ecmc motion system test report

- Data file : ../../ecmc_bifrost_slits_sat/tests/11359/axis2/axis2_data.log
- Date : Tue Dec 15 20:31:55 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 : 2.6133mm

External verification system, Micro-Epsilon ILD2300 sensor

Conversion data (to open loop coord syst):

1. Scale factor : -1 (measure from top)
2. Offset : 61.4427mm

Limit Switch Performance

Low Limit Engage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	-0.4559	-0.4616	-0.0056
2	-0.4484	-0.4530	-0.0045
3	-0.4492	-0.4539	-0.0047
4	-0.4552	-0.4607	-0.0055
5	-0.4567	-0.4623	-0.0056
6	-0.4574	-0.4631	-0.0057
7	-0.4582	-0.4639	-0.0057
8	-0.4589	-0.4648	-0.0059
9	-0.4589	-0.4647	-0.0058
10	-0.4582	-0.4639	-0.0056
AVG	-0.4557	-0.4612	0.0055
STD	0.0036	0.0041	-0.0004
Range	0.0105	0.0118	

Low Limit Disengage Position

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

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	0.0017	0.0014	-0.0003
2	0.0002	0.0003	0.0001
3	0.0002	0.0003	0.0002
4	0.0024	0.0019	-0.0005
5	-0.0026	-0.0017	0.0009
6	-0.0041	-0.0026	0.0015
7	-0.0034	-0.0022	0.0013
8	-0.0035	-0.0021	0.0014
9	-0.0036	-0.0022	0.0014
10	-0.0043	-0.0027	0.0016
AVG	-0.0017	-0.0010	-0.0008
STD	0.0024	0.0017	0.0008
Range	0.0067	0.0046	

High Limit Engage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	66.9657	66.9864	0.0207
2	66.9787	66.9891	0.0104
3	66.9710	66.9877	0.0166
4	66.9652	66.9862	0.0210
5	66.9720	66.9878	0.0159
6	66.9732	66.9881	0.0149
7	66.9823	66.9901	0.0077
8	66.9748	66.9884	0.0136
9	66.9755	66.9885	0.0129
10	66.9762	66.9886	0.0124
AVG	66.9735	66.9881	-0.0146
STD	0.0051	0.0011	0.0040
Range	0.0172	0.0039	

High Limit Disengage Position

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
1	66.5417	66.5370	-0.0047

Test	Openloop [mm]	Resolver [mm]	Diff [mm]
2	66.5401	66.5354	-0.0047
3	66.5395	66.5345	-0.0049
4	66.5350	66.5301	-0.0049
5	66.5402	66.5354	-0.0048
6	66.5395	66.5345	-0.0049
7	66.5370	66.5322	-0.0048
8	66.5410	66.5363	-0.0047
9	66.5387	66.5337	-0.0051
10	66.5395	66.5345	-0.0049
AVG	66.5392	66.5344	0.0048
STD	0.0019	0.0019	-0.0001
Range	0.0067	0.0069	

Repeatability

Target Position 15 Positive and Negative Direction

Test	Resolver Pos [mm]	Resolver Neg [mm]	Diff [mm]
1	15.0005	14.9994	0.0011
2	15.0005	14.9994	0.0011
3	15.0004	14.9994	0.0011
4	15.0004	14.9994	0.0010
5	15.0005	14.9994	0.0011
6	15.0004	14.9994	0.0011
7	15.0005	14.9994	0.0011
8	15.0004	14.9994	0.0010
9	15.0004	14.9994	0.0010
10	15.0005	14.9994	0.0011
AVG	15.0004	14.9994	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]

Test	ILD2300 Pos [mm]	ILD2300 Neg [mm]	Diff [mm]
1	14.9870	14.9876	-0.0006
2	14.9870	14.9872	-0.0002
3	14.9874	14.9876	-0.0002
4	14.9872	14.9870	0.0002
5	14.9874	14.9876	-0.0002
6	14.9872	14.9872	0.0000
7	14.9868	14.9870	-0.0002
8	14.9876	14.9864	0.0012
9	14.9870	14.9872	-0.0002
10	14.9874	14.9876	-0.0002
AVG	14.9872	14.9872	0.0000
STD	0.0002	0.0004	-0.0001
Range	0.0008	0.0012	0.0018

Repeatability (ILD2300): 0.0012

Target Position 35 Positive and Negative Direction

Test	Resolver Pos [mm]	Resolver Neg [mm]	Diff [mm]
1	35.0008	34.9995	0.0013
2	35.0008	34.9994	0.0014
3	35.0008	34.9995	0.0013
4	35.0008	34.9995	0.0013
5	35.0008	34.9995	0.0013
6	35.0008	34.9994	0.0013
7	35.0008	34.9995	0.0013
8	35.0008	34.9995	0.0013
9	35.0007	34.9995	0.0013
10	35.0007	34.9995	0.0013
AVG	35.0008	34.9995	0.0013
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	35.0008	34.9982	0.0027
2	35.0010	34.9972	0.0039
3	35.0016	34.9984	0.0033
4	35.0002	34.9982	0.0020
5	35.0004	34.9980	0.0024
6	35.0018	34.9984	0.0035
7	35.0012	34.9980	0.0033
8	35.0002	34.9976	0.0027
9	34.9998	34.9974	0.0024
10	35.0002	34.9986	0.0016
AVG	35.0007	34.9980	0.0027
STD	0.0006	0.0004	0.0002
Range	0.0020	0.0014	0.0022

Repeatability (ILD2300): 0.0020

Target Position 55 Positive and Negative Direction

Test	Resolver Pos [mm]	Resolver Neg [mm]	Diff [mm]
1	55.0010	54.9996	0.0014
2	55.0010	54.9996	0.0014
3	55.0010	54.9996	0.0014
4	55.0010	54.9996	0.0014
5	55.0010	54.9996	0.0014
6	55.0010	54.9996	0.0014
7	55.0010	54.9996	0.0014
8	55.0010	54.9996	0.0014
9	55.0010	54.9996	0.0014
10	55.0010	54.9996	0.0014
AVG	55.0010	54.9996	0.0014
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	55.0153	55.0136	0.0016
2	55.0153	55.0132	0.0020
3	55.0153	55.0134	0.0018
4	55.0151	55.0134	0.0016
5	55.0153	55.0132	0.0020
6	55.0153	55.0128	0.0024
7	55.0155	55.0130	0.0024
8	55.0157	55.0128	0.0029
9	55.0157	55.0128	0.0029
10	55.0153	55.0126	0.0027
AVG	55.0153	55.0131	0.0022
STD	0.0002	0.0003	-0.0001
Range	0.0006	0.0010	0.0012

Repeatability (ILD2300): 0.0010

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	36.1501000	0.0000142
2	36.24922	36.2503000	0.0000131
3	36.37422	36.4001000	0.0000201
4	36.49922	36.5003000	0.0000160
5	36.62422	36.6503000	0.0000209
6	36.74922	36.7504000	0.0000126
7	36.87422	36.9002000	0.0000149
8	36.99922	37.0002000	0.0000105

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	5.0004	0.0004	Out of range	NaN
2	10.0000	10.0002	0.0002	Out of range	NaN
3	15.0000	15.0003	0.0003	14.9878	-0.0122

Test	Setpoint [mm]	Resolver [mm]	Diff [mm]	ILD2300 [mm]	Diff [mm]
4	20.0000	20.0004	0.0004	20.0021	0.0021
5	25.0000	25.0004	0.0004	25.0058	0.0058
6	30.0000	30.0004	0.0004	30.0065	0.0065
7	35.0000	35.0004	0.0004	35.0027	0.0027
8	40.0000	40.0006	0.0006	40.0064	0.0064
9	45.0000	45.0008	0.0008	45.0136	0.0136
10	50.0000	50.0008	0.0008	50.0299	0.0299
11	55.0000	55.0008	0.0008	55.0147	0.0147
12	60.0000	60.0009	0.0009	60.0086	0.0086
Accuracy	-	-	0.0009	-	0.0299

Accuracy (Resolver): 0.0009

Accuracy (ILD2300): 0.0299

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	4.9990	-0.0010	Out of range	NaN
2	10.0000	9.9991	-0.0009	Out of range	NaN
3	15.0000	14.9992	-0.0008	14.9888	-0.0112
4	20.0000	19.9992	-0.0008	19.9993	-0.0007
5	25.0000	24.9993	-0.0007	25.0036	0.0036
6	30.0000	29.9994	-0.0006	30.0085	0.0085
7	35.0000	34.9993	-0.0007	35.0018	0.0018
8	40.0000	39.9994	-0.0006	40.0039	0.0039
9	45.0000	44.9994	-0.0006	45.0123	0.0123
10	50.0000	49.9995	-0.0005	50.0275	0.0275
11	55.0000	54.9995	-0.0005	55.0124	0.0124
12	60.0000	59.9996	-0.0004	60.0151	0.0151
Accuracy	-	-	0.0010	-	0.0275

Accuracy (Resolver): 0.0010

Accuracy (ILD2300): 0.0275