

MTS Systems Corporation

Calibration Report

Calibration Date: 1/18/2018

SWIFT Evo (TM) Spinning Wheel Integrated Force Transducer
SWIFTCAL version 1.7

Customer: Transducer Engineering

System/Job Number: Demo

SWIFT Evo Transducer Serial Number: 10558903C
SWIFT Evo Transducer Type: SWIFT Evo 30A

VERIFICATION OUTPUTS: FX Full Scale 28.0 kN = +/- 10.000 Volt Output

Pass

FullScale Load Calibrated Ranges	FX	FY	FZ	MX	MY	MZ
Units	kN	kN	kN	kN-m	kN-m	kN-m
FullScale	28	23	28	5	7.5	5

Axis Units	load % of FS	STANDARD CELL APPLIED LOADS						SWIFT TRANSDUCER OUTPUT						ERROR % FULL SCALE						
		FX kN	FY kN	FZ kN	MX kN-m	MY kN-m	MZ kN-m	FX kN	FY kN	FZ kN	MX kN-m	MY kN-m	MZ kN-m	Error % FS	Error % FS	Error % FS	Error % FS	Error % FS	Error % FS	
Positive Polarity	0	0	0	0	0	0	-0.002	0.000	-0.002	0.000	0.000	0.001	-0.008	0.000	-0.008	0.001	-0.005	0.011		
per transducer labeling	20	5.680	0	0	0	0	5.635	0.012	-0.013	0.000	0.000	-0.001	-0.159	0.054	-0.047	-0.001	-0.004	-0.028		
	40	11.183	0	0	0	0	11.181	0.013	-0.019	0.000	-0.001	-0.002	-0.007	0.055	-0.068	-0.005	-0.014	-0.041		
	50	13.981	0	0	0	0	13.978	0.009	-0.021	0.000	-0.001	-0.001	-0.012	0.038	-0.074	-0.005	-0.013	-0.030		
	60	16.775	0	0	0	0	16.773	0.011	-0.022	0.000	-0.001	-0.001	-0.006	0.047	-0.080	-0.009	-0.013	-0.019		
	80	22.381	0	0	0	0	22.368	0.004	-0.023	0.000	-0.001	0.000	-0.049	0.018	-0.083	-0.006	-0.019	0.000		
	100	27.984	0	0	0	0	27.955	-0.006	-0.023	0.000	-0.001	0.000	-0.102	-0.025	-0.083	-0.008	-0.017	0.008		
	60	16.780	0	0	0	0	16.759	0.010	-0.020	-0.001	-0.001	0.000	-0.074	0.043	-0.073	-0.012	-0.014	-0.009		
	50	13.985	0	0	0	0	13.953	0.015	-0.019	0.000	-0.001	-0.001	-0.114	0.066	-0.069	-0.009	-0.014	-0.014		
	40	11.183	0	0	0	0	11.168	0.014	-0.018	0.000	-0.001	-0.001	-0.054	0.063	-0.063	-0.009	-0.010	-0.021		
	0	0	0	0	0	0	-0.006	0.000	-0.002	0.000	0.000	0.000	-0.020	-0.001	-0.007	0.000	-0.001	0.003		
Hysteresis	40	11.20	0	0	0	0	11.198	N/A	N/A	N/A	N/A	N/A								
(Data linearly scaled to equal load points)	50	14.00	0	0	0	0	13.997	N/A	N/A	N/A	N/A	N/A								
	60	16.80	0	0	0	0	16.798	N/A	N/A	N/A	N/A	N/A								
	60	16.80	0	0	0	0	16.779	N/A	N/A	N/A	N/A	N/A	-0.068	N/A	N/A	N/A	N/A	N/A	N/A	
	50	14.00	0	0	0	0	13.968	N/A	N/A	N/A	N/A	N/A	-0.103	N/A	N/A	N/A	N/A	N/A	N/A	
	40	11.20	0	0	0	0	11.185	N/A	N/A	N/A	N/A	N/A	-0.046	N/A	N/A	N/A	N/A	N/A	N/A	
Negative Polarity	0	0	0	0	0	0	-0.002	0.000	-0.001	-0.001	0.000	0.001	-0.007	-0.002	-0.005	-0.010	0.001	0.012		
per transducer labeling	20	-5.576	0	0	0	0	-5.580	0.008	-0.005	-0.001	0.000	0.001	-0.014	0.034	-0.018	-0.012	0.001	0.011		
	40	-11.179	0	0	0	0	-11.188	0.005	-0.009	-0.001	0.000	0.001	-0.031	0.022	-0.033	-0.015	0.005	0.022		
	50	-13.981	0	0	0	0	-13.988	0.004	-0.011	-0.001	0.001	0.000	-0.024	0.016	-0.039	-0.014	0.008	0.007		
	60	-16.779	0	0	0	0	-16.784	0.001	-0.012	-0.001	0.001	0.000	-0.017	0.005	-0.044	-0.015	0.012	-0.001		
	80	-22.373	0	0	0	0	-22.373	-0.004	-0.015	-0.001	0.001	-0.001	-0.000	-0.017	-0.054	-0.016	0.016	-0.026		
	100	-27.980	0	0	0	0	-27.972	-0.010	-0.017	-0.001	0.002	-0.001	-0.029	-0.044	-0.062	-0.019	0.025	-0.028		
	60	-16.779	0	0	0	0	-16.766	-0.001	-0.014	-0.001	0.001	-0.001	0.045	-0.002	-0.048	-0.012	0.016	-0.026		
	50	-13.980	0	0	0	0	-13.971	0.001	-0.012	-0.001	0.001	-0.001	0.032	0.006	-0.043	-0.011	0.014	-0.023		
	40	-11.178	0	0	0	0	-11.171	0.004	-0.011	-0.001	0.001	0.000	0.025	0.016	-0.038	-0.012	0.010	-0.003		
	0	0	0	0	0	0	0.001	0.000	-0.002	0.000	0.000	0.001	0.005	-0.002	-0.008	-0.009	0.003	0.012		
Hysteresis	40	-11.20	0	0	0	0	-11.209	N/A	N/A	N/A	N/A	N/A								
(Data linearly scaled to equal load points)	50	-14.00	0	0	0	0	-14.007	N/A	N/A	N/A	N/A	N/A								
	60	-16.80	0	0	0	0	-16.805	N/A	N/A	N/A	N/A	N/A								
	60	-16.80	0	0	0	0	-16.787	N/A	N/A	N/A	N/A	N/A	-0.062	N/A	N/A	N/A	N/A	N/A	N/A	
	50	-14.00	0	0	0	0	-13.991	N/A	N/A	N/A	N/A	N/A	-0.056	N/A	N/A	N/A	N/A	N/A	N/A	
	40	-11.20	0	0	0	0	-11.193	N/A	N/A	N/A	N/A	N/A	-0.055	N/A	N/A	N/A	N/A	N/A	N/A	

Calibration Equipment
see page 1 of Calibration Report for Calibration Equipment and Asset Numbers

CALIBRATION RESULTS						
Error % FS						
	FX	FY	FZ	MX	MY	MZ
Maximum Error - Loaded Axis						
Actual - positive polarity	-0.159					
Actual - negative polarity	0.045					
Allowed per Spec	1.000					
Non-Linearity						
Actual - positive polarity	0.144					
Actual - negative polarity	-0.038					
Allowed per Spec	0.250					
Crosstalk Error						
Actual - positive polarity		0.066	-0.083	-0.012	-0.019	-0.041
Actual - negative polarity		-0.044	-0.062	-0.019	0.025	-0.028
Allowed per Spec		1.500	1.500	1.500	1.500	1.500
Hysteresis						
Actual - positive polarity		-0.103				
Actual - negative polarity		-0.062				
Allowed per Spec		0.500				
Return to Zero						
Actual - positive polarity		-0.011	-0.001	0.000	-0.001	0.004
Actual - negative polarity		0.012	0.001	-0.003	0.001	0.002

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SWIFT Evo (TM) Spinning Wheel Integrated Force Transducer
SWIFTCAL version 1.7

Customer: Transducer Engineering

System/Job Number: Demo

SWIFT Evo Transducer Serial Number: 10558903C
SWIFT Evo Transducer Type: SWIFT Evo 30A

VERIFICATION OUTPUTS: FY Full Scale 23.0 kN = +/- 10.000 Volt Output

Pass

FullScale Load Calibrated Ranges	FX	FY	FZ	MX	MY	MZ
Units	kN	kN	kN	kN-m	kN-m	kN-m
FullScale	28	23	28	5	7.5	5

Axis Units	STANDARD CELL APPLIED LOADS							SWIFT TRANSDUCER OUTPUT						ERROR % FULL SCALE					
	load % of FS	FX kN	FY kN	FZ kN	MX kN-m	MY kN-m	MZ kN-m	FX kN	FY kN	FZ kN	MX kN-m	MY kN-m	MZ kN-m	Error % FS	Error % FS	Error % FS	Error % FS	Error % FS	Error % FS
Positive Polarity	0	0	0	0	0	0	0	-0.004	-0.003	0.002	0.000	0.000	-0.001	-0.014	-0.013	0.006	-0.006	0.006	-0.022
per transducer labeling	20	0	4.579	0	0	0	0	0.012	4.574	0.013	-0.002	0.000	0.003	0.042	-0.022	0.046	-0.036	0.005	0.062
	40	0	9.179	0	0	0	0	0.014	9.174	0.013	-0.002	0.000	0.002	0.050	-0.021	0.048	-0.038	0.004	0.049
	50	0	11.480	0	0	0	0	0.014	11.475	0.014	-0.002	0.000	0.003	0.050	-0.021	0.051	-0.039	0.006	0.051
	60	0	13.779	0	0	0	0	0.017	13.777	0.014	-0.002	0.001	0.002	0.059	-0.010	0.052	-0.039	0.008	0.040
	80	0	18.376	0	0	0	0	0.016	18.376	0.014	-0.001	0.001	0.001	0.055	-0.003	0.051	-0.029	0.009	0.021
	100	0	22.978	0	0	0	0	0.018	22.980	0.012	-0.001	0.000	0.000	0.064	0.006	0.044	-0.019	0.005	-0.004
	60	0	13.780	0	0	0	0	0.017	13.772	0.014	-0.002	0.001	0.002	0.061	-0.034	0.049	-0.043	0.007	0.049
	50	0	11.480	0	0	0	0	0.016	11.472	0.014	-0.002	0.000	0.003	0.057	-0.035	0.049	-0.047	0.004	0.059
	40	0	9.179	0	0	0	0	0.015	9.171	0.013	-0.002	0.000	0.003	0.052	-0.035	0.048	-0.045	0.006	0.064
	0	0	0	0	0	0	0	-0.003	-0.005	0.002	0.000	0.000	-0.001	-0.010	-0.020	0.008	-0.005	0.004	-0.014
Hysteresis	40	0	9.20	0	0	0	0	N/A	9.195	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(data linearly scaled to equal load points)	50	0	11.50	0	0	0	0	N/A	11.495	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	60	0	13.80	0	0	0	0	N/A	13.798	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	60	0	13.80	0	0	0	0	N/A	13.792	N/A	N/A	N/A	N/A	N/A	-0.024	N/A	N/A	N/A	N/A
	50	0	11.50	0	0	0	0	N/A	11.492	N/A	N/A	N/A	N/A	N/A	-0.014	N/A	N/A	N/A	N/A
	40	0	9.20	0	0	0	0	N/A	9.192	N/A	N/A	N/A	N/A	N/A	-0.014	N/A	N/A	N/A	N/A
Negative Polarity	0	0	0	0	0	0	0	0.003	0.000	0.001	0.000	0.000	-0.001	0.009	-0.001	0.004	-0.001	-0.002	-0.022
per transducer labeling	20	0	-4.608	0	0	0	0	0.010	-4.611	0.005	0.000	0.000	0.001	0.036	-0.013	0.019	-0.003	0.002	0.013
	40	0	-9.206	0	0	0	0	0.012	-9.207	0.007	0.000	0.001	0.000	0.042	-0.004	0.024	-0.005	0.007	0.009
	50	0	-11.503	0	0	0	0	0.017	-11.502	0.007	0.000	0.001	0.001	0.062	0.006	0.026	-0.006	0.008	0.020
	60	0	-13.803	0	0	0	0	0.016	-13.799	0.009	0.000	0.000	0.000	0.056	0.018	0.032	-0.005	0.005	0.008
	80	0	-18.403	0	0	0	0	0.022	-18.392	0.011	0.000	0.000	0.001	0.080	0.051	0.038	-0.003	0.006	0.017
	100	0	-23.002	0	0	0	0	0.029	-22.981	0.013	0.000	0.000	0.001	0.103	0.090	0.046	-0.003	-0.002	0.012
	60	0	-13.803	0	0	0	0	0.018	-13.797	0.008	-0.001	0.000	0.001	0.065	0.025	0.030	-0.012	0.001	0.013
	50	0	-11.503	0	0	0	0	0.015	-11.500	0.007	-0.001	0.000	0.001	0.055	0.014	0.026	-0.013	0.003	0.014
	40	0	-9.206	0	0	0	0	0.012	-9.204	0.007	-0.001	0.000	0.000	0.044	0.005	0.025	-0.013	0.005	0.010
	0	0	0	0	0	0	0	-0.001	0.001	0.003	0.000	0.000	-0.001	-0.004	0.004	0.009	0.000	0.001	-0.015
Hysteresis	40	0	-9.20	0	0	0	0	N/A	-9.201	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(data linearly scaled to equal load points)	50	0	-11.50	0	0	0	0	N/A	-11.499	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	60	0	-13.80	0	0	0	0	N/A	-13.796	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	60	0	-13.80	0	0	0	0	N/A	-13.794	N/A	N/A	N/A	N/A	N/A	-0.007	N/A	N/A	N/A	N/A
	50	0	-11.50	0	0	0	0	N/A	-11.497	N/A	N/A	N/A	N/A	N/A	-0.008	N/A	N/A	N/A	N/A
	40	0	-9.20	0	0	0	0	N/A	-9.199	N/A	N/A	N/A	N/A	N/A	-0.009	N/A	N/A	N/A	N/A

Calibration Equipment
see page 1 of Calibration Report for Calibration Equipment and Asset Numbers

CALIBRATION RESULTS						
Error % FS						
	FX	FY	FZ	MX	MY	MZ
Maximum Error - Loaded Axis						
Actual - positive polarity		-0.035				
Actual - negative polarity		0.090				
Allowed per Spec		1.000				
Non-Linearity						
Actual - positive polarity		-0.044				
Actual - negative polarity		0.065				
Allowed per Spec		0.250				
Crosstalk Error						
Actual - positive polarity	0.064		0.052	-0.047	0.009	0.064
Actual - negative polarity	0.103		0.046	-0.013	0.007	-0.022
Allowed per Spec	1.500		1.500	1.500	1.500	1.500
Hysteresis						
Actual - positive polarity		-0.024				
Actual - negative polarity		-0.009				
Allowed per Spec		0.500				
Return to Zero						
Actual - positive polarity	0.004	-0.007	0.003	0.001	-0.002	0.007
Actual - negative polarity	-0.013	0.005	0.005	0.000	0.003	0.007

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SWIFT Evo (TM) Spinning Wheel Integrated Force Transducer
SWIFTCAL version 1.7

Customer: Transducer Engineering

System/Job Number: Demo

SWIFT Evo Transducer Serial Number: 10558903C
SWIFT Evo Transducer Type: SWIFT Evo 30A

VERIFICATION OUTPUTS: FZ Full Scale 28.0 kN = +/- 10 Volt Output

Pass

FullScale Load Calibrated Ranges	FX	FY	FZ	MX	MY	MZ
Units	kN	kN	kN	kN-m	kN-m	kN-m
FullScale	28	23	28	5	7.5	5

Axis Units	STANDARD CELL APPLIED LOADS							SWIFT TRANSDUCER OUTPUT						ERROR % FULL SCALE					
	load % of FS	FX kN	FY kN	FZ kN	MX kN-m	MY kN-m	MZ kN-m	FX kN	FY kN	FZ kN	MX kN-m	MY kN-m	MZ kN-m	Error % FS	Error % FS	Error % FS	Error % FS	Error % FS	Error % FS
Positive Polarity	0	0	0	0	0	0	0	0.002	-0.001	0.001	0.000	0.000	0.000	0.008	-0.003	0.005	0.001	-0.004	-0.009
per transducer labeling	20	0	0	5.579	0	0	0	0.018	0.018	5.587	0.001	0.000	0.000	0.065	0.076	0.028	0.029	-0.004	-0.008
	40	0	0	11.183	0	0	0	0.018	0.016	11.185	0.001	0.000	0.000	0.065	0.070	0.007	0.015	0.003	-0.009
	50	0	0	13.982	0	0	0	0.019	0.015	13.983	0.000	0.000	0.000	0.070	0.065	0.003	0.006	0.006	-0.008
	60	0	0	16.779	0	0	0	0.020	0.013	16.783	-0.001	0.001	-0.001	0.071	0.057	0.013	-0.011	0.008	-0.010
	80	0	0	22.384	0	0	0	0.020	0.009	22.380	-0.002	0.001	-0.001	0.071	0.038	-0.014	-0.040	0.014	-0.011
	100	0	0	27.983	0	0	0	0.019	0.004	27.972	-0.004	0.001	0.000	0.068	0.016	-0.038	-0.077	0.017	-0.008
	60	0	0	16.780	0	0	0	0.020	0.014	16.771	-0.001	0.000	-0.001	0.073	0.062	-0.030	-0.020	0.004	-0.012
	50	0	0	13.981	0	0	0	0.020	0.016	13.972	0.000	0.000	-0.001	0.071	0.071	-0.032	-0.010	0.002	-0.012
	40	0	0	11.183	0	0	0	0.018	0.017	11.174	0.000	0.000	-0.001	0.064	0.075	-0.029	0.002	0.000	-0.012
	0	0	0	0	0	0	0	0.001	0.000	-0.001	0.000	0.000	0.000	0.004	0.000	-0.002	0.001	-0.004	-0.009
Hysteresis	40	0	0	11.20	0	0	0	N/A	N/A	11.202	N/A	N/A	N/A	N/A	N/A				
(Data linearly sorted to equal load points)	50	0	0	14.00	0	0	0	N/A	N/A	14.001	N/A	N/A	N/A	N/A	N/A				
	60	0	0	16.80	0	0	0	N/A	N/A	16.804	N/A	N/A	N/A	N/A	N/A				
	60	0	0	16.80	0	0	0	N/A	N/A	16.792	N/A	N/A	N/A	N/A	N/A	-0.043	N/A	N/A	N/A
	50	0	0	14.00	0	0	0	N/A	N/A	13.991	N/A	N/A	N/A	N/A	N/A	-0.035	N/A	N/A	N/A
	40	0	0	11.20	0	0	0	N/A	N/A	11.192	N/A	N/A	N/A	N/A	N/A	-0.036	N/A	N/A	N/A
Negative Polarity	0	0	0	0	0	0	0	-0.002	0.001	0.002	0.000	0.000	0.000	-0.007	0.003	0.008	-0.004	-0.003	-0.002
per transducer labeling	20	0	0	-5.576	0	0	0	0.007	0.018	-5.578	-0.002	0.000	0.000	0.025	0.078	-0.010	-0.049	0.005	-0.004
	40	0	0	-11.179	0	0	0	0.014	0.018	-11.183	-0.003	0.001	0.000	0.051	0.077	-0.012	-0.050	0.012	-0.005
	50	0	0	-13.981	0	0	0	0.018	0.016	-13.984	-0.002	0.001	0.000	0.063	0.069	-0.010	-0.041	0.015	-0.006
	60	0	0	-16.780	0	0	0	0.021	0.014	-16.782	-0.002	0.001	0.000	0.075	0.060	-0.008	-0.031	0.015	-0.005
	80	0	0	-22.373	0	0	0	0.026	0.008	-22.371	0.000	0.001	0.000	0.094	0.036	0.007	-0.005	0.019	-0.008
	100	0	0	-27.980	0	0	0	0.031	0.002	-27.969	0.002	0.002	0.000	0.112	0.008	0.008	0.034	0.025	-0.010
	60	0	0	-16.779	0	0	0	0.023	0.014	-16.768	-0.001	0.001	0.000	0.083	0.062	0.038	-0.014	0.018	-0.006
	50	0	0	-13.981	0	0	0	0.020	0.017	-13.969	-0.002	0.001	0.000	0.070	0.073	0.039	-0.034	0.016	-0.007
	40	0	0	-11.178	0	0	0	0.016	0.018	-11.170	-0.002	0.001	0.000	0.058	0.080	0.031	-0.036	0.014	-0.005
	0	0	0	0	0	0	0	-0.002	0.001	0.006	0.000	0.000	0.000	-0.008	0.003	0.022	-0.003	-0.002	-0.001
Hysteresis	40	0	0	-11.20	0	0	0	N/A	N/A	-11.203	N/A	N/A	N/A	N/A	N/A				
(Data linearly sorted to equal load points)	50	0	0	-14.00	0	0	0	N/A	N/A	-14.003	N/A	N/A	N/A	N/A	N/A				
	60	0	0	-16.80	0	0	0	N/A	N/A	-16.802	N/A	N/A	N/A	N/A	N/A				
	60	0	0	-16.80	0	0	0	N/A	N/A	-16.789	N/A	N/A	N/A	N/A	N/A	-0.045	N/A	N/A	N/A
	50	0	0	-14.00	0	0	0	N/A	N/A	-13.989	N/A	N/A	N/A	N/A	N/A	-0.050	N/A	N/A	N/A
	40	0	0	-11.20	0	0	0	N/A	N/A	-11.191	N/A	N/A	N/A	N/A	N/A	-0.043	N/A	N/A	N/A

Calibration Equipment
see page 1 of Calibration Report for Calibration Equipment and Asset Numbers

CALIBRATION RESULTS						
Error % FS						
	FX	FY	FZ	MX	MY	MZ
Maximum Error - Loaded Axis						
Actual - positive polarity			-0.038			
Actual - negative polarity			0.039			
Allowed per Spec			1.000			
Non-Linearity						
Actual - positive polarity			0.033			
Actual - negative polarity			-0.024			
Allowed per Spec			0.250			
Crosstalk Error						
Actual - positive polarity	0.073	0.076		-0.077	0.017	-0.012
Actual - negative polarity	0.112	0.080		-0.050	0.025	-0.010
Allowed per Spec	1.500	1.500		1.500	1.500	1.500
Hysteresis						
Actual - positive polarity			-0.043			
Actual - negative polarity			-0.050			
Allowed per Spec			0.500			
Return to Zero						
Actual - positive polarity	-0.004	0.002	-0.007	0.000	0.000	0.000
Actual - negative polarity	-0.001	0.000	0.014	0.001	0.000	0.001

MTS Systems Corporation

Calibration Report

Calibration Date: 1/18/2018

SWIFT Evo (TM) Spinning Wheel Integrated Force Transducer
SWIFTCAL version 1.7

Customer: Transducer Engineering

System/Job Number: Demo

SWIFT Evo Transducer Serial Number: 10558903C
SWIFT Evo Transducer Type: SWIFT Evo 30A

VERIFICATION OUTPUTS: FZ Full Scale 28.0 kN = +/- 10 Volt Output
MX Full Scale 5.0 kN-m = +/- 10 Volt Output

Pass

FullScale Load Calibrated Ranges	FX	FY	FZ	MX	MY	MZ
Units	kN	kN	kN	kN-m	kN-m	kN-m
FullScale	28	23	28	5	7.5	5

STANDARD CELL APPLIED LOADS

SWIFT TRANSDUCER OUTPUT

ERROR % FULL SCALE

Axis Units	load % of FS	STANDARD CELL APPLIED LOADS						SWIFT TRANSDUCER OUTPUT						ERROR % FULL SCALE					
		FX kN	FY kN	FZ kN	MX kN-m	MY kN-m	MZ kN-m	FX kN	FY kN	FZ kN	MX kN-m	MY kN-m	MZ kN-m	FX Error % FS	FY Error % FS	FZ Error % FS	MX Error % FS	MY Error % FS	MZ Error % FS
Positive Polarity																			
per transducer labeling	0	0	0	0	0	0	0.005	-0.001	-0.002	-0.001	0.000	0.000	0.019	-0.006	-0.007	-0.012	-0.004	0.009	
	20	0	0	-4.007	1.002	0	0.018	-0.038	-3.997	0.999	0.000	0.003	0.063	-0.163	0.036	-0.049	0.006	0.064	
	40	0	0	-8.011	2.003	0	0.020	-0.038	-8.012	2.003	0.000	0.004	0.073	-0.163	-0.002	0.008	0.007	0.078	
	50	0	0	-10.011	2.503	0	0.020	-0.033	-10.015	2.504	0.000	0.004	0.072	-0.144	-0.012	0.011	0.003	0.081	
	60	0	0	-12.011	3.002	0	0.021	-0.026	-12.017	3.004	0.000	0.004	0.073	-0.114	-0.022	0.030	0.001	0.081	
	80	0	0	-15.014	4.003	0	0.022	-0.003	-15.020	4.005	0.000	0.004	0.077	-0.015	-0.020	0.026	-0.005	0.080	
	100	0	0	-20.016	5.004	0	0.021	0.029	-20.021	5.003	-0.001	0.004	0.074	0.125	-0.020	-0.016	-0.007	0.082	
	60	0	0	-12.009	3.002	0	0.016	-0.022	-12.007	3.001	-0.001	0.003	0.058	-0.095	0.006	-0.030	-0.011	0.064	
	50	0	0	-10.011	2.503	0	0.015	-0.029	-9.999	2.500	-0.001	0.003	0.055	-0.127	0.043	-0.067	-0.009	0.060	
	40	0	0	-8.010	2.003	0	0.015	-0.034	-7.994	1.998	-0.001	0.003	0.052	-0.148	0.059	-0.086	-0.008	0.055	
	0	0	0	0	0	0	0.006	0.000	0.001	-0.001	0.000	0.000	0.022	-0.002	0.002	-0.022	-0.006	0.010	
Hysteresis																			
(Data linearly scaled to equal load points)	40	0	0	-8.00	2.00	0	N/A	N/A	-8.000	2.000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	50	0	0	-10.00	2.50	0	N/A	N/A	-10.003	2.501	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	60	0	0	-12.00	3.00	0	N/A	N/A	-12.006	3.001	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	60	0	0	-12.00	3.00	0	N/A	N/A	-11.998	2.999	N/A	N/A	N/A	N/A	N/A	-0.028	-0.059	N/A	N/A
	50	0	0	-10.00	2.50	0	N/A	N/A	-9.988	2.497	N/A	N/A	N/A	N/A	N/A	-0.055	-0.078	N/A	N/A
	40	0	0	-8.00	2.00	0	N/A	N/A	-7.983	1.996	N/A	N/A	N/A	N/A	N/A	-0.061	-0.095	N/A	N/A
Negative Polarity																			
per transducer labeling	0	0	0	0	0	0	0.000	-0.006	-0.001	0.000	0.000	0.000	0.001	-0.027	-0.002	-0.002	0.000	-0.007	
	20	0	0	3.967	-0.991	0	0.011	-0.050	3.979	-0.996	-0.001	0.003	0.039	-0.218	0.044	-0.084	-0.009	0.052	
	40	0	0	7.965	-1.991	0	0.014	-0.047	7.982	-1.995	0.000	0.003	0.050	-0.202	0.060	-0.065	-0.006	0.058	
	50	0	0	9.966	-2.491	0	0.015	-0.041	9.983	-2.494	0.000	0.003	0.055	-0.179	0.058	-0.049	-0.004	0.060	
	60	0	0	11.968	-2.992	0	0.017	-0.033	11.982	-2.993	0.000	0.003	0.060	-0.144	0.053	-0.026	-0.003	0.060	
	80	0	0	15.969	-3.992	0	0.018	-0.010	15.983	-3.991	0.000	0.003	0.066	-0.042	0.051	0.019	0.001	0.063	
	100	0	0	19.964	-4.991	0	0.019	0.026	19.972	-4.987	0.000	0.003	0.068	0.115	0.029	0.085	0.005	0.065	
	60	0	0	11.966	-2.992	0	0.016	-0.029	11.977	-2.992	0.001	0.003	0.057	-0.127	0.040	0.000	0.014	0.056	
	50	0	0	9.964	-2.491	0	0.014	-0.038	9.968	-2.492	0.001	0.003	0.051	-0.164	0.012	-0.021	0.014	0.053	
	40	0	0	7.965	-1.991	0	0.012	-0.043	7.972	-1.992	0.001	0.002	0.044	-0.185	0.025	-0.023	0.012	0.049	
	0	0	0	0	0	0	0.001	-0.005	-0.002	0.000	0.000	0.000	0.004	-0.024	-0.008	0.008	0.000	-0.006	
Hysteresis																			
(Data linearly scaled to equal load points)	40	0	0	8.00	-2.00	0	N/A	N/A	8.016	-2.003	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	50	0	0	10.00	-2.50	0	N/A	N/A	10.016	-2.502	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	60	0	0	12.00	-3.00	0	N/A	N/A	12.014	-3.001	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	60	0	0	12.00	-3.00	0	N/A	N/A	12.011	-3.000	N/A	N/A	N/A	N/A	N/A	-0.012	-0.026	N/A	N/A
	50	0	0	10.00	-2.50	0	N/A	N/A	10.003	-2.501	N/A	N/A	N/A	N/A	N/A	-0.047	-0.028	N/A	N/A
	40	0	0	8.00	-2.00	0	N/A	N/A	8.007	-2.001	N/A	N/A	N/A	N/A	N/A	-0.035	-0.043	N/A	N/A

Calibration Equipment
see page 1 of Calibration Report for Calibration Equipment and Asset Numbers

CALIBRATION RESULTS						
Error % FS						
	FX	FY	FZ	MX	MY	MZ
Maximum Error - Loaded Axis						
Actual - positive polarity			0.058	-0.086		
Actual - negative polarity			0.060	0.085		
Allowed per Spec			1.000	1.000		
Non-Linearity						
Actual - positive polarity				0.039		
Actual - negative polarity				0.095		
Allowed per Spec				0.250		
Crosstalk Error						
Actual - positive polarity	0.077	-0.163			-0.011	0.082
Actual - negative polarity	0.068	-0.218			0.014	0.065
Allowed per Spec	1.500	1.500			1.500	1.500
Hysteresis						
Actual - positive polarity			-0.061	-0.085		
Actual - negative polarity			-0.047	-0.043		
Allowed per Spec			0.500	0.500		
Return to Zero						
Actual - positive polarity	0.003	0.005	0.009	-0.011	-0.002	0.001
Actual - negative polarity	0.002	0.004	-0.006	0.010	0.000	0.001

MTS Systems Corporation

Calibration Report

Calibration Date: 1/18/2018

SWIFT Evo (TM) Spinning Wheel Integrated Force Transducer
SWIFTCAL version 1.7

Customer: Transducer Engineering

System/Job Number: Demo

SWIFT Evo Transducer Serial Number: 10558903C
SWIFT Evo Transducer Type: SWIFT Evo 30A

VERIFICATION OUTPUTS: MY Full Scale 7.5 kN-m = +/- 10 Volt Output

Pass

FullScale Load Calibrated Ranges	FX	FY	FZ	MX	MY	MZ
Units	kN	kN	kN	kN-m	kN-m	kN-m
FullScale	28	23	28	5	7.5	5

Axis Units	STANDARD CELL APPLIED LOADS							SWIFT TRANSDUCER OUTPUT						ERROR % FULL SCALE					
	load % of FS	FX kN	FY kN	FZ kN	MX kN-m	MY kN-m	MZ kN-m	FX kN	FY kN	FZ kN	MX kN-m	MY kN-m	MZ kN-m	Error % FS	Error % FS	Error % FS	Error % FS	Error % FS	Error % FS
Positive Polarity	0	0	0	0	0	0	0	0.000	-0.002	-0.002	0.000	0.000	0.000	0.001	-0.007	-0.008	-0.007	0.000	0.004
per transducer labeling	20	0.014	0	-0.014	-0.002	1.491	-0.002	0.034	-0.029	0.001	-0.008	1.494	0.001	0.071	-0.127	0.053	-0.116	0.033	0.065
	40	0.014	0	-0.014	-0.002	2.992	-0.002	0.031	-0.027	-0.001	-0.007	2.995	0.001	0.059	-0.117	0.048	-0.091	0.049	0.057
	50	0.014	0	-0.014	-0.002	3.742	-0.002	0.032	-0.032	-0.001	-0.007	3.746	0.001	0.064	-0.137	0.045	-0.092	0.052	0.070
	60	0.013	0	-0.015	-0.002	4.492	-0.002	0.033	-0.038	-0.001	-0.007	4.494	0.002	0.071	-0.164	0.048	-0.097	0.030	0.075
	80	0.014	0	-0.014	-0.002	5.992	-0.002	0.031	-0.056	-0.001	-0.010	5.991	0.003	0.063	-0.244	0.044	-0.171	-0.014	0.096
	100	0.015	0	-0.015	-0.002	7.492	-0.002	0.026	-0.075	-0.005	-0.016	7.486	0.002	0.037	-0.326	0.037	-0.275	-0.082	0.078
	60	0.014	0	-0.014	-0.002	4.492	-0.002	0.021	-0.050	-0.014	-0.009	4.495	0.003	0.025	-0.218	-0.003	-0.149	0.047	0.096
	50	0.016	0	-0.015	-0.002	3.742	-0.002	0.021	-0.046	-0.015	-0.010	3.747	0.002	0.021	-0.200	-0.002	-0.165	0.070	0.087
	40	0.013	0	-0.014	-0.002	2.992	-0.002	0.021	-0.043	-0.017	-0.011	2.998	0.003	0.026	-0.185	-0.010	-0.169	0.079	0.104
	0	0	0	0	0	0	0	0.003	-0.001	-0.002	0.000	-0.001	0.000	0.010	-0.004	-0.007	-0.007	-0.014	0.008
Hysteresis	40	0	0	0	0	3.00	0	N/A	N/A	N/A	N/A	3.004	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(Data linearly scaled to equal load points)	50	0	0	0	0	3.75	0	N/A	N/A	N/A	N/A	3.754	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	60	0	0	0	0	4.50	0	N/A	N/A	N/A	N/A	4.502	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	60	0	0	0	0	4.50	0	N/A	N/A	N/A	N/A	4.504	N/A	N/A	N/A	N/A	N/A	0.017	N/A
	50	0	0	0	0	3.75	0	N/A	N/A	N/A	N/A	3.755	N/A	N/A	N/A	N/A	N/A	0.018	N/A
	40	0	0	0	0	3.00	0	N/A	N/A	N/A	N/A	3.006	N/A	N/A	N/A	N/A	N/A	0.030	N/A
Negative Polarity	0	0	0	0	0	0	0	-0.003	0.000	0.002	-0.001	-0.001	0.000	-0.012	0.000	0.009	-0.011	-0.011	0.003
per transducer labeling	20	0.008	0	-0.008	-0.001	-1.501	-0.001	0.032	-0.097	0.011	-0.016	-1.507	0.012	0.087	-0.423	0.068	-0.304	-0.078	0.258
	40	0.009	0	-0.008	-0.001	-3.003	-0.001	0.026	-0.065	0.009	-0.013	-3.006	0.006	0.061	-0.283	0.061	-0.237	-0.044	0.134
	50	0.008	0	-0.008	-0.001	-3.752	-0.001	0.022	-0.050	0.009	-0.011	-3.754	0.002	0.050	-0.218	0.062	-0.201	-0.026	0.073
	60	0.008	0	-0.008	-0.001	-4.501	-0.001	0.018	-0.038	0.007	-0.011	-4.501	0.001	0.033	-0.164	0.055	-0.197	-0.003	0.039
	80	0.007	0	-0.008	-0.001	-6.001	-0.001	0.013	-0.020	0.005	-0.008	-5.996	0.001	0.020	-0.087	0.047	-0.143	0.055	0.039
	100	0.007	0	-0.008	-0.002	-7.500	-0.001	0.002	-0.008	0.007	-0.005	-7.489	0.002	-0.019	-0.035	0.056	-0.071	0.136	0.077
	60	0.008	0	-0.008	-0.001	-4.502	-0.001	0.020	-0.049	0.015	-0.011	-4.505	0.003	0.041	-0.215	0.082	-0.187	-0.044	0.081
	50	0.008	0	-0.011	-0.001	-3.752	-0.001	0.024	-0.064	0.014	-0.012	-3.758	0.005	0.057	-0.279	0.090	-0.207	-0.083	0.125
	40	0.008	0	-0.008	-0.001	-3.002	-0.001	0.027	-0.078	0.017	-0.013	-3.009	0.008	0.066	-0.341	0.091	-0.232	-0.098	0.176
	0	0	0	0	0	0	0	-0.005	0.000	0.002	-0.001	0.000	0.001	-0.019	0.001	0.007	-0.012	0.004	0.011
Hysteresis	40	0	0	0	0	-3.00	0	N/A	N/A	N/A	N/A	-3.003	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(Data linearly scaled to equal load points)	50	0	0	0	0	-3.75	0	N/A	N/A	N/A	N/A	-3.752	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	60	0	0	0	0	-4.50	0	N/A	N/A	N/A	N/A	-4.500	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	60	0	0	0	0	-4.50	0	N/A	N/A	N/A	N/A	-4.503	N/A	N/A	N/A	N/A	N/A	0.041	N/A
	50	0	0	0	0	-3.75	0	N/A	N/A	N/A	N/A	-3.756	N/A	N/A	N/A	N/A	N/A	0.057	N/A
	40	0	0	0	0	-3.00	0	N/A	N/A	N/A	N/A	-3.007	N/A	N/A	N/A	N/A	N/A	0.055	N/A

Calibration Equipment
see page 1 of Calibration Report for Calibration Equipment and Asset Numbers

CALIBRATION RESULTS						
Error % FS						
	FX	FY	FZ	MX	MY	MZ
Maximum Error - Loaded Axis						
Actual - positive polarity						-0.081
Actual - negative polarity						0.135
Allowed per Spec						1.000
Non-Linearity						
Actual - positive polarity						-0.071
Actual - negative polarity						0.107
Allowed per Spec						0.250
Crosstalk Error						
Actual - positive polarity	0.071	-0.326	0.053	-0.275		0.104
Actual - negative polarity	0.087	-0.423	0.091	-0.304		0.258
Allowed per Spec	1.500	1.500	1.500	1.500		1.500
Hysteresis						
Actual - positive polarity						0.030
Actual - negative polarity						0.057
Allowed per Spec						0.500
Return to Zero						
Actual - positive polarity	0.009	0.003	0.001	0.000	-0.014	0.004
Actual - negative polarity	-0.007	0.001	-0.002	-0.001	0.014	0.008

MTS Systems Corporation

Calibration Report

Calibration Date: 1/18/2018

SWIFT Evo (TM) Spinning Wheel Integrated Force Transducer
SWIFTCAL version 1.7

Customer: Transducer Engineering

System/Job Number: Demo

SWIFT Evo Transducer Serial Number: 10558903C
SWIFT Evo Transducer Type: SWIFT Evo 30A

VERIFICATION OUTPUTS: FX Full Scale 28.0 kN = +/- 10 Volt Output
MZ Full Scale 5.0 kN-m = +/- 10 Volt Output

Pass

FullScale Load Calibrated Ranges	FX	FY	FZ	MX	MY	MZ
Units	kN	kN	kN	kN-m	kN-m	kN-m
FullScale	28	23	28	5	7.5	5

STANDARD CELL APPLIED LOADS

SWIFT TRANSDUCER OUTPUT

ERROR % FULL SCALE

Axis Units	load % of FS	STANDARD CELL APPLIED LOADS						SWIFT TRANSDUCER OUTPUT						ERROR % FULL SCALE					
		FX kN	FY kN	FZ kN	MX kN-m	MY kN-m	MZ kN-m	FX kN	FY kN	FZ kN	MX kN-m	MY kN-m	MZ kN-m	FX Error % FS	FY Error % FS	FZ Error % FS	MX Error % FS	MY Error % FS	MZ Error % FS
Positive Polarity																			
per transducer labeling	0	0	0	0	0	0	0.001	-0.001	-0.003	0.000	0.000	0.000	0.003	-0.005	-0.012	0.005	0.002	0.002	0.002
	20	3.966	0	0	0	0	3.977	-0.041	-0.013	0.002	0.000	0.996	0.039	-0.180	-0.045	0.045	-0.006	0.080	0.080
	40	7.965	0	0	0	0	7.980	-0.039	-0.015	0.003	-0.001	1.996	0.055	-0.169	-0.052	0.057	-0.012	0.105	0.105
	50	9.967	0	0	0	0	9.980	-0.033	-0.015	0.003	-0.001	2.496	0.045	-0.145	-0.053	0.064	-0.009	0.085	0.085
	60	11.968	0	0	0	0	11.991	-0.025	-0.015	0.003	-0.001	2.996	0.049	-0.109	-0.053	0.068	-0.007	0.079	0.079
	80	15.969	0	0	0	0	15.978	0.003	-0.014	0.004	0.000	3.994	0.030	0.014	-0.050	0.071	-0.003	0.028	0.028
	100	19.966	0	0	0	0	19.947	0.040	-0.013	0.004	0.001	4.996	-0.069	0.172	-0.047	0.082	0.011	-0.098	0.098
	60	11.965	0	0	0	0	11.969	-0.018	-0.006	0.003	0.000	2.997	0.014	-0.080	-0.021	0.068	0.004	0.102	0.102
	50	9.965	0	0	0	0	9.968	-0.026	-0.005	0.003	0.000	2.496	0.010	-0.113	-0.019	0.064	0.000	0.090	0.090
	40	7.964	0	0	0	0	7.967	-0.031	-0.006	0.003	0.000	1.996	0.011	-0.135	-0.022	0.059	0.000	0.086	0.086
	0	0	0	0	0	0	-0.002	0.000	-0.003	0.000	0.000	0.000	-0.005	-0.001	-0.011	0.005	0.002	-0.008	-0.008
Hysteresis																			
(data linearly scaled to equal load points)	40	8.00	0	0	0	0	8.015	N/A	N/A	N/A	N/A	2.005							
	50	10.00	0	0	0	0	10.012	N/A	N/A	N/A	N/A	2.504							
	60	12.00	0	0	0	0	12.013	N/A	N/A	N/A	N/A	3.004							
	60	12.00	0	0	0	0	12.003	N/A	N/A	N/A	N/A	3.005	-0.035	N/A	N/A	N/A	N/A	N/A	0.023
	50	10.00	0	0	0	0	10.002	N/A	N/A	N/A	N/A	2.505	-0.035	N/A	N/A	N/A	N/A	N/A	0.005
	40	8.00	0	0	0	0	8.003	N/A	N/A	N/A	N/A	2.004	-0.044	N/A	N/A	N/A	N/A	N/A	-0.019
Negative Polarity																			
per transducer labeling	0	0	0	0	0	0	0.004	-0.001	0.002	0.000	0.000	0.000	0.016	-0.004	0.007	0.005	-0.002	0.003	0.003
	20	-4.008	0	0	0	-1.002	-3.986	-0.034	0.000	0.001	-0.001	-0.999	0.079	-0.146	0.000	0.021	-0.009	0.051	0.051
	40	-8.011	0	0	0	-2.003	-8.000	-0.031	-0.002	0.002	-0.001	-2.004	0.040	-0.136	-0.007	0.032	-0.008	-0.023	-0.023
	50	-10.013	0	0	0	-2.503	-10.000	-0.029	-0.004	0.002	-0.001	-2.503	0.045	-0.125	-0.014	0.034	-0.011	-0.004	-0.004
	60	-12.011	0	0	0	-3.003	-11.999	-0.017	-0.006	0.002	-0.001	-3.002	0.046	-0.075	-0.021	0.036	-0.012	0.015	0.015
	80	-16.013	0	0	0	-4.004	-16.000	0.013	-0.011	0.002	-0.001	-4.000	0.044	0.056	-0.038	0.036	-0.007	0.076	0.076
	100	-20.015	0	0	0	-5.004	-20.015	0.045	-0.015	0.002	0.002	-4.996	0.001	0.197	-0.053	0.031	0.027	0.173	0.173
	60	-12.009	0	0	0	-3.002	-12.006	-0.020	-0.017	0.002	0.001	-3.000	0.011	-0.088	-0.060	0.035	0.007	0.038	0.038
	50	-10.010	0	0	0	-2.503	-9.998	-0.026	-0.015	0.002	0.000	-2.501	0.043	-0.112	-0.055	0.035	0.004	0.040	0.040
	40	-8.010	0	0	0	-2.003	-7.988	-0.034	-0.012	0.002	0.000	-2.000	0.077	-0.146	-0.045	0.032	0.000	0.048	0.048
	0	0	0	0	0	0	0.012	0.001	0.001	0.000	0.000	0.001	0.043	0.004	0.004	0.004	-0.006	0.025	0.025
Hysteresis																			
(data linearly scaled to equal load points)	40	-8.00	0	0	0	-2.00	-7.989	N/A	N/A	N/A	N/A	-2.001							
	50	-10.00	0	0	0	-2.50	-9.987	N/A	N/A	N/A	N/A	-2.500							
	60	-12.00	0	0	0	-3.00	-11.987	N/A	N/A	N/A	N/A	-2.999							
	60	-12.00	0	0	0	-3.00	-11.996	N/A	N/A	N/A	N/A	-2.998	0.035	N/A	N/A	N/A	N/A	N/A	-0.023
	50	-10.00	0	0	0	-2.50	-9.987	N/A	N/A	N/A	N/A	-2.498	0.002	N/A	N/A	N/A	N/A	N/A	-0.044
	40	-8.00	0	0	0	-2.00	-7.978	N/A	N/A	N/A	N/A	-1.998	-0.038	N/A	N/A	N/A	N/A	N/A	-0.071

Calibration Equipment
see page 1 of Calibration Report for Calibration Equipment and Asset Numbers

CALIBRATION RESULTS						
Error % FS						
	FX	FY	FZ	MX	MY	MZ
Maximum Error - Loaded Axis						
Actual - positive polarity	-0.069					0.105
Actual - negative polarity	0.079					0.173
Allowed per Spec	1.000					1.000
Non-Linearity						
Actual - positive polarity						-0.117
Actual - negative polarity						0.136
Allowed per Spec						0.250
Crosstalk Error						
Actual - positive polarity		-0.180	-0.053	0.082	-0.012	
Actual - negative polarity	0.197	-0.060	0.036	0.027		
Allowed per Spec	1.500	1.500	1.500	1.500	1.500	
Hysteresis						
Actual - positive polarity	-0.044					0.023
Actual - negative polarity	-0.038					-0.071
Allowed per Spec	0.500					0.500
Return to Zero						
Actual - positive polarity	-0.009	0.004	0.001	0.000	-0.001	-0.010
Actual - negative polarity	0.027	0.008	-0.003	-0.001	-0.005	0.022

MTS Systems Corporation

Calibration Report

Calibration Date: 1/18/2018

SWIFT Evo (TM) Spinning Wheel Integrated Force Transducer
SWIFTCAL version 1.7

Customer: Transducer Engineering

System/Job Number: Demo

SWIFT Evo Transducer Serial Number: 10558903C
SWIFT Evo Transducer Type: SWIFT Evo 30A

Pass

Full Scale Calibrated Ranges		FX	FY	FZ	MX	MY	MZ
	Units	kN	kN	kN	kN-m	kN-m	kN-m
		28	23	28	5	7.5	5
Full Scale Output Voltage	+/-	10 Volts					

Shunt Calibration Shunt Resistor Value: 316 kOhm

Shunt Calibration Results

	Raw Bridge Output In Volts:							Full Scale Output In Volts						Full Scale Output in Calibrated Engineering Units								
	FX1	FX2	FY1	FY2	FY3	FY4	FZ1	FZ2	FX	FY	FZ	MX	MY	MZ	kN	kN	kN	kN-m	MX	MY	MZ	
None	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	0.000	0.000	-0.003	0.000	0.000	0.000	0.000	0.000
Relay 1	0.872	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.713	-0.028	-0.001	0.009	0.555	-0.027	4.796	-0.064	-0.003	0.004	0.416	0.004	0.416	-0.014
Relay 2	0.000	0.000	0.873	0.000	0.000	0.000	0.000	0.000	0.011	1.372	0.019	-0.825	0.001	-0.014	0.031	3.156	0.053	-0.412	0.001	0.001	-0.007	0.000
Relay 3	0.000	0.000	0.000	0.000	0.000	0.000	0.873	0.000	0.002	-0.027	1.701	0.021	0.552	0.010	0.006	-0.062	4.763	0.011	0.414	0.006	0.414	0.005
Relay 4	0.000	0.000	0.000	0.873	0.000	0.000	0.000	0.000	-0.018	1.363	0.006	0.009	0.004	-0.827	-0.050	3.135	0.017	0.004	0.003	0.003	-0.413	0.000
Relay 5	0.000	0.873	0.000	0.000	0.000	0.000	0.000	0.000	1.704	0.027	0.006	0.013	-0.556	-0.024	4.771	0.062	0.017	0.006	-0.417	-0.012	-0.012	0.000
Relay 6	0.000	0.000	0.000	0.000	0.873	0.000	0.000	0.000	-0.013	1.357	-0.015	0.823	0.003	0.009	-0.036	3.121	-0.042	0.411	0.002	0.002	0.004	0.000
Relay 7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.872	-0.008	0.029	1.707	0.025	-0.557	0.013	-0.022	0.067	4.780	0.013	-0.418	0.013	-0.418	0.006
Relay 8	0.000	0.000	0.000	0.000	0.000	0.873	0.000	0.000	0.014	1.363	-0.001	-0.010	0.001	0.822	0.039	3.135	-0.003	-0.005	0.001	0.411	0.411	0.000

Transducer Interface Electronics Gain Settings

KFX1=	0.391481	KMX=	3.020960								
KFX2=	0.391481	KMY=	1.626230								
KFY1=	0.312466	KMYZ=	1.626230								
KFY2=	0.312466	KMZ=	3.021990								
KFY3=	0.312466										
KFY4=	0.312466										
KFZ1=	0.390537										
KFZ2=	0.390537										
KFXFX=	1	KFXFY=	-0.001146	KFXFZ=	-0.001605	KFXMX=	0.014430	KFXMY=	0.008712	KFXMZ=	-0.019200
KFYFX=	-0.000406	KFYFY=	1	KFYFZ=	0.000856	KFYMX=	0.008958	KFYMY=	-0.050023	KFYMZ=	0.000147
KFZFX=	0.001555	KFZFY=	0.001637	KFZFZ=	1	KFZMX=	0.020803	KFZMY=	-0.006380	KFZMZ=	0.004491
KMXFX=	-0.000726	KMYFY=	0.000437	KMXFZ=	-0.013531	KMYMX=	1	KMYMY=	0.003160	KMYMZ=	-0.011638
KMYFX=	-0.000284	KMYFY=	0.001807	KMYFZ=	-0.001620	KMYMX=	-0.001021	KMYMY=	1	KMYMZ=	0.001738
KMZFX=	0.015096	KMZFY=	0.001940	KMZFZ=	-0.006748	KMZMX=	0.013978	KMZMY=	0.002312	KMZMZ=	1