QUANTUM DIGITAL LABORATORIES Pty Ltd

Barrie King
Transtech Electronic Controls Pty Ltd
Unit 2, 48 Dellamarta Road
WANGARA
Western Australia, 6065

15 June 2010

ENGINEERING REPORT QDL100401.E

A Surge Protection Device, Model: TLP-150-3M/CATB (Equipment Under Test = EUT), was subjected to a combination wave surge (as per EN 61000-4-5, 1.2/50µs voltage waveshape and 8/20µs current waveshape) at a variety of different voltages using a Keytek EMCPro Advanced EMC Immunity Test System.

Testing was performed according to the methodology and procedures of IEC 61643-1:2005 Clause 7/7.1, Clause 7.5.2, Clause 7.6.5/7.6.6.

The Let Through Voltage was monitored with a floating oscilloscope (battery powered Fluke 199C-Scopemeter 200MHz Digital Storage Oscilloscope (Serial: DM9290043) with Calibration Report Number: NC09.34313

All 3 samples of the EUT passed testing to IEC 61643-1:2005 Ed. 2.0 Clause 7.5.2 and Clause 7.6.5/7.6.6 for a Class II device. The Residual Voltage Level Rating was calculated (as per Clause 7.5.2) to be = 873V.

All current was self-extinguished and thermal stability was achieved after each impulse of the operating duty test. Both the voltage and current oscillographs, together with a visual inspection, showed no indication of puncture or flashover of the samples. Mechanical damage was not observed during these tests.

Once thermal stability was achieved, the current, which flowed through the test samples, was measured. The resistive component (measured at the crest of the sine wave) did not exceed 1 mA. Hence as per Clause 7.6.6 the devise has met the Pass Criteria requirements.

COMMENTS

The unit as tested has passed IEC 61643-1:2005 Clause 7.5.2 and Clause 7.6.5/7.6.6.

Roman Gdowski :  .....
B.Eng

Technical Director

Unit 8, 15 Dyer Road, Bassendean, 6054, Western Australia Tel: +61 8 9379 1165 Fax: +61 8 9379 1167
Email: roman@qdl.com.au Website: qdl.com.au

IEC 61643-1:2005 Clause 7 – Type Test

The EUT was tested in accordance with Clause 7 – Type Test.

IEC 61643-1:2005 Clause 7.1 – General Testing Procedures

The EUT was tested in accordance with Clause 7.1 – General Testing Procedures.

IEC 61643-1:2005 Clause 7.5.2 – Residual Voltage with 8/20 current impulses

The EUT was tested in accordance with the methodology and procedures of Clause 7.5.2 – Test procedure to measure the residual voltage with 8/20 current impulses, for a Class II device.

Results:

	1.0 x In = 3000A, +6kV	1.0 x In = 3000A, -6kV
L1/E	+780	-780
L2/E	+860	-800
L3/E	+820	-740
N/E	+760	-820
L1/N	+920	-780
L2/N	+840	-780
L3/N	+920	-760
L1/L2	+880	-720
L1/L3	+1080	-740
L2/L3	+840	-700

Plate 1: Surge Residual Voltage Reference Data.

Since the SPD contains only voltage-limiting components, this test was only required to be performed at In = 3000Amps as per IEC 61643-1 Clause 7.5.2 Test procedure to measure the residual voltage with 8/20 current impulses.

One sequence of positive polarity and one sequence of negative polarity was applied to the SPD for each line combination for each sample.

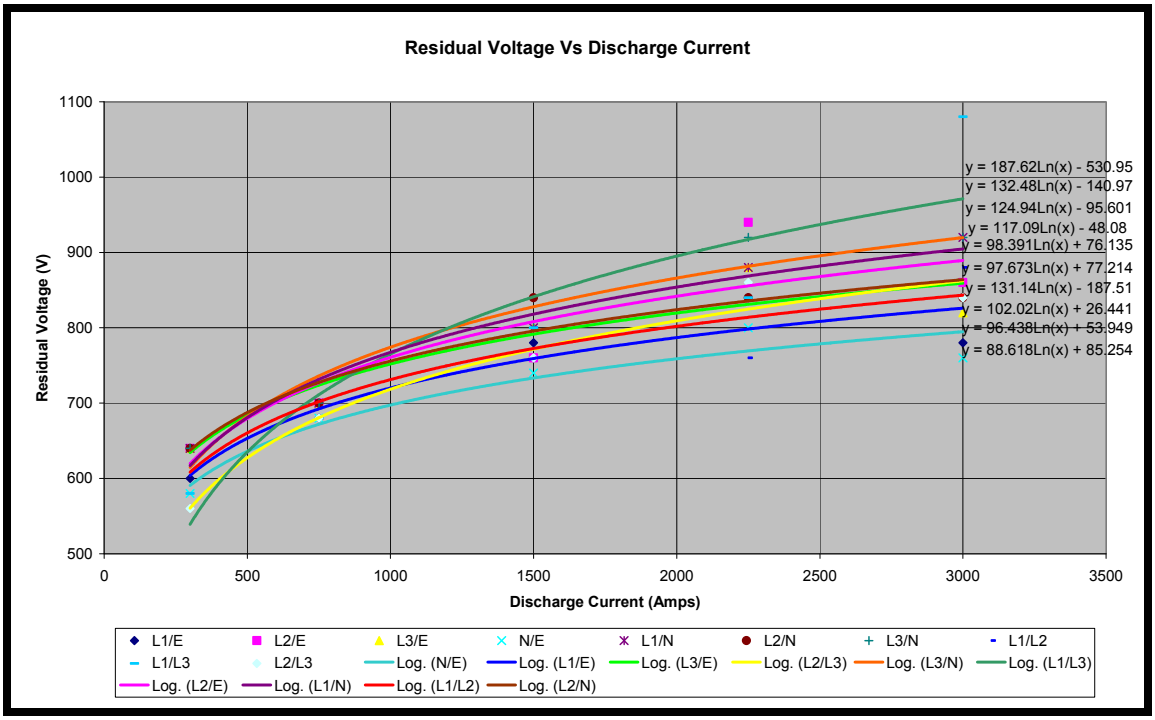

Plate 2: Discharge Current Vs Residual Voltage graph.

The Residual Voltage (RV) used for determining the measured limiting voltage is given by definition as the highest voltage on this curve (for each line combination) corresponding in the range of currents (from Clause 7.6.5 Operating Duty Test) for class II: up to I_n (3000Amps).

	Curve of Best Fit	RV at 3000A
L1/E	y = 96.438*Ln(x) + 53.949	826
L2/E	y = 117.09*Ln(x) - 48.08	889
L3/E	y = 97.673*Ln(x) + 77.214	859
N/E	y = 88.618*Ln(x) + 85.254	795
L1/N	y = 124.94*Ln(x) - 95.601	905
L2/N	y = 98.391*Ln(x) + 76.135	864
L3/N	y = 132.48*Ln(x) - 140.97	920
L1/L2	y = 102.02*Ln(x) + 26.441	843
L1/L3	y = 187.62*Ln(x) - 530.95	971
L2/L3	y = 131.14*Ln(x) - 187.51	862

Plate 3: Residual Voltage Reference Data calculated from Curve of Best Fit.

The Residual Voltage was calculated for each line/phase combination using the curve of best fit at In = 3000Amps. The average of the extrapolated Residual Voltage (at In = 3000A) was then calculated to be = 873V.

Note:

The interval between the individual impulses was 0.5 hrs. The EUT remained thermally stable after each impulse. The maximum external case temperature rise was 3 degrees Celsius above ambient.

All voltage waveform oscillographs were taken with a 500V/Div Voltage axis and a 200µs/Div time axis.

All current waveform oscillographs were taken with a 5µs/DIV time axis where the current monitor supplies 1V per 200Amps.

All positive surges were coupled to lines with a 2Ω source impedance at a 90º phase angle reference and likewise, all negative surges were coupled to lines with a 2Ω source impedance at a 270º phase angle reference to maximise the severity of the impulse.

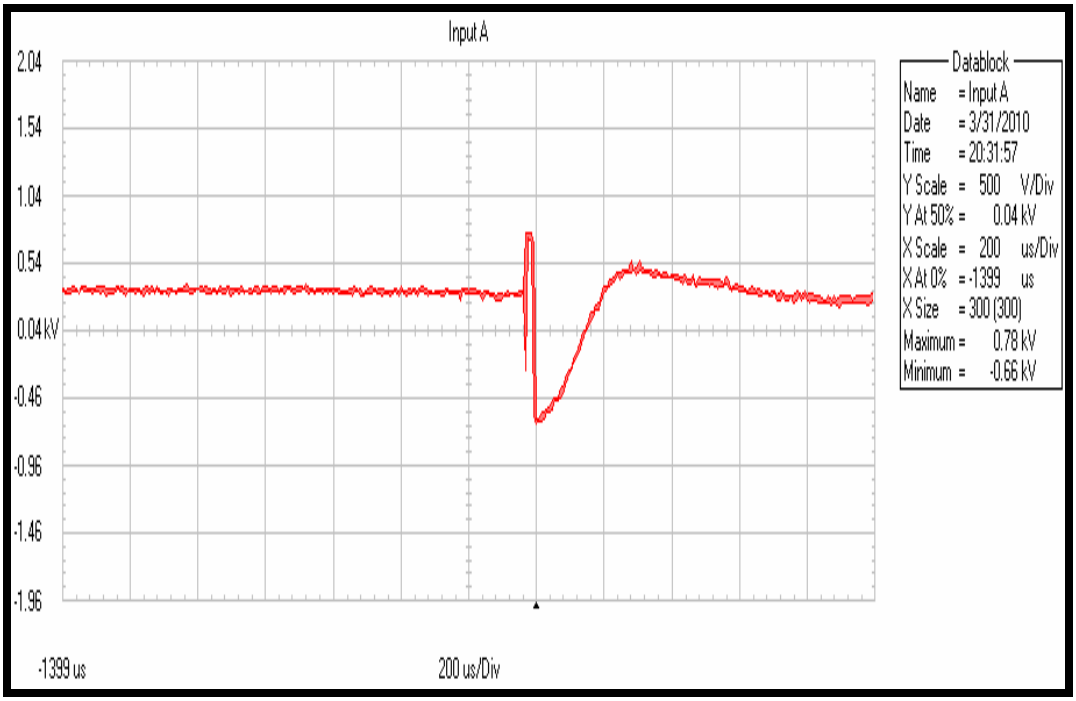

Plate 4: Voltage waveform at +6000V, 3000A Phase 1 to Protective Earth.

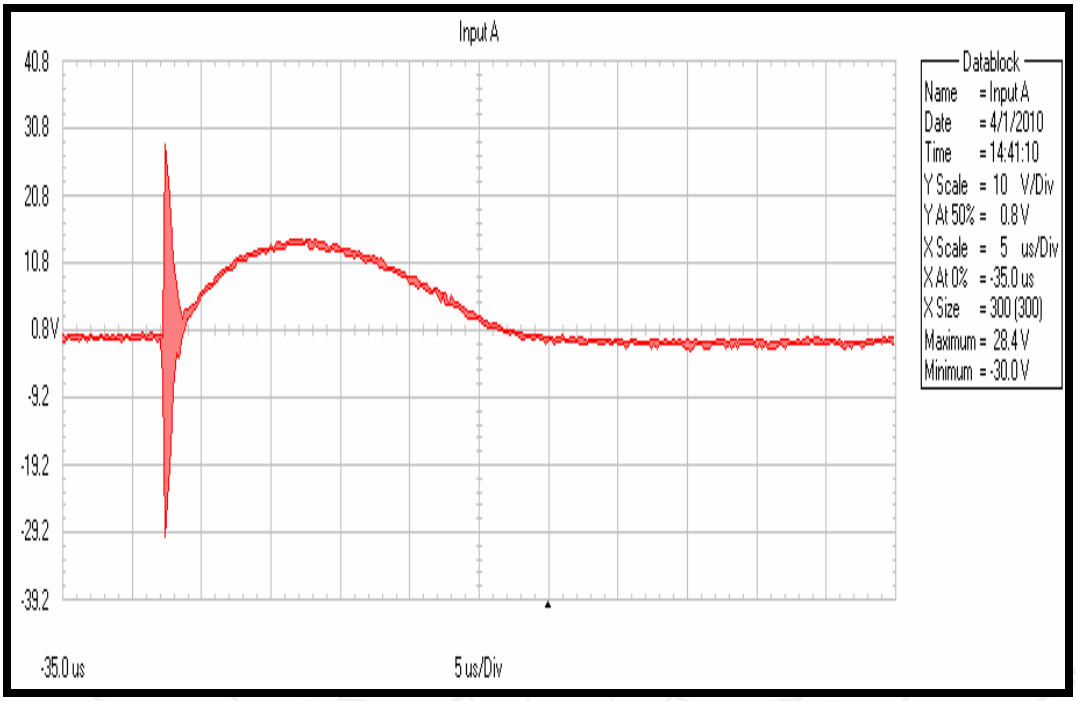

Plate 5: Current waveform at +6000V, 3000A Phase 1 to Protective Earth.

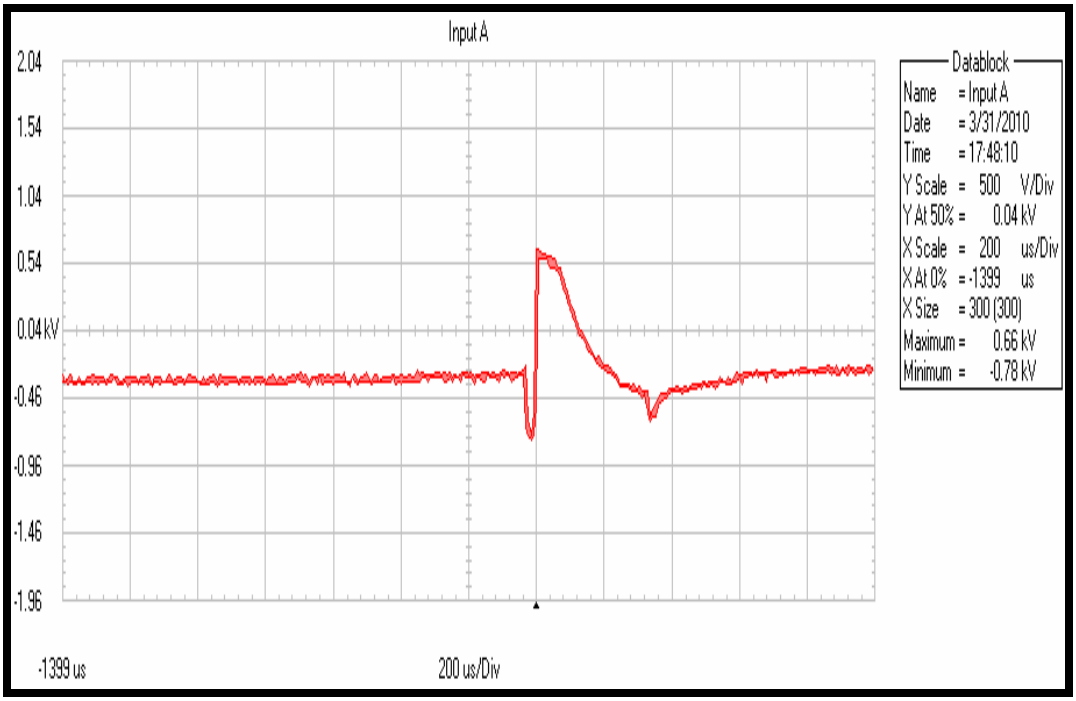

Plate 6: Voltage waveform at -6000V, 3000A Phase 1 to Protective Earth.

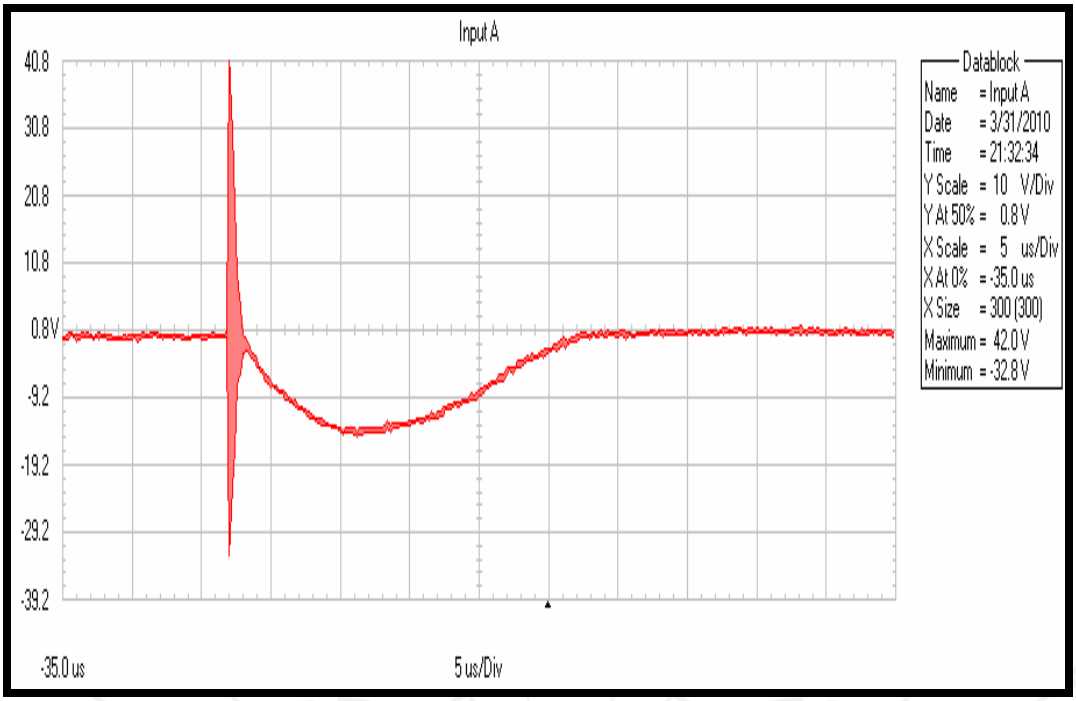

Plate 7: Current waveform at -6000V, 3000A Phase 1 to Protective Earth.

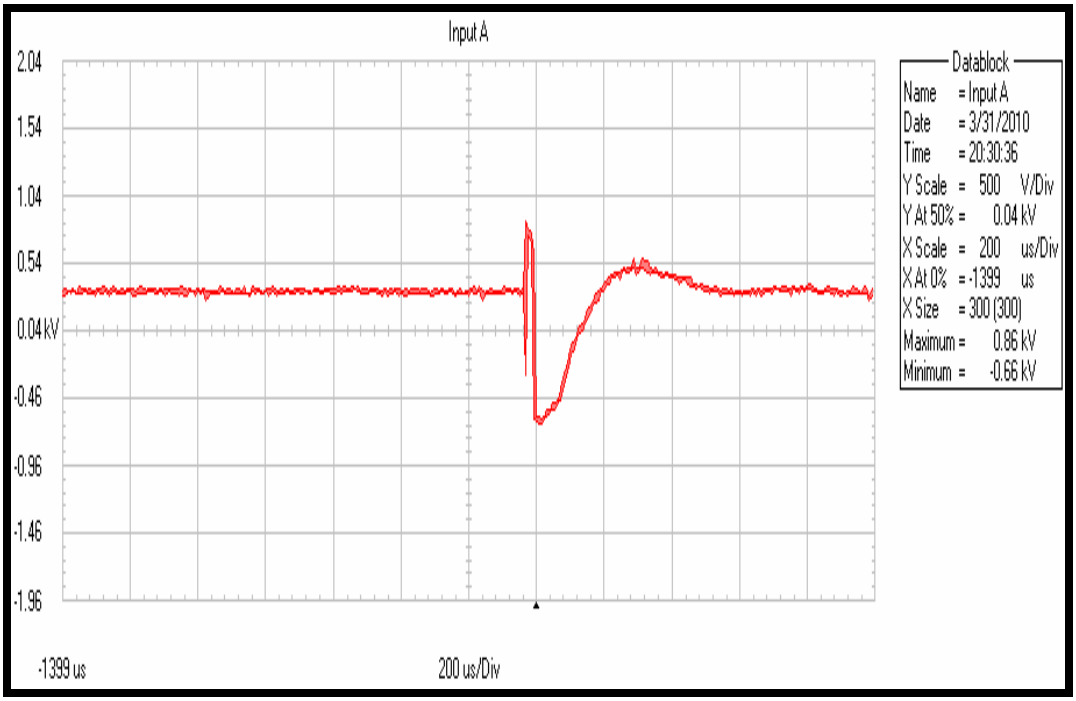

Plate 8: Voltage waveform at +6000V, 3000A Phase 2 to Protective Earth.

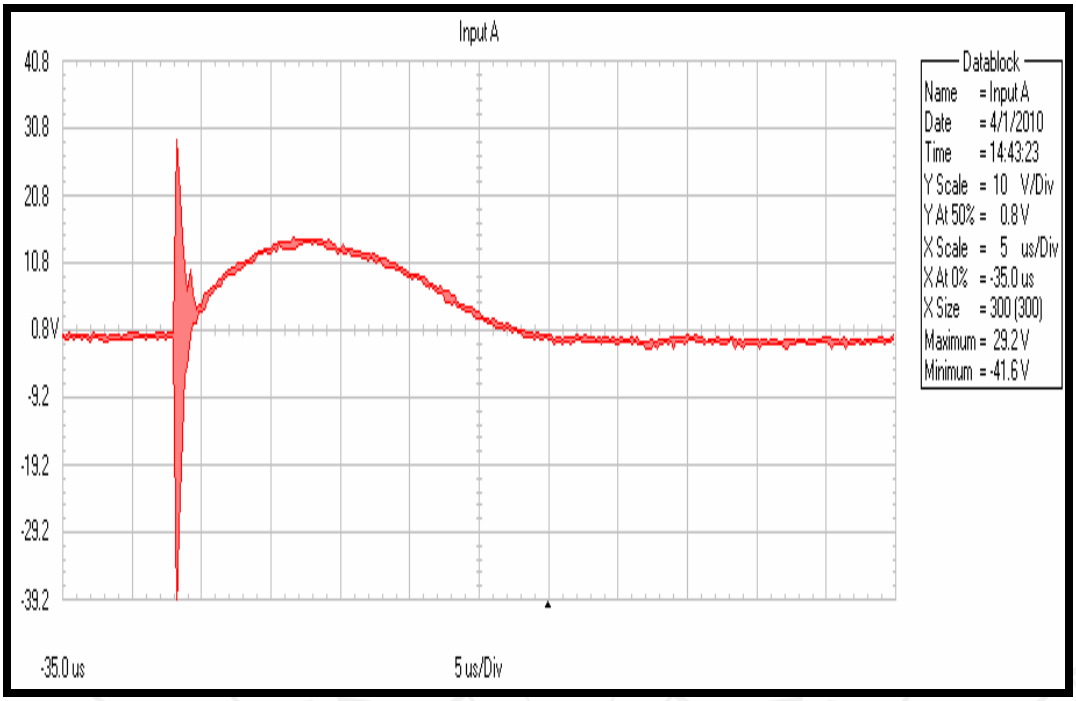

Plate 9: Current waveform at +6000V, 3000A Phase 2 to Protective Earth.

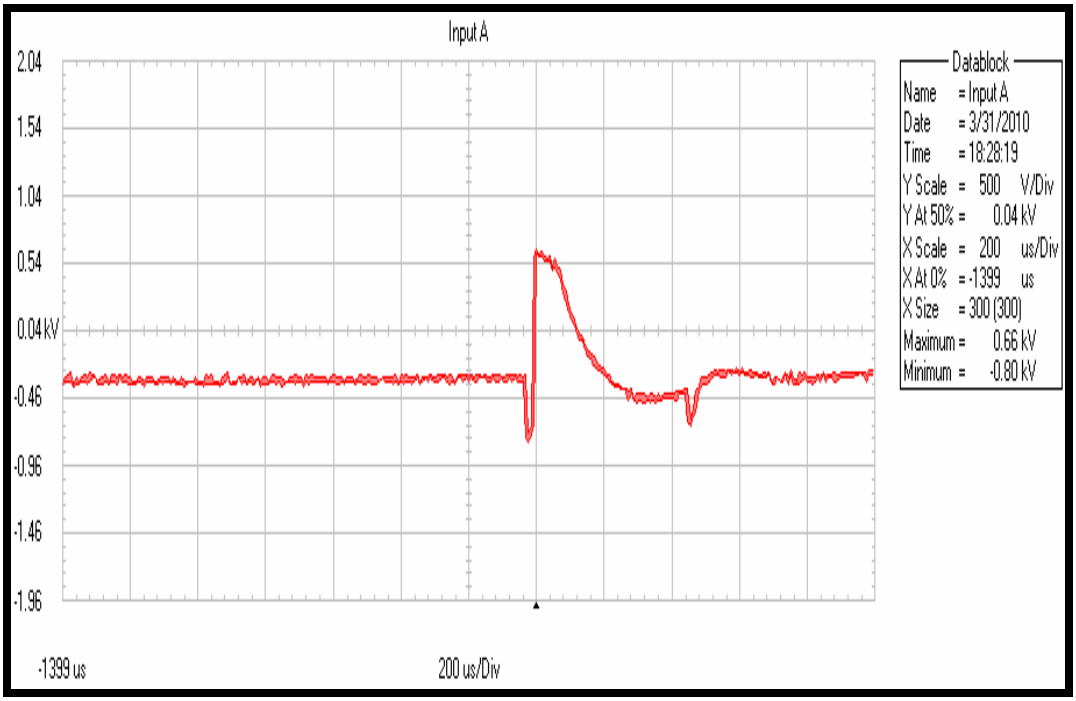

Plate 10: Voltage waveform at -6000V, 3000A Phase 2 to Protective Earth.

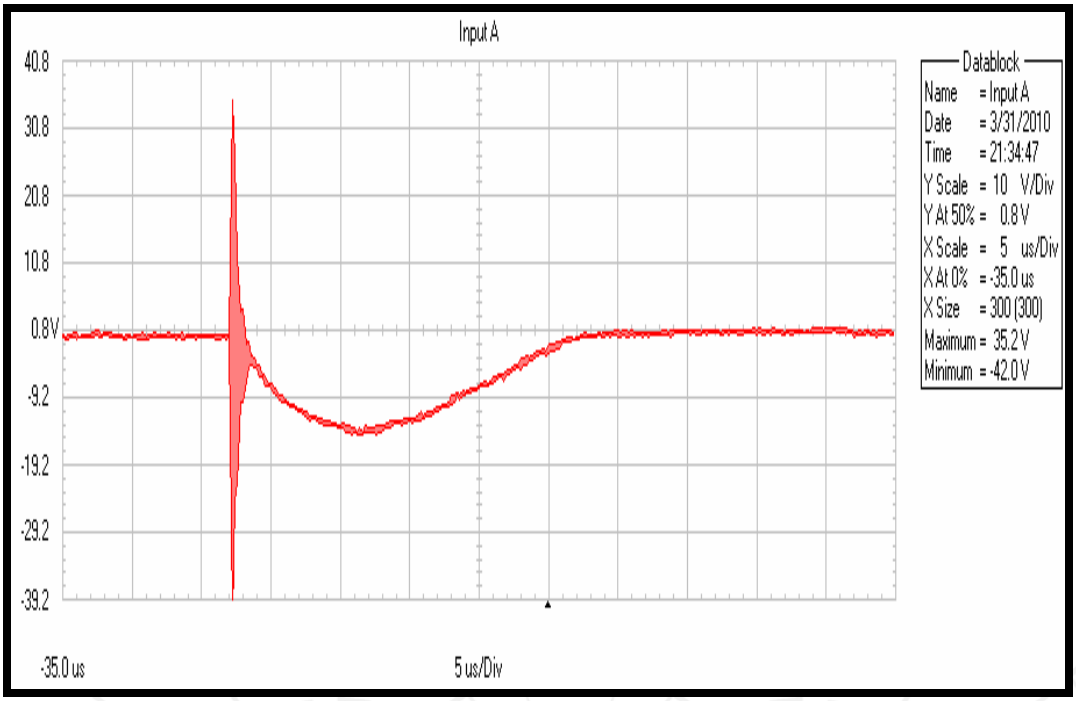

Plate 11: Current waveform at -6000V, 3000A Phase 2 to Protective Earth.

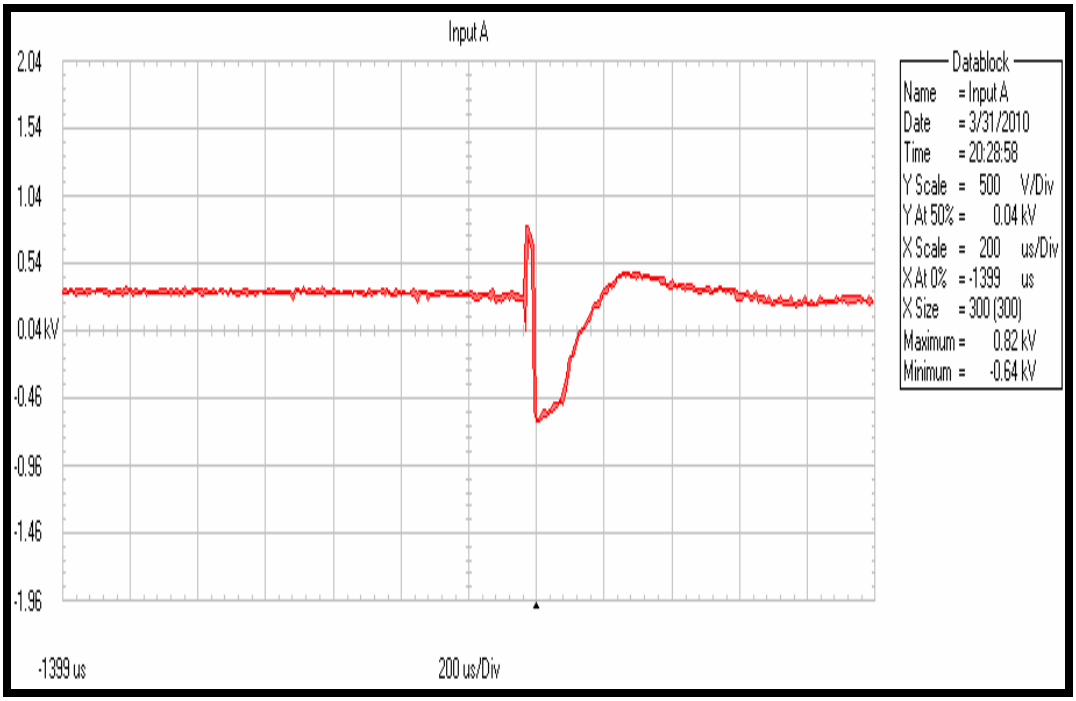

Plate 12: Voltage waveform at +6000V, 3000A Phase 3 to Protective Earth.

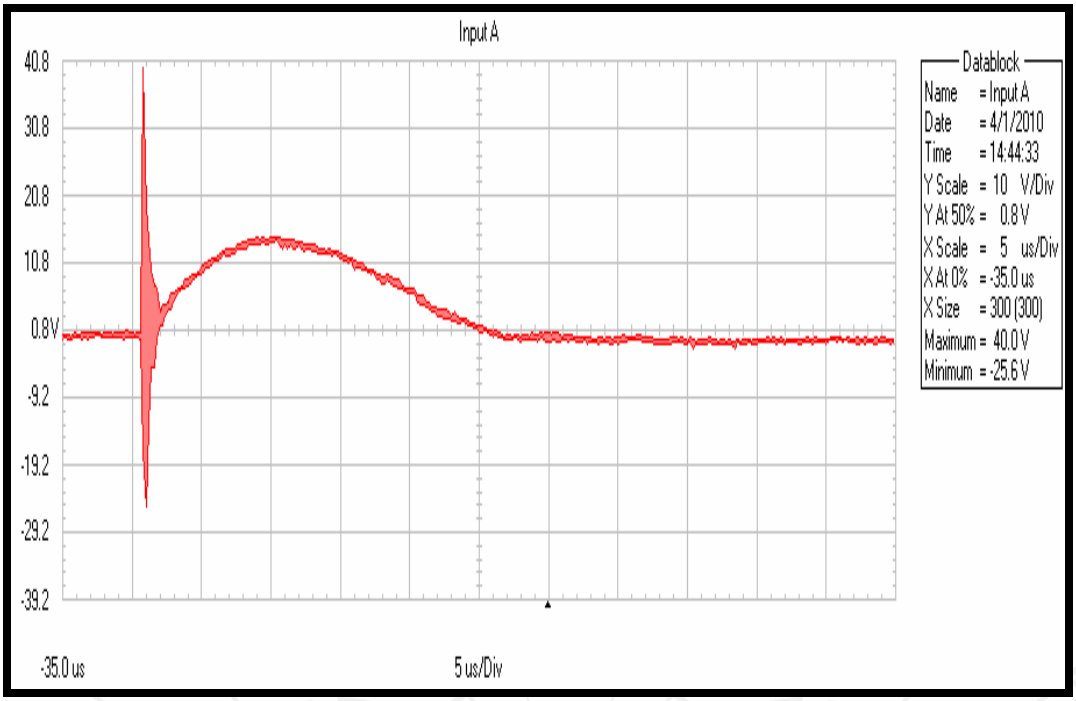

Plate 13: Current waveform at +6000V, 3000A Phase 3 to Protective Earth.

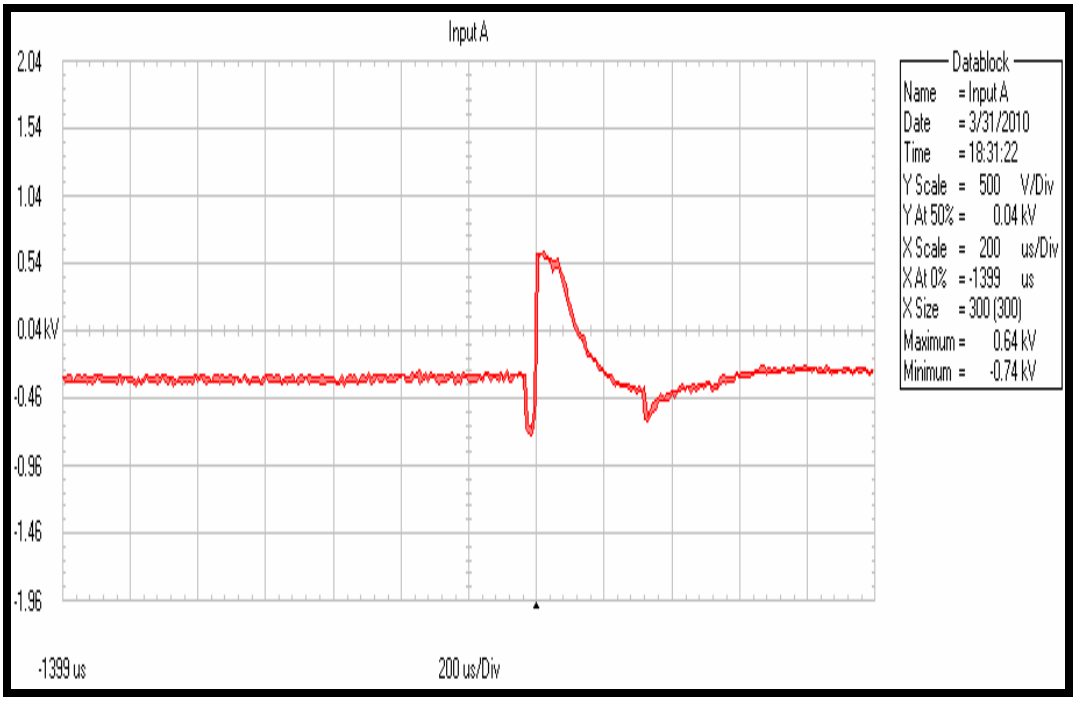

Plate 14: Voltage waveform at -6000V, 3000A Phase 3 to Protective Earth.

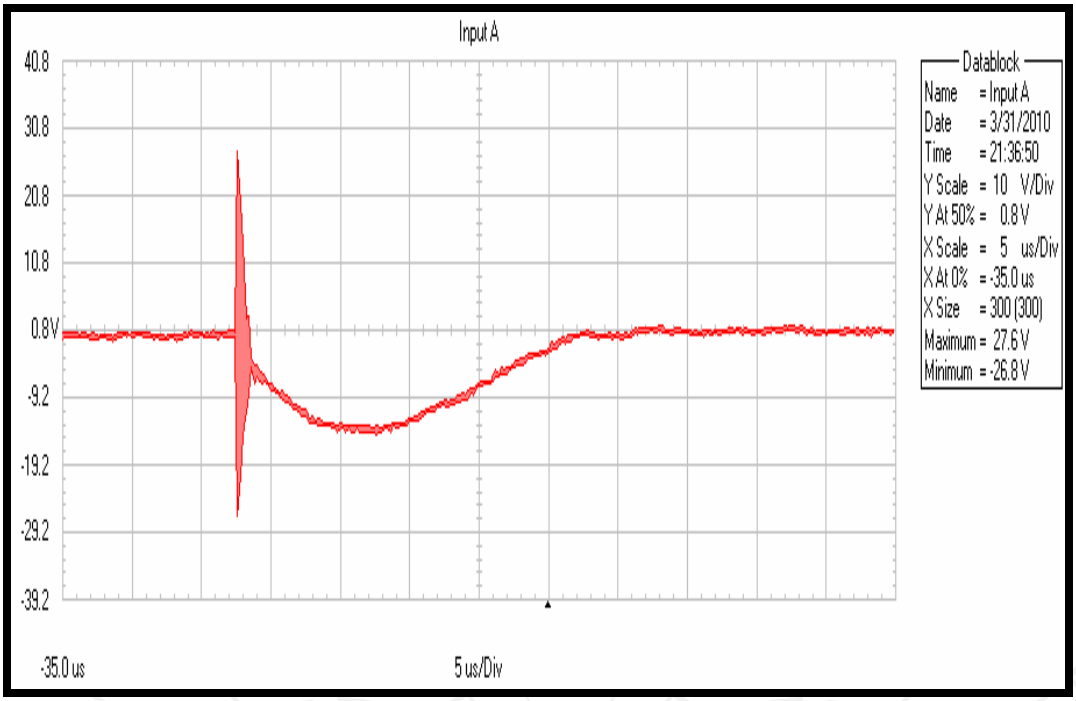

Plate 15: Current waveform at -6000V, 3000A Phase 3 to Protective Earth.

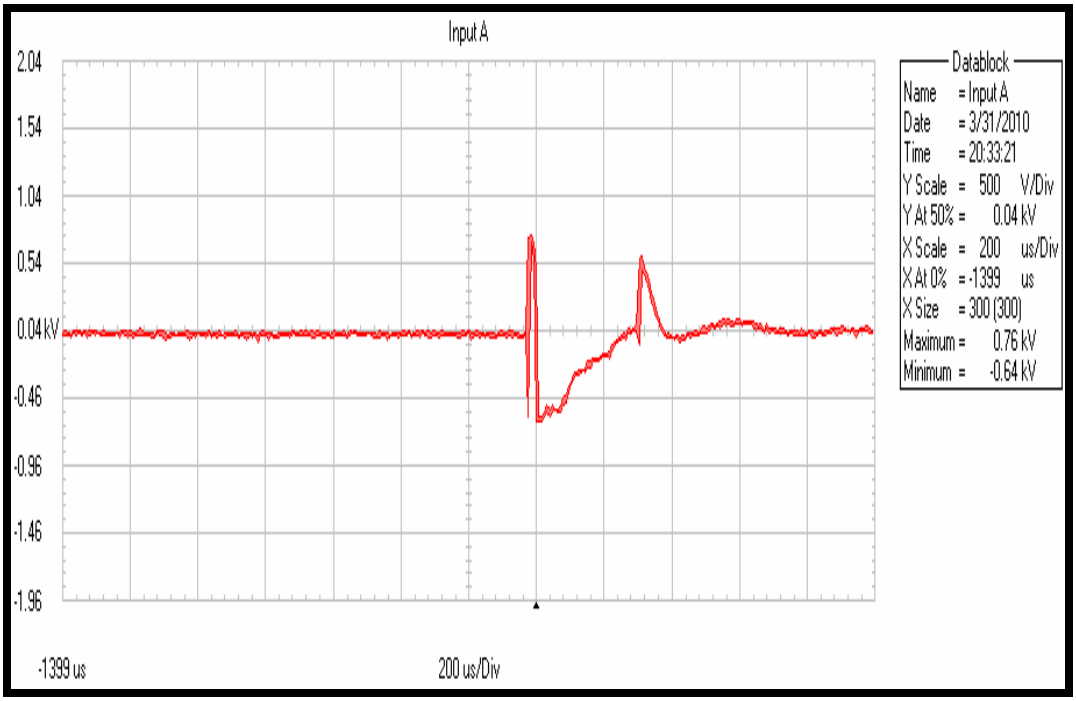

Plate 16: Voltage waveform at +6000V, 3000A Neutral line to Protective Earth.

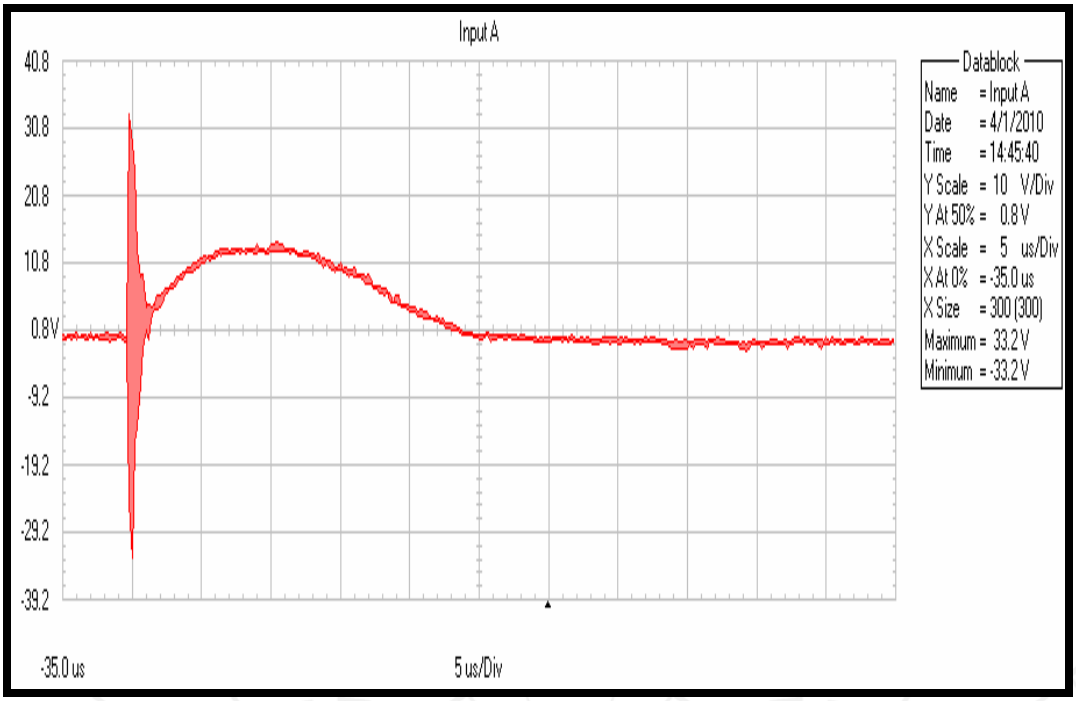

Plate 17: Current waveform at +6000V, 3000A Neutral line to Protective Earth.

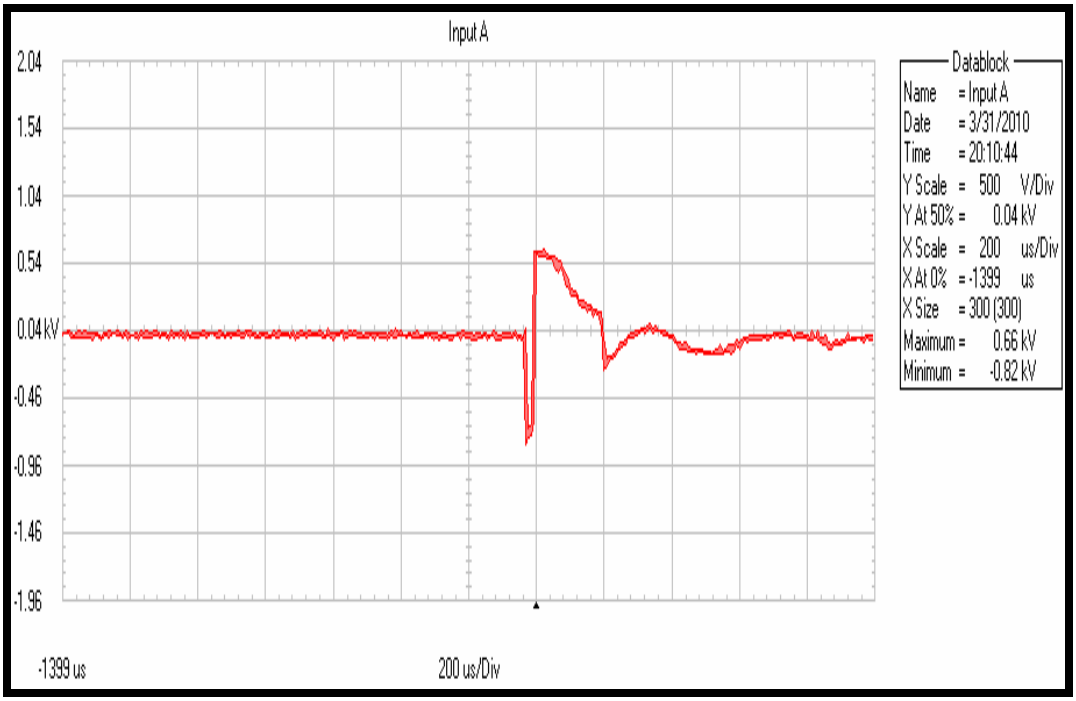

Plate 18: Voltage waveform at -6000V, 3000A Neutral line to Protective Earth.

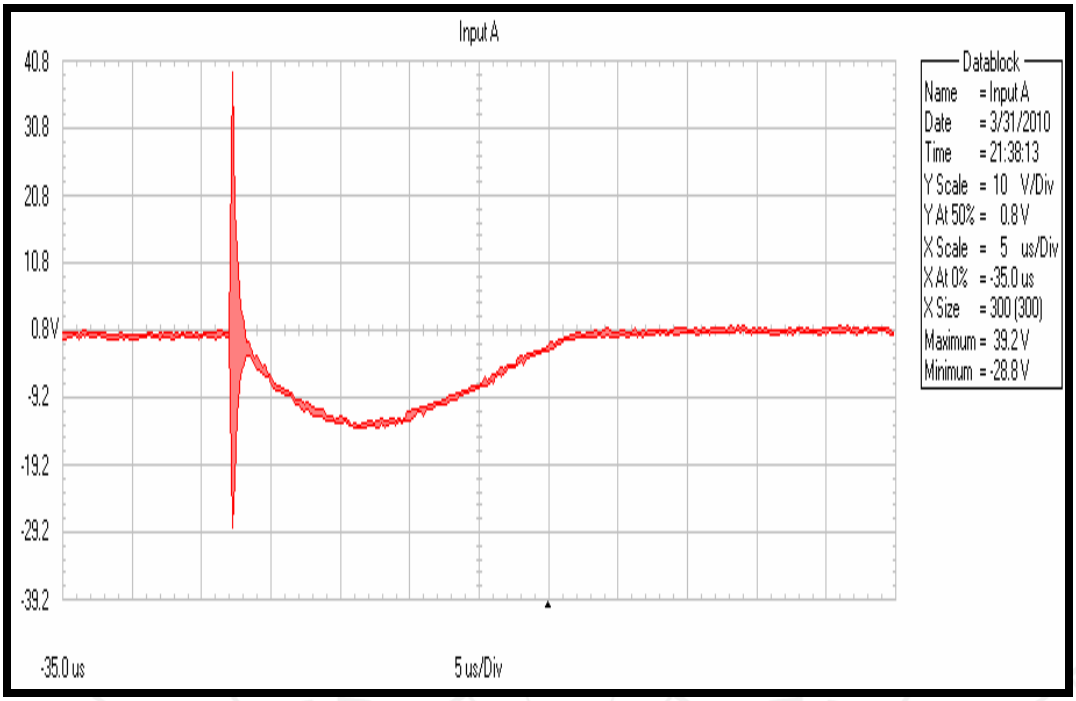

Plate 19: Current waveform at -6000V, 3000A Neutral line to Protective Earth.

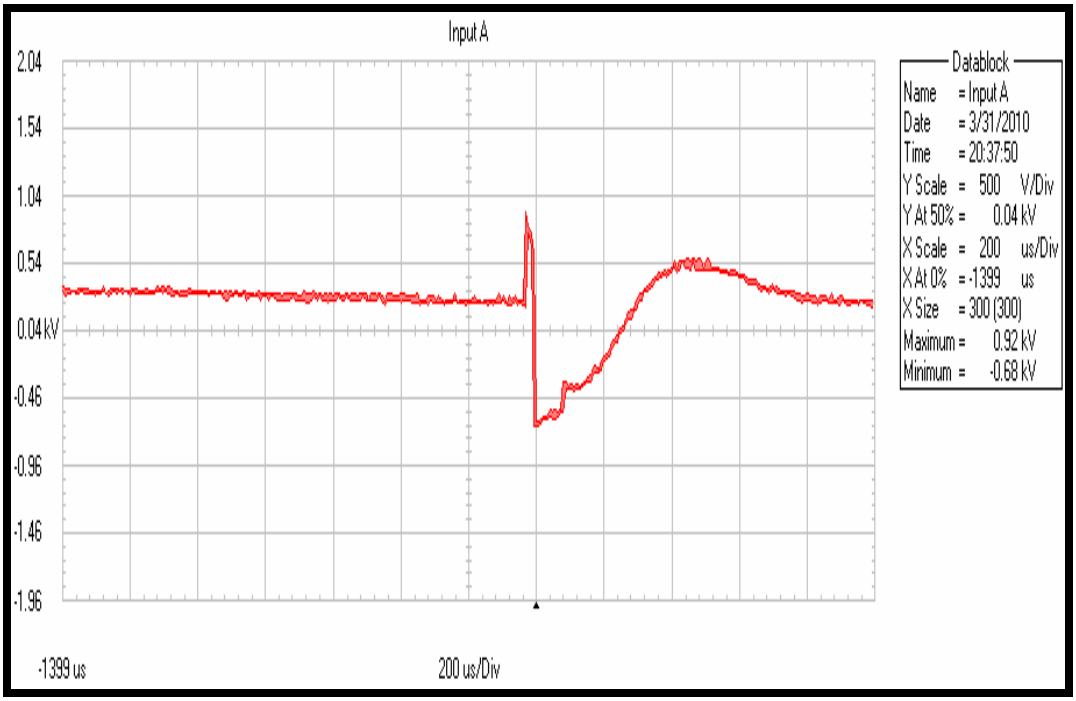

Plate 20: Voltage waveform at +6000V, 3000A Phase 1 to Neutral line.

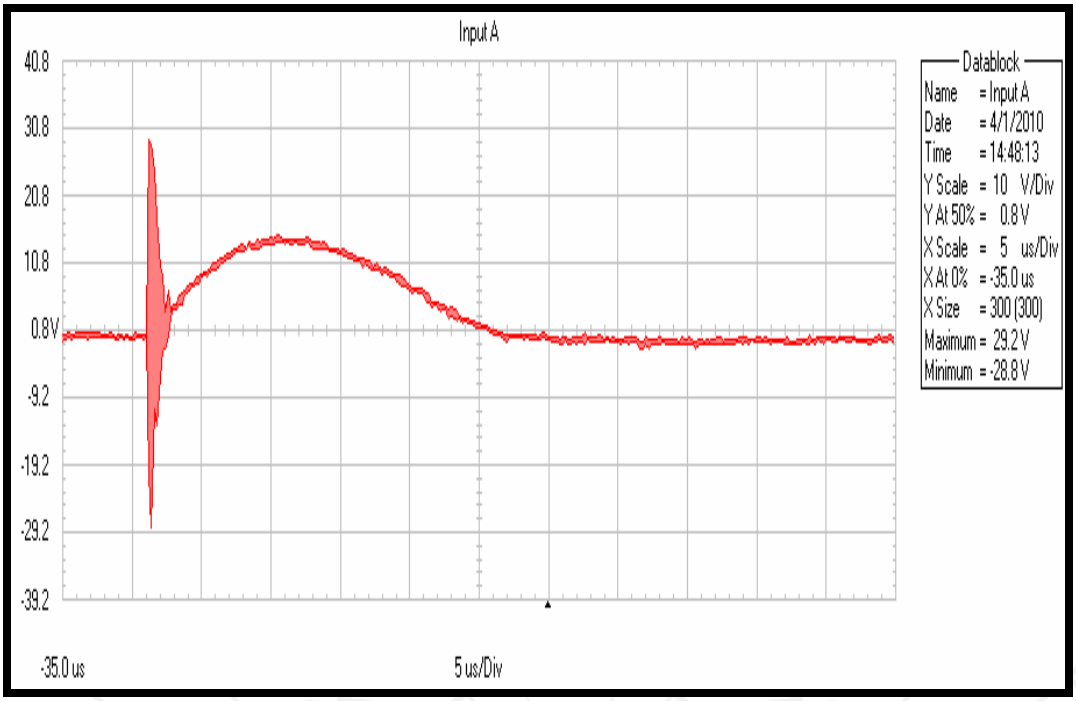

Plate 21: Current waveform at +6000V, 3000A Phase 1 to Neutral line.

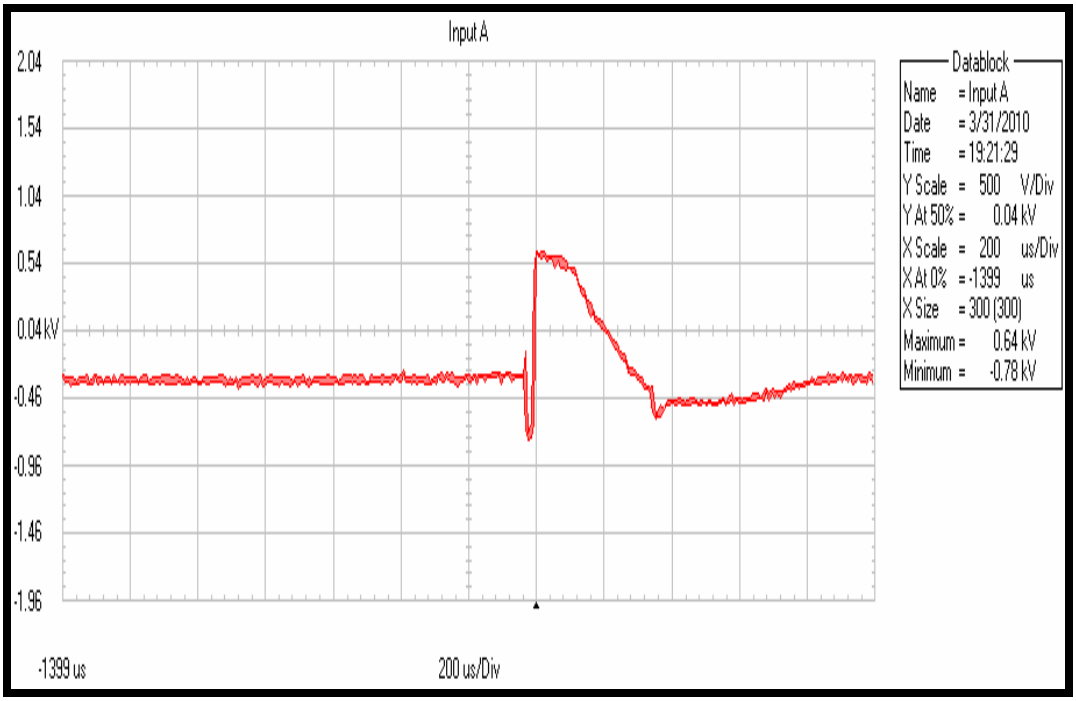

Plate 22: Voltage waveform at -6000V, 3000A Phase 1 to Neutral line.

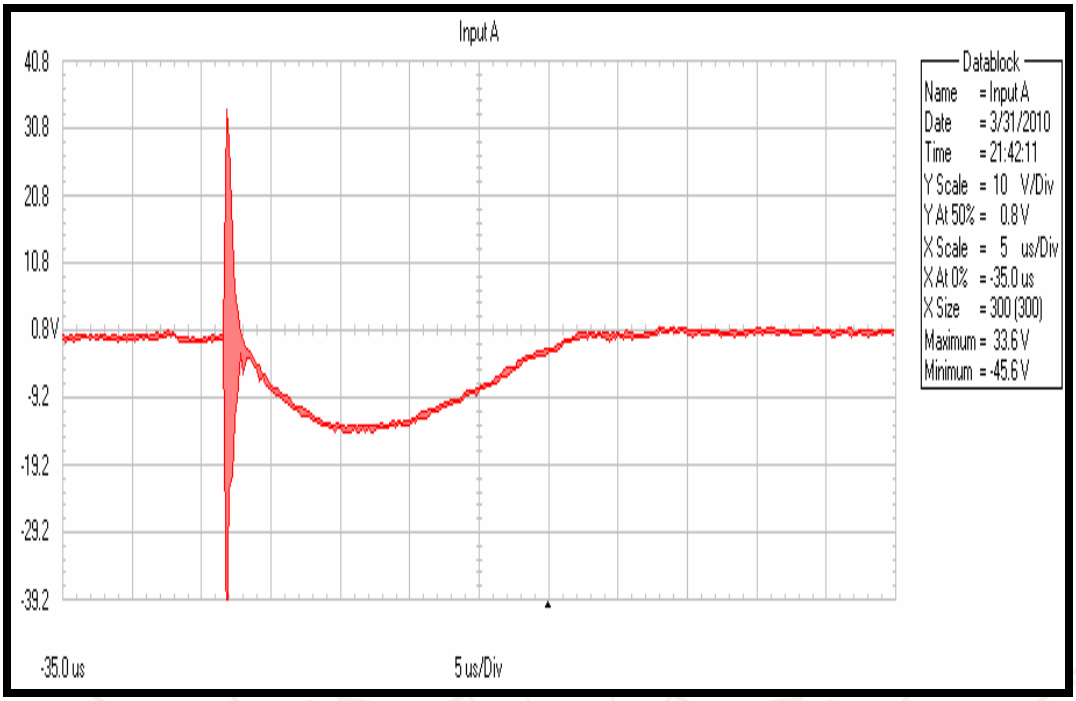

Plate 23: Current waveform at -6000V, 3000A Phase 1 to Neutral line.

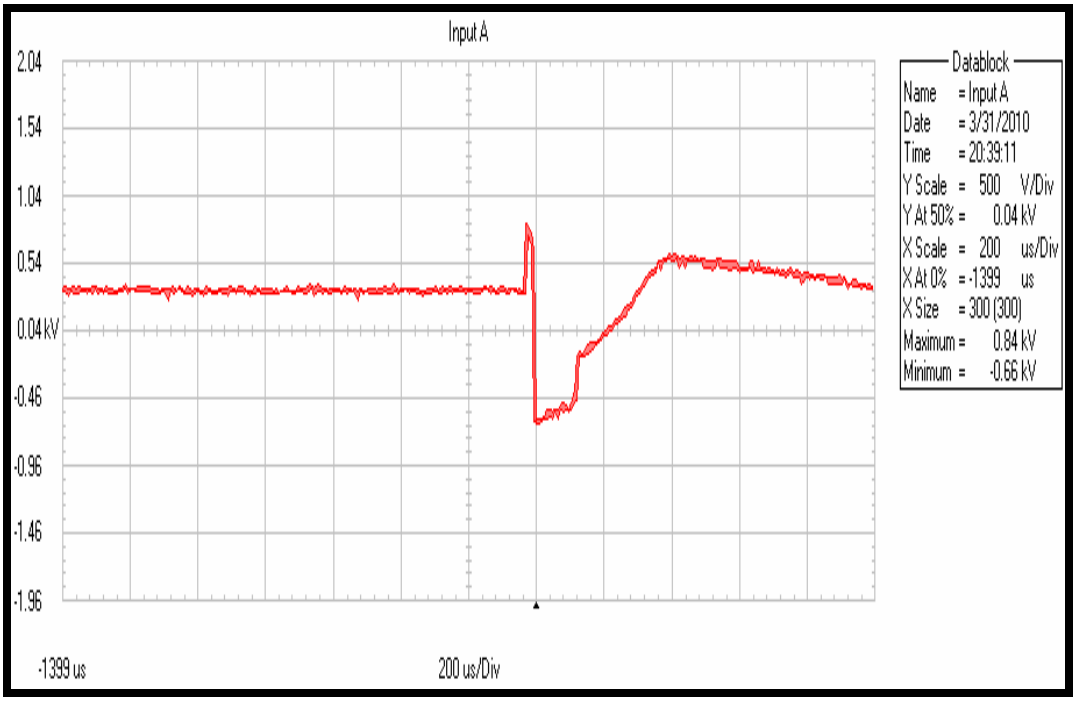

Plate 24: Voltage waveform at +6000V, 3000A Phase 2 to Neutral line.

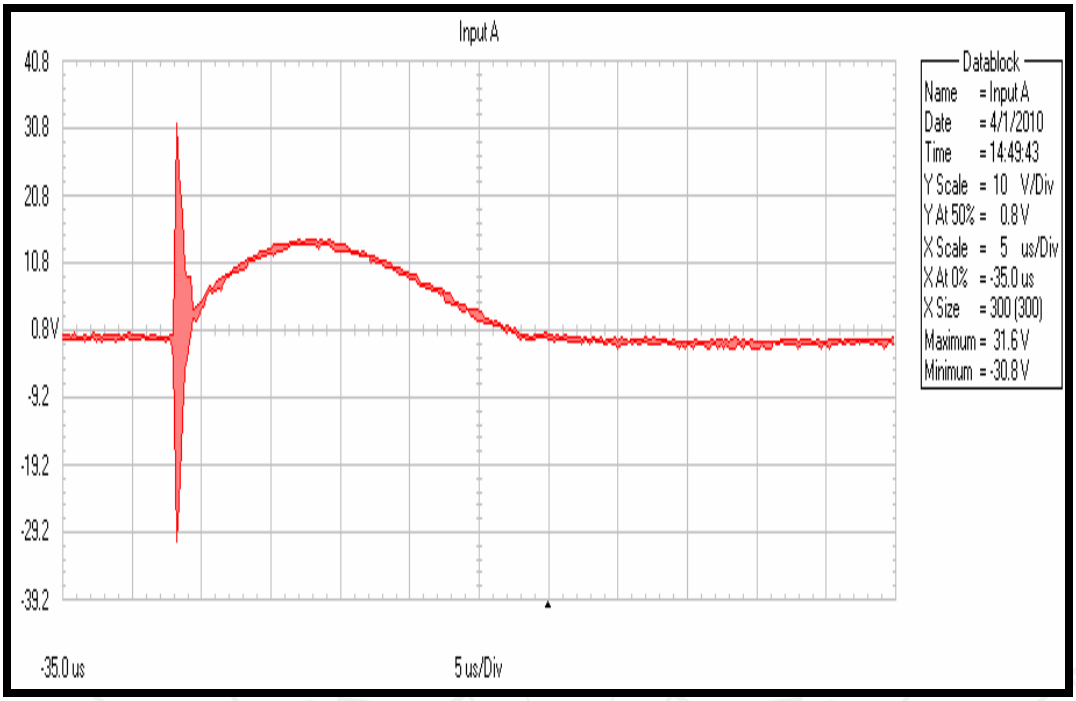

Plate 25: Current waveform at +6000V, 3000A Phase 2 to Neutral line.

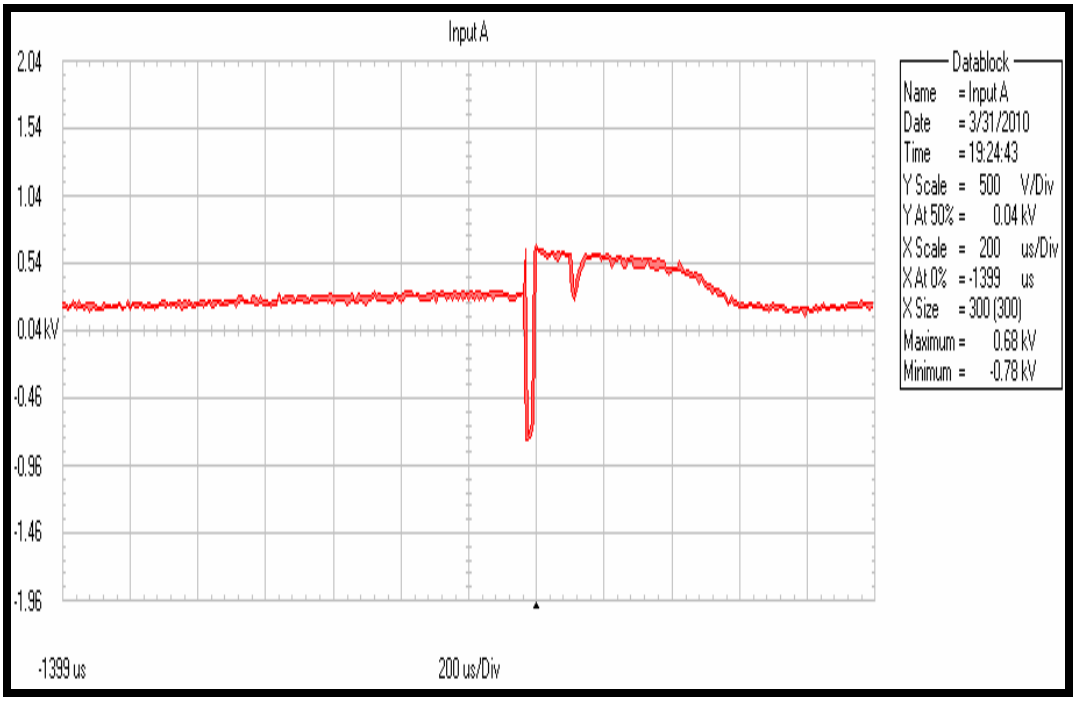

Plate 26: Voltage waveform at -6000V, 3000A Phase 2 to Neutral line.

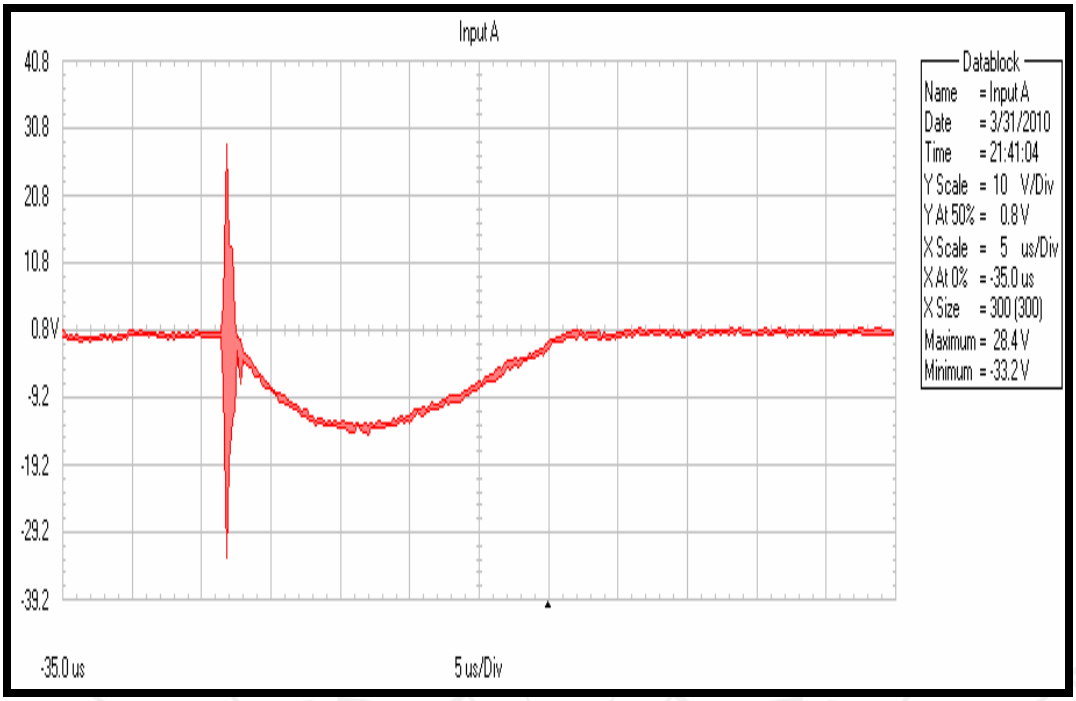

Plate 27: Current waveform at -6000V, 3000A Phase 2 to Neutral line.

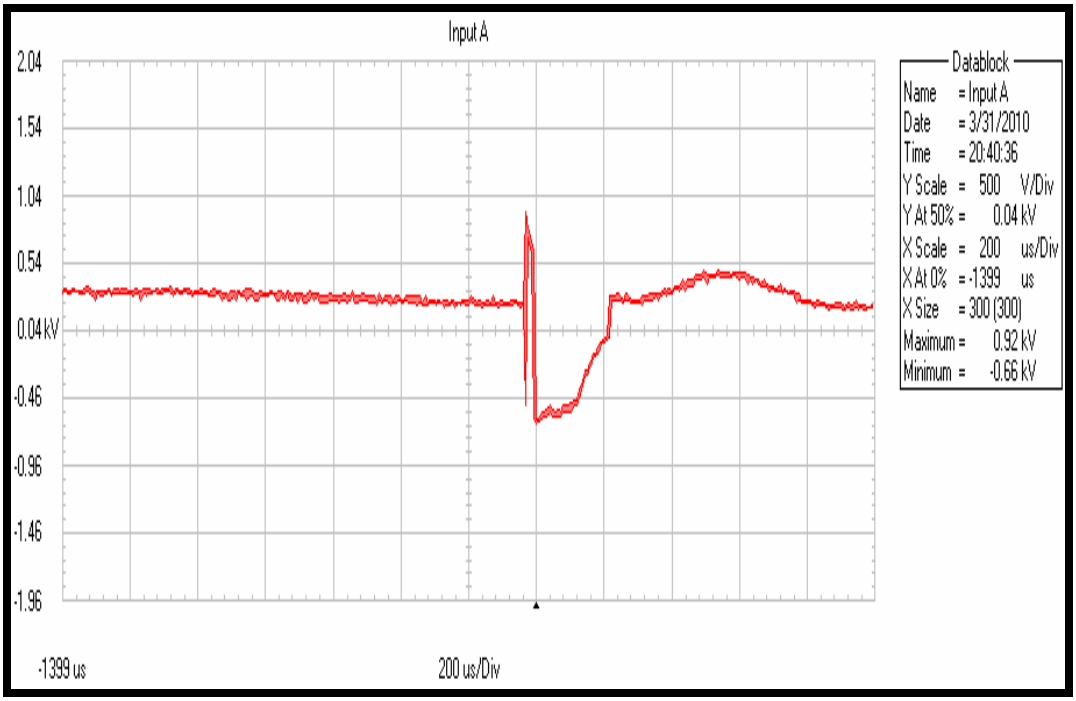

Plate 28: Voltage waveform at +6000V, 3000A Phase 3 to Neutral line.

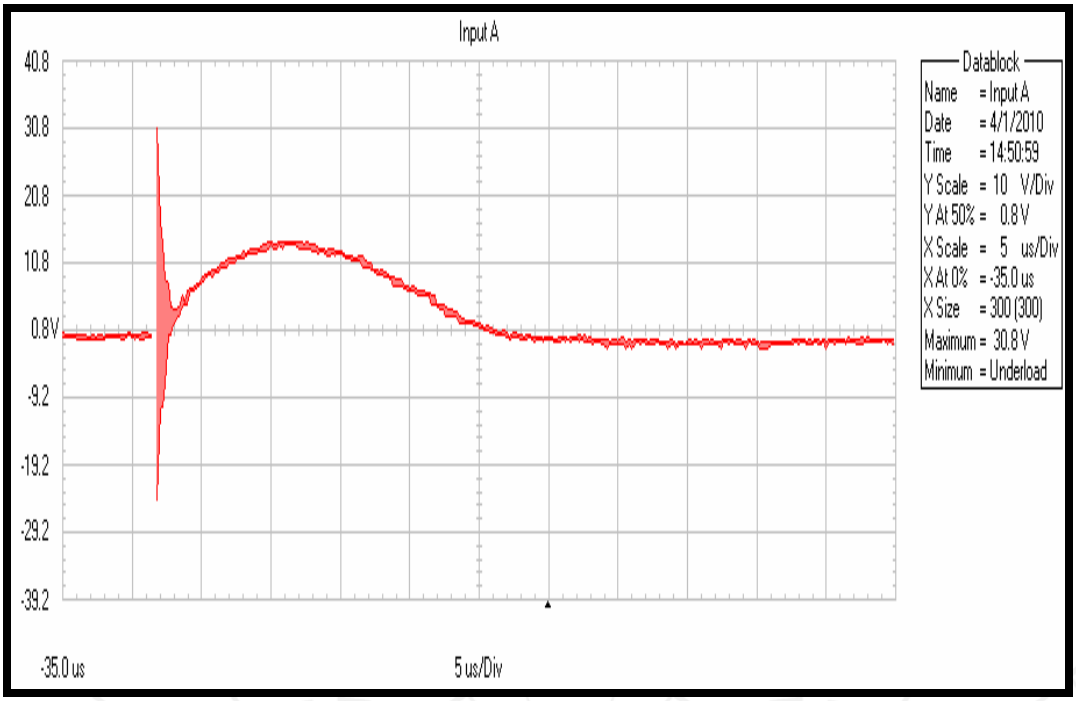

Plate 29: Current waveform at +6000V, 3000A Phase 3 to Neutral line.

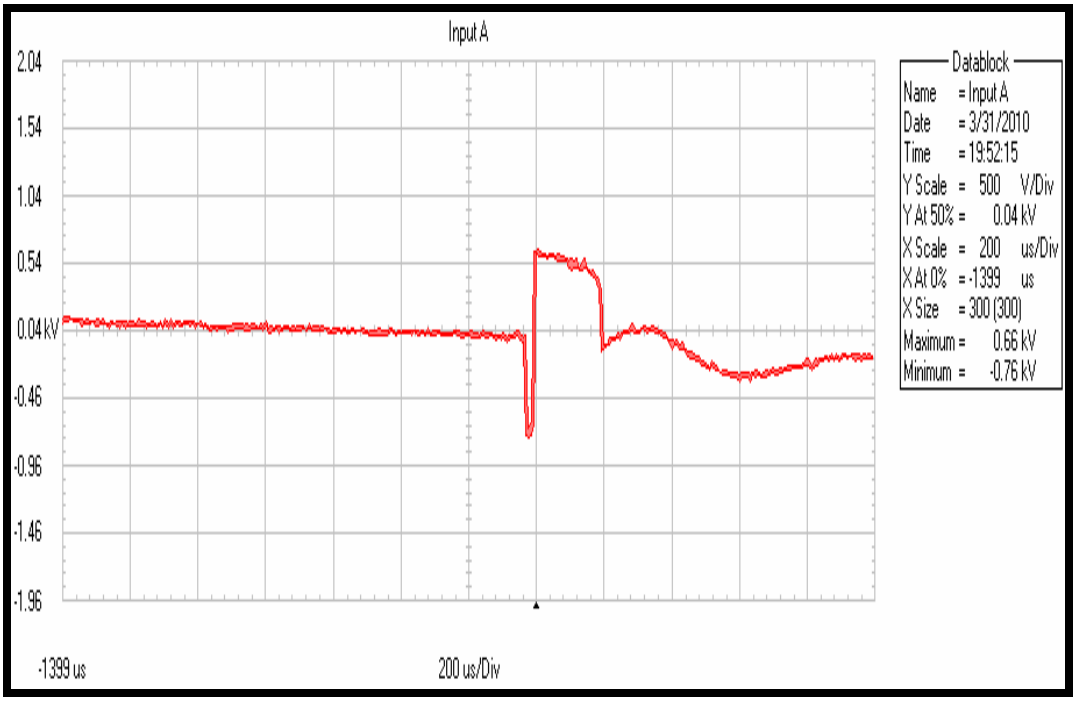

Plate 30: Voltage waveform at -6000V, 3000A Phase 3 to Neutral line.

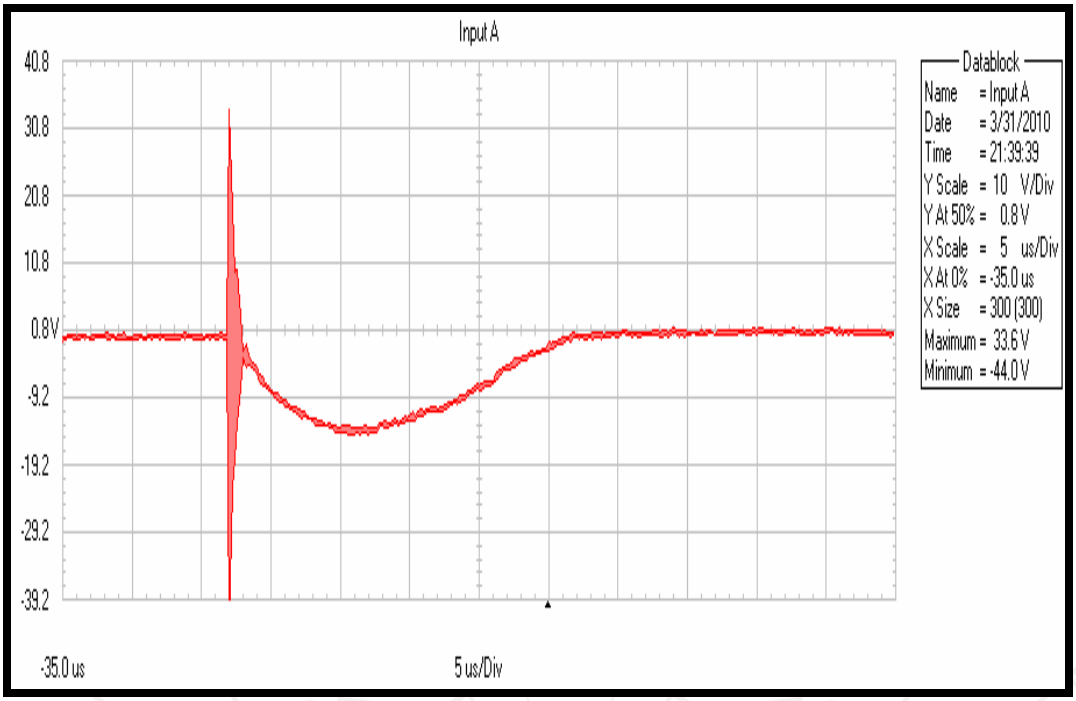

Plate 31: Current waveform at -6000V, 3000A Phase 3 to Neutral line.

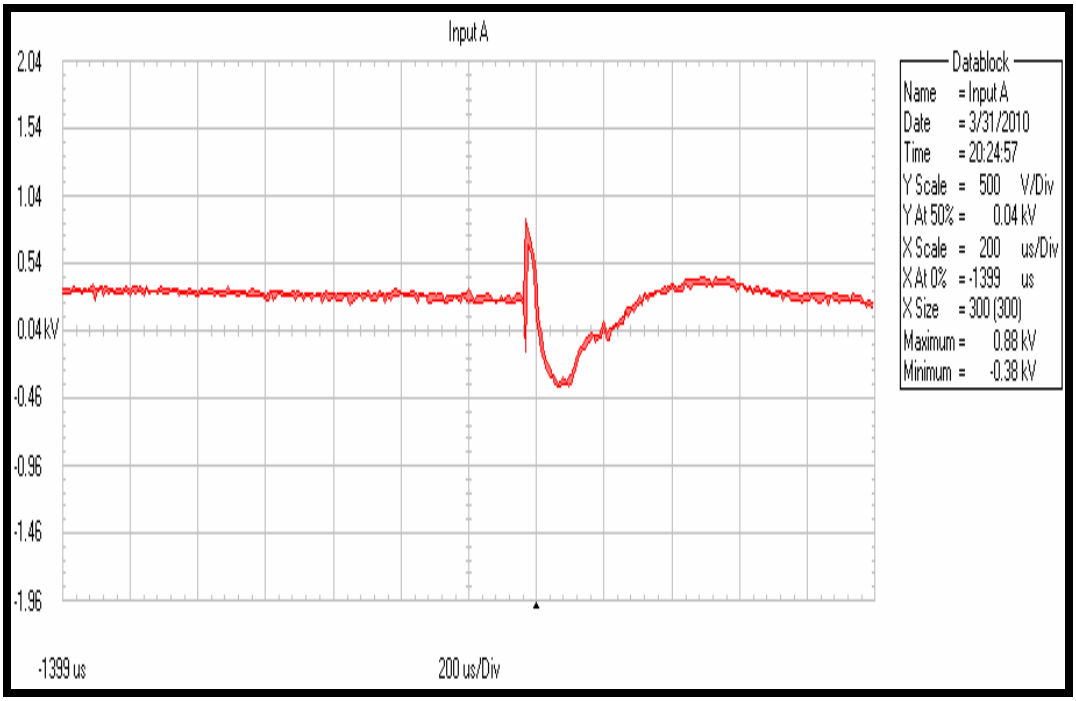

Plate 32: Voltage waveform at +6000V, 3000A Phase 1 to Phase 2.

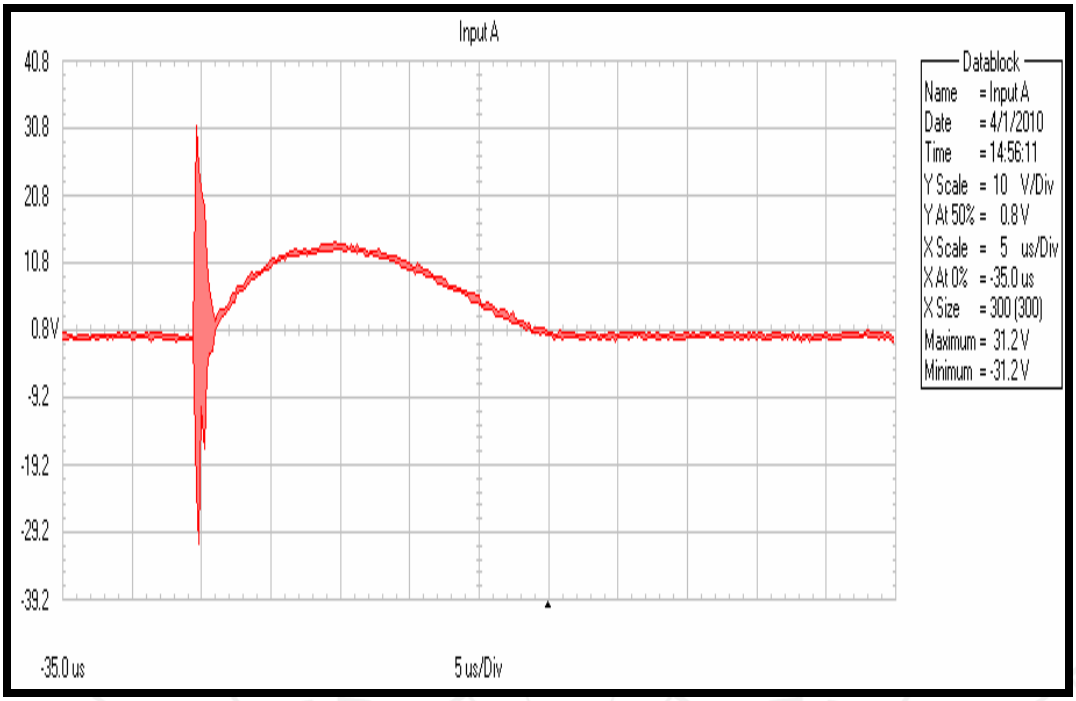

Plate 33: Current waveform at +6000V, 3000A Phase 1 to Phase 2.

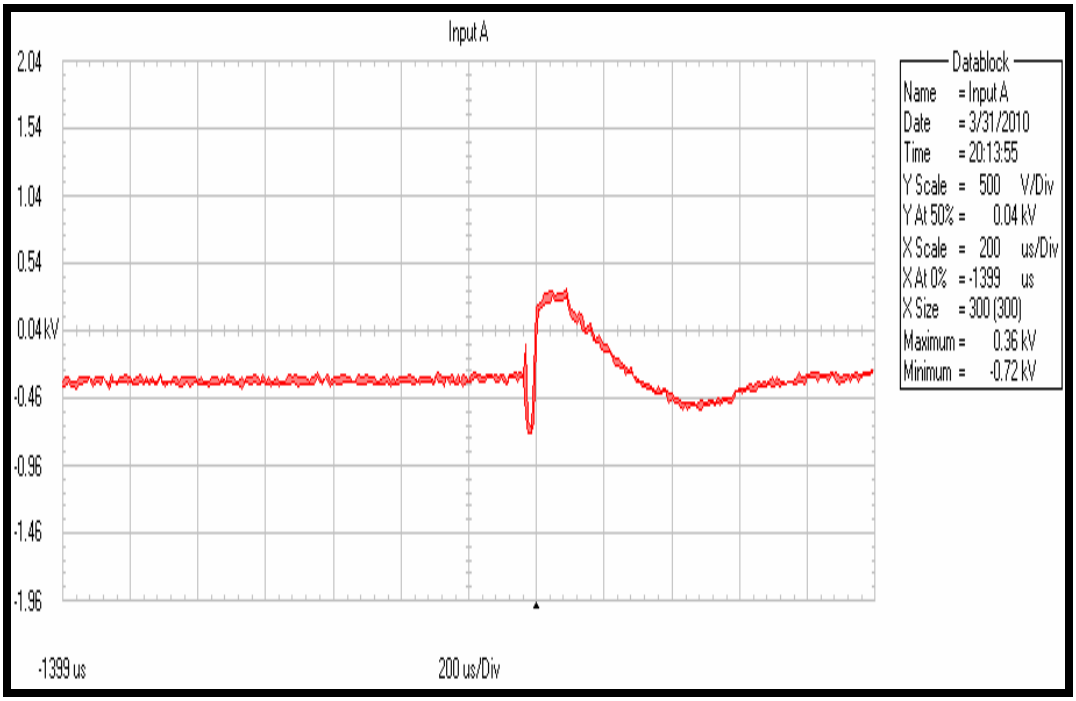

Plate 34: Voltage waveform at -6000V, 3000A Phase 1 to Phase 2.

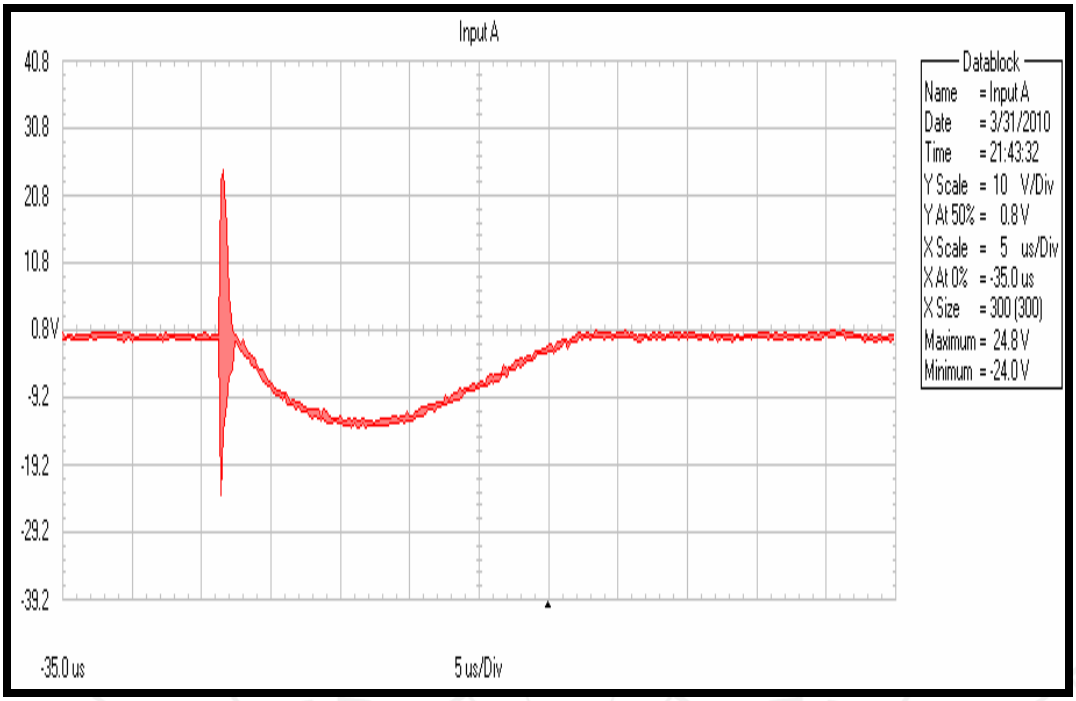

Plate 35: Current waveform at -6000V, 3000A Phase 1 to Phase 2.

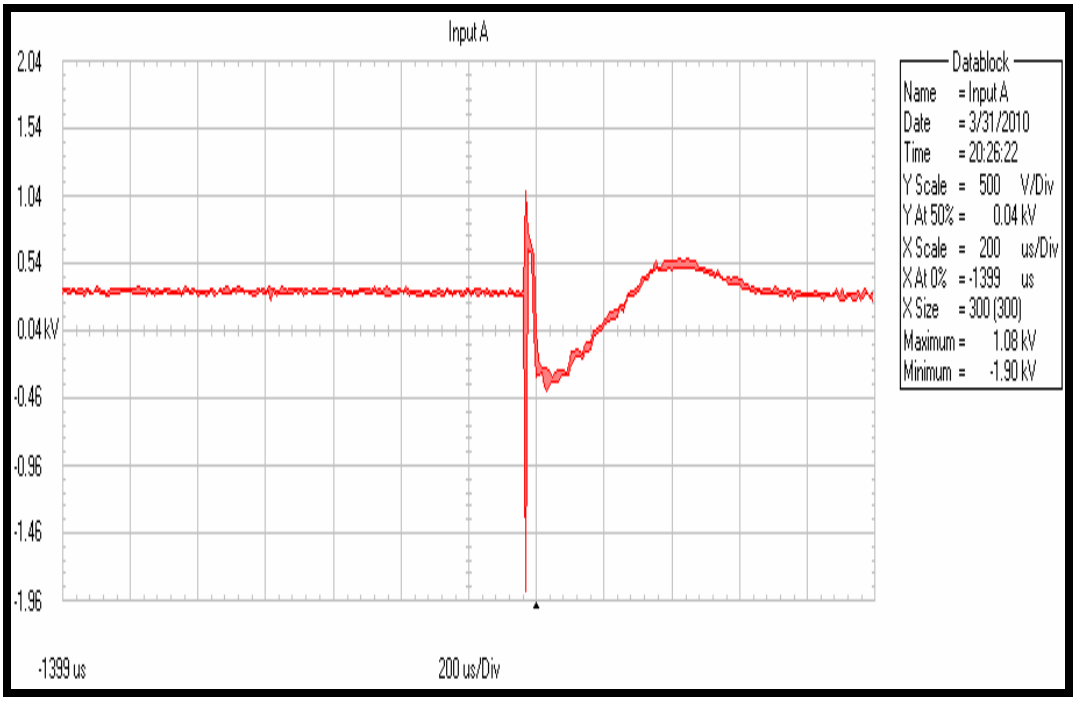

Plate 36: Voltage waveform at +6000V, 3000A Phase 1 to Phase 3.

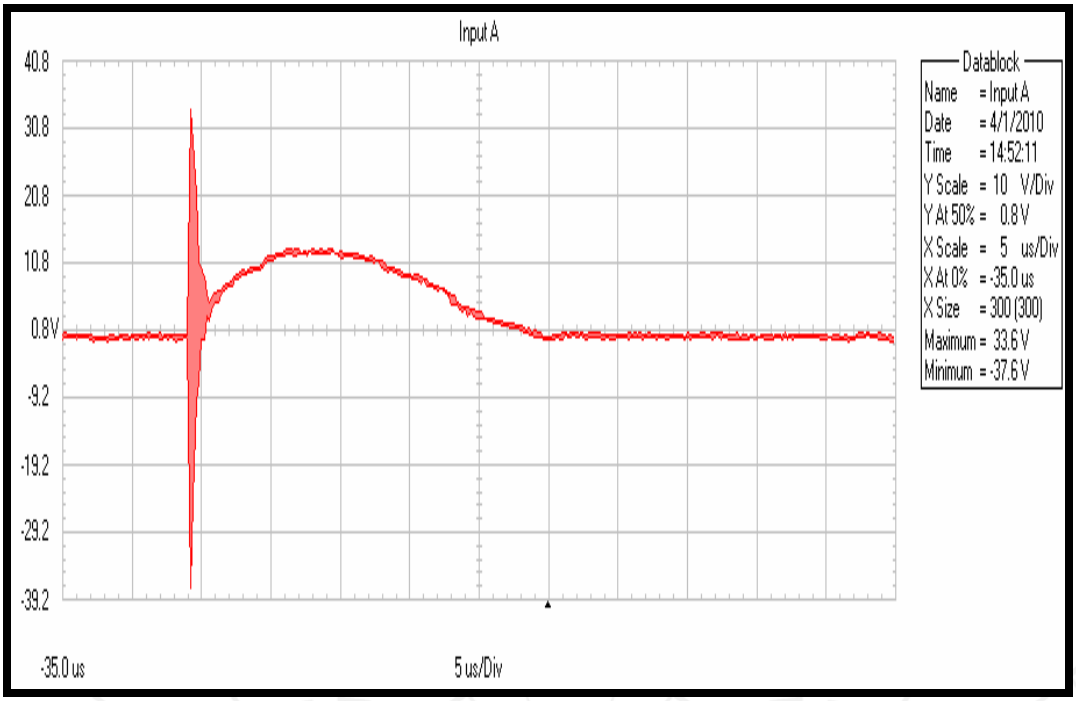

Plate 37: Current waveform at +6000V, 3000A Phase 1 to Phase 3.

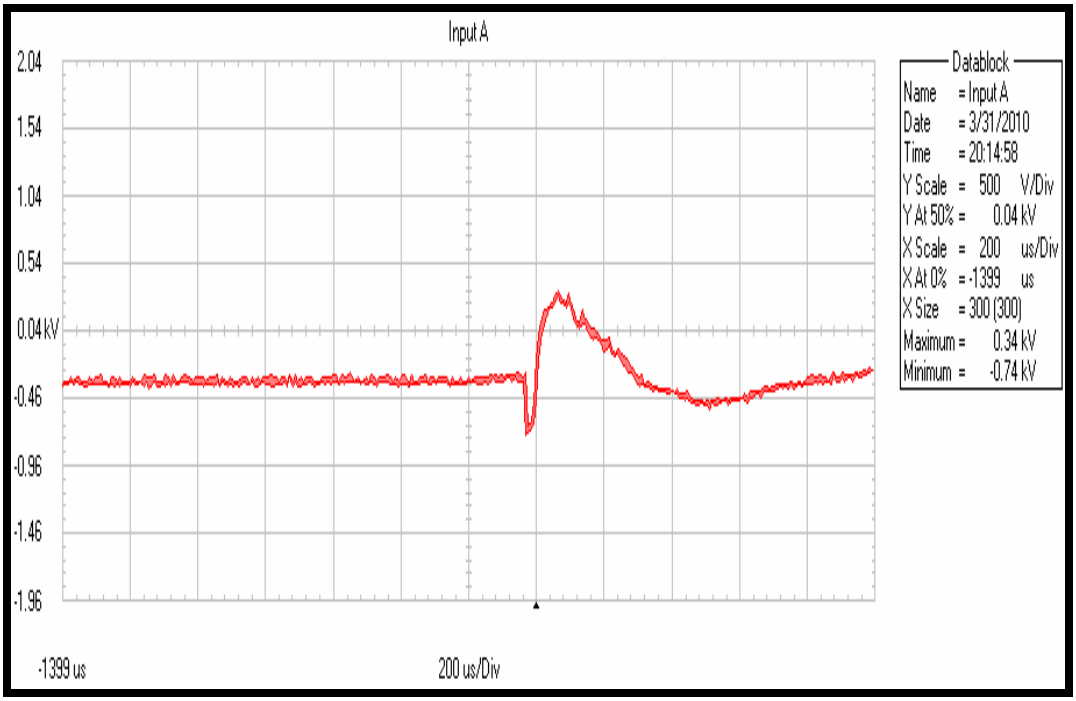

Plate 38: Voltage waveform at -6000V, 3000A Phase 1 to Phase 3.

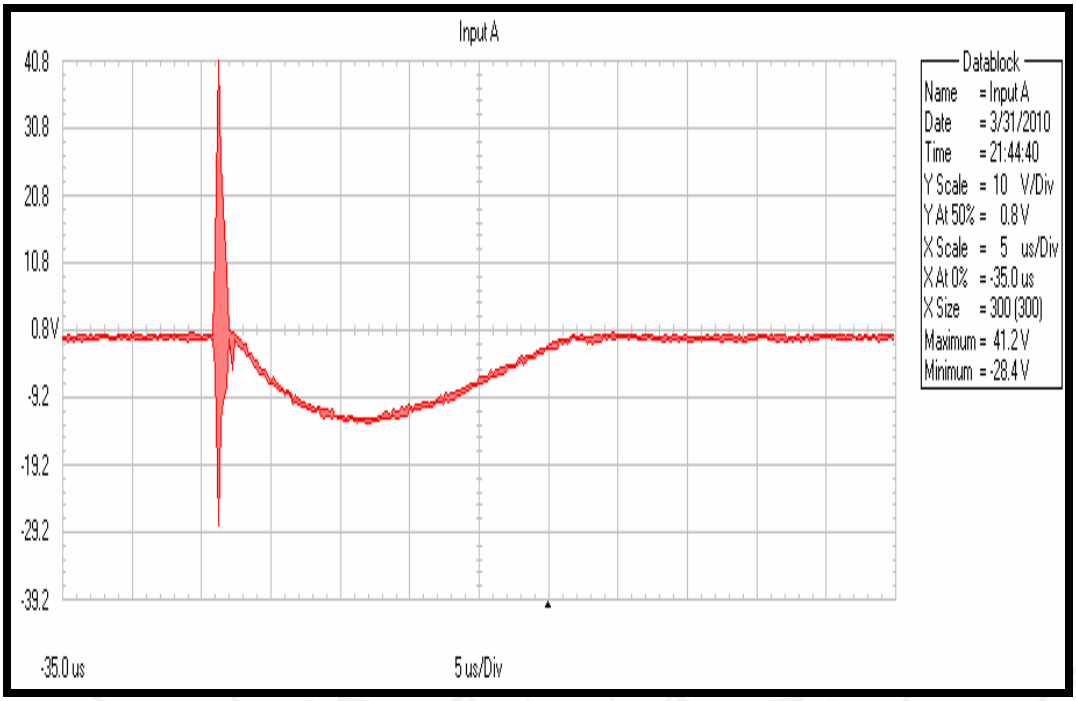

Plate 39: Current waveform at -6000V, 3000A Phase 1 to Phase 3.

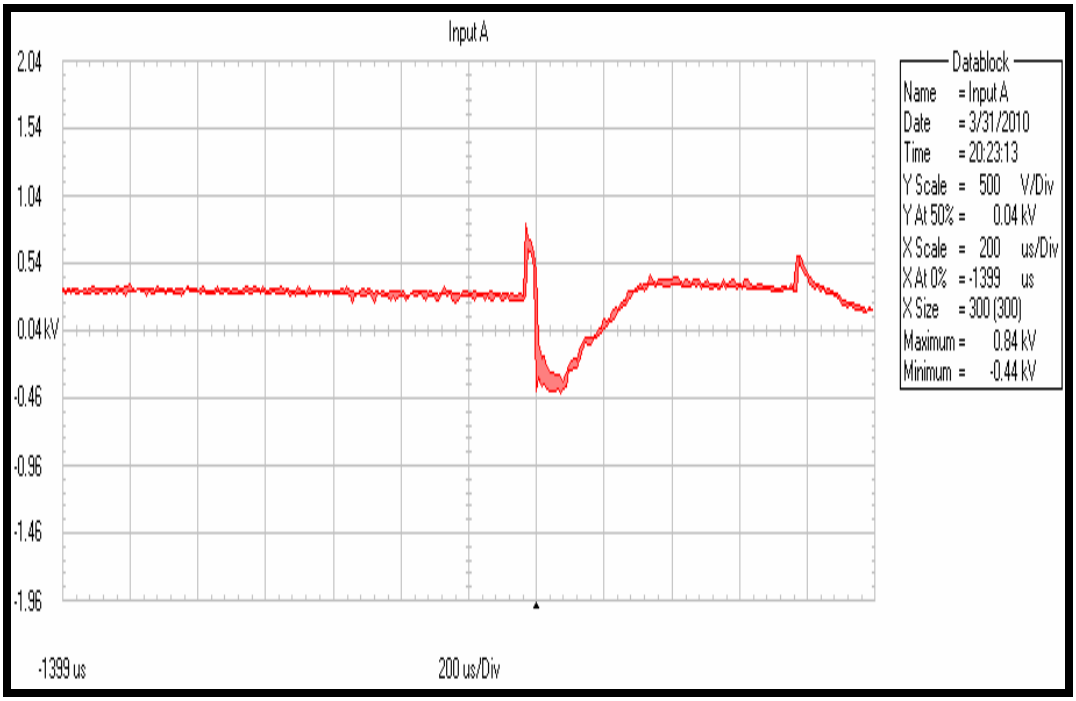

Plate 40: Voltage waveform at +6000V, 3000A Phase 2 to Phase 3.

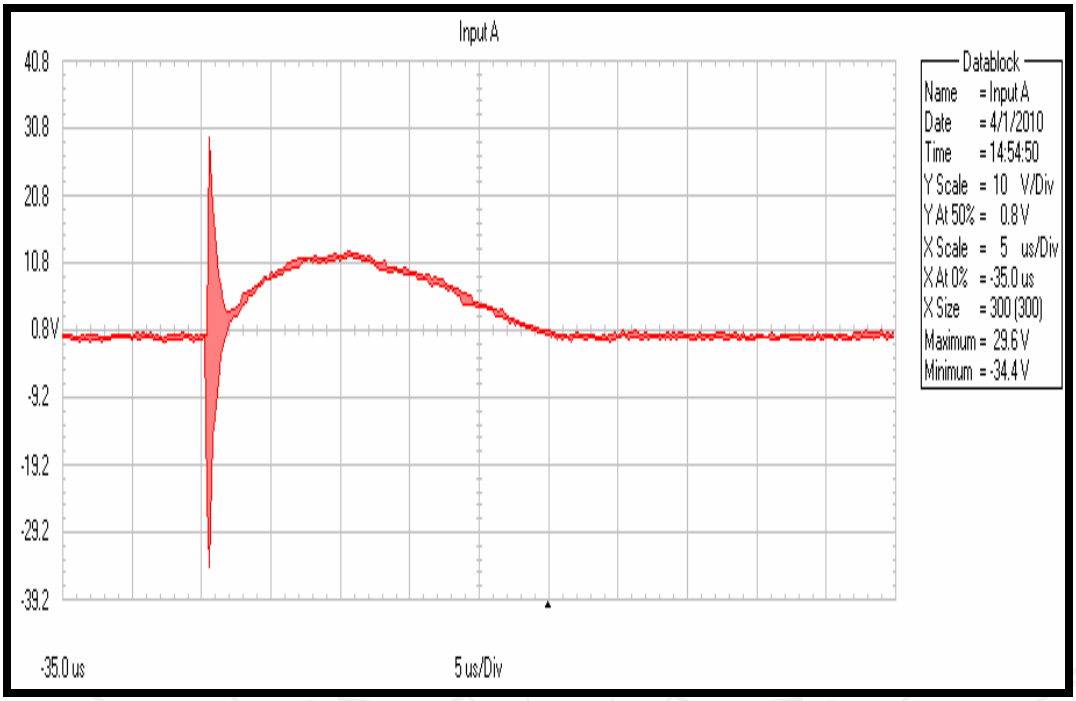

Plate 41: Current waveform at +6000V, 3000A Phase 2 to Phase 3.

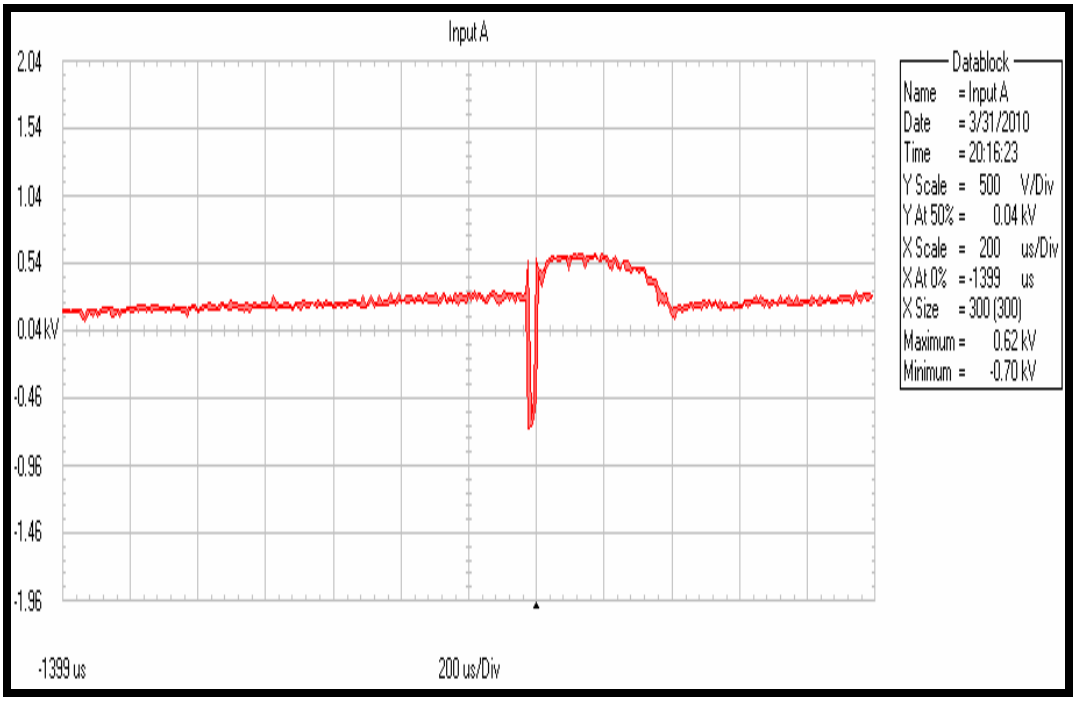

Plate 42: Voltage waveform at -6000V, 3000A Phase 2 to Phase 3.

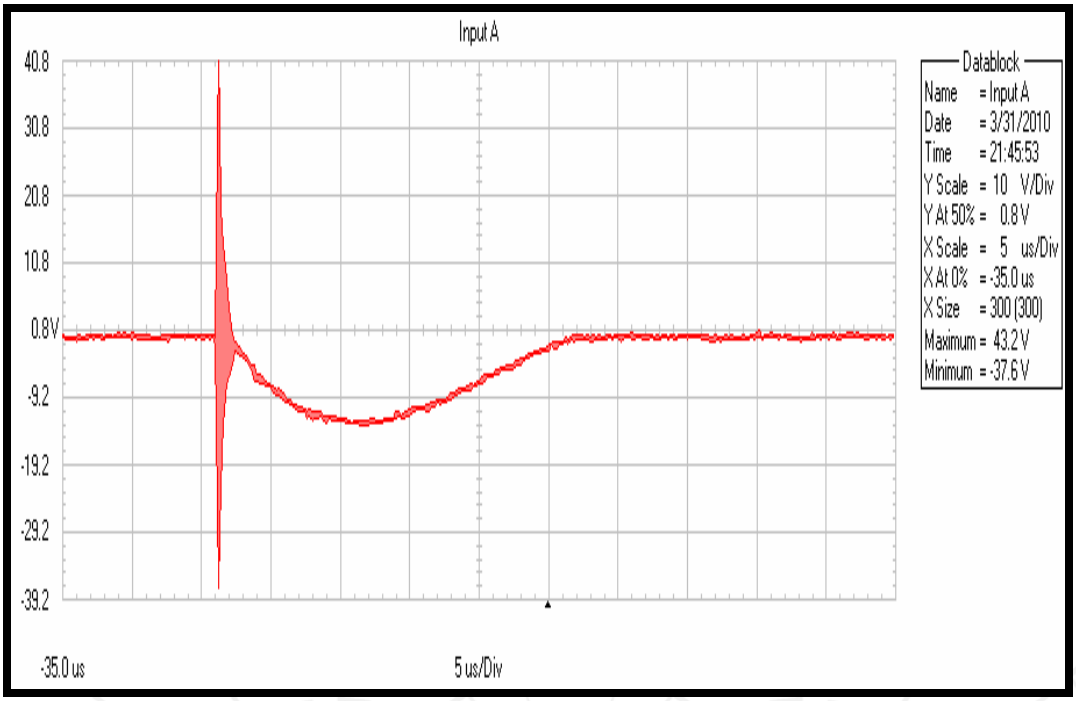

Plate 43: Current waveform at -6000V, 3000A Phase 2 to Phase 3.

IEC 61643-1:2005 Clause 7.6.5/7.6.6 – Class II Operating Duty Test

The EUT was tested in accordance with the methodology and procedures of Clause 7.6.5 for a Class II device and has passed the performance criteria outlined in Clause 7.6.6.

Results:

	1.00 x Imax = 3000A	0.75 x Imax = 2250A	0.50 x Imax = 1500A	0.25 x Imax = 750A	0.10 x Imax = 300A
L1/E	780	840	780	680	600
L2/E	860	940	760	700	640
L3/E	820	880	800	700	640
N/E	760	800	740	680	580
L1/N	920	880	800	700	640
L2/N	840	840	840	700	640
L3/N	920	920	800	700	640
L1/L2	880	760	800	680	620
L1/L3	1080	840	800	680	580
L2/L3	840	860	760	680	560

Plate 44: Surge Residual Voltage Reference Data.

One sequence of positive polarity was applied to the SPD for each line combination for each sample.

All follow current was self-extinguished and thermal stability was achieved after each impulse of the operating duty test. Once thermal stability was achieved, the post surge leakage current was measured (see table below) and met the Pass Criteria requirements of < 1mA.

	Sample 1	Sample 2	Sample 3
Leakage Current (µA)	493	551	507

Plate 45: Post Surge Leakage Current Reference Data.

Following the complete test sequence and after the sample had cooled down to near ambient temperature, the measured limiting voltage test, which was made at the beginning of the test sequence, was repeated. The values measured before and after the test were below that of the voltage protection level, U_p = 0.9kV. The EUT, therefore, is deemed to have passed the test requirements of Clause 7.6.5/7.6.6.

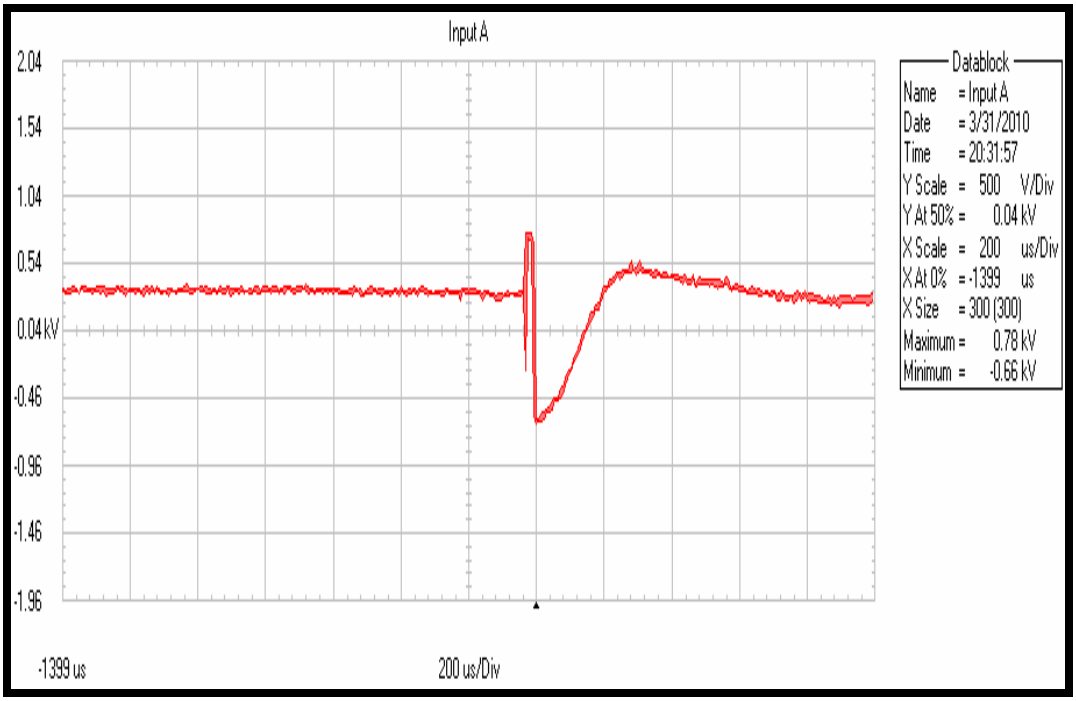

Plate 46: Voltage waveform at +6000V, 3000A Phase 1 to Protective Earth.

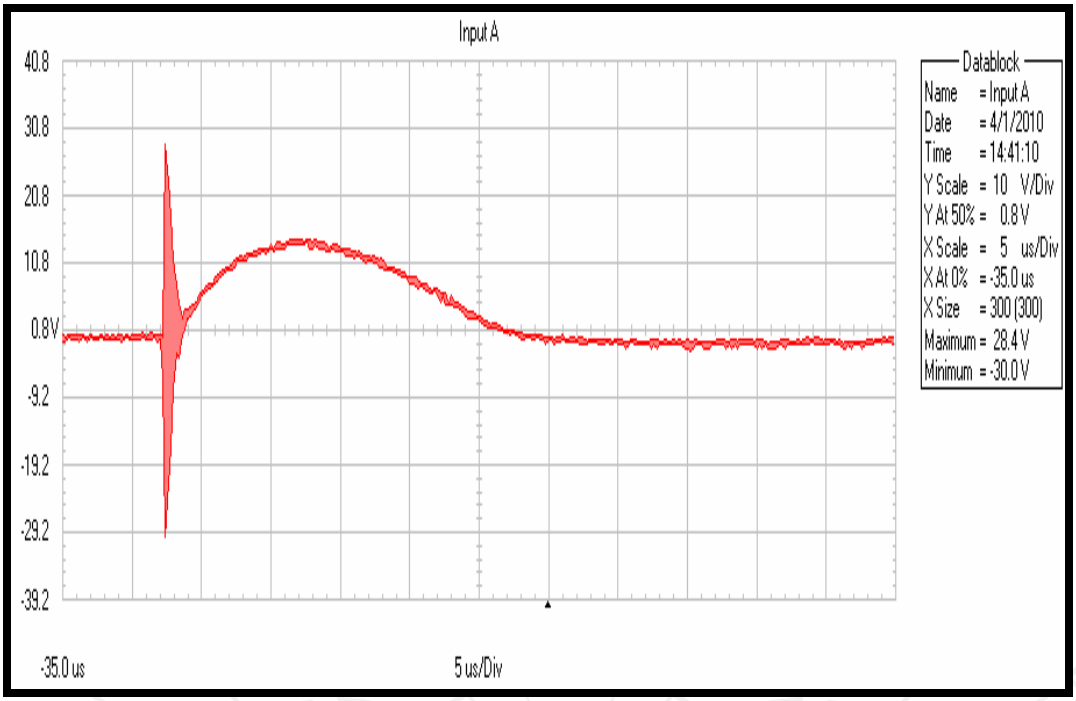

Plate 47: Current waveform at +6000V, 3000A Phase 1 to Protective Earth.

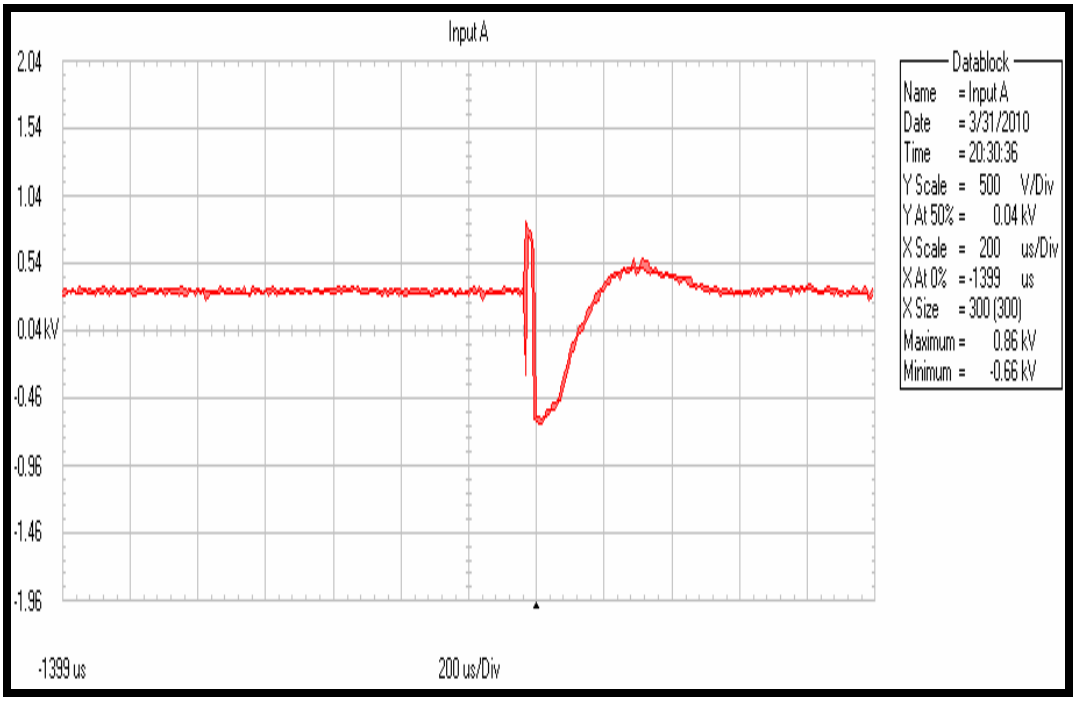

Plate 48: Voltage waveform at +6000V, 3000A Phase 2 to Protective Earth.

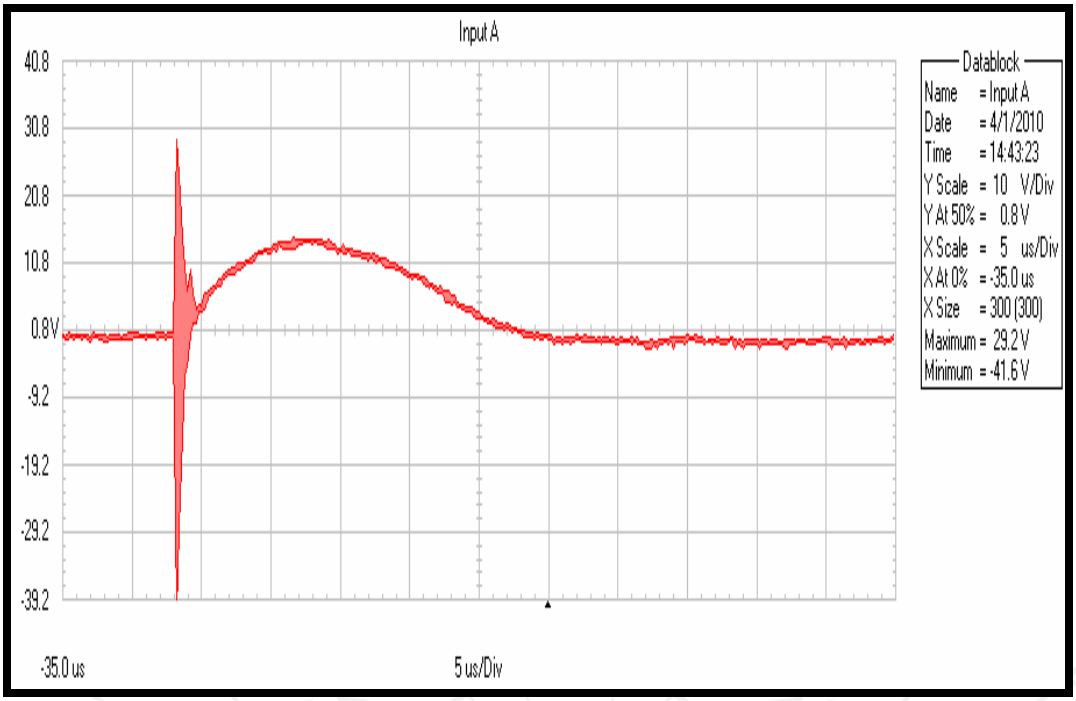

Plate 49: Current waveform at +6000V, 3000A Phase 2 to Protective Earth.

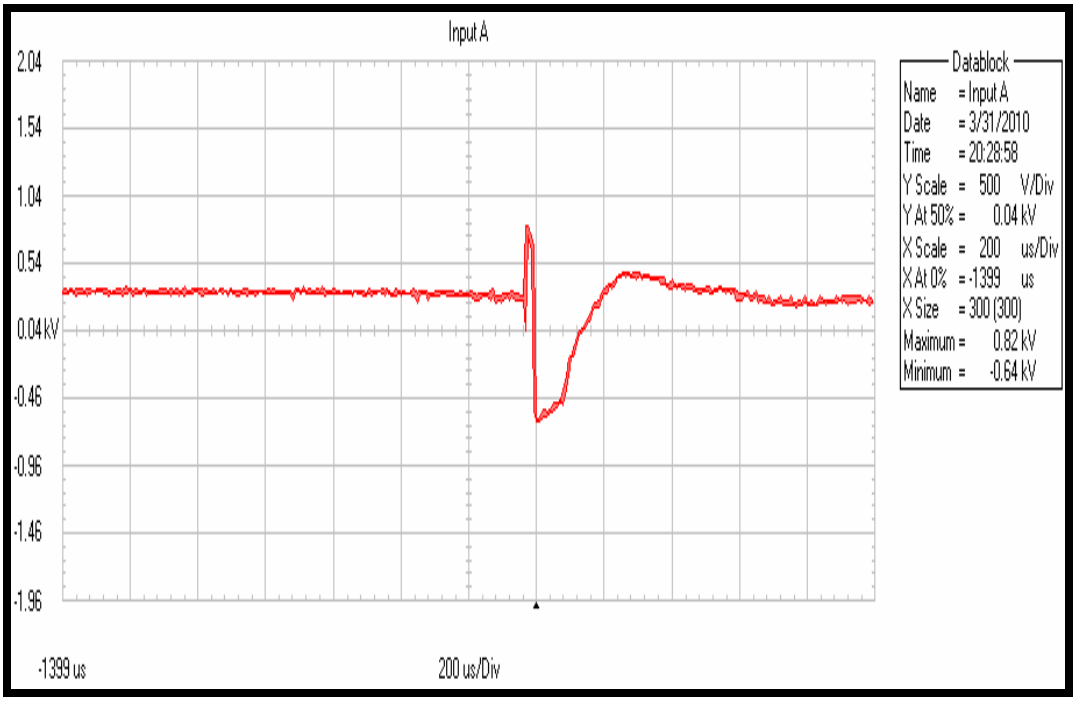

Plate 50: Voltage waveform at +6000V, 3000A Phase 3 to Protective Earth.

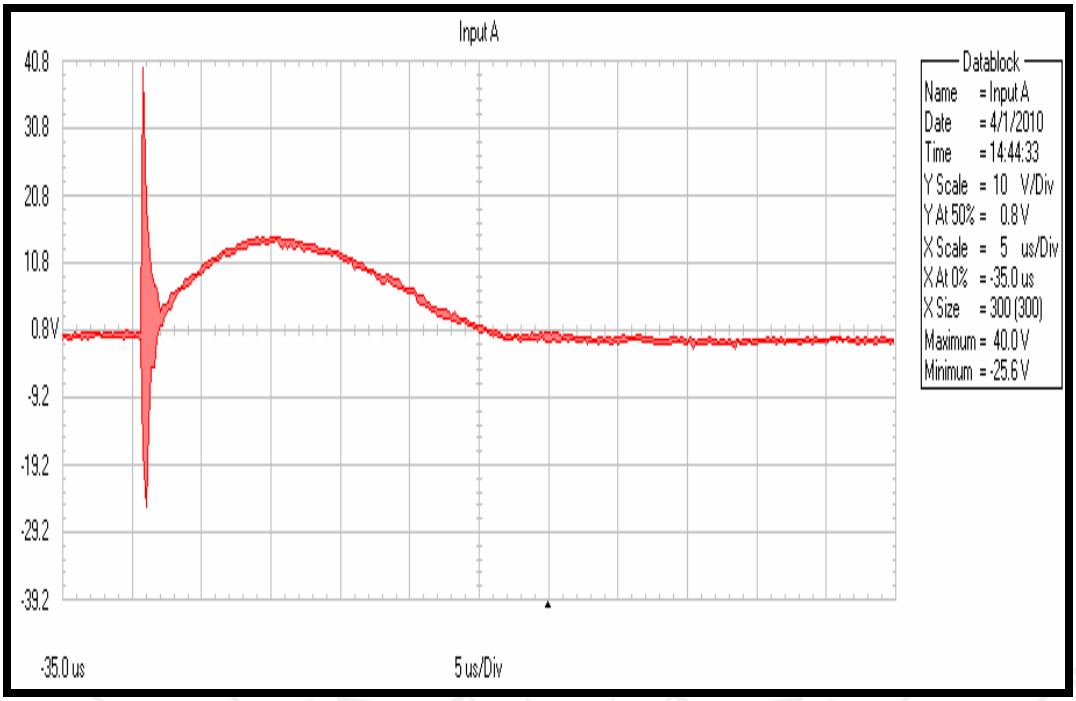

Plate 51: Current waveform at +6000V, 3000A Phase 3 to Protective Earth.

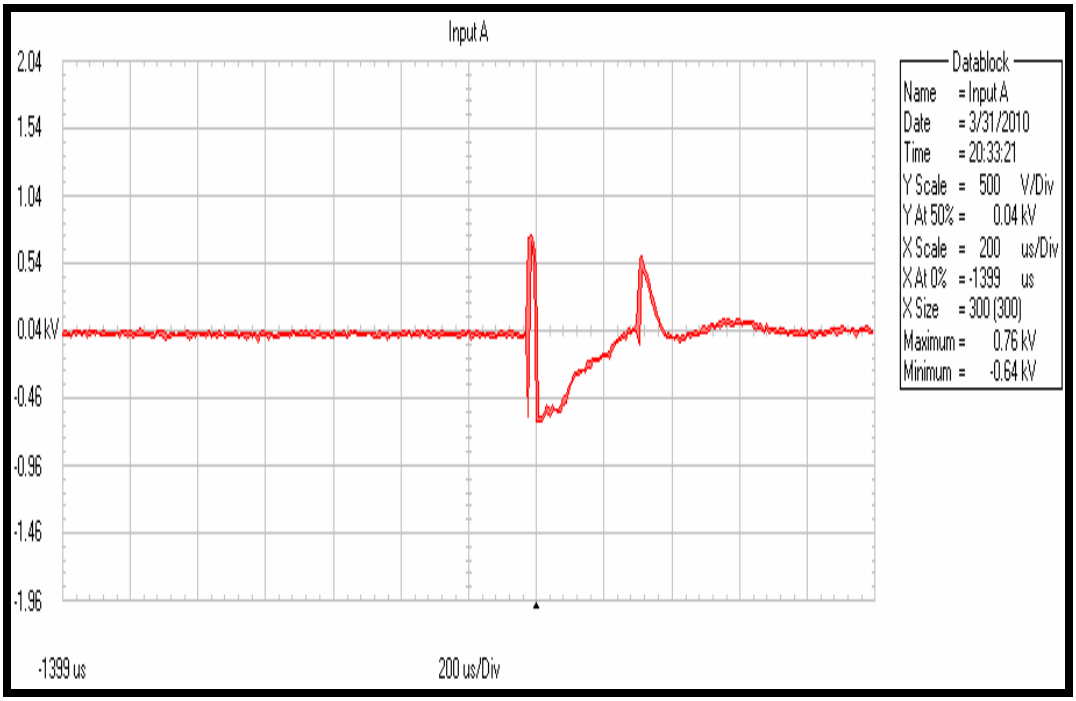

Plate 52: Voltage waveform at +6000V, 3000A Neutral line to Protective Earth.

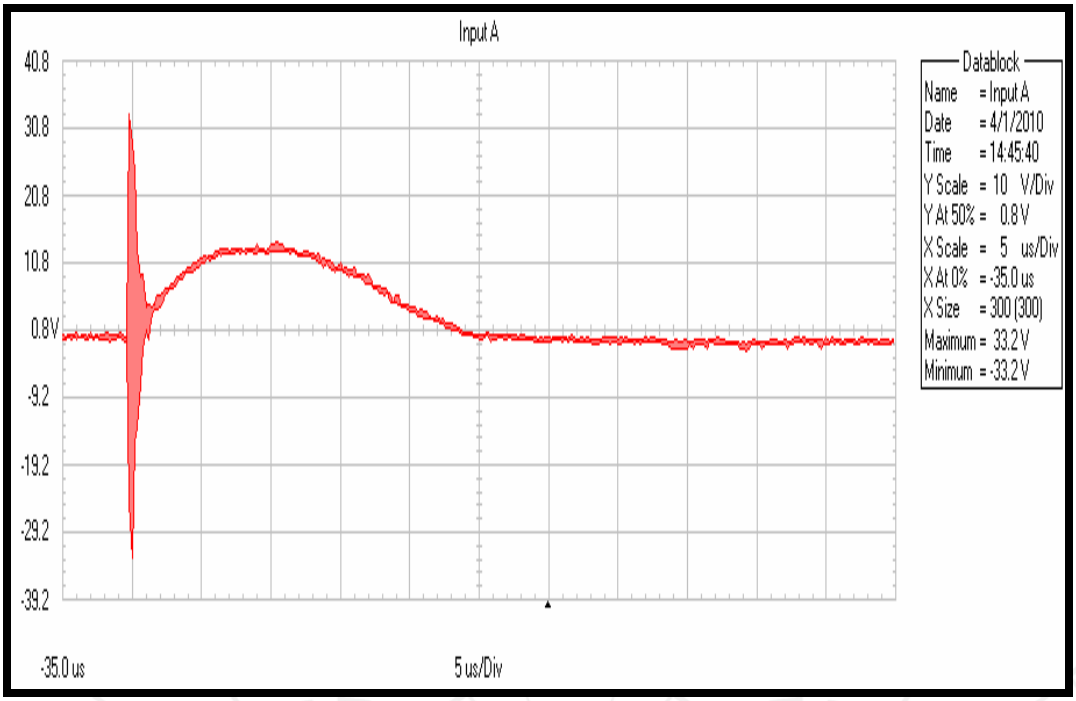

Plate 53: Current waveform at +6000V, 3000A Neutral line to Protective Earth.

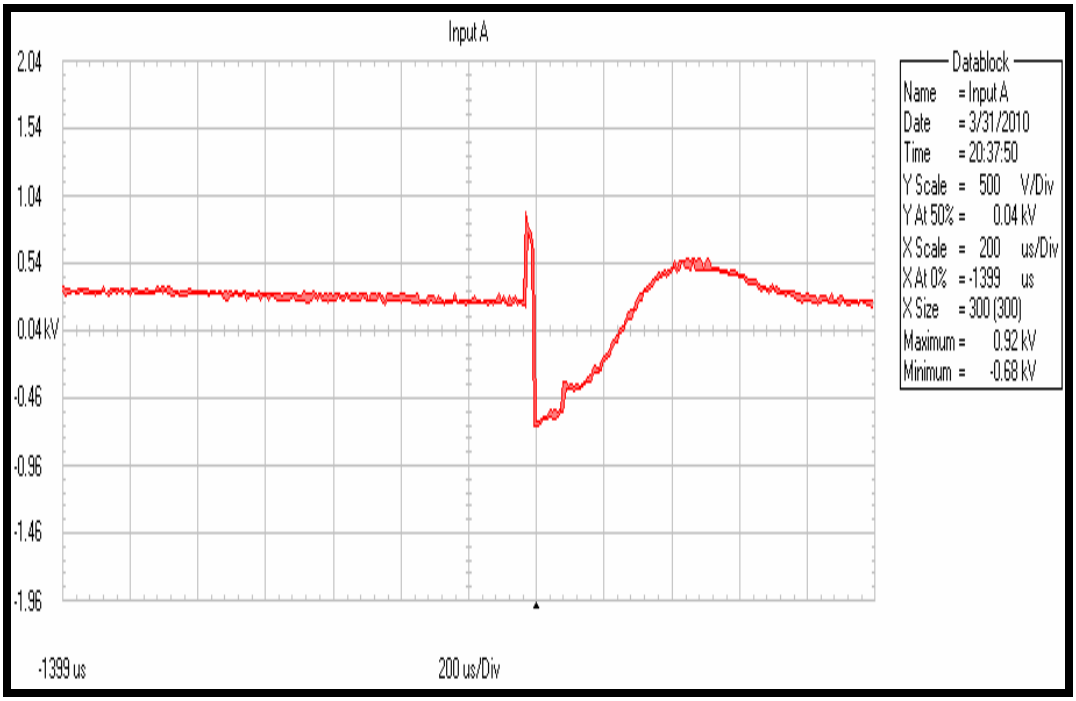

Plate 54: Voltage waveform at +6000V, 3000A Phase 1 to Neutral line.

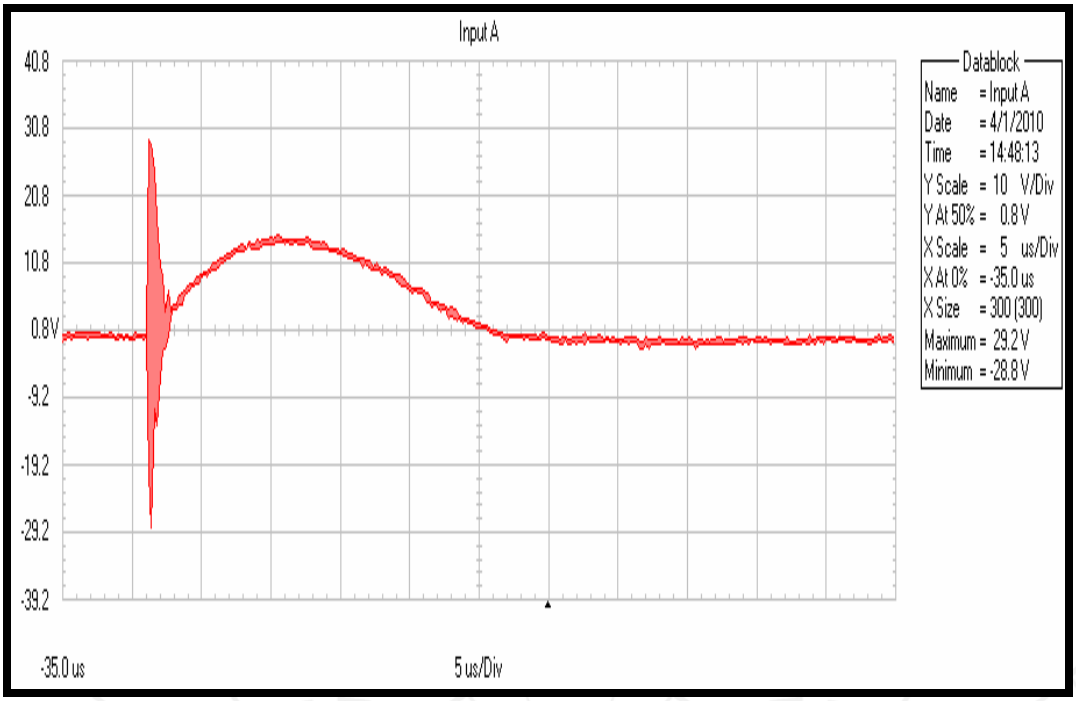

Plate 55: Current waveform at +6000V, 3000A Phase 1 to Neutral line.

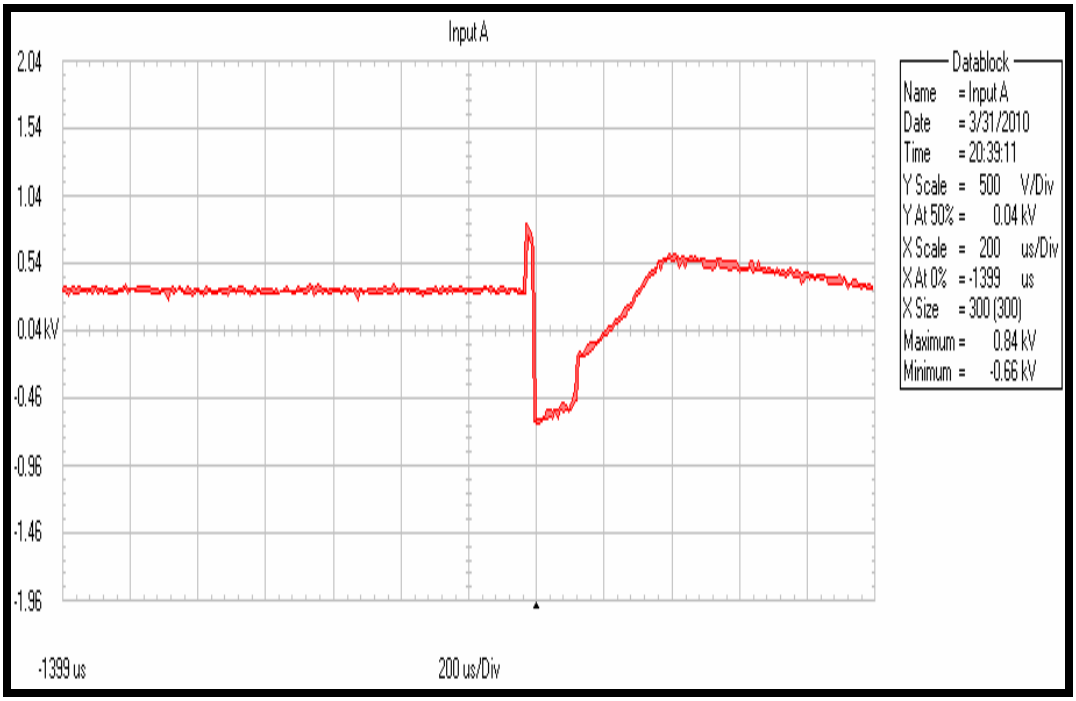

Plate 56: Voltage waveform at +6000V, 3000A Phase 2 to Neutral line.

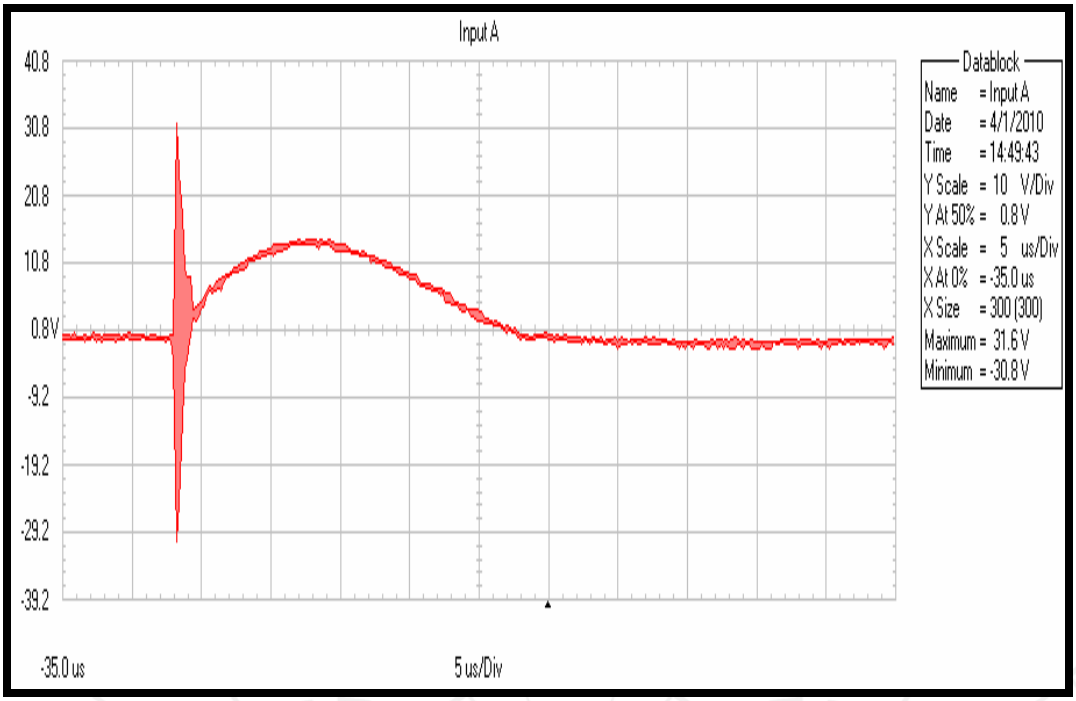

Plate 57: Current waveform at +6000V, 3000A Phase 2 to Neutral line.

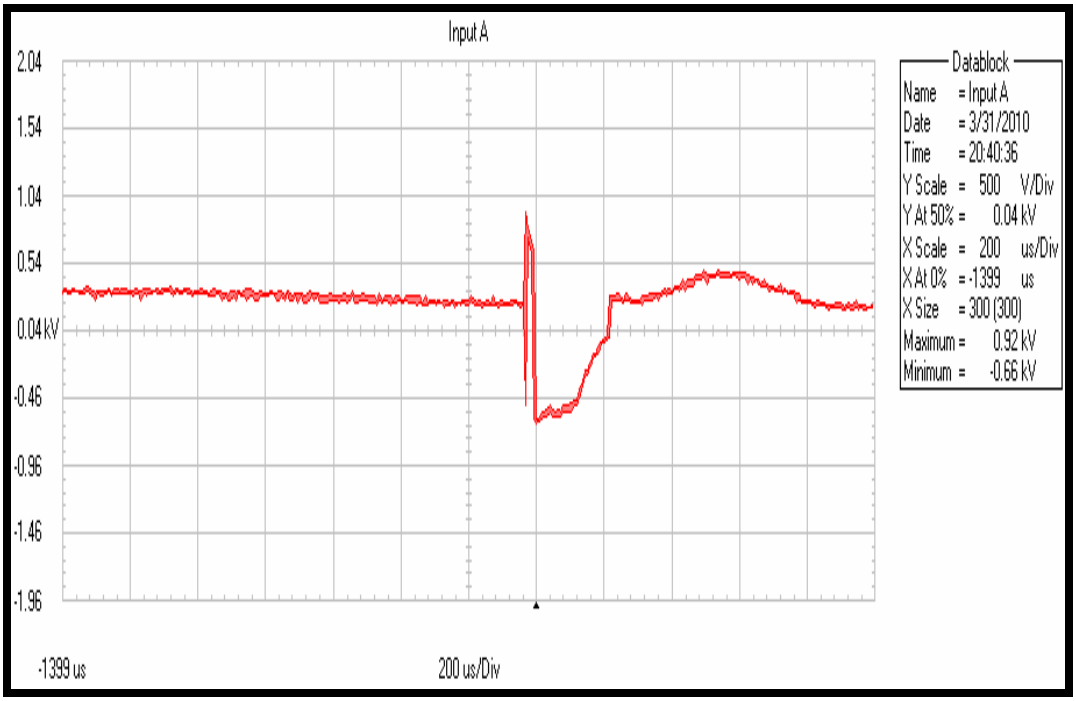

Plate 58: Voltage waveform at +6000V, 3000A Phase 3 to Neutral line.

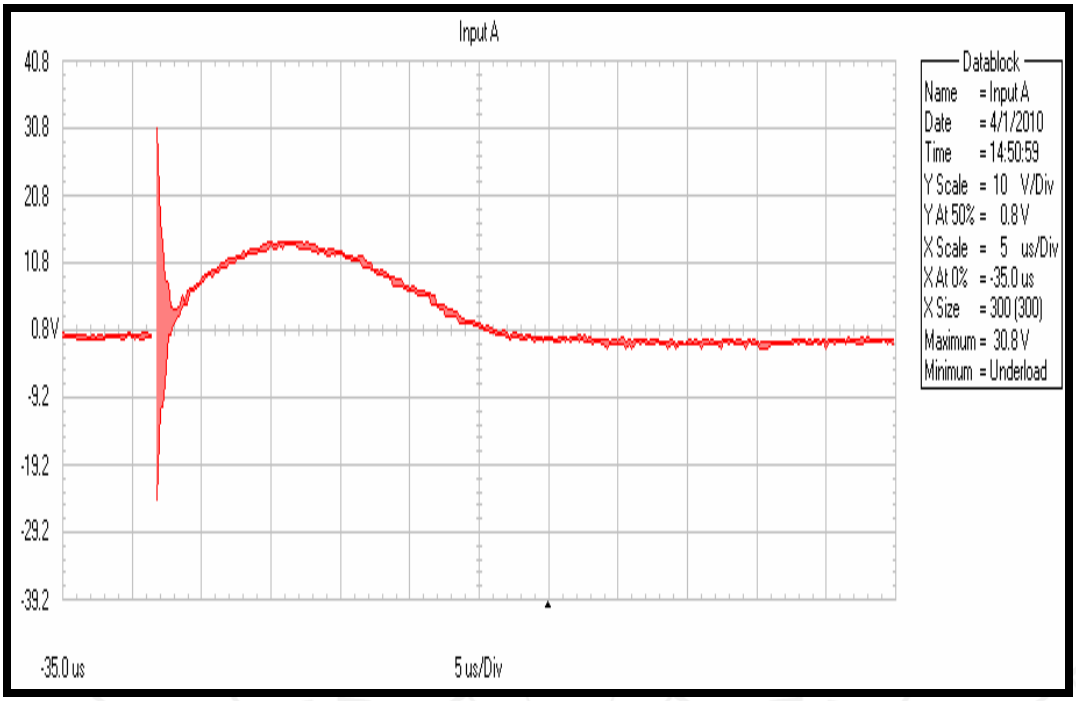

Plate 59: Current waveform at +6000V, 3000A Phase 3 to Neutral line.

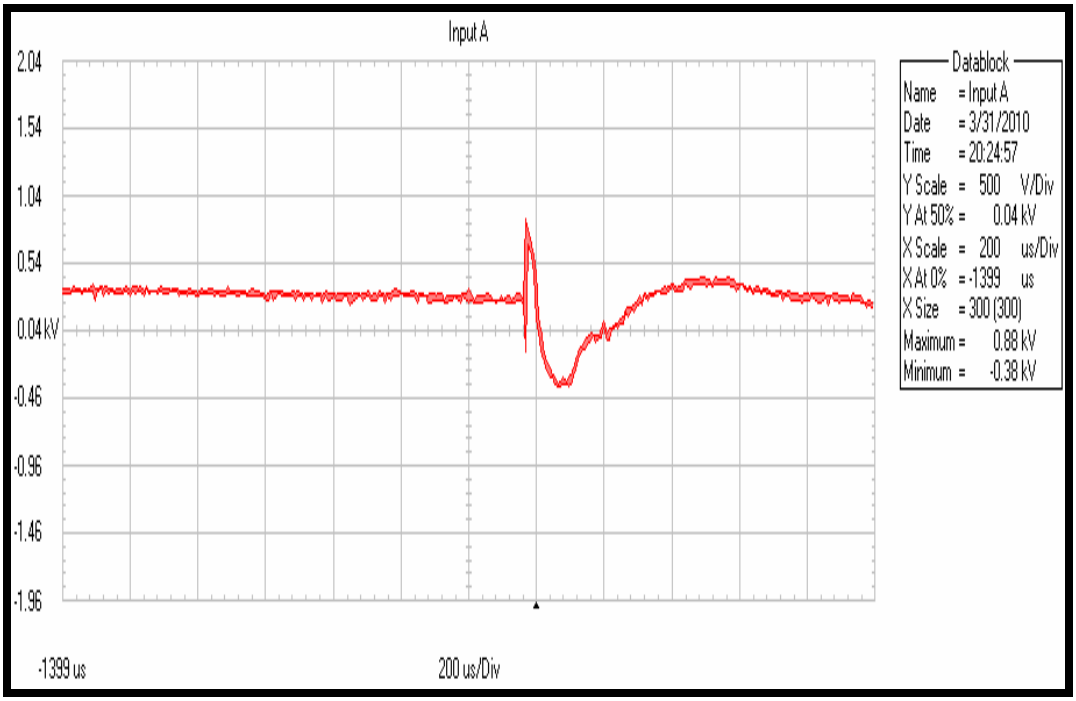

Plate 60: Voltage waveform at +6000V, 3000A Phase 1 to Phase 2.

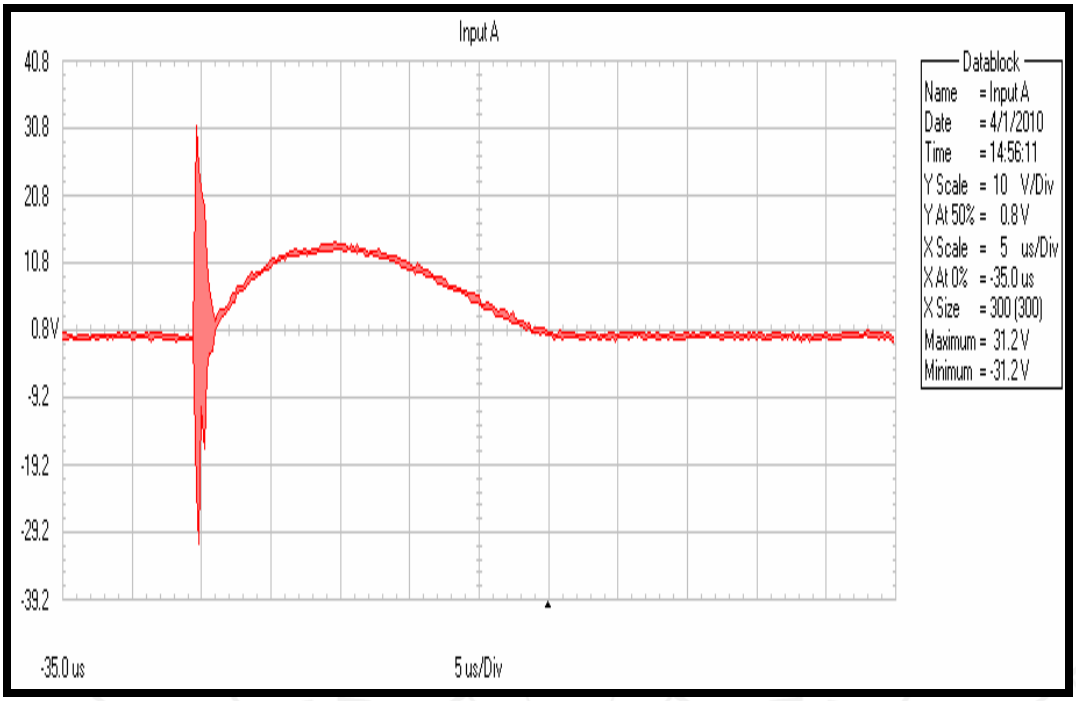

Plate 61: Current waveform at +6000V, 3000A Phase 1 to Phase 2.

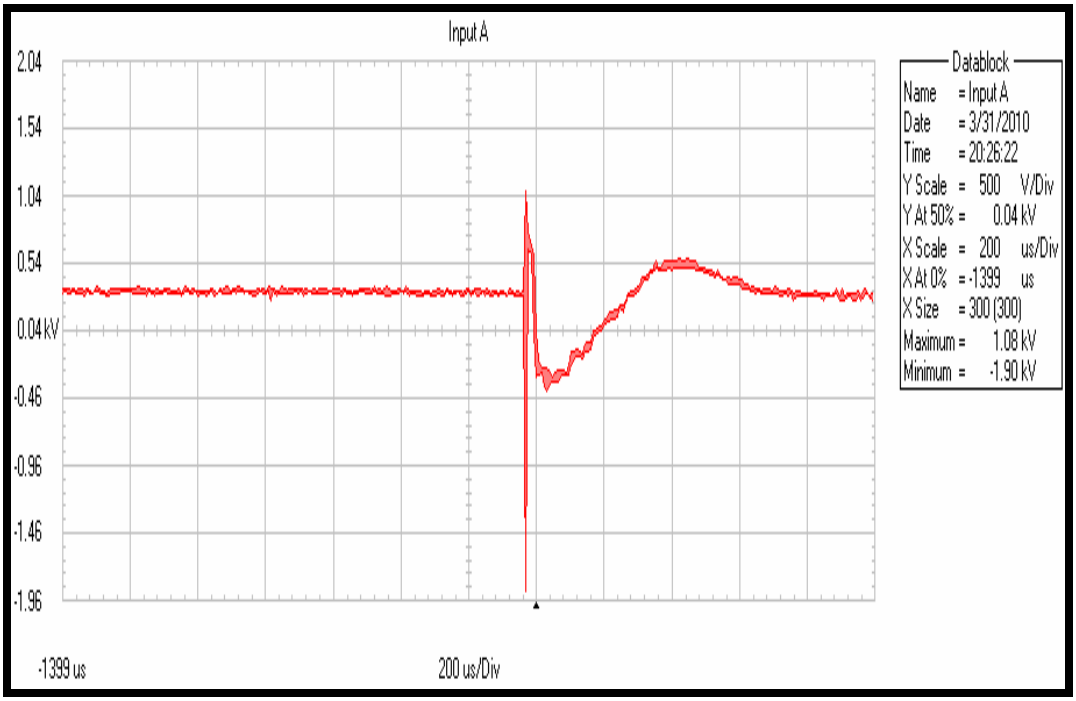

Plate 62: Voltage waveform at +6000V, 3000A Phase 1 to Phase 3.

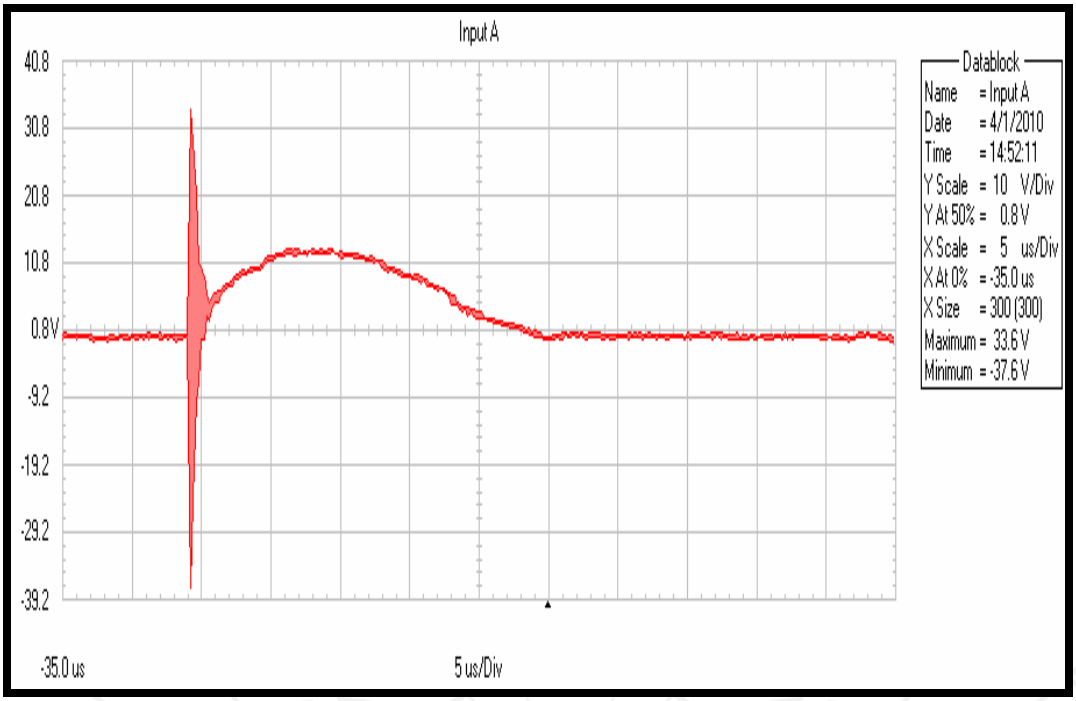

Plate 63: Current waveform at +6000V, 3000A Phase 1 to Phase 3.

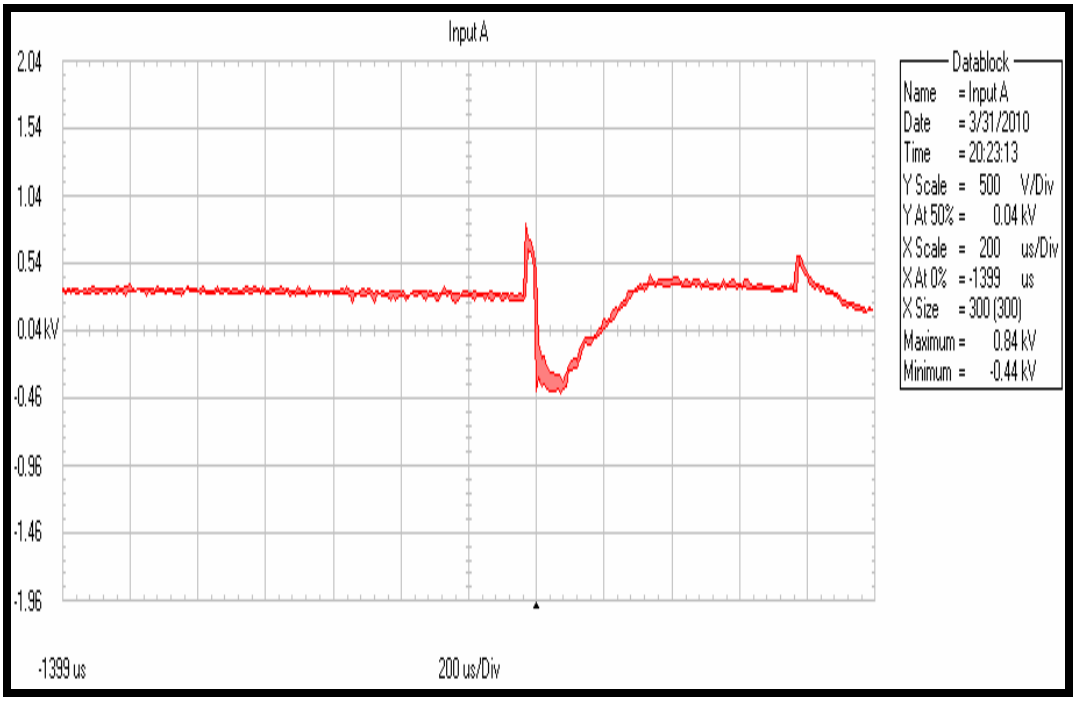

Plate 64: Voltage waveform at +6000V, 3000A Phase 2 to Phase 3.

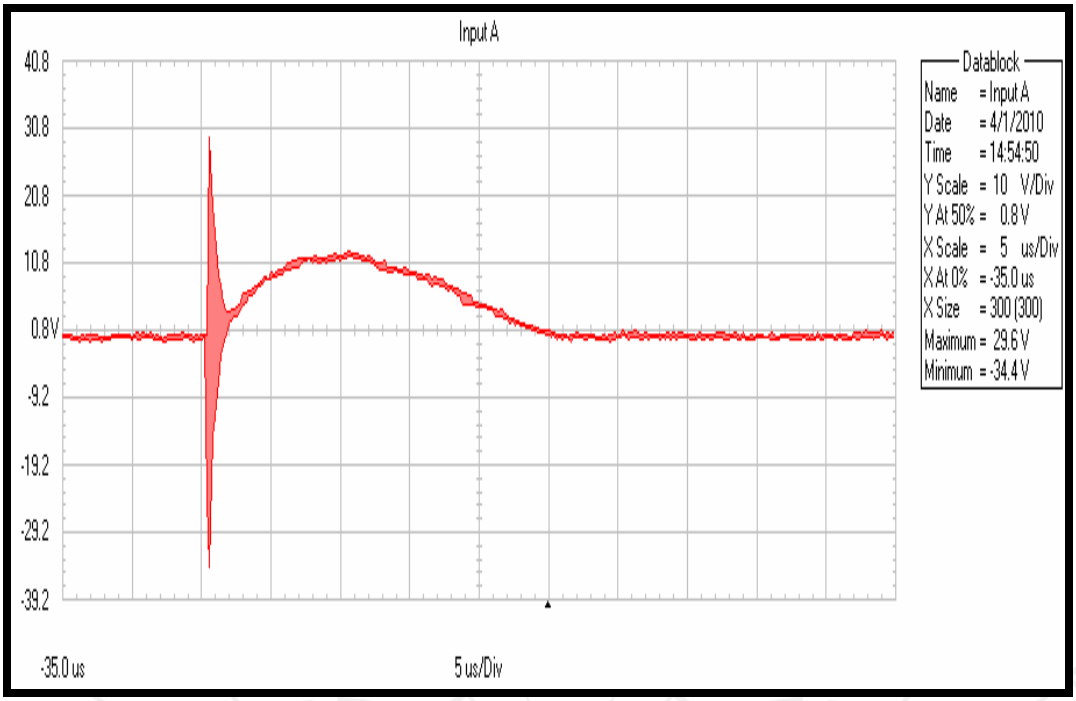

Plate 65: Current waveform at +6000V, 3000A Phase 2 to Phase 3.

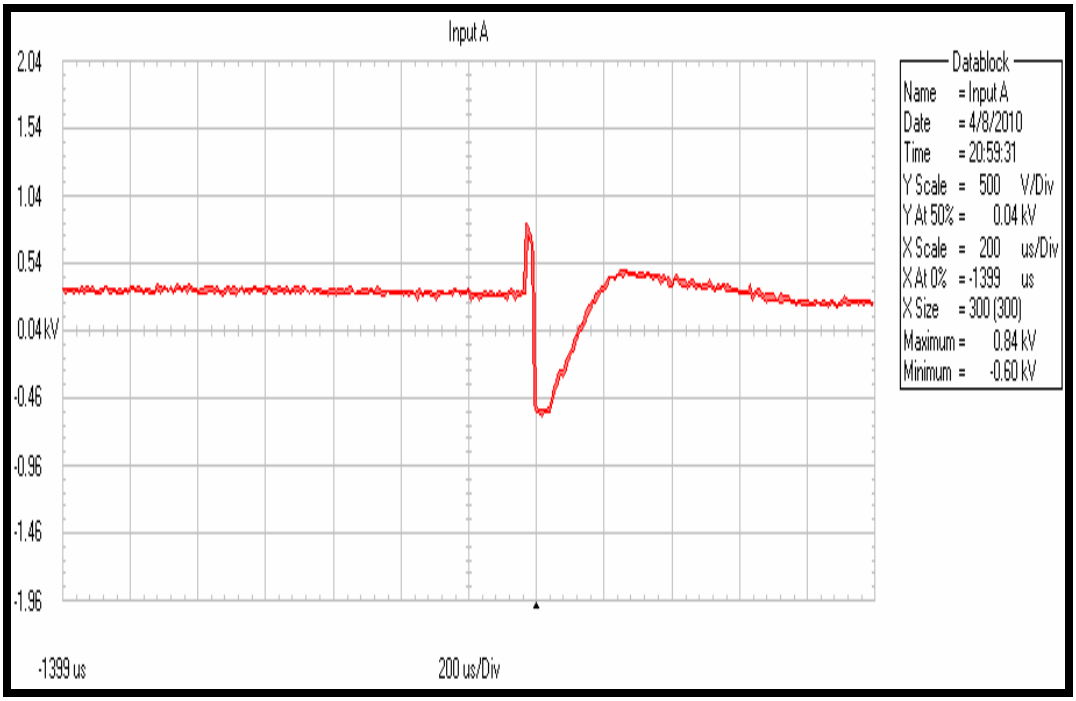

Plate 66: Voltage waveform at +4500V, 2250A Phase 1 to Protective Earth.

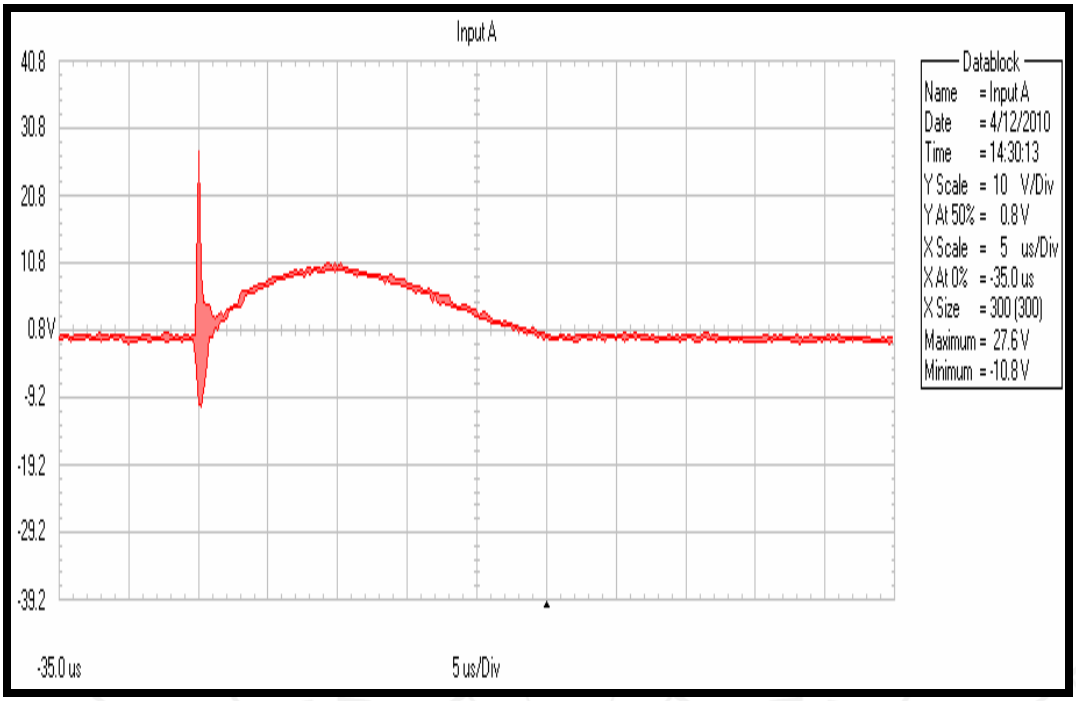

Plate 67: Current waveform at +4500V, 2250A Phase 1 to Protective Earth.

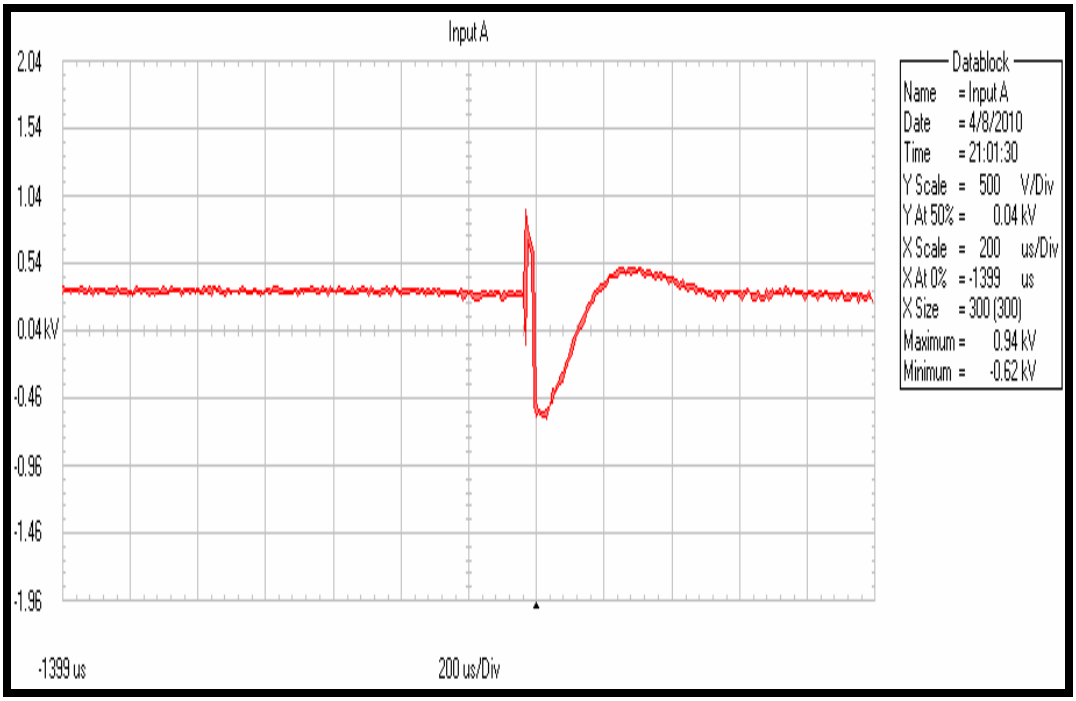

Plate 68: Voltage waveform at +4500V, 2250A Phase 2 to Protective Earth.

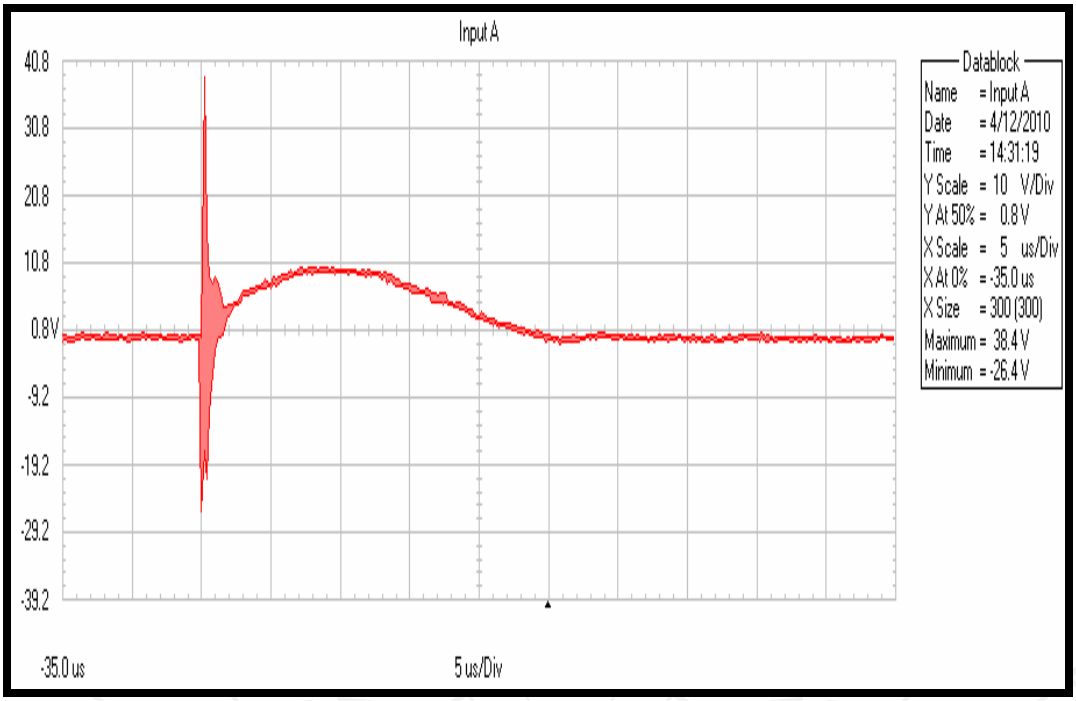

Plate 69: Current waveform at +4500V, 2250A Phase 2 to Protective Earth.

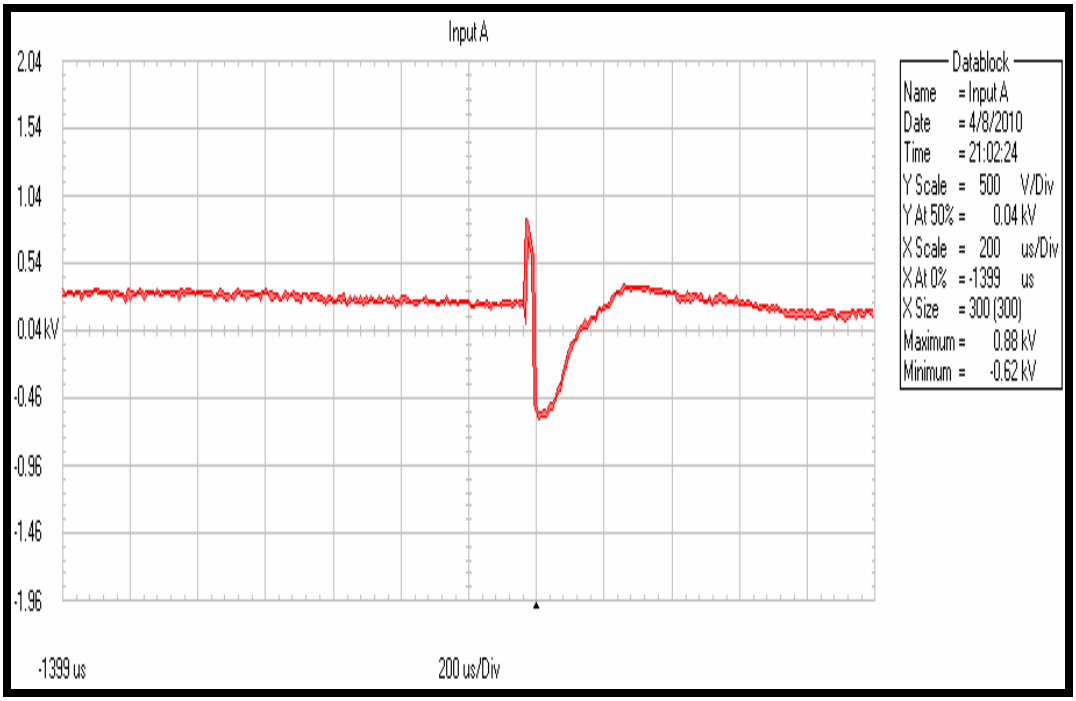

Plate 70: Voltage waveform at +4500V, 2250A Phase 3 to Protective Earth.

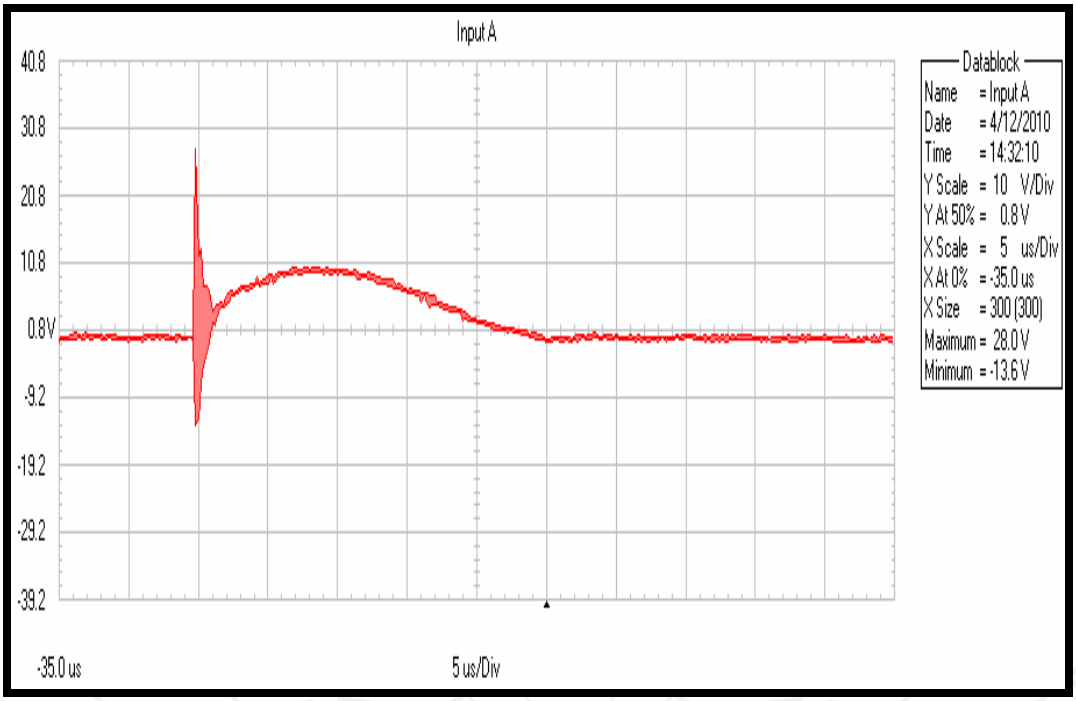

Plate 71: Current waveform at +4500V, 2250A Phase 3 to Protective Earth.

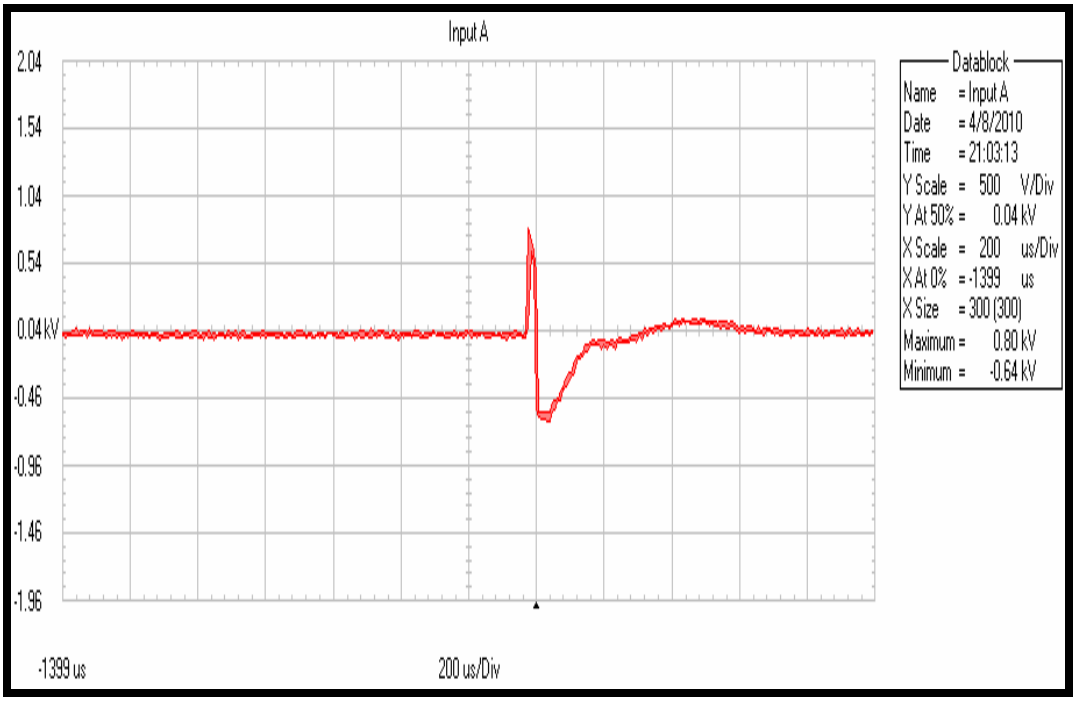

Plate 72: Voltage waveform at +4500V, 2250A Neutral line to Protective Earth.

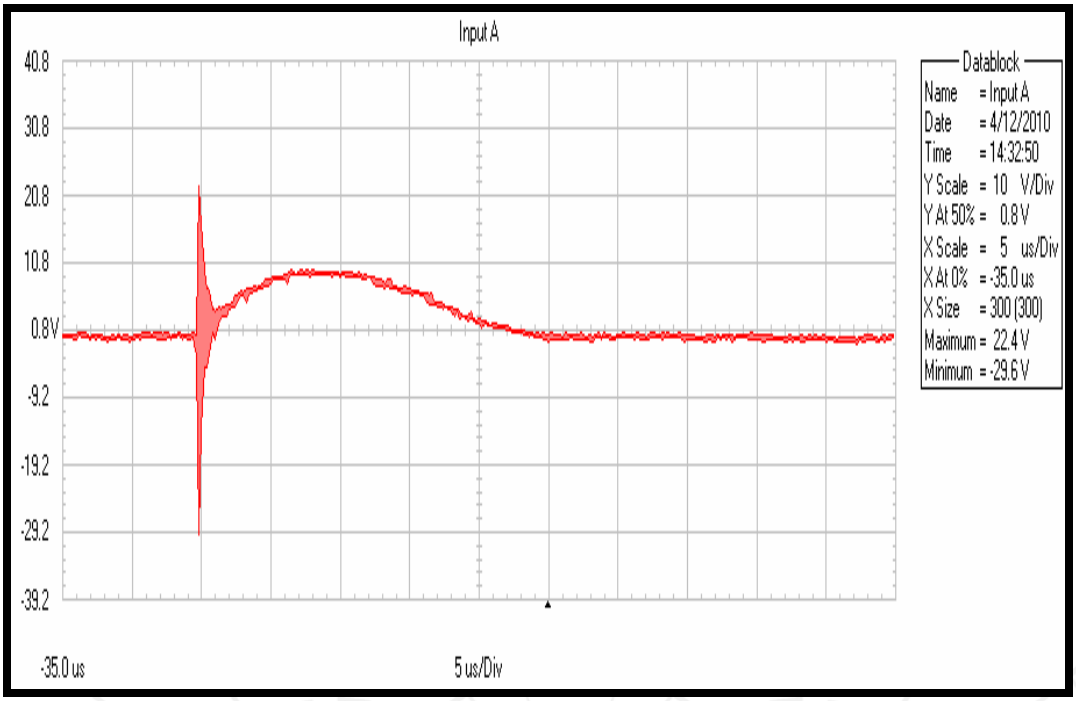

Plate 73: Current waveform at +4500V, 2250A Neutral line to Protective Earth.

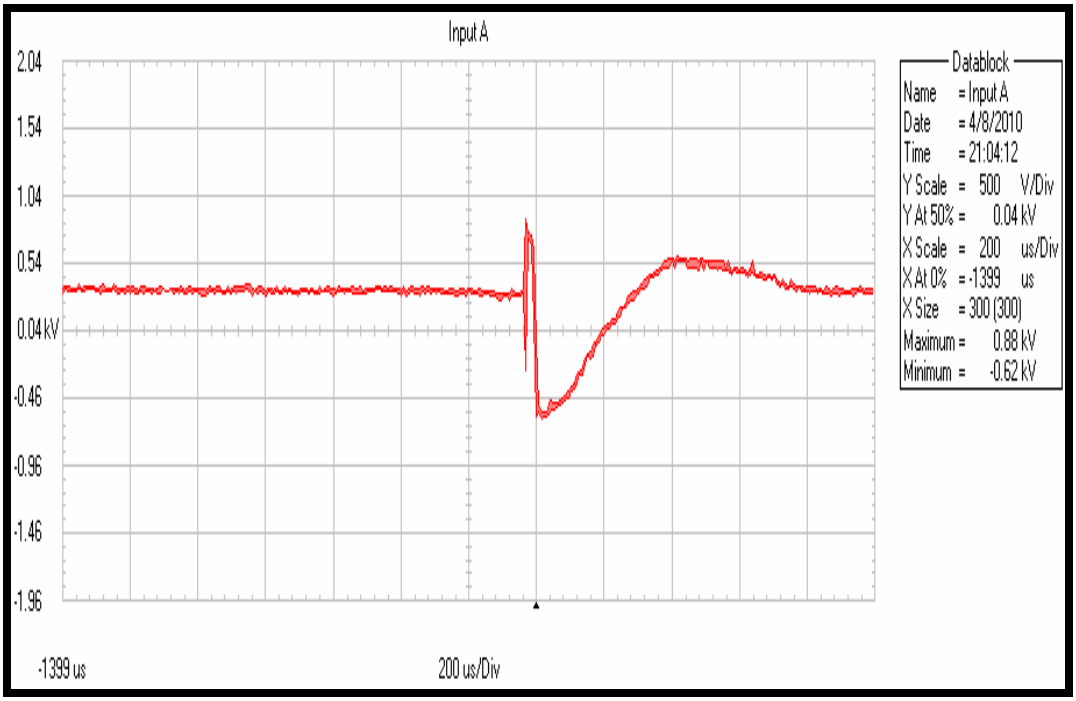

Plate 74: Voltage waveform at +4500V, 2250A Phase 1 to Neutral line.

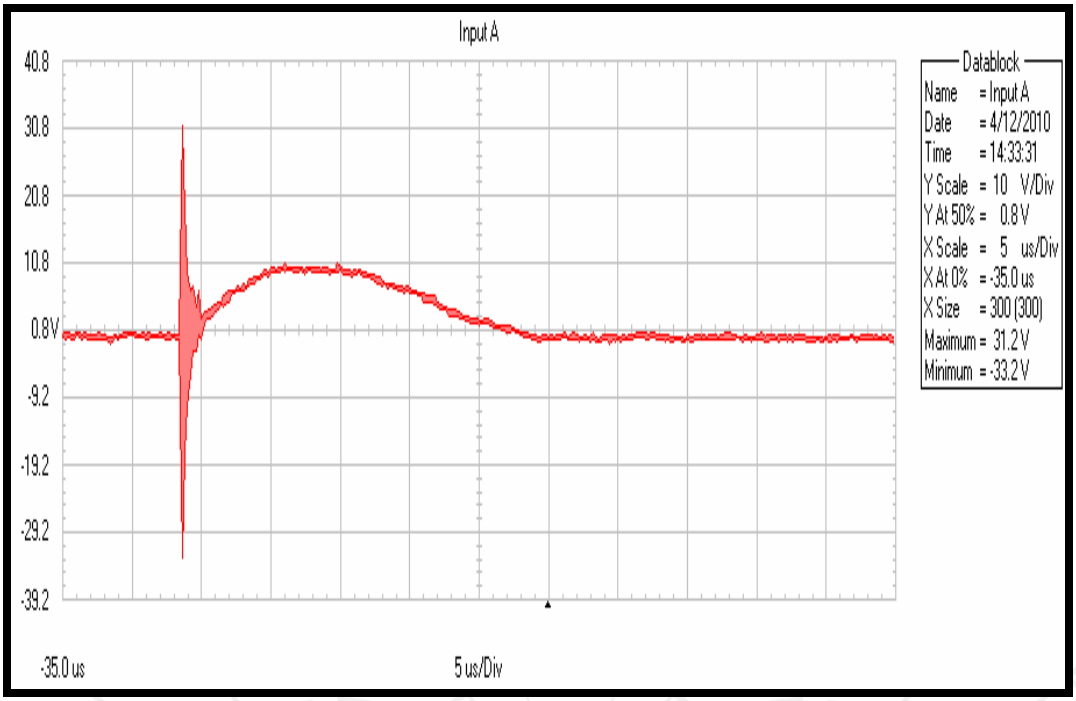

Plate 75: Current waveform at +4500V, 2250A Phase 1 to Neutral line.

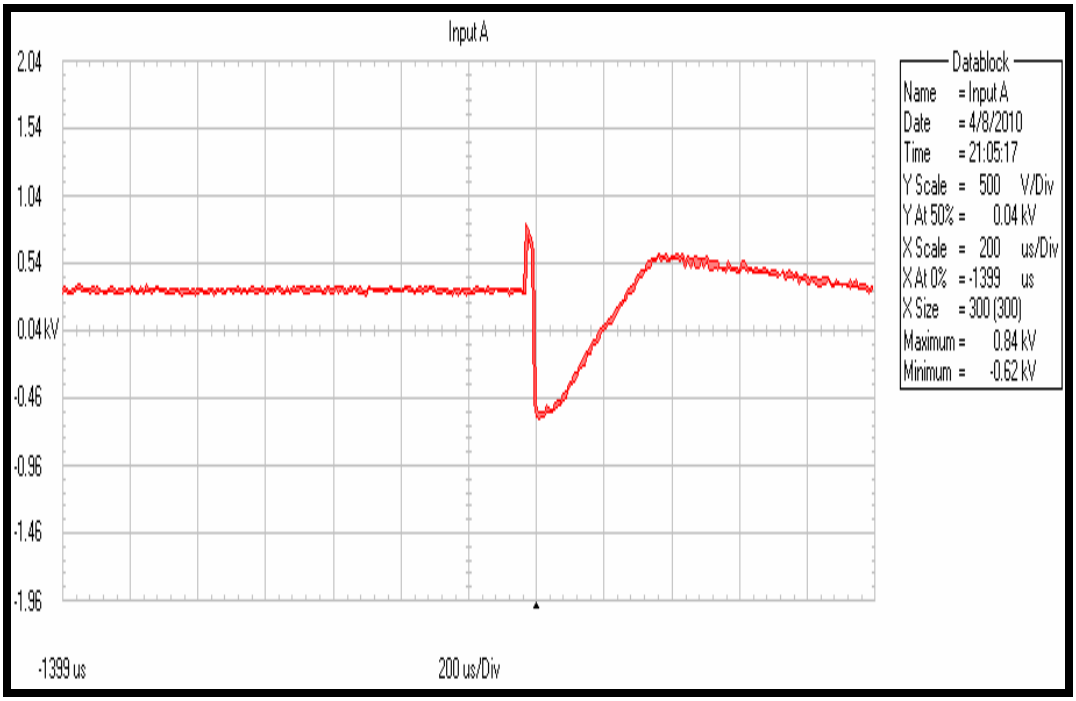

Plate 76: Voltage waveform at +4500V, 2250A Phase 2 to Neutral line.

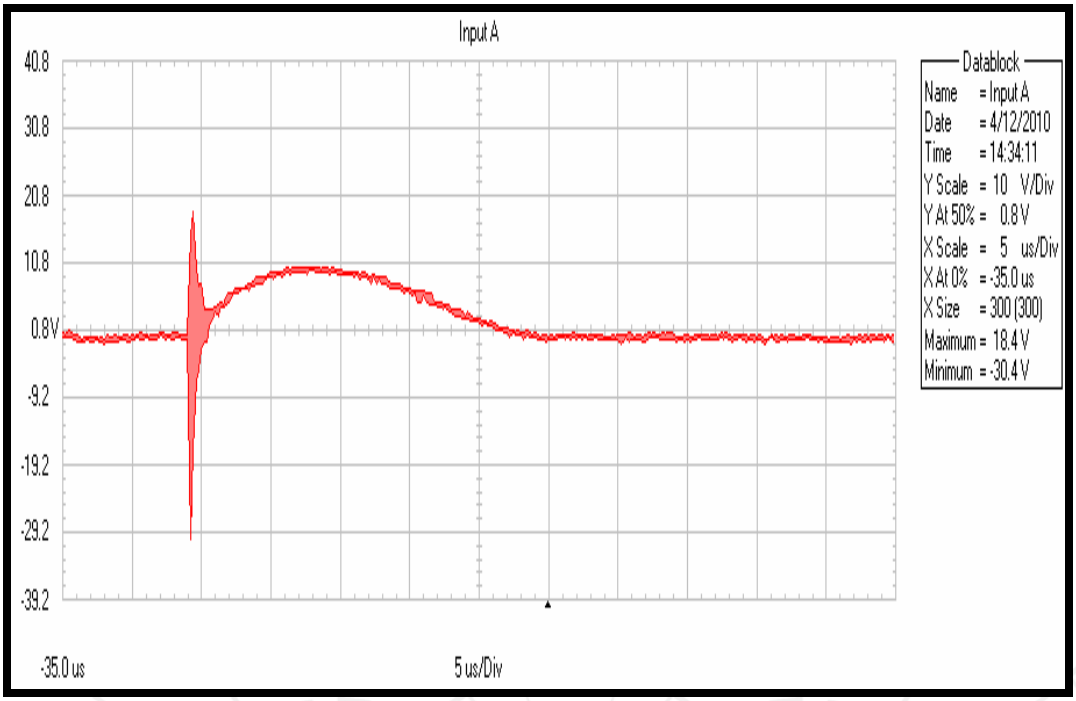

Plate 77: Current waveform at +4500V, 2250A Phase 2 to Neutral line.

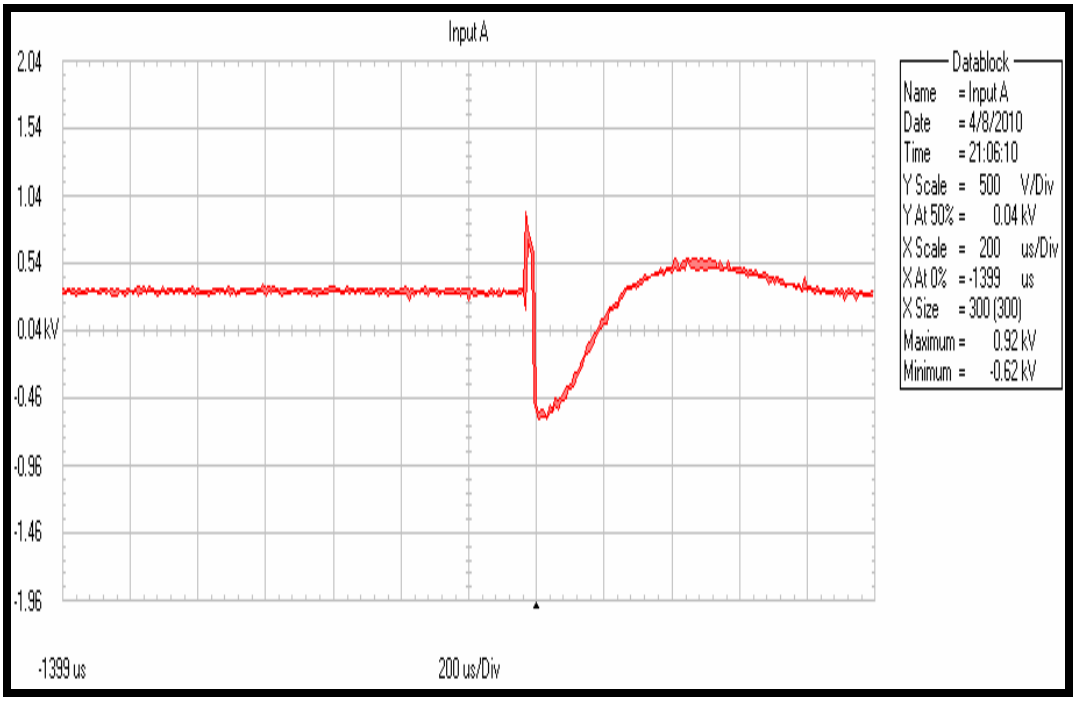

Plate 78: Voltage waveform at +4500V, 2250A Phase 3 to Neutral line.

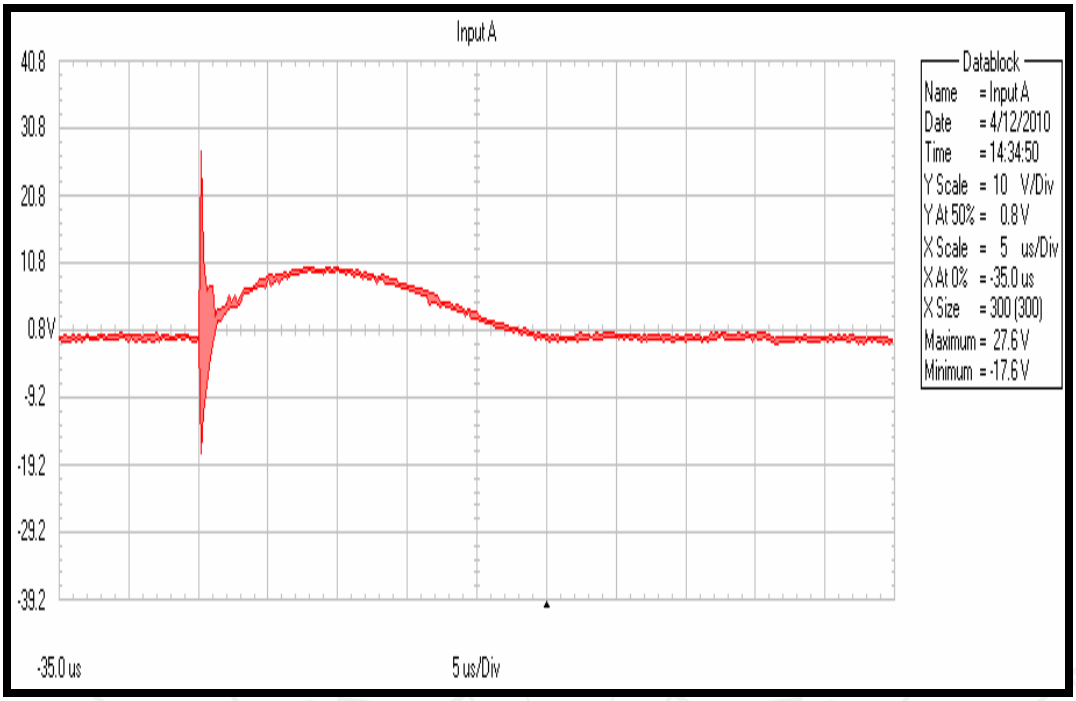

Plate 79: Current waveform at +4500V, 2250A Phase 3 to Neutral line.

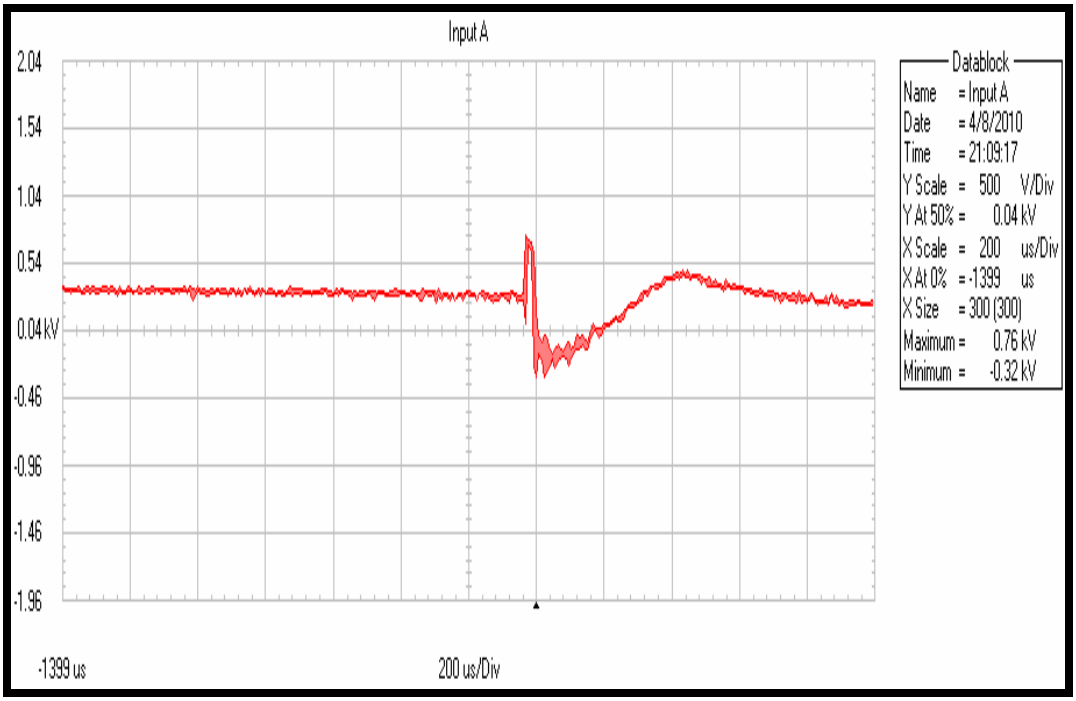

Plate 80: Voltage waveform at +4500V, 2250A Phase 1 to Phase 2.

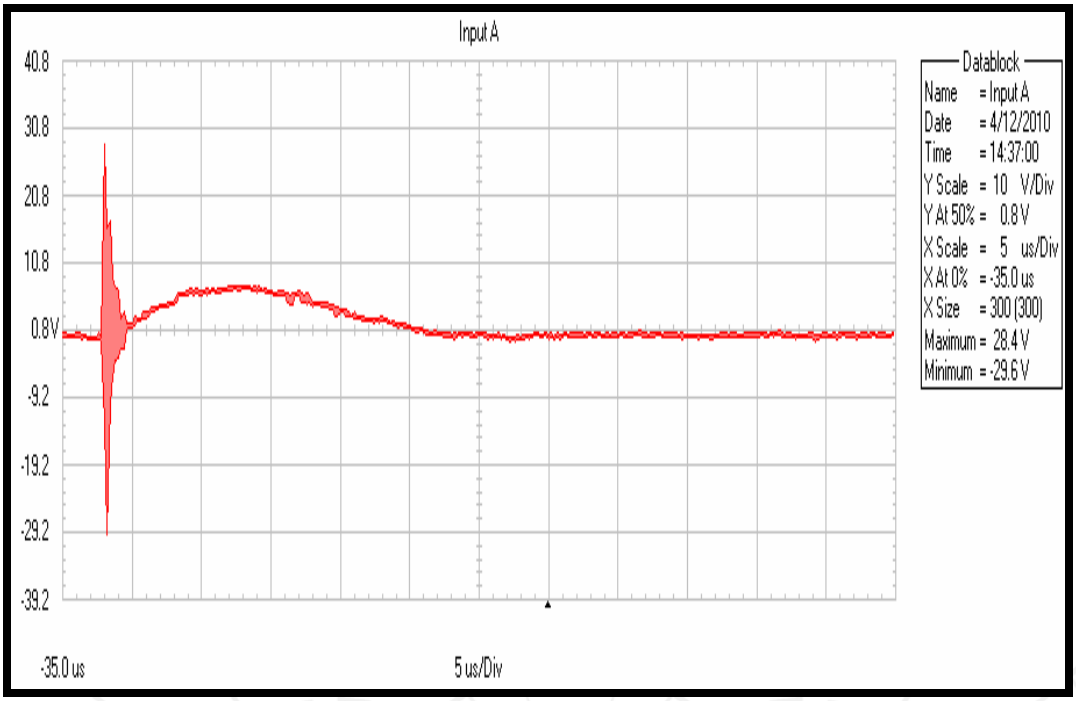

Plate 81: Current waveform at +4500V, 2250A Phase 1 to Phase 2.

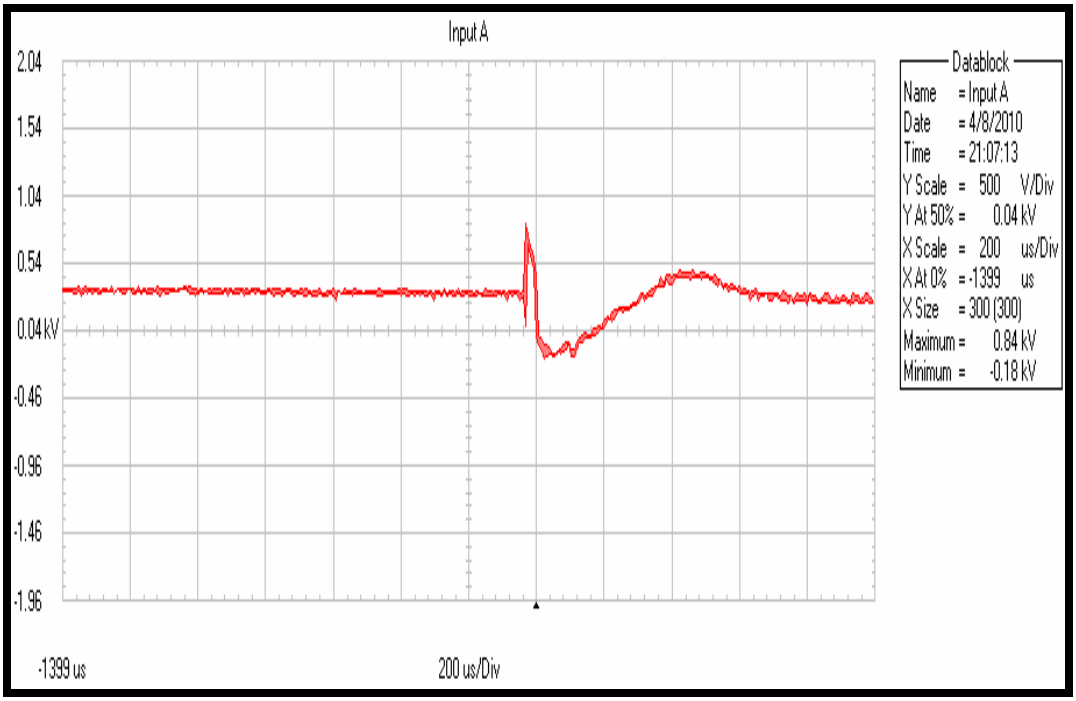

Plate 82: Voltage waveform at +4500V, 2250A Phase 1 to Phase 3.

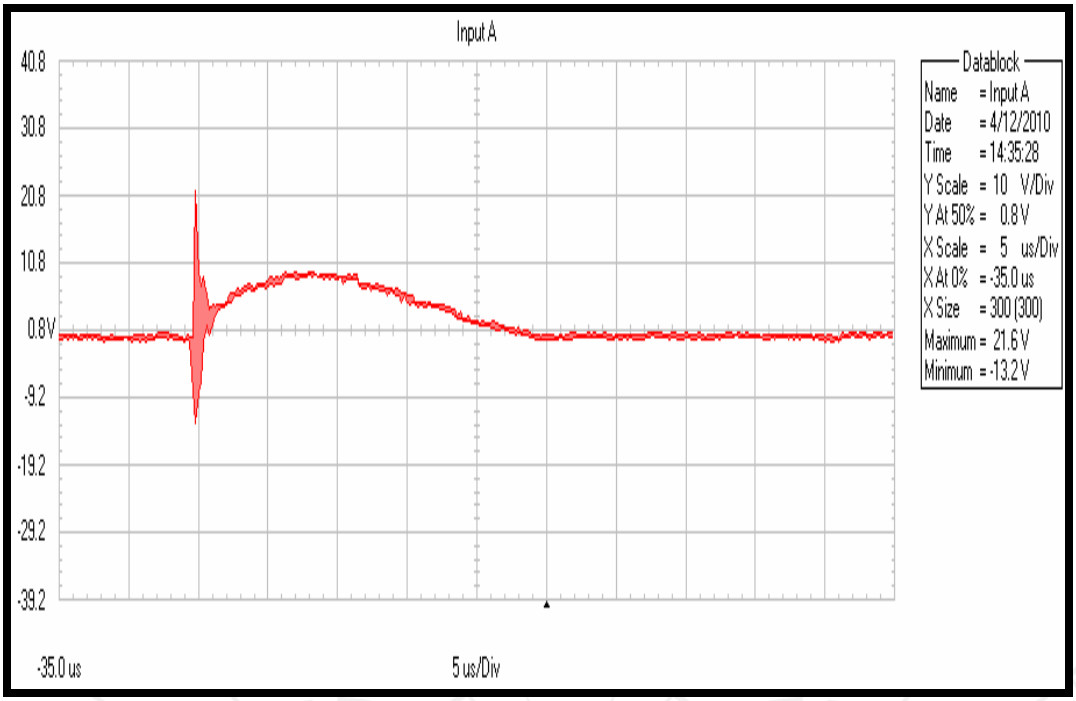

Plate 83: Current waveform at +4500V, 2250A Phase 1 to Phase 3.

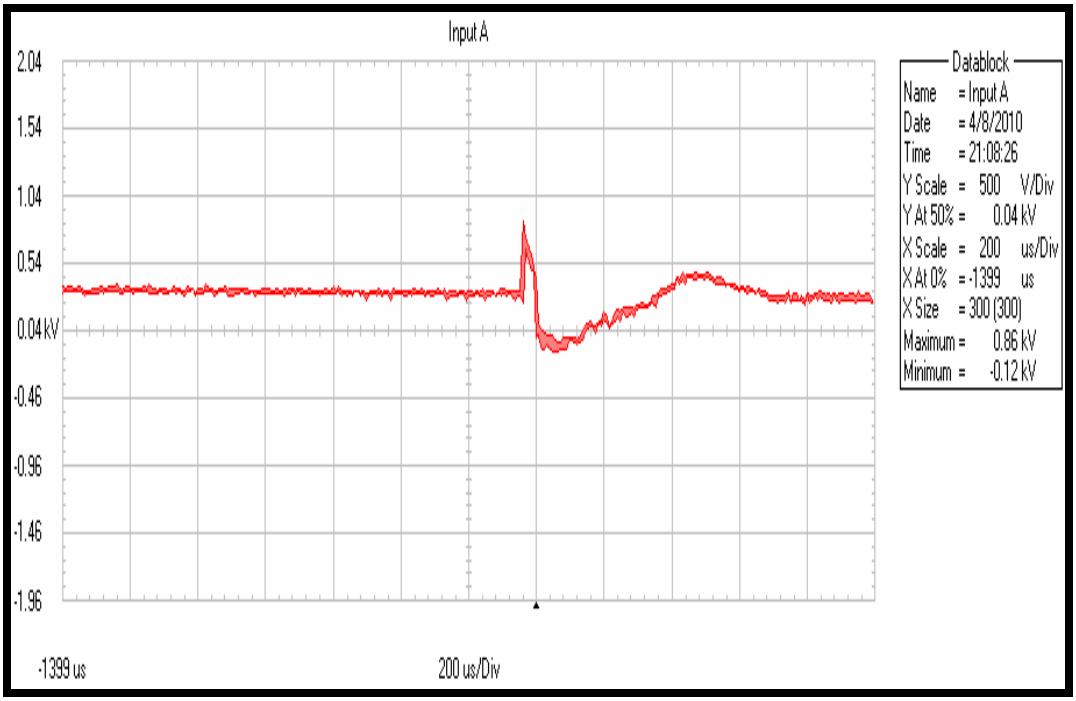

Plate 84: Voltage waveform at +4500V, 2250A Phase 2 to Phase 3.

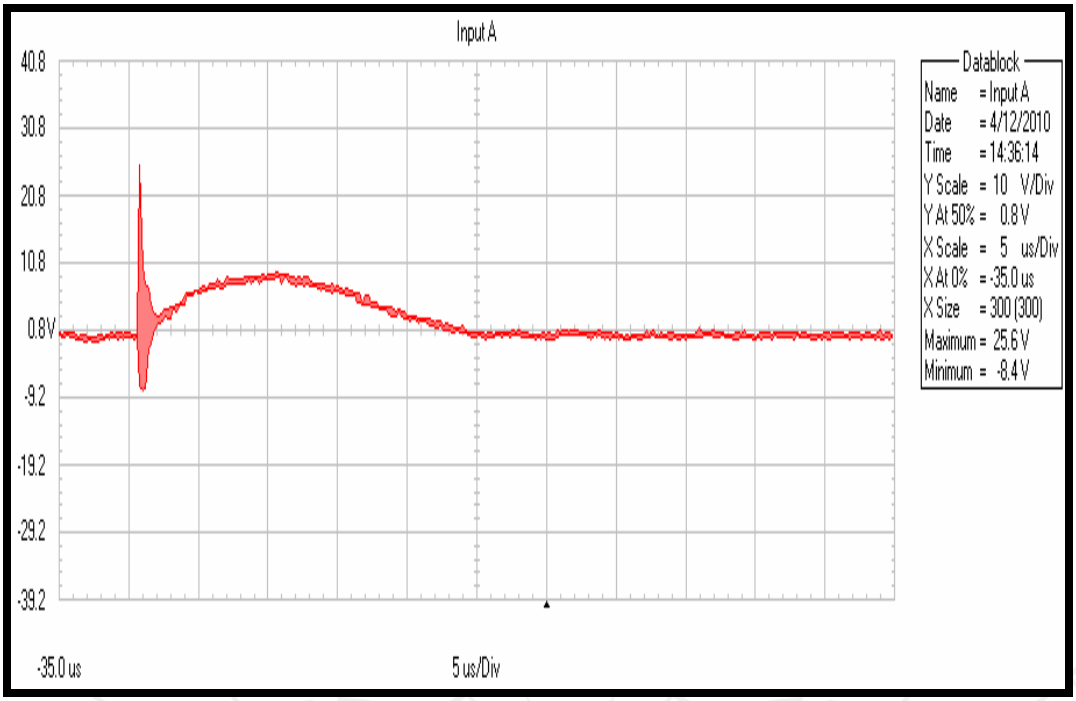

Plate 85: Current waveform at +4500V, 2250A Phase 2 to Phase 3.

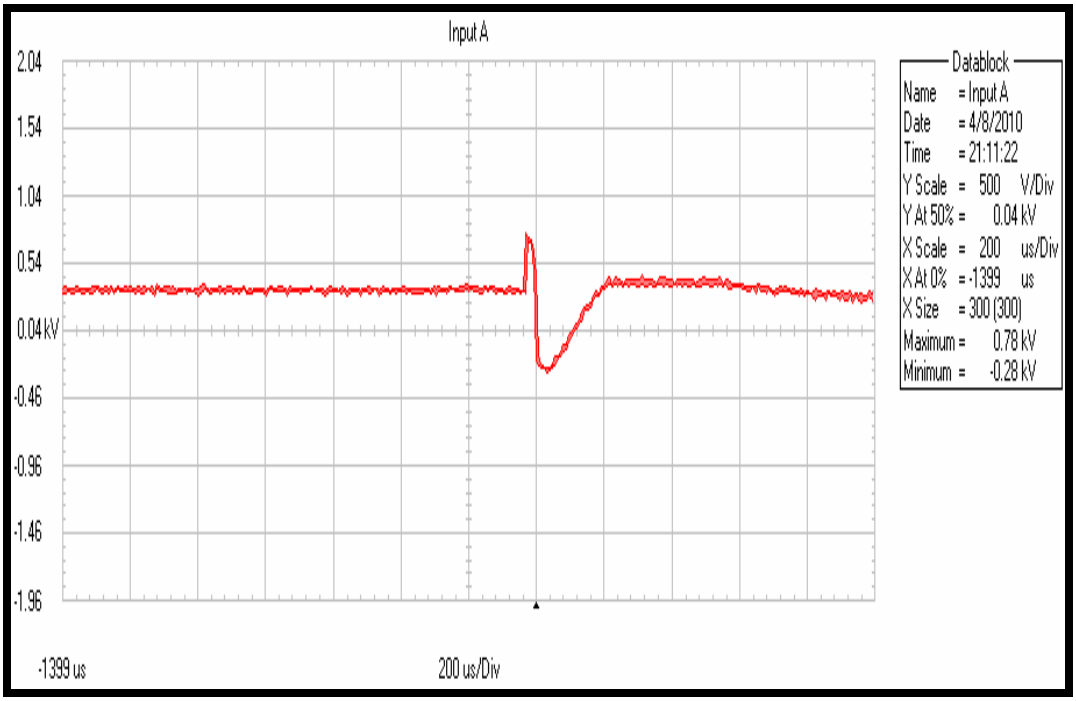

Plate 86: Voltage waveform at +3000V, 1500A Phase 1 to Protective Earth.

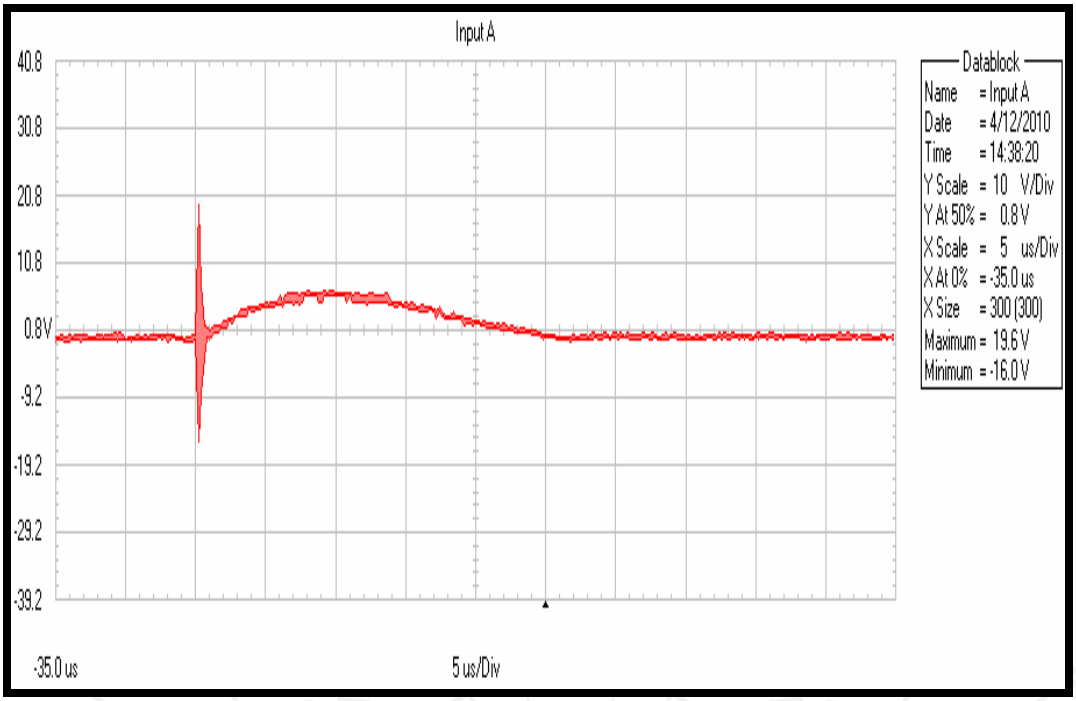

Plate 87: Current waveform at +3000V, 1500A Phase 1 to Protective Earth.

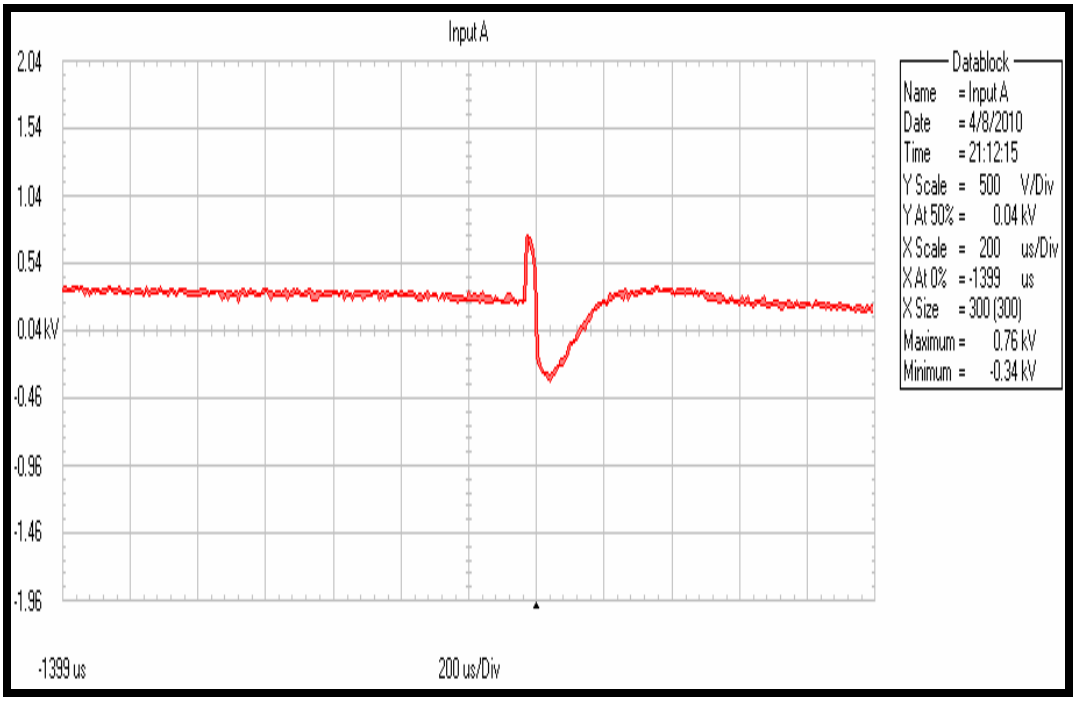

Plate 88: Voltage waveform at +3000V, 1500A Phase 2 to Protective Earth.

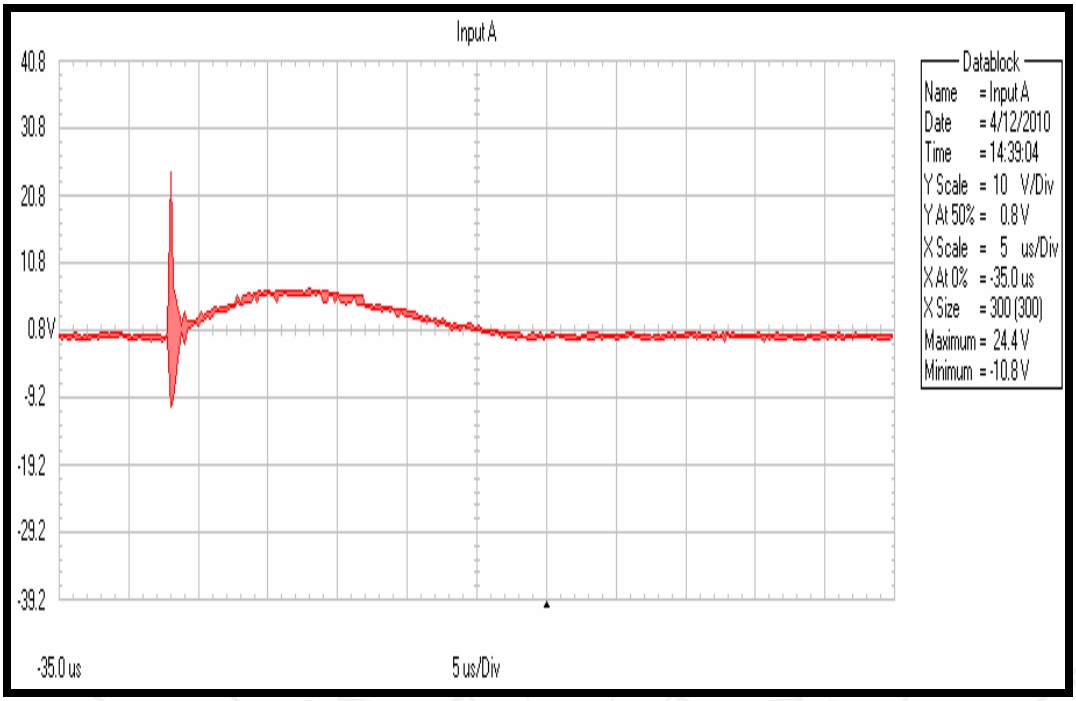

Plate 89: Current waveform at +3000V, 1500A Phase 2 to Protective Earth.

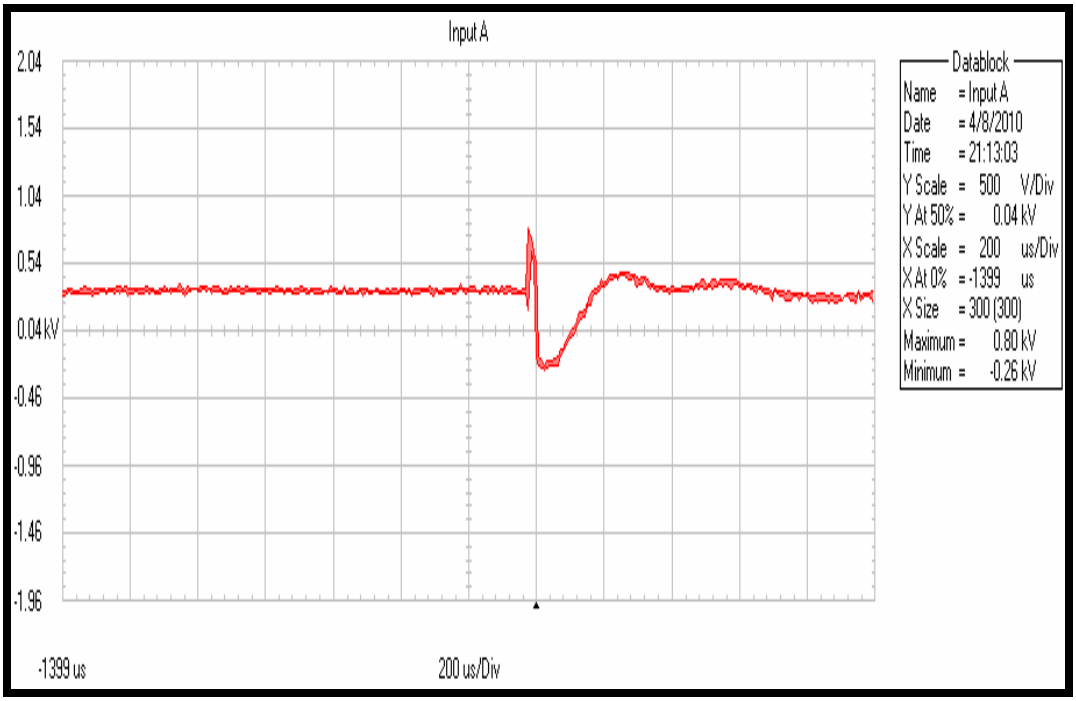

Plate 90: Voltage waveform at +3000V, 1500A Phase 3 to Protective Earth.

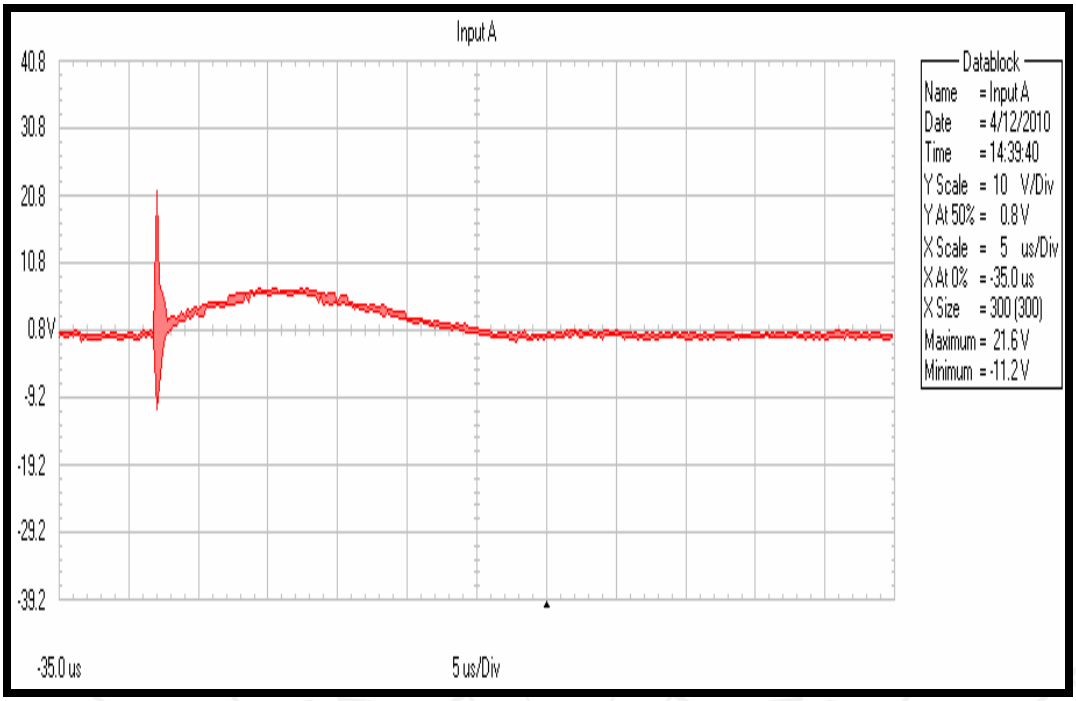

Plate 91: Current waveform at +3000V, 1500A Phase 3 to Protective Earth.

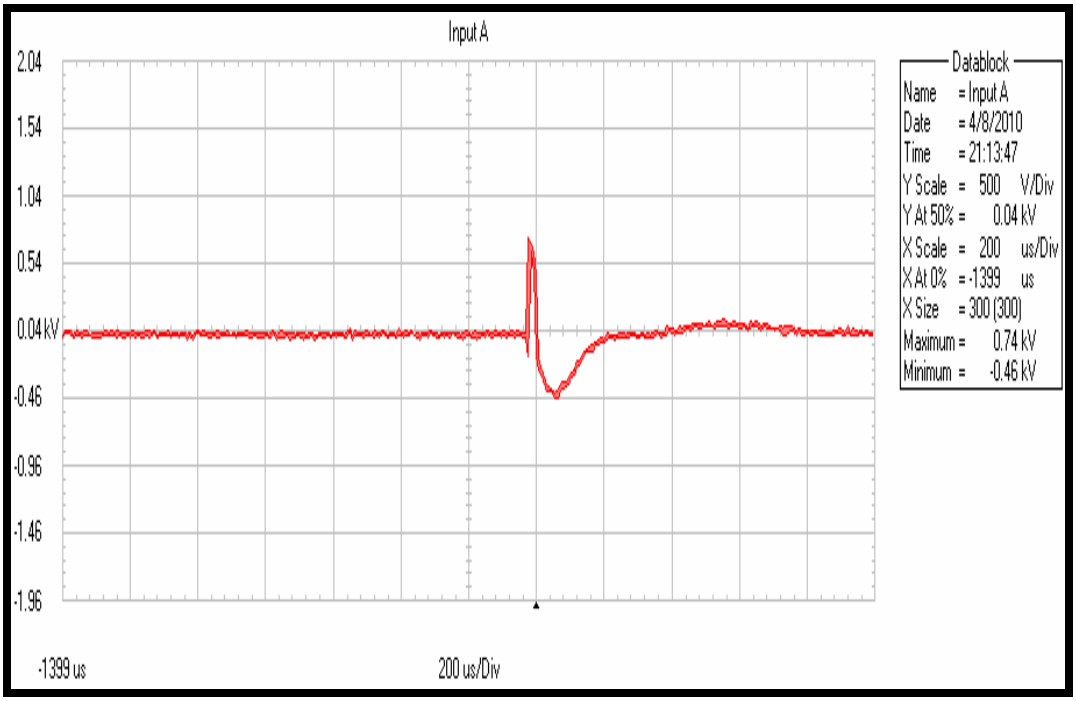

Plate 92: Voltage waveform at +3000V, 1500A Neutral line to Protective Earth.

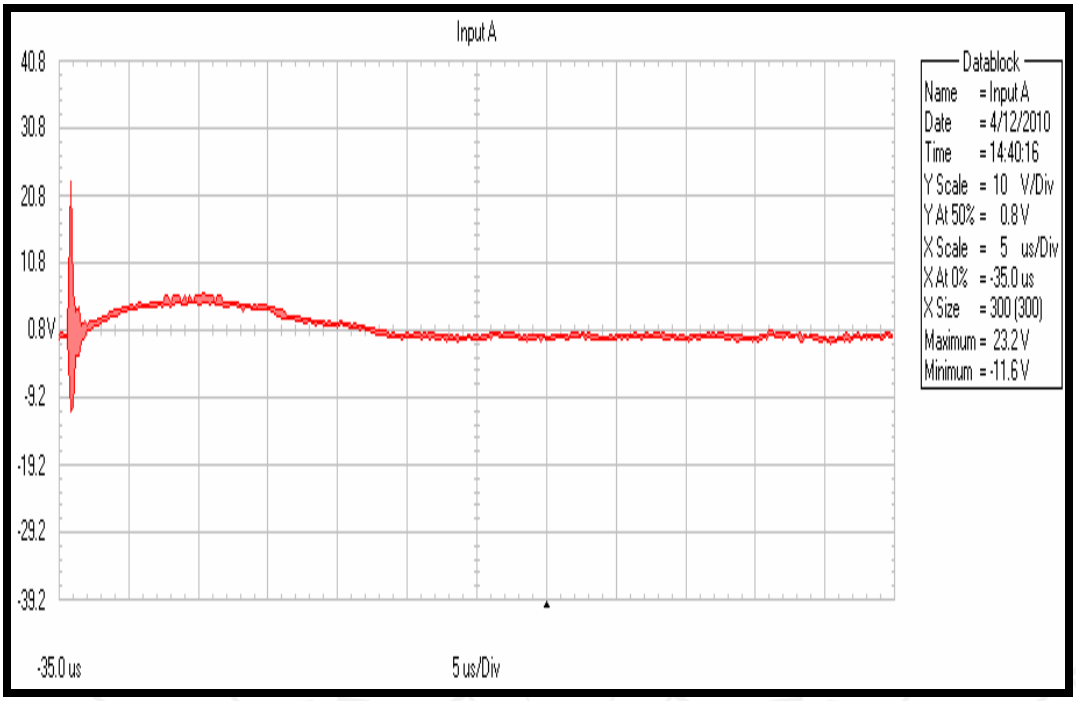

Plate 93: Current waveform at +3000V, 1500A Neutral line to Protective Earth.

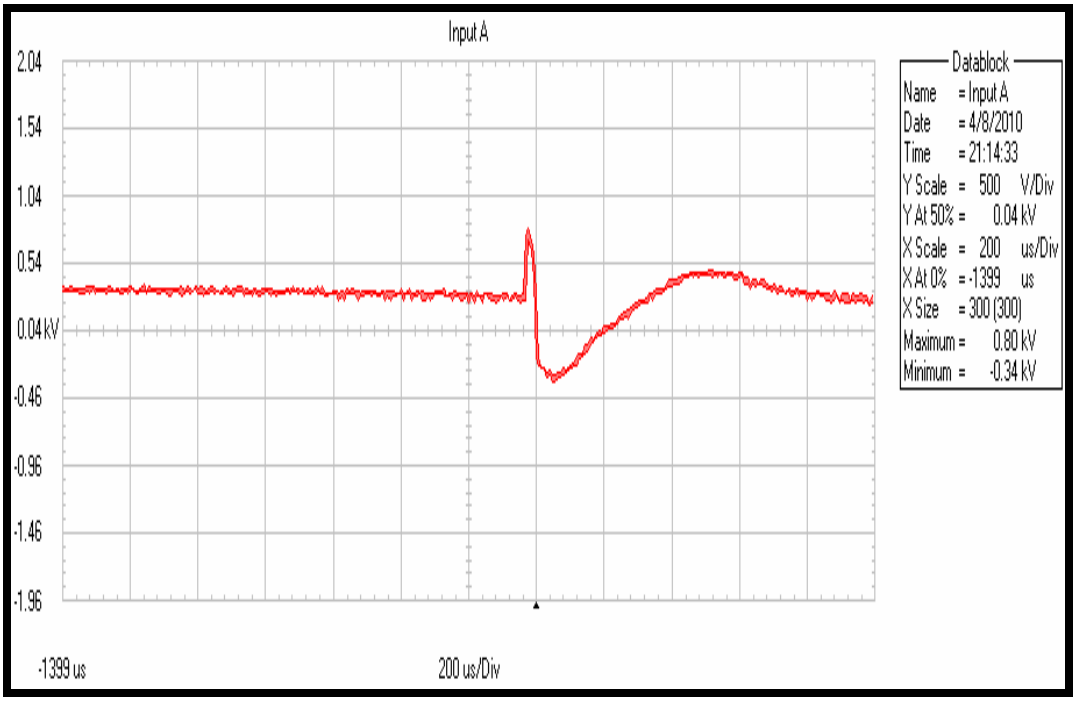

Plate 94: Voltage waveform at +3000V, 1500A Phase 1 to Neutral line.

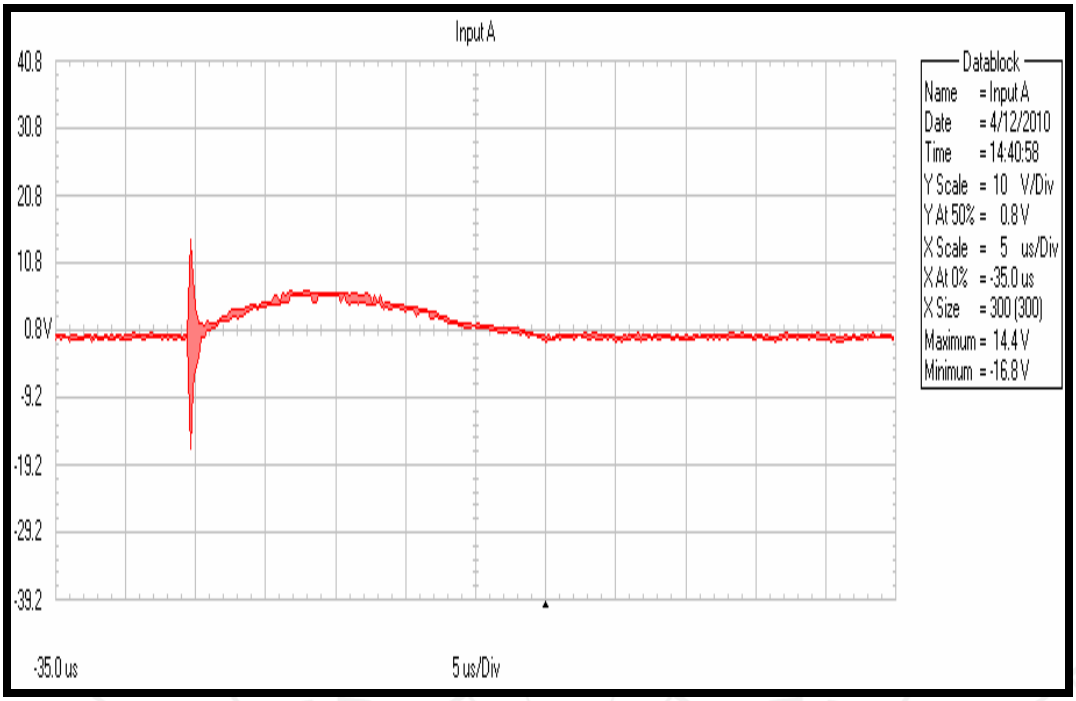

Plate 95: Current waveform at +3000V, 1500A Phase 1 to Neutral line.

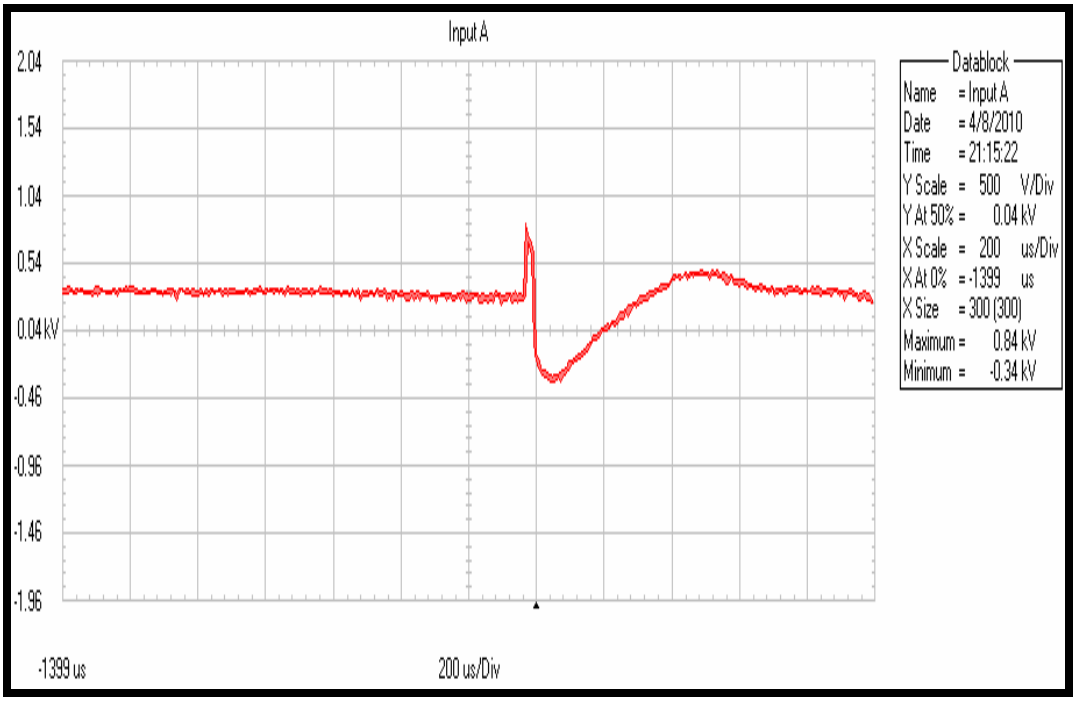

Plate 96: Voltage waveform at +3000V, 1500A Phase 2 to Neutral line.

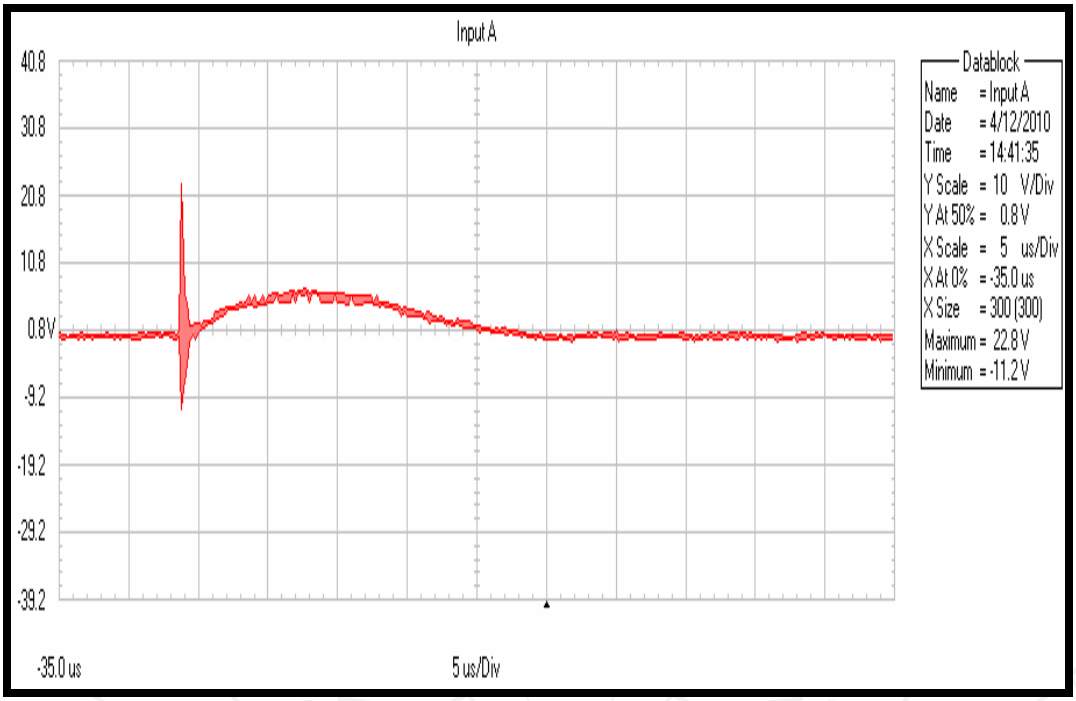

Plate 97: Current waveform at +3000V, 1500A Phase 2 to Neutral line.

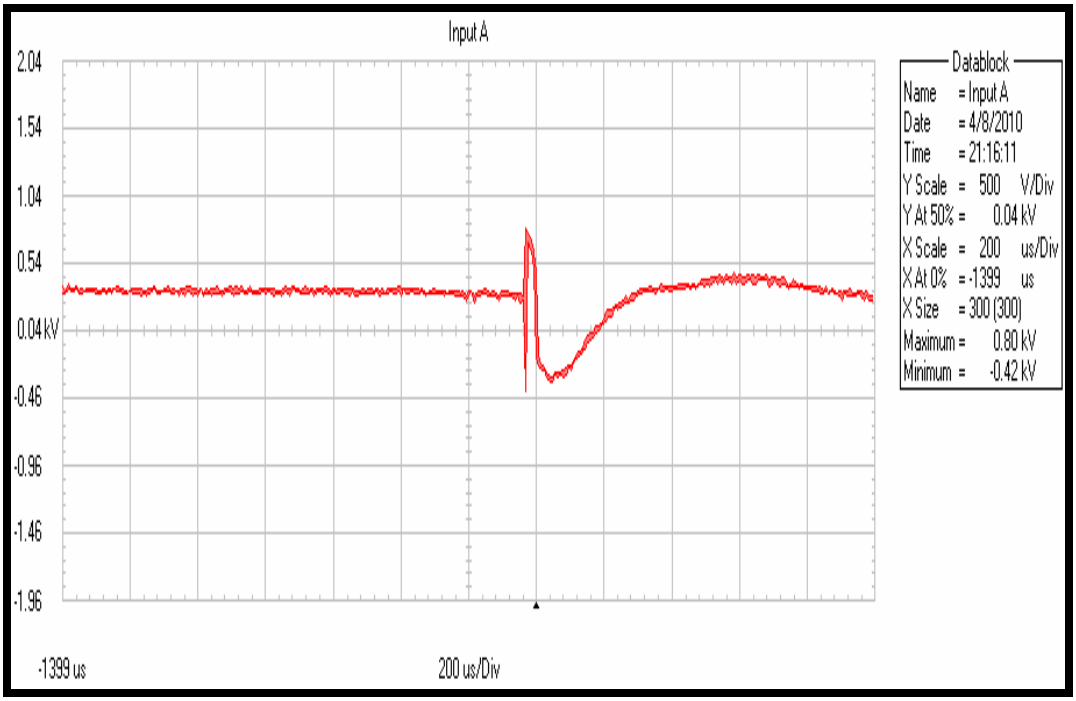

Plate 98: Voltage waveform at +3000V, 1500A Phase 3 to Neutral line.

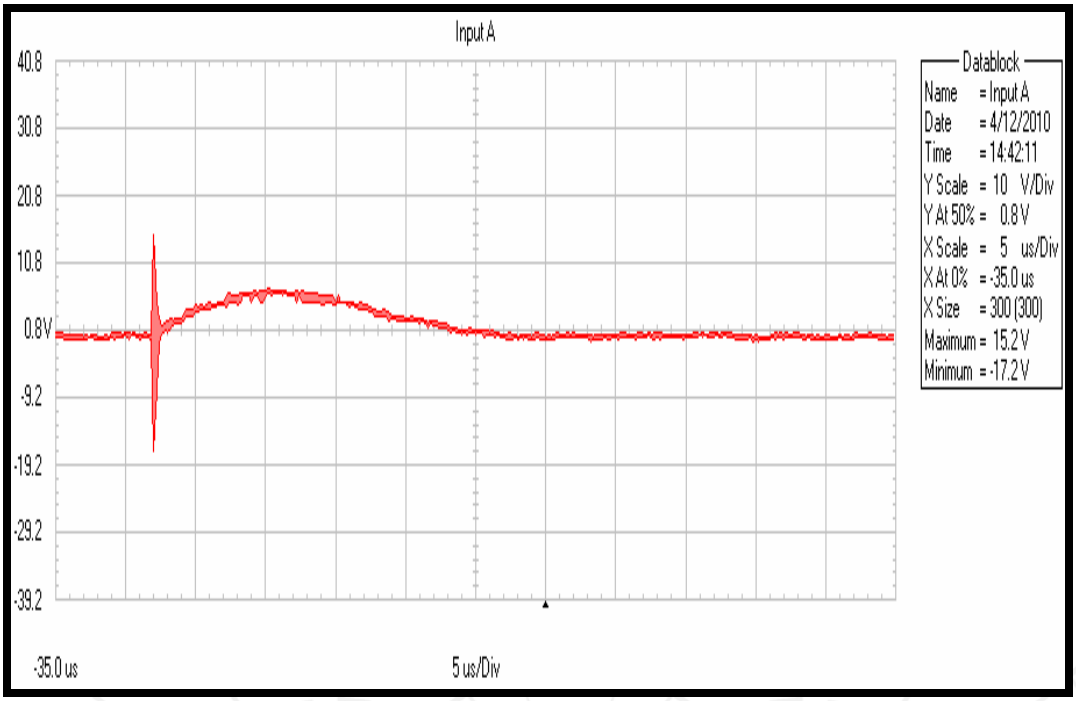

Plate 99: Current waveform at +3000V, 1500A Phase 3 to Neutral line.

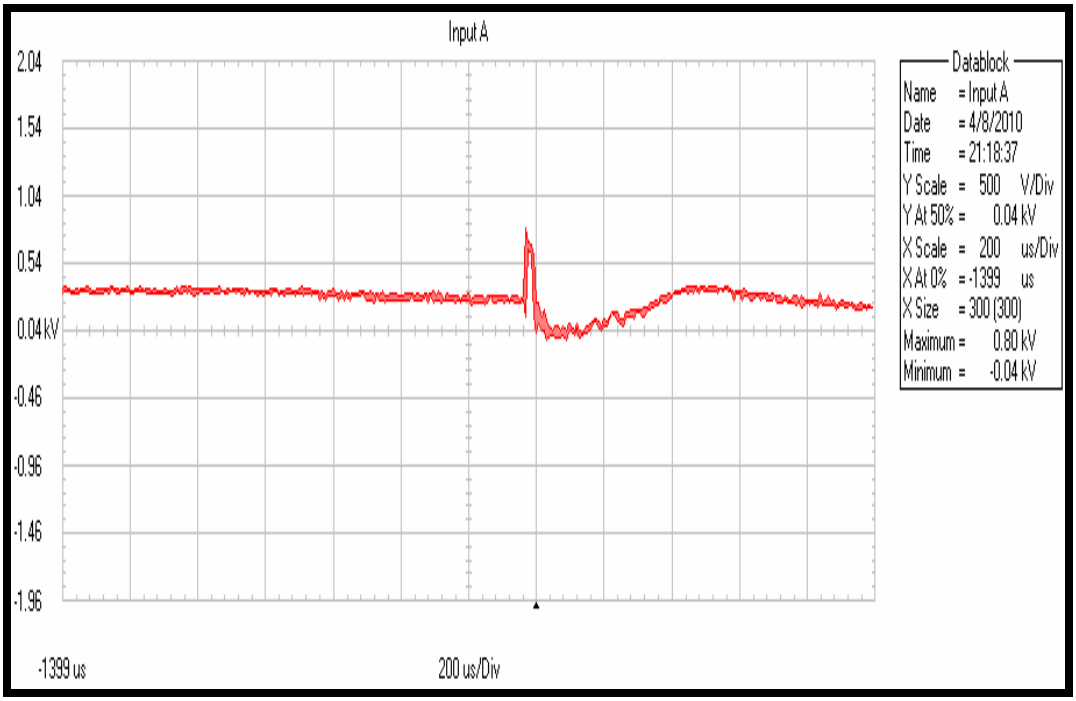

Plate 100: Voltage waveform at +3000V, 1500A Phase 1 to Phase 2.

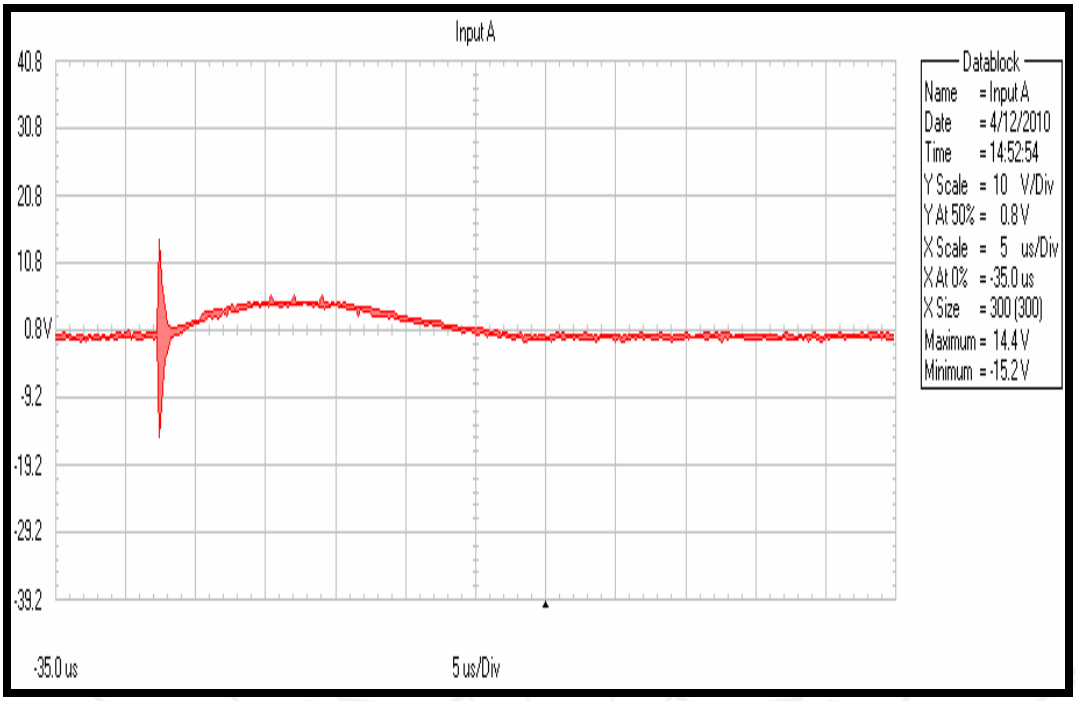

Plate 101: Current waveform at +3000V, 1500A Phase 1 to Phase 2.

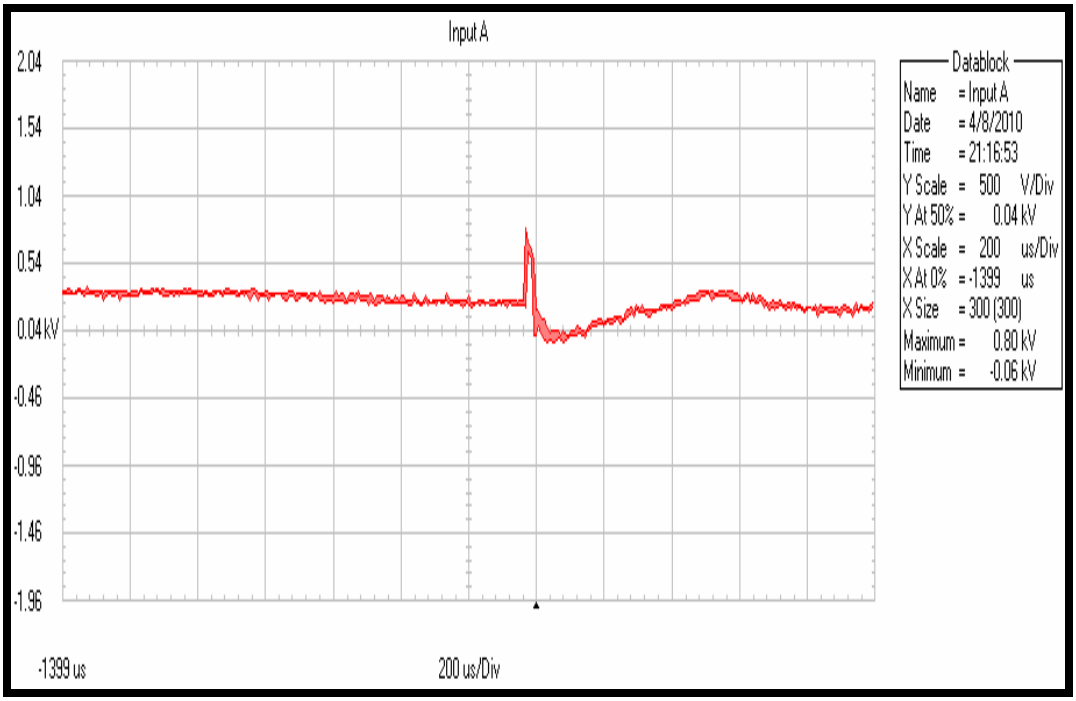

Plate 102: Voltage waveform at +3000V, 1500A Phase 1 to Phase 3.

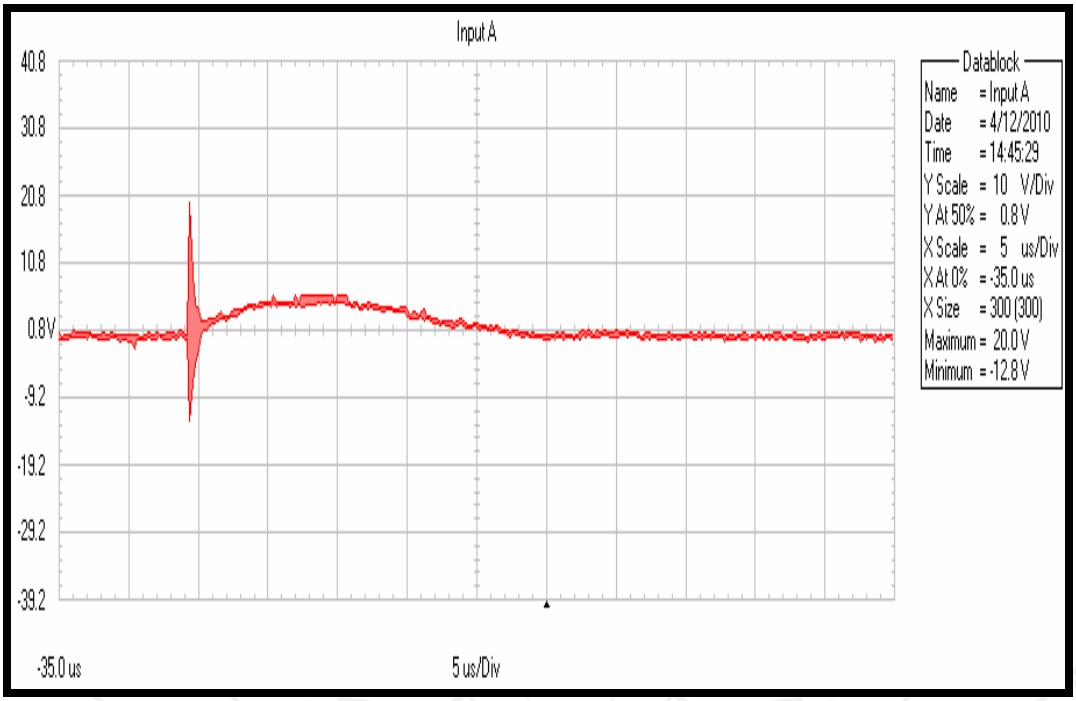

Plate 103: Current waveform at +3000V, 1500A Phase 1 to Phase 3.

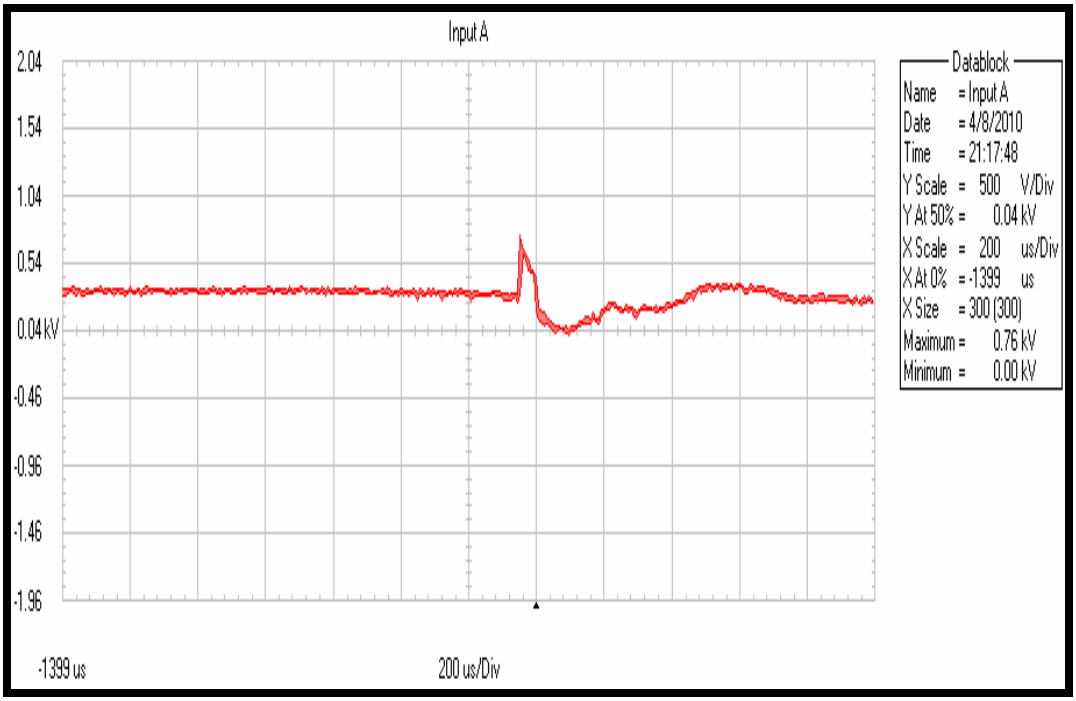

Plate 104: Voltage waveform at +3000V, 1500A Phase 2 to Phase 3.

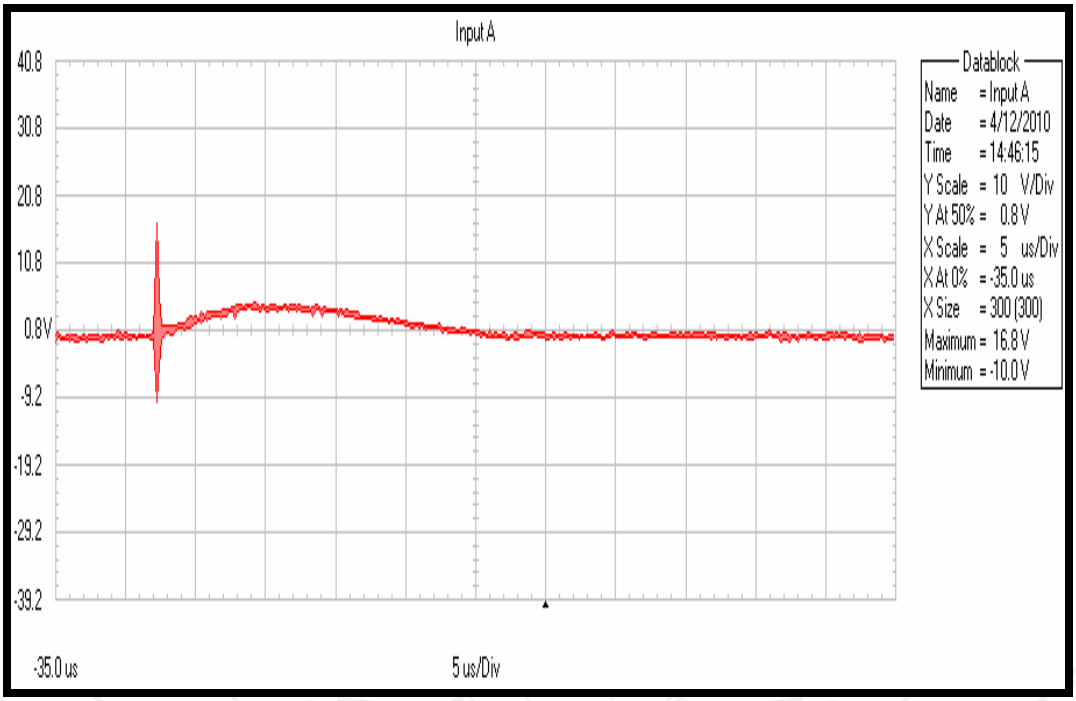

Plate 105: Current waveform at +3000V, 1500A Phase 2 to Phase 3.

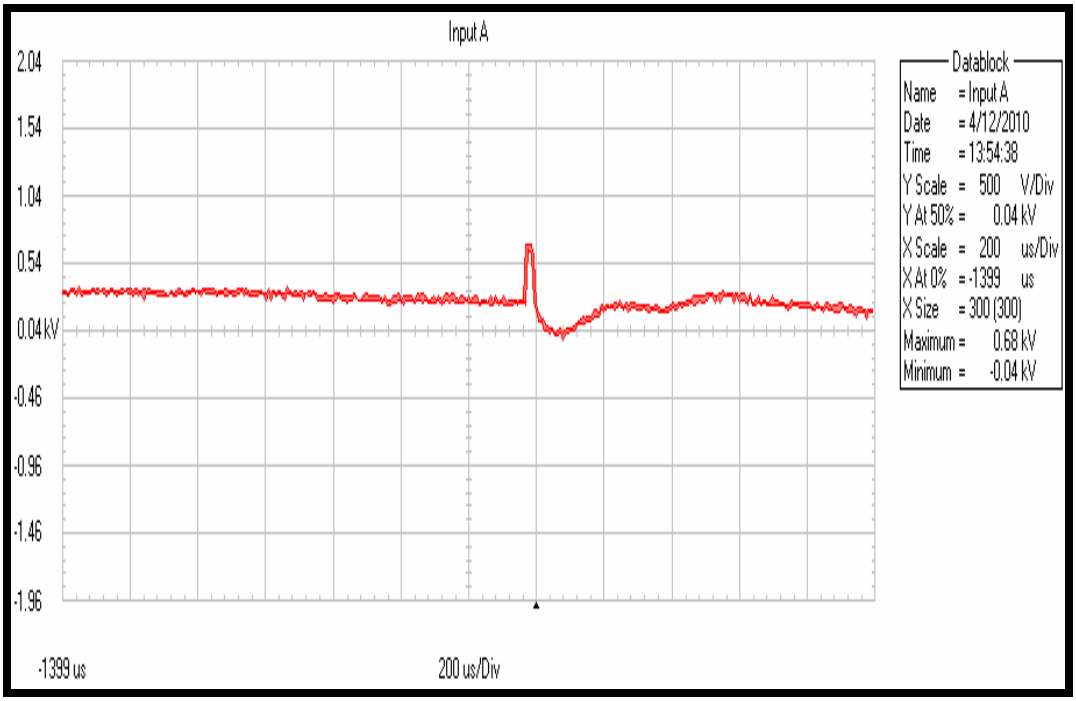

Plate 106: Voltage waveform at +1500V, 750A Phase 1 to Protective Earth.

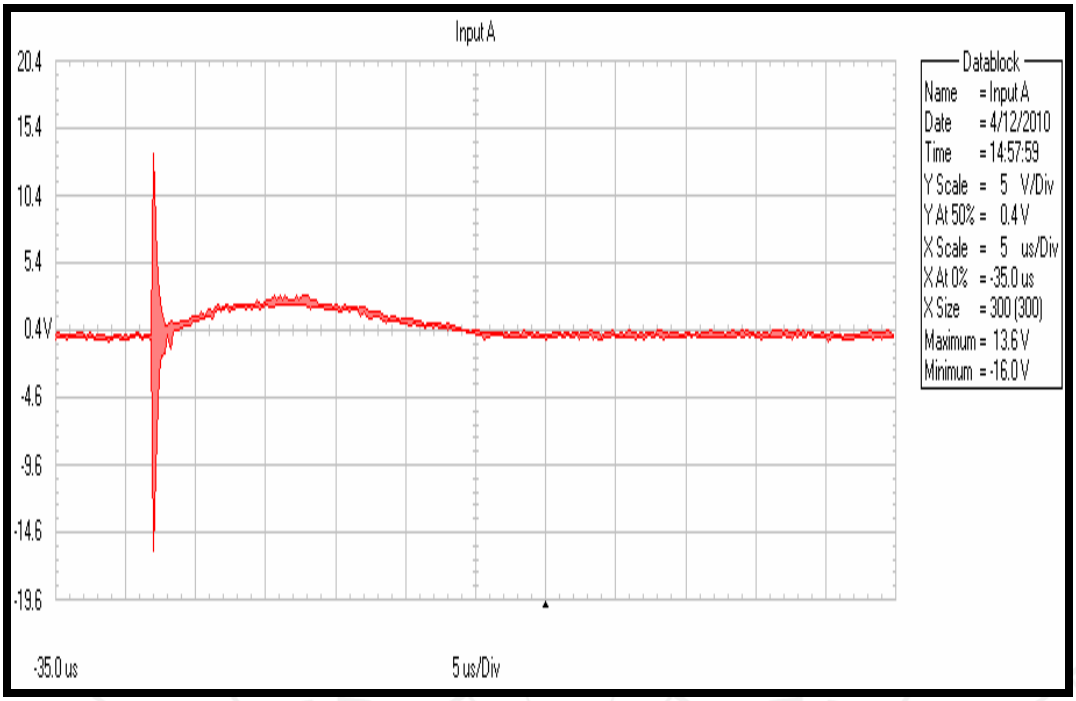

Plate 107: Current waveform at +1500V, 750A Phase 1 to Protective Earth.

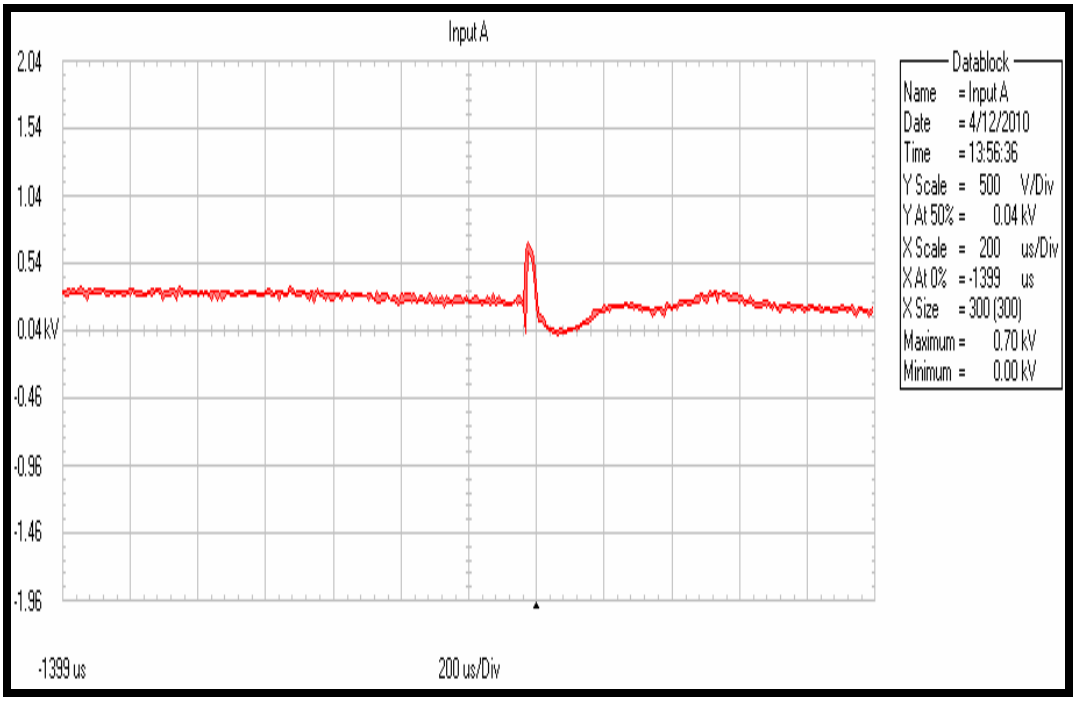

Plate 108: Voltage waveform at +1500V, 750A Phase 2 to Protective Earth.

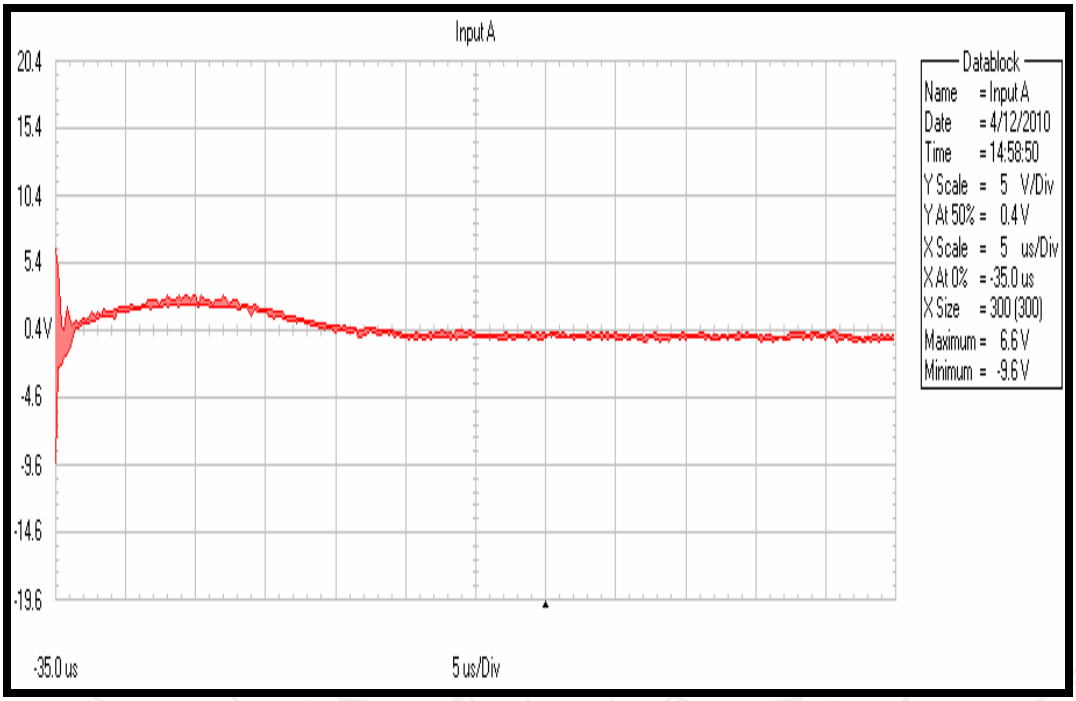

Plate 109: Current waveform at +1500V, 750A Phase 2 to Protective Earth.

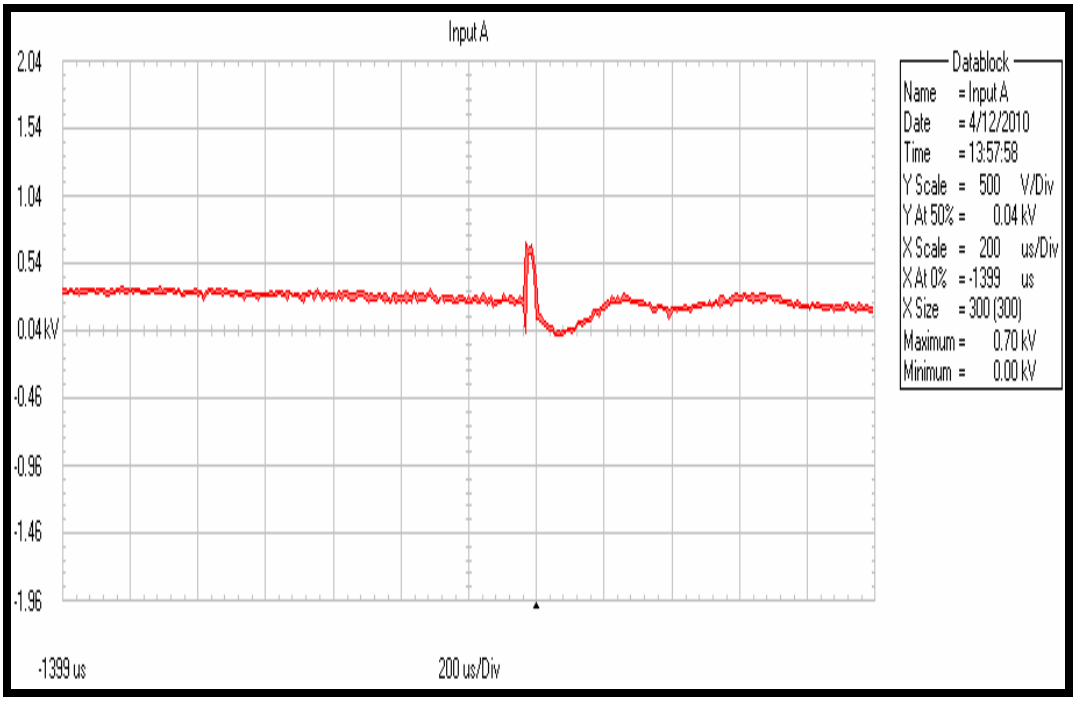

Plate 110: Voltage waveform at +1500V, 750A Phase 3 to Protective Earth.

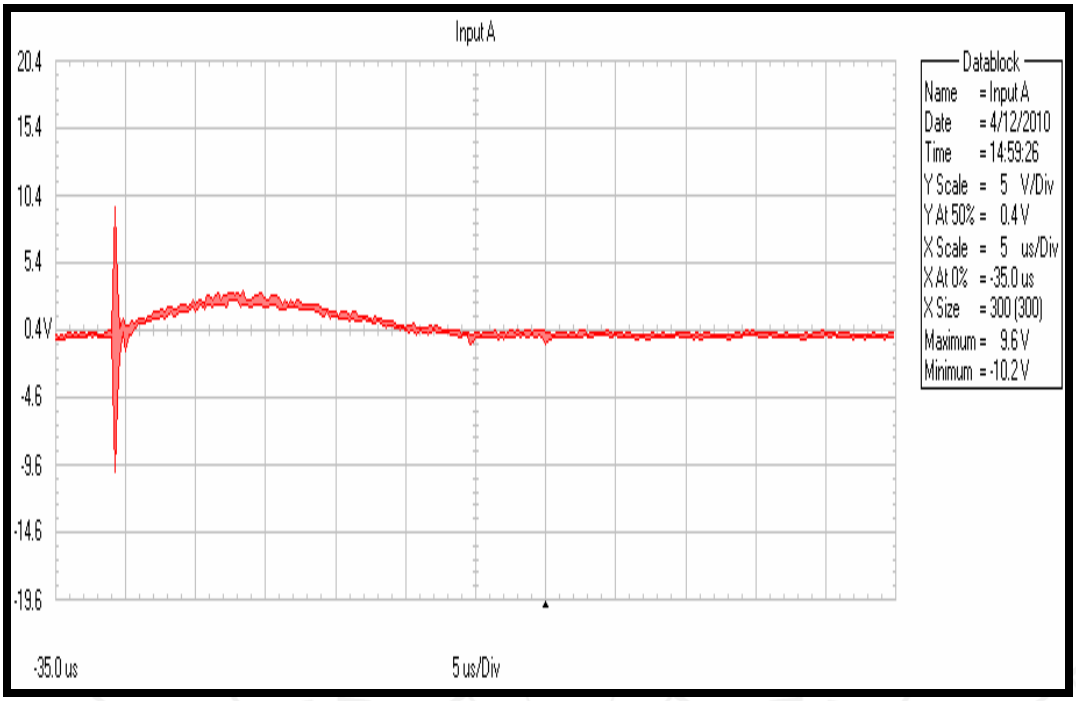

Plate 111: Current waveform at +1500V, 750A Phase 3 to Protective Earth.

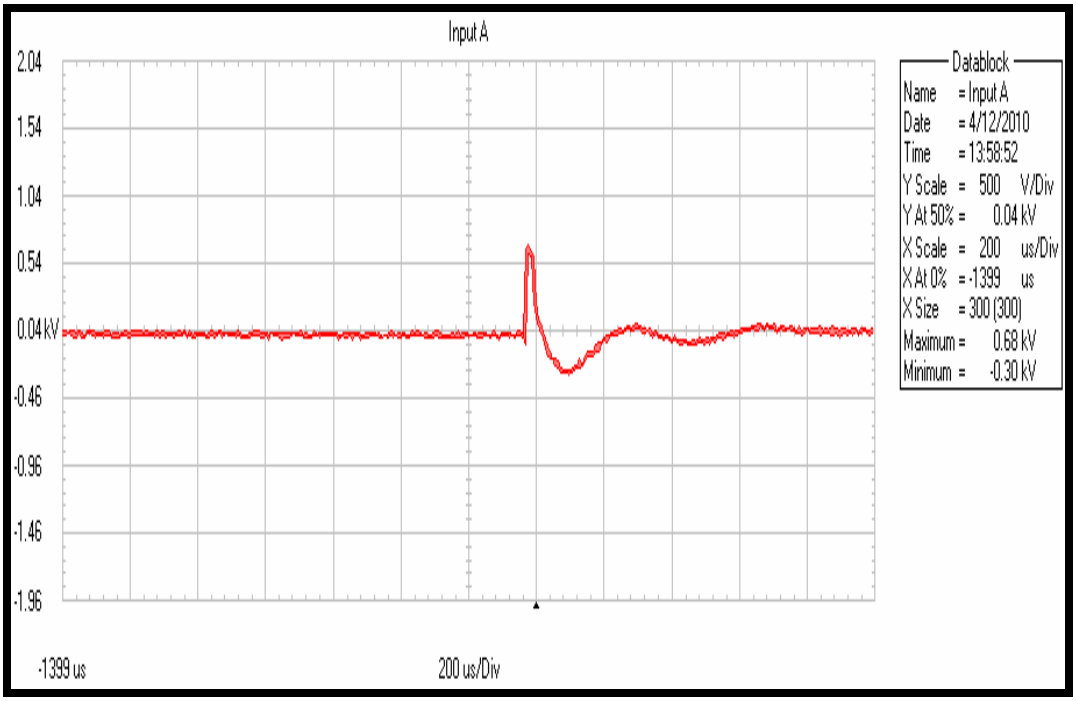

Plate 112: Voltage waveform at +1500V, 750A Neutral line to Protective Earth.

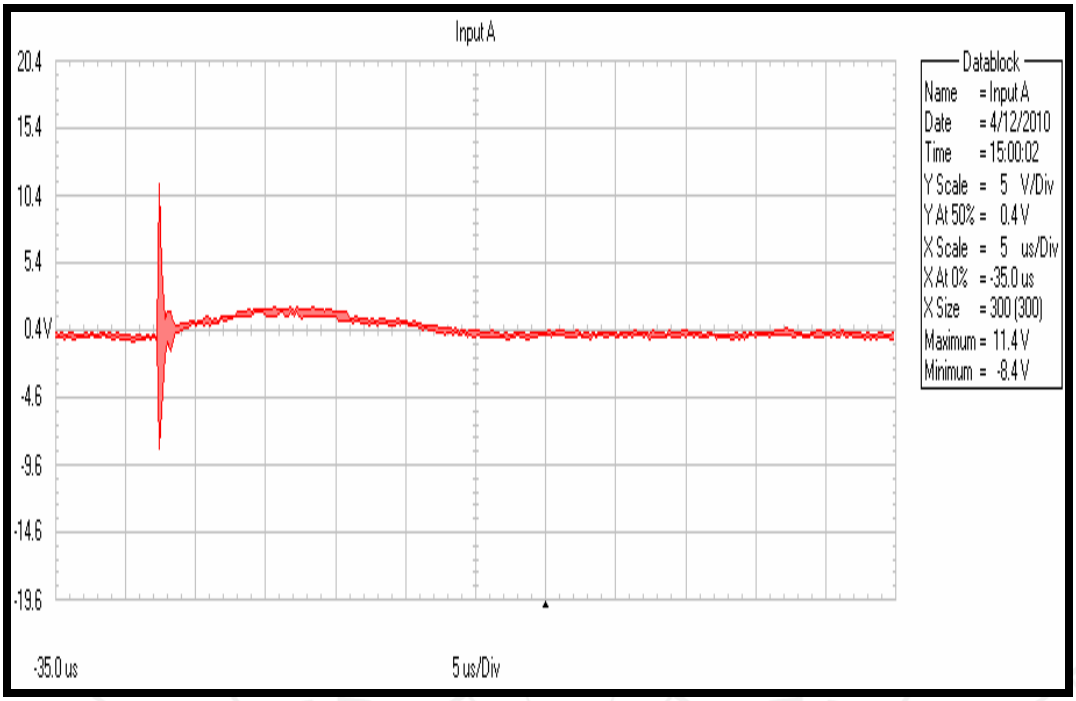

Plate 113: Current waveform at +1500V, 750A Neutral line to Protective Earth.

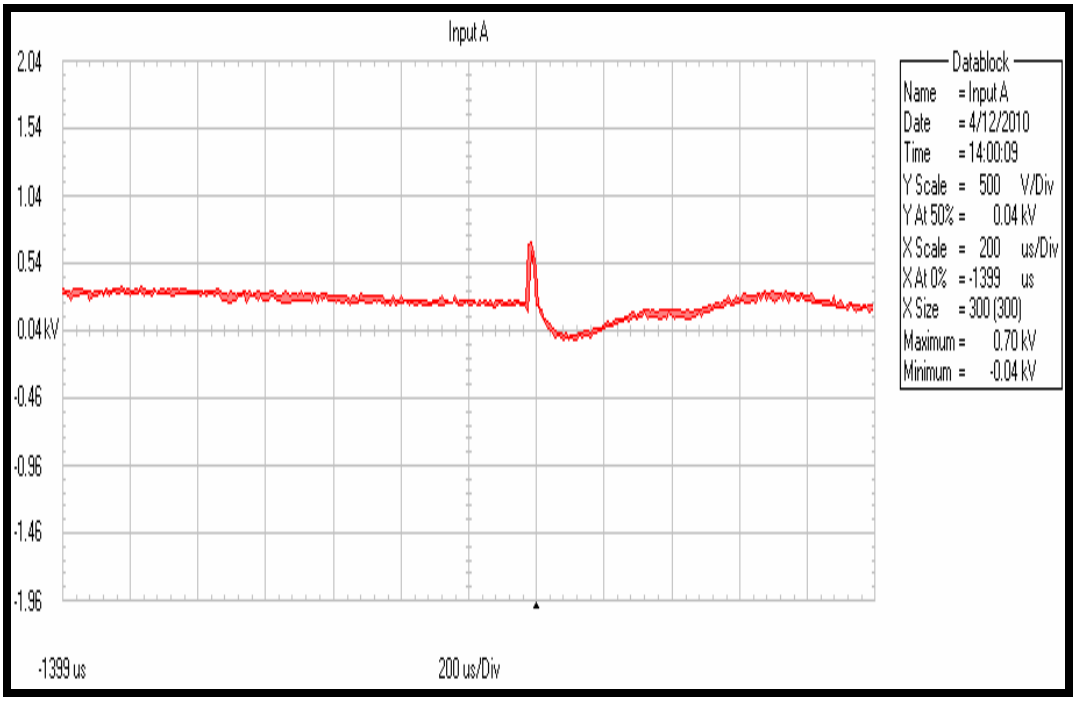

Plate 114: Voltage waveform at +1500V, 750A Phase 1 to Neutral line.

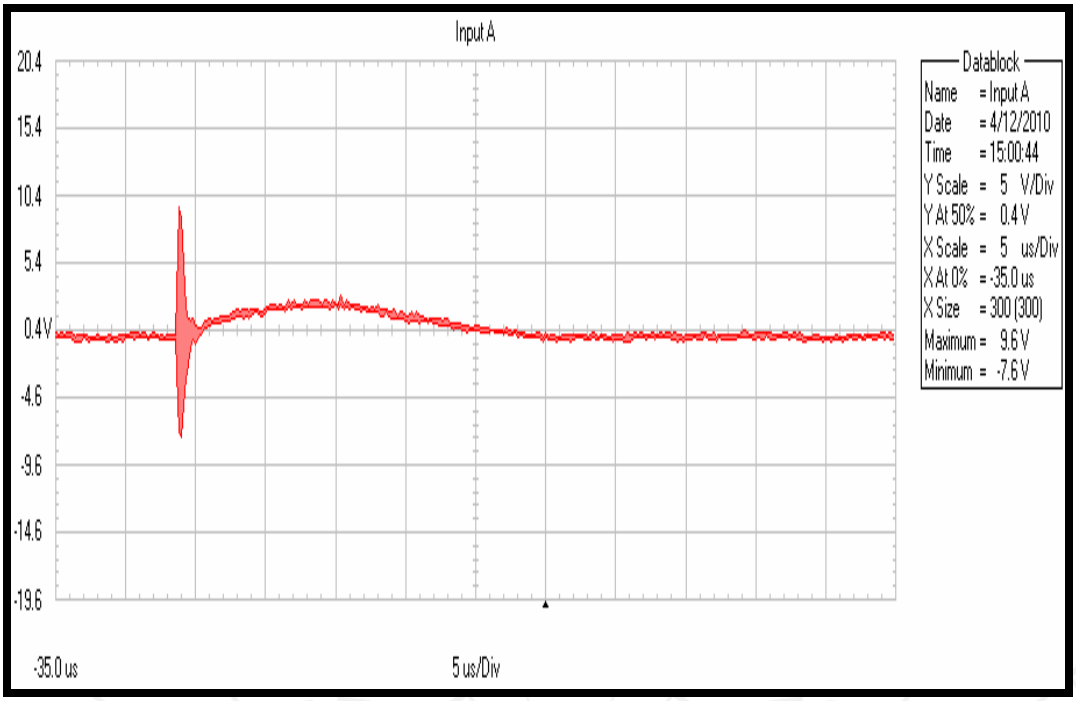

Plate 115: Current waveform at +1500V, 750A Phase 1 to Neutral line.

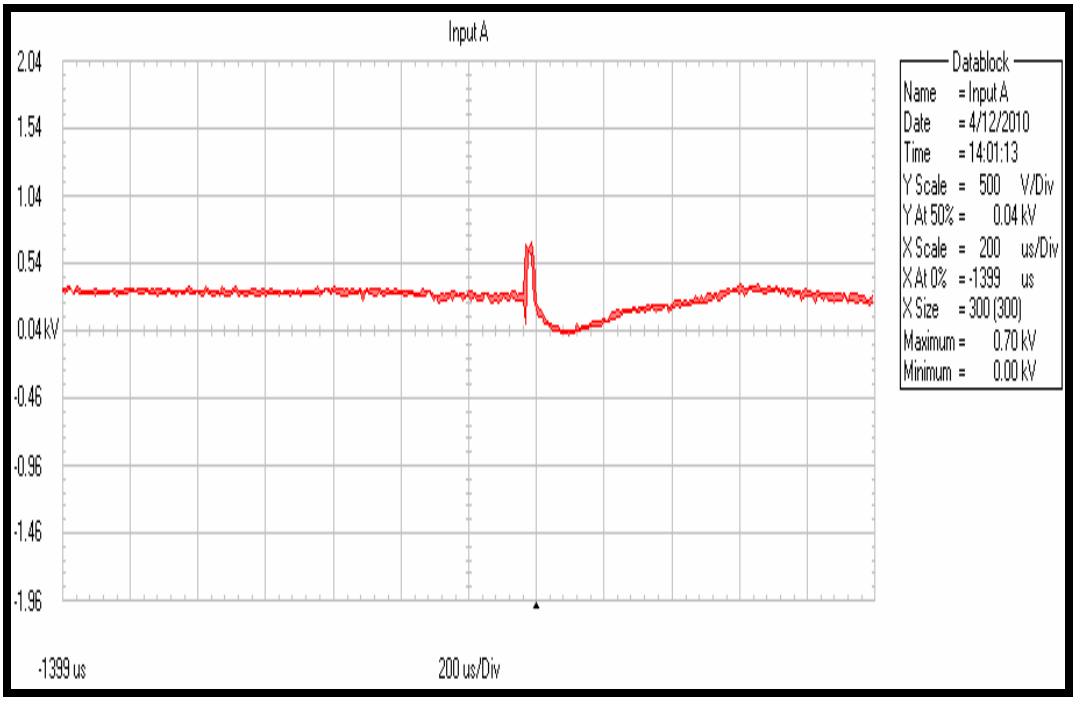

Plate 116: Voltage waveform at +1500V, 750A Phase 2 to Neutral line.

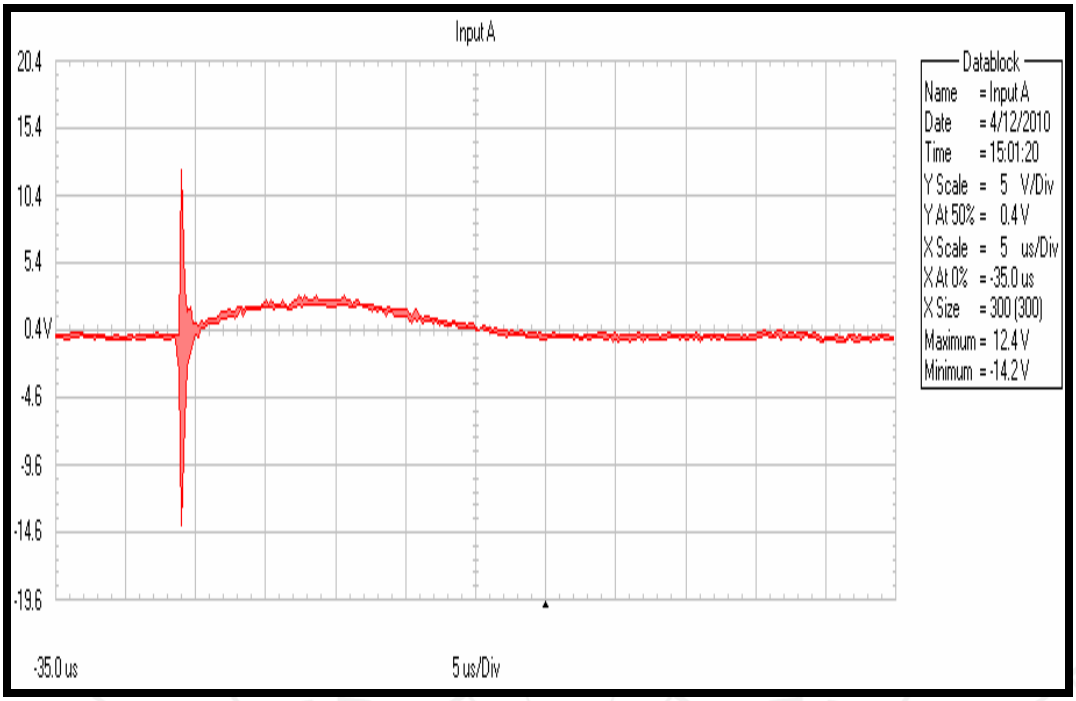

Plate 117: Current waveform at +1500V, 750A Phase 2 to Neutral line.

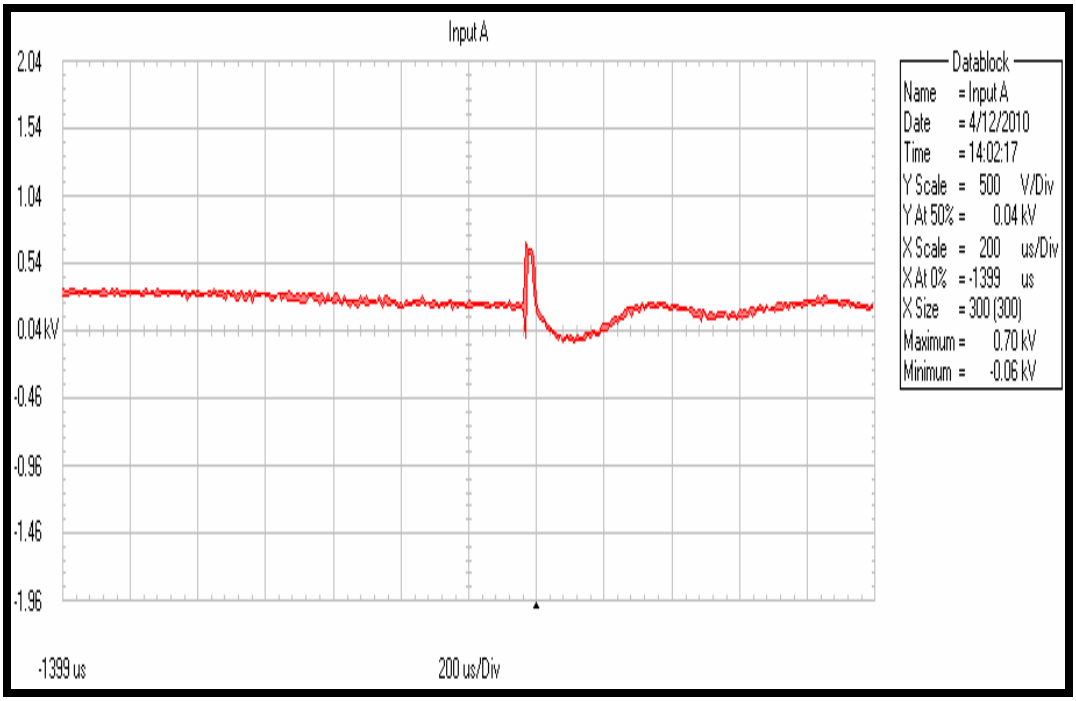

Plate 118: Voltage waveform at +1500V, 750A Phase 3 to Neutral line.

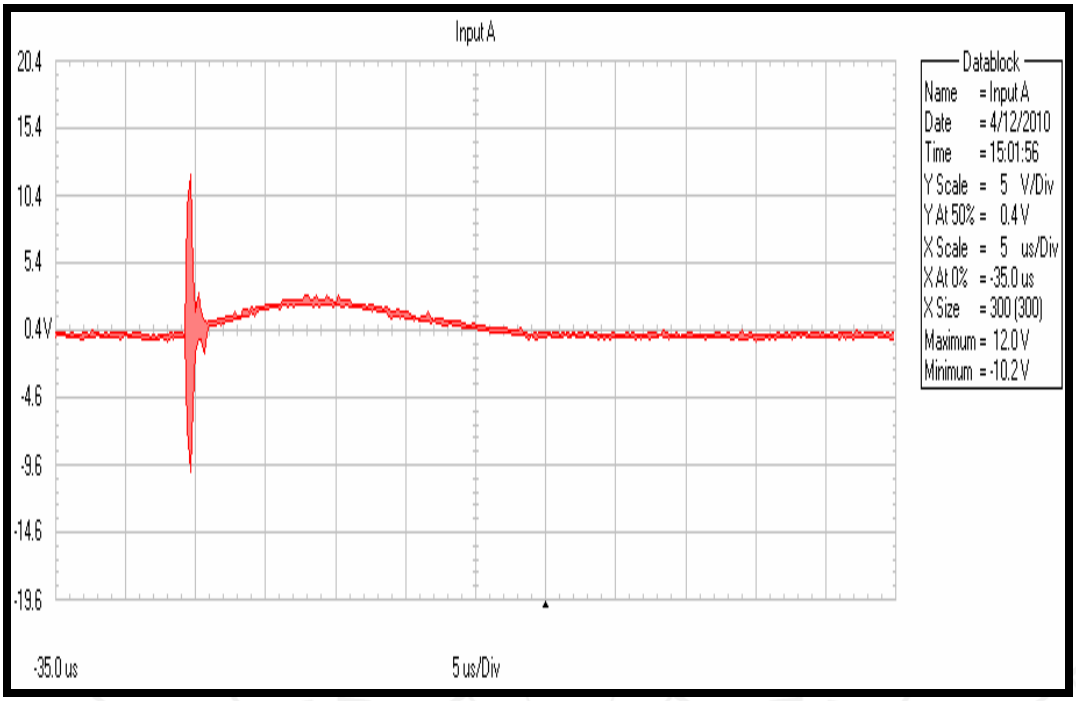

Plate 119: Current waveform at +1500V, 750A Phase 3 to Neutral line.

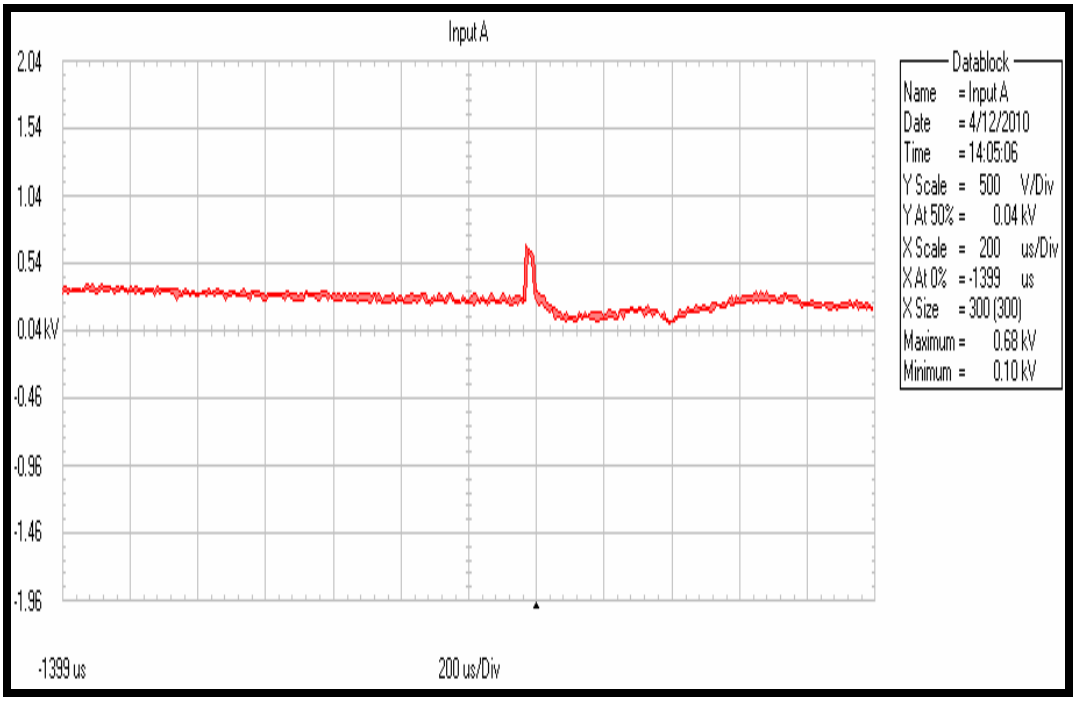

Plate 120: Voltage waveform at +1500V, 750A Phase 1 to Phase 2.

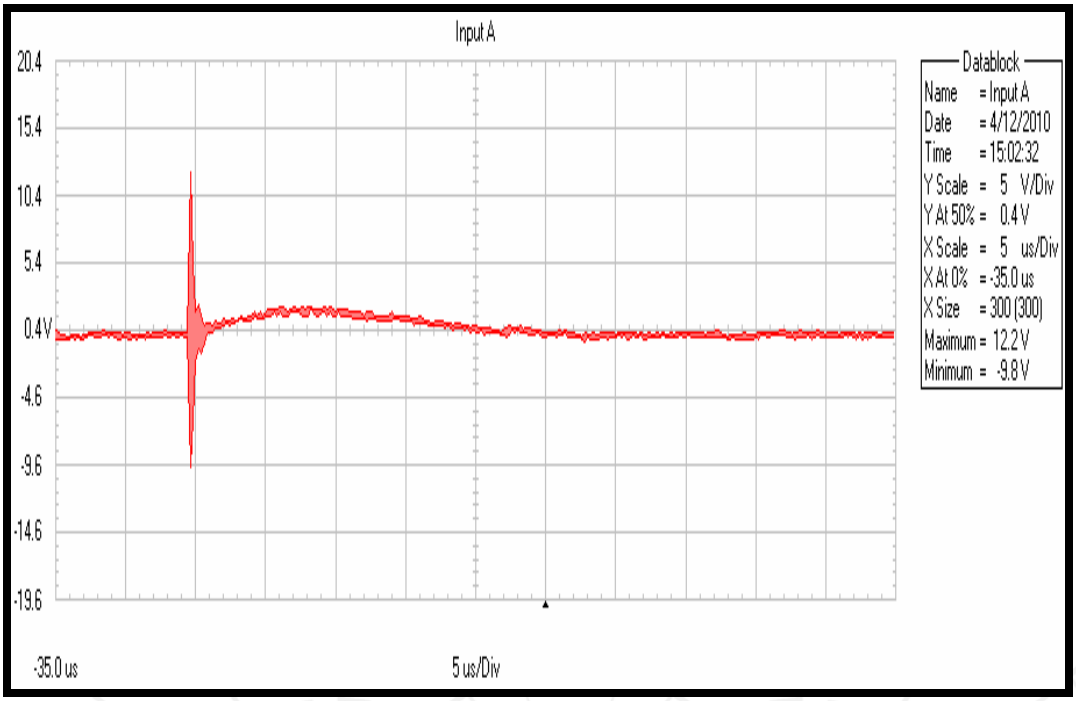

Plate 121: Current waveform at +1500V, 750A Phase 1 to Phase 2.

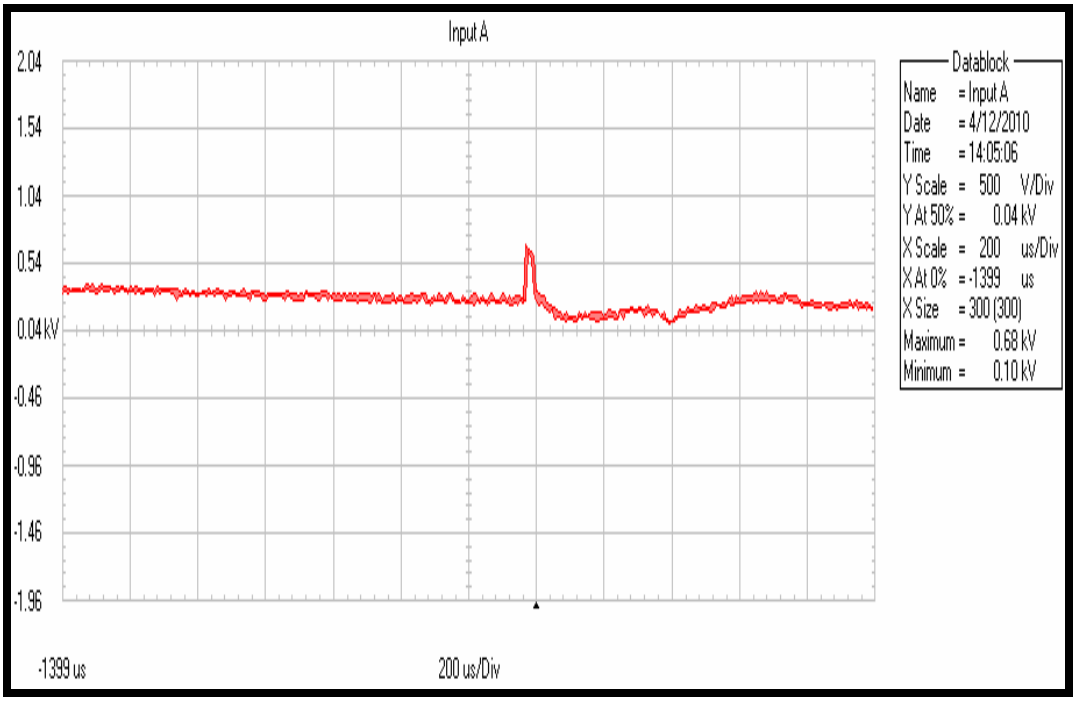

Plate 122: Voltage waveform at +1500V, 750A Phase 1 to Phase 3.

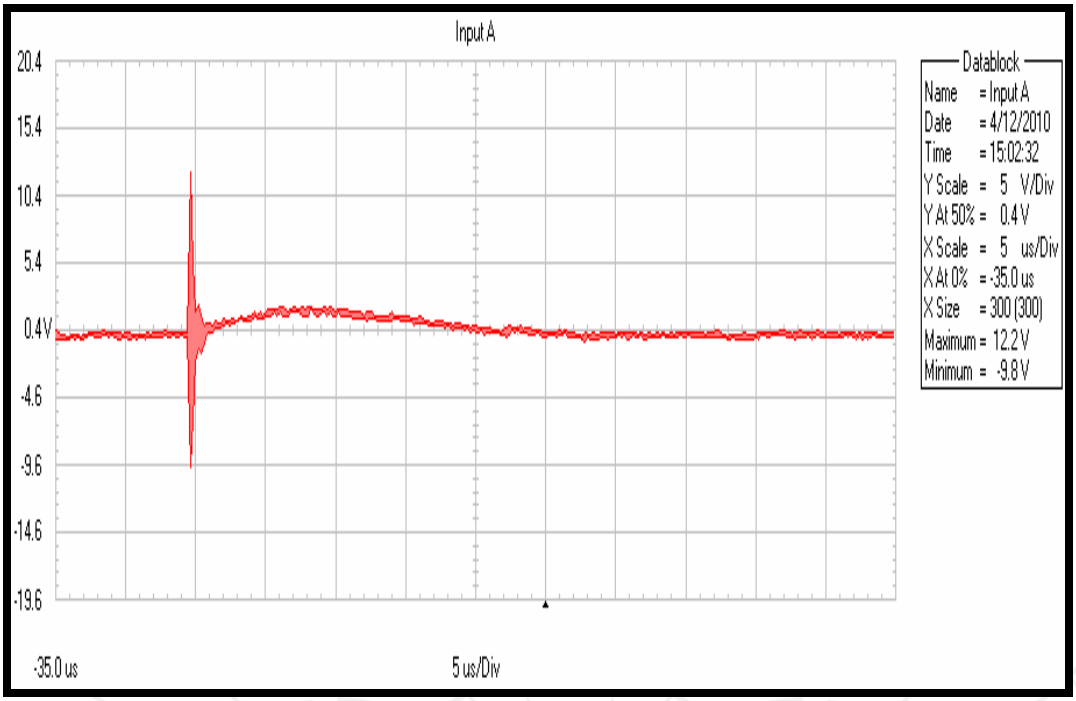

Plate 123: Current waveform at +1500V, 750A Phase 1 to Phase 3.

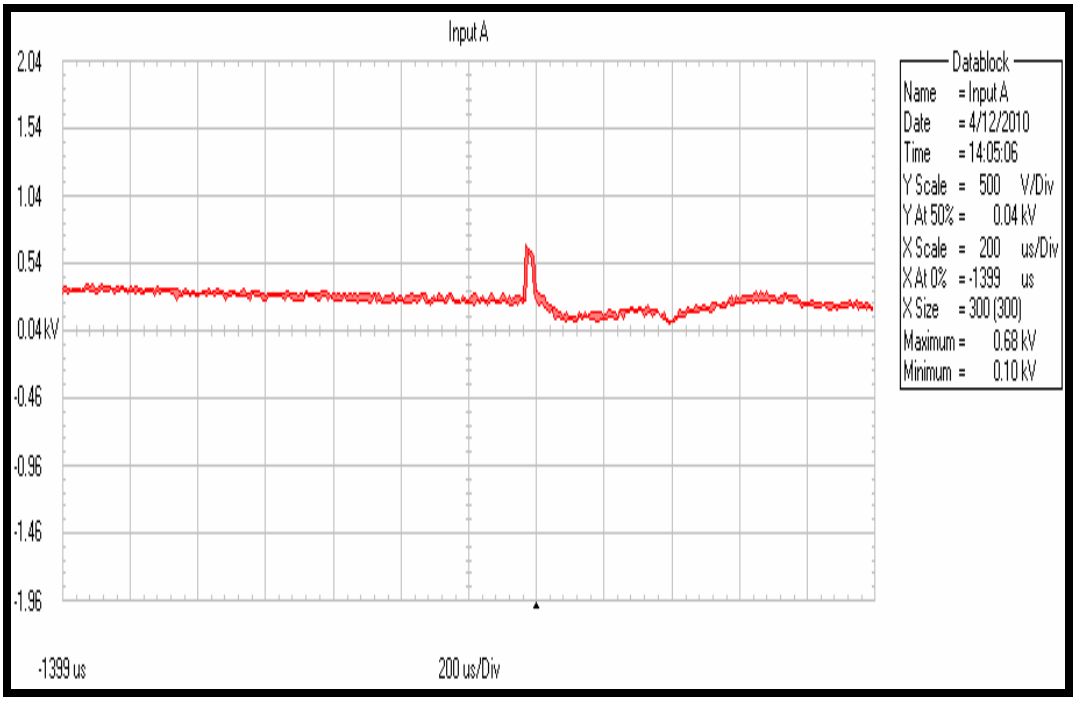

Plate 124: Voltage waveform at +1500V, 750A Phase 2 to Phase 3.

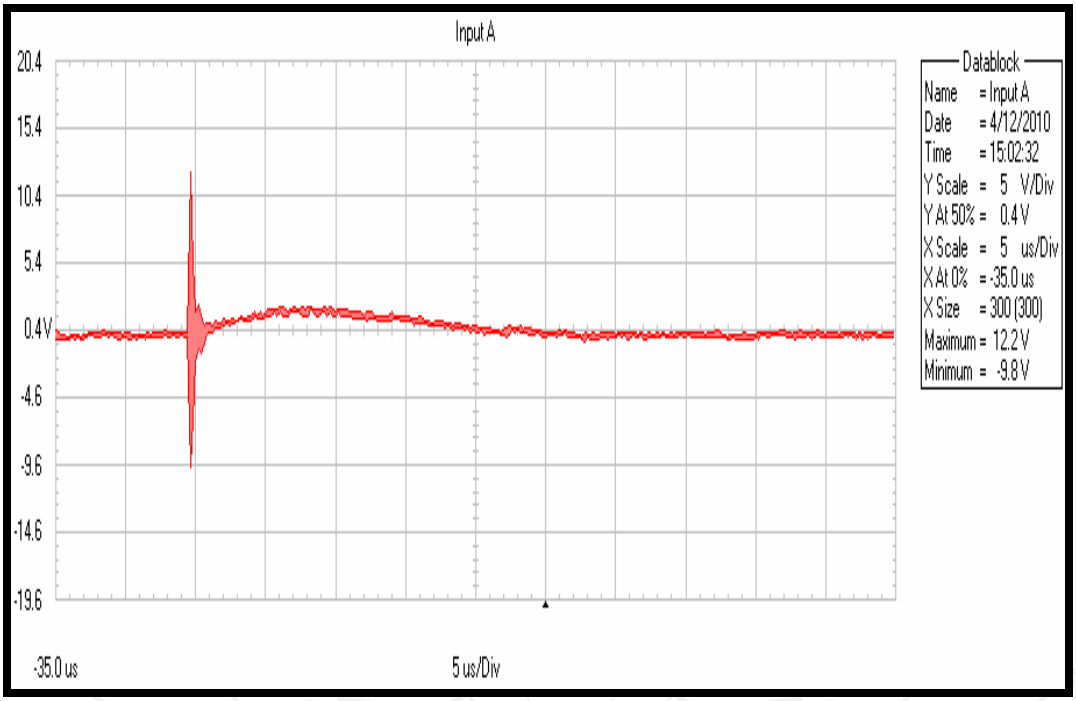

Plate 125: Current waveform at +1500V, 750A Phase 2 to Phase 3.

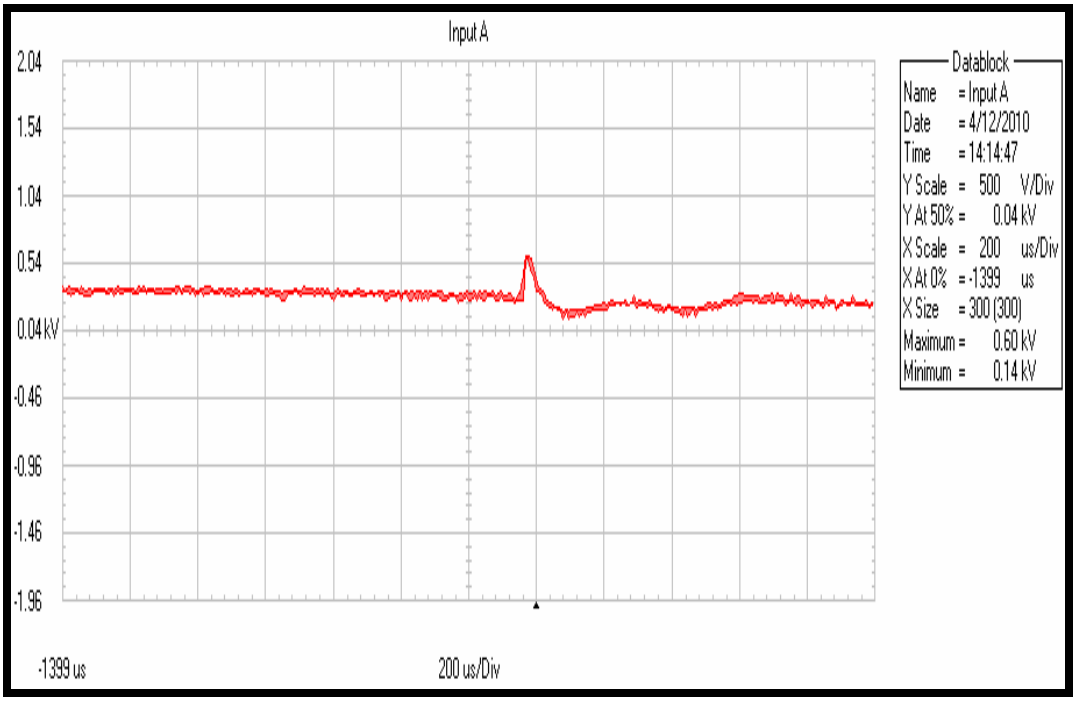

Plate 126: Voltage waveform at +600V, 300A Phase 1 to Protective Earth.

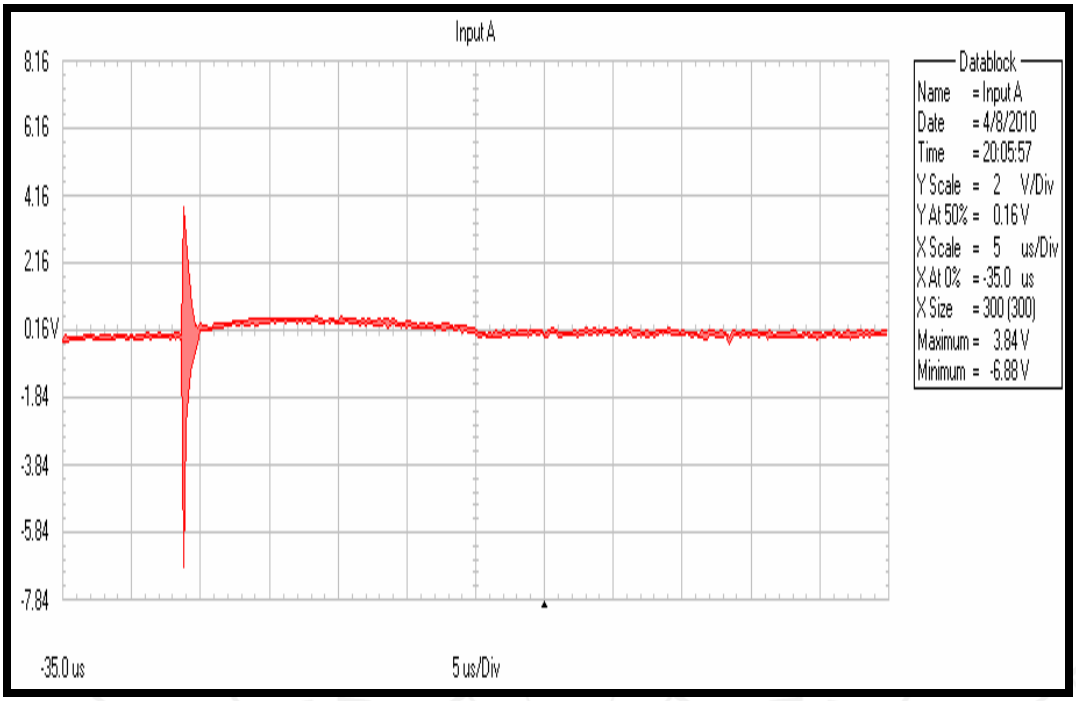

Plate 127: Current waveform at +600V, 300A Phase 1 to Protective Earth.

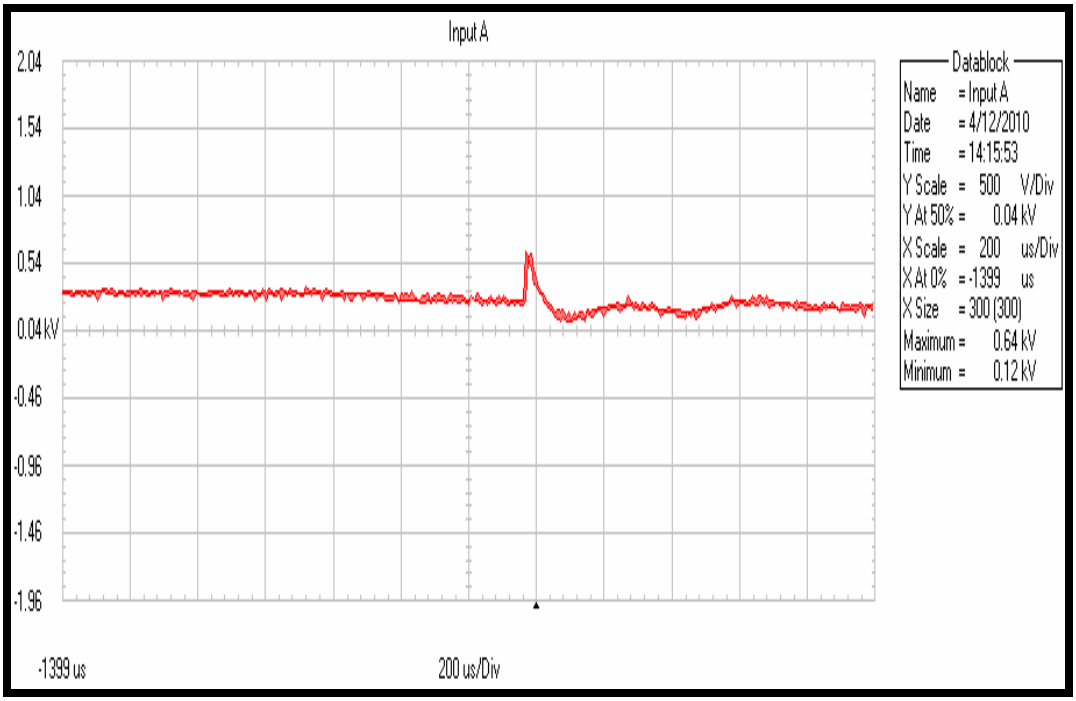

Plate 128: Voltage waveform at +600V, 300A Phase 2 to Protective Earth.

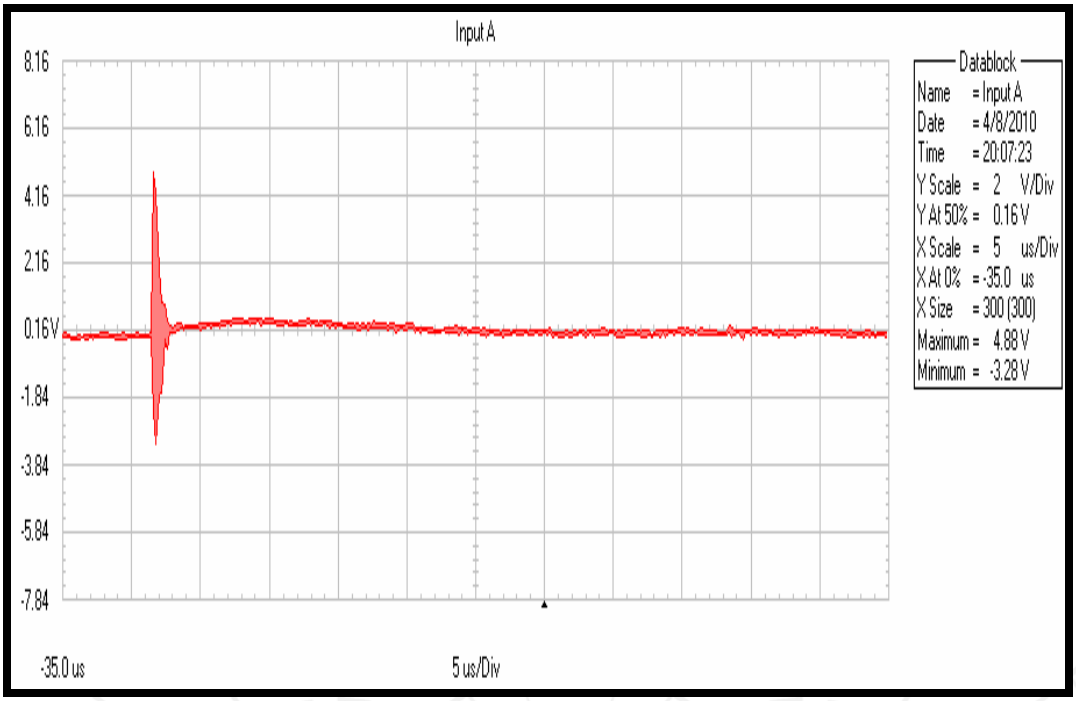

Plate 129: Current waveform at +600V, 300A Phase 2 to Protective Earth.

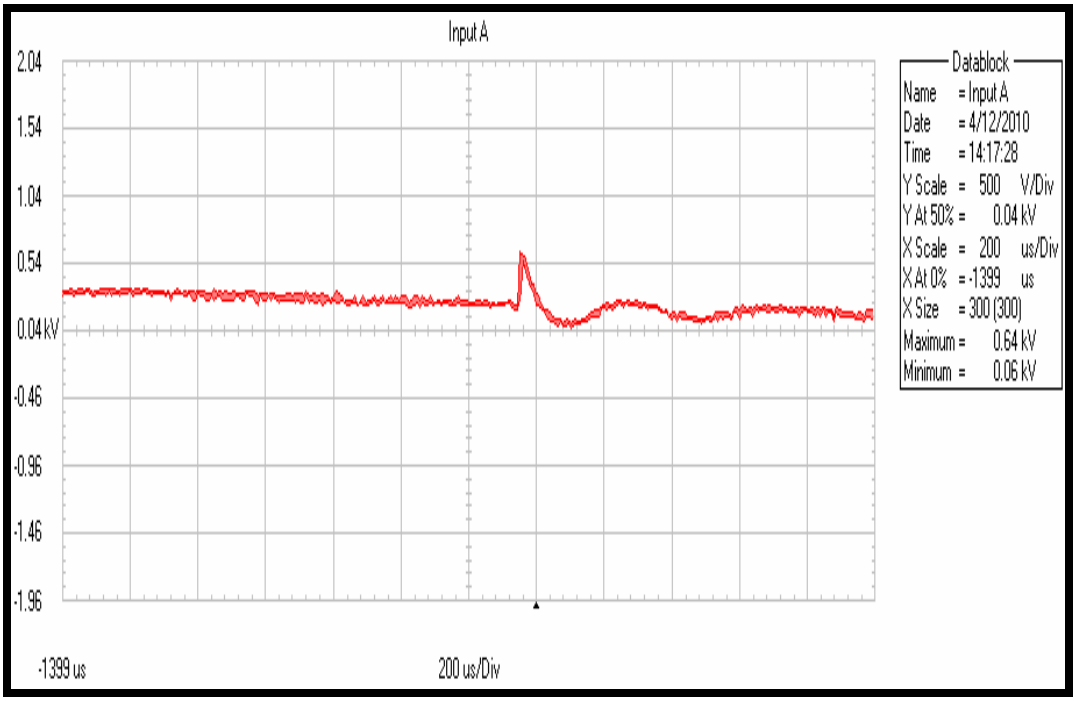

Plate 130: Voltage waveform at +600V, 300A Phase 3 to Protective Earth.

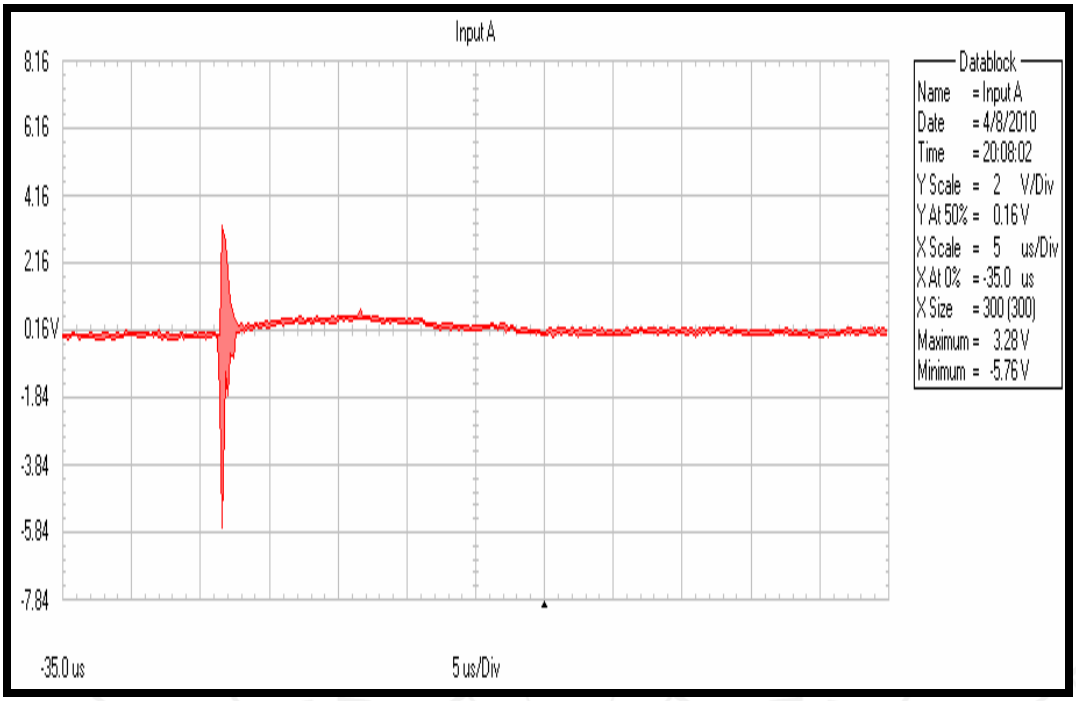

Plate 131: Current waveform at +600V, 300A Phase 3 to Protective Earth.

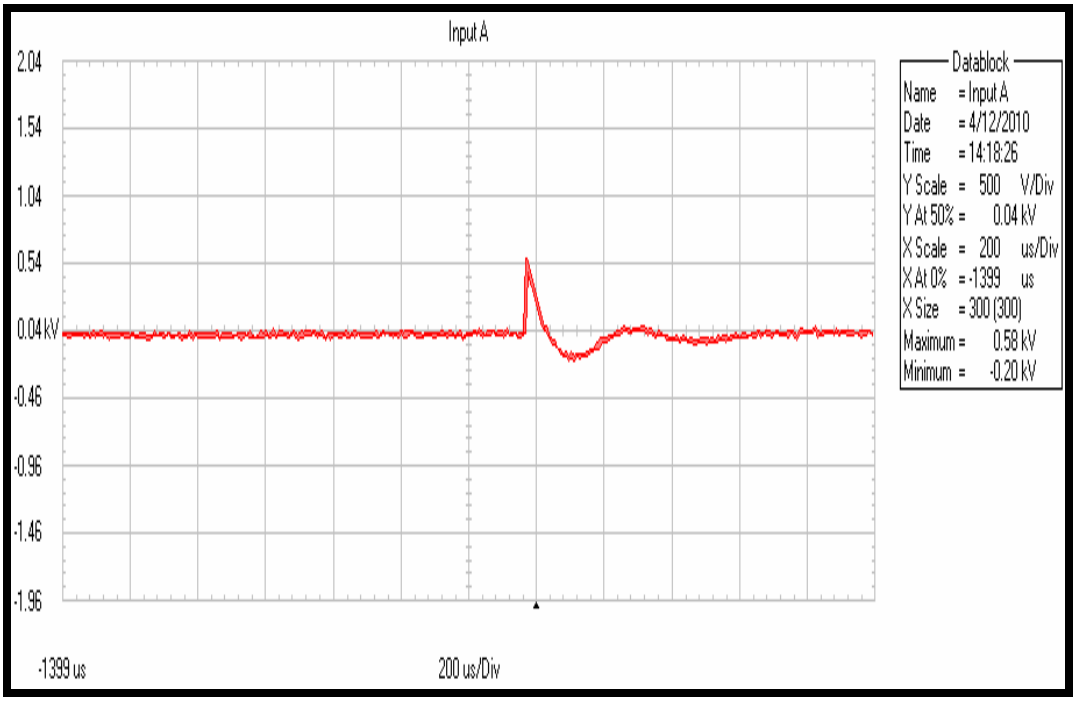

Plate 132: Voltage waveform at +600V, 300A Neutral line to Protective Earth.

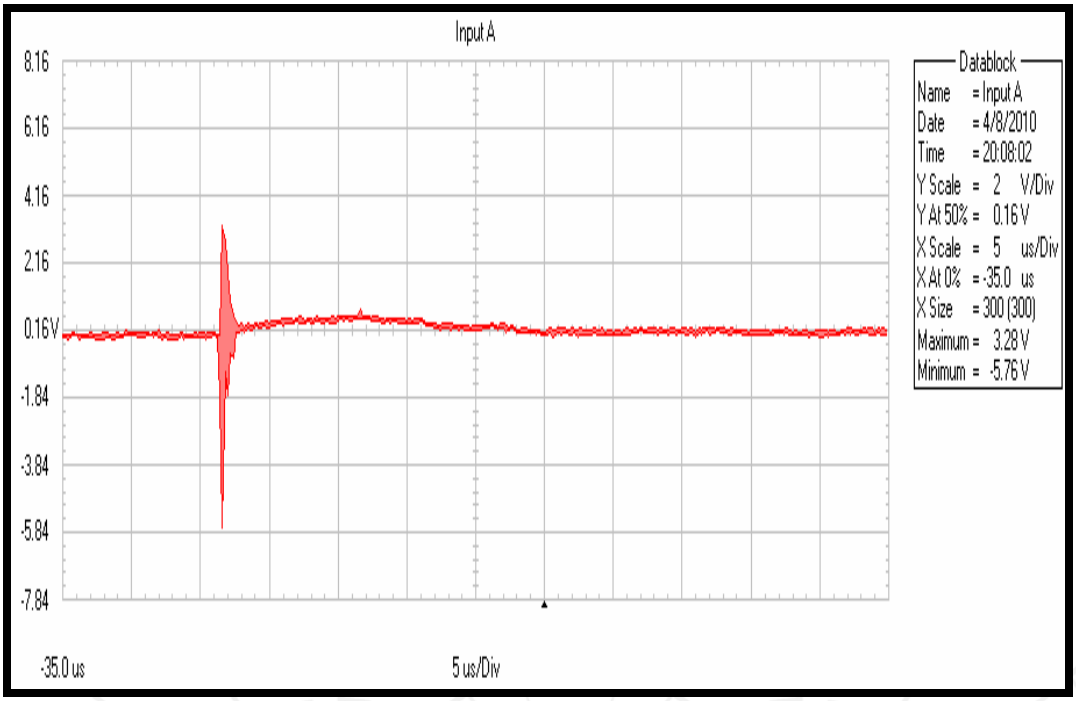

Plate 133: Current waveform at +600V, 300A Neutral line to Protective Earth.

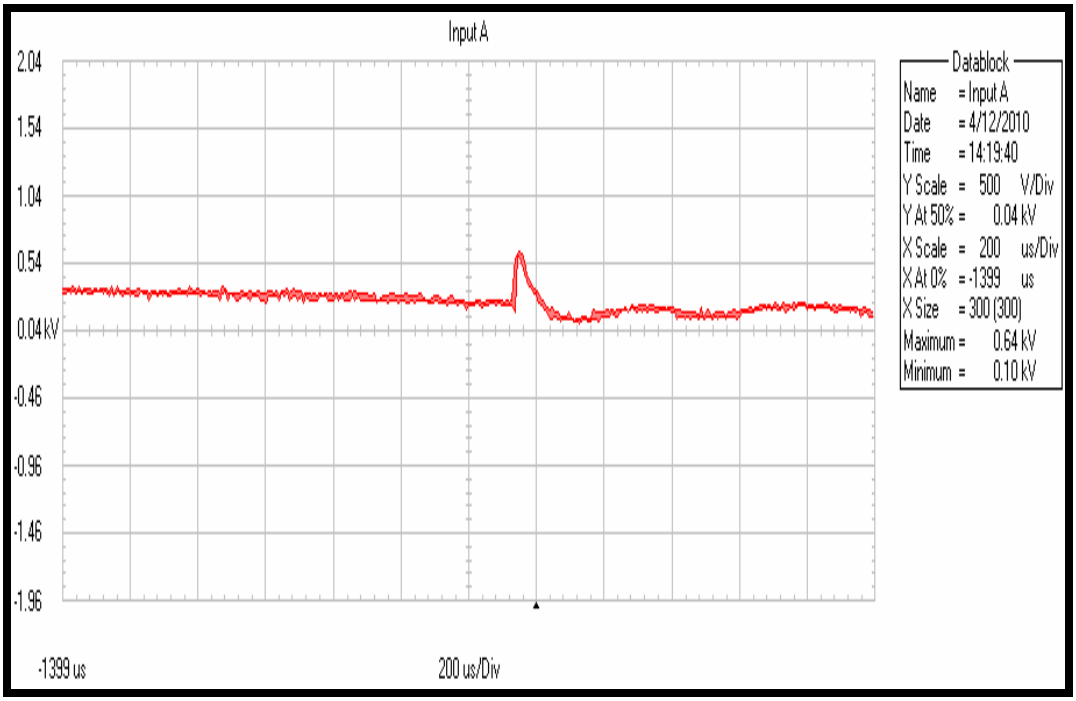

Plate 134: Voltage waveform at +600V, 300A Phase 1 to Neutral line.

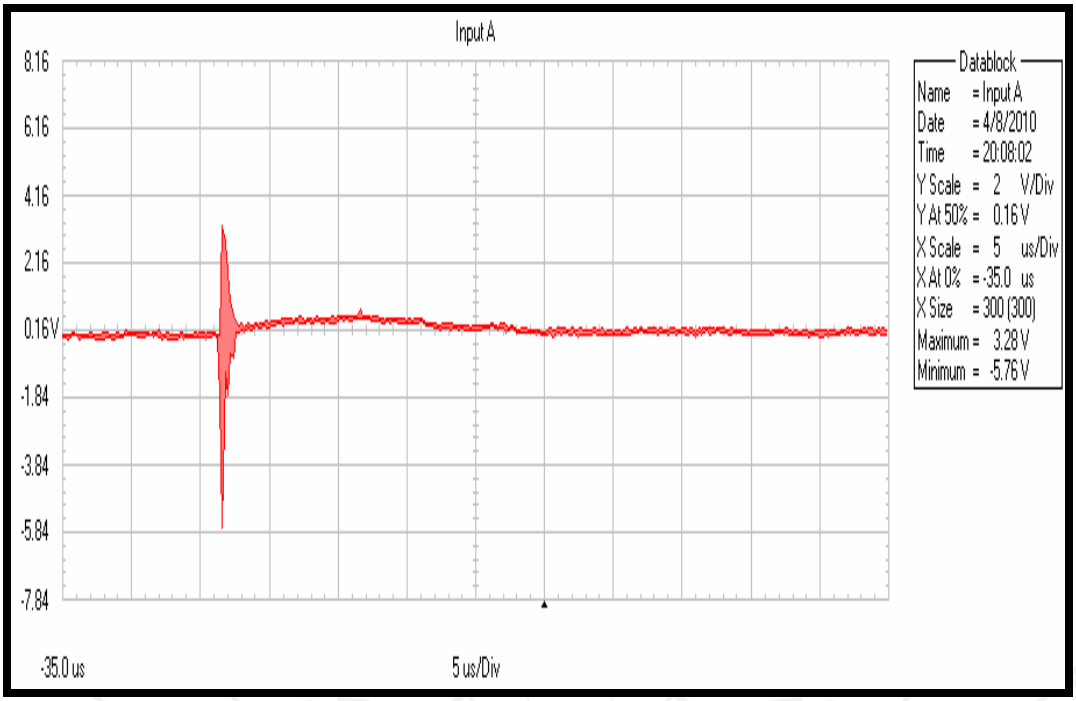

Plate 135: Current waveform at +600V, 300A Phase 1 to Neutral line.

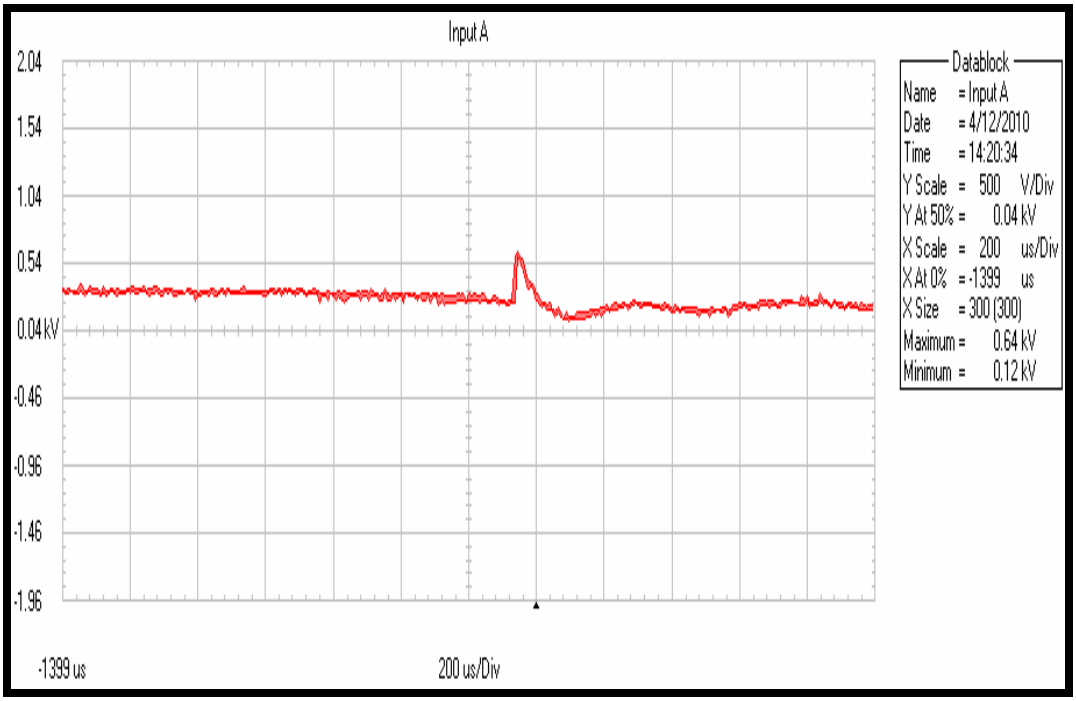

Plate 136: Voltage waveform at +600V, 300A Phase 2 to Neutral line.

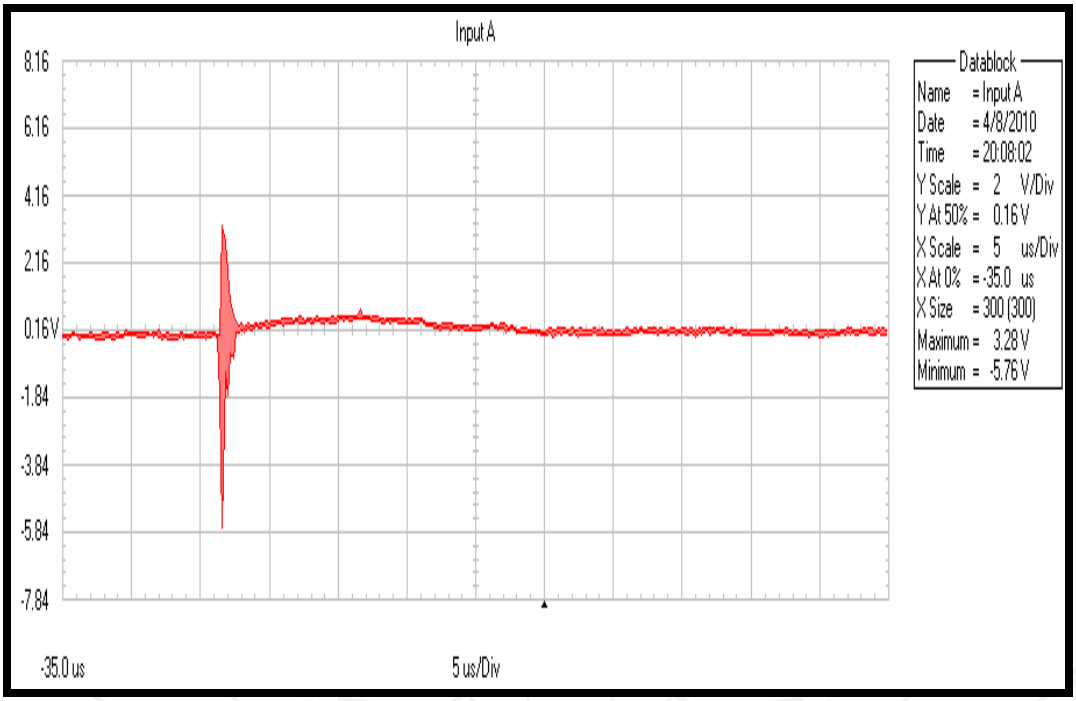

Plate 137: Current waveform at +600V, 300A Phase 2 to Neutral line.

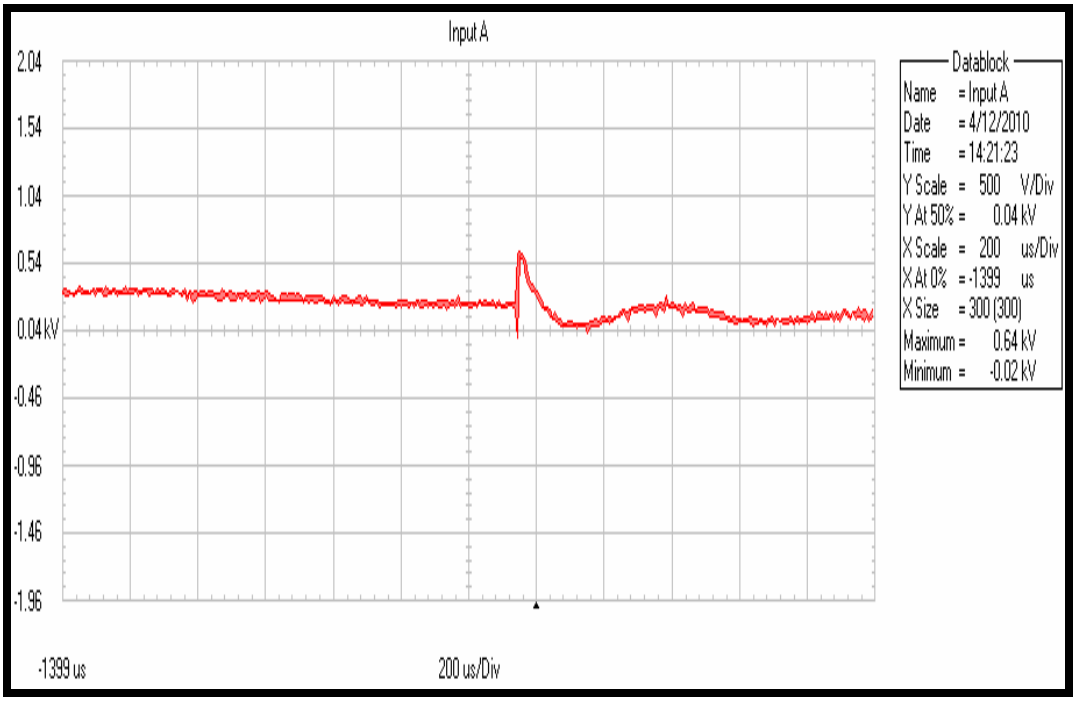

Plate 138: Voltage waveform at +600V, 300A Phase 3 to Neutral line.

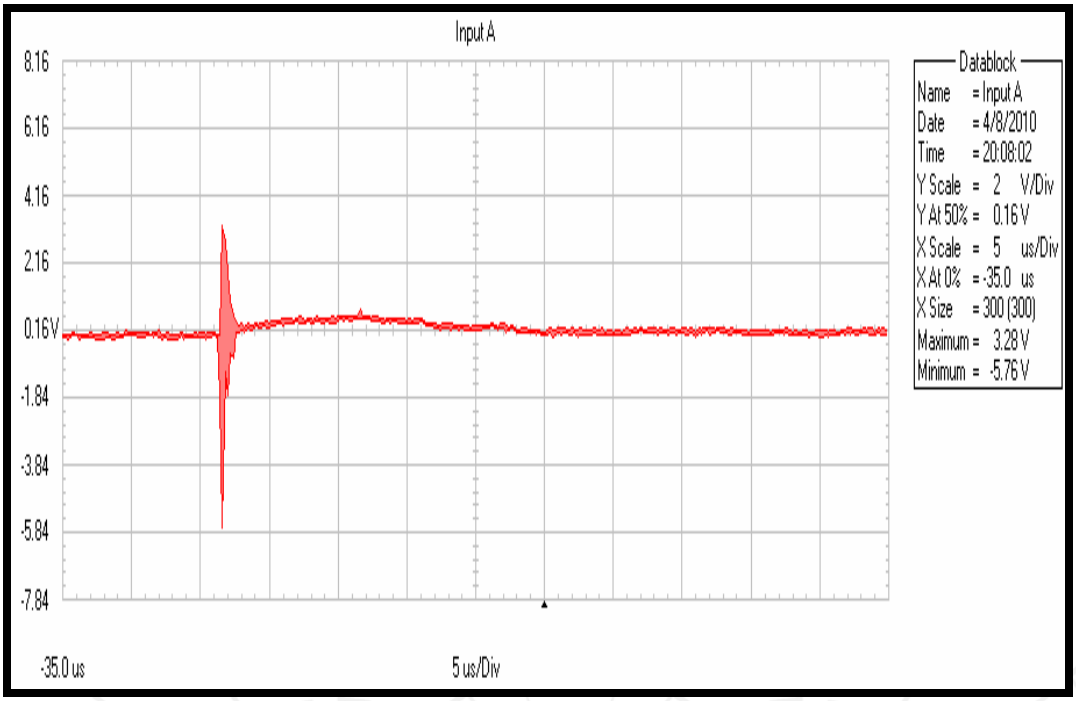

Plate 139: Current waveform at +600V, 300A Phase 3 to Neutral line.

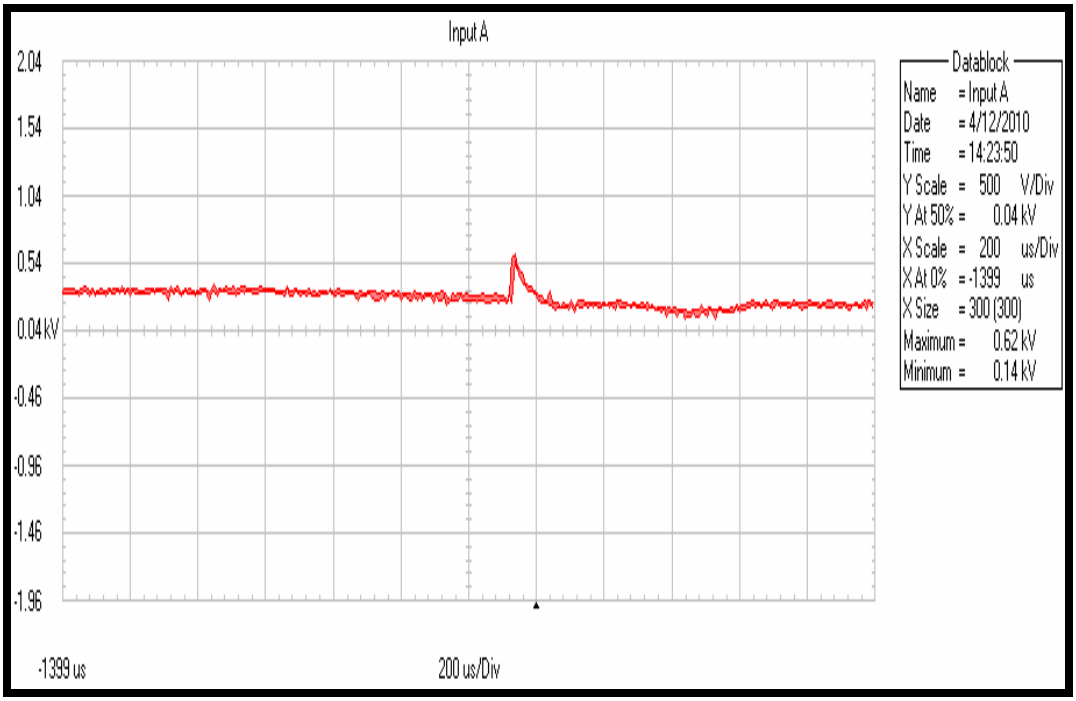

Plate 140: Voltage waveform at +600V, 300A Phase 1 to Phase 2.

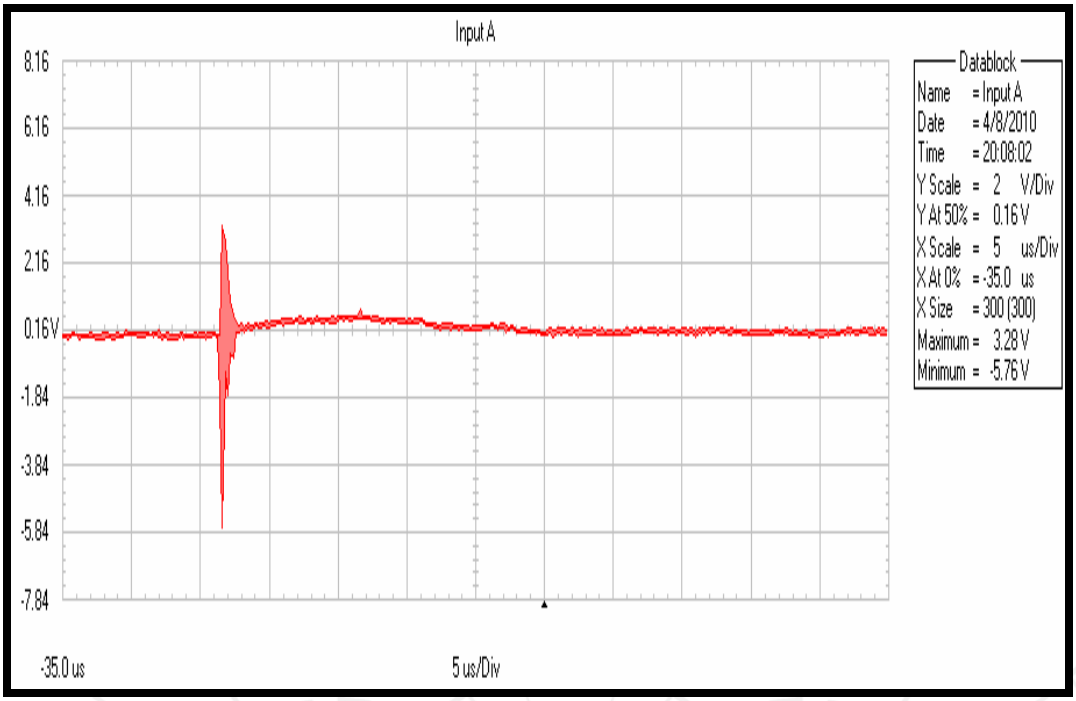

Plate 141: Current waveform at +600V, 300A Phase 1 to Phase 2.

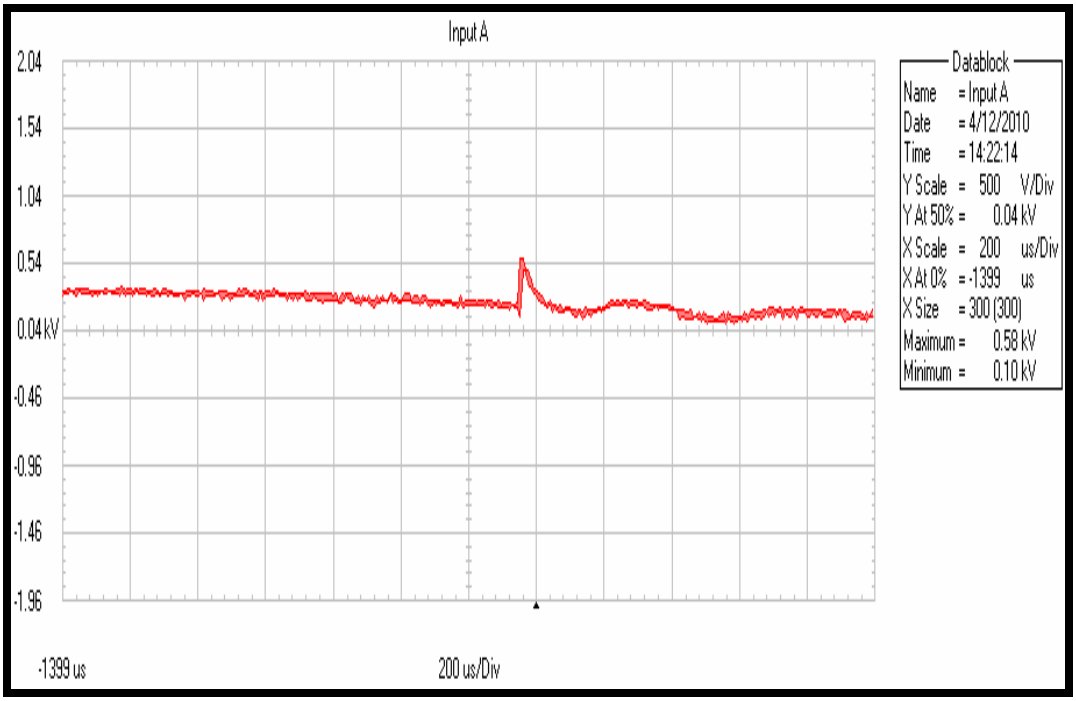

Plate 142: Voltage waveform at +600V, 300A Phase 1 to Phase 3.

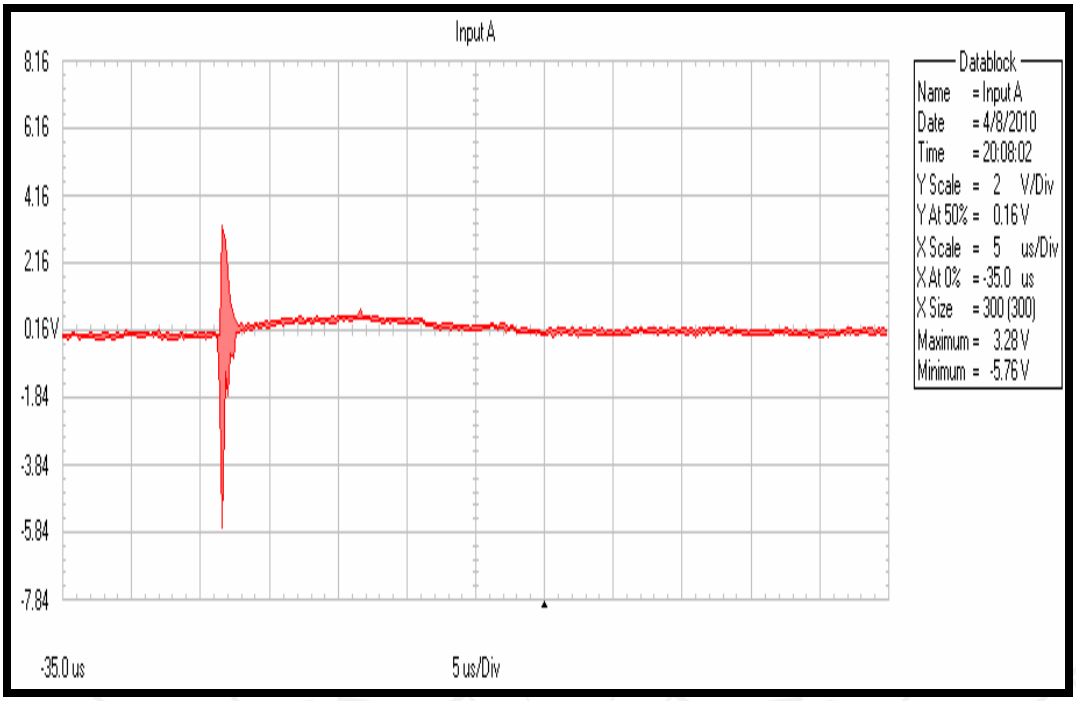

Plate 143: Current waveform at +600V, 300A Phase 1 to Phase 3.

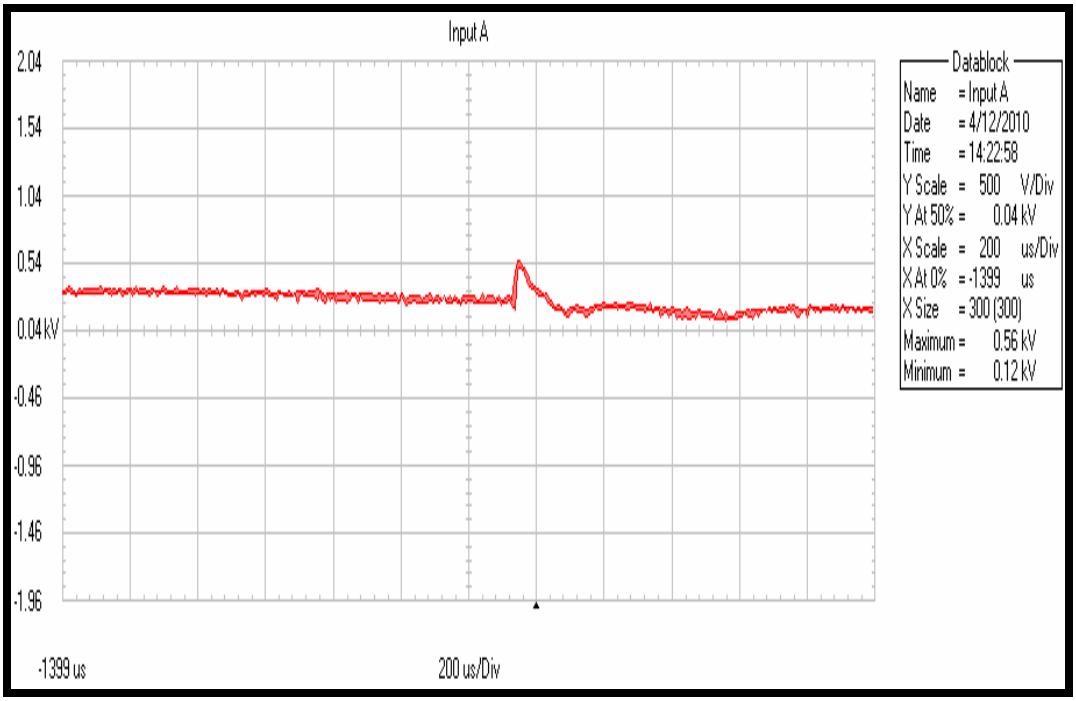

Plate 144: Voltage waveform at +600V, 300A Phase 2 to Phase 3.

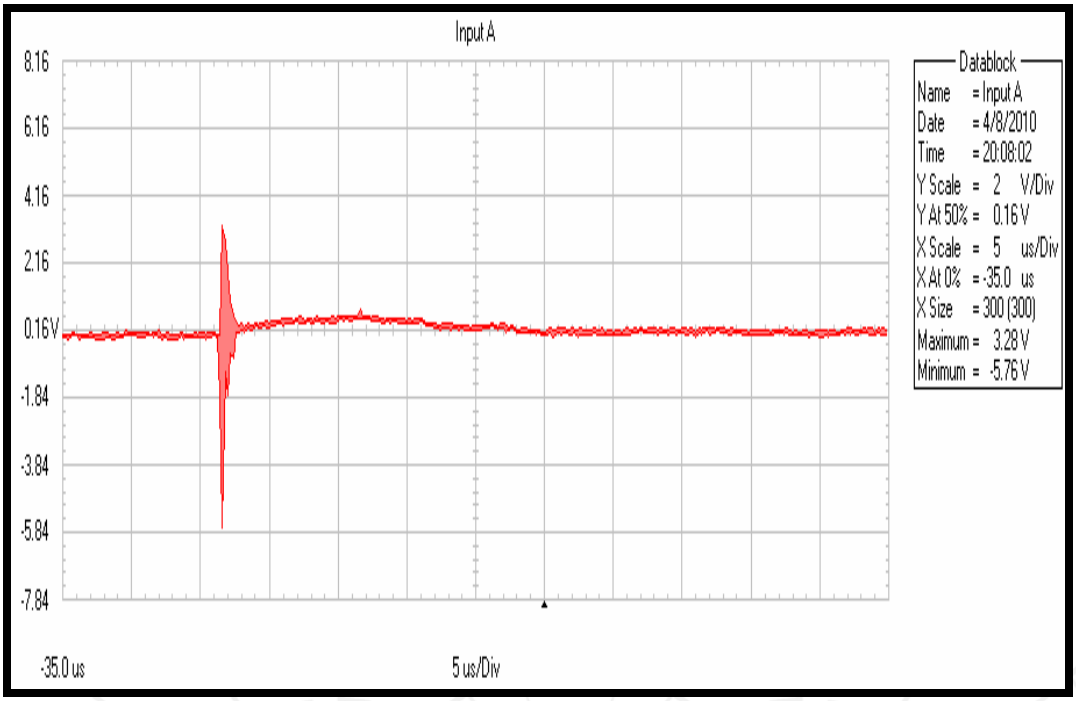

Plate 145: Current waveform at +600V, 300A Phase 2 to Phase 3.

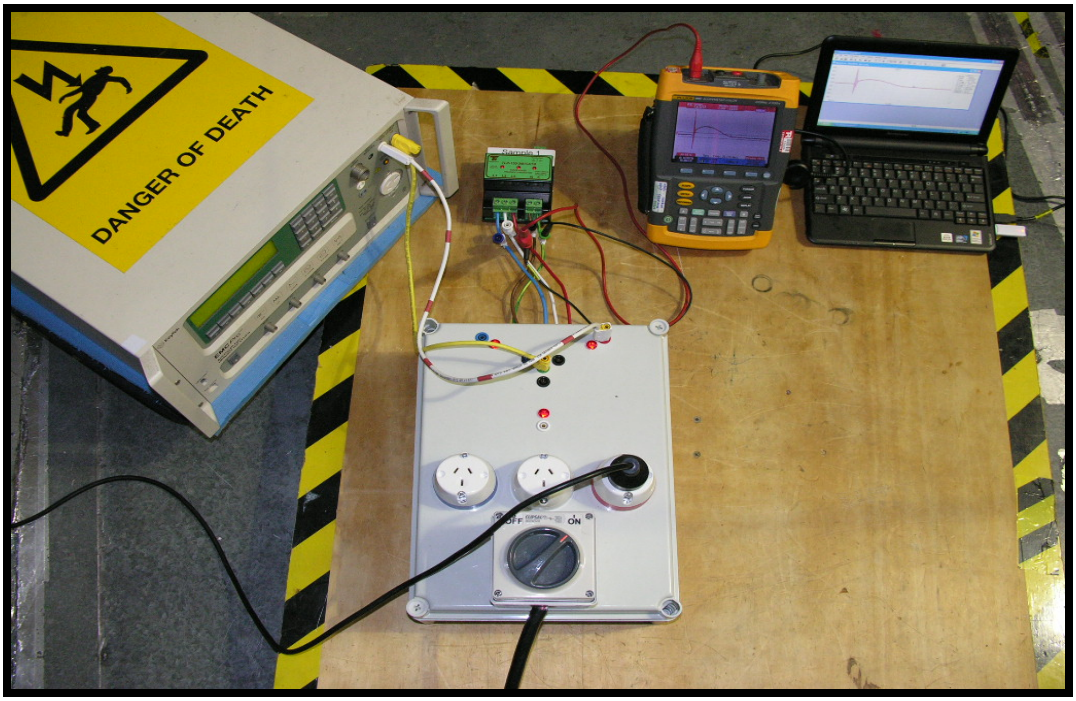

Plate 146: EUT Setup for Surge Testing, monitoring voltage waveform.

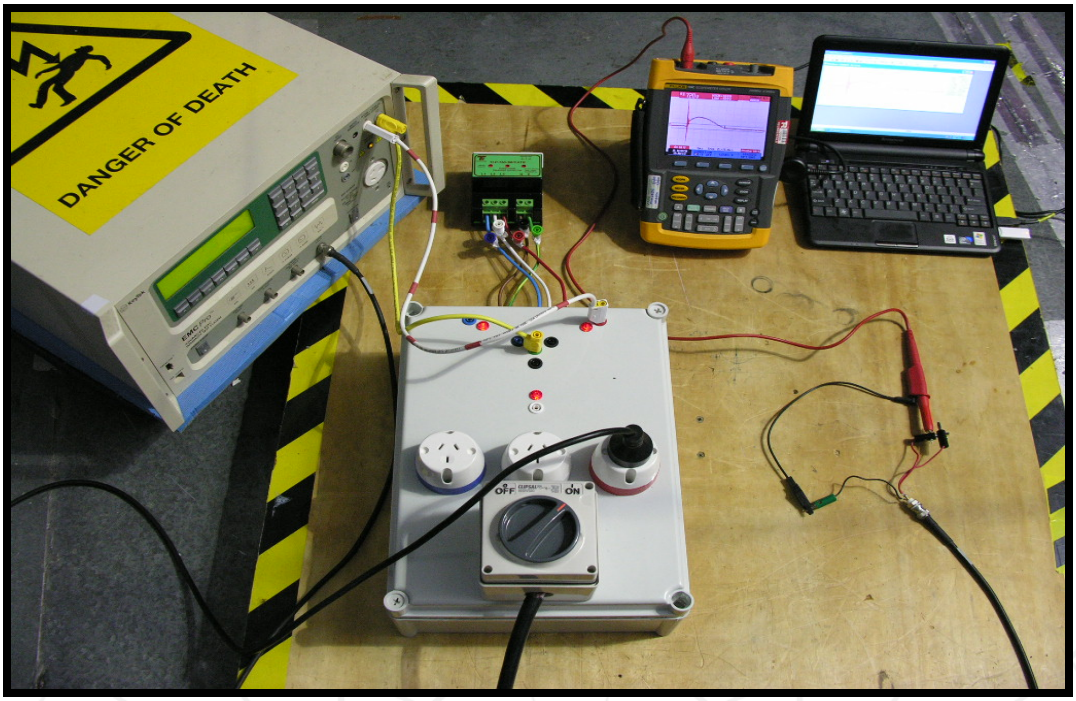

Plate 147: EUT Setup for Surge Testing, monitoring current waveform.

Plate 148: EUT Identification (Front).

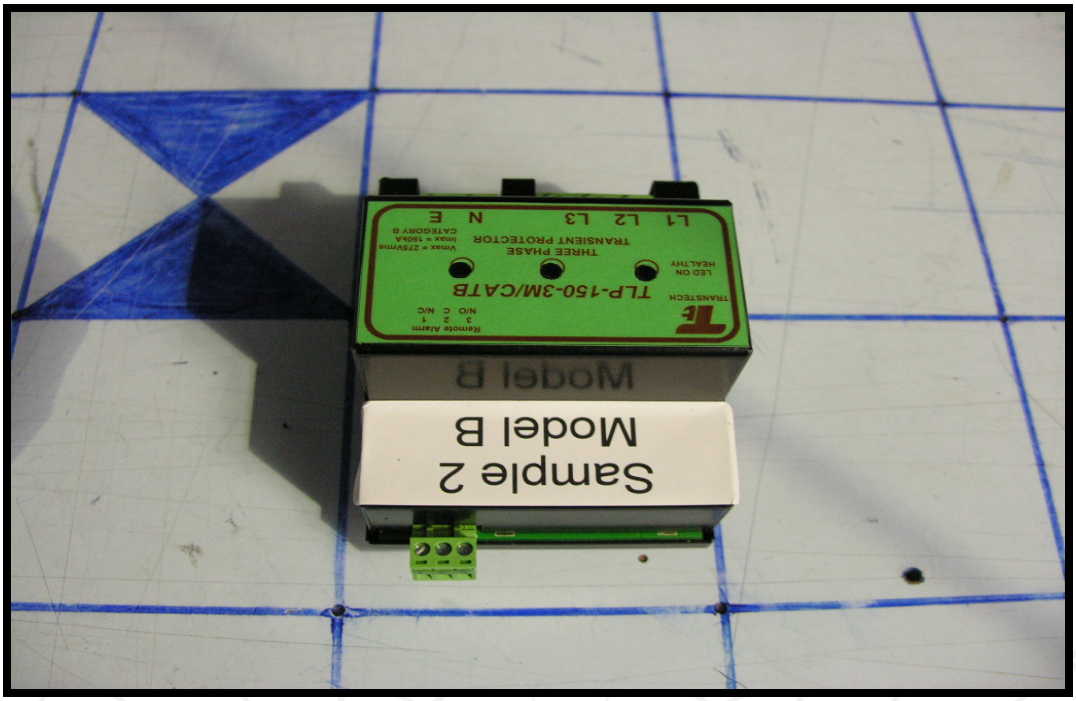

Plate 149: EUT Identification (Rear).

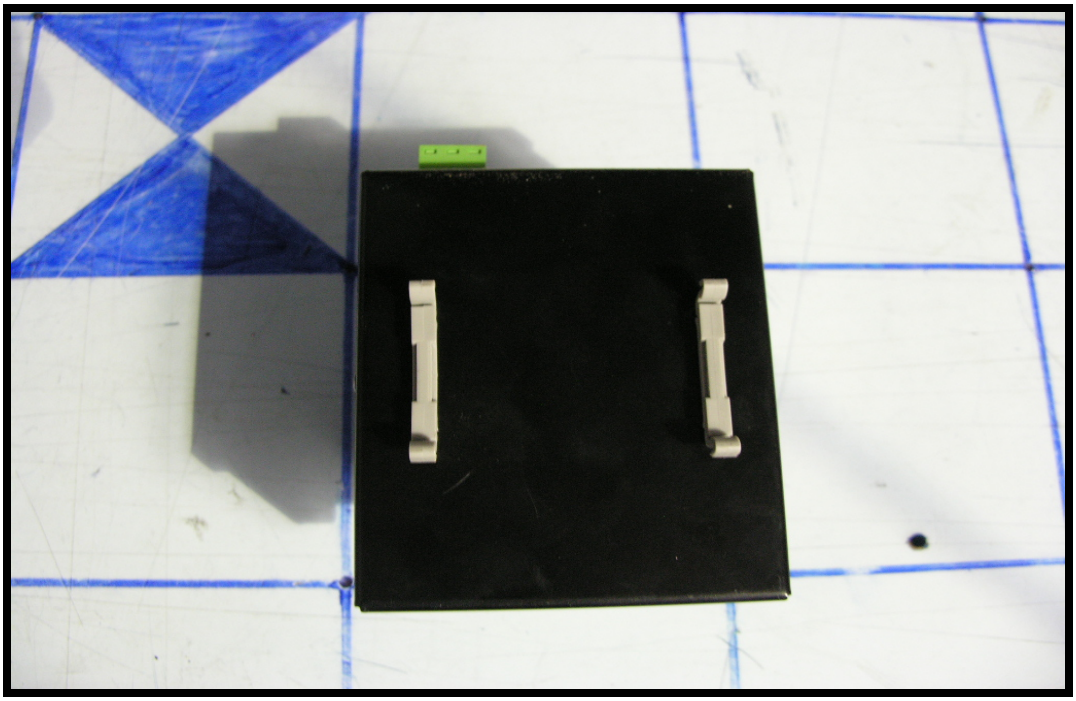

Plate 150: EUT Identification (Back).

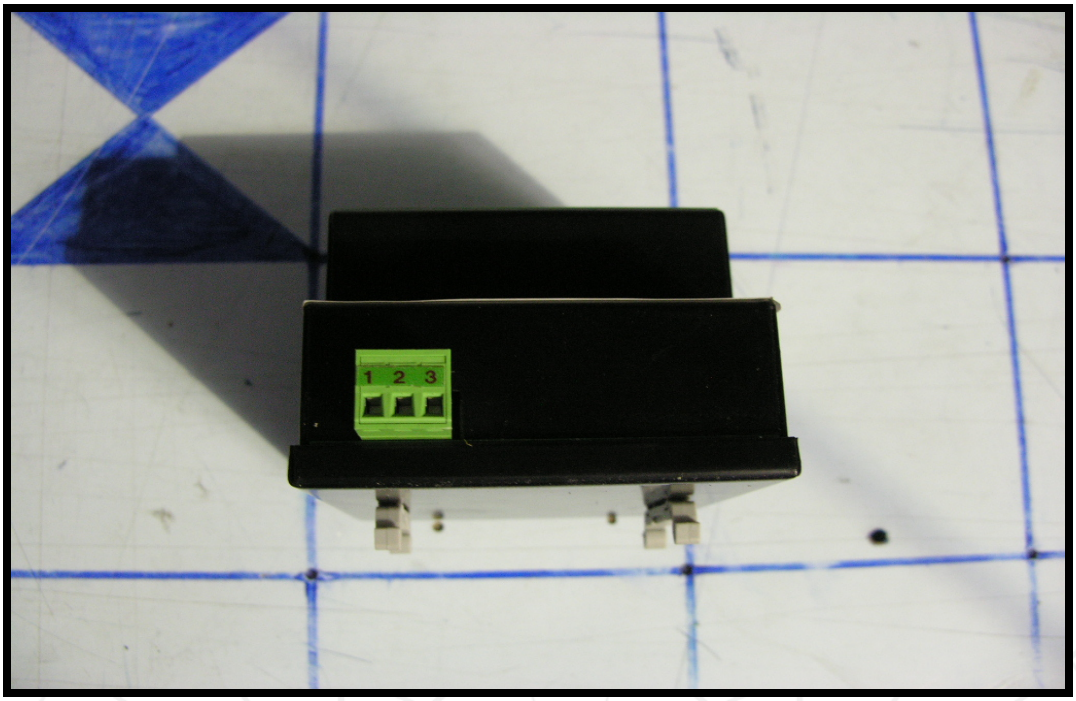

Plate 151: EUT Identification (Side).

TEST REPORT

Instrument Details:	**Report Number NC 09.34313**
Description:	Scopemeter
Brand:	Fluke
Model:	199C
Serial No:	DM9290043
Asset No:	120209
CALID No:	1014600

Customer Details:
Tech-Rentals Pty Limited - Blackburn North
6 Joseph Street
Blackburn North VIC 3130

Reference:
PO039523
Test Location:
Milperra

Test Details:

Calibration Date:	2, December 2009
Client Specified Due Date:	2, December 2010
Issue Date:	2, December 2009
Environment:	23 ± 3°C / 30-70% RH

Procedure/Specification Reference
CP980730 Manufacturer's Specifications

Statement of Conformance:
As Found Condition: Unit wouldn't turn on and stay on; the unit would turn off after a short time. Due to the nature of the fault the main board has been replaced, this was done prior to calibration.

After Repair Condition: Conformed to specifications for tests performed.

Testing Officer: Sam Oliveri

Approved Signatory: David Holden

Attachment: Test Results

Sydney – 34/244 Horsley Rd, Milperra, NSW, 2214. Ph (02) 9771 9300 Fx (02) 9771 9600

Web Page: www.vms.net.au

Checked:

TEST RESULTS **Attachment for Report Number: NC 09.34313**

Measuring Equipment	Cal ID	Cal Due	Report No
Suhner NMN 50 Ohm Feedthrough Termination	330358	13 Jan 10	NC 08.35272
Fluke 5520A-SC1100 Calibrator (NATA)+ scope option	110103	05 Aug 10	NC 09.33611

Uncertainty:

Vertical Accuracy	:	± 0.7%
A & B Voltage Accuracy		
(DC)	:	± 0.4%
(AC)	:	± 1.0%
(Peak)	:	± 1.7%
Frequency	:	± 0.1%
VAC HF	:	± 2%
Meter Voltage Accuracy		
(DC)	:	± (0.1% + 0.1mV)
(AC)	:	± 0.3%
Diode Functions	:	± 1.0%
Resistance	:	± (0.1% + 0.1Ω)

Confidence Interval:
The reported uncertainty of measurement is at time of test and was calculated with a confidence level of 95%. If not otherwise stated the coverage factor is k=2.0 for 30 degrees of freedom.

Notes:
Nil

Comments:
The Bandwidth tests were performed using source and load impedances of 50 ohms.

The unit was calibrated with Calibration No. #1 dated 10/06/2009.

Testing Officer: S.Oliveri **Approved Signatory:** D.Holden

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