



# LV Service Board Power Cable TESTING



# Test Summary

This test procedure will qualify the cable build.

We will test for shorts and opens, cable resistance by measuring the voltage drop under load.

The test will verify proper fabrication of the cable.

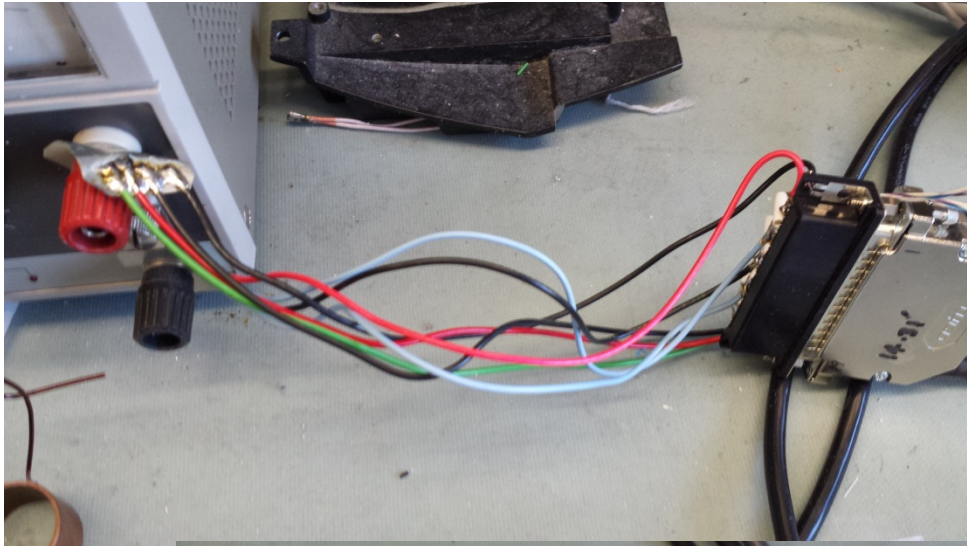
The test runs 5 Amps of current through each circuit. The voltage drop is recorded for each conductor pair.



# Setup

- Power Supply
  - Kenwood 6V@30A bench supply or a supply that can provide up to 6V @ 25A.
- Adapter cable
  - Needed so the sensing pins can be measured
- CUT (Cable Under Test)
- Load
  - Adapter with 4 load resistors, should be in a box with a fan because the resistors get very hot and pose a burn hazard.
- Test Equipment:
  - DVM
  - Clamp-on Current Probe

# Source and Load



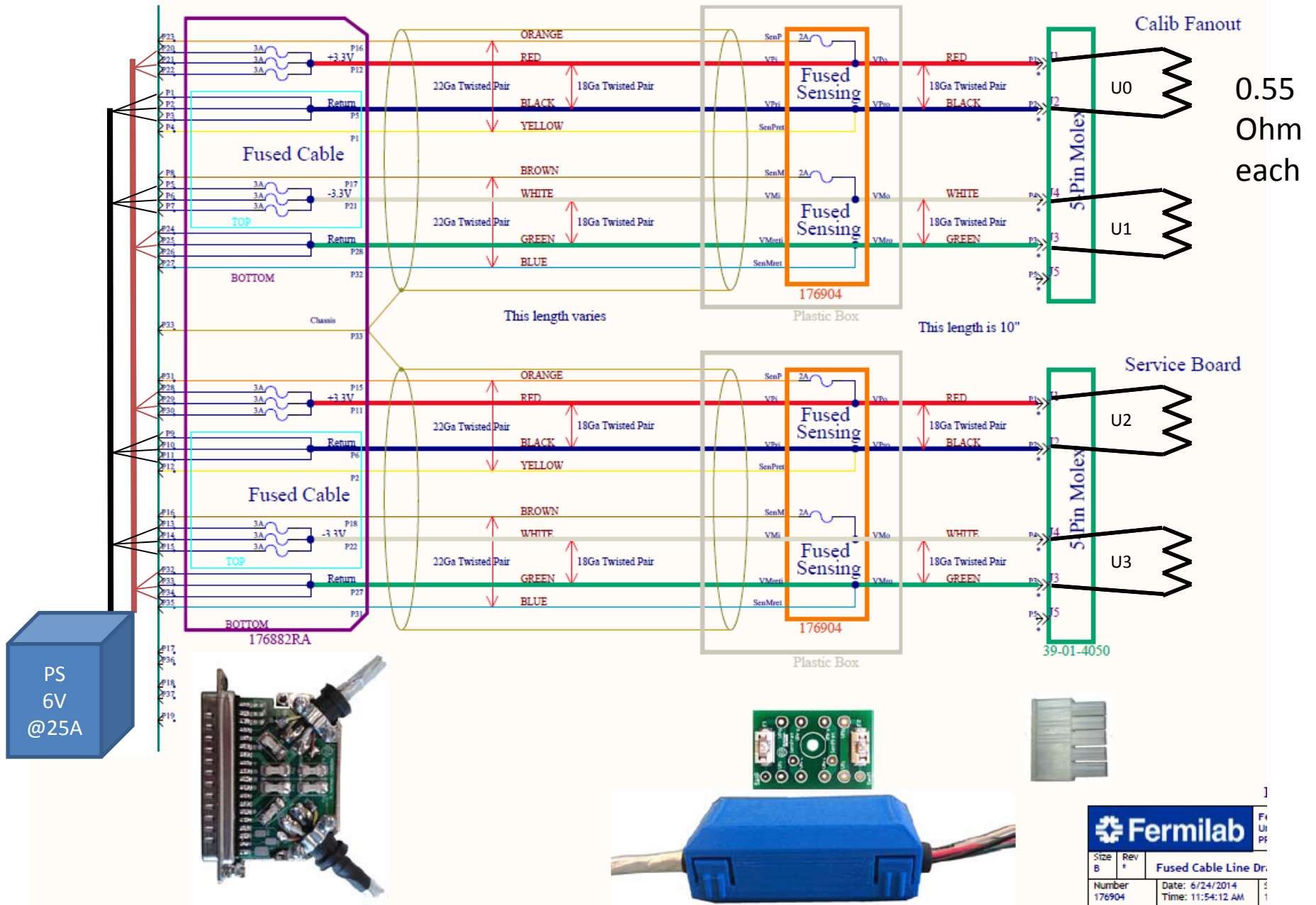
All four circuits are connected in parallel to the power supply.



Each circuit has its own load resistor.

*Caution: These resistors get hot during testing.*

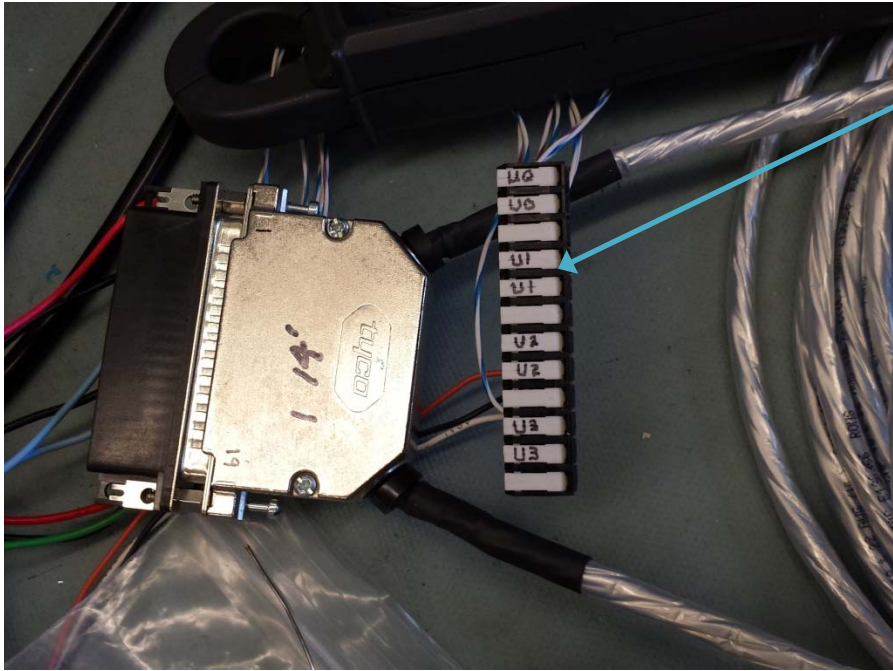
# Setup



0.55 Ohm each

		F4 U1 PF
Size B	Rev #	Fused Cable Line Dr
Number 176904	Date: 6/24/2014 Time: 11:54:12 AM	1

# Pictures

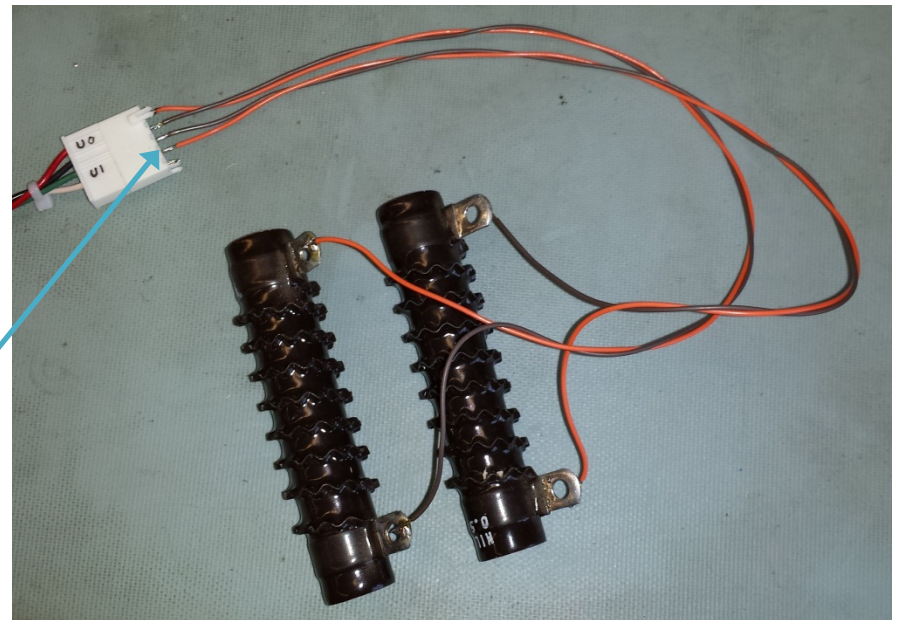


Measure Sensing here

This is the load configuration for one of the cables. The orange and brown 22 Ga wires are adding 0.05 Ohm to the 0.5 Ohm resistors.

This connector adapts to a single power supply while making the sense lines available for measurements.

Measure Load here





# Measurements

- Check the continuity of each output. Check for shorts between all outputs.
- Connect Cable Under Test to the supply and load.
- Adjust the output current to 20 Amps, this is the total load and should cause about 5 Amps to flow through each load resistor.
  - NOTE: The test can be done at a lower current level and still provide information about the integrity of the assembly. For example 10 Amps total for 2.5 Amps through each resistor. This should be close to the normal electronics loading.
- Record the voltage at the supply and the current through each resistor.
- Record each sensing voltage on the terminal strip.
- Record the voltage on the Molex connector.
- DO NOT run more than 5 minutes at the 6A level since it is the maximum rating of the fuses.



# Measurements

Cable (#-ft)	Source				Sensing				Load				Current			
	U0	U1	U2	U3	U0s	U1s	U2s	U3s	U0l	U1l	U2l	U3l	U0i	U1i	U2i	U3i
1-14'	3.897	3.897	3.897	3.897	2.857	2.837	2.857	2.829	2.729	2.728	2.735	2.714	4.99	5.12	5.01	5.14
2-16'	4.130	4.130	4.130	4.130	2.890	2.867	2.895	2.869	2.789	2.757	2.773	2.759	5.11	5.17	5.13	5.20
3-16'	4.130	4.130	4.130	4.130	2.840	2.870	2.840	2.870	2.780	2.760	2.780	2.750	5.09	5.16	5.12	5.24
4-20'	4.255	4.255	4.255	4.255	2.791	2.766	2.790	2.759	2.694	2.672	2.692	2.658	4.91	5.01	4.96	5.02
5-20'	4.408	4.408	4.408	4.408	2.901	2.874	2.894	2.861	2.791	2.773	2.781	2.752	5.09	5.20	5.08	5.17
6-20'	4.313	4.313	4.313	4.313	2.847	2.825	2.818	2.792	2.742	2.722	2.721	2.689	4.98	5.04	5.00	5.04
7-20'	4.312	4.312	4.312	4.312	2.842	2.811	2.836	2.804	2.680	2.707	2.732	2.692	4.98	5.09	5.00	5.02
8-24'	4.587	4.587	4.587	4.587	2.815	2.785	2.799	2.764	2.696	2.679	2.702	2.661	4.96	5.02	4.95	4.96
9-24'	4.587	4.587	4.587	4.587	2.822	2.795	2.818	2.778	2.700	2.693	2.706	2.669	4.94	5.04	4.94	5.01
10-27'	4.773	4.773	4.773	4.773	2.768	2.749	2.758	2.732	2.670	2.645	2.658	2.629	4.82	4.91	4.87	4.97
11-27'	4.877	4.877	4.877	4.877	2.842	2.807	2.830	2.789	2.725	2.701	2.722	2.686	4.96	5.04	5.01	5.08
12-29'	4.892	4.892	4.892	4.892	2.803	2.775	2.803	2.759	2.705	2.673	2.689	2.656	4.93	5.01	4.95	4.98
13-29'	4.892	4.892	4.892	4.892	2.802	2.778	2.794	2.761	2.696	2.673	2.687	2.649	4.93	5.00	4.93	4.99
14-31'	5.083	5.083	5.083	5.083	2.934	2.897	2.966	2.903	2.811	2.789	2.798	2.759	5.14	5.21	5.10	5.19
15-31'	5.162	5.162	5.162	5.162	2.862	2.819	2.800	2.767	2.719	2.688	2.703	2.665	4.98	5.03	4.99	5.03





# Results

Cable (#-ft)	Resistance @ meas.Current				Cable Voltage Drop				Expected			
	R1	R2	R3	R4	U0	U1	U2	U3	U0	U1	U2	U3
1-14'	0.547	0.533	0.546	0.528	1.060	1.040	1.068	1.168	1.004	1.030	1.008	1.034
2-16'	0.546	0.533	0.541	0.531	1.263	1.235	1.261	1.341	1.163	1.176	1.167	1.183
3-16'	0.546	0.535	0.543	0.525	1.260	1.290	1.260	1.350	1.158	1.174	1.165	1.192
4-20'	0.549	0.533	0.543	0.529	1.489	1.465	1.496	1.561	1.376	1.404	1.390	1.407
5-20'	0.548	0.533	0.547	0.532	1.534	1.514	1.547	1.617	1.426	1.457	1.423	1.449
6-20'	0.551	0.540	0.544	0.534	1.488	1.495	1.521	1.571	1.395	1.412	1.401	1.412
7-20'	0.538	0.532	0.546	0.536	1.501	1.476	1.508	1.632	1.395	1.426	1.401	1.407
8-24'	0.544	0.534	0.546	0.536	1.802	1.788	1.823	1.891	1.651	1.671	1.648	1.651
9-24'	0.547	0.534	0.548	0.533	1.792	1.769	1.809	1.887	1.644	1.678	1.644	1.668
10-27'	0.554	0.539	0.546	0.529	2.024	2.015	2.041	2.103	1.795	1.828	1.813	1.850
11-27'	0.549	0.536	0.543	0.529	2.070	2.047	2.088	2.152	1.847	1.876	1.865	1.891
12-29'	0.549	0.534	0.543	0.533	2.117	2.089	2.133	2.187	1.965	1.997	1.973	1.985
13-29'	0.547	0.535	0.545	0.531	2.114	2.098	2.131	2.196	1.965	1.993	1.965	1.989
14-31'	0.547	0.535	0.549	0.532	2.186	2.117	2.180	2.272	2.184	2.214	2.167	2.206
15-31'	0.546	0.534	0.542	0.530	2.343	2.362	2.395	2.443	2.116	2.138	2.121	2.138