

# TEST REPORT



Testing Certification # 1367-01

Laboratory ID

PRODUCT SAFETY ENGINEERING, INC.  
12955 Bellamy Brothers Boulevard  
Dade City, Florida 33525 USA  
PH (352) 588-2209 FX (352) 588-2544

Submitter ID

D. B. I. America Corporation  
254 Cystral Grove Blvd  
Lutz, FL 33548

Report Issue Date: 24 Jul 08  
Sample S/N: See Appendix B

Test Report Number: 08F276I  
Model Designation: SP 200 & Swift  
Portable Piezo Ultrasonic Scaler  
Product Description: See Appendix B

Sample Receipt Date: July 3, 2008  
Sample Test Date: see data sheets

Description of non-standard test method or test practice: *None*  
Estimated Measurement Uncertainty: *Not Applicable*  
Special limitations of use: *None*

Traceability: *reference standards of measurement have been calibrated by a competent body using standards traceable to the NIST.*

According to testing performed at Product Safety Engineering, Inc., the above-mentioned unit is in compliance with the electromagnetic compatibility requirements defined in regulations indicated on page (3) of the test report. The test results contained herein relate only to the model(s) identified above. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

As the responsible EMC Project Engineer, I hereby declare that the equipment tested as specified above conforms to the requirements indicated on page (3) of the test report.

Signature [Signature] Name David Ernest

Title Immunity Team Leader Date July 24, 2008

**Reviewed by:**  
Approved Signatory [Signature] Steven Hoke Date 24 Jul 08

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Test Report Number 08F276I

## DIRECTORY

<b>A) Documentation</b>	<b>Page(s)</b>
Test report	1-17
Directory	2
Test Regulations	3
General Remarks and Summary	17
Test-setups (Photos)	18-23
<b>B) Test data: Immunity against</b>	
Electrostatic discharge	5
Radiated fields	6
Fast transients	7-8
Surge transients	9-10
Conducted disturbance	11-12
Power frequency magnetic field	13
Voltage dips, interruptions & variations	14
Current harmonics	15
Voltage fluctuations / flicker	15
<b>C) Appendix A</b>	
Test Equipment Calibration Information	A2
40cm Field Strength Reporting Page	A3
Test Plan and Test Data Sheets	A4 - A17
<b>D) Appendix B</b>	
System Under Test Description	B2

### Sign Explanations:

□ - not applicable

■ - applicable

*Test Report Number 08F276I*

## **Immunity Test Regulations :**

**The tests were performed according to following regulations :**

- - EN 60601-1-2:2001 (Medical Electrical Equipment - collateral standard: electromagnetic compatibility - requirements)
- 
- - IEC 61000-4-2:1995 / EN 61000-4-2:1995/A1:1998/A2:2001 (Electrostatic Discharge Immunity Test)
- - IEC 61000-4-3:2002 / EN 61000-4-3:2002/A1:2002 (Radiated, radio-frequency, electromagnetic field immunity test)
- - IEC 61000-4-4:2004 / EN 61000-4-4:2004 (Electrical Fast Transient/Burst immunity test)
- - IEC 61000-4-5:1995 / EN 61000-4-5 :1995 (Surge immunity test)
- - IEC 61000-4-6:1996 / EN 61000-4-6 :1996 (Immunity to conducted disturbances, induced by radio-frequency fields)
- - IEC 61000-4-8:1993 / EN 61000-4-8 :1994 (Power frequency magnetic field immunity test)
- - IEC 61000-4-11:2004 / EN 61000-4-11:2004 (Voltage dips, short interruptions and voltage variations immunity tests)
  
- - IEC 61000-3-2:2005 / EN 61000-3-2:2006 (Limits for harmonic current emissions)
- - IEC 61000-3-3:1994 / EN 61000-3-3:1995/A1:2001/A2:2005 (Limitation of voltage fluctuations & flicker in low voltage supply systems)

*Test Report Number 08F276I*

**Environmental conditions in the lab:**

Actual

Temperature: \* : 22 ° C  
Relative Humidity \* : 43 %  
Atmospheric pressure \* : 1009 mBar  
Power supply system : 230 volts 50 Hz 1 phase

\* The above climatic conditions were recorded during the ESD testing.

*Test Report Number 08F276I*

## Immunity Test Conditions: ELECTROSTATIC DISCHARGE (ESD)

The immunity against *ELECTROSTATIC DISCHARGE (ESD)* measurements were performed in the following location :

- Test not applicable

- Shield Room A (12' x 12' x 10')
- Shield Room B (14' x 12' x 10')

### Test equipment used :

Model Number	Manufacturer	Description	Serial Number
■ - PESD 3010	Haefely	ESD Simulator	H 509 178
■ - HCP	PSE	Horizontal Coupling Plane	---
■ - VCP	PSE	Vertical Coupling Plane	---

### Test specification:

- Discharge Voltage (Air):                    ■ - 2 kV  
    ■ - 4 kV    ■ - 8 kV
- Discharge Voltage (Contact):            ■ - 2 kV    ■ - 6 kV  
    ■ - 4 kV
- Discharge Impedance:                    ■ - 330Ω / 150 pF
- Discharge Repetition Rate:            ■ - ≥1 second
- Number of discharges:                    ■ - ≥10 at all locations
- Kind of discharges:                    ■ - air discharge                            ■ - contact discharge (relay)  
    ■ - direct                                        ■ - indirect
- Polarity:                                        ■ - positive                                    ■ - negative
- Location of discharge:                    ■ - see description on data page in Appendix A  
     - each location on the surface touchable by hand  
     -
- 

### Result :

- - no degradation of function            - Met Criterion A
- distortion of function                    - Met Criterion B
- error of function                            - Met Criterion C
- loss of function                            - Broken

Remarks:

Test Report Number 08F276I

## Immunity Test conditions: RADIATED FIELDS

The immunity against *RADIATED FIELDS* measurements were performed in the following location:

- Test not applicable

- - Shield Room C - Semi-Anechoic ferrite lined shielded room (24' x 12' x 10')
- 

### Test equipment used :

Model Number	Manufacturer	Description	Serial Number
■ - 8648C	Hewlett-Packard	Signal Generator	3619U00734
■ - CMX 5001	IFI	Power Amplifier	1630-0396
■ - CBL 6121	Chase	Bilog Antenna	0009
<input type="checkbox"/> - LFG1310	Leader	Function Generator	8060233
<input type="checkbox"/> - HI 4422	Holiday Industries	Isotropic Field Probe	90310
■ - 4220A	Boonton	RF Power Meter	204103AA
<input type="checkbox"/> - 51011	Boonton	RF Power Sensor	28823
■ - 51011	Boonton	RF Power Sensor	23752
■ - AT4002A	AR	Horn Antenna	306752
■ - 5151F-001	Ophir	Power Amplifier	1007
<input type="checkbox"/> - AFG3021	Tektronix	Function Generator	C012481
<input type="checkbox"/> - HI6005	ETS-Lindgren	Isotropic Field Probe	00070043

### Test specification:

Frequency - range:

- - 80 MHz - 2500 MHz

Field strength:

- - 3 V/m

Distance antenna - EUT:

- - 3 m

Modulation:

- - AM : 80 % 1 kHz sinewave

Step:

- - 1%

Polarization of antenna:

- - horizontal
- - vertical

### Result :

- - no degradation of function - Met Criterion A
- distortion of function - Met Criterion B
- error of function - Met Criterion C
- loss of function - Broken

Remarks:

Test Report Number 08F276I

## Immunity Test conditions: FAST TRANSIENTS (BURST)

The immunity against *FAST TRANSIENTS (BURST)* measurements were performed in the following test location :

- **Test not applicable**

- Shield Room A (12' x 12' x 10')
- Shield Room B (14' x 12' x 10')
- 

### Test equipment used :

Model Number	Manufacturer	Description	Serial Number
<input checked="" type="checkbox"/> - CEMaster	Keytek	EMC Tester	9703378
<input type="checkbox"/> - IP4A	Haefely-Trench	Capacitive Coupling Clamp	083309-003
<input type="checkbox"/> -			

### Test specification:

Pulse amplitude - AC Power Port:

- 2,0 kV

Burst frequency:

- 5,0 kHz

Time of coupling:

- 60 seconds

Coupling method:

- coupling/decoupling network
- coupling clamp

Polarity:

- positive
- negative

Test Report Number 08F276I

**Result:**

- |  |                   |
|--|-------------------|
| <input checked="" type="checkbox"/> - no degradation of function | - Met Criterion A |
| <input type="checkbox"/> - distortion of function                | - Met Criterion B |
| <input type="checkbox"/> - error of function                     | - Met Criterion C |
| <input type="checkbox"/> - loss of function                      | - Broken          |

Remarks:

*Test Report Number 08F276I*



## Immunity Test conditions: SURGE TRANSIENTS

The immunity against *SURGE TRANSIENTS* measurements were performed in the following test location :

- Test not applicable

■ - Test Area 1- Bench top

### Test equipment used :

Model Number	Manufacturer	Description	Serial Number
■ - PSURGE4	Haefely-Trench	Surge tester	083372-13

### Test specification:

Pulse amplitude - AC Power Port:

■ - 0,5 kV	■ - 2,0 kV
■ - 1,0 kV	

Source impedance:

■ - 2 $\Omega$ + 18 $\mu$ F	■ - 12 $\Omega$ + 9 $\mu$ F
-----------------------------	-----------------------------

Number of surges:

■ - 5 surges/angle	
--------------------	--

Angle:

■ - 0 °	■ - 90 °
■ - 180 °	■ - 270 °

Repetition rate:

■ - 60 sec.	.
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Polarity:

■ - positive	■ - negative
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Test Report Number 08F276I

**Result:**

- |  |                   |
|--|-------------------|
| <input checked="" type="checkbox"/> - no degradation of function | - Met Criterion A |
| <input type="checkbox"/> - distortion of function                | - Met Criterion B |
| <input type="checkbox"/> - error of function                     | - Met Criterion C |
| <input type="checkbox"/> - loss of function                      | - Broken          |

Remarks:

*Test Report Number 08F276I*

## Immunity Test conditions: CONDUCTED DISTURBANCE

The immunity against *CONDUCTED DISTURBANCE* measurements, induced by radio frequency fields above 9 kHz, were performed in the following test location:

- Test not applicable

- Shield Room C - lined shield room (24' x 12' x 10')
- Test Area 2 - Bench top with Copper Ground Plane
- Shield Room C - lined shield room (24' x 12' x 10') with Bench top with Copper Ground Plane

### Test equipment used :

Model Number	Manufacturer	Description	Serial Number
<input checked="" type="checkbox"/> - 8648C	Hewlett-Packard	Signal Generator	3619U00734
<input checked="" type="checkbox"/> - CMX 5001	IFI	Power Amplifier	1630-0396
<input type="checkbox"/> - CDN 1000-M2-25	Chase (FCC)	Coupling Decoupling Network	9614
<input checked="" type="checkbox"/> - CDN 1000-M3-25	Chase (FCC)	Coupling Decoupling Network	9615
<input type="checkbox"/> - CDN 1000-M4-25	Chase (FCC)	Coupling Decoupling Network	9616
<input type="checkbox"/> - CDN 1000-M5-25	Chase (FCC)	Coupling Decoupling Network	9617
<input type="checkbox"/> - FCC-801-S25	Fischer Custom Com.	Coupling Decoupling Network	68
<input type="checkbox"/> - FCC-801-M3-25A	Fischer Custom Com.	Coupling Decoupling Network	01080
<input type="checkbox"/> - CIC 8100	Chase (FCC)	EM Injection Clamp	153
<input type="checkbox"/> - FCC-801-M3-25A	Fischer Custom Com.	Coupling Decoupling Network	01081
<input type="checkbox"/> - FCC-801-M3-25A	Fischer Custom Com.	Coupling Decoupling Network	01082
<input checked="" type="checkbox"/> - 4220A	Boonton	RF Power Meter	204103AA
<input type="checkbox"/> - 51011	Boonton	RF Power Sensor	28823
<input type="checkbox"/> - FCC-801-M1-25A	Fischer Custom Com.	Coupling Decoupling Network	2018
<input type="checkbox"/> - FCC-801-M2-25A	Fischer Custom Com.	Coupling Decoupling Network	2043
<input type="checkbox"/> - FCC-801-T2	Fischer Custom Com.	Coupling Decoupling Network	03010
<input type="checkbox"/> - FCC-801-T4	Fischer Custom Com.	Coupling Decoupling Network	03011
<input checked="" type="checkbox"/> - 51011	Boonton	RF Power Sensor	23752
<input type="checkbox"/> - AFG3021	Tektronix	Function generator	C012481

### Test specification:

Frequency - range:  - 0,15 MHz - 80 MHz

Voltage level (EMF):  - 3 V

Modulation:  - AM : 80 % 1 kHz sinewave

Step:  - 1%

Test Report Number 08F276I

**Result :**

- |  |                   |
|--|-------------------|
| <input checked="" type="checkbox"/> - no degradation of function | - Met Criterion A |
| <input type="checkbox"/> - distortion of function                | - Met Criterion B |
| <input type="checkbox"/> - error of function                     | - Met Criterion C |
| <input type="checkbox"/> - loss of function                      | - Broken          |

Remarks:

*Test Report Number 08F276I*

## Immunity Test conditions: POWER FREQUENCY MAGNETIC FIELD

The immunity against *POWER FREQUENCY MAGNETIC FIELD* measurements were performed in the following test location:

- Test not applicable

- Test Area 2 - Bench top with Copper Ground Plane
- Shield Room C - lined shield room (24' x 12' x 10') with Bench top with Copper Ground Plane

### Test equipment used :

Model Number	Manufacturer	Description	Serial Number
<input checked="" type="checkbox"/> - 1 Meter Loop	PSE	1 Meter Square Coil	--
<input type="checkbox"/> - 2.6 X 1 Meter Loop	PSE	2.6 X 1 Meter Square Coil	--
<input checked="" type="checkbox"/> - PT 150 QG	Hammond Mfg	Transformer	--
<input checked="" type="checkbox"/> - 87	Fluke	Multimeter	59250853
<input checked="" type="checkbox"/> - 4090	F W Bell	H Field Meter	PSE # 90

### Test specification:

Frequency - range:  - 50 Hz  - 60 Hz

Field level (EMF):  - 3 A/m

Duration:  - >20 seconds

Axis of orientation:  - X-axis  - Y-axis  - Z-axis

### Result :

- no degradation of function - Met Criterion A
- distortion of function - Met Criterion B
- error of function - Met Criterion C
- loss of function - Broken

Remarks:

Test Report Number 08F276I

## Immunity Test conditions: VOLTAGE DIPS, INTERRUPTIONS & VARIATIONS

The immunity against *VOLTAGE DIPS, INTERRUPTIONS & VARIATIONS* measurements were performed in the following test location :

- Test not applicable

- - Test Area 1- Bench Top
- 

### Test equipment used :

Model Number	Manufacturer	Description	Serial Number
■ - 6842A	Hewlett-Packard	Harmonic/Flicker Test System	3531A00149

### Test specification:

Mains Test Voltage(s) (Ut): ■ - 230 VAC

Level of reduction(dip):

- - 10 mS at >95% Reduction of Ut
- - 500 mS at 30% Reduction of Ut
- - 100 mS at 60% Reduction of Ut

Duration of interruption (>.95\*Ut): ■ - 5000 mS

### Result :

- - 10 mS at >95% Reduction of Ut
- - 500 mS at 30% Reduction of Ut
- - 100 mS at 60% Reduction of Ut
  
- - no degradation of function - Met Criterion A
- distortion of function - Met Criterion B
- error of function - Met Criterion C
- loss of function - Broken
  
- - 5000 mS at >95% Reduction of Ut
  
- no degradation of function - Met Criterion A
- distortion of function - Met Criterion B
- - error of function - Met Criterion C
- loss of function - Broken

Remarks:

Test Report Number 08F276I

**Immunity Test conditions: CURRENT HARMONICS AND VOLTAGE FLUCTUATIONS / FLICKER**

The *CURRENT HARMONICS AND VOLTAGE FLUCTUATIONS/ FLICKER* measurements, produced by the EUT, were performed in the following test location :

- Test not applicable

- - Test Area 1- Bench top

**Test equipment used :**

<b>Model Number</b>	<b>Manufacturer</b>	<b>Description</b>	<b>Serial Number</b>
<input type="checkbox"/> - 6842A	Hewlett-Packard	Harmonic / Flicker Test System	3531A00149
■ - PM6000	Voltech	Power Analyzer	100006700148

**Test specification:**

Equipment Class                      ■ - A             - B             - C             - D

**Result :**

Harmonic Currents     - Pass             - Fail            ■ - Not Applicable

Voltage Fluctuations and Flicker                                  ■ - Pass             - Fail             - Not Applicable

**Remarks:**

Test Report Number 08F276I

**Equipment Under Test (EUT) Test Operation Mode - Immunity tests :**

**The device under test was operated under the following conditions during immunity testing :**

See Appendix A for test plan

- Standby
- Test program (H - Pattern)
- Test program (color bar)
- Test program (customer specific)
- Practice operation
- Normal operating mode

**Configuration of the device under test:**

- See System Under Test Description in Appendix B

**Rationale for EUT setup / configuration:**

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*Test Report Number 08F276I*



## GENERAL REMARKS:

## SUMMARY:

The requirements according to the technical regulations are

■ - met

□ - **not** met.

The device under test does

■ - fulfill the general approval requirements mentioned on page 3.

□ - **not** fulfill the general approval requirements mentioned on page 3.

Testing Start Date: July 7, 2008

Testing End Date: July 18, 2008

Product Safety Engineering Inc

*Test Report Number 08F276I*

Test-setup photo(s):  
Electrostatic Discharge (ESD)  
IEC 61000-4-2  
EN 61000-4-2

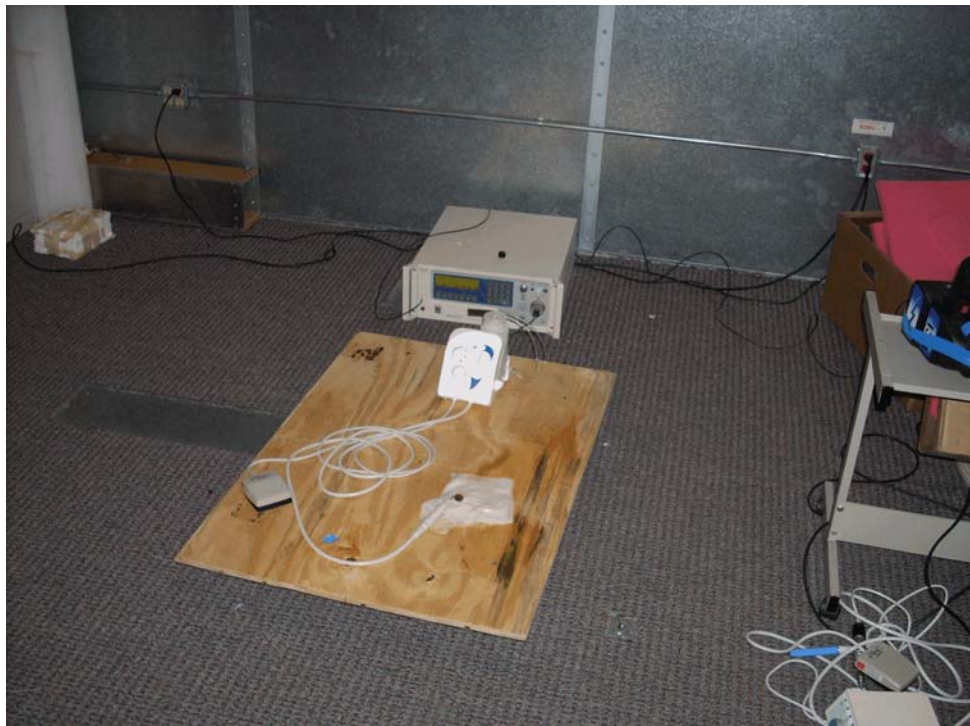


Test-setup photo(s):  
Radiated Electromagnetic Field  
IEC 61000-4-3  
EN 61000-4-3



*Test Report Number 08F276I*

Test-setup photo(s):  
Fast transients (BURST)  
IEC 61000-4-4  
EN 61000-4-4

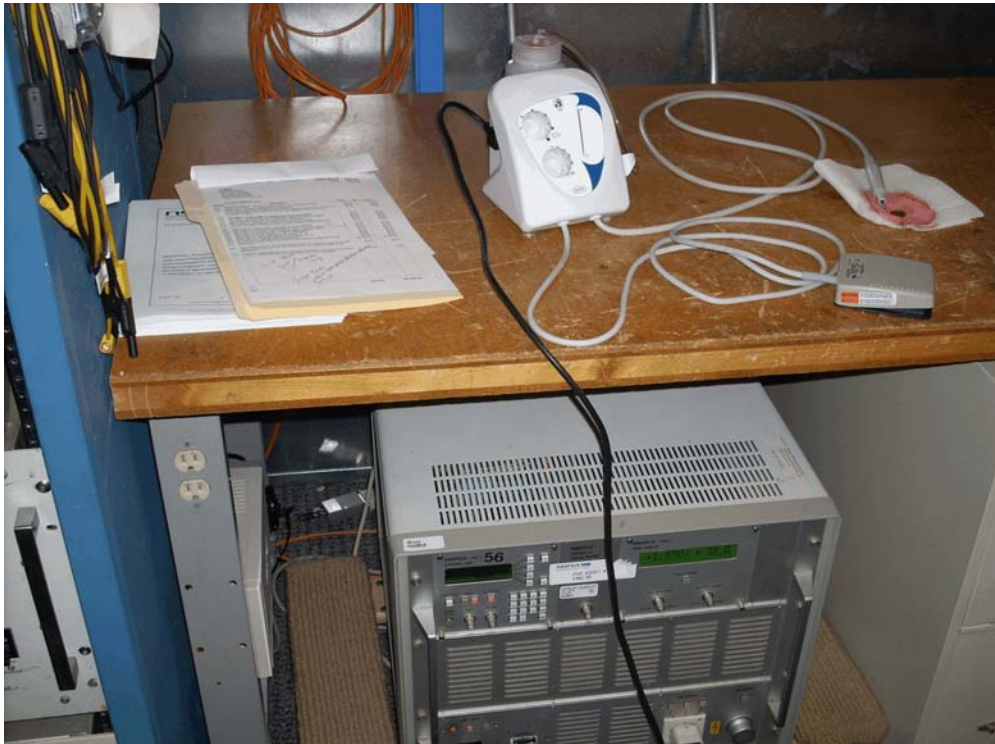


*Test Report Number 08F276I*

**Product Safety Engineering, Inc 12955 Bellamy Brothers Blvd. Dade City, FL 33525**  
**Tel (352) 588-2209 Fax (352) 588-2544**

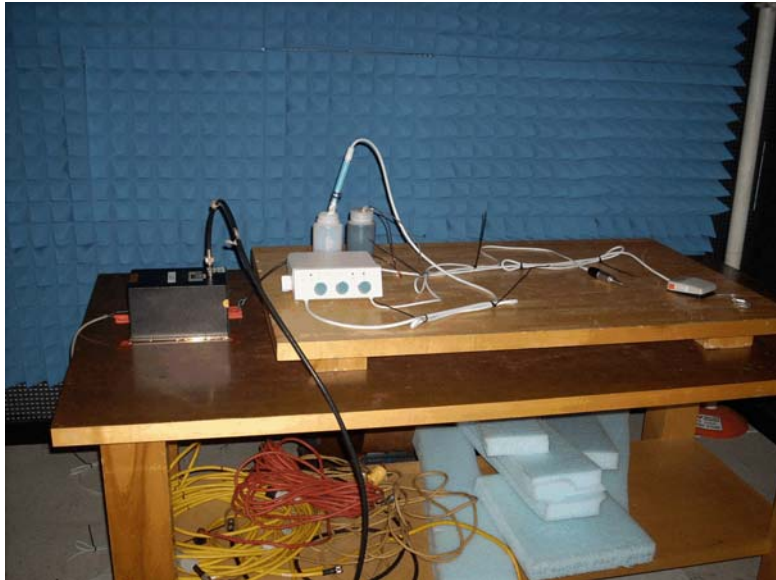
Page 19 of 23

Test-setup photo(s):  
SURGE transients  
IEC 61000-4-5  
EN 61000-4-5



Test Report Number 08F276I

Test-setup photo(s):  
Conducted disturbance  
IEC 61000-4-6  
EN 61000-4-6



*Test Report Number 08F276I*

Test-setup photo(s):  
Power frequency magnetic field  
IEC 61000-4-8  
EN 61000-4-8



Test-setup photo(s):  
Voltage dips, interruptions & variations  
IEC 61000-4-11  
EN 61000-4-11



*Test Report Number 08F276I*

Test-setup photo(s):

Current Harmonics & Voltage Fluctuations / Flicker

EN 61000-3-2

EN 61000-3-3

Setup photo unavailable  
- setup is similar to voltage dip test

*Test Report Number 08F276I*

# **Appendix A**

**Equipment Calibration Information,**

**Test Plan,**

**ESD Test Point Map,**

**Test Data Sheets**

**and**

**Test Setup Drawing(s)**

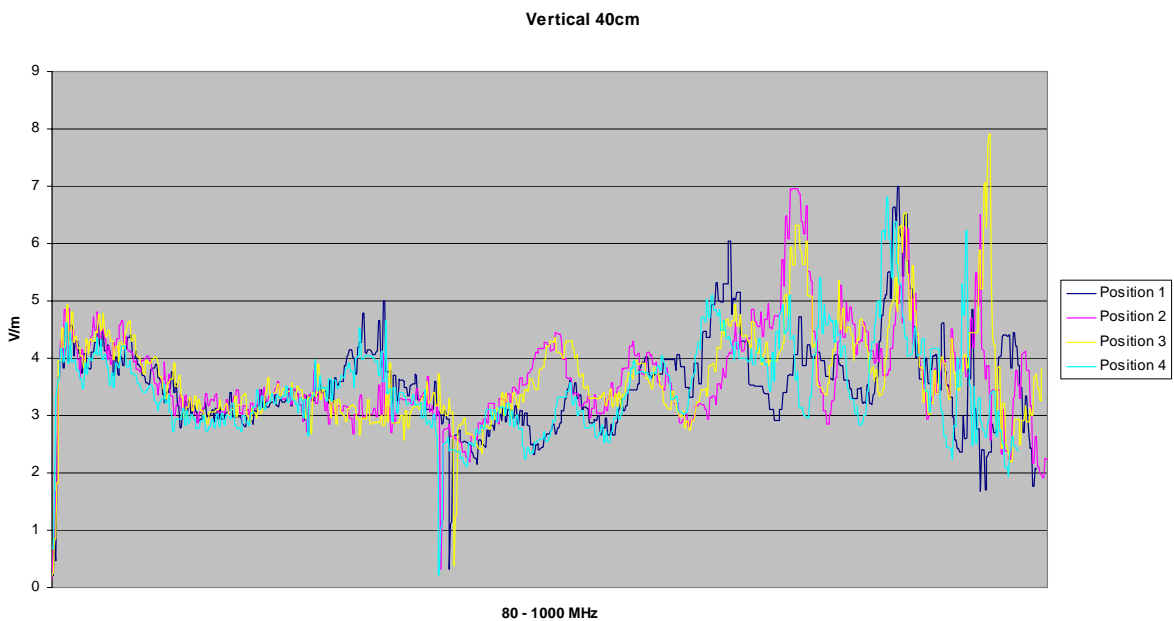
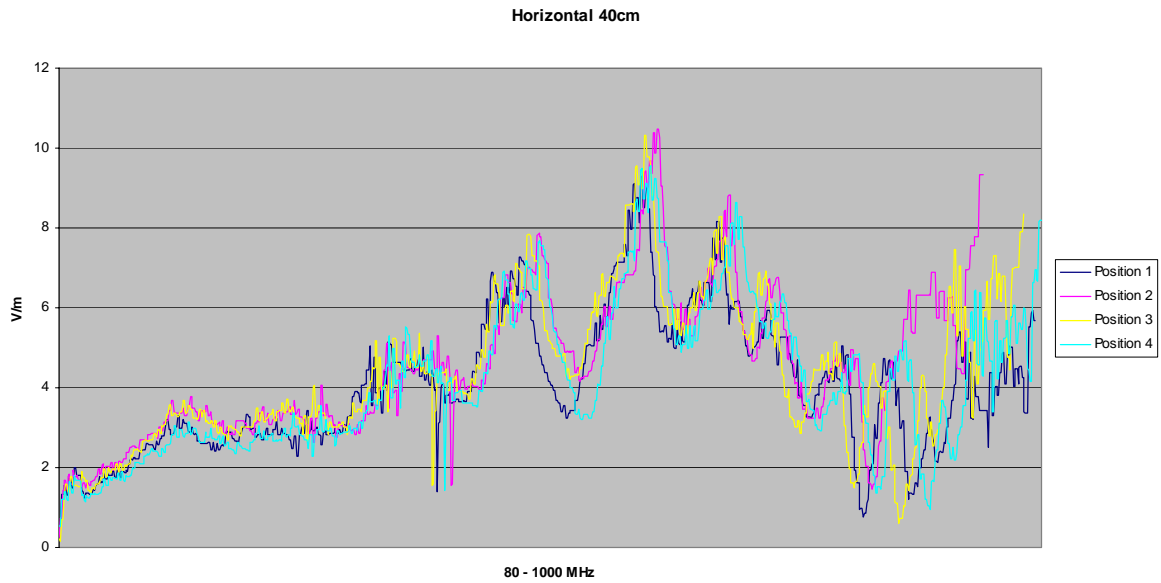


## TEST EQUIPMENT CALIBRATION INFORMATION

Manufacturer	Model	Description	Serial Number	Cal Due
Hewlett Packard	8648C	Signal Generator	3619U00734	12/07/08
Hewlett Packard	6842A	Harmonic / Flicker Tester	3531A00149	07/17/09
Haefely	PESD 3010	ESD Tester	H 509 178	09/22/08
Keytek	CEMaster	EMC tester	9703378	04/23/09
Leader	LFG1310	Function Generator	8060233	
Haefely-Trench	Psurge 4	Surge Tester	083372-13	02/26/09
Holaday Ind.	HI 4422	Isotropic Probe	90310	
Fischer Custom	F-33-1	RF Current Probe	360	
Boonton	4220A	RF Power Meter	204103AA	07/09/09
Boonton	51011	RF Power Sensor	28823	
Fluke	87	Multimeter	59250853	12/05/08
Fischer Custom	FCC-801-S25	Coupling Decoupling Network	68	
Chase (FCC)	CDN 1000-M2	Coupling Decoupling Network	9614	
Chase (FCC)	CDN 1000-M3	Coupling Decoupling Network	9615	01/18/10
Chase (FCC)	CDN 1000-M4	Coupling Decoupling Network	9616	
Chase (FCC)	CDN 1000-M5	Coupling Decoupling Network	9617	
Chase (FCC)	CIC 8100	EM Injection Clamp	153	
F. W. Bell	4090	H Field Meter	PSE# 90	01/08/09
Fischer Custom	FCC-801-M1	Coupling Decoupling Network	2018	
Fischer Custom	FCC-801-M2	Coupling Decoupling Network	2043	
Fischer Custom	FCC-801-M3	Coupling Decoupling Network	01080	
Fischer Custom	FCC-801-M3	Coupling Decoupling Network	01081	
Fischer Custom	FCC-801-M3	Coupling Decoupling Network	01082	
Fischer Custom	FCC-801-T2	Coupling Decoupling Network	03010	
Fischer Custom	FCC-801-T4	Coupling Decoupling Network	03011	
Radio Shack	63-867	Thermometer/Hydrometer	PSE# 80	
Boonton	51011	RF Power Sensor	23752	07/09/09
Cole-Palmer	99760-00	Thermo/Hydro/Barometer	61493735	03/26/09
Tektronix	AFG3021	Function Generator	C012481	
ETS-Lindgren	HI6005	Isotropic Probe	00070043	
Voltech	PM6000	Power Analyzer	100006700148	07/11/09

## Field strength reporting requirement at 40 cm per EN 61000-4-3 clause 6.2

The data below was at 4 positions 40cm above the ground plane using the current calibration information .  
Test level was 3 V/m CW.



## IMMUNITY TEST PLAN

### MONITORED FUNCTIONS

- Scaler and polish motor operation

### DEFINITION OF FAILURE MODES

- Scaler and polish motor operation  
Loss or significant change in operation as determined by manufacturer

### METHOD OF EXERCISING

- Scaler operation was observed by the water mist and vibration against a penny (the penny was not used during radiated and conducted immunity but checked before and after test). Polish motor operation was observed using a piece of tape attached to the shaft.

# ESD TEST DATA

**EUT:** SP200 and Swift

**DATE OF TEST:** July 14 & 16, 2008

**MANUFACTURER:** D.B. I. America Corporation

**PROJECT #:** 08F276I

**TECHNICIAN:** Dave Ernest

Note : Swift and SP200 were tested individually

DISCHARGE LOCATION	AIR	APPLIED VOLTAGE (KV)/ DISCHARGES PER POINT				OBSERVED EFFECT ON EUT	
	CONTACT		2	4	6		8
Horizontal Coupling Plane (HCP) Front	CONTACT	+	10	10	10	None	
		-	10	10	10	None	
Horizontal Coupling Plane (HCP) Right	CONTACT	+	10	10	10	None	
		-	10	10	10	None	
Horizontal Coupling Plane (HCP) Left	CONTACT	+	10	10	10	None	
		-	10	10	10	None	
Horizontal Coupling Plane (HCP) Back	CONTACT	+	10	10	10	None	
		-	10	10	10	None	
Vertical Coupling Plane (VCP) Front	CONTACT	+	10	10	10	None	
		-	10	10	10	None	
Vertical Coupling Plane (VCP) Right	CONTACT	+	10	10	10	None	
		-	10	10	10	None	
Vertical Coupling Plane (VCP) Left	CONTACT	+	10	10	10	None	
		-	10	10	10	None	
Vertical Coupling Plane (VCP) Back	CONTACT	+	10	10	10	None	
		-	10	10	10	None	
Water inlet (both units)	CONTACT	+	10	10	10	None	
		-	10	10	10	None	
Power switch (both units)	AIR	+	10	10		10	None
		-	10	10		10	None

# ESD TEST DATA

**EUT:** SP200 and Swift

**DATE OF TEST:** July 14 & 16, 2008

**MANUFACTURER:** D.B. I. America Corporation

**PROJECT #:** 08F276I

**TECHNICIAN:** Dave Ernest

DISCHARGE LOCATION	AIR	APPLIED VOLTAGE (KV)/ DISCHARGES PER POINT				OBSERVED EFFECT ON EUT	
	CONTACT		2	4	6		8
Scaler tip (both units)	CONTACT	+	10	10	10	None	
		-	10	10	10	None	
Motor body (SP200)	CONTACT	+	10	10	10	None	
		-	10	10	10	None	
Back panel (SP200)	CONTACT	+	10	10	10	None	
		-	10	10	10	None	
Bottom screw nearest center (SP200)	CONTACT	+	10	10	10	None	
		-	10	10	10	None	
Pump switch (Swift)	AIR	+	10	10		10	None
		-	10	10		10	None
Plastic screws on back (Swift)	AIR	+	10	10		10	None
		-	10	10		10	None
Top center case seam (both units)	AIR	+	10	10		10	None
		-	10	10		10	None
LEDs front panel (both units)	AIR	+	10	10		10	None
		-	10	10		10	None
Control knobs (both units)	AIR	+	10	10		10	None
		-	10	10		10	None
Side seams (both units)	AIR	+	10	10		10	None
		-	10	10		10	None

# RADIATED ELECTROMAGNETIC FIELD TEST DATA

EUT: SP200 & Swift Portable Piezo Ultrasonic Scaler

TEST DATE: July 7 & 8, 2008

MANUFACTURER: D. B. I. America Corporation

PROJECT #: 08F276I

TECHNICIAN: Dave Ernest

EUT ORIENTATION	ANTENNA POLARIZATION	FREQUENCY RANGE	V/M APPLIED	OBSERVED EFFECT ON EUT
Front	Vertical	80 - 2500 MHz	3	None *
Right	Vertical	80 - 2500 MHz	3	None *
Back	Vertical	80 - 2500 MHz	3	None *
Left	Vertical	80 - 2500 MHz	3	None *
Left	Horizontal	80 - 2500 MHz	3	None *
Back	Horizontal	80 - 2500 MHz	3	None *
Right	Horizontal	80 - 2500 MHz	3	None *
Front	Horizontal	80 - 2500 MHz	3	None *

\* Changes in polishing motor speed were observed but not determined to be significant by the manufacturer.

## EFT/B TEST DATA

**EUT:** SP200 and Swift

**TEST DATE:** July 16 and 18, 2008

**MANUFACTURER:** D.B.I. America Corporation

**PROJECT #:** 08F276I

**TECHNICIAN:** Dave Ernest

TEST ORDER	LEADS TESTED	COUPLING DEVICE/ VOLTAGE LEVEL	OBSERVED EFFECT ON EUT
		MAINS NETWORK	
1	Swift Line, Neutral & PE	+2000	None
2	Line, Neutral & PE	-2000	None
3	SP200 Scaler mode Line, Neutral & PE	+2000	None
4	Line, Neutral & PE	-2000	None
5	SP200 Polisher mode Line, Neutral & PE	+2000	None
6	Line, Neutral & PE	-2000	None

# SURGE TEST DATA

**EUT:** SP200 and Swift

**TEST DATE:** July 9, 10 & 11, 2008

**MANUFACTURER:** D.B.I. America Corporation

**PROJECT #:** 08F276I

**TECHNICIAN:** Chip Foerstner

SURGE PATH	VOLTAGE PEAK	OBSERVED EFFECT ON EUT
LINE AND PROTECTIVE EARTH	+ 500 V	None
	- 500 V	None
LINE AND PROTECTIVE EARTH	+ 1000 V	None
	- 1000 V	None
LINE AND PROTECTIVE EARTH	+ 2000 V	None
	- 2000 V	None
NEUTRAL AND PROTECTIVE EARTH	+ 500 V	None
	- 500 V	None
NEUTRAL AND PROTECTIVE EARTH	+ 1000 V	None
	- 1000 V	None
NEUTRAL AND PROTECTIVE EARTH	+ 2000 V	None
	- 2000 V	None
LINE AND NEUTRAL	+ 500 V	None
	- 500 V	None
LINE AND NEUTRAL	+ 1000 V	None
	- 1000 V	None

Note the Swift and SP 200 were tested separately. The SP 200 was tested in scaler and polishing mode alternately between surges.



# CONDUCTED RF IMMUNITY TEST DATA

EUT: SP200 & Swift

TEST DATE: July 8, 2008

MANUFACTURER: D.B.I. America Corporation

PROJECT #: 08F276I

TECHNICIAN: Dave Ernest

EUT PORT	COUPLING METHOD	FREQUENCY RANGE	TEST LEVEL	OBSERVED EFFECT ON EUT
	CDN			
AC mains Swift	X	150 kHz - 80 MHz	3 Vemf	None
AC mains SP200 scaler mode	X	150 kHz - 80 MHz	3 Vemf	None
AC mains SP200 polisher mode	X	150 kHz - 80 MHz	3 Vemf	None

# POWER FREQUENCY MAGNETIC FIELD

**EUT:** SP 200 and Swift

**DATE OF TEST:** July 10, 2008

**MANUFACTURER:** D. B. I. America Corporation

**PROJECT#:** 08F276I

**TECHNICIAN:** Dave Ernest

EUT ORIENTATION (Surface parallel to coil)	COIL POLARIZATION/ POSITION	FREQUENCY Hz	A/m APPLIED	OBSERVED EFFECT ON EUT
FRONT	VERTICAL	50	3	NONE
SIDE	VERTICAL	50	3	NONE
TOP	HORIZONTAL	50	3	NONE
FRONT	VERTICAL	60	3	NONE
SIDE	VERTICAL	60	3	NONE
TOP	HORIZONTAL	60	3	NONE

The unit were powered at the same frequency as the test signal.

This test was performed twice - with the SP200 in Scaler mode and in Polisher mode

# VOLTAGE DIPS, INTERRUPTIONS & VARIATIONS

**EUT:** SP200 and Swift

**DATE OF TEST:** July 18, 2008

**MANUFACTURER:** D.B.I. America Corporation

**PROJECT#:** 08F276I

**TECHNICIAN:** Dave Ernest

Reduction of Ut (%)	Duration in periods	Ut	Phase Angle	OBSERVED EFFECT ON EUT
Swift >95	0.5	230	0	None - Note
>95	0.5	230	180	None - Note
60	5	230	0	None - Note
30	25	230	0	None - Note
>95	250	230	0	Criteria C - System reset
SP 200 >95	0.5	230	0	None - Note
>95	0.5	230	180	None - Note
60	5	230	0	None - Note
30	25	230	0	None - Note
>95	250	230	0	Criteria C - System reset

Note: During the voltage dip an audible change in scaler or motor operation was observed. The worst case observed was with the 60% dip on the Swift - the LED indication on the front blinked in addition to the change. The manufacturer has determined this performance is acceptable.  
The SP200 was tested twice - Scaler and polisher modes.

# CURRENT HARMONICS AND VOLTAGE FLUCTUATIONS/FLICKER TEST DATA

EUT: SP200 & Swift

CLASS: A

PROJECT #: 08F276I

MANUFACTURER: D.B.I. America Corporation

## TESTS PERFORMED

### CURRENT HARMONICS

TECHNICIAN: Dave Ernest  
REMARKS:

PASS N/A  
FAIL

TEST  
DATE: July 16, 17 & 18, 2008

Input power was less than 75 watts and complies with conditions of Clause 7, EN 61000-3-2 making the limits of this standard not applicable. Test data was supplied to support this statement.

### VOLTAGE FLUCTUATIONS AND FLICKER

TECHNICIAN: Dave Ernest  
REMARKS: Each unit was tested independently and the SP 200 was tested in scaler and polisher modes

PASS X  
FAIL

TEST  
DATE: July 16, 17 & 18, 2008





Product:	DBI SWIFT AND SP200	Jul 18 2008 10:24am
Serial no:		Page A16 of 17
Description:		
Result Name:	08276DBISP200FLK	
Voltech IEC61000-3 Windows Software 1.10.04RC5		Test Date: Jul 17 2008 8:25am
Type of Test:	Flickermeter Test - Table	
Power Analyzer:	Voltech PM6000 SN: 100006700148 Firmware Version: v1.20.06RC4	
	Channel(s):	
	1. SN: 090015501187, 26 Adjusted Date: 9 JUL 2008. 2. SN:None Adjusted Date:None	
	3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None	
	5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
	Shunt(s):	
	1. SN: 091024300432, 4 Adjusted Date: 11 JUL 2008. 2. SN:None Adjusted Date:None	
	3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None	
	5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
AC Source:	HP6842A	
Overall Result:	Notes:	
<b>PASS</b>	Plt test duration 120 minutes	
	Measurement method - Voltage <b>Test Report # 08F276I</b>	

	Plt
Limit	0.650
Reading	0.087

	Pst	dc (%)	dmax (%)	d(t) > 3.3%(ms)
Limit	1.000	3.300	7.000	500
Reading 1	0.087	0.003	0.195	0
Reading 2	0.087	0.003	0.192	0
Reading 3	0.087	0.002	0.204	0
Reading 4	0.087	0.003	0.226	0
Reading 5	0.087	0.002	0.221	0
Reading 6	0.087	0.003	0.212	0
Reading 7	0.087	0.002	0.203	0
Reading 8	0.087	0.002	0.215	0
Reading 9	0.087	0.002	0.194	0
Reading 10	0.087	0.002	0.174	0
Reading 11	0.087	0.002	0.175	0
Reading 12	0.087	0.003	0.171	0

Product:	DBI SWIFT AND SP200	Jul 18 2008 10:24am
Serial no:		Page A17 of 17
Description:		
Result Name:	08276DBISWIFTFLK	
Voltech IEC61000-3 Windows Software 1.10.04RC5		Test Date: Jul 18 2008 8:12am
Type of Test:	Flickermeter Test - Table	
Power Analyzer:	Voltech PM6000 SN: 100006700148 Firmware Version: v1.20.06RC4	
	Channel(s):	
	1. SN: 090015501187, 26 Adjusted Date: 9 JUL 2008. 2. SN:None Adjusted Date:None	
	3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None	
	5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
	Shunt(s):	
	1. SN: 091024300432, 4 Adjusted Date: 11 JUL 2008. 2. SN:None Adjusted Date:None	
	3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None	
	5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None	
AC Source:	HP6842A	
Overall Result:	Notes:	
<b>PASS</b>	Plt test duration 120 minutes	
	Measurement method - Voltage <b>Test Report # 08F276I</b>	

	Plt
Limit	0.650
Reading	0.101

	Pst	dc (%)	dmax (%)	d(t) > 3.3%(ms)
Limit	1.000	3.300	7.000	500
Reading 1	0.131	0.029	0.275	0
Reading 2	0.096	0.032	0.327	0
Reading 3	0.097	0.027	0.336	0
Reading 4	0.098	0.021	0.325	0
Reading 5	0.097	0.027	0.267	0
Reading 6	0.099	0.018	0.356	0
Reading 7	0.104	0.023	0.349	0
Reading 8	0.101	0.024	0.310	0
Reading 9	0.098	0.018	0.346	0
Reading 10	0.097	0.026	0.320	0
Reading 11	0.090	0.015	0.288	0
Reading 12	0.090	0.020	0.299	0



## **Appendix B**

### **System Under Test Description**

*Test Report Number 08F276I*

**SYSTEM COMPONENTS**

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DEVICE TYPE: EUT, SP200 COMBINATION PIEZO ULTRASONIC SCALER WITH ELECTRIC MOTOR (SP200, SP100 AND SIMILAR) PORTABLE AND NON-PORTABLE  
S/N: 081201 & SN 081202 (RADIATED immunity ONLY)  
\*\*\*\*\*

DEVICE TYPE: EUT, SWIFT PORTABLE PIEZO ULTRASONIC SCALER (PORTABLE AND NON-PORTABLE)  
S/N: 871101  
\*\*\*\*\*

**INTERFACE CABLES**

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DEVICE TYPE: EUT (ALL 3)  
SHIELD: NO  
LENGTH: 2 METER  
CONNECTOR TYPE: DEDICATED TO DEDICATED  
PORT: FOOT SWITCH  
\*\*\*\*\*

DEVICE TYPE: EUT (ALL 3)  
SHIELD: NO  
LENGTH: 6 feet  
CONNECTOR TYPE: DEDICATED TO DEDICATED  
PORT: SCALER  
\*\*\*\*\*

DEVICE TYPE: EUT (SP 200)  
SHIELD: NO  
LENGTH: 6 feet  
CONNECTOR TYPE: DEDICATED TO DEDICATED  
PORT: MOTOR  
\*\*\*\*\*

**AC LINE CORDS**

\*\*\*\*\*

DEVICE TYPE: EUT (3X)  
SHIELD: No  
LENGTH: 6 feet (0.5 meters for EFT and 25 cm for conducted immunity)  
CONNECTOR TYPE: IEC to dedicated  
\*\*\*\*\*