

ecmc motion system test report

- Data file : ../../ecmc_bifrost_slits_sat/tests/11361/axis2/axis2_data.log
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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 : 55.6079mm

External verification system, Micro-Epsilon ILD2300 sensor

Conversion data (to open loop coord syst):

1. Scale factor : -1 (measure from top)
2. Offset : 61.4539mm

Limit Switch Performance

Low Limit Engage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	-0.2679	-0.2620	0.0059
2	-0.2806	-0.2671	0.0136
3	-0.2881	-0.2689	0.0192
4	-0.3009	-0.2762	0.0246
5	-0.3069	-0.2802	0.0267
6	-0.3092	-0.2818	0.0274
7	-0.3092	-0.2818	0.0274
8	-0.3091	-0.2818	0.0273
9	-0.3098	-0.2824	0.0275
10	-0.3107	-0.2830	0.0277
AVG	-0.2992	-0.2765	-0.0227
STD	0.0143	0.0073	0.0071
Range	0.0428	0.0210	

Low Limit Disengage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	-0.0124	-0.0088	0.0036

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
2	-0.0095	-0.0067	0.0028
3	-0.0108	-0.0078	0.0030
4	-0.0154	-0.0106	0.0048
5	-0.0102	-0.0072	0.0030
6	-0.0117	-0.0082	0.0035
7	-0.0147	-0.0100	0.0047
8	-0.0140	-0.0096	0.0044
9	-0.0140	-0.0096	0.0044
10	-0.0124	-0.0087	0.0037
AVG	-0.0125	-0.0087	-0.0038
STD	0.0019	0.0012	0.0007
Range	0.0059	0.0039	

High Limit Engage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	67.6055	67.6277	0.0222
2	67.6041	67.6258	0.0218
3	67.6100	67.6340	0.0240
4	67.6085	67.6319	0.0233
5	67.6145	67.6405	0.0260
6	67.6115	67.6361	0.0246
7	67.6115	67.6361	0.0246
8	67.6160	67.6422	0.0262
9	67.6160	67.6423	0.0262
10	67.6190	67.6464	0.0274
AVG	67.6117	67.6363	-0.0246
STD	0.0046	0.0063	-0.0018
Range	0.0149	0.0206	

High Limit Disengage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	67.2317	67.2379	0.0062
2	67.2347	67.2399	0.0052

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
3	67.2317	67.2379	0.0062
4	67.2355	67.2403	0.0049
5	67.2370	67.2412	0.0043
6	67.2348	67.2399	0.0051
7	67.2370	67.2412	0.0042
8	67.2422	67.2449	0.0027
9	67.2423	67.2449	0.0026
10	67.2407	67.2439	0.0032
AVG	67.2367	67.2412	-0.0045
STD	0.0037	0.0025	0.0012
Range	0.0105	0.0070	

Repeatability

Target Position 15 Positive and Negative Direction

Test	Resolver Pos [mm]	Resolver Neg [mm]	Diff [mm]
1	15.0005	14.9991	0.0014
2	15.0005	14.9991	0.0014
3	15.0005	14.9991	0.0014
4	15.0005	14.9992	0.0014
5	15.0005	14.9991	0.0014
6	15.0005	14.9991	0.0014
7	15.0005	14.9992	0.0014
8	15.0005	14.9992	0.0014
9	15.0005	14.9991	0.0014
10	15.0006	14.9992	0.0014
AVG	15.0005	14.9991	0.0014
STD	0.0000	0.0000	-0.0000
Range	0.0000	0.0001	0.0000

Repeatability (Resolver): 0.0001

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
1	15.0021	15.0019	0.0002

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
2	15.0043	15.0017	0.0027
3	15.0037	15.0025	0.0012
4	15.0031	15.0023	0.0008
5	15.0037	15.0021	0.0016
6	15.0037	15.0019	0.0018
7	15.0037	15.0029	0.0008
8	15.0039	15.0025	0.0014
9	15.0037	15.0033	0.0004
10	15.0027	15.0027	0.0000
AVG	15.0035	15.0024	0.0011
STD	0.0006	0.0005	0.0001
Range	0.0022	0.0016	0.0027

Repeatability (ILD2300): 0.0022

Target Position 35 Positive and Negative Direction

Test	Resolver Pos [mm]	Resolver Neg [mm]	Diff [mm]
1	35.0008	34.9993	0.0016
2	35.0008	34.9993	0.0015
3	35.0008	34.9993	0.0015
4	35.0008	34.9993	0.0015
5	35.0008	34.9993	0.0015
6	35.0008	34.9993	0.0015
7	35.0008	34.9993	0.0016
8	35.0008	34.9993	0.0015
9	35.0008	34.9993	0.0015
10	35.0008	34.9993	0.0015
AVG	35.0008	34.9993	0.0015
STD	0.0000	0.0000	0.0000
Range	0.0001	0.0000	0.0001

Repeatability (Resolver): 0.0001

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
1	34.9982	34.9969	0.0012

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
2	34.9988	34.9977	0.0010
3	34.9994	34.9977	0.0016
4	35.0004	34.9977	0.0027
5	35.0008	34.9975	0.0033
6	35.0000	34.9982	0.0018
7	34.9994	34.9982	0.0012
8	34.9996	34.9973	0.0022
9	35.0002	34.9982	0.0020
10	35.0004	34.9975	0.0029
AVG	34.9997	34.9977	0.0020
STD	0.0008	0.0004	0.0004
Range	0.0027	0.0012	0.0022

Repeatability (ILD2300): 0.0027

Target Position 55 Positive and Negative Direction

Test	Resolver Pos [mm]	Resolver Neg [mm]	Diff [mm]
1	55.0010	54.9995	0.0016
2	55.0010	54.9995	0.0015
3	55.0010	54.9995	0.0015
4	55.0010	54.9995	0.0016
5	55.0010	54.9995	0.0015
6	55.0010	54.9995	0.0015
7	55.0010	54.9995	0.0015
8	55.0010	54.9995	0.0015
9	55.0010	54.9995	0.0015
10	55.0010	54.9995	0.0015
AVG	55.0010	54.9995	0.0015
STD	0.0000	0.0000	0.0000
Range	0.0001	0.0000	0.0001

Repeatability (Resolver): 0.0001

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
1	55.0148	55.0132	0.0016

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
2	55.0142	55.0138	0.0004
3	55.0148	55.0130	0.0018
4	55.0150	55.0134	0.0016
5	55.0150	55.0128	0.0022
6	55.0152	55.0128	0.0024
7	55.0157	55.0130	0.0027
8	55.0155	55.0106	0.0049
9	55.0163	55.0136	0.0027
10	55.0161	55.0124	0.0037
AVG	55.0153	55.0129	0.0024
STD	0.0006	0.0009	-0.0003
Range	0.0020	0.0033	0.0045

Repeatability (ILD2300): 0.0033

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	36.1531000	0.0000223
2	36.24922	36.2507000	0.0000128
3	36.37422	36.4035000	0.0000183
4	36.49922	36.5003000	0.0000159
5	36.62422	36.6529000	0.0000161
6	36.74922	36.7508000	0.0000134
7	36.87422	36.9038000	0.0000203
8	36.99922	37.0003000	0.0000157

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	5.0003	0.0003	Out of range	NaN
2	10.0000	10.0003	0.0003	Out of range	NaN
3	15.0000	15.0004	0.0004	15.0017	0.0017
4	20.0000	20.0004	0.0004	19.9989	-0.0011

Test	Setpoint [mm]	Resolver [mm]	Diff [mm]	ILD2300 [mm]	Diff [mm]
5	25.0000	25.0005	0.0005	25.0040	0.0040
6	30.0000	30.0005	0.0005	30.0136	0.0136
7	35.0000	35.0006	0.0006	35.0000	-0.0000
8	40.0000	40.0007	0.0007	40.0229	0.0229
9	45.0000	45.0008	0.0008	45.0052	0.0052
10	50.0000	50.0008	0.0008	50.0360	0.0360
11	55.0000	55.0009	0.0009	55.0142	0.0142
12	60.0000	60.0010	0.0010	60.0090	0.0090
Accuracy	-	-	0.0010	-	0.0360

Accuracy (Resolver): 0.0010

Accuracy (ILD2300): 0.0360

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	4.9988	-0.0012	Out of range	NaN
2	10.0000	9.9989	-0.0011	Out of range	NaN
3	15.0000	14.9990	-0.0010	15.0019	0.0019
4	20.0000	19.9991	-0.0009	19.9950	-0.0050
5	25.0000	24.9991	-0.0009	25.0020	0.0020
6	30.0000	29.9993	-0.0007	30.0201	0.0201
7	35.0000	34.9992	-0.0008	34.9982	-0.0018
8	40.0000	39.9993	-0.0007	40.0219	0.0219
9	45.0000	44.9993	-0.0007	45.0084	0.0084
10	50.0000	49.9994	-0.0006	50.0328	0.0328
11	55.0000	54.9994	-0.0006	55.0150	0.0150
12	60.0000	59.9995	-0.0005	60.0090	0.0090
Accuracy	-	-	0.0012	-	0.0328

Accuracy (Resolver): 0.0012

Accuracy (ILD2300): 0.0328