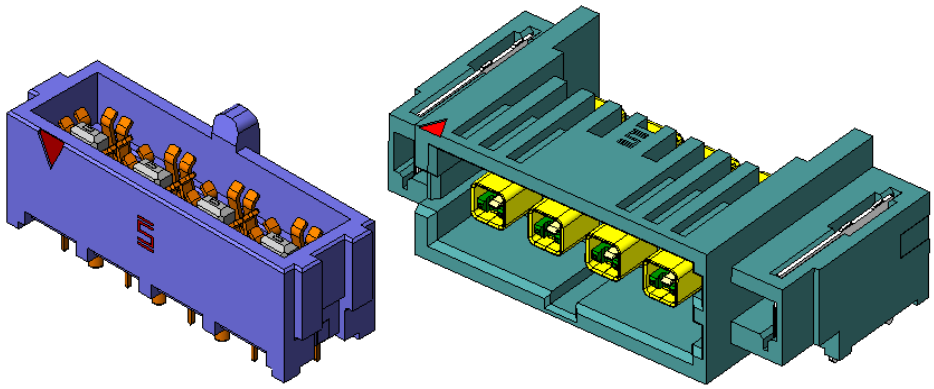
Project Number: Design Verification Test	Tracking Code: TC0920—2470_Report_Rev_1		
Requested by: Kevin Meredith	Date: 2/15/2010	Product Rev: 1	
Part #: IP5-08-01-L-S-RA1 / IJ5-08-05.0-L-S-1	Lot #: na	Tech: Rodney Riley Tony Wagoner Troy Cook	Eng: Eric Mings Mark Shireman
Part description: 50Ω Isolation Right Angle Connector Assembly		Qty to test: 70	
Test Start: 05/13/2009	Test Completed: 2/3/2010		



Design Verification Test Report

PART DESCRIPTION

IP5-08-01-L-S-RA1-TR
IJ5-08-05.0-L-S-1

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.

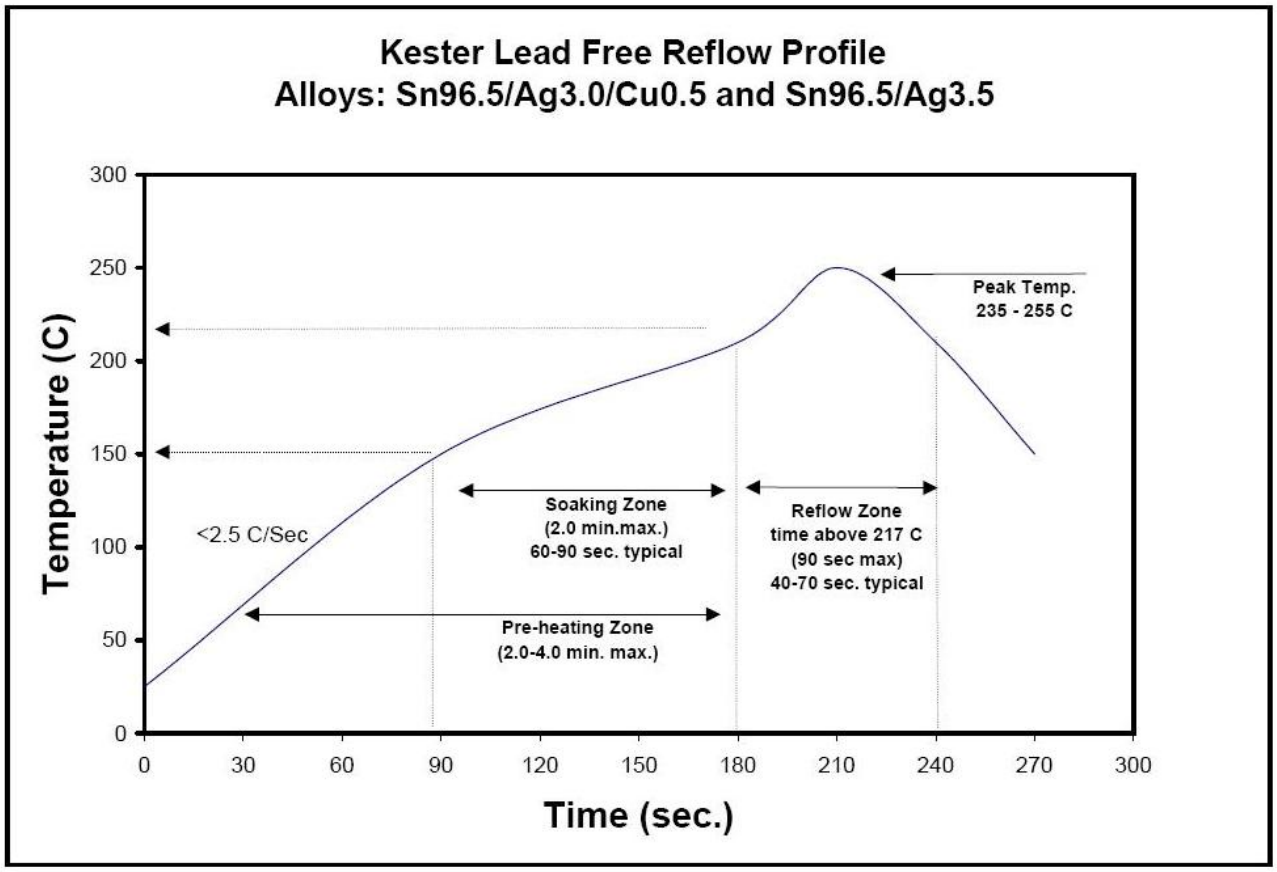
APPLICABLE DOCUMENTS

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.
8) Solder Information: Lead Free
9) Re-Flow Time/Temp: See accompanying profile.
10) Samtec Test PCBs used: PCB-101798-TST / PCB-101825-TST / PCB-102244-TST

TYPICAL OVEN PROFILE (Soldering Parts to Test Boards)



FLOWCHARTS

IR & DWV

TEST STEP	GROUP A1 2 Mated Sets Break Down - Pin to Ground	GROUP A2 2 Unmated of Part # Being Tested Break Down - Pin to Ground	GROUP A3 2 Unmated of Mating Part # Break Down - Pin to Ground	GROUP B 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)

*** - DWV on group B to be performed at Test Voltage**
DWV test voltage is equal to 75% of the lowest break down voltage from group A1, A2 or A3
Thermal Aging = EIA-364-17, Test Condition 4 (105 °C)
Time Condition 'B' (250 hours)
Humidity = EIA-364-31, Test Condition B (240 Hours)
and Method III (+25° C to +65° C @ 90%RH to 98% RH)
ambient pre-condition and delete steps 7a and 7b
IR = EIA-364-21
DWV = EIA-364-20, Test Condition 1

Gas Tight

TEST STEP	GROUP A Center Conductor & Shield 80 Points (min)
01	LLCR-1
02	Gas Tight
03	LLCR-2

Gas Tight = EIA-364-36
LLCR = EIA-364-23, LLCR
use Keithley 580 in the dry circuit mode, 10 mA Max

Current Carrying Capacity

TEST STEP	GROUP A1 3 Mated Assemblies Center Conductor 1 Contact Powered, Shield Grounded	GROUP A2 3 Mated Assemblies Center Conductor 2 Contacts Powered, Shields Grounded	GROUP A3 3 Mated Assemblies Center Conductor 3 Contacts Powered, Shields Grounded	GROUP A4 3 Mated Assemblies Center Conductor 4 Contacts Powered, Shields Grounded	GROUP A5 3 Mated Assemblies Center Conductor All Contacts Powered, Shields Grounded
01	CCC	CCC	CCC	CCC	CCC

TEST STEP	GROUP B1 3 Mated Assemblies 1 Shield Powered, Center Conductor Grounded	GROUP B2 3 Mated Assemblies 2 Shields Powered, Center Conductor Grounded	GROUP B3 3 Mated Assemblies 3 Shields Powered, Center Conductor Grounded	GROUP B4 3 Mated Assemblies 4 Shields Powered, Center Conductor Grounded	GROUP B5 3 Mated Assemblies All Shields Powered, Center Conductor Grounded
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

Durability/Thermal Age/Cyclic Humidity

TEST STEP	GROUP A 80 Points Min 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 4, 105 deg C;
Time Condition 'B' (250 hours)
Humidity =EIA-364-31, Test Condition B (240 Hours)
and Method III (+25 ° C to +65 ° C @ 90%RH to 98% RH)
ambient pre-condition and delete steps 7a and 7b
LLCR = EIA-364-23, LLCR
use Keithley 580 in the dry circuit mode, 10 mA Max

Mating / Unmating

TEST STEP	GROUP 1A 10 Boards (2 Position)	GROUP 2A 4 Boards (8 Position)
01	Mating / Unmating	Mating / Unmating
02	25 Cycles	25 Cycles
03	Clean w/Compressed Air	Clean w/Compressed Air
04	Mating / Unmating	Mating / Unmating
05	25 Cycles (50 Total)	25 Cycles (50 Total)
06	Clean w/Compressed Air	Clean w/Compressed Air
07	Mating / Unmating	Mating / Unmating
08	25 Cycles (75 Total)	25 Cycles (75 Total)
09	Clean w/Compressed Air	Clean w/Compressed Air
10	Mating / Unmating	Mating / Unmating
11	25 Cycles (100 Total)	25 Cycles (100 Total)
12	Mating / Unmating	Mating / Unmating

Thermal Aging = EIA-364-17, Test Condition 4 (105 °C)
Time Condition 'B' (250 hours)
Humidity = EIA-364-31, Test Condition B (240 Hours)
and Method III (+25 °C to +65 °C @ 90%RH to 98% RH)
ambient pre-condition and delete steps 7a and 7b
Mating/Un-Mating Forces = EIA-364-13

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 4 at 105° C.
3) Test Time Condition B for 250 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 B, 240 Hours.
3) Method III, +25° C to + 65° C, 90% to 98% Relative Humidity excluding sub-cycles 7a and 7b.
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.

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.

RESULTS

Temperature Rise, CCC at a 20% de-rating - SIGNALS

- **CCC for a 30°C Temperature Rise----------2.8A per contact with 1 contact powered**
- **CCC for a 30°C Temperature Rise----------2.3A per contact with 2 adjacent contacts powered**
- **CCC for a 30°C Temperature Rise----------2.1A per contact with 3 adjacent contacts powered**
- **CCC for a 30°C Temperature Rise----------2.0A per contact with 4 adjacent contacts powered**
- **CCC for a 30°C Temperature Rise----------1.7A per contact with 8 (all) adjacent contacts powered**

Temperature Rise, CCC at a 20% de-rating - GROUNDS

- **CCC for a 30°C Temperature Rise----------5.4A per ground with 1 ground powered**
- **CCC for a 30°C Temperature Rise----------5.1A per ground with 2 adjacent grounds powered**
- **CCC for a 30°C Temperature Rise----------4.6A per ground with 3 adjacent grounds powered**
- **CCC for a 30°C Temperature Rise----------4.3A per ground with 4 adjacent grounds powered**
- **CCC for a 30°C Temperature Rise----------4.1A per ground with 8 (all) adjacent grounds powered**

Mating / Unmating Forces – 2 Position

- **Initial**
  - **Mating**
    - **Min ---------- 3.78 Lbs**
    - **Max---------- 5.66 Lbs**
  - **Unmating**
    - **Min ---------- 3.12 Lbs**
    - **Max---------- 5.49 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 2.82 Lbs**
    - **Max---------- 5.36 Lbs**
  - **Unmating**
    - **Min ---------- 2.22 Lbs**
    - **Max---------- 4.80 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 2.68 Lbs**
    - **Max---------- 5.40 Lbs**
  - **Unmating**
    - **Min ---------- 1.82 Lbs**
    - **Max---------- 3.74 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ---------- 2.17 Lbs**
    - **Max---------- 5.00 Lbs**
  - **Unmating**
    - **Min ---------- 1.76 Lbs**
    - **Max---------- 3.54 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ---------- 2.06 Lbs**
    - **Max---------- 4.01 Lbs**
  - **Unmating**
    - **Min ---------- 1.55 Lbs**
    - **Max---------- 3.01 Lbs**

Mating / Unmating Forces – 8 Position

- **Initial**
  - **Mating**
    - **Min ----------17.61 Lbs**
    - **Max----------19.74 Lbs**
  - **Unmating**
    - **Min ----------16.59 Lbs**
    - **Max----------19.64 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ----------14.81 Lbs**
    - **Max----------17.24 Lbs**
  - **Unmating**
    - **Min ----------14.45 Lbs**
    - **Max----------17.83 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ----------10.97 Lbs**
    - **Max----------15.45 Lbs**
  - **Unmating**
    - **Min ----------11.90 Lbs**
    - **Max----------15.58 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ----------10.12 Lbs**
    - **Max----------14.24 Lbs**
  - **Unmating**
    - **Min ----------10.35 Lbs**
    - **Max----------14.19 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ---------- 9.86 Lbs**
    - **Max----------14.30 Lbs**
  - **Unmating**
    - **Min ---------- 9.59 Lbs**
    - **Max----------12.93 Lbs**

Insulation Resistance minimums, IR

- **Initial**
  - **Mated---------- 25,000 Meg Ω ---------- Pass**
  - **Unmated ---------- 30,000 Meg Ω ---------- Pass**
- **Thermal**
  - **Mated----------100,000 Meg Ω ---------- Pass**
  - **Unmated ----------100,000 Meg Ω ---------- Pass**
- **Humidity**
  - **Mated----------100,000 Meg Ω ---------- Pass**
  - **Unmated ----------100,000 Meg Ω ---------- Pass**

Dielectric Withstanding Voltage minimums, DWV

- **Minimums**
  - **Breakdown Voltage----------760 VAC**
  - **Test Voltage ----------570 VAC**
  - **Working Voltage ----------190 VAC**
- **Initial DWV ----------Passed**
- **Thermal DWV----------Passed**
- **Humidity DWV----------Passed**

LLCR Durability – Signal & Ground (120 LLCR test points)

- **Initial – Signal ---------- 21.9 mOhms Max**
- **Initial – Ground ----------5.5 mOhms Max**
- **Durability, 100 Cycles**
  - **<= +5.0 mOhms ----------120 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 ----------117 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ----------3 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 ----------118 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ----------2 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 – Signal & Ground (144 LLCR test points)

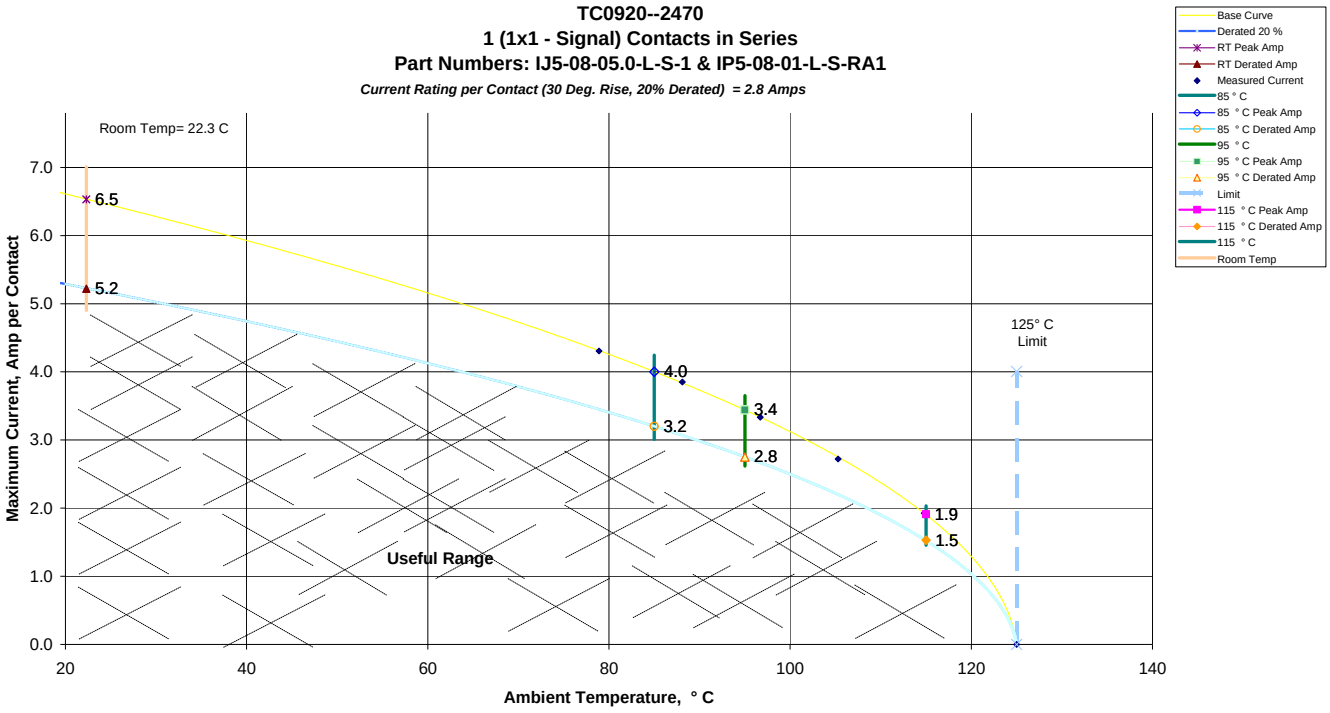
- **Initial – Signal ---------- 22.9 mOhms Max**
- **Initial – Ground ----------5.7 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ----------144 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**

DATA SUMMARIES

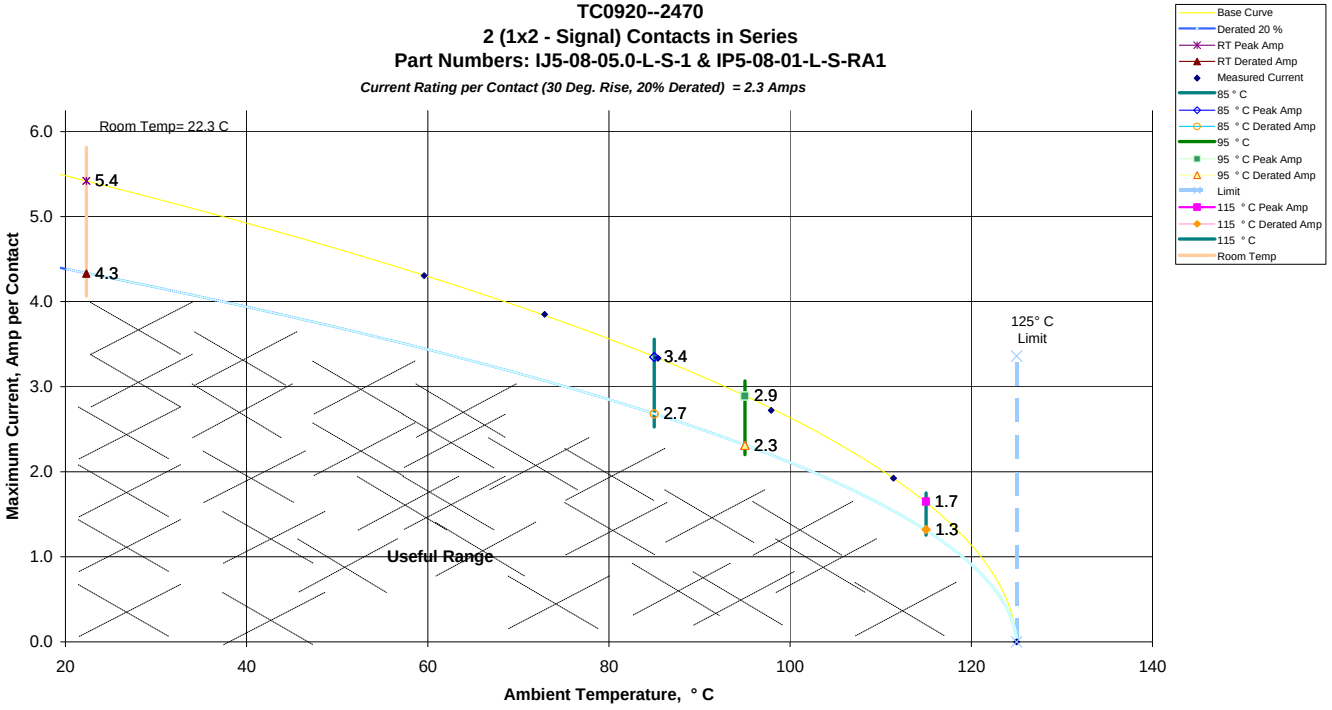
TEMPERATURE RISE (Current Carrying Capacity, CCC) - SIGNALS:

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:

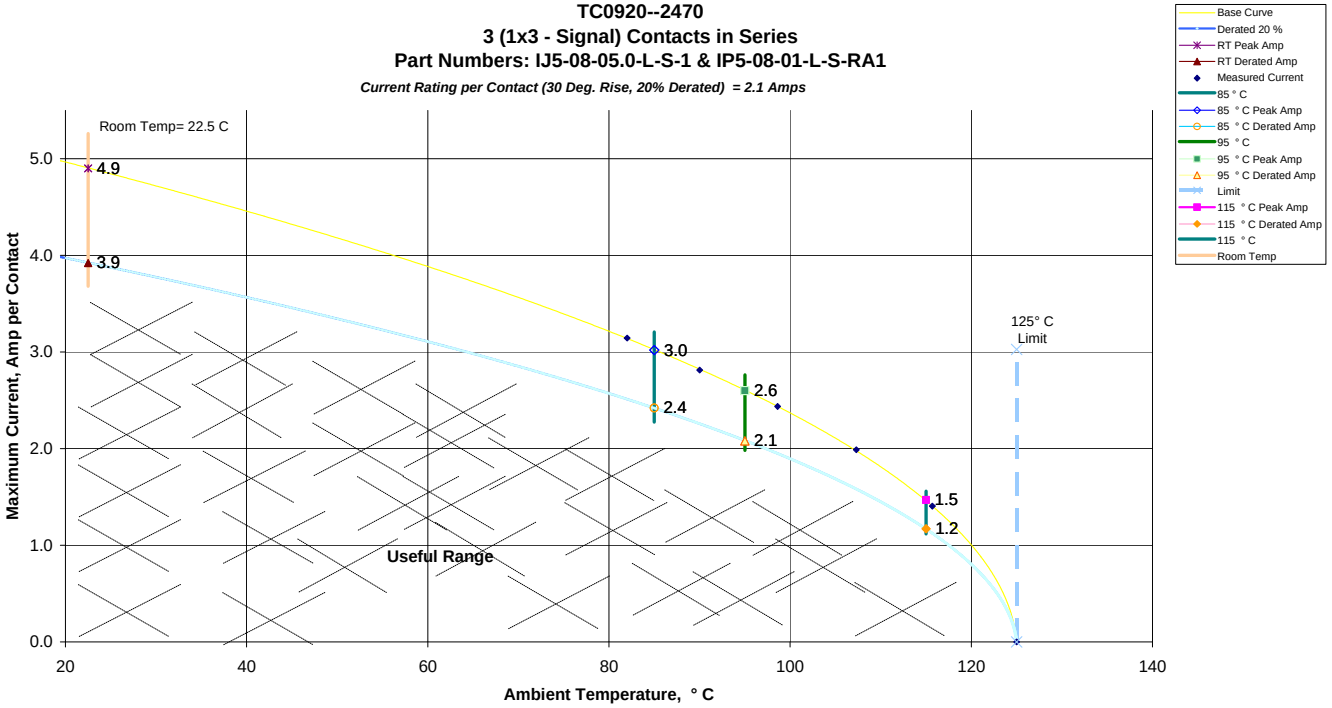
    a. Linear configuration with 1 conductor/contact powered



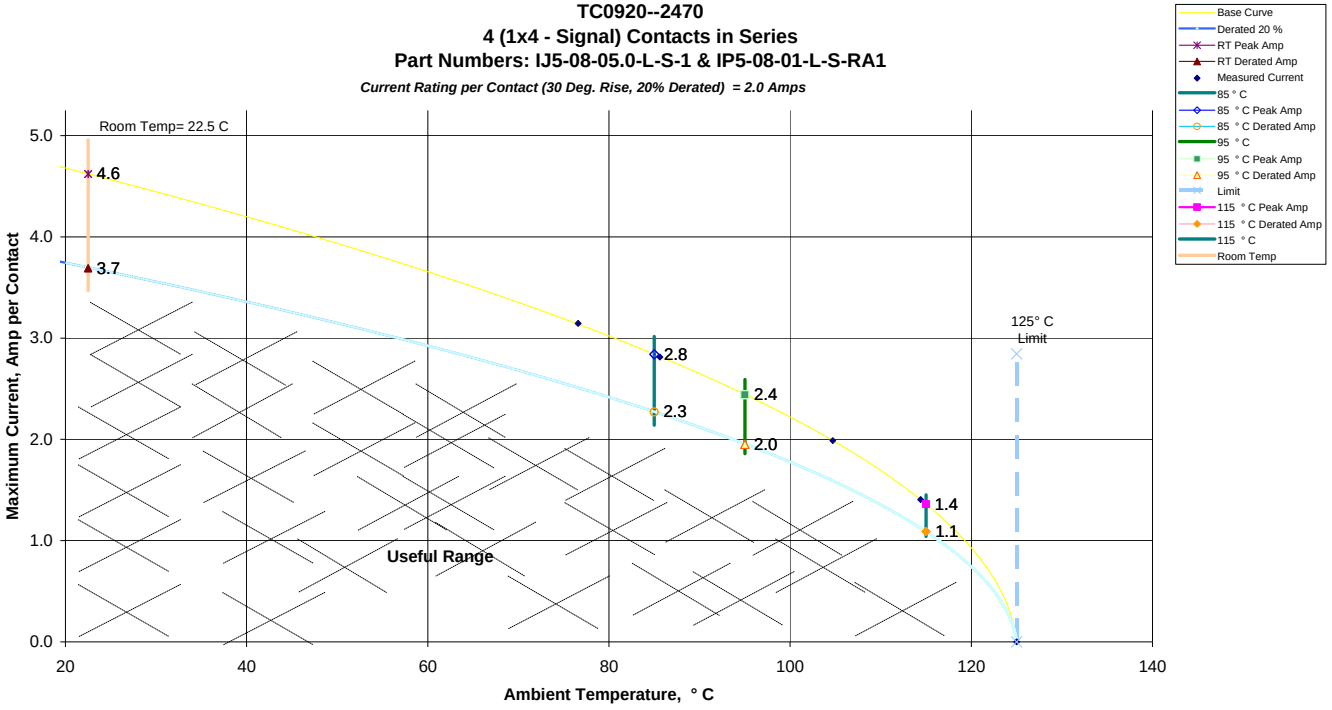
b. Linear configuration with 2 adjacent conductors/contacts powered



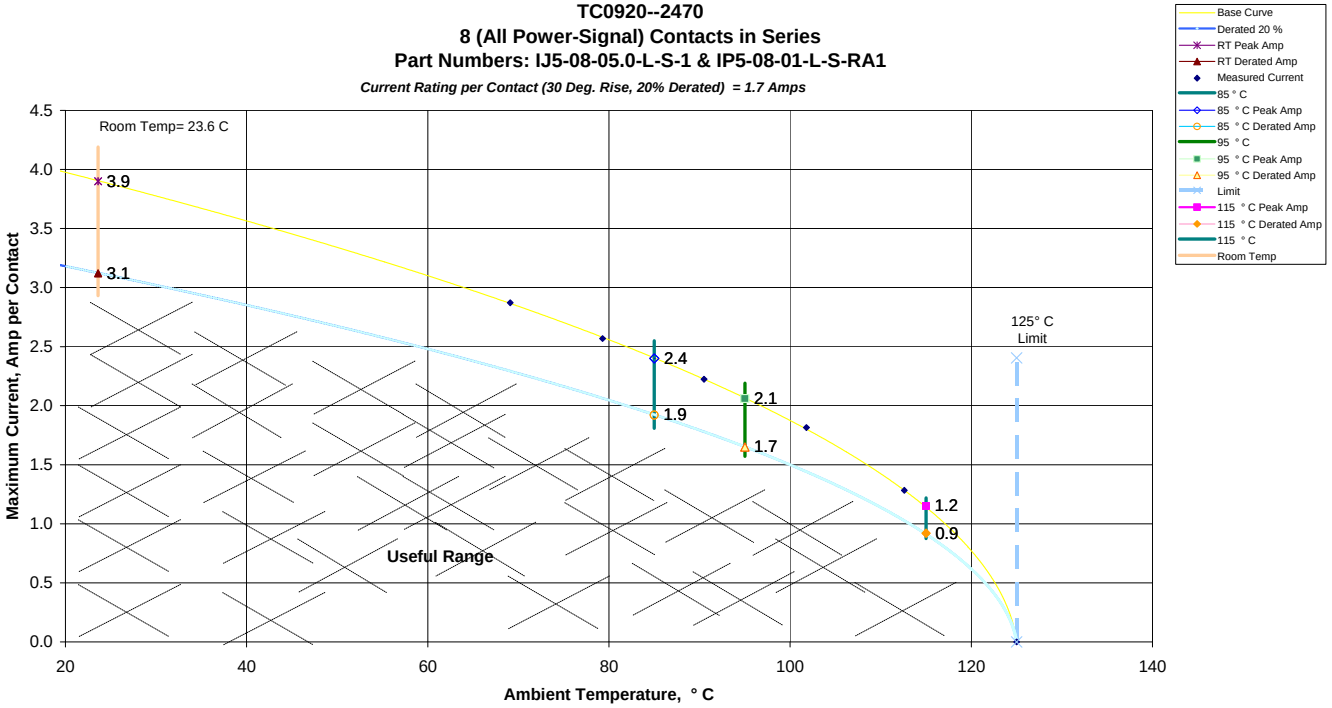
c. Linear configuration with 3 adjacent conductors/contacts powered



d. Linear configuration with 4 adjacent conductors/contacts powered



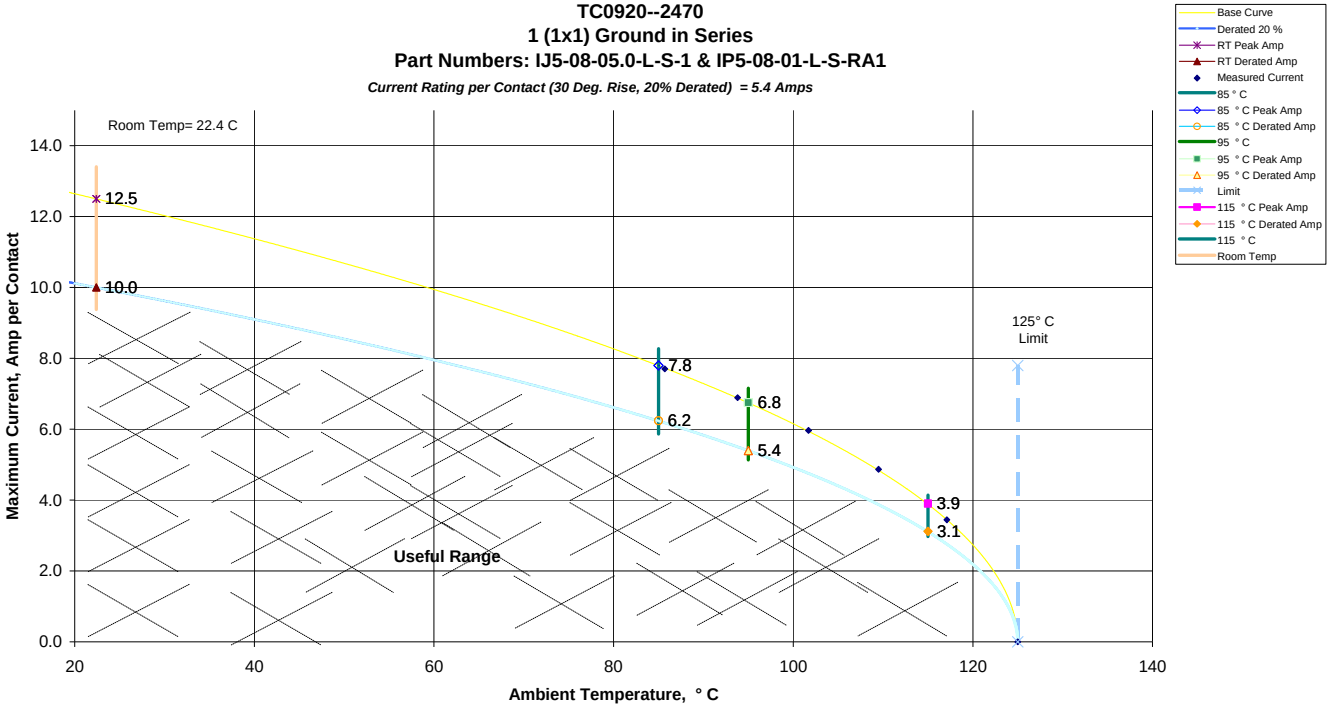
e. Linear configuration with 8 (all) adjacent conductors/contacts powered



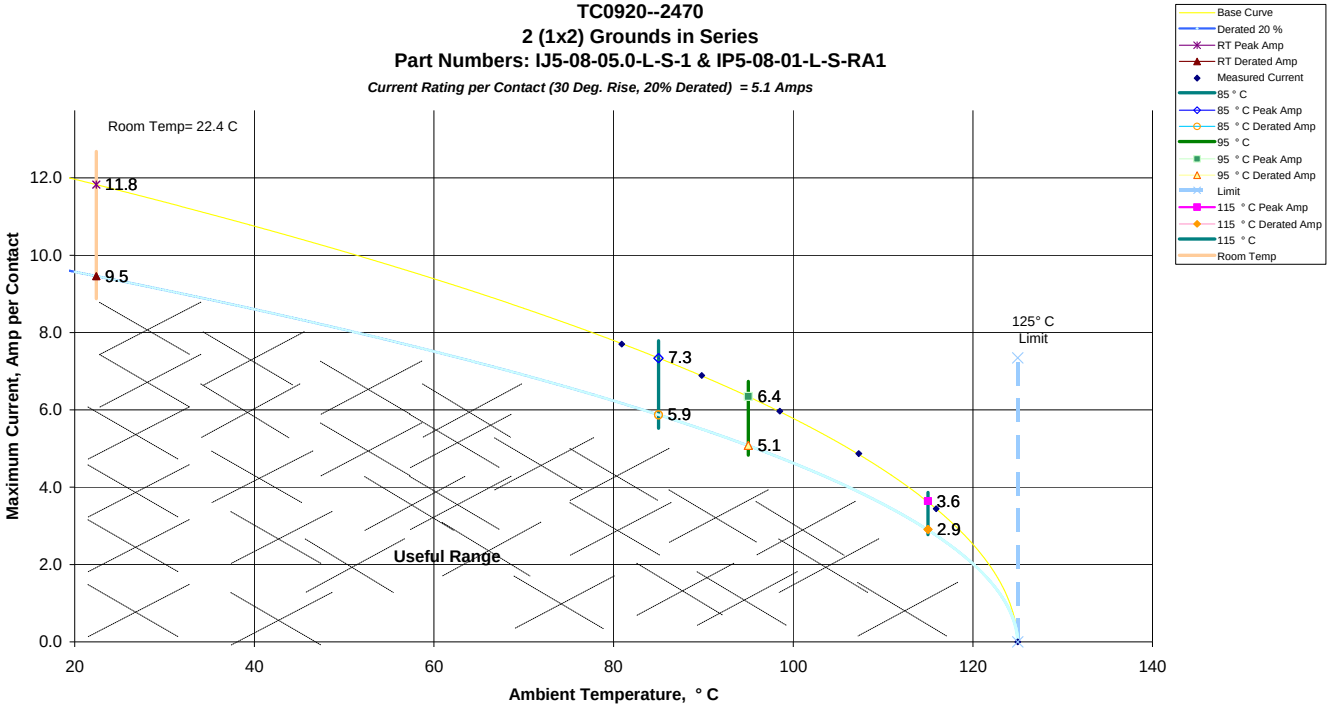
TEMPERATURE RISE (Current Carrying Capacity, CCC) - GROUNDS:

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:

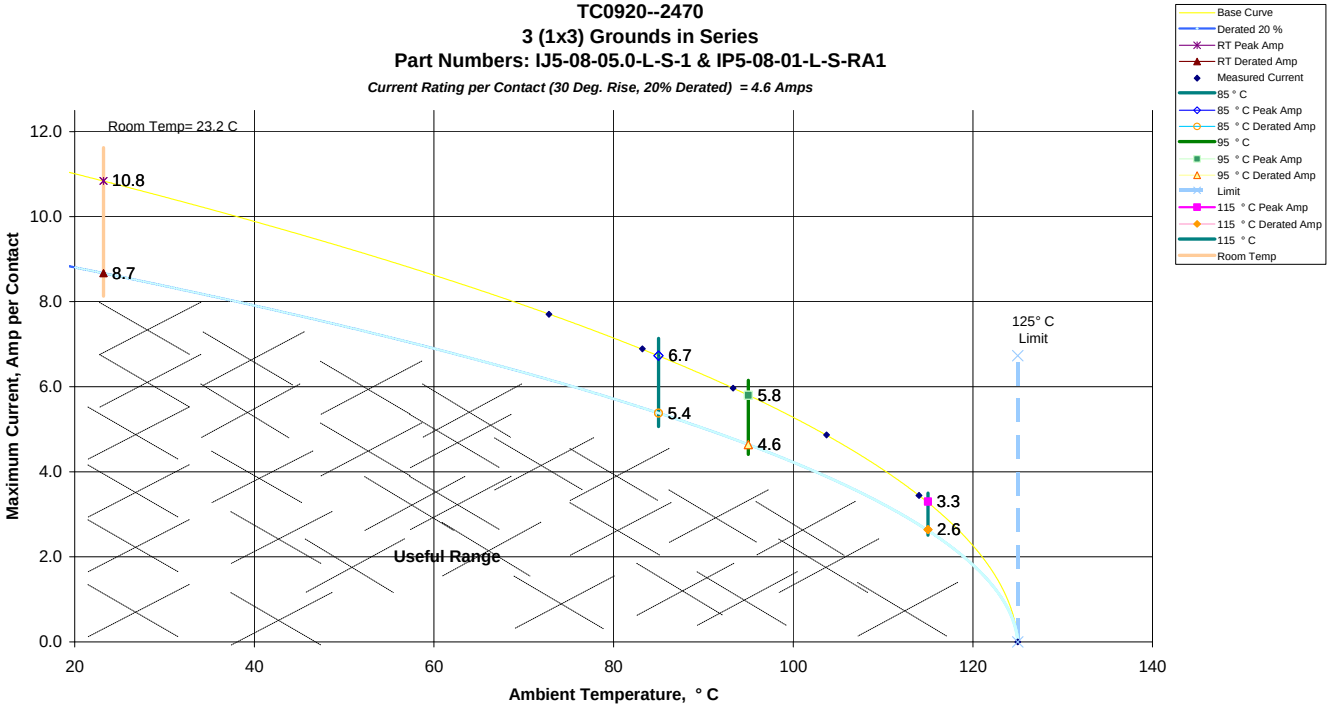
    a. Linear configuration with 1 ground powered



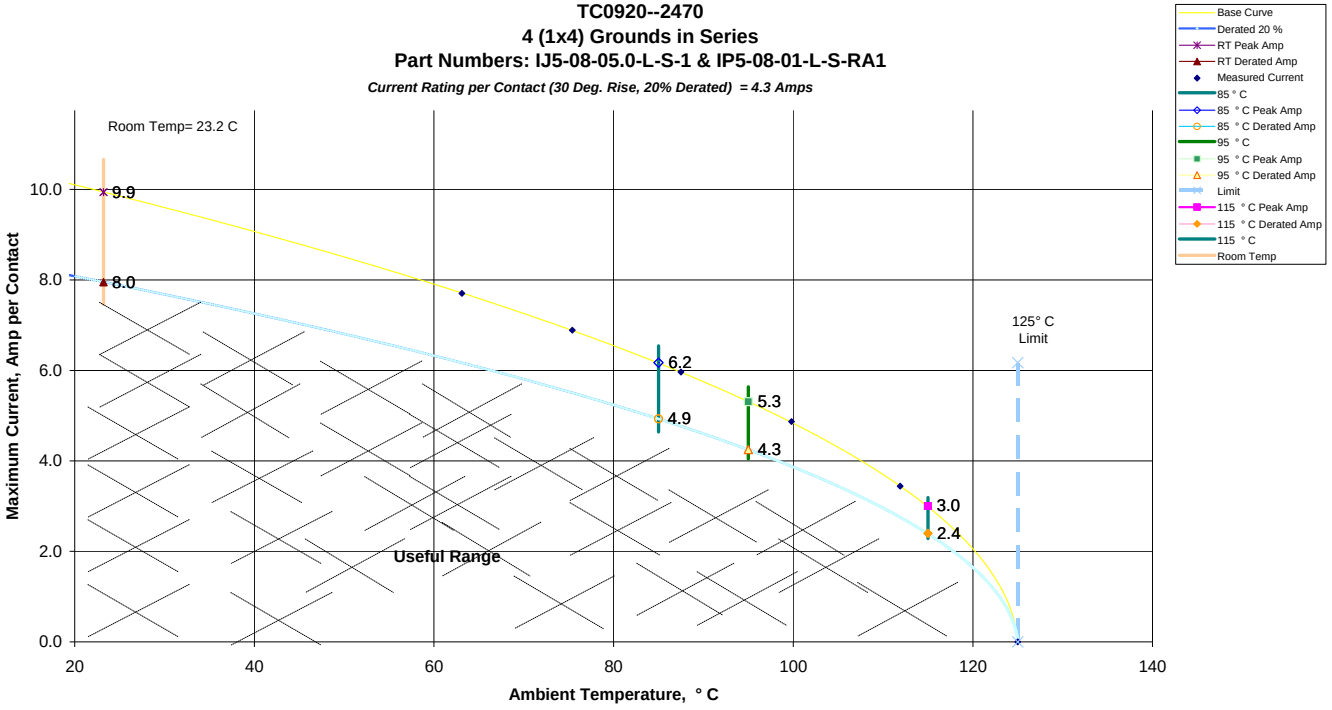
b. Linear configuration with 2 adjacent grounds powered



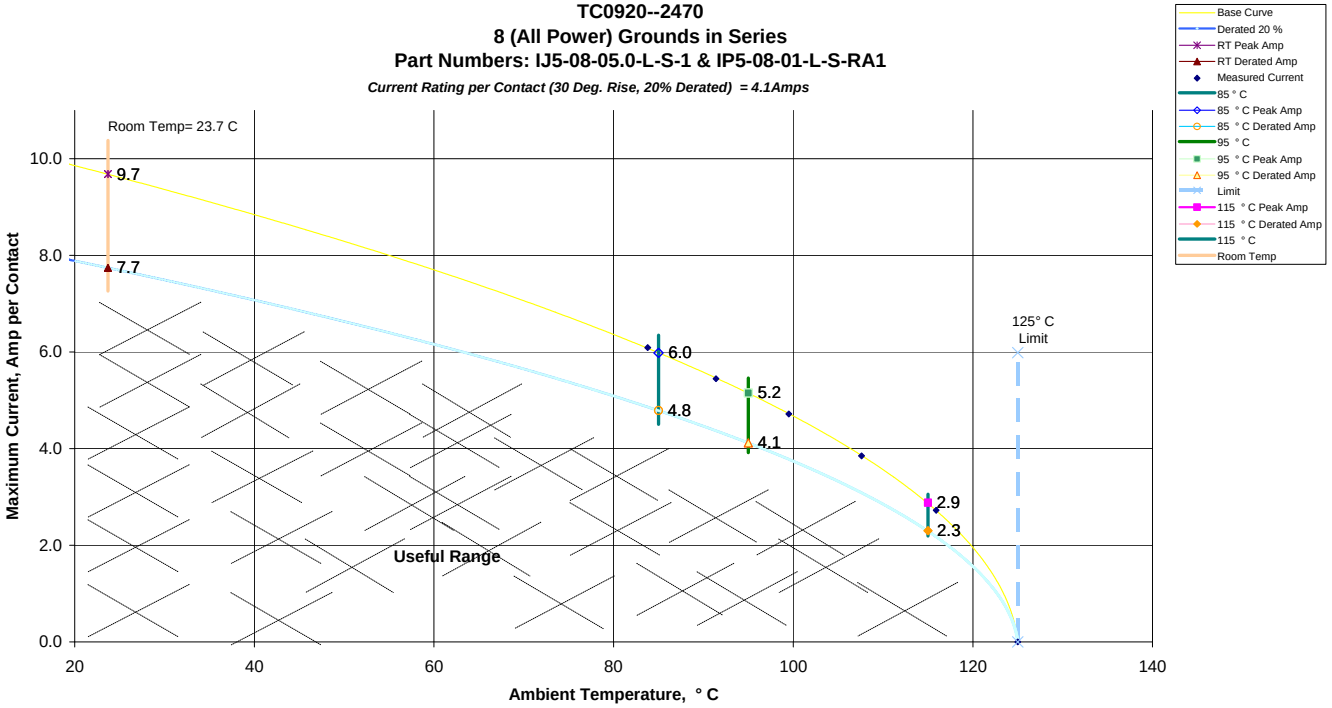
c. Linear configuration with 3 adjacent grounds powered



d. Linear configuration with 4 adjacent grounds powered



e. Linear configuration with 8 (all) adjacent grounds powered



MATING/UNMATING – 2 Position:

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	16.80	3.78	13.89	3.12	12.53	2.82	9.88	2.22
Maximum	25.19	5.66	24.40	5.49	23.82	5.36	21.35	4.80
Average	21.06	**4.74**	17.31	**3.89**	18.28	**4.11**	13.59	**3.06**
St Dev	2.92	0.66	3.49	0.79	3.47	0.78	3.42	0.77
Count	10	10	10	10	10	10	10	10

	After 50 Cycles				After 75 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	11.91	2.68	8.10	1.82	9.64	2.17	7.85	1.76
Maximum	24.01	5.40	16.64	3.74	22.25	5.00	15.72	3.54
Average	16.76	**3.77**	11.21	**2.52**	14.99	**3.37**	10.18	**2.29**
St Dev	3.27	0.73	2.66	0.60	3.88	0.87	2.63	0.59
Count	10	10	10	10	10	10	10	10

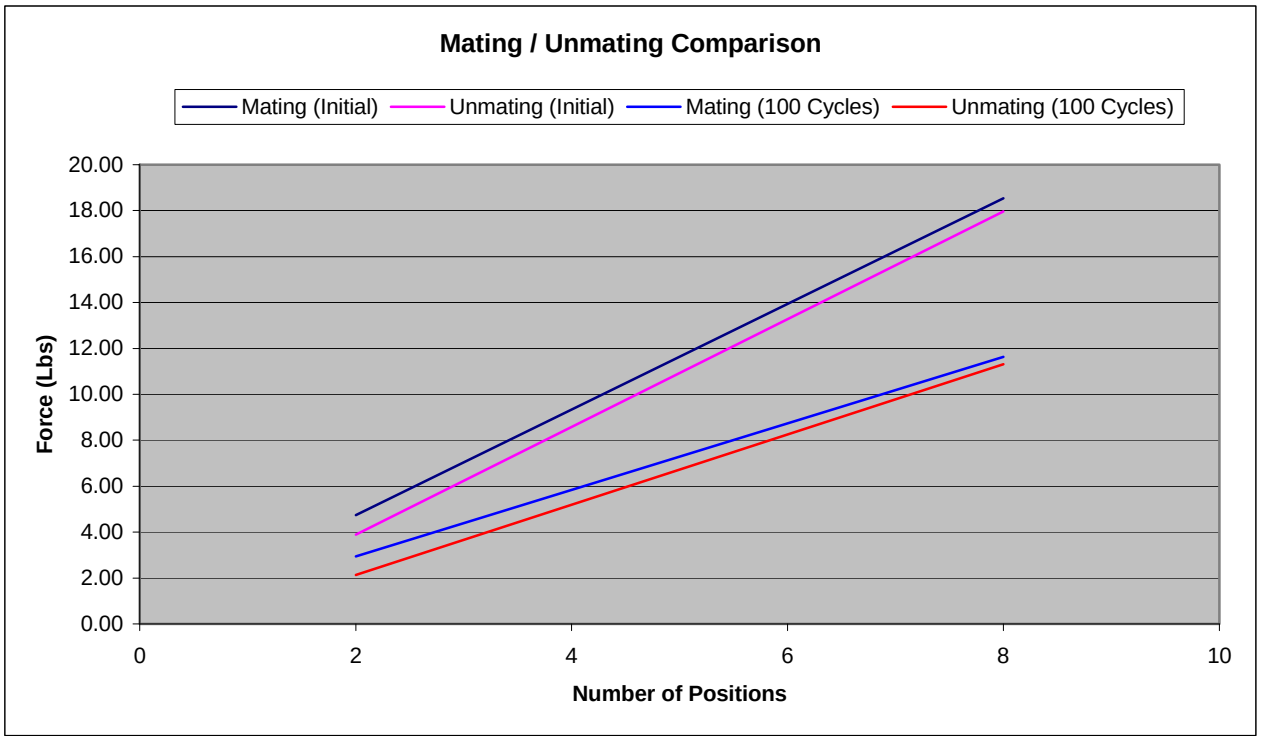
	After 100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	9.17	2.06	6.89	1.55
Maximum	17.82	4.01	13.39	3.01
Average	13.06	**2.94**	9.47	**2.13**
St Dev	2.76	0.62	2.03	0.46
Count	10	10	10	10

MATING/UNMATING – 8 Position:

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	78.33	17.61	73.81	16.59	65.88	14.81	64.26	14.45
Maximum	87.81	19.74	87.35	19.64	76.69	17.24	79.30	17.83
Average	82.43	**18.53**	79.89	**17.96**	71.86	**16.16**	71.89	**16.16**
St Dev	4.55	1.02	7.03	1.58	4.47	1.00	7.87	1.77
Count	4	4	4	4	4	4	4	4

	After 50 Cycles				After 75 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	48.80	10.97	52.95	11.90	44.99	10.12	46.04	10.35
Maximum	68.73	15.45	69.32	15.58	63.32	14.24	63.10	14.19
Average	59.08	**13.28**	60.93	**13.70**	52.66	**11.84**	53.11	**11.94**
St Dev	8.17	1.84	8.06	1.81	8.14	1.83	8.11	1.82
Count	4	4	4	4	4	4	4	4

	After 100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	43.84	9.86	42.67	9.59
Maximum	63.61	14.30	57.52	12.93
Average	51.71	**11.63**	50.33	**11.31**
St Dev	9.17	2.06	7.88	1.77
Count	4	4	4	4



INSULATION RESISTANCE (IR):

	Pin to Ground		
	Mated	Unmated	Unmated
Minimum	**IP5/IJ5**	**IP5**	**IJ5**
Initial	25000	30000	Not Tested
Thermal	100000	100000	Not Tested
Humidity	100000	100000	Not Tested

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	**IP5/IJ5**
Break Down Voltage	760
Test Voltage	570
Working Voltage	190

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

LLCR:

1) A total of 120 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

	SIGNALS			
Date	12/2/2009	12/3/2009	12/15/2009	12/29/2009
Room Temp C	22	22.7	22	20
RH	28%	30%	29%	20%
Name	Rodney Riley	Rodney Riley	Tony Wagoner	Rodney Riley
mOhm values	**Actual Initial**	**Delta 100 Cycles**	**Delta Thermal**	**Delta Humidity**
Average	19.7	0.2	0.9	-0.2
St. Dev.	0.7	0.8	1.9	0.8
Min	18.5	-2.2	-1.6	-2.1
Max	21.9	3.5	9.6	4.0
Count	60	60	60	60

	GROUNDS			
Date	12/2/2009	12/3/2009	12/15/2009	12/29/2009
Room Temp C	22	22.7	22	20
RH	28%	30%	29%	20%
Name	Rodney Riley	Rodney Riley	Tony Wagoner	Rodney Riley
mOhm values	**Actual Initial**	**Delta 100 Cycles**	**Delta Thermal**	**Delta Humidity**
Average	4.2	0.4	0.6	1.6
St. Dev.	0.6	0.3	0.6	1.7
Min	3.1	0.1	0.2	0.3
Max	5.5	1.6	3.6	9.3
Count	60	60	60	60

GAS TIGHT:

1) A total of 144 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

	SIGNALS	
Date	12/2/2009	12/2/2009
Room Temp C	21	23
RH	28%	28%
Name	Rodney Riley	Rodney Riley
mOhm values	**Actual Initial**	**Delta Gas Tight**
Average	20.2	0.1
St. Dev.	0.9	0.3
Min	18.7	-1.3
Max	22.9	1.7
Count	72	72

	GROUNDS	
Date	12/2/2009	12/2/2009
Room Temp C	21	23
RH	28%	28%
Name	Rodney Riley	Rodney Riley
mOhm values	**Actual Initial**	**Delta Gas Tight**
Average	4.3	0.0
St. Dev.	0.5	0.0
Min	3.3	0.0
Max	5.7	0.1
Count	72	72

DATA

MATING / UNMATING – 2 Position:

	Initial		After 25 Cycles		After 50 Cycles		After 75 Cycles		After 100 Cycles	
Sample#	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating
1	3.90	3.12	2.82	2.22	2.68	2.10	2.17	1.82	2.17	1.81
2	5.66	4.27	3.92	2.92	3.27	2.57	2.91	2.36	2.82	2.30
3	4.63	5.49	4.13	4.80	3.16	3.74	4.17	3.54	2.53	3.01
4	4.64	4.13	5.36	3.84	3.84	3.34	3.24	3.13	2.82	2.67
5	4.36	3.23	4.04	2.54	3.84	2.27	3.50	2.02	3.55	1.85
6	5.39	4.18	4.45	2.97	4.25	2.18	2.77	2.10	2.69	2.01
7	5.46	3.66	3.66	2.77	3.81	2.33	3.56	2.05	3.38	2.15
8	4.39	3.12	3.69	2.62	3.99	1.82	2.36	1.76	2.06	1.55
9	3.78	3.13	3.69	2.51	3.44	2.13	4.03	1.81	3.34	1.65
10	5.15	4.58	5.35	3.37	5.40	2.72	5.00	2.30	4.01	2.28

MATING / UNMATING – 8 Position:

	Initial		After 25 Cycles		After 50 Cycles		After 75 Cycles		After 100 Cycles	
Sample#	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating
3	19.01	16.59	16.23	14.83	10.97	11.90	10.12	10.35	10.16	9.98
4	17.61	16.63	14.81	14.45	13.18	12.41	10.76	10.56	9.86	9.59
5	19.74	19.64	17.24	17.83	13.53	14.89	12.24	12.66	12.18	12.93
6	17.76	18.98	16.34	17.54	15.45	15.58	14.24	14.19	14.30	12.75

INSULATION RESISTANCE (IR):

Initial Insulation Resistance
Measured In Meg Ohms

	Pin to Ground		
	Mated	Unmated	
	x	x	
Sample#	IP5/IJ5	IP5	IJ5
1	40,000	50,000	
2	25,000	30,000	

Thermal Insulation Resistance
Measured In Meg Ohms

	Pin to Ground		
	Mated	Unmated	
	x	x	
Sample#	IP5/IJ5	IP5	IJ5
1	100000	100000	
2	100000	100000	

Humidity Insulation Resistance
Measured In Meg Ohms

	Pin to Ground		
	Mated	Unmated	
	x	x	
Sample#	IP5/IJ5	IP5	IJ5
1	100000	100000	
2	100000	100000	

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Initial DWV
Test Voltage= 570

	Pin to Ground		
	Mated	Unmated	
Sample#	IP5/IJ5	IP5	IJ5
1	570	570	
2	570	570	

Thermal Test Voltage
Test Voltage= 570

	Pin to Ground		
	Mated	Unmated	
Sample#	IP5/IJ5	IP5	IJ5
1	570	570	
2	570	570	

Humidity Test Voltage
Test Voltage= 570

	Pin to Ground		
	Mated	Unmated	
Sample#	IP5/IJ5	IP5	IJ5
1	570	570	
2	570	570	

LLCR - SIGNALS:

Board	mOhm values Position	Actual Initial	Delta 100 Cycles	Delta Thermal	Delta Humidity
1	P2	19.0	0.3	0.9	0.3
1	P4	19.9	1.0	7.9	1.0
1	P5	20.0	0.7	9.6	0.8
1	P7	20.0	0.3	0.1	-0.1
1	P9	20.2	0.5	1.2	0.3
1	P11	19.3	0.6	6.8	4.0
2	P2	19.0	0.2	0.5	-0.1
2	P4	20.4	0.9	0.5	-0.1
2	P5	19.5	0.1	0.1	-0.8
2	P7	20.0	0.5	0.5	-0.3
2	P9	19.2	0.4	-0.2	-0.5
2	P11	19.9	0.9	1.1	0.2
3	P2	19.0	0.6	0.6	0.6
3	P4	19.0	3.5	4.2	0.9
3	P5	20.6	2.8	2.0	0.1
3	P7	20.4	0.3	2.2	-0.3
3	P9	20.0	0.4	0.6	0.1
3	P11	19.7	1.1	1.1	-0.5
4	P2	19.9	-0.5	-0.4	-0.6
4	P4	19.4	-0.3	0.2	0.1
4	P5	19.3	-0.1	0.4	-0.5
4	P7	18.5	0.8	1.3	0.6
4	P9	19.3	0.8	0.9	-0.3
4	P11	19.0	0.0	0.8	-0.1
5	P2	19.8	-0.4	-0.3	-1.0
5	P4	19.7	0.2	-0.2	-0.7
5	P5	20.0	0.9	1.1	0.4
5	P7	19.8	-0.7	-0.7	-0.8
5	P9	19.9	-0.6	-0.1	-0.5
5	P11	20.9	-0.3	-0.4	-0.8
6	P2	19.9	0.6	0.2	-0.4
6	P4	19.9	-0.1	0.0	-0.6
6	P5	20.0	0.0	-0.2	-0.8
6	P7	20.1	-0.5	-0.1	-0.2
6	P9	21.0	-1.0	-0.9	-1.3
6	P11	21.3	-0.2	0.1	-0.5
7	P2	19.5	0.1	0.8	-0.5
7	P4	19.6	-0.4	0.2	0.1
7	P5	19.4	0.0	2.8	0.3
7	P7	19.9	-0.3	1.0	-0.2
7	P9	21.2	-2.2	-1.6	-2.1
7	P11	19.5	-0.7	0.0	-0.5
8	P2	19.1	1.1	0.7	-0.1

8	P4	19.1	0.3	0.3	-0.3
8	P5	19.4	0.4	0.9	-0.2
8	P7	19.3	-0.4	-0.1	-0.6
8	P9	19.4	0.0	0.8	0.0
8	P11	19.7	0.6	1.2	0.7
9	P2	20.8	0.0	0.2	-0.3
9	P4	21.9	-0.7	-0.5	-0.9
9	P5	19.2	0.3	0.2	-0.3
9	P7	18.9	-0.5	0.2	-0.7
9	P9	19.9	-0.4	-0.2	-1.0
9	P11	21.0	-1.0	-1.0	-1.3
12	P2	18.7	0.3	0.6	0.3
12	P4	19.1	-0.3	0.3	-0.8
12	P5	19.0	0.7	1.9	-0.1
12	P7	19.4	0.6	1.8	-0.1
12	P9	20.3	-0.6	-0.2	-0.3
12	P11	19.1	-0.3	0.1	-0.5

LLCR - GROUNDS:

	mOhm values	Actual	Delta	Delta	Delta
Board	Position	Initial	100 Cycles	Thermal	Humidity
1	P1	4.2	0.1	0.4	0.6
1	P3	4.7	0.3	0.4	0.5
1	P6	5.0	0.3	0.4	2.0
1	P8	3.8	0.3	0.4	1.1
1	P10	4.0	0.3	0.4	0.6
1	P12	3.8	0.3	0.3	0.5
2	P1	4.1	0.4	0.4	0.5
2	P3	4.5	0.4	0.3	0.3
2	P6	5.4	0.1	0.2	0.3
2	P8	3.5	0.2	0.3	0.5
2	P10	3.6	0.2	0.4	0.5
2	P12	4.2	0.3	0.4	0.6
3	P1	3.8	1.6	3.6	9.3
3	P3	4.0	1.1	2.3	4.0
3	P6	5.5	0.8	1.5	4.9
3	P8	4.3	0.8	1.4	6.9
3	P10	3.7	0.9	1.8	4.0
3	P12	3.6	0.8	1.6	2.3
4	P1	4.5	0.4	0.8	2.1
4	P3	4.0	0.4	0.6	1.0
4	P6	4.2	0.1	0.3	4.3
4	P8	3.7	0.3	0.4	2.3
4	P10	3.2	0.3	0.5	1.2
4	P12	3.7	0.3	0.5	1.1
5	P1	4.0	0.4	0.4	0.7

5	P3	4.8	0.2	0.2	0.4
5	P6	5.4	0.3	0.4	1.1
5	P8	4.1	0.4	0.6	0.8
5	P10	4.5	0.5	0.5	0.9
5	P12	4.1	0.6	0.5	0.9
6	P1	4.5	0.6	1.1	2.2
6	P3	4.7	0.3	0.4	1.0
6	P6	5.2	0.3	0.6	1.1
6	P8	3.8	0.4	0.6	0.9
6	P10	4.2	0.2	0.3	0.6
6	P12	4.2	0.2	0.3	0.5
7	P1	4.0	0.5	0.7	1.9
7	P3	3.8	0.3	0.4	1.1
7	P6	5.1	0.3	0.5	3.0
7	P8	3.8	0.3	0.5	2.3
7	P10	3.8	0.4	0.6	1.3
7	P12	3.8	0.3	0.3	1.1
8	P1	4.6	0.4	0.7	0.7
8	P3	4.8	0.4	0.6	0.5
8	P6	5.3	0.2	0.4	1.9
8	P8	4.1	0.5	0.6	1.0
8	P10	4.1	0.4	0.5	0.6
8	P12	4.1	0.4	0.7	0.6
9	P1	4.2	0.2	0.2	0.8
9	P3	4.6	0.2	0.2	0.5
9	P6	4.5	0.3	0.3	1.1
9	P8	3.6	0.2	0.2	0.8
9	P10	3.6	0.2	0.2	0.5
9	P12	3.9	0.2	0.2	0.7
12	P1	3.7	0.4	0.4	1.0
12	P3	4.4	0.3	0.4	1.1
12	P6	4.5	1.0	1.2	5.0
12	P8	3.1	0.4	0.7	2.0
12	P10	3.2	0.4	0.6	1.3
12	P12	3.7	0.2	0.3	0.8

GAS TIGHT - SIGNALS:

	mOhm values	Actual	Delta
Board	Position	Initial	Gas Tight
1	P2	20.3	0.4
1	P4	20.1	-0.1
1	P5	19.4	-0.3
1	P7	19.4	0.0
1	P9	21.0	0.1
1	P11	19.7	-0.1
2	P2	20.7	0.3
2	P4	21.1	0.2
2	P5	20.8	-0.3
2	P7	19.3	0.5
2	P9	19.7	0.0
2	P11	19.4	0.2
3	P2	18.8	0.2
3	P4	20.3	0.3
3	P5	19.4	0.2
3	P7	20.2	0.4
3	P9	22.1	0.4
3	P11	21.3	0.7
4	P2	20.2	0.0
4	P4	20.2	-0.1
4	P5	19.8	0.1
4	P7	20.9	-0.3
4	P9	20.5	-0.4
4	P11	22.2	-1.3
5	P2	20.1	0.2
5	P4	19.7	0.3
5	P5	20.0	0.4
5	P7	22.3	-0.4
5	P9	22.0	-0.1
5	P11	20.4	0.3
6	P2	21.3	1.7
6	P4	19.9	0.3
6	P5	20.0	0.1
6	P7	21.8	0.1
6	P9	20.3	0.1
6	P11	21.4	0.2
7	P2	19.8	0.0
7	P4	19.9	0.0
7	P5	20.0	-0.1
7	P7	21.1	0.0
7	P9	19.4	0.0
7	P11	19.8	0.1
8	P2	20.4	0.1

8	P4	20.5	0.0
8	P5	22.1	0.3
8	P7	22.9	0.3
8	P9	19.8	0.1
8	P11	20.3	0.2
9	P2	19.1	0.1
9	P4	19.1	0.1
9	P5	19.0	0.0
9	P7	18.7	0.1
9	P9	19.6	0.0
9	P11	18.7	0.1
10	P2	19.4	0.1
10	P4	20.2	0.1
10	P5	20.1	0.0
10	P7	20.9	-0.1
10	P9	21.5	0.2
10	P11	20.2	0.0
11	P2	18.9	0.0
11	P4	19.1	0.3
11	P5	19.1	-0.1
11	P7	19.9	-0.3
11	P9	20.2	-0.5
11	P11	20.2	0.1
12	P2	19.4	-0.3
12	P4	18.8	-0.2
12	P5	19.3	-0.6
12	P7	20.6	-0.3
12	P9	20.2	-0.3
12	P11	19.4	0.2

GAS TIGHT - GROUNDS:

	mOhm values	Actual	Delta
Board	Position	Initial	Gas Tight
1	P1	4.6	0.1
1	P3	4.3	0.1
1	P6	4.8	0.1
1	P8	3.9	0.0
1	P10	4.3	0.1
1	P12	4.0	0.0
2	P1	4.7	0.1
2	P3	4.6	0.1
2	P6	4.5	0.1
2	P8	3.7	0.1
2	P10	3.7	0.1
2	P12	3.6	0.0
3	P1	3.7	0.1
3	P3	4.7	0.1
3	P6	5.3	0.1
3	P8	3.9	0.0
3	P10	4.3	0.0
3	P12	4.3	0.0
4	P1	4.5	0.0
4	P3	4.2	0.0
4	P6	4.7	0.1
4	P8	3.6	0.0
4	P10	3.9	0.0
4	P12	4.0	0.0
5	P1	4.5	0.0
5	P3	4.3	0.1
5	P6	4.4	0.1
5	P8	4.7	0.1
5	P10	4.1	0.1
5	P12	4.2	0.0
6	P1	4.3	0.0
6	P3	4.5	0.1
6	P6	5.1	0.0
6	P8	4.3	0.1
6	P10	4.7	0.0
6	P12	4.6	0.0
7	P1	4.9	0.0
7	P3	4.2	0.0
7	P6	5.4	0.1
7	P8	4.0	0.0
7	P10	4.1	0.0
7	P12	4.0	0.0
8	P1	4.3	0.0

8	P3	4.6	0.0
8	P6	5.7	0.1
8	P8	3.8	0.0
8	P10	3.6	0.0
8	P12	3.8	0.0
9	P1	4.4	0.0
9	P3	4.2	0.0
9	P6	4.4	0.0
9	P8	3.6	0.0
9	P10	3.7	0.0
9	P12	3.5	0.0
10	P1	4.3	0.0
10	P3	4.5	0.0
10	P6	5.1	0.0
10	P8	4.0	0.0
10	P10	4.6	0.1
10	P12	4.1	0.0
11	P1	4.3	0.0
11	P3	4.3	0.0
11	P6	5.1	0.0
11	P8	3.8	0.0
11	P10	4.5	0.0
11	P12	4.2	0.1
12	P1	4.2	0.1
12	P3	4.3	0.0
12	P6	5.1	0.1
12	P8	4.0	0.1
12	P10	3.3	0.1
12	P12	3.3	0.1

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: RS-09
Description: Current Shunt
Manufacturer: Empro
Model: HA10050
Serial #: HA10050-1
Accuracy: +/- 0.25% of RDG
… Last Cal: 05/14/2009, Next Cal: 05/14/2010

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 #: MO-11
Description: Switch/Multimeter
Manufacturer: Keithley
Model: 3706
Serial #: 120169
Accuracy: See Manual See Manual
… Last Cal: 08/09/2008, Next Cal: 08/08/2009

Equipment #: TCT-03
Description: Dillon Quantrol TC2 Test Stand
Manufacturer: Dillon Quantrol
Model: TC2
Serial #: 02-1033-03
Accuracy: Speed Accuracy: +/- 5% of indicated speed; Displacement: +/- 5 micrometers.
… Last Cal: 5/12/2009, Next Cal: 5/6/2010

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 #: OV-03
Description: Cascade Tek Forced Air Oven
Manufacturer: Cascade Tek
Model: TFO-5
Serial #: 0500100
Accuracy: Temp. Stability: +/-.1C/C change in ambient
… Last Cal: 06/17/2009, Next Cal: 06/17/2010

Equipment #: OV-5
Description: Forced Air Oven, 5 Cu. Ft., 120 V
Manufacturer: Sheldon Mfg.
Model: CE5F
Serial #: 02008008
Accuracy: +/- 5 deg. C +/- 5 deg. C
… Last Cal: 02/19/2009, Next Cal: 02/19/2010

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