Qualification of Maxi, Mini, Micro, VI-200 and VI-J00 Products to Railway Applications Shock and Vibration Standard EN 61373

Governing Standard BS EN 50155 Railway Applications – Electronic equipment used on rolling stock.
Date: May, 2006
1. **PURPOSE:**

   To demonstrate compliance of Vicor product to the environmental (EN 50125-1), shock and vibration (EN 61373) standards from EN 50155, the European Standard for electronic equipment used in Railway applications.

2. **EXECUTIVE SUMMARY:**

   Representative DC-DC power conversion modules were selected, VI-810423B was selected as the representative model for the Maxi, Mini and Micro products and VI-2T3-CU was selected as the representative model for the VI-200 and VI-J00 products.

   Each group was tested as outlined below to demonstrate compliance to EN 50155. Both groups successfully completed the testing with no deterioration in the performance of the modules as demonstrated in the test results.

3. **REQUIREMENTS:**

   3.1 **Test Samples:** Each test group contained 15 test samples.

   3.2 **Production Requirements:** All test samples were manufactured with the standard process.

   3.3 **Testing Requirements:**

   ▪ All modules must be tested on the standard production ATE tester for that specific model, passing all tests before initiating qualification testing.

   ▪ During qualification testing the product must operate as outlined in the test requirement.

   ▪ Upon the completion of each test set each module must be tested to verify that there are no electrical failures. Each module must also be visually inspected to verify that there are no visual defects.
3.4 **Definition of Electrical Failure:** A failure will be a module that changes in electrical performance (parameters outside acceptable tolerance limits of specification) or other criteria specific to an environmental test. If the cause of the failure is caused by fixture failure or operator error it will not be counted as a failure.

4 **TEST SEQUENCE**

<table>
<thead>
<tr>
<th>1. Initial Electrical Performance Test At Rated Operating Temperatures:</th>
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<tr>
<td><strong>Test Method:</strong> Functional ATE test.</td>
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<th>2. Shock &amp; Vibration Test: Test performed at outside LAB – The report from the outside Lab has been added to the end of this report.</th>
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<tbody>
<tr>
<td><strong>Test Condition:</strong> Nominal input voltage, no load, output monitored to verify continuous operation.</td>
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</table>
| **Test Parameters:** Random Vibration: Category <0.3Kg  
Freq range: 5-150Hz @ 5grms:  
5hrs per axis  
Shock:  
Long./Trans./Vert. Axis  
Peak acceleration:5g/2g/1g  
Duration: 50ms/ 20ms/ 20ms. |

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<th>3. Electrical Performance Tests At Rated Operational Temperatures:</th>
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<td><strong>Test Method:</strong> Functional ATE test</td>
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4. Temperature/Relative Humidity Test

**Test Condition:** Non-biased.

**Test Parameters**
- **Time:** 10 hours
- **Temperature:** 55°C
- **Relative Humidity:** 95%RH

5. Operating Temperature Test

**Test Condition:** Nominal Input Full load, continuous operation.

**Test Parameters**
- **Time:** 8 hrs
- **Temperature:** 85°C for 6 hrs followed by 2 hrs at –40°C

6. Electrical Performance Tests At Rated Operational Temperatures:

**Test Method:** Functional ATE test.
## 5. TEST DATA

**VI-2T3- CU – Vibration And Shock Test Results**

### CONTINUATION / RELIABILITY ENGINEERING DEPARTMENT

**RANDOM VIBRATION:** (5GRMS 5-150HZ)

**SHOCK:** (1G 20MS, 2G 20MS, 5G 50MS)

**ENG TECHNICIAN:** EDWARD MEJIA / NATIONAL TECHNICAL SYSTEMS 978.263.2933

**MODEL NUMBER:** VI-2T3-CU

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VI-2T3-CU – Vibration And Shock Test Results - Continued

### VI-2T3-CU

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# CONTINUATION / RELIABILITY ENGINEERING DEPARTMENT

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**SHOCK:** (1G 20MS, 2G 20MS, 5G 50MS)

**ENG TECHNICIAN:** EDWARD MEJIA / NATIONAL TECHNICAL SYSTEMS 978.263.2933

**MODEL NUMBER:** VI-810423B

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Test Report No. TR-300814-05E, Rev. 0

Vibration and Shock Testing
of
Power Supplies

Prepared For: Vicor Corporation
400 Federal Street
Andover, MA 01810
P.O. Number: 158432SEV

Prepared By: National Technical Systems
1146 Massachusetts Avenue
Boxborough, MA 01719
(978) 266-1001
www.ntscorp.com

Issued: March 17, 2006
## Revision Page

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Signatures

Prepared by: Erin K. Reilly, Technical Writer

Approved by: Steven Goodman, Program Manager

Reviewed by: NTS Quality Representative
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## Appendices

Appendix A  Test Equipment List.......................................................................................... A-1

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1.0 Purpose
This report presents the test procedures used and the results obtained during the performance of a Vibration and Shock test program. The test program was conducted to assess the ability of 30 Power Supplies to successfully satisfy the requirements specified in the references listed in Section 2.0 of this report.

2.0 References

2.1 Vicor Corporation Purchase Order Number 158432SEV dated December 20, 2005
2.2 NTS Quotation Number B-1105E-7257-1 dated December 20, 2005
2.3 ISO/IEC 17025:2005(E), General Requirements for the Competence of Testing and Calibration Laboratories, May 15, 2005

3.0 Test Items

3.1 Description

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3.2 Security Classification of Items
Unclassified

4.0 Test Dates and Equipment

4.1 Test Dates
February 17-28 and March 2, 2006

4.2 Test Equipment
A list of the test equipment used is included in Appendix A of this report. This equipment is calibrated according to ISO/IEC 17025:2005(E) and calibration is traceable to the National Institute of Standards and Technology (NIST). Calibration records are maintained on file at National Technical Systems.
5.0 Test Descriptions and Results

- The test items were inspected upon receipt at NTS. No damage was noted.
- All testing was performed in accordance with Section 2.0 of this test report.

5.1 Test Summary

The Power Supplies met the requirements of Section 2.0 of this test report. There was no damage or deterioration following the Vibration and Shock test program.

Four incidents of deviation occurred during Random Vibration testing.

- Test #5 in the X-axis was aborted at 36 minutes, 10 seconds. It was noted that the spanners on the piston had loosened during vibration. The spanners were tightened and testing continued. Reference Appendix C for Notice of Deviation Number D-1 dated February 20, 2006.

- Test #5 in the X-axis was aborted at 38 minutes, 59 seconds. It was noted that two of the flange bolts on one side of the piston had broken, causing hydraulic oil to spray from the pit. The bolts were replaced and testing continued. Reference Appendix C for Notice of Deviation Number D-2 dated February 20, 2006.

- Test #13 in the X-axis was aborted at 3 hours, 54 minutes, 11 seconds. A hairline crack was found near a weld on one of the flanges on the piston, causing hydraulic oil to spray from the pit. The flange was re-welded to cover the crack and testing continued. Reference Appendix C for Notice of Deviation Number D-3 dated February 22, 2006.

- Test #21 in the Z-axis was aborted at 8 minutes, 36 seconds. Two of the flange bolts on one side of the piston had broken, causing hydraulic oil to spray from the pit. Testing at that point had been split-banded. Testing in the range from 20 Hz to 150 Hz was completed on the NTS T-4000 Electrodynamic Shaker. Testing in the range from 5 Hz to 20 Hz was completed on the Electro-hydraulic Shaker. Reference Appendix C for Notice of Deviation D-4 dated February 24, 2006.

Reference Sections 5.2 through 5.3 for test details and Appendix B for Vibration and Shock test data.

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<th>Section</th>
<th>Reference</th>
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5.2 **Random Vibration Test**
The Power Supplies, in an operating mode, were securely attached to a fixture plate, which was securely mounted to the Electro-hydraulic Shaker (the NTS T-4000 Electro-dynamic Shaker was used for one axis). One control accelerometer was located on the test fixture during all Random Vibration testing to monitor and record testing for later playback and plotting. The vibration system was programmed as follows:

**Table I: Random Vibration Test**

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<td>5 grms Total</td>
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<td>5 Hz to 150 Hz @ 0.1725 g²/Hz</td>
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<tr>
<td>5 hours/axis</td>
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<tr>
<td>Three mutually perpendicular axes</td>
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Random Vibration Test Setup

X-axis VI-2T3-CU  

Y-axis VI-2T3-CU  

X-axis VI-810-423B  

Y-axis VI-810-423B
Random Vibration Test Setup

Z-axis VI-2T3-CU  
Z-axis VI-810-423B

Z-axis VI-810-423B (T-4000 Shaker)

Comments

The Power Supplies showed no damage or deterioration following the Random Vibration testing. Reference Appendix B for Vibration and Shock Test Data.

Test #5 in the X-axis was aborted at 36 minutes, 10 seconds. It was noted that the spanners on the piston had loosened during vibration. The spanners were tightened and testing continued. Reference Appendix C for Notice of Deviation Number D-1 dated February 20, 2006.

Test #5 in the X-axis was aborted at 38 minutes, 59 seconds. It was noted that two of the flange bolts on one side of the piston had broken, causing hydraulic oil to spray from the pit. The bolts were replaced and testing continued. Reference Appendix C for Notice of Deviation Number D-2 dated February 20, 2006.
Test #13 in the X-axis was aborted at 3 hours, 54 minutes, 11 seconds. A hairline crack was found near a weld on one of the flanges on the piston, causing hydraulic oil to spray from the pit. The flange was re-welded to cover the crack and testing continued. Reference Appendix C for Notice of Deviation Number D-3 dated February 22, 2006.

Test #21 in the Z-axis was aborted at 8 minutes, 36 seconds. Two of the flange bolts on one side of the piston had broken, causing hydraulic oil to spray from the pit. Testing at that point had been split-banded. Testing in the range from 20 Hz to 150 Hz was completed on the NTS T-4000 Electro-dynamic Shaker. Testing in the range from 5 Hz to 20 Hz was completed on the Electro-hydraulic Shaker. Reference Appendix C for Notice of Deviation D-4 dated February 24, 2006.

5.3 Shock Test
The Power Supplies, in an operating mode, were securely attached to a fixture plate, which was securely mounted to the NTS Electro-hydraulic Shaker. One control accelerometer was located on the test fixture during all Shock testing to monitor and record testing for later playback and plotting. The vibration system was programmed as follows:

Table II: Mechanical Shock Test

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<tr>
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<tbody>
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<td>1 g half-sine waveform</td>
</tr>
<tr>
<td>20 millisecond duration</td>
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<tr>
<td>1 shocks in each ° directions/axis</td>
</tr>
<tr>
<td>6 total shocks</td>
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<tr>
<td>Three mutually perpendicular axes</td>
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<table>
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<tr>
<th>TEST PROFILE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 g’s half-sine waveform</td>
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<td>50 millisecond duration</td>
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<tr>
<td>1 shocks in each ° directions/axis</td>
</tr>
<tr>
<td>6 total shocks</td>
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<tr>
<td>Three mutually perpendicular axes</td>
</tr>
</tbody>
</table>
Shock Test Setup

X-axis VI-2T3-CU

X-axis VI-810-423B

Y-axis VI-2T3-CU

Y-axis VI-810-423B
Shock Test Setup

Z-axis VI-2T3-CU

Z-axis VI-810-423B

Comments
The Power Supplies showed no damage or deterioration following the Mechanical Shock testing. Reference Appendix B for Vibration and Shock Test Data.
Appendix A

Test Equipment List
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<td>AC0789</td>
<td>AC647</td>
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<td>1HZ TO 4KHZ</td>
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<td>+/-5%</td>
<td>7/01/06</td>
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<td>AC1871</td>
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<td>1 - 20 KHZ</td>
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<td>VIBRATION RESEARCH</td>
<td>079cbb,038bfa,0</td>
<td>+/-2% 5-10 HZ</td>
<td>12/07/06</td>
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<tr>
<td>BX0393</td>
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<td>C1405A</td>
<td></td>
<td>000</td>
<td>NCR</td>
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<td>BX0894</td>
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<td>2552B</td>
<td>0 TO 20 KHZ</td>
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<td>BX1677</td>
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<td>PCB PIEZOTRONICS</td>
<td>353B17</td>
<td>1-10000HZ, 10MV/G</td>
<td>006</td>
<td>CAL</td>
</tr>
</tbody>
</table>

Calibration Abbreviations:
- UWCE - use with calibrated equipment
- CBU - calibrate before use
- NQM - not used for quantitative measurement
- CAL - calibrated
- NCR - no calibration required
Appendix B

Vibration and Shock Test Data
Vibration and Shock Test Data

Data stored on February 17, 2006 16:10:14
MJO# 300814  Vicor  VI-2T3-CU (15)
Test# 1  Axis: Z  Random Vibration 5-150 Hz

*End of Test*
Vibration and Shock Test Data

Data stored on February 17, 2006 16:10:14
MJO# 300814 Vicor VI-2T3-CU (15)
Test# 1 Axis: Z Random Vibration 5-150 Hz

Breakpoint table

<table>
<thead>
<tr>
<th>Frequency</th>
<th>G²/Hz</th>
<th>dB/Octave</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Hz</td>
<td>0.1725</td>
<td>0</td>
</tr>
<tr>
<td>150 Hz</td>
<td>0.1725</td>
<td></td>
</tr>
</tbody>
</table>

Test level schedule:

1) 5:00:00 100 %  
** Test started February 17, 2006 11:01:02, running for 5:06:20  
** Current level: 1, running at 100 % for 5:00:00 of 5:00:00

Measurements:

Demand: 5.0037 G RMS 1.29079 in pk-pk  
Control: 5.03356 G RMS 1.30556 in pk-pk  
Ch1: 0.000193413 G RMS Ch1 in-band: 0.000128444 G RMS  
Ch2: 0.0157477 G RMS Ch2 in-band: 0.00712682 G RMS  
Ch3: 0.000484965 G RMS Ch3 in-band: 0.000121223 G RMS  
Ch4: 0.000791943 G RMS Ch4 in-band: 0.00010393 G RMS  
Drive voltage: 0 Vrms

System gain is 0 Volts/G (Max system gain limit = 5)

Accelerometer calibration details:

Ch1: 104.4 mV/G (75954, 8/07/05)  
Ch2: 103.9 mV/G (53972, 7/1/06)  
Ch3: 102.1 mV/G (57970, 10/26/06)  
Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 17, 2006 16:34:10
MJO# 300814 Vicor VI-2T3-CU (15) - Test# 2 Axis: Z Shock 1G 20ms

Test Profile:
20 ms Half Sine Pulse with amplitude 1 G (Negative)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 % (Memorized drive)</td>
</tr>
</tbody>
</table>

** Test started February 17, 2006 16:33:54
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 1.03959 G
Output voltage: 0.0892149 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G (75954, 8/07/05)
Ch2: 103.9 mV/G (53972, 7/1/06)
Ch3: 102.1 mV/G (57970, 10/26/06)
Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 17, 2006 16:32:18
MJO# 300814  Vicor  VI-2T3-CU (15) - Test# 2  Axis: Z  Shock 1G 20ms

Starting with Memorized Drive

Test Profile:
- 20 ms Half Sine Pulse with amplitude 1 G (Positive)
- Pre-pulse amplitude: 10 % of the peak acceleration
- Post-pulse amplitude: 30 % of the peak acceleration
- Normal limits used
- Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

** Test started February 17, 2006 16:31:51
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
- Control amplitude: 1.00422 G
- Output voltage: 0.0953548 Volts peak

Accelerometer calibration details:
- Ch1: 104.4 mV/G  (75954, 8/07/05)
- Ch2: 103.9 mV/G  (53972, 7/1/06)
- Ch3: 102.1 mV/G  (57970, 10/26/06)
- Ch4: 102.3 mV/G  (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 17, 2006 16:36:55
MJO# 300814   Vicor   VI-2T3-CU (15) - Test# 3  Axis: Z  Shock 2G 20ms

Stop Button Pressed

Test Profile:
20 ms Half Sine Pulse with amplitude 2 G (Negative)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

** Test started February 17, 2006 16:36:35
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 2.05841 G
Output voltage: 0.184918 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G  (75954, 8/07/05)
Ch2: 103.9 mV/G  (53972, 7/1/06)
Ch3: 102.1 mV/G  (57970, 10/26/06)
Ch4: 102.3 mV/G  (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 17, 2006 16:36:21  
MJO# 300814 Vicor VI-2T3-CU (15) - Test# 3 Axis: Z Shock 2G 20ms  
Stop Button Pressed

Test Profile:  
20 ms Half Sine Pulse with amplitude 2 G (Positive)  
Pre-pulse amplitude: 10 % of the peak acceleration  
Post-pulse amplitude: 30 % of the peak acceleration  
Normal limits used  
Control channels: Control

Test level schedule:  
1) 1 100 % (Memorized drive)  
** Test started February 17, 2006 16:34:58  
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:  
Control amplitude: 1.99425 G  
Output voltage: 0.192144 Volts peak

Accelerometer calibration details:  
Ch1: 104.4 mV/G  
Ch2: 103.9 mV/G  
Ch3: 102.1 mV/G  
Ch4: 102.3 mV/G  
(75954, 8/07/05)  
(53972, 7/1/06)  
(57970, 10/26/06)  
(57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 17, 2006 16:39:28
MJO# 300814 Vicor VI-2T3-CU (15) - Test# 4 Axis: Z Shock 5G 50ms

Stop Button Pressed

Test Profile:
50 ms Half Sine Pulse with amplitude 5 G (Negative)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

(Memorized drive)

** Test started February 17, 2006 16:39:06
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 6.28054 G
Output voltage: 1.45773 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G (75954, 8/07/05)
Ch2: 103.9 mV/G (53972, 7/1/06)
Ch3: 102.1 mV/G (57970, 10/26/06)
Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 17, 2006 16:38:56
MJO# 300814  Vicor  VI-2T3-CU (15) - Test# 4  Axis: Z  Shock 5G 50ms

Stop Button Pressed

Test Profile:
50 ms Half Sine Pulse with amplitude 5 G (Positive)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

(Memorized drive)

** Test started February 17, 2006 16:37:40
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 5.13672 G
Output voltage: 1.38425 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G (75954, 8/07/05)
Ch2: 103.9 mV/G (53972, 7/1/06)
Ch3: 102.1 mV/G (57970, 10/26/06)
Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on Feb 21, 2006 16:13:50
MJO# 300814  Vicor   VI-2T3-CU (15)
Test# 5  Axis: X   Random Vibration 5-150 Hz

End of Test

Acceleration Profile - Loop 1

Frequency (Hz)

Acceleration (G²/Hz)

Demand
Control
Vibration and Shock Test Data

Data stored on Feb 21, 2006 16:13:50
MJO# 300814  Vicor       VI-2T3-CU (15)
Test# 5  Axis: X   Random Vibration 5-150 Hz

Breakpoint table

<table>
<thead>
<tr>
<th>Frequency</th>
<th>G²/Hz</th>
<th>dB/Octave</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Hz</td>
<td>0.1725</td>
<td>0</td>
</tr>
<tr>
<td>150 Hz</td>
<td>0.1725</td>
<td></td>
</tr>
</tbody>
</table>

Test level schedule:

<table>
<thead>
<tr>
<th>Duration</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>5:00:00</td>
<td>100 %</td>
</tr>
</tbody>
</table>

** Test started February 20, 2006 09:34:54, running for 5:22:10
** Current level: 1, running at 100 % for 5:00:00 of 5:00:00

Measurements:

- Demand: 5.0037 G RMS 1.29079 in pk-pk
- Control: 5.00012 G RMS 1.38474 in pk-pk
- Ch1: 0.000476867 G RMS Ch1 in-band: 0.000132451 G RMS
- Ch2: 0.00620958 G RMS Ch2 in-band: 0.0026277 G RMS
- Ch3: 0.000468269 G RMS Ch3 in-band: 0.000181327 G RMS
- Ch4: 0.000500854 G RMS Ch4 in-band: 0.000152943 G RMS
- Drive voltage: 0 Vrms

System gain is 0 Volts/G (Max system gain limit = 5)

Accelerometer calibration details:

- Ch1: 104.4 mV/G (75954, 8/07/05)
- Ch2: 103.9 mV/G (53972, 7/1/06)
- Ch3: 102.1 mV/G (57970, 10/26/06)
- Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 21, 2006 16:18:41
MJO# 300814   Vicor   VI-2T3-CU (15) - Test# 6  Axis: X  Shock 1G 20ms

Stop Button Pressed

Test Profile:
- 20 ms Half Sine Pulse with amplitude 1 G (Negative)
- Pre-pulse amplitude: 10 % of the peak acceleration
- Post-pulse amplitude: 30 % of the peak acceleration
- Normal limits used
- Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

** Test started February 21, 2006 16:18:20
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
- Control amplitude: 1.02543 G
- Output voltage: 0.0861669 Volts peak

Accelerometer calibration details:
- Ch1: 104.4 mV/G (75954, 8/07/05)
- Ch2: 103.9 mV/G (53972, 7/1/06)
- Ch3: 102.1 mV/G (57970, 10/26/06)
- Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 21, 2006 16:17:49
MJO# 300814 Vicor VI-2T3-CU (15) - Test# 6 Axis: X Shock 1G 20ms

Stop Button Pressed

Test Profile:
20 ms Half Sine Pulse with amplitude 1 G (Positive)
Pre-pulse amplitude: 10% of the peak acceleration
Post-pulse amplitude: 30% of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100% (Memorized drive)</td>
</tr>
</tbody>
</table>

** Test started February 21, 2006 16:17:33
** Current level: 1, running at 100% for 0 of 1 pulses

Measurements:
Control amplitude: 0.983675 G
Output voltage: 0.0951946 Volts peak

Accelerometer calibration details:

<table>
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<tr>
<th>Channel</th>
<th>Calibration Value</th>
<th>Calibration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch1</td>
<td>104.4 mV/G</td>
<td>75954, 8/07/05</td>
</tr>
<tr>
<td>Ch2</td>
<td>103.9 mV/G</td>
<td>53972, 7/1/06</td>
</tr>
<tr>
<td>Ch3</td>
<td>102.1 mV/G</td>
<td>57970, 10/26/06</td>
</tr>
<tr>
<td>Ch4</td>
<td>102.3 mV/G</td>
<td>57976, 10/26/06</td>
</tr>
</tbody>
</table>
Vibration and Shock Test Data

Data stored on February 21, 2006 16:21:11
MJO# 300814 Vicor VI-2T3-CU (15) - Test# 7 Axis: X Shock 2G 20ms -

Stop Button Pressed

Test Profile:
- 20 ms Half Sine Pulse with amplitude 2 G (Negative)
- Pre-pulse amplitude: 10 % of the peak acceleration
- Post-pulse amplitude: 30 % of the peak acceleration
- Normal limits used
- Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 % (Memorized drive)</td>
</tr>
</tbody>
</table>

** Test started February 21, 2006 16:20:55
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
- Control amplitude: 2.39075 G
- Output voltage: 0.271932 Volts peak

Accelerometer calibration details:
- Ch1: 104.4 mV/G (75954, 8/07/05)
- Ch2: 103.9 mV/G (53972, 7/1/06)
- Ch3: 102.1 mV/G (57970, 10/26/06)
- Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 21, 2006 16:20:44
MJO# 300814  Vicor   VI-2T3-CU (15) - Test# 7  Axis: X  Shock 2G 20ms -
*Stop Button Pressed*

Test Profile:
20 ms Half Sine Pulse with amplitude 2 G (Positive)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>
** Test started February 21, 2006 16:19:21
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 2.14132 G
Output voltage: 0.212374 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G (75954, 8/07/05)
Ch2: 103.9 mV/G (53972, 7/1/06)
Ch3: 102.1 mV/G (57970, 10/26/06)
Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 21, 2006 16:41:34
MJO# 300814 Vicor VI-2T3-CU (15) - Test# 8 Axis: X Shock 5G 50ms -
Stop Button Pressed

**Test Profile:**
48 ms Half Sine Pulse with amplitude 5 G (Negative)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

**Test level schedule:**

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

(Memorized drive)

**Test started February 21, 2006 16:39:37**
**Current level: 1, running at 100 % for 0 of 1 pulses**

**Measurements:**
Control amplitude: 6.30898 G
Output voltage: 1.22725 Volts peak

**Accelerometer calibration details:**
Ch1: 104.4 mV/G  (75954, 8/07/05)
Ch2: 103.9 mV/G  (53972, 7/1/06)
Ch3: 102.1 mV/G  (57970, 10/26/06)
Ch4: 102.3 mV/G  (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 21, 2006 16:27:28
MJO# 300814 Vicor VI-2T3-CU (15) - Test# 8 Axis: X Shock 5G 50ms -
Stop Button Pressed

Test Profile:
50 ms Half Sine Pulse with amplitude 5 G (Positive)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

** Test started February 21, 2006 16:25:09
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 5.31558 G
Output voltage: 1.30775 Volts peak

Accelerometer calibration details:

<table>
<thead>
<tr>
<th>Channel</th>
<th>Sensitivity (mV/G)</th>
<th>Calibration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch1</td>
<td>104.4 mV/G</td>
<td>75954, 8/07/05</td>
</tr>
<tr>
<td>Ch2</td>
<td>103.9 mV/G</td>
<td>53972, 7/1/06</td>
</tr>
<tr>
<td>Ch3</td>
<td>102.1 mV/G</td>
<td>57970, 10/26/06</td>
</tr>
<tr>
<td>Ch4</td>
<td>102.3 mV/G</td>
<td>57976, 10/26/06</td>
</tr>
</tbody>
</table>
Vibration and Shock Test Data

Data stored on February 21, 2006 22:09:05
MJO# 300814  Vicor VI-2T3-CU (15)
Test# 9  Axis: Y  Random Vibration 5-150 Hz

End of Test

![Acceleration Profile - Loop 1](attachment:image.png)
Vibration and Shock Test Data

Data stored on February 21, 2006 22:09:05
MJO# 300814 Vicor VI-2T3-CU (15)
Test# 9 Axis: Y Random Vibration 5-150 Hz

Breakpoint table

<table>
<thead>
<tr>
<th>Frequency</th>
<th>G²/Hz</th>
<th>dB/Octave</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Hz</td>
<td>0.1725</td>
<td>0</td>
</tr>
<tr>
<td>150 Hz</td>
<td>0.1725</td>
<td></td>
</tr>
</tbody>
</table>

Test level schedule:

<table>
<thead>
<tr>
<th>Duration</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 5:00:00</td>
<td>100 %</td>
</tr>
</tbody>
</table>

** Test started February 21, 2006 17:05:20, running for 5:03:19
** Current level: 1, running at 100 % for 5:00:00 of 5:00:00

Measurements:

Demand: 5.0037 G RMS 1.29079 in pk-pk
Control: 5.00331 G RMS 1.339 in pk-pk
Ch1: 0.000181205 G RMS Ch1 in-band: 0.000146051 G RMS
Ch2: 0.00892392 G RMS Ch2 in-band: 0.00362944 G RMS
Ch3: 0.000245581 G RMS Ch3 in-band: 0.000234214 G RMS
Ch4: 0.000454197 G RMS Ch4 in-band: 0.000153521 G RMS
Drive voltage: 0 Vrms

System gain is 0 Volts/G (Max system gain limit = 5)

Accelerometer calibration details:

Ch1: 104.4 mV/G (75954, 8/07/05)
Ch2: 103.9 mV/G (53972, 7/1/06)
Ch3: 102.1 mV/G (57970, 10/26/06)
Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 22, 2006 08:19:58
MJO# 300814 Vicor VI-2T3-CU (15) - Test# 10 Axis: Y Shock 1G 20ms

Stop Button Pressed

Test Profile:
20 ms Half Sine Pulse with amplitude 1 G (Negative)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

(Memorized drive)
** Test started February 22, 2006 08:19:32
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 1.04996 G
Output voltage: 0.0750762 Volts peak

Accelerometer calibration details:

<table>
<thead>
<tr>
<th>Channel</th>
<th>Sensitivity</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch1</td>
<td>104.4 mV/G</td>
<td>75954, 8/07/05</td>
</tr>
<tr>
<td>Ch2</td>
<td>103.9 mV/G</td>
<td>53972, 7/1/06</td>
</tr>
<tr>
<td>Ch3</td>
<td>102.1 mV/G</td>
<td>57970, 10/26/06</td>
</tr>
<tr>
<td>Ch4</td>
<td>102.3 mV/G</td>
<td>57976, 10/26/06</td>
</tr>
</tbody>
</table>
Vibration and Shock Test Data

Data stored on February 22, 2006 08:19:16
MJO# 300814 Vicor VI-2T3-CU (15) - Test# 10 Axis: Y Shock 1G 20ms

Stop Button Pressed

Test Profile:
20 ms Half Sine Pulse with amplitude 1 G (Positive)
Pre-pulse amplitude: 10% of the peak acceleration
Post-pulse amplitude: 30% of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100% (Memorized drive)</td>
</tr>
</tbody>
</table>

** Test started February 22, 2006 08:18:46
** Current level: 1, running at 100% for 0 of 1 pulses

Measurements:
Control amplitude: 0.987858 G
Output voltage: 0.081205 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G (75954, 8/07/05)
Ch2: 103.9 mV/G (53972, 7/1/06)
Ch3: 102.1 mV/G (57970, 10/26/06)
Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 22, 2006 08:22:13
MJO# 300814 Vicor VI-2T3-CU (15) - Test# 11 Axis: Y Shock 2G 20ms

Stop Button Pressed

Test Profile:
20 ms Half Sine Pulse with amplitude 2 G (Negative)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
<th>(Memorized drive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
<td></td>
</tr>
</tbody>
</table>

** Test started February 22, 2006 08:21:57
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 2.32744 G
Output voltage: 0.165198 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G (75954, 8/07/05)
Ch2: 103.9 mV/G (53972, 7/1/06)
Ch3: 102.1 mV/G (57970, 10/26/06)
Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 22, 2006 08:21:43
MJO# 300814 Vicor VI-2T3-CU (15) - Test# 11 Axis: Y Shock 2G 20ms

Stop Button Pressed

Test Profile:
20 ms Half Sine Pulse with amplitude 2 G (Positive)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

** Test started February 22, 2006 08:21:24
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 2.23007 G
Output voltage: 0.176248 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G (75954, 8/07/05)
Ch2: 103.9 mV/G (53972, 7/1/06)
Ch3: 102.1 mV/G (57970, 10/26/06)
Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 22, 2006 08:29:34
MJO# 300814  Vicor VI-2T3-CU (15) - Test# 12  Axis: Y Shock 5G 50ms

Stop Button Pressed

Test Profile:
50 ms Half Sine Pulse with amplitude 5 G (Negative)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

(Memorized drive)
** Test started February 22, 2006 08:27:53
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 6.28992 G
Output voltage: 1.30584 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G  (75954, 8/07/05)
Ch2: 103.9 mV/G  (53972, 7/1/06)
Ch3: 102.1 mV/G  (57970, 10/26/06)
Ch4: 102.3 mV/G  (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 22, 2006 08:25:56
MJO# 300814 Vicor VI-2T3-CU (15) - Test# 12 Axis: Y Shock 5G 50ms

Stop Button Pressed

Test Profile:
50 ms Half Sine Pulse with amplitude 5 G (Positive)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

(Memorized drive)

** Test started February 22, 2006 08:24:02
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:

Control amplitude: 6.02651 G
Output voltage: 1.51031 Volts peak

Accelerometer calibration details:

Ch1: 104.4 mV/G  (75954, 8/07/05)
Ch2: 103.9 mV/G  (53972, 7/1/06)
Ch3: 102.1 mV/G  (57970, 10/26/06)
Ch4: 102.3 mV/G  (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 23, 2006 16:29:11
MJO# 300814  Vicor  VI-810-423B
Test# 13  Axis: X  Random Vibration 5-150 Hz

End of Test

![Acceleration Profile - Loop 1](image-url)
Vibration and Shock Test Data

Data stored on February 23, 2006 16:29:11
MJO# 300814 Vicor VI-810-423B
Test# 13 Axis: X Random Vibration 5-150 Hz

Breakpoint table

<table>
<thead>
<tr>
<th>Frequency</th>
<th>G²/Hz</th>
<th>dB/Octave</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Hz</td>
<td>0.1725</td>
<td>0</td>
</tr>
<tr>
<td>150 Hz</td>
<td>0.1725</td>
<td></td>
</tr>
</tbody>
</table>

Test level schedule:

<table>
<thead>
<tr>
<th>Duration</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 5:00:00</td>
<td>100 %</td>
</tr>
</tbody>
</table>

** Test started Feb 22, 2006 09:45:59, running for 5:07:17
** Current level: 1, running at 100 % for 5:00:00 of 5:00:00

Measurements:

Demand: 5.0037 G RMS 1.29079 in pk-pk
Control: 5.008839 G RMS 1.38593 in pk-pk
Ch1: 0.000767322 G RMS Ch1 in-band: 0.000131015 G RMS
Ch2: 0.00879462 G RMS Ch2 in-band: 0.00400285 G RMS
Ch3: 0.000660705 G RMS Ch3 in-band: 0.000236433 G RMS
Ch4: 0.000487542 G RMS Ch4 in-band: 0.000170112 G RMS
Drive voltage: 0 Vrms

System gain is 0 Volts/G (Max system gain limit = 5)

Accelerometer calibration details:

Ch1: 104.4 mV/G (75954, 8/07/05)
Ch2: 103.9 mV/G (53972, 7/1/06)
Ch3: 102.1 mV/G (57970, 10/26/06)
Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 23, 2006 16:43:32
MJO# 300814  Vicor  VI-810-423B - Test# 14  Axis: X  Shock 1G 20ms

Stop Button Pressed

Test Profile:
- 20 ms Half Sine Pulse with amplitude 1 G (Negative)
- Pre-pulse amplitude: 10 % of the peak acceleration
- Post-pulse amplitude: 30 % of the peak acceleration
- Normal limits used
- Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

(Memorized drive)

** Test started February 23, 2006 16:43:17
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
- Control amplitude: 0.987201 G
- Output voltage: 0.0690943 Volts peak

Accelerometer calibration details:
- Ch1: 104.4 mV/G  (75954, 8/07/05)
- Ch2: 103.9 mV/G  (53972, 7/1/06)
- Ch3: 102.1 mV/G  (57970, 10/26/06)
- Ch4: 102.3 mV/G  (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 23, 2006 16:43:09
MJO# 300814 Vicor VI-810-423B - Test# 14 Axis: X Shock 1G 20ms -
Stop Button Pressed

**Test Profile:**
20 ms Half Sine Pulse with amplitude 1 G (Positive)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

**Test level schedule:**

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

(Memorized drive)

**Test started February 23, 2006 16:41:49**
**Current level: 1, running at 100 % for 0 of 1 pulses**

**Measurements:**
Control amplitude: 1.22913 G
Output voltage: 0.0803908 Volts peak

**Accelerometer calibration details:**
Ch1: 104.4 mV/G (75954, 8/07/05)
Ch2: 103.9 mV/G (53972, 7/1/06)
Ch3: 102.1 mV/G (57970, 10/26/06)
Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 23, 2006 16:44:49
MJO# 300814  Vicor VI-810-423B - Test# 15  Axis: X  Shock 2G 20ms -

Stop Button Pressed

Test Profile:
20 ms Half Sine Pulse with amplitude 2 G (Negative)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

(Memorized drive)

** Test started February 23, 2006 16:44:35
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 2.14693 G
Output voltage: 0.219859 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G  (75954, 8/07/05)
Ch2: 103.9 mV/G  (53972, 7/1/06)
Ch3: 102.1 mV/G  (57970, 10/26/06)
Ch4: 102.3 mV/G  (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 23, 2006 16:44:27
MJO# 300814  Vicor  VI-810-423B - Test# 15  Axis: X  Shock 2G 20ms -

Stop Button Pressed

Test Profile:
20 ms Half Sine Pulse with amplitude 2 G (Positive)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
<th>(Memorized drive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
<td></td>
</tr>
</tbody>
</table>

** Test started February 23, 2006 16:44:03
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:

Control amplitude: 1.97138 G
Output voltage: 0.201524 Volts peak

Accelerometer calibration details:

<table>
<thead>
<tr>
<th>Channel</th>
<th>Calibration</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch1</td>
<td>104.4 mV/G</td>
<td>(75954, 8/07/05)</td>
</tr>
<tr>
<td>Ch2</td>
<td>103.9 mV/G</td>
<td>(53972, 7/1/06)</td>
</tr>
<tr>
<td>Ch3</td>
<td>102.1 mV/G</td>
<td>(57970, 10/26/06)</td>
</tr>
<tr>
<td>Ch4</td>
<td>102.3 mV/G</td>
<td>(57976, 10/26/06)</td>
</tr>
</tbody>
</table>
Vibration and Shock Test Data

Data stored on February 23, 2006 16:46:38
MJO# 300814   Vicor   VI-810-423B - Test# 16  Axis: X  Shock 5G 50ms

Stop Button Pressed

Test Profile:
50 ms Half Sine Pulse with amplitude 5 G (Negative)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 % (Memorized drive)</td>
</tr>
</tbody>
</table>

** Test started February 23, 2006 16:46:18
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 6.39892 G
Output voltage: 1.26351 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G  (75954, 8/07/05)
Ch2: 103.9 mV/G  (53972, 7/1/06)
Ch3: 102.1 mV/G  (57970, 10/26/06)
Ch4: 102.3 mV/G  (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 23, 2006 16:46:08
MJO# 300814  Vicor VI-810-423B - Test# 16  Axis: X  Shock 5G 50ms

Stop Button Pressed

Test Profile:
50 ms Half Sine Pulse with amplitude 5 G (Positive)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

(Memorized drive)
** Test started February 23, 2006 16:45:46
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 6.68202 G
Output voltage: 1.59115 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G (75954, 8/07/05)
Ch2: 103.9 mV/G (53972, 7/1/06)
Ch3: 102.1 mV/G (57970, 10/26/06)
Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 24, 2006 13:05:28
MJO# 300814  Vicor  VI-810-423B
Test# 17  Axis: Y  Random Vibration 5-150 Hz

**End of Test**

![Acceleration Profile - Loop 1](image)
Vibration and Shock Test Data

Breakpoint table

<table>
<thead>
<tr>
<th>Frequency</th>
<th>G²/Hz</th>
<th>dB/Octave</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Hz</td>
<td>0.1725</td>
<td>0</td>
</tr>
<tr>
<td>150 Hz</td>
<td>0.1725</td>
<td></td>
</tr>
</tbody>
</table>

Test level schedule:

<table>
<thead>
<tr>
<th>Duration</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>5:00:00</td>
<td>100 %</td>
</tr>
</tbody>
</table>

** Test started Feb 24, 2006 08:01:48, running for 5:03:25
** Current level: 1, running at 100 % for 5:00:00 of 5:00:00

Measurements:

| Demand: | 5.0037 G RMS | 1.29079 in pk-pk |
| Control:| 4.99023 G RMS| 1.39153 in pk-pk |
| Ch1:    | 0.000310243 G RMS | Ch1 in-band: 0.00015369 G RMS |
| Ch2:    | 0.00980801 G RMS | Ch2 in-band: 0.0108155 G RMS |
| Ch3:    | 0.000896484 G RMS | Ch3 in-band: 0.000262389 G RMS |
| Ch4:    | 0.000516645 G RMS | Ch4 in-band: 0.000193795 G RMS |

Drive voltage: 0 Vrms

System gain is 0 Volts/G (Max system gain limit = 5)

Accelerometer calibration details:

| Ch1: 104.4 mV/G | (75954, 8/07/05) |
| Ch2: 103.9 mV/G | (53972, 7/1/06) |
| Ch3: 102.1 mV/G | (57970, 10/26/06) |
| Ch4: 102.3 mV/G | (57976, 10/26/06) |
Vibration and Shock Test Data

Data stored on February 24, 2006 13:08:03
MJO# 300814  Vicor  VI-810-423B - Test# 18  Axis: Y  Shock 1G 20ms

Stop Button Pressed

Test Profile:
20 ms Half Sine Pulse with amplitude 1 G (Negative)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

(Memorized drive)

** Test started February 24, 2006 13:07:48
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 1.16557 G
Output voltage: 0.0788941 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G  (75954, 8/07/05)
Ch2: 103.9 mV/G  (53972, 7/1/06)
Ch3: 102.1 mV/G  (57970, 10/26/06)
Ch4: 102.3 mV/G  (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 24, 2006 13:07:36
MJO# 300814  Vicor   VI-810-423B - Test# 18  Axis: Y  Shock 1G 20ms

Stop Button Pressed

Test Profile:
20 ms Half Sine Pulse with amplitude 1 G (Positive)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

(Memorized drive)

** Test started February 24, 2006 13:06:22
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 1.03108 G
Output voltage: 0.116048 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G  (75954, 8/07/05)
Ch2: 103.9 mV/G  (53972, 7/1/06)
Ch3: 102.1 mV/G  (57970, 10/26/06)
Ch4: 102.3 mV/G  (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 24, 2006 13:14:57
MJO# 300814  Vicor  VI-810-423B - Test# 19  Axis: Y  Shock 2G 20ms

Stop Button Pressed

Test Profile:
20 ms Half Sine Pulse with amplitude 2 G (Negative)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

** Test started February 24, 2006 13:14:43
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 2.10161 G
Output voltage: 0.178913 Volts peak

Accelerometer calibration details:

<table>
<thead>
<tr>
<th>Channel</th>
<th>Calibration</th>
<th>Calibration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch1</td>
<td>104.4 mV/G</td>
<td>75954, 8/07/05</td>
</tr>
<tr>
<td>Ch2</td>
<td>103.9 mV/G</td>
<td>53972, 7/1/06</td>
</tr>
<tr>
<td>Ch3</td>
<td>102.1 mV/G</td>
<td>57970, 10/26/06</td>
</tr>
<tr>
<td>Ch4</td>
<td>102.3 mV/G</td>
<td>57976, 10/26/06</td>
</tr>
</tbody>
</table>
Vibration and Shock Test Data

Data stored on February 24, 2006 13:14:34
MJO# 300814  Vicor VI-810-423B - Test# 19 Axis: Y Shock 2G 20ms

Stop Button Pressed

Test Profile:
20 ms Half Sine Pulse with amplitude 2 G (Positive)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

(Memorized drive)

** Test started February 24, 2006 13:13:06
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 1.99561 G
Output voltage: 0.191043 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G  (75954, 8/07/05)
Ch2: 103.9 mV/G  (53972, 7/1/06)
Ch3: 102.1 mV/G  (57970, 10/26/06)
Ch4: 102.3 mV/G  (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 24, 2006 13:19:20
MJO# 300814 Vicor VI-810-423B - Test# 20 Axis: Y Shock 5G 50ms

Stop Button Pressed

Test Profile:
50 ms Half Sine Pulse with amplitude 5 G (Negative)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
<th>(Memorized drive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
<td></td>
</tr>
</tbody>
</table>

** Test started February 24, 2006 13:17:26
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 5.65205 G
Output voltage: 1.52962 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G (75954, 8/07/05)
Ch2: 103.9 mV/G (53972, 7/1/06)
Ch3: 102.1 mV/G (57970, 10/26/06)
Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on February 24, 2006 13:17:10
MJO# 300814 Vicor VI-810-423B - Test# 20 Axis: Y Shock 5G 50ms -
Stop Button Pressed

Test Profile:
50 ms Half Sine Pulse with amplitude 5 G (Positive)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

(Memorized drive)

** Test started February 24, 2006 13:15:20
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 5.83422 G
Output voltage: 1.39589 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G  (75954, 8/07/05)
Ch2: 103.9 mV/G  (53972, 7/1/06)
Ch3: 102.1 mV/G  (57970, 10/26/06)
Ch4: 102.3 mV/G  (57976, 10/26/06)
Vibration and Shock Test Data

Test Levels: 0.000 dB
Test Time: 00:00:00

Reference RMS: 4.772
Clipping: 3.00 Sigma

Frequency (Hz)

[Log]

g/Hz DOF 120 RMS: 4.317 g

21-09-25 28-Feb-2006
Vibration and Shock Test Data

Data stored on March 1, 2006 13:55:56
MJO# 300814 Vicor VI-810-423B
Test# 21 Axis: Z Random Vibration 5-20 Hz

End of Test

![Acceleration Profile - Loop 1](image)

- Frequency (Hz)
- Acceleration (G²/Hz)

Control Demand
Vibration and Shock Test Data

Breakpoint table

<table>
<thead>
<tr>
<th>Frequency</th>
<th>G²/Hz</th>
<th>dB/Octave</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Hz</td>
<td>0.1725</td>
<td>0</td>
</tr>
<tr>
<td>20 Hz</td>
<td>0.1725</td>
<td></td>
</tr>
</tbody>
</table>

Test level schedule:

<table>
<thead>
<tr>
<th>Duration</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>5:00:00</td>
<td>100 %</td>
</tr>
</tbody>
</table>

** Test started March 1, 2006 08:52:25, running for 5:02:21
** Current level: 1, running at 100 % for 5:00:00 of 5:00:00

Measurements:

- Demand: 1.62283 G RMS 1.28145 in pk-pk
- Control: 1.63052 G RMS 1.33083 in pk-pk
- Ch1: 0.000520615 G RMS Ch1 in-band: 0.000103879 G RMS
- Ch2: 0.00669764 G RMS Ch2 in-band: 0.000219127 G RMS
- Ch3: 0.000290839 G RMS Ch3 in-band: 8.31055e-005 G RMS
- Ch4: 0.000245413 G RMS Ch4 in-band: 9.73282e-005 G RMS
- Drive voltage: 0 Vrms

System gain is 0 Volts/G (Max system gain limit = 5)

Accelerometer calibration details:

- Ch1: 104.4 mV/G (75954, 8/07/05)
- Ch2: 103.9 mV/G (53972, 7/1/06)
- Ch3: 102.1 mV/G (57970, 10/26/06)
- Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on March 2, 2006 08:33:37
MJO# 300814  Vicor  VI-810-423B - Test# 22  Axis: Z  Shock 1G 20ms

**Stop Button Pressed**

Test Profile:
- 20 ms Half Sine Pulse with amplitude 1 G (Negative)
- Pre-pulse amplitude: 10 % of the peak acceleration
- Post-pulse amplitude: 30 % of the peak acceleration
- Normal limits used
- Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

(Memorized drive)

** Test started March 2, 2006 08:33:21
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
- Control amplitude: 1.0215 G
- Output voltage: 0.0704199 Volts peak

Accelerometer calibration details:
- Ch1: 104.4 mV/G  (75954, 8/07/05)
- Ch2: 103.9 mV/G  (53972, 7/1/06)
- Ch3: 102.1 mV/G  (57970, 10/26/06)
- Ch4: 102.3 mV/G  (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on March 2, 2006 08:33:13
MJO# 300814 Vicor VI-810-423B - Test# 22 Axis: Z Shock 1G 20ms - Stop Button Pressed

**Test Profile:**
- 20 ms Half Sine Pulse with amplitude 1 G (Positive)
- Pre-pulse amplitude: 10 % of the peak acceleration
- Post-pulse amplitude: 30 % of the peak acceleration
- Normal limits used
- Control channels: Control

**Test level schedule:**

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 % (Memorized drive)</td>
</tr>
</tbody>
</table>

**** Test started March 2, 2006 08:31:54
** Current level: 1, running at 100 % for 0 of 1 pulses

**Measurements:**
- Control amplitude: 1.04841 G
- Output voltage: 0.0775076 Volts peak

**Accelerometer calibration details:**
- Ch1: 104.4 mV/G (75954, 8/07/05)
- Ch2: 103.9 mV/G (53972, 7/1/06)
- Ch3: 102.1 mV/G (57970, 10/26/06)
- Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on March 2, 2006 08:36:20

MJO# 300814  Vicor VI-810-423B - Test# 23  Axis: Z  Shock 2G 20ms

Stop Button Pressed

Test Profile:
- 20 ms Half Sine Pulse with amplitude 2 G (Negative)
- Pre-pulse amplitude: 10 % of the peak acceleration
- Post-pulse amplitude: 30 % of the peak acceleration
- Normal limits used
- Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 % (Memorized drive)</td>
</tr>
</tbody>
</table>

** Test started March 2, 2006 08:36:05
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
- Control amplitude: 2.09725 G
- Output voltage: 0.165604 Volts peak

Accelerometer calibration details:
- Ch1: 104.4 mV/G  (75954, 8/07/05)
- Ch2: 103.9 mV/G  (53972, 7/1/06)
- Ch3: 102.1 mV/G  (57970, 10/26/06)
- Ch4: 102.3 mV/G  (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on March 2, 2006 08:35:47
MJO# 300814  Vicor  VI-810-423B - Test# 23  Axis: Z  Shock 2G 20ms -

Stop Button Pressed

Test Profile:
20 ms Half Sine Pulse with amplitude 2 G (Positive)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

(Memorized drive)

** Test started March 2, 2006 08:34:23
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 2.02144 G
Output voltage: 0.169957 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G  (75954, 8/07/05)
Ch2: 103.9 mV/G  (53972, 7/1/06)
Ch3: 102.1 mV/G  (57970, 10/26/06)
Ch4: 102.3 mV/G  (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on March 2, 2006 08:41:07
MJO# 300814 Vicor VI-810-423B - Test# 24 Axis: Z Shock 5G 50ms

Stop Button Pressed

**Test Profile:**
- 50 ms Half Sine Pulse with amplitude 5 G (Negative)
- Pre-pulse amplitude: 10 % of the peak acceleration
- Post-pulse amplitude: 30 % of the peak acceleration
- Normal limits used
- Control channels: Control

**Test level schedule:**

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 % (Memorized drive)</td>
</tr>
</tbody>
</table>

**Test started March 2, 2006 08:40:48**
**Current level: 1, running at 100 % for 0 of 1 pulses**

**Measurements:**
- Control amplitude: 6.35263 G
- Output voltage: 1.37596 Volts peak

**Accelerometer calibration details:**
- Ch1: 104.4 mV/G (75954, 8/07/05)
- Ch2: 103.9 mV/G (53972, 7/1/06)
- Ch3: 102.1 mV/G (57970, 10/26/06)
- Ch4: 102.3 mV/G (57976, 10/26/06)
Vibration and Shock Test Data

Data stored on March 2, 2006 08:40:41
MJO# 300814  Vicor  VI-810-423B - Test# 24  Axis: Z  Shock 5G 50ms -
Stop Button Pressed

Test Profile:
50 ms Half Sine Pulse with amplitude 5 G (Positive)
Pre-pulse amplitude: 10 % of the peak acceleration
Post-pulse amplitude: 30 % of the peak acceleration
Normal limits used
Control channels: Control

Test level schedule:

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 %</td>
</tr>
</tbody>
</table>

** Test started March 2, 2006 08:38:58
** Current level: 1, running at 100 % for 0 of 1 pulses

Measurements:
Control amplitude: 5.02076 G
Output voltage: 1.28512 Volts peak

Accelerometer calibration details:
Ch1: 104.4 mV/G  (75954, 8/07/05)
Ch2: 103.9 mV/G  (53972, 7/1/06)
Ch3: 102.1 mV/G  (57970, 10/26/06)
Ch4: 102.3 mV/G  (57976, 10/26/06)
Appendix C

Notices of Deviation
NOTICE OF DEVIATION

Customer Name: Vicor Corporation
N/O #: 300814-05E
NOD #: D-1
CPAR #: N/A
P.O. #: 1884328EV

Test Name: Random Vibration
Unit(s) Under Test: VI-2T3-CU
Specification: EN 50155
Revision: -
Date: 2001

Notification Made To: Ed Mejia
Notification Date: 2/20/06
Notification Made by: Jon Arseneault
Notified Via: Witness

Requirements (Reference paragraph or section of specification):
Paragraph 10.2.11
5 Hz to 150 Hz @ 5 Grms
5 hours/axis
3 axes

Description of Deviation:
Test #5 in the X-axis was aborted at 36 minutes, 10 seconds. It was noted that the spanners on the piston had loosened during vibration.

Disposition/Comments/Recommendations:
The spanners were re-tightened and testing continued.

CAUSE OF DEVIATION

<table>
<thead>
<tr>
<th>Code</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Employee Error</td>
</tr>
<tr>
<td>2</td>
<td>Test Equipment Problem</td>
</tr>
<tr>
<td>3</td>
<td>Customer Item Problem</td>
</tr>
<tr>
<td>4</td>
<td>Weather</td>
</tr>
<tr>
<td>5</td>
<td>Power Failure</td>
</tr>
<tr>
<td>6</td>
<td>Equipment Limitations</td>
</tr>
<tr>
<td>7</td>
<td>Other</td>
</tr>
</tbody>
</table>

Tracking Code: 2

Client Test Witness (if applicable) Date: 3/14/2006
Project Manager Date: 3/15/2005
Quality Representative Date: 

Government QAR (if applicable) Date:
NOTICE OF DEVIATION

Note: It is the client's responsibility to analyze and disposition deviations on client test programs.

<table>
<thead>
<tr>
<th>Customer Name</th>
<th>VICOR Corporation</th>
</tr>
</thead>
<tbody>
<tr>
<td>M/O #</td>
<td>300814-05E</td>
</tr>
<tr>
<td>N/O #</td>
<td>D-2</td>
</tr>
<tr>
<td>CPAR #</td>
<td>N/A</td>
</tr>
<tr>
<td>P.O. #</td>
<td>158432SEV</td>
</tr>
<tr>
<td>Test Name</td>
<td>Random Vibration</td>
</tr>
<tr>
<td>Unit(s) Under Test</td>
<td>VI-2T3-CU</td>
</tr>
<tr>
<td>Specification</td>
<td>EN 50155</td>
</tr>
<tr>
<td>Revision</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>2001</td>
</tr>
<tr>
<td>Notification Made To</td>
<td>Ed Mejia</td>
</tr>
<tr>
<td>Notification Date</td>
<td>2/20/06</td>
</tr>
<tr>
<td>Notification Made by</td>
<td>Jon Arseneault</td>
</tr>
<tr>
<td>Notified Via</td>
<td>Witness</td>
</tr>
</tbody>
</table>

Requirements (Reference paragraph or section of specification):
Paragraph 10.2.11
5 Hz to 150 Hz @ 5 Grms
5 hours/axis
3 axes

Description of Deviation:
Test #6 in the X-axis was aborted at 3 hours, 38 minutes, 50 seconds. Two of the flange bolts on one side of the piston had broken, causing hydraulic oil to spray from the pit.

Disposition/Comments/Recommendations:
The bolts were replaced and testing continued.

Client Test Witness (if applicable) | Date
-----------------------------------|--------

Project Manager | Date
----------------|--------

Quality Representative | Date
-----------------------|--------

Government QAR (if applicable) | Date
--------------------------------|--------

CAUSE OF DEVIATION | Code
-------------------|-----
Employee Error     | 1    |
Test Equipment Problem | 2   |
Customer Item Problem | 3   |
Weather             | 4    |
Power Failure       | 5    |
Equipment Limitations | 6   |
Other               | 7    |

TRACKING CODE: 2

C-3 of 68
NOTICE OF DEVIATION

Customer Name: Vicor Corporation
MOC #: 300814-05E
NCD #: D-3
CPAR #: N/A
P.O. #: 1584328EV

Test Name: Random Vibration
Unit(s) Under Test: VI-810-4238s
Specification: EN 50155
Revision: -
Date: 2001

Notification Made To: Ed Mejia
Notification Date: 2/22/06
Notification Made by: Jon Arsenault
Notified Via: Witness

Requirements (Reference paragraph or section of specification):
Paragraph 10.2.11
5 Hz to 150 Hz @ 5 G rms
5 hours/axis
3 axes

Description of Deviation:
Test #13 in the X-axis was aborted at 3 hours, 54 minutes, 11 seconds. A hairline crack was found near a weld on one of the flanges on the piston, causing hydraulic oil to spray from the pit.

Disposition/Comments/Recommendations:
The flange was re-welded to cover the crack and testing continued.

CAUSE OF DEVIATION

<table>
<thead>
<tr>
<th>Cause</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee Error</td>
<td>1</td>
</tr>
<tr>
<td>Test Equipment Problem</td>
<td>2</td>
</tr>
<tr>
<td>Customer Item Problem</td>
<td>3</td>
</tr>
<tr>
<td>Weather</td>
<td>4</td>
</tr>
<tr>
<td>Power Failure</td>
<td>5</td>
</tr>
<tr>
<td>Equipment Limitations</td>
<td>6</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
</tr>
</tbody>
</table>

Client Test Witness (if applicable)
Date: 3/13/2006
Project Manager
Date: 3/15/2006
Quality Representative
Date: 3/15/2006

Government QAR (if applicable)
Date:
NOTICE OF DEVIATION

Note: It is the client's responsibility to analyze and disposition deviations on client test programs.

<table>
<thead>
<tr>
<th>Customer Name</th>
<th>Vicor Corporation</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAO #:</td>
<td>300814-05E</td>
</tr>
<tr>
<td>NCD #:</td>
<td>D-4</td>
</tr>
<tr>
<td>CPAR #:</td>
<td>N/A</td>
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<tr>
<td>P.O. #:</td>
<td>1584323E0V</td>
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<tr>
<td>Test Name</td>
<td>Random Vibration</td>
</tr>
<tr>
<td>Unit(s) Under Test</td>
<td>VI-810-423B</td>
</tr>
<tr>
<td>Specification:</td>
<td>EN 50156</td>
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<tr>
<td>Revision:</td>
<td>-</td>
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<tr>
<td>Date:</td>
<td>2001</td>
</tr>
</tbody>
</table>

Notification Made To: Ed Mejia
Notification Date: 2/24/06
Notification Made by: Jon Arsenault
Notified Via: Witness

Requirements (Reference paragraph or section of specification):
Paragraph 10.2.11
5 Hz to 150 Hz @ 5 Gms
5 hours/axis
3 axes

Description of Deviation:
Test #21 in the Z-axis was aborted at 8 minutes, 36 seconds. Two of the flange bolts on one side of the piston had broken, causing hydraulic oil to spray from the pt.

Disposition/Comments/Recommendations:
Testing at this point had been split banded. The range from 20 Hz to 150 Hz was completed on the Electro-dynamic shaker in Boxboro (T-4000). The range from 5 Hz to 20 Hz was completed on the Electro-hydraulic shaker.

CAUSE OF DEVIATION        Code
Employee Error             1
Test Equipment Problem     2
Customer Item Problem      3
Weather                    4
Power Failure              5
Equipment Limitations      6
Other                      7

Client Test Witness (if applicable) Date

Project Manager Date

Quality Representative Date

Government QAR (if applicable) Date