ecmc motion system test report

- Data file : ../../ecmc_bifrost_slits_sat/tests/11361/axis1/axis1_data.log
- Date : Tue Dec 15 20:35:47 CET 2020
- Author : anderssandstrom

Sensors

Open loop step counter of stepper

The stepper motors was run in open loop during all the tests. The openloop step counter reflects the actual position of the contolsystem.

Resolver:

Conversion data (to open loop coord syst):

1. Scale factor : 1
2. Offset : 29.3758mm

External verification system, Micro-Epsilon ILD2300 sensor

Conversion data (to open loop coord syst):

1. Scale factor : -1 (measure from top)
2. Offset : 60.1835mm

Limit Switch Performance

Low Limit Engage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	-0.5807	-0.5619	0.0188
2	-0.5814	-0.5629	0.0185
3	-0.5791	-0.5601	0.0190
4	-0.5822	-0.5639	0.0183
5	-0.5779	-0.5585	0.0194
6	-0.5791	-0.5602	0.0190
7	-0.5799	-0.5609	0.0190
8	-0.5791	-0.5601	0.0190
9	-0.5814	-0.5629	0.0185
10	-0.5830	-0.5648	0.0181
AVG	-0.5804	-0.5616	-0.0188
STD	0.0015	0.0019	-0.0004
Range	0.0051	0.0063	

Low Limit Disengage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	0.0118	0.0027	-0.0091
2	0.0111	0.0025	-0.0086
3	0.0103	0.0023	-0.0080
4	0.0118	0.0027	-0.0091
5	0.0035	0.0011	-0.0024
6	0.0104	0.0023	-0.0081
7	0.0088	0.0020	-0.0068
8	0.0028	0.0010	-0.0018
9	0.0058	0.0014	-0.0043
10	0.0081	0.0019	-0.0063
AVG	0.0084	0.0020	0.0065
STD	0.0032	0.0006	0.0026
Range	0.0090	0.0017	

High Limit Engage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	67.4273	67.4504	0.0230
2	67.4371	67.4609	0.0238
3	67.4373	67.4609	0.0236
4	67.4379	67.4617	0.0238
5	67.4409	67.4645	0.0235
6	67.4431	67.4668	0.0237
7	67.4386	67.4624	0.0238
8	67.4402	67.4637	0.0236
9	67.4386	67.4624	0.0238
10	67.4454	67.4690	0.0236
AVG	67.4386	67.4623	-0.0237
STD	0.0045	0.0047	-0.0001
Range	0.0180	0.0186	

High Limit Disengage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	66.8818	66.8864	0.0046

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
2	66.8788	66.8822	0.0034
3	66.8810	66.8852	0.0042
4	66.8825	66.8876	0.0051
5	66.8810	66.8852	0.0042
6	66.8802	66.8843	0.0040
7	66.8817	66.8864	0.0046
8	66.8833	66.8889	0.0057
9	66.8840	66.8901	0.0061
10	66.8863	66.8935	0.0073
AVG	66.8821	66.8870	-0.0049
STD	0.0020	0.0031	-0.0011
Range	0.0075	0.0113	

Repeatability

Target Position 15 Positive and Negative Direction

Test	Resolver Pos [mm]	Resolver Neg [mm]	Diff [mm]
1	15.0007	15.0005	0.0003
2	15.0007	15.0005	0.0002
3	15.0007	15.0005	0.0002
4	15.0007	15.0005	0.0002
5	15.0007	15.0005	0.0002
6	15.0007	15.0005	0.0002
7	15.0007	15.0005	0.0002
8	15.0007	15.0005	0.0003
9	15.0007	15.0005	0.0002
10	15.0007	15.0005	0.0002
AVG	15.0007	15.0005	0.0002
STD	0.0000	0.0000	0.0000
Range	0.0000	0.0000	0.0001

Repeatability (Resolver): 0.0000

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
1	15.0293	15.0354	-0.0061
2	15.0277	15.0330	-0.0053
3	15.0277	15.0330	-0.0053
4	15.0307	15.0328	-0.0020
5	15.0277	15.0332	-0.0055
6	15.0279	15.0342	-0.0063
7	15.0291	15.0328	-0.0037
8	15.0303	15.0352	-0.0049
9	15.0281	15.0371	-0.0090
10	15.0281	15.0326	-0.0045
AVG	15.0287	15.0339	-0.0052
STD	0.0011	0.0014	-0.0003
Range	0.0031	0.0045	0.0069

Repeatability (ILD2300): 0.0045

Target Position 35 Positive and Negative Direction

Test	Resolver Pos [mm]	Resolver Neg [mm]	Diff [mm]
1	35.0007	35.0005	0.0002
2	35.0007	35.0005	0.0002
3	35.0008	35.0005	0.0002
4	35.0008	35.0006	0.0002
5	35.0008	35.0005	0.0002
6	35.0007	35.0005	0.0002
7	35.0008	35.0005	0.0002
8	35.0007	35.0005	0.0002
9	35.0008	35.0005	0.0002
10	35.0008	35.0005	0.0002
AVG	35.0008	35.0005	0.0003
STD	0.0000	0.0000	0.0000
Range	0.0000	0.0000	0.0000

Repeatability (Resolver): 0.0000

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
1	35.0013	35.0097	-0.0084
2	34.9993	35.0077	-0.0084
3	34.9999	35.0083	-0.0084
4	35.0005	35.0062	-0.0057
5	35.0005	35.0089	-0.0084
6	35.0019	35.0095	-0.0075
7	35.0003	35.0097	-0.0094
8	34.9972	35.0091	-0.0118
9	34.9972	35.0081	-0.0108
10	35.0003	35.0089	-0.0086
AVG	34.9999	35.0086	-0.0087
STD	0.0015	0.0010	0.0004
Range	0.0047	0.0035	0.0061

Repeatability (ILD2300): 0.0047

Target Position 55 Positive and Negative Direction

Test	Resolver Pos [mm]	Resolver Neg [mm]	Diff [mm]
1	55.0008	55.0006	0.0002
2	55.0008	55.0006	0.0002
3	55.0008	55.0006	0.0002
4	55.0008	55.0006	0.0002
5	55.0008	55.0006	0.0002
6	55.0008	55.0005	0.0003
7	55.0008	55.0006	0.0002
8	55.0008	55.0006	0.0002
9	55.0008	55.0006	0.0002
10	55.0008	55.0005	0.0003
AVG	55.0008	55.0006	0.0002
STD	0.0000	0.0000	-0.0000
Range	0.0000	0.0000	0.0001

Repeatability (Resolver): 0.0000

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
1	54.9862	54.9819	0.0043
2	54.9852	54.9827	0.0024
3	54.9850	54.9805	0.0045
4	54.9844	54.9809	0.0035
5	54.9848	54.9801	0.0047
6	54.9844	54.9819	0.0024
7	54.9848	54.9817	0.0031
8	54.9858	54.9807	0.0051
9	54.9846	54.9813	0.0033
10	54.9837	54.9817	0.0020
AVG	54.9849	54.9813	0.0036
STD	0.0007	0.0008	-0.0001
Range	0.0024	0.0027	0.0031

Repeatability (ILD2300): 0.0027

Resolver Value Distribution

Measured at 8 positions offset by 45deg resolver shaft angle. The distrubution values are based on 75 values at each location.

Test	Setpoint [mm]	Resolver AVG[mm]	Resolver STD[mm]
1	36.12422	36.1268000	0.0000104
2	36.24922	36.2509000	0.0000114
3	36.37422	36.3768000	0.0000215
4	36.49922	36.5007000	0.0000123
5	36.62422	36.6265000	0.0000067
6	36.74922	36.7506000	0.0000138
7	36.87422	36.8765000	0.0000172
8	36.99922	37.0007000	0.0000094

Accuracy based on Resolver and ILD2300 Sensor Positive Direction

Measured at 12 positions offset by 5mm over the entire actuator stroke.

Test	Setpoint [mm]	Resolver [mm]	Diff [mm]	ILD2300 [mm]	Diff [mm]
1	5.0000	5.0007	0.0007	Out of range	NaN
2	10.0000	10.0007	0.0007	9.9987	-0.0013
3	15.0000	15.0007	0.0007	15.0269	0.0269
4	20.0000	20.0007	0.0007	20.0263	0.0263

Test	Setpoint [mm]	Resolver [mm]	Diff [mm]	ILD2300 [mm]	Diff [mm]
5	25.0000	25.0007	0.0007	25.0008	0.0008
6	30.0000	30.0008	0.0008	29.9713	-0.0287
7	35.0000	35.0007	0.0007	34.9954	-0.0046
8	40.0000	40.0008	0.0008	40.0010	0.0010
9	45.0000	45.0008	0.0008	44.9957	-0.0043
10	50.0000	50.0008	0.0008	50.0153	0.0153
11	55.0000	55.0008	0.0008	54.9844	-0.0156
12	60.0000	60.0008	0.0008	60.0105	0.0105
Accuracy	-	-	0.0008	-	0.0287

Accuracy (Resolver): 0.0008

Accuracy (ILD2300): 0.0287

Accuracy based on Resolver and ILD2300 Sensor Negative Direction

Measured at 12 positions offset by 5mm over the entire actuator stroke.

Test	Setpoint [mm]	Resolver [mm]	Diff [mm]	ILD2300 [mm]	Diff [mm]
1	5.0000	5.0005	0.0005	Out of range	NaN
2	10.0000	10.0005	0.0005	10.0007	0.0007
3	15.0000	15.0005	0.0005	15.0291	0.0291
4	20.0000	20.0005	0.0005	20.0294	0.0294
5	25.0000	25.0005	0.0005	25.0010	0.0010
6	30.0000	30.0006	0.0006	29.9811	-0.0189
7	35.0000	35.0005	0.0005	35.0040	0.0040
8	40.0000	40.0005	0.0005	40.0026	0.0026
9	45.0000	45.0006	0.0006	44.9947	-0.0053
10	50.0000	50.0006	0.0006	50.0086	0.0086
11	55.0000	55.0006	0.0006	54.9778	-0.0222
12	60.0000	60.0006	0.0006	60.0030	0.0030
Accuracy	-	-	0.0006	-	0.0294

Accuracy (Resolver): 0.0006

Accuracy (ILD2300): 0.0294