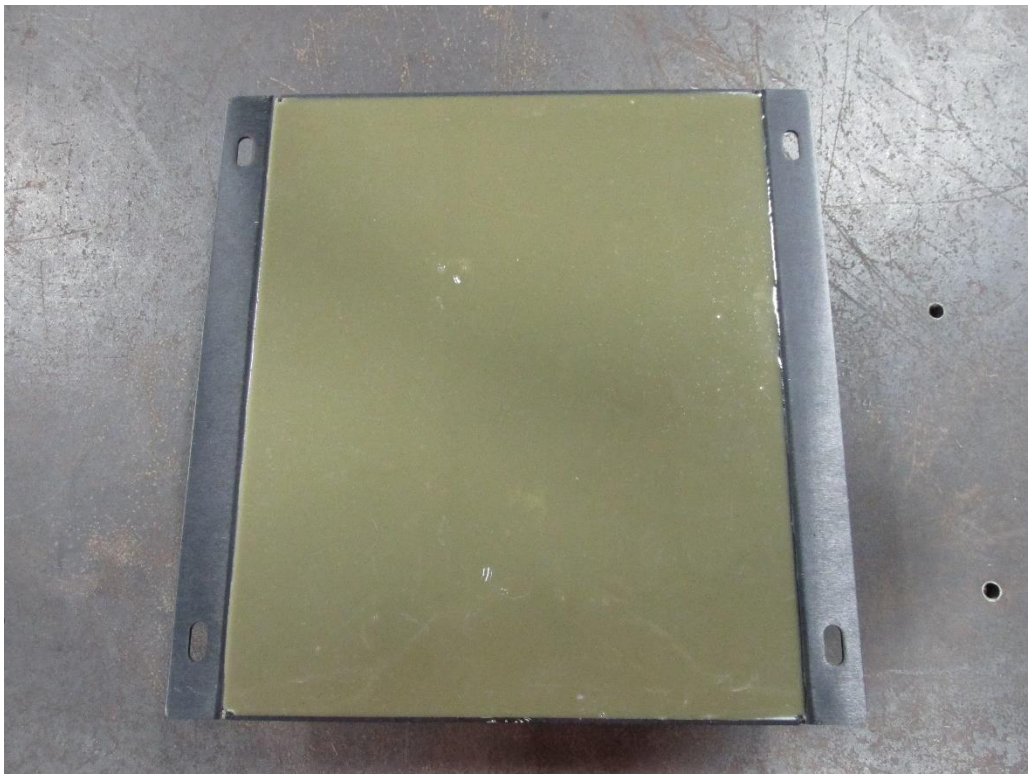

Figure A14: Sample 53A Pre-Test (Back)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

Figure A15: Sample 53A Pre-Test (Top)

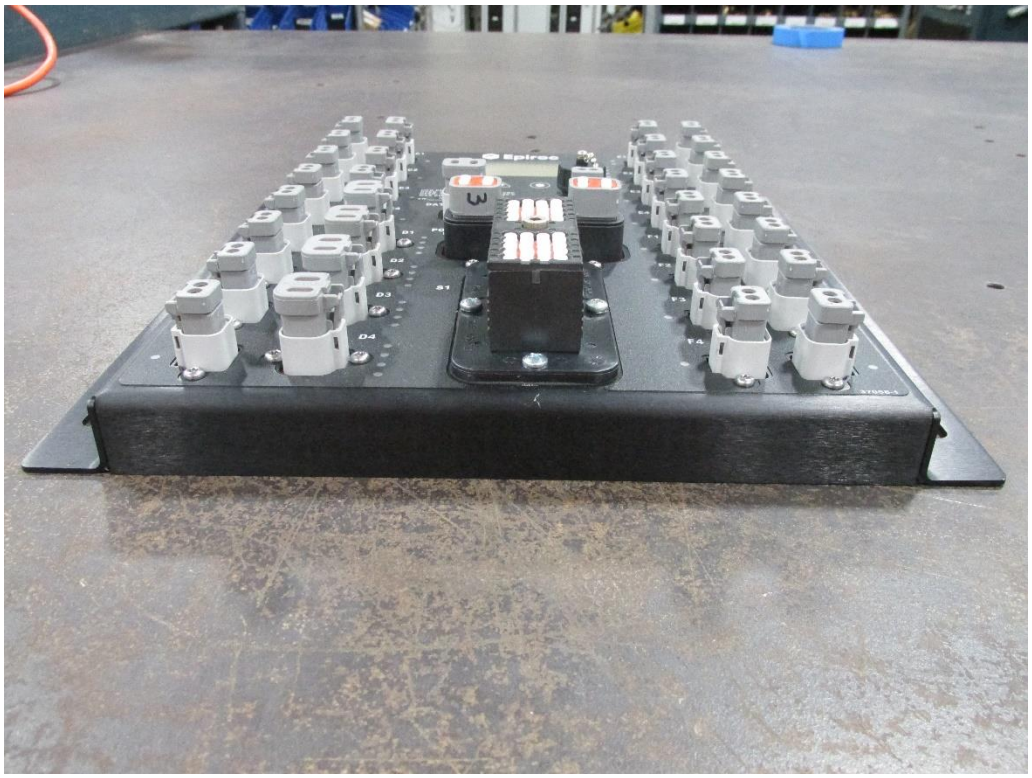

Figure A16: Sample 53A Pre-Test (Bottom)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

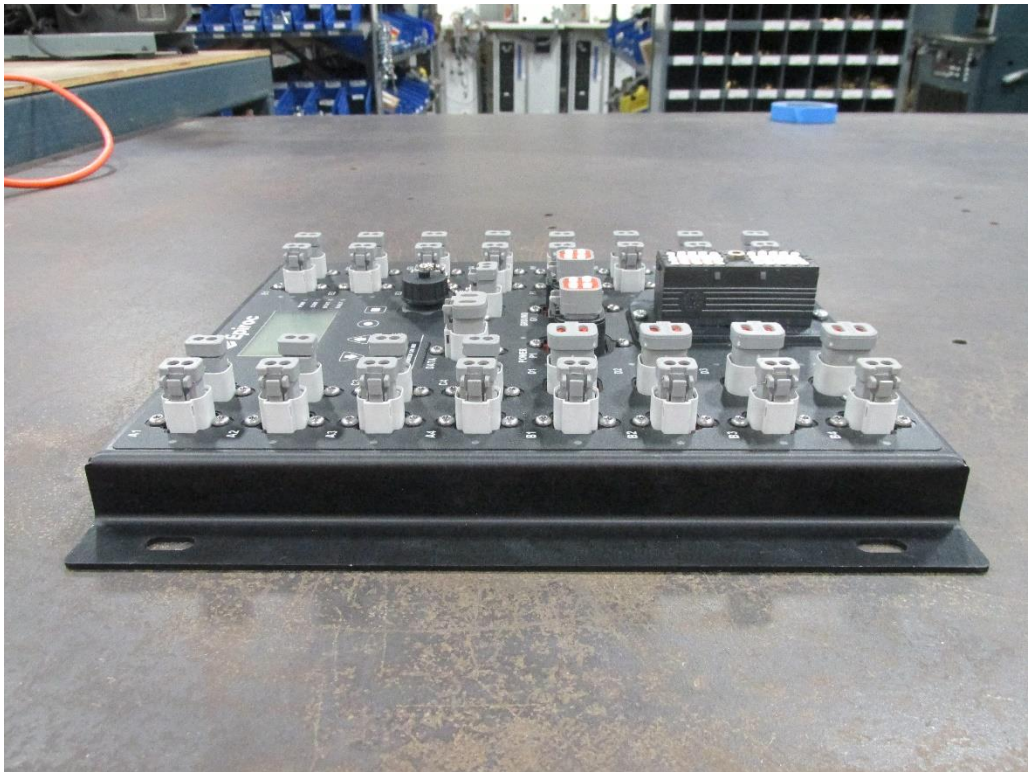

Figure A17: Sample 53A Pre-Test (Left)

Figure A18: Sample 53A Pre-Test (Right)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

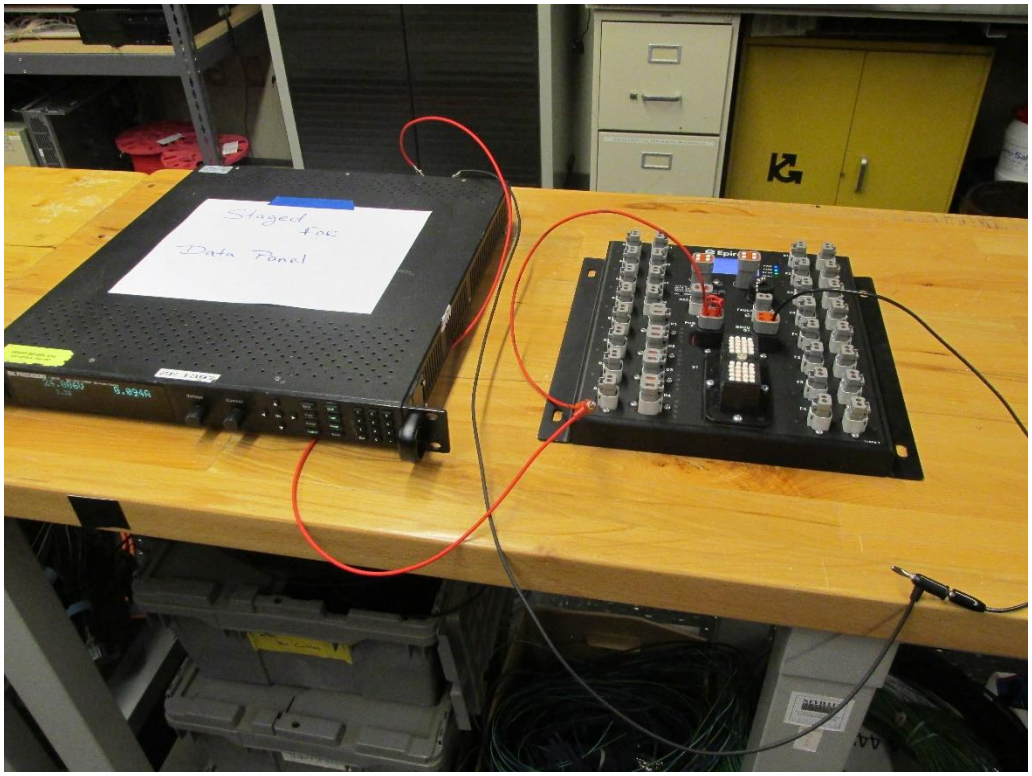

Figure A19: Representative of Functional Check

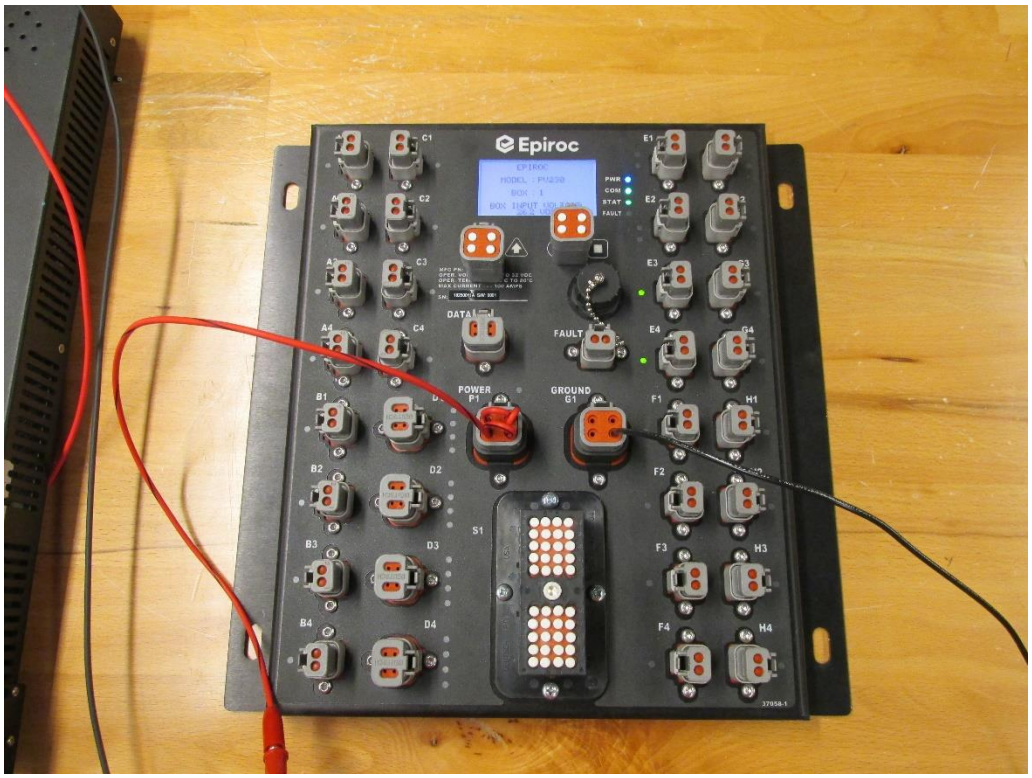

Figure A20: Representative of Functional Check

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

Figure A21: Test Setup

Figure A22: Sample 11A Post-Test (Front)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

Figure A23: Sample 11A Post-Test (Back)

Figure A24: Sample 11A Post-Test (Top)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

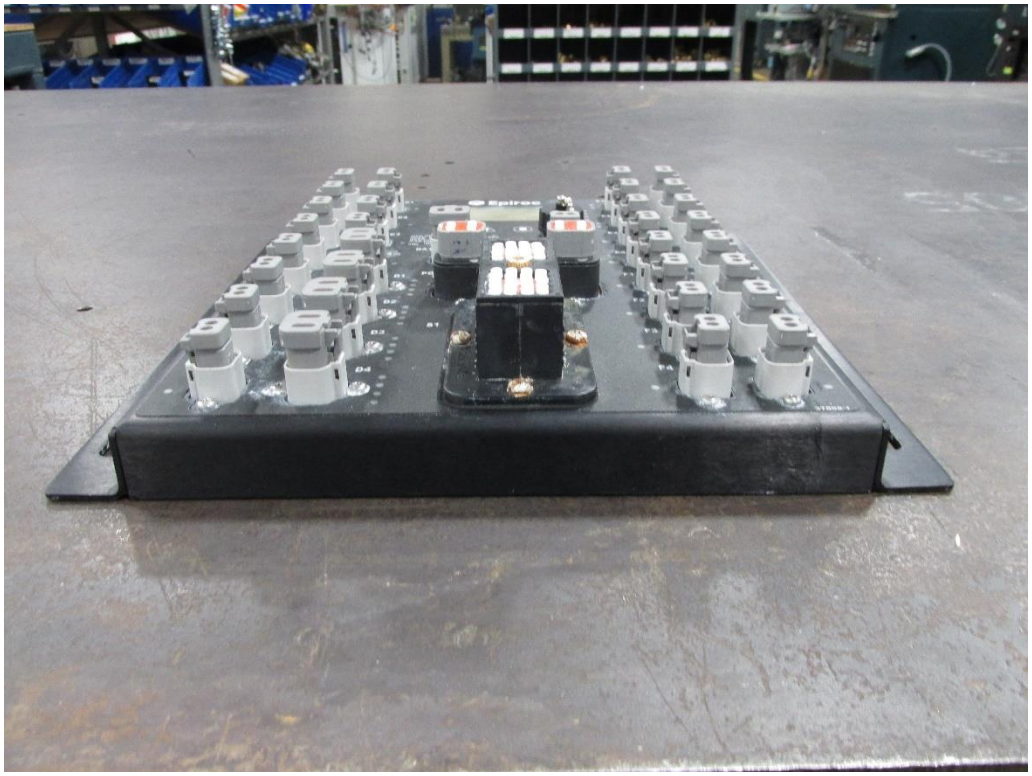

Figure A25: Sample 11A Post-Test (Bottom)

Figure A26: Sample 11A Post-Test (Left)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

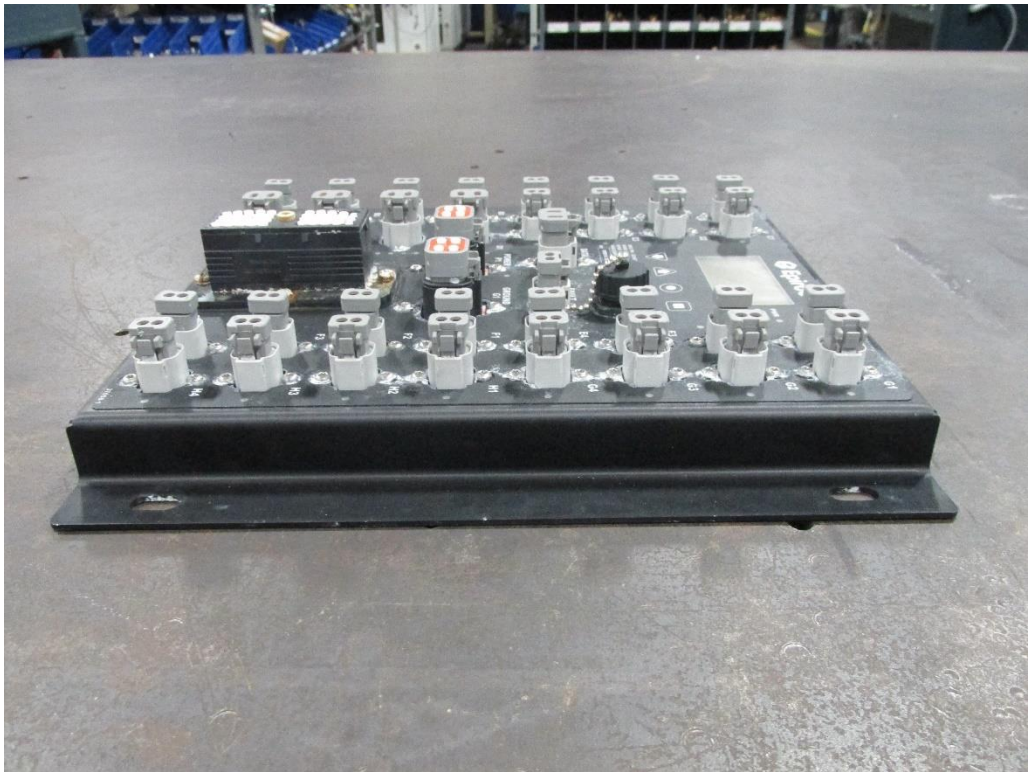

Figure A27: Sample 11A Post-Test (Right)

Figure A28: Sample 52A Post-Test (Front)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

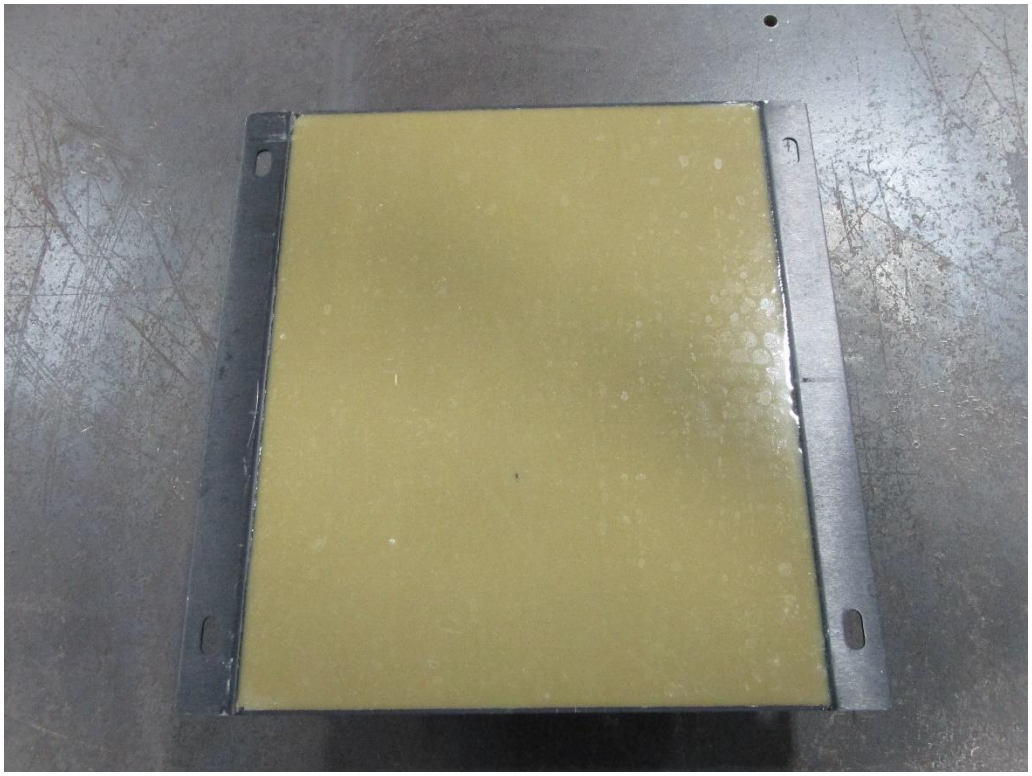

Figure A29: Sample 52A Post-Test (Back)

Figure A30: Sample 52A Post-Test (Top)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

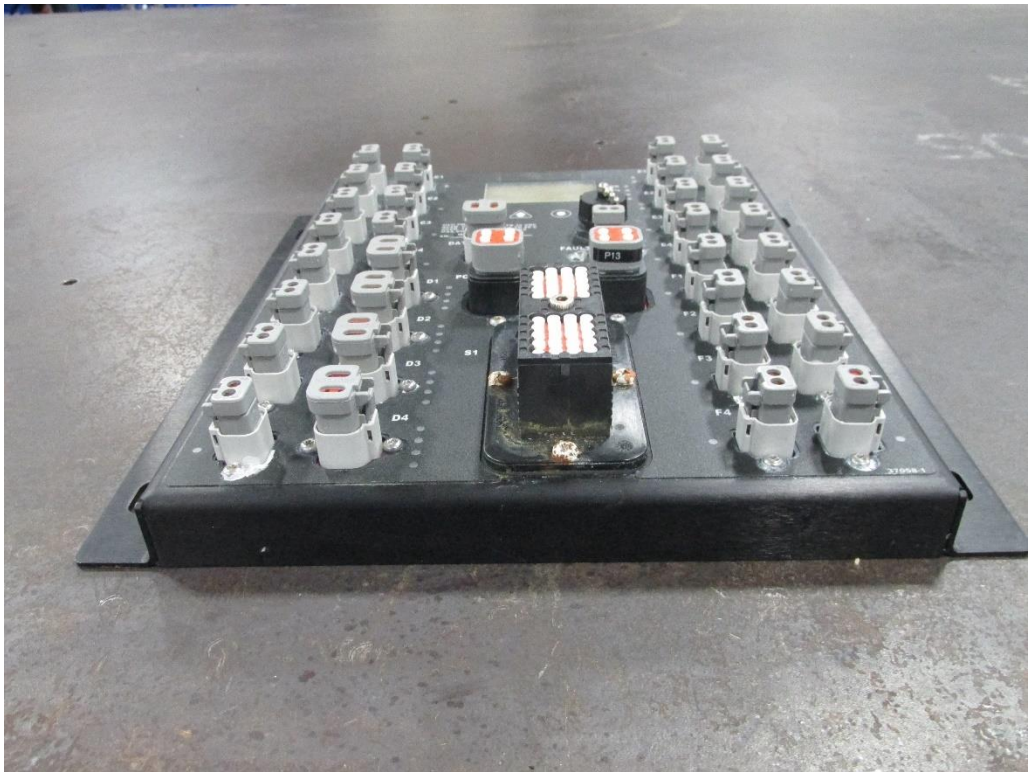

Figure A31: Sample 52A Post-Test (Bottom)

Figure A32: Sample 52A Post-Test (Left)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

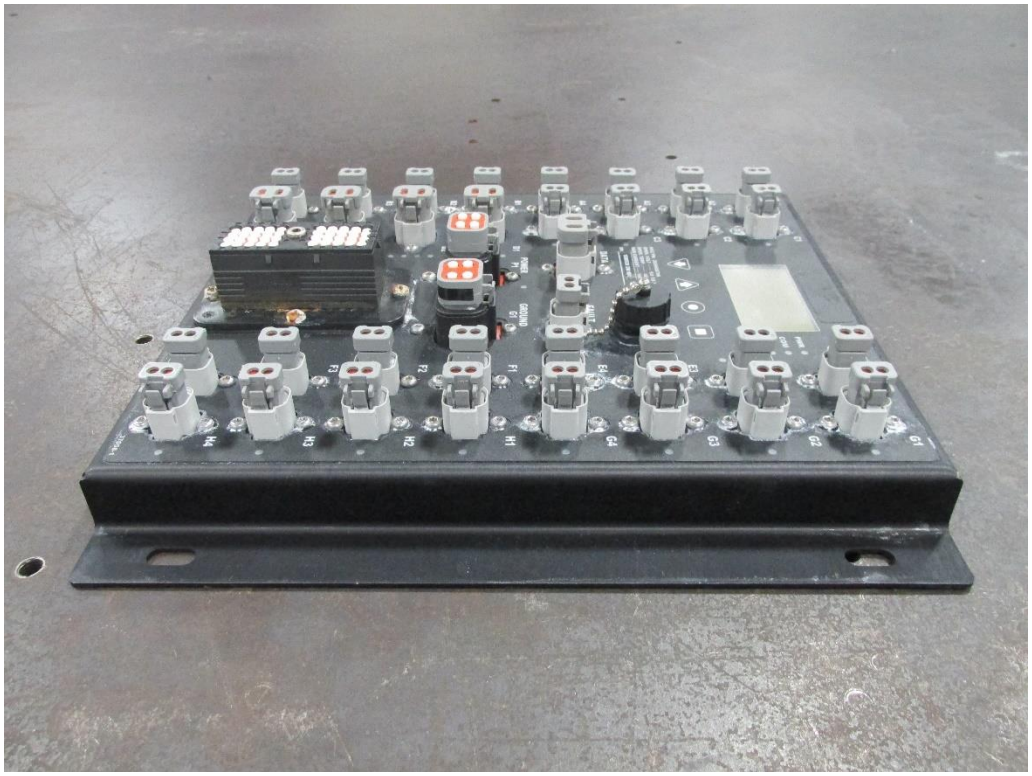

Figure A33: Sample 52A Post-Test (Right)

Figure A34: Sample 53A Post-Test (Front)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

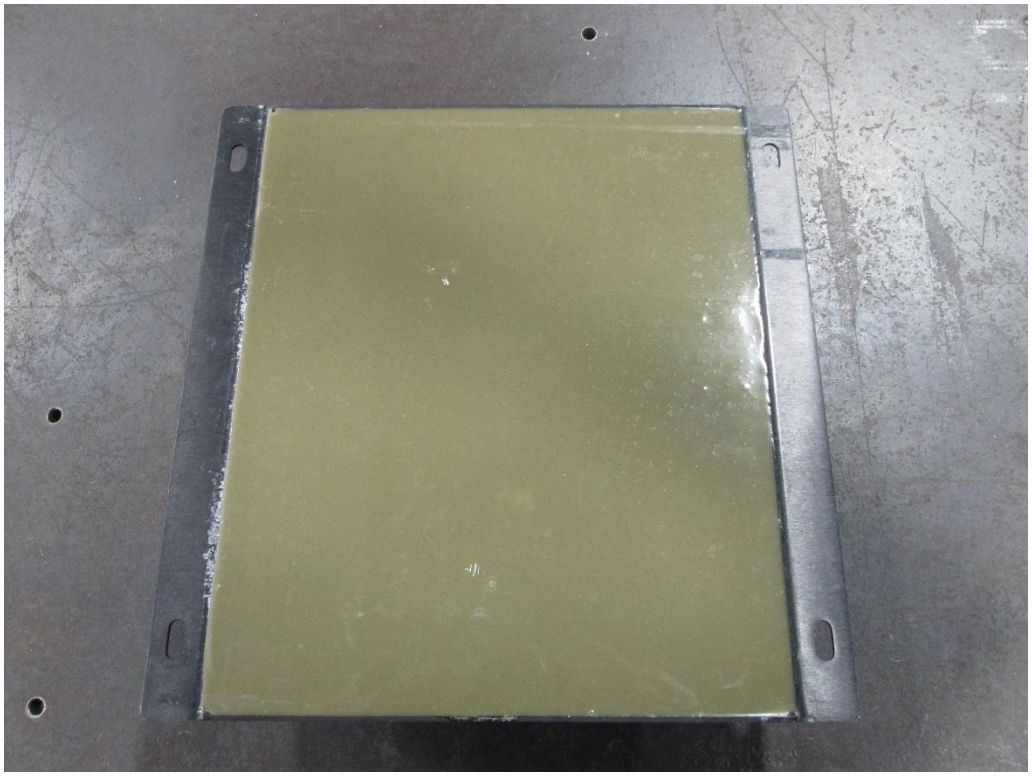

Figure A35: Sample 53A Post-Test (Back)

Figure A36: Sample 53A Post-Test (Top)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

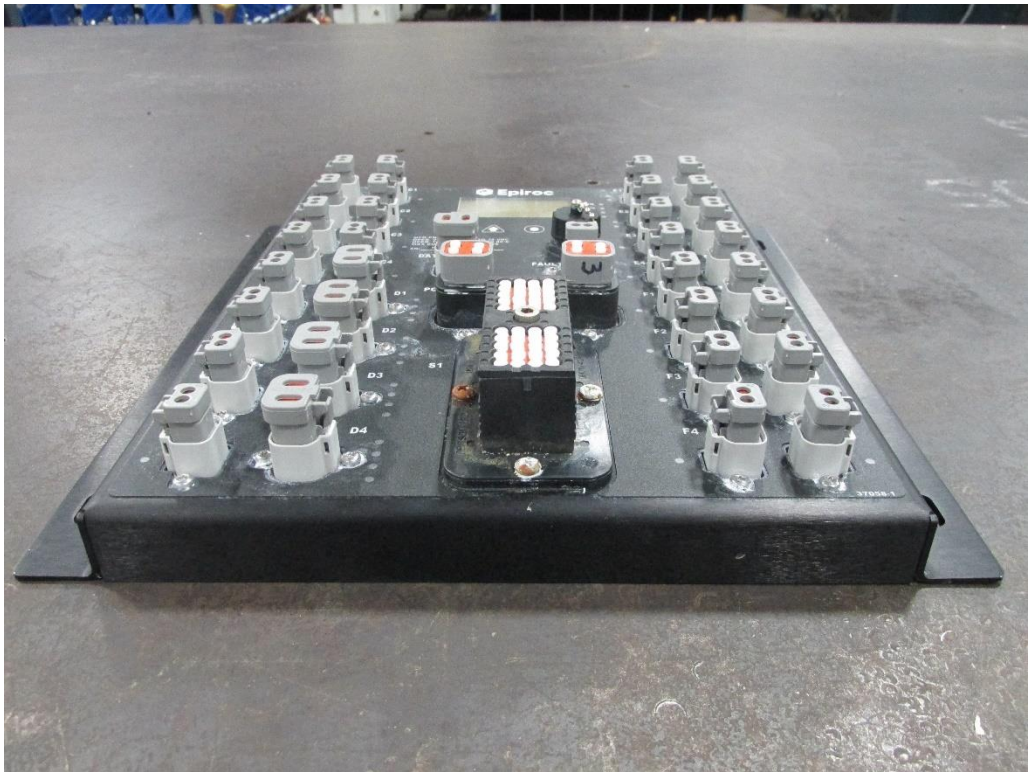

Figure A37: Sample 53A Post-Test (Bottom)

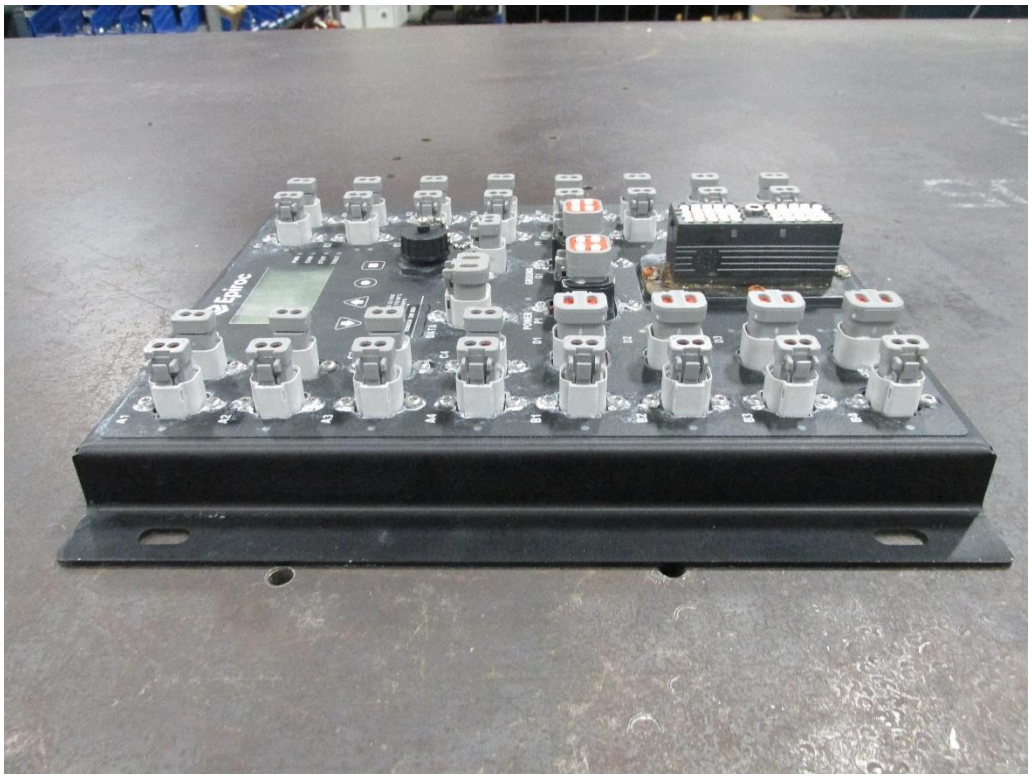

Figure A38: Sample 53A Post-Test (Left)

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APPENDIX A (CONT): TEST PHOTOGRAPH(S)

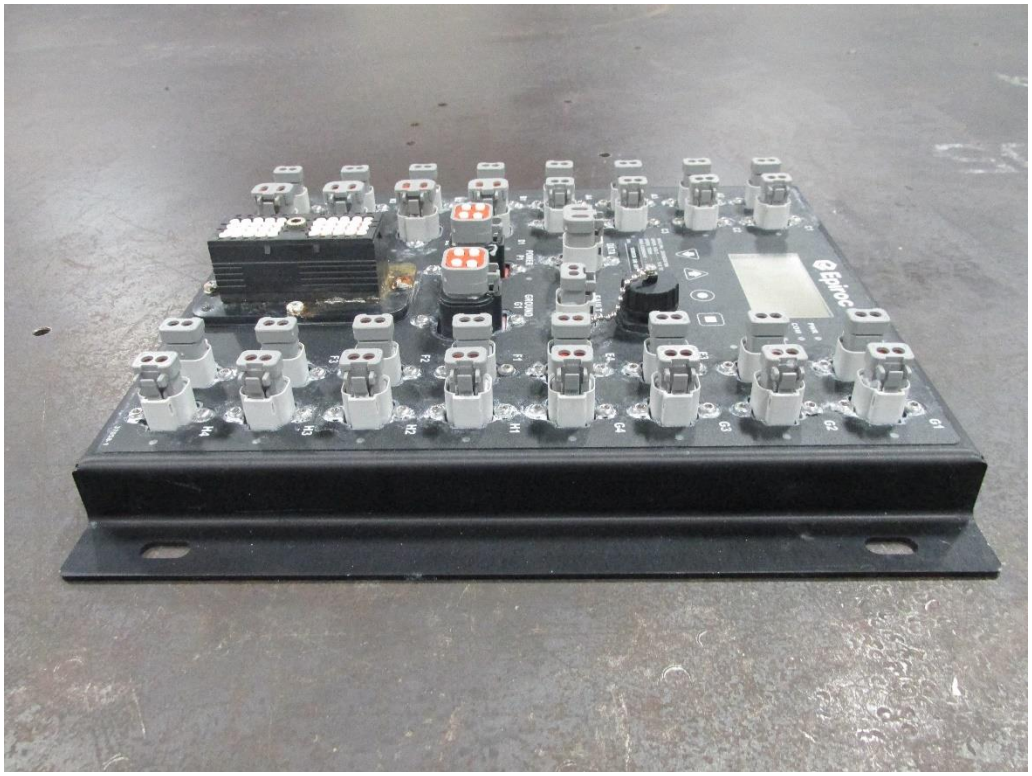

Figure A39: Sample 53A Post-Test (Right)

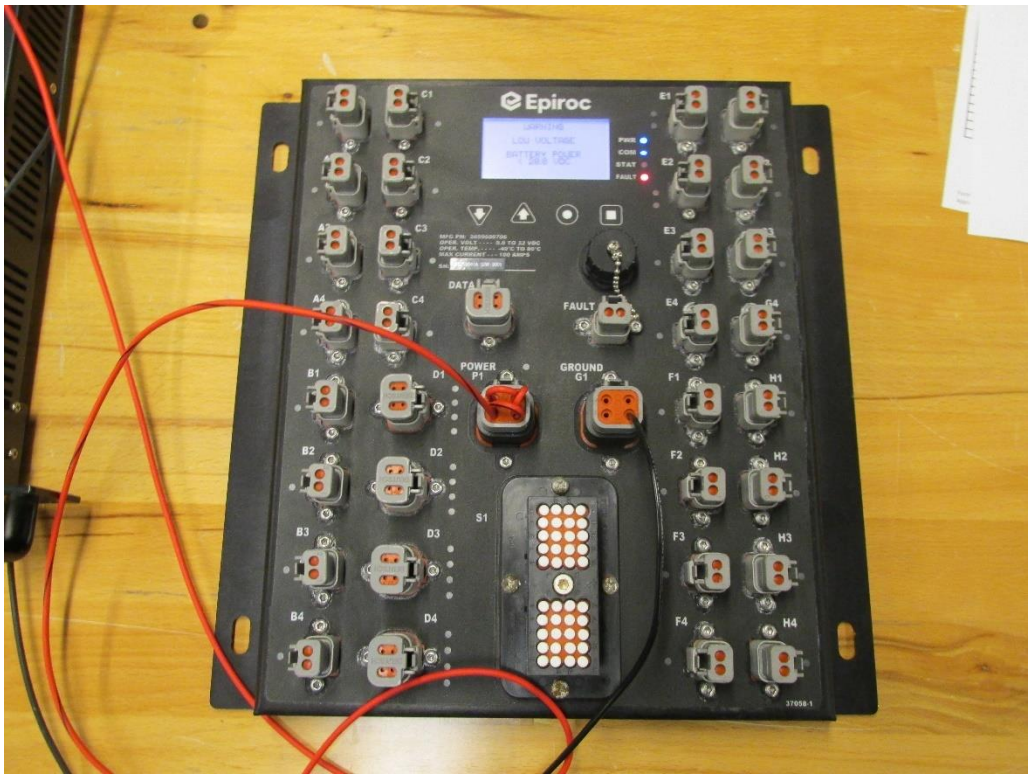

Figure A40: Sample 11A Post-Test Functional Check Abnormality

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APPENDIX B: TEMPERATURE CHART(S)

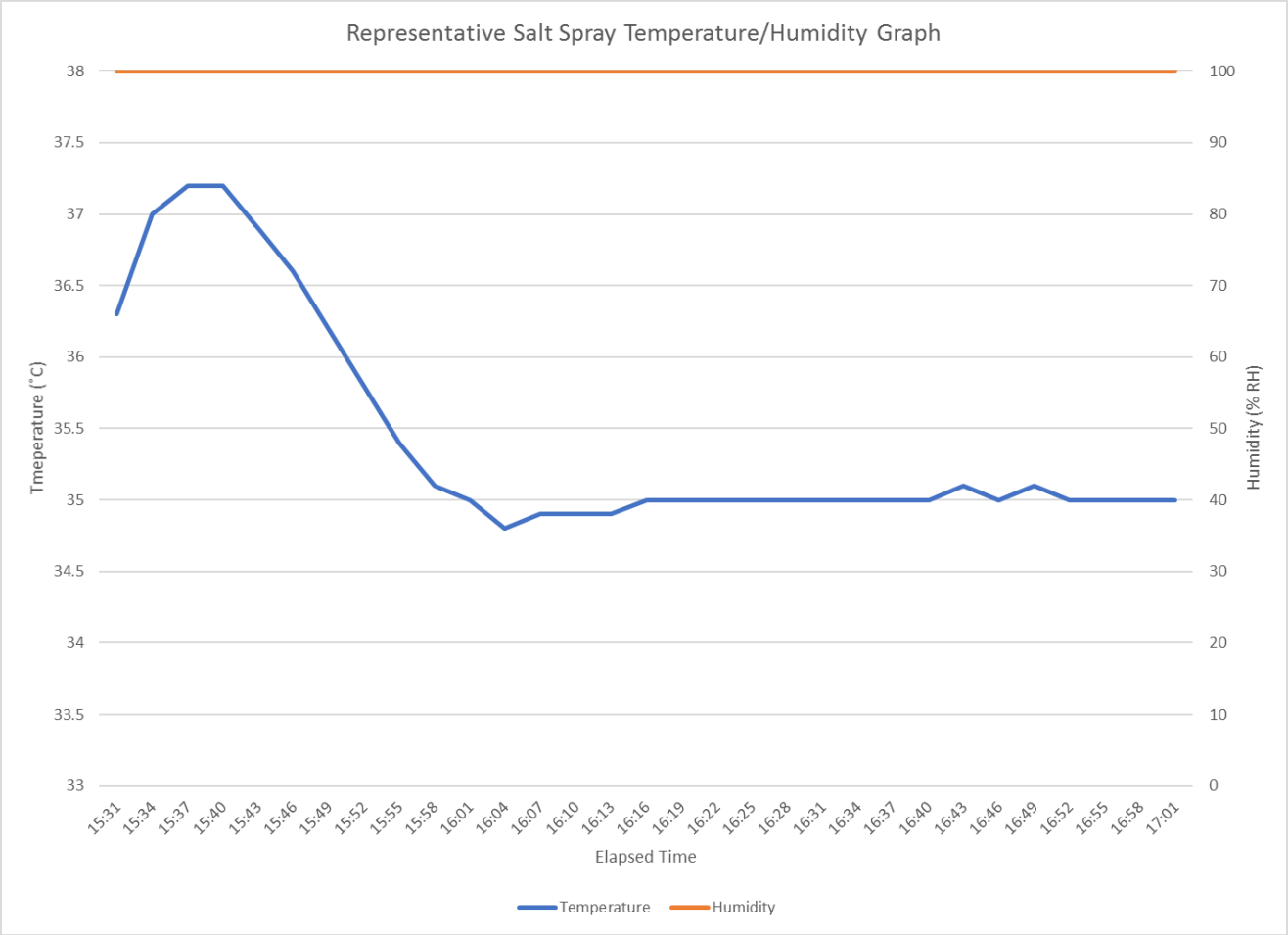

Figure B1: Representative of Salt Spray Temperature/Humidity

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APPENDIX B (CONT): TEMPERATURE CHART(S)

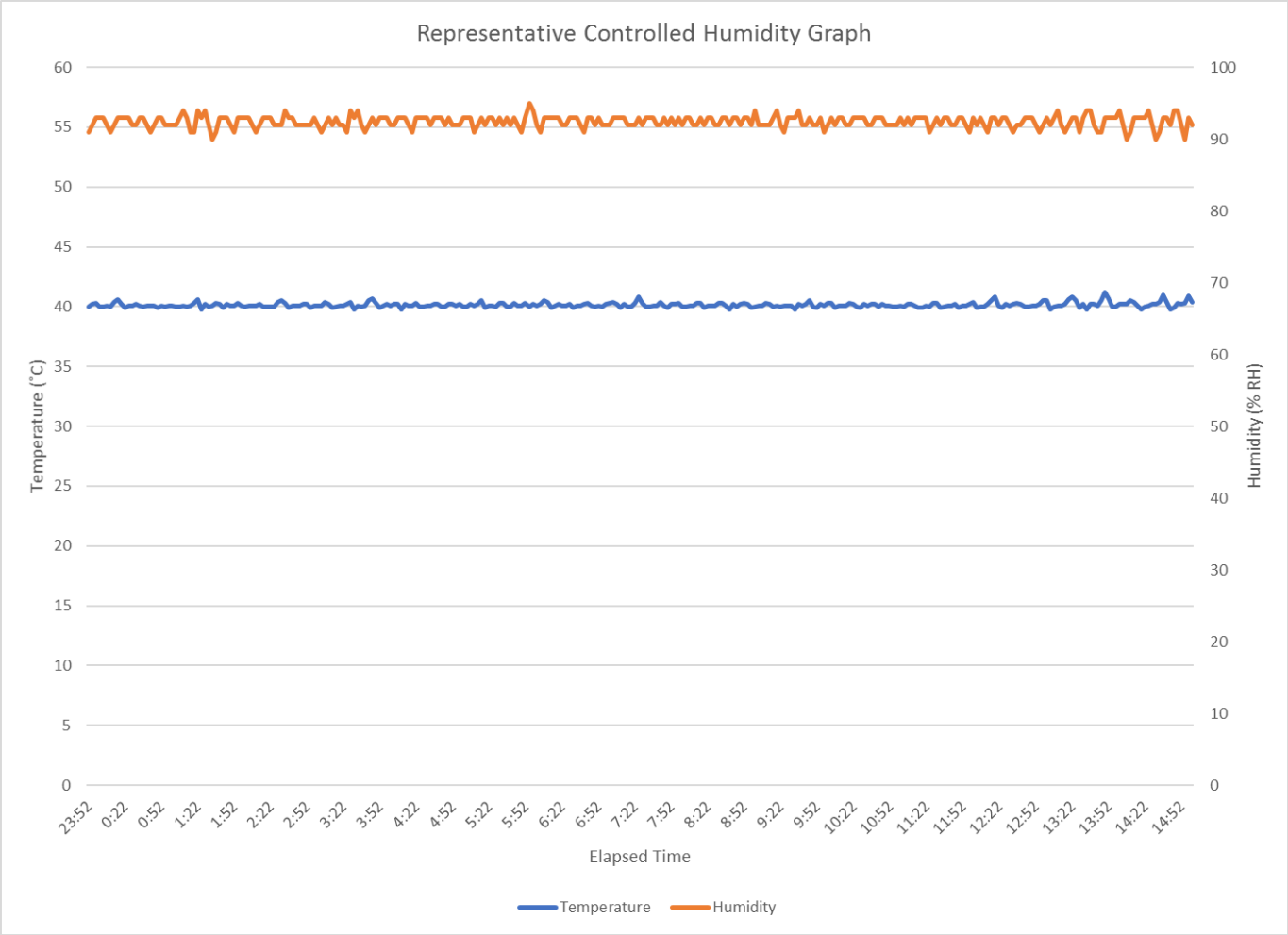

Figure B2: Representative of Controlled Temperature/Humidity

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