

Mechanical Test Report

Equipment under Test (EUT): **UPSI-IP-1 Series**
2 samples

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This document replaced test report MEC+BIC-19001-PR01-M01a.

Test date: June 26, until June 27, 2019

Issue date: July 24, 2019

Result: **Passed**

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Test Engineer



Signature

Reviewed by: Alexander Gerum
Test Engineer



Signature

The results in this report apply only to the tested sample(s).
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EUT : UPSI-IP-1 Series

2. Table of contents

	Page No.
1. Cover	1
2. Table of contents	2
3. Summary of standards and results	3
3.1. Project history	3
3.2. Classification of mechanical conditions	3
3.3. Test procedure	4
3.4. Summary of results	5
3.5. Table of used instruments	6
4. Equipment under test	7
4.1. System description	7
4.2. Environmental conditions	7
4.3. Test specification	8
5. Test results	9
5.1. Vibration sinusoidal, operating	9
5.2. Impact, operating	13
5.3. Initial measurement	20
5.4. Recovery time /Final measurements	20
6. EUT-Photos	21

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3. Summary of standards and results

The system was tested according to the applicable standards as referenced below.

3.1. Project history

Edition	Date	Pages affected	Revision
M01	July 11, 2019	-	First issue
M01a	July 12, 2019	7	Name UPSI-2406IP-12U -> UPSI-IP-1 Series Type UPSI-2406IP-12U + BP-LFP-1325 -> UPSI-2406IP-12U
M01b	July 24, 2019	3	Date format project history

In case of a revision the edition concerned is invalid. The original has to be returned and all copies have to be deleted.

3.2. Classification of mechanical conditions

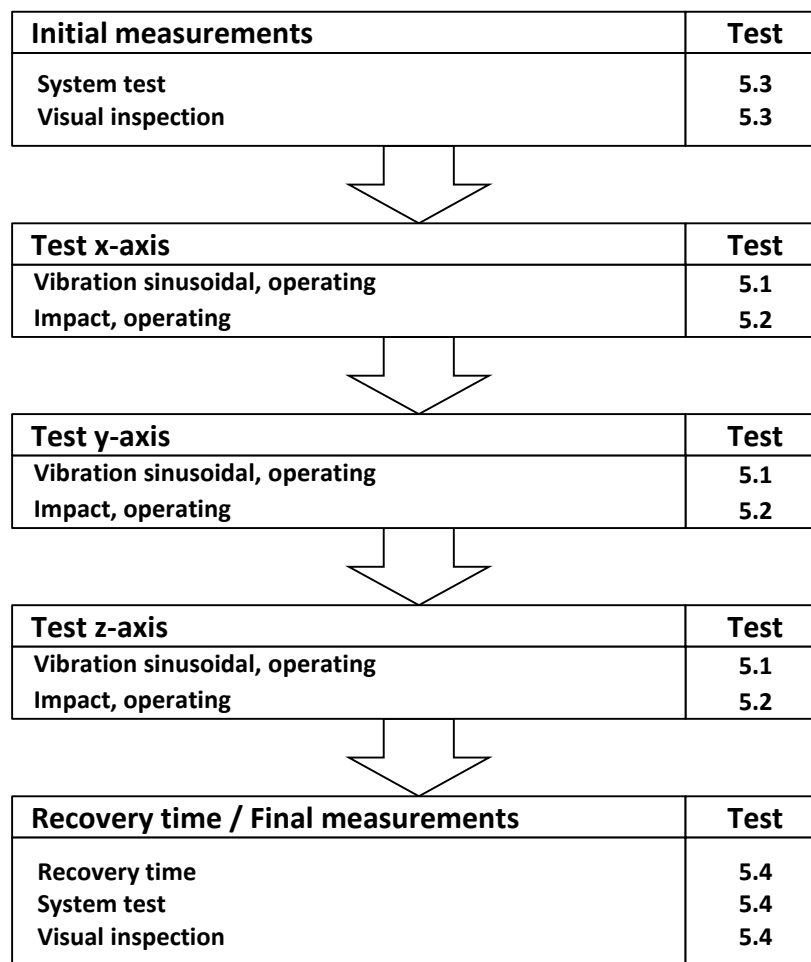
Mechanical environmental conditions on the basis of customer conditions.

Test specification:

Vibration sinusoidal, operating	According to DIN EN 60068-2-6:2008	Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)
Impact, operating	According to DIN EN 60068-2-27:2010	Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock

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3.3. Test procedure



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3.4. Summary of results

3.4.1. Valued tests

	passed	failed
Vibration sinusoidal, operating, x-, y-, z-axis	X	
Impact, operating, x-, y-, z-axis	X	
Initial System test	X	
Initial Visual inspection	X	
Final System test	X	
Final Visual inspection	X	

Remark : The results are only applicable for the tested configuration.

3.4.2. Acceleration values

3.4.2.1. Vibration sinusoidal, operating

1923B0450014							
Shaker	X-axis		Y-axis		Z-axis		
ref. value [g]	a [g]	f [Hz]	a [g]	f [Hz]	a [g]	f [Hz]	
Vibration	3,0	19,1	483 Hz	15,5	491 Hz	3,6	500 Hz
X-axis		637%		517%		120%	
Vibration	3,0	4,1	500 Hz	6,8	372 Hz	3,2	500 Hz
Y-axis		137%		227%		107%	
Vibration	3,0	3,6	461 Hz	1,7	460 Hz	8,3	460 Hz
Z-axis		120%		57%		277%	

1923B0450020							
Shaker	X-axis		Y-axis		Z-axis		
ref. value [g]	a [g]	f [Hz]	a [g]	f [Hz]	a [g]	f [Hz]	
Vibration	3,0	19,0	485 Hz	18,4	492 Hz	6,6	485 Hz
X-axis		633%		613%		220%	
Vibration	3,0	3,2	500 Hz	5,7	341 Hz	3,5	500 Hz
Y-axis		107%		190%		117%	
Vibration	3,0	6,5	500 Hz	3,8	500 Hz	9,2	500 Hz
Z-axis		217%		127%		307%	

3.4.2.2. Impact, operating

a [g]		1923B0450014			1923B0450020		
Shaker	ref. value	X-axis	Y-axis	Z-axis	X-axis	Y-axis	Z-axis
Impact	40,0	40,8	17,6	3,8	41,3	5,6	1,9
X-axis		102%	44%	10%	103%	14%	5%
Impact	40,0	5,6	40,1	4,9	5,3	43,4	3,2
Y-axis		14%	100%	12%	13%	109%	8%
Impact	40,0	4,4	4,1	44,0	2,3	3,6	41,1
Z-axis		11%	10%	110%	6%	9%	103%

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3.5. Table of used instruments

Vibration generator

Test-/Measure device	Equipment name			Check (Ch) / Calibration (C)	
	Manu- facturer	Type	Serial-No.	Last	next
Shaker	RMS	SW8200	5751	not necessary	not necessary
Power amplifier	RMS	TGE13-4	17239	not necessary	not necessary
Shaker control system	M+P	VP8	B080064 B080078	11.18C	11.20C
Shaker software	M+P	VcpNT Revision 2.12.35	--	not necessary	not necessary
Accelerometer (vertical table)	PCB	TLD355M 102	44263	01.19C	01.20C
Thermo-/ Hygro-/ Barom- eter	W&T	57613	01710200	10.18C	10.20C
Torque Wrench	Hoffmann Garant	656050- 400	12- 254410	12.18C	12.19C
Torque Wrench	Motec	4550-20	B009597	12.18C	12.19C

Used accelerometers / EUT measure points

Instruments	Equipment name			Check (Ch) / Calibration (C)	
	Manu- facturer	Type	Serial-No.	Last	Next
1 Accelerometer attached to the 1923B0450020	PCB	356A01	LW120750	01.19C	01.21C
2 Accelerometer attached to the 1923B0450014	PCB	356A01	LW124683	01.19C	01.21C

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4. Equipment under test

4.1. System description

EUT1:

Name: UPSI-IP-1 Series
Type: UPSI-2406IP-12U
Manufacturer: Bicker Elektronik GmbH
Serial number: 1923B0450020

EUT2:

Name: UPSI-IP-1 Series
Type: UPSI-2406IP-12U
Manufacturer: Bicker Elektronik GmbH
Serial number: 1923B0450014

Function test:

The EUT was connected to power. The output voltage was recorded and checked.

Receipt date: June 26, 2019

Condition when received: ready for test

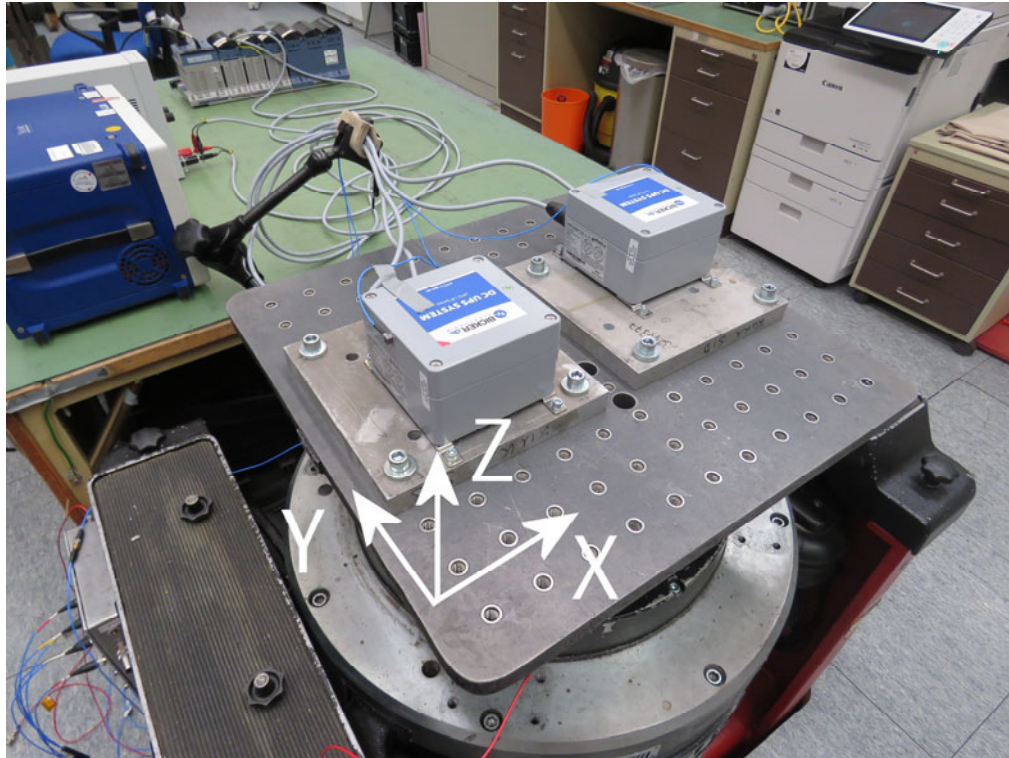
Preconditioning: The preconditioning was performed according to the relevant specification on the basis of DIN EN 60068-1.

4.2. Environmental conditions

Temperature:	15°C – 35°C
Relative Humidity:	25%.- 75%
Barometric Pressure	86 kPa – 106 kPa

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4.3. Test specification



Function test: See 4.1 System description

EUT fixing: The EUT was fixed to the vibration table with a metal adapter plate (see photo above).

Measuring points:

No.	Axis	Sensor type	Position
1	x,y,z	356A01	side of the 1923B0450020
2	x,y,z	356A01	side of the 1923B0450014

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5. Test results

5.1. Vibration sinusoidal, operating

	passed	failed
Vibration sinusoidal, operating x-axis	X	
Vibration sinusoidal, operating y-axis	X	
Vibration sinusoidal, operating z-axis	X	

Test specification: Customer conditions

Standard: According to DIN EN 60068-2-6:2008 Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)

Vibration severity: Vibration (sinusoidal):
 10 - 500 Hz: 3g
 Duration: 22 sweep
 (2 sweep = 1 cycle = 10 Hz to 500 Hz to 10 Hz)
 sweep rate: 1 Oct/min.
 Start frequency: 10 Hz
 Control strategy: Single control
 Reference point: Single control

Requirements: No damage and errors allowed during vibration test.

Function test: See 4.1 System description

Test results:

Test No.	Axis	Component	Test program	Test cycles	Results
1	x	1923B0450020	-	22 sweep	passed, results according to fig. 2, page 10
2	x	1923B0450014	-	22 sweep	passed, results according to fig. 1, page 10
3	y	1923B0450020	-	22 sweep	passed, results according to fig. 4, page 11
4	y	1923B0450014	-	22 sweep	passed, results according to fig. 3, page 11
5	z	1923B0450020	-	22 sweep	passed, results according to fig. 6, page 12
6	z	1923B0450014	-	22 sweep	passed, results according to fig. 5, page 12

Remark: none

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Fig. 1

Vibration sinusoidal, operating x-axis

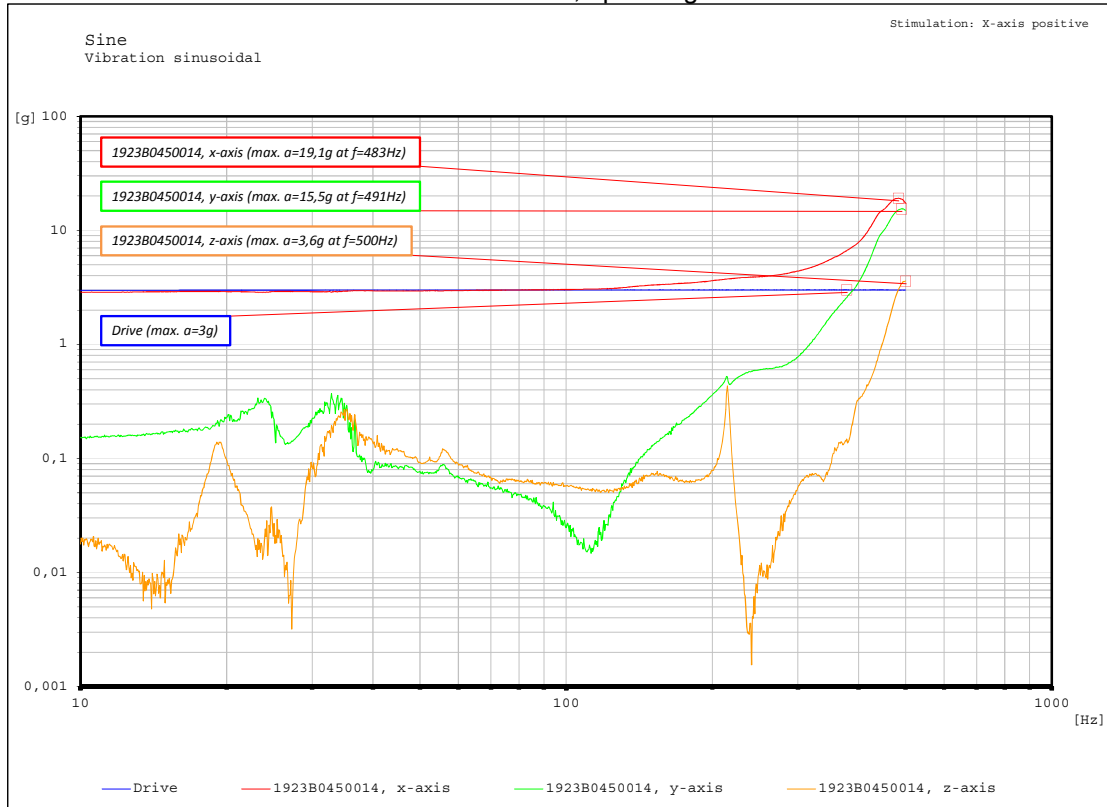
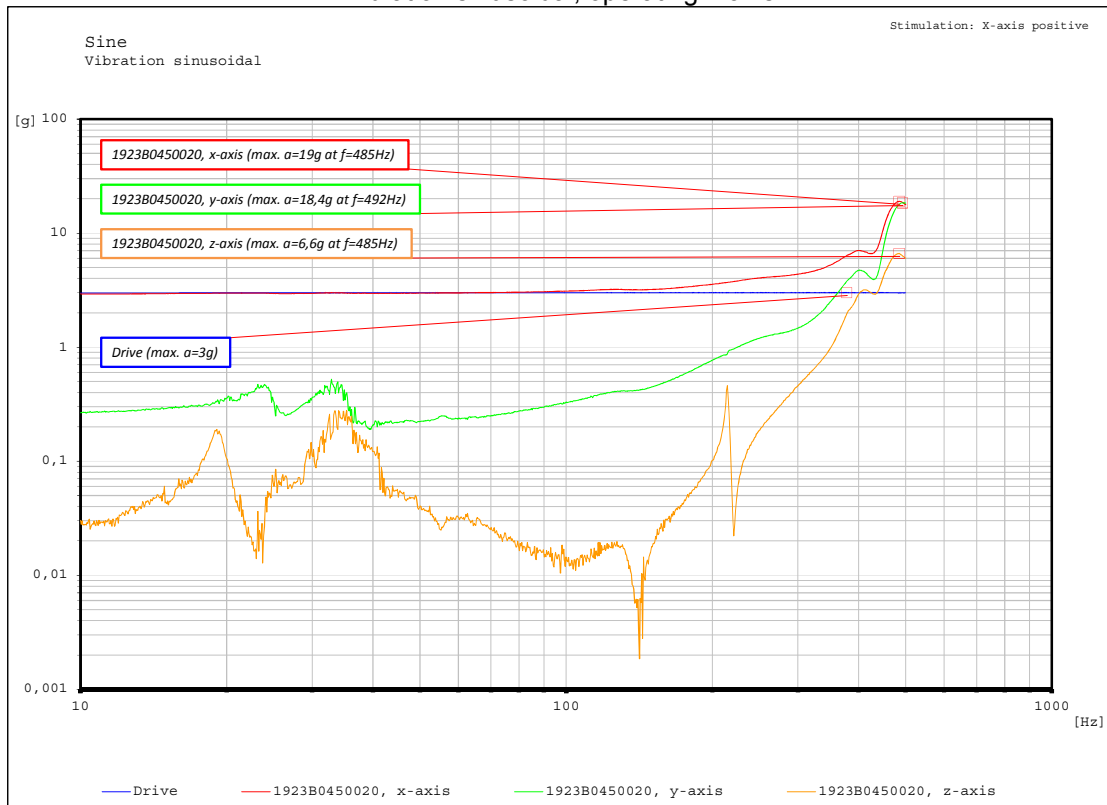


Fig. 2

Vibration sinusoidal, operating x-axis



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Fig. 3

Vibration sinusoidal, operating y-axis

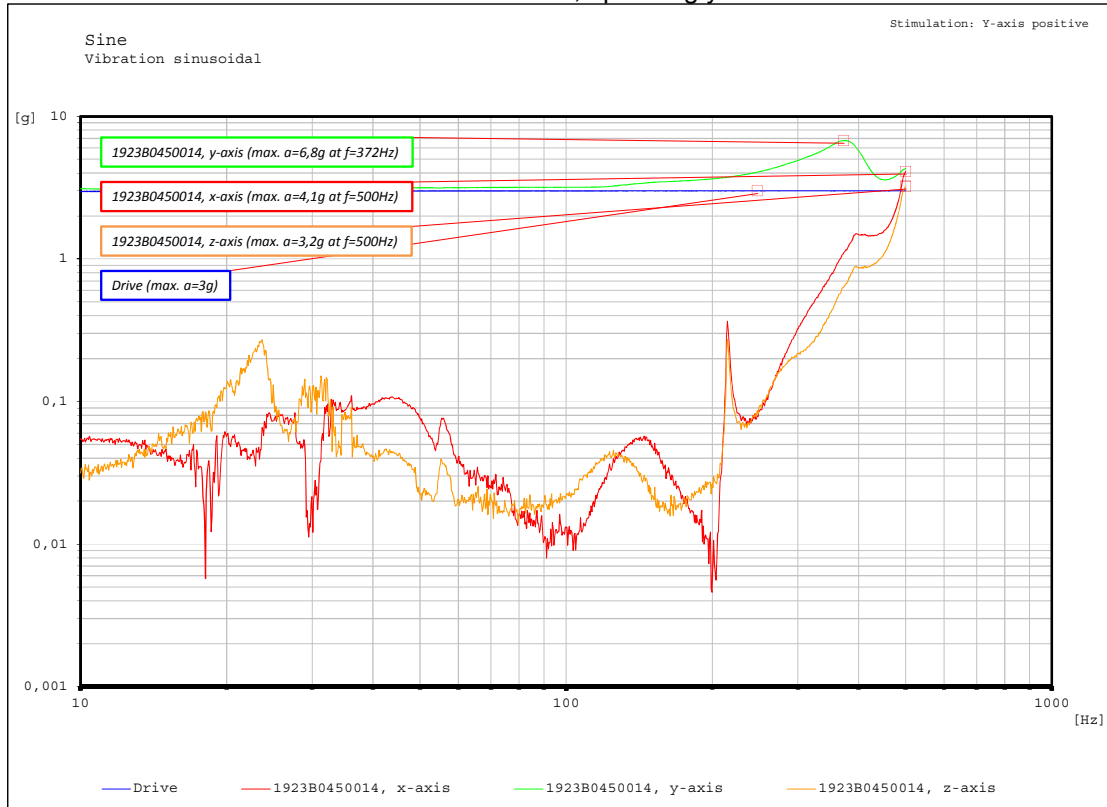
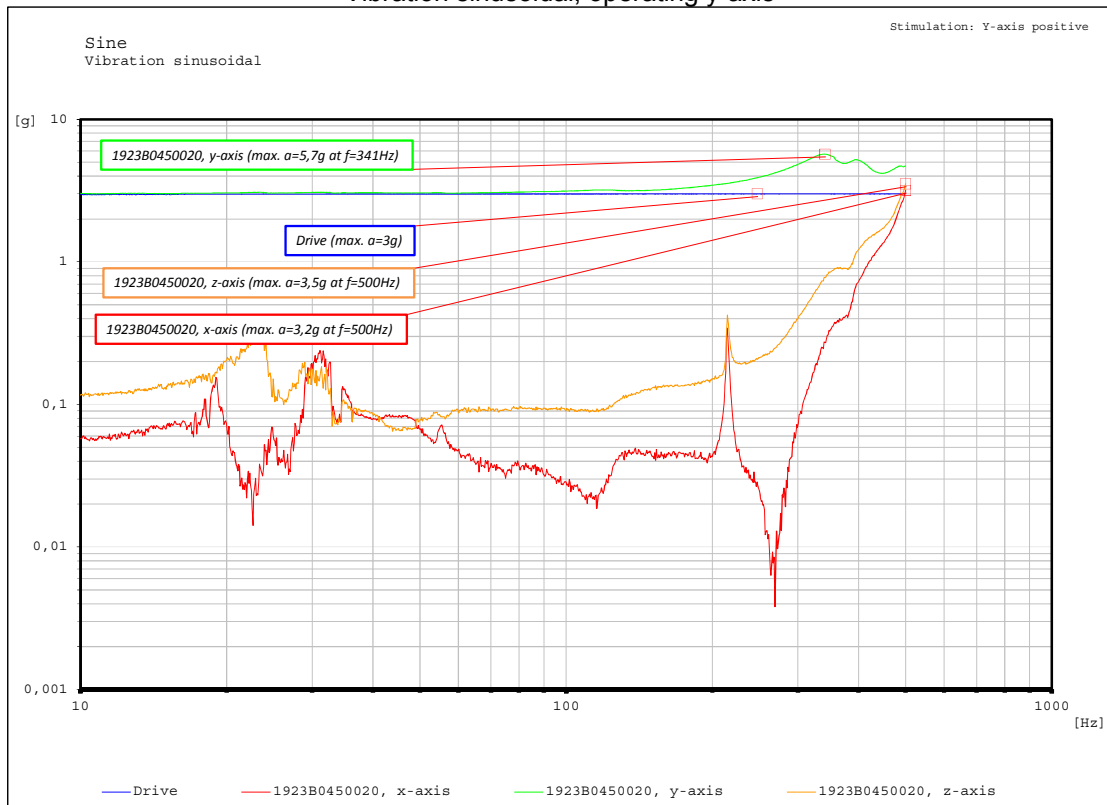


Fig. 4

Vibration sinusoidal, operating y-axis



EUT : UPSI-IP-1 Series

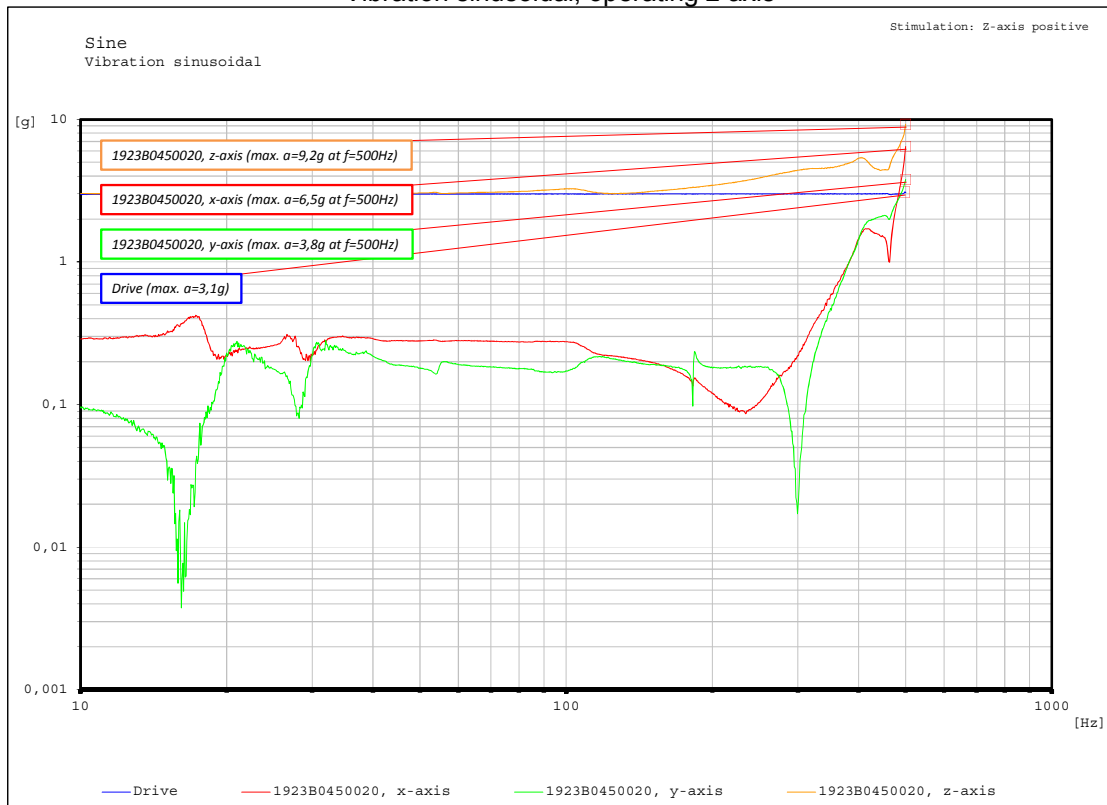
Fig. 5

Vibration sinusoidal, operating z-axis



Fig. 6

Vibration sinusoidal, operating z-axis



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5.2. Impact, operating

	passed	failed
Impact, operating x-axis (pos./neg. direction)	X	
Impact, operating y-axis (pos./neg. direction)	X	
Impact, operating z-axis (pos./neg. direction)	X	

Test specification: Customer conditions

Standard: According to DIN EN 60068-2-27:2010 Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock

Severity: Impact operating:
Pulse shape: half sine
Acceleration: 40 g
Duration: 6 ms
Number: 3000 impacts per direction
Total number: 18000 impacts
Time between pulse: 3 s

Requirements: No damage and errors allowed during impact test.

Function test: See 4.1 System description

Test results:

Test No.	Axis	Component	Test program	Test cycles	Results
1	x	1923B0450020	-	+3000/-3000 impact	passed, results according to fig. 3 and 4, page 15
2	x	1923B0450014	-	+3000/-3000 impact	passed, results according to fig. 1 and 2, page 14
3	y	1923B0450020	-	+3000/-3000 impact	passed, results according to fig. 7 and 8, page 17
4	y	1923B0450014	-	+3000/-3000 impact	passed, results according to fig. 5 and 6, page 16
5	z	1923B0450020	-	+3000/-3000 impact	passed, results according to fig. 11 and 12, page 19
6	z	1923B0450014	-	+3000/-3000 impact	passed, results according to fig. 9 and 10, page 18

Remark: none

EUT : UPSI-IP-1 Series

Fig. 1

Impact, operating x-axis

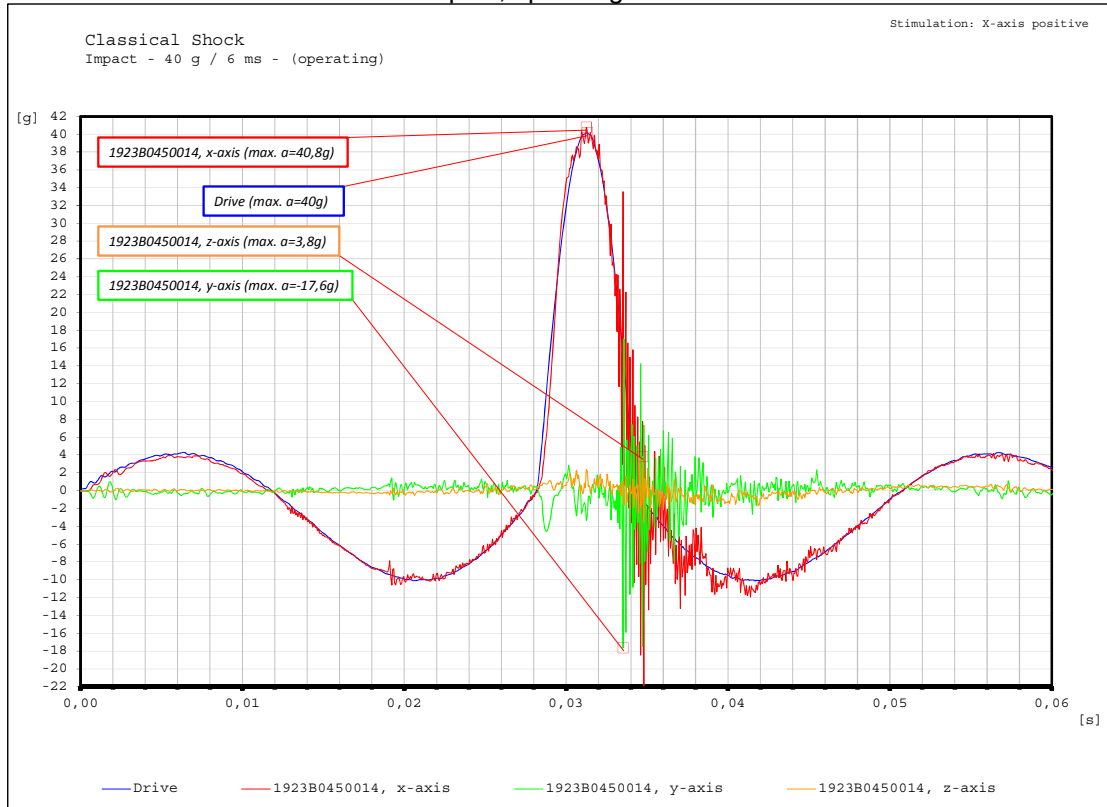
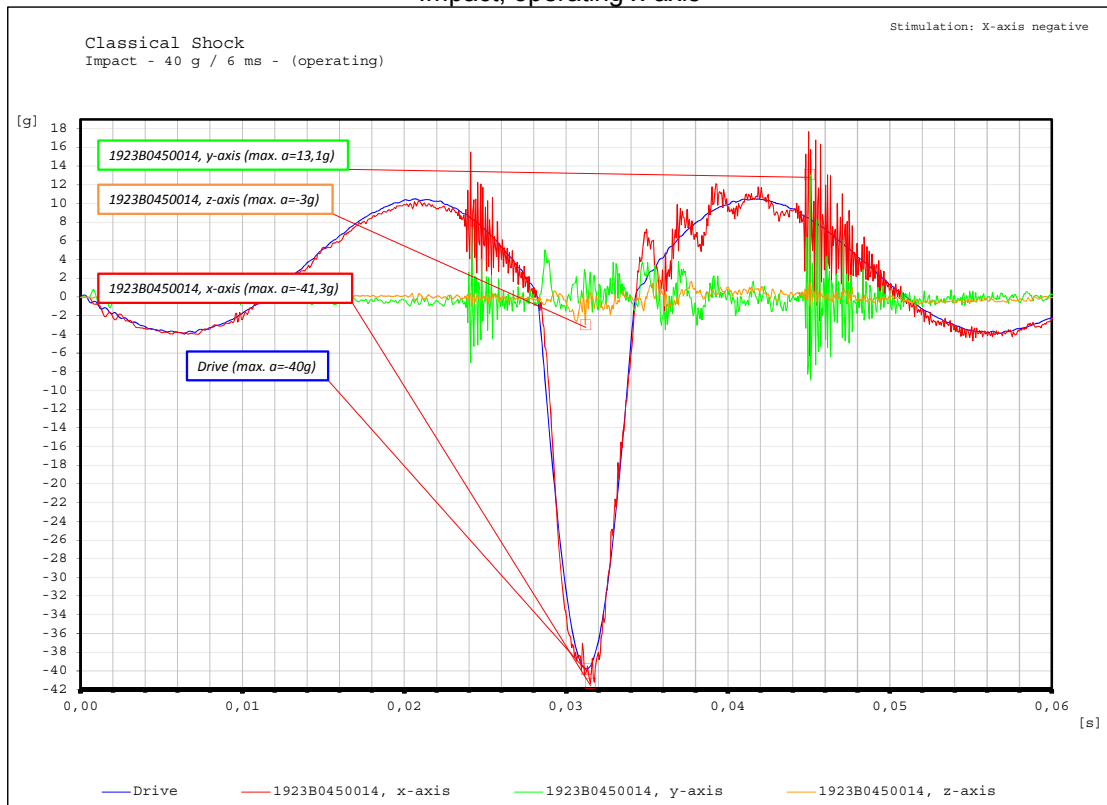


Fig. 2

Impact, operating x-axis



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Fig. 3

Impact, operating x-axis

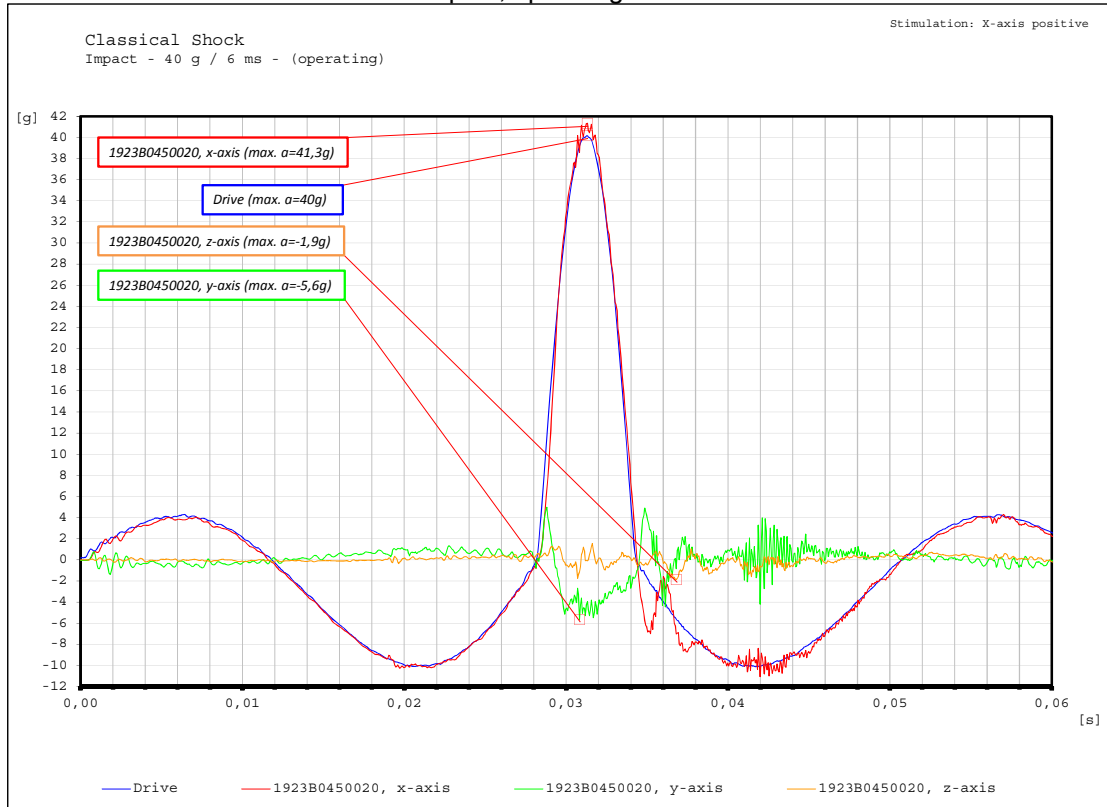
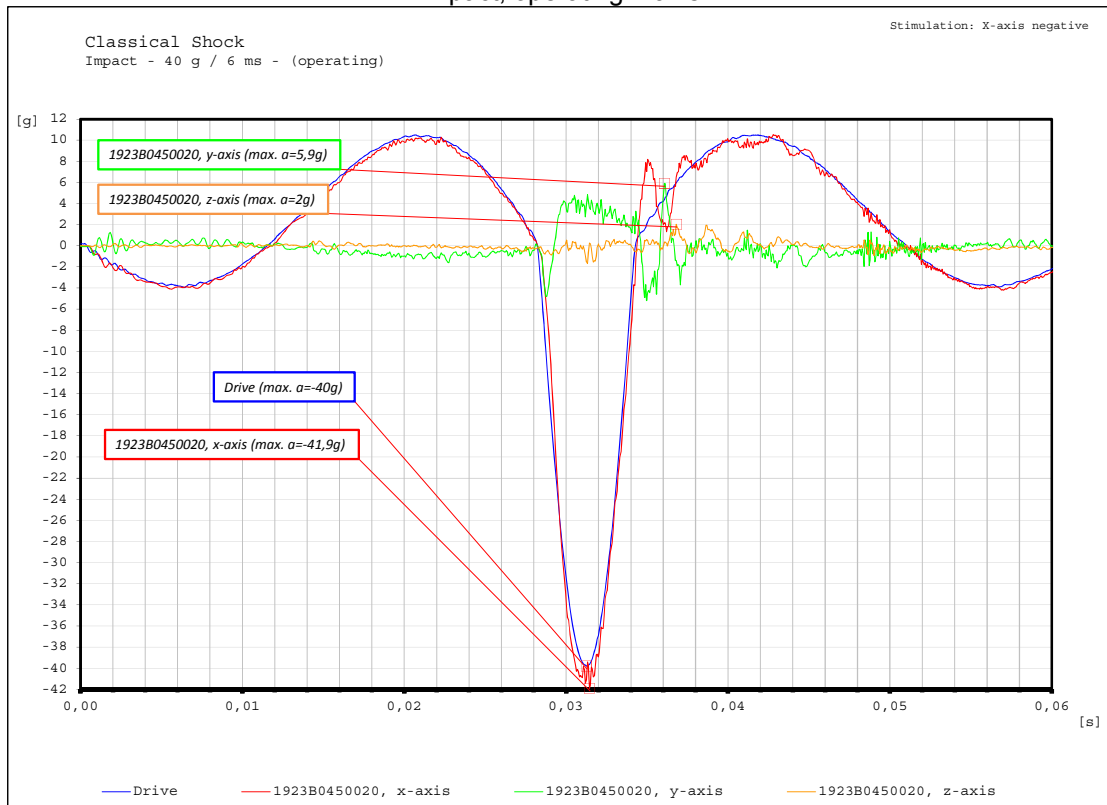


Fig. 4

Impact, operating x-axis



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Fig. 5

Impact, operating y-axis

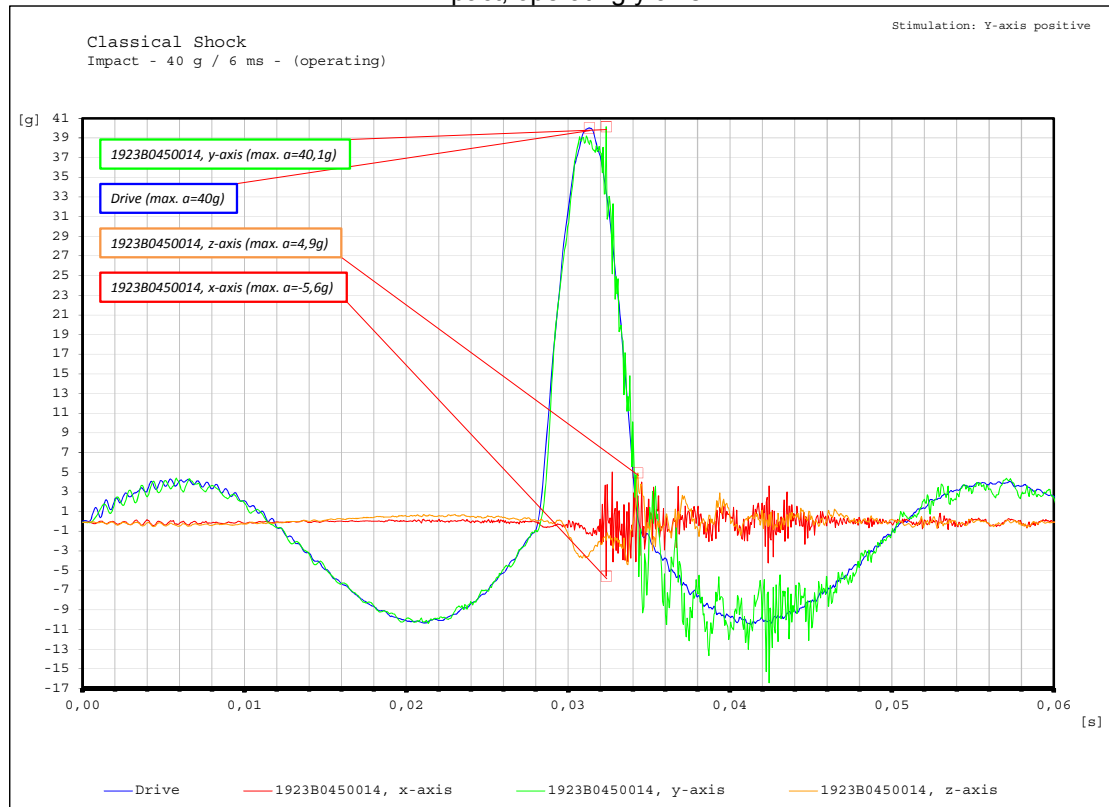
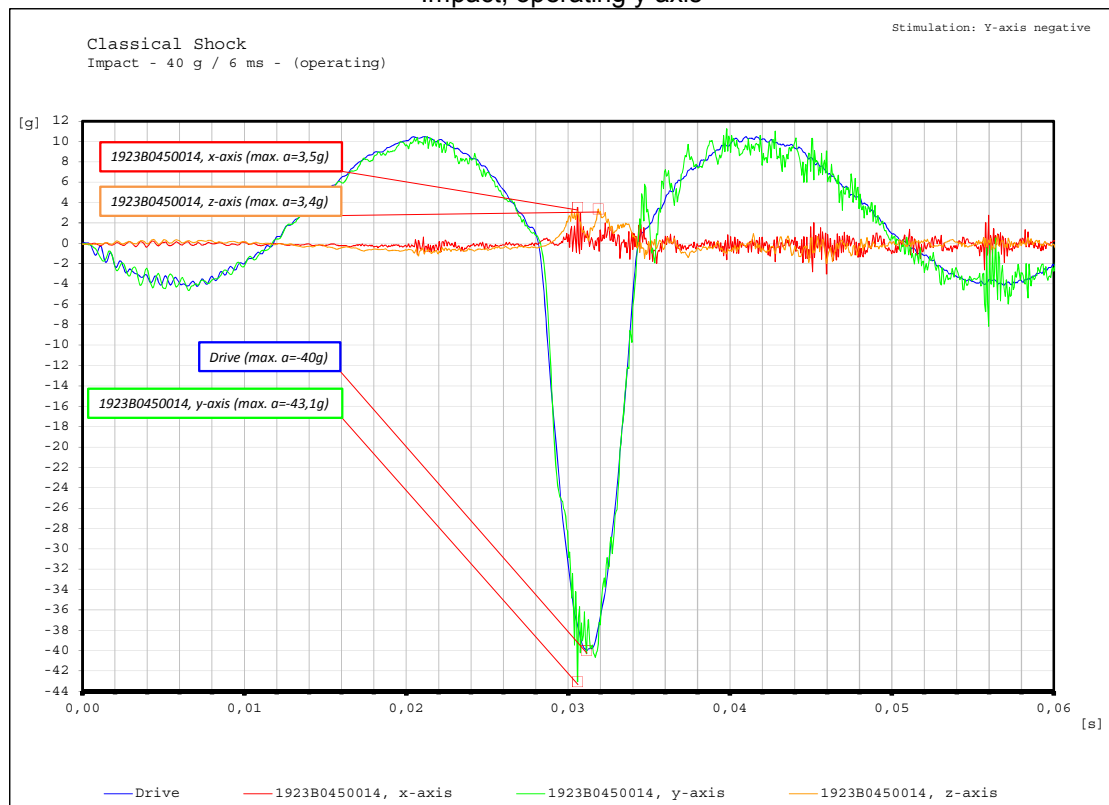


Fig. 6

Impact, operating y-axis



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Fig. 7

Impact, operating y-axis

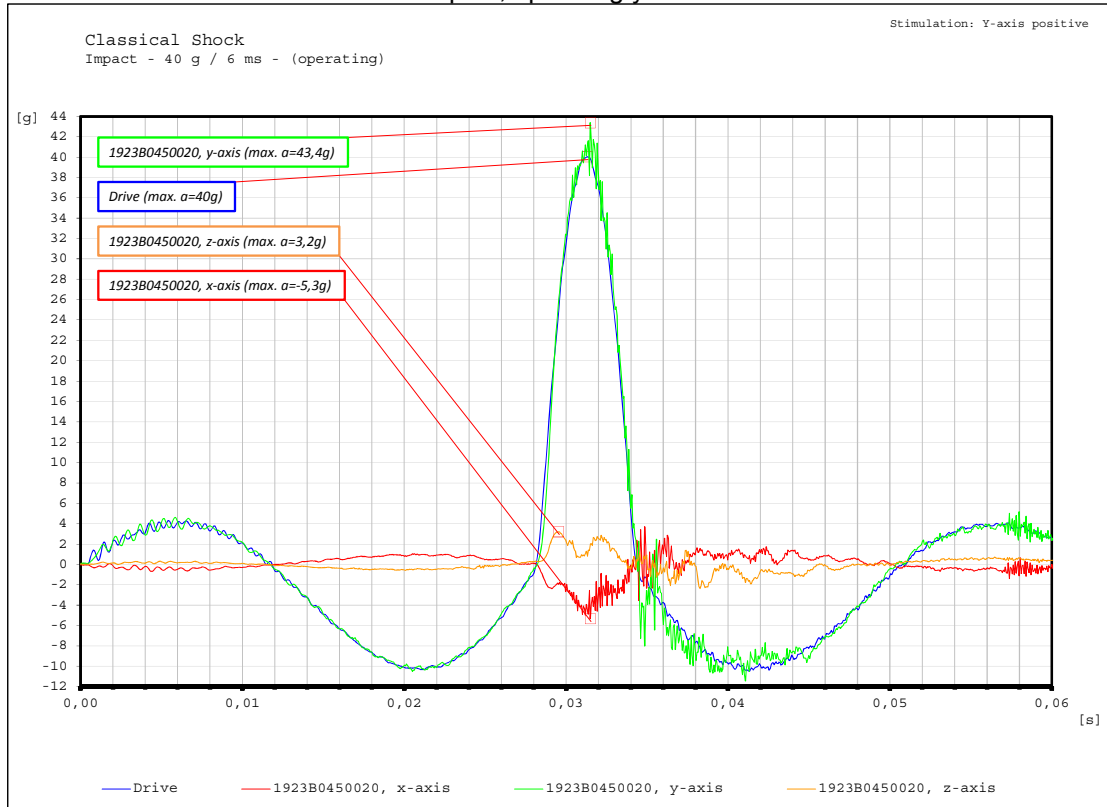
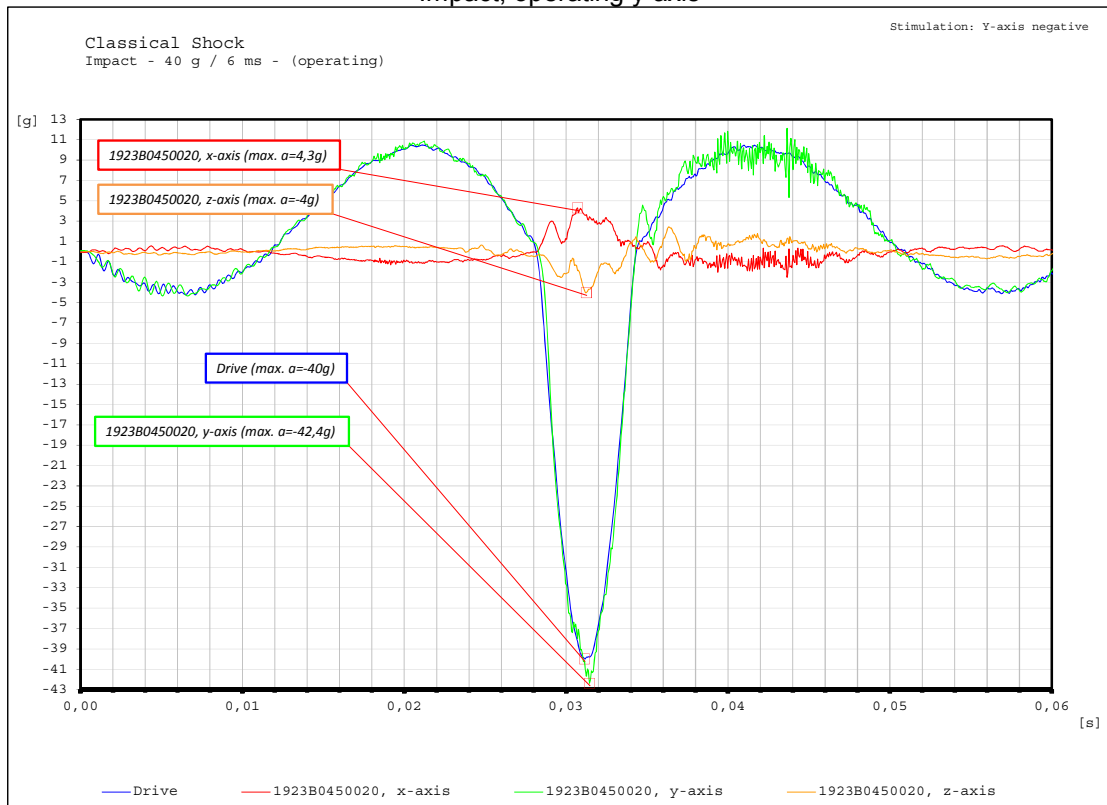


Fig. 8

Impact, operating y-axis



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Fig. 9

Impact, operating z-axis

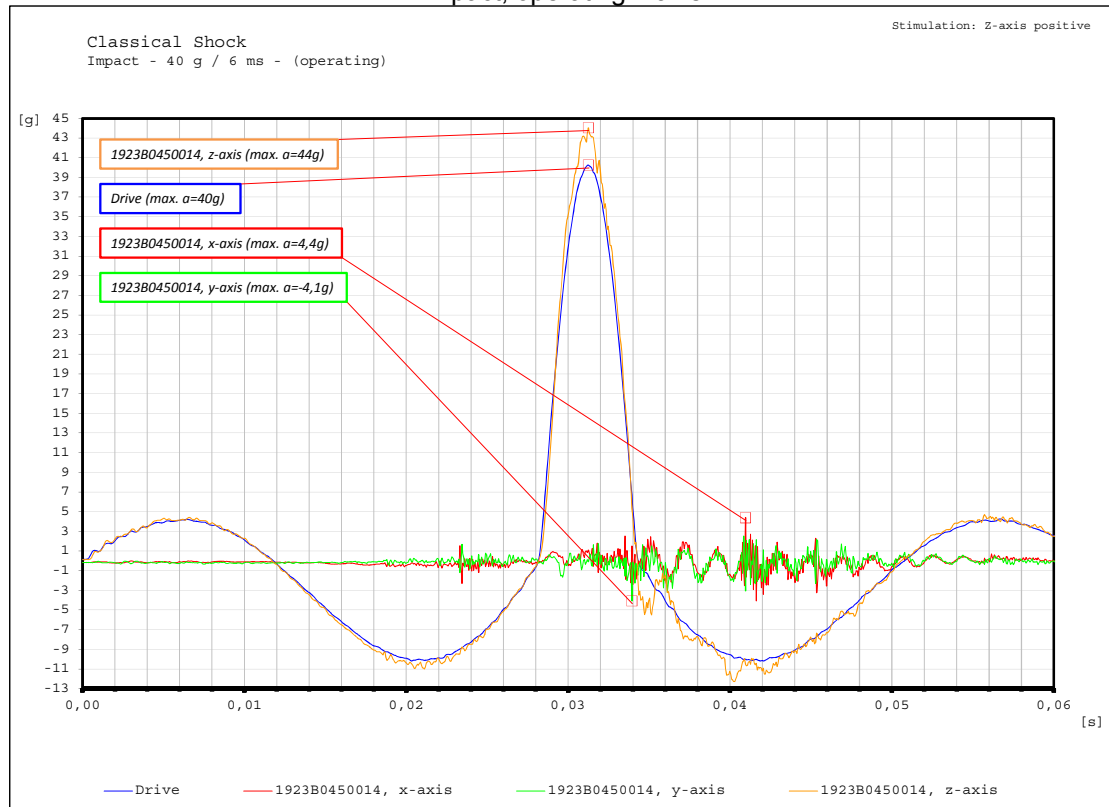
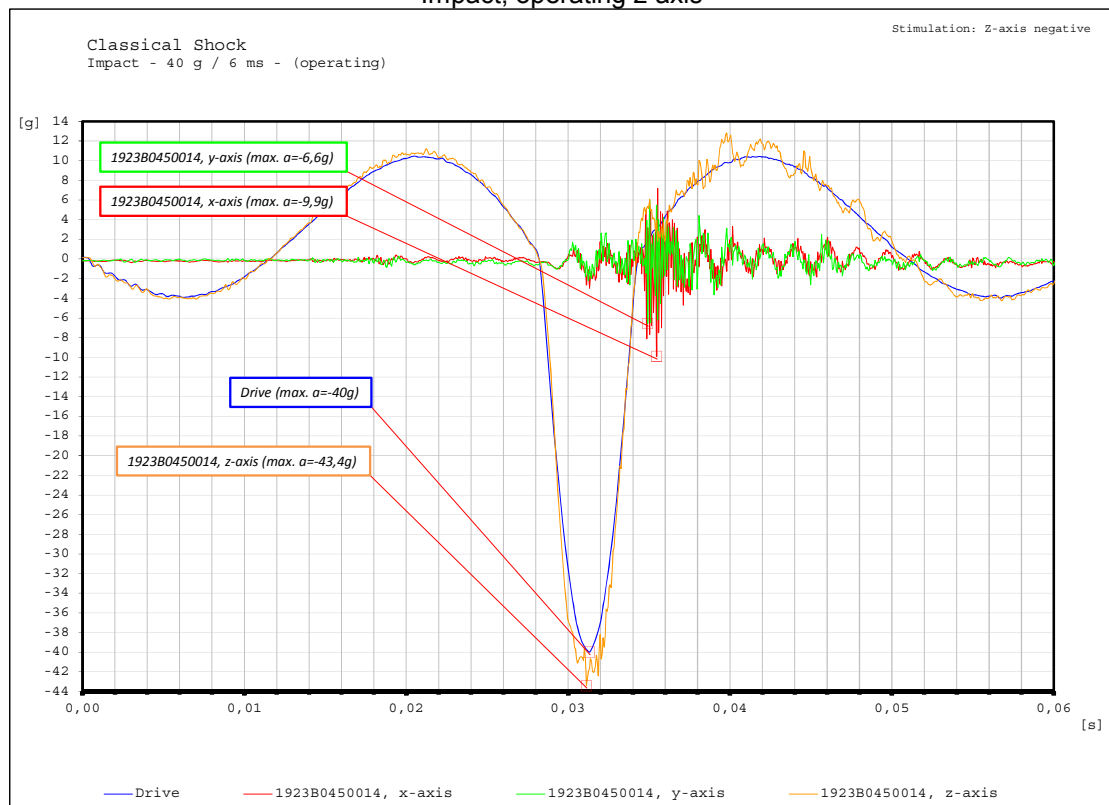


Fig. 10

Impact, operating z-axis



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Fig. 11

Impact, operating z-axis

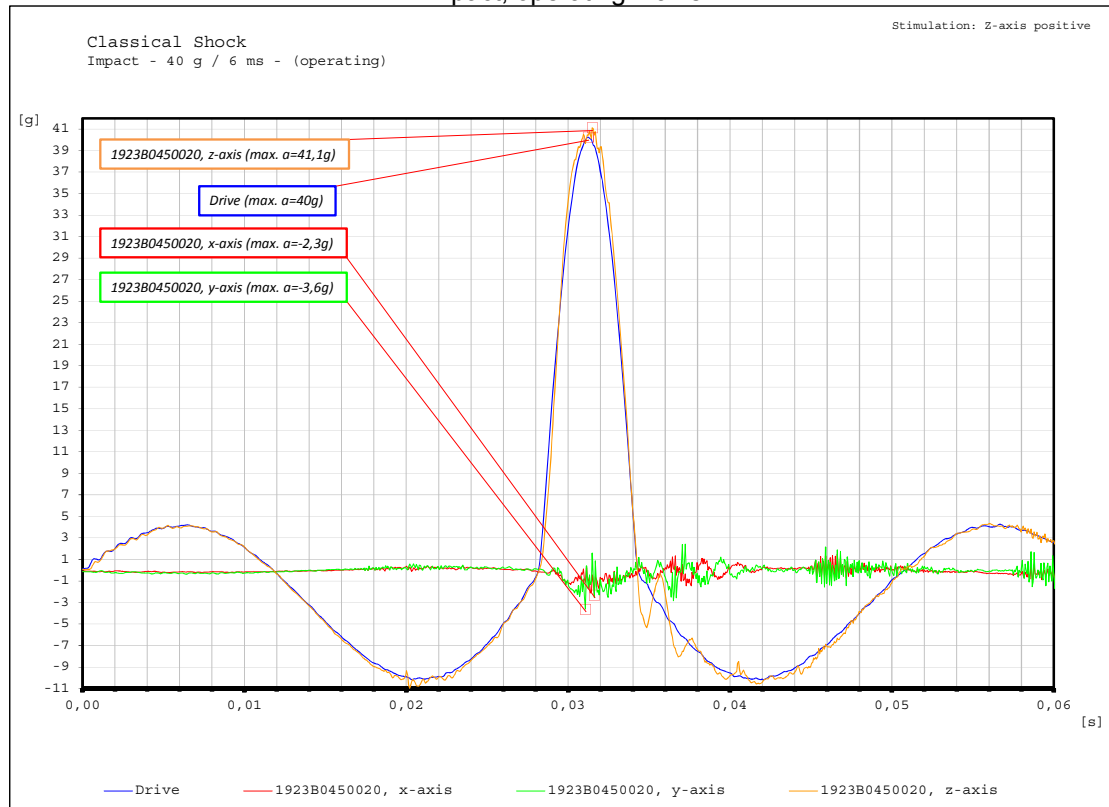
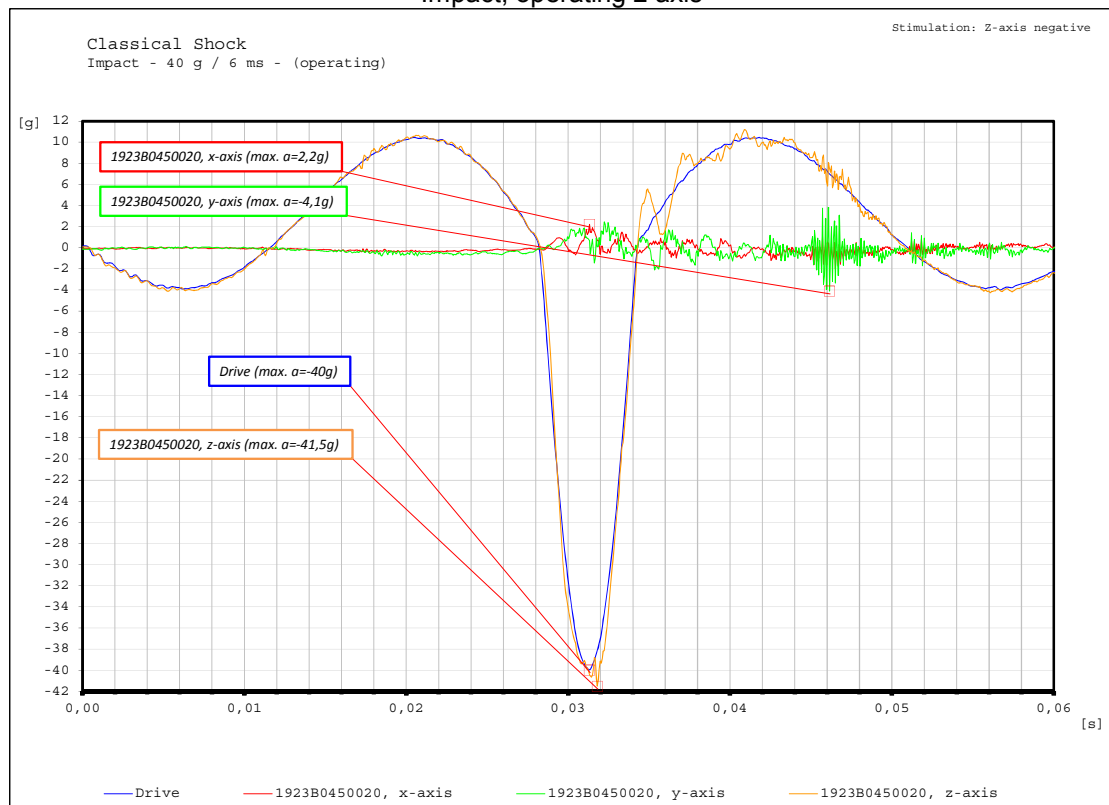


Fig. 12

Impact, operating z-axis



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5.3. Initial measurement

	passed	failed
System test	X	
Visual inspection	X	

5.4. Recovery time /Final measurements

The specimen gets a period of time to recover in a normal function status after that the final measurements will be performed. The time depends on the relevant specification.

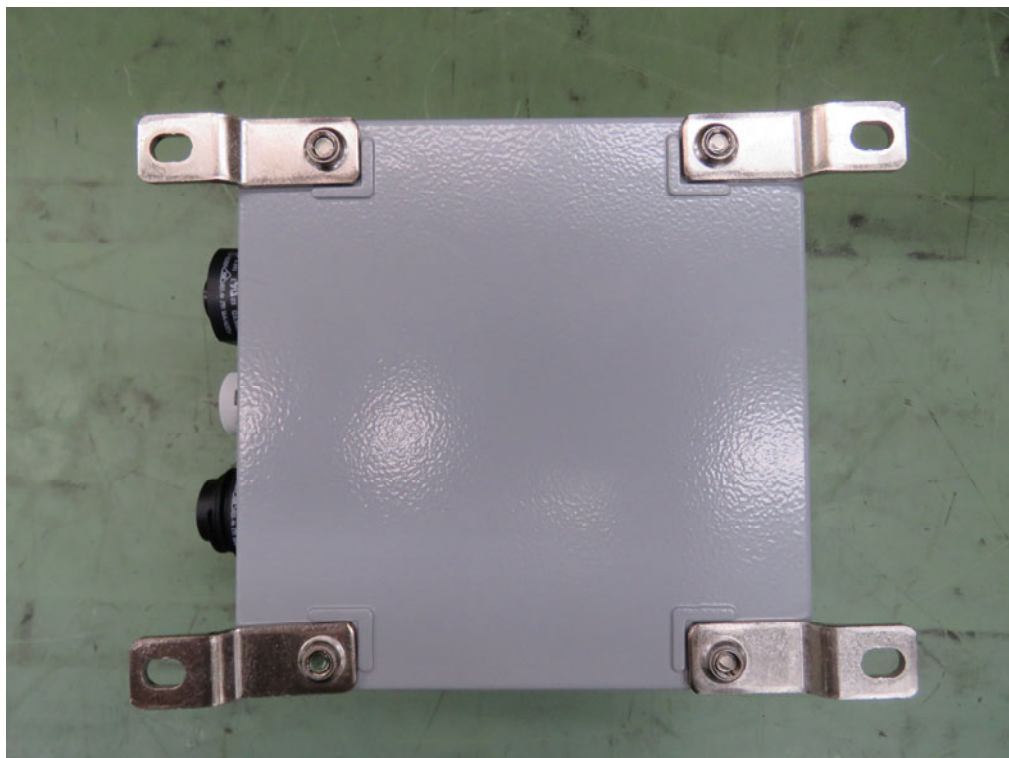
	passed	failed
System test	X	
Visual inspection	X	

EUT : UPSI-IP-1 Series

6. EUT-Photos



Picture no. 1: Top side of EUT



Picture no. 2: Bottom side of EUT

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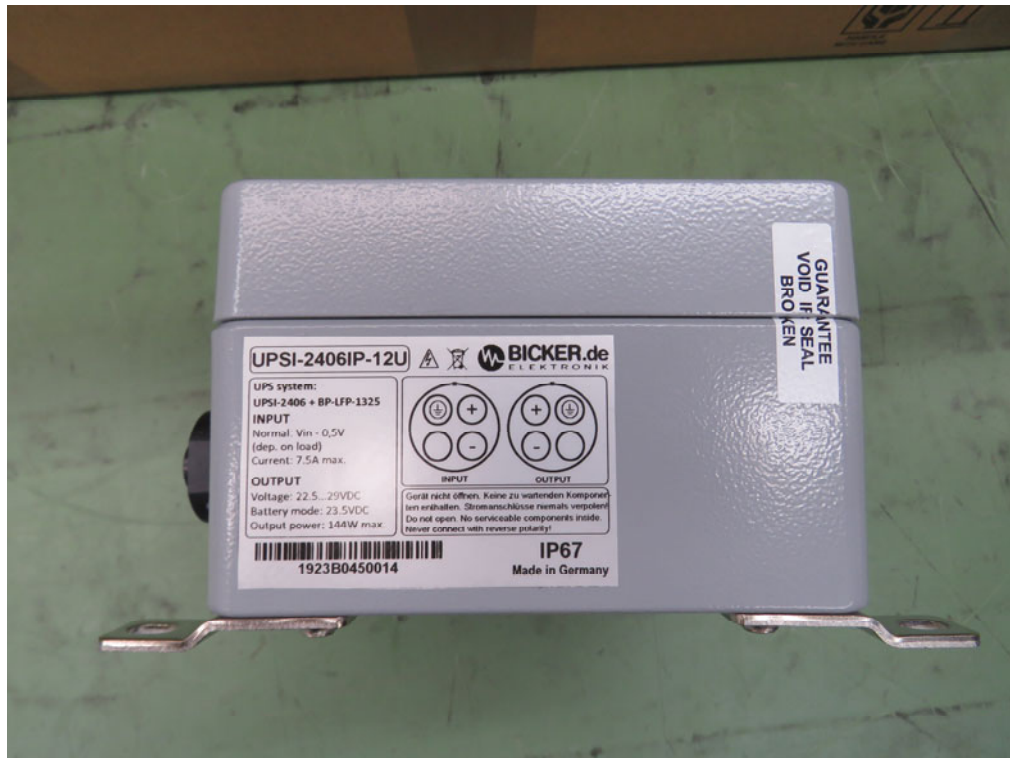


Picture no. 3: Connector side of EUT

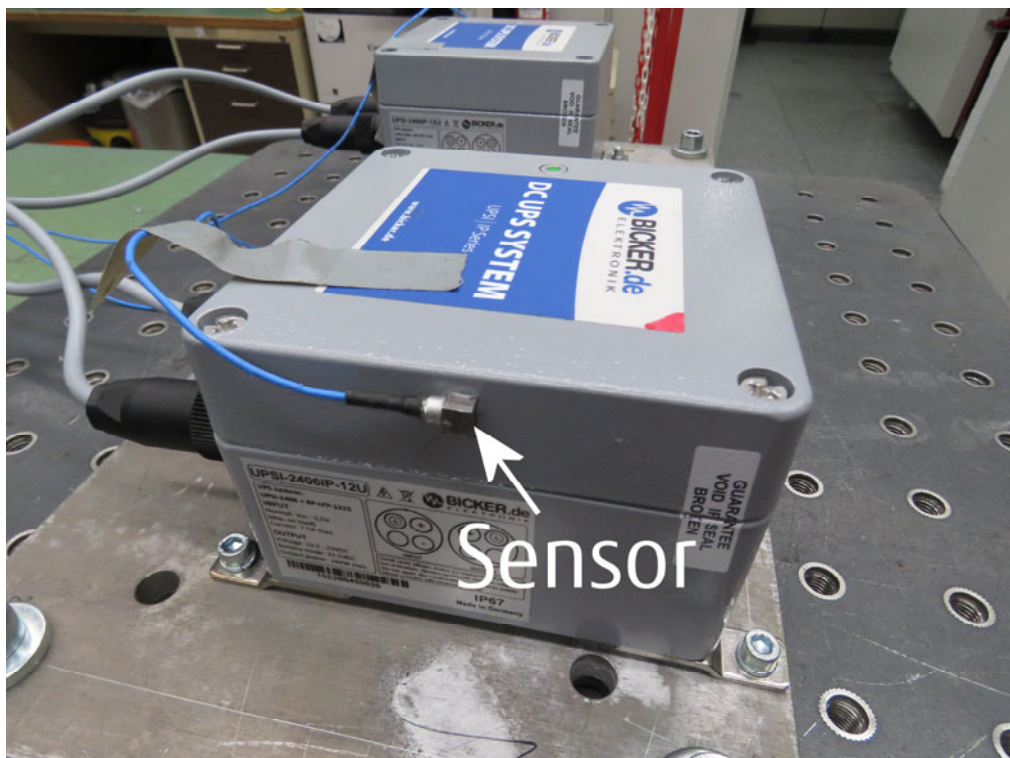


Picture no. 4: Type label EUT1

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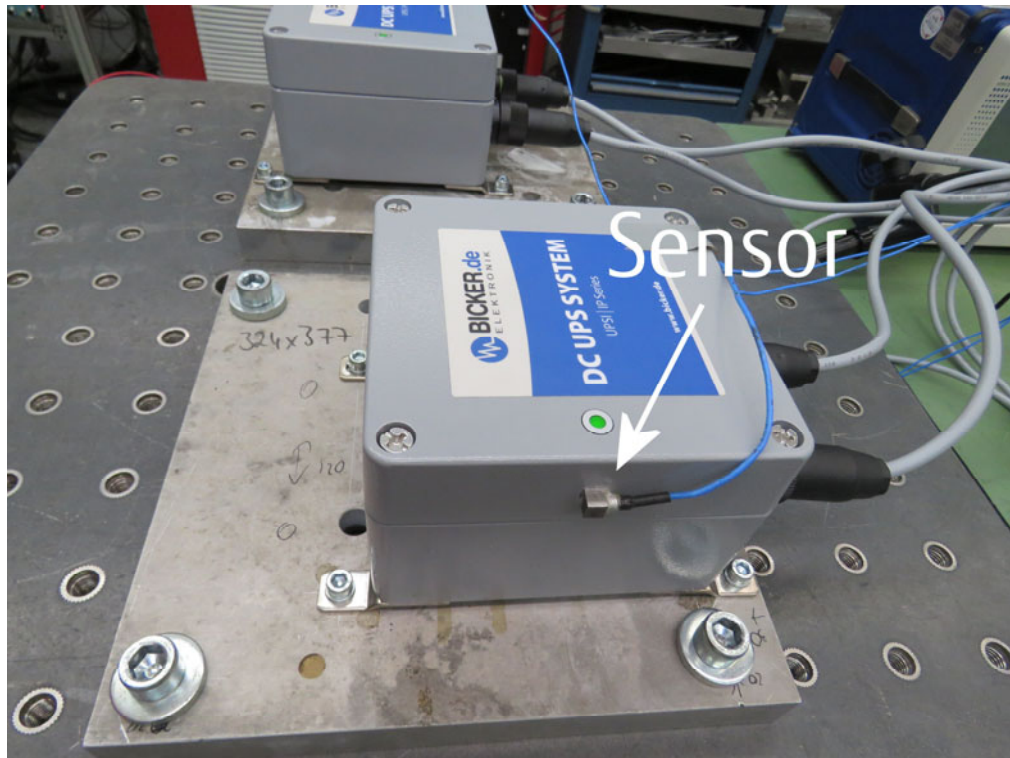


Picture no. 5: Type label EUT2

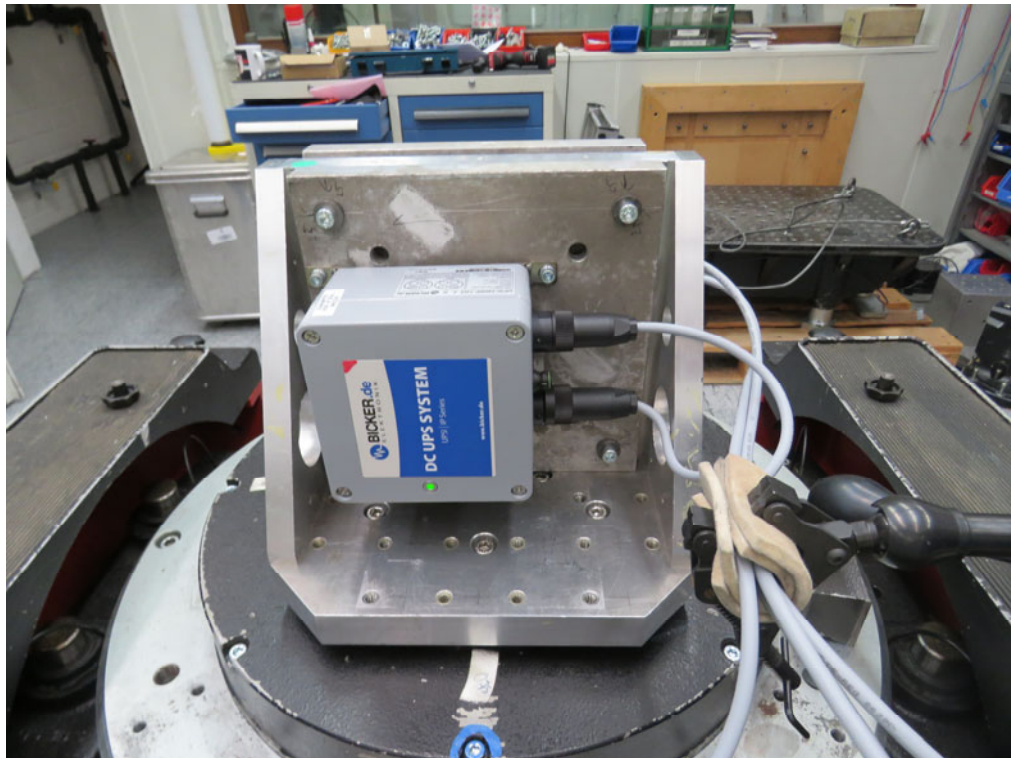


Picture no. 6: Measuring point no. 1 (1923B0450020)

EUT : UPSI-IP-1 Series

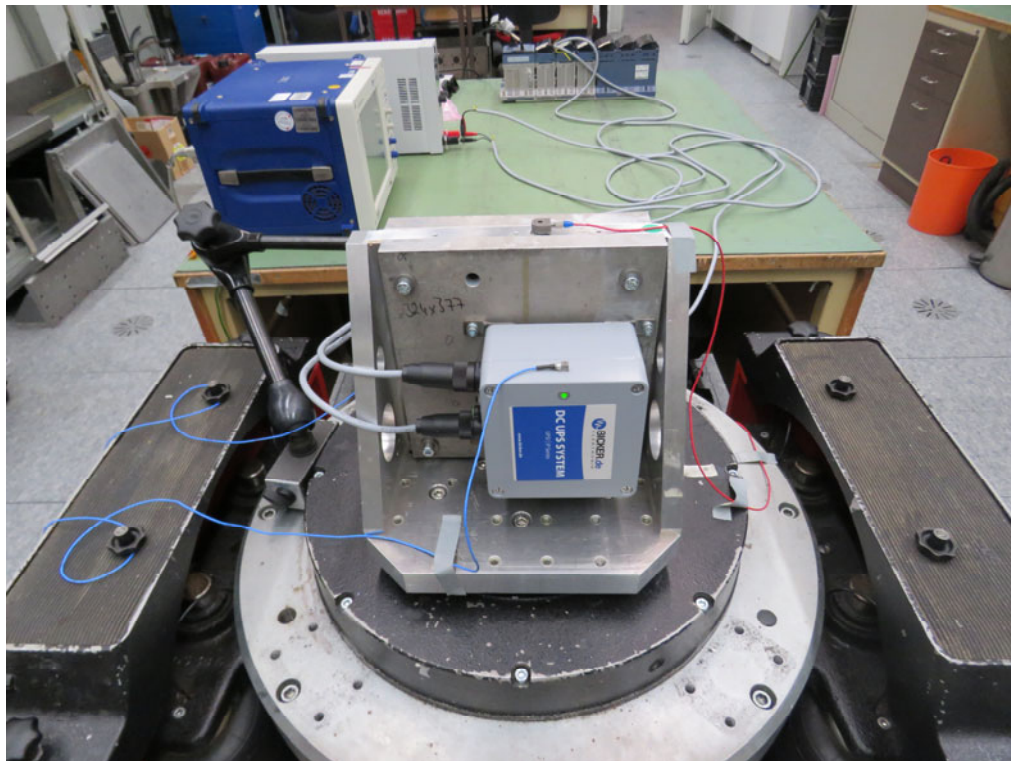


Picture no. 7: Measuring point no. 2 (1923B0450014)

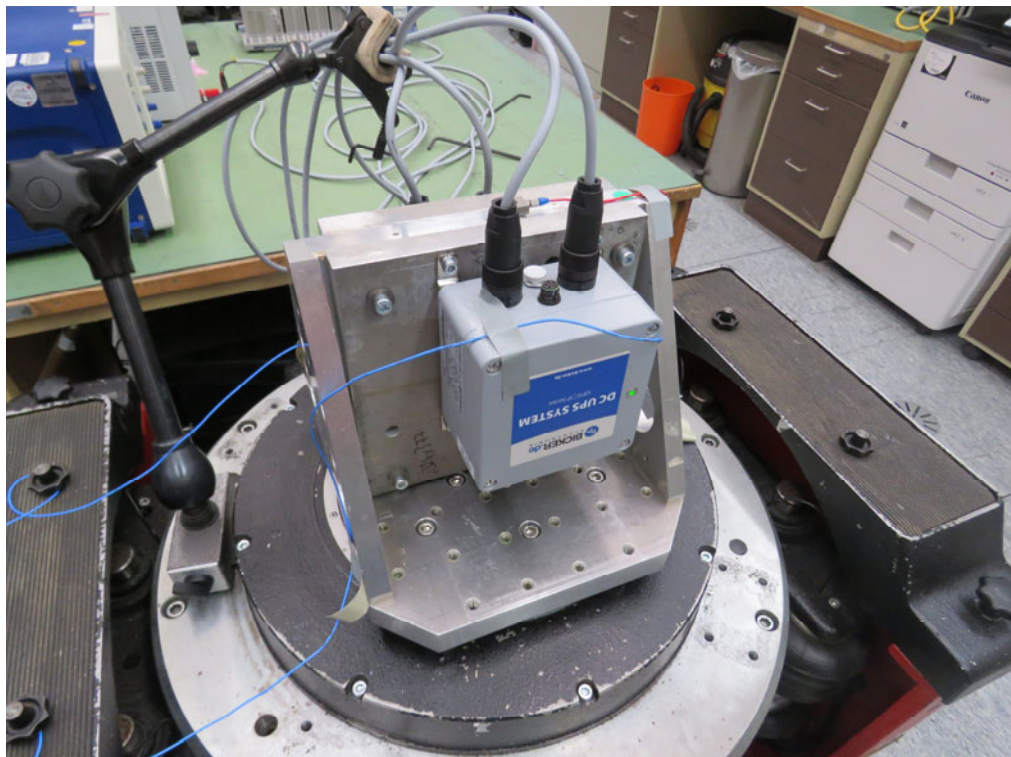


Picture no. 8: The EUT on x-axis

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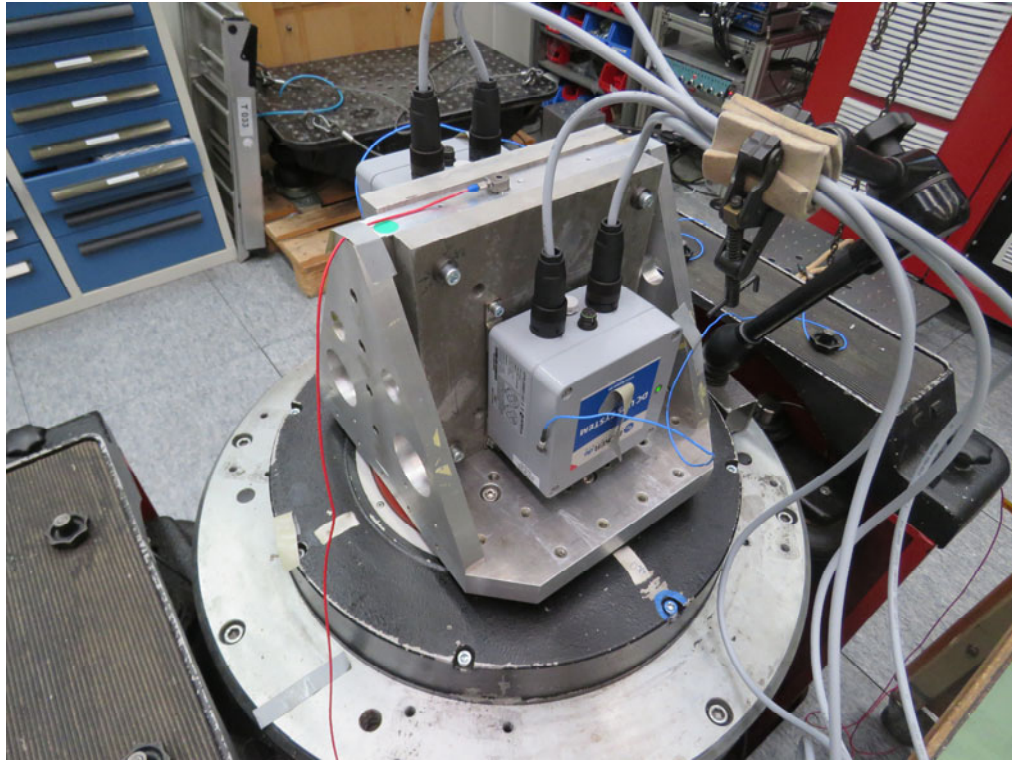


Picture no. 9: The EUT on x-axis

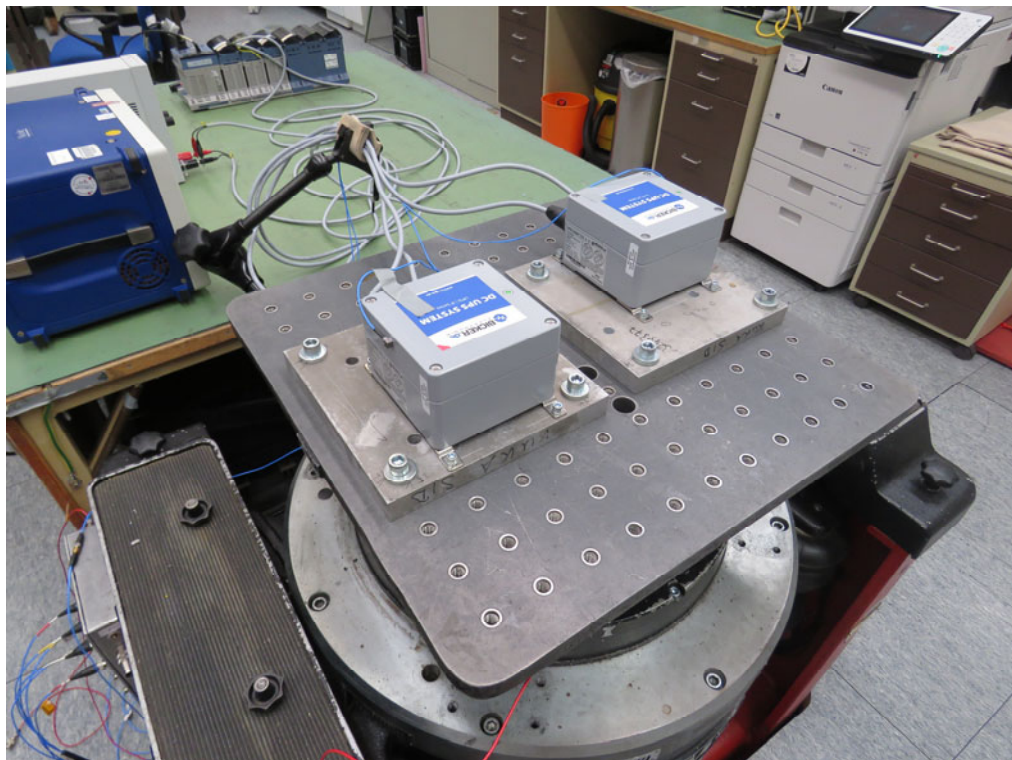


Picture no. 10: The EUT on y-axis

EUT : UPSI-IP-1 Series

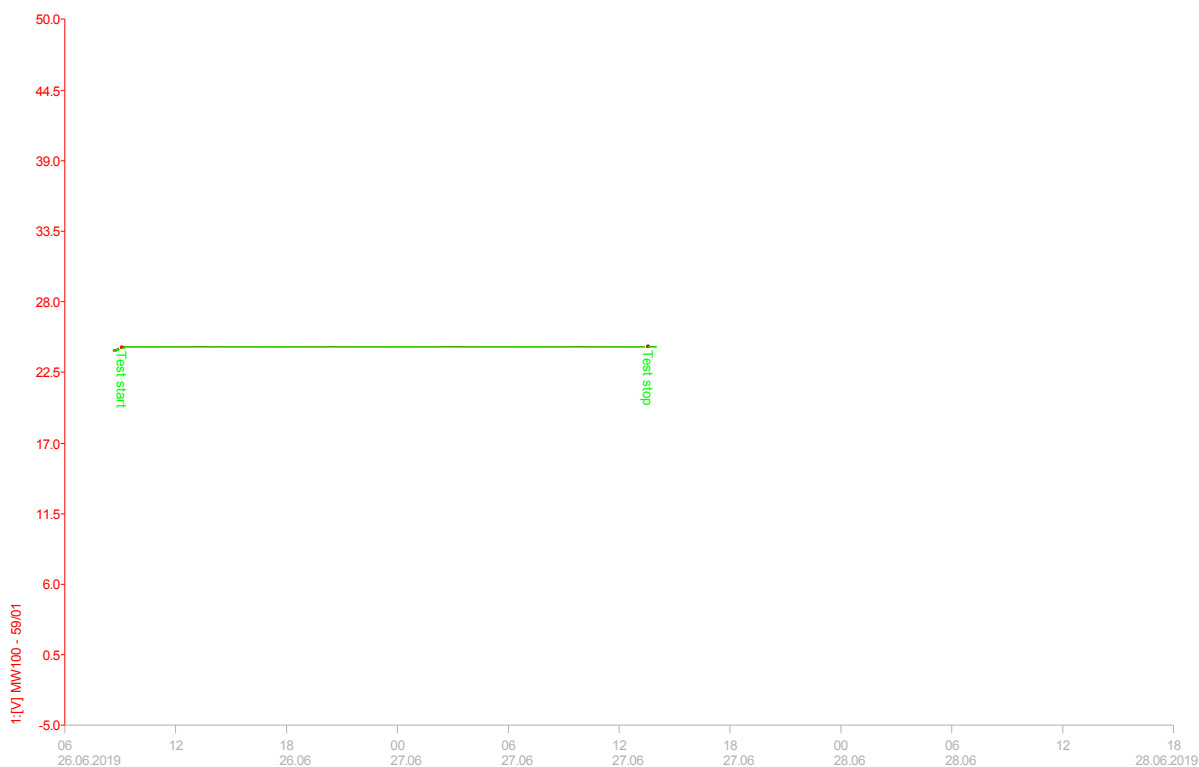


Picture no. 11: The EUT on y-axis



Picture no. 12: The EUT on z-axis

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Picture no. 13: Recording of the function test