

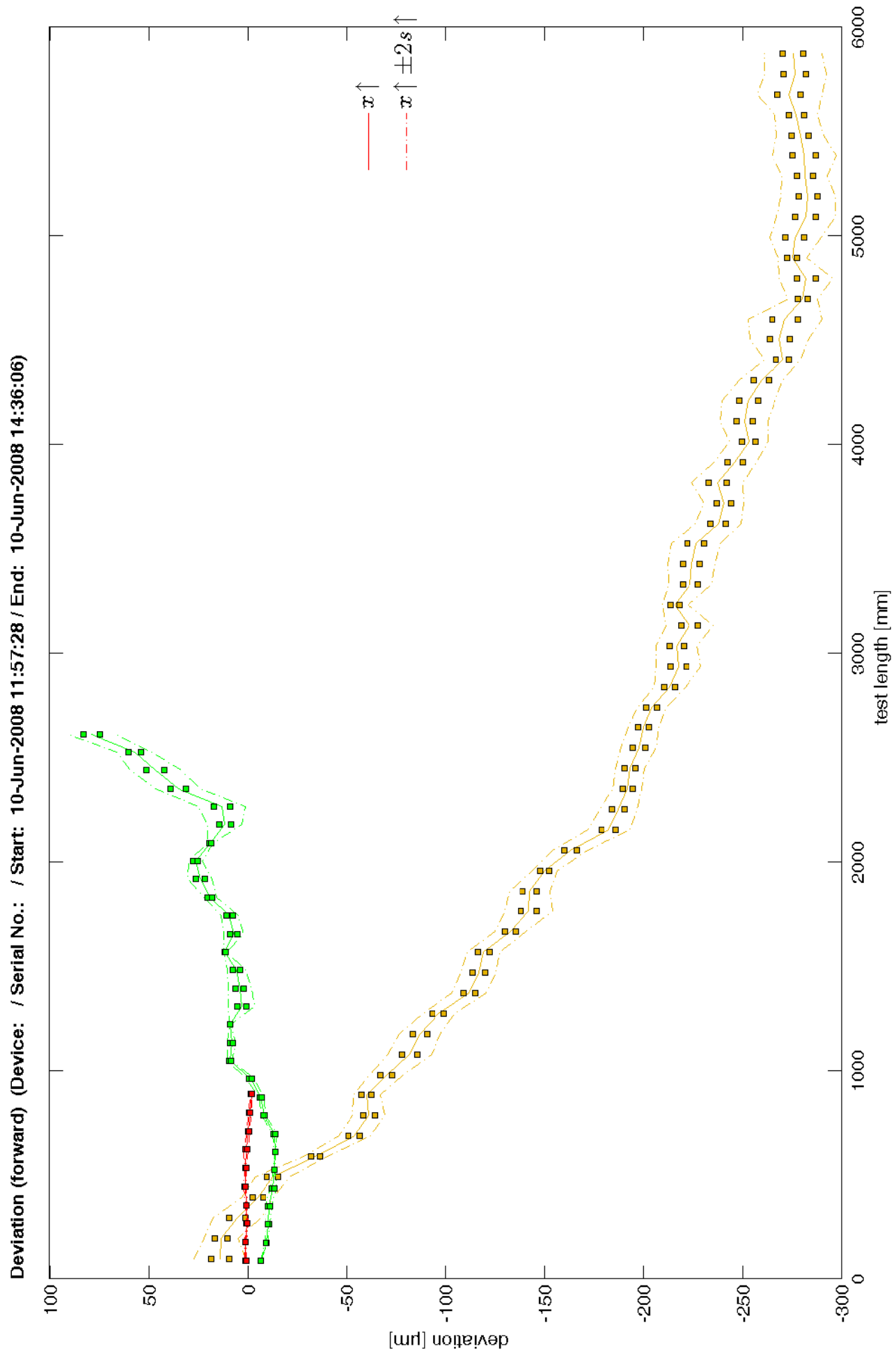
Inspection report TRAC-CHECK (ISO 230-2 / ISO 230-6)

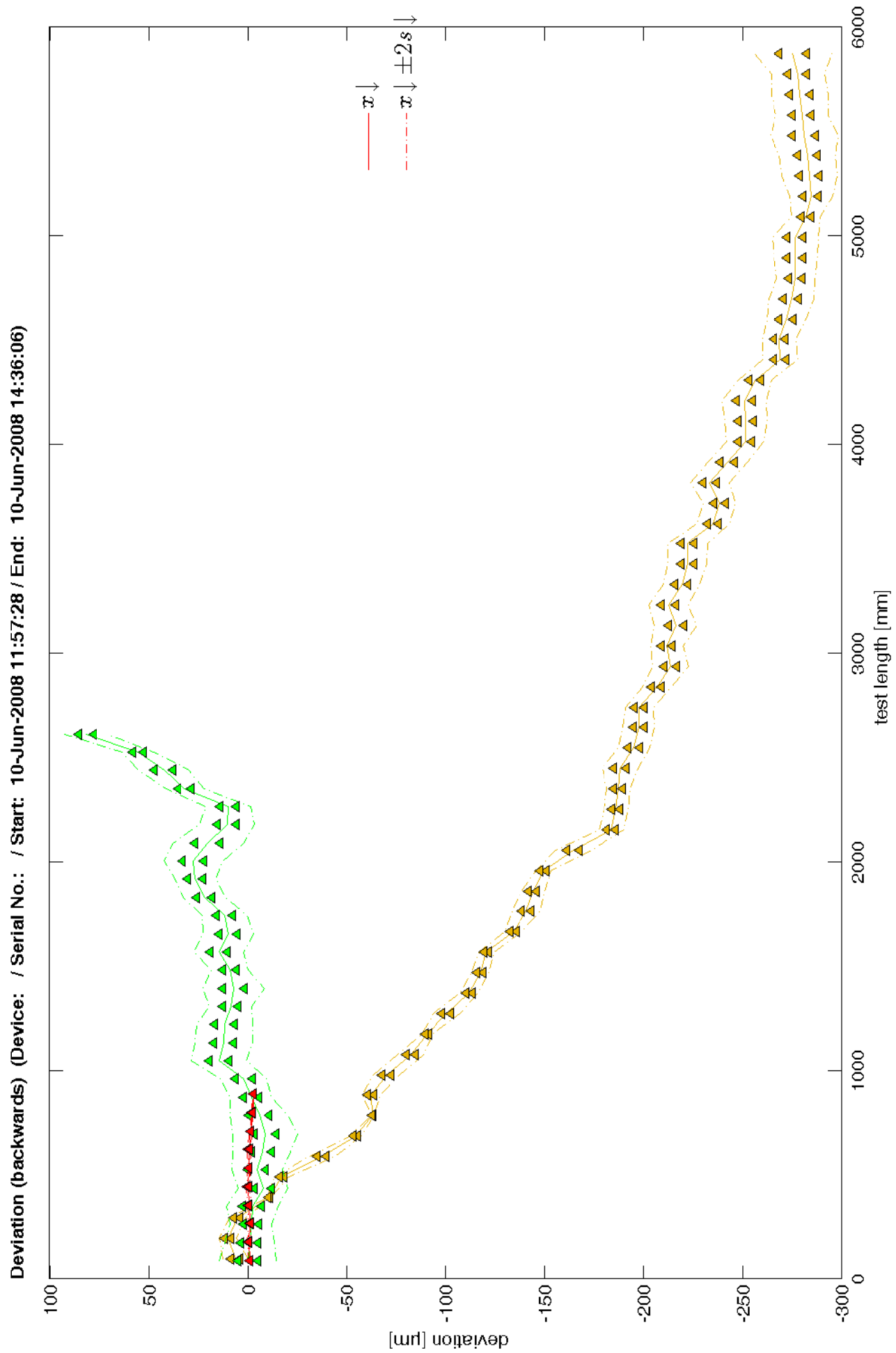
Device:		
Serial No.:		
Model:	Example Machine	
Company:	Compay	
Machine volume [X,Y,Z] [mm]:	[6000,3200,1000]	
Examination start:	10-Jun-2008 11:57:28	
Examination end:	10-Jun-2008 14:36:06	
Date of last examination:		

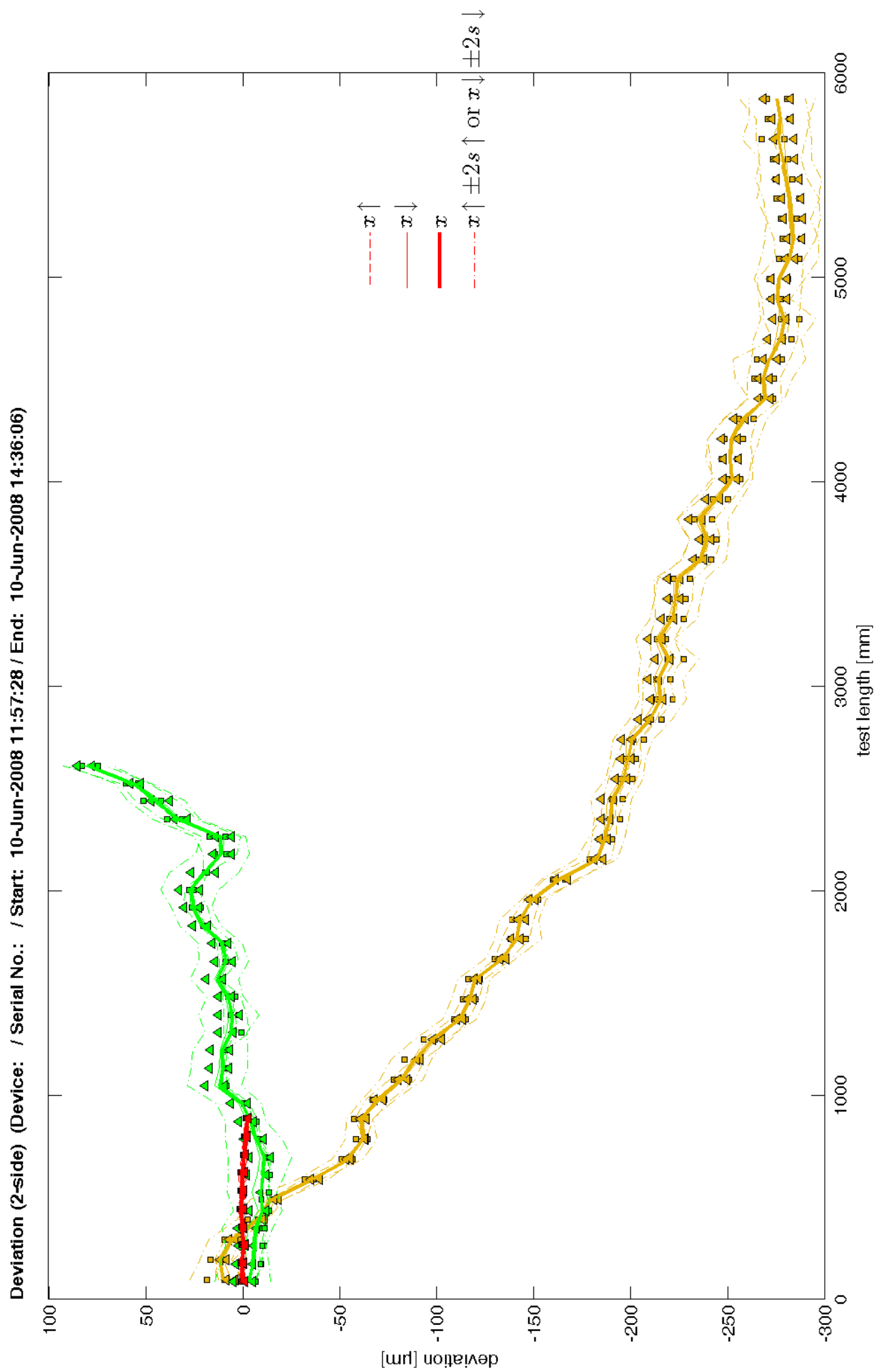
Examiner:	ETALON
Department:	
Comment:	

Interferometer:	LaserTRACER
Serial No.:	
Date of last calibration:	
Calibration sign:	
Uncertainty (k=2):	0.1 μm + 0.2 $\mu\text{m}/\text{m}$
Comment:	

Software:	Trac-Check
Version No.:	V16.52.2009-08-04







Measured axis / Device: / Serial No.: / Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06

Axis	Term	E <->	Mean B <->	Positions per meter	Measurements per line	ISO satisfied
X	X: no comp [116,1587,-72] - [5891,1587,-72]	298.59	-0.41	10	2	no
Y	Y: no comp [568,2624,-848] - [568,98,-848]	95.76	-3.20	11	2	no
Z	Z: no comp [805,1603,-897] - [805,1603,-100]	4.23	1.49	10	2	no

X (Device: / Serial No.:)

Table 1: Settings (Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)

Type of scale				
NDE correction		yes		
Expansion Coefficient [ppm/K]		11		
Feed rate [mm/min]		3000		
Dwell time at target position [sec]		5		
Used compensation				
Position of axes not under test [mm]		y =1586.6351, z =-71.7129		
Test Conditions	Measuring point		t start [°C]	t end [°C]
Material sensor 1			26.0	26.0
Material sensor 2			20.0	20.0
Material sensor 3			20.0	20.0
Air temperature [°C]	25.7		25.9	26.0
Air pressure [hPa]	978.9			
Humidity [%]	33			

Deviation (2-side)

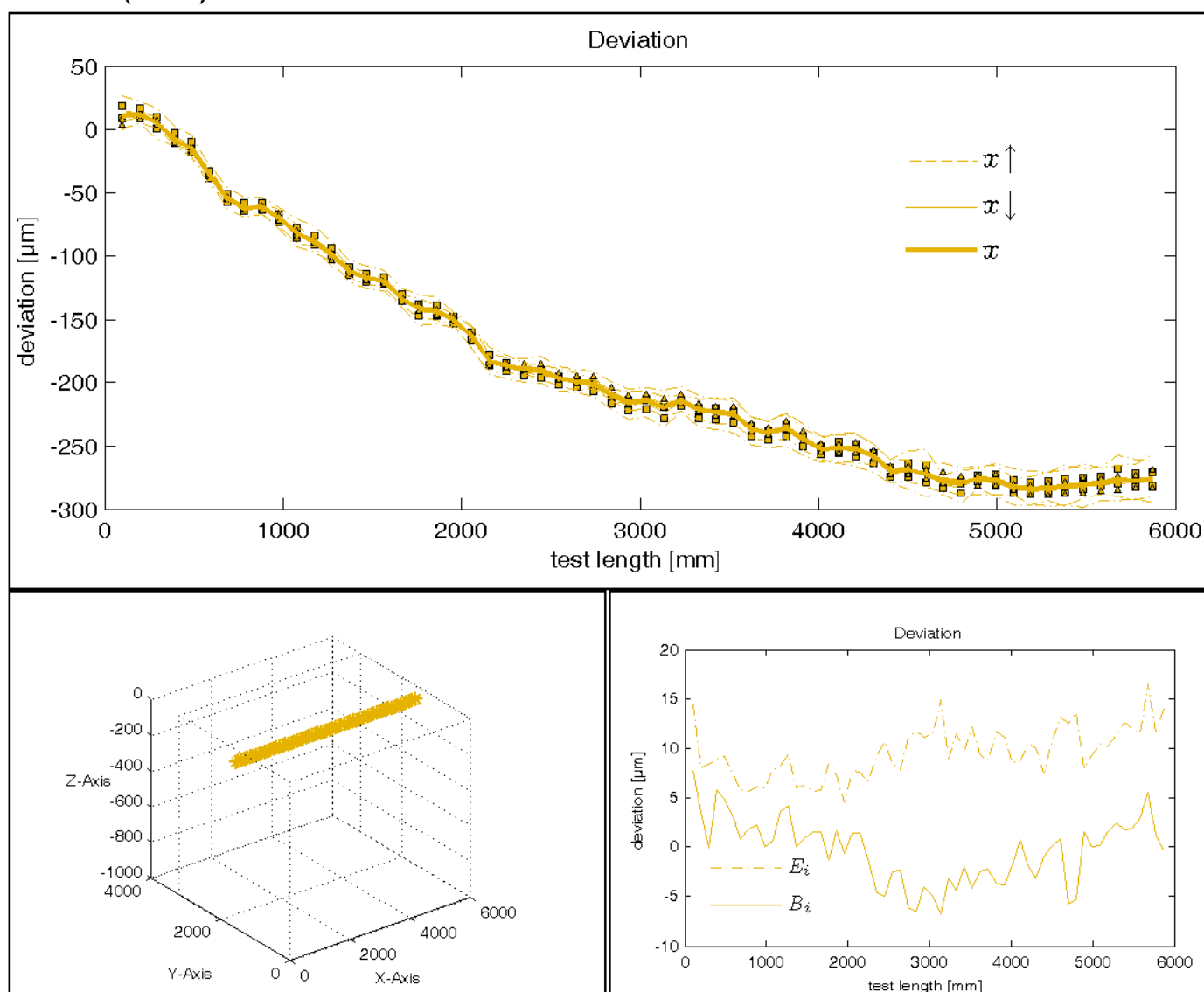
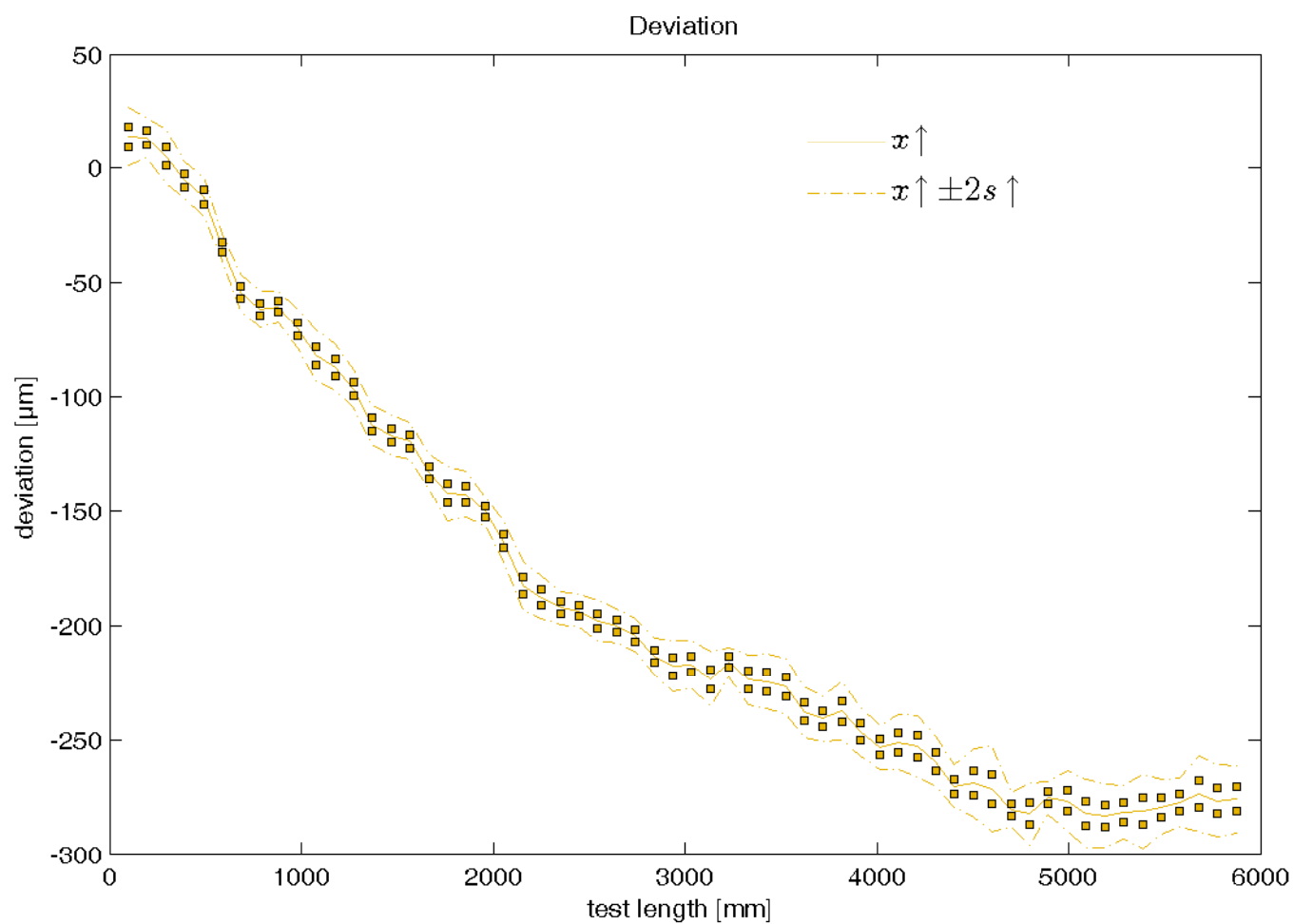


Table 3: Deviation of axis

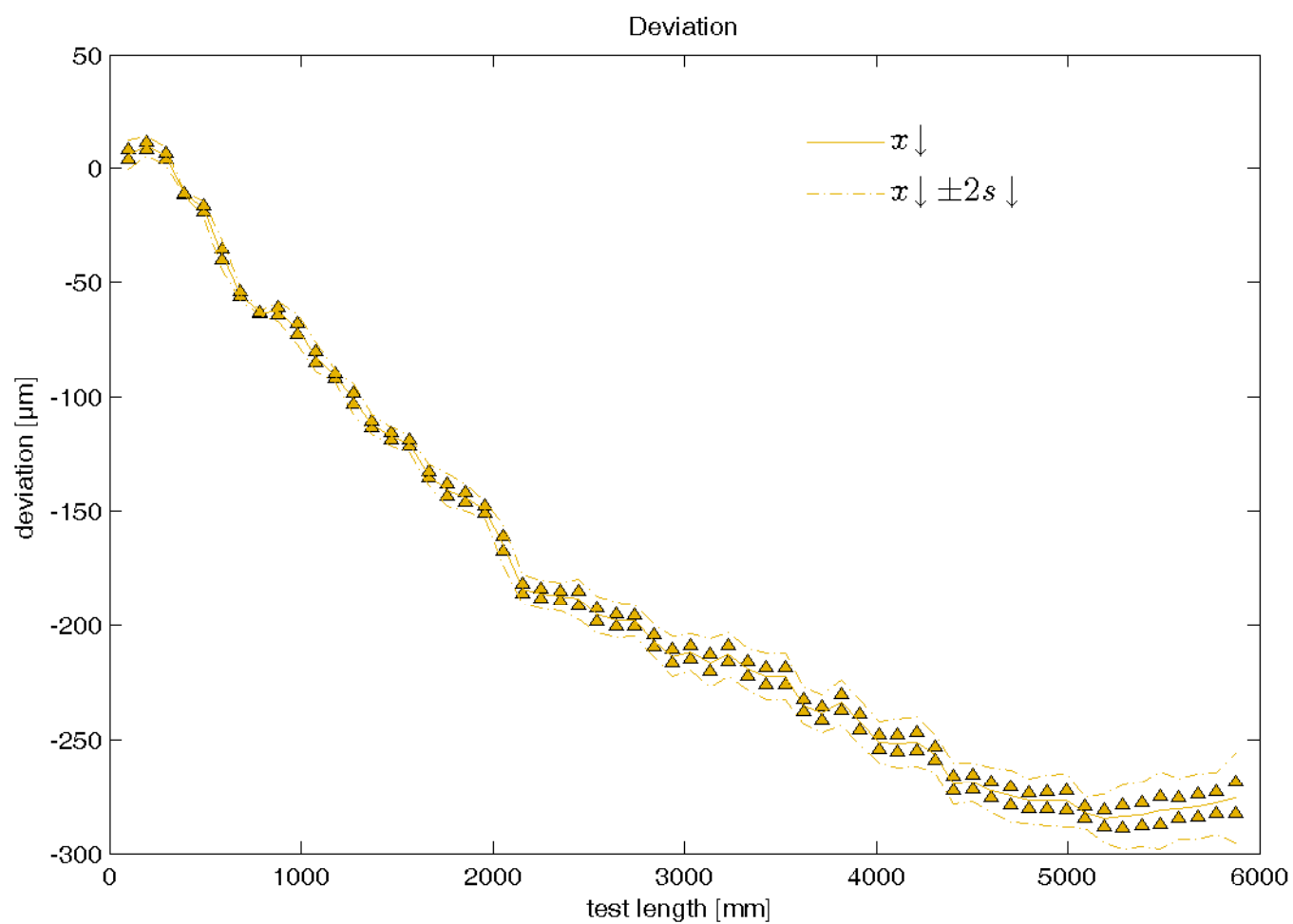
Deviation of axis [μm]	forward	backward	2 side
B (Reversal Value)	Not applicable	Not applicable	7.69
Mean B (Mean reversal value)	Not applicable	Not applicable	-0.41
M (Range mean directional positional deviation)	Not applicable	Not applicable	307.29
E (Systematic positional deviation)	297.09	294.60	298.59
R (Repeatability of positioning)	37.22	39.44	39.44
A (Accuracy)	324.18	312.29	324.91

X (Device: / Serial No.:)

Deviation (forward) (Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)



Deviation (backwards)



X – Table 2: Test results (Device: / Serial No.: / Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)

i	1		2		3		4		5		6	
Position Pi [mm]	98		196		294		392		489		587	
Direction	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward
deviation 1 [μm]	9.29	3.93	10.31	8.35	1.01	3.83	-8.08	-11.29	-15.70	-18.77	-36.53	-40.07
deviation 2 [μm]	18.35	8.33	16.44	11.31	9.46	6.76	-2.36	-10.74	-9.58	-16.26	-32.42	-35.41
mean deviation [μm]	13.82	6.13	13.37	9.83	5.24	5.30	-5.22	-11.01	-12.64	-17.51	-34.47	-37.74
si [μm]	6.41	3.11	4.33	2.09	5.97	2.07	4.05	0.38	4.33	1.78	2.91	3.30
2 si [μm]	12.81	6.22	8.67	4.18	11.94	4.14	8.09	0.77	8.65	3.56	5.82	6.60
xi - 2 si [μm]	1.01	-0.09	4.71	5.65	-6.71	1.16	-13.31	-11.78	-21.29	-21.07	-40.29	-44.34
xi + 2 si [μm]	26.63	12.36	22.04	14.01	17.18	9.43	2.87	-10.25	-3.99	-13.95	-28.66	-31.14
Ri (1) [μm]	25.63	12.44	17.34	8.36	23.88	8.27	16.19	1.54	17.30	7.12	11.64	13.20
Bi [μm]	7.69		3.54		-0.06		5.79		4.87		3.26	
Ri (2) [μm]	26.72		17.34		23.88		16.19		17.30		15.68	
M [μm]	9.98		11.60		5.27		-8.12		-15.08		-36.11	

pi: unidirectional positional deviation

xi: mean unidirectional positional deviation

Mxi: mean bi-directional positional deviation

si: estimator for the unidirectional axis repeatability of positioning

Bi: Reversal value

Ri (1): Unidirectional repeatability

Ri (2): Bidirectional repeatability

X – Table 2: Test results (Device: / Serial No.: / Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)

i	7		8		9		10		11		12	
Position Pi [mm]	685		783		881		979		1077		1175	
Direction	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward
deviation 1 [μm]	-57.08	-56.01	-64.42	-63.65	-62.86	-64.25	-73.30	-72.65	-85.86	-84.86	-90.88	-91.81
deviation 2 [μm]	-51.26	-54.04	-58.69	-63.13	-58.09	-61.07	-67.31	-68.06	-78.01	-80.29	-83.57	-89.88
mean deviation [μm]	-54.17	-55.03	-61.56	-63.39	-60.48	-62.66	-70.30	-70.36	-81.94	-82.58	-87.22	-90.85
si [μm]	4.11	1.40	4.05	0.37	3.37	2.25	4.24	3.25	5.55	3.23	5.17	1.36
2 si [μm]	8.22	2.80	8.10	0.74	6.75	4.50	8.47	6.50	11.10	6.46	10.34	2.73
xi – 2 si [μm]	-62.39	-57.82	-69.66	-64.13	-67.23	-67.15	-78.78	-76.85	-93.04	-89.03	-97.56	-93.57
xi + 2 si [μm]	-45.95	-52.23	-53.46	-62.66	-53.73	-58.16	-61.83	-63.86	-70.84	-76.12	-76.89	-88.12
Ri (1) [μm]	16.44	5.59	16.21	1.47	13.50	8.99	16.95	12.99	22.20	12.92	20.67	5.45
Bi [μm]	0.86		1.83		2.18		0.05		0.64		3.62	
Ri (2) [μm]	16.44		16.21		13.50		16.95		22.20		20.67	
M [μm]	-54.60		-62.48		-61.57		-70.33		-82.26		-89.04	

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X – Table 2: Test results (Device: / Serial No.: / Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)

i	13		14		15		16		17		18	
Position Pi [mm]	1273		1371		1468		1566		1664		1762	
Direction	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward
deviation 1 [μm]	-99.40	-103.06	-115.08	-113.60	-119.92	-119.16	-122.08	-122.05	-135.57	-135.87	-146.39	-143.40
deviation 2 [μm]	-93.65	-98.32	-109.06	-110.48	-113.71	-116.08	-116.39	-119.38	-130.10	-132.80	-137.88	-138.29
mean deviation [μm]	-96.53	-100.69	-112.07	-112.04	-116.81	-117.62	-119.24	-120.72	-132.83	-134.33	-142.14	-140.85
si [μm]	4.06	3.35	4.25	2.20	4.38	2.18	4.03	1.89	3.87	2.17	6.02	3.61
2 si [μm]	8.13	6.71	8.51	4.41	8.77	4.36	8.05	3.77	7.75	4.34	12.04	7.23
xi – 2 si [μm]	-104.65	-107.40	-120.58	-116.45	-125.58	-121.98	-127.29	-124.49	-140.58	-138.67	-154.17	-148.07
xi + 2 si [μm]	-88.40	-93.98	-103.56	-107.63	-108.05	-113.26	-111.19	-116.94	-125.09	-130.00	-130.10	-133.62
Ri (1) [μm]	16.25	13.42	17.02	8.82	17.54	8.72	16.10	7.54	15.49	8.68	24.07	14.46
Bi [μm]	4.16		-0.03		0.80		1.48		1.50		-1.29	
Ri (2) [μm]	19.00		17.02		17.54		16.10		15.49		24.07	
M [μm]	-98.61		-112.05		-117.22		-119.98		-133.58		-141.49	

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X – Table 2: Test results (Device: / Serial No.: / Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)

i	19		20		21		22		23		24	
Position Pi [mm]	1860		1958		2056		2154		2252		2350	
Direction	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward
deviation 1 [μm]	-146.27	-146.33	-152.50	-150.94	-166.28	-167.77	-186.48	-186.32	-190.93	-188.59	-194.81	-189.70
deviation 2 [μm]	-139.01	-142.14	-147.94	-148.16	-160.07	-161.43	-178.89	-181.76	-184.34	-184.29	-189.70	-185.45
mean deviation [μm]	-142.64	-144.24	-150.22	-149.55	-163.17	-164.60	-182.69	-184.04	-187.63	-186.44	-192.25	-187.58
si [μm]	5.13	2.96	3.23	1.97	4.39	4.48	5.37	3.22	4.66	3.04	3.61	3.01
2 si [μm]	10.27	5.92	6.46	3.93	8.79	8.96	10.74	6.45	9.31	6.08	7.22	6.02
xi – 2 si [μm]	-152.90	-150.15	-156.68	-153.48	-171.96	-173.56	-193.43	-190.48	-196.94	-192.52	-199.47	-193.59
xi + 2 si [μm]	-132.37	-138.32	-143.76	-145.62	-154.39	-155.64	-171.94	-177.59	-178.32	-180.36	-185.03	-181.56
Ri (1) [μm]	20.53	11.84	12.91	7.86	17.57	17.91	21.49	12.90	18.62	12.16	14.44	12.03
Bi [μm]	1.60		-0.67		1.43		1.35		-1.19		-4.68	
Ri (2) [μm]	20.53		12.91		19.17		21.49		18.62		17.91	
M [μm]	-143.44		-149.88		-163.89		-183.36		-187.04		-189.91	

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X – Table 2: Test results (Device: / Serial No.: / Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)

i	25		26		27		28		29		30	
Position Pi [mm]	2447		2545		2643		2741		2839		2937	
Direction	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward
deviation 1 [µm]	-196.01	-191.69	-201.03	-198.32	-202.89	-200.63	-206.79	-200.62	-216.22	-209.45	-221.69	-216.86
deviation 2 [µm]	-190.91	-185.38	-194.84	-192.65	-197.49	-195.10	-201.64	-195.69	-210.66	-204.42	-213.86	-210.54
mean deviation [µm]	-193.46	-188.54	-197.93	-195.49	-200.19	-197.86	-204.22	-198.16	-213.44	-206.94	-217.78	-213.70
si [µm]	3.61	4.46	4.38	4.01	3.82	3.91	3.64	3.49	3.93	3.56	5.54	4.47
2 si [µm]	7.22	8.93	8.76	8.03	7.64	7.83	7.29	6.98	7.86	7.12	11.07	8.93
xi – 2 si [µm]	-200.68	-197.46	-206.70	-203.51	-207.83	-205.69	-211.51	-205.13	-221.30	-214.06	-228.85	-222.63
xi + 2 si [µm]	-186.24	-179.61	-189.17	-187.46	-192.55	-190.04	-196.93	-191.18	-205.58	-199.81	-206.71	-204.77
Ri (1) [µm]	14.44	17.85	17.52	16.05	15.28	15.65	14.57	13.96	15.72	14.24	22.14	17.87
Bi [µm]	-4.92		-2.45		-2.33		-6.06		-6.50		-4.08	
Ri (2) [µm]	21.07		19.24		17.79		20.33		21.48		24.08	
M [µm]	-191.00		-196.71		-199.03		-201.19		-210.19		-215.74	

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i	31		32		33		34		35		36	
Position Pi [mm]	3035		3133		3231		3329		3426		3524	
Direction	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward
deviation 1 [µm]	-220.58	-214.79	-227.58	-220.37	-218.32	-216.28	-227.65	-222.62	-228.67	-225.95	-231.08	-226.04
deviation 2 [µm]	-213.26	-209.10	-219.18	-212.75	-213.70	-209.40	-219.99	-216.18	-220.22	-218.96	-222.31	-218.92
mean deviation [µm]	-216.92	-211.94	-223.38	-216.56	-216.01	-212.84	-223.82	-219.40	-224.45	-222.46	-226.69	-222.48
si [µm]	5.18	4.02	5.94	5.39	3.27	4.87	5.42	4.56	5.97	4.95	6.20	5.03
2 si [µm]	10.36	8.04	11.88	10.78	6.54	9.74	10.84	9.12	11.95	9.89	12.40	10.07
xi – 2 si [µm]	-227.28	-219.99	-235.26	-227.34	-222.55	-222.58	-234.66	-228.52	-236.40	-232.35	-239.09	-232.55
xi + 2 si [µm]	-206.56	-203.90	-211.51	-205.78	-209.47	-203.10	-212.98	-210.28	-212.50	-212.56	-214.30	-212.42
Ri (1) [µm]	20.72	16.09	23.75	21.56	13.08	19.48	21.68	18.24	23.90	19.79	24.79	20.13
Bi [µm]	-4.97		-6.82		-3.17		-4.42		-1.99		-4.21	
Ri (2) [µm]	23.38		29.48		19.48		24.38		23.90		26.67	
M [µm]	-214.43		-219.97		-214.42		-221.61		-223.45		-224.59	

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i	37		38		39		40		41		42	
Position Pi [mm]	3622		3720		3818		3916		4014		4112	
Direction	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward
deviation 1 [µm]	-241.84	-238.17	-244.33	-241.46	-241.99	-237.24	-250.04	-245.98	-256.61	-254.58	-255.26	-255.56
deviation 2 [µm]	-233.84	-232.47	-237.32	-235.65	-232.96	-230.27	-242.55	-238.94	-249.81	-248.15	-246.85	-248.04
mean deviation [µm]	-237.84	-235.32	-240.83	-238.55	-237.48	-233.76	-246.30	-242.46	-253.21	-251.37	-251.05	-251.80
si [µm]	5.66	4.03	4.96	4.11	6.38	4.93	5.30	4.98	4.81	4.55	5.95	5.31
2 si [µm]	11.32	8.05	9.91	8.22	12.77	9.87	10.60	9.96	9.63	9.10	11.90	10.63
xi – 2 si [µm]	-249.16	-243.37	-250.74	-246.77	-250.25	-243.62	-256.89	-252.42	-262.84	-260.47	-262.95	-262.43
xi + 2 si [µm]	-226.52	-227.27	-230.92	-230.34	-224.71	-223.89	-235.70	-232.50	-243.59	-242.26	-239.16	-241.17
Ri (1) [µm]	22.63	16.10	19.82	16.43	25.54	19.74	21.19	19.92	19.25	18.21	23.80	21.26
Bi [µm]	-2.52		-2.27		-3.72		-3.84		-1.85		0.75	
Ri (2) [µm]	22.63		20.40		26.36		24.39		20.58		23.80	
M [µm]	-236.58		-239.69		-235.62		-244.38		-252.29		-251.43	

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i	43		44		45		46		47		48	
Position Pi [mm]	4210		4308		4405		4503		4601		4699	
Direction	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward
deviation 1 [μm]	-257.71	-254.97	-263.45	-259.39	-273.60	-272.41	-274.12	-271.89	-278.12	-275.82	-283.21	-278.82
deviation 2 [μm]	-248.29	-247.19	-255.66	-253.44	-266.99	-266.10	-263.62	-265.84	-264.96	-268.83	-277.95	-270.78
mean deviation [μm]	-253.00	-251.08	-259.56	-256.42	-270.29	-269.25	-268.87	-268.86	-271.54	-272.33	-280.58	-274.80
si [μm]	6.66	5.50	5.51	4.21	4.68	4.46	7.42	4.28	9.30	4.94	3.72	5.69
2 si [μm]	13.32	11.01	11.02	8.41	9.35	8.92	14.85	8.56	18.61	9.88	7.44	11.38
xi – 2 si [μm]	-266.32	-262.08	-270.58	-264.83	-279.65	-278.17	-283.72	-277.42	-290.15	-282.21	-288.01	-286.18
xi + 2 si [μm]	-239.68	-240.07	-248.53	-248.01	-260.94	-260.34	-254.02	-260.31	-252.93	-262.44	-273.14	-263.43
Ri (1) [μm]	26.64	22.01	22.05	16.82	18.71	17.83	29.70	17.11	37.22	19.76	14.87	22.75
Bi [μm]	-1.92		-3.14		-1.04		-0.01		0.78		-5.77	
Ri (2) [μm]	26.64		22.57		19.31		29.70		37.22		24.59	
M [μm]	-252.04		-257.99		-269.77		-268.86		-271.93		-277.69	

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i	49		50		51		52		53		54	
Position Pi [mm]	4797		4895		4993		5091		5189		5286	
Direction	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward
deviation 1 [μm]	-287.10	-280.44	-277.88	-280.74	-281.34	-280.83	-287.35	-284.75	-288.11	-288.61	-285.68	-288.94
deviation 2 [μm]	-277.52	-273.51	-272.74	-272.92	-272.05	-272.59	-276.92	-279.73	-278.44	-280.93	-277.57	-279.08
mean deviation [μm]	-282.31	-276.98	-275.31	-276.83	-276.70	-276.71	-282.13	-282.24	-283.27	-284.77	-281.63	-284.01
si [μm]	6.78	4.90	3.63	5.53	6.57	5.82	7.38	3.54	6.84	5.43	5.73	6.97
2 si [μm]	13.55	9.80	7.27	11.05	13.14	11.65	14.75	7.09	13.68	10.86	11.47	13.94
xi – 2 si [μm]	-295.87	-286.78	-282.58	-287.88	-289.83	-288.36	-296.88	-289.33	-296.96	-295.64	-293.09	-297.95
xi + 2 si [μm]	-268.76	-267.17	-268.04	-265.78	-263.56	-265.06	-267.38	-275.15	-269.59	-273.91	-270.16	-270.07
Ri (1) [μm]	27.11	19.61	14.54	22.10	26.27	23.30	29.50	14.18	27.37	21.73	22.93	27.88
Bi [μm]	-5.33		1.52		0.01		0.11		1.50		2.38	
Ri (2) [μm]	28.69		22.10		26.27		29.50		27.37		27.88	
M [μm]	-279.64		-276.07		-276.70		-282.19		-284.02		-282.82	

pi: unidirectional positional deviation

xi: mean unidirectional positional deviation

Mxi: mean bi-directional positional deviation

si: estimator for the unidirectional axis repeatability of positioning

Bi: Reversal value

Ri (1): Unidirectional repeatability

Ri (2): Bidirectional repeatability

X – Table 2: Test results (Device: / Serial No.: / Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)

i	55		56		57		58		59		60	
Position Pi [mm]	5384		5482		5580		5678		5776		5874	
Direction	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward
deviation 1 [µm]	-287.01	-288.03	-283.64	-287.28	-281.11	-285.01	-279.50	-284.34	-282.27	-282.80	-281.05	-282.58
deviation 2 [µm]	-275.49	-277.96	-275.21	-275.24	-273.55	-275.60	-267.86	-274.16	-271.15	-273.23	-270.70	-268.63
mean deviation [µm]	-281.25	-283.00	-279.42	-281.26	-277.33	-280.30	-273.68	-279.25	-276.71	-278.02	-275.87	-275.60
si [µm]	8.15	7.12	5.97	8.51	5.34	6.66	8.23	7.19	7.86	6.77	7.32	9.86
2 si [µm]	16.29	14.24	11.93	17.02	10.68	13.31	16.46	14.39	15.73	13.54	14.64	19.72
xi – 2 si [µm]	-297.54	-297.24	-291.36	-298.28	-288.01	-293.62	-290.14	-293.64	-292.43	-291.56	-290.52	-295.33
xi + 2 si [µm]	-264.95	-268.75	-267.49	-264.24	-266.65	-266.99	-257.22	-264.86	-260.98	-264.48	-261.23	-255.88
Ri (1) [µm]	32.59	28.49	23.86	34.03	21.37	26.63	32.92	28.78	31.45	27.08	29.28	39.44
Bi [µm]	1.75		1.84		2.97		5.57		1.31		-0.27	
Ri (2) [µm]	32.59		34.03		26.97		36.42		31.45		39.44	
M [µm]	-282.12		-280.34		-278.82		-276.47		-277.36		-275.74	

pi: unidirectional positional deviation

xi: mean unidirectional positional deviation

Mxi: mean bi-directional positional deviation

si: estimator for the unidirectional axis repeatability of positioning

Bi: Reversal value

Ri (1): Unidirectional repeatability

Ri (2): Bidirectional repeatability

Y (Device: / Serial No.:)

Table 1: Settings (Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)

Type of scale			
NDE correction	yes		
Expansion Coefficient [ppm/K]	11		
Feed rate [mm/min]	3000		
Dwell time at target position [sec]	5		
Used compensation			
Position of axes not under test [mm]	x =567.9013, z =-848.3282		
Test Conditions	Measuring point	t start [°C]	t end [°C]
Material sensor 1		26.0	26.0
Material sensor 2		26.2	26.3
Material sensor 3		20.0	20.0
Air temperature [°C]	25.7	26.2	26.3
Air pressure [hPa]	977.8		
Humidity [%]	30		

Deviation (2-side)

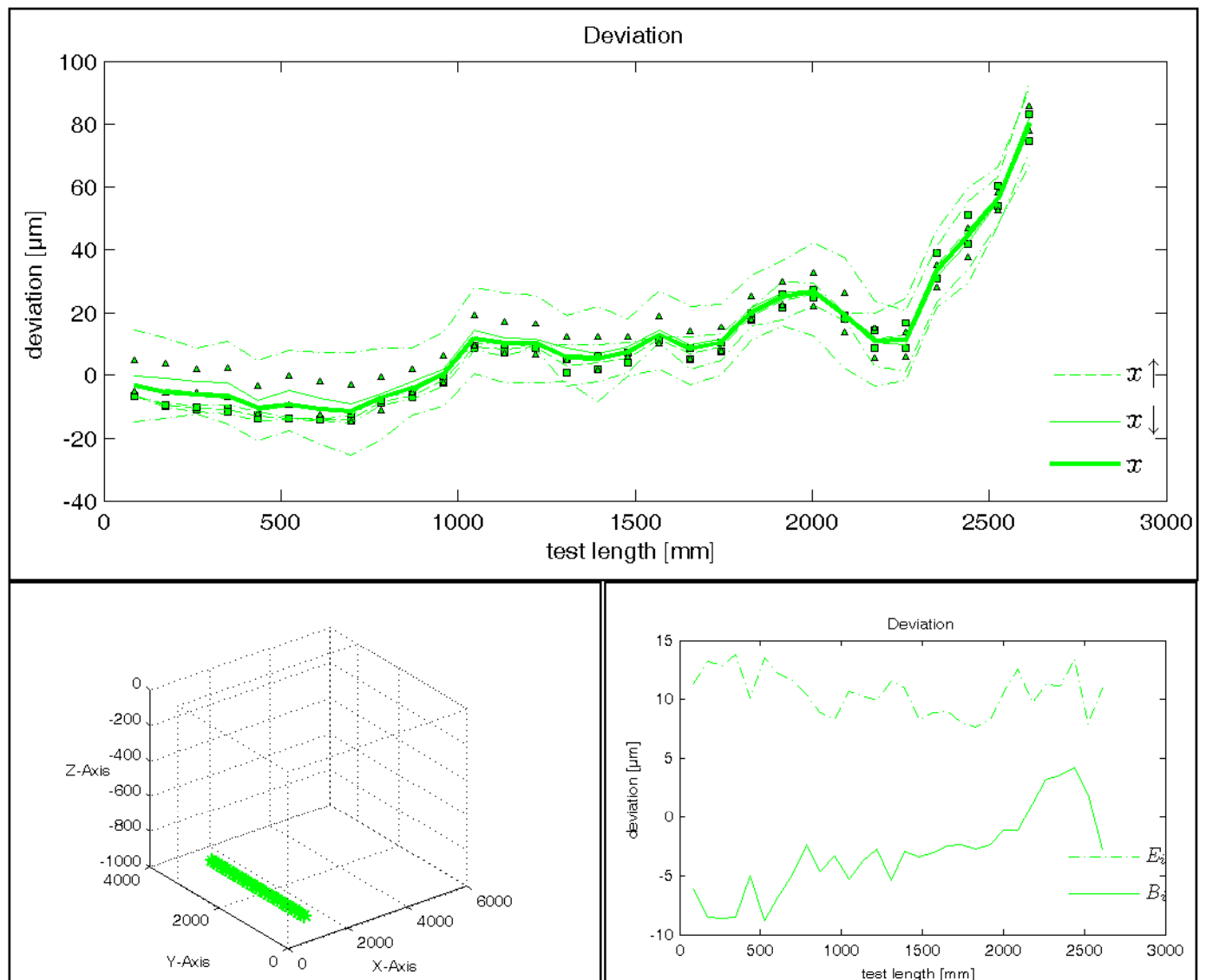
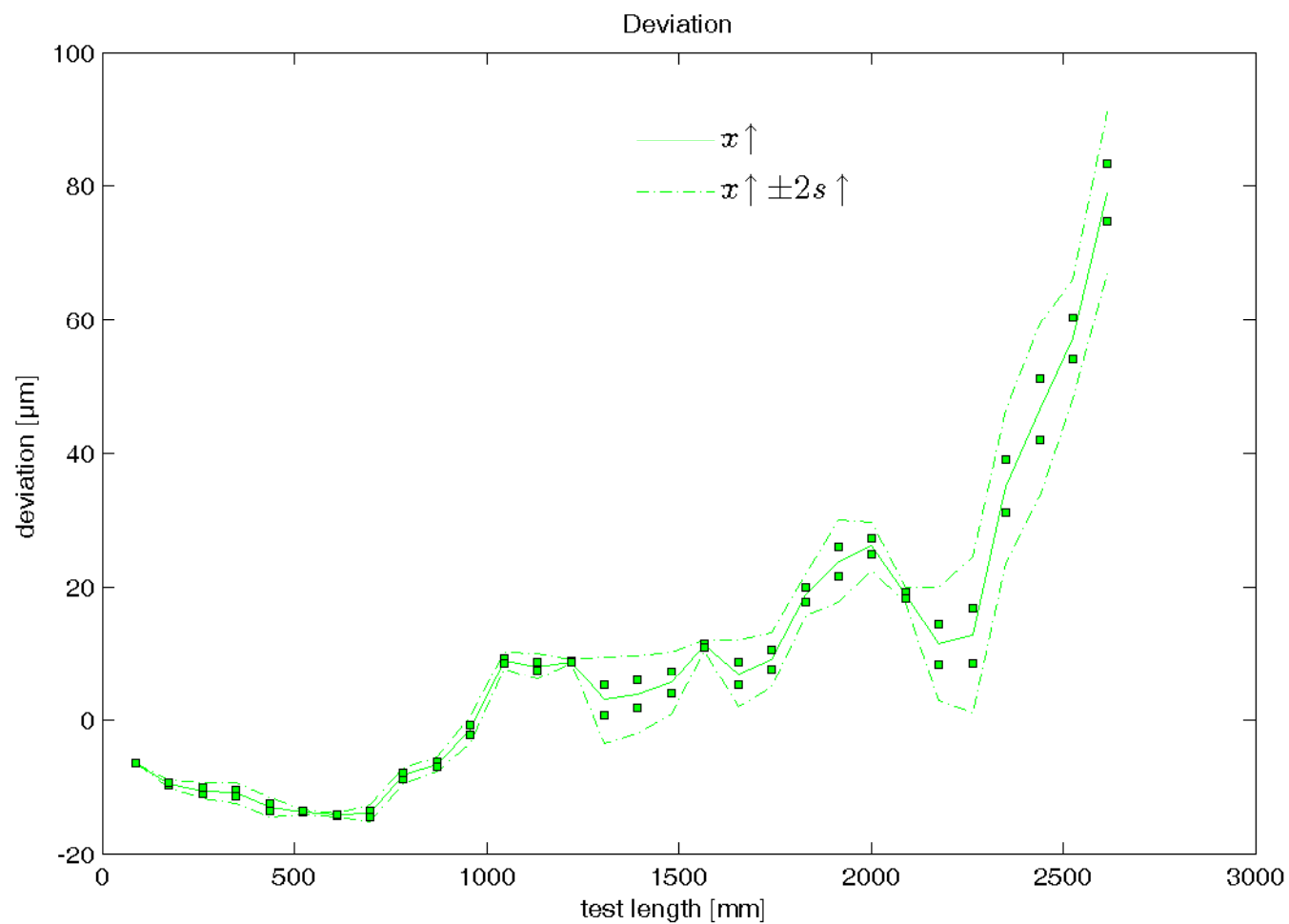


Table 3: Deviation of axis

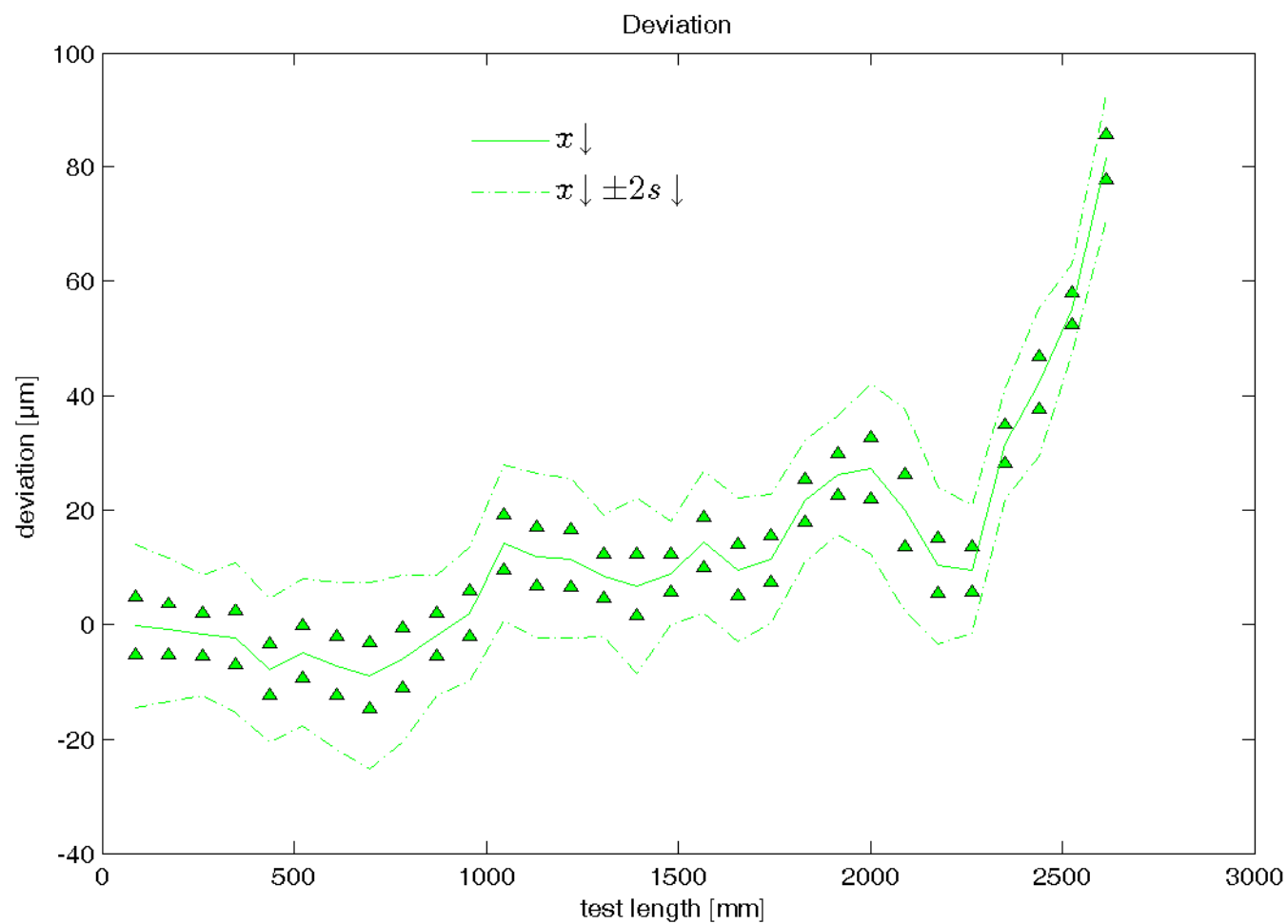
Deviation of axis [μm]	forward	backward	2 side
B (Reversal Value)	Not applicable	Not applicable	4.18
Mean B (Mean reversal value)	Not applicable	Not applicable	-3.20
M (Range mean directional positional deviation)	Not applicable	Not applicable	100.27
E (Systematic positional deviation)	93.02	90.63	95.76
R (Repeatability of positioning)	25.67	35.38	35.38
A (Accuracy)	106.23	117.89	117.89

Y (Device: / Serial No.:)

Deviation (forward) (Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)



Deviation (backwards)



Y – Table 2: Test results (Device: / Serial No.: / Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)

i	1		2		3		4		5		6	
Position Pi [mm]	87		174		261		348		435		523	
Direction	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward
deviation 1 [μm]	-6.43	4.83	-9.65	3.53	-10.93	1.89	-10.32	2.31	-12.49	-3.51	-13.77	-0.31
deviation 2 [μm]	-6.44	-5.32	-9.29	-5.38	-10.08	-5.58	-11.39	-6.98	-13.54	-12.42	-13.51	-9.39
mean deviation [μm]	-6.44	-0.25	-9.47	-0.92	-10.51	-1.85	-10.86	-2.34	-13.02	-7.96	-13.64	-4.85
si [μm]	0.00	7.18	0.25	6.30	0.60	5.28	0.75	6.57	0.74	6.30	0.18	6.42
2 si [μm]	0.00	14.36	0.51	12.60	1.20	10.56	1.50	13.14	1.48	12.61	0.36	12.84
xi – 2 si [μm]	-6.44	-14.61	-9.98	-13.52	-11.71	-12.40	-12.36	-15.48	-14.49	-20.57	-14.00	-17.68
xi + 2 si [μm]	-6.43	14.11	-8.96	11.68	-9.31	8.71	-9.35	10.80	-11.54	4.64	-13.28	7.99
Ri (1) [μm]	0.01	28.72	1.02	25.20	2.40	21.11	3.01	26.28	2.96	25.21	0.71	25.67
Bi [μm]	-6.19		-8.55		-8.66		-8.52		-5.05		-8.79	
Ri (2) [μm]	28.72		25.20		21.11		26.28		25.21		25.67	
M [μm]	-3.34		-5.19		-6.18		-6.60		-10.49		-9.24	

pi: unidirectional positional deviation

xi: mean unidirectional positional deviation

Mxi: mean bi-directional positional deviation

si: estimator for the unidirectional axis repeatability of positioning

Bi: Reversal value

Ri (1): Unidirectional repeatability

Ri (2): Bidirectional repeatability

Y – Table 2: Test results (Device: / Serial No.: / Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)

i	7		8		9		10		11		12	
Position Pi [mm]	610		697		784		871		958		1045	
Direction	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward
deviation 1 [μm]	-14.19	-2.10	-13.45	-3.21	-8.69	-0.75	-6.16	1.86	-0.82	5.99	9.38	19.10
deviation 2 [μm]	-14.01	-12.44	-14.34	-14.74	-7.87	-11.08	-6.95	-5.64	-2.22	-2.26	8.52	9.44
mean deviation [μm]	-14.10	-7.27	-13.89	-8.97	-8.28	-5.91	-6.56	-1.89	-1.52	1.86	8.95	14.27
si [μm]	0.12	7.31	0.63	8.15	0.58	7.31	0.56	5.30	0.99	5.83	0.61	6.83
2 si [μm]	0.25	14.62	1.26	16.31	1.16	14.62	1.12	10.60	1.98	11.66	1.22	13.66
xi – 2 si [μm]	-14.35	-21.88	-15.15	-25.28	-9.44	-20.54	-7.68	-12.49	-3.50	-9.79	7.74	0.61
xi + 2 si [μm]	-13.85	7.35	-12.63	7.33	-7.12	8.71	-5.43	8.71	0.46	13.52	10.17	27.93
Ri (1) [μm]	0.50	29.23	2.52	32.61	2.32	29.24	2.25	21.21	3.97	23.31	2.43	27.32
Bi [μm]	-6.83		-4.92		-2.36		-4.67		-3.38		-5.32	
Ri (2) [μm]	29.23		32.61		29.24		21.21		23.31		27.32	
M [μm]	-10.68		-11.43		-7.10		-4.22		0.17		11.61	

pi: unidirectional positional deviation

xi: mean unidirectional positional deviation

Mxi: mean bi-directional positional deviation

si: estimator for the unidirectional axis repeatability of positioning

Bi: Reversal value

Ri (1): Unidirectional repeatability

Ri (2): Bidirectional repeatability

Y – Table 2: Test results (Device: / Serial No.: / Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)

i	13		14		15		16		17		18	
Position Pi [mm]	1132		1219		1306		1393		1481		1568	
Direction	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward
deviation 1 [µm]	8.79	17.06	8.89	16.47	5.34	12.24	5.97	12.27	7.25	12.24	11.55	18.76
deviation 2 [µm]	7.42	6.86	8.70	6.66	0.77	4.74	1.83	1.41	3.96	5.78	10.99	9.92
mean deviation [µm]	8.11	11.96	8.79	11.57	3.05	8.49	3.90	6.84	5.60	9.01	11.27	14.34
si [µm]	0.96	7.21	0.14	6.94	3.23	5.30	2.92	7.67	2.33	4.57	0.39	6.26
2 si [µm]	1.93	14.42	0.28	13.88	6.46	10.60	5.85	15.35	4.65	9.13	0.79	12.51
xi – 2 si [µm]	6.18	–2.46	8.51	–2.31	–3.40	–2.11	–1.95	–8.51	0.95	–0.12	10.48	1.83
xi + 2 si [µm]	10.04	26.38	9.07	25.44	9.51	19.09	9.75	22.19	10.25	18.14	12.06	26.85
Ri (1) [µm]	3.86	28.84	0.56	27.75	12.91	21.21	11.70	30.69	9.30	18.26	1.58	25.02
Bi [µm]	–3.86		–2.77		–5.44		–2.94		–3.41		–3.07	
Ri (2) [µm]	28.84		27.75		22.50		30.69		18.26		25.02	
M [µm]	10.03		10.18		5.77		5.37		7.30		12.81	

pi: unidirectional positional deviation

xi: mean unidirectional positional deviation

Mxi: mean bi-directional positional deviation

si: estimator for the unidirectional axis repeatability of positioning

Bi: Reversal value

Ri (1): Unidirectional repeatability

Ri (2): Bidirectional repeatability

Y – Table 2: Test results (Device: / Serial No.: / Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)

i	19		20		21		22		23		24	
Position Pi [mm]	1655		1742		1829		1916		2003		2090	
Direction	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward
deviation 1 [μm]	8.79	13.98	10.54	15.45	19.86	25.32	25.93	29.89	27.29	32.52	19.18	26.18
deviation 2 [μm]	5.21	5.07	7.58	7.46	17.70	17.89	21.62	22.51	24.80	21.98	18.30	13.67
mean deviation [μm]	7.00	9.53	9.06	11.45	18.78	21.60	23.78	26.20	26.04	27.25	18.74	19.92
si [μm]	2.53	6.30	2.09	5.65	1.52	5.25	3.05	5.22	1.76	7.45	0.62	8.84
2 si [μm]	5.05	12.60	4.18	11.30	3.05	10.51	6.10	10.43	3.52	14.90	1.25	17.69
xi – 2 si [μm]	1.95	–3.07	4.88	0.15	15.73	11.10	17.67	15.77	22.53	12.35	17.49	2.24
xi + 2 si [μm]	12.05	22.13	13.24	22.75	21.83	32.11	29.88	36.63	29.56	42.15	19.99	37.61
Ri (1) [μm]	10.10	25.20	8.36	22.60	6.10	21.01	12.20	20.86	7.03	29.80	2.49	35.38
Bi [μm]	–2.53		–2.39		–2.83		–2.42		–1.21		–1.19	
Ri (2) [μm]	25.20		22.60		21.01		20.86		29.80		35.38	
M [μm]	8.27		10.26		20.19		24.99		26.65		19.33	

pi: unidirectional positional deviation

xi: mean unidirectional positional deviation

Mxi: mean bi-directional positional deviation

si: estimator for the unidirectional axis repeatability of positioning

Bi: Reversal value

Ri (1): Unidirectional repeatability

Ri (2): Bidirectional repeatability

Y – Table 2: Test results (Device: / Serial No.: / Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)

i	25		26		27		28		29		30	
Position Pi [mm]	2177		2264		2352		2439		2526		2613	
Direction	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward
deviation 1 [μm]	14.41	15.14	16.83	13.53	39.15	35.00	51.05	46.92	60.33	58.02	83.22	85.53
deviation 2 [μm]	8.46	5.48	8.57	5.62	31.02	28.10	41.98	37.74	54.00	52.48	74.62	77.79
mean deviation [μm]	11.43	10.31	12.70	9.57	35.08	31.55	46.52	42.33	57.17	55.25	78.92	81.66
si [μm]	4.21	6.83	5.84	5.60	5.75	4.88	6.42	6.49	4.48	3.92	6.08	5.48
2 si [μm]	8.42	13.67	11.68	11.20	11.51	9.75	12.84	12.99	8.95	7.84	12.16	10.95
xi – 2 si [μm]	3.01	–3.35	1.02	–1.62	23.58	21.80	33.68	29.35	48.22	47.41	66.76	70.70
xi + 2 si [μm]	19.86	23.98	24.39	20.77	46.59	41.30	59.35	55.32	66.12	63.08	91.08	92.61
Ri (1) [μm]	16.84	27.33	23.36	22.39	23.01	19.51	25.67	25.97	17.90	15.67	24.32	21.91
Bi [μm]	1.12		3.13		3.54		4.18		1.92		–2.74	
Ri (2) [μm]	27.33		26.01		24.80		30.00		18.70		25.85	
M [μm]	10.87		11.14		33.32		44.42		56.21		80.29	

pi: unidirectional positional deviation

xi: mean unidirectional positional deviation

Mxi: mean bi-directional positional deviation

si: estimator for the unidirectional axis repeatability of positioning

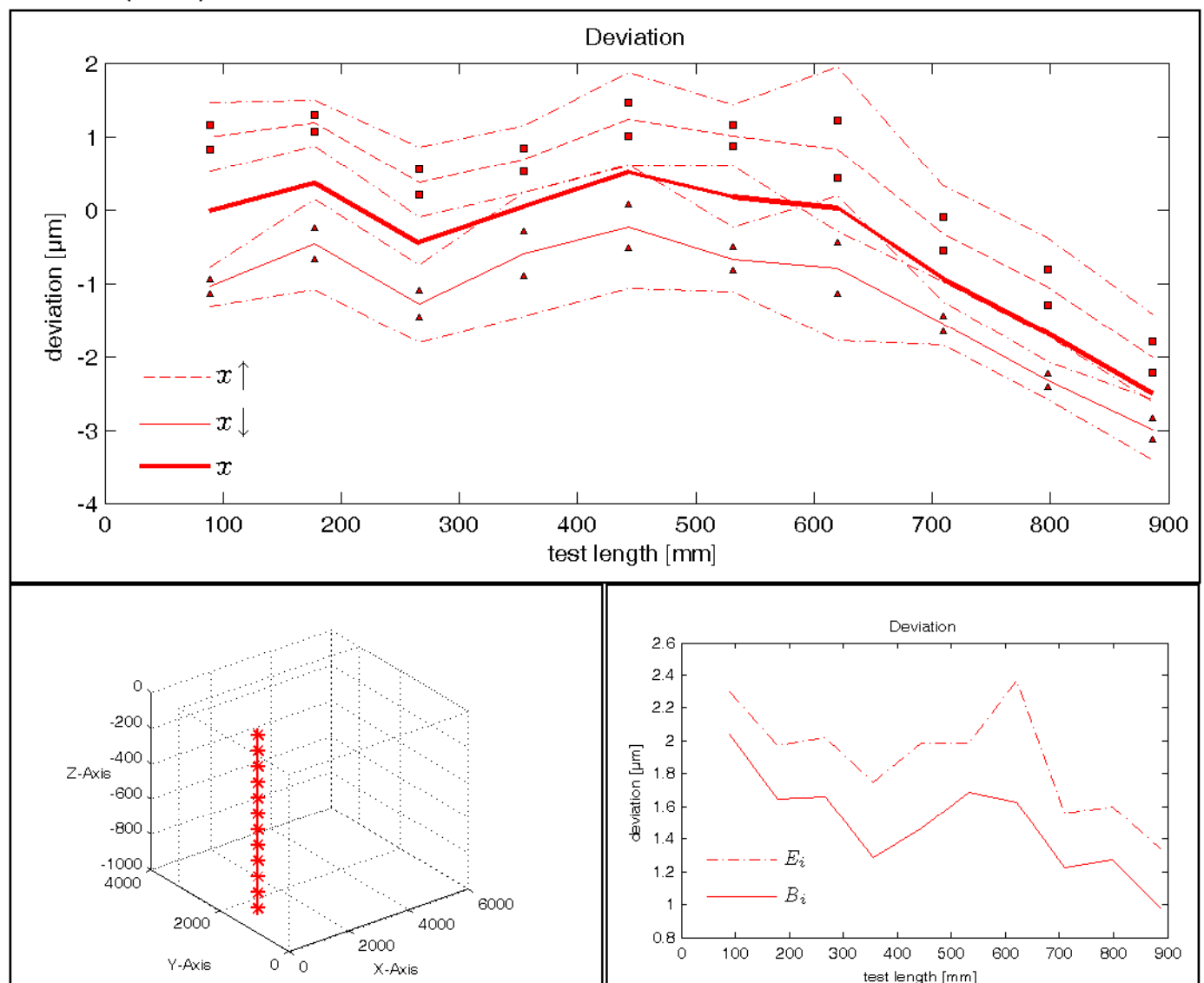
Bi: Reversal value

Ri (1): Unidirectional repeatability

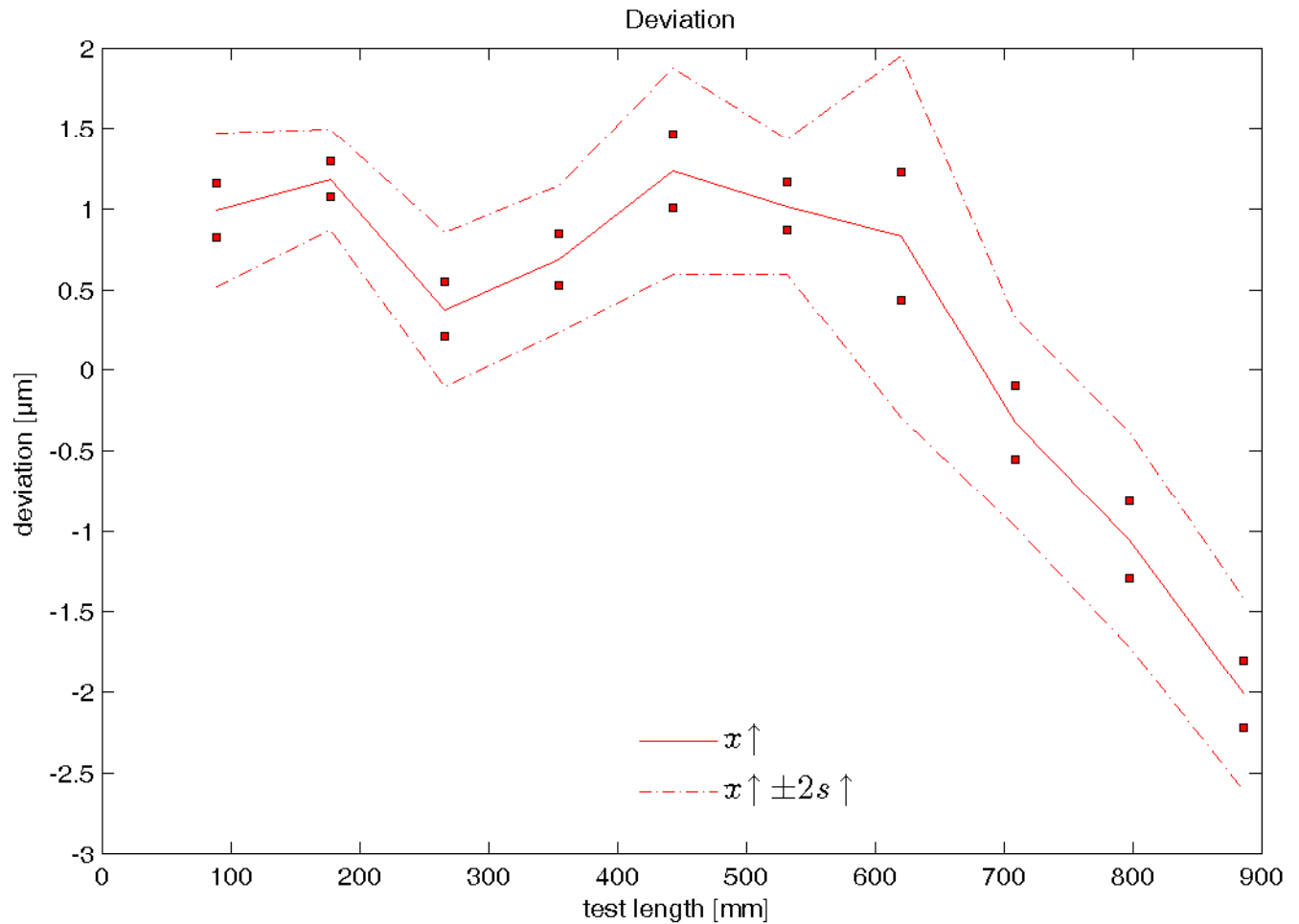
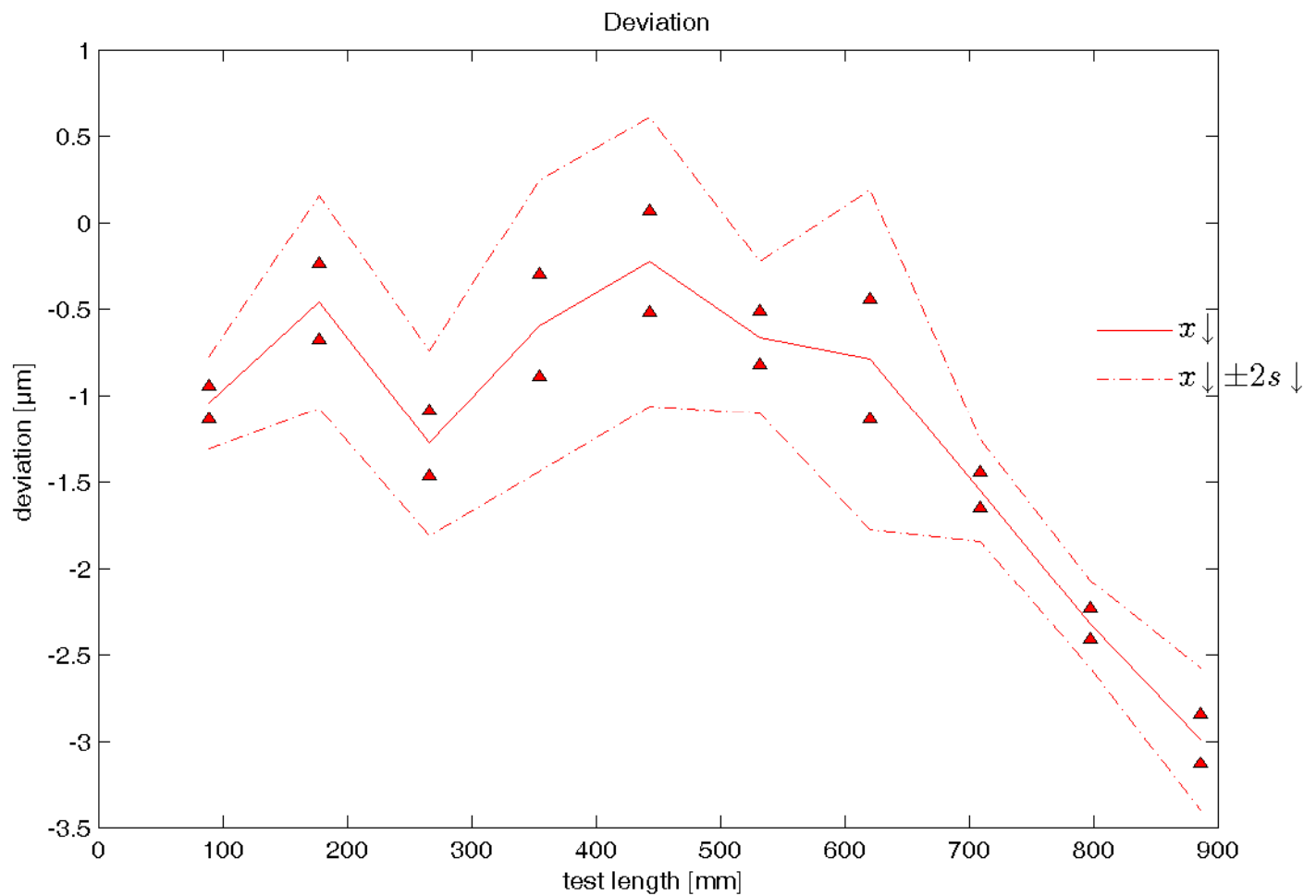
Ri (2): Bidirectional repeatability

Z (Device: / Serial No.:)**Table 1: Settings** (Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)

Type of scale			
NDE correction	yes		
Expansion Coefficient [ppm/K]	11		
Feed rate [mm/min]	3000		
Dwell time at target position [sec]	5		
Used compensation			
Position of axes not under test [mm]	z =-985.7554, y =1603.309		
Test Conditions	Measuring point	t start [°C]	t end [°C]
Material sensor 1		26.0	26.0
Material sensor 2		26.3	26.3
Material sensor 3		26.2	26.4
Air temperature [°C]	25.7	26.7	26.3
Air pressure [hPa]	977.3		
Humidity [%]	29		

Deviation (2-side)**Table 3: Deviation of axis**

Deviation of axis [μm]	forward	backward	2 side
B (Reversal Value)	Not applicable	Not applicable	2.04
Mean B (Mean reversal value)	Not applicable	Not applicable	1.49
M (Range mean directional positional deviation)	Not applicable	Not applicable	4.60
E (Systematic positional deviation)	3.25	2.76	4.23
R (Repeatability of positioning)	2.24	1.97	3.72
A (Accuracy)	4.56	4.01	5.35

Z (Device: / Serial No.:)**Deviation (forward) (Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)****Deviation (backwards)**

Z – Table 2: Test results (Device: / Serial No.: / Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)

i	1		2		3		4		5		6	
Position Pi [mm]	89		177		266		354		443		532	
Direction	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward	forward	backward
deviation 1 [μm]	1.16	-0.95	1.29	-0.25	0.55	-1.09	0.85	-0.30	1.46	0.07	1.16	-0.51
deviation 2 [μm]	0.83	-1.14	1.07	-0.68	0.21	-1.47	0.53	-0.90	1.01	-0.53	0.87	-0.83
mean deviation [μm]	0.99	-1.04	1.18	-0.46	0.38	-1.28	0.69	-0.60	1.24	-0.23	1.01	-0.67
si [μm]	0.24	0.13	0.16	0.31	0.24	0.27	0.23	0.42	0.32	0.42	0.21	0.22
2 si [μm]	0.47	0.27	0.31	0.61	0.48	0.53	0.45	0.84	0.64	0.84	0.42	0.44
xi – 2 si [μm]	0.52	-1.31	0.87	-1.08	-0.10	-1.81	0.23	-1.44	0.60	-1.07	0.60	-1.11
xi + 2 si [μm]	1.47	-0.77	1.49	0.15	0.86	-0.75	1.14	0.24	1.88	0.61	1.43	-0.23
Ri (1) [μm]	0.95	0.54	0.62	1.23	0.96	1.07	0.91	1.68	1.28	1.68	0.84	0.88
Bi [μm]	2.04		1.65		1.66		1.29		1.46		1.68	
Ri (2) [μm]	2.78		2.57		2.67		2.58		2.94		2.54	
M [μm]	-0.02		0.36		-0.45		0.04		0.50		0.17	

pi: unidirectional positional deviation

xi: mean unidirectional positional deviation

Mxi: mean bi-directional positional deviation

si: estimator for the unidirectional axis repeatability of positioning

Bi: Reversal value

Ri (1): Unidirectional repeatability

Ri (2): Bidirectional repeatability

Z – Table 2: Test results (Device: / Serial No.: / Start: 10-Jun-2008 11:57:28 / End: 10-Jun-2008 14:36:06)

i	7		8		9		10					
Position Pi [mm]	620		709		798		886					
Direction	forward	backward	forward	backward	forward	backward	forward	backward				
deviation 1 [µm]	1.22	-0.45	-0.10	-1.45	-0.82	-2.24	-1.80	-2.85				
deviation 2 [µm]	0.43	-1.14	-0.55	-1.65	-1.29	-2.41	-2.22	-3.14				
mean deviation [µm]	0.83	-0.79	-0.33	-1.55	-1.05	-2.33	-2.01	-2.99				
si [µm]	0.56	0.49	0.32	0.15	0.33	0.13	0.30	0.21				
2 si [µm]	1.12	0.98	0.65	0.29	0.67	0.25	0.60	0.41				
xi – 2 si [µm]	-0.29	-1.78	-0.97	-1.84	-1.72	-2.58	-2.61	-3.40				
xi + 2 si [µm]	1.95	0.19	0.32	-1.26	-0.38	-2.07	-1.41	-2.58				
Ri (1) [µm]	2.24	1.97	1.29	0.59	1.34	0.50	1.20	0.82				
Bi [µm]	1.62		1.22		1.27		0.98					
Ri (2) [µm]	3.72		2.16		2.19		1.99					
M [µm]	0.02		-0.94		-1.69		-2.50					

pi: unidirectional positional deviation

xi: mean unidirectional positional deviation

Mxi: mean bi-directional positional deviation

si: estimator for the unidirectional axis repeatability of positioning

Bi: Reversal value

Ri (1): Unidirectional repeatability

Ri (2): Bidirectional repeatability