ecmc motion system test report

- Data file : ../../ecmc_bifrost_slits_sat/tests/11358/axis2/axis2_data.log
- Date : Tue Dec 15 20:25:49 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 : 63.1937mm

External verification system, Micro-Epsilon ILD2300 sensor

Conversion data (to open loop coord syst):

1. Scale factor : -1 (measure from top)
2. Offset : 60.4704mm

Limit Switch Performance

Low Limit Engage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	-0.4423	-0.4434	-0.0011
2	-0.4507	-0.4498	0.0009
3	-0.4775	-0.4751	0.0024
4	-0.4708	-0.4681	0.0027
5	-0.4798	-0.4777	0.0021
6	-0.4618	-0.4593	0.0025
7	-0.4685	-0.4660	0.0026
8	-0.4588	-0.4568	0.0020
9	-0.4543	-0.4527	0.0015
10	-0.4813	-0.4792	0.0022
AVG	-0.4646	-0.4628	-0.0018
STD	0.0125	0.0117	0.0008
Range	0.0391	0.0358	

Low Limit Disengage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	0.0095	0.0111	0.0017

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
2	0.0086	0.0103	0.0017
3	0.0130	0.0155	0.0025
4	0.0101	0.0120	0.0019
5	0.0131	0.0156	0.0025
6	0.0116	0.0139	0.0022
7	0.0116	0.0138	0.0021
8	0.0087	0.0103	0.0017
9	0.0141	0.0164	0.0024
10	0.0094	0.0111	0.0017
AVG	0.0110	0.0130	-0.0020
STD	0.0019	0.0022	-0.0003
Range	0.0055	0.0062	

High Limit Engage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	62.8290	62.8178	-0.0112
2	62.8380	62.8190	-0.0191
3	62.8387	62.8191	-0.0197
4	62.8539	62.8229	-0.0310
5	62.8898	62.8514	-0.0384
6	62.8845	62.8465	-0.0380
7	62.8845	62.8465	-0.0380
8	62.8779	62.8406	-0.0373
9	62.8718	62.8357	-0.0361
10	62.8787	62.8412	-0.0375
AVG	62.8647	62.8341	0.0306
STD	0.0215	0.0124	0.0090
Range	0.0608	0.0336	

High Limit Disengage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	62.7521	62.7522	0.0001
2	62.7528	62.7531	0.0003

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
3	62.7695	62.7726	0.0031
4	62.7625	62.7650	0.0025
5	62.7533	62.7537	0.0004
6	62.7571	62.7585	0.0014
7	62.7609	62.7629	0.0020
8	62.7594	62.7610	0.0016
9	62.7698	62.7732	0.0034
10	62.7594	62.7610	0.0016
AVG	62.7597	62.7613	-0.0016
STD	0.0060	0.0071	-0.0011
Range	0.0177	0.0211	

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	14.9980	0.0022
3	15.0003	14.9979	0.0023
4	15.0002	14.9979	0.0023
5	15.0002	14.9979	0.0023
6	15.0002	14.9980	0.0023
7	15.0002	14.9980	0.0022
8	15.0002	14.9979	0.0023
9	15.0002	14.9979	0.0024
10	15.0002	14.9979	0.0023
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	14.9951	14.9949	0.0002

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
2	14.9947	14.9951	-0.0004
3	14.9947	14.9949	-0.0002
4	14.9957	14.9955	0.0002
5	14.9955	14.9945	0.0010
6	14.9953	14.9937	0.0016
7	14.9953	14.9949	0.0004
8	14.9953	14.9949	0.0004
9	14.9949	14.9955	-0.0006
10	14.9949	14.9945	0.0004
AVG	14.9952	14.9949	0.0003
STD	0.0003	0.0005	-0.0002
Range	0.0010	0.0018	0.0022

Repeatability (ILD2300): 0.0018

Target Position 35 Positive and Negative Direction

Test	Resolver Pos [mm]	Resolver Neg [mm]	Diff [mm]
1	35.0009	34.9982	0.0026
2	35.0008	34.9983	0.0026
3	35.0009	34.9982	0.0027
4	35.0009	34.9982	0.0027
5	35.0009	34.9982	0.0027
6	35.0008	34.9982	0.0026
7	35.0009	34.9982	0.0027
8	35.0009	34.9982	0.0026
9	35.0008	34.9982	0.0026
10	35.0008	34.9982	0.0026
AVG	35.0009	34.9982	0.0027
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]

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
1	34.9998	35.0030	-0.0033
2	35.0006	35.0032	-0.0027
3	35.0008	35.0034	-0.0027
4	35.0016	35.0026	-0.0010
5	35.0006	35.0030	-0.0024
6	35.0006	35.0030	-0.0024
7	35.0008	35.0028	-0.0020
8	35.0008	35.0028	-0.0020
9	35.0008	35.0030	-0.0022
10	35.0008	35.0030	-0.0022
AVG	35.0007	35.0030	-0.0023
STD	0.0004	0.0002	0.0002
Range	0.0018	0.0008	0.0022

Repeatability (ILD2300): 0.0018

Target Position 55 Positive and Negative Direction

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

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
1	55.0032	55.0036	-0.0004
2	55.0030	55.0032	-0.0002
3	55.0028	55.0036	-0.0008
4	55.0032	55.0034	-0.0002
5	55.0034	55.0030	0.0004
6	55.0026	55.0028	-0.0002
7	55.0024	55.0028	-0.0004
8	55.0032	55.0030	0.0002
9	55.0032	55.0028	0.0004
10	55.0036	55.0032	0.0004
AVG	55.0031	55.0031	0.0000
STD	0.0004	0.0003	0.0001
Range	0.0012	0.0008	0.0012

Repeatability (ILD2300): 0.0012

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	36.0877000	0.0000152
2	36.24922	36.2496000	0.0000158
3	36.37422	36.3376000	0.0000160
4	36.49922	36.4997000	0.0000197
5	36.62422	36.5879000	0.0000125
6	36.74922	36.7499000	0.0000172
7	36.87422	36.8378000	0.0000210
8	36.99922	36.9999000	0.0000154

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	5.0002	0.0002	Out of range	NaN
2	10.0000	10.0003	0.0003	9.9818	-0.0182
3	15.0000	15.0004	0.0004	14.9931	-0.0069

Test	Setpoint [mm]	Resolver [mm]	Diff [mm]	ILD2300 [mm]	Diff [mm]
4	20.0000	20.0005	0.0005	19.9393	-0.0607
5	25.0000	25.0006	0.0006	24.9734	-0.0266
6	30.0000	30.0007	0.0007	29.9734	-0.0266
7	35.0000	35.0007	0.0007	35.0010	0.0010
8	40.0000	40.0010	0.0010	39.9982	-0.0018
9	45.0000	45.0011	0.0011	45.0066	0.0066
10	50.0000	50.0013	0.0013	50.0042	0.0042
11	55.0000	55.0014	0.0014	55.0028	0.0028
12	60.0000	60.0014	0.0014	60.0171	0.0171
Accuracy	-	-	0.0014	-	0.0607

Accuracy (Resolver): 0.0014

Accuracy (ILD2300): 0.0607

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	4.9978	-0.0022	Out of range	NaN
2	10.0000	9.9980	-0.0020	9.9841	-0.0159
3	15.0000	14.9981	-0.0019	14.9941	-0.0059
4	20.0000	19.9982	-0.0018	19.9464	-0.0536
5	25.0000	24.9983	-0.0017	24.9864	-0.0136
6	30.0000	29.9984	-0.0016	29.9697	-0.0303
7	35.0000	34.9984	-0.0016	35.0036	0.0036
8	40.0000	39.9984	-0.0016	40.0196	0.0196
9	45.0000	44.9985	-0.0015	45.0094	0.0094
10	50.0000	49.9986	-0.0014	50.0044	0.0044
11	55.0000	54.9987	-0.0013	55.0032	0.0032
12	60.0000	59.9989	-0.0011	60.0214	0.0214
Accuracy	-	-	0.0022	-	0.0536

Accuracy (Resolver): 0.0022

Accuracy (ILD2300): 0.0536