ecmc motion system test report

- Data file : ../../ecmc_bifrost_slits_sat/tests/11359/axis1/axis1_data.log
- Date : Tue Dec 15 20:30:22 CET 2020
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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 : 2.0011mm

External verification system, Micro-Epsilon ILD2300 sensor

Conversion data (to open loop coord syst):

1. Scale factor : -1 (measure from top)
2. Offset : 59.6583mm

Limit Switch Performance

Low Limit Engage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	-0.2282	-0.2196	0.0086
2	-0.2387	-0.2351	0.0036
3	-0.2396	-0.2362	0.0034
4	-0.2372	-0.2327	0.0045
5	-0.2341	-0.2285	0.0056
6	-0.2341	-0.2286	0.0056
7	-0.2357	-0.2307	0.0050
8	-0.2357	-0.2307	0.0050
9	-0.2364	-0.2318	0.0047
10	-0.2387	-0.2350	0.0037
AVG	-0.2358	-0.2309	-0.0050
STD	0.0031	0.0045	-0.0014
Range	0.0114	0.0166	

Low Limit Disengage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	0.0098	0.0142	0.0044

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
2	0.0084	0.0120	0.0037
3	0.0061	0.0086	0.0025
4	0.0054	0.0073	0.0019
5	0.0038	0.0052	0.0014
6	0.0098	0.0143	0.0044
7	0.0113	0.0167	0.0054
8	0.0106	0.0155	0.0049
9	0.0038	0.0052	0.0014
10	0.0068	0.0098	0.0030
AVG	0.0076	0.0109	-0.0033
STD	0.0026	0.0040	-0.0014
Range	0.0075	0.0115	

High Limit Engage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	68.5137	68.5216	0.0079
2	68.4927	68.4902	-0.0026
3	68.5408	68.5591	0.0183
4	68.4035	68.3879	-0.0156
5	68.4455	68.4266	-0.0189
6	68.4620	68.4465	-0.0155
7	68.4740	68.4626	-0.0113
8	68.4298	68.4103	-0.0195
9	68.4410	68.4218	-0.0192
10	68.4110	68.3939	-0.0171
AVG	68.4614	68.4521	0.0093
STD	0.0421	0.0536	-0.0114
Range	0.1373	0.1712	

High Limit Disengage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	67.1898	67.1698	-0.0199
2	67.1916	67.1715	-0.0200

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
3	67.1899	67.1696	-0.0203
4	67.1843	67.1636	-0.0207
5	67.1825	67.1622	-0.0203
6	67.1834	67.1628	-0.0205
7	67.1804	67.1599	-0.0205
8	67.1865	67.1661	-0.0204
9	67.1804	67.1600	-0.0204
10	67.1813	67.1609	-0.0204
AVG	67.1850	67.1646	0.0204
STD	0.0040	0.0041	-0.0001
Range	0.0112	0.0116	

Repeatability

Target Position 15 Positive and Negative Direction

Test	Resolver Pos [mm]	Resolver Neg [mm]	Diff [mm]
1	15.0002	14.9979	0.0023
2	15.0002	14.9979	0.0023
3	15.0002	14.9979	0.0023
4	15.0002	14.9979	0.0023
5	15.0003	14.9979	0.0023
6	15.0003	14.9979	0.0024
7	15.0002	14.9979	0.0023
8	15.0002	14.9979	0.0023
9	15.0003	14.9979	0.0024
10	15.0003	14.9979	0.0024
AVG	15.0002	14.9979	0.0023
STD	0.0000	0.0000	0.0000
Range	0.0001	0.0001	0.0001

Repeatability (Resolver): 0.0001

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
1	14.9478	14.9468	0.0010

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
2	14.9486	14.9470	0.0016
3	14.9490	14.9476	0.0014
4	14.9486	14.9474	0.0012
5	14.9486	14.9472	0.0014
6	14.9484	14.9470	0.0014
7	14.9484	14.9462	0.0022
8	14.9484	14.9468	0.0016
9	14.9484	14.9470	0.0014
10	14.9478	14.9464	0.0014
AVG	14.9484	14.9469	0.0015
STD	0.0004	0.0004	-0.0001
Range	0.0012	0.0014	0.0012

Repeatability (ILD2300): 0.0014

Target Position 35 Positive and Negative Direction

Test	Resolver Pos [mm]	Resolver Neg [mm]	Diff [mm]
1	35.0008	34.9981	0.0027
2	35.0008	34.9982	0.0027
3	35.0008	34.9982	0.0026
4	35.0008	34.9982	0.0025
5	35.0008	34.9982	0.0026
6	35.0008	34.9982	0.0026
7	35.0009	34.9983	0.0026
8	35.0009	34.9982	0.0026
9	35.0008	34.9982	0.0026
10	35.0008	34.9982	0.0026
AVG	35.0008	34.9982	0.0026
STD	0.0000	0.0000	-0.0000
Range	0.0001	0.0001	0.0001

Repeatability (Resolver): 0.0001

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
1	35.0029	35.0020	0.0008

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
2	35.0031	35.0004	0.0027
3	35.0008	34.9992	0.0016
4	35.0000	34.9988	0.0012
5	35.0018	34.9990	0.0029
6	35.0008	34.9986	0.0022
7	35.0024	34.9988	0.0037
8	35.0014	35.0022	-0.0008
9	35.0016	34.9986	0.0031
10	35.0020	34.9990	0.0031
AVG	35.0017	34.9997	0.0020
STD	0.0009	0.0013	-0.0004
Range	0.0031	0.0037	0.0045

Repeatability (ILD2300): 0.0037

Target Position 55 Positive and Negative Direction

Test	Resolver Pos [mm]	Resolver Neg [mm]	Diff [mm]
1	55.0013	54.9987	0.0026
2	55.0013	54.9987	0.0026
3	55.0014	54.9987	0.0027
4	55.0014	54.9986	0.0028
5	55.0014	54.9987	0.0027
6	55.0013	54.9987	0.0026
7	55.0014	54.9987	0.0027
8	55.0014	54.9987	0.0027
9	55.0014	54.9986	0.0028
10	55.0014	54.9987	0.0027
AVG	55.0014	54.9987	0.0027
STD	0.0001	0.0000	0.0000
Range	0.0002	0.0001	0.0002

Repeatability (Resolver): 0.0002

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
1	54.9722	54.9720	0.0002

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
2	54.9734	54.9720	0.0014
3	54.9736	54.9716	0.0020
4	54.9738	54.9730	0.0008
5	54.9734	54.9724	0.0010
6	54.9734	54.9722	0.0012
7	54.9734	54.9730	0.0004
8	54.9726	54.9732	-0.0006
9	54.9736	54.9702	0.0035
10	54.9734	54.9689	0.0045
AVG	54.9733	54.9719	0.0014
STD	0.0005	0.0013	-0.0008
Range	0.0016	0.0043	0.0051

Repeatability (ILD2300): 0.0043

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	36.1259000	0.0000105
2	36.24922	36.2502000	0.0000126
3	36.37422	36.3758000	0.0000149
4	36.49922	36.4997000	0.0000094
5	36.62422	36.6259000	0.0000138
6	36.74922	36.7500000	0.0000171
7	36.87422	36.8759000	0.0000123
8	36.99922	36.9996000	0.0000107

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	5.0000	-0.0000	Out of range	NaN
2	10.0000	10.0000	0.0000	9.8013	-0.1987
3	15.0000	15.0003	0.0003	14.7922	-0.2078
4	20.0000	20.0004	0.0004	19.7706	-0.2294
5	25.0000	25.0006	0.0006	24.7672	-0.2328

Test	Setpoint [mm]	Resolver [mm]	Diff [mm]	ILD2300 [mm]	Diff [mm]
6	30.0000	30.0006	0.0006	29.8170	-0.1830
7	35.0000	35.0006	0.0006	34.8350	-0.1650
8	40.0000	40.0010	0.0010	39.8007	-0.1993
9	45.0000	45.0012	0.0012	44.8165	-0.1835
10	50.0000	50.0013	0.0013	49.8390	-0.1610
11	55.0000	55.0014	0.0014	54.8192	-0.1808
12	60.0000	60.0016	0.0016	59.8348	-0.1652
Accuracy	-	-	0.0016	-	0.2328

Accuracy (Resolver): 0.0016

Accuracy (ILD2300): 0.2328

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	4.9976	-0.0024	Out of range	NaN
2	10.0000	9.9977	-0.0023	9.8013	-0.1987
3	15.0000	14.9979	-0.0021	14.7918	-0.2082
4	20.0000	19.9980	-0.0020	19.7704	-0.2296
5	25.0000	24.9981	-0.0019	24.7665	-0.2335
6	30.0000	29.9983	-0.0017	29.8155	-0.1845
7	35.0000	34.9982	-0.0018	34.8315	-0.1685
8	40.0000	39.9983	-0.0017	39.7997	-0.2003
9	45.0000	44.9984	-0.0016	44.8106	-0.1894
10	50.0000	49.9985	-0.0015	49.8410	-0.1590
11	55.0000	54.9987	-0.0013	54.8184	-0.1816
12	60.0000	59.9988	-0.0012	59.8337	-0.1663
Accuracy	-	-	0.0024	-	0.2335

Accuracy (Resolver): 0.0024

Accuracy (ILD2300): 0.2335