ecmc motion system test report

- Data file : ../../ecmc_bifrost_slits_sat/tests/11358/axis1/axis1_data.log
- Date : Tue Dec 15 20:28:01 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 : 83.1304mm

External verification system, Micro-Epsilon ILD2300 sensor

Conversion data (to open loop coord syst):

1. Scale factor : -1 (measure from top)
2. Offset : 59.5035mm

Limit Switch Performance

Low Limit Engage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	-0.4996	-0.5002	-0.0006
2	-0.5304	-0.5230	0.0074
3	-0.5371	-0.5298	0.0073
4	-0.5296	-0.5223	0.0073
5	-0.5236	-0.5173	0.0063
6	-0.5386	-0.5311	0.0075
7	-0.5304	-0.5229	0.0075
8	-0.5469	-0.5392	0.0077
9	-0.5251	-0.5184	0.0067
10	-0.5402	-0.5326	0.0076
AVG	-0.5301	-0.5237	-0.0065
STD	0.0123	0.0102	0.0021
Range	0.0473	0.0390	

Low Limit Disengage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	-0.0090	-0.0059	0.0031

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
2	-0.0166	-0.0116	0.0050
3	-0.0181	-0.0127	0.0054
4	-0.0180	-0.0127	0.0053
5	-0.0212	-0.0150	0.0061
6	-0.0159	-0.0110	0.0049
7	-0.0143	-0.0098	0.0045
8	-0.0152	-0.0104	0.0048
9	-0.0188	-0.0131	0.0057
10	-0.0182	-0.0127	0.0055
AVG	-0.0165	-0.0115	-0.0050
STD	0.0031	0.0024	0.0008
Range	0.0122	0.0092	

High Limit Engage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	63.7181	63.7270	0.0088
2	63.7212	63.7295	0.0083
3	63.7204	63.7289	0.0085
4	63.7129	63.7219	0.0090
5	63.7137	63.7227	0.0090
6	63.7137	63.7227	0.0090
7	63.7227	63.7307	0.0080
8	63.7106	63.7198	0.0092
9	63.7106	63.7199	0.0092
10	63.7106	63.7199	0.0093
AVG	63.7154	63.7243	-0.0089
STD	0.0045	0.0041	0.0004
Range	0.0120	0.0109	

High Limit Disengage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	63.1546	63.1490	-0.0056
2	63.1486	63.1401	-0.0085

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
3	63.1456	63.1356	-0.0100
4	63.1441	63.1333	-0.0108
5	63.1470	63.1378	-0.0092
6	63.1456	63.1356	-0.0100
7	63.1411	63.1287	-0.0124
8	63.1471	63.1378	-0.0093
9	63.1426	63.1309	-0.0117
10	63.1419	63.1297	-0.0121
AVG	63.1458	63.1359	0.0099
STD	0.0037	0.0057	-0.0019
Range	0.0135	0.0204	

Repeatability

Target Position 15 Positive and Negative Direction

Test	Resolver Pos [mm]	Resolver Neg [mm]	Diff [mm]
1	15.0006	14.9997	0.0008
2	15.0005	14.9997	0.0008
3	15.0005	14.9997	0.0008
4	15.0005	14.9997	0.0008
5	15.0005	14.9997	0.0008
6	15.0005	14.9997	0.0008
7	15.0005	14.9997	0.0008
8	15.0005	14.9997	0.0008
9	15.0005	14.9997	0.0008
10	15.0005	14.9997	0.0008
AVG	15.0005	14.9997	0.0008
STD	0.0000	0.0000	-0.0000
Range	0.0000	0.0001	0.0001

Repeatability (Resolver): 0.0001

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
1	15.0423	15.0352	0.0071

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
2	15.0407	15.0352	0.0055
3	15.0403	15.0346	0.0057
4	15.0397	15.0339	0.0057
5	15.0388	15.0344	0.0045
6	15.0386	15.0333	0.0053
7	15.0380	15.0327	0.0053
8	15.0368	15.0325	0.0043
9	15.0372	15.0323	0.0049
10	15.0360	15.0323	0.0037
AVG	15.0388	15.0336	0.0052
STD	0.0018	0.0011	0.0007
Range	0.0063	0.0029	0.0035

Repeatability (ILD2300): 0.0063

Target Position 35 Positive and Negative Direction

Test	Resolver Pos [mm]	Resolver Neg [mm]	Diff [mm]
1	35.0008	34.9998	0.0009
2	35.0007	34.9998	0.0009
3	35.0007	34.9998	0.0009
4	35.0008	34.9998	0.0010
5	35.0008	34.9998	0.0010
6	35.0008	34.9998	0.0010
7	35.0008	34.9998	0.0009
8	35.0008	34.9998	0.0010
9	35.0008	34.9998	0.0009
10	35.0008	34.9998	0.0010
AVG	35.0008	34.9998	0.0010
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	35.0019	34.9976	0.0043

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
2	35.0025	34.9968	0.0057
3	35.0019	34.9966	0.0053
4	35.0000	34.9968	0.0033
5	35.0011	34.9982	0.0029
6	35.0004	34.9968	0.0037
7	35.0002	34.9982	0.0020
8	34.9994	34.9976	0.0018
9	35.0000	34.9978	0.0022
10	35.0000	34.9986	0.0014
AVG	35.0008	34.9975	0.0033
STD	0.0010	0.0007	0.0003
Range	0.0031	0.0020	0.0043

Repeatability (ILD2300): 0.0031

Target Position 55 Positive and Negative Direction

Test	Resolver Pos [mm]	Resolver Neg [mm]	Diff [mm]
1	55.0010	55.0000	0.0010
2	55.0010	55.0000	0.0010
3	55.0010	55.0000	0.0010
4	55.0010	55.0000	0.0010
5	55.0010	55.0000	0.0010
6	55.0010	55.0000	0.0010
7	55.0010	55.0000	0.0010
8	55.0010	55.0000	0.0010
9	55.0010	55.0000	0.0010
10	55.0010	55.0000	0.0010
AVG	55.0010	55.0000	0.0010
STD	0.0000	0.0000	-0.0000
Range	0.0000	0.0001	0.0001

Repeatability (Resolver): 0.0001

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
1	54.9953	54.9910	0.0043

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
2	54.9949	54.9910	0.0039
3	54.9951	54.9908	0.0043
4	54.9933	54.9904	0.0029
5	54.9931	54.9902	0.0029
6	54.9929	54.9898	0.0031
7	54.9926	54.9894	0.0033
8	54.9924	54.9894	0.0031
9	54.9922	54.9890	0.0033
10	54.9916	54.9888	0.0029
AVG	54.9933	54.9900	0.0033
STD	0.0012	0.0008	0.0004
Range	0.0037	0.0022	0.0014

Repeatability (ILD2300): 0.0037

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	36.1049000	0.0000131
2	36.24922	36.2501000	0.0000150
3	36.37422	36.3552000	0.0000189
4	36.49922	36.5003000	0.0000089
5	36.62422	36.6049000	0.0000121
6	36.74922	36.7504000	0.0000150
7	36.87422	36.8552000	0.0000182
8	36.99922	37.0002000	0.0000144

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	5.0005	0.0005	Out of range	NaN
2	10.0000	10.0005	0.0005	10.0064	0.0064
3	15.0000	15.0005	0.0005	14.9991	-0.0009
4	20.0000	20.0006	0.0006	20.0036	0.0036
5	25.0000	25.0006	0.0006	25.0299	0.0299

Test	Setpoint [mm]	Resolver [mm]	Diff [mm]	ILD2300 [mm]	Diff [mm]
6	30.0000	30.0007	0.0007	30.0086	0.0086
7	35.0000	35.0007	0.0007	34.9674	-0.0326
8	40.0000	40.0009	0.0009	39.9680	-0.0320
9	45.0000	45.0009	0.0009	44.9642	-0.0358
10	50.0000	50.0009	0.0009	49.9732	-0.0268
11	55.0000	55.0010	0.0010	54.9696	-0.0304
12	60.0000	60.0010	0.0010	59.9578	-0.0422
Accuracy	-	-	0.0010	-	0.0422

Accuracy (Resolver): 0.0010

Accuracy (ILD2300): 0.0422

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	4.9998	-0.0002	Out of range	NaN
2	10.0000	10.0002	0.0002	10.0007	0.0007
3	15.0000	14.9999	-0.0001	15.0009	0.0009
4	20.0000	20.0003	0.0003	19.9973	-0.0027
5	25.0000	25.0001	0.0001	25.0330	0.0330
6	30.0000	30.0001	0.0001	30.0090	0.0090
7	35.0000	35.0002	0.0002	34.9733	-0.0267
8	40.0000	40.0000	0.0000	39.9738	-0.0262
9	45.0000	45.0003	0.0003	44.9638	-0.0362
10	50.0000	50.0001	0.0001	49.9749	-0.0251
11	55.0000	55.0002	0.0002	54.9790	-0.0210
12	60.0000	60.0003	0.0003	59.9680	-0.0320
Accuracy	-	-	0.0003	-	0.0362

Accuracy (Resolver): 0.0003

Accuracy (ILD2300): 0.0362