



Product Service

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Technical Report No.

713019650Rev.1

dated
2013-02-27

Client: Pentair Equipment Protection
Schroff GmbH
Langenalber Straße 96 - 100

75334 Straubenhardt

Manufacturer and / or
location of manufacturing: see client

Unit/s under test (UUT): Subrack europac Pro R (Rugged) 6 U 84 HP235D

Test specification: Resonance search and resonance dwell in accordance to IEC 61587-1
Vibration and shock test in accordance to IEC 61587-1 DL3

Test scope: Verification of suitability for intended application according to the
under position 3 detailed test specification.

Test result: The unit under test was not opened. The visual inspection showed no
deficiencies or damages (see notes position 5 - test sequence).
A detailed test will be carried out by the customer at his location.

This technical report may only be quoted in full. Any use for advertising purposes must be granted in writing. This report is the result of a single examination of the object in question and is not generally applicable evaluation of the quality of other products in regular production.

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Editor: Norbert Drescher

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Integrated documentation

none

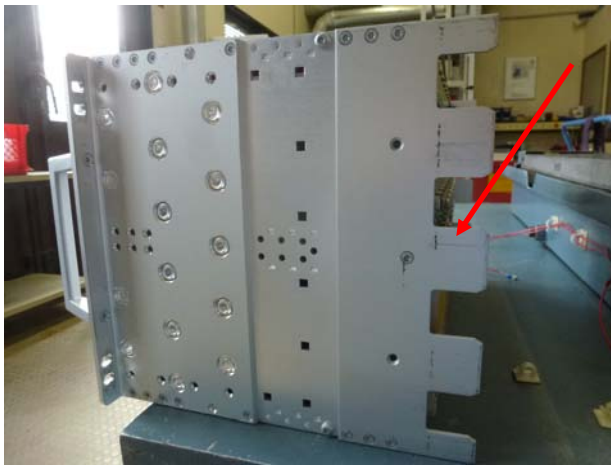
1 Unit/s under test (UUT)

The unit under test was a subrack:

Type: europac Pro R (Rugged) 6 U 84 HP235D – modified with additionally holder

Test set for subrack after the series IEC 60297, development with 14 units of the width 4 HP with about 500g, evenly distributed, remaining gaps with blanking panels closed

UUT modified with additionally holder



2 Order

2.1 Date of order, initial of client

Company Pentair Equipment Protection Schroff GmbH ordered from TÜV SÜD Product Service GmbH with order sheet dated 2013-02-11, order No. 33004018/OP to test the a.m. UUT.

2.2 Receipt of UUT

The sample was delivered by the client on 2013-02-21.

2.3 Reconsignment of UUT

The sample was taken by the client on 2013-02-22.



3 Test specification

3.1 Vibration test, sine

3.1.1 Resonance search

Frequency range: 10 Hz - 150 Hz
Amplitude/Acceleration: 10 Hz; 0,2 g
150 Hz; 0,2 g
Sweep rate: 1 Oct./min
Test duration: 1 sweep / axis, in 3 axes

3.1.2 Resonance dwell

Frequency range: resonance frequencies determined with 3.1.1
Acceleration in x-axis: 0,20 g
Acceleration in y-axis: 0,21 g
Acceleration in z-axis: omitted
Test duration: 10 min

3.1.3 Vibration test, endurance

Frequency range: 5 Hz - 200 Hz
Amplitude/Acceleration: 5 Hz; 10 mm
8,63 Hz; 3,0 g
200 Hz, 3,0 g
Sweep rate: 1 Oct./min
Test duration: 10 Cycles (20 Sweeps) / axis, in 3 axes

3.2 Shock test

Type of shock: half sine
Acceleration: 25 g
Shock duration: 18 ms
Number of shocks: 3 shocks each in both directions on three mutually perpendicular axes



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4 Test equipment

Equipment	Type	Ser.-No.	Manufacturer	Calibrated to
Shaker Vibration control system	SA 30-R 16A V Win	n.A.	Unholtz-Dickie Unholtz-Dickie	10/2013
Signal conditioner	133	AE 48	Endevco	10/2013
Signal conditioner	133	BR 09	Endevco	10/2013
Signal conditioner	133	AG 94	Endevco	11/2013
Accelerometer	4501 A	30324	Brüel & Kjaer	04/2013
Accelerometer	4501 A	30414	Brüel & Kjaer	04/2013
Accelerometer	4501 A	30329	Brüel & Kjaer	10/2013
Accelerometer	4501 A	30330	Brüel & Kjaer	04/2013
Accelerometer	4382	30556	Brüel & Kjaer	07/2013

The measuring equipment is calibrated regularly according to the calibration instructions of TÜV SÜD PRODUCT SERVICE GmbH. All calibrations are traced back to national standards.



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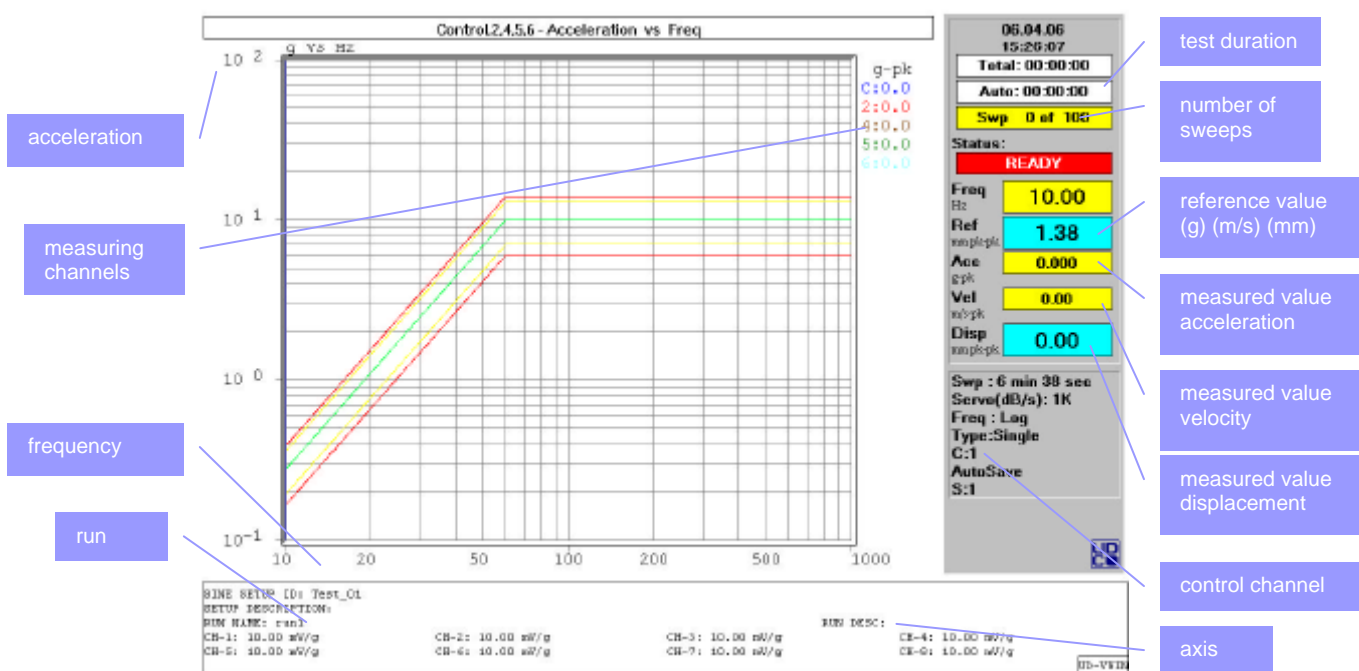
5 Test sequence

Test date: from 2013-02-21 to 2013-02-22

No.	Test	Run	Axis	Notes
1	Vibration, sine, resonance search	8-1	x	Chanel 3, front horizontal rail, top, center; Chanel 4, back horizontal rail, top, center; Chanel 5, right side wall, above; Chanel 6, backplane.
2	Vibration, sine, resonance dwell	8-2	x	
3	Vibration, sine, endurance	8-3	x	
4	Shocks	8-4	x	
5	Vibration, sine, resonance search	8-5	y	
6	Vibration, sine, resonance dwell	8-6	y	
7	Vibration, sine, endurance	8-7	y	
8	Shocks	8-8	y	
9	Vibration, sine, resonance search	8-9	z	no resonance in the range of 10 - 150 Hz.
10	Vibration, sine, resonance dwell		z	omitted
11	Vibration, sine, endurance	8-11	z	
12	Vibration, sine, resonance search	8-13	z	no resonance in the range of 10 - 150 Hz.
13	Shocks	8-12	z	

6 Legend of measuring diagrams

6.1 Vibration test sine



6.2 Resonance list

List of Resonances: Sweeping UP

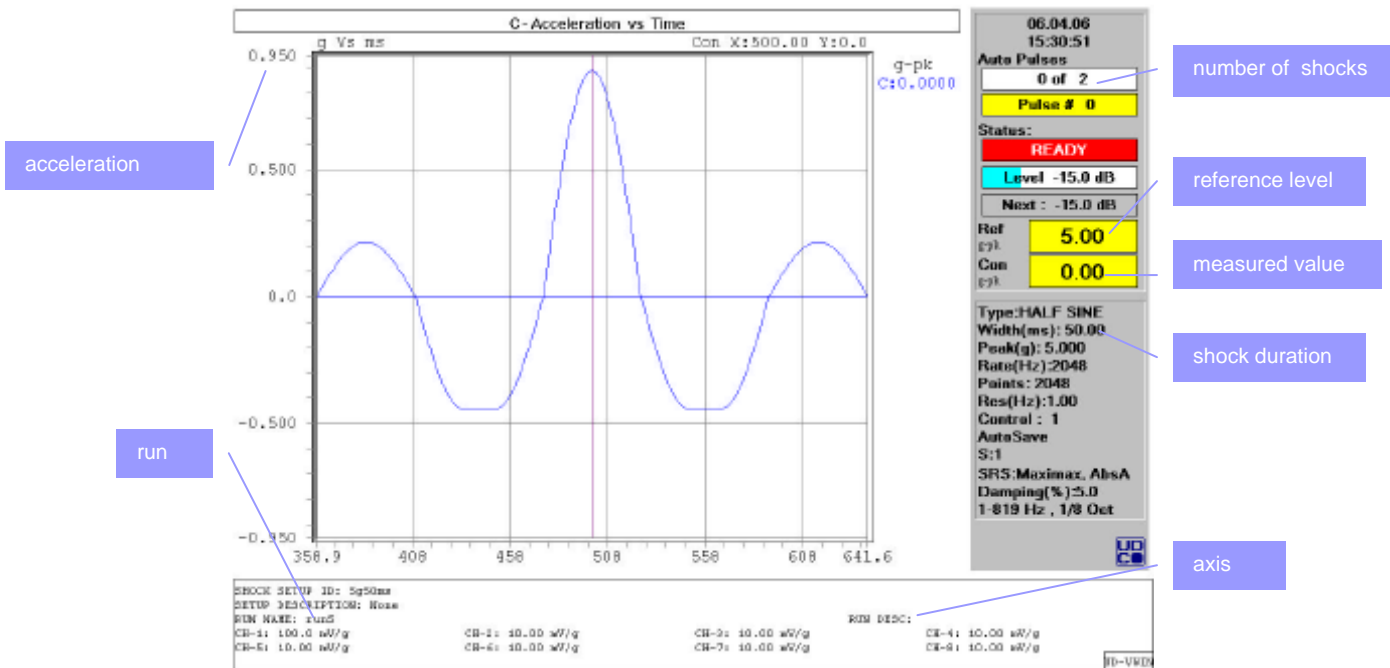
SINE SETUP ID:
 SETUP DESCRIPTION:
 RUN NAME: run1
 RUN DESC: Z-Achse
 Ratio Limit Entered(g/g): 2.00

Chan	Freq(Hz)	g/g	CON (g)	CH (g)	Q	Phase
2	135.983	18.05	0.50	9.0	8.70	-55.40
2	346.009	3.78	0.50	1.9	20.38	72.10
2	403.974	2.82	0.50	1.4	9.08	36.14

Annotations with blue boxes point to various elements:

- run: points to the "RUN NAME" field.
- axis: points to the "RUN DESC" field.
- reference advantage factor: points to the "Ratio Limit Entered" field.
- measuring channel: points to the "Chan" column header.
- frequency: points to the "Freq(Hz)" column header.
- advantage factor: points to the "g/g" column header.
- stimulation: points to the "CON (g)" column header.
- measured value: points to the "CH (g)" column header.

6.3 Shock test

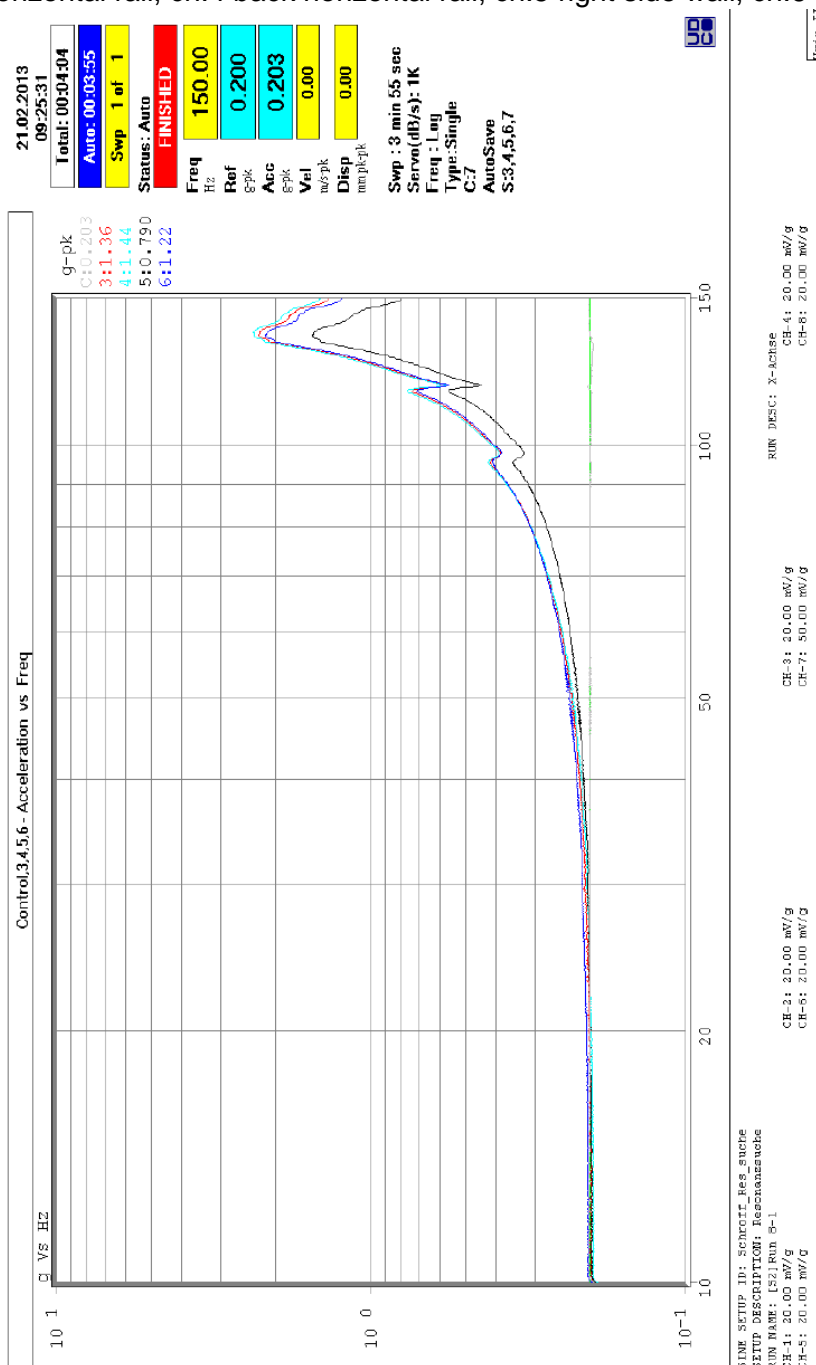


Note: Before applying the test shocks several reference shocks of a lower level (25%, 50%) were applied as equipment test. This explains the different number of shocks in the measuring diagrams.

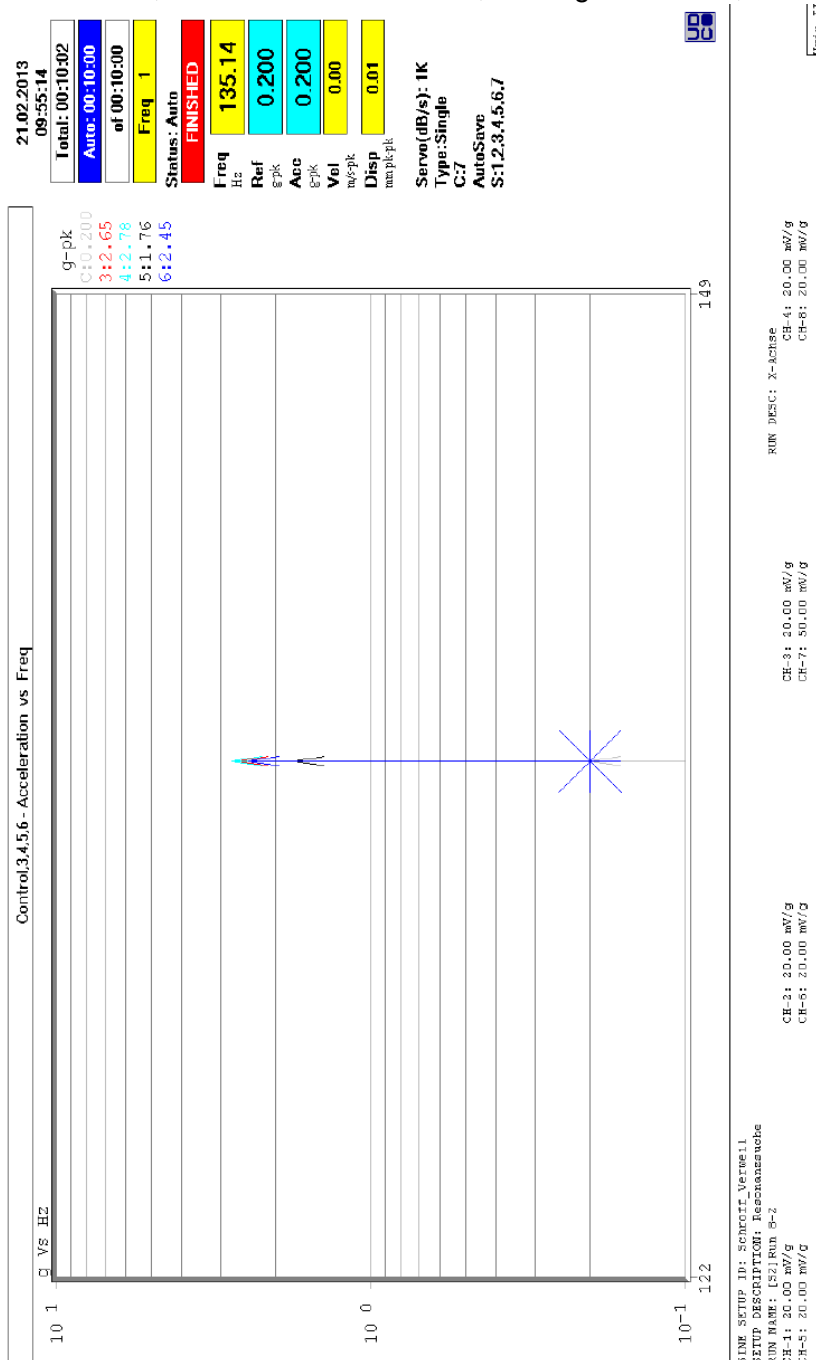
7 Test documentation

7.1 measuring diagrams of the vibration test, sine

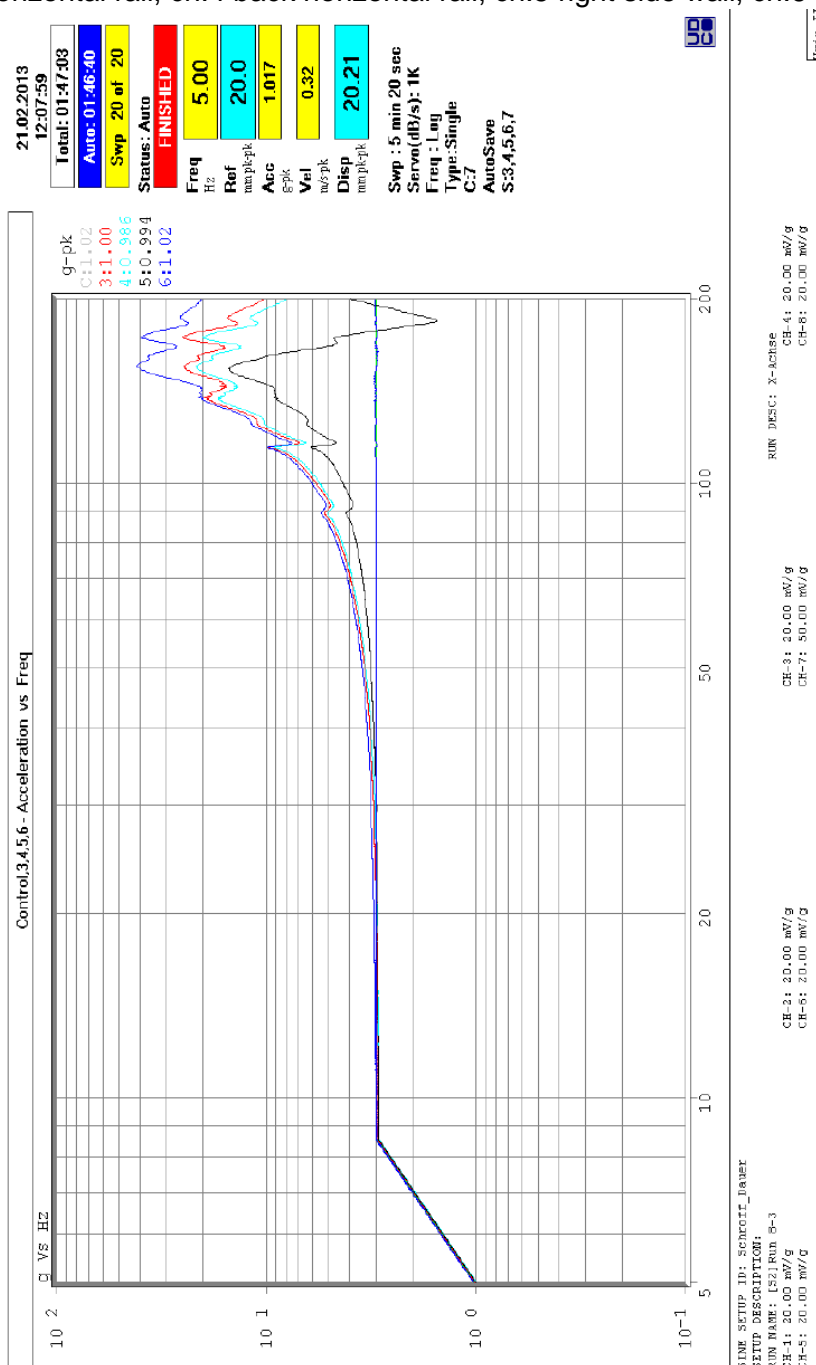
Run 8-1, x-axis, resonance search,
Ch.3 front horizontal rail, ch.4 back horizontal rail, ch.5 right side wall, ch.6 backplane



Run 8-2, x-axis, resonance dwell,
Ch.3 front horizontal rail, ch.4 back horizontal rail, ch.5 right side wall, ch.6 backplane



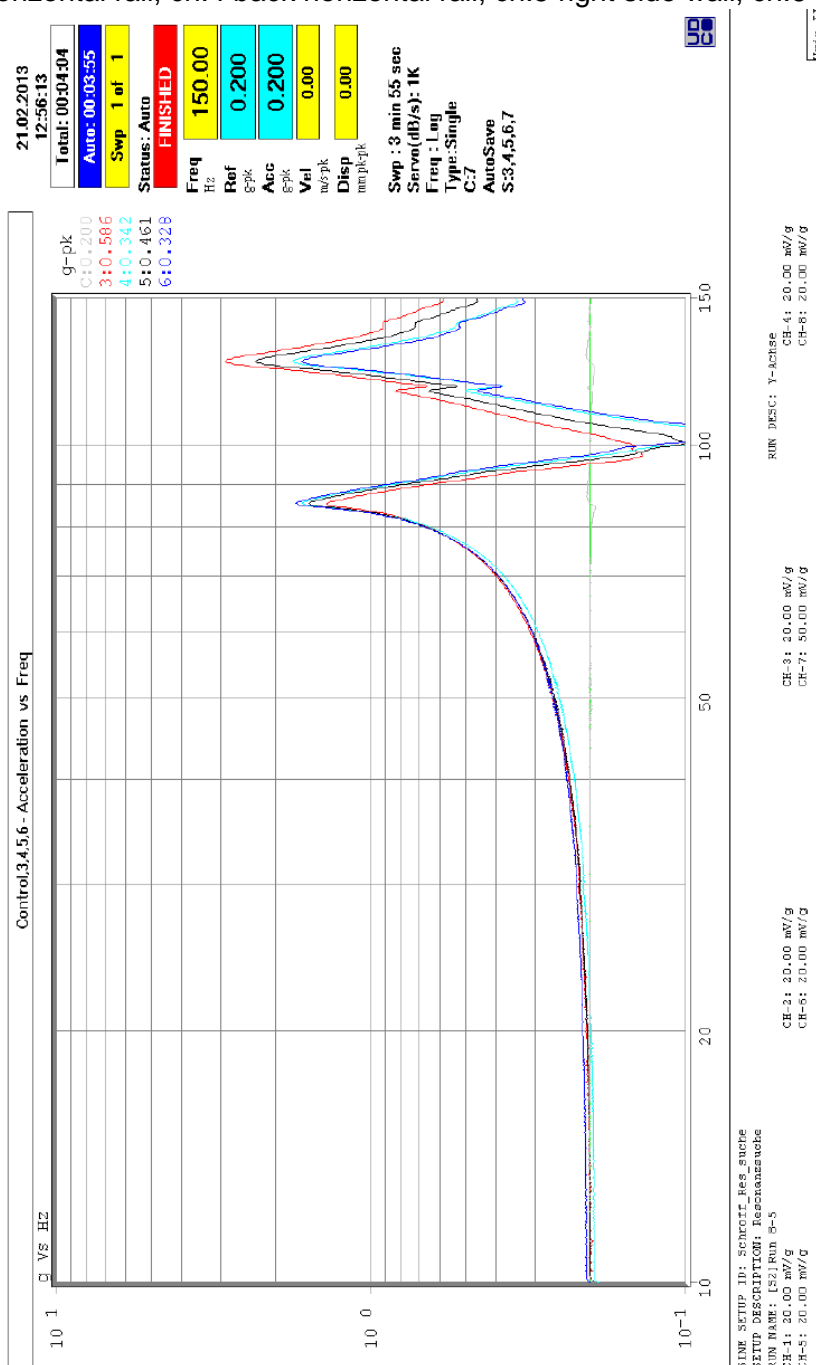
Run, 8-3 x-axis, endurance,
Ch.3 front horizontal rail, ch.4 back horizontal rail, ch.5 right side wall, ch.6 backplane





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Run 8-5, y-axis, resonance search, Ch.3 front horizontal rail, ch.4 back horizontal rail, ch.5 right side wall, ch.6 backplane



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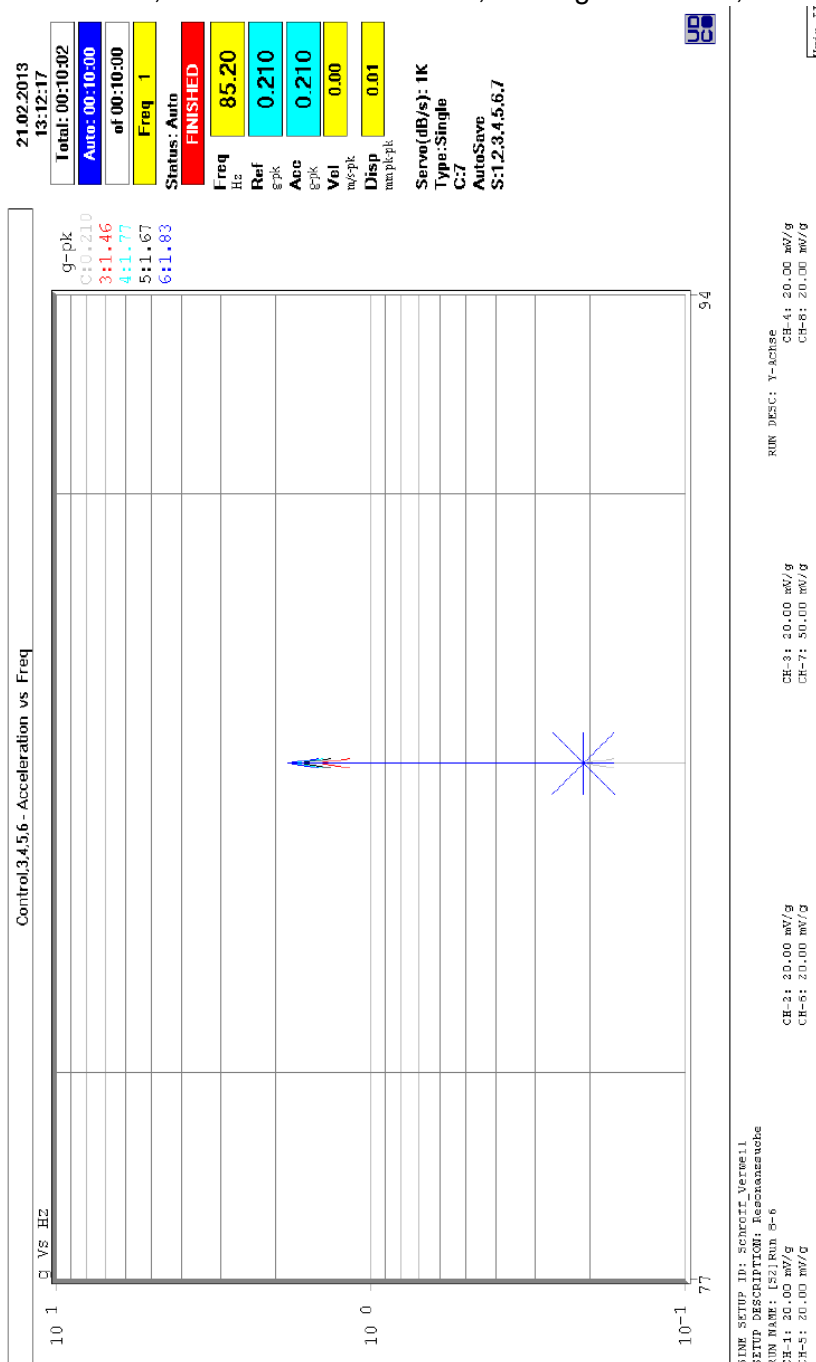
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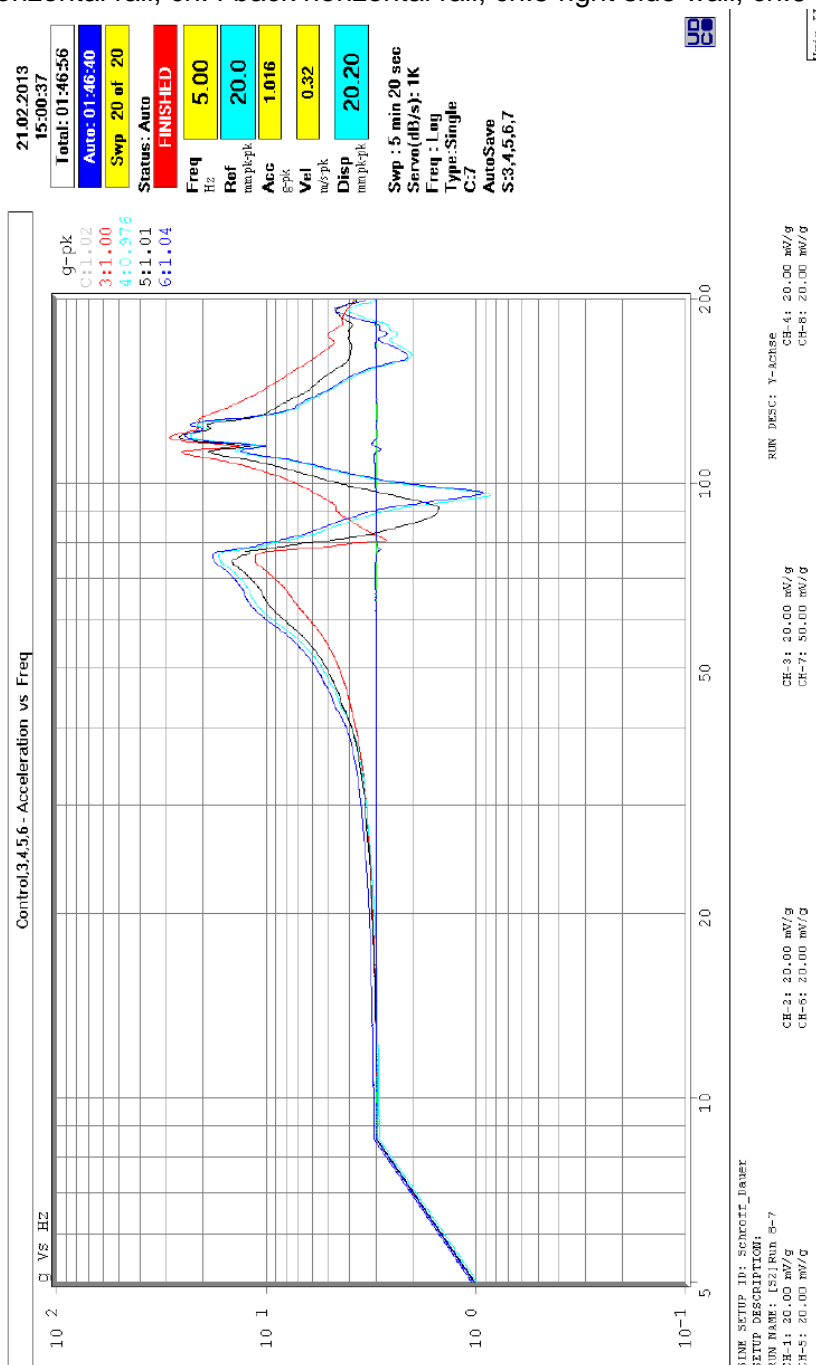
Run 8-6, y-axis, resonance dwell,
Ch.3 front horizontal rail, ch.4 back horizontal rail, ch.5 right side wall, ch.6 backplane





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Run 8-7, y-axis, endurance, Ch.3 front horizontal rail, ch.4 back horizontal rail, ch.5 right side wall, ch.6 backplane



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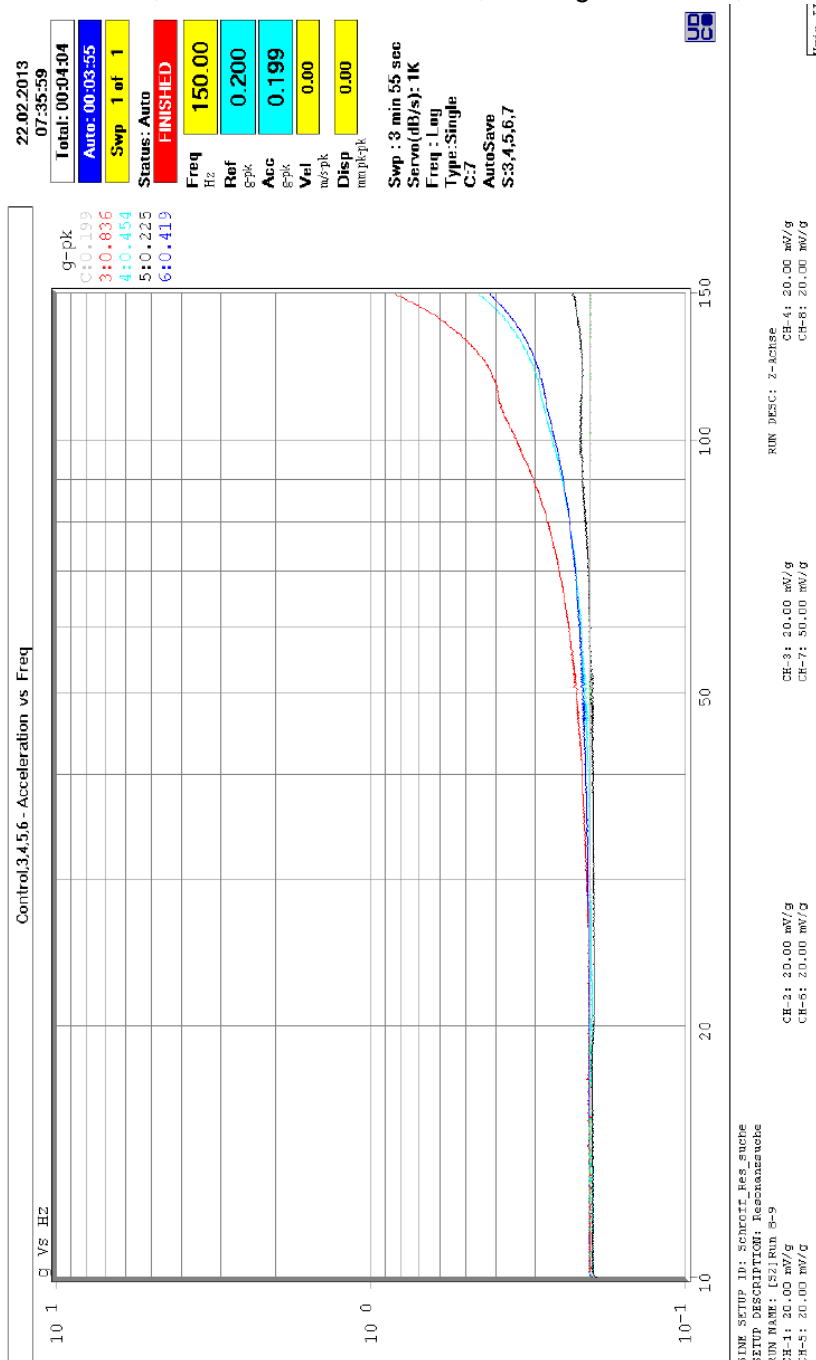
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Run 8-9, z-axis, resonance search, Ch.3 front horizontal rail, ch.4 back horizontal rail, ch.5 right side wall, ch.6 backplane



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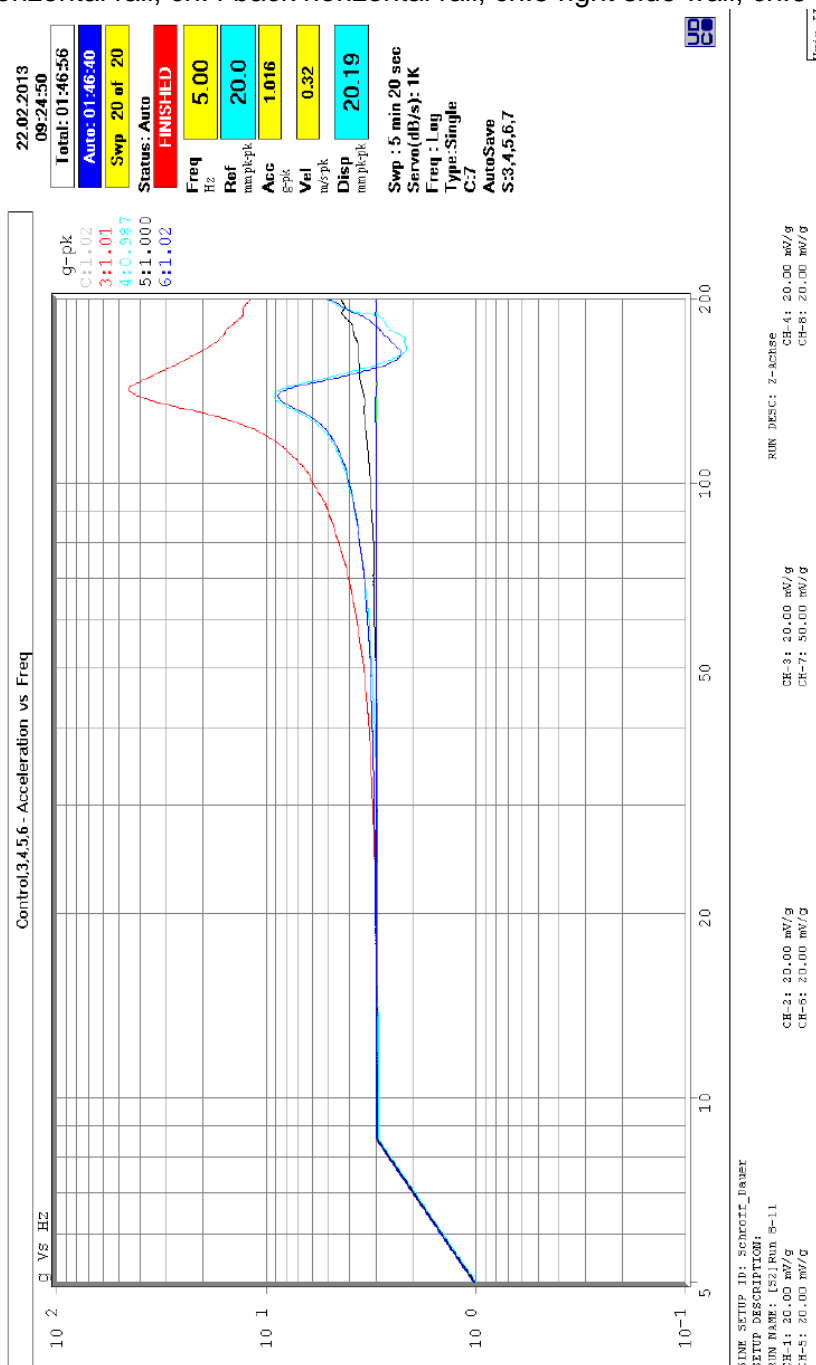


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Run 8-11, z-axis, endurance, Ch.3 front horizontal rail, ch.4 back horizontal rail, ch.5 right side wall, ch.6 backplane



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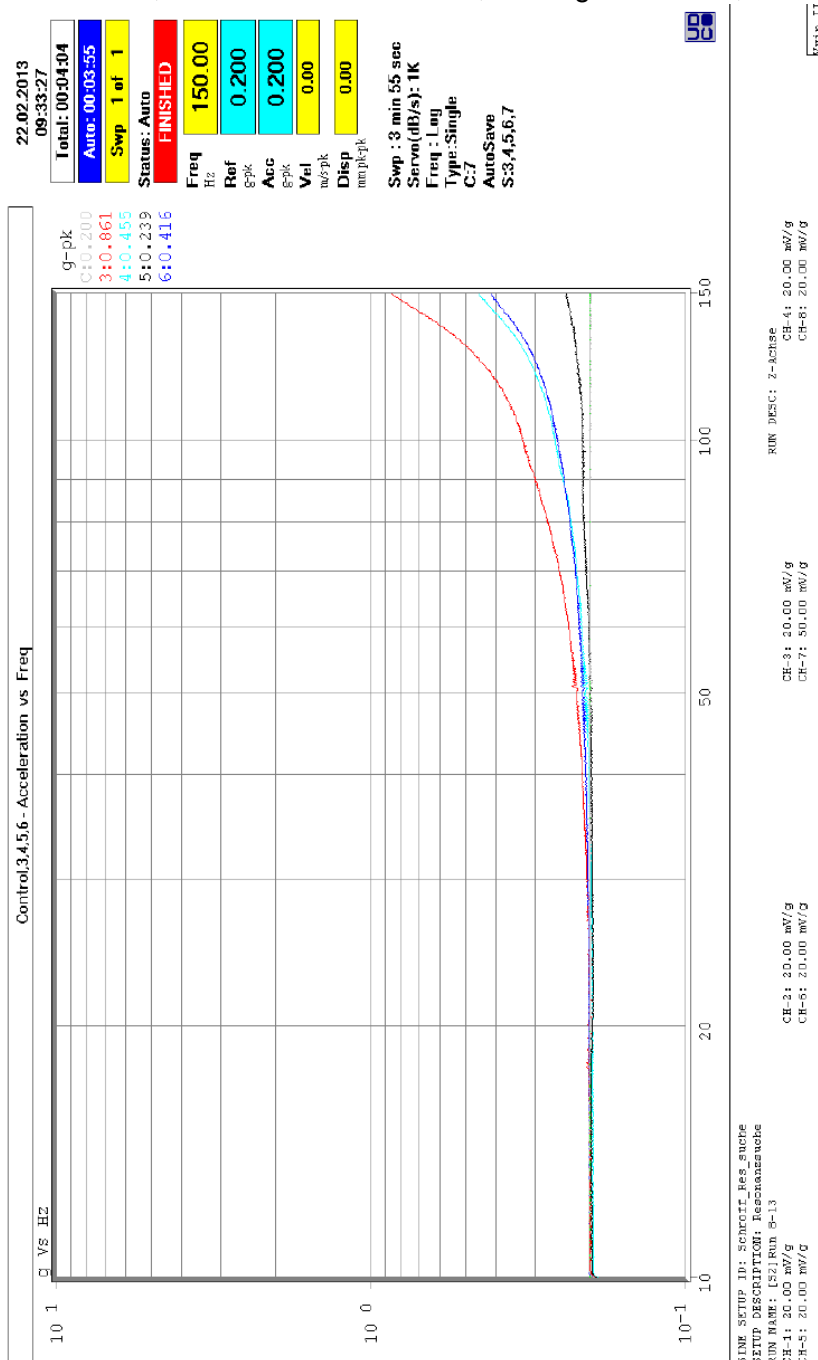


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Run 8-13, z-axis, resonance search after endurance, Ch.3 front horizontal rail, ch.4 back horizontal rail, ch.5 right side wall, ch.6 backplane



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7.2 resonance list

Run 8-1, x-axis, resonance search,
Ch.3 front horizontal rail, ch.4 back horizontal rail, ch.5 right side wall, ch.6 backplane

List of Resonances: Sweeping UP
SINE SETUP ID: Schroff_Res_suche
SETUP DESCRIPTION: Resonanzsuche
RUN NAME: [S2]Run 8-1
RUN DESC: X-Achse
Ratio Limit Entered(g/g): 2.00

Chan	Freq(Hz)	g/g	CON (g)	CH (g)	Q	Phase
3	135.142	11.30	0.20	2.3	8.43	-38.04
4	136.315	11.76	0.20	2.4	8.37	139.16
5	135.142	7.66	0.20	1.5	9.34	-37.20
6	135.142	10.84	0.20	2.2	8.70	142.85

Run 8-5, y-axis, resonance search,
Ch.3 front horizontal rail, ch.4 back horizontal rail, ch.5 right side wall, ch.6 backplane

List of Resonances: Sweeping UP
SINE SETUP ID: Schroff_Res_suche
SETUP DESCRIPTION: Resonanzsuche
RUN NAME: [S2]Run 8-5
RUN DESC: Y-Achse
Ratio Limit Entered(g/g): 2.00

Chan	Freq(Hz)	g/g	CON (g)	CH (g)	Q	Phase
3	85.175	6.97	0.20	1.4	19.18	-17.92
3	125.894	14.38	0.20	2.9	21.29	-39.01
4	85.322	8.28	0.20	1.7	19.79	156.63
4	126.112	8.76	0.20	1.8	21.33	140.89
5	85.175	7.90	0.20	1.6	19.11	159.86
5	125.894	11.51	0.20	2.3	20.55	141.68
6	85.322	8.63	0.20	1.7	19.79	-23.31
6	125.894	8.23	0.20	1.7	20.55	-36.72



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Run 8-9, z-axis, resonance search,
Ch.3 front horizontal rail, ch.4 back horizontal rail, ch.5 right side wall, ch.6 backplane

List of Resonances: Sweeping UP
SINE SETUP ID: Schroff_Res_suche
SETUP DESCRIPTION: Resonanzsuche
RUN NAME: [S2]Run 8-9
RUN DESC: Z-Achse
Ratio Limit Entered(g/g): 2.00

Chan	Freq(Hz)	g/g	CON (g)	CH (g)	Q	Phase
3	Not found					
4	Not found					
5	Not found					
6	Not found					

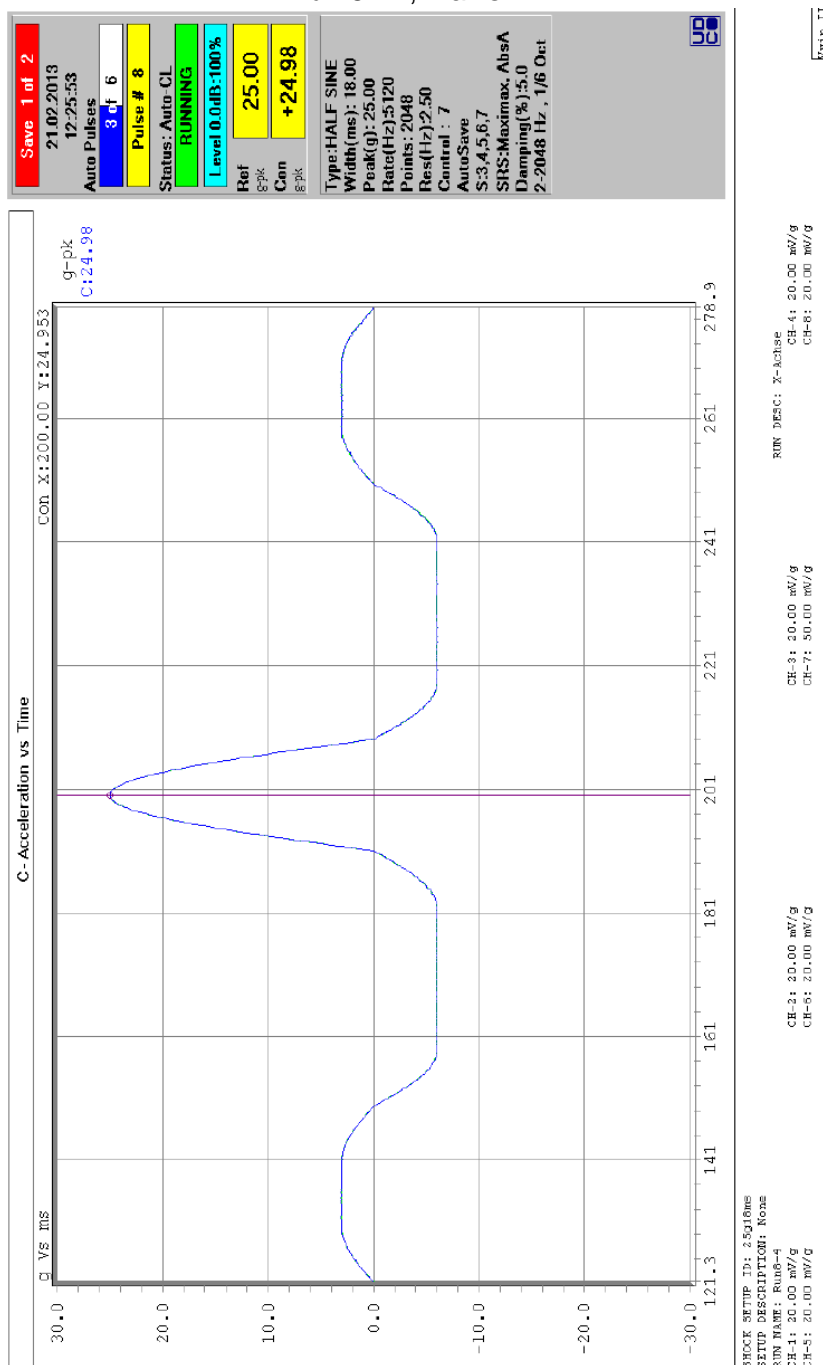
Run 8-13, z-axis, resonance search after endurance,
Ch.3 front horizontal rail, ch.4 back horizontal rail, ch.5 right side wall, ch.6 backplane

List of Resonances: Sweeping UP
SINE SETUP ID: Schroff_Res_suche
SETUP DESCRIPTION: Resonanzsuche
RUN NAME: [S2]Run 8-13
RUN DESC: Z-Achse
Ratio Limit Entered(g/g): 2.00

Chan	Freq(Hz)	g/g	CON (g)	CH (g)	Q	Phase
3	Not found					
4	Not found					
5	Not found					
6	Not found					

7.3 measuring diagrams of the shock test

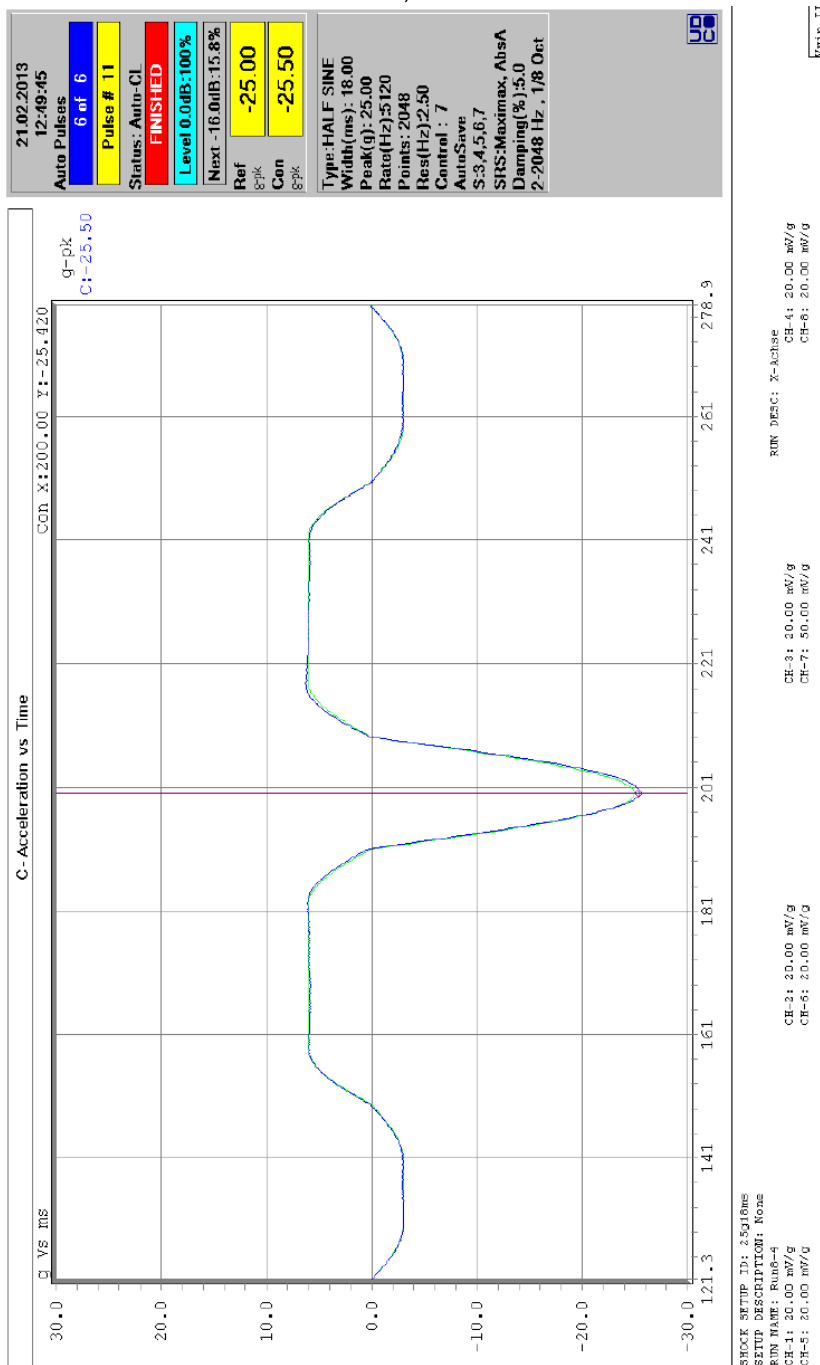
run 8-4+, x-axis





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run 8-4-, x-axis



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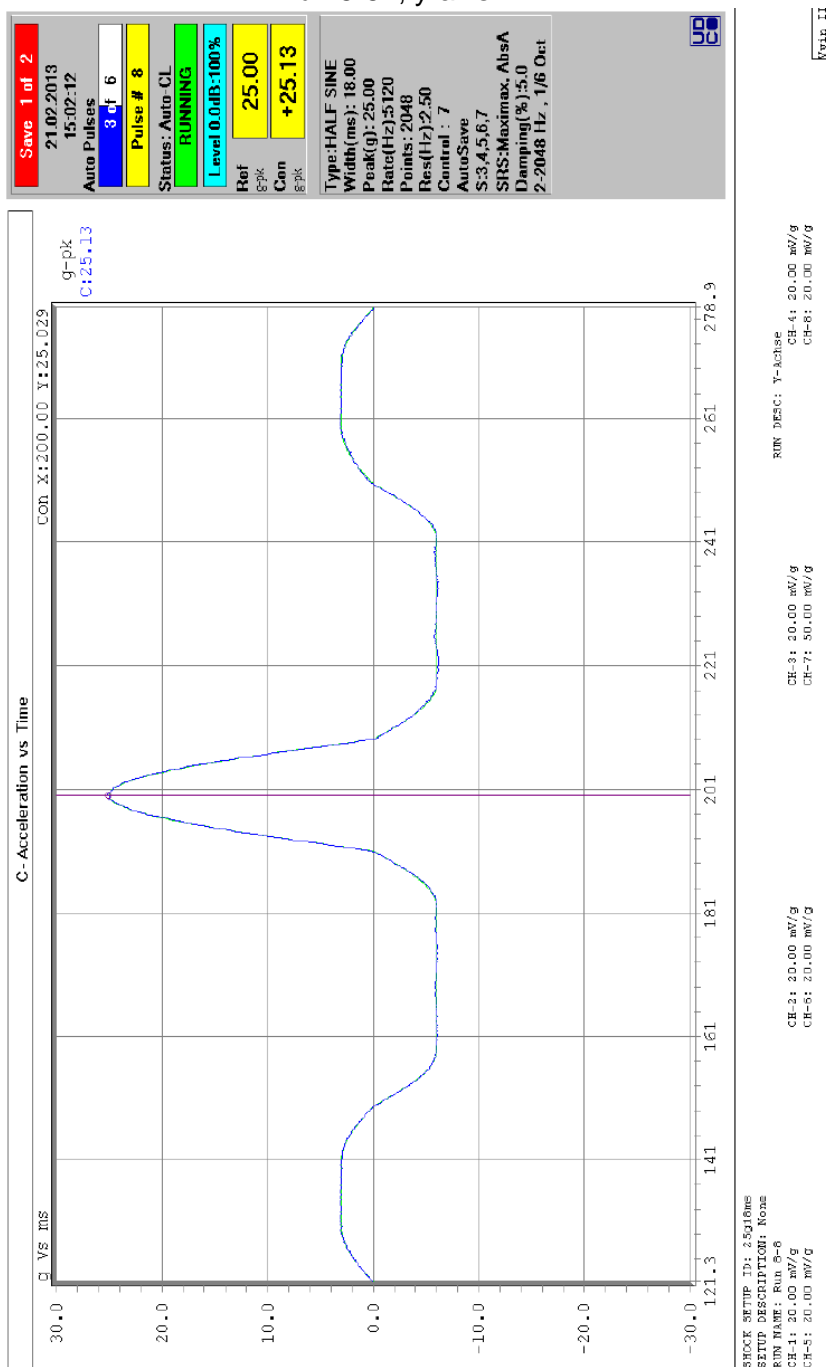
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run 8-8+, y-axis



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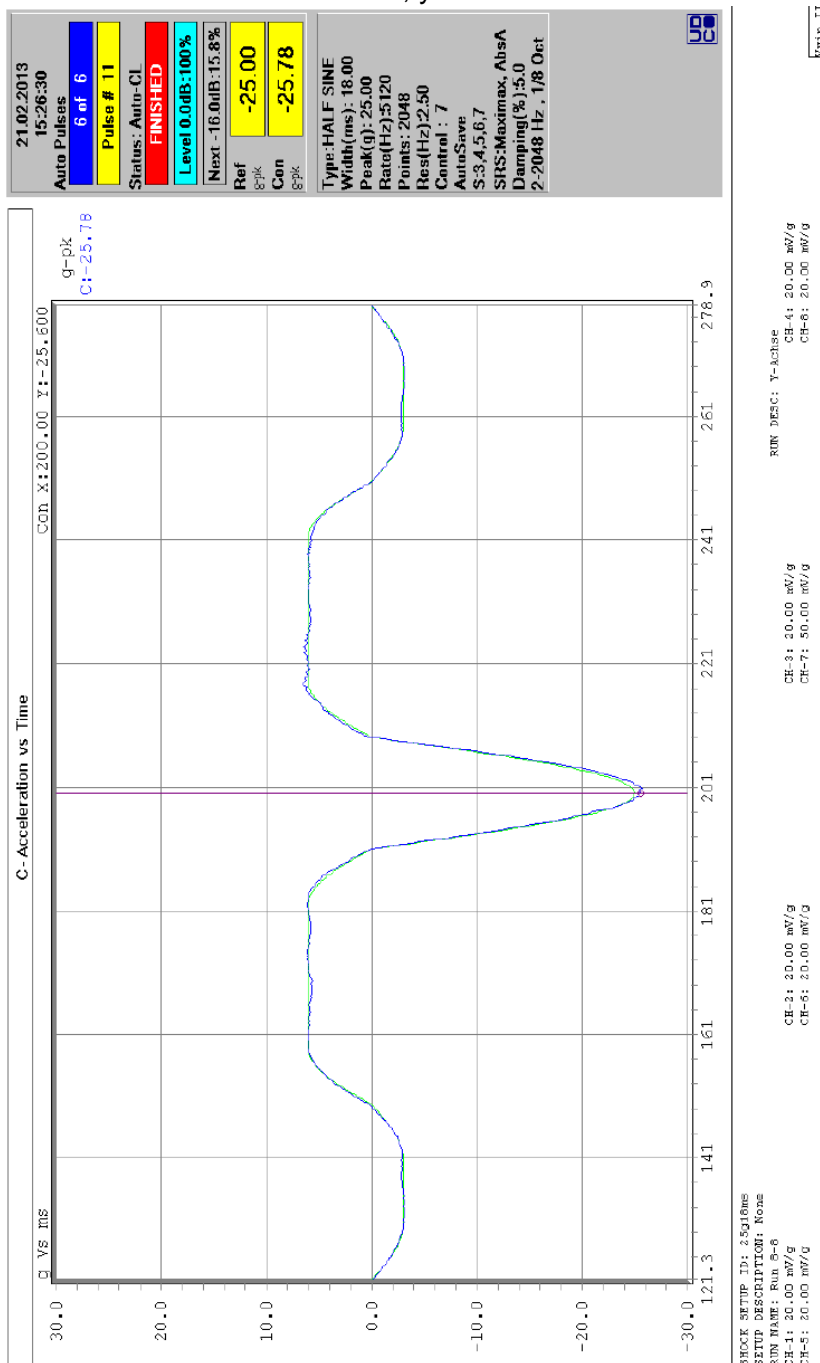
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run 8-8-, y-axis



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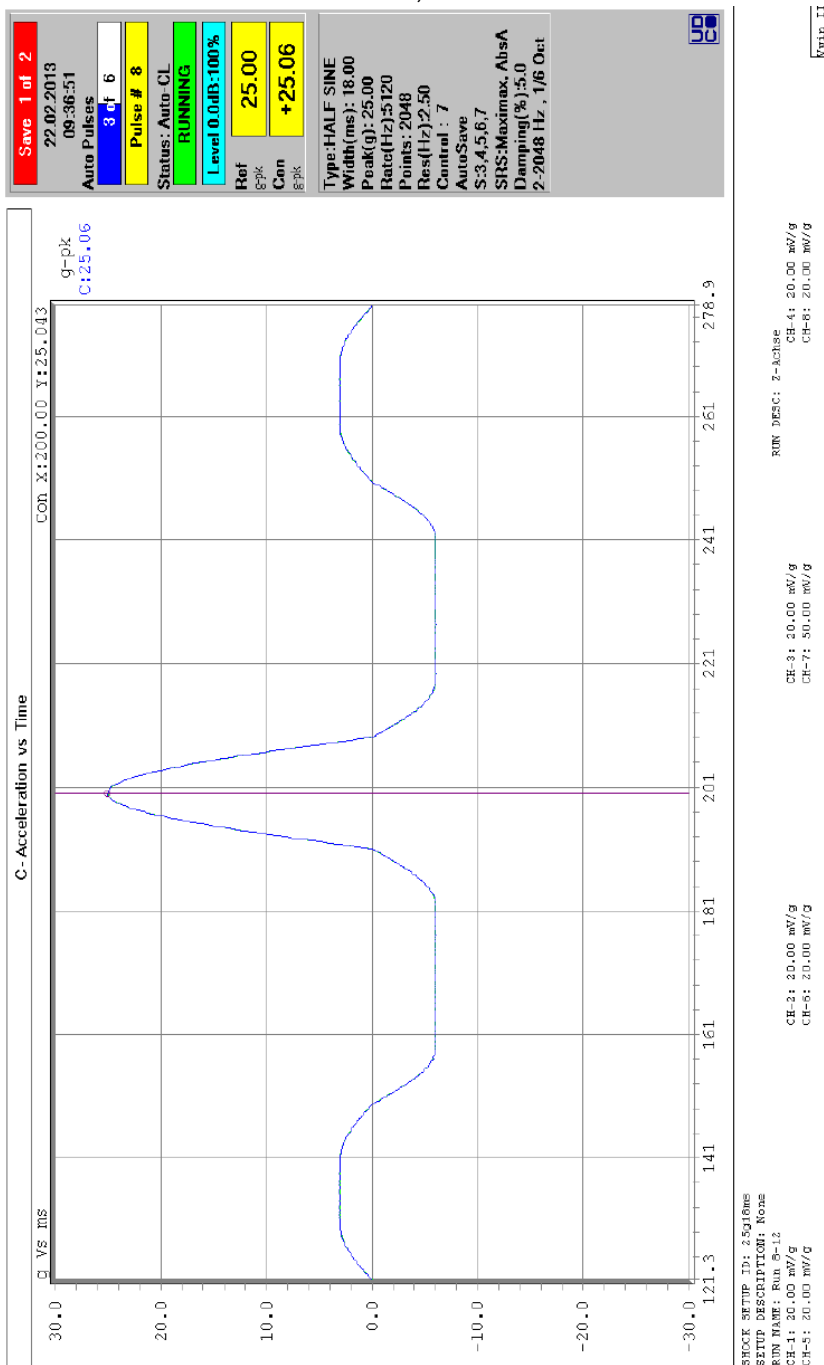
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run 8-12+, z-axis



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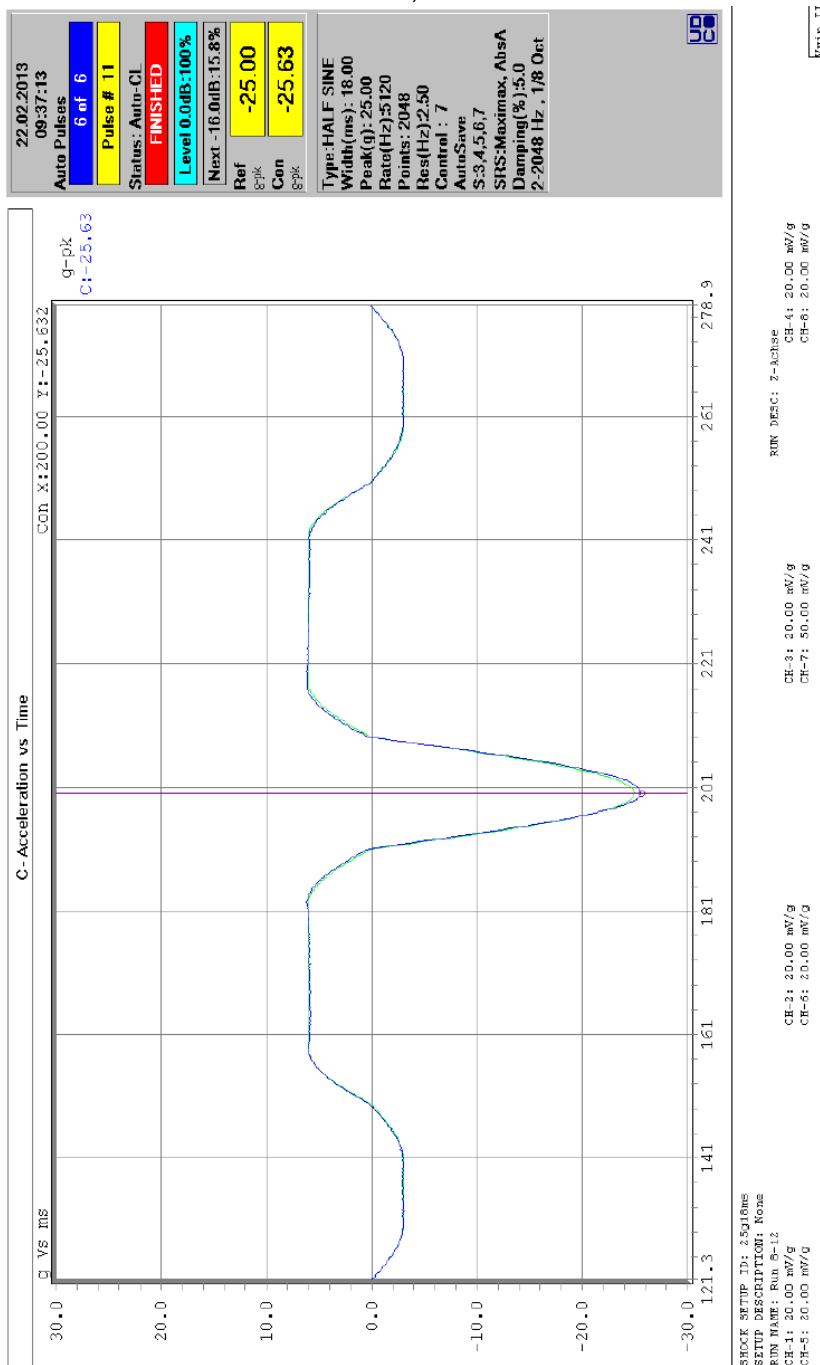


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run 8-12-, z-axis



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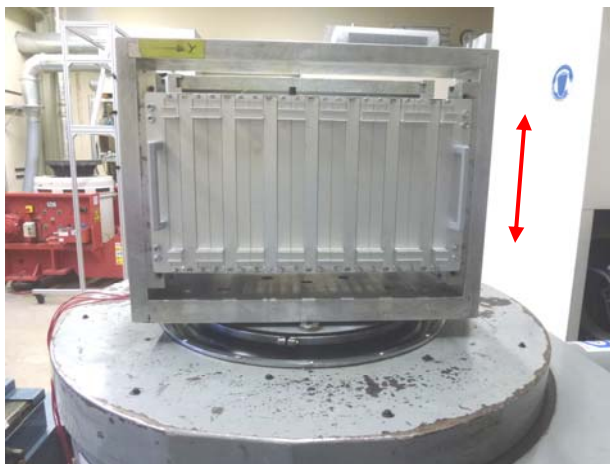
8 Photo documentation



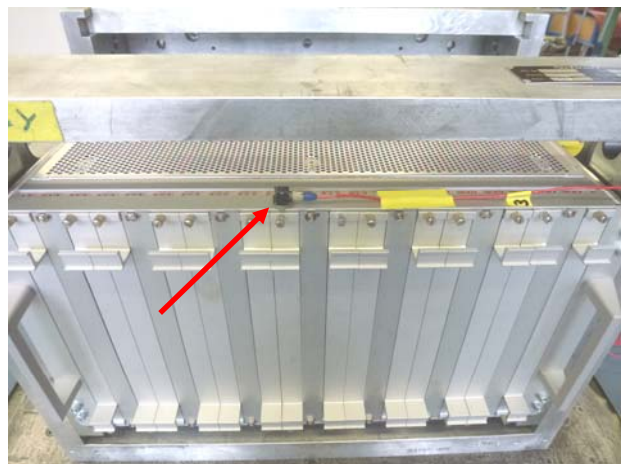
1: UUT in x-axis on slip-table



2: UUT in y-axis on slip-table



3: UUT in z-axis on head-expander



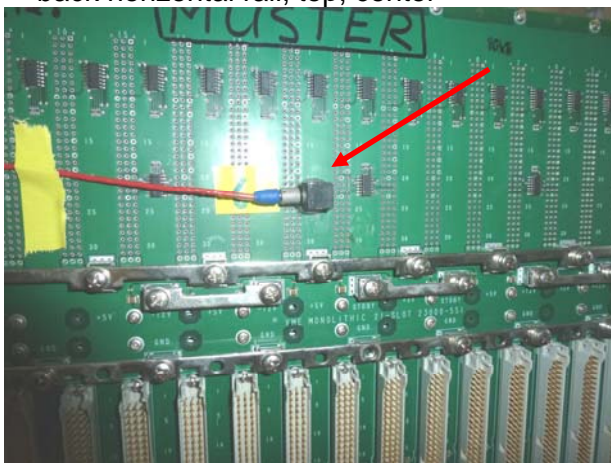
4: measuring point channel 3,
front horizontal rail, top, center



5: measuring point channel 4,
back horizontal rail, top, center



6: measuring point channel 5,
right side wall, above



7: measuring point channel 6, backplane
right side wall, above

Verified
Signature

Hari Mountogianakis
Dept. Vice-Manager

Edited
Signature

Norbert Drescher
Test Engineer