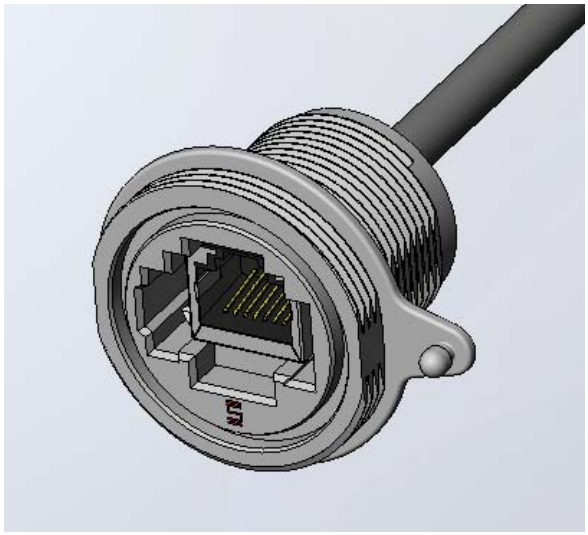
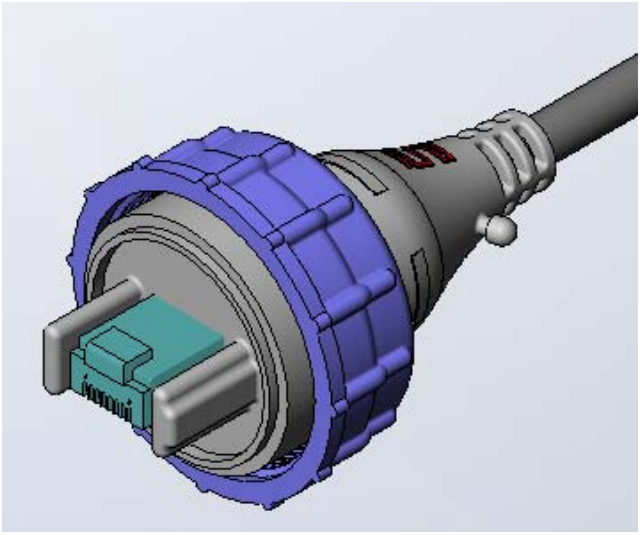
Project Number: Design Verification Test	Tracking Code: TC0928—2599_Report_Rev_1		
Requested by: Brandon Harpenau	Date: 12/17/2009	Product Rev: A	
Part #: SCRES-G-XX.XX-D / SCPE-G-XX.XX-D	Lot #: 1	Tech: Troy Cook Gary Lomax Rodney Riley	Eng: Eric Mings Mark Shireman
Part description: Sealed Circular Receptacle / Plug, Ethernet			Qty to test: 80
Test Start: 07/08/2009	Test Completed: 9/16/2009		





Design Verification Test Report

PART DESCRIPTION

SCRES-G-XX.XX-D
SCPE-G-XX.XX-D

CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to IS0 10012-l and ANSI/NCSL 2540-1, as applicable.

SCOPE

To perform the following tests: Design verification test. See test plan.

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

1) All materials were manufactured in accordance with the applicable product specification.
2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
3) After soldering, the parts to be used for LLCR and DWV/IR testing were cleaned according to TLWI-0001.
4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
5) The automated procedure is used with aqueous compatible soldering materials.
6) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
7) Any additional preparation will be noted in the individual test sequences.

FLOWCHARTS

Gas Tight

TEST STEP	GROUP A 80 Points
01	LLCR-1
02	Gas Tight
03	LLCR-2

Gas Tight = EIA-364-36A

LLCR = EIA-364-23, LLCR

use Keithley 580 in the dry circuit mode, 10 mA Max

Mating/Unmating/Gaps/Normal Force/Deflection Force

TEST STEP	GROUP A 10 Boards (each position submitted)	GROUP B1 Individual Contacts (8-10 min)	GROUP B2 Individual Contacts (8-10 min)
01	Mating / Unmating	Setup Approve	Setup Approve
02	25 Cycles	Normal Force (in the body unless otherwise specified)	Thermal Aging (Mated)
03	Clean w/Compressed Air		Normal Force
04	Mating / Unmating		
05	25 Cycles (50 Total)		
06	Clean w/Compressed Air		
07	Mating / Unmating		
08	25 Cycles (75 Total)		
09	Clean w/Compressed Air		
10	Mating / Unmating		
11	25 Cycles (100 Total)		
12	Clean w/Compressed Air		
13	Mating / Unmating		
14	Thermal Aging (Mated)		
15	Mating / Unmating		
16	Cyclic Humidity (Mated)		
17	Mating / Unmating		

Thermal Aging = EIA-364-17, Test Condition 11 (65 °C)

Time Condition 'A' (96 hours)

Humidity = EIA-364-31, Test Condition A (96 Hours)

Method II, with the following test conditions: +65 °C, 90% to 95% RH

ambient pre-condition

Mating/Un-Mating Forces = EIA-364-13

Normal Force = EIA-364-04

(Perpendicular) displacement Force = 12.7 mm/min +/- 6 mm/min

Spec is 50 N @ 1 mm displacement

Gasket to be removed prior to taking forces.

IR & DWV

TEST STEP	GROUP A1 2 Mated Sets Break Down - Pin to Pin	GROUP A2 2 Unmated of Part # Being Tested Break Down - Pin to Pin	GROUP A3 2 Unmated of Mating Part # Break Down - Pin to Pin	GROUP B 2 Mated Sets Pin to Pin
01	DWV/Break Down Voltage	DWV/Break Down Voltage	DWV/Break Down Voltage	IR & DWV at test voltage (on both mated sets and on each connector unmated)
02				Thermal Aging (both sets unmated)
03				IR & DWV at test voltage (on both mated sets and on each connector unmated)
04				Cyclic Humidity (both sets unmated)
05				IR & DWV at test voltage (on both mated sets and on each connector unmated)

TEST STEP	GROUP E1 2 Mated Sets Break Down - Pin to Ground	GROUP E2 2 Unmated of Part # Being Tested Break Down - Pin to Ground	GROUP E3 2 Unmated of Mating Part # Break Down - Pin to Ground	GROUP F 2 Mated Sets Pin to Ground
01	DWV/Break Down Voltage	DWV/Break Down Voltage	DWV/Break Down Voltage	IR & DWV at test voltage (on both mated sets and on each connector unmated)
02				Thermal Aging (both sets unmated)
03				IR & DWV at test voltage (on both mated sets and on each connector unmated)
04				Cyclic Humidity (both sets unmated)
05				IR & DWV at test voltage (on both mated sets and on each connector unmated)

Thermal Aging = EIA-364-17, Test Condition 11 (65 °C)
Time Condition 'A' (96 hours)
Humidity = EIA-364-31, Test Condition A (96 Hours)
Method II, with the following test conditions: +65 °C, 90% to 95% RH
ambient pre-condition
IR = EIA-364-21
DWV = EIA-364-20, Test Condition 1

Durability/Thermal Age/Cyclic Humidity

TEST STEP	GROUP A 80 Points 100 Cycles
01	LLCR-1
02	100 Cycles
03	Clean Mating Interface
04	LLCR-2
05	Thermal Age (Mated and undisturbed)
06	LLCR-3
07	Cyclic Humidity (Mated and undisturbed)
08	LLCR-4

Thermal Aging = EIA-364-17, Test Condition 11 (65 °C)
Time Condition 'A' (96 hours)
Humidity = EIA-364-31, Test Condition A (96 Hours)
Method II, with the following test conditions: +65 °C, 90% to 95% RH
ambient pre-condition
LLCR = EIA-364-23, LLCR
use Keithley 580 in the dry circuit mode, 10 mA Max

Current Carrying Capacity

TEST STEP	GROUP A 3 Mated Assemblies 1 CONTACT POWERED	GROUP B 3 Mated Assemblies 2 CONTACTS POWERED	GROUP C 3 Mated Assemblies 3 CONTACTS POWERED	GROUP D 3 Mated Assemblies 4 CONTACTS POWERED	GROUP E 3 Mated Assemblies ALL CONTACTS POWERED
01	CCC	CCC	CCC	CCC	CCC

(TIN PLATING) - Tabulate calculated current at RT, 65° C, 75° C and 95° C
after derating 20% and based on 105° C
(GOLD PLATING) - Tabulate calculated current at RT, 85° C, 95° C and 115° C
after derating 20% and based on 125° C
CCC, Temp rise = EIA-364-70

IP67 Mated Connector

TEST STEP	GROUP A SCRES-G-0.25-D 6 Connectors	GROUP A1 SCRES-G-0.25-D 6 Connectors
01	Dust Test	Water Test
02	Check for Dust	Check for Water

Dust/Water Testing = Per CEI/IEC 60529 Code IP67

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL:

1) EIA-364-17, *Temperature Life with or without Electrical Load Test Procedure for Electrical Connectors.*
2) Test Condition 11 at 65° C.
3) Test Time Condition A for 96 hours.
4) All test samples are pre-conditioned at ambient.
5) All test samples are exposed to environmental stressing in the mated condition.

HUMIDITY:

1) Reference document: EIA-364-31, *Humidity Test Procedure for Electrical Connectors.*
2) Test Condition A, 96 Hours.
3) Method II, with the following test conditions: + 65° C, 90% to 98% Relative Humidity.
4) All samples are pre-conditioned at ambient.
5) All test samples are exposed to environmental stressing in the mated condition.

TEMPERATURE RISE (Current Carrying Capacity, CCC):

1) EIA-364-70, *Temperature Rise versus Current Test Procedure for Electrical Connectors and Sockets*.
2) When current passes through a contact, the temperature of the contact increases as a result of I^2R (resistive) heating.
3) The number of contacts being investigated plays a significant part in power dissipation and therefore temperature rise.
4) The size of the temperature probe can affect the measured temperature.
5) Copper traces on PC boards will contribute to temperature rise:
    a. Self heating (resistive)
    b. Reduction in heat sink capacity affecting the heated contacts
6) A de-rating curve, usually 20%, is calculated.
7) Calculated de-rated currents at three temperature points are reported:
    a. Ambient
    b. 80^{o} C
    c. 95^{o} C
    d. 115^{o} C
8) Typically, neighboring contacts (in close proximity to maximize heat build up) are energized.
9) The thermocouple (or temperature measuring probe) will be positioned at a location to sense the maximum temperature in the vicinity of the heat generation area.
10) A computer program, *TR 803.exe*, ensures accurate stability for data acquisition.
11) Hook-up wire cross section is larger than the cross section of any connector leads/PC board traces, jumpers, etc.
12) Hook-up wire length is longer than the minimum specified in the referencing standard.

MATING/UNMATING:

1) Reference document: EIA-364-13, *Mating and Unmating Forces Test Procedure for Electrical Connectors*.
2) The full insertion position was to within 0.003" to 0.004" of the plug bottoming out in the receptacle to prevent damage to the system under test.
3) One of the mating parts is secured to a floating X-Y table to prevent damage during cycling.

NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

1) Reference document: EIA-364-04, *Normal Force Test Procedure for Electrical Connectors*.
2) The contacts shall be tested in the connector housing.
3) If necessary, a "window" shall be made in the connector body to allow a probe to engage and deflect the contact at the same attitude and distance (plus 0.05 mm [0.002"]) as would occur in actual use.
4) The connector housing shall be placed in a holding fixture that does not interfere with or otherwise influence the contact force or deflection.
5) Said holding fixture shall be mounted on a floating, adjustable, X-Y table on the base of the Dillon TC^2, computer controlled test stand with a deflection measurement system accuracy of 5.0 µm (0.0002").
6) The nominal deflection rate shall be 5 mm (0.2")/minute.
7) Unless otherwise noted a minimum of five contacts shall be tested.
8) The force/deflection characteristic to load and unload each contact shall be repeated five times.
9) The system shall utilize the TC^2 software in order to acquire and record the test data.
10) The permanent set of each contact shall be measured within the TC^2 software.
11) The acquired data shall be graphed with the deflection data on the X-axis and the force data on the Y-axis and a print out will be stored with the Tracking Code paperwork.

INSULATION RESISTANCE (IR):

To determine the resistance of insulation materials to leakage of current through or on the surface of these materials when a DC potential is applied.

1) PROCEDURE:
    a. Reference document: EIA-364-21, *Insulation Resistance Test Procedure for Electrical Connectors*.
    b. Test Conditions:
        i. Between Adjacent Contacts or Signal-to-Ground
        ii. Electrification Time 2.0 minutes
        iii. Test Voltage (500 VDC) corresponds to calibration settings for measuring resistances.
2) MEASUREMENTS:
3) When the specified test voltage is applied (VDC), the insulation resistance shall not be less than 5000 megohms.

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

To determine if the sockets can operate at its rated voltage and withstand momentary over potentials due to switching, surges, and other similar phenomenon. Separate samples are used to evaluate the effect of environmental stresses so not to influence the readings from arcing that occurs during the measurement process.

1) PROCEDURE:
    a. Reference document: EIA-364-20, *Withstanding Voltage Test Procedure for Electrical Connectors*.
    b. Test Conditions:
        i. Between Adjacent Contacts or Signal-to-Ground
        ii. Barometric Test Condition 1
        iii. Rate of Application 500 V/Sec
        iv. Test Voltage (VAC) until breakdown occurs
2) MEASUREMENTS/CALCULATIONS
    a. The breakdown voltage shall be measured and recorded.
    b. The dielectric withstanding voltage shall be recorded as 75% of the minimum breakdown voltage.
    c. The working voltage shall be recorded as one-third (1/3) of the dielectric withstanding voltage (one-fourth of the breakdown voltage).

LLCR:

1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
    a. <= +5.0 mOhms: ---------- Stable
    b. +5.1 to +10.0 mOhms:---------- Minor
    c. +10.1 to +15.0 mOhms: ---------- Acceptable
    d. +15.1 to +50.0 mOhms: ---------- Marginal
    e. +50.1 to +2000 mOhms: ---------- Unstable
    f. >+2000 mOhms:---------- Open Failure

GAS TIGHT:

To provide method for evaluating the ability of the contacting surfaces in preventing penetration of harsh vapors which might lead to oxide formation that may degrade the electrical performance of the contact system.

1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
    a. <= +5.0 mOhms: ---------- Stable
    b. +5.1 to +10.0 mOhms:---------- Minor
    c. +10.1 to +15.0 mOhms: ---------- Acceptable
    d. +15.1 to +50.0 mOhms: ---------- Marginal
    e. +50.1 to +2000 mOhms: ---------- Unstable
    f. >+2000 mOhms:---------- Open Failure
4) Procedure:
    a. Reference document: EIA-364-36, *Test Procedure for Determination of Gas-Tight Characteristics for Electrical Connectors, Sockets and/or Contact Systems*.
    b. Test Conditions:
        i. Class II--- Mated pairs of contacts assembled to their plastic housings.
        ii. Reagent grade Nitric Acid shall be used of sufficient volume to saturate the test chamber
        iii. The ratio of the volume of the test chamber to the surface area of the acid shall be 10:1.
        iv. The chamber shall be saturated with the vapor for at least 15 minutes before samples are added.
        v. Exposure time, 55 to 65 minutes.
        vi. The samples shall be no closer to the chamber walls than 1 inches and no closer to the surface of the acid than 3 inches.
        vii. The samples shall be dried after exposure for a minimum of 1 hour.
        viii. Drying temperature 50^{o} C
        ix. The final LLCR shall be conducted within 1 hour after drying.

SUPPLEMENTAL TESTS

WATER TESTING:

1) Reference document: CEI/IEC 60529 Code IP67
2) SCRES torque specification for SPN-17-01 is 12 IN-LB
3) SCPE torque specification for SCN-17-01 is 12 IN-LB

DUST TESTING:

1) Reference document: CEI/IEC 60529 Code IP67
2) SCRES torque specification for SPN-17-01 is 12 IN-LB
3) SCPE torque specification for SCN-17-01 is 12 IN-LB

RESULTS

Temperature Rise, CCC at a 20% de-rating

- **CCC for a 30°C Temperature Rise----------3.8A per contact with 1 contact powered**
- **CCC for a 30°C Temperature Rise----------2.7A per contact with 2 adjacent contacts powered**
- **CCC for a 30°C Temperature Rise----------2.4A per contact with 3 adjacent contacts powered**
- **CCC for a 30°C Temperature Rise----------2.1A per contact with 4 adjacent contacts powered**
- **CCC for a 30°C Temperature Rise----------1.6A per contact with 8 (all) adjacent contacts powered, thermocouple located in SCRES/SCPE mate area**

Mating – Unmating Forces

- **Initial**
  - **Mating**
    - **Min ---------- 2.6 Lbs**
    - **Max---------- 4.8 Lbs**
  - **Unmating**
    - **Min ---------- 1.1 Lbs**
    - **Max---------- 3.8 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 3.4 Lbs**
    - **Max---------- 5.6 Lbs**
  - **Unmating**
    - **Min ---------- 1.7 Lbs**
    - **Max---------- 4.7 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 3.6 Lbs**
    - **Max---------- 5.9 Lbs**
  - **Unmating**
    - **Min ---------- 1.8 Lbs**
    - **Max---------- 5.3 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ---------- 3.9 Lbs**
    - **Max---------- 6.5 Lbs**
  - **Unmating**
    - **Min ---------- 1.8 Lbs**
    - **Max---------- 5.3 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ---------- 4.1 Lbs**
    - **Max---------- 6.4 Lbs**
  - **Unmating**
    - **Min ---------- 2.0 Lbs**
    - **Max---------- 5.4 Lbs**
- **Thermal**
  - **Mating**
    - **Min ---------- 2.1 Lbs**
    - **Max---------- 4.1 Lbs**
  - **Unmating**
    - **Min ---------- 0.6 Lbs**
    - **Max---------- 2.7 Lbs**
- **Humidity**
  - **Mating**
    - **Min ---------- 2.1 Lbs**
    - **Max---------- 3.2 Lbs**
  - **Unmating**
    - **Min ---------- 0.9 Lbs**
    - **Max---------- 2.6 Lbs**

Normal Force at 0.075" deflection

- **Initial**
  - **Min ---------- 145.50 g Set ----- 0.0000"**
  - **Max ---------- 157.40 g Set ----- 0.0004"**
- **Thermal**
  - **Min ---------- 154.70 g**
  - **Max ---------- 185.10 g**

Insulation Resistance minimums, IR

- **Initial**
  - **Mated ---------- >100,000 Meg Ω ---------- Pass**
  - **Unmated ---------- >100,000 Meg Ω ---------- Pass**
- **Thermal**
  - **Mated ---------- >100,000 Meg Ω ---------- Pass**
  - **Unmated ---------- >100,000 Meg Ω ---------- Pass**
- **Humidity**
  - **Mated ---------- 9,000 Meg Ω ---------- Pass**
  - **Unmated ---------- 9,000 Meg Ω ---------- Pass**

Dielectric Withstanding Voltage minimums, DWV

- **Minimums**
  - **Breakdown Voltage ---------- 1,000 VAC**
  - **Test Voltage ---------- 750 VAC**
  - **Working Voltage ---------- 250 VAC**
- **Initial DWV ---------- Passed**
- **Thermal DWV ---------- Passed**
- **Humidity DWV ---------- Passed**

LLCR Durability (80 LLCR test points)

- **Initial ---------- 68.7 mOhms Max**
- **Durability, 100 Cycles**
  - **<= +5.0 mOhms ---------- 80 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **Thermal**
  - **<= +5.0 mOhms ---------- 80 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **Humidity**
  - **<= +5.0 mOhms ---------- 80 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

LLCR Gas Tight (80 LLCR test points)

- **Initial ---------- 59.7 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ---------- 80 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

SUPPLEMENTAL TESTING

IP67 Testing (Water & Dust)

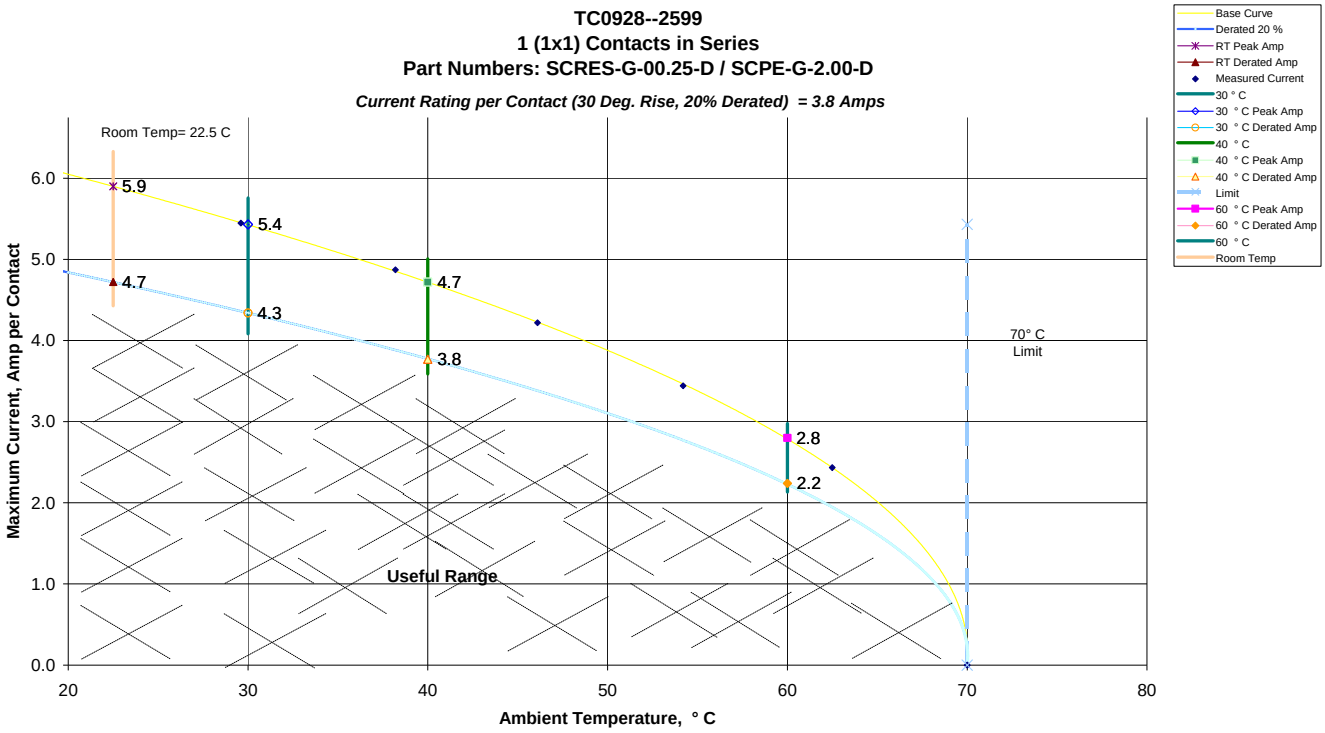
	Initial (Before Exposure)	After Exposure
Water	**No Water Present**	**No Water Present**
Dust	**No Dust Present**	**No Dust Present**

DATA SUMMARIES

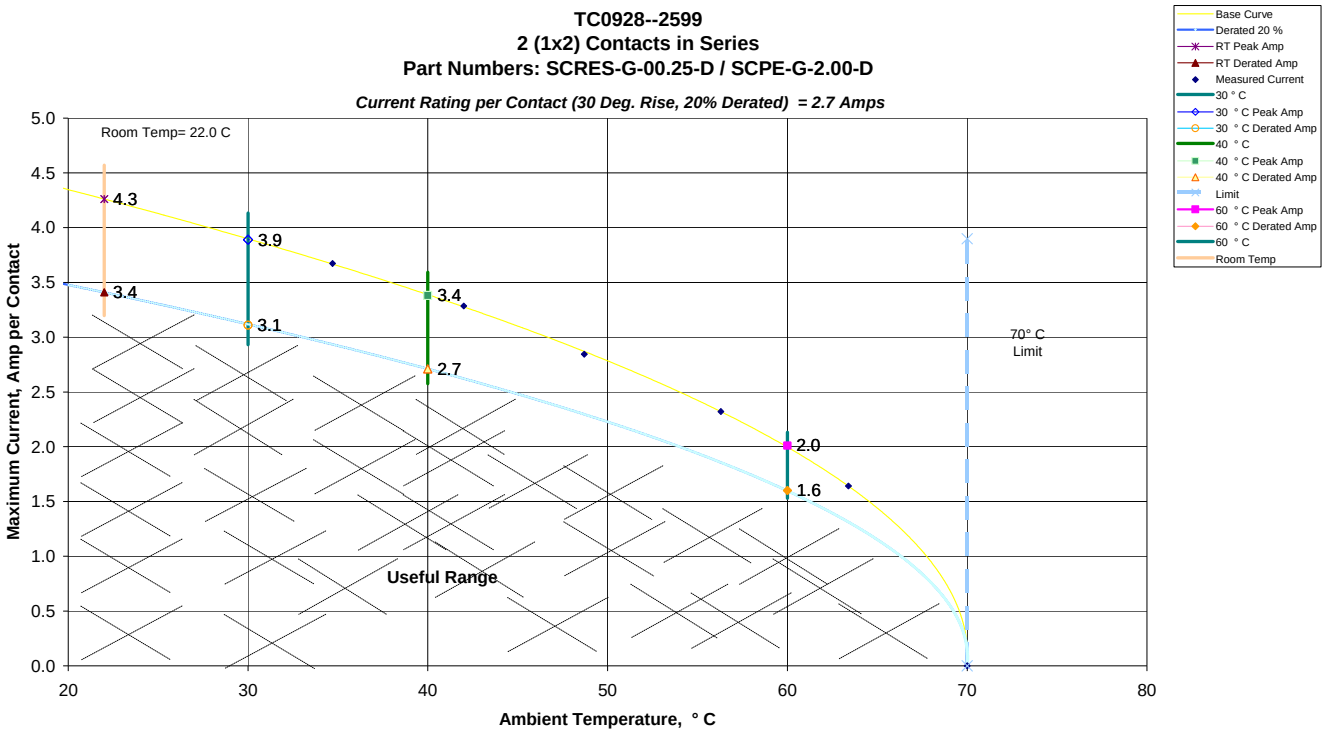
TEMPERATURE RISE (Current Carrying Capacity, CCC):

1) High quality thermocouples whose temperature slopes track one another were used for temperature monitoring.
2) The thermocouples were placed at a location to sense the maximum temperature generated during testing.
3) Temperature readings recorded are those for which three successive readings, 15 minutes apart, differ less than 1° C (computer controlled data acquisition).
4) Adjacent contacts were powered:

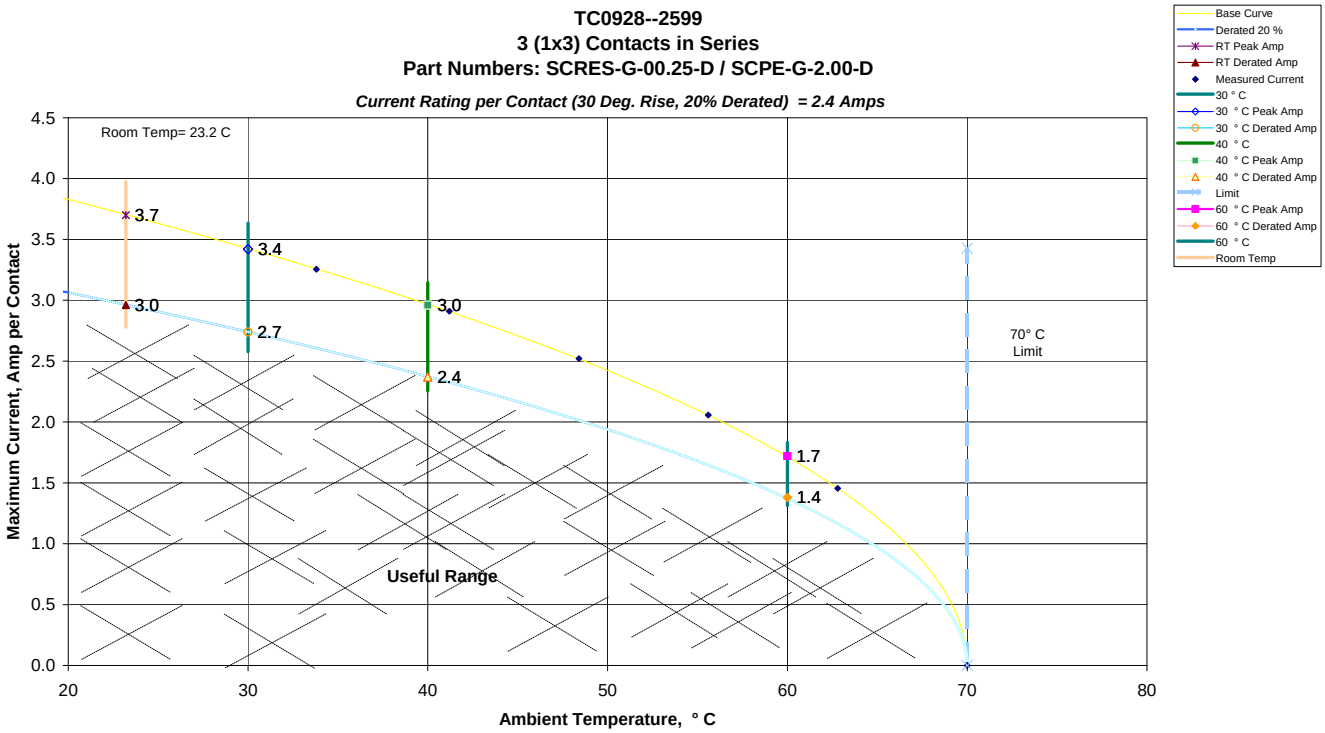
    a. Linear configuration with 1 conductor/contact powered



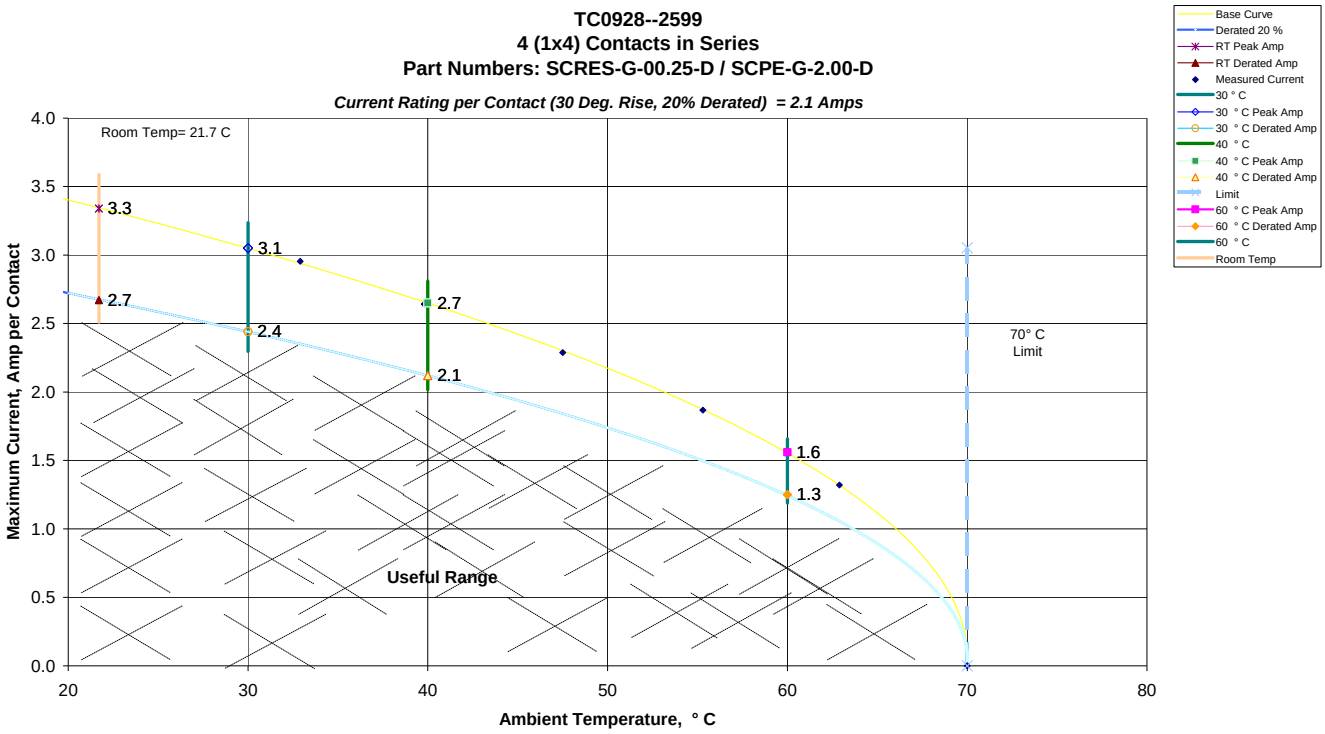
b. Linear configuration with 2 adjacent conductors/contacts powered



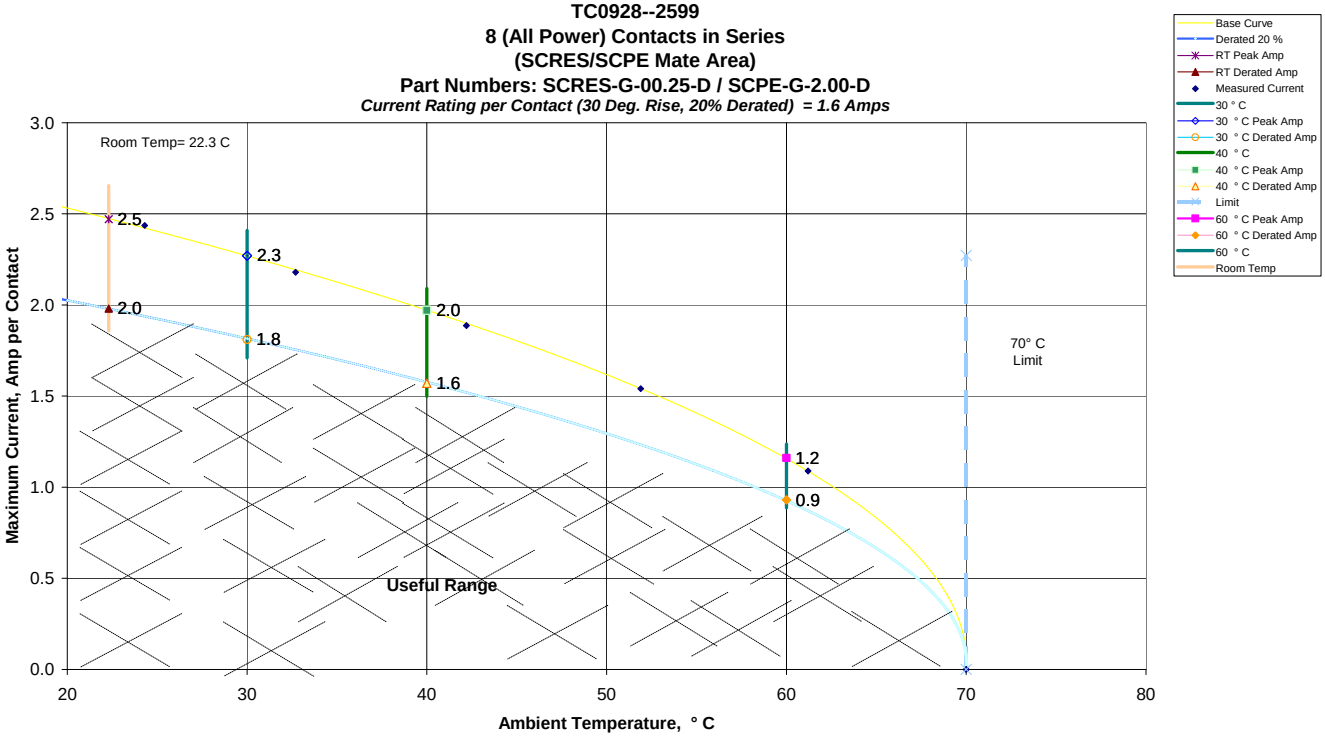
c. Linear configuration with 3 adjacent conductors/contacts powered



d. Linear configuration with 4 adjacent conductors/contacts powered



e. Linear configuration with 8 (all) adjacent conductors/contacts powered, thermocouple located in SCRES/SCPE mate area



MATING/UNMATING:

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
Minimum	42.1	2.6	17.3	1.1	54.9	3.4	27.4	1.7
Maximum	77.3	4.8	61.4	3.8	89.8	5.6	74.7	4.7
Average	57.1	**3.6**	33.4	**2.1**	70.3	**4.4**	42.9	**2.7**

	After 50 Cycles				After 75 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
Minimum	57.6	3.6	29.1	1.8	62.1	3.9	29.0	1.8
Maximum	94.1	5.9	85.0	5.3	103.2	6.5	85.0	5.3
Average	74.2	**4.6**	46.4	**2.9**	78.6	**4.9**	50.1	**3.1**

	After 100 Cycles				After Thermals			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
Minimum	66.2	4.1	31.5	2.0	33.0	2.1	8.8	0.6
Maximum	102.9	6.4	85.6	5.4	66.2	4.1	43.3	2.7
Average	80.6	**5.0**	52.5	**3.3**	42.7	**2.7**	26.8	**1.7**

	After Humidity			
	Mating		**Unmating**	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
Minimum	33.6	2.1	14.9	0.9
Maximum	51.8	3.2	41.4	2.6
Average	42.1	**2.6**	25.8	**1.6**

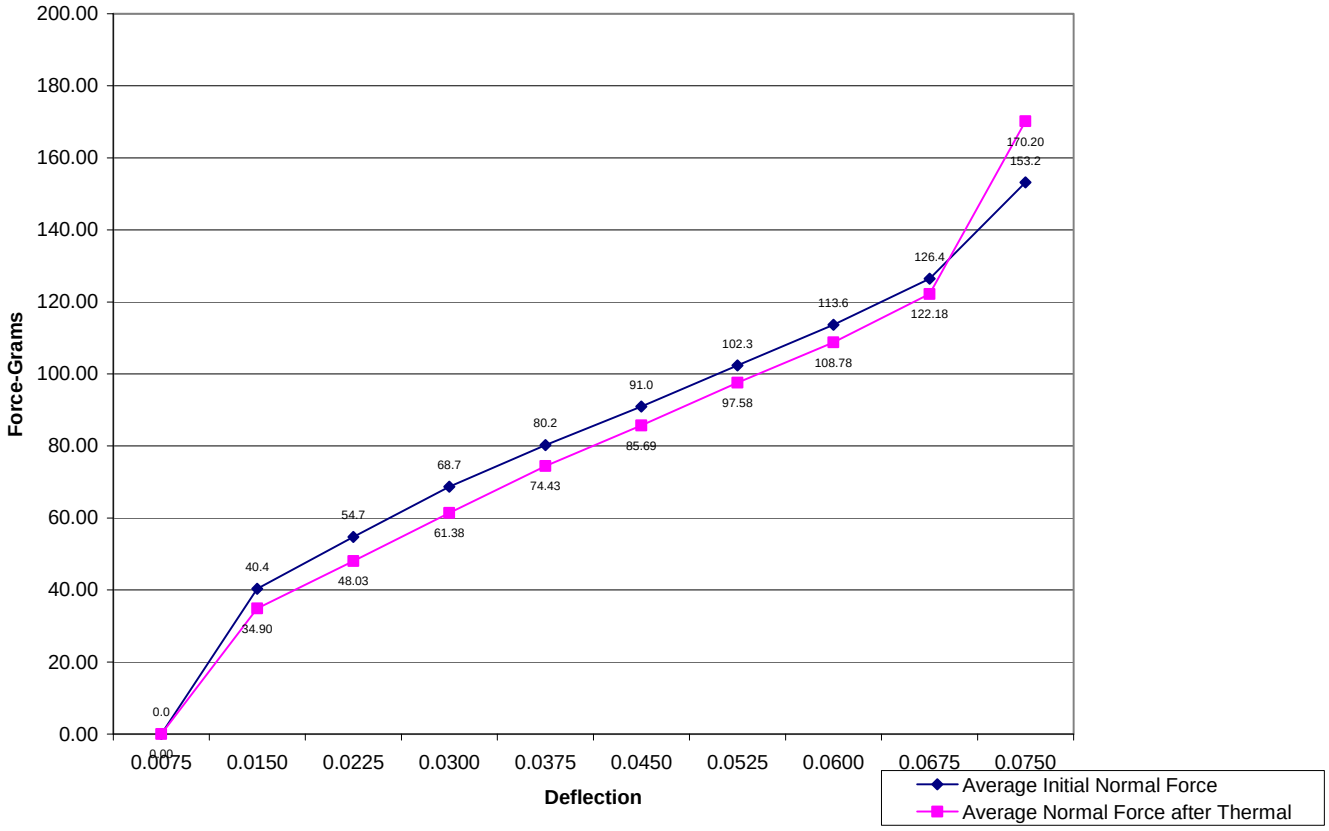
NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

1) Calibrated force gauges are used along with computer controlled positioning equipment.
2) For Normal force 8-10 measurements are taken and the averages reported.

Initial	Deflections in inches Forces in Grams										
	0.0075	**0.0150**	**0.0225**	**0.0300**	**0.0375**	**0.0450**	**0.0525**	**0.0600**	**0.0675**	**0.0750**	***SET***
Averages	40.37	54.74	68.69	80.21	90.99	102.33	113.64	126.43	140.04	153.19	0.0002
Min	34.80	49.70	61.10	69.80	84.40	96.80	108.60	120.90	132.40	146.50	0.0000
Max	44.00	59.40	75.20	88.20	98.90	109.50	117.70	131.00	144.50	157.40	0.0004
St. Dev	3.359	4.177	4.986	6.872	5.027	4.514	3.120	3.765	4.743	4.636	0.0002
Count	7	7	7	7	7	7	7	7	7	7	7

After Thermals	Deflections in inches Forces in Grams										
	0.0075	**0.0150**	**0.0225**	**0.0300**	**0.0375**	**0.0450**	**0.0525**	**0.0600**	**0.0675**	**0.0750**	***SET***
Averages	34.90	48.03	61.38	74.43	85.69	97.58	108.78	122.18	139.44	170.20	0.0001
Min	31.20	41.70	55.70	69.20	78.30	91.20	102.90	116.10	134.00	154.70	0.0000
Max	37.10	51.40	65.10	79.10	91.80	103.60	115.10	128.90	146.30	185.10	0.0003
St. Dev	2.153	3.438	3.435	3.708	4.972	4.538	4.327	4.659	4.865	9.439	0.0001
Count	8	8	8	8	8	8	8	8	8	8	8

Normal Force - Average Initial vs Average Thermal



INSULATION RESISTANCE (IR):

	Pin to Pin		
	Mated	Unmated	Unmated
Minimum	**SCPE/SCRES**	**SCPE**	**SCRES**
Initial	100000	100000	100000
Thermal	100000	100000	100000
Humidity	25000	100000	40000

	Pin to Shield		
	Mated	Unmated	Unmated
Minimum	**SCPE/SCRES**	**SCPE**	**SCRES**
Initial	100000	100000	100000
Thermal	100000	100000	100000
Humidity	9000	100000	9000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	**SCPE/SCRES**
Break Down Voltage	1000
Test Voltage	750
Working Voltage	250

Pin to Pin	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

Pin to Ground	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

LLCR:

1) A total of 80 points were measured.
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ---------- Stable
   b. +5.1 to +10.0 mOhms:---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

Date	07/21/09	07/27/09	08/05/09	8/17/2009
Room Temp C	24	22.4	23.4	24
RH	36%	54%	37%	42%
Name	Troy Cook	Troy Cook	Troy Cook	Troy
mOhm values	**Actual Initial**	**Delta 100 Cycles**	**Delta Thermal**	**Delta Humidity**
Average	62.7	-0.2	0.1	-0.6
St. Dev.	2.6	0.8	0.5	0.5
Min	58.2	-1.4	-0.8	-1.9
Max	68.7	4.7	1.9	0.9
Count	80	80	80	80

GAS TIGHT:

1) A total of 80 points were measured.
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ---------- Stable
   b. +5.1 to +10.0 mOhms:---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms: ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

Date	07/21/09	7/31/2009
Room Temp C	24	24
RH	37%	38%
Name	Troy Cook	Rodney Riley
mOhm values	**Actual Initial**	**Delta Gas Tight**
Average	63.0	0.3
St. Dev.	2.6	0.5
Min	59.6	-0.4
Max	67.7	4.1
Count	80	80

SUPPLEMENTAL TESTS

IP67 Testing (Water & Dust)

IP67 Water Submersion Test

Sample #	Visual Inspection
1	Passed (NO WATER INGRESS verified by black light)
2	Passed (NO WATER INGRESS verified by black light)
3	Passed (NO WATER INGRESS verified by black light)
4	Passed (NO WATER INGRESS verified by black light)
5	Passed (NO WATER INGRESS verified by black light)
6	Passed (NO WATER INGRESS verified by black light)

IP67 Dust Pressure Test

Sample #	Visual Inspection
1	No dust ingress through connector or into enclosure
2	No dust ingress through connector or into enclosure
3	No dust ingress through connector or into enclosure
4	No dust ingress through connector or into enclosure
5	No dust ingress through connector or into enclosure
6	No dust ingress through connector or into enclosure

DATA

MATING/UNMATING:

	Initial		After 25 Cycles		After 50 Cycles		After 75 Cycles		After 100 Cycles		After Thermals		After Humidity	
Sample#	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating
1	2.75	1.17	3.43	1.80	3.74	1.82	3.88	1.81	4.14	1.97	2.31	0.55	2.20	1.29
2	2.93	1.19	3.93	1.75	4.22	2.01	4.48	2.06	4.81	2.35	2.10	0.81	2.23	0.99
3	2.96	1.17	3.78	1.71	3.80	1.85	4.05	2.10	4.15	2.07	2.06	0.60	2.24	0.96
4	4.74	3.31	5.61	3.50	5.84	3.76	6.45	4.29	6.43	4.41	2.41	1.94	2.54	1.24
5	4.83	3.84	5.22	4.67	5.40	5.31	5.94	5.31	5.87	5.35	2.80	2.64	3.08	2.59
6	4.72	3.48	5.43	4.12	5.88	4.45	6.04	4.50	6.25	4.71	2.65	2.10	2.53	2.54
7	2.63	1.23	3.69	1.92	3.97	1.84	4.43	2.32	4.56	2.52	4.14	2.57	3.19	2.24
8	3.37	1.78	4.43	1.92	4.72	2.14	4.56	2.24	4.54	2.30	2.81	2.71	2.95	1.24
9	2.66	1.08	3.50	2.09	3.60	2.30	4.20	2.96	4.43	3.10	2.88	1.05	2.10	0.93
10	4.11	2.65	4.91	3.36	5.23	3.50	5.11	3.70	5.18	4.01	2.55	1.75	3.24	2.11

NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

Initial	Deflections in inches, Forces in Grams										
Sample #	**0.0075**	**0.0150**	**0.0225**	**0.0300**	**0.0375**	**0.0450**	**0.0525**	**0.0600**	**0.0675**	**0.0750**	***SET***
1	34.8	50.2	64.6	78.1	90.6	102.6	114.2	127.7	143.9	156.5	0.0002
2	44.0	58.3	71.4	83.2	89.8	100.5	112.9	123.4	136.6	150.3	0.0001
3	42.8	59.4	75.2	88.2	92.6	106.2	117.7	131.0	144.5	157.4	0.0000
4	42.6	59.0	72.9	86.5	98.9	109.5	113.8	128.2	143.3	155.9	0.0004
5	41.8	54.3	69.5	82.7	94.8	103.0	116.9	130.0	142.9	157.3	0.0001
6	39.3	49.7	61.1	73.0	85.8	96.8	108.6	120.9	132.4	146.5	0.0001
7	37.3	52.3	66.1	69.8	84.4	97.7	111.4	123.8	136.7	148.4	0.0004

After Thermals	Deflections in inches, Forces in Grams										
Sample #	**0.0075**	**0.0150**	**0.0225**	**0.0300**	**0.0375**	**0.0450**	**0.0525**	**0.0600**	**0.0675**	**0.0750**	***SET***
1	31.2	45.3	58.3	71.1	82.1	93.7	106.0	118.6	135.0	162.3	0.0003
2	34.8	48.4	61.6	73.9	78.3	91.2	104.3	118.1	134.0	163.8	0.0001
3	37.1	50.8	64.0	76.7	88.7	99.2	110.7	124.1	142.1	175.1	0.0000
4	36.9	51.2	65.1	79.1	91.8	103.6	115.1	128.9	146.3	185.1	0.0001
5	36.8	51.4	64.8	78.3	90.9	102.8	112.7	127.7	143.8	173.4	0.0001
6	34.9	41.7	55.7	69.2	82.2	94.4	107.1	120.2	136.6	174.2	0.0001
7	32.4	46.0	58.8	70.9	82.6	95.4	102.9	116.1	134.7	154.7	0.0001
8	35.1	49.4	62.7	76.2	88.9	100.3	111.4	123.7	143.0	173.0	0.0000

INSULATION RESISTANCE (IR):

Initial Insulation Resistance
Measured In Meg Ohms

	Pin to Pin			
	Mated	Unmated		
	x	x	x	
Sample#	SCPE/SCRES	SCPE	SCRES	
1	100000	100000	100000	
2	100000	100000	100000	

	Pin to Shield			
	Mated	Unmated		
	x	x	x	
Sample#	SCPE/SCRES	SCPE	SCRES	
1a	100000	100000	100000	*stripe*
1b	100000	100000	100000	*solid*
2a	100000	100000	100000	*stripe*
2b	100000	100000	100000	*solid*

Thermal Insulation Resistance
Measured In Meg Ohms

	Pin to Pin			
	Mated	Unmated		
	x	x	x	
Sample#	SCPE/SCRES	SCPE	SCRES	
1	100,000	100,000	100,000	
2	100,000	100,000	100,000	

	Pin to Ground			
	Mated	Unmated		
	x	x	x	
Sample#	SCPE/SCRES	SCPE	SCRES	
1a	100,000	100,000	100,000	*stripe*
1b	100,000	100,000	100,000	*solid*
2a	100,000	100,000	100,000	*stripe*
2b	100,000	100,000	100,000	*solid*

Humidity Insulation Resistance
Measured In Meg Ohms

	Pin to Pin		
	Mated	Unmated	
	X	X	X
Sample#	SCPE/SCRES	SCPE	SCRES
1	40,000	100,000	40,000
2	25,000	100,000	50,000

	Pin to Ground			
	Mated	Unmated		
	x	x	x	
Sample#	SCPE/SCRES	SCPE	SCRES	
1a	10,000	100,000	10,000	*stripe*
1b	9,000	100,000	9,000	*solid*
2a	25,000	100,000	35,000	*stripe*
2b	3,500	100,000	5,500	*solid*

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Initial DWV
Test Voltage= 750

	Pin to Pin		
	Mated	Unmated	
Sample#	SCPE/SCRES	SCPE	SCRES
1	750	750	750
2	750	750	750

	Pin to Shield			
	Mated	Unmated		
Sample#	SCPE/SCRES	SCPE	SCRES	
1a	750	750	750	*stripe*
1b	750	750	750	*solid*
2a	750	750	750	*stripe*
2b	750	750	750	*solid*

Thermal Test Voltage
Test Voltage= 750

	Pin to Pin		
	Mated	Unmated	
Sample#	SCPE/SCRES	SCPE	SCRES
1	750	750	750
2	750	750	750

	Pin to Shield			
	Mated	Unmated		
Sample#	SCPE/SCRES	SCPE	SCRES	
1a	750	750	750	*stripe*
1b	750	750	750	*solid*
2a	750	750	750	*stripe*
2b	750	750	750	*solid*

Humidity Test Voltage
Test Voltage= 750

	Pin to Pin		
	Mated	Unmated	
Sample#	SCPE/SCRES	SCPE	SCRES
1	750	750	750
2	750	750	750

	Pin to Shield			
	Mated	Unmated		
Sample#	SCPE/SCRES	SCPE	SCRES	
1a	750	750	750	*stripe*
1b	750	750	750	*solid*
2a	750	750	750	*stripe*
2b	750	750	750	*solid*

LLCR:

Board	mOhm values Position	Actual Initial	Delta 100 Cycles	Delta Thermal	Delta Humidity
1	Wh/O	62.2	-0.6	0.0	-0.6
1	O	66.5	-0.2	0.1	-1.4
1	Wh/G	60.3	0.3	0.0	-0.5
1	Bl	64.9	-0.5	-0.6	-1.0
1	Wh/Bl	60.4	-0.3	-0.8	-1.6
1	G	66.6	0.3	-0.4	-1.2
1	Wh/Br	61.4	3.6	1.9	-1.6
1	Br	65.6	0.3	0.2	-0.9
2	Wh/O	63.6	-0.9	0.4	-1.1
2	O	66.2	0.7	0.8	-0.5
2	Wh/G	61.6	-0.3	0.1	-0.7
2	Bl	63.6	0.0	0.1	-0.9
2	Wh/Bl	61.8	0.3	1.6	-0.8
2	G	64.0	-0.8	-0.7	-1.2
2	Wh/Br	61.8	-0.2	0.6	-0.4
2	Br	64.8	-0.2	-0.4	-1.8
3	Wh/O	59.8	0.8	0.5	-0.1
3	O	64.5	0.2	0.2	-0.8
3	Wh/G	59.0	-0.2	0.6	-0.3
3	Bl	63.8	-0.6	-0.6	-0.6
3	Wh/Bl	59.8	-0.6	0.1	-0.1
3	G	63.3	0.2	0.4	-0.6
3	Wh/Br	58.7	0.7	0.7	-0.3
3	Br	63.0	0.2	0.2	-0.4
4	Wh/O	62.7	-0.2	0.2	0.3
4	O	65.0	0.5	0.8	0.0
4	Wh/G	60.3	0.1	0.0	-0.9
4	Bl	64.5	-0.1	0.3	-0.5
4	Wh/Bl	59.9	-0.1	0.3	-0.4
4	G	65.1	0.4	1.0	0.9
4	Wh/Br	60.9	0.0	0.1	-0.5
4	Br	66.4	-0.3	0.2	-0.7
5	Wh/O	61.8	-0.3	-0.1	-1.2
5	O	64.4	-0.2	0.1	-0.2
5	Wh/G	60.0	-0.2	0.2	-1.0
5	Bl	63.6	-0.5	-0.1	-0.9
5	Wh/Bl	60.1	-0.7	0.0	-0.7
5	G	68.7	-0.3	0.0	-0.9
5	Wh/Br	61.1	-1.4	-0.7	-1.5
5	Br	64.8	-0.8	-0.7	-0.9
6	Wh/O	61.9	-0.7	0.4	-1.0
6	O	66.5	-0.8	-0.5	-0.8
6	Wh/G	58.2	0.3	0.5	0.1

6	Bl	64.8	-0.9	-0.3	-0.5
6	Wh/Bl	59.4	-0.5	0.1	-0.6
6	G	65.0	-0.9	-0.6	-0.7
6	Wh/Br	60.7	-1.2	-0.6	-0.8
6	Br	66.5	-0.6	-0.7	-1.9
7	Wh/O	61.0	-0.5	-0.2	0.1
7	O	65.2	-1.1	-0.6	-1.0
7	Wh/G	59.3	4.7	0.1	-0.4
7	Bl	64.1	0.0	0.3	-0.6
7	Wh/Bl	59.1	0.1	0.3	0.3
7	G	63.7	-0.5	0.1	-0.3
7	Wh/Br	59.9	0.0	0.5	-0.5
7	Br	65.4	-0.6	0.1	-0.6
8	Wh/O	59.4	-0.7	-0.2	0.1
8	O	63.7	-0.2	0.3	0.1
8	Wh/G	58.4	-0.1	0.3	-0.2
8	Bl	62.9	-0.5	-0.2	-0.5
8	Wh/Bl	59.0	-0.2	0.2	-0.3
8	G	66.5	-0.5	-0.2	-0.5
8	Wh/Br	59.6	0.0	0.0	-1.1
8	Br	65.0	-0.3	0.1	-1.0
9	Wh/O	59.8	-0.5	0.7	-0.1
9	O	65.9	-0.7	0.4	-0.6
9	Wh/G	60.5	-0.4	0.7	-0.9
9	Bl	63.4	-0.3	0.5	-0.6
9	Wh/Bl	58.5	-0.4	0.6	-0.3
9	G	64.9	-0.8	0.1	-0.4
9	Wh/Br	60.2	-1.0	0.3	0.6
9	Br	66.9	-0.7	0.0	-1.0
10	Wh/O	60.9	-0.2	-0.1	-0.5
10	O	65.2	-0.2	0.5	-0.1
10	Wh/G	61.1	-0.7	-0.6	-1.1
10	Bl	63.7	-0.3	0.3	-0.6
10	Wh/Bl	60.6	-0.3	0.2	-0.2
10	G	64.8	-0.7	0.0	-1.1
10	Wh/Br	61.7	-1.1	0.1	-0.6
10	Br	66.0	-0.2	0.8	-0.3

GAS TIGHT:

	mOhm values	Actual	Delta
Board	Position	Initial	Gas Tight
1	Wh/O	60.5	-0.2
1	O	66.5	-0.3
1	Wh/G	59.7	-0.1
1	Bl	64.0	0.1
1	Wh/Bl	60.7	-0.2
1	G	66.0	0.0
1	Wh/Br	61.2	0.0
1	Br	64.8	0.0
2	Wh/O	61.7	1.2
2	O	65.8	0.5
2	Wh/G	60.9	0.6
2	Bl	64.2	0.7
2	Wh/Bl	60.1	0.7
2	G	63.9	0.7
2	Wh/Br	60.6	0.2
2	Br	66.6	0.5
3	Wh/O	61.1	0.3
3	O	65.6	0.3
3	Wh/G	59.7	0.1
3	Bl	65.3	-0.4
3	Wh/Bl	59.8	-0.1
3	G	65.7	0.2
3	Wh/Br	60.8	0.4
3	Br	65.5	0.3
4	Wh/O	62.3	-0.1
4	O	67.7	0.2
4	Wh/G	60.2	0.0
4	Bl	64.1	0.2
4	Wh/Bl	60.9	0.3
4	G	65.2	-0.2
4	Wh/Br	61.0	0.2
4	Br	66.1	0.1
5	Wh/O	60.6	0.5
5	O	66.0	0.1
5	Wh/G	60.1	4.1
5	Bl	63.7	0.2
5	Wh/Bl	60.4	1.2
5	G	66.3	0.0
5	Wh/Br	60.1	-0.1
5	Br	64.9	0.1
6	Wh/O	59.9	0.7
6	O	66.7	0.8
6	Wh/G	59.9	0.4

6	Bl	64.5	0.1
6	Wh/Bl	59.6	0.1
6	G	65.5	0.0
6	Wh/Br	61.2	0.3
6	Br	66.5	0.3
7	Wh/O	61.6	0.9
7	O	66.6	0.1
7	Wh/G	60.2	0.5
7	Bl	64.6	0.5
7	Wh/Bl	60.6	0.9
7	G	66.8	0.2
7	Wh/Br	61.0	0.0
7	Br	63.8	0.1
8	Wh/O	61.0	0.5
8	O	66.5	0.4
8	Wh/G	60.1	0.1
8	Bl	64.5	0.7
8	Wh/Bl	60.1	0.6
8	G	65.2	0.4
8	Wh/Br	60.2	0.5
8	Br	64.5	0.6
9	Wh/O	61.8	0.7
9	O	67.6	0.1
9	Wh/G	60.0	0.1
9	Bl	63.5	0.3
9	Wh/Bl	60.4	0.3
9	G	65.1	0.4
9	Wh/Br	60.6	-0.4
9	Br	64.8	0.0
10	Wh/O	61.6	0.4
10	O	66.4	0.6
10	Wh/G	60.1	-0.1
10	Bl	64.7	0.5
10	Wh/Bl	61.3	0.0
10	G	66.1	0.2
10	Wh/Br	61.2	0.5
10	Br	65.6	0.1

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: MO-01
Description: Micro-Ohmeter
Manufacturer: Keithley
Model: 580
Serial #: 0772740
Accuracy: See Manual
… Last Cal: 06/16/09, Next Cal: 06/16/2010

Equipment #: MO-03
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0791975
Accuracy: See Manual
… Last Cal: 06/16/09, Next Cal: 06/16/2010

Equipment #: MO-06
Description: Micro-Ohmeter
Manufacturer: Keithley
Model: 580
Serial #: 1110525
Accuracy: See Manual
… Last Cal: 06/16/2009, Next Cal: 06/16/2010

Equipment #: MO-07
Description: Multimeter / Data Acquistion System
Manufacturer: Keithley
Model: 2700
Serial #: 1116559
Accuracy: See Manual
… Last Cal: 6/16/2009, Next Cal: 6/16/2010

Equipment #: TCT-04
Description: Dillon Quantrol TC21 25-1000 mm/min series test stand
Manufacturer: Dillon Quantrol
Model: TC2 I series test stand
Serial #: 04-1041-04
Accuracy: Speed Accuracy: +/- 5% of indicated speed; Speed Accuracy: +/- 5% of indicated speed;
… Last Cal: 5/12/2009, Next Cal: 5/12/2010

Equipment #: THC-02
Description: Temperature/Humidity Chamber
Manufacturer: Thermotron
Model: SE-1000-6-6
Serial #: 31808
Accuracy: See Manual (SJR Unit #1)
… Last Cal: 9/21/2009, Next Cal: 9/21/2010

Equipment #: THC-03
Description: Temperture/Humidity Chamber (SJR Room - Unit #2)
Manufacturer: Thermotron
Model: SE-1000-10-10
Serial #: 37551
Accuracy: See Manual (For SJR Testing) See Manual (For SJR Testing)
… Last Cal: 08/19/2008, Next Cal: 08/19/2009

Equipment #: THC-04
Description: Temperature/Humidity Chamber
Manufacturer: Thermotron
Model: SM-8-3800
Serial #: 37782
Accuracy: See Manual
… Last Cal: 04/07/2009, Next Cal: 04/07/2010

Equipment #: HPM-01
Description: Hipot Megommeter
Manufacturer: Hipotronics
Model: H306B-A
Serial #: M9905004
Accuracy: 2 % Full Scale Accuracy
… Last Cal: 11/24/08, Next Cal: 11/24/09

Equipment #: MO-04
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0798688
Accuracy: See Manual
… Last Cal: 04/06/09, Next Cal: 04/06/2010

Equipment #: RS-09
Description: Current Shunt
Manufacturer: Empro
Model: HA10050
Serial #: 0772740
Accuracy: +/- 0.25% of RDG
… Last Cal: 05/14/2009, Next Cal: 05/14/2010