

Sensor Data Analysis Report

Statistics Summary

Available Row	Missing Rows	Duplicates	Frequency	mean	Standard Deviation	min	25%	
1162	0	0	3600.0	0.00206294802...	0.00036081248...	0.00095611	0.00175072574...	
1162	0	6	3600.0	94.3248527783...	15.0282958895...	-17.91932146	94.0381191125	
1162	0	0	3600.0	55.1219504276...	9.46489890465...	0.581809133	51.4189773	
1162	0	0	3600.0	2505.78131510...	72.4150203834...	1311.946773	2503.054293	
1162	0	0	3600.0	2385.59023884...	29.3319405111...	2073.656268	2372.60761675	
1162	0	0	3600.0	242.779298002...	29.9699781697...	33.68069906	227.26365545	
1162	0	0	3600.0	794.515215543...	29.8567051097...	442.9929689	798.689639875	
1162	0	0	3600.0	-1.8477068030...	0.13469582080...	-2.050539077	-1.97908947675	
1162	0	10	3600.0	8370.29077752...	803.267896736...	0.0	8063.99737775	
1162	0	0	3600.0	547.584803738...	26.2078454982...	376.9629398	537.53636955	
1162	0	1	3600.0	43.2224496321...	16.4992697812...	25.17604865	25.1964433375	
1162	0	0	3600.0	39.1496431509...	16.1282440539...	24.79283688	24.81303756	
1162	0	0	3600.0	2334.04716919...	113.190014098...	1732.858754	2265.26894425	
1162	0	0	3600.0	9.78245528782...	0.53252012543...	7.743709801	9.520459667	
1162	0	0	3600.0	7.58186587209...	0.36442878130...	6.578536078	7.3552632615	
1162	0	0	3600.0	2.20058941570...	0.33476126510...	1.070777225	2.06685422499...	
1162	0	0	3600.0	22.9472266884...	1.68572083376...	9.547503507	22.268713725	
1162	0	7	3600.0	0.16214318137...	0.16916004078...	0.0	0.10511150500...	
1162	0	6	3600.0	0.16438442790...	0.15676312052...	0.0	0.10698170725	
1162	0	0	3600.0	5.86729627152...	1.29346719455...	-30.08977316	5.6247956025	

Sensor Health Check

Missing Values %	Duplicates %	Outliers	Isolation Forest Anom	One-Class SVM Anom	Robust Filter Anom	Cp	Cpk	K-S Statistic	K-S p-value	Skewness	
0.0	0.0	0	59	135	24	0.96	0.9	0.11704	0.00069	0.175	
0.0	0.52	432	59	44	9	5.54	2.49	0.57315	0.0	14.704	
0.0	0.0	70	59	117	29	1.29	0.66	0.1704	0.0	-1.386	
0.0	0.0	62	59	36	14	2.93	0.37	0.39415	0.0	-10.659	
0.0	0.0	39	59	128	6	2.12	0.7	0.30809	0.0	-3.781	
0.0	0.0	39	59	231	30	1.6	0.87	0.45095	0.0	-2.382	
0.0	0.0	217	58	39	15	2.11	0.29	0.61962	0.0	-6.326	
0.0	0.0	3	59	32	15	1.45	0.5	0.36833	0.0	0.322	
0.0	0.86	33	59	291	18	2.41	1.34	0.08778	0.0227	-3.137	
0.0	0.0	45	59	153	12	1.39	0.61	0.15491	0.0	-1.818	
0.0	0.09	0	59	38	15	0.43	0.36	0.51807	0.0	-0.115	
0.0	0.0	0	59	26	24	0.5	0.3	0.51291	0.0	0.278	
0.0	0.0	12	59	229	8	1.33	0.89	0.13081	9e-05	-0.881	
0.0	0.0	51	59	282	27	1.57	1.28	0.13253	7e-05	0.888	
0.0	0.0	25	59	273	31	1.58	0.92	0.19793	0.0	1.699	
0.0	0.0	88	59	112	11	1.67	1.12	0.15663	0.0	-0.587	

0.0	0.0	36	59	131	25	1.78	0.91	0.09466	0.01093	-1.642	
0.0	0.6	58	59	40	9	4.14	0.32	0.31842	0.0	15.506	
0.0	0.52	64	59	64	10	3.02	0.35	0.30981	0.0	11.277	
0.0	0.0	39	59	68	11	6.65	4.04	0.358	0.0	-16.884	

Feature Stability Analysis

Feature Name	CV	PSI	KS Test	KL Divergence	Outliers (%)	Rolling Mean S
MAGMA Melter/...	0.175	inf	0.952	0.415	0.09	Unstable
Gob Propertie...	0.159	inf	0.578	inf	0.69	Unstable
Simplified Ba...	0.172	0.896	0.143	0.438	1.38	Unstable
MAGMA Melter/...	0.029	inf	0.315	5.377	0.95	Unstable
MAGMA Melter/...	0.012	inf	0.361	0.624	1.55	Unstable
Glass Propert...	0.123	6.825	0.694	4.038	2.41	Unstable
MECS/Line Uti...	0.038	inf	0.212	0.058	2.75	Unstable
MAGMA Melter/...	-0.073	inf	0.917	inf	0.26	Unstable
MECS/Stack Fl...	0.096	inf	0.062	inf	0.6	Unstable
MECS/Line Uti...	0.048	inf	0.275	0.15	2.07	Unstable
MECS/Exhaust ...	0.382	inf	0.552	0.866	0.0	Unstable
MECS/Exhaust ...	0.412	inf	0.551	inf	0.0	Unstable
MAGMA Melter/...	0.048	inf	0.518	inf	0.6	Unstable
Water_Cooling	0.054	1.559	0.117	0.763	1.46	Unstable
Circuit_Q	0.048	0.736	0.231	0.313	1.2	Unstable
Burner_Q	0.152	inf	0.225	1.316	0.52	Unstable
MAGMA Melter/...	0.073	inf	0.119	0.425	1.55	Unstable
Gob Propertie...	1.043	inf	0.341	1.272	0.43	Unstable
Gob Propertie...	0.953	inf	0.348	0.897	0.43	Unstable
Energy per ton	0.22	inf	0.284	inf	0.52	Stable

Model Stability Summary

Mean MAE	MAE Variance	Mean MSE
0.31036023571...	7.70011801961...	7.45784305776...

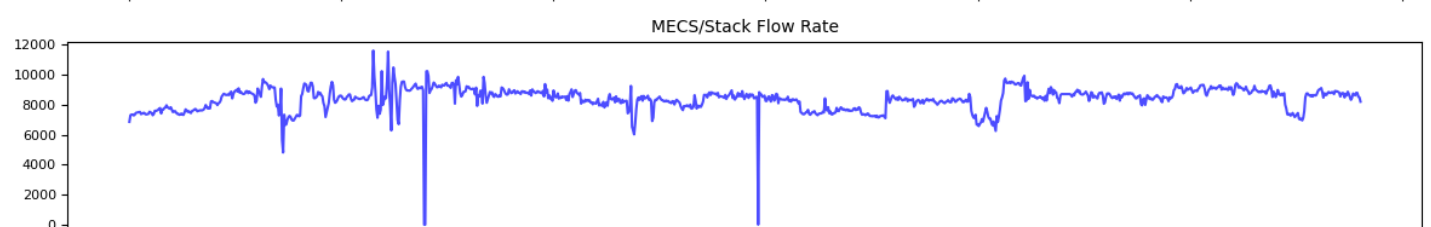
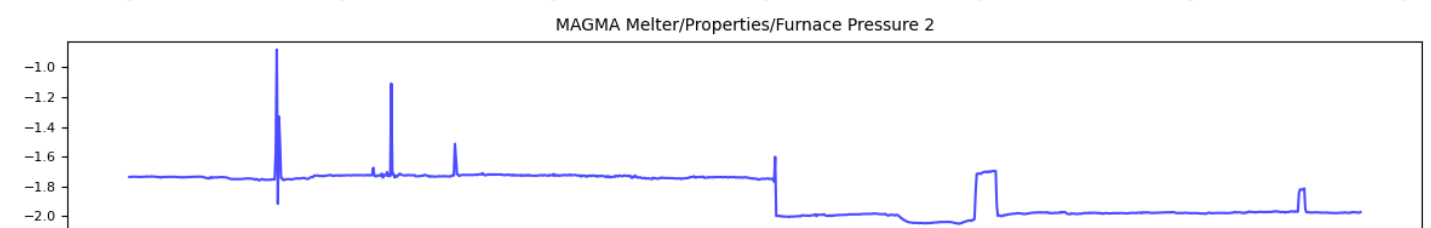
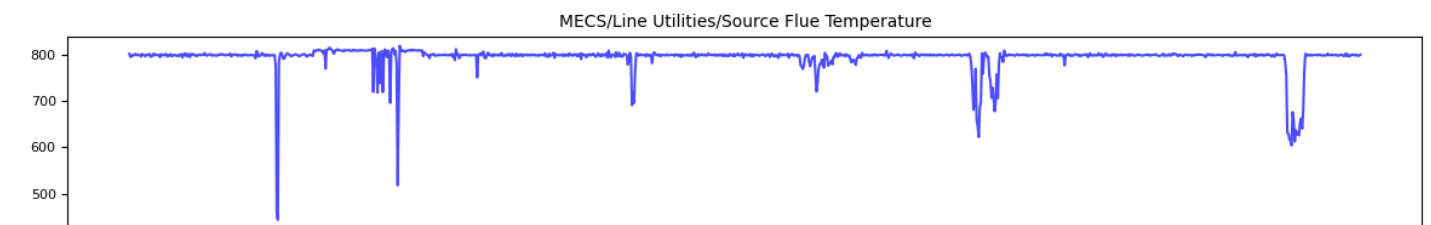
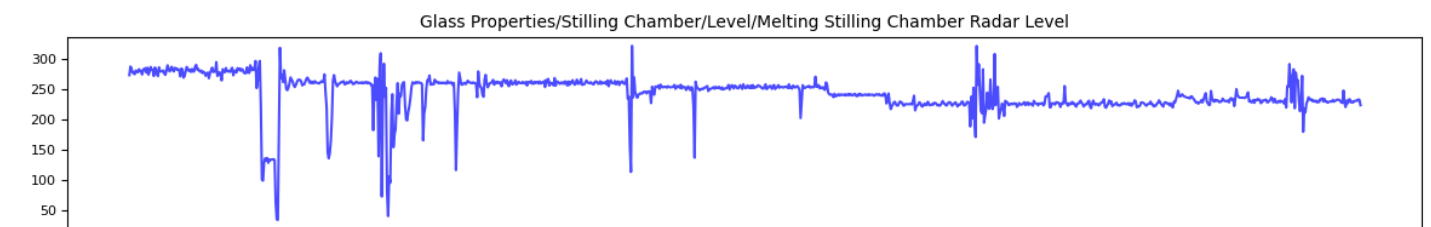
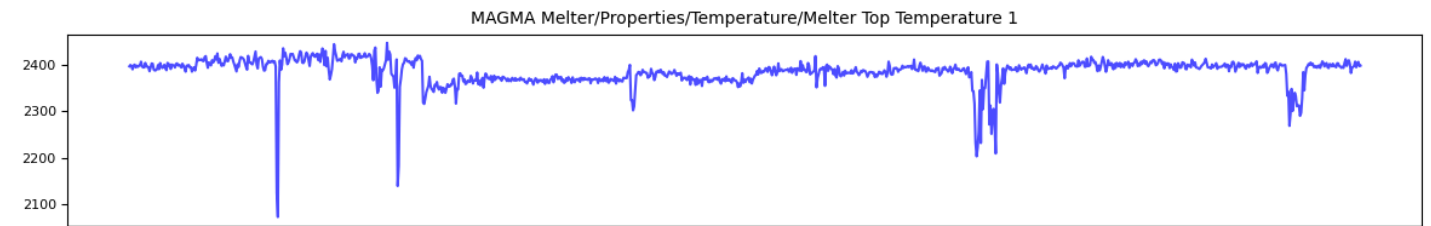
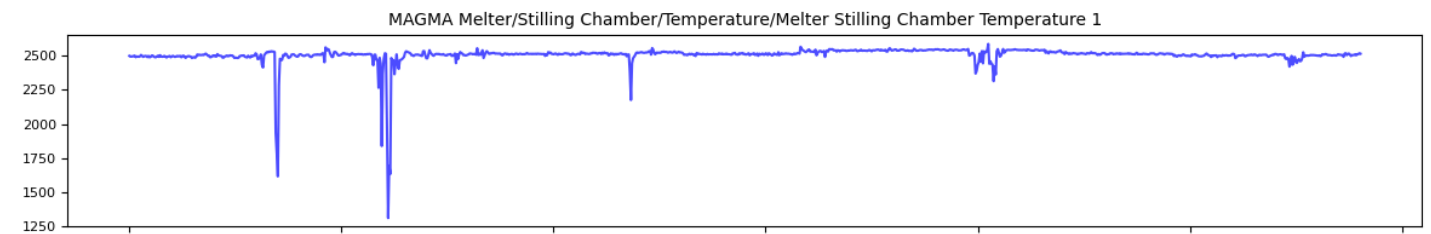
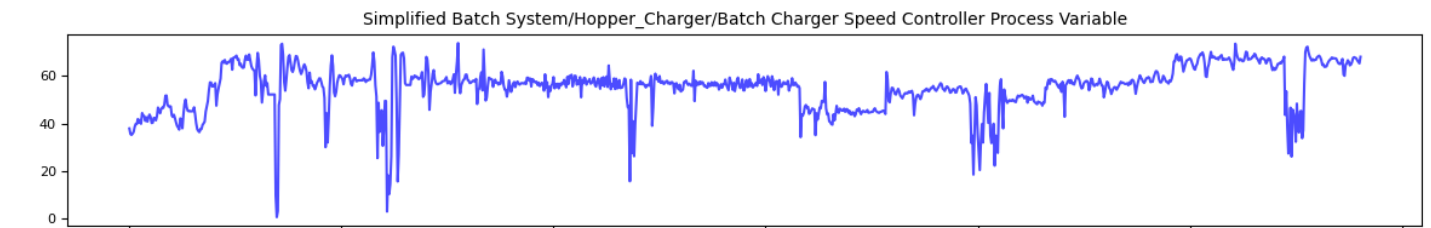
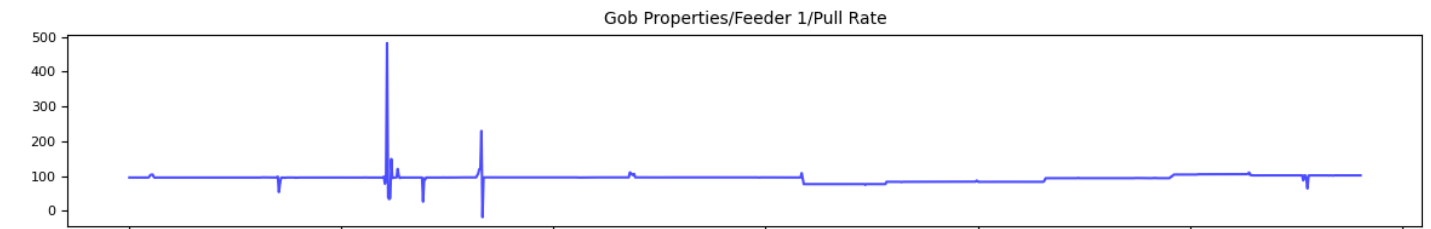
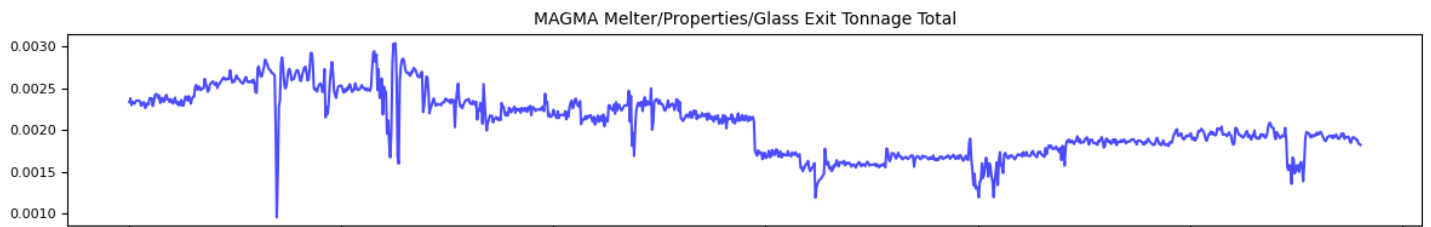
Cluster Summary

MAGMA Melter/...	Gob Properties	Simplified Ba...	MAGMA Melter/...	MAGMA Melter/...	Gob Properties	MECS/Line Uti...	MAGMA Melter/...	MECS/Stack Fl...	MECS/Line Uti...	MECS/Exhaust ...	MECS/Exhaust ...	MAGMA Melter/...	Water_Cooling	Circuit_Q
0.0	96.52	57.41	2511.37	2378.43	253.64	801.48	-1.75	8609.33	554.71	25.19	57.87	2402.65	9.66	7.52
0.0	83.19	48.29	2514.84	2386.97	219.45	795.13	-1.96	8147.44	541.15	48.79	32.5	2379.75	10.36	8.09
0.0	97.63	52.17	2492.28	2402.11	272.9	798.29	-1.73	7789.96	525.95	54.09	26.72	2313.83	9.85	7.39
0.0	98.83	62.19	2509.61	2398.85	229.25	799.41	-1.97	8723.16	565.99	59.12	25.39	2221.36	9.48	7.37
0.0	94.34	33.89	2412.23	2283.46	240.74	655.55	-1.8	7028.77	465.69	44.28	28.22	2184.24	9.34	7.32

Missing Timestamps

Column	Missing
N/A	Unsup

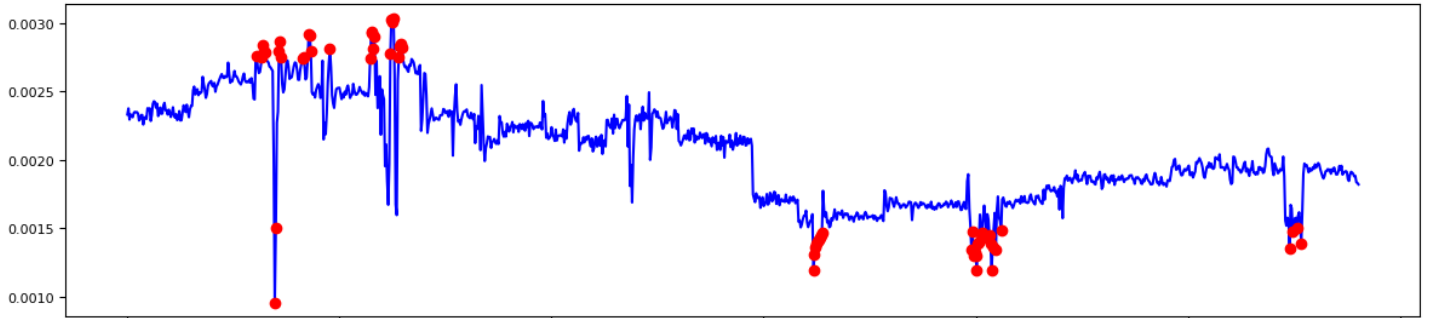
Time Series Plot



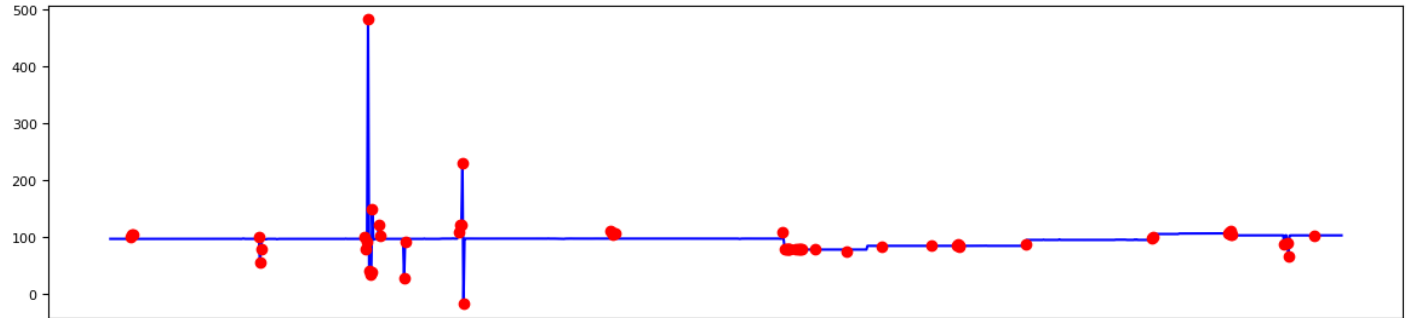
MECS/Line Utilities/Exhaust System Inlet Duct Temperature

Anomaly Detection Plot

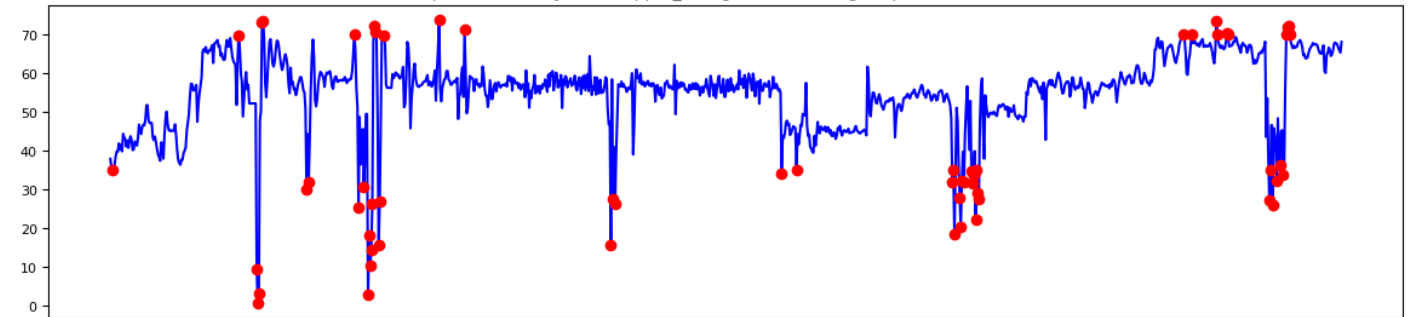
Anomalies in MAGMA Melter/Properties/Glass Exit Tonnage Total



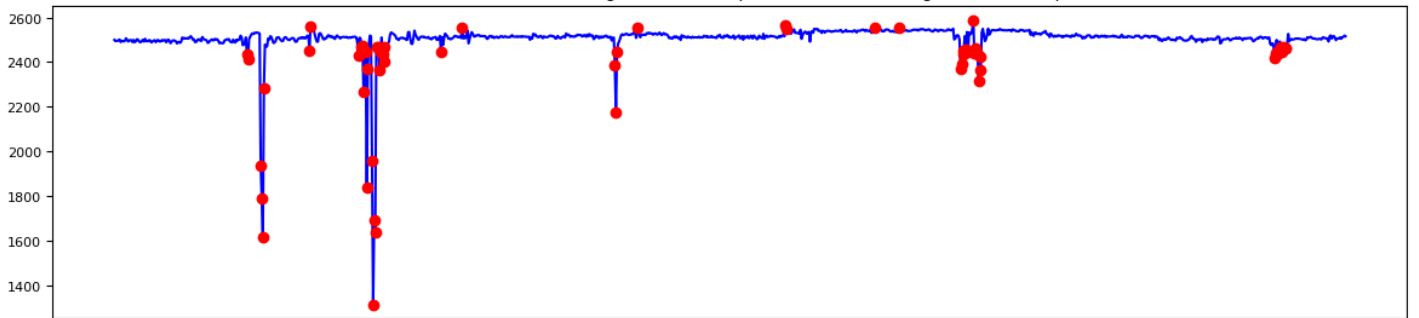
Anomalies in Gob Properties/Feeder 1/Pull Rate



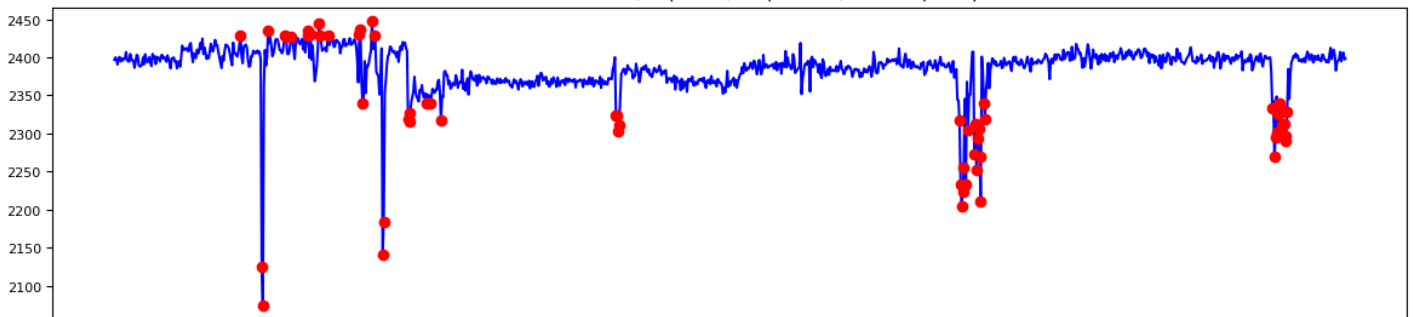
Anomalies in Simplified Batch System/Hopper_Charger/Batch Charger Speed Controller Process Variable



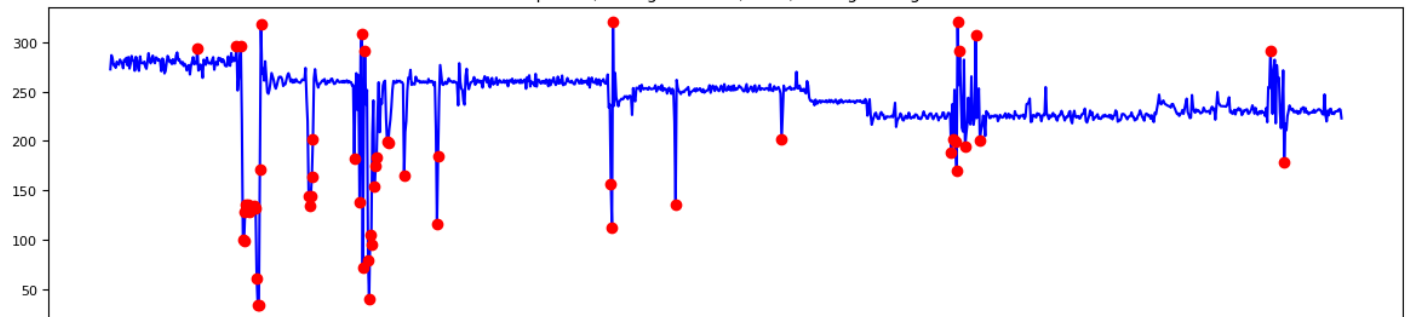
Anomalies in MAGMA Melter/Stilling Chamber/Temperature/Melter Stilling Chamber Temperature 1



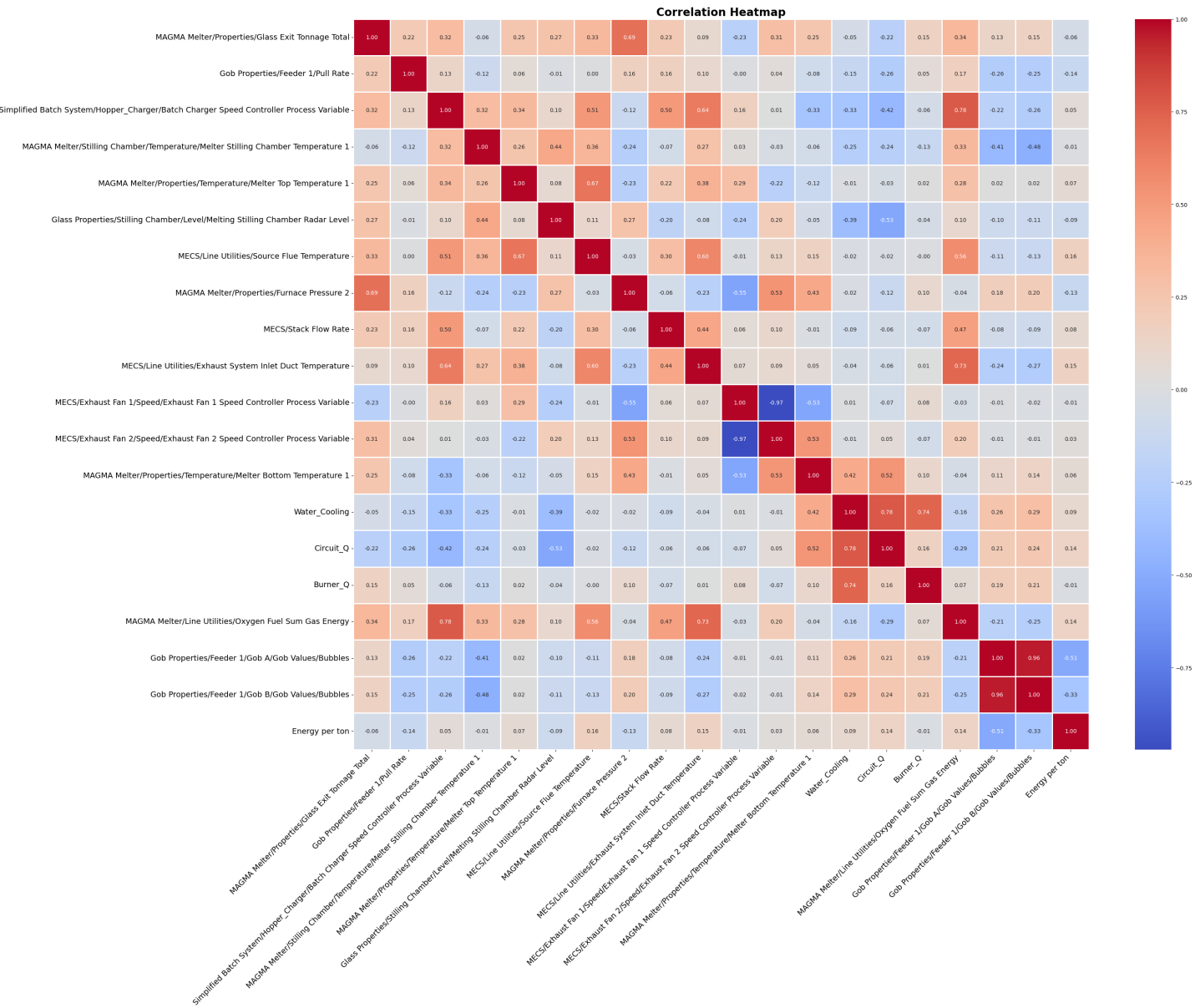
Anomalies in MAGMA Melter/Properties/Temperature/Melter Top Temperature 1



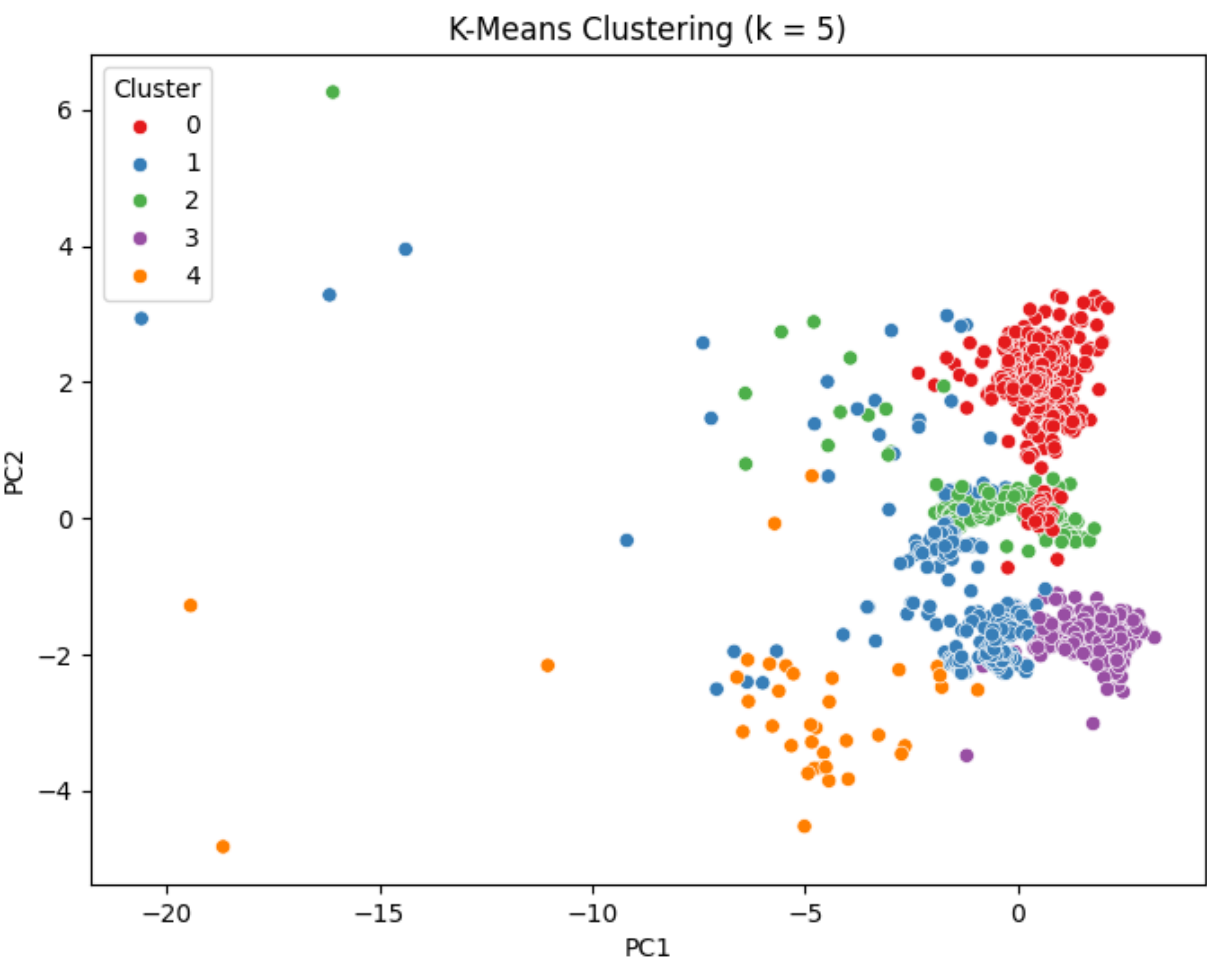
Anomalies in Glass Properties/Stilling Chamber/Level/Melting Stilling Chamber Radar Level



Correlation Heatmap



Cluster PCA Plot



K-Selection Plot

